

ADVANCED WATER TREATMENT TECHNOLOGIES SERVICES



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**WATER TREATMENT
EQUIPMENT REFURBISHING
AND
CONSULTING SERVICES**

STATEMENT OF QUALIFICATIONS

SUBMITTED BY

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STATEMENT OF QUALIFICATION

1.0 AWTS, INC.

AWTS, Inc. is a service-oriented company, established in Plano, Texas. AWTS, Inc. was started in August 1996, and has provided consulting and/or equipment upgrade services to industrial customers. These include: ConocoPhillips at Ponca City, Oklahoma, ConocoPhillips at Roxana, IL, Mirant Morgantown at Baltimore, Constellation Energy (Two locations in Texas), Arab Potash Company, Jordan, Calpine Corporation (Various locations), Entergy (Various locations), Dow Chemicals at Freeport, Texas, Monochem Inc. at Geismar, LA, DuPont at Orange, Texas, VLSI Technologies Inc. at San Antonio, BP Amoco at Victoria, Texas, Mead Paper Company at Alabama, NRG McClain at Oklahoma City, OK, Ponderosa Pine energy Cleburne, City of Cleburne at Cleburne, TX, City of Palmer at Palmer, TX; Public Utilities of Brownsville at Brownsville, TX; Mitchell Gas Services at Bridgeport, TX; Wheelabrator Energy at Anderson, California and Pinellas County, Florida; and Simpson Paper Company at Anderson, California. AWTS, Inc. is 100% owned and managed by Ken Pandya. Equipment rehabilitation and upgrades include process components such as, clarifiers, media filters, reverse osmosis systems, EDI systems, UF and MF systems, various types of ion exchange demineralizers, Deep-bed condensate polishing demineralizers, forced draft/ vacuum and membrane degasifiers, various types of chemical feed systems, PLC/SCADA automation, instrumentation and piping system.

2.0 KEN PANDYA'S QUALIFICATIONS

Ken Pandya has 38-years of experience with water purification systems. Ken has a BS degree in Chemical Engineering, and a BS degree in Chemistry. Ken has worked for some of the finest water treatment companies, including seven years with Wheelabrator Water Technologies (Now a division of Siemens Water Technologies) and nine years with Hydranautics (Now a division of Nitto).

Ken's career highlight include designing and manufacturing tens of large scale state-of-the-art water treatment systems for municipal and industrial customers, acting as owners' representative, and providing consulting to in-house sales, engineering, and R&D personnel. Ken's responsibilities have included management of equipment manufacturing operations, evaluation of several filtration, clarification, ion exchange and membrane technologies, providing start-up services and providing technical support to sales, marketing, and R&D groups. Ken has also provided water treatment equipment related technical support services to the local water treatment chemical suppliers. Ken has worked in development of patents for special internal distributors for media filters and demineralizer systems. Also has worked in the development of process patent's in the application area of pretreatment of highly contaminated wastewater streams from industries such as oil and gas drilling operations..

2.1 TRADE SHOWS, CONFERENCES, AND TECHNICAL PAPERS

Over the past 38 years, Ken Pandya has actively participated in numerous water treatment trade shows, conferences and seminars. Ken has worked in the capacity as a consultant with major chemical companies, and provided training seminars to various industrial customers on a World-wide basis to highlight the latest developments

in water treatment industry, including Seawater RO desalination, Zero Liquid Discharge technologies, production of semi-conductor grade ultrapure water and wastewater recycle. Ken has presented various technical papers for prestigious conferences such as International Water Conference at Pittsburgh, PA, Ultrapure Water Journal sponsored trade shows and ASME committee for Power Plant Environmental and Research. Ken is a member of Power Plant environmental and research committee sponsored by ASME.

2.2 PRODUCTS KNOWLEDGE

- **MEDIA FILTERS:** All types of media filters, including sand filters, dual media filters, multi-media filters, mixed-media filters, carbon filters, iron filters. Product knowledge includes design, instrumentation, automation, loading, unloading, and sterilization. Also familiar with several types of internal distributors, air scour systems. Designed systems up to 4000 gpm. Retrofitted internals of several filters.
- **REVERSE OSMOSIS MEMBRANE SYSTEMS:** All types of reverse osmosis membranes, as manufactured by Filmtec, Hydranautics, Fluid Systems, TriSep and Desal. Familiarity with most of the latest membrane performance projection and normalization programs. Trouble shooting and cleaning procedures for CA as well as TFC membrane products. Work closely with the representatives from ChemTreat, Betz-Dearborn, Calgon, TriSep, Nalco and other chemical companies. Familiar with most of the commercially available scale inhibitors, and chemical treatment for pre-conditioning. Product knowledge includes design, instrumentation, automation, and chemical feed equipment, cleaning equipment, loading, unloading, and sterilizing. Familiar with scaling, fouling scenarios for most of the US based fresh water make-up streams. Designed RO systems up to 12.5 million gallons per day. Performed several membrane conversions of CA to TFC, and TFC to CA. Performed conversion of single stage RO systems to double stage RO systems. Work closely with all major membrane manufacturers, and chemical companies. Familiar with Siemens Water Technologies, GE, Graver, Aquatech International, Infilco Degremont, Hungerford and Terry, LA Water Treatment, Cochrane and other major equipment manufacturing operations.
- **ELECTRO DEIONIZATION SYSTEMS:** E-Cell, FEDI, Ionpure and Electropure technologies. Provide classroom training for design and selection of EDI systems, troubleshooting EDI systems and cleaning EDI systems. Evaluating and designing pretreatment systems for EDI systems.
- **MICROFILTRATION SYSTEMS:** Memtek, and Epoc micro filters. Some ceramic membrane filters by US Filter. Designed a 600-gpm system for waste reclaim for a petrochemical operation, and assisted with a 1000-gpm waste reclamation system for an electronics firm. Provided consulting engineering services to senior level design engineers, and project managers.
- **ULTRA FILTRATION MEMBRANE SYSTEMS:** Zenon, Memcor, Nitto (Hydranautics), and Asahi (Pall) capillary tube type membranes, Desal, Osmonics, and Nitto spiral wound membranes. Knowledge includes design, instrumentation, automation, installation, and sterilization. Designed systems up to 600 gpm. Work

closely with UF membrane manufacturers and OEM network.

- **MEMBRANE DEGASIFIER SYSTEMS:** Single stage, and multi-stage membrane degasifiers by Celgard (Celanese).
- **VACUUM DEGASIFIER SYSTEMS:** Single stage, and two-stage degasifier systems. Carbon steel with black/white rubber lining, as well as all electro-polished stainless steel. Worked with several types of packing manufacturers, including Jaeger, Pall, Mass Transfer, and Raschig rings. Worked with Sihi and Nash vacuum pumps, and eductor systems. Familiar with eductor freezing problems, degasifier performance problems. Have designed systems with 10 ppb dissolved oxygen tower performance. Designed systems up to 1600 gpm. Provided consulting engineering, design engineering, and start-up support for several units.
- **UV STERILIZERS:** Hands-on experience with most of the manufacturers of medium and high-pressure UV sterilizers. Designed systems up to 600 gpm.
- **MEMBRANE FILTERS:** Gelman, Pall, Memtec filters, and ozone resistant units. Particle filtration ranging from 0.2 micron absolute to 10-micron particle size. Product knowledge includes design, instrumentation, automation, loading, unloading, and sterilization. Routinely work with several filter manufacturers.
- **ION EXCHANGE SYSTEMS:** All types of cation, anion, and mixed-bed resins, as manufactured by Dow, Rohm and Haas, Sybron, and Resin Tech. Standard demineralizer applications including co-current, counter current, co-counter current. Mixed bed design with in-situ regeneration of UPW grade resin and external regeneration processes offered by most of the respected OEM companies. Product knowledge includes design, instrumentation, automation, loading, unloading, resin sluice operations, capacity calculations, and efficiency calculations. Familiar with several types of internal distributors. Familiar with rubber lined carbon steel vessels, PVDF lining, Halar lining, FRP pressure vessels, etc. Designed systems up to 2000 gpm. Provided consulting services for systems up to 16,000 gpm. Retrofitted several systems. Rehabilitated several vessel internals, up to 12' diameter. Work closely with major resin manufacturers, and OEM companies.
- **INTERNAL DISTRIBUTORS AND FILTER SCREEN NOZZLES:** Several type of internal distributors for media filters, ion exchange demineralizers and vacuum degasifiers. Knowledge includes wedge wire screens, slotted distributors, pipe base laterals, header-lateral design, hub-spoke design, header-lateral design with drop strainers, etc. Stainless steel, Hastalloy-C, Monel, Sch. 80 PVC, PPL, PVDF and other materials. Retrofitted several systems having problems with product water quality, chemical regeneration efficiency, channeling, etc. Routinely work with several screen manufacturers.
- **EFFICIENT NOZZLE DESIGN:** AWTS has extensive knowledge of several styles of filters/ion exchange systems screen nozzles. The customers have realized from 30% to 300% process improvement as measured by increase in throughput capacities, drastic reduction in chemicals usage, minimized resin losses, provided higher product water quality, and reduced labor.

- **RESIN TRAPS:** Resin traps up to 12" size for media filters, water softeners, condensate polishers and ion exchange demineralizers. These resin traps are available in either clear plastic housing (Maximum 6" size) or all stainless steel housing (maximum 12" size), with internal wedge-wire screen and media blow-off valve. These resin traps can be rated for up to 250 degrees F operating temperatures.
- **PRESSURE VESSELS AND LINING:** ASME Code, Section VIII, Division-1 for carbon steel vessels, ASME Code, Section X for FRP vessels, black rubber lining, white rubber lining, PVDF, PPL, and Halar lining procedures. Routinely work with several pressure vessel and lining manufacturers. Our projects include rubber lined pressure vessels for hot condensate polishing systems, rated up to 180 degrees F operating temperature.

2.3 CONSULTING SERVICES FOR PROJECTS DEVELOPED BY END-USERS

AWTS, as subject matter expert and trainer, provides consulting services for project development as related to water purification. These projects are typically undertaken and developed by the in-house staff of the end-users such as power plants, petrochemical companies, pulp and paper companies, chemical manufacturing complexes and similar industries.

- **PROCESS FLOW DIAGRAMS:** Detailed process flow diagrams, mass balance, equipment sizes, line sizes, chemical consumption calculations
- **P & I DIAGRAMS:** Detailed P&I diagrams, line sizes, equipment sizes, all types of water treatment processes, instrumentation, and controls.
- **EQUIPMENT LAYOUT:** Detailed equipment layout drawings, general arrangement drawings for all types of water treatment processes. Skid layout of major components.
- **EQUIPMENT DESIGN:** Detailed process specifications, selection of major components, design of major components including valve sizing, piping sizes, pump sizing, instrument selection, controls selection.
- **O & M COST CALCULATIONS:** Calculation of power, chemicals, consumable materials, operating labor costs for most of the unit processes in water and waste water treatment. Feasibility studies and system efficiency studies.

2.4 WORKING STYLE

- **PEOPLE SKILLS:** Participated in several management seminars to improve communication skills. Participated in human resource development efforts, training junior level employees. Developed excellent relations with customers, employers, employees, contractors, and suppliers.
- **IMPROVEMENT OF SKILLS:** On-going efforts to keep up with the industry, clients, consultants, suppliers and contractors. Work closely with industry leaders, including membrane companies, ion exchange resin companies, chemical companies and key component suppliers. Also maintain a strong effort to improve product knowledge

through literature research, reading, and communication with fellow engineers, consultants, and industry experts. Maintain current information on specialty components and equipment manufacturers. Participated in executive training seminars.

- **INDUSTRY PRESENCE:** Direct contact with end-users, active participation with ASME committee members, consultation with the suppliers of water treatment chemicals, suppliers, present technical papers. Travel extensively across the USA, and many areas of the world including Jordan, Japan, Korea, India, China, UK, South America, and Middle East.

AWTS, INC. REFERENCE PROJECTS (PARTIAL LIST)

Customer	ConocoPhillips (Multiple plants)
Type of Business	Petrochemical complex
Location	Ponca City, OK; WRR Refining complex, Roxana, Illinois, Bayway Refinery, NJ
Project Description	Provided consulting services to evaluate upgrading of a 1500-2200 gpm high purity water systems and several critical auxiliary components. Helped with the development of system purchase specifications, evaluate competitive bids, reviewed drawings
Project completed	On-going from Year 2007.
Customer	Mirant Morgantown
Type of Business	Power Plant
Location	Baltimore
Project Description	Provided consulting services for a 1500 gpm Seawater RO water systems and several critical auxiliary components. Helped with the development of system purchase specifications, evaluate competitive bids, reviewed drawing submittals, reviewed fabrication of major components, supervision for installation and startup, plant acceptance practices
Project completed	On-going from Year 2008.
Customer	Dow Chemical Company
Type of Business	Chemicals manufacturing complex
Location	Freeport, Texas
Project Description	Provided consulting services to evaluate performance of a 3000 gpm high purity water system and several critical auxiliary components. Provided equipment rehabilitation services to upgrade five primary demineralizer trains, each consisting of 10' diameter cation and 10' diameter anion. AWTS scope included all new internal

Project completed	distributors for ten process vessels. Process performance was increased by 300% 2002
Customer	Calpine Pryor
Type of Business	Power plant
Location	Pryor, OK
Project Description	Provided consulting services to troubleshoot problems within 600-gpm RO system. Provided equipment-refurbishing ideas and helped the customer with total design revamp, full automation and controls.
Project completed	4 th quarter of 2004
Customer	Monochem
Type of Business	Water treatment for local industries
Location	Geismar, LA
Project Description	Provided consulting services to troubleshoot problems within 1500 gpm ion exchange system. Provided new underdrain distributors, process revision and supervision for startup
Project completed	4 th quarter of 2004
Customer	Entergy (Several plants)
Type of business	Power plants
Project description	Consulting services to evaluate process problems, System expansion, controls upgrade, system upgrades, feasibility studies for clarifiers, filters, RO system, microfiltration system, upgrade of 600 GPM RO system (Turnkey), upgrade of 16000 GPM condensate polisher system (turnkey)
Location	Lake Charles, New Orleans, LaPlace, Baton Rouge
Project completed	Ongoing since 1997
Customer	Republic Paperboard
Type of Business	Manufacture of paperboard products
Location	Lawton, OK
Project Description	Consulting services to evaluate system performance. Replaced two ion exchange softener units that had failed in less than 3 years
Project completed	2003
Customer	Simpson Paper Company
Type of Business	Pulp and Paper company
Location	Anderson, California

Project Description	Site survey, data collection, feasibility study for treating up to 150 gpm of contaminated condensate stream from pulp mill operations, and 350 gpm of contaminated condensate stream from paper mill operations. Evaluate several treatment options including magnetic filters, Graver Powdex system, and ion exchange system. Develop a plan for sample collection. Provide data sheets on most efficient equipment to aid in customer's own engineering specifications for a pilot system as well as full-scale system, RFQ, bid evaluation, and recommendations to Owner.
Project completed	August, 1997
Customer	VLSI Technologies, Inc (Later Phillips Semiconductors)
Type of Business	Semiconductor parts manufacturing
Location	San Antonio, Texas
Project Description	<ol style="list-style-type: none"> 1. Review wastewater streams. Evaluate several options for treating and recycling waste streams from semiconductor operation. Helped develop specifications for pilot plan, RFQ, bid evaluation, and recommendations 2. UPW system expansion. Evaluate several options for expanding the existing UPW system. The new UPW system is rated for 300-gpm primary make-up, and 600-gpm polishing loop. State-of-the-art technologies include: Membrane degasification system designed for less than 1 ppb oxygen, UPW UF membranes, medium pressure UV sterilizers, primary and polishing mixed-bed units, POU cartridge filters, and polishing UF membranes 3. Retrofitting primary and polishing mixed-bed ion exchange demineralizer internal distributors to improve performance. 4. Consultation for evaluation and purchasing of the most efficient equipment, helped develop equipment specifications and provide oversight for 300-gpm wastewater recycle system. City of San Antonio awarded \$1.0 million award to encourage other industries to implement similar programs.
Project completed	1999

Customer Mitchell Gas Services (Liquid Energy)
Type of Business Processing and refining natural gas
Location Bridgeport, TX

Project Description

1. Feasibility studies. Evaluation of a 350-gpm clarifier, filter, two (2) 200-gpm softeners and chemical feed equipment.
2. Rebuilding of existing water softeners, supervision of installation, start-up and operator training. O&M manual revisions.
3. Retrofitting gravity media filter.

Project completed June 1998

Customer Ponderosa Pine Energy
Type of Business Cogeneration power plant
Location Cleburne, TX

Project Description Evaluation and rehabilitation of a 300-gpm RO/EDI system efficiency study and O&M problems. The system includes multi-media filters, a double pass RO system, an EDI system, and an ion exchange system.

Project completed July 1998

Ken V. Pandya
Representative Projects

CUSTOMER		SIZE GPD	TECHNOLOGIES	SCOPE	PROJECT
General Electric	FL	345,000	RO, IX, vacuum degasifiers, UV, Ozone, PVDF piping, SCADA	Turn-key	UPW
Sony Micro Electronics	TX	403,000	Carbon filters, RO, IX, controls	Design, build	Rehab
IBM (Several)		720,000 - 2,880,000	RO membranes, pressure tubes	Supply	UPW
Micron Technologies	ID		RO membranes, pressure tubes	Supply	UPW
Motorola (Several)		288,000 - 1,440,000	RO membranes, pressure tubes	Supply	UPW
IDT	CA	432,000	Vacuum degas	Design, build	UPW
Olin Chemicals	LA	1,300,000 - 2,880,000	Pretreatment, IX, controls	Design, build, own, operate	HPW
Chevron Chemicals	CA	410,400	Pretreatment, Seawater RO	Design, build	HPW
Mobil Chemicals	TX	1,296,000	Ion Exchange Internals	Consult, Design, build	Rehab
Exxon Chemicals	CA	864,000	Cross-flow dynamic membrane microfilters	Design, build	Waste water treatment
Pacific Gas and Electric	CA	576,000	Pretreatment, Seawater RO	Design Build Own Operate	HPW
TU Electric, Mountain Creek	TX	288,000	Pretreatment, RO	Design, build	HPW
TU Electric (Several)	TX	288,000 - 720,000	RO, Pressure tubes	Supply	Rehab
Pacific Power and Light	WY	576,000	RO system	Design, build	HPW

Kimberly Clark	AL	432,000	Chemical feed systems, SCADA	Design, build	Rehab
Georgia Pacific	GA	2,304,000	Vacuum degas	Design, build	HPW
International Paper (Several)		720,000 - 288,000	Ion exchange system internals	Design, build	Rehab
Douglas Aircraft	CA	500,000	Clarifier, filter, RO, SCADA	Turn-key	Waste water
Reynolds Metal	WA	5,760,000	Horizontal filters	Design, build	Waste water
National Fertilizers India		2,000,000	Pre-treatment, RO	Design, build	Waste water
City of Cape Coral	FL	9,000,000	RO, Degas, SCADA	Design, build	Potable water
City of Englewood	FL	6,500,000	RO, Degas, SCADA	Design, build	Potable water
City of Fort Myers	FL	12,000,000	RO, Degas, SCADA	Design, build	Potable water
Port St. Lucie	FL	1,000,000 12,000,000	RO, Degas, SCADA	Design, build	Potable water
Ministry of Agriculture and Water, Saudi Arabia		1,160,000	RO, Degas, controls	Design, build	Potable water
King Khaled International Airport, Saudi Arabia		1,200,000	RO, Degas, Controls	Design, build	Potable water
Lagovan Refinery, Venezuela		8,640,000	Ion exchange system, Chem feed	Consult	HPW
Merck Shape and Dohmme,	PR	288,000	Ion exchange, degas	Consult, design, build	Rehab
Wheelabrator Energy	CA	720,000	Pre-treatment, ion exchange	Consult	HPW
Wheelabrator Energy Aluminum Partners, Jamaica	CA	86,400 288,000	RO, ion exchange Ion exchange system internals	Start-up Consult, design, build	HPW Rehab

Professional History of Ken V. Pandya

38-years experience in water-treatment management projects. Subject matter expertise includes all types of Pretreatment processes, Seawater, Brackish water and Waste water reverse osmosis (RO) technologies, Electro-deionization (EDI), Ultra-Filtration (UF), micro-filtration (MF), Ion Exchange (IX), Membrane Degasification, liquid-solid-gas separation technologies, Chemical Feed Systems and Process Automation. Worked on RO systems up to 20 MGD, IX systems up to 5 MGD and Condensate polishing systems up to 25 MGD.

AWTS, Inc., Dallas, TX

(September 1996 - present)

President: Consulting, project support, systems upgrade, rehabilitation and retrofitting services for industrial customers. Pre-treatment systems, UPW loop expansion, condensate polishing, wastewater reclaim, RO systems and demineralizers' start-up and troubleshooting, and operator training. Market development for new, innovative products.

Wheelabrator Water Technologies Inc., Naperville, IL

(1989 - September, 1996)

Business Development staff member, Industrial Business Development unit: Development of DBO water and wastewater treatment projects for Wheelabrator-Betz Alliance for large multi-national petrochemical companies in USA and overseas, evaluation of new technologies for acquisition, develop new markets for Wheelabrator products.

Technical Director, Industrial Water Process Group: Management of high purity water and wastewater proposals, management of McCormack product lines.

Vice President, ARI Technologies McCormack Division: Management of High purity water systems utilizing reverse osmosis, ion exchange, and conventional treatment technologies. Managed a staff of 32 employees responsible for sales, engineering, service and manufacturing.

Hydranautics, Division of Nitto Electric Co., Santa Barbara, CA

(1980 - 1989)

Director of Industrial Sales: Reverse osmosis and ultra-filtration membrane elements, specialty membrane housing products to electronics, petrochemical and power industries. Managed OEM sales.

Manager of Proposals: State-of-the-art, large scale brackish, seawater and wastewater reverse osmosis systems, control systems for municipal and industrial applications worldwide.

Morgan Company, Houston, TX

(1977 - 1980)

Engineering Coordinator: Sales, proposals, ion exchange resins and systems.

Gharchem Engineering, Houston, TX

(1976- 1977)

Proposals Engineer: Ion exchange demineralizers and conventional water treatment systems

Bernard Johnson Incorporated, Houston, TX

(1973-1976)

Process Engineer: High purity water systems, and waste water systems

BS Chemical Engineering Texas A & I University, Kingsville, TX (1973)

BS Chemistry (Honors) University of Bombay, Bombay, India (1970)