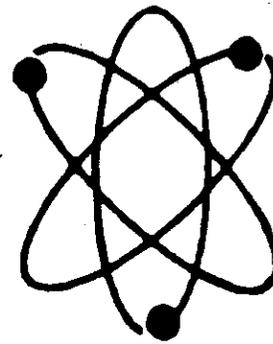


**Synergy In Energy**



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**OHIO ONTARIO  
CLEAN FUELS, INC.**

**PROTOTYPE COMMERCIAL COAL/OIL  
CO-PROCESSING PLANT**

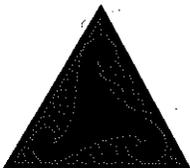
**PHASE I**

**Work Breakdown  
Structure & Dictionary**

**BOOK 3**

SNR Rao

**This Book is assigned to:** \_\_\_\_\_



**Stone & Webster Engineering Corporation  
Houston, Texas 77094**

WORK BREAKDOWN STRUCTURE AND DICTIONARY  
 BOOK No. 3  
 OHIO ONTARIO CLEAN FUELS, INC.  
 PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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## SECTION 1

WORK BREAKDOWN STRUCTURE  
DEFINITION

The project is defined by a Work Breakdown Structure (WBS) incorporating the following components:

- ~~A graphic display of the method in which the project is systematically and logically subdivided into discrete end products. A customized Engineering WBS is developed for each specific project, defining the scope of work in terms of discrete, manageable work packages.~~
- Exhibit 1 is the project Work Breakdown Structure.
- A series of work packages, each of which:
  - Has a scope of work whose cost can be budgeted in man-hours or dollars.
  - Is specifically assigned to a group, contractor, or individual for accomplishment.
  - Has a defined schedule for accomplishment.
  - Serves as a vehicle for progress and cost reporting for use in evaluating the performance of each assigned group, contractor, or individual.
- A description of the services that must be performed for each work package.



## SECTION 2

PROJECT DICTIONARY

Project reporting will be by work breakdown structure as follows:

- 
- Level 1 - Total Project.

---

  - Level 2 - Project Phase.
    - Phase I.
    - Phase II.
    - Phase III.
  - Level 3 - Project Unique and Individual Units.
    - Project Unique.
      - 75 - Program Management
      - 85 - Licensing and Site Selection, Permitting, and Site Development
      - 90 - Project Management and Direct Support
    - Individual Units.
      - 00 - Feed Materials Storage and Handling
      - 01 - Coal Preparation
      - 02 - Co-Processing High Pressure Unit
      - 03 - Atmospheric Distillate (Crude)
      - 04 - Steam Reforming
      - 05 - Naphtha Hydrotreating
      - 06 - Distillate Hydrotreating
      - 07 - Acid Gas Removal
      - 08 - Sulfur Plant
      - 09 - Light Ends Recovery
      - 10 - Sour Water Stripping
      - 11 - Bottoms Flaking and Power Generation
      - 12 - Utilities
      - 13 - General Offsites
      - 14 - Co-Processing Low Pressure Unit

- Levels 4 and 5 - Work Group and Work Package.

Project unique.

<u>Level 4</u>	<u>Level 5</u>	<u>Description</u>
50		PROCUREMENT
	A	Procurement Coordination, Purchasing, Traffic, and Inspection Coordination
51		PROJECT MANAGEMENT AND ADMINISTRATION
	A	Project Management and Administration
	B	Drawing/Vendor Data Control
52		CONSTRUCTION ADVISORY
	A	Construction Advisory
53		COST AND SCHEDULING
	A	Project Controls
	B	Estimating
54		QUALITY ASSURANCE
	A	Inspection
	B	Engineering Assurance
55		LICENSING AND SITE SELECTION, PERMITTING AND SITE DEVELOPMENT
	A	Environmental Reports and Studies
	B	Permitting
56		GENERAL ENGINEERING
	A	Subcontract Management
	B	Field Followup
	C	Supervision - General
	D	Plant Layout and Piping - General
	E	Control Systems - General
	F	Electrical - General
	G	Civil/Structural - General
75	A	Program Management (OOCF only)

Individual units.

<u>Level 4</u>	<u>Level 5</u>	<u>Description</u>
40		PROCESS
	A	Process Engineering
	B	PDU Testing (Unit 200 Only - HRI)
41		CONTROL SYSTEMS
	A	Control Systems Engineering
	B	Control Systems Design and Drafting
	C	Control Systems Bulk Commodity Procurement Engineering
42		ELECTRICAL
	A	Electrical Engineering
	B	Electrical Design and Drafting
	C	Electrical Bulk Commodity Procurement Engineering
43		STRUCTURAL
	A	Site Work
	B	Concrete
	C	Structural Steel
	D	Architectural, HVAC and Plumbing
	E	Structural Bulk Commodity Procurement Engineering
44		MECHANICAL ENGINEERING
	A	Process Systems - Mechanical
	B	Pressure Vessels and Tanks
	C	Heat Transfer Equipment
	D	Rotating and Special Equipment
	E	Environmental Engineering Equipment
	F	Plant Layout and Piping
	G	Material Specifications, Mechanical Bulk Commodity Procurement Engineering
	H	Power Equipment

## SECTION 3

WORK PACKAGE DESCRIPTIONS

This section comprises detailed descriptions of each work package (WP) for the Project including:

---

- PROCUREMENT

Procurement Coordination, Purchasing, Traffic, and Inspection Coordination (WP No. 50A, Issue 0)

- PROJECT MANAGEMENT AND ADMINISTRATION

Project Management and Administration (WP No. 51A, Issue 0)

Drawing/Vendor Data Control (WP No. 51B, Issue 0)

- CONSTRUCTION ADVISORY

Construction Advisory (WP No. 52A, Issue 0)

- COST AND SCHEDULING

Project Controls (WP No. 53A, Issue 0)

Estimating (WP No. 53B, Issue 0)

- QUALITY ASSURANCE

Inspection (WP No. 54A, Issue 0)

Engineering Assurance (WP No. 54B, Issue 0)

- LICENSING AND SITE SELECTION, PERMITTING AND SITE DEVELOPMENT

Environmental Reports and Studies (WP No. 55A, Issue 0)

Permitting (WP No. 55B, Issue 0)

- GENERAL ENGINEERING

Subcontract Management (WP No. 56A, Issue 0)

Field Followup (WP No. 56B, Issue 0)

Supervision (WP No. 56C, Issue 0)

Plant Layout and Piping - General (WP No. 56D, Issue 0)

Control Systems - General (WP No. 56E, Issue 0)

Electrical - General (WP No. 56F, Issue 0)

Civil/Structural - General (WP No. 56G, Issue 0)

Program Management (OOCF only) (WP No. 75A, Issue 0)

- PROCESS

- Process Engineering (WP No. 40A, Issue 0)

- PDU Testing (Unit 200 Only - HRI) (WP No. 40B, Issue 0)

- CONTROL SYSTEMS

- Control Systems Engineering (WP No. 41A, Issue 0)

- Design and Drafting (WP No. 41B, Issue 0)

- Subcontracts, Material Specifications, Material Takeoffs and Requisitions (WP No. 41C, Issue 0)

- ELECTRICAL

- Electrical Engineering (WP No. 42A, Issue 0)

- Design and Drafting (WP No. 42B, Issue 0)

- Subcontracts, Material Specifications, Material Takeoffs and Requisitions (WP No. 42C, Issue 0)

- STRUCTURAL

- Site Work (WP No. 43A, Issue 0)

- Concrete (WP No. 43B, Issue 0)

- Structural Steel (WP No. 43C, Issue 0)

- Architectural, HVAC and Plumbing (WP No. 43D, Issue 0)

- Subcontracts, Material Specifications, Material Takeoffs and Requisitions (WP No. 43E, Issue 0)

- MECHANICAL ENGINEERING

- Process Systems - Mechanical (WP No. 44A, Issue 0)

- Pressure Vessels and Tanks (WP No. 44B, Issue 0)

- Heat Transfer Equipment (WP No. 44C, Issue 0)

- Rotating and Special Equipment (WP No. 44D, Issue 0)

- Environmental Engineering Equipment (WP No. 44E, Issue 0)

- Plant Layout and Piping (WP No. 44F, Issue 0)

- Subcontracts, Material Specifications, Material Takeoffs and Requisitions (WP No. 44G, Issue 0)

- Power Equipment (WP No. 44H, Issue 0)

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROCUREMENT COORDINATION, PURCHASING,  
TRAFFIC, AND INSPECTION COORDINATION

---

WP NO. 50A

---

DESCRIPTION OF SERVICES:

1 FUNCTION

The purchasing and materials management services to be provided under the above work package number specifically include procurement coordination, purchasing, traffic services, and inspection coordination.

The specific tasks to be performed to accomplish each of the above services are as follows:

2 OPERATIONS

Procurement Coordination

The materials management effort will be carried out by personnel assigned to the project task force who will work under the direction and control of the Project Procurement Coordinator. This individual is vested with overall responsibility for the following activities:

- Development of the project procurement procedures to be used by personnel assigned to the project to carry out their procurement activities.
- Coordination of project related functional activities of those individuals who are assigned to the project task force to perform procurement tasks.
- Interaction with the task force and monitoring the project schedule to ensure that all procurement activities are being performed in a timely manner.
- Attendance at progress review meetings to identify and resolve areas of concern involving procurement.
- Publication of progress and status reports covering requisitions, inquiries, purchase orders, vendor data and delivery of material to the jobsite.
- Review the commercial comparison of bids and provide input to recommendations.
- Monitoring of procurement-related work hours activity and alerting management to deviations so that corrective action may be taken.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROCUREMENT COORDINATION, PURCHASING,  
TRAFFIC, AND INSPECTION COORDINATION

---

WP NO. 50A

---

Purchasing

Assigned project personnel will carry out the following tasks:

- Development of a bidders list to be utilized for all purchases including obtaining required approvals.
- Issuance of inquiry packages in accordance with project procurement procedures.
- Receipt, review, and analysis of proposals in conjunction with engineering. The assigned personnel will prepare the commercial bid comparisons. Quoted and/or negotiated prices and delivery schedules will be compared to project budget and schedule requirements.
- Prepare the purchase recommendation statement on the commercial bid comparison and obtain all necessary approvals. Forward the purchase recommendation along with supporting commercial and technical documentation to the client for approval.
- Award, execute, and administer purchase orders to selected suppliers.
- Followup on matters involving interpretation or administration of the purchase order terms subsequent to award.
- Review vendor invoices for compliance with purchase order requirements and recommend approval of vendor payments.

Traffic Services

In the event the information from suppliers is deemed inadequate for project control, SWEC's Traffic Services Group can provide those transportation and related services required for the project to realize maximum economics consistent with maintaining jobsite delivery schedules. The major areas of responsibility are as follows:

- Evaluation of supplier quoted freight allowances or cost estimates.
- Selection of the mode of transportation and specific carrier for each procurement, consistent with site delivery and cost requirements.
- Performance of in-transit shipment tracing and expediting.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROCUREMENT COORDINATION, PURCHASING,  
TRAFFIC, AND INSPECTION COORDINATION

WP NO. 50A

---

- Publication of transportation progress reports to project management as required.
- 

Inspection Coordination

Inspection coordinators are used for monitoring and assisting PQA related activities for materials and equipment purchased for the project. Inspection coordination functions to be performed are as follows:

- Provide liaison with District Office Manager(s) and personnel assigned the responsibility for performing inspection related activities.
- Review purchase orders for inspection requirements.
- Establish in conjunction with the responsible engineer the inspection requirements for each class of equipment.
- Prepare a detailed Inspection Plan for each purchase order requiring inspection. The Plan shall contain instructions and information covering the allocated number of shop visits, the proposed inspection activities, and the number of work-hours budgeted for these activities.
- Forward the appropriate Inspection Plan and purchase order documents to the designated District Office for implementation.
- Initiate preinspection meetings and/or telephone conferences with District Office and supplier personnel which may be necessary to resolve queries involving compliance with purchase order requirements.
- Receive and distribute all Inspection Reports submitted by District Office personnel.
- Promptly notify the Requisitioning Engineer and, when required, the assigned Buyer of any situation which requires review and resolution regarding supplier performance. Such notice shall preferably be given before the inspector leaves the supplier's shop.
- Maintain files of all documents, reports, etc., relative to inspection coordination on a per purchase order basis.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROCUREMENT COORDINATION, PURCHASING,  
TRAFFIC, AND INSPECTION COORDINATION

---

WP NO. 50A

---

---

3 INPUT DATA

---

- From applicable Work Packages:
  - Requisition packages.
  - Vendor proposals.
  - Client approvals.
  - Technical bid evaluations.
  - Recommended vendors list.

4 OUTPUT DATA

- Inquiries.
- Bid evaluations.
- Purchase orders.
- Procurement plan.
- Purchasing reports.
- Inspection reports.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROJECT MANAGEMENT AND ADMINISTRATION

WP NO. 51A

---

This work package includes descriptions of services pertaining to:

- The Project Manager
- The Project Engineer
- Project Clerical Staff.

DESCRIPTION OF SERVICES:

## A) PROJECT MANAGER

## 1 FUNCTION

The project is carried out from contract award to completion under the direction and control of the Project Manager who has full responsibility and commensurate authority for the successful execution of the project. He is the single individual responsible for the overall direction of the project within Stone & Webster and the coordination of the work with OOCF, and maintains contact with OOCF's Project Manager on all matters pertaining to the project. The Project Manager is also responsible for coordination of project activities with HRI and other subcontractors involved in the execution of the project. Project correspondence will flow through the Project Manager, as required by applicable procedures contained in the Project Management Plan.

## 2 OPERATIONS

- Provides analysis and evaluation of all factors and their ramifications, as they affect decision making on the project.
- Renders guidance, direction, and judgment to the client and the project team.
- Manages a tightly knit project organization.
- Manages project cost, schedule, and quality always in keeping with the client's financial objectives.
- Organizes meetings related to the project as listed but not limited to the following:
  - Project job kickoff meeting.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROJECT MANAGEMENT AND ADMINISTRATION

WP NO. 51A

- 
- Scheduling review meetings.
  - Estimate and man-hour review meetings.
  - Meetings with OOCF.
  - Meetings with other subcontractors.
  - Weekly project meetings.
  - Monitors man-hour and schedule control.
  - Prepare monthly status report.
  - Approves estimates for change order requests.
  - Supervises the preparation of the Engineering Management System (EMS).
  - Coordinates with Engineering Management regarding manpower requirements and status of project.
  - Coordinates with construction regarding equipment delivery and document issue requirements.
  - Approves time sheets for all Project Personnel on the specific project.
  - Reviews all actual charges to the project.
  - Approves Labor Cost Statement (LCS) adjustments.
  - Monitors drawing/document status reports.

### 3 INPUT DATA

- Project Planning and Scheduling Personnel will provide:
  - Schedules and planning logic.
  - Other EMS Schedule Reports.
- Project Cost Personnel will provide:
  - Man-hour budgets.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROJECT MANAGEMENT AND ADMINISTRATION

WP NO. 51A

- 
- Equipment and material cost budgets.
  - MIS, ATR, and LCS Reports.
  - Other EMS Cost Reports.
  - Project Engineering Personnel will provide:
    - Drawing/Document Status Reports.
  - Project Procurement Personnel will provide:
    - Purchase Orders for approval.
- 4 OUTPUT DATA
- Records of meeting.
  - Interoffice memorandums (IOMs).
  - Interoffice correspondence (IOC).
  - Records of telephone conversations. (Hot Line Reports)
  - Project correspondence.
    - Client letters.
    - Vendor letters.
  - Change orders.
  - Monthly project progress report.
  - Quarterly project progress report.
  - Project evaluation plans.
  - Project evaluation reports.
  - Project management plan.
  - Intermediate project evaluation report.
  - Approved WPCNs and MECs.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROJECT MANAGEMENT AND ADMINISTRATION

WP NO. 51A

---

B) PROJECT ENGINEER

---

1 FUNCTION

The scope of this work package is to supervise the work accomplished by all Engineering Disciplines for the project.

2 OPERATIONS

- Attend meetings related to work packages described under the Project Work Breakdown Structure as listed but not limited to the following:
  - Job kickoff meeting.
  - Scheduling review meetings.
  - Estimate and man-hour review meetings.
  - Engineering review meetings.
  - Coordination meetings with vendors.
  - Inspection meetings.
  - Client meetings.
  - Weekly project meetings.
- Maintain man-hour and schedule control.
- Monitor Drawing/Document monitoring, scheduling, and distribution system.
- Review estimates for work package change notices (WPCNs).
- Assist in the implementation of the Engineering Management System (EMS).
- Coordinates with Division Management regarding manpower requirements and status of project.
- Resolves interdisciplinary coordination matters.
- Coordinates with cost and scheduling for the preparation of the project schedule.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROJECT MANAGEMENT AND ADMINISTRATION

WP NO. 51A

- 
- Initial time sheets for all engineering personnel on the specific project.
  - Review and clarify Management Information System (MIS) Reports.
  - Review Labor Cost Statement (LCS) for consistency with MIS reports.

## 3 INPUT DATA

- Work Package 53A:
  - Schedules and planning logic.
  - Other EMS Schedule Reports.
  - Man-hour budgets.
  - Equipment and material cost budgets.
  - ATR, MIS, and LCS Reports.
  - Other EMS Cost Reports.
- From Applicable Work Packages:
  - Drawing/Document Status Reports.

## 4 OUTPUT DATA

- Prepare minutes of meeting.
- Prepare Interoffice Memorandums (IOMs).
- Prepare Interoffice Correspondence (IOC).
- Prepare project correspondence:
  - Client letters.
  - Vendor letters.
- Review schedule update.
- Review and administer Drawing/Document Control System.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROJECT MANAGEMENT AND ADMINISTRATION

WP NO. 51A

- 
- ~~Review MIS Report.~~
  - Review cost estimate.
  - Review and approve WPCNs and MECs.
  - Topical reports.
  - Preliminary design report.
  - Final technical reports.
  - Process Confirmation Plan.
  - System Safety Plan.
  - Final Design Report.
  - Conference papers.

## C) PROJECT CLERIAL

## 1 FUNCTION

The scope of this work package is to provide clerical services and word processing services for the Project.

## 2 OPERATIONS

- Process time cards.
- General typing for Interoffice Memorandums (IOMs), Interoffice Correspondence (IOC), letters, reports and specifications.
- General filing for project personnel.
- Word processing for project specifications, procedures, and basis of design.

## 3 INPUT DATA

- Documents from applicable personnel.
  - Rough draft Interoffice Memorandums, Interoffice Correspondence, and letters.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROJECT MANAGEMENT AND ADMINISTRATION

WP NO. 51A

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---

- Time cards.

- Rough draft specifications, procedures, and basis of design.

4 OUTPUT DATA

- Interoffice Memorandums.
- Interoffice Correspondence.
- Project specifications, procedures, and basis of design.
- Project letters.
- Reports.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: DRAWING/VENDOR DATA CONTROL

WP NO. 51B

---

DESCRIPTION OF SERVICES:

1 FUNCTION

The scope of this work package is to control, operate, run interface with and maintain the Drawing/Document Control System for SWEC and Vendor drawings and documents.

2 OPERATIONS

- Control assignment of drawing/document numbers to all divisions.
- Enter drawing and document data into the computer.
- Run updates and reports to/for the system as specified in the project procedure covering the system.
- Run transmittals, reproduction slips and microfilm requests.
- Operate distribution system for drawings and documents.
- Interface with Reproduction, Records Retention Center, Computer Room, and Mail Room.
- Maintain project files of transmittals, drawings and documents.
- Maintain document distribution related to telex and correspondence files.
- Establish records for data to be submitted by suppliers on a per purchase order basis.
- Receive, date stamp, and enter the required submittal information into the proper records.
- Mark each submittal document with a unique file number; verify that the document satisfies required criteria with respect to timely receipt, quantity, medium, legibility and certification.
- Return unsatisfactory data to the vendor and transmit satisfactory data to the requisitioning engineer for review.
- After engineering review, enter the status notation of each document in the record and return the document to the supplier with the appropriate instructions.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: DRAWING/VENDOR DATA CONTROL

WP NO. 51B

- 
- Prepare and issue reports, as required, statusing supplier documents ~~submitted for review or information~~ and maintain vendor data record files.

## 3 INPUT DATA

- Project Engineering and Design Discipline personnel will provide:
  - Scoping sheets.
  - Start transaction sheets.
  - Status update sheets along with drawing and or documents to be transmitted to client.
- Work Package 54B:
  - Procedures for the use and operation of the Drawing/Document Control System.

## 4 OUTPUT DATA

- Enters data into computer.
- Prints transmittal forms, reproduction slips, and microfilm requests and distributes same.
- Assembles transmittal, drawings and/or documents into a package for distribution.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: CONSTRUCTION ADVISORY

WP NO. 52A

---

---

DESCRIPTION OF SERVICES:

---

Later

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROJECT CONTROLS

WP NO. 53A

---

DESCRIPTION OF SERVICES:

1 FUNCTION

The scope of this work package is the development, maintenance and analysis of project plans, schedules, project expediting, Engineering Management System (EMS), Cost Reports and cash flow forecasts.

2 OPERATIONS

- Orchestrate the EMS workshop to develop the project schedule and man-hour forecasts under the direction of the Project Manager and supervision of the Project Engineer.
- Develop and maintain the Project Management Plan, which provides but is not limited to the logic and duration for implementing EMS on this project, and preparing and customizing the Project Manual.
- Prepare and maintain the Project Summary Network which is a time scaled CPM network that summarizes the entire scope and schedule of the project on a single document.
- Develop and maintain project work breakdown structure.
- Prepare and maintain detailed work package networks.
- Input and maintain a computerized network file and schedule reports.
- Provide project schedule analysis and work package analysis as input into the monthly project report.
- Prepare and maintain monthly project status reports.
- Prepare and maintain cost variance reports and assessment of impact.
- Prepare and maintain classification of accounts.
- Develop and track cash flow forecasts.
- Develop capital cost estimate.
- Monitor accuracy of actual man-hour charges.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROJECT CONTROLS

WP NO. 53A

- 
- Pricing and distribution of work package change notices.
  - Verification that the supplier is in possession of all information necessary to proceed with execution of the order.
  - Obtaining detailed production and performance schedules from the supplier.
  - Obtaining copies of suppliers suborders.
  - Verification that all phases of the production program are proceeding as scheduled.
  - Preparation of reports after each contact with the supplier giving the exact status of the production program.
  - Expediting vendor submittals required by the purchase order.
  - Recording expediting actions and information in a material status report.
- 3 INPUT DATA
- Progress data from applicable work packages.
  - Logic and schedule data for WPCNs.
  - Detailed explanations and resolutions for schedule problems.
  - Man-hour data for WPCNs.
  - Detailed explanations and resolutions for work package over/underruns.
  - Actual man-hour reports (MIS, ATR, LCS).
  - Actual expenditure cost reports.
- 4 OUTPUT DATA
- Schedules and planning logic (to Project Engineer/Project Manager).
  - Monthly Schedule Analysis.
  - Man-hour Budgets.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROJECT CONTROLS

WP NO. 53A

---

- Equipment and Material Cost Estimates.
- MIS, ATR, LCS Reports.
- Monthly Cost Analysis.
- EMS Reports.
- WPCNs
- Cost Plan (DOE Form F 1332.7).
- Cost Performance Report (DOE Form F 1332.12).
- Milestone Schedule Plan and Status (DOE Form F 1332.3).
- Work Breakdown Structure and Dictionary.
- Project Base Line Report.
- Summary Report schedule.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ESTIMATING

WP NO. 53B

---

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DESCRIPTION OF SERVICES

Later

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: INSPECTION

WP NO. 54A

---

1 FUNCTIONS AND OPERATIONS

---

SWEC PQA personnel assigned to District Offices strategically located are assigned to perform scheduled and unscheduled visits to vendors shops. The specific responsibilities of these personnel are as follows:

- Perform regularly scheduled inspections of specific items of equipment at vendor shops to implement the inspection plan prepared by the Inspection Coordinator.
- Perform periodic inspection visits and/or PQA surveillances to determine the general quality level and schedule being maintained by the supplier.
- Prepare and issue an Inspection Report for each shop inspection made and promptly forward the report to the Inspection Coordinator. The report will identify any problem(s) encountered with regard to quality, compliance with specifications and drawings, or job progress, and the steps being taken to eliminate such problem(s).

2 INPUT DATA

- From applicable work packages:
  - Requisition packages.

3 OUTPUT DATA

- Inspection Reports.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ENGINEERING ASSURANCE

WP NO. 54B

---

DESCRIPTION OF SERVICES:

## 1 FUNCTION

Describe methods to control engineering and design tasks undertaken and/or planned by Project Engineering Department personnel in written procedures/instructions/guidelines.

Develop and execute programs to train appropriate project personnel in EA program concepts, methods, and project procedures.

Develop and execute programs to audit/survey engineering and design tasks performed by Project Engineering Department personnel, suppliers of engineering services, and equipment manufacturers.

## 2 OPERATIONS

- Identify project requirements necessary to control engineering, design, and procurement activities.
- Review and evaluate Client requirements.
- Develop and effect the issuance of procedures that reflect SWEC's organizational responsibilities and methods necessary to accomplish engineering and design tasks.
- Conduct Continuing Education presentations to appropriate personnel relative to the basis of the EA program and use of appropriate procedures / instructions / guidelines.
- Audit/survey, evaluate, and report on the adequacy of the project engineering and design programs.
- Audit/survey, evaluate, and report on the project's compliance with the Client's and SWEC's requirements.
- Survey, audit, evaluate, and report on suppliers of engineering services for their ability to provide services, the adequacy of their engineering and design programs, and their degree of compliance with contractual requirements.
- Survey or audit, evaluate, and report on engineering and design activities performed by equipment manufacturers.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ENGINEERING ASSURANCE

WP NO. 54B

- 
- Assess the adequacy of proposed corrective action to ensure that the cause, the extent of the unsatisfactory condition, the action to correct the existing condition, and the action to prevent recurrence is addressed adequately.
  - Verify that acceptable action to correct reported program deficiencies are performed adequately and in a timely manner.

## 3 INPUT DATA

- Project will advise EA of applicable Client requirements to control the scope of work, and the preferred method to accomplish the work.
- Project will provide lists of personnel who should attend Continuing Education presentations.
- Project, suppliers of engineering services, and equipment manufacturers will provide access to documents necessary in the performance of the audits/surveys.
- EA will advise the Project of applicable SWEC Engineering Department requirements relative to the scope of work.
- EA will resolve circumstances when the identified client requirements and/or the preferred method(s) to accomplish the work are inconsistent with applicable SWEC Engineering Department requirements.
- EA will provide a lesson plan, course outline, or script for each Continuing Education presentation.

## 4 OUTPUTS

- Project procedures/instructions/guidelines.

A Master Log for each Continuing Education presentation which includes:

- Preparation of notes and references.
- Flow charts (where applicable).
- Reproducible masters for all visuals.
- Lesson plan, course outline, or script.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ENGINEERING ASSURANCE

WP NO. 54B

- 
- Feedback memorandums (when written).
  - Attendance records.
  - Related correspondence.
  - A package for each audit/survey which includes:
    - The audit/survey schedule.
    - The audit/survey plan.
    - The audit/survey review plan (check list).
    - The audit/survey report.
    - Issued audit observations, signed responses/evaluations (audits only).
    - Audit/Survey followup and close-out documentation.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: ENVIRONMENTAL REPORTS AND STUDIES

WP NO. 55A

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DESCRIPTION OF SERVICES:

1 FUNCTION

The scope of this work package is to prepare reports studies, surveys, audits and assessments, and to collect, evaluate, and analyze environmental data and information relating to noise, meteorology, air quality, water treatment, waste treatment, geological and hydrological analysis, ecology, environmental monitoring, cultural and socioeconomic, land use planning aspects of process projects.

2 OPERATIONS

Makeup Water Treatment

- Assess makeup water needs for the project.
- Assess regional and onsite water sources.

Waste Handling, Disposal and Treatment

- Wastewater
  - Perform background water quality studies.
  - Perform wastewater surveys.
  - Assess compatibility with existing regional wastewater treatment facilities.
  - Perform wastewater treatability studies.
  - Prepare Spill Prevention and Countermeasure Control Plans.
- Prepare soil erosion and sediment control plans.
- Solid/hazardous wastes.
  - Perform environmental assessments associated with solid waste disposal, storage and treatment.
  - Prepare toxic and hazardous material management plans.
  - Assess compatibility of existing regional waste treatment and disposal facilities.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ENVIRONMENTAL REPORTS AND STUDIES

WP NO. 55A

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Air Quality

- Perform environmental assessment of regional air quality data.
- Estimate expected maximum emissions of the plant (normal and upset operations).
- Assess the impact of the emissions on regional air quality.
- Determine representativeness of available meteorological and criminological data.
- Analyze meteorological data obtained from onsite data collection program as required.
- Select appropriate atmospheric diffusion models for use in air quality assessments based on federal, state, and local regulatory requirements, client preferences, meteorological considerations, and topographical features.

Hydrological

- Prepare engineering scopes of work and supervise hydrographic field surveys.
- Prepare surface water analysis including regional flood, local flood, and low water evaluations.

Aquatic and Terrestrial Ecology

- Collect and review available ecological data.
- Evaluate field data requirements and prepare scopes of work.
- Supervise subcontractor activities.
- Develop assessments of ecological impacts.
- Perform special studies including assessments, biofouling control, impact of waste discharges on receiving water bodies, and the impact of stack emissions and cooling system drift on the terrestrial and aquatic ecosystems.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ENVIRONMENTAL REPORTS AND STUDIES

WP NO. 55A

- 
- Provide input to design including:
    - Mitigation measures installed to reduce impacts on aquatic and terrestrial ecology.
    - Site plan optimization regarding aquatic and terrestrial ecological impacts.
    - Excavation activities for the preliminary placement of soil, erosion and sediment control plans, and restoration and reclamation plans.

Archaeological

- Prepare engineering scopes of work and supervise archaeological field surveys.

Geological

- Prepare engineering scopes of work and supervise geological field surveys.

Noise Control

- Conduct ambient sound level surveys as required, predict plant sound levels and assess community impact associated with construction and operation.

Socioeconomics and Land Use Planning

- Assess visual impact of a proposed facility.
- Perform demographic studies.
- Assess the socioeconomic impacts on employment, taxation, housing availability, community and public services, land valuation, economic productivity, and population trends.
- Assess current and future impacts on land use.
- Assess impact on local traffic patterns associated with construction and operational activities.
- Prepare alternative site review.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ENVIRONMENTAL REPORTS AND STUDIES

WP NO. 55A

- 
- Perform reclamation planning as required for regulatory approval (~~this activity will include incorporating work of the other environmental disciplines~~).

Environmental Monitoring

- Prepare scopes of work for field data acquisition.
- Coordinate the administrative aspects of multidisciplinary field study programs.
- Monitor the performance of all contractors with respect to schedule, cost and contractual requirements through the life of the program.
- Prepare monthly status reports of all contracted activities to reflect the progress of work, the cost to date, the projected cost to complete, and other pertinent information.
- Develop specifications and scopes of work for source monitoring programs.

General

- Develop Environmental Monitoring Plan Outline.
- Develop Environmental Monitoring Plan.
- Develop Plan for Environmental Report (ER) based on DOE requirements.

### 3 INPUTS

The following input data is common to each of the environmental activities listed above. Specialized input data unique to each activity are listed under the respective Work Package in which the data will be developed.

- Work Package 40A:
  - Engineering data including process data, process description, flow diagrams, material balances, characterizations of feedstock and waste streams and flowrates, equipment lists, etc.
  - Water quality requirements for process water.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ENVIRONMENTAL REPORTS AND STUDIES

WP NO. 55A

- 
- Work Package 52A:
    - Number and types (i.e., crafts) of manual and nonmanual construction personnel.
    - Number and type of equipment to be utilized during construction.
    - Construction scheduling and production philosophy (i.e., how many crews, etc.).
  - Work Package 44F:
    - Plot plans and planning studies.
    - Site location and description.
    - Location of point discharges.
  - Work Package 43A:
    - Infrared photographic survey from aerial survey.

#### 4 OUTPUT

- U.S. Department of Energy (DOE) Environmental Report.
- Environmental Monitoring Plan Outline.
- Environmental Monitoring Plan.

These documents will include, but not be limited to, the following information:

- Analysis of regulations (federal, state, and local) affecting the Project.
- Analyses of makeup and receiving water quality.
- Evaluations of equipment performance.
- Analysis of wastewater quality.
- Evaluation of solid waste by-products.
- Analyses of soil and sediment characteristics.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ENVIRONMENTAL REPORTS AND STUDIES

WP NO. 55A

- 
- Performance tests of monitoring instrumentation.
  - Evaluations of point-source and fugitive emissions.
  - Analysis of biological, physical, and chemical characteristics of discharges including quantitative and qualitative evaluations.
  - Analysis of site groundwater characteristics.
  - Analysis of site surface water characteristics including qualitative and quantitative evaluations.
  - Available ecological data and environmental baseline studies.
  - Available sound level data for both the interior and exterior areas.
  - Available meteorological and climatological data.
  - Studies, reports, and background documentation.
- Interim reports as required by the DOE.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: PERMITTING

WP NO. 55B

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DESCRIPTION OF SERVICES:

## 1 FUNCTION

The scope of this work package is to perform the necessary activities to apply for the applicable environmental permits and regulatory approvals required for Process projects.

## 2 OPERATIONS

Regulatory Assessment

- Review the national, state, and local environmental regulations applicable to the Project.
- Identify the permits that must be obtained to meet regulatory requirements.
- Establish a commitment tracking permit acquisition system.

Preparation of Technical Background Documentation

- Prepare necessary technical documentation to support permit applications (such as environmental impact statements, environmental assessments, environmental reports, emissions calculations, analysis of air dispersion modeling, analysis of control technologies, emissions offsets, etc.).

Prepare Permit Applications

- Prepare necessary permit applications required for the Project.
- Interface with government agencies during permit application process.

Support of Hearing Process

- Prepare technical background documentation.
- Provide expert testimony.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PERMITTING

WP NO. 55B

---

3 INPUT DATA

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- Work Package 55A:
  - Environmental regulatory requirements.
  - Results of environmental engineering analyses and environmental studies.
  - Project emission and effluent calculations.
- From Applicable Work Packages:
  - Plot plans and planning studies.
  - Site location and description.
  - Equipment lists.
  - Location of point source dischargers and emissions.

4 OUTPUT DATA

- Implemented commitment tracking system.
- Completed permit applications (to include but not be limited to):
  - Air
  - Wastewater
  - Solid Waste
- Technical background documents.
- Permit Acquisition Schedule (PAS).

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: SUBCONTRACTOR MANAGEMENT

WP NO. 56A

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DESCRIPTION OF SERVICES:

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Later

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: FIELD FOLLOWUP

WP NO. 56B

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DESCRIPTION OF SERVICES:

## 1 FUNCTION

The scope of work package is to perform field followup.

## 2 OPERATIONS

- Coordinate with field construction, as required, to answer questions and propose solutions to potential engineering and design non-conformances.
- Supervise field engineering activities and travel to the site, as required, to develop lines of communication and coordinate information between engineering and construction.

## 3 INPUT DATA

- Project Engineering Personnel will provide:
  - Project data, coordination procedures, project instructions, and client specifications, if any exist.
- Project Construction Personnel will provide:
  - Field construction inquiries.

## 4 OUTPUT DATA

- Field trips.
- Field followup reports.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: SUPERVISION - GENERAL

WP NO. 56C

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DESCRIPTION OF SERVICES:

## 1 FUNCTION

The scope of this work package is to supervise the work on the Project to be accomplished for all Work Packages.

## 2 OPERATIONS

- Attend meetings related to work packages described under the Project Work Breakdown Structure such as:
  - Job kickoff meeting.
  - Scheduling review meetings.
  - Estimate and man-hour review meetings
  - Engineering review meetings.
  - Coordination meetings with vendors.
  - Inspection meetings.
  - Client meetings.
  - Weekly project meetings.
- Maintain man-hour and schedule control.
- Monitor Drawing/Document monitoring, scheduling, and distribution system.
- Review estimates for man-hour revision requests.
- Assist in the preparation of the Engineering Management System (EMS).
- Coordinate with Division Management regarding manpower requirements and status of project.
- Coordinate with construction regarding equipment delivery and document issue requirements.
- Initial time sheets for all Engineering Project Personnel on the specific project.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: SUPERVISION - GENERAL

WP NO. 56C

- 
- Review and clarify Management Information System (MIS) Reports.
  - Review Labor Cost Statement (LCS) for consistency with MIS reports.
- 3 INPUT DATA
- Work Package 53A:
    - Schedules and planning logic.
    - Other EMS Schedule Reports.
    - Man-hour budgets.
    - Equipment and material cost budgets.
    - MIS and LCS Reports.
    - AM-1 Reports.
    - Other EMS Cost Reports.
  - From Applicable Work Packages:
    - Drawing/Document Status Reports.
- 4 OUTPUT DATA
- Prepare minutes of meeting.
  - Prepare interoffice memorandums (IOMs).
  - Prepare interoffice correspondence (IOCs).
  - Prepare project correspondence.
    - Client letters.
    - Vendor letters.
  - Review schedule update.
  - Review and administer Drawing/Document Control System.
  - Review MIS Report.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: SUPERVISION - GENERAL

WP NO. 56C

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- 
- Review cost estimate.
  - Review and approve WPCNs and MECs.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: PLANT LAYOUT AND PIPING - GENERAL

WP NO. 56D

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DESCRIPTION OF SERVICES:

1 FUNCTION

The scope of this work package is to define the work to be accomplished on the Project that is common to all units.

3 OUTPUT DATA

- Plant Layout and Piping.
- General Engineering.
- General Design and Drafting.
- General Subcontracts, Material Specifications.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: CONTROL SYSTEMS - GENERAL

WP NO. 56E

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DESCRIPTION OF SERVICES:

1 FUNCTION

The scope of this work package is to define the work to be accomplished on the Project that is common to all units.

2 OUTPUT DATA

- Control Systems General Engineering.
- General Design and Drafting.
- General Subcontracts, Material Specifications.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: ELECTRICAL - GENERAL

WP NO. 56F

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DESCRIPTION OF SERVICES:

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1 FUNCTION

The scope of this work package is to define the work to be accomplished on the Project that is common to all units.

2 OUTPUT DATA

- Electrical General Engineering.
- General Design and Drafting.
- General Subcontracts, Material Specifications.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: CIVIL/STRUCTURAL - GENERAL

WP NO. 56G

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DESCRIPTION OF SERVICES:

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1 FUNCTION

The scope of this work package is to define the work to be accomplished on the Project that is common to all units.

2 OUTPUT DATA

- Civil/Structural General Engineering.
- General Design and Drafting.
- General Subcontracts, Material Specifications.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: PROGRAM MANAGEMENT (OOCF only)

WP NO. 75A

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DESCRIPTION OF SERVICES:

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1 FUNCTION

Later

4 OUTPUTS

- Marketing plan.
- Master management plan.
- Program income/revenue reports.
- Continuation application.
- Feasibility evaluation.
- Phase II funding profile.
- Conference reports.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: PROCESS ENGINEERING

WP NO. 40A

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This work package includes descriptions of services pertaining to:

- The Design Basis.
- Process Flow Diagrams and Process Design.
- Operating Manuals.

DESCRIPTION OF SERVICES:

## A) DESIGN BASIS

## 1 FUNCTION

The scope of this work package is to define the design basis and to support completion of other work packages.

## 2 OPERATIONS

- Prepare preliminary process scope of work.
- Update process scope of work based on the process studies and client inputs.
- Prepare initial basis of design.
- Prepare initial Process Equipment List.
- Establish battery limit conditions.
- Write process descriptions and process instructions.

## 3 INPUT DATA

- Work Package 51A:
  - Project Management Plan - Scope of Work.
  - Options to be studied or evaluated by Process.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROCESS ENGINEERING

WP NO. 40A

---

4    OUTPUT DATA

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- Process scope of work.
- Basis of design.
- Battery limit conditions.
- Process Equipment List.
- Process description.
- Process instructions.
- Project (Study) Report.
- Process Water Quality Requirements.

B)    PROCESS FLOW DIAGRAMS AND PROCESS DESIGN

1    FUNCTION

The scope of this work package is to develop the basic process flow scheme based on client input, field data, and process scoping studies, process data sheets, utility summaries, and heat and material balances.

2    OPERATIONS

- Review contract details for applicable inputs.
- Evaluate the process options and discuss with the client. Determine energy conservation, feedstock flexibility, debottlenecking studies to be performed.
- When necessary, collect operating data and analyze to determine unit and individual equipment performance.
- Determine appropriate computer programs and data bases to be utilized for simulation of the specific unit.
- Prepare necessary process studies to determine basic process flow scheme for review and comment by client.
- Prepare environmental summaries identifying and quantifying all waste streams and emissions.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROCESS ENGINEERING

WP NO. 40A

- 
- Prepare process sketches for drafting of the PFDs by Process Systems.
  - Develop basic control philosophy and incorporate on PFDs.
  - Review PFDs with client.
  - Revise and update PFDs based on detail process design and comments from client or other engineering disciplines.
  - Prepare overall and detail heat and material balances for the unit.
  - Size process equipment and prepare process equipment data sheets and specifications.
  - Prepare utility and chemical summaries based on process evaluations.
  - Determine payout or economic incentive for proposed modifications.
  - Prepare instrument and analyser design data.

### 3 INPUT DATA

- From Applicable Work Packages:
  - Project Management Plan - Scope of work.
  - Concurrence on final flow scheme.
  - Comments on PFDs.
  - Client feed, product, and utility pricing data and payout or Return on Investment (ROI) information sufficient to determine feasibility of proposed modifications, additions, or new units.
- Work Package 41A:
  - Control systems design criteria.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROCESS ENGINEERING

WP NO. 40A

---

4      OUTPUT DATA

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- Instrument and analyser design data.
- Process scoping studies.
- Instrument setpoints.
- Process flow sketches.
- Process flow diagrams.
- Basic control philosophy.
- Overall heat and material balance.
- Detail heat and material balances.
- Utility and chemical summaries.
- Environmental summaries.
- Process data sheets for all equipment.
- Battery limit summaries.

C)    OPERATING MANUALS

1      FUNCTION

The scope of this work package is to prepare a detailed set of operating instructions.

2      OPERATIONS

- Prepare manual outline and get client/project approval.
- Collect necessary mechanical data to supply necessary input to the manual.
- Prepare draft of manual for project/process/client comments.
- Review comments and incorporate into final manual.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: PROCESS ENGINEERING

WP NO. 40A

---

3 INPUT DATA

- Work Package 51B:
  - The necessary vendor data to prepare the manual.
  - Client definitions of the scope desired.
- Work Package 44A:
  - The latest version of the P&IDs and any changes to them.

4 OUTPUT DATA

- Manual outline.
- Manual draft.
- Final operating manual.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: PDU TESTING (UNIT 200 ONLY-HRI)

WP NO. 40B

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DESCRIPTION OF SERVICES:

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WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: CONTROL SYSTEMS ENGINEERING

WP NO. 41A

---

DESCRIPTION OF SERVICES:

## 1 FUNCTION

- The scope of this work package is to translate basic engineering data from other work packages into instrument design criteria, specifications, process control philosophy, and scope of work; design to develop instrumentation.

## 2 OPERATIONS

- Review the contract details for applicable inputs.
- Examine process data to ensure that a compatible and practicable control system design may be achieved, and develop an instrument philosophy in the form of a Control Systems Block Diagram and design criteria.
- Review pneumatic instrument requirements and determine air requirements.
- Review and comment on the P&IDs.
- Review preliminary instrument power requirements and determine distribution, type, and quantity.
- Produce a scope of work for each unit that will become the Control Systems section of the bid book.
- Prepare instrument specifications, data sheets, and requisitions for:
  - Analyzers, analyzer houses, and analyzer systems design.
  - Flow instruments.
  - Level instruments.
  - Pressure instruments.
  - Temperature instruments.
  - Advanced Control Systems including Distributed Control System (DCS), Programmable Logic Controllers (PLCs), or computers, as required.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: CONTROL SYSTEMS ENGINEERING

WP NO. 41A

- 
- Special packaged control systems, as required.
  - Local receiver instruments, controllers, indicators, and recorders.
  - Control valves.
  - Control panels, computers, and annunciators.
  - Evaluate technical acceptability of bidders.
  - Review instrument specifications for package/skid-mounted units.
  - Review cost data and provide data for special equipment by providing specifications and evaluating budget pricing for these items. Review the control systems equipment in the final estimate.

## 3 INPUT DATA

- Work Package 40A:
  - Engineering data including process data, description, flow diagrams, and analyzer data.
- Work Package 44A:
  - Preliminary P&IDs.
- Work Package 42A:
  - Electrical characteristics (voltage, frequency).
  - Hazardous area diagrams and required electrical area classification.
- Work Package 44D:
  - Compressor, dryers, and other packaged equipment specifications to determine accessory instruments.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: CONTROL SYSTEMS ENGINEERING

WP NO. 41A

- 
- ~~Work Package 44F:~~
    - Plot plan drawings.
  - Work Package 44B:
    - Process release vessel sketches.
  - Work Package 50A:
    - Preliminary bidders list.
  - From applicable Work Packages:
    - Equipment lists.

## 4 OUTPUT DATA

- Preliminary instrument power requirements and distribution.
- Preliminary instrument air quantities and distribution.
- Control System's design criteria.
- Process Control philosophy.
- Control System's comments on P&IDs.
- Instrumentation specifications including data sheets for:
  - Analyzers.
  - Flow Instruments.
  - Level Instruments.
  - Pressure Instruments.
  - Temperature Instruments.
  - Miscellaneous Instruments.
  - Control Valves.
  - Control Systems (e.g., DCS, PLC, computers).

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: CONTROL SYSTEMS ENGINEERING

WP NO. 41A

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- 
- Special Packaged Control Systems.
  - Control Panels.
  - Budget pricing for special Control Systems equipment.
  - Scope of work for each unit for the bid books.
  - Comments on packaged equipment specifications.
  - Control systems comments on estimate.
  - Control room layout sketches.
  - Instrument index.
  - Alarm and shutdown list.
  - Control loop, logic and ladder sketches.
  - PLC data base configuration.
  - Review of vendor drawings and data.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: CONTROL SYSTEMS DESIGN AND DRAFTING

WP NO. 41B

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DESCRIPTION OF SERVICES:

## 1 FUNCTION

- The scope of this work package is to identify the drawings required for the control systems design criteria, specifications, and control philosophy.

## 2 OPERATIONS

- The following drawings will be provided:
  - Control system block diagram showing the overall components and interconnections of the control system.
  - Console and panel layouts showing the general locations of equipment in the consoles and control panels.
  - Control Room layouts showing the location of equipment within the Control Room.
  - Rack and remote building layouts showing the layouts of Auxiliary Rooms or buildings that contain control systems equipment (e.g., DCS racks, analyzers, etc.).

## 3 INPUT DATA

- Work Package 41A:
  - Drawing sketches.

## 4 OUTPUT DATA

- Control systems drawings.
- Typical instrument installation details.
- Interconnection drawings.
- Control room layout drawings.
- Control loop, logic, and ladder diagrams.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: CONTROL SYSTEMS BULK COMMODITY  
PROCUREMENT ENGINEERING

WP NO. 41C

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DESCRIPTION OF SERVICES:

1 FUNCTION

The scope of this work package is to utilize the instrument system design for use in specifying and requisitioning bulk materials for the project and an instrumentation subcontract package.

2 OPERATIONS

- Review the contract details for applicable inputs.
- Prepare specifications, data sheets, bills of materials, and requisitions for bulk instrument installation material.
- Evaluate technical acceptability of bidders.
- Review vendor drawings and data.

3 INPUT DATA

- Work Package 40A:
  - Engineering data including process data, description, flow diagrams, analyzer data, and material balance.
- Work Package 44A:
  - P&IDs.
- Work Package 42B:
  - Hazardous area diagrams and required electrical area classification.
  - Wiring Schedules.
  - Cable run diagrams for electronic signals and thermocouples.
- Work Package 44F:
  - Plot plans.
  - Platform elevations around vessels and racks.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: CONTROL SYSTEMS BULK COMMODITY  
PROCUREMENT ENGINEERING

---

WP NO. 41C

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~~Piping specification.~~

- Initial and final piping plans and elevations.
- Initial and final piping isometric drawings.
- Control valve station and meter run details.
- Pipe rack details.

- Work Package 44B:

- Type of temperature and pressure taps in vessels.

- From applicable Work Packages:

- Equipment lists.

4 OUTPUT DATA

- Bulk material specifications.
- Bills of material.
- Bulk material requisitions.
- Subcontract specification and requisition package.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ELECTRICAL ENGINEERING

WP NO. 42A

---

DESCRIPTION OF SERVICES:

## 1 FUNCTION

The scope of this work package is to establish engineering requirements suitable for specifying electrical systems and equipment and developing construction documentation.

## 2 OPERATIONS

- Examine Process Flow Diagrams, Material Balance Streams, Equipment Lists, Project Requirements, and Plot Plans to Develop the Electrical System One-Line Diagrams.
- Make Engineering Calculations for Short Circuit, Grounding, Voltage Drop, and Motor Starting.
- Prepare Electrical Equipment Specifications for Transformers, Packaged Equipment, Motors, Switchgear, Motor Controllers, Motor Control Centers, Cable, UPS, etc.
- Prepare Motor and Load List.
- Prepare Electrical Equipment List.
- Prepare Electrical Scope of Work Section for Bid Books.
- Provide Input to Development of Area Classification Drawing.
- Determine Emergency Power (UPS) Requirements.

## 3 INPUT DATA

- Work Package 44F:
  - Site and plot plans.
  - Planning study drawings for specific locations of equipment and arrangement of piping, and coordination for location of substations, distribution panels, and motor starter panels.
  - Pipe support locations for coordination of underground conduit.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ELECTRICAL ENGINEERING

WP NO. 42A

- 
- Checked general arrangement drawings.
  - Work Packages 43A and B:
    - Drawings locating roads, ditches, foundations, etc.
  - Work Package 44A:
    - P&IDs.
  - Work Package 41B:
    - Instrument Index.
    - Process control logic diagrams showing electrical requirements for shutdown, control, and alarms.
  - Work Package 44D:
    - Compressor shutdown requirements, as required.
  - Work Package 44C:
    - Furnace fan motor data and fired heater controls.
  - Work Package 44A:
    - Motor data (hp requirement) and motor list.
  - Work Package 40A:
    - Overall material balance with stream compositions for area classifications.
    - Battery Limit Conditions.
  - From Applicable Work Packages
    - Equipment List.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ELECTRICAL ENGINEERING

WP NO. 42A

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4 OUTPUT DATA

- One-Line Diagram Sketches.
- Area Classification Drawing Sketch.
- Electrical Equipment Specifications.
- Motor and Load Lists.
- Electrical Equipment Lists.
- Bid Book Scope of Work (Electrical).
- Emergency Power Recommendations.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ELECTRICAL DESIGN AND DRAFTING

WP NO. 42B

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This work package includes descriptions of services pertaining to:

- One-Line and Area Classification Drawings
- Typical Lighting, Grounding and Power Plans
- Special Electrical Drawings

DESCRIPTION OF SERVICES:

## A) ONE-LINE AND AREA CLASSIFICATION DRAWINGS

## 1 FUNCTION

The scope of this work package is to translate mechanical equipment and process electrical requirements into electrical design suitable for specifying electrical bulk materials requirements and producing construction drawings and documents.

## 2 OPERATIONS

- Examine the construction specification, process engineering flow diagrams, material balance streams, and plot plan to determine the area classification.
- Prepare and issue the area classification drawings.
- Prepare Substation and switchgear arrangement drawings.
- Examine basic design data, site utility data, and mechanical equipment lists and develop one-line diagrams.
- Prepare and issue one-line diagrams to the project.

## 3 INPUT DATA

- Work Package 44F:
  - Site and plot plans.
  - Planning study drawings for specific locations of equipment and arrangement of piping, and coordination for location of substations, distribution panels, and motor starter panels.
  - Pipe support locations for coordination of underground conduit.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ELECTRICAL DESIGN AND DRAFTING

WP NO. 42B

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~~Check general arrangement drawings.~~

- Work Package 42A:
  - Check underground drawings.
- Work Packages 43A and B:
  - Drawings locating roads, ditches, foundations, etc.
- Work Package 44A:
  - P&IDs.
- Work Package 41B:
  - Instrument Index.
  - Process control logic diagrams showing electrical requirements for shutdown, control, and alarms.
- Work Package 44D:
  - Compressor shutdown requirements, as required.
- Work Package 44C:
  - Furnace fan motor data and fired heater controls.
- Work Package 44A:
  - Motor data (hp requirement) and motor list.
- Work Package 40A:
  - Overall material balance with stream compositions for area classifications.
  - Battery Limit Conditions.
- From Applicable Work Packages
  - Equipment List.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ELECTRICAL DESIGN AND DRAFTING

WP NO. 42B

---

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4 OUTPUT DATA

- Area classification drawings.
- One-line diagrams.
- Substation and switchgear arrangement drawings.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
\_\_\_\_\_  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT  
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WORK PACKAGE: ELECTRICAL DESIGN AND DRAFTING

WP NO. 42B

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B) ~~TYPICAL LIGHTING, GROUNDING AND POWER PLANS~~

## 1 FUNCTION

The scope of this work package is to translate mechanical equipment and process requirements into typical electrical lighting, grounding and power drawings for specifying equipment and producing construction drawings and documents.

## 2 OPERATIONS

- Examine the construction specification for special requirements.
- Prepare and issue typical lighting layout drawings.
- Prepare and issue typical grounding drawings.
- Prepare and issue typical power plan drawing.

## 3 INPUT DATA

- Work Package 44F:
  - Site and plot plan.
  - Space on pipe rack for wireways and conduit runs.
  - Checked general arrangement drawings.
- Work Packages 43A and B:
  - Drawings locating roads, ditches, foundations, etc.
- Work Package 43C:
  - Pipe rack and platform drawings for lighting design.
  - Furnace detail steel and platform drawings.
- Work Package 43D:
  - Architectural plans, control room reflected ceiling, and building steel drawings for lighting design.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ELECTRICAL DESIGN AND DRAFTING

WP NO. 42B

- 
- ~~Work Package 44C:~~
    - Furnace outline and manufacturers' drawings.
  - From applicable Work Packages:
    - Equipment list.
  - Work Package 40A:
    - Battery limits.

## 4 OUTPUT DATA

- Typical lighting drawing.
- Typical grounding drawing.
- Typical power plan drawing.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: ELECTRICAL DESIGN AND DRAFTING

WP NO. 42B

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c) ~~SPECIAL ELECTRICAL DRAWINGS~~

## 1 FUNCTION

The scope of this work package is to translate mechanical equipment and process electrical requirements into electrical design drawings suitable for specifying special electrical equipment and producing construction drawings and documents.

## 2 OPERATIONS

- Prepare standard connection assembly drawings.
- Prepare underground ductbank layout drawing.
- Prepare electrical feeder layout drawing.

## 3 INPUT DATA

- Work Package 44F:
  - Site and plot plan.
  - Planning study drawings for specific locations of equipment.
  - Piping design drawings.
  - Layout drawings.
  - Checked general arrangement drawings.
- Work Package 42A:
  - Checked underground drawings.
- Work Package 43B:
  - Drawings locating roads, ditches, foundations, etc.
- Work Package 43C:
  - Pipe rack and platform drawings.
  - Furnace detail steel and platform drawings.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: ELECTRICAL DESIGN AND DRAFTING

WP NO. 42B

- 
- ~~Work Package 43D:~~
    - Architectural plans.
  - Work Package 41B:
    - Main control panel and control room layouts.
  - Work Package 44C:
    - Furnace outline and manufacturers' drawings.
  - Work Package 40A:
    - Equipment list.
    - Established battery limits.

#### 4 OUTPUT DATA

- Standard electrical connection assembly drawings for lighting, grounding, motor connection, instrument connections and miscellaneous details.
- Underground duct bank drawing.
- Electrical feeder layout drawing.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: ELECTRICAL BULK COMMODITY  
PROCUREMENT ENGINEERING

---

WP NO. 42C

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DESCRIPTION OF SERVICES:

1 FUNCTION

The scope of this work package is to translate electrical designs into bulk electrical material specifications.

2 OPERATIONS

- Prepares bulk electrical material specifications.

3 INPUT DATA

- Work Package 44F:

- Site and plot plan.

- Work Package 41B:

- Vessel sketches with thermocouple locations and information on any required electrical heaters.

- Instrument Index.

- Loop diagrams for electronic instrumentation.

- Process control logic diagrams showing electrical requirements for shutdown, control, and alarms.

- Main control panel and control room layouts.

- Thermocouple and electronic instrument and field junction box location drawings.

- Work Package 44A:

- Motor operator valve data sheets and vendor data.

- Engineering and utility flow diagrams (P&IDs).

- Work Package 44D:

- Compressor wiring (vendor drawing).

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: ELECTRICAL BULK COMMODITY  
PROCUREMENT ENGINEERING

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WP NO. 42C

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- ~~Work Package 42A:~~

- Available main substation primary voltages.

- From Applicable Work Packages:

- Equipment list.

- Work Package 40A:

- Established battery limits.

4 OUTPUT DATA

- Bulk electrical materials specifications.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: SITE WORK

WP NO. 43A

---

DESCRIPTION OF SERVICES:

## 1 FUNCTION

The scope of this work package is responsibility for the technical adequacy of all matters relating to site work design and to convert the data and information generated in other work packages into designs and drawings suitable for use in requisitioning materials and constructing the facilities.

## 2 OPERATIONS

- Review soils exploration report to ensure that the basis for foundation design is complete and reasonable. Develop scope and conduct additional geotechnical, as required.
- Develop boring location plan.
- Verify all civil design criteria.
- Prepare quantity takeoffs for cost estimates and comparisons.
- Provide input for developing the storm drainage system.
- Produce the design computations in all areas requiring analysis.
- Review and comment on drawings from other work packages.
- Participate in site surveys when requested.
- Prepare site preparation drawings.

## 3 INPUT DATA

- Work Package 42B:
  - Drawings or sketches showing the location and arrangement of outdoor electrical equipment, underground conduit runs, and manholes.
- Work Package 44F:
  - Planning studies and plot plan which define the site arrangement and utilization.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: SITE WORK

WP NO. 43A

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- Work Package 51A:

- Project data, coordination procedures, and project instructions.

4 OUTPUT DATA

- Design calculations and sketches.
- Technical bid evaluation.
- Design drawings covering the following items:
  - Rough grading, drainage and roads.
  - Finish grading and paving.
  - Fencing.
  - Railroad plans and profiles.
- Aerial site photographic survey:
  - Stereoscopic digitization for topographical mapping.
  - Infrared photographic survey.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: CONCRETE

WP NO. 43B

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DESCRIPTION OF SERVICES:

## 1 FUNCTION

The scope of this work package is responsibility for the technical adequacy of all matters relating to civil and structural design and to convert the data generated by other work packages into designs and drawings suitable for use in requisitioning materials and constructing the facilities.

## 2 OPERATIONS

- Review soils report and foundation data to ensure that the basis for foundation design is complete and reasonable.
- Verify all civil design criteria.
- Define, distribute, and utilize earthquake and wind load information for design of foundations and structures.
- Make cost comparison studies to verify that economical construction methods and materials are used.
- Provide assistance to develop the storm drainage system.
- Produce the design computations in all areas requiring analysis.
- Review and comment on drawings from other work packages.
- Prepare detailed design drawings for concrete foundations.
- Review and comment on vendor equipment drawings and data sheets.

## 3 INPUT DATA

- From applicable Work Packages:
  - Equipment weights and drawings showing anchor bolt arrangements.
- Work Package 44D:
  - Unbalanced moments and forces for all rotating machinery requiring dynamic analysis for foundations or structures.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: CONCRETE

WP NO. 43B

- 
- Work Package 44B:
    - Vessel weights, shears, moments, anchor bolt size, diameter of bolt circle, and location of bolts for foundation design.
  - Work Package 42B:
    - Drawings or sketches showing the location and arrangement of electrical equipment, overhead or underground conduit runs, switchgear building requirements, and equipment and building loads for design.
  - Work Package 44F:
    - Planning studies and plot plan which releases location of equipment, extent of structures, pipe loads and forces, and underground piping study for use in foundation and structural designs.
  - Work Package 51A:
    - Project data, coordination procedures, and project instructions.

#### 4 OUTPUT DATA

- Design calculations and sketches.
- Design drawings covering the following items:
  - Building foundations.
  - Structure and equipment foundation drawings.
  - Concrete superstructure drawings.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: STRUCTURAL STEEL

WP NO. 43C

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DESCRIPTION OF SERVICES:

STRUCTURAL STEEL

1 FUNCTION

The scope of this work package is responsibility for the technical adequacy of all matters relating to structural design and to convert the data generated by other work packages into designs and drawings suitable for use in requisitioning materials and constructing the facilities.

2 OPERATIONS

- Verify all structural design criteria.
- Utilize earthquake and wind load information.
- Make cost comparison studies to verify that economical construction methods and materials are used.
- Review and comment on the required shop drawings and manufacturers' prints.
- Produce the design computations in all areas requiring analysis.
- Review and comment on drawings from other work packages.
- Prepares detailed structural design drawings for all steel structures, and buildings, except for preengineered metal buildings.
- Prepares vessel platform detail and location drawings and drawings for platforms, and brackets which are attached to vessels.
- Review and comment on vendor equipment drawings and data sheets.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: STRUCTURAL STEEL

WP NO. 43C

---

3 INPUT DATA

- Work Package 44F:
  - Planning studies and plot plan which releases location of equipment, extent of structures, pipe loads, and forces.
- Work Package 42B:
  - Drawings or sketches showing the location and arrangement of electrical equipment, overhead conduit runs, switchgear building requirements.
- Work Package 44G:
  - Painting and fireproofing specifications and requirements.
- Work Package 51A:
  - Project data, coordination procedures, and project instructions.

4 OUTPUT DATA

- Design drawings, sketches, and calculations covering the following items:
  - Building structures.
  - Pipe rack structures.
  - Process structures.
  - Vessel platforms.
  - Miscellaneous structures and platforms.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ARCHITECTURAL, HVAC AND PLUMBING

WP NO. 43D

---

This work package includes descriptions of services pertaining to:

- Architectural Design
- HVAC and Plumbing

DESCRIPTION OF SERVICES:

A) ARCHITECTURAL DESIGN

1 FUNCTION

The scope of this work package is to prepare architectural designs and drawings suitable for lump sum bidding by general contractors and constructing the facilities.

2 OPERATIONS

- Consult with client to determine project requirements of an architectural nature, such as space requirements, number of people working in each space, physical relationship of spaces, types and sizes of equipment, finish materials, etc.
- Determine what building code will govern the building designs. In the absence of a local building code or specific requirement, the uniform building code is recommended.
- Determine requirements, equipment sizes and clearances, functions and relationships of equipment, etc.
- Prepare a color and finish material chart.
- Conduct field observation during the construction period, interpreting the drawings to the General Contractor as required.
- Prepare schematic designs.
- Produce the design computations in all areas requiring analysis.
- Make cost comparison studies to verify that economical construction methods and materials are used.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ARCHITECTURAL, HVAC AND PLUMBING

WP NO. 43D

---

- Prepare detailed building drawings.
- Prepare construction specifications and other bidding documents.
- Review and comment on drawings and specifications from other work packages.
- Review the required shop drawings and manufacturers' prints.

### 3 INPUT DATA

- Work Package 44G:
  - Painting and fireproofing specifications and requirements.
- Work Package 44F:
  - Planning studies and plot plan which releases location of equipment, extent of structures.
- Work Package 42B:
  - Drawings or sketches showing the location and arrangement of outdoor electrical equipment, overhead and underground conduit runs, switchgear building requirements, and other buildings and their requirements for design.
- Work Package 51A:
  - Project data, coordination procedures, and project instructions.

### 4 OUTPUT DATA

- Design calculations.
- Conceptual building layout sketches and outline specifications.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ARCHITECTURAL, HVAC AND PLUMBING

WP NO. 43D

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- 
- Architectural design drawings and specifications including:
    - Prefabricated buildings.
    - Masonry buildings.
    - Steel buildings.
  - Statement of probable cost at end of conceptual phase and at completion of bid documents.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ARCHITECTURAL, HVAC AND PLUMBING

WP NO. 43D

---

B) HVAC AND PLUMBING

1 FUNCTION

The scope of this work package is to design, specify, and recommend optimum heating, ventilating and air conditioning (HVAC) and plumbing systems suitable for the project site conditions.

2 OPERATIONS

- Review the contract details for applicable inputs.
- Prepare HVAC system description and conceptual design.
- Examine the building design package, location of HVAC equipment rooms, outside air intakes, and exhaust outlets to ensure that a compatible and sound system design concept may be achieved.
- Select air conditioning and heating system, provide analysis for system performance.
- Prepare and draft HVAC system piping and instrumentation diagrams (P&IDs).
- Perform heating and cooling load calculations, psychometrics, pressure drop calculations, and system analysis.
- Prepare system arrangement drawings.
- Prepare chilled and hot water piping, steam and refrigerant piping layout.
- Prepare piping pressure drop calculation, select control valves, pumps, and other associated equipment.
- Prepare and issue the HVAC mechanical equipment room drawings.
- Evaluate and recommend to the Client the best technically qualified vendor to furnish and install the required HVAC equipment.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ARCHITECTURAL, HVAC AND PLUMBING

WP NO. 43D

- 
- Perform bid evaluations.
  - Review vendor drawings and technical information submitted in accordance with drawings and specifications.
  - Examine the building design package and the data furnished by the Structural Division to ensure the piping chases allowed provide sufficient space and access to allow a compatible and practical piping and equipment arrangement.
  - Perform calculations as required for facilities piping and miscellaneous equipment.
  - Examine the HVAC system design and duct arrangement drawings to identify interface requirements and possible interferences.
  - Develop Bill of Materials for miscellaneous facilities fixtures and bulks, and specify the minimum requirements to be included in the applicable plant building specifications.
  - Prepare and issue the facilities piping installation specification to be utilized during the construction phase of the project.
  - Review HVAC system control and logic diagrams.
  - Prepare bulk material takeoffs and requisitions.

### 3 INPUT DATA

- From Applicable Work Packages:
  - System design descriptions.
  - Lighting, equipment, and panel heat loads.
- Work Package 43D (task A):
  - Building design drawings including necessary construction details such as wall, roof and glass, with sections and space allocations for routing duct and laying out necessary equipment.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ARCHITECTURAL, HVAC AND PLUMBING

WP NO. 43D

- 
- Work Package 44F:
    - Plot plans.
  - Work Package 41B:
    - Process control logic diagrams.
  - Work Package 50A:
    - Vendor technical proposal.
  - Work Package 51A:
    - Project data, coordination procedures, project instructions.

#### 4 OUTPUT DATA

- Utility piping and instrument diagrams and line designation tables.
- HVAC duct arrangement drawings.
- Steam or hot water piping arrangement drawings.
- Mechanical room and mechanical yard layout arrangement drawings.
- Equipment selection and piping calculations.
- HVAC equipment and installation specifications, data sheets, and equipment bid evaluation.
- Review of vendor drawings and technical support information.
- Chilled water and refrigeration piping drawings.
- Piping specification (HVAC Piping Only) and class sheets.
- Insulation specifications (sound and thermal), HVAC duct and equipment only.
- Facilities piping and instrument diagrams, and line designation tables.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ARCHITECTURAL, HVAC AND PLUMBING

WP NO. 43D

- 
- Facilities piping and miscellaneous equipment sizing calculations.
  - Facilities equipment specifications.
  - Facilities piping arrangement drawings (for cold water and sewer piping to building limits).
  - Piping specifications and class sheets including insulation specifications.
  - Facilities Bill of Materials and specific technical requirements.
  - Facilities piping installation specifications.
  - Bulk Material Takeoffs (MTOs), Bill of Materials (BOMs) and requisition.
  - Bid evaluations.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: STRUCTURAL BULK COMMODITY  
PROCUREMENT ENGINEERING

WP NO. 43E

---

DESCRIPTION OF SERVICES:

1 FUNCTION

The scope of this work package is the preparation of specifications and requisitions for materials and subcontracted tasks utilizing the civil, structural, and architectural design drawings for construction of the facilities and the development of Bills of Material from the architectural, civil and structural design drawings and requisitioning these materials for construction of the facilities.

2 OPERATIONS

- Prepare technical specifications, requisitions, service agreements, and subcontracts as appropriate for the following:
  - Civil
    - Subsurface geological investigation.
    - Fencing.
    - Site preparation and rough grading.
    - Finish grading.
    - Road and walkway paving.
    - Railroad spurs.
  - Structural
    - Piling.
    - Concrete.
    - Reinforcing steel.
    - Structural steel.
    - Miscellaneous steel.
    - Preengineered buildings.
  - Architectural
    - Masonry buildings.
    - Roofing and siding.
    - Building interior finish materials.
    - Landscaping.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: STRUCTURAL BULK COMMODITY  
PROCUREMENT ENGINEERING

WP NO. 43E

---

- ~~Review and comment on specifications from other work packages, and utilize them in requisitions or subcontract packages as necessary.~~
- Evaluate technical acceptability of bidders as required and to provide bid analysis.
- Prepare Bills of Material and Requisitions for civil/structural materials as required.

3 INPUT DATA

- Work Package 44G:
  - Painting and fireproofing specifications and requirements.
- Work Package 51A:
  - Project data, coordination procedures, and project instructions.

4 OUTPUT DATA

- Technical bid evaluations.
- Technical specifications for requisitions and subcontract packages as required for the following:
  - Civil
    - Subsurface geological investigation.
    - Fencing.
    - Site preparation and rough grading.
    - Finish grading.
    - Road and walkway paving.
    - Railroad spurs.
  - Structural
    - Piling.
    - Concrete.
    - Reinforcing steel.
    - Structural steel.
    - Miscellaneous steel.
    - Preengineered buildings.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: STRUCTURAL BULK COMMODITY  
PROCUREMENT ENGINEERING

---

WP NO. 43E

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---

Architectural

- Masonry buildings.
  - Roofing and siding.
  - Building interior finish materials.
  - Landscaping.
  - Preengineered buildings.
- Bills of Material, Purchase Requisitions, and Subcontracts as required for the following:
    - Buildings.
    - Major structural steel.
    - Concrete.
    - Miscellaneous steel.
    - Reinforcing steel.
    - Anchor bolts.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROCESS SYSTEMS - MECHANICAL

WP NO. 44A

---

This work package includes descriptions of services pertaining to:

- Piping and Instrumentation Diagrams
- Calculations

DESCRIPTION OF SERVICES:

A) PIPING AND INSTRUMENTATION DIAGRAMS

1 FUNCTION

The scope of this work package is to engineer, design and draft utility flow diagrams, Process and Instrumentation Diagrams (P&IDs), as well as Line Designation Tables and Tie-In Schedules.

2 OPERATION

- Design and layout engineering and utility piping and instrumentation diagrams (P&IDs).
- Draft utility P&IDs.
- Develop and draft line designation tables and tie-in schedules.

3 INPUT DATA

- Work Package 40A:
  - Process flow diagrams with heat and material balance.
  - Process description.
  - Pump process data sheets.
  - Compressor data sheets.
  - Tower data and tray loading sheets.
  - Furnace data sheets.
  - Special equipment data sheets.
  - Utility and chemicals summary.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROCESS SYSTEMS - MECHANICAL

WP NO. 44A

- 
- Work Package 44G:
    - Recommendation for material of construction.
  - Work Package 44F:
    - Plot plan.
    - Piping design drawings (and comments).
  - From applicable Work Packages:
    - Equipment list.
    - Project data.
    - Utility data.
    - Chemicals, charge, and product data.
    - Project instructions.
    - Client coordination procedure.
    - Project contract specifications.
    - Client comments to P&ID.
    - Vendor equipment data and drawings.
    - Vendor instrument data and drawings.

#### 4 OUTPUT DATA

- Engineering and utility piping and instrument diagrams.
- Line designation tables.
- Tie-in Schedules.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROCESS SYSTEMS - MECHANICAL

WP NO. 44A

---

B) CALCULATIONS

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## 1 FUNCTION

The scope of this work package is to translate process information into mechanical information suitable for use in other work packages.

## 2 OPERATION

- Calculate the sizes of all process utility lines.
- Calculate wall thickness of all pipe.
- Calculate compressor and pump differential pressures, pump NPSH based on a practical balance between pump differential pressure and the total circuit pressure loss.
- Set the design pressures and temperatures for vessels, heat exchangers, furnaces, and proprietary equipment.
- Specify the size, rating and facing, or bevel type and schedule of all vessel, exchanger, proprietary equipment, and furnace connections, except manholes and instruments.
- Define the extent of steam generating systems that must conform to the ASME Boiler Code.
- Set the distribution of pressure losses among the circuit components and allocate a practical amount to control valves.
- Calculate preliminary sizes of control valves and flow meters.
- Select and specify all piping specialities so they may be readily requisitioned.
- Size and select pressure relief valves and rupture discs.
- Develop flare system and silencer specifications.
- Review Logic Diagrams.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PROCESS SYSTEMS - MECHANICAL

WP NO. 44A

---

3 INPUT DATA

---

- Work Package 40A:
  - Process flow diagrams with heat and material balance.
  - Process description.
  - Utility and Chemicals Summary.
  - Tower data and tray loading sheets.
- Work Package 40D:
  - Pump process data sheets.
  - Compressor data sheets
  - Special equipment data sheets.
- Work Package 40C:
  - Furnace data sheets.
- Work Package 41B:
  - Logic Diagrams.
- Work Package 40G:
  - Recommendation for material of construction.
- From applicable Work Packages:
  - Equipment list.
  - Project data.
  - Utility data.
  - Chemicals, charge, and product data.
  - Project instructions.
  - Client coordination procedure.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: PROCESS SYSTEMS - MECHANICAL

WP NO. 44A

---

- Project contract specifications.

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## 4 OUTPUT DATA

- Compressor Data Summary.
- Vessel Elevation and Pump NPSH.
- Boiler Code Data Sheets.
- Vessel Connection Summary.
- Pump Data Summary.
- Furnace Connection Summary.
- Exchanger Design Pressure/Nozzle Summary.
- Pipe wall thickness calculations.
- Control Valve Data Sheet.
- Flow Meter Summary.
- Safety and Relief Valve Summary.
- Safety-Relief Valve Data Sheets.
- Miscellaneous Piping and Material Summary.
- Steam Trap Summary.
- Battery Limit Summary.
- Flare System Specification.
- Silencers' Specification.
- Specialty Packages (including piping items).

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PRESSURE VESSELS AND TANKS

WP NO. 44B

---

DESCRIPTION OF SERVICES:

1 FUNCTION

The scope of this work package is to interpret and translate process and general mechanical information into design drawings suitable for requisitioning pressure vessels, tanks and towers.

2 OPERATIONS

- Examine process and general mechanical data to ensure that a practical, compatible, and economical tower design can be achieved.
- Select the specific type of equipment and recommend specific materials of construction to satisfy the process and general mechanical data.
- Establish specific design features of the vessel including wall thickness, nozzles, types of heads, support details for external and internal loads and anchor bolt size, circle and location.
- Prepare technical specification.
- Prepare vessel drawings.
- Prepare mechanical data sheets.
- Furnish thermowell immersion data.
- Develop and issue requisition packages which include drawings, basic equipment specification, job requirements, standard drawings, approximate quantities of support clips, other detail features required for the specific equipment, and inspection and vendor data requirements.
- Recommend bidders for the vendor bid list.
- Prepare technical bid evaluations and resolve any technical questions raised by the subject quotations.
- Update vessel drawings to incorporate final nozzle locations and sizes, specific support clips and attachment locations, and lifting attachments.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PRESSURE VESSELS AND TANKS

WP NO. 44B

- 
- Review manufacturers' drawings and other data, to ensure compliance with the Purchase Order.
  - Develop weights, base moments, and shear loads from equipment for foundation designs.
  - Review process flow diagrams for compatibility with the equipment requisitioned.
  - Review equipment test data.
  - Review manufacturers' recommendations for startup spare parts, if required.

### 3 INPUT DATA

- Work Package 40A:
  - Process data sheets, instructions, description, flow diagrams, basis of design, and tray data sheets.
- Work Package 44A:
  - Equipment design pressures, design temperatures, nozzle sizes, ratings and facings, preliminary skirt heights and elevations.
- Work Package 44G:
  - Index of insulated, fireproofed, and painted equipment.
  - Materials of Construction Specifications.
- Work Package 42B:
  - Area classification drawings and grounding requirements, as well as cathodic protection information.
- Work Package 44F:
  - Plot plans, piping design layouts, and platform locations.
  - Final skirt heights and elevations.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PRESSURE VESSELS AND TANKS

WP NO. 44B

- 
- Work Package 50A:
    - Vendor technical proposals and recommended bidders list.
  - Work Packages 43B and C:
    - Wind and earthquake criteria.
  - Work Packages 51A and B:
    - Information and instructions, and coordination procedure, as well as vendor drawings via the Project Drawing/Document Control System.

#### 4 OUTPUT DATA

- Foundation loads and moments, anchor bolt size, locations, and quantity.
- Vessel thermowell immersion data.
- Nozzle orientation drawing.
- Equipment specifications and requisitions.
- Catalyst requisition as required.
- Internal requisition as required.
- Major material issue drawings.
- Technical bid evaluation.
- Clip phase drawings.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: HEAT TRANSFER EQUIPMENT

WP NO. 44C

---

This work package includes descriptions of services pertaining to:

- Heat Transfer Equipment
- Fired Heaters

DESCRIPTION OF SERVICES:

A) HEAT TRANSFER EQUIPMENT

1 FUNCTION

The scope of this work package is to interpret and translate process and general mechanical information into designs suitable for requisitioning equipment.

2 OPERATIONS

- Examine process and general mechanical data to ensure a practical, compatible, and economical heat exchanger design can be achieved.
- Select the specific type of equipment to satisfy the process and general mechanical data.
- Prepare technical specification.
- Perform thermal rating and/or check rating of exchanger.
- Prepare exchanger mechanical data sheets.
- Estimate nozzle locations, weights, and support design.
- Prepare setting plans for shell and tube exchangers.
- Develop and issue requisition packages which include exchanger data sheets, setting plans, basic equipment specification, job requirements, and other detail features required for the specific equipment.
- Recommend bidders for the vendor bid list.
- Prepare technical evaluations of quotations, and resolve any technical questions raised by the subject quotations.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: HEAT TRANSFER EQUIPMENT

WP NO. 44C

- 
- Review manufacturers' drawings to ensure compliance with the Purchase Order.
  - Review manufacturers' recommendations for startup spare parts.
  - Review equipment test data.

## 3 INPUT DATA

- Work Package 40A:
  - Process data sheets, instructions, description, flow diagrams, basis of design, cooling or heating data and curves.
- Work Package 44A:
  - Equipment operating and differential pressure.
  - Engineering utility flow diagrams.
- Work Package 44G:
  - Index of insulated, fireproofed and painted equipment.
  - Materials of construction specifications.
- Work Package 50A:
  - Vendor technical proposals, evaluation of vendor commercial terms and conditions and approved bidders' list.
- Work Package 51A:
  - Project data, information and instructions.
- Work Package 42B:
  - Area classification drawings.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: HEAT TRANSFER EQUIPMENT

WP NO. 44C

- 
- Work Package 44F:
    - Plot plans.
  - Work Package 41B:
    - Process control diagrams.
  - Work Packages 43B and C:
    - Wind and earthquake criteria.

#### 4 OUTPUT DATA

- Technical bid evaluation.
- Equipment specifications, data sheets, setting plans, and requisitions.

### B) FIRED HEATERS

#### 1 FUNCTION

The scope of this work package is to interpret and translate process and general mechanical information into a requisitioning package suitable for requisitioning equipment.

#### 2 OPERATIONS

- Examine process and general mechanical data to ensure that a practical, compatible, and economical design can be achieved.
- Prepare mechanical data sheets.
- Prepare the general technical specification for fired heaters.
- Accumulate other sections specifications, drawings, and information referred to in the General Fired Heater specification for attachment in the Requisition Package.
- Preparation of vendor data requirements for the fired heater and associated equipment.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: HEAT TRANSFER EQUIPMENT

WP NO. 44C

- 
- Preparation of notes modifying or adding clarifications to, or further defining specifications and other attachments.
  - Develop and issue Requisition Package.
  - Make vendor recommendations.
  - Technically review vendor quotations and resolve technical questions concerning the quotations.
  - Provide consultation and assistance in optimizing process designs when affected by the fired heater.
  - Review vendor drawings and data to assure compliance with purchase order documents, and that the proposed designs reflect sound engineering practice.

### 3 INPUT DATA

- Work Package 40A:
  - Process and fuel portions of the fired heater data sheets. Fuel chemistry to be itemized.
  - Process property curves (enthalpy-temperature-pressure curves, vaporization-molecular weight-API° curves, and vaporization-pressure-temperature curves).
  - Available fuel pressure and temperature.
- Work Package 44A:
  - Available air pressure for actuating equipment.
  - Engineering and utility flow diagrams.
- Work Package 44H:
  - Available steam and/or water pressure, temperature and quantity for air preheater cleaning, soot blowers, or steam snuffing.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: HEAT TRANSFER EQUIPMENT

WP NO. 44C

- 
- Work Package 41B:
    - Instrumentation requirements.
  - Work Packages 43B and C:
    - Earthquake and wind loading requirements.
    - Miscellaneous furnace structural requests.
  - Work Package 44G:
    - Index of insulated, fireproofed and painted equipment.
    - Materials of construction specifications.
  - Work Package 42B:
    - Electric motor specifications when required, electrical characteristics, area classification requirements, required electrical enclosures and emergency generator data.
  - Work Package 44D:
    - Required rotating equipment specifications for turbines, fans, and electric motors.
  - Work Package 44E:
    - Noise and pollution specifications.
  - Work Package 44F:
    - Restrictions to space and/or accessibility.
    - Plot plan and piping design layouts.
  - Work Package 50A:
    - Purchase order package.
    - Vendor proposals, final bid tabs and approved bidders' list.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: HEAT TRANSFER EQUIPMENT

WP NO. 44C

- 
- Work Package 51A:
    - Project data, information, and instructions.

## 4 OUTPUT DATA

- Utility consumption data.
- Equipment cost information.
- Technical review and bid tab evaluation.
- General and detailed physical equipment characteristics.
- Equipment performance characteristics.
- Control schemes.
- Vendor data status.
- Startup and shutdown schemes.
- Vendor recommended spare parts.
- Equipment specifications, data sheets, and requisitions.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ROTATING AND SPECIAL EQUIPMENT

WP NO. 44D

---

DESCRIPTION OF SERVICES:

## 1 FUNCTION

The scope of this work package is to interpret and translate process and general mechanical information into designs suitable for requisitioning equipment.

## 2 OPERATIONS

- Examine process and general mechanical data to ensure a practical, compatible, and economical design can be achieved.
- Select the specific type of pump and driver and their associated materials of construction to satisfy the process and general mechanical data.
- Calculate the pump estimated BHP.
- Calculate the steam turbine requirements.
- Calculate the compressor, fan, or blower, estimated SCFM, BHP requirements, and discharge temperature.
- Calculate the steam turbine estimated BHP and associated temperatures.
- Calculate the steam turbine water rate and efficiency.
- Prepare technical specification.
- Prepare mechanical data sheets.
- Develop, and issue requisition package which includes a bill of materials, mechanical data sheets, basic equipment specification, job requirements, and other detail features required for the pumps and drivers.
- Recommend bidders for vendor bid list.
- Prepare technical evaluations of quotations and resolve any technical questions raised by the subject quotes.
- Review manufacturers' drawings to ensure compliance with the Purchase Order.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ROTATING AND SPECIAL EQUIPMENT

WP NO. 44D

- 
- Prepare estimated utility requirements.
  - Develop estimated weights of equipment for foundation designs.
  - Review process flow and engineering flow diagrams for compatibility with the equipment requisitioned.
  - Review equipment test data and performance curves.
  - Review manufacturers' recommendations for startup spare parts.
  - Observe shop performance tests.

## 3 INPUT DATA

- Work Package 40A:
  - Process data sheets, instructions, description and flow diagrams.
- Work Package 42B:
  - Motor specifications, electrical characteristics, area classification drawings, required electrical enclosures and emergency generator data sheet.
- Work Package 44A:
  - Pump operating and differential pressures and available NPSH.
  - Engineering and utility flow diagrams.
  - Compressor operating and differential pressures.
- Work Package 44G:
  - Index of insulated, fireproofed and painted equipment.
  - Materials of construction specifications.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ROTATING AND SPECIAL EQUIPMENT

WP NO. 44D

- 
- Work Package 44H:
    - Steam and cooling water conditions and extraction steam requirements.
  - Work Package 44F:
    - Plot plans and piping design layouts.
  - Work Package 50A:
    - Vendor technical proposals, evaluation of vendor commercial terms and conditions and approved bidders' list.
  - Work Package 51A:
    - Project data, information and instructions.

## 4 OUTPUT DATA

- Planning and utility consumption data.
- Trip Report for shop performance tests.
- Equipment performance characteristics.
- Control schemes and protective device data.
- Technical bid evaluation.
- Equipment specifications, data sheets, and requisitions.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: ENVIRONMENTAL ENGINEERING EQUIPMENT

WP NO. 44E

---

DESCRIPTION OF SERVICES:

## 1 FUNCTION

The scope of this work package includes all engineering aspects of environmental engineering including engineering studies, development of conceptual designs and production engineering relating to the environmental aspects of the project.

## 2 OPERATIONS

Water Treatment

- Conceptual and detailed engineering and design, specification of equipment, and services for the following types of systems:
  - Condensate demineralization and filtration.
  - Boiler makeup water treatment.
  - Cooling system makeup water treatment.
  - Chemistry sampling and monitoring systems.
  - Chemical feed systems (associated with cooling, boiler and condensate systems).
  - Potable water treatment systems.
  - Water biofouling control.
  - Chemical storage (associated with water treatment systems).
- Preparation of plant chemistry maintenance and operating procedures (associated with water treatment systems).

Waste Treatment

- Conceptual and detail engineering and design, specification of equipment and services for the following types of systems:
  - Sanitary waste treatment.
  - Solid waste treatment.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: ENVIRONMENTAL ENGINEERING EQUIPMENT

WP NO. 44E

- 
- Process and utilities area wastewater treatment.
  - Wastewater recycle treatment.
  - Air pollution control system solid and liquid waste treatment.
  - Chemical injection systems associated with wastewater treatment systems.
  - Oil/water separation systems.

#### Air Quality

- Develop air pollution control equipment performance standards and design criteria based on regulatory requirements and emission levels.
- Prepare detailed specifications and bid evaluations, and supervise subcontractors.
- Develop estimates of the costs for equipment.

#### Hydrological Analysis

- Develop design criteria for flood protection, if required.
- Design channels for stream diversion and water supply.
- Evaluate sediment transport characteristics and design corresponding mitigation measures.

#### Noise Control

- Develop conceptual noise controls for plant exterior to meet criteria.
- Develop sound level criteria for interior spaces based on OSHA and speech interference criteria.
- Review equipment list, machine location drawings, and architectural treatment to determine potential noise problems and required noise control engineering.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ENVIRONMENTAL ENGINEERING EQUIPMENT

WP NO. 44E

- 
- Determine the degree of noise reduction required and provide noise level specifications for all major noise sources so that the total interior and exterior sound levels do not exceed applicable criteria.
  - Prepare specifications for all noise control devices such as large fans and fan rooms, ventilation systems, steam vents and valve silencers, quiet valves, enclosures, lagging, acoustical treatment, large rotating equipment such as large pumps and turbines.
  - Evaluate bids, including assessment of manufacturers' ability to meet sound level specifications.

### 3 INPUT DATA

The following input data is common to each environmental discipline. Specialized input data unique to each discipline are listed under the respective heading.

- Work Package 44A:
  - "Basis of Design" descriptions including applicable interface piping and instrument diagrams.
  - The number and type of all sources of gaseous emissions (pumps, valves, vessels, etc).
  - Operating parameters for the above sources such as pressure, fluid composition, flow rates, temperatures, etc.
  - Data on all fuel burning operations including fuel composition, amount, operating schedule, and dispersion parameters.
  - Engineering data including process data, description, flow diagrams, material balances, etc.
  - Composition and quantity of releases from all sources of gaseous emission (point, area, and fugitive sources).
  - Composition and quantity of all waste product streams (solid, liquid, and gaseous).

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: ENVIRONMENTAL ENGINEERING EQUIPMENT

WP NO. 44E

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- Work Package 44H:

- Utilities heat balance, including steam, condensate and cooling water material balances.

- Work Package 51A:

- Project data; coordination procedures and project instructions.

#### 4 OUTPUT

- Conceptual and detailed design of Environmental systems.
- Environmental design criteria for plot plans and planning studies.
- Vendor technical proposals, as well as vendor drawings for review.
- Design criteria.
- Engineering scopes of work for subcontractors.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PLANT LAYOUT AND PIPING

WP NO. 44F

---

This work package includes descriptions of services pertaining to:

- Plant Layout and Piping
- Pipe Stress Analysis
- Underground Piping Design
- Pipe Support Design
- Aboveground Piping Design
- Steam Tracing

DESCRIPTION OF SERVICES:

A) PLANT LAYOUT AND PIPING

1 FUNCTION

The scope of this work package is to provide plot plans, site plans, equipment arrangements. These drawings fix locations of equipment, structures, buildings, roads, as well as pipeways and all facilities required for the plant and offsite areas. This work package also includes conceptual piping arrangement drawings.

2 OPERATIONS

- Review the process package and contract specifications.
- Reviews manufacturers' drawings.
- Prepare Plot Plans for the plant, and Site Plans for offsite units.
- Review process package, contract specifications, and Manufacturers' Data.
- Review manufacturers' drawings.
- Develops arrangement studies which determine the location of equipment, type of supports and elevations, critical or complex piping systems, orientation of all nozzles on equipment, extent of structural platforms, and the method of access and handling facilities.
- Determines in conjunction with other work packages equipment elevations and vessel skirt heights.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PLANT LAYOUT AND PIPING

WP NO. 44F

---

3 INPUT DATA

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- Work Package 40A:
  - Process description, data, philosophy, process flow diagrams, and vessel data sheets.
- Work Package 44A:
  - Any special piping requirements such as gravity flow, NPSH requirements, minimum equipment elevations, P&I diagrams, and line designation tables.
- Work Package 42B:
  - Estimated floor space requirements for motor control centers, switchgear and substation transformers, estimated size and routing of underground and overhead electrical cable runs, and electrical specifications.
- From applicable Work Packages:
  - Sizes and arrangements for all exchangers, surface condensers and air coolers, preliminary and certified manufacturers' drawings of all proprietary equipment, and heat exchanger specifications; floor space requirements for all equipment purchased by the Equipment Engineering Division Personnel, preliminary and certified manufacturers' drawings for all equipment including small specialty component packages furnished as part of the main equipment.
  - Equipment specifications, floor space requirements, preliminary and certified manufacturers' drawings of package boilers, cooling towers, raw water and wastewater treating equipment.
  - Preliminary setting plans for shell and tube exchangers.
  - Floor space requirements, preliminary and checked drawings on manufacturers drawings for furnaces, superheaters, fired heaters including small specialty items such as blowers and stacks.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PLANT LAYOUT AND PIPING

WP NO. 44F

- 
- Work Package 44B:
    - Copies of process vessel data sheets with any additional manholes indicated, vessel and tank outline drawings, and vessel specifications.
    - Offsite tankage general design and tank sizes.
  - Work Package 43B:
    - Foundation information.
  - Work Package 51A:
    - Project Data and Coordination Procedures.

## 4 OUTPUT DATA

- Plot Plan.
- Site Plans.
- Conceptual piping arrangements.

## B) UNDERGROUND PIPING DESIGN

## 1 FUNCTION

The scope of this work package is to design and route all underground piping areas.

## 2 OPERATIONS

- Review the contract details to determine applicable information.
- Prepare conceptual design criteria.
- Examine the site plot plan and the piping and instrument diagrams to identify space allowed for routing the piping as well as to identify the extent of underground piping required for the project.
- Prepare design calculations and conceptual layout studies to route the underground sewer piping.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PLANT LAYOUT AND PIPING

WP NO. 44F

- 
- Coordinate the interface design and routing of electrical underground cables and duct banks.
  - Review piping plans and elevation drawings as required to identify underground piping interface requirements.
  - Prepare underground piping drawings.
  - Prepare and issue the underground sewer piping installation specification to be used during the construction phase of the project.

### 3 INPUT DATA

- Work Package 40A:
  - Process data and basis of design.
- Work Package 44A:
  - Process piping and instrumentation diagrams.
- Work Package 42B:
  - Estimated size and routing of underground electrical cable and duct bank runs and electrical specifications.
- From applicable Work Packages:
  - Sizes and arrangements for all exchangers, surface condensers and air coolers, preliminary and certified manufacturers' drawings of all proprietary equipment, and heat exchanger specifications.
  - Floor space requirements for all equipment, preliminary and certified manufacturers' drawings for all equipment including small specialty component packages furnished as part of the main equipment.
  - Setting plans for shell and tube exchangers.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PLANT LAYOUT AND PIPING

WP NO. 44F

- 
- Work Package 44H:
    - Equipment specification, floor space requirements, preliminary and certified manufacturers' drawings of boilers, cooling towers, raw water and waste water treating equipment, all other equipment specified and requisitioned, and equipment specifications when applicable for offsite tankage general design and tank sizes.
  - Work Packages 43A, B and C:
    - Preliminary foundation sizes.
    - Checked concrete, structural, and building drawings.
    - Maximum allowable loads from paving.
    - Maximum allowable differential settlement.
    - Civil specifications.
  - Work Package 44B:
    - Copies of process vessel data sheets with any additional manholes indicated, vessel and tank outline drawings, and vessel specifications.
  - Work Package 44G:
    - Materials of construction specifications.
  - Work Package 50A:
    - Vendor technical proposal.
  - Work Package 51A:
    - Project data, coordination procedures, and project instructions.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PLANT LAYOUT AND PIPING

WP NO. 44F

---

4 OUTPUT DATA

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- Sewer sizing and design calculations.
- Conceptual and final underground piping arrangement drawings.
- Underground piping installation specification.

C) ABOVEGROUND PIPING DESIGN

1 FUNCTION

The scope of this work package is to translate all engineering data into final drawings of piping systems and components suitable for fabrication and construction.

2 OPERATIONS

- Design and develop aboveground piping layout drawings.
- Review manufacturers' drawings and data.

3 INPUT DATA

- Work Package 44A:
  - Engineering and Utility P&I (Piping and Instrument) Diagrams, (Issue B and C), line designation tables, data sheets, preliminary and certified drawings of piping specialty items.
- Work Package 44G:
  - Insulation and paint specifications.
  - Piping material specifications.
- Work Packages 43A, B and C:
  - Final Civil/Structural drawings.
- Work Package 42B:
  - Final Electrical drawings.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

---

WORK PACKAGE: PLANT LAYOUT AND PIPING

WP NO. 44F

- 
- Work Package 42B:
    - Final Pipe Support information.
  - Work Package 51A:
    - Project data and coordination procedure.
  - From applicable Work Packages:
    - Dimensional equipment drawings, data sheets, and vendor drawings.

## 4 OUTPUT DATA

- Aboveground Piping Design Layouts.
- Elevations.
- Large Bore Isometrics.
- Small Bore Isometrics.

## D) PIPE STRESS ANALYSIS

## 1 FUNCTION

The scope of this work package is related to the effort necessary to analyze piping configurations to determine stresses.

## 2 OPERATIONS

- Review piping layout drawings.
- Provide significant pipe support forces on equipment and structures, and locations where stress analysis calculations are required.
- Prepare input data for pipe runs to be used in stress analysis.
- Perform pipe stress analysis, suggest pipe configurations that will reduce pipe stresses, and determine pipe support and loading information that will affect vessel, structural, and equipment design.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: PLANT LAYOUT AND PIPING

WP NO. 44F

---

3 INPUT DATA

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- Work Package 40A:
  - Process description, data, philosophy, flow diagrams, and vessel data sheets.
- Work Package 44A:
  - P&I diagrams, line designation tables, and piping specifications.
- From applicable Work Packages:
  - Sizes and arrangements for all exchangers, surface condensers and air coolers, preliminary and certified manufacturers' drawings for all equipment including small specialty components furnished as part of the main equipment, and equipment specifications.
- Work Package 44B:
  - Process vessel data sheets with any additional manholes indicated, vessel and tank outline drawings, and vessel specifications.
- Work Package 44H:
  - Floor space requirements, and preliminary and certified manufacturers' drawings of package boilers, cooling towers, raw water and waste water treating equipment, all other equipment specified and requisitioned by the Power/Facilities Personnel, and equipment specifications.
- Work Packages 43A, B, and C:
  - Civil/Structural planning arrangement studies, preliminary foundation sizes, checked concrete, structural, and building drawings, maximum allowable loads from paving, maximum allowable differential settlement, and civil specifications.

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WORK PACKAGE: PLANT LAYOUT AND PIPING

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- 
- Work Package 44G:
    - Material of Construction Specifications.
  - Work Package 51A:
    - Project Data and Coordination procedures.

## 4 OUTPUT DATA

- Data for pipe loads and confirmation of pipe layout by stress analysis. (This will include comments and suggested piping configurations as necessary.)
- Computer runs.

## E) PIPE SUPPORT DESIGN

## 1 FUNCTION

The scope of this work package is to provide pipe support mechanical designs suitable for drafting and requisitioning of pipe supports.

## 2 OPERATIONS

- Review manufacturer's drawings, as required.
- Select and design pipe supports and prepare required drawings.
- Review piping design and isometric drawings of branch connections for reinforcing requirements, and welded attachments.
- Calculate and select special pipe support components.
- Prepare the data required to requisition pipe supports including specifications and drawings.

## 3 INPUT DATA

- Work Package 40A:
  - Process description, data, philosophy, flow diagrams, and vessel data sheets.

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- 
- Work Package 44A:
    - P&I diagrams, line designation tables and pipe specifications.
  - From applicable Work Packages:
    - Sizes and arrangements for all exchangers, surface condensers and air coolers, preliminary and certified manufacturers' drawings for all equipment including small specialty components furnished as part of the main equipment, and equipment specifications.
  - Work Package 40B:
    - Process Vessel Data Sheets with any additional manholes indicated, vessel and tank outline drawings, and vessel specifications.
  - Work Package 44H:
    - Floor space requirements, and preliminary and certified manufacturers' drawings of package boilers, cooling towers, raw water and waste water treating equipment, all other equipment specified and requisitioned by the Power/Facilities Personnel, and equipment specifications.
  - Work Packages 43A, B and C:
    - Civil/Structural planning arrangement studies, preliminary foundation sizes, checked concrete, structural, and building drawings, maximum allowable loads from paving, maximum allowable differential settlement, and civil specifications.
  - Work Package 44G:
    - Material of Construction Specifications.
  - Work Package 51A:
    - Project Data and Coordination procedures.

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4 OUTPUT DATA

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- Pipe support detail and location drawings.

## F) STEAM TRACING

## 1 FUNCTION

The scope of this work package is to translate all engineering data into final steam tracing drawings of piping systems and components suitable for fabrication and construction.

## 2 OPERATIONS

- Design and develop steam tracing systems.
- Review manufacturers' drawings and data.

## 3 INPUT DATA

- Work Package 44A:
  - Engineering and Utility P&I (Piping and Instrument) Diagrams, line designation tables, data sheets, preliminary and certified drawings of piping specialty items.
- Work Package 41B:
  - Steam traced instrument installation details.
  - Instrument index.
- Work Package 44G:
  - Insulation and paint specifications.
  - Piping material specifications.
- From applicable Work Packages:
  - Dimensional equipment drawings, data sheets, and vendor drawings.

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WORK PACKAGE: PLANT LAYOUT AND PIPING

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- Work Package 51A:

- Project data and coordination procedures.

4 OUTPUT DATA

- Steam Tracing Drawings.

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OHIO ONTARIO CLEAN FUELS, INC.  
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WORK PACKAGE: MATERIALS SPECIFICATIONS AND MECHANICAL  
BULK COMMODITY PROCUREMENT ENGINEERING

WP NO. 44G

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This work package includes descriptions of services pertaining to:

- Specifications
- Paints, Insulation, and Fireproofing Specifications, Requisitions, and Subcontract Tasks
- Materials of Construction
- Bulk Material Requisitions

DESCRIPTION OF SERVICES:

A) SPECIFICATIONS

1 FUNCTION

The scope of this work package is:

- Development of the pipe material, plumbing material, coating, shop and field piping fabrication, and the piping color/marketing specifications.
- Development of pipe material specifications for computer input.

2 OPERATIONS

- Prepare and update pipe material, plumbing material, coating, shop and field piping fabrication, and piping color/marketing specifications.
- Prepare and update piping material specifications for computer input.

3 INPUT DATA

- Work Package 44A:
  - Engineering and Utility P&I diagrams including line tables.
  - Piping specialty data sheets (bulk specialties only).
  - Specifications for cleaning and inspection.

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OHIO ONTARIO CLEAN FUELS, INC.  
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- The limits of pipe shop fabrication.
- Work Packages 41A and B:
  - Instrument data.
- Work Packages 42A and B:
  - Electrical data.
- Work Packages 43A, B, and C:
  - Civil/Structural data.
  - Aboveground pipe support data.
- Work Package 44F:
  - Plot plans and planning studies.

#### 4 OUTPUT DATA

- Evaluation of piping material substitution requests, including corrosion allowance.
- Specifications for:
  - Pipe material (pipe classes).
  - Pipe material color coding and marking.
  - Plumbing Materials.
  - Coating requirements.
  - Shop and field piping fabrication.
  - General assembly details (for vents, drains, PIs, etc.).
  - Manual valves.
- Special piping component material data sheets.

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B) PAINT, INSULATION, AND FIREPROOFING SPECIFICATIONS, REQUISITIONS,  
AND SUBCONTRACT TASKS

1 FUNCTION

The scope of this work package is to define the painting, insulating, and fireproofing requirements and also establish the extent of insulating, painting, and fireproofing. Requisitioning bulk quantities of paint, insulation materials, and fireproofing materials are also part of this work package.

2 OPERATIONS

- Review project documents to determine the basis of the painting, insulation, and fireproofing work.
- Review data supplied by Process and Process Systems to establish equipment and/or piping temperature, potential corrosive conditions, and whether insulation is required.
- Review vendor equipment drawings and supply shop painting requirements.
- Prepare the insulation, painting, and fireproofing specifications, for equipment and piping.
- Prepare the Schedule of Insulated, Painted, and Fireproofed Equipment. This establishes the extent of insulating, painting, and fireproofing of equipment.
- Review Line Designation Table to establish the extent of insulation and painting application.
- Prepare the bulk material requisitions for insulation materials, fireproofing materials, and paint for equipment only.
- Prepare paint, insulation, and fireproofing subcontract packages.
- Review the bids submitted by the paint, insulation, and fireproofing vendors, prepare bid tabs, and recommend a vendor for purchase.

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3 INPUT DATA

- Work Package 40A:
  - Process Flow Diagrams and process equipment data sheets.
- Work Package 44A:
  - Engineering and Utility P&IDs.
  - Line Designation Table.
- From applicable Work Packages:
  - Vendor information for equipment support designs. (Rotating equipment, heat exchangers, fired heaters).
- Work Package 44B:
  - Tank and vessel support designs.
- Work Package 43C:
  - Pipe support designs.
- Work Package 51A:
  - Project data, project instructions, and coordination procedures.

4 OUTPUT DATA

- Insulation, Painting, and Fireproofing Specifications for equipment and piping.
- Application specifications for paint, insulation, and fireproofing materials for field use.
- Schedule of Insulated, Painted, and Fireproofed Equipment.
- Requisitions for purchase of bulk insulation, fireproofing, and painting materials.

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OHIO ONTARIO CLEAN FUELS, INC.  
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WORK PACKAGE: MATERIALS SPECIFICATIONS AND MECHANICAL  
BULK COMMODITY PROCUREMENT ENGINEERING

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- Subcontract packages for paint, insulation, and fireproofing, including bid evaluations.
- Marked vendor drawings for shop painting.

## C) MATERIALS OF CONSTRUCTION

## 1 FUNCTION

The scope of this work package is to assign Materials of Construction to items of equipment, e.g., vessels, drums, heat exchangers, pumps, etc.

## 2 OPERATIONS

- Review project documents to determine the basis of the materials selection work.
- Review the data supplied by other work packages and establish a list of candidate materials that will perform adequately in the service environment.
- Prepare Materials of Construction Specification from Process Flow Diagrams. Assign materials of construction to all items of equipment, specify corrosion allowance requirements, and lining requirements.
- Prepare alloy markup from Process Flow Diagrams. Assign materials of construction to piping components.
- Review P&IDs to ensure that the proper piping material specifications are assigned to each line.

## 3 INPUT DATA

- Work Package 40A:
  - Process Flow Diagrams and process equipment data sheets.
- Work Package 44A:
  - Engineering and Utility Piping and Instrument Diagrams.

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WORK PACKAGE: MATERIALS SPECIFICATIONS AND MECHANICAL  
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- Line Designation Table.

- Work Package 51A:
  - Project data, instructions, and coordination procedures.

## 4 OUTPUT

- Materials of Construction Specification.
- Alloy markup.
- Comments on P&IDs with respect to material specifications.

## D) BULK MATERIAL REQUISITIONS

## 1 FUNCTION

The scope of this work package is the development of Bills of Materials from the pipe support design drawings and requisitioning these materials for construction of the facilities.

## 2 OPERATIONS

- Prepares Bills of Materials and requisitions for all pipe support material, including but not limited to hangers, springs, expansion joints, structural shapes, plates, and hardware.
- Make recommendations to Purchasing relative to technical acceptability of bidders as required and to provide bid analysis and requisitions.
- Prepare bulk material comparison summaries for control and monitoring.

## 3 INPUT DATA

- From applicable Work Packages:
  - Material contingency requirements.

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WORK PACKAGE: MATERIALS SPECIFICATIONS AND MECHANICAL  
BULK COMMODITY PROCUREMENT ENGINEERING

WP NO. 44G

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- Work Package 51A:

- Project data, coordination procedures, project instructions, and client specifications.

4 OUTPUT DATA

- Technical bid evaluations.
- Comparison summaries for bulk materials.
- Bills of Material.
- Purchase requisitions.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: POWER EQUIPMENT

WP NO. 44H

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DESCRIPTION OF SERVICES:

## 1 FUNCTION

The scope of this work package is to interpret and translate process and general mechanical information into designs suitable for requisitioning equipment required for the project.

## 2 OPERATIONS

- Examine process and general mechanical data to ensure a practical, compatible, and economical design can be achieved.
- Select the specific type of power equipment and their associated materials of construction to satisfy the process and general mechanical data.
- Prepare technical specification.
- Prepare mechanical equipment data sheets.
- Develop, and issue requisition package which includes a bill of materials, mechanical data sheets, basic equipment specification, job requirements, and other detail features required for the mechanical equipment.
- Recommend bidders for vendor bid list.
- Prepare technical evaluations of quotations and resolve any technical questions raised by the subject quotes.
- Review manufacturers' drawings to ensure compliance with the Purchase Order.
- Develop estimated weights of equipment for foundation designs.
- Review process flow and engineering flow diagrams for compatibility with the equipment requisitioned.
- Review equipment test data and performance curves.
- Review manufacturers' recommendations for startup spare parts.
- Observe shop performance tests.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: POWER EQUIPMENT

WP NO. 44H

- 
- Perform vacuum bottoms Burn Test Study to determine requirements of burn test and develop test specification.

## 3 INPUT DATA

- Work Package 44G:
  - Index of insulated, fireproofed and painted equipment.
  - Materials of construction specifications.
- Work Packages 42A and B:
  - Motor specifications, electrical characteristics, area classification drawings, required electrical enclosures and emergency generator data sheet.
- Work Package 44F:
  - Plot plans piping design layouts, and mechanical arrangement drawings.
- Work Package 50A:
  - Vendor technical proposals, evaluation of vendor commercial terms and conditions and approved bidders' list.
- Work Package 51A:
  - Project data, information and instructions.

## 4 OUTPUT DATA

- Planning and utility consumption data.
- Trip Report for shop performance tests.
- Equipment performance characteristics.
- Control schemes and protective device data.
- Technical bid evaluation.
- Equipment specifications, data sheets, and requisitions.

WORK PACKAGE DESCRIPTION  
OHIO ONTARIO CLEAN FUELS, INC.  
PROTOTYPE COMMERCIAL COAL/OIL CO-PROCESSING PLANT

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WORK PACKAGE: POWER EQUIPMENT

WP NO. 44H

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- Vacuum Bottoms Burn Test Study.
- Vacuum Bottoms Burn Test specification and subcontract.
- Vacuum Bottoms Burn Test and results.

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END