

SCOPE OF WORK

Replacement of Four Boilers

South Woods State Prison
Bridgeton, Cumberland County, NJ

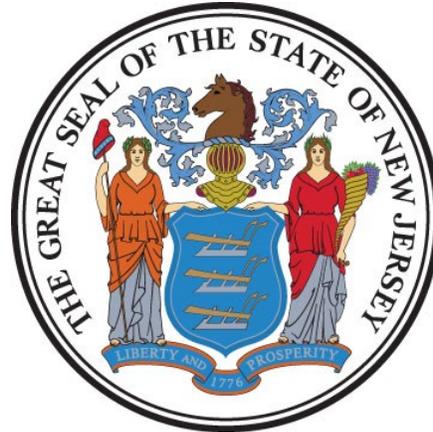
Project No. C1100-00

STATE OF NEW JERSEY

Honorable Philip D. Murphy, Governor
Honorable Tahesha L. Way, Lt. Governor

DEPARTMENT OF THE TREASURY

Elizabeth Maher Muoio, Treasurer



DIVISION OF PROPERTY MANAGEMENT AND CONSTRUCTION

Thomas A. Edenbaum, Director

Date: May 06, 2025

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PROJECT LOCATION: South Woods State Prison
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I. OBJECTIVE

The objective of this project is to replace four (4) boilers with new energy efficient boilers of the same rating located in Central plant- Building C, at South Woods State Prison (SWSP). See **Exhibit 'B'** for the project site location map.

II. CONSULTANT QUALIFICATIONS

A. CONSULTANT & SUB-CONSULTANT PRE-QUALIFICATIONS

The Consultant shall be a firm pre-qualified with the Division of Property Management & Construction (DPMC) in the following discipline(s):

- **P020 Boiler/Steam Lines/High Pressure Systems**

The Consultant shall also have in-house capabilities or Sub-Consultants pre-qualified with DPMC in:

- **P002 Electrical Engineering**
- **P025 Estimating/Cost Analysis**
- **P037 Asbestos Management & Design**
- **P038 Asbestos Safety Control Monitoring**
- **P065 Lead Paint Evaluation/Inspection**

As well as, **any and all** other Architectural, Engineering and Specialty Disciplines necessary to complete the project as described in this Scope of Work (SOW).

III. PROJECT BUDGET

A. CONSTRUCTION COST ESTIMATE (CCE)

The initial Construction Cost Estimate (CCE) for this project is \$5,317,000.

The Consultant shall review this Scope of Work and provide a narrative evaluation and analysis of the accuracy of the proposed project CCE in its technical proposal based on its professional experience and opinion.

B. CURRENT WORKING ESTIMATE (CWE)

The Current Working Estimate (CWE) for this project is \$6,700,850.

The CWE includes the construction cost estimate and all consulting, permitting and administrative fees.

The CWE is the client agency’s financial budget based on this project Scope of Work and shall not be exceeded during the design and construction phases of the project unless DPMC approves the change in Scope of Work through a Contract amendment.

C. CONSULTANT’S FEES

The construction cost estimate for this project *shall not* be used as a basis for the Consultant’s design and construction administration fees. The Consultant’s fees shall be based on the information contained in this Scope of Work document and the observations made and/or the additional information received during the pre-proposal meeting.

IV. PROJECT SCHEDULE

A. SCOPE OF WORK DESIGN & CONSTRUCTION SCHEDULE

The following schedule identifies the estimated design and construction phases for this project and the estimated durations.

PROJECT PHASE	ESTIMATED DURATION (Calendar Days)
1. Site Access Approvals & Schedule Design Kick-off Meeting	14
2. Investigation Phase	42
• <i>Project Team & DPMC Plan/Code Unit Review & Comment</i>	14
3. Design Development Phase	42
• <i>Project Team & DPMC Plan/Code Unit Review & Comment</i>	14
4. Final Design Phase	42
• <i>Project Team & DPMC Plan/Code Unit Review & Approval</i>	14
5. Final Design Re-Submission to Address Comments	7
• <i>Project Team & DPMC Plan/Code Unit Review & Approval</i>	14

6. DCA Submission Plan Review	30
7. Permit Application Phase	7
• <i>Issue Plan Release</i>	
8. Bid Phase	42
9. Award Phase	28
10. Construction Phase	300
11. Project Close Out Phase	30

B. CONSULTANT’S PROPOSED DESIGN & CONSTRUCTION SCHEDULE

The Consultant shall submit a project design and construction schedule with its technical proposal that is similar in format and detail to the schedule depicted in **Exhibit ‘A’**. The schedule developed by the Consultant shall reflect its recommended project phases, phase activities, activity durations.

A written narrative shall also be included with the technical proposal explaining the schedule submitted and the reasons why and how it can be completed in the time frame proposed by the Consultant.

This schedule and narrative will be reviewed by the Consultant Selection Committee as part of the evaluation process and will be assigned a score commensurate with clarity and comprehensiveness of the submission.

V. PROJECT SITE LOCATION & TEAM MEMBERS

A. PROJECT SITE ADDRESS

The location of the project site is:

South Woods State Prison
215 South Burlington Road
Bridgeton, Cumberland County, New Jersey 08302

See **Exhibit ‘B’** for the project site location map.

B. PROJECT TEAM MEMBER DIRECTORY

The following are the names, addresses, and phone numbers of the Project Team members.

1. DPMC Representative:

Name: Robert Tampellini, Project Design Manager
Address: Division of Property Management & Construction
20 West State Street, 3rd Floor
Trenton, NJ 08608-1206
Phone No: (609) 633-7069
E-Mail: Robert.Tampellini@treas.nj.gov

2. Department of Corrections:

Name: Drew Pangaldi, Project Manager
Address: Department of Corrections
Whittlesey Road, PO Box 863
West Trenton, NJ 08625
Phone No: (609) 292-4036 ext. 5270
E-Mail: drew.pangaldi@doc.nj.gov

VI. PROJECT DEFINITION

A. BACKGROUND

The South Woods State Prison (SWSP) was constructed as a design/build project by the Perini Corporation under DPMC Project #C0469-00. When opened in the spring of 1997, it became the Department of Corrections' newest and largest prison, located on 85 acres in Bridgeton, NJ. The facility provides offenders with a substance abuse treatment program, regional medical clinics, an extended care unit, a dialysis unit and a regional food service that provides thousands of meals per day to institutions throughout the state. The Bureau of State Use Industries/DEPTCOR operates footwear, clothing, printing/graphics, signs and decals/binders shops for the facility. The prison is a medium security facility and houses approximately 3200 incarcerated person. See **Exhibit 'B'**.

B. FUNCTIONAL DESCRIPTION OF THE BUILDING

The Central plant- Building C at South Woods State Prison (SWSP) is located outside the secure perimeter of the facility. The boilers are manufactured by the Johnston Boiler Company. See **Exhibit 'F'**.

VII. CONSULTANT DESIGN RESPONSIBILITIES

A. INVESTIGATION PHASE

1. Permits and Approvals:

The Consultant is responsible to contact the New Jersey Department of Environmental Protection and any other applicable regulatory agency during the Investigation Phase of the project for permitting requirements, including the approval of the NJDEP air emissions permit, any modification to the facility's existing air emissions permit and SOTA compliance to prevent project delays. All costs for permits, meetings with the NJDEP, public notice/hearings, air emissions modeling, etc. must be anticipated by the Consultant and included in its fee proposal line item entitled "Plan Review and Permit Fee Allowance". DPMC will pay for the NJUCC permit. Refer to Section VIII of this document for more information.

2. Boilers:

The Consultant shall investigate the four (4) boilers located in Central plant- Building C, and compare boilers to be replaced with same BTU/HP rated boilers and provide recommendations with cost estimates.

3. Feed Water Systems:

The Consultant shall investigate the feed water systems softeners and chemical make-up systems at South Woods State Prison (SWSP) and determine locations of existing systems, controls and equipment. Replace existing feed water systems softeners and chemical make-up systems to be consistent with requirements of the new boiler systems.

Confirm existing electric is compatible with new replacement boilers and make any necessary modifications to circuits.

4. Report and Presentation:

Provide three (3) bound copies of the Investigation Report to the Project Manager. The document shall be presented in an 8 ½" x 11" bound booklet that contains a Table of Contents describing all of the information contained in the document and an Executive Summary with a

list of “prioritized” recommendations for burner replacements and justifications where appropriate.

All supporting documentation such as calculations, photographs, drawings, catalog cuts, correspondence, meeting minutes, and any other data obtained shall be included in the report appendix for reference. All cost data shall be in sufficient detail for each related division of the new CSI 2004 format and shall also be summarized on the DPMC 38 Cost Analysis form(s).

An oral presentation shall be made to the Project Team describing the findings of investigation and the recommendations for replacement. The Consultant may not proceed with the design phase of the project until the Project Team has reviewed the presentation and approved the recommendations made for this project.

B. DESIGN PHASE

1. General:

The Consultant shall provide design, specification, bid/award and construction administration services to replace the four (4) boilers located in Central plant- Building C, at South Woods State Prison (SWSP) as determined in the Investigation Phase. Meet EPA/NJDEP standards for (SOTA) State of the Art boilers and approvals for emissions.

The DEP State of the Art page (SOTA) <https://dep.nj.gov/boss/state-of-the-art/>

The page specifically to the boiler SOTA https://dep.nj.gov/wp-content/uploads/boss/state-of-the-art/final-sota-manual-for-boilers_apr-1-2024.pdf

2. Feed Water System Replace Design:

The consultant shall estimate the cost to provide design, specification, bid/award and construction administration services to replace existing feed water system softeners and chemical make up to be consistent with requirements of the new boilers replacement.

3. Demolition:

Depending on the results of the Investigation Phase, the Consultant shall provide the design and specifications to dismantle and remove the existing boilers and associated equipment. The owner reserves the first right of refusal on any and all portions of the dismantled units. Portions not claimed by the owner shall become property of the contractor and removed from the premises. Prior to dismantling the boiler, the boiler shall be free of asbestos containing materials (ACM).

4. New Boilers:

Depending on the results of the Investigation Phase, the Consultant shall provide for the installation of new, appropriately sized boilers based on technology that can be fired by natural gas and fuel oil.

The boilers and all associated equipment shall be tested to the manufacturer’s full performance test requirements.

5. Air Permits:

The Consultant shall prepare documentation necessary to modify the facility’s general air permits and obtain a pre-construction permit from DEP, as applicable. All costs for permits, meetings with the NJDEP, public notice/hearings, air emissions modeling, etc. must be anticipated by the Consultant and included in its fee proposal line item entitled "Plan Review and Permit Fee Allowance" in the base bid. DPMC will pay for the DCA Plan Review and NJUCC permit. Refer to Section VIII of this document for more information.

6. Piping:

All pertinent existing piping shall be modified as required to adapt to the new boilers. New piping shall be added where necessary. Verify the condition of existing piping and connection points where new piping will be connected.

All new lines shall be properly insulated, if required, and have identification tags installed.

7. Controls:

The Consultant shall survey the existing and new controls, panels, instrumentation, etc. and determine the upgrade and computer monitoring interface requirements and provide the design for same.

Ensure electronic monitoring and control system on new boilers are compatible with existing systems

8. Training:

It shall be required that training sessions be recorded (for future reference) for the Using Agency Facility Engineers and boiler room operators to demonstrate the proper operation of the burner/boiler, ancillary equipment, and control systems. The supplier shall use the manufacturer’s representative to conduct the training session. The training time required shall be estimated by the Consultant and approved by the Using Agency representative.

Five (5) sets of drawings, equipment specifications, manuals, operating instructions, recommended spare parts lists, warranties, and all other relevant information shall be bound in a binder and forwarded to the DPMC Project Manager at the end of the training session.

9. Rental:

Ensure continual operation by the temporary rental boilers during construction. Feed water, returns, blowdown, natural gas and electric were relocated from non-operational boilers.

C. HAZARDOUS BUILDING MATERIALS

Consultant shall survey project areas and related components and, if deemed necessary, collect samples of materials that will be impacted by the construction/demolition activities and analyze them for the presence of hazardous materials including:

1. Asbestos in accordance with N.J.A.C. 5:23-8, Asbestos Hazard Abatement Sub code.
2. Lead in accordance with N.J.A.C. 5:17, Lead Hazard Evaluation and Abatement Code.
3. PCB's in accordance with 40 CFR 761, Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions. Consultant shall engage a firm certified in the testing and analysis of materials containing PCB's.

Consultant shall document their procedure, process and findings and prepare a "Hazardous Materials Survey Report" identifying building components impacted by construction activities requiring hazardous materials abatement. Consultant shall provide three copies of the "Hazardous Materials Survey Report" to the Project Manager.

Consultant shall estimate the cost of hazardous materials sample collection, testing, analysis and preparation of the Hazardous Materials Survey Report and include that amount in their fee proposal line item entitled "**Hazardous Materials Testing and Report Allowance**", refer to paragraph X.C.

Based on the Hazardous Materials Survey Report, Consultant shall provide construction documents for abatement of the hazardous materials impacted by the work in accordance with the applicable code, sub code and Federal regulations.

Consultant shall estimate the cost to prepare construction documents for hazardous materials abatement and include that amount in their fee proposal line item entitled "**Hazardous Materials Abatement Design Allowance**", refer to paragraph X.D.

Consultant shall estimate the cost to provide “Construction Monitoring and Administration Services” for hazardous materials abatement activities and include that amount in their fee proposal line item entitled “**Hazardous Materials Construction Administration Allowance**”, refer to paragraph X.E.

There shall be no “mark-up” of sub consultant or subcontractor fees if sub consultants or subcontractors are engaged to perform any of the work defined in paragraph VII.C “Hazardous Building Materials”. All costs associated with managing, coordinating, observing and administering sub consultants and subcontractors performing hazardous materials sampling, testing, analysis, report preparation, hazardous materials construction administration services shall be included in the consultant’s lump sum fee proposal.

D. DESIGN MEETINGS & PRESENTATIONS

1. Design Meetings:

Conduct the appropriate number of review meetings with the Project Team members during each design phase of the project so they may determine if the project meets their requirements, question any aspect of the contract deliverables, and make changes where appropriate. The Consultant shall describe the philosophy and process used in the development of the design criteria and the various alternatives considered to meet the project objectives. Selected studies, sketches, cost estimates, schedules, and other relevant information shall be presented to support the design solutions proposed. Special considerations shall also be addressed such as: Contractor site access limitations, utility shutdowns and switchover coordination, phased construction and schedule requirements, security restrictions, available swing space, material and equipment delivery dates, etc.

It shall also be the responsibility of the Consultant to arrange and require all critical Sub-Consultants to be in attendance at the design review meetings.

Record the minutes of each design meeting and distribute within three (3) calendar days to all attendees and those persons specified to be on the distribution list by the Project Manager.

2. Design Presentations:

The minimum number of design presentations required for each phase of this project is identified below for reference:

Investigation Phase: One (1) oral presentation at phase completion.

Design Development Phase: One (1) oral presentation at phase completion.

Final Design Phase: One (1) oral presentation at phase completion.

E. EXISTING DOCUMENTATION

Copies of the following documents will be provided to each Consulting firm at the pre-proposal meeting to assist in the bidding process.

- Steam And Hot Water System Schematic Flow Diagram, C-M4.2. Dated 6-27-1997.
- C0777-00 Sprinkler Head Replacement 01-16-2002.
- Fire Detection Drawings- As-built for project record 11-04-1997.
- S. Jersey State Prison Bridgeton NJ. Mechanical Piping Plan Dated 4-26-1996.

Review these documents and any additional information that may be provided at a later date such as reports, studies, surveys, equipment manuals, as-built drawings, etc. The State does not attest to the accuracy of the information provided and accepts no responsibility for the consequences of errors by the use of any information and material contained in the documentation provided. It shall be the responsibility of the Consultant to verify the contents and assume full responsibility for any determination or conclusion drawn from the material used. If the information provided is insufficient, the Consultant shall take the appropriate actions necessary to obtain the additional information required.

All original documentation shall be returned to the provider at the completion of the project.

VIII. PERMITS & APPROVALS

A. NJ UNIFORM CONSTRUCTION CODE PLAN REVIEW AND PERMIT

The project construction documents must comply with the latest adopted edition of the NJ Uniform Construction Code (NJUCC).

The latest NJUCC Adopted Codes and Standards can be found at:

<http://www.state.nj.us/dca/divisions/codes/codreg/>

1. NJ Uniform Construction Code (NJUCC) Plan Review

Consultant shall estimate the cost of the NJUCC Plan Review by DCA and include that amount in their fee proposal line item entitled “**Plan Review and Permit Fee Allowance**”, refer to paragraph X.A.

Upon approval of the Final Design Phase Submission by DPMC, the Consultant shall submit the construction documents to the Department of Community Affairs (DCA), Bureau of Construction Project Review to secure a complete plan release.

As of July 25, 2022, the Department of Community Affairs (DCA) is only accepting digital signatures and seals issued from a third party certificate authority.

Procedures for submission to the DCA Plan Review Unit can be found at:

https://www.state.nj.us/dca/divisions/codes/forms/pdf_bcpr/pr_app_guide.pdf

Consultant shall complete the “Project Review Application” and include the following on Block 5 as the “Owner’s Designated Agent Name”:

Trevor M. Dittmar, DPMC
PO Box 235
Trenton, NJ 08625-0235
Trevor.Dittmar@treas.nj.gov 609-984-5529

The Consultant shall complete the NJUCC “Plan Review Fee Schedule”, determine the fee due and pay the NJUCC Plan Review fees, refer to Paragraph X.A.

The NJUCC “Plan Review Fee Schedule” can be found at:

http://www.state.nj.us/dca/divisions/codes/forms/pdf_bcpr/pr_fees.pdf

2. NJ Uniform Construction Code Permit

Upon receipt of a complete plan release from the DCA Bureau of Construction Project Review, the Consultant shall complete the NJUCC permit application and all applicable technical sub-code sections. The “Agent Section” of the application and certification section of the building sub-code section shall be signed. These documents, with **six (6) sets of DCA approved, signed and sealed construction documents** shall be forwarded to the DPMC Project Manager.

The Consultant may obtain copies of all NJUCC permit applications at the following website:

<https://www.nj.gov/dca/divisions/codes/resources/constructionpermitforms.html>

All other required project permits shall be obtained and paid for by the Consultant in accordance with the procedures described in Paragraph VIII.B.

3. Prior Approval Certification Letters:

The issuance of a construction permit for this project may be contingent upon acquiring various “prior approvals” as defined by N.J.A.C. 5:23-1.4. It is the Consultant’s responsibility to determine which prior approvals, if any, are required. The Consultant shall submit a general

certification letter to the DPMC Plan & Code Review Unit Manager during the Permit Phase of this project that certifies all required prior approvals have been obtained.

In addition to the general certification letter discussed above, the following specific prior approval certification letters, where applicable, shall be submitted by the Consultant to the DPMC Plan & Code Review Unit Manager: Soil Erosion & Sediment Control, Water & Sewer Treatment Works Approval, Coastal Areas Facilities Review, Compliance of Underground Storage Tank Systems with N.J.A.C. 7:14B, Pinelands Commission, Highlands Council, Well Construction and Maintenance; Sealing of Abandoned Wells with N.J.A.C. 7:9D, Certification that all utilities have been disconnected from structures to be demolished, Board of Health Approval for Potable Water Wells, Health Department Approval for Septic Systems. It shall be noted that in accordance with N.J.A.C. 5:23-2.15(a)5, a permit cannot be issued until the letter(s) of certification is received.

4. Multi-building or Multi-site Permits:

A project that involves many buildings and/or sites requires that a separate permit shall be issued for each building or site. The Consultant must determine the construction cost estimate for *each* building and/or site location and submit that amount where indicated on the permit application.

5. Special Inspections:

In accordance with the requirements of the New Jersey Uniform Construction Code N.J.A.C. 5:23-2.20(b), Bulletin 03-5 and Chapter 17 of the International Building Code, the Consultant shall be responsible for the coordination of all special inspections during the construction phase of the project.

Bulletin 03-5 can be found at:

http://www.state.nj.us/dca/divisions/codes/publications/pdf_bulletins/b_03_5.pdf

a. Definition:

Special inspections are defined as an independent verification by a certified special inspector for **Class I buildings and smoke control systems in any class building**. The special inspector is to be independent from the Contractor and responsible to the Consultant so that there is no possible conflict of interest.

Special inspectors shall be certified in accordance with the requirements in the New Jersey Uniform Construction Code.

b. Responsibilities:

The Consultant shall submit with the permit application, a list of special inspections and the agencies or special inspectors that will be responsible to carry out the inspections required for the project. The list shall be a separate document, on letter head, signed and sealed.

B. OTHER REGULATORY AGENCY PERMITS, CERTIFICATES AND APPROVALS

The Consultant shall identify and obtain all other State Regulatory Agency permits, certificates, and approvals that will govern and affect the work described in this Scope of Work. An itemized list of these permits, certificates, and approvals shall be included with the Consultant’s Technical Proposal and the total amount of the application fees should be entered in the Fee Proposal line item entitled, **“Plan Review and Permit Fee Allowance.”**

The Consultant may refer to the Division of Property Management and Construction “Procedures for Architects and Engineers Manual”, Paragraph **“9. REGULATORY AGENCY APPROVALS”** which presents a compendium of State permits, certificates, and approvals that may be required for this project.

The Consultant shall determine the appropriate phase of the project to submit the permit application(s) in order to meet the approved project milestone dates.

Where reference to an established industry standard is made, it shall be understood to mean the most recent edition of the standard unless otherwise noted. If an industry standard is found to be revoked, or should the standard have undergone substantial change or revision from the time that the Scope of Work was developed, the Consultant shall comply with the most recent edition of the standard.

IX. ENERGY REBATE AND INCENTIVE PROGRAMS

The Consultant shall review any and all programs on the State and Federal level to determine if any proposed upgrades to the mechanical and/or electrical equipment and systems for this project qualify for approved rebates and incentives.

The Consultant shall review the programs available on the “New Jersey’s Clean Energy Program” website at: <http://www.njcleanenergy.com> as well as federal websites and New Jersey electric and gas utility websites to determine if and how they can be applied to this project.

The Consultant shall identify all applicable rebates and incentives in their technical proposal and throughout the design phase.

The Consultant shall be responsible to complete the appropriate registration forms and applications, provide any applicable worksheets, manufacturer’s specification sheets, calculations, attend meetings, and participate in all activities with designated representatives of the programs and utility companies to obtain the entitled financial incentives and rebates for this project.

All costs associated with this work shall be estimated by the Consultant and the amount included in the base bid of its fee proposal.

X. ALLOWANCES

A. PLAN REVIEW AND PERMIT FEE ALLOWANCE

The Consultant shall obtain and pay for all of the project permits in accordance with the guidelines identified below.

1. Permits:

The Consultant shall determine the various permits, certificates, and approvals required to complete this project.

2. Permit Costs:

The Consultant shall estimate the application fee costs for all of the required project permits, certificates, and approvals (excluding the NJ Uniform Construction Code permit) and include that amount in its fee proposal line item entitled “**Plan Review and Permit Fee Allowance**”. A breakdown of each permit and application fee shall be attached to the fee proposal for reference.

NOTE: The NJ Uniform Construction Code permit is excluded since it will be paid for by the State.

3. Applications:

The Consultant shall complete and submit all permit applications to the appropriate permitting authorities and the costs shall be paid from the Consultant’s permit fee allowance. A copy of the application(s) and the original permit(s) obtained by the Consultant shall be given to the DPMC Project Manager for distribution during construction.

4. Consultant Fee:

The Consultant shall determine what is required to complete and submit the permit applications, obtain supporting documentation, attend meetings, etc., and include the total cost in the base bid of its fee proposal under the “Permit Phase” column.

Any funds remaining in the permit allowance will be returned to the State at the close of the project.

B. HAZARDOUS MATERIALS TESTING AND REPORT ALLOWANCE

Consultant shall estimate the costs to complete the hazardous materials survey, sample collection, testing and analysis and preparation of a “Hazardous Materials Survey Report” noted in paragraph VII.B and enter that amount on their fee proposal line item entitled “**Hazardous Materials Testing and Report Allowance**”. Consultant shall attach a detailed cost breakdown sheet for use by DPMC during the proposal review and potential fee negotiations. The cost breakdown sheet shall include, but not be limited to, the following information:

- Description of tasks and estimated cost for the following:
 - Sample collection
 - Sample testing
 - Preparation of an Hazardous Materials Survey Report

Any funds remaining in the Hazardous Materials Testing and Report Allowance will be returned to the State at the close of the project.

C. HAZARDOUS MATERIALS ABATEMENT DESIGN ALLOWANCE

Consultant shall estimate the costs to prepare construction documents for hazardous materials abatement noted in paragraph VII.B and enter that amount on their fee proposal line item entitled “**Hazardous Materials Abatement Design Allowance**”. Consultant shall attach a detailed cost breakdown sheet for use by DPMC during the proposal review and potential fee negotiations. The cost breakdown sheet shall include a description of the tasks to be performed and the estimated cost of each task.

Any funds remaining in the Hazardous Materials Abatement Design Allowance will be returned to the State at the close of the project.

D. HAZARDOUS MATERIALS CONSTRUCTION ADMINISTRATION ALLOWANCE

Consultant shall estimate the cost to provide Construction Monitoring and Administration Services for hazardous materials abatement as noted in paragraph VII.B and enter that amount on their fee proposal line item entitled “**Hazardous Materials Construction Administration**”

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Allowance". Consultant shall attach a detailed cost breakdown sheet for use by DPMC during the proposal review and potential fee negotiations. The cost breakdown sheet shall include a description of the tasks to be performed and the estimated cost of each task.

Any funds remaining in the Hazardous Materials Construction Administration Allowance will be returned to the State at the close of the project.

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XI. SOW SIGNATURE APPROVAL SHEET

This Scope of Work shall not be considered a valid document unless all signatures appear in each designated area below.

The client agency approval signature on this page indicates that they have reviewed the design criteria and construction schedule described in this project Scope of Work (including the subsequent contract deliverables and exhibits) and verifies that the work will not conflict with the existing or future construction activities of other projects at the site.

SOW PREPARED BY: Lucy Ibrahim 05/06/2025
LUCY IBRAHIM, PROJECT MANAGER DATE
DPMC PROJECT PLANNING & INITIATION

SOW APPROVED BY: James Wright 5/6/2025
JAMES WRIGHT, MANAGER DATE
DPMC PROJECT PLANNING & INITIATION

SOW APPROVED BY: Drew P. 5/6/25
DREW PANGALDI, PROJECT MANAGER DATE
DEPARTMENT OF CORRECTIONS

SOW APPROVED BY: Robert TamPELLINI 5/6/2025
ROBERT TAMPELLINI, PROJECT MANAGER DATE
DPMC PROJECT MANAGEMENT GROUP

SOW APPROVED BY: Jeanette M. Barnard 5.13.25
JEANETTE M. BARNARD, DEPUTY DIRECTOR DATE
DIV PROPERTY MGT & CONSTRUCTION

XII. CONTRACT DELIVERABLES

The following are checklists listing the Contract Deliverables that are required at the completion of each phase of this project. The Consultant shall refer to the DPMC publication entitled “Procedures for Architects and Engineers,” 3.0 Edition, dated September 2022 available at <https://www.nj.gov/treasury/dpmc/Assets/Files/ProceduresforArchitectsandEngineers.pdf> for a detailed description of the deliverables required for each submission item listed. References to the applicable paragraphs of the “Procedures for Architects and Engineers” are provided.

Note that the Deliverables Checklist may include submission items that are “S.O.W. Specific Requirements”. These requirements will be defined in the project specific scope of work and included on the deliverables checklist.

This project includes the following phases with the deliverables noted as “Required by S.O.W” on the Deliverables Checklist:

- **INVESTIGATION PHASE**
- **DESIGN DEVELOPMENT PHASE**
- **FINAL DESIGN PHASE**
- **PERMIT APPLICATION PHASE**
- **BIDDING AND CONTRACT AWARD**
- **CONSTRUCTION PHASE**
- **PROJECT CLOSE-OUT PHASE**

XIII. EXHIBITS

- A. SAMPLE PROJECT SCHEDULE FORMAT
- B. PROJECT SITE LOCATION MAP
- C. EXISTING PHOTOS
- D. RULES & REGULATIONS REGARDING OUTSIDE CONTRACTORS
- E. STEAM & HOT WATER SYSTEM SCHEMATIC FLOW DIAGRAM C-M4.2
- F. JOHNSTON BOILERS
- G. FINAL-SOTA-MANUAL-FOR-BOILERS_APR-1-2024

END OF SCOPE OF WORK

Deliverables Checklist Design Development Phase

A/E Name: _____

A/E Manual Reference	Submission Item	Required by S.O.W.		Previously Submitted		Enclosed	
		Yes	No	Yes	No	Yes	No
14.4.1.	A/E Statement of Site Visit						
14.4.2.	Narrative Description of Project						
14.4.3.	Building Code Information Questionnaire						
14.4.4.	Space Analysis						
14.4.5.	Special Features						
14.4.6.	Catalog Cuts						
14.4.7.	Site Evaluation						
14.4.8.	Subsurface Investigation						
14.4.9.	Surveys						
14.4.10.	Arts Inclusion						
14.4.11.	Design Rendering						
14.4.12.	Regulatory Approvals						
14.4.13.	Utility Availability						
14.4.14.	Drawings (6 Sets)						
14.4.15.	Specifications (6 Sets)						
14.4.16.	Current Working Estimate/Cost Analysis						
14.4.17.	Project Schedule						
14.4.18.	Formal Presentation						
14.4.19.	Plan Review/Scope of Work Compliance Statement						
14.4.20.	Design development Phase Deliverables Checklist						
S.O.W. Reference	S.O.W. Specific Requirements						

This checklist shall be completed by the Design Consultant and included as the cover sheet of this submission to document to the DPMC the status of all the deliverables required by the project specific Scope of Work.

Consultant Signature

Date

Deliverables Checklist Bidding and Contract Award Phase

A/E Name: _____

A/E Manual Reference	Submission Item	Required by S.O.W.		Previously Submitted		Enclosed	
		Yes	No	Yes	No	Yes	No
17.1.1.	Notice of Advertising						
17.1.2.	Bid Proposal Form						
17.1.3.	Bid Clearance Form						
17.1.4.	Drawings (6 Sets)						
17.1.5.	Specifications (6 Sets)						
17.1.6.	Construction Schedule						
17.3	Pre-Bid Conference/Mandatory Site Visit						
17.3.1.	Meeting Minutes						
17.4	Bulletins						
17.5	Post Bid Meeting						
17.6.	Contract Award "Letter of Recommendation"						
17.8.	Bid Protests - Hearings						
17.9.	Bidding and Contract Award Phase Deliverables Checklist						
S.O.W. Reference	S.O.W. Specific Requirements						

This checklist shall be completed by the Design Consultant and included as the cover sheet of this submission to document to the DPMC the status of all the deliverables required by the project specific Scope of Work.

Consultant Signature

Date

February 7, 1997
Rev.: January 29, 2002

Responsible Group Code Table

The codes below are used in the schedule field "GRP" that identifies the group responsible for the activity. The table consists of groups in the Division of Property Management & Construction (DPMC), as well as groups outside of the DPMC that have responsibility for specific activities on a project that could delay the project if not completed in the time specified. For reporting purposes, the groups within the DPMC have been defined to the supervisory level of management (i.e., third level of management, the level below the Associate Director) to identify the "functional group" responsible for the activity.

<u>CODE</u>	<u>DESCRIPTION</u>	<u>REPORTS TO ASSOCIATE DIRECTOR OF:</u>
CM	Contract Management Group	Contract Management
CA	Client Agency	N/A
CSP	Consultant Selection and Prequalification Group	Technical Services
A/E	Architect/Engineer	N/A
PR	Plan Review Group	Technical Services
CP	Construction Procurement	Planning & Administration
CON	Construction Contractor	N/A
FM	Financial Management Group	Planning & Administration
OEU	Office of Energy and Utility Management	N/A
PD	Project Development Group	Planning & Administration

EXHIBIT 'A'

Activity ID	Description	Respon	Weeks
<PROJ>			
Design			
CV3001	Schedule/Conduct Pre-design/Project Kick-Off Mtg.	CM	
CV3020	Prepare Program Phase Submittal	AE	
CV3021	Distribute Program Submittal for Review	CM	
CV3027	Prepare & Submit Project Cost Analysis (DPMC-38)	CM	
CV3022	Review & Approve Program Submittal	CA	
CV3023	Review & Approve Program Submittal	PR	
CV3024	Review & Approve Program Submittal	CM	
CV3025	Consolidate & Return Program Submittal Comments	CM	
CV3030	Prepare Schematic Phase Submittal	AE	
CV3031	Distribute Schematic Submittal for Review	CM	
CV3037	Prepare & Submit Project Cost Analysis (DPMC-38)	CM	
CV3032	Review & Approve Schematic Submittal	CA	
CV3033	Review & Approve Schematic Submittal	PR	
CV3034	Review & Approve Schematic Submittal	CM	
CV3035	Consolidate & Return Schematic Submittal Comment	CM	
CV3040	Prepare Design Development Phase Submittal	AE	
CV3041	Distribute D. D. Submittal for Review	CM	
CV3047	Prepare & Submit Project Cost Analysis (DPMC-38)	CM	
CV3042	Review & Approve Design Development Submittal	CA	
CV3043	Review & Approve Design Development Submittal	PR	
CV3044	Review & Approve Design Development Submittal	CM	
CV3045	Consolidate & Return D.D. Submittal Comments	CM	
CV3050	Prepare Final Design Phase Submittal	AE	
CV2001	Distribute Final Design Submittal for Review	CM	
CV2002	Review & Approve Final Design Submittal	CA	
CV3053	Review & Approve Final Design Submittal	PR	
CV3054	Review Final Design Submittal for Constructability	OCS	

Sheet 1 of 3

Bureau of Design & Construction Services

DBCA - TEST

NOTE:
Refer to section "IV Project Schedule" of the
Scope of Work for contract phase durations.

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EXHIBIT 'A'

Activity ID	Description	Respn	Weeks
CV6014	Roughing Work Complete	CON	
CV6021	Interior Finishes Start	CON	
CV6022	Install Interior Finishes	CON	
CV6030	Contract Work to Substantial Completion	CON	
CV6031	Substantial Completion Declared	CM	
CV6075	Complete Deferred Punch List/Seasonal Activities	CON	
CV6079	Project Construction Complete	CM	
CV6080	Close Out Construction Contracts	CM	
CV6089	Construction Contracts Complete	CM	
CV6090	Close Out A/E Contract	CM	
CV6092	Project Completion Declared	CM	

DBCA - TEST

Sheet 3 of 3

Bureau of Design & Construction Services

EXHIBIT 'A'

NOTE:
Refer to section "IV Project Schedule" of the
Scope of Work for contract phase durations.

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Site Map - South Woods State Prison

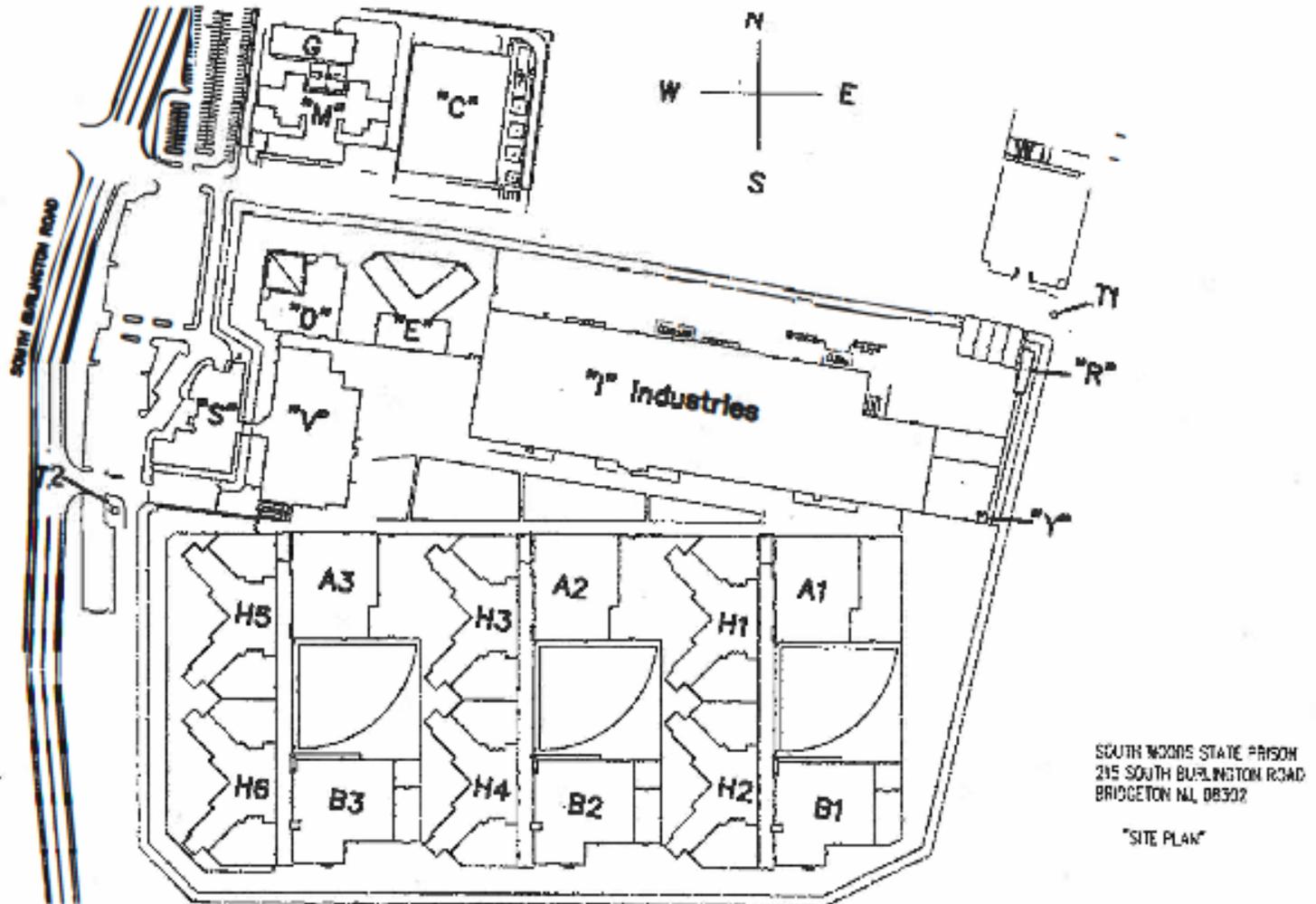


EXHIBIT 'B'

Site Map - South Woods State Prison



EXHIBIT 'B'

South Woods State Prison



EXHIBIT 'C'

South Woods State Prison



EXHIBIT 'C'

South Woods State Prison



EXHIBIT 'C'

South Woods State Prison
215 S. Burlington Rd.
Bridgeton, NJ 08302
856-459-7000

RULES AND REGULATIONS REGARDING OUTSIDE CONTRACTORS

South Woods State Prison administration is charged with the responsibility of the custody of incarcerated persons. All non-state employees must comply with the below listed Rules and Regulations as a condition of their employment and access to state property.

1. Drivers' License or other approved photo I.D. is to be used, as identification for work crews. **NOTE:** If Temporary I.D.'s are used the contractors Identification will be turned in at the beginning of the day and a temporary ID card will be issued to the escort officer. At the end of the day, the temporary ID will be turned in and the Identification submitted will be returned to each worker. No temporary ID cards will leave the Institution.
2. Work crews will enter through Receiving Gate as scheduled. They will be escorted to the work site unless special arrangements have been made through the area supervisor.
3. If Restricted Visitor's Badges are issued by the Lobby LCP or the Receiving Gate they must be worn on the outer most garment at all times.
4. An escort will be required to and from the job site. No contractor will walk anywhere on the compound without a proper escort.
5. All workers and vehicles will be subject to search prior to entry into the Institution. Furthermore, any worker or vehicle is subject to a search at any time while on State property.
6. All workers are to read, sign, and receive a set of South Woods State Prison Outside contractor regulations.
7. If any workers have any relatives or friends incarcerated at SWSP, they are to notify administrative officials.
8. No workman is to fraternize or argue with incarcerated persons. Any difficulties with incarcerated persons and /or employees must be reported to the escorting officer immediately. The officer will then inform his area supervisor of any problems.
9. Do not give anything to, or take anything from incarcerated persons.
10. Lock all personal vehicles and demobilize construction vehicles and equipment when left unattended. All tools stored outside the security perimeter will be secured in locked vehicles. Ladders will be firmly secured and locked to the roof or side of construction vehicles.
11. Photographs are prohibited. Cameras are not permitted on the grounds.
12. All tools and equipment will be locked in the contractors trailer overnight. Equipment, such as ladders and scaffolding, will be chained and locked (contractors supply these items) before leaving. Any scaffolding will be removed at the end of each workday and locked.
13. Warning lights must be displayed at all dangerous areas at night.
14. No firearms, ammunition, hunting knives, personal knives of any size or type, or other articles of this nature are permitted on State Property or stored in vehicles.
15. No alcoholic beverages, controlled substances, or prescription medication (drugs) are permitted on the grounds. Smoking is prohibited in ALL State Buildings.
16. Institutional Fire Regulations shall be strictly adhered to; you may contact the Institutional Fire Marshall through the Escort Officer.

EXHIBIT 'D'

17. Obey speed limit and all NO PARKING and designated parking areas.
18. Lock personal items in your vehicle outside the security perimeter of the prison.
19. All excavations will be protected as directed by the Engineer-in-charge of Maintenance and those across main roads must be covered with plates.
20. It is the responsibility of each contractor to know that his tools and equipment are secured in a locked trailer at the end of every workday.
21. All workers will be photographed and his/her picture kept on file at the Receiving Gate for identification purposes.
22. Each contractor with a gang box will submit an inventory tool list. All power tools must be inspected and required tool inventory submitted at the end of each workday. Tools will not be permitted inside the security perimeter if not job specified. All gang boxes will be searched upon entering and leaving the Institution
23. Equipment and tools are to be kept away from the bars and fence surrounding the job site.
24. Each contractor is responsible for any damage done as a result of their work.
25. All acetylene torch heads, regulators, and hoses will be removed from the Institution on a daily basis. All tanks will be secured in locked trailers or containers outside the security perimeter.
26. Tools will be inventoried on a daily basis, secured in gang boxes, and sealed with tamper proof seals. The seal numbers will be logged on the Daily Inventory Sheet.
27. All blades, regardless of nature, will be inventoried. When a blade wears out or breaks, it will be taken off the inventory and taken out of the Institution.
28. Unacceptable Clothing – The following clothing should not be worn when entering any part of the prison.
 - Tank Tops, Mesh Tops, or Tube Tops
 - Low-Cut, Shoulderless, Halters Tops, or Sheer Clothing
 - Shorts
 - SweatPants
 - Leggings, or Tights (Unless covered by a long top, skirt, etc.)
 - Bike Pants, Ragged jeans (No patches or holes)
 - Skirts with high slits, mini styled skirts, mini dresses, or mini culottes
 - Proper foot wear is required, No Thong sandals, beach footwear, or open toed shoes
 - Clothing with inappropriate or offensive inscriptions
29. In the event of an emergency, you will be directed to a secured area of the institution. You are to follow the direction of your escort officer at ALL times.

I have reviewed the above rules and regulations pertaining to outside contractors working in South Woods State Prison. I understand that any violation of these rules and regulations could result in me no longer being permitted to work within this institution and its grounds.

Name

Company Name

Signature

Date

Escort Officer's Name

Escort Officer's Signature

EXHIBIT 'D'

NEW JERSEY DEPARTMENT OF CORRECTIONS
SPECIAL INVESTIGATIONS DIVISION (609) 292-9362
P.O. BOX 863 TRENTON, NEW JERSEY 08625

APPLICATION FOR CLEARANCE AND ISSUANCE OF
IDENTIFICATION CARDS

CIRCLE ONE: TEMPORARY OR VOLUNTEER CIRCLE ONE: NEW RENEWAL

(PLEASE PRINT LEGIBLY)

NAME: _____ SS #: _____
(LAST) (FIRST) (M.I.)

AKA: _____ / _____
(OTHER NAMES USED SUCH AS MAIDEN NAME, ADOPTIONAL, RELIGIOUS, ETC.) (MARKS, SCARS AND TATTOOS)

DATE OF BIRTH : ____ / ____ / ____ SEX: ____ RACE: ____ EYES: ____ HAIR: ____ HT: ____ WT: ____

PLACE OF BIRTH: _____ Driver's Lic. #: _____
(State Only) (State) (Number)

HOME ADDRESS: _____
(STREET) (CITY) (STATE) (ZIP CODE)

Name of your Department/Agency: _____ Phone # _____

ADDRESS: _____
(STREET) (CITY) (STATE) (ZIP CODE)

PURPOSE OF VISITATION TO INSTITUTIONS: _____

Have you ever been convicted of any violation of the Criminal Code in this State or in any other Jurisdiction?
(Violations include offenses, crimes, misdemeanors, and felonies).

(Circle one) YES NO If "YES", explain on reverse side.

Do you presently have any pending criminal charges? YES ____ NO ____ If "YES", explain on reverse side.

APPLICANT MUST LIST EXPUNGED CONVICTION(S) INFORMATION, SIGN AND DATE THE
"AUTHORIZATION TO RELEASE INFORMATION" FORM ON THE REVERSE SIDE. FALSIFICATION OF APPLICATION
MAY RESULT IN THE TERMINATION OF YOUR EMPLOYMENT.

Have you ever been employed by the NJ Dept. of Corrections in any capacity? YES ____ NO ____
If "YES", explain on reverse side.

Are you currently on an inmate visit list or do you currently have any acquaintances or family members
incarcerated in any NJ Dept. of Corrections facilities? YES ____ NO ____ If "YES", explain on reverse side.

A ***** (DO NOT WRITE BELOW THIS LINE, FOR SPONSOR USE ONLY) ***** A

Title applicant applying for: __ Contractor _____ Location: __ South Woods _____

Sponsor: _____ Ed Watts _____ Title: __ AEICM _____

Division, Bureau or Unit: __ Corrections, South Woods State Prison, Maintenance _____

Sponsor's signature: _____ Date: _____

Send reply to: __ Ed Watts _____ Phone: __ 856-459-7600, fax 856-459-7620 _____

(Print Name)

NATURE OF CONVICTION	DATE OF CONVICTION	AGE AT TIME OF INCIDENT	NAME & ADDRESS OF POLICE AGENCY OR COURT	DISPOSITION

COMMENTS / EXPLANATIONS: _____

AUTHORIZATION TO RELEASE INFORMATION:

I hereby authorize the release of any and all information regarding me, to the NJ Department of Corrections, at their request, in order that they may determine my suitability for employment.

SIGNATURE OF APPLICANT: _____ DATE: _____

.....
^ ***** DO NOT WRITE BELOW THIS LINE ***** ^

***** SPECIAL INVESTIGATIONS DIVISION USE ONLY *****

THE ABOVE NAMED APPLICANT'S CRIMINAL HISTORY RECORD INDICATES:

_____ ARREST & CONVICTION

_____ ARREST AND NO CONVICTION

_____ NO RECORD

_____ NAME

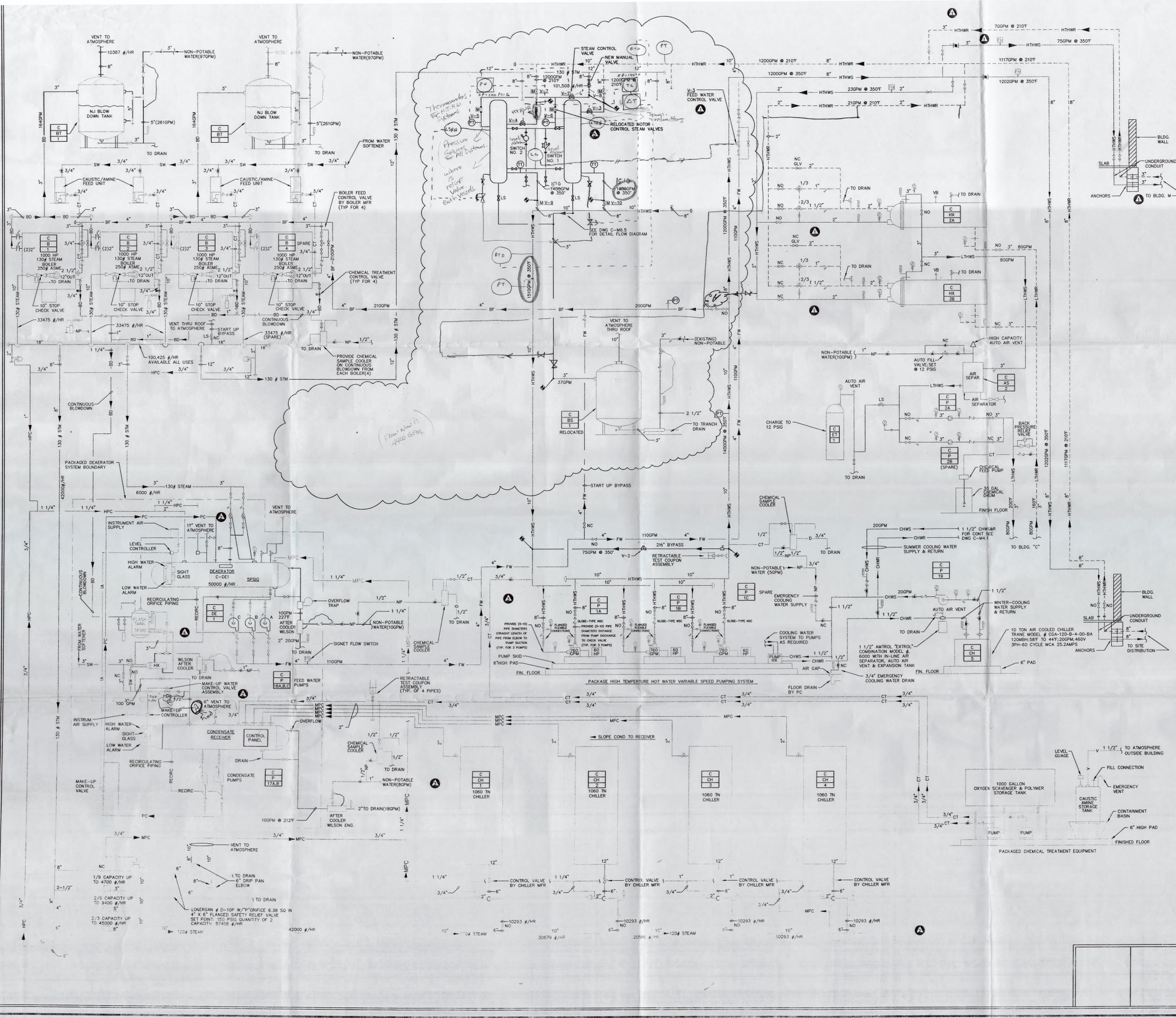
EXHIBIT 'D'

_____ DATE

SOUTH WOODS STATE PRISON

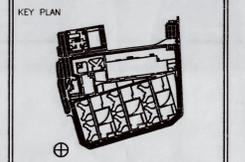
Bridgeton, New Jersey
 DBC Project # C0469-00
 DCA Project # 9120-95

- ▲ 3/13/96 DESIGN REVISIONS
- ▲ 5/31/96 DESIGN REVISIONS
- ▲ XX/XX/96 DESIGN REVISIONS, B-21, B-23
- ▲ 3/12/97, B-35, B-36
- ▲ 6/3/98 DESIGN REVISIONS, B53



ISSUED FOR
 PHASE I
 COMPLETION
 6/27/97

Design/Builder
PERINI
 L. Robert Kimball
 & Associates
 Architects and
 Engineers, Inc. ©1995



DATE: NONE
 SCALE: NONE
 DRAWN BY: HFF
 CHECKED BY: DTH

STEAM AND HOT WATER SYSTEM SCHEMATIC FLOW DIAGRAM

C-M4.2

BUILDING: **C** CENTRAL PLANT

FORM P-2 MANUFACTURER'S DATA REPORT FOR ALL TYPES OF BOILERS EXCEPT WATERTUBE AND ELECTRIC

As required by the Provisions of the ASME Code Rules, Section I

1. Manufactured by Johnston Boiler Company 300 Pine Street Ferrysburg, MI 49409-0300
(Name and address of Manufacturer)

2. Manufactured for South Woods State Prison Bridgeton NJ 07974
(Name and address of Purchaser)

3. Location of Installation South Woods State Prison Bridgeton NJ 07974
(Name and address)

4. Type Firetube Scotch Marine Boiler No. 9538-03 953810101 9248 Year Built 1996
(PFT, etc.) (Mfg. Serial No.) (CRN) (Drawing No.) (Mfr. Serial No.)

5. The chemical and physical properties of all parts meet the requirements of material specifications of the ASME BOILER AND PRESSURE VESSEL CODE. The design, construction, and workmanship conform to Section I of the ASME Boiler and Pressure Vessel Code 1995.
(Year)

Addenda to A-95 and Code Cases _____
(Date) (Number)

Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors are attached for the following items of this report

None
(Name of part, part number, mfg. name and identifying stamp)

6. Shells or drums: One SA-516-70 1.00" 119.00" 260.00
(No.) (Mat. Spec. Grade) (Thickness (in.)) (Dia (in.)) (Length (in.)) (Weight (lbs.))

7. Joints: Welded 100% Welded Two
(Type (seamless, welded)) (Efficiency (as compared to seamless)) (Type (seamless, welded)) (No. of shell courses)

8. Heads SA-516-70 0.625" Flat
(Material Specification No.; Thickness - Flat, Dished, Ellipsoidal - Radius or Dish)

9. Tubesheet SA-516-70 0.625" Tube Holes 2.53"
(Mat. Spec., Grade Thickness) (Dia)

10. Boiler Tubes: No. 386 SA-178-A Straight
(Mat. Spec., Grade) (Straight or Bend)

Dia 2.500" Length 219.00" - 280.00" Gauge #13 B.W.G.
(If vertical, give max & min) (for thickness)

11. Furnace No. One Size 47.00" OD Length, each section _____ Total 231.25"
(OD or W x H)

Type Corrugated
(Plain, Asmerson, Ring Reinforced, Corrugated, Compound, or Stayed)

SA-516-70 0.750" Seams: Type Welded
(Mat. Spec., Grade, Thickness) (Seamless, Welded)

12. Staybolts: No. 80 Size 1.25" Dia SA-36 1.227 Sq. In.
(Dia, Mat. Spec. Grade, Size Tables, Net Area)

Pitch 7.50" X 7.50" MAWP 270 psi.
(Hor. and Vert.)

13. Stays or Braces

Location	Material Spec. No.	Type	No. & Size	Max Pitch	Total Net area	Fig. PFT-32 U1	Dist. Tubes to Shell	Area to be Stayed	MAWP. psi
(a) F.H. above tubes	SA-36	Diag.	25, 1.375"	7.50"	37.1	1.15	25.00"	1463	283
(b) R.H. above tubes	SA-36	Diag.	22, 1.375"	7.50"	32.7	1.15	25.00"	1363	267
(c) F.H. below tubes									
(d) R.H. below tubes	SA-36	Diag.	6, 1.375"	7.50"	8.9	1.15		338	295
(e) Through stays									
(f) Dome braces									

14. Other Parts 1. W.C. Piping 2. Feedwater Piping 3. Blowdown Piping
(Part Description - i.e., Dome, Boiler Piping, etc.)

1. SA-53-B 1.00" Threaded Pipe Sch. #80
(Mat. Spec., Grade, Size, Material Thickness, MAWP)

2. SA-53-B 2.00" Threaded Pipe Sch. #80

3. SA-53-B 1.25" Threaded Pipe Sch. #80

FORM P-2 (BACK)

- 15. Openings: (a) Steam One 8.00" 300# LWN FLG (b) Safety Valve Three 3.00" NPT 300# FC
(No., Size, and Type) (No., Size, and Type)
- (c) Blowoff Two 2.00" NPT 300# FC Bottom (d) Feed Two 4.00" 300# SO Flange 1 LH Side 1 RH Side
(No., Size, Type, and Location) (No., Size, Type, and Location)
- (e) Manholes: No. One Size 12X16 (3/4X3 Ring) Location Rear Head Above Tubes
- (f) Handholes: No. Seven Size 3.25X5.00 Location 2 Front 1 Bottom 2 Rear 1 LH Side 1 RH Side
- 16. Fusible Plug (if used) None
(No., No. Location, Mfr's Stamp)
- 17. Boiler Supports: No. Three Type Saddles Attachment Welded
(Position, Legs, Lugs)
- 18. MAWP 250 psi Based On PFT-18 (261) Heating Surface 5000 sq. ft.
(Code Par. and Formula) (Total)
- 19. Shop Hydrostatic Test 375 psig. 20. Maximum Designed Steaming Capacity 34,500 lbs/hr.
- 21. Remarks _____

CERTIFICATE OF SHOP COMPLIANCE

We certify that the statements made in this data report are correct and that all details of design, material, construction, and workmanship of this boiler conform to Section I of the ASME BOILER AND PRESSURE VESSEL CODE.

Our Certificate of Authorization no. 231 to use the (S) S symbol expires March 30, 1999

Date 23 August 1996 Signed Harold P. Tills Name Johnston Boiler Company
(Authorized Representative) (Manufacturer)

CERTIFICATE OF SHOP INSPECTION

Boiler constructed by Johnston Boiler Company at Ferrysburg, Michigan

I, the undersigned, holding a valid commission issued by the National Board Of Boiler and Pressure Vessel Inspectors and/or the state or province of Michigan and employed by H. S. B. I. & I. Co. of Hartford CT

_____ have inspected parts of this boiler referred to as data items 4-20 inclusive

_____ and have examined Manufacturer's Partial Data Reports for items None

_____ and state that, to the best of my knowledge and belief, the manufacturer has constructed this boiler in accordance with Section I of the ASME BOILER AND PRESSURE VESSEL CODE.

By signing this certificate neither the inspector nor his employer makes any warranty, expressed or implied, concerning the boiler described in this Manufacturer's Data Report. Furthermore, neither the inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 23 August 1996 Signed Richard S. Balda Commissions NB-7607A MS-414
(Authorized Inspector) Nat'l. Board (incl. endorsements), State, Province, and Mex.

CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE

We certify that the field assembly construction of all parts of this boiler conforms with the requirements of Section I of the ASME BOILER AND PRESSURE VESSEL CODE.

Our Certificate of Authorization no. _____ to use the (A) or (S) _____ symbol expires _____

Date _____ Signed _____ Name _____
(Authorized Representative) (Assembler)

CERTIFICATE OF FIELD ASSEMBLY INSPECTION

I, the undersigned, holding a valid commission issued by the National Board Of Boiler and Pressure Vessel Inspectors and/or the state or province of _____ and employed by _____

_____ have compared the statements in this Manufacturer's Data Report with the described boiler and state that the parts referred to as data items _____ not included in the certificate of shop inspection, have been inspected by me and that to the best of my knowledge and belief, the manufacturer and/or the assembler has constructed and assembled this boiler in accordance with the applicable sections of the ASME BOILER AND PRESSURE VESSEL CODE. The described boiler was inspected and subjected to a hydrostatic test of _____ psi.

By signing this certificate neither the inspector nor his employer makes any warranty, expressed or implied, concerning the boiler described in this Manufacturer's Data Report. Furthermore, neither the inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date _____ Signed _____ Commissions _____

INSPECTION CERTIFICATE

**Johnston Boiler Company
Ferrysburg, Michigan 49409**

1. Boiler manufactured for South Woods State Prison of Bridgeton NJ 07974
2. Type Firetube Scotch Marine Order No. 9536 Drawing No. 953610101
3. Serial Nos: 9536-03 9248
(Manuf's) (A.S.M.E.) (States)
4. SHELL: Diam. 113.00" LD. Length over all 260.00" No. of Courses Two
5. LONGITUDINAL JOINTS: Welded Butt
(Type) (Riveting) (Diam. Hole) (Pitch)
6. Efficiency 100% Rivets
(Made By) (Material)
- THICKNESS: Of shell 1.00" Of butts Of heads .625" Of furnace .750"
7. STAYBOLTS: Material SA-36
Diam. outside 1.25" Net area 1.2272 Sq. In. Max. pitch 7.50"
8. STAYS above tubes 25 - 1.375" Dia. Front 22 - 1.375" Dia. Rear
Area: Front Head 1463 Sq. In. Rear Head 1363 Sq. In.
STAYS below tubes 6 - 1.375" Area: 338 Sq. In.
9. TUBES: No. 386 Diam. 2.50" Length 219.00" & 260.00 Material SA-178-A
10. DOME: Diam. and length None Grate Area
11. Constructed for pressure 250# Steam Tested to 375 lbs. per sq. in.

MATERIAL

DESCRIPTION	Yield Point Pb. Inch	ULT Strength Sq. Inch	ELONG. in 8 Inches	Red Area per cent	CHEMICAL ANALYSIS					GRADE	HEAT Number	
					Thick- ness	Copper	Carbon	Mang.	Phos.			Sulph.
Shell, Front Course	59000	81000	24%		1.00"		.19	.94	.011	.007	516-70	D21837
Shell, Rear Course	45000	72000	27%		1.00"		.19	.94	.011	.007	516-70	D21837
Furnace 1st Csc.	49000	75000	26%		.750"		.20	.98	.021	.007	516-70	E22678
Furnace 2nd Csc.	49000	75000	26%		.750"		.20	.98	.021	.007	516-70	E22678
Rear Head	51000	75000	24%		.625"		.21	.97	.015	.007	516-70	E23292
Front Head	51000	75000	24%		.625"		.21	.97	.015	.007	516-70	E23292
Comb. Chamb. Rear Head	48500	72500			.625"		.18	1.08	.012	.009	516-70	1509
Comb. Chamb. Tube Sheet	48500	72500			.625"		.18	1.08	.012	.009	516-70	1509
Comb. Chamb. Wrapper	37000	61000			1.500"		.080	.604	.004	.010	285-C	M228
Fur Extn. Shell												
Drum Shell												
Drum Head												
Drum Reinforce												

WE CERTIFY the above data to be correct and that all details of material, construction and workmanship on this boiler conform to the boiler rules of the AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

JOHNSTON BOILER COMPANY

Date 23 August 1981

By Donald W. Potholke

JOHNSTON FLUE GAS RECIRCULATION (FGR) BURNER

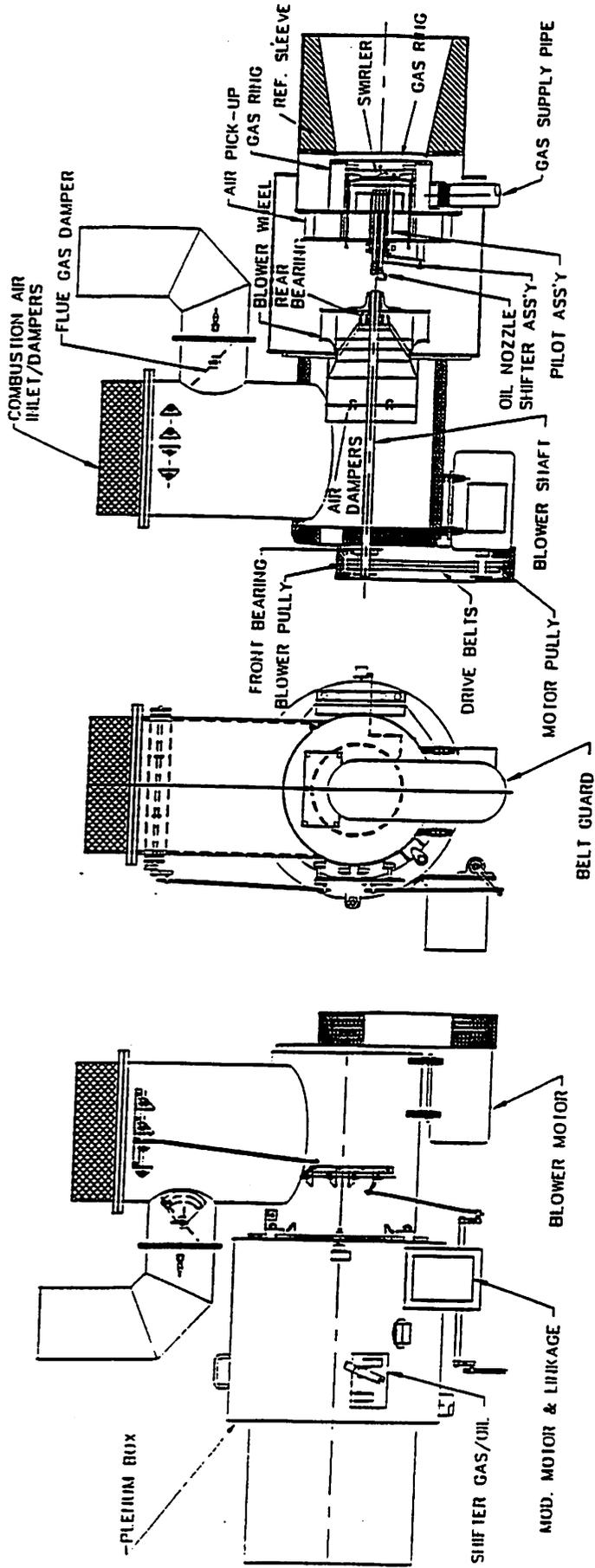


EXHIBIT 'F'

II. B.

PRESSURE VESSEL CONSTRUCTION

Johnston boiler pressure vessels are constructed in accordance with the ASME Boiler and Pressure Vessel Code. ~~Steam boilers, for 15 PSIG maximum design and hotwater boilers for operating at temperatures not exceeding 250° F, are constructed in accordance with Section IV of the code. Steam boilers designed for operation exceeding 15 PSIG, or hotwater boilers operating at water temperatures exceeding 250° F, or pressures greater than 160 PSIG, are constructed in accordance with Section I of the code.~~

As previously described, the Johnston boiler is a packaged firetube boiler, 3 or 4 Pass, of welded steel construction, with a submerged rear combustion chamber. The pressure vessel consists of an outer shell, tube sheets, main furnace tube, combustion chamber shell and rear head and long and short pass boiler tubes. Stay rods are utilized in the pressure vessel, as determined by design and required by code. Threaded and/or flanged connections are provided for steam or hotwater system piping, safety relief valves, blowdown and blowoff valves, water level and pump controls and other miscellaneous boiler trim. Access to the waterside of the pressure vessel is accomplished with a manway and/or handhole openings. On 3 Pass boilers the manway opening is located in the upper front tube sheet. On 4 Pass boilers the manway is located in the upper rear tube sheet. On Johnston's Twin Fire series boiler, which is a dual main furnace/burner, 3 Pass boiler, there are two (2) manway openings in the front tube sheet. One is located at the top and one is located at the bottom of the tube sheet. On both 3 and 4 Pass boilers, various handhole openings are located in the lower front and rear tube sheets and throughout the boiler shell. Access to the fireside of the pressure vessel is accomplished with two (2) front and two (2) rear smokebox doors and a rear combustion chamber access door.

Construction standards for
pressure vessel?

II. A.

GENERAL DESCRIPTION

The Johnston boiler is a steam or hotwater packaged firetube boiler, ranging in size from 50 to 2,000 Horsepower, 15# to 300# design pressure, 3 or 4 Pass, of welded steel construction, with a submerged rear combustion chamber. The package consists of a pressure vessel, base frame, forced draft burner, fuel train(s), control panel and miscellaneous boiler trim.

All components are factory mounted, piped and/or wired, other than those that have to be removed from the boiler for shipment. The pressure vessel is covered with a 2" thick blanket of insulation and a galvaneal steel jacket. The boiler is painted with a hard enamel finish, with the exception of the smokebox doors and frames, which are finished with a flat high temperature paint.

Connections are provided for steam or hotwater system valves and piping, flue gas breaching or stack, safety relief valve discharge piping, blowoff or blowdown valve discharge piping, water level and pump control, feedwater, electrical power and the fuel(s) supply. Openings are also provided in the boiler pressure vessel for handhole and manway access.

Lightweight castable refractory is used in the front and rear smokebox doors and rear combustion chamber access door. Heavy castable refractory is used in the burner cone (throat). A small amount of molded plastic refractory is used in the main burner gas ring (straight gas or combination gas/oil fired boilers) and in the main burner oil plug (oil fired boilers only).

Items not normally furnished by Johnston Boiler, but typically the responsibility of the boiler owner (or installing contractor) are as follows: breaching and/or stack, system piping valves at the boiler, safety relief valve discharge piping, blowdown valve discharge piping, fuel supply piping, vent line piping, feedwater supply piping, power supply line to the boiler, boilout and boiler water treatment compounds and procedures and the provision for combustion air supply into the boiler room.

I. B. BOILER INFORMATION SHEET

Type:	Steam
Model:	PFTE-1000-4LG-250S
Serial Number:	9536-01,02,03,04
Horsepower:	1000
Number of Passes:	4
Operating Pressure:	<i>250</i> 250 psig
Safety Valve - Set Pressure:	<i>225</i> 250 psig
Relieving Capacity	<i>3 @ 15,800 lbs for total of 47,400</i> 34,500 LBS./HR.
Capacity (Steaming / Hotwater) - Maximum:	34,475,000 BTU/HR.
Heating Surface:	5,014 SQ. FT.
Power Requirements - Supply:	460/3/60
* Control Circuit:	120/1/60



New Jersey Department of Environmental Protection
Division of Air Quality, Bureau of Stationary Sources

State of the Art (SOTA) Manual for Boilers and Process Heaters

Originally Published: July 1997
First Revision: February 22, 2004
Third Revision: February 2024

EXHIBIT 'G'



**Section 3.12 - State of the Art (SOTA)
 Manual for Boilers and Process Heaters**

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3.12 SOTA MANUAL FOR BOILERS AND PROCESS HEATERS

3.12.0 Definitions

All terms used in this SOTA Manual are defined in N.J.A.C. 7:27-19.1, N.J.A.C. 7:27F-1.3, Title 40 of the Code of Federal Regulations (40 CFR), Part 63, Subparts DDDDD and JJJJJ. Additional definitions used in this SOTA Manual are as follows:

“Biogas” means a gas produced by anaerobic digestion or fermentation of organic matter, including landfill gas and digester gas.

“Higher Heating Value (HHV)” means the heat content of a fuel in units of energy per mass or volume.

“Light Liquid Fuel” means any liquid fuel sold and suitable for use in furnaces, heaters, or boilers that is a distillate oil, biodiesel, or vegetable oil and is not a residual oil, jet fuel, kerosene, or gasoline. Fuel oil is categorized by grades:

1. No. 1 and No. 2 fuel oil is a distillate oil;
2. No. 4 fuel oil is a mixture of distillate and residual oils; and
3. No. 5 and No. 6 fuel oil are residual oils.

This SOTA Manual only applies to No. 1 and No. 2 distillate oils and non-distillate fuels other than residual fuel with comparable physical and chemical properties (e.g., biodiesel fuel) to distillate oils or a mixture of these types of distillate oil and non-distillate fuels with comparable physical and chemical properties.

“Natural Gas” means a fluid mixture of hydrocarbons composed of at least 70 percent methane by volume that is merchantable and marketable that meets an interstate or intrastate transmission company’s minimum specifications with respect to:

- (i) delivery pressure;
- (ii) delivery temperature;
- (iii) heat content between 950 and 1,100 British Thermal Units (BTU) per dry standard cubic foot;
- (iv) mercaptan sulfur;
- (v) total sulfur less than 20.0 grains per 100 standard cubic feet;
- (vi) moisture and/or water content;
- (vii) CO₂;
- (viii) oxygen (O₂);
- (ix) total inerts (the total combined CO₂, helium, nitrogen, O₂, and any other inert compound percentage by volume);
- (x) hydrocarbon dew point limits;
- (xi) merchantability;
- (xii) content of any liquids at or immediately downstream of the delivery point into a pipeline; and
- (xiii) interchangeability with the typical composition of the gas in the pipeline with respect to the following indices: Wobbe Number, Lifting Index, Flashback Index, and Yellow Tip Index per AGA Bulletin No. 36.

Natural gas can include renewable natural gas that meets the requirements for natural gas but does not include the following gaseous fuels: Landfill gas, digester gas, refinery gas, sour gas, blast furnace gas, coal-derived gas, producer gas, coke oven gas, or any gaseous fuel produced in a process which might result in highly variable sulfur content or heating value.



“**Renewable Natural Gas (RNG)**” means biogas that has been processed to remove impurities and increase the methane concentration to meet interstate or intrastate transmission company’s minimum specifications for natural gas.

“**Steady state**” means all operations except for startup, shutdown, and fuel type switching.

3.12.1 Scope

This State-of-the-Art (SOTA) manual establishes emissions performance levels and control technologies for the best performing sources within the U.S. Conformance to the requirements established in this manual by a permit applicant alleviates the need for the applicant to review and establish a case-by-case SOTA for any air contaminant source included in this manual.

These SOTA performance levels apply to boilers and process heaters with a maximum heat input capacity of 10 million British thermal units (MMBtu) per hour or more, based on the higher heating value (HHV) of the natural gas or light liquid fuel (e.g., No. 1/2 fuel oil or similar) combusted. This SOTA Manual does not apply to boilers or process heaters firing any other type of fuel, including residual oils or residual oil blends (e.g., No. 4/6 fuel oil or similar), which are prohibited from being combusted after January 31, 2025.¹

The SOTA thresholds for source operations, which must obtain a Preconstruction Permit pursuant to N.J.A.C. 7:27-8, can be found in:

1. N.J.A.C. 7:27-8, Appendix 1, [Table A](#) for criteria pollutants; and
2. N.J.A.C. 7:27-17.9, [Tables 3A and 3B](#) for hazardous air pollutants (HAP) and toxic substances (TXS) regulated by the New Jersey Department of Environmental Protection (the Department).

The SOTA thresholds for source operations which must obtain an Operating Permit, pursuant to N.J.A.C. 7:27-22 can be found in:

1. N.J.A.C. 7:27-22, Appendix, [Table A](#); and
2. N.J.A.C. 7:27-17.9, [Tables 3A and 3B](#) for HAP and TXS.

If a source operation was omitted in this manual or a boiler combusts a fuel not included in this manual, the applicant must represent SOTA technology using a case-by-case approach, if applicable, pursuant to N.J.A.C. 7:27-8.12 and N.J.A.C. 7:27-22.35. For air contaminants that may be emitted from the sources described in this manual, but for which a performance level is not specified, SOTA will be done on a case-by-case basis pursuant to N.J.A.C. 7:27-8 and N.J.A.C. 7:27-22.

3.12.1.1 Types of Boilers and Process Heaters

Boilers and process heaters are external combustion sources: a fuel is combusted to generate heat in a fluid (usually water) or gas (usually air). The heated fluid or gas is then used to provide heat or perform work, rather than the combustion process being used to generate motion directly, (i.e., an internal combustion engine). Process heaters heat a liquid or gas (most commonly air) to provide heat only, while boilers heat liquids (most commonly heating water to steam) to provide heat or generate motive power. For example, a water heater warms the water for bathing and cooking and a furnace warms the air during the winter months, whereas a boiler is used to generate steam for use in an apartment building to warm air via radiators or in an engine to generate motive power.

¹ [N.J.A.C. 7:27F-3.2](#)



There are two different methods for combusting fuel in an external combustion source: direct- and indirect-firing. In direct-fired external combustion, air enters the combustion chamber and directly contacts the flame. Since the flame is heating the air directly, it is very efficient; however, the heated exhaust air contains the products of combustion (air pollution). For this reason, direct-fired heaters are uncommon and limited to use in well vented, exterior locations. An example of direct-fired heater is provided in Figure 3.12-1.

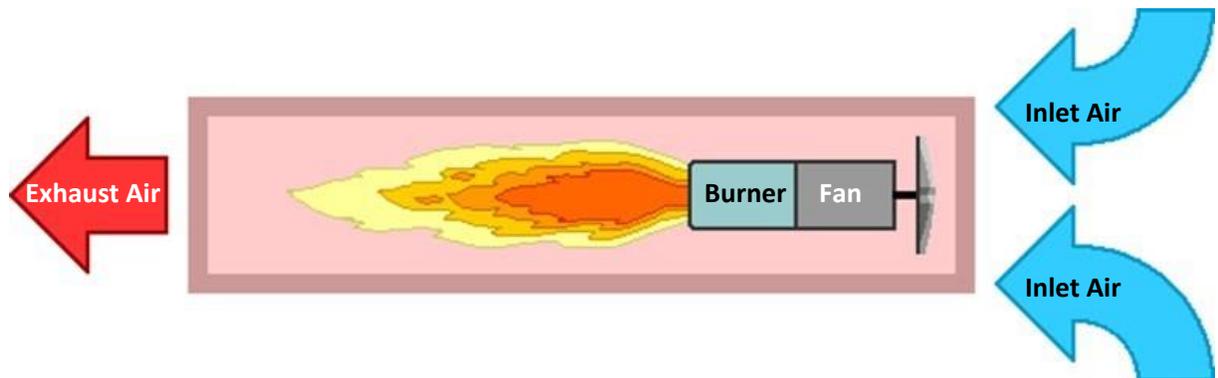


Figure 3.12 – 1: Direct-fired Heater

In an indirect-fired heater or boiler, the combustion process is separated from the liquid or gas being heated. Indirect-fired heaters and boilers are the most common external combustion sources and the only ones that can be used in interior or enclosed spaces. The combustion chamber has its own air source, and the products of combustion are vented through a heat exchanger and then to the atmosphere.² A gas or liquid is heated as it moves through the heat exchanger: a series of tubes within the combustion chamber where heat is transferred from the hot exhaust gases to the gas or liquid to be heated.

For indirect-fired boilers, the heat exchanger can operate in one of two different ways:

1. Fire Tube Boiler: The tubes contain exhaust gases and the gas or liquid flows over the tubes; or
2. Water Tube Boiler: The tubes contain the gas or liquid being heated and the exhaust gases flow over the tubes.

There are also tubeless boilers, which are similar to water tube boilers: the hot exhaust gases pass over and heat pressure vessels containing water.³ Heat exchangers used in heaters can also operate using either method; however, the type of heat exchanger is not commonly used in classifying heaters. An example of an indirect-fired fire tube boiler is provided in Figure 3.12-2 and an indirect-fired water tube boiler is provided in Figure 3.12-3.

² *Economic Analysis of Air Pollution Regulations: Boilers and Process Heaters*, EPA, November 2002.

³ *Compilation of Air Emissions Factors, Volume 1, Chapter 1: External Combustion Sources, Section 1.3: Fuel Oil Combustion*, EPA AP-42, September 1999.

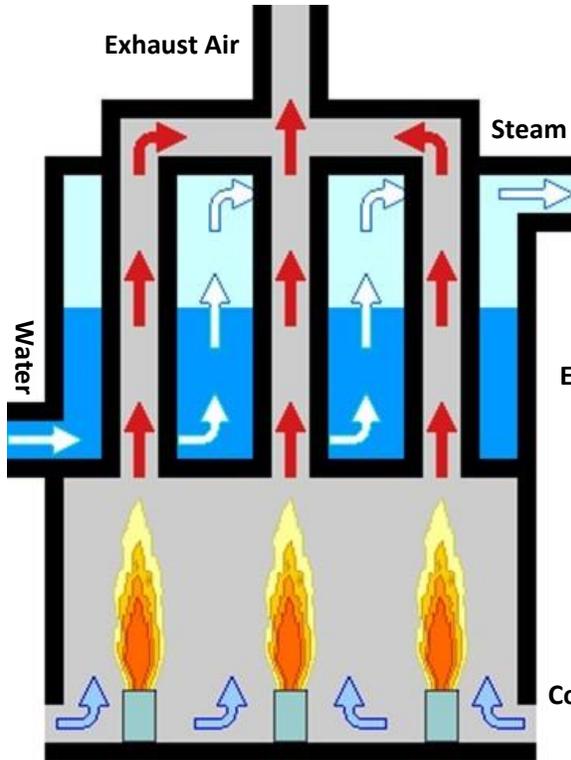


Figure 3.12 – 2: Indirect-fired Fire Tube Boiler

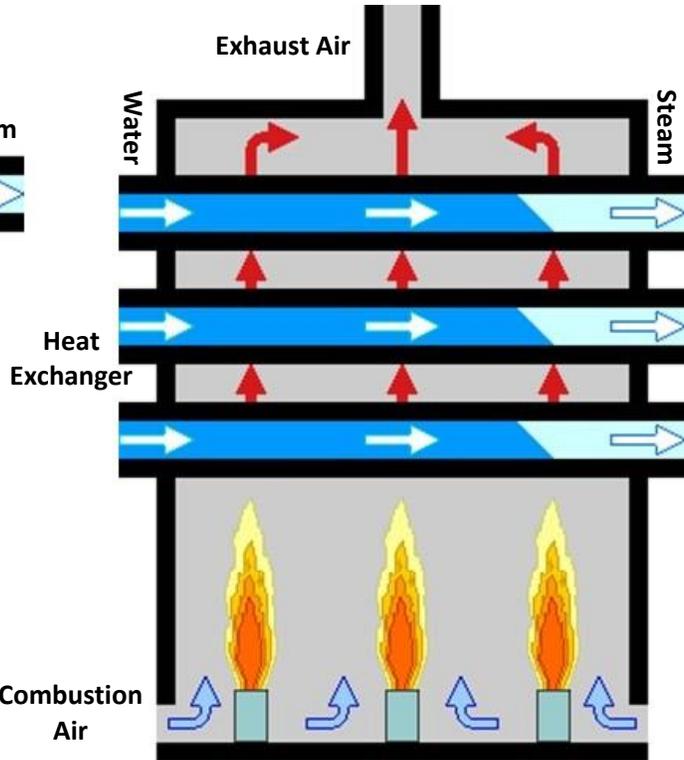


Figure 3.13 – 3: Indirect-fired Water Tube Boiler

3.12.2 SOTA Performance Levels

This SOTA Manual includes operational requirements, emissions limitations, and control efficiency requirements for different air contaminants, depending on the fuel combusted.

3.12.2.1 Maximum Achievable Control Technology for Boilers and Process Heaters

The U.S. Environmental Protection Agency (EPA) has issued multiple standards for boilers and process heaters. The Maximum Achievable Control Technology (MACT) standard is considered equivalent to SOTA for hazardous air pollutants (HAPs), pursuant to N.J.A.C. 7:27-8.12(e)(3) for preconstruction permits and the MACT and Generally Available Control Technology (GACT) standard are considered equivalent to SOTA for HAPs, pursuant to N.J.A.C. 7:27-22.35(c) for operating permits. Emissions of other air contaminants from boilers or process heaters not subject to a MACT or GACT standard are addressed in other sections of this SOTA manual.

Multiple MACT standards apply to boilers and process heaters located at major sources of hazardous air pollutants (HAP). The primary MACT standard for boilers and process heaters is found in Title 40 of the Code of Federal Regulations (CFR), Part 63, Subpart DDDDD, National Emission Standards for Hazardous Air Pollutants (NESHAP) for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters.⁴ Additionally, other NESHAP have specific requirements for boilers or process heaters associated with other equipment regulated by that NESHAP; only the requirements of the Major Source Boiler MACT standard are included in this SOTA manual. Some additional NESHAP that may include requirements for boilers include:

1. Coal- and Oil-Fired Electric Utility Steam Generating Units NESHAP (Subpart UUUUU);

⁴ Title 40 of the Code of Federal Regulations, Part 63, Subpart [DDDDD](#).



2. Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills NESHAP (Subpart MM);
3. Secondary Lead Smelting NESHAP (Subpart X);
4. Generic MACT Standards: Ethylene Cracking Furnace (Subpart YY);
5. Hazardous Waste Combustors NESHAP (Subpart EEE); and
6. Boilers and process heaters used as control devices in Group I Polymers and Resins NESHAP (Subpart U), Group IV Polymers and Resins NESHAP (Subpart JJJ), Manufacture of Amino/Phenolic Resins NESHAP (Subpart OOO), and Polyether Polyols Production NESHAP (Subpart PPP).

Major Source Industrial, Commercial, and Institutional Boilers and Process Heaters

The Major Source Boiler MACT standard includes emissions limits for hydrochloric acid, mercury, carbon monoxide (CO), and filterable particulate matter (PM); these emissions limits apply to liquid- or gas-fired boilers and process heaters with a maximum heat input rate of 10 million British Thermal Units per hour (MMBtu/hour) or greater that were constructed or reconstructed on or after January 31, 2016, and located at a major source of HAP emissions. The emissions limits are provided in Table 3.12.2-1. Sources may opt to comply with alternative emissions limitations until October 6, 2025; these alternative emissions limits are provided in Table 3.12.2-2.

**TABLE 3.12.2-1
 MACT Standards for Boilers and Process Heaters Located at a Major Source of HAP⁵**

Pollutant	Fuel	Emissions Limitations	
		Steady State Operation	Startup and Shutdown
Hydrochloric Acid (HCl)	Light Liquid Fuel	1.5×10 ⁻⁴ lbs./MMBtu [†] heat input	1.7×10 ⁻⁴ lbs./MMBtu steam output
Mercury	Light Liquid Fuel	4.8×10 ⁻⁷ lbs./MMBtu heat input	5.3×10 ⁻⁷ lbs./MMBtu steam output
CO	Light Liquid Fuel	130 ppmvd [‡] (3% O ₂)	0.13 lbs./MMBtu steam output
Filterable PM	Light Liquid Fuel	1.1×10 ⁻³ lbs./MMBtu heat input	1.2×10 ⁻³ lbs./MMBtu steam output

[†]lbs./MMBtu – pounds per million British Thermal Units

[‡]ppmvd – parts per million by volume, dry basis

**TABLE 3.12.2-2
 Alternative MACT Standards for Boilers and Process Heaters Located at a Major Source of HAP (Valid through October 6, 2025)⁶**

Pollutant	Fuel	Emissions Limitations	
		Steady State Operation	Startup and Shutdown
Hydrochloric Acid (HCl)	Light Liquid Fuel	4.4×10 ⁻⁴ lbs./MMBtu heat input	4.8×10 ⁻⁴ lbs./MMBtu steam output

⁵ Title 40 of the Code of Federal Regulations, Part 63, Subpart [DDDDD](#).

⁶ Title 40 of the Code of Federal Regulations, Part 63, Subpart [DDDDD](#).



Area Source Industrial, Commercial, and Institutional Boilers and Process Heaters

The GACT standard applies to boilers located at area sources of HAP; this standard is found in 40 CFR, Part 63, Subpart JJJJJ, NESHAP for Area Sources: Industrial, Commercial, and Institutional Boilers applies.⁷ The GACT standard includes emissions limits for filterable particulate matter (PM); these emissions limits apply to boilers and process heaters firing a liquid fuel with a maximum heat input capacity of 10 MMBtu/hour or greater that were constructed or reconstructed after May 20, 2011. The emissions limits are provided in Table 3.12.2-3.

**TABLE 3.12.2-3
GACT Standards for Boilers and Process Heaters Located at an Area Source of HAP⁸**

Pollutant	Fuel	Emissions Limitations	
		Steady State Operation	Startup and Shutdown
Filterable PM	Light Liquid Fuel	3.0×10 ⁻² lbs./MMBtu heat input	None specified.

3.12.2.2 New Source Performance Standards for Steam Generators

EPA has developed new source performance standards (NSPS) in 40 CFR, Part 60, Subpart Db⁹ and Dc¹⁰ for steam generating units (boilers); process heaters are not included in these standards. Subpart Db applies to steam generating units that were constructed, modified, or reconstructed after June 19, 1984, with a maximum heat input capacity of 100 MMBtu/hour or greater. It includes emissions limits for PM, nitrogen dioxide (NO₂), and sulfur dioxide (SO₂). Subpart Dc applies to steam generating units that were constructed, modified, or reconstructed after June 9, 1989, with a maximum heat input capacity of 10 MMBtu/hour or greater and less than 100 MMBtu/hour. It includes emissions limits for PM and SO₂. Since the emissions limits for PM, NO₂, and SO₂ are equivalent or less stringent than the emissions limits determined to be SOTA in Section 3.12.2.3, they are not included in this manual.

3.12.2.3 Other SOTA Performance Levels for Boilers and Process Heaters

The SOTA performance level for SO₂ applicable during steady state operations while combusting natural gas is 0.056 lbs./MMBtu;¹¹ the sulfur fuel content for light liquid fuels with a Saybolt Seconds, Universal (SSU) viscosity of no more than 45 is 15.0 parts per million by weight (ppmw).¹²

The SOTA performance levels for TSP and opacity applicable during steady state operations while combusting gaseous fuels or liquid fuels are provided below:

1. Total suspended particulate (TSP) emissions limits:
 - A. 0.0075 lbs./MMBtu for boilers and process heaters firing natural gas;
 - B. 0.015 lbs./MMBtu for boilers and process heaters firing light liquid fuel <50 MMBtu/hour;
 - C. 0.020 lbs./MMBtu for boilers and process heaters firing light liquid fuel ≥50 MMBtu/hour;¹³

⁷ Title 40 of the Code of Federal Regulations, Part 63, Subpart JJJJJ.

⁸ Title 40 of the Code of Federal Regulations, Part 63, Subpart JJJJJ.

⁹ Title 40 of the Code of Federal Regulations, Part 60, Subpart Db

¹⁰ Title 40 of the Code of Federal Regulations, Part 60, Subpart Dc.

¹¹ Converted from 20.0 grains total sulfur per 100 standard cubic feet (scf) at a heating value of 1,026 Btu/scf.

¹² N.J.A.C. 7:27-9.2

¹³ SC&A, Inc. *Analysis of Boiler / Heater Permits Emissions Limits and Control Requirements*, August 2023.



2. An opacity limit of 10% for all operations when firing gaseous fuels and for all operations EXCEPT startup, shutdown, and fuel switching for liquid fuels. For startup, shutdown, and fuel switching of liquid fuels, the opacity limit is 20%.¹⁴

Additional requirements for steady state operation of boilers and process heaters are included in Tables 3.12.2-4 through 3.12.2-6. These include control equipment and emissions limits for carbon monoxide (CO), nitrogen oxides (NO_x), and volatile organic compounds (VOC).

The Department also requires an annual combustion adjustment for any indirect-fired boiler or heat input of 5 MMBtu/hour or greater. The annual combustion adjustment includes an inspection and repair, cleaning, or replacement of the burner, flame pattern, air-to-fuel ratio controllers, and a measurement of the CO, NO_x, and oxygen concentrations before and after the adjustment.¹⁵

The emissions limits specified in this SOTA manual do not apply outside of steady state operating conditions. SOTA technology for startup, shutdown, and fuel switching is determined using the case-by-case approach, pursuant to N.J.A.C. 7:27-8.12 and N.J.A.C. 7:27-22.35.

**TABLE 3.12.2-4
 CO SOTA Steady State Performance Levels for Boilers and Process Heaters¹⁶**

Pollutant	Size	Fuel	Control Technology	Emissions Limitations
CO	≥10 MMBtu/hr and <75 MMBtu/hr	Light Liquid Fuel	Good Combustion Control	0.036 lbs./MMBtu heat input
CO	≥75 MMBtu/hr	Light Liquid Fuel	Good Combustion Control	0.039 lbs./MMBtu heat input
CO	≥10 MMBtu/hr and <75 MMBtu/hr	Natural Gas	Good Combustion Control	0.05 lbs./MMBtu heat input
CO	≥75 MMBtu/hr	Natural Gas	Good Combustion Control	0.037 lbs./MMBtu heat input

**TABLE 3.12.2-5
 NO_x SOTA Steady State Performance Levels for Boilers and Process Heaters¹⁷**

Pollutant	Size	Fuel	Control Technology	Emissions Limitations
NO _x	≥10 MMBtu/hr and <75 MMBtu/hr	Light Liquid Fuel	Low NO _x Burners (LNB) with Flue Gas Recirculation (FGR)	0.06 lbs./MMBtu heat input
NO _x	≥75 MMBtu/hr	Light Liquid Fuel	LNB with FGR AND Selective Catalytic Reduction (SCR)	0.03 lbs./MMBtu heat input
NO _x	≥10 MMBtu/hr and <50 MMBtu/hr	Natural Gas	LNB with FGR OR Ultra Low NO _x Burners (ULNB)	0.035 lbs./MMBtu heat input
NO _x	≥50 MMBtu/hr	Natural Gas	ULNB with FGR AND/OR SCR	0.01 lbs./MMBtu heat input

¹⁴ SC&A, Inc. *Analysis of Boiler / Heater Permits Emissions Limits and Control Requirements*, August 2023.

¹⁵ N.J.A.C. [7:27-19.16](#)

¹⁶ SC&A, Inc. *Analysis of Boiler / Heater Permits Emissions Limits and Control Requirements*, August 2023.

¹⁷ SC&A, Inc. *Analysis of Boiler / Heater Permits Emissions Limits and Control Requirements*, August 2023.



**TABLE 3.12.2-6
VOC SOTA Steady State Performance Levels for Boilers and Process Heaters¹⁸**

Pollutant	Size	Fuel	Control Technology	Emissions Limitations
VOC	≥10 MMBtu/hr and <75 MMBtu/hr	Light Liquid Fuel	Good Combustion Control	0.004 lbs./MMBtu heat input
VOC	≥75 MMBtu/hr	Light Liquid Fuel	Good Combustion Control	0.008 lbs./MMBtu heat input
VOC	≥10 MMBtu/hr	Natural Gas	Good Combustion Control	0.005 lbs./MMBtu heat input

3.12.3 Control Technologies

Reductions in CO, NO_x, and VOC emissions can be achieved using combustion control technologies or flue gas treatment (post-combustion control technologies). SO₂ is primarily controlled by regulating the fuel sulfur content.

3.12.3.1 Combustion Control Technologies for NO_x

NO_x controls alter the combustion parameters by changing the combustion chemistry (lower temperature, excess oxygen, and reduced residence time). NO_x is formed from nitrogen in the fuel (Fuel NO_x) and atmosphere (thermal NO_x) combining with excess oxygen in the combustor section.

Low NO_x Burners (LNB) / Ultra Low NO_x Burners (ULNB)

Low NO_x Burners (LNB) and Ultra Low NO_x Burners (ULNB) reduce thermal NO_x formation by reducing flame temperature. This lowers the energy available to convert atmospheric nitrogen and oxygen to NO_x. LNB and ULNB create a reduced oxygen level in the combustion zone, also limiting fuel NO_x formation. ULNB uses fuel staging and internal flue gas recirculation within the burner to lower NO_x even further. For fuel staging, fuel gas is injected into the combustion chamber in two stages, creating an ignitable fuel-rich zone surrounded by a fuel-lean zone, delaying combustion and reducing temperature. LNB can reduce NO_x emissions by 35-55%, whereas ULNB can reduce NO_x emissions by up to 75%.

Flue Gas Recirculation (FGR)

Exhaust (flue) gases that contain a lower oxygen content are recirculated back into the combustion chamber. These already hot gases lower the combustion temperature required for fuel ignition and reduce the available oxygen content for NO_x formation. FGR is usually used in conjunction with LNB. Sensors monitor the oxygen content of the flue gas and regulate the amount of flue gas that is reintroduced into the combustion chamber. FGR can reduce NO_x emissions by 5-30%.

Selective Catalytic Reduction (SCR)

SCR is an add-on NO_x control technique that is placed in the exhaust stream following the boiler or process heater. SCR is a process in which ammonia is directly injected into the flue gas and then passed over a catalyst to react with NO_x, converting the NO_x, and ammonia to nitrogen and water. The catalyst allows this reaction to take place at a lower temperature than would be required without it. The temperature of the catalyst should be between approximately 570°F to 750°F depending on the catalyst used. The catalyst is usually either a noble metal, base metal (titanium or vanadium), or a zeolite-based material.

¹⁸ SC&A, Inc. *Analysis of Boiler / Heater Permits Emissions Limits and Control Requirements*, August 2023.



SCR is a common technique for boilers and process heaters. SCR can reduce NO_x emission by 70-90%; as an add-on control, it can be used in conjunction with LNB / FGR or ULNB.

Selective Non-Catalytic Reduction (SNCR)

SNCR is an add-on NO_x control technique used instead of SCR. Ammonia or urea, (which contains ammonia), is injected into the exhaust, reducing NO_x to nitrogen and water vapor. Rather than using a catalyst to cause the chemical reduction reaction, the exhaust gases are at temperature high enough to cause the chemical reduction reaction. To conduct SNCR, the exhaust gases must be at a temperature greater than 1,550°F and require a residence time between the ammonia / urea and exhaust gas of at least 1 second. SNCR has been employed in boilers >50 MMBtu/hour. More ammonia / urea is added to the exhaust gas than needed, so some of this ammonia passes is emitted (ammonia slip); ammonia slip of 10 ppm is considered reasonable. SNCR can reduce NO_x emission by 30-50%; as an add-on control, it can be used in conjunction with LNB / FGR or ULNB.

3.12.3.2 CO and VOC Control Technology

Good Combustion Control

To control emissions of CO and VOC, the fuel must be completely combusted, as CO is formed by incomplete oxidation of the carbon within the fuel and VOCs are unburned hydrocarbons. Combustion control is achieved by monitoring the temperature and oxygen, CO, and NO_x content of the exhaust gases, to ensure that the boiler or process heater is operating at an optimal condition. Excess oxygen or higher CO indicates that the fuel is not being fully combusted, and the burners are adjusted to achieve optimal combustion conditions.

3.12.3.3 Alternate Control Technologies - Energy Efficiency

Greater energy efficiency reduces emissions of all air contaminants, including CO₂, a greenhouse gas. The Boiler NESHAP for major sources and the Boiler NESHAP for area sources require an energy assessment conducted by an energy assessor to evaluate the capacity of certain boilers and inventory of major energy use systems. This report identifies ways to improve efficiency from the existing boiler system.

The energy efficiency of the boilers and process heaters are expressed in terms of the efficiency for converting fuel to steam; these values must be reported in the permit application. Higher efficiency systems require less fuel to produce the required energy.

3.12.4 Technical Basis

Information from the following sources were used as the basis for developing this SOTA Manual:

- A. Title 40 of the Code of Federal Regulations, Part 60, Subpart Db, "Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units"
- B. Title 40 of the Code of Federal Regulations, Part 60, Subpart Dc, "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units"
- C. Title 40 of the Code of Federal Regulations, Part 63, Subpart DDDDD, "National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters"
- D. Title 40 of the Code of Federal Regulations, Part 63, Subpart JJJJJ, "National Emission Standards for



Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources”

- E. SC&A, Inc. *Analysis of Boiler Permits Emissions Limits and Control Requirements*, August 21, 2023.

3.12.5 Recommended Review Schedule

This SOTA Manual will be reviewed periodically and revised if new collection and control technologies that minimize emissions become available, and any time a new MACT standard or standard of performance for new or existing sources is published.