

**SUMMARY OF DOCUMENTS RELATED TO
WATERBAG TECHNOLOGY PROGRESS**

**PREPARED ESPECIALLY FOR LESTER SNOW, DIRECTOR,
CALIFORNIA DEPARTMENT OF WATER RESOURCES**

August 19, 2008

1. Introduction: **ECONOMIST** Magazine, July 19, 2008
"In total there is more than enough water for all, but it is often in the wrong place and difficult and expensive to transport."
2. Metropolitan Water District of Southern California letter of support, May 20, 2008
3. A.G. Kawamura comments on waterbag technology---meeting summary, June 27, 2008
4. Proposal to Delta Task Force to test waterbag technology as an emergency conveyance system and Phil Isenberg letter, July 25, 2008
5. Waterbag reservoir storage analysis for A.G. Kawamura/Steve Shaffer, June 25, 2008
6. Summary of documents presented to and discussed with A.G. Kawamura during June 27, 2008 meeting
7. Ray Seed/Bob Bea, U.C. Berkeley, waterbag levee repair applications and diagram
8. Colorado River augmentation waterbag applications and SNWA/Bill Rinne email
9. Oregon legislator support for California water transfers from the Columbia River
10. *"EPA: Water transfers will not need permits,"* June 9, 2008
11. Middle East waterbag documents: Turkey/Palestinian Water Authority negotiations summary documents, July 23, 2008, July 28, 2008
12. Australia waterbag speeches in South Australia Parliament, May 5, 2008 and July 24, 2008
13. MIT waterbag technical analysis, June 9, 2008
14. An economic analysis of waterbag technology
15. Waterbag demonstration voyage financial and fabrication milestones and budget

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Time for Oregon to cash in Columbia water?

Either the Northwest sells or the thirsty Southwest starts moving here; so now what?

Sunday, August 10, 2008

MICHAEL MILSTEIN

The Oregonian Staff

When parched Southwest states recently considered ways they might bring more water to the overtaxed Colorado River, they imagined snaking a fiberglass straw up the Pacific coast and sipping from the Columbia River.

That's probably a pipe dream, but it's also a recurring vision the drenched Northwest might not want to laugh off forever.

When desert cities -- enduring record drought -- reach the breaking point, water will have to come from somewhere. And water in the West is largely a zero-sum game: For someone to get it, someone else will have to give it up.

Although the Northwest appears to be swimming in water, rapid growth and salmon demands mean most of it is spoken for in summer. But if some is up for grabs at other times, what should we do with it?

Is water the new oil, and could Oregon become the new Texas? Could the Northwest sell some of its wealth of water the way Alaska sells oil from its pipeline?

At least one Oregon lawmaker says so, seeing water sales as a way to fund public services without raising taxes. But a veteran of Northwest salmon fights warns the region to resolve its internecine bickering over fish and water so it can mount a united defense if the Southwest comes knocking.

Because, in a drier future, the choices are few: Either people move to the water, migrating northwest as the Southwest runs dry. Or water moves to the people, through a new generation of long-distance pipelines and canals.

"There will be nothing done with water in the West without there being winners and losers," says Patrick O'Toole, a Wyoming rancher and president of the Family Farm Alliance. Cities may expect to buy water from farms, but that's not a good solution as global food shortages make farming a crucial national need, he says.

So they may have to look elsewhere.

Oregon laws probably would not allow the sale of water outside the state, but Alaska changed its law years ago so it could pipe water to Los Angeles if the opportunity arose. Asked how much California would have to pay for Alaskan water, former Alaska Gov. Walter "Wally" Hickel said, "Depends how thirsty they are."

Not a new idea

Colorado River states' recent study of ideas for supplementing the dwindling river mentions an undersea aqueduct from the Columbia River. The report doesn't recommend the far-out option, and nobody expects a

proposal anytime soon.

But it does hint at just how precious water may become.

"That may be a choice Oregon may be faced with or presented with by some states from the Southwest: 'We'd like to buy your water,' " says Michael E. Campana, director of Oregon State University's Institute for Water and Watersheds. "That seems preposterous now, but in 30 or 40 years, who knows? I'm not willing to say that's not going to happen."

It's not a new idea.

Campana went to graduate school in Arizona and remembers students asking what would happen when the booming Southwest ran out of water. A professor answered, "Don't worry, we'll just pump it out of the Columbia."

In the 1960s, Southern California water leaders quietly discussed routing Columbia River water to Lake Mead, the reservoir that supplies Las Vegas and Los Angeles. But powerful U.S. Sen. Henry "Scoop" Jackson of Washington killed the idea with a provision prohibiting federal engineers from studying it.

That provision has expired, but the idea is still roundly dismissed as politically impractical, environmentally troublesome and financially prohibitive.

The Colorado, with less than a tenth the flow of the Columbia, supports nearly 30 million people, three times the population of Oregon and Washington combined. But its water was divided up when the river was unusually full and now cannot meet rising demands. An eight-year drought, for instance, has left Lake Mead half empty.

The states – Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming – reached a hard-fought agreement last year on how to spread the pain of water shortages. Their deal promoted water conservation, but also committed to study options for bringing extra water into the Colorado system.

They considered more than 10 possibilities: desalinating ocean and brackish drainage water, capturing and reusing stormwater runoff, seeding clouds to generate more rain – even towing in icebergs wrapped in plastic.

Two involve the Northwest: rerouting water from rivers outside the Colorado drainage, such as the upper Snake, into the Colorado system, and the undersea aqueduct from the Columbia, possibly to Southern California.

The idea builds on studies looking at undersea pipelines from Alaska or Northern California. They found the concept feasible but extremely expensive. The new study discusses a high-strength fiberglass pipeline collecting water near the mouth of the Columbia, below hydroelectric dams, and snaking south offshore.

Pumping stations might be required along the way. The study suggests the cost could top \$150 billion – some 20 times Oregon's annual general fund budget. Feasibility studies alone could be more complex than the \$450 million worth of analysis for the trans-Alaska oil pipeline.

The study adds flatly that "considerable opposition from the states of Washington and Oregon and from environmental groups should be expected if this option were proposed."

Richard Golb, a water consultant who represents irrigation districts in Oregon and is the former executive director of a California water association, says there is no Columbia surplus to give away. Oregon needs its water. And, he says, "the Columbia River is a big part of what makes Oregon Oregon."

Southwest leaders emphasize they're not coming after Northwest water. The pipeline and other options are not recommendations, says Bill Rinne, director of surface water resources for the Southern Nevada Water Authority in Las Vegas, which led the study. They're just concepts to ponder as the West grows and develops.

"You must keep some of these things on the table," he says. "They may stimulate other ideas."

The nation has had it easy when it comes to water, Rinne says. As supplies tighten, a new generation of planning may involve longer-term, higher-cost water projects. Las Vegas is developing a pipeline to draw groundwater from central Nevada, hundreds of miles to the north. But that doesn't mean the Columbia is next.

"It's not as if we're coming up there trying to siphon water out," Rinne says. "We might like to. But we know that's not going to happen."

At what price?

Not everyone is convinced. U.S. District Judge Malcolm Marsh, who presided over Columbia River salmon disputes for years, warned a recent Portland conference of fisheries leaders that other states might come after the Columbia as global warming shrinks their water supplies.

"I don't think those ideas have died," he said. "I think they're very, very much in sleep mode right now."

He warned Northwesterners to settle their differences over fish and water so they're unified if other states with more political power come calling. "You don't want them to come up here in a situation of chaos," he said. "You want them to come up here in a situation of agreement."

But is there a price that could make the Northwest consider selling water to states that want it?

If it's difficult to think of water as a commodity, consider that you already pay more for a bottle of drinking water than an equivalent amount of gasoline at the pump. Global warming and population growth will make water only more scarce -- and valuable.

"There will be a coming water crisis that the public does not yet comprehend," says Jim Martin, the Oregon Department of Fish and Wildlife's former fisheries chief who advocates for salmon protection. "The long-term impact on the Northwest is that Southern California will want to export water south."

Oregon lacks many profitable commodities such as oil and minerals. But it has lots more water than others.

"The scarcity of water is going to increase, and the willingness to pay for it will increase," says William Jaeger, an OSU professor who studies water economics. But the value of water left in rivers for fish and recreation is also rising.

Economists like to put a dollar value on water because people are less likely to waste something they pay for.

"However, having a market for water raises the possibility that someone far away will buy it and begin drawing it away," Jaeger says.

To state Sen. David Nelson, a Republican from Pendleton, that's a profitable opportunity. He envisions supertankers docked in Astoria, filling their holds with crystalline Northwest water -- for a price, of course.

"We have a valuable commodity, and if we can make use of it without harming the environment and harming fish and while respecting tribal commitments, we ought to look at that," he says. "The demand for public services is definitely overwhelming our ability to pay for it, and here's a way to bring in some revenue."

Nelson says at least half of Oregonians he talks to say that if water sales can help lower taxes and pay for public services without harming the environment, they'd support it.

Timber has fallen off as Oregon's stalwart cash cow. Now global warming promises to make water even more precious. "We have to look at things differently, is how I'm thinking of it," he says.

If Oregon keeps its water to meet demands that often leave it in short supply already, Jaeger says, that could come at a cost: More people coming here to slake their thirst.

"Do we want to think about a future where we move water to where people are?" he says. "Or do we want people to move where the water is? Oregonians, I'm sure, will be conflicted on that because as much as they are reluctant to send our water to the Southwest, they may not like to see the alternative."

Terry Spragg

From: Terry Spragg [spraggbag@gmail.com]
Sent: Monday, June 02, 2008 7:59 PM
To: 'Bill.Rinne@SNWA.com'
Cc: 'Bruce.Moore@SNWA.com'; 'Patterson,Roger K'; 'sarakawa@rwdh20.com'
Subject: Emailing: ReviewJournal.com - News - Water story makes big splash

Dear Bill,

In reviewing my files I find that you and I have shared emails in the past, most recently when I sent you an email on October 16, 2007 and your response of November 21, 2007.

However, I hope the letter of endorsement for the feasibility of waterbag technology from Jeff Kightlinger, in which he states,

"...that the Metropolitan Water District of Southern California has reviewed your proposed waterbag technology and concluded that it is feasible and could potentially be applied for either emergency use of regular water supply."

will allow Pat Mulroy and the SNWA to take another look at our waterbag technology proposal and have you seriously review the documents that I submitted in my earlier email to you and Bruce today.

Most of all, I would hope that Pat would contact Jeff, or that you might contact Roger, in order to follow up on Jeff's statement in his letter to me that his,

"...staff would be happy to discuss Metropolitan's conclusions on waterbag technology and applications with anyone... who may wish to contact us."

Your email response of November 21, 2007 stated that the SNWA has not pursued an investigation of waterbag technology because,

"...due to our understanding of the various legal, logistical and economic issues that must be addressed...as well as uncertainties relating to firmness of water supply and water rights continue to present very difficult challenges. As a result, we are not interested in participating in the demonstration voyage project at this time."

Since I received this email a number of things have changed. The Black & Veatch report was issued. The Scripps study was issued. And the current conditions on the Colorado River have not materially changed. I am aware of the good snow pack conditions in the Upper Colorado River Basin, but that does not help the current situation in the Northern California Sierras. And knowing that Pat is a visionary I am guessing that she is not betting on the situation in the Upper Colorado River to continue for several more years in order to fill Lake Powell and Lake Mead, otherwise the Colorado River Augmentation Plan report would not have been commissioned.

I should emphasize that the public support we are requesting from the SNWA of our demonstration voyage plans does not require addressing any "legal, logistical and economic issues" as is stated above, or require the resolution of any, "...uncertainties relating to firmness of water supply and water rights." Nor are we requesting any financial support in order to implement our waterbag demonstration voyage plans.

We are simply requesting the public support of our waterbag demonstration voyage plans by the SNWA, perhaps in the form of a letter similar to the one we recently received from MET that I have shared with you. This public support will also benefit the efforts of Black & Veatch, as they investigate which of the 12 alternatives for augmenting the Colorado River that were addressed in their recent Colorado River augmentation plan report should be considered for further review. If two waterbags were sitting off the California coastline today, having been towed to Southern California from Washington State, I believe that the reality of this event would have a direct bearing on the next steps that water managers in the seven Western States would take in investigating new water supplies for the SNWA and the rest of the Colorado River Basin States.

Over the past year the SNWA has listed the following problems that they see with implementing a desalination exchange program with Southern California. I will list these problems and then give you my response as to how waterbag technology can be compared to desalination in addressing these problems. Some of the information that I sent to you earlier today can be used to document my comments.

Problems which Inhibit the Development of Desalination for the SNWA:

- (1) The permitting process.
- (2) Supply shortages at the source (Southern California) which could inhibit deliveries to the SNWA.
- (3) Environmental concerns, such as brine disposal, plant location permits, and greenhouse gas emissions produced at the desalination plant site.
- (4) The cost for the vast amounts of energy needed to produce desalinated water.
- (5) Access and the expense of the coastal property needed to develop a sufficient number of desalination plants.
- (6) Existing treaties.
- (7) According to a March 31, 2008 article in the Las Vegas REVIEW JOURNAL, the SNWA estimates the cost to desalt seawater on the Southern California coast would be between \$1,100 and \$1,800 per acre foot.

Waterbag Solutions to the Above Mentioned Desalination Development Problems:

- (1) Waterbag off-loading sites are much easier to permit, as these sites will require a much smaller footprint than a desalination plant and will have no major off-loading site energy requirements that will require special permits.
- (2) Supply shortages at the source, which would be in Washington State and possibly in Alaska, would be minimal if non-existent.
- (3) Waterbag technology has minimal environmental problems. There is no brine disposal problem and a minimal greenhouse gas problem. A report published in the *Journal of the Australian Water Association* by Ian Edmonds' in September 2007 compares the greenhouse gas emissions from using waterbag technology to those created by operating a desalination plant. According to Edmonds' report he calculates that waterbag technology "may emit 60 times less greenhouse gas" than a desalination plant of comparable size. I sent you a copy of this report today.
- (4) Energy costs to transport waterbag through the ocean are only around 4% of the total operating costs compared around 40% to 50% of the total cost to operate a desalination plant.
- (5) Access to the land needed to off-load waterbags will usually require only an on-shore pump and a pipeline or pipelines to the waterbags as they float off the shoreline. The land-based footprint for a waterbag off-loading site will be minimal.
- (6) I am not sure what Pat Mulroy was referring to related to existing treaties.
- (7) We have completed a detailed analysis for MET which shows the cost of waterbag transported water to range between \$500 to \$900/acre foot depending on the location of the water source and other factors. These figures include moving waterbags over 1,000 miles through the ocean.

I was happy to read in the March 31, 2008 article in the Las Vegas REVIEW JOURNAL titled, "VARIED OPTIONS: Big Ideas, slim hope for water," your quote referring to

6/5/2008

using the ocean to the move water where you were quoted as saying,

"It does pass the straight-face test enough to where you have to look at it," Rinne said. "Look at our petroleum supply. We move that all over the place, and we've done that forever."

You are so correct in your visionary thinking. Waterbag technology is simply a matter of using a modular, fabric pipeline, linked together by a patented zipper connection system that allows the movement of large volumes of fresh water through the ocean, just like tankers move oil through the ocean. Except that in the case of using waterbag technology you have no environmental damage that can be caused by a rupture of the waterbag pipeline.

When we next speak, I will explain how the media coverage described in the story below can pay for 100% of our waterbag demonstration voyage expenses when we tow two waterbags connected in a train from Washington State to California.

When Las Vegas publicly announces that it will be supporting our demonstration voyage event all the media sources mentioned in this article will again be in contact with the SNWA for details of this story.

We will be able to fund our California/Nevada waterbag demonstration voyage by using the worldwide media coverage this event will generate to attract sponsors from around the world. You can review our website, www.waterbag.com and also review a short video of the television coverage we received during our Washington State demonstration voyage event to document the type of worldwide media coverage an event supported by Las Vegas and MET will generate.

Perhaps we might hire Billy Vassiliadas, at R&R Partners in Las Vegas, to sell sponsorship rights to a select group of Las Vegas business leaders with a vested interest in making sure that Las Vegas doesn't go dry, and therefore doesn't dry up their businesses as well. I am confident that R&R Partners could convince Steve Wynn and John Ritter to join in this effort. I share mutual friends with both of these men. My friends would be glad to endorse our demonstration voyage project, especially if it had the support of the SNWA.

Ask your Public Information Manager, Scott Huntley, if after reviewing our website and our television news video on You Tube, if he thinks our demonstration voyages will attract national and international media attention and sponsorship support, not only from Las Vegas but from around the country and around the world. Think of Richard Branson and the media attention (and sponsorship support) he and others received as they tried to circle the earth in hot air balloons.

As a result of events during the past two weeks that have been developing over the past several months, we are now in the process of arranging a joint meeting with two of Governor Schwarzenegger's Cabinet members, Agriculture Secretary A.G. Kawamura, and Natural Resources Secretary Mike Chrisman, in order to discuss our California waterbag demonstration voyage plans. Both these men have been briefed on our waterbag demonstration voyage plans for California and they have asked their staff to arrange a meeting with me to discuss these plans. You may contact Steve Shaffer, Secretary Kawamura's staff Director ((916) 653-5658) who is making the arrangements for this meeting to confirm that this meeting is being arranged.

I hope you find this additional email of help in your analysis of our waterbag technology proposal. The immediate focus of our efforts is to implement a demonstration of our technology that can be of benefit to both California and Nevada water interests. I hope Pat Mulroy and the SNWA will consider writing us a letter of support similar to the one that Jeff Kightlinger at MET was so gracious to send to us so that we could proceed with gaining support for our demonstration voyage plans.

I will look forward to speaking to you on Thursday of this week, as on Friday I will be taking a tour of the Diamond Valley Reservoir as the guest of MET and the West Basin MWD. It should be interesting.

Please give my regards to Pat. If nothing else, you can tell her that we are persistent.

Warmest regards,

Terry

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Water story makes big splash

Doomsday predictions for Lake Mead, Las Vegas get world's attention

By HENRY BREAN
 REVIEW-JOURNAL



As part of a recent four-part series on worldwide water issues, Japanese newspaper Yomiuri Shimbun focused on drought-stricken Lake Mead and efforts to replace grass

The story has everything, from the lights of Las Vegas to the end of the world. No wonder it's drawing so much attention from media worldwide.

Over the past year, the Southern Nevada Water Authority has fielded a barrage of interview requests from media outlets from across the country and around the globe.

They all want to talk about the same thing: doomsday predictions for climate change, drought on the Colorado River and Las Vegas' water future.

Authority officials have been interviewed more than 30 times by some of the world's most recognized publications and broadcast outlets, from Good Morning America to the BBC, Time