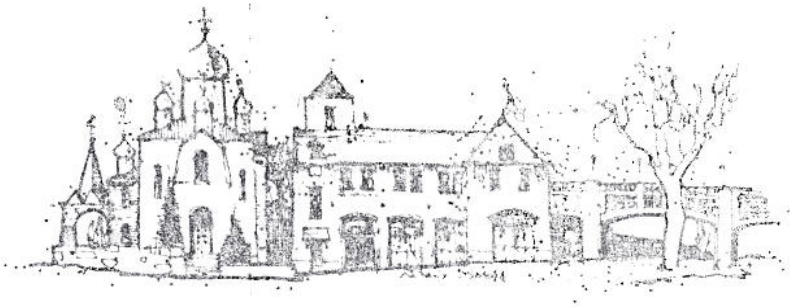

City of Seattle
Department of Community Development/Office of Urban Conservation LPB-160/79

Landmark Nomination Form

Name GEORGETOWN STEAM PLANT Year Built* 1906
(Common, present or historic)

☒ Landmark
☐ Landmark Site
☒ ~~Both~~

Street and Number NE CORNER, KING COUNTY AIRPORT

Assessor's File No. - - - -

Legal Description Plat Name - - - Block - - - Lot - - -

SUMMARY: N. & W.½ of Old Duwamish filled riverbed situated in portions of Sec. 28-24-4 and 29-24-4, Collins Donation Claim; the Queen City Suppl. Add.; and portion Lot 11, Duwamish Industrial Add.

(See attachment for full legal description)

Present Owner SEATTLE CITY LIGHT Present Use STAND-BY

Address 1015 - 3rd AVENUE, SEATTLE, WA. 98104

Original Owner SEATTLE ELECTRIC CO. Original Use ELECTRICITY GENERATOR

Architect _____ Builder STONE & WEBSTER ENGINEERING; BOSTON, MASS.

Designation Criteria:

Standards for Designation of Landmark Sites and Landmarks. (Ordinance 106348 Section 3.01). An object, site or improvement which is more than twenty-five (25)* years old may be designated for preservation as a landmark site or landmark if it has significant character, interest or value, as part of the development, heritgage or cultural characteristics of the city, state, or nation and if it falls into one of the following categories:

* INFORMATION SUMMARY ON PLANT BUILDING:

The Georgetown Steam Plant was designed in 1906 by Stone & Webster Engineering Corporation of Boston, Massachusetts. The plant is a substantial reinforced concrete frame structure located in an industrial area in the Georgetown district of south Seattle. The plant is roughly T-shaped in plan, one wing measuring 76 feet by 153 feet and the other measuring 79 feet by 64 feet with a 36 foot extension at one end. The exterior architectural treatment is a simplified industrial adaptation of the Neo-Classic style. Such characteristics as a cornice, belt course, water table and pilasters are incorporated in the design. The longer wing is four stories in height with a monitor or clerestory running the length of the roof. The shorter wing is five stories in height, also with a monitor

In terms of operating efficiency, the plant is very precisely organized. Its longest wing is devoted almost entirely to the production of steam. Before conversion to oil fired boilers, this wing consisted of four levels, each with a separate function. The entire coal and ash handling system within the building was arranged to allow the fuel and waste material to be simply dumped as necessary from one floor to the next without relying upon further mechanical distribution.

Oriented on a perpendicular axis across one end of the boiler wing, the second, shorter wing is devoted to generating electricity. Above the generators the engine room is open to the roof. A 50 ton crane runs on a track overhead to assist with disassembling the equipment for maintenance. Across from the generators on the opposite wall, the room is divided into a gallery with five levels. The lower floor is occupied by a bank of transformers and two exciters (small generators necessary to energize field windings in the turbo-generators to produce the basic electromagnetic force). Above this section at various levels are the plant office, the switchboard room, and other control equipment.

The Georgetown Steam Plant has undergone very little modernization since the installation of its third generator in 1917. The boilers were converted to steam atomized oil fired furnaces beginning in 1918 and the process of conversion continued until 1946. This modification was accomplished without requiring any substantial alterations to the building, although coal conveyor and ash cars were removed. When the King County Airport was constructed on adjoining property in the mid-1930's, it became necessary to replace the tall exhaust stack with roof mounted induced draft fans to prevent the stack from interfering with the flight path. Both original smoke flues were dismantled, and new ducts were installed to connect into the system of fans.

The plant was originally built on the east bank of the Duwamish River to take advantage of the river as a source of cooling water for the condensers and for conveniece in discharging wastewater. At roughly the same time the stack was removed the Duwamish was diverted to accommodate construction of the county airport, leaving the plant some distance from the river's new channel. A pumping station was therefore built to insure a continued supply of river water, and the discharge tunnel was also lengthened.

INFORMATION SUMMARY ON GENERATORS AT PLANT:

The Georgetown Steam Plant contains three steam turbine generators rated at capacities of 3,000 kw, 8,000 kw, and 10,000 kw. These generators were installed individually in 1907, 1908, and 1917 respectively. The two smaller machines are vertical Curtis turbine generators with the generating unit positioned directly above the turbine drive and connected by an upright shaft. The 10,000 kw machine is a Curtis turbine of the later horizontal type where the turbine is mounted alongside the generator and the connecting shaft is horizontal. All three turbo-generators are operational and most of the original ancillary equipment is still in place. The two vertical Curtis turbines at Seattle's Georgetown Steam Plant are understood to be the only turbines of this type that remain in an operating condition. The Curtis turbine generator, when first manufactured by the General Electric Company, more than tripled the power capacity of turbine generators then in use, at the time the world's most powerful steam driven turbine. It represented a significant achievement in eletric power generation technology that has had an influence on the design of all major thermal power generation systems built since its introduction. The success of the Curtis design established that the steam turbine was a practical and compact prime mover capable of producing large amounts of power.

Earl Curtis turbine generators were arranged with the generator positioned directly above the turbine and connected by a vertical shaft. This vertical configuration was an adaptation to steam turbines of an arrangement commonly used with hydroelectric generators. Its use was first proposed by William LeRoy Emmet, an electrical engineer employed by General Electric. The principal advantages were that stacking the components in this way required less floor space, and the connecting shaft was not subject to the stress of lateral distortion due to the force of gravity and the tremendous weight of the revolving parts. Emmet is the project engineer who is actually credited with achieving the practical development of the Curtis Turbine for use in the generation of electricty. Curtis himself is said to have opposed the vertical configuration, although he licensed his basic patents to the General Electric Company. General Electric abandoned its use of the vertical shaft as further refinements in the design of the turbine were adopted between 1908 and 1913. Operating speeds were increased from 500 rpm to 1800 rpm and eventually to 3600 rpm. At higher speeds it was necessary to restrain the top end of the shaft more effectively to prevent it from wobbling off center. The additional bracing required a much stiffer structure that could be more easily constructed if both ends of the shaft were supported directly on the floor of the building.

The 10,000 kw horizontal generator and its condenser are simpler and more compact than the two older vertical machines. It is smaller even than the 3,000 kw unit which has less than one-third its generating capacity. The vertical configuration requires the use of a step bearing to carry the tremendous weight of the revolving mass. This bearing actually floats the shaft on a thin layer of oil that it constantly injected by high pressure pumps. Finally, the original barometric condensers for the two vertical generators were rebuilt in 1965 and 1969. Both new condensers are in general duplications of the earlier installation as is apparent from the engineer's drawings on file.

MORE*

INFORMATION SUMMARY ON GENERATORS AT PLANT (cont):

The Georgetown Steam Plant is significant not only because it contains the last operating examples of the vertical Curtis turbine, but also because it includes an improved horizontal Curtis turbine installed ten years later. The horizontal machine represents the second generation of Curtis turbines and it reflects design improvements significant in themselves that were the result of early experiments with this type of power source. The Georgetown Plant and its equipment are a unique working demonstration of this period in the history of electric power generation technology.

INFORMATION SUMMARY ON PLANT HISTORY:

The Georgetown Steam Plant was originally built and operated by the Seattle Electric Company which was founded in the late 1890's when a number of Seattle's small, fiercely competitive electric utilities merged to form a single corporation. In response to renewed competition, in 1912 most of the city's remaining suppliers of electricity were further consolidated under the name Puget Sound Light, Traction and Power Company, which acquired the Georgetown plant in the merger. This combined organization was owned by Stone & Websters holding company subsidiary. Under pressure from the federal government, Stone & Webster was forced to divest itself of certain properties. To comply with the order, Stone & Webster relinquished the traction portion of its operations in Seattle, reorganizing under the name Puget Sound Power & Light Company but still under the control of the parent corporation. Finally in 1951, Seattle City Light bought out Puget Power & Light's Seattle area facilities, and the Georgetown Steam Plant came under municipal ownership.

The plant was last operated on a regular basis during World War II to alleviate critical shortages in generating capacity. Since then it has only been run to meet brief power shortages in the early 1950' and 1960's. Since that time, it has remained on stand-by status. The plant is only operated occasionally to check the condition of its equipment, but regular maintenance is performed to prevent deterioration. Heaters are used to stop moisture from condensing inside the machinery, and the shafts are rotated regularly to prevent them from permanently deforming or seizing the bearings. A recent test run surprised the plant engineers and demonstrated that the generators are capable of producing considerably more power than City Light previously estimated. This has resulted in an update revision in the plant's rating for stand-by capacity. A modern generating plant is approximately three times more efficient in its energy consumption for the production of an equivalent amount of electric power.

SEE ATTACHED

* INFORMATION SUMMARIES ARE CONDENSATIONS FROM THE FORM PREPARED BY JACOB THOMAS NOMINATING THE PLANT TO THE NATIONAL REGISTER (attached).

Nomination Submitted by Charles Royer, Mayor City of Seattle/by Roberta Deering, LPB Coordinator

Address 12th Floor, Municipal Building
600 - 4th Avenue, Seattle, Wa. 98104 Phone 625-4000

Date 16 May 1979

Reviewed _____ Date 16 May 1979
Historic Preservation Officer
(E.D. Layman)