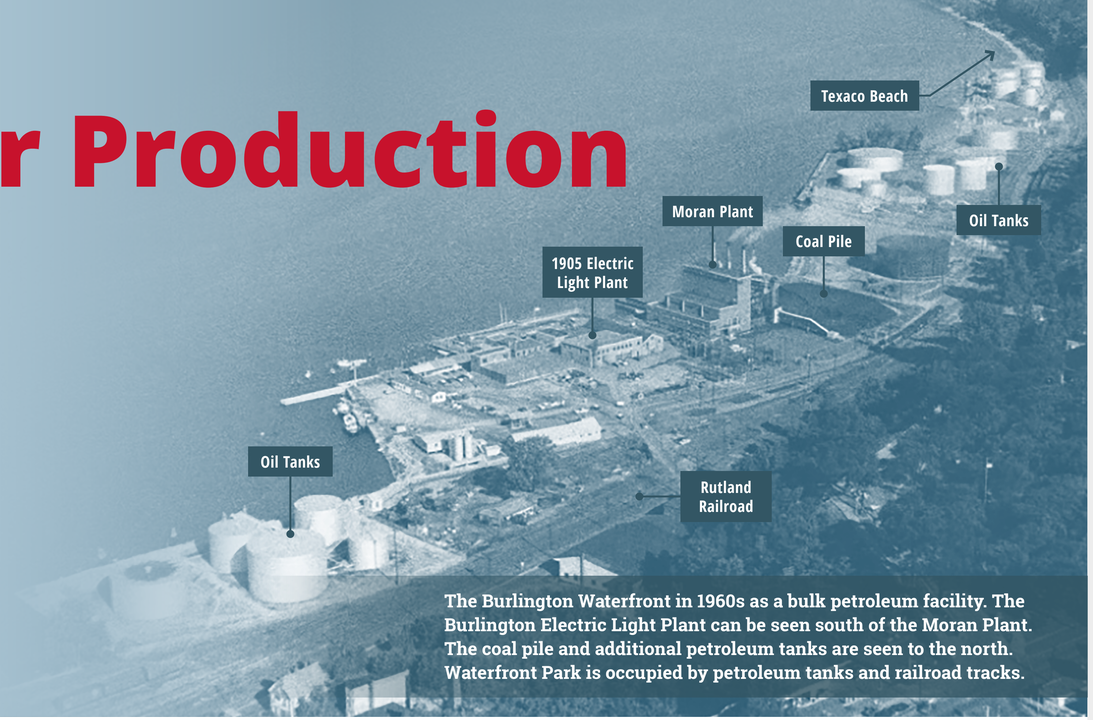
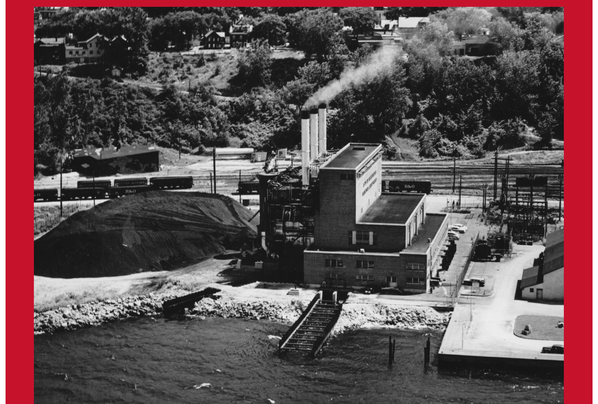
Electrical Power Production in Burlington

With the completion of the Champlain Canal in 1823 and bolstered by the arrival of the Rutland Railroad in 1849, the Burlington waterfront has a storied history of industrial use.



The Burlington Waterfront in 1960s as a bulk petroleum facility. The Burlington Electric Light Plant can be seen south of the Moran Plant. The coal pile and additional petroleum tanks are seen to the north. Waterfront Park is occupied by petroleum tanks and railroad tracks.

By the mid-1870s, Burlington was the third largest lumber port in the country and its waterfront, filled with lumber storage, rail sidings, factories and mills, drove the City's economy. Burlington's shoreline gradually moved westward with the repeated addition of fill. By the end of the 1950s, over 60 acres of new land had been added to the waterfront. By the mid-20th century, rail usage declined and the waterfront evolved into a bulk petroleum storage facility. At one time there were 83 above-ground oil storage tanks on the Burlington waterfront stretching from Oakledge Beach to North Beach. Removal of the petroleum tanks and revitalization of the waterfront began in the 1980s with construction of Waterfront Park and the Burlington Bike Path.



ELECTRICAL POWER PRODUCTION

Electricity first came to Burlington in 1886, when lights were installed throughout the City for its first Winter Carnival. Although several private companies provided electric power to Burlington in the late-19th century, by 1905, the Burlington Gas Light Company was the only provider. To compete with this privately owned company, residents voted to construct the City's first municipal power generating station in 1903. The City-owned, coal-fired Burlington Electric Light Plant opened in 1905, and still stands today just south of the Moran FRAME (*see image above*).

The demand for electricity increased in the first half of the 20th century and by 1950, the City's electrical system was undersized and outdated. In 1951, the City purchased land from the Central Vermont Railway for the construction a new electric generating facility. The Moran Municipal Generating Station, commonly referred to as the Moran Plant, began operations in 1955 on Burlington Electric Department's 50th anniversary. The Moran Plant facilitated the debut of electric heat to the City in 1957.

In part due to the energy crisis of the 1970s, in 1977, the City converted one of the coal-fired generators in the Moran Plant to wood burning. Within weeks, the Burlington Electric Department determined wood was more cost effective than coal and converted a second coal-fired generator to wood-fired in 1979. By 1980, construction began on the wood-fired McNeil Generating Station at the Intervale; it opened on March 17, 1984. Consequently, the Moran Plant was decommissioned in 1986. The building remained mostly vacant from 1986 until 2020, when it was dismantled except for the steel superstructure as part of the FRAME project.

At left is the Moran Plant in 1957, seen from above Lake Champlain looking east towards Burlington. The large coal pile sites are to the left of Moran Plant. Its exterior steel boiler and three smokestacks are on the left side of the plant. The 1905 Electric Light Plant is seen at the right in the image. *Source: Roger Conant,* Generating Station in Burlington, *Vermont, 1957. Gelatin silver print. Collection of the Shelburne Museum. 27.12-408.*

Scan here for more information and translations
Scanner ici pour avoir plus d'informations et pour les traductions
थप जानकारी र अनुवादको लागि यहाँ स्क्यान गरनुहोस्।
Halkan ku iskaan garee si aad u hesho macluumaad iyo turjumaad dheeraad ah
Escanee aquí para obtener más información y traducciones
Changua hapa upate taarifa zaidi na tafsiri

1823 Champlain Canal opens

1843 Chambly Canal opens

1849 Rutland & Burlington Railroad built on the Burlington waterfront

1860 -1890 The waterfront's busiest industrial years

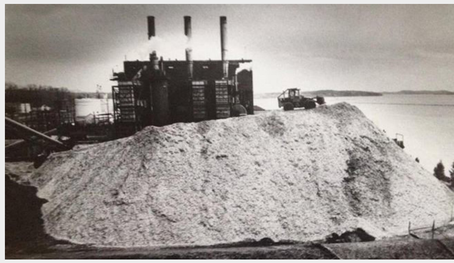
1886 Electricity comes to Burlington with the Brush Swan Electric Light & Power Company

1905 Burlington Electric Light Plant begins operation

1928 Green Mountain Power takes over Burlington Gas Light Company

1955 Moran Plant begins operation

1977 -1979 City converts two of the coal fired generating units in the Moran Plant to wood fired



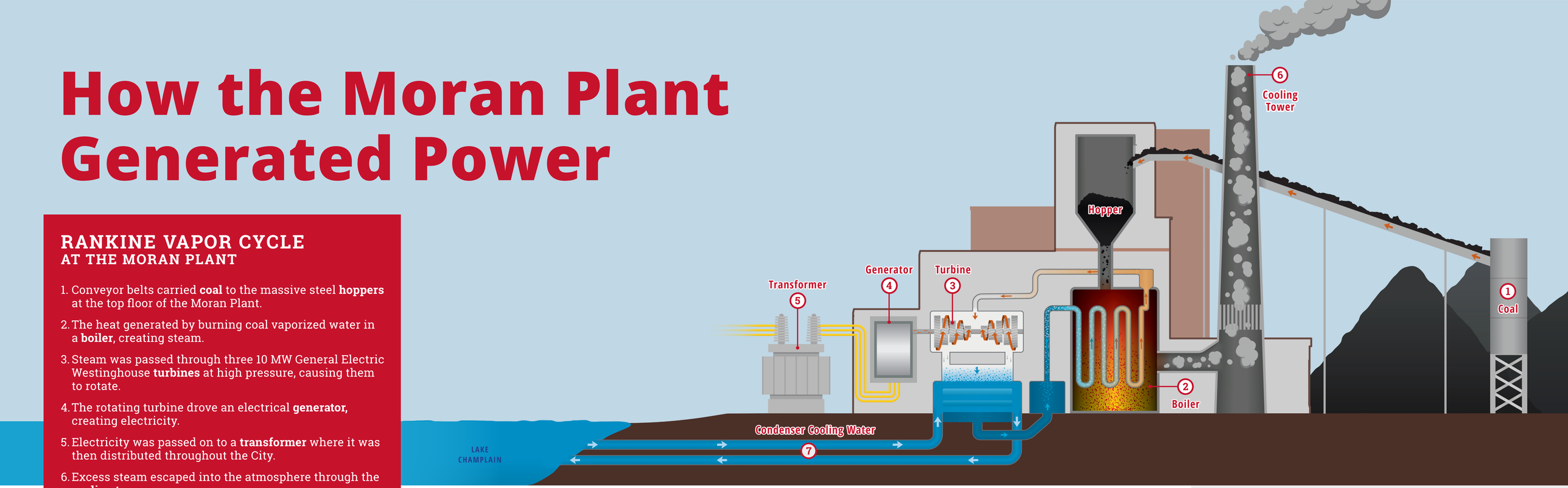
After 1977 when the Moran Plant converted to wood burning generators, the large pile of coal was replaced by the mountain of wood chips. This photograph looks south to the Moran Plant. *Source: Burlington Electric Department archives*

1984 McNeil Generating Station begins operation

1986 Moran Plant decommissioned

2020 Moran Plant dismantled, leaving the steel superstructure in place

How the Moran Plant Generated Power



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.

The Moran Plant generated electricity via the Rankine Vapor Cycle, named for thermodynamics pioneer William Rankine. The cycle requires three principal components: fuel, water, and a mechanism to be acted upon. In coal-fired power plants, the heat produced by burning coal vaporizes water in a boiler, creating steam that is passed through a turbine at high pressure causing it to rotate. The rotation of the turbine drives an electrical generator, producing electricity. The Moran Plant had a lake water intake system and trains brought coal directly to the plant.

Scan here for more information and translations
Scanner ici pour avoir plus d'informations et pour les traductions
थप जानकारी र अनुवादको लागि यहाँ स्क्यान गर्नुहोस्।
Halkan ku iskaan garee si aad u hesho macluumaad iyo turjumaad dheeraad ah
Escanee aquí para obtener más información y traducciones
Changua hapa upate taarifa zaidi na tafsiri

PURPOSEFUL DESIGN

Monumental power plants with ornate architectural details were favored in the early 1900s; but, by the 1950s, architects preferred simple, utilitarian designs that reflected the needs of the machinery and equipment housed inside. The Moran Plant's design reflected this mid-century utilitarian aesthetic. The plant was comprised of three stepped, flat-roofed units that were shaped by interior functions and reflected innovations and technological advancements in power plant design. Notably, the plant had an attached exterior steel boiler structure instead of a separate building to house the cooling and ventilation system, an important advancement in power plant design. The architecture intentionally projected a sense of clean, modern, unpretentious efficiency.

Although a small portion of the plant contained offices and locker rooms, most of the plant's interior consisted of large open spaces housing power generating equipment. Steel beams were exposed and the lack of interior partitions enhanced light penetration from industrial and clerestory windows and electrical fixtures. The unfinished concrete floors, plain brick walls, and exposed steel were materials chosen because of their functionality, low cost, and ability to withstand the constant vibrations of coal conveyors and the rotation of turbines.

Today, the Moran Plant's tiered steel superstructure has been repurposed as the FRAME, a public landmark at the heart of the redeveloped Burlington waterfront. The FRAME consists of an open-air park surrounding the superstructure of the Moran Plant. The FRAME remains as one of the vital links in the chain of lakeside amenities developed by the City while also representing the waterfront's industrial heritage.

Inside the Turbine Room of the Moran Plant main floor. The turbines are at the center and the switchgear cabinets are to the right. Note the heavy steel frame visible today and the wide, unobstructed walkways surrounding the generating equipment.
Source: Burlington Electric Department

Moran Plant viewed from the southwest. The building's overall form reflected its interior functionality, with the highest portion housing the hoppers that fed coal to the boilers.
Source: Burlington Electric Department

Scan here for more information and translations

Scanner ici pour avoir plus d’informations et pour les traductions

थप जानकारी र अनुवादको लागि यहाँ स्क्यान गर्नुहोस्।

Halkan ku iskaan garee si aad u hesho macluumaad iyo turjumaad dheeraad ah

Escanee aquí para obtener más información y traducciones

Changua hapa upate taarifa zaidi na tafsiri