End of Life for a Power Plant: Cost Estimating & Evaluation

Steve Sheridan – Project Manager, D&D Services

May 20, 2025

Agenda

- Why is Cost Estimating Important?
- Scope of Work Determination
- Optional Pricing
- Estimating Methodology
- Constructability Evaluation
- Asset Valuation
- Retirement-in-Place (RIP) vs. Full Demolition Example
- Summary
- Questions

Why is Cost Estimating Important?

BURNS McDONNELL®

Planning Level Cost Estimates

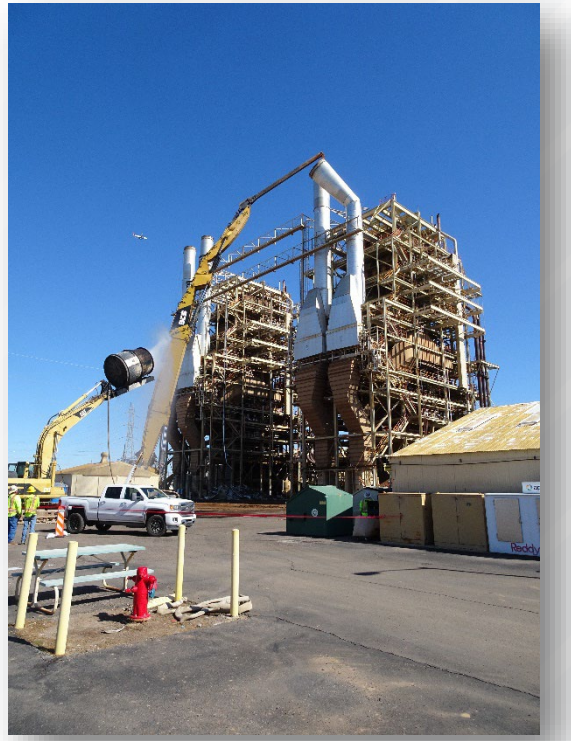
- First step in project planning is budgeting
  - ➡ What will it cost for the approach I like?
- Used to develop a preliminary base scope of work including assumptions for unknowns and potential alternative scopes of work
- Establishes a base line for equipment & scrap salvage value
- Assists in understanding potential concerns/restrictions with demolition means and methods
- Used to compare optional approaches (retirement-in-place, partial demolition, full demolition) before decisions are made
- Used to generate a baseline schedule for the project to understand duration

Scope of Work Determination

BURNS McDONNELL®

Scope of Work Determination

- Understand the use for the estimate
  - Rate case support or Asset Retirement Obligations (ARO)
  - Project planning and budgeting
- Start with the end goal in mind
  - Do you want, a grassy park, leave slabs or prep for future construction?
  - Foundation removal (complete or to a designated depth 2 or 4 feet below grade)
  - Can masonry debris be re-used for backfill?
  - What will local and state agencies require? (engage early)
- What needs to be protected?
  - Underground Utilities
  - Other facility assets
- Utility isolation & reroute
  - Which utilities & who will be responsible for the “Cut & Cap”
  - Re-routing and re-powering of critical items (sump pumps & stack lighting)
  - Temporary utility install & hookup (power & water)



Scope of Work Determination

- What known regulated materials currently exist requiring removal?
  - Asbestos (Do you have a current survey, or do you need to do one?)
  - Universal Waste (i.e., mercury, lighting, CFCs, ballasts)
  - Oils & Fluids (i.e., hydraulic, lube, glycol)
- What unknown environmental concerns could exist?
  - PCB contaminated concrete, building materials or soil
  - Below grade storage and septic tanks (possible contaminated soil)
  - PCB transformer oil
  - CCR unit(s) closure and impact to groundwater
- Have you identified and quantified subsurface environmental concerns?
- What are some of the most expensive parts of the project and how can they be value engineered?
  - Environmental, Below Grade Demo & Backfilling

Scope of Work Determination

- Will you perform some level of decommissioning with your own forces?
- For retirement-in-place (RIP) what are the security, insurance and maintenance requirements?
- Can underground utilities be abandoned in place?
  - ➡ Full removal
  - ➡ Flow fill
  - ➡ Clean and CCTV documentation
- How will intake and discharge structures be decommissioned?
  - ➡ Equipment removal and sealing
  - ➡ Equipment removal, sealing and full flow fill
  - ➡ What will the Army Corps of Engineers allow?

Optional Pricing

BURNS McDONNELL®

Optional Pricing

- What if.....
  - We want to remove the rail?
  - We want to flow fill the entire intake & discharge?
  - The boiler is full of asbestos?
  - We are required to remove all structures in bodies of water?
  - The electrical wiring is coated with spray-on ACM?
  - We only decommission the plant and not remove the structure?
  - We want to take out the slabs and foundations?
  - The chimney cannot be imploded or is coated with asbestos?
  - We only perform select demolition while protecting the other operating units?
- Helps bracket risk management (cost impacts)
  - Minimum requirements
  - Base case
  - Upper bound

Estimating Methodology

BURNS McDONNELL®

Estimating Methodology

Estimate Class	Maturity Level of Project Definition	End Usage	Expected Accuracy Range
Class 5	0% – 2%	Concept screening	+/- 30% to 50%
Class 4	1% - 15%	Study or feasibility	+/- 20% to 30%
Class 3	10% - 40%	Project funding/budget	+/- 10% to 20%
Class 2	30% - 75%	Baseline budget (Bid)	+/- 5% to 15%
Class 1	65% - 100%	Discrete parts (subs)	+/- 3% to 10%

- Cost estimate classifications per the Association for the Advancement of Cost Engineering (AACE)

Estimating Methodology

Estimate Class	Maturity Level of Project Definition	End Usage	Expected Accuracy Range
Class 5	0% – 2%	Concept screening	+/- 30% to 50%

- High-level, desk top cost estimate. Generally, no site visit and relying on cost estimates for similar size and type projects.
- Used for Asset Retirement Obligation (ARO) assessment or for rate cases
- Accuracy is low and requires substantial contingency

Estimating Methodology

Estimate Class	Maturity Level of Project Definition	End Usage	Expected Accuracy Range
Class 4	1% - 15%	Study or feasibility	+/- 20% to 30%

- Includes site visit and typically takeoffs from site measurements and drawings
- Generally coupled with a Regulated Materials Assessment to understand the cost implications of abatement and waste removal
- Scope determination is more mature and accuracy increases
- Can be used for long-term budget planning with increase contingency

Estimating Methodology

Estimate Class	Maturity Level of Project Definition	End Usage	Expected Accuracy Range
Class 3	10% - 40%	Project funding/budget	+/- 10% to 20%

- Includes site visit and typically takeoffs from site measurements and drawings
- Regulated Materials Assessment is necessary to understand the cost implications of abatement and waste removal
- Scope determination is more mature and accuracy increases
- Is generally used for near-term budget planning for implementation

Estimating Methodology

Estimate Class	Maturity Level of Project Definition	End Usage	Expected Accuracy Range
Class 2	30% - 75%	Baseline budget (Bid)	+/- 5% to 15%

- Includes the solicitation of bids from contractors
- Regulated Materials Assessment is necessary to obtain accurate costs for abatement and waste removal
- Scope determination is very close to complete
- Can be used to implement the project assuming scope is unchanged

Estimating Methodology

Estimate Class	Maturity Level of Project Definition	End Usage	Expected Accuracy Range
Class 1	65% - 100%	Discrete parts (subs)	+/- 3% to 10%

- Includes the solicitation of bids from contractors or subcontractor
- Regulated Materials Assessment is necessary to obtain accurate costs for abatement and waste removal
- Scope determination is complete for discrete portions of work
- Is used to implement the project, most accurate

Estimating Methodology

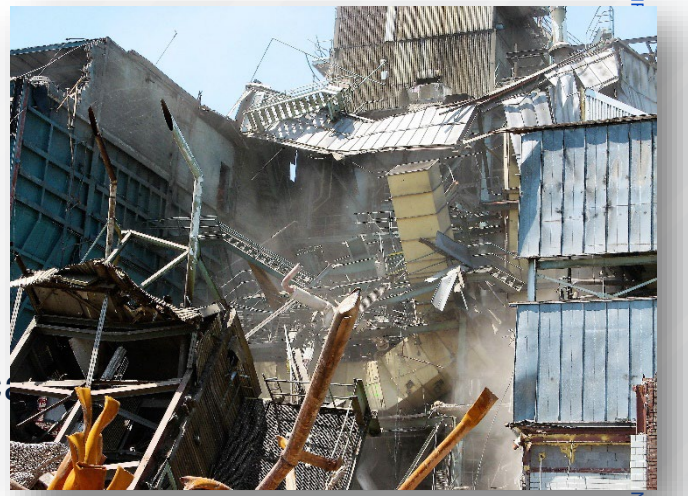
- Perform a detailed “bottom up” up estimate **(Class 3 & 4)**
  - Using as-built drawings, equipment data sheets & environmental surveys to establish material quantities
  - Investigate and perform field take-offs to compliment data provided

- Demolition projects are just a collection of waste streams
  - Quantify how much of each waste stream there is and how it needs to be disposed of or recycled:
    - Scrap steel – ferrous and non-ferrous
    - C&D – carpet, drywall, wood, etc.
    - Masonry debris – brick, block & concrete
    - Universal waste – light bulbs, ballasts, CFC’s
    - E-waste – computers
    - Asbestos – friable & non-friable
    - Regulated waste – oil’s, greases & lubricants
    - Hazardous waste – chemicals, acids, caustics
    - TSCA waste – PCB’s

Estimating Methodology

- Engage a cost estimator with demolition experience (understands how the work is done)

- Develop crew sizes, equipment and production rates
  - Use real world demolition crews and production rates
    - RS Means doesn't account for industrial demolition means and methods
  - Use fair-market labor and equipment rates
    - Contractors will come from all areas of the country to perform the work (loc
      apply)



Estimating Methodology

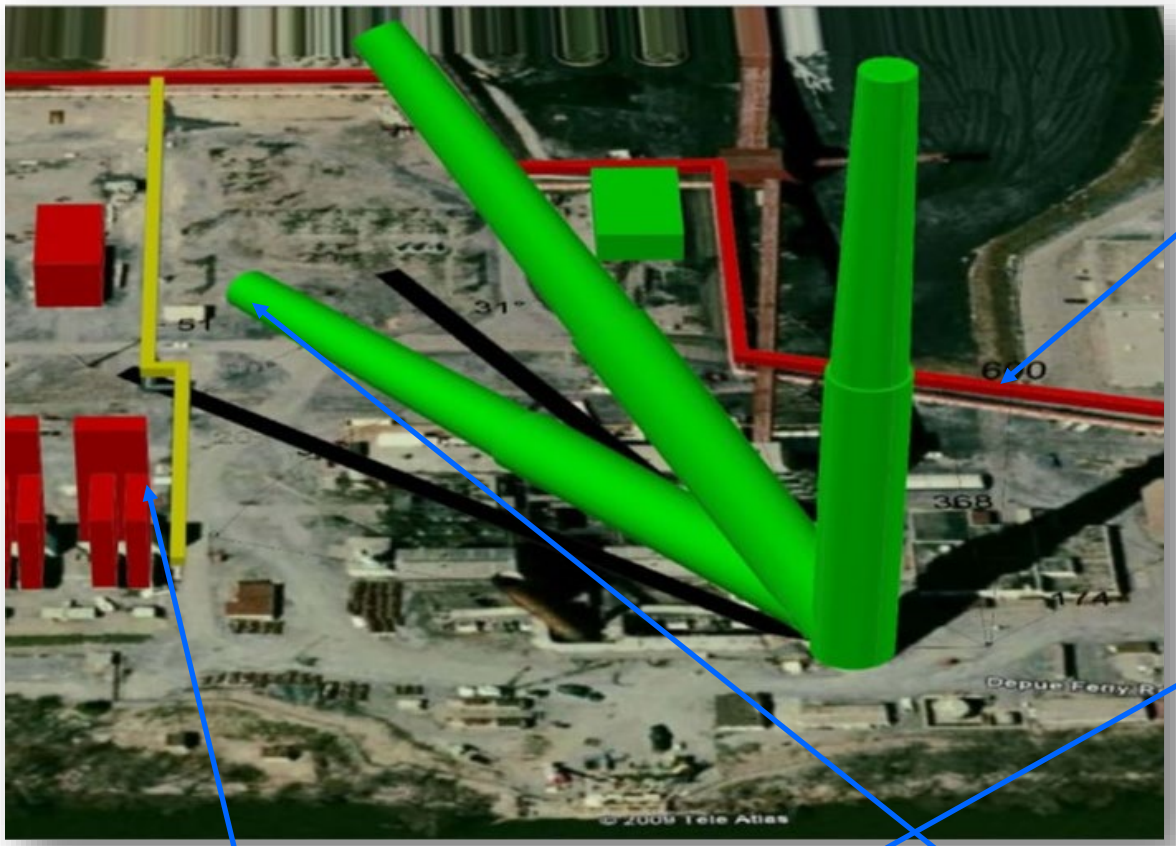
- Develop crew sizes, equipment and production rates (cont'd)
  - Use actual local landfill pricing
    - C&D can range from $35 to $85 a ton depending on location
    - Asbestos can range from $65 to $185 a ton depending on location
  - Use actual scrap salvage market rates
    - Ferrous pricing changes monthly
    - Non-ferrous pricing changes daily
    - Will very greatly depending on geography (proximity to steel mills)
    - Factor in additional transportation costs if site is remote
    - Scrap will be discounted to account for market fluctuations (Bid date vs. Act date)

Constructability Evaluation

BURNS McDONNELL®

Constructability

Constructability

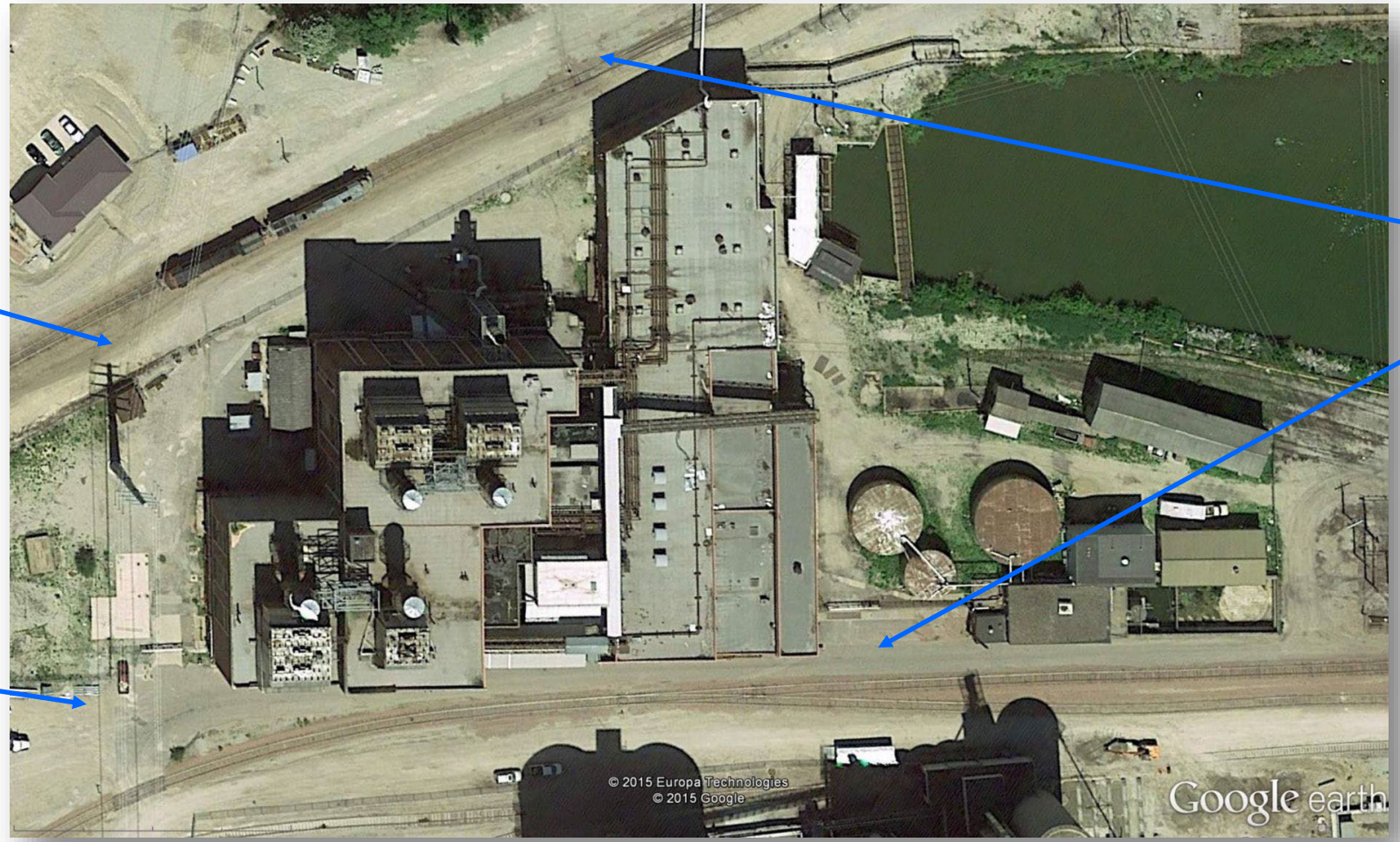


Aboveground Line to Remain

CT Units to Remain

Natural Gas Line to Remain

Constructability

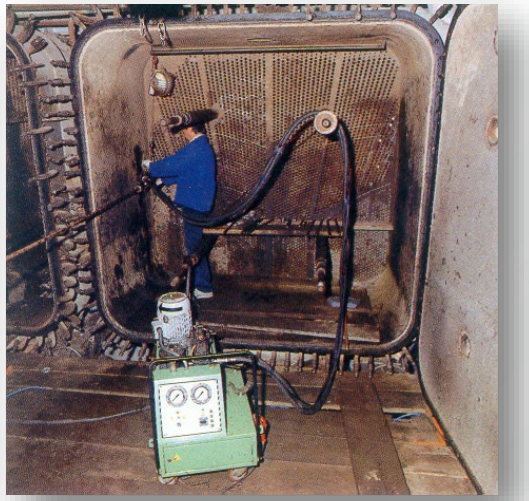


Asset Valuation

BURNS McDONNELL®

Asset Valuation

- Know what your assets are worth before you go to bid
  - ➡ Allows you to be in a position of strength to negotiate
  - ➡ Allows you to avoid the scrap “shell game” when bids come in
- Are my assets worth more to me now or later?
  - ➡ Perform an evaluation to determine if it is better to leave it for the demolition contractor

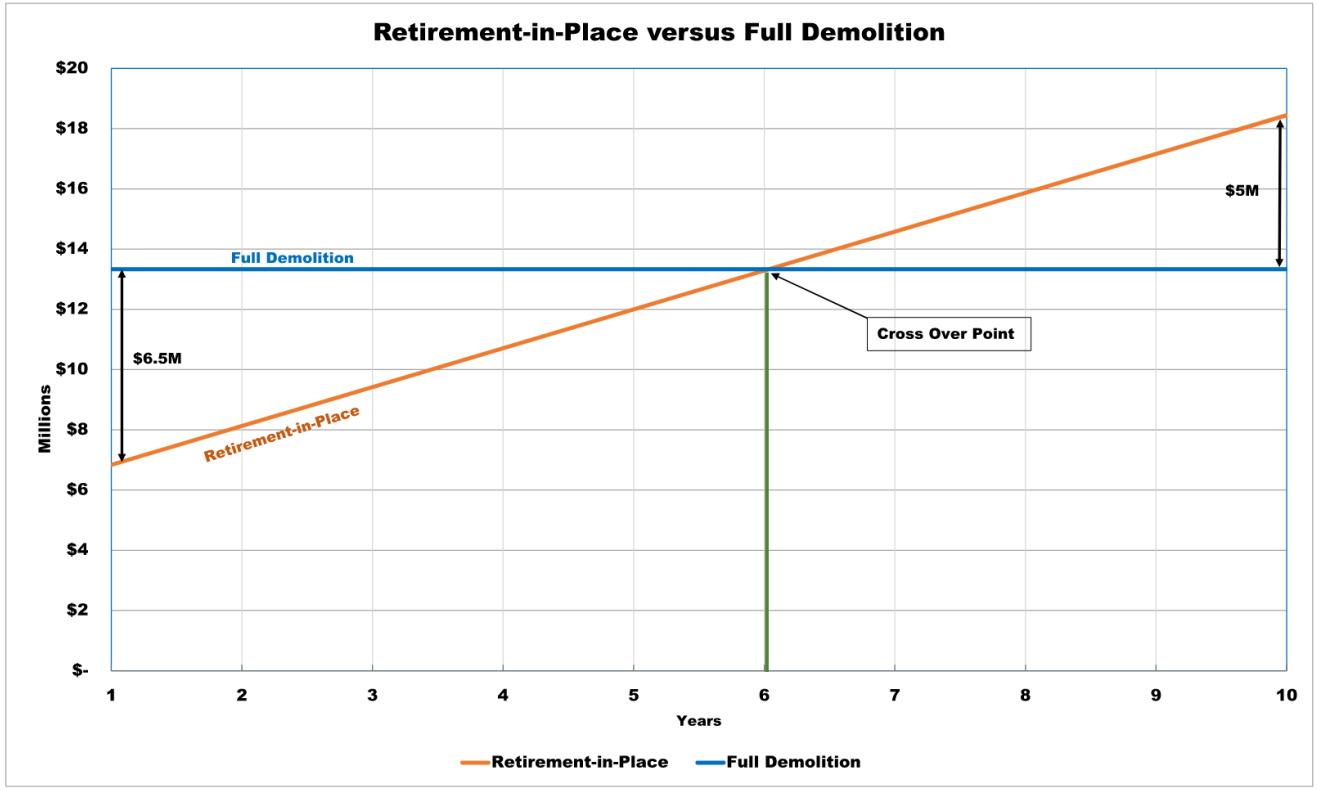


Retire-in-Place (RIP) vs. Full Demolition Example

BURNS McDONNELL®

Retire-in-Place vs Full Demolition

- Former Coal Plant – 200 MW
- Determine at which point, leaving the facility to sit idle, are you receiving diminishing returns
- A thorough cost evaluation comparing the cost of both options over a desired time frame is critical for determining the best approach for your facility.
  - In this example, the retire-in-place option would save the client $6.5M in the first year when compared to demolition.
  - At year 6 the cost is equal to the original full demolition.
  - Finally, by year 10, the retire-in-place option would cost $5M more than the demolition option.



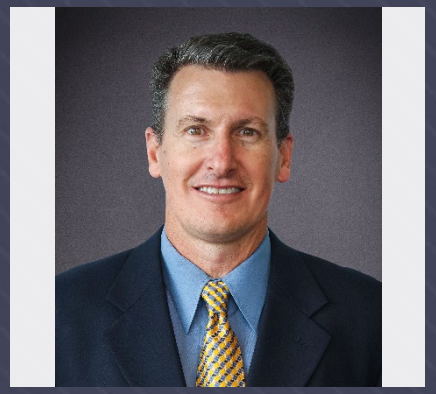
Summary

BURNS McDONNELL®

Summary

- Determine the cost classification based on the expected use of the cost estimate
- Determine scope to increase accuracy of cost estimate. Consider evaluating optional approaches to determine direction of project
- Contract with an engineering firm that has ex-demolition estimators
- Determine assets that can have value beyond the just scrap

Questions



Steve Sheridan

Project Manager, Facility Decommissioning & Demolition Services

1431 Opus Place, Suite 400
Downers Grove, IL 60515
513-250-5225 – Cell

BURNS McDONNELL®