



Volume 11 / Issue 5 / May 2010

# Global Water Intelligence

Market-Leading Analysis of the International Water Industry

Zapping the zebra mussels **Ballast water treatment set for blast-off**

It's Magor versus Wager ...as Biwater dumps Cascad shares at a discount

DB or not DB – that is the question  
**Can US change procurement model?**

It may be China, but this is crazy  
Origin Water valued at \$3.3 billion

One night in Paris **Queen Noor presents the Global Water Awards**

# The “O” that completes the circle

Convincing US municipalities to consider the full lifecycle cost of a new treatment plant is not as easy as it sounds. Emily Pickrell examines the anatomy of the design-build-operate model.

At a time when US municipalities are trying to think creatively about how to meet both their budgets and increasingly strict environmental regulations, the design-build-operate (DBO) option may yet have its time in the sun.

For some cities, the default procurement option – the design-bid-build (DBB) model – is still the preferred choice. This approach allows a city to hire a consulting engineer to draw up plans, which are then put out to competitive bid among contractors, with the contract being awarded to the lowest bidder.

This bias is only now beginning to change, and a growing number of cities are showing interest in exploring the design-build (DB) approach. DBs require close cooperation between engineers and contractors. A municipality will hire a consulting engineer to draw up a broad specification of a project, but the percentage of the completed design is much lower, and the project is then put out to bid for delivery as a complete package by a team of engineers and contractors.

One of the strongest arguments for DB procurement is that the engineer and the contractor are required to work together as part of a team. This team collaboratively designs and builds a plant, solving challenges as they come up during the plant's construction, rather than establishing a blueprint, regardless of unforeseen outcomes and logistical challenges.

This argument is even stronger when it comes to including an operational phase, which allows an operator to provide input on how a certain design solution will play out in practice, or how the construction will impact the operation of the plant.

When the City of Fillmore in California began planning a new wastewater reuse plant, it decided to go down the DBO route to utilise the knowledge of operators – as well as contractors and engineers – on how best to apply cutting-edge know-how and technology to meet the city's needs.

“What I wanted to do was to bring in an experienced water treatment plant operator, someone who had already operated a variety of technologies for membrane reactors,” says Burt Rapp, chief engineer for the City of Fillmore.

“I wanted a contractor on board who had built sewage treatment plants before,

and can make decisions on whether one building, or a two-storey facility with components built around it, is a better solution. And I wanted an engineer who has already designed a variety of treatment plants and is familiar with differing sizes and standards.”

Rapp said that the inclusion of an operator was especially important, as they would be key to ensuring that the plant be built to last for decades and could be readily maintained.

“The design-bid-build model hires one engineer, and that engineer has his opinion,” Rapp told GWI. “You can accept his opinions and put it out to bid, but the agency is then left to try to make it run after he is done. You don't know if you got a gold-plated, oversized plant or one that was done too cheaply. It could be a case where the builder got you in the door but you have a maintenance nightmare on your hands for the next 30 to 50 years.”

DBOs offer some protection against future maintenance costs, as they lessen

the manufacturer did not need to please the end-user, only the design engineer. They never dealt with people who are going to be using it, like an operator. This is a huge change for how this stuff will be sold in the future.”

For many US cities, however, the option to include operations as part of a DB contract has been slow to take off, despite its widespread popularity in much of the rest of the world. After a flurry of activity during 1997-2001, there have only been a handful of DBO projects commissioned in the US water and wastewater sector over the past five years, despite the strong track record of many of the completed plants (*see table p26*).

“The DBO market is flat and slow,” says Jeff Kowal, executive vice president of Veolia Water North America. “We are hopeful, given the economy, that the marketplace will come back in the near future, but it has been quiet for the last couple of years.”

Advocates of DBOs also say that cities are bit like lemmings when it comes to

**“The agency may specify equipment, such as different types of pumps, but sometimes they're doing it because a salesman is calling them.”**

the danger that cheaper components will be used that reduce the initial capital expenditure.

The operator can also provide insight into when municipalities are being given a bum steer on what equipment to use. “The agency may specify equipment, such as different types of pumps, but sometimes they're doing it because a salesman is calling them,” said Tom Peterson, the American Water operator for the Fillmore plant.

“The salesman has no idea how tough it is to maintain. The design engineer is not going to be dealing with that municipality ever again – the operator will.”

Having an operator on board from the start can make negotiating with manufacturers much easier, Peterson added. “When we had a seal fall out, they replaced the whole pump; people answer our phone calls,” he told GWI. “Historically,

trying something new, and that historically, one of the roadblocks to taking the DBO approach was the fact that for many years, there just weren't many successful examples in the US to compare with. Indeed, when Seattle first considered using a DBO approach in the mid-1990s, it turned to Europe for examples of successful projects.

“I did an international investigation,” said Scott Haskins, the former deputy director of the Seattle Water Department, who was part of the team that commissioned the Tolt River water treatment plant in 2000. “I looked at people in the marketplace, in Australia, in Europe – the French – to find different companies that were executing models that were non-traditional.”

Haskins said that this comparison is what convinced him that this model could work in Washington State. “I saw

an opportunity to use new technology and new contracting options to get the pieces of design, construction and operations into a single point of accountability, cost, and performance-based type of contract,” he explained to GWI.

The San Diego County Water Authority, which procured the 100MGD (378,540m<sup>3</sup>/d) Twin Oaks water treatment plant in 2005 using a DBO contract worth \$157 million – including an annual operating fee of \$6 million – used Seattle’s experience to plan the structure of its own project, forming a team of experts to help advise them.

“During the preparation and solicitation

of documents, we hired five or six individuals who were experienced in water quality as senior consultants,” said Tim Suydam, water quality manager of the San Diego County Water Authority (SDCWA). “Between them we had over three hundred years of experience in reviewing these documents.”

Suydam said that these consultants gave a broad spectrum of invaluable guidance: operational guidelines, guidance on procedures, as well as advice on how to keep the solicitation transparent and the documents confidential.

They also helped the SDCWA develop

good strategies for ensuring that rules of communication were established and followed.

#### Studying plant life

Proponents of DBOs say that one of the most attractive features of using the procurement method is that the lifetime cost of a plant can be more accurately assessed when the operations component is included.

“When you have a water treatment plant, these are long-term operations,” observes John Young, president of American Water Services. “When you bring

### US municipal water and wastewater DBOs since 2000

Year of award	Project location	State	Contractor	Capacity (m <sup>3</sup> /d)	Contract duration (years)	Contract scope
2010	East Providence	RI	AECOM/United Water	39,364	10	WWTP
2009	Spokane	WA	CH2M Hill	30,280	20	WWTP
2008	Santa Paula <sup>(1)</sup>	CA	PERC Water/PACE/Layton Construction/ Trussell Technologies	12,869	30	Water recycling facility
2007	Tampa Bay	FL	Veolia Water NA	181,680	13	Surface water TP
2006	Fillmore	CA	American Water/Boyle Eng./W.M. Lyles/Kennedy Jenks	6,813	20	Water recycling facility
2006	Clovis	CA	CH2M Hill	10,598	10	WWTP MBR
2006	Rockland	NY	Veolia Water ST/Jett Industries/CDM/Delaware Engineering	5,678	5	WWTP
2005	Twin Oaks	CA	CH2M Hill	378,500	15	WTP
2004	Tampa Bay	FL	American Water/Acciona	94,625	20	SWRO
2003	Lake Pleasant	AZ	American Water	302,800	15	WTP
2003	Lathrop	CA	Veolia Water	2,839	20	Tertiary treatment plant
2003	Stockton	CA	CH2M Hill	208,175	20	WWTP + Water
2003	Cle Elum	WA	Veolia Water	13,626	20	WWTP
2002	San Juan Capistrano	CA	ECO Resources, Inc./Boyle Engineering/ARB Inc.	19,455	20	BWRO
2002	Taunton River <sup>(1)</sup>	MA	Inima/Metcalf & Eddy	18,925	20	BWRO
2002	Pawtucket	RI	Earth Tech	94,625	20	WTP
2002	Richmond	CA	USFilter (Veolia Water)	60,560	20	WWTP
2001	Seattle (Cedar)	WA	CH2M Hill	681,300	25	WTP
2001	Newport	RI	Earth Tech	40,500	20	WWTP
2001	Beverly Hills <sup>(1) (2)</sup>	CA	Earth Tech	11,355	20	WTP
2001	Camp Creek	GA	American Water/Western Summit Constructors/Parsons	90,840	15	WWTP
2001	Lynn	MA	Aqua Alliance (Veolia)	97,653	20	WWTP
2001	Glens Falls <sup>(3)</sup>	NY	Earth Tech	26,495	20	WTP
2000	Tampa Bay	FL	Veolia Water NA/CDM/Clark	249,810	15	Surface water TP
2000	Quincy <sup>(1)</sup>	WA	Earth Tech	19,493	20	WWTP
2000	Springfield	MA	US Water (United Water)	253,595	20	WWTP

(1) DBFO

(2) The city repurchased the plant after five years

(3) Contract terminated in 2006; also included upgrades and 20-year O&M of a 5.5MGD WWTP

Sources: Company releases, NCPPP, USCM

the contractor and the operator together, they can determine not only what is the best way to design it, but the operator can tell you what might have a high capital cost but a low operational cost. They factor in the lifecycle cost of the equipment, and are not just looking at the price of building something – it drives the value throughout that entire lifecycle.”

It also forces the firms building the plant to avoid some of the cost-cutting that DB construction can spawn. “DB delivery can encourage and get a good price for clients in terms of the facility, but you may not get a long-term perspective on the facility,” explained Veolia Water’s Kowal.

“As a long-term operations and maintenance contractor, we look at the facility as a city would – we try to select the process and equipment that provides the lowest lifecycle cost to the client. In a DB, you may not get that; firms want to design a plant, and do it cheaply. They don’t have the long-term horizon in the clients’ best interest and focus, so they may cut corners to save construction costs and may not give the client the best facility over the long term.”

So why aren’t DBOs catching on more readily? The reasons, like the water industry itself, are varied and complex.

Historically, state laws have not permitted the use of design-build, which has provided an initial hurdle for municipalities interested in adopting any form of alternative procurement. The laws have, however, been changing at a rapid clip in recent years, and Eric Petersen of Hawkins, Delafield & Wood LLP lists only New York, Pennsylvania, Louisiana and Mississippi as having legislation that make alternative procurement extremely difficult.

Local communities sometimes raise opposition as well, fearing the loss of local jobs, according to Mark Alpert, senior vice president of design-build for CH2MHill.

While the lifetime cost estimate that a DBO can provide is attractive, others have pointed out that DBO contracts also generate additional costs.

These complex contracts sometimes add substantial costs to the procurement process, as all DB contracts are performance-based. Including an operational component adds a contractual warranty to the client, which also means expensive legal haggling over risk allocation, Hawkins’ Petersen explained.

David Stanton, former chief operating officer at SouthWest Water and a veteran of Earth Tech in its DBO heyday, notes that because the risk related to the operational

component of a contract is inherently different from the construction risk, it is often easier to establish a separate contract for operations, rather than include it in a single DBO contract.

“It is often more efficient to have a separate O&M agreement that doesn’t intermingle all the contractual issues,” said Stanton, who added that what clients really want is the transition between construction and operation of the plant to be handled smoothly.

“The solution is to get people together that understand DB, and those who do O&M,” said Stanton. “Partnering is a good solution.”

Construction firms also suggest that adding operations to a DB contract raises the complexity in terms of getting the necessary insurance coverage. “Unless it is a short operation, our insurance coverage will not provide a bond for more than five years,” said Marc Filanc, founder of J.R. Filanc Construction. “You have to get creative on how to deliver a DBO.”

Filanc explained that one option is to disengage the bond for the operator from the construction and performance bond. Another option is for a team consisting of the engineer and contractor to ‘prime’ the job, and at the end of that portion of the contract, to phase out one team and have the operator then work with the municipality.

Filanc emphasized that this turnover could only take place after the plant had been demonstrated as being up and

of the bid can easily run to a million dollars or more, and potential suitors have to weigh the options, trying to determine if the terms of the deal and their potential to win merit the chase.

American Water, for example, had been pursuing the Pima DBO contract, but decided to drop out, explaining that the project scope was too prescriptive and that the contract terms and risk allocation were not favourable.

The competition for such contracts is intense, with no single company dominating the market. Although criticisms have been raised over the lack of meaningful competition for such contracts as the wastewater DBO in Lynn, MA, “there are enough players in the field, so that owners have a choice to get the best value, whether that value is price, or price with strong technical solutions,” says CH2M Hill’s Alpert. He notes that while many overseas companies have expressed interest in the US market, they continue to puzzle over how to make a reasonable return out of it.

“My sense is that they would rather parcel out the design and construction risk to others, and keep the operations,” observes Alpert. “I don’t think it is their core competency, or else they have simply chosen not to bring that core competency here to the United States.”

Despite all of these challenges, DBOs continue to be the most practical route for cities such as Santa Paula, CA, which was up against the wall to build a new 3.4

**“It is often more efficient to have a separate O&M agreement that doesn’t intermingle all the contractual issues.”**

running, which typically takes one to two years.

Despite these considerations, many firms are still pursuing existing DBO opportunities, and are eagerly awaiting more to come.

One of the most attractive high-profile DBO contracts out in the market is for Pima, AZ, which will involve building and operating a new 32MGD (121,000m<sup>3</sup>/d) water reclamation plant to replace the Roger Road Water Reclamation Facility in the City of Tucson. The contract itself is valued at \$260 million and has a 15-year O&M component that can be extended for an additional five years.

For each new contract, the preparation

MGD (12,870m<sup>3</sup>/d) water recycling facility by December 2010 to avoid heavy EPA penalties.

After beginning its procurement of a new plant using DBB, the city decided instead to use a DBO approach with private finance to meet tight deadlines and financial constraints, resulting in the plant being commissioned a year ahead of schedule.

“We had a fixed timeline from the state,” said former Santa Paula mayor Ralph Fernandez. “We didn’t want to have to deal with one entity trying to blame another for problems or delays and still keep on track financially and meet our deadline. With design-build-operate, there is only one party to deal with.”