(NRDC), bottled water regulations lacked the quality control mandated to public water supplies. NRDA tested samples of 1,000 bottles from 103 brands, some of which were found to contain contaminants such as synthetic organic chemicals, bacteria and arsenic.

There is uncertainty whether regulations governing bottled water are adequate to ensure purity or safety. Bottled water regulations are administered by the Food and Drug Administration (FDA) and are not as stringent as those required of public water supplies. Table 1 below is a comparison of the 1999 standards required of tap water and bottled water. It shows rigorous controls for tap water for constituents such as fecal coliform and Cryptosporidium.

In recent years, FDA has moved toward regulations that put it in line with EPA regulations for public drinking water supplies. Marketing within the individual states may not be regulated; however, public water supplies are required by EPA to send an annual report to their consumers on water quality.

So the question is: should we be consuming more bottled water because of some phobia about tap water created by advertising propaganda? Literally billions of plastic bottles are used once and discarded each year. A large portion of these, including juice drinks, electrolytes and carbonated sodas, will end up in the landfills. The plastic material, PET or PETE, of which the bottles are made is not biodegradable, which means it could be around for generations. The only answer to this problem is a greater concentrated effort at recycling.

The AWWA (American Water Works Association) celebrates its 125th anniversary this year and is the foremost authority on treatment of water for public consumption. It takes pride in delivering good quality potable water to the public. In a recent promotion AWWA distributed water bottles highlighting the following reasons to fill up with tap water (Opflow/February 2006):

- Free refills at participating faucets
- Refill vs. landfill
- Undergoes more testing than professional athletes
- Trendy people drink it when you're not looking
- Source water for bottled water with fabulous label

One final thought: if you have a computer, go to a search engine such as Google and type in "bottled water". It has much more information than can be included in a newsletter. For example, there is an upscale brand of bottled water known as Evian. When you spell it backwards, you reach an interesting conclusion. Are they trying to tell us something?

Water Type	Disinfection Required	Confirmed E. Coli & Fecal Coliform Banned?	Testing Frequency for Bacteria	Must Filter to Remove Pathogens, or Have Strictly Protected Source?	Must Test for Cryptosporidium Giardia, Virus
Bottled Water	No	No	1/week	No	No
Carbonated or Seltzer water	No	No	None	No	No
Big City Tap Water (using surface water)	Yes	Yes	Hundreds/month	Yes	Yes

Table 1 (Source:NRDC)

Annual Pumpage Summary

The average daily pumpage for the year 2005 was 169 mgd (million gallons per day). Pumpage results are summarized in table 2. Public-supply pumpage accounted for 51% of the total and industrial pumpage 49%. The bar graph (figure 1) shows the pumping trends over the past 20 years.

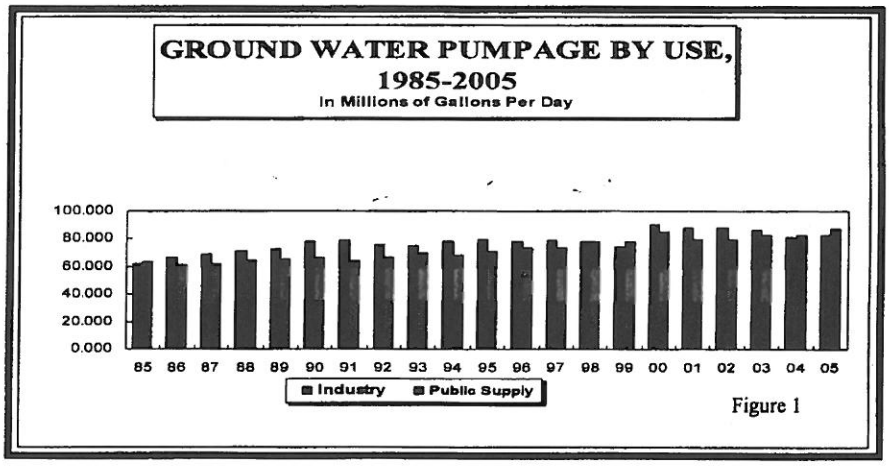
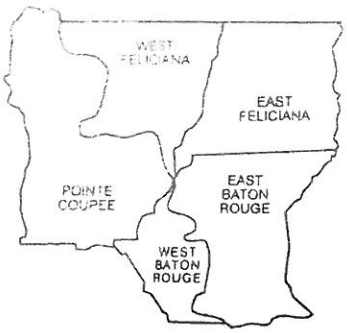


Figure 1



Capital Area Ground Water Conservation Commission

Watching out for A Treasured Earth Resource

Dedicated to the conservation, orderly development and protection of quality of ground water in the Capital Area

Volume 32, Number 1 **NEWSLETTER** *July 2006*

Commission & District News

Scheduled Meetings. – The Technical Committee will meet at 1:30 p.m. Tuesday, September 12, 2006 in the conference room of the U.S. Geological Survey at 3535 South Sherwood Forest Boulevard, Baton Rouge. The regular meeting of the Board of Commissioners will be held at 9:30 a.m., Tuesday, September 19, 2006 in the conference room of the U.S. Geological Survey. The Administrative Committee will meet at 8:30 a.m. in the Commission office, Suite 129, 3535 South Sherwood Forest Boulevard, one hour before the regular meeting.

May & June Meetings. – The Long-Range Planning Committee met in May and June to develop plans for the next 5 to 10 years. The first priority is to evaluate and extend the monitoring network to stay abreast of saltwater encroachment. In order of priority, the "2,000-foot" and "1,500-foot" sands need additional information because of their proximity to industrial and public-supply pumping areas. Funding is critical to this project, and the committee discussed several options at the June meeting. Another meeting will be called prior to the September Commission meeting. At that time, the committee is expected to have in place a plan of action for the short-term (5years) and long-term (10 years).

June Meeting. – The Technical Committee met on Tuesday June 13th at the USGS office, 3535 South Sherwood Forest Blvd,., Baton Rouge, Louisiana.

Doug Carlson and Thomas Van Biersel from the Louisiana Geological Survey at LSU gave a presentation on the modeling study areas in Louisiana which include (1) the Chicot (2) Southern Hills (3) Evangeline-Jasper-Catahoula and (4) Cockfield-Sparta-Wilcox. The models are regional in scope but can be adapted to parishes or local problems. Carlson reported that the Chicot model is essentially completed.

Van Biersel reported on the Southern Hills aquifer. Data for the study has been collected from the files of USGS, DEQ, DOTD and DNR. Hydraulic conductivity is being assembled from pumping tests, specific capacity tests and sieve analyses. Water levels are determined from potentiometric maps of the area.

Formation factors will be determined for each aquifer. Formation factor (F) requires a combination of electrical log data and water quality of the formation. It is expressed as the ratio of $R_o/R_w=F$ where:

- R_o is the resistivity read from the long-normal curve on the electrical log
- R_w is the resistivity of the water in the formation

Formation factors that are quantified for a particular aquifer are a useful tool for estimating water-quality parameters such as chloride concentration. The data collected will be used to derive other information on the aquifer system such as geotechnical data on clays, clay thickness and depth to shallow sands.

Bottled vs. Tap Water

Bottled water consumption has grown dramatically in recent years. A public perception of purity is driven by advertising and labeling that depicts glaciers, clear mountain springs and the like. However, bottled water is not necessarily safer or cleaner than tap water. According to a 1999 report by Natural Resources Defense Council

Pumpage by Aquifer, 2005 (MGD)						
Aquifer	East Baton Rouge	East Feliciana	Pointe Coupee	West Baton Rouge	West Feliciana	Total
Shallow	.048					.048
400	4.425					4.425
400/600	11.521					11.521
600	7.043					7.043
800	1.458			1.205		2.663
1,000	4.989			1.295		6.284
1,200	21.058	.016	.759	1.185		23.018
1,500	16.199	.165	.225	2.729		19.318
1,500/1,700	7.975					7.975
1,700	5.122		.324	.165		5.611
2,000	21.503		.467		2.474	24.444
2,400	17.604	.369	.477		.957	19.407
2,800	27.823	1.596	1.530		1.496	32.445
Catahoula		.916				.916
Totals	150.917	3.062	3.782	6.579	4.927	169.267

Table 2

A summary of pumpage by parish over the last six years is shown in in table 3.

The year 2000 remains the highest average pumpage on record. The influx of evacuees from hurricane Katrina and population growth in East Baton Rouge Parish did not affect significantly the average pumpage in 2005. Predictably, an upward trend is likely to occur in 2006 as permanent residents settle here. The first quarter of 2006 shows an average pumpage of 162 million gallons per day.

Gerald Walker

We were saddened to hear of Mr. Walker's sudden death on March 22, 2006. Gerald, a CPA, did our annual audits for the District over the past several years. He was a cordial, likeable person and we enjoyed working with him and discussing financial matters affecting the District. He will be greatly missed.

Year	East Baton Rouge	East Feliciana	Pointe Coupee	West Baton Rouge	West Feliciana	Total
	Pumpage (mgd)					
2000	154.615	3.148	4.611	6.571	5.777	174.222
2001	149.397	3.115	3.614	6.330	4.864	167.319
2002	149.995	2.928	3.748	6.174	4.946	167.319
2003	150.620	2.905	3.521	6.392	5.126	168.564
2004	145.213	2.875	3.737	6.829	5.115	163.769
2005	150.917	3.062	3.782	6.579	4.927	169.267

Table 3

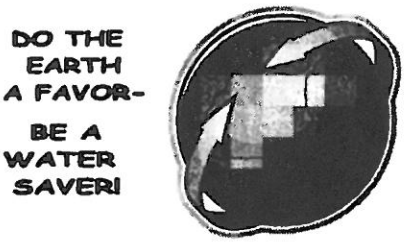
Meetings

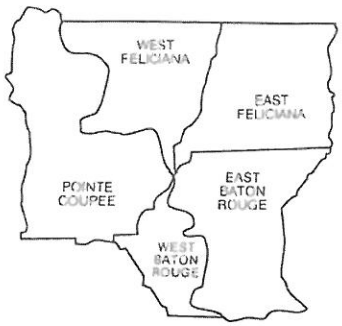
July 18, 2006, Lorman Education Services,**"Protecting Groundwater Resources Through a Successful Wellhead Protection Program in Louisiana"**, Marriott Hotel, Baton Rouge, Louisiana; for registration call (866) 352-9539.

October 8-11, 2006, AWWA Southwest Section Annual Meeting; Baton Rouge, Louisiana. Contact David Kincannon (405)372-5300.

Any man worth his salt will stick up for what he believes right, but it takes a slightly better man to acknowledge without reservation that he is in error.

Andrew Jackson





Capital Area Ground Water Conservation Commission

Watching out for A Treasured Earth Resource

Dedicated to the conservation, orderly development and protection of quality of ground water in the Capital Area

Volume 32, Number 2 **NEWSLETTER** *October 2006*

Commission & District News

Scheduled Meetings. – The Technical Committee will meet at 1:30 p.m. Tuesday, December 5, 2006 in the conference room of the U.S. Geological Survey at 3535 South Sherwood Forest Boulevard, Baton Rouge. The regular meeting of the Board of Commissioners will be held at 9:30 a.m., Tuesday, December 12, 2006 in the conference room of the U.S. Geological Survey. The Administrative Committee will meet at 8:30 a.m. in the Commission office, Suite 129, 3535 South Sherwood Forest Boulevard, one hour before the regular meeting.

September Meetings. – The Technical Committee met at 1:30 p.m., Tuesday, September 12, 2006, at 3535 South Sherwood Forest Blvd., Baton Rouge, Louisiana. The Technical Committee meeting was called to order by Chairman Dale Aucoin. The meeting was a continuation of discussion on the Long Range Committee's August 24th meeting to come up with a plan of action to deal with saltwater encroachment in the affected aquifers. The discussion was centered on two main issues: (1) adding monitor wells at strategic locations to define the areas of advance of saltwater or (2) do some preliminary modeling to define the aquifer flow systems and predict the arrival of saltwater at the major pumping centers. After modeling predictions are studied, monitor well placement would be given consideration to fill in the gaps where data are needed. The USGS will develop a proposal to model the "2,000-foot" (which is highest priority at this time) and present it to the Commission. The Long Range Committee will meet again in October to discuss and revise the long-range plan.

Sparta Reclamation Project

The city of West Monroe has a plan to reduce pumping from the Sparta aquifer by 10 million gallons per day. Reported in the Ruston Daily Leader, June 14, 2006, the city is working on a partnership with a local industry to use reclaimed gray water in their plant operation. A pilot project will process a million gallons per day and operate for a full year. The process consists of a dissolved air flotation unit, along with an activated carbon filtration unit. The plant has received FDA approval on the project.

Algae is reported to be the biggest problem in recycling gray water. The air flotation unit removes algae by bubbling it to the surface where it is raked off. The water is then run through pressurized activated carbon units that remove everything else. The city's Environmental Quality manager reports that it meets the standards for the plant which manufacturer paper for packaging.

Overpumping from the Sparta has been a concern for officials, legislators and citizens of north Louisiana for many years. The main problems are declining water levels and saltwater encroachment toward pumping areas. Sounds familiar to the Baton Rouge area. The freshwater-saltwater interface for the aquifer is near West Monroe. Their goal is to:

- Protect the Sparta and allow future growth
- Provide a sustainable water supply for the plant and protect jobs
- Find a good use for recyclable waste water and decrease the amount of water discharge into the Ouachita River

In 2004, the Capital Area Ground Water Conservation Commission entered into a contract with East Baton Rouge Parish to do a feasibility study using gray water for some industrial applications. The first phase of the study consisted of taking an inventory of industries and their water requirements. The next phase (2005) had funding from the Corps of Engineers but the consulting firm on the project reports that it is no longer being funded.

In spite of all this, reclaimed water is a viable option that should not be discounted as a source of usable water. Modern technology is capable of upgrading the quality of water to the standard that is desired. Baton Rouge has the same problems that occur in the Sparta aquifer i.e., water-level decline over time and saltwater encroachment. The only difference for Baton Rouge is that we have several aquifers to tap, which is a more favorable management situation.

Chloride Monitoring Project

The Commission and U.S. Geological Survey entered into an agreement in 2004-2005 to do an extensive chloride sampling project in East and West Baton Rouge to monitor saltwater encroachment. One hundred or so wells were sampled in addition to the regularly sampled wells in the network. Several wells that had previously indicated only background levels of chloride concentration (<10mg/L) showed notable increases. A summary of wells, aquifers and chloride results are shown in the following table. (*The data are preliminary unpublished results subject to revision.*)

The project was extended into 2006 to do some follow-up sampling of wells where chloride concentration was changing. The results of the follow-up sampling will be available later this fall.

WELL	DATE	SAND	CHLORIDE (MG/L)	LOCATION
EB-793	11/29/04	"600-foot"	29.2	N. 14th Street
EB-1328	09/08/04	"1,000-foot"	222	Weiner Station
EB-621	09/04/04	"1,200-foot"	135	Westminster Station
EB-621	12/17/04	"1,200-foot"	117	Westminster Station
EB-621	04/13/05	"1,200-foot"	101	Westminster Station
EB-413	09/02/04	"1,500-foot"	11.5	Government Street
EB-413	12/17/04	"1,500-foot"	12.3	Government Street
EB-413	04/13/05	"1,500-foot"	13.6	Government Street
EB-658	09/02/04	"1,500-foot"	51.1	Lula Station
EB-658	04/13/05	"1,500-foot"	55.8	Lula Station
EB-917	12/15/04	"1,500-foot"	50.5	Webb Park
EB-918	12/16/05	"1,500-foot"	915	Witter Estate
EB-938	09/02/04	"1,500-foot"	14.6	Lula Station
EB-938	12/17/04	"1,500-foot"	17.5	Lula Station
EB-938	04/13/05	"1,500-foot	18.6	Lula Station
WBR-113	10/28/04	"1,500-foot"	247	Plaquemine
WBR-113	04/15/05	"1,500-foot"	257	Plaquemine
WBR-113	07/12/05	"1,500-foot"	235	Plaquemine
EB-1150	09/02/04	"2,000-foot"	167	Convention Street
EB-1150	12/08/04	"2,000-foot"	164	Convention Street
EB-804B	12/13/04	"2,400-foot"	111	Airline @ Nesser Overpass
EB-750	09/03/04	"2,800-foot"	67.2	Southern Univ.
EB-750	12/17/04	"2,800-foot"	67.2	Southern Univ.
EB-750	04/13/05	"2,800-foot"	68.3	Southern Univ.

Remediation in Other Areas

Denver. – In 1999 a water audit by the city of Denver revealed that the zoo was one of its top users at 300 million gallons/year. Using grant money, the zoo began a reclamation project to decrease its use of public water for which it was paying almost a million dollars a year. The zoo's water use had consisted of a once-through operation that was both costly and wasteful.

They revamped the polar bear and seal's exhibits by installing a filtration process by which recycled water was used instead of constant draining and refilling. The waterfowl areas of the zoo had always been a once-through system. Part of the exhibit was turned into a wetland where water was percolated through sand and gravel filters and reused. Water use was reduced by 98%. Further reduction has been accomplished by the zoo's

use of recycled water from Denver Water to irrigate the 80-acre campus.

Tampa Bay. – A growing population projected to be over 2 million by 2020 coupled with overpumping of ground water led to declining water levels and causing saltwater intrusion to move inland. Going online this year, a 25 mgd desalination plant will augment the ground water and surface water sources to meet the projected demand. Monitoring of the dumped brine will be conducted to determine if there are any harmful environmental effects.

Baton Rouge. – Although the number may be disputed by the agencies involved, the population of the Capital Area has increased considerably since Hurricane Katrina. With the population increase comes an increased demand for water. Now is the time to look ahead 20 or 30 years to see what the projected needs will be. Eventually, as saltwater encroachment reaches areas of pumping wells, alternatives may be called for. Desalination is a possibility in areas where the aquifers contain brackish water. Economically, desalination of brackish water is cheaper than it is for saltier seawater (e.g. Tampa Bay). A variation of desalination is the use of scavenger wells, where fresh and salt water are pumped simultaneously and the saltwater dumped.

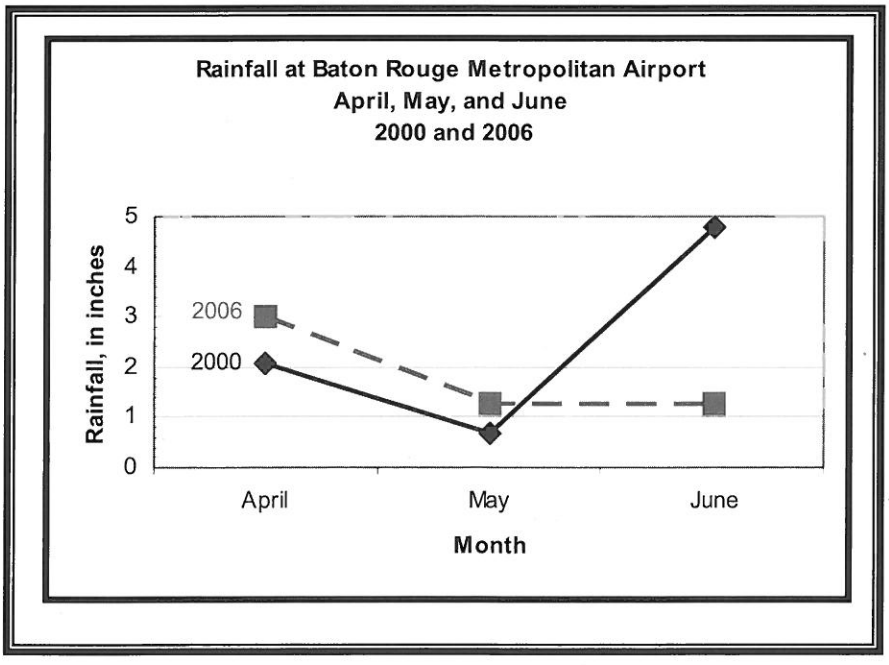
There is a possibility that the future water needs of Baton Rouge will be a combination of sources such as the Tampa Bay area. All of the components are readily available. Surface water of good quality can be obtained from the Amite-Comite River system. It has an advantage over the Mississippi River due to low hardness and dissolved solids as well as clarity. Within the next decade the Comite River Diversion Canal should be completed. The impoundment will have a storage capacity of billions of gallons of good quality water.

It is also interesting to note that research in membrane technology is moving forward. An article in the AWWA Journal (April 2006) by Kumar et.al. states: *Desalination of brackish ground water represents an important alternative resource for water utilities. High-pressure membranes that use reverse osmosis (RO) and nanofiltration (NF) are recognized as a viable technology for ground water desalination. New membranes are being rapidly introduced into the market, highlighting the need for standardized evaluation protocols.*

Pumpage 2nd Quarter 2006

Total pumpage for the 2nd quarter was 191 million gallons per day. This amount exceeds the drought year (2000) which showed a total of 180 million gallons per day for the 2nd quarter. The second quarter was hotter and drier than usual. The months of May and June 2006 recorded well below average rainfall for Baton Rouge (see graph). The summary below shows a substantial pumpage increase for public supply use but a decline in industrial pumage. In the past few years industry has made strides in ground-water conservation by recycling and switching to more river water usage.

Year	2nd Quarter	Increase	Industrial	Increase	Public Supply	Increase
2006	191 mgd	6%	84.6	-6%	106.6	18%
2000	180 mgd	----	89.7	----	90.1	----



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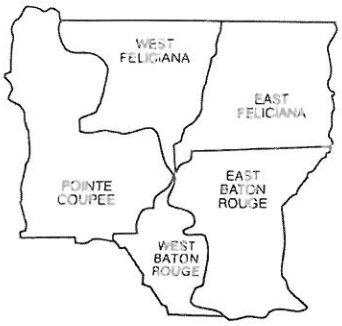


Capital Area Ground Water Conservation Commission

Watching out for A Treasured Earth Resource

Dedicated to the conservation, orderly development and protection of quality of ground water in the Capital Area

Volume 32, Number 3 **NEWSLETTER** *January 2007*

Commission & District News

Scheduled Meetings. – The Technical Committee will meet at 1:30 p.m. Tuesday, March 13, 2007 in the conference room of the U.S. Geological Survey at 3535 South Sherwood Forest Boulevard, Baton Rouge. The regular meeting of the Board of Commissioners will be held at 9:30 a.m., Tuesday, March 20, 2007 in the conference room of the U.S. Geological Survey. The Administrative Committee will meet at 8:30 a.m. in the Commission office, Suite 129, 3535 South Sherwood Forest Boulevard, one hour before the regular meeting.

December Meetings. – The Technical Committee met at 1:30 p.m., Tuesday, December 5, 2006, at 3535 South Sherwood Forest Blvd., Baton Rouge, Louisiana.

Paul Frederick, USGS presented updated information on the three subsidence monitor wells located in the industrial area. New equipment was purchased and installed on the wells in 2002 resulting in more accurate data collections. The wells were completed at three depths: shallow (600-foot sand), intermediate (1,700-foot sand), and deep (2,800-foot sand). Overall subsidence for the past four years is about 0.1 foot, which is due to pumpage from the entire section of freshwater sands.

The results show a similarity to the data presented by Whiteman (1980) in an earlier report. Elastic compaction and rebound are exhibited in the shallower units. These sands display seasonal high and low water levels affected by the loading effect of seasonal river stages. The three wells are maintained by the USGS in a cooperative agreement with the Commission.

The Committee had an extended discussion on plans to model the "2,000-foot" sand. Earlier meetings by the Long Range Committee had indicated a need for monitor wells to delineate the area of saltwater encroachment. The plan was then revised to build a model which would give better definition to locations where wells were needed and predictive estimates of direction and rate of movement of advancing saltwater.

A proposal was presented by the USGS to model the "2,000-foot" sand. The project would be extended over a four year period with a total cost of about half a million dollars. The completed study would consist of a model that would be used as a management tool to determine future use. An alternative proposal was suggested to include the "1,500-foot" sand in the proposal. In order to fund the proposal the Commission will seek assistance from the major sources including parish and state government, industry and public supply users. The plan was discussed further at the regular Commission meeting December 12th, and the alternative proposal to include the "1,500-foot" sand was adopted.

Water–Level Trends 2006

A summary of hydrographs through October shows downward trends in most of the aquifers. The second quarter pumpage for the District was 13% over the previous year, and most of the increase was due to public supply use (figure 1). A significant increase in population occurred following hurricane Katrina, resulting in a greater demand for public supply water.

Key observation well graphs are shown on page 3. Water levels through October 2006 are plotted on the graphs. Summaries of the water-level trends are shown in table 1. It should be pointed out that the water-level trends as seen in the table are in proportion to the well's location with respect to the area of maximum drawdown. For example, well EB-367 is in such an area and shows a decline of 4 ft/yr. Well EB-168 is located off-center from the point of maximum drawdown, and indicates a decline of 2 ft/yr.

Well	Sand	Trend	Rate
EB-146	"1,200-foot"	Falling	3.5 ft/yr (10-year period)
EB-168	"1,500-foot"	Falling	2.0 ft/yr (10-year period)
EB-804A	"1,700-foot"	Falling	3.2 ft/yr (10-year period)
EB-367	"2,000-foot"	Falling	4.0 ft/yr (10-year period)
EB-806B	"2,400-foot"	Falling	3.0 ft/yr (10-year period)
EB-468	"2,800-foot"	Falling	1.5 ft/yr (10-year period)

Table 1

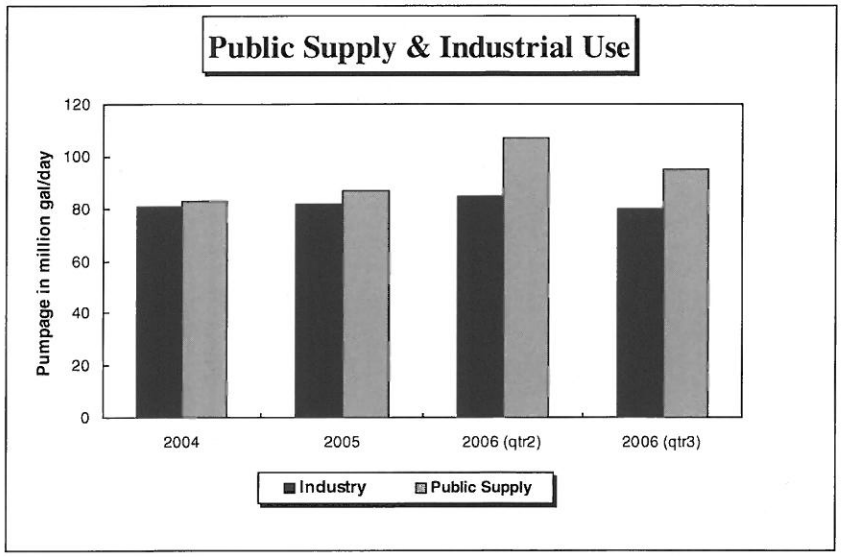


Figure 1

The bar graph in figure 1 depicts the increase in public-supply use over the past three and a half years. The trend in industrial pumpage is almost level over the same period, and is probably due to increased use of the Mississippi River for industrial processes.

Water Conservation

In many parts of the United States, water conservation is not just a byword. In times of drought it may be enforced by local ordinances. People are asked to cut back on water use in many ways. Lawn watering and car washing are restricted. Even in Louisiana most of our aquifers are showing water-level declines and quality problems associated with saltwater encroachment.

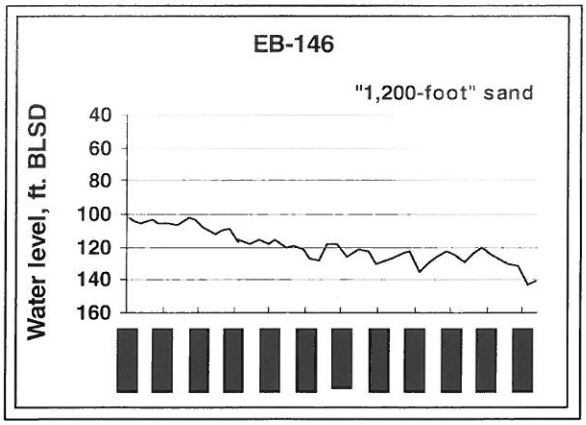
A study made by Texas A&M University reported that 20 percent of potable water in the United States is used to flush toilets and urinals. A conventional urinal in an office building will use an average 40,000 gallons of water per year (U.S. Water News, October 2006). Unfortunately, this water is good quality drinking water. In our office here, the urinal has a tendency to overflush. Water cascades down the drain and sometimes on the floor because the cutoff valve does not operate efficiently. Many older toilets across the country are notorious water wasters, using 3.5 up to 8 gallons per flush. Since 1992, standard toilets have a 1.6 gallon tank and an enlarged trap at the bottom of the toilet to allow quicker removal of water and waste.

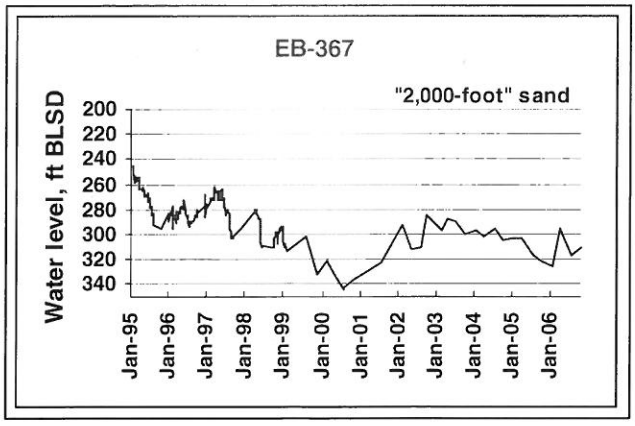
A 51-story Bank of America building is being constructed in New York that will have low-flow faucets, toilets and showers. As for the urinals, they will be waterless. Besides saving water, there is a savings in electricity because less water is required to be pumped up to the floors of the building. The waterless urinal works in the following manner.

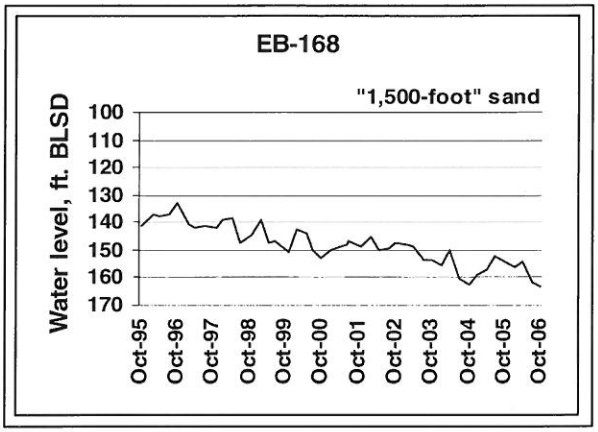
- Gravity drains the urine into a trap cylinder
- The trap cylinder is equipped with a thin layer of sealant that prevents odors from escaping
- Water flows from the cylinder into a drainpipe connected to the urinal

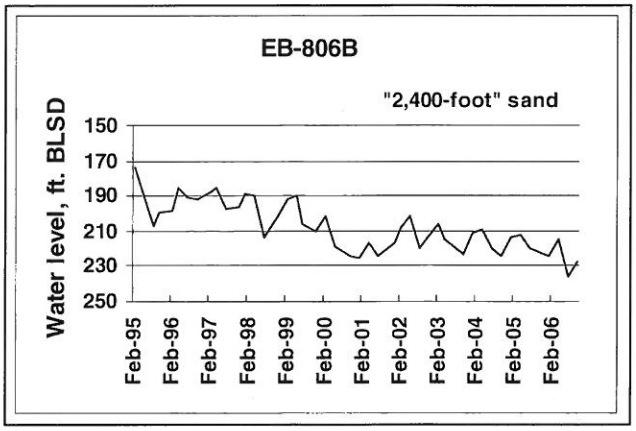
Discourage litigation. Persuade your neighbors to compromise whenever you can. As a peacemaker the lawyer has superior opportunity of being a good man. There will still be business enough.

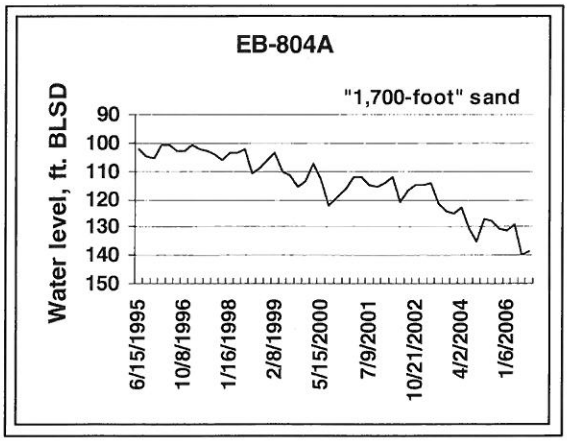
Abraham Lincoln

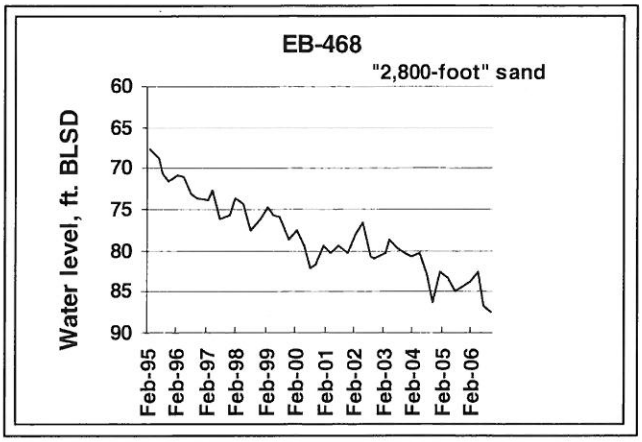

EB-146
"1,200-foot" sand
Water level, ft. BLSD
40
60
80
100
120
140
160

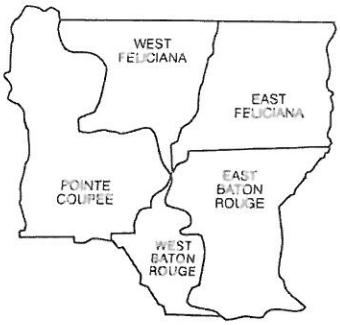

EB-367
"2,000-foot" sand
Water level, ft BLSD
200
220
240
260
280
300
320
340
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06


EB-168
"1,500-foot" sand
Water level, ft. BLSD
100
110
120
130
140
150
160
170
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06


EB-806B
"2,400-foot" sand
Water level, ft. BLSD
150
170
190
210
230
250
Feb-95
Feb-96
Feb-97
Feb-98
Feb-99
Feb-00
Feb-01
Feb-02
Feb-03
Feb-04
Feb-05
Feb-06


EB-804A
"1,700-foot" sand
Water level, ft. BLSD
90
100
110
120
130
140
150
6/15/1995
10/8/1996
1/16/1998
2/8/1999
5/15/2000
7/9/2001
10/21/2002
4/2/2004
1/6/2006


EB-468
"2,800-foot" sand
Water level, ft. BLSD
60
65
70
75
80
85
90
Feb-95
Feb-96
Feb-97
Feb-98
Feb-99
Feb-00
Feb-01
Feb-02
Feb-03
Feb-04
Feb-05
Feb-06



Capital Area Ground Water Conservation Commission

Watching out for A Treasured Earth Resource

Dedicated to the conservation, orderly development and protection of quality of ground water in the Capital Area

Volume 32, Number 4 **NEWSLETTER** *April 2007*

Commission & District News

Scheduled Meetings. – The Technical Committee will meet at 1:30 p.m. Tuesday, June 12, 2007. Discussion at the last meeting indicated an interest in visiting the site of the Comite River Diversion Canal. More information will be sent to Committee members at a later date. The regular meeting of the Board of Commissioners will be held at 9:30 a.m., Tuesday, June 19, 2007 in the conference room of the U.S. Geological Survey. The Administrative Committee will meet at 8:30 a.m. in the Commission office, Suite 129, 3535 South Sherwood Forest Boulevard, one hour before the regular meeting.

December Meetings. – The Technical Committee met at 1:30 p.m., Tuesday, March 13, 2007, at 3535 South Sherwood Forest Blvd., Baton Rouge, Louisiana.

Dietmar Rietschier, Director of the Amite River Basin Commission, presented information on the Comite River Diversion Canal. The completed canal will convey flood water from the Comite River westward to the Mississippi River. Construction on the west end at Lilly Bayou has started. A 60 foot drop in elevation from the canal to the valley floor will readily dispose of the flood water. Water will be diverted through a weir when the Comite River stage reaches 5 feet above normal flow. About 50% of the flow will go to the diversion canal. For a 10-year flood event, stage reduction on the Comite River at White Bayou is projected to be 6.2 feet. The decreased flow of the Comite River into the Amite River will reduce the stage of the Amite River at Denham Springs by 1.5 feet and at Port Vincent 0.8 foot for a 10-year flood event. Funding for the project is 70% Federal and 30% non-federal. Part of the user-federal match is paid by residents living within the Amite River Basin through a 3 mill property tax. As of October 2006 the cost for completing the project will be $172,000,000.

In other business, discussion between the Technical Committee and U.S. Geological Survey representatives was held to consider the funding arrangements for the modeling study of the "2,000-foot" sand. An annual breakdown of the proposed funding is shown in the table below. The total amount over a four-year period is $700,000.

Water Shortage

With the prolonged drought in the plains and western states over several years, water managers are looking seriously at new innovations to conserve their water resources. Available water is limited, and rapid growth in some areas has called for measures to curb wasteful practices of water use. Las Vegas, NV is reportedly one of the fastest growing

Year	CAGWCC	USGS	LA DOTD	EBR	Other Parties
July 2007 – June 2008	$50,000	$43,000	$32,000	$25,000	$25,000
July 2008 – June 2009	$50,000	$43,000	$32,000	$25,000	$25,000
July 2009 – June 2010	$50,000	$43,000	$32,000	$25,000	$25,000
July 2010 – June 2011	$50,000	$43,000	$32,000	$25,000	$25,000
TOTAL	$200,000	$172,000	$128,000	$100,000	$100,000

cities in the country. It relies on nearby Lake Mead, which has seen its surface lowered due to decreased runoff upstream. Tourists visiting the lake can see the "bathtub rings" around the shoreline where the water once stood. Upstream, Lake Powell has experienced the same problem with below average runoff. If its supply is low it cannot supply any excess water to Lake Mead.

The only option is to restrict the use of water. New homes in Las Vegas are required to have artificial turf or use xeriscaping on their property. Xeriscaping makes use of native plants and grasses for landscaping. These plants have adapted to the arid climate, which only receives an average of 4 inches of rainfall per year.

As we move forward in this century, water availability will be stressed in many areas, and water managers will need innovative solutions. The next article discusses what is happening in Texas.

Water Conservation in Texas

The Texas Water Development Board has submitted a report (December 2006) to the Legislature on rainwater harvesting. A committee was required to study its potential and develop water quality guidelines for indoor use of harvested rainwater. Some of the recommendations include:

- New state buildings exceeding 10,000 square feet of roof space would include rainwater harvesting in their design
- Encourage harvesting in residential, commercial and industrial facilities
- Legislative appropriations made available to provide matching funds for demonstration projects

In Austin, Texas, a historical perspective of conservation efforts by Gregg et.al. in the AWWA Journal (February 2007) discusses steps that were taken over the past two decades to develop better water efficiency. Among the other steps that were taken, xeriscaping and rainwater harvesting were included in the conservation program. The city has distributed more than 8,900 rain barrels to collect excellent quality rainwater for plant watering. As a result of the Austin plan, pumpage of water leveled off in comparison to the rapid population growth between 1984 and 2001 (figure 1). A photo of rain collection barrels is shown in figure 2.

Even in water-rich Baton Rouge, plants become stressed for lack of water during the hot summer months. Last year saw a large number of trees die in the eastern part of the parish partly from hurricane wind damage and also the effects of an extended dry spell.

At one time cisterns were in common use in Louisiana. These, or some variation of them (e.g. rain barrels), could still be quite useful for watering plants. Rainwater is excellent for the watering of potted plants especially.

FIGURE 1 Austin area population and total water use changes, 1984–2001

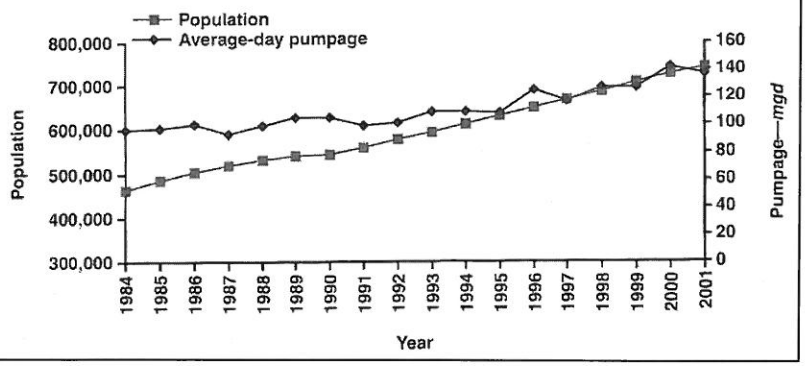


Figure 2

Tap water in the Capital area, though of very good quality for most purposes, is not a good choice for potted plants. The dissolved solids in the water build up in the potted soil as the water evaporates. On the other hand, rainwater is virtually free of dissolved solids and is an excellent source for potted plants. An added advantage is the fixation of atmospheric nitrogen by lightning, which is frequently associated with summer thundershowers. The heat generated by a bolt of lightning breaks down the nitrogen molecule and the nitrogen atoms combine with oxygen to form nitric oxide. Further chemical reactions convert nitrogen to nitrates which are beneficial to plant growth.

Chloride Monitoring Project

The final round of sampling of wells showing rises in chloride concentration were undertaken in December 2006 to verify earlier analyses of samples taken in 2004 and 2005. The study was a cooperative effort with the U.S. Geological Survey. Some wells whose history showed low levels of chloride (<10 mg/L) have risen slightly. A summary of findings of the 2006 sampling follows. A report showing all of the sampling results will be published this year. Graphs showing chloride increases at selected sites are displayed as figures 3, 4 and 5.

Baton Rouge Drinking Water

To anyone who has lived here any length of time, the quality of drinking water in the Greater Baton Rouge area is superb. A survey of Men's Health magazine listed Baton Rouge tap water as the second-cleanest in the country. Rounding out the top five were Denver (1), Kansas City (3), Norfolk, VA (4) and Memphis (5). The rankings were based on the level of contaminants and bacteria that may be found in some tap water, and the number of EPA violations reported from 1995 to 2005. We can take pride in the fact that we are at the top instead of mid-level or lower level as is the case in many other rankings. Many city managers and water superintendents would give their "eye teeth" to have such a valuable underground water resource. The next time you see a water works employee reading meters or a crew repairing a leaking water line, compliment them for helping to maintain an excellent water supply.

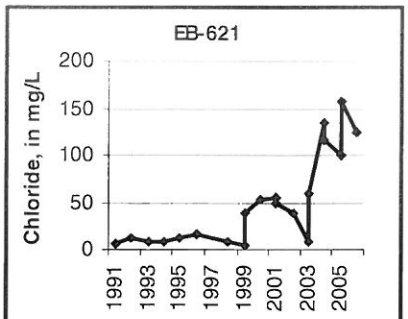


Figure 3. "1,200-foot" sand

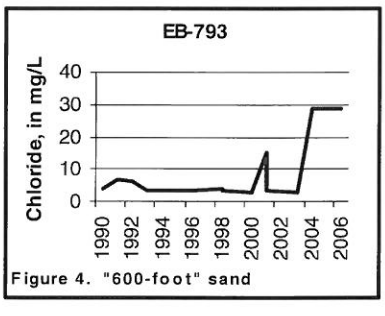


Figure 4. "600-foot" sand

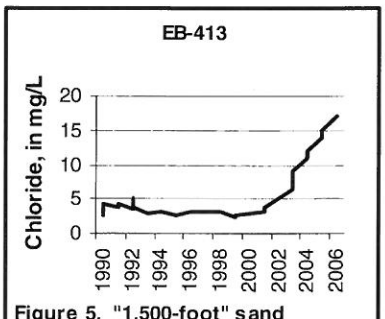


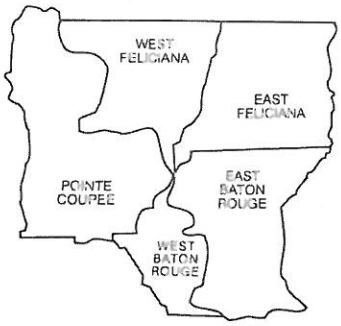
Figure 5. "1,500-foot" sand

Well	Aquifer	Chloride (mg/L)	
EB-793	"600-foot" sand	29	No increase since 2004
EB-805	"1,000-foot" sand	9,490	Continues to increase
EB-621	"1,200-foot" sand	125	Fluctuating between 100 and 150
EB-413	"1,500-foot" sand	17	Up for over 2 years
WBR-113	"1,500-foot" sand	214	Fluctuates between 200 and 250 mg/L
WBR-173	"1,500-foot" sand	57	Slow rise
EB-1150	"2,000-foot" sand	160	Holding its own
EB-804B	"2,400-foot" sand	129	Slow rise
EB-750	"2,800-foot" sand	71	Slow rise

An Englishman is a person who does things because they have been done before.

An American is a person who does things because they haven't been done before.

Mark Twain



Capital Area Ground Water Conservation Commission

Watching out for A Treasured Earth Resource

Dedicated to the conservation, orderly development and protection of quality of ground water in the Capital Area

Volume 33, Number 1 **NEWSLETTER** *July 2007*

Commission & District News

Scheduled Meetings. – The Technical Committee will meet at 1:30 p.m. Tuesday, September 11, 2007 in the conference room of the U.S. Geological Survey at 3535 South Sherwood Forest Boulevard, Baton Rouge, Louisiana. The regular meeting of the Board of Commissioners will be held at 9:30 a.m., Tuesday, September 18, 2007 in the conference room of the U.S. Geological Survey. The Administrative Committee will meet at 8:30 a.m. in the Commission office, Suite 129, 3535 South Sherwood Forest Boulevard, one hour before the regular meeting.

June Meetings. – The Technical Committee met at 1:30 p.m., Tuesday, June 12, 2007, at the construction site of the Comite River Diversion Canal on West Irene Road.

Dietmar Rietschier, Director of the Amite River Basin Commission, and an employee with the construction company led the tour. Construction is proceeding on the spillway which will empty floodwater from the Comite River into Lilly Bayou and ultimately the Mississippi River.

A large excavation below the spillway will collect the overflow, and from this point it will flow down Lilly Bayou to the river. Baffles will be constructed to slow the plunging water from the spillway. Wells were drilled around the perimeter of the excavation to dewater the shallow sands and prevent seepage into the construction site. The wells are completed at depths of 100 and 240 feet. Estimated withdrawal from the pumping wells is about 200,000 gallons per day. The pumped water is fed into Lilly Bayou downstream from the site.

At the regular Commission meeting on June 19, several Commissioners reported on activities in their area of interest. Chairman Bolourchi reported that he attended the Ground Water Management Districts Association (GMDA) annual summer conference at Estes Park, Colorado, June 3-5, 2007. Several topics of interest were covered at the meeting.

Dale Aucoin is making plans to meet with the top ten industrial water users and have the USGS present their plans for modeling the "2,000-foot" sand. Each industry will be asked to contribute $2,500 for the project, or a total of $25,000. A meeting is being set up for mid-July.

Jerry Klier reported the City-Parish is preparing next year's budget. He will draft a letter to them requesting their participation in the modeling project.

J.A. Rummler, representing Pointe Coupee Parish, also is with EarthCon, a firm that is doing a watershed planning study for Pointe Coupee, West Baton Rouge and Iberville Parishes. The company is also involved in a project to locate abandoned wells in Pointe Coupee Parish. Other items of interest:

- Jake Causey indicated that DHH is concerned about emergency supply wells in New Orleans being connected to the public-supply system. It is crucial that backflow prevention from one system to another needs to be enforced.
- "Bo" Bolourchi reported two activities at DOTD: contracts to study (1) ground-water resources of West Feliciana and (2)

ground-water quality of northwest Louisiana.

- Barry Brewer reported that Port Allen is currently replacing its well meters.
- James Rills said the south part of West Baton Rouge Parish is showing rapid growth. The parish is planning to drill a well north of the Intracoastal Canal due to high chloride levels south of the canal.
- John Steib reported that East Feliciana Parish has a new well. They also plan to replace some meters on parish wells.
- John Hashagen said West Feliciana is moving water lines for the widening of Highway 61, and that there are concerns about disposal of waste water due to population growth.

Septic Tanks

Much of the area in the Capital Area District is outside the jurisdiction of municipalities that have sewage treatment systems. Consequently, home owners rely on septic tanks to dispose of household waste water. The information that follows describes the proper installation of septic tanks.

Septic tanks may have one or two compartments. The double compartment does a better job of settling the solids. Baffles at the inlet pipe slow the incoming effluent to reduce disturbance of the settled sludge. Lighter material (oils, soap suds) form a scum layer at the top of the water surface. The drain going to the outlet pipe should be set below the scum level (top) and above the sludge (bottom). The diagram below shows the basic construction of a septic tank. They may be made of concrete, polyethylene or fiberglass. (See figure 1.)

The proper operation of a septic tank requires a well-designed drain field that receives the water from the outflow. The field consists of several trenches lined with gravel. Perforated pipe is laid in the gravel so that water can move easily out of the pipe into the gravel bed. (See figure 2.)

In the shallow sands and gravels, especially in the Felicianas some thought should be given to the location of septic tanks with respect to water well locations. The drain field should be downgradient from the well, especially for shallow wells (50-200 feet).

In the Felicianas ground-water movement in the shallow sands is related to the topography, i.e. ground water moves from upland regions toward the stream valleys. Therefore, drain fields should be located downhill from the well site. The DOTD Water Well Rules and Regulations (1985) gives a minimum distance of 50 feet; however if space is available, the distance should be as far as possible. (See figure 3.)

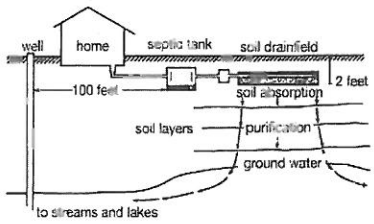


Figure 3. Wastewater Treatment and Disposal in the Soil

Taste of Water

An interesting article on the taste of drinking water appeared in the June 2007 issue of the AWWA Journal. The following material is from that report. The article states that the taste of drinking water is the result of a complex mix of anions, cations and minerals. The common anions (negative charge) are chlorides, sulfates, phosphates and bicarbonates. Cations (positive charge) consist mainly of sodium, potassium, calcium and magnesium. The major constituents in the aquifers serving the Baton Rouge area are sodium and bicarbonate. This causes the water to be a "soft" water. Hardness in water is caused by the presence of alkaline-

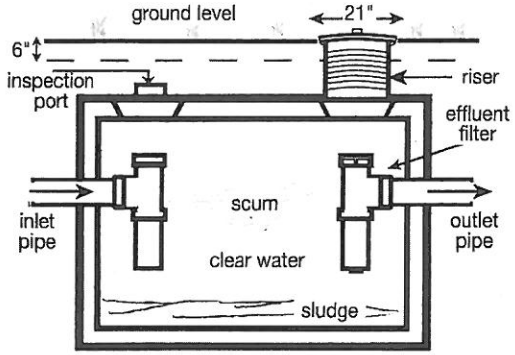


Figure 1. Septic Tank with Effluent Filter

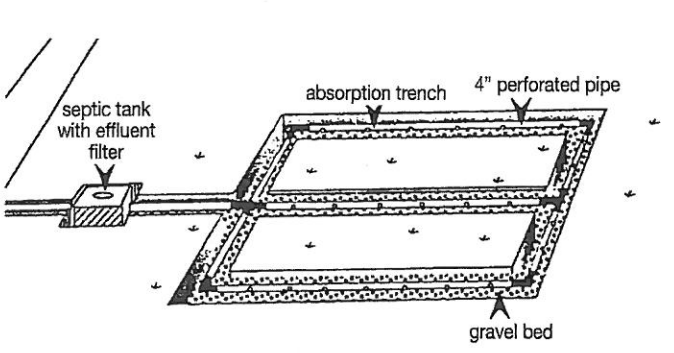


Figure 2. Septic System with Effluent Filter

earth elements, primarily calcium and magnesium. The Baton Rouge area aquifers also contain varying amounts of the non-ionic mineral silica (SiO_2).

The article points out that the relation of drinking water taste to water quality and water treatment has not received much attention. However, the authors believe as water treatment techniques such as desalination and membrane processes continue, the effect of treatment on taste is becoming more important.

Flavor is described as the sum of human sensations created by food or water and includes taste and odor. The human response to taste is characterized by descriptive terms such as "sweet", "sour", "weak", or "strong". A sour or tart taste is related to the hydrogen ions which pass through the membrane of the taste cells. These cells are located on the tongue and other regions of the mouth, and different cells have sensitivities to different tastes such as sour, bitter or sweet.

A salty taste is produced primarily by the sodium ion. When we add sodium chloride to food, it is the sodium that imparts the salty taste. Whenever the concentration of sodium exceeds that of saliva, a salty taste is detected. The taste threshold level for sodium chloride is about 650 mg/L (roughly 250 mg/L chloride).

- Odor is often associated with taste. During the process of eating or drinking, odors enter the nasal cavity and are released by mouth movements during tasting and swallowing. For example, minute concentrations of hydrogen sulfide in ground water may impart a disagreeable odor to the taster.

- High molecular-weight inorganic salts usually taste bitter (e.g. magnesium chloride). High levels of some metals such as copper may impart a bitter taste.

- Bitterness may also be caused by organic compounds such as caffeine. Sugar may be added to coffee to inhibit bitterness, or to lemonade to inhibit sourness.

- Some inorganic salts (e.g. lead) may impart a sweet taste.

Pumpage in 2006

Table 1 is a summary of pumpage in the Capital Area for 2006. The average daily pumpage was approximately 174 million gallons per day compared to 169 mgd in 2005. A significant increase was recorded for the "800-foot" sand from 2.7 to 4.3 mgd and in the "1,000-foot" sand (6.3 to 8.4 mgd). The average pumpge for East Baton Rouge Parish increased from 151 to 155 mgd.

Director Speaks to Sparta Commission

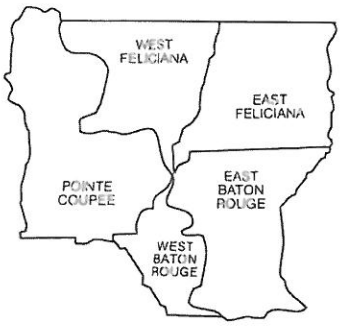
The Sparta Commission invited Don Dial to attend their meeting on June 14th at Arcadia, Louisiana. Gene Coleman, Chairman of the Sparta Commission, had contacted Dial earlier to see if he would give a talk on how we operate the Capital Area District. The Sparta group was interested in how our self-supporting Capital Area District was set up.

The Director gave a power point presentation that focused on our organizational structure as stated in the Enabling Act. A question and answer session followed the talk. The Sparta group would like to set up a similar district. They plan to line up legislative support to write their own act if response is favorable. A summary of the meeting and talk were written up in the Ruston Daily Leader, June 15, 2007.

Pumpage by Aquifer, 2006 (MGD)

Aquifer	East Baton Rouge	East Feliciana	Pointe Coupee	West Baton Rouge	West Feliciana	Total
Shallow	.048					.048
400	4.344					4.344
400/600	11.495					11.4951
600	7.681					7.681
800	3.060			1.266		4.326
1,000	7.071			1.347		8.418
1,200	21.947	.016	.6469	1.249		23.858
1,500	16.076	.099	.231	2.933		19.339
1,500/1,700	7.970		.013			7.983
1,700	5.671		.299	.172		6.142
2,000	22.276		.407		2.515	25.198
2,400	18.786	.344	.351		1.100	20.581
2,800	28.469	1.582	1.876		1.491	33.417
Catahoula		.858				.858
Totals	154.894	2.899	3.823	6.967	5.106	173.689

Table 1



Capital Area Ground Water Conservation Commission

Watching out for A Treasured Earth Resource

Dedicated to the conservation, orderly development and protection of quality of ground water in the Capital Area

Volume 33, Number2 **NEWSLETTER** *October 2007*

Commission & District News

Scheduled Meetings. – The Technical Committee will meet at 1:30 p.m. Tuesday, December 4, 2007 in the conference room of the U.S. Geological Survey at 3535 South Sherwood Forest Boulevard, Baton Rouge, Louisiana. The regular meeting of the Board of Commissioners will be held at 9:30 a.m., Tuesday, December 11, 2007 in the conference room of the U.S. Geological Survey. The Administrative Committee will meet at 8:30 a.m. in the Commission office, Suite 129, 3535 South Sherwood Forest Boulevard, one hour before the regular meeting.

September Meetings. – The Technical Committee met at 1:30 p.m., Tuesday, September 11, 2007, at 3535 South Sherwood Forest Blvd., Suite 129, Baton Rouge, Louisiana.

Don Dial introduced the speaker, Brian Smith, Sems, Inc., who gave a talk on the Ethyl Corporation remediation project. Up until the 1980s six buildings were constructed to manufacture tetraethyl lead which was used as a gasoline additive. Ethylene dichloride (EDC) was used in the manufacturing process. Ethyl had about 30 wells at one time that pumped from the "400" and "600-foot" sands. Waste water from the plant was pumped into holding ponds on the plant property. Ethylene dichloride, being a "sinker" (i.e. heavier than water) eventually seeped into a shallow sand (60 feet) and contaminated it.

Many of Ethyl's production wells were drilled in the 1930s and the annular space outside the casing was not cemented. Thus, contaminants from the shallow sands entered the open boreholes and reached the "400-foot" sand. Ethyl has been pumping EDC from the "400-foot" sand since the 1980s to contain it at the plant site. No contamination was detected in the "600-foot" sand. Early on, the EDC concentration in the "400-foot" sand was about 52 ppm (parts per million) but is now lowered to near detection limit. Water is continuously pumped from the sand at 5 gallons per minute to control downward leakage.

The Technical Committee discussed further the findings of the Long Range Committee meeting held on August 14. At that meeting, it was decided that support of the modeling project by industrial users would be abandoned in favor of adding $25,000 annually to the Commission's cost of the project. A projected four-year budget was drawn up to support the additional cost and maintain a reserve. The Long Range Committee concluded that a pumping fee increase would be needed during the course of the project. This information was brought before the Commission at their meeting on September 18th, and the Board approved a fee increase to take effect January 1, 2008.

Global Warming

A wise man once said: "you may deceive all the people part of the time, and part of the people all the time, but not all the people all the time." That seems to be the case with the current media hype about global warming. It is reported as an established fact, a done deal by some of our politicians and journalists. A recent article in AWWA Journal (September 2007) refers to an assessment report of the Intergovernmental Panel on Climate Change (IPCC) with "has removed many doubts" about the subject of climate change. By the way, the term "climate change" seems to be replacing the more ominous term "global warming". In the

paragraph of the AWWA article, it says *the IPCC does not carry out research or monitor climate-related data or other relevant parameters.* Interesting.

The report goes on to say that global temperature since the mid-20th century is very likely due to an increase in greenhouse gas concentrations. A video clip on You Tube by a well-known award-winning politician says emphatically that global warming is being caused by the buildup of carbon dioxide (CO_2) in the atmosphere. If this assumption is built into a computer model, it seems likely that the computer output will give the modeler the desired results.

What do the scientific records say about all of this? First of all, the past several centuries have shown cycles of above-normal and below-normal earth temperatures. In 1610, at the time of Galileo, sunspots began to be recorded. The earth is now entering its 23rd sunspot cycle. Records show that when the sunspot numbers are low the earth is colder. A higher number means a warmer earth. Another factor is the earth's ellipticity around the sun. It is not constant and may be affected by gravitational pull of other planets (e.g. Jupiter) in their orbits. Since grade school, we have been told the earth rotates on its axis 23 ½ degrees between summer and winter. This number is now known to vary also.

With respect to CO_2, the historical record indicates that periods of warming are followed by a buildup of CO_2. Thus, CO_2 buildup is not the cause for warming, but an effect of warming – the exact opposite of what the alarmists would have us believe. A table (below) by a professional climatologist gives an interesting summary of the man-made contributions of greenhouse gases.

Climatic change is a complex subject with many variables that are not yet clearly understood. If there is a moral to this story it would be to put to rest the assertions of the soothsayers and alarmists and give center stage to the professional scientists who have devoted whole careers trying to understand these phenomena.

Modeling Project

A ground-water modeling project for the "1,500-foot" and "2,000-foot" sands was approved and began officially on October 1st. The project will be continued over a four-year period to evaluate the alternatives for managing the encroachment of saltwater in the two aquifers.

The U.S. Geological Survey will conduct the study, which will be cooperatively funded by the U.S.G.S., Capital Area Ground Water Conservation Commission, Louisiana Department of Transportation and Development and East Baton Rouge Department of Public Works. Total funding for the project will be $700,000. At the September 2007 meeting the Commission approved a pumping fee increase from $3.50 to $4.00 per million gallons to maintain a suitable cash reserve. This is the first rate change since 1995, and is necessary to keep up with operating costs.

A project proposal prepared by the U.S.G.S. shows a timeline for a work plan to be carried out over four years. In brief summary, the work schedule over the four-year period is shown below.

- Year 1 – Compile data to map the configuration of the "2,000-foot" sand. Information will be compiled on the "1,500-foot", "1,700-foot" and "2,400-foot" sands as well as including base, top, thickness and sand percentage. Information on confining layers will also be collected. Ground-water withdrawal data will be collected for each aquifer.
- Year 2 – Translate data sets into MODFLOW input files. Use MODFLOW to perform steady state and transient simulations of ground-water flow. Perform preliminary flow-model calibration to observed water levels. Write preliminary draft of the report.
- Year 3 – Integrate saltwater transport into the flow model using SEAWAT. Continue model calibration. Continue report writing.
- Year 4 – Complete the model calibration and hypothetical simulations. Complete the report review process.

Man-made Contribution to the "Greenhouse Effect", expressed as % of Total (water vapor INCLUDED)

Based on concentrations (ppb) adjusted for heat retention characteristics	% of All Greenhouse Gases	% Natural	% Man-made
Water vapor	95.000%	94.999%	0.001%
Carbon Dioxide (CO2)	3.618%	3.502%	0.117%
Methane (CH4)	0.360%	0.294%	0.066%
Nitrous Oxide (N2O)	0.950%	0.903%	0.047%
Misc. gases (CFC's, etc.)	0.072%	0.025%	0.047%
Total	100.00%	99.72%	0.28%

Quarterly project reviews will be held by the Technical Committee at their quarterly meetings.

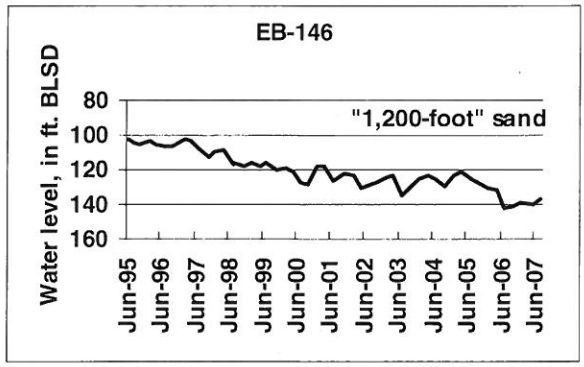
Water Levels

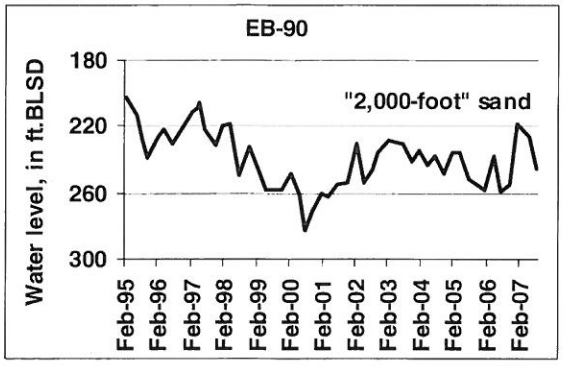
Water levels in four major public-supply aquifers are shown graphically in the illustrations below. In general, the water levels are trending downward in three sands, but the trend in the "2,000-foot sand (EB-90) has remained flat in the past few years. Comparison of the effect of pumping on water-level trends can be made by observing the pumpage table. A voluntary effort by industries to cut back pumpage in the "2,000-foot" sand has been effective so far in maintaining this trend.

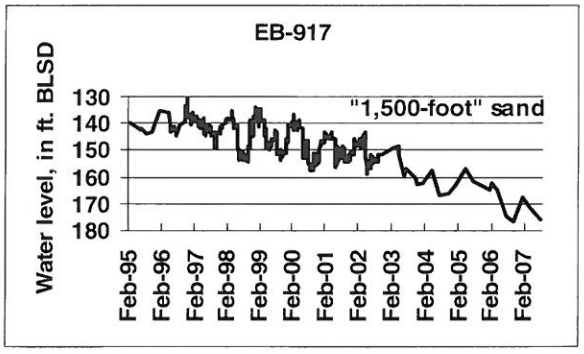
From 1998 to 2006, the table shows increases for the "1,200-foot" sand from 18.6 to 23.8 mgd, 17.0 to 19.3 mgd for the "1,500-foot" sand and 20.0 to 20.6 for the "2,400-foot" sand. However, the "2,000-foot" sand shows a decrease from 29.3 to 25.2 mgd for the period.

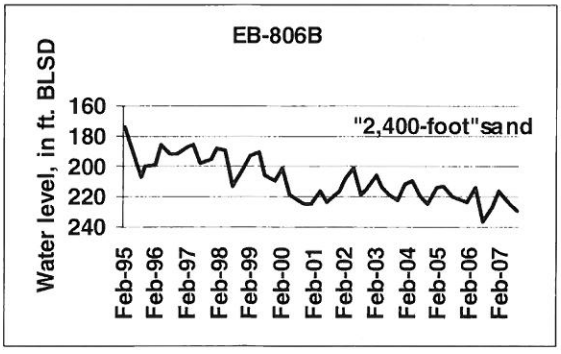
Pumpage in million gallons per day

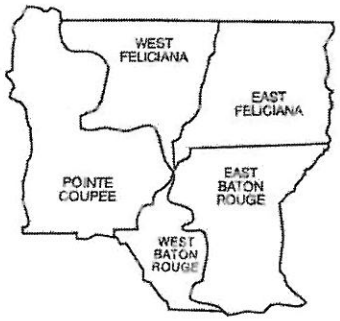
Sand	1998	1999	2000	2001	2002	2003	2004	2005	2006
1,200-ft	18.639	21.100	21.793	21.026	23.153	23.057	22.083	23.018	23.858
1,500-ft	17.007	16.452	17.952	17.790	18.273	19.082	19.127	19.318	19.339
2,000-ft	29.322	31.633	31.912	28.073	26.110	26.226	26.461	24.444	25.200
2,400-ft	20.046	18.978	20.538	21.200	19.676	20.200	20.379	19.407	20.581
2,800-ft	29.367	27.350	33.596	33.091	33.868	33.515	31.417	32.445	33.417











Capital Area Ground Water Conservation Commission

Watching out for A Treasured Earth Resource

Dedicated to the conservation, orderly development and protection of quality of ground water in the Capital Area

Volume 33, Number 3 **NEWSLETTER** *January 2008*

Commission & District News

Scheduled Meetings. – The Technical Committee will meet at 1:30 p.m. Tuesday, March 11, 2008 in the conference room of the U.S. Geological Survey at 3535 South Sherwood Forest Boulevard, Baton Rouge, Louisiana. The regular meeting of the Board of Commissioners will be held at 9:30 a.m., Tuesday, March 18, 2008 in the conference room of the U.S. Geological Survey. The Administrative Committee will meet at 8:30 a.m. in the Commission office, Suite 129, 3535 South Sherwood Forest Boulevard, one hour before the regular meeting.

December Meetings. – The Technical Committee met at 1:30 p.m., Tuesday, December 4, 2007, at 3535 South Sherwood Forest Blvd., Suite 129, Baton Rouge, Louisiana.

Mike Simms, URS Corporation, gave a presentation on the ground-water modeling study at the Georgia-Pacific plant at Port Hudson. The model consists of six layers extending to a depth of about 800 feet. (See diagram)

The modeling study consists of several steps. First, a data base was collected of the hydrogeology of the aquifers in the area of study. This consists of well logs, water levels in the sand units, hydraulic characteristics and aquifer testing. This information is then fed into the MODFLOW model. The grid size in the mill area was 100x100 feet increasing to 500 feet squares at the boundaries. Simulations of the model were run to match the historical data. Also, the effect of the Mississippi River alluvial aquifer on the aquifers were studied. Cross sections across the valley indicate the upper and middle and lower sands have hydraulic connection to the alluvial aquifer. The modeling study evaluated the hydraulic impacts of several new production well locations in the middle and lower sands within the Georgia-Pacific property.

A brief presentation of the USGS modeling study of the "2,000-foot" sand was given by John Lovelace and Dan Tomaszewski. Quarterly progress reports on the study will be given at the Commission's Technical meetings. Chuck Haywood of Colorado has been hired to head up the modeling effort and will be assisted by the Baton Rouge USGS office.

Layer	Unit	Depth	Baton Rouge Aquifer
1	Prairie Terrace		
2	Upper Sand	130-195	"400-ft" sand
3	Middle Sand	205-260	"400-ft" sand
4	Lower Sand	320-410	"600-ft" sand
5	G-P "500-ft" sand	440-520	"800-ft" sand
6	G-P "700-ft" sand	650-790	"1,000/1,200-ft" sand

Organic Contaminants

Organic contaminants comprise a diverse group of carbon compounds that affect water quality and public health. Carbon's unique chemical makeup allows it to combine with various other elements to form a multitude of organic chemicals. These include the open-chain or "aliphatic" and ring or "aromatic" compounds.

Organic compounds exist both as naturally occurring and man-made occurrences. The contaminants of most concern in drinking water are man-made. The list is lengthy and includes pesticides, herbicides, petrochemicals, benzene, disinfection by-products and persistent chemicals including pharmaceuticals, DDT and PCB (polychlorinated biphenyls), to name a few. Pharmaceuticals are a special problem because they end up in the wastewater stream and eventually, out in the environment. It is a simple matter to flush them down the toilet.

The long term effect of pharmaceuticals and personal care products is not well known. A Wisconsin scientist reported that hormones such as estrogen may have a significant effect on aquatic organisms. More research is needed on the fate and transport of these chemicals. Wastewater reclamation in the western states is used to recharge aquifers and augment the local ground-water supply. If the pharmaceuticals and other persistent chemicals are not screened out, there is the potential for them to enter the public drinking water supplies.

Naturally occurring organic compounds include tannins and lignins produced by vegetation decomposition and compounds secreted by algae and bacteria in water. The total organic carbon (TOC) is the sum of all the carbon, both natural and man-made. Purification of water by chlorination may cause the formation of chlorinated hydrocarbons, for example trihalomethanes or haloacetic acids. Because these compounds may have adverse health effects, maximum contaminant levels are regulated by EPA, and public water suppliers are required to give an annual report to consumers on water quality. The table below shows the maximum contaminant level (MCL) of some common organic chemicals. Baton Rouge Water Company's 2006 report to consumers reported both trihalomethanes and haloacetic acids as "not detected". This is a testimony to the good quality of ground water in the Capital Area District.

Organic Compound	Maximum Contaminant Level (micrograms per liter)
Trihalomethanes (sum of 4)	80 mg/L (running annual average)
Haloacetic acids (sum of 5)	60 mg/L (running annual average)
Atrazine	3 mg/L (varies by state)
Benzene	5 mg/L (varies by state)

Well Rehabilitation

Most of the wells drilled for industrial and public supply use are tested at completion to determine the aquifer properties and well capacity. The well owner should keep a historical record of the well's performance over time. A simple and reliable way of checking wells is to monitor their specific capacity at certain intervals of time, say semiannually or annually. Specific capacity is defined as the well's output in gallons per minute for each foot of drawdown. For example, let's say a new well is pumping at 1,200 gallons per minute (gpm) and the drawdown (difference between static water level and pumping level) is 60 feet. The specific capacity of the well is 1,200 divided by 60 or 20 gpm per foot of drawdown.

Over a period of time if the specific capacity declines to 18 or 16 gpm/foot of drawdown, some type of rehabilitation may be necessary to maintain the long-term performance and extend the well life. A rule of thumb is to perform some type of well maintenance if the specific capacity declines by 10 percent. Like changing oil in a car, well maintenance extends the well life and results in lower operational costs. The AWWA Journal Opflow (October 2007) lists three categories of primary well rehabilitation.

- Chemical – acids, bases, dispersants, antibacterial agents
- Mechanical – surging, brushing, jetting, freezing
- Impulse Generation – detonation cord, impulse generators

Impulse generation is a process where a compressed gas is released under high pressure. The generator is equipped with a valved system to release the energy in short bursts into the screened interval. The energy vibrates the well screen and formation material and loosens plugged sediment and biological deposits around the screen. In Germany, research has been conducted to compare the various well rehabilitation techniques. They found that the impulse generation was the most effective technology concerning penetration depth and energy measured outside the well screen.

Impulse generators can be used in various well types including vertical or horizontal stainless steel screens, perforated or slotted casing and open-hole wells. According to Opflow

(October, 2007) the advantages of this technology are

- Its wide range of applications
- Its effectiveness
- The powerful impulse applied simultaneously throughout the well screen provides good coverage
- Fast, cost-efficient operation
- No harmful side effects; no by-products

Not only is the impulse generation effective in rehabilitation, but for new well development. A city in Idaho drilled a 24-inch well with a discharge of 2,400 gpm. However, the pumping rate declined to 1,600 gpm over a short time, and it was determined that initial well development was inadequate. Redevelopment with the aid of impulse generation was successful in removing sediment outside the well screen. An impulse generator setup is shown in the photo below.

Reports

Griffith, J.M., 2007, Fluoride concentrations in freshwater aquifers in Louisiana, 1931-2006: Louisiana Department of Transportation and Development Technical Report No. 77.

Prakken, L.B., 2007, Chloride concentrations in the southern Hills regional aquifer system in Livingston, southern Tangipahoa, and St. Tammany Parishes, Louisiana, 2005: Louisiana Department of Transportation and Development Technical Report No. 76.

Sargent, B.P., 2007, Water use in Louisiana, 2005: Louisiana Department of Transportation and Development water Resources Special Report No. 16.

U.S. Geological Survey, 2002, Pharmaceuticals, hormones, and other organic wastewater contaminants in U.S. Streams, USGS Fact Sheet FS-027-02.

Lovelace, J.K., 2007, Chloride concentrations in ground water in East and West Baton Rouge Parishes, Louisiana, 2005-05, USGS Scientific Investigations Report 2007-5069. (in press)

Fluoride Report

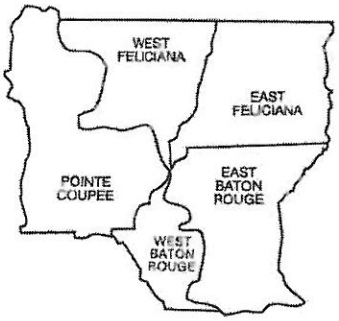
A report on the fluoride concentrations in the aquifers of Louisiana has been published. (See Reports). Fluoride at the proper level of concentration (0.8 to 1.2 milligrams per liter) is beneficial in preventing tooth decay. However, too much fluoride is undesirable and causes tooth mottling. In general, this is not a problem in Louisiana's ground water, but some wells in Avoyelles Parish screened in Pliocene and Miocene sands have shown fluoride concentrations several times the optimum level.

Aquifers in the Capital Area District are, for the most part, below the optimum recommended level in fluoride concentration. A summary table in the report shows the following results.

Aquifer	Median Concentration in mg/L
Chicot equivalent Upland Terrace "400-foot" "600-foot"	0.2
Evangeline equivalent "800 thru 1,700-foot"	0.2
Jasper equivalent "2,000 thru 2,800-foot"	0.3

An impulse generator uses compressed gas to loosen mechanically plugged sediment and biological deposits.

Water rights have been fought over since ancient times. Abraham successfully dug wells to water his herds. Canaanite tribesmen under Abimelech seized the well from Abraham's herdsmen and he entered into a covenant with Abimelech (Genesis 21:27) to reclaim the well. His son, Isaac, continued to dig wells in the family tradition, but continued to struggle with the Philistines over the wells (Genesis 26:19-22).



Capital Area Ground Water Conservation Commission

Watching out for A Treasured Earth Resource

Dedicated to the conservation, orderly development and protection of quality of ground water in the Capital Area

Volume 33, Number 4 **NEWSLETTER** *April 2008*

Commission & District News

Scheduled Meetings. – The Technical Committee will meet at 1:30 p.m. Tuesday, June 10, 2008 in the conference room of the U.S. Geological Survey at 3535 South Sherwood Forest Boulevard, Baton Rouge, Louisiana. The regular meeting of the Board of Commissioners will be held at 9:30 a.m., Tuesday, June 17, 2008 in the conference room of the U.S. Geological Survey. The Administrative Committee will meet at 8:30 a.m. in the Commission office, Suite 129, 3535 South Sherwood Forest Boulevard, one hour before the regular meeting.

March Meetings. – The Technical Committee met at 1:30 p.m., Tuesday, March 11, 2008, at 3535 South Sherwood Forest Blvd., Suite 129, Baton Rouge, Louisiana.

Commission Chairman John Steib introduced himself and had each of the attendees identify themselves and who they represented. Technical Committee Chairman Dale Aucoin brought the meeting to order, and Don Dial introduced the speaker. Jay Grymes works full time as the weather forecaster at WAFB Channel 9. He also has some part-time teaching commitments in the Geography and Biological and Agricultural Engineering Departments at LSU.

Mr. Grymes gave a presentation on the subject of global warming. First of all, he stressed that global is an inappropriate term and climate change should be addressed on regional terms. As an example, from 1901-1998 the northeast U.S. showed a warming trend and the southeast a cooling trend.

Climate change is largely natural in occurrence, and the effect of human-induced changes is problematic. Many periods of warming and cooling have been documented over the past 600,000 years. The present warming trend (last 30 years) is believed by many to be caused by greenhouse gas emissions, notably carbon dioxide, oxides of nitrogen and methane. However, by far the most important greenhouse gas in the atmosphere is water vapor which often receives little or no attention.

There are difficulties involved in computer models which may reflect the bias of the organization or person doing the model. Carbon dioxide is considered by many to be the culprit of global warming. However, long-term records show that the rise and fall of carbon dioxide **follows** the rise and fall of earth temperature, not vice versa at least prior to human factors and industrialization. Mr. Grymes also mentioned the effect of solar radiation and the cyclical effect of sunspot activity. Only in the recent past have ocean factors such as La Nina and El Nino been studied. Their effect on global climate is widespread. He concluded that he is neither a proponent nor a skeptic of global warming, but a "watcher". That is, he looks at the information with a critical eye to see if the conclusions are justified based on scientific knowledge.

Pumping Fee Increase

The Board of Commissioners voted unanimously at the Commission meeting December 11, 2007 to increase the pumping fees in the five-parish District to $4.00 per million gallons. The last increase was in 1995. The Board felt that an increase was needed to keep pace with the rising operation costs. Over the years, rent, office supplies, transportation and project costs have increased.

The Commission, along with three other cooperators, U.S. Geological Survey, Louisiana Department of Transportation and Development and East Baton Rouge City-Parish DPW, will be involved in a ground-water flow model of the "1,500-foot" sand and a flow and solute-transport model of the "2,000-foot" sand.

The fee increase takes effect on April 1st. Pumping invoices that are sent to the water users on April 1st, which covers the period of January, February and March, will be billed at the old rate ($3.50 per million gallons). Invoices that are sent out on July 1st will bill the users at $4.00 per million gallons. A reminder of the new rate will be sent with each invoice.

Alternative Water Source

By 2020, desalination and water purification technologies will contribute significantly to a sustainable, affordable and adequate water supply for our nation.

-USGS Fact Sheet 075-03-

In Louisiana, we have taken pride in the fact that we have a voluminous amount of fresh ground water. This is generally true, but not a guarantee that we will always be problem free. In the Capital Area, two of our concerns are water-level declines and saltwater encroachment. In the foreseeable future, we may want to investigate supplemental sources to augment the fresh ground water for industrial and public-supply use.

Water-deprived areas such as the western United States are finding new sources to deal with water shortages. El Paso, Texas opened up a 27 million gallons a day desalination facility last year. The plant uses brackish water from the Hueco bolson to supplement the fresh ground water and water from the Rio Grande. The project is the first of its kind involving a federal-local partnership. The plant serves the city and military base at Ft. Bliss.

San Antonio is completing a feasibility study to treat brackish ground water in that region. Their goal is a 22,000 acre feet annual supply of potable water that would supplement the freshwater from the Edwards aquifer during times of peak demand.

The availability of brackish water in the Baton Rouge area is practically unlimited as there are many sands at depths below the base of fresh water. An exhaustive study of saline water resources of Louisiana shows the availability of brackish water at dissolved solids concentrations of 1,000-3,000 mg/L and 3,000-10,000 mg/L in the USGS publication Hydrologic Atlas 310 by Winslow et.al (1968). It should be pointed out that desalination of brackish water has economic advantages over that of seawater. Seawater has a chloride concentration of 19,000 mg/L, whereas brackish water can be found up to a few thousand mg/L in the Capital Area. The table below from the booklet desalination.com (2003) gives estimates of the cost to consumers.

Salinity	US $ per 1000 Gallons
Fresh water	$0.95 to $2.50
Brackish water	$1.25 to $2.75
Seawater	$2.50 to $7.00

Six Ways to Kill a Pump

1. Ignore it. – This is the long, torturous way of death. You probably have a book containing operation and maintenance instructions. This includes periodic checks on packing, gaskets, O-rings, amperage and pump discharge. Failure to give the pump a shot of grease, check for misalignments, change of filters or cleaning of parts may cause your pump to become old before its time. Think of it as a new car you purchased for $30,000. No way would you want to deny it the proper maintenance it requires because you want to protect your investment.

2. Strangle it. – The life breath of a pump is liquid taken in through the inlet or suction nozzle. To strangle the pump, you simply operate it at a suction head less than that required for the pump. This may occur because of lowered pumping levels or a strainer clogged with debris. Routine checks for air entrainment which results from cavitation will reveal that you have a problem. Ignore the change in pitch of the motor and you may be rewarded with an impeller eroded beyond repair.

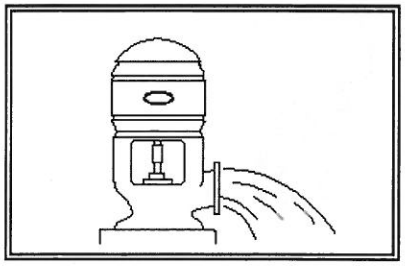
3. Fry it. – To heat up the pump, close down the valves to reduce flows. For a faster kill, operate the pumpage at "shutoff" (i.e. running without priming) or closing the valve to control discharge. This would be like hitching a Clydesdale to a garden cultivator. A pump operating at low efficiency creates heat, and heat means problems will occur somewhere down the line. Once the pump is fried, get one that matches the expected flow and demand conditions.

4. Overtax it. – In other words, tax it to death. Work it at higher than rated capacities and you can count on a broken shaft or bearing. To save it from an early death, run the pump within the requirements noted on the nameplate such as capacity, head, speed, amps, volts, etc. If this is not feasible get a pump that is suited to your conditions.

5. Rip it apart. – If the pipes don't match the pump, get out the old come-along and contort the components in place and bolt them together! In due time the pipes and fitting will crack, water will blow all over the place and the motor may short out. The alternative is to install the piping correctly the first time.

6. Vibrate the #!&!# out of it. – By seriously misaligning the pump and motor, you can set up a good vibration that will work on the bearings and shaft. The pump base can also sound the death knell if the bolts aren't secured properly or the bolts aren't checked routinely to see that they remain tight.

(This entertaining report on pumps appeared in the AWWA publication Opflow, January 2005, "How Many Ways Can We Kill a Pump", by John Stubbart. I have condensed and edited it to fit in the newsletter. DD)



Damaged Well Survey

It was reported in the Advocate, March 29th, that the state will be conducting a survey of damaged water wells in the coastal parishes. The destruction caused by hurricanes Katrina and Rita in 2005 left many wells whose present status needs to be checked. The Departments of Natural Resources and Health and Hospitals are teaming up to investigate an estimated 3,600 to 4,000 water wells that may have been affected by the storms.

The survey has begun in Cameron Parish, and will move eastward across the coastal parishes. A Baton Rouge-based firm, GEC Inc., will be doing the work which will take six to eight months to complete. The project will cost about $600,000. Damaged wellheads will be closed off to protect the aquifers from surface contamination. After the work is completed, a report will be given to the Louisiana Recovery Authority to decide on what should be done with the wells. It should be pointed out that DOTD regulations for the plugging of abandoned wells are in place and need only to be executed.

We reported after hurricane Katrina in the October 2005 newsletter of conditions in the New Orleans area. After being inundated several weeks by contaminated water, the amount of recharge through abandoned and improperly secured pumping wells probably will never be determined. It is hoped that the survey will shed some light on that problem. In our Capital Area District the effect of Katrina on wells was minimal. We did not bear the brunt of the storm and there was no flooding.

Pointe Coupee Water Levels

In this issue we will review the water levels in the major aquifers outside the major pumping centers in Baton Rouge. The aquifers that supply industrial and public-supply use in Baton Rouge extend into the surrounding parishes. The following graphs reveal water-level trends in Pointe Coupee Parish over the last 11 or 12 years.

In Pointe Coupee Parish, the four major aquifers are shown in the graphs. Over a period of about twelve years the declines are as follows:

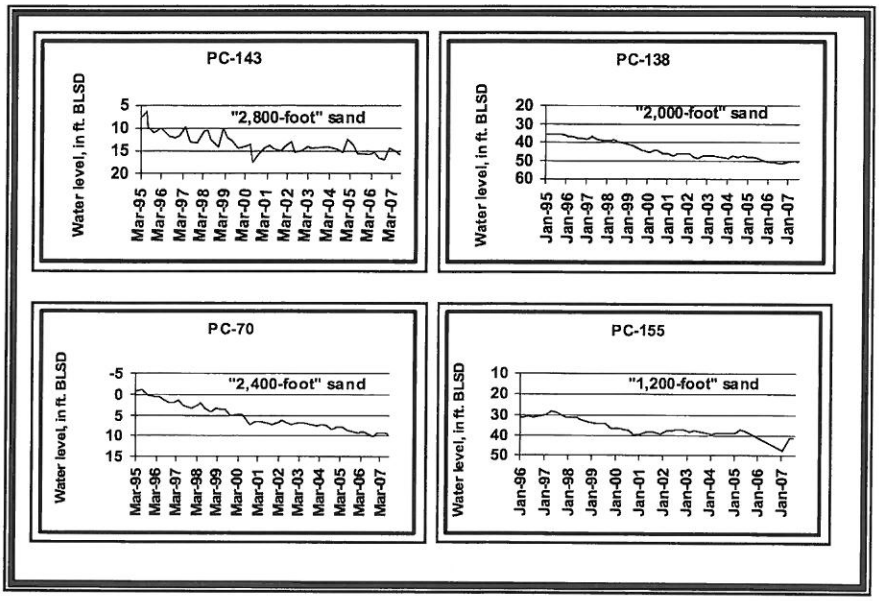
PC-143 – "2,800-foot" sand —5 feet
PC-70 – "2,400-foot" sand —10 feet
PC-138 – "2,000-foot" sand —14 feet
PC-155 – "1,200-foot" sand —10 feet

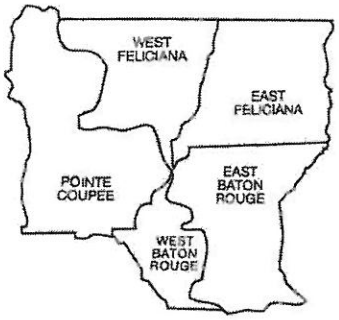
In future issues we will review the water levels in the other parishes in the District.

Did You Know?

"We have staked the whole of all our political institutions upon the capacity of mankind for self-government, upon the capacity of each and all of us to govern ourselves, to control ourselves, to sustain ourselves according to the Ten Commandments of God."

James Madison
(Known as the "Father of our Constitution")





Capital Area Ground Water Conservation Commission

Watching out for A Treasured Earth Resource

Dedicated to the conservation, orderly development and protection of quality of ground water in the Capital Area

Volume 34, Number 1 **NEWSLETTER** *July 2008*

Commission & District News

Scheduled Meetings. – The Technical Committee will meet at 1:30 p.m. Tuesday, September 9, 2008 in the conference room of the U.S. Geological Survey at 3535 South Sherwood Forest Boulevard, Baton Rouge, Louisiana. The regular meeting of the Board of Commissioners will be held at 9:30 a.m., Tuesday, September 16, 2008 in the conference room of the U.S. Geological Survey. The Administrative Committee will meet at 8:30 a.m. in the Commission office, Suite 129, 3535 South Sherwood Forest Boulevard, one hour before the regular meeting.

June Meetings. – The Technical Committee met at 1:30 p.m., Tuesday, June 10, 2008, at 3535 South Sherwood Forest Blvd., Suite 129, Baton Rouge, Louisiana.

Dale Campau, a chemist and Environmental Coordinator for East Baton Rouge Parish Public Works gave a presentation on the East Baton Rouge North landfill located west of Highway U.S. 61 just south of Irene Road. The landfill opened in 1993 and has handled 6.4 million tons of waste so far. The average input is around 1,500 tons per day. The height of the landfill is restricted to a maximum of 301 feet.

A total of 19 monitor wells surround the landfill area. These wells are sampled periodically for volatile organics and metals. Monitoring up to the present has not shown any contamination. However, some wells have shown higher than expected levels of barium. In a reconnaissance study undertaken by the USGS to relate ground-water quality to land use, barium was higher than normal in the industrial area and may have been due to extensive oil exploration. (USGS, Water Resources Investigation Report 86-4325, 1987). Drilling mud is also used in water-well drilling and residual barium could be present in water samples.

The life expectancy of the landfill is about 30 years (2038). One prospect for a future landfill is the "red mud" site next door that was used by Kaiser Aluminum to dump spent bauxite. Curb recycling has been effective in removing a sizeable amount of waste material to the landfill. Improvement is needed in recycling commercial waste and waste from apartments.

At the old landfill (Devil's Swamp) site, methane gas has become a profitable by-product. The gas is collected, cleaned up and sold to a neighboring industrial plant. It is expected that the North landfill will be used in the same way with the rising cost of fuel.

Thinking Outside the Box

What was once unthinkable for water suppliers was the reclamation of water after having been once used. Waste water from industrial and public-supply uses was disposed of to be re-processed by nature's hydrologic cycle. Now, as the world's demand for usable water increases with increasing population, inevitably we have to look at new and innovative ways to maintain a sustainable source of supply.

At one time distillation of brackish water was the only "game in town". Ships at sea and coastal areas without freshwater had to rely on it for potable supplies. Navy men will recall times when their ship's operation mandated water restrictions or "water hours", and unessential water use was shut down because the ship's boilers had the highest priority. During such times saltwater showers were the rule. Because of the energy required to heat water, distillation has been largely replaced by reverse osmosis and newer procedures.

Early in my career, the term reverse osmosis was practically unknown except to a minority of research scientists. Now it is being used as a supplemental source of freshwater in many places. In coastal areas, conversion of seawater to freshwater is expanding rapidly.

The cost of producing freshwater is proportional to the dissolved solids content. Therefore, some inland areas (for example El Paso, TX) desalinate brackish ground water to supplement their water supply. Brackish water is in the range of 1,000 to 10,000 mg/L. Seawater has a dissolved solids content of about 35,000 mg/L. The diagram below shows how reverse osmosis works.

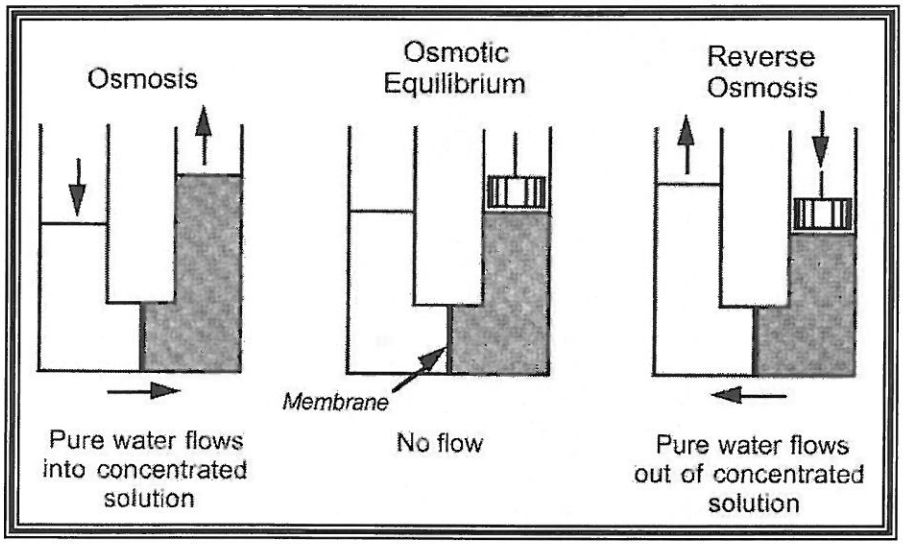
Can wastewater be reused for other than non-potable uses? The answer is yes. On the space station it is essential to reuse water over and over to maintain a water supply. Water vapor from breathing and perspiration is collected and condensed to counter the buildup of humidity. The mini-hydrologic cycle replenishes the water supply of the astronauts.

On the earth, the city of Singapore is using innovative technology to repurify water for potable use. With a population of 4.5 million people living in an area of 267 square miles, acquisition of reusable source water is at a premium. Waste water is run through a membrane bioreactor (MBR) followed by reverse osmosis (RO) and finally, treated with ultraviolet disinfection. Another example is at Brisbane, Australia which has a severe water shortage caused by drought and population increase. Municipal wastewater will be used to provide about 82 mgd. Of this amount, 17.4 mgd will be sent to the advanced water treatment plant for further ultrafiltration and reverse osmosis. Completion is set for mid-2008.

At the recent Ground Water Management Districts Association (GMDA) meeting in El Paso, the attendees visited the new desalination plant located some 20 miles out in the desert. The RO plant completion was a joint effort between the federal and local government. Nearby Ft. Bliss is expected to grow in population over the next few years, and was looking to increase its water supply. The resulting desalination plant, which began operation in 2007, was a win/win situation for both entities.

Brackish water volume in the Hueco bolson near El Paso exceeds potable water by 600%. The use of this water serves two purposes: (a) it saves the freshwater from being overpumped and (b) it protects the fresh ground water by controlling encroachment of brackish water toward areas where freshwater is pumped. The concentrate (brine) is injected into deeper subsurface units.

In the future, such a procedure could very well be feasible in the Baton Rouge area. Our brackish ground water resources are almost unlimited. The benefits derived would be the same as noted in (a) and (b) above.



Pumpage in 2007

The total average pumpage for 2007 was about 2.2 million gallons per day less than in 2006 in the Capital Area District. Totals for the past three years are shown as follows:

Year	Industrial (mgd)	Public Supply (mgd)	Total (mgd)
2005	82.498	86.769	169.267
2006	81.712	91.975	173.687
2007	83.453	88.017	171.470

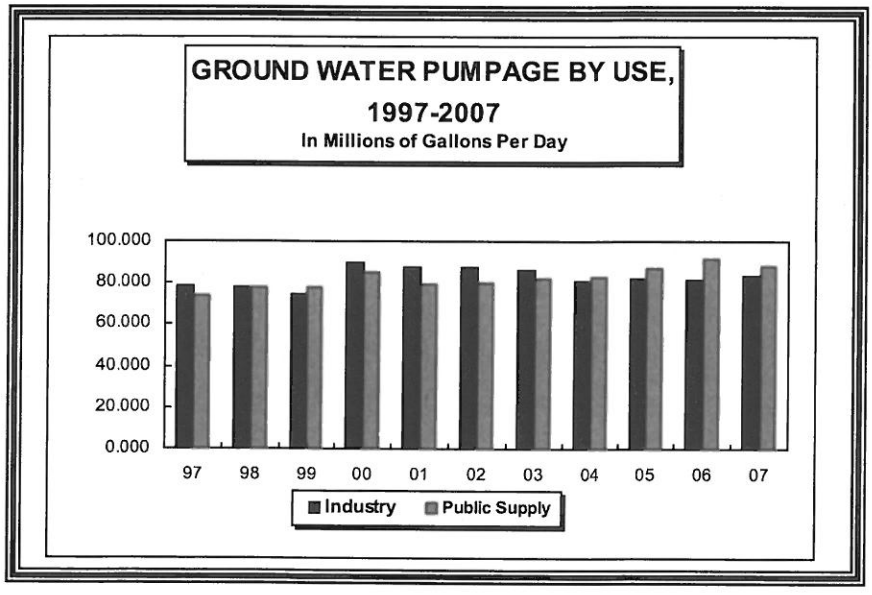
Public supply usage surpassed industrial usage beginning in 2004. The spike in 2006 public-supply usage is likely due to the abrupt population growth following Hurricane Katrina. As shown in the table, the public-supply usage in 2006 increased about 4.4 million gallons per day (mgd).

Leo Bankston Award to Georgia-Pacific

Georgia-Pacific Corporation has been named the recipient of the 2007 Leo Bankston Ground Water Conservation Award. The award was presented at the June meeting of the Capital Area Ground Water Conservation Commission by Chairman John Steib. Joey Hebert of Georgia-Pacific was present to receive the award.

The award is given annually to recognize and encourage good stewardship in the use of ground-water

PUMPAGE BY AQUIFER 2007 (MGD)						
Aquifer	East Baton Rouge	East Feliciana	Pointe Coupee	West Baton Rouge	West Feliciana	Totals
Shallow	0.048					0.048
400 ft	3.604					3.604
400/600 ft	13.223					13.223
600 ft	6.408					6.408
800 ft	3.822			1.179		5.001
1,000 ft	6.528			1.24		7.768
1,200 ft	22.019	0.016	0.731	1.27	0.001	24.037
1,500 ft	15.979	0.096	0.217	3.03		19.322
1,500/1,700 ft	7.664					7.664
1,700 ft	6.492		0.293	0.192		6.977
2,000 ft	21.244	0.02	0.343		2.417	24.024
2,400 ft	19.444	0.378	0.391		1.070	21.284
2,800 ft	27.394	1.603	1.274		1.050	31.321
Catahoula		0.789				0.789
Totals	153.869	2.903	3.249	6.911	4.538	171.470



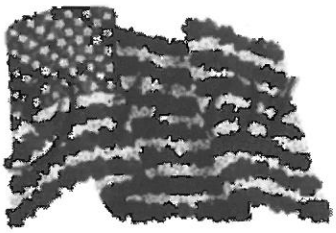
resources. Georgia-Pacific installed technology improvements at 20 water wells to provide instantaneous flow and motor amp readings from all wells and for flow rates at key pipe locations. The information allows better response time to well malfunctions or excessive flow, and it produces more accurate flow totals including automatic start/stop based on water storage levels. The result will be a reduction in total ground-water use.

The plant at Port Hudson also completed a computer model of ground-water flow in the shallow sands. The model will allow Georgia-Pacific to increase its sustainable water production in the shallow sands in place of the deeper sands in accordance with the goals of Capital Area Ground Water Conservation Commission.

Pumping Fee Increase

Pumping invoices being mailed to water users on July 1st will have an attached reminder that the pumping fees will be at the rate of $4.00 per million gallons. The Board of Commissioners voted unanimously to increase the fee to keep pace with rising costs of supplies, rent and employee benefits. This is the first adjustment of pumping rates since 1995.

The Commission has only two paid employees, a Director and an Administrative Assistant. We would like to encourage water users in the District to make payment within 30 days so that we can save postage and extra paperwork. After 30 days we have to send out reminders of delinquent payments.



WE THE PEOPLE of the United States, in order to form a more perfect union, establish justice, insure domestic tranquility, provide for the common defense, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity, do ordain and establish this constitution of the United States of America.