

**FY96-XXIII-66**  
**DEVELOPMENT OF ANODE BINDER & ASPHALT SUBSTITUTES**  
**FROM DGC'S TAR OIL PITCH**

**CONTRACTOR:** Dakota Gasification Company

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**PARTICIPANTS**

<u>Sponsor</u>	<u>Cost Share</u>
Dakota Gasification Company	\$90,250
ND Industrial Commission	<u>60,000</u>
Total	\$150,250

**Project Schedule – 18 Months**

Contract Date – 3/13/96  
Start Date – 3/12/96  
Completion Date – 6/15/97

**Project Deliverables**

Interim Report - 4/17/96 ✓  
Final Report - 2/5/97 ✓

**OBJECTIVE / STATEMENT OF WORK**

The primary objective of this study is to produce oxidized pitch from DGC's tar oil and to evaluate the oxidized pitch product as a chemical feedstock used in the manufacture of carbon anodes for the aluminum industry. In addition, the oxidized pitch will be evaluated as an asphalt substitute for other applications such as roofing shingles and driveway sealers. DGC has teamed with Allied Signal for technology development and evaluation.

**STATUS**

DGC produces approximately 450 million pounds per year of raw tar oil. About half of the raw tar oil is considered tar pitch. Feedstock for the thermal oxidation was produced by distillation of the raw tar oil. The first distillation was done at atmospheric pressure to remove water and light hydrocarbons. The second distillation was done at a low vacuum to remove cresylic acid and a tar oil distillate fraction. The final distillation was done at a high vacuum to yield a tar pitch residue.

Thermal air oxidation of the tar pitch was done in a pilot-scale 60-gallon reactor design to operate at 14 PSIG and 700 °F. DGC provided analytical samples and drum-size trade samples for testing and evaluation. The following conclusions were reached:

- The desired softening point specification was reached. However, desired coking value and density specifications were not reached.
- Blending of the DGC material with other pitch material produced an acceptable anode binder pitch for the aluminum industry. However, there are other pitch-extenders, which may have better product properties.
- Further work is needed to improve product quality.
- Further work is needed to evaluate the DGC pitch in other applications such as roofing tar.