

Power Generation

Full Service Design and Engineering





EAPC Industrial Services offers a full spectrum of services including consulting, engineering, construction, operation, maintenance, startup, and testing solutions provided through flexible work processes tailored to meet your specific needs.

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EAPC INDUSTRIAL SERVICES

ENGINEERING FOR HEAVY INDUSTRY

EAPC Industrial Services is a multi-disciplinary consulting firm with offices in Grand Forks, Fargo, Bismarck, Minot, and Williston, ND; Sioux Falls, SD; Bemidji and St. Paul, MN; Fort Collins, CO; Phoenix, AZ; and Kansas City, MO.

The staff of EAPC has performed hundreds of power generation and process industry projects for a wide breadth of clients nationally.

HSE QUALIFICATIONS

EAPC is certified under ISNetworld (ISN# 400-217037)

NCMS NON-DOT Qualified

EAPC has 115 employees providing services in the following areas:

Engineering: Chemical, Combustion, Mechanical, Electrical, Structural

Commissioning

Architecture

Procurement

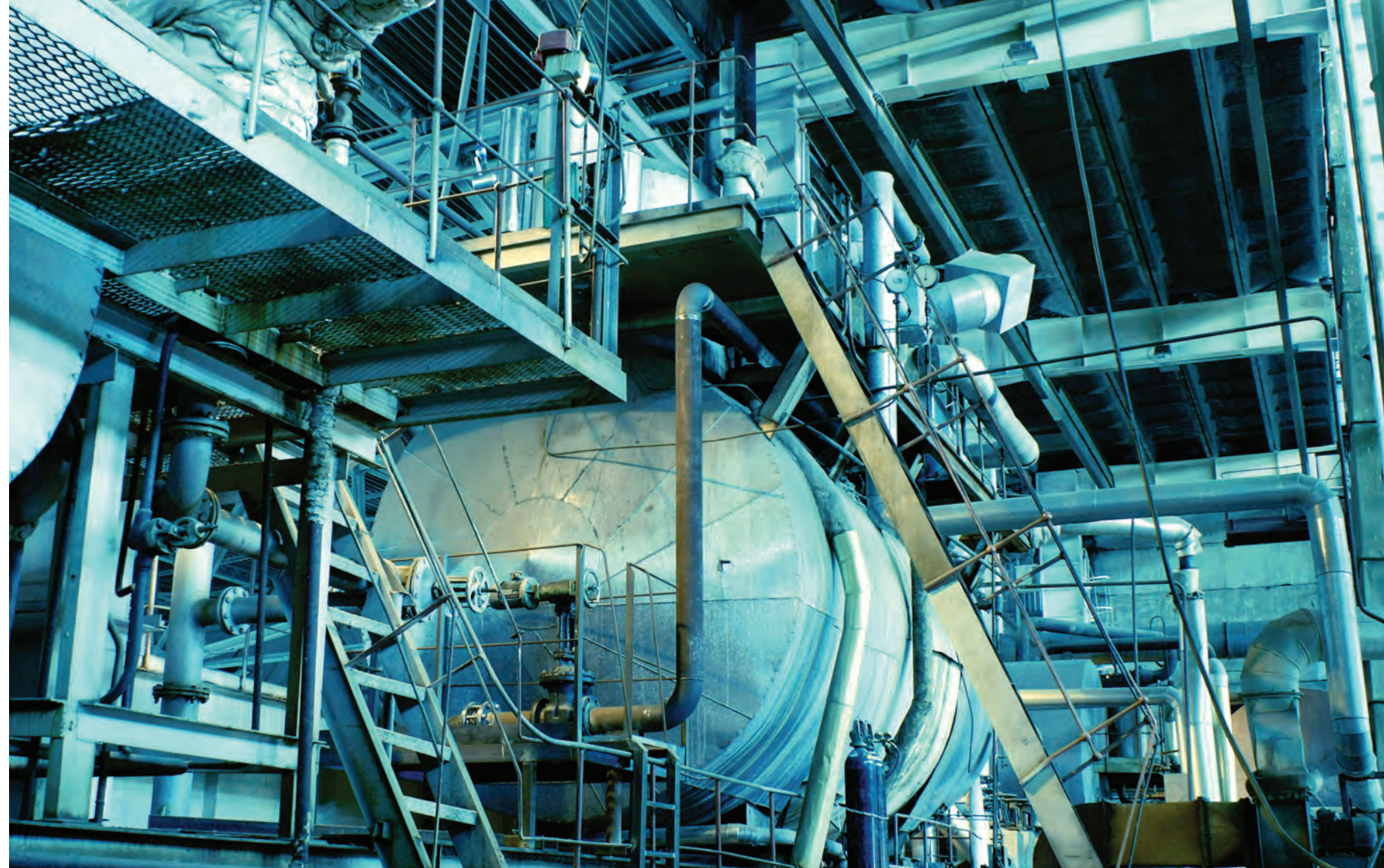
Construction Management

Maintenance Planning

Forensics

Wind Energy Consulting

Business Excellence: LEAN Methodologies, Leadership Training



INDUSTRIAL SERVICES TEAM

Our multidisciplinary teams include members who previously worked at operating plants, consulting organizations, and research centers with experience working around the world and close to home.

MEETING YOUR NEEDS

Our Industrial Services Group provides a full spectrum of services including consulting, engineering, training, construction management, operation, maintenance, startup, and testing solutions that support your organizational goals. We do this through flexible work processes tailored to meet your specific needs with a focus on developing and maintaining a long-term relationship with you.

INDUSTRY EXPERIENCE

Our experience spans a broad range of industries including Food Processing, Industrial, Power, Process, Commercial, Institutional, and Governmental.

We have completed countless projects in these industries including Sugar Processing, Ethanol, Bio-refining, Oil & Gas, Electric Power Generation, Agriculture & Food Processing, Minerals & Mining, Forest Products, and Manufacturing.

Our expertise covers many technologies, equipment, and systems including Process, Fractionation, Distillation, Bulk Material Handling, Heat Transfer, Fluid Handling Systems, Separation, Filtration Systems, Evaporation Systems, Combustion Systems, Flare Systems, Pollution Control, Explosion Prevention, Pressure Vessel Systems Analysis, and Pressure Piping Systems Analysis.



POWER GENERATION

SOLUTIONS

The power generation industry is very complex. EAPC can provide the knowledge and experience to meet those requirements. Our team is made up of a strong mix of experienced, industry tested professionals who provide a consistent and technologically advanced approach to all projects.

We have the breadth and depth of experience needed for Power Station Owners seeking outside engineering service support. Although we have completed greenfield projects, our niche is retrofit projects. Our staff is experienced in engineering, procurement and construction support including engineers who have worked for operating companies at central power generating stations. We also have experience across a wide breath of heavy industries from which we draw applicable experience to the power industry including: Oil & Gas, Minerals and Mining, Petroleum Processing, Agricultural Processing, Biofuels, and Institutional Central Boiler Plants

We have combustion, mechanical, electrical, environmental, structural, and chemical engineers within our organization to support all disciplines required for a project. Those areas where we don't have specialized expertise, we have developed partnering relationships to provide the necessary services.

EAPC is a successful competitor based upon our ability as a smaller organization to provide responsive, high quality solutions through competent, experienced personnel at typically a lower cost. With multiple locations throughout the region, EAPC is able to meet your needs quickly and efficiently.



EXPERIENCE

Boiler Systems
Stack Additions/Replacements
Boiler MACT, ESP, CEMS, COMS Systems
Balance of Plant Systems
Combined Heat & Power
Buried and Elevated Steam Condensate Systems
ASME Section VIII New & Existing Vessel and API Tank Design/Analysis
ASME B31 Code Piping Engineering Design
API 650 Tank Design
Industrial HVAC
Chiller Systems
Water Treatment Systems
Mercury Capture
Fuel Oil to NG for Startups
Project Management
Construction Management
Energy Studies and Assessments

Code Studies
Electrical Area Classifications
Plant Outage Support
Startup Support
Maintenance Planning and Scheduling
Combustible Dust Explosion Protection/Prevention
Waste Water Treatment Systems
Material/Coal Handling Conveying
Unloading/Storage/Feeding
Chutes/Transitions/Hoppers/ Grating
Equipment Structures-Elevated
Dust Control/Explosion Mitigation
Buildings/Foundations/ Structures
Civil/Roads
Electrical Power Distribution
Instrumentation and Control Systems
Interface with Plant Control Systems
Security and Fire Protection Systems

COMBUSTION ENGINEERING

HARNESSING ENERGY FROM FUEL THROUGH COMBUSTION PROCESSES AND SYSTEMS

Whether it is burner design, modification, or testing, burners are included in the many services we offer. Coal pulverizers, coal classifiers, crusher-driers, and coal conduits merit similar attention. Our Combustion Engineering work includes forensics, testing and design, usually for the purpose of either performance improvement or solving a problem. We specialize in combustion systems coordination for optimum performance.

SOLVING PROBLEMS IN POWER PLANT PERFORMANCE

Our combustion engineering sector focuses on helping utility owners and operators solve power plant performance problems. Historically our emphasis has been on controls, boilers, fuels, and a variety of combustion improvement and combustion forensic services.

DESIGN AND RETROFIT ENGINEERING ASSISTANCE

Our services include complete DCS and BMS replacements, new Low NOX Burners and Overfire Air Systems design, and SNCRs.

SERVICES

Combustion
Boiler Services
Start-up Services
Burner Management Systems
Performance Monitoring

Coal Test Burning
Mill Inerting
Performance Testing
Technical Resource



MECHANICAL ENGINEERING

APPLYING ENGINEERING, PHYSICS, AND MATERIALS SCIENCE FOR YOUR MECHANICAL THERMAL AND FLUID SYSTEM NEEDS

Responsive personnel support projects from feasibility studies, design, procurement, construction, start-up and testing, and troubleshooting phases through maintenance planning support. With state-of-the-art technology software applications and informational resources to assist in problem solving and data analysis, we provide efficient, cost effective service to respond to your needs.

SERVICES AND DELIVERABLES

3D MODEL AND DRAWING PREPARATION

- 3D Laser Scanning and Documentation
- Equipment Design
- General Arrangement Drawings
- Piping and Instrumentation Diagrams (P&IDs)
- Process Flow Diagram (PFD)
- Sheet Metal, Chutes, Transitions, Spouting
- Vessel and Tank

SPECIFICATION PREPARATION

- Equipment & Device Data Sheets
- Equipment & Materials

INSPECTIONS

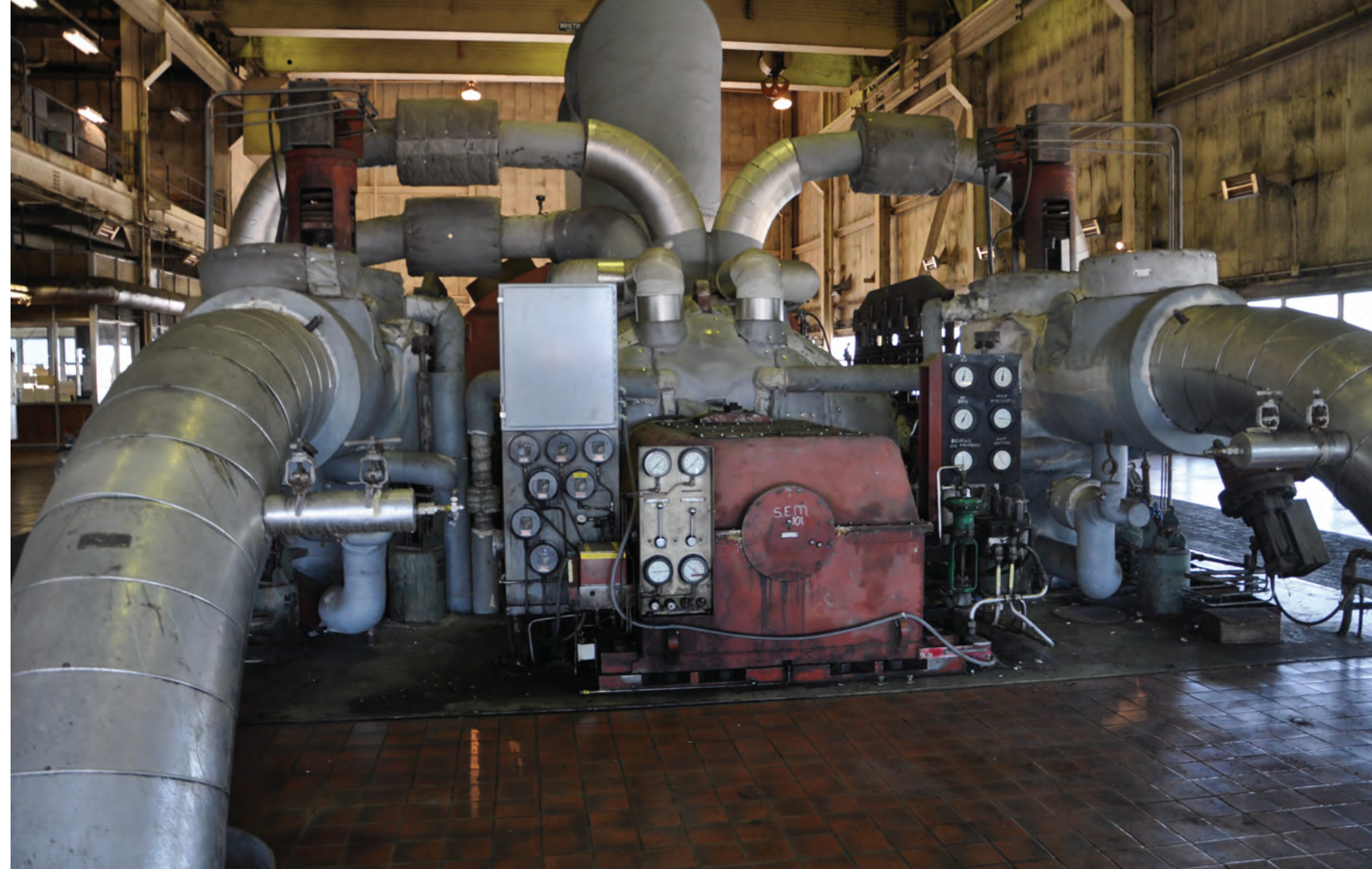
- Ultra Sonic Thickness Testing

STUDIES

- AACE Cost Estimate Studies
- API
- Basis of Design
- Business Case Development
- Codes - ASME Boiler & Pressure Vessel Code
- Feasibility Studies
- NFPA
- Preliminary Engineering

ANALYSIS

- Fluid Statics/Dynamics
- Heat Transfer
- Mechanics
- Thermodynamics



APPLICATION EXPERIENCES

Above & Below Ground Tanks – API
ASME STS-2000 Stack Analysis & Design
Boiler & Chiller Systems
Cogeneration Systems
Combustible Dust/Dust Collection/Pollution Control
Cooling Towers
Dewatering Systems – Process/Centrifugal
Diesel Generator Systems
Dryers
Electrostatic Precipitators
Elevated Cranes
Evaporators
Explosion Protection and Suppression
Fire Protection
 Filters
Heat Exchangers
HVAC – Commercial and Industrial
Material Handling
 Belt
 Screw
 Drag
 Pneumatic
 Elevators
 Storage
 Vibratory Feeders
 Conveyors
 Reclaiming

Machine Design – Process Equipment
Pelletizing
Plumbing
Power Transmission – Hydraulic/Pneumatic
Pump Systems
Pressure Vessels – ASME, B&PV, Section VIII
Product Coolers
Sampling Systems
Services and Applications
Screening
Scrubbers
Size Classification
Tank Installations – API
Truck and Rail Loading and Unloading Systems
Underground Storage
Washing and Dewatering Systems



PIPING ENGINEERING

DESIGNING SAFE AND COST EFFECTIVE PIPING SYSTEMS

Our full spectrum of services ranges from plant expansions to equipment installations, pressure piping and pressure vessel analysis, code evaluations, and cost estimating. Because of our flexibility, we devote the same level of attention to client concerns for projects all sizes. Our flexibility allows us to assimilate into your organization with a minimal learning curve to maximize your project team's resources. Let us help you reach your goals with any size industrial project.

SERVICES AND DELIVERABLES

3D MODEL AND DRAWING PREPARATION

Piping & Instrumentation Diagrams (P&ID)
Orthographic & Isometric Design/Layout
Hanger, Anchor & Support Design/Layout
Isometric & Spool Drawings
3D Laser Scanning and Documentation

SPECIFICATION PREPARATION

Components and Materials
International EN Piping Specification
Development

STUDIES

Codes – AMSE & API
Capacity | Remaining Life

INSPECTIONS

Infrared Leak Detection
Ultrasonic Thickness Testing

ANALYSIS

Fluid Statics/Dynamics
Heat Transfer
Piping-Stress/Flexibility



APPLICATION EXPERIENCES

Buried Underground Piping
Cathodic Protection
Double Containment Systems
Expansion Joints/Loops
Heat Tracing
High Energy Piping
Network Systems
Plant Retrofits
Premanufactured Piping Systems
Power Piping Systems
Process Piping Systems
Refrigeration Piping Systems
Road & Bridge Crossings
Tie-ins
Utility Piping
Steam & Condensate Distribution Systems

ELECTRICAL ENGINEERING

POWER DISTRIBUTION FOR ALL YOUR NEEDS

Our electrical engineers support projects from feasibility studies through design and procurement. We support any need you may have during construction and start-up/testing/troubleshooting. Using state-of-the-art technology software applications and informational resources, we provide efficient, cost effective service to respond to your needs.

SERVICES AND DELIVERABLES

DRAWING PREPARATION

- Feeder Riser Diagrams
- Grounding Plans
- Instrumentation Loop Diagrams
- Motor Connection Diagrams
- Motor with Control Schematic/Logic Diagrams
- System Layouts
- Switchboard & Motor Control Center Designs

SPECIFICATION PREPARATION

- Equipment Components & Materials
- Instrumentation & Equipment Data Sheets

STUDIES

- Arc Flash
- Area Classification
- Electrical Distribution
- Load Flow
- Utility Power Coordination

INSPECTIONS

- Commissioning
- IR Scanning
- Loop Checks



ANALYSIS

- Device Coordination
- Field Survey & Analysis
- Load Calculations
- Lighting Calculations
- Voltage Drop

APPLICATION EXPERIENCES

- Cable Tray & Rack Systems
- Cogeneration Equipment
- Communication Networks
- Emergency Generation & UPS Systems
- Energy Conservation
- Electric Heating Systems
- Fire Alarm Systems
- Grounding & Bonding
- Ground Fault & Short Circuit Design
- Heat Tracing
- Lighting Controls
- Lightning Protection
- Power Monitoring & Controls
- Power Factor Correction
- Security Systems
- Sound & Paging
- Transient Voltage Suppression
- Industrial/Commercial/Site/Roadway Lighting

ENVIRONMENTAL ENGINEERING

MANAGEMENT, COMPLIANCE, AND AUDITING

SERVICES AND DELIVERABLES

ISO 14001 ENVIRONMENTAL MANAGEMENT SYSTEM

Initial Review of Existing Management Program

Gap Analysis

Pre-Registration System Design and Implementation

- Adapting Permit and Regulatory Requirements to ISO 14001

- Review of Affected Sources and Processes

- Identification of Documentation Requirements

- Implementation of Documentation Control

- Support in Writing Procedures

- Training

Pre-Registration Third Party Audit Support

Registration Audit Support

AIR PERMITTING

Title V, New Source Review (NSR) permit renewals

- Bact Analysis for Major Permit Modifications

- Air Modeling

- Crudes, Intermediates, Asphalt, Gasoline, Fuels, Asphalt, and Chemical Product Terminals And Operations

- Natural Gas and Coal-Fired Power Electrical Generation Plants

- Oil and Gas Field Permitting

Emissions Inventories

Annual Compliance Certification Preparation

- Implementation of Compliance for Subpart BBBBBB NESHAP for Gasoline Distribution Bulk Terminals





WATER

NPDES Permitting

Spill Prevention, Control, and Countermeasures (SPCC) Plans and Training

Storm Water Pollution Prevention Plans (SWPPP) and Training

CHEMICAL USE AND RCRA MANAGEMENT

Records gathering and Electronic Submittal for the Toxic Release Inventory

Hazardous Waste Management

- Waste Classification Review

- Review of Regulatory Compliance with RCRA

- Design of Tracking Systems for Handling of Containers in Satellite Accumulation Areas

- Labeling and Manifesting

- Manifest Tracking

- Monthly Waste Count

- Annual or Biennial Hazardous Waste Reporting

- SARA Tier II Record Keeping and Electronic Report Submittal

CHEMICAL ENGINEERING

DESIGN FOR THE PRODUCTION, TRANSFORMATION, TRANSPORTATION, AND PROPER USE OF CHEMICALS, MATERIALS, AND ENERGY

Our Chemical Engineering Group provides process engineering capabilities over a wide range of industries – gas plants, oil refineries, chemical and manufacturing plants, water and wastewater treatment, pollution control, steam and power generation, sugar processing, food industries, and more.

We work with our clients in all phases of project development and provide a full range of engineering services, including: Conceptual engineering, Basic engineering and design, Detailed engineering and design, Procurement, Fabrication, Commissioning and start-up.

We help clients on equipment sizing and specifications, safety concerns, evaluation of alternatives, infrastructure requirements, and modifications of existing facilities to develop engineering solutions that are clear, concise, and appropriate.

SERVICES AND DELIVERABLES

PROCESS MODELS

Mass, Heat, Energy Balance
Process Design Criteria Development
Process Functional Description

PREP, DESIGN, AND MANAGEMENT

Process Design and Flow Diagram Preparation
Piping and Instrumentation Diagram Preparation
Process Equipment Specification Preparation
Process Safety Management

STUDIES

Process Modifications
Expansions
Efficiency Improvements
Financial Returns/Models

TROUBLE SHOOTING

Unit Operation and Plant Troubleshooting
Operational Analysis and Recommendations
Start-up Assistance



APPLICATION EXPERIENCE

Autoclaves
Boiler
Centrifuges
Chillers
Classifiers
Clarification
Condensate Systems
Cooling Water System
Crystallization
Chromatography
Decolorization
Diffusion
Distillation
Dryers
Fermentation
Filtration
Fire Water and Protection System
Flare System
Ion Exchange
Instrument Air System
Scrubbers
Steam Distribution
Vacuum System
Water Treatment
Wastewater Treatment

STRUCTURAL/ARCHITECTURAL ENGINEERING & DESIGN

SPECIALIZING IN THE ANALYSIS AND DESIGN OF FOUNDATIONS AND STRUCTURES

Physical laws and empirical data allow us to understand, predict, and calculate the stability, strength, and rigidity of structures as well as to design, construct, and maintain the built environment.

Using the latest in engineering software, our structural team members can analyze existing as well as design new structures, foundations, and plant facilities/infrastructure. For projects needing architectural work, our staff includes professional architects certified in numerous jurisdictions. Whether it is a plant expansion or a greenfield site, our multidisciplinary team can handle your project from start to finish.

Our structural team takes pride in striving to understand each client's individual goals and objectives as well as the needs of the project. We work with you to provide options to find a solution that works best for you. We have the tools, the experience, and the knowledge to provide safe, efficient, cost effective, buildable structures that perform as intended.

SERVICES AND DELIVERABLES

DRAWING PREPARATION

- Architectural Plans Elevations
- Construction Detailing
- Site Layout/Topography
- Structural Plans/Sections

SPECIFICATION PREPARATION

- Architectural
- Structural

STUDIES

- Code
- Feasibility/Cost
- Forensic
- Structural

ANALYSIS/DESIGN

- Dynamic/Vibration
- Steel, Concrete (Cast-In-Place and Precast),
Masonry, Wood, Aluminum Materials
- Structural Components (Roofs, Walls, Floors, etc.)
- Steel Connections





EXPERIENCE

Access Platforms and Mezzanines/Stairs/Ladders

Building and Architectural Design (new and remodel)

Catwalks, Platforms, Ladders

Concrete Pump Pads

Construction Detailing

Containment and Dike Design

Earth Retention

Equipment and Machinery Foundations

Equipment and Machinery Structural Steel
Support and Access

Failure/Stress Analysis

Foundation Design

Lifting Beams

Liquid Containment Structures

Monorails/Hoist Beams and Supports
for Bridge Cranes

Retaining Walls

Piling, Caissons, and Deep Foundation Systems

Piping Racks and Trestles/ Bridges

Pedestrian Facilities/ Urban Design

Pre-Engineered Buildings

Runoff and Drainage Management

Site Road Design

Site Improvements

Storage Tanks, Bins and Hoppers

Storm Sewer Design

Steel Stacks

Subsurface Utilities

Support Structures for Piping and/or Equipment

Tank and Vessel Support Structures and Foundations

Topographical Surveys

Water-Containing Concrete Structure

PROJECT MANAGEMENT

SINGLE-POINT OF CONTACT TO INCREASE YOUR OPTIONS FROM PLANNING THROUGH START-UP

Factors such as plant shutdown dates, equipment delivery, regulatory deadlines, and construction scheduling all affect your budget and completion dates. EAPC will assist you in selecting the most appropriate project delivery method based on our experience with design-bid-build with professional construction management and procurement support or single point design-build services. With this array of options, our clients select the project delivery approach that will result in the most successful project experience through all phases of engineering, procurement, and construction.

SERVICES

ENGINEERING

- Constructability, Operability, Maintainability Analysis
- Economic Analysis
- Value Engineering
- Cost Estimating and Budget Development
- Budget Control and Reporting
- Execution Planning, Resource Management and Project Scheduling
- Contract and Bid/Construction Document Development
- Contractor Prequalification



PROCUREMENT

- Procurement Plan Development, Management and Reporting
- Supplier Prequalification
- Bid Specification Development
- Contract Terms and Conditions Development
- Request For Quotation Development and Issuance
- Bid Process Management
- Bid Receiving and Analysis
- Purchase Award Recommendation
- Spare Parts Definition
- Monitoring Supplier Engineering, Shop Drawing Development, Fabrication and Shipping
- Inspection Support to Verify Contract Compliance and Quality Requirements
- Expediting Plan Development, Monitoring and Reporting
- Receiving Coordination

CONSTRUCTION

- Pre-Construction Planning
- Safety Coordination
- Site Facilities Planning
- Contracting Strategy Development
- Cost Management, Monitoring and Reporting
- Construction Schedule Development, Management and Reporting
- Construction Sequence and Logistics Development
- Field Contract Administration and Document Control
- Contractor Coordination Meetings
- On Site Technical Support
- Startup and Commissioning, Operating Procedure Development and Staff Augmentation

3D AERIAL & GROUND-BASED LASER SCANNING

ACCURATE AND PRECISE SITE DOCUMENTATION

We use scanning primarily to increase the accuracy and reduce manpower required to create as-built conditions for retrofits to facilities. A scan can be converted to a working 3D model which designers can use as a starting point for modifications to the facility.

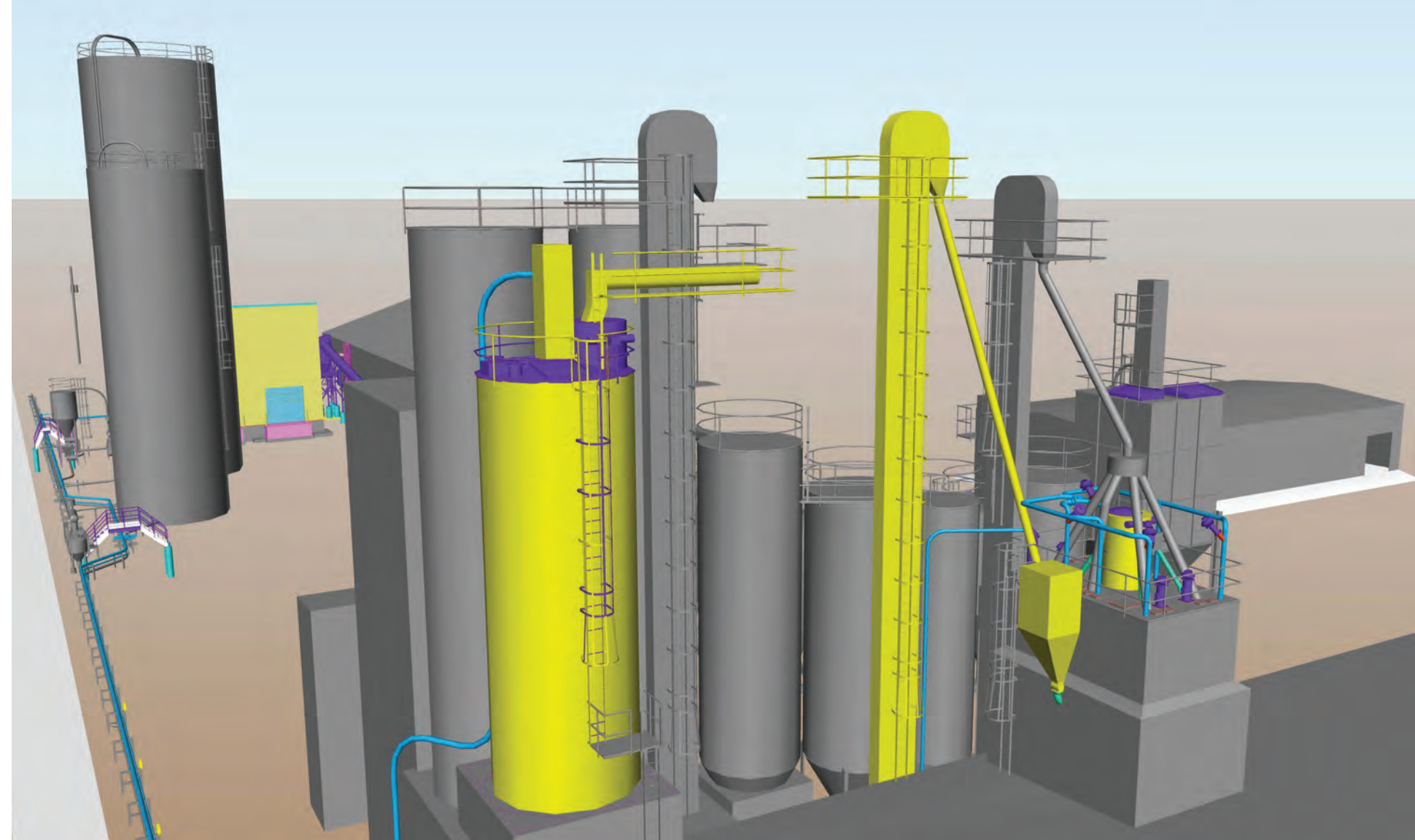
EAPC has also partnered with SkySkopes to offer our clients 3D Aerial Scanning services. SkySkopes utilizes a state-of-the-art LiDAR system, providing customers with cm-level accuracy for their surveying needs. Integrated with the LiDAR unit is a 24 MP camera, allowing simultaneous capture of still imagery for easy asset identification.

3D GROUND-BASED LASER SCANNING

EAPC's ground-based scanner is a LiDAR system that quickly and very accurately creates a 3D model of its surroundings. On the job site, we are capable of running multiple scans and using software in our office to join the scans together and create one large 3D model, referred to as a point cloud. We then use the point cloud as a template in AutoCAD to draw solid objects to design around.

Scanning allows us to achieve greater accuracy in our field measurements because it removes the human error inherent in pulling a tape measure. This allows us to more accurately design a project and keeps change orders to a minimum.

It is also much faster than using traditional measuring methods, which saves us and our clients time and money.





PROFESSIONAL DRONE SERVICES

Through a partnership with SkySkopes, we are able to offer our clients 3D aerial scanning services. SkySkopes utilizes a state-of-the-art LiDAR system, providing customers with cm-level accuracy for their surveying needs. Integrated with the LiDAR unit is a 24 MP camera, allowing simultaneous capture of still imagery for easy asset identification.

LiDAR SERVICES

Mapping/Surveying

3D Modeling

Right of Way/Encroachment Surveys

Terrain Models

OPTICAL GAS IMAGING INSPECTIONS

Detect fugitive gas leaks

Dual HD video and OGI for comprehensive inspections

Collect radiometric temperature data in 640×512 resolution

Superior detection of 20 different HydroCarbon gases

THERMAL INSPECTIONS

Capture Detailed Temperature Data

Dual HD and Thermal Images for Comprehensive Inspections

Collect Radiometric Temperature Data in 640×512 Resolution

Cover an Entire Building in a Fraction of time Compared to Handheld



PROGRAM OFFERINGS

LNG CONVERSION

Liquefied Natural Gas Conversion Systems for Plant Startup and Shutdown and Natural Gas Curtailment at CT Stations

HEP INSPECTION

High Energy Piping Inspection Program for Power Generation and Process Industries

LOW LOAD OPERATION OPTIMIZATION

Assisting power generation plants in achieving the lowest load possible, to reduce revenue losses during periods of low power demand and pricing.

LLOO also includes Ramp Rate Improvement, Short-term Shutdown and Startup Program Development, Auxiliary Power/Station Service Reduction, SOP Development/Revision.



PROFESSIONAL ENGINEERING SUPPORT

WHERE AND WHEN YOU NEED IT

The power generation industry is experiencing a massive turnover in staff due to attrition and with this turnover, many plants are losing decades of experience. In addition, many are downsizing their staff. With limited resources and time, project support and training can become very challenging.

ON-SITE ENGINEERING AND SUPPORT SERVICES

EAPC provides on-site engineering and support services to power generation clients. Our team can provide engineers to supplement existing staff for capital projects, plant outages, and project backlog. Our staff will be an extension of your team and provide the services you require. We provide the necessary flexibility to meet your schedule and can provide a combination of on-site and off-site services.

SERVICES

- Engineering Staff Support
- Capital Projects
- Outage Management/Support
- End of Year Project Closeout
- Planning and Scheduling
- P&ID Red-Lining and Drawing Updates

TRAINING SERVICES

EAPC's Industrial Services staff comes from a diverse background with many of our team members having several years of direct power generation industry experience. Our knowledge and experience allow us to provide training to plant engineering, operations, and management teams. Although we specialize in some areas of training, we can develop a customized training program based on your specific requirements.

EAPC's on-site training program offers an affordable, time effective method of providing hands-on training to power generation professionals.

TRAINING PROGRAMS

- Combustion Optimization
- NFPA
- Project Management
- Standard Operations Procedure "SOP" Development
- Standard Maintenance Procedure "SMP" Development
- Business Excellence "LEAN"





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