U. S. DEPARTMENT OF ENERGY

ENVIRONMENTAL ASSESSMENT

ATMOSPHERIC FLUIDIZED-BED COMBUSTION (AFBC)
CO-FIRING OF COAL AND HOSPITAL WASTE

A PROJECT PROPOSED BY DONLEE TECHNOLOGIES, INC.
AT THE VETERANS AFFAIRS (VA) MEDICAL CENTER
LEBANON, PENNSYLVANIA

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ACRONYMS AND ABBREVIATIONS

AFBC	-	Atmospheric Fluidized-Bed Combustion
Btu/lb	-	British thermal units per pound
CEQ	-	Council on Environmental Quality
CFB	-	Circulating Fluidized-Bed
C	-	Carbon
CO	-	Carbon Monoxide
CO ₂	-	Carbon Dioxide
Db	-	Decibel
DER	-	Department of Environmental Resources
DOE	-	Department of Energy
DSCEF	-	Dry Standard Cubic Foot
EA	-	Environmental Assessment
EIS	-	Environmental Impact Statement
EPA	-	Environmental Protection Agency
FONSI	-	Finding Of No Significant Impact
gr	-	grains
GSH	-	Good Samaritan Hospital
H ₂	-	Hydrogen
H ₂ O	-	Water
HCl	-	Hydrochloric Acid
lb/hr	-	pounds per hour
METC	-	Morgantown Energy Technology Center
mg/l	-	milligrams per liter
N ₂	-	Nitrogen
ng/Kg	-	nanograms per kilogram
ng/Nm ³	-	nanograms per standard cubic meter
NO	-	Nitrogen Oxide
NSPS	-	New Source Performance Standard
O ₂	-	Oxygen
PAH	-	Polyaromatic Hydrocarbons
PCDD	-	Polychlorinated Dioxins
PCDF	-	Polychlorinated Furans
ppb	-	parts-per-billion
ppmv	-	part-per-million on a volume, wet weight basis
RCRA	-	Resource Conservation and Recovery Act
S	-	Sulfur
SO ₂	-	Sulfur Dioxide
TCLP	-	Toxicity Characteristic Leaching Procedure
VA	-	Veterans Affairs
VOC	-	Volatile Organic Compounds

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ENVIRONMENTAL ASSESSMENT

This Environmental Assessment (EA) has been prepared by the Department of Energy (DOE) in compliance with the requirements of the National Environmental Policy Act (NEPA) of 1969. It has been prepared in accordance with the President's Council on Environmental Quality (CEQ) regulations implementing NEPA and the DOE Procedures for compliance with NEPA (57 FR 15122, April 24, 1992, to be codified at 10 CFR Part 1021). As required by Section 1508.9b of the CEQ regulations, the sections contained within this EA include the following:

- 1.0 Purpose and Need for the Proposed Action
- 2.0 Alternatives Including the Proposed Action
- 3.0 Environmental Impacts of the Proposed Action and the No Action Alternative
- 4.0 List of Agencies and Persons Contacted
- 5.0 References

1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

The proposed project involves co-firing of coal and medical waste (including infectious medical waste) in an atmospheric fluidized-bed combustor (AFBC) to safely dispose of medical waste and produce steam for hospital needs. Combustion at the design temperature and residence time (duration) in the AFBC has been proven to render infectious medical waste free of disease producing organisms. The project would be located at the Veterans Affairs (VA) Medical Center in Lebanon, Pennsylvania. The estimated cost of the proposed AFBC facility is nearly \$4 million. It would be jointly funded by DOE, Veterans Affairs, and Donlee Technologies, Inc., of York, Pennsylvania, under a cooperative agreement between DOE and Donlee. Under the terms of this agreement, \$3.708 million in cost-shared financial assistance would be jointly provided by DOE and the Veterans Affairs (50/50), with \$278,000 provided by Donlee. The purposes of the proposed project are to: (1) provide the VA Medical Center and the Good Samaritan Hospital (GSH), also of Lebanon, Pennsylvania, with a solution for disposal of their medical waste; and (2) demonstrate that a new coal-burning technology can safely incinerate infectious medical waste, produce steam to meet hospital needs, and comply with environmental regulations.

This proposed AFBC project at the VA Medical Center is the second phase of an ongoing effort to demonstrate the use of coal-fired AFBC technology to destroy hospital waste. A feasibility study and regulatory analysis of AFBC co-firing of coal and hospital waste were initiated in September 1988, in the first phase of

this project under a cooperative agreement between DOE and GSH with participation by the Pennsylvania State University, Skelly and Loy, Inc., Steckbeck Engineering Associates, and Donlee Technologies, Inc. In addition, operation of a waste shredder on simulated hospital waste, and test burning of coal and simulated hospital waste in a pilot-scale AFBC were demonstrated in the first phase at the Donlee Technologies facility in York, Pennsylvania. These small-scale tests and design studies were successful and confirmed the potential of using AFBC coal technology to destroy hospital wastes while providing an on-site source of steam for a hospital. In order to obtain final design information and to assess operational reliability, as well as fully characterize the associated emissions, an integrated shredder and pilot-scale AFBC test (using actual hospital waste) was performed at the Donlee facility from December 1991, through March 1992. Details of these tests are provided in the June 1992, Donlee Technologies Draft Topical Report included among the references listed in Section 5.0.

The Lebanon VA Medical Center has been cited twice for violations of the Clean Air Act (CAA) in operation of its gas-fired medical waste incinerator. The citations from the Pennsylvania Department of Environmental Resources (DER) have directed the VA to develop a pollution abatement plan and to take appropriate measures to assure future compliance with the Pennsylvania DER regulations. The existing incinerator is 18 years old and exhibits severe corrosion from acidic gases generated in the heating and cooling cycles of operation. Minor repairs will not assure future compliance with regulations. The VA has decided to replace the existing unit which was shutdown in August 1991.

GSH is located about three miles from the VA Medical Center. For many years, the GSH disposed of their infectious medical waste by burning it in an on-site incinerator. In the mid-1980s, the GSH halted operation of their incinerator, due to excessive opacity in its emissions. Following shutdown of their incinerator, the GSH contracted with the VA Medical Center for incineration of the GSH waste, but terminated the contract after the VA was cited for CAA violations. Following contract termination, the GSH has been contracting with the private sector for waste disposal at a cost of approximately \$0.50 per pound, which is not a long-term, cost-effective disposal option.

Both the VA Medical Center and the GSH are seeking long-term, cost-effective solutions for disposal of their medical waste. The proposed project addresses a solution to this problem by replacing the existing VA Medical Center incinerator with a co-fired AFBC to safely dispose of medical waste from the Lebanon VA Medical Center and the GSH. The VA Medical Center site was selected for installation of the proposed AFBC because it has adequate land, whereas GSH does not have sufficient space for the proposed AFBC. The proposed AFBC would burn approximately less than 14,400 pounds of waste per week including approximately 3,994 pounds per week of infectious medical waste and 45 pounds

per week of nonhazardous chemotherapeutic waste. Construction and operation of the AFBC unit would be more economical than a commercial off-site disposal service or construction and operation of a gas-fired incinerator. Based on a February 1991, GSH economic study covering a 15-year period, construction, operation, and maintenance of the AFBC unit would cost \$2.3 million less than a gas-fired incinerator and \$1.5 million less than using a commercial off-site disposal service.

In addition, the steam needs of the VA Medical Center would be met from steam generated by the AFBC. The VA Medical Center uses steam for laundry facilities and general heating. The older, existing gas-fired boiler units would be replaced eventually by the AFBC. The AFBC unit would operate continuously and produce up to 20,000 pounds per hour (lb/hr) of low-pressure steam. The AFBC unit would be co-fired with coal and medical waste for about 15 hours per day and fired with only coal for the remaining 9 hours. The AFBC unit would operate under variable load between 5,000 and 20,000 lb/h steam in response to daily and seasonal requirements for steam. The benefit of this AFBC system is that one piece of equipment can meet the hospital's steam and waste disposal requirements simultaneously.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 THE PROPOSED ACTION

2.1.1 Project Description

The proposed project would involve construction and operation of an AFBC unit at the VA Medical Center facility in Lebanon, Pennsylvania.

The process schematic for this unit is shown in Figure 1. Flue gas and solids from the combustor pass through the cyclone where solids are collected and recirculated back to the combustor. The flue gas from the cyclone then passes through the heat recovery boiler where heat in the flue gas is used to produce steam. From the boiler, the flue gas continues to the bag filter where flyash is collected. Finally, the cooled, cleaned flue gas leaves the system through the stack. On the steam side of the system, the hot water/steam mixture from the heat exchanger in the combustor flows to the heat recovery boiler. In the boiler, additional heat from the flue gas is absorbed, and the hot water/steam mixture is separated. Steam is extracted for use by the hospital, and hot water is recirculated back to the combustor heat exchanger for additional heat absorption.

Figure 1. Schematic for AFBC Unit

This AFBC unit would include the following features: a material handling and storage area, a material size reduction unit (i.e., shredder), a co-fired AFBC, and an ash disposal area. It would require about 18 months to design and construct the AFBC unit. Following construction, the AFBC unit would be operated under DOE and VA Medical Center funds for about 12 months. Following the 12-month demonstration period, the VA Medical Center would continue to operate the AFBC using its own funds. The AFBC unit would be designed to operate for about 25 years.

2.1.1.1 Handling and Storage

Non-infectious and infectious medical waste would be separated at the point of origin at the VA Medical Center and GSH, placed in appropriately labeled and sealed bags and cartons, and stored in Rubbermaid carts, which are one cubic yard in size. Medical waste from GSH would be transported to the VA Medical Center in sealed trucks. Medical waste storage areas would be located close to the processing area in a manner to prevent direct contact with people, animals, and weather. Refrigeration units would be installed for short-term storage of infectious waste to comply with medical waste storage regulations. Refrigeration would be needed if the infectious waste could not be burned within 24 hours. Arrangements for off-site disposal and incineration would be made in case of long-term outages of the combustor. The size of the storage containers would be less than that of the feed opening of the combustion unit (40 in x 25 in) and the weight of each container would range from 25 to 50 pounds. Large metal objects are the only type of waste that cannot be handled. Large metal objects in the waste would be segregated, autoclaved, and disposed off-site. (Autoclaving refers to rendering the waste non-infectious by exposing the waste to steam under pressure.) Coal would be brought to the VA Medical Center via a single truck delivery per day. This same truck would be used to haul away the ash for disposal as described in Section 2.1.1.4. Limestone would be brought to the VA Medical Center every other day via a single truck delivery.

2.1.1.2 Material Size Reduction Unit

Unlike most incinerator designs, the co-fired AFBC would require that waste be reduced in size (less than 2 inches) for feeding to the combustor. For this reason, a size reduction unit (shredder) as shown in Figure 2 would be added to the combustion unit. To comply with regulations, the size reduction unit would also incorporate sterilization. Shredded waste would be directly fed to the combustor to avoid handling of waste after shredding. The shredder would be of heavy construction and made primarily of carbon steel. The unit would have the ability to process more than 500 lb/hr of infectious and general medical waste. This processing capacity would be in excess of the required maximum processing rate of 300 lb/hr. The unit would operate on a low-speed, high-torque principle that features an auto-reversing,

Figure 2. Shredder Unit for the AFBC Unit

non-jamming capability. This feature would reduce damage to the machine and downtime for maintenance and repair. The unit would also have two disinfectant atomizers to sterilize the inside of the unit, when access is necessary. The unit would also have slide gate doors to prevent contamination of the work area.

2.1.1.3 AFBC Unit

The proposed AFBC unit would be 45 feet tall (10 feet taller than the existing boiler building) and would operate at a high air velocity and high solids recirculation rate. The highly turbulent combustion zone and long solids residence time would ensure efficient combustion. Medical waste incinerators operate at a temperature of 1800 degrees Fahrenheit (F), while AFBCs operate at a temperature of 1600 degrees F. Because of the high turbulence and long residence time, an AFBC operating at the lower temperature can destroy the infectious wastes as well as an oil-fired or gas-fired medical waste incinerator operating at the higher temperature. The lower operating temperature in the AFBC results in lower emissions of nitrogen oxides (NOx), volatile metals, sulfur dioxide (SO₂), and hydrogen chloride (HCl). Particles would be collected in a cyclone and returned to the combustor through a non-mechanical seal. Recirculation of particles would increase combustion efficiency and reduce carbon monoxide (CO) emissions. The solids recirculation loop would operate at nearly constant temperature, to avoid ash slagging encountered in some types of incinerators. Coal and limestone would be stored on-site in enclosed bins. Medical waste, coal, and limestone would be fed into the combustor. The role of the limestone in the proposed AFBC unit is to combine with the sulfur and chloride compounds generated by combustion of coal and medical waste, thereby reducing the emissions associated with these compounds. The AFBC would be capable of generating up to 20,000 lb/hr of low-pressure steam.

2.1.1.4 Ash Disposal

Ash would be removed by gravity flow from beneath the combustor and the baghouse filter. The ash would be cooled prior to temporary storage in hoppers at the site. Ash generated during co-firing would be collected in separate hoppers than ash generated during firing with only coal. The ash collected during co-firing would be tested at the VA Medical Center to ensure that the pathogens (i.e., disease-producing organisms) have been destroyed. Analyses of ash samples would be submitted to the Pennsylvania DER. Prior to transport to a licensed off-site disposal facility, the ash would be contained in the hoppers to prevent release into the environment. Transportation of ash would be in an enclosed or covered vehicle to prevent dispersal during transportation. Under current Pennsylvania DER regulations, ash from the combustion of medical waste must be disposed of in a permitted double-lined landfill. Therefore, the ash generated during co-firing would be disposed in a licensed, double-lined landfill off-site. This is required even though the

Toxicity Characterization Leaching Procedure (TCLP) analysis from co-firing would almost certainly be indistinguishable from that when firing coal alone. Ash generated during firing with only coal would be disposed of by landfilling abandoned coal mines in accordance with Pennsylvania DER regulations. (See discussion in Section 3.1.3). The Ph will be less than 12.5 and will not be classified as hazardous under the Resource Conservation and Recovery Act (RCRA). In any case, residue (ash) from combustion of coal is also exempt from being classified as hazardous under RCRA. Approximately 8 to 11 tons per day of bottom ash and fly-ash would be generated by the AFBC. About 60% of the ash would be generated during co-firing, while the remaining ash would be generated during firing with only coal.

2.1.2 Description of Project Location

2.1.2.1 General Description of the Area

The facility would be installed and operated in Lebanon, Pennsylvania (Figure 3) at the VA Medical Center. The location of the VA Medical Center in Lebanon is shown in Figure 4. The proposed AFBC unit would be installed near the eastern property border of the VA Medical Center. Areas of the proposed new construction are shown in Figure 5. The areas surrounding the VA Medical Center consist primarily of low-density residential neighborhoods and farmland. The closest residence is approximately 1,000 feet from the proposed site. A school complex is located about 3,000 feet from the proposed site. The terrain where the AFBC unit would be located is flat.

2.1.2.2 Description of Project Site

Route 38016 (State Drive) is located immediately east of the proposed project location and would provide access to the site. The main AFBC building would occupy a plan area of 2,200 square feet. The total project area, including coal and ash handling, etc., would occupy 23,000 square feet on the existing 215 acre VA site. These areas are equivalent to 0.023% and 0.244% of the total VA site, respectively. About 4,700 square feet of earth would need to be excavated for foundations and installation of the coal receiving hopper. The truck ramp leading to the coal receiving hopper would require about 31,000 cubic feet of earth from off-site sources. Coal would be stored on-site in enclosed bins. Bottom ash and flyash would also be stored on-site in enclosed bins before removal to an off-site location.

2.2 ALTERNATIVES

There are three alternatives considered in the EA: No Action, Alternative Sites, and Alternative Technologies.

Figure 3. Location of Lebanon, Pennsylvania

Figure 4. Location of Lebanon Veterans Affairs (VA) Medical Center

Figure 5. Conceptual Layout of AFBC Building at the Lebanon VA Medical Center

2.2.1 No Action Alternative

Under the "no action" alternative, the proposed projects would not be funded by DOE. Besides foreclosing an opportunity to demonstrate the ability of AFBC technology to be employed in the safe combustion of infectious medical waste, such alternative would further delay the installation of required incineration capacity acceptable to the Pennsylvania DER.

Twice in a 2-year span, the VA Medical Center has been cited by the Pennsylvania DER for violations of the CAA and Pennsylvania DER regulations for operation of the VA Medical Center's existing incinerator. The VA Medical Center cannot operate its existing medical waste disposal unit without taking necessary pollution abatement measures.

2.2.2 Alternative Sites

There are alternatives to combustion of the VA and GSH medical waste at the VA Medical Center. Five private sector contractors regularly serve the Lebanon County medical community by providing hauling and off-site incineration. These contractors are Bridgeview, Inc.; Envirotech; Gilarde Waste Disposal; Waste Management, Inc.; and York Waste Disposal. Each of these contractors is interested in disposal of the VA medical waste. They all have adequate volume to handle the waste and have active permits for incineration of medical waste. However, over the 15 years of the economic analysis, off-site disposal would cost \$1.5 million more than construction and operation of an AFBC unit.

Off-site incineration of the VA medical waste does not eliminate the environmental issues, it only transfers them to another location. Also, transportation of the large amount of medical waste from the VA Medical Center to an off-site incinerator could result in potential environmental problems.

The close proximity of the VA Medical Center and GSH creates an ideal setting for burning infectious waste from both hospitals in a single combustor. Adequate space for installation of a new combustor is not available at the GSH facility. The VA Medical Center has a large amount of land area, with adequate space next to its existing incineration facility. For these reasons, the VA Medical Center was selected as the proposed site for construction and operation of the AFBC.

2.2.3 Alternative Technologies

2.2.3.1 Alternatives to Incineration

Several non-incineration alternative treatment technologies for medical wastes are commercially available, and others are at a conceptual or developmental stage. Non-incineration alternatives include steam sterilization, dry heat, gas sterilization, chemical sterilization, and ionizing radiation.

All of these alternatives to incineration are less suited to the large quantities of waste that will be generated by the VA Medical Center and GSH. Chemical treatment is best used for liquid wastes, while 90% of the VA Medical Center and GSH medical waste is solid. Furthermore, some of the waste will be chemotherapeutic waste (i.e., waste from treatment of cancer with chemicals) and Title 25, Chapter 273, of the Pennsylvania Code requires that all chemotherapeutic waste must be incinerated prior to disposal at a landfill. Medical waste from the VA Medical Center and GSH includes chemotherapeutic waste.

The Pennsylvania State University assessed autoclaving the infectious portion of a waste stream as a treatment option. In this alternative, the infectious waste would have to be collected separately, with the chemotherapeutic waste isolated and incinerated at the VA Medical Center or another location. The analysis concluded that autoclaving would not be a feasible alternative due to the large quantities of waste involved and the need to separately treat the chemotherapeutic waste. Autoclaving is becoming less acceptable to landfill operators because of uncertainties regarding the ability of autoclaving to render the waste non-infectious.

As health risks associated with these technologies are not thoroughly understood, these alternatives to incineration do not appear appropriate for the type and quantity of medical waste generated at the VA Medical Center and GSH. Continuous burning processes (e.g., AFBC and incineration) are preferred over batch processes (e.g., autoclaving and chemical treatment) for disposal of large quantities of medical waste.

2.2.3.2 Incineration Technology Alternatives

In current practice, there are three principal medical waste incineration technologies (i.e., excess air, controlled air, and rotary kiln incinerators). Each of these incinerators is fired with gas or oil. A major advantage of the AFBC over oil-fired or gas-fired incineration is that the AFBC would be operated continuously, while such incinerators would operate only intermittently. Poor combustion efficiency and high pollutant emissions are common during the start-up and shutdown of incinerators.

Over the 15 years of the economic analysis presented in the GSH February 1991 Progress Report (see Section 5.0), the AFBC unit would cost \$2.3 million less to construct, operate, and maintain than a gas-fired incinerator. The proposed project would be the first demonstration of co-firing coal and medical waste in an AFBC. AFBC technology combines an available and relatively inexpensive fuel source (i.e., coal), high combustion efficiency, and emission levels within the Pennsylvania and Federal guidelines.

3.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION AND THE NO ACTION ALTERNATIVE

3.1 THE PROPOSED ACTION

3.1.1 Air Quality

During construction of the AFBC unit, there would be emissions of small quantities of dust or occasional smoke in the construction area. These emissions would be generated from construction equipment including personal vehicles for crew, earthmoving equipment, and electric generators. These emissions are expected to be minimal in quantity, temporary, and confined to the site. Fugitive dust emissions would depend on weather and would be reduced by spraying water on the roads during construction. Gaseous emissions from the vehicles would include SO_2 , NO_x , CO, and volatile organic compounds (VOC). Construction would last 9 months, with the heaviest period of construction lasting only 3 months. Construction traffic would be highly variable during this time. Changes in ambient levels of particulate matter, SO_2 , NO_x , CO, and VOC would be minimal and temporary.

The AFBC unit would use coal, general medical waste, and infectious medical waste as the fuel source. Limestone would be added to the AFBC unit to reduce SO_2 and HCl emissions. Limestone would also be injected prior to the baghouse to remove additional HCl. The estimated material consumption for the proposed AFBC unit is contained in Table 1.

Pilot-plant tests of co-firing coal and a simulated medical waste in an AFBC were conducted in 1990, at the Donlee Technologies, Inc. pilot-plant facility in York, Pennsylvania. Based on the maximum heat input, the pilot-plant is about 40% of the scale of the AFBC proposed for installation and operation at the VA Medical Center. The simulated medical waste in the pilot-plant tests was a more difficult waste to efficiently combust than would be the actual medical waste in the proposed project. The simulated medical waste used in the pilot-plant tests was composed of 60% polyvinyl chloride and 40% water. Because of lower combustion efficiency, the pollutant emissions from the pilot-plant tests were greater than pollutant emissions expected from the proposed project.

The AFBC pilot-plant was operated to analyze operational parameters that affect combustion efficiency and emissions. Tests were intended to simulate actual operation of the proposed, full-scale

Table 1. Estimated Material Consumption at the AFBC Facility

Material	Consumption
Coal (tons/year)	5,185
Limestone (tons/year)	2,290
General Waste (tons/year)	269
Infectious Waste (tons/year)	105
Max. Total Waste (tons/year)	374
Max. Waste Destruction Rate (lb/h)	300

AFBC unit. Two types of bituminous coal and an anthracite coal were used in the tests. Anthracite coal would be used in the proposed AFBC unit at the VA Medical Center. Table 2 contains the characteristics of the coal and Table 3 contains the composition of the limestone used in the pilot-plant tests.

During the pilot-plant tests, gas emissions were continuously monitored for oxygen (O_2), CO, carbon dioxide (CO_2), SO_2 , and NO_x . Stack flue gas samples were collected and analyzed via approved Environmental Protection Agency (EPA) methods for dioxins/furans, hydrochloric acid, and hydrocarbons. Table 4 contains emission data from the pilot-plant tests and the current regulations for emissions in Pennsylvania. The pilot-plant tests demonstrated the ability of the AFBC to meet emission regulations for SO_2 , NO_x , and dioxins/furans.

Carbon monoxide emissions ranged from 59 to 195 parts per million by volume (ppmv) at 7% O_2 during the pilot-plant tests. The CO emission guideline for the proposed AFBC unit is 100 ppmv CO at 7% O_2 in Pennsylvania (Pennsylvania DER, Bureau of Air Quality, 1989). Three of the nine tests using bituminous coal emitted less than 100 ppmv CO at 7% O_2 . The test using bituminous coal with the highest ash content had the highest concentration of CO of 195 ppmv at 7% O_2 . The two tests with anthracite coal emitted concentrations of CO of 59 and 118 ppmv at 7% O_2 . CO emission levels in several operating circulating fluidized bed boilers are compared in Table 5. Although the operating fluidized-bed boilers that were the sources of the performance data compared in

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Table 5 are approximately the same size as the AFBC proposed for the VA Medical Center, the significant variation in recorded CO emissions can be attributed to differences in configuration, age, and operational parameters among these reference units. As Table 5 indicates, CO and particulate emissions from the Table 2. Characteristics of the Coal to be Used in the AFBC Unit (Percent [%] Composition)

Coal Type	Dry Ultimate Analysis, Percent (%)						
	Btu/lb	C	H ₂	O ₂	N ₂	S	Ash H ₂ O
Anthracite	12,730	77.56	1.68	0.70	0.80	0.60	13.57 5.01

Table 3. Characteristics of a Possible Limestone to be Used in the AFBC Unit (Percent [%] Composition)

Compound	% (Dry Basis)
Calcium Carbonate	80.7
Magnesium Carbonate	9.9
Inerts	9.4

operating units are well under the limits prescribed by the incinerator guideline for Pennsylvania with which the proposed AFBC unit proposed would have to comply. These actual performance data reflect the likelihood that the proposed AFBC will meet the Pennsylvania regulatory limits on CO and particulate.

Further, the type of coal used would need to be carefully considered for compliance with CO emission standards. The increased residence time in the proposed AFBC (3.1 seconds compared to 1.8 seconds in the pilot-plant) and increase in excess air would result in lower CO emissions. The combination of coal selection, increased residence time, and increased excess air would result in acceptable CO emissions for the proposed AFBC unit.

Total suspended particulates were not measured during the pilot-plant tests. However, the emission limit of 0.03 grains/dry standard cubic foot (Pennsylvania DER, Bureau of Air Quality, 1989) is readily achievable by collecting particles in a baghouse

Table 4. Emission Levels from a Surrogate Waste Test
Average (Range)

Pollutant	Emissions (ppmv) (a)	(Emissions) (lb/10 ⁶ Btu)	Regulation (≤ 300 lb/h capacity)
SO ₂	238 (35-417)	0.63 (0.11-1.13)	1.2 lb/10 ⁶ Btu (b)
NO _x	149 (100-242)	0.29 (0.20-0.56)	1.0 lb/10 ⁶ Btu (b)
CO	112 (59-195)	NA	100 ppmv @ 7% O ₂ (c)
Total Suspended Particles	Not Analyzed	Not Analyzed	0.03 gr/DSCF (c) @ 7% O ₂
HCl	1153 (113-2867)	NA	30 ppmv @ 7% O ₂ (c) or 90% Capture
PAH	0.00158 (0.000117-0.00405)	NA	No Definite Regulation
	<u>ng/Nm³ @ 7% O₂</u>	<u>ng/Kg of Waste</u>	
Dioxins/ Furans (e)	0.045 (0.025-0.078)	0.79 (0.37-1.51)	0.15 ng/Nm ³ @ 7%O ₂ (d) 10 ng/Kg of waste (f)

Note: Values denote as average (range)

(a) parts-per-million on a volume, wet basis

(b) New Source Performance Standards (1989)

(c) Incinerator guideline for Pennsylvania (1989)

(d) Equivalent to Pennsylvania Department of Environmental Resources regulation annual ambient concentration of less than 0.030 x 10⁻⁷ ug/Nm³, as required

(e) EPA toxic equivalents of 2,3,7,8-TCDD

(f) Proposed California hospital waste incinerator regulation as of May 1991

NA -- Not Applicable

prior to the stack. The proposed AFBC would use a baghouse system to control particulate emissions within environmental regulations. Table 5 also shows a comparison of particulate emissions in operating circulating fluidized-bed boilers. The data indicate that fluidized bed boilers with baghouses can easily meet the environmental regulations for particulates.

Table 5. Circulating Fluidized Bed Boilers
Actual Performance Data

Pollutant	Reference A	Reference B	Reference C	Incinerator Guidelines for Pennsylvania
CO ppmv (lb/10 ⁶ Btu)	85(0.078)	20(--)	31(0.031)	100(0.109)
Particulate gr/DSCF (lb/10 ⁶ Btu)	--(0.008)	0.003(--)	--(0.007)	0.03(0.055)

References:

- A. Miller, T., and E. Hurn, Circulating Fluidized Bed Combustion, CALMAT - California Portland Cement Division Operating Experience and Status, American Society of Mechanical Engineers, 87-JPGC-PWR-57, October 1987.
- B. Hallstrom, C., and R. Karlsson, Waste Incineration in Circulating Fluidized Bed Boilers Test Results and Operating Experiences. Presented at Third International Conference on Circulating Fluidized Beds, Nagoya, Japan, October 15-18, 1990.
- C. Taylor, E., Start-Up and Operating Experience of the Pyroflow Circulating Fluidized Bed Boiler at the B. F. Goodrich Plant, Henry, Illinois. Presented at the CIBO Fluidized Bed Boiler Conference, St. Louis, Missouri, December, 1987.

The range of HCl emissions from the pilot-plant tests is shown in Table 4. None of the emissions meet the Pennsylvania DER requirement of 30 ppmv at 7% O₂ (Pennsylvania DER Bureau of Air Quality, August 1989). To meet the Pennsylvania's DER requirement, a scrubber system would be installed upstream of the baghouse. A dry sorbent (e.g., limestone) would be pneumatically conveyed and injected into a mixing section upstream of the baghouse. Hydrogen chloride would react with the sorbent to form solid calcium chloride. The calcium chloride and any unreacted sorbent would be removed in the baghouse. The AFBC system would need to emit less than 4 lb/hr HCl to meet an emission limit of 30 ppmv HCl. The AFBC unit including the scrubber/baghouse system would emit less than 1.7 lb/hr HCl. Polyaromatic hydrocarbon (PAH) emissions for the pilot-scale tests ranged from 1.17×10^{-4} to 4.05×10^{-3} ppmv at 7% O₂. These emissions are very low, and the PAH emissions from the VA Medical Center AFBC unit would also be expected to be very low. PAH emissions from the VA Medical Center AFBC unit are estimated to be less than 0.00034 lb/hr at full load. By comparison, total hydrocarbon

emissions from oil and gas-fired medical waste incinerators can range from 0.0088 to 0.0176 lb/hr (Joy Energy Systems 1990). Direct comparisons are difficult since PAH has not been regulated nor measured in the past. There are no definitive Pennsylvania DER regulations for PAH emissions from medical waste incinerators.

Dioxins and furans are expressed as EPA Toxic Equivalents of 2,3,7,8-Toxicity Chlorinated Dibenzo-p-dioxins/Dibenzofurans (TCDD) in Table 4. On this basis, the emissions from the AFBC pilot-plant tests were equivalent to 0.025 to 0.078 nanograms per normal cubic meter (ng/Nm³) at 7% O₂. These concentrations meet the Pennsylvania DER required ambient annual concentrations for dioxin and furan emissions. In general, dioxin/furan emissions decrease as combustion efficiencies increase. Dioxin and furan levels, expressed as PCDD (polychlorinated dioxins) and PCDF (polychlorinated furans), were an average of 1.51 ng/Nm³ at 7% O₂ during the pilot-plant tests. These levels are several orders of magnitude lower than those from typical medical waste incinerators (Table 6) (Radian Corporation 1988).

The projected annual emissions for the proposed project are shown in Table 7. Based on these emissions, Skelly and Loy, Inc. conducted air dispersion modeling. The results indicated that a 70 foot high stack with an inside diameter of 1.79 feet would be required for the proposed VA Medical Center AFBC facility.

3.1.2 Water Quality Impacts

The AFBC would use a maximum of 60,000 gallons per day of water to meet the VA Medical Center's steam requirements. The VA Medical Center is a customer of the City of Lebanon for both water and sewage. Currently, the VA Medical Center consumes approximately 190,000 gallons of water per day. Approximately 150,000 gallons is discharged to the city sewage system, and 50,000 gallons per day are lost to evaporation. No additional water would be needed for the proposed project. Water currently consumed in the existing unit would be routed to the new unit.

Groundwater is not presently used by the VA Medical Center nor would it be used by the proposed project. Therefore, no adverse impact to the quality or quantity of the region's groundwater is anticipated (see Appendix A).

3.1.3 Solid Waste Disposal

All construction waste (e.g., cement, debris) would be disposed in accordance with state and federal regulations.

Before infectious and nonhazardous chemotherapeutic waste can be disposed in a landfill, it must be rendered noninfectious and certified as noninfectious. Combustion or incineration is the preferred method for rendering medical waste noninfectious. Combustion or incineration sanitizes and reduces the volume of

solid waste by burning the waste and leaving an ash residue. Ash disposal is

Table 6. Chlorinated Dibenzo-p-Dioxins/Dibenzofurans Emissions from Hospital Waste Incinerators^a

	Cedar Sinai Medical Center Los Angeles, CA	St. Agnes Medical Center Fresno, CA	Royal Jubilee Hospital Victoria, B.C.	
	Fabric Filter (ng/Nm ³)	Uncontrolled (ng/Nm ³)	Uncontrolled (ng/Nm ³)	Uncontrolled (ng/Nm ³)
Total PCDD				
High	130.0	259.0	450.0	83.5
Low	129.0	163.0	290.0	51.8
Average	129.5	210.3	370.0	68.9
Total PCDF				
High	435.0	695.0	785.0	196.5
Low	106.0	441.0	704.0	117.3
Average	270.2	570.7	744.5	155.6
Total PCDD/ PCDF				
High	565.0	954.0	1235.0	280.0
Low	235.0	604.0	994.0	169.1
Average	400.0	781.0	1114.5	224.5

^a From Radian Corporation, 1988.

regulated by the Pennsylvania DER (Title 25, Chapters 273, 283, and 285). As discussed previously, ash produced during co-firing would be stored separately from ash generated during firing with only coal. Coal ash (bottom ash and flyash) is classified as special handling waste and must be disposed in a permitted landfill. Ash generated during firing with only coal would be disposed of by landfilling abandoned coal mines in accordance with Pennsylvania DER regulations. The Ph will be less than 12.5 and will not be classified as hazardous under RCRA. In any case, residue (ash) from combustion of coal is also exempt from being classified as hazardous under RCRA. However, ash generated from co-firing coal and medical waste would be disposed in more expensive double-lined landfills.

Table 7. Expected Annual Emissions from Proposed AFBC Unit

Pollutant	Annual Emissions (Pounds)
Nox	71,400
SO ₂	25,480
CO	14,700
HCl	9,190
Particulates	7,390
PAH	1.94
Dioxins/Furans	0.0000121

Regulations for storage and handling of chemotherapeutic and infectious waste include: (1) protection from animals, rain, and wind; (2) prevention of the spread of infectious agents; and (3) prevention of a breeding place or food source for rodents and insects. Per regulations, infectious and chemotherapeutic medical waste would be combusted within 24 hours or placed in refrigerated units.

About six trucks of coal and four trucks of limestone per week would be delivered to the VA Medical Center. The coal trucks would be filled with ash for transport to the landfills. Since delivery of coal and limestone would only increase truck traffic to the VA Medical Center by 5%, there would be little impact to the local highways and roads.

A composite ash sample was formed from individual samples from all the pilot-plant tests. The ash sample analysis from the pilot-plant testing showed that the dioxins and furans content of the ash samples was less than 200 nanograms per kilogram. Analysis showed that the ash met the Pennsylvania DER requirements for disposal of medical waste ash. The analysis included Toxicity Characteristic Leaching Procedure (TCLP) tests. Data from these tests is shown in Table 8. TCLP tests on several ash samples indicated that the ash could be classified as hazardous according to RCRA. The amount of unreacted sorbent in the ash can result in leachates with Ph values in excess of 12.2. The Pennsylvania DER would need to determine whether this coal ash could be disposed as hazardous or non-hazardous waste, since only some leachates from the TCLP test had Ph values in excess of 12.2. In any event, the ash would be disposed in accordance with rulings of the Pennsylvania DER. Arrangements have been made for disposal at both hazardous and non-hazardous landfills.

Table 8. TCLP Test Data for Composite Sample from
Simulated Waste Tests

Pollutant	Leachate Concentration (mg/l)	Maximum Allowed Concentration (mg/l)
Arsenic	<0.007	5.0
Barium	<0.1	100.0
Benzene	<0.005	0.5
Cadmium	0.01	1.0
Carbon tetrachloride	<0.005	0.5
Chlordane	<0.02	0.03
Chlorobenzene	<0.005	100.0
Chloroform	<0.005	6.0
Chromium	<0.05	5.0
o-Cresol	<0.01	100.0
m/p-Cresol	<0.01	100.0
2,4-D	<0.01	10.0
1,4-Dichlorobenzene	<0.01	7.5
1,2-Dichloroethane	<0.005	0.5
1,1-Dichloroethylene	<0.005	0.7
2,4-Dinitrotoluene	<0.02	0.13
Endrin	<0.001	0.02
Heptachlor	<0.0005	0.008
Hexachlorobenzene	<0.01	0.13
Hexachlorobutadiene	<0.01	0.5
Hexachloroethane	<0.01	3.0
Lead	<0.10	5.0
Lindane	<0.001	0.4
Mercury	<0.0004	0.2
Methoxychlor	<0.005	10.0
Methyl ethyl ketone	0.191	200.0
Nitrobenzene	<0.01	2.0
Pentachlorophenol	<0.04	100.0

Table 8. TCLP Test Data for Composite Sample from
Simulated Waste Tests
(Continued)

Pollutant	Leachate Concentration (mg/l)	Maximum Allowed Concentration (mg/l)
Pyridine	<0.02	5.0
Selenium	<0.005	1.0
Silver	<0.01	5.0
Tetrachloroethylene	<0.005	0.7
Toxaphene	<0.01	0.5
Trichloroethylene	<0.005	0.5
2,4,5- Trichlorophenol	<0.01	400.0
2,4,6- Trichlorophenol	<0.01	2.0
2,4,5-TP Silvex	<0.01	1.0
Vinyl chloride	<0.005	0.2

3.1.4 Noise

The greatest noise levels would be associated with construction, which will last 9 months with peak activity in the first 3 months. The greatest noise levels would be 83 decibels (Db) at 15 meters from the predominant work area. This would be the average sound level when all equipment is operating simultaneously. The greatest noise level at 150 meters would be 62 Db. These levels are within required limits of the Occupational Safety and Health Administration and the Pennsylvania Medical Safety and Health Administration.

Individual equipment would be purchased with typical noise levels of 85 Db at a distance of 1 meter from the equipment. During initial operation of the AFBC, noise levels at property lines and on-site buildings would be measured. If needed, additional means of acoustical attenuation would be provided if the predicted levels are beyond those levels required by the VA Medical Center. The closest residence is approximately 1,000 feet from the general site location, which is twice as far as the acceptable 62 Db contour. A school complex is located even further away at 3,000 feet.

3.1.5 Floodplains and Wetlands

Stormwater flow is regulated by the local municipality through the land development and subdivision process and stormwater quality is regulated by the Pennsylvania DER. According to Skelly and Loy, Inc., the site is not on or near any 100-year delineated floodplain (see Appendix A).

An on-site investigation by Skelly and Loy in February 1991 determined that no wetland habitats exist within a 300-foot boundary of the proposed project. They made this determination based on Federal guidelines for identifying and delineating wetlands (see Appendix B).

3.1.6 Historic Areas

The Pennsylvania Historical and Museum Commission Bureau for Historical Preservation determined that the proposed project would not impact archaeological resources or any registered historic places (see Appendix C).

3.1.7 Ecological Impacts

The Pennsylvania Fish Commission determined that there would be no impact to aquatic species as a result of the project. No Pennsylvania threatened or endangered terrestrial species would be impacted by the proposed project, but the Pennsylvania Game Commission determined that the purple martin (Progne subis), a special concern species in Pennsylvania, may exist in the area. They have concluded that the proposed project would cause no impact to this bird species. The Pennsylvania Bureau of Forestry determined that there were no plant species of special concern in the area of the proposed project.

No federally listed or proposed threatened or endangered species under the jurisdiction of the U.S. Department of the Interior are known to exist in the project impact area. Therefore, no Biological Assessment or further Section 7 consultation under the Endangered Species Act is required with the U.S. Fish and Wildlife Service (see Appendix D).

Construction and operation of the proposed project would not have any discernible impact on aquatic or terrestrial ecosystems. The construction site is on the VA Medical Center property and is not the site of any sensitive habitat.

3.1.8 Socioeconomics

Construction of the proposed project would last approximately 9 months with a peak activity period of approximately 3 months. About 12 construction workers would be required at the peak activity. No new jobs would be generated for the area, because the contractor has a sufficient local work force. The one hospital operator currently working with the existing steam

boilers and the incinerator would be trained to operate the new AFBC facility. Adequate roads are available to handle the entrance, exit, and access of construction vehicles and coal and limestone delivery trucks to the proposed AFBC site.

3.1.9 Land Use

The site for the project would be located on the grounds of the VA Medical Center. The total area of the VA property is 215 acres. The total area to be disturbed during construction is less than 0.5 acre. This area is now grass-covered vacant property or used for parking. The VA Medical Center site is zoned R-1, Low Density Residential District. Medical facilities are allowed as special exception use. To construct this facility, the VA Medical Center would obtain a special zoning permit and have to meet the requirements and conditions as specified in the South Lebanon Township Zoning Ordinance. Because the new AFBC facility would be constructed within the existing property on the Medical Center site and be located adjacent to existing buildings, there would be no difficulty in meeting these requirements. The main AFBC building would occupy a plan area of 2,200 square feet. The total area, including coal and ash handling, etc., would occupy 23,000 square feet. These areas are equivalent to 0.023% and 0.244% of the total VA site, respectively. The AFBC building would be constructed behind the main VA hospital buildings, adjacent to the existing boiler house and incinerator building. The AFBC will be part of a complex at the back of the VA site that presently includes a supply warehouse, a laundry, a garage, a utility building, a safety storage building, and an engineering storage building. As stated in Section 2.1.1.3, the AFBC building would be approximately 45 feet tall, with a 70-foot stainless steel stack, about 2 feet in diameter. The AFBC building would be a corrugated metal building that would be painted to blend in with the surrounding structures.

Since the main administration building, which is at the front of the VA complex, is approximately 60 feet in height, the AFBC building would not be visible from the front of the VA Medical Center. However, about 10 feet of the stack would remain visible from this perspective. Numerous trees and hedges exist throughout the VA site that help to screen buildings from one another and from the nearest public road, State Drive.

3.1.10 Occupational Health and Safety

No negative impacts to occupational health and safety would occur from construction and operation of the AFBC facility. Any potential exposure of workers to hazards would be minimized by a combination of engineering controls, sound work practices and procedures, and personal protective equipment. Training programs would be conducted to ensure that workers are aware of potential hazards and are able to react properly to emergency situations.

3.1.11 Summary of Impacts

Construction and operation of an AFBC unit at the VA Medical Center is expected to have only minor impacts to the environment in the surrounding area. Air quality would improve since the AFBC would emit less pollutants than the existing incinerator. No additional land beyond the existing Medical Center property would be required, and no additional water would be needed for the proposed project. Historical, cultural and archaeological resources; ecology resources; and floodplains and wetlands would not be impacted by the project. Generation of solid waste would increase, but is not expected to significantly impact the environment, because there is adequate capacity at the hazardous and non-hazardous landfills in the local area. There would be little or no impact to noise, visual quality, and socioeconomic factors from the proposed project.

3.2 NO ACTION ALTERNATIVE

Under the "no action" alternative, DOE would not contribute to the funding of this proposed project. In the absence of these funds, it is not expected that the AFBC unit would be built at the VA Medical Center in Lebanon, Pennsylvania. Therefore, if the action were canceled, the impacts described hereunder would not occur. However, in this event, the existing incinerator at the VA Medical Center would remain unchanged, and the facility would continue to operate in non-compliance with the CAA and Pennsylvania DER regulations. Although the VA Medical Center is continuing to operate their existing incinerator, they are required to develop a pollution abatement plan and to take appropriate measures to assure future compliance with the CAA and Pennsylvania DER regulations. If the VA Medical Center does not respond with a pollution abatement plan in a timely manner, the Pennsylvania DER may force permanent shutdown of the existing incinerator. Unless a yet unidentified cost-effective and environmentally acceptable alternative approach to providing the needed incineration capacity is found, the VA Medical Center and the Good Samaritan Hospital would likely have to rely upon off-site commercial sources with the higher cost and other potential environmental problems as discussed in Section 2.2.2.

4.0 LIST OF AGENCIES AND PERSONS CONTACTED

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5.0 REFERENCES

Chang, D.P.Y., and N.W. Sarbo, "Evaluation of a Pilot-Scale Circulating Bed Combustor with a Surrogate Waste Mixture," Incinerating Hazardous Wastes, H.M. Freeman, ed., Technomic Publishing Company, Lancaster, Pennsylvania, pp. 271-277, 1988.

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U.S. Department of Energy

Finding of No Significant Impact

**Construction and Operation of an Atmospheric Fluidized-Bed Combustor (AFBC) for
Co-Firing of Coal and Hospital Waste at the Veterans Affairs (VA) Medical Center in
Lebanon, Pennsylvania**

AGENCY: U. S. Department of Energy (DOE)

ACTION: Finding of No Significant Impact (FONSI)

SUMMARY: The DOE has prepared an Environmental Assessment (EA) (DOE/EA-0814) that analyzes the potential environmental impacts of the construction and operation of a full-scale, proof-of-concept AFBC facility at the VA Medical Center in Lebanon, Pennsylvania. The AFBC would co-fire coal and medical waste, thereby destroying hospital waste while generating steam for the hospital. Based on the analyses in the EA, the DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment, within the meaning of the National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. 4321 et seq. Therefore, the preparation of an environmental impact statement (EIS) is not required and the Department is issuing this FONSI. Prior to making its final determination whether to prepare an EIS, the DOE published a proposed FONSI in the Lebanon Daily News on January 16, 1993, inviting public review and comment on the proposed action for a period of 30 days. Making the FONSI available for public review was in accordance with the provisions of section 1501.4(e)(2) of the Council on Environmental Quality

NEPA Regulations applicable to circumstances such as this where the proposed action is closely similar to one which normally requires an EIS under Appendix D to Subpart D of the DOE regulations for compliance with NEPA (57 FR 15122, April 24, 1992, to be codified at 10 CFR Part 1021). Verbal comments were received from the Bureau of Air Quality in the Pennsylvania Department of Environmental Resources and the VA Medical Center. The Bureau of Air Quality noted that the AFBC had been permitted by the State to burn only anthracite coal, thereby eliminating bituminous coal as an alternate fuel as had been stated in the original EA. DOE agrees that the AFBC is limited by permit to the burning of anthracite coal. As a result, due to the typically lower sulfur content of anthracite coal, the maximum sulfur dioxide emissions from the AFBC would be less than originally estimated. Additionally, the Bureau of Air Quality noted that the existing waste incinerator at the VA Medical Center had been shut down in August 1991. The VA Medical Center noted that the AFBC would burn no more than 14,400 pounds of medical waste per week, rather than the 31,245 pounds of waste stated in the original EA. Also, the VA Medical Center noted that the AFBC would not require any additional water capacity from the City of Lebanon since water consumed by the previous unit would be sufficient to meet the demands of the AFBC. Additionally, the VA Medical Center requested deletion of any reference in the EA to the future use of similar technology at other VA hospitals. The EA has been modified to reflect or address these comments, which DOE found to have no substantive impact on the analyses presented in the EA.

COPIES OF THIS EA (DOE/EA-0814) ARE AVAILABLE FROM:

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BACKGROUND: This proposed AFBC project at the VA Medical Center is the second phase of an ongoing effort to demonstrate the use of coal-fired AFBC technology to destroy hospital waste. A feasibility study and regulatory analysis of AFBC co-firing of coal and hospital waste were completed in 1990, in the first phase of this project. In addition, operation of a waste shredder on simulated hospital waste, and test burning of coal and simulated hospital waste in a pilot scale AFBC were demonstrated in the first phase. These small-scale tests and design studies were successful and confirmed the potential of using AFBC coal technology to destroy hospital wastes while providing an on-site source of steam for a hospital. In order to obtain final design information and to assess operational reliability, an integrated shredder and pilot scale AFBC test (using simulated non-infectious hospital waste) was conducted from December 1991, through March 1992, at the Donlee Technologies, Inc. facility in York, Pennsylvania.

DESCRIPTION OF PROPOSED ACTION: A full-scale proof-of-concept AFBC facility would be designed, constructed, and tested at the VA Medical Center in Lebanon, Pennsylvania. The AFBC would co-fire coal and medical wastes -- discarded surgical gowns, gloves, needles, etc. -- while providing steam for the hospital. The proposed AFBC would burn less than approximately 14,400 pounds of medical waste per week, including approximately 3,995 pounds per week of infectious medical waste and 45 pounds per week of chemotherapeutic waste. Up to 20,000 pounds per hour of low-pressure steam would be produced in the new combustor. The use of coal-fired AFBC technology to destroy hospital waste would be demonstrated by the proposed project. Data would be collected to confirm the technical and economic viability of the concept and the commercial advantages over other alternatives.

ENVIRONMENTAL IMPACTS: Potential environmental impacts of the proposed action were analyzed. Construction and operation of an AFBC unit at the VA Medical Center in Lebanon is expected to have only minor impacts to the environment in the surrounding area. Air quality would improve over that which existed prior to August 1991, when the existing medical waste disposal unit was shut down due to violations of the Clean Air Act and Pennsylvania Department of Environmental Resources regulations. No additional land beyond the existing Medical Center property would be required for the proposed project, and no additional water capacity would be needed from the City of Lebanon. Historical, cultural and archeological resources, ecological resources, and floodplains and wetlands would not be impacted by the project.

Generation of solid waste would increase, but is expected to have only limited impact on the environment because there is excess capacity in both the hazardous and non-hazardous landfills in the local area. There would be little or no impact to noise, visual quality, and socioeconomic resources from the proposed project.

ALTERNATIVES CONSIDERED: Alternatives to the proposed action were considered in the EA. Under the no action alternative, the VA Medical Center and the Good Samaritan Hospital would continue to rely upon off-site disposal of their medical wastes. Alternative technologies were considered in the EA. Non-combustion technologies are not well suited to the quantities of waste that would be generated by these medical facilities and the requirement to burn certain classes of medical waste, e.g., chemotherapeutic wastes. Alternative gas or oil-fired combustion technologies are not as attractive as the proposed AFBC. A major advantage of the AFBC over other medical waste disposal technologies is that the AFBC would operate continuously, while other medical waste disposal technologies would only operate intermittently. This feature allows the AFBC to avoid much of the poor combustion efficiency and high pollutant emissions that are common during the start-up and shutdown of other medical waste disposal technologies. Also, the AFBC unit would cost \$2.3 million less to own and operate than a gas-fired combustor over the 15 years used in the economic analysis. Alternative sites were considered, but have disadvantages. Off-site incineration would cost \$1.5 million more than construction and operation of an AFBC unit over the 15 year period of the analysis.

PUBLIC AVAILABILITY: Copies of the EA and this FONSI will be distributed to all persons and agencies known to be interested in or affected by the proposed action or alternatives, including appropriate agencies within the Commonwealth of Pennsylvania. Additional copies of the EA and FONSI are available upon request from the DOE's Morgantown Energy Technology Center at the address given above.

PROPOSED DETERMINATION: Based on the information and analyses provided in the EA, including consideration of the comments received during the 30-day public review period, DOE has determined that the proposed AFBC for co-firing coal and hospital waste at the VA Medical Center in Lebanon, Pennsylvania, does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of NEPA. Therefore, an environmental impact statement is not required.

ISSUED IN WASHINGTON, D.C. THIS 22^d DAY OF April 1993.

Peter N. Brush
Acting Assistant Secretary
Environment, Safety and Health

END

DATE
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