CI Energy Group's
Shutdowns Superconference

Building Scope Management into Your Planning, Designing and Execution Stages to Avoid Scope Creep During Your Turnaround

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Summary

Although controls that are put into place during the execution phase of a turnaround such as, Scope Change Approval processes are a key element to controlling scope creep, if they are not supported by specific activities during the design and execution phases of the turnaround they will be less than fully effective.

Introduction

To minimize scope creep during the execution phase of a turnaround requires three activities that must occur during the planning and designing phases of the turnaround;

- Development of a Turnaround Timeline that is based on a Long Range Turnaround Plan
- Comprehensive Scope Development Process that involves all stakeholders
- Detailed planning process that includes risk analysis and mitigation planning

Turnaround Timeline

- The minimum requirements in the development of a turnaround timeline are:
  - Identification of key milestones and due dates for all pre and post turnaround activities
  - A long range Turnaround Plan (7-10 Years) that has been developed using a Strategic Asset Management Plan
  - A Timeline Management process that establishes accountabilities and responsibilities

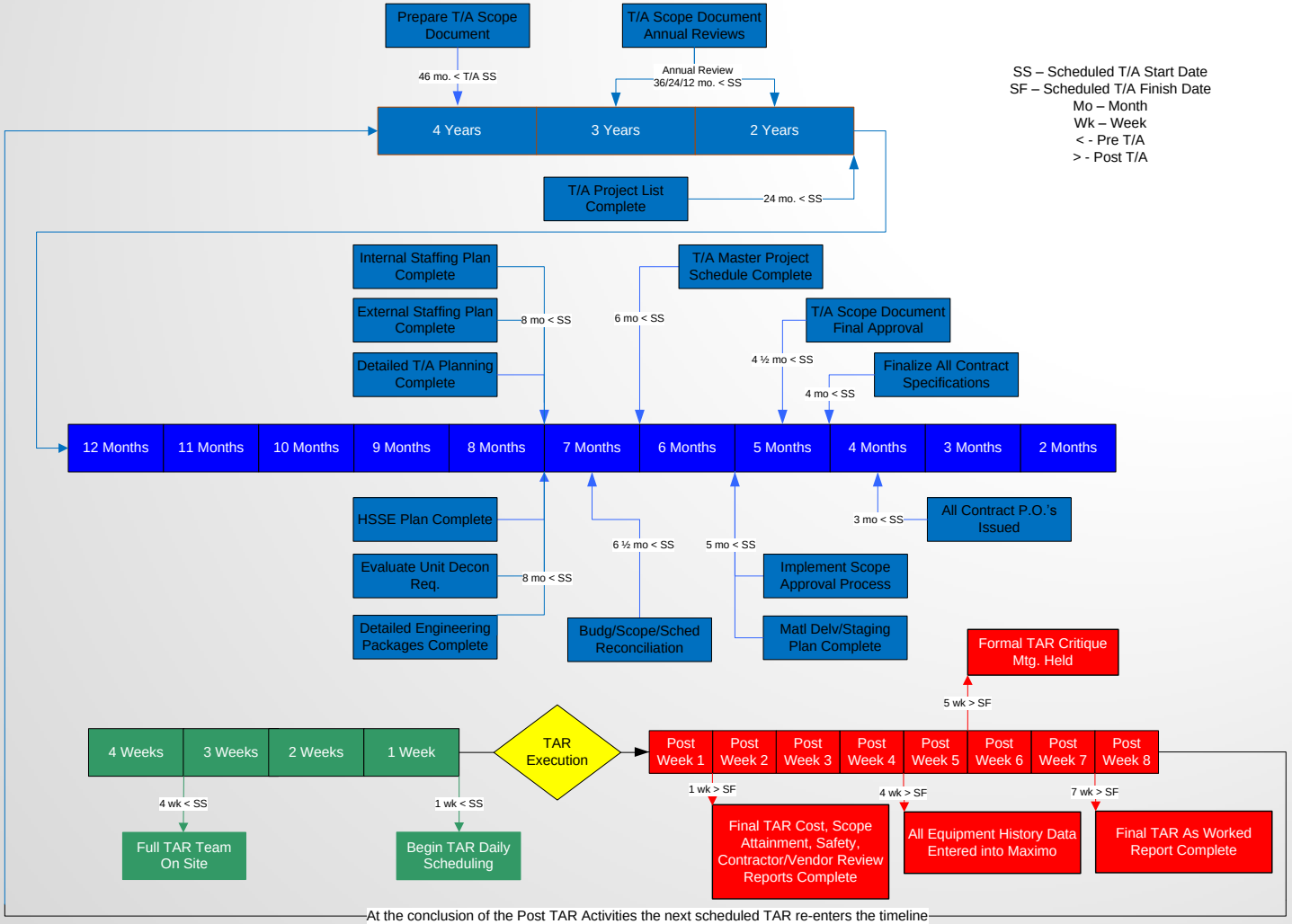
Turnaround Timeline

Key Milestones and Due Dates

- Work Scope Defined (Scope Freeze)
- Project Planning Complete
- Health, Safety, Security and Environmental (HSSE) Plans Complete
- Internal & External Staffing Plans Complete
- Parts and Material Delivery and Staging Plans Complete
- Etc.

Turnaround Timeline

T/A Management Timeline Pre and Post T/A Activities
4 Year Cycle T/A



Turnaround Timeline

Long Range Turnaround Plan

- Developed based on the Strategic Asset Management Plan
- Should have a scheduled start date and duration for all turnarounds for the next (7-10) years
- Accuracy of schedule dates should be +/- 30 days, estimated budgets should be within +/- 25%

Turnaround Timeline

T/A Timeline Management Process

- Defined and documented formal process to manage all turnaround due dates for each turnaround on the timeline
  - Standing meetings at least monthly
  - Defined roles, responsibilities and accountability
  - Mitigation procedures for milestones that are behind schedule

Scope Development

Purpose

Turnaround scope development is the activity of clearly determining the objectives of a turnaround and compiling a comprehensive, prioritized and organized Work Breakdown Structure (WBS) containing all work that must be completed to achieve those objectives.

Scope Development

Desired Characteristics

- Accurate scope development with complete work orders for all work
- All work linked to a T/A objective
- Work identified early (for the next scheduled T/A on an asset scope development should begin during the current T/A on that asset)
- Standard format used to identify all work

Continued

Scope Development

Desired Characteristics

- Identified work organized into a hierarchical driven work breakdown structure (WBS)
- Identify 100% of all T/A work regardless of type of work, the originating or performing organization , based on Post TAR, Inspection Reports, Risk Assessment, etc.
- The T/A scope development process should identify and sort work based on the basis of maintenance activities and not on the basis of contracts required to perform the work

Continued

Scope Development

Desired Characteristics

- Scope development and planning activities driven by a master scope document that is in a standardized format for all T/A's
- Objectives for each T/A are identified, quantified, prioritized and measurable
- The T/A scope development process should identify all work required to achieve the desired asset profile

Continued

Scope Development

Desired Characteristics

- The T/A scope development process should flag long lead time items to facilitate the timely delivery of all parts and materials
- All T/A work must meet the following criteria:
  - Targets one or more of the T/A Objectives
  - Work execution requires the asset to be out of service

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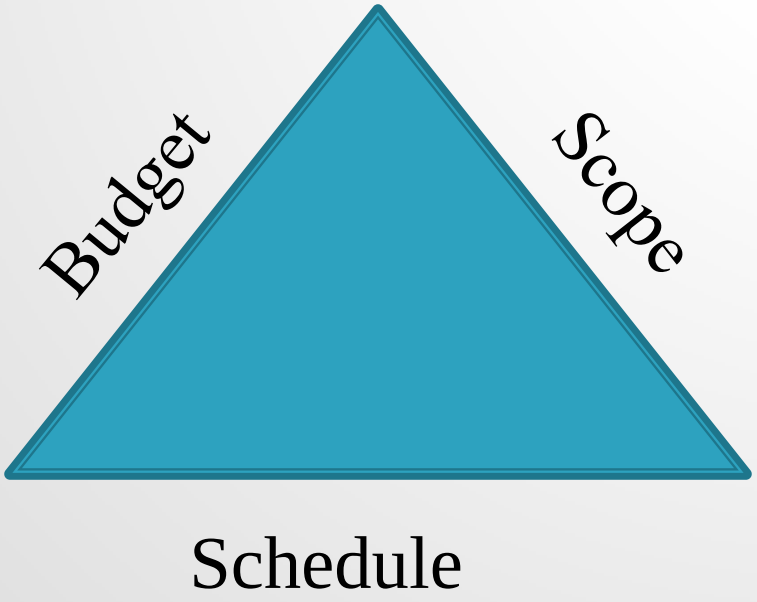
Scope Development

Desired Characteristics

- Scope should drive the T/A budget and schedule



Scope Development

Scope Document – Minimum Contents

- General Information Statement – Including a T/A Purpose Statement and the T/A Objectives
- T/A Team Members and contact information
- Recommendations
- Assumptions
- Work Breakdown Structure (WBS)
- Pre T/A Equipment Testing Requirements

Continued

Scope Development

Scope Document – Minimum Contents

- Standard Reoccurring Work List
- Capital Project List
- Capital Project Work List
- Mandatory Work List
- Corrective Work List
- Cost Estimates
- Budgetary Data

Continued

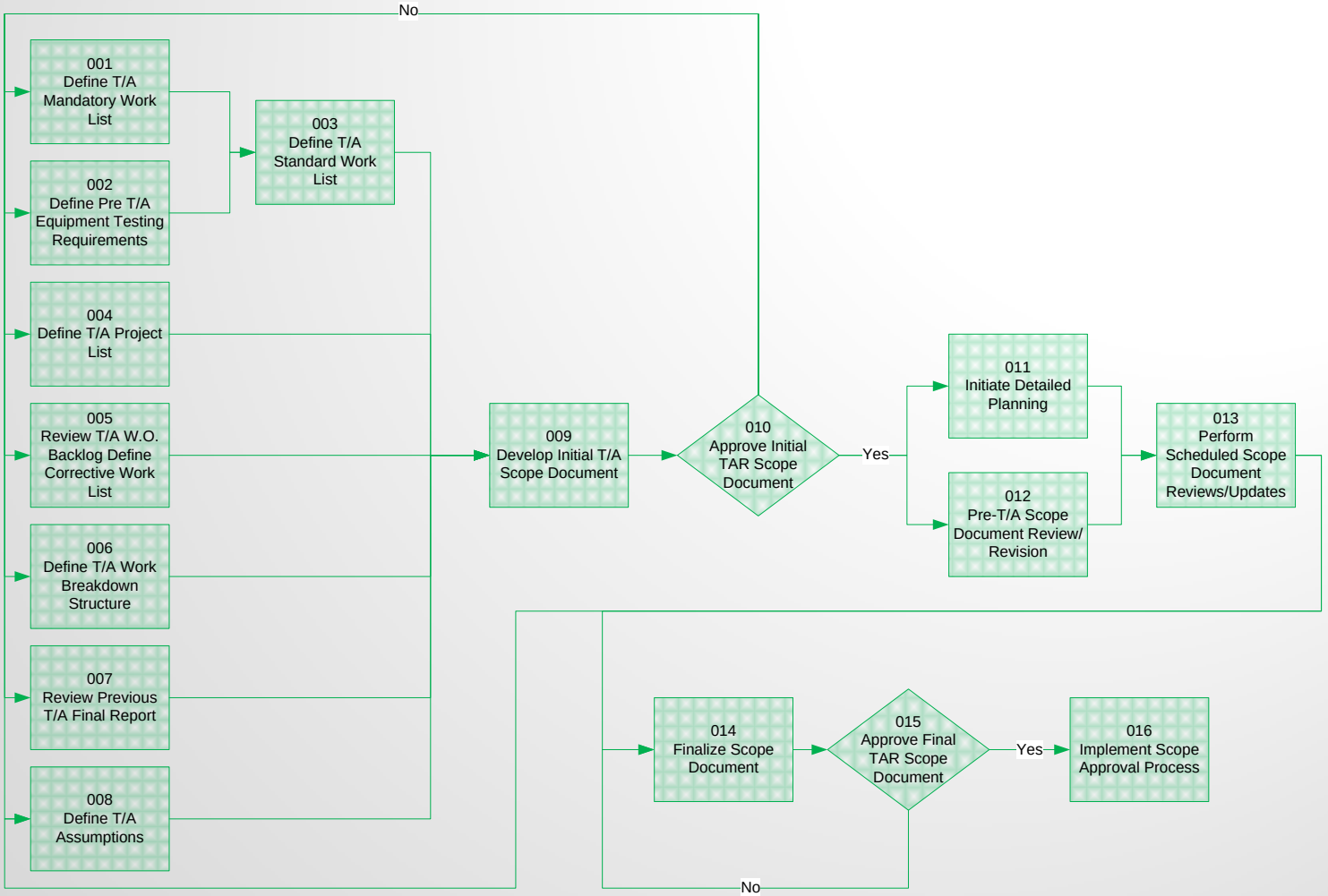
Scope Development

Scope Document – Minimum Contents

- Internal Resource Plan
- External Resource Plan
- Special Tool and Equipment Requirements
- Master Project Schedule
- HSSE Plan
- Material Staging and Delivery Plan
- Risk Analysis and Mitigation Plans
- Summary Statement

Scope Development

TAR Scope Document Process



Planning

Detailed T/A planning should include an experience based risk analysis and mitigation planning step

- This is not a statistical analysis but a subjective risk analysis performed at the activity level of each job by an experienced craftsman that has performed the work

Planning

- Requires the establishment of planning thresholds that determine the degree of mitigation planning that is required based on the acceptable level of risk to T/A budget and schedule

- Used to identify the majority of discovery work during the execution phase of the T/A and includes detailed mitigation plans that can be merged into the Master Project Schedule and executed

Planning

Benefits of Risk Analysis and Mitigation Planning

- Decision making and approval process occurs prior to T/A execution, reducing any schedule impacts
- Enables the acquisition of parts and materials that result from identified discovery work, mitigating schedule and costs related to expediting those parts and materials
- Allows planning accuracy to improve since contingencies are not built into T/A scope planning

Planning

Requirements

- In order for risk analysis and mitigation planning to be successful it does require that a very comprehensive and robust planning process be in place. This process must ensure that planning occurs at a very detailed level
- Planning resources must be experienced and familiar with the specific work scope, the accuracy of subjective risk analysis is directly related to the experience level of the planning resource

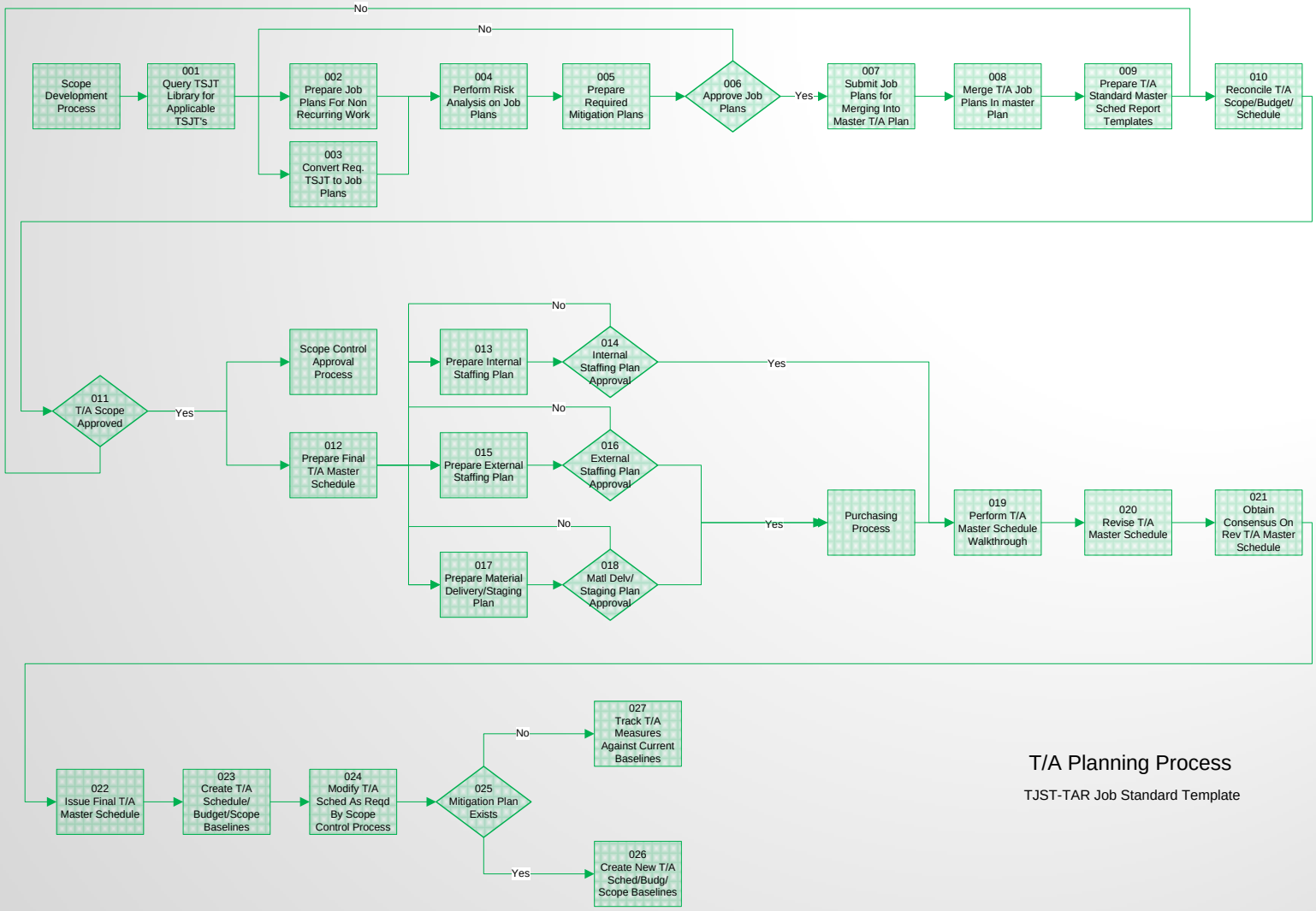
Planning

Although risk analysis and mitigation planning is labor resource intensive and requires a significant investment in both time and money it is justified since:

- Excluding project work typically 80% of all work performed during a turnaround is repetitive in nature

- If planning is performed utilizing a comprehensive, detailed planning process the bulk of the work related to risk analysis and mitigation planning is performed once and only reviewed and revising for future T/A's

Planning



T/A Planning Process

TJST-TAR Job Standard Template

Scope Change Control

Scope Freeze

- Based on asset T/A cycle
- Set by the T/A Scheduled Start Date where (T/A SS) is the turnaround scheduled start date (asset out of service)
  - 0-6 month cycle, Scope Freeze = T/A SS – 60 days
  - > 6 mo to 18 mo cycle, Scope Freeze = T/A SS – 90 Days
  - >18 mo to 36 mo cycle, Scope Freeze = T/A SS – 120 days
  - >36 mo – 72 mo cycle, Scope Freeze – T/A SS – 180 days

Scope Change Control

Scope Freeze

- Once scope freeze is implemented through T/A execution complete (asset returned to service) any addition or deletion of scope from the T/A would require following a formal defined scope approval process
  - Requires approvals at the same level as that required to authorize the T/A expenditure, for any scope changes that will impact schedule a high level approval requirement should be defined.

Scope Change Control

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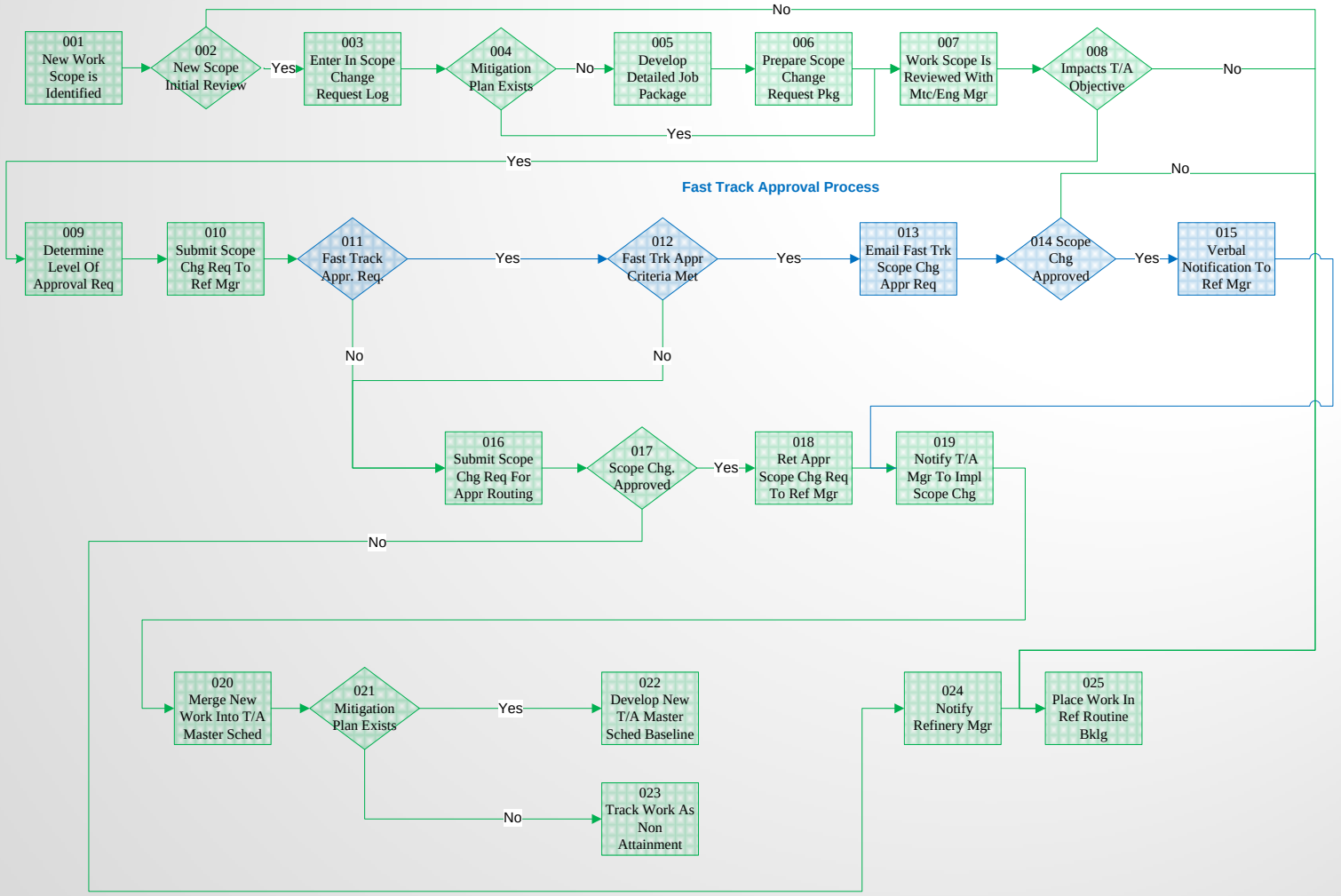
Scope Control Process Flow



Conclusion

Questions and Answers

Author's Biographies and Contact Information

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Professional Biography:

- Mr. Covato is a registered professional engineer with over forty years experience in power generation (fossil, hydro and nuclear) and project management. He has retired after approximately thirty years of service with Allegheny Energy Incorporated. He is currently employed as a Project Manager Outage/Turnaround Subject Matter Expert with the Reliability Management Group in Minneapolis, Minnesota. He has had several papers published on process design and implementation of both routine and outage/turnaround work management process topics.

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