

# Incremental Hydroelectric Energy

The Bowersock Mills and Power Co., Lawrence, KS



# Hydroelectric Energy Potential for U.S.

## BMPC Plant At Forefront of Development Curve



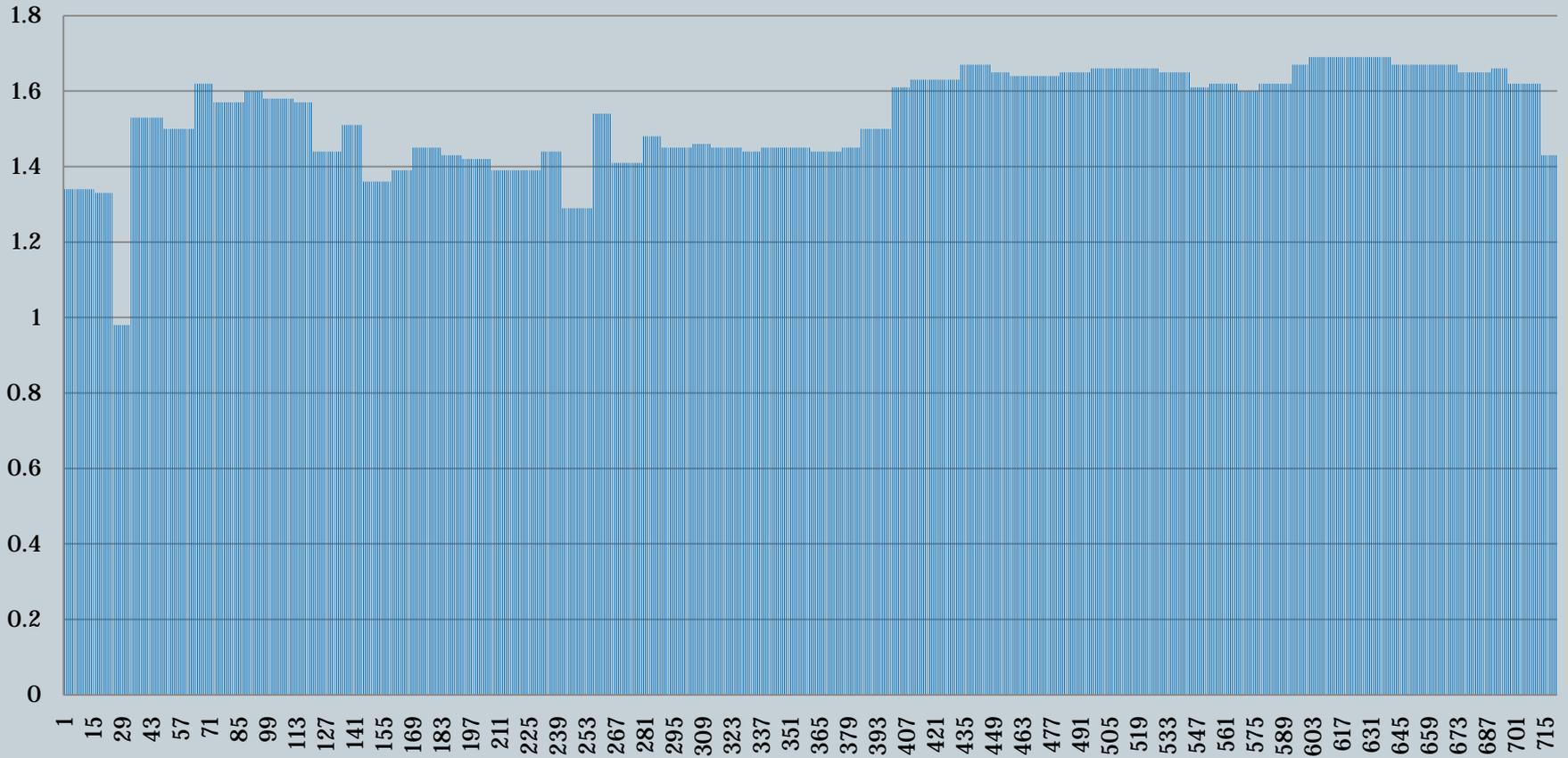
*“In our estimates we have about **70 GW of additional hydro which would have minimal impact**; and so where does this come from? It comes from putting in better turbines in existing dams, it comes from run-of-the-river turbines that don't create the minimal environmental impact and it comes from using water storage that was made for flood control and then as you let that water out, it generates small electricity with it. The fact is, its 70 GW and 96 GW today of hydro, so it's nearly double. **Seventy GW is 70 nuclear power plants, maybe 100 new coal plants.** If you look at the economics of hydro, it's far less than any of those. **So it's one of the best kept secrets.**”*

Secretary of Energy  
Stephen Chu  
September, 2009

# Hydro = Domestic, Renewable Baseload



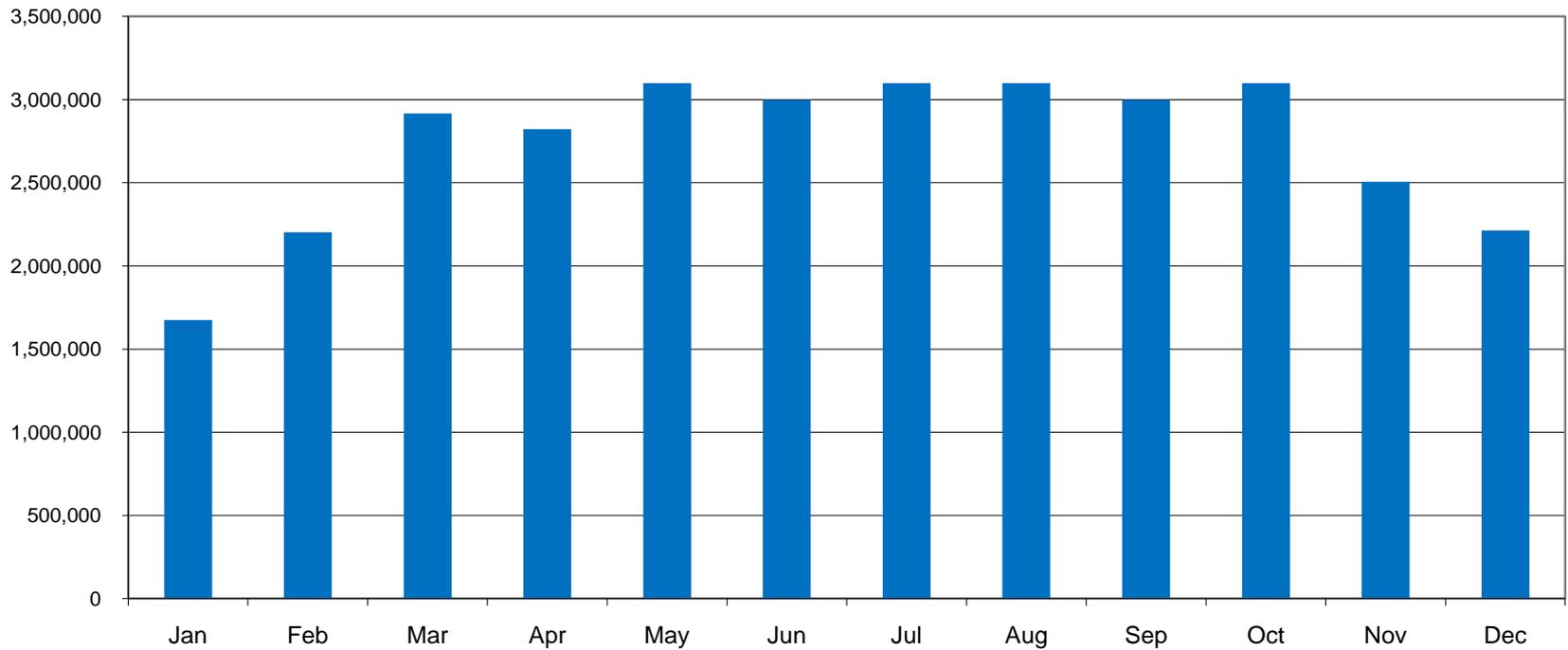
November 2009 Hourly Schedule



# Hydro = Domestic, Renewable Baseload



**BMPC Kansas River Expanded Project Projected Monthly Production**



# BMPC South Powerhouse



# South Powerhouse Exterior

Structure Circa 1905



- The largest and only major hydro plant in Kansas
- Oldest hydropower plant in the region - 1905
- Certified “Low Impact” in 2005 – one of 53 in U.S.
- South Powerhouse – 2.35 MW  
2300 cfs max
- Offtaker - Kansas Power Pool
- City of Lawrence maintains dam, which pools water for over 50% of daily water supply for the City – Public/Private partnership
- Median Water Flow in the Kansas River – 3400 cfs
- Significant quantities of unused water – potential for additional powerhouse

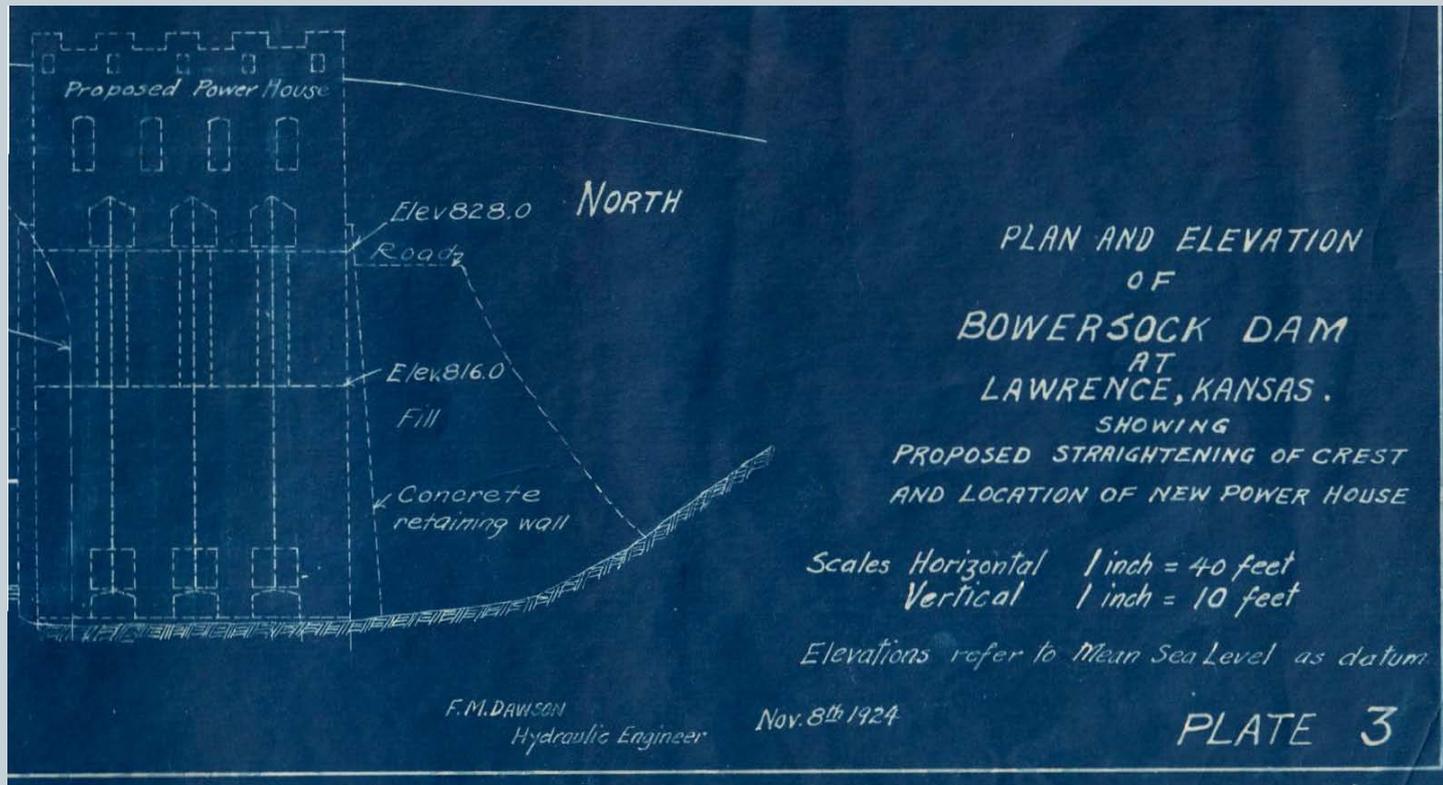


# North Plant Project

## A long time coming...



- 1924 – Present
  - Blueprints from 1924 found in files at the Army Corps of Engineers





# BMPC Project - Key Partners



- **Olsson Associates** — Project Engineer
  - Civil, Structural, Mechanical, Geotechnical, Electrical & some hydraulic eg river study
  - Some Permitting – Non-FERC + highly involved providing data for FERC
- **Kissick Construction** — Contractor
  - Early Contractor Involvement
- **Mid-States Energy Works Inc.- High Voltage**
- **City of Lawrence** – Dam Maintenance Partnership
- **Kansas City Board of Public Utilities**



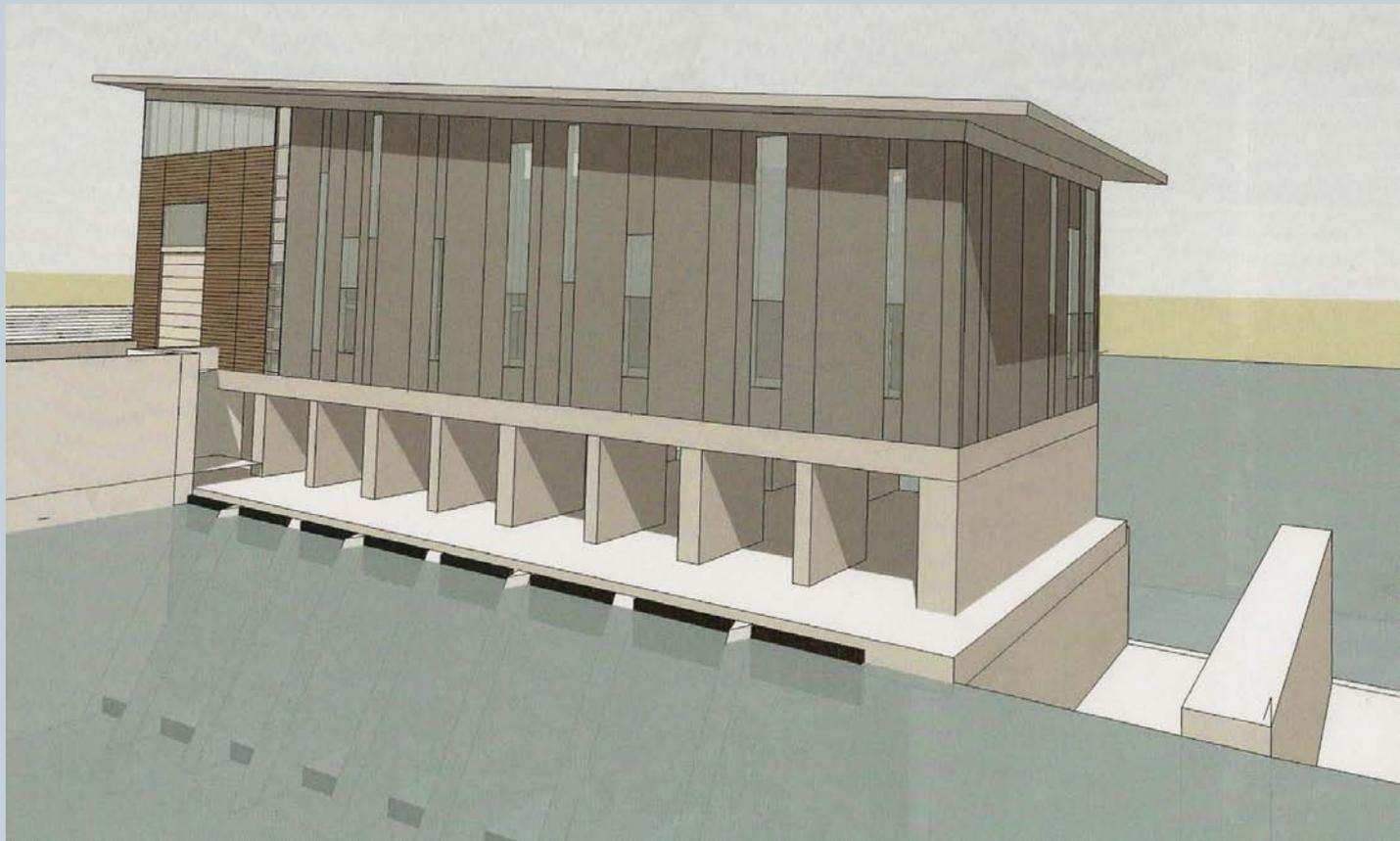
# BMPC Project Expansion Stats



- FERC License granted August 9<sup>th</sup>, 2010
  - Total Project 7MW (South + North)
  - Increase in Flashboard Height of 1.5 feet
  - 4 additional turbine/gen sets @ 1,000 kw each
    - 2 existing Turbine/Gen Sets; 2 new from China
  - Plans to add rubber dam -
- 25 Year Power Purchase Agreement with Kansas City Board of Public Utilities (KCBPU) signed Nov. 3, 2010
- Financing – Bond Structure, Closed – March 10, 2011
  - Recovery Zone Facility Bonds – Tax Exempt
  - Qualified Energy Conservation Bonds - Taxable
- Construction – Initiated June 13, 2011
  - 18-Month Construction Schedule
  - Early Contractor Involvement
- Total per kW cost - @ \$5,000

# BMPC North Powerhouse

4.65 MW



153' long, 32 feet wide, 4 turbine chambers, X tons of concrete

# FERC License Granted – P-13526



- Didn't set the record, but almost
  - License Submitted: Feb. 8<sup>th</sup>, 2010
  - License Granted: August 9<sup>th</sup> 2010
  - Just under 6 months
- Elected to use Traditional Licensing Process
- Ramp-up to application submittal
  - January 21, 2009 – Preliminary Permit Application
  - 1 ½ years for full process...
- Remarkably smooth process – until we needed permission to construct.

# FERC Process Milestones



- **January 21, 2009** – Application for Preliminary Permit
  - Working on PAD, Setting up Public Meeting
- **August 13<sup>th</sup>, 2009** – Public Meeting
- **September 23<sup>rd</sup>, 2009** – Notice of Intent/Pre Application Document & Request to use Traditional Licensing Process
- **October 2, 2009** – Preliminary Permit Granted
- **November 5<sup>th</sup>, 2009** – Permission Granted to use Traditional Licensing Process
- **February 8, 2010** – Application for License Submitted
- **March 3, 2010** – FERC Notice of Application Tendered – Intent to waive Stage I & Stage II Pre-Filing Consultation Requirements & Scoping
- **April 5<sup>th</sup>, 2010** – [Corps of Engineers Requests Cooperating Agency Status in Environmental Assessment](#)
- **April 12<sup>th</sup>, 2010** – [FERC Letter of Understanding – Corps as Cooperating Agency on 404](#)
- **April 16<sup>th</sup>, 2010** – FERC Waiver of Stage I and II Granted. Acceptance of Application and Solicitation for Motions to Intervene, Ready for Environmental Analysis (REA), Solicitation of Comments, Terms & Conditions, etc.
- **April 16<sup>th</sup>, 2010** – FERC Additional Information Request (AIR)
- **May 10<sup>th</sup>, 2010** – BMPC Submits Response to AIR
- **August 19<sup>th</sup>, 2010** – FERC Notice of Availability of Environmental Assessment
- **August 19<sup>th</sup>, 2010** – FERC Order Issuing Original License and Terminating Exemption from License

# What worked?



- **Good FERC Consultant**
  - Bill Smith, HIS, Inc.
  - Didn't use Bill as much as I had thought because...
- **Good FERC Licensing Staff**
  - Monte TerHaar
  - Available & helpful throughout. Good guide. Responsive. Signposted.
- **Site Selection – Incremental Hydro**
  - The BMPC expansion makes sense – existing dam used for city water supply
  - Limited Additional Footprint
  - Community & environmental group support – current climate is good
- **LIHI Certification**
  - Had recently worked with all the agencies and NGOs
  - They knew BMPC, I knew all the key individuals
  - Official thumbs up that BMPC was being a good steward of the river
- **Community Involvement**
  - BMPC – long history with the Lawrence community

# Challenges... stumbling blocks



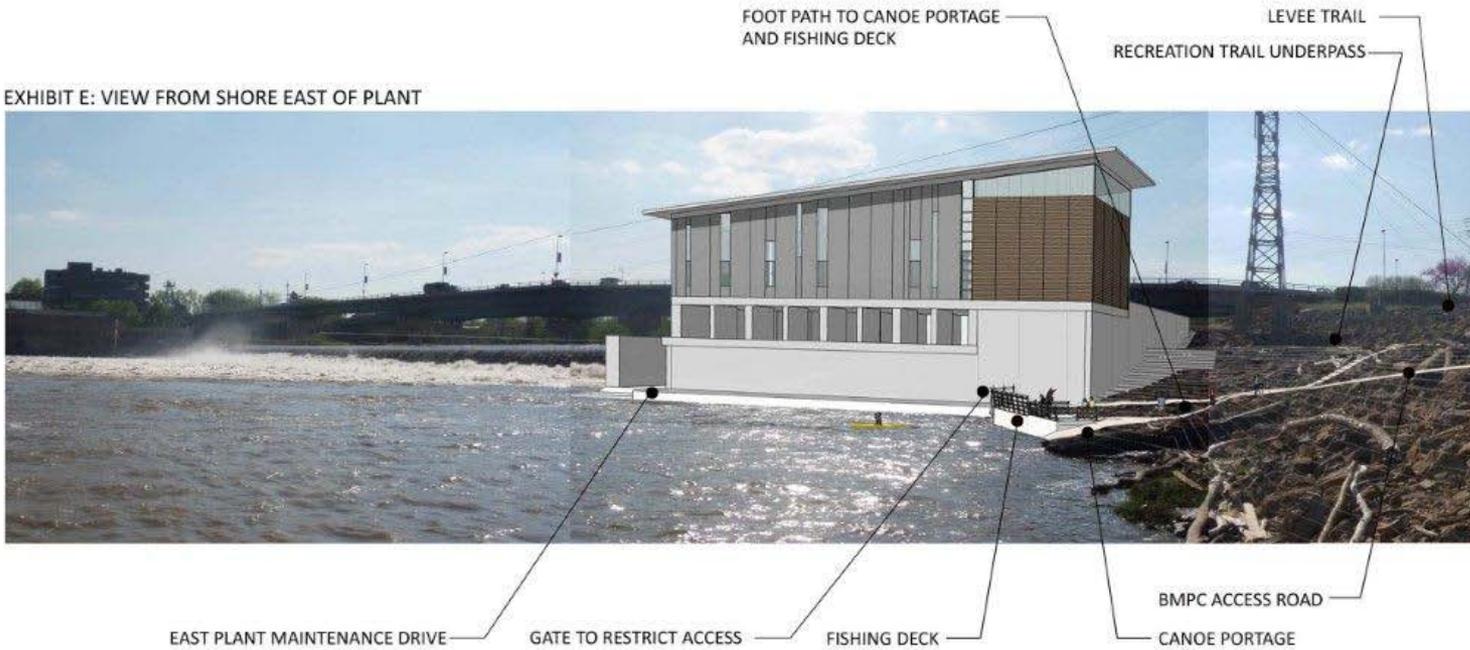
- **Financing** – very difficult to arrange within the context of the permitting process. \$25M – too small in many cases.
  - Chicken and Egg Situation - Can't get money until you have permission, can't do the engineering required until you have money.
- **Licensing Delays** – BMPC was not prepared for late delays  
Funded March 10<sup>th</sup> – Permissions received June 1 - @ 3 month delay
  - **Permission to Construct**
    - FERC Permission to Construct
      - needed clarification on requirements and “approval”
      - Financing Plan Requirements – posed challenges as far as timing
    - **Corps of Engineers** – process & communication issues
      - Corps guideline not to look at plans until complete – problematic with both financing and working within the FERC parameters – late inclusion of issues. Need something like early contractor involvement.
      - Consider having early meetings with Corps and municipal levee managers to get on the same page with requirements and timing
- All the major problems we haven't anticipated yet...

# BMPC North Powerhouse

## East Elevation



EXHIBIT E: VIEW FROM SHORE EAST OF PLANT



# Progress

## Generator Rewind



Cole Electric - Atlanta, Georgia



# Progress On Site

Site Prep – Monday, June 13<sup>th</sup>, 2011

