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## ESStB – Production Tree Systems

### Production Tree System

A production tree is a series of valves, spools, and other fittings used to control or shut-in produced fluids and gasses.

**Parts and Components (Barrier Elements),** *i.e., Description of pressure containing parts and components that serve as part of a primary or secondary barrier envelope when required.*

**Valves** – Components that close to isolate fluids (e.g. Production Master Valve, Production Wing Valve.)

**Plugs** - Retrievable mechanical barriers elements installed within a production tree which seal the bore(s) and act as part of either barrier envelope against the wellbore(?) pressure (e.g., crown plug, BPV)

**Seals** – Components used to close off or secure against fluid (e.g. elastomeric, metal-to-metal, gaskets, hanger body).

**Body** - Provides structural support for the associated components and sealing elements (e.g., valves, plugs, etc.)

**Spools** –Pipe with end connectors (e.g. flanges) and potentially side outlets used to connect between barrier elements (e.g., tubing head spool.)

**Ancillary Components** (Tree cap, flowline connector, etc) – Any other components not listed above that are not part of a primary/secondary barrier envelope.

**Parts and Components (Mitigators),** *i.e., Description of fluid wet components or components used to directly prevent escalation of events required for system to work as a mitigator. These are components that apply mitigation directly to the hazard. This should not include control systems.*

**Injection Lines** – Small-diameter conduits that enable injection of inhibitors or similar treatments (e.g. hydrate remediation, emulsifier.)

**High Pressure Fluid Pump** – Equipment utilized to inject fluid into a wellbore.

**Valves** – Components equipped with an adjustable aperture to control the rate of flow of fluid (e.g. Choke Valves.)

### Scope

Analysis on production tree systems will be limited to the period in which the equipment must perform as a barrier, from installation until removal from service. The scope of the analysis is defined as:

- Any well construction or well modification operation (e.g., drilling, completion, well interventions, workover activities, abandonment, decommissioning).
- Normal production operations will be covered in a separate assessment.

- Test trees are excluded from this document.

### Assumptions

- The equipment is field proven.
- The equipment is,
  - Manufactured according to specification
  - Installed as per Original Equipment Manufacturer guidelines
  - Maintained as required
  - Functioning properly
  - Verified as needed
  - Regularly tested
- Throughout the equipment’s lifecycle, the equipment is utilized within its prescribed applicable performance envelope (e.g., pressure, longevity, environment) and operated within design limits.

### Performance Requirements for Public Comments

<b>Barriers</b>	
<b>Part/Component</b>	<b>Performance Requirement</b>
System	The Production Tree System, including all components, must not leak to the environment.
Body	Must contain wellbore fluids either from upstream tubulars or the environment.
Ancillary Components	Must contain wellbore fluids either from upstream tubulars or the environment.
Plugs	Must seal to prevent leakage of wellbore fluids to either upstream tubulars or the environment.
Valves	Must seal to prevent leakage of wellbore fluids to either upstream tubulars or the environment.
Seals	Must seal to prevent leakage of wellbore fluids to either upstream tubulars or the environment.
Spools	Must contain wellbore fluids either from upstream tubulars or the environment.

<b>Mitigators</b>	
<b>Part/Component</b>	<b>Performance Requirement</b>
Injection Lines	Injects fluids into the wellbore or annulus via the tree without leaking to the environment.
High Pressure Fluid Pump	Injects fluids into the wellbore or annulus via the tree without leaking to the environment.
Valves	Restricts the rate of flow of wellbore fluid to upstream tubulars or the environment.