Planning and Executing

COAL-FIRED POWER PLANT DECOMMISSIONING AND DEMOLITION PROJECTS

BURNS McDONNELL

DECOMMISSIONING PHASES

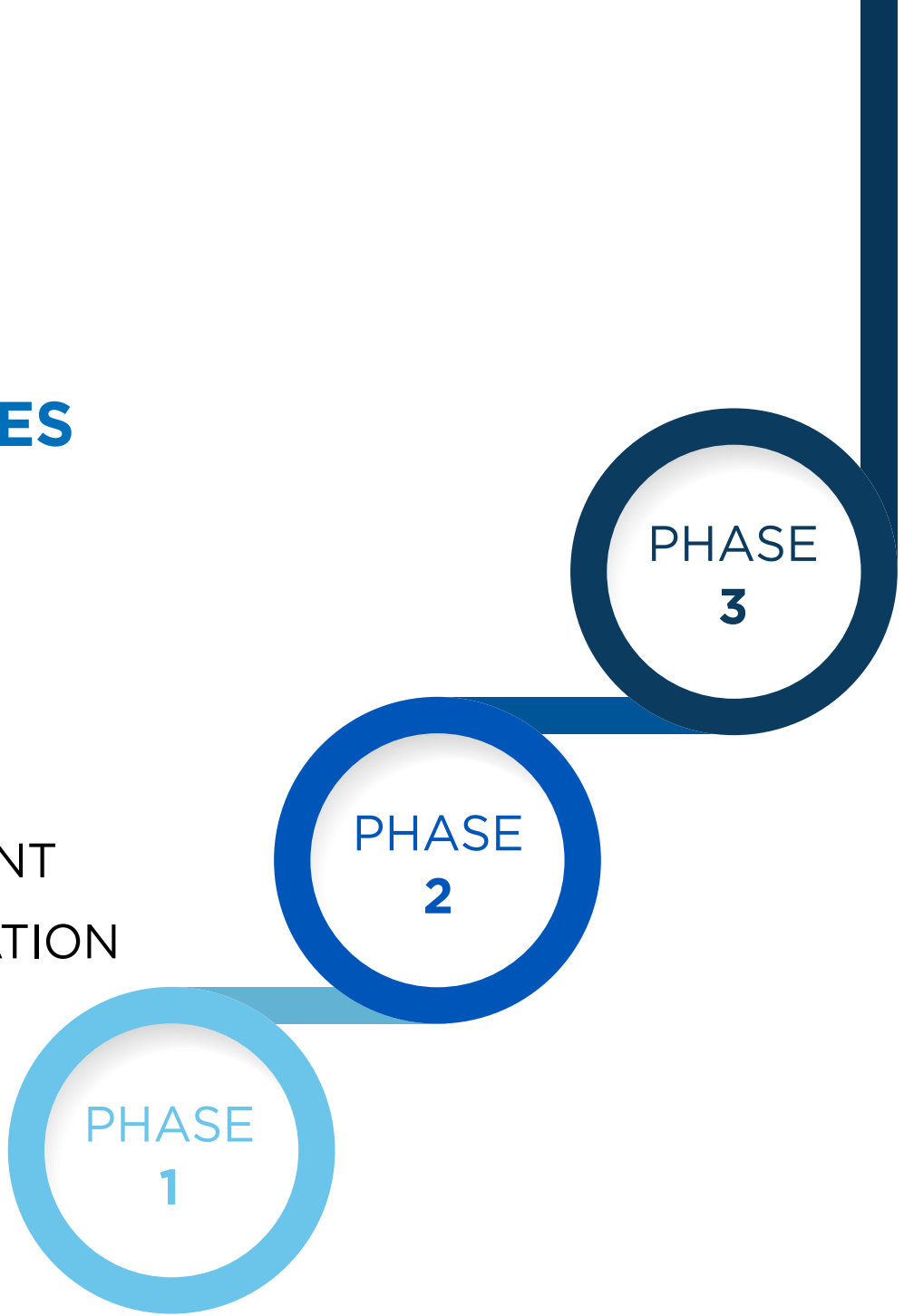
Participants in this workshop will gain knowledge of best practices and recommendations for:

- Identifying the most appropriate decommissioning model
- Developing a decommissioning and demolition project plan
- Developing bid evaluations and contractor pre-qualification

DECOMMISSIONING PHASES

Power plant retirement and decommissioning projects typically follow a three-phase process:

- PHASE 1: PRE-PLANNING
- PHASE 2: PROJECT DEVELOPMENT
- PHASE 3: PROJECT IMPLEMENTATION



PHASE 1: PRE-PLANNING

This phase involves assembling the project team, retrieving information, determining the property disposition (retire-in-place or complete demolition) and developing cost estimates. This team should be assembled immediately after the decision to retire an asset is made.

PHASE 1: PRE-PLANNING

Selecting Your Decommissioning Model

Various economic factors are continuing to drive coal-fired power plant retirements. However, long-term cost, safety and environmental factors are driving influences an owner's decision on what to do with a facility once it is decommissioned — retire-in-place or demolish.

PHASE 1: PRE-PLANNING

Selecting Your Decommissioning Model

Retire-in-Place: Owner retains the property and facilities

- Deal for multiunit sites with varying retirement timelines
- Lower upfront capital costs, but accrues expenses over time such as security, maintenance, FAA lighting, etc.

PHASE 1: PRE-PLANNING
Selecting Your Decommissioning Model

Demolition: All assets demolished and removed from the site

- Fixed, upfront capital costs
- Enables site and other assets such as scrap metal to be sold
- Allows for potential redevelopment or re-powering of site

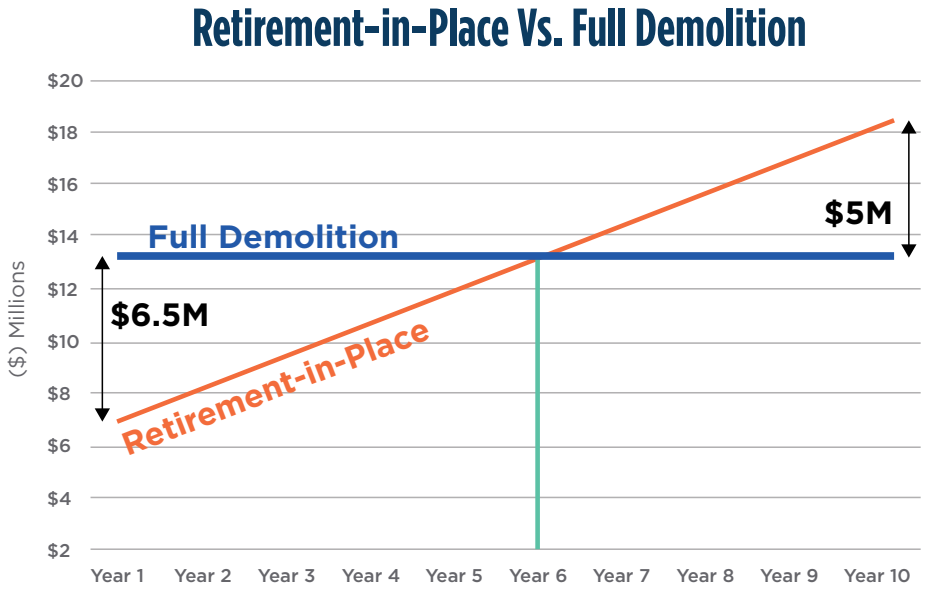
PHASE 1: PRE-PLANNING

Selecting Your Decommissioning Model

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.

PHASE 1: PRE-PLANNING
Selecting Your Decommissioning Model

In this example, the retire-in-place option would save the client $6.5 million in the first year when compared to demolition. However, by year 10, the retire-in-place option would cost $5 million more than the demolition option.



PHASE 1: PRE-PLANNING

A decommissioning project typically consists of three specialized teams:

- **Utility Project Team**: Responsible for determining project scope and defining end state of the site following decommissioning
- **Owner's Engineer Team**: Responsible for determining permitting and technical requirements for the decommissioning scope determined by owner, including development of bid documents
- **Stakeholder Engagement Team**: Responsible for presenting conceptual approach to outside stakeholders, including local/state/federal government and environmental agencies to obtain comments on plan prior to implementation

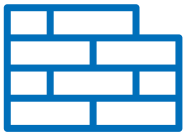
PHASE 1: PRE-PLANNING

Information Retrieval

Information retrieval involves gathering data on the assets and materials on-site to inform cost evaluation, support project development and provide contractors with important site knowledge. Critical information for decommissioning planning and development includes:

Construction Drawings

Environmental Reports



Materials of Construction

Permits

PHASE 2: PROJECT DEVELOPMENT

In this phase, the project team thoroughly assesses the as-is site to determine requirements, the division of responsibility (DOR) between the stakeholders and develops a project timeline, budget and comprehensive bid documents.

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PHASE 2: PROJECT DEVELOPMENT

Project development needs and outputs will vary depending on the decommissioning model selected and site attributes. This section outlines common key considerations for retire-in-place project development and demolition project development.

PHASE 2: PROJECT DEVELOPMENT

Retire-in-Place Key Considerations

Unique requirements of the retire-in-place option involve completing a utility intertie evaluation, and addressing ongoing stack requirements and site security.

PHASE 2: PROJECT DEVELOPMENT
Retire-in-Place Key Considerations

The utility intertie evaluation will:

- Identify interties with units or facilities that remain on site
- Determine if utilities should be isolated when not needed such as fire protection, sanitary sewers/stormwater, communications, etc.
- Identify new utilities needed to support ongoing site activities
- Account for the relocation or rerouting of utilities going through isolated units

PHASE 2: PROJECT DEVELOPMENT

Retire-in-Place Key Considerations

Conducting baseline and periodic inspections of stacks is essential for maintaining long-term safety and regulatory compliance. Results may prompt consideration for demolition. Inspections should:

- Determine if stacks contain asbestos and the need to encapsulate or abate asbestos coating
- Determine FAA lighting on stacks to be maintained (depending on height)

PHASE 2: PROJECT DEVELOPMENT

Retire-in-Place Key Considerations

To protect the public and environment from other potential hazards, the site must be secured against unauthorized access. A security assessment will determine ongoing security requirements for the site, such as secure doors, fencing, cameras, security force, etc.

PHASE 2: PROJECT DEVELOPMENT
Demolition Key Considerations

The demolition/decommissioning option involves removing all assets and structures from the site and remediating and restoring the site for potential reuse by another owner or for re-powering.

PHASE 2: PROJECT DEVELOPMENT

Demolition Key Considerations

It is important during project development to consider property assets that may make the site more attractive to potential future owners. Such assets could include waterway access, water rights, rail access and transmission line access.

PHASE 2: PROJECT DEVELOPMENT

Other key requirements applicable to both decommissioning options include conducting a regulated materials assessment and determining the method for coal pile, pond and landfill closures.

PHASE 2: PROJECT DEVELOPMENT
Other Key Requirements

A thorough regulated materials assessment is needed to account for:

- Removal of regulated materials, such as fuels, mercury, chemicals, gases, PCBs, etc.
- Abatement or encapsulation of other hazardous items, such as devices containing mercury, asbestos in stack liners, lead-based paint, and devices with a nuclear source that includes coal flow meters, exit signs, etc.

PHASE 2: PROJECT DEVELOPMENT
Other Key Requirements

Determine coal pile, landfill and pond closures

- Coal Pile: residual removal and capping
- Landfill: consolidation and capping
- Ash Pond: close in place or remove

COAL PILE REMOVAL

LANDFILL CAPPING

ASH POND REMOVAL

PHASE 2: PROJECT DEVELOPMENT
Assemble Critical Facility Information

Critical facility information includes:

- Reference drawings that show details in the structure, layout and materials of construction
- Contract drawings that identify items included in the scope of work and items to be protected
- Relevant exhibits, such as site permits, sampling results for materials, equipment inventory and materials for scrap
- Final site-grading plans based on site requirements

PHASE 2: PROJECT DEVELOPMENT

Research Local Ordinances and Permit Requirements

Identify and communicate to bidders all information regarding local ordinances and permit requirements that could impact how they complete the work, such as:

- Demolition requirements
- Permits to work on or near bodies of water
- Local, county and state permits needed to conduct work
- FAA permits for stack lighting or temporary lighting during demolition
- Utility abandonment requirements

PHASE 2: PROJECT DEVELOPMENT

Developing Bid Documents

Comprehensive bid documents should ease evaluation and comparison of bidders, reduce potential for change orders, and serve as a project plan for successful implementation.

PHASE 2: PROJECT DEVELOPMENT

Developing Bid Documents

High-quality bid documents include all site information, critical facility information and a clearly defined scope of work that minimizes ambiguity and enables a true apples-to-apples comparison of bid responses.

PHASE 2: PROJECT DEVELOPMENT
Developing Bid Documents

It is recommended that facility owners include optional scope items or unit pricing for activities that may arise during the project, such as:

- Unit prices for asbestos abatement, such as boiler refractory, stack and underground piping
- Unit prices for other items like soil removal
- Labor and equipment costs needed to evaluate change orders
- Other items that may be included later, such as additional buildings to be removed

PHASE 2: PROJECT DEVELOPMENT

Determine Division of Responsibility (DOR)

Clearly define the roles and responsibilities for your in-house project team, contractor, owner's engineer and other stakeholders before the project execution phase.

The DOR can be used as a reference and checklist during the project but is intended to indicate which activities are the responsibility of the contractor. This assists with the development of an accurate cost estimate.

PHASE 2: PROJECT DEVELOPMENT

Develop a Schedule of Values (SOV)

The SOV can be used for detailed evaluation of bid costs and tracking project implementation progress. It also can be used to:

- Identify unit price items where unknowns still exist, and be sure to include a base allowance for comparing bids
- Identify large alternate cost items
- Establish unit prices for additional items or activities that may arise

PHASE 3: PROJECT IMPLEMENTATION

The following slides provide recommendations for key contractor personnel, contractor pre-qualification, bid evaluation and on-site field representation during the execution of decommissioning project.

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PHASE 3: PROJECT IMPLEMENTATION

Key Contractor Personnel Recommendations

When developing your RFP, it is recommended that owners include a full-time, on-site safety manager and superintendent among their key personnel.

PHASE 3: PROJECT IMPLEMENTATION

Key Contractor Personnel Recommendations

For a full-time, **on-site safety manager**, we recommend candidates with the following attributes:

- Certified Safety Professional (CSP) or Associate Safety Professional (ASP)
- Minimum of five years of experience with similar projects
- No other responsibilities at the site

PHASE 3: PROJECT IMPLEMENTATION

Key Contractor Personnel Recommendations

We recommend a full-time, **on-site superintendent** whose sole focus is directing and conducting the work safely and effectively.

Key attributes should include:

- Experience with similar projects
- Same person for abatement and demolition activities
- No other responsibilities at the site

PHASE 3: PROJECT IMPLEMENTATION

Contractor Pre-Qualification

Prior to determining which contractors receive RFPs, we recommend pre-qualifying potential bidders to identify contractors who are qualified to conduct the work. This activity helps clients better evaluate project costs based on the responses from those who are truly qualified to complete the work.

PHASE 3: PROJECT IMPLEMENTATION

Contractor Pre-Qualification

Key attributes of **pre-qualified** contractors include:

- Experience with similar size and scope
- Good safety record for previous three years (EMR, TRIR, DART)
- Availability of required equipment
- Experience of staff assigned to the project

PHASE 3: PROJECT IMPLEMENTATION

Bid Evaluation

The bid evaluation provides a consistent evaluation of all bidders and is composed of two primary sections: the financial evaluation and the technical evaluation.

PHASE 3: PROJECT IMPLEMENTATION

Bid Evaluation, Financial

The financial evaluation allows owners to compare various costs and potential credits among bidders, such as:

- The base bid for the project (depending on contracting mechanism)
- Scrap credit
- Proposed cost for alternate projects
- Unit prices

PHASE 3: PROJECT IMPLEMENTATION

Bid Evaluation, Technical

The technical evaluation typically compares the following elements among potential bidders:

- Contractor-developed execution plan and project understanding
- Safety statistics of the contractor and any subcontractors for the previous three years
- Relevant project experience among contractor and subcontractors
- Experience of proposed project team

PHASE 3: PROJECT IMPLEMENTATION

Pre-Activity Plan Review

We recommend requiring **Contractor- Developed Execution Plans** that include:

- A structure evaluation developed by a structural engineer prior to demolition
- Inclusion of detailed plans with methodology and types of equipment to be used
- Sequence of activities for demolition
- Identification of exclusion zones for demolition activities

PHASE 3: PROJECT IMPLEMENTATION

Pre-Activity Plan Review

Benefits of **Contractor-Developed Execution Plans**:

- Enables the evaluation team to determine if the bidder has developed a site-specific plan that aligns with the scope of work and cost estimate
- Enables the evaluation team to identify if bidders are focused on your specific project versus providing a generic approach that could change once the project is awarded

PHASE 3: PROJECT IMPLEMENTATION

Pre-Activity Plan Review

We recommend requiring that Contractor-Developed Execution Plans include detailed activities regarding utility isolation throughout the project to mitigate safety risks.

PHASE 3: PROJECT IMPLEMENTATION

Utility Isolation

Utility isolation activities should include:

- The types and locations of utilities to be isolated based on critical facility information and other information provided

Each bidder should identify how isolation and air gap will be completed, including:

- Permanent air gap or determination of utilities
- Removal of potential energy/pressure
- Insertion of potentially flammable materials into lines prior to cutting/removal

PHASE 3: PROJECT IMPLEMENTATION

Utility Isolation

The contractor should also detail how it will verify utilities are isolated or air gapped prior to demolition activities.

Fire protection

Natural gas

Electrical

Service/potable water

Sanitary/storm sewers

Compressed air

Controls/ communication

PHASE 3: PROJECT IMPLEMENTATION

Establish On-Site Field Representation

On-Site field representation is important to confirm that the selected contractor is following scope requirements, conducting work in accordance with the execution plan and meeting project expectations.

PHASE 3: PROJECT IMPLEMENTATION

Establish On-Site Field Representation

The on-site field representative provides the facility owner with independent verification and documentation of contractor activities. Independent verification is important to observe the contractor's activities to confirm it is complying with the plans and specifications, including proper recycling and disposal of materials generated during the project.

PHASE 3: PROJECT IMPLEMENTATION
Establish On-Site Field Representation

The **full-time on-site field representative** is responsible for:

- Reviewing contractor invoices
- Tracking and confirming proper waste disposal activities
- Verifying contractor staff has required certifications, such as for asbestos abatement

PHASE 3: PROJECT IMPLEMENTATION
Establish On-Site Field Representation

Additional **on-site field representative** responsibilities include:

- Participating in daily safety meetings and notifying the contractor and owner of nonconformance with the safety plan or if unsafe situations are observed
- Observing on-site demolition activities for conformance with the execution plan
- Developing the final report with all documents, manifests and results in one place

CONCLUSION

As with any large-scale project, successful projects depend upon rigorous planning to clearly and narrowly define the scope of work and deliver desired project safety, schedule and financial performance.

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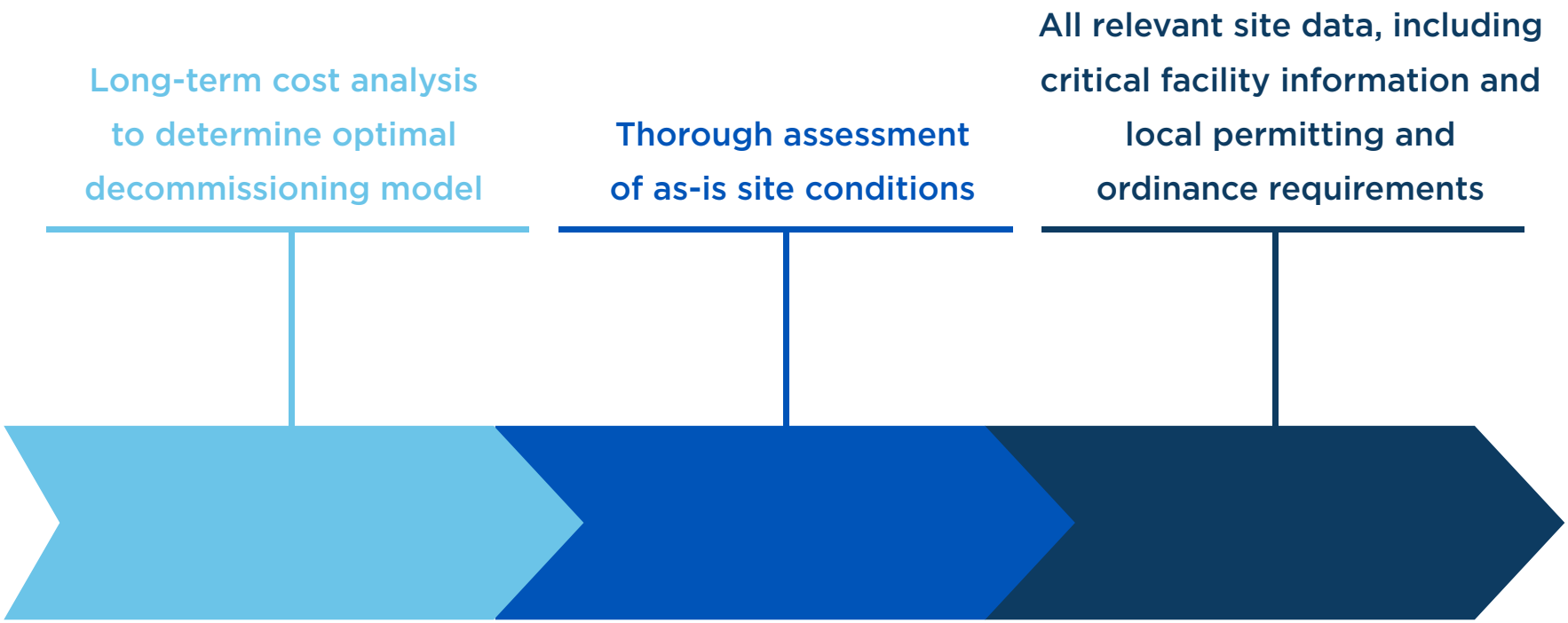
CONCLUSION

Key attributes of high-quality decommissioning plans include:



CONCLUSION

A narrowly defined scope of work enables you to more easily compare RFP technical and financial responses since bidders must follow a common approach and consider the same defined project responsibilities.

Site owners can further safeguard their decommissioning projects by selecting a full-time, on-site field representative to oversee decommissioning activities and verify project tasks are completed as planned and in compliance with environmental and regulatory statutes.

For more information, contact

JEFF L. POPE, PE

jpope@burnsmcd.com

630-724-3328

linkedin.com/in/jefferypope