

Looking Forward to 15 More Years of Innovation and Excellence

Special Issue

By JEFFREY J. MOSHER

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This year, NWRI celebrates its 15th anniversary. It was founded in 1991 by the Joan Irvine Smith & Athalie R. Clarke Foundation, who joined with water and wastewater agencies in Southern California to create a public/private partnership “for the promotion of excellence in water management and research.” Under the direction of Ron Linsky, NWRI’s founding Executive Director, NWRI was built into an active, robust, and influential research institute involved in local, regional, national, and international initiatives. Commemorating NWRI’s anniversary and saluting Ron Linsky’s accomplishments provide an opportunity to reflect on NWRI’s past and, more importantly, its future.

Last year was a difficult year for NWRI because of Ron’s illness. During that time, however, NWRI also received a tremendous amount of support from colleagues and friends all over the world. NWRI especially appreciated the steadfast support of co-founder Mrs. Joan Irvine Smith and of both the NWRI Board of Directors (representing NWRI’s water agency members) and the Research Advisory Board, all of whom worked tirelessly to keep NWRI running smoothly.

No one can replace Ron Linsky. He was unique — a man of unlimited enthusiasm to try new things and explore new territories. What we can do is work to keep his legacy alive. That means NWRI will continue to pursue efforts to create new sources of water, protect public health, and improve the freshwater and marine environments.

Over the last 15 years, NWRI has funded or co-funded 160 projects,

supported more than 20 graduate students through fellowships, produced 120 publications, and sponsored over 40 workshops and conferences. In 2006, NWRI will continue efforts to find new, exciting areas of research — areas of water science and technology that will result in safe, reliable, and sustainable water supplies and water resources. The following is a summary of some of our newest and most recent activities and programs.

Fulfilling Planned Projects

NWRI has built a reputation for bringing to the forefront the most important issues in water science, whether that be through holding first-of-its-kind conferences, publishing groundbreaking reports, or funding innovative research to continu-

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NWRI was honored at a reception held by Mrs. Joan Irvine Smith and family following the passing of Ron Linsky. Guests included: (from left) Jeff Mosher (NWRI); his wife, Liese Mosher; Mrs. Joan Irvine Smith; and Patricia Linsky, the wife of Ron Linsky.

Fourth Microfiltration Conference Highlights Operations and Innovations, Including Membrane Bioreactors

Regulations, real-world operations, and future innovations were just some of the topics highlighted at Microfiltration IV, an international conference devoted to low-pressure membrane applications to water and wastewater treatment.

In the water and wastewater industries, membranes are used to remove contaminants from water, acting similar to a screen or sponge. Examples of membrane technologies include microfiltration and ultrafiltration.

NWRI has held a Microfiltration Conference every four years since 1994, providing updates on the status of the technology and critical issues faced by end-users. This year's conference, held in March 2006, included speakers like Dr. Richard Sakaji of the

"We received many compliments about the quality of the speakers and the content of the presentations," added Mosher. "The presentations were some of the best I have seen in a while. There was also a good mix of operational, technical, design, and research topics. Overall, attendees were very pleased with the conference."

On the theoretical side, presenters like Dr. Bruce Rittmann of Arizona State University discussed novel technologies like the use of the hydrogen-based membrane biofilm reactor, a biological treatment process that can reduce almost all oxidized pollutants from groundwater. Dr. Rittmann's presentation highlighted the results of his research, focusing on work with nitrate and perchlorate as factors that control the performance of membrane bioreactors.

On the practical side, presenters like Dale Rohe of MWH provided a detailed description of the issues affecting the design and procurement of membrane filtration systems, highlighting factors such as meeting regulations, protecting the membranes from damage, and writing successful procurement documents. He also provided a brief summary of capital, operation, and maintenance costs of plants with capacities of 5 and 25 million gallons per day (mgd).

"It's my hope that the sharing of lessons learned from full-scale microfiltration and ultrafiltration plants at the Microfiltration IV Conference will help consulting engineers improve their designs and plant owners achieve trouble-free facility operation," said Rohe.

Among the case studies, six different utilities were examined, each using microfiltration or ultrafiltration in their treatment processes.

- ◆ The *Sunrise Water Authority* in Oregon shared its experience in expanding its 10-mgd slow sand filter plant to 25 mgd — incorporating membrane technology — in under 17 months.
- ◆ The *Los Angeles Department of Water and Power* provided lessons learned in the design and construction of brand-new membrane filtration facilities at two different reservoirs in Southern California.
- ◆ *Olivenhain Municipal Water District* in California provided details on upgrading an existing plant with membrane filtration to become independent of imported water and to have the ability to treat its own water.
- ◆ *OCWD* gave an in-depth look at the Groundwater Replenishment System, an indirect potable reuse project using microfiltration and reverse osmosis to produce 70 mgd of reuse water for groundwater recharge and basin protection from saltwater



Presenters from the introductory sessions at Microfiltration IV included: (top left) David Furukawa (Separation Consultants, Inc.), Dr. Samer Adham (MWH), Jeff Mosher (NWRI); (bottom left) Jim Lozier (CH2M HILL), Dr. Kerry Howe (University of New Mexico), Manish Kumar (MWH), and Prof. Simon Judd (Cranfield University).

California Department of Health Services, who discussed how regulations, such as the Long Term 2 Enhanced Surface Water Treatment Rule, will affect filtration programs, while Professor Anthony Fane of the UNESCO Centre for Membrane Science and Technology in Australia discussed how to improve membrane technology in four areas: better permeate quality, less fouling, less energy usage, and more sustainability.

"The impact of an event like Microfiltration IV," said NWRI's Acting Executive Director, Jeff Mosher, "is that it is a forum in which individuals are able to come together and discuss the newest developments in the technology. Our presenters included everyone from real-world operators to pioneers in the field, and we had panel discussions after each session, giving the audience the opportunity to talk about their experiences and concerns."

Over 180 people from around the world attended Microfiltration IV, which was sponsored by MWH, Cranfield University, USFilter, Zenon Environmental Corporation, Kruger Inc., Corona Department of Water and Power, and Orange County Water District (OCWD).

intrusion. Conference attendees were also able to visit the project's construction site at OCWD during a field trip.

◆ The *Public Utilities Board* described how Singapore manages its water resources through an integrated water management program, which includes large-scale water reclamation projects using membrane technology to increase the water supply.

◆ *Central and West Basin Municipal Water Districts* shared its water resource management plan, which includes using reclaimed and desalinated water (treated by membranes) to meet water demands in Southern California.

A special feature of Microfiltration IV was its one-day short course on membrane bioreactors (MBRs), a promising technology that uses micro-filtration or ultrafiltration to enhance wastewater and reclaimed water treat-

ment processes. Twelve different presentations focused on issues ranging from commercially available MBRs to how to retrofit existing conventional wastewater treatment plants with MBRs.

"MBRs are groundbreaking because they can enhance wastewater treatment and make reuse more safe and efficient," said Dr. Samer Adham, who was Chair of the Conference Planning Committee. "We felt it was absolutely crucial to highlight MBRs in Microfiltration IV. As Dr. Rhodes Trussell said in his Keynote Address, 'projects are popping up everywhere.' The interest and momentum are just getting

stronger, so it's vital that we exchange as much information as possible about this exciting new technology."

Professor Simon Judd of Cranfield University in England was a principal speaker for the MBR course, giving three different presentations to introduce the fundamentals of the technology, provide a global perspective on the operational experiences of full-scale systems, and offer suggestions on the future research needs and challenges facing MBRs.

Attendees also had the opportunity to take a field trip to an MBR plant at the Corona Department of Water and Power in California. Currently, about 0.4 mgd of recycled water is produced at the plant using the ZenoGem Process, a technology designed by Zenon that consists of a suspended growth biological reactor integrated with a micro-

"The conference was well-received. In fact, people have begun asking that NWRI consider holding [it] every two or three years. The technology is progressing rapidly, and this is a great venue for people to get together and share information"
— David Furukawa

filtration membrane system.

"The short course on MBRs provided an excellent introduction to the technology," said David Furukawa of Separation Consultants, Inc., who was also a Keynote Speaker at Microfiltration IV. "Altogether, the entire conference was well-received. In fact, people have begun asking that NWRI consider holding its Microfiltration conferences every two to three years, rather than wait for another four years. The technology is progressing rapidly, and this is a great venue for people to get together and share information. I'm looking forward to the next conference."

Abstracts From Microfiltration IV Now Available

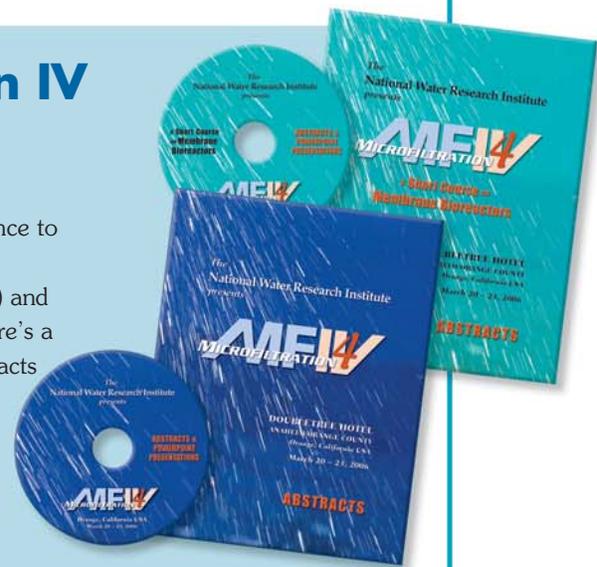
If you missed the Microfiltration IV conference, here's your chance to catch up on the latest in membrane technology!

NWRI is offering the abstracts from Microfiltration IV (76 pages) and from the Short Course on MBRs (48 pages) for \$25.00 each. There's a special discounted price of \$40.00 total if you purchase both abstracts together.

As a bonus, each set of abstracts includes a CD-Rom with:

- ◆ A PDF of the abstracts.
- ◆ PowerPoint presentations from each session.

To purchase the abstracts, please visit www.NWRI-USA.org.



Water and Sanitation Districts Honored for Reuse Project at Microfiltration IV

The Orange County Water District (OCWD) and Orange County Sanitation District (OCSD), both of Fountain Valley, California, were honored as joint recipients of the third NWRI Award of Excellence for leadership on the Groundwater Replenishment System, a world-class indirect potable reuse project.

NWRI established the Award of Excellence in 2000 to recognize projects throughout the world that demonstrate leadership in the application of technology to improve water supplies, protect public health, and enhance the value of water.

OCWD and OCSD received the award on March 21, 2006, at NWRI's Microfiltration IV Conference, which was held at the Doubletree Hotel in Orange, California.

"I am very pleased that OCWD and OCSD were chosen as the recipients of NWRI's Award of Excellence," said Microfiltration IV Conference Chair Dr. Samer Adham of MWH. "Both organizations pioneered the research efforts on the application of microfiltration as pretreatment to reverse osmosis to purify wastewaters. The success of these efforts was instrumental in the development of multiple water reclamation projects worldwide."

Considered a leader among water utilities, OCWD is responsible for protecting Orange County's rights

to the Santa Ana River and for managing a groundwater basin that supplies water to more than 20 cities and water agencies in the region. Located next door to OCWD, OCSD is responsible for collecting and treating 243-million gallons of wastewater generated each day from these cities. Together, these districts are leading the way in developing a

project — called the Groundwater Replenishment System — to purify and reuse treated wastewater to near-distilled quality to provide a reliable source of water for 2.8-million residents of Orange County.

Scheduled to begin operation in 2007, the Groundwater Replenishment System will be the largest advanced water purification facility in the world for indirect potable reuse. Its facilities will include microfiltration, reverse osmosis, and ultraviolet light with advanced oxidation technologies to purify wastewaters.



(From left) OCSD Board Director Norman Eckenrode and OCWD Board Director Phil Anthony accept the Award of Excellence from NWRI Acting Executive Director Jeff Mosher (right) at Microfiltration IV.

Microfiltration is a low-pressure membrane filtration process that takes small suspended particles, bacteria, and other materials out of the water. It provides the most efficient preparation of water for reverse osmosis, which is a high-pressure membrane filtration process that sieves much smaller contaminants, like minerals, salts, viruses, and pharmaceuticals, from water. As the final step, ultraviolet light uses high intensity, low output lamps to disinfect water. Used in combination with hydrogen peroxide, ultraviolet light creates an advanced oxidation reaction that breaks down any remaining compounds — like trace organic compounds — to create ultra-pure water.

OCWD Board Director Phil Anthony and OCSD Board Director Norman Eckenrode accepted the award, in the form of two identical plaques, on behalf of their districts.

"We're honored to receive such an award," said Eckenrode at the award ceremony. "The project has demonstrated due diligence not only in meeting basic requirements, but also in taking a step forward to protect the environment. It has even exceeded the expectations of regulatory bodies. My question, however, is 'what's next?'. Microfiltration has come a long way towards treating reuse water, but what are we going to do next to solve the problems that will invariably arise? That's the challenge that the people in this room need to consider. How will we address future issues?"

Past recipients of the NWRI Award of Excellence include the Public Utilities Board in Singapore for its pioneering research with membrane technology to create a new source of potable water called NEWater (2002) and the Honolulu Board of Water Supply for its efforts in using an innovative new technology called membrane bioreactors to enhance Hawaii's water resources (2004).



The Groundwater Replenishment System's microfiltration process consists of a 6-mgd USFilter CMF-S submersible system. This process is a smaller-scale version of the 86-mgd microfiltration facility currently under construction at the same site.

The Life of

Ron Linsky



Part Two

Ron Linsky lived an amazing life. He was a “bio-politician” and a self-taught oceanographer. He had traveled around the world and under the seas. He had a story for everything.

You always learned something from Ron — he was a fount of knowledge, no matter what the topic. He’d even draw you a picture upside down to help illustrate his point, if needed!

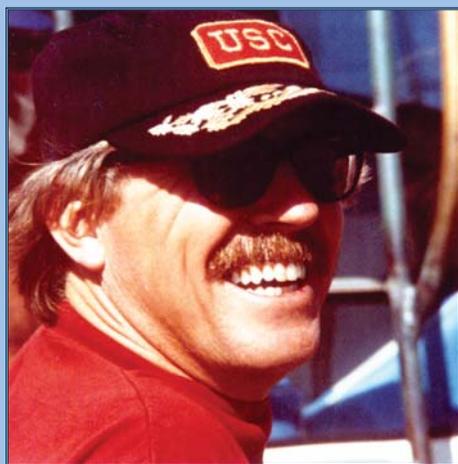
A modest man, Ron didn’t brag about his accomplishments. He’d drop hints, but only if it pertained to something he was telling you. Consequently, not many people knew what he was like — and what he had done — outside of NWRI.

We wanted to share his remarkable story. It’s a compilation of interviews, newspaper articles, old resumes, personal letters, and a short autobiography that Ron once wrote about himself. We think you’ll be surprised by the man you meet here. We were, and we worked with him everyday.

Setting Sail with USC

By the late 1960s, Ron Linsky had built a name for himself as an oceanographer.

He had created a one-of-its-kind Floating Lab Program that took thousands of students to sea to learn hands-on marine science. He was collaborating with Jacques Cousteau, the most famous oceanographer in the world. And he was traveling all the over the world, encouraging curriculums in marine science and recruiting the next generation of oceanographers.



Then, in 1970, everything changed. After years of trying to open doors toward the possibilities in marine science, Ron found a door opening up to him. In fact, the recruiter became the recruited when several universities approached him simultaneously to lead their ocean research programs. There was no competition, however, for Ron knew exactly which one he was going to work for — his beloved alma mater, the University of Southern California (USC) in Los Angeles.

Thus began his career overseeing the brand-new Sea Grant Program at USC.

The purpose of Sea Grant was threefold. It was meant to 1) train and educate the next generation of marine scientists and engineers, 2) support research in marine resources management and development, and 3) provide advisory services to the business and science communities, as well as the general public.

Seeking out funding was just one part of Ron’s job as Director of Sea Grant at USC. The program was aimed at resolving issues in coastal resource development within the Southern California region.

Under Ron’s leadership, research focused on everything from the impacts of urban runoff on coastal waters to recreational and commercial harbor design and development. Some highlights included a study on the effects of the Santa Barbara Channel oil spill; a survey of the effects of industrial use on the California coast; and a survey on the possibilities of using unemployed aerospace personnel in

the field of oceanography (which resulted in new careers for many former aerospace engineers and technicians!).

Around the World in 1,095 Days

It was during his time as Director of Sea Grant at USC that Ron really started to travel. In a 3-year period, he visited no less than 15 countries, spending months at a time in places like French Polynesia (Tahiti, he once said, was the most beautiful place he’d ever seen), Asia, and Europe.

Sometimes it was to conduct research, others times it was to organize international conferences or to present at leading oceanographic institutions throughout the world.

His work included:

North America. He was responsible for organizing bilingual international conferences and training programs in Mexico, including exploring the environmental impacts of opening the Trans-Peninsula

The Team Player...

One of Ron’s favorite stories about his experience at USC involved his first look at the Sea Grant budget. In fact, he realized there was no budget. He knew that couldn’t be right, so he brought it up to his supervisor, Executive Vice President Zohrab Kaprielian — who smiled broadly at him and said, “Welcome to USC.”

Jerome B. Walker, Ph.D., who is currently Associate Provost at USC, remembers working with Ron so many years before.

“Ron was asked to run the Sea Grant program with virtually no budget,” Walker said, “and he was thrown upon his own resources to build research funding. His impressive entrepreneurial skills were being challenged early in his career, and he met that challenge successfully; but it must have been a considerable struggle, because he periodically reminded me of it for the next 30 years.”

The entrepreneurial spirit was alive and well at a university dependent upon private funding, and Ron was given quite the crash-course in leveraging resources by finding matching funds and creating joint-venture partnerships.

It was a lesson he took to heart.

From that point on, his career was defined by his ability to build collaborations and seek outside sources of funding. In fact, the last 15 years of his life were devoted to NWRI, which was unique in the industry because it required matching funding for all its projects.

And getting matching funds meant getting people to buy-in and work together.

“Ron had a special way of connecting with people — whether an NWRI Board member or the door attendant at the hotel. Effective leaders have this ability,” said longtime colleague Stan Ponce, Ph.D., of the U.S. Geological Survey. “I will always remember how Ron would greet me with that sparkle in his eye, that wonderful smile, and exuberance in his voice as he said, ‘Stanley! How are you?’ In the course of the conversation, he would put his arm on my shoulder and say, ‘Let me tell about this idea I have and how we can work together.’ Ron’s passion was contagious. He truly cared about people and was an expert at developing collaborative relationships. I learned a lot from him over the years. A part of Ron will always be with me, and I hope to model some of the behaviors he lived by.”

Cruising Through Life...

Ron loved the ocean. He also loved to travel. So it should be of no surprise that he took a cruise every year for 8 years, beginning in 1977.

The South Pacific, Caribbean, and Panama Canal. Hong Kong, Bangkok, and Singapore. These were some of the fabulous places Ron and his wife, Patricia, spent their winters cruising together.

However, these cruises weren't all fun and games. Ron worked as an enrichment lecturer, giving presentations on topics such as "Mankind and the Sea" or "Trumpets, Pearls, and Stars: The Dallas, Dynasty, and General Hospital of the Coral Reef."

His wife also participated, and together they would teach passengers how to snorkel. In fact, Ron loved to snorkel and scuba dive. He never had any scary shark stories (and scoffed at being afraid of sharks), but he'd had a couple close encounters with barracudas, which wouldn't let go once they latched on for a bite. Really, the only fear of the sea he had was of being sunburned, because his fair skin reddened faster inside the water than out.

Aside from the many adventures he had, the cruises were also special because of the lifelong friendships he made.

One of the first people he met aboard ship was Sterling Silliphant, a Hollywood writer who wrote the Academy-Award winning screenplay for *In the Heat of the Night*, as well as screenplays for films like *The Poseidon Adventure* (a cruise ship disaster movie!). They remained close until Silliphant's death in 1996.

Another dear friend was Sam Markell, a lawyer from Boston who, it turns out, was something of a poet. He wrote this ode to Ron in 1977:

Ron says life would be very simple if we were all "dunked" in the sea.
He has come to this conclusion from his studies of oceanography.
We would live in a submersible, go up and down as we please.
Thus lead a life of luxury with the very greatest of ease.
No problems of what to wear — a diving suit would suffice.
No need for a refrigerator — deep-sea water's as cold as ice.
A generator would supply the light, as well as the heat.
You just throw out a net and catch all the fish you can eat.
The protein would make us very healthy and strong.
Now tell me, is there anything with such a life that you could say is wrong!

Highway in Baja California.

South Pacific. He went island-hopping across French Polynesia and made stops in Tonga, Fiji, Samoa, New Zealand, and Australia to lecture and investigate marine resources development programs, such as the impacts of fish poisoning upon native populations.

Asia. He toured Thailand and India as a lecturer and consultant in marine and coastal resources planning and development.

Europe. As a member of the National Academy of Engineering's Committee on Ocean Research, he worked with Great Britain, France, and Germany to encourage information exchange and to expand knowledge in the field of coastal zone management. A year later, he traveled through Great Britain, Scotland, Ireland, Norway, and The Netherlands on an NOAA-sponsored sponsored research

grant to study the impacts of North Sea oil exploration and development upon the coasts.



A Little Taste of Aloha

In 1975, Ron made the decision to leave USC and run away to paradise — to direct the Sea Grant Program at the University of Hawaii in Mañoa (UH).

The Sea Grant programs at USC and Hawaii were different in that USC was dealing with the management of existing resources while Hawaii, made up of eight main islands rich in resources, needed to better plan its marine future. It was a challenge Ron plunged into head first.

Since Hawaii had one of the largest Sea Grant budgets in the nation, Ron was given more leeway in running the show. One of the first things he did was help negotiate the transfer of the Law of the Sea Institute from the University of Rhode Island to UH to undertake studies of international significance, such as seabed resources and international fishery treaties.

"Ron was a wonderful leader," said Jeremy Harris, Retired Mayor of the City and County of Honolulu, who — at the time — worked for Ron in the Sea Grant program. "He was inspiring and brought out the best in people. I remember that he would call us 'biopoliticians.' Instead of just being biologists, we took the various sciences we worked with at the university and applied them to a community setting. We had to make science and technology understandable to the public."

Some of the work they were involved in varied from increasing fishermen's catches to informing homeowners how to

Water World...

Ron wanted people to "think wet." He would travel around the world advocating the various uses of the ocean and how it could benefit mankind. One of the things he used to say was that this planet should never have been called Earth. Instead, it should have been called Neptune — the water planet.

prevent coastal damage. According to Harris, most of the funding went towards research to improve aquaculture and fisheries.

In fact, aquaculture (the rearing of aquatic animals for food) became such an important component of Ron's work that he became Special Assistant to the Dean of the College of Tropical Agriculture at UH for aquaculture research and development in 1977.

One of his greatest accomplishments at the time was the creation of a statewide market for the aquaculture industry in Hawaii, representing more than 300 acres and \$5 million in investments.

His wife, Patricia, remembers that Ron had fun planning creative — and sneaky — activities to encourage people to expand their palettes of fish food sources in Hawaii. For instance, he would hold a reception in the evening in which Hawaiian girls in muumuus would walk around serving small bites of shark or the freshwater fish tilapia (considered a trash fish by Hawaiians) to guests who wouldn't realize at first what they were eating. Or else he would have different restaurants prepare the fish in several ways and have the fish arranged prettily at lunch for the curious to try.

Helping Others Help Themselves

After spending 16 years devoted to teaching, Ron decided it was time to take a leap of faith. He needed to see if he could succeed on his own. It was the scariest decision he ever made. But he had to do it. He had to try.

In 1978, he ended his service as Director of Sea Grant in Hawaii and moved back to

Living History...

While Ron was in the Philippines, he and other workshop attendees took a two-day field trip to the Lingayen gulf region. All around them was "rice country with the usual water buffalos lazing in the paddies or pulling the cultivators through the muddy plots," wrote Ron.

They went around the coast looking at things like mills, gold mines, and the remains of a recent mudslide. Then they went out to the beach where, according to Ron, "the Dutch, Japanese, and the Americans landed to capture and liberate the country. A real bit of history."

In fact, he couldn't help but feel awe while standing there at that battlefield. As a kid, he played soldier with his friends, pretending to fight at exotic locales only heard about in school or seen on film. "To finally stand at the place of which movies are made and heroes elevated, including John Wayne, makes me smile," he wrote. "Strange how my life seems to be working. I love it!"

The Birthday Boy...

California. This time, he was going to work for himself.

So he became a consultant.

At first, it was a real struggle. According to Patricia, "Oceanography funds were reduced by Congress, and there was less emphasis on oceanography in general. So Ron regrouped and decided what he wanted to do with the rest of his life. He had good people skills. He excelled at building programs. One of the first things he did on his own was help lay out the groundwork for the Marine Studies Institute at Dana Point. He didn't get paid for it. He just helped. Then he got contracts with the United Nations and did work in the Philippines and Sri Lanka."



Ron celebrated life to its fullest — and loved a good party. He enjoyed having get-togethers and surrounding himself with friends and family. He also had his traditions, and you could count on him to deliver.

Every Thanksgiving, he baked pumpkin pies. Every Christmas, he displayed his collection of Santa Clauses and decorated the tree with beautiful glass ornaments. And every birthday, he had something special planned — whether it was going out to lunch to celebrate or hosting a great, big surprise party.

"My dad was the birthday guy," said Ron's son, Bryan Linsky. "He'd say everybody celebrates the holidays, but your birthday belongs to you. It's your special day, a day you should be showered in gifts. He never forgot a birthday."

development. It was so hot in Sri Lanka that "trees were drying up all over town" and "kids with watering cans were trying to keep the flowers around the hotels alive," Ron wrote. One of the highlights of working in Sri Lanka was that Ron got to meet with Arthur C. Clarke, the author of science fiction novels like *Space Odyssey*, to discuss Sri Lanka's water future.

"We talked a lot about coral mining and tropical fish collecting and what it is doing to the environment," wrote Ron, who pointed out that the reefs were being torn up and the coral used for concrete, so beaches were eroding. The meeting ended on a positive note, for they planned a seminar in which Ron, Clarke, and others would present "our thoughts on environmental

planning and coral mining."

Even the Minister of Fisheries agreed to host the session.

New Trini in Town

Ron's work with the UN didn't end with his adventures in the South Seas. In fact, he soon moved to the other side of the world — the Caribbean — to become the UN's Chief Technical Advisor and, later, CEO of the Institute of Marine Affairs (IMA) in Trinidad & Tobago.

"As head of the UN team of experts, I had to

give advice," Ron used to say. "As the Director of the Institute, I took my own advice. It was the best of both worlds."

For two years, he worked hard to establish a marine institute in a developing country with diminishing offshore resources. While he was there, he built a laboratory, purchased an ocean-going ship, and established programs revolving around the fishing industry, coastal zone management, and contamination. He also introduced aquaculture as a viable resource.

Doon Ramsaroop, the former Deputy Director in charge of research at IMA, remembered Ron as an avid swimmer who loved to go turtle watching. "We had great fun together during our weekend snorkeling trips to the islands of the Dragon's Mouth, off the northwestern tip of Trinidad," he said. "Ron's secret love, however, was for a small remote cove called Arnos Vale on Tobago's Caribbean coast. Whenever time permitted, he and Patricia would escape for a couple of days to this idyllic retreat."

He also remembers Ron as a warm-hearted person who truly cared about his colleagues. There were many a night that Ron and his wife would invite co-workers over for a homemade dinner and a game of Scrabble.

"I used to be amazed by his penchant for constructing outrageous words," said

Pupus and Beer...

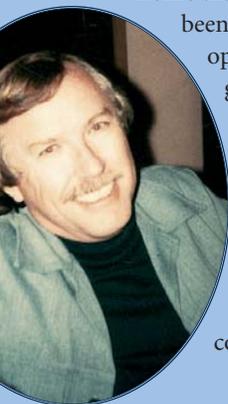
Jeremy Harris was just starting out as a biologist when Ron arrived at UH to replace the existing Director of Sea Grant. "Ron captured everyone's heart immediately," said Harris. "He was a likable guy who made everyone feel comfortable about the tasks ahead."

He described Ron as a generalist who wasn't content to deal with just one area of research. "Ron would talk about the biology of a species one minute," said Harris, "then turn around and talk about thermodynamics the next. He liked the variety. It allowed him to get involved in all aspects of the ocean."

One of Harris' fondest memories of Ron's time at UH was when the two of them would go to the local grill and have appetizers Hawaiian-style (known as "pupus"). They wouldn't order from a menu. Instead, the waitress would bring out a big platter of fish and steak (which she purchased with her own money) and "we'd eat the food with chopsticks and watch TV, paying only for the beer and tip" said Harris. "It's old-style Hawaiian hospitality."

For his first job with the United Nations (UN), Ron was asked to develop and conduct a workshop on developing coastal and offshore resources in Southeast Asia and the South Pacific. Representatives from 13 countries (such as Vietnam, Malaysia, and South Korea) attended, prompting Ron to remark in a letter home that "This meeting has really been an experience and an opportunity that few people get — working with so many nations."

He made a lot of connections on that trip, including one that paid off by sending him to Sri Lanka twice to serve as a consultant and UN rep in coastal resource



Royal Treatment...

One of Ron's oldest friends is M.L. Prachaksilp "Pee Wee" Tongyai, a great-, great-grandson of King Rama-IV — the very same King of Siam romanticized in The King and I and Anna and the King.

Tongyai first met Ron when Ron was still with the Floating Lab Program. In fact, Tongyai — then a Scientific Research Officer with the Marine Fisheries Division in Thailand — contacted Ron initially to evaluate the program and see if it could apply to Thailand as "the Fisheries Division had many large research vessels that might be good 'floating schools' for students and a new generation marine fishermen."

"Ron managed to find funds to finance my airfare to California," said Tongyai, who stayed as a guest in Ron's home for 10 days while he visited. "We had a wonderful time on land and sea. Ron had a knack for turning dull scientific procedures and facts into Disney-type entertainment, with color, wit, and laughter!"

After Tongyai returned to Thailand, he used what Ron taught him to train fishermen and construct both a Marine Biology Research Center and Aquarium in Phuket. Another aquarium was also established in Bang Saen Beach for outreach purposes.

Years later, when Ron visited Thailand on behalf of the U.S. State Department, he had the opportunity to meet the mother of King Bhumibol Adulyadej. According to Tongyai, "Ron chatted with the Princess Mother concerning ecology and the environment, including the conservation and distribution of water resources for various 'competing' and 'conflicting' uses."

No one will ever know if that conversation produced any concrete results, but Tongyai was pleased to point out that, in June 2006, for the 60th Anniversary Celebration of H.M. the King on the Throne of Thailand, the Secretary-General of the UN, Kofi Annan, presented the first UN Human Development Lifetime Achievement Award to the King "for His decades-long support of national development initiatives, including Royal Rain Making to supplement natural rain for irrigation during long periods of drought, especially during El Niño years."

To China, With Love...

Ron deeply admired Asian culture. There was something about the food, history, and attitude that appealed to him. Japan was among his favorites. He loved every minute he spent in Okinawa while he was an army “spy.” The license plate on his Cadillac read MIZU SAN, which is Japanese for “Mr. Water.” Even his wife was part Japanese! But there was one Asian country that Ron loved even more than Japan, and that was China.

“Sometimes Ron would joke that he looked Chinese,” said Ron’s best friend, David Hsu, M.D. “He loved Chinese food, every kind. He even talked about retiring there. In the last 15 years, we went to China at least six or seven times together. He was very interested in China and its resources.”

“Once, he went to China to learn more about the Three Gorges Project on the Yellow River,” added Hsu. “He was invited to dinner and was asked to help the Chinese get a loan for \$30 billion U.S. Ron said that was slightly above his budget, but he was willing to help. Since then, he involved himself in Chinese water resources issues. He helped host Chinese officials who would come to the U.S. to tour and learn, or would invite them to visit. In the last three years, he worked hard to get U.S. delegates to China. I’m happy that NWRI will continue to pursue this.”

Ramsaroop. “When challenged, he would insist that the word existed. Of course, on most occasions, it could not be found in the dictionary. To his credit, though, he always took his losses at Scrabble quite graciously. It was clear to me that he played Scrabble not to win, but purely to enjoy the game and have fun.”

The Institute Without Walls

In 1991, Ron’s life changed again. He was selected to become the founding Executive Director of NWRI, a non-profit organization devoted to creating new

A Man and His Dog...

Ron was a dog lover. And his favorite dogs were Jack Russell terriers, which are perky, energetic, and friendly creatures — very much like Ron himself.

Ron’s dog, 11-year old Raffles, was named after a favorite hotel in Singapore called the “Sir Raffles Huxley.” In fact, Raffles’ full name is Sir Raffles Huxley Bjur Linsky, and he’s just as pampered as his name implies. Ron used to say, “Raffles doesn’t live with us; we live in his dog house,” and loved to talk about his dog’s latest caper. One of the things Ron enjoyed most with his dog was chasing off the crows in the garden. Raffles got good exercise and Ron ensured the flora and fauna in his backyard were protected from the loud birds.

As much as he loved his dog, Ron was a little jealous of him because Raffles got to stay home all day with Patricia. In fact, Ron was fond of saying that when his time came, he wanted to be “reincarnated as a Jack Russell terrier in the home of Patricia Linsky.”



sources of water through research and technology. Much like his work many years earlier at USC, Ron had to build the program from scratch — a program that was based on finding and leveraging funding from outside sources.

NWRI wasn’t about ocean water or aquaculture, which Ron had mostly been dealing with. It was about all aspects of water, from drinking water to recycled water to desalted water to the value of water. Ron loved the diversity and challenge of working with the brand-new Institute, and spent the next 15 years — the longest he ever

worked in any one setting — devoted to making NWRI one of the most reputable and active water-research organizations in the world.

He referred to NWRI as the “institute without walls” because NWRI itself never conducted any research. Instead, NWRI found “the best and the brightest” to do the work for it.

From publishing the first guidelines on using ultraviolet disinfection in water and wastewater treatment to encouraging the use of nanotechnology in membrane applications, Ron was known for his pioneering spirit and willingness to fund new and exciting technology to explore its benefit to the water industry. Because of his can-do attitude, NWRI was able to support over 160 projects throughout the years.

In fact, at the time of his passing, NWRI was one of the largest water research institutes in the U.S.

Good Bye, Ron

“Live life” was Ron’s attitude.

He loved his work and he loved his family and friends, and not for a single second did he ever think of slowing down and taking it easy. He didn’t want to have any regrets and he did what he could to fulfill his dreams, whether that was traveling to far-off lands like Tasmania for vacation or working with the Office of the President of the United States to get water into the heart and minds of people everywhere.

He was not afraid to try. And he was always, always optimistic. Even until the very end.

After fighting the disease for 6 years, Ron passed away on August 14, 2005, of myelodysplastic syndrome, a bone marrow ailment, at USC’s Norris Cancer Center. He was 71 years old.



Part 1 of Ron’s biography can be found in the Fall 2005 (Vol. 14, No. 3) Briefings newsletter, and covers everything from his brief stints as an army spy and radio celebrity to his close encounters with rabid bats in Costa Rica and his endeavors to take students to sea on the Floating Lab. Copies can be downloaded at www.NWRI-USA.org.

For the Family...

Ron had lived such a rich, full life. He’d traveled the world and seven seas. His greatest passion was his work, which never felt like a job to him. He loved to learn and he loved to teach, no matter how old the student. And he made new friends everywhere he went.

But the most important thing in his life was not how many wonderful places he visited or what new program he developed, but rather something much more dear: his wife, Patricia, who absolutely made him glow; his children and their spouses — Bryan and Helene Linsky, Todd and Jeannene Linsky, Maureen and Gerd Rausch, and Christopher Madden — who he always supported, no matter what; and his grandchildren — Jacob and Evan Linsky, Alexandra and Harrison Linsky, and Amelie Rausch — who he would talk about nonstop. It was obvious he was a proud Papa.

To those who loved Ron so much, we know how much it hurts to lose him. He always made us feel like family and, just like family, we want you to know that we will always be there for you. Thank you for sharing Ron with us. And thank you for letting us share his memory.

C.W. & Modene Neely Foundation Supports NWRI Fellow at U. of Arizona

Through the generous support of an Arizona-based private foundation, graduate student Kristopher Kuhlman received a fellowship from NWRI for his innovative research to develop a more efficient groundwater modeling tool.

Kuhlman, 30, was selected as the NWRI-C.W. & Modene Neely Fellow because of his research project on the “Extension and Implementation of the Laplace Transform Analytic Element Method (LT-AEM) for Efficient Simulation of Groundwater Resources.” He is a first-year Ph.D. student in the Department of Hydrology and Water Resources at the University of Arizona.

Funding for this special Fellowship was provided by the C.W. & Modene Neely Charitable Foundation, which focuses on supporting projects to alleviate human suffering. Some of the Foundation’s most recent projects include sponsoring the construction of a new dental clinic in Flagstaff, Arizona, for the indigenous population, as well as supporting a program that helps acquire pharmaceuticals for seniors who cannot afford to fill their own prescriptions.

“The Foundation is an advocate of developing technologies and practices that benefit people around the world, such as producing genetically engineered maize that is heat and drought resistant,” said Foundation representative Richard Morrison, a former water rights lawyer. “We also know that people everywhere need to know the location and quantity of available clean water supplies. NWRI is helping people figure that out, and we see that work as critically important to human health and survival. Since the Foundation prefers to assist students who will do research that addresses human needs, it was only natural that we sponsor a Fellowship.”

A native of Fremont, Nebraska, Kuhlman spent his youth camping, biking, or hiking whenever he had the chance. When it came time to go to college, he chose to major in geological engineering because “it was an excuse to go outside and get credit for it.”

His most memorable experience at the Colorado School of Mines, where he studied as an undergrad, was when he spent 6 weeks at a summer field camp working at different locations in Southern Colorado and Utah to learn hands-on geologic field mapping. “We spent a lot of time looking at the geology on the surface and trying to determine how it relates underneath, where you can’t see,” he said. “It’s like putting together a puzzle.” He also enjoyed hiking up and down mountains or through forests to trace the movements of an ancient glacier or to determine how volcanic activity had affected the region over the course of time.

Another area of geology that Kuhlman enjoyed puzzling through was groundwater modeling, some-

thing he spent a lot of time doing as an undergrad because of an interest in hydrology. Groundwater modeling is used to predict the response of an aquifer to natural and hydraulic activities, like pumping water out of wells or tracking contamination. The models can vary from simple equations to complex computer programs.

Kuhlman worked mostly with computer models, which he said “basically create an electronic version of the groundwater basin” using historical data. “The computer model is actually a mass balance for a whole bunch of little elements,” he added. “You have to break the basin into hundreds of thousands of little pieces, like sugar cubes, and then you solve equations for every little cube and put them back together to get your answer.”

Groundwater modeling soon became his specialty when, after graduating in 1998, he accepted a job with a hydrology consulting firm in Claremont, California. He quickly became the main groundwater modeler, working mostly with MODFLOW and transport modeling. However, because he wanted to learn more about modeling, specifically how to apply the models better, Kuhlman decided to earn his Ph.D. at the University of Arizona.

Now a full-time graduate student, he spends most of his days at the university, writing computer programs for his research project on using the LT-AEM to better simulate models of groundwater resources, which was co-developed by the USGS.

According to Kuhlman, his project is “an application of applied mathematics to hydrology to solve a problem in an efficient or elegant way.”

“The work that I did as a consultant,” he said, “used a program that takes a divide-and-conquer, brute-force approach to modeling, where you divide the domain into hundreds of thousands of little pieces and you solve a really simple equation for each piece. What I’m doing is a little more complicated in the beginning, but you just solve one equation to get the information you need and in a shorter amount of time. It is a different way of doing things.”

Because the approach would allow for quick and simple groundwater simulations, Kuhlman hopes that it would be useful as an instructional tool for students and as a “what if” scenario tool for consultants and designers who need fast answers. “It’s not meant to replace all the other groundwater models out there,” he added. “It’s actually meant to be like another little blade in your Swiss Army knife.”

With the help of the Fellowship, Kuhlman is progressing with his research and has been invited to give his first presentation on the subject at the 2006 *International Conference on Computational Methods in Water Resources* in Denmark. He expects to graduate within the next 2 years.



Kris Kuhlman

Upcoming Events

2006 Annual Conference on Increasing Freshwater Supplies

July 18–20, 2006

LA FONDA HOTEL

Santa Fe, New Mexico USA

Sponsored by

Universities Council on Water Resources
The National Institutes for Water Resources

with

Sandia National Laboratories
Los Alamos National Laboratory

The 2006 Annual Conference on Increasing Freshwater Supplies will focus on increasing freshwater availability for human uses through practicable means.

For more information, please contact:

Universities Council on Water Resources
Carbondale, Illinois USA
Tel: (618) 536-7571

Email: ucowr@siu.edu ♦ www.ucowr.siu.edu

2006 Biennial Conference and Exposition

“Desalination Comes of Age: The Answer to New Supplies”

July 31 – August 2, 2006

MARRIOTT HOTEL

Anaheim, California USA

Sponsored by:

American Membrane Technology Association
in cooperation with
Southern California Salinity Coalition
U.S. Desalination Coalition

The 2006 Biennial Conference and Exposition will provide attendees with the latest advances and developments in membrane treatment, emphasizing brackish and seawater desalination.

It will also feature pre-conference workshops on the following:

- ♦ Concentrate Disposal Summit
- ♦ Membrane Plant Operator Forum & Hands-On Training
- ♦ Metallurgy and Membrane Systems

For more information, please contact:

American Membrane Technology Association
Stuart, Florida USA
Tel: (772) 463-0820

Email: amtaorg@aol.com
www.membranes-amta.org

Meeting on Managing Drought and Water Scarcity in Vulnerable Environments

“Creating a Roadmap for Change in the United States”

September 18–20, 2006

THE RADISSON HOTEL & CONFERENCE CENTER

Longmont, Colorado USA

Sponsored by:

The Geological Society of America

The meeting on *Managing Drought and Water Scarcity in Vulnerable Environments*, which is co-sponsored by NWRI, will focus on evaluating current drought-related problems and anticipate future issues, including identifying successful strategies for drought and water scarcity management and developing a clear and decisive action plan.

For more information, please contact:

Deborah Nelson
Geological Society of America
Boulder, Colorado USA
Tel: (303) 357-1014

Email: dnelson@geosociety.org
www.geosociety.org/meetings/06drought/

Sixth International Symposium on Managed Aquifer Recharge

October 28 – November 2, 2007

POINTE SOUTH MOUNTAIN RESORT

Phoenix, Arizona USA

Sponsored by

Arizona Hydrological Society
with

International Association of Hydrogeologists
American Society of Civil Engineers/
Environmental & Water Resources Institute
United Nations Educational, Scientific
and Cultural Organization
National Water Research Institute

The *Sixth International Symposium on Managed Aquifer Recharge* will present on a variety of active recharge facilities in the desert southwest of the United States. Highlights will include technical and poster sessions, workshops, a “meet and greet” reception, field trips to innovative aquifer recharge projects, and sightseeing tours to places such as Las Vegas and the Grand Canyon.

For more information, please contact:

Email: info@ismar6.org
www.ismar2007.org

New Reports, Conferences on NWRI's Plate

Continued from Page 1

ously push technology forward. These are some examples of projects to be completed in 2006 or 2007:

California MTBE Research Partnership Report

NWRI manages the California MTBE Research Partnership, which will release its newest publication in late-2006. *Removal of MTBE in Drinking Water Using Air Stripping: Case Studies* is the eighth in a series of reports aimed at investigating technologies that can clean-up MTBE, a gasoline additive that has contaminated various surface and groundwater supplies throughout the nation. Malcolm Pirnie, Inc. prepared this report, which evaluates the cost and performance of air strippers and the associated off-gas treatment systems for MTBE removal.

Third Edition of the UV Guidelines

In partnership with the Awwa Research Foundation, NWRI published a groundbreaking report in 2000 that provided guidelines for using ultraviolet (UV) technology as part of the treatment process for producing both reclaimed and drinking water. NWRI expects to publish the third edition of the UV guidelines in late 2006 or early 2007.

Riverbank Filtration Demonstration Protocols

Over the years, NWRI has promoted the use of riverbank filtration (RBF) as a low-cost water treatment technology that uses natural percolation processes to treat water. At present, we are planning to develop draft protocols that would allow RBF demonstration projects to obtain treatment credit for removing the pathogen *Cryptosporidium*. No other protocol like it exists, and we anticipate it will allow more utilities, working with state regulators, to consider using RBF as either a pretreatment or stand-alone treatment process.

Exploring New Territories

One of the most important elements of NWRI's research program is supporting innovative projects and activities that address critical issues in the world of water. Not only will NWRI play an active role in pushing forward the progress of water science and technology, but we will also do so at regional, national, and international levels. Here are examples of new areas of water science that NWRI will explore:

American Academy of Microbiology's "Clean Water: What is Acceptable Microbial Risk"

NWRI will sponsor a workshop organized by the American Academy of Microbiology on the need for a comprehensive, standardized set of criteria for integrated microbial risk assessments. The workshop



will provide a forum to assess existing microbial risk assessments based on sound scientific principles and data and will develop a blueprint for research needs.

Geologic Society of America's "Managing Drought and Water Scarcity in Vulnerable Environments: Creating a Roadmap for Change in the U.S."

NWRI will sponsor a conference by the Geologic Society of America to evaluate current drought-related problems and anticipate future issues. The outcome of this conference will be a "Roadmap for Change" report, a document that will contain recommendations for public policy, research, and funding needs.

NWRI's Conference on Advances in Nanotechnologies for Water Purification

Nanoscale environmental technology is a new field that addresses environmental issues at the molecular level. In the water industry, nanotechnology is being merged with water purification processes to develop a new generation of technology to address difficult-to-remove contaminants. NWRI has already delved into this area of research by supporting Dr. Mamadou Diallo of the California Institute of Technology in his efforts to remove and recycle metals from the waste streams of the water treatment process by using dendrimers to attach to specific metal ions in the waste stream. Now, NWRI intends to hold a conference devoted to discussing recent advances and current research on the use of nanotechnologies to address water purification needs.

AMWA Manual on Strategic Marketing

NWRI is funding a research project sponsored by the Association of Metropolitan Water Agencies (AMWA) that will create a manual to help water utilities become more business and marketing savvy, including viewing the communities that they serve not just as customers, but as investors whose decisions impact the quality of water and, therefore, quality of life for themselves and future generations. The principal investigator and author is John

Members of NWRI's Independent Advisory Panel for the County of Orange's Nitrogen and Selenium Management Program include: (from left) Dr. Brock Bernstein (Consultant); Dr. JoAnn Silverstein (University of Colorado, Boulder); Dr. Mohsen Mehran (Rubicon Engineering Corp.); Dr. Roy Schroeder (U.S. Geological Survey); and Dr. Gerald Combs (U.S. Department of Agriculture).

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What's Next for NWRI?

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Ruetten of Resources Trends, Inc., who expects the AMWA guidance manual to be published by late 2006.

Putting a New Twist on Tradition

NWRI is best known for the research it supports and the publications it produces. However, it also offers many programs and activities that help everyone from young people interested in science to major agencies looking for guidance in holding workshops or managing consortiums. These are some of the programs that NWRI will be updating this year:

Southern California Salinity Coalition

NWRI has acted as administrator of the Southern California Salinity Coalition (SCSC), a non-profit organization devoted to removing salt from water supplies and preserving water resources in Southern California. NWRI is now in the processes of giving SCSC a fresh look by revamping its action plan and launching its own website (separate from NWRI's). SCSC also plans to award its first fellowship to a graduate student, at a university in Southern California, conducting research on salinity and its impacts on water resources.

Corporate Associates Program

NWRI's Corporate Associates Program was developed to foster collaboration and coordination among researchers and real-world practitioners in the water industry. Starting this year, funding from the Corporate Associates Program will directly support NWRI's Fellowship Program, which sponsors graduate research related to water resources. The newly redesigned Corporate Associates Program will allow corporations and consulting firms to actively work with NWRI in creating opportunities for the practical application of water research.

Keeping Up the Quality

There are some programs that NWRI has run for years, having built a reputation of providing the expertise and support needed to get things done efficiently and quickly. These are some of the activities that we not only will continue, but would like to highlight as services that NWRI specializes in:

Independent Advisory Panels

Last year alone, NWRI provided third-party oversight for six different projects or programs through Independent Advisory Panels. For instance, NWRI organized a Panel for the City of San Diego to provide technical and scientific review for its Water Reuse Study, which examined the feasibility of the

water reuse alternatives for the City. In completing its review, the Panel endorsed all of the City's proposed water recycling alternatives, including indirect potable reuse, based on its scientific and technical merits.

NWRI's two newest Panels, both convening for the first time in 2006, include reviewing the Nitrogen and Selenium Management Program for a watershed in Southern California on behalf of the County of Orange and the Water Master Plan for the City and County of San Francisco on behalf of the San Francisco Public Utilities Commission.

Nominal Group Technique Workshops

NWRI pioneered the use of the Nominal Group Technique (NGT) process for identifying, prioritizing, and developing approaches to address critical water issues. Since 1992, NWRI has held over 25 NGT workshops on topics ranging from non-potable water recycling to hurricane forecasting and warning. The workshops span 3 days and are facilitated by NWRI on behalf of another organization or agency. Many of these workshops have resulted in new projects or partnerships.

Looking to the Future

NWRI has had a great 15 years and is well positioned to continue that success based on three significant factors.

First, NWRI enjoys the generous support of the Joan Irvine Smith & Athalie R. Clarke Foundation, which provides the basis for NWRI to leverage its resources and maximize the impact of its research programs.

Second, NWRI has the support and guidance of its member agencies, who not only provide funding support, but also serve as NWRI's governance and fulfill the critical role of setting NWRI's goals and priorities.

Third, NWRI has a long history and reputation of being on the leading edge of water science and technology research. This history includes numerous collaborations with NWRI's partners, the formation of the Research Advisory Board, the work of NWRI's staff, and the support and loyalty of water professionals and stakeholders from the water community, state and federal agencies, universities, and other organizations from around the U.S. and the world.

Over the next few months, NWRI will be setting new challenges through our Board of Directors and Research Advisory Board. We would be very interested in receiving ideas from our colleagues and supporters that would impact NWRI's future directions. Please call (714-378-3278) or email (jmosher@NWRI-USA.org) me with your thoughts and suggestions. I look forward to hearing from you.

National Water
Research Institute

Member Agencies:

Inland Empire Utilities Agency

Irvine Ranch Water District

Los Angeles Department
of Water and Power

Orange County
Sanitation District

Orange County Water District

West Basin
Municipal Water District

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