Waste Coal to Ultra Clean Fuels
applying the
Shell Coal Gasification Process

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WMPI Project
Waste Coal to Ultra Clean Liquid Fuels

Integration of three major blocks:

1. **Gasification** of Waste Coal to Produce Synthesis Gas

2. Conversion of Synthesis Gas using **Fischer-Tropsch** Technology to Liquid Fuels

3. Combustion of Tail Gas to produce **Electric Power** and Steam
The Team

- WMPI Pty., LLC
- Nexant
- Shell Global Solutions U.S.
- SASOL Technology / ChevronTexaco
- Uhde
Sponsorship for WMPI Project

U.S. Department of Energy,
Through the
National Energy Technology Laboratory
Under the
Clean Coal Power Initiative (CCPI)
DE-PS26-02NT41428
Development of Uhde's Gasification Portfolio

K-T
- Koppers-Totzek 1941

Windler 1928

TKP
- Koppers-Totzek

TCGP
- K (oil) - 1952
- Gae, Florida

KTP
- 1956
- Tokyo, Japan

KTP
- 1957
- Krefeld, Germany

KTP
- K (oil) - 1957
- Sewall's Point, FL

KTP
- K (oil) - 1950
- Philadelphia, USA

KTP
- 1952
- Alexandria, Egypt

KTP
- 1955
- Vivero, Spain

HTW
- 1973
- Development

KTP
- 1975
- Wolfsburg

KTP
- 1976
- Gae, Florida

KTP
- 1979
- Sewall's Point, FL

KTP
- 1979
- Philadelphia, USA

KTP
- 1984
- Krefeld, Germany

KTP
- 1986
- Wolfsburg

KTP
- 1986
- Vivero, Spain

KTP
- 1988
- Wolfsburg

HTW
- 1988
- Cork, Ireland

HTW
- 1988
- Wolfsburg

HTW
- 1993
- Wolfsburg

HTW
- 2000
- Stahl, Japan

HTW
- 2002
- Vivers, Spain

SGP
- Shell-Koppers - 1974
- Senior Development

Prenflo
- SCGP

SCGP
- 1963
- Houston, USA

SCGP
- 1964
- Hudson, USA

Prenflo
- 1966
- Prenflo, NC

188 SGP Readers (Shell reference)

SKG
- Texaco - 1953
- Texaco, Brazil

SKG
- Texaco - 1959
- Texaco, Brazil

SKG
- Texaco - 1960
- Texaco, France

SKG
- Texaco - 1971
- Texaco, Australia

SKG
- Texaco - 1981
- Texaco, Brazil

SKG
- Texaco - 1988
- Texaco, South Africa

Prenflo
- 1959
- Prenflo, USA

Prenflo
- 1966
- Prenflo, USA

Prenflo
- 1974
- Prenflo, USA
Gilberton
Frackville, Pennsylvania

A company of ThyssenKrupp Technologies
Uhde

ThyssenKrupp
Solids Processing

- Raw Culm
- Raw Tailings

Culm / Tailings Processing
- +10” reject (Rock)
- ¾” reject (Rock)
- 28 mesh reject (Rock)
- 3/4” carbon
- 28 mesh carbon

Homogeneously mixed Feedstock
- Fluxant
- Petcoke
- Coal Dust
- Slag fines

Coal Milling & Drying
- Coal Dust
- Slag fines

Gasification
- Raw gas
- Slag
- Fly ash
- Petcoke
- Fluxant
Shell Coal Gasification Process (SCGP)

Solid Feedstocks
- Membrane Wall protected by the slag layer

**solid** slag

Gasifier space > 1500 °C

molten slag flows downwards

Water Tube

BFW, 40-70 bar
Membrane wall for gasifier
(test piece)
IGCC Puertollano 318 MWel, net
(feedstock: petcoke / coal)
Preliminary Plot Plan
Project Benefits

• **Economical Benefits**
  1. Coal Production & Revitalization
  2. Creating Jobs: Construction and Operating
  3. Energy Diversification & Independence

• **Environmental Benefits**
  1. Waste Utilization
  2. Ultra Clean Fuels
  3. Extreme low emissions from production and fuel use
Project Execution Structure

WMPI

Lump Sum Turn Key Contract

Uhde / S&W - Project Directorate
Single Point Responsibility

ASU Vendor Package Unit

Utilities

Power Block

S&W - Basic Engineering

S&W - Basic Engineering

Uhde & S&W - Task Force
Detail Engineering, Procurement, Supervision, Commissioning

S&W - Civil and Erection

Gasification Island

Syngas to Liquids Unit

Downstream Units

Shell / Uhde
Sasol / ChevTx
Licensors

Lump Sum Turn Key Contract

WMPI
Summary

• Estimated net plant efficiency: 42%
• Economical & Marketable Fuels & Power
• Advanced Technologies for Future Needs
• Demonstrate Operability, Reliability
Conclusion

The WMPI Project:

Paving the way forward for coal to continue as the most secure and economical source of energy