Seymour Engine Plant

Sustainability Journey

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Who we are
SEYMOUR
650,000 sq. ft. 51 acres

Power Generation
Locomotive
Mining
Industrial
Marine
Oil and Gas
Military

Seymour Employees
1200

Labor Unions
2
Office Committee
Diesel Workers

Year facility first opened
1976

Nationalities represented
41

Certified Star Site
OSHA Voluntary Protection Program

OHSAS 18001
BUREAU VERITAS Certification
Health & Safety

ISO 9001
BUREAU VERITAS Certification
Quality Management

ISO 14001
BUREAU VERITAS Certification
Environmental Management

ISO 50001
BUREAU VERITAS Certification
Energy Management
What we produce and remanufacture
V903
V 8 cylinder

19 Liter
Inline 6 cylinder
500-1000 HP

30 Liter
V 12 cylinder
760-1500 HP

95 Liter
3200-5000 HP
V 16 cylinder

6,000,000 kilowatt-hours
annual electricity production
Who we serve
Our community

11097 hours

annual employee community service

122+

Community partners

85%

Employee community participation

Day of caring

966 employees
146 projects
6 counties
1 day
Our customers

customers

applications

Military Contractors

Industrial and Construction Equipment

Computer Data Centers

Commercial Marine

Locomotives

Commuter Rail

Electric Power Generation

Military

Contractors

Computer

Data Centers

Commercial

Marine

Locomotives
What we develop
Products Developed

- V903
- QSK19
- QST30
- QSK38
- QSK50
- QSK60
- QSK78
- HSK78
- QSK95

Technologies Developed

- Exhaust Aftertreatment
- Service Solutions
- Performance
- Exhaust Emissions
- Combustion
- Diesel and Gaseous Fuels
- Electronic Controls
- Turbochargers
- System Integration
- Fuel Systems
- Customer Application Solutions
Our Story

WHY WE EXIST

OUR MISSION
Making people’s lives better by powering a more prosperous world

WHAT WE WANT TO ACCOMPLISH

OUR VISION
Innovating for our customers to power their success

HOW WE WILL DO IT

VALUES
INTEGRITY
Doing what you say you will do and doing what is right

DIVERSITY & INCLUSION
Valuing and including our differences in decision making is our competitive advantage

CARING
Demonstrating awareness and consideration for the wellbeing of others

EXCELLENCE
Always delivering superior results

TEAMWORK
Collaborating across teams, functions, businesses and borders to deliver the best work

LEADERSHIP CULTURE
Inspiring and encouraging all employees to achieve their full potential

BRAND PROMISE
Powering our customers through innovation and dependability

STRATEGY
Delivering value to all stakeholders
Cummins two critical sustainability challenges

Achieving our mission of powering a more prosperous world, while meeting our obligation to use fewer of its resources.

Helping customers succeed through innovation and dependability so when they win, we win.

ENVIRONMENTAL SUSTAINABILITY = BUSINESS SUSTAINABILITY
HHP 16 & 17
Regenerative Dynos
Regenerative Dynos have been installed at other facilities, but none of this magnitude (voltage and power)

These are the first Regenerative Dynos for High Horsepower

Water-brake dynos convert mechanical power produced by the engine into heat which is ultimately dissipated to the atmosphere via engine exhaust and cooling tower.

Motoring dynos act as a generator by absorbing the mechanical power.

Through a regenerative drive, power is converted to electricity that is used by the plant or exported to the grid.

The two – 5 MW dynos installed are capable of generating enough electricity to power the entire SEP/STC site
Environmental Improvements

Energy
- Generate 20% of site electrical consumption that would have otherwise been purchased from the utility
- Annual savings equivalent to the energy use of 516 American homes or 1,031 passenger cars

Energy Air
- Assuming 7,000 MWh generation per year that equates to an annual avoidance of:
  - 17,500 kg PM
  - 84,000 kg SO2
  - 14,000 kg Nox
  - 4,400 metric tons of CO2
Environmental Improvements

Water

- 33% reduction in cooling tower water as compared to a water-brake dyno
- 1,114,667 gal / yr avoided on site
  - Likely would have had to install an additional cooling tower cell at the site if water-brake dynos were installed instead
- 1,850,000 gal / year avoided at the electrical utility

Waste

Indiana is the 3rd largest coal consuming State in the U.S. with 70% of electricity generated from coal

- It takes approximately 123 tons of coal to produce 1000 MWh of electricity*
- 7,000 MWh of avoided electrical consumption is equivalent to 861 tons of coal avoided per year
- Avoidance of additional cooling tower water chemicals

Facility Emission Abatement
Project Background and Innovation

- SEP needed to implement a system to reduced NOx and CO emissions from the test facility to be able to develop the Hedge Hog engine platforms.
- It was decided that a SCR, DOC, and CEMS would be used to reduce NOx and CO emissions.
- Supplier delivered systems were incapable to perform to our specifications.
- Systems were improved and redesigned (new injection nozzles, mixers, injection locations, measurement locations) by Cummins and now meet our specifications.

SCR: Selective Catalytic Reduction  
DOC: Diesel Oxidation Catalyst  
CEMS: Continuous Emission Monitoring System
Environmental Improvements

Air

- Systems allowed HH and other platforms to be developed in the newly built test cell addition at SEP.
- Final developed abatement systems showed a reduction of 216.24 tons of NOx in 2017

Business

- Without the abatement systems Cummins would have had to spend $15.5M annually to develop engines outside of Cummins since there are no test cells large enough for the 95L engines in Cummins fleet of test cells.
- If the engines had to be outsource for development the environment would have not seen the emission reductions that we created since other facilities do not have these systems (SWRI, England, Etc.). SEP created a net global NOx reduction for developing engines at SEP.
Project Background and Innovation

Project Background

• In 2015, Compressed Air was identified as a “Significant Energy User” through the site’s ISO 50001 System
• The Energy Team began to focus on opportunities to better manage compressed air use at the site
• Primary goal was to reduce electrical consumption required for generation of compressed air

Opportunities / Benefits:

• Reduce air pressure to the minimum required for plant equipment
• “Right Size” air compressor equipment
• Reduce waste through leak identification and repair
• Properly manage end uses of compressed air

Photo 1: Before - 500 hp Centac Air Compressor
Implementation – Pressure Reduction

- The Energy Team first identified that the system pressure was likely higher than what the plant needed.
- The facilities team reduced the pressure off the compressors 1 psi per week until any equipment negatively responded.
- Pressure off of the compressors was reduced from 107 psi to 99 psi.
- This resulted in a 3.14% reduction in compressor electrical consumption.

![Figure 1: Pressure Reduction Savings]
Implementation – “Right Sizing” Compressors

- The team realized the current compressors were oversized for the plant.
- It was decided to replace one of the 500 hp Centacs with a 350 hp Rotary Sierra VFD compressor.
- Right Sizing the compressors resulted in a 28.3% reduction in compressed air electrical usage!

![Figure 4: Before and After “Right Sizing” Savings Analysis](image)
Benefits to the Environment

- **Overall 38% reduction** in compressed air energy consumption from 2015 to 2018 (exceeded our goal of a 25% reduction)
- **1,143,000 kWh/yr savings**
- Equivalent to 110 average US households annual consumption
- Removed Compressed Air as a site SEU
Sustainable Future

- Raise environmental awareness throughout facility.
- Continue to collect & analyze data for waste, water, air, and energy.
- Partner with cross functional teams to create innovative solutions to improve life cycle footprint of SEP’s products.
- Identify opportunities to eliminate waste upstream.