

REINHOLD ENVIRONMENTAL Ltd.



**2017 APC & Wastewater Round Table  
& Expo Presentation**

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# Operational Reality of Operating a Zero Liquid Discharge Plant

Presented at Reinhold 2017 APC-Wastewater Conference

Eric Costello, PE - Orlando Utilities Commission

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# Background

## History of Orlando Utilities Commission

- ▶ Formed at the turn of the 20<sup>th</sup> Century
- ▶ Authority as electric & water utility in 1923 by State
- ▶ OUC operates as Commission

# Background

## Stanton Energy Center

- ▶ 1800 MW Coal and Combined Cycle
- ▶ SEC A & B 900 MW
- ▶ SEC 1 & 2 900 MW
- ▶ Coal Units Cycled at night

# Combined Cycle Units - SEC A and SEC B



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# Coal Units SEC Unit 1 and SEC Unit 2



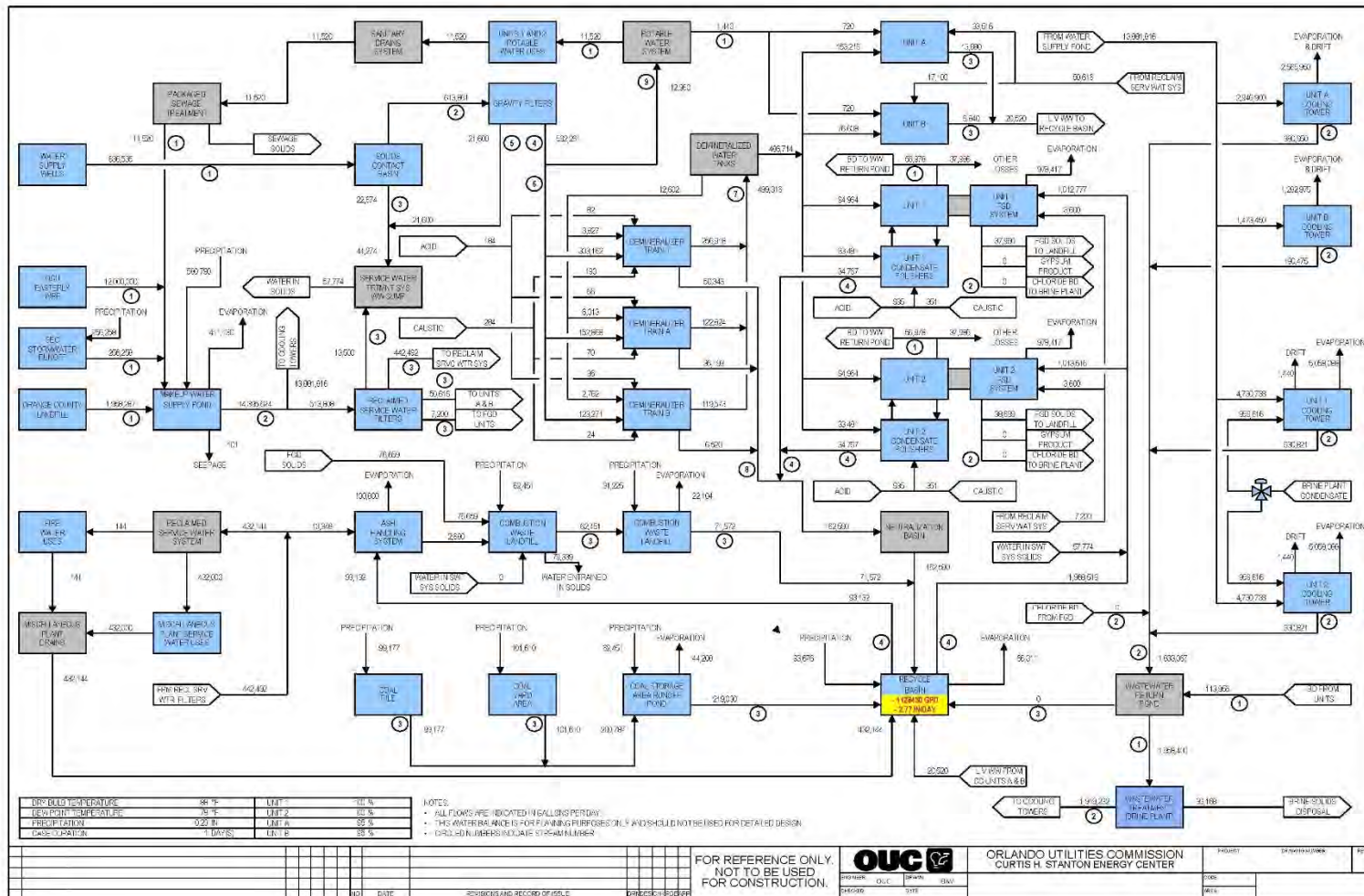
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# ZLD

What does it mean to have a ZLD Plant?

- ▶ No process water leaves the site
- ▶ Managing water is essential to operations
- ▶ Be prepared and develop new strategies

# Water Balance

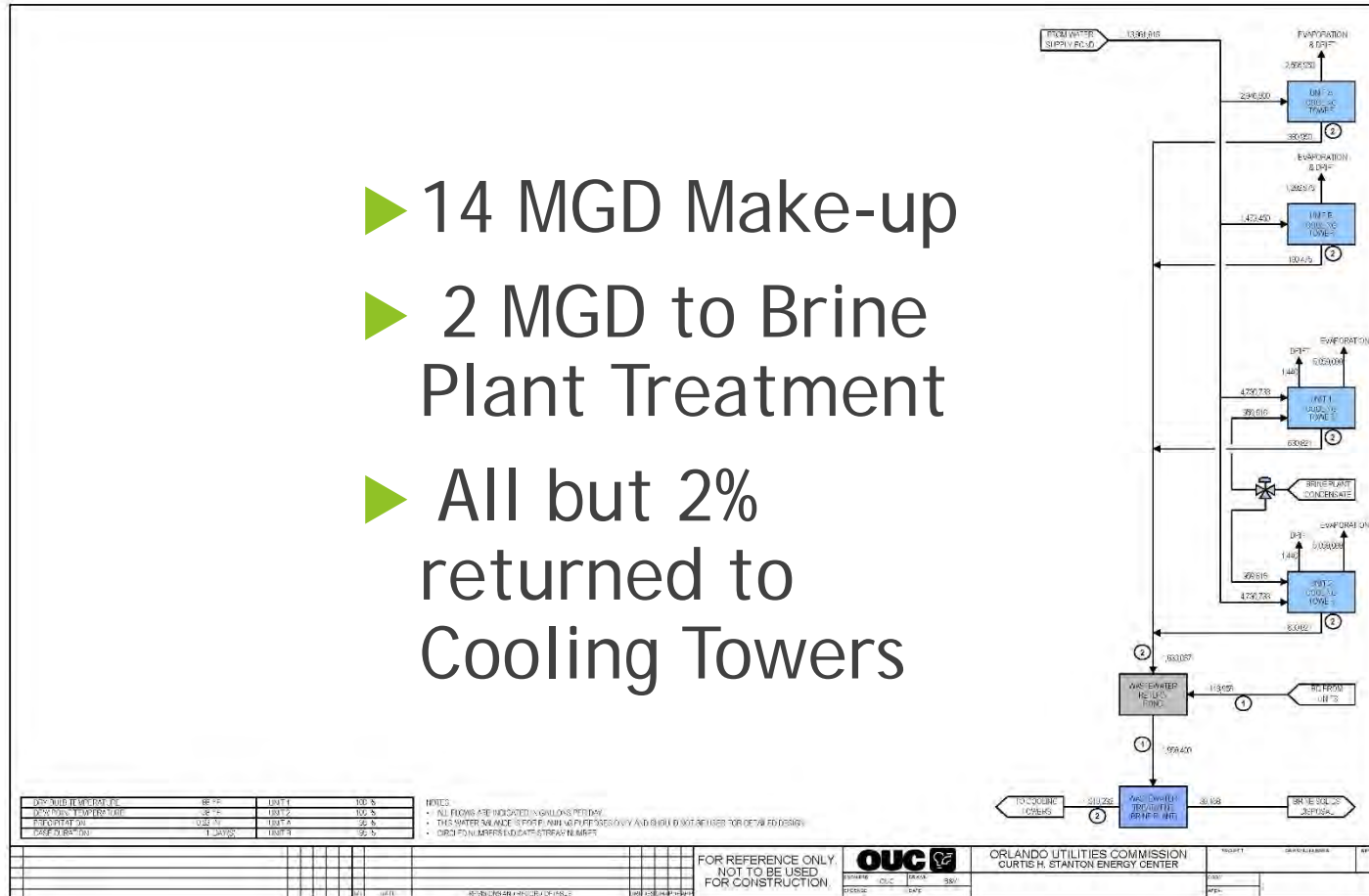


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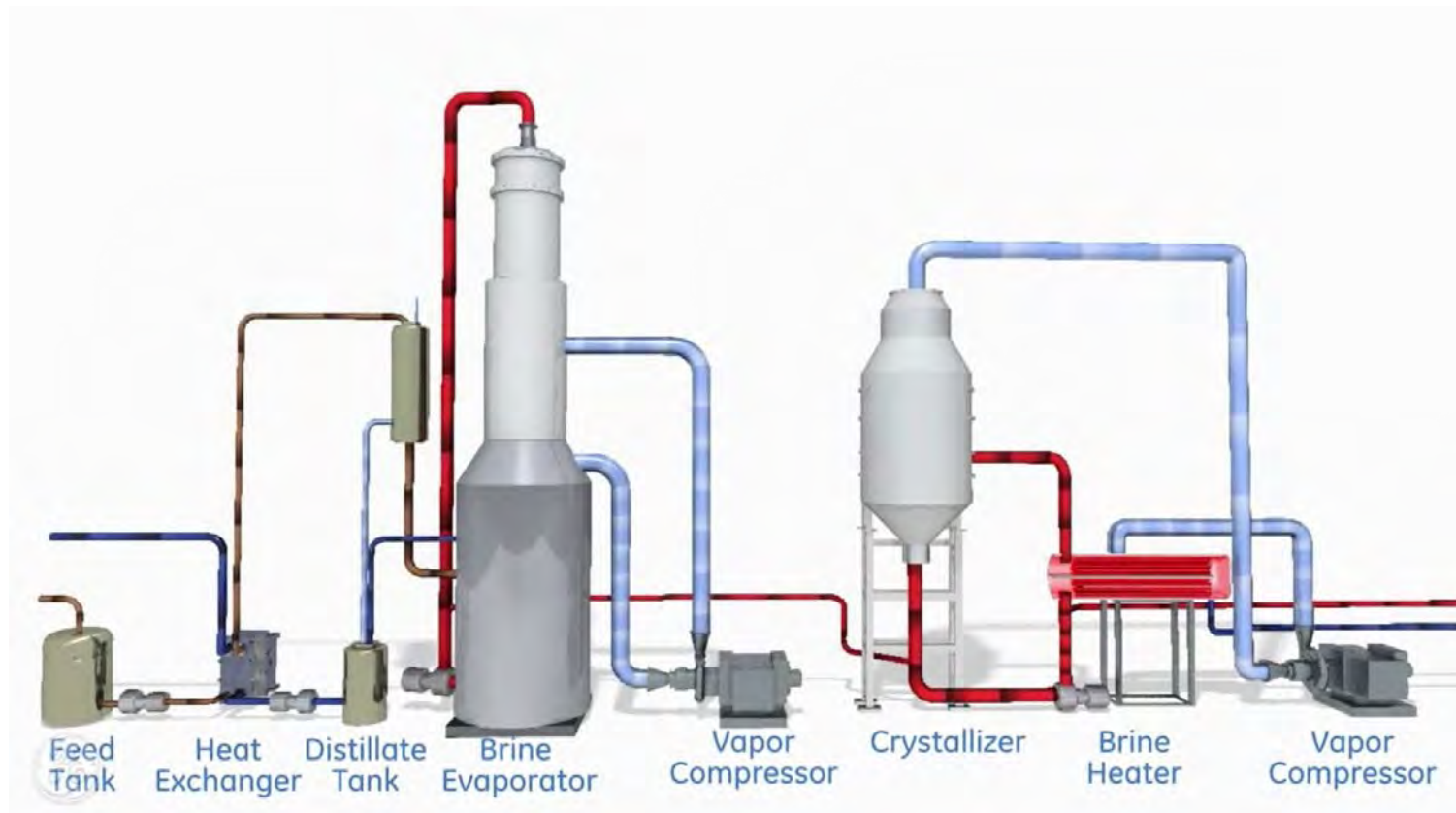


# Part 1 - Cooling Tower Blowdown

- ▶ 14 MGD Make-up
- ▶ 2 MGD to Brine Plant Treatment
- ▶ All but 2% returned to Cooling Towers



# Brine Plant - GE



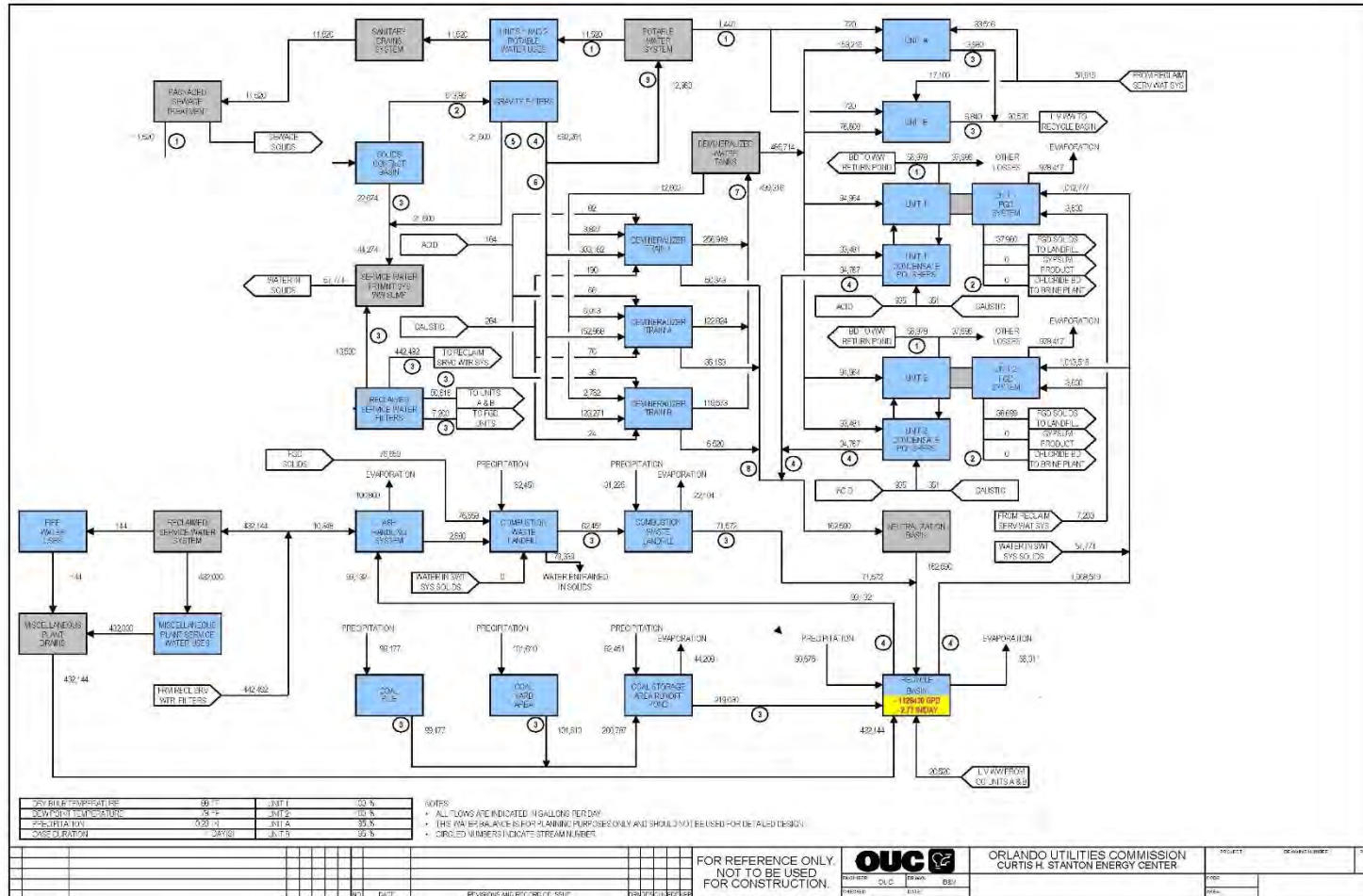
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# Brine Plant - GE



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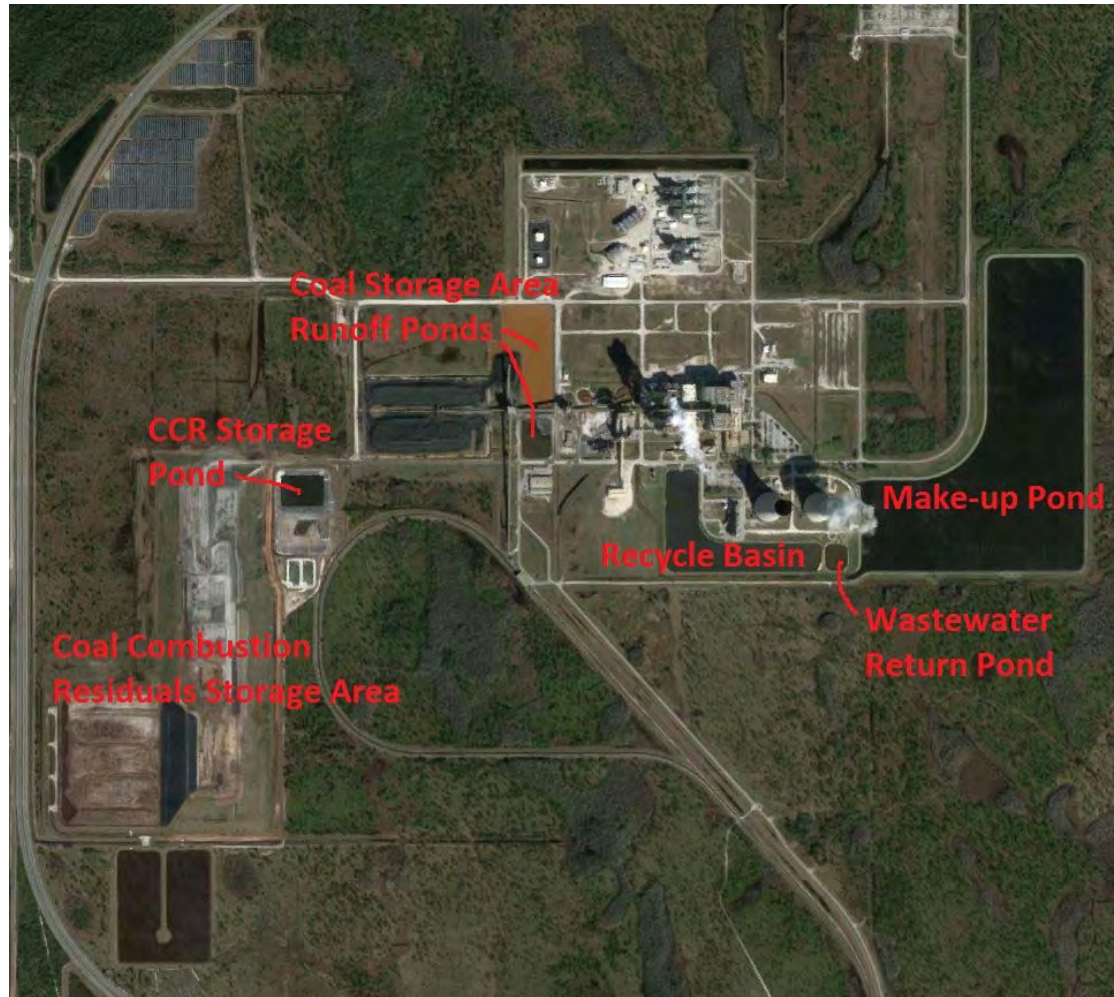
# Part 2 - Waste Water



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# SEC Site Plan



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# SEC Site - Solid Management Pad



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# SEC Site - New Landfill



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# SEC Site - Original Landfill



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# SEC Site - Solid Management Pad



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# SEC Site - CCR Storage Ponds



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# SEC Site - CCR Storage Ponds



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# SEC Site - Recycle Basins(s)



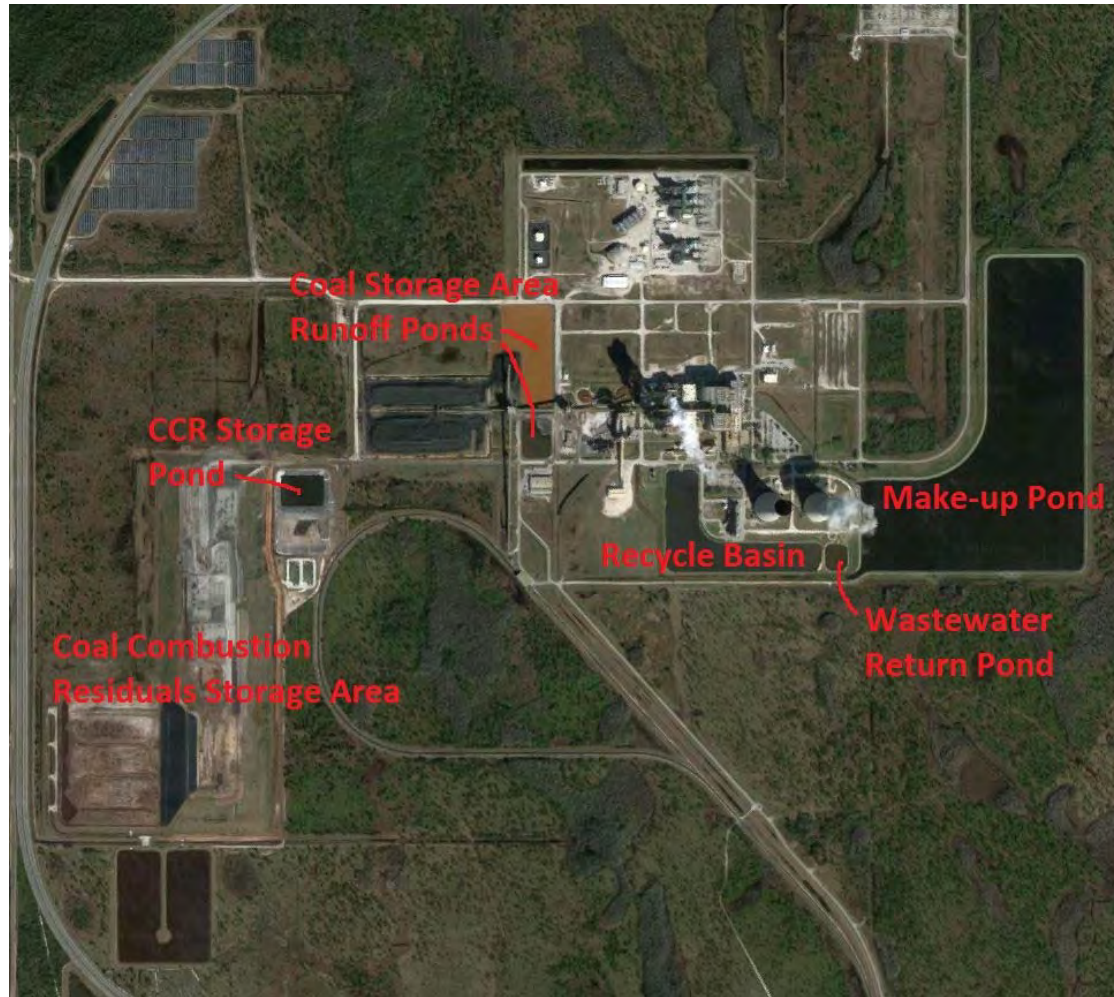
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# SEC Site - Recycle Basins(s)



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# SEC Site Plan



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# What has changed the Reality of Operating a ZLD Plant

Since 2003 SEC has seen many changes:

- ▶ Addition of Combined Cycle Units
- ▶ Change in fossil fuel mix
- ▶ Dispatch and preparing for storm events

# Reality of Operating a ZLD Plant - FGD Make-up



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# Reality of Operating a ZLD Plant - Storage Management



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# Reality of Operating a ZLD Plant - Reuse & Recycling

## Selected Opportunities :

- ▶ Boiler Blowdown to cooling towers - 150 gpm.
- ▶ Recycle Seal Water - 40 gpm.
- ▶ Update Demineralizer - 40 gpm.
- ▶ Reduce contact water - 300 gpm.

# Boiler Blowdown Recovery



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# Recycle Seal Water



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# Reduce Contact Water- re-route roof drains



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# Reduce Contact Water- re-route roof drains



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# Reduce Contact Water- Electrical Vaults



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# Reduce Contact Water-Electrical Vaults



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# Reduce Contact Water-Electrical Vaults



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# Reduce Contact Water- Roof Drains to Secondary Containment



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# Reduce Contact Water- Temporary Measures



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# Conclusions

Reality of Operating a ZLD Plant:

- ▶ FGD Make-up
- ▶ Storage Management
- ▶ Reuse and Recycling

# Questions?



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