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RESUME

EDUCATION

Ph.D.	Civil Engineering, University of Washington, Seattle, Washington	1972
M.S.	Civil Engineering, University of Washington, Seattle, Washington	1966
B.S.	Chemical Engineering, University of California, Berkeley, California	1963
H.S.	Graduate, John Muir School, Pasadena, California	1958

EMPLOYMENT

Chairman - CEFCO (Clean Energy Fuels Company) LLC, Dallas, Texas	2006 – 2007
President - Cooper Energy and Fertilizer Company, Kirkland, Washington	1998 - 2006
Consulting Engineer - Cooper Consulting Company, Kirkland, Washington	1993 - 1998
Supervising Engineer - Brown and Caldwell Consultants, Seattle, Washington	1990 - 1993
Consulting Engineer - Private Consulting Assignments, Albuquerque, New Mexico	1987 – 1990
President- Texas Railroad Transportation Company, Austin, Texas	1983 - 1987
Committee Clerk – Texas State House of Representatives, Austin, Texas	1982 - 1983
Associate Professor - University of Texas at Austin, Austin, Texas	1974 - 1982
Assistant Professor - Texas A& M University, College Station, Texas	1972 - 1974
Research Engineer - National Council of Paper Industry for Air and Stream Improvement, Corvallis, Oregon	1965 - 1969

EXPERIENCE

Hal Cooper's extensive career has been one of energy and transportation project developer, air pollution control specialist, and professor of civil engineering. He has been responsible for energy and transportation project planning in Texas, North Dakota, California, Canada, China and Russia. He is a specialist in air pollution emission control technologies for coal-fired power plants and other industrial sources. He has participated in the development of major advances in new technologies to reduce emissions of sulfur oxides, nitrogen oxides, carbon dioxide, and particulate matter and trace metals from coal-burning facilities. He is experienced in the use of electric power for rail transportation operations for freight and passengers and is a specialist in coal utilization technologies.

QUALIFICATIONS

Registered Professional Engineer, State of Texas, No. 38180	1975
Engineer-in-Training, State of Oregon, No. 1375	1967
Author of five books, 150 articles, 116 reports and 11 technical bulletins	
Foreign languages: French, German, Spanish (some) and Russian (some)	

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Air Pollution Control / Energy Project Development / Coal Utilization Projects
Energy & Transportation Project Planning / Strategic Project Analysis

QUALIFICATIONS

Hal Cooper's extensive career has been one of energy and transportation project developer, air pollution control specialist, and professor of civil engineering. He has been responsible for energy and transportation project planning in Texas, North Dakota, California, Canada, China and Russia. He is a specialist in air pollution emission control technologies for coal-fired power plants and other industrial sources. He has participated in the development of major advances in new technologies to reduce emissions of sulfur oxides, nitrogen oxides, carbon dioxide, and particulate matter and trace metals from coal-burning facilities. He is experienced in the use of electric power for rail transportation operations for freight and passengers and is a specialist in coal utilization technologies.

In the past five years, Dr. Cooper has focused on the development and advancement of new proprietary air pollution emission control technologies for use on coal-fired power plants to remove sulfur oxides, nitrogen oxides and carbon dioxide plus particulate matter and trace metals. He has prepared a number of reports to evaluate the use of these air pollution control systems for a number of existing and proposed coal-fired power plants in which technical and economic issues were evaluated. He has also prepared technical and economic feasibility studies of power plants to support the electrification of both new and existing railroad lines.

Dr. Cooper has conducted a number of field studies of air pollution control systems for a variety of industrial sources, including coal-fired power plants, pulp and paper mills, non-ferrous metal smelters, steel mills, cement plants and others. He has conducted source testing and ambient air quality evaluations for industrial sources and has designed air pollution control systems for new power plants plus retrofit applications. He has also prepared reports with capital and operating cost estimates of air pollution control facilities along with revenue generation estimates of chemical and fertilizer byproduct production applications for clean fuels from coal-fired power plants.

Dr. Cooper was a professor of Civil Engineering for ten years where he specialized in air pollution emission control technologies at the University of Texas at Austin and at Texas A&M University. He taught courses on gaseous and particulate emission control, air quality chemistry and meteorology as well as on energy technologies and transportation systems. He was actively involved in conducting short course on air pollution control and energy technologies, and participated in numerous research projects on air pollution emission control from power plants plus environmental impact studies of alternative energy technologies for coal, oil, gas, nuclear, geothermal and wind power.

Dr. Cooper received his Doctor of Philosophy degree from the University of Washington in 1972, where his dissertation research project involved evaluation of the chemistry and kinetics of black liquor oxidation with molecular oxygen for odorous sulfur control in pulp and paper mills. He received his Master of Science degree in Civil Engineering in 1966 from the University of Washington following his receiving a Bachelor of Science degree in Chemical Engineering from the University of California at Berkeley in 1963. Dr. Cooper is a registered professional engineer in Texas, and is the author of more than 150 publications, including two books. He speaks German, French, Russian and English.

CAREER HIGHLIGHTS

Chairman and CTO - CEFCO (Clean Energy Fuels Company), LLC

2006 – Present

CEFCO LLC is a global energy project development and finance company specializing in coal-fired electric power generation and in the elimination of air pollution emissions and the recovery of valuable byproducts from the captured air pollutants. CEFCO has invented novel air pollution control technology and is developing strategic partnerships with electricity generators, coal mining companies, oil and gas producing companies, carbon dioxide pipeline transmission companies, heavy metals recovery and recycling companies, and with major engineering companies. CEFCO employs multiple business models in different parts of the world to include joint ventures, build-own-operate and build-own-transfer arrangements, and franchising activities in different countries.

President and CEO – Cooper Energy and Fertilizer Company

1998 – 2006

Dr. Cooper established Cooper Energy and Fertilizer Company as a forerunner to CEFCL LLC in 1998. He organized and planned several projects to incorporate the Cooper Process for air pollution emission control at coal-fired power plants in Texas, North Dakota, Washington, Montana, and Saskatchewan and in China. He prepared technical and economic reports and feasibility studies on the use of the Cooper process for air pollution emission control at several coal-fired power plants plus the associated infrastructure planning studies involving chemical and fertilizer production.

Consulting Engineer – Cooper Consulting Company

1994 – 2006

Dr. Cooper served as an independent consultant to prepare a number of engineering studies on energy and transportation projects. These energy project included analyses of coal-fired power plants, nuclear power plants, electric transmission lines and radioactive waste treatment facilities. He also prepared several transportation studies on light rail transit route alignments, high-speed rail passenger systems, intermodal freight transport and railroad coal transport to power plants.

Supervising Engineer – Brown and Caldwell Consultants

1990 – 1993

Dr. Cooper served as the chief environmental consultant to the Washington State Department of Ecology to oversee the nuclear waste cleanup at the Hanford Nuclear Reservation in eastern Washington. He prepared numerous surveys and studies on remediation systems for radioactive waste cleanup at the high level waste tanks and for the contaminated groundwater aquifer remediation systems. He prepared detailed engineering studies of air pollution emission controls for conventional and radioactive pollutants for the proposed high level waste vitrification plant as well as the low level radioactive waste vitrification facilities at the Hanford site. He prepared air pollution emission inventories and engineering emission control studies for a munitions plant in Idaho as well as industrial waste water inventories for a community in Washington.

Consulting Engineer – Courtland Engineering Corporation

1983 – 1989

Dr. Cooper served as a private consultant on numerous environmental, energy and transportation projects in Texas, New Mexico, Arizona and California. He prepared engineering and economic studies of coal-fired power plant emission controls, coal transportation systems by rail, nuclear power plants and waste storage facilities, water treatment and wastewater treatment plant, radioactive waste incinerators, and low level radioactive waste treatment facilities plus industrial process wastewater treatment plants. He also prepared engineering reports and analyses of new coal-fired power plants to serve electrified railroads in Texas, including air pollution emission control systems, including electrification of the coal haul line from Montana to Texas.

Committee Clerk – Texas State House of Representatives**1982 – 1983**

Dr. Cooper served as the Committee Clerk to the Committee to Study Rail Passenger Service in Texas. He assisted in the conduct of public hearings and prepared committee reports and surveys. He prepared a feasibility study for the proposed high-speed intercity passenger rail transport system in the Texas Triangle to connect Houston with Dallas and San Antonio. He became intimately familiar with the legislative process and with political lobbying as a result of this assignment to gain experience in government activities.

Associate Professor – University of Texas at Austin**1974 – 1982**

Dr. Cooper served as Associate Professor of Civil Engineering at the University of Texas at Austin, where he did teaching and research on the environment, energy and transportation. He served as the Environmental Studies Coordinator at the Center for Energy Studies, and also the Director of the Southwest Regional Air Pollution Training Center for the U.S. Environmental Protection Agency. His research and teaching focused on energy production technologies and air pollution control systems for lignite and coal-fired power plants plus acid precipitation studies.

Assistant Professor – Texas A&M University**1972 – 1974**

Dr. Cooper served as an Assistant Professor of Civil Engineering at Texas A&M University, where he specialized in teaching and research on air pollution control. He prepared energy and economic studies on increased coal use in Texas and on the needs for air pollution control involving power plants, oil refineries and other industrial sources in the Houston-Galveston metropolitan area. He prepared energy policy analyses of the National Energy Plans by Presidents Nixon and Ford, especially as it involved the potential for increased coal use.

**Research Engineer – National Council of the Paper
Industries for Air and Steam Improvement****1965 – 1969**

Dr. Cooper performed numerous air pollution emission surveys of process and combustion sources at numerous pulp and paper mills in the United States. He evaluated existing emission control systems for pulp and paper mills, and made technical and economic analyses and designs of alternative solutions. He made numerous field investigations of process emissions and control systems in order to prepare technical bulletins for overall industry dissemination. He wrote numerous technical reports on air pollution control systems for pulp and paper mills, including for coal-fired power boiler emission controls and wood powered boilers at paper mills.

Instrument Technician – San Bernardino County Air Pollution Control District**1964 – 1965**

Dr. Cooper served as the field air monitoring station technician for the ambient air quality measurements in the San Bernardino County Air Pollution Control District. He conducted source emission surveys for steel mills, cement plants, power plants and other industrial sources as a part of agency inspection programs. He also participated in emission source compliance programs for stationary sources as well as mobile sources including diesel trucks, and on studies for a proposed coal-fired power plant in San Bernardino County.

Research Technician – California Institute of Technology

1962 – 1963

Dr. Cooper served as a technician at Cal Tech to develop and evaluate an ambient air monitoring system for an environmental test chamber used to determine patient physiologic responses to air pollutant exposures at the Rancho Los Amigos Hospital of Los Angeles County. The test chamber and ambient air monitoring system was among the first to study the health effects of exposure of humans to long term air pollution in urban areas. The air monitoring system was successful in facilitating environmental test chamber exposure studies.

Laboratory Technician – American Potash and Chemical Corporation

1960 – 1961

Dr. Cooper served as the operator of a butyllithium pilot plant on a manufacturing shift basis for organic chemicals. He performed drafting and testing for potash electrolysis cells and reactors for organic chemical production at a manufacturing plant.