STATE OF MISSOURI

PERMIT BOOK

DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: 032011-001 Project Number: 2010-02-055

Parent Company: Lester E. Cox Medical Center South

Parent Company Address: 3801 South National Avenue, Springfield, MO 65807

Installation Name: Lester E. Cox Medical Center South

Installation Number: 077-0209

Installation Address: 3801 South National Avenue, Springfield, MO 65807

Location Information: Greene County, S12, T28N, R22W

Application for Authority to Construct was made for:
Installation of four dual fuel boilers, eight diesel-fired emergency generators, and six ethylene oxide sterilization units. This review was conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required.*

☐ Standard Conditions (on reverse) are applicable to this permit.

☑ Standard Conditions (on reverse) and Special Conditions are applicable to this permit.

MAR - 1 2011

EFFECTIVE DATE

James Kavanaugh

DIRECTOR OR DESIGNEE
DEPARTMENT OF NATURAL RESOURCES

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devises shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the Departments' Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant sources(s). The information must be made available within 30 days of actual startup. Also, you must notify the Department of Natural Resources Regional office responsible for the area within which you are located within 15 days after the actual start up of this (these) air contaminant source(s).

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant sources(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention: Construction Permit Unit.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."

Lester E. Cox Medical Center South
Greene County, S12, T28N, R22W

1. Emission Limitation – Oxides of Nitrogen
   A. Lester E. Cox Medical Center South shall emit less than 40.0 tons of oxides of nitrogen (NO_X) in any consecutive 12-month period from the combustion sources identified in Appendix A.

   B. Attachment A or equivalent forms, such as electronic forms, approved by the Air Pollution Control Program shall be used to demonstrate compliance with Special Condition 1.A.

2. Control Device Requirement – Ethylene Oxide Abators
   A. Lester E. Cox Medical Center South shall install ethylene oxide abators to control emissions from all of the ethylene oxide sterilization units (EU10-12) and (EU16-18) within 180 days of permit issuance.

   B. The abators shall be operated and maintained in accordance with the manufacturer's specifications.

   C. Lester E. Cox Medical Center South shall maintain an operating and maintenance log for the abators which shall include the following:
      1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
      2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.

3. Record Keeping and Reporting Requirements
   A. Lester E. Cox Medical Center South shall maintain all records required by this permit for not less than five (5) years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

B. Lester E. Cox Medical Center South shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than ten days after the end of the month during which any record required by this permit shows an exceedance of a limitation imposed by this permit.

C. Lester E. Cox Medical Center South shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, within 30 days of the start of operation of the ethylene oxide abators.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (5) REVIEW
Project Number: 2010-02-055
Installation ID Number: 077-0209
Permit Number:

Lester E. Cox Medical Center South
3801 South National Avenue
Springfield, MO 65807

Complete: February 19, 2010

Parent Company:
Lester E. Cox Medical Center South
3801 South National Avenue
Springfield, MO 65807

Greene County, S12, T28N, R22W

REVIEW SUMMARY

- Lester E. Cox Medical Center South has applied for the authority to install a 32.95 million Btu per hour dual fuel capability boiler and three 2206 brake horsepower diesel-fired generators. This review also includes the existing boilers, emergency generators and ethylene oxide sterilization units some of which should have received a construction permit. Appendix A includes a summary of all equipment considered for this review.

- Hazardous Air Pollutant (HAP) emissions are expected due to the combustion of natural gas and diesel fuel. Emissions of ethylene oxide are expected due to the use of six ethylene oxide sterilization units.

- 40 CFR 60 Subpart Dc, "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units" applies to the boilers constructed after 1989 (EU9B and EU15). 40 CFR 60 Subpart Dc does not apply to the boilers constructed prior to 1989 (EU06, EU07, and EU08) because they were constructed prior to the applicability date for the rule.

- 40 CFR 60 Subpart IIII, "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines" applies to the generator engines (EU13B, EU14B, and EU19). 40 CFR 60 Subpart IIII does not apply to the engines installed prior to 2006 (EU01 – EU05) because they were manufactured prior to the applicability date for the rule.

- None of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) apply to this installation.

- 40 CFR 63 Subpart ZZZZ, “National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines” applies to all of the emergency generators listed in Appendix A.

- 40 CFR 63 Subpart WWWWW, “National Emission Standards for Hospital Ethylene Oxide Sterilizers” applies to the ethylene oxide sterilization units (EU10-12 and EU16-18).

- Ethylene oxide abators will be installed to control emissions from the ethylene oxide sterilizers (EU10-12) and (EU16-18).

- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of NO_X are conditioned below the de minimis level.

- This installation is located in Greene County, an attainment area for all criteria pollutants.

- This installation is not on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 250 tons per year and fugitive emissions are not counted toward major source applicability.

- Ambient air quality modeling was performed since the potential emissions of ethylene oxide exceed the Screening Model Action Level (SMAL).

- Emissions testing are not required for the equipment.

- A Basic Operating Permit application is required for this installation within 30 days of equipment startup.

- Approval of this permit is recommended with special conditions.

INSTALLATION/PROJECT DESCRIPTION

Lester E. Cox Medical Center South (Cox Medical Center - South) is an existing 563-bed, full service hospital located in the city of Springfield, Missouri. The facility began servicing patients in 1985 and has received one construction permit from the Air Pollution Control Program for the installation of one 16.74 million Btu per hour dual fuel boiler. This permit was issued by the Air Pollution Control Authority of Springfield, Missouri in February of 1995.

Table 1: Permit History

Permit Number	Description
0295-176D	Installation of a 16.738 million Btu per hour dual fuel (diesel and natural gas) boiler.

In January of 2010, Cox Medical Center – South was issued a notice of violation by the Springfield-Green County Health Department for the 2009 installation of a new 800 horsepower boiler and three 1500 kilowatt emergency generators without first obtaining a construction permit. However, Cox Medical Center - South has other equipment located at the facility that was not previously reviewed for permit applicability. The following bullets provide a summary of the project history and their respective permit determinations.

- A 1983 project included the installation of five emergency generators and four dual fuel boilers. This project was installed after the minor source applicability date of May 13, 1982 and the project potential emissions exceeded the de minimis level for NO_X, therefore a construction permit was required.
- In 1993, three ethylene oxide sterilization units were installed. A construction permit was not required for this project because the Screening Model Action Levels (SMALs) for HAPs were not in effect at this time.
- In 1994, a boiler and two emergency generators were installed. The potential emissions exceeded the insignificant emission exemption level for NO_X and construction permit number 0295-176D was issued for the boiler with no special conditions. However, this permit should have also included the emergency generators that were installed at the same time.
- A 2000 project included the installation of three more ethylene oxide sterilization units. As the effective date for SMALs was November 30, 1999 and the potential emissions exceeded the SMAL for ethylene oxide, a construction permit including an ambient impact analysis was required.
- The 2009 project included the installation of a new dual fuel boiler and three emergency generators. Although the project also included the removal of two previously installed emergency generators and a boiler, the potential emissions of the project consider only the increase in potential emissions from the new equipment. The 2009 project exceeded the insignificant emission exemption level for NO_X, therefore a construction permit was required.

A complete list of all emission units considered for this project review, their maximum design rates, and their dates of installation are summarized in Appendix A. The following table provides a summary of the potential emissions for each project.

Table 2: Summary of Projects (tons per year)

Pollutant	1983 Project Potential Emissions	1993 Project Potential Emissions	1994 Project Potential Emissions	2000 Project Potential Emissions	2009 Project Potential Emissions (tons/yr)
PM_{10}	3.07	N/A	0.87	N/A	1.18
$PM_{2.5}$	3.07	N/A	0.87	N/A	1.18
SO_X	0.47	N/A	0.12	N/A	0.24
NO_X	72.20	N/A	21.53	N/A	38.75
VOC	2.47	0.12	0.72	0.12	1.18
CO	31.15	N/A	8.58	N/A	13.53
Ethylene Oxide	N/A	0.12	N/A	0.12	N/A
Combined HAPs	0.56	0.12	0.14	0.12	0.29

N/A=Not Applicable

EMISSIONS/CONTROLS EVALUATION

Emissions data for the new emergency generators were provided by the manufacturer. All other emission factors used in the analysis of the boilers and generators were obtained from the following sections of the Environmental Protection Agency (EPA) document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition: Section 1.3 “Fuel Oil Combustion” (September 1998), Section 1.4 “Natural Gas Combustion” (July 1998), and Section 3.4 “Large Stationary Diesel and All Stationary Dual-fuel Engines” (October 1996).

Potential emissions of ethylene oxide (EO) from the EO sterilization units were calculated using a mass balance approach assuming 100% emitted. The maximum design rates for the EO sterilization units were provided the applicant. Each unit can process one 100 gram EO canister per cycle and has a maximum capacity of seven cycles per week.

Potential emissions of the emergency generators were calculated assuming maximum operating hours of 500 hours per year. Potential emissions of all other equipment were calculated assuming continuous operation (8760 hours per year.) The following table provides a summary of the regulatory emission threshold levels and the facility-wide potential emissions.

Table 3: Emissions Summary (tons per year)

Pollutant	Regulatory *De Minimis* Levels	Insignificant Emission Exemption Levels[1]	Existing Actual Emissions (2008 EIQ)	New Facility-Wide Potential Emissions[2]	New Facility-Wide Conditioned Potential[3]
PM_{10}	15.0	4.4	0.63	4.26	N/A
$PM_{2.5}$	10.0	N/D	0.63	4.26	N/A
SO_X	40.0	12.0	0.06	0.71	N/A
NO_X	40.0	12.0	8.33	110.94	<40.0
VOC	40.0	12.0	0.52	3.89	N/A
CO	100.0	30.1	6.91	44.68	N/A
Ethylene Oxide	10.0	0.1	N/A	0.24	2.41E-4
Combined HAPs	25.0	N/A	N/A	0.84	N/A

N/A=Not Applicable; N/D = Not Determined
[1]For individual HAPs, value represents the Screening Model Action Level (SMAL)
[2]The new facility-wide potential considers the removal of some existing equipment as a result of the 2009 project.
[3]The conditioned potential emissions considers the installation of add-on pollution control equipment for the ethylene oxide sterilization units.

The new facility-wide potential emissions were included in the table for completeness purposes and accounts for the removal of a boiler and two emergency generators as a result of the 2009 project. As the facility-wide potential emissions of NO_X exceed the Title V major source threshold (100 tons per year), Cox Medical Center – South has requested a voluntary de minimis limit on the potential emissions of NO_X in order to avoid the requirement to obtain an intermediate or Part 70 operating permit.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of NO_X are conditioned below the de minimis level.

APPLICABLE REQUIREMENTS

Lester E. Cox Medical Center South shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit.

GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information,* 10 CSR 10-6.110
  The emission fee is the amount established by the Missouri Air Conservation Commission annually under Missouri Air Law 643.079(1). Submission of an Emissions Inventory Questionnaire (EIQ) is required June 1 for the previous year's emissions.

- *Operating Permits*, 10 CSR 10-6.065

SPECIFIC REQUIREMENTS

- *New Source Performance Regulations*, 10 CSR 10-6.070 – New Source Performance Standards (NSPS) for 40 CFR 60, Subpart Dc, "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units"

- *New Source Performance Regulations*, 10 CSR 10-6.070 – New Source Performance Standards (NSPS) for 40 CFR 60, Subpart IIII, "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines"

- *Maximum Achievable Control Technology (MACT) Regulations*, 10 CSR 10-6.075, “National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines”, 40 CFR 63, Subpart ZZZZ

- *Maximum Achievable Control Technology (MACT) Regulations*, 10 CSR 10-6.075, 40 CFR 63, Subpart WWWWW, “National Emission Standards for Hospital Ethylene Oxide Sterilizers”

- *Restriction of Emission of Sulfur Compounds*, 10 CSR 10-6.260

- *Maximum Allowable Emissions of Particulate Matter From Fuel Burning Equipment Used for Indirect Heating*, 10 CSR 10-4.040

AMBIENT AIR QUALITY IMPACT ANALYSIS

An ambient air quality impact analysis is required for hazardous air pollutants when the potential emissions exceed the Screening Model Action Level (SMAL). As indicated in Tables 2 and 3 above, the potential emissions of ethylene oxide from the EO sterilization units (EU16-18) installed in 2000 are greater than the SMAL; therefore, an ambient impact analysis was performed using a conservative screening model (Screen3). Potential emissions from the existing EO sterilization units (EU10-12) installed in 1993 were also included in the model as a background concentration. Table 4 below summarizes the results of the ambient impact analysis.

According to the Ambient Impact Analysis, the maximum modeled impact of the EO sterilization units exceeds the Risk Assessment Level (RAL) and may pose a risk to the public health. As a result, Cox Medical Center – South has proposed to address this concern by installing EO abators with a control efficiency of 99.9%. As shown in Table 4 below, the installation of the abators reduces the ambient impact to well below the RAL.

Table 4: Screen3 Ambient Impact Analysis

Pollutant	Maximum Impact μg/m3 Pre-Control	Maximum Impact μg/m3 Controlled	RAL μg/m3	Time Period
Ethylene oxide	1.26	1.25E-3	0.1	Annual

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, I recommend this permit be granted with special conditions.

_____ _____

Kathi Jantz Date
Environmental Engineer

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated February 8, 2010, received February 19, 2010, designating Lester E. Cox Medical Center South as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Southwest Regional Office Site Survey, dated March 11, 2010.

Appendix A – Emission Unit Summary

Lester E. Cox Medical Center South
Greene County, S12, T28N, R22W
Project Number: 2010-02-055
Installation ID Number: 077-0210
Permit Number: _____

New/Existing	ID	Description	MHDR	MHDR Units	Installation	In Service
Existing	EU01	Generator #1	1005	hp	1983	Y
Existing	EU02	Generator #2	1005	hp	1983	Y
Existing	EU03	Generator #3	1005	hp	1983	Y
Existing	EU04	Generator #4	1005	hp	1983	Y
Existing	EU05	Generator #5	1005	hp	1983	Y
Existing	EU06	Boiler #1	0.12 0.0165	10^3 gal diesel /hr cf natural gas/hr	1983	Y
Existing	EU07	Boiler #2	0.12 0.0165	10^3 gal diesel /hr cf natural gas/hr	1983	Y
Existing	EU08	Boiler #3	0.12 0.0165	10^3 gal diesel /hr cf natural gas/hr	1983	Y
Existing	EU9A	Boiler #4	0.12 0.0165	10^3 gal diesel /hr cf natural gas/hr	1983	Removed 2009
Existing	EU10	EO Sterilizer #1	4.17	grams EO/hr[1]	1993	Y
Existing	EU11	EO Sterilizer #2	4.17	grams EO/hr	1993	Y
Existing	EU12	EO Sterilizer #3	4.17	grams EO/hr	1993	Y
Existing	EU13A	Generator #6	830.8	hp	1994	Removed 2009
Existing	EU14A	Generator #7	1005	hp	1994	Removed 2009
Existing	EU15	Boiler #5	0.12 0.0165	10^3 gal diesel /hr cf natural gas/hr	1994	Y
Existing	EU16	EO Sterilizer #4	4.17	grams EO/hr	2000	Y
Existing	EU17	EO Sterilizer #5	4.17	grams EO/hr	2000	Y
Existing	EU18	EO Sterilizer #6	4.17	grams EO/hr	2000	Y
New	EU9B	New Boiler #4	0.24 0.0323	10^3 gal diesel /hr cf natural gas/hr	2009	Y
New	EU13B	New Generator #6	2206	bhp	2009	Y
New	EU14B	New Generator #7	2206	bhp	2009	Y
New	EU19	New Generator #8	2206	bhp	2009	Y

[1]EO= Ethylene oxide CAS #75-21-8

Attachment A – NO_X Compliance Worksheet

Lester E. Cox Medical Center South
Greene County, S12, T28N, R22W
Project Number: 2010-02-055
Installation ID Number: 077-0210
Permit Number: _____

This sheet covers the period from _____ to _____.
(month, year) (month, year)

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9
Month/ Year	Boiler Natural Gas Usage[1] (million cubic feet)	Natural Gas Emission Factor (tons/million cubic feet)	Boiler Diesel Fuel Usage[2] (thousands of gallons)	Boiler Diesel Fuel Emission Factor (tons/thousands of gallons)	Generator Diesel Fuel Usage[3] (thousands of gallons)	Generator Diesel Fuel Emission Factor (tons/thousands of gallons)	Monthly NO_X Emissions[4] (tons)	12-Month Total NO_x Emissions[5] (tons)
		0.05		0.01		0.219		
		0.05		0.01		0.219		
		0.05		0.01		0.219		
		0.05		0.01		0.219		
		0.05		0.01		0.219		
		0.05		0.01		0.219		
		0.05		0.01		0.219		
		0.05		0.01		0.219		
		0.05		0.01		0.219		
		0.05		0.01		0.219		

[1]Total amount of natural gas combusted in the boilers for the month indicated in Column 1
[2]Total amount of diesel fuel combusted in the boilers for the month indicated in Column 1
[3]Total amount of diesel fuel combusted in the generators for the month indicated in Column 1
[4]Column 8 = (Column 2 x Column 3) + (Column 4 x Column 5) + (Column 6 x Column 7)
[5]Column 9 = Sum of Column 8 from this month and the previous 11 months. NOTE: A 12-Month total NO_x emissions less than 40.0 tons for Column 9 indicates compliance.

Mr. Dieter Reichmann
Director, Engineering
Lester E. Cox Medical Center South
3801 South National Avenue
Springfield, MO 65807

RE: New Source Review Permit - Project Number: 2010-02-055

Dear Mr. Reichmann:

Enclosed with this letter is your permit to construct. Please study it carefully. Also, note the special conditions, if any, on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files. Operation in accordance with these conditions, your new source review permit application and with your amended operating permit is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you have any questions regarding this permit, please do not hesitate to contact Kathi Jantz, at the Department's Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Kendall B. Hale
New Source Review Unit Chief

KBH:kjl

Enclosures

c: Southwest Regional Office
PAMS File: 2010-02-055

Permit Number: