

**LIDCON**

## A New Petroleum Coking Process

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**LIDCON**

The logo consists of the word "LIDCON" in a bold, sans-serif font, centered within a rectangular frame. The frame is composed of two horizontal lines above and below the text, and two vertical lines to the left and right, creating a simple border around the company name.

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## Agenda

- ❖ History
- ❖ Concept Origination
- ❖ Devolatilizer Description
- ❖ LIDCON Advantages
- ❖ Refiner Financial Benefits
- ❖ Summary

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## History

- ❖ Company History
  - Founded in 2002
  - Owner/Inventor Doug Sullivan, P.E.
  - Conducting coking test program to validate science
  - Currently funded by owner, seeking capital to commercialize the process
  - Owned and operated manufacturer's representative firm, Whitson Sullivan Co. for over 30 years
  - Extensive experience in chemical engineering design and development for chemical and refining industries

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## Concept Origination

### ❖ Origination:

- Chemical process that employs special devolatilizer
- Process converts a tarry residue into solid carbon particles
- Recovers valuable vaporized volatile compounds
- Secrecy surrounding process meant this devolatilization process never publicized

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## Process Description

### ❖ Continuous LIDCON Process

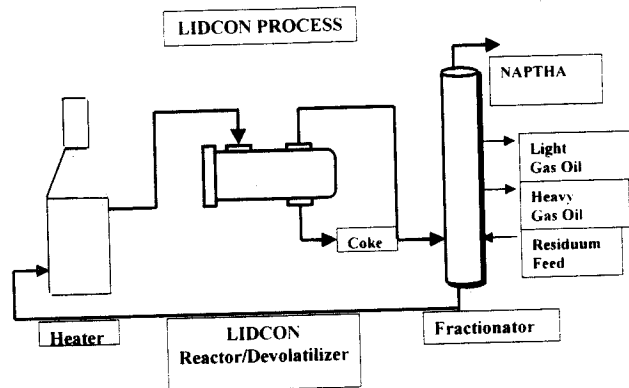
- Continuous versus batch process
- Closed system compared to the open drums during decoking of drums in delayed coking process
- Unique reactor-devolatilizer applies a mixing and kneading action to the viscous coker feed stream
- Creates constant exposure of new interfacial surface between the viscous mass and the gas phase
- Releases most volatiles into the gas phase where current batch processes traps many volatiles in the solidified coke

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## Process Flow

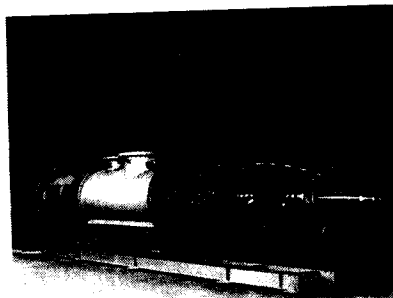


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## Devolatilizer Description

- ❖ Prototype
  - Rotating disks pass close to stationary arms
  - Produces kneading action on viscous mass
  - Close clearance assures internals continuously clean sticky mass



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## LIDCON Advantages

- ❖ LIDCON continuous coking process will:
  - Recover currently wasted valuable hydrocarbons
  - Reduce capital expenditures and operating costs
  - Reduce energy and utility consumption
  - Reduce the environment impacts of petroleum coke production
  - Reduce the manpower required to produce petroleum coke
  - Minimize waste water
  - Increase safety
  - Eliminate worker exposure to petroleum coke and its byproducts
  - Produce more uniform petroleum coke quality

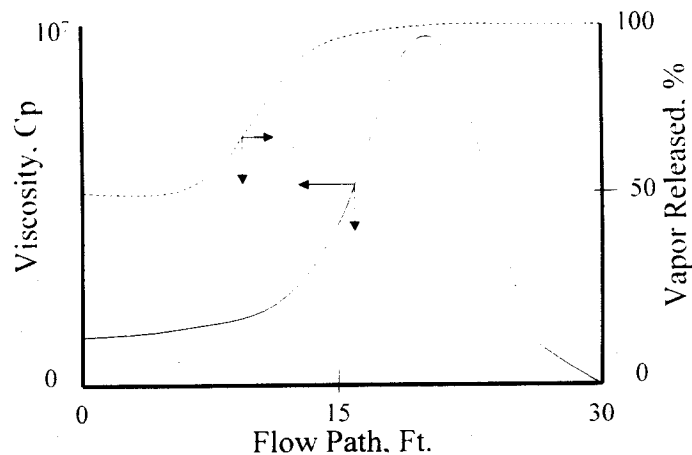
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## LIDCON Advantages

Projected Performance of Continuous Coker



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## Refiner Financial Benefits

- ❖ Refiners will benefit financially by:
  - Reduced capital expenditures - lower cost to construct new coker plant (30-40% less)
  - Retrofitting existing plants expect to yield ROI in 3 to 4 years
  - An average coker unit\* will receive a benefit of \$11.5 Million/year
  - Additional financial impact
    - ✓ Reduced manpower expense
    - ✓ Reduced medical and insurance expense due to improved safety
    - ✓ Potentially reduced liability of job related accidents
    - ✓ Reduced water treatment expenses

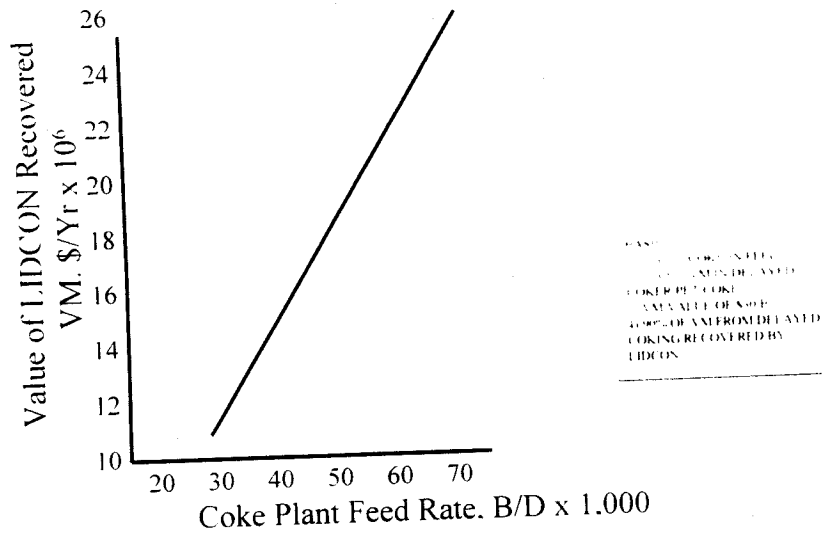
\*Average coker unit - 40,000 B/D; collected volatiles approximately \$9 Million/year increased revenue and utility Savings of approximately \$2.5 Million/yr

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## Refiner Financial Benefits



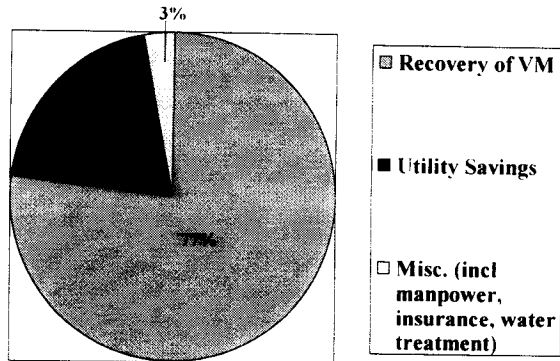
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## Refiner Financial Benefit

### ❖ Analysis of Financial Benefit



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## Summary

### ❖ LIDCON Advantages over Delayed Coking:

- Lower capital cost for new plants
- High return on investment for modifying Delayed Cokers to LIDCON
- Recover more volatiles
- Eliminate air emissions
- Reduce steam and water consumption
- Improve worker safety

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