WILLIAM G. ACKER

3217 Nicolet Drive ▪ Green Bay, Wisconsin 54311 ▪ (920) 465-3548

EDUCATION:

University of Wisconsin-Madison
B.S. Civil & Environmental Engineering (1970-1974)

PROFESSIONAL AFFILIATIONS:

AEE, ASHRAE and TAPPI

WORK HISTORY:

1996 - Present	Acker & Associates	**President**
1993 - 1996	Foth & Van Dyke	**Technical Development Consultant**
1982 - 1993	James River Corporate Engineering	**Senior Project Engineer**
1976 - 1982	American Can Corporate Engineering	**Utility Engineer**
1974 - 1975	Self-Employed	**HVAC Consultant**
1966 - 1974	S.J. Baisch & Associates, Inc.	**Draftsman**

SYNOPSIS:

William G. Acker has more than twenty-two years experience in design, engineering and construction in the pulp and paper industry. As a Senior Project Engineer he has successfully managed from conception to completion a unique variety of Engineering Projects. His responsibilities include: request for funding, engineering, supervision of designers and draftsmen, equipment specification, bid preparation, estimating, budgeting, scheduling, cost control and construction management.

During Mr. Acker's thirty-three year career he has developed expertise in many engineering fields some of which include: energy engineering, mechanical, environmental, industrial, HVAC, fresh water and waste water treatment, industrial hygieneology and toxicology. He has worked with company business units to help identify, initiate and implement opportunities related to cogeneration, utility contracts, energy strategies, plant and machine efficiencies, to ensure reliable energy services and systems that will sustain production operations. His expertise in these areas will give increased focus and will help improve a company's competitive position in the market place.

ENGINEERING EXPERTISE:

A. **High Level of Expertise**

1. Industrial HVAC
2. Condensation Prevention & Control
3. Indoor Air Quality
4. Dust Collection – Commercial
5. Dust Collection – Industrial & Boiler
6. Ventilation Surveys
7. Chilled Water Systems
8. Reroofing Industrial Buildings
9. Cooling Towers
10. Compressed Air Systems
11. Industrial Hygieneology
12. Steam & Condensate Return
13. Cogeneration System
14. Package Boilers
15. Recovery Boilers
16. Boiler Energy Surveys
17. Heat Recovery Systems
18. Boiler Emission Analysis & Control
19. VOC Emissions Control
20. Papermachine Installed Cost Estimating
21. Sludge Incineration
22. Insulation Design
23. Compressed Air Systems
24. Flow Metering
25. Control Valve Sizing
26. Boiler Water Treatment
27. Papermachine Dryers
28. Papermachine Hoods
29. Papermachine Steam & Condensate Return
30. Landfill Gas Cogeneration
31. Corrosion Analysis & Control
32. Woodyard Design
33. Pulp & Paper Manpower Analysis
34. Project Management
35. Papermachine Coaters & Coater Dryers
36. Lime Kiln Design
37. Papermachine Dry End Speed-Up Study
38. Project Estimating
39. Greenfield Pulp & Papermill Design & Estimating
40. Greenfield Secondary Fiber Plant Design & Estimating
41. Pump & Fan Systems Design & Testing
42. Entire Plant Energy Surveys

B. **Average Level of Expertise**

1. Pulp Mill Operations
2. Bleach Plant Operations
3. Papermill Wastewater Treatment
4. Lubrication Systems
5. Digesters & Evaporators
6. Chlorine & Chlorine Dioxide Scrubbers
7. Secondary Fiber Plant

C. **Low Level of Expertise**

1. Instrumentation
2. Electrical Wiring
3. Papermill Converting Systems
4. Hydraulic Systems
5. High Temperature Piping Expansion Design
6. Material Conveying
7. Papermachine Wet End Speed-Up Study
8. Forest Land Management
9. Papermachine Wet-End Design

ENGINEERING EXPERTISE DESCRIPTIONS:

A. **Electrical Generation Systems/Performance Testing/Emissions**

1. Natural Gas Boiler & Steam Turbine
2. Natural Gas Simple Cycle Gas Turbine
3. Natural Gas Simple Cycle Advanced Gas Turbine
4. Natural Gas Combined Cycle Gas Turbine
5. Natural Gas Combined Cycle Advanced Gas Turbine
6. Coal Spreader Stoker Fired Boiler & Steam Turbine
7. Coal Cyclone Fired Boiler & Steam Turbine
8. Pulverized Coal & Steam Turbine
9. Atmospheric Bed Coal Boiler & Steam Turbine
10. Circulating Bed Coal Boiler & Steam Turbine
11. Coal-Integrated Gasification Combined Cycle (IGCC)
12. No. 2 Fuel Oil Boiler & Steam Turbine
13. No. 4 Fuel Oil Boiler & Steam Turbine
14. No. 6 Fuel Oil Boiler & Steam Turbine
15. Nuclear Power – Boiling Water Reactor (BWR), Pressurized Water Reactor (PWR)
16. Wind Turbine
17. Solar Power – Parabolic Mirror Stirling Engine Generator
18. Solar Power – Parabolic Trough & Steam Turbine
19. Solar Power – Heliostat Mirror Tower System & Steam Turbine
20. Solar Power – Photovoltaic Panel
21. Molten Carbonate Fuel Cell (MCFC)
22. Phosphoric Acid Fuel Cell (PAFC)
23. Solid Oxide Fuel Cell (SOFC)

B. **Energy Surveys/Troubleshooting/Heat Recovery**

1. Boilers
2. Steam Turbines
3. Steam Supply Pipelines
4. Condensate Return Pipelines
5. Papermill & Pulpmill Entire Plant Surveys
6. Papermachine Cylinder Dryer
7. Papermachine Through Air Dryer
8. Papermachine High Velocity Impingement Dryer
9. Papermachine Coater Dryers

10. Compressed Air Systems
11. Spray Dryer Systems
12. HVAC
13. Water Effluent to Heat Incoming Fresh Water
14. Cogeneration Systems
15. Landfill Gas Cogeneration
16. Ventilation Surveys

C. **Operational Surveys/Efficiency Testing**

1. Fans
2. Pumps
3. Compressors
4. Chilled Water Systems
5. Cooling Towers
6. Lubrication Systems
7. Control Valve Sizing and Existing Value Flow Estimates
8. Flow Metering and Flow Testing for Determination of Accuracy
9. Dust Collection
10. Natural Gas Compressors
11. Air Conditioning Systems
12. Dehumidification Systems
13. Hot Water Systems

D. **Fuels/Alternative Fuels/Combustion Analysis/Air Emissions**

1. Natural Gas
2. Compressed Natural Gas (CNG)
3. Liquefied Natural Gas (LNG)
4. Synthetic Natural Gas
5. Natural Gas Liquids
6. Propane
7. Landfill Gas
8. Distillates
    - No. 1 Fuel Oil
    - No. 2 Fuel Oil
    - Kerosene
    - No. 1 Diesel
    - No. 2 Diesel
    - No. 4 Fuel Oil
9. Residual Fuel Oil
    - No. 5 Fuel Oil
    - No. 6 Fuel Oil
10. Orimulsion (Similar to No. 6 Fuel Oil)
11. Petroleum Diesel
    - Use with and without particulate trap
12. Bio Diesel
    - Bio Diesel B100 (100% Bio Diesel)
    - Bio Diesel Blends
    - Feedstocks (Oil Based Products)
        - Jatropha Shrubs and Trees
        - Palm Trees
        - Soybeans
        - Canola Crops
        - Yellow Grease (Recycled Cooking Oil)
        - Animal Fats (including tallow, lard, chicken fat)
        - Sewage Waste
        - Vegetable Oil and Waste Vegetable Oil

        - Hemp
        - Algae (Natural Oil Content Over 50%)
    - Feedstock for Thermal Depolymerization
    - Reduces Hydrocarbon Feedstocks and Non-Oil Feedstocks
        - Old Tires
        - Offal (Internal Organs & Parts of a Butchered Animal)
        - Wood
        - Plastic
13. Synthetic Diesel (Dried and gasified, followed by Fischer Tropsch)
    - Feedstock
        - Wood
        - Straw
        - Corn
        - Garbage
        - Food Scrapes
        - Sewage Sludge
        - Waste Plastic
        - Natural Gas Conversion to Diesel (GTL Process)
        - Coal Conversion to Diesel (CTL Process)
14. Coal
    - Bituminous
    - Sub Bituminous
    - Anthracite
    - Lignite
    - Indirect Liquefacation to Synthetic Diesel & Naphtha
    - Direct Liquefacation to Synthetic Diesel & Naphtha
    - Direct Liquefacation to Synthetic Diesel & Gasoline
    - Coal Gasification to Synthetic Natural Gas
15. Petroleum Coke
    - Petroleum Coke Conversion to Synthetic Natural Gas
16. Hydrogen
    - Liquid Hydrogen
    - Compressed Hydrogen
    - Hydrogen from Photovoltaic Water Electrolysis
    - Hydrogen via Steam Methane Reforming
    - Hydrogen via Biomass Gasification
    - Coal to Hydrogen Gasification Utility Plant
    - Cellulosic Biomass Conversion to Hydrogen
17. Gasoline
    - Conventional
    - Oxygenated (with Ethanol, ETBE and MTBE)
    - Reformulated
    - Fuel Ethanol
18. Ethanol
    - Production from Corn
        - Dry Milling Process
        - Wet Milling Process
    - Production from Sugar Cane
    - Cellulosic Ethanol (Research Stage)
    - Cellulosic Feedstocks
        - Agricultural Wastes
        - Corn Stover (Leaves, Starks and Cobs)
        - Bagasse (Sugar Cane Waste)
        - Rice Straw
        - Wheat Straw
        - Switchgrass

Prairie Grasses
Woodchips
Municipal Waste (such as paper)
Hybrid Poplars (fast growing trees)
Hybrid Willows (fast growing trees)
Forestry Waste & Residues
Papermill Sludge

19. Oil Shale (Extraction of oil from oil shale bearing rock)
    The rock can be mined and shipped to the refinery or the ground can be heated until the oil leaches from the rock allowing removal of the liquids and vapors for further processing at a refinery. The refinery extracts the kerogen and by pyrolysis converts it into oil.
20. Oil Sands (or Tar Sands or Bituminous Sands)
    Extract oil-like bitumen (extra heavy crude oil) from sand and clay soil. The Bitumen is processed in heavy oil refineries, into synthetic crude oil or refined into petroleum products by specialized refineries.
    Extraction Methods
        Surface Mining
        Pump it out
        Steam Injection & Pumping
        Hydrocarbon Solvents & Pumping
21. Cow Manure in an Anaerobic Digester for Methane Gas Production used in a Engine Generator.
22. Dried Manure Incineration in a Steam Boiler followed by a Steam Turbine for Electricity Generation.
23. Municipal Solid Waste Incinerator
24. Papermill Sludge Incinerator

E. **Experience in Cargo Transit/Efficiency/Emissions**

1. Railroad Class I Freight
    Btu of Fuel/Ton-Mile of Freight
    Car Miles/Gallon
    Locomotive Miles/Gallon
2. Oil & Coal by Railroad
    Btu of Fuel/Ton-Mile of Freight
3. All Freight by Truck
    Miles/Gallon
    Btu of Fuel/Ton-Mile of Freight
4. Class 8 Freight Trucks (Tractor Trailers)
    Miles/Gallon
    Btu of Fuel/Ton-Mile of Freight
5. All Freight Trucks
    Miles/Gallon (for each gross vehicle weight class)
    Miles/Gallon (for each fuel type)
6. Oil Transport by Truck
    Btu of Fuel/Ton-Mile of Freight
7. Coal Transport by Truck
    Btu of Fuel/Ton-Mile of Freight
8. Intercity Truck Transport
    Btu of Fuel/Ton-Mile of Freight
    Miles/Gallon
9. Cargo Planes
    Btu of Fuel/Ton-Mile of Freight
    Miles/Gallon
10. All Domestic Waterborne Freight
    Btu of Fuel/Ton-Mile of Freight
11. Oil Transport by Water (Coastal, Lakewise and River)
    Btu of Fuel/Ton-Mile of Freight

12. Coal Transport by Water (Lakewise and River)
    Btu of Fuel/Ton-Mile of Freight
13. Oil by Pipeline, Crude Oil & Petroleum Products
    Btu of Transport Energy/Ton-Mile of Oil Moved
    Btu Barrel of Oil of Transport Energy/Barrel of Oil Moved
14. Natural Gas Pipeline, Electric Motor Driven Compressor
    Reciprocating Compressor and Centrifugal Compressor Systems
    KWH of Compressor Electricity/Std. $Ft.^3$ of Natural Gas Compressed
    Btu of Compressor Electricity/Std. $Ft.^3$ of Natural Gas Compressed
    Btu of Compressor Electricity/Btu of Natural Gas Compressed
    Btu of Fuel to Produce Compressor Electricity/Btu of Natural Gas Compressed
    Motor HP/Standard Cubic Feet Per Hour of Natural Gas Compressed
15. Natural Gas Pipeline – Simple Cycle Gas Turbine Drive Compressor System
    Btu of Natural Gas for the Gas Turbine Compressor Drive/Std. $Ft.^3$ of Natural Gas Compressed
    Btu/Hour of Natural Gas for the Gas Turbine Compressor Drive/Horsepower of Compressor Output

F. **Experience in Passenger Transit Systems, Efficiency and Emissions**
1. Light Vehicle Cars and Light Trucks
    Gasoline Engine – Internal Combustion Engine (ICE)
    Gasoline Blends – Internal Combustion Engine (ICE)
    Hybrid Electric Vehicle (HEV)
    Plug In Hybrid Electric (PHEV)
    Electric Vehicle (EV)
        Lead Acid Battery (Pb)
        Nickel Metal Hydride (NiMH)
        Lithium Ion Battery (Li-Ion)
    Fuel Cell Vehicle (FCV)
        Proton Exchange Membrane (PEM) Fuel Cell
        Using Hydrogen Fuel
    Diesel Engine – Internal Combustion Engine (ICE)
    Flexible Fuel Vehicle (FFV)
    Btu of Fuel/Passenger Mile
    Btu of Fuel/Vehicle Mile
    Persons/Vehicles
    Miles/Gallon
    Emissions
2. Airlines – Certified Route Airlines & General Aviation
    Btu of Fuel/Passenger Mile
    Btu of Fuel/Vehicle Mile
    Persons/Vehicle
    Miles/Gallon
    Btu of Fuel/Ton-Mile
    Emissions
3. Passenger Rail – Intercity – Transit – Commuter
    Btu of Fuel/Passenger Mile
    Btu of Fuel/Vehicle Mile
    Persons/Vehicle
    Miles/Gallon
    Btu/Ton-Mile
    Emissions
4. Buses – Transit – Intercity - School
    Fuels
        Gasoline
        Compressed Natural Gas (CNG)
        Liquefied Natural Gas (LNG)
        93% Ethanol and 7% Unleaded Gasoline (E93)

95% Ethanol and 5% Unleaded Gasoline (E95)
80% Diesel and 20% Bio Diesel (BD-20)
Liquefied Petroleum Gas (LPG)
Methanol

Emissions (Grams/Mile)
Particulate (PM)
Oxides of Nitrogen (NOx)
Hydrocarbons (HC)
Carbon Monoxide (CO)

Miles Per Gallon (#2 Diesel Equivalent)
Operating Cost Per 1000 Miles
Btu of Fuel/Passenger Mile

G**. Wind Turbines**

1. Capacity Factor – For KWnameplate
2. Capacity Factor – For Annual Operating Hours
3. Capacity Factor – Overall
4. Kinetic Energy in the wind over the blade sweep area – Kw kinetic energy
5. Transmission System Efficiency
6. Generator Efficiency
7. Overall Efficiency
8. Rotor Speed (rpm)
9. Generator Speed (rpm)
10. Coefficient of Performance
11. Noise
12. Performance at different wind speeds
13. Calculation of Annual Electricity Output (kwh/yr)
14. Installed Cost
15. Operating Costs
16. Analysis of Operating Cost per kwh (cost/kwh)

H**. Photovoltaic Panels**

1. Flat Plate –no tracking
   Flat Plate – One Axis Tracking
   Flat Plate – Two Axis Tracking
2. Sunshine Hours Per Year
3. Solar Radiation
   a. Btu/ft^2-day
   b. Kwh/m^2-day
4. System KW @ Based on 1000 watts of sun/sq. meter of panel
5. Capacity Factor
6. Panel Efficiency
7. Inverter Efficiency
8. Installed Cost
   a. Cost/KW
   b. Cost/ft^2 panel
9. Electricity Cost (cost/kwh)
10. State & Federal Rebates

I. **Contaminant Identification, Reduction, Removal and Risk Analysis**

1. Indoor Air Quality Survey
2. Industrial Plant Formaldehyde
3. Foundry Lead
4. Particulate
5. Silica Dust
6. Hydrogen Sulfide Gas

7. Volatile Organic Compounds (VOC's)
8. Asbestos
9. PCB's
10. Oil Mist
11. Mercury
12. Insect Control
13. Chromium
14. Fungus & Mold
15. Radiation
16. Combustion Gases: SO2, NOx, HCL, CO2, CO, Particulates, etc.
17. Ozone
18. Beryllium
19. Cyanide
20. Welding & Metal Shop Fumes
21. Verification of Contaminants (such as PCB contaminated sediment)
22. Flue Gas Emission Control
    - Baghouse
    - Precipitators
    - Fuel Gas Desulfurization
        - Wet Limestone
        - Lime Spray Dryer
        - Pebble Lime Circulating Bed
        - Sodium Carbonate
        - Citric Acid
        - Sodium Sulfate
        - Activated Carbon
        - Sodium Bicarbonate
        - Magnesium Sulfate
        - Limestone & Formic Acid
        - Limestone & Acidic Acid
23. Gas Cleaning, Odor Control & VOC Abatement
    - Regenerative Thermal Oxidation
    - Recuperative Thermal Oxidation
    - Regenerative Catalytic Oxidation
    - Recuperative Catalytic Oxidation
    - Absorption for Product Recovery
    - Absorption with Carbon and Zeolites for Product Recovery
    - Surface Condenser for Product Recovery
    - Contact Condenser
    - Flaring
    - Biofiltration
    - Membrane Separation
    - Ultraviolet Oxidation
    - Liquid Waste Burners
    - Cryogenic Refrigeration
    - Polymoric Absorbents and Microwave Desorption
24. NOx Reduction
    - Pre-Combustion Control – Flame Temp. Reduction
        - Flue Gas Recirculation
        - Staged Combustion
        - Low NOx Burners
            - Low Excess Air
            - Air Staging
            - Fuel Staging
            - Pulse Firing
            - Flameless Oxidation Burners

Inward-Fired Adiabatic Burner
Fuel Switching
Water/Steam Injection
Dry Low NOx Combustion
In Coal Plants Use Orimulsion as a Reburn Fuel
Use Oxygen instead of Air for Combustion
Gas Turbine Inlet Fogging
Post-Combustion Control
Selective Catalytic Reduction (SCR)
Phosphorous Injection to SCR
Selective Non-Catalytic Reduction (SNCR)
Injection of Ammonia
Injection of Urea
Non-Selective Catalytic Reduction (NSCR)
Sodium Bicarbonate Injection

PROFESSIONAL ACHIEVEMENTS

- Conducted a tissue machine dryer survey for the James River No. 6 machine in Naheola, Alabama. My survey identified low dryer nozzle velocity due to supply fan problems. The correction increased production by 7,050 tons per year resulting in $7,755,000 of additional sales.

- In 1995 completed the design and purchase of equipment for the first combination through air dryer and high velocity impingement dryer for the Proctor & Gamble Green Bay Mill. The Yankee Hood exhaust fan discharge is fed to the thru air dryer system. The fan is the largest single width single inlet fan made. It is designed to deliver 210,070 ACFM at 526 degrees F and 644 BHP.

- Completed a tissue machine dry end production increase survey for the James River No. 1 machine in Old Town Maine. The purpose of the study was to look at the ROI for three possible projects: a new dryer hood, a new dryer cylinder and a combination new hood and dryer cylinder.

- Lead Engineer for the design and installation of the largest gas-fired make-up air system built in Wisconsin. The system provides 170,000 SCFM of make-up air to Curwood in Oshkosh, Wisconsin.

- Developed a procedure to monitor nozzle velocity on high temperature velocity impingement dryers for tissue machines. Began to file for a patent on the system during employment at Foth & Van Dyke. However, it was never completed.

- In 1989 received a Bronze Key Engineering Excellence Award from James River for a psychrometric and thermodynamic air and water vapor analysis computer program. This program was the first program in the USA. Enerdry had since developed a similar program.

- In 1992 developed a water vapor migration computer program which was one of only three programs in the USA. The program is used to calculate water vapor transmission through building walls and roof systems and determines if condensation occurs in the construction.

- Consultant for James River Green Bay Mill on the use of gas turbine generator flue gas for the tissue machine dryer systems. The project would install a 50.5 MW combined cycle gas fired cogeneration facility and would feed the flue gas to the papermachine hoods. Estimated project cost was $40,942,000.

- In 1993 developed the first computer program that sizes the hood exhaust and supply systems for cylinder dryer papermachines. The program can size open hoods, partially enclosed hoods, totally enclosed hoods

and totally enclosed high humidity hoods. The program also calculates the annual operating cost for electricity and steam. To date, this is the only such program in the USA.

- Lead Design Engineer for a 10,200 KW steam turbine generator installation at the James River Green Bay Mill. The project saves $890,500/year.

- Project Manager and Design Engineer for the installation of a boiler feedwater heat recovery system at the James River Ashland Wisconsin Mill. The project saves $38,000/year.

- Project Manager and Design Engineer for a second boiler feedwater heat recovery system at James River Ashland Wisconsin Mill.

- In 1981 designed a heat exchange system to recover heat from the paper mill effluent water and pass it to the mill fresh water intake for the James River Ashland Wisconsin Mill. The project saves $123,000/year and received a top energy award from James River.

- Consultant to the James River Project Manager for the Old Town Maine chlorine and chlorine dioxide scrubber system. Installed cost of the project was $3,237,300.

- Project Manager and Design Engineer for the installation of two false ceiling exhaust systems for the James River No. 3 boardmachine and No. 2 boardmachine in Naheola Alabama. Installed cost was $303,000.

- In 1988 designed a system to feed pentane VOC emissions to an existing boiler for incineration at the James River Polystyrene Cup Facility in Metuchen, New Jersey.

- Conducted a ventilation survey and roofing survey on a building housing five papermachines at the James River Naheola Alabama Plant. The survey revealed a need for 1,377,000 SCFM of additional make-up air. The estimated installed cost was $8,000,000 for ventilation and $4,000,000 for reproofing.

- Design Engineer for the installation of the new No. 7 tissue machine installed at the James River Naheola Albama Plant. Installed cost was $73,706,000.

- Expert Witness for Giddings and Lewis in Michigan over air emissions discharge from an emissions capture device over the melting furnaces.

- Expert Witness for a client who had a building with condensation problems resulting in $35,000 of building damage.

- Consultant to the Project Manager for the James River Naheola Alabama Recovery Boiler and Pulp Mill Modification Project. Project installed cost was $30,762,000.

- Lead Design Engineer for a No. 6 fuel unloading facility at the James River Ashland Wisconsin Plant.

- Consultant to the Project Manager for on a new pulp machine and pulp dryer for the James River Marathon Canada Pulp Mill Expansion Study. Estimated installed cost was $298,931,000.

- Project Estimator for the study of a James River Greenfield tissue mill. Estimated installed cost was $1,200,000,000.

- Consultant to the Project Manager for the installation of coater dryers on the James River No. 3 boardmachine in Naheola, Alabama. Installed cost was $2,218,000.

- Complete testing and design for a digester blow heat recovery system at the James River Green Bay Mill.

- In 1984 conducted a ventilation and energy survey for the James River Berlin New Hampshire Mill. The study identified a potential for $1,280,267/year of energy savings. The plant installed the recommendations in 1986.

- Consultant for James River Marathon Canada on the failure of two boiler economizers installed on two natural gas fired boilers. Failure occurred eleven months after installation.

- Consultant on sludge incineration projects, VOC control, NOx reduction, baghouses and electrostatic precipitators.

- Completed a pressure drop analysis of the entire 150 PSIG header system for the James River Naheola, Alabama Plant. The purpose of the study was to find ways to increase the steam supply pressure to the tissue machine Yankee Cylinder dryers.

- Selection to the Advisory Board of Heating Piping and Air Conditioning Engineering Magazine in 1999.

- Selected by the U.S. EPA in 2000 to the Enhanced Ventilation for Schools Project Development Team.

- In 2003 Mr. Acker was selected by the U.S. Department of Energy (DOE) to peer review their Distributed Energy Program for Thermally Activated Technologies. This program provides grants to companies for developing clean, efficient and affordable on site generation, thermal energy and combined heat and power (CHP).

- In 2006 ASHRAE selected a team of 10 experienced professionals which included Mr. Acker, to assist Professor Gronzik in the rewriting of the Air Conditioning Systems Design Manual. Due to many energy analysis errors, discovered by Mr. Acker, Mr. Acker had to work closely with Professor Gronzik.

- In 2003 Mr. Acker took on the Department of Transportation and the Maritime Administration (MARAD) over incorrect and false transportation energy data, comparing the energy efficiency of freight movement by truck, rail and barge. The data on the MARAD website as well as many U.S. port websites, had the wrong engineering units in its example, was very old data, and it said that waterborne freight consumed less energy to move freight then rail or truck. Mr. Acker used Department of Transportation data to prove that Class I rail transport was more efficient then waterborne freight. After much time and effort MARAD agreed with Mr. Acker and removed the incorrect data from their website. Mr. Acker's data exposing the MARAD website errors was published in August 2003 by Transportation and Distribution magazine.

- From 1985 to Present Mr. Acker and his colleague Mr. Nels Strand have developed over 60 proprietary engineering computer programs. The programs are primarily energy programs, combustion programs, emissions programs, psychrometric and thermodynamics of air and water vapor, pressure drop, fan performance, steam turbine performance and much much more. The primary advantage of these programs is the significant reduction in engineering time and the in-depth analysis capabilities.

- Over Mr. Acker's thirty-three year career, he has taught classes on psychrometric and thermodynamics of air and water vapor, boiler combustion and air emissions, water treatment, water vapor transmission and condensation analysis, heat recovery, air flow and flue gas flow testing, mass flow analysis and Btu analysis and fan performance testing and efficiency.