

Ed COOLEY

Office: 970-625-0102

Cellular: 970-319-5386

PROFESSIONAL AFFILIATIONS

Colorado Mountain College Advisory Board Member

Past Board of Directors Member and Current Member National Oil Shale Association

Past Director Garfield County Fair Board

Past Member Board of Directors of Colorado Water Congress

Founding Director and President of Garfield School District RE 2 Education Foundation

Past Director Grand Valley District 16 School Board, Parachute, Colorado

Past President Rotary Club, Rifle, Colorado

Past Director Chamber of Commerce, Rifle, Colorado

SUMMARY OF EXPERIENCE

2013 – Present Mr. Cooley is a consultant doing engineering design, process development and environmental permitting for oil shale, oil and gas, and sodium minerals industries. Also, he is a Senior Associate with Sage Geotech Inc.

2005 – 2012 Chief Operating Officer - Shale Tech International Partners (STIP). Mr. Cooley oversaw operations at the Paraho Research Center near Rifle, Colorado. The Center is operates 24 hours per day, 365 days per year and employs 4 managers, 19 technicians, 5 engineers and 3 administrative staff. The Research Center conducts studies on oil shale resources and tests the viability of processing oil shales from North American and International oil shale reserves to produce syn-crude for conversion to commercial and military grade fuels. The Research Center consists of Paraho pilot scale retort, raw materials handling and testing systems, oil recovery systems, ash handling and testing system, a laboratory with Fischer Assay Benches and oil testing capabilities, state of the art DCS control and datalogging systems, oil storage and sampling systems.

Company Projects - 2005 thru 2010: Demonstrated the viability of processing oil shale from the McFarlane, Kerosene Creek and Stuart North reserves held by Queensland Energy Resources in Queensland Australia. Each of the three different shales was tested using the internal combustion, externally heated and combination modes of operation in the Paraho pilot scale retort which required three separate distinctive testing programs. Each individual program was monitored for environmental components of each

process stream. Process and engineering data from each program were compiled and analyzed to support economic and mechanical design decisions for the project.

Upon completion of project demonstrating viability of processing oil shale from Australia in the Paraho retort, Mr. Cooley managed the engineering design, procurement of equipment and installation of the Technology Demonstration scale Paraho retort and support systems at Queensland Energy Resources' New Fuels Development Center at Gladstone, Queensland, Australia. During the project, he served both as Shale Tech International's project manager and as QER's project engineer for the retort design and construction.

Company Projects – 2010 thru 2012: Continued operation of the pilot scale retort on Green River oil shales of Colorado and Utah with emphasis on advancing the further development of the ParahoII retorting technology. Updated the Commercial Scale Paraho Retort design package with improvements developed during the 2005 to 2010 operations and converted the original design drawings and new modifications to current AutoCad and 3D Model status.

1997 – 2007

Project Manager - American Soda L.L.P (a partnership between Williams Companies and American Alkali). Mr. Cooley was involved in the development of solution mining and processing technology for recovery of nahcolite from the Green River Oil Shale formation for production of sodium bicarbonate and sodium carbonate.

Technology Demonstration Project 1997 – 1998: Mr. Cooley was responsible for engineering design, construction and operation of a pilot plant to demonstrate commercial viability of American Soda's solution mining technology.

Commercial Scale Project 1999 – 2000: Mr. Cooley led the team that completed a Federal Environmental Impact Statement, obtained EPA Class III Injection Well Permits, Colorado State Air Quality & Water Quality Permits and Local Special Use and Construction Permits. He was involved in the engineering design, procurement, construction and startup of two 1.5 million ton per year commercial scale plants; the design and construction of two 12" diameter insulated hot product pipelines, each 44 miles in length for transport of product between the two plants. Work included drilling and placing into operation 32 solution mining wells. This was a \$450 million dollar project with up to 1,400 contractors and employees.

2001 – 2004: Mr. Cooley was the General Services Manager responsible for New Construction, Environmental, Health & Safety, Public Relations, New Business Development and Permitting for American Soda operations.

Sale of American Soda to Solvay Chemical Co. 2005 – 2006

Solvay Chemical purchased the American Soda facilities in 2004 and Mr. Cooley agreed to facilitate the transition of operations to another site near Parachute, Colorado and help modify the plant design and operations.

- 1987 – 1997 Vice President of Operations - New Paraho Corporation Mr. Cooley managed the Paraho Research Center near Rifle, CO. During this period, they developed the SOMAT shale oil modified asphalt technology and demonstrated the product in multiple highway test strips located in Texas, California, Michigan, Wyoming, Utah and Colorado.
- 1986 – 1987 Research Manager - Western Research Institute/University of Wyoming
Mr. Cooley served as Manager of WRI's research facility at Laramie, Wyoming. They were involved in the Technological Development of a High Frequency Microwave Enhanced Fluidized Bed reactor for sulfur removal from coal, oil shale and tar sands. They also examined the application of microwave heating for in-situ recovery of oil shale, tar sands and gasification of coal.
- 1985 – 1986 Construction Manager - Twombly and Associates
Mr. Cooley oversaw the construction of 75 MegaWatt Co-Generation Power Plant at Rifle, Colorado.
- Construction Manager - Schmeuser & Associates
Managed civil and mechanical construction projects at Union Oil of California commercial oil shale plants at Parachute, Colorado.
- 1973 – 1984 Vice President of Operations - Paraho Development Corp.
Mr. Cooley served as the Manager of the U.S. Bureau of Mines, Anvil Points Oil Shale Mine and Research Center with up to 118 employees.
- 1973 – 1979 Project: Paraho Demonstration Project which included the construction and operations for demonstration of a Paraho Pilot Plant scale oil shale retort and a Paraho Semi-Works scale oil shale retort application of vertical inserted mechanical roof bolts. In addition to demonstrating the reliable continuous operating capabilities of the Paraho Semi-Works and Pilot Scale

retorts, approximately 100,000 barrels of shale oil were produced and refined to produce military specification Jet Fuels, Diesel Fuels, Aviation Grade Gasoline and Heavy Bunker Fuels for testing in U.S. Navy ships and aircraft.

1979 Project: Conducted a resource evaluation and testing program to determine viability of mining and processing high moisture, clay-based oil shale for an Israeli client. Following a successful testing program and completion of engineering analysis of data, a Commercial Feasibility Study and Cost Estimate for a 10,000 BPD Oil Shale Plant was provided to the client.

1980 Project: Testing program to determine viability of processing high moisture clay base oil shale for a Moroccan client. Detailed laboratory analysis completed to determine oil and water contents and mineral components of oil shale and multiple tests in the pilot scale retort were ran to demonstrate reliable continuous operation and acceptable product recovery from the resource using the Paraho retorting technology. Following successful testing program and completion of engineering analysis of data a Commercial Feasibility Study and Cost Estimate for a Semi-Works Scale Oil Shale Plant was provided for the client.

1980 – 1981 Project: The pilot scale retort was retrofitted to test the viability and economics of pressurized, super-heated steam retorting of Green River oil shale using the Paraho technology. The testing provided information on economics and operability of super-heated steam retorting under increased pressure and also provided valuable improvements to the standard atmospheric pressure internal combustion and externally heated mode of operation of the Paraho retorting technology.

Completed a detailed engineering design and cost estimate for a 10,000 barrel/day Commercial Scale Paraho Retort Facility.

1982 – 1984 Project: At the conclusion of the Paraho Development Corporation Demonstration Program and the discontinuation of the lease on the U.S. Bureau of Mines Anvil Points Oil Shale Research Center, Mr. Cooley was commissioned by Paraho to obtain property, manage the design, permitting and construction of the current Paraho Oil Shale Research Center at Rifle, Colorado.

The new Paraho Oil Shale Research Center was placed into operation in 1983. The initial project for the new center was a more extensive testing program of oil shale from an Israeli resource oil shale Paraho retorting facility for the Israeli client. At

the conclusion of the Israeli project a program of the same magnitude was conducted for an Australian client. Oil shale from the Condor deposit of Queensland Australia was processed in the pilot scale retort in both the internal combustion and externally heated modes of operation. Operations proved successful and process data and heat and material balances were generated from the testing and used to support the detailed engineered design of a commercial scale Paraho retorting facility for the Australian client.

- 1971 – 1973 Engineer Technician – Garrett Research (Occidental Oil Shale, Logan Wash Modified In-Situ Project).
Mr. Cooley was involved in the underground mine development and construction of research phase modified insitu retorts.
- 1965 – 1969 Operations Supervisor - Colorado School of Mines Research Foundation.
Responsible for operation of gas combustion oil shale retorts at Anvil Points Oil Shale Research Center.

STRENGTHS

Over the past 45 plus years Mr. Cooley has managed multiple process plant and mining operations as well as engineering design, construction, environmental and development projects and has supervised staffs of 25 to 125 operations and technical personnel and construction projects with from 20 up to 1400 construction personnel. He has led projects from grass roots research to full commercial design, construction, startup and production and has managed local, state and federal level permitting for projects including Final Environmental Impact Statement for major operations on federal lands and Title V Air Operating Permits with the state of Colorado. He has over 35 years of experience in U.S. and International oil shale and 10 years of experience in the sodium minerals industry. He has extensive knowledge on worldwide resources with a particular emphasis on the Green River oil shale's and sodium minerals of Colorado, Utah and Wyoming.

He has served on the Board of Directors of the National Oil Shale Association for several years and is an active member and supporter of the association's educational and pro-development efforts for the industry.