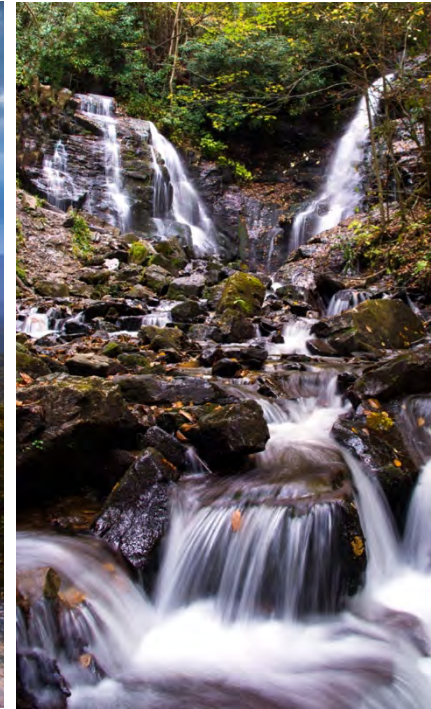


Water Supply Management, Challenges and Alternative Water Supply Projects

Iliia Balcom - Duke Energy Florida

Florida Section A&WMA 53rd Annual Conference - October 2017



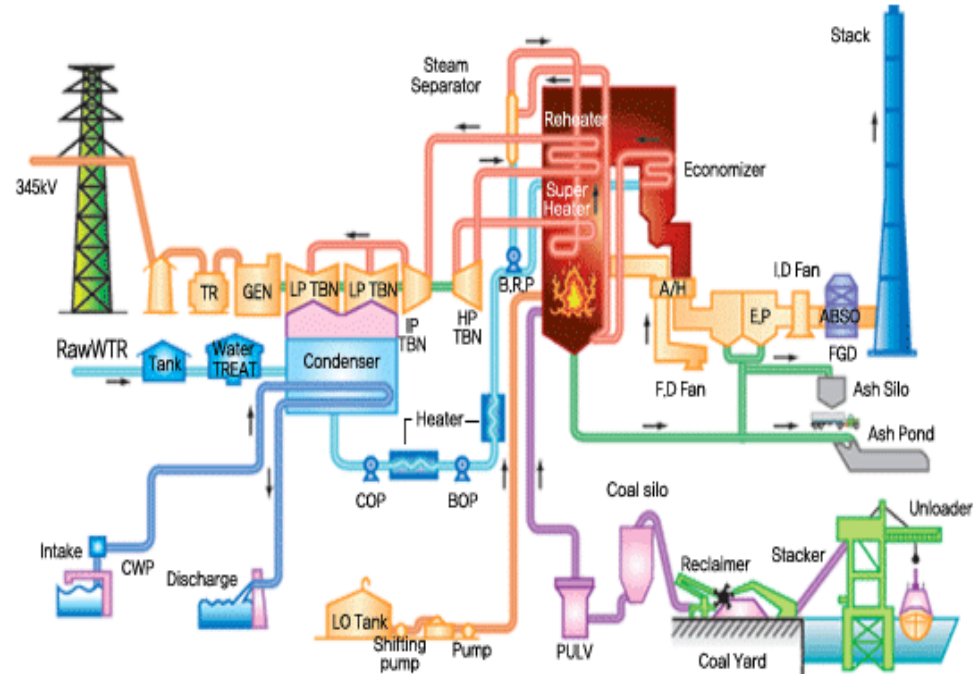
Objectives

- Overview of water uses at Power Plants
- General Water Supply Challenges
- Examples of Alternative Water Use Projects
 - Hines Energy Complex
 - Bartow Energy Station
 - Crystal River Energy Units 4 & 5



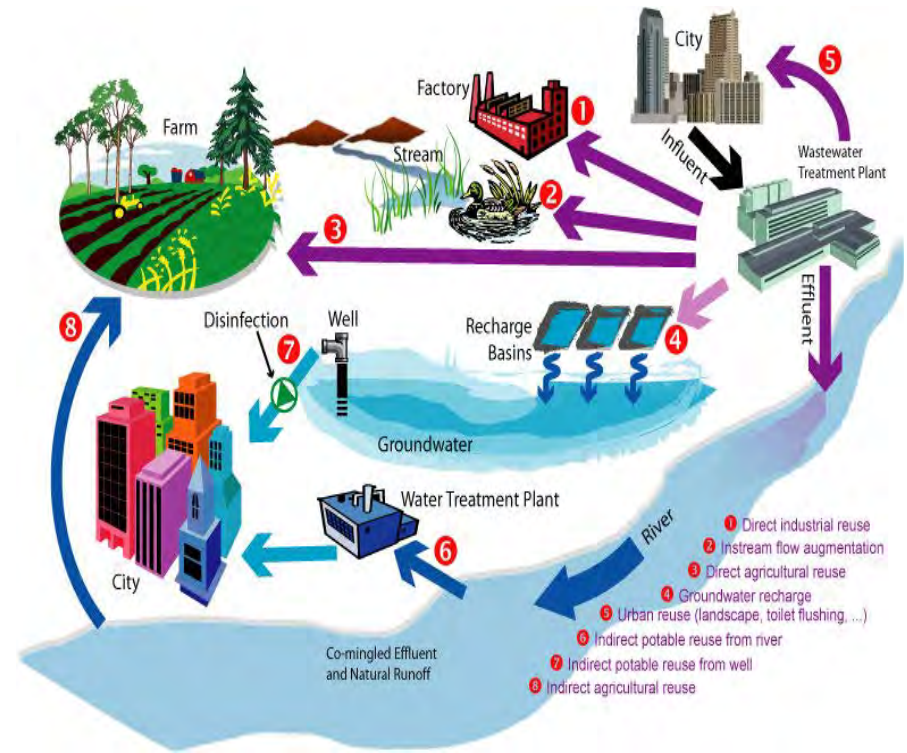
Water Uses at a Power Plant

- Main Water Use is for Cooling
 - Example, Crystal River 4&5 uses approximately 45.8 MGD per unit
- Uses of freshwater from groundwater include
 - Untreated: Ash conditioning, bottom ash transfer system, boiler washes, air heater washes, flue gas desulfurization.
 - Treated: Service water for potable water, fire protection, wash downs, pump seal water, dust suppression, and cooling of equipment and heat exchangers.
 - High purity water to produce steam
 - Approximately 2.5 MGD used at Crystal River 4 & 5



Water Use Challenges

- Competition for existing water supply sources
 - Florida Population Growth
- Limited supply of ground water
 - Central Florida Water Initiative (CFWI)
 - Conservation Goals
- In some instances degrading ground water quality-salt water intrusion
- Competition for Reclaimed Water Use



Alternative Water Supply Projects

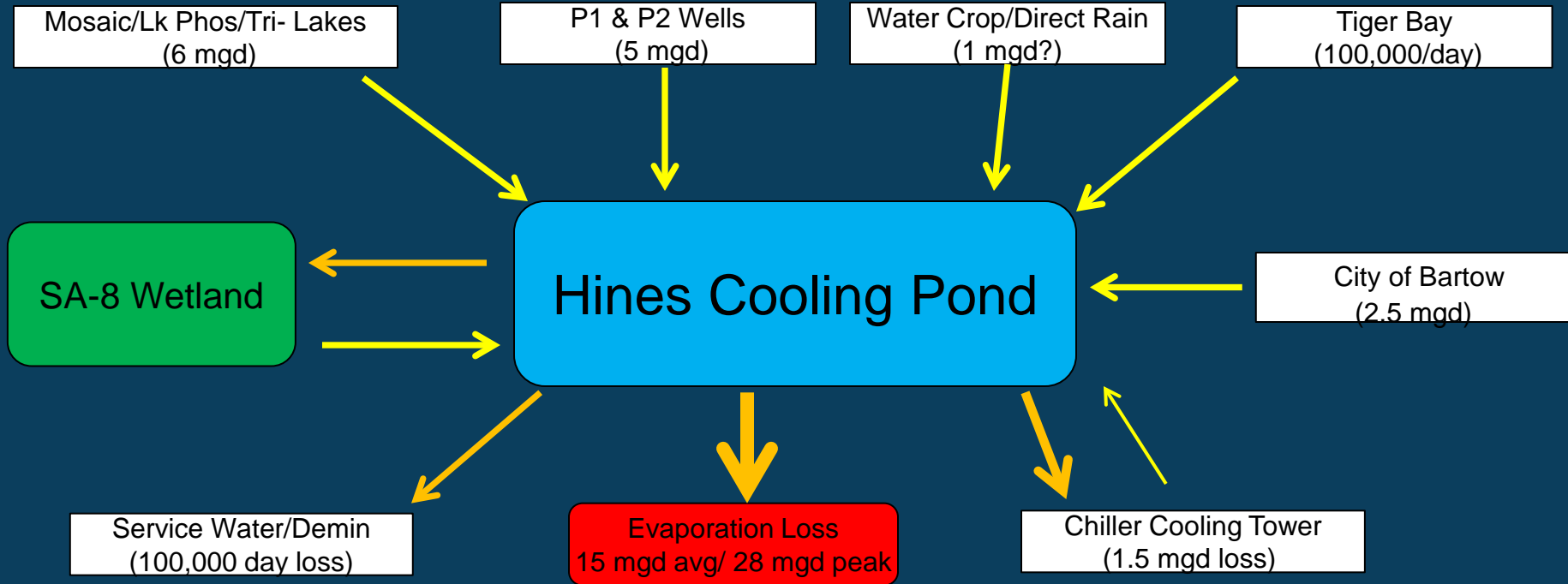


Hines Energy Complex

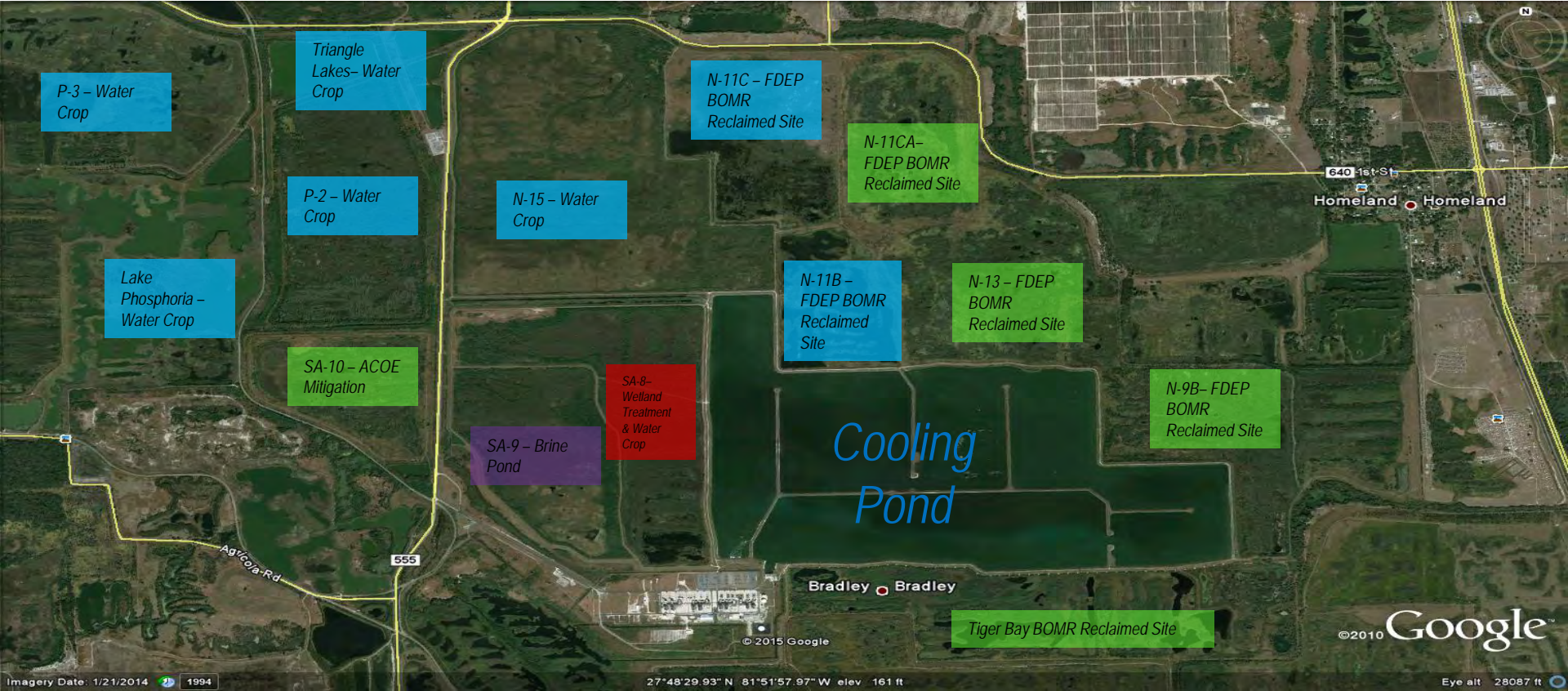
- Located in 8,200 acres of formerly phosphate mined land in Bartow, consists of four Power Blocks, each comprised of two combined-cycle combustion turbines (CT) with compressor inlet chilling, unfired heat recovery steam generators (HRSG) and a steam turbine. Total Rating of 2,265 MW.
- Main source of water is the on-site 1,200-acre cooling pond.
- 2 production wells
- Alternate Water Supply Sources:
 - Reclaimed Water from City of Bartow
 - Industrial Wastewater and Cooling Tower Blowdown from Tiger Bay Cogen
 - Industrial Wastewater from Mosaic



Hines Energy Complex-Cooling Pond



Hines Energy Complex Water Cropping



Hines Energy Complex - Plant Island Stormwater Management System

Zero-Discharge Cooling Pond

SA-12 Stormwater Collection Basin

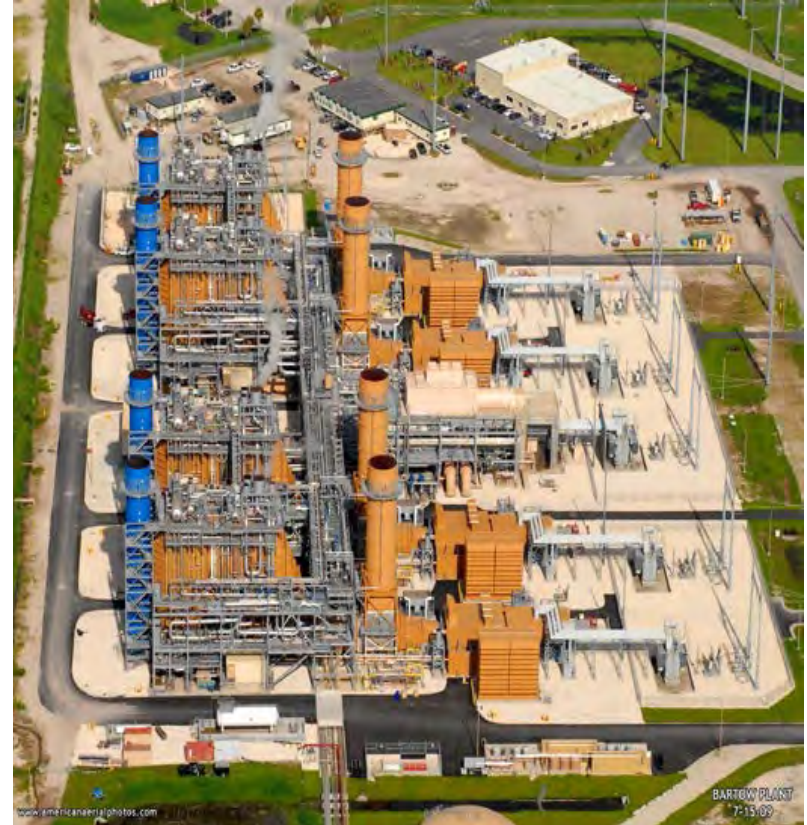
Conveyance Ditch

← = flow direction



Bartow Station

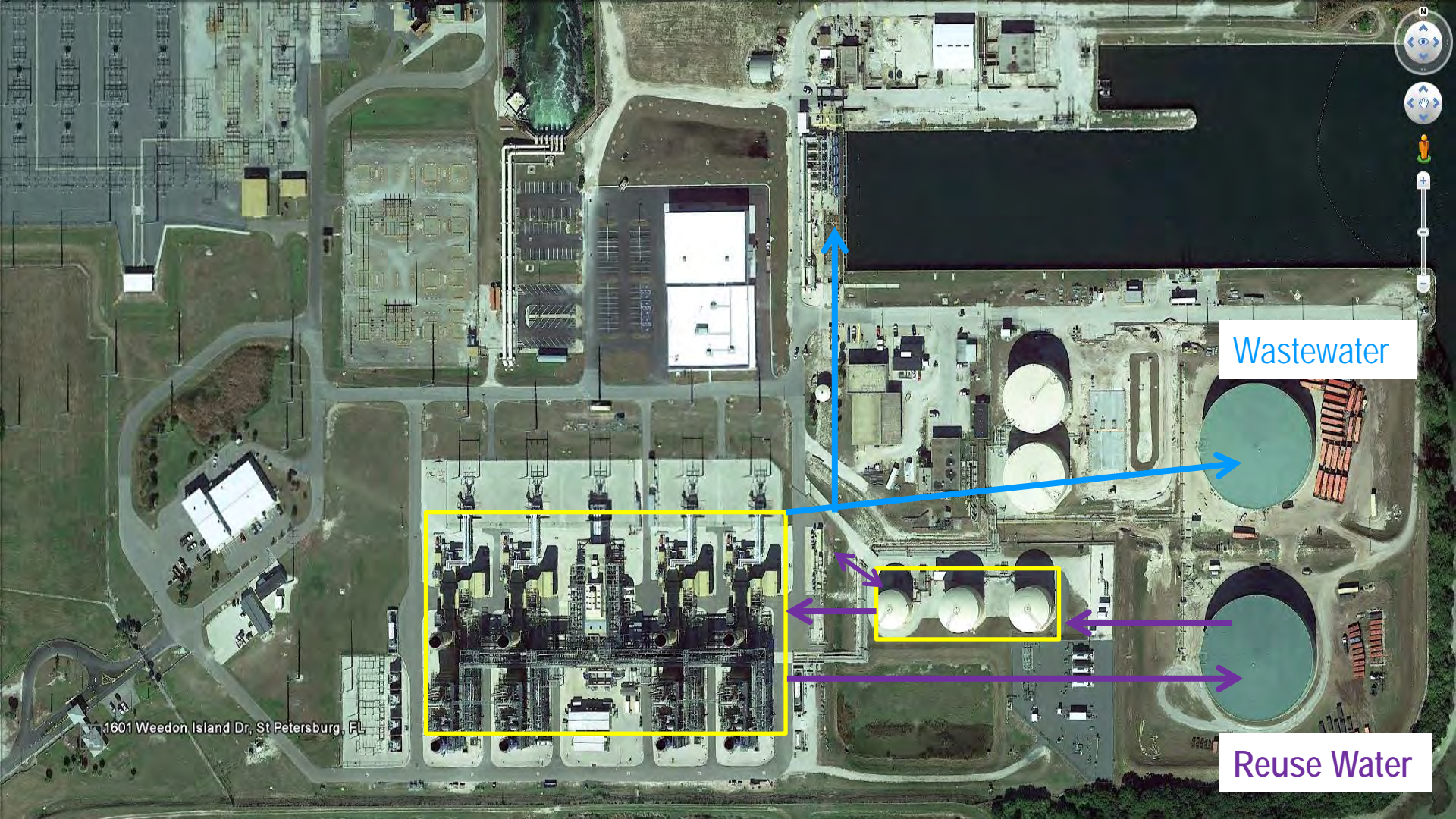
- Located on land abutted by Old Tampa Bay to the north and east, and the Weedon Island County Preserve on the west and south, Bartow consists of a 4 on 1 combined-cycle combustion turbine unit, four simple-cycle combustion turbine. Rated at 1,280 MW.
- Main source of water for cooling is Old Tampa Bay
- Process and potable water supplied by City of St. Petersburg



Wastewater and Water Reuse Project Background

- Industrial Wastewater Ponds required corrective action
- Wastewater was re-directed to an internal surface water discharge
- Water Reuse Project implemented in conjunction to reduce the surface water discharge and the amount of potable water use from the City.





Wastewater

Reuse Water

1601 Weedon Island Dr, St Petersburg, FL

Industrial Wastewater Flows Directed to Repurposed Tanks

- Reuse Surge Tank
 - 215,000 GPD from HRSG Blowdowns, Reheat Blowdowns and Evaporative Cooler Blowdowns
 - Used as Demineralized water makeup
 - Chlorine feed prior to sending to Reuse Surge Tank
- Wastewater Surge Tank-Emergency Use
 - R.O. Reject
 - Surplus Reuse Water
 - Oil/Water Separator
 - Wastewater Sumps

Project Highlights

- Involved Repurposing of two (2) No. 6 Oil Tanks
 - 191,000 gallons of used No. 6 oil shipped for recycling
 - 9,100 tons of No. 6 oil sludge shipped for disposal
 - Incineration and landfill
 - 102,000 gallons of petroleum contact water shipped for disposal.
 - No oil spills occurred during the project.
 - Included removing the heater elements and fiberglass flooring
 - Approximately 6 months to complete
- Nitrogen loading into Old Tampa Bay is less than 1 tons per year, well below the current allocation of 3 tons per year.
- Potable Water use from City of St. Petersburg reduced in 2015 from a high of 19.3 MG to 4.1 MG

Repurposed Oil Tanks-Before and After



Crystal River 4 & 5

- The Crystal River Energy Complex (CREC) is located near the City of Crystal River on 4,729 acres of land adjacent to the Gulf of Mexico. Units 4 and 5 (Crystal River North), built in the early 1980s, are pulverized coal, wall-fired boilers equipped with ESPs, low NOx burners, selective catalytic reduction (SCR), wet limestone flue gas desulfurization (FGD), acid mist mitigation (AMM), and two natural draft saltwater cooling towers. Crystal River 4 & 5 is rated at 1,480 MW.
- In addition to gulf water for cooling, CREC has ten (10) production wells located approximately 5 miles east of the main plant site. Total allowable groundwater use is 4.3 MGD.



Reclaimed Water Project

- Starting on July 2015, 750,000 gallons per day of reclaimed water from the City of Crystal River
- Previously discharged to the City's sprayfield, a concern of nutrient loading in the area in close proximity to springs.
- Used for flue gas desulfurization
- Total amount used in 2016 was 187.16 MG
- Currently in discussion with Citrus County to receive additional reclaimed water from their system.







Top 5 Buzz Words In Water for 2018

David Childs
AWMA 2017

Hopping Green & Sams

Top 5 Buzz Words In Water for 2018



Know these and you will be a cocktail party sensation!



Cooperative Federalism

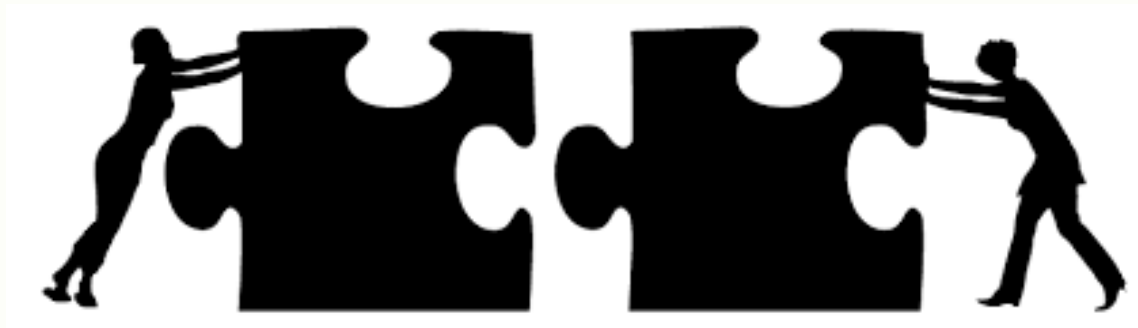


Spill Bill

Hopping Green & Sams
Attorneys and Counselors



Blue Star



Hydrologic Connectivity



Potable Reuse

Thank You!

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Attorneys and Counselors



AWMA 2017 Annual Conference

Water Supply Management and Sustainability

- **First Coast Manufacturer's Association (FCMA)**
 - **Background**
 - **Environmental Innovations**

- **Anheuser-Busch (ABInBev)**
 - **Global Environmental Goals**
 - **Jacksonville Brewery**
 - **History**
 - **Water Conservation Successes**
 - **Metal Container Corporation - ABInBev**
 - **History**
 - **Water Conservation Success**
 - **Water Conservation Plans**





FIRST COAST MANUFACTURERS ASSOCIATION

- **Protecting The Environment**
- Educating The Workforce
- Improving The Economy

FCMAWEB.COM

Consumer Products Made In Northeast Florida



Industrial Products Made In Northeast Florida



State Level

- ◆ **14,000 Florida Manufacturers Employ Over 307,500 Skilled Workers**
- ◆ **Manufacturing - 6 Times Economic Impact of Agriculture**
- ◆ **13th Largest Manufacturing State**
- ◆ **93% of Florida's Exports (Worth \$60B) Were Manufactured Products**

Local Level

- ◆ Manufacturing Accounts For 15% Of The Total Gross Regional Product
- ◆ Manufacturing Accounts For 20% Of Area Capital Investment
- ◆ Manufacturers Pay 25% Of The Tangible Personal Property Tax
- ◆ 50% Of FCMA Manufacturing Members Are Involved In Imports & Exports

Manufacturers Lead In Environmental Innovations

- ◆ **JEA - Solar Farm, Methane From Landfills, Reclaims Water Daily**
- ◆ **Gerdau - Recycles 600,000 Tons Of Scrap Metal Per Year**
- ◆ **WhiteWave - Reduced Waste Hauling & Electrical Consumption**
- ◆ **Vac-Con - Recycles All Water Used To Pressure Test Trucks**

Why Support Manufacturing ?

In Last 5 Years:

- ◆ GE Oil & Gas Relocates: 500 jobs; 1,500 indirect jobs
- ◆ Vistakon Expansion: 100 jobs; 300 indirect jobs
- ◆ Embraer Relocates: 50 jobs; 150 indirect jobs



Supporting Manufacturing

- ◆ **Medtronic Expansion: 175 jobs; 525 indirect jobs**
- ◆ **Flightstar Aircraft Services Relocates: 400 jobs; 1,200 indirect jobs**
- ◆ **Anheuser-Busch Expansion: 75 jobs; 225 indirect jobs**

Anheuser-Busch InBev



Our 2017 Environmental Goals

We commit to:

1

reduce water risks and improve water management

in **100%** of our key barley growing regions

2

engage in watershed protection measures

at **100%** of our facilities located in key areas

3

reduce water usage

to a leading-edge **3.2 hectoliters per hectoliter of production**

4

reduce energy usage

by another **10% per hectoliter of production** on top of the level we achieved in 2012

5

reduce greenhouse gas emissions in beverage production

by another **10% per hectoliter of production**, including a **15%** reduction in China

6

reduce packaging materials

by **100,000 tons** from our 2012 base

7

increase eco-friendly cooler purchases

to a **70% global average** annually

8

reduce greenhouse gas emissions in logistics operations

by **15% per hectoliter sold** from our 2013 baseline



www.ab-inbev.com www.facebook.com/ebinbev



Anheuser-Busch InBev Commits to a 100% Renewable Electricity Future

*New commitment to secure 100% of purchased electricity
from renewable sources by 2025*

*AB InBev to become the largest corporate direct purchaser of renewable
electricity in the global consumer goods sector,¹ reducing the company's
operational carbon footprint by 30%*

*Mexico Power Purchase Agreement (PPA) signed, our first agreement
under this new commitment*



Jacksonville Brewery

History & Water Conservation

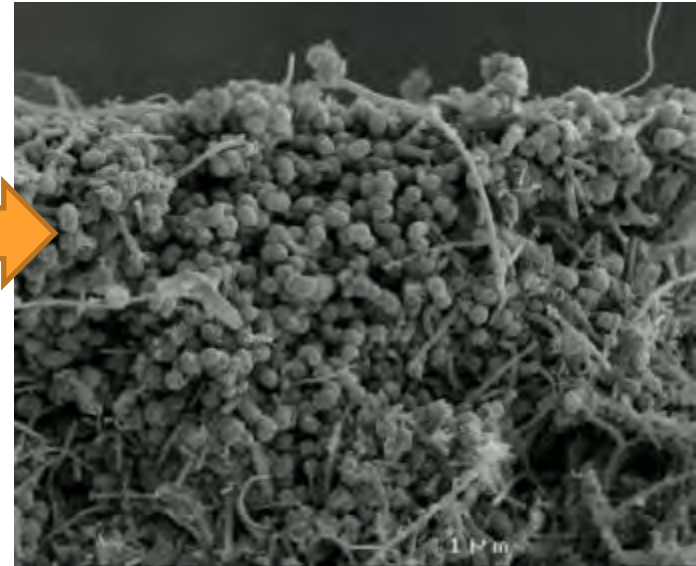
Jacksonville Brewery

- **Opened in 1969**
- **Total footprint: 2,200 acres (includes Brewery and Sod Farms)**
- **1.4MM sq ft under roof**
- **3 Can Lines, 3 Bottle Lines, 1 Draft Line**
- **Volume: 9.8M bbls Packaged (132M cases)**
- **3rd Largest Brewery in the U.S Network**



Jacksonville Brewery

- BERS, the Biological Energy Recovery System, wastewater treatment plant.
- **Biomass** → “bugs” (microscopic bacteria) that treat the wastewater.
- The bugs’ activity → produce **methane gas** → burned in the powerhouse → generates **energy** to help run the plant!
- Sell biomass to help seed other wastewater treatment plants.



BERS Plant

Nutri-Turf Farm

- Most of our wastewater is sent to the sprayfields at Nutri-turf Main St & Lem Turner farms.
- Wastewater → sprayed on the pivots where various crops, including hay and corn, are grown → harvested and sold for cattle feed.
- 1.3 mgd wastewater reused on sprayfields.



Jacksonville Brewery

Examples of conservation practices:

- 101 internal meters on process water systems.
- Convert spare tanks and piping to reclaim water system for makeup water to our cooling tower systems.
- Reduced number/duration of rinses, use conductivity probes to determine when to stop rinsing, collect final rinse and use as the pre-rinse.
- Replaced cooling water loops with air coolers.
- Updated cooling tower chemical management system to reduce flow through sensors to the drain.



Jacksonville Brewery

Examples of conservation practices:

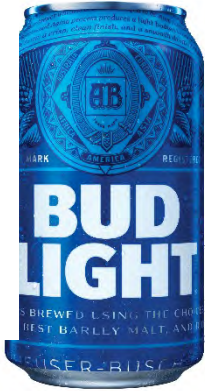
- Installed RO skid on steam boilers to reduce boiler blow down cycle intervals from 20 to 50 cycles.
- Control on Pasterizers to eliminate loss of 30k gpd.
- 50% reduction in water use in past ten years.
- Water usage is 3.1 hectoliter / hectoliter of product.
 - hectoliter = 26.418 gallons





MCC Jacksonville – ABInBev

History & Water Conservation



MCC Jacksonville



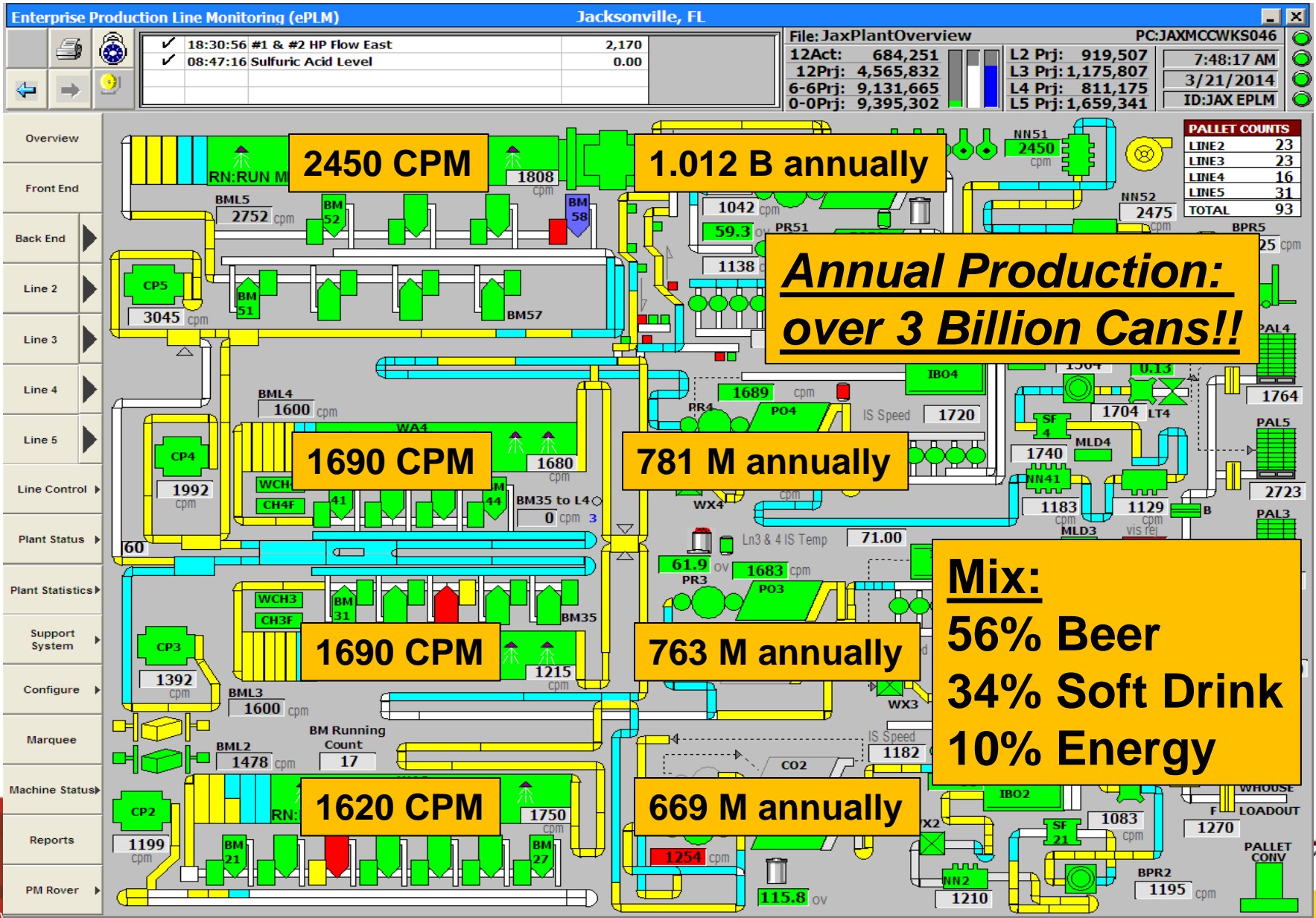
MCC Jacksonville



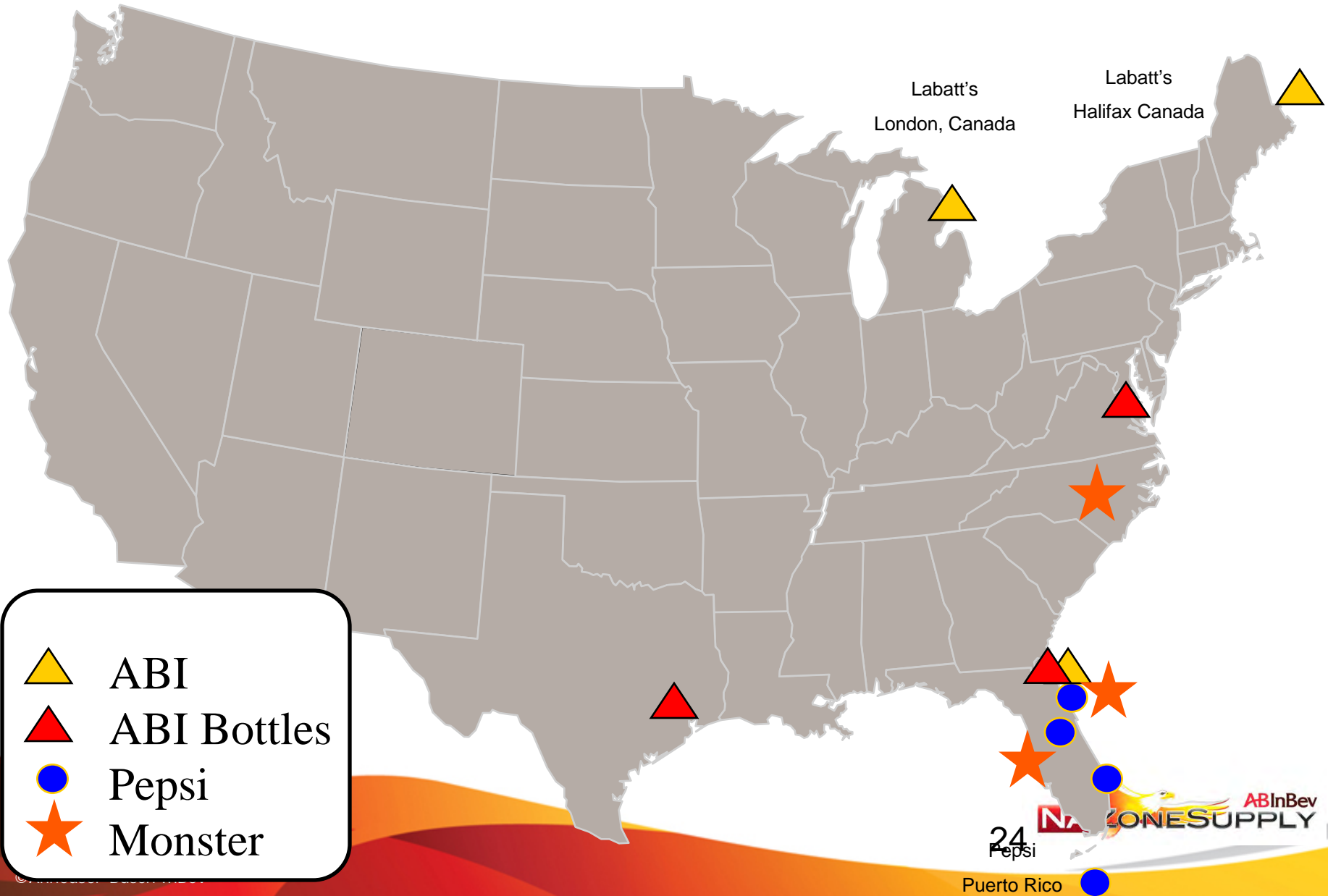
- Opened 1974.
- First aluminum can manufacturing Plant in Anheuser-Busch family.
 - The plant has 400,000 sq. ft. under roof
 - Four Can Lines - Three 12 oz & One 16 oz
 - Mix: 56% Beer – 34 % Soda – 10% Energy
 - Upgrades & Modernization – 1986, 1991, 2007, 2008
- 2017 Plant Expansion:
 - 16 oz Aluminum Bottle Line / 12 oz Sleek Can.
 - Now 650,000 sq. ft. under roof.







Jacksonville Volume & Mix

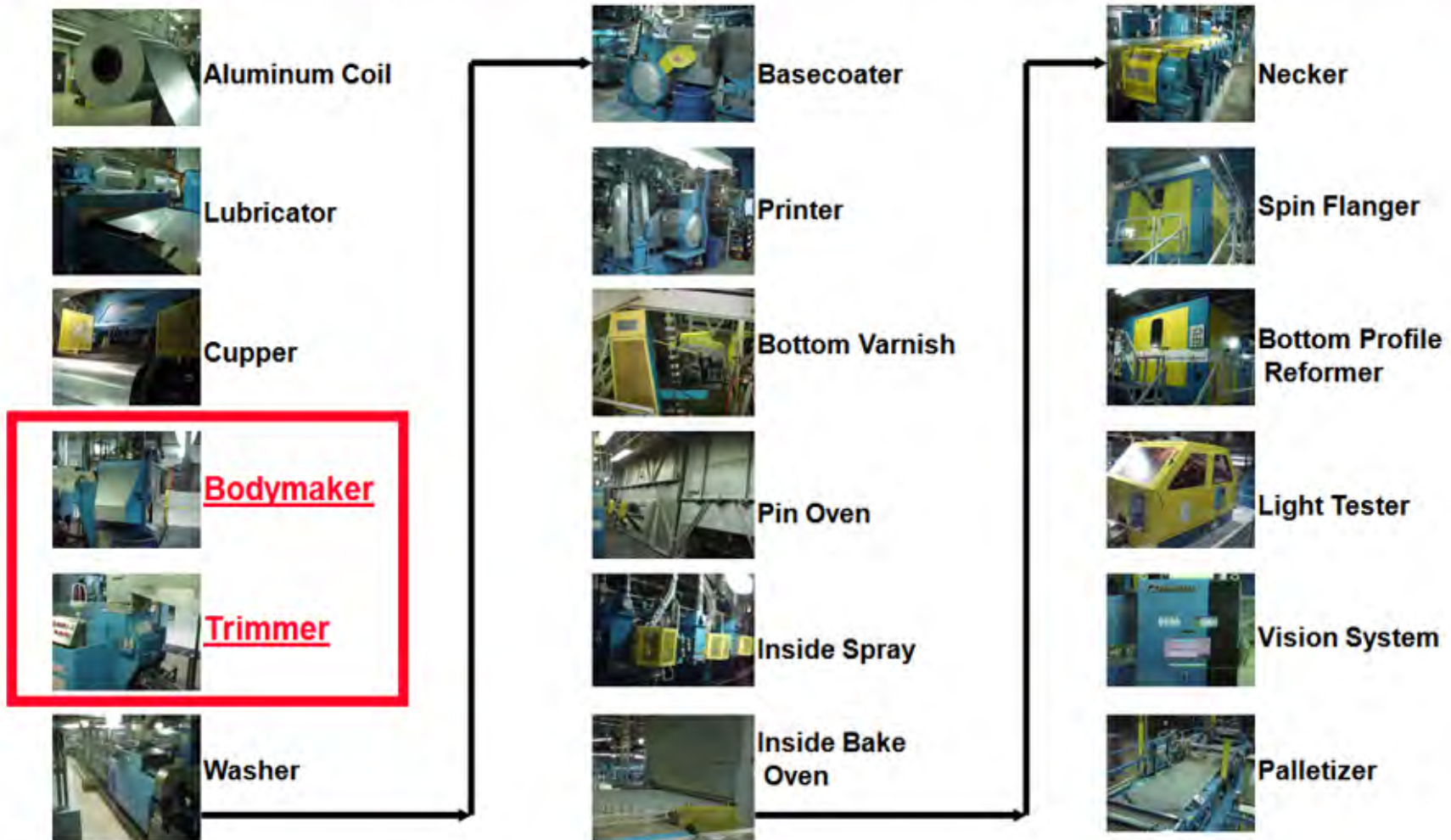


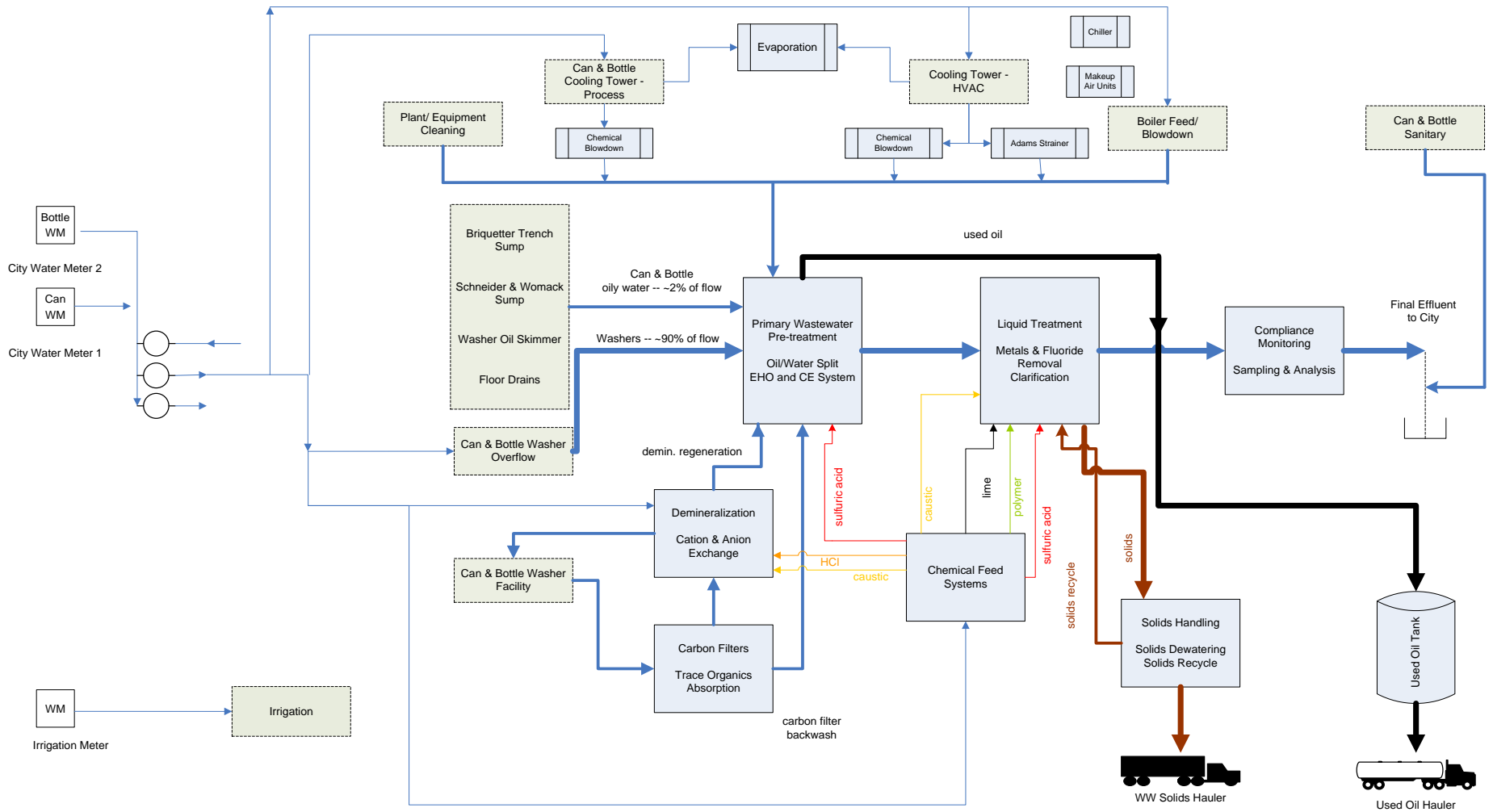
Major Customer Locations



	ABI
	ABI Bottles
	Pepsi
	Monster

Can Manufacturing Process





- 13% reduction in water use in past five years. 9 million gallons per year.
- Production increased 8% in past five years.

MCC Jacksonville
Water & Wastewater Schematic



MCC Jacksonville Water Conservation Plans

MCC Jacksonville Water Conservation Plan

Purpose

- Describe the processes being implemented to ensure Water is utilized in an efficient, non-wasteful and economical manner.

Process

- Daily, Monthly and Annual flow volume trend analysis.
- Site-wide leak detection and repair program using Work Order and Preventative Maintenance systems.
- Formal Site-wide Audit with associated action plans.
- Capture seal water and HVAC condensate for make-up pump seal water.



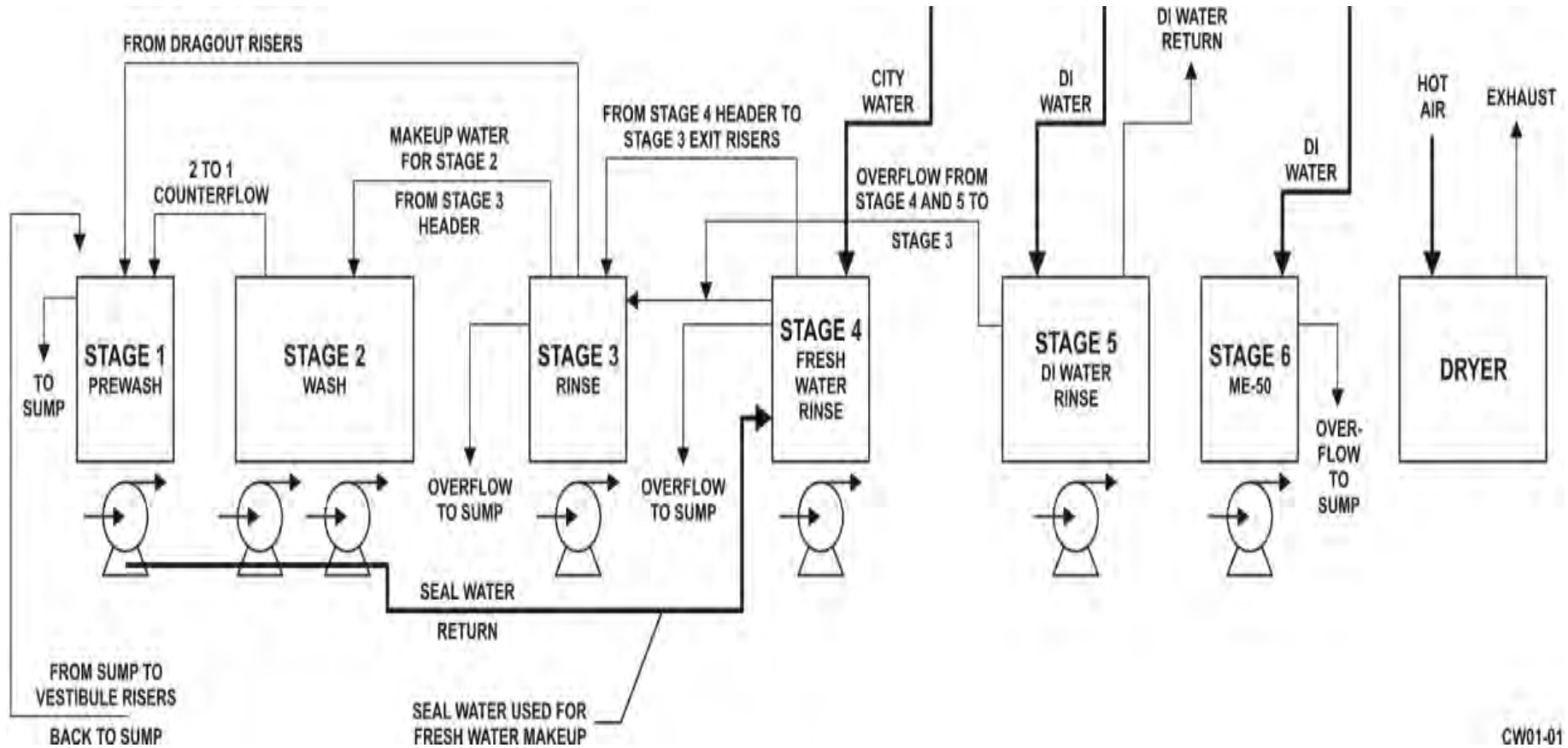
MCC Jacksonville Water Conservation Plan cont'd

- **Minimize Process Loss**
 - **Information management system to enhance planning.**
 - **Operator training to quickly identify production issues impacting water usage.**
- **Washer Reclaimed Water**
 - **Can washers use a counter flow system that matches the quality of water to the appropriate use. Clean water is used where necessary, and reclaimed water is used in other stages that can tolerate the lower water quality. The following diagram summarizes the recirculation of water inside the washer.**



MCC Jacksonville Water Conservation Plan cont'd

Washer



CW01-01

MCC Jacksonville Water Conservation Plan cont'd

Employee Engagement

- Each year, MCC and its parent company Anheuser-Busch celebrates World Earth Day.
- Encouraging employees to get involved and take action to reduce their environmental impact at home and work.
- Recent World Earth Day tag lines urged employees to recycle, conserve energy, conserve water, protect wildlife habitat, and to get involved.
- The focus is to conserve natural resources and to educate employees and their families about ways to reduce their impacts at work, home and school.



Questions?