



IWA PIPELINE



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INJECTION WELL ... CHAPTER 3

In the last two editions of the *Pipeline*, we explained how and why IWA will be constructing a deep injection well for disposal of our RO Plant brine waste stream and for the City of Sanibel's excess treated wastewater effluent. We also discussed early site preparation and permitting activities. In this article, Chapter 3, we will discuss well construction details and the safeguards which will be installed to protect our groundwater supply.

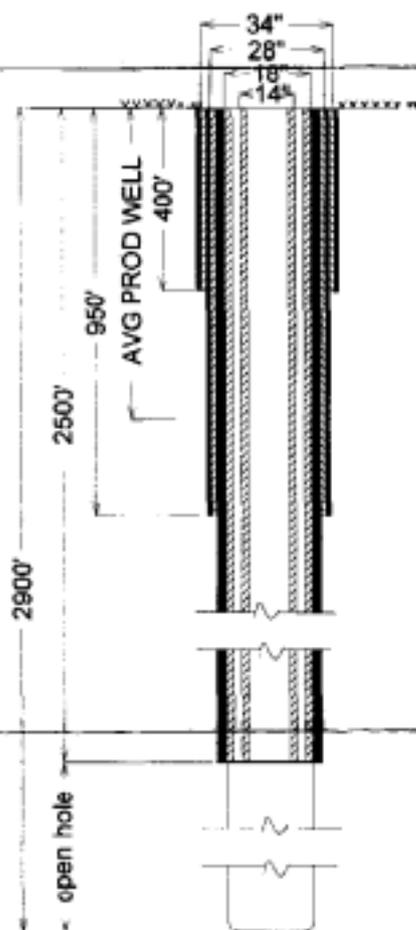
First, a little update on Chapter 2. On April 20, after over 4 months, the Florida Department of Environmental Protection finally issued the draft permit for construction of the injection well. A meeting to allow the public to provide comments regarding the project was held on June 1st in our main office complex. We hope to have the final permit issued by no later than July 1st. Drilling should begin very shortly thereafter, with completion expected by the end of the year and with the well in full operation by around April 2000. We have also signed a contract with the well driller, Youngquist Brothers, Inc. of Fort Myers. They have tentatively decided to use their larger drill rig (nearly 200 feet tall) in order to accelerate the drilling process, contrary to earlier plans to use a smaller one, as reported in Chapter 2. Also, with the larger rig, they are only planning to drill 24 hours per day 5 days per week (as opposed to 7 days previously anticipated), except for certain periods when drilling must continue for technical reasons. Now, on to Chapter 3 topics.

The injection well will be a very large project, costing nearly \$4 million. IWA will own and operate the well, with the City of Sanibel paying a portion (28.6%) of construction and operating costs, with the portion determined by anticipated usage rates. If Captiva decides to send their excess ef-

fluent to the well at some point in the future, a similar agreement will be negotiated with them. To finance its portion of the well, IWA has obtained a \$3 million loan at a very favorable interest rate (approximately 6.25%), fixed for the next 25 years.

The well will be constructed with a number of concentric (i.e.: having a common center) pipes, known as casings. Refer to the following sketch. From the ground surface to a depth of 400 feet, a 40 inch diameter hole will be drilled. A 34 inch diameter steel casing with a 3/8 inch wall thickness will be installed in this hole and the 3 inch annulus (i.e.: the ring-shaped space between concentric circles) between the casing and the hole will be filled with cement grout. Then a 34 inch diameter hole will be drilled from 400 feet depth to 950 feet below ground. A 28 inch diameter steel casing with a 3/8 inch wall thickness will be installed in this hole and the 3 inch annulus between the 34 inch and 28 inch casings will be filled with cement grout down to 400 feet depth. Then the remaining annulus between the 34 inch hole and 28 inch casing will be similarly filled from a depth of 400 feet, down to a depth of 950 feet. Next a 12 inch diameter "pilot hole" will be drilled from a depth of 950 feet to 2,900 feet. This hole will be closely inspected to confirm that the well will provide adequate injection capacity, then it will be back-filled with cement grout. Next, a 28 inch diameter hole will be drilled (through the just installed grout) from 950 feet to 2,500 feet depth. An 18 inch diameter steel casing with a 1/2 inch wall thickness will be installed in this hole and the 5 inch annulus between the 28 inch and 18 inch casings will be filled with cement grout down to 950 feet depth. Then the remaining annulus between the 28 inch hole and 18 inch casing will be similarly filled from a depth of 950 feet, down to a depth of 2,500 feet. Next (we're almost there!), an 18 inch diameter

hole is drilled from 2,500 feet to 2,900 feet depth. This is the open hole (no casing) where injection actually takes place. Finally, a 14 inch diameter steel casing (the "injection tubing") with a 1/2 inch wall thickness will be installed inside the 18 inch casing to approximately the same 2,500 foot depth, with the annulus between them sealed at the bottom by a "packer." The 2 inch annulus between the 18 inch and 14 inch casings will then be filled and pressurized with a non-toxic liquid, the pressure and quantity of which will be continuously monitored for leakage in either of these two innermost casings. Whew!!!



The whole point of the above marginally intelligible paragraph and sketch is that well construction will be very complex and involved (hence the \$4 million price tag!), and the final result will be a minimum of three concentric steel casings (combined wall thickness of 1 3/8 inches) to about 100 feet below our deepest production well. Below that level, there will be two concentric casings, with a combined wall thickness of 1 inch, with the annulus

between them continuously monitored to detect leaks in either one. In addition, we will perform a "mechanical integrity test" on the casings every 5 years, physically inspecting them via television cameras, etc., to ensure that the well remains leak-free. One might think that would be enough protection, but it's not all! Read on.

Since the fluids we will be injecting are lighter (much less salty) than the fluids already found at 2,900 feet below ground, we are also concerned that the injected fluids might somehow migrate upward through the approximately 1,200 feet of overlying non-porous rock layers. Therefore, we also will be drilling a 6 inch diameter deep monitoring well to a depth of around 1,700 feet, into the first porous rock layer above the non-porous layers above the injection zone. The water from this well will be frequently tested to enable us to immediately detect and take steps to correct the very remote possibility of any upward migration of injected fluids. There is also an existing (i.e.: free!) shallow monitoring well about 870 feet deep, which we will test to detect any upward migration that somehow was missed in the deep monitoring well. Even this shallow monitoring well is deeper than the production wells feeding the RO Plant, so we would have time to prevent contamination of our groundwater supply.

So the end result is that it would be virtually impossible for the injection well to contaminate our groundwater supply. First, all the concentric casings would have to leak, then the continuous monitoring of the innermost two casings would have to fail to detect the leak, and/or the injected fluids would have to migrate upward through about 1,200 feet of non-porous rock and go undetected in two monitoring wells at two different depths. The author of this newsletter, who is also IWA's General Manager/Chief Engineer (and who lives on the islands and drinks IWA water!) will not have many sleepless nights worrying about such a remote possibility.

Stay tuned to future issues of the Pipeline for construction updates. In the meantime, you can visit our internet site (www.islandwater.com), which has a live picture of the construction site. You can also stop by our offices from time to time and we will give you a tour of the drilling site (from a distance!). Please do not just drive onto the site to look for yourself, since the well construction activity, combined with our normal operations, result in a situation that could be very unsafe for onlookers without a knowledgeable guide. Thanks!

SO LONG, JACK



Jack Middlebrook has announced his retirement from The Island Water Association, Inc., effective on June 1, 1999. Jack has worked for IWA for over 23 years, coming to the islands in May 1978 from Charleston, South Carolina, where he served for 20 years in the United States Air Force. For many of his years with IWA, Jack served as Administrative Supervisor. He became Distribution Manager in 1995, looking after our 125 miles of buried distribution pipes and 4,500 meters. In both roles, Jack has become well known to many IWA members as he has dealt with their service problems and concerns.

Jack plans to remain in the Southwest Florida area for a few months before relocating to Virginia, where he will become involved in his third career! Jack is co-founder of Sanibel Sound, a business located near Roanoke. The company imports and distributes high-end audio equipment from manufacturers in Italy and France. It would appear that the word "retirement" is not in Jack's vocabulary!

In many ways, Jack has become the "institutional memory" of IWA. His vast knowledge of our past and hence understanding of where we are today, will be sorely missed by members and employees alike.

HELP!!!

Every so often in the *Pipeline*, we make a plea for more members to join our automatic bill paying program. We have been **very** pleased with the response by our members every time we make this plea. But guess what. It's that time again!!

Handling twelve monthly bill payments for every

one of our 4,500 members is a very time consuming and expensive process for us (and therefore our members). By the time we mail your bill and process your payment, we conservatively estimate it costs us 55¢. Multiply that by 4,500 bills twelve months per year, and you start to see why we make this plea. It amounts to nearly \$30,000!

Fortunately, over 750 members have already chosen to help us out by using our automatic bill paying option. Not only does that save us nearly \$5,000 per year, but these members are also saving twelve 33¢ stamps and envelopes! Not to mention avoiding the aggravation of remembering to pay their water bill every month.

In the automatic bill paying program, we debit your bank account every month on the **last** possible day, which is the due date. You will still receive a bill so that you can check it and give us a call if you believe there is a problem, long before your account is debited.

To join this program, stop by our offices and pick-up an application form, or just call us and we'll mail you one. Complete the form and either mail it to us (P. O. Box 509, Sanibel) or drop it off at our offices. You can include it with your normal monthly payment check and save yet another stamp and envelope! Also, please include a blank check with "VOID" written across it. Your bills will clearly indicate when your automatic payment plan actually begins.

Thanks! If you have any questions, just call our offices at (941) 472-1502.

Y'ALL CAME!!

At our Annual Meeting on April 12th, we were VERY glad to see a better than normal attendance for the second year in a row, with very few empty seats. Everyone enjoyed the traditional coffee and donuts before the meeting, and some accepted our offer of plant, injection well site and office tours afterwards.

President Timothy Gardner presided over his last Annual Meeting this year, after serving the maximum of six years on the Board of Directors, the last one as President. He thanked the Membership for the opportunity to be of service and reviewed changes at IWA over the last six years, including:

- Construction of our new office complex.
- Remodel of the RO Plant building.

- Installation of a 1.2 megawatt emergency generator.
- Avoidance of any rate increases since 1993, with a 7.5% decrease in 1994.
- Significant productivity improvements due to increased computerization of operations.

Vice President/Treasurer Harley Derleth reported that IWA's financial position remains strong and stable, and is in fact improving every day, with adequate reserves for whatever unforeseen needs may develop. He also reiterated IWA's continuing concern with local environmental issues. We are poised to spend \$3 to \$4 million for a new deep injection well to improve the manner in which both IWA and the City of Sanibel dispose of their waste streams. We also continue to remain vigilant with regard to our water quality, with approximately 20% of our assets devoted to ensuring that we provide our members with the highest quality water possible.

General Manager Roger Blind reported that 1998 had been another good year for IWA's operations:

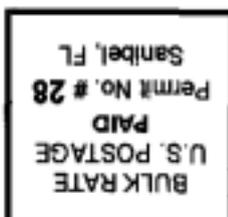
- Water production was up by 5.5% over 1997, and total revenue was up by \$320,000.
- IWA completed 34 capital projects in 1998, costing \$1.1 million.
- Sale of the old ED Plant site for \$500,000 was one of the one of the main reasons our reserves increased in 1998.
- The deep injection well will be the largest capital project we have ever undertaken.
- We have decided not to allow cellular towers on any of our property.

- We are working hard to ensure that water service will not be interrupted by the Y2K computer problem.
- Pete Wilson, Production Manager, retired in October 1998, after over 22 years of exemplary service. Jack Middlebrook, Distribution Manager, has announced his retirement in June 1999, after over 23 years of equally exemplary service.

After the reports were complete, members raised a number of questions on a variety of topics, ranging from various environmental concerns regarding the deep injection well (we are aware of the concerns and have designed the well to avoid any such problems), to why we have not paid-off old, high interest rate loans (pre-payment penalties make that option economically unattractive).

Paul E. Garvey was re-elected to a third and final two year term on the Board. Robert B. Davison was elected to serve his first two-year term. Mr. Davison had filled the seat of departing Board Member, Paul Storves, since November of 1998. Stella E. Farwell was also elected to fill the vacant seat left by departing Board President, Timothy A. Gardner.

At a special meeting of the Board of Directors following the Annual Meeting, officers for the next year were elected as follows: President: Harley R. Derleth; Vice Presidents: Robert B. Davison and Stella E. Farwell; Vice President/Secretary: Richard A. Calabrese; Vice President/Treasurer: Paul E. Garvey.



The Island Water Association, Inc.
P.O. Box 509
Sanibel, FL 33957