



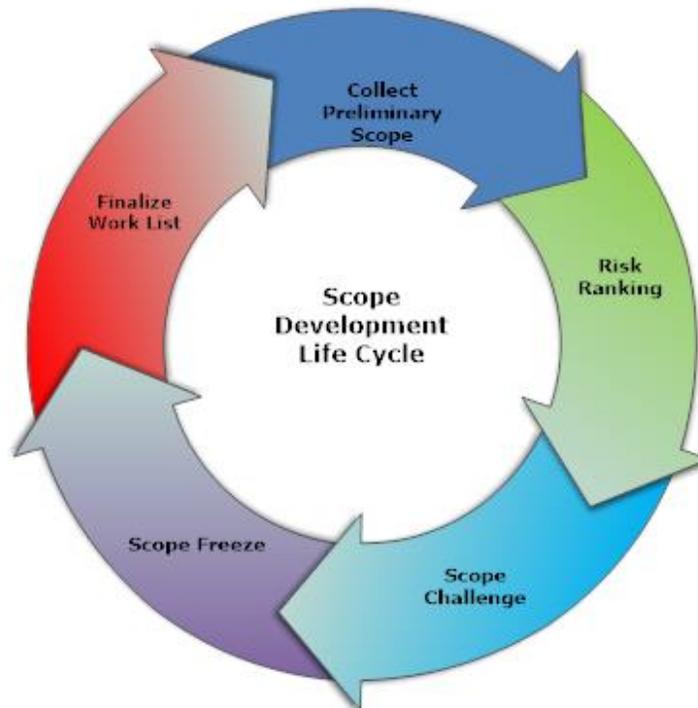
How-To Develop a Turnaround Scope

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1.1 Scope Development Process

Scope development is the process of describing, in sufficient detail, the turnaround's deliverables and the work required to accomplish those deliverables. All scope items should have at least one, direct connection to the turnaround business objectives.

Scope Development Life Cycle





1.1.1 Scope Categories

Prior to developing scope, there needs to be a structure in place to group the different jobs into categories. These categories are generally broke down based off of the turnaround's business objectives.

Sample Categories

Tiers - Categorize the scope into business objectives categories.

- **Tier 1** - Safety, Environmental, Regulatory, Mechanical Integrity Items That Require a Turnaround to Execute
- **Tier 2** - Items Requiring A Shutdown That Are Necessary To Ensure an Uninterrupted Run Until The Next Scheduled Turnaround
- **Tier 3** - Reliability Items Required To Achieve A 97% Operational Efficiency Rating With No Unplanned Outages Until The Next Scheduled Turnaround, These Items Also Require A Turnaround To Execute
- **Tier 4** - Additional Items That Could Increase Efficiency or Productivity That Are Justified On A Return On Investment Basis, These Items Also Require A Turnaround To Execute

Drivers - Further define the scope within the Tier it is associated with.

- Regulatory Compliance
- Required By Inspections
- Environmental, Health & Safety
- VOC Emissions
- Reliability, Availability, Maintainability
- Opportunity Requires Turnaround
- Other Work Scope Requiring Turnaround
- Capital Projects / Improvements



1.1.2 Typical Turnaround Scope Items

- Malfunctioning Equipment
- Any equipment that will be at or near failure at the time of the turnaround
- Equipment needing repairs that cannot be performed online
- Leaking valves
- Inoperable valves
- PSV's due for inspection
- Equipment due for inspection
- Equipment needing to be cleaned due to fouling
- Any containment items such as clamps
- VOC leaks
- Regulatory Compliance Items

Preliminary Work List

The development of the preliminary work list is the first stage in the scope development life cycle. It starts by collecting all known turnaround related items; these will come in the form of different lists from different parts of the organization. For example:

- Any items required to meet business objectives in the turnaround premise document
- Capital Project items
- Regulatory compliance items
- CMMS backlog
- Reliability items required to meet the units desired run cycle
- Repairs that require turnaround to execute
- PM's
- Piping Tie-Ins
- VOC Emissions

Once the lists have been collected, they need to be consolidated in the turnaround work log. The work log could be in the form of an Excel document or a computerized planning database. The work log should contain the appropriate amount of information to effectively manage the scope.



Sample fields to include in the work log:

- WBS
- System
- Driver
- Tier
- Job Number
- Unit
- Equipment #
- Equipment Name
- P&ID#
- Scope
- MOC Required
- Assigned Planner
- Originator
- Risk Matrix Index
- Scaffold Required
- Insulation Required
- Paint Required
- Asbestos Testing
- Lead Paint Testing
- Materials Required

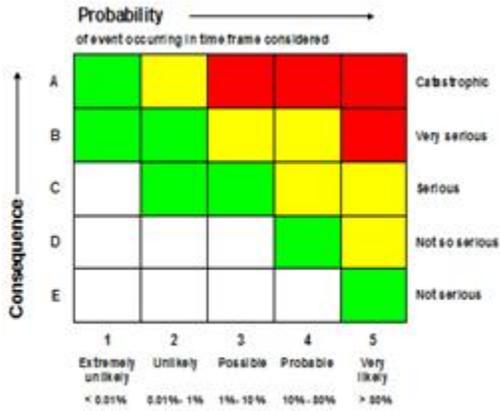
With the different scope lists consolidated, there should be scope development meetings to review each item individually to ensure all needed information has been identified. It's recommended to obtain a copy of the latest version of the P&ID's and mark up each item as they are reviewed to prevent duplicating scope items. Often, different operators or maintenance personnel enter the same items in the CMMS software with different descriptions. By marking the scope items up on the P&ID's, it prevents planning duplicate work, thus saving you time and money.

1.1.3 Risk Based Work Selection

Scope is developed utilizing a risk matrix to identify the probability and consequence of doing, or not doing, a specific item in relation to the turnaround's business objectives. The matrix is made up of a 5 X 5 scale with the horizontal axis representing the probability and the vertical axis representing the consequence. The probability ranges from 1 thru 5, with 1 representing the least likely to occur and 5 being the most likely to occur. The consequence ranges from A thru E, with A being the most severe and E being the least severe.



Sample Risk Matrix



Sample Consequences

| POTENTIAL CONSEQUENCES | | | |
|------------------------|--|--|---|
| Category | Production losses ¹⁾ | Environment ²⁾ | Health / Safety |
| | <small>(as a percentage of maximum plant daily output)</small> | | |
| A | > 50% Full unit for more than five days Production lines for more than 2 weeks | Release of highly toxic chemicals, highly flammable gases, explosive chemicals | Disabling injury / fatality |
| B | > 100% Full unit more than one day Production lines for multiple days | Release of flammable liquid or gaseous chemical minor toxic fluids | Lost time injury / Recordable work injury |
| C | > 10% Full unit for couple of hours Production lines for one day | Vapor release or liquid spill outside plant limits | First aid injury |
| D | > 1% Production line outage / upset less than one day | Vapor release or liquid spill within plant limits | |
| E | < 1% Production upset Yield loss | Minor not reportable release | |

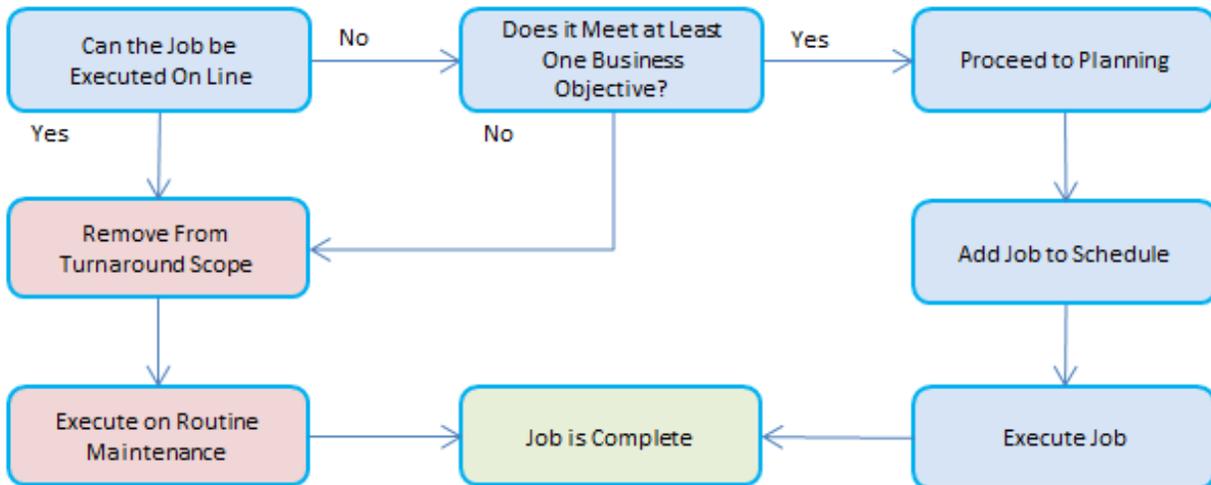
Utilizing (RBWS) Risk Based Work Selection provides a foundation for the organization to make decisions on whether a particular scope item should be included in the turnaround's scope. Utilizing this process will help eliminate unnecessary scope items that could impact your overall budget and duration.

1.1.4 Scope Challenge

When the preliminary work list is complete, there needs to be a scope challenge session. This session is where we determine whether an item meets the requirements to be turnaround scope. Each scope item must meet at least one of the turnaround's business objectives, and determined if the scope can be performed online or if it requires the unit to be down (offline) to execute. You want to avoid as much of the opportunity work as you can, as this impacts the overall budget.



Scope Challenge Diagram



1.1.5 Freeze Scope

The amount of time that scope is frozen prior to execution could vary based on the size and complexity of the turnaround. The date should allow sufficient time for detailed planning, scheduling, and budget development. Freezing the scope initiates the change management process; from that point on, any item being added or removed must go through the change management process.