

REINHOLD ENVIRONMENTAL Ltd.



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

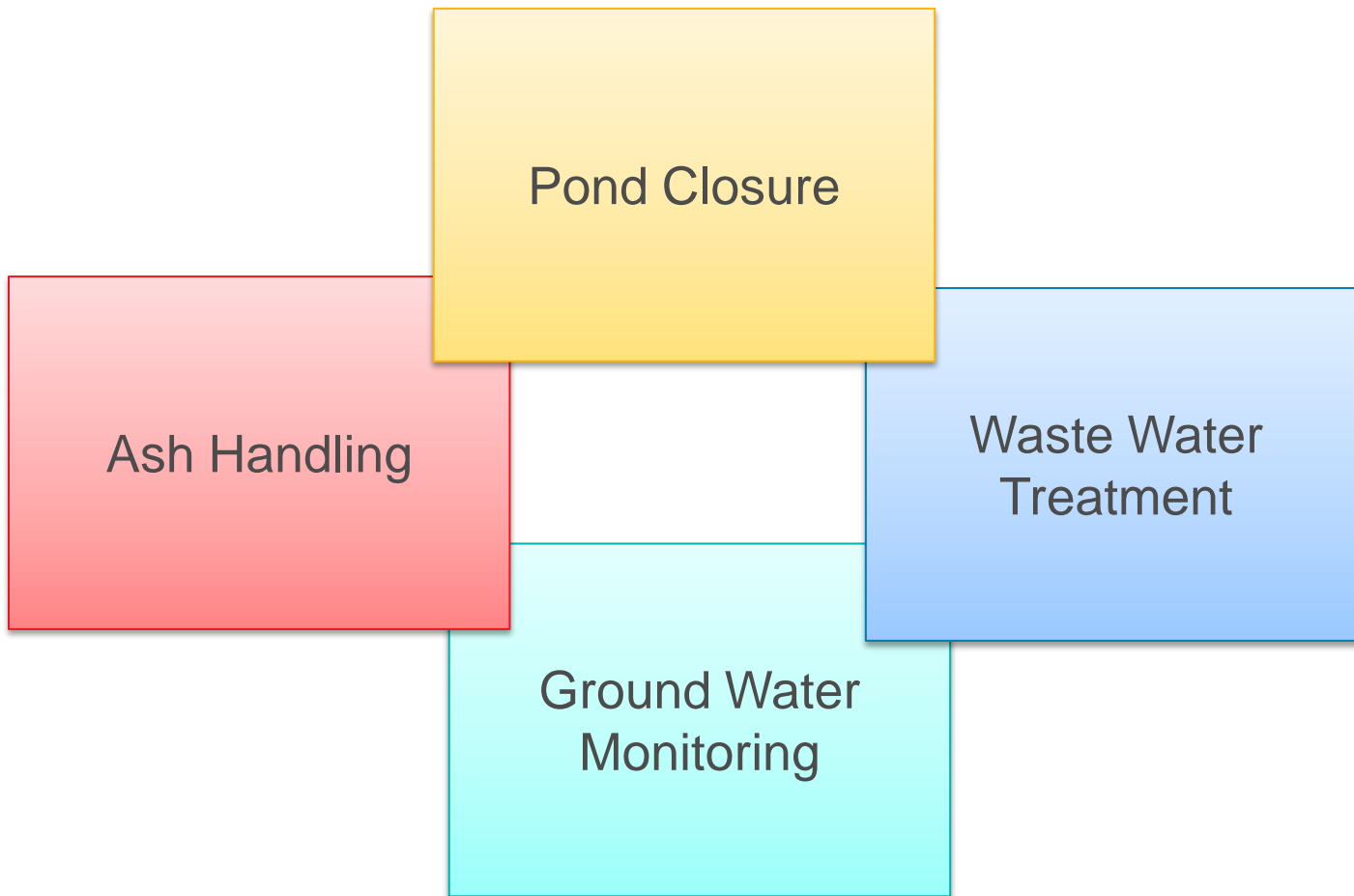
July 17 & 18, 2017 in Charlotte, NC / Hosted by Duke Energy

All presentations posted on this website are copyrighted by Reinhold Environmental, Ltd (RE). Any unauthorized downloading, attempts to modify or to incorporate into other presentations, link to other websites, or obtain copies for any other uses than the training of attendees to RE's Conferences is expressly prohibited, unless approved in writing by RE or the original presenter. RE does not assume any liability for the accuracy or contents of any materials contained in this library which were presented and/or created by persons who were not employees of RE.

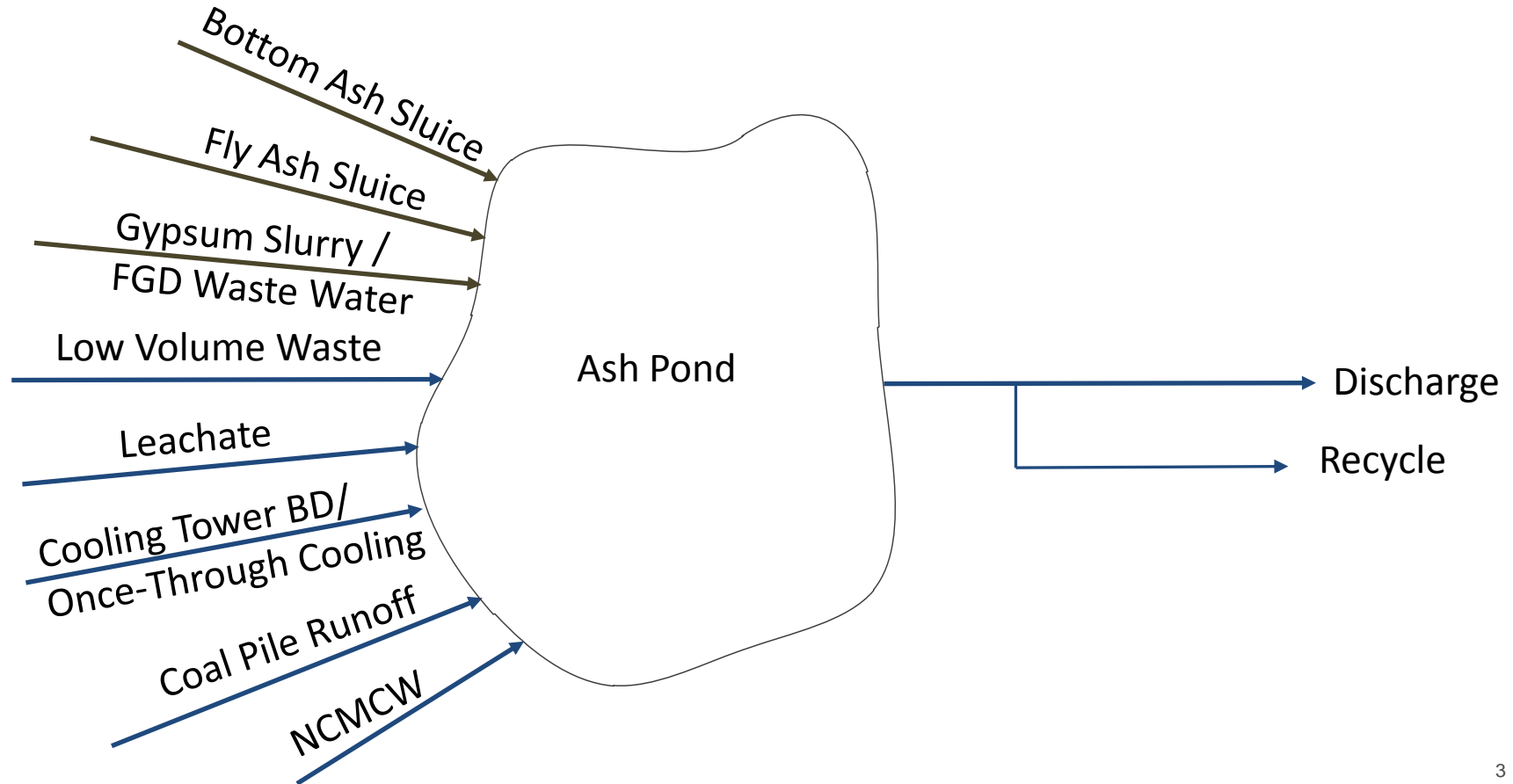
Retrofit of Wastewater Management at a Coal-fired Plant

Grace Guin
APC & Wastewater Roundtable
July 18, 2018
Charlotte, NC

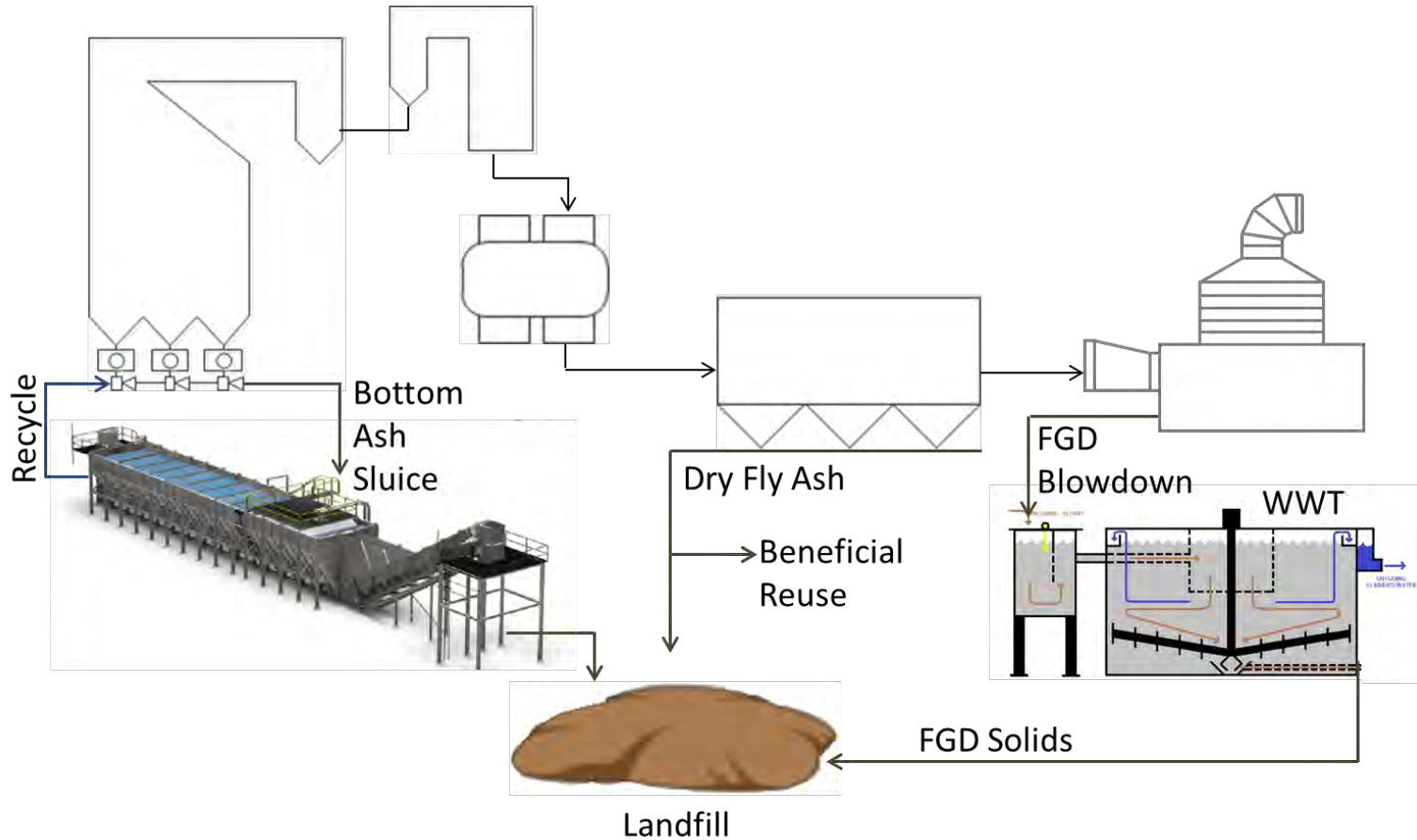




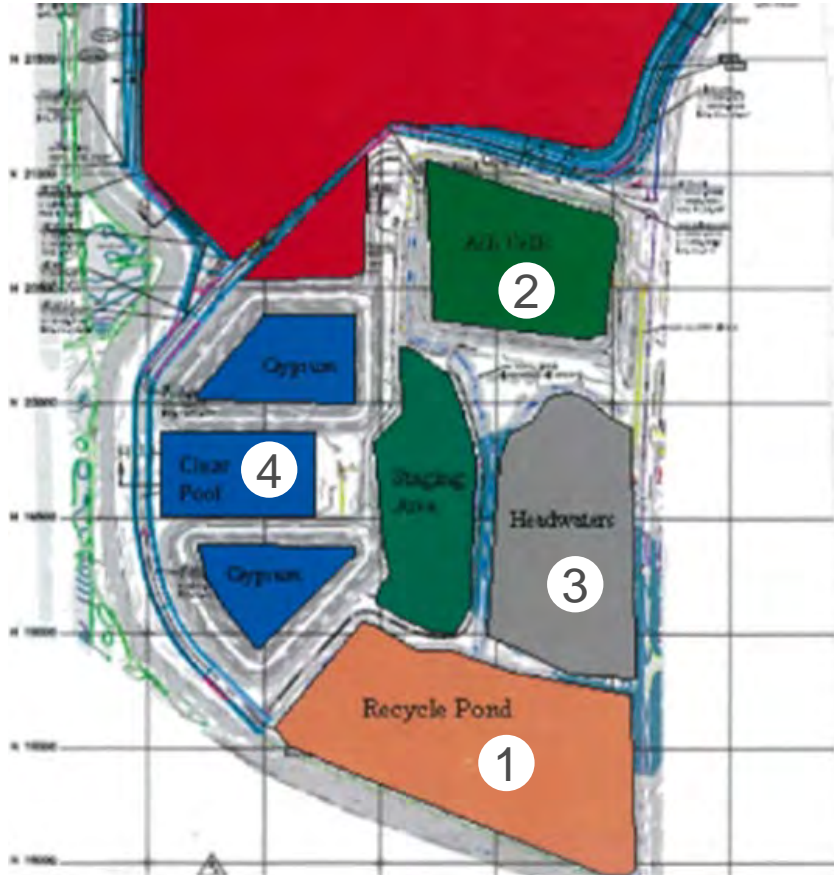
Water management program must consider CCR and non-CCR containing waste streams.



Individual treatment devices must be deployed for CCR containing waste streams previously treated in the ash pond.



Ash ponds currently serve as collection basins, reservoirs and treatment devices for coal-fired generation sites.



Impacted wastestreams:

- Low Volume Wastewater
- Coal Pile Runoff Water
- Cleaning Wastes (nonchemical)
- Leachate
- Fly Ash Transport Water
- Flue Gas Mercury Control Wastewater
- Bottom Ash Transport Water
- FGD Wastewater

Tanks, clarifiers, or ponds may be used as wastewater treatment devices. Primary considerations are cost and available space.

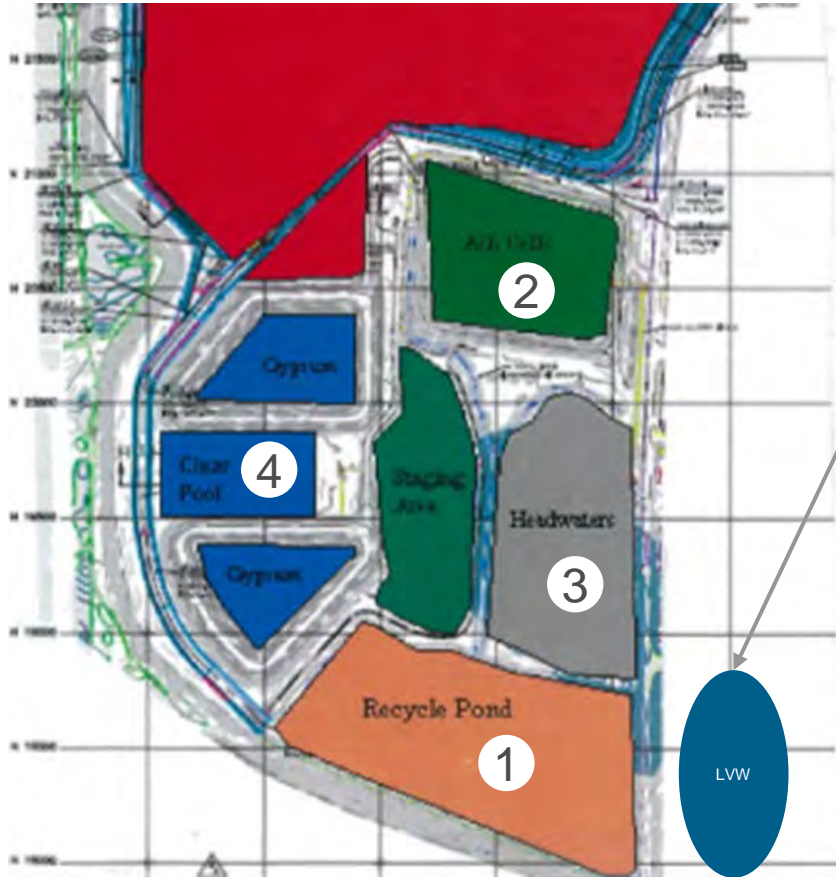


Considerations

- Installation costs
- Space available
- Capacity required
- Sediment handling
- O&M costs
- Wastewater compatibility

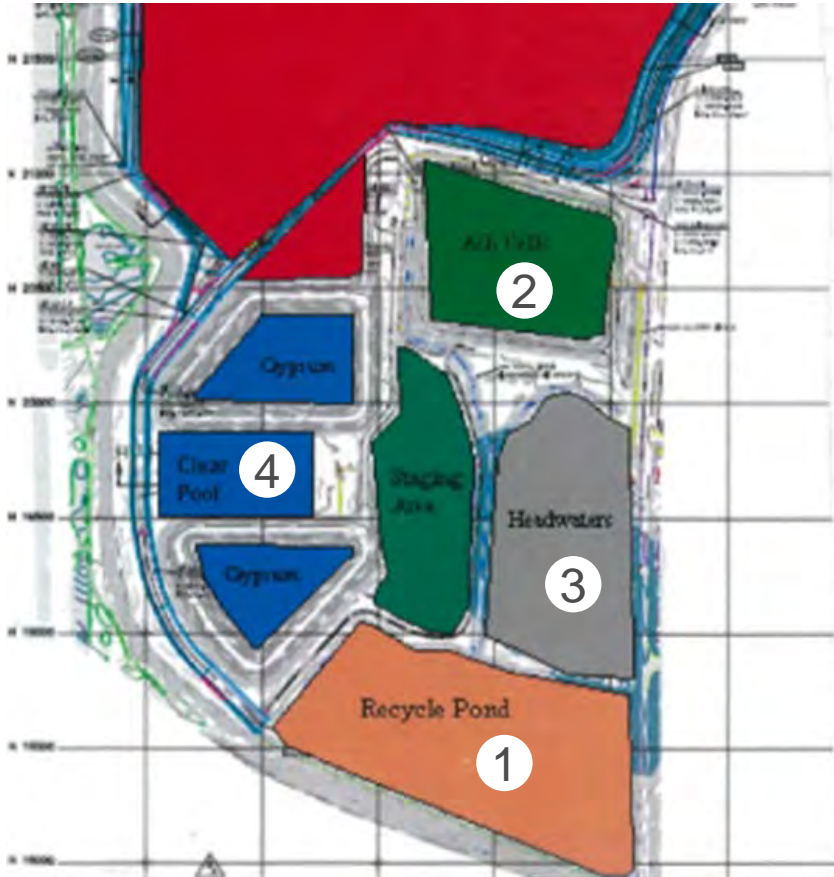


A new low volume waste system must be implemented for treatment of miscellaneous plant waste.



- Not a CCR impoundment
- Combined treatment for miscellaneous flows

Dry fly ash conversions reduce ash risk at sites and take a step toward future ELG compliance.



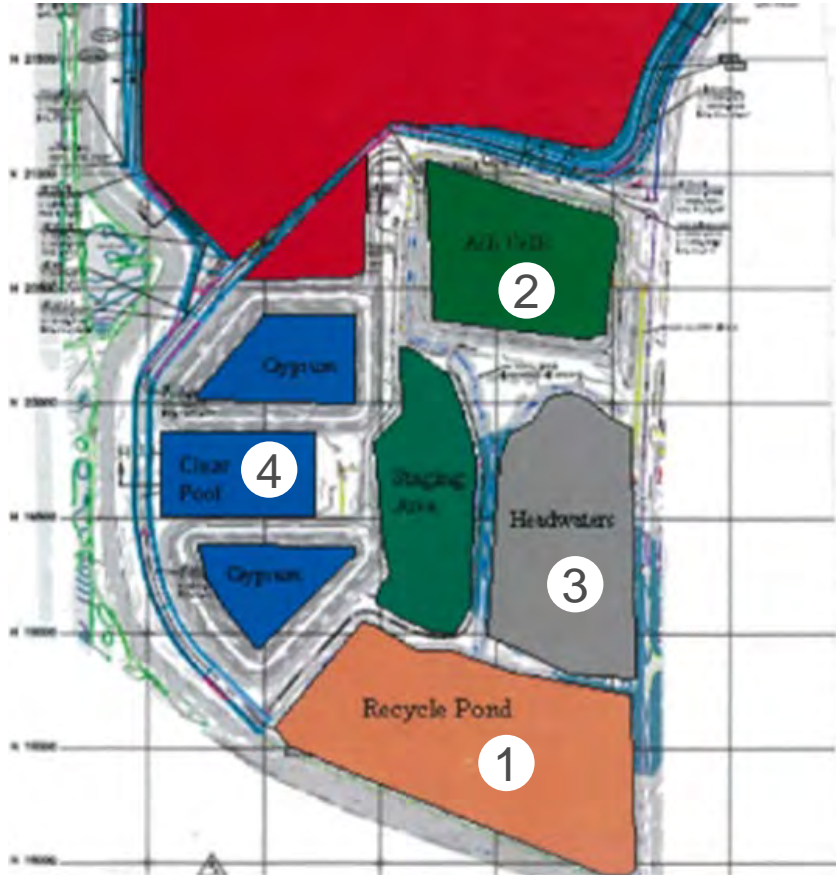
| | Fly Ash Technology | Bottom Ash Technology |
|---------|--------------------|-----------------------------------|
| Plant A | New Dry | 3 RCCCs BARS |
| Plant B | Existing Dry | 4 MACs |
| Plant C | New Dry | 2 RSCCs BARS |
| Plant D | New Dry | 2 RSCCs BARS |
| Plant E | Existing Dry | 4 PAX |
| Plant F | New Dry | 2 RSCCs BARS |
| Plant G | New Dry | Existing basins Recirc. system |

Bottom ash conversion technology decisions were based on quantitative and qualitative factors.



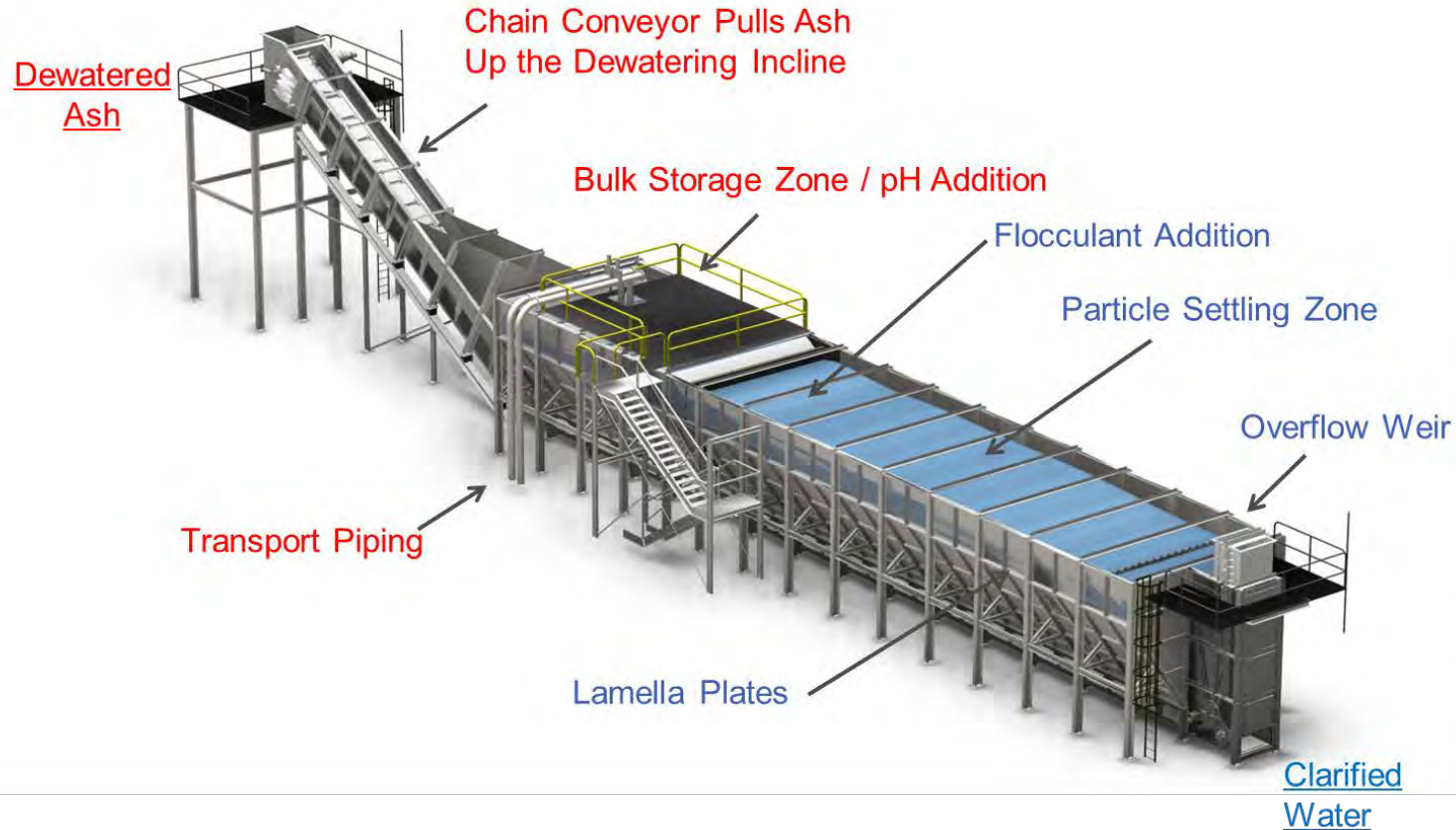
| | MAC (Magaldi Ash Cooler) | PAX (Pneumatic Ash Extractor) | Remote Drag Chain | Hydrobins |
|--------------------------------|--------------------------|-------------------------------|-------------------|-----------|
| Total Dry | Yes | Yes | No | No |
| Closed loop, Wet System | No | No | Yes | Yes |
| Improved Boiler Efficiency | Yes | Yes | No | No |
| Continuous Material Handling | Yes | Yes | Yes | No |
| Batch Material Handling | No | No | No | Yes |
| Intermediate Handling Required | No | No | Yes | No |
| Requires Change to Hoppers | Yes | Yes | No | No |
| Multiple Unit Synergy | No | No | Yes | Yes |
| Capital Cost | High | High | Moderate | Low |
| O&M Costs | Low | Low | Moderate | High |
| Water Usage Requirements | Low | Low | High | High |
| Power Requirements | Moderate | Moderate | High | High |

Bottom ash conversion technology decisions were based on quantitative and qualitative factors.

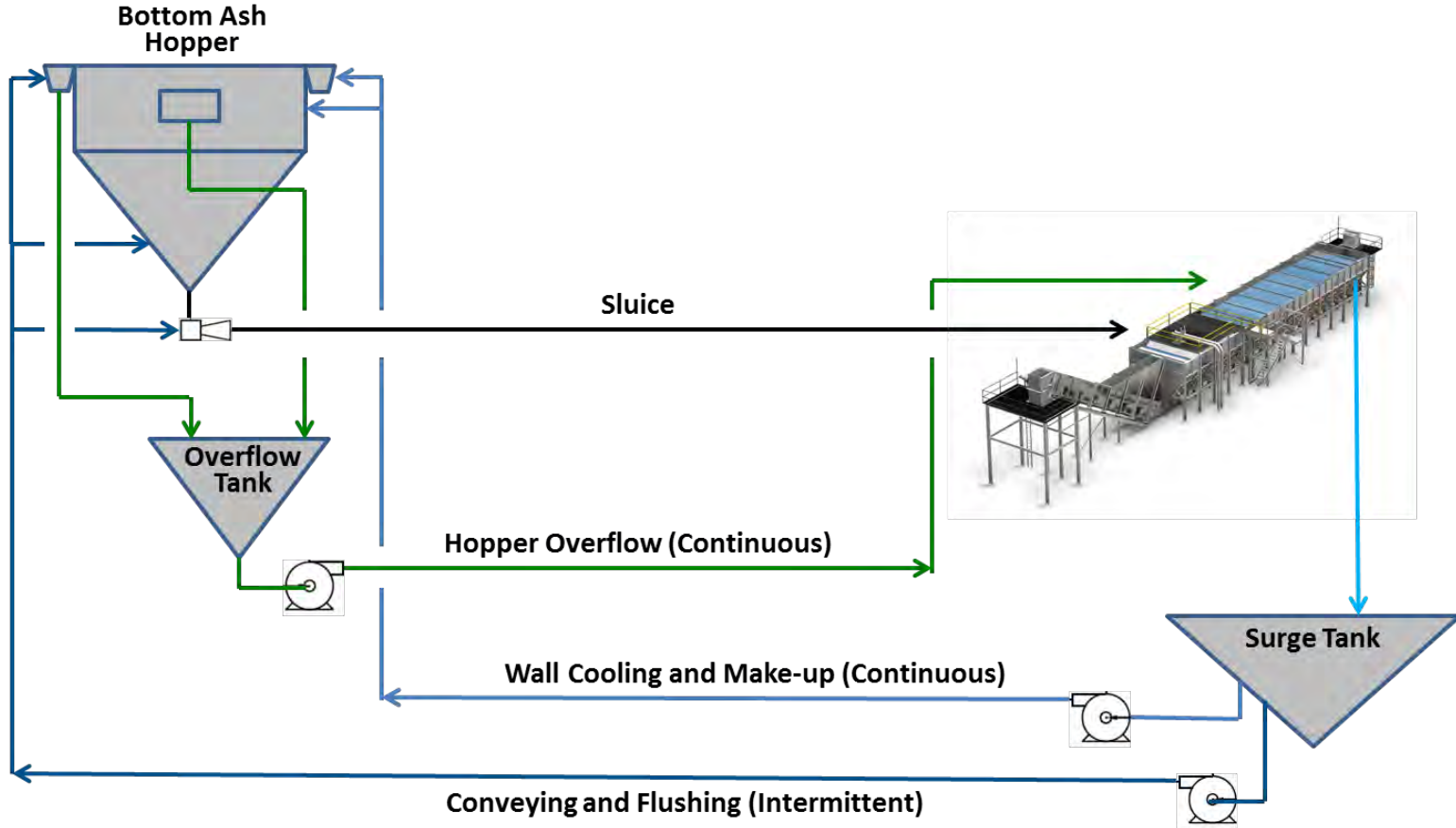


| | Fly Ash Technology | Bottom Ash Technology |
|---------|--------------------|-----------------------------------|
| Plant A | New Dry | 3 RCCCs BARS |
| Plant B | Existing Dry | 4 MACs |
| Plant C | New Dry | 2 RSCCs BARS |
| Plant D | New Dry | 2 RSCCs BARS |
| Plant E | Existing Dry | 4 PAX |
| Plant F | New Dry | 2 RSCCs BARS |
| Plant G | New Dry | Existing basins Recirc. system |

Remote drag chains offer flexibility to handle and treat other waste water streams aside from bottom ash transport water.



Remote drag chains offer flexibility to handle and treat other waste water streams aside from bottom ash transport water.

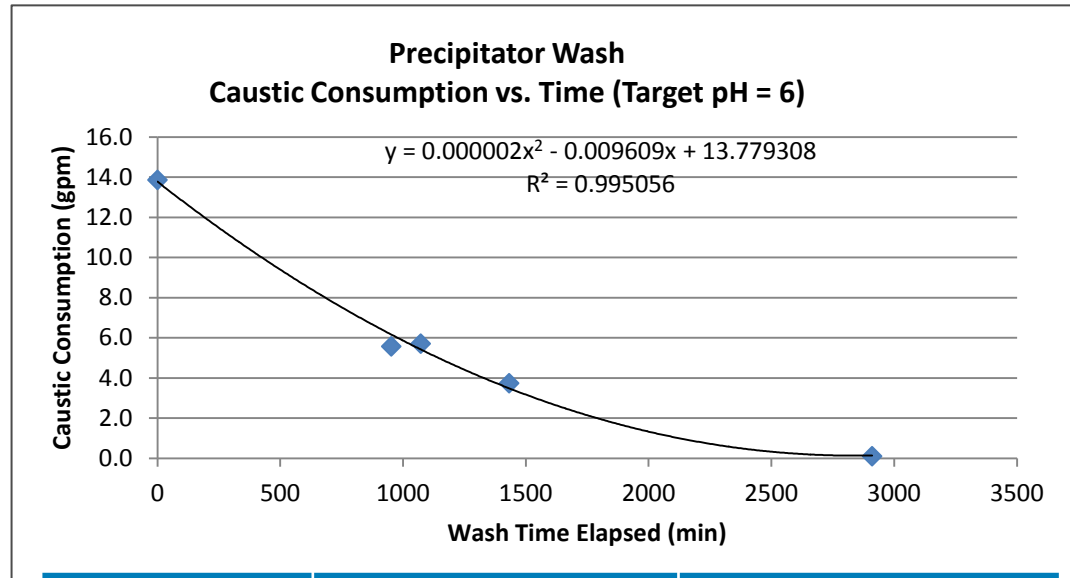


Non-chemical metal cleaning waste poses a challenge for future water management strategies.



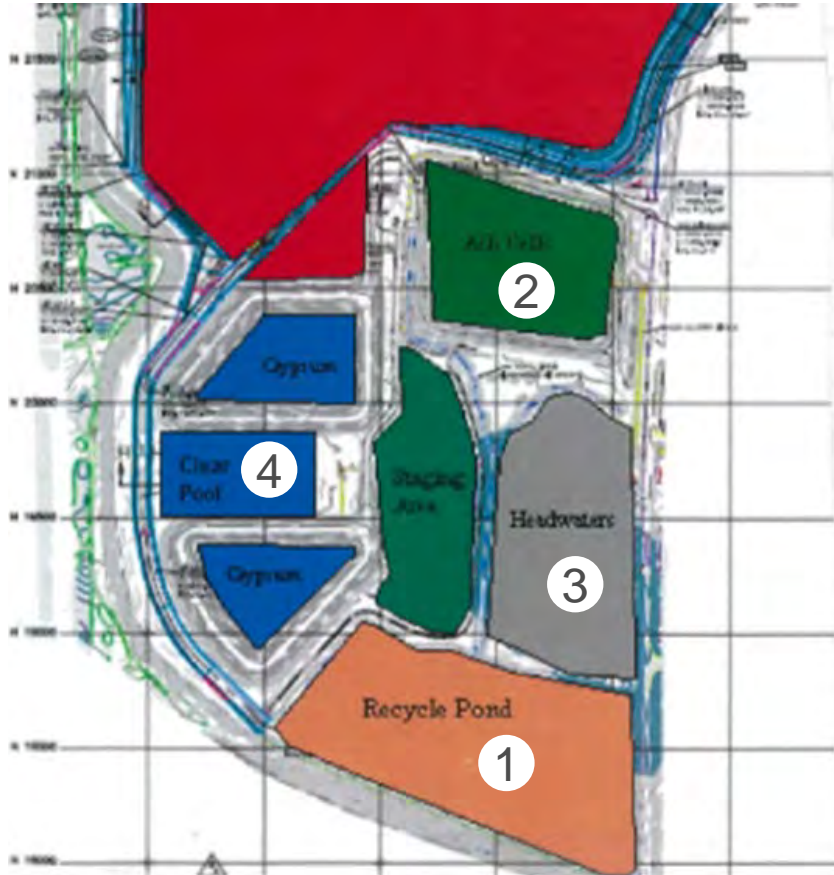
Considerations

- Collection and transport
- Settling of fine particles
- Adjustment of pH



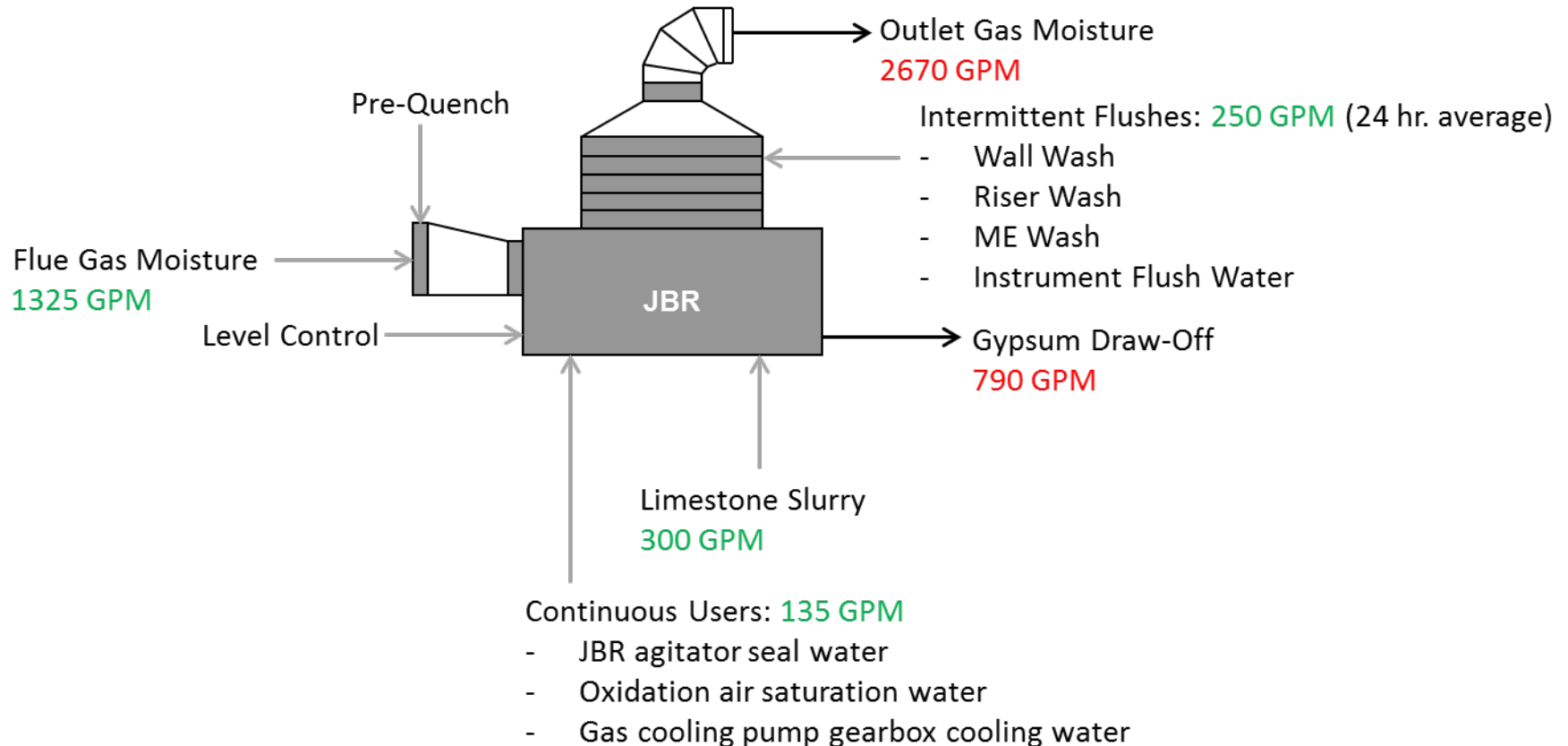
| Sample # | pH | TSS (mg/L) |
|----------|------|------------|
| 1 | 2.53 | 59,460 |
| 2 | 2.74 | 22,940 |
| 3 | 2.74 | 34,687 |
| 4 | 2.94 | 32,820 |
| 5 | 4.54 | 693.3 |

An important element is reduction of wastewater streams, especially FGD blow down, since it will need to be treated to lower limits in the future.

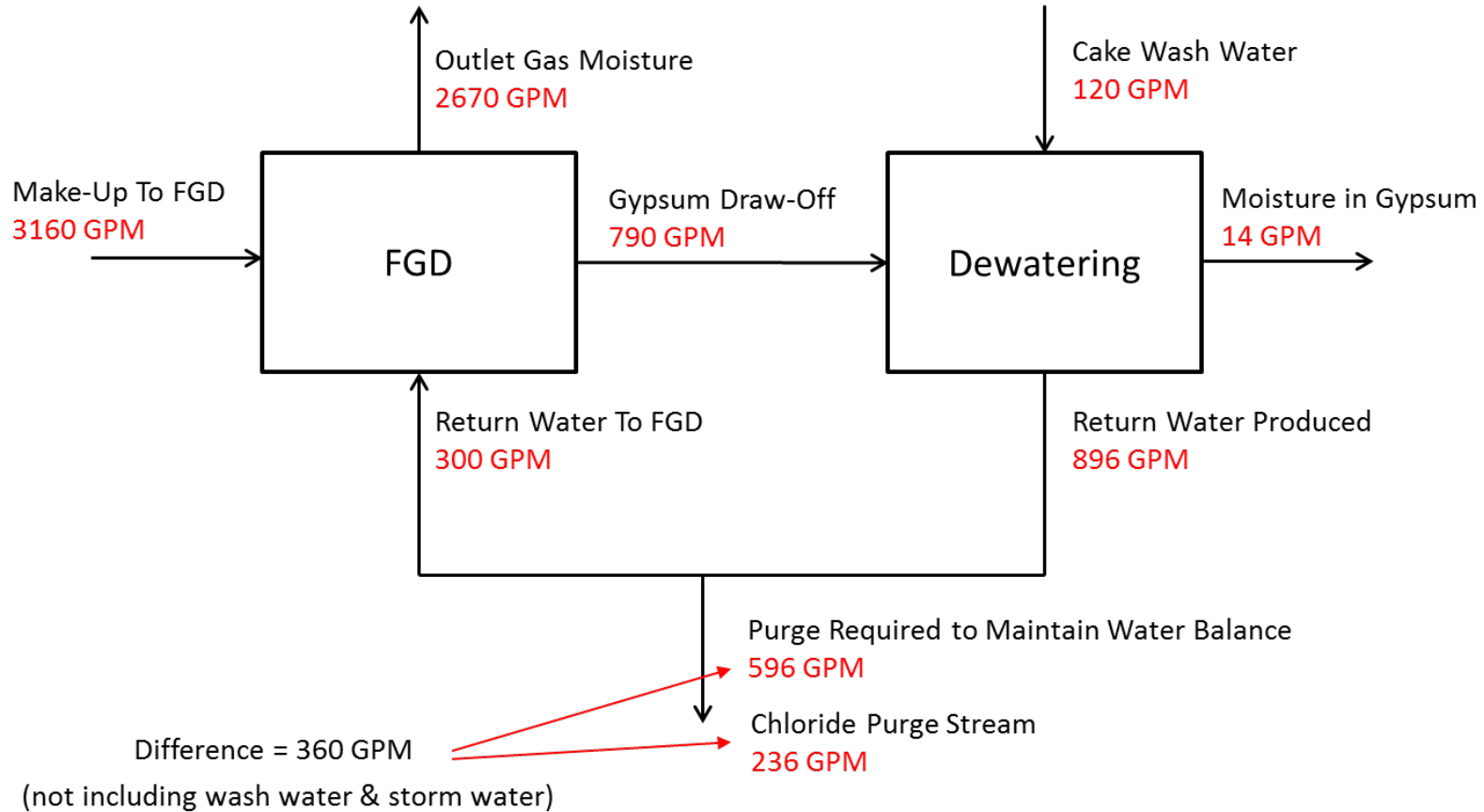


- FGD blow down currently treated as low volume waste
- Treatment solutions include dewatering cells, clarifiers, and ponds
- Efforts must be made to reduce flow rate of FGD blow down

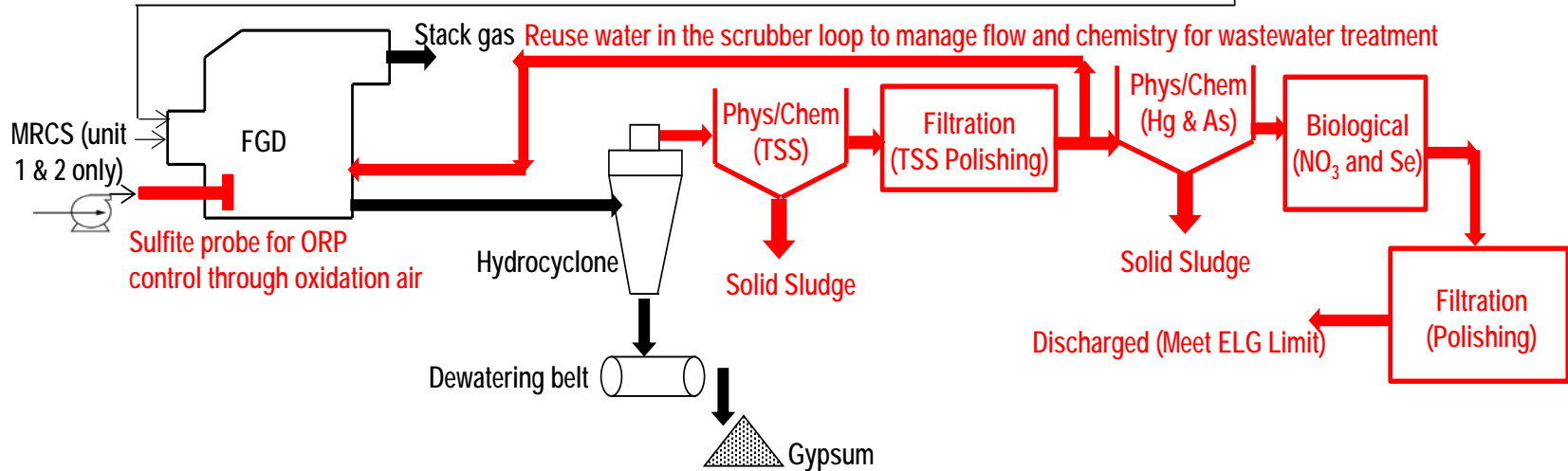
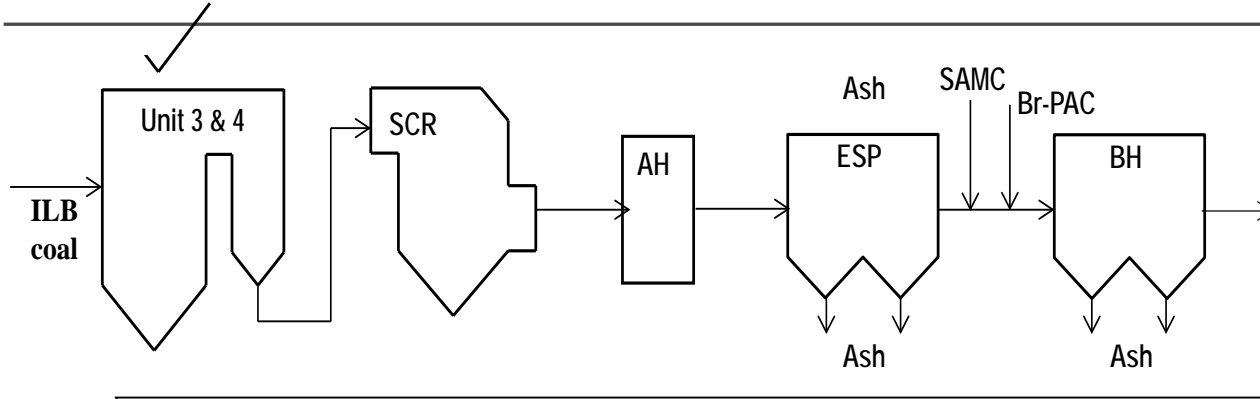
An important element is reduction of wastewater streams, especially FGD blow down, since it will need to be treated to lower limits in the future.



An important element is reduction of wastewater streams, especially FGD blow down, since it will need to be treated to lower limits in the future.



Today's solution for FGD wastewater must be adaptable for the future.





Questions?

