

Northwest Refining, Inc

Phase II

**Permitting and Business Plan
Development**

Request for Funding

To

North Dakota

Industrial Commission

Oil & Gas Research Department

**Northwest Refining, Inc
Permitting and Business Plan
Phase II of Three**

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Nov 2, 2008

Ms Karlene Fine
Executive Director
State Capitol-14th Floor
600 East Boulevard Avenue-Dept 405
Bismarck, ND 58505-0840

Dear Ms Fine:

Please find enclosed application for funding request for Northwest Refining, Inc. The project will encompass all the necessary criteria needed to receive the permits that are required for a 100,000 barrel per day oil refinery.

This project will also provide a complete business plan that will be presented to several interested firms for financing of the construction phase of the oil refinery.

The total estimated cost of the project will be \$2,500,000.00. Northwest Refining, Inc will provide the additional funding needed to complete this project.

Northwest Refining is requesting that \$650,000 of this project be provided by ND Industrial commissions Oil & Gas Research Grant Monies.

I respectfully submit this application and would ask that it would be considered for approval.

Sincerely,

Northwest Refining, Inc

Mel D. Falcon, CEO

A handwritten signature in black ink, appearing to read 'Mel D. Falcon', is written over the printed name.

Northwest Refining, Inc

Permitting and Business Plan

Phase II of Three

Applicant: Northwest Refining, Inc
P.O. Box 119
Trenton ND, 58853

Principal Investigators: Northwest Refining, Inc

Date of Application: Nov. 2, 2008

Total Expected Cost of Project: \$2,500,000.00

Amount of Request: \$ 650,000.00

Northwest Refining, Inc Permitting and Business Plan Phase II of Three

Abstract

Objective: The purpose of this project will be to explore and develop and apply for all permits that are necessary to construct a 100,000 barrel per day oil refinery in North Dakota. In addition to permits, this project will also develop a business plan that will provide potential investors the criteria to determine profitability and costs of the project.

Expected Results: It is anticipated that the project will yield all the necessary permits, licenses, protocol and criteria needed to construct a 100,000 barrel refinery in North Dakota. It will also provide the Business Plan, land costs, construction costs, and all financial information needed to potential investors and financial institutions.

Duration: Project is expected to be completed within 12 to 16 months.

Total Project Cost: Total estimated costs are expected to be approximately 2.5 million. Northwest Refining is committed to obtaining and providing the monies necessary to institute and complete this project in a timely manner. Any and all monies provided by the Oil and Gas Research Council will be expended on this project.

Participants: The participants of this project are: Northwest Refining, Inc. of Williston North Dakota.

Project Description:

Northwest Refining, Inc is a for-profit ND corporation owned solely by North Dakota investors, will contract with ENGlobal Engineering of Houston. With the aid of this firm, Northwest Refining will be able to apply for and obtain the permits, licenses, costs, land, and any and all the information required to construct an oil refinery.

ENGlobal Engineering will provide the information and expertise to obtain a Title V air quality permit and will provide, but not limited to, the following criteria:

- ✚ Contact ND and Federal agencies to determine the protocol needed for Title V permitting.
- ✚ Obtain copies of all State and US applications for permits pertaining to refineries
- ✚ Obtain copies of all state and federal forms.
- ✚ Develop a refinery block flow diagram for permit application
- ✚ Define property and property boundary line for permit
- ✚ Develop a plot plan
- ✚ Develop USGS overlay maps
- ✚ Provide heater duty information for each unit
- ✚ Develop approximate valve and flange count for each unit from providers of equipment
- ✚ Develop an emissions spread sheet
- ✚ Provide process description for state and federal permits
- ✚ Provide a BACT analysis
- ✚ Develop compliance monitoring devices or activities listing.

- ✚ Develop point source emission forms
- ✚ Provide emission calculations
- ✚ Provide modeling of emissions.
- ✚ Due diligence in providing the information and expertise to obtain a Title V air quality permit.

A local Engineering firm will provide the necessary permitting processes, other than the Title V Air Quality permits, that will be needed to complete the process design of an oil refinery and will divide the process into 3 phases:

- Phase I: Project Development, Scoping, and Issue Identification
- Phase II. Studies, Reports, and Permits
- Phase III. Permitting Coordination

A local engineering firm will provide the following under Project Development:

- ✚ Work with NWR to determine work plan and implementation
- ✚ Develop and coordinate schedules with NWR and ENGGlobal
- ✚ Develop Critical Success Factors
- ✚ Provide updated information for review with State & Federal agencies & NWR
- ✚ Submit materials and information to NWR board for approvals and signatures.

Local engineering firms will review the Feasibility Study and coordinate with the NWR board to clarify the project scope and footprint. The proposed refinery will require the following permits:

- ✚ Air Quality (provided by ENGGlobal)
- ✚ Waste Water
- ✚ Solid Waste

✚ Hazardous waste

✚ NPEDS (National Pollutant Discharge Elimination System) from NDDOH

Additional permits, approvals, or clearances may be required from federal, state, local and or tribal agencies, depending on the footprint of the refinery, pipelines, and other associated infrastructure. It will be critical to determine the scope and potential footprint of the project early in the process to ensure that the appropriate entities are included in the coordination efforts.

Local engineering firms will develop a coordination plan with NWR and ENGlobal, which outlines a process for coordination with affected agencies, the general public, other stakeholders, and the media throughout the development of the project. The coordination plan will also identify the process for affected agencies, the public, and other stakeholders to comment on the proposed project, in accordance with applicable laws, regulations and policies. Local engineering firms will provide the information necessary for any and all permits, public comment periods, and will provide a forum for public meetings.

Agency Scoping and Coordination:

1. Develop scoping package, informational materials and mailing lists.

Prepare and distribute scoping packages to governmental agencies. The package will be used as means of “scoping” issues pertinent to the process and to obtain the information necessary for the permits, licenses, or other agency requirements needed to construct the project

Interagency meetings will be held to properly determine and pertinent issues that federal, state, local, or tribal agencies have with the proposed action. The meetings will be used to

identify which agencies may have regulatory authority, the permits, authorizations, or environmental clearances that may be needed.

Public meetings will be scheduled for the surrounding areas during the permitting process to obtain comments, concerns, and general feedback.

Other consultants will be utilized for the some or all of the following:

- ❖ Field Surveys, including cadastral, topographic, wetland delineation, archaeological, architectural, botanical, or threatened and endangered species field surveys.
- ❖ NEPA documentation
- ❖ Studies, reports, or permit applications
- ❖ Legal testimony arising out of litigation regarding project decisions.

The project will also include a complete Business Plan that will provide the pertinent information needed for investors and financial institutions. The Business Plan will include but not limited to:

- Complete cost of 100,000 bbl per day refinery
- Pro Forma Statements
- Profitability
- Products
- Marketing
- Identification of various products
- Off take agreements
- Local market potential

- Potential financing identification
- List of machinery costs and availability
- Long-range planning

The Business Plan will provide all the information that would be pertinent to independent oil companies, financial institutions, and potential investors and can be tailored to any and all interested entities.

Standards of Success:

According to the Feasibility Study completed by Northwest Refining, Inc and ENGlobal Engineering of Houston, Texas, construction of a 100,000 bbl refinery in the Williston ND area is totally feasible. There is enough crude available with the Bakken and Sanish (Three Forks) and other zones that can be accessed by horizontal drilling to support a refinery for the next 75 years. The pipelines from wells in the Williston Basin are at capacity. Wells that have heavier crude are being shut in and others that have been drilled and completed are limiting production. There have been several rail spurs installed to provide some production to travel by train to refineries several states away from the Williston Basin. This method is very costly and time consuming. The need for a new oil refinery in the Williston Basin, especially in Western ND cannot be stressed enough.

Development of a new refinery will have a huge impact on the ND State economy. The area where the refinery is constructed will increase the local, county and state tax base dramatically. It will impact the local school districts and reduce property taxes to the local property, home owners, and school districts, now having to maximize the mill levy for funding the schools.

During the construction to the refinery, there will be approximately 1,000 jobs created.

There will be approximately 250 direct new jobs and approximately 400 indirect jobs created from the new refinery. There are planning sessions at the present to have the refinery be part of an Energy Cooperative, that is, have an Ethanol plant, a Biodiesel plant, and Wind Generator System to provide supplemental power to the Cooperative. All the mentioned plants are totally compatible and complement each other.

The construction of a new refinery in the Williston Basin will alleviate the backlog of crude from the new and old wells from having to wait for pipeline capacity before being shipped to refineries out of state. New and old wells can be operated more efficiently and produce more revenue for the producer, landowners, state and local governments.

Consumers in the ND, SD, and Montana should see a reduction in gas and fuel prices because of not having to absorb transportation costs of having the crude go to refineries outside the area and then absorbing the cost of transporting the products back to the area.

It is estimated that a savings of \$.10 a gallon in gas and fuel cost will allow approximately \$2,000,000.00 to remain in the North Dakota economy and not have those monies go outside the state. We have observed that areas that have refineries have lower prices for gas and diesel (Casper, Wyoming), however, even though North Dakota has an existing refinery, the prices for fuel, gas, and oil products have been the highest in the Nation! Shortages have occurred for farm fuel and off road diesel for oil rigs, and diesel frac fluids for stimulating new wells. The spinoffs from the refinery will provide additional jobs and revenues to the area.

Product pipelines will also need to be installed. NWR has addressed this in the feasibility study and has identified the corridors and costs that will be associated with terminals and

pipeline. This will also create another industry apart from the refinery. It is anticipated that the pipeline and terminals will be operated by other parties. NWR has spoken to entities that are interested in the product pipelines and terminals, however, it is premature to decide who or which companies would operate a product pipeline. There has been interest in the recovery of the carbon dioxide from the refinery, ethanol plant, and biodiesel plant that will be utilized for tertiary oil recovery in the older oil fields in ND and Eastern Montana. The above mentioned Energy Cooperative that would include the Oil Refinery would be a model for the Nation and would be the most environmental friendly facility in the US.

Background/Qualifications:

Mel Falcon, the CEO of Northwest Refining is the present owner of Aqua-Envirotech Mfg., Inc, a construction, water treatment, oilfield service, and specialized company. AEM, Inc has provided municipal, commercial, residential, and industrial systems to communities, plants, oilfield applications, and specialized systems for recovery of oilfield pits, drilling and completion fluids for the oil industry. Mr. Falcon has also experience as an oilrig hand, roustabout oilfield supervisory for Natco, and was the Regional Manager for Fluids Control, Inc for 14 years. Mr. Falcon was manager of operations in ND, SD, Montana, Alaska, Canada and exported equipment while manager of FCI to Russia, Indonesia, Scotland, South America and Kuwait.

Mr. Falcon has a Bachelor of Science degree in Business Administration from the University of Mary in Bismarck ND. He has worked as an accountant and finance officer of a governmental organization.

Other stockholders of NWR include Leroy Gregory, president of NWR, and owner of Gregory Water and Energy. Larry Gregory, owner of Gregory Drilling, Inc. Les Bergh a former supervisor of Dresser Industries,(now Halliburton) and has extensive oilfield experience. (See resumes)

NWR will also employ the services of ENGlobal Engineering of Houston, Texas that is specialized in oil refining project, management of oilfield facilities and many multi-disciplinary engineering services to the oil industry. ENGlobal will conduct the Title V air quality permitting process, design the plant, locate the machinery and costs of the system, engineer the construction and startup phase of the refinery. A subsidiary of ENGlobal will provide the training and management of the refinery until proper personnel has been trained to manage the facility. Local engineering firms will be contracted to provide the services that are not provided by ENGlobal.

ENGlobal Engineering, Inc has over 2200 employees and has completed project in the billions of dollars for Shell, Motiva Enterprises, Valero, Catalyst Recovery, Coffeyville Resources, Huntsman Corporation and many others in the petroleum industry.

Gary Reeves will be the principal lead supervisor of ENGlobal Engineering. He is specialized in process engineering and will provide the guidance for establishing the permits, design, and implementation to the NWR refinery. Information and resumes are included in the Appendices.

Timetable:

The estimated time for the permitting process is approximately 6 to 24 months. The process will be governed by the coordination between state and federal agencies with

representatives of NWR. North Dakota officials have expressed a desire to help expedite this project and can be very instrumental in implementing the permits in a timely manner. Financing and construction of this project are currently running over 36 months. There are fairly long time spans from the ordering point for equipment and the delivery to the equipment required to have a complete 100,000 bbl per day refinery. This could consist of between 42 months to 5 to 7 years before a complete refinery is ready for startup.

Schedule for this project would consist of the following:

- ↓ Land acquisition
- ↓ Permitting process
- ↓ Financing
- ↓ Platting of land
- ↓ Establishing water sources
- ↓ Design of facilities
- ↓ Ordering and acquiring refinery components
- ↓ Foundation and earth work
- ↓ Construction of facilities
- ↓ Start up and commissioning of system

These are basic steps and are not necessarily the sequences of the process. The actual timetable of events will depend on the structuring of the financing, marketing analysis of potential products, pipeline and transportation facilities, availability of manufacturing facilities that can produce the equipment needed. Cooperation by state, federal and local officials for permitting, planning and zoning, will be essential to the timely implementation of this project.

Several stockholders of NWR have established another firm that will implement a “topping plant”, which is a small refining system that will produce diesel. The permitting process has already begun and will be funded by the participants. This small plant will be the pilot for the for the 100,000 bbl refinery and will provide the guideline for the permitting. This topping plant is not part of the request for funds provided in this proposal. It is anticipated that the profits of the topping plant can be utilized by some its stockholders to help fund the 100,000 bbl per day refinery and will help to provide seed money for obtaining larger investment from the private sector. However, the above statement does not commit the topping plant profits to Northwest Refining, Inc’s project.

January 15, 2009	Project targeted starting date
February 15, 2009	Completion of contacts of federal & state agencies
March 15, 2009	Completion of forms for Title V permits.
April 15, 2009	Completion of criteria needed for Title V.
May 15, 2009	Draft of permit documents for approval by NWR.
June 15, 2009	Submit documents to agencies for Title V permits.
July 15, 2009	Public hearings for Title V permit comments.
August 15, 2009	Start permitting for other permits required
September 15, 2009	Contacts with various permitting agencies.
October 15, 2009	Draft copies for additional required permits
November 15, 2009	Submit approved permit applications.
December 15, 2009	Public comment meetings for permits
January 15, 2010	Provide all additional documentation needed.
February 15, 2010	Finalize and an all permit requirement

March 15, 2010

Permitting process final

Monies Requested from NDIC O&G **\$650,000.00**

Estimated Budget: Consultant cost for 1 & 2

1. Title V Air Quality Permits:	\$ 650,000.00
a. Monies from NDIC O&G Research grant	(162,500.00)
b. Monies from Northwest Refining	(162,500.00)
2. Various other permits:	\$ 325,000.00
(waste water, solid wastes, hazardous waste, NPEDS permits)	
a. Monies from NDIC O&G Research grant	(162,500.00)
b. Monies from Northwest Refining	(162,500.00)
3. Land acquisitions: (option on 645 acres)	\$ 600,000.00
4. Land Surveys:	\$ 50,000.00
5. Legal:	\$ 150,000.00
6. Architectural:	\$ 350,000.00
7. Business Plan Development:	\$ 25,000.00
8. Pipeline Surveying (possible funded by others)	\$ 300,000.00
9. Public meetings & NWR Staff Wages & Salaries:	\$ 100,000.00
a. Public meeting rents, etc	(10,000.00)
b. Wages (NWR Staff)	<u>(90,000.00)</u>
Total Estimated costs for project:	\$ 2,500,000.00

Confidentiality, Patent Rights to Technical Data:

There are no patents rights to the data. However, we request that the data be kept confidential for the minimum of 6 months after presentation to NDIC O&G.

November 2, 2008

Ms Karlene Fine
Executive Director
North Dakota Industrial Commission
State Capitol, 14th Floor
600 East Boulevard Avenue, Dept 405
Bismarck, ND 58505-0840

Dear Ms Fine:

Please consider this correspondence as an affidavit of the business firm of Northwest Refining, Inc does not owe any outstanding tax liability to the State of North Dakota or any of its political subdivisions. There are no outstanding tax liabilities with any other states or their political subdivisions.

A statement of such can be obtained by NWR from the ND Tax Dept if requested by NDIC O&G Research Council.

Sincerely,

Northwest Refining, Inc

Mel D. Falcon, CEO

Appendices

- 1. Northwest Refining, Inc Certificate of Incorporation**
- 2. Northwest Refining-Resumes**
 - a. Mel D. Falcon**
 - b. Les Bergh**
 - c. Leroy Gregory**
 - d. Larry Gregory**
- 3. ENGlobal Engineering, Inc- Past Project History**
- 4. ENGlobal Engineering, Inc-Key Staff Resumes**
 - a. Gary G Reeves**
 - b. Larry G Smith**
 - c. David B. Carpenter**

State of North Dakota

SECRETARY OF STATE



CERTIFICATE OF INCORPORATION OF

NORTHWEST REFINING, INC.

Secretary of State ID#: 23,503,800

The undersigned, as Secretary of State of the State of North Dakota, hereby certifies that Articles of Incorporation for the Incorporation of

NORTHWEST REFINING, INC.

duly signed and verified pursuant to the North Dakota statutes governing a North Dakota BUSINESS CORPORATION, have been received in this office and are found to conform to law.

ACCORDINGLY the undersigned, as such Secretary of State, and by virtue of the authority vested in him by law, hereby issues this Certificate of Incorporation to

NORTHWEST REFINING, INC.

Effective date of Incorporation: June 13, 2007

Issued: June 13, 2007

A handwritten signature in cursive script, reading "Alvin A. Jaeger".

Alvin A. Jaeger
Secretary of State

Mel D. Falcon

Position: President and CEO

Mr. Falcon is president and CEO Aqua-Envirotech Mfg., Inc. of Williston, ND, a company that specializes in the manufacturing, installation, and servicing of water and wastewater treatment systems. Mr. Falcon has designed and manufactured systems for municipal, residential, commercial, and industrial applications. He has over 22 years of experience in water and soils related remediation projects.

Skills & Experience

Aqua-Envirotech Mfg., Inc. 1994 to present

Responsible for all day to day and long range planning and decision making.

Duties and experience include:

- General accounting and cost accounting
- Overall management
- New products designing, manufacturing, testing, and implementing
- Welding, painting, fabricating products and machinery
- Estimating and cost analysis of new products and projects
- Personnel management
- Operating machine tools and construction equipment
- Consulting on water and wastewater projects

Fluids Control, Inc. 14 years as Regional and General Manager of the Central Division, Canadian & Alaskan Divisions.

- Responsible for the Williston, ND office and District offices of Gillette (Wyoming), Calgary (Alberta-Canada), and Anchorage & Fairbanks (Alaska)
 - Oversee District Managers
 - Design and manufacture, oilfield water filtration systems, drilling fluids processing systems, soil remediation systems, potable water treatment systems
 - Sales and customer service
 - Construction of plants, tanks, water & wastewater treatment systems
 - Install piping above and below ground
 - Cleanup of oilfield wastes, water, salt and oil spills contamination
 - Solidification of drilling fluid waste pits
 - Recovery of waste oil
 - Filtration of drilling and production fluids
 - Drilling mud processing and pit restoration

TISA Corporation 3 years as finance officer and accountant for a government type of organization. Supervised four accounting staff personnel. Member of Board of Directors

- Responsible for all accounting
 - Budgeting
 - Personnel manager for 51 employees
 - Controlling and managing government contracts
-

General Construction Reef Development and Murchison Construction of Hawaii, 5 years. Jacob Construction and Commercial Builders of Williston, ND, 8 years. Superintendent and foreman for construction of schools, houses, high rise buildings, shopping centers, and businesses.

Skills include:

- Carpentry
- Masonry
- Steel
- Concrete
- Water & sewer
- Excavating

Bomac Drilling, G & O Roustabout, and Natco, Williston, ND Worked as a general oilfield hand such as:

- Roughneck
- Derrick hand
- Painter
- Sandblaster
- Pipe fitter
- Machine operator
- Steel worker

Education

Bachelor of Science, Business Adm. and Accounting, University of Mary, Bismarck, ND

40 hour hazwoper certification

Organization Participation

- Chairman of Board of Supervisors, Trenton Township ND, 12 years
- Chairman of Board of Directors, Trenton Rural Fire Dept. and volunteer fireman
- Member of School Board, Trenton Public School
- Member of Williston, ND Chamber of Commerce
- Member of National Federation of Independent Businesses
- Member of Montana Rural Water Association

Resume': Les Bergh
Born: Williston ND

1962: Joined Loffland Drilling Co as roughneck in the oil fields of Wyoming, Colorado, and Utah

1964-1966: Attended Casper College, Wyo for Petroleum Engineering while working part time in the oil industry

1967: Joined Dresser Industries (Halliburton) as Field Engineer for Western District of US

1968-1974: Engineer for Dresser Industries, Australia, New Zealand and became the Regional Manager of the South Pacific Operations.

1974-1975: Dresser Industries manager of Indonesian Operations based out of Jakarta.

1975- 1977: Dresser Industries Manager of Nigeria and West Africa Division.

1977-1996: Founded and operated Fluids Control, Inc and oil field service company with operations throughout Western US, South America, Australia, Indonesia, Alaska, North Sea, Canada and exported oil field equipment to Russia, South America, Indonesia, and North Sea.

1997: Established Round Valley Golf Course in Morgan, Utah a 27 hole course that became a model course in Utah.

2007: Sold Golf Course and became Vice President of Northwest Refining. Returned to North Dakota.

Resume' of Leroy Gregory
3484 114U Ave NW
Dickinson ND, 58601

1975: Started with Gregory Drilling, Inc, a family owned water well drilling company that drilled water well, oilfield production water wells. Drilled and completed gas wells in Wyoming, ND, and other locations. Learned the drilling trade while working in several states and in North Dakota. Left Gregory Drilling, Inc when family member sold the company and moved to another location.

1993: Established Gregory Water and Energy a water well drilling company with 2 rigs and equipment that can drill water wells, gas wells, and shallow oil wells.

Duties as President of GW&E:

Licensed Water Well Driller

Accounting

Personnel Director

Office Manager

Certified License in South Dakota

Types of Work:

Domestic

Municipal

Industrial

US Government registered vendor

Shallow gas wells

Shallow oil wells

Other:

Equipped to provide well pump installation

Backhoe work

Pipeline work

LAWRENCE N. GREGORY

**17609 NE 70th Street
Redmond, WA 98052
425-869-23**

QUALIFICATIONS:

SHALLOW OIL & GAS EXPLORATION, MINERAL EXPLORATION, WATER WELL, GEOTECHNICAL, ENVIRONMENTAL AND GEOTHERMAL

Larry has been in the drilling industry for 33 years in charge of multi-million dollar operations. He is the owner of Gregory Drilling, Inc. for all 33 years of its existence. Prior to starting his own business in 1975 Larry has encountered many types of soils, problems and methods of drilling. He is currently a licensed driller in the states of Washington, North Dakota, and South Dakota. He is a member of the National Groundwater Association, Washington State Drillers Association, North Dakota Drillers Association, South Dakota Drillers Association, and is a member of the Technical Advisory Group (TAG) for the Washington State Department of Ecology. Larry has been involved with the water well, mineral exploration, geotechnical, and environmental industries in North Dakota, South Dakota, Montana, Colorado, Wyoming, Utah, Washington, Oregon and California in his past 33 years of experience. Some of his projects include coal exploration for the USGS in Montana, Wyoming and North Dakota. Oil shale exploration for ARCO in Utah and Colorado, coal exploration for the US Department of Interior in the Midwest, uranium exploration for UREX in Wyoming, and numerous amounts of water wells for clients ranging from local farmers to the Federal government and major oil companies such as Texaco, Amerada Hess, Exxon and Amoco. Many of these water wells were drilled to depths exceeding 2000 feet in depth. In some instances no other drilling contractor was able to accomplish the task at hand, except for Gregory Drilling Inc. under Larry's direction. Over water drilling projects include environmental drilling for the EPA at the Wyckoff Facility near Bainbridge Island, WA, geotechnical investigation for the replacement of Pier D at the US Navel Base in Bremerton, WA. Larry has conducted many geotechnical and environmental site investigations throughout Washington and Oregon using hollow stem auger, mud rotary, HWT and HQ casing advancer and HQ-3 wireline core drilling methods. In addition to above-mentioned licenses Larry also currently has a Class A commercial driver's license, is 40 hour HazMat, 24hr MSHA trained and is part of a random drug test program.

GEOTHERMAL DRILLING

Larry is also IGSHPA (International Ground Source Heat Pump Association) certified. IGSHPA training provides instructional programs in geothermal heat pump system design, installation and training. IGSHPA certification is a nationally recognized certification. Larry has been involved with the following geothermal projects.

- Aspen, CO. Drilling, installation and grouting of 54 holes to 250' at a residence.**
- Steamboat Springs, CO. Drilling, installation and grouting of 47 holes to 300' for condominiums.**
- Mercer Island, WA. Drilling and installation of 12 holes to 300' for a new res**

EMPLOYMENT

1975- Driller/Owner, Gregory Drilling, Inc.
Started Gregory Drilling, Inc in 1975. Have done numerous amounts of drilling in the water well, mineral exploration, shallow oil and gas, geotechnical and environmental industries. Much of the work from 1975 to 1991 was water well drilling, installing and developing in the states of North Dakota, South Dakota, Montana and Wyoming using rotary drilling rigs. Many of these water wells exceeded 1000 feet in depth and some over 2000 feet deep. Deep water injection wells were also drilled for major oil companies such as Amerada Hess and Texaco. Also in this time Larry was involved in uranium exploration in Wyoming for Framco, which involved conventional coring methods to depths of 1000 feet. While in North Dakota many coal exploration programs were undertaken. Projects for the BNI Coal Mine near Center, ND consisted of coal coring to various depths in 300 holes. Royal Oak Enterprises was another client that requested coal exploration in North Dakota to various depths at several locations in the western part of the state. In 1991 Larry opened an office in Redmond, WA where Gregory Drilling, Inc. is currently located. He has operated CME drill rigs that have the ability to auger, mud rotary, HWT and HQ casing advancer and HQ- wireline core drill. Also includes installation of various down hole instruments. Work has been performed throughout Washington and Oregon. Larry is an active owner in his 26-year-old business and handles much of the paperwork, proposals and client public relations.

1972-1975 Driller, James Drilling

Worked as a driller in the geotechnical and mineral exploration industry. Work consisted of drilling, sampling and instrumentation installation using hollow stem auger, mud rotary and core drilling methods. Also did work consisting of mineral exploration using conventional core drilling methods to depths of 3000 feet.

1970-1971 Driller, Kal-Zeff and Associates

Worked as a driller in the geotechnical drilling industry. Work consisted of drilling, sampling and instrumentation installation using hollow stem auger, mud rotary and core drilling methods in the Denver, CO area.

1966-1969 Driller, Noble Drilling Co.

Worked as a driller in the oil and gas drilling industry. Work consisted of oil and gas exploratory drilling to depths of 13,000 feet in the Williston, ND area.

CLIENTShell/Motiva
Refinery**PROJECT**Crude Expansion
OSBL**ENGLOBAL'S SCOPE OF WORK**

ENGglobal has recently been awarded the first stage FEL/FEED contract for a major refinery upgrade at Shell/Motiva's Port Arthur refinery. The project will involve increasing capacity of the refinery from 300,000 barrels per day to 600,000 barrels per day with total installed cost expected to exceed \$3.5 billion dollars. Kellogg Brown & Root has been awarded the onsite front end loading work, while ENGglobal's contract covers front end loading for all offsite facilities. ENGglobal's scope will include the following:

- New Central Control Building with all associated DCS connections from the new process units as well as from the old units.
- New pipe racks for transfer lines, utilities, and product lines throughout the entire refinery.
- Demolition and relocation of old facilities.
- New water treating plant and API separators.
- New cogeneration facilities.
- Sulfur Recovery and Tail Gas Treating process units.
- Gas treating process units.
- New power distribution in conjunction with another subcontractor.
- Relocation and design of new storage tanks.

ENGglobal's portion of the work covers approximately one billion dollars of new and revamped facilities. The front end development effort will involve approximately eighty (80) ENGglobal people and will be completed mid-year 2006. Assuming approval of the project, ENGglobal will continue on with detailed design, procurement, and construction management of the required facilities.

Motiva Enterprises
LLCPower Station 3
Instrumentation
Modernization

ENGglobal is performing EPCM services for this \$27 Million project. ENGglobal began the FEED/FEL phase for this project in June 2004 and was awarded the project upon client approval in February 2005. The scope includes modernization of a water plant with eight demineralization trains, boiler house with four gas fired and two heat recovery steam generators with supplemental firing and power generation facilities including three steam turbine generators and two gas turbines.

Valero Energy
Corporation
Ardmore, OK

Sour Crude
Project

Project scope included: front end engineering, detail engineering, AFE cost estimates, detail design, procurement, and construction management. Project included the replacement of naphtha hydrotreater reactors and installation of chloride scrubber, installation of cat feed hydrotreater 4th reactor and 3rd hydrogen make-up compressor, a sulfur recovery unit including tail gas amine treating unit, two asphalt loading spots and loading pump, installation of a new 13.2 KVA power feed with step down transformers and MCC, and all associated piping, valves, instrumentation and controls.

Catalyst Recovery
of LA
Lafayette, LA

No. 4 Rebuild Project. Front end study, scope book, engineering, procurement and construction management for retrofitting existing catalyst handling equipment and adding new equipment and technology to increase production throughput to the No. 4 line. The controls for the new equipment were integrated into the existing control system. The control room for the plant was also reworked.

Coffeyville
Resources
Refining &
Marketing, LLC
Coffeyville, KS

Ultra Low Sulfur
Diesel Project

Project scope included: front end engineering, detail engineering, AFE cost estimates, detail design, procurement, and construction. Project included a grass root 23,000 bpd HDS unit including a new flare, revamp of the existing 24,000 bdp HDS unit, revamp of the Unifiner, a grass root 60 LTP Sulfur Plant, a grass root 20 MMSCFD hydrogen plant, the addition of an amine contactor, a 3rd cooling tower bay, a new feed line and its associated pumps, a 12.47 KV power distribution system, and all associated OSBL including piping, valves, instrumentation and controls.

Huntsman
Corporation

Thai Olefins
Ethanolamines
Plant

Project scope includes: producing a complete Basic Engineering Package for a new Ethanolamines plant to be built in Thailand, owned and operated by the Thai Olefins Company. Huntsman Licensing Technology, Performance Products Group has sold a license for proprietary technology to TOC, and as part of the signed agreement, must provide a complete BEP package within six months. ENGglobal began this project in early September and plans to finish the package by late February 2006. Process engineering is producing new PFD's and P&ID's, Equipment Data Sheets, and a Preliminary Plot Plan, among other deliverables, based on a similar facility that Huntsman operates in Port Neches, Texas. The final package will be delivered to the Thai Olefins Company, which will issue it for EPC bidding and ultimately, an EPC contract.

Safra Company
Limited

Naptha and
Aromatics
Complex

Project scope of work includes the development of the FEED Package and process package for this grassroots project which consists of four main processing units, two offsite units and other combined facilities such as a central control room, instrument air compressors, etc. The four main process units to be installed are:

- Naphtha Hydrodesulphurization (HDS) Unit
- Continuous Catalytic Reformer (CCR) Unit
- Extractive Distillation (ED) Unit
- Zeoformer Unit

In addition to the four major units, there will also be a small sour water stripper unit, and a sour gas treating unit. The main products from this complex are propane, butane, benzene, toluene, mixed xylenes and motor gasoline.

TOTAL, Port
Arthur, TX
Refinery

NAC Revamp

Project Scope included: FEED Package for a revamp of the Naptha and Aromatics Complex which included upgrades of equipment in three units: Naptha Hydrodesulphurization (HDS), Continuous Catalytic Reformer (CCR) and the BTX Unit. This project resulted in upgrades to numerous pumps and heat exchangers in addition to retraying of 2 distillation towers, installation of a Packinox exchanger in the CCR Unit and a total revamp of the CCR Furnace and Air Preheater system.

TOTAL, Port
Arthur, TX
Refinery

Project scope included: FEED package for a new 8 MMSCFD refinery sour gas compressor system. The old compressor was poorly designed and undersized resulting in fines due to flaring and several serious safety incidents including one explosion. ENGlobal determined the full range of sour gas composition that would be possible at the compressor from all the refinery units feeding it. Many different operating and upset scenarios were studied to make sure the compressor could perform under all conditions. The project was funded and ENGlobal also performed the detailed design, DCS configuration, wrote the operating procedures, etc. The project was built and successfully started up with the new compressor system able to handle large swings in molecular weight, flow, etc. without tripping offline.

Client Information
Confidential

Flue Gas
Scrubber &
Waste Heat
Recovery

Project scope of work included: front end engineering, AFE cost estimates, procurement, and field support. Units included: two CO boilers, a flue gas scrubber and dearator / demineralizer / boiler feed water pumps, two steam turbine generators, hydrogen unit modifications, DCS upgrade, and all associated piping, valves, instrumentation and controls.

BASF Fina
Limited
Partnership

Steam,
Demineralized
Water and
Condensate Study

Project scope included: Performed a study to determine where bottlenecks would occur in the TOTAL (Fina) Refinery after the startup of the BFLP Steam Cracker, Condensate Splitter Unit (CSU) and the SABINA C4 Complex. The study included a complete steam, condensate and demineralized water balance for the entire refinery / petrochemical complex. Several options for debottlenecking the system were presented. The study resulted in production of a FEED package for funding of the modifications needed that were agreed upon by BASF, Fina and **Shell**. This project was on a very fast track and successfully installed with no interruptions to intended operations. ENGglobal also performed the resulting detailed design which included the following to be installed in the TOTAL Refinery: Boiler Feedwater pump, BFW control valve trim changes at FCCU, new demineralized water train, new high pressure deaerator, new sand filter and several pump upgrades.

REFINERY FEED PACKAGE EXPERIENCE MATRIX	SCOPE/SCHEDULE A												
	Site Investigation	Feasibility Analysis	Capital Budgeting	Economic Evaluations	AFE Documentation Preparation	Process Flow Diagrams	Heat & Material Balance	Process Simulation	P&IDs	Equipment Data Sheets	HAZOPs & PSM	Equipment Specifications	Cost Estimates
Client/Project													
ATOFINA Petrochemicals, Inc. Condensate Splitter	X		X	X		X	X	X	X	X	X	X	X
ATOFINA Petrochemicals, Inc. Sour Gas Compressor Upgrade	X	X	X			X	X	X	X	X	X	X	X
ExxonMobil Refinery Alkylation Upgrade					X	X	X	X	X	X		X	X
ExxonMobil Refinery Coker Unit / Crude Unit Hydraulics								X		X			
ATOFINA Petrochemicals, Inc. Refinery Flare Gas Recovery	X	X						X	X	X	X	X	
ATOFINA Petrochemicals, Inc. Asphalt Blending Facilities	X	X				X	X	X	X	X	X	X	X
Alon, U. S. A. (Big Spring Refinery) Gasoline Desulfurization Unit	X	X				X			X	X		X	X
Mobil Chemical Environmental Compliance/Beaumont Tx Star Enterprise					X			X	X	X		X	X
Wastewater Project/Pt Arthur, Tx Mobil Oil	X					X			X	X		X	
Process Control Project/Beaumont, Tx Mobil Oil									X	X		X	X
Expansion Project/Beaumont, Tx Mobil Oil									X	X		X	X
Gasoline Blending/Beaumont, Tx Lyondell-Citgo Refinery									X	X		X	X
Refinery Conversion/Houston, Tx Exxon Refinery								X	X	X			X
Process Engineering/Baton Rouge, La TransAmerican Refining					X								X
150,000 bbd Expansion/Norco, La Chevron Chemical									X	X	X	X	X
Cyclohexane Unit/Pt Arthur, Tx TransAmerican Refining						X		X	X				
Dehydrogenation Unit/Norco, La Sinclair Refinery		X											
Plant Shutdown Compliance Study/OK Sinclair Refinery		X											
Penex, Isom, & Poly Unit DCS Study/OK Valero Energy Corporation	X	X	X	X	X	X	X	X	X	X	X	X	X
Sour Crude Project/Ardmore, OK Client Information Confidential	X	X	X	X	X	X	X	X	X	X	X	X	X
Flue Gas Scrubber & Waste Heat Recovery	X	X	X	X	X	X	X	X	X	X	X	X	X

2. In terms of working with Shell in the past we have several projects that come to mind. All of the following were performed using Shell's DEP standards.
- Shell Yellowhammer in Alabama – Gas processing plant and a sulfur removal plant.
 - Shell Belpre in Ohio – A complete upgrade to the instrumentation and controls system.
 - Shell Deer Park in Texas – Refinery metering project along with other controls and instrumentation.
 - Shell Petronas in Malaysia – OGP being the prime we used the DEP for our portion of the overall facility engineering and design.

Further work which ENGGlobal has performed for Shell includes but is not limited to the following:

<u>SHELL DIVISION</u>	<u>UNIT</u>	<u>ENGGLOBAL'S SCOPE OF WORK</u>
Shell Chemical Co. Deer Park, TX		Process unit modification (confidential).
Shell Oil Company Geismar, LA		Series of modernization projects to convert the Shell Geismar Plant from pneumatic controls to Honeywell TDC Distributed Controls. The projects were phased over a 7 year period to minimize impact on Shell. On each of these projects, responsibility included development of the AFE estimate submitted for funds allocation, and conduct of the engineering, design, procurement, and construction management. Home office construction support was provided on an as-needed basis.
Shell Chemical Company Geismar, LA	Olefins	Branched Olefins - Neoflex 9 Project. Facilities modification to produce new product with an existing process unit including raw material receiving, storage, product storage and shipping by truck, rail or barge. 60,000+ home office manhours.
Shell Oil Norco, LA	Catalytic Cracking Unit	Catalytic Cracking Unit (CCU) Energy Conservation Project. Project undertaken to reduce energy consumption and increase the temperature and quantity of heat recovered in the fractionation section of the plant. 219,000 manhours (65,000 home office, 154,000 field).
Shell Chemical Co. Geismar, LA	C ₁₀ Alpha Olefin	C ₁₀ alpha olefin recovery unit and offsites; and P,C C ₁₆ /C ₁₈ alpha olefin separation unit and offsites (modifications of existing process units to new services).
Shell Chemical Co. Geismar, LA		Offsite facilities.
Shell Chemical Co. Geismar, LA	Ethylene Oxide/Ethylene Glycol	Ethylene oxide/ethylene glycol unit. High pressure steam generator.

Shell Chemical Co. Geismar, LA	Alpha-Olefins	A major debottlenecking and operability project on the first installation of Shell's Higher Olefin's Process for the production of alpha-olefins. Additions included expanded purification and isomerization beds, expansion of the regeneration system, and modification to the catalyst preparation and separation facilities. Also, heat transfer additions and modifications were made to the feed, intermediates and products areas.
Shell Chemical Co. Geismar, LA	Heat Recovery	Unit Waste Heat Recovery Project.
Shell Chemical Co. Geismar, LA	M-Unit	M-Unit Dual Rundown Project.
Shell Chemical Co. Geismar, LA		Utilities computer system monitor and reports on all plant utilities and provide control on a number of loops.
Shell Chemical Co. Geismar, LA		Miscellaneous offsites including compressor installations, rail and truck loading facilities, tankage and piping systems.
Shell Chemical Co. Geismar, LA	Ethylene Oxide Alpha Olefin	Miscellaneous projects including ethylene oxide unloading and tie to storage facility, pressure swing absorption hydrogen unit; alpha olefin catalyst residue storage, drumming and truck loading station.
Shell Chemical Co. Geismar, LA	Ethoxylation	Batch process unit addition to ethoxylation plant including offsites.
Shell Chemical Co. Geismar, LA	Neodol® Ethoxylates	Two "grass roots" batch-type process units to manufacture biologically degradable Neodol® ethoxylates; approximate capacity 250 million pounds annually.
Shell Chemical Company Geismar, LA	Olefin	AO/ID-1 Modernization Project. Modernization of instrumentation/control system for two olefin units. Performed the architectural design for enlargement and renovation of existing control building to accommodate new control system consoles, control equipment racks, and computer equipment. Design included installation of redundant air conditioning systems, dehumidification equipment, and air filtration equipment. Also provided construction management for installation of new instrumentation/control system, and hot cutover from the existing pneumatic system to the new electronic system. CM responsibilities also included control building addition and renovations.

Shell Chemical Co. Houston, TX	Ethylene Oxide/Ethylene	Ethylene oxide/ethylene glycol offsites facilities at Geismar, LA plant including nitrogen and oxygen systems, raw water (river system, process and shipping tankage, ethylene system, fire protection system, boiler (200,000 lb/hr) and steam system, water treating facilities and inter-unit ties.
Shell Oil Norco, LA	Residue Catalytic Cracking Unit	Residue Catalytic Cracking Unit (RCCU) Offsites Project. Offsites installation encompassing 16 operating units which were all ultimately connected to the new RCCU. 325,000 home office manhours.
Shell Oil Company Norco, LA	Coker	Coker Revamp Projects consisting of blowdown recovery, modernization and debottlenecking and computer control. Significant items of work included: new coker charge heater, jet pump, new steam-air decoking shutdown header, coke drum bottom head handling facilities, replacement motors to critical equipment, control room modifications for new instrument panel, installation design for new VAX/DEC computer system and spare computer system, and power supply and distribution system. All work designed and constructed during normal plant operations.
Shell Oil Company Norco, LA		Norco Effluent Treatment (NET) Project. Project undertaken to allow the discontinuation of deep well disposal of sour water and various other effluent streams. Prepared scope definition package for comprehensive sour/non-sour waste water collection and treatment system from both refinery and chemicals operations for the entire Norco manufacturing complex. Scope included collection and segregation of streams, organics, and solids separation by CPI, IGF and DAF processing, sludge handling, sour water stripping and biological treatment. Definitive detail scope package was prepared for the solicitation of Lump Sum E,P,C proposals and included demolition definition, P&ID's, plot plan and general arrangements, equipment list, equipment specifications, all project specifications, electrical one-line, instrument list, instrument specifications, etc.
Shell Chemical Co. Norco, LA		Miscellaneous modifications of on-site and site facilities.
Shell Chemical Co. Norco, LA		Process unit modification (confidential).
Shell Chemical		Major upgrade to batch process surfactants plant, all process sections, utilities, controls, power, safeguards, product & send out.

Shell Oil Company
Norco, LA

C-Unit

C-Unit protective instruments project. A two stage reactor was added to the air conditioning system by others. The Class I shutdown system for the C-Unit interfaced with this work and picked up new solenoid valves, TDC alarms, transmitters and switches. Other shutdown valves were also added to the Class I shutdown systems in chlorine, nitrogen purge and AC service.

Shell Oil Company
Norco, LA

Capital Improvements Projects. Series of capital improvement and maintenance projects performed for the OL-5 Unit and RCCU Turnarounds and other plantwide improvements over a two year period.

GARY G. REEVES, P.E.

MANAGER PROCESS ENGINEERING

BACKGROUND SUMMARY

Mr. Reeves has 39 years of experience in process/environmental technology and water treating, including 17 years of field experience in operating facilities. He has also spent over two years of his engineering and construction experience in the field either participating in start ups or expanding existing facilities. He is a experienced in design, operation, and permitting of plant utilities/offsites, NOx control, water treating, wastewater treating, petrochemical, specialty chemical, polyolefin, refinery, oil field production, commercial hazardous waste disposal, permitting, design, detailed design, and construction of client facilities.

Mr. Reeves is ENGGlobal's Manager of Process Engineering, responsible for the process portion of projects and environmental portions of projects from the proposal phase through project completion. He is also responsible for obtaining operational permits and preparing Environmental Impact Assessments (EIA) as required. He is experienced in permitting, design, detailed design, and construction of client facilities.

His expertise in water treating includes: complete raw water treatment, boiler feedwater treatment, cooling water systems and water treatment for reuse. He has commercial and industrial waste disposal experience in pretreating biological treatment, recovery, filtration, sludge processing, stripping and evaporation. Mr. Reeves also has experience in permitting, design and operation of industrial and commercial hazardous waste disposal facilities. His offsite experience includes tankage, fire water loops, oil water separation; sewer systems, cooling towers, loading facilities, mixing ponds, pH control, sour water stripping and fuel gas systems.

EDUCATION

University of Michigan, Michigan

BSChE, 1968

C.S. Mott College, Michigan

Associate in Science, 1963

PROFESSIONAL REGISTRATIONS

Texas Professional Engineer License #44569 (Chemical Engineering)

PROFESSIONAL AFFILIATIONS

American Institute of Chemical Engineers

PROJECT EXPERIENCE

The following list of projects includes, but is not limited to, home office and in-plant assignments completed.

- **Regulatory permitting**

Directed permitting efforts for air and water, both for domestic plants and overseas plants. He prepared permit applications and EIA's for large polyolefin complexes, small specialty chemical plants, refineries, oil

field production, stabilization, LNG vaporization terminals and pipeline projects. His permitting experience includes working with consultants plus modifying designs so facilities would be under PSD limits or a non-major source allowing them to be constructed under a permit amendment.

- **Environmental studies and models**

Performed and consulted on many environmental studies and performed computer modeling. The studies range from small single-problem studies to full detail environmental impact assessments for large, complex processing plants. On large projects, he directed a team effort to run several air dispersion and dense phase models to generate isopleth maps showing resultant plant emissions. Air emissions modeling ranges from screening models to full US EPA ISC models. He has also completed several hazardous chemical release and flare radiation studies using PHAST. He has prepared several air permits incorporating this data.

- **Refinery experience**

Completed many refinery projects including both offsite facilities and process designs. His range of experience extends from small studies to complete plant expansions involving many processing units. He concentrated on flare systems, relief load calculations, utility and offsite facilities design, drainage systems, and process modifications which helped the offsite facilities costs and reduced the environmental problems.

- **Utilities and offsite facilities designs**

Numerous utilities and offsite facilities designs and modifications have been designed and operated by Mr. Reeves over the last 39 years. The projects include all aspects of utility and offsite facilities including firewater supply systems, tankage, loading and unloading, compressed air, cooling water, nitrogen generation, steam networks, topping turbines for power generation and steam let down, raw water treating, and wastewater treating. The projects he designed range from small revamps to large grassroots chemical complexes and cover many types of facilities from chemical plants to refinery and oil field production sites.

Confidential Client Site selection study

Evaluated two potential sites for a new chemical plant based on waste disposal options, environmental requirements and available infrastructure at each site. This resulted in follow up assistance with permitting at the chosen site for both an air permit and waste disposal well permit amendment.

Exxon Neftegas Project Services Sakhalin Island, Russia Odoptu project

Exxon Neftegas Project Services Odoptu project Sakhalin Island, Russia. Prepared a preliminary Environmental Report which included quantifying all the air emission point sources, including several options on the types of drivers to reduce pollution. The air emissions were modeled in Houston and in Russia by AGRA consulting using the Russian Prizma dispersion model. The Russian results were compared and presented as a comparison to the screening results and presented in the Environmental Report. An Environmental matrix was generated to look at the impacts and options for reducing environmental impacts from the project. Several options were looked at and presented to reduce the environmental impact to the area. An ecological review meeting was held with the Exxon project team to present the environmental options.

Conoco Syria DEZ Gas Project:

Detailed engineering design of a DEZ Gas Project located in the Eastern desert of Syria. The project includes six (6) compression stations, five (5) gathering stations and pipelines, and a 460 MMSCFD gas plant. Scope included redesigning the raw water and wastewater treating facilities to provide workable facilities that would supply adequate quality water for the plant and wastewater suitable for discharge. The gas plant is designed to recover, fractionate, store and export approximately 12,000 BPD LPG and 36,000 BPD of hydrocarbon condensate products. A part of the residue gas (150 MMSCFD) is compressed and routed to a new pipeline for export. The excess gas is re-injected back into the gas field. The project also includes all the offsite facilities required for the operation of this stand-alone gas plant: Refrigeration, Hot Oil, Fuel Gas, Flare, Diesel, Fire Protection, Fire & Gas Detection, Water Treatment, Wastewater Treatment, Truck Loading and Unloading, Chemical Injection, Plant air and Instrument air, Blowdown and Drain systems. The project also includes all administration, maintenance, living quarters and control buildings and their associated sanitation systems.

Cerro Negro Project - Heavy oil production and shipping facilities Mobil/PDVSA Partnership, Caracas, Venezuela

Performed an environmental due diligence review of the oil production, collection, field processing, pipelines, upgrader plant, and shipping of heavy oil for the Cerro Negro Project. The review included all current Environmental conditions, design and construction and potential future environmental liabilities. The review was performed by reviewing the project documents and interviewing the project personnel to determine what the design would and would not include.

Wastewater Characterization and Treatment Plant Design Kuwait National Petroleum Company, Mina Al-Ahmadi Refinery, Kuwait

As part of the Multi Project Development at KNPC, sampled and characterized the wastewater produced by the existing facilities as well as the proposed new facilities. He lead a team of engineers and the plant personnel in a task force to assure that the results produced from the plant laboratory for wastewater treating tests are reliable and repeatable for the test period and beyond. The team conducted a 2.5 month sampling and testing effort that resulted in a complete characterization and water balance for the entire refinery complex including the additional units that are planned for KNPC. The efforts coordinated the preparation of the personnel in Kuwait to assure that everything required to conduct the testing was either completed or available when the sampling team arrived. The treatment design reused as much of the existing wastewater treatment equipment as possible, and modified the system where required to provide the most economical system that would consistently produce compliant wastewater discharge from the refinery.

Drainage Upgrade Saudi ARAMCO, Riyadh, Saudi Arabia

Designed upgraded drainage facilities to provide adequate oily water, firewater, and stormwater drainage for the Riyadh refinery. The project included a new API separator, several lift stations, and segregated clean and oily water sewer systems for a zero discharge refinery. The project also included studies on the condition and improvements on the evaporation pond operation. The condition of the existing API separator was also evaluated and studied as to the requirements for making it operational. Due to his efforts a drainage system that

accomplishes the project goals, reduces pollution levels, and allows recycling of the clean stormwater was designed at a reduced cost to the client.

**Value Engineering, Clean Fuels Project-Offsites -
Shell Oil Company, Martinez, California**

Participated in the Value Engineering Analysis Team of the process flow diagrams for facilities to support the planned new process units at Shell Oil Company's Martinez Manufacturing Complex located in Martinez, California. Contributed cost/benefit analysis on environmental, utilities, and offsite facilities. Mr. Reeves was able with his background and experience not influenced by the clients engineering standards and practices to provide a fresh look at the systems involved in the analysis. The team developed thirty two cost saving design alternatives into proposals.

LARRY G. SMITH

PRINCIPAL PROCESS ENGINEER

BACKGROUND SUMMARY

Experienced Petrochemical and Refining Manufacturing Engineer/Manager with particular expertise in Ethylene and Olefins processes. Comprehensive experience in all aspects of olefins-related process engineering and technical/operations management (including process simulation, fractionation, refrigeration, compression, hydraulics, **unit operations and unit startups**, process and business optimization, project feasibility and economic studies, project development and management.) Proven leader that effectively interacts with personnel across all levels of an organization.

EDUCATION

Washington State University

Bachelor of Science in Chemical Engineering, 1969

Chevron

Extensive company-sponsored training including programs in Leadership, Management, Project Management, Quality Principles and Tools, Ethics, Diversity and Safety.

PROJECT EXPERIENCE

The following list of projects includes, but is not limited to, home office and in-plant assignments completed.

Technical Consultant to Petrochemical and Refining Industries

(Process Engineering and Operations)

- Provided process/operations technical expertise to help develop and evaluate new technologies and engineering software products for use in the energy industry (i.e., petroleum refining, petrochemicals, chemicals, and other related processes). Determined potential markets and provided technical assistance in the marketing of these products.
- Evaluated and provided technical assistance in the development, marketing and utilization of engineering based software for QMC (Quality Monitoring and Control Company).
- Provided technical evaluation and determined potential markets for Accrtru International's innovative "High Temperature, Self-Verifying Sensor System". The system is now successful in the ceramics industry and has great potential for use in high temperature ethylene cracking furnaces.

GULF OIL COMPANY (SRC Project)

Project Management Coordinator - Solvent Refined Coal (SRC) Project

Coordinated the efforts of the operations group, engineering design group and others with project management for the design and construction of a plant that would convert coal to a liquid fuel oil.

**CENEX Petroleum Refinery
Operations Superintendent**

Managed the process unit operations of the 45,000-barrel per day refinery. Units included naphtha and mid-distillate hydro-treaters, FCC, alkylation, C4 isomerization, sulfur recovery and supporting facilities.

Engineering and Operations Assignments

Managed the design, construction and startup of a 15,000 barrel per day Naphtha Reformer. Project was completed on schedule and within budget.

**UNIVERSAL OIL PRODUCTS (UOP)
Refinery Process Units Start-up Engineer**

Training and unit start-up assignments in Illinois, Montana and Canada

CHEVRON CHEMICAL COMPANY

**Olefins Technical Superintendent
(Process Engineering Department)**

Directed the process engineering services for the Cedar Bayou Complex with thirty process engineers. Three groups provided the process engineering functions for the complex's units (Olefins, Utilities, Intermediate Polyolefin's, Low and High density Polyolefin's).

- Managed an ethylene/propylene capacity expansion that eliminated cracking furnace and fractionation bottlenecks. Increased ethylene capacity by 300 million pounds per year and propylene 100 million pounds.
- Directed the project management of a grassroots Polyolefin's Unit and the preliminary development of a grassroots Intermediate Polyolefin's Unit.
- Instrumental in promoting and implementation of a computer control system resulting in optimization of furnace throughput and yields and maximum ethylene production. Annual savings ranging from \$7million to \$12million.
- Implemented the development and growth of the department from a limited group of eight engineers to a group of thirty engineers providing full range of process engineering services for the facility.
- Led the development of an Engineering Training Program for new Engineers with the assistance of Chevron University.
- Instituted a cultural change in supervision and management methods by following the guidelines set forth in a Reinforcement Based Leadership Program.

Olefins Senior Staff Engineer (Kingwood Technical Center)

Provided comprehensive technical services (process engineering and operations assistance) to the Olefins Facilities at Baytown and Port Arthur, Texas.

- Completed a feasibility study and prepared a budget estimate for a major ethylene capacity expansion of the Port Arthur, Texas facility.
- Developed a preliminary process design, cost estimates and economic evaluation of the ethylene expansion project that eventually resulted in an ethylene capacity increase of more than fifty per cent.

Process Engineering Supervisor

Directed the Ethylene and Utilities Process Engineering Group at the Cedar Bayou Petrochemical Complex. Approximately 1.2 billion pound per year ethylene unit, utilities included the water and waste water treatment facilities, all steam production facilities (400, 700, 1500 psi boilers).

- Directed the development of a computer model (includes feedstock product yields, a unit material/energy balancer, and unit cost analyzer) that resulted in significant cost saving from improved energy efficiency and optimized feed slate selection.
- Actively involved in operations optimization and troubleshooting.
- Led the group in the development and implementation of a major debottleneck project resulting in ethylene capacity increase of over 200 million pounds per year.
- Directed studies of the large compression systems (cracked gas, ethylene and propylene refrigeration) resulting in modifications that led to major energy savings.
- Led a study to determine the feasibility of a power co-generation study unit.
- Implemented a major project to increase propylene by ~100,000 pounds per year.

DAVID B. CARPENTER, P.E.

PRINCIPLE PROCESS ENGINEER

EDUCATION

Rice University, Houston, Texas
Bachelor of Arts, 1962

Rice University, Houston, Texas
Bachelor of Science, Chemical Engineering

Marshall University, Huntington, West Virginia
Master of Business Administration, 1969

PROFESSIONAL REGISTRATIONS

Licensed Professional Engineer, P.E. #40067, State of Texas

PROFESSIONAL/TECHNICAL TRAINING

Lube Oil and Wax Processing Technology – Refining Process Services, 1995

PROFESSIONAL AFFILIATIONS

American Institute of Chemical Engineers
South Texas Section of AIChE
Commercial Development and Marketing Association

PUBLICATIONS

“Uses of Custom Processing” – *Chemical Engineering Magazine*, 1977

PATENTS

US 3,689,404 with LJE Hofer
US 3,697,414 with EA Thompson
US 3,835,183 with JW Mittendorf

PROJECT EXPERIENCE

The following list of projects includes, but is not limited to, home office and in-plant assignments completed.

January 1992 – May 1999

Served on the team that developed the lubricating base oil process for Excel Paralubes. This process had three distinct areas that ran concurrently.

Distillation – Cut three different crude oils into three different cuts by vacuum distillation. A light and a heavy Arabian crude, and a heavy Mexican crude were all cut to determine the yields and to produce the feedstock for further processing. The distillation produced 5 cuts, three of which were suitable for producing 100, 300, and 600 SUS (Saybolt Universal Seconds) viscosity base oils. The light ends were suitable for diesel fuel, and the heavy ends were only suitable for residual fuel. A two vacuum column system was used in the process. The light ends,

and the 100 SUS viscosity cut was produced in the first pass through the system. The bottoms from the first pass was redistilled to produce the 300 and 600 SUS viscosity products, and the residual oil material.

Hydrocracking – Hydrocracked each of the three cuts from each of the three crude oils was processed to produce a hydrocrackate. The processing was done over a Ni-Mo catalyst at approximately 3000 psi, and 650 °F and a LHSV (Liquid Hourly Space Velocity) of about 1. The target VI (viscosity index) was 100 SUS in each case. Each of the crude oils was evaluated on the yields of the various cuts, the overall yield from the crude, and the quality of the products produced.

Dewaxing – The Hydrocracked products were dewaxed, using the Chevron Isodewaxing® process. This process utilized a zeolite catalyst. This catalyst broke pieces off the straight chain paraffin, but unlike traditional dewaxing processes, it reattached the shorter chain to the side of the longer paraffinic chain, making an isoparaffin. The composition of the catalyst was proprietary. The process was still run under fairly severe conditions (~ 1000 psi, 650 °F). The advantage of this process is that it has a much higher yield than traditional catalytic dewaxing, and that the reformed paraffin molecules had a high VI.

Process Hazards Analysis - Led the HAZOP team that reviewed the pilot plant units involved in this project. Assembled the team. Assembled the P&IDs for each of the three units involved. Led the review HAZOP review and wrote the report on the findings of the team.

When the crude and catalysts were selected, production runs were made to generate enough material for engine testing, using the standard Pennzoil additive package. Overall yields and product quality information were provided to the Pennzoil process engineering group for detail process design.

April 1997 – May 1999

White Oil Manufacture by Hydrogenation - Led a project to perform a process variable study on the production of white oils by hydrogenation. The process was run at about 2000 psi and 600 °F over a nickel catalyst. Designed the experiments to find the correct set of conditions for the production of white oils from lube oil base oils by hydrogenation. Ran the experiments and reported the results. This project showed that hydrogenation was both technically and economically preferable to the existing sulfuric acid treating and partial hydrogenation / sulfuric acid treating processes, but that for Pennzoil, the advantages were not great enough to justify the capital expenditure required.

June 1996 – September 1997

Diolefin Hydrogenation - Led a project to demonstrate a process for hydrogenating the diolefins in catalytically cracked gasoline to monoolefins, using reactive distillation technology. The process was reviewed, and the feedstock matching the expected commercial feed for the pilot runs was obtained. This process had two advantages in that it would process light cat cracked gasoline continuously during distillation before the diolefins had an opportunity to polymerize, and that it tended to produce higher value pentenes that could be used to produce high octane alkylate. Worked with the technology supplier in planning and making pilot runs at their site. Analyzed the data from the pilot runs, and reported the results to the Pennzoil process design group. Participated in the start up of the commercial unit start up at the Pennzoil Shreveport refinery to assure that the plant was started up and operated properly.

February 2006 – March 2007

Fluid Catalytic Cracker Incident - Investigated the cause and origin of a fire that occurred during the restart of a Fluid Catalytic Cracking Unit after a forced shut down for Hurricane Rita. Determined that there were two separate incidents during the shut down and restart, and that only one of them had a causal effect on the fire. During the course of the

investigation, it was determined that there were ten events in the chain of events that led from the root cause of the incident to the fire.

March 1998 – September 1998

Diesel Fuel Catalytic Dewaxing and Desulfurization - Led a project for the catalytic dewaxing of diesel fuel at the Pennzoil Shreveport refinery. This was a stacked bed process that both catalytically dewaxed and desulfurized the diesel fuel. The desulfurization catalyst also hydrogenated the olefins that were created in the catalytic dewaxing bed, so that the overall process was slightly exothermic. A process variable study was run in the pilot plant to establish the operating conditions for the process. This process was transferred to the Shreveport refinery. The start up and initial runs in the refinery were supervised to assure that everything operated properly.

April 1995 – October 1995

Dewaxing Processes & Costs - Investigated the cost of producing waxes for the domestic producers of wax. Constructed a cost curve for paraffin waxes, showing the volume of waxes and the cost for producing the waxes by producer. This analysis enabled my employer to assess their cost position within the market. It was necessary to study and evaluate the Texaco and Dilchill™ processes for dewaxing oil and deoiling wax to complete this study.

March 2005 – Three weeks

Hydrocracker Incident - Investigated the cause and origin of an overheating incident that led to the catastrophic failure of a Hydrocracker reactor. Determined that the reactor had been fed olefinic oil in the presence of hydrogen and catalyst during the start up of another unit operated from the same control room. The olefins reacted, increasing the temperature of the reactor to the point that the metal in the reactor failed, causing the reactor body to bulge and rupture, leading to a fire.