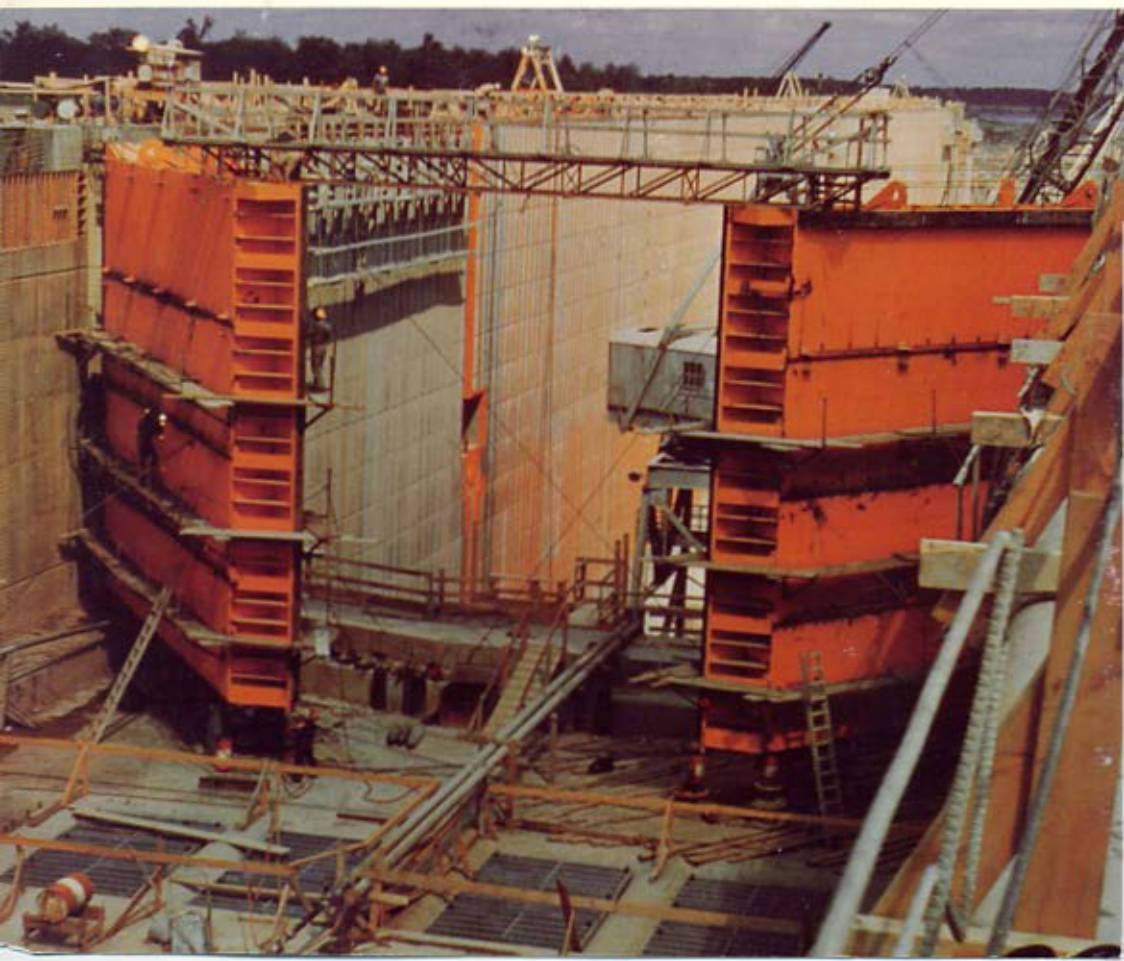


From the Atlantic to the Great Lakes

A History of the
U.S. Army Corps of Engineers
and the St. Lawrence Seaway

William H. Becker



On the Cover

Snell Lock under construction, August 1957.

FROM THE ATLANTIC TO THE GREAT LAKES

A History of the U.S. Army Corps of Engineers and the St. Lawrence Seaway

by

William H. Becker

**Historical Division
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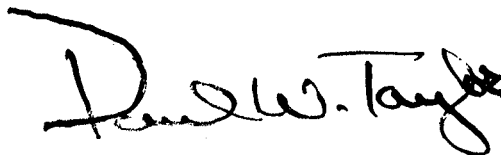
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Foreword

The U.S. Army Corps of Engineers planned and supervised the construction of the United States' section of the St. Lawrence Seaway. The project was both a massive engineering effort and an unusually complicated exercise in intergovernmental cooperation. Local, state, and federal agencies shared a concern with finishing the project as quickly and competently as possible. However, inevitably disagreements occurred over timetables, budgets, and priorities. There was also the general concern with meeting our commitment to Canada, which had assumed the responsibility for constructing most of the Seaway.

This history is an analysis of the planning and engineering effort of the Corps of Engineers on the Seaway project. More than that, the author addresses the various political issues that often influenced the engineers. Because of the scale of operations, the large number of governmental bodies involved, and the even greater number of contractors and subcontractors, the story of the construction of the St. Lawrence Seaway offers significant insights into problems facing federal engineers in developing huge international projects.



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Preface

The Corps of Engineers played a major part in the planning, design, and construction of the St. Lawrence Seaway, an international power and navigation project. Improvements for navigation required building two American and four Canadian locks, constructing ship channels in the International Rapids and the Lachine (Montreal) sections of the river, and extensive dredging in the St. Lawrence. The power works, a joint effort of New York State and Ontario, called for a powerhouse across the north channel of the St. Lawrence River and the construction of a powerhouse spillway dam, the Long Sault Dam. A control dam crossed the river in the vicinity of Iroquois Point to regulate the outflow of Lake Ontario. These navigation and power improvements required an extensive system of dikes and the relocation of towns, roads, railroads, bridges, and power lines.

By the time the Seaway officially opened on 26 June 1959, the United States had spent \$131 million, Canada \$340 million, and New York and Ontario each \$300 million. In one sense, the St. Lawrence Seaway's most striking aspect is its formidable engineering achievement, requiring the coordinated design and building of numerous features: locks, canals, bridges, channels, and the like. Yet, as important as the engineering were the managerial achievements of coordinating such a complex project. The Corps was the construction agent for the St. Lawrence Seaway Development Corporation, a public entity created by Congress in 1954 to oversee the American part of the improvements in navigation. Canadian navigation improvements were the responsibility of the St. Lawrence Seaway Authority, which worked closely with the Corporation. Creating the hydroelectric works was the joint responsibility of the power authorities of the State of New York and the Province of Ontario.

Completing the St. Lawrence Seaway fulfilled the dreams of many residents and businessmen in the Great Lakes area. It vindicated the work of many others who had actively supported the project from the 1920s. Nevertheless, the Seaway had been controversial. Many had seen it as a threat to their particular interests and had opposed it vigorously for decades. Railroads serving the Great Lakes area had feared a loss of traffic to a waterway that would directly connect Lakes ports to the Atlantic. For similar reasons, businessmen engaged in the business of New Orleans and East Coast ports opposed the Seaway project. They too feared the Seaway's competition. Also in opposition were private power companies who objected to public sponsorship of projects for the generation of power.

Support for the joint power-navigation project coalesced formally into the Great Lakes-St. Lawrence Association in the 1920s. This group led the political battle throughout the 1930s and 1940s. Continued delays in gaining congressional approval led New York to apply to the Federal Power Commission in 1949 for separate approval of a joint New York-Ontario power works. Approval finally came in 1953. Nevertheless opponents continued to oppose federal legislation authorizing improvements in navigation. Congress

finally authorized the project in May 1954, but only after Parliament had created the St. Lawrence Seaway Authority to construct the navigation project entirely within Canadian territory. Railroads and East Coast port interests continued to object to what they saw as an unfair subsidy to Great Lakes port interests. To placate opponents Congress mandated that the Seaway pay for itself through tolls. These fees were to be used to retire a bonded debt to the United States Treasury.

The Seaway's troubled political history profoundly affected the nature of the Corps of Engineers' involvement in the project. From the 1920s, the Corps thought it would have responsibility for the project. As it turned out, the Engineers' role was unlike its assignment in most other civil works projects. The differences resulted from the international nature of the project, the divided federal-state responsibility for the power and navigation works, the heated political opposition that continued even after congressional approval of the Seaway, and the need to work as the agent of a public corporation, the St. Lawrence Seaway Development Corporation. The Corps also had to work closely with the Power Authority of the State of New York, which with the Hydro-Electric Power Commission of Ontario had responsibility for building the power project. Constructing the Seaway, therefore, posed unique organizational problems for the Corps. Introduced into the Corps' routine determination of costs, drawing of plans, and consideration of engineering issues was the need to satisfy the state and federal organizational interests, as well as the Canadian agencies building their part of the project.

Throughout the project tension was created by differences between the Engineers' traditional procedures and the need to accommodate the interests and responsibilities of these other agencies. As the agent of the Development Corporation, that body's needs had the greatest impact on the Corps. Congress mandated to the Corporation three major areas of responsibility. First, it had the primary duty of coordinating the Seaway project with its counterpart, the St. Lawrence Seaway Authority. Second, it had the financial responsibility of setting tolls at a level that would raise the revenue needed to retire the Treasury bonds used to finance the project. Third, it had to coordinate the American role in the navigation project with the power authorities of New York and Ontario.

Further complicating the project for the Engineers was the continued intrusion of partisan politics and public opinion. Approval of the Seaway in 1954 did little to reduce the fervor of the project's congressional adversaries, and the Corps occasionally found itself the target of opponents who criticized every reestimate of costs or request for increased budgets.

Supporters of the project also proved troublesome at times. In the Great Lakes area, the project received constant press and television coverage. Delays and disputes among those building the Seaway received quick public attention. On such a visible but complex undertaking it was easy to receive unfavorable publicity, even from those who in the normal course of events favored the project and approved of the Corps' role in it.

While the project was of great importance to the Great Lakes area, it was also significant to the Corps at the time the project received congressional approval. The Engineers had been involved in technical discussions of the

Seaway since the 1920s. Corps studies, especially the detailed plans drawn up in the 1940s, formed the basis for the project that was ultimately completed in 1959. Many Corps officials were fully committed to the project, and some had literally been involved with the St. Lawrence Seaway for all of their careers.

But the Seaway was important to the Engineers for other reasons. Congress approved the project at a time of troubling change and uncertainty over the Corps' future. In the late 1940s the United States military services had been consolidated. One result of this unification had been an Air Force challenge to the Corps' responsibility for military construction. While the Engineers, as it turned out, kept many of its traditional responsibilities for military construction, Corps officials had worried about an erosion of the Engineers' mission in military construction. With regard to civil works projects, the advent of a new Republican administration for the first time in 20 years had clouded the Engineers' future role on such projects too. President Eisenhower had committed himself in the 1952 election campaign to reduce government spending. Civil works projects comprised only one of many categories that came under close review by the new administration and its budget officials. In this context, the Seaway took on great importance. Congress' creation of a public corporation with overall responsibility for the Seaway seemed, for a time, to presage the shape of future civil works projects. Certainly, the Eisenhower administration viewed the joint state-federal project as a way to save federal dollars, with New York State taking on the responsibility with Ontario for the construction of the power works. Chief of Engineers Samuel D. Sturgis thought that the Corps had to do an exemplary job to ensure that it would be given future assignments with public corporations. As it turned out, these public self-financing agencies were not the route later taken for civil works projects.

In any event, the Seaway project was perhaps the first important example of the more complicated political and bureaucratic environment in which the Corps was to work in the future. Indeed, the Corps found itself in a "negotiated" environment. That is, the Corps had to develop the bureaucratic means of dealing with a number of agencies, while keeping as intact as possible traditional procedures of design, contracting, and inspection. The project was the first of many which would require the Engineers to collaborate fully with multiple federal and state agencies, a mode of operation that was to become more common with the growing federal interest in environmental issues.

The scope of the Corps' role in the project was determined in part by its long involvement in the development of the St. Lawrence; in part by events and political relationships and controversies in the United States and Canada; and in part by the engineering issues involved in and the organizational structure devised for the successful completion of the project. Based on extensive research in the published and archival sources of the Corps, Congress, and the Bureau of the Budget, this study covers each of these determinants, then provides an assessment of the effectiveness of the Seaway. Unfortunately, a fire at the Corporation's Massena office prevented use of that organization's records. To be sure, the circumstances surrounding the Seaway project will not repeat

themselves. But a careful analysis of the complex interaction between the Corps and the other agencies it had to deal with provides some important lessons.

The Corps' work in the project was to be in the so-called International Rapids section of the St. Lawrence River, with dredging and channel enlargement in the Thousand Islands section. The International Rapids section is approximately the 46 miles between Chimney Point and St. Regis. The section below St. Regis was commonly referred to as the "Canadian Section." The United States project was made up of work in three major areas: Long Sault Canal; the channel south of Cornwall Island; and the Thousand Islands section.

The most complicated part of the project for the Corps was the Long Sault canal section, later called the Wiley-Dondero Ship Channel. Work in this area required close collaboration with the American and Canadian power companies because the resultant power pool would affect Corps navigation improvements. Within the Long Sault canal section, the Corps was to construct the Robinson Bay Lock, later renamed Eisenhower Lock, and the Grass River Lock, later renamed the Bertrand H. Snell Lock, and the intermediate pool between the locks and their dikes. The Corps was also to be responsible for dredging the channel south of Cornwall Island, the entrance to the canal below Grass River Lock. This dredging proved to be involved. Extensive model tests were required to determine the extent of work necessary to ensure conditions of suitable flow. The dredging also depended on railroad and highway relocations which were part of the work on the Long Sault Canal. It also had to await the removal of a railroad bridge, the Roosevelt Bridge, connecting the mainland to Cornwall Island, a project that turned out to be organizationally and politically difficult, to say nothing of the engineering problems involved.

Dredging the Thousand Islands section, compared to these other projects, was a minor task. Work included channel enlargement in two reaches and sweeping to 27 feet a 21-mile reach from Tibbetts Point (Lake Ontario) to Clayton, New York. The first stage of the channel enlargement was in a 12-mile reach stretching from Clayton to one mile below Alexandria Bay. This involved removing ledge rock and overburden located in 33 shoals. The second-stage channel enlargement was in a 12-mile reach from about one mile below Alexandria Bay to Oak Point. It involved the removal of rock in 20 shoals. Below this reach to Chimney Point, primarily in Canadian waters, the Corps conducted a hydrographic survey. The drawings based on these survey findings were furnished to the Canadian Seaway Authority, which took responsibility for these improvements.

Essentially, the navigation improvements circumvented the rapids that had been the bane of earlier ship pilots. In addition, the improvements circumvented the 80-foot drop that was to be created in the power pool for the generation of power.

North of Massena, New York, several large islands (Croil, Long Sault, and Barnhart) divide the river into two main channels. Currents in these narrow channels were swift. Indeed on either side of Long Sault Island were the

infamous Long Sault Rapids. At the downstream end of Barnhart Island, the Power Authority of the State of New York and the Hydro-Electric Power Commission of Ontario were to build a dam and powerhouse between the island and the Canadian shoreline. At the other end of the island, a dam was to connect the United States mainland to the island. This dam would be just below Long Sault Island. Thus, these dams and powerhouses, along with Barnhart Island itself, were to stretch across the entire width of the river. Behind this barrier was to be the power pool that eventually was to provide for the generation of electricity. The Long Sault Canal was designed to move ships around the dams and powerhouse, while raising them from the pools below the dams to the power pool above. This passage was to be through a ten-mile canal in which the two major American-made locks were to be located. The ship channel was to begin south of Croil Island, northwest of Massena, and end near the mouth of Grass River.

The Canadian St. Lawrence Seaway Authority took responsibility for a short canal which bypassed the Iroquois Control Dam; within this canal the Canadians constructed the Iroquois lock. In addition the Canadians were to add two locks, Upper and Lower Beauharnois, to the Beauharnois Canal. This 16-mile canal had been built in 1928 by the Beauharnois Light, Heat and Power Company. One of the most demanding tasks for the Canadians was the construction of a 20-mile canal which included the Cote Ste. Catherine and St. Lambert Locks to bypass the Lachine Rapids near Montreal. The Canadian part of the project also included extensive dredging in Lakes St. Francis and St. Louis and deepening the Welland Ship Canal between Lakes Ontario and Erie to 27 feet.

The United States originally planned to build a canal and lock at Point Rockway to provide shipping around Iroquois Dam. In view of Canada's plans to construct the Iroquois Canal and Lock on their side, the St. Lawrence Seaway Development Corporation cancelled this plan since the project would have duplicated the Canadian effort.

All in all, the Seaway completed in 1959 represented the culmination of almost 50 years of active lobbying. The project had provoked intense political debate in both the United States and Canada. Yet, the interest in the twentieth century had been matched by sustained efforts in the century before to improve navigation on the St. Lawrence. It is to this background that we turn in the first chapter, for the completed project was very much the product of the aspirations of earlier American and Canadian shippers and traders who first envisioned the magnificent possibilities of the St. Lawrence.

I would like to thank Dr. John T. Greenwood, Chief, Historical Division, Office of the Chief of Engineers, and his historian colleagues for the friendly assistance they gave me in writing this history. In particular, I appreciated the tough-minded, but good humored guidance of Dr. Martin Reuss, who oversaw this project, and the helpful spirit of Dr. Martin Gordon, who made available the Corps' voluminous records on the St. Lawrence Seaway.

William H. Becker

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Chapter I

THE ST. LAWRENCE AND THE CORPS OF ENGINEERS

Early Navigation on the St. Lawrence

Europeans first travelled the St. Lawrence in the 16th century. Cartographers then believed that a waterway existed that would provide a navigable westward route to China and India. The English and the French showed the greatest interest in the route to the East, barred as they were by Spanish and Portuguese naval power from southern routes. In 1535 Jacques Cartier sailed into the St. Lawrence on a voyage commissioned by Francis I of France. He was looking for gold, as well as the northwest passage to China and India. During this trip he sailed a thousand miles only to be stopped by the La Chine, now Lachine, Rapids. Although Cartier never returned, he opened the river and its tributaries to trade in fish and furs. At the beginning of the next century Samuel de Champlain moved farther inland. He travelled to Georgian Bay, connected to Lake Huron, and eventually to Lake Ontario. These explorations gave him an inkling of the connection between the St. Lawrence River and the Great Lakes. Later in the 17th century, Robert Cavalier de LaSalle opened up the other Great Lakes to the French fur trade. LaSalle's later explorations to the mouth of the Mississippi helped provide the French with the wherewithal to maintain an empire in the new world. The St. Lawrence thus played a part in French attempts to expand and then maintain its empire in the new world. French military and commercial outposts along the St. Lawrence and the Great Lakes gave them control of the fur trade.¹

By the last third of the 18th century, the substantial trade in furs, fish, and military supplies led to calls for the building of canals to bypass some of the dangerous rapids in the St. Lawrence River. Interest in such canals goes back to 1680, although early efforts generally failed for lack of funds. Success finally occurred after 1778. In that year the governor of Quebec, Frederick Haldimand, proposed a series of locks and canals between Montreal and Lake St. Francis. Work began in 1779, and within a year a canal system opened with three locks. It was the first lock canal in North America, with a total length of 900 feet. The three locks were 40 feet long, 7 feet wide and 2.5 feet deep, allowing passage only to the shallow boats commonly used in the fur trade at the time.²

In the 19th century these modest successes encouraged grander plans. Both Canada and the United States expanded economically. By 1800 settlers had moved into the upper St. Lawrence Valley and southern Ontario, as well into the Ohio Valley. Supplies to and, later, exports from this region were difficult to move because of the rapids in the river. The river's potential became clearer with the introduction of steam-powered craft. In 1809 the first

steamship went into service on the lower St. Lawrence, cutting to three days the 15-day sailing time from Montreal to Quebec. In 1818 steamboat service appeared on the Great Lakes between Kingston and Prescott. Steam power improved to a point that by 1833 some of these craft negotiated the least violent of the rapids. As a rule, however, transshipment was still necessary.³

Increasing settlement and higher levels of trade made the river's hindrances more and more troubling to farmers and merchants. The economic growth of southern Ontario and the Middle West enhanced the importance of the St. Lawrence as the shortest route between the North American interior and Europe. Growing trade in agricultural and forestry products sharpened the need for improved transportation. This need, however, was satisfied by the Erie Canal, which served both as a hindrance and a model to advocates of improving the St. Lawrence.

Begun in 1817 the canal proved an enormous success even before its entire 363 miles were completed. Its \$7 million cost seemed entirely justified because of the prosperity it brought to the towns and cities along its route and because of the significant reduction in transportation costs. The canal connected Albany and Buffalo, following the Mohawk River valley from the Hudson River, and cutting overland to Lake Erie. The canal became the primary source for shipping grain east. Connected ultimately to the port of New York, the canal provided access to a port that in contrast to Montreal and Quebec was open almost all of the year.⁴

The success of the Erie Canal created a canal boom in the United States. Merchants in Montreal were equally impressed with its achievements and benefits and used its success to press for further canal work along the St. Lawrence. They thought that Montreal could benefit just as New York City had. Steps already had been taken by the time the Erie Canal opened. The War of 1812 demonstrated the importance of communication for military defense. Lower Canada approved a canal at the Lachine Rapids. Initially, nothing came of this effort, but three years later, in 1818, a joint committee of representatives from Upper and Lower Canada recommended building canals on the St. Lawrence west of Montreal. In any event, Lower Canada began work on a canal between Lachine and Montreal in 1821 and the first Lachine Canal, with its seven locks, opened in 1825.

Other canal projects were also affected. As early as 1798 traders had suggested a canal to bypass Niagara Falls. Work on that project, however, was not begun until 1824, and, although private investors were responsible for beginning the first project to circumvent the falls, the Welland Canal was finally completed only in 1829 after the Imperial government made land grants to the canal company and the government of Upper Canada made loans.⁵

The 1830s brought the construction of other canals along the St. Lawrence route as well as the founding of the first of the St. Lawrence lobbies, the Association for the Improvement of the St. Lawrence. It was only one of the many groups that would espouse the advantage of a ship canal along the St. Lawrence. In 1841, the year after the union of Upper and Lower Canada created one province in the Great Lakes-St. Lawrence region, the lobbyists

succeeded in getting a commitment for the building of a series of canals and the deepening of existing facilities to nine feet. By 1855, when the State of Michigan opened a canal around St. Marys Falls, ships drawing eight feet of water could sail all the way into Lake Superior.⁶

These canals, however, enjoyed limited success. For one thing, they had cost \$20 million in public and private funding—a large sum for a country with a population, in 1850, of only two million. For another, railroad construction competed for available capital, and when the lines were completed, for traffic. Canada underwrote the Grand Trunk Railway, constructed between 1852 and 1863. It went from Chicago through Toronto and Montreal to Portland, Maine, and competed directly with the St. Lawrence canals for business. The canals ended up with the bulk grain and coal cargoes, while the railroads took the more profitable commodities, especially manufactured products. By the last third of the century, the railroads had even begun to make inroads into the canals' handling of bulk cargoes.⁷

In 1867 the passage of the British North America Act, based on the carefully wrought Quebec Resolutions, brought about the confederation of the united province of Canada and the provinces of Nova Scotia and New Brunswick. The new federal government wished to protect western agricultural as well as eastern mercantile and shipping interests, and, at the same time, gain general popular support by countering American route and carrier competition. The Dominion's leaders, however, soon faced problems similar to those facing the American government, and their efforts were slowed by economic and political pressures, particularly the need for a comprehensive transportation policy.

As indicated above, the St. Lawrence canals had begun to feel the effects of railroad competition even before confederation. In the 1850s the railroads had complemented canal service; by the next decade they had clearly captured a portion of the east-west trade. Rail transport was faster than shipment via the canals, and trains could operate in the winter. The growing size of ships on the upper lakes also hurt St. Lawrence traffic, especially as there had been no enlargement of the Welland Canal which connected Lake Erie to Lake Ontario and the St. Lawrence. Canadian and American Great Lakes merchants saw improvements in the St. Lawrence as obvious. But political leaders had other considerations. One counterproposal was a canal between Montreal and Georgian Bay. This route, its advocates maintained, would be important to Canadian defense, allowing the government to better protect the Lakes. But this and other alternative proposals to improve the movement of goods from west to east were very costly; the cheapest solution was to improve the Welland and St. Lawrence canals and to build a canal at Sault Ste. Marie. Parliament accepted that solution in 1872, based as it was on an 1871 report by a royal commission appointed at the behest of the Minister of Public Works.⁸

The federal government, however, did not place a very high priority on these works. They were delayed at times for lack of revenue, but more often because the government faced more pressing issues: the financing of a trans-continental railway, formulation of a western lands policy, and negotiation of

a reciprocal tariff treaty with the United States. Nevertheless, by the 1880s, increasing trade had again brought attention to the deficiencies of the Welland Canal. Dissatisfaction with what farmers and merchants saw as discriminatory practices by railroads also increased the political pressure to improve the St. Lawrence canals. Piecemeal, the government began asking for increased appropriations to upgrade the canal system. Gradually, through the late 1880s and 1890s, the work progressed despite delays due to politics and economics. It was interrupted by a nasty political battle over whether the Beauharnois Canal on the south side of the St. Lawrence should be enlarged or a new canal should be built on the northern side. Technical considerations gave added weight to the argument for the latter, and the Soulanges was approved in 1891. Depression in the 1890s caused further delays, but work resumed in 1896. The Soulanges was completed in 1899, the Cornwall in 1900, the Lachine in 1901, and the Williamsburg in 1904.⁹

The government thus completed its program to deepen the St. Lawrence canals to 14 feet. But, by that time, the new canal system was becoming outdated. Ship technology had advanced to such a point that a 14-foot depth no longer accommodated the majority of ocean-going ships. And, as always, by comparison shipment through the canal system was slow. There were only 41 miles of canals, but the system needed 22 locks to lift vessels the required elevation of 209 feet. At the same time, increased traffic on the Great Lakes heightened awareness of the inadequacies of the St. Lawrence canals. And, after 1914, the Panama Canal provided additional, and significant, competition; prairie grain could be economically shipped from Vancouver to Europe. The St. Lawrence canals satisfied neither the growing needs of Great Lakes commerce, nor the increasing demands of western Canada—Midwest merchants turned to the railroads, and the profitable business of western Canada looked south to the Panama Canal. Those needs affected both Canadian and American businessmen in the Great Lakes area and ultimately raised the kind of public interest that led to plans for comprehensive projects on the St. Lawrence.¹⁰

The United States and the St. Lawrence

American interest in the St. Lawrence did not approach Canadian concern until late in the 19th century. The St. Lawrence River, after all, was almost entirely in Canadian territory. Even so, the river and its potential increasingly figured in the thoughts of American farmers, merchants, and industrialists. Increased attention led to the studies and commissions that eventually brought about closer collaboration between Canada and the United States in developing the St. Lawrence.

Americans first became interested in the river as part of efforts to improve transport on the Great Lakes. As long as the population in the region remained sparse, neither Congress nor most Presidents were willing to seriously consider coordinated improvements in connecting the Great Lakes. The most pressing problems were the shallow channels of the St. Clair Flats which connected Lakes Erie and Huron and the St. Marys Falls which hindered traf-

fic between Lakes Huron and Superior. As the population increased, the federal government came under growing pressure to take part in improving Lakes navigation.¹¹

The Army Corps of Topographical Engineers, a separate engineering corps from 1838 to 1863 when it was reunited with the Corps of Engineers, became involved in the efforts to improve Great Lakes navigation in 1841. That year the Chief of Topographical Engineers, Colonel John J. Abert, began to recommend that harbors and channels in the Great Lakes region be improved. Included in his annual reports, the recommendations were accompanied by detailed analyses of conditions that would make improvements feasible.¹²

To act on the proposals would have cost considerable sums of money. And, in any event, many of the Presidents in the two decades before the Civil War seriously questioned the authority of the federal government to carry out "internal improvements." For most of those years, the Democrats were in power and, as a rule, they opposed the idea of federal support of internal improvements. Whig politicians generally took a "looser" constitutional view of the issue, supporting federal assistance to internal improvements. The Whigs, however, held the presidency for only eight years during that period, and for over three of those eight years John Tyler held office. Succeeding the brief administration of William Henry Harrison, Tyler was in fact a Democrat who opposed the broadly-conceived constitutional views of Whigs on the role of the federal government in helping bring about economic development. Democrats dominated the debate, arguing as James Polk said that "to regulate commerce does not mean to make a road, or dig a canal, or clear out a river, or deepen a harbor."¹³

Such views led to organized political lobbying in behalf of improved navigation in the Great Lakes region. Lakes port interests in particular argued that only the federal government could coordinate among the states and provide the resources necessary to improve navigation in the area. On constitutional grounds, these groups justified action as protecting common interests, in which they included the development of interstate and foreign trade.¹⁴

The federal government's policy changed in 1850 with the inauguration of Whig Millard Fillmore, who came to office at the death of Zachary Taylor. Of the projects Fillmore approved, the most important was perhaps the granting of 750,000 acres of federal land to the State of Michigan to assist in financing construction of a canal around St. Marys Falls. Other legislation provided for improvements in the St. Clair Flats. In approving federal appropriations for improvements in the Great Lakes region, Fillmore was responding to economic change. There had been significant growth in Great Lakes commerce in the 1830s and 1840s. Traffic on the Lakes, negligible in 1820, reached nearly 55,000 tons in 1841, then almost tripled in the next decade. In 1845 commerce on the Lakes was valued at \$100 million, increasing to \$251 million in 1855. This growth was in good measure a result of the development of copper and iron ore mines in Michigan and Minnesota. To maintain that growth, however, Great Lakes shippers, in effect, supported two separate merchant marines, one on the upper and the other on the lower lakes. Defense

arguments also played a part in gaining improvements in the Great Lakes. Advocates of federal assistance made the case that opening links among the lakes would enhance naval defense.¹⁵

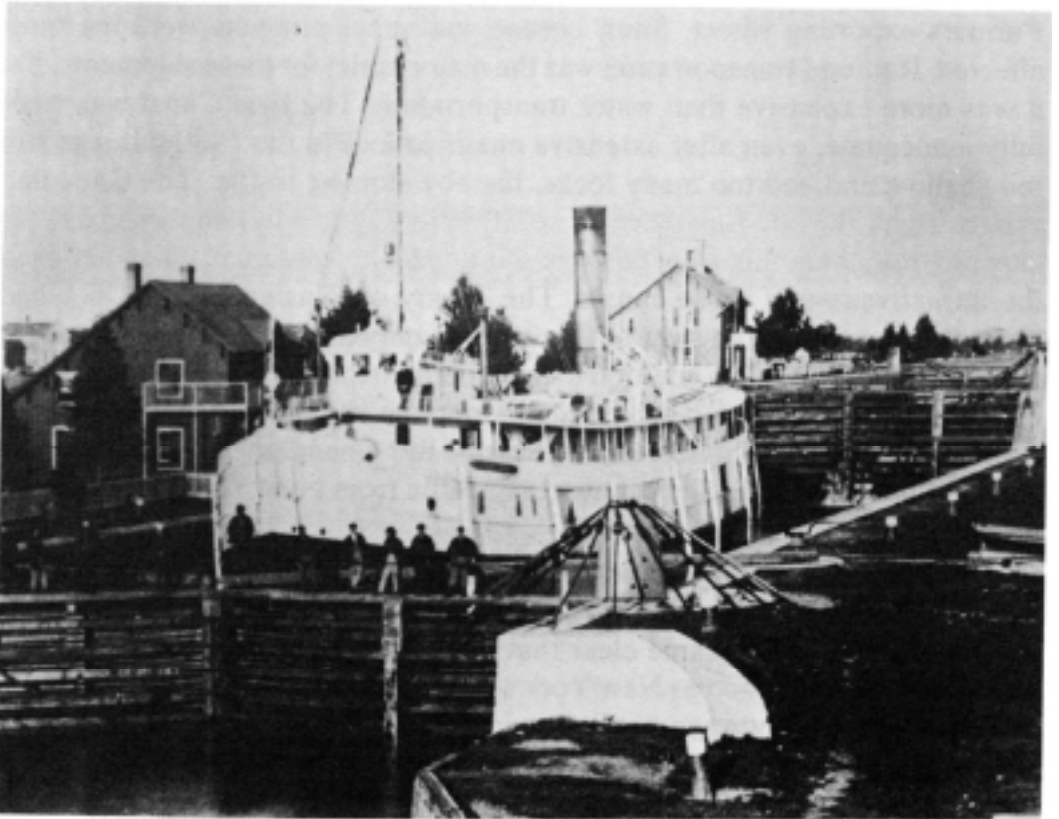
Fillmore's initiatives, however, were short-lived. His successor, Franklin Pierce, opposed internal improvements as had many of his Democratic predecessors. Yet his stubborn opposition prompted Great Lakes businessmen to organize a campaign for internal improvements. They gained the support of their state and federal legislators, and, in 1856, over the President's veto, Congress appropriated funds for dredging the connecting channels. This work was completed by the Civil War, but further projects were successfully vetoed by Democrat James Buchanan.¹⁶

The Civil War restimulated support for navigational improvements in the Great Lakes area. Fear of war with Great Britain lent credence to proposals to further improve the connecting channels. Military considerations prompted examinations of ways to improve American routes between the Midwest and the Atlantic. The Canadian canals on the St. Lawrence were, however, the focus of concern, since the British could use them to gain entrance to the Lakes. These arguments were not convincing. For one thing, the Rush-Bagot Agreement prohibited both the United States and Great Britain from placing war ships on the Lakes. Even so, the St. Lawrence canals would not accommodate most of Britain's warships. The debate, however, did underscore again the increasing economic importance of the Great Lakes. At the same time, it drew attention to the inadequacies of the Erie Canal which even though deepened to seven feet needed further work to meet the needs of new ships and increased commercial traffic from the Lakes ports.¹⁷

Wartime pressures on the Treasury, as well as traditional sectional jealousies, prevented approval of any grandiose plans to improve America's European trade. Congress, however, did realize the advantages of the St. Lawrence route. Despite the facts that it was almost entirely in Canada and that American shippers had to pay Canadian tolls through the Welland and St. Lawrence canals, the system was superior—and cheaper—to anything proposed by the American government. Bitterness toward Great Britain and Canada quickly ended after the Civil War, and American farmers and Great Lakes merchants again looked to the St. Lawrence route.¹⁸

The Corps and the St. Lawrence

Although initially opposed to United States participation in improvements in the St. Lawrence, a waterway substantially in Canadian territory, the Corps of Engineers did support improvements in the Great Lakes system. In 1870 the Chief of Engineers, Brigadier General Andrew A. Humphreys, supported local pleas for improvements in the St. Marys canal. Rapidly expanding trade and larger vessels had taxed the canal to its limit. At the least the old locks needed repair, and at best new ones should be built. Congress, in the same year, began appropriating funds to repair the old locks while work was begun on a new lock. Engineer Major Godfrey Weitzel supervised the



The old State Lock at Sault Ste. Marie. Lock tenders lived in the two houses beside the lock,

design and construction of a new canal and lock; construction began in 1876 and was completed in 1881. By that time, the State of Michigan had transferred the facility to the federal government. After only a short time in operation, it became clear that a larger lock was needed, and the Corps throughout the early 1880s recommended the new works. That project was begun in 1887 and completed in 1896. The pressure, however, remained as traffic on the Lakes had continued to increase, especially after the opening of the Mesabi iron ore mines in the early 1890s.¹⁹

The Corps involved itself in long-term improvements to other links among the Great Lakes. Dredging begun in the Detroit River in the late 1870s was completed in 1890. The St. Clair Flats were deepened between 1886 and 1892. In 1884, after five years of work, the Corps completed dredging the American channel of the St. Marys River. The Engineers also participated in the first comprehensive planning for the Great Lakes by advising Congress during the drafting of the River and Harbor Act of 1890 which authorized funds to improve the Great Lakes navigational system. Under the provisions of the act, the Corps was to conduct a survey to mark out a 20-foot ship channel in the waters connecting the Lakes Erie, Huron, and Superior. Work on the dredging began in 1893 and was completed by 1897. The new channel vastly improved shipping on the Lakes, easing the movement of Minnesota's iron ore, Wisconsin's lumber, and Pennsylvania's coal.²⁰

Trade among Lake ports was eased by these improvements. Those interested in foreign trade from those ports, however, were not so well served.

Farmers exporting wheat, flour, cheese, and meat products were the most affected. Railroad transportation was the major outlet for these shipments, but it was more expensive than water transportation. The Erie Canal was woefully inadequate, even after extensive modifications in the 1880s. It was still too shallow and had too many locks, thereby slowing traffic. The Canadian canals along the St. Lawrence were attractive, but only small ships were capable of making this slow passage. Nationalistic sentiments also lessened the attractiveness of those canals. The Treaty of Washington of 1871 had given the Canadians the right to terminate American access to the canals on two years notice. And, in addition to that potential threat, many Midwest businessmen and politicians believed that American use of the canals promoted Canadian and British interests, especially the Canadian merchant marine which might eventually divert important traffic from New York and the other major American East Coast ports.²¹

Despite these reservations, Midwest farmers and businessmen continued to focus attention on the St. Lawrence. This interest increased in the early 1890s when it became clear that an all-American ship canal from the Lakes to the Hudson across New York would be prohibitively expensive. Congress turned its attention to the St. Lawrence in 1892 in response to a resolution introduced by Minnesota Congressman John Lind. He proposed that the government negotiate an agreement with the Canadians to improve the Welland and St. Lawrence canals while the United States would deepen the Great Lakes channels to the same depths as the Canadian works. Nothing came of Lind's recommendation other than to draw attention to the possibility of cooperation.²²

Canadian and American businessmen, however, took the initiative and convened a deep waterway conference in Toronto in September 1894. The St. Lawrence came in for the most attention, although other routes to the eastern seaboard were discussed. The convention recognized, however, that joint American-Canadian action would be necessary to make improvements, and the delegates urged their governments to cooperate with each other. To continue that effort they formed the International Deep Waterways Association to carry on an extensive lobbying campaign on both sides of the international boundary. One result of the propaganda effort was the appointment of a joint Deep Waterways Commission in 1895 to study feasible routes for a deep waterway connection between the Lakes and the eastern seaboard. Its 1897 report concluded that two routes recommended themselves: the St. Lawrence canals and a new project using the Mohawk River to connect Lake Erie to the Hudson.²³

In response to that report the Corps of Engineers became involved in discussions of a deep waterway. The Canadian commissioners had recommended to their government that funds be appropriated to make engineering surveys of necessary improvements if the United States seemed willing to cooperate. Congress was unsure about cooperation, but it did think further studies were necessary. In 1897 Congress authorized the creation of a board of engineers to make surveys and estimate costs of deep waterways between the Great Lakes and the Atlantic ports.

The board, headed by Engineer Lieutenant Colonel Charles W. Raymond, produced an extensive report in 1900 which did not support the idea of joint U.S.-Canadian improvements. It recognized that there were some advantages to the St. Lawrence route, and it included a full analysis of possible improvements in the International Rapids section of the St. Lawrence, but it supported a more southerly route to connect Lake Ontario to the Hudson. Such a route would have a longer navigation season and, of equal importance to the military, it could be more easily defended. The issue of defense had not played much of a role in the thinking of the International Deep Waterways Association, but it was an issue of great concern to the board. After all, Canada still had close political and economic ties to Great Britain. Relations between the United States and Canada and between the United States and Great Britain had been strained over a number of issues ranging from fishing rights to British pressure on Venezuela, to the charging of tolls on Canadian waterways, and to the Alaskan boundary and the Bering Sea seals controversies. While war between the United States and Great Britain did not seem likely, there was always the possibility that some point of strain between the two might lead to conflict.

The report, however, had little impact. It certainly did not diminish Midwest agricultural and business interest in the St. Lawrence route even though the State of New York was considering enlarging the Erie Canal to accommodate 1000-ton barges. Such a move would not entirely satisfy the needs of the Midwest, but it was better than nothing. New York legislators approved the expansion in 1903, and the expensive project was completed in 1918.²⁴

Across the border, there was enough nationalistic sentiment to believe that a joint project with the United States was not a good idea in any case. In the first decade of the century, therefore, the Canadian government focused on building another transcontinental railway. Navigation improvements were discussed and some undertaken in the Welland and St. Lawrence canals, but the focus was for the moment on railroads.

In the United States, alternate routes were also considered for getting Great Lakes cargo to the Atlantic. In 1906 the Lakes-to-Gulf Deep Waterway Association championed linking the Great Lakes to the Atlantic via the Illinois and Mississippi rivers. The north-south route attracted important advocates including Presidents Theodore Roosevelt and William Taft, although the Corps of Engineers issued an unfavorable report in 1909 which questioned the costs of constructing and maintaining such an extensive waterway.²⁵

Nevertheless 1909 was an important year in the history of the St. Lawrence seaway. Formal Canadian-American cooperation over boundary waters started in that year. The 1909 Boundary Waters Treaty provided for the establishment of a permanent Canadian-American body, the International Joint Commission (IJC), with jurisdiction over boundary-water issues, including those involving temporary or permanent "obstructions or diversions" affecting the natural flow or level of water. The treaty specified that navigation "shall for ever continue free and open for the purposes of commerce" and that the navigation laws of one country were to apply to citizens and vessels of

the other. Vessels of both countries were to have rights to use canals connecting boundary waters, and although the treaty provided that each country could impose tolls on its canals, equal tolls were to be charged to vessels of both countries. In fact, Canada had given up tolls on its waterways in 1905; the United States did the same in 1909.²⁶

The establishment of the IJC encouraged advocates of joint action to improve the St. Lawrence canals. Beginning work in 1911, the commission was made up of three representatives from each country. And, from the beginning, those representatives handled the most difficult and intricate issues efficiently and without wrangling. The commission demonstrated that the two countries could work together cooperatively, and its record underscored the possibilities of jointly improving the St. Lawrence.²⁷

The years before Canada entered World War I saw increasing interest in the St. Lawrence in both countries. Population, industry, and commerce expanded on both sides of the border, putting more pressure on available means of transportation. Another factor, however, also entered into considerations of the river: electricity. The rapids along the St. Lawrence, for centuries viewed as hindrances, suddenly took on a positive aspect as generators of electricity. The possibilities were enhanced with the increasing success of long distance transmission of electricity. As early as 1881 the Niagara had produced electricity. In 1910 a proposed hydroelectric dam near Barnhart Island raised interest in the entire International Rapids section of the river. Discussions of power development, however, also caused apprehension among advocates of improved navigation. Power works could negatively affect shipping channels, and shippers resisted early 20th-century plans to develop power on the river.²⁸

Economic growth and the fear of development of hydroelectric power brought added support for improving navigation on the St. Lawrence. In 1912 the Great Waterways Union of Canada was formed. It became a very vocal lobbying group for all waterways and the St. Lawrence in particular. American politicians from the Great Lakes states showed increasing interest, and, on the eve of the European war, Secretary of State William Jennings Bryan lent his support to a proposed International Joint Commission feasibility study of joint American-Canadian development of the St. Lawrence. These steps were greeted enthusiastically in the Great Lakes region, the mood perhaps best captured in a popular slogan of the time, "Every Lakeport a Seaport." But August 1914 brought war in Europe, and Canadian attention turned to the conflict.²⁹

World War I, the Corps, and the St. Lawrence

During the war, the Corps of Engineers again studied the feasibility of improvements in the St. Lawrence. Their 1918 report did not support major improvements in the river, but unlike their earlier opposition in 1900, this report did not focus on defense considerations which questioned developing a strategically important waterway in a foreign country. The 1918 study simply

could not justify such navigation improvements without significant work in the Great Lakes connecting channels and, in any event, it doubted whether there would be increased traffic to warrant the project.

The war experience, however, changed the minds of many other people. By 1920 important lobbying groups in Canada and the United States had begun the long campaign that eventually led to the building of the St. Lawrence Seaway. The war had put enormous strains on rail transportation, and the railroads had proved inadequate. Moreover, the conflict had also demonstrated industry's need for expanded electrical generating capacity. Increasingly, therefore, those who advocated improved navigation worked with those who wanted increased electricity.

The Corps was won over to this position as a result of an extensive three year, joint U.S.-Canadian engineering study completed in 1921. The study concluded that improvements in navigation would not be economically justified without developing the river's capabilities for generating power. Conducted under the auspices of the International Joint Commission, the study was directed by Colonel William P. Wooten, U.S. Army Corps of Engineers, and W.A. Bowden, Chief Engineer, Department of Railways and Canals of Canada. The Wooten-Bowden report, as it came to be known, was the basis for 20 years of discussions about building a seaway.

The United States experienced the economic effects of World War I long before entering the conflict in 1917. Industrial and agricultural production had expanded rapidly to meet European wartime demands, with industrial production alone increasing 40 percent between 1914 and 1916. Entry into the war strained an already taxed railroad system and chaos eventually forced the government to take over the railroads. The railroads' problems underscored the importance of waterways. The Great Lakes and the St. Lawrence came in for added attention because of the shortage of ships. Government officials recognizing the shipbuilding potential of the Great Lakes ports also had to recognize the limitations of the Welland and St. Lawrence canals—only smaller ships able to transit those canals could be constructed for service outside the region.³⁰

Wartime demands also pointed up the need for more electric power in both countries. Officials in Washington became more sensitive to the issue of the St. Lawrence as a power source because of a wartime controversy over private use of the river. The Aluminum Company of America, ALCOA, had permission from the International Joint Commission to build a submerged dam in the St. Lawrence between Long Sault Island and the American side of the river. The Secretary of War had supported the proposal because the water was to be diverted to ALCOA's Massena facilities which produced aluminum necessary for the war. The IJC had approved the application, but the proposal had also engendered serious opposition in New York and in Canada.

Out of the Canadian opposition came the first serious proposal that the United States and Canada jointly plan and develop the St. Lawrence's navigation and power potential. In September 1918, the Canadian government, worried about a piecemeal approach to improving the St. Lawrence, proposed a treaty to formalize a comprehensive approach to improving navigation and developing power on the river. The U.S. Department of State, however, did

not follow up the proposal. The war and post-war planning took top priority, and with IJC approval of ALCOA's plan, the immediate need for State Department action faded. There were also constitutional and public policy questions. Officials in Albany believed their state had the right to develop water power on a river that was within New York boundaries, while some members of Congress opposed the public development of power. And, then, there were the Corps of Engineers reports that Congress had authorized in August 1917. These reports had studied the possibilities of improving navigation on the St. Lawrence and concluded that the United States should not do anything until the Canadians improved the Welland and deepened their canals in the St. Lawrence.³¹

Nevertheless, World War I energized Midwest support for improving the St. Lawrence. As discussed earlier, the conflict had shown the limits of the railroads in meeting expanding agricultural and industrial production and, at the same time, demonstrated the limitations placed on the shipbuilding potential of the Great Lakes states. Finally, the opening of the Panama Canal in 1914 had challenged Great Lakes shippers, farmers, and manufacturers. The canal lowered transportation costs to competitors on both the West and East coasts. In response, Canadians and Americans again turned to pressure groups to convince their respective lawmakers of the need to improve the St. Lawrence. In 1919 American businessmen formed the Great Lakes-St. Lawrence Tidewater Association and the Canadians, the Canadian Deep Waterways and Power Association.³²

One of the American group's first efforts helped increase the Corps' interest and involvement in discussions of what work was needed on the St. Lawrence. Friendly senators introduced legislation directing the International Joint Commission to study the feasibility of a joint comprehensive project to develop the St. Lawrence from Montreal to the head of the Lakes. It was this initiative that had led to the 1921 Wooten-Bowden report which diminished the Corps' opposition to the St. Lawrence improvements.³³

The Corps and Early Planning for a Seaway

Despite its early lack of interest, the Army Engineers played a central role in planning a St. Lawrence seaway. Up through World War I, their studies had been skeptical of proposals to improve river navigation. They did not think it economically feasible, especially before the Canadians had improved the Welland and St. Lawrence canals. As reflected in the Wooten-Bowden report, however, World War I had changed attitudes in the Corps. For one thing, the meeting of wartime demands had demonstrated the enormous potential for the Midwest's commercial growth. The consistent and insistent support in the Great Lakes region had influenced the Corps too, since Corps personnel in the Lakes region and in Washington knew the leaders in the movement to gain American participation in improving the St. Lawrence. Finally, the Corps' own studies indicated the need for more hydroelectric power in New York and New England.³⁴

Corps involvement in the political movement for a St. Lawrence seaway, however, was circumspect. For most of the long years of political struggle, the Engineers focused on the complex technical issues involved in designing a joint power-navigation project. The seaway project created strong opposition among East, West, and Gulf coast port interests and their representatives in Congress. It also faced opposition from the State of New York because its officials supported the New York State Barge Canal (formerly the Erie Canal) as an alternative to the St. Lawrence. The Corps, involved in projects in all of the ports and in New York state, had to keep a discreet distance from too great involvement in the political maneuvering over the proposed seaway.

The Corps' contribution during those years was in the technical field and as a liaison with Canadian engineers. Throughout the 1920s and 1930s, the Corps worked with the Canadians on studies of what in fact would be needed on a comprehensive power and navigation project in the St. Lawrence. These studies proved controversial, since the Americans and the Canadians had different technical approaches to the project. Eventually, however, the two sides compromised. In 1942, the Corps issued an authoritative report reflecting the decades of discussion. Because of its detailed analysis of the many engineering issues raised, this document, as amended in 1946, formed the basis for the ultimate planning and construction of the seaway in the 1950s.

In short, against the complex political maneuvering in both the United States and Canada, the Corps and its Canadian counterparts worked out the details of what was to become the St. Lawrence Seaway. These efforts proved critical when the project was ultimately approved and time and financing became major factors. The project as a whole, both power and navigation works, was to be self-liquidating and the builders were pressed to complete the project quickly so that revenue could be generated to begin paying off the debt. The extensive examination of the major engineering issues well before work was begun made possible a fairly rapid final design and scheduling of the project.

The start of that period of intensive cooperative work had been the Wooten-Bowden report. After Wooten and Bowden had presented their report to the International Joint Commission in June 1921, the commission had held public hearings. Alternatives proposed at those meetings were also included in the final report issued in December 1921. As mentioned earlier, the report concluded that improvements for navigation alone were not justified without taking advantage of the river's potential for the generation of hydroelectric power. Power could be most easily developed in the International Rapids section of the river, and it was in this stretch that the Engineers recommended dual development of power and navigation. Power could be developed in other parts of the river later if demand warranted it. Dredging in the project should be to a 25-foot depth, with 30-foot depths over sills in the locks. If necessary, the channels could later be deepened to 30-foot depths. As for other navigation projects the report recommended canals to allow ships to get from Montreal harbor to the deeper water in what was called Lake St. Francis, a reach of the river upstream from the city.³⁵ And, it recommended that Canada's Welland

Canal be treated as a part of the project—a provision ultimately dropped in the final planning.

The International Joint Commission supported the report's findings and recommended that a U.S.-Canadian treaty be signed to carry out the necessary work. But, as extensive as the Wooten-Bowden report was, the hearings indicated that there was little agreement on how best to proceed. The commission, therefore, recommended that an expanded engineering board be appointed by both governments to further study the actual construction of a St. Lawrence waterway.

Canada and the United States responded positively to the commission's recommendation. In 1924 each appointed three engineers to work with the IJC. The American representatives were drawn from the Corps and included the Chief of Engineers, then Major General Harry Taylor. This Joint Board of Engineers looked more closely at the many technical issues raised by the Wooten-Bowden report's recommendations. But the more these proposals were examined, the greater the degree of difference that arose between the American and Canadian approaches to the problems. Indeed, the engineering board's 1926 report could not agree on any one approach. Instead, it included two sets of recommendations.³⁶

The development of power was the source of greatest difference between the two countries. The United States proposed what the Engineers called a "single-stage plan," whereas the Canadians wanted a "two-stage plan." In essence, these proposals differed in that the Americans wanted power generation centered at the downstream end of Barnhart Island, with two powerhouses there. The Canadians advocated developing power at both Barnhart and Ogden islands. More than location was involved in the disagreement, since the choice of site influenced control over the flow of water, which in turn affected navigation conditions. American members of the board maintained that their suggestions made navigation easier and provided more power at slightly less cost than the Canadian plan. The two-stage plan, the Canadians countered, required less flooding of land and would allow for speedier development of power.³⁷

At about the same time the Joint Board of Engineers made its report, the Chief of Engineers, then Major General Edgar Jadwin, issued the Corps' findings on a related matter. At the behest of the St. Lawrence Commission, which had been appointed to advise the Joint Board, the Corps of Engineers had investigated the feasibility of building a deep-water route from the Great Lakes across the state of New York to the Hudson River. The Chief's report unequivocally came out in favor of the St. Lawrence route. Combined with the obvious possibilities of joint power development, the St. Lawrence was clearly preferable in providing navigation for ocean vessels between the Great Lakes and the sea.³⁸

Eventually, the United States and Canada compromised on what was called a "controlled single stage" plan. During the 1930s the Canadians singly, and jointly with the Americans, continued to study the proposed waterway and power projects. In 1932, a reconvened Joint Board of Engineers came up with a compromise two-stage proposal. This board's report served as

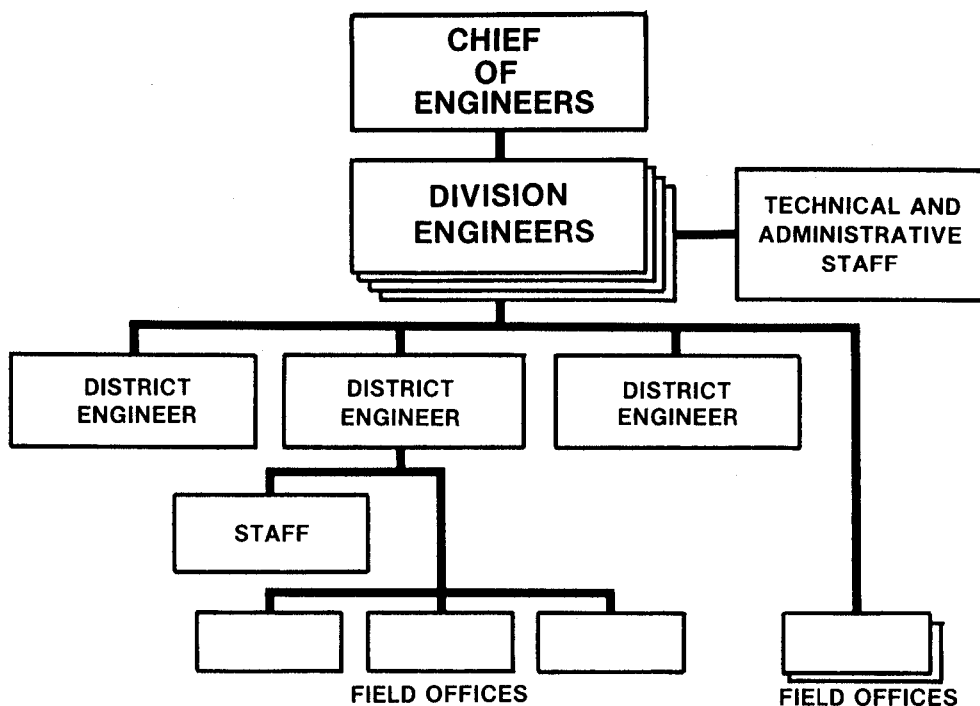
the basis for a treaty between the United States and Canada, which, although signed, failed to pass the United States Senate. The Canadians continued to study the problem, and in 1939 proposed what was called a “238-242” controlled single-stage plan for development. This reflected earlier American ideas, and was taken in the spirit of compromise shown by the United States earlier in the 1930s when it had accepted a modified two-stage plan as the basis of treaty negotiations. In turn, the plan of 1939 prompted the Corps study of 1942 (amended in 1946) upon which the final planning for the seaway was based.³⁹

As indicated earlier, these engineering studies had not occurred in a political vacuum. While the Engineers conducting the investigations kept out of politics, the fate of their recommendations was decided on that level. Political events in both Canada and the United States overtook the St. Lawrence project studies on numerous occasions.⁴⁰ In Canada, there were federal-provincial disputes over the project. The disputes even reached the municipal level. The City of Montreal was divided—at times its leaders worried that the seaway might harm its transshipment business, at other times they happily contemplated the benefits of growing commerce through their port. In the United States the long-standing questions raised earlier continued to affect government interests in and support for the seaway. Opponents of public power were hostile to the project, as were the railroads and the coastal ports. New York State wanted a ship canal through its territory as well as the development of power in the International Rapids section of the St. Lawrence.⁴¹

The events of the time, however, did not always work against the seaway. The onset of World War II again pointed out to national leaders the need for increased hydroelectric power capacity. War in Europe also revived interest in Great Lakes shipbuilding, giving further impetus to study of the St. Lawrence waterway. And, in this context of heightened interest and concern, the two governments authorized the studies that in the end formed the basis for the construction of the seaway in the 1950s.

In January 1940 the two federal governments again attempted to come to some agreement on how to develop power in the International Rapids section of the St. Lawrence River. Each appointed representatives to a board of engineers which was to evaluate all the proposals that had been made to achieve that objective. The board was to report to two temporary agencies, one Canadian and the other American, appointed to coordinate the study. Making its report in January 1941, the board recommended the “238-242” Controlled Single-Stage Project. The findings included an outline of the scope of improvements, a list of principal features, and the recommended locations for the various improvements.

After receiving the report, the Canadian and American supervisory agencies turned to the Corps of Engineers to work up the detailed surveys necessary to make the improvements for power and, ultimately, navigation. The incumbent Democratic administration supported that work as the President, Franklin D. Roosevelt, hoped to see power developed in time to help in the war effort.⁴²



Organization Chart of the Corps of Engineers' Civil Works Districts and Divisions.

In October 1940, the Corps established the St. Lawrence River District with headquarters at Massena, New York, solely to carry out that survey work. The surveys were underway by late 1940 and proceeded on the basis of the "238-242" Controlled Single-Stage Plan. At the end of April 1942, the District submitted its report after which the District was abolished. Its "St. Lawrence River Project, Final Report 1942" referred to earlier, became the basis for the later planning and construction of the seaway. It presented detailed surveys of the area, extensive plans for the features to be included in the project, and extensive subsurface analyses and land title searches. In 1946, as a result of model studies at the Corps' Waterways Experiment Station in Vicksburg, Mississippi, and further subsurface tests at the proposed sites, the Corps issued an addendum. With this addition, the 1942 final report became the basic scheduling, planning, and design document for the later improvements in both power and navigation.⁴³

By the spring of 1942, however, when the Corps completed the report, the United States was at war. Before American entry into the conflict, Roosevelt had seen the project as providing power essential to the war effort as well as the navigational improvements needed to realize Great Lakes ship-building potential. But entry into the war dampened that earlier administration enthusiasm. The seaway project, according to Corps estimates, would take three years to build, limiting its effectiveness. And, of more significance, the seaway would take away materials needed for more urgent war-related projects. Thus, events had intervened once again to delay a St. Lawrence seaway.⁴⁴

Post World War II Developments

Interest in the seaway project grew during World War II. Power needs in both Canada and the United States became acute, and, with peace, seaway proponents tied postwar economic recovery in the Great Lakes region to the provision of increased supplies of hydroelectric power. The Corps' detailed 1942 report provided the extensive information and research for a realistic plan of action for building the project, and it was a plan that commanded the support of both American and Canadian government engineers. Yet opposition to the project remained. Opponents in the United States were as adamant as ever, and they did what they could to prevent the project from being approved.

The railroads and East Coast port interests led the fight against the seaway, basing much of their public opposition on the idea that the seaway would constitute a subsidy to one mode of transportation not open to others. They also thought that the "subsidy" would help foreign (that is, Canadian) business at the expense of American railroads, ports, and shippers. Seaway proponents maintained that the opposition was based on the fear of competition, a competition which would benefit shippers and consumers by lowering transportation costs.

To counter the subsidy argument, seaway proponents accepted the idea of charging tolls to pay for the project. This political expedient, however, flew in the face of the American tradition of free inland waterways and changed the basis of the project. In April 1947 the Canadian government accepted the proposal "in principle" with the condition that the two governments make suitable arrangements to determine and collect tolls. Legislation to that effect died in the U.S. Senate in February 1948, a victim of the continued efforts of the groups that traditionally opposed the project.⁴⁵

In the meantime, Canadian support for the seaway increased. On the transport issue, railroads, unable to handle the growing grain trade, were strained even further after the discovery of iron ore in Quebec and Labrador. On the power question, both provincial and federal officials saw economic development threatened without increased sources of hydroelectric power. South of the border, the State of New York also supported hydroelectric development, in large part because the late 1930s had brought shortages which were aggravated during the war.

The inability of Congress to pass suitable legislation authorizing a binational comprehensive project to develop power and improve navigation made proponents in Canada and New York explore other arrangements. In 1948 the State of New York and the Province of Ontario worked up their own plans to immediately develop power in the International Rapids section of the St. Lawrence. The administration of President Harry S. Truman opposed, at least initially, dividing the project. In any event, New York's power proposal needed the approval of the Federal Power Commission. Opponents of public power challenged the application and threatened court action if the FPC ruled in favor of the proposal.⁴⁶

Canadian officials despaired at the apparent inability of the United States government to cooperate in a joint project. And, therefore, after two years of discussion, Parliament created the St. Lawrence Seaway Authority (SLA). The agency was instructed to construct, operate, and maintain the waterway which had been discussed for decades. Parliament also authorized the SLA to cooperate with appropriate American agencies, if that was possible. But if the United States would not cooperate, the SLA had the authority to proceed on its own. In 1952, Congress once again rejected proposals for a jointly built comprehensive power and navigation project. The Canadian government then went ahead and proposed an all-Canadian waterway and a joint Ontario-New York power project. In an exchange of notes the Truman administration agreed to support the Canadian proposal.⁴⁷

A delay in considering New York's application at the Federal Power Commission gave the President one more opportunity to push Congress for legislation supporting an American role in the project. In January 1953 the Canadian government agreed to delay one more time, and on 6 May 1954 Congress at last authorized American participation in the project. The new administration under Dwight D. Eisenhower supported the project in large part because of defense considerations—any such strategic waterway leading into the center of the United States should be at least partly under American control. In addition economic considerations had expanded as American steel makers became convinced that they would eventually need iron ore from the Quebec-Labrador fields. And, finally, the willingness to accept tolls had tipped the balance among undecided congressmen, since with the tolls the project would ultimately pay for itself.⁴⁸

Congress created the St. Lawrence Seaway Development Corporation to construct the American part of the project. The public corporation would mirror Canada's St. Lawrence Seaway Authority, providing American input not only during construction but also on the question of tolls which would have to be jointly determined and administered. It would also oversee the repayment of the Seaway bond debt to the U.S. Treasury.

To accomplish their purpose, both the Seaway Development Corporation and the Seaway Authority would need technical and coordination assistance. Providing such assistance to the Development Corporation would pose novel challenges to the Corps of Engineers, the organization ultimately chosen for this responsibility.

Chapter II

THE CORPS' ASSIGNMENT TO THE SEAWAY PROJECT

Approval of the St. Lawrence Seaway brought a great sense of relief as much as joy to project proponents. For almost 50 years a deep waterway into the American heartland via the Great Lakes had been discussed, and, since 1919, the Great Lakes-St. Lawrence Tidewater Association had worked diligently to get congressional approval. Through it all, the Corps of Engineers had played a highly important and supportive role to advocates of navigation and power works along the St. Lawrence. Indeed, the Corps' 1942 St. Lawrence report had shown in detail the feasibility of the joint power-navigation project. Both congressional and Great Lakes area supporters had assumed that the Corps would build the Seaway. The authorization of the Seaway project, however, had occurred in ways that its supporters had not anticipated. Certainly the Corps never expected that it would work on the project as the agent of the St. Lawrence Seaway Development Corporation and only as an advisor to the New York and Ontario power agencies which were to build the hydroelectric power works.

During the early 1950s the Corps prepared to work on an assignment which remained nebulous for many months as Congress, the President, and the Canadians slowly worked their way to approval of the joint navigation and power projects. Once its role was finally delineated as agent for the Seaway Department Corporation, the Corps faced difficult organizational problems involving internal operations as well as external relations with the other, numerous, official bodies participating in the project.

The Power Project

Throughout 1953 and much of 1954 the Corps faced a frustrating situation in two ways. First, what role, if any, the Corps was to play in the power project awaited the decisions of the Federal Power Commission (FPC) and the federal courts, as opponents of the power projects tried to block licensing of the Power Authority of the State of New York (PASNY) to build the hydroelectric works in cooperation with the Hydro-Electric Power Commission of Ontario (HEPCO). Second, the Corps had to wait several months before the new St. Lawrence Seaway Development Corporation formally determined that the Engineers would in fact be the planning and construction agent for the navigation project. Legal and political questions had divided what had always been contemplated as a joint project into separate enterprises for navigation and power and had complicated the role the Corps had in the St. Lawrence Seaway. Construction of the St. Lawrence power works was essential to the

later development of the Seaway because the two projects were intricately interconnected. Indeed, the Corps' 1942 plans saw them as a comprehensive package. Failure to coordinate the work done on power and navigation would have created critical delays, since the power project's timetable had an important impact on the completion of the works for navigation.

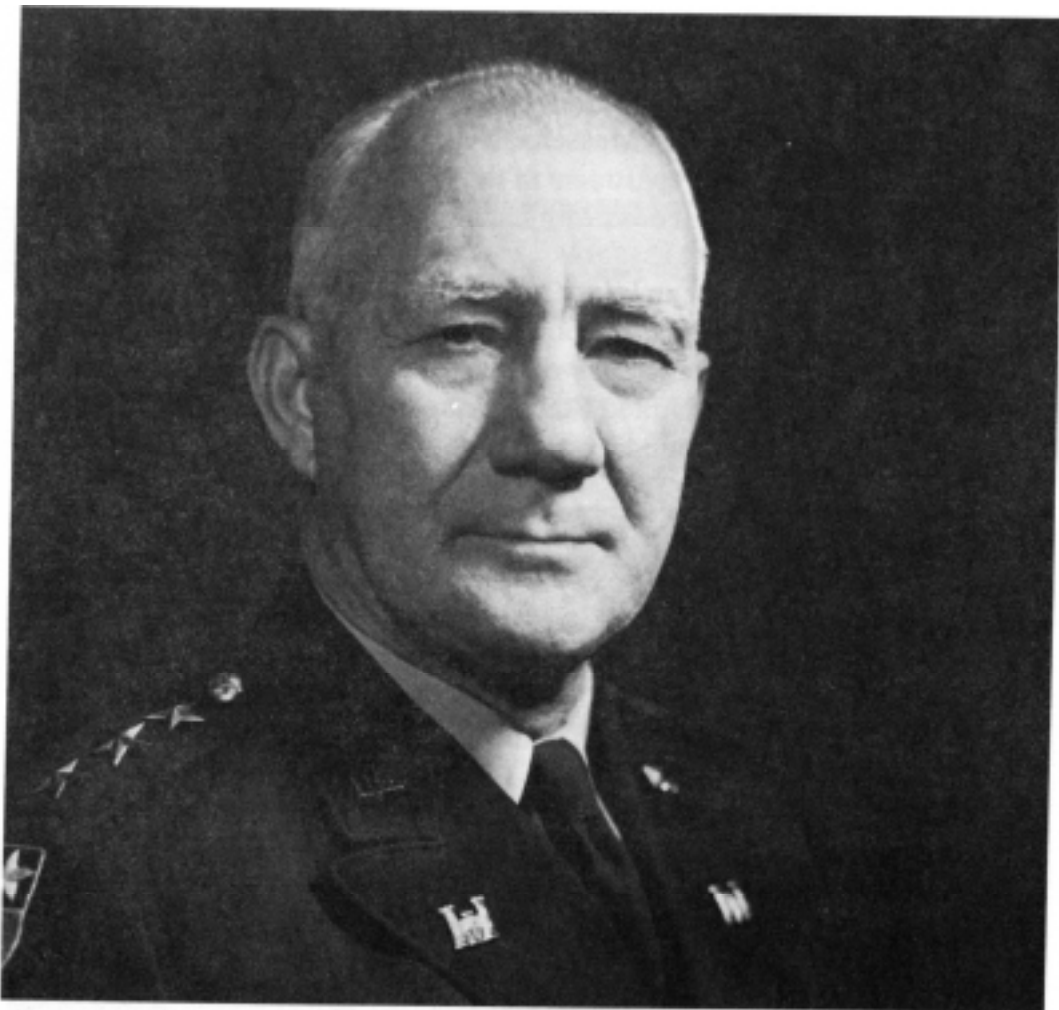
But the Corps' ultimate role in the Seaway and power projects remained unclear. On the sidelines for most of the political and legal debates discussed in the last chapter, the Corps became more directly involved when the United States government acquiesced in plans for an all-Canadian Seaway and New York State's proposed power project in 1953 and 1954.

The Corps had been closely involved with PASNY since that agency's formation in 1931. Indeed, the state agency had been instrumental in getting President Roosevelt to approve the original surveys in 1940 that led to the Corps' 1942 report, the basis for the St. Lawrence power and navigation projects completed in 1959. Since the 1930s the Corps had preferred a joint navigation-power plan for the St. Lawrence because of the interdependence of the two enterprises. The raising of the power pool anticipated flooding the 14-foot channels that traversed the river in the international sections. Such flooding required new canals and locks to allow traffic to circumvent the power pool.

Nevertheless, New York state's needs for new sources of power after 1945 were such that Governor Thomas B. Dewey pressed on until, in October 1952, the International Joint Commission (IJC) approved the plans of New York and Ontario to build the power works. The Truman administration continued to prefer the joint power-navigation project. By the summer of 1952, however, the administration was exasperated by congressional inability to approve an American role in building the St. Lawrence navigation works. Thus, in mid-June 1952 when the Canadians proposed a seaway of canals and locks solely on their side of the border, the United States acquiesced in the plan. Less than two weeks later, on 30 June 1952, the United States and Canada simultaneously submitted almost identical applications to the IJC to develop power in the International Rapids section of the river. The New York Power Authority's application to build the power works was already before the Federal Power Commission; the license was granted in May 1953.¹

The Corps of Engineers played an important role in PASNY's application to the FPC. The Power Authority made no secret of the fact that the plans first submitted to the commission in July 1948 were based on the 1942 St. Lawrence report prepared by the Engineers. Moreover, PASNY officials consulted Corps personnel in preparing their modified reapplication to the FPC in July 1952, as well as in their defense of the application in the lengthy commission hearings and federal court proceedings that followed. Neither PASNY nor the Corps wanted to repeat the FPC's 1950 rejection.

The Corps became directly involved in these efforts to gain approval of the power project in October 1952. At that time, President Truman appointed the Chief of Engineers, Major General Lewis A. Pick, to an interdepartmental committee to draw up detailed plans to be submitted for approval to the IJC. The Chief designated Corps personnel to represent him. The committee



¹ Lieutenant General Lewis A. Pick, Chief of Engineers (1949-1953).

based its recommendations heavily on the Corps 1942 report and on more recent data collected since the end of World War II.

On 29 October 1952 the International Joint Commission approved the proposed power project and recommended the creation of a St. Lawrence River Joint Board of Engineers which would include Corps representation. As a member of a board of engineers created to oversee the project the Corps gained formal responsibility. The American section of the board was eventually headed by Major General Bernard L. Robinson, Deputy Chief of Engineers for Construction.²

The Chief worked assiduously to ensure the Corps an important role in the power project. By the time the Federal Power Commission issued its license to PASNY to build the United States' part of the power project, there was no question that the Corps would have a major role in the work of the American section of the St. Lawrence River Joint Board of Engineers (JBE). Late in 1952 it was not clear whether or not PASNY would ask the Corps to be its construction agent on the project. But whether or not that happened, Pick made the case for the Corps having a major role in the work of the United States section of the Joint Board of Engineers. President Eisenhower complied in an executive order of 4 November 1953. It specified that the American sec-

tion of the Joint Board of Engineers be made up of the Secretary of the Army and the Chairman of the Federal Power Commission or their designated alternates. General Robinson represented the Secretary in the American headquarters of the board located in Massena, New York. The executive order also specifically instructed the Department of the Army and the FPC to furnish the United States section of the board with facilities, supplies, and personnel. The Corps' assignment to take on these responsibilities was logical since it was represented on the International Joint Commission, which provided the initial order of approval under which the power project was to be constructed. The Corps also had had experience in working with the Canadians, being represented on numerous other United States-Canadian joint boards that oversaw issues having to do with boundary waters.³



Major General Bernard L. Robinson, Deputy Chief of Engineers for Construction (1955-1956).

The Corps also played a role in the power project through its representation on the Joint Board of Control. (JBC) The IJC had established this body to oversee changes in the level of the river, something that would occur upon the completion of the power project. The JBC relied heavily on the Engineers' surveys of the Great Lakes and river levels, as well as on Corps personnel experienced in such matters.⁴

The Corps' influence on the power project, however, was most directly exercised by its role on the Joint Board of Engineers. The United States section of the board was to act for the United States in all technical issues raised

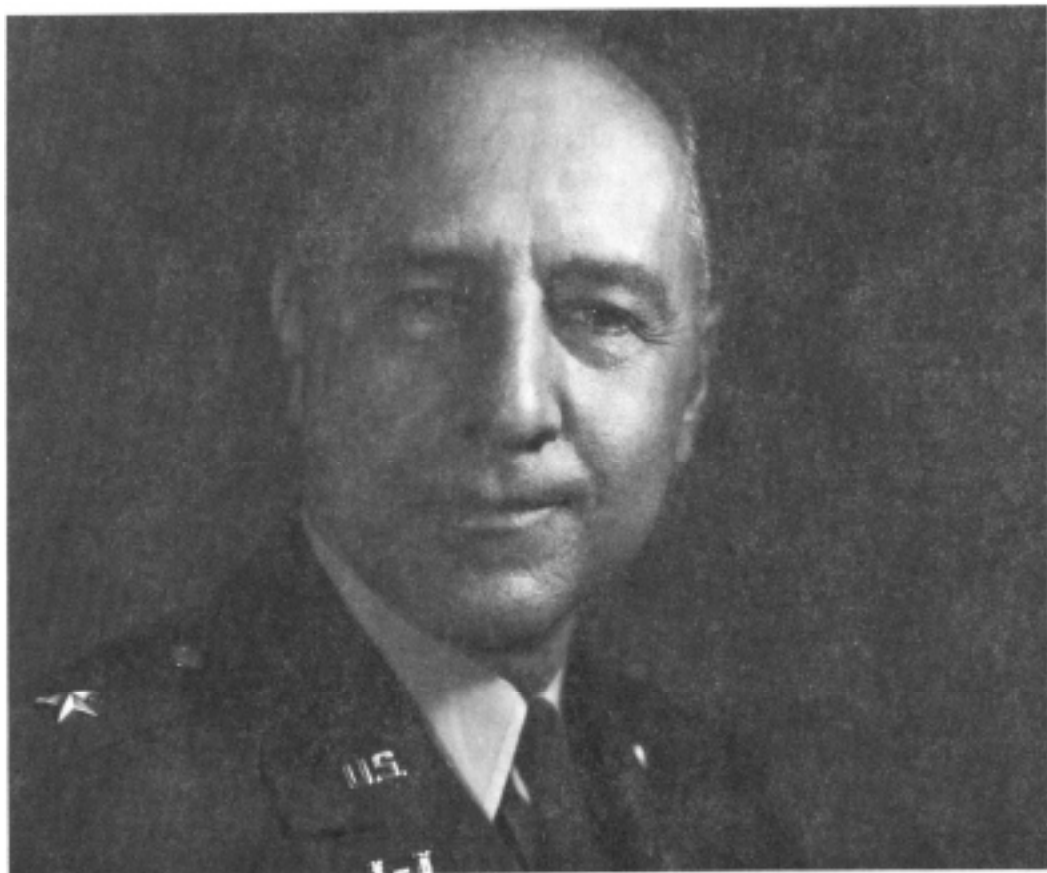
by the power project. The board's responsibilities included reviewing, approving, and coordinating the plans, specifications, and work schedules before construction began. Also, the board had the responsibility to review major changes made in the plans and ultimately to inspect the completed works to insure that they conformed to specifications.⁵

The case for the Corps' involvement in the Joint Board of Engineers was a good one. In the first place, the New York and Ontario power entities were to rely almost exclusively on the Corps' 1942 report as the basis of their project. Second, speed was essential to completing the project. It was to be costly (original estimates were about \$450 million). Both New York and Ontario wanted, needed, the revenues to be raised by providing power. They had to meet heavy interest charges on the project's financing. The Corps had the necessary experience in foundation engineering and structural design that would help speed the project along, and it also had the contacts with private consultants who might be needed at times during construction.⁶

For a period in 1953 it appeared that the Engineers' role in the power project was to be more than that of a very influential partner in the work of the Joint Board of Engineers. At a meeting of Corps officials from the Great Lakes Division and PASNY, the chairman of the Power Authority, John E. Burton, indicated that he was considering the Corps for the design and the construction of the power works. While no decision had been reached on the issue, the major reason for interest in utilizing the Engineers was to keep costs down. Burton saw no need at that time to build up a large design or construction organization when the Corps already had one in place. That the chairman's interest was serious seemed confirmed by the fact that PASNY approached Corps representatives with similar observations about the usefulness of the Engineers' cooperation.⁷

Nothing came of these discussions, however. By November 1953, when the President signed the executive order approving the power project, PASNY had decided on private engineers to design the power works and private construction companies to build them. The Power Authority's decision not to use the Corps was in large part the result of the political atmosphere in the early 1950s. For one thing, President Eisenhower had all but ruled out a direct federal role in building the power works. Concerned about balancing the budget, expensive power projects seemed a good place to cut spending, especially when a state such as New York was eager to take on the project.⁸

Corps officials were not unhappy about this decision. According to its attorneys, the Engineers did not have the legal authority to work for the State of New York without congressional authorization. The hostility to New York's power plan in Congress, as well as the prospect of court challenges to the FPC license, precluded that state seeking such legislative authority. Then, too, the Engineers were not sure that being the construction agent for PASNY was a good idea. In the first instance, the Corps was no more interested than PASNY in being trapped in a series of legal webs, woven by enemies of the project, over the authority of a state in using a federal agency. Of more significance, the Corps doubted that the state could delegate sufficient authority for the Engineers to successfully undertake the project. The legal hurdles would thus



Brigadier General Claude H. Chorpening, Assistant Chief of Engineers for Civil Works (1951-1954).

create organizational and command problems. From the perspective of command, it was not clear that the Chief of Engineers and the Division Engineer would have effective control of the project. Moreover, the Engineers anticipated other problems from the Power Authority's intractable enemies. Representatives of private power interests, who had fought the FPC's granting PASNY a license, were expected to seize on any difficulty to criticize the project. In such a charged political atmosphere, the Corps feared, it could become the scapegoat for any problems. In such circumstances, the Assistant Chief of Engineers for Civil Works, Brigadier General Claude H. Chorpening, wrote that "the Corps could expect" to get much of "the blame for difficulties and little of the credit for the achievement." Leaders in the Corps were also apprehensive that in working closely with PASNY there would be excess costs in a project that would end up with dual supervision. The Chief clearly did not want to be saddled with criticisms that the Corps contributed to an excessively costly project.⁹

Although the Corps was not to be a major partner with the New York Power Authority in building the power works, the latter were vitally important to the Corps' later responsibility for constructing the improvements for navigation. The Engineers, therefore, made the most of their role on the Joint Board of Engineers. They were able to have an important hand in the planning and construction of the power works because they possessed a vast collection of

work papers, records, title abstracts, property ownership research data, test boring cores, etc. worked up and expanded since 1940-1941. The Corps kept tight control of these files.

In October 1953, the New York Power Authority's chairman wrote to the Chief of Engineers requesting all these Corps technical materials. The Power Authority needed these data in preparing final estimates of cost, contract plans, and detailed specifications. Fifty cases of materials supplemented the printed reports, based on the work of the 1940s, which the power entity already had in its possession. The Corps was willing to cooperate with PASNY, but it was reluctant to turn over all of its papers and files. For one thing, the Defense Department did not think that PASNY had the authority to request the papers. This question of authority, however, did not really concern the Chief of Engineers. He wanted to keep these records because it would require the Power Authority to interact continually with the Corps in almost every phase of the project. This interaction between Corps and PASNY personnel had been going on since the State of New York had prepared its applications to both the International Joint Commission and the Federal Power Commission. The Chief and the Secretary of the Army were looking ahead to the possibility that the Corps might still have a role in the improvements in navigation, the Seaway itself, a project dependent on close coordination with the construction of the power project. Ultimately, the papers remained in the hands of the Corps, but they were moved to the Buffalo District office where the officials of the Power Authority could easily examine them.¹⁰

At this same time, supporters of an American role in building a seaway made their last congressional effort to gain approval of what was shaping up as an all-Canadian navigation project. The Corps supported these efforts which had begun while the New York Power Authority's application faced delays at the Federal Power Commission. In December 1952 President Truman took advantage of these delays and tried once again to get approval for United States involvement in improving navigation works on the American side of the International Rapids section of the St. Lawrence River. Truman failed to get approval before he left office, but the momentum begun in the last months of his administration carried over into the incoming Eisenhower administration.

Once the St. Lawrence Seaway Development Corporation designated the Corps as the construction agent for the navigation improvements, in September 1954, the contacts with PASNY in Buffalo became more and more important. It was essential that the Corps and the Power Authority work together closely. The power and navigation aspects of the project were inextricably connected. A failure to cooperate would have delayed the complex project where timing and coordination were essential.¹¹

The Corps' involvement with PASNY manifested itself in several ways during the building of the Seaway. As the construction agent for the St. Lawrence Seaway Development Corporation, which we will discuss shortly, Corps officials often dealt directly with officials of PASNY. PASNY representatives also attended informal weekly meetings initially held in Buffalo and later in Massena over the years that the project was under construction.

These meetings were with members of the Corps' Buffalo District staff and representatives of the Development Corporation.

The Corps' insistence on a leading role in the work of the Joint Board of Engineers proved important to the speedy beginning of the navigation project when in May 1954 Congress finally approved an American role in the construction of the Seaway. The Engineers had already been involved in PASNY's planning. The close working relationship between the Corps and PASNY was perhaps initially most important in developing the procedures for the acquisition of lands for the project. Under the terms of the Federal Power Commission license granted to PASNY, the Power Authority had to turn over, without cost, what lands were necessary to build the navigation works. Because of the Engineers' studies of land acquisition needs in 1942, PASNY invited Corps representatives to an Albany meeting on 18 August 1954 to discuss general policies and procedures for land acquisition. This meeting was a significant indication of the Engineers' important influence, because it occurred several weeks before the Development Corporation formally designated the Corps as its construction agent. Attending the meeting were representatives of the Office of the Chief of Engineers, the North Central Division, the Buffalo District, PASNY, the Attorney General of the State of New York, and the Superintendent of the New York Department of Public Works. The latter department was to be PASNY's agent for land acquisition. It traditionally had been the agency that acquired, on a reimbursable basis, lands, easements, and rights-of-way for federal flood control projects in the state. It was fully staffed with personnel experienced in acquiring the lands necessary for the Seaway and power projects.¹²

Essentially the Power Authority was to acquire all the lands that were to be flooded for the power pool and the lands upon which the dikes for the pool were to be built. Lands within the area of the power pool that were needed for navigation were eventually conveyed to the Development Corporation as required in PASNY's Federal Power Commission license. In view of the public works department's previous experience in acquiring lands for Corps flood-control projects, that department also agreed to acquire the land necessary for the navigation works. Title for these lands was also ultimately conveyed to the St. Lawrence Seaway Development Corporation.¹³

As with so many aspects of the projects for navigation and power, close coordination was essential in acquiring lands. In working with New York's Department of Public Works, the Buffalo District had to acquire land in time to meet the construction schedule being worked up by the Corps, PASNY, and the Development Corporation. One of the most critical tasks proved to be arranging with the state public works department for early access to the land to begin preliminary work. Buffalo also had to arrange joint appraisals of property for which the Development Corporation was obligated to reimburse PASNY.¹⁴

On the engineering aspects, the Corps also became more directly involved in PASNY's planning beyond its role on the Joint Board of Engineers. By September 1954 it was clear that close coordination between PASNY and the Development Corporation was essential. Within two weeks of being designated the Corporation's construction agent, joint meetings were

begun to coordinate the design of PASNY's dikes. Corps representatives were present at a meeting in New York on 15 September 1954 with PASNY and its consulting engineers, the firm of Uhl, Hall and Rich, who were to design the dikes. The designs, however, were subject to the approval of the Joint Board of Engineers. In return for PASNY's taking responsibility for the design, the Corps agreed to provide the plans for highway relocations and new road construction. The Engineers, especially the Buffalo District, also took the lead in work on other projects of interest to both the Seaway Development Corporation and PASNY, such as the relocation of power lines.¹⁵ These subjects will be covered fully in subsequent chapters, but the point is that the Corps' Buffalo District office became an important point of contact and interaction between PASNY and the Corporation.

Thus, the Corps' role in the power project was more significant than appeared on paper as a representative on the American section of the Joint Board of Engineers. As originators of the basic plans for both the power and navigation projects, the Corps exercised great influence. Both projects had to be completed as quickly as possible. Corps personnel and files were indispensable to PASNY in drawing up its own plans, which in many ways were little more than updated versions of the Corps' 1942 report on the St. Lawrence. The Engineers' experience with PASNY and the New York department charged with responsibility for public works also contributed to enlarging the Corps' role in the Seaway and power projects. Indeed, in its own way the legislation authorizing the Seaway almost seemed to mandate, whether intentionally or not, a major role for the Corps. The law creating the Seaway Development Corporation specified that work on the navigation project could not begin until PASNY was able to provide assurances that the dams and power works approved by the International Joint Commission could be completed concurrently with the navigation projects.¹⁶

This requirement prompted meetings between PASNY and Corps officials to assure that planning proceeded quickly on such issues as land acquisition and highway and power line relocations. Working out essential points of coordination, even before the Corps received the go-ahead from the Corporation in September 1954, PASNY was able to propose a detailed construction schedule on 27 October 1954. This overall schedule prepared by PASNY's consulting engineers promised completion of the works by December 1959. It also provided the necessary assurances mandated by Congress before work could begin on the Seaway.

Relations with PASNY were essential to the successful completion of the Seaway. As we shall see, relations were not always smooth. Nevertheless, the Corps had a history of cooperation with PASNY. The same could not be said, of course, for the new St. Lawrence Seaway Development Corporation which had only been formed in May 1954 to take charge of the financial planning and construction of the improvements in navigation. While some of its corporate officers were known to Corps leaders, it was new and untried. The Corps' reputation was perhaps more on the line because of its subordination to the Seaway Development Corporation than it had been or was in projects for which the Corps had fuller responsibility. To the Engineers the danger was

that failure would be attributed to the Corps, while the Corporation would take credit for successes.

Assigning the Corps Its Role

That the public law authorizing the Seaway left the designation of the construction agent to the President was a source of disappointment and some alarm to the Corps. In retrospect there seems little doubt that the Corps was to be assigned the job. But the Chief of Engineers, Lieutenant General Samuel D. Sturgis, could not afford to take such an assignment for granted. From his perspective the Corps was working in a time of troubling change. President Eisenhower had appointed the Hoover Commission to look into government reorganization. Sturgis and others in the Corps saw the commission as hostile—some members of its task force advocated reductions in the Corps' role in civil works projects. The Corps was also going through a protracted dispute with the Air Force over military construction. And President Eisenhower's commitment to cutting federal spending left open the possibility of fewer projects for the Corps. Sturgis also thought that public corporations like the Development Corporation might be the wave of the future. It was vital to the Corps that it not be denied the major role in the Seaway that the Engineers always assumed would be theirs. If public corporations were to be



Lieutenant General Samuel D. Sturgis, Jr., Chief of Engineers (1953-1956).

charged with future civil works projects, Sturgis wanted to assure that the Corps would carry on its traditional role as primary construction agent for such enterprises.

Congress had created the Seaway Development Corporation, as we have seen in the last chapter, in large part because it was to mirror the Canadian St. Lawrence Seaway Authority. As it turned out, the Corporation was not to presage the future. It was the product of special circumstances: the need to finance the Seaway through bonds sold to the U.S. Treasury and the need to work out a schedule of tolls with Canada to raise the revenue to retire the bonds.¹⁸

In any event, the Corps had joined enthusiastically the efforts in 1953 and early 1954 to get the United States to take part in the St. Lawrence Seaway project. The Secretaries of Defense and the Army had regularly gone on record in support of the project. The Defense Department advocated American participation to ensure that the United States had a voice in determining how to defend the navigation works in a time of war.¹⁹

While the Corps and the Defense Department favored an American role in the construction of the navigation improvements, neither was pleased with public discussion of a semi-public development corporation to build the Seaway. In responding to letters from the Senate Foreign Relations Committee chairman in February 1953, the Secretary of Defense, Charles E. Wilson, questioned whether the proposed St. Lawrence Seaway Development Corporation was the most appropriate way to ensure American participation in and protect American interests on the project. Wilson's questions were prompted by his concern over whether "such a corporation would establish a desirable precedent with respect to similar future projects." What particularly concerned the Secretary, however, was that "no provision is made in the bills and joint resolution for utilizing the services of the Corps of Engineers of the United States Army."²⁰

Even though the Secretaries of the Army and Defense had made the case for the Corps' participation in the project, the bill that passed Congress in May 1954 did not identify the Engineers as the construction agent of the new St. Lawrence Seaway Development Corporation. This omission caused more than a little anxiety. After all, the Corps had designed and built virtually every federal lock constructed during the previous 100 years. It had also been responsible for the design, construction, maintenance, and operation of all federal navigation channels and harbors in the Great Lakes since the 1850s. But these facts had not been enough to sway Congress.²¹

Many officials in the Defense Department, as well as private business supporters of the Corps in the Great Lakes area, thought that the Corps would eventually get the job. General Sturgis and others in the Corps, however, believed that nothing could be taken for granted. Indeed, as the bill approving the Seaway made its way through Congress for the last time, Sturgis's mood was one of genuine anxiety. He saw events as adding "up to a definite pattern" that would undermine the traditional role of the Corps. Part of the pattern that worried him was the make-up of the Hoover Commission task force, the body that would do the basic work for the study of government reorganization. Several of the appointments "indicate a concerted effort for pushing the

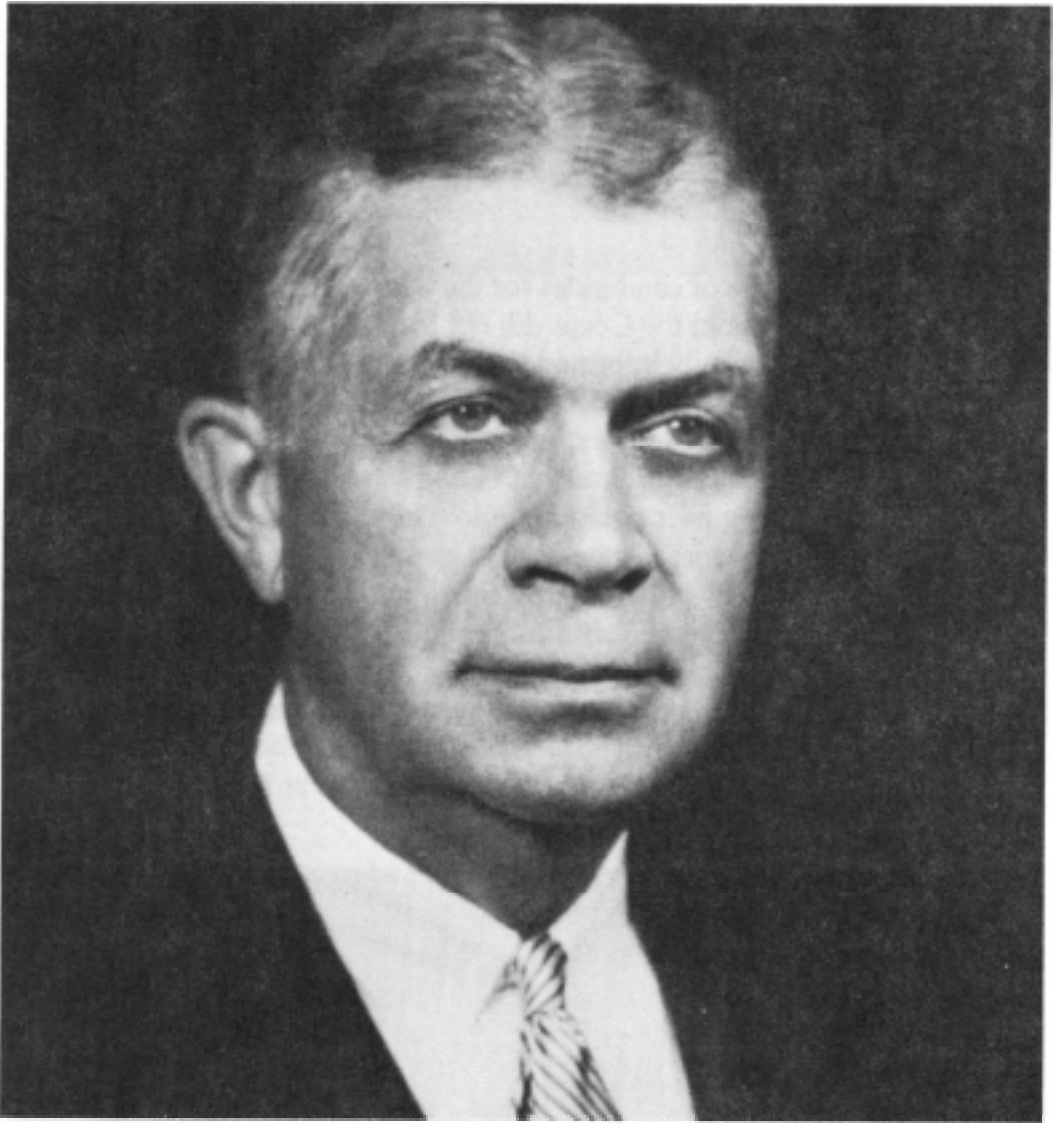
Navy Bureau of Yards and Docks to a favorable position over the Corps of Engineers.” Sturgis also feared that highly placed naval officials and the American Society of Civil Engineers, under the leadership of some prominent civil engineering firms, were engaged in a “very careful calculated plan” to make inroads into “the largest block of public work both military and civil—namely that of the Corps of Engineers.” The Chief of Engineers saw as evidence of the pattern the attacks by Senator Lyndon B. Johnson on the Corps, the formation of a private civil engineering contract group for Air Force construction in France, and the loss of construction projects in building United States bases in Spain.²²

Equally disturbing to General Sturgis was uncertainty over the Eisenhower administration’s approach to civil works. The President’s desire to keep down federal spending might make public corporations more likely in future civil works projects. As the St. Lawrence Seaway project received final approval, the President and members of Congress called for greater cooperation among federal, state, local, and private interests in the development of power in federal multi-purpose projects. Receiving much attention, for example, in that spring of 1954 were the Cougar and Green Peter projects in the Willamette River Valley in Oregon.²³

In any event, Sturgis wanted to assure that if public corporations were to be used for civil works, the Corps would continue its traditional role in such projects. Sturgis, therefore, campaigned to make certain that the Corps would get the Seaway assignment. He and his close subordinates, Generals Robinson and Chorpening, began with the Department of Defense itself. With the Eisenhower administration still inexperienced, the Engineers had to make a strong case to the upper reaches of the Defense Department to ensure support of the Corps’ role. The Secretary of Defense had direct access to the President, and both ultimately supported the Corps’ role in the Seaway. Once top-level support was secured, the key issue to Sturgis was to see that the new public corporation came under the control of the Secretary of the Army, something that eventually happened. The arrangement proved advantageous as the public corporation reported to the same office that the Engineers reported to, a common superior authority most solicitous of the interests of the Corps.²⁴

Sturgis, for his part, did his best to establish good relations with the Development Corporation’s administrator, Lewis G. Castle. The administrator would decide what agency would construct the Seaway for the Corporation. Continued good relations with Castle—a Duluth banker, long involved in the lobbying to get the Seaway project approved, who had had numerous dealings with the Corps over the years—were essential.²⁵

Sturgis openly cultivated Castle, both before and after he was formally named administrator of the St. Lawrence Seaway Development Corporation, and made the Corps available to the Corporation to help it get established. The Deputy Chief of Engineers, General Robinson, and his staff worked closely with Castle and his associates in revising the cost estimates for the project. Robinson also advised Castle on how to go about coordination with PASNY on technical issues. Robinson thus made the most of his position as head of the American section of the Joint Board of Engineers that had been set up to oversee the power works being built by PASNY and HEPSCO.²⁶



Lewis G. Castle, Administrator, St. Lawrence Seaway Development Corporation (1954-1960).

St. Lawrence Seaway Development Corporation

By the end of July, Sturgis believed that Castle favored giving the Corps the job. The Chief continued to make the Corps' case at every opportunity, although thinking it better to be indirect, talking "very tactfully on the outer fringes." Sturgis, for example, arranged for Castle to fly back to Washington with him after the Chief had given a speech in Duluth about the development of the city's port. Castle had flown out to Duluth with Robinson. Sturgis and Robinson had gone to great lengths to clear the speech with Castle and to take his suggestions for changes. As it turned out Castle's suggestions were useful, softening some points that the administrator thought might have been too strongly put for the Chief's audience. Castle, however, was under some pressure not to choose the Corps for the project, and Sturgis did not want to be too overt for "it would be only embarrassing if I decided to press him" directly.²⁷

One of the most serious of the local problems in the Great Lakes area that Sturgis had to address involved N. R. Danielian, president and treasurer

of the Great Lakes-St. Lawrence Association and editor of an influential business publication, *The Heartland*. Danielian was an influential figure in the area because of his tireless efforts on behalf of the Seaway project. Danielian, however, proved troublesome to the Corps. For one thing, he opposed giving the planning and construction assignment to the Buffalo District-according to Great Lakes Division Engineer Colonel Wendell P. Trower, Danielian thought it “would ‘downgrade’ the job too much.” In addition, Danielian was promoting his own slate of candidates for the Seaway Corporation’s Board of Advisors-many of whom the Corps did not like. Danielian resented that the Corps did not keep him fully informed about improvements in harbors and the connecting channels of the Great Lakes, tolls, and the like. And, after congressional approval of the Seaway, he wanted to assure a continued role for himself and his association in issues affecting the Great Lakes area. In any event, the Division Engineer could not allow him the level of interference in Corps affairs that he wanted.²⁸

Sturgis, as well as others in the Corps, personally disliked Danielian, but the Chief did his best to mollify him. He enlisted the assistance of other influential people from the area such as Castle and Congressman George Dondero, one of the most prominent sponsors of the Seaway bill, to keep Danielian in line. Unfortunately, Sturgis and Danielian had exchanged harsh words in December 1953. Danielian, whose main concern had been a seaway,



N. R. Danielian, President and Treasurer of the Great Lakes-St. Lawrence Association.

St. Lawrence Seaway Development Corporation



Colonel Wendell P. Trower, North Central Division Engineer (1951-1955).

not who built it, had acted “cocky” once the Canadians decided to build a seaway themselves. To his face, Sturgis called Danielian a “damn fool,” and no doubt some of the trouble that Danielian caused for the Corps was the result of this incident.²⁹

Sturgis also had to confront political problems on other levels. Senator Hubert H. Humphrey of Minnesota had come out in support of former Chief of Engineers Lewis A. Pick as deputy administrator of the Seaway Corporation. Pick had had close ties to President Truman and the Democratic party, and although Sturgis did not believe that a Republican administration would choose him, the maneuvering in favor of Pick was watched closely. The fear was that Pick would want a separate district, reporting directly to him, created to build the Seaway.³⁰

Another problem was that some of the people, friends from the private sector, influencing Castle’s personnel decisions were hostile to the Corps. But Sturgis concluded that ultimately there was little he could do about such hostility, and he concentrated his energies where he thought they would do the most good.³¹

Within the Defense Department itself, the Corps made its case for getting the assignment by reviewing its lengthy history of involvement in similar projects and its general experience with the Canadians. Under long-established law and custom, the Corps had been responsible for the planning, construction, maintenance, and operation of federal navigation works. In the Great Lakes area, the Corps’ involvement went back over 100 years, and the

Engineers had been responsible for the major plans for the navigation and power improvements in the St. Lawrence. Aside from that experience, the Corps underscored the fact that it had worked closely with the Canadians before, especially since 1909 when the Boundary Waters Treaty had established the International Joint Commission on the St. Lawrence. Indeed, this was only one of several joint American-Canadian boards having responsibility over boundary waters on which the Corps was represented. Another argument the Engineers made both within and outside of the Department of Defense was that the experienced Buffalo District could promptly expand “to handle the design and construction” of the Seaway.³²

While Sturgis wanted the Corps to get the assignment, he worked hard to ensure as much autonomy as possible for the Engineers as construction agent. The Chief of Engineers thought it essential that the Engineers have full responsibility for the construction. In part this was a result of Sturgis’ respon-



Martin W. Oettershagen, Administrator, St. Lawrence Seaway Development Corporation (1961).

St. Lawrence Seaway Development Corporation

sibility to protect the Corps' reputation. Freedom to do what they knew best—engineering and construction—was very important. One way to guarantee this independence was to have a Corps officer appointed deputy administrator of the St. Lawrence Seaway Development Corporation. The Chief also wanted to influence the make-up of the Corporation's five-man advisory board. He would have liked to have seen an Engineer officer experienced in navigation works and a civilian familiar with Great Lakes port management and shipping, someone likely to be a supporter of the Corps of Engineers, appointed.³³

As it turned out, the Corps received wide latitude for planning, designing, and constructing the project. It did not, however, have as much influence on the Corporation's board as Sturgis had hoped, nor did Castle appoint an engineer officer as deputy administrator. Castle insisted on greater distance from the Corps and appointed a deputy and a board of his own choosing. Sturgis confided to Chorpening in an "eyes only" memo that he was "not too happy" about the board members' general lack of relevant experience. Most disappointing, however, was Castle's appointment of Martin W. Oettershagen, a private engineer, as deputy administrator, Oettershagen, a Chicagoan, had wide hydraulic engineering experience in the Great Lakes area.³⁴

Despite the jockeying over the Corporation appointments, General Sturgis could take comfort in the fact that the Secretary of Defense, to whom the Seaway Corporation was responsible, had designated the Secretary of the Army as the official to whom the Corporation's administrator was to report. This made the final authority an individual sympathetic and understanding of the Corps' approach to civil works projects. On a more general level, Corps officials argued that the arrangement was sound administratively and an improvement over "accepted procedures of one federal department doing work for another in that both the Corps and the Corporation would be directly responsible to the Secretary of the Army."³⁵

Ultimately, the Engineers were not happy with their subordinate role vis-a-vis the Corporation. Sturgis thought it important that eventually the operation and maintenance of the Seaway become the responsibility of the Corps. As early as December 1955, only a year after the advertisement of the first contract, Sturgis ordered drafted proposals for the Corps' taking over operation and maintenance of the Seaway when completed. The issue was not finally determined, as we shall see, until 1958. And the Corps gained the enmity of both Corporation and Bureau of the Budget officials over the attempt to wrest that responsibility from the Corporation. But Sturgis was concerned about proper maintenance of the Seaway, not bureaucratic power plays. Lax maintenance, he feared, would lead to deterioration that would ultimately reflect badly on the Corps.³⁶

Underlying much of Sturgis's concern about the Corps' authority in the project was that he saw the Corporation making an already complex project even more so. The Seaway was to be built under the supervision of, from the Corps' point of view, a thoroughly inexperienced organization. The Corporation, in that context, heightened the possibility of both cost overruns and failures to meet deadlines. And at that time, when the Republican administra-

tion was looking for ways to reduce government spending, the Corps believed that it could not afford to be associated with a project that went over budget and missed deadlines. The St. Lawrence Seaway was simply too visible a project. These fears led the Engineers to insist on elaborate rules for inspection of works and formal procedures for approval of the works turned over to the Corporation as the project was completed.³⁷

Sturgis's problems were not limited to his dealings with external authorities and organizations. He had to face internal problems too. Corps personnel were dismayed, if not angered, that it had taken the Corporation from May to September 1954 to designate the Corps as its construction agent. Sturgis had to issue several directives reminding his subordinates of the need for cooperation with the Corporation. In one such directive, he ordered Chorpening and Trower to make clear to all concerned with the project that they "be frank, fair, and . . . give full recognition to the responsibilities of the Seaway [Corporation]." He went on to say that "we must fully and freely recognize that it is *not* an ordinary project. . . ." (Sturgis's emphasis). What the Chief wanted remembered, however, was "that under present philosophy and trends, [the Seaway Corporation] may well be the forerunner of other Government corporations." For that reason, the Corps "must aim to build a record of confidence, trust, and cooperation . . . that will recommend and stand us well in the future." Such a record would assure that the Corps continued to be chosen as the construction agent on such projects.³⁸

Morale was not the only internal consideration. As the power and navigation projects seemed more and more likely to receive congressional approval, Sturgis faced internal organizational decisions in 1953 and early 1954. As early as 1951 the Assistant Chief of Engineers for Special Projects, Brigadier General William E. Potter, had proposed the creation of a special district at Massena to construct the St. Lawrence Seaway and power projects. He had argued that the creation of a special district, which had been done on earlier projects, was justified because of the complexity of the proposed Seaway. His proposed Massena district, the early proposals advocated, would serve as a place to oversee the several projects that were to go into the overall task of the Seaway and power works. Each job would have been assigned to one project manager who would have reported to the top levels of the Corps. Much discussion followed, but no firm decisions could be reached about organization until it was clear whether the Corps would be responsible for a joint project, if any.³⁹

Sturgis and his subordinates began to focus more clearly on the organizational issues raised by the project once the Federal Power Commission began to take seriously the State of New York's application for a license late in 1952. So long as it seemed there was a chance that the Corps might be responsible for both the power works and the improvements in navigation, setting up a separate district remained a possibility. Once it became clear, however, that New York's Power Authority would not turn over the power works construction to the Corps, the organizational questions changed. Sturgis, Chorpening, and Robinson concluded that a separate district would not be necessary if the Corps' likely assignment would be in constructing the



Major General William E. Potter. As a brigadier general, Potter was the Assistant Chief of Engineers for Civil Works (1949-1951) and the Assistant Chief of Engineers for Special Projects (1951).

Seaway alone. The question then was what, if any, reorganization might be necessary within the Engineers to deal with the navigation project.⁴⁰

The initial organizational issue raised by the possibilities of the St. Lawrence navigation project centered on which Division should be assigned the task, the North Atlantic or the Great Lakes Division (which became the North Central Division on 1 September 1954). After studying the alternatives, the project was assigned to the Great Lakes Division primarily because that Division had considerably less work scheduled for it than the North Atlantic Division.⁴¹

Technical considerations also figured into the decision. "While careful adjustment of workloads between Divisions is a desirable objective," Chorpene observed, "Civil Works is of the opinion that the regional economic and physical aspects of the Great Lakes-St. Lawrence Basin should be given primary consideration. The close inter-relationship between hydrologic and hydraulic aspects with design and operational criteria is obvious."⁴²

The Great Lakes Division, particularly the Buffalo District, had the experience and expertise to deal effectively with the regional economic and physical aspects involved in the project. Watershed boundaries were not always the controlling factors in determining Division boundaries, but most of the American portion of the Great Lakes drainage basin was within the Great Lakes Division. Water uses in the Great Lakes were so interrelated that it sim-

plified the Corps' responsibilities to have projects within that system under the jurisdiction of the one Division. The Lake Survey District, one of the Districts in the Great Lakes Division, had been conducting topographic and hydrographic surveys as well as maintaining records of lake levels and outflows in the region since the 1840s. In 1952 that District had begun a water-level survey and study aimed at developing a coordinated system of lake regulation. The work included the upper reaches of the St. Lawrence, which affected the regulation of Lake Ontario. One of the survey's goals was to project the effects of power and navigation development, particularly silting, shore erosion, and flooding. Because of that project, Colonel Trower, the Great Lakes Division Engineer, maintained that his Division could best resolve problems that developed over the hydraulics of the system's outflows into the St. Lawrence River.⁴³

The Great Lakes Division's navigation experience also influenced its receiving the Seaway project assignment. And, in gaining its knowledge of the problems of Great Lakes navigation, the Great Lakes Division had developed close relations with shipping and port interests. Navigation requirements on the St. Lawrence were to be similar to those on the Great Lakes. Indeed, the Seaway was to be an extension of the Great Lakes navigation system. As Trower put it, "the work in the International Rapids Section would be merely an extension of the type of work in which the Great Lakes Division will be engaged in the connecting channels [among the Great Lakes] and of the type with which it is thoroughly experienced."⁴⁴

While Sturgis did not want the Great Lakes Division to think of the work on the connecting channels and the Seaway project as one and the same, he nevertheless found the Division's arguments convincing as its work had also given it long-term experience in working with the Canadians. The Division had harmoniously negotiated boundary-water issues with them for decades. This was an important consideration, since the work in the International Rapids section of the St. Lawrence was going to raise complex new issues that would have to be resolved in close cooperation with the Canadians and with local interests.⁴⁵

Once the determining factors were discussed, Sturgis quickly assigned the St. Lawrence project to the Great Lakes Division. By doing so early, in June 1953, he limited time-consuming jockeying over the issue within the Corps and gained preparation time for those assigned to the project. Congress soon began discussing the project again, and contractors and engineering firms began to approach the Corps about future contracts. Indeed, once the project was approved, prospective bidders increased their pressure on the Corps. The Engineers were thus placed in a difficult position since they had to wait several months before formally receiving the assignment as agent for the Seaway Development Corporation. During that time, bidder inquiries increased, and Sturgis, wanting to give full answers, ordered preliminary planning.⁴⁶

The major reason, however, for Sturgis's expeditious handling of these preliminary matters was the fact that the Seaway, if approved and assigned to the Corps, would be on a tight schedule. The navigation works were closely tied to the power project, and the state and provincial authorities involved were anxious to get it done as quickly as possible. They needed to generate revenues

to begin paying off the project's indebtedness. Moving quickly on the work was essential to allow the most time for planning and construction. Updating all of the plans would require "considerable work." In particular, the mechanical and electrical features of the locks, Trower thought, were going to take a great deal of time and attention. Moreover, the need to work with the Power Authority of the State of New York on a "fractionalized," instead of the originally proposed "comprehensive," project was going to increase the time needed to complete it. Bureaucratic coordination was always time consuming.⁴⁷

The ability of the Great Lakes Division's Buffalo District to quickly prepare for the project had been a compelling justification for giving the assignment to that Division. Buffalo lived up to expectations by beginning preliminary work on organizing and planning for the project three weeks after Sturgis's approval to proceed with planning. Colonel Trower set things in motion by requesting that the old St. Lawrence River District files, which formed the basis for the 1942 report, be transferred to the Buffalo District from the North Atlantic Division.⁴⁸

Thus, early in 1954, as Congress considered the project for the last time, the Corps had already spent six months preparing itself in anticipation of eventually getting the assignment. During the summer and fall of 1953, Trower and his staff worked with the Buffalo District Engineer, Colonel Philip R. Garges, to finalize the organization and procedures that would be needed to construct the navigation works of the St. Lawrence Seaway. They submitted their report to Sturgis and Chorpening on 11 January 1954.⁴⁹

This joint Division-District report outlined the fundamental organization of the project. It also anticipated design revisions which would be necessary to permit separate construction of the navigation and the power projects, since the original 1942 report had based its plans on a joint, or comprehensive, power-navigation project. On 25 February 1954, just after Congress started debate on the Seaway, Trower and his staff were called to a meeting at the Office of the Chief of Engineers. At that meeting, participants went over details of the proposed organization. The Office of the Chief questioned several aspects of the plan, including the need to set up, for example, a separate St. Lawrence Seaway branch in the District office. Other matters discussed included the assignment of specific individuals to fill the jobs the project would create, as well as more mundane questions about the necessary office space in Buffalo and at the Division's headquarters in Chicago. Most questions were over matters of detail. The overall plan to organize the work on the St. Lawrence navigation improvements was approved as outlined in the joint report.⁵⁰

In working up their plan of operations, Trower and Garges had tried to estimate the time necessary to update designs and specifications for advertising. They had also sought to take into account technical progress since 1942 and the fact that the power and navigation works were to be built by separate entities. This effort had been necessary in order to estimate the size and cost of the needed engineering staff. Fundamentally, the organization of the navigation project revolved around assignment of operating responsibility for all phases to the Buffalo District Engineer under the supervision of the Division

Engineer in Chicago. Buffalo was to have responsibility for designs, plans, and specifications. As mentioned earlier, acquisition of the land necessary to complete the project was to be handled by the real estate branch of the Buffalo District. That branch would have to be expanded to meet the anticipated increased demands of the project, even though much of the real estate acquisition was to be handled by the Power Authority of the State of New York. Buffalo had no difficulty with this latter procedure as it had just completed the Mount Morris Dam in New York and the acquisition of necessary real estate on that project had been accomplished by the state authorities. Supervision and inspection in the field were to be accomplished by a St. Lawrence Seaway Area Office located at or near Massena. Since Massena was a small town, the actual location had much to do with whether or not sufficient housing could be found for the assigned staff. A similar problem affected overall construction—the joint power and navigation works were estimated to require about 8000 workers, most of whom would move to the area.⁵¹

The Division-District report of January 1954 provided detailed plans for this field supervision of the works, which would cover about 31 miles of river. Each of the locks—originally planned at three but later reduced to two—were major works requiring on-site personnel to ensure efficient construction and effective inspection. Essentially, both the Division and the District proposed a decentralized administrative structure. The canals, locks, dikes, dredging, and relocation aspects of the project each lent itself to fairly clear divisions for the purposes of supervision and inspection. The coordination of the major phases of construction, top-level field supervision, assignment of laboratory tasks, and basic administrative support would be the responsibility of the area office. The latter was initially to be in Buffalo, although later to be assigned to Massena once the project was fully under way. The area engineer was to be responsible directly to the District Engineer, although his operation was to receive staff support and supervision from the Division level. Division Engineer Trower estimated that this arrangement would provide necessary field supervision at a cost of about 3.8 percent of the total cost of the Seaway. Staffing estimates, which were for the most part later reached, were placed at 186 for maximum strength at both the area and District offices.⁵²

The District and Division offices had worked out tentative schedules of letting contracts, estimating that they could award contracts for excavation within three to four months. Buffalo anticipated that within one year they could place the major contracts for lock masonry, gates, and machinery. Both the District and the Division anticipated that the major problems would be timely acquisition of necessary real estate, coordination of construction of navigation works with those for power development, and coordination of some aspects of excavation and dike construction with New York State and Canada.⁵³

As thorough as the January 1954 joint report was, the Chief of Engineers had to decide whether to go further and make more detailed studies and plans even before the program was approved by Congress. General Sturgis ordered that such studies be made, something that the joint report advocated. Much needed to be done to complete all the necessary engineering studies, designs, plans, and specifications. The Engineers began a

detailed review to thoroughly analyze all features of the project and to develop a detailed engineering program. Buffalo estimated that the necessary work would require about "15 or 20 months" to complete. Sturgis's decision to go ahead was important for the later comparatively on-schedule completion of the project. Trower proposed to assign five or six engineers to the project for three to four months of intensive work. Receiving general approval to proceed, the Division Engineer then informally requested supplemental funds to recruit personnel and begin the review of existing plans to determine the extent of additional design work needed.⁵⁴

The result of these studies was that by the summer of 1954 the Chief had three design memos reviewing the 1942 plans, recommending necessary changes, and showing in detail the scheduling and organization necessary for the project. Once these studies were in hand, Sturgis called a two-day meeting in August 1954 in Washington for a full-scale review. The meeting, attended by the Division and District Engineers and their staffs, as well as several representatives from the Chief's office, discussed what in fact were to become the on-going issues of the navigation project: whether there were to be two or three locks, changes in guide walls from 1942 suggestions, problems of relocating utilities, the use of hydraulic models, relations with New York's Power Authority, etc. Perhaps the most important result of this gathering was the determination of a construction schedule and agreement "on the design criteria which were within the authority of the Office, Chief of Engineers to decide."⁵⁵

Trower's staff, by this time, had already begun subsurface explorations and other field work. They were also recruiting personnel for the engineering division of the Buffalo District so that design work could be completed. These early efforts enabled them to complete several other design memos soon after the Corps formally received the assignment as the Corporation's construction agent on 17 September 1954. Design memos IV(A), V, and VIII dealt with excavation and a comprehensive review of design criteria for the important Long Sault Canal. The memos were completed by the Buffalo office in October and December 1954 and February 1955. While these documents were subject to extensive review, their early completion contributed to the timely beginning of work on the Seaway. Indeed, the Corps was able to issue advance notice to prospective bidders for construction on 27 October 1954.⁵⁶

The Corps and the Corporation

The Corporation ultimately assigned broad authority to the Corps in the construction of the St. Lawrence Seaway. Nevertheless, the relationship between the two organizations was to prove a difficult one. In large part, this resulted from the Corporation's responsibility for the overall coordination of the project. Both the Corps and the Corporation had a large stake in the success of the Seaway. The Corps' task was more clearly focused than that faced by the Corporation. The Corporation had to pay attention to many problem-strewn facets of the project, among them a responsibility to Congress for assur-

ing that toll funds would be adequate to pay off the Seaway's construction debt. It also had the responsibility for dealing with the Canadians on all levels including political, financial, and legal.

One source of great tension between the Corps and the Corporation was the Corps' sense of Corporation "interference." For its part, the Corps wanted the project to be a success, that is, completed on time and at a cost somewhere near estimates. General Sturgis was determined that the relationship between the Corps and the Corporation be a good one. Nevertheless, the fact remained that officers in the Corps felt that the Corporation did not fully understand the complex engineering and construction problems involved in the Seaway project. As a result, personnel in the North Central Division and the Buffalo District expressed concern at times that the Corporation's procedures were slowing the project.

The Engineers, however, had to face the fact that Congress had given final responsibility for the Seaway to the Corporation. To be sure, the formal requirements of the enacting legislation gave way in practice to informal working relationships. Relationships which, despite the tensions created by teaming two such differently structured organizations, grew out of warm and cooperative interaction between individual Corps and Corporation officials. At the highest level, for instance, Sturgis was able to empathize with the problems Castle faced, such as maintaining good public relations and being wary of critics waiting for a slip-up in order to denounce the entire project.⁵⁷

In any event, Castle formally notified the Secretary of the Army in September 1954 that the Corps was to be the Corporation's design and construction agent for the navigation project. At the last minute, however, he made the Corps apprehensive about its role. On 2 September, in a letter to the Secretary of the Army, he formally requested the Corps of Engineers "to render certain services to this corporation in connection with the St. Lawrence River navigation project" In that request, perhaps unintentionally, he left vague the critical issue of authority and command in supervising construction. The Corps was to exercise "such supervision of construction operations as may be, from time to time, delegated to the U.S. Army Corps of Engineers by the St. Lawrence Seaway Development Corporation." Sturgis wanted a clearer statement of responsibility. On 17 September, Castle responded with a letter "in amplification of that [2 September] letter," in which he requested the Corps to serve as the Corporation's "agent for design and construction," specifically delegating to the Engineers "field construction supervision including job control to assure compliance with contract provisions." Nonetheless, "all of the activities assigned to the Corps of Engineers will be subject to the general direction, review and supervision of the Administrator or his designee."⁵⁸

While the second letter was better than the first, Sturgis later regretted not having further clarified the relationship. A little over a year later, in November 1955, he observed that "Perhaps anxiety to get the job curbed proper foresight." By then, organizational differences were readily apparent and he was bothered by breakdowns in the Corps command structure and the potential of "decisions by the Seaway [Corporation] which in our opinion are against sound engineering and economics."⁵⁹

Despite these concerns, on paper at least the Engineers were given broad authority for the acquisition of lands needed for the project; for the design of the navigation works; for the planning of construction and preparation of specifications and contracts; and for the actual supervision of the construction of the Seaway. All of these responsibilities were to be fulfilled by the office of the District Engineer in Buffalo, which, as we have seen, had begun work on the plans several months before the Corps' assignment as the Corporation's agent.

The relationship between the Corporation and the Corps in practice was more complex than the designation "agent" implied. The St. Lawrence Seaway Development Corporation was charged with overall supervision of the project and of the funds appropriate to build the Seaway. As a result, the Corporation required oversight over the responsibilities delegated to the Corps. This requirement became the area where the Corps and the Corporation tended to offend the sensibilities of each other. Both were engaged in a new experience. The Corporation, a newly created entity, had obviously never undertaken such a project before. In contrast, the Corps had vast experience in such civil works projects, but had never had to work so clearly in a subordinate role.

Despite Sturgis's later misgivings, an elaborate set of understandings, attempting to describe in detail the role the Corporation was to play in the Corps' work, had been worked out in the fall of 1954. The Corporation had to give formal approval to all matters which in the Corps' experience on similar projects had been submitted to the Chief of Engineers. Such matters were to be forwarded through command channels to the Chief's office, whence they would be transmitted to the Corporation. The arrangement also stipulated that the Corporation must endorse plans and specifications which were normally reviewed and approved by the Division Engineer and not forwarded to the Chief's office for further review.

To facilitate planning and scheduling, the Buffalo District office was to prepare a design memorandum for each major part of the project. To avoid repetition of certain overall procedures and design criteria, a General Design Memorandum (Design Memo IV) covered such issues as hydrology and geology. That memo was to be supplemented by specific design memoranda for the various major elements of the project. Each of these latter memoranda was to cover all engineering aspects and contain detailed design criteria and design analyses.⁶⁰

Eighteen of these design documents were approved in 1954. Once they were approved by the Chief of Engineers and the Corporation administrator, the Buffalo District office would prepare the final plans and the detailed specifications for each of the contracts to be let as part of the project. The detailed plans and specifications were then to move through channels—North Central Division and then the Office of the Chief of Engineers—eventually to be reviewed and approved by the Corporation administrator. In submitting its plans and specifications, the Buffalo District followed standard Corps procedure and kept to a schedule previously prepared by Colonel Trower. The District also submitted advertisements for contracts and progress reports according to that schedule.⁶¹

Accounting methods also followed standard Corps procedures. The project was broken down into its various worksites and component features. Costs were then estimated for those elements. That initial project breakdown served as the basis for all subsequent scheduling, budgeting, accounting, and reports of work performed. This strict accounting allowed both the Corps and the Corporation to keep abreast of costs, as well as enabling the Engineers to prepare a detailed project schedule. This schedule established the work that was to be performed, the chronological order by which it was to be completed, and the work's estimated cost. This standard Corps procedure allowed both the Engineers and the Corporation to plan for the orderly allocation of necessary funds, even though there would be changes in estimates, plans, and schedules.⁶²

To ensure time for full review by both the Corps and the Corporation, the Chief's office wanted about two to three months lead time on the design memos before the plans and specifications were worked up. That much time was not always necessary, especially with the first several contracts which were for relatively simple excavation projects. Nor was it always available as there was pressure from congressional supporters to get the project under way as quickly as possible.⁶³ A shorter time—four to six weeks—was anticipated for the necessary review and approval of the plans and specifications based on approved design memos. Work was to be advertised for 30 to 45 days; two weeks were scheduled for the consideration of bids.

Plans and specifications, however, were not the only matters subject to the Corporation's review. Contracts for more than \$100,000 had to be approved by the Corporation as well as being recommended by the Corps of Engineers. Contracts for under \$100,000 were subject to the approval of the District Engineer. Contract modifications involving more than a ten percent change in costs had to be coordinated with representatives of the Corporation.⁶⁴

Both the Corps and the Corporation carefully laid out inspection procedures. The Engineers were sensitive about these inspections. The Corps had its reputation to protect on general principles, but more specifically it had to accede to the wishes of a corporation with little experience in what was to be undertaken in building the St. Lawrence Seaway. The Corps insisted that the Corporation's oversight be no more than part of its general supervisory responsibilities; the Corporation was not to relieve the Corps of Engineers of any of its direct responsibility for the project. The Corps wanted to ensure that if there were problems, they would be addressed immediately, preferably in the field where the inspection was being made. To protect itself against criticism after the fact, the Corps insisted on a highly formal procedure of turning over the project to the Corporation. As the various contracts neared completion, representatives of both the Corps and the Corporation prepared for a joint inspection of the completed work to ensure that all requirements of the contract had been satisfactorily met. The Corps and the Corporation also elaborated a procedure for formal transfer of completed sections of the project. The Corps would formally notify the Corporation that particular part of the project was ready to be turned over to them, and the Corporation would then formally accept the completed work.⁶⁵

One of the more complex tasks of the Seaway project would be relocation of highways, railroad track, electric transmission lines, and water and sewer pipes. In most instances, these projects were less engineering and construction problems than they were tasks requiring legal, political, and public relations expertise. Because of the potential for legal and local political problems, the Corporation insisted on having a representative involved in all negotiations on relocation issues.⁶⁶

To achieve the necessary coordination between the Corporation and the Corps, the former established an office in Buffalo. While the formal procedures were carefully followed for most of the project, informal contacts grew and proved essential to the completion of the Seaway. From mid-1955 through 1958, when the project was almost complete, informal coordination conferences were held almost every two weeks. These meetings provided Corps, Corporation, and New York Power Authority personnel an opportunity to stay abreast of progress as well as problems.⁶⁷

This informal coordination was essential as a breakdown in working relationships could have delayed the entire project. Attention had to be paid to every serious issue that arose. Since so many parts of the complex project were related to other parts, a delay in one area had the potential of delaying the entire Seaway's completion. And neither the Corporation nor the Corps wanted delays. The Corporation always had to keep an eye on its critics, who would pounce on delay as an example of inefficiency. The Corps was sensitive to the fact that whether responsible or not, the Corporation might blame the Engineers for delays. The project remained remarkably on schedule for the most part, and that achievement can be attributed to the fact that the Corps had had extensive plans for the project ready by the time the Corporation chose the Engineers as its construction and planning agent. It was also a result of the two organizations working hard at cooperation despite Corps unease at being ultimately responsible to the Corporation, and the latter's sense that the Corps was trying to undermine its authority.

Chapter III

BUILDING LONG SAULT: NEW ARRANGEMENTS AND TRADITIONAL PRACTICES

In constructing the Seaway, the Corps had to create workable arrangements not only with the St. Lawrence Seaway Development Corporation and the Power Authority of the State of New York, but also with the St. Lawrence Seaway Authority, the Hydro-Electric Power Commission of Ontario, the Federal Power Commission, the St. Lawrence Joint Board of Engineers, the New York Central Railroad, the New York State Department of Public Works, and the Mohawk Indians. Thus, in addition to its traditional concerns for designing, scheduling, contracting, and inspecting, the Engineers had to cope with a complex organizational environment. This chapter examines how the Corps worked out administrative arrangements for dealing with the other agencies having responsibility for the improvements in navigation and the power works. This chapter also examines how these procedures translated themselves into practice in the construction of Long Sault Canal which contained the two major American lock projects. The next chapter will treat how the Corps carried out the other improvements in navigation in this difficult environment.

Being only one of a number of agencies with interest in and responsibility for the Seaway, the history of the Corps' involvement in building Long Sault is in one sense very much a matter of how the Engineers coped with a complex organizational environment. It is an account of trying to follow standard practices and procedures in changeable circumstances in the glare of public attention. The Seaway attracted more general public notice, especially in the Great Lakes area, than many other civil works projects. While much of the television, newspaper, and magazine coverage was supportive of the project and the Corps' role, the Engineers nevertheless had to be attentive to public sentiment. This was especially true in the Massena area where lands were being condemned for the project. At the same time, the Seaway continued to run into political opposition. Opponents of the project looked for delays and increased costs in order to justify renewed attacks, and, although the Seaway Development Corporation bore the brunt of these attacks, the Corps was not spared.

In addition to the complex organizational situation, constant public attention, and politically-motivated scrutiny, the Corps also encountered problems typical of construction projects: changed conditions at worksites, defaults by contractors, bad weather, labor shortages, unavailable supplies, and the like. But the Engineers had long experience in coping with these kinds of problems. Indeed, their expertise in this regard contributed much to the completion of the Seaway on schedule despite fundamental changes in design,

scheduling, and contracting which led to tighter schedules and a greater sense of pressure.

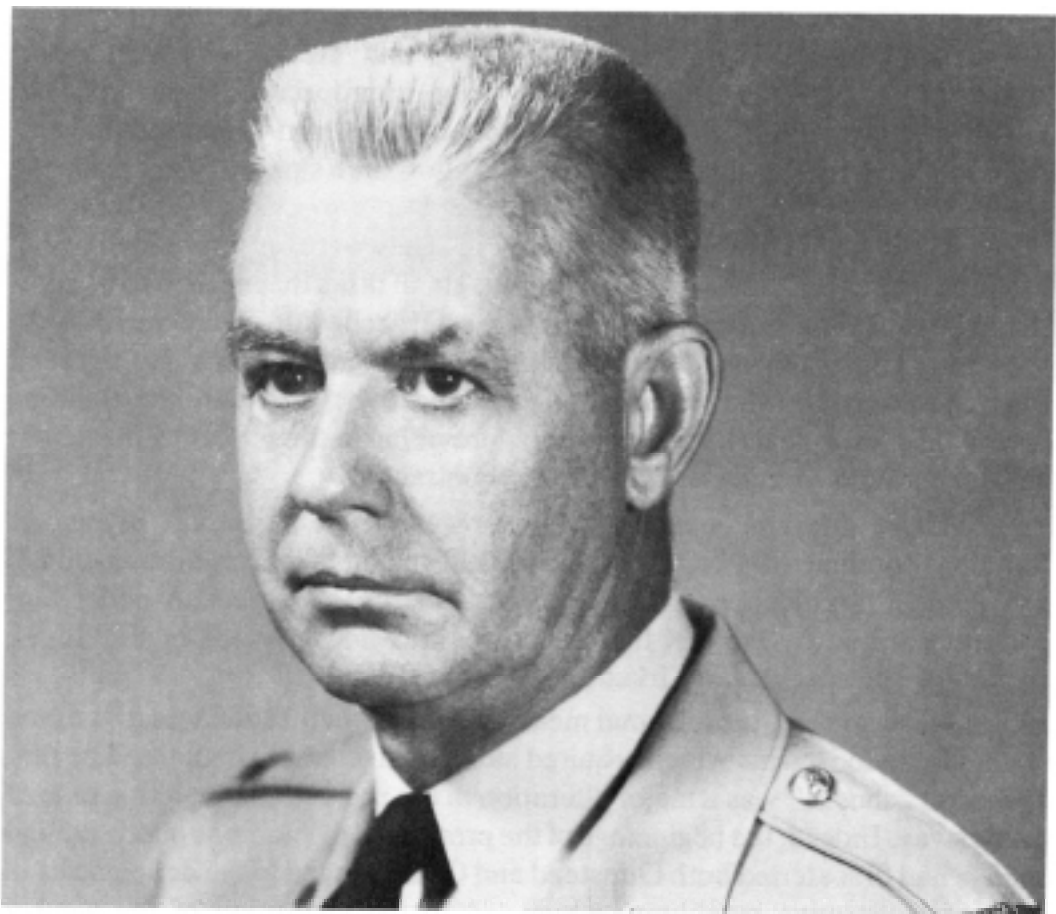
The complexities of the project forced Corps officials to adhere strictly to standard design, schedule, contract, and inspection procedures; to deviate from them would have opened the possibility of further delay and increased costs. Use of those procedures also allowed the Engineers to be flexible in their dealings with the many other public and private agencies involved. That flexibility, particularly the ability not only to recognize but also to accommodate the interests of other groups, helped build good will and minimize confrontation. And confrontation was to be avoided since it resulted only in delay.

Work Begins

January 1955 saw the first bids advertised for the St. Lawrence Seaway project. And, as the April groundbreaking ceremonies approached, the Corps and the St. Lawrence Seaway Development Corporation refined their administrative procedures and began working up final schedules, designs, and cost estimates. Meanwhile, the preliminary work had to be carried out: the acquisition of land and the relocation of people, roads, railroads, and power lines. Once these tasks were completed, work could begin on the canal and locks in Long Sault. This early work, however, was disrupted by two changes that caused strains on the working relationship between the Engineers and the Corporation which resulted in further changes in their organizational arrangements.

The first of these changes was the insistence of the Power Authority of the State of New York and the Hydro-Electric Power Commission of Ontario that the power pool be raised earlier than originally planned. This change required substantial revisions in timetables for the completion of the Long Sault Canal and its two locks at Grass River and Robinson Bay. The second change resulted from the New York Central Railroad's decision to abandon its branch to Ottawa which crossed the St. Lawrence River near the site of the Seaway.

Neither the Corporation nor the Corps anticipated these changes as they set to work in late 1954. As mentioned earlier, the Buffalo District office became the key point of contact between the Corps and the Corporation. The Corporation set up an office in Buffalo which was headed by Deputy Administrator Martin Oettershagen. The Buffalo District Engineer, Colonel Loren W. Olmstead, had been assigned responsibility for the Corps' contracting authority. He and his staff of 140 were responsible for engineering design work, preparation of contract plans and specifications, administration of bids and contracts, project scheduling, and construction superintendence. The staff was organized along functional lines—engineering (the largest), legal, real estate, relocation, coordination, etc. The coordination division had been created to keep the Corporation apprised of the Corps' work, as well as to maintain relations with the other agencies involved. In addition to the Buffalo staff, the District also employed another 100 people at the worksites to provide supervision, inspection, and support services. Oettershagen and his staff of



Colonel Loren W. Olmstead, Buffalo District Engineer (1954-1959).

five engineers were responsible for engineering review and general supervision to assure that the Corporation met its responsibilities while the Seaway was under construction.¹

Project operations were divided into major worksites. Each of these was further divided into work “features.” Thus, the Long Sault worksite was divided into such features as the Robinson Bay and Grass River locks, channels, roads, levees, relocations, etc.² Initially, there were three major worksites: Long Sault, Thousand Islands, and Cornwall Island. But as detailed engineering design work and scheduling began, Colonel Olmstead and his staff added a fourth worksite designated as “general purpose facilities and equipment.” This site included those necessary features of the project that did not easily fit into one of the other three: buildings, grounds, utilities, permanent operating facilities and equipment, and navigation aids.³

The design, scheduling, and construction of the project depended on the ability of the Corporation’s deputy administrator and the Corp’s Buffalo District Engineer to create workable administrative procedures. This was not an easy task since both Oettershagen and Olmstead were engaged in an unfamiliar relationship. It took the first half of 1955 before they created an organizational relationship that worked.

At first, Olmstead and Oettershagen planned on monthly meetings to review the progress of design, scheduling, contracting, excavations, and construction.⁴ Informal weekly conferences, however, soon became necessary.

Corps and Corporation personnel were regular participants, with representatives from New York's Power Authority and the New York Central Railroad, for example, in attendance when appropriate. These informal meetings provided the give-and-take Oettershagen and Olmstead thought necessary to reduce misunderstandings and allow both sides to better grasp the other's most pressing concerns.⁵

The weekly meetings were successful. They were forums for discussing issues as well as deadlines for the numerous small tasks that needed to be completed on time if the entire project was to meet its schedule. They were helpful in plotting courses through bureaucratic mazes to gain permits and rights of entry. And they allowed Corporation personnel to get a better understanding of how the Corps dealt with contractors, providing in the process a means for the Corporation to make suggestions to contractors.⁶

These informal meetings were, however, not foolproof. Misunderstandings continued to occur. The Corps believed that the Corporation did not give enough prominence to the Engineers' role in the project. A belief supported, at times, by the fact that the Corps was not informed of VIP tours, something that particularly irked the District Engineer.⁷

Nevertheless, the informal meetings proved their usefulness in the face of unanticipated events which required substantial changes in plans. The first of several "shocks" was a major alteration in the projected completion date of the Seaway. Indeed, the beginnings of the protracted discussions of this critical change had first alerted both Olmstead and Oettershagen to the deficiencies in their administrative machinery which led to the institution of the weekly meetings.

In November 1954 the Power Authority of the State of New York and its consulting construction engineers formally raised questions about the Corps' proposed construction schedule for the navigation works. The new locks had to be ready for traffic at the same time that the power pool would flood the existing 14-foot Canadian locks that St. Lawrence shipping depended on. Both the American and the Canadian power companies were anxious to begin operation of their hydroelectric works. The New York Power Authority, in fact, planned to raise the power pool on 1 July 1958. But the Engineers' construction schedule projected that the Long Sault Canal and its two locks would not be ready for service until 1 September.⁸

The Power Authority argued that the terms of its bond issue required that power be generated by the 1 July date, making an already tight engineering schedule even tighter. Indeed, the 1 September 1958 date already represented a change from original Corps planning. At first, the Corps' schedules anticipated completing the navigation improvements by the beginning of the spring 1959 shipping season. Thus, by accepting 1 September 1958, the Corps had already acquiesced in what it saw as an accelerated schedule to meet the power company's desire to speedily bring the power works on line.⁹

The Corps took the position that the July date would increase costs and "jeopardize good construction practices," since contractors would have to pour concrete during the winter season (November, December, January, and February) 1956. The issue flamed even more when the Corps and the Cor-

poration insisted that if the date were moved up, the Power Authority must pay any additional costs.¹⁰

By the spring of 1955 it was clear that the impasse had to be overcome. Buffalo was at full strength with work proceeding on designs, contracts, advertisements, and schedules. To come to a resolution, the Power Authority suggested that the Corps reduce the contingency periods allowed on the canal and lock contracts, which were to be finished 1 April 1958, with contingencies anticipating a 1 September 1958 date. Buffalo rejected this proposed solution, arguing that the "experience of this office is that all construction jobs are plagued by strikes, abnormal weather, necessary modifications in many cases, unforeseen construction conditions which invariably result in extensions of time to the contractor and delayed completion of contract work . . . For a project as large and as complex, and with the major soil problems involved on the St. Lawrence Seaway . . . [several months for contingencies] is neither abnormal nor excessive." But in the face of the power entities' adamancy, General Robinson accepted the PASNY's argument, with the proviso that if costs rose later because of the accelerated work schedule, the Corps would come back to the agency to negotiate further payment.¹¹

The compromise put pressure on the Buffalo offices. While the basic schedules did not need to be revised or reworked, Olmstead and Oettershagen would have to ensure that contractors remained on schedule. The need for such oversight to meet the new 1 July 1958 deadline made the frequent informal meetings between Corps and Corporation officials in Buffalo essential.

The weekly meetings also helped meet deadlines in other ways. They eased the handling of the complex issues raised in the acquisition of property for the project. New York's Power Authority, responsible for acquiring much of the land, relied on the New York Department of Public Works for most of the detailed work involved in title research, condemnation hearings, and negotiations with land holders. But the Corporation and the Engineers kept a close watch on the process. A speedy and orderly taking of land could forestall price increases, while mishandling land acquisitions could create costly and time-consuming legal questions as well as serious public relations problems.

Land condemnation was one area where the Seaway engendered real local hostility. Both of the state agencies heightened local apprehension by issuing vague statements about what lands would be needed for the project. And Robert Moses, the Power Authority chairman, made matters worse when he discussed the recreational benefits to be gained by the project. Farmers who stood to lose property objected to the taking of their land for such frivolous purposes.¹²

The complex interrelationships among the Corps, the Corporation, the New York Power Authority and the New York Department of Public Works lent themselves to misunderstandings. In the early stages of planning for the project the New York authorities had assumed responsibility for acquiring land in return for the Corps' designing dikes and relocating roads, bridges, railroad track, and power lines. This was a logical division of tasks, since the power project would take more land for flooding the power pool than the Corps would have to condemn for navigation improvements.

While the Corps cooperated with the Power Authority and the Department of Public Works in acquiring land for the project, the Buffalo District's real estate branch occasionally hastened condemnation proceedings. Buffalo District and Corporation officials worried about delaying over a drawn-out dispute over land. The Corps could go to court for condemnation hearings and obtain special writs permitting entry to land not yet finally conveyed to the Power Authority and the Corporation, but these procedures consumed valuable time. In most instances, the Corp's responsibility for relocation of roads, railroad track, and power lines necessitated their own negotiations with property holders. The Corps, however, kept New York authorities informed when it took such actions. For example, Buffalo's intervention prevented a delay on the construction of a new highway and railroad between the Raquette and Grass rivers. In that case, the proposed right-of-way cut one farm in half, preventing the movement of livestock from one side of the farm to the other. In the face of the owner's threat of legal action and unfavorable press coverage, Robert O. Scribner, the head of the Buffalo District's real estate branch, negotiated a settlement whereby the Seaway Development Corporation paid for the construction of a cattle "pass" under the road and the railroad tracks.¹³

Such solutions, however, were not always so easily arrived at. Real estate dealings with private individuals were, in some respects, simpler than negotiating with corporations and public entities. To be sure, the latter were apt to get less public sympathy than individuals in a land dispute with the Power Authority, but such disputes with large corporations, for example, the Reynolds Aluminum Company, were extremely time consuming and frustrating. And because such companies were bureaucratic, even out-of-court negotiations seemed to the Corps to take longer than necessary.¹⁴

Unfavorable public opinion and vexatious delays, however, could not always be avoided. This was particularly true of the dispute with the Mohawk Indians of the St. Regis Reservation. The Buffalo District feared that the dispute could delay the project, raise its cost, and bring negative publicity. The reservation extended into the south channel between Cornwall Island and the United States mainland, where the Corps planned to dredge. The reserve also included land needed for the approaches to a bridge connecting the mainland and Cornwall Island and for the eastern tip of the proposed Long Sault Canal. Tribal leaders adamantly rejected as inadequate the money offered for their lands. They also feared that placing dredged material in the river near their reservation would damage fishing and a beach.

This controversy raised three distinct problems. First, the area in dispute was pivotal to the timely opening of the navigation works to their full 27-foot depth. The work in the Cornwall Island south channel was to widen as well as deepen the channel, a project necessary to allow safe passage into and out of the proposed canal. The dispute with the Indians would delay removal of a low bridge over the channel and the construction of a new high-level bridge. Removal of the older bridge was necessary to allow ships through the newly widened and deepened channel. Without a new high-level bridge, auto and truck traffic to Canada would be disrupted.

Second, the reservation's legal status was such that ordinary condemnation hearings could not be heard in the state courts. The tribe held its land by treaty with the United States government and could only be sued in the federal courts. Corps officials thought that the federal courts would be less sympathetic to the project than the state courts. Moreover, the real estate branch thought that litigation in the federal courts would take longer than the standard state condemnation procedures.

The third problem, related in large part to the second, was adverse publicity. A prolonged controversy could shape up in the press as the Indian David facing down the combined Goliaths of the Corps of Engineers and the St. Lawrence Seaway Development Corporation.

The stakes were high, therefore, when Robert Scribner began discussions with Mohawk representatives late in 1955. The negotiations were complicated and protracted and involved disputes within the tribe and within the Corps. It was not until January 1957 that a mutually agreeable deal was reached. In essence, the discussions revolved around 86 acres, an area referred to as the upper land on Raquette Point. The area was east of the proposed canal, at the eastern end of the dredging that was to be done in the Cornwall Island south channel.¹⁵

The January 1957 understanding came none too soon—bids on the scheduled work for the area were due to be opened on 22 January 1957. The land was acquired and the work could begin on time, but Scribner often had to go back to discuss the project with tribal leaders.¹⁶

Relocating Roads, Rails, and Power Lines

The real estate branch was only one of the offices in the Buffalo District kept busy in the first year of the Seaway project. The relocation of roads, bridges, railroad tracks, and power lines, for which the Corps bore full responsibility, was one of the most important tasks of the first year or so of Seaway construction. Relocation of roads and power lines was often necessary to ensure that construction equipment could get to worksites and operate once there. Some of the relocations were fairly routine affairs, while others were highly complex and involved changes in plans. Such changes significantly affected design work and scheduling.

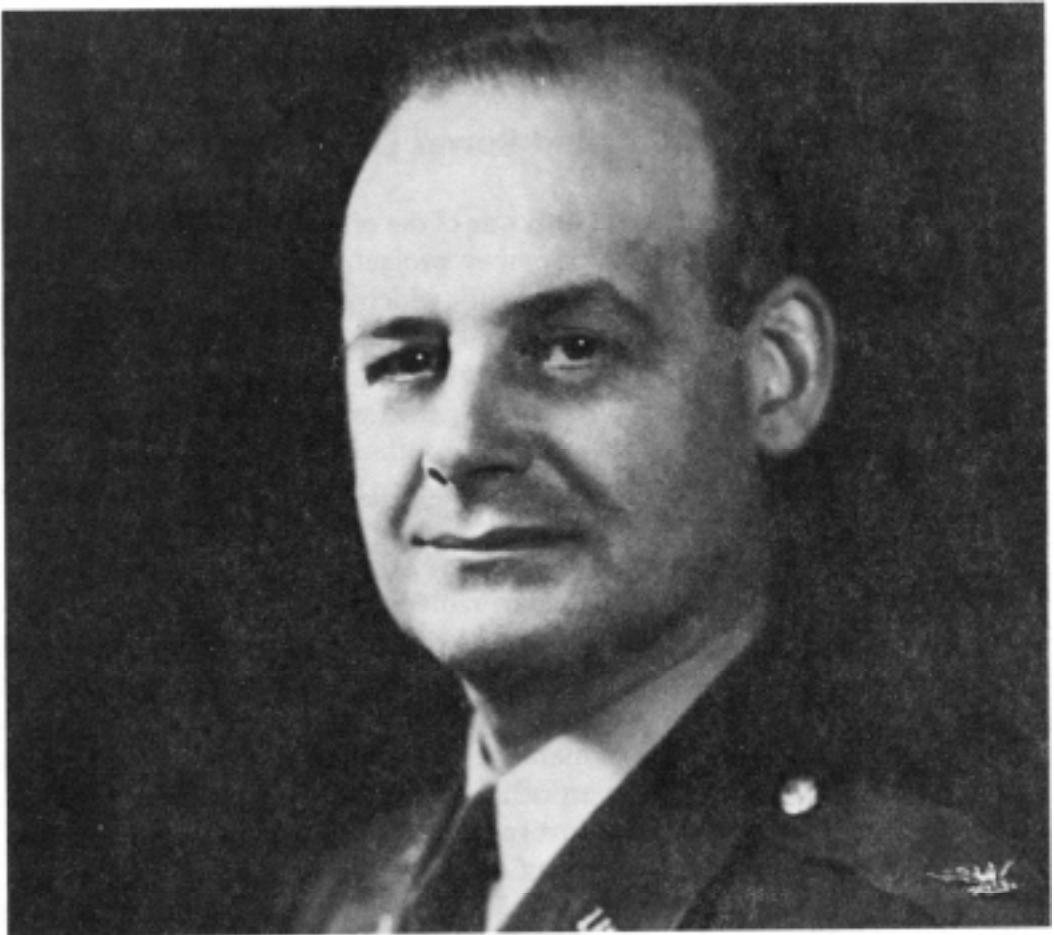
In one respect, the Americans had an easier time with relocations than the Canadians. Relocation in Canada involved entire communities. Lands taken for the project on the American side did not include highly populated areas. In contrast, on the Canadian side, the project involved the inundation of eight communities with a population of about 6,500 people. Canada also would have to move 40 miles of mainline railroad track and 35 miles of the country's busiest highway. As part of the effort to accommodate those displaced by the project, the Ottawa government built two new towns and relocated many of the buildings from one of the towns to be flooded.¹⁷

American relocation work centered on moving power lines, roads, and railroad tracks. No townships or villages were involved. This is not to say, however, that relocation projects were free of complications; quite the contrary.

Relocation work drew intense public attention. **Plans** for roads on Cornwall Island raised the ire of the local Catholic bishop. He objected to dividing a parish in two. The owners of the Cornwall International Bridge Company, Ltd., objected to the Pollys Gut bridge since it would allow traffic to circumvent their facility. The general public was interested in the debate because of the need for a link between the communities of Massena in New York and Cornwall in Ontario. Workers from both sides of the border crossed the border daily for work on the other side.¹⁸

Much of the work, however, turned out to be fairly routine. The Corps focused initially on quickly executing changes in road and power lines. The highway work was essential because many of the new roadways were to serve excavation and construction contractors. In places, the Engineers built temporary roadways to ease access to major sites, although contractors had to build their own roads within their worksites. The power lines had to be moved quickly to serve the electrical needs of the contractors.

In building the new roads, the Corps had to work closely with state highway officials, as well as elected representatives of the county and town governments in the area. Moreover, some of the roads the Seaway Corporation and the Corps were to build were technically for New York's Power Authority. A major artery across Bamhart Island, for example, particularly concerned PASNY. The roadway was to connect the powerhouse on the east-



Colonel Paul D. Berrigan, North Central Division Engineer

ern end of the island to the Long Sault Dam at the western end. It also was to link up with a road coming from the mainland, near where the Power Authority was building its permanent administration building for the power project.

The Seaway Corporation was to build PASNY's roads as part of the agreement assigning the Power Authority responsibility for acquiring necessary lands for the projects while the Corporation took responsibility for relocations. In carrying out this assignment, the Corps had to work closely with the New York State Department of Public Works which had ultimate responsibility for roads in the area. Eventually, the roads built by the Corps were to be turned over to the state for maintenance, and New York officials objected to some of the construction plans. They insisted on roads able to withstand the heavy construction traffic and the rigors of northern New York winters. Corps designers thought New York plans unnecessarily costly, but deferred to state officials on the issue. The state, after all, would have to maintain the roads.¹⁹

Bureaucratic considerations also influenced that course of action. Writing to the new Division Engineer, Colonel Paul D. Berrigan, Olmstead observed, "that acquiescing to the desires of the agencies of the State of New York will make for better relationships where further negotiations are required."²⁰

Relocating power lines was as important as road work to the early stages of the project. Contractors needed electricity for their excavation and construction projects. In relocating power lines, the Engineers were involved in more complex relationships than in the road work. They needed to negotiate with the Federal Power Commission, as well as with New York State officials and Canadian power agencies. The Corps also had to deal with private interests, especially the Aluminum Company of America. That company obtained most of the power for its Massena plant from the Hydro-Electric Power Commission of Ontario, which generated it at facilities in Quebec. In the United States, the St. Lawrence River Power Company, an ALCOA subsidiary, owned the lines. The Power Authority of the State of New York and HEPCO were to bear the costs of relocating lines, except where they crossed Long Sault Canal. Those expenses were to be the responsibility of the St. Lawrence Seaway Development Corporation.²¹

While the Corps was responsible for contracting for the power-line work, the Seaway Corporation and PASNY had to work out the sharing of the costs for the projects. That cost-sharing agreement, however, took over seven months of negotiations. The seeming impasse between the power company and the Corporation was broken by an anxious General Robinson, who as Deputy Chief of Engineers for Construction also chaired the U.S. section of the St. Lawrence River Joint Board of Engineers. In that latter capacity, he forged a compromise acceptable to both sides. Again, Corps personnel displayed flexibility in dealing with the other agencies with responsibility for aspects of the Seaway project.²²

While the Buffalo District's design and engineering staffs were busy with relocating highways and power lines, District Engineer Olmstead and Deputy Administrator Oettershagen increasingly devoted themselves to resolving problems which developed in planning the Pollys Gut bridge. Of the

issues dealt with in the first year of the project, only those dealing with the plans for that bridge equalled the controversy over raising the power pool. The bridge, originally designed to carry both motor and rail traffic, was central to both the timing of dredging work south of Cornwall Island and the construction of the Grass River Lock in the Long Sault Canal.

The original Seaway plans called for relocating the New York Central's line across Cornwall Island. The rail line, which terminated in Ottawa, had to be moved because its bridge, the Roosevelt Bridge, crossed the critical south channel, which, when fully dredged, would feed directly into the Long Sault Canal. The Roosevelt Bridge had to be eliminated. It was too low for ships to pass under, and its pilings interfered with plans to widen the channel. And, since railroad grades had to be very gradual, a new bridge was impractical in that reach. The plans, therefore, eliminated the railroad bridge over the south Cornwall Island channel and rerouted the rail line on the New York mainland in a westward "loop." This rerouting called for the railroad to cross the Grass River, then cross the proposed Grass River Lock over swing bridges to be built at either end of the lock. The two swing bridges were necessary to ensure that neither rail nor ship traffic would be interrupted. Ships could move into either end of the lock while rail traffic moved over the swing bridge at the other end. Once over the lock, the relocated rail line would parallel the new East-West highway, crossing the south channel of the St. Lawrence River on a proposed dual highway-railroad bridge over the Pollys Gut reach of the river. This part of the St. Lawrence would not be dredged. Once across the river onto Cornwall Island, the new rail line would link up with the old tracks and proceed across the existing railroad bridge over the north channel of the St. Lawrence to the Ontario mainland.²³

Much engineering, design, scheduling, and contract preparation proceeded on the many aspects of the "loop" during 1955 and into 1956 even though the plans were based on the 1942 report. With the exception of the excavation and construction of Long Sault Canal and its two locks, the "loop" was perhaps the most complex part of the American Seaway project plans. It required contracts for the removal of the Roosevelt Bridge, which crossed the international boundary and thus complicated matters. Dismantling the bridge and abandoning its highway and rail approaches required Canadian permission, as did plans for the new construction at Pollys Gut. American agencies and contractors needed Canadian approval to navigate vessels in boundary waters and to operate machinery in Canadian territory. The United States requested the waiver of import duties on material needed for the project and the Canadian government's acceptance of the jurisdiction of American labor laws in contracts for work to be performed across the border.²⁴ These and related diplomatic issues had to be resolved before final design work could be completed. Discussion on the issues, however, was eased by the fact that the St. Lawrence Seaway Development Corporation and the St. Lawrence Seaway Authority agreed in November 1955 that it was to be a joint project.²⁵

The interests of the Cornwall International Bridge Company, Ltd., however, complicated these Canadian-American discussions. The private company had long-term lease arrangements giving it the right to operate and

maintain the roadway and easements over the north and south channel bridges, as well as the highway across Cornwall Island. The bridge company feared that it would suffer serious losses because of the plans to “loop” the highway and railroad on the mainland, thereby causing the abandonment of the cross-island highway and the loss of toll and custom facilities that the company had built and operated for Canada. The Corporation and the Corps worried that litigation—possibly lasting several years—over the issue could complicate planning for the new bridge over Pollys Gut. It also could delay removal of the Roosevelt Bridge, and that could put the entire project off schedule.²⁶ The bridge company eventually received acceptable compensation; its actions caused no real delays.

A delay, however, did occur in removing the Roosevelt Bridge pilings. The blame for that delay, which pushed back completion of the 27-foot navigation channel beyond 1 July 1958, rested with the New York Central Railroad, the Corps, and the Corporation. Both of the latter were blind to the railroad’s interests. From the 1942 report onward, the Corps’ planning had simply assumed that the New York Central would want to relocate its tracks to keep open its line to Ottawa. But by 1954, the railroad had begun to question those assumptions and raised those questions in joint meetings. Neither the Corps nor the Corporation picked up on these hints, and instead pushed ahead with planning. Ultimately, the railroad company decided to abandon its rail service on the Ottawa branch.²⁷

The Engineers’ and the Corporation’s misreading of the railroad’s intentions is explainable in terms of a failure to contemplate the “unthinkable.” As 1955 passed, contracts were awarded and work was begun on major sections of the Seaway project, and both the Corps and the Corporation found it inconceivable that the New York Central would abandon its service to Ottawa. Olmstead and Oettershagen knew that abandonment would require them to make major changes in design, cancel contracts, and schedule new work projects. Thus, in July 1956, when the railroad announced its intention to abandon its Ottawa service, the announcement came as a “bombshell.”²⁸

The New York Central’s decision resulted as much from railroads’ general inability to compete effectively with trucks in the early 1950s as from the anticipated costs of relocation. The railroad held options on land in the area, property which had risen markedly in value because of the expected location of new industry once the Seaway opened. And the railroad admitted that it was making a profit on the exclusively freight traffic carried on its Ottawa branch. But future profits were less certain. The new heavy-duty roads to be built in the vicinity of the Seaway meant greater truck competition in a region of anticipated business growth.²⁹

Corps and Corporation officials had not taken the New York Central’s talk of abandonment seriously, in large part because they had thought that the Interstate Commerce Commission (ICC) would never approve the railroad’s request. Moreover, there had been persuasive political reasons for not abandoning the railroad. A proposal to give up service, Castle had calculated, would have brought about a storm of political opposition on Cornwall Island and in the mainland town of Cornwall. Town officials were still angered by the fact that a highway to be flooded for the power pool had been rerouted around

Cornwall, making access to the town less convenient than before. As Arthur J. Walters, chief of Buffalo District's legal branch, had observed, "for these reasons it is felt that New York Central could not abandon its rail line without diplomatic help from the Saint Lawrence Seaway Development Corporation." Such help, the attorney knew, the Corporation would not give.³⁰

The railroad, however, had the upper hand. New York Central officials knew how critical timing was to the Seaway. They were aware of the increased pressure on the Corps and the Corporation stemming from the setting of an earlier date for flooding the power pool. They knew that their abandonment decision might end up in lengthy ICC hearings and perhaps in protracted appeals in the courts. And they knew that neither the Corps nor the Corporation could afford to go through that lengthy process as it opened up the possibility of truly extensive and costly delays. When the railroad finally decided on abandonment, there was little the Corporation or the Corps could do about it.

Within a day of the railroad's decision, Canadian and American Seaway officials began meeting with representatives of the Corps. Plans were changed. The "loop" was abandoned, and a decision to substitute a high-suspension highway bridge over the south Cornwall channel and improve the highway across the island was made. Close Canadian-American coordination was essential in all aspects of the suspension bridge project, which both countries agreed should be completed by 1 April 1958. The bridge was to cross the international boundary, but dividing the work on the bridge to allow each country responsibility for construction on its side of the border was impractical. Instead the Seaway Authority, the Seaway Development Corporation, and the Corps decided to assign work for the substructure of the bridge to Canada and the superstructure to the United States. The Seaway Authority and the Corporation were to obtain the necessary clearances from their respective foreign offices so that Canadian contractors could work on the American side of the border and American contractors could work on the Canadian side.

To avoid labor problems that could turn into political disputes in each country, the meeting recommended that the Canadians use American subcontractors on the United States side of the river. Similarly the Americans would use Canadian subcontractors on Canada's side of the boundary. Other measures discussed dealt with speeding up planning and detailing specifications to contractors.³¹

The Corps and the Seaway Corporation also had to clear up details concerning the initial "loop" plan. Contracts had to be cancelled on the swing bridges over the Grass River Lock, as well as for projected work on bridges over the Grass and Raquette rivers. The unfinished portion of the East-West highway was downgraded from heavy-duty road to minimum standards, since it was no longer to be a major artery between the United States and Canada.³²

All of these changes required budget alterations. Costs of the new bridge were shifted from the Long Sault Canal worksite accounts to those for Cornwall Island. More important, however, than the accounting changes were



The partially removed Roosevelt Bridge, May 1958. Its north span rests on temporary piers. Also shown is the excavation on Cornwall Island and the partially built high-level bridge.

the losses involved. The “loop” design planning costs of \$328,000 had been almost twice the original \$182,000 projected. The Seaway Corporation also had to pay \$2.4 million to the railroad and bridge companies to acquire their interests in the abandoned property. Finally, both the Corps and the Corporation had to make contingency plans to move traffic across the channel should the bridge not be finished on time. Approximately \$400,000 was allotted for a ponton bridge or ferry service.³³

Abandonment of the “loop” and the Pollys Gut bridge also led to a sharp disagreement between the Corps and the Corporation. In defending its budget for fiscal year 1957 before the House Appropriations Committee, the Corporation faced criticism that its budget was too high. Castle worked hard to maintain good relations with Congress, and, after a review, he cut the Corps’ budget across the board. The Corps took strong exception to these cuts because they reduced expenditures for engineering, design; supervision, and inspection for fiscal years 1957 and 1958. The Corps felt the cuts were risky as they involved quality control expenditures. Major General Charles G. Holle, Acting Chief of Engineers, believed that neither the Buffalo District nor the North Central Division had been adequately consulted about the reductions. And from the perspective of the Chiefs office, Holle wanted to be assured that



Major General Charles G. Holle, Deputy Chief of Engineers for Construction (1955-1956); Special Assistant to the Chief of Engineers (1956-1958).

the Corporation put “on record” justifications for these reductions. In this way, the Corps could defend its reputation should there be future criticism of works the Corps believed had needed more attention than that allowed by the Corporation’s reduced budget allotment.³⁴

Perhaps the most important effect of the changes in plans, however, was to increase the sense of pressure over deadlines. The abandonment of the loop plans came just 24 months before the Seaway was to open, which did not allow much time to complete the new suspension bridge. Yet the increased pressure pulled the Americans and Canadians closer together as they cooperated well in dividing up the work for the new bridge.³⁵

Thus, the Corps worked on many fronts during 1955 and 1956. Personnel in the Buffalo District had faced everything from fairly trivial issues, such as the location of observation points for tourists, to truly monumental issues such as those having to do with the raising of the power pool and the relocation of the New York Central Railroad. That same period, however, also brought satisfaction as work began on the major features of the American part of the project: the Long Sault Canal and the two locks located within its ten miles.

Design and Construction

Construction of the Long Sault Canal, with its two locks, involved the largest number of Corps administered contracts; its excavation and construction also required the greatest number of workers. The canal and lock designs were based on those included in the 1942 report prepared by the Corps. Many canal features were, of necessity, redesigned as project planning got underway and new conditions, changing costs, and the need to work closely with the Power Authority of the State of New York and the St. Lawrence River Joint Board of Engineers had to be taken into account.

Many aspects of the project involved routine excavation and construction, tasks long familiar to the Corps. But the Engineers’ long experience had taught them that on a major project of such complexity the routine could not always be expected. And indeed the approval process alone lent itself to redesign or at least refinement of designs of fairly standard features. This was to be expected, more or less a natural byproduct of a system requiring successive bureaucratic approvals through the chain of command. But it was the addition of Corporation oversight and the need to coordinate parts of the project with PASNY that perhaps led to more revisions in designs than was typical of Corps projects. As a result, when difficulties arose after the project was underway, the Corps, as discussed earlier, insisted on using its standard practices in regard to scheduling and contracting in order to avoid further delay.³⁶

Plans for the Long Sault Canal differed only “in matters of detail” from those found in the Corps’ 1942 report. In the summer of 1954, as we have seen, the Buffalo District began work on design memoranda for the Seaway project. The ten-mile Long Sault Canal received the most attention. Corps planners saw the canal project as being made up of four major components. The critical first component was the power pool and its related dikes. Although

these dikes were primarily for power, they affected navigation and had to be constructed to suit the needs of both. The locks at Robinson Bay and Grass River each made up another component, and the fourth part was the intermediate pool between the locks.³⁷

The first step in designing Long Sault Canal was to conduct field studies. To provide satisfactory guides for construction, Buffalo established a system of stations along the centerline and abreast the canal. The six stations alongside the canal were designed to remain after the power pool was raised and the canal filled and were positioned for the convenience of contractors on the major worksites.³⁸

The field studies included geological and soil studies which were conducted by the Buffalo District in the fall of 1954. These analyses built upon the work done for the Corps' 1942 report. Between 1940 and 1942, the Corps had obtained subsurface information by drilling and testing core samples. To determine the depth of soft deposits they probed into the soft overburden and conducted seismic tests to determine bedrock elevations. In 1954 the Corps concentrated on updating and expanding the data from the earlier borings, especially at the sites of the proposed Robinson Bay and Grass River locks. The Corps' studies were supplemented by those conducted by New York's Power Authority at the sites of its dikes.³⁹

The studies disclosed two minor problems in the composition of the foundation rock. Where Robinson Bay Lock was to be located, the borings indicated a two-foot deep gypsum bed about 50 feet below the top of the rock. At the eastern, downstream end of the lock the gypsum appeared to be dissolved, which made the rock above unsound. This discovery required changes in the original lock design and grouting of the unsound rock. More serious was the discovery of a fault at the site of the Grass River Lock. As a result, planners moved the site of the lock downstream to ensure that the lock walls would be on a sound footing.⁴⁰

Soil investigations also led to changes in the 1942 recommendations. The Buffalo District decided to reexplore areas where deep clay strata had been found in the early 1940s. The new studies focused on particularly soft marine clay near the Robinson Bay Lock and at the lower end of the canal downstream from the Grass River Lock. Laboratory tests of samples obtained from the deep clay strata verified most of the 1942 findings, and located even weaker zones. As a result, contractors would have to be responsible for extensive flattening to compensate for the deep marine clay underneath.

Another line of investigation was the adequacy of concrete aggregates in the area. The 1942 report had made similar studies, but Corps standards for concrete had changed between 1942 and 1954. The new studies were to determine the highest quality of aggregates within an economical distance of hauling. The Power Authority had let a contract to a group of construction companies that was producing aggregates at a nearby quarry. Corps tests showed that quarry to be an excellent source of supply, and the Buffalo District designated it, along with two others, as the three "approved sources" for contractors bidding on the lock projects.⁴¹

The determination of water-surface levels had the greatest impact on the Corps' design responsibilities on the Long Sault project. Hydraulic design

became a problem because the Corps needed the cooperation of PASNY, the International Joint Commission, and Canadian officials. An agreement on water levels was essential for the final design and specifications of the canal and the locks.

Since so many agencies were involved in the determination of water levels, a final decision would not be reached until after design work was supposed to be completed. The Corps had to devise preliminary projections so that planning could proceed as scheduled. The method of regulation adopted for Lake Ontario would determine water-surface levels above the Robinson Bay Lock. The International Joint Commission, with jurisdiction over boundary water, held responsibility for matters affecting the St. Lawrence and had begun studies on river levels in 1952.

As the St. Lawrence River Joint Board of Control and the International Joint Commission made final studies they came under increasing political pressure. In June and July 1955, congressmen whose constituents might be affected wrote the board about the need to keep in mind the interests of property owners along the shoreline. The board decided to appoint American and Canadian field representatives to gather information about lake stages and outflows before, during, and after construction. These representatives, the board hoped, would allay fears and at least keep fully informed those most likely to be affected adversely.⁴²

New York's Power Authority was also vitally interested in the issue. The IJC's Order of Approval for construction of the power works required that PASNY and the Power Commission of Ontario design their excavations and facilities to meet specified velocity and depth criteria. Those standards, which would ease navigation in the river after the power works were in operation, were based on a plan devised by the Canadian Department of Transport, another party to the negotiations on the final method of regulation.⁴³

Provincial officials were also involved in those negotiations. Water levels below the Grass River Lock affected Ontario and Quebec. Below Long Sault Canal was a wide reach of the river known as Lake St. Francis. This 30-mile stretch of the river, entirely in Canadian territory, was bounded by Ontario and Quebec.⁴⁴

In the face of so much uncertainty about the final methods of controlling water levels, the Corps estimated the most likely levels ultimately to be adopted by the IJC. However, in November 1955, when the final determinations were issued, they differed from the estimates, and the Corps had to redesign parts of the canal and issue change orders to contractors.⁴⁵

In any event, the first major design consideration was the canal's alignment. The original plans called for several sharp angles in the approach and in the canal itself. Six alternative alignments, along with the one proposed in 1942, were considered in Buffalo District headquarters. Of prime concern were potential hazards to large ships, since the channels were to be comparatively narrow in the canal. Dangerous conditions could result from uncertain currents when combined with night, high winds, fog, and snow. The alignment, therefore, had to provide an upstream entrance to the canal easily accessible in bad weather.⁴⁶

An even more significant departure from the 1942 recommendations was the elimination of a guard gate structure upstream from Robinson Bay Lock. In the 1942 report the gate was to provide protection against damage to or failure of the miter gates at that lock by stopping the flow of water from the pool above the lock. The guard gate was to have two concrete walls, 110 feet apart, with a two-leaf sector-type gate. On both the upstream and downstream approaches to the gate there were to be guide and wing walls similar to those provided at the entrance of the locks. The decision to eliminate the guard gate was taken for many of the same reasons the canal's alignment was changed. District investigations indicated that the guard gate would complicate navigation in and out of the upstream end of Long Sault Canal. Without the gate, vessels could pass through the canal more quickly, speeding up navigation, easing possible congestion, and reducing projected shippers' costs. Moreover, there were other ways to plan for emergencies. Corps designers added vertical lift gates as part of the lock structure to provide for the eventuality of damage to the miter gates.⁴⁷

Elimination of the guard gate led to the abandonment of plans for one of the dikes, a change Corps planners welcomed. The design of the dikes had turned out to be a lengthy process, since the Corps shared design responsibility with PASNY. The Power Authority had responsibility for the majority of the dikes since the power pool flooding covered so many more acres than the canal. But the Corps retained the right to review PASNY's designs, since Buffalo was to take responsibility for contracting for the dikes. After lengthy discussions, PASNY also agreed to "pay for construction of dikes to the extent that dikes would be necessary if only the powerhouse were being constructed."⁴⁸

As with so much else of the planning for Long Sault Canal, Buffalo based its initial design work on the 1942 report. A number of changes in the interim, however, led to relocation and redesign of some of the dikes. Better estimates of the amount of material excavated, for example, allowed the elimination of one dike. Further data about and estimates of wave action also led to changes in the designs and heights of the dikes, especially whether they were to be sloping-faced or vertical-faced structures. Similarly, soil and geological studies indicated that the dikes needed to be moved from where the plans of the early 1940s had placed them. As mentioned before, this was particularly true of the dikes near Grass River Lock which had to be moved because of a fault line. A dike that crossed Robinson Creek was also found to have a foundation of very poor clay. As a result, Buffalo planned for a wide-berm type section to better distribute the dike load. Wide-berm dike sections were also scheduled for placement near Grass River Lock because of the poor clay foundation there.⁴⁹

Of all Buffalo's design responsibilities, however, the design of the locks proved the most complex and demanding. Since 1942, technological improvements had occurred in the machinery and equipment necessary for operating the locks. Other Corps Districts had experience and expertise in these matters, and Buffalo made use of it. Design of the miter gates and their operating machinery, for example, was given to the Nashville District of the

Ohio River Division. Nashville also designed the culvert bulkheads. The marine division in the Philadelphia District helped on the design of the gate lifters for the Seaway locks. The St. Paul District conducted hydraulic model tests to determine the most effective systems for filling and emptying the locks. These tests duplicated the capacities, locations, sizes, and arrangements of required culverts, ports, and diffuser systems. St. Paul also ran tests on the vertical emergency lift gate which was to be installed at the Robinson Bay Lock. These tests determined the forces working on the gate while being lifted, as well as the effect of water running over its top.⁵⁰

The Corps' Buffalo District also made use of the Corps' Waterways Experiment Station (WES) at Vicksburg, Mississippi. There a model of Pollys Gut and the downstream approach to the Grass River Lock was constructed to examine the effect of man-made changes on the south channel of Cornwall Island, a major issue which is discussed in the next chapter, as well as to test the lock's design. The experiment station also provided assistance in determining the effects of the Big Sny channel, at the upstream entrance to Long Sault Canal, on the direction and magnitude of currents in the canal and in studying surges in the intermediate pool between the locks of the canal.⁵¹

Discussions of lock design began in the summer of 1954, even before the Corps received the assignment as the Corporation's construction agent. By December 1954 basic decisions about design had been reached, and early in 1955 the initial plans moved through the necessary bureaucratic channels for approval.

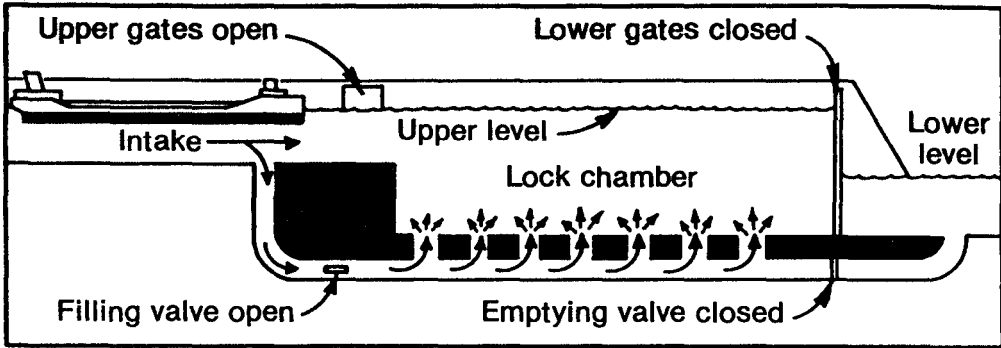
The Robinson Bay Lock, designed by engineers of the Buffalo District and redesignated the Dwight D. Eisenhower Lock in May 1956, was to be located about midway in the length of the Long Sault Canal. The lock was the upstream step of the double-lock system which allowed vessels to bypass the Long Sault Dam. Under normal working conditions, the lock was to provide a lift of about 42 of the 88 feet necessary in the canal. Upstream from the upper miter gate, a vertical lift gate was to prevent a free flow from the upper pool of the canal. A highway tunnel through the upper sill of the lock was to carry traffic to and from Barnhart Island and mainland Canada. This tunnel replaced the 1942 report's recommendation of a highway bridge across the lock.⁵²

In working up the initial designs the Buffalo District followed standard Corps' engineering procedures. Lock walls and sills were analyzed for strength and durability under a series of varying conditions of operation: the hydraulic forces resulting from high and low water levels, earthquakes, and hawser pull. Final determination of the effects of these forces were in some instances a matter of continuing discussion, even after the initial design had received approval. Many of these design issues were settled after model tests at the St. Anthony's Falls Hydraulic Laboratory of the University of Minnesota. The Corps helped fund the construction there of a model of the Robinson Bay Lock, which was later modified to represent the lock at Grass River.⁵³

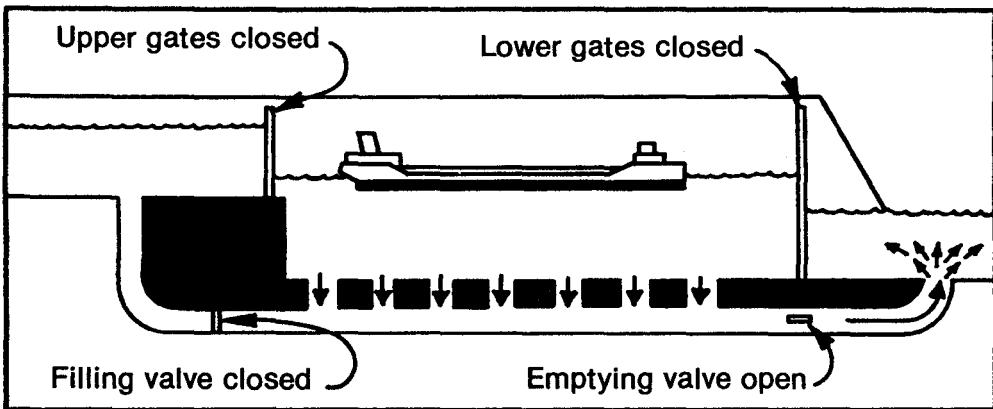
Buffalo began design work on the Grass River Lock, which was to provide a lift of approximately 46 feet, after its planning staff got to work on the upstream Robinson Bay Lock. The design of the downstream lock, redesignated the Bertrand H. Snell Lock in 1958, differed from that at Robinson

How Navigation Locks Operate

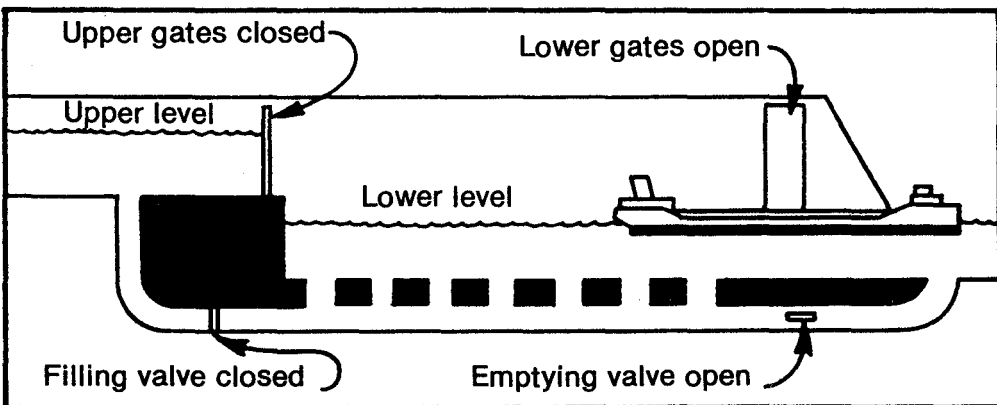
These diagrams show how a ship is lowered in a lock. A ship is raised by reversing the operation. No pumps are required, the water is merely allowed to seek its own level.



With both upper gates and lower gates closed, and with the emptying valve closed and the filling valve open, the lock chamber has been filled to the upper level. The upper gates are then opened allowing the ship to enter the lock chamber.



Now the ship is in the lock chamber. The upper and lower gates and the filling valve are closed. The emptying valve has been opened to allow water to flow from the lock chamber to the lower level.



With the water level in the lock chamber down to the lower level, the lower gates have been opened, and the ship is leaving the lock chamber. After this, the lock is ready for an upbound ship to come in and be lifted, or may be filled to lower another down-bound ship.

Bay primarily because of its location in the vicinity of soft marine clays. In addition to a change in the design of the lock chamber floor, model tests had shown that the lock needed a different emptying and filling system because of excessive turbulence. Many of the features adopted at Robinson Bay, however, applied downstream too. Such standard design made mooring bits, rope fenders, and stop log derricks almost interchangeable between the two locks. Much the same could be said for the electrical system, as well as the miter gates and lock machinery.⁵⁴

By the end of 1955 the design of the canal and locks had received the approval of the Corps and the Seaway Development Corporation. Other factors, however, also influenced project designing. In response to requests from the Buffalo District, potential users of the Seaway commented on several features of the project. Their recommendations were perhaps most significant in the layout of guide and approach walls which in the end generally "reflect[ed] the desires of the Lake Carriers' Association." The Seaway Authority forwarded recommendations from the Dominion Marine Association and the Shipping Federation of Canada which buttressed the views of their American counterparts.⁵⁵ The potential users and the Corps kept up a dialogue as lock and canal features continued to be revised. While the Engineers accepted many of their suggestions, others were rejected.

Among those rejected was maximum vessel size using the canal and locks. Both the Corporation and the Seaway Authority knew this to be a "sensitive" issue to shippers; it had come up in regard to dimensions for the St. Marys Falls canal and locks and the Welland Canal. The Corporation had determined that the locks should accommodate 715-foot ships. Slightly longer (730 feet) and wider (75-foot beam) ships could use the locks, but they would have to receive special scheduling and handling. As anticipated, shipowners with larger ships objected. The Engineers supported the Corporation; a longer lock was not justified in view of the relatively small number of longer ships likely to use the Seaway.⁵⁶

In any event, a dialogue with potential users of civil works projects was not unusual. Essentially, the Corps' internal design process continued routinely. By the end of 1956 about 90 percent of the design work was completed.⁵⁷ Where the Corps faced most of its problems was in its need to deal with other agencies such as the Power Authority of the State of New York, the Seaway Development Corporation, and the St. Lawrence River Joint Board of Engineers. The Corps' design process was a matter of constant elaboration on plans that moved through the Corps' command structure. To the Engineers this was a routine procedure, familiar to staff at all levels. But the Power Authority and the Corporation were not so accustomed to the Corps' procedures; neither had a staff large enough to handle expeditiously the heavy volume of paperwork generated by the Corps' planners. Inevitably delays in their handling of plans review created discontent in the Corps.

The key to understanding the Corps' attitudes toward delays in design was the change in the date of raising the power pool. That change of date, insisted upon by PASNY, had reduced significantly the amount of time that the Corps would have to cope with unforeseen events. Thus delays in the planning

process troubled Corps officials. These delays increased the pressure on other aspects of the project and had the potential of preventing the Engineers from completing the navigation improvements before the Power Authority flooded the power pool in July 1958.

Difficulties with the New York Power Authority began early. At the first meetings over dike design in September 1954, Corps representatives realized that PASNY's design engineers (Uhl, Hall and Rich) would not be able to meet the Corps' schedule for all of the dikes to be built above Robinson Bay Lock. As a result, the Engineers added two dike designs to their planning work for the lock. Scheduling was critical because the Corps was to construct all of the dikes for the project, even those designed by PASNY. Buffalo went ahead and designed the two dikes, which were modified somewhat by the Chief's office late in December 1954. In the meantime, PASNY's private engineering firm continued its design work and in mid-January 1955 delivered designs for the two dikes to the Corps. While acceptable from an engineering point of view, they differed from those prepared by the Corps. Buffalo was reluctant to make the changes that PASNY insisted upon. To do so required modifications by addenda to contracts that were already out to bid.⁵⁸

The Power Authority nevertheless insisted on the modifications. Ultimately, Buffalo gave in to PASNY's demands. Colonel Olmstead feared that pressing the point so early in the relationship might sour future relations. His willingness to concede the point might also have had something to do with the higher level negotiations then taking place with PASNY over the date to raise the power pool. There seemed no reason to alienate the Power Authority over the small issue of dike design while the major question of when to elevate the power pool was still being discussed.⁵⁹

Relations between the Corps and the Power Authority were eased when Uhl, Hall and Rich established an office in Massena. PASNY, however, became even more cooperative when it began to face serious difficulties that might have delayed its own timetable for flooding the power pool. In November 1955 the St. Lawrence River Joint Board of Engineers formally discussed the Power Authority's "non-compliance" with the International Joint Commission Order of Approval granting the authority to construct the power works. The order had specifically required that PASNY and the Hydro-Electric Power Commission of Ontario "submit plans and specifications in time for Board approval prior to construction." PASNY had failed to obtain board approval before beginning work. To be sure, some of the work in question involved preliminary preparation of worksites. But other work involved major features of the power project. Most troubling to the board were doubts about the adequacy of the foundation for Long Sault Dam, the key to the generation of power. Although ultimately resolved to everyone's satisfaction, the board threatened to issue an order for a stop in construction. Such a turn of events could have significantly delayed the power works.⁶⁰

Officials at PASNY turned their attention to the Joint Board of Engineers, and the Corps found the Power Authority easier to work with on the design and construction of the dikes. In any event, dike design was one of the earliest of the planning projects to be completed, and, on that project, the Corps and PASNY had not had to work closely with each other for a long

period of time. This was not the case with the Corporation, which had full responsibility for all aspects of the navigation works. Eventually, the Corps and the Corporation settled on a workable routine for designing the Seaway. But there were problems, aside from what the Corps saw as the Corporation's overly slow process of design review.

A serious design dispute arose between the Corps and the Corporation over the layout of the locks in the Long Sault Canal. Deputy Administrator Oettershagen objected to Corps plans for guide wall locations as being dangerous to shipping. To no avail, Corps officials pointed out that their design had been discussed with and approved by the Lake Carriers' Association. There is no doubt that Oettershagen felt strongly about issues of safety. But his adamancy also might very well have been an attempt on his part to assert the Corporation's authority early in the relationship. In any event, substantial changes were necessary. While these alterations were not the only cause, the Corps eventually had to extend by 60 days the submission of its design memoranda on the two locks.⁶¹

The Engineers were most exasperated with the Corporation over determining the final water levels upstream and downstream from the Long Sault Canal. Corps officials pressed the Corporation to use its influence to hurry along the decision on water levels. Toward the end of the process, which involved both national governments, private interests, and international agencies, the Corps saw the Corporation as delaying a final resolution of the issue. In fact, by the fall of 1955, the International Joint Commission had submitted to each government a plan for regulating water levels. In the meantime, the St. Lawrence River Joint Board of Engineers proposed extra depth allowances in the navigation channels to allow for rock bottoms and surges. The Canadian Seaway Authority had promptly submitted its recommendations, but the Seaway Development Corporation had not been heard from.

By November 1955 both the St. Lawrence River Joint Board of Engineers and Corps officials believed that the Corporation had to address itself to "this pressing problem." They turned to Holle who at that time was both a member of the Joint Board of Engineers and Deputy Chief of Engineers for Construction. He was to take up the issue personally with Corporation Administrator Castle. A timely decision was necessary, and the Corps was exasperated by going through the "clogged channels" of the Corporation.⁶²

Delays nevertheless were not always the fault of one of the agencies that the Corps had to deal with. The Engineers themselves were at fault at times. The most glaring example was an oversight in design of the lock gates. The upper gates could be damaged by ships with sharply raked bows, but the Corps had taken into account only vessels with vertical bows, used for the most part in Lakes shipping. This oversight is remarkable in that so much of the argument in favor of the Seaway was based on its opening the interior lake ports to ocean-going vessels, which were more likely to have raked bows. In any event, the Canadians brought the problem to the Corps' attention and the upper gates were redesigned to minimize the possibility of damage from ocean-going shipping.⁶³

The design process continued apace through 1955 and 1956. As planning for the major features slacked off, engineers in the Buffalo office turned

CONSTRUCTION CONTRACTS

Thousand Islands Work Site

- Dredging in St. Lawrence River, between Clayton and Alexandria Bay, N.Y. and between Alexandria Bay and Morristown, N.Y.:
Tecon Corporation
- Construction of navigation aids:
Arnold M. Diamond, Inc.

Long Sault Work Site

- Excavation for Dwight D. Eisenhower Lock and Dikes:
Jack and Jim Maser, Inc. (Tecon Corporation)
- Excavation for Bertrand H. Snell Lock and Dikes:
Dutcher Construction Corp.
- Construction of Dwight D. Eisenhower Lock:
Joint venture of Morrison-Knudsen Co. Inc.; Perini Quebec, Inc.; and Walsh Construction Co.
- Construction of Bertrand H. Snell Lock:
Joint venture of B. Perini & Sons, Inc.; Walsh Construction Co.; Morrison-Knudsen, Inc.; Peter Kiewit Sons' Co.; and the Utah Construction Co.
- Dredging Downstream Approach to Snell Lock:
Great Lakes Dredge and Dock Co.
- Excavation of Upstream Portion of Long Sault Canal:
Badgett Mine Stripping Corp.
- Excavation of Mainland Portion of Long Sault Canal:
Peter Kiewit Sons' Co. and Morrison-Knudsen Co., Inc.
- Construction of Navigation Aids, Long Sault Canal:
Arnold M. Diamond, Inc.

Cornwall Island Work Site

- Construction of Superstructure for High-Level Bridge:
United States Steel Corp.
- Dredging, South Channel:
Merritt-Chapman & Scott Corp. and S. J. Groves and Sons Co.
- Construction of Navigation Aids:
Arnold M. Diamond, Inc.

Source: U.S., Congress, House of Representatives, Committee on Public Works, *Annual Report of the Saint Lawrence Seaway Development Corporation for 1957*, H. Doc. 326, 85th Cong., 2 sess., 1958, pp. 18-23, 38-39.

their attention to less critical parts of the project. They were involved in the design of an administration building for the Corporation, the control houses near the locks, and repair shops and yards. At times, too, they took part in discussions of landscaping near the locks and overlooks for sightseers. Once designs and specifications were approved, the Corps advertised for bids on contracts.⁶⁴

Contracts and Contractors

The Engineers' extensive experience in dealing with contractors proved a critical element in constructing the Seaway. As part of standard practice the Corps had its field staff compile data for weekly progress reports. But the Corps' increasing sense of pressure to meet deadlines increased the need for vigilance. Corps officials closely monitored contractors who fell behind, while helping others who had difficulties, such as in obtaining materials. Because effective relations with contractors were essential to meeting deadlines, the Corps vigorously resisted attempts by the Corporation to change standard contracting procedures.

By early 1955 the Engineers had let four major excavation contracts. These were for the main portion of the Long Sault Canal, its westerly end, and the two lock sites. The Corps followed established practices, using standard forms for invitations to bid and for contracts.⁶⁵

Corps contract procedures at times, however, became a source of sharp conflict with the Corporation. At first the Corporation deferred to the Corps on contracting matters, but as Seaway officials became more confident they approached the Corps with suggestions, questions, and finally criticisms. In reviewing plans and cost estimates late in 1955, for example, the Corporation thought that federal freight taxes possibly might be saved "by inserting a provision in the specifications permitting the Contracting Officer to require the contractor to ship certain construction materials on Government Bills of Lading." Deputy Administrator Oettershagen believed that real savings could be realized "if the procedure was administered efficiently" and applied to such bulk supplies as aggregates and cement.⁶⁶

The Corps opposed using government bills of lading. In the first place, such a procedure would be difficult to administer. Second, and of greater importance to the Engineers, "the contracting officer would then be assuming a responsibility with regard to shipment of material which could react greatly to the Government's disadvantage." The Corps argued that the bills of lading would represent a commitment to take responsibility for shipping, in many instances the most demanding managerial task for contractors. The Engineers remained firm on this issue. To have accepted the Corporation's suggestion would have further complicated an already complex process of design, bidding, and contracting.⁶⁷

The Engineers were uncompromising toward other Corporation suggestions to change standard contracting procedures. The Corporation, and personnel in the Buffalo District, anticipated that major lawsuits would be filed

over disputes with one or two of the Seaway contractors. The Corporation believed that its legal counsel and perhaps representatives of the Department of Justice should start preparing to defend the government's interests. The Corps, however, was adamantly opposed. General Holle, Special Assistant to the Chief of Engineers at the time, wrote rather bluntly that it was not "necessary, desirable, or appropriate to involve either the Corporation or the Department of Justice" in precautionary preparations for lawsuits. If litigation became necessary, Holle noted, the Corps had experience in such matters and a well-trained legal staff.⁶⁸

One of the sharpest exchanges about contracts took place in 1956 over the proper kinds of supply and construction contracts the Corps should issue as the agent of the Corporation. The Corps routinely issued contracts in its own name. The Corporation, however, had inquired into the practices of other government corporations and found that they executed and carried out contracts in their own names. "Since the accountability and responsibility for the Corporation's funds," Lewis Castle maintained, "are not transferred to the Corps of Engineers in the same manner as appropriated funds are transferred, the best practice is to have all contracts issued by the Corps of Engineers in the name of the Saint Lawrence Seaway Corporation."⁶⁹

The Chief's office vigorously rejected any notion of changing the contracting procedure used by the Buffalo District. Such a change "would create a situation and relationship radically different from the standard, accepted, and time-proven arrangement whereby one Government agency accomplishes a service for another." As arranged in the initial understandings between the two entities, the Corporation as the "served" agency ultimately would become the "owner" of the works completed by the Corps. But "the one agency does not perform and act as the 'agent' for the other," Holle wrote. To undermine the notion that the Corps was performing a service would only confuse contractors who would not know which agency's operating policies and procedures applied to their contracts. The result would be uncertainty about the contracting officer's authority and the chain of command to be used in appeals of contested decisions of the contracting officer. The Office of the Chief of Engineers would go no further on this essential issue than to promise to make clearer that works were being constructed by the Corps for the Corporation. The Chief instructed his subordinates in the North Central Division and in the Buffalo District that "all reasonable and proper wording" be adopted in bid advertisements and contracts to ensure that contractors understood that the works would become the property of the Seaway Corporation.⁷⁰

In short, at the end of December 1956, two years into the project, the Corps was not about to change contracting procedures. The Chief was not prepared to give ground on a fundamental relationship that the Engineers thought had been settled in September 1954. Ultimately, Holle unequivocally rejected Castle's ideas: "I believe that it would be impracticable, unwarranted, unnecessary and undesirable for the Corps of Engineers' agencies or officials to act as 'agents' in the legal sense, for the Corporation, as you propose."⁷¹

The Corporation's questioning of the Corps' contracting procedures was part of a dispute over larger issues. The Corporation was concerned about

its future status once the Seaway was completed. Questions, therefore, over the proper relationship between government corporations and other agencies were an attempt by Castle to assert the independence of the Corporation. Questioning legal definitions of "agency" and Corps contract procedures helped affirm the Corporation's position that it was a public entity empowered not only to build the Seaway, but also to maintain and operate it once completed. Corps adamancy was part of its attempt to gain responsibility for operations and maintenance once the Seaway opened, a subject covered in the next chapter.

Whatever the political and bureaucratic reasons for the dispute, the Corps also had practical reasons for opposing diminishing its role in dealing with contractors. Traditional practices were necessary because under an increasingly tight schedule new procedures would have further delayed the project. Familiar procedures allowed the Corps the time to work outside of channels when necessary to help contractors fulfill their contracts. The Corps' long-established contract relationships allowed careful supervision of contractors' work. A change in the Engineers' contracting authority would have deflected attention from both helping and cajoling contractors when required.

Construction of such a multifaceted project involved the Engineers in a variety of construction questions, from the contractors' choice of earthen as opposed to metal cofferdams to the best way to install electrical lock equipment. In the face of difficulties, contacts between the Corps and the contractors increased.

Seaway contractors faced problems similar to those found on comparable projects elsewhere. Weather interfered with projected schedules—roads became impassable in heavy rain and concrete could not be poured if cold weather came earlier than usual.⁷² Nor was the Seaway project immune from other, more serious construction problems. Probably the most frequent had to do with unanticipated site conditions. In excavating the Long Sault Canal, for example, the contractor found that naturally occurring calcium carbonates had cemented the glacial till. In other sections of the area, the same contractor found that there were fines in the till, making it very sensitive to moisture and equally as difficult to work in as the cemented till as it created material difficult to manipulate once it was broken for excavation. Contractors in the Robinson Bay Lock excavation were also slowed by the make-up of the till, and they were frustrated by the discovery of groundwater at an elevation higher than that indicated on the contract drawings.⁷³

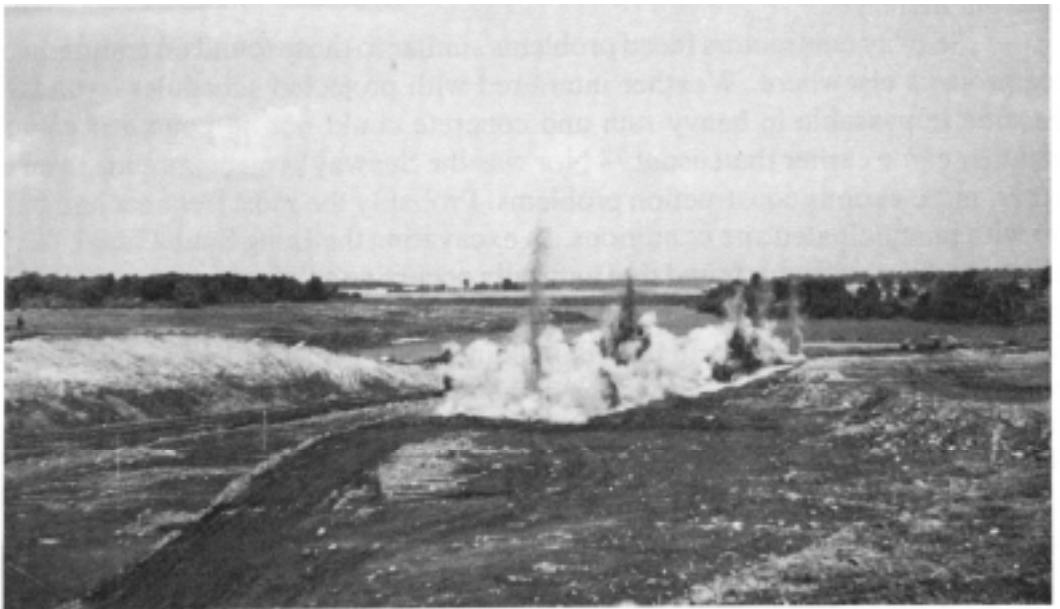
Not all construction problems were the result of nature. There were man-made reasons for construction not going the way the Corps and the contractors had originally planned. Some were relatively minor. As part of the Robinson Bay Lock excavation, for example, the contractor had to repair a public road outside the contract area. Not to do so would have slowed his work. On this project the same contractor also had to move utility lines in order to proceed with his schedule.⁷⁴

Other man-made problems assumed major proportions. Nationwide strikes in the steel industry in 1956 and among concrete producers in 1957 dis-

Excavating Long Sault Canal



Excavation, September 1955.



Blasting, August 1956.



Excavation, September 1956.



The project, July 1957.

rupted work. The Corps routinely assisted contractors facing severe difficulties in obtaining equipment or supplies. During the steel strike, however, the Engineers went to extra efforts to minimize the dispute's negative impact on the Seaway. With equipment suppliers affected, the Corporation and the Corps approached the Office of Defense Mobilization to obtain a priority rating for the Seaway. Despite several lengthy conferences on the subject, that office rejected the request. Both the Engineers and the Corporation decided not to appeal the decision immediately, relying instead on the ability of the Corps to assist manufacturers in rescheduling their production or in seeking out and obtaining steel supplies. The Chief's office, however, planned to appeal the decision if it proved necessary to keep the Seaway on schedule.⁷⁵

The contractor most seriously hurt by the steel strike, the Willamette Iron and Steel Company of Portland, Oregon, produced the operating machinery for the vertical lift gates at Eisenhower Lock (formerly the Robinson Bay Lock) and the wire rope fenders for both locks. These features were to provide a back-up to the miter gates should they fail, and the locks could not be operated until the back-up features were in place. The contractor specialized in hydroelectric and irrigation dams and was highly-regarded as a manufacturer of custom machine plating and steel fabrication products. The firm had fulfilled Corps contracts before and was well-known to the Portland District Engineer. Nevertheless, by February 1957, the contractor had only been able to complete 54 percent of a contract that was scheduled for 82 percent completion by that date.⁷⁶

Willamette Iron and Steel Company's request for a seven-month contract extension was a serious blow to Corps hopes to finish on schedule. The company was also committed to several large contracts for the Corps' San Francisco District and the Atomic Energy Commission at the time that the steel strike began. Neither was willing to defer its schedules to accommodate the Buffalo District. Their contracts required extensive time, as did the Seaway contract, on the company's large machine tools. Even if these problems of production scheduling had been easily resolvable, there remained the fact that the firm was having difficulty obtaining critical items such as 4"-square steel bars.⁷⁷

Unable to get the Office of Defense Mobilization to issue priority status to the Seaway, Buffalo joined Portland District officials in negotiating a mutually agreeable plan with the company to reschedule the plant's work. The result of this close collaboration was a reduction in the anticipated delay from seven to four months. While a four-month extension gave the Corps little extra time should there be difficulties installing the equipment, it held out the prospect of completing the project on time. Installations of both the rope fenders and the machinery for the vertical lift gates were not in themselves difficult tasks. That gamble seemed better than relying on an appeal of the decision refusing the Seaway priority status.⁷⁸

The cement strike in June 1957 jeopardized concrete work at both lock sites. Supplies of cement were available in Canada, but the contractors working under Corps contracts were required by law to buy their supplies in the

United States. The law had originally been passed in 1933 to stimulate depressed American industry.⁷⁹

Buffalo acted swiftly to help the contractors in need of cement. Similar problems had occurred before, and the Corps had a standard procedure to gain exemptions from the "Buy American Act." Within ten days of strikers closing down the plants supplying the Seaway contractors, Buffalo obtained the exemption that would allow them to buy concrete in Canada.⁸⁰

The District office was not always able to act so swiftly, but it continued to keep close working relationships with its contractors. When, for example, Grass River Lock contractors were unable to obtain gantry cranes from private sources, they turned to the Buffalo District office for assistance. District officials arranged for the contractors to rent the cranes from the Navy.⁸¹

A close working relationship with companies performing construction projects was standard practice in the Corps. What was fairly routine became absolutely essential to the Seaway, however, when, in February 1956, bidding on the Grass River Lock turned up only one bid. The bid came from B. Perini & Sons, Inc., Walsh Construction Co., Morrison-Knudsen, Inc., Peter Kiewit Sons' Co., and the Utah Construction Co. proposing a joint venture. Their price was 23 percent above Corps projections. The Chief's office required that bids 15 percent over Engineer estimates be justified before acceptance. The Buffalo District investigated and urged that the bid be accepted rather than re-advertised. District personnel knew that the contractors engaged on the Eisenhower Lock were not interested in the Grass River Lock. Construction conditions at the upstream lock had played a part in the contractors' decision not to bid on the one downstream. Not only had there been a large number of changes once work had begun, but there had also been a shortage of suitable workers. Moreover, in the opinion of experienced contractors, labor production was low, in part because of poor living conditions and in part because of increasingly tight schedules. Worker dissatisfaction at times led to disputes and work stoppages. These problems invariably increased labor costs. Construction conditions, however, were not the only reasons for lack of interest in bidding on the Grass River Lock. There were other large projects about to be advertised on the West Coast, and several of the contractors involved in the Seaway were preparing bids on those contracts.⁸²

Thus the circumstances inclined Buffalo toward supporting the one bid from a consortium of contractors, as did a closer examination of the reasons the contractors had arrived at their price. The most costly item in the bid was for concrete. Corps estimates contemplated placing the concrete as late as December, making some allowances for extra costs for heating and drying. But the contractors contemplated having to place the concrete during the rest of the winter season and they convinced Buffalo that this winter concreting was "not an unreasonable expectation."⁸³

The contractors also convinced District officials of the reasonableness of their bid on other aspects of the contract. Of the five involved in the joint venture, four had done work on either the Seaway or the power project. They all agreed that original cost estimates for excavation in the Long Sault Canal and at the Eisenhower Lock had not been realistic. Moreover, Buffalo's origi-

nally projected costs for the Grass River Lock did not reflect changed circumstances since the advertisement to bid had first been prepared. Government estimates for steel sheet and bearing piles, for example, assumed that the material would be delivered during November and December 1956, allowing the driving of the piling while the ground was frozen. In fact, the expected delivery date was most likely early spring 1957. A portion of the driving, therefore, would have to be done after the frost left the ground, making it likely that operations would be extremely difficult.⁸⁴

Buffalo, thus, saw no advantage in readvertising the bid. If anything, a further delay would probably increase the costs even more, since there would be increased pressure on the contractors to complete a complex project in a yet even shorter period of time. The North Central Division Engineer, Colonel Berrigan, accepted Buffalo's argument, especially in view of the fact that the contractors at the Eisenhower Lock were losing money. "In the case of the Robinson Bay Lock," Berrigan observed, "the government accepts an indicated advantage or loss to the contractor. In the case of the Grass River Lock the advantage rests with the contractor. Such are the results of the bidding system." In his review of the situation, therefore, he endorsed Buffalo's position and recommended against substituting a negotiated lump sum or a negotiated cost-plus-fixed-fee contract for the bid contract.⁸⁵

The Office of the Chief of Engineers went along with Buffalo's and the Division Engineer's recommendations. As it turned out, the problems over this bid led to later recriminations between the Corps and the Corporation. Under the press of congressional questioning Corporation officials complained about the Corps' inability to attract suitable bids. Corps officials thought this unfair, given the circumstances. In any event, getting a contractor did not solve all the problems involved in constructing the Grass River Lock.⁸⁶

Even after March 1956, when the Corps accepted the one bid proffered for the Grass River Lock, Buffalo still faced construction problems at the lock site. Excavation work scheduled for completion by the time the lock contract was awarded remained incomplete. Indeed, the excavation contractors on that site worried both the Corps and the Corporation. Originally awarded the contract in April 1955, the firm had planned to complete excavation by February 1956. By the summer of 1955, the company had fallen behind and was operating at a loss. By late March 1956, the spring thaw had set in, making haul roads impassable and bringing excavation work to a halt. Work would apparently not begin again until May. And the remaining excavation was in hard till and a small area of clay, which was very difficult to approach with equipment.

These circumstances were troubling enough in themselves, but they kept the Grass River Lock construction contractors from beginning their work. The Buffalo District knew that the schedule for the lock was "very tight" and that "the time allowed under the contract is the absolute minimum required for completion on the scheduled date."⁸⁷ Early in April, the Buffalo office brought together representatives of both contractors. The upshot of these meetings was the transfer of the excavation contract to the lock contractors. The latter were then to arrange for the scheduling of the excavation, working it into their overall plans for building the lock. This was an excellent solution

from the Corps' point of view. It not only increased the likelihood that the lock would be built on schedule, but also removed the possibility of claims against the government by the lock contractors. If the excavation contractor had in fact defaulted, delaying substantially the beginning of work on the lock, the lock contractors could have brought claims for any losses due to the delay. Once the joint contracting venture got under way at Grass River, the Corps began to see improvements. Indeed, by February 1957, the Engineers were able to report that work at the Grass River Lock was up to schedule.⁸⁸

The on-schedule completion of the Seaway in 1958, therefore, owed much to the careful coordination of scheduling, designing, and construction. As we have seen, this was not a process without problems. But the Corps' procedures refined over the years had the effect of minimizing problems or at least providing a mechanism for solving them. These same procedures were followed in the projects designed for improving navigation in the south channel of Cornwall Island and the Thousand Islands. There, as at Long Sault, the Engineers maintained a policy of accommodating the interests of the other agencies engaged in the Seaway project, while adhering as strictly as possible to standard operating practices.

Constructing Eisenhower Lock (Robinson Bay)



Model B. Scrapers doing early excavation, September 1955.



Shovels excavating, January 1956.



The drainage problem during construction, February 1956.

St. Lawrence Sea way Development Corporation



Construction traffic during the excavation, February 1956.

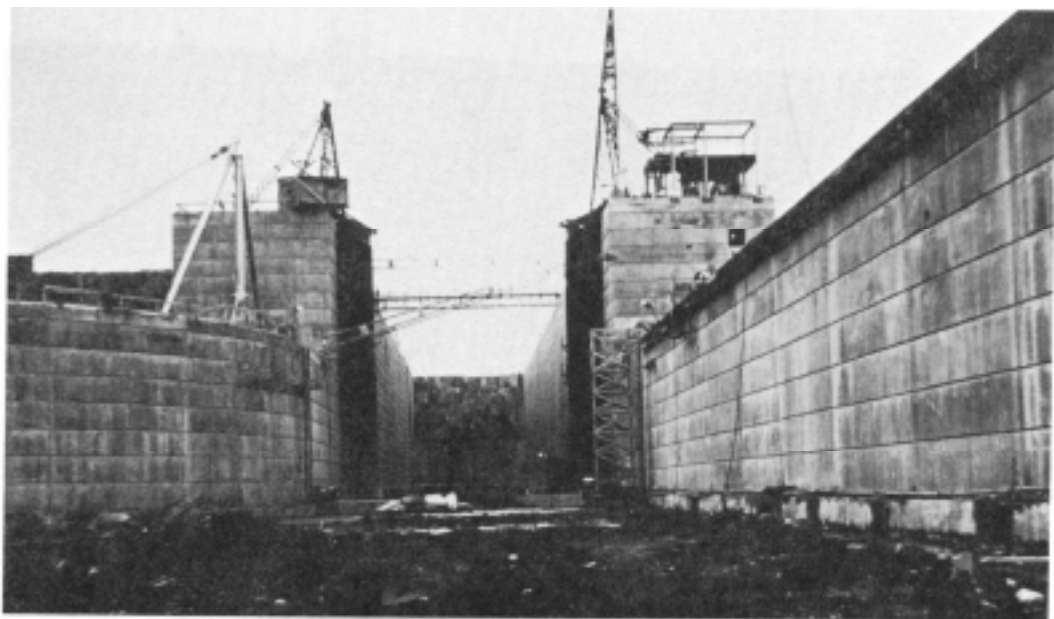
St. Lawrence Sea way Development Corporation



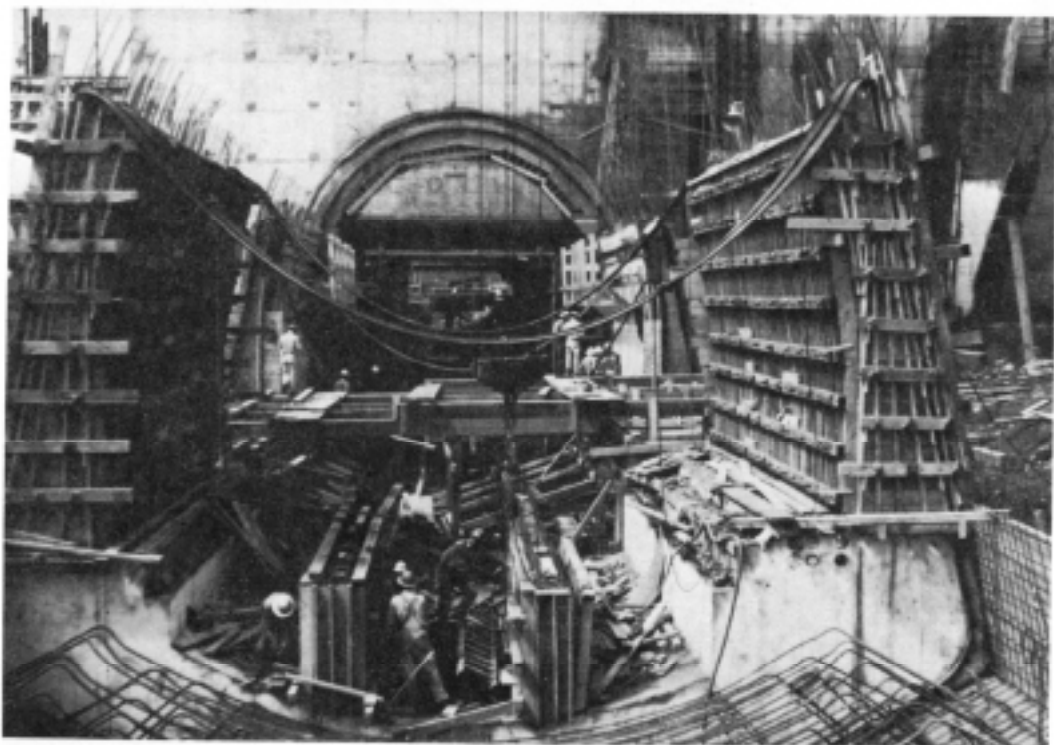
Construction, looking eastward, August 1956.



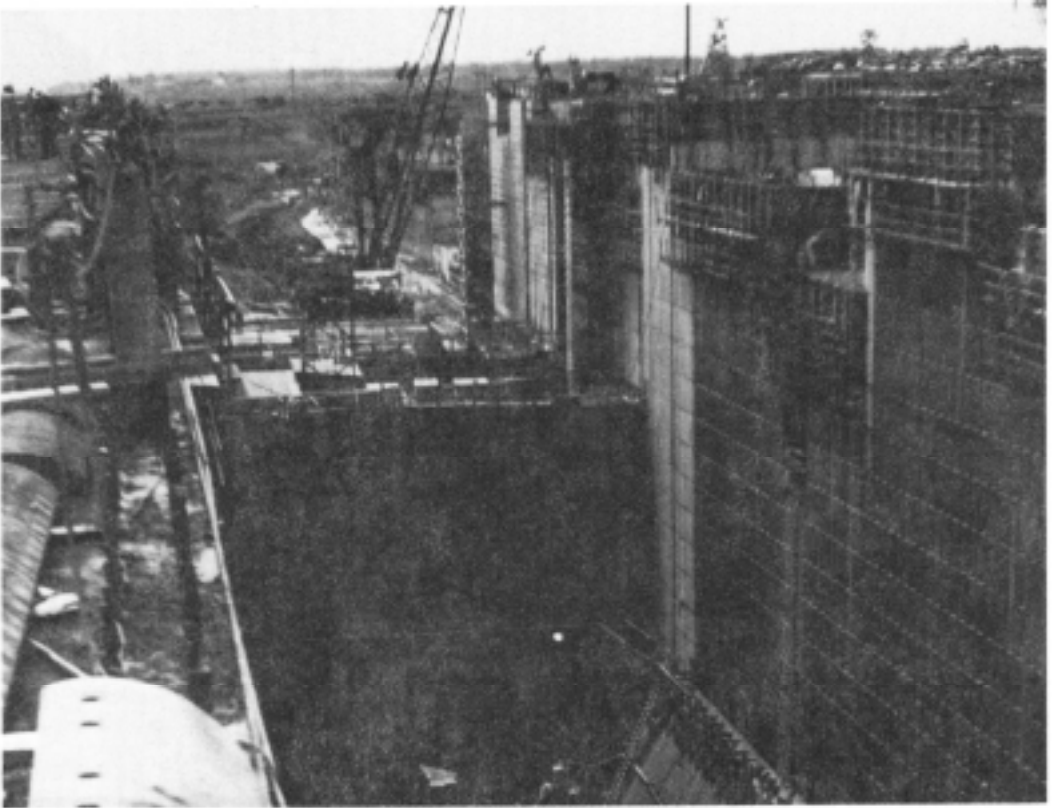
Lock and related construction activity, September 1956.



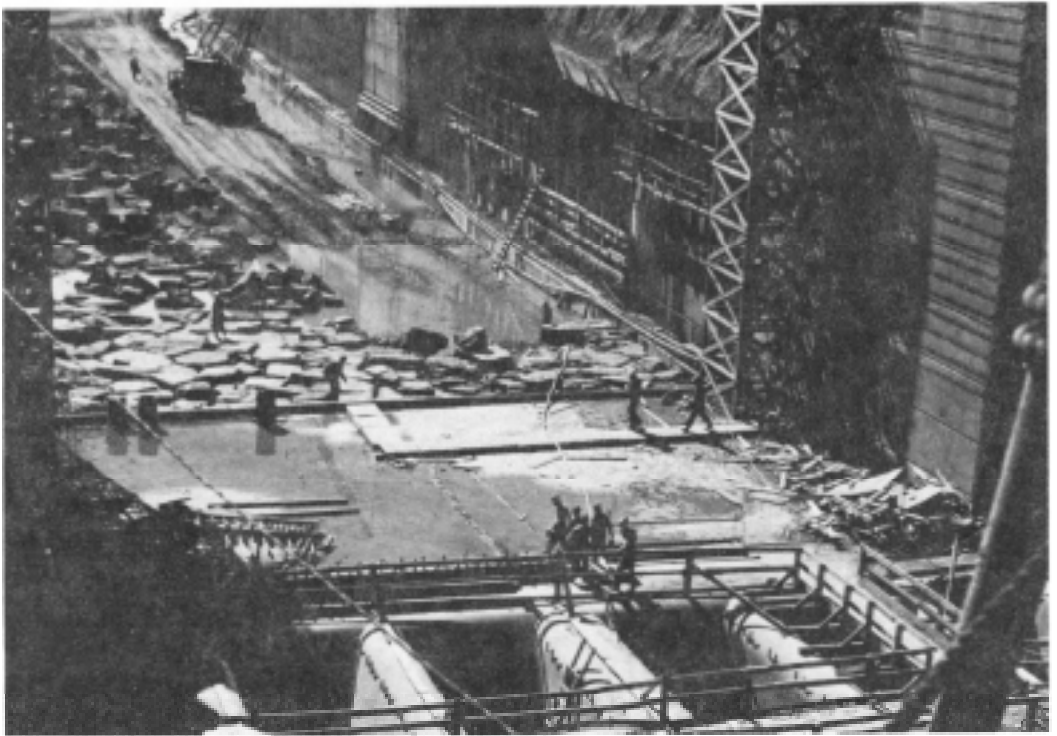
Top of centerline of the sill, June 1957.



Eisenhower Lock Tunnel, from the south, July 1957.



Upper sill, looking west, July 1957.



Placing derrick stone in upstream approach, August 1957.



Looking downstream from centerline; note fenders along walls, November 1957.



Eisenhower Lock from the north upstream bank, May 1958. Note the upstream miter gate in operable condition and the vertical lift gate in raised position.

Constructing Snell Lock (Grass River)



Excavation, from the west end, February 1956. A bottom-dump Euclid in the foreground.



Excavation, February 1956. Glacial till in foreground, marine clay in background.

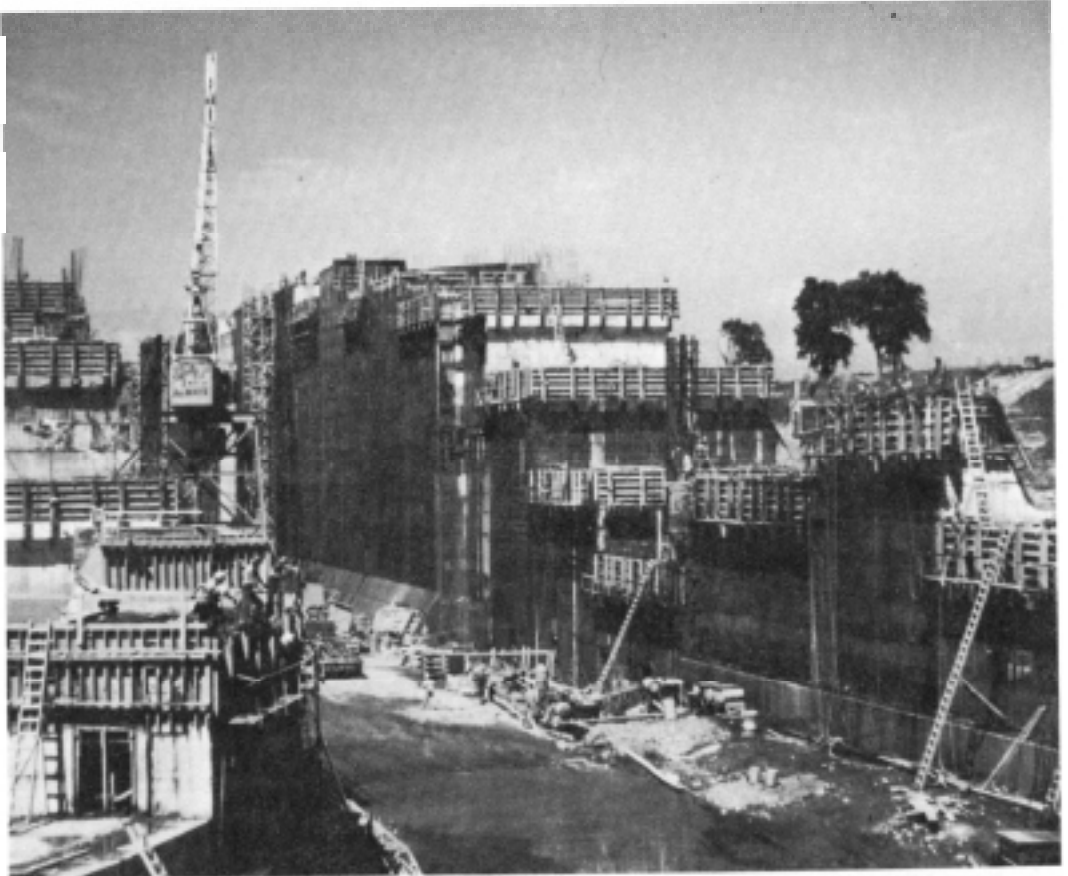


↑ Early concrete construction, September 1956.

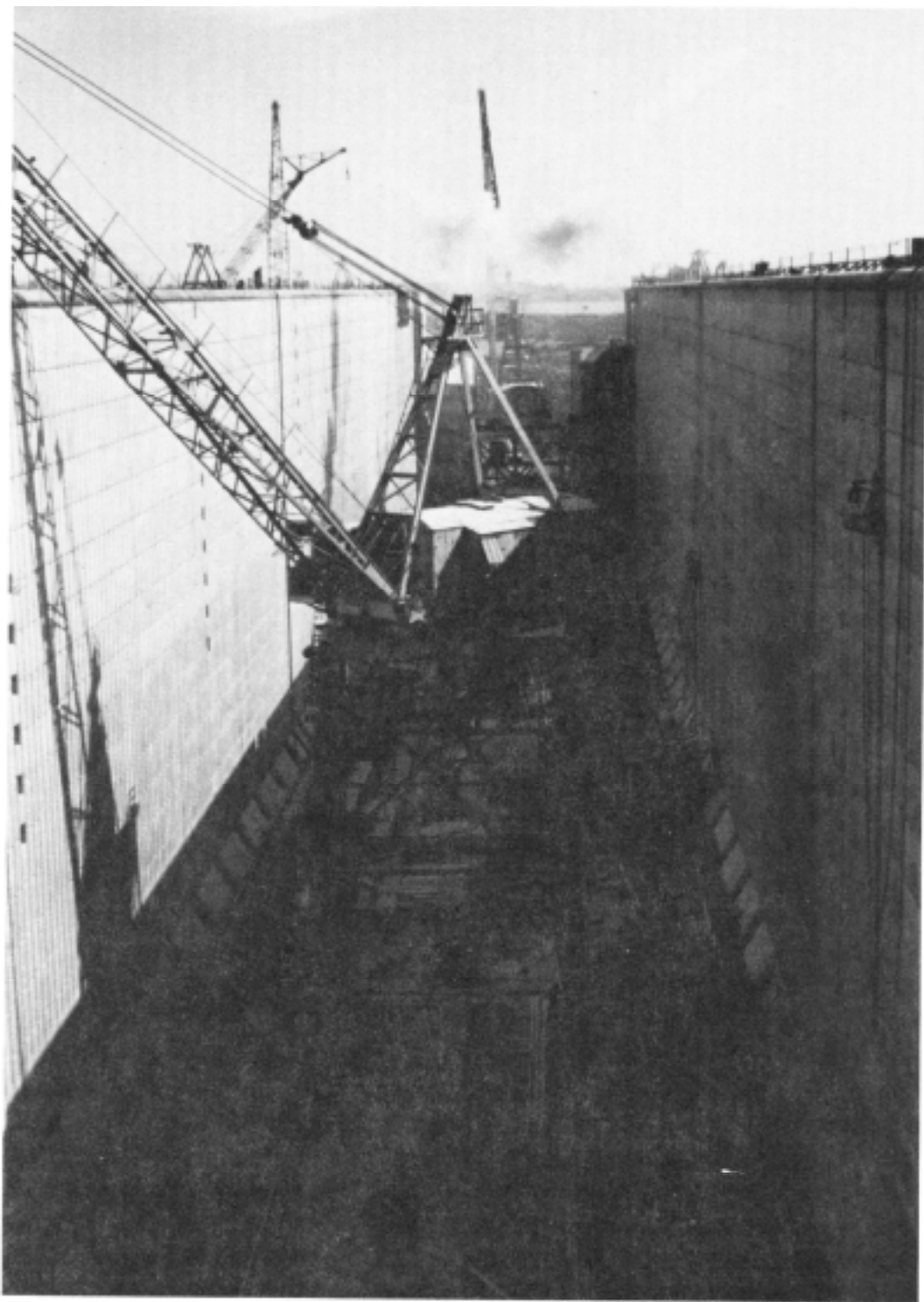


Construction activity, November 1956.

St. Lawrence Seaway Development Corporation



Construction of forms for placing concrete, May 1957.



The nearly completed Snell Lock, September 1957. The high gantry crane is dwarfed by the lock chamber. Construction activity continued around the clock.



Removing the plugs, May 1958.

Chapter IV

IMPROVING NAVIGATION

The Long Sault Canal and its two locks were the most complex components of the United States' role in building the St. Lawrence Seaway. Nevertheless, on-schedule dredging of the ship channels leading to that key portion of the Seaway was also vital to the timely completion of the project. Dredging was less complex technically than the tasks involved in building either the two locks or the Long Sault Canal. For the Corps with its extensive experience in maintaining and improving United States waterways, certain aspects of the Seaway dredging proved routine. Others, however, presented complex organizational problems.

Determining standards for and making the improvements in navigation channels demanded close cooperation among a number of agencies with responsibility for the river and the Seaway. Perhaps because the dredging seemed so routine, orders and legislation authorizing the improvements for navigation were less precise than on other aspects of the project. Imprecision in standards and ambiguity in the assignment of responsibility, however, led to protracted negotiations which at times contributed to strained relations among the many groups involved. In a few instances, controversial issues prompted sharp diplomatic exchanges between the United States and Canada and public controversy between American agencies.

Corps officials confronted problems over dredging in much the same way as they had dealt with issues that arose in building Long Sault. As a rule, the Corps attempted to accommodate the interests of those with responsibility for the dredging while adhering as strictly as possible to standard Engineer practices. This procedure worked well in dealing with the Power Authority of the State of New York and the Hydro-Electric Power Commission of Ontario over criteria for navigation channels. It was not so successful in dealing with Canada over the division of responsibility for dredging in the south channel of Cornwall Island. The engineering issues there were not clearcut, and a good case could have been made for either side on technical points. Corps experience as a mediator between conflicting parties during the course of the project served it well in trying to reach a compromise. Canada, however, had political considerations that required the Corps to accede to Canada on the dredging issues, although the Engineers were able to make the dredging a cooperative enterprise once both sides agreed to what their responsibilities were. And Corps expertise did prove critical in getting the dredging done on time after advertisements produced no acceptable bids.

While the dredging in the Cornwall Island channels produced perhaps the most acrimonious disputes of any in the entire project, other parts of the navigation works were fairly routine. Work proceeded smoothly in the Thousand Islands section. And, in all sections of American responsibility, the

Corps' long-term relationship with the Coast Guard helped when it came to working out the details of designing and installing navigational aids.

Determining Navigation Criteria

The St. Lawrence Seaway Development Corporation had sole responsibility for improvements to aid navigation in the Thousand Islands reach as well as in the Long Sault Canal area. The Corps of Engineers had been involved in studies about desirable navigation standards there since the 1920s. But determining criteria for Seaway navigation during the project was difficult because the power entities had responsibility for dredging that affected both power and navigation. That is, the dredging done by the power authorities in navigation channels that were also important to generating power would determine ships' sailing courses. In fact, as it turned out, the power agencies were not necessarily obligated by law to adopt the criteria that the Corps and the Corporation, in consultation with the Canadian Seaway Authority, had accepted for navigation channels. The failure to have the power authorities legally bound to follow the criteria determined by the Corporation and the Corps was the result of the two-stage approval of the project in which the power projects had received the "go-ahead" before the navigation project.

Even so, the power authorities could not act in total disregard of the Seaway Development Corporation and the Seaway Authority. HEPCO and PASNY were responsible to the St. Lawrence River Joint Board of Engineers, chaired by General Robinson, Deputy Chief of Engineers for Construction. Moreover, the power entities had to meet standards of river water-level control determined and supervised by the Board of Control, an agency of the International Joint Commission. It was that board's duty to assure that Lake Ontario water levels were not adversely affected by projects along the St. Lawrence River.

In dealing with navigation, therefore, the Corps and the Corporation had to determine navigation criteria early in the project so that planning, design, scheduling, and contracting could proceed. Determining the criteria proved to be a formidable organizational task. The Corps and the Corporation turned to the Joint Board of Engineers to help get both Canadian and power entity approval of criteria for navigation. Time was of the essence in the resultant negotiations because the power authorities planned to let contracts early for their dredging, much of which was critical to the timely completion of the power projects.

Early in 1955, a few months after the project had begun, the Corps and Corporation initiated detailed discussions over navigation criteria. The Corps took the lead in preparing what it thought to be desirable standards, cooperating closely with the Corporation and the Joint Board of Engineers. Navigation issues included determination of "negative deviations," that is, short-term fluctuations of water levels in the river. Other navigation subjects included depth of excavation in rock channels, agreement on duration of the navigation season, criteria for the widening of navigation channels at bends,

width of channels, and the basis for determining acceptable velocities. Under the terms of the International Joint Commission Order of Approval, the power authorities had to accomplish a considerable portion of the rock excavation in the channel of the St. Lawrence River, making necessary close cooperation among the power and Seaway entities.¹

Grading in the navigation channels was the first issue that needed resolution. Corps officials believed that the “criteria providing for a 27-foot channel depth is well established.” To achieve a 27-foot channel, the Engineers’ experience in the Great Lakes suggested that the excavated depth in rock be 29 feet. The two-foot greater depth in rock than in softer materials was necessary for ease of maintenance and lower long-run maintenance costs. “In the rock cuts,” Robinson, a key figure in the discussions, observed, “the propeller wash of ships seems to turn up loose slabs of rock thereby creating serious hazards which are difficult to detect and remove.”²

Initially, there were questions over whether or not the power entities were required to excavate to the 27-foot depth. In February 1955, the Joint Board of Engineers ruefully concluded that “no basis had yet been found for requiring the power agencies to excavate” to 29 feet or indeed even 27 feet.³

That there should be such ambiguity over an issue that the Corps thought resolved was the result of the tortuous paths of approval of the power and then the Seaway projects. Robinson had instructed the Joint Board to investigate the long and tangled series of authorizations to determine exactly what responsibilities the power authorities had. A careful review of the International Joint Commission’s Order of Approval of 31 October 1952 indicated that specific navigation criteria were not included in approving the power projects. This order noted that the project was to be constructed, operated, and maintained according to standards set forth in a Canadian-American joint report of 3 January 1941, the precursor of the important Corps report of 1942.⁴

What these investigations did find, however, was that both governments intended that the depth of the navigation channels be 27 feet. Although the order of approval did not specify such depth, the two governments in applying for an order of approval from the International Joint Commission specified that they sought a “controlling channel depth of 27 feet.”⁵

While this satisfied the commission, Robinson looked for ways to accommodate the power entities who still were not convinced of their obligations. Digging a 29-foot channel in rock would increase their costs, understandably creating some resistance to the Corps’ recommendations. As a compromise, Robinson suggested that HEPCO and PASNY compensate for the increased depth by narrowing the width of the channels they planned to excavate. The power authorities ultimately went along with these requests, especially after the Seaway Development Corporation and the Seaway Authority gave “informal indications that [they] would absorb any additional costs found necessary to obtain a 29-foot depth in rock.” This was necessary to avoid continued wrangling and possible delay in the opening of the navigation works in July 1958. Both HEPCO and PASNY were also willing to accommodate the Seaway agencies because the power entities had to be

concerned about velocities in the river. The power works had important responsibilities toward maintaining IJC-mandated velocities in navigation channels, which in places required more substantial cuts in channels than were alone required for navigation. The Corps pressed navigation issues because, as Robinson said, these matters were of "some urgency since a number of excavation contracts [were] being planned by the power entities for award" in the spring of 1955.⁶

The power authorities' acquiescence on excavation depth was more easily gained than on some other issues. On channel alignment, the power entities let contracts before there was agreement on whether or not to have bends in channels in the vicinity of Canada Island and in the Ogden Island reach. In November 1954 HEPCO, on behalf of both power entities, proposed to the St. Lawrence River Joint Board of Engineers a channel alignment that the board found unacceptable. The Joint Board preferred a straighter alignment, one in fact mandated by the order of approval. The board's formal disapproval, however, did not reach the power agencies construction agents in time to be reflected in their initial construction schedules. The Corps, the Coast Guard, and Great Lakes shippers opposed the proposed channel alignments. All agreed that "curved courses are unacceptable to mariners." The Corps proposed instead an alignment that had straight reaches, definite turning points, and sufficient widening at unavoidable bends. Since the Corps had the support of so many other interested parties, the power agencies acquiesced in the desired changes, even though it required their construction agents to redesign and reschedule some of the work.⁷

Other navigation issues also involved the Corps in a coordination role. Perhaps none of these was more important than that of water levels. These levels affected the interests of almost all of those participating in the Seaway and power projects. Determining water levels required agreement on the methods of control of the river level and on how best to cope with "negative surges." The latter were sharp natural variations in the river level. In planning for the locks and the Long Sault Canal the range of these variations had to be taken into account. Their range was also important in determining the depth of cuts in navigation channels.

Essentially, the new power and navigation works were going to require a greater degree of control over the river's flow. Determining a method of regulation provided much of the background for the discussion of navigation criteria. The problem of controlling the river had received extensive study, especially by the Canadian Department of Transport.

All discussions of navigation standards had to take into account the criteria to be satisfied by the method of regulation of water-surface levels. These requirements were based on the need to keep within Lake Ontario's natural fluctuations. A further consideration that had important political implications in Canada was the need to ensure that the method of regulation did not allow the river to fall below the minimum levels at Montreal harbor. Similarly, in the interest of the efficient use of the power plants, the method of regulation had to ensure that water levels did not dip below the low levels that occurred naturally from December to the end of March. High water levels also had to be considered. Spring often brought an increase in the river level

because of the breakup of ice below Montreal. River regulation that did not provide for the high river flows during May might aggravate the high water levels in Lake St. Louis during the flood season in the Ottawa River. During the summer months, the regulation method had to hold back the natural outflows from Lake Ontario in order to keep the lake at high levels.⁸

Determining navigation criteria, therefore, took place as part of discussions of a basic plan for river regulation, the context of which was uncertain. Corps officials pressed for an early decision on the method of regulation. For the purposes of planning the navigation works, however, the Engineers had to assume that whatever plan was adopted would conform to natural changes in river level.

But what constituted “natural” variations was not easily agreed upon. Indeed determining the range of negative surges affected the entire course of discussion of criteria for navigation channels. Agreement on interpreting the data on negative surges was critical and the matter took on a certain degree of urgency. Despite its being essentially a technical hydraulic question, it became a source of disagreement between Canadian and American officials. In large part this resulted from the different methods by which the Canadians and the Americans determined negative surges. Simply put, the issue was to agree on measurement techniques and a method of calculating the magnitude and frequency of negative surges which were likely to reduce the water surface below the lowest point allowed in whatever plan was adopted to regulate the river’s range of levels. These issues were finally resolved in September 1955, allowing the Corps to proceed with its design, planning, and preparation for awarding of contracts.⁹

Other navigation issues also took time to resolve, although they lacked the immediacy of the questions of river control, channel excavation, and negative surges. The Corps, for example, was drawn into the consideration of spoilage areas to be used by the power entities. Plans to dispose of spoil between Chimney Point and Ogdensburg harbor faced local opposition, especially after it was proposed that the area to be used for dredged material be enlarged. Officials of the town of Ogdensburg, as well as New York State officials, objected. The spoilage area severely limited entrances to their harbor, making future expansion there uneconomical. They appealed to the Corps and the St. Lawrence Joint Board to intervene. After discussions with Uhl, Hall & Rich, consulting engineers to PASNY, new plans were drawn up to take into consideration the interests of Ogdensburg harbor. Since the Corps expected to have future responsibility for the navigability of the river, Buffalo District officials believed that the Power Authority’s plans “should be critically reviewed before use of the spoil area is allowed.”¹⁰

1955 also saw discussions of how long navigation would be interrupted when the power pool was flooded. This issue led to some strain between the United States and Canada. The problem stemmed from the idea in the early 1950s that the Canadians would themselves build a canal entirely in Canada. Even after the agreement to construct the project jointly with the United States, the Canadians continued to consider the possibility of building what in effect would have been duplicative works on their side of the border. Like their

counterparts in the Seaway Development Corporation, officials of the Seaway Authority had to contend with political pressures. Canada's interest, for example, in possibly keeping the Cornwall canals operational was in part the need to placate local interests. It was also a way to guarantee that there would be a means of relief should the Seaway become congested. Whatever the reason, the prospect of continuing to maintain the 14-foot Canadian canals near Cornwall caused anxiety in the Corporation. The prospect of deepening those canals to 27 feet truly alarmed Corporation Administrator Lewis Castle. He was "highly concerned" about this "by-pass" because of its potentially negative "impact on the self-liquidating prospects of the Long Sault Canal."¹¹

New York's Power Authority and the Corps agreed with the Corporation on this matter. The issue arose indirectly early in 1955 as the St. Lawrence River Joint Board of Engineers began discussions about the date the power entities were to raise the power pool. As discussed earlier, July 1958 was ultimately decided upon as the time to flood the power pool. By that date, Long Sault was to be ready to accommodate 14-foot navigation. The future of the Cornwall canals arose during discussions of flooding the power pool. The immediate issue was how long navigation was to be interrupted by flooding the power pool. The IJC order of approval of October 1952 required "the continuance of 14-foot navigation during the construction." The order did not define "continuance."¹²

Canadian representatives on the Joint Board of Engineers thought that navigation would be interrupted for five days at least, perhaps for a month. The New York Power Authority believed that five days would be all that was required to elevate the pool and accomplish the work necessary to switch traffic into the Long Sault Canal. The Ontario Power Commission thought that it could construct a dike "plug" across the existing Cornwall canal in minimum time. Pool raising and plug construction would be accomplished at the same time. The Corps' position was based on its experience from similar situations elsewhere. On internal rivers of the United States, Corps practice was to stop navigation for up to two weeks or more on vital construction. In such instances, the Corps did not pay indemnities to the navigation interests affected.¹³

Thus, HEPCO, PASNY, and the Corps believed that flooding the power pool would not have an adverse affect on navigation. Corps officials, such as General Robinson, believed that a five-day delay in navigation did not violate the spirit of the order of approval's mandate for "continuance" of navigation. The Corps' position was that the faster the older 22 locks were abandoned in favor of opening the seven new locks of the Seaway, the better for river traffic.¹⁴

Canadian representatives on the Joint Board of Engineers, however, had other matters to consider. There were interests in the Cornwall area that did not want to see the older canals totally abandoned. At the national level, some Canadian politicians preferred that these canals be held in reserve and indeed, at some point, deepened to 27 feet. The cross purposes at work became clear in discussing plans for closing the canals. Canadian representatives on the Joint Board of Engineers proposed the construction of a concrete headworks with slots for quick insertion of stop logs. This project would have saved

the canals. The Corporation opposed this plan since it left open the possibility of a canal in competition with Long Sault. Both power entities also objected to the Canadian proposal since it would delay the flooding of the power pool.¹⁵

Ultimately, the Canadians gave in. The \$3.5 million in extra cost to build the concrete headworks undermined support in Parliament. The Seaway Authority also acquiesced because of pressure from HEPSCO. Delay in flooding the power pool would have proved costly to the power entities. Moreover, in February 1955, the Canadian and American governments had exchanged notes that in principle agreed that there would not be duplication of works on both sides of the border. In view of the savings, the United States had agreed to abandon a lock originally planned at Rockway Point. It would have duplicated the Canadian works at Iroquois. In that same spirit, the Canadians ultimately abandoned the idea of duplicative 27-foot canals in Cornwall, canals that Castle and the Corps feared would compete with Long Sault.¹⁶

Dredging the South Channel

Few issues proved more divisive than the dredging in the south channel of Cornwall Island. The power authorities disputed their responsibility for any of the work to be done there, and the Canadian and American Seaway agencies disagreed on the way in which to approach the dredging. The negotiations over organizational, technical, and political problems were time consuming and threatened to delay completion of 14-foot navigation beyond the July 1958 deadline. As in other issues covered in this study, delay was serious because it created the possibility of a long-term interruption in navigation in the St. Lawrence River. The power authorities, as we have seen, had determined to flood the power pool in July 1958. This flooding would have inundated the existing 14-foot canal system. By that date, the Corporation and the Corps had to ensure that 14-foot navigation would be available in the new navigation channels planned as part of the St. Lawrence Seaway.

According to the Corporation, neither the order of approval of October 1952 nor the Seaway enabling legislation, Public Law 384, provided much guidance on the division of responsibilities for dredging in the channel south of Cornwall Island. The Corporation maintained that the power entities had responsibility for that dredging. The Corps' studies in the 1940s, which formed the technical basis of the 1954 Seaway Act, indicated that the south channel was for purposes "common to navigation and power." Public Law 384 empowered the Corporation only to perform work "solely for navigation," leaving to the power entities dredging that affected both power and navigation.¹⁷

The Joint Board of Engineers agreed with the Corporation's interpretation of responsibility for dredging. Its members were prepared to issue an order to PASNY and HEPSCO on the work they had to do in the south channel. Castle, however, preferred to negotiate some compromise with the power entities, in part because he did not want to precipitate a court battle over the issue. Such a confrontation would have delayed the navigation project. The desire for

compromise was also based on a recognition that the Corporation's position was somewhat weak. Castle and the Corps had not budgeted funds for the dredging, assuming that the power companies would do the work. In contrast, the Canadians had allocated funds for dredging around the island. In anticipating some responsibility for work in the Cornwall channels, the Seaway Authority undermined the Corporation's position that HEPCO and PASNY were alone responsible for the work.¹⁸

For their part, the power entities vigorously protested taking on the dredging in the Cornwall channels. Early estimates were that in the south channel alone over nine and one-half million cubic yards would have to be excavated. It was to be a difficult job because of swift currents and the nature of the glacial till. All sides anticipated costs of about \$18 million to complete the job.

The power entities based their position on what they saw as a certain degree of discretion in determining what dredging was necessary for the purposes of power. They argued that they were required only to perform such excavation downstream from the powerhouses as was needed to reduce the tailwater level at the powerhouses. This water level was critical since it affected both the dike works and property along the shore. Both the American and Canadian power companies maintained that they could achieve the tailwater reduction without the extraordinary and expensive dredging around Cornwall Island. They based their position on the 1952 International Joint Commission order. That order did not mandate how the power authorities were to lower the tailwater at the powerhouse, only that it had to be done. Indeed, the order left open to further study the determination of the method to reduce the tailwater level.¹⁹

Discussion of this issue took most of 1956. Robert Moses, chairman of PASNY, made the case that the dredging in the south channel would not be beneficial to either PASNY or HEPCO. Other courses could be adopted that would lower the tailwater. He conceded that, as originally planned, the power entities did have some responsibility for navigation, but not to the extent that the Corporation and the Corps believed. He objected strenuously to dredging solely for the purposes of navigation. The discussion of the issue became public when Moses accused both the Corps and the Corporation of inefficiency. The Corps had miscalculated costs, he said, and the Corporation had exacerbated the problem by mismanagement.²⁰

While the dispute could have dragged on, HEPCO and PASNY were quick to compromise. An aggressive stance failed to force the Corporation and the Seaway Authority to back down. The power entities then sought a compromise. The finances of HEPCO and PASNY were such that they needed to open the power works on schedule. The revenues were necessary to begin the timely reduction of their indebtedness. After many meetings, the parties agreed to divide the work equitably between the power authorities and the Seaway development entities. Each power company contributed \$6 million to the project, with the Canadian and American development agencies each providing half of the balance.²¹

Even so, this compromise forced Castle to seek congressional author-

ity to raise more money. The dredging in the south channel, to be sure, was not the only reason for increased costs. Nevertheless, any approach to Congress opened the possibility of another salvo of criticism from adversaries of the Seaway. But the issue had to be resolved since Castle had to begin planning to go to Congress for more money in mid-1956.²²

While the negotiations with the power entities were difficult, those with the Canadians proved even more troubling and time consuming. The major issue dividing Canada and the United States was that the dredging in the international waters of the south channel would affect conditions in the Canadian waters of the north channel. According to the 1909 International Boundary Waters Treaty neither country could disturb the natural flow of water without the consent of the other. Dredging in the south channel would require, therefore, compensatory dredging in the north channel.²³

The Canadians adhered strictly to the terms of the treaty, maintaining that the magnitude of water flows should not be disturbed by the dredging work to be done. Normally, about one-third of the water flowed into the north and two-thirds into the south channel. The St. Lawrence River Joint Board of Engineers had mandated that water velocity be about 4 feet per second during the navigation season. In its natural state, water velocity was about 12 feet per second in the south channel. Dredging in the channel, as well as below the power pool upriver, would reduce this water velocity. But the Americans argued that if more water could be diverted to the north channel, the amount of dredging necessary in the south channel would be reduced, thus lowering their costs.²⁴

Corporation and Corps officials challenged the Canadian position. Ontario's Power Commission, for one thing, had disturbed the natural flow of water in its dredging work being done near Waddington. And, of more significance, Buffalo District officials had discussed the issue with Canadian engineers who had agreed in principle that flows need not be balanced.²⁵

The problem, however, was a political one, not a matter of engineering. Changing the condition of the north channel presented the Seaway Authority with some unpleasant problems. New velocities or depths in the north channel might adversely affect shipping at Cornwall. That city already was angry over roadway relocations that had rerouted a major highway around Cornwall. The Seaway Authority took great pains not to jeopardize town plans for an improved harbor that could accommodate ocean-going ships.²⁶

The Canadians remained adamant for other reasons. Too great an alteration in the natural flow around the island, they thought, might jeopardize downstream interests near Montreal by altering river levels and flow near the important harbor there. Corps analyses indicated, however, that adjustments in depth and widths of channels could prevent adverse effects downstream. The Buffalo District had also studied proposals to constrict the entrance to Polly's Gut, the reach between the north and south channels.

In the meantime, the Corporation focused on keeping the costs of the excavation and dredging to a minimum. The more water diverted to the north channel, the lower the velocities in the south channel. Reduced velocities achieved in this way would reduce the amount of dredging and excavation needed along the shorelines of the south channel.²⁷

Nevertheless, the Canadians refused to budge from their position. In part, their adamancy was the result of a superior bargaining position. As mentioned earlier, their original cost projections had included dredging in the north channel to compensate for the results of changes in the river brought about by the power projects. In contrast, the Corporation had not included such cost estimates. Thus, the Seaway Authority did not have the cost incentives that the Corporation had. But the Canadians had higher political "costs" than the Americans. Substantial alterations in the north channel had the potential of alienating the public in Cornwall and in Montreal.

For its part, the Corps wanted the dredging issue resolved, and the Engineers pressed Castle to come up with a solution. Other dredging projects in the Great Lakes area had been advertised in the summer of 1956, and officials in both the District and Division offices were concerned that not enough equipment would be available for the Cornwall project. By the end of July 1956, however, there was still no resolution.²⁸

Part of the reason for the delay was technical, that is, over interpreting the results of model tests. In so obviously complex a set of issues as dredging around Cornwall Island, model tests were crucial. The Corps designed tests for the Corporation, while the Canadians conducted their own tests. Dredging around Cornwall then became more complicated because of a dispute between Americans and Canadians over interpretation of the results of model tests.

Corps testing at its Vicksburg facility indicated that the best way to proceed, from the American point of view, was for the Canadians to accept greater quantities of water and more dredging in the north channel.²⁹

The Canadians fully rejected the idea, adamantly retaining their position that the natural division of flow around the island must be maintained. The Corporation and the Corps agreed to that and then focused exclusively on ways in which to minimize the costs of making the south channel meet the criteria for navigation.

By November 1956 both sides were ready to compromise. The Canadians, after all, had nothing to gain by a stalemate that might delay opening the Seaway on schedule. Since the power entities had already agreed to provide some funding for the south channel dredging, only the division of responsibility for dredging in the south channel was left to be determined. The Canadians had won the point that the natural flow of water around the island was to be maintained. On 6 December 1956 they agreed to take responsibility for a large cut of excavation along the southern shore of Cornwall Island. This cut, along with the widening and deepening of channels, was necessary to allow the Corps and the Corporation to meet the navigation criteria in the channel, especially the requirement that water not run faster than four feet per second. This compromise was a sensible one, since the international boundary ran through the south channel and the Canadians therefore would be performing work in their own territory. And that factor was not a minor consideration in view of the fact that the project had already suffered from labor disputes prompted in part by United States and Canadian unions angered by foreign nationals doing work in each other's countries.³⁰

Throughout the negotiations in 1956, Corps officials in the Buffalo District and the North Central Division had warned of the difficulties that

would be met in finding acceptable bidders on dredging contracts. There was considerable work to be done in the Great Lakes area. Equally significant, the work in the south channel was extensive and difficult. Water currents were swift. There were nine and a half million cubic yards to be removed, four and a half million of which were marine excavation. Moreover, because the work was to be done in the vicinity of the international boundary, labor difficulties were likely.³¹

During most of 1956 Corps officials believed that Corporation Administrator Castle was not moving swiftly enough in coming to an agreement with the Canadians. Buffalo District Engineer Olmstead perhaps summed up the apprehension best when he said that "anything that can be done to persuade the Seaway Corporation to expedite their negotiations with the Seaway Authority and the power entities should be pushed to the utmost." As the discussions continued into the fall of 1956, the Corps began to make alternate sets of plans for the work. These plans were based on each of the several major proposals under discussion. If deadlines were to be met, officials in Buffalo thought mid-November the latest possible time to come to some agreement with Canada.

As early as July 1956, General Holle had made clear to Castle that in the Corps' estimation the 1956 season was lost to work on the south channel. Under the circumstances, Holle was not sure that the Corps could produce anything other than a "substandard navigation channel south of Cornwall Island." He went on to say that "the realization of even this limited objective will be endangered unless the current negotiations" with Canada were completed promptly.³²

Agreement was finally reached on 6 December 1956. Engineers from the Corporation, the Corps, and the Seaway Authority divided up the work between miles 107 and 110 of the Seaway, with the United States taking responsibility for most of the marine dredging in this reach. The Canadians agreed to do a small portion of the marine work and all of the cuts necessary on the southern tip of Cornwall Island. The Corps had anticipated the final settlement and had advertisements for bids ready. They were published on 10 December 1956.³³

No bids were received. The work advertised covered dredging of 5.14 million cubic yards. Corps officials, therefore, called a series of conferences with the various dredging companies in the Great Lakes area. As a result, the work was rescheduled and resubdivided. Some of the dredging originally contemplated for the south Cornwall channel in 1957 could be deferred. This latter dredging was necessary for the 27-foot navigation channel scheduled for April 1959, although it would not meet completely at that time all the required navigation criteria. Channels would be narrower and water velocities faster than originally contemplated. Bringing the channels south of Cornwall up to required standards was scheduled for completion in 1960 and 1961.³⁴

Advertisements for the rescheduled work went out on 6 February 1957. When bids were opened on 4 March 1957, the Corps discovered that the contractors had bid well in excess of Buffalo's estimates of the cost of the project. Indeed, the total cost of the bids was almost twice (\$32 million) what

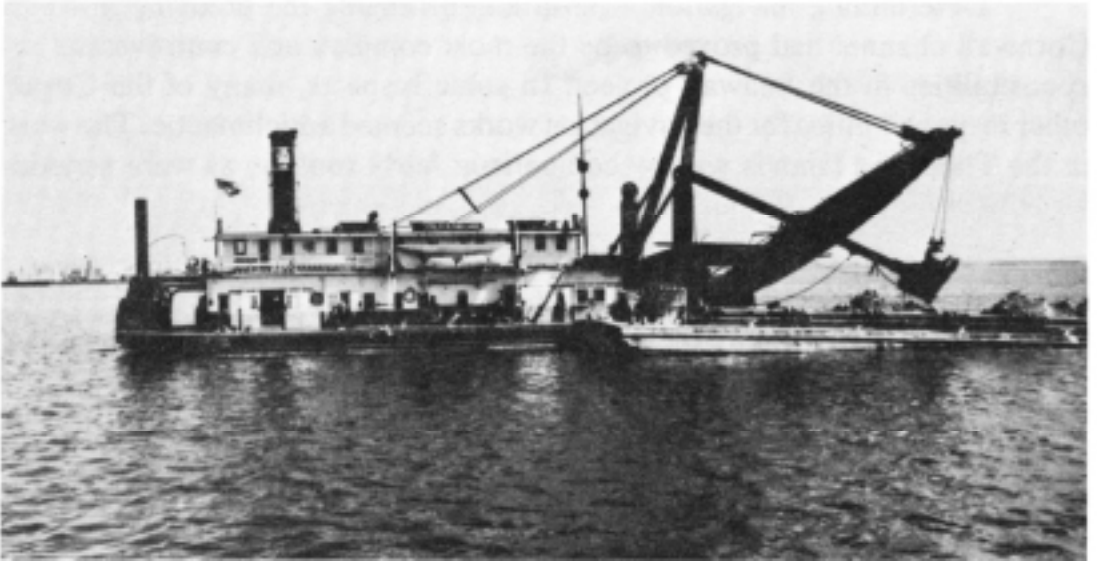
the Engineers had estimated (\$18 million). The one bid accepted was for dry excavation. All the others, for marine excavation, were rejected.³⁵

In response, Buffalo began negotiations with four dredging companies to develop contracts for any portion of the work the firms would be willing to undertake at acceptable costs. The excessive bids were in part the result of competition from other work in the Great Lakes area. Involved also were concerns over labor problems in the Seaway work area. Labor was scarce and bringing workers from other areas often required special living allowances. Moreover, there were long-standing problems with labor unions, in particular prolonged territorial disputes between longshoremen and members of the International Brotherhood of Engineers. Such disputes were likely to cause shutdowns which led to increased costs.³⁶

Ultimately, the negotiations with dredging firms failed to produce satisfactory contracts for most of the work to be done in the south channel. A negotiated contract was awarded 29 April 1957 to Merritt-Chapman & Scott for the removal of 470,000 cubic yards in marine excavation. This was, however, only a small part of what needed to be done. Buffalo recommended that contracts be awarded to other firms with whom the District Engineer had been negotiating. The Corporation, however, opposed the high bids and recommended instead that United States government plant and hired labor be used for the approximately 390,000 cubic yards of dredging necessary.³⁷

While the District Engineer and the Division Engineer appreciated the Corporation's desire to keep costs down, there were real problems with using government equipment and hired labor. Corps responsibilities would extend to arranging for the equipment, that is, dredges and scows, and hiring the crews to man these craft. Such a method was undoubtedly cost-efficient, but Buffalo District personnel doubted that it would be as economical as Castle and the Corporation hoped. Buffalo questioned whether adequate crews could be secured and retained. While the government would pay union scale, it was not empowered to pay certain fringe benefits. These included a portal and board payment of \$5.00 per day. Officials in the Buffalo District office worried that the \$30.00 difference for a six-day week would make attracting a crew impossible, especially in view of the continuing shortage of labor in the Massena area. Despite such reservations, the Corporation wanted to go ahead and take what Buffalo considered the "last resort" approach. Considerations of cost were uppermost in Castle's mind after being sharply criticized in congressional budget hearings in the winter and spring 1956-1957.³⁸

Corps officials did not want to appear as obstructionists, nor as advocates of a more expensive approach to dredging. Therefore, Buffalo complied with the request for government equipment and hired labor. Indeed, as early as February 1957, the Corps began to survey the availability of both private and Engineer dredging equipment in the Great Lakes and East Coast areas. As a result, when the assignment finally came in April, both the Buffalo District Engineer and North Central Division Engineer were prepared to provide the dredges and necessary scows. Indeed, both officials had collected names of potential workers in the Great Lakes area, men willing to work without some of the fringe benefits laborers in the Massena area had come to expect. Crews were recruited for the dredge *Gaillard* and Corps personnel were assigned



Corps of Engineers dipper dredge ***Colonel D.D. Gaillard***, used for the critical work in the south channel area.

from the St. Paul, Buffalo, and Chicago Districts to supervise the work.³⁹

Corps-sponsored dredging proved a success. The project was kept on-schedule, and the Corporation could confidently report at the end of 1957 that 14-foot navigation would be ready in July 1958 as originally planned. Indeed, experience with the *Gaillard* found that the Corps costs were \$1.00 less per cubic yard than Buffalo itself had originally estimated. The success of dredging at considerably lower costs than originally projected by private contractors induced the Corporation to turn to the Corps for the remaining work to bring channels to 27 feet. The bids received for the 27-foot dredging in November 1957 were high when compared to estimates of expenses based on government hired-labor costs. The Corporation turned to the Corps for the rest of the work, using the *Gaillard* and the dredge *Paraiso* which had been rented from the Panama Canal Company.⁴⁰

Castle was both relieved and pleased with the results of the Corps taking direct responsibility for the dredging in critical reaches of the Cornwall channel. Within the Corps, however, there was less enthusiasm. For one thing, the assignment presented complicated labor negotiations. The Corps could not pay full fringe benefits to workers on its project, but it did pay prevailing union scales and endeavored to make clear to the unions that the current dredging was a last-resort policy. Even more troubling to the Corps was the attitude of companies in the dredging industry. Representatives of one of the dredging industry's trade associations protested to Buffalo. They saw the Corps' role as unfair government competition for what had traditionally been the preserve of the private sector. The association was also critical of what it interpreted as the Corps' unwillingness to negotiate, even when in some instances contractors were willing to work with the government to negotiate a contract acceptable to both parties. These protests were of no avail in view of the Corporation's desire to keep costs as low as possible. But the Buffalo District was troubled by alienating a group whose members it would have to do business with in the future.⁴¹

Determining navigation criteria and arranging the dredging in south Cornwall channel had proved to be the most complex and controversial responsibilities in the Seaway project. In some respects, many of the Corps' other responsibilities for the navigation works seemed anticlimactic. The work in the Thousand Islands was by comparison fairly routine, as were negotiations with the Coast Guard.

The Thousand Islands

Work in the Thousand Islands section of the Seaway proved relatively easy. On organizational and technical issues, relations between the United States and Canada were marked by mutual cooperation. Most of the Thousand Islands section of the Seaway project lay within American waters. Where it crossed into Canada, the 23-mile lower reach from mile 45 to Chimney Point (mile 68), the Seaway Development Authority took responsibility for widening channels and deepening them to 27 feet. The Corps, at the suggestion of the Corporation, undertook hydrographic surveys to assist the Canadians.⁴²

Both governments had to grant exemptions to coastwise laws for work in the Thousand Islands section. These waivers allowed work vessels of either country to cross boundaries at will. Prior agreements were also needed to allow Americans to serve on Canadian vessels operating in the Thousand Islands section, and vice versa. These understandings were coordinated between the United States Secretary of State and Canadian Secretary of State for External Affairs.⁴³

One of the major tasks to ensure opening of navigation on time was the placement of aids to navigation. These aids were the responsibility of the Coast Guard. Although the contacts were formally between the Corporation and the Coast Guard, the Corps played an important role as a liaison between the two. Good working relationships between the Corps and the Coast Guard on numerous other projects eased the work of the Corporation.

As early as July 1955 the Coast Guard and the Buffalo District began discussions on procedures for the placement of aids to navigation. By March 1956, the details were completed. The Corps agreed to construct the mountings for the placement of the Coast Guard's equipment. The relationship for the most part went smoothly, although the Coast Guard objected to some of the Corporation's review procedures. "The Coast Guard cannot accept," Rear Admiral F. A. Leamy, commander of the Ninth Coast Guard District, observed in discussing procedures, "any provision whereby its statutory responsibility for determining [type, number, and locations of aids to navigation] are subjected to review for purposes of approval by another agency." The Corporation acquiesced in this regard, although it insisted on a major role in the design stages of aids to navigation.⁴⁴

The agreement worked out between the Coast Guard and the Engineers followed procedures similar to those used on other projects where both agencies had responsibilities. In the design stage of the work on navigation aids, the Coast Guard took responsibility for the location, type, and char-

acteristics for each piece of equipment. In the construction stages, the Coast Guard provided and installed "Coast Guard peculiar items," that is, items which were either manufactured only by or for the Coast Guard or which could be obtained most easily under Coast Guard supply contracts. These latter items included buoys, lanterns, lamp chambers, and batteries. The Corps took responsibility for the construction of both substructure and superstructure of each fixed aid, for the acquisition of necessary real estate, and for connections to commercial power lines when they were used. As a rule, the Coast Guard preferred more economical battery-operated equipment. The Coast Guard had to approve the finished work before turning it over to the Corporation. This latter stage of the work also included issuing notices to mariners about the new devices.⁴⁵

The Corps reimbursed the Coast Guard for its work, with the approval of the Corporation. The Coast Guard assigned two men full-time to design and then to supervise the installation of the aids to navigation. This procedure generally worked well. The only difficulty arose in the need to include the Corporation in the discussions between the Corps and the Coast Guard. At times, both the Corporation and the Corps felt that the Coast Guard was not fully informing them of the progress of work. For its part, the Coast Guard found it irritating to have to keep the Corporation informed about what it considered to be fairly routine work. The Corporation, however, insisted on being fully informed and represented at any meeting about navigation aids.⁴⁶

Thus, the navigation aspects of the Seaway presented some of the most complex technical and organizational problems encountered in building the Seaway, even though they might at first have appeared as fairly routine. On balance, the Engineers succeeded in getting the power entities to accept Corporation and Seaway Authority navigation standards. To do so required the Corps and the Corporation to recognize and compromise on some of the power entities' cost concerns related to adopting those criteria. In determining the division of responsibility in the south channel of Cornwall Island, however, the Corps' negotiating skills came up against Canadian adamancy. The Corps and the Corporation had to accommodate themselves fully to the Canadian viewpoint, an accommodation that complicated and increased the costs of the American task. Navigation also required coordination among the largest number of agencies. But despite all of the organizational and technical problems, the Seaway did open for 14-foot traffic on 1 July 1958 as scheduled and for 27-foot traffic with the spring of 1959. Not all of the navigational issues of course were disputed. Indeed, the work in the Thousand Islands reach was marked by cooperation.

Ultimately, however, the Corps had had to take greater responsibility for dredging in the south Cornwall Island channel. While this turned out to be a success in terms of cost and meeting schedules, it became a source of irritation between the Corps and the Corporation. And the Corporation, as we shall see in the next chapter, did not want the Corps to take over maintenance and operation of the completed Seaway. But to the Engineers, the Corps' handling of the south Cornwall channel dredging problem was an excellent argument in favor of continued responsibility for the Seaway once it opened.

Chapter V

DISPUTE OVER CONTROL

The Seaway opened to shipping as scheduled in July 1958. Delays to traffic were minimal, and the Long Sault Canal and its two locks were easily handling about 75 vessels a day. As planned, the initial navigation channel was opened with only a 14-foot depth. Dredging continued during 1958 and early 1959, and when the Seaway opened officially on 26 June 1959, the 27-foot depth had been achieved.¹

By the time of the official ceremonies, however, the Corps of Engineers was no longer fully involved in the project. An executive order of June 1958 had assigned the responsibility for the Seaway Development Corporation to the Department of Commerce, ending the role of the Department of the Army. The Corps continued to be involved only until the completion of a few dredging contracts. They were finished by 31 December 1959.

The last year of the Corps' relationship with the Seaway Corporation proved rocky. As we have seen, the Corps had worried that the Corporation had taken too long in settling on an appropriate division of responsibility between Canada and the United States in dredging the south channel of Cornwall Island. As Corporation officials had concerned themselves over the need to increase its borrowing authority, the Engineers had feared that the result would be missed deadlines.

These concerns formed the backdrop to two issues that confronted the Corps in 1957 and 1958. While the Corps was not directly involved in the determination of tolls, it was interested in the outcome of negotiations between Canada and the United States. Generally, the Engineers did not like the idea of charging tolls. Seaway charges might set a precedent for establishing user fees elsewhere on the United States' inland waterways system. The Corps also had other concerns about the outcome of the tolls negotiations. If they were too high, tolls would limit traffic on the Seaway. Reductions in traffic would reduce revenues, hindering the Corporation's ability to amortize its bonded debt to the U.S. Treasury. High tolls would also undermine the Corps' estimates of the benefit-cost relationships that had originally justified building the Seaway.

The second issue during those years concerned the future operation of the Seaway. Corps officials wanted responsibility for the operation and maintenance of the completed project. The Corporation fought hard to keep those tasks for itself. Ultimately the Corps lost its bid for a major operational role. But by the time the Eisenhower administration assigned the operation and maintenance of the Seaway to the Corporation, both sides had become involved in a nasty dispute, with charges and countercharges traded publicly.



A freighter in Snell Lock soon after the opening of the Seaway.

St. Lawrence Seaway Development Corporation

Seaway Tolls

The Corps of Engineers had only an indirect role in determining the tolls that were to be charged on the St. Lawrence Seaway. Establishing those rates had been one of the major reasons for the formation of the St. Lawrence Seaway Corporation in the first place. As a joint venture between the United States and Canada, the legislation authorizing the Seaway saw the Corporation as an essential liaison with representatives of Canada. In 1955, both the Corporation and the Canadian St. Lawrence Seaway Authority established a joint tolls committee. American representatives on the committee were drawn from the Corporation, the Maritime Administration of the Department of Commerce, and the academic world. From time to time, the committee turned to the Corps to help assemble data on costs and project future expenditures. These data were essential in establishing the rate base for the tolls. By law, the Corporation had to pay back, with interest, the money borrowed from the Treasury. Since costs mounted during the course of the project, the Corporation needed detailed estimates of total cost in order to settle on a rate base that would retire the debt in the 50 years set for full payment.²

Levying tolls on the St. Lawrence Seaway had been the focus of the debate over final congressional approval of the project in 1954. That the Seaway was to be a self-liquidating enterprise had been the critical factor in gaining congressional support for passage of the authorizing legislation. That law required that tolls be levied at a rate adequate to meet all costs of operating and maintaining the works. Toll revenues were also to provide revenue to cover depreciation charges, payments in lieu of taxes, interest on obligations, and amortization of the debt within 50 years. Neither proponents nor opponents of the Seaway, however, ever resolved for themselves the issue of the tolls. Proponents thought that the rates would have to be too high to pay off the costs of the Seaway, thus making it uneconomical for the shippers who had held out the most hope for the project. Opponents of the Seaway believed that the tolls would not be high enough to cover the costs of building the locks and navigation channels thus providing in effect a subsidy to Great Lakes shipping. But to members of Congress from states without vociferous, well-organized groups either in favor of or opposed to the Seaway, the issue of self-financing was critical. Disinterested congressional observers found little difficulty in supporting a project that would pay for itself, with the government earning interest on the capital provided to build the Seaway.³

Determining the Seaway tolls, therefore, became a highly charged issue. Both the proponents and opponents of the Seaway kept to their original positions. Whatever the Corporation and the Canadians came up with did not satisfy Seaway proponents who had long believed that tolls should not be charged at all, maintaining that they would discourage traffic. Opponents thought that the tolls were not high enough, arguing that the taxpayers would end up paying for the Seaway. Castle and other officials of the Corporation had to come up with a compromise position, if for no other reason than to keep the support of those members of Congress who had only supported the Seaway in the first place because it was to be self-liquidating.⁴

Castle was also sensitive to congressional opinion for other reasons. For one thing, the original cost projections for the Seaway had been too low. He had had to return to Congress in 1957 to request a \$35 million increase in borrowing authority. This request came at the time that the toll committee was first publicly discussing a schedule of rates which they finally agreed upon in June 1958. The request had also come at a time when dividing up the responsibility for dredging around Cornwall Island had drawn unfavorable public attention to the Seaway project and when the Corps was finding it impossible to attract bidders on that same dredging. The Corps had taken on the responsibility itself, but the episode had proven embarrassing to the Corporation.⁵

These events had focused attention on the budget hearings scheduled to consider the Corporation's 1957 request for an increase in borrowing authority. All of the old arguments for and against tolls were heard at these and other hearings. Castle had had to explain the reasons for the increasing costs, while steadfastly sticking to the Corporation's promise that tolls would be levied to retire the Seaway debt. Ultimately, Congress accepted tolls that satisfied the Bureau of the Budget and which both the Canadians and the American representatives on the toll committee thought adequate to cover Seaway expenses and debt retirement.⁶

Critics of the project, led by the American Association of Railroads, rehashed long-standing arguments against the Seaway. The AAR argued that the Corporation and the Corps overestimated the traffic to be expected in the St. Lawrence system, and that they had done this in order to project artificially high revenues, funds that would be needed to retire the Seaway debt. The Association's estimates of traffic were considerably lower. The lower revenues generated would not be adequate to cover anywhere near the Seaway costs. Thus, they argued the Seaway was unfair to other modes of transportation such as the railroads which had to maintain their own rights of way. Moreover, since the Seaway was part of an international system, the United States government was in effect subsidizing the foreign users of the Seaway if tolls were not high enough to pay the increasing costs of the project.⁷

The Seaway's most ardent supporters were also disturbed by the need to increase the borrowing authority of the Corporation. They feared that the increasing costliness of the project would in fact make it necessary to set tolls at such a level that the Seaway would become uneconomical to shippers. Many groups that Castle had counted on for support in the past, therefore, distanced themselves from him on the question of tolls. Among the more hyperbolic defenders of the Seaway, such as N. R. Danielian, there were charges that Castle by his insistence on tolls had, perhaps unwittingly, helped those opposed to the project.⁸

Danielian's point of view was shared by other members of the Great Lakes-St. Lawrence Association of which he was president. He also served as chairman of the Users' Committee on St. Lawrence Seaway Tolls, a group set up in 1956 to monitor the negotiations on tolls. It was made up of representatives from major manufacturing firms in the Great Lakes area (Ford, Chrysler, Cargill, Youngstown Sheet and Tube), as well as shipping interests

(the Lake Carriers' Association and the American Merchant Marine Institute), and farmers organizations (the American Farm Bureau Federation, the National Grange, and the National Farmers' Union). His committee also cooperated with interested Canadians engaged in the newsprint, iron ore, and shipping industries. Danielian maintained that the Users' Committee spoke for 80 percent of the potential users of the Seaway.⁹

Danielian's groups supported the Corporation's request for an increase in borrowing authority, but with some important reservations. They wanted to see the project completed. "After months of intensive study and thorough deliberations," both the Users Committee and the Great Lakes-St. Lawrence Association supported the request for an increase in borrowing authority. Danielian, however, wanted to make clear to Congress that the complete repayment of principal, interest, operating, and maintenance expenses might not be possible within the mandated 50 years anticipated for repayment. Because of competing modes of transportation in the Midwest, Danielian questioned whether it would be possible to charge toll rates high enough to pay the necessary yearly costs and still attract the level of traffic originally contemplated.¹⁰

Danielian obviously did not like the position he was put into. He pledged that the users were committed to working with the House Public Works Subcommittee on Rivers and Harbors to determine whether the increased costs were fully justified. From the users' point of view, however, the \$52 million increase from original estimates of \$88 million represented the need to raise an additional two million dollars a year from tolls. After ticking off the costs of all the added and changed features that required increased borrowing authority, Danielian concluded that the users "must reserve judgment on all items of increased costs which they are told they must pay through tolls." They did not want to stop the project and they certainly did not advocate "an extended period of investigation" which might delay completion.¹¹

The Users' Committee criticized Castle and the Corporation because of the proposed toll rates. Danielian observed that the Canadians and the Americans did not have uniform systems of accounting and they had failed to come up with an adequate rate base or property valuation. The committee also faulted the absence of a "supervisory or regulatory body [with] . . . the power to review management decisions affecting the rate base."¹²

The users' questioning of the Corporation's toll policies was troubling to both the Corporation and the Corps. The Engineers were implicated in the users' critique, since the Corps had been charged with the responsibility for helping the Corporation determine costs. But the situation became more complicated as both the *New York Times* and the *Atlantic Monthly* ran articles on the toll issue. Both pieces criticized the Corporation's handling of the project. Questions were also raised about the Corporation's ability to handle the complex negotiations with the Canadians. These questions were also shared privately within the government, especially the Bureau of the Budget. Indeed, one report in April 1957 bluntly stated that "in view of the ineptness of the Corporation in handling less complex problems in past dealings with Canada and the New York Power Authority, and the sensitive nature of this matter, we

have doubts about the Corporation's ability to carry on these negotiations successfully."¹³

By the spring of 1957 there was, therefore, serious skepticism about the Corporation's handling of the tolls issue. As a budget office official noted in reviewing the tolls situation: "there appears to be a feeling that the Corporation is more concerned with repayment of the investment than with encouraging the development of commerce." In fairness to Castle, however, he had to adhere strictly to the Corporation's original congressional mandate that the Seaway be a self-liquidating project. Not to do so would have eroded the congressional support of those who only voted for the Seaway under those circumstances. The lack of that support might mean defeat for requests for increased funding, a defeat that would delay the project, if it did not turn it into a complete fiasco.¹⁴

Castle did not accept the legitimacy of the users' argument. To him the project did not cost too much, and he rejected the notion that the tolls would be so high that traffic would be insufficient to raise enough revenue to cover yearly maintenance, operations, and interest costs. He further inflamed the issue in the fall of 1957. The Corporation had committed itself consistently to repayment. Any reconsideration, Castle stated, would be a matter of "bad faith." Michigan Congressman Thaddeus M. Machrowicz publicly castigated Castle for his statement and suggested to Secretary of the Army Wilber M. Brucker that the toll negotiations be taken over by some other "higher level" agency. Some proponents of the Seaway attributed Castle's position to his banking background, while others thought that he had gone over to the side of Seaway opponents. Canadian opinion was also critical of what it saw as the Corporation's rigid insistence on high tolls in the face of increased costs.¹⁵

Castle apologized to the congressman. The toll negotiations continued through the first half of 1958. On 29 January 1959, the Corporation and the Seaway Authority accepted the schedule agreed to the previous June. President Eisenhower, on the recommendation of the Bureau of the Budget, approved the agreement on 25 February 1959, and the United States and Canada formally accepted the toll rate schedule in an exchange of notes on 9 March 1959.

Officials at the Bureau of the Budget, in recommending the schedule, rejected the arguments on both sides of the issue. They concluded that critics had underestimated the growth of two-way traffic on the Seaway, ore westward, coal and grain eastward; the growth of traffic due to reduced lockage time in the improved Welland Canal; and, lastly, the effect on Seaway capacity when larger vessels went into service after the opening of 27-foot navigation. Those officials recognized that the Corporation had been very conservative in determining traffic estimates. Even if traffic held to moderate projections, budget officials thought that tolls could even be increased without loss of traffic. Among users, critics were mollified by one provision of the tolls agreement. The final proposal provided for the creation of a Joint Tolls Advisory Board empowered to hear complaints about the toll rates and the manner in which they were levied. The Joint Board would hear complaints after a shipper had protested to one of the Seaway entities. The Board would

then report its findings and recommendations to the Corporation and the Seaway Authority.¹⁶

The agreement, however, did not provide a final settlement. As we shall see in the concluding chapter, tolls proved controversial again in the 1960s when Seaway traffic did not live up to expectations. And, the acceptance of that agreement, as critics feared, also set a precedent for discussions of imposing user fees on other waterways.

The tolls controversy, however, convinced Castle that the Corporation's future task was going to be the stimulation of traffic. This concern was, in part, the reason that he proposed the transfer of the Corporation to the Department of Commerce in September 1957. That proposal only convinced his opponents that he had "gone over to the other side." They feared that the Seaway would face the stiff bureaucratic competition of other modes of transportation in the Commerce Department, to the detriment of Seaway users. The users' increasing disenchantment with Castle led them to support the Corps in its attempt to secure a future role in the Seaway by taking on responsibility for operation and maintenance.¹⁷

Operation and Maintenance of the Seaway

While the Corps remained on the sidelines during most of the discussions of tolls, it was in the middle of the debate about the future operation of the Seaway. As discussed earlier, relations between the Corps and the Corporation had become tense during the resolution of the dispute between the United States and Canada over the division of responsibility in the Cornwall Island dredging. The strains developed into confrontation when the Corporation opposed the Corps' retaining any responsibility for operations and maintenance after June 1959.

Corps officials believed that the Engineers could operate and maintain the Seaway more cheaply than the Corporation. The Corporation argued that it could do the job for the same amount of money as the Corps. The debate became acrimonious. Both sides questioned the motives of the other. And, in addition, supporters of the Corps saw in the debate an attempt by Seaway opponents to cripple the new waterway.

The Corps' future role in the Seaway became a major issue in the summer and fall of 1957. Castle supported his request for a further increase in authority to borrow money with references to the future duties of the Corporation. Discussions were thus opened and two issues became dominant: what role, if any, the Corps was to have in the operation and maintenance of the completed Seaway and whether the Corporation was to be transferred from the Department of the Army to the Commerce Department.

The Eisenhower administration had been interested in reorganizing the executive branch. Special studies and commissions had looked into the question. And the Bureau of the Budget had an entire office devoted to management issues including the appropriate division of bureaucratic responsibility within the government. The President directed that office to determine the future of the Seaway's administration. At best a tough assignment, it became more

complicated because the issue was joined first over the Corporation's request for an increase in borrowing authority.¹⁸

The question of the Corps' future role in the Seaway had been raised before. Indeed, it had been a tacit issue throughout the relationship between the Corps and the Corporation. By the time the Corporation formally rejected Corps offers to take on the operation and maintenance of the Seaway in March 1957, discussions had been going on for almost two years. The then Chief of Engineers, Samuel D. Sturgis, first addressed the issue in December 1955, pointing out to Castle what he thought was the Corporation's "omission" in references to the Engineers' role after the Seaway opened. The issue was joined in Castle's reply to Sturgis. Castle maintained that the Seaway authorization legislation was "clear and unambiguous" in placing on the Corporation the responsibility for construction, operation, and maintenance of the Seaway.

The Corps did not challenge Castle directly. Instead it came up with its own interpretation of what the Congress meant by "responsibility." Major General Charles G. Holle made the case for the Corps by arguing that Congress had given the Corporation "overall" responsibility. Congress, he concluded after reviewing the legislative history of the act authorizing the Seaway, had unambiguously charged the Corps with the tasks of "actual construction, operation and maintenance." Holle based his interpretation on the fact that the Corporation did have responsibility for determining with Canada the Seaway's toll rates. As such, the Corporation had to be concerned with the total costs of building and working the Seaway. But Holle saw that as an administrative and fiscal responsibility, not an operational one. For its part, however, the Corporation did not take up the challenge in 1956. There were too many other more pressing duties in getting the project designed, scheduled, and built to deal with longer-term issues.¹⁹

Nevertheless, Corps officials continued to defend their point of view, albeit indirectly, over the years of the project. Several Corporation proposals clearly suggested a diminished later role for the Corps. During 1955 and 1956, for example, the Engineers resisted Corporation plans for facilities the Corporation thought necessary to carry on its own maintenance of the Seaway. The Corporation proposed elaborate repair facilities and a large marine base. Corps experience suggested that they were unnecessary, especially if the Engineers continued to play a part after the project was completed.²⁰

The debate was muted for the rest of 1956, but by 1957 the Corporation raised it again in connection with discussions of how the completed works were to be turned over to it. In January 1957 Castle tried to make clear to the Corps that its role would end with the completion of construction. Corporation officials made the point by outlining an elaborate procedure of reviewing scheduled work to ensure that "no item essential to operation of the Seaway" had been omitted. More directly, early in 1957, Castle wrote to Holle stating the Corporation's intention of taking full responsibility for the Seaway once construction was completed:

It is becoming increasingly necessary for this Corporation and its personnel to become more completely familiar and informed in con-

nection with all items of operating equipment as installed, with structures as built, with locations of survey markers and ranges, and with all other information pertinent to our responsibility for Seaway operations and maintenance.²¹

Corps officials, however, persisted in trying to ensure a role for the Engineers in the completed project. They saw an opportunity to make their case when, in the spring and summer of 1957, the Corporation was criticized for having to seek increases in funding. Then indeed, the Corps' role after 1959 became an issue of congressional and public debate. The discussion became more acrimonious when, in the fall, the Corporation announced that it should become part of the Department of Commerce. Castle made the case that the transfer was warranted because a major future responsibility would be the promotion of traffic on the Seaway and industry in the area. The proposal surprised and chagrined the Corps. More important, supporters of the Seaway project thought the move to Commerce detrimental. Shippers and Great Lakes ports operators, those most worried about high tolls, saw the proposed move as a "sellout" to Seaway opponents. In Commerce, the Seaway would have to contend with such staunch adversaries as the railroads and shippers and merchants in East Coast ports.

In any event, the Eisenhower administration turned the question over to the Bureau of the Budget. Officials there reviewed the Corporation's proposed budget and future administrative relationships. For the most part, the debate was conducted through Bureau of Budget investigation and interviews, as well as before congressional committees, especially the House Appropriations Committee and its subcommittees. In March 1957, however, the issue became the focus of a public controversy that precipitated the bureau's decision on the question.

The bureau studied the arguments of both sides. Buttressing the Corps' position was reference to a 1954 House of Representatives report on pending Seaway legislation. That report clearly anticipated that the Corps would have long-term operation and maintenance responsibilities. The Corps' case also made reference to its long-term involvement in works to improve and maintain national waterways. The Engineers had almost exclusive responsibility for maintaining the waterways which included 26 canal projects (with hundreds of locks), 700 channels and harbors, and hundreds of flood control and multiple-purpose projects.²²

Budget officials, however, were not convinced by the language of the House Report. The terminology of the final Seaway authorization bill had not included the same references to Corps responsibility as had the House Report. Moreover, the bill had been drafted by the Bureau of the Budget and cleared with the President. In addition, the bill's language about operation and maintenance had been chosen to conform to specifications that the Canadians had adopted in creating the St. Lawrence Seaway Authority.²³

The Engineers' strongest argument for a future role was its experience. Yet that too failed to convince the Bureau of the Budget. The Corps reasoned that the Seaway was similar to many other projects for which it had responsibility. Well-trained and experienced personnel could easily be called upon for Seaway work. The only expansion of staff necessary would be in the Buf-

falo District office. Corps arguments also rested on the probability of duplication of effort by the Corporation. After all, the Buffalo District was able to operate the locks, provide the necessary maintenance dredging, conduct hydrographic surveys, remove wrecks, service the aids to navigation, and provide for internal security.²⁴

Budget office analysts, however, rejected the Corps' central contentions. They rejected the proposition that the Seaway was like other inland waterways the Corps managed. The Seaway was an international project undertaken jointly between the United States and Canada, and it was to be paid for by tolls. Corps projects were within the confines of the United States and paid for by appropriations. On the other hand, Congress had specifically established the Corporation "to coordinate Seaway operations with its Canadian counterpart, including, among other things, the establishment and setting of tolls." The bureau also pointed out that the procedures for dealing with government corporations were not at all like those usually used by the Corps.

The bureau also thought the duplication argument fallacious. The Corporation could easily get assistance from the Corps when necessary and reimburse it for its services. And there was no reason that the Corporation could



Lieutenant General Emerson C. Itschner, Chief of Engineers
Assistant Chief of Engineers for Civil Works from 1953 to 1956.

was

not contract with private dredging companies for maintenance of channels. Security for the Seaway could be easily obtained by hiring a few more employees. In reviewing the Corps' argument about experience, one Bureau of the Budget official remarked that operation and maintenance of locks was "not a difficult job and the Corporation can be expected to master it easily."²⁵

In response to such criticisms, the then Chief of Engineers, Lieutenant General Emerson C. Itschner, harked back to Holle's attempt to make a careful distinction between "overall" and "operational" responsibility for the Seaway. He granted that the Corporation would have to carry on coordinating functions with the Canadian Seaway Authority. He did not see this responsibility, however, as an argument in favor of giving the Corporation total control over operations and maintenance. He contended that the responsibilities could be divided. The Bureau of the Budget, however, rejected this proposal too. Officials in the budget office agreed with the Comptroller General that the Corporation, by law, could not delegate its responsibilities for tolls and coordination with the Canadians. The bureau concluded that in view of these responsibilities, the Corporation should not give up maintenance and operation responsibilities. The bureau concluded that maintenance, traffic, regulation, and collection of tolls were so closely interwoven that separation of any of these functions would be organizationally "inadvisable."²⁶

While the Bureau of the Budget sided with the Corporation in assigning it maintenance and operation responsibilities, the bureau criticized some Corporation administrative practices, implicitly accepting several points made by the Corps in this regard. Corps officials had been unhappy with Corporation management, and in studying the question of assigning operational responsibility, representatives of the bureau's commerce and finance division had interviewed Corps officials. Colonel Olmstead, whose office had worked closely with the Corporation for the duration of the project, observed that he and many of his colleagues believed "that the Seaway Corporation had much too large an organization." He attributed the organizational problems to the lack of "firm leadership" and poor coordination among its divisions and between the Corporation and the Corps.²⁷

Bureau of the Budget officials were themselves skeptical of some Corporation procedures. The bureau's management division prepared an unflattering report on Corporation administration. It described the Corporation as suffering from "bureaucratitis," defined as "an organizational disease characterized by backbiting, lack of communication, high grade structure, low utilization of personnel, and excessive demands for space and equipment." High-level Corporation personnel with little to do had led to internal dissension over responsibility. Other problems included overstaffing in the engineering and comptroller's offices. Neither office needed so many people as the Seaway neared competition.²⁸

Ultimately, however, the budget officials were critical of the Corps, too. Running throughout the bureau's analyses of the arguments over operational responsibility was a highly negative tone toward the Engineers. The bureau's criticisms, however, were not of the Corps' work. Indeed, budget officials were impressed with the amount of money the Corps had saved the Corporation in the south Cornwall Island dredging. Instead, budget office

analysts criticized what they perceived as the Corps' motives in opposing the Corporation's operating and maintaining the Seaway. The bureau concluded that the Corps was engaged in a campaign to discredit the Corporation in order to get operation of the locks and the general maintenance functions. Once these responsibilities were turned over to the Engineers, some bureau officials thought, the Corps would then mount a campaign to do away with the tolls. The assistant director of the Bureau of the Budget's division for management and organization, William F. Finan, concluded that this was a long-standing effort. "From the time the bill to create the SLSDC was pending before the Congress, the Corps of Engineers has been conducting a campaign to 'capture' control of the Seaway." He also thought that the Corps had made it difficult for the Corporation to give no more than "circumscribed" direction to the Engineers. In some instances, the administrator had to go directly to the Secretary of the Army. Another bureau official bluntly observed that "the real issue is whether the Corps and its friends are to be permitted to continue their campaign of discrediting the Corporation. The prizes in this game would seem to be first, the control of the seaway operations, second the dissolution of the Corporation, and third, the removal of tolls from the Seaway."²⁹

The record does not indicate whether Corps officials were ever aware of the extent to which Bureau of Budget officials criticized what they perceived as a "campaign" to undermine the Corporation. That the Chief, his special assistants, Division and District Engineers were critical of Corporation practices and management is clear from the Corps' internal record. On occasion, in the last year of the project, high-level officials such as Holle had made their views known publicly. Indeed, one official of the budget office described Holle as speaking "rather loosely" about the defects of the Corporation's management.³⁰

The Corps' position was based on more than its criticism of the Corporation's management. The Seaway project had proved a boon to the Buffalo District. The District Engineer admitted to a budget office official that he had thought that the District was about to be closed when Congress approved the Seaway project in 1954. With the completion of the Seaway, the District would have only a few dredging programs and some small increase in Great Lakes harbor work to keep it going. There were no large military construction projects in the offing. The future of the District hinged, he thought, on the fact that it covered a large geographical area and that its expertise could be called upon by other District offices. Indeed, its engineering division already was engaged in design work for other large projects. Getting these assignments, the District Engineer thought, justified its continued existence, but the operation and maintenance of the Seaway would give it an unchallenged long-term mission.³¹

Thus, the Corps' concern for keeping a role in the St. Lawrence Seaway was based on two factors. First, the Engineers had become genuinely critical of the way in which the Corporation operated, and Corps officials involved in the Seaway project were convinced that the Corps could do a better and cheaper job of operation and maintenance. The second factor was a narrower bureaucratic interest: the need to defend the mission of the Buffalo District.

Bureau of the Budget officials probably could understand the Corps' desire for self-preservation. Bureau reports indicate a keen sense of the bureaucratic strategies agencies used to defend themselves. Indeed, one bureau memorandum referred to officials of the Corporation as a very determined lot and as "empire builders." Their hostility to the Corps, therefore, perhaps stemmed more from some of its supporters than the Corps itself. Critics of tolls had seized on the issue of future Seaway maintenance and operational responsibility to discredit the Corporation. Those who held this view, as we have seen, clearly saw Castle's concern for repaying the Seaway debt as detrimental to users of the new waterway. They, therefore, believed their interests would be better understood and served by the Corps' running the Seaway. Their tactics, however, helped undermine the Corps' defense of its arguments for operational and maintenance responsibility. The Bureau of the Budget was committed to tolls, and the Corps' position was hurt by being perceived as encouraging those who wanted to abolish tolls.³²

Probably most damaging to the Corps' standing within the bureau was the campaign mounted against the Corporation by Senator Charles E. Potter of Michigan. Budget officials did not see Potter as a disinterested party, since Michigan shippers had opposed the tolls to be charged on the Seaway. Potter had publicly criticized the Corporation over its request for increased borrowing authority. He also believed that within the Commerce Department, the Seaway Corporation would be directly in competition with other transportation interests hostile to the Seaway. The railroads, especially, continued to oppose the Seaway as did some East Coast port interests. Potter feared that in such an atmosphere the Corporation would be at a disadvantage.

In speeches and press releases the senator charged that moving the Corporation from the Army to Commerce was a "backstage maneuver" and "power play" by long-term Seaway opponents. Potter maintained that the transfer "would expose pending toll negotiations to all sorts of pressure from rival transportation media." To block the transfer, he enlisted the support of senators from other states with interest in the Seaway.³³

Potter escalated the campaign against the transfer of the Corporation by proposing to close it down. There was, in his view, nothing "dishonorable" in abolishing the Corporation. Indeed, he thought that it would be "refreshing" to see an "empire" thwarted before it could be built up. He claimed disinterest in the "tug of war" between the Corporation and the Corps, appealing only to the taxpayers' interest in who would do the job for the lowest cost. In January 1958 Potter and other Seaway supporters formally requested the Corps to come up with an estimate of what it would cost the Engineers to run the Seaway. Corporation estimates of operating and maintenance costs were contained in the Corporation's budget that included a request for increased borrowing authority. Hearings on that budget were scheduled for the spring of 1958, but were moved up because of this controversy. Corps estimates were contained in correspondence with several members of Congress and in testimony before subcommittees of the House Appropriations Committee.³⁴

The controversy gained political momentum when the senator revealed that the Corps' estimates were less than the Corporation's projec-

tions, a difference of about \$348,000. Potter advocated, therefore, enlarging the Buffalo District office to handle the Seaway. Corporation and Bureau of the Budget officials challenged the Corps' figures, pointing out that the Engineers' estimates had left out some important categories factored in by the Corporation. And indeed when these were added to the Corps' calculations, the Corporation's figures were about \$97,000 cheaper than the Corps'. This "highly political controversy," as budget officials charged, only demeaned the Corps at the Bureau of the Budget. What particularly hurt the Corps' standing was the fact that it appeared to budget officials that the Corps was at best collaborating with Potter and his congressional associates, and at worst had been behind the entire political campaign.³⁵

Castle tried to reassure Potter that even though the Corporation needed an additional \$35 million in borrowing authority, the Seaway would be paid off and that the tolls would be kept low to make it attractive to shipping. Potter and other supporters were not convinced. In any event, the Bureau of the Budget sided with the Corporation and drafted the executive order that on 20 June 1958 transferred the Corporation from the responsibility of the Secretary of the Army to that of the Department of Commerce. The decision was based on the belief that a primary future responsibility of the Corporation was to be the promotion of traffic on the Seaway. A task that to the Bureau of the Budget, presidential advisors, and the majority of the Congress seemed to be most appropriate to the Commerce Department.³⁶

In fact, the Corps had not instigated the campaign against the Corporation. The political controversy was the result of the fears of Seaway proponents. They thought that opponents would, at the last minute, have the opportunity to cripple the Seaway's effectiveness by high tolls. Project supporters also saw Castle and the Corporation management as weak and certainly no match for those who had spent over a quarter of a century in opposition to the idea of the Seaway.

To be sure, Corps officials had cooperated with the Corporation's opponents. In the process they had made some enemies in the Bureau of the Budget. While this hostility certainly was not the main factor in the Corporation getting responsibility for operation and maintenance, it certainly did not help the Corps' case for a continued role. In view of President Eisenhower's interest in efficiency and streamlined governmental administration, the tolls were essential. Adequate revenue from tolls would result only from a sufficient volume of traffic. With this goal in mind, the budget office assigned the Corporation to the Commerce Department which had the capacity and experience to promote business for the Seaway.³⁷ In fact, the Corporation's ability to promote traffic became, as we shall see in the next chapter, an issue of continuing concern in the 1960s and 1970s.

Thus, the possibility of a future operational role for the Corps in the Seaway seemed foreclosed in June 1958. Unfortunately, the decision came as the aftermath of a nasty public political controversy, with administration officials publicly challenging the Chief's and the Corps' estimates of the costs of future operation of the Seaway. The opening of the Seaway to shipping in July 1958 overshadowed the embarrassment a bit, for the Corps was given due credit for its important contribution. The same was true later in the formal

ceremonies opening the fully completed Seaway in June 1959. And, as it turned out, the Engineers were to play a part in the 1960s and 1970s when the Corporation tried to expand the navigation season by reducing the ice on the river.³⁸ Even so, the pleasure of the on-schedule completion of the project was lessened by the bitter controversies over the Corps' future responsibilities for the Seaway.



Dedication ceremony, official opening of the St. Lawrence Seaway, 26 June 1959. In the foreground, the Duke of Edinburgh, Queen Elizabeth II, President Dwight D. Eisenhower, and Mrs. Eisenhower.

St. Lawrence Sea way Development Corporation

Chapter VI

SINCE 1959

On 26 June 1959, the St. Lawrence Seaway was formally opened, although its 27-foot channel had been unofficially open to deep-draft navigation since 25 April 1959. Over 50,000 spectators were present for the official ceremonies at which President Eisenhower and Queen Elizabeth II presided. In their speeches, both marked the engineering accomplishments and the diplomatic significance of successfully carrying out the joint international project.

The ceremonies took place on both Canadian and American territory. President and Mrs. Eisenhower were met by the Queen and the Prime Minister, John Diefenbaker. The first part of the proceedings took place at the eastern approach to St. Lambert Locks, across the river from Montreal. The dignitaries then boarded the Queen's yacht, *Britannia*, which proceeded through specially constructed gates as it approached the first lock to officially open the Seaway. President Eisenhower remained on board for a five-hour trip to Lower Beauharnois Lock, then disembarked to return to Washington by plane. The next day, the *Britannia* proceeded to Massena and the American locks where Vice President Richard Nixon and the Queen presided over ceremonies to mark their opening.¹

By that time, Corps of Engineers' involvement in the Seaway had effectively ended. From time to time, however, the Corps performed maintenance tasks for the Corporation, and, through the International Joint Commission and the St. Lawrence River Joint Board of Engineers, Corps officials continued to have an impact on issues that affected the Seaway. After 1959, the Corps' most direct involvement in the Seaway was to conduct feasibility studies on extending the navigation season into the winter months. This program was only one of several efforts, however, to cope with the fact that the Seaway was not living up to the expectations of its most vociferous supporters. In the early 1960s traffic was not up to what had been predicted, and the composition of cargoes remained bulk goods, much as they had always been in the 14-foot canals in use before the Seaway's completion. The Corporation was unable to earn revenues sufficient to meet its obligations to the U.S. Treasury. Moreover, maintenance costs were higher than estimated, thereby aggravating its financial situation.

Many, if not all, of the Seaway's problems stemmed from the dogged opposition of its long-time adversaries among East Coast port interests and the railroads. Through legislation, they prevented the Seaway Development Corporation from advertising and carrying on a campaign to develop business. In the face of the Corporation's inability to meet its financial obligations, they advocated increased tolls. Great Lakes supporters of the Seaway objected that tolls were the reason Seaway traffic did not meet expectations in the first place.

The failure to attract ocean shipping was perhaps the sorest disappointment to Seaway proponents and there was some justice to their argument that the Seaway was hampered by the lack of assistance from the Federal Maritime Administration which assisted ocean ports and shipping. Other problems stemmed from federal policies that ensured the shipment of defense-related materials from East Coast ports, even though large proportions of these goods were produced in the Midwest. The Interstate Commerce Commission was also accused of discriminating in favor of railroads in rate making.

Not all of the Seaway's problems, however, could be attributed to the obstructions of its opponents. Technological changes and the business cycle also affected the Seaway's performance. Those effects were usually adverse, although the waterway did benefit from the oil price increase crisis in 1974 as ships were more efficient users of fuel than railroads or trucks. Containerization had a profound impact at all ports, and those along the Great Lakes were no exception. But converting ports to handle containers was expensive and time consuming. Moreover, the increasing size of ocean-going ships undermined the utility of the Seaway. And, in the mid-1970s, troubles in the American steel and auto industries, as foreign competition cut into American sales, meant less Seaway tonnage.

Seaway proponents, with their long experience in lobbying, turned their attention to these questions. Partly in response to these new concerns, the Corps occasionally became involved in the Seaway's development even though the Corporation had assumed full responsibility for the Seaway's operation.

Traffic Patterns on the Seaway

By the mid-1960s, it was clear that the Seaway was being used in ways not foreseen by its staunchest proponents over the years. Bulk cargoes continued to have greater significance than general cargoes. For one thing, iron ore from Quebec-Labrador was an important return shipment back to the Lakes ports. Moreover, the use of containers for the shipment of general cargo increased, requiring heavy new investments for Great Lakes and St. Lawrence ports. Railroads remained competitive, at least in carrying general cargo, by the introduction of the unit-train, which allowed for long trains carrying containers of truck trailers.²

Not surprising was the role the Seaway played in the grain trade. Once opened, the Seaway experienced a marked increase in grain traffic. It was carried efficiently because of larger Lake vessels which had been designed to make maximum use of the Seaway lock system. These, ships with flatter bottoms and wider beams, could carry a greater volume in relation to their size than ocean-going vessels. Lake carriers devoted to moving bulk cargoes eastward became even more efficiently utilized with the development of Quebec-Labrador iron ore production and its shipment westward to American steelmakers located near the Lakes.³

While many of the Seaway's proponents had emphasized its potential

as an artery to serve overseas trade, the Seaway proved more important to trade between the United States and Canada. It also was of much greater significance to domestic Canadian than to domestic American trade. This is not surprising, since the major portion of the St. Lawrence Seaway is within Canadian territory. In 1976, “cross-border” trade was 47.5 percent of the total volume of cargo shipped on the Seaway. In that same year 31.5 percent of the traffic was between two Canadian ports and less than one percent between two American ports. Cargo bound overseas in ocean-going vessels accounted for 20.4 percent.⁴

Nevertheless, an important proportion of the goods shipped between American and Canadian ports, and between two Canadian depots, ultimately was sent overseas. Primarily bulk cargoes of grain, these goods were, and are, transferred to seagoing vessels at Quebec ports as most of the ocean-going vessels involved in the trade are too large for the Seaway locks. Indeed, in 1976, 80 percent of the grain shipped along the St. Lawrence was exported. Added to the direct overseas shipments that year, this grain transshipped increased the percentage of goods exported overseas to 37 percent of all traffic on the Seaway. (This reduces cross-border traffic to about 43 percent and all-Canadian trade to 19 percent of total Seaway traffic.)

Shipments from overseas are almost entirely general cargo, that is manufactured or semi-manufactured goods such as steel bars. Most of these general cargoes are destined for the United States, which tends to benefit more from the overseas trade than Canada.⁵

Nevertheless, bulk cargoes represent the largest percentage of Seaway traffic, about 91 percent in 1982 and 1983. Grain is the most important product carried on the Seaway. Although harvest conditions and variable export



The Seaway today. The freighter *Baie St. Paul* travels “downbound” through the Snell Lock to Montreal with a load of wheat.

St. Lawrence Seaway Development Corporation

demand affect markets for grain, it has had a growing share of Seaway traffic since 1959. During the 1960s grain accounted for a little more than one-third of the total volume of products carried on the Seaway, with about 55 percent originating from Canada and 45 percent from the United States. Grain shipments are about half wheat, one third corn and barley, and the rest other grains, primarily soybeans. In the 1970s grain became a more important commodity. By the end of that decade, it represented 49 percent of all cargo carried on the Seaway. Projections by both the Seaway Corporation and the Seaway Authority estimate it will be about 54 percent of total traffic in the year 2000.⁶

While Seaway grain shipments have increased as a percentage of total Seaway tonnage, they represent a smaller and smaller proportion of total American grain shipments. The bulk of American grain exported moved through Gulf of Mexico ports. Seaway shipments represented 18 percent of the total in 1970 but only 11 percent in 1975. Atlantic ports did not fare well either, dropping from 20 percent to 6 percent between 1959 and 1971. By 1976, however, unit-trains had helped the Atlantic ports increase their share to 16 percent.⁷

These patterns were determined in good measure by where the grain was grown. Wheat raised in Minnesota, for example, was shipped from Duluth through the Seaway. Wheat grown elsewhere in the Midwest might go down the Mississippi or be shipped by rail to East Coast ports.

Iron ore is the second most important cargo shipped on the St. Lawrence. United States steel manufacturers on the Great Lakes traditionally relied on ore from the Mesabi range in Minnesota at the western end of Lake Superior. By the 1950s, Canada's Quebec-Labrador mines, north of the St. Lawrence River, were producing a portion of the steel industry's needs. This allowed Lake shipping to carry iron ore westward after moving grain to Montreal. The tonnage carried, however, lags behind projections made at the time the Seaway received approval. Then, mining experts thought that ore from the Mesabi range was running out. But the Mesabi has remained viable with the discovery of a method for upgrading ore. Thus, expectations that the Quebec-Labrador ore would supplant that from the Mesabi were not entirely fulfilled. Pre-shipment processing of the Canadian ore, reducing its bulk by turning the ore into pellets, had further reduced the anticipated traffic. Pelletization reduces the weight by almost 30 percent, thus reducing not only bulk, but also revenues from tolls. In any event, there are enormous supplies of ore available in the Quebec-Labrador mines, making future traffic in that commodity likely since the other sources will ultimately be depleted before those ranges. Projections over the next two decades anticipate iron ore remaining about the same as a percentage of traffic on the Seaway: from 24 percent in the 1978-1980 period to 21 percent in 2000.⁸

Coal is the third most important of the bulk cargoes to use the Seaway system. Moved across Lake Erie, the coal then passes eastward through the Welland Canal for use by Canadian power and steel producers. The Welland Canal connects Lakes Ontario and Erie, and is therefore an important part of the total waterway system served by the St. Lawrence Seaway. These connec-

tions have become even more important since the oil crisis of 1974, as coal has become a more important American export, moving farther eastward along the Seaway. In the 1978-1980 period, it represented less than 1 percent of total tonnage, although projections put it at about 4 percent in the year 2000.⁹

General cargo traffic is the next most important for the Seaway. By the mid-1960s, it constituted almost 10 percent of the shipments on the Seaway. In 1971 it had grown to 17 percent, although it declined thereafter, falling as low as 7.5 percent in 1976. Most of this general cargo was inbound to the ports of Chicago, Cleveland, Detroit, Toledo, and Milwaukee. It is generally linked to return shipments of grain. Almost all of the general cargo moved on the Seaway was overseas trade, and 75 percent of it was manufactured iron and steel products.¹⁰

The development of general cargo traffic on the Seaway was hurt by a number of factors. The growing use of container shipping in the 1960s put the Lakes ports and the St. Lawrence Seaway at a disadvantage with the Atlantic ports. Several of the Lakes ports, therefore, equipped themselves to handle containers. Containers allowed the packing of mixed cargoes in standard containers, reducing the costs of handling. In effect, containerization provided some of the advantages of bulk cargo shipment, since the containers were easily transferred from ship to train or truck. But, although there are smaller container ships, containers can most easily be carried on large ocean-going vessels that cannot pass through Seaway locks.¹¹

Even though general cargo was only 9 percent of overall Seaway traffic in 1982, it is nevertheless economically important. It usually represents more costly goods and is of greater importance therefore to the business of Lake ports in terms of income earned.¹² In this area, moreover, the Seaway has fulfilled hopes that it would provide an outlet to overseas trade. General cargo is primarily direct, not transshipped, traffic, thus making Lake ports accessible to ocean-going trade.

Ship size has also affected Seaway traffic in other commodities. The oil industry in the 1960s began to use large ocean-going tankers unable to navigate the Seaway locks. Shipment of oil disappeared totally in 1976 with the opening of the Sarnia-Montreal pipeline, although it was back to about 3 percent in 1982.¹³

Transportation policies in both Canada and the United States affected traffic patterns on the Seaway too. Not only has the United States maintained a competitive waterway system on the Mississippi River, but Canada has subsidized railroads. The rail subsidies were part of a Canadian governmental commitment to encourage the east-west movement of goods and to provide inexpensive transportation for grain and coal. The system established rate objectives that to be met required subsidies, resulting in a rate structure with little relationship to true costs.

The United States' maintenance of an inland water system provided an up-graded alternative water route for the shipment of grain through New Orleans. There were also limited, but positive results from the perspective of the Seaway. Free passage through the "Soo" Locks on the St. Marys River reduced the costs of all users of the Great Lakes-St. Lawrence System.¹⁴

Overall, however, Seaway traffic suffered from inconsistent Canadian and American transportation policies. The subsidized Canadian railroads and the free United States inland water system siphoned traffic away from the Seaway, while rising operating and maintenance costs and the prospect of higher tolls undermined confidence in the future utility of the Seaway.

Federal-level policies in Canada and the United States have had other effects too. Shipping policies in both countries influence the makeup of the fleets that ply the St. Lawrence Seaway. American-flag ships are not a major factor in St. Lawrence Seaway shipping. Canadian Lakes shipping carries most goods through the Seaway to lower St. Lawrence points. American Lakes shipping is devoted almost entirely to carrying bulk cargoes on the upper lakes.¹⁵

United States shipping policy has reserved the shipment of goods among American ports for vessels built and registered in the United States. With the opening of the Seaway, Canada adopted a similar policy toward trade on the Great Lakes and the St. Lawrence.¹⁶

Canada has also dominated St. Lawrence shipping because of her policies of subsidizing ship construction for the coastal trade. After World War II, Canada adopted a policy of subsidizing domestic shipbuilding, while the United States' merchant fleet in general declined. As the Seaway approached completion, Canadians took advantage of building subsidies to construct larger ships capable of making the most efficient use of the enlarged Seaway locks. American Lakes shipping, meanwhile, became dominated by vessels owned by large American steel companies. These ships almost exclusively carried bulk cargoes on the upper lakes. Most ocean-going shipping on the Seaway, therefore, is in non-American-flag ships.¹⁷

Thus, government shipbuilding subsidies allowed Canadian shipping companies to take full advantage of the Seaway. While the Canadians actively built bulk carriers between 1960 and 1969, the United States did not. The Merchant Marine Act of 1970, however, specifically extended subsidies and other benefits to Lakes shipping. Congress in passing the act materially helped American bulk shipping on the Great Lakes. For one thing, subsidies previously available only to American ships handling general cargo in international trade were extended to Lakes shipping which handled bulk cargo. For another, construction subsidies became available for vessels to be employed in Great Lakes shipping. The program also deferred taxes on the earnings from investment in new ships and provided tax write-offs to refit older ships, while loan guarantees underwrote 87.5 percent of constructing bulk cargo ships.¹⁸

The situation in Great Lakes shipping between 1959 and 1970 reflected, however, much larger changes. American merchant ships made up less and less of the country's overseas shipping in these years. In 1945 over 60 percent of American trade was carried in United States ships. By 1976 it had declined to about 5 percent. This decline occurred in the face of efforts to compensate for higher costs of operating and building American ships. The 1970 act did have an impact. However, it took until 1975 to reverse the trend that had seen *no* ships of United States registry make scheduled visits to a United

States Lakes port. Then, in 1975 and 1976, operating subsidies allowed two lines to begin Lakes operations.

The Merchant Marine Act of 1970 also helped American Seaway traffic by allowing government cargoes to be shipped from Lakes ports. Before 1970 cargo preference laws then on the books virtually prohibited Lakes ports as points of departure for government cargoes. These laws required that between 50 and 100 percent of the shipments be carried in American-flag ships.

The Great Lakes ports were hurt by this earlier legislation. Aside from the fact that the Seaway shut down for part of the year, there was little interest in the Great Lakes by merchant fleet operators since they were heavily reliant on shipments of government cargoes. Only grains carried because of Public Law 480 (Food for Peace) had any positive impact on the traffic of the Seaway.¹⁹

Ports along the Seaway and Great Lakes were affected by other government policies. American railroads, for instance, were not required by the Interstate Commerce Commission to offer to short-haul shippers to the Great Lakes the same low rail rates they offered for the long haul of products to be exported from East Coast ports. In Canada, there were similar discriminations. Toronto, for the purposes of rate making, was never considered a point of export, suffering the same short-haul rate discrimination as the American Great Lakes ports. Furthermore, rate making in Canada was complicated by joint operation of Canadian railroad and shipping companies, a policy that would have run afoul of the American antitrust laws.²⁰

Other problems related to government policy have affected traffic on the Seaway. One of the most notable was the lack of coordination among American Great Lakes ports in preparing for ocean shipping. Port improvements were a local responsibility for the most part, and, in any case, they were poorly coordinated with federal efforts. In contrast, port development in Canada was a federal responsibility in the 1960s and early 1970s, making the Canadians more responsive to the need for change.²¹

Seaway Problems

As these difficulties led to disappointments in the Seaway, the Corps of Engineers again became directly involved. At times, the Engineers helped the Seaway Corporation maintain facilities by dredging channels and the like. The Corps' major role, however, came in attempts to extend the navigation season and through studies of new facilities. Engineer officials also spoke to and were supportive of several of the new groups formed in the Great Lakes area. Nevertheless, Corps officials were not central to most of the debates about the Seaway's traffic problems. For one thing the Corps saw these skirmishes as the responsibility of the Seaway Corporation which had responsibility for operation and maintenance of the waterway. Then, too, the Corps served the needs of those involved in alternative waterways, as well as the ports most vociferously opposed to the Seaway. They did not want to alienate them or their sup-

porters in Congress. It was, however, in trying to address some of the problems perceived in the 1960s that the Corps was invited back to play a more direct role in the Seaway, especially in studies of extending winter navigation and expanding facilities.

In retrospect, many of the Seaway's problems seem inevitable in view of the constraints that had been put on the waterway from the beginning. In some respects, the problems were the result of serious maladjustments in transportation policy in both Canada and the United States, and between the two countries.

From the perspective of Seaway boosters, however, these disappointments and problems seemed more immediately the result of politics. Seaway proponents had been in the habit of attributing past difficulties to railroad and East and Gulf coast port interests. It was easy to see the opponents' hands in the problems that developed in the 1960s. And, to be sure, as the political battles continued over such issues as tolls, maintenance costs, and shipment of government cargo, those interests remained hostile to the Seaway, and they did advocate policies detrimental to the waterway.

By the mid-1960s, Seaway proponents organized to protect their interests. Tonnage on the Seaway was below expectations, and the administration of the Seaway Development Corporation did not seem aggressive enough for those who had placed high expectation in the project. Moreover, the proponents objected to what they perceived as continued Interstate Commerce Commission rate discrimination, as well as maritime policies that reduced the likelihood of ocean shipping making use of the Seaway. And, as the Seaway Corporation found it harder and harder to pay both the principal and interest on the Seaway debt, Congress explored increasing tolls. Proponents responded adamantly and got in the Merchant Marine Act of 1970 some fundamental changes to help the Seaway. In addition to the subsidies already discussed, Congress authorized the abandonment of interest payments on the Seaway's construction debt.

This lobbying effort involved the strengthening of port, maritime, and industrial organizations in the Great Lakes area. With the waterway in operation, its benefits induced the formation of groups which sought to make more effective use of the Seaway and the Great Lakes maritime system of which it was a part. In 1956, three years before the Seaway opened, maritime firms and port officials in the Lake Erie area had established the Council of Lake Erie Ports (CLEP). The council's purpose was simply to encourage traffic on the new system. In 1960, representatives of both Canada and the United States created the International Association of Great Lakes Ports (IAGLP). Representing 22 major Canadian and American ports, it quickly became the leading group promoting tonnage through the Lakes ports and the Seaway. It also broadened its agenda to look into other issues, such as dredging and pollution control, in which it dealt with the Corps of Engineers, and local industrial development in the vicinity of the ports represented in the group.²²

Throughout the 1960s and 1970s IAGLP took an active role in promoting the Great Lakes and the Seaway. It became an effective advocacy group, monitoring government policy toward the Atlantic ports. In the 1970s, it sent trade missions abroad to encourage traffic through the Seaway and to

the Lakes ports. The Council of Lake Erie Ports mirrored that work. The council represents only the 12 ports on Lake Erie. In one sense, however, CLEP is somewhat more broadly based in membership than the IAGLP. The council includes international banks, as well as warehouse, freight forwarding, and shipping companies. In the 1960s, CLEP began to sponsor a "Washington Roundup" which brought together all of the Great Lakes and Seaway interests in Washington to meet with interested federal officials and members of Congress.²³

Other groups formed to meet particular needs. By the late 1960s, these associations frequently gathered to demonstrate the wide-range of interests involved in the Seaway and the Great Lakes. One group similar to CLEP was the Western Great Lakes Port Association which devoted itself to cargo development in the Lake Michigan ports. Shipping companies operating on the Lakes and in the Seaway created the U.S. Great Lakes Shipping Association. But the group with the longest agenda and largest staff is the Great Lakes Commission. Formed in 1955 by the eight Great Lakes states and directed by a retired Corps of Engineers officer, Colonel Leonard J. Goodsell, the commission initially confined itself to water resource problems. As the Seaway began to experience problems in the 1960s, the commission established a Seaway committee and became the coordinator of efforts to change legislation detrimental to the Seaway. It lobbied vigorously to assure that the Seaway was not slighted in the administration of cargo preference laws that pertained to shipments of agricultural and defense cargo. It also was outspoken in its opposition to raising tolls and its support of extending the navigation season and expanding the Seaway system.²⁴

All of these groups, plus others such as the Great Lakes Terminals Association, formed a "task force" of associations to bring together diverse interests and present a united front to federal officials and members of Congress. With more money and staff support than the Washington Roundup, the task force lobbied the informal Great Lakes Conference of senators, representatives, and federal officials. They proved effective in getting the Merchant Marine Act of 1970 passed.²⁵

The task force brought labor into the efforts to lobby for better federal treatment of the Lakes and the Seaway. This alliance was tenuous, since labor continued to press its own interests over the years. And it did not always agree with what the businessmen in the ports wanted. Union officials, for example, were generally less sympathetic to extending the navigation season. Labor saw sailing the Seaway in the winter as a much more dangerous and difficult proposition than proponents were willing to admit. And labor leaders, if not necessarily their memberships, tended to worry about the environmental impact of winter navigation. Labor also had its divisions and disputes, most notably between Canadian and American pilot unions which often were at odds with each other over pay and working conditions. Pilots were needed to guide ships through the locks. The choice of a Canadian or American pilot depended on the ship's port of destination.

Despite their differences, the unions helped lobby for federal measures to promote traffic and growth in the Great Lakes-St. Lawrence region. Union

officials routinely attended the Washington “round ups,” and they participated regularly in task force efforts in Washington. Their organizations also took part in task force drives to promote foreign trade in the Seaway. Unions participating were the International Longshoremen’s Association, Marine Engineers Beneficial Association, and Great Lakes Association of Stevedores.

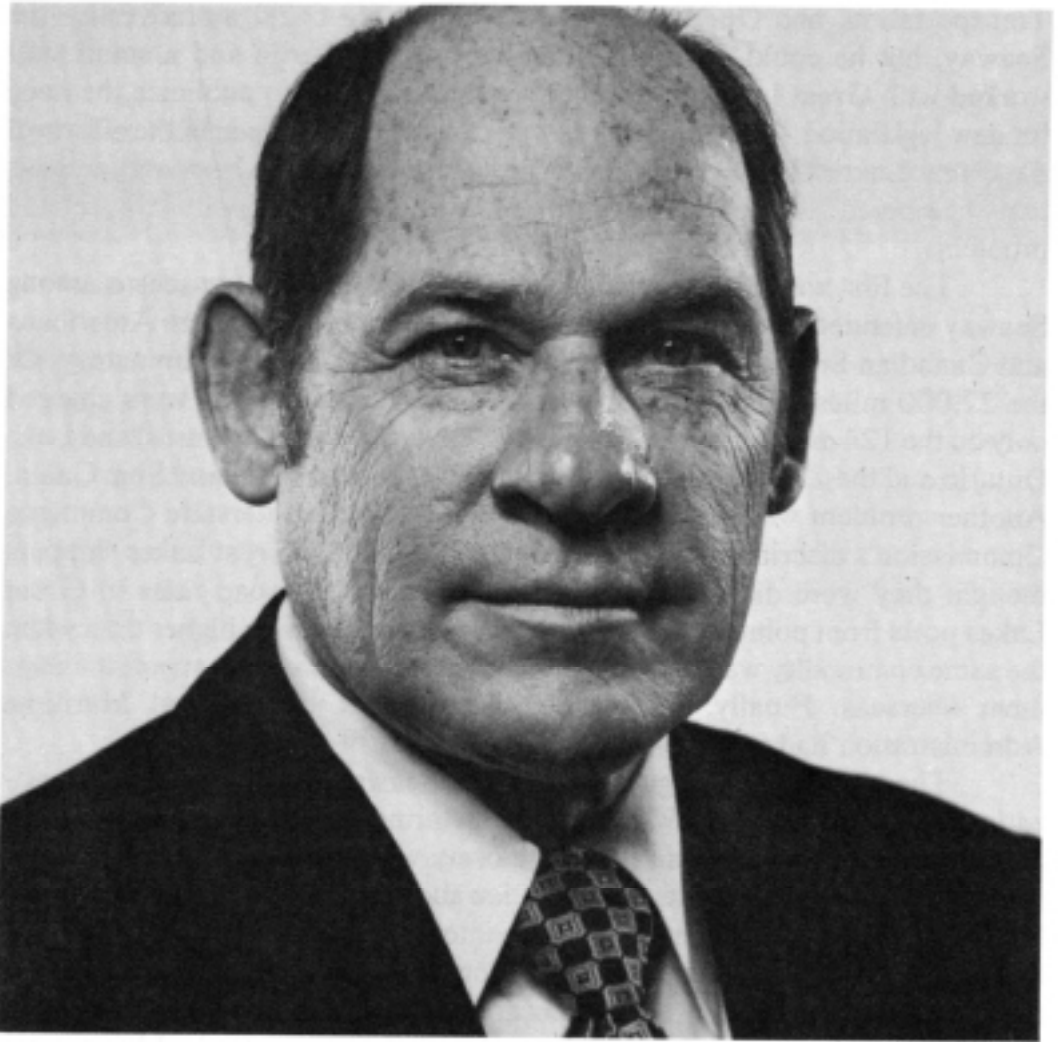
The task force proved as successful as it was in large part because it had an energetic executive secretary in Washington and staff assistance provided by the Great Lakes Commission.²⁶ Equally helpful to lobbying efforts on behalf of the Seaway was the Industrial Users Group, made up of corporations which shipped their products on the Seaway system. Beginning in 1970 with ten members, the association had well over 100 by 1975. The users group supported many of the lobbying efforts, especially the abolishment of Seaway tolls.²⁷

Surprisingly, the Seaway Corporation was not actively involved in many of these lobbying activities. Representatives of the Corporation attended the meetings of and at times addressed the memberships. For the most part, however, the Corporation saw its mission during the decade after 1959 as smooth operation and efficient maintenance. This attitude resulted in part because Congress had by law forbidden the Corporation to advertise the



Joseph H. McCann, Administrator, St. Lawrence Seaway Development Corporation (1962-1969).

St. Lawrence Sea way Development Corporation



David W. Oberlin, Administrator, St. Lawrence Seaway Development Corporation (1969-1983).

St. Lawrence Sea way Development Corporation

Seaway. Corporation leaders abided by the law, and by extension saw lobbying in the same light, an activity not appropriate to its congressional mandate. Lewis G. Castle's immediate successor was his long-time deputy administrator, Martin W. Oettershagen. He accepted Castle's cautious philosophy toward administering the Seaway, as did his successor, Joseph McCann. By the mid-1960s, when it was clear the Seaway traffic was not meeting expectations, the low-key Corporation administration came in for increasingly sharp criticism from port operators, industrialists, ship operators, and union officials. Indeed, one of the reasons that the Great Lakes area experienced the rapid organizational activity described above had much to do with the attitude of the Seaway Corporation, which to its critics was symbolized by Corporation's administrator.²⁸

Richard Nixon's election in 1968 brought changes. Soon after taking office the new President appointed David W. Oberlin administrator of the St. Lawrence Seaway. He was a port official with experience in both Duluth and Toledo. Oberlin moved the Seaway administrator's office from Massena to Washington. Since 1966, the Corporation had been part of the Department of

Transportation, and Oberlin set up shop there. He could not advertise the Seaway, but he could make it politically visible. Oberlin and a small staff worked with Great Lakes representatives and senators to publicize the need for new legislation.²⁹ The Seaway Corporation thereby joined in the efforts of the Great Lakes Commission and its task force to change laws and policies that hampered the Seaway. They focused on three politically-related problems.

The first was the tolls, and indeed there was a strong consensus among Seaway defenders that this was the most serious problem. To both Americans and Canadian Seaway users the tolls seemed particularly discriminatory. Of the 27,000 miles of navigable waters in North America, tolls were charged only on the 124 miles of the St. Lawrence Seaway between Montreal and Lake Ontario and the 27 miles that made up the all-Canadian Welland Ship Canal. Another problem was what proponents viewed as the Interstate Commerce Commission's discriminatory rate policies. In brief, the Great Lakes shippers thought they were discriminated against since the railroad rates to Great Lakes ports from points in the Midwest were in many cases higher than when the same commodity was sent a further distance to an East Coast port for shipment overseas. Finally, proponents thought that the Federal Maritime Administration had overlooked the Great Lakes.³⁰

The most critical legislation for the Seaway since its 1954 authorization, however, was the 1970 Merchant Marine Act. Once in Washington, Administrator Oberlin began to work closely with friendly members of Congress and the Great Lakes task force office and staff. While Congress had forbidden the Seaway to advertise, Oberlin interpreted the law as not preventing him from "educating" the public and Congress about the Seaway. Oberlin faced severe pressures on the Corporation. Traffic had not been what was anticipated which reduced revenues, and maintenance costs had been more expensive than originally planned, thus increasing operating costs. The most difficult burden was the interest owed the U.S. Treasury on the construction bonds. An attempt in 1969 to do away with the entire Seaway debt failed to pass the Congress.

An increase in tolls seemed the only alternative, something of course not distasteful to the Seaway's opponents. Oberlin enlisted the Great Lakes groups to press the new Nixon administration for some relief. After a year of intricate congressional maneuvering, the provisions to assist the Seaway were written into the bill which became the Merchant Marine Act of 1970.

The 1970 legislation provided for the cancellation of the interest owed on the Seaway's construction debt, for a long-term savings of over a billion dollars. Originally introduced to provide one billion dollars to revitalize the American merchant marine with the building of 300 ships, the act also recognized the St. Lawrence-Great Lakes as America's fourth seacoast. Because of that designation, the Federal Maritime Administration opened a Great Lakes office in Cleveland in November 1975. But of more immediate importance, the designation made available tax deferrals and subsidies for constructing and refurbishing ships sailing the Great Lakes. American-flag vessels had virtually disappeared from the Seaway and Great Lakes in the absence of federal assistance. This particularly hurt American traffic because

overseas defense shipments and agricultural products sent abroad as part of the P.L. 480 food program had to be carried in American vessels and the Midwest produced a large proportion of both the military material and the food products to be sent abroad.³¹

While the 1970 legislation clearly helped the Seaway, it was by no means a panacea. Indeed, Seaway problems continued through the 1970s. An increase in the rate of inflation late in that decade hurt the Seaway a great deal. Foreign competition in autos and steel injured two of the major industries in the Great Lakes area, reducing traffic in their products. And the increased politicization of the wheat trade, with large sales to the Soviet Union, added an element of uncertainty to predictions about shipments of grain. By 1978 costs had risen to such an extent, and traffic had at times eroded, that the Seaway was forced to increase tolls by almost 100 percent. These new charges were to be phased in over a three-year period.³²

In the early 1980s the Seaway continued to face problems. The growing difficulties of the major industries in the area and the United States grain embargo against the Soviet Union disrupted traffic patterns. Also, maintenance charges mounted beyond all expectation because of significant deterioration in the Eisenhower Lock. As a result, the Corporation found it necessary to request the Treasury to reschedule payments on its principal. The agreement was to level payments to \$2 million annually between 1980 and 1985. By 1986, however, these payments would have to be made up, which would have probably required an increase in tolls. The Corporation continued, therefore, to press for cancellation of the remaining debt, something Congress did in passing in the 1983 appropriations bill for the Department of Transportation. President Ronald Reagan signed the bill (PL97-369) on 18 December 1982. This brought the United States into line with Canada, which had cancelled the St. Lawrence Seaway Authority's debt in 1977.³³

The Corps was not involved in Seaway political affairs for most of the 1960s and 1970s. The Corporation, however, had turned to the Engineers to perform maintenance dredging and for help with the repairs of the locks. In the 1970s, however, the Corps became more directly involved in the Seaway again as it undertook studies on the questions of extending the Seaway season and expanding the facilities in the Seaway system. This new role for the Corps was the result of the waterway's problem. Extending the navigation season, especially, was seen as a way to make the Seaway more productive—making the Seaway available for longer periods of time would, hopefully, increase traffic and revenues. Expanding facilities would relieve existing bottlenecks and take care of the increased demands anticipated by the end of the 1980s.

Winter Navigation

Winter navigation posed formidable engineering, economic, and, ultimately, political challenges. Ice, always a hindrance to man's use of the Great Lakes, closed the Seaway for about three and one half months every year.

Pushed by members from the Great Lakes region, Congress authorized studies of the feasibility of reducing ice on the Great Lakes and St. Lawrence Seaway. The River and Harbor Act of 1965 directed the Corps to study ways in which to extend the navigation season on the Lakes and in the Seaway. Congressional proponents of the study deflected critics by arguing that if economically and technically feasible, an extended navigation season would provide general benefits to local industry, shippers, vessel owners, and port employees.³⁴

Corps officials were confident that the season could be extended, although they undertook the study without illusion about the difficulties involved. To be feasible, a program required modifying ice formation, augmenting icebreaking facilities already in place, and reinforcing vessels engaged in winter traffic. In addition, as the Corps looked into the issue, environmental questions arose about the impact of changing the ice formation. Such changes might lead to damage to property in the Great Lakes-St. Lawrence area, damage that would impose extra costs on the program. The changes would also affect the power works, and those interests had to be considered.

After four years of analysis the Corps submitted a feasibility report to Congress. It recommended that further study was necessary, to determine if the quickly changing technology was as yet sophisticated enough to eliminate or at least overcome the effects of ice. If, in fact, further analysis indicated that ice could be reduced, winter operations would be physically possible. The Engineers' recommendation, however, included some cautionary observations. Progress, it observed, was more likely to come through gradual extensions of the winter navigation season rather than from a sudden major expansion. The gradual approach was not only more practical in view of the technical problems involved, but also because of the amounts of money likely to be available for the project.³⁵

The report also recommended further study because its investigation had discovered problems not anticipated earlier. High insurance rates to shippers, for example, were likely to prove an obstacle to companies making use of an extended season. The Engineers' report recommended, therefore, a thorough analysis of the costs to be incurred, the economic benefits of such an extended season, and the extent of federal participation necessary to make such a project workable.³⁶

Congress accepted the Corps' recommendations and established a "demonstration program" in the Rivers and Harbors Act of 1970. The legislation authorized the Corps to develop a program to demonstrate the practicality of extending the winter navigation in the Great Lakes-St. Lawrence River system. The project divided into three basic parts. First, the Corps was to study the economic benefits from winter navigation. This included an investigation of engineering capabilities, environmental impact, and the role of differing federal agencies. Second, the Corps was, on a limited basis, to undertake some demonstration projects. And, finally, the Engineers were to cooperate with the Secretary of Commerce, through the Maritime Administration, in studying ways to provide attractive insurance rates for shippers likely to be interested in winter navigation.³⁷

Congress extended the three-year demonstration program, at the Corps' request, in the Water Resources Development Act of 1974. The demonstration project had proved more costly than initially anticipated, and the legislation also authorized an increase in funding. The Corps was to report on the demonstration program at the end of 1976, with a full feasibility study due in mid-1977.³⁸

The Chief of Engineers, Lieutenant General William C. Gribble, Jr., placed the demonstration program under the direction of the North Central Division Engineer. He chaired the Winter Navigation Board (WNB) which had overall responsibility for formulating, coordinating, and reporting on the demonstration program. Other federal agencies were involved in the program through WNB working groups. Each such group was under the leadership of one federal, or "lead," agency which had the responsibility to carry out a particular part of the program. The working groups each had access to technical advisors, as well as private sector observers and representatives. The other federal agencies with major assignments were the Department of Transportation (Coast Guard and St. Lawrence Seaway Development Corporation), the Department of the Interior, the Department of Commerce (Maritime Administration), and the Environmental Protection Agency (EPA).³⁹

Congress charged the Corps, through the Winter Navigation Board, to determine whether or not to seek permanent financing for an extended navigation program. For most of the 1970s, therefore, the Engineers were engaged in testing equipment that might be necessary to reduce ice conditions on the St. Lawrence River and the Great Lakes and its other tributaries. The program also included collection of data on ship voyages that had extended beyond the normal navigation season and observations of ice conditions. Much time was devoted to the collection of technical data on how best to improve the design of ships for use during the most extreme part of the winter. The WNB also worked closely with shippers in order to collect and distribute information about weather and ice conditions.⁴⁰

While the demonstration program had broad support among the agencies involved and those in the area that stood to benefit from an extended season, significant opposition also developed during the 1970s. Environmental groups, especially the "Save the River" committee based in the Thousand Islands area of New York, gained national attention. The committee charged that the Corps' ice program would kill the river. An emotionally charged, but effective, campaign gained national television coverage for the committee's efforts. In addition, the program to extend navigation predictably came under attack from the long-term opponents of the Seaway among railroad and East Coast port interests. Within the government itself, however, there was also opposition. Perhaps the most significant criticism came in reports, inspired by the Office of Management and Budget, from the General Accounting Office and the Comptroller General. These studies called into question the economic feasibility of the study.⁴¹

Alone, probably none of these opponents could have stopped the program. Together, however, they posed a formidable challenge, especially since the Power Authority of the State of New York and the Hydro-Electric Power

Commission of Ontario raised serious legal questions about winter navigation's effect on the ability to generate power. Other Canadian opposition was also a factor. Canadian citizens made up about ten percent of the membership of the "Save the River" committee. In addition, the Canadian government and Parliament showed less interest than the American administration and Congress in ice reduction. Yet Canada's cooperation was essential since boundary waters would be affected by whatever program the United States adopted.

The criticisms by the General Accounting Office and the Comptroller General were contained in a 1976 report to Congress on progress of the demonstration program. The WNB's data suggested that the demonstration program had increased winter traffic on the Lakes and the Seaway. Instead, the GAO maintained that the increases were a result of the activities of the demonstration program itself. In reviewing the Corps' analysis, the GAO analyzed data on shipping to find that the increase in traffic could only be attributed to particular geographical areas, certain commodities, and a few of the largest shipping operations. Areas that had the greatest success were those in the southernmost latitudes of the area being studied, regions where ice was less of a problem. The GAO went on to point out that the winters under analysis had been unusually mild. Moreover, the most successful shippers in winter months had been so before the demonstration program began. They were the largest shippers, such as United States Steel, which had made major investments in new or reinforced ships that could deal with ice conditions. That company also did not rely on outside insurance companies, having the resources to cover itself.⁴²

The Corps challenged some of these findings, raising questions about the methods used by GAO. Corps officials were confident that a reexamination of the data would not alter the basic conclusion that winter navigation was both feasible and practical.⁴³

Less open to dispute, however, was the fact that the Canadians had not been fully cooperative. In some respects, this was the Comptroller General's most telling criticism of the program to extend winter navigation. From the first, the Canadians had sent an observer to the WNB meetings. But not until the third year of the program had the board asked the State Department to invite Canada to send a representative. It was to be the State Department's responsibility to work out a formal agreement with the Canadians. More troubling, however, was the seeming lack of enthusiasm in Canada for extending the navigation season. Meetings in November 1975 about greater cooperation between the two countries were inconclusive. A four-year Canadian technical and economic feasibility study had been proposed by the government in 1973. The Parliament failed to provide funding, although individual agencies conducted some related studies out of funds in their own budgets.⁴⁴

Nevertheless, the lack of a Canadian program comparable to that in the United States was a serious problem. Below Lake Erie, winter navigation required full Canadian cooperation. The important Welland Canal and over half of the Seaway are in Canadian territory. Private Canadian property owners, industries, and municipalities would have been affected by any program for extension since, with the exception of Lake Michigan, all the lakes are

boundary waters between the two countries. Moreover, the Comptroller General's report made much of the fact that the most severe ice problems in the St. Lawrence occur between Montreal and the international boundary at St. Regis, New York, a reach of river entirely within Canadian territory.⁴⁵

Most troubling to officials at GAO was the fact that what interest the Canadians had shown in extending navigation indicated an approach to the problem different from that of the United States. The WNB demonstration program emphasized policies that would assist navigation in both January and February. In contrast, the Canadians emphasized extending the season through the last two weeks of December and then, in March, trying to open it two weeks earlier. Moreover, the Canadians emphasized detailed analyses of sources of revenue that would be necessary to recover investment and operating costs. The American study gave little attention to the question.⁴⁶

From the Winter Navigation Board's perspective, however, the most troubling issue was the impact of extending the navigation season on the power interests in the Great Lakes area, especially those connected with the St. Lawrence Seaway. The power companies needed stable ice cover on the river in order to generate electricity. To provide stable ice, the companies used "ice booms." These booms were large floating timbers anchored to the river bottom by heavy cables. Any extension of the navigation season, however, required icebreaking among the ice booms. Not only might the booms have been damaged, but icebreaking might have altered river flows thus affecting the ability to generate power.⁴⁷

Extending navigation, therefore, had a potential impact on the generation of power in both the United States and Canada. Almost every channel in the Great Lakes-St. Lawrence Seaway system had hydroelectric power plants. The United States plants accounted for only about 2.5 percent of total American generating capacity, but about 31 percent of the total power capacity in the market area served by the facilities maintained by PASNY.⁴⁸

The power companies and the communities served by them, thus, had a keen interest in the demonstration program. Aside from the technical and economic impact on the power companies, complex legal questions also arose. In the first instance, the extension of navigation might affect the regulation of river flows and levels. Both could cause flooding and erosion after the winter. The power entities had a legal responsibility, given to them by the International Joint Commission, over the regulation of flows and river levels. Ice booms were essential to regulating river flows.⁴⁹

Interfering with the ice booms raised other legal problems. In 1974 the Corps gained permission from the power companies to build several movable booms. In principle, the power companies did not object to the test on movable booms, but they wanted the WNB to take legal responsibility for damages that might result. The board refused, and the power companies objected to the series of scheduled tests. The board authorized one test that was conducted in an area that did not have severe icing. Critics of the entire program questioned the validity of that test. The Corps' response to the issue was to undertake further studies to develop a technology that would ensure that adverse affects from movable ice booms would be kept to a minimum.⁵⁰

The general lack of cooperation from the power entities delayed the work on the demonstration program. Ultimately, however, the most potent opponents were representatives of environmental groups. They were able to gain the support of New York's governor, Hugh Carey, and its senator, Patrick Moynihan, in opposing the extension of the navigation season. According to the National Environmental Policy Act of 1969, federal agencies were required to prepare an environmental impact statement before each major action, recommendation, or report on legislation that might have a major effect on the environment. The contention over the environmental impact stalled the program.

In the 1970s the Corps had become more and more sensitive to environmental issues. Its adversary relationship with some environmental groups faded on water resource management issues. In other areas, a sharp adversarial relationship remained. This was particularly the case in its attempts to reduce ice on the Lakes and St. Lawrence River. The Corps recognized, as part of its mandate, the environmental problems: shoreline erosion, damage to shore structures, increased pollution of waterways, and flooding. The Engineers also had to look into aquatic ecology, a significant issue for critics of the program. A major campaign against the Corps' plans in the St. Lawrence began in 1976. The "Save the River" committee proved effective in garnering public support in the area, national media attention, and sufficient political support from New York officials to stop further work on extending the navigation season. Tests remained incomplete when the program funding expired in September 1977 without congressional authorization for further work. Later, therefore, the Corps informally presented information on the demonstration program to Congress. The completed tests suggested that extending the navigation season was both technically and economically feasible, although observations about the project's environmental impact were left more tentative in the report.⁵¹

Despite the stalemate on winter navigation, Congress did not abandon interest in the Seaway. Indeed, the debate over winter navigation probably helped the Corporation in some respects. One argument for the winter navigation program was to make the Seaway more profitable. Winter navigation, its proponents maintained, would help the waterway live up to its potential. The cost and controversial nature of extending navigation, however, suggested to some members of Congress that perhaps the best way to help the Seaway was to reduce its costs by forgiving the Seaway debt to the Treasury, a measure which finally received congressional approval in 1982.

Expanded Facilities

The Corps' involvement in the Seaway did not end with the uncompleted study on ice and winter navigation. The Buffalo District has played a major role in studies of improving Seaway facilities by building new locks and deepening channels.

In the early 1970s, the Buffalo District conducted studies on the feasi-

bility of expanding Seaway facilities. These analyses proposed an all-American canal between Lakes Erie and Ontario to serve as an alternative to Canada's Welland Canal. Corps recommendations were based on projections that showed the Welland Canal becoming almost a permanent bottleneck by 1990, damaging the economies of both Canada and the United States. Increased traffic was not the only consideration. Larger ships, a well-established trend in shipbuilding technology, heightened the possibility of problems for the Seaway and the Great Lakes because the Welland was not able to accommodate them.

The proposed canal would not replace the Welland, but would be built parallel to the existing facilities. An alternative route appealed to shippers—an accident in the Welland in 1974 had closed the canal and Seaway for more than a week. The Corps report also argued that a new canal would stimulate the local economy along its length, requiring a major new port on Lake Ontario and providing benefits to Buffalo at the other end of Lake Erie. Anticipating the successful extension of the navigation season, the Engineers also argued that the new canal would enhance the efficiency of the entire Seaway and Great Lakes navigation system, which would have greater demands put on it when the navigation season was extended.⁵²

Response to the report was far from positive. For one thing, critics in Congress and among the Seaway's traditional adversaries attacked the cost of the proposal. In 1972 the Corps estimated the new canal to cost about \$2.3 billion. It would have required the building of four locks, major relocations of roads, railroads, utilities, and homes. Congress was not disposed to fund such an expensive project during the stagflation of the late 1970s.

A similar response awaited another Corps report that recommended building parallel locks in the St. Lawrence Seaway. The new locks were to be longer and wider than the present ones, allowing 45,000-ton ships to use the Seaway as well as the 30,000-ton vessels that were the maximum size for the original Seaway locks.⁵³

Canada has also shown interest in upgrading the Seaway system. Canadian traffic represents a greater percentage of total Seaway tonnage, so there has been less Canadian opposition to improvements. Even so, the Canadians have not gone very far with proposals either. In 1974 Canada completed a Welland by-pass canal which straightened the canal near the city of Welland, making navigation easier. Canada's Seaway Authority also expropriated 2200 acres of land east of the Welland Canal in order to build its own parallel works, should they ever be authorized. Like their southern neighbors, however, there was little enthusiasm in Parliament for an expensive program to build new "super" locks in the St. Lawrence Seaway system. By 1982 both Canada and the United States had given up hopes of major expansion of facilities. One of the major assumptions of the joint Seaway Authority and Seaway Corporation study, "Seaway Commodity Flow Forecast, 1980 to 2000," was that there would be no change in lock size or increase in navigation season. The report was to help current planning for future problems of traffic congestion, "without making additional large-scale structural changes."⁵⁴

Thus on its 25th anniversary in 1984 the St. Lawrence Seaway and the Corps of Engineers are not closely related. The Corps' major role had been in



The completed project. At far left is the Wiley-Dondero Canal with the Eisenhower Lock at the upper left and the Snell Lock below. At the bottom of the picture is the tip of Cornwall Island. At right is the town of Cornwall, Ontario, and the Cornwall Canal. The St. Lawrence Power Dam is at the center, the Long Sault Dam to the left.

New York Power Authority

the planning and building of the Seaway. Its 1942 report on the feasibility of the project had provided the detailed plans from which the actual design and building of the waterway had taken place. After 1959, the Corps became involved to any great extent only in the attempts to extend the navigation season and expand facilities. Neither of these efforts have been successful. While the Seaway itself has not met the most extravagant expectation of its major proponents, the waterway nevertheless has proved important to the economies of the Great Lakes states. In 1983 the Seaway carried its one billionth ton of cargo, a fitting symbol of its utility. That the waterway did not live up to the hopes of its most ardent defenders has had much to do with unforeseen changes in the major steel and auto industries, as well as in world trade. American grain and, after the oil embargo of 1974, coal, increased in importance as exports. Shipbuilding technology also outpaced expectations, making ocean-going vessels too big for the St. Lawrence Seaway locks. Inflation increased maintenance costs, as did unexpected problems of concrete deterioration in the Eisenhower Lock. Federal policies also hurt the Seaway. After much lobbying these policies were changed, making the Seaway more competitive with other modes of transportation and the East Coast ports. Legislation in 1982 forgave what remained of the burdensome Seaway debt, most likely relieving the Seaway of the need to increase tolls in 1986.

With the stalemate over the extension of winter navigation after 1979, the Corps' role in the Seaway again was reduced. Studies of future traffic have been predicated on the idea that the season would remain as it is now and that the system would not be fundamentally expanded. The Corps' role in the future of the Seaway is thus unlikely to involve more than maintenance work that the Corporation might call upon it to carry out. Even so, the Corps' experience in designing and building the American section of the St. Lawrence Seaway can rightly be a source of great satisfaction. The waterway was completed on time and has proved to be of enormous significance to the economies of the states in the Midwest.

Notes

Chapter I

1. Theodore L. Hills, *The St. Lawrence Seaway* (New York: Frederick A. Praeger, 1959), pp. 29–31.
2. *Ibid.*, pp. 31–33.
3. *Ibid.*, pp. 31–34.
4. *Ibid.*, pp. 34–35.
5. *Ibid.*, p. 36; William R. Willoughby, *The St. Lawrence Waterway: A Study in Politics and Diplomacy* (Madison: The University of Wisconsin Press, 1961), pp. 17–18.
6. Hills, pp. 37–38; Willoughby, *The St. Lawrence Waterway*, pp. 21–27, 32.
7. Hills, pp. 38–39; Willoughby, *The St. Lawrence Waterway*, pp. 40–44.
8. Willoughby, *The St. Lawrence Waterway*, pp. 40–44.
9. *Ibid.*, pp. 48–52.
10. Hills, pp. 45–46.
11. Willoughby, *The St. Lawrence Waterway*, pp. 29–30.
12. *Ibid.*, pp. 30–31.
13. *Ibid.*, p. 31.
14. *Ibid.*, pp. 31–32.
15. *Ibid.*, pp. 30–32; and William R. Willoughby, "The St. Marys: Our First Ship Canal," *Inland Seas*, 11 (Winter 1955): 243–255.
16. Willoughby, *The St. Lawrence Waterway*, pp. 33–36.
17. *Ibid.*, pp. 37–39.
18. *Ibid.*, pp. 38–39.
19. *Ibid.*, pp. 53–55; "Report of the Chief of Engineers," *Report of the Secretary of War, 1870*, House Executive Doc. 1, vol. 2, part 2, 41st Cong., 3d sess., 1870, pp. 160–163.
20. Willoughby, *The St. Lawrence Waterway*, p. 57.
21. *Ibid.*, pp. 58–59.
22. *Ibid.*, p. 59.
23. *Ibid.*, pp. 61–65; Gennifer Sussman, *The St. Lawrence Seaway: History and Analysis of a Joint Water Highway* (Washington: National Planning Association and Ottawa: C. D. Howe Research Institution, 1967), pp. 18–19; U.S., Congress, House, *Report of the United States Deep Waterways Commission*, House Doc. 192, 54th Cong., 2d sess., 1897; *Reports of the Canadian Members of the International Commission* (Ottawa, 1897).
24. Willoughby, *The St. Lawrence Waterway*, pp. 63–67; U.S., Congress, House, *Report of the United States Deep Waterways Board*, House Doc. 149, vol. 71, part 1, 56th Cong., 2d sess., 1900.
25. Willoughby, *The St. Lawrence Waterway*, pp. 68–75; U.S., Congress, House, *Report by Special Board of Engineers on Survey of Mississippi River*, House Doc. 50, vol. I, part 1, 61st Cong., 1st sess., 1909, Serial 5573.
26. Sussman, pp. 18–19; *Treaty Between His Majesty and the United States of America Relating to Boundary Waters and Questions Arising along the Boundary Between Canada and the United States*, January 11, 1909, Treaty Series No. 23 (Ottawa: King's Printer, 1910). In the same year the treaty was signed, Congress passed the 1909 Rivers and Harbors Act which prohibited charging tolls on locks or canals built by the United States. The Panama Canal was the only exception. Tolls had been abolished on the Erie Canal in 1883 and the federal government had accepted from Michigan the St. Marys canals with the stipulation that they be available free of charge. When Congress approved the St. Lawrence Seaway, tolls were recognized as an exception to standard practice. The exception was noted as necessary because of

the international nature of the project. See House Public Works Committee Report on Wiley-Dondero Bill, H.R. 1215, 83d Cong., 2d sess., 1954.

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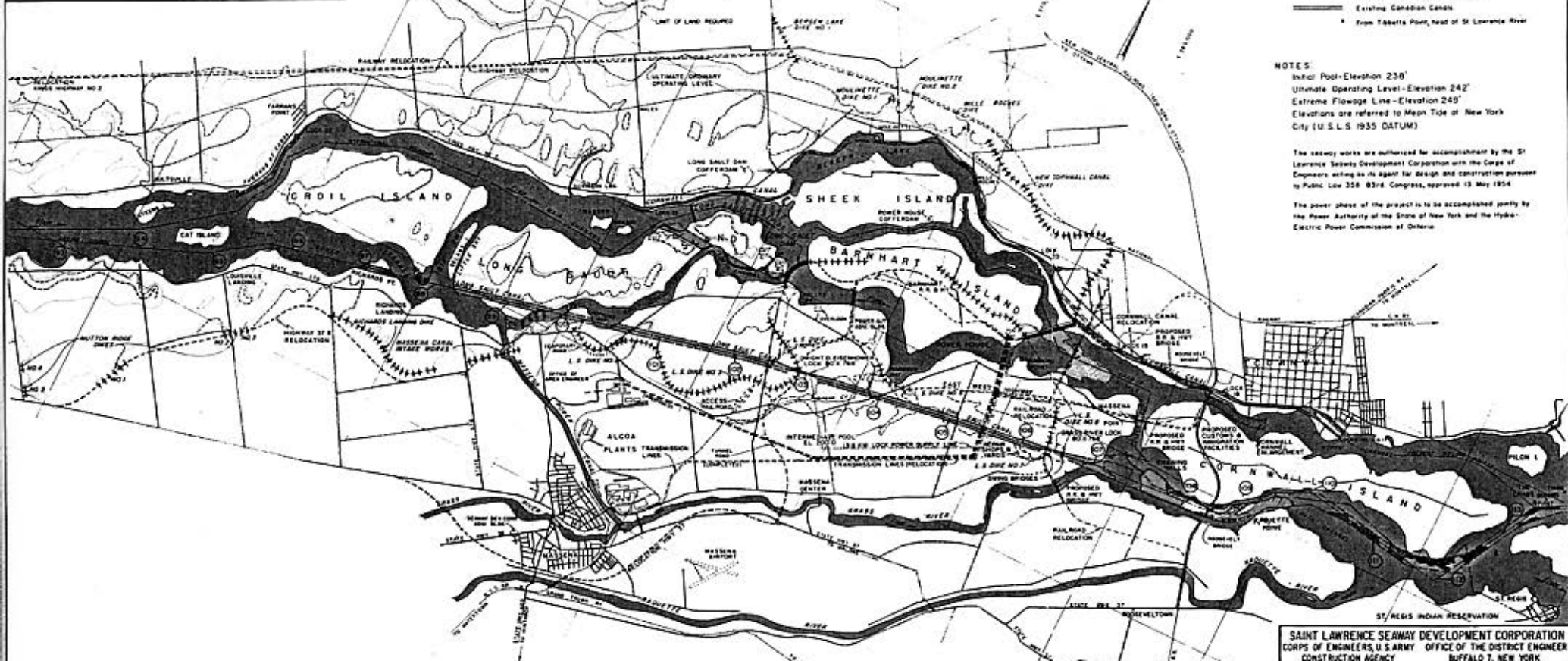
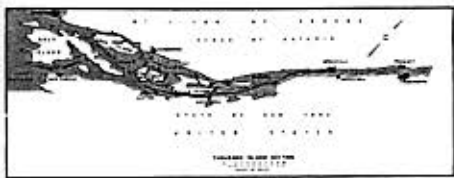
DOMINION OF CANADA
PROVINCE OF ONTARIO

- LEGEND:**
- Cuts or Draining Area
 - Proposed Navigation Channel
 - Towing Miles
 - Dike
 - Limit of Land Required
 - Proposed Railroad
 - Proposed Highway
 - Ultimate Ordinary Operating Level
 - Existing Canadian Canal
 - From Tabella Point, head of St. Lawrence River

NOTES:
Initial Pool-Elevation 236'
Ultimate Operating Level-Elevation 242'
Extreme Flowage Line-Elevation 249'
Elevations are referred to Mean Tide at New York City (U.S.L.S. 1955 DATUM)

The roadway works are authorized for accomplishment by the St. Lawrence Seaway Development Corporation with the Corps of Engineers acting as its agent for design and construction pursuant to Public Law 358, 83rd Congress, approved 13 May 1954

The power phase of the project is to be accomplished jointly by the Power Authority of the State of New York and the Hydro-Electric Power Commission of Ontario.



STATE OF NEW YORK
UNITED STATES

SAINT LAWRENCE SEAWAY DEVELOPMENT CORPORATION
CORPS OF ENGINEERS, U.S. ARMY OFFICE OF THE DISTRICT ENGINEER
CONSTRUCTION AGENCY BUFFALO 7, NEW YORK

SAINT LAWRENCE SEAWAY
LONG SAULT CANAL SECTION
GENERAL PLAN

NO. 1 SHEET SCALE 1"=500'

1 MAY 1954 DWG. NO. 840-A-19



**US Army Corps
of Engineers**