

**3/23/10
LUNCH &
LEARN:
EMERGING
COAL
MARKETS
& TECH...**

Usibelli Coal Mine, Inc. Emerging Coal Markets and Technologies

Alaska Capitol Building
Lunch and Learn Program

March 23, 2010

Steve Denton, VP Business Development



Emerging Coal Markets and Technologies

- Coal Formation and Rank
- Alaska's Coal Resources & Markets
- Alaska's Export Infrastructure
- Export Markets
- Combustion Technologies
- Coal Gasification



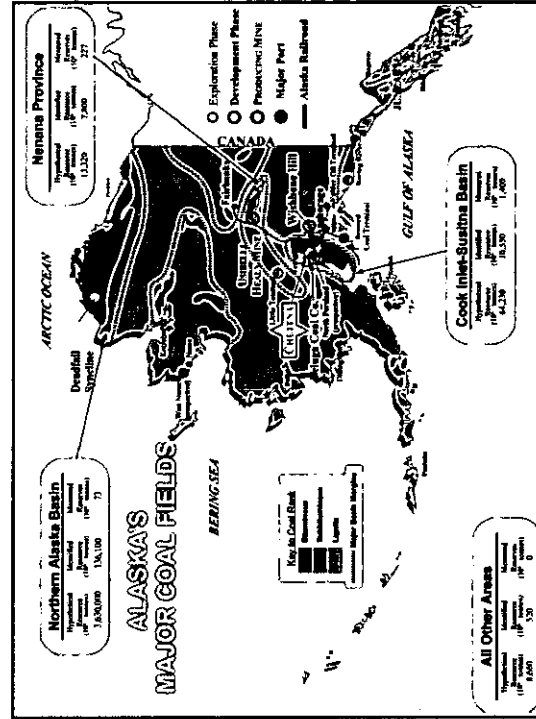
Coal Rank



Today

Usibelli Coal – Sub-bituminous
About 20 million years old

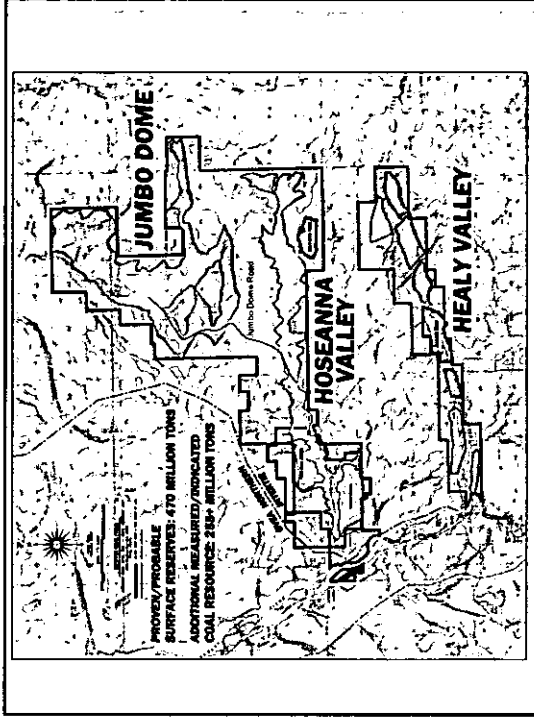
300 million
Years



Alaska Coal Deposits With Export Potential

Deposit	Coal Rank	Million Short Tons	
		Reserves	Resources
Nenana (Healy)	Sub-Bituminous	500	7,000
Wishbone Hill	HV Bituminous	20	52
Cook Inlet	Sub-Bituminous	1,400	10,000
Deadfall Syncline	HV Bituminous	30	100+
Bering River	LV Bituminous	35	60

1 billion tons coal ~ 15 - 25 tcf natural gas



Alaska Coal Markets

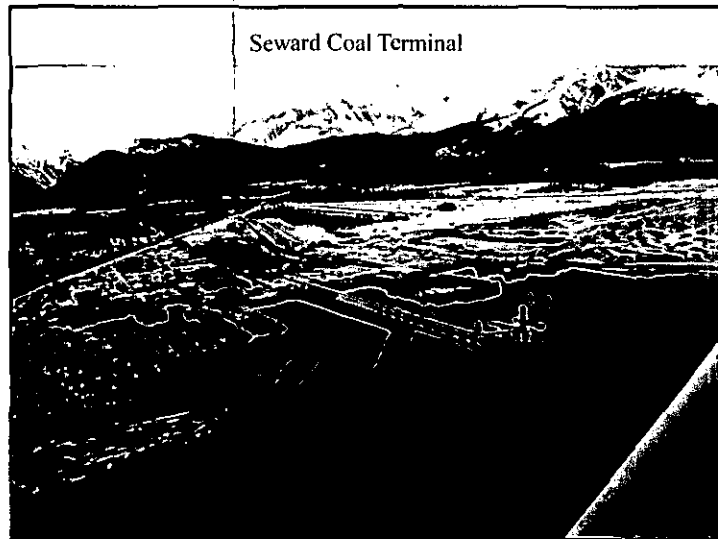
- o 2009 Alaska consumption - 975,578 tons
Total for 2009 - 1,861,714 tons.
- o Existing Customers
 - 5 cogeneration plants, Clear, Wainwright, Eielson, Aurora, University
 - GVEA Unit 1 mine mouth plant in Healy
 - North Pole Coal, residential/commercial space heating
 - Seward Terminal, residential/commercial space heating
- o Potential new markets.
 - Healy Clean Coal Project
 - Railbelt power generation
 - Synthetic fuel production



Alaska Railroad Corporation

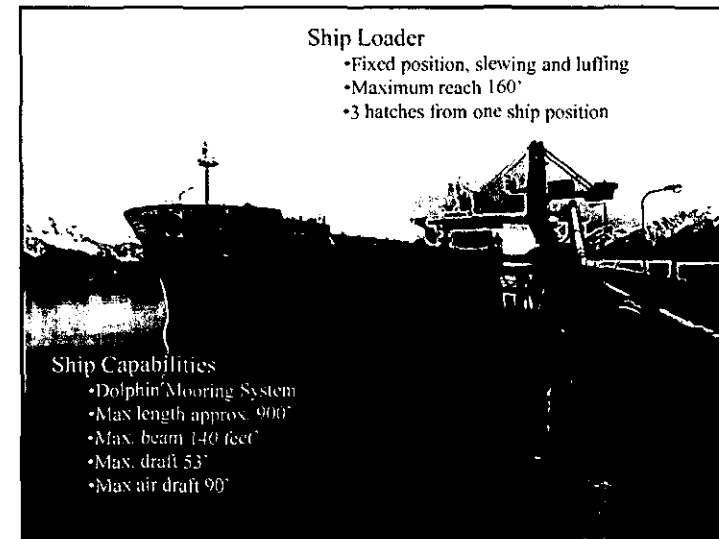
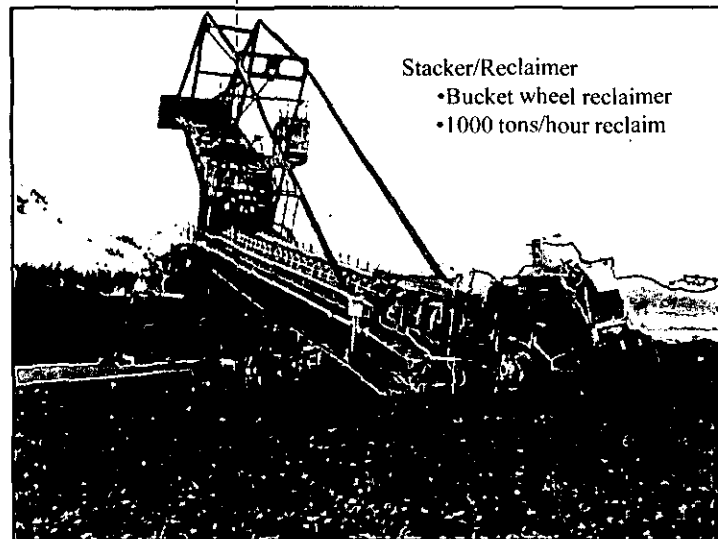
- o Owned by State of Alaska
- o Fairbanks to Seward - 470 miles
- o Healy to Seward - 358 miles
- o Mostly single line
- o Severe grades and corner radius areas
- o Summer traffic congestion
- o Maximum 80 car unit train to Seward

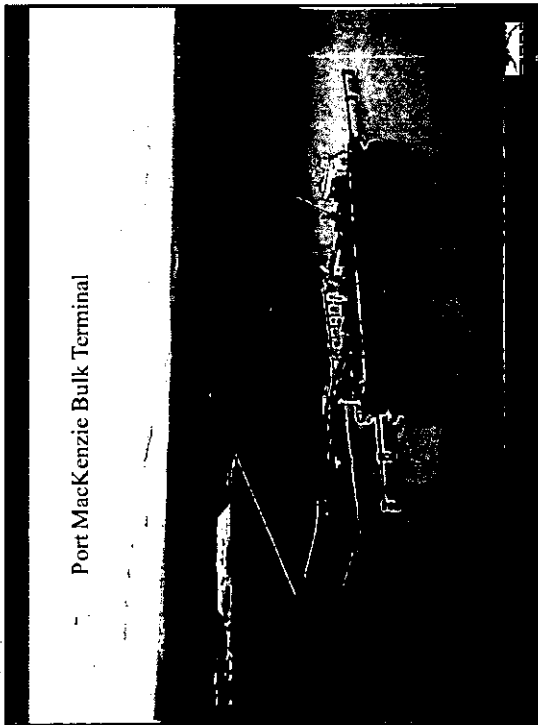




SEWARD COAL TERMINAL

- 1.5 million mt/year capacity
- 12,000 to 16,000 mt/day loading rate
- 120,000 mt stockpile capacity
- 16 meter draft (53 feet)
- 90,000 ton maximum ship size
- Owned by the Alaska Railroad Corp.
- Operated by Aurora Energy Services, LLC, affiliate of Usibelli Coal Mine, Inc.





Port MacKenzie Bulk Terminal

Port MacKenzie

- Located about 150 miles closer by rail, 2-3 days longer for bulk carriers.
- Currently no rail service, 43 miles new track required.
- Cape class draft, high tide departure due to shoals.
- Extreme tide range – 35 feet
- Currents to 5 knots at angle to dock
- 9 – 10 month ice free season
- Fixed loading arm
- Currently loading wood chips and gravel



World Coal Production

EIA Preliminary 2007 Data
(million short tons)

North America	1,234
Central/South America	92
Europe	814
Eurasia	537
Middle East	1.4
Africa	289
Asia & Oceania	4,069
Total	7,036



PacRim Coal Importers

EIA Preliminary 2007 Data
(million short tons)

	Production	Consumption	Imports
Japan	0	207	207
South Korea	3	106	103
China/Hong Kong	2,804	2,904	100
India	528	579	51
Taiwan	0	73	73
Thailand	20	36	16
Malaysia	1	12	11
Mexico	12	19	7
Chile	1	6	5

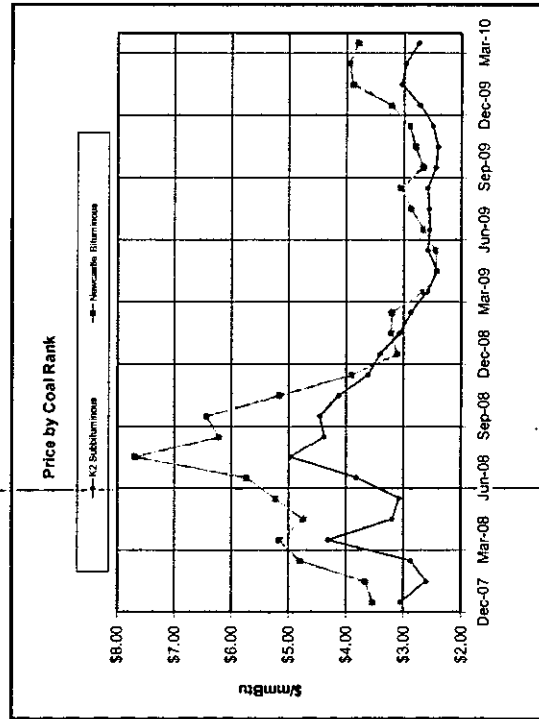
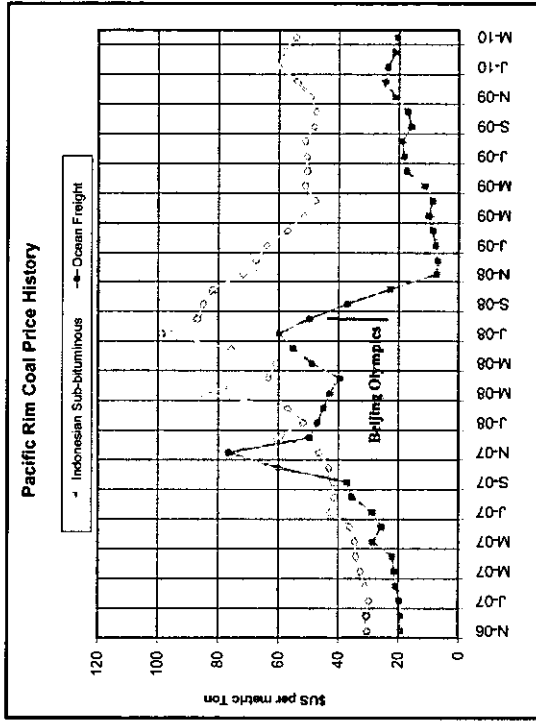


PacRim Coal Exporters

EIA Preliminary 2007 Data
(million short tons)

	Production	Consumption	Net Export
Australia	428	146	282
Indonesia	180	50	130
Russia	347	261	86
South Africa	283	203	80
Vietnam	44	19	25
USA	1,146	1,129	17
Canada	76	62	14

Approximate Total Seaborne Coal Trade - 750 million metric tons



Expanding Coal Demand

- Platts International Coal Report, March 22, 2010
- Seaborne demand up by 300 million tons by 2015
 - India - 125 million
 - China - 45 million
 - Japan - 25 million
 - S. Korea - 15 million
 - Taiwan - 10 million
 - Remaining Pacific - 30 million
 - Atlantic - 45 million
 - New power plant construction
 - India - 55,000 megawatts under construction
 - China - 55,000 megawatts in 2010
 - Around 1 billion tons new demand by 2015



Key Players - Demand

- India
 - Swing buyer - both Pacific and Atlantic sources
 - Committed to major coal generation expansion
 - Supply shortages from domestic producers
- China
 - Continued high growth rate.
 - Internal transportation infrastructure challenged
 - Large coal reserves
- South East Asia
 - High growth rate and internal consumption
 - Primarily Australia/Indonesia sources



Key Players - Supply

- Australia - Largest export supplier
 - Port and Rail limitations (50+ queue at Newcastle)
 - Large bituminous reserves
- Indonesia
 - Predominant supplier of sub-bituminous
 - High internal demand growth
- South Africa - Pacific and Atlantic supply source
- Colombia
 - Potential source for India
 - Aggressive expansion plans
- Russia
 - Both Atlantic and Pacific ports
 - Long rail transport distances



Alaska Export Opportunities

- Currently approximately 5,000 megawatts of generation can use 10 - 50% Alaska coal.
- Chile - Plans to add approximately 7000 megawatts by 2017, mostly coal.
- Japan/China/Korea - High demand growth from India and South East Asia will stress supply for North Pacific consumers.
- South Africa - Increased demand from India and SE Asia will create increased demand for Colombian coal in Europe.
- Colombia - Less attractive source for Chile due to high Europe demand.



Usibelli Coal Exports


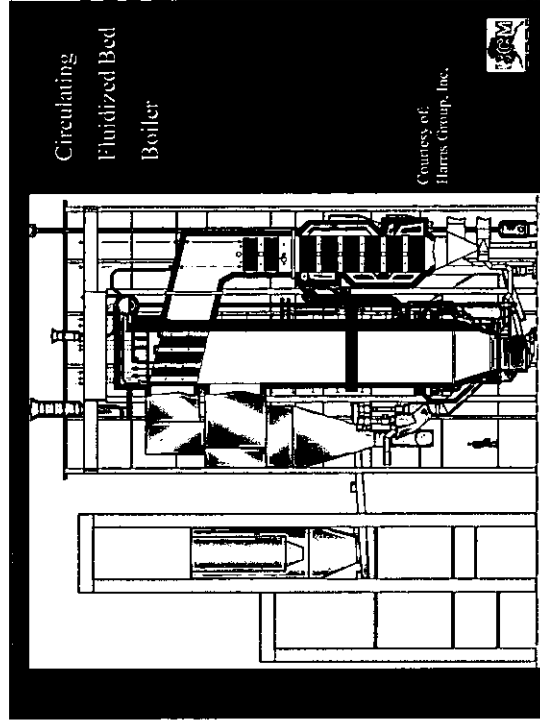
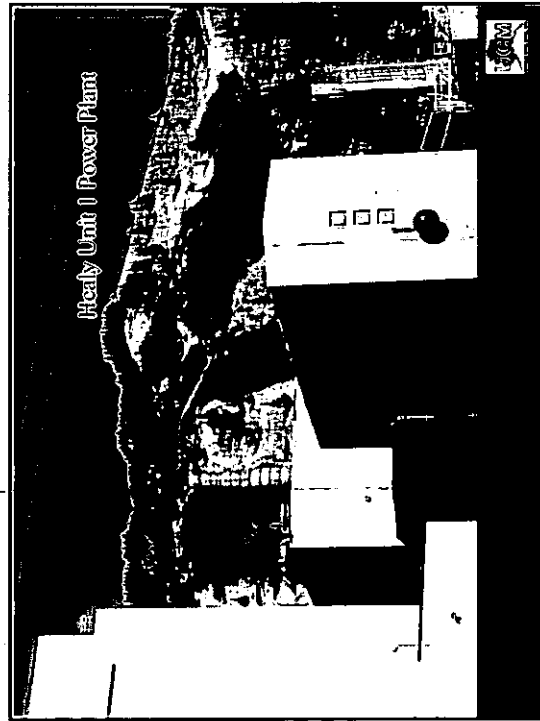
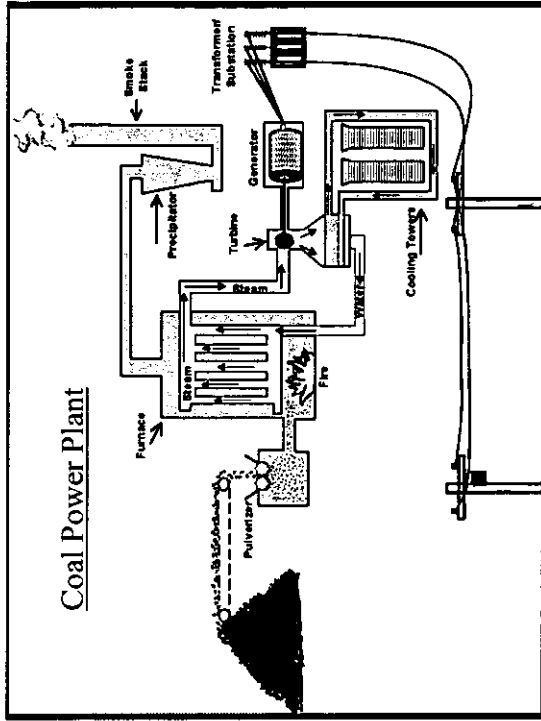
- Up to 723,000 mt to Asia 1985 - 2003
- Recent years (metric tons):

	Asia	Chile	Total
2004	408,840	86,110	494,950
2005	362,660	93,360	456,020
2006	319,610	73,170	392,780
2007	0	279,624	279,624
2008	157,582	364,994	521,000
2009	336,843	466,908	803,751



Power Generation Options

- Traveling Grate Stoker - Fairbanks
- Conventional PC Power Plant - Healy I
- Circulating Fluid Bed - fuel diversity
- Super and Ultra Supercritical PC
 - Better efficiency and modest cost
- IGCC - high cost and high efficiency
- Gasification for polygeneration
 - Electricity plus liquid fuel or chemicals

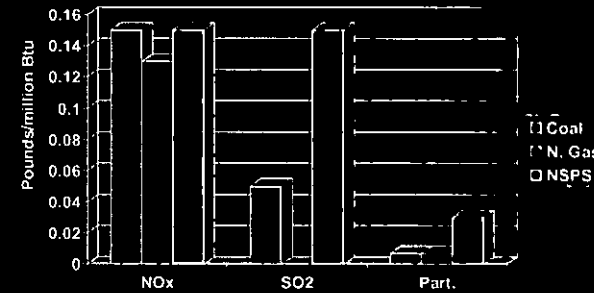



Coal A Safe & Clean Energy Choice

- Safe to transport. Non-toxic if spilled
- Low combustion potential.
- Useful by products from ash.
- Clean burning with modern technology.
- New plants will employ pollution controls for all pollutants, including mercury.
- Mine lands reclaimed and returned to productive use.



Coal and Natural Gas Emission Comparison



Gasification Coal's Future?

New Life For An Old Technology

- Integrated Gasification Combined Cycle (IGCC)
- Fischer-Tropsch (FT) Fuel
- Fertilizer/Ammonia
- Petrochemicals



Gasification Process

Organic material (C + H) + Water + *Not Enough* (O₂)
+ little heat

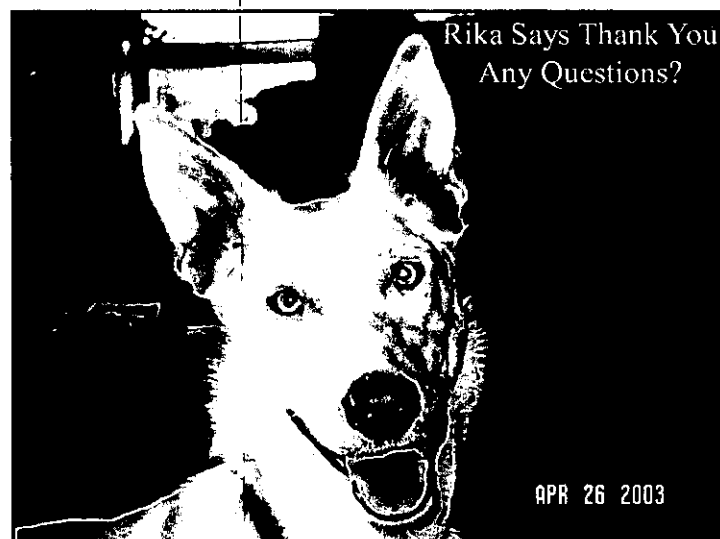
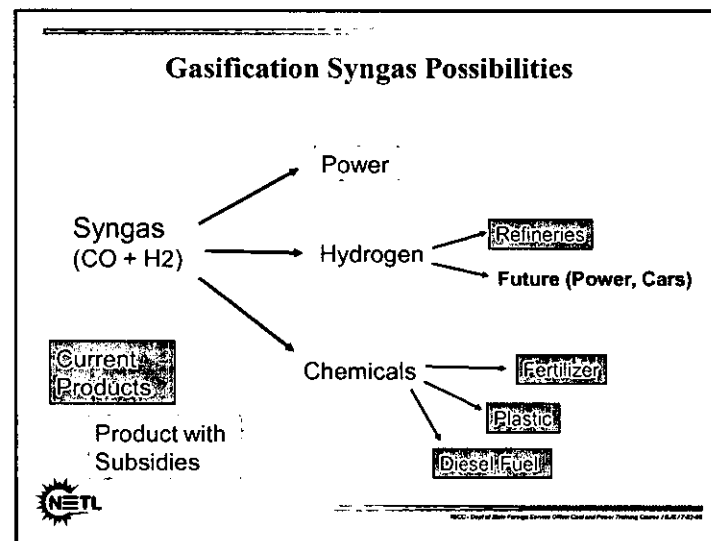
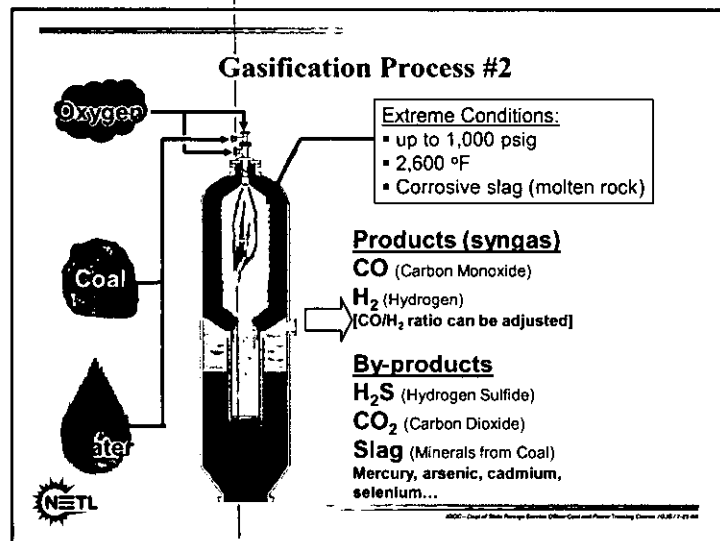
Results in gasification:

Some Heat + Carbon Monoxide (CO)
+ Hydrogen (H₂) + ash + pollutants

- Can convert almost any organic material into heat and a combustible gas
- Typically the organic material is coal or pet coke, but biomass, municipal waste, natural gas, etc. will all work (pet coke is refinery waste)



NETL - Dept of Energy, Energy Research Center and Energy Research Center, Pittsburgh, PA 15213-1088



Useful Web Sites

- www.eia.doe.gov
 - Extensive data on all types of energy
- www.teachcoal.org
 - American Coal Foundation site with lots of information for those wanting to teach or learn about coal.
- www.uky.edu/KGS/coal
 - University of Kentucky – Kentucky Geological Survey web site.

TCM