Due Diligence for Investors & Lenders in Major Biotechnology Projects

A Service of Lee Enterprises Consulting Inc.

Adm. Dennis McGinn (Ret.)

S. Glenn Farris

Andrew J. Grant

July 2021

LEE ENTERPRISES CONSULTING, INC.

Lee Enterprises Consulting (LEC) Presenters

- **Moderator: Adm. Dennis McGinn (Ret.) - Former Assistant Secretary of the Navy for Energy, Installations and Environment. Advisory Board for Center for Climate and Security. Current Senior Group Advisor at LEC.**

- **Presenter: Glenn Farris: Named one of the 5 most influential people in renewable energy in North America by European Institutional Investors Services. Current EVP at LEC.**

- **Presenter: Andrew Grant. 25 years' experience in due diligence, biomass power and conversion processes, plant engineering and plant contracting, project development, consulting and technology assessment. Current Project Leader at LEC.**

Due Diligence – What is it?

- **Rampant fraud and speculation gave us the stock market crash in 1929**
- **Great Depression followed**
- **Congress established in the Securities Act of 1933**
  - Securities brokers and dealers became required to make full disclosure
  - Due diligence established a legal defense
  - Evolved over time – Hard and soft due diligence

BROOKLYN DAILY EAGLE

And Complete Long Island News

LATE NEWS

NEW YORK CITY, THURSDAY, OCTOBER 24, 1929

32 PAGES

WALL ST. IN PANIC AS STOCKS CRASH

Attempt Made to Kill Italy's Crown Prince

STOCKS CRASH IN RUSH TO SELL; BILLIONS LOST

ASSASSIN CAUGHT IN BRUSSELS MOB; PRINCE UNHURT

Hollywood Fire Destroys Films Worth Millions

FEAR 52 PERISHED IN LAKE MICHIGAN FERRY IS MISSING

PIECE OF PLANE LIKE DITEMAN'S IS FOUND AT SEA

High Duty Group Gave $700,000 to Coolidge Drive

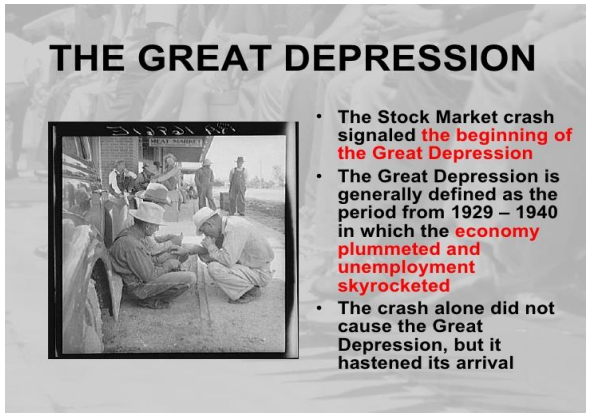
FOR MORE LOBBYISTS

CARNEGIE CHARGE OF PAID ATHLETES

HOOVER'S TRAIN HALTED BY AUTO

WARDER SOUGHT TO KEEP SEA TRIP

SOMERS NAMED AS HEAD OF NEW



LEE ENTERPRISES CONSULTING, INC.

Due Diligence – One Part of Risk Control

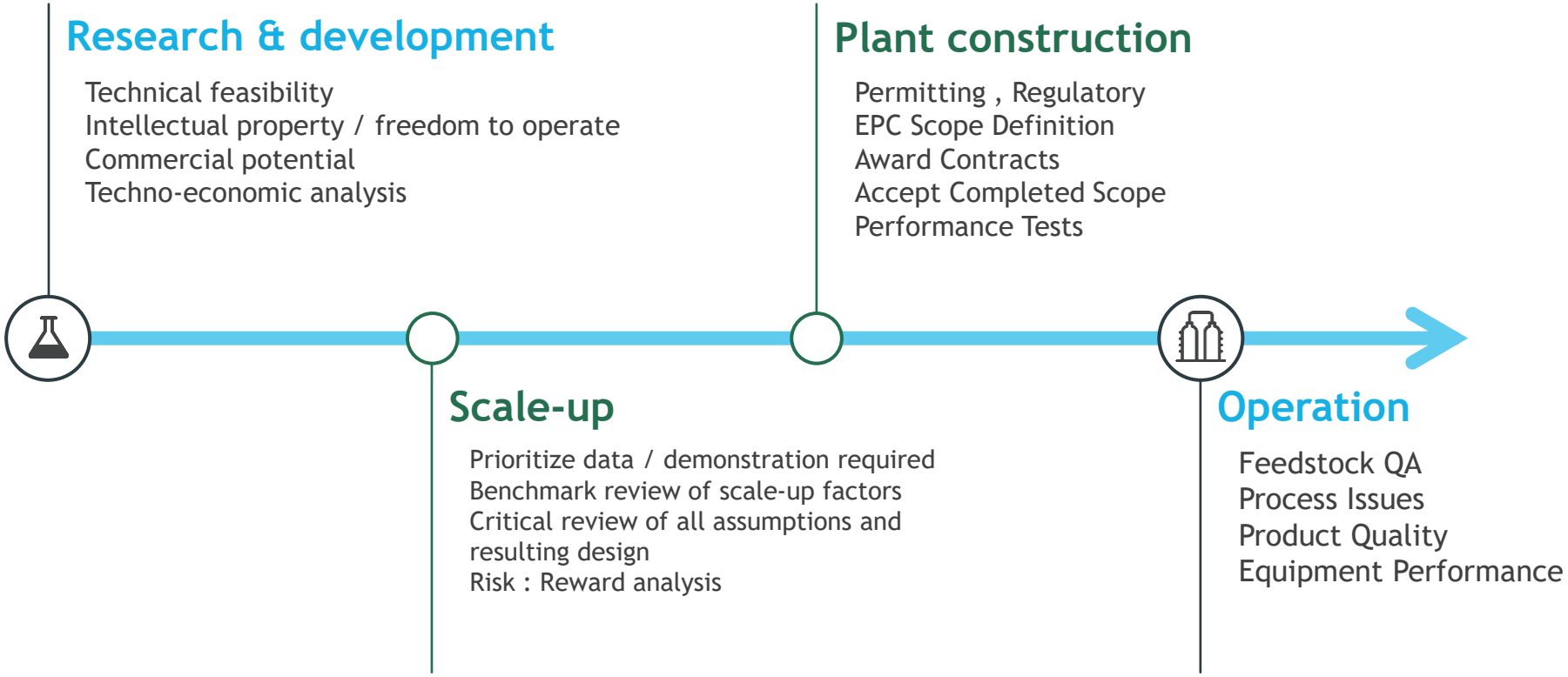
- **Why perform Due Diligence?**
  - Protect yourself
  - Protect your investors
- **Who should do DD? Everyone! To ensure that the project matches your goals.**
- **What is the Process of Due Diligence?**
  - Classic DD for Investors / Lenders is an “Independent Report”, as a precedent for Project Financial Close or Event. Can apply to an operating plant, a new project, or a process.
- **All Stakeholders must be involved to ensure success**
- **A Due Diligence Report should confirm that continuing Risk Control is in place.**
  - Define the risks in each part of the project or business plan and make sure your team has the expertise to define not only what could happen but the likelihood that it will happen;
  - What can you do to mitigate the risk?
  - What are the consequences associated with the risk?
    - Minimal or devastating
  - Will there be a monetary damage associated with the risk?

Global Biotechnology Projects Scope & Scale

- **Biotechnology projects, using well-known processes such as anaerobic digestion, gasification, Fischer-Tropsch or fermentation are one category:**
  - Processes thoroughly understood, standards set by industry groups
  - Very few major project failures or performance disputes
  - Usually, low risk for investors and lenders
- **Explosion of investment in novel, relatively complex processes, driven by new technology, developers & investors; these are NOT established businesses**
  - Capital costs from $50 MM to $3.5 Billion per project
  - Worldwide, international process technology transfers, many EPC contractors
  - Some technologies have acquired reputations as riskier investments

New Technology Project Life Cycle

Due Diligence Throughout the Lifecycle of a Project



Three Types of Risks

Technical Risk

Execution Risk

Contractual Risk

LEE ENTERPRISES CONSULTING, INC.

Driving Design Reviews: The 1,000:1 Rule

Relative Impact of a Change:	Typical Scope;	Cost Impact:
During Conceptual Design - $1	Process Change, 2 drawings, process description, estimating, 150 manhours	$22,500
During Detailed Design - $10	Equipment Arrangement, Piping GA's, P&IDs, Piping, Elec, 20 dwgs, specs, descriptions, procedures, estimate & schedule	$225,000
During Construction - $100	Rebuild equipment and all process, utility connections, control logic, construction delay	$2,250,000
During Comm'l Operation - $1,000	Shut-down to replace with new equipment, systems and controls, re-start the plant	$22,500,000

Design Review Teams & Tasks

- Check proposed conceptual design against others.
- Techno Economic Analysis if required.
- Check Preliminary design against site requirements, feedstocks available, environmental issues, process and equipment commercial status and guarantees available. Preliminary cost estimate review.
- Check Definitive design, FEED – firm cost basis – against process requirements, P&ID review, initial HazOps review, guarantee calculations, definitive estimate, detailed schedule, supporting equipment and construction proposals.
- Check ongoing detailed design monthly, start-up plans.
- Input at each step to Owner's Risk Control system.

Key Technical Issues

- Feedstock Variability
- Mass / Energy balances and the Assumptions – not always stated!
- Emissions – usually a contract “ make-good” item, no LDs applicable
- Scale-Up – overall process, key equipment
- Redundancy and maintainability as basis of Revenue Operation
- P&ID reviews – P&IDs as key scope document
- Design for Start-Up – essential for processes without much experience
- Controls Simulation to avoid lengthy site delays

Reference Plants

- **Proven Technology**
  - Design Not Based on Flawed Assumptions
  - Proven Operational Procedures
  - Good Scope Definition – FEED Level 3
  - Pro Forma backed by hard data
  - Visit Reference Plants to Verify Data

- **Helps Avoid:**
  - Construction Cost Increases
  - Scheduling Delays
  - Missed Performance Guarantees
  - Feedstock Issues
  - Stakeholder Miscommunication
  - Local/Community Issues
  - Contract Disputes

Key Contractual Issues

- Performance Guarantees, Validity, Testing
- Contract Flow-Through: Feedstocks, EPC, O&M, Offtake Contracts
- Long-term Offtake Structures as basis of financing – sensitivity analysis
- EPC contract strength, parent guarantees, efficacy policies, Owner's ability to step in
- Major sub-contractors, record, strength, ability to support schedule
- Warranties and assignment to Owner
- Insurance
- LD Calculations to support Owner's proforma

Financing Support Analysis

- Does the package of licensor, contractor, and insurance firm support meet the requirements of project financing?
- Issue Analysis – In the event of an issue, how long will it take to be resolved, what costs will the Owner cover, financial strength of each party.
- Alternate Financing Arrangements, based on the unique bio-process involved, the site, feedstocks, offtakes and contractors involved.
- Project sensitivity to Market changes – mitigations available.
- Pass-through cost elements.
- Cost & Schedule Certainty.
- Reserve Funds, draw-down schedule, working capital arrangements.

Sustainability

Bioeconomy Projects require proof of sustainability along the full value chain.

Project Due Diligence Must Contain a Sustainability Report, including:

- **Chain of Custody - feedstock contracts**
- **Certification status of feedstock and its supplier**
  - Forestry, Agricultural, Urban/Industrial wastes, with documented origins
  - Collection, Harvesting and Processing procedures
  - Supply Chain logistics
- **LCA/GHG/RIN calculations status, Logistics impacts, "Carbon Footprint"**
- **Analyses of compliance with target markets – Revenue impact**
- **Product value consequences**

Key Project Execution Issues

- Independent Review for Owner and Lenders
- Stakeholder meetings and communications – key to resource availability
- Risk Control – ongoing plans to recognize and correct issues arising
- Community Relations and Political Support – a continuing plan
- Craft labor availability, training, logistics, remote area issues
- Owner’s pre-commercial plans, facilities, staffing, training
- Start-Up Team
- Preparation for system-by-system inspection and turn-over to St-Up

Choosing a Due Diligence Review Team?

- **Experienced: Been There, Done That**
  - Most have conducted Discovery and Early Applied R&D
  - Fewer have conducted Commercially-Focused PDU scale development
  - Fewer yet have conducted large fully integrated pilot/demo development
  - Even fewer have run commercial operations
- **Internal**
  - Technical
  - Business
- **External**
  - Independent Third Parties
  - Fill the Gaps

LEE ENTERPRISES CONSULTING, INC.

Early-Stage Technologies: Techno-Economic Analysis

In early-stage technology development, there are always things you don't yet know. Techno-economic modeling helps you understand the implications of what you do know.

- **What are the Critical Factors Driving Capital Costs, Operating Costs, and Revenue?**
- **Where are the Areas of Greatest Uncertainty and Risk? How Can They be Mitigated?**
- **Which Parameters Should R&D Address First to Get to Market Most Efficiently?**

A Techno-Economic Model is More Than a "One-Off" Cost Estimate.

Techno-economic modeling provides value beyond economic evaluation and due diligence. As you move forward with development, it can be a tool for objective decision-making, tracking progress, and avoiding dead-ends.

Due Diligence / Owner Support Conclusions

- In-depth due diligence analysis is a Critical Requirement for bio-technologies
- A necessary service to Lenders and Investors to support Financial Close
- The Owner's Team often requires experienced support during the issue-intense phases of a major project, starting early with a design review program
- An Owner's Risk Control program should be tailored to each Owner's needs
- Risk Control should support:

No Surprises!

Do It Right The First Time!

About Lee Enterprises Consulting

♦ SEASONED, PROFESSIONAL EXPERTISE ♦

- **OUR TEAM:** We are the world's largest bio consulting group with over 150 subject matter experts, plus contract execution and commercial expertise.

- **OUR PROJECTS:** Our members have completed thousands of projects in biofuels, biomaterials, bio-technologies, feedstocks, and water/wastewater treatment.

- **OUR ADVANTAGE:** We provide independent third-party expertise that provides cost-effective, interdisciplinary teams with a single point of client contact without hiring additional full-time employees.

- **OUR CLIENTS:** Our clients include biofuels companies, biochemical companies, investors, banks, entrepreneurs, plant owners, law firms, biotechnology providers, energy companies, and engineering firms.