

A photograph of an industrial facility at night, showing large cylindrical tanks, complex piping, and scaffolding illuminated by warm lights against a dark sky.

Wabash River Operations Update

October 7, 2008



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Gasification Technologies Conference 2008

Wabash River Operations Update

E-Gas™ Technology at SG Solutions



Refresher Course.....

- **DOE CCT Program Selection; Commercial Start in late 1995**
- **Repowering of existing Steam Turbine for 262 MW net rating**
- **2500 TPD bituminous coal feed
2000 TPD pet coke feed**
- **Largest IGCC and cleanest coal plant (of any kind) at start of operations**
- **Seamless transition from coal to petcoke feed in 2000**

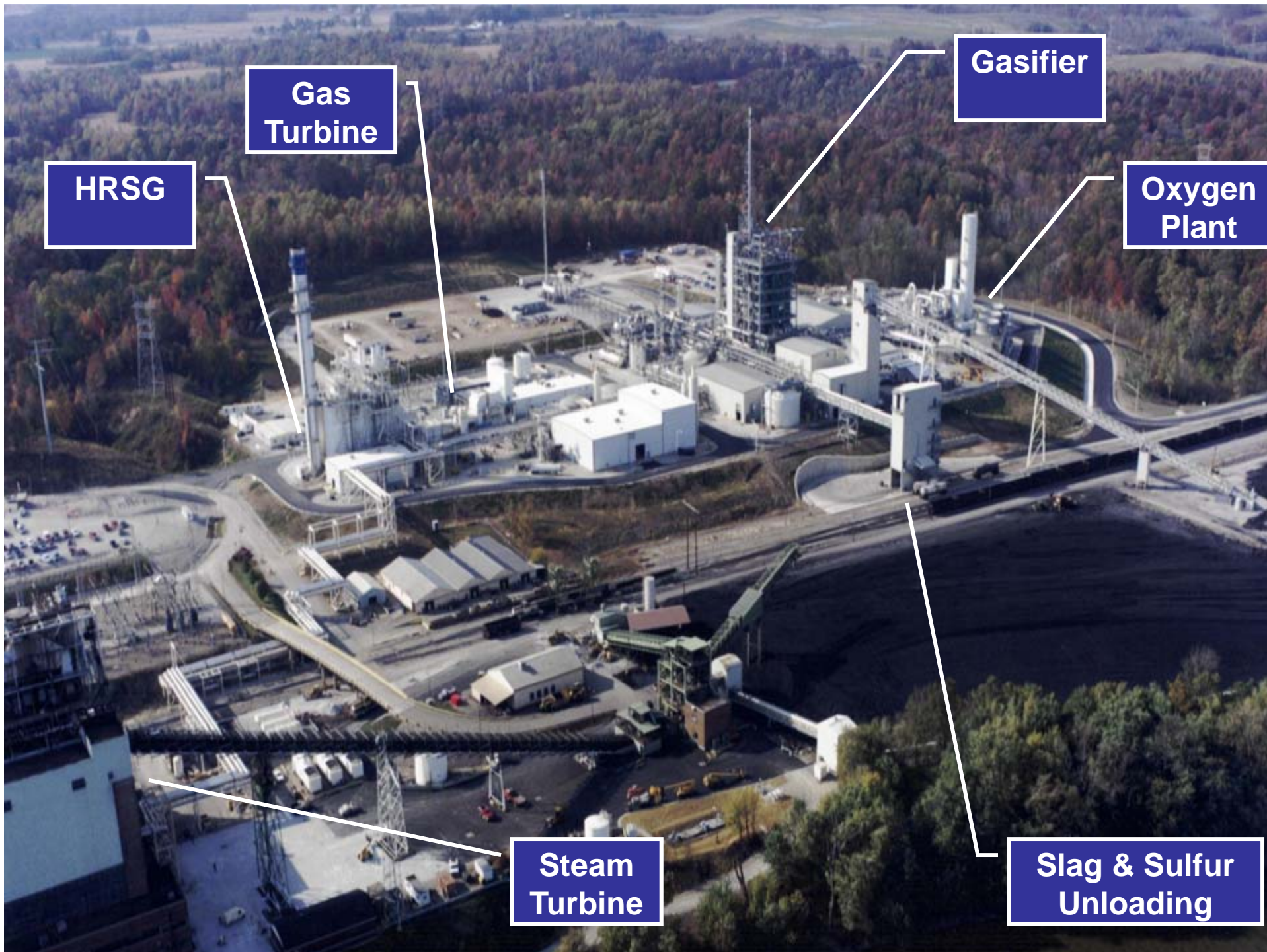
Wabash River Operations Update

E-Gas™ Technology at SG Solutions



Refresher Course.....

- **Plant Re-Start under New Ownership in 2005 as SG Solutions, LLC**
- **ConocoPhillips Operations & Maintenance leadership under Services Agreement**
- **More info?
See www.gasification.org Library for *2007 Briefing on Wabash River IGCC***



HRSG

**Gas
Turbine**

Gasifier

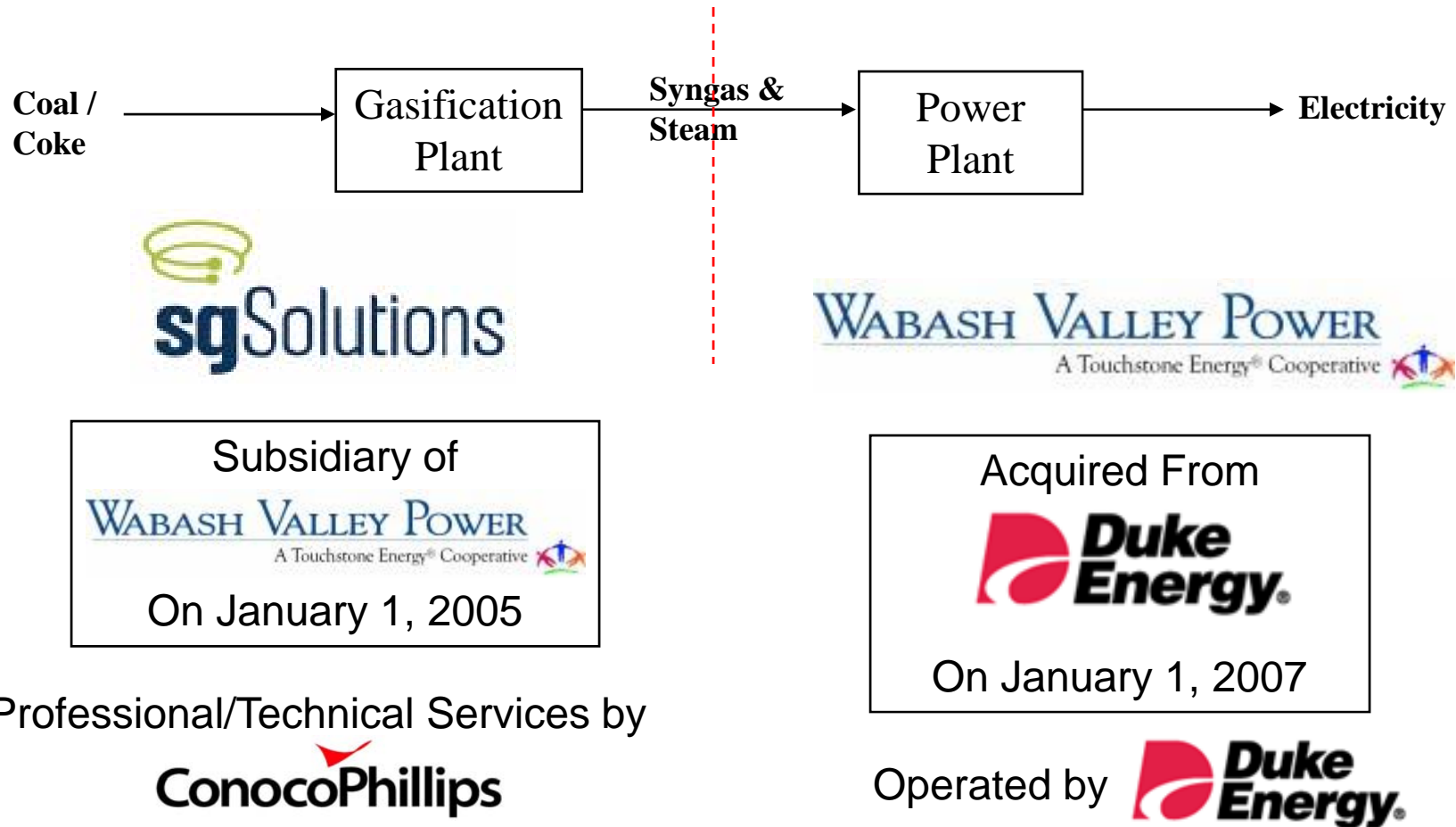
**Oxygen
Plant**

**Steam
Turbine**

**Slag & Sulfur
Unloading**

Wabash River Ownership

E-Gas™ Technology at SG Solutions



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Primary Focus.....

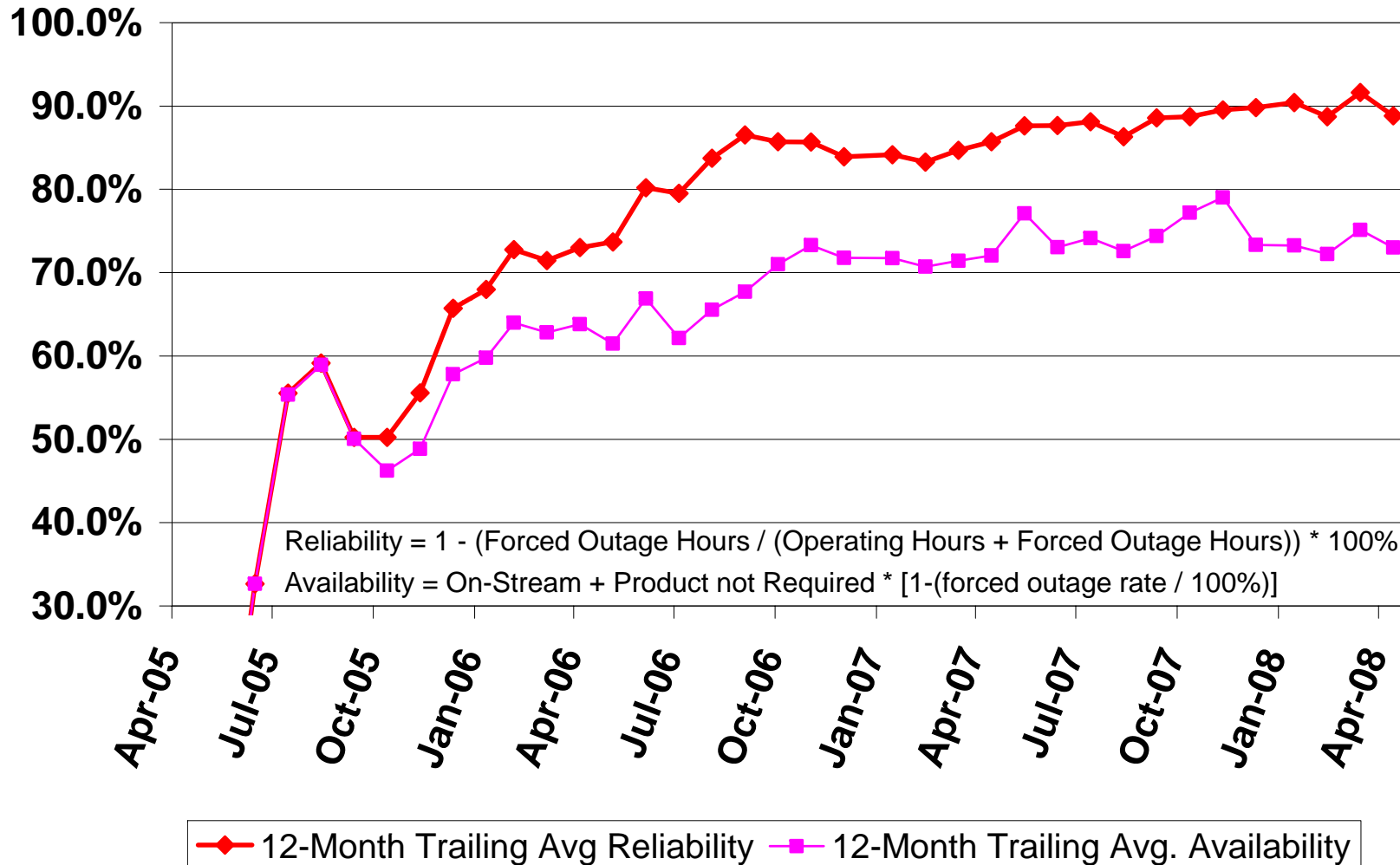
A new era of operations commenced under SG Solutions in 2005 after an 18-month downtime for contract restructuring & ownership change.

- **Recent Review of Production & Reliability Statistics**
- **Recent and Continuing Technology Advancements**

Wabash Historical 12-Month Trailing Averages

Gasification Technology Only

E-Gas™ Technology at SG Solutions

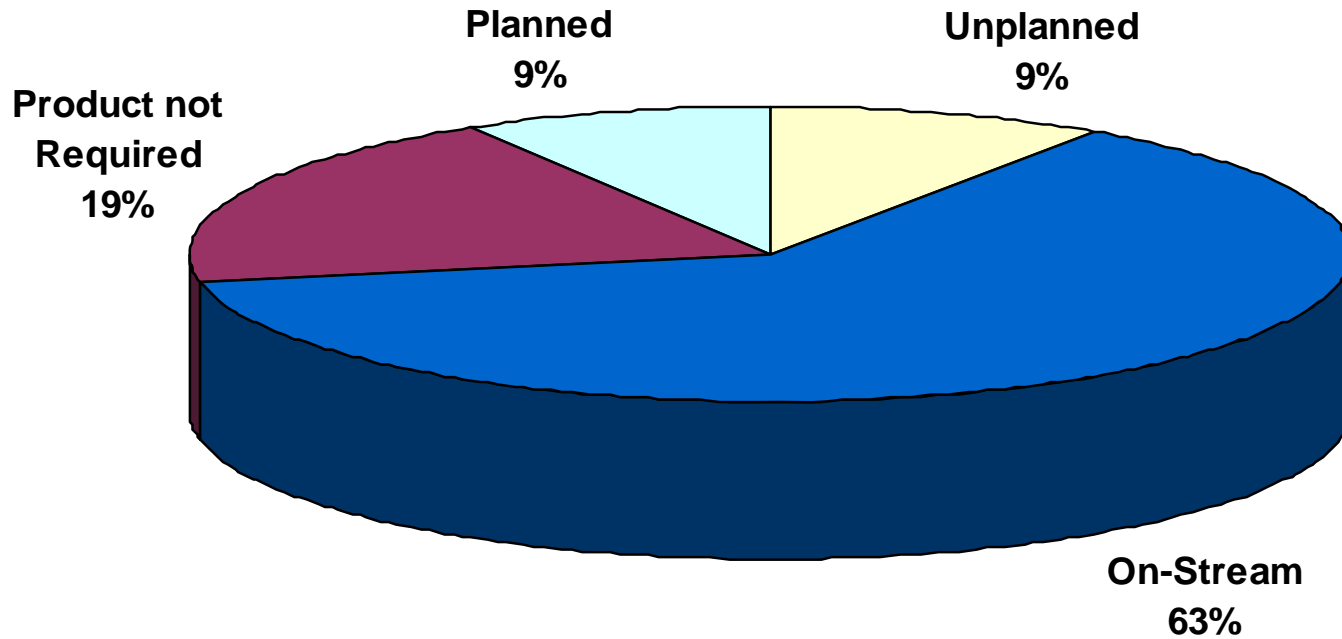


Wabash River Reliability

Gasification Technology Only

E-Gas™ Technology at SG Solutions

Operating Period
Dec 2005 to Apr 2008

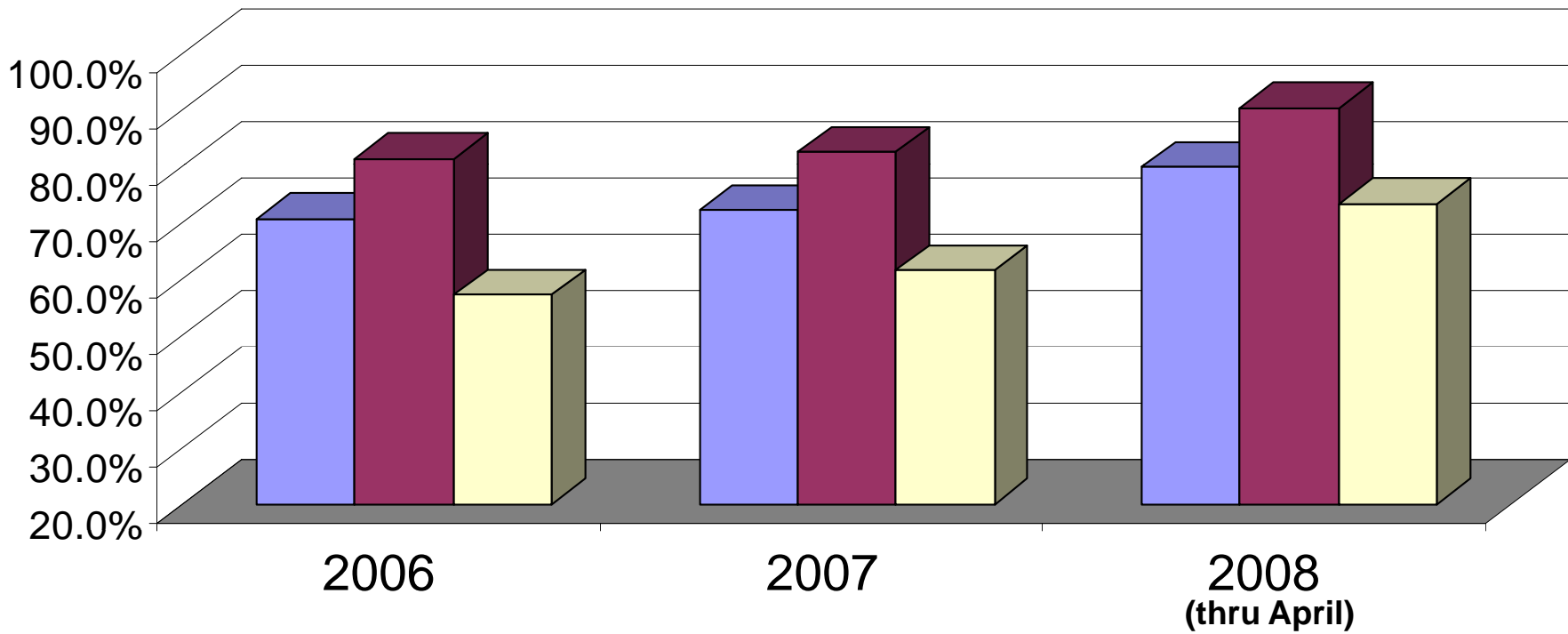


Wabash River Availability by Island

(Gas Island includes ASU)

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Gas Island Power Island IGCC



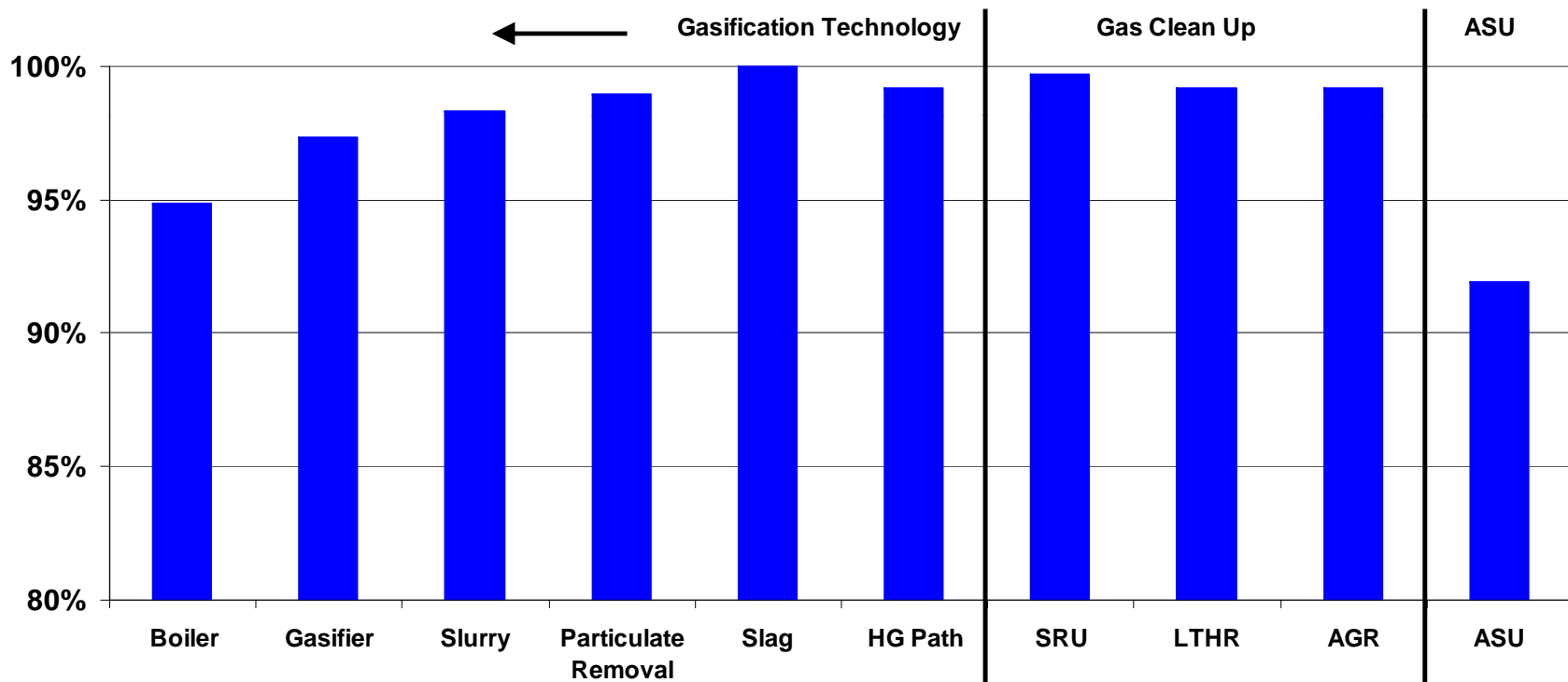
Availability = On-Stream + Product not Required * [1-(forced outage rate / 100%)]

Wabash River Reliability by Process Area

E-Gas™ Technology at SG Solutions

Operating Period

Dec 2005 to Apr 2008



$$\text{Reliability} = 1 - (\text{Forced Outage Hours} / (\text{Operating Hours} + \text{Forced Outage Hours})) * 100\%$$

Wabash River Reliability Summary

E-Gas™ Technology at SG Solutions

- Since start of 2006, Wabash River has achieved 79% availability at 90% reliability over a continuous 12-Month period
 - 8 of top 12 “longest continuous runs” in plant’s history are since start of 2006 (Best: 9+ weeks ended by planned outage).

- Key run limiting components and leading causes of downtime:
 - syngas cooler cleanout (occurs on a 10 - 15 week cycle)
 - partial hot zone refractory replacement annually
 - slurry mixer replacement (occurs on a 16 - 22 week cycle)

Operations & Maintenance Lessons

E-Gas™ Technology at SG Solutions

Syngas Cooler:

Understanding of ash deposition methods and means to improve; tube repair & replacement optimization; ferrule technology; inlet screen technology & optimization; less than 10% of tubes replaced after 10+ years

Gasifier Refractory:

Reduction in 2nd stage deposition; optimization of 1st stage liner (life and material costs); optimization of maintenance requirements (reduction in downtime)

Char Filtration:

Understanding and optimization of char transfer systems; internal gas distribution requirements; filter life optimization; filter maintenance optimization; blowback valve technology & reliability improvements; failsafe technology developed/optimized

Slurry Mixers:

Life optimization; understanding life limitations due to operating conditions

General Mechanical Integrity:

Replacement / Optimization of piping materials; Improved understanding of downtime corrosion issues;

Advancing E-Gas™ Technology

E-Gas™ Technology at SG Solutions

➤ Gasifier Refractory

- Single train plant originally designed w/ spare gasifier for off-line rebricks; Spare no longer needed.
- 2007 redesign now allows hot-face liner repairs on typical 17-day spring & fall outage as demonstrated in 2008.
- Continue researching/testing new materials

➤ Dry Particulate Filtration

- Advanced alloys & improved construction
- Candle element life improved to 10,000 hrs
- Current prototype expected to yield 2X life
- Planned element changeout takes 7-8 day outage

Advancing E-Gas™ Technology

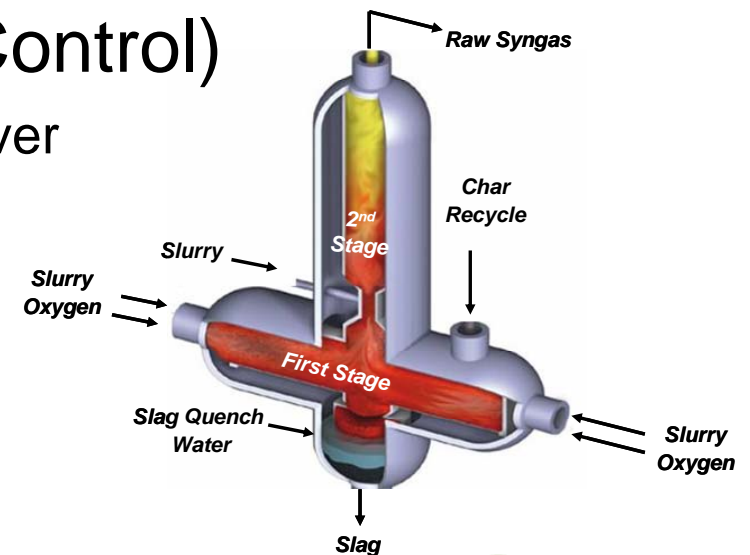
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➤ Abrasion Resistant Lined-Pipe

- Demonstrated success in the 1990s w/ high velocity erosive particulate in small bore piping
- Successful scale up to large bore syngas (up to 28") piping at 800 deg F and 400 psig has eliminated erosive wear in particulate laden syngas stream.

➤ Ash Management (Gasifier Control)

- Fluxant studies to control ash carryover
- Dynamic modeling to optimize syngas quench media & locations
- Developing optical sensor to monitor gasifier flame spectral characteristics (DOE, GTI)



Advancing E-Gas™ Technology

E-Gas™ Technology at SG Solutions

➤ Slurry Feed Mixers

- Typical mixer life at 2500+ hrs
- Typically run to failure – operating data gives 3-6 day notice
- Planned changeout in a 24hr window

➤ Optimizing Plant Start-Up

- Cold start via pressurized, inert atmosphere pilot burners
- Seamless transfer from gasifier heat-up to slurry feed
- No sulfur emissions from cold start to syngas operation on CT
E-Gas technology has never flared sour syngas as part of a normal plant start-up in 20+ years.

Wabash River Operations Update Summary

E-Gas™ Technology at SG Solutions



- Advances in materials & maintenance processes (*refractory, particulate filtration*) reducing O&M costs and downtime
- Ash management techniques improving on-line time between planned outages
- Reliability projects identified and being implemented jointly w/ ConocoPhillips
- Single train gasification plant availabilities achieving 80%

A photograph of an industrial gasification plant at night. The scene is filled with large cylindrical vessels, complex piping, and scaffolding, all illuminated by warm yellow lights against a dark blue twilight sky.

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