

Docket No. GMCB-017-15con

Certificate of Need Application
Replacement Boiler Plant
Southwestern Vermont Medical Center
June 27, 2016

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Organizational Chart**

Project Description

Southwestern Vermont Medical Center (SVMC) proposes to replace its aged and inefficient oil burning boilers on the Bennington Campus with modern, clean burning efficient boilers that decrease operating expenses and reduce harmful emissions. The total project cost of is estimated to be \$3,750,000 and is expected to reduce operating expenses by more than \$200,000 annually. We request CON approval as soon as reasonably possible to maintain the project timeline (appendix 1).

SVMC requests approval to replace its boilers for the following reasons;

- o The current boilers are more than 35 years old and significantly beyond their useful life of 25 years;
- o The current boilers inefficiently burn outdated #6 oil;
- o The proposed replacement boilers burning natural gas have advanced capabilities;
 - More energy efficient, saving 4,199 MMBTU's (Million British Thermal Units) annually;
 - Cleaner burning, saving 1,888 metric tons of carbon dioxide (equivalent to removing 392 automobiles);
 - More reliable reducing repair and maintenance costs;
 - Elimination of Hazardous Air Containment fees associated with burning #6 oil;
 - Reduction in fire risk to patients and patient care facilities;
 - Increased flue type flexibility for prospective conversion to biomass fuel.
- o The new boilers will reduce operating expenses by more than \$200,000 annually.

	Current state Old Boilers Burning #6 Fuel	Future state New Boilers burning cNG Year 1	Future state New Boilers burning cNG Year 2
Capital Expenditure		\$ 3,750,000	
Operational Expense			
Depreciation - Building (\$1,884,500 30 years)		\$ 31,408	\$ 62,817
Depreciation - Fixed Equip (\$1,865,500 20 years)		46,638	93,275
Depreciation subtotal		78,046	156,092
Fuel Expense	1,116,500	760,000	760,000
Maintenance expense	30,000	15,000	15,000
Total Operational Expense	1,146,500	775,000	775,000
Total Expense	1,146,500	853,046	931,092
Annual Savings		293,454	215,408

SVMC intends to construct a 3,600 sq ft prefabricated metal building to house the replacement boilers and steam plant. Facility design schematics (current and future state) are in appendix 2. This facility will relocate the boiler plant 200 yards from patient care areas and thereby increase patient safety by reducing fire risk to patients and patient care areas. Steam will be piped underground to the buildings throughout the Bennington campus. The steam will be used for heating buildings, hot water and sterilization. The steam will not be used for electricity generation.

The project also involves removal of the existing oil boilers and two 20,000 gallon underground #6 fuel oil storage tanks. We do not anticipate the need for environmental remediation and will work closely with Vermont's Department of Environmental Conservation as this project proceeds.

The primary fuel for the replacement boilers will be natural gas. The back-up fuel will be #2 oil. As such, the project also includes installation of a compressed natural gas decompression station and a 20,000 gallon above ground #2 fuel oil storage tank. After extensive investigation, natural gas was selected as the fuel source because it is reliably available, clean burning, requires little operational oversight or dedicated employees, and will provide significant operational savings. One of the replacement boilers will have the capability to convert to a biomass boiler if future fuel price, availability or regulations make it favorable to burn biomass fuel. We have worked closely with Efficiency Vermont and the interested parties to vet the options and develop the boiler design. On April 13, 2016 we obtained verbal approval from the interested parties in the CON process for the proposed boiler plant design including installation of the 500 HP convertible boiler.

Consideration was given to the on-site storage of compressed natural gas, the design of the decompression station and the impact of natural gas deliveries on patients and the community. We expect that SVMC will average 3 deliveries of natural gas per week with 4-5 deliveries per week under rare peak conditions. Deliveries would enter campus using major thoroughfares, as do all box trucks, and increase truck deliveries to SVMC by a mere 10%. Once on SVMC's campus, all trucks are routed around the perimeter, away from patient and staff parking. These routes have proven safe and undistruptive to the neighboring community, patients and employees.

The cost of the project are necessary and reasonable. Less expensive alternatives that deliver reliability and future fuel flexibility are not available or appropriate. The project will not disrupt current services or create undue impact on patients. The project will serve the public good through reducing SVMC's operating expenses, affording reliability to SVMC's steam generation system, and by decreasing emissions that harm health. In addition the proposed boiler plant with convertible boiler increases SVMC's fuel type flexibility by allowing an easier transition to biomass fuel when biomass fuel availability and pricing, and financial conditions warrant.

Summary Project Description

Location of the proposed project– The replacement boilers would be installed on SVMC's Bennington campus. SVMC intends to construct a 3,600 sq ft prefabricated metal building to house the replacement boilers and steam plant. Steam will be piped underground and connect to the current steam pipes at the location of the current boilers. From there, the steam will be piped through the current pipe network throughout the campus.

Service to be added and proposed location were the services will be rendered– This project is not associated with any new clinical care services.

Description of the proposed service area– SVMC's serves the population within Bennington County, Western Windham County, the Eastern NY counties of Rensselaer and Washington and Northern Berkshire County, MA. The installation of a replacement boiler providing steam to SVMC's main campus in Bennington will serve these communities because residents typically travel to Bennington for care such as emergency care, imaging and diagnostic testing, inpatient care and surgeries.

Detailed description of equipment to be purchased– SVMC plans to purchase (Qty. 2) , Model Mohican Model 2000, 400 bhp fire-tube boilers, Superior Boiler Works, and (Qty. 1) Model N65, 500 bhp convertible biomass boiler, Hurst Boiler, Inc. Each fire-tube boiler shall be rated for 16,738 MBH input capacity, 13,390 MBH output capacity and 13,330 lbs/hr of steam output when operating at 105 psig steam. The convertible biomass boiler shall be rated for 20,922 MBH input capacity, 16,378 MBH output capacity and 16,660 lbs/hr of steam output when operating at 105 psig steam.

The new boilers shall be equipped with parallel positioning Combustion Control Systems (CCS) and Burner Management Systems (BMS). Each boiler CCS shall incorporate oxygen trim and variable speed combustion blowers. These boilers were chosen because of their efficiency levels and manufacturer reputation. The boiler design achieves an approximate 80% fuel-to-steam efficiency with 3.0% excess oxygen content when burning natural gas and 82% fuel-to-steam efficiency with 3.0% excess oxygen when burning #2 fuel oil. This is considerably more efficient than our current boilers burning #6 fuel oil which deliverer 78% combustion efficiency and 6.3% percent oxygen content. The replacement boilers will save approximately 4,199 MMBTU annually. There are an abundance of service companies centrally located to the hospital that can perform preventative maintenance and repairs on the boilers.

Number of square feet of renovation/new construction– SVMC will construct a 3,600 sq ft prefabricated metal building to house the boilers. The project also includes installation of a compressed natural gas decompression station and a 20,000 gallon above ground #2 fuel oil storage tank. Approximately 200 yards of steam piping will also be installed.

Total Project Cost– Total project costs are estimated to be \$3,750,000 comprised of 4 main components;

- Two Mohican boilers \$ 452,000
- One Hurst boiler \$ 380,000
- Prefab metal building and decompression station \$ 696,000
- Control systems, installation, permits and contingency, etc. \$ 2,222,000

There are no information technology expenses associated with this project.

A summary of the construction and installation expenses in CSI16 format appears below;

Division	SUMMARY- DO NOT CHANGE	MATERIAL Cost	LABOR Cost	OTHER Cost	TOTAL Cost
1	General	\$ 110,000.00	\$ 433,500.00	\$ -	\$ 543,500.00
2	Sitework	\$ 65,000.00	\$ 360,000.00	\$ -	\$ 425,000.00
3	Concrete	\$ 70,000.00	\$ 35,000.00	\$ -	\$ 105,000.00
4	Masonry	\$ -	\$ -	\$ -	\$ -
5	Metals	\$ -	\$ -	\$ -	\$ -
6	WoodPlastics	\$ -	\$ -	\$ -	\$ -
7	ThermalMoisture	\$ 74,000.00	\$ 40,000.00	\$ -	\$ 114,000.00
8	DoorsWindows	\$ 30,000.00	\$ 15,000.00	\$ -	\$ 45,000.00
9	Finishes	\$ 4,500.00	\$ 2,500.00	\$ -	\$ 7,000.00
10	Specialties	\$ -	\$ -	\$ -	\$ -
11	Equipment	\$ -	\$ -	\$ -	\$ -
12	Furnishings	\$ 4,500.00	\$ 500.00	\$ -	\$ 5,000.00
13	Special Construction	\$ 300,000.00	\$ 60,000.00	\$ -	\$ 360,000.00
14	Conveying	\$ -	\$ -	\$ -	\$ -
15	Mechanical	\$ 1,041,250.00	\$ 824,250.00	\$ -	\$ 1,865,500.00
16	Electrical	\$ 85,000.00	\$ 195,000.00	\$ -	\$ 280,000.00
	TOTAL	\$ 1,784,250.00	\$ 1,965,750.00	\$ -	\$ 3,750,000.00

These costs are reasonable and necessary. The complete CSI detail appears in appendix 3 and quotes from our construction partner (Trane Building Services) and from our compressed natural gas distributor (Direct Energy) appear in appendix 4 & 5, respectively.

We anticipate the replacement boilers to decrease operating expenses by more than \$200,000 annually, primarily driven by a reduction in fuel and staff expenses. The efficient boilers burning natural gas require less expenses per MMBTU than the current inefficient boilers burning #6 oil. Also fewer staff are required to operate and maintain the replacement boilers than are required to operate and maintain the aged and outmoded current boilers.

	Current state Old Boilers Burning #6 Fuel	Future state New Boilers burning cNG Year 1	Future state New Boilers burning cNG Year 2
Capital Expenditure		\$ 3,750,000	
Operational Expense			
Depreciation - Building (\$1,884,500 30 years)		\$ 31,408	\$ 62,817
Depreciation - Fixed Equip (\$1,865,500 20 years)		46,638	93,275
Depreciation subtotal		78,046	156,092
Fuel Expense	1,116,500	760,000	760,000
Maintenance expense	30,000	15,000	15,000
Total Operational Expense	1,146,500	775,000	775,000
Total Expense	1,146,500	853,046	931,092
Annual Savings		293,454	215,408

How will the project be financed– SVMC plans to finance this capital project from operating revenue, thereby no debt will be incurred specifically to this project. The cost of this project was included in the capital fiscal year 2015 & 2016 capital budgets submitted to the Green Mountain Care Board (GMCB). Since the project was put on temporary hold the cost of the project will be included in the capital budget for fiscal years 2016 & 2017.

Need for the project including data– SVMC requests approval to replace its boilers for the following reasons;

- The current boilers are more than 35 years old and significantly beyond their useful life of 25 years;
- The current boilers inefficiently burn outdated #6 oil;
- The proposed replacement boilers burning natural gas have advanced capabilities;
 - More energy efficient, saving 4,199 MMBTU's (Million British Thermal Units) annually;
 - Cleaner burning, saving 1,888 metric tons of carbon dioxide (equivalent to removing 392 automobiles);
 - More reliable reducing repair and maintenance costs;
 - Elimination of Hazardous Air Containment fees associated with burning #6 oil;
 - Reduction in fire risk to patients and patient care facilities;
 - Increased flue type flexibility for prospective conversion to biomass fuel.
- The new boilers will reduce operating expenses by more than \$200,000 annually.

Objective to be achieved by the project– SVMC seeks to replace the current aged and outmoded boilers with modern boilers that are more reliable, energy efficient and fuel type flexible. The energy efficiency translates into a reduction in carbon admissions, lower fuel costs

and lower operating expenses. The savings achieved by implementing this project will provide additional resources that can be redirected towards patient care.

Impact on healthcare costs, access and quality– We do not anticipate that this project will directly impact healthcare costs, access or quality. However, the operational savings achieved by the project might secondarily allow resources to be leveraged to improve access and care quality. Moreover, implementation of modern boilers that decreasing operating expenses is part of SVMC’s strategy to reduce operating expenses and better manage future rate increase requests. Lastly, installing boilers that create less pollution will increase the health of the surrounding community.

Project beginning and completion date– SVMC is poised to begin the project upon approval from the GMCB. Appendix 1 is a timeline for the project. We anticipate gaining swift approval for this project, breaking ground in October, 2016 and completing the project 7 months later in April, 2017. We have a contract with our construction partner, Trane Building Services (www.Trane.com). Trane specializes in boiler installation projects and is committed to completing the project on time and under budget.

The remainder of this application addresses the CON statutes and CON standards indicated in the jurisdiction letter dated August 12, 2015.

CON Statutory Criteria

CON Statutory Criteria 1- the application is consistent with the health resource allocation plan;

The application is consistent with the health resource allocation plan as evidenced by consistency with specific CON standards demonstrated below.

CON Standard 1.9: Applicants proposing construction projects shall show that costs and methods of the proposed construction are necessary and reasonable. Applicants shall show that the project is cost-effective and that reasonable energy conservation measures have been taken.

The costs and methods of the proposed project are necessary and reasonable. Total project costs are estimated to be \$3,750,000 comprised of 4 main components;

- Two Mohican boilers \$ 452,000
- One Hurst boiler \$ 380,000
- Prefab metal building and decompression station \$ 696,000
- Control systems, installation, permits and contingency, etc. \$ 2,222,000

There are no information technology expenses associated with this project.

The cost of the steam boilers is reasonable. Trane Building Services, our construction partner, specializes in boiler installation projects and frequently works with Superior Boiler Works and Hurst Boiler, Inc. on commercial boiler fabrication and installation. Both boiler companies have been producing high quality boilers at competitive prices and installing them throughout the region for decades. In particular the Hurst boiler is specifically designed to be converted to a biomass boiler and has been installed in that configuration at several institutions throughout New England. The steam boilers burning natural gas balance reliability, efficiency and convenience with price, while maintain future fuel flexibility.

Construction of the metal building is necessary to house the replacement boilers at a safe distance from patient care areas. The cost of the metal building and decompression station are also reasonable. Costs have been dutifully negotiated and the facility has been value engineered. Similarly the costs for boiler installation, permitting and other dimensions of the project have been fully vetted as reasonable and necessary.

A summary of the construction and installation expenses in CSI16 format appears below;

Division	SUMMARY- DO NOT CHANGE	MATERIAL Cost	LABOR Cost	OTHER Cost	TOTAL Cost
1	General	\$ 110,000.00	\$ 433,500.00	\$ -	\$ 543,500.00
2	Sitework	\$ 65,000.00	\$ 360,000.00	\$ -	\$ 425,000.00
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8	DoorsWindows	\$ 30,000.00	\$ 15,000.00	\$ -	\$ 45,000.00
9	Finishes	\$ 4,500.00	\$ 2,500.00	\$ -	\$ 7,000.00
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11	Equipment	\$ -	\$ -	\$ -	\$ -
12	Furnishings	\$ 4,500.00	\$ 500.00	\$ -	\$ 5,000.00
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14	Conveying	\$ -	\$ -	\$ -	\$ -
15	Mechanical	\$ 1,041,250.00	\$ 824,250.00	\$ -	\$ 1,865,500.00
16	Electrical	\$ 85,000.00	\$ 195,000.00	\$ -	\$ 280,000.00
	TOTAL	\$ 1,784,250.00	\$ 1,965,750.00	\$ -	\$ 3,750,000.00

These costs are reasonable and necessary. The complete CSI detail appears in appendix 3 and quotes from our construction partner (Trane Building Services) and from our compressed natural gas distributor (Manheim CNG Center) appear in appendix 4 & 5, respectively.

We anticipate the replacement boilers to decrease operating expenses by more than \$200,000 annually primarily driven by a reduction in fuel and staff expenses. The efficient boilers burning natural gas require less expenses per MMBTU than the current inefficient boilers burning #6 oil. Also fewer staff are required to operate and maintain the replacement boilers than are required to operate and maintain the aged and outmoded current boilers.

	Current state Old Boilers Burning #6 Fuel	Future state New Boilers burning cNG Year 1	Future state New Boilers burning cNG Year 2
Capital Expenditure		\$ 3,750,000	
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Total Expense	1,146,500	853,046	931,092
Annual Savings		293,454	215,408

CON Standard 1.10: Applicants proposing new health care projects requiring construction shall show such projects are energy efficient. As appropriate, applicants shall show that Efficiency Vermont, or an organization with similar expertise, has been consulted on the proposal.

Efficiency Vermont has assigned a designated energy consultant to review the project design and support energy efficiency initiatives. This work has included providing technical assistance and recommendations, cost/benefit analyses and collaboration with architects and contractors. By partnering with Efficiency Vermont, SVMC is ensuring that every effort is being taken towards energy efficiency within the specifications of this project. A letter confirming engagement of Efficiency Vermont appears in appendix 6.

SVMC has also adjusted the boiler plant design in response to the CON interested parties. The proposed design in this replacement CON includes a 500HP convertible boiler that could be converted to burn biomass when financial conditions sensibly support the transition. This adjustment to the boiler plant provides fuel flexibility as supported by Efficiency Vermont.

CON Standard 1.11: Applicants proposing new health care projects requiring new construction shall demonstrate that new construction is the more appropriate alternative when compared to renovation.

The project to replace SVMC's boilers requires new construction. Careful consideration was given to renovation, however for the following reasons new construction was selected;

- New construction is less expensive than renovation of the current space
- New construction can occur without the hindrance and disruption of operations of the current boiler plant
- Decommissioning of current outmoded boilers and removal of the #6 oil tanks can occur more easily while the remote boiler plant is operational
- Appropriate space for a natural gas decompression station is not available adjacent to the current boiler plant
- The current boiler plant is nearby patient care areas and remotely locating the new boiler plant reduces fire risk to patients and patient care areas

SVMC explored several options as the fuel source for the replacement boiler system. Each fuel source was compared across several dimensions. Natural Gas was selected as the primary fuel source with #2 oil as back-up.

Regionally, oil #6 is being discontinued as a fuel source and therefore this fuel will be increasingly difficult to obtain. Oil #6 also does not burn clean and would create a substantial environmental hazard if a tank leaked or there was a significant spill. As such, oil #6 was not chosen as a fuel source for the replacement boilers.

Oil #2/#4 is more readily available than oil #6, however projections indicate it will become increasingly more expensive. In addition, boilers burning oil create more pollution and need

more maintenance and staff for operation than boilers burning other fuel sources. As such, oil #2/#4 is not the optimal fuel choice for SVMC's replacement boilers.

Propane is a reasonable fuel source and has many desirable features. However, it is heavier than air and as such, a leak or spill would result in a significant safety risk. Moreover, propane storage requires significantly more space than natural gas and would require a considerably larger decompression station. As such, propane was not selected as a fuel source for the replacement boilers.

Biomass is a cost effective solution when considering only fuel costs. However burning biomass creates significant emissions without expensive pollution control systems. A biomass plan also requires a very large bunker for fuel storage that can be expensive to construct. The associated biomass boilers require additional routine maintenance and ash removal processes. Lastly a biomass boiler plant is more expensive than constructing a cNG plant. Although a renewable resource, biomass is not the best option as a fuel source for SVMC's replacement boilers at this time. However, SVMC has elected to install a convertible boiler that could be adapted to burn biomass if regulations or financials conditions in the future warrant.

Compressed natural gas has the best balance of cost, efficiency, operations, site requirements and environmental risks. For SVMC's application, natural gas is the most logical fuel source. For references supporting the statements above and the decision to install 2 boilers fitted to burn cNG and one convertible boiler with future biomass capabilities, see appendix 7.

Consideration was given to the on-site storage of compressed natural gas, the design of the decompression station and the impact of natural gas deliveries on patients and the community. The natural gas decompression station configuration allows the docking and simultaneous storage of three box trucks containing compressed natural gas tanks. When the tanks in one box truck are empty the system automatically switches to the tanks in the next available truck docked at the decompression. We expect that SVMC will have 3 deliveries of natural gas per week, each replacing one empty box truck, thereby rotating the stock.

Deliveries would enter campus using major thoroughfares, as do all box trucks currently entering campus to delivery supplies or equipment. These routes have been proven safe and undisruptive to neighbors and the local community. SVMC typically receives 3-5 deliveries from similar box trucks each day. Receiving compressed natural gas by box truck will increase truck deliveries to SVMC by a mere 10% (from 28 trucks /week to 31 trucks / week).

Once on SVMC's campus, all trucks are routed around the perimeter, away from patient and staff parking and towards the loading dock at the rear of the hospital. The trucks delivering natural gas to the decompression station would follow the same perimeter route. This route has been proven safe and undisruptive to patients and employees.

CON Standard 1.12: New construction health care projects shall comply with the Guidelines for Design and Construction of Health Care Facilities as issued by the Facilities Guidelines Institute (FGI), 2014 edition.

This project complies with the standards of;

- Guidelines for Design and Construction of Health Care Facilities, and
- Facilities Guidelines Institute (FGI), 2014 edition

Attestation of this compliance across the entire project is provided in a memo from our design and construction partner (appendix 8)

CON Standard 3.4: Applicants subject to budget review shall demonstrate that a proposed project has been included in hospital budget submissions or explain why inclusion was not feasible.

The project to replace the SVMC’s boilers was included in fiscal years 2015 and 2016 capital budgets. Since the project was put on temporary hold the cost of the project will be included in the capital budget for fiscal years 2016 & 2017. The total cost of the project reported in this application is consistent with that indicated in budget submissions.

CON Statutory Criteria 2- the cost of the project is reasonable, because:

(A) the applicant’s financial condition will sustain any financial burden likely to result from completion of the project;

SVMC’s boiler plant is critical infrastructure whose modernization is long overdue. The hospital’s overall financial health over the past 5 years has improved and replacing the current inefficient boilers with a more efficient boiler plant will further contribute SVMC’s financial health. SVMC plans to finance this capital project from operating revenue, thereby no debt will be incurred. The cost of this project was included in the fiscal year 2015 & 2016 capital budgets submitted to the GMCB. Since the project was put on temporary hold the cost of the project will be included in the capital budget for fiscal years 2016 & 2017.

The hospital, several years ago embarked on a five year plan to reduce costs to prepare SVMC for healthcare reform. This effort is continuing today. Management considers the replacement

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boiler plant as a key initiative to realize operational savings that can be redirected to care transformation. Estimates suggest operational savings of more than \$200,000 annually through reduced fuel and staff expenses counter balanced by increased depreciation.

(B) the project will not result in an undue increase in the costs of medical care. In making a finding under this subdivision, the commissioner shall consider and weigh relevant factors including;

(i) the financial implications of the project on hospitals and other clinical settings, including the impact on their services, expenditures, and charges;

Installation of the replacement boiler plant will not impact care services, nor result in an undue increase in the costs of medical care. In this context “costs of medical care” is assumed to be SVMC’s revenue rather than SVMC’s costs or expenses to deliver the care.

With installation of the replacement boiler plant, SVMC will realize operational savings (reduction in expenditures) and thereby no increase in charges will occur beyond annual rate increases approved by the GMCB.

We do not anticipate the replacement boiler plant to impact other clinical settings within the SVMC system, nor throughout the Vermont healthcare system. The replacement boiler plant should not impact visit volumes, charges or revenue from SVMC’s primary care practices, surgery practices, imaging and laboratory services, emergency room or inpatient services.

(ii) whether the impact on services, expenditures, and charges is outweighed by the benefit of the project to the public;

The replacement of SVMC’s boiler plant reduces hospital expenditures, decreases fire risk to patients and decreases pollution. Thereby the project cost is outweighed by the benefit to the public.

(C) less expensive alternatives do not exist, would be unsatisfactory, or are not feasible or appropriate;

Less expensive alternatives to replacing the boilers are not feasible. SVMC requires steam to heat buildings, deliver hot water and sterilize instruments. Boilers are the most efficient and cost effective method for producing the necessary steam. Boilers burning compressed natural gas efficiently and reliably produce steam while minimizing costs and emissions. Extensive exploration of alternatives including biomass has indicated that the proposed project is the optimal approach to meet SVMC’s steam production needs at this time.

(3) there is an identifiable, existing, or reasonably anticipated need for the proposed project which is appropriate for the applicant to provide;

The need for the proposed project is critical and addresses two dimensions;

- The current boilers are more than 35 years old and significantly beyond their useful life of 25 years. SVMC requires steam to heat buildings, delivery hot water and for sterilization. SVMC needs a reliable and efficient boiler plant to meet these needs.
- The current boilers inefficiently burn outdated and “dirty” #6 oil, thereby creating harmful emissions. The delivery of healthcare by SVMC should not create collateral harm to Vermonters through the production of undue amounts of pollution. The proposed boilers deliver comparable steam while producing significantly less emissions.

There is an identifiable and existing need for SVMC to replace its aged boilers with modern, more efficient and cleaner burning boilers.

(4) the project will improve the quality of healthcare in the state or provide greater access to healthcare for Vermont’s residents, or both;

This project will improve the quality of healthcare in Vermont and maintain access to critical healthcare for residents of Southern Vermont. Replacing SVMC’s aged and outmoded boilers will reduce SVMC’s operating expenses and allow more resources to be directed to care delivery, improve quality and enhance access. Moreover, the replacement boilers will produce significantly less emissions that harm health. The replacement boilers will reduce harm to the environment and Vermonters, and facilitate resource relocation to quality and access.

(5) the project will not have an undue adverse impact on any other existing services provided by the applicant;

The replacement boiler plant will not impact existing care services provided by SVMC including, but not limited to, emergency department visits, inpatient volumes or imaging and laboratory studies. All construction, installation, connection to current facilities and operation will be done with minimal disruption of campus traffic flow, patient access and the patient experience. Similarly, decommissioning and removal of the current boilers and underground oil tanks will create minimal patient inconvenience and not disrupt care delivery. The final connection of the replacement boilers to the current steam distribution system will be done with minimal interruption of steam flow. Lastly, there will be very limited impact of neighborhood and campus traffic by compressed natural gas delivery by box trucks. As such, the project will not have an undue adverse impact on existing service provided by SVMC or the surrounding community.

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(6) the project will serve the public good;

The replacement of SVMC's boiler plant reduces hospital expenditures, decreases fire risk to patients and decreases pollution. Thereby the project will serve the public good.

Appendix 7

References

The subsequent pages contain the following references;

Appendix 7a- Vermont Fuel Price Report, May 2016, pages 1-7.

http://publicservice.vermont.gov/publications/fuel_report

Appendix 7b- The fuel effect: What is being burned matters. *The bottom of the barrel* (2009) Environmental Defense Fund. Pages 1-12

http://www.edf.org/sites/default/files/10071_EDF_BottomBarrel_Ch3.pdf

Appendix 7c- Natural Gas and the Environment, Natural Gas 1998: Issues and Trends. US Energy Information Administration. Page 49-71.

http://www.eia.gov/pub/oil_gas/natural_gas/analysis_publications/natural_gas_1998_issues_trends/pdf/chapter2.pdf

Appendix 7d- Tables comparing Current Home Heating costs for Oil, LP & Natural Gas, Electricity, Firewood in the U.S. (2015) InspectAPedia Pages 1-11.

http://inspectapedia.com/heat/Current_Heating_Cost_Table.htm

Appendix 7e- Emission Factors for Greenhouse Gas Inventories. (2014) US Environmental Protection Agency Pages 1-5. <http://www2.epa.gov/climateleadership>

Appendix 7f- Fuel emission factors and carbon dioxide emissions coefficients (2013). US Energy Information Administration reports EIA-1605.

www.eia.gov/survey/form/eia_1605/excel/Fuel_Emission_Factors.xls