EAD Catalog of Services: Engineering
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General Information

EAD was founded in early 2001 as an engineering firm. Over the years, we have recognized and responded to our clients’ needs by diversifying our services into automation and project management. Our steady growth is attributed to our dedication to find solutions that deliver value to our clients. Our projects are recognized for their quality, timeliness and commitment to success.

Headquartered in Omaha, Nebraska, EAD has satellite offices around the U.S. Our professionals are sought-after solution providers who have recent, international project experience in South America, Italy, Brazil, and even Antarctica.

Because we have worked with dozens of clients on hundreds of systems during the past 15 years, EAD has the experience to manage projects of all sizes and complexities to successful completion. From document control to working with construction trades, our experienced professional staff will ensure that your project is properly handled and is delivered on time and in budget.

EAD Mission Statement

EAD is an experienced and proven provider of Program and Project Management. We Design, Engineer, Automate and Construct innovative and sustainable solutions in an environmentally sound and safe manner. We create World-Class Experiences for our Clients.

EAD Core Values

At EAD, A Trooper...

...will never quit. | ...is open to change. | ...is willing to step-up.

...has a desire to win. | ...is someone you can trust. | ...motivates you to be better.

...keeps their composure under fire. | ...is loyal to the company, the people and the cause.
WHO WE ARE

EAD Footprint with Satellite Office Locations

OUR LOCATIONS:
EAD Main: 3835 S. 149th Street
Omaha, NE 68144
EAD West: 15555 Industrial Road
Omaha, NE 68144

SATELLITE LOCATIONS:
1570 Washington Street
Blair, NE 68008
17540 Monroe Wapello Road
Eddyville, IA 52553
1401 Harris Avenue
Trenton, MO 64683
554 S. Yosemite Avenue
Oakdale, CA 95361
2168 Frisco Avenue
Memphis, TN 38114

EAD Clients

Kellogg's
ConAgra Foods
IAIA USA
BD
Sargento
Barilla
BUNGE
Cargill
NovoZymes
MnSP
FedEx
MERCK
Sensory Effects
Zoetis
Kraft
Metropolitan Utilities District
Nestlé PURINA
Green Plains
Darling International
Bakery Concepts

EAD Catalog of Services
WHO WE ARE

EAD Safety Policy:
It is the policy of EAD to ensure that all aspects of our operation are executed in the safest manner possible. EAD holds the health and safety of our employees and those exposed to our operations as a core value. We believe that all accidents are preventable and we will continually work towards establishing and maintaining an accident free and healthful workplace.

We are committed to excellence in implementing safety, health, and environmental standards that not only meet, but also exceed those set forth in Federal, State and Local regulations. By doing so, we ultimately protect our employees, clients, contractors, and communities.

We believe that accident prevention is a constant shared responsibility. EAD Management will provide the resources and leadership required for creating a work environment free of recognized hazards. EAD Management will also supply the equipment and training necessary to give employees the knowledge and tools they need to do their jobs in a safe and efficient manner. All employees are responsible for following safe work practices as outlined by EAD and the standards set forth in regulation. In addition, employees are expected to report hazardous conditions or unsafe acts to EAD Management immediately upon being identified.

By staying true to our values, and maintaining a strong personal commitment to each other and our clients, we can achieve our goal of an accident free workplace.

EAD Awarded One of Nebraska’s Safest Companies:
Our absolute commitment to a safe work environment and to projects that diligently follow safe protocols is central to EAD’s brand promise regarding project delivery. We have developed comprehensive and in-depth safety policies, systems and programs designed to engage the entire workforce in the delivery of safe work on all our projects. These efforts were recognized May 25, 2016 when EAD was named again as one of Nebraska’s safest companies by the National Safety Council at this year’s Safety Summit.

Total Frequency Injury Rate (TFIR):
Our TFIR for the last three years is as follows:

It is a metric calculated off of total man-hours worked by employees over the course of a year. A "1" would mean that was one injury for every 100 full time employees for the year.

2015 - 0.0
2014 - 0.0
2013 - 0.87
OUR CAPABILITIES

Program & Project Management

EAD employs the methods of the Project Management Institute (PMI), the worldwide standard for project management, as the foundation for execution of all projects. Areas of focus include:

- Scope Development & Management
- Schedule Development & Tracking
- Cost Management & Reporting
- Quality Assurance/Quality Control
- Human Resource Management
- Document Management
- Communications
- Risk Management
- Procurement
- Stakeholder Management
- Integration

A plan is created for each of these areas, and then the individual plans are combined to create the Project Execution Plan for the program or project. At EAD, we have developed over 300 standard procedures to help ensure we execute each and every project wisely. Following are examples of services we have provided for our clients:

- Project Risk Management
- Project Due Diligence
- Change Order Resolution
- Constructability Reviews
- Program Management (Owner's Rep)
- Dispute Avoidance / Resolution
- Project Management (Owner's Rep)
- PM Training

Our employees have experience sitting on both sides of the table. Whether you need someone to manage a simple project or an entire program, we have the resources that can support your needs.
EAD’s engineering and design team is capable of providing complete engineering services for your projects. We employ the latest technology to assist our engineers in preparing quality design packages that meet our Client’s needs. EAD maintains in-house expertise in the following disciplines:

- Civil Engineering
- Structural Engineering
- Process Engineering
- Mechanical Engineering
- Electrical Engineering
- Environmental Engineering
- Industrial Engineering

Our engineers get the added benefit of field experience so they fully understand the needs of the craftsmen in the field. This helps us convey the design-intent. Following are examples of the services we have provided to our clients:

- Facility Planning
- Front End Loading (FEL) Engineering
- Process Engineering
  - Asset Utilization & Optimization
  - Debottlenecking
  - Plant Expansions
  - Process Analysis / Process Studies
  - Process Design & Development
  - Feasibility Studies
  - Process Modeling
  - Recipe Management
  - Waste Reduction
  - Material & Energy Balance
  - Process Narriative
- Civil Engineering
  - Site Planning
  - Site Design
  - Wetlands Delineation / Mitigation
  - Stormwater Mitigation
  - SWPP Inspections
  - Paving & Geometrics
  - Underground Utilities
  - NPDES Permitting
- Electrical Engineering
  - Asset Evaluation
  - Power Monitoring
  - Power System Analysis
  - Short Circuit Analysis
  - Arc Flash Analysis
  - Load Side Coordination Studies
  - Capacity & Utilization Surveys
  - Power Factor Analysis & Correction
  - Power Distribution Design
  - Grounding & Lightning Protection Design
  - Lighting Design
  - Equipment Specifications
- Structural Engineering
  - Footing & Foundation Design
  - Structural Steel Design
  - Vibration Analysis
  - Seismic & Wind Analysis
  - Forensic Analysis
  - Critical Lift Plan Development & Review
  - Structural Detailing
- Mechanical Engineering
  - Equipment Layouts / General Arrangements
  - Plumbing Design & Drawings
  - HVAC Design & Drawings
  - Process Sheetmetal Design
  - Equipment Specifications
  - Piping Design & Drawings
  - Equipment Setting Plans, Elevations & Details
  - Tank & Pressure Vessel Design
  - Energy Studies & Audits
  - 3D Modeling / BIM
- Industrial Engineering
  - Time Studies
  - Process Modeling
  - Waste Reduction
  - Debottlenecking
  - Asset Utilization & Optimization
  - Manufacturing Studies
- Environmental
  - Air Permitting
  - Air Modeling
Our capabilities:

- PLC, DCS and BMS
- Calibration Procedure Editing/Development
- Instrument Specification
- Process Documentation CFR21 Part 11
- IQ/OQ and PQ Implementation
- Validation Protocol Development
- cGMP Audits
- System Obsolescence Migration
- Open Architecture Development
- Computer Validation

Our automation engineers have experience across a broad array of platforms. As an open shop, we are not locked into a single platform and can offer our clients the best solution that fits their long-term needs. Following are examples of services we have provided to clients:

- Industrial Specifications
- Control Panel Design
- Network Architecture Design
- Phone & Data System Design
- Motor Control Loops
- Instrument Control Loops
- Control Wiring Design
- HMI Programming
- PLC Programming
- DCS Programming
- 24 Hour Service & Support
Construction Management isn’t just about the work in the field. Proper planning and preparation can increase the efficiency of the craftsmen in the field. EAD has the expertise to help ensure your project is completed on-time and on-budget.

- Scheduling
- Estimating
- Procurement and Expediting
- Inspections and Testing
- Field Engineering
- Permits and Approvals
- Contractor Pre-Qualification
- Safety Programs and Audits
- Earned Asset Management
- Construction Supervision
- Document Management
- Temporary Facilities

Our construction managers understand the importance of communication and coordination on a project. They understand how important your production is to your business, and they work to ensure our construction schedule will minimally impact your business. Following are examples of services we have provided to clients:

- **Pre-Construction**
  - Develop Contracting Strategies
  - Constructability Reviews
  - Value Engineering Assessments
  - Temporary Protection Planning
  - Site Logistics Planning
  - Schedule Development
  - Pre-Qualifications
  - Manage Bid Process
  - Contractor Training
  - Risk Assessments
  - Permitting & AHJ Planning
  - Estimating
  - Temporary Facility Planning

- **Construction**
  - Schedule Maintenance
  - Earned Asset Management
  - Equipment, Material & Contractor Procurement
  - Plant Coordination
  - Construction Coordination
  - Construction Safety
  - Budget Tracking & Management
  - Change Order Tracking & Management
  - Expediting
  - Inspections & Testing
  - Project Controls & Communication
  - Document Management

- **Post Construction**
  - Start-Up & Commissioning
  - Validation
  - Punchlist
  - Warranty Support
  - Close Out Documentation
  - Asset Set-Ups
OUR CAPABILITIES

Safety Services

Process Safety
• Combustible Dust Explosion Protection
• OSHA Process Safety Management (PSM)
• Process Hazard Analysis (PHA)
• Management of Change Reviews (MOC)
• Material and Chemical Compatibility Reviews
• Machine Guarding Consultation and Design
• Electrical Safety Consultation and Design
• Arc Flash Study and Assessment

Site Inspection and Project Safety
• Construction Project Safety Management and Inspections
• General Industry Safety Management and Inspections

Food Safety
• Food Processing Safety Inspections and Assessments
• Industrial Hygienic Services
• HACCP/SQF Training

General Safety
• Safety Program Development
• Safety Audits & Inspections
• OSHA Mitigation & Support
• HAZCOM Program Development
• Machine Guarding Audits / Risk Assessments
• Machine Guarding Design
• Safety Observations - Construction
• Safety Observations - General Industry
OUR CAPABILITIES

Training

• OSHA (General) 10 and 30-Hour
• OSHA (Construction) 10 and 30-Hour
• Red Cross First Aid and CPR/AED
• Fall Protection
• Scaffolding
• ARC Flash
• Lock Out/Tag Out
• Confined Space Management
• Program Design and Management
• Hazcom/GHS Program Consulting and Training
• Safety Management for the Job Site and Company
• Workplace Violence Prevention
Fabrication

Our Panel Factory is equipped to design, assemble and test hazardous and non-hazardous UL-Listed control panels. We design panels to meet your needs, whether it’s for new processes, maintenance or future expansion.

- Standard Three-Year Warranty
- Rigorous QA/QC Program
- 100% Energized Testing before shipment
- UL and cUL capabilities for 508A and 698A/B
- 48 hour turn-around on all quotations
- Emergency Service and Support
- Service and Maintenance Contracts
- Junction Boxes/Marshalling Panels
- Hazardous Location Panels
- Motor Control Centers
- Remote I/O Panels
- Ready-To-Ship Panels
- Operator Stations
- HMI Stations
- PLC Panels
- Private Labeling
- OEM Builds
- AC/DC Drive Panels

In conjunction with our Engineering, Automation and Panel Fabrication capabilities, we have partnered with a local fabricator to be able to Custom Fabricate Equipment Skids that meet sanitary design standards.

- Full 3-D modeling of the skids and equipment
- Total turn-key solutions
- Complete sanitary design, testing and validation
- Stand-alone or fully integrated into existing processes
OUR CAPABILITIES

Project Delivery Methods

Because of the diversity and experience of our team, EAD is able to execute construction projects under a variety of different approaches.

- **Professional Services (A-La-Carte)**
  - Program and Project Management
  - Engineering
  - Construction Management
  - Automation
  - Safety Services
  - Training
- **Design-Bid-Build**
- **Design-Build**
- **Construction Manager at Risk**
CARGILL CORN MILLING, INC.
Breaker Retrofit

Client: Cargill Corn Milling
Location: Blair, NE
Market(s) Served: Renewable fuels, agriculture

PROFILE

EAD was trusted with the unique assignment of replacing a 4,000-amp fused disconnect with a circuit breaker to significantly reduce an electrical hazard. The remotely controlled circuit breaker was custom designed and fabricated by EAD to ensure fit into the location of the existing fused disconnect. Execution was complicated by the necessity for precise measurements. Installation of the circuit breaker was coordinated with the plant and managed by EAD.

In addition to providing greater personnel safety due to remote operation, the breaker reduced the reaction time to clear an electrical fault by more than 13 times as compared to the existing disconnect. The incident energy level in the event of an arc flash was reduced by more than 45 times. Better coordination and quicker response to faults would reduce damage to downstream equipment in instances of major electrical fault.

SERVICES

• Engineering
• Project Management
The City of Ames, IA contracted EAD to provide professional engineering and construction management services for a power plant switching station. Design included integrating a 161kV switching station into the 161kV and 69 kV transmission loops, a 100 MVA 161/69kV autotransformer and relocation of several existing 69 kV transmission lines.

EAD was responsible for all portions of the project from conception to final checkout. EAD was also able to tackle the challenging terrain features, which included an irregularly shaped, sloped parcel of land on which the station was constructed.
A large food manufacturer produces approximately 175,000 cases of product per day. EAD was asked to provide a solution to the high number of "No Read" conditions caused by the barcode scanning systems that resulted in cases not automatically being sorted into unit load, but instead were being sent to the hand-sorting and stacking area. The read rate efficiency was approximately 92 percent of the total cases produced. The remaining 8 percent (approximately 14,000 cases per day) had to be hand-sorted, stacked and wrapped.

EAD worked with Sick Optics, USA and installed 16 new barcode scanners throughout the sortation system. These barcode scanners were initially integrated into the control system using ASCII technology. This effort improved the read rate to 96 percent. Then EAD worked with the case manufacturer to install similar bar code systems on their manufacturing lines. This was done to ensure the food manufacturer was receiving cases that had high quality printing. This effort improved the read rates to over 98 percent, reducing the number of hand-sorted cases from 14,000 per day to approximately 1,100. This improvement in efficiency and throughput allowed this company to re-assign two employees per shift to other duties.
GREEN PLAINS RENEWABLE ENERGY
Corn Unload Dust Collection

Client: Green Plains Renewable Energy
Location: Wood River, NE
Market(s) Served: Ethanol, processing, renewable fuels

PROFILE

Leading ethanol producer Green Plains gave EAD the opportunity to assist them with an expansion and redesign of the dust collection of their grain-handling facility. The client recognized that grain dust was collecting in underground tunnels and truck unload bays in unsafe quantities. EAD substantially reduced the dust explosion hazard by designing new dust collection ducting and specifying air handling equipment to safely remove dust from equipment, truck bays and confined spaces.

The multidisciplinary design team included mechanical engineers and designers to specify and layout equipment, electrical engineers to develop electrical power distribution, process engineers to ensure combustible dust safety and structural engineers to design support structure for new equipment and bridging over plant roads.

SERVICES

- Project Management
- Engineering
MAHLE Engine Components USA in Atlantic, IA is a leading manufacturer of engine bearings and bushings. MAHLE recognizes the importance of data acquisition and scalable HMI systems. However, because of the high number of stand-alone processes and the segmented nature of their plant operations, they discovered numerous challenges in implementing a SCADA/HMI package that could become the plant standard. One of the largest challenges was communication with legacy Omron PLCs in their wastewater treatment facility.

EAD Control Systems was hired to put all the pieces of the puzzle together. EAD designed and installed a redundant WinCC server application. This involved configuring both servers, designing and implementing the WinCC application and configuring an OPC server used to communicate with the Omron PLCs via a serial to Ethernet gateway. Additionally the Web Navigator functionality was enabled and a web server was configured to allow access across the plant network. Working closely with MAHLE staff, EAD was able to install, test and commission the system in only a few days and without taking the wastewater process offline.
The EAD family of companies teamed up to provide a turnkey solution to a food safety and industrial hygiene problem faced by Mars Petcare. Plant operators faced issues with dust control at mixing stations where dry fine powder ingredients are manually added to the product. It also created a housekeeping issue requiring frequent attention by plant personnel.

A sanitary system of ventilation ducts was engineered to collect the fine dust and safely remove it from the system. Process control programming was developed to facilitate ease of use and provide an automated water flush of the ductwork to prevent cross-contamination between different product batches. Installation of the system was overseen by an EAD construction management team.
Merck Animal Health in Worthington, MN is a leading animal health company, dedicated to the research and development, production and marketing of innovative pharmaceutical products and vaccines for animals.

Merck had two freeze dryers and two autoclaves that were in need of modernizing the SCADA systems and integrating the new system into the plants network for collecting critical data and providing remote access for monitoring without being in the clean rooms. The existing SCADA was out of date and didn’t allow for plant integration.

EAD was retained to convert the existing SCADA application to a modern SCADA platform. Along with the conversion, EAD was tasked with providing additional functionality for historical data collection, remote access and modified recipe management. The project also included the engineering and procurement of new hardware to replace outdated operator interfaces in the clean rooms. This new hardware allowed the plant to integrate the all of the control systems into the plant network architecture.

Working closely with Merck staff, EAD was able to install, test and validate each autoclave and freeze dryer one at a time without affecting the operations of the other autoclaves and freeze dryers.
Proliant Meat Ingredients, a manufacturer of broths, flavorings and functional proteins was faced with the challenge of substantially expanding an operating facility without impacting production. The EAD family of companies was contracted to provide a turnkey solution. The scope included a building addition, site pavement reconstruction, new production lines of equipment, sanitary piping systems, process automation, clean-in-place systems, electrical power distribution and tie-in to existing utilities.

Our team worked closely with the client to understand not only how they make their product, but also to understand the commercial and operational challenges they faced on a daily basis. The completed project resulted in a facility that exceeded the requirements of Proliant's food safety plan while more than doubling the production rate of the existing process.
RC Hydraulics is an equipment design and manufacturing firm. The company came to EAD Controls to design the controls for a new system used to construct grain bins. EAD was tasked with designing a wireless system that could monitor and lift multiple hydraulic jacks under different loads all at the same time. There are anywhere from 4 to 36 jacks that could be used depending on the grain bin size. RC Hydraulics had the idea to create a new way of constructing bins but wanted a partner to help them design and test this concept.

EAD Controls designed, built and installed the Siemens wireless control system and technology for each jack. The jacks are now capable of coordinating constant height evenly plus or minus 1/8 of an inch and maintains equal weight on each jack regardless of wind or uneven concrete pads. They were programmed and tested in our U-listed panel shop. EAD worked closely with RC Hydraulics Industries to develop and deliver a system that would be reliable, user friendly and safe. Together we have been able to reduce the amount of time and equipment required when constructing a grain bin. This system revolutionizes the way grain bins are constructed and has several other applications within the construction industry.
TSI designs and builds equipment for today’s highly automated plants in the engineered wood and biomass industries. TSI offers solutions for dryer islands (heat energy, drying and emission control) and finishing lines.

EAD Controls was retained to design a control system for a dryer island that is comprised of two independent combustion chambers, two (2) secondary combustion chambers, two single-pass dryer systems and a radiant heat thermal oil heater system. The project required the control system for the dryer island to easily integrate into the plant’s overall network architecture with similar programming for the PLC and SCADA to ensure plant consistency for operations and maintenance.

Working closely with the client and end user, EAD designed a control system that provided state-of-the-art user interfaces, historical data collection capabilities, robust safety monitoring systems and high-quality control panel designs to ensure the longest life cycle possible. Due to EAD’s commitment to our client’s success, EAD applied the appropriate resources and project execution techniques to ensure the client was able to provide a complete, high-quality control system design to the end user.
Abengoa is a publicly traded company that applies innovative technology solutions for sustainability in the energy and environment sectors, generating electricity from renewable resources, converting biomass into biofuels and producing drinking water from sea water.

Abengoa retained EAD for the conceptual and schematic design of the front-end material handling system for the Hugoton, Kansas facility. This plant was designed to produce 25MMGPY of bioethanol from cornstover and switchgrass (second-generation bioethanol). As part of the design, EAD managed the design and testing of first-generation material handling equipment, fire and explosion protection and pneumatic conveying.

This facility was Abengoa’s first second-generation facility and seventh first-generation bioethanol facility in the U.S., bringing the company’s total biofuel production in the country to more than 400 million gallons.
EAD Control Systems Inc. of Omaha created a command-and-control system for the drill that is essentially a large Ethernet ring that is connected to sensors that monitor the whole system and allow the drillers to control it from laptop computers. EAD’s Adam Melby deployed to Antarctica to see the drill through its crucial testing phase on the ice shelf near McMurdo.

EAD was recommended by another consulting firm to be part of the research team associated with the WISSARD project. During this project, there was a specially designed hot-water drill to cleanly bore through a half mile of ice, a National Science Foundation (NSF)-funded team of researchers has become the first ever to reach and sample the “grounding zone”, where Antarctic ice, land and sea all converge. Data gathered from samples of sediment taken in the grounding zone will provide clues about the mechanics of ice sheets and their potential effects on sea-level rise.

EAD’s part in this project included design and build of the control system for the hot water drill. All instrumentation was specified and mounted in shipping containers to be sent directly to the drill site in Antarctica. EAD staff completed the command and control installation on the ice as part of the acceptance testing and commissioning of the WISSARD hot water drilling system.
AltEn retained EAD to provide engineering services related to the installation of a 5.3 MW gas turbine and heat recovery steam generator (HRSG). This installation includes a new building to house the HRSG, 4160V switchgear, 480 V MCC, and turbine accessories. The system also includes a 1000 Hp, 4160 gas compressor. A new building with 13.8 kV switchgear including protective relays was also included to interface with the local utility and meet the local utility’s distributed generation system interconnection requirements.

The completed combined heat and power (CHP) system will take advantage of the biogas produced by the anaerobic digesters to generate enough electrical power to meet the ethanol facility demands. The HRSG will produce 24,000 lbs. per hour of steam at 150 psig to augment the plant’s process boilers.
Aventine Renewable Energy, Inc. is a leading producer and marketer of ethanol and related by-products. Through their own production facilities, they market and distribute ethanol to many of the leading energy companies in the U.S.

EAD served as the Construction Manager for this project. Aventine required a large scale conveyor system design for ethanol input and outputs for plants under construction in Aurora, Nebraska and Mt. Vernon, Indiana.

EAD's engineering and construction teams designed and managed the installation of a 1,600 foot long corn conveyor system. This system delivered 20,000 bushels of corn per hour from a nearby co-op to their facility under construction in Aurora.

For both the Aurora and Mt. Vernon plants, EAD also designed the conveyor system to transfer wet distiller grains from process centrifuges to a storage and load-out location.
EAD was contracted to construct a new Visitor Center for the Blair Bio-Refinery Campus operated by Cargill Inc. The Visitor Center is used by Cargill’s security contractor to process visitors to the facility and provide training classes for contractors working on site. The building also includes a garage to house the emergency response vehicles for the campus.

The building itself is a 3,800 square food pre-engineered metal building with a standing seam roof and brick wainscot. The hip roof design sets it apart from the average metal building. Construction began in the spring of 2011, but was interrupted by the threat of flooding from the nearby Missouri River. Construction resumed when the threat abated, and the project was completed in November 2011.
EAD acted as owner’s representative during project execution. We were responsible for FEL 3 Electrical and Instrumentation (E&I) construction cost estimate and bid package development. We also conducted pre-bid meetings, evaluated proposals, selected contractors, conducted pre-mobilization meetings, and coordinated shutdowns. We managed the development of process narratives compliant with ISA 88 standards.

EAD also developed and maintained metrics that tracked applications engineering progress from document development and user acceptance testing through implementation. Project was executed with zero recordable injuries, within budget and on schedule.
EAD was contracted to take an existing fully operational plant and replace the inadequate control system with a new one. The switchover was to be done with minimal impact to normal operations and production while the existing control system consisted of 8000 I/O points and was being changed almost daily from a programming standpoint.

EAD applied a project management team that worked closely with the Client to manage project funding, logistics, scheduling, budget and manpower. The team developed time saving techniques of gleaning current process information and applying it to the programming of the new system. This time saving measure cut the estimated programming duration from two years to 13 months. The team also implemented enhanced documentation review procedures to ensure there was no loss of functionality or safeties. This documentation then served additional duty as training and living process narratives for future use.

In addition to the project processes, EAD managed the physical switchovers during downtimes and worked with the client to keep both systems fully functional until the end of the project.
CARGILL LSR

Client: Cargill
Location: Omaha, NE
Market(s) Served: Industrial

SERVICES

- Project Management
- Construction Management

PROFILE

The challenge EAD faced was to supplement Client’s construction management team with electrical and instrumentation management on an aggressive schedule while implementing new automation techniques. EAD was tasked to manage multiple electrical and instrumentation subcontractors as well as, QA/QC inspection, budgets, change orders, schedule, checkout & commissioning, and safety.

Electrical and instrumental contractors were new to the Client and their processes; therefore, EAD had to ensure that all Client specifications for installation were met while overcoming challenges of an unfamiliar work environment. EAD ensured that all contractors performed to the high expectations of the Client.

Shared utilities and a raw product stream with an existing facility added further challenges to the project as planning and utilization of downtimes to make utility connections were crucial.

EAD’s solution was to ensure installation was in compliance with the Client’s global standards, specifications and requirements. During the final phase of construction EAD coordinated a temporary power solution that allowed the facility to run particular product lines, which allowed the Client to go into partial production.
E3 Biofuels
Controls Integration & Start-Up

**Client:** E3 Biofuels  
Location: Mead, Nebraska  
Market(s) Served: Agriculture, processing, renewable fuels

**PROFILE**

E3 Biofuels was the first commercial plant to make ethanol with virtually no fossil fuels for heat; instead using manure to make bio-gas.

E3 Biofuels, a 22 MGY ethanol plant located in Mead, NE, asked EAD to identify design and installation issues with the facility so that bugs could be corrected prior to start-up. There were 800 I/O points throughout the plant that needed to be commissioned. There were control systems for the digesters, grain handling, ammonia purification, the ethanol plant proper and utilities that were not integrated.

EAD developed the entire automated controls installation punch list and managed the correction of each issue. We identified, designed and installed control systems that were left out of the original scope of work. The team worked extensively on the I/O checkout, instrumentation set-up, calibration and verification of the control systems throughout the plant. EAD partnered with another 3rd party vendor on the DCS configuration and integration while they designed the controls for the hammer mill area and fabricated the heat trace and fire water control panels. EAD personnel were present during commissioning and start up.
EAD was engaged to plan and manage the removal and replacement of 40,000 SF of deteriorated roof and decking due to high acidity levels from active food processes below. Interior scaffolding and double containment enclosures were constructed for isolation.

Through extensive investigation and pre-planning, working with plant management and maintenance personnel, EAD successfully managed the construction phases of this project while allowing client operations to continue. EAD focused on schedule and safety management of contractors, providing oversight for the client.

EAD provided safety orientation training for all contractor employees and facilitated daily supervisor safety and schedule meetings to increase safety awareness and coordination between trades. The project was completed within budget and on schedule without any contamination to the process.
EAD was requested to provide engineering, technical and construction support to replace the existing interior and exterior sanitary sewer systems at an operating facility. The project spanned over seven years with a total installed cost of approximately $13 million.

The facility’s existing sewer system had been in place since the 1960’s and was deteriorated beyond repair. Since the majority of this project occurred within an operating food plant, EAD had to replace the system and at the same time meet critical food safety standards.

EAD implemented double wall containments constructed of metal studs and poly, along with providing negative ventilation for the construction area to ensure no cross contamination issues could occur. Gowning rooms, travel route planning, and strict sanitation procedures also aided in being able to perform without incident.
EAD was engaged to provide an automated controls solution for a 24-bin grain elevator with grain drying capacity and two large dry grain storage bins. This ongoing, multi-million dollar project is located in Osceola, Nebraska.

The site consists of eight concrete storage silos that have been refurbished and automated. The EAD project added two large capacity dry grain storage bins, a continuous grain dryer, four bucket elevators and multiple drag and belt conveyors. Operators were given full automated control, with a manual override, of the grain conveyance and distribution system from all HMI locations. The controls system also monitored the equipment status utilizing speed switches, plug switches and belt tracking switches to minimize equipment damage. EAD was responsible for the design of the control system, fabrication of all HMI and control panels, programming of the Schneider PLC’s and HMI’s for the entire site, as well as the configuration of the Schneider MCC’s. EAD also performed the commissioning and startup services for the entire site expansion. This was done in partnership with the client’s on-site electrician.
Green Plains Renewable Energy, Inc. is an ethanol producer based in Omaha, Nebraska with the current ethanol production capacity of approximately 790 MMGPY (spanning across 10 plants). At capacity, Green Plains produces approximately 2.2 million tons of distillers grains annually to be used as a high-protein, high-energy animal fodder and feed supplement. Corn oil is also a co-product of ethanol production.

EAD was responsible for designing and installing a system to remove corn oil from stillage. At project onset, EAD met with Green Plains Renewable Energy, Inc. to acquire a thorough understanding of the current plant environment as well as the goals for the new system.

We specified pumps, tanks, and heat exchangers, and also designed piping, power, controls and wiring. Additionally, we provided field engineering support where we managed the team of contractors.

EAD interfaced with Green Plains Renewable Energy, Inc.’s third party automation contractor. We led the engineering project that managed the controls, structural engineering and design.

We continue to support Green Plains Renewable Energy, Inc.’s facility and systems at their various sites.
Kiewit was building two 110 MGPY ethanol plants for Aventine Renewable Energy. EAD Engineering was contracted to design and furnish wet distillers grain conveyors to serve the plants under construction in Aurora, NE and Mt. Vernon, IN.

EAD Engineering produced two nearly identical designs that would take the wet distillers grain discharge from the stillage centrifuges and deliver to a wet-cake pad for storage and load-out. Our mechanical, process, electrical and controls engineers teamed up to execute the design for this project. Each system consisted of drag conveyors and augers totaling approximately 400 feet in length. EAD Engineering also made an installation verification during construction.
Minnesota Soybean Processors is a membership cooperative that owns and operates a soybean crush facility and bio-diesel operation. They provide the latest soybean processing technologies and a high quality renewable fuel source.

EAD performed the unloading and repair of a field fabricated storage tank that had been subjected to fire damage.

EAD was engaged by the client to get the damaged tank back into safe service after the fire incident. Using a team of experts in the management of waste material and tank construction, EAD was able to unload the tank of approximately 500K gallons of crude sludge to ready the tank for repair.

In the repair segment, safety was the primary concern. EAD developed multiple procedures specific to the job to mitigate both personnel and process incidents. Extensive structural and civil repairs were necessary, and were executed safely.

The return to service deadline allowed the client to pre-sell product. The EAD team was able to hit the mark.
MINNESOTA SOYBEAN PROCESSORS
Soybean Oil Refinery and Biodiesel Plant

Client: Minnesota Soybean Processors
Location: Brewster, MN
Market(s) Served: Agriculture, processing, renewable fuels

Minnesota Soybean Processors is a membership cooperative that owns and operates a soybean crush facility and bio-diesel operation. They provide the latest soybean processing technologies and a high quality renewable fuel source.

EAD performed engineering, project management, controls and automation services for a 30 MMGPY addition to an existing soybean oil extraction facility located in Brewster, MN.

This plant was co-located next to an existing 70 MMGPY soybean oil extraction facility. In conjunction with this project, EAD also designed a 60 MMGPY refined and bleached oil plant to produce feedstock for the biodiesel plant and RB oil as a commercial product.

The project was driven by speed to market which required a fast-tracked schedule. Additionally, since MNSP broke ground in the winter months, the weather presented scheduling challenges which EAD overcame through communication and flexibility.

This project marks the first large-volume biodiesel producer in the United States, and established EAD as a pioneer in the biodiesel fuel industry. EAD continues to serve MNSP with engineering services, HAZOP revalidations, maintenance management services, troubleshooting and as a PSM consultant.
Minnesota Soybean Processors is a membership cooperative that owns and operates a soybean crush facility and bio-diesel operation. They provide the latest soybean processing technologies and a high quality renewable fuel source.

This project consisted of the design-build delivery of a replacement, multi-product, load-out unit at an existing biodiesel plant in Brewster, Minnesota.

The project presented two distinct challenges. First, the operational date was aggressive and the construction was scheduled during the winter months. Second, the operations of the plant could not be disrupted and a temporary loadout unit had to be designed and constructed.

With a focus on construction logistics combined with the synergy of in house design, EAD was able to maintain the design just in front of the execution through to a successful completion.

The project's success was due to the teaming relationship that was in place from the client down to the individual trades. All team members were able to rally around the common goal of delivering a high-quality, safe installation.
EAD was responsible for the design and build of our storage tank farm. We partnered with them throughout the planning, civil and structural design phase and through execution of our storage tank farm facility. From beginning to end, EAD’s execution, communication, project and vendor management was excellent. - Mark Vermeer, Progressive Energies

Northwest Missouri Biofuels, located in St. Joseph, MO produces 15 million gallons of biodiesel per year. Animal fat is the main feedstock for this company.

EAD designed and constructed a new storage facility for this existing biodiesel plant.

The storage facility was to include hazardous chemical storage and loading, and a total of 1.5mm gallons of finished product capacity all located in a concrete containment structure. EAD was also responsible for the structural steel required for tank top access and utility racking.

EAD was presented with challenging subgrade conditions on this project and utilized Rammed Aggregate Piers as a solution. We were able to get out of the ground quicker and put our concrete and tank building teams to work toward successful completion.

The amount of elevated work in the running facility also presented some unique opportunities for logistics and safety planning. EAD leaned on its safety department for many different procedures to accomplish many complex tasks safely.
“Our relationship with EAD has continued to grow as we work together to make Novozymes project deliverables a success. EAD is all about helping the client be successful and their biggest attribute is their personnel. They truly believe in ‘boots on the ground’ and ‘doing whatever it takes’.” - Cindy Campbell, Senior Project Engineer, Novozymes

Novozymes is an enzyme production facility co-located at the bio-refinery complex in Blair, NE. It provides the biofuels industry with a critical component to efficiently bring ethanol to the marketplace. As production processes advance, Novozymes is uniquely positioned to meet the needs of next-generation biofuels.

As an on-site Project Engineering resource, EAD provides assistance in executing capital projects.

In early 2013, Novozymes began a project to improve the efficiency of their cooling tower system, providing the site with a critical utility for sustainable operation. EAD was tasked with management of project scope, schedule, and budget, working closely with a refrigeration contractor based in Florida.

Project success was driven by the ability to execute a fast-track project in a predetermined plant shut-down window. Novozymes, EAD and contractor personnel were all heavily involved in project scheduling and construction, which ultimately provided Novozymes with an on-time and on-budget deliverable.
When Novozymes needed to upgrade its bulk solids conveying and treatment system to handle spent filter cake from fermentation product filters, it contracted EAD to create the design from conception through completion over multiple years and through all project phases. Each phase required a design review, construction cost estimate of increasing accuracy and rescoping for the next phase.

Conceptual design basis work included processing equipment testing, material properties analysis, production rate requirements and project execution planning. Basic design added equipment selection, layouts, power supply, automation, operability and occupational safety. The detailed design ran concurrent with preliminary construction, which required the development of several drawing packages that allowed contractors to begin work before the final equipment submittals and construction package were available.

The equipment layout faced several design constraints, from physical space availability to installing around operating equipment to chemical exposure isolation requirements. EAD’s design team used 3D CAD to create a design free of interferences that required no existing building modifications. All process equipment, piping, HVAC units, electrical equipment, cable tray and new interior structures were added to a 3D model of the existing building created by EAD just for this project.

The building model became the plant’s master drawing/model for this building, which EAD will maintain throughout future projects.
EAD performed engineering, project management, controls and panel building services for a pet food manufacturing plant. EAD was asked by this core client to replace an obsolete PLC panel so the client could update the programming software. EAD designed a new panel with a Modicon Quantum system.

To provide the client with a new panel, EAD developed a panel layout, parts specification, parts lists control schematics and provided them to EAD’s panel shop. EAD’s panel shop purchased all parts needed, fabricated, tested, and shipped the PLC control panel to the client.

To install the panel in the field EAD compiled a bid package that included electrical drawings, bid legal documentation, specifications, and scope of work. EAD obtained bid pricing from electrical contractors and worked with the electrical contractors to install and test the new PLC panel.

This is an example of just one of several ongoing factory automation upgrade projects that EAD continues to work with the client to perform engineering, automation, and design services.
GLOBAL PET FOOD PROCESSOR

Hygienic Design

**Profile**

**Client:** Confidential  
**Location:** Global  
**Market(s) Served:** Pet food processing

**Services**

- Engineering  
- Project Management  
- Risk Management  
- Automation

This leading global pet food processor faced a food safety and cross contamination issue with their five mixing stations. The addition of hand added ingredients to four of their product mixers and their gravy mixer was creating an airborne dust contamination within the mixing room and adjacent areas and creating unsatisfactory working conditions for their personnel. EAD provided this client with a turn-key solution utilizing hygienic design.

EAD worked to fully understand the existing mixing system and conditions of normal operation. A sanitary design was created that met the expectations of the plant sanitation and operation requirements. EAD installed the dust collection system which utilized a Roto-Clone suspended above the ceiling of the mixing room. The mixers were connected to the Roto-Clone using a sanitary ducting system that could be easily disassembled and entirely sanitized at scheduled preventative maintenance periods.

During normal operation, our design utilized automated rinse-in-place components and programming that provided a rinse cycle after each batch of product was mixed. Automated slide gates controlled which leg of the system was being utilized and a barometric damper balanced the airflow through the varying duct sizes.
GLOBAL PET FOOD FACILITY
Plant Expansion

Client: Confidential
Location: Global
Market(s) Served: Pet food processing

This leading global pet food facility needed to increase production and volume of its 5.5-ounce cat food lines.

EAD Engineering doubled the plant's production and packing lines for its 5.5-ounce cat food products. We initially designed the warehouse, tripling its space from 70,000 to 210,000 square feet.

We prepared the equipment and system layouts for the liquid material and meat slurry handling. We designed CIP and pigging systems. We added fillers/seamers and a 13-ounce and 5.5-ounce pal/depal and added two 5.5-ounce labelers. We did the equipment layouts for high-speed labeling, tray packing, and shrink-wrapping and alvey case palletizing.
This leading global pet food processor asked EAD to provide engineering services for an ammonia system upgrade project. The plant obtained several audits that updates to their current ammonia safety system, which included detection, ventilation and equipment updating.

EAD worked directly with the plant to develop a scope, budget, and schedule to obtain funding for the project. EAD then designed a custom ammonia alarm detection system that interfaced with the current detection system, designed necessary control panels, and also designed a ventilation system to meet the PHA & PSM audits.

EAD provided project management for the client by working with various contractors to solve large issues like re-piping the ammonia lines to the roof to make the control banks accessible and prevent forklift damage. Details were also addressed like tagging and P&ID updating.
PETROALGAE, INC.
Aquatic Biomass Production Facility

Client: PetroAlgae, Inc. (Now Parabel USA, Inc.)
Location: Melbourne, FL
Market(s) Served: Agriculture, processing, renewable fuels

PROFILE

PetroAlgae’s aquaculture technology enables producers to grow, harvest and process locally-available micro-crops to create feed and food products for global markets.

PetroAlgae (located in Melbourne, FL) asked EAD to partner with them on the development of leading edge technology for the production, harvest and processing of microalgae and aquatic plants.

PetroAlgae had the initial concept, but they desired a proven partner’s expertise in renewable energy to assist them in bringing it to commercialization.

EAD began with process-development consulting. Laboratory scale processes were increased to pilot scale. At that point, we performed the site specific engineering, which included grading and building design, facility layouts, code compliance and electrical power supply for the demonstration facility in Indian River County, FL.

EAD also developed the conceptual design of this first-generation, commercial-scale, full-license aquatic plant farm.

SERVICES

- Project Management
- Construction
- Engineering
- Automation
EAD began construction on the Ponca Public Schools Addition and Remodel Project in the Spring of 2010. Original bids came in at $1.4 million over the district’s budget. EAD brought the project under budget and reduced the overall cost of the project by $20 per square-foot through value engineering. We maintained the original square footage, met the bond requirements and retained “green” options. Quality, durability, original design, functions and capabilities were maintained throughout the value engineering process.

The project was completed in two phases over a duration of approximately two years. Phase one consisted of construction of the new high school, parking areas, a new drive and student dropoff area. It also included new classrooms, a kitchen, commons area, library and administrative offices. After completion of phase one, school staff and students were relocated to the new facility and demolition of the existing two- and three-story structures commenced, making way for construction of the new gymnasium, locker rooms, restrooms, vocal and instrumental music rooms and a community wellness area.
Rentech retained EAD to perform the engineering, project management, construction management, and design to convert two decommissioned fiber mills into wood pellet plants. The mills are located in Wawa and Atikokan in Ontario, Canada.

**Wawa Facility**
Rentech acquired an idle strand board processing mill located in Wawa, Ontario, which was converted for wood pellet production. The repurposed plant was designed to produce 400,000 metric tons annually. The facility is expected to consume approximately 890,000 tons of certified sustainably managed fiber annually.

**Atikokan Facility**
Rentech acquired a former particle board processing mill located in Atikokan, Ontario, which was converted for production of approximately 90,000 metric tons of pellets annually. The facility is expected to consume approximately 200,000 tons of fiber annually.

These projects had aggressive timelines in order to meet Rentech’s contractual delivery dates. EAD worked to overcome multiple challenges such as designing to Canadian safety standards (CanOSH) and sub-zero degree weather during critical foundation work. EAD worked with the client to structure a team that was collaborative, goal-oriented and adaptive.
EAD was awarded a contract from the US Army Corps of Engineers (St. Louis District) in October 2013 for the Melvin Price Locks and Dam control upgrade project. EAD’s mission was to design, build, program and test 17 new panels and custom-engineered NEMA 12 electrical enclosures ranging in size from 32”x38”x18” up to 96”x36”x24”.

All of the panels and enclosures were designed, custom-engineered, and completed by EAD design personnel. The manufacturing and assembly of all systems were completed at one time so that the testing of all 17 enclosures could be networked together for three days of burn-in and factory acceptance testing (FAT). The operation was performed by EAD personnel with acceptance from on-site St. Louis District personnel. Once FAT testing was complete, all units were processed for shipping and installation on-site. This project was fast-tracked and completed within a 60-day cycle.

EAD was given an exceptional performance rating in 90 percent of the categories. This project was completed on time and within budget.