
**STATEMENT OF QUALIFICATIONS
FOR
CONTRACT OPERATIONS
OF
WASTEWATER TREATMENT**

Prepared for:

CLIENT
Facility Name
Location

June 2003

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ENVIRONMENTAL ENGINEERS, INC.

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CORPORATE OVERVIEW

Phoenix Environmental Engineers, Inc. is a Nashville-based multi-disciplinary consulting engineering company providing specialized civil and environmental engineering services to industrial and manufacturing concerns.

Phoenix personnel have an established reputation as experienced, professional and innovative problem solvers who have hands-on expertise in the planning, conceptual design, design criteria development, detailed engineering design, cost-estimating, construction representation and startup of industrial projects.

Our experience enables us to define the problem, evaluate the applicable regulatory requirements, understand the causes, conceive cost-effective remedies and implement innovative, successful solutions.

We pride ourselves in our ability to develop cost-effective solutions that are always responsive to your needs, whether they require innovative or conventional engineering approaches. Our goal is to provide you the best solution for the least cost. The fact that over 80 percent of our projects come from previous clients tells us we have demonstrated the ability to meet this goal.

ENGINEERING SERVICES

Phoenix has the capability to provide complete engineering services for installation of all types of environmental facilities. Phoenix has provided detailed design and construction representation on numerous industrial projects. Specific capabilities of Phoenix engineers includes:

Treatability Investigations
Conceptual Design
Process Design
Detailed Design
Solid Residuals Management
Toxicity Reduction Evaluations
Industrial Waste Surveys
In-Plant Source Controls

Pretreatment Programs
Wastewater Analysis
Contract Operations
Air, Water and Solid Waste Permits
Air Emission Control Systems
Solid Waste Management Facilities
Hazardous Waste Management
Facilities

PARTIAL LIST OF CLIENTS

Engineering Firms

Almon Engineering, Inc. - Cookeville, TN
AM Environmental, Inc. - Austin
Bio-Tex Environmental Corp -Houston
CIERRA, Inc. - Little Rock
DRE Technologies, Inc. - Franklin, TN
Energy Environment Interface, Inc. - Austin
Environmental Resource Management (ERM)
GMD Corporation - Nashville
IC Thomasson Associates, Inc - Nashville
Pinnacle Env Svcs, Inc. - Evansville
Primm Engineering Services - Chattanooga
Vaughn & Melton Engineers - Greeneville, TN

Law Firms

Greenbaum, Doll & McDonald, PLLC -
Lexington, KY
Long, Ragsdale & Watters - Knoxville
Manier, Herrod, Hollabaugh & Smith -
Nashville
Robertson, Williams, Ingram and Overbey -
Knoxville
Simpson, Thatcher and Bartlett -
New York
Swidler & Berlin - Washington, DC
Waller, Lansden, Dortch & Davis -
Nashville
Woodward, Hobson & Fulton -
Louisville

Food Industry

The All American Gourmet Company
CBP Resources, Inc.
Cracker Barrel Country Stores, Inc.
Dairymen, Inc.
Glasgow Spray-Dry, Inc.
Hunt Foods
Louis Rich Foods Company
Mondo Baking Co.
Nestle Foods
Oscar Mayer Foods Corporation
Powell Valley Foods, Inc.

Riviana, Inc.
Stevison Ham Company
Swaggerty's Sausage, Inc.

Automotive Industry

Nissan Motor Manufacturing Corporation
USA
Goodyear Tire & Rubber Company
Fruehauf Corporation
Southern Aluminum Castings Corporation

Other Industry

Chase Instruments Corporation (glass)
Channel Shipyards, Inc.
Coey Tanning Company, Inc.
Custom Fabricators and Erectors, Inc. (metal
fabrication)
DARAMIC, Inc. (plastic extrusion)
Deringer, Inc. (metal forming)
Dowling Bag Company
Federated Technologies of Mississippi, Inc.
Fiesta Gas Grills, LLC. (foundry)
Knoxville Ready-Mix, Inc.
Mattel, Inc. (plastic extrusion)
Smelter Service Co., Inc. (aluminum)
Stabilit Corporation (fiberglass)
Tennessee Branch Water, Inc.
Waste Control Specialists, LLC

Chemical Industry

Air Products and Chemicals, Inc.
Arapahoe Chemicals, Inc.
Dow Chemical Company
Diamond Shamrock Corporation
Hampshire Chemical Corporation
Hooker Chemicals and Plastics
IMC Chemical Corporation
Nitrogen Products, Inc.
Syntex Chemicals
Terre Haute Coke & Carbon Corporation
Vanderbilt Chemicals Corporation
Velsicol Chemical Corporation
Western Tar Products Corporation
W.R. Grace & Co.

Forest Products Industry

Acme Wood Preserving, Inc.
Appalachian Timber Services, Inc.
Atlantic Wood Industries, Inc.
Easterday Tie & Timber Co., Inc.
FiberMark, Inc.
Florida Fence Post, Inc.
International Paper Company

Kerr-McGee
Koppers Company
Langdale Forest Products, Inc.
Manor Timber Company
Northeast Wood Treaters, Inc.
Specialty Paperboard, Inc.
Western Tar Products Corporation

OPERATIONS ASSISTANCE FOR INDUSTRIAL WASTEWATER TREATMENT FACILITIES

Overview

Increasingly stringent effluent limitations, combined with scarce capital resources require industrial wastewater treatment systems to be operated at full capacity while at the same time achieving optimum effluent quality. Recent Government Accounting Office (GAO) reports indicate that the bulk of non-compliant municipal wastewater treatment systems are improperly operated, maintained and designed. PHOENIX's experience indicates that many industrial facilities may have similar operational problems. For this reason, outsourcing of utilities operations has become common at industrial plants. PHOENIX's personnel have a 25 year track record of operations experience.

The personnel of PHOENIX Environmental Engineers, Inc. have considerable treatment system design and operating experience. This experience indicates that most plants are conservatively designed due to unknowns at the time of design. Poor treatment performance often occurs when plants are operated based upon initial design values which do not reflect operating experience and do not always provide optimum effluent quality.

Capabilities

Based upon these observations, PHOENIX has developed a straight-forward, low-cost method to optimize existing wastewater treatment systems' operation and effluent quality. A remedial program consisting of any or all of the following elements is tailored to the plant's needs.

- Contract Operations
- Treatment System Evaluation
- De-bottlenecking or Trouble-shooting Facilities
- Development of Operating Parameters to Maximize Effluent Quality
- Preparation of Operations Manual
- Startup Assistance and Operator Training Courses
- Emergency Response

Contract Operations

PHOENIX is experienced in contract operations and has an excellent compliance record at plants under our operation. Our approach to contract operation is the same as it is to engineering services: a total commitment to quality service. We have licensed operators on-staff. With our process engineering background, we are able to operate treatment plants optimally on a day-to-day basis. At

optimal efficiency, consumption of energy , chemicals, repair labor and numerous other less tangible operating expenses are reduced thereby providing a benefit to our clients beyond just treating the wastewater. Our process engineers and operators work hand-in-hand to optimize treatment system performance. PHOENIX process engineers and operators are also available to assist in optimizing, troubleshooting and starting-up wastewater treatment systems.

Treatment System Evaluations

Process designs for wastewater treatment plants are typically based upon the rate of pollutant removal under standard, often assumed, conditions. The aeration, clarification and solids handling equipment are sized to accommodate flows and loadings determined in initial design projections. Typically, operation of these units may also be based upon these design assumptions. PHOENIX's experience has indicated that existing wastewater treatment plants' effluent quality may be markedly improved by changing these operating parameters. Reduced operating costs have also resulted from optimizing operating parameters.

The purpose of the PHOENIX Plant Evaluation is to determine the operating capacity of an existing wastewater treatment facility and to define the impact of increased loads on effluent quality at variable operating conditions. In addition, a PHOENIX Plant Evaluation serves as the foundation of a remedial action program and provides the following:

- A basis for determining the need for capital improvements.
- A basis for establishing operating parameters.
- A definition of optimum effluent quality.
- A basis for establishing the plant operating budget.

In summary, a PHOENIX Plant Evaluation provides all elements necessary to define a plan of action.

Debottlenecking of Plant Facilities

In many cases, expansion or modification of one process unit or of ancillary equipment can substantially increase a system's capability to receive and treat wastewater. The PHOENIX Plant Evaluation will provide the information necessary to define weaknesses in the treatment process. This information may then be used to define changes in process controls or equipment. PHOENIX has the capability to identify the problem and then develop a solution whether the solution lies in process optimization, operational controls, equipment inefficiency or infrastructure.

Development of Operating Parameters to Maximize Effluent Quality

The Plant Evaluation can provide valuable information on cause-and-effect relationships between plant operating parameters and effluent quality. PHOENIX has the experience required to develop

these relationships from actual data or on bench-scale units (should plant operating data not be sufficient). This information may be used to:

1. Select parameters for optimum removal under current conditions.
2. Plan a long-term strategy for meeting more stringent effluent levels.
3. Develop future capital expenditures to increase capacity.

Preparation of Operations Manuals

Operations manuals are essential tools for any industrial or municipal wastewater treatment facility. PHOENIX operating manuals are working documents, useful in current operations, not bookends which collect dust. These manuals are prepared for both new and existing treatment plants and are specifically tailored for each site. Operating instructions are provided for routine operations and have the specific objective of providing information in a usable manner which will allow operators to detect and correct operational problems before they hamper the performance of the treatment facility. The manuals incorporate both process and mechanical considerations. They include a detailed troubleshooting guide and monitoring schedule for plant operation and regulatory reporting.

Startup Assistance and Operator Training Courses

PHOENIX offers assistance for startup of treatment facilities and provides comprehensive training programs for both novice and experienced operators. The purpose of the startup program is to familiarize the operators with the new system, to achieve acceptable performance from the treatment units, and to ensure all equipment is functioning properly. Startup services include mechanical and process equipment checkout, cost-effective evaluations of plant startup alternatives, and detailed development of startup procedures. Operators are trained in the fundamentals of process operation, the mechanical details of the system, and the detection and correction of potential operational problems in the early stages of development. Special training programs may be conducted to revise operating procedures, train new operators or further the knowledge of the existing operations staff.

Emergency Response

When abnormal conditions dictate the need for immediate action, PHOENIX can provide operational services on short notice. These emergency services may include:

- interim facility management
- development of emergency action plans
- implementation of emergency operating procedures
- locating contract equipment or personnel
- assessment of plant operating capacity

OPERATIONS ASSISTANCE EXPERIENCE

Specific operations related projects which PHOENIX personnel have conducted and in which they have participated encompass plant evaluation and optimization, equipment performance testing, effluent quality optimization, operations manual preparation, startup and operator training. Some of these projects are described below.

PLANT EVALUATION

Olin Chemicals Group Lake Charles, LA (1978)

The wastewater treatment operations at a major industrial chemical complex were evaluated extensively. The project consisted of a two-week site visit to assemble historical information, develop correlations from operating data, establish a data tracking system, observe operating procedures, check out mechanical equipment, and evaluate deficiencies. A concise 12-page summary of the findings defined problem areas in the existing waste treatment operation and enumerated specific measures to improve operation of the system. The evaluation of physical facilities addressed mechanical deficiencies including spill diversion controls, surface aerators, equalization basin mixers, suction takeoff clarifier mechanisms, and sludge dewatering centrifuges.

EVALUATION OF TREATMENT CAPACITY

Arapahoe Chemicals, Inc. Newport, TN (1980-81)

In the course of developing a pretreatment system for a pharmaceuticals manufacturer, the receiving municipal treatment system was evaluated for its capability to treat the industrial waste and its overall treatment capacity. The POTW included primary treatment, activated sludge treatment, second-stage nitrification tower, and tertiary filtration. The sludge treatment system consisted of dissolved air flotation, belt presses, and a multiple hearth incinerator. The compatibility of the industrial wastewater was tested in side-by-side bench-scale units operated at the plant site. Each treatment unit in the POTW was evaluated for treatment capacity and ability to meet effluent standards. The treatment capacity of the plant was determined from this evaluation. Bottleneck processes were identified for expansion to increase the treatment capacity.

EVALUATION OF ALTERNATIVES FOR UPGRADING EFFLUENT QUALITY

Gilman Paper Company St. Marys, GA (1979)

A wastewater treatment survey was conducted to evaluate alternatives for improving effluent quality to meet BAT requirements. Alternatives investigated in this study were optimization of lagoon performance by addition of aerators and baffles to increase mixing and eliminate short-circuiting, improvements in primary clarifier hydraulics, spill control, addition of nutrients, and application of additional units for coagulation and filtration of effluent solids. A material balance and waste inventory was performed on the sewers to define sources of excessive in-plant discharges. Alternatives considered for reduction of waste loads were improved pulp washing, conversion to surface condensers, counter-current bleaching techniques, and control of tall oil discharges. Each alternative was evaluated for its cost and effluent reduction potential and ranked from most cost-effective to least. In this manner, future pollution control projects were prioritized.

TREATMENT SYSTEM EVALUATION

EPA Region IV Atlanta, GA (1979)

Legal enforcement action was pending against a 110-MGD, pure oxygen sewage treatment facility (POTW) that was not meeting effluent requirements due to mechanical and operational problems. The U.S. EPA had the operability of the facility evaluated. A member of the PHOENIX staff was part of a specialty team selected to inspect the plant and determine deficiencies and remedial measures. Major mechanical problems were isolated in the oxygen reactors, computer control system, sludge treatment equipment, and effluent pump station. A careful analysis revealed the plant could operate efficiently at a reduced capacity until deficiencies were remedied. An operator training program was recommended due to the unusual operating requirements of the complex facilities. In addition to a cryogenic oxygen unit, the facilities included heat treatment of sludge, multiple hearth incineration, and computer operation.

AERATOR PERFORMANCE TEST PROGRAM

**Norton Company
Worcester, MA (1979)**

A series of performance tests were conducted for an aeration equipment manufacturer. The Norton "Dome Diffuser Aeration System" was subjected to non-steady state oxygen transfer tests at various air flow rates and liquid depths to determine transfer efficiency and mixing performance. Dissolved oxygen measurements were simultaneously recorded at four locations in the test tank. Air flow measurement by orifice plate and positive displacement meter ensured the accuracy of the test results. Although the tests were conducted outdoors in winter, the test conditions on replicate tests were within required accuracy.



OPERATING EXPERIENCE SUMMARY

PROJECT	CLIENT	STATUS	DESCRIPTION	CONTACT
Contract Operation of Leachate Treatment Facility for solid waste landfill (biological plant - sequencing batch reactor system)	Waste Management, Inc. - Russellville, KY	Active	Operate and maintain KY Class II system for direct discharge. Includes process and effluent monitoring, equip maint, daily/monthly rpt, gas monitoring	Carl Cressler (270) 726-9016
Operations Assistance for Commercial Hazardous Waste Landfill LTU (metals precipitation/carbon adsorption)	Waste Control Specialists, LLC. - Andrews Co., TX	Active	O&M Manual, start-up, operator training, process optimization, trouble-shooting, sampling, DMR prep and regulatory interface to reduce compliance rqmts	Mark Orsak (505) 394-4300
Contract Operation of Latex Polymer Plant Effluent Treatment System (combined physical/chemical/biological plant)	W.R. Grace & Co. - Owensboro, KY	Active	Operate KY Class III system for control of over 70 pollutants	Jamie Coomes (270)688-5603
Contract Operations of Engine Machining Plant Effluent Pretreatment System (ultrafiltration)	Nissan North America, Inc. - Decherd, TN	Active	Operate and maintain oily waste pretreatment system. Includes O&M Manual prep, equip maint, effluent monitoring, oil disposal coord, daily/weekly/monthly rpt	John Boren (615)223-3836
Contract Operation of Paperboard Mill Treatment System (primary clarifier, biological lagoon and sludge dewatering)	Fibermark, Inc. - Owensboro, KY	Active	Operate and maintain 0.5 MGD plant (KY Class III) until mill was closed, continue to maintain equip/gnds and monitor SW	Bill Spreeman (802)257-5906
Operations Assistance for Winter Conditions (biological treatment)	Metropolitan Nashville Airport Authority - Nashville, Tennessee	Active	Process optimization of aircraft deicing fluids treatment system.	Dewey Klahn (615)275-1600
Design, Start-up and Operations Assistance for Water Reclamation System (fixed film biological)	Acme Wood Preserving, Imc. - Princeton, WV	Active	Aerobic biological system for creosote oils and polynuclear aromatics	Dwight Dunford (304)425-0144

OPERATING EXPERIENCE SUMMARY (cont'd)

PROJECT	CLIENT	STATUS	DESCRIPTION	CONTACT
Contract Maintenance of Process Water Purification System (softener/RO)	Nissan North America, Inc. - Decherd, TN	Active	Clean, test, troubleshoot and maintain RO unit, softener and carbon col.	Ray Lugos (931)962-5540
Operations Assistance for Filamentous Growth Control (activated sludge)	Riviana Foods, Inc. - Carlisle, AR	Complete	Implemented filamentous bacteria control using chlorination	Donnie Pasley (870)552-7545
Operations Assistance for Poultry Lagoon Nitrification/Denitrification (activated sludge)	Kraft Foods - Newberry, SC	Complete	Modifications to control filaments and nitrify	Paul Livingston (803)321-1835
Design of Leachate Treatment Unit (LTU) for Commercial Hazardous Waste Landfill (metals precip/carbon)	Waste Control Specialists, LLC. - Andrews Co., TX	Complete	Metals and trace organic removal process to treat 75,000 gpd leachate for in-plant reuse	Mark Orsak (505) 394-4300
Design and Start-up of Organic Chemicals Plant Effluent Treatment System (activated sludge)	Dow Chemical Co. - Deer Park, TX	Complete	Operator training course, O&M Manual, and trouble shooting	Bill Pasko (713)479-9525
Operator Training and O&M Manual	Lifesavers, Inc. - Las Piedras, Puerto Rico	Complete	Operator training course and O&M Manual for activated sludge treatment of candy effluent	Randy Pohren (512)445-3074
Design and Start-up of Engine Machining Plant Effluent Pretreatment System (ultrafilter/carbon)	Nissan North America, Inc. - Decherd, TN	Complete	Oily water treatment system consisting of O/W separator, UF, carbon column.	John Boren (615)223-3836
Design and Start-up of Ammonia Stripper (air stripper)	Coey Tanning Co., Inc. - Wartrace, TN	Complete	Air stripper to remove 100 mg/L ammonia from 100,000 gpd	Chuck Cares, Jr. (931)389-6423
Start-up Assistance for Groundwater Treatment System (fixed film biological)	Langdale Forest Products Co., Inc - Sweetwater, TN	Complete	Aerobic biological system to remove PNAs	Ed Minton (229)242-7450
Operations Assistance for Filamentous Growth Control (activated sludge)	Glasgow Spray-Dry, Inc. - Glasgow, KY	Complete	Selector and chlorination used to control filamentous bacteria	Cecil Compton (270)651-1112