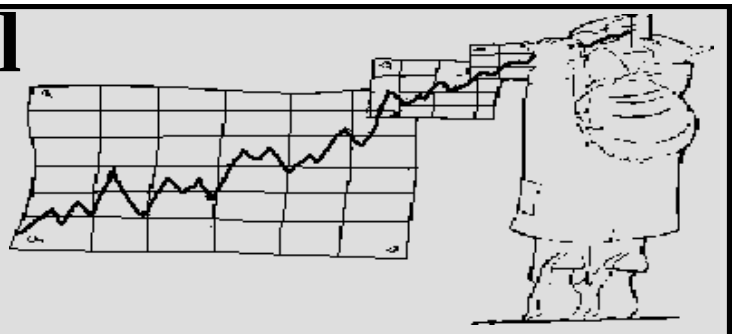
The Environmental Benchmarker & *Strategist*™

Annual WATER Issue

Rules of Thumb and Strategic Insights . . . . For the Water Executive

Winter 2004



The State of the Water Industry – 2004
"Musical Chairs" Begins in the U.S. Industry

by Steve Maxwell

The water and wastewater treatment industry continues to be an evolving and often unpredictable business, and the year 2003 did not disappoint. The on-going corporate consolidation in the industry produced surprises and new directions, while the headlong rush towards privatization seemed to falter, or at least slow a bit. Water resource issues and water management controversies continued to climb onto the front pages of the popular media – with water quality scares, water rights battles, and water security issues gaining significant public exposure. Wide-ranging debate over how to best fund the vast future capital needs of the water business began to take center stage. The extensive regional droughts of 2002 are still fresh in the minds of many people. And, although water stocks out-performed the general stock market this year, there still seem to be no big winners emerging. Below, we highlight the key industry developments of the past year, review the current characteristics of the market, and discuss the evolving drivers behind this business.

Overview:

Studies and reports announcing the certainty and severity of future water challenges continue to be issued from the Federal government, the various water-related trade associations, and environmental think tanks around the country. Earlier in the year, and to much fanfare, the American Council of Engineering Companies (ACEC) gave the water infrastructure system of the country a general grade of "D," and – supplementing numerous prior studies – the Congressional Budget Office predicted that we will need to spend more than $800 billion over the next twenty years to fix this problem. The increasing focus of concern amongst water industry and municipal officials is how to reconcile the difference between *current* spending rates and projected *future* needs – how to finance the "gap" that is becoming increasingly clear. As one observer put it, sometimes it seems that the fluid of most concern in this industry is not water, but red ink.

Although the trend to greater consolidation continued, 2003 may be remembered as the year in which the much-ballyhooed "foreign invasion" of recent years began to reverse directions. After practically tripping over each other in the rush to acquire assets during the late nineties, many of the major European water companies began to shed major U.S. water businesses during the year. Although perhaps not totally unexpected, these divestitures constituted a major shift in the competitive dynamics and transactional trends in the business. In sum, several major players which have long been viewed as the prominent buyers in the industry, suddenly appeared to turn (at least partially) into sellers.

The reasons behind this shift are varied and complex (see discussion below) but it seems clear that a large-scale game of "musical chairs" is starting to happen in this industry. A considerable rearrangement of key assets is already starting to happen – in general, away from foreign companies and back towards domestic ownership. And, unfortunately for these foreign companies who were buying several years ago, average valuations in the industry are now lower (see Valuation chart insert) and the dollar has slid significantly against the Euro over the past couple of years.

Another longer-term trend in the market – greater municipal outsourcing and private contract operation – also seemed to begin to shift direction or become less clear this year. The pace of privatization has been rapid over the past decade or so, and in fact many analysts believe it was the perceived privatization opportunity that effectively drove much of the acquisition frenzy of the late 1990s. The last few years, however, have seen a gradual slow-down in this trend, and an increasingly widespread reconsideration of the benefits of privatization of public water treatment operations. Starting with the much-publicized cancellation of Atlanta's water privatization plan, and the postponement of programs in cities such as New Orleans and Stockton, the whole concept of water privatization has taken a major hit in public opinion circles over the past couple of years. For the first time in several years, the volume of outsourcing contracts in the country was actually down, and fairly sharply down, in 2003.

Nonetheless, the business of private contract operation is still projected to be one of the fastest growing market niches in the whole water industry. The forces behind privatization remain strong primarily because of the difficult position of municipalities. Public works managers are between a rock and a hard place – costs, technical requirements and regula-

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tory complexities continue to increase, but the general public remains resistant to increasing taxes and users fees. As the contract operations firms point out, oftentimes the best solution to this dilemma may be to turn to private companies to finance, build and operate their water or wastewater systems.

From the perspective of Wall Street, the water industry was relatively stronger this year, with most water funds and indices out-performing in generally stronger markets. But even though performance was stronger, we still haven't seen any really "big winners" in the industry – stocks which have returned investors many times their original investment. However, the professional stock-pickers assure us that there *will* be such companies emerging in the near future.

An emerging issue in the water industry – one which is likely to loom considerably larger in the future – is the appropriate balance the Federal government and local authorities in the financing and management of water resources in this country. Groups like AMSA (the Association of Metropolitan Sewerage Agencies) claim that the Federal government is sidestepping the whole issue of clean water. In an aggressive public information campaign which the group began to mount in 2003, they pointed out that in 1980 over half of the total capital investment in clean water came from Federal funds, whereas today that figure today is less than ten percent.

Certainly, watershed management and water quality issues are, by nature, interstate issues – water quality and management issues rarely follow state boundaries. Another lobbying group, the Water Infrastructure Network – a coalition of various elected officials, water utilities and water resource groups – points out that clean water supports $50 billion per year in water based recreation, $300 billion per year of coastal tourism, $45 billion in commercial fishing, and of course, hundreds of billions in basic manufacturing and industry. Despite the obvious criticality of water to the overall economy, so far there are few indications that the Federal government plans to address the complex funding issues facing the business.

And other new challenges continue to arise and bedevil the U.S. water industry. Following the events of 9/11, and the discovery of potential terrorist interest in public drinking water supplies, security issues quickly moved to the forefront of immediate challenges facing the industry. Although there has been a lot of discussion about security threats, most of the work remains to be done, and most of the dollars still need to be spent – one more increment to the total cost of providing the public with acceptable drinking water.

A related problem also got new visibility this year as well – the issue of back-up electrical power in the water system. During the massive northeastern black-out of August 14, several major cities which rely primarily upon pumping for water distribution (as opposed to cities like New York with largely gravity-fed systems) were without sufficient water for several hours. An outbreak of fire during that particular day, for example in downtown Cleveland or Detroit, could have been catastrophic. Installation of sufficient back-up power for pumping and distribution quickly has quickly become a high priority at many water systems across the country.

Technology development and implementation continues to be an active area, attracting many new players, and holding out the hope of future solutions. The full-scale commercialization of membrane filtration is a good example – more and more water and wastewater utilities are now examining this technology, as its costs have come down dramatically in recent years. Although the much-discussed Tampa desalination plant suffered extensive operating problems this year, including the bankruptcy filing of its operator, the market for this particular technology – particularly in desalination and water reuse applications – remains strong. (See the article on new membrane technologies and desalination.) Other areas include *in situ* repair and relining of aging distribution pipelines, "smart" monitoring, metering and system control software, and a wide range of other new treatment, distribution and conservation technologies.

40 Publicly Traded Companies With Interests in the Water Industry

Company	Symbol	Revenues $ mils.	Income $ mils.	Market Cap. $ mils.
American States	awr	213	17.2	388.36
Ameron	amn	576	27.7	316.224
Aqua America	wtr	367	71	1940.4
Artesian Resources	artna	36	4.2	110.175
Badger Meter	bmi	184	7.6	123.222
Calgon Carbon	ccc	278	4.5	272.22
California Water	cwt	277	19.3	473.2
Clarcor	clc	741	55	1068.925
Clorox	clx	4140	486	10478.26
Cuno	cuno	288	26.8	688.708
Danaher	dhr	5290	537	14579.18
Dionex	dnex	232	34.6	1158.792
FlowServe	fls	2370	49.2	1103.448
Fluor	flr	8810	179	3348.06
Franklin Electric	fele	360	34.5	652.365
Glacier Water	hoo	71.2	-1.5	42.21
Great Lakes Chemical	glk	1470	-33	1277.144
Insituform Tech.	insu	491	23.5	424
Ionics	ion	349	-19.6	507.656
Isco	isko	62.5	1.46	48.8196
ITT Industries	itt	5630	391	7088.6
Layne Christenson	layn	278	2	164.3
Lindsay Mfg.	lnn	166	12.8	292.994
Metpro	mpr	74	6.4	141.681
Middlesex Water	msex	63.8	7.2	216.452
Millipore	mil	800	101	2434.144
Pall	pll	1660	151	3311.28
Pentair	pnr	2720	144	2637.96
Robbins & Myers	rbn	568	14.5	286.375
SJW Corporation	sjw	150	18.7	292.89
Southwest Water	swwc	164	6.1	205.506
Suez SA	sze	55850	-3360	21906.9
Tetra Tech	ttek	922	54	1188.096
Thermo Electron	tmo	2100	173	4619.42
URS	urs	3190	58	978.51
Valmont Industries	vmi	826	26	522.41
Vermont Pure Hldgs.	vps	76	1.35	72.846
Veolia Environne.	ve	36740	-2490	11736.9
Waterpik	pik	305	11	156.86
Watts Water Tech.	wts	676	34	623.76

In response to all these changing social, political and economic drivers, the water industry continues to undergo a gradual evolution and coalescence. With such dramatic changes occurring in technology, asset ownership, regulation, and public concern, the water industry seems certain to remain in a constant state of change for the foreseeable future.

Another way to gauge the impact of all these changes on the commercial industry itself is to look back at our list of public companies in *The Environmental Benchmarker and Strategist* from just five short years ago, in late 1998. The experiences of these companies – most of which have now disappeared from the ranks of the public companies – illustrates some of the general trends in the industry since that time:

- Air and Water Technologies – sold by Vivendi in 2000
- American Water Works – purchased by Thames Water/RWE in 2001
- Aquarion – purchased in 1999 by Yorkshire Water (now Kelda)
- Azurix – Enron's heralded entry into the water industry; dead three years later
- BetzDearborn – purchased by Hercules, later sold to General Electric in 2002
- Cadiz – company virtually disappeared after major water storage program was nixed by the state of California in 2002
- Culligan – acquired by U.S. Filter in 1998, and now for sale again
- E-One – sold to Precision Castparts in the late 1990s
- Hach – acquired by Danaher Corporation in 1998
- Nalco – bought by Suez in 1999 and sold to private investors in 2003
- Osmonics – acquired by General Electric in 2003
- Recovery Engineering – acquired by Procter and Gamble in 1998
- Stone and Webster – filed for bankruptcy, assets acquired by Shaw Group
- Thermo Instrument Systems – collapsed back into parent Thermo Electron
- US Filter – acquired by Vivendi, spun into Veolia subsidiary, with most of its non-contract services businesses now for sale again
- U.S. Liquids – suffered through extreme financial difficulties, selling off assets, and now trading at a few cents per share
- United Water – remaining traded stock acquired by Suez in 2001
- Western Water – like Cadiz, has shrunk down considerably, perhaps a company before its time in water rights trading
- Zurn – company was sold to U.S. Industries in 1998

Market Size and Growth Characteristics:

According to recent Department of Commerce statistics, the water and environmental business in this country comprises over $200 billion of revenues per year, encompasses some 115,000 companies and organizations, and employs more than 1.4 million workers. More specifically, the water and wastewater industry is generally estimated to be around $90 to $100 billion per year, with the comparable world market being about five times as large, or around $500 billion.

Estimates of the true size of this business vary, largely due to one key reason – it is a tough business to define and "encircle" – definitions differ, and even where they don't differ, market estimates still vary widely. Perhaps the most thoroughly researched and widely cited numbers on the overall domestic water industry are those published annually by Environmental Business International, as shown in the table.

Size of the Water Industry
(Revenues in Millions)

Business Segment	2003 Revenue	'04-'06 Growth
Water Treatment Equipment	$8,860	4 – 6%
Delivery Equipment	$8,880	2 – 3 %
Chemicals	$3,660	0 – 1%
Contract Operations	$2,290	6 – 10%
Consulting/Engineering	$6,090	5 – 6%
Maintenance Services	$1,640	3 – 5%
Instruments/Monitoring	$800	5 – 7%
Analytical Testing	$480	2 – 4%
Wastewater Utilities	$30,780	3 – 4%
Drinking Water Utilities	$32,650	3 – 4%
Total U.S. Water Industry	**$96,130**	

Source: Environmental Business Journal, 2003

Because it is such a broad and varied business, it is not meaningful to try to capture the overall industry's growth rate in a single figure either; different sectors of the business are growing at considerably different rates. For example, the more mature chemicals sector and infrastructural supply businesses (pumps, pipes, tanking, and so on) are probably growing at something in the 2% to 3% range. The water and wastewater utility sectors, which comprise the largest individual source of revenues in the industry, are largely reflective of population and GNP growth, and show growth in the 3% to 4% range. Other businesses, tied to the upgrading and replacement of our vast water infrastructure, such as consulting/engineering and instrumentation/monitoring show slightly higher growth – in the 6% to 8% range.

On the other hand, other sectors of the business boast growth well above these rates. The contract operations and outsourcing sector of the business has demonstrated growth in the 15% to 20% range for several years, and even given the recent slowdown is still likely to average something in the 8% to 10% range. And although the overall treatment technology sector shows average growth of around 5%, there

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The Global Desalination Market: Trends and Outlook for the Future

by Lisa Henthorne and Eric Jankel

The desalination market has reached an all-time high in terms of growth in capacity, primarily due to the fact that the cost to desalinate water continues to decrease, and now stands at less than $2.00 per thousand gallons of produced clean drinking water. Remarkably, in 2001, over 845 million gallons per day (gpd) of new capacity was contracted for installation worldwide, making it the highest recorded year in terms of contracts for new installations. The final numbers for 2002 are expected to be even higher. Prior to 1996, an average of about 265 million gpd of new capacity was contracted per year, which rose to about 500 million gpd average per year in the years between 1996 and 2000. As a result, this is a very exciting time to be involved in the desalination market. Presently, approximately 8.5 billion gpd of desalination capacity has been installed or contracted through the conclusion of calendar year 2001 in 9,500 plants worldwide.

The desalination market is in a state of rapid change. Membrane plants using seawater as a source and reverse osmosis (RO) as a process, are being designed and constructed with capacities that were unheard of as recently as five years ago. Examples include the Ashkelon, Israel and Fujuirah, U.A.E. plants of 87 million gpd and 45 million gpd respectively. Unit capacities for multiple stage flash (MSF) distillation units are approaching 20 million gpd each. The Middle East region has traditionally been the focus of desalination activity, predominantly utilizing thermal technology such as MSF, but today large-scale desalination plants are being built throughout the world, with plants outside the Middle East region preferring RO technology. As a result, there is a broad-based shift occurring, from thermal technologies to membrane technologies for desalination applications. In 1990, 60% of the world's existing desalination capacity utilized thermal technologies, whereas at the end of the 2001 this had dropped to 47% – with the remaining capacity utilizing membrane technology.

On a worldwide basis, the desalination market installed capacity has grown at an average rate of 10.6% per year averaged over the last 30 years. In the more recent few years, the growth rate has begun to increase. The key drivers behind the tremendous growth in the desalination market can be summarized as follows:

(1) Significant reductions in the cost of desalting water due to:
- improved productivity and reduced cost of membrane elements utilized in the reverse osmosis process;
- increased efficiencies and economies of scale improvements in thermal processes;
- the global trend toward privatization of water/power projects; and
- improved energy recovery devices, which reduce the net energy requirement for the reverse osmosis process.

(2) Changing demographics – specifically, population growth in arid, semi-arid areas and water-deficient areas.

(3) Continuing increased standards of living in water-deficient areas.

(4) Environmental concerns and increasing regulatory requirements that are forcing water suppliers to examine and utilize alternative sources of raw water.

(5) Concerns and reaction to sustained drought conditions – seawater desalination is a drought-proof source of raw water.

(6) Increased demand for high-grade water for industrial and commercial applications.

There are several recent desalination activities of particular note going on around the world. Due to increasing revenues as the price of crude oil has risen, construction of new desalination capacity and refurbishment of installed desalination capacity in the Gulf States is taking place at a rapid pace, especially in the U.A.E. The first large-scale (90 million gpd) privatized wastewater reuse RO plant is under construction in Kuwait using ultrafiltration (UF) as pretreatment.

For the first time a large-scale seawater RO plant (25 million gpd) has begun operating in North America – in Tampa Bay, Florida. At least 10 more large-scale seawater RO plants are in the planning stages in California, Texas and Florida. Large-scale (40 million gpd) nanofiltration (NF) plants are also pending start-up of operations in the United States.

The growth of both thermal and membrane technologies is shown graphically in Figure 1.

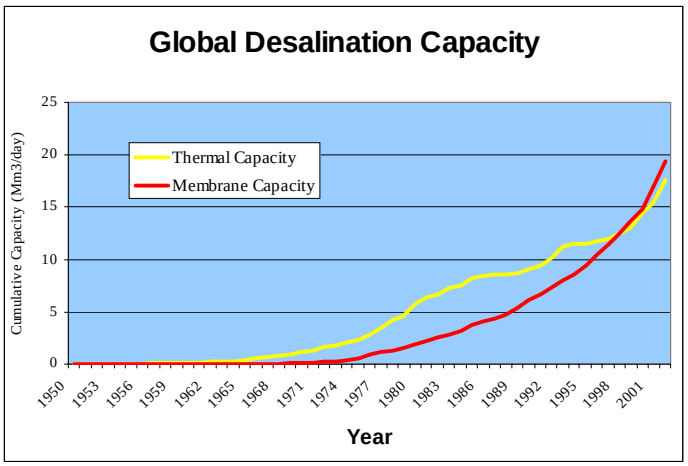


Figure 1. Cumulative capacity of all desalting technologies installed worldwide between 1950 and 2001 with projected plants in 2002.

The primary factor behind the increasing growth of membrane desalination is a rapidly declining cost of membranes. A U.S. government-funded research and development program in the early 1960's developed and commercialized the first membrane-based RO process. These membranes that resulted from this effort became commercially available in the 1970's. Continued development and improvements to membrane productivity, and reduction in pricing of the membranes due to competition between key manufacturers has continued through today with the result that over two hundred RO and nanofiltration products now available. Today, the membrane based reverse osmosis process has become extremely competitive and cost effective as a means of producing large volumes of very high quality water.

Another way to evaluate the impact of the improvement in RO membrane properties on the cost of membrane technol-

ogy is to consider the amount of water produced per unit capital cost. Figure 2 illustrates the increase in water produced using seawater desalination for the same capital investment, compared over time since 1980. These data indicate that for the same capital investment, approximately 27 times more water can be produced today using RO membranes than was possible in 1980.

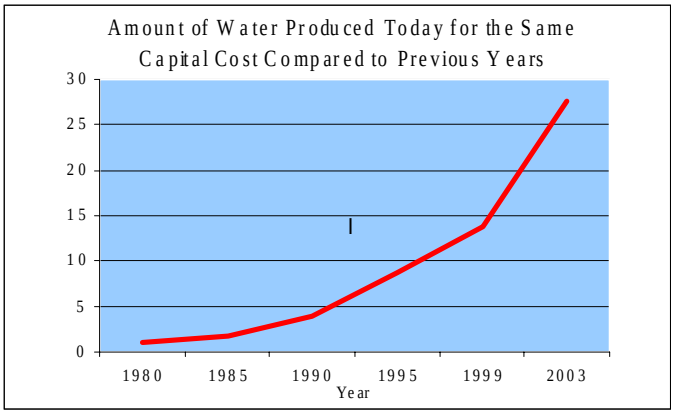


Figure 2. Change in water produced using seawater RO technology for the same capital investment over time.

Capital costs for membrane technology vary considerably based upon the feedwater source and technology being used. The Table below provides a range of typical capital costs based on facilities being contracted over the last few years and over a range of throughput capacities.

Range of Capital Costs for Membrane Desalination Plants (2001-2003)

Technology	Feedwater Source	Cost, $/gpd
NF	Wells with hardness and salinity	$1.13 - $1.51
RO	Brackish wells	$1.13 - $1.89
RO	Brackish surface	$1.51 - $2.65
RO	Seawater	$2.84 - $4.54
RO	Municipal wastewater	$2.27 - $4.16

The privatized total water cost for seawater desalination using RO technology in large-scale facilities is generally in the $2.00 per thousand gpd price range.

A key recent project, which may portend future market trends and innovative approaches to membrane desalination in the United States is the Tampa Bay Water program. This regional water utility, which supplies 225 million gallons per day of water to a five county area, was required by regulators to reduce the pumping of groundwater at the same time that it faced a sustained period of drought. The utility responded by asking the industry to propose new alternatives for operating on a privatized basis. Through a long and arduous process, four bidders submitted tenders to supply a 25 million gpd desalination system. There are unique site-specific factors which contribute to the $2 per 1000 gpd price, including salinity fluctuations below average seawater levels (from 16,000 to 32,000 mg/L) and co-location with the adjacent power plant providing warmed cooling water and shared intake/outfall. The facility was developed by a privatized developer, Poseidon Resources, but ownership was transferred to Tampa Bay Water prior to the plant commissioning in May 2003.

Covanta Water constructed the plant and would have operated the facility under a 25-year agreement with Tampa Bay Water. However, under a settlement agreement recently executed Covanta has been expelled as the operator due to problems with the performance testing. Hydranautics, the RO membrane supplier utilized some unique design features to the facility, including a partial second pass to optimize product water quality. There are over 10,000 RO membranes installed at the facility and their total energy demand is about 14 MW. Presently the plant is experiencing difficulty in achieving successful pretreatment utilizing the Covanta proprietary dual-sand filtration process.

The desalination market has a very bright future, and should offer vast opportunities for private companies. The Middle East region is still the largest market for desalination systems, maintaining approximately 49% of the worldwide contracted capacity. Figure 3 shows the percentage which each of the key regions of the world comprise, based upon their desalination capacity contracted or installed through 2001.

Prospects for the continuing growth of the application and use of desalination technology are very optimistic. In the big picture, the availability of fresh water in the earth's hydrologic cycle is fixed, while at the same time the global population is growing – especially in arid and semi-arid areas, standards of living are generally rising, existing sources of fossil groundwater are being depleted, surface supplies are being more stringently regulated, and the economic, political and environmental costs to develop new sources of surface supply are increasing.

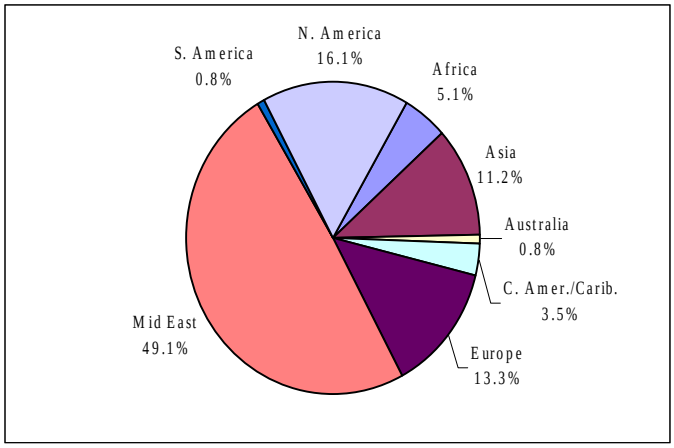


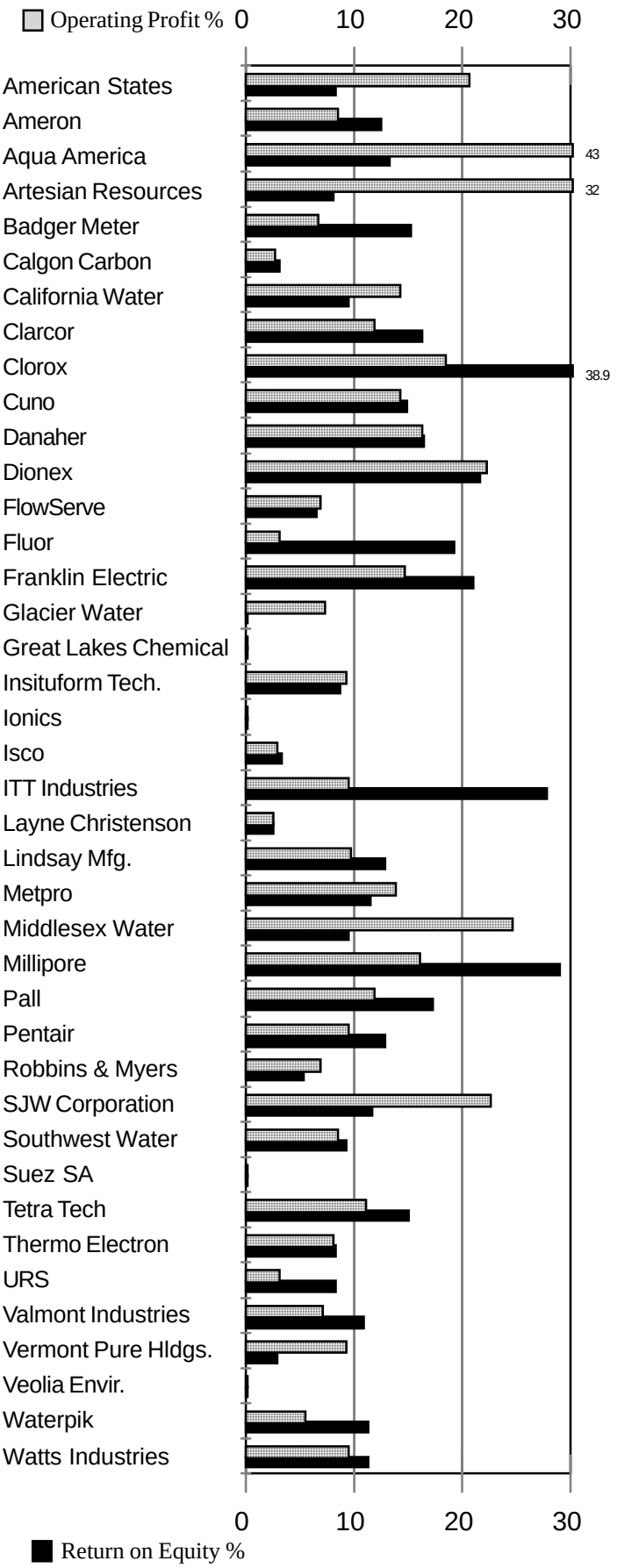
Figure 3. Distribution of desalination capacity by region based on installed capacity.

Reverse osmosis applications are anticipated to continue growing at roughly 11% to 12% in the future, while nanofiltration capacity is expected to grow at about 16% per year. Thermal technologies and electrodialysis are anticipated to grow at lesser rates in the future. Over the period from 2004 to 2009, there will be over six billion gpd of new desalination capacity contracted, with a capital investment value of between $15 and $25 billion, as determined by our current evaluation and projections for the overall world desalination market.

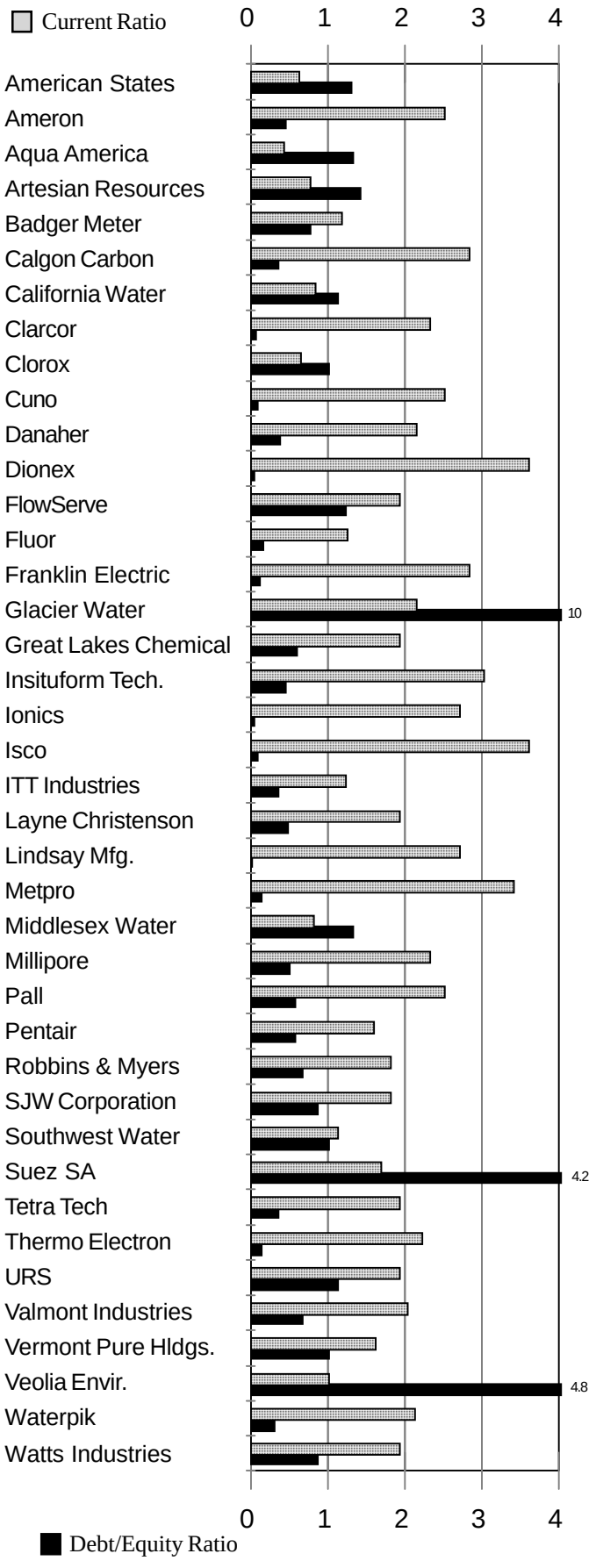
Lisa Henthorne, P.E., is Vice President & Membrane Technology Leader, and Eric R Jankel is Vice President & Global Desalination Market Leader, for Metcalf and Eddy, Inc., Wakefield, MA.

For further and more detailed information regarding the global desalination market, the Desalination Market Analysis Report is available from Metcalf and Eddy, Inc. and Aqua Resources International, LLC, at 303-670-1414.

Profitability & Performance



Balance Sheet Information



Note: Where there is no bar, the number is zero or has a negative value.

Financial Performance of Water Companies

(Note: The data used to construct the charts and analysis on pages 6 through 8 are from early February, 2004; sources and definition of the various data utilized herein are summarized in the box on page 11.)

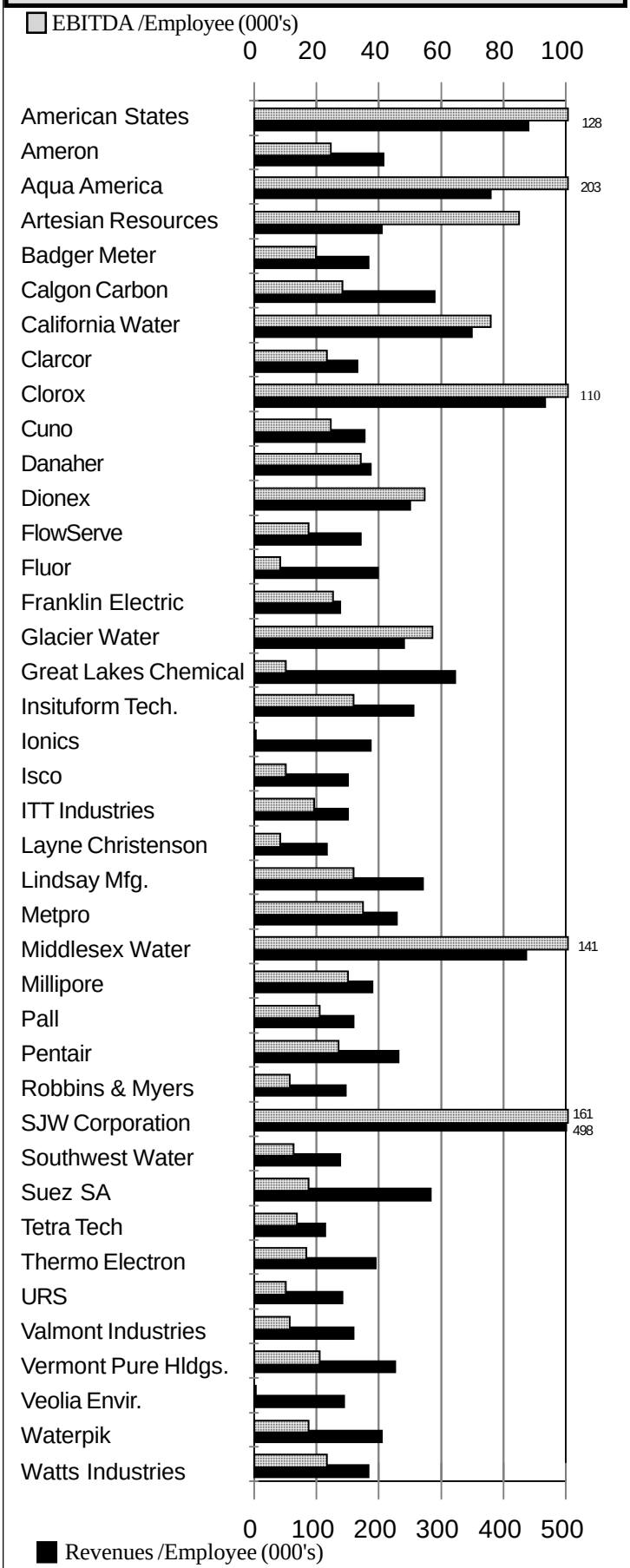
The right-hand table on page 8 demonstrates the recent strength in the broader stock market, with most of the water firms trading at or near their 52 week highs – as was the overall market in early February. The left hand table on page 8 is also a reflection of the price of the individual company's stock; most water firms show a P/E ratio of between 15 and 20. The exceptions are a handful of firms, like Glacier Water and Great Lakes Chemicals, who have negative earnings for the trailing twelve month period used in these calculations, and for whom this is hence not a relevant measure.

There is one important note about the Equity Valuation chart on page 8 – the sometimes overlooked effect of simple arithmetic in ratio calculations. One of the inherent difficulties in interpreting either P/E ratios (or EBITDA multiples) is the effect of a very small value in the denominator. Generally speaking, companies with higher P/Es are perceived to be more valuable; however, this only applies within given ranges of "reasonableness." For example, the very high estimated P/E ratios for Layne Christenson or Vermont Pure are more the result of tiny earnings than intense interest in and demand for the stock. A detailed understanding of the company's individual economic circumstances, and some judgment is needed in the interpretation of what an individual P/E ratio really means.

Two different measures of profitability are shown in the left chart on page 6 – operating profit as a percentage of revenue, and return on equity. As can be seen, many companies in the water industry generate operating profits of between ten and fifteen percent, which is higher than most other environmental companies. It is also quite clear that the water utility companies, as regulated local monopolies, have uniformly higher operating profits; see Artesian Resources, Aqua America, American States, and SJW. Return on equity measures not only general profitability, but also the relative balance of debt and equity in the financing the company. The other chart on page 6 shows two key figures from a company's balance sheet – the current ratio, or ratio of currents assets to current liabilities, and the longer-term debt to equity ratio. A higher current ratio usually implies a stronger short-term financial situation. As detailed in the Cover Story, note the relatively much higher debt levels of both of the key French companies, Veolia and Suez.

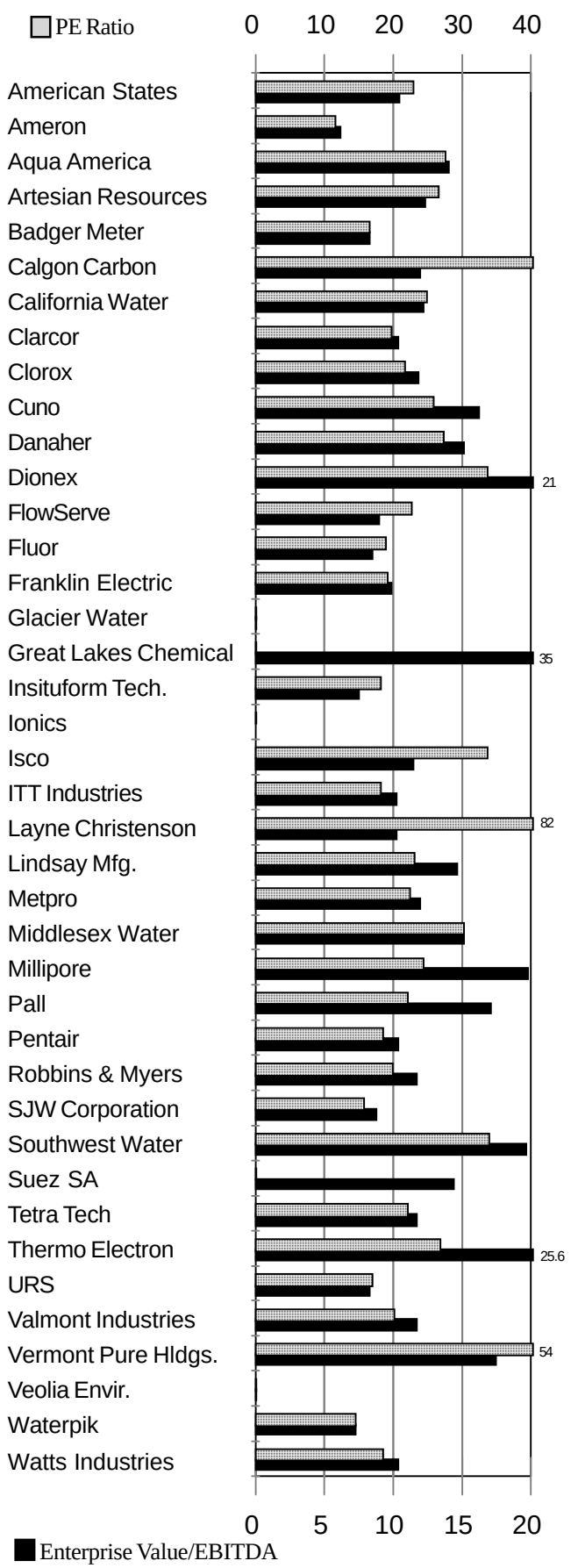
The chart on this page illustrates two rough productivity measures – the amount of earnings (actually EBITDA is used here) and revenue which a company manages to generate per employee. Interestingly, when compared in this manner, water companies show quite a wide range of variation. Consulting and engineering firms, for example, typically show revenues per employee in the $100,000 to $150,000 range, whereas equipment manufacturers may show considerably higher figures. Note again the relatively high earnings per employee which the drinking water utilities are able to produce.

Productivity Measures



Note: Where there is no bar, the number is zero or has a negative value.

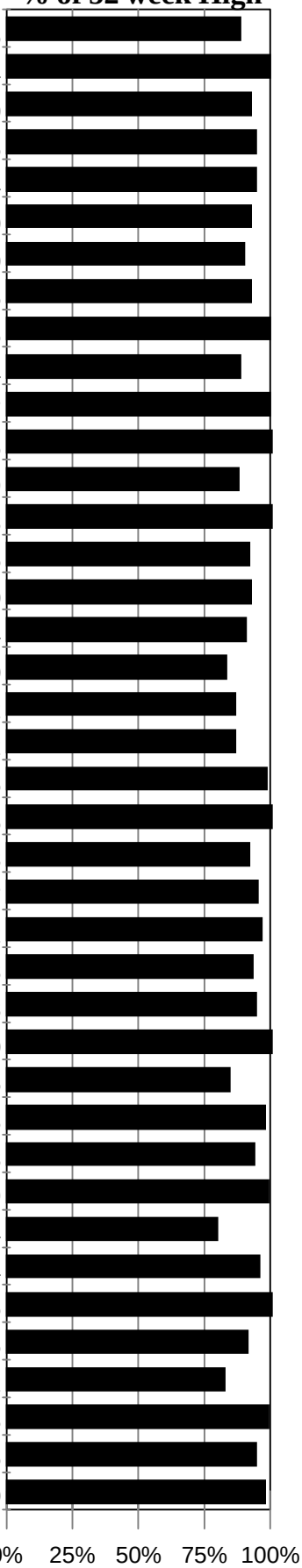
Equity Valuations



Note: Where there is no bar, the number is zero or has a negative value.

Stock Price Performance

Company	Price	% of 52 week High
American States	$25.55	
Ameron	$39.04	
Aqua America	$21.00	
Artesian Resources	$28.25	
Badger Meter	$37.34	
Calgon Carbon	$19.90	
California Water	$28.00	
Clarcor	$42.25	
Clorox	$49.66	
Cuno	$41.24	
Danaher	$94.67	
Dionex	$54.66	
FlowServe	$19.99	
Fluor	$40.83	
Franklin Electric	$59.85	
Glacier Water	$20.10	
Great Lakes Chemical	$25.24	
Insituform Tech.	$16.00	
Ionics	$28.52	
Isco	$ 8.52	
ITT Industries	$77.05	
Layne Christenson	$13.25	
Lindsay Mfg.	$24.83	
Metpro	$17.07	
Middlesex Water	$20.42	
Millipore	$49.88	
Pall	$26.28	
Pentair	$53.40	
Robbins & Myers	$19.75	
SJW Corporation	$97.63	
Southwest Water	$13.98	
Suez SA	$21.69	
Tetra Tech	$21.84	
Thermo Electron	$28.34	
URS	$28.95	
Valmont Industries	$21.95	
Vermont Pure Hldgs.	$ 3.42	
Veolia Envir.	$28.98	
Waterpik	$12.65	
Watts Industries	$22.60	



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are certain niches – such as the membrane treatment and advanced oxidation technologies – which are currently enjoying growth more in the 10% to 15% range.

Key Market Drivers:

As we have detailed in the past, a handful of key factors – economic and social demands, and political realities – are driving the overall development of the water industry. These drivers, in turn, are giving rise to various trends and effects which will likely dominate the water industry for years to come. Some of the key factors are listed below:

• *Water Scarcity and Water Quality Problems Are Growing:* this is clearly the critical core issue behind this entire industry, and the ultimate driver behind the challenges and growth projected for the water business over coming decades. The gradual development of this situation has resulted from decades (indeed, centuries) of unfettered industrial expansion, continuing population growth, and a careless and uninformed belief that the environment would take care of itself. We don't need to recite the statistics again here, as they are well-known – the millions of children who die each year because of unsanitary water conditions, the major cities of the world which still discharge their untreated wastes directly into the natural waterways, the number of people even in the United States who still drink water that is out of compliance with the Safe Drinking Water Act, and so on. Hundreds of studies have pinpointed the lack of sufficient clean water as one of the most serious threats facing mankind.

• *Public Awareness and Concerns Are Growing*: as these water scarcity and quality problems have become more serious and more apparent, the public has become better informed – and more concerned about the water problems that their children and grandchildren may inherit. One needs only to look at the pages of the popular press to see how broad and widespread this recognition is becoming – stories about water scarcity or pollution problems are common headlines, and have even become the stuff of popular Hollywood entertainment. As the general public becomes more aware and concerned about water, peoples' demands and perceptions will become a more important driver in determining the shape of the business. (One need only look at the explosive growth of the bottled water industry over the past few years to see how significantly customer perceptions – rightly or wrongly – can create and drive new markets.)

• *Regulatory Controls and Enforcement Are Growing:* in turn, as public awareness and concern has grown, it has translated inexorably into greater government review, legislation, and regulatory control. Although environmental regulation and enforcement has waxed and waned during the past three decades, when it comes to drinking water the public is insistent upon ever-stronger regulatory protection of our water resources. For example, there were just nine new bodies of regulations, or rules, implemented between 1974 and 1996. Since the 1996 reauthorization of the Safe Drinking Water Act (SDWA), there have been more than ten new rules implemented.

Under the SDWA some of the key on-going areas of regulatory development include the disinfection by-product rule, the interim enhanced surface water treatment rule, the arsenic rule, and the groundwater rule. On the *waste*water side of the business, the primary governing legislation is the Clean Water Act, where key trends have included a more intense focus on *non-point* source run-off, continuing implementation of the total maximum daily load (TMDL) regulations, and programs geared towards combined and sanitary sewer overflow regulations to control wet weather run-off in metropolitan areas. Overlying all of these strictly regulated areas is the growing concern about potentially "introduced" compounds – i.e., terrorism activity – and all of the security concerns regarding primary drinking water supplies which have arisen as a result of 9/11. And finally, although the pace and intensity varies, regulatory controls are also becoming stronger in most other regions of the globe as well.

• *Meeting All These Needs is Going to Require Huge Expenditures:* finally, in order for municipalities and industry to comply with all these regulations, and to maintain and expand water infrastructure, huge capital expenditures will be required over the coming decades. As we have mentioned, numerous studies have predicted how large this expenditure must be; the estimates vary, but it is definitely in the hundreds and hundreds of billions of dollars range. These dollars represent a huge challenge to this country, but they also constitute a huge opportunity for firms serving the water and wastewater treatment industry.

Key Industry Trends:

These drivers in turn are leading to various trends and developments, both in terms of how the economy uses water, and in terms of supply and demand within the commercial water technologies and services industry. These include:

• *Continuing Consolidation and Ownership Changes*: the water industry has been experiencing a dramatic rearrangement of ownership and increasing consolidation, as firms strategically position in order to address all of these opportunities. The dizzying pace of transactions the last few years – particularly those involving the larger domestic players and major foreign acquirers – has dramatically altered the face of this industry. (See insert page for a comprehensive listing of recent deals.)

On the other hand, it would be easy to get the impression – particularly in the last few months – that events may actually be headed in the other direction. Quite abruptly, several key buyers (who have pumped hundreds and hundreds of millions of dollars into U.S. water acquisitions over recent years) seem to be reversing direction, and deciding to spin off key businesses. In September, Suez announced that it had sold its Nalco water treatment unit to a group of private equity investors for $4.2 billion – roughly the same price for which it had acquired the business four years earlier. In its announcement, the company cited a narrowing strategic focus and the need of the parent organization to reduce its debt.

But the real surprise came in late September, when Veolia's U.S. Filter unit announced plans to sell off many of the businesses it had acquired through the 1990s. U.S. Filter has been the "king" of the emerging water industry for over a decade, having conducted dozens of consolidating acquisitions during the 1990s, before being acquired itself by Veolia (Vivendi) in 1999. Although many had expected the company to spin off a few units here and there as it continued to

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focus its business, few expected a divestiture of this magnitude. Veolia cited similar considerations to Suez – the need for reduction of high debt at the parent company level, and a further strategic concentration onto its historical core business in contract operations and out-sourcing services.

As of early February 2004, the sale of U.S. Filter's businesses is still on-going. Everpure, the firm's water filtration products business, recently sold to Pentair Corporation at a very high price – $215 million for a business doing $60 million in revenue per year and producing some $20 million of EBITDA per year. The well-known Culligan subsidiary has attracted interest, but to date, has not been sold. The remaining bulk of U.S. Filter's equipment business – which represents $1.2 billion in revenues – also remains on the block. U.S. Filter's preference that the business be sold as one piece, and the likelihood that it will trade at a multiple of greater than one times revenues, has obviously restricted the pool of capable and interested buyers – there simply are not many buyers financially capable of undertaking that large a purchase.

Some of the major British water companies also have begun to divest of various units – again, primarily equipment and product businesses. In other recent transaction news:

• Ionics, one the larger remaining independent players in the water industry, acquired Ecolochem, a private water treatment company, at a value of more than three times revenues. This was a large deal for Ionics, which has been struggling financially during the last two years.

• ITT Industries maintained its rapid pace of expansion in the industry, buying several more small players, but also commencing a bid for the major German ultraviolet treatment technology firm Wedeco. Wedeco had approximately $150 million of revenue in its latest fiscal year. ITT remains one of the most active buyers in the U.S. water market.

• Pentair acquired WICOR, a unit of Wisconsin Energy which produces water systems, filtration products, and swimming pool products and services. The deal was priced at $850 million in cash for a company generating approximately $750 million in revenues. At the same time, Pentair announced the divestiture of some of its other non-water related businesses, culminating a dramatic strategic repositioning of the firm into almost a water industry "pure play."

• Philadelphia Suburban Water company, now the largest independent investor-owned utility in the country, continues to make additional acquisitions. Most recently, it acquired several businesses from Allete Water in North Carolina. Philadelphia Suburban also changed its name to Aqua America to reflect its new and broader strategy.

• Finally, as always, there are also numerous smaller deals occurring, including the acquisition of Flowmatic, a reverse osmosis component manufacturer, by Watts Water, and the sale of Waterlink's remaining Barneby Sutcliffe operation to Calgon Carbon Corporation.

With so many major assets up for sale at the same time, the competitive situation in the water treatment equipment industry has been turned upside down. It will be interesting to watch where these various assets end up, and to see which companies step forward to be major players in the next generation of this industry. Most observers are betting on the various diversified U.S. companies mentioned above – ITT Industries, GE Water, Pentair, and perhaps several others who have not yet made their first move. But the big questions remain – how can companies that were committed buyers turn into sellers in just a few short years? Was something wrong with their business strategies? Will the new owners of these assets be more logical owners than the previous ones? And most importantly, what will be the ultimate impact of this massive ownership rearrangement on employees, shareholders, and finally, the customer?

• *The Pace of Privatization & Out-Sourcing Begins to Slow*: as mentioned above, one of the most controversial aspects of the water industry today involves the transfer of water management, treatment and distribution operations from public to private control. Although private operation of water and wastewater utilities has been common in parts of Europe for decades, increasing privatization in North America and other parts of the world seems to be generating increasingly bitter political debate. During the past couple of years, it has become considerably less clear as to how far privatization will actually proceed in this country. The highly-publicized misfortunes of several large projects like Atlanta, combined with an active and organized opposition movement, has forced a wholesale re-evaluation of water and wastewater privatization. A number of large projects have been shelved or put on hold, and the whole nature of private contract operations is undergoing a major shift.

As a result, while the industry had been growing at rates of as high as 25% per year, considerably lower growth is now expected. As an example of how tough the last year was, one industry publication recently indicated that the U.S. contract operations business had seen the number of contracts drop off by 20%, while the *value* of the contracts declined by almost 73% during the year. OMI and Thames stood to lose as much as $300 million if their project in Stockton, CA is unwound. United Water was a big loser with the Atlanta job and with PRASA in Puerto Rico, which would have been one of the world's largest privatization projects.

The contract operations business also seems to be experiencing somewhat of a shift from a major "big-city" project orientation to smaller and shorter-term contracts for smaller municipalities. The firms that have focused on this latter type of business seem to be doing reasonably well, while the firms that have focused on the huge projects seem to be having a more difficult time. Nonetheless, many firms continue to believe that contract operators have a very important and growing role to play in the industry. Veolia/U.S. Filter is obviously still very optimistic about the potential to successfully and profitably manage the larger privatization jobs, as indicated by its current effort to strategically reposition the firm as primarily a contract services provider.

And, in the bigger scheme of things, it is important to note that the simple threat of privatization has already forced widespread efficiencies by itself – a sort of "de facto" privatization. In summary, despite the concerns of labor organizations and various public interest groups, the urgency of infrastructural needs and the political barriers against major tax increases makes it seems likely that privatization will continue to grow. At the same time, it is clear that private operators are going to be judged by a very demanding and critical public.

A few other key trends are also important to note in any broad review of this industry:

• *Increased Focus on Water Recycling & Re-Use*: there are continuing and inexorable pressures towards greater water re-use and recycling systems – an obvious but as yet largely untapped means of addressing water shortages. With technologies readily available today, wastewater can easily be cleaned to levels where it can be recycled back into primary usage – and at steadily declining costs. Examples of new wastewater re-sue projects are coming out regularly now – typically for irrigation projects, or for more innovative applications, such as one recent project where treated wastewater was injected into the ground to act as a barrier against seawater intrusion, protecting underground freshwater aquifers in southern California.

Direct re-use of wastewater, particularly for drinking, is still a bit of a stretch for most Americans (and indeed is only commercially practiced in a small handful of locations around the world). However, this resistance is primarily due to poor understanding of the hydrologic cycle, and our nation's current water usage patterns. For example, on some of the major river systems in the United States, water is used and re-used up to 20 times as it travels to the sea – the discharge water from one wastewater treatment plant contributing to the raw water intake for a primary drinking water plant a few miles downstream. In fact, as a result of thirty years of steady progress under the Clean Water Act, the discharged waters from wastewater treatment plants are often cleaner than the rivers and streams they flow into. This type of *indirect* re-use of wastewater for drinking (after it has flowed in and out of a river, or into and out of an underground aquifer, and then through a treatment process) is clearly widespread, and is obviously "acceptable" to most Americans.

An interesting statistic to remember when evaluating the long-term impact of wastewater re-use as a means of extending our primary water resources is that only a tiny percentage of our primary water supply is actually used for drinking. Compared to the roughly 1200 gallons of water per capita per day that it currently takes to power the U.S. economy, an individual typically drinks less than a gallon a day. This leaves 1199 gallons per person per day which could be recovered without anyone ever having to drink "recycled" wastewater. Hence, even if only small incremental gains could be made in terms of non-potable water re-use, overall water availability concerns could be substantially impacted. Over the longer-term, we will move beyond our "linear" thinking of today, and develop a more "circular" philosophy of water usage.

• *Conservation and Efficient Water Use*: closely related to improving our water re-use habits as a nation is the whole area of conservation of water, and more efficient usage of water. During the droughts of 2002, many of us were forced to see just how much efficient we could become – and most of us found that it was not that difficult to save quite a bit of water. Indeed, water conservation ideas are only just begin-

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HOW TO READ THE ENVIRONMENTAL BENCHMARKER AND STRATEGIST

Please note that with the exception of page 2 all of the tables herein show two different financial statistics which are measured on different scales; the metric listed at the top of the table is shown as the top bar in the chart, and is measured against the scale shown on the top of the table. Likewise, the metric listed at the bottom is shown as the lower bar and is measured against the scale shown at the bottom of the table. Where this is no bar, the calculated number is zero or has a negative value. Where the bar extends off of the scale, the actual value is shown in type.

The financial data and statistics utilized in *The Environmental Benchmarker and Strategist* are provided by Market Guide, Inc. through various financial web-sites. The data utilized in constructing the charts herein are typically from a date two to three weeks prior to the time the subscriber receives the publication in his or her mailbox. Specific definitions of certain data contained herein follow:

- number of shares includes all shares outstanding, less the shares held in treasury
- price to earnings ratio is calculated using earnings *before* extraordinary items and accounting changes over the past four quarters
- EBITDA equals earnings before interest, taxes, depreciation and amortization
- net earnings used to calculate return on equity is calculated as income after taxes plus minority interest and equity in affiliates plus preferred dividends and U.S. GAAP adjustments.
- return on equity is calculated as net earnings available to common shareholders divided by average common equity over the most recent five quarters
- debt to equity ratio is total debt for the most recent quarter divided by total shareholder equity for the same period
- cash includes actual cash as well as short-term investments on the balance sheet
- enterprise value equals market capitalization plus long-term debt less cash (as defined above)
- Per employee statistics shown on page 5 are based upon headcount reported in the most recent 10-K filing to the Securities and Exchange Commission, which is only published annually. For companies which have grown substantially within the past year via acquisition, financial data may be published and updated prior to the availability of new employee data. Hence, these per employee statistics may be overstated for a few quarters.

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ning to take advantage of the "low-hanging fruit;" as water prices rise, there will be increasing incentives for people to use water more carefully, and for industrial companies to retool their manufacturing systems to utilize less water.

Outlook for the Future:

As we have said many times, the challenges and requirements of the water industry are likely to be one of the most pressing problems facing humankind over the next century. The primary and over-riding conclusion that falls out of the foregoing discussion is the inevitability of continuously rising water prices over the longer-term future; as water becomes scarcer, there seems to be no alternative. Water is still very inexpensive – ridiculously cheap in many ways. And, at least in the United States, we are still on the highly inelastic portion of the demand curve for water – where increases in price have relatively little impact on usage. This inescapable conclusion, and the vast scale of the world's water problems, were highlighted in a special report in the July, 2003 issue of the respected British newsweekly *The Economist*, which concisely concluded that water is "ill-governed and colossally under-priced." Discouragingly, the study also reported that the United States is the most wasteful nation on earth in terms of water usage.

As prices continue to increase, decisions about water usage will necessarily begin to take on greater economic significance. This will force us to start to focus on more efficient water usage and demand management techniques, technologies such as membrane desalination, and practices such as improved water conservation and recycling. All of these are, in fact, already happening – but in the future, water expenditures will make up a larger and larger share of the GNP.

Water will increasingly be recognized as an economic good. However, exactly what that means is subject to varying interpretation. Some argue that water should be treated as a fully tradable market commodity, subject to the general forces of supply and demand in an unregulated market – that water's value is essentially the same as its free market price. On the other hand, there is the anti-market argument – that water should be exempt from market forces, because it is an essential prerequisite to life. Adherents to this philosophy argue that water is a basic human right – and that forces greater than the free market are required to insure that everyone has enough clean water to live.

Over the long-term, some sort of intermediate position is likely to prevail – water should be treated as a scarce resource, which means that we have to balance economic and social objectives, and carefully allocate water to its different myriad uses. Market incentives can be a powerful means of properly managing and allocating a scare resource, but in the case of water, we must insure that such markets are sufficiently regulated to protect social equity concerns as well.

In closing, consider the following "big questions" – many more of which will continue to emerge in the future:

• water is being transferred from American agriculture to American cities at an alarming rate. Farmers in the southwest are increasingly finding that current economics suggest that they stop farming and sell their underlying water rights to neighboring cities. What are the long-term implications of allowing our farmlands to dry up in order to slake the thirst of our ever-expanding cities?

• why do we as a society treat such vast amounts of water to drinking quality standards when less than one percent is actually used for drinking? Should we really be incurring the capital costs of providing drinking quality water for fire-fighting, mixing cement, washing cars, or watering yards?

• as sedimentary deposits fill the massive reservoirs that we have constructed over the last sixty to eighty years, how will we continue to provide controlled water supplies to the arid southwestern part of the country? We have become experts at building dams – what do we do with them when they no longer function?

So ... the water industry is full of challenges, but it is also full of opportunities. Water is an essential prerequisite of life, and we are not going to find any substitutes for it. The amount of freshwater on this earth is relatively fixed, and we need to become much smarter and more efficient in our usage of that scarce resource. For creative, innovative and well-managed firms, the water industry offers unrivalled opportunities. *Steve Maxwell (303) 442-4800*

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