Las Vegas, Nevada
November 30, 2011

Susan Joseph- Taylor
Chief Hearing Officer
Office of the State Engineer
901 South Stewart St, Suite 2002
Carson City, Nevada, 89701

I have followed the saga of transporting Northern Nevada water to Las Vegas for years..

The reality of this poorly-advised water grab is:

(1) The people who stand to benefit from this outrage are the Manufacturers of the pipe, the sellers of the pumps, the electronics and the installers along with other vendors.

(2) There is no positive guarantee that the required amount of water will be available.

(3) There are better ways to secure more water such as desalination from the Paciifc Ocean.. It is wide and is deep and no danger of ever running out. Please note that the distance from Las Vegas to the Pacific is comparable to the distance from Las Vegas to White Pine County.

(4) It has not been determined how much of this proposed water is prehistoric and not replaceable.

W. G. Flangas
11156 Shadow Nook Ct
Las Vegas, NV 89144

William G. Flangas
11156 Shadow Nook Court
Las Vegas, Nevada 89144
(702) 871-1730

Personal Data

Born and raised in Ely, Nevada, June 4, 1927. Educated in White Pine schools. U.S. Navy Veteran, World War II.

Education

Graduate, University of Nevada-Reno, in 1951, with B. S. Degree in Metallurgical Engineering. Submitted thesis and received Engineer of Mines Degree (E.M.) in 1958.

Employment

Currently, self- employed Underground Mining, Construction & Management Consultant (1996 - Present).

Employed by Reynolds Electrical and Engineering Co. (REECo) , the prime contractor at the Nevada Test Site, Mercury, 1958-1995. Vice President and Manager of Operations and Maintenance Division (O&M) 1979-1995. Served as Mine Superintendent and Department Manager for tunneling and mining operations at the Nevada Test Site (1958 - 1979). Excavated 7 major tunnel complexes (approx. 47+ miles) and drilled 1.1. million feet of vertical "big hole" up to 12 foot diameters. Involved in significant efforts to meet new environment, safety, and health compliance requirements; via employee empowerment through joint management/craft committees. Adopted Total Quality Management techniques.. Successfully inculcated line acceptance and implementation in environmental compliance through personal management visibility via bottoms up scheduled weekly job site visits and discussions, and conducting personal safety and environmental compliance inspections. Served on Monitoring Teams for Threshold Test Ban Treaty (TTBT) and Peaceful Nuclear Explosions Treaty (PNET). Traveled to Russia on two occasions. Involved with Comprehensive Test Ban Treaty (CTBT) efforts. Participated in Technology Transfer efforts to the public sector. Instrumental in establishing a drug free workplace in the O&M Division (0.5% or less). The program consisted of pre-employment exams, mandatory annual screens and rehabilitation.

Served as Underground Mine Foreman and Mine Engineer, 1951 to 1958, at Ruth, Nevada, for Kennecott Copper Corporation (shaft sinking and block cave mining for copper production).

Professional/Activities

- State Public Works Board - 1964 to 1985 - Vice Chairman (1971-1973), Chairman (1973-1977), Vice Chairman (1977-1984), Chairman (1984-1985).
- Mackay School of Mines Advisory Council - 1975 to present.
- UNLV Athletic Commission - 1982
- Independent Youth Athletic Association IYAA) - 1963 to 1983 - Chairman (1974-1983) - headed up volunteer efforts to light up four City, one County, and one Church baseball

fields and the construction of the four-court basketball gymnasium on Lindell.

- Board of Directors, Boys and Girls Clubs of Las Vegas - 1984 to 1987.
- Trustee, University Medical Center Foundation - 1982 to 2004
- Citizens Environmental Resources Advisory Board (CERAB) - Clark County Commission - 1978 to 1983
- Board of Directors, Citizens for Private Enterprise (CPE) - 1978 to 1990.
- Registered Professional Engineer, Nevada, since 1955.
- National Society of Professional Engineers (NSPE) - State Chairman, 1959 and National Director, 1960.
- American Institute of Mining, Metallurgical and Petroleum Engineers (AIME), Southern Nevada Section Chairman, 1975.
- Governor's Advisory Mining Board - 1961 to 1971
- Chairman, White Pine County War Memorial Task Force (1995) to complete memorial honoring military war dead from 1898 through Vietnam.
- Appointed Member Nevada State Ethics Commission (10/01/99 thru 09/30/07) Vice Chairman - May, 2002-July 2003

Publications

Underground Mining Operations at Ruth, Nevada, 1951-1958. Thesis submitted to University of Nevada-Reno for Engineer of Mines Degree, 1958.

An Application of Nuclear Explosives to Block Caving Mining, University of California Lawrence Radiation Laboratory Report (UCRL 5949, June 1960) Coauthor - Lysle E. Shaffer, Professor of Mining Engineering, University of California at Berkeley.

Nuclear Explosives in Mining, University of California Lawrence Radiation Laboratory Report (UCRL 6636, September 1961) Coauthor - David D. Rabb, Mining Engineer, Lawrence Radiation Laboratory.

Nuclear Explosives, University of California Lawrence Radiation Laboratory Report (UCRL 6708, December 1961) Coauthor - David D. Rabb, Mining Engineer, Lawrence Radiation Laboratory.

Awards

- 1976 Nevada Engineer of the Year
- 1979 Las Vegas Exchange Club Book of Golden Deeds Award
- 1983 (TV-3) 3-Spirit Award
- 1984 Distinguished Nevadan - University of Nevada Board of Regents
- 1992 Award of Excellence in Support of Nuclear Weapons Testing Program
- 1999 Honorary Associate of Arts Degree in Humane Letters - Community College of Southern Nevada
- 2007 Mackay School of Earth Sciences & Engineering Alumnus of the Year

WHERE I STAND

IF YOU HAVE LIVED around Southern Nevada the past 20 years, you probably can recall the plan local professional engineer Bill Flangas presented the Clark County Commissioners in 1974 to prevent the traffic problems he foresaw for the Strip. That's when he recommended a well-designed subway plan that would have prevented today's problems.

Then, two years ago, when the above-the-ground monorail idea and later accepted and funded traffic plan were being kicked around, I recalled Bill's underground plan in this column. You would have thought I committed blasphemy. It was too late, too expensive and just not acceptable to the people now running the Strip and the county. They at least reacted to the plan, which was more than the sleepyheads did in 1974.

MIKE O'CALLAGHAN LV Sun 6/14/92

Now, as local leaders plunge ahead with plans to drill wells in several rural counties and transport the water for use in Las Vegas, some people concerned about the environment are objecting. Others are rightfully concerned about both the environment and cost. Yes, and some are even questioning the morality of the move.

So what does native Nevadan and respected engineer Bill Flangas have to say about these plans to import water from the rural counties to Las Vegas? He objects for several reasons, including:

- The cost of locating, confirming and constructing pumping capacity would run into hundreds of millions.
- Once the pumping capacity has been built, there's no guarantee the source will remain steady through both wet and dry periods and, in fact, it might even be depleted, if indeed an adequate supply exists.
- Who's to predict what deep, subsurface structural damage can result from the removal of huge volumes of deep aquifer water; would we see large scale surface subsidence or earthquakes?
- Most restaurants in Las Vegas serve beef, a goodly portion provided by our rural ranchers. Do we solve our water problem at the expense of destroying this industry and then importing beef?

SEE WHERE, 2A

Where

CONTINUED FROM 1A

- The morality of big neighbors raping their little neighbors somehow doesn't square with the historical traditions of the great state that I was born and raised in.

So what does Flangas suggest? He says, "The ultimate solution for our future water needs lies in tapping the Pacific Ocean. It's long, it's wide, and it's deep!

"Large-scale desalination efforts around the world are rapidly improving both in terms of volume and cost. Some plants are achieving results of $500 per acre-foot. Most costs range significantly higher, depending upon the cost of power, which remains the most important factor in desalination.

"It appears to me that, with the present military scaledown between the U.S. and Soviet Union, a new opportunity has materialized to help resolve the water problem. I suggest acquiring two U.S. Navy cruisers, anchor them offshore, and use their reactors to provide power. Once stripped of their armaments, additional reactors could be installed as required. It's no big deal then to desalinate water on board, pump the fresh water inland, and return the salt products for dilution to the sea. Benefits from this scheme may be summarized as follows:

- Provide source of cheap and abundant power;
- Siting and zoning considerations greatly minimized – have entire Pacific Coast to select from;
- Fear of earthquake damage essentially nil; no greater shock mounting could ever be designed;
- Should unforeseen emergencies arise, operations can be suspended immediately and vessels moved in a matter of minutes;
- Water is easily pumped and the prospect of line failures or spills is certainly a refreshing difference to toxic spills;
- 24-hour, 365-day operations, both in dry and wet years; fresh water produced in excess of needs can be used to recharge underground aquifers;
- Operator and crew quarters, as well as essential storage, repair shop facilities, accommodated on board."

Wisely, Flangas adds that "the cost of desalinated water obviously would exceed the amount from current sources. Even at the price of doubling or tripling current costs, this would still be cheap when considering the alternative of insufficient water and retarded development. Initial capital costs would have to be amortized over a 20- or 30-year period, but would certainly qualify as a necessary investment in the future."

Just to keep his thinking within reasonable fiscal constraints, the Las Vegas engineer cautions that we not hire expensive consultants to prepare their usual "lengthy and unusable feasibility studies and reports." Flangas believes that by "taking advantage of city and county staff, university staff, DOE and a number of publicly spirited private engineers and engineering societies, the feasibility of this scheme could be determined at minimum cost."

MIKE O'CALLAGHAN, a former two-term governor of Nevada, is executive editor of the Las Vegas SUN.

Las Vegas, Nevada
January 27, 1992

Bernard W. Menke
1131 Strong Drive
Las Vegas, NV 89102

Dear Bernard:

I enjoyed our recent visit and conversation regarding our mutual concern over the impending water shortage in Southern Nevada. As we discussed, I remain fully opposed to meeting our future needs by appropriating water from White Pine, Lincoln, and Nye Counties.

- The cost of locating, confirming, and constructing pumping capacity would run into hundreds of millions.
- Once the pumping capacity has been built, there's no guarantee the source will remain steady through both wet and dry periods and, in fact, might even be depleted, if indeed an adequate supply exists.
- Who's to predict what deep, subsurface structural damage can result from the removal of hugh volumes of deep aquifer water; would we see large scale surface subsidence or earthquakes?
- Most restaurants in Las Vegas serve beef, a goodly portion provided by our rural ranchers. Do we solve our water problem at the expense of destroying this industry and then importing beef?
- The morality of big neighbors raping their little neighbors somehow doesn't square with the historical traditions of the great state that I was born and raised in.

The ultimate solution for our future water needs lies in tapping the Pacific Ocean. It's long, it's wide, and it's deep ! ! !

Large scale desalination efforts around the world are rapidly improving both in terms of volume and cost. Some plants are achieving results of $500 per acre-foot. Most costs range significantly higher, depending upon the cost of power which remains the most important factor in desalination.

It appears to me that with the present military scaledown between the U.S. and Soviet Union, a new opportunity has materialized to help resolve the water problem. I suggest acquiring two U.S. Navy cruisers, anchor them offshore, and use their reactors to provide power. Once stripped of their armaments, additional reactors could be installed as required. It's no big

deal then to desalinate water on board, pump the fresh water inland, and return the salt products for dilution to the sea. Benefits from this scheme may be summarized as follows -

- o Provide source of cheap and abundant power
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- o Fear of earthquake damage essentially nil; no greater shock mounting could ever be designed
- o Should unforseen emergencies arise, operations can be suspended immediately and vessels moved in a matter of minutes
- o Water is easily pumped and the prospect of line failures or spills is certainly a refreshing difference to toxic spills
- o 24-hour, 365-day operations, both in dry and wet years; fresh water produced in excess to needs can be used to recharge underground aquifers
- o Operator and crew quarters, as well as essential storage, repair shop facilities, accommodated on board

The cost of desalinated water obviously would exceed the amount from current sources. Even at the price of doubling or tripling current costs, this would still be cheap when considering the alternative of insufficient water and retarded development. Initial capital costs would have to be amortized over a twenty- or thirty-year period, but would certainly qualify as a necessary investment in the future.

Should this proposal arouse any interest, I suggest that the time honored tradition of Southern Nevada government hiring expensive consultants to prepare lengthy and unusable feasibility studies and reports be avoided. I believe that by taking advantage of city and county staff, university staff, DOE, and a number of publicly spirited private engineers and engineering societies, the feasibility of this scheme could be determined at minimum cost.

Sincerely,

Bill Flangas

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Las Vegas, NV
March 22, 2004

Congressman Jim Gibbons
600 Las Vegas Blvd Ste 680
Las Vegas, NV 89101

Dear Congressman Gibbons:

I read in the Ely Daily Times dated March 18, 2004 where you expressed that the entire southwest should seek long-term answers to the water shortage, particularly turning to desalinization of ocean water for fresh water needs.

Enclosed is a letter I wrote to a DOE official on January 27, 1992 and a subsequent article by Mike O'Callaghan dated June 4, 1992.

Also enclosed is a letter to Professor Charles Goldman, University of California, Davis on March 17, 2003 and a Las Vegas Review Journal editorial dated March 16, 2003.

I remain totally convinced that there is no excuse for the lack of sufficient water anywhere in the world, if desalinization efforts were properly developed and utilized. However, the older I get, the more I realize that anything that makes sense, is immediately suspect, and major problems remain unattended until an extreme emergency forces action. Perhaps this material will be useful to you.

Thank you for your comments in Ely.

Regards -

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Clearing the Air

...to the environment, some ...ering firms are turning to carbon offset programs with the goal of supporting renewable energy and energy conservation.

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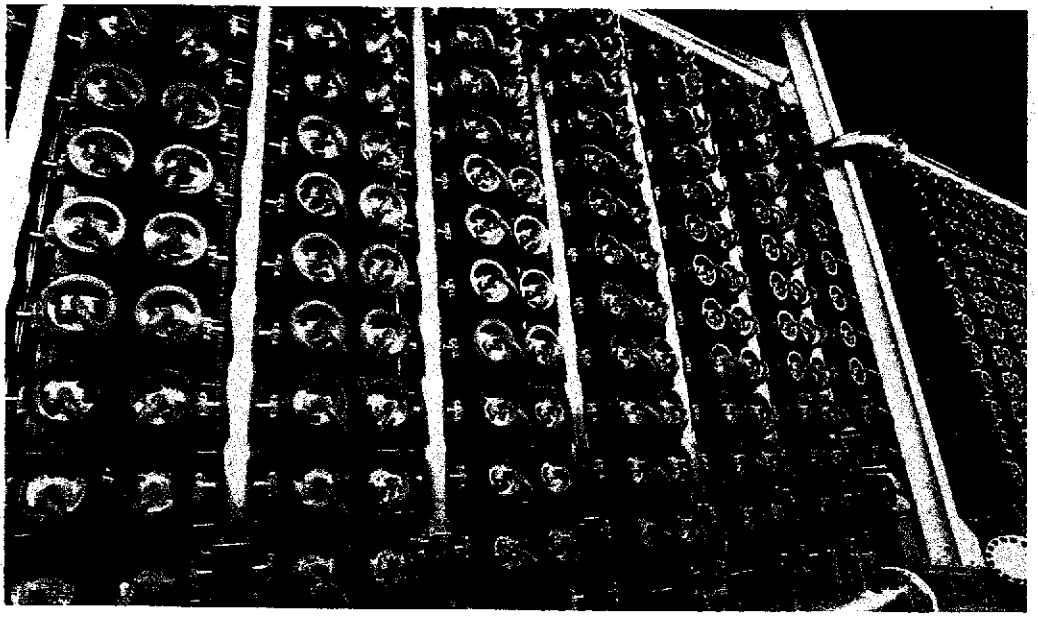
Desalination Benefits From Technology Improvements



A SEAWATER DESALINATION PLANT IN TAMPA BAY, FLORIDA, PRODUCES 25 MILLION GALLONS PER DAY AT A COST OF ABOUT $3 PER 1,000 GALLONS.

Salt water comprises 97% of the earth's water supply. As the U.S. population expands and droughts occur, water utilities are looking to additional sources to keep up with demand. Seawater desalination is one option they're exploring. The process is coming down in price as technology improves, but some people have concerns about energy usage and environmental effects.

In 2003, Sandia National Laboratories and the Department of the Interior's Bureau of Reclamation published the *Desalination and Water Purification Technology Roadmap*. Its vision was that "by 2020, desalination and water purification technologies will contribute significantly to ensuring a safe, sustainable, affordable, and adequate water supply." The roadmap acknowledged, however, that cost is an ongoing concern.

Ken Herd, P.E., project director for Florida's Tampa Bay Seawater Desalination Plant, which has been producing water intermittently since 2003, estimates the price of desalination using reverse osmosis technology at about $3 per 1,000 gallons. Herd, who is also director of operations and facilities for Tampa Bay Water, puts the cost of fresh surface water at $2 per 1,000 gallons and fresh groundwater taken out of an aquifer at a little over $1 per 1,000 gallons.

"[Desalination is] still more expensive than traditional sources," he says, "but the cost has come down significantly" from 15 or 20 years ago.

The primary cost of desalination at the Tampa Bay plant comes from the high pressure—as high as 1,000 pounds per square inch—required to carry out the reverse osmosis process. But reverse osmosis membranes and energy recovery equipment are becoming more efficient, explains Robert Castle, P.E., water quality manager for California's Marin Municipal Water District, which launched a pilot plant in 2005 and is now exploring a full-scale plant on San Francisco Bay. According to a MMWD presentation, in the last two decades, the required energy usage for desalination has fallen 75%.

"If you mention seawater desalination to most people...energy-intensive will often be the first thing [they think of]," says Castle. "Even amongst engineers, the perception of how much energy desalination requires is much higher than it actually is."

Castle is on the board of directors of the Affordable Desalination Collaboration, a non-profit organization of industry companies, federal and state government agencies, and water districts. The group operates demonstration projects to show off state-of-the-art desalination technologies.

Its test facility at Port Hueneme, California, "set the record straight that desalination can be achieved at about 5 1/2 kilowatt hours per thousand gallons," Castle says, "which is a fraction of what most people think."

But what about desalination's effect on the environment? The Tampa Bay facility is lucky enough to be colocated with a power plant that uses more than a billion gallons of water per day to cool its boilers. That water is blended with the concentrated sea water produced from the desalination process and then reintroduced into the bay. And now that monitoring has demonstrated that the project is creating no environmental harm to Tampa Bay, public concerns have died down.

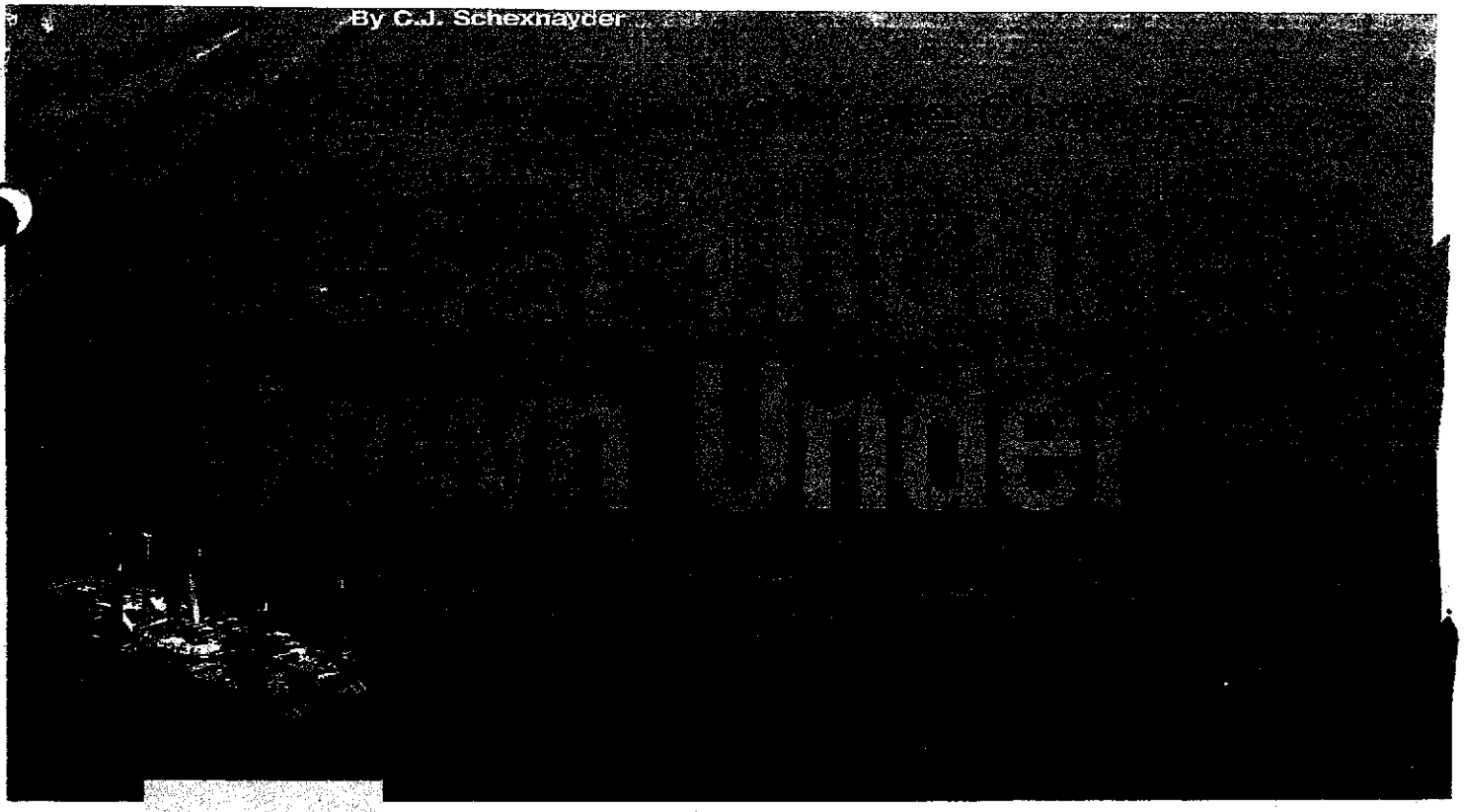
The plant is now operating at its full capacity of 25 million gallons per day and will reduce groundwater pumping from 158 million gallons per day to 90 million gallons per day in 2008. It also provides a drought-proof supply source, says Herd.

In Marin County's test program, solids removed by pretreatment are dewatered, dried to sludge, and transported to a landfill. Therefore, the desalination process doesn't produce any new contaminants, and in fact leaves San Francisco Bay "cleaner than we found it," says Castle. This process adds costs, but he says the affluent community places a higher value on ecological impact.

Castle says that the district has had to overcome popular misconceptions about the water's purity. The membrane processes are very good at taking out contaminants as well as salt, he explains.

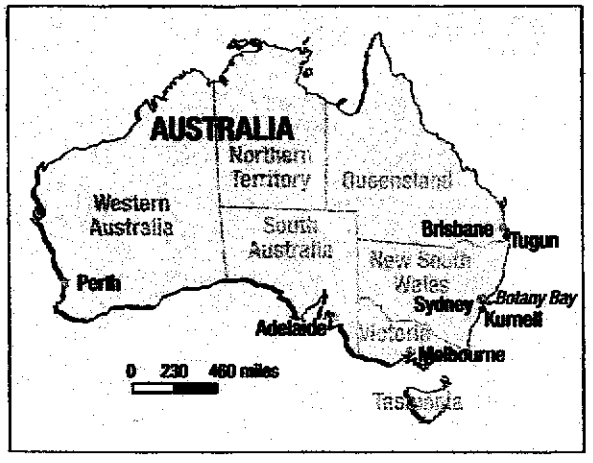
"People like to believe the water they drink is kissed by angels and never been used before," he says, "but the fact of the matter is that all the water we drink is pre-owned."

By C.J. Schexnayder



For the past five years, Australia has been gripped by a drought of historic proportions, and scientists warn the problem is likely to continue over the next several decades. The situation has pushed the drinking-water resources for the country's 21 million residents to the brink and authorities are now looking for ways to "drought-proof" water supplies.

"We have got a dry continent that is getting dryer," says New South Wales Water Utilities Minister Nathan Rees. The country's major cities are betting on desalination to keep drinking water flowing. Sydney, Melbourne, Adelaide, Brisbane are all in various stages of construction and Perth has begun efforts to construct a second plant.



MAP BY NANCY BOUILLARD FOR ENR; PHOTO COURTESY OF GOLD COAST DESALINATION

• Sydney's $1.55-billion desalination project currently under construction will have a capacity of 250 megaliters of water a day, or 66 million gallons, double the original plan. The project also includes an 18-kilometer pipeline to tie the plant to the system.

• In Queensland, the $1-billion Gold Coast Desalination Project is well under way at Tugun. The GCD Alliance is performing the work, which is scheduled for completion in November 2009. GCD consists of John Holland Group, Veolia Water Australia, Sinclair Knight Merz and Cardno. The plant and a 24-km pipeline will provide 125 ML per day of fresh water to southeast Queensland, approximately 20% of the area's needs.

• Although Perth put the Kwinana Desalination Plant online earlier this year, Western Australia's water utility, Water Corp., is planning a new plant expected to cost approximately $875 million. When it is completed in 2011, the Binningup plant will provide 50 gigaliters of water per year and have the capacity to double in size if needed. Contractor selection is expected by the year-end, with construction going forward in 2009.

• Victoria plans to build a $2.7-billion plant to supply water for the Melbourne metropolitan area. A public-private partnership is expected to tender work next

year for a station near Wonthaggi. Construction should begin next year. When completed in 2011, the plant will provide 15 megaliters of water a year via an 85-km pipeline. That is about one-third of Melbourne's supply.

• Adelaide also is eyeing a $1.2-billion desalination project. Construction of a $10-million pilot plant could start next year. The project would require construction of a $304-million interconnector pipeline to connect two nearby reservoirs.

In recent years desalination efforts have surged internationally, but the boom in Australia is the first that can be directly attributed to climate change, says Lisa Henthorne, vice president and director of desalination technology for CH2M Hill Cos., Englewood, Colo., and president of the International Desalination Association. "A similar phenomenon is occurring in the Middle East...driven by pent-up demand and incredible population growth," she says. "The growth in Australia is purely a function of drought brought about by climate change."

According to the Australian Commonwealth Scientific and Research Organization, annual average rainfall is expected to decrease substantially over the next two decades across all of the country except the far north. A report by the Intergovernmental Panel on Climate Change predicts more frequent droughts and rising evaporation rates punctuated by intense rainstorms.

Weather was a major issue in last month's parliamentary elections. Kevin Rudd, the country's new prime minister, promised an $8.76-billion water plan that included funding construction of desalination and recycling plants across the country. Most cities already have severe usage restrictions. In New South Wales, conservation measures aim to save some 145 billion liters of water over the next eight years. Last September, the NSW government made Sydney's emergency water restrictions permanent.

Last July, Blue Water Joint Venture, formed by Australia-based John Holland and Veolia Water, won a $960-million contract to design and construct Sydney's desalination plant. The consortium will design, build, operate and maintain the plant at Kurnell, opposite Botany Bay from Sydney, for 20 years.

"This is a traditional hard-money, fixed-time, design-and-construct contract," says Bob Evans, project director.

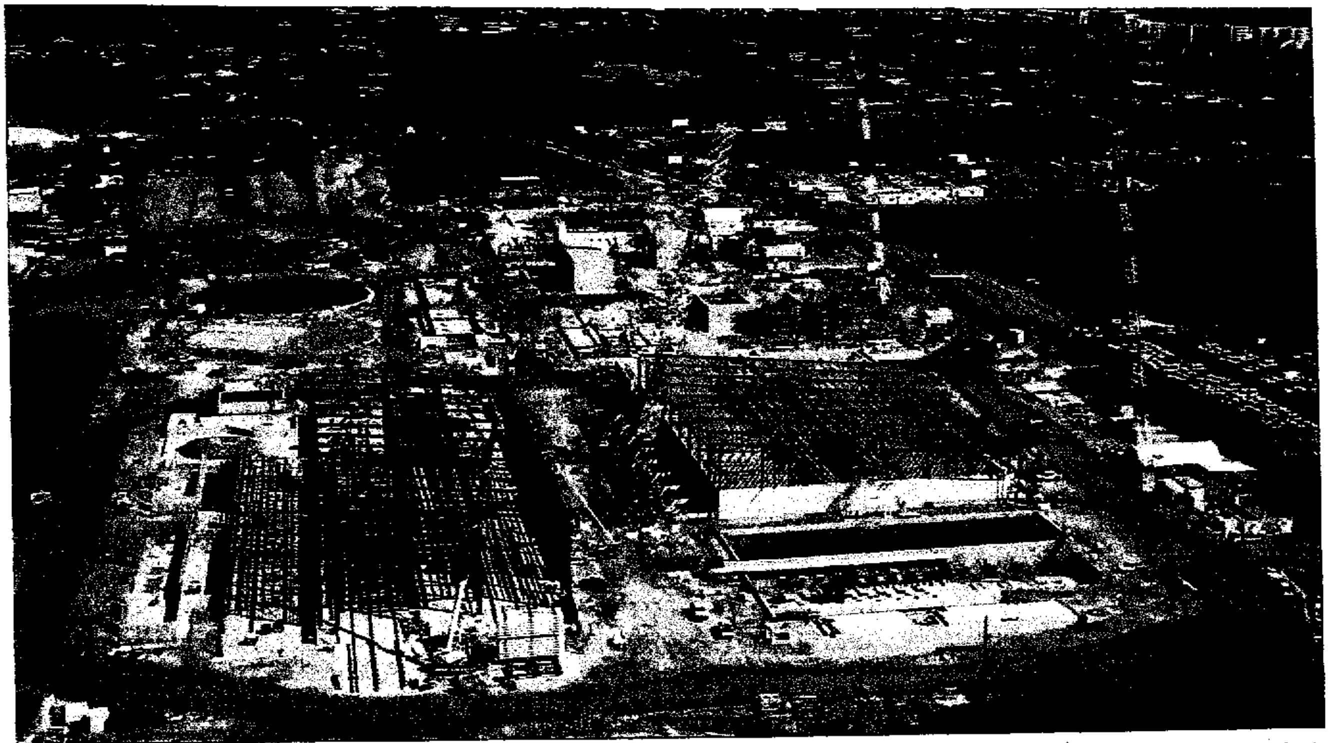
The plant will go online in February 2010, producing 250 ML per day, although many components, such as inlet and outlet tunnels and a pump station, are designed to handle 500 ML per day. The plant will use reverse-osmosis technology to produce drinking water.

The Sydney plant's major obstacle — a challenge common to all Australian desalination projects—is a short construction schedule. Most of the projects are slated to be built within a 26-month window to produce water before levels drop precipitously.

Blue Water faced a run on equipment

Setting Standard. Rock-anchor crew sets foundation walls for Sydney's Blue Water plant near Kurnell.

PHOTO COURTESY OF SYDNEY DESALINATION



Gold Coast. Queensland project near Brisbane is well under way. The $1-billion plant is to be completed in November 2009.

PHOTO COURTESY OF GOLD COAST DESALINATION

and personnel. "We ordered the two tunnel-boring machines before we were awarded the position as the preferred tenderer," Evans says. "Because of the world demand for tunnel-boring machines, we had to get a slot as soon as possible."

Double-shielded TBMs will excavate a pair of 2.5-km-long tunnels, although Evans says the likelihood of extreme water intrusion is small. "The geology here, primarily Sydney sandstone, is such that we should have fair sailing," he says.

The consortium has purchased a self-elevating, 45-sq-m platform to drill shafts for inlet and outlet risers. Eight shafts will be drilled less than 350 m from the shoreline where wave conditions are extremely variable. "We have to be able to jack up high out of the water due to the wave action," Evans says.

While Blue Water races forward with plant construction, Sydney Water is working to complete the 18-km-long pipeline that will connect the plant to the city's water supply. The Connect Alliance, made up of international and Australian firms such as Bovis Lend Lease, McConnell Dowell, Kellogg Brown & Root, Patterson Britten & Partners and Environmental Resources Management, won the job in May. The NSW government greenlighted the $750-million pipeline in October.

When complete, the line will connect the Kurnell facility to the city's main water-supply pipeline. A large portion of the route will consist of two 1.4-m-dia pipes beneath Botany Bay. A single 1.8-m-dia underground pipe will handle flows through urban sections. Placing it will require a "tricky" 4.5-m-dia trench in some of the more populated sections of the route, Watt says. Microtunneling will be used to place pipe in congested urban areas and sections of protected parkland.

Restrictions

Limits on water are coming as the country's population is continuing to grow at a pace of 1.4% a year. Metropolitan Sydney's 4.3 million people consume approximately 600 billion liters of drinking water annually—a figure that has stayed steady over the past decade.

"Essentially Sydney has a million more people than we had 20 years ago, but we use the same amount of water," said Stuart White, director of the Institute for Sustainable Futures at University of Technology, Sydney, and a critic of the rush to desalination.

About 80% of New South Wales's water comes from an impoundment about 65 km west of Sydney. The 142-m-high concrete dam sealed a Warragamba River gorge in 1960, creating the 75-sq-km Lake Burragorang.

As water levels dropped to one-third capacity, Sydney officials fast-tracked their desalination project. But when summer rains replenished the supply, critics were quick to characterize the project as wasteful and unnecessary. "It just becomes an economic white elephant," says White. "If you build them and come out of drought, it's a huge surplus that you have to keep paying a premium for [over] the next 50 years. And it could be a similar situation in Queensland and Victoria as well."

Government officials say they are obliged to pursue desalination because the stakes are too high to leave to chance.

"It is obviously the right decision to make," Rees says. "If you are presented with all the facts and materials and projections and then would choose not to build it, that would be seriously irresponsible discharge of government." ■