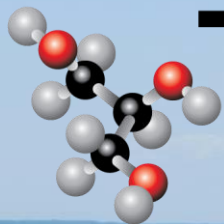


FUTURE FUEL[®]

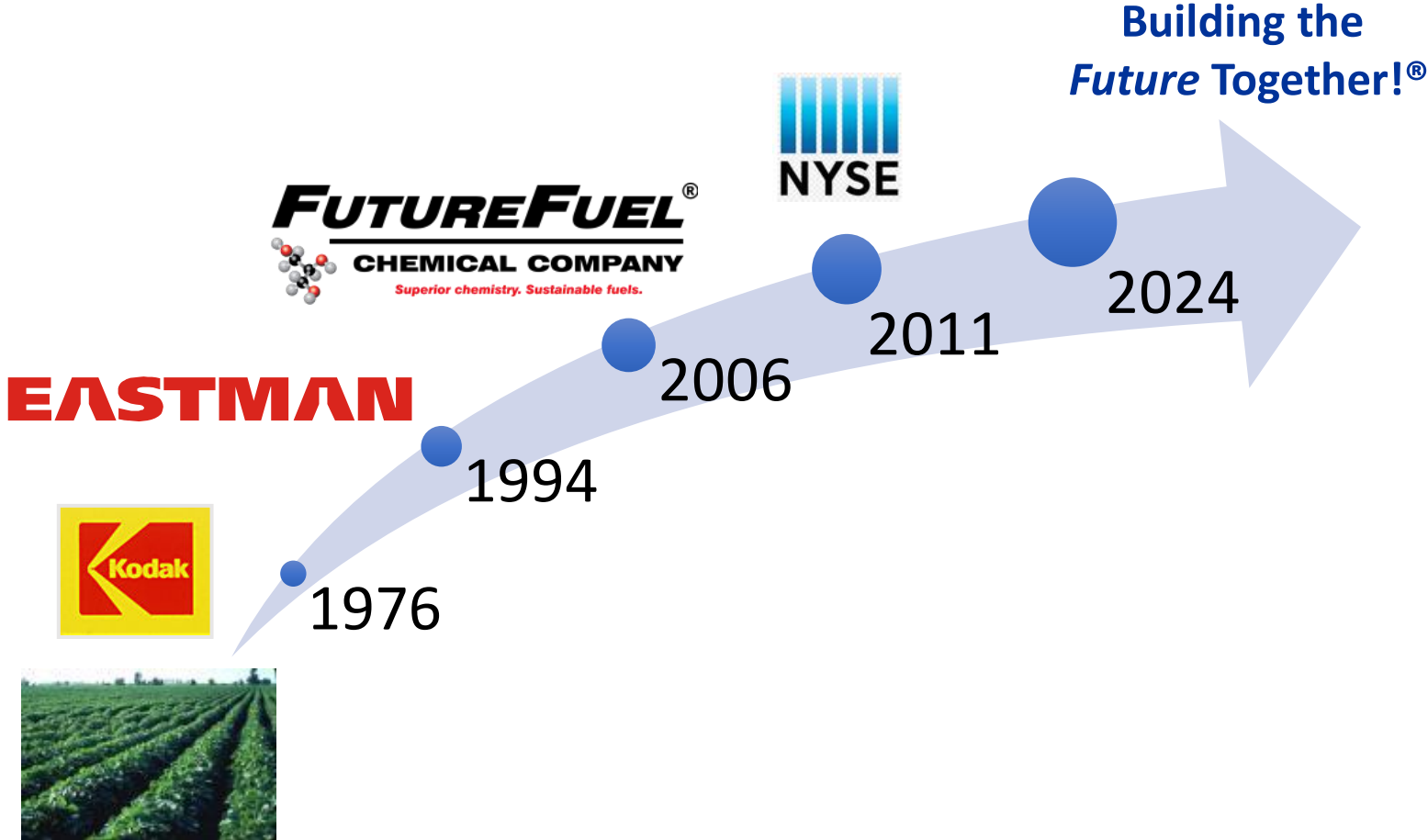


CHEMICAL COMPANY

Superior chemistry. Sustainable fuels.



Our Site History



Company Overview



Specialty Chemicals

- Custom
- Performance
- Biodiesel

Custom Chemicals

- 48 years of reliable custom contract manufacturing
- A world-class, fully integrated and full-service site
- Flexible, responsive, and committed to excellence
- Experts in complex organic chemistries, synthesis and process development, engineering, commercialization, and customer service



Performance Chemicals

- Includes sulfonated monomers, polymer additives, refined glycerin, and specialty solvents such as FutureSol®DEM
- Active R&D new product development:
 - FutureChem® Duality
 - 'Dual action' bleach activator & chelant for HI&I detergents
 - FutureChem® Bio-Betaine
 - Surfactant with higher bio content and improved performance vs. CAPB
 - New monomer additives for nylon & polyester fiber processing
 - Improved dyeability and stain resistance
 - Eliminates process downtime associated with current chemistry



Technology Capabilities

Our professionals:

5 PhD Organic Synthesis Scientists

10 Bench Chemists & 1 Technologist

1 PhD Chemical HSES Engineer

3 PhD Analytical Scientists

1 BS Chemist, 4 Technologists

4 Instrument Specialists

14 Shift Analysts

1 PhD Application Scientist

Services include:

- Synthesis development
- Method development, validation
- Product and process safety testing
- Complex analytical testing
- Process optimization



Synthesis Expertise

Acetoacetylation

Acetylation

Acid Chlorides

Acylation

Alcoholysis

Aldol Condensation

Alkoxylation

Alkylation

Alkylation, Reductive

Aminoalkylation

Asymmetric Synthesis

Benzoylation

Benzylation

Bromination

Benzylation

Carbonylation

Catalytic Reduction

Chemical Reduction

Chlorination

Chlorosulfonation

Cyanation

Cyclization

Decarboxylation

Dehalogenation

Dehydrogenation

Diazotization

Epoxidation

Esterification

Etherification

Formylation

Halogen Replacement

Halogenation

Heterocyclic Chemistry

Hydrobromination

Hydroformylation

Hydrolysis

Hydroxylation

Methylation

N-Alkylation

Nitrosation

Nucleophilic Substitution

O-Alkylation

Organometallic Reactions

Oxidation

Phase Transfer Reactions

Polymerization

Quaternization

Ring Closure

Saponification

Sulfonation

Transesterification

Analytical Capabilities

Development and production samples are, almost exclusively, analyzed on-site using our very wide array of analytical instrumentation

- Nuclear Magnetic Resonance (400mHz)
- Ion Chromatography
- Liquid Chromatography
- LC-Mass Spectrometry
- Gas Chromatography
- GC-Mass Spectrometry
- Differential Scanning Calorimetry (DSC)
- UVF Sulfur Analyzer
- UV/Vis Spectrometers
- Fourier Transform Infrared
- Inductively Coupled Plasma (ICP)
- X-Ray Fluorescence
- Thermal Gravimetric Analysis
- Total Organic Carbon (TOC)
- Particle Size Analyzers
- KF & Auto Titrators

Process Hazard Evaluation & Scale-up

- On-site Process Hazard Analysis and Safety Testing on all processes at FFCC before startup
- Scale-up from a 1 liter specially designed Reaction Calorimeter which mimics process agitation and temperature control of our larger plant reactors
- RC-1 (Mettler Reaction Calorimeter)
- DSC (Differential Scanning Calorimetry)
- RSST (Reactive Safety Screening Tool)



Quality Assurance & Control

Quality Assurance

- ISO 9001:2015 certified quality system
- BQ9000 quality system for biodiesel
- GMP Capability



Quality Control

- Full staff of chemists, technicians, and analysts
- Wide range of modern instrumentation
- 24/7 operations



GMP

- **FutureFuel's Arkansas site was GMP qualified from 1994 to 2004 and supplied leading pharmaceutical companies with intermediates for human API's.**
- **Site is again GMP ready, as assessed by a 3rd-party pharmaceutical audit firm in July 2022.**
 - **Auditors affirm FFCC's past GMP compliance is a significant strength, and an advantage over other specialty chemical companies attempting to enter GMP**
 - **Growing demand for custom GMP manufacturing due to reshoring**
- **We can now support GMP projects for high value human and veterinary pharmaceuticals.**

Environmental Commitment

AIR

- 2 Regenerative Thermal Oxidizers and 2 Thermal Oxidizers to reduce air emissions
- Monitor 2800 VOC points
- Existing permits allow for significant expansion without need for modifications = more speed to commercialization

WATER

- Waste water treatment facility on site

SOLIDS/LIQUIDS WASTE

- Licensed RCRA hazardous waste incinerator on site
- Boiler capable of burning liquid waste
- Cost efficiency and speed



Health and Safety Commitment

FutureFuel First Responders:

- Emergency Response Crew
- Fire Fighting Crew
- Paramedics
- Nurses

Additional H&S Staff & Resources:

- Certified Industrial Hygienist
- Doctor
- Firefighting Training Center, also serving the Batesville Community



Raw Material Handling

We are equipped to handle many hazardous materials, including:

- Acetonitrile
- Acetaldehyde
- Acetic Anhydride
- Aluminum Chloride
- Benzene
- Bromine
- tert-Butyl Acryl Amide
- tert-Butyl Acrylate
- Chlorine
- Chlorobenzene
- Crotonaldehyde
- Dichlorobenzene
- Diethoxymethane
- Dimethylformamide
- DMSO
- Ethyl Mercaptan
- Formaldehyde
- 36% Hydrochloric Acid
- Hydrogen Chloride(Anhy Gas)
- Isophthalic Acid
- alpha-Methyl Styrene
- 30% Oleum
- Phenol
- Phosphorous Oxychloride
- Phosphorous Trichloride
- Propylene
- Sulfuric Acid
- Styrene
- Thionyl Chloride
- Vinyl Acetate



Bulk Material Handling Capabilities

**Rail spur with space
for 300 railcars**

**Monthly Capacity to
handle**

~900 Tankers

~200 Package Trucks

~400 Railcars



Manufacturing Resources

Development Scale



General Purpose Batch



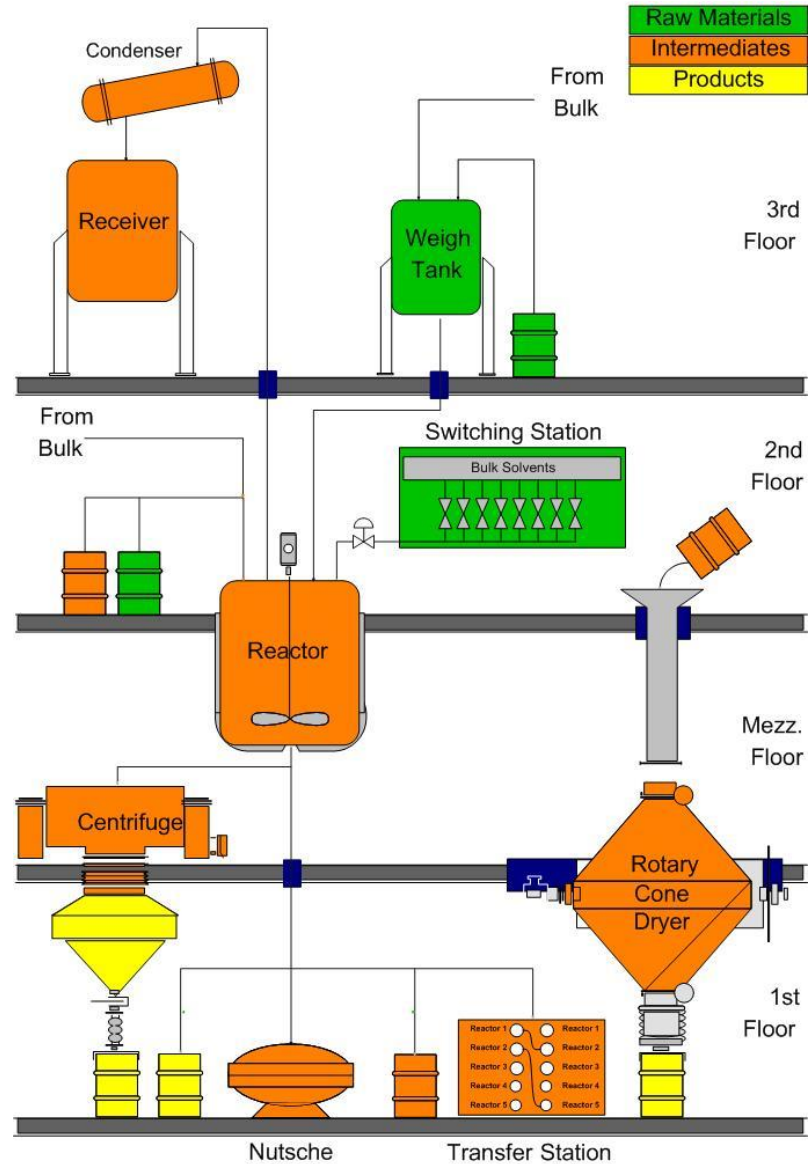
Dedicated Continuous



Dedicated Batch



Batch Plant Equipment Layout



Batch Plant Equipment

Reactors:

- 66 Multipurpose GL & SS
- 1,000 to 3,000 gal
(3785 to 11,356 L)

Distillation Stills:

- 8 GL & SS
- 1,000 to 3,000 gal
(3785 to 11,356 L)

Distillation Columns:

- 20 Hastelloy, SS, Glass lined
- 0.3 to 0.6 m (1 ft to 2 ft) Diameter
- 2.7 to 4.6 m (9 ft to 15 ft) Height

Filtration Equipment:

- 36 Nutsches
- 13 Alloy C and SS centrifuges
- 3 AutoFilter Dryers

Dryers:

- 10 Rotary cone vacuum dryers



Continuous Plant Equipment

Reactors:

- 21 Glass Lined & Stainless
- 500 to 6,500 gal (1893 to 24,600 L)

Distillation Columns:

- 2 Glass Lined (36" X 62')
(0.9 m X 18.9 m)
- 11 Stainless Steel (120" X 118')
(3m X 36m)
- 5 Hastelloy (48" X 95')(1.2m X 29m)
- 1 Titanium (22" X 26') (0.6m X 7.9m)
- 1 Polymer Lined (18" X 36')
(0.46m X 11m)

Filtration Equipment:

- 9 Solid Bowl Centrifuges Stainless
(largest 30" x 120") (0.76m X 3.0m)

Dryers:

- 4 Ring Dryers
- 2 Plate Dryers/Coolers



Utilities



Utility Capabilities

FutureFuel:

Steam Supply - Five boilers @ 30, 60, 90, 150, 600 psig

Three Cryogenic Nitrogen Plants

River water: Cooling, fire-fighting

Liquid Waste Incinerator

Activated Sludge Waste Water Treatment

Third Party:

Electricity: Entergy substation on-site (dual feed)

Natural gas: Macquarie

Potable water: Rock-Moore Public Water

Affiliations

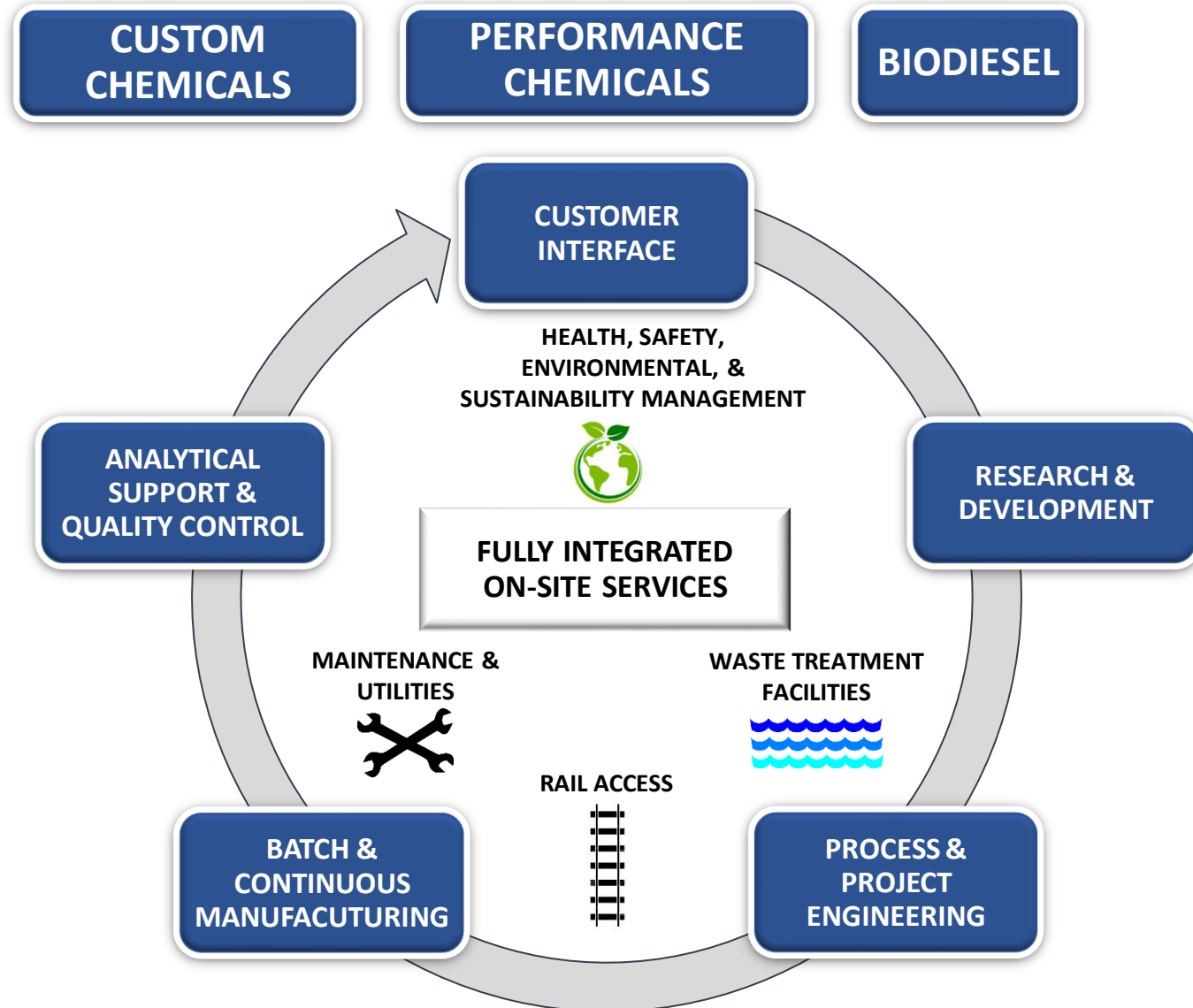


ISO 9001 Registered
No. FM 13127



RESPONSIBLE CARE[®]
OUR COMMITMENT TO SUSTAINABILITY

FutureFuel Chemical Company



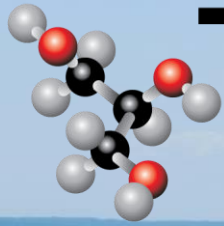
FutureFuel Chemical Company

Reliable Domestic Supplier

- Committed to safety, environmental stewardship, sustainability, and performance excellence
- Proven capabilities, flexibility, and speed to commercialization
- A world-class, full-service site, with exceptional people
- Providing the “complete package”, to ensure our partners’ success
- **Forbes 2023 Top 100 List of America’s Best Small Companies**



FUTUREFUEL[®]



CHEMICAL COMPANY

Superior chemistry. Sustainable fuels.

Please visit us at Booth 719

