The Interconnection of the East and West Bank Water Supplies

St. Charles Parish Department of Waterworks
St. Charles Parish
St. Charles Parish Waterworks Districts

- Eastbank Waterworks District One
  - Created on November 17, 1949
- Westbank Waterworks District Two
  - Created on November 21, 1949
- Department of Waterworks
  - Created on November 6, 1989
WATER TREATMENT CAPACITY

• **EastBank Production Capacity - 7 MGD**
  A Plant Built in 1950 (1.5 MGD)
  B Plant Built in 1965 (1.5 MGD)
  C Plant Built in 1978 (4 MGD)

• **WestBank Production Capacity - 9 MGD (+30%)**
  A Plant Built in 1950 (1 MGD)
  B Plant Built in 1963 (2 MGD)
  C Plant Built in 1973 (3 MGD)
  D Plant Built in 1983 (6 MGD) 3 MGD Filter Capacity
District #1 and #2 Consolidated November 1989

• Under the River Connection first conceived shortly after consolidation
  – Directional Boring & HDPE still new to water industry
  – Deemed Cost Prohibitive

• Last Expansion of the East Bank Production Facilities was completed in 1978.
  – “C-Plant” Responsible for more than ½ of Daily Water Demand on the East Bank of St. Charles
  – Could not be taken out of service for long enough to repair without running out of water (approx. 18 hrs)
Katrina Effect

• Began Plant Expansion Engineering in 2003
• Hurricane Katrina caused extensive wind damage but no loss of water system
  – All leaks repaired in first weeks
  – No catastrophic flooding
  – Refugees from surrounding areas (60% increase on EB)
• Decide on two pronged approach to Capacity
  – Complete Design of Plant Expansion ($$$)
  – Interconnection of East and West Bank Water (120)
Water Consumption

Eastbank Average Daily Consumptions

- 2006
- 2005
- 2004
- 2003
- 2002
- 2000
Water Consumption

Eastbank Average Daily Consumptions

- Maximum Output without C Plant
- 2006
- 2005
- 2004
- 2003
- 2002

The diagram shows the average daily water consumptions for Eastbank from 2002 to 2006, with a peak in October 2005.
Design Criteria

• Proper Sizing of the Two Lines
  – Internal Pressures on Pipe –DR9 (150~156 lbs)
  – Over Burden Pressure (Service Load Condition 130 lbs)
  – Pulling Strength

• Proximity to Treatment Plant / Large Mains
  – Plants located 5 miles apart on river
  – #1 connected 16” EB main at Plant to 10” WB main
  – #2 connected 10” WB main to 12” EB main (16”WB south of UPRR)

• Sufficient Room for Layout
  – #1 - 3350 feet (.63 miles)  #2 - 2957 feet (.56 miles)
Design Criteria

• Levee Slope Stability Control Line / Batture
  – WB of Crossing #1 had batture > 1900 ft. (permitted)
  – 30 ft from Toe of Levee
  – 25 ft below River Bottom

• Landowners / Servitudes
  – Multiple Owners
  – Business Impact Mitigation

• Soil Conditions
  – Hydrographic Survey for River Bottom Profile

• Distance Across River / Crossing Angles

• Temporary Access Roads / Weight Loading on Levee
Permitting, etc.

– Louisiana Department of Transportation
  • Crossing LA 18 / LA 48 on both crossings
  • LA 3160

– Railroad Right of Way Permits
  • Illinois Central (Crossing #2a)
  • Union Pacific (Crossing #2b)

– Louisiana Department of Health and Hospitals
  • Office of Public Health

– Louisiana State Land Office (>10,000)

– U. S. Coast Guard
Permitting, etc.

– U.S. Army Corps of Engineers
  • Permits
  • Technical
  • Geotechnical Engineering
  • Structural Engineering
  • Mitigation

– Department of Natural Resources
  • Wetland Mitigation $7K for #1 - $36K for #2

– Pontchartrain Levee District

– Lafourche Levee District

– River Stage > 11 ft NGVD at Carrollton Gage

– Air Release / SCADA Controlled Valves / Flow Meters
Construction of Crossing #1

• Construction
  – Vermeer 330x500 directional drilling rig was used
  – 8” pilot hole took 4 1/2 days averaging 733 ft/day (11”)
  – Backreaming pass made with 24-inch fly cutter
  – Second pass made with 36-inch fly cutter (16 Days)
  – Pullback of the Pipe took 10 hours (Max depth 150 feet)
  – Contained a compound curve of 6 degrees to the left and 9 degrees to the right to stay within acquired property

• Layout / Impact to State Highway (66 Joints of Pipe)

• Pressure Testing of High Density Polyethylene
  – Utilizing Air versus Water
  – Above / Below Ground
Passing Bacteriological Testing

• Debris in Line
  – Pigging Line to remove debris (Used 93)
  – Fused Joints (66 Total on Crossing #1)
  – Elevation / Slope of Pipe

• “Timing” samples to ensure complete Disinfection of water main
  – AWWA recommends sample taps ever 1000’

• Videoing Interior of the Main
Rejecting / Redesign of Crossing #2

• Mississippi River Levee Slope Stability Line
• Acquiring land / Servitude
  – Land Purchase
    • Multiple Owners (11) with pipe at 45 degrees to property
• New Permits (Starting the Process Again)
  – USACOE
  – Pontchartrain and Lafourche Levee Boards
  – LDOTD
  – DNR
  – Louisiana State Land Office
  – LDHH
Constructing Crossing # 2

• Construction
  – 8” pilot hole took 3 days averaging 1000 ft/day (4”)
  – Backreaming pass made with 24-inch fly cutter
  – Second pass made with 36-inch fly cutter (14 Days)
  – Pullback of the Pipe took 8 hours (Max depth 165 feet)
• Avoiding Construction Delays / Damages
  – Fusible Pulling Head
  – Filling the Line with Water Prior to Pull
  – Gashes in Pipe Wall / What is acceptable? 10%
  – Road Closures and their impact on community
  – Impacts to the Environment (Historic Oak Trees)
  – Impacts to local residents / businesses (RR Luling)
Benefits of Connections
Anticipated

• Reduce / Eliminate Dependence on outsiders
• Redundancy of Water Intakes
• Increasing Water Pressure / Flows
• Ability to use excess Capacity on West to Supplement East in the events that demand exceeded design capacity or with failure of East Bank C Plant
• Freeze Event (1.5 MGD to East)
South Tranfer Line

Daily Positive Flow: 516722 GALLONS
Daily Negative Flow: -141 GALLONS
Weekly Positive Flow: 2874256 GALLONS
Weekly Negative Flow: -141 GALLONS

Luling
100.0%

Destrehan
100.0%

562.5 GPM

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Benefits
More than Anticipated

• Ability to Balance Flows from Each Unit to Increase Efficiency
• WB D-Plant out of service at Peak Demand Season
• EB Distribution Mains at Plant rerouted with no issues to customers
• Changes throughout both Distribution Systems
• River Crossings vs. Storage Tanks
  – (1 Million Gallons = 4.8 Hours)
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Questions or Comments?

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