



**COMMISSION
AGENDA MEMORANDUM**

Item No. 4g

ACTION ITEM

Date of Meeting December 13, 2016

DATE: December 5, 2016

TO: Ted Fick, Chief Executive Officer

FROM: Jeffrey Brown, Director, Aviation Facilities and Capital Programs
Wayne Grotheer, Director, Aviation Project Management Group

SUBJECT: Emergency Generator Controls Project (CIP #C800784)

Amount of this request: \$713,000

Total estimated project cost: \$2,500,000

ACTION REQUESTED

Request Commission authorization for the Chief Executive Officer to prepare design and construction bid documents for the Emergency Generator Controls Upgrade project at Seattle-Tacoma International Airport not to exceed \$713,000 for a total estimated project cost of \$2,500,000.

EXECUTIVE SUMMARY

This project will provide for the renewal and replacement of the existing control system and thereby extend the useful life of the generators that provide emergency electrical power to Concourses B, C, D, the Central Terminal, and the North and South Satellites. Emergency power is legally required for egress lighting within the terminal buildings and at other locations where interruption of power could produce life safety hazards. While the diesel engine generators are in good working condition, the manufacturer has discontinued support for the microprocessor based control system and no longer provides technical support or replacement parts.

Additionally, this project will install a load bank necessary for system compliance testing in a way that will not disturb normal power distribution or interrupt airport operations. Reliable emergency power is essential for public safety and the Port's Century Agenda goal of meeting the region's air transportation needs at Sea-Tac airport.

JUSTIFICATION

This project contributes to the Port's Century Agenda goal to meet the region's air transportation needs at Sea-Tac Airport for the next 25 years. This project extends the useful life of the existing emergency power system and minimizes operational costs and impacts of code-required compliance testing.

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The project manager will work with the Office of Social Responsibility to determine small business participation opportunities, in accordance with the terms of Resolution No. 3618.

DETAILS

The Port of Seattle currently utilizes two 750kW and two 1500 kW diesel engine powered emergency generators to supply National Electrical Code (NEC) required emergency power to Concourses B, C, D, the Central Terminal, and the North and South Satellites. These emergency generators are located at the Loading Dock level of the Sea-Tac Airport Main Terminal building and are approximately 20 years old.

The control and operation of these generators is through a set of six microprocessor based programmable logic controllers that have been discontinued and are no longer supported by the manufacturer. This project will provide for the renewal and replacement of the existing control system and thereby extend the useful life of the generator sets, valued at \$10 million, by an estimated 20 years. The second component of this project includes the installation of a load bank for NEC required monthly testing. The load bank is required because the generators must be tested under electrical load. Port maintenance staff was formerly able to test and exercise the emergency generators by utilizing airfield lighting load, but the airfield lights are no longer connected to this system.

The system will be designed and configured such that generator load testing does not disturb normal power distribution or interrupt power to other airport loads.

This system is necessary to provide legally required emergency power. The Washington Administrative Code (WAC) 296-46B-700 states all exit and emergency lights must be installed in accordance with Article 700 of the NEC. Emergency systems may also provide power for such functions where interruption would produce life safety hazards.

The future Airport wide Alternate Utility Power Facility will not meet the requirements of NEC Article for emergency power because doing so would be prohibitively expensive. Emergency wiring and power distribution equipment must be kept entirely independent of all other wiring and equipment. The Alternate Utility Power Facility project will utilize existing building power wiring and distribution equipment.

Scope of Work

This project will replace and program new controllers for the emergency generator control system. A load bank will also be installed for testing the emergency generators. Emergency generators will also be serviced as part of this project. Two of the existing generators will be restored to service to provide additional emergency power capacity.

All efforts within the design and construction phases will be supported by the utilization of small and diverse businesses within the scopes of work.

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Schedule

Activity

| | |
|---------------------------------------|----------------|
| Design start | 2017 Quarter 1 |
| Commission construction authorization | 2017 Quarter 4 |
| Construction start | 2018 Quarter 2 |
| In-use date | 2019 Quarter 1 |

Cost Breakdown

| | This Request | Total Project |
|--------------|------------------|--------------------|
| Design | \$713,000 | \$800,000 |
| Construction | \$0 | \$1,700,000 |
| Total | \$713,000 | \$2,500,000 |

ALTERNATIVES AND IMPLICATIONS CONSIDERED

Alternative 1 – Do not replace control system and utilize rental load bank for testing

Cost Implications:

Cost Estimate \$330,000

Total Cost of Ownership \$974,000

Annual Operating Costs \$45,000

Pros:

- (1) Lowest cost
- (2) System can be load tested to be in compliance with the NEC

Cons:

- (1) Risk of extended emergency power system failure
- (2) No manufacturer support for troubleshooting
- (3) Must utilize used parts with uncertain condition
- (4) No increased system capacity to accommodate growth
- (5) Load test requires approximately 400 annual staff hours
- (6) Annual drive lane closure in access tunnel for an estimated 6 days
- (7) Additional safety hazard with live high voltage cable in traffic control zone
- (8) Annual versus monthly load tests

This is not the recommended alternative.

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Alternative 2 – Replace control system and utilize rental load bank for testing

Cost Implications:

Cost Estimate \$2,000,000

Total Cost of Ownership \$2,700,000

Annual Operating Costs \$45,000

Pros:

- (1) System can be load tested to be in compliance with the NEC
- (2) New control system allows for continued reliable operation of emergency power system
- (3) Increased system capacity to accommodate growth

Cons:

- (1) Test requires approximately 400 annual staff hours
- (2) Annual drive lane closure in access tunnel for an estimated 6 days
- (3) Additional safety hazard with live high voltage cable in traffic control zone
- (4) Annual versus monthly load tests

This is not the recommended alternative.

Alternative 3 – Replace control system and install load bank for testing

Cost Implications:

Cost Estimate \$2,500,000

Total Cost of Ownership \$2,600,000

Annual Operating Cost \$9,000

Pros:

- (1) System can be load tested and in compliance with the NEC
- (2) New control system allows for continued reliable operation of emergency power system
- (3) Increased system capacity to accommodate growth
- (4) No impact to operations for testing
- (5) No significant increase in operational costs
- (6) Improved safety with no exposed high voltage cable in traffic control zones
- (7) Lowest Life Cycle cost which includes renewal of generator assets

Cons:

- (1) Highest first cost

This is the recommended alternative.

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FINANCIAL IMPLICATIONS

Capital costs to build improvements for control system and for required testing, and expense costs to service existing generators.

| <i>Cost Estimate/Authorization Summary</i> | Capital | Expense | Total |
|--|--------------------|------------------|--------------------|
| COST ESTIMATE | | | |
| Original estimate | \$995,000 | \$0 | \$995,000 |
| Budget increase | \$1,505,000 | \$140,000 | \$1,645,000 |
| Revised Budget | \$2,500,000 | \$140,000 | \$2,640,000 |
| AUTHORIZATION | | | |
| Previous authorizations | \$87,000 | \$0 | \$87,000 |
| Current request for authorization | \$713,000 | \$0 | \$713,000 |
| Total authorizations, including this request | \$800,000 | \$0 | \$800,000 |
| Remaining amount to be authorized | \$1,700,000 | \$140,000 | \$1,840,000 |

Annual Budget Status and Source of Funds

The Emergency Generator Controls Upgrade project (CIP #C800784) was included in the 2016-2020 capital budget and plan of finance as a business plan perspective project with a total capital budget of \$995,000. Additional capital budget of \$1,505,000 was transferred from the Aeronautical Allowance (CIP #C800753), resulting in no net change to the capital budget. The capital budget adjustment was a result of new project scope necessary to accommodate NEC required testing and control system improvements. This project will be funded by the Airport Development Fund.

Financial Analysis and Summary

| | |
|---|--------------------------------------|
| Project cost for analysis | \$2,500,000 |
| Business Unit (BU) | Terminal Building |
| Effect on business performance (NOI after depreciation) | NOI after depreciation will increase |
| IRR/NPV (if relevant) | N/A |
| CPE Impact | \$0.01 in 2020 |

Future Revenues and Expenses (Total cost of ownership)

The preferred alternative will not substantially increase operational costs. Total cost of ownership is \$2,600,000, reflecting the up-front capital costs and the net present value of relatively minimal ongoing operating costs.

ATTACHMENTS TO THIS REQUEST

None

PREVIOUS COMMISSION ACTIONS OR BRIEFINGS

None