FEARLESS RELOOK AT MORAN ELECTRIC

The (Re)generation of the Moran Plant

City of Burlington

Winter 2023

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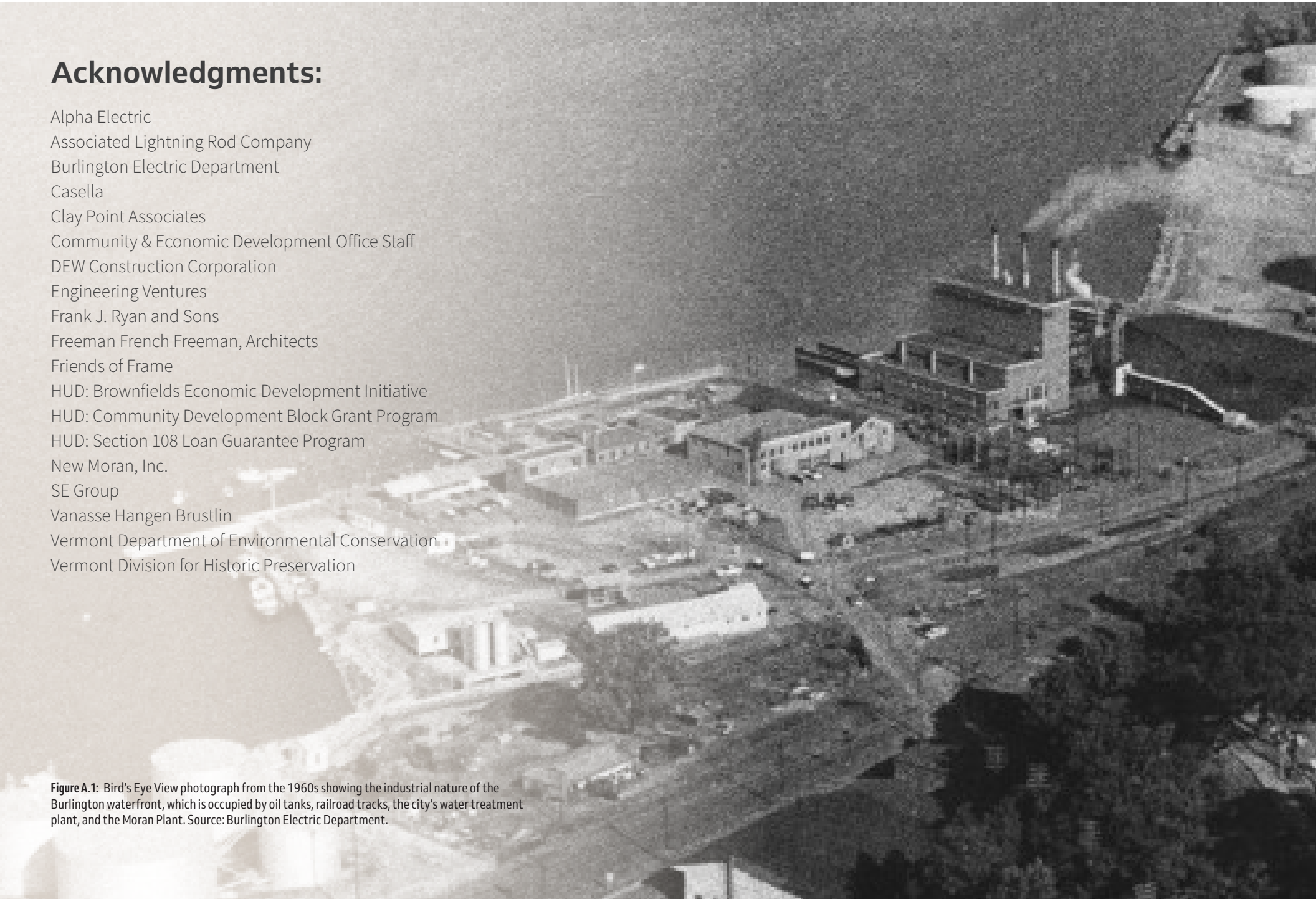

Figure A.1: Bird's Eye View photograph from the 1960s showing the industrial nature of the Burlington waterfront, which is occupied by oil tanks, railroad tracks, the city's water treatment plant, and the Moran Plant. Source: Burlington Electric Department.

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Figure A.2: The Moran Plant in 1979. Source: UVM Libraries Special Collections.

Figure A.3: The Moran FRAME in Spring 2022. Source: Kaitlin O'Shea, VHB.

Forward

The Moran Plant was a three-story, coal-fired municipal power plant located on the shore of Lake Champlain just north of Waterfront Park. The plant was brought online in 1954 and powered Burlington's streets, homes, and businesses with coal and then woodchips until 1986, when the Joseph C. McNeil Generating Plant opened in the Intervale.

In 1986, the Moran Plant was transferred from the Burlington Electric Department (BED) to the city of Burlington. Under city ownership, numerous attempts were made to re-envision the space for public benefit. Over the course of three decades, the city reviewed a wide range of imaginative proposals that included moving the YMCA to the building, creating an art incubator space, building an indoor ice climbing wall, creating event spaces and rooftop restaurants, building a concert hall, relocating the University of Vermont's Fleming Museum to the building, and transforming the building and site into a baseball stadium – all of which hit various roadblocks. In 2018, the

city finally accepted a proposal for the FRAME concept which sought to create a community icon of the building through partial demolition (the name FRAME stands for “Fearless Relook at Moran Electric”). The transformation required significant abatement and environmental remediation efforts to stabilize the area and make it safe for the public.

Today, the Moran FRAME is a cultural landmark on Burlington’s waterfront and a resource for recreation and cultural activities. The Moran FRAME represents an integral piece of the efforts to revitalize Burlington’s waterfront that began in the 1990s. A later phase of waterfront revitalization occurred in 2014 after voters endorsed a slate of improvement projects that included the relocation of the Lake Champlain Community Sailing Center, creation of a new private marina, the Burlington Harbor Marina, expansion of the ECHO Center’s parking amenities, continued development of Waterfront Park, and creation of Water Works Park. The Moran FRAME, growing out of this latest wave of development, turns the page on Burlington’s waterfront. As the site of heavy industrial activity for over a century, the waterfront has been reborn as a place of recreation and community bonding. Towering over the lake and lakeside parks, the Moran FRAME is a reminder of Burlington’s industrial heritage and efforts to reimagine the lakeshore for the public.This booklet has been developed to chronicle the history of Burlington’s waterfront and electrical generation within the city, as well as the history of the Moran Plant and efforts to revitalize the waterfront.

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Beauty and the Industrial Beast

Beauty and the Industrial Beast

In 1879, W.S. French of Woodstock, Vermont, a student at the Vermont Episcopal Institute, took his spyglass out to Rock Point and cast it back upon the City of Burlington. French's description of the lakefront was captured in an essay he wrote for the *Rock Point Cadet* newspaper:

> **The most conspicuous object before your eyes is the surface of the lake. On it are yachts, sloops, canal-boats, steamboats, row-boats, lumber and coal boats. The surface of the lake is of deep blue. Every wavelet looks like a diamond as its sparkles in the sun-light, and on its surface are sail-boats with their sails, gliding along, and steamboats with flying flags and happy people on them…After surveying the lake you next take a survey of Burlington, two miles off. First you see the harbors, with the steamboats pulling in and out, and the little tugs which are pulling half a dozen lumber boats full of lumber. Then you observe the lumber yards piles of lumber extending two miles along the shore.**[1]

Figure 1.1: Postcard from circa 1890 showing Burlington Bay. In the distance (left of center) Rock Point is visible. The city's industrial development is largely omitted from this image. Source: UVM Libraries Special Collections.

The description of the waterfront highlights the contrast that wrested at the heart of Burlington's identity. At once, the city's waterfront was a site of industrial activity and the launching point for pleasure cruises, fishermen, and yachters. Postcards depicting Burlington in the late 19th century often used the lakeshore as their subject, omitting the industrialized waterfront in favor of depicting an idyllic and unspoiled shoreline. While most of Burlington's wealthiest citizens lived in the Hill Section east of City Hall Park, families who labored in the mills and factories at the waterfront and along Pine Street lived in neighborhoods closer to the waterfront and its industry.[2]

Evolution of the Burlington Waterfront

For thousands of years prior to European contact, Native people dwelled, hunted, and fished along the original margins of the Burlington waterfront. Lake Champlain provided

for Native people an important food resource base, a critical transportation corridor, and was a ritualized landscape where the creator of the valley, Odzihozo, dwelt amid his works.

Since the first European settlers came to Chittenden County and made permanent settlement in Burlington, the waterfront has both shaped and been shaped by the needs and desires of residents. Early depictions of the waterfront emphasized its scenic beauty, even as industry grew along the lakeshore. This industrial presence, driven largely by the trade of Canadian lumber, helped to shape Burlington in the 19th century. The impact of this once vibrant lumber trade remains visible today in the high-style homes of the city's lumber barons in the Hill Section neighborhood, as well as in the small vernacular houses once occupied by mill laborers that make up neighborhoods like the Old North End. The lake itself was reshaped by the needs of industry with over 40 acres of land created by lakeward expansion during the 19th century to make space with fill for railroad infrastructure and lumber piles.

The relationship between Burlingtonians and their waterfront was also shaped in the late 19th century by the popularity of the city's yacht club and the growth of steamship pleasure tours. While the city's waterfront remained an industrial center filled with machinery, workers, and lumber piles, the water itself remained a popular attraction. For the wealthy, this meant cruising up and down Lake Champlain and interacting with others of their same social circle from yacht clubs in Plattsburgh and Canada. For the city's middle class, the pleasure steamers offered an inexpensive way to see the lake, explore historic and scenic locations, and get away from Burlington on hot summer days. These pleasure tours also brought visitors from Lake George and downstate New York to Burlington, creating a new tourism industry.

By the 20th century, Burlington's lumber industry had declined. In place of lumber piles and planing mills, by the 1930s the waterfront was lined with bulk petroleum storage tanks. Gas companies saw Burlington as a strategic harbor where they could easily ship and store oil along the lakeshore then distribute it during the winter months when it was most needed. Never beloved, the storage tanks became a point of debate within the community, particularly as people developed a greater sensitivity to the environmental degradation caused by petroleum and oil spills. In the 1960s there was a saw a growing push from within the city to take control of the waterfront and redevelop the lakeshore for the benefit of Vermonters rather than businesses. As a result of this push, and the steady decline of lake shipping, development plans were put forward to transform the lakeshore. The nature of these transformations varied from developer to developer; however, by the 1980s, the creation of public parks along the lakeshore began to crystalize in each new development proposal.

Figure 1.2: 1930s postcard of Burlington promoting its pristine beauty on Lake Champlain and its recreational and cultural attractions. The city's industrial development is largely omitted from this image. Source: Fletcher Free Library.

During the mid-20th century and just preceding the most intense debates regarding the more economical, environmentally responsible, and advantageous use of the waterfront, the Moran Municipal Generating Station was built. Standing three stories and capable of generating 30 MW of electricity, the station – which was commonly referred to as the Moran Plant – supplied electricity to Burlington from 1955 until 1986. Much like the bulk petroleum tanks that surrounded it, the Moran Plant quickly became a contentious feature of the waterfront particularly among those who lived near the plant, which released hundreds of pounds of soot and smoke each day.

In 1989, the city and state used the Public Land Doctrine to wrest development control of the waterfront from the Central Vermont Railway (CVR), which owned much of the waterfront. After purchasing the land from the CVR, Burlingtonians were finally given the beautified public waterfront they had been demanding for decades.

Figure 1.3: Circa 1850 painting of Burlington Bay by Theodore Hopkins, a well-known artist of the Hudson River School of art. Source: Fleming Museum of Art, University of Vermont.

In many ways, the city's purchase of over fifty acres of waterfront land and the subsequent creation of park and parkland spaces mark a return to the city's idyllic past. However, the Burlington waterfront remains an amalgamation of desires, both industrial and recreational. The land upon which Waterfront Park and the skate park were built was created to fulfill industrial needs. Vestiges of the industrial past such as the Moran FRAME, the city's Electric Light Plant building, and the railroad tracks remain intact, reminding us of the interplay between recreation and industry that has shaped the city's waterfront since the late 18th century.

The Nineteenth Century Waterfront

Carved out by the retreat of the Laurentide Ice Sheet 12,000 years ago, Lake Champlain has been referred to as the sixth Great Lake. For boaters, fishing enthusiasts, swimmers, nature lovers, and beachgoers, the lake is a source of entertainment and relaxation. For many communities, the recreation opportunities provided by Lake Champlain have become a significant economic driver. Among the many lakeside towns and cities, arguably none have built more of their modern identity around Lake Champlain than Burlington, Vermont.

The largest community on Lake Champlain, Burlington has five popular parks: Battery Park, Leddy Park, Oakledge Park, North Beach, and Waterfront Park, all of which take advantage of the lake's beauty. A sixth park on the lake, Red Rocks Park, sits just outside the city limits in South Burlington. These parks, popular with locals and visitors, are part of a rich tradition of recreation that has drawn people to Burlington since the city's founding.

The beauty of the landscape and setting around Burlington was remarked upon throughout the 19th century. In 1806, Timothy Dwight, president of Yale University, came to Burlington and provided one of the first descriptions of Burlington and Burlington Bay:

> **The site of this town [Burlington] is uncommonly beautiful. It is an extensive slope, ascending gradually from Lake Champlain three fourths of a mile. The part of the lake, by which it is borders, is a noble bay, about four miles in depth, and to the eye an exact semi-circle.[3]**

Almost a century later, the American Publishing Company produced a volume entitled *Industries and Wealth of the Principal Points of Vermont*. In this book, Burlington and its waterfront on Lake Champlain was again given effusive praise:

> The Queen City has the mountain scenery of Scotland, the sky and sunsets of Italy, the valleys and verdure of France, the lake views of Switzerland and the quiet park-like surroundings of an English landscape. In a word, it is a gem set in an emerald ring of natural beauty which can hardly be equaled anywhere else in New England and can be excelled nowhere.[4]

A Lumber Port on Lake Champlain

Lumber has long been a critical resource in the economic development of Burlington. In his letters from 1806, Timothy Dwight described how logs cut in Vermont's forests were floated to Burlington and from there to Québec and Montréal.[5] Burlington was also classified as a port of entry, which meant that goods bound to and from Canada passed through Burlington's customs house, creating jobs along the waterfront, and encouraging the early industrial development of the harbor.

In 1823, the Burlington waterfront was forever changed by an event that occurred approximately 70 miles away at the southern end of Lake Champlain. In that year, civil engineers Benjamin Wright and John Jervis completed the Champlain Canal, a sixty-mile waterway that connected Lake Champlain to the Hudson River, enabling continuous water travel from Québec to New York City and the Atlantic Ocean. The canal's completion made

Figure 1.4: A group of canal boats being towed by a tugboat (at right) c. 1905. Although most of the canal boats are flat decked, one boat retains its mast and rigging, an unusual feature during this era. Champlain College Special Collections.

Canal boats were a quintessential feature of the Burlington waterfront in the 19th century. With the ability to carry up to 180 tons of cargo, by 1873, canal boats were the main vehicle for moving bulky goods such as iron, grain, and most importantly, lumber between Canada and New York City and all destinations in between. Operating canal boats was also a way of life for thousands of Canadian and American families.

EACH CANAL BOAT HAD LIVING QUARTERS THAT WERE DESCRIBED IN THE RUTLAND DAILY HERALD AS FOLLOWS:

The canal boat house is not on the top of the deck. Its flat roof rises over the deck level only a few feet, and you go down below, after raising a door like a cellar opening, by half a dozen steep little steps. Then it is you see what order and economy of space may mean. Each step of the stairs forms a coalbin, the walls are all cupboards, and contain principally provisions. Clothing is folding flat on the bottom shelves, as there is no room for drawers…This cubby-house is the epitome of economic order, so that in winter…a family of four or five need not find it unbearable. But in summer the cubby-house is little used. The man with a family raises above his roof four supporting poles and fastens them to a roofing of sail-cloth. The stove is brought up, a table, a hammock, a rocking chair or two, and here the family lives in an open-air house.[6]

Although the use of canal boats peaked in the 19th century, the Lake Champlain canals remained in heavy use through the 1940s. By this time, however, many of wooden canal boats had been replaced by steel or wood barges capable of handling up to 1,000 tons of cargo. The development of these barges marked the passage of the canal boat into the pages of history.

Figure 1.5: Circa 1870 photograph of the Burlington Waterfront showing stacks of dressed lumber and the railroad in the foreground. In the background smoke billows from the stacks of factories that were likely producing wood products. A portion of the Burlington Breakwater can be seen at top right. Source: Fletcher Free Library.

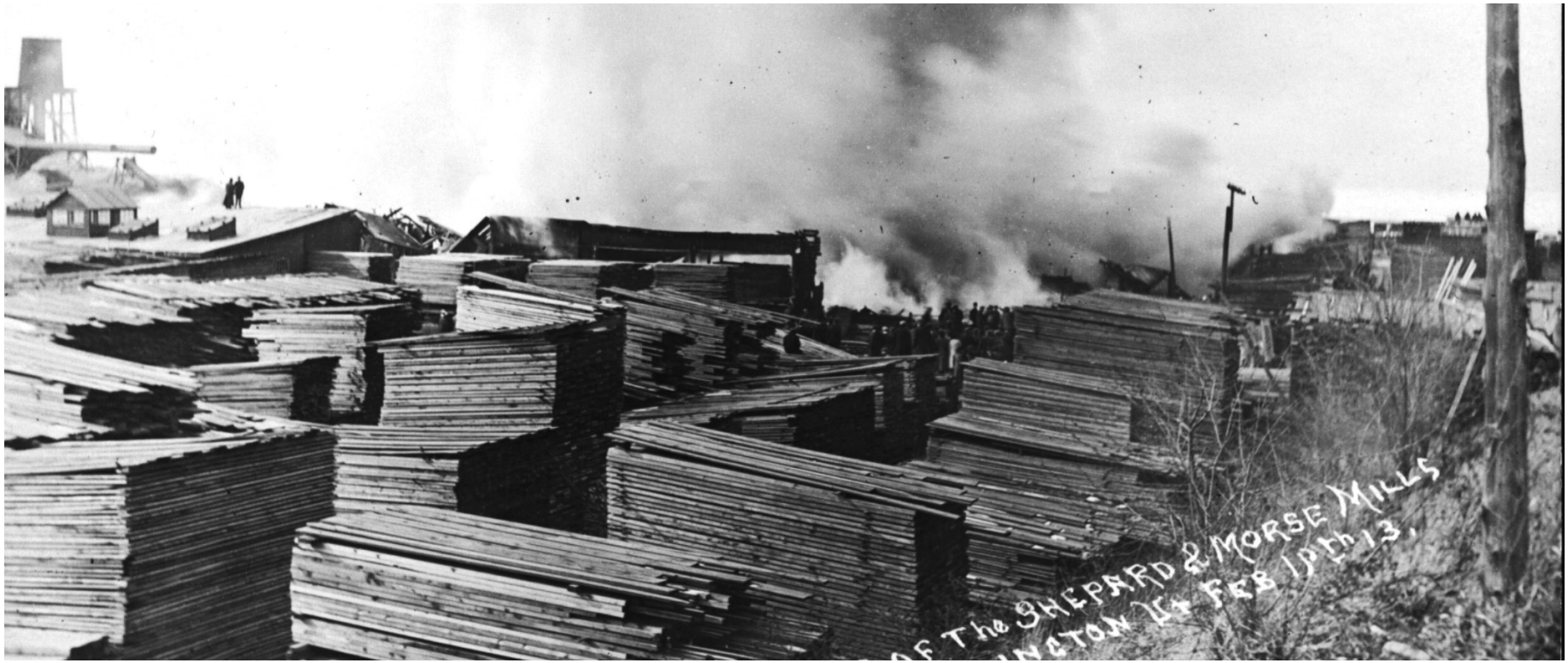


Figure 1.6: Photo of the fire that damaged the Shepard and Morse Planing Mill. In the foreground are stacks of planed lumber, in the center background people are visible fighting the fire. Source: Champlain College Special Collections.

Figure 1.7: Detail from 1877 Birdseye map of Burlington and Winooski depicting various industries along the Burlington waterfront, heavy boat traffic, and hundreds of piles of dressed and undressed lumber. Source: UVM Libraries Special Collections.

Burlington the largest and most significant port on Lake Champlain. Burlington quickly became a major regional shipping center for lumber and stone. In 1843, the city experienced another boon with the completion of the Chambly Canal on the Richelieu River, which improved trade with Canada. As a result of the canal network, in 1843, it took just 6 to 12 days to transport goods from Canada to New York City and on average 8,000 tons of material were shipped through Lake Champlain each week.[7]

As a result of this trade, Burlington became one of the most important freshwater ports in the United States.

In 1836, at the behest of the United States Secretary of War Lewis Cass, the Burlington Breakwater was built to shelter docks and wharves and protect lake commerce and US military interests on Lake Champlain.[8] Initially 1,000 feet and taking generally a V shape, the Burlington Breakwater was lengthened several times as the harbor expanded, and the number of wharves grew. What is now a 4,157-foot breakwater is generally parallel to and approximately 1,000 feet from Burlington's lakeshore. The breakwater substructure is crib construction, with timber cells filled with stone for ballast. Notched timbers in alternate rows of headers and stretchers formed the cribs.[9]

By 1850, the bulk of Vermont's virgin forests had been cut down for lumber and to create farmland for the state's growing Merino sheep boom. With domestic timber exhausted, trees had to be imported from Canada. In 1856, entrepreneur Lawrence Barnes discovered a loophole in American tax law that allowed Canadian timber to be imported tariff free. This discovery kicked off a half century of Canadian lumbering, which saw millions of acres cut down and shipped to Burlington and Albany, New York, creating two of the largest lumber ports in the United States. For his part, Lawrence Barnes started his first lumber yard in 1856, Skillings, Whitneys & Barnes Lumber Co. By the 1870s, the company was generating $4 million annually in business, the equivalent of $103 million dollars today.

Lawrence Barnes was the first successful lumber baron in Burlington, and he instituted certain practices that were instrumental to the city's growth as a lumber port. After shipping his logs from Canada over Lake Champlain, Barnes Barnes had the timber rough-sawn into boards that were planed on two sides, a process called "dressing the lumber." Once dressed, Barnes's lumber was shipped by canal or rail to its final destination.[10] By dressing his lumber, Barnes saved 12% on shipping costs and transformed Burlington into a major lumber port. Sawmills were opened and were soon followed by woodworking shops, planing mills, and sash and door factories. These factories were all

built along the waterfront and on Pine Street, which became the city's main industrial center after Barnes developed the street in 1869 to accommodate lumber storage and mills that could no longer fit at the busy waterfront. From 1870 to 1897, the Burlington lumber industry generated millions of dollars in revenue and provided work for thousands of residents. It was not uncommon for over one hundred million board feet of timber to be sawn annually.[11] Much of this lumber exited the city and was used throughout the Northeast to build houses, towns, and cities; however, a significant portion of the lumber arriving in Burlington was used to produce furniture, a local industry that grew significantly during the 1880s and 1890s.

With so much lumber passing through Burlington, the waterfront became a staging ground filled with dressed lumber and fresh cut logs. Maps and photos from the era show immense piles of lumber stored at the waterfront [See Figures 2-5]. To create more land for the busy harbor, a portion of Lake Champlain west of Battery Street was filled in and fifteen acres of land were created in this area by using soil from the Battery Park bluff. High-powered water guns were used to break up the bluff's soil, which was carried down to the lake by a network of flumes. This fill comprises the flat area of Waterfront Park today. Additionally, during the 1850s, the Burlington and Rutland Railroad took control of approximately 65 acres of swampy marshland along the waterfront and built a railyard to service the nearby planing mills and factories. In 1860, the CVR enhanced the city's railroad network by building the North Avenue Rail Tunnel, a 340-foot tunnel that allowed the railway to better connect to the waterfront. Built in six months, the North Avenue Rail Tunnel was one of the first large scale tunnels successfully dug in the United States. The CVR further added to its rail infrastructure during the 1860s by building a passenger depot and a freight house at the foot of College Street.

Despite the successes, Burlington's lumber trade was dealt a blow in 1888 when a fire broke out on the waterfront. The fire destroyed the Taft Brothers door and sash factory at the foot of College Street, one million board feet of lumber, and caused significant damage to the Shepard and Morse Planing Mill.[12] Strenuous efforts by local volunteer fire companies prevented the fire, prevented the fire from burning out of control and destroying all the lumber stored along the waterfront. Another devastating fire in 1895 at the J.R. Booth lumber mill led to the creation of the professional, paid Burlington Fire Department.

Burlington's lumber trade recovered from the fire but declined after 1898 due to new tariffs on imported lumber and the availability of cheap domestic lumber from the west. This western lumber was transported by rail, furthering how the railroad transformed Burlington's waterfront in the 20th century.

Figure 1.8: Highlighted area is the approximate boundary of the land created in the late-19th century for the lumber industry and railroad.

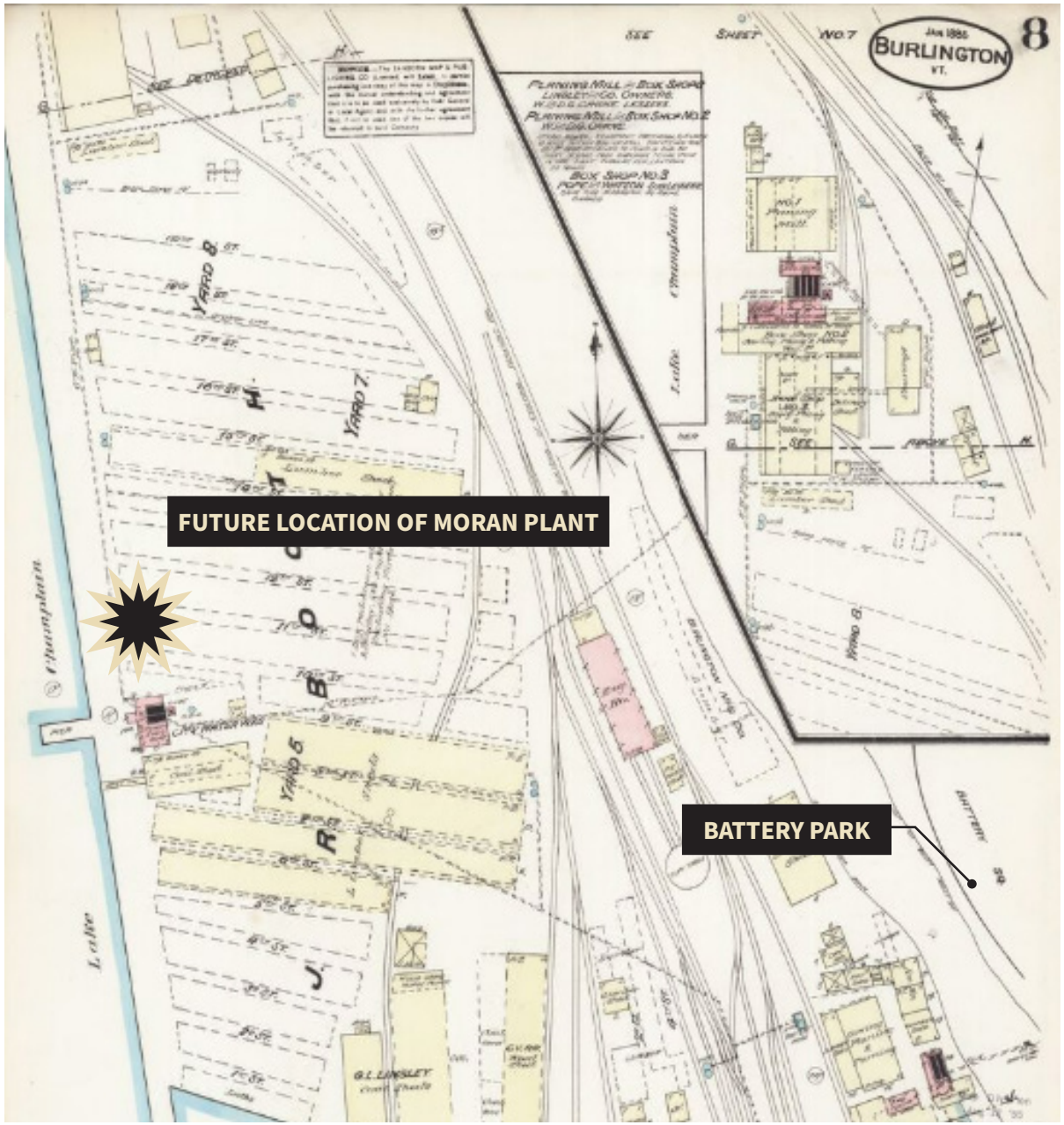


Figure 1.9: 1885 Sanborn Fire Insurance map depicting what is now Waterfront Park. Now a recreation destination, during the late 19th century this land would have been filled with towering piles of lumber, railroad tracks, sawmills, and other industrial buildings. Source: Sanborn Map Company.

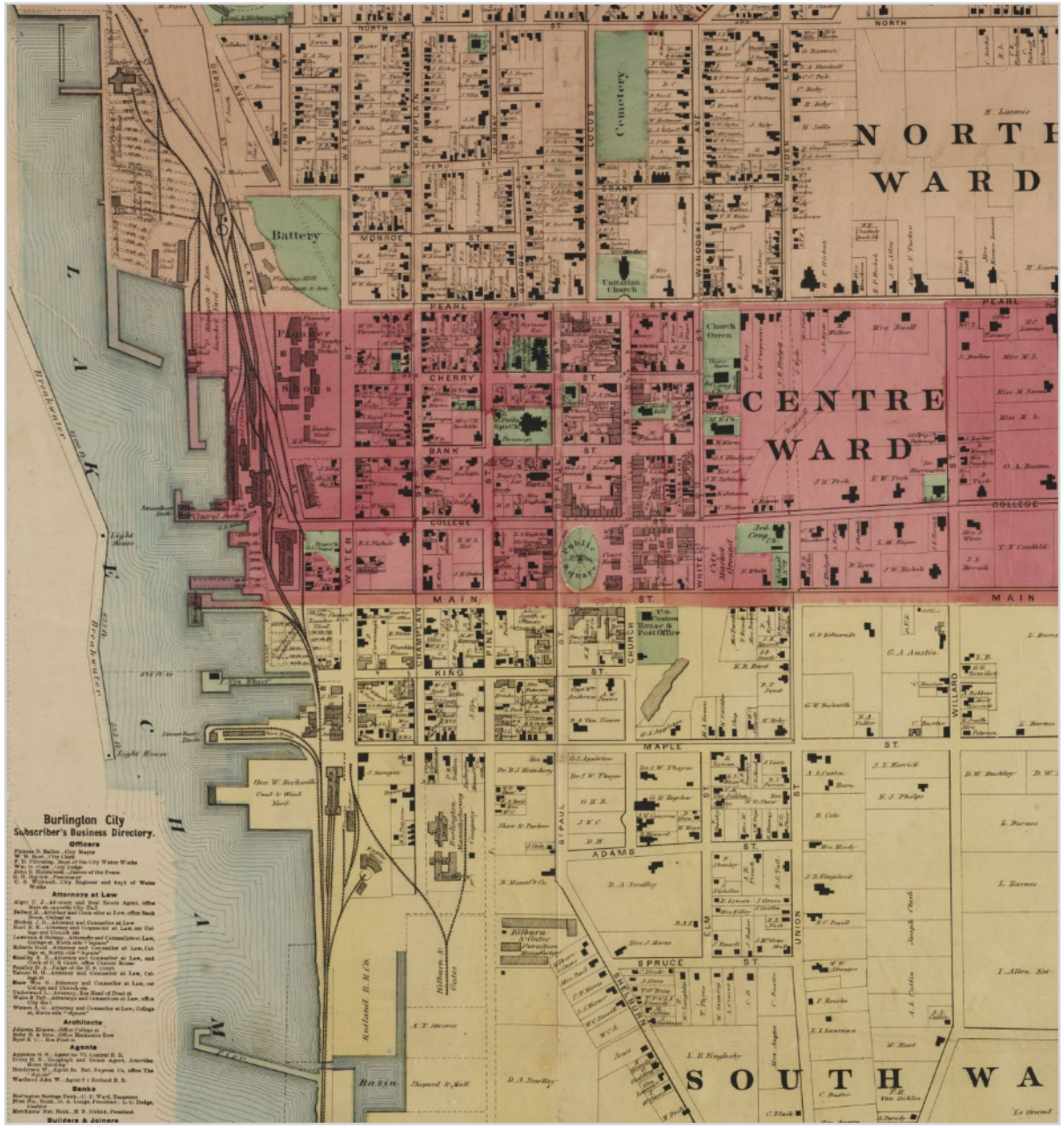


Figure 1.10: 1869 Beers map of Burlington showing the city's waterfront. The map depicts the vast network of waterfront railroad tracks, lumber piles, and basins. In this image present day Battery Street is labeled Water Street. Source: UVM Libraries Special Collections.

As railroad connections grew in importance, canals and boat traffic faded. Burlington, which lacked the rail connections of larger cities like Chicago, Buffalo, and Pittsburgh, saw its industrial base shrink as major manufacturing processes were diverted to these larger cities.

Waterfront Recreation

Lake Champlain's waters were a popular attraction, despite the unappealing industrial activity that occupied the shoreline of Burlington Bay. The wealthier citizens of Burlington and affluent summer residents spent their summers sailing upon Lake Champlain in impressive yachts, with the Lake Champlain Yacht Club serving as the hub of this activity in the Burlington area. During the winter months, people took to the lake to build ice fishing huts or go ice skating by the shoreline. The Burlington Carnival of Winter Sports, held in 1886 and 1887, hosted an array of winter activities on the frozen lake surface such as ice hockey, ice sailing, and skating. In the summer months, people spent their free time swimming in the lake, lounging on beaches, canoeing, or riding small pleasure boats and skiffs. By the late 19th century, a new tourism industry of steamship cruises emerged and remained wildly popular through the first decades of the 20th century.

Figure 1.11: The lake provided entertainment opportunities through ice skating and ice fishing. This photograph shows ice skating on Lake Champlain during the early 20th century. Source: Shelburne Museum.

Figure 1.12: Ice Fishing Huts on Lake Champlain near the Burlington Breakwater. The Moran Plant is visible in the upper right of the photograph, and oil tanks are visible in the left background. Source: Shelburne Museum.

Figure 1.13: The third Lake Champlain Yacht Club. This building was erected after fires destroyed the previous two clubhouses. Source: Champlain College Special Collections.

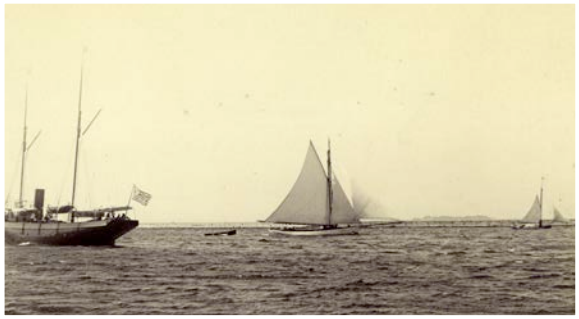


Figure 1.14: Yachts and sailboats plying the waters just beyond the Burlington breakwater circa 1895. The black yacht is the ELFRIEDA owned by Dr. W. Seward Webb. Source: Shelburne Museum.

Figure 1.15: Ice Yachting on Lake Champlain during Burlington's Winter Carnival in 1886. Though not as popular as summer yachting some Burlingtonians built ice yachts to traverse Lake Champlain during the winter. Source: UVM Libraries Special Collections.

Yachting on the Lake

Although canal boats and tugs were the most common vessels seen on Lake Champlain, the more visually impressive vessels were yachts. During the late 19th century, Burlington's wealthiest residents, along with a host of wealthy summer guests who occupied homes along the lakeshore in Malletts Bay, South Burlington, or Shelburne, had a passion for yachting and each summer these families spent their days cruising on the lake. Burlington's status as a yachting destination was further boosted in 1886 thanks to the writing of William Henry Harrison Murray, an American clergyman and author. Known as Adirondack Murray thanks to his effusive praise of the Adirondack Mountains, Murray was an avid yachter and in 1886 he penned an editorial in the *Boston Herald* promoting Burlington and Lake Champlain as a yachter's paradise. Murray highlighted all the different inland waterways a yachter could visit from Lake Champlain and the many vistas and views one could take in while cruising the lake.[13] He demonstrated the potential of Lake Champlain as a yachting destination by setting out on a grand voyage from Burlington in 1887. Murray's voyage took him up the Richelieu River, down the St. Lawrence River and out into the Atlantic. He then traveled down to the Gulf of Mexico, looped back up the Hudson River, the Champlain Canal, and back to Burlington, a 5,000-mile journey that avoided all the country's major eastern seaports.[14] His wildly successful voyage marked the birth of Burlington's yachting community.

In 1887, the Lake Champlain Yacht Club formed but because the club could not find space on the waterfront's dry land, the group's first two-story clubhouse was built close to shore on pilings in 1888.[15] The summer activities of the Lake Champlain Yacht Club were a highly visible part of high society in Burlington. During the summers, Burlington residents could watch power yachts and sailing vessels ply the waters, gliding between Juniper Island and the Four Brothers Islands. Summers were filled with regattas, fishing expeditions, and leisurely sailing cruises that allowed for the very public display of yachts. These summer residents made the Lake Champlain Yacht Club's clubhouse their private retreat and the club's membership peaked in 1922 with 334 members and hundreds of boats in the fleet. Although membership faded during World War II, the club experienced a resurgence in the postwar years and the yachting community remains active in Burlington. The current boathouse at the bottom of College Street was built in the 1980s on the same location as the Lake Champlain Yacht Club's previous clubhouses.

Destination North Beach

In the 1910s, there was a concerted effort to create a municipal bathing beach for city residents. With the University of Vermont growing along with nearby Fort Ethan Allen, residents of Chittenden County felt that Burlington needed to provide more recreation opportunities along Lake Champlain. Around this time, hundreds of people were already using the north shore, then owned by members of the Arthur family, for weekend swimming and bathing excursions.[16] In 1919, the city purchased the property, renaming it the Municipal Bathing Beach, though the name North Beach quickly superseded this more formal designation.[17] After coming under city management, North Beach became a major destination for summer relaxation. The city built a changing house, diving boards and floating docks, hired lifeguards and swim instructors, and erected a restaurant where beachgoers could purchase everything from ice cream and hotdogs to steaks.[18] In its first year of operation, North Beach was the site of one of the largest gatherings in Burlington's history when 20,000 city residents and visitors went to the beach to celebrate Independence Day and the return of Vermont's World War I veterans.[19] The celebration, which culminated in a fireworks display, included athletic games, a clam bake, and the appearance of a float plane that landed in the shallows near North Beach.

Figure 1.16: North Beach on July 4th in 1919. This photo was taken during an Independence Day celebration meant to honor Burlington's returning World War I veterans. Source: Fletcher Free Library.

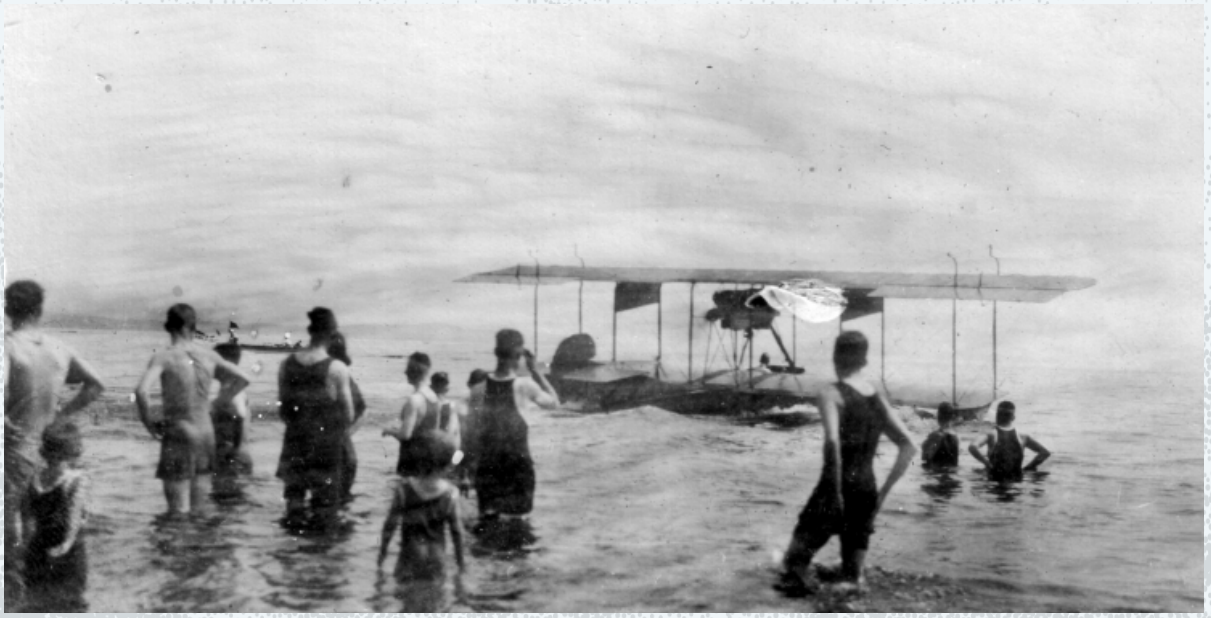


Figure 1.17: A seaplane at North Beach. This plane's arrival was also part of the July 4th festivities in 1919. Source: Fletcher Free Library.

Steamers and Pleasure Cruisers

Pleasure craft and lumber boats were not the only vessels sailing Lake Champlain during the 19th century. In addition to conveying logs, the water was an efficient vehicle to carry people and their merchandise between New York and Vermont and from Canada to the United States. The first steamship to ply Lake Champlain, the *Vermont*, launched from Burlington Bay in 1809, two years after Robert Fulton launched the *Clermont*, America's first steamship.[20] The Vermont had a twenty-horsepower engine and could move roughly five-miles an hour. Departing from St. Johns in Canada, it took a minimum of thirty-nine hours for the Vermont to reach Burlington. The *Vermont* sank in 1815 on the Richelieu River; however, the steamship age had only begun on Lake Champlain.

Not long after the *Vermont* sank, the Lake Champlain Steamboat Company built the steamship *Phoenix*. This vessel sailed between St. Johns, Québec (now Saint-Jean-sur-Richelieu) to Whitehall, New York with stops in between, including Burlington.[21] In the years before railroad travel became widespread in Vermont, steamships were the most efficient way to travel the State. In 1826, the Lake Champlain Transportation Company received its charter from the State of Vermont and began operating a ferry service between Rouses Point, New York and Whitehall, New York.[22] During the 19th century, this company operated a sizable fleet that included steamships such as the *Franklin*, the *Saranac*, the *Ethan Allen*, the *Vermont*, and the *Ticonderoga*. These vessels were docked at Shelburne Bay and provided an important transportation link for people on both sides of the lake. In addition to these steamships, in the late 19th century steam-powered tugboats were built. These tugs were used to pull log barges down from Canada. These same tugboats carried goods south through the Lake Champlain Canal and into New York City.

By the latter half of the 19th century, railroads displaced steamships as the primary mode of travel in America. With its business under threat, the Lake Champlain Transportation Company, the largest steamship company operating on the lake, pivoted and began to offer pleasure cruises to the lakeside tourists who came to Lake George and Lake Champlain each summer. To this end, the company built the *Chateaugay* in 1888, a two-hundred-foot iron hulled luxury steamship. The *Chateaugay* and its sister ships the Vermont and *Ticonderoga* were used to offer summer cruises that ran from Lake George to Montréal.[23] These lake cruises provided guests the chance to experience beautiful scenery and visit important historic sites such as Crown Point, New York, and Fort Ticonderoga. For Burlington residents, pleasure trips to New York City were offered and the advertisements for these trips highlighted the scenery and the comfortable nature of the boats and trains guests would take.[24] Although a journey to New York City by steamship and train took over a day to complete, these trips remained popular through the 19th century and pleasure cruises on Lake Champlain remained popular until the Great Depression. The economic downturn coupled with the widespread availability of automobiles shifted tourist dollars away from lake vessels like the *Ticonderoga* and *Chateaugay*.

Figure 1.18: The steamship *Ticonderoga*, the last side-paddle-wheel ship to travel Lake Champlain. Source: Shelburne Museum.

Lake tourism rebounded after the Great Depression, though never to the heyday of the late 19th century. Ferry companies continue to operate and primarily move people and automobiles between New York and Vermont. In Burlington, vessels like the Spirit of *Ethan Allen* continue to offer cruises up and down Lake Champlain, carrying on the rich tradition of lake tourism pioneered by the *Chateaugay* and its sister ships.

Figure 1.19: c.1940s photograph of the north end of the Waterfront. The first Burlington Electric Light Plant is at left. The future location of the Moran Plant is at the center of the image. Source: UVM Libraries Special Collections.

Twentieth Century Industrialization: From Lumber to Tank Farms

By the turn of the 20th century, Burlington's waterfront, particularly along Pine Street, remained an important site for the transportation and manufacturing of wood products, though lumber imports steadily fell through the 1910s and 1920s. Tracks and trains for the CVR and Rutland Railroad crisscrossed the waterfront and municipal services such as the city waterworks and the Burlington Electric Department's (BED) Electric Light Plant were located along the lakeshore. Although the waterfront's industrial heyday had passed, the lakeshore remained highly industrialized and would continue as such through the 1980s.

Oil Storage Industry

As Burlington's lumber industry faded, infrastructure related to railroads took over the lands that had been formerly occupied by lumber piles and mills. By the early 1930s a new industrial force - bulk petroleum storage - began to dictate the use of Burlington's waterfront. Starting with the Shell Oil Company, multiple large oil, kerosene, and gas companies shipped oil by barge and train to Burlington where it was stored in massive metal tanks. In 1938, tankers and barges belonging to five different firms offloaded twenty-five million gallons of oil at Burlington and additional oil was shipped to Burlington along the railroads.[25] The oil stored on Burlington's lakeshore was distributed during the winter months across the northeast with significant portions of the collection pumped into tanker trucks and sent out to fuel homes in Vermont and New York State.[26] This process continued until the 1990s when it became more cost efficient to ship fuel oil and other petroleum products by truck or rail freight. At the peak of the oil industry in Burlington, 83 oil tanks lined the Burlington waterfront from the edge of Oakledge Park to Texaco Beach just south of North Beach.

The oil storage industry and its tank farms created jobs in the community, although not nearly at the scale of the earlier lumber industry. The tank farms also generated controversy and consternation within the community. Some Burlington residents were fearful of what would happen if the tanks ruptured or exploded.[27] One of the tank farms was built near the Burlington Waterworks, just south of the Moran Plant, and locals were particularly concerned about the prospect of a catastrophic explosion damaging or destroying the waterworks.[28] Despite these reservations, the construction of more tank farms was permitted during the 1930s and 1940s and the oil companies became some of the city's most important taxpayers.

Turning the Tide

As the decades advanced and Americans became more aware of the impact of pollution, residents of Burlington and the nearby lakefront towns became more resistant to the expansion of tank farms. This resistance hardened in the 1960s and 1970s following a series of well-publicized oil spills along the lakeshore. Between 1964 and 1971, there were eleven significant oil discharges into Burlington and Shelburne harbors, the largest of which occurred in 1967 when 14,500 gallons of jet fuel leaked from the Northern Oil Company's tanks near Oakledge Park.[29]

In large part due to the spills and the unattractive sight of the tank farms, Burlington residents began to cry out for changes to the waterfront. Beginning the mid-1960s, there was a burgeoning grassroots effort to draw attention to the potential revitalization of the Burlington waterfront. Guided historical

Figure 1.20: Aerial imagery from 1962 showing the Burlington lakeshore. The Moran Plant and its coal piles (shaded red) are located at the center of the frame while oil takes are visible north and south of the power plant. The future Waterfront Park (dotted red line) is occupied by a mix of railyards and tanks. Source: Vermont Center for Geographic Information.

walking tours of the waterfront were led by the Chittenden County Historical Society in 1965 during Burlington's centennial celebration of its establishment as a city. A 1969 quote from *Chittenden Magazine* summed up public sentiment on the state of Burlington's waterfront and the changes residents wanted to see:

> **Somewhere, underneath all the ugly oil tanks and old buildings, behind the spreading junk car lot, there is a beautiful lakefront. But Burlington just hasn't given it any chance to bloom, and instead has turned its greatest asset into an eyesore, darkening the face of nature in a shortsighted and insulting way... If Burlington's lakefront is ever to offer beauty and peace to the eye and ear of her citizens, the City government must lead the way.**

The vision of a beautiful Burlington waterfront would not be realized for decades, and it would take significant efforts from multiple mayors, city councils, and private citizens to clean up the waterfront. In 1969, people avoided the waterfront, which was dominated by trash heaps, abandoned railroad cars, derelict buildings, and junkyards. Meanwhile, the daily release of smoke and coal dust from the Moran Plant

Figure 1.21: 1979 photograph of the waterfront looking north, with railroad tracks, industrial buildings, and oil tanks still dominating the land. Lake Street would eventually be built at right. Source: UVM Libraries Special Collections.

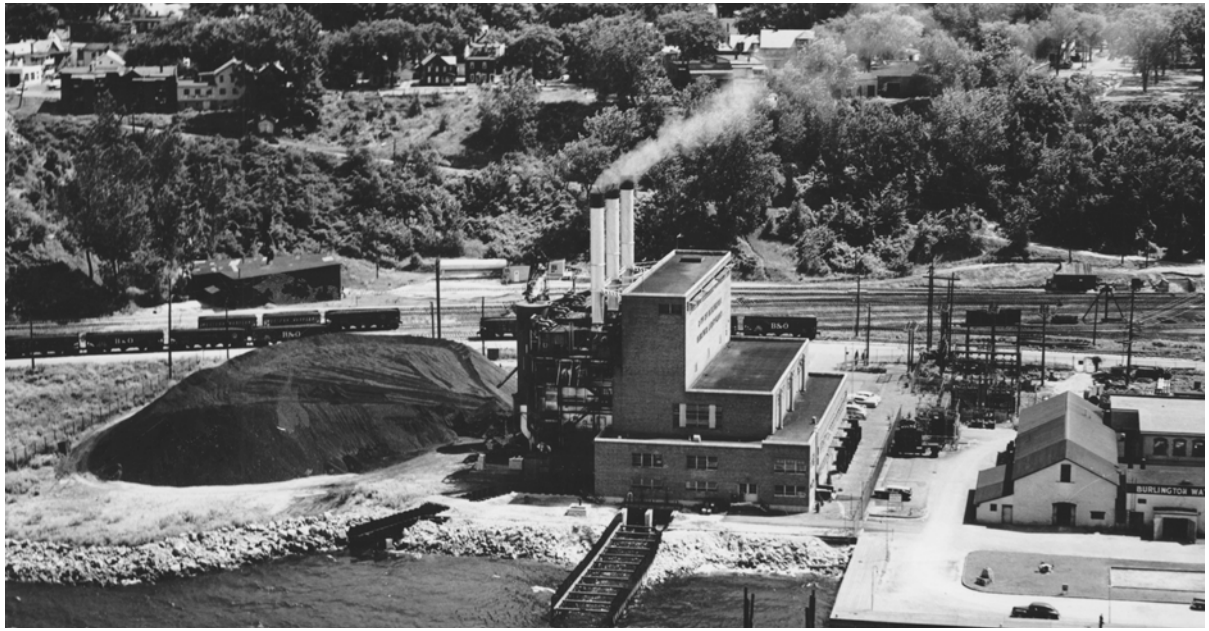


Figure 1.22: Photograph from 1957 showing the Moran Plant. A massive coal pile sits to the left of the plant which released hundreds of pounds of soot and smoke daily. Source: Shelburne Museum.

fouled the surrounding neighborhoods. On top of this, much of the soil had been contaminated by oil spills, coal, and heavy metals. With environmental laws growing increasingly strict, particularly in an environmentally conscious state like Vermont, the revitalization of Burlington's waterfront was made harder as regulations limited land use opportunities along the Lake Champlain shoreline. It would not be until the 1980s that real, measurable changes began to occur on the Burlington waterfront.

The Struggle for a Vision of the Waterfront

While residents voiced their anger about the proposed expansion of tank farms, city leaders and private citizens debated publicly and privately how best to utilize the waterfront. During the late 1960s, 1970s, and early 1980s, developers and planners produced several ambitious revitalization schemes that ran the gamut from the construction of a waterfront highway to the erection of eighteen-story condominiums along the lakeshore. At one point, a proposal was put forward to build a nuclear power plant in Burlington, though this was quickly shot down by unenthusiastic citizens.

One of the biggest problems for each of these proposed developments was obtaining ownership of land along the waterfront. The CVR owned thirty-six acres of prime waterfront

land, most of which they leased to the bulk petroleum facilities that dominated the waterfront. The CVR had acquired much of this land by expanding their track network during the 19th century and in some locations, there were up to twelve rows of railroad tracks, effectively barring land development. The CVR's leases were initially profitable for the railway, which allowed most of its waterfront land to sit vacant. By the mid-1980s, however, Burlington's role as a bulk petroleum storage center was waning. This, coupled with the urgent desire to redevelop the waterfront, led the CVR to engage with the city government, then led by Mayor Bernard Sanders and the Alden Development Corporation led by Paul Flinn.

Figure 1.23: Piles of trash and metal scrap along the waterfront from 1979. Source: UVM Libraries Special Colletions.

In 1983, the Alden Development Corporation purchased twelve acres of waterfront land between the Moran Plant and King Street Ferry from the CVR.[30] The development corporation consisted of a group of investors who wanted to create a large-scale waterfront development in Burlington. The group called for the creation of a public park, restaurants, marina, retail stores, a museum, hotel, and condominiums.[31] Initially, hopes were high to fund the project with a mix of private financing and federal grants; however, Burlington did not meet the economic thresholds necessary to qualify for a federal Urban Development Action Grant. The grants were awarded on a point system with 70% of points awarded based on a city's economic distressed and the remaining 30% awarded based on the merits of the project. Because of Burlington's relative prosperity when compared to other grant applicants, the city's application was rejected. As a result, in 1985 it became necessary to go directly to local voters and pursue a six-million-dollar bond to finance the project.[32]

The Alden Development Corporation and the Sanders administration faced significant opposition to their proposed waterfront development. Local Republicans and Democrats voiced concerns about how the project would impact school and property taxes, while environmentalists argued that more of the land should be left to nature or redeveloped as public parkland. On top of this, city officials discovered an obscure law which had the potential to significantly impact the project: the Public Land Doctrine. This legal principle, that had its origins in the legal codes of the Byzantine Empire, is part of American common law and recognizes the public right to access natural resources including the air, running water, the sea, and its shore.[33] The CVR's railroad facilities were built on fill that had been created when the lakeshore was extended. Because the CVR was no longer actively using this property, some in Burlington wanted to use the Public Land Doctrine to revert the CVR lands to the State of Vermont, which could hold the property in a public trust.[34] Once

controlled by the state, this land could only be utilized for the public good and many wanted to convert the abandoned rail yards and petroleum tank lots to publicly accessible green space.

Debates raged back and forth throughout 1985 but when the votes were finally tallied on December 10th, 1985, the 6 million-dollar bond for private development of the waterfront failed to achieve the 2/3 majority it needed to pass owing to fears that the bond would result in higher property and school taxes.[35] The bond's failure was a major defeat for the Sanders administration and saw the exit of the Alden Development Corporation.

Following this loss, the city changed course and partnered with the State of Vermont to pursue a suit in the Vermont Supreme Court against CVR to reclaim the filled lands of the waterfront for public use.[36] The success or failure of the suit carried far reaching consequences; with the Alden Development Corporation gone, CVR had put forward its own $170 million redevelopment plan, which called for large scale commercial and residential development along the lakeshore property owned by the railroad company. In 1989, the Vermont Supreme Court heard arguments from representatives of the state and CVR and when the judges retired to deliberate, they held the future of Burlington's waterfront in their hands. Ultimately, the Vermont Supreme Court concluded that the CVR only held title to its lakeshore property so long as it utilized the property for railroad

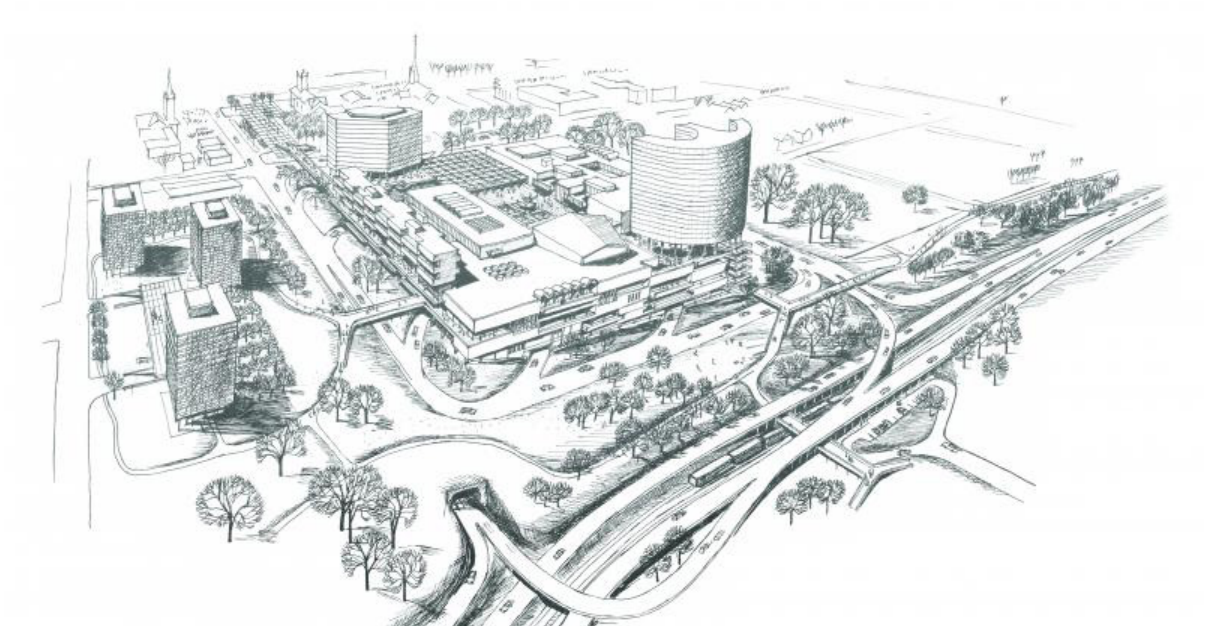


Figure 1.24: Rendering of a segment of the proposed 1964 lakeside highway. Source: Vermont Agency of Transportation.

business.[37] The decision was a major blow to the CVR and a game changing victory for advocates of a publicly accessible waterfront. Based on the court's ruling, none of the CVR's plans could move forward. Additionally, after the Supreme Court ruling, the city was able to acquire waterfront lands from the CVR.[38] Although the city took on the responsibility of cleaning up the former railroad property, Burlington residents finally had control of their waterfront and its use.

Public Space and City Asset

After the Vermont Supreme Court's ruling in 1989, the State of Vermont controlled the Burlington waterfront, which was held in a public trust. As a result, the Vermont General Assembly had the power to determine appropriate public use of the city's lakeshore.[39] On the directive of the Vermont Supreme Court, the General Assembly reserved use of the lakeshore for "indoor or outdoor parks and recreation uses and facilities including parks and open space, marinas open to the public on a non-discriminatory basis, water-dependent uses, boating, and related services."[40] The filled lands of the waterfront were to be transformed forever, with a focus on public access and enjoyment. During this time, removal of the now emptied bulk petroleum storage tanks began leaving behind acres of prime, but contaminated, waterfront.

Park development on the Burlington waterfront began in 1988 with the construction of the

Figure 1.25: An artist rendering of a proposed redevelopment for the Waterfront. This scheme retained certain elements such as the Community Boat House that exists today. The overall plan showed a greater emphasis on residential development. The Moran Plant is visible to the lower left. Source: Burlington Community & Economic Development Office.

Community Boathouse, which was designed by famed Burlington architect Marcel Beaudin to resemble the former Lake Champlain Yacht Club Clubhouse. The Community Boathouse offered sail and rowboat rentals, as well as docking for pleasure craft. In 1990, the city began to develop Waterfront Park, which encompassed the land between the (future) ECHO Lake Aquarium and Science Center at the bottom of College Street and the (future) Coast Guard Station to the north. The 8.5-acre park was financed through a 2 million-dollar bond and opened to the public in 1991. That same year, railroad spikes taken during the removal of the railroad tracks were presented to citizens who were involved in the fight for city ownership of the waterfront.[41]

The spikes were engraved with the words:

THE PEOPLE BUY THE WATERFRONT
OCTOBER 15, 1991

While the city worked to develop Waterfront Park, lawyers and appraisers representing the city and CVR worked to determine the value of the waterfront land north of the Moran Plant, known as the Urban Reserve. Initially, the city estimated the property as having a value of $1.2 million while the railway felt the land should be valued at $10.6 million; ultimately the appraisers sided with the city's lower estimate.[42] The city agreed to purchase the land and in 1993, Vermont Governor Howard Dean gave the city $1.3 million to help pay for the Urban Reserve. With the purchase of the Urban Reserve, the City of Burlington had access to another significant parcel of developable waterfront stretching from the Community Sailing Center to North Beach. Rather than immediately develop this land, city officials opted to allow future generations to decide the land's usage. As a result, in subsequent years, large portions of the parcel have been allowed to return to nature. A dog park was built in this area, and a portion of the Burlington Bike Path was realigned through the Urban Reserve in 2015.The bike path, one of Burlington's most popular attractions is a 7.9-mile asphalt travel way that stretches from Oakledge Park

Figure 1.26: Waterfront Park under construction in 1991. The Community Boathouse is center right. Source: UVM Libraries Special Collections.

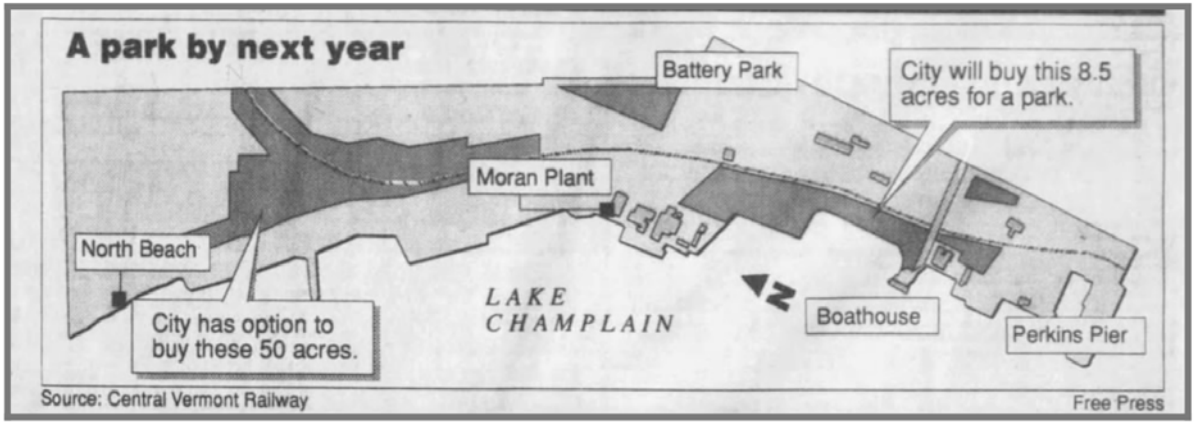


Figure 1.27: Map of the city's proposal for Waterfront Park in 1990. Source: *Burlington Free Press.*

to the Colchester Causeway. To deal with the contamination left behind by over one hundred years of heavy industrial use, the city laid new topsoil over the contaminated earth. The topsoil separates the petroleum hydrocarbons in the soils and people and animals using the site. It allows for the compounds to naturally break down over time, aided by plants growing in the soils. Today, the Urban Reserve is a popular recreation area for residents and tourists alike.

During the early 21 century, some of the city's most popular waterfront attractions were opened. In 2003, ECHO at the Leahy Center for Lake Champlain opened. Formerly the Lake Champlain Basin Science Center, ECHO is an aquarium and education center dedicated to teaching people about Lake Champlain and the natural environment. The ECHO Center occupies the former Naval Reserve building which was demolished in 2001 to build the new museum. In 2015, the city opened the Andy "A_Dog" Williams Skate Park in an area formerly used for coal and scrap metal storage that was designated as an Interim Development Area, a key reason why so many efforts at reuse of the Moran Plant and its surrounds were attempted. The park, part of a $9.1 million waterfront improvement project, was instantly a hit with bikers, roller-skaters, and skateboarders. And in 2018, the new building for the Community Sailing Center was constructed just north of the skate park, furthering the vibrancy of this area.

Figure 1.28: The Moran FRAME in Spring 2022. This photo highlights the merging of industry and recreation on Burlington's waterfront. Source: Kaitlin O'Shea, VHB.

02

Early Electric Generation

Figure 2.1: Night lights at the 1901 Pan-American Exposition in Buffalo, New York. Source: Unversity of Buffalo.

Early Electric Generation

Electric Generation in the Late Nineteenth Century

From the time of Benjamin Franklin, Americans have experimented with electricity. During the late 19th century, inventors and businesspeople achieved a more sophisticated understanding of electricity and electrical generation, which culminated in the creation of massive power plants and modern electrical distribution systems. During the 1860s, European inventors developed dynamos capable of generating a reliable electrical current and powering machinery. These dynamos, driven by steam engines powered by burning coalcreated new opportunities for factory owners and after Charles Brush invented the carbon arc lamp in 1877, municipalities, eager to display their modernity, sought to illuminate their streets with electric lighting.

At the Chicago World's Columbian Exposition in 1893, the capabilities and opportunities of electricity were put on display for a mass audience for the first time. Luminaries such as Thomas Edison, George Westinghouse, and Nikola Tesla dazzled fairgoers with inventions and electrical gadgets. At night, Westinghouse lamps lit the fairgrounds and the striking image of the Exposition buildings lit up remained a salient memory for many fairgoers.

In western New York, hydroelectric power generated at Niagara Falls had been distributed to nearby Buffalo since 1896, and the power generated at the falls became the centerpiece of Buffalo's Pan-American Exposition in 1901.[43] Electric lighting, powered by the waterfall, was utilized to illuminate the exhibition grounds after dark in a display which dazzled attendees much as it had eight years prior in Chicago.

Events like the World's Columbian Exposition in Chicago and the Pan-American Exposition in Buffalo can be used to characterize America's early interaction with widely available electric power. Experiencing electricity for the first time, many were awed by its transformational promise. However, some Americans felt anxieties about power generation and worried about its potential to injure or kill. As the technology for generating electricity became more sophisticated, capitalists enlisted architects to dress their generating plants with a veneer of respectability and assuage the anxiety some Americans felt about electricity.

Figure 2.2: Adams Generating Station in Niagara Falls, New York. Source: Library of Congress.

Figure 2.3: The powerhouse of the Vergennes Hydroelectric Project on the Otter Creek, another early 20th century hydroelectric facility that expresses a more vernacular example of the classicism seen in the Adam's Generating Station. Source: Shelburne Museum.

To convey that electricity was modern, safe, and the cornerstone of a rapidly changing society, architects utilized monumental Classical architecture when designing late 19th and early 20th century power plants.[44] Many Americans associated Classical forms with permanence, and it was the preferred design mode for banks and civic buildings. Utilizing these forms for their power plants, architects made a statement about the importance of electricity and its place in the modern world. As a result, massive electric generation stations like the Glenwood Power Plant in New York City and the Adams Generating Station at Niagara Falls were built in the early 20th century. These plants utilized heavy stone, brick, and massive lightwells to convey power, creating almost a cathedral of the modern, of the electrical power that would run the machines and lights of America's cities.

Figure 2.4: The Winter Carnival's main sled raceway along Main Street, 1886. Source: UVM Libraries Special Collections.

Figure 2.5: Advertisement for the Winter Carnival.
Source: UVM Libraries Special Collections.

Electricity Comes to Burlington

Much like the World's Columbian Exposition and the Pan-American Exposition, Burlington's first public foray into electrical power generation came in the form of a major public event, the 1886 Winter Carnival. Organized by the Burlington Coasting Club, the Winter Carnival was modeled off Montréal's Winter Carnival and celebrated winter sports such as sledding, ice skating (called fancy skating), hockey, and skiing.[45] During the weeklong event, attendees skated on Lake Champlain, skied through the city, and raced down Main Street in traverses (sleds) that could travel upwards of 80 mph. These speeds were enhanced by the Coasting club, which iced Main Street and built an elevated platform near the University Green to help riders pick up speed as they hurtled towards Lake Champlain.[46] At night, a mix of torchlight and electrical lamps lit the Winter Carnival, and the effect of these lamps left a major impression on carnival goers. Speaking of the event the *Burlington Free Press* wrote:

> **On the lake, the electric lights made the scene seem like a vast fantasy under a flood of the brightest moonlight, while the fireworks dotted the air like sparks from a titanic fireplace. The whole city was also brilliantly illuminated, the electric lights having been extended on all the principal streets. Main Street, as on the previous evening, blazed from the College campus to the lake with a double line of fire, while the brilliantly lighted and decorated arches looked from a distance like palaces of flame.[47]**

Burlington's Winter Carnival was only held in 1886 and 1887. The Montreal Winter Carnival, which had been canceled in 1886 due to a smallpox epidemic, returned in 1887 and drew away many carnival goers. Further, the Burlington Coasting Club membership quickly declined after 1887 as the coasting fad faded away. Nonetheless, Burlington's Winter Carnival proved to be a pivotal local showcase for electricity. Throughout the event, downtown Burlington was illuminated on a scale never before seen and the dazzle of electric lighting sparked a desire to see Burlington's streets lit permanently.

A year before the Winter Carnival, the Brush Swan Electric Light and Power Corporation established a hydroelectric plant on the Winooski River near the falls. Although the plant's owners faced some difficulties in getting the facility up and running, by 1886 they were prepared to commence generation and sought a contract with the City of Burlington to provide municipal electric lighting under the following conditions:

> This company has already placed before the Board of Aldermen a proposition to light the city, furnishing twenty times as much light as at present, putting up all the necessary fixtures at no cost to the city, and running the lights till midnight, at $5000 a year or about $650 less than it would cost to burn gas and naphtha the same number of hours.[48]

The Brush Swan Corporation signed a contract to provide electrical lighting to downtown Burlington on June 21, 1886, four months after the Winter Carnival's conclusion. It initially provided lights to an area bound by Pearl Street, Winooski Avenue, and King Street.[49] These streets were lit by arc lamps making Burlington the first community in Vermont where streets were lit by electric lamps.[50] The arc lamp was the first widely used electric streetlight; in operation, the arc lamp passed a current through carbon rods and as the electricity jumped between these rods, it produced a bright light suitable for illuminated outdoor spaces. The city's electric arc lamps initially caused consternation as many were placed at street corners and hung low, resulting in livery drivers being blinded by the intense light cast by the lamps.

The Brush Swan Corporation was bought out by the Burlington Gaslight Company, which moved the powerplant equipment to the waterfront where they had already established a gasworks at the corner of Battery and Bank streets. The Burlington Gaslight Company, which

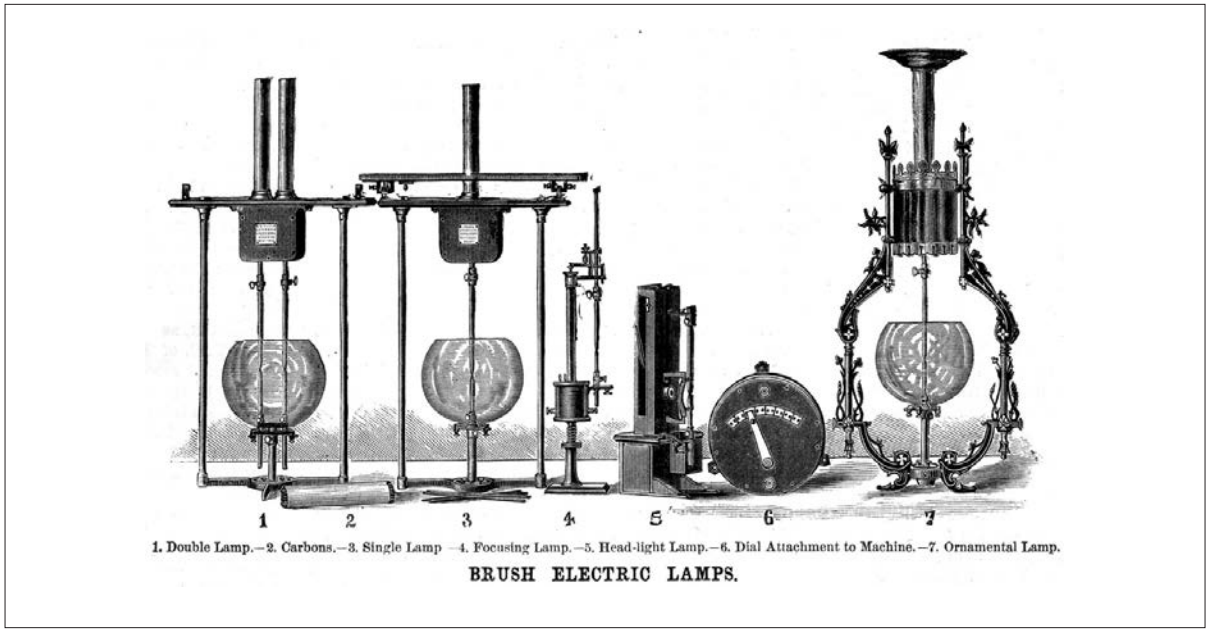


Figure 2.6: Examples of electric lamps and electrical equipment produced by the Brush Electrical Company in 1881. Source: Scientific American.

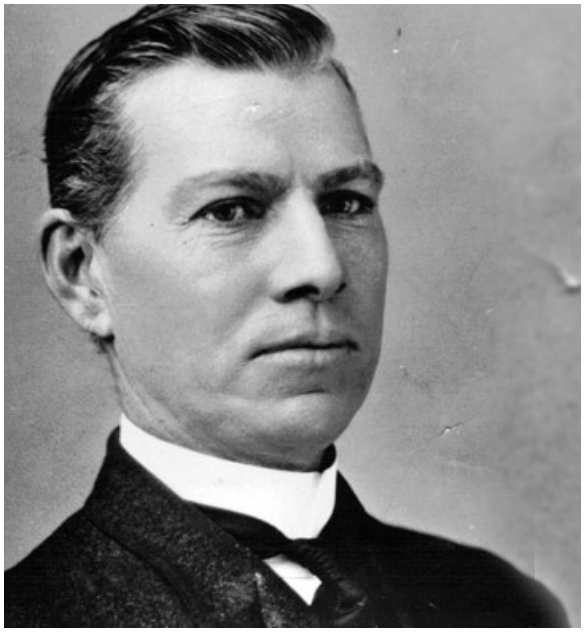


Figure 2.7: Mayor James Edmund Burke. Source: Burlington Electric Department.

had provided the city with coal gas lighting since 1853, saw electricity as secondary to its coal gas lighting business.[51] The Burlington Gaslight Company's leaders quickly lost faith in the future of coal gas lighting. During the 1890s, the company purchased several small generating stations along the Winooski River and merged these concerns into a new entity known as the Consolidated Electric Company.[52]

In 1890, another electrical utility, the Vermont Electric Company, organized under the leadership of Dr. Walter S. Vincent and E.D. Blackwell, and developed a hydroelectric facility on the Winooski River at the Winooski Gorge with the construction of a concrete dam and powerhouse.[53] The Vermont Electric Company soon had a contract to provide hydroelectric power to the Consolidated Energy Company, which continued to operate Burlington's streetlights.[54] The Vermont Electric Company also provided power for Burlington's streetcar system, private homes, and industrial works.[55] The firm provided electrical power in Burlington until 1902, when the American Gas Company of Philadelphia, Pennsylvania purchased the company and its works on the Winooski River.[56]

Until 1902, the electrical utility companies operating in Burlington were for-profit stock corporations that sought to make a profit generating electricity for the municipalities of Burlington, Winooski, and Colchester, as well as for private interests like the textile mills on the Winooski River. These corporations had all been local until the American Gas Company purchased the dam and electrical works of the Vermont Electric Company, which marked the first instance where a major outside corporation controlled electrical utilities in Burlington.

Electricity for the People

In 1902, under the leadership of Burlington mayor Donly C. Hawley, the city wrote a bill to the Vermont General Assembly to authorize the creation of a municipally run lighting plant.[57] The decision to build a municipal light plant immediately concerned the American Gas Company's leadership, who did not want to lose the lucrative municipal lighting contract with Burlington.[58] Conversely, the city's leaders believed that by building their own lighting plant, they could provide significant savings to local taxpayers.

In 1903, newly elected Burlington mayor James Edmund Burke took advantage of the enabling law pushed by his predecessor and began to seriously explore the feasibility of building a municipal light plant. A progressive who took a stand against big business, Burke's time as Burlington mayor was marked by increased supervision of the police force, anticorruption programs, and efforts to improve the standard of living in Burlington. Burke worked with UVM Professor W.H. Freedman to assess how much a plant would cost and after careful calculation, Freedman concluded that a light plant could be built for approximately $56,000.[59] Further, Freedman's report indicated that the city could provide municipal lighting for free by selling electricity to private homes, thereby providing significant savings to local taxpayers. Burke immediately issued municipal bonds for the plant's construction and between 1903 and 1905 the Burlington Electric Light Plant was constructed on a waterfront lot near the city's municipal water works. The steam powered plant had coal fired boilers to run the generators and came online during the spring of 1905 under the management of the newly created Burlington Electric Department (BED).

The Burlington Electric Light Plant and BED immediately faced significant external pressures brought by the Burlington Gas and Light Company, a local subsidiary of the American Gas Company that sought to usurp the municipal power plant and take over electric light generation on the city streets and private homes. This pressure came to a head in 1910 during a debate about providing further bonded funds to BED for the purchase of new electrical generating equipment. The city's demand for electricity outstripped the plant's ability to provide it and BED found itself constantly playing catch up and purchasing machinery to generate power for the city. Between 1905 and 1910, $150,000 in bonds were required to purchase new equipment to expand the plant's capacity. In 1910 alone, BED needed to purchase around $30,000 of new equipment and while the purchase was debated, the Burlington Gas and Light Company approached the city, offering to take over municipal lighting services. The Burlington Gas and Light Company proposed a contract that would have initially saved residents approximately $10,000 per

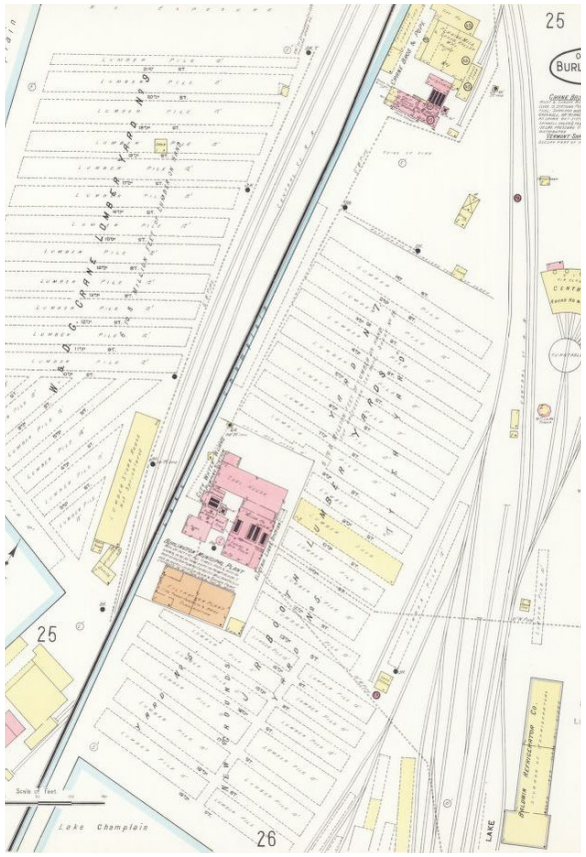


Figure 2.8: Map of the Burlington Electric Light Plant and the Municipal Waterworks in 1912. During this time both buildings were surrounded by the Booth Lumber Yard. Source: Sanborn Map Company.

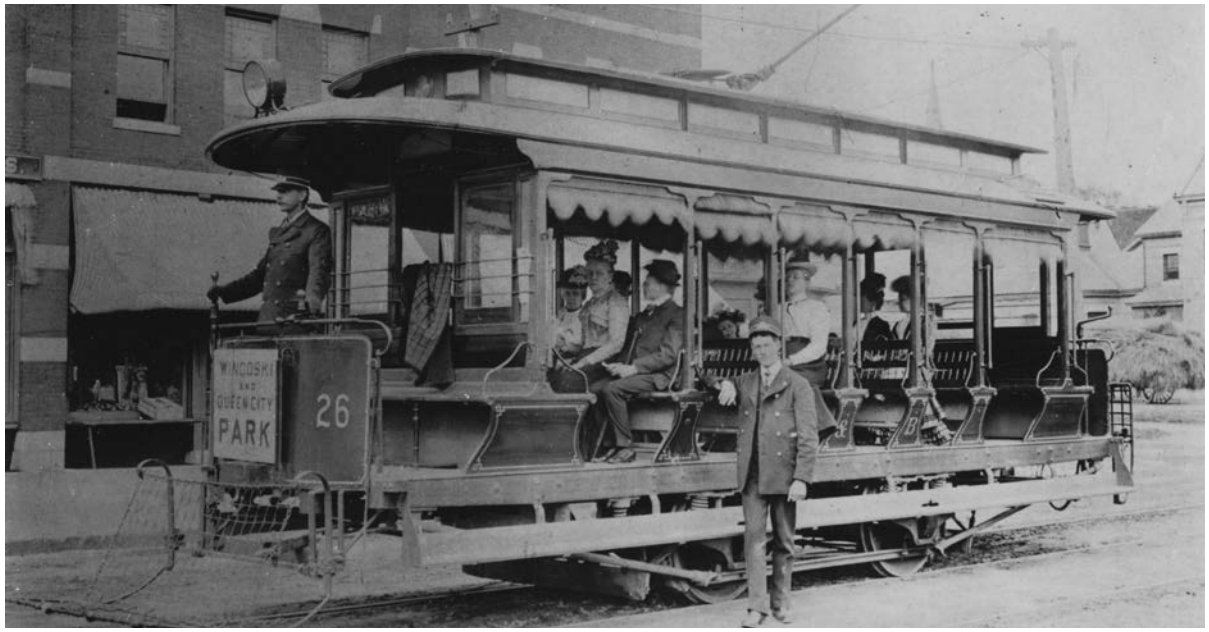


Figure 2.9: Electric streetcar for the Burlington Traction Company, c. 1904. Source: Shelburne Museum.

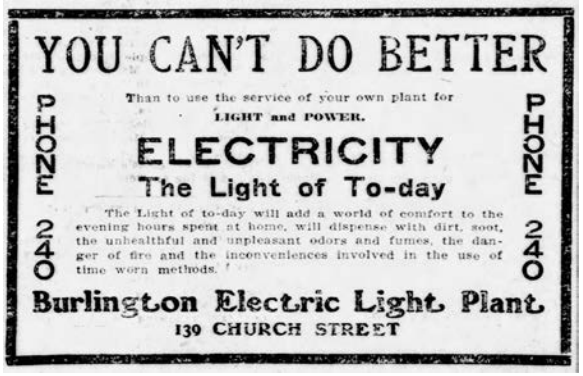


Figure 2.10: 1907 advertisement for the Burlington Electric Light Plant, promoting electric lighting for the home. Source: *Burlington Free Press.*

year on electricity expenses; however, the City Aldermen rejected the proposal, fearing that the company wanted to run the city plant out of business and establish a utilities monopoly.[60] Immediately after this, the Burlington Gas and Light Company laid an injunction against the city, temporarily keeping them from purchasing a much-needed new steam turbine. It was not until 1912 that BED was able to acquire the Westinghouse Turbine it needed to reliably meet the city's growing demand for electricity. Once the necessary equipment had been installed, BED became the primary supplier of electricity in Burlington, providing electrical current to nearly 350 streetlights and over 1,500 buildings.[61]

In 1914, the city also began supplying power to the Burlington Traction Company, which provided streetcar service to Burlington, Winooski, and Essex Junction. By 1920, most newly built houses in Burlington and Winooski were wired for electricity while older buildings were retrofitted for electric lighting.[62] Additionally, businesspeople started to promote appliances and electrical household gadgets such as irons, vacuum cleaners, and incandescent lights.

America's entry into World War I in 1917 and the wartime coal scarcity led to major changes at the Burlington Electric Light Plant. With coal prices skyrocketing, BED formed a cooperative agreement with the Public Electric Light Company (PELCO) of St. Albans. PELCO had hydroelectric generating stations in Fairfax and Milton, Vermont, on the Lamoille River and were able to supply electrical current to BED at inexpensive wholesale rates.[64] This arrangement allowed BED to meet Burlington's electricity demands and survive World War I and the Great Depression. As a result of the arrangement with PELCO, Burlington's municipal plant sat dormant for long stretches of time however during instances of low water the plant was brought back online until the hydroelectric plants were capable of generating electricity again.

Figure 2.11: Church Street in the 1910s when power lines dominated the skyline. Courtesy Penobscot Marine Museum, PPM Image ID LB2007.1.10090.

Powering the Home

Once BED established itself as the primary supplier of electricity in Burlington, the city's residents started to embrace electrical lighting within their homes as well as electrical appliances. During the 1920s, newspapers like the *Burlington Free Press* started to advertise gadgets such as the electric washing machine, electric iron, or vacuum cleaner, revolutionary devices that replaced manual labor with the mechanical labor of an electric motor. Prior to the invention of these devices, these machines we now take for granted required a significant investment of labor. Ironing clothes required one to heat an iron on a stove, pressing the hot metal against clothing; washing similarly required hand scrubbing in buckets of hot soapy water heated on a stove. Another major innovation came with the development of the electric refrigerator. Prior to the widespread availability of electricity, refrigerators had relied on ice and insulation to keep food cool. Although functional, these early refrigerators required fresh ice on a regular basis. Starting in the 1910s with luxury electric refrigerators, electric refrigeration became more commonplace during the 1920s. Advertisements for the new electric refrigerators marveled at the machines which self-regulated their temperature without the intervention of ice, saving consumers a significant amount of money.

Figure 2.12: 1918 advertisement for the Electric Iron.
Source: *Burlington Free Press.*

Figure 2.13: Nighttime on Main Street in Burlington, looking west, c. 1910s. City Hall Park is at right. Source: Burlington Electric Department.

03

Development of the Moran Plant

Development of the Moran Plant

By the 1940s, the Burlington Electric Light Plant had started to show its age. Much needed maintenance had been deferred for years as the sizable profits realized by BED were plowed back into the city treasury and used for other projects and programs.[65] Additionally, the amount of electricity needed by city residents and businesses continued to grow, placing stress on the plant.[66] Wartime coal shortages and severe droughts put a strain on BED and the Burlington Electric Light Plant's ability to create enough power for the city. Additionally, in 1944 the city ended its cooperative relationship with PELCO, meaning the old light plant had to generate an even greater portion of the city's power. In 1948, the State of Vermont experienced a drought that impacted hydroelectric facilities on the Lamoille River. Simultaneously, Green Mountain Power, which supplied fuel oil to multiple power plants including the Burlington Electric Light Plant, found its oil reserves nearly tapped. This oil shortfall forced a month-long shutdown of Burlington's generating plant.[67] With local hydroelectric power unavailable and oil in short supply, Burlington experienced a series of blackouts in January and February of 1948. As the situation grew more desperate, the BED asked Burlington residents to conserve electricity by unplugging appliances that were not in use, even suggesting hot water heaters be unplugged during daytime hours.[68] The blackouts, coupled with the end of the cooperative agreement with PELCO, convinced Burlington's leadership to build a new self-sufficient electrical generating station along the city's waterfront.[69]


POWER LACK HITS STATE
INDUSTRY LAYOFFS LOOM

Figure 3.1: Headline from October 18, 1947, in the *Burlington Daily News*. The State of Vermont's power shortfall led to major power suppliers asking their industrial clients to curtail activity during the fall and winter of 1947-48 as power plants struggled to keep pace with demand. Source: *Burlington Free Press.*

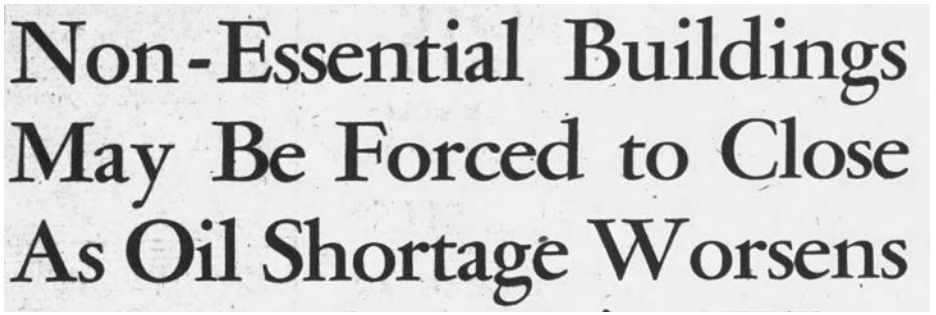

Non-Essential Buildings
May Be Forced to Close
As Oil Shortage Worsens

Figure 3.2: Headline from the February 5, 1948, edition of the *Rutland Daily Herald*, as the oil and power crisis in Vermont deepened. Source: *Burlington Free Press.*

Figure 3.3: Mayor John Edward Moran Source: *Burlington Free Press.*

Burlington's decision to build a new plant occurred against the backdrop of widespread concerns about power generation in Vermont. The drought of 1948 exposed the weaknesses of the state's hydroelectric plants, many of which functioned below capacity during the winter already. Statewide, Vermont's leaders recognized that upgrades to generating plants were needed to keep electricity flowing in a stable, reliable manner. To achieve greater stability in the state's power generation, some Vermonters promoted the use of diesel generators, suggesting the shore of Lake Champlain be lined with powerplants while others suggested that larger dams, capable of impounding more water, be built.[70] Ultimately, Green Mountain Power built a series of new hydroelectric facilities such as the Peterson Hydroelectric Station in Milton and upgraded older facilities such as the Silver Lake Hydroelectric Project in the towns of Salisbury, Leicester, and Goshen, Vermont. The development and improvement of these plants, coupled with the construction of the Vermont Yankee Nuclear Power Plant in Vernon, helped to alleviate the state's electrical shortfall.

Construction of the Moran Plant

In Burlington, support for a new coal-fired electric generation plant grew under the leadership of recently elected Mayor John Edward Moran and Harold Williams, superintendent of BED. In 1951, Burlington's citizens voted in favor of a $4 million bond to fund the construction of a new such plant.[71] In 1952, the city purchased a plot of land near the old Burlington Electric Light Plant from the Central Vermont Railroad for $47,000.[72] Initially, the city contracted with the Pierce Consulting Engineering Company to design the plant while a Pierce subsidiary, the Vermont Construction Company, was tasked with erecting the plant.[73] Despite initial hopes for the rapid construction of the new plant, the Pierce Consulting Engineering Company quickly ran into irrecoverable difficulties. Unbeknownst to the city, the Vermont Construction Company was in severe financial distress and went bankrupt. Further, as the city reviewed the Pierce Company's plans, questions emerged as to the feasibility of their proposals. Edgar Pierce appeared before the city's Aldermen on June 5, 1952 and refused to provide a progress report or list of expenditures; because of his mismanagement, the city decided to freeze all work on the generating plant on November 1, 1952.[74] During this time, a consulting architecture firm, Stone and Webster, produced a report detailing how much of the plant had been completed by the Pierce Company. By December of 1952, the Pierce Company had lost their contract with the city and a new engineering firm,

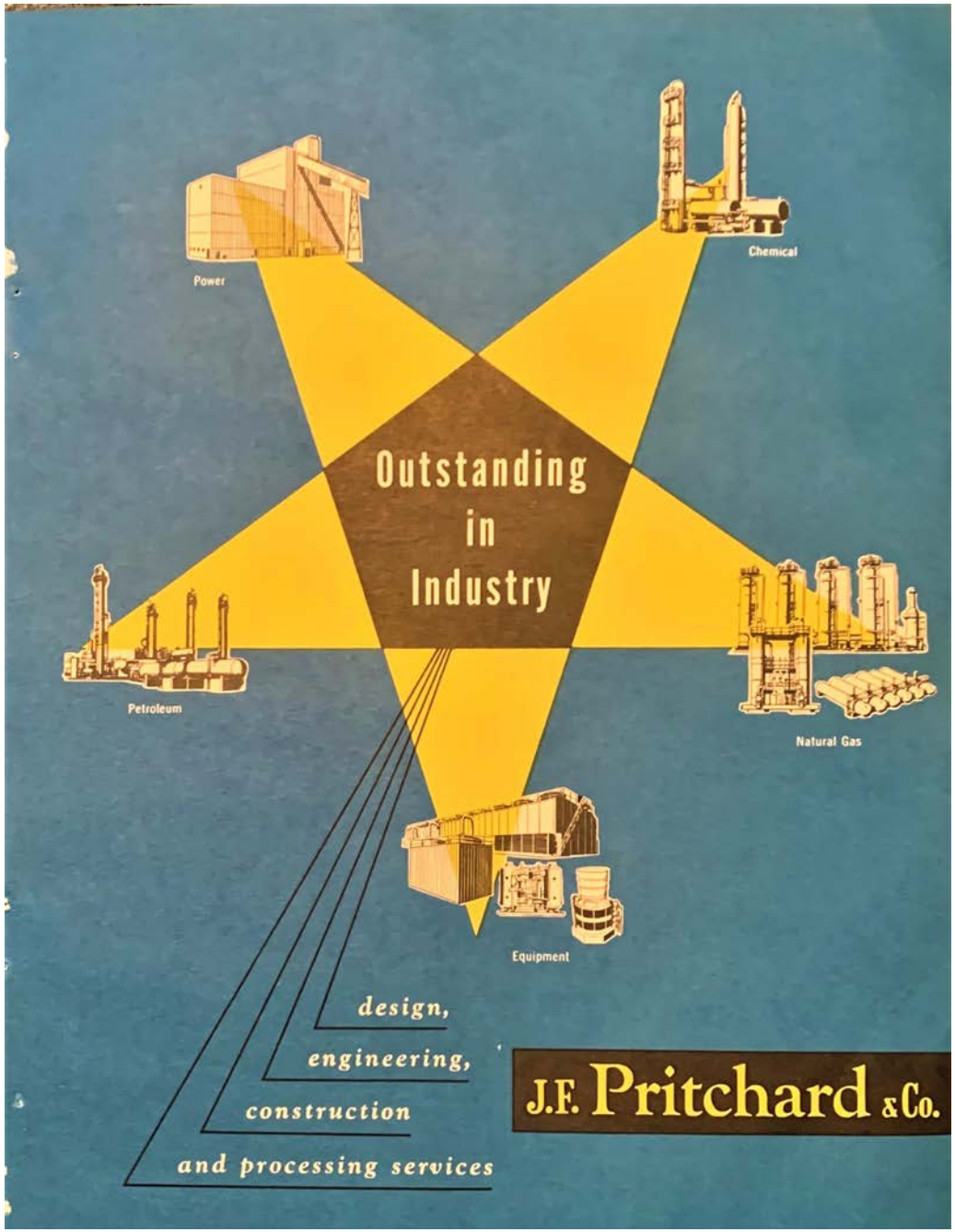


Figure 3.4: Advertisement for the J.F. Pritchard & Co.

Figure 3.5: Newspaper advertisement for "Burlington's new power plant" by the J.F. Pritchard & Co., October 20, 1954. Source: *Burlington Free Press.*

the J.F. Pritchard & Co. of Kansas City, Missouri, took over work on the generation plant.[75]

The J.F. Pritchard & Co. of Kansas City, Missouri was a construction and engineering firm that specialized in industrial buildings and had branch offices throughout the country. The company also specialized in the design of power plants and built generating stations in communities such as Sioux City, Key West, and New York City.[76] The J.F. Pritchard & Co. did not complete any additional projects of note in Vermont; however, they were penciled in to serve as the engineers for a proposed Burlington nuclear power plant.[77] Entering the design process late, owing to Burlington's financial entanglements with the Pierce Consulting Engineering Company, the J.F. Pritchard & Co. immediately sent two engineers to Burlington to act as liaisons to the city and to supervise construction.[78] While local work crews began to lay the Moran Plant's concrete foundation, the engineering firm began the process of designing the new electric generating plant.

By the time the J.F. Pritchard & Co.'s engineers came to Burlington, very little of the actual plant had been erected. The city had purchased most of the generating equipment and a massive concrete foundation had been laid by the Cass Warner Corporation of Essex Junction.[79] The concrete work for the generating plant required 350 tons of steel and 2,200 yards of concrete laid in three massive pours of 580 yards, 630 yards, and 750 yards.[80] Work on the plant recommenced in 1953 but was stalled by steel strikes in 1954. The first turbine was finally set in motion in June 1954 and the plant was officially dedicated on October 20, 1954.[81] Guest speakers at the dedication included Senator George D. Aiken, Mayor Moran, and city attorney Robert Larrow.[82] Originally named the Burlington Municipal Generating Station, the waterfront powerplant was renamed the J. Edward Moran Plant in 1962 following the death of Mayor Moran.

Upon opening in 1954, the Moran Plant had a generating capacity of 27,000 kw with power generated by three General Electric turbines. Electricity generated at the plant was fed into five feeder lines that provided power to Burlington as well as two Green Mountain Power (GMP) lines that traveled north and south out of the city.[83] Just prior to opening the plant, BED and GMP reached an agreement whereby GMP ran the Moran Plant, and the city sold the electricity to Burlington customers for 7½ years.[84] This arrangement ended nearly a half century of competition between BED and GMP; this competition had led to the needless duplication of poles, power lines, and a general inefficient approach to allocating electricity. The agreement brought together BED's approximately 10,000 residential customers with GMP's 3,800 industrial customers, effectively doubling the city's electrical generation business.[85] The lease ended in 1962 at which point BED took back control of the Moran Plant and resumed generating electricity for the City of Burlington.

Figure 3.6: The Moran Plant mid-construction in 1954. Note the portion of the exposed steel frame. Source: Burlington Electric Department.

Figure 3.7: The Moran Plant shortly after construction. The front entry with its Art Deco inspired design is visible, as are the long banks of windows that evoke the International Style. Source: Burlington Electric Department.

Design and Engineering of the Moran Plant

By the 1950s, electricity had been thoroughly integrated into American life, particularly in urban settings where many Americans had access to electric power for at least forty years. Industrial architects and engineers no longer needed to utilize monumental Classical forms to legitimize their power plants. A new design ethos emerged, one which prioritized function and efficiency. No longer temples of electricity, by this point, power plants were utilitarian buildings where exterior form was derived from interior function.

The J.F. Pritchard & Co. adhered to this modern philosophy in their design for the Moran Plant, which was comprised of several stepped, flat-roofed units with exterior boilers and an extensive network of tunnels that brought lake water into the plant. Inside, the Moran Plant was composed of large open spaces with tile floors, exposed steel support beams, and simple, unadorned exterior walls. This design bore a striking resemblance to the Sewaren Generating Station, another coal fired power plant built in New Jersey in 1949.[86] Widely publicized in architectural journals, the Sewaren Station was a product of the modern movement towards simplicity and efficiency. The plant's designers focused on minimizing costs by utilizing a simple, unadorned design for the building. For example, interior finishes were largely composed of tile for easy cleaning, while the ventilation system utilized low air pressure to encourage air flow.[87] Mechanically, the plant's exterior boilers greatly simplified heating and ventilation and each boiler was directly connected to a single turbine, again creating efficiency.

Architecturally, the Moran Plant took inspiration from the International Style, one of the main Modernist movements in architecture that had its heyday between the 1930s and 1960s. The International Style emphasized large window groupings, linear expanses of windowless wall surface, a unified wall cladding, and an overall asymmetrical design. Rising up as three stepped blocks, the Moran Plant had a distinctive and asymmetrical form. Clad in brick, the building's wall planes were largely devoid of windows. Where they occurred however, the building's windows were set in long continuous banks. The Moran Plant also had a simple Art Deco tripartite details, visible around its entry, one of the few places of architectural embellishment on the whole building.

The advances in power plant design seen in the Sewaren Generating Station carried over to the Moran Plant, making it a modern and cost-efficient generating facility. Coal was offloaded in the plant's marshalling yard and taken by conveyor belt into the tallest portion of the building. Fed into coal hoppers, the fuel was pulverized and gravity fed to furnaces that could produce fires up to 825 degrees Fahrenheit. The heat generated by these furnaces boiled water drawn from Lake Champlain to create steam. Pushed through pipes at 900 pounds per square inch, the steam entered a turbine room in the lowest portion of the Moran Plant.[88] The turbines spun three 10-megawatt generators that produced the plant's electricity, which was subsequently carried by insulated lines out to Burlington's homes. In 1956, the plant could produce seventeen million kilowatt hours of electricity per month and as technology advanced and the plant was upgraded that number had risen to nineteen million kilowatt hours per month in 1974.[89] This was enough power to provide the city with a consistent source of electricity through the 20th century.

Figure 3.8: The Sewaren Generating Station in New Jersey. Source: Ike Vern, Environmental Protection Agency.

Figure 3.9: Turbine room inside the Moran Plant showing two of the Westinghouse turbines, the unfinished walls, exposed steel beams, and the tile floor. Source: Burlington Electric Department.

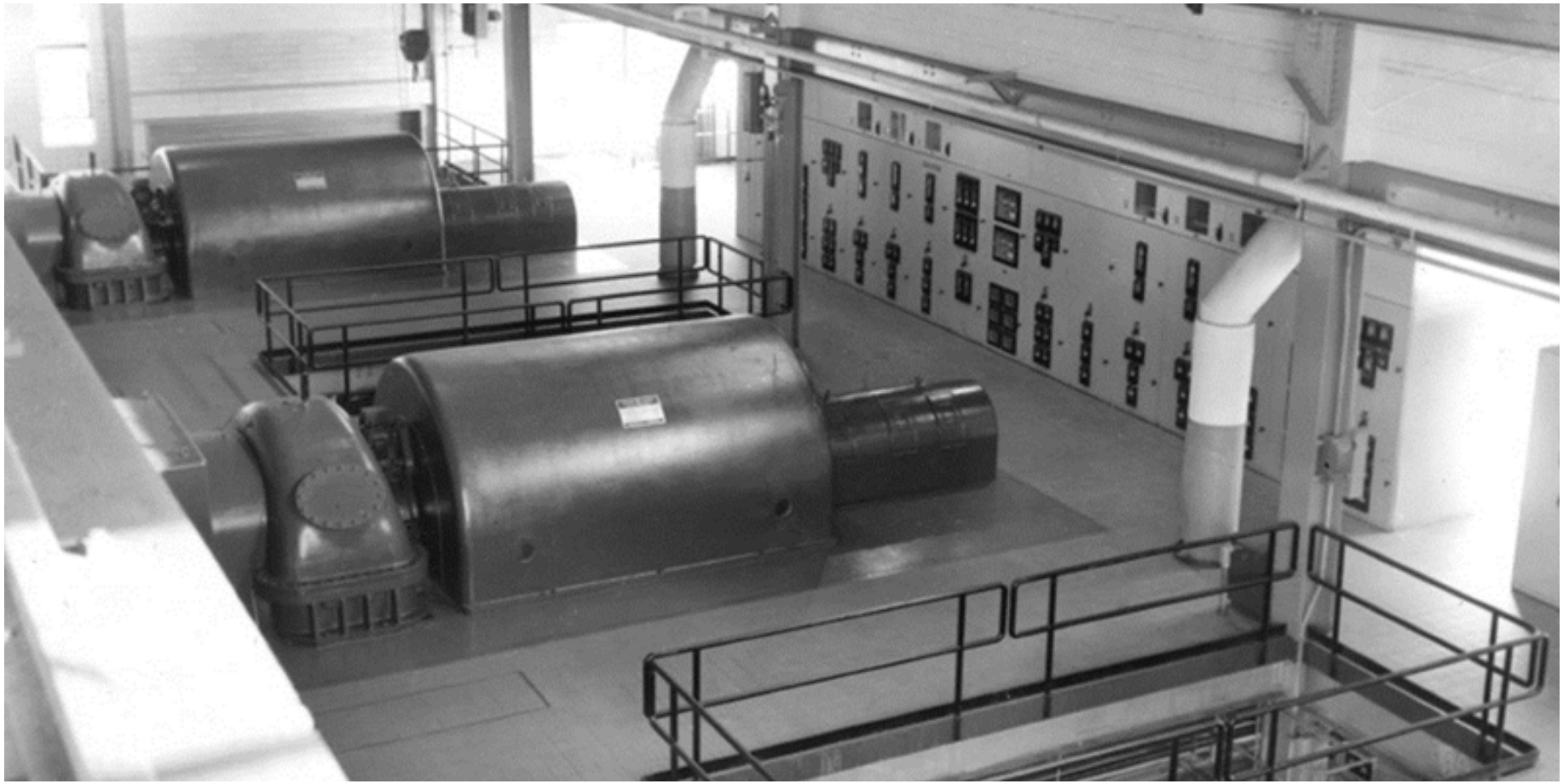


Figure 3.10: Turbine room inside the Moran Plant showing two of the turbines. Source: Burlington Electric Department.

Rankine Vapor Cycle at the Moran Plant

1. Conveyor belts carried coal to the massive steel hoppers at the top floor of the Moran Plant.
2. The heat generated by burning coal vaporized water in a boiler, creating steam.
3. Steam was passed through three 10 MW General Electric Westinghouse turbines at high pressure, causing them to rotate.
4. The rotating turbine drove an electrical generator, creating electricity.
5. Electricity was passed on to a transformer where it was then distributed throughout the city.
6. Excess steam escaped into the atmosphere through the cooling towers.
7. Remaining steam was condensed and recycled through the plant.

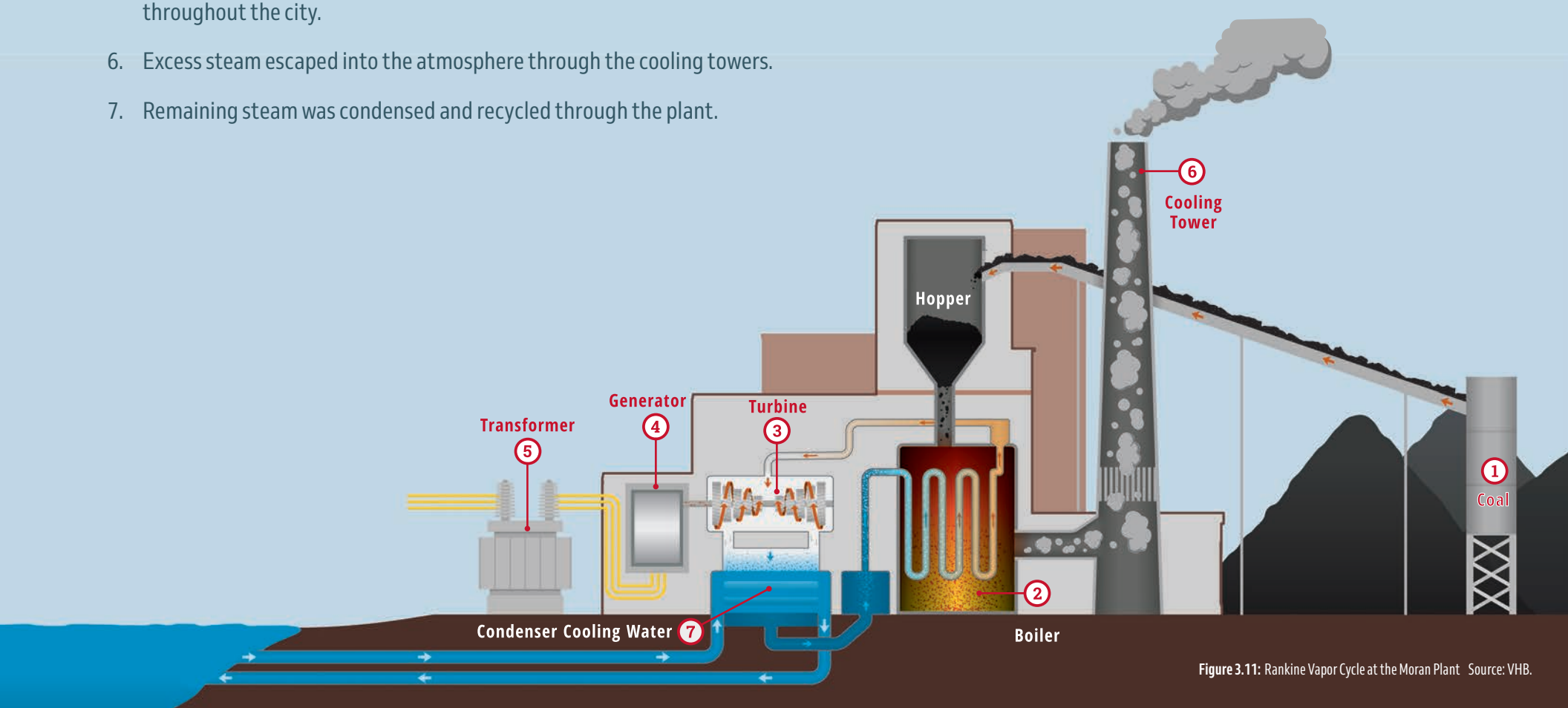


Figure 3.11: Rankine Vapor Cycle at the Moran Plant Source: VHB.

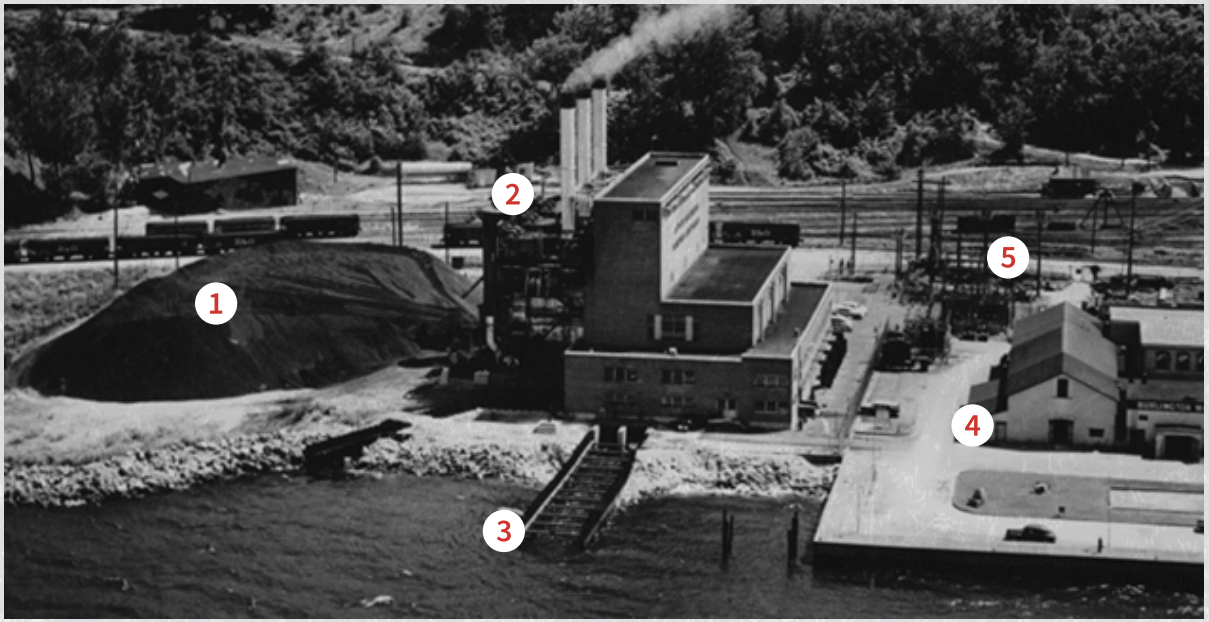


Figure 3.12: The Moran Plant as seen from Lake Champlain. Visible are the plant's coal pile (1), exterior boilers (2), lake water intake (3), the Burlington Electric Light Plant (4), and the power substation and transformers (5). Source: Shelburne Museum.

How a Coal Fired Power Plant Works

A coal fired power plant utilizes the Rankine Cycle to generate power. Named for thermodynamics pioneer William Rankine, the Rankine Cycle utilizes coal, water, and a turbine to create electricity. To start the process, coal is pulverized and incinerated. Heat from the burning coal boils water, usually drawn from a nearby body of water. The boiling water vaporizes into steam, which passes through pipes at high pressure, and is released in a turbine room. The steam causes the turbine to spin rapidly and the rotation of this mechanism generates electricity.

By the time of the Moran Plant's construction, engineers had mastered the Rankine Cycle and understood how best to design a coal fired plant. The Moran Plant was designed to take advantage of its environment. The plant's location on the lakeshore gave it access to a ready supply of fresh water to generate steam and a large intake channel fed directly from the lake to the Moran Plant. The nearby railroads were also critical to the plant; given the Moran Plant required 180,000 tons of coal to operate annually, BED needed an efficient railroad network to supply the plant with fuel. BED's coal was piled in a yard just north of the plant and carried into the building through a large exterior tower and conveyor belt system. The coal entered the building at its highest point where it was pulverized and fed down into hoppers that steadily released the coal into the plant's furnaces. These furnaces heated the Moran Plant's exterior boilers. Steam generated in these boilers traveled through pipes to the General Electric turbines at ground level. The electricity generated by these turbines was transmitted to a substation, which converted the direct current to alternating current to distribute the power through Burlington's electrical lines.

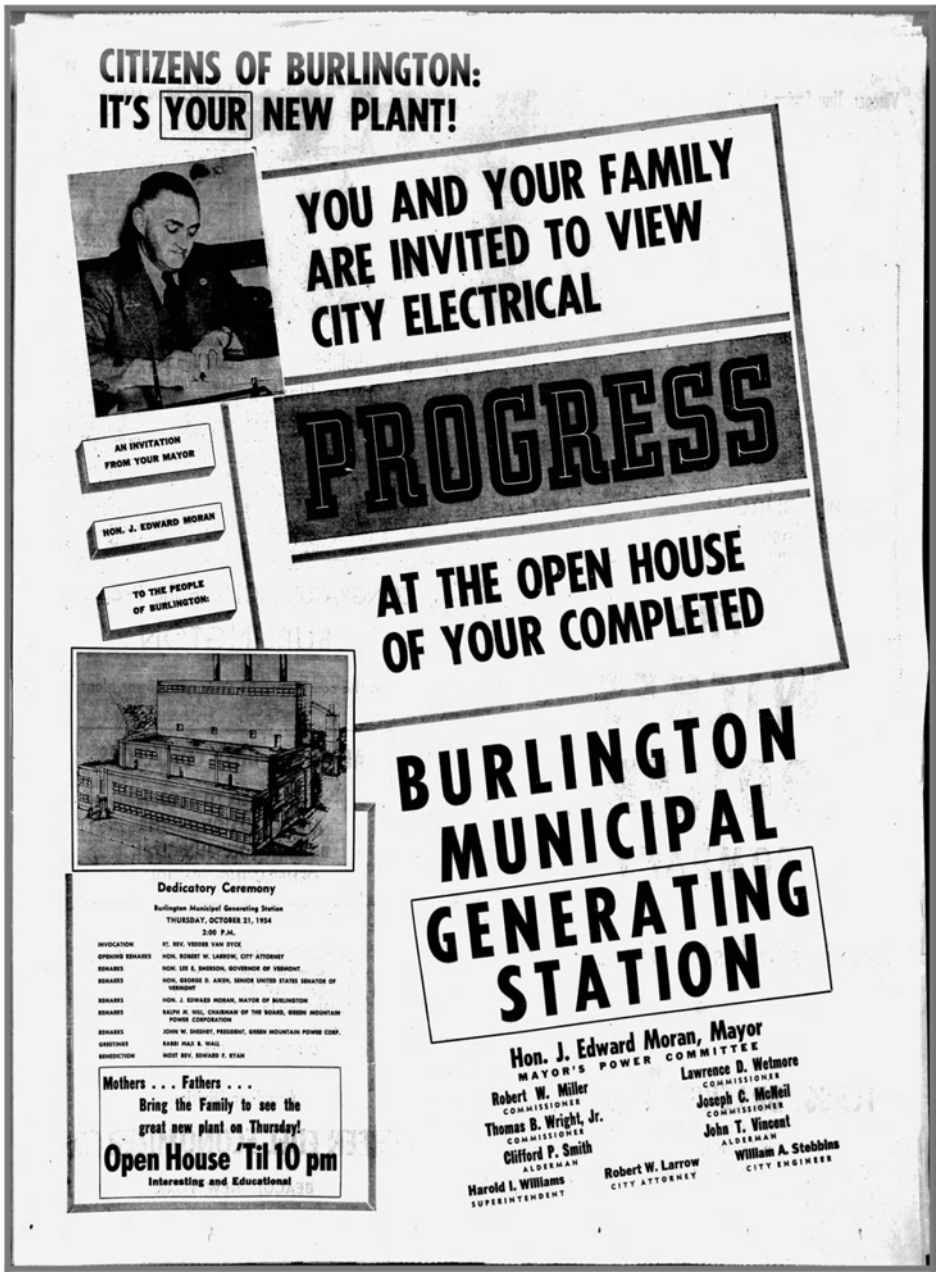


Figure 3.13: October 20, 1954 newspaper advertisement for the Burlington Municipal Generating Station Open House event. Source: *Burlington Free Press.*

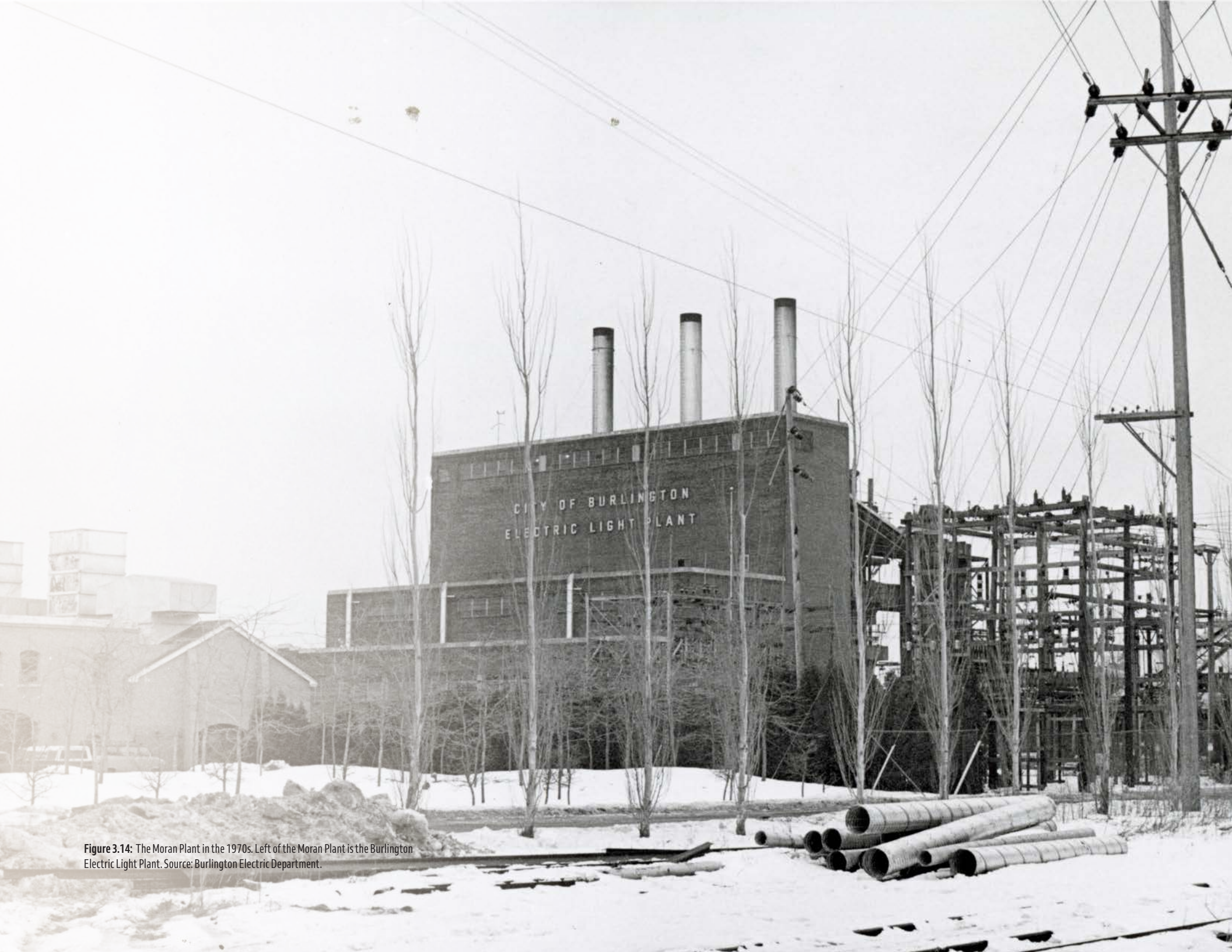


Figure 3.14: The Moran Plant in the 1970s. Left of the Moran Plant is the Burlington Electric Light Plant. Source: Burlington Electric Department.

04

The Rise and Fall of the Moran Plant

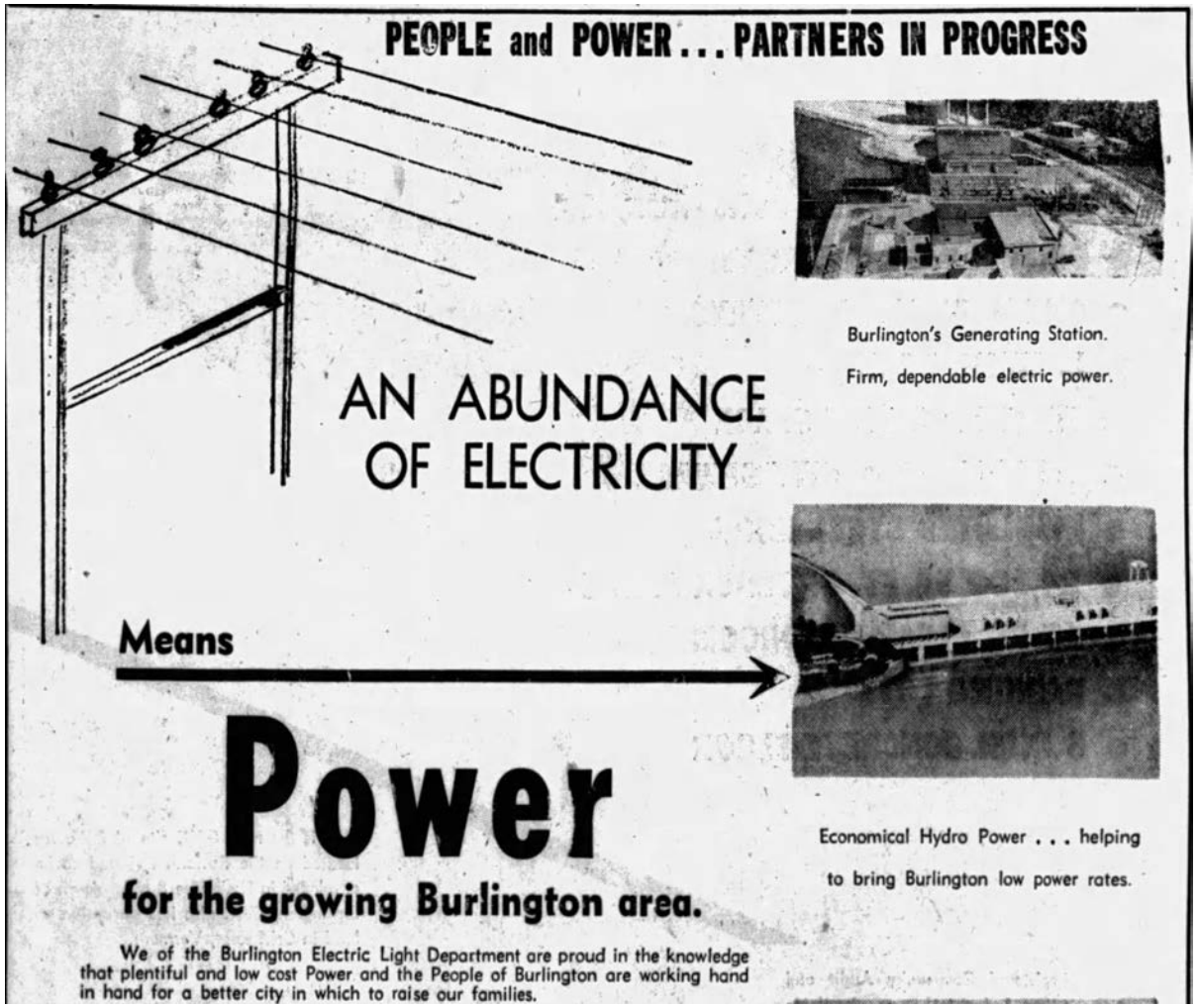


Figure 4.1: March 1960 Burlington Electric Department advertisement in the *Burlington Free Press* touting its abundance of electricity and low rates.
Source: *Burlington Free Press*.

The Rise and Fall of the Moran Plant

Throughout the 1950s and early 1960s, the Moran Plant was largely seen as a success in delivering reliable and affordable power to Burlington's residents with a series of rate cuts enacted in 1960. During this period, Burlington increased its usage of electricity, with BED investing in improvements to street lighting, expanding access to electric heat, and bringing electricity to local schools. However, BED anticipated growing demand for electrical power and by 1960 its leadership began to consider other forms of electricity generation such as expanding hydroelectric power facilities and even building a nuclear-powered steam plant at the waterfront.[90]

The Moran Plant's success had a flipside, however, due in large part to its reliance on coal and oil. In November 1965, the Northeastern United States and Province of Ontario experienced a thirteen-hour blackout that impacted over thirty million people. Following the blackout, New England's various electrical companies formed the New England Power Pool (NEPOOL), a massive regional network that allowed power plants to economically distribute their electricity.[92] To meet demand, NEPOOL brought the most efficient power plants online first and called on less efficient plants as demand required. As a result of

environmental regulations and the rising price of coal, the Moran Plant was more costly to operate than many other plants and as a result, by the 1970s, it was one of the less frequently activated power plants. The energy inefficiency of the Moran Plant's coal and oil burning model, coupled with the energy crisis of the 1970s, prompted forward-thinking BED employees to more seriously consider alternative approaches to generating power.

The Energy Crises and Environmental Regulation

Throughout the 1950s and 1960s, domestic oil production declined, and the United States increasingly relied on foreign oil. This became problematic when the oil embargo of 1973-74 almost quadrupled the price of oil imported from OPEC countries and led to a nationwide oil and gas shortage. BED was denied the ability to raise rates in 1974 to accommodate the rising cost of fuel, which created financial strain on the department.[93] Coal strikes in 1977-78 raised the price of bituminous coal significantly, and the second oil crisis of 1979 more than doubled the price of crude oil.[94] As a result, the Moran Plant was no longer financially sustainable.

On top of this, in the 1970s, Vermont passed strict air quality laws that greatly hampered the Moran Plant's operations. When it opened, the Moran Plant produced roughly 260 pounds of particulate pollution per hour. In the 1970s, BED installed smokestack cleaning devices that reduced the pollution rate to 25 pounds per hour; however, Vermont's laws mandated only a maximum of 15 pounds of pollution per hour. To operate, the Moran Plant had to mix its coal with up to 2,000 gallons of fuel oil per day, an expensive proposition given the energy crisis of the 1970s.

By the early 1980s, the Moran Plant cost BED $1 million to operate annually due to a combination of the plant's age, the cost of fuel, and environmental regulations.[95] The plant, once a sparkling jewel of modernity, had also lost its original luster. For years, Burlington residents had complained about the soot it produced and the damage wrought by coal particulates on their property. This pollution consisted of chemicals such as sulfur dioxide, and it stained clothing and covered buildings in fine soot. With residents increasingly conscious of the scenic beauty of Lake Champlain and Burlington, complaints against the Moran Plant grew and by the 1980s, some residents of Lakeview Terrace were considering a class action lawsuit against BED.[96]

A New Generation of Power

In 1976, BED Superintendent Robert C. Young and Burlington Mayor Gordon H. Paquette hired a firm to examine generating electricity from scrap wood and trash and determine the feasibility of a new power plant at the Intervale. The intention was to create a sustainable approach to power generation by which the city's waste would be recovered for fuel, using the waste heat from power generation to heat nearby greenhouses for food production.[97] This same study also explored converting the Moran Plant to burn wood chips, adding to the three power sources it already used: natural gas, oil, and coal. At that time, the Moran Plant was the only facility in New England that could burn all three fuels.[98] That same year, a second feasibility study explored the potential to develop a hydroelectric facility at the Winooski falls, which eventually came to fruition in 1993 when the Winooski One Hydro Plant opened.

In the fall of 1977, BED spent $25,000 to convert one of the Moran Plant's boilers to use wood chips as fuel.[100] Immensely successful, the conversion showed that wood fired generators could produce as much electricity as the original coal fired generators and at a significantly lower cost. The next year, the Moran Plant's remaining generators were converted to burn wood chips and wood pellets, a process that involved installing new conveyors to move wood chips out of a storage bunker, installation of some new control equipment, and the onsite fabrication of new machines to blow the wood chips into the furnaces.[101] According to Bob Young, this project may have been the first of its kind in the country, a legacy that it carries to this date.[102] Due to this successful project, progressive magazine *Mother Jones* called BED "the yardstick with which to measure all other utilities."

Figure 4.2: July 22, 1970 *Burlington Free Press* photograph about the complaints by Lakeview Terrace residents of pollution from the Moran Plant. Source: *Burlington Free Press.*

LAKEVIEW TERRACE, a turn-of-the-20th-century neighborhood of modest houses historically occupied by families connected to industry at the waterfront, sits on a terrace northeast of the Moran Plant.

Lakeview Terrace Smoking Mad About Ash

With the street almost at the same elevation of the plant's three smokestacks, soot and ash rained down on Lakeview Terrace when the wind blew from the west. One mother complained that when she poured her toddler a glass of milk outside, it would be speckled with black dust within a couple of minutes. Other residents talked about the layer of soot that accumulated on the flower petals in the gardens and on their laundry hung out to dry. Residents complained and wrote letters to the city and BED but felt that their concerns were unanswered; as one resident stated, "For years Burlington, regarded as one of the most beautiful cities in the world, had to stand by helplessly and watch the Moran Plant pour its ugly smoke into the atmosphere."[103] BED's solution to the problem was to extend the smokestacks further into the air to allow the particulates to float over Lakeview Terrace, although this attempt was marred by the fact that the soot and ash began to accumulate along residential areas of North Avenue instead.[104]

Vermont historian and politician Lilian Baker Carlisle, who moved to Lakeview Terrace in 1958, joined the ranks of residents who were upset by the pollution and the city's lack of attention to their concerns. Carlisle wrote dozens of letters to BED and filled a box with ash from the smokestacks, a box that eventually found its way into the Fleming Museum's collection when many of her written works, research, and personal items were donated to the museum in the 1990s. Frustrated that the city did not act to remediate the pollution problem – in large part due to the fact that the Moran Plant was not actually violating any environmental laws – Carlisle ran for office and was elected to the Vermont House of Representatives in 1968. As she said in 1970, "When I had talked myself dry [about air pollution] and found that talking and complaining got you nowhere fast, I decided it would take legislative changes to bring anything about."[105] With a keen interest in environmental protection that grew from her experience with the Moran Plant, she served on the Natural Resources Committee and helped bring about two key legislative acts that addressed environmental concerns: Green Up Day, the first of which was held on April 18, 1970, and the Vermont Land Use and Development Law (Act 250), enacted in 1970.

While BED developed the plans for what would become the Joseph C. McNeil Generating Station (commonly referred to as the "McNeil Station') at the Intervale, they continued to operate the Moran Plant as a wood-fired generating station. Doing so proved invaluable as it allowed BED to vet potential wood suppliers and make sure they had the capacity to supply Burlington with enough wood to fire the plant.[106] Of particular concern was ensuring that the wood for the plant's fuel was harvested sustainably to quell any public unease about the destruction of forestland. In 1979, BED hired a forester to monitor the harvesting of timber for wood chips; as Bob Young said, "One black eye will just set the whole thing back and we want to do this thing right."[107]

Although the development of nuclear power and hydroelectric power was still favored by BED leadership, beyond buying some power from Vermont Yankee Nuclear Power Plant and other hydroelectric providers, the BED decided to direct efforts to develop the 50-megawatt McNeil Station. Burlingtonians also threw their support behind the project, approving by a two-to-one margin a bond issue to fund the station, as well as the proposed Winooski falls hydroelectric facility and a trash incinerator.[108] The bond vote did not entirely supplant criticism of the proposed new plant, however. Environmentalists expressed concerns about the impacts to Vermont's forests by the need to harvest so much wood to run the plant (the plant would burn between 200,000 to 320,000 cords of wood per day), area residents complained that the smoke and powerlines from the plant would degrade quality of life, there were concerns about how the wood chips would be transported to the plant, and others questioned the need for such a large facility in the first place. Environmental permitting of the plant was also controversial. However, BED persisted in its argument that sustainable, local energy production was needed in the event that other forms of power would become too expensive or unattainable. The Moran Plant's rollercoaster of struggles and success in the 1970s, with wood chip power ultimately allowing the plant to be viable, was just the example that BED needed. After years of planning, in June 1984, the McNeil Station officially opened.

Figure 4.3: 1970s photograph of a train offloading coal at the Moran Plant. Coal was hoisted from the rail car and carried overhead on a wire system to the coal storage yard. Source: Burlington Electric Department.

Joseph C. McNeil Generating Station

The McNeil Station was granted its Certificate of Public Good by the Vermont Public Service Board on September 14, 1981.[109] The plant came online in June 1984, having been constructed under budget and ahead of schedule. Today, the plant is jointly owned by BED (operator and 50% owner), Green Mountain Power (31% owner), and Vermont Public Power Supply Authority (19% owner). It has the capacity to generate 50 megawatts of power, with approximately 76 tons of wood chips consumed per hour; however, it is set up to be able to burn other types of fuel such as oil and gas in the event that wood is not available.[110] It remains Burlington's main source of locally generated power. BED's other local power sources include the Winooski One Hydro Plant, output from various solar projects throughout city and at the airport, wind power facilities in Vermont, and an emergency gas turbine. In 2021, the city developed a Net Zero Energy roadmap, one of the most ambitious local climate plans in the country, to become a Net Zero Energy city by 2030.

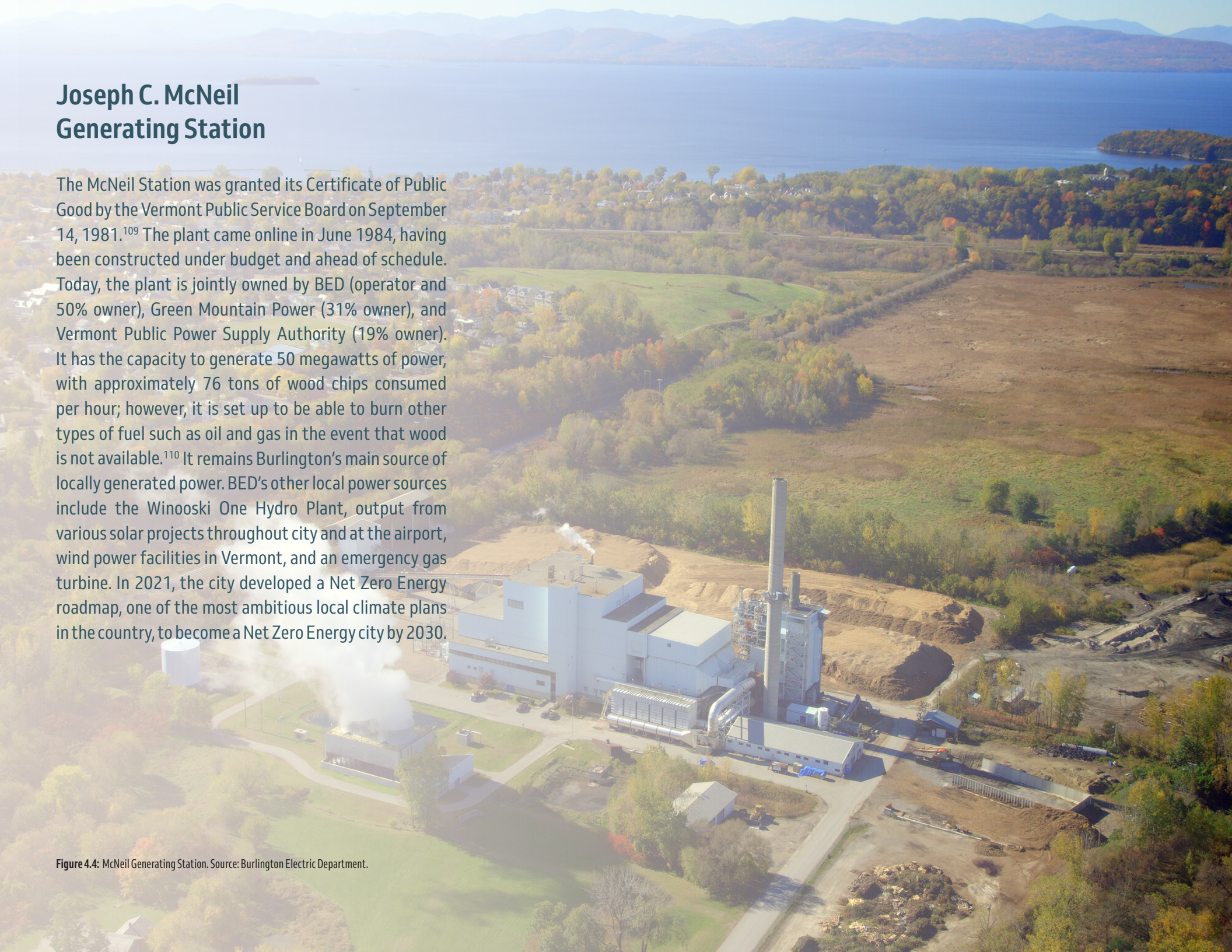


Figure 4.4: McNeil Generating Station. Source: Burlington Electric Department.

Closure of the Moran Plant

After the McNeil Station was brought online, the Moran Plant continued to function, albeit poorly. By the summer of 1984 just after the McNeil Station opened, the Moran Plant stopped burning wood chips and returned to burning oil, gas, and coal, just at the time that the electrostatic precipitator, a pollution control device, broke down and areas of steel had corroded.[111] While residents of nearby neighborhoods such as Lakeview Terrace felt a reprieve from the coal pollution when the plant converted to wood chip power, once again they felt the negative effects from the plant and even filed a class action lawsuit asking for compensatory and punitive damages.[112] However, BED was hesitant to close the plant for several reasons: it provided an emergency power source if the McNeil Station were to go offline, it had actually become relatively cheap to operate, and BED saw its potential value if the region saw growth.

Mayor Bernard Sanders and BED general manager Robert C. Young made the decision to close the Moran Plant in the summer of 1985 due to what Sanders stated as environmental, economic, and aesthetic reasons.[113] The plant cost $1 million more to run per year than it made in revenues, making it economically unviable. The plant's pollution was such that a $40,000 settlement was reached with 38 neighbors who had filed the lawsuit against BED.[114] BED recognized that indeed, the plant had gone past its expected 30-year life, and the cost savings of shuttering the plant would fend off rate increases that year. In addition, the Moran Plant was seen as incompatible with the ambitious redevelopment plans for the Burlington Waterfront during this era.

After the generating equipment was removed, the BED briefly considered moving its headquarters to the Moran Plant so they would not pay taxes on an unused building. Due to the Public Trust Doctrine, the building would need to have been put into public use, which would have been the case if BED moved its offices there. However, a $4.5 million price tag to renovate the building – plans that included office space, a public gallery, and a park – ultimately discouraged BED from pursuing this option.[115]

Although a new use had not been planned for the Moran Plant after it was decommissioned, its vacancy prompted a long period of debate as to how to best use the building. A squabble in May of 1987 over whether or not the smokestacks should be removed – many believed that they were an iconic, historic relic that should be preserved – was just the first of many decisions that would need to be made in the long fight to preserve the building.[116]

Figure 4.5: The Moran Plant in the 1970s burning wood chips. Most of the smoke billowing from the stacks is steam. Source: Burlington Electric Department.

Figure 4.6: Bob Young, Moran Plant operator and General Manager of the Burlington Electric Department from 1959-1991. Source: Burlington Electric Department.

Robert Charles Young, 1937 – 2022

Robert "Bob" Charles Young (1937 – May 2, 2022) worked for the Burlington Electric Department for 32 years, from 1959 until 1991, serving as BED's General Manager from 1975 to 1991. Young's forward-thinking views on energy production motivated the conversion of the Moran Plant to wood chip fuel in 1977, and he was the driving force behind the development of the McNeil Station. The Moran Plant and the McNeil Station were among the first electricity plants in the nation – and quite possibly, in the world – to utilize wood chips for fuel.

Young was hired by BED as an engineer immediately upon his graduation from Norwich University in 1959, where he earned his degree in Electrical Engineering. In the 1960s, he was promoted to Chief Engineer of the BED, at which point he began to lobby for a more sustainable approach to electrical generation. Intimately familiar with the Moran Plant's limitations as it relied on coal and oil, as well as the pollution generated by burning these fuels, Young believed in the clean, local energy source that was wood. A 1984 article in the New York Times about the McNeil Station talked about Young's belief in the "backyard reliability" of wood chips and its economic boost to the region; he was quoted as saying "I like to have Vermonters taking care of Vermonters."[117]

In this same spirit, Young was known for giving back to the community, installing lights at several local ball fields including Centennial Field, Burlington High School, and South Park. He was also known to work from the ground up, the approach he took to developing the McNeil Station. He was once quoted as saying, "I went out on almost every outage myself, and that put me really close to the system. I liked to get the lights back on."[118]

Figure 4.7: The Moran Plant in operation in the 1960s. Smoke from the plant released chemicals and soot across Burlington, particularly in nearby Lakeview Terrace. The Valcour car ferry is visible in the foreground. Source: Shelburne Museum.

05

Re-envisioning the Moran Plant

Figure 5. 1: The Moran Plant in the early 1990s.
Source: Burlington Electric Department.

Figure 5. 2: Model of the 1989 proposed Museum of Science and Education at the Moran Plant. Source: Freeman French Freeman.

Re-envisioning the Moran Plant

Early Envisioning

The Moran Plant was transferred from BED to the city in 1986 and in the three decades that followed, there were numerous attempts to re-envision and redevelop the space for the public benefit.

1980s

The first concept was developed in 1989 by architect Jesse Beck of Freeman French Freeman for a proposed children's museum in the Moran Plant. The museum proposal was city effort by Mayor Peter Clavelle, CEDO Director Michael Monte, and a steering committee of nine community members chaired by Carol Stewart. The newly renovated building was to be called the Museum of Science & Education and included a museum, planetarium, and winter garden that would have been built into the exposed portion of steel frame on the north side of the building. After two years of development, the intensity of the project and $8 million price tag stalled the project, which eventually became the genesis for the ECHO, Leahy Center for Lake Champlain on the waterfront south of the Moran Plant.

Figure 5. 3: Scene from the 1990 International Sculpture Symposium."
Source: Diana Carlisle.

1990s

In the summer of 1990, an international sculpture symposium brought together artists from all over the world to create a work of public art that would draw people to this area of the waterfront. The resulting art installation, arranged in a pattern inspired by the Adirondack Mountains and the Green Mountains, was situated in a gravel yard adjacent to the north of the Moran Plant – right where the coal heaps and woodchip piles were once located. A hand-painted sign at the site of the installation proposed an idea for the adaptive reuse of the building that would be called the "Renaissance Center for Science and the Environment." The sign read:

The SCULPTURE SYMPOSIUM represents the first public expression calling attention to the potential of this site and building.

RENAISSANCE CENTER
for SCIENCE + the ENVIRONMENT
is a community vision for the adaptive re-use of the Moran Plant. Some day, we hope citizens + visitors will work with "hands-on" exhibits about science, culture, and the environment. Also housed here will be state-of-the-art research labs.
--A RENAISSANCE PROJECT

Never intended to be a permanent work of art, it was dismantled in 2014 to make way for the redevelopment of this area around the Moran Plant.

In 1993, the city released a request for proposals to redevelop the industrial relic and attracted several interesting proposals. However, none had adequate funding. In 1995, the city issued a second request and selected a proposal from the University of Vermont Fleming Museum. After several years of planning, the Fleming Museum chose not to build and instead focused on improving their facility on the University's main campus.

As the city attempted to find an alternative use for the Moran Plant, the building sat empty, slowly deteriorating as the waterfront transformed around it. In 1994, the Moran Plant finally found a long-term tenant in the Lake Champlain Community Sailing Center, which organized that same year. The organization's move into the building was facilitated by local architects including Alex Halpern of the firm Marcel Beaudin and Associates.

Figure 5. 4: The Moran Plant in 2010 when the Community Sailing Center occupied the west side of the building. Source: Liisa Reimann.

Figure 5. 5: The Moran Plant in 2016 when it was occupied by the Community Sailing Center. Boat storage surrounded the building. Source: Kaitlin O'Shea, VHB.

Lake Champlain Community Sailing Center

Still in existence since it was established in the Moran Plant in 1994, the Lake Champlain Community Sailing Center is a nonprofit organization dedicated to providing people of all experience and ability the opportunity to learn how to sail. The sailing center offers educational and recreational opportunities on Lake Champlain and uses the deep harbor near the Moran Plant as a sheltered cove to teach novice sailors the ropes.

The Community Sailing Center maintained its offices on the first floor of the Moran Plant from 1994 until 2008 and would be the only organization to occupy the building after it was decommissioned in 1986. Initially, the Moran Plant was an ideal location for the organization, providing easy access to the lake at ample room to store boats in a fenced-in yard surrounding the building. However, the Moran Plant lacked basic amenities and, due to the inconvenience of maintaining a portion of the deteriorated building, the Lake Champlain Community Sailing Center moved its physical offices out of the Moran Plant in 2008 and erected a temporary office next to the building while continuing to store boats in the surrounding yard. In 2016, work began on a new building for the organization, also designed by Marcel Beaudin and Associates. Completed in 2017, the new sailing center was the first net-zero community waterfront building in the country. Based out of the new building, the Lake Champlain Community Sailing Center continues to provide sailors of all ages, abilities, and interests with the opportunity to experience the joy of sailing across Lake Champlain.

Moran for the People: City Support in the 21st Century

Although the Community Sailing Center was a successful adaptive reuse of the building, a larger rehabilitation, it only occupied a small portion of the building. As Burlington progressed into the 21st century, the Moran Plant still faced numerous challenges and future proposals hit various roadblocks including funding. Burlington Parks and Recreation teamed with the YMCA to consider a recreation center on the Waterfront. However, construction and operations costs were beyond the city's abilities and there were concerns about traffic and parking. In another proposal, a baseball stadium was proposed but the size and site would not meet the stadium's needs. A brewery and concert hall were also considered but this use was not allowable under the Public Trust Doctrine.

In 2008, it was proposed that the Moran Plant be converted into a publicly owned multi-use facility that would enhance the local economy. This plan included a for-profit climbing center, community sailing center, space for a third tenant, café/restaurant, observation deck, public restrooms, and an office for the Department of Parks and Recreation. This plan coalesced in 2010 when Scottish development group named "The Ice Factor" entered a Development Agreement with the city under Mayor Bob Kiss to renovate the building into an ice climbing facility; at the time, it would have been one of

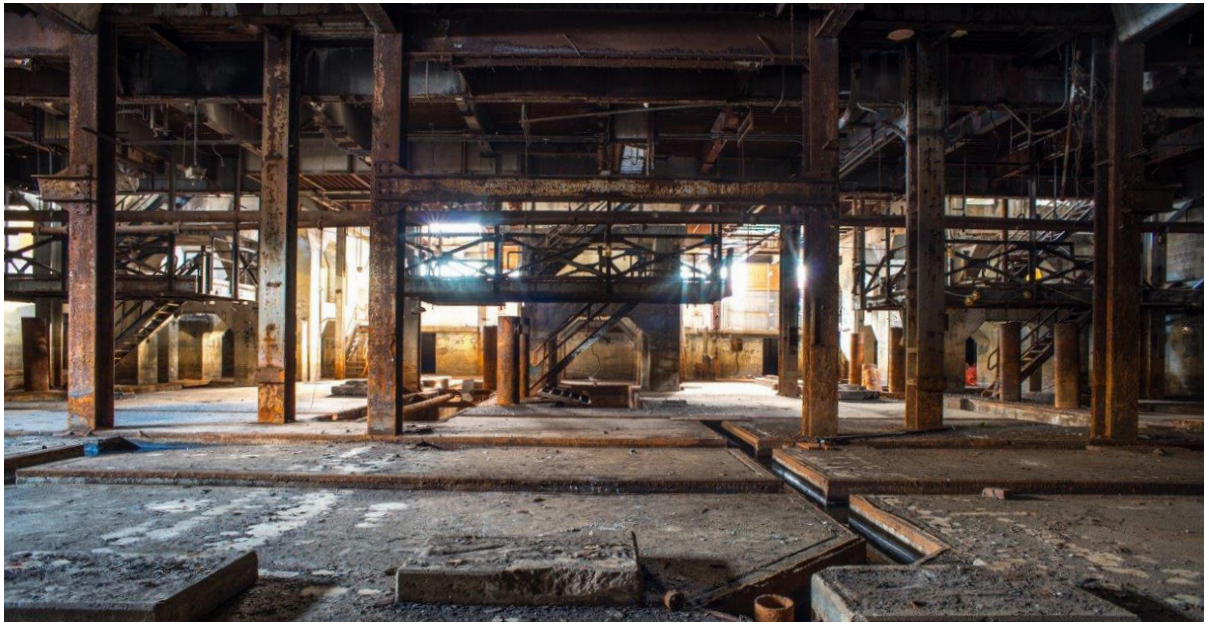


Figure 5. 6: Interior of the Moran Plant in 2015 where the turbines were formerly located. Source: Daniel J. Cardon.

Figure 5. 7: Coal conveyor belt in the upper level of the Moran Plant. This 2013 photograph also highlights a colorful art installation by Sarah O'Donnell called "A Visible Night." Source: New Moran

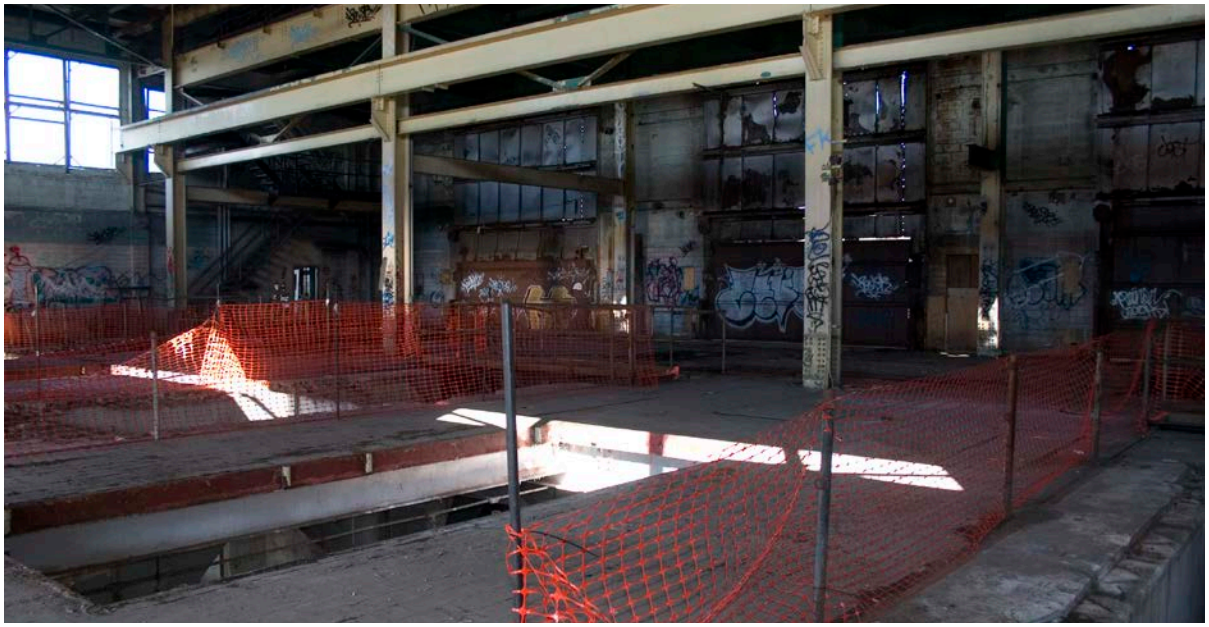


Figure 5. 8: Interior of the Moran Plant in 2010. Source: Liisa Reimann.

Figure 5. 9: Interior of the Moran Plant showing the coal hoppers. Source: Kaitlin O'Shea, VHB.

only three such facilities in the world. The Ice Factor had an indoor ice tower for year-round ice climbing and other climbing facilities of all difficulties. This redevelopment proposal also included the continued occupation of the building by the Community Sailing Center, a proposed Green Mountain Children's Museum, a Children's Activity Center, and an ice skating rink/ splash pad. Freeman French Freeman was again hired to create plans for the redevelopment, an initiative led by Alex Halpern and Jesse Beck. However, this $12 million proposal stalled due to lease negotiations, timing, and the complexity of funding sources. It was officially discontinued in 2012 by recently elected Mayor Miro Weinberger, who felt that the planned development put the city at too great a financial risk.[119]

In 2012, the city contracted with Artspace, a nonprofit arts organization specializing in creating, owning, and operating spaces for artists and creative businesses . Artspace helped to evaluate and envision potential uses and design for the building and site that would qualify as "public use." Artspace submitted a report that proposed three models for the Moran that qualify as "public use" including a co-working space, maker space, and temporary uses. Ultimately, however, it proved impossible to raise sufficient funds to rehabilitate the Moran Plant and establish an appropriate use for the building. As a result, the city began to develop alternative solutions to the problems posed by the Moran Plant. To help boost interest in the Moran Plant, in 2013, the city sponsored a

public art installation in the building by artist Sarah O'Donnell. Entitled "A Visible Night," the installation consisted of different colored pieces of silk that covered the upper windows of the plant, creating a rainbow effect on the exterior. Inside, the silk reflected the sunlight and a live video feed documenting the changing colors inside the building throughout the day was played at Burlington City Arts' gallery on Church Street.

In 2013, lagging progress toward a more vibrant waterfront prompted the city to propose investing in public infrastructure that would launch additional investments, grow City revenues, increase public awareness and enjoyment of the waterfront, and create housing opportunities. To tackle this initiative, the city began a transparent and collaborative process known as the Public Investment Action Plan (PIAP) process. During this two-year process, a Request for Proposal for redevelopment of the Moran Plant was solicited by the city administration and the Public Investment Team (PIT) held open meetings to review and score proposals. The City Council voted to include six potential projects on the 2014 March ballot, projects that were intended to strengthen this area of the waterfront.[121]

The results of the voting revealed approval from 69.5% of Burlington voters. Since then, the city administration and departments have worked to advance these approved projects.

A New Path Forward

After three decades of failed efforts, this 2014 ballot permitted a last attempt at an ambitious redevelopment of the Moran Plant. To move progress forward for the Moran, the New Moran, Inc. (NMI), a Vermont 501(c) 3 organization, was created, giving the nonprofit company the exclusive opportunity to redevelop the Moran Plant. In the two years that followed the 2014 vote, NMI reviewed a variety of scenarios for the Moran ranging in estimated cost from $15 million to $34 million but was unable to assemble the requisite funding. In July 2016, the city and NMI agreed to dissolve the Memorandum of Agreement (MOA) to allow the city an opportunity to explore additional partnerships. In fall of 2016, the city released a Request for Qualifications to invite proposals from experienced professionals to implement the vision for the plant as approved by the voters of Burlington in 2014. One proposal from NMI was received and the two parties attempted to move the project forward but were unable to reach an agreement on a term sheet that would have defined the city's granting of Tax Increment Financing (TIF) funds and a long-term lease of the building and site to NMI.

When this final attempt at redevelopment failed, the city turned its attention towards demolition and reuse of the site.[122]

In March 2017, the Community and Economic Development Office (CEDO) released a report that outlined four full demolition options ranging from $3.9 million to $10.7 million. At the mayor's direction, CEDO sought an alternative that would:

- **Provide greater value than full demolition of the $5.4 million in voter approved TIF funds set to expire December 31, 2019;**
- **Compliment the progress made at the waterfront during the previous five years;**
- **Enhance public access to the waterfront;**
- **Activate space for community gatherings; and**
- **Honor the Moran Plant's historic importance and architectural character.**

CEDO's final proposal, the Fearless Relook at Moran Electric or FRAME Concept, was accepted in 2019. Drawing on decades of experience, this proposal sought to create a community icon through a partial demolition. It incorporated the core elements of other popular proposals while stabilizing the site to create a platform for future phases. Freeman French Freeman led this new design effort, bringing almost three decades of experience in envisioning and community engagement to repurpose the Moran Plant. The Moran FRAME proposal sought to create a cultural landmark on Burlington's waterfront that is publicly accessible, financial sustainable, and easily adapted to accommodate additional public amenities over time.[123]

Figure 5. 10: Moran FRAME, November 2022. Source: Ryan Bent Photography.

06

Moran FRAME: Connecting Past, Present, and Future

Figure 6.1: The conceptual rendering for the Moran FRAME project by Freeman French Freeman. Source: Freeman French Freeman.

Moran FRAME:
Connecting Past, Present, and Future

After more than three decades of efforts to repurpose the former coal plant, the Moran FRAME stands as an iconic landmark on the Burlington waterfront. Now stabilized and rehabilitated, the site provides public access while preserving the rich history of Burlington's industrial past. The project is the final piece in the revival of Burlington's northern waterfront and provides a foundation and framework for additional improvements in future years.

The Moran FRAME represents the final piece of broader efforts to revitalize Burlington's waterfront. The effort began in 2014 after Burlington voters endorsed a slate of six projects to transform the waterfront all of which has seen significant progress or reached completion. These projects consisted of the relocation of the Lake Champlain Community Sailing Center, expansion of the Burlington Harbor Marina, expansion of the ECHO Center's parking amenities, continued development of Waterfront Park, and the creation of Water Works Park.[124] Other efforts to revitalize the area have included the creation of Andy "A_Dog" Williams Skatepark, the rehabilitation of the Burlington Bike Path, and new access to Lake Champlain through Texaco Beach.

The Moran FRAME concept overcame many of the rehabilitation challenges encountered by various projects pursued from 1986 to 2017. By peeling back the brick and concrete exterior to reveal the steel frame beneath, the project achieved a less costly alternative than a complete rebuild while maintaining the site's history. The distinctive tiered structure is preserved and serves as a "framework" for future phases that could include amenities such as bathrooms, a shade structure, and waterfront pathways. Taking advantage of the structure's unique height, a height that is no longer permissible for new construction along the waterfront, viewing decks may be constructed to offer a spectacular vantage of Lake Champlain.

The Moran Plant was methodically dismantled beginning in August 2020, when large interior components began to be removed. In September 2020, removal of the exterior began and within three months, about 80 percent of the deconstruction work was complete. In January 2021, portions of the concrete foundation were still intact and the labor-intensive process of removing this concrete lasted throughout the winter. In summer and fall 2021, after the building was fully deconstructed, the metal frame was scraped and painted. The final site work and landscaping occurred in 2022.

Once a derelict eyesore, the Moran FRAME now provides a stable and safe resource for recreation and cultural activity along the Burlington waterfront.

Figure 6.2: The Moran Plant after the brick envelope was removed and during soil restoration efforts. Source: Jeffords Steel and Engineering Company.

Environmental Cleanup at the Moran Plant

Perhaps the most important consideration for any redevelopment of the Moran Plant and its environs was remediation of environmental contaminants resulting from its decades of industrial use associated with machinery, the railroad, coal storage, and bulk petroleum storage. The transition to this area of the waterfront to recreational use has required significant abatement and environmental remediation to stabilize the area and make it safe for the public. The first efforts began in the 1980s with the removal of petroleum tanks, industrial buildings, and other derelict structures dotting the lake's shore. Soils throughout the Waterfront Access North, including the Moran FRAME, required remediation. After isolating potentially contaminated soils under a barrier, clean soils were brought in. Preserving the Moran FRAME also required abatement and remediation for hazardous building materials including asbestos, lead paint, and PCB containing paint. Once the majority of the structure was dismantled, entire frame of the building was scrapped free of loose and flaking paint and chemically treated before being reinforced and repainted a striking red, using the same paint found on San Francisco's Golden Gate Bridge.

Kurt Muller, P.E. (currently of VHB) has served as lead Environmental Engineer on the project since 2019. Kurt's involvement started with contaminant characterization of sediment, groundwater, and concrete in the basement level of the building, a project that transitioned to clean-up planning and oversite of an interim remedial action in 2010. As years passed and several redevelopment concepts were contemplated, Kurt's primary role was to support the city and evaluate how to effectively implement a Corrective Action Plan (prepare by Miles Waite) in a manner that was protective, cost effective, and compliant. In 2017 at the city's request, Kurt lead a team that was comprised of a demolition contractor (Casella Construction), hazardous building material abatement contractor (Clay Point Associates), and the city to evaluate the feasibility and potential cost associated with full and partial demolition scenarios of the building. The findings from this exercise were used to move the FRAME concept forward. Since 2017, Kurt and the VHB team have served as the primary liaison between State regulators and the city, monitoring and documenting the effectiveness and compliance of the remediation and abatement of the property.

Dismantling of the Moran Plant (2020 to 2021)

AUGUST 19, 2020
Moran Frame formal project kick-off with Mayor Miro Weinberger

SEPTEMBER 11, 2020
Most of the interior equipment had been dismantled and removed prior to dismantling the building itself.

› AUG '20 › SEPT '20

DISMANTILING STARTED IN AUGUST 2020 AND WAS COMPLETED MARCH 2021

› OCT '20 › NOV '20

OCTOBER 7, 2020
Work continues on removal of the masonry.

NOVEMBER 9, 2020
The building envelope is peeled away and steel moment connections are installed to support the frame.

Figure 6.3: Moran Plant deconstruction, August 2020 - October 2021. Source: VHB.

DECEMBER 1, 2020
Majority of concrete, brick, and masonry are removed from the building to expose the frame - notice the former coal “hopper” structure in the upper level of the building.

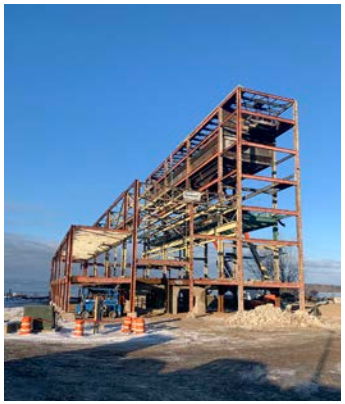
MARCH 8, 2021
All brick and masonry are removed, lead paint abatement is in progress, and preparation for coating application is in progress.

› DEC ‘20 › MAR ‘21

OVER 922,000 BRICKS WEIGHING 1,844 TONS WERE DISPOSED
4,318 CUBIC YARDS OF GRANULAR MATERIAL BACKFILLED THE FOUNDATION

› JAN ‘21 › OCT ‘21

JANUARY 26, 2021
In progress is the finer removal of concrete and and brick from the structure.



OCTOBER 20, 2021
The painted frame structure is completed.

Figure 6.4: Moran FRAME, November 2022. Source: Ryan Bent Photography.

Figure 6.5: Moran FRAME, November 2022. Source: Ryan Bent Photography.

Figure 6.6: Moran FRAME, November 2022. Source: Ryan Bent Photography.

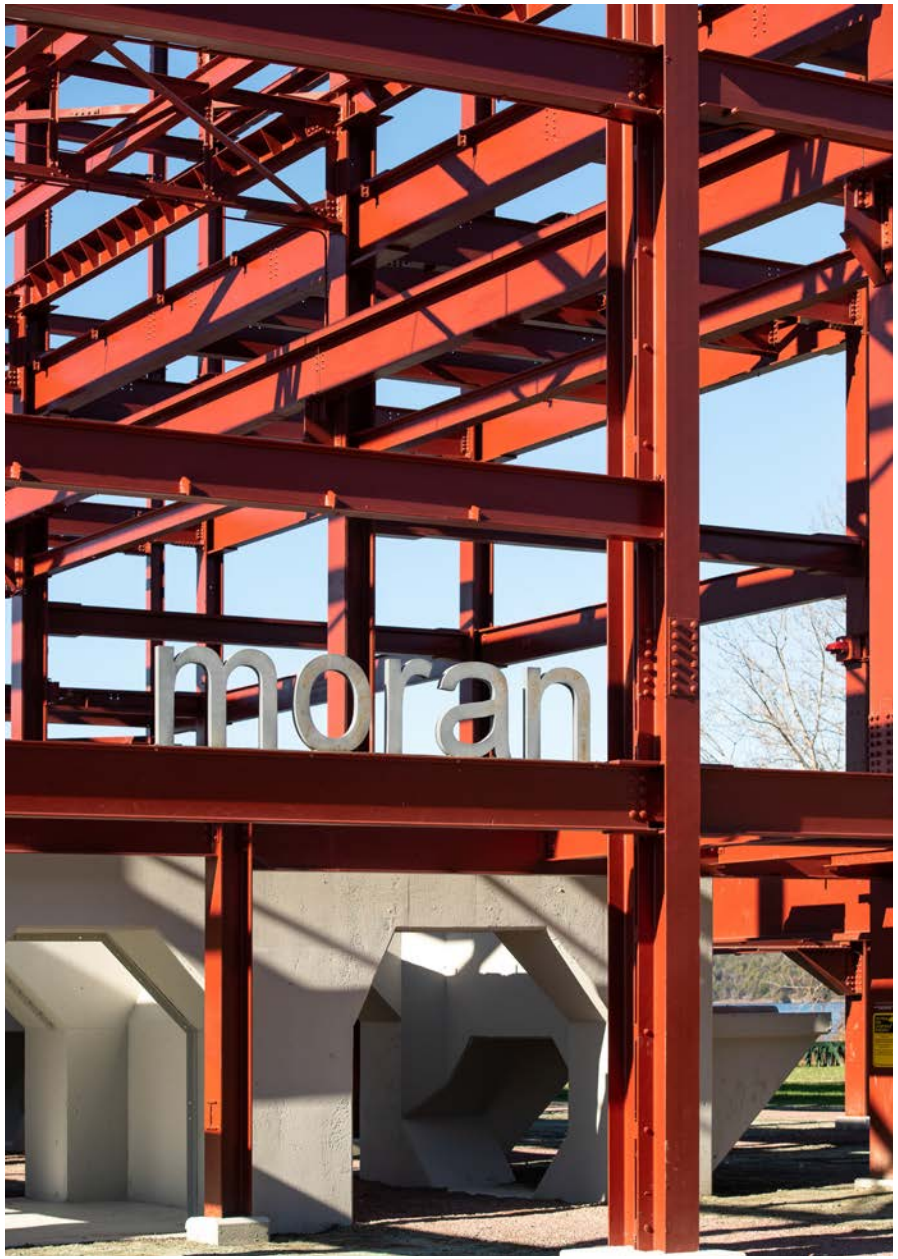


Figure 6.7: Moran FRAME, November 2022. Source: Ryan Bent Photography.

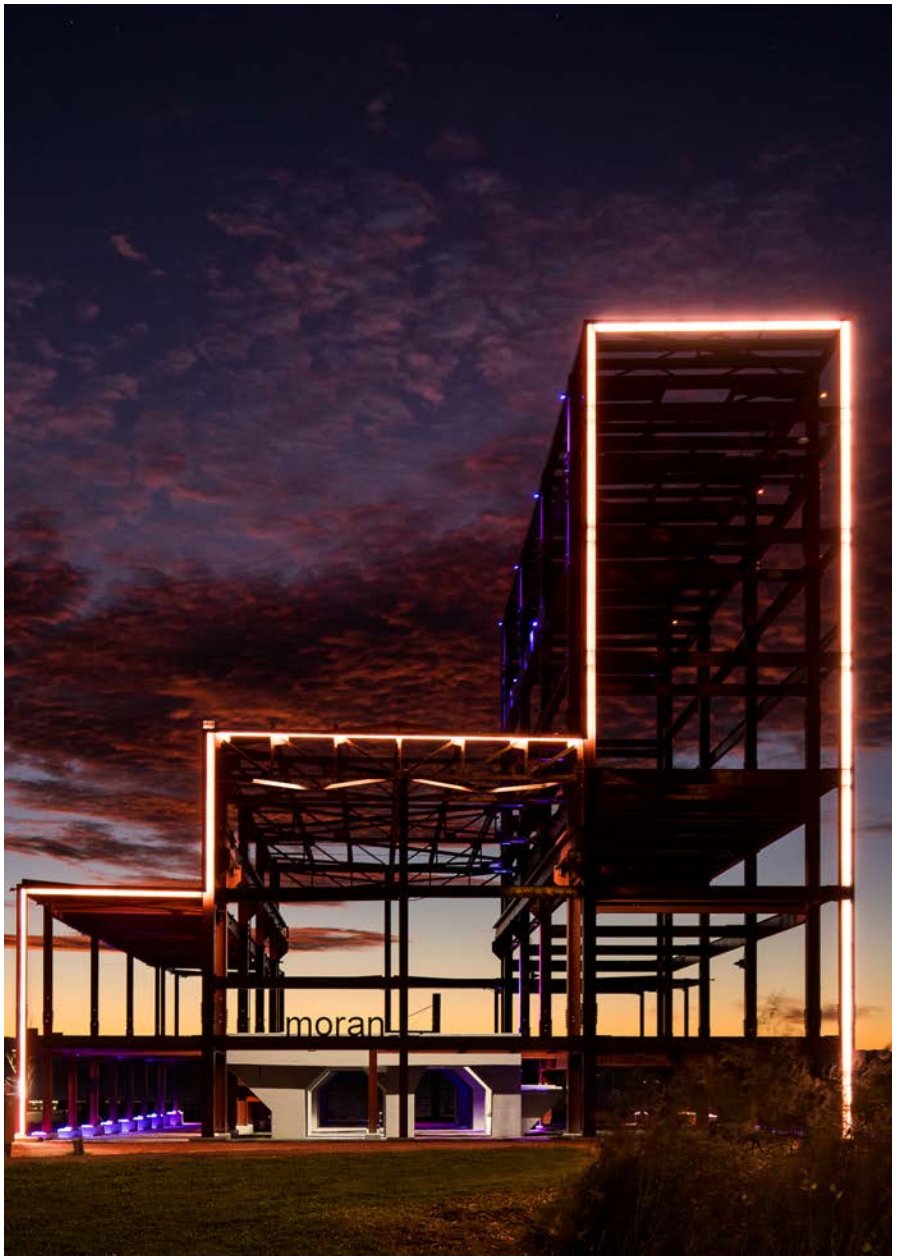


Figure 6.8: Moran FRAME, November 2022. Source: Ryan Bent Photography.

Figure 6.9: Moran FRAME from Battery Park, November 2022. Source: Ryan Bent Photography.

Figure 6.10: Moran FRAME from Battery Park, November 2022. Source: Ryan Bent Photography.

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Figure Citations

A.1 Undated bird’s eye view photograph. Burlington Electric Department Archives.

A.2 Thomas Richard Hudspeth. “Visual Preference as a Tool for Citizen participation: A Case Study of Urban Waterfront Revitalization in Burlington, Vermont,” 1979, Photograph. Courtesy of University of Vermont Silver Special Collections Library.

A.3 Moran FRAME from Water Works Park, April 2022. Photographer: Kaitlin O’Shea.

1.1 “Burlington Harbor and Rock Point,” circa 1918. Courtesy of the University of Vermont Silver Special Collections Library.

1.2 “Greetings from Burlington,” circa 1935, Paper. UVM Landscape Change Program, LS11303_000. Courtesy of the Fletcher Free Library.

1.3 Fleming Museum of Art, University of Vermont. Theodore Hopkins, Burlington Bay, c.1850, oil on panel, Gift of Walter Cerf 1981.16.

1.4 “In Tow Down Lake Champlain,” circa 1905, Paper, 13.8 x 8.9 cm. Llewellyn Collection of Vermont History, Lake Champlain Special Collections, Burlington, Vermont. 2010.1.570.

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1.12 Roger Conant, Ice Fishing at Burlington Harbor, 1910–40. Gelatin silver print, 8 x 10 in. Collection of Shelburne Museum. 27.12-524.

1.13 "Yacht Club, Burlington Vermont." 1916. Paper, 13.7 x 8.8 cm. Llewellyn Collection of Vermont History, Champlain College Special Collections, Burlington, Vermont. 2013.1.65.

1.14 Alvaro Adsit, Yacht Elfrieda in Burlington Breakwater, before 1900. Gelatin silver print, 5 1/8 x 9 in. Collection of Shelburne Museum. 27.12-501.

1.15 C.P. Hibbard, Ice boating on Lake Champlain, 1886. Courtesy of the University of Vermont Silver Special Collections Library.

1.16 "North Beach Opening," 1919, Photograph. UVM Landscape Change Program, LS11561_000. Courtesy of the Fletcher Free Library.

1.17 "Sea Plane at North Beach," 1919, Photograph. UVM Landscape Change Program, LS11410_000. Courtesy of the Fletcher Free Library.

1.18 Detroit Publishing Company, Steamer "Ticonderoga" Leaving Burlington, Vermont, 1907. Ink on paper, 3 1/2 x 5 1/2 in. Collection of Shelburne Museum Archives. PCSM-157.

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1.21 Thomas Richard Hudspeth. "Visual Preference as a Tool for Citizen participation: A Case Study of Urban Waterfront Revitalization in Burlington, Vermont," 1979, Photograph. Courtesy of University of Vermont Silver Special Collections Library.

1.22 Roger Conant, Generating Station in Burlington, Vermont, 1957. Gelatin silver print. Collection of Shelburne Museum. 27.12-408.

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3.11 Designer: Kimi Tokarczyk, VHB, 2021.

3.12 Roger Conant, Generating Station in Burlington, Vermont, 1957. Gelatin silver print. Collection of Shelburne Museum. 27.12-408.

3.13 "Citizens of Burlington: It's Your New Plant!" Burlington Free Press, October 20, 1954, 15.

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5.1 The Moran Plant in the early 1990s. Burlington Electric Department Archives.

5.2 Model of the Museum of Science and Education at the Moran Plant, 1989. Collection of Freeman French Freeman.

5.3 International Sculpture Symposium, 1990. Collection of Diana Carlisle.

5.4 Moran Plant exterior, National Register nomination, 2010. Photographer: Liisa Reimann.

5.5 Community Sailing Center at the Moran Plant, June 2016. Photographer: Kaitlin O'Shea.

5.6 Interior of the Moran Plant, 2015. Photographer: Daniel J. Cardon.

5.7 Interior of the Moran Plant, 2013. Collection of New Moran.

5.8 Moran Plant interior, National Register nomination, 2010. Photographer: Liisa Reimann.

5.9 Interior of the Moran Plant, January 2012. Photographer: Kaitlin O'Shea.

5.10 Moran FRAME, November 2022. Source: Ryan Bent Photography.

6.1 Rendering for the Moran FRAME. Collection of Freeman French Freeman.

6.2 Moran FRAME during soil restoration efforts, 2020. Photographer: Jeffords Steel and Engineering Company.

6.3 Moran Plant deconstruction progress, 2020-2021. Photographer: Kurt Muller.

6.4 Moran FRAME, November 2022. Photographer: Ryan Bent Photography.

6.5 Moran FRAME, November 2022. Photographer: Ryan Bent Photography.

6.6 Moran FRAME, November 2022. Photographer: Ryan Bent Photography.

6.7 Moran FRAME, November 2022. Photographer: Ryan Bent Photography.

6.8 Moran FRAME, November 2022. Photographer: Ryan Bent Photography.

6.9 Moran FRAME from Battery Park, November 2022. Source: Ryan Bent Photography.

6.10 Moran FRAME from Battery Park, November 2022. Source: Ryan Bent Photography.

B.1 Moran FRAME from Depot Street, April 2022. Photographer: Kaitlin O'Shea.

B.2 Undated photograph, Burlington Electric Department Archives.

Epilogue:
The Waterfront Reimagined

The Burlington waterfront has experienced transformational change since the first European settlers arrived in the late eighteenth century. This sheltered bay, carved out by the retreat of a continental ice sheet, has been the economic driver of Burlington since the city's founding. The waterfront has been used to store timber and petroleum. It has been developed, expanded, and abandoned by the railroad and most recently the waterfront has become a place of recreation and relaxation for Burlington's residents.

Originally built to power the city, the Moran FRAME now stands as a bridge between Burlington's industrial heritage and the city's present and future. The FRAME is a representation of the city's goals, of the desire to create a more environmentally responsible series of waterfront park and recreation amenities. A major source of pollution for decades, the Moran Plant, through conscientious environmental remediation, has been reimagined. The skeletal steel which once supported coal hoppers, furnaces, boilers, and turbines is now a piece of the Burlington skyline and the capstone of a waterfront reimagined.

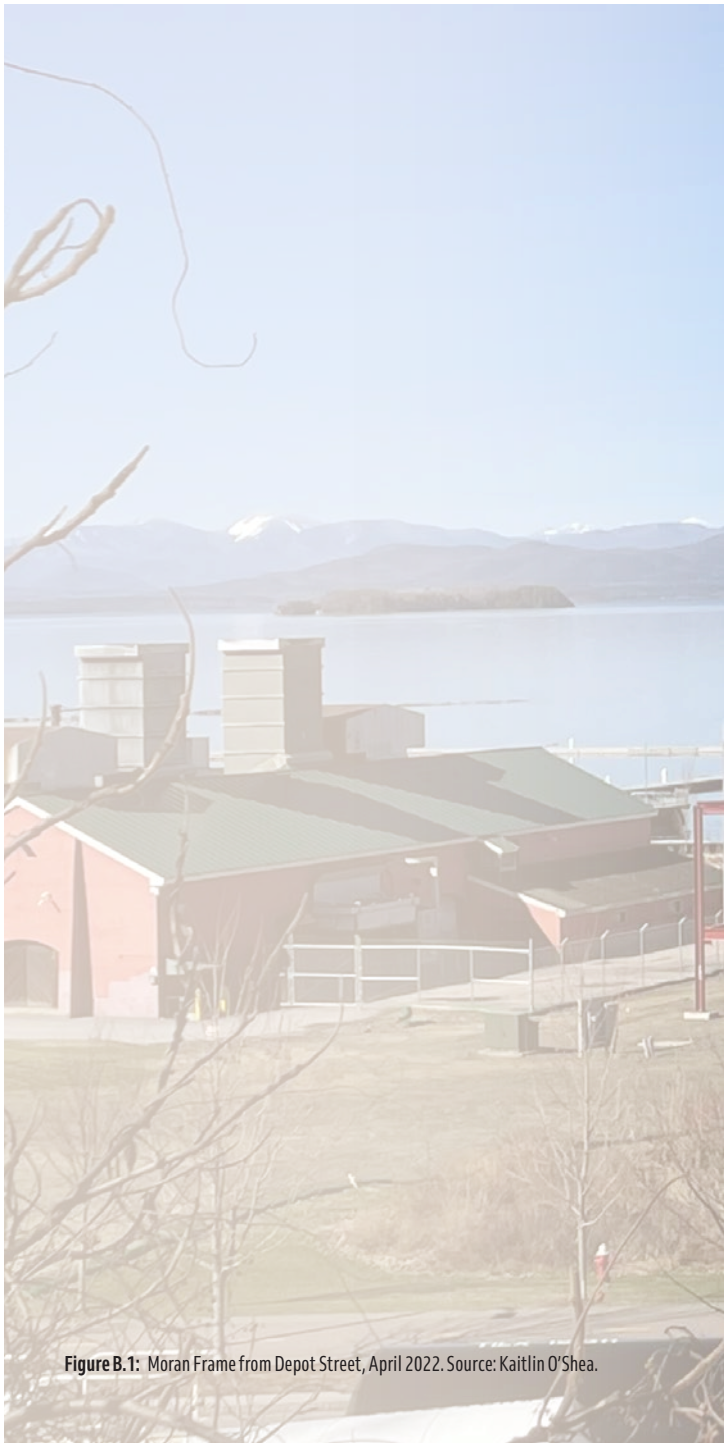

Figure B.1: Moran Frame from Depot Street, April 2022. Source: Kaitlin O'Shea.

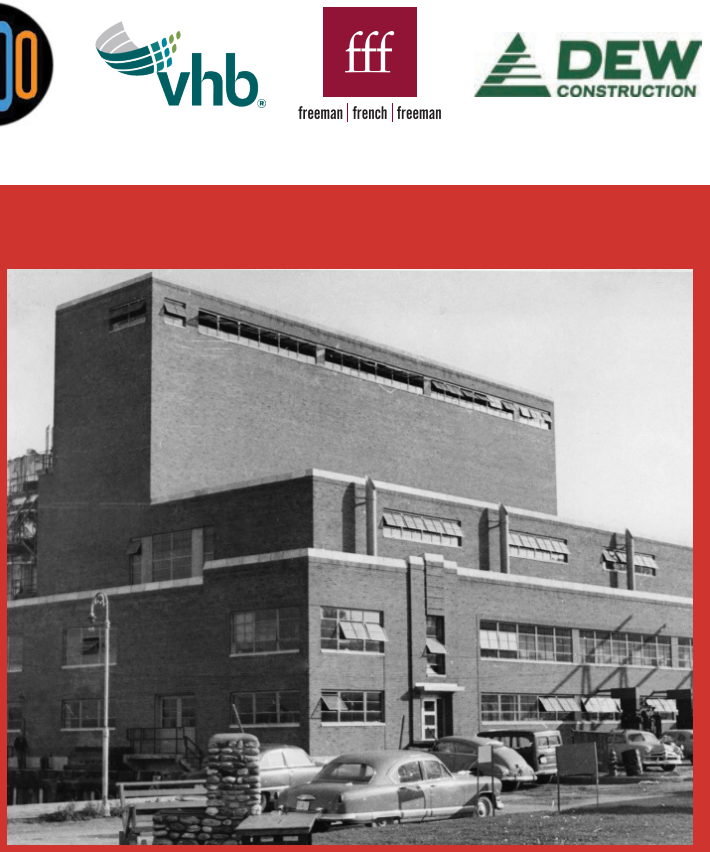

Figure B.2: The Moran Plant in the mid-1950s. Source: Burlington Electric Department.

The Moran Plant was a three-story, coal fired power plant that provided electricity to Burlington from 1954 until its decommissioning in 1986. Owned by the City of Burlington after 1986, the plant sat vacant and deteriorating as the waterfront transformed from an industrial center to a place of recreation and an important community asset. In 2018, Burlington adopted the FRAME concept, an ambitious plan that restored public access to this part of the waterfront, remediating, stabilizing and activating a derelict site and creating an iconic Burlington landmark that alludes to the area's industrial past. As part of the mitigation for the significant alteration to the historic building, Vanasse Hangen Brustlin (VHB) developed this booklet about the history of the Moran Plant and the history of Burlington's waterfront. The booklet was written by Matthew Shoen, Britta Tonn, and Samantha Alger and edited by Kaitlin O'Shea, Kurt Muller, and Brad Ketterling.