



# Clyde Bergemann Delta Ducon

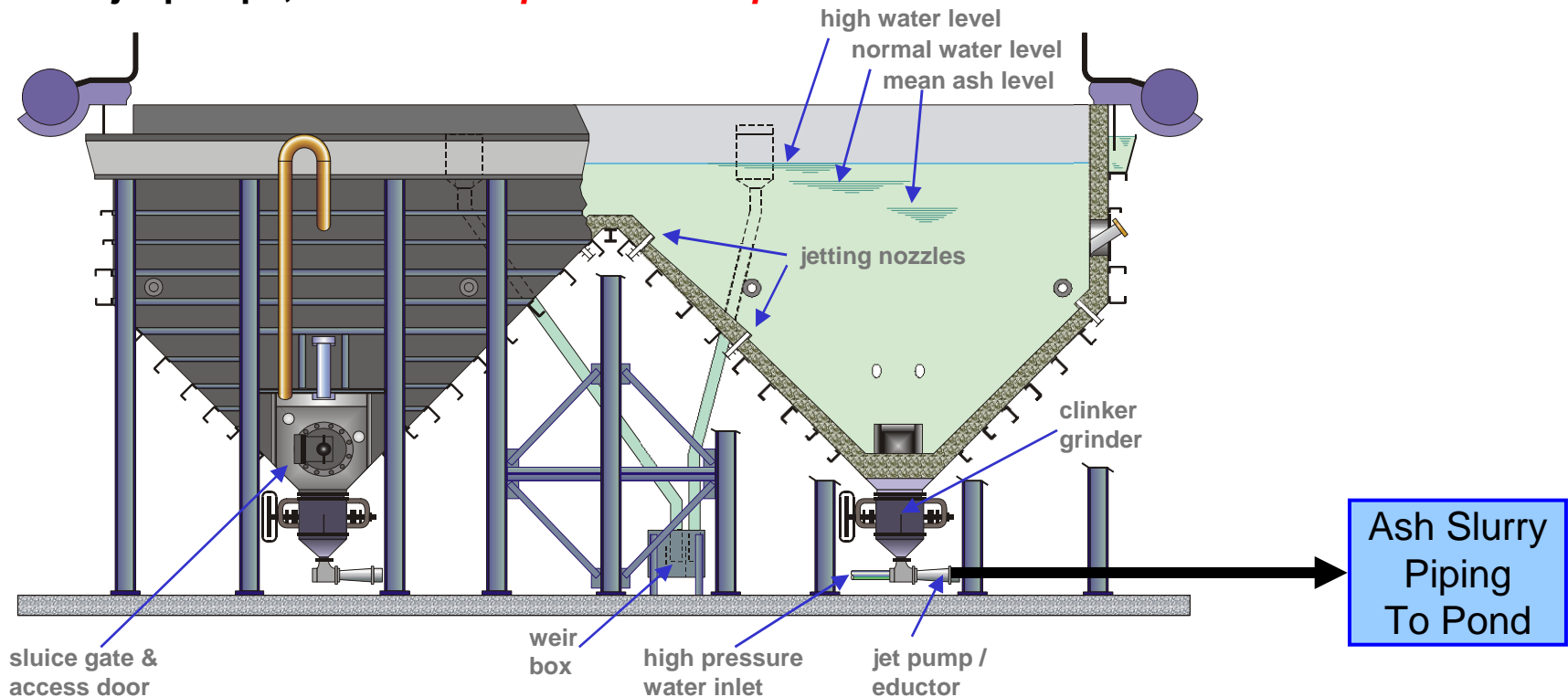
## Bottom Ash Conversion Options *for Ash Pond Removal*

McIlvaine Company  
*Hot Topic Hour*  
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# Bottom Ash Hopper – Typical Design:

- Many existing coal fired boilers were designed and built with water impounded style bottom ash hoppers.
- The ash hopper stores bottom ash that is periodically crushed and evacuated via water driven jet pumps, *often to ash ponds for disposal.*



**Typical Water Impounded Bottom Ash Hopper System under a Boiler**

# Bottom Ash Slurry Systems:



**Typical Bottom Ash Slurry Piping**

- The bottom ash is transported, in a slurry form to an ash pond.
- The bottom ash is then stored in the ash pond.



**Bottom Ash discharged to an ash pond**



# Bottom Ash Retrofit Options:



Plants that are considering eliminating the use of their ash ponds have the following options:

- 1) **Replace** the bottom ash hopper system with a dry ash conveyor (**DRYCON™**).
- 2) **Replace** the bottom ash hopper system with a submerged scraper conveyor (SSC).
- 3) **Divert** the flow of the existing bottom ash slurry piping to new dewatering bins.
- 4) **Divert** the flow of the existing bottom ash slurry piping to an **ASHCON™** system.

Clyde Bergemann Delta Ducon can provide and support **ALL** of the above solutions.



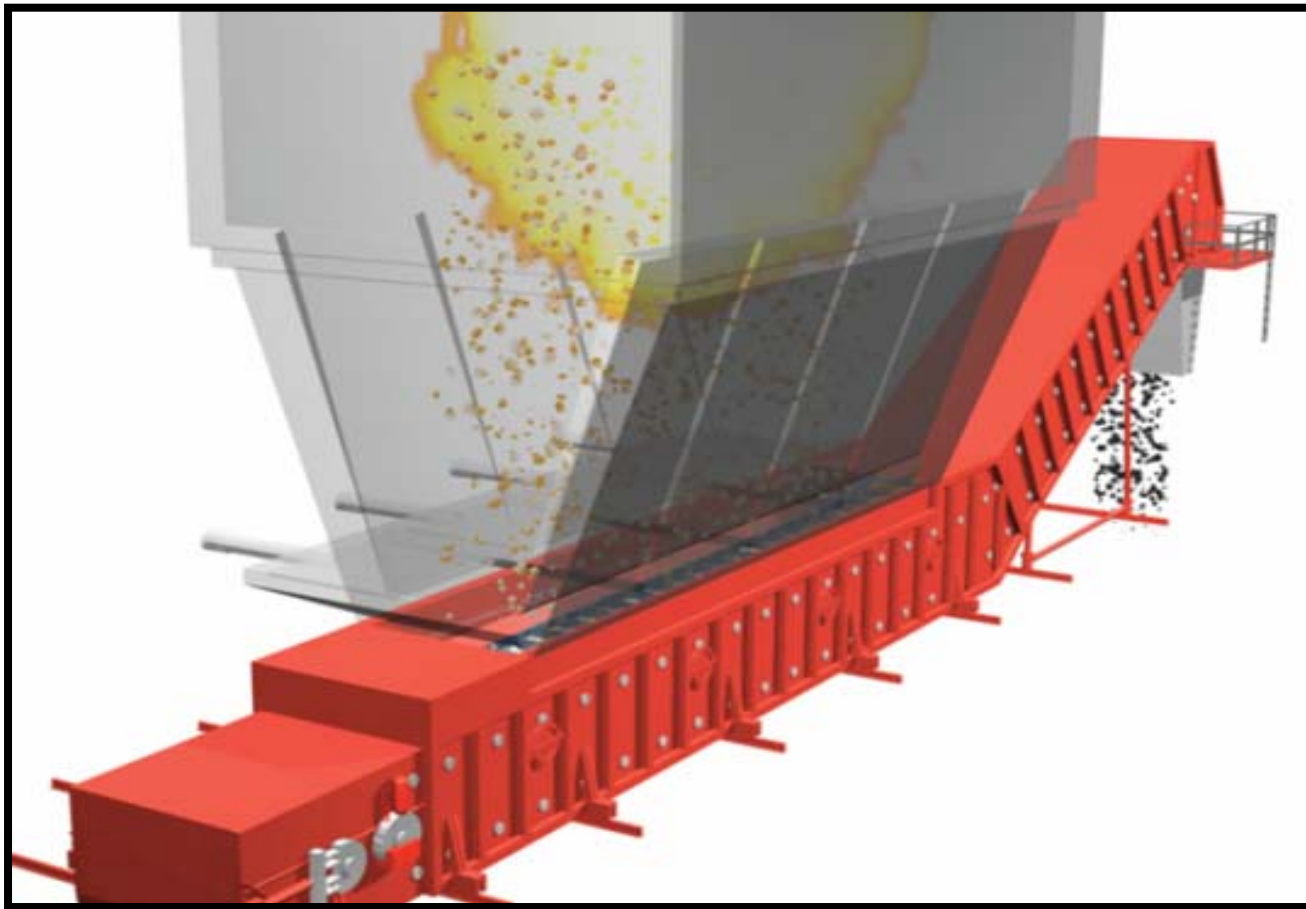
# Bottom Ash Retrofit Options:



## Exploring the **OPTIONS!** #1

The most efficient method to eliminate the use of their ash ponds is the following:

- 1) **Replace the bottom ash hopper system with a dry ash conveyor (DRYCON™).**



# Benefits Considered for DRYCON™ System



## Environmental Protection

- Elimination of **ALL** water usage
- Elimination of water effluent & treatment
- Easiest compliance with environmental protection regulations
- Fully enclosed system

## Cost Reduction

- Reduced maintenance costs
- Reduction in materials handling costs
- No water usage
- No water treatment costs

## Increased Efficiency

- Reduction of thermal energy losses
- Reduction of unburned carbon
- Increased boiler efficiency
- Reduction in CO<sub>2</sub> emissions

## Increased Revenue

- Improved boiler efficiency
- Saleable ash quality

# DRYCON™ is a Steel Plate Conveyor



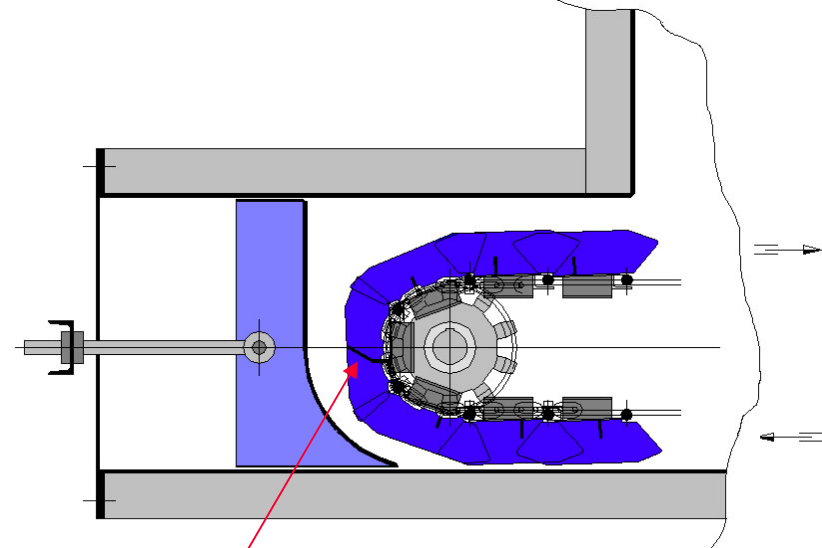
- 🌐 Closed plate (apron, pan) conveyor
- 🌐 Small gap between the plates
- 🌐 Lowest overall height
- 🌐 Robust and simple design
- 🌐 Easy assembly and disassembly
- 🌐 High resistance to temperature
- 🌐 Ash inlet area is supported by impact tables



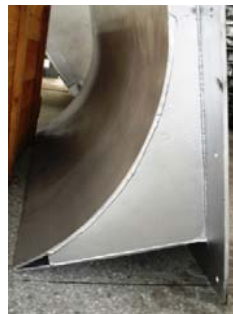
# Steel Plate Conveyor Fines Recirculation



- 🌐 Fines re-circulation plate fitted every 6<sup>th</sup> pan.
- 🌐 Allows for self cleaning of fines accumulation.
- 🌐 The fines re-circulation is integral to the primary conveyor.
- 🌐 Deflector connected to tensioning system.

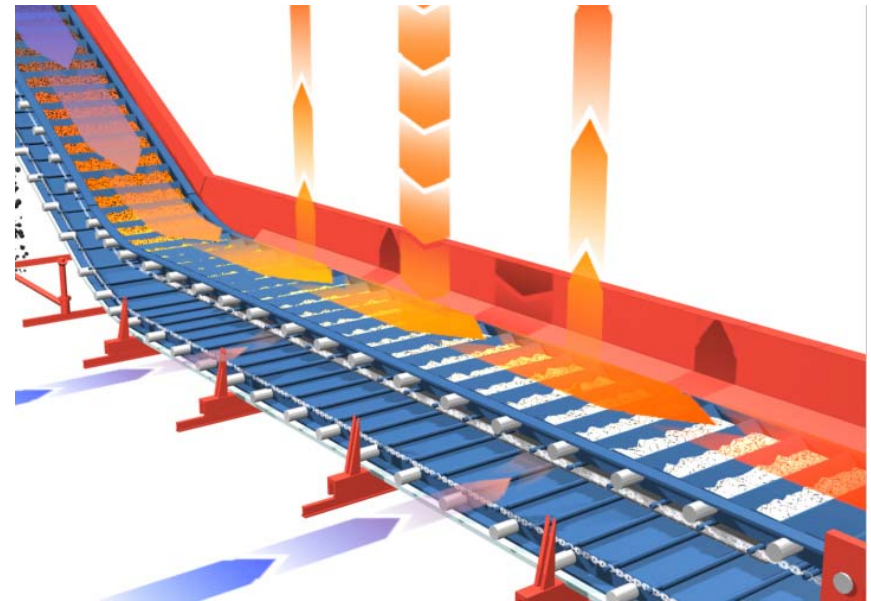
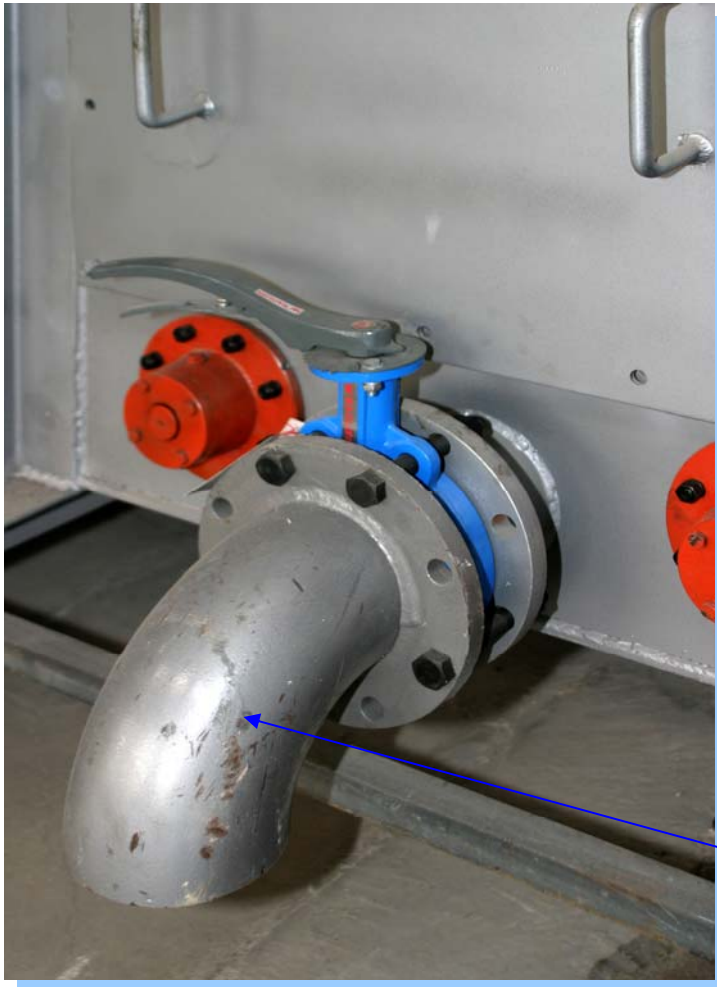


Fines re-circulation plate





# Cooling Air Flow & Inlets

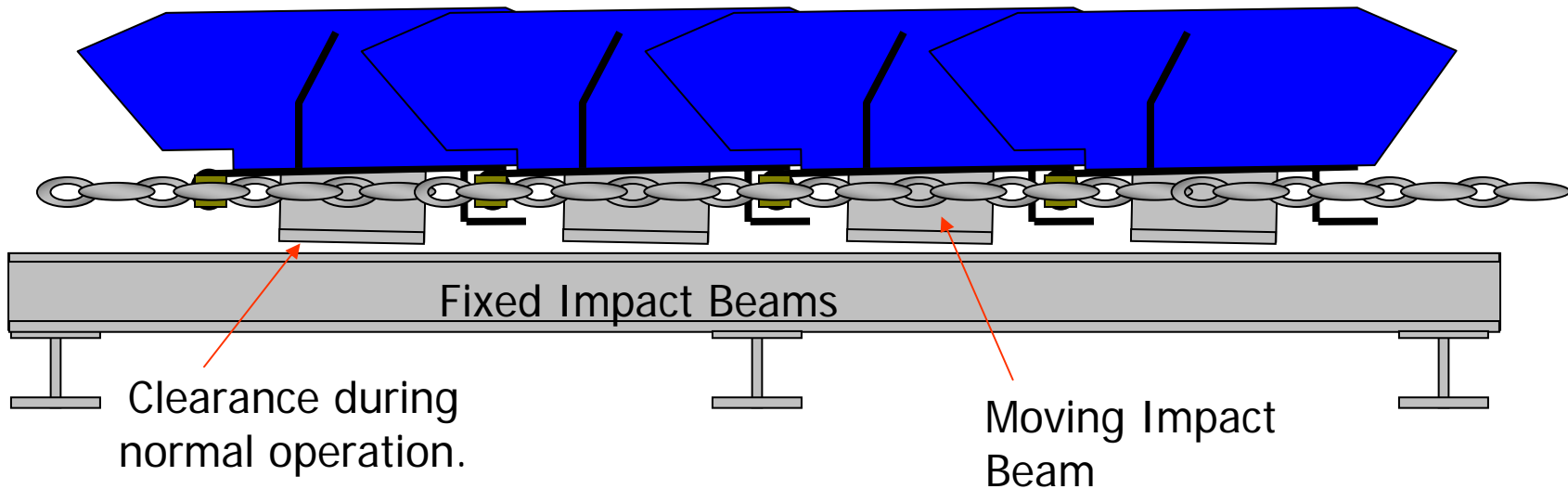
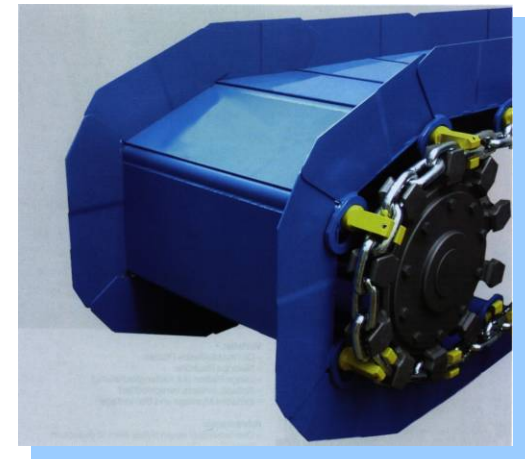


Controlled Cooling  
Air Inlet

# Impact of Large Slag Falls



The impact of large ash lumps are directed onto Impact Beams, not onto the supporting idlers.

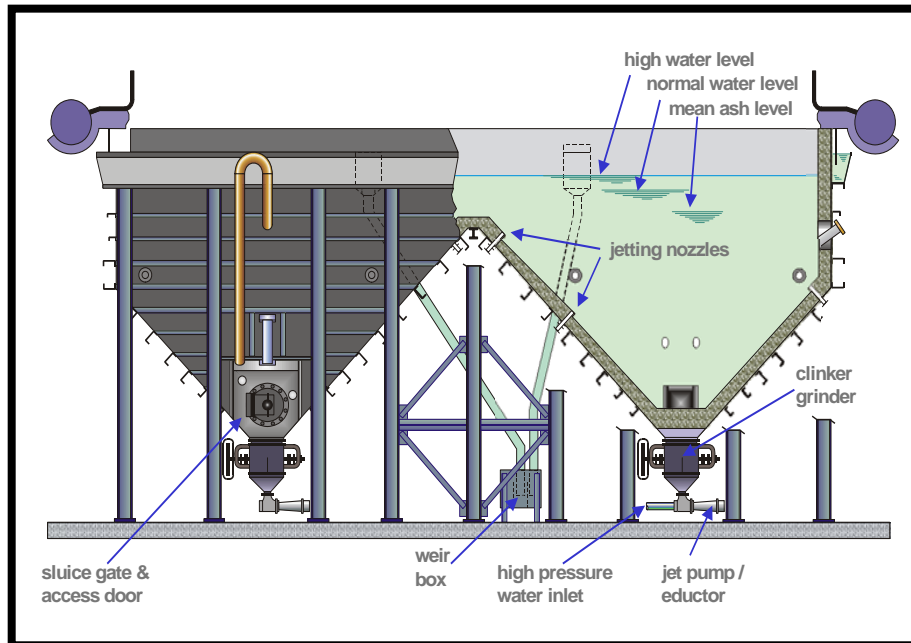


# Bottom Ash Retrofit Options:

## Exploring the OPTIONS! #2

The most efficient method to eliminate the use of their ash ponds is the following:

- ➔ 1) ~~Replace the bottom ash hopper system with a dry ash conveyor (DRYCON™).~~
- ➔ 2) Replace the bottom ash hopper system with a submerged scraper conveyor (SSC).



**FROM – AN EXISTING WATER  
IMPOUNDED BOTTOM ASH HOPPER**



**TO – A SUBMERGED SCRAPER  
CONVEYOR**

# SSC Technology

## SSC Design Features



Angle plate provides chain protection and retention

Bolted flight bar connection for ease of maintenance

Flight bar with hardened wear strips

Heavy duty round link chain.  
Tempered or case hardened

Manganese Steel liner plate

***Still "Wet" Bottom Handling  
with much less water  
and much less horsepower***



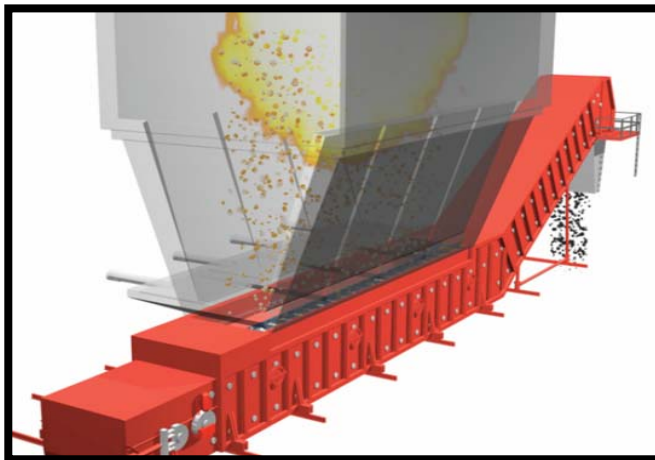
# Bottom Ash Retrofit Options:



## Exploring the OPTIONS! #1 & #2 Summary

The most efficient method to eliminate the use of their ash ponds is the following:

- 1) **Replace the bottom ash hopper system with a dry ash conveyor (DRYCON™).**
- 2) **Replace the bottom ash hopper system with a submerged scraper conveyor (SSC).**
  - Both of the above options are the best solutions for bottom ash handling. Both involve removal of the existing water impounded bottom ash hopper. **However, many existing plant designs do not allow for this type of retrofit.** The existing bottom ash hoppers may be located in a pit or basement level and/or surrounded by auxiliary equipment or columns. This can make it difficult or impractical for a DRYCON™ or SSC retrofit.



DRYCON



SUBMERGED SCRAPER CONVEYOR

## Bottom Ash Retrofit Issues:



What if a  
**DRYCON™** or  
**SSC** doesn't fit !



Bottom Ash  
Hopper Discharge  
Gate

Bottom Ash  
Clinker Grinder

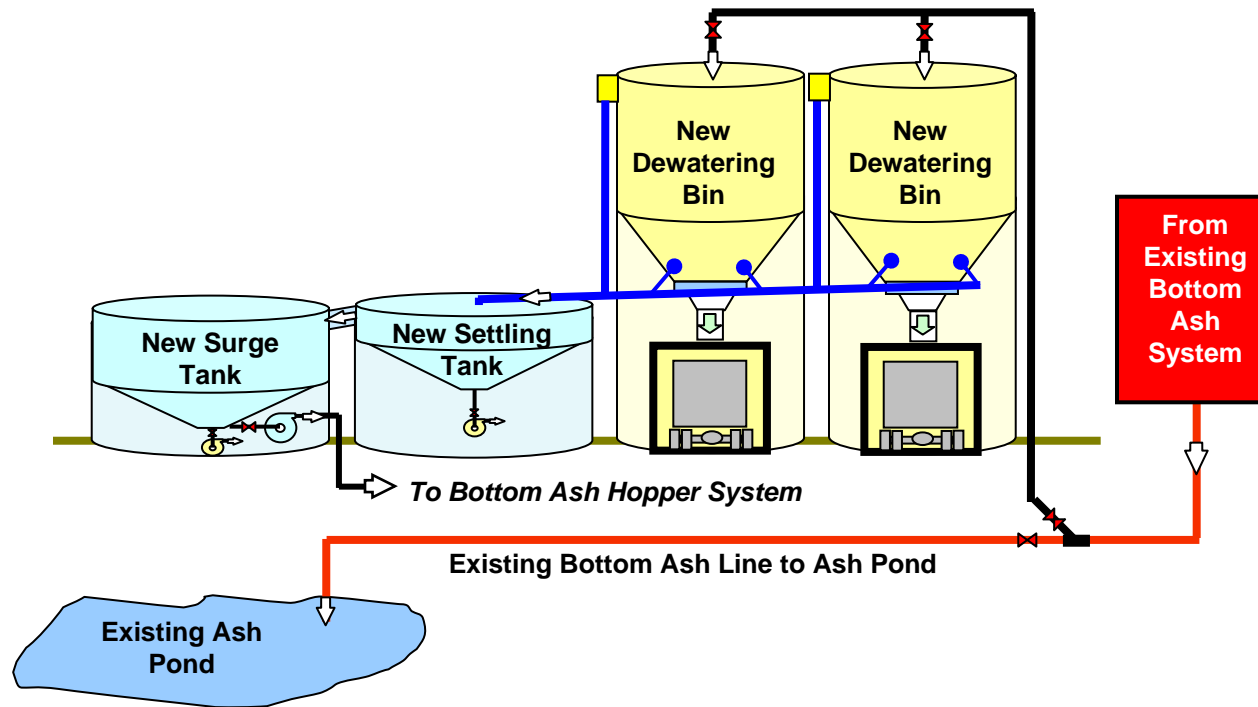
Bottom Ash Sluice  
Line

This photo is an example of a water impounded bottom ash hopper. Located below grade and surrounded by boiler support columns, this unit would be difficult or impossible to retrofit with a **DRYCON™** or Submerged Scraper Conveyor (SSC).

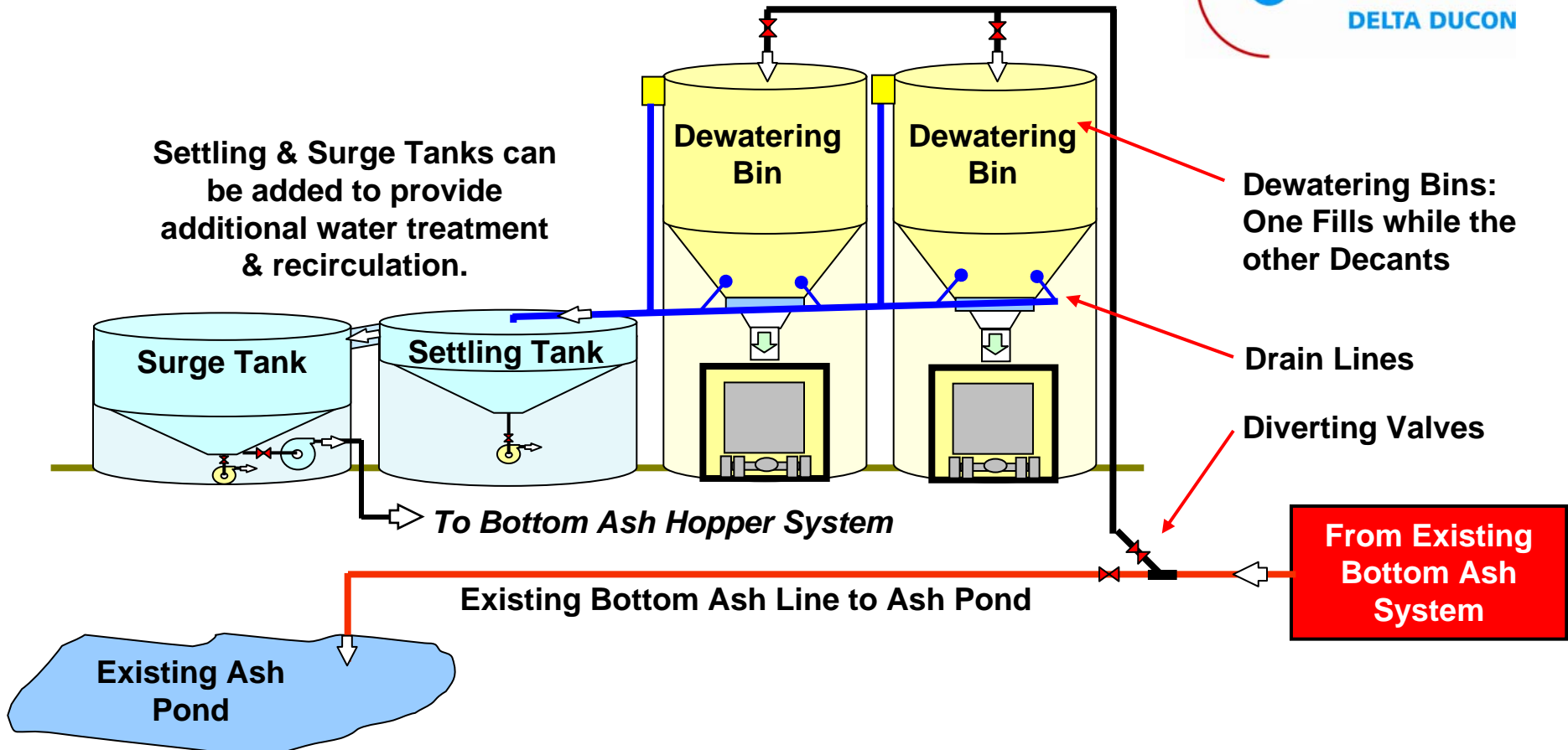
# When a DRYCON™ or SSC won't fit:

## Exploring the OPTIONS! # 3

- Plants that are considering eliminating the use of their ash ponds have the following options:
  - 1) ~~Replace the bottom ash hopper system with a dry ash conveyor (DRYCON™).~~
  - 2) ~~Replace the bottom ash hopper system with a submerged scraper conveyor (SSC).~~
  - 3) **Divert** the flow of the existing bottom ash slurry piping to new dewatering bins.
  - 4) **Divert** the flow of the existing bottom ash slurry piping to an **ASHCON™** system.



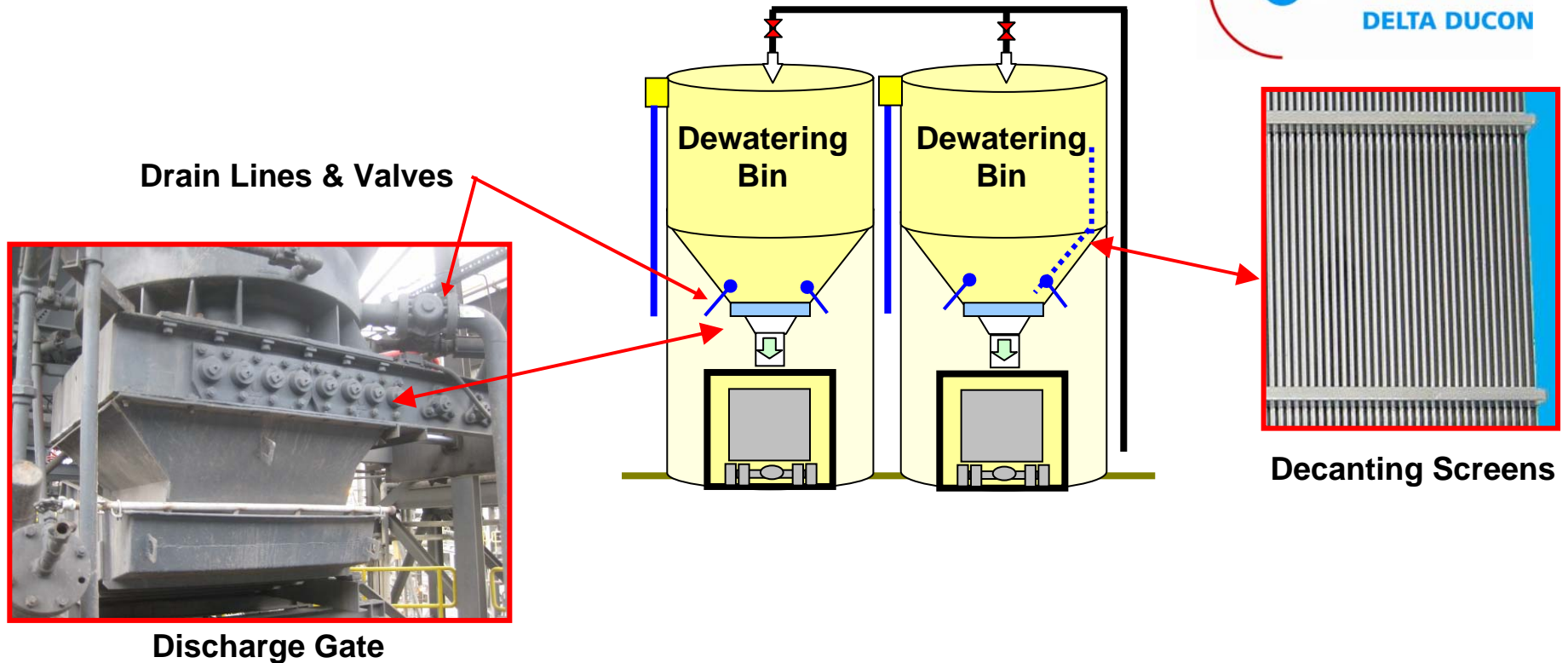
# Traditional Dewatering System:



- With a traditional dewatering system bottom ash slurry can be diverted away from the ash pond into two Dewatering Bins.
- The Dewatering Bins feature decanting screens and overflow troughs to dewater the bottom ash to a ~20% moisture content where it can be discharged into trucks for removal.



# Traditional Dewatering System:



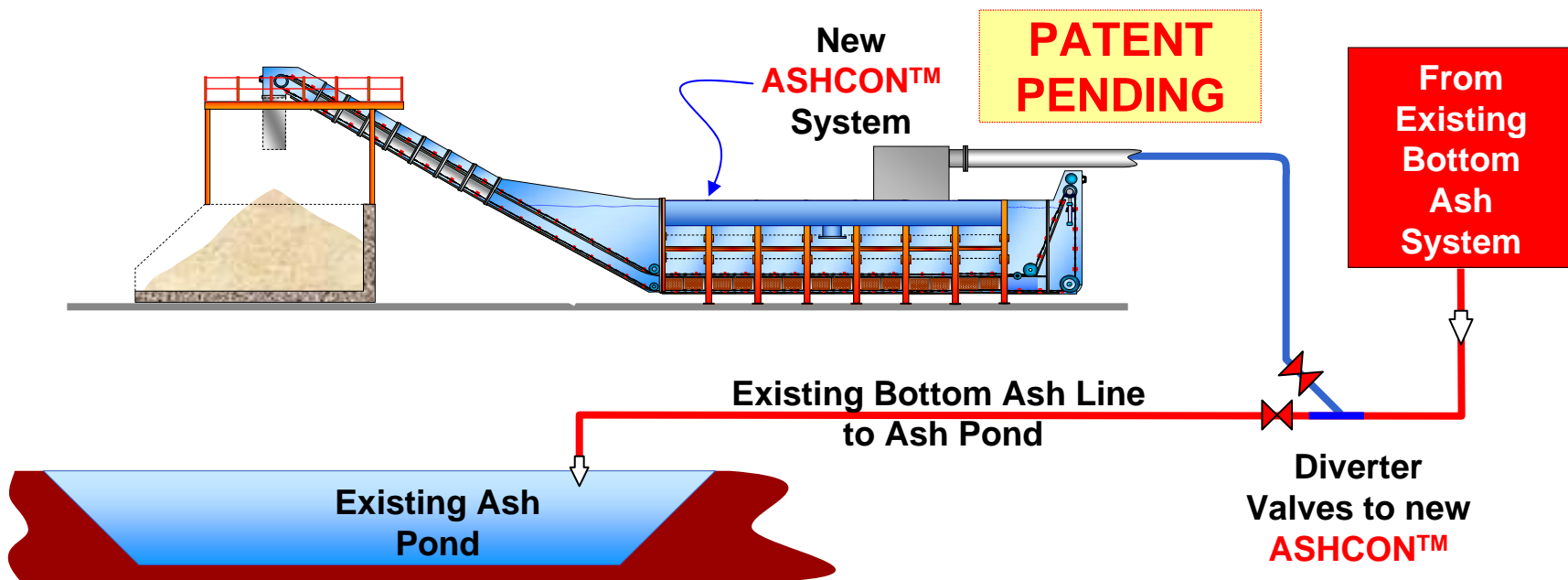
- **Common Issues Related to Dewatering Bins:**

- **Decanting Screen Blockage** – Fine ash can blind screens making them ineffective.
- **Drain Line Valve Wear** – Fine ash can wear away drain valves causing leaks.
- **Large Discharge Gate Issues** – Difficult to seal, Difficult to maintain, Often Leak!
- **On retrofit projects the existing slurry pumps do not have the ability to lift slurry to top.**

# When a DRYCON™ & SSC won't fit:

## Exploring the OPTIONS! #4

- Plants that are considering eliminating the use of their ash ponds have the following options:
  - 1) ~~Replace the bottom ash hopper system with a dry ash conveyor (DRYCON™).~~
  - 2) ~~Replace the bottom ash hopper system with a submerged scraper conveyor (SSC).~~
  - 3) *Divert* the flow of the existing bottom ash slurry piping to new dewatering bins.
  - 4) *Divert* the flow of the existing bottom ash slurry piping to an **ASHCON™** system.



## THE BASIC CONCEPT:

**Divert** the existing bottom ash slurry line(s) to a unique Remote Submerged Scraper Conveyor (**ASHCON™**) to provide a dewatered ash that can be handled, dust free, for removal. **ASHCON™** dewatered ash contains only 15-20% moisture.



Bottom Ash  
Slurry Lines



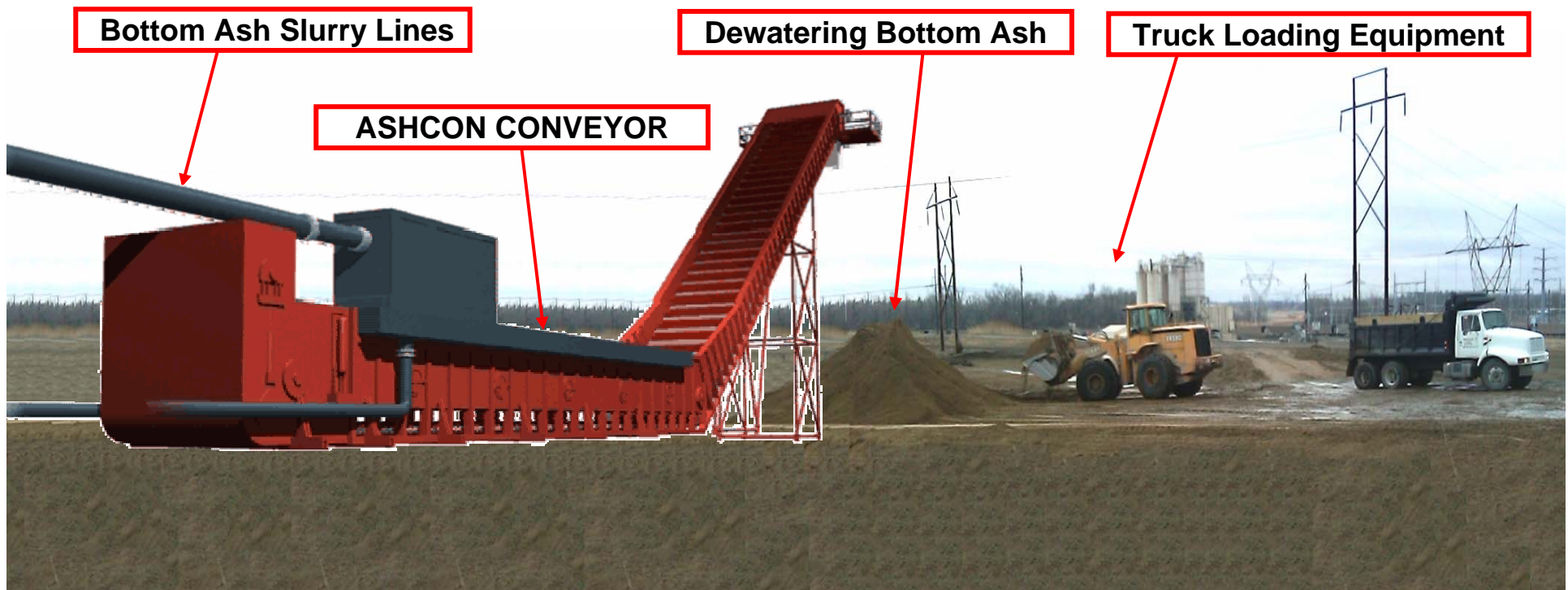
Modified SSC  
Technology



Dewatered Bottom  
Ash

## THE BASIC CONCEPT:

A basic **ASHCON™** system will accept the flow of bottom ash slurry line(s) and discharge dewatered ash for loading into dump trucks. Overflow water from the **ASHCON™** can drain into a settling sump or settling pond. A water recirculation system can also be added.





# ASHCON™ Technology

**PATENT  
PENDING**



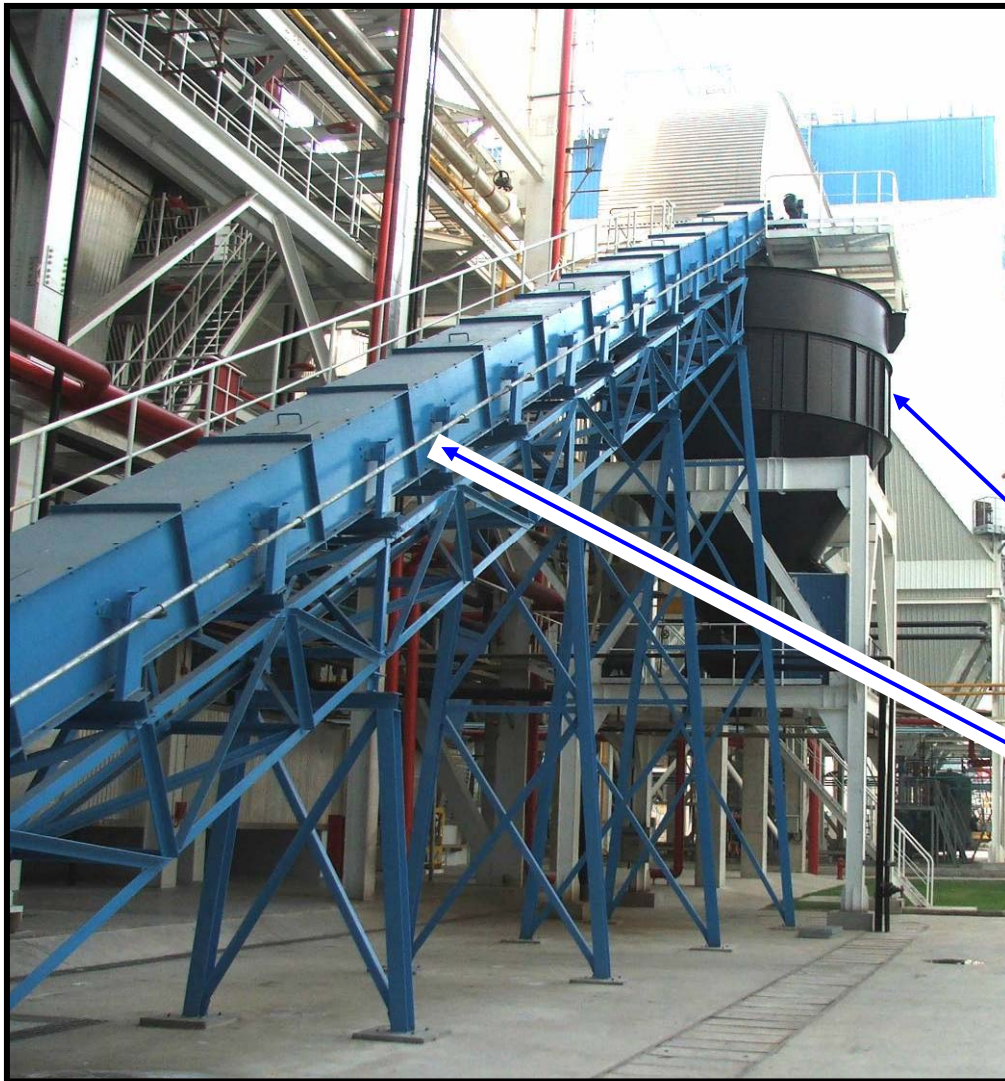
## **OPTIONS:**

If the need for dewatering below 20% moisture by weight is desired, secondary Dewatering Bins can be added.

If bottom ash storage is desired, a single storage bin can be added.

Secondary Dewatering or  
Bottom Ash Storage Bin(s)

**ASHCON™** conveyor or  
Secondary Conveyor





[www.deltaducon.com](http://www.deltaducon.com)