OPERATIONS SAFETY MANAGEMENT PROGRAM

Date: November 18, 2021

Location: WR OGDP 1 / Wells Ranch CDP DP / A18-09 Pad

Legal Description: NESE Section 18, Township 6 North, Range 64 West, Weld County, Colorado

RULE 304.C(7) Operations Safety Management Program

Oil and Gas Development Plan WR OGDP 1

A18-09 Pad: NESE Section 18, Township 6 North, Range 64 West

Form 2A Doc #402099017

Weld County, Colorado

An operations safety management program consistent with the requirements of Rule 602.d.

602.d. - Operators will establish and maintain a written operations safety management program for all Oil and Gas Operations. The operations safety management program will establish operational practices and procedures for safety and will include at a minimum a:

- (1) Change management program; and
- (2) Pre-Startup safety program for all new and existing Oil and Gas Locations.

Change Management Program:
Purpose and Objectives*: The purpose of this Management of Change for Facilities and Operations (MOC-F&O) Process is to manage changes to facilities, operations, procedures and products to prevent incidents, support reliable and efficient operations, and to mitigate, or where possible, eliminate unacceptable risks from being introduced into our business.*

The objectives of this MOC-F&O process are to:

- Define the requirements for permanent, temporary and emergency changes
- Establish authority for approving changes
- Provide a means to evaluate health, environmental and safety risks of potential changes and identify mitigation by competent experts
- Require communication of the change
- Required training of personnel impacted by changes to facilities, operations, procedures or products
- Establish a mechanism for updates to and maintenance of process safety information (PSI) and other critical OE documentation.
- Establish requirements on tracking and reporting of MOC-F&O Leading and Lagging Metrics
- Establish requirements to document, track and verify progress

Scope: This process applies to all permanent, temporary and emergency changes to facilities, operations, procedures or products that occur at locations owned, operated, leased or controlled by Chevron including operated joint ventures and consolidated subsidiaries.

This Management of Change for Facilities and Operations process must be applied when a change results in or is the result of changes to facilities, operations, procedures or products as defined in the Scope of this MOC Process.

Procedures:

- Changes to Operating and Maintenance procedures that affect the established operating state of the facility, operation, or product where the change could impact health, safety, environment, efficiency, or reliability
- Changes to temporary repair procedures
- Changing the sequence and the adding or deleting of steps within operating procedures.
- Changing the safe operating limits in the operating procedures.
- Relocating information on safe upper and lower limits, consequences of deviation, etc., from the operating procedure to a separate referenced document.
- Creating a temporary operating procedure

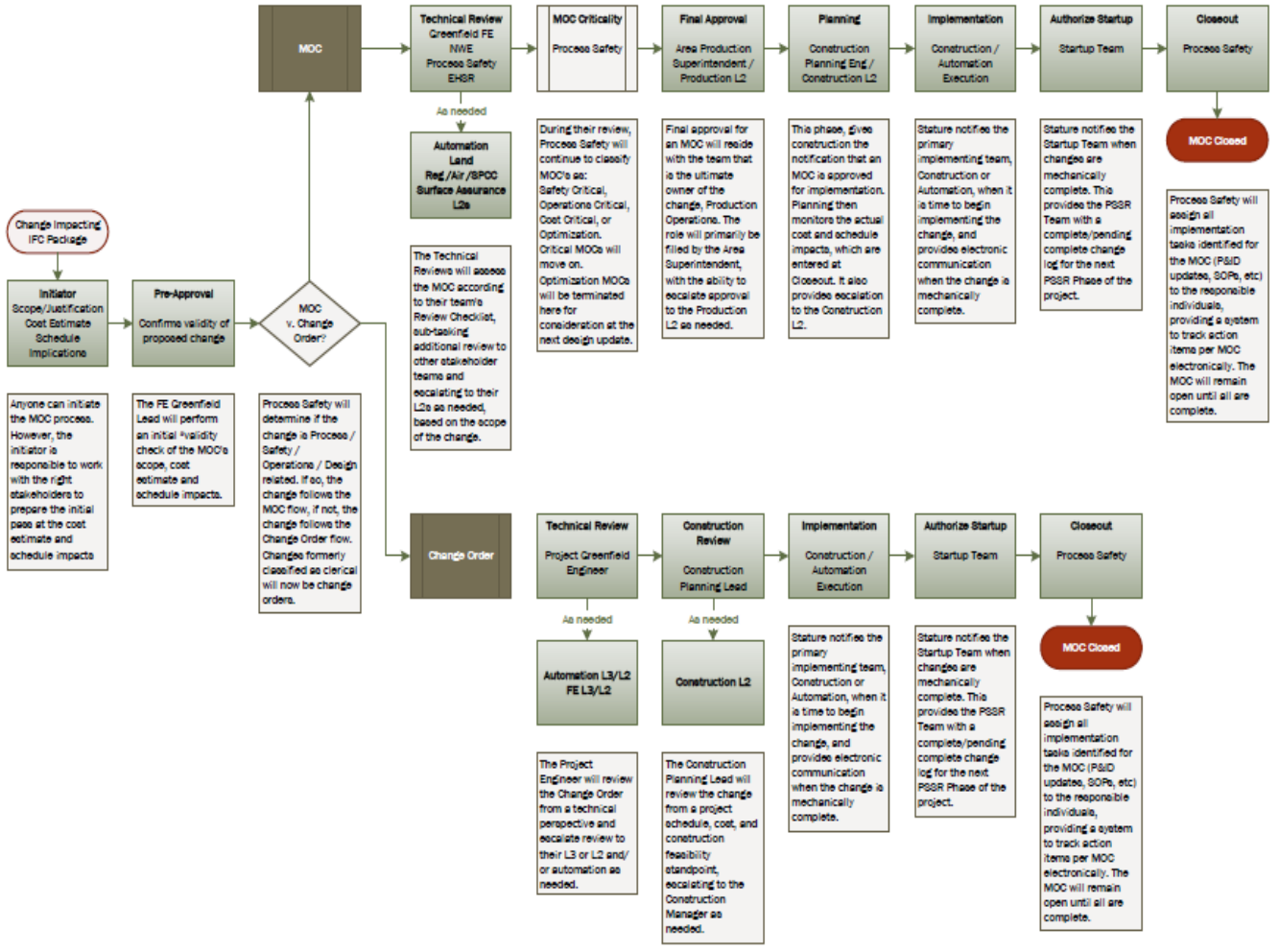
Management of Change Procedure:

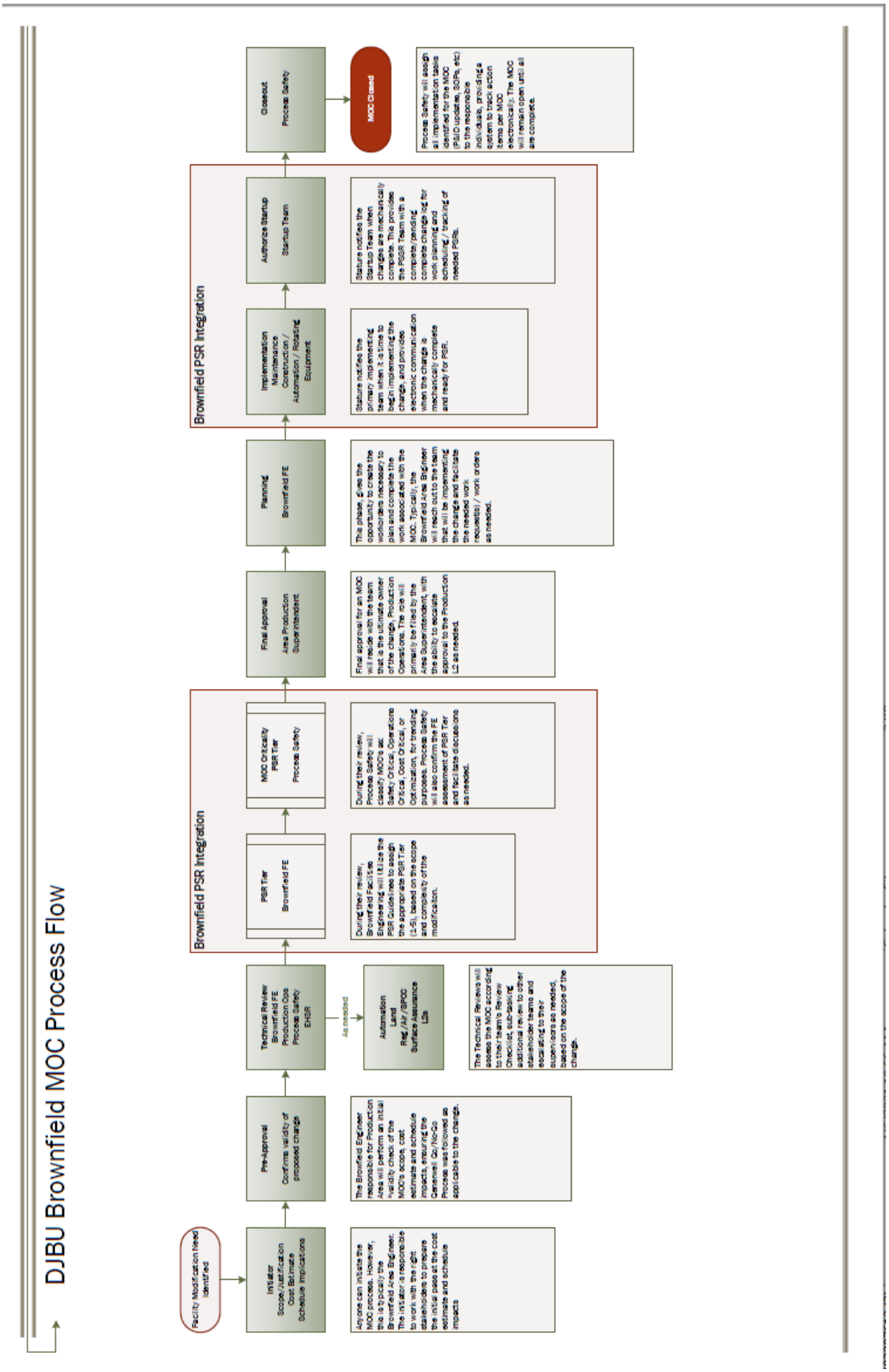
Description: The U&G Management of Change for Facilities and Operations Procedures provides the detailed steps for completing an MOC.

The procedure includes the following steps:

- Request the Change
- Approve to Proceed
- Identify, Assign & Perform Functional and Risk Assessment Reviews
- Approve to Make Change
- Make the Change
- Perform Pre Start-up Safety Review
- Approve for Startup
- Close out MOC
- Temporary Change
- Emergency Change

DJBU Greenfield MOC Process Flow




DJBU Brownfield MOC Process Flow
Facility Modification Need Identified
Initiator
Scope/Justification
Cost Estimate
Schedule Implications
Anyone can initiate the MOC process. However, this is typically the Brownfield Area Engineer. The initiator is responsible to work with their right stakeholders to prepare the initial pass at the cost estimate and schedule impacts
Pre-Approval
Confirms validity of proposed change
The Brownfield Engineer responsible for Production Area will perform an initial validity check of the MOC's scope, cost estimate and schedule impacts, ensuring the Gateshell Go/No-Go Process was followed as applicable to the change.
Technical Review
Brownfield FE
Production Ops
Process Safety
EHSR
As needed
Automation
Land
Reg/Air/SPCC
Surface Assurance
LDs
The Technical Reviews will assess the MOC according to their team's Review Checklist, sub-tasking additional reviews to other stakeholder teams and escalating to their supervisors as needed, based on the scope of the change.
Brownfield PSR Integration
PSR Tier
Brownfield FE
During their review, Brownfield Facilities Engineering will utilize the PSR Guidelines to assign the appropriate PSR Tier (1-5), based on the scope and complexity of the modification.
MOC Criticality
PSR Tier
Process Safety
During their review, Process Safety will classify MOC's as: Safety Critical, Operations Critical, Cost Critical, or Optimization, for trending purposes. Process Safety will also confirm the FE assessment of PSR Tier and facilitate discussions as needed.
Final Approval
Area Production
Superintendent
Final approval for an MOC will reside with the team that is the ultimate owner of the change, Production Operations. The role will primarily be filled by the Area Superintendent, with the ability to escalate approval to the Production LDs as needed.
Planning
Brownfield FE
This phase, gives the opportunity to create the workorders necessary to plan and complete the work associated with the MOC. Typically, the Brownfield Area Engineer will reach out to the team that will be implementing the change and facilitate the needed work requestss) / work orders as needed.
Brownfield PSR Integration
Implementation
Maintenance
Construction /
Automation / Rotating
Equipment
Stature notifies the primary implementing team when it is time to begin implementing the change, and provides electronic communication when the change is mechanically complete and ready for PSR.
Authorize Startup
Startup Team
Stature notifies the Startup Team when changes are mechanically complete. This provides the PSSR Team with a complete/pending complete change log for work planning and scheduling / tracking of needed PSRs.
Closeout
Process Safety
MOC Closed
Process Safety will assign all implementation tasks identified for the MOC (P&ID updates, SOPs, etc) to the responsible individuals, providing a system to track action items per MOC electronically. The MOC will remain open until all are complete.

Management of Change documents are created and stored in the Stature software system. Records are maintained for the active life of the facility + a period of no less than 3 years. Detailed information for the retention period of different categories of process critical documents (information) can be found in table 1. Records are updated when a change has been approved and the change management process is initiated. Records pertaining to critical information about a change can generally be made available within 14 business days of the written notice of request.

Critical Process Information

The documents and data listed in Table 5 shall be managed and handled as defined by the U&G OEIM standard. Information Risk Management (IRM) Record Categories are established by Chevron Policy 566. Information Protection information classifications are established by the Enterprise Security Architecture System (ESAS) standard #S1336. 'Critical' information is all required process documentation and all information captured and created during the operation of the process. 'Controlled' is information that requires approval.

Table 1. Critical Information

U&G and SBU Determined			
Critical Information	**Information Protection Classification (IPC)**	**Retention Category**	**Information Format (Structured/ Unstructured)**
Process and Procedure documents and related guidance	Company Confidential	ADM6020 Active +7 years	Unstructured
Leading and lagging metrics and performance indicators	Company Confidential	ADM5000 5 years	Unstructured
Process and procedure related training records	Company Confidential	HRW8540 5 years	Unstructured
Process training materials	Company Confidential	HRW8530 Active +5 years	Unstructured
MOC Package (includes, but is not limited to, FR checklists, FRA reports, PSSR checklists, Training Records, Communication records)	Company Confidential	OPR2040 Active +5 years	Unstructured
MOC Data contained in the OE IMPACT MOC IT Tool	Company Confidential	ITE8500 3 years	Structured

PSSR:

The most basic intent of a Pre-Startup Safety Review (PSSR) is to ensure safe startups and reliable operations, which is accomplished by systematically performing a series of checks on newly installed, modified, or idled systems. These checks verify that equipment and systems meet design intent and the applicable provisions of a facility's OE program have been maintained accordingly. PSSRs add value by allowing periodic opportunities to verify that the risk of the new or modified facility is being appropriately managed.

This procedure will clearly define the multiple layers that lie within the RMBU PSSR program.

There is the Pre-Start-Up Assessment (PSA) which is a review process for small scope changes to facilities or current operations usually conducted in conjunction with Mechanical Integrity, Work Orders or Management of Change (MOC).

There is a more formal process referred to as a Pre-Start-Up Safety Review (PSSR) process. A multidiscipline, multiphase review typically required during commissioning of new facilities or facilities that have undergone major modifications (e.g. extended shutdowns/ turnarounds).

- ### PSSR PHASE 0 – (PRE-CONSTRUCTION MEETING)
    - PSSR alignment meetings familiarize the team with terms of reference, PSSR checklists, expectations, and key documents available for review. The PSSR alignment meeting will initiate the development of a detailed plan for review activities, a list of participants, a list of the documents and records that should be available for review, and a detailed schedule. The plan should be distributed to all participants as early as possible prior to PSSR Phase 1.
- ### PSSR PHASE 1 – (MECHANICALLY COMPLETE)
    - The Phase 1 PSSR meeting is held when facilities construction is mechanically complete. With representation from all key stakeholders. The objective of this meeting is to confirm that the project remains on schedule and is ready to turn the site over to the I&E Department.
- ### PSSR PHASE 2 – (I&E/ROTATING EQUIPMENT COMPLETE)
    - The Phase 2 PSSR meeting occurs at the Project location with an objective to determine completion status of the Project with representation from all key stakeholders.
- ### AUTHORIZATION FOR FACILITY START-UP FORM
    - The Authorization for Start-Up form shall be utilized as a means of communicating to the departmental leaders that the project has reached a state of readiness. The PSSR project book along with this form will be provided to these individuals for review and sign off. The purge or start-up of the facility / location shall not proceed unless all involved departmental leaders have reviewed and signed off that their respective deliverables are complete
- ### PSSR PHASE 3 – (VALVE ALIGNMENT, PRE-FILL, PURGE, ESD TESTING, COMPRESSOR COMMISSIONING)
    - PSSR Foreman(s), Production Safety, and Startup Team, (Construction and I&E on standby within a 30-minute drive)

      Pre-requisites to this meeting for PSSR Team are as follows:

        - All identified "A" Items complete.
        - A site-specific Authorization for Startup Form signed off by all Department representatives
        - PSSR Foreman(s) have UAW of all work prior to the Phase 3 meeting
        - PSSR Foreman(s) are responsible for coordinating Phase 3 meeting with the Startup Team.

- PSSR Foreman(s) are responsible for scheduling and facilitating the Phase 3
- Pre-fill orders are coordinated through the Startup Team.
- Rotation bump checks and run tests of rotating equipment.
- SOP's, C&E, updated P&ID's are on site.
- Tree-up for first set of wells complete.

Mid-Stream or third-party operational readiness.

- PSSR PHASE 4 –FIRST GAS SALES READY (FGS)

- A final change of custody will occur upon completion of the facility purge (<8ppm of Oxygen), ESD testing and compressor commissioning. This handover of facility control will change from the Surface Assurance PSSR Foreman(s) to the Production Startup Team. The Phase 4 PSSR is a facility status designation – FGS READY. To formalize this state of readiness, the Handover/Custody Transfer form must be completed documenting the transfer of custody from the PSSR Foreman's to the Startup Team. This Team will assume custody of facility and coordinate the startup of the facility.

- AFTER START UP PSA/PSSR REVIEW

- The After Start Up Review will provide an opportunity for the PSA/PSSR team members to implement our continuous improvement model and reflect/provide recommendations on lessons learned. Representatives from all disciplines should be encouraged participate.
- Items to be considered should include but are not limited to the following:
  - Realized gaps in the current PSA/PSSR process.
  - EHSR challenges
  - Construction challenges and opportunities
  - Scheduling challenges
  - Procurement challenges
  - Engineering modifications
  - Training opportunities
  - 3rd Party challenges
  - Develop an Action Item list of PSSR "B" Items to be mitigated 30 days post FGS

- RBU PSSR STANDARD

RBU - Upstream Pre-Startup Safety Review (PSSR) Standard

Upstream Capability - Base Business and Operations

February 2014 – Rev. 0

Date	Description	Revision By
20-Feb-14	Standard approved by EGB.	Lauren Bailey (LBHI)
7-July-21	RBU Blue Language added	Brian Condray

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Introduction

The purpose of this document is to standardize PSSR program components and procedure for Pre-Startup Safety Reviews (PSSRs) in Chevron's Upstream organization. This allows for a fit-for-purpose approach, while ensuring that core requirements are met.

Executive Summary

The Pre-Startup Safety Review (PSSR) is the final review to ensure that equipment, a system, or a facility is safe to start up and provides reliable operation. It is one mechanism used to manage risk and is a key component of process safety efforts. The PSSR is owned by the operations team in the business unit (BU) but requires support and input from a multi-functional PSSR Team. The PSSR Standard and Checklist will be managed by the PSSR Coordinator. This procedure fulfills the requirements for a PSSR as detailed in Operational Excellence Management System (OEMS) Expectation 2.4.

The Upstream PSSR Standard focuses on four dimensions that must be validated in a PSSR:

Design, Construction, & Commissioning Specifications

Procedures

Process Hazard Analysis (PHA)

Training

To ensure an effective PSSR Program, this document contains:

PSSR Standard

PSSR Checklist Expectations

Purpose

The most basic intent of a Pre-Startup Safety Review (PSSR) is to ensure safe startup and reliable operations, which is done by systematically performing a final check on newly installed, modified, or idled systems. This check verifies that equipment and systems meet design intent and the applicable provisions of a facility's OE program have been maintained accordingly. PSSRs add value by allowing a final opportunity to verify that the risk of the new or modified facility is being appropriately managed.

Specific to Chevron, PSSRs are an expectation of the OEMS (Operational Excellence Management System) under OE Element 2: Facilities Design and Construction. This procedure meets the requirements of Expectation 2.4 to "Conduct pre-startup reviews on all new, modified or previously idled facilities prior to startup and after shutdown to confirm they meet applicable regulatory and corporate requirements".

A Major Capital Project (MCP) PSSR program should be aligned with that of its accepting Business Unit (BU). The drawing below underscores the need to provide continuity, ensure basic requirements are achieved, and facilitate a smooth exchange from MCPs to Phase 5 operations.

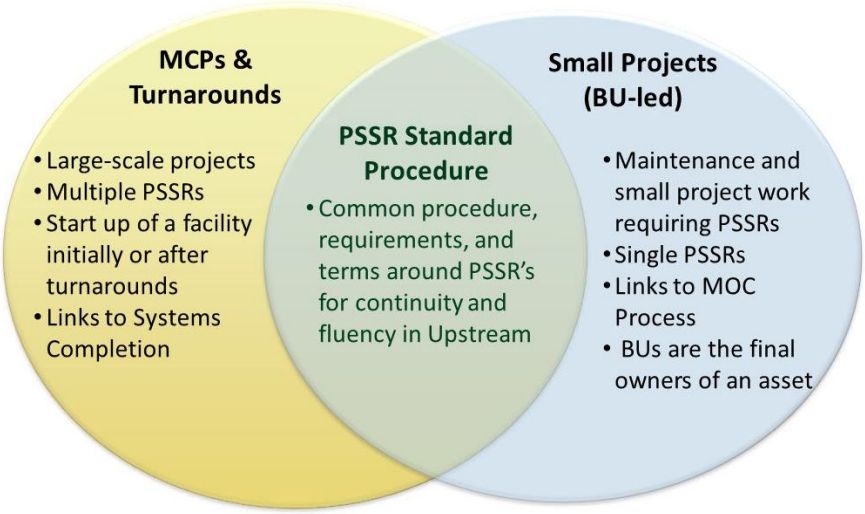

Figure 1: Need for a Common PSSR Standard

Objectives

A Pre-Start-up Safety Review verifies that the following objectives are achieved:

Installation or modification of the equipment / system / facility has been completed in accordance with design specifications and commissioned in alignment with OEMS and BU testing requirements.

Documented certification or compliance with appropriate codes, standards, and regulations from both Chevron and the host region.

Fulfills Management of Change (MOC) for Facilities & Operations requirements as related to PSSRs.

Upon startup, process safety information (PSI) is up to date in the Business Unit's system of record.

An appropriate level of risk assessment (e.g., PHA or HAZOP) has been performed and all pre-startup recommendations have been resolved.

Process controls, emergency shutdowns, safety systems, and integrity critical elements are in place, tested, and can function as designed.

New or revised Operating Manuals, Operating Procedures, Maintenance Procedures, and Emergency Procedures are in place and updated.

Technical, maintenance, operations, and contract personnel affected by the new installation or modified facilities have received the necessary training and materials for on-going training programs have been updated accordingly.

Personnel affected by the new installation or modification are aware of new hazards or increased risk and understand key safeguards associated with those hazards.

Emergency response plans, procedures, equipment, and training are in place including escape, evacuation, and rescue systems.

All warnings, markings, labels, signs and required safety or emergency response equipment (e.g., fire extinguishers, flange shields, safety showers) are installed and ready for service.

All action items critical to startup have been completed and post-startup action items are tracked to closure.

PSSR Triggers

Prior to startup, operations must “assure itself” that the facility is safe for startup. This should be the key consideration in deciding if a PSSR should be performed. This section details:

When a PSSR should be performed

The scope of the PSSR(s)

When a PSSR is Required

Defining when a PSSR is to be performed is a required component of a PSSR program and shall be clearly documented. Below are the minimum instances when a PSSR shall be performed.

At a minimum, a PSSR is required for:

All changes that are in the scope of the Upstream MOC for Facilities and Operations Process.

Changes in process safety information (PSI), including greenfield installations or modifications to an existing (brownfield) facility. (See the Upstream Facility Information Management Standard Process, FEF-STD-CUG-0002-Z01, for a full catalogue of PSI.)

A significant replacement in kind (RIK) (complex in scope or affecting multiple systems) has been made to an existing system / facility, such as a unit turnaround.

A RIK is considered significant if the piece(s) of equipment impacted:

Are major pieces of equipment

Gas Compressor/Driver 300hp or greater

Pump 300hp or greater

Vessels

Tank

PLC/Electrical/Instrumentation (Affecting multiple pieces of equipment or instruments)

As the Final Approver The Production Supervisor (PS) has the option to have a PSSR completed on any additional RIK.

After an intrusive inspection effort or major repair. For example, disassembly and inspection of an entire train or system within a train of equipment.

Additional examples of an intrusive inspection are:

Inspection or repair of components which require disassembly of a major piece of equipment

(ex. Compressor/Driver annual/overhaul)

Internal repair or inspection of vessel or tank

As the Final Approver, The Production Supervisor (PS) has the option to have a PSSR completed on any additional intrusive inspection/major repair.

A temporary change has been made. Perform a PSSR to start up the process with the temporary change and again when the system is reconfigured to its permanent condition.

A “mothballed” or idled process (one that has been out of service for a length of time) is restarting.

This requirement is applicable only to pieces of equipment that have been previously removed from service and is not intended to apply to equipment designed to operate infrequently (ex. start up pumps or spared equipment). Any equipment removed from service for more than 6 months shall complete a PSSR.

As the Final Approver, The Production Supervisor (PS) has the option to have a PSSR completed on any additional facility/process/equipment that was taken Out of Service.

For large MCPs, a PSSR is required for new systems being put into operation for the first time where there is risk for impact to safety upon startup.

A person for the facility or project should be designated as the point person for interpreting when a PSSR is needed. For example, this may be an HES, Process Safety, Operations, or FE Manager.

When a PSSR is Scalable

The PSSR Checklist is scalable, allowing for reducing the size of the PSSR team and checklist based on the type of change. The PSSR Team Leader in conjunction with the Final Approver is responsible for agreeing upon the PSSR Checklist prior to execution of the PSSR. At a minimum, the first grouping of questions listed in Appendix A (“Pre-Startup Operations Checks”) should be asked. Examples of when a scaled-down PSSR Checklist may be used include:

Small projects or routine maintenance on non-integrity critical equipment.

Changes to operating or maintenance procedures that did not entail a change to an existing system / facility or a significant change in operations.

If multiple locations are involved, separate PSSR checks shall be done for each location. Single PSSR form may be modified to show completed checks on multiple locations.

The PSSR Checklist Template can be found in the (Still working on the location) Resources SharePoint Site. This template shall be used as a guide. In a fit-for-purpose manner the template can be modified to address specific changes and pre-startup efforts.

PSSR Scope and Timing

This document applies to instances where a single PSSR is performed and those where multiple, successive PSSRs are performed. In other words, this document applies to both Business Units (BU) where typically a single PSSR is performed and Major Capital Projects (MCP)and Turnarounds that usually require multiple PSSRs.

PSSR Scope

Depending on the size and complexity of the project or scope of work, multiple PSSRs may need to be performed. For most small projects and BU work that are being driven by an MOC, generally only one PSSR needs to be performed. However, even on small projects, it is relevant to understand where the PSSR fits into the wider facility view. For MCPs

where commissioning and startup work is occurring over an extended duration and scope is broad, multiple levels of PSSRs are needed and the MCP must have a clear understanding of signoff protocol and where information needs to be fed forward.

The overall goal, regardless of scope size is readiness for startup, consistency in signoffs, and assurance that PSSR objectives have been met. To do this, a system walkthrough shall occur and documentation from previous reviews may be leveraged as supporting evidence.

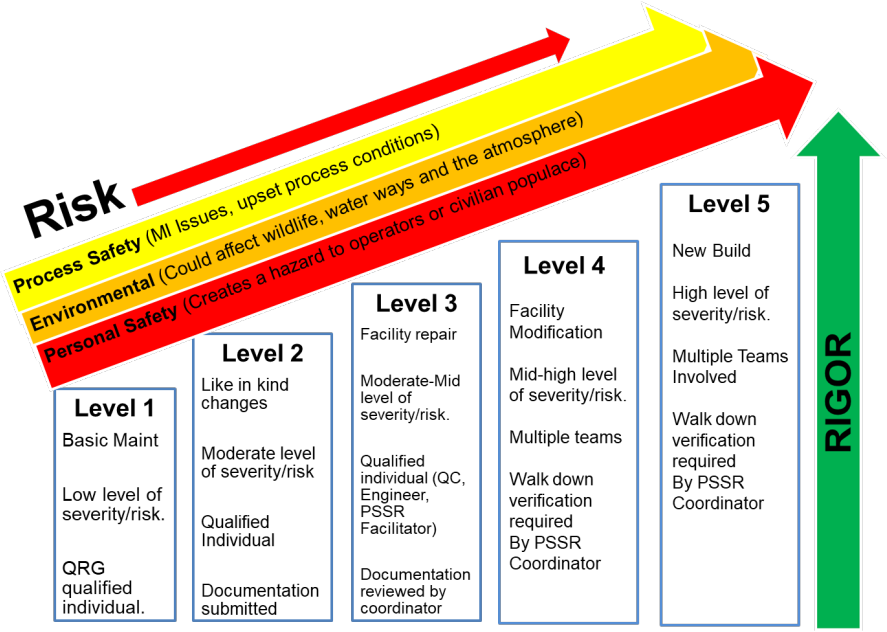

Figure 2: Representation of PSSR Levels for Various Scopes of Change

PSSR Timing

A PSSR shall be performed prior to a system operating in accordance with its "intended use." The figure below shows a sequence of events from implementation of a change to startup, and to sustained operations.

A PSSR should be performed when construction and commissioning are complete, and startup is imminent. Thought should be given to when startup occurs and when is the most effective time to perform a PSSR. For example, when commissioning a motor, it is energized and technically started up during a "bump test" and then de-energized. It should be pre-determined whether a PSSR will be performed prior to the bump test. This requires sound judgment and pre-planning to determine when the PSSR will be performed during commissioning and startup process.

Steps for Determining PSSR Scope

Identify "levels" within a project / scope of work. This varies for each project / work; not all levels will be present in each. On MCPs, this should align with systems completions.

Determine at which level PSSRs will be performed. The figure shows "levels" that exist on the largest type of MCP, for example in a multi-train LNG facility. The "asset" is the compilation of all the trains, while the facility might be one train.

Consistency in signoffs for each level is imperative.

If multiple PSSRs are required, they should be compiled for the entire scope of the startup prior to transfer of care, custody, and control to Phase 5 Operations.

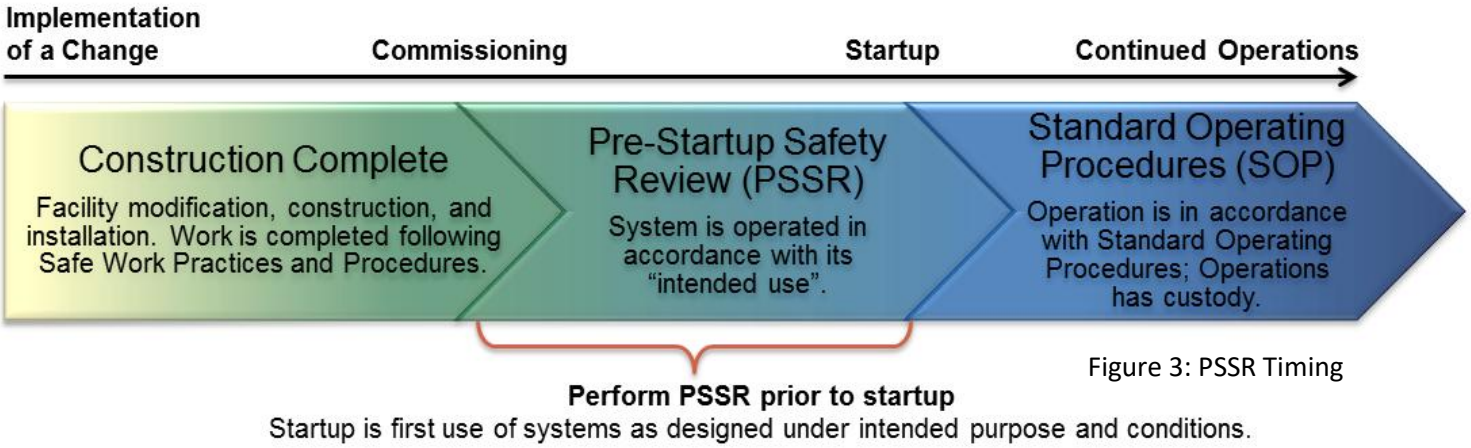

Figure 3: PSSR Timing

PSSR PHASES (GREENFIELD)

PSSR Program Requirements

At a minimum, the following components shall be addressed as part of a PSSR Program.

Local Regulatory and Chevron Requirements

PSSRs shall follow OEMS principles and must conform to local regulations. Regulatory regimes primarily considered in this PSSR Standard are:

OSHA 29 CFR Part 1910.119

HSE (Health and Safety Executive) Safety Case

COGCC

Additionally, Pre-Startup Safety Reviews link to several existing standards within Chevron, which are detailed in Appendix B. It is relevant to note these key Chevron standards and processes to ensure that criteria detailed in those are being met with respect to PSSRs.

Document Control

The PSSR Procedure and completed PSSRs shall be stored in a system of record. Completed PSSR information that is captured and tracked includes:

Completed and approved (signed) PSSRs

PSSR deviations tracked to closure

Note that for all PSSRs associated with MOCs, document control is covered as part of the MOC Facilities and Operations (F&O) Procedure.

For PSSRs not associated with an MOC, documentation shall be stored in the system of record.

Building a Team and Participant Responsibilities

At a minimum, the PSSR Team shall comprise of a PSSR Team Leader and a Final Approver; these shall not be the same person. Additionally, there must be representation from operations on the PSSR Team as well as a person with competency to answer technical questions. All PSSR Team Members shall sign off on the PSSR to attest to the answers given on his or her section(s) of the checklist.

Depending on the scope of the PSSR, there should be PSSR Team Members who can answer checklist questions from Operations, Systems Completion, Technical, and HES disciplines. Any one of these functions may act as the PSSR Team

Leader. For all PSSRs, the team who will be executing the PSSR should be identified when the PSSR Checklist is being compiled. The contents of the checklist will define what team members are required based on the size and complexity of the PSSR scope.

The PSSR Team is responsible for:

Ensuring the PSSR Checklist adequately addresses the hazards and risks associated with the new or modified facility.

Having the expertise to answer checklist questions and seeking additional support as needed.

Answering checklist questions objectively, critically, and carefully.

Determining which documentation is appropriate to use and rely upon to answer PSSR Checklist questions. Documentation should be challenged prior to acceptance for use including examining it for content, dates, and signoffs. If the PSSR Team does not feel confident in any of the supporting documentation, the PSSR Team must validate that information firsthand.

The following table outlines the roles and responsibilities of the PSSR Team.

PSSR Team Role	Responsibilities
PSSR Team Leader (Required PSSR Team Member) Plans and leads the PSSR, coordinating with operations. Responsible for completion of the PSSR and ensuring resulting action items are completed. Typically, for the RBU this is typically the PSSR foreman or designee, this is the MOC Owner for small projects. For MCPs, the PSSR Team Leader may be from Pre-Operation, Start-up, Facilities, or Systems Completion Teams.	Identify the PSSR Team and ensure each team member understands his or her role. Assigns checklist sections to team members. Based on the PSSR scope, review and compile the checklist. Determine if additional checklist items are required. Identify supporting documentation for the PSSR. Validate the checklist with the PSSR Final Approver prior to performing PSSR. Schedule and conduct PSSR planning and walkthroughs. Ensure fulfillment of MOC for Facilities & Operations requirements, as applicable. Determine if any action items are required as a result of the PSSR and captures and assigns those accordingly. Notes action items on the PSSR checklist for the Final Approver's awareness. Review and sign the PSSR checklist to confirm the PSSR has been performed. Send the final executed PSSR checklist to relevant parties. (For example, the System Lead, MOC Owner, etc.). Ensure final executed PSSR checklist is stored in Business Unit's system of record. If multiple PSSRs are being performed, ensure that the PSSR documentation is being stored and compiled for the entire scope of startup. Follow up on action items post-startup.
PSSR Final Approver (Required for PSSR Approval) The operations lead responsible for the area where the PSSR is taking place. Typically, this is an	Ensure participation of operations in the PSSR. Review the PSSR Checklist prior to conducting the PSSR to ensure that it appropriately addresses the nature of the work and the related hazards. Review and sign the PSSR checklist to confirm the facility is safe for startup.

Operations Superintendent, Manager or Area Supervisor	Has overall responsibility for ensuring safe startup and continued operations of the asset. Therefore, must be confident that the PSSR has asked all the right questions, the right subject matter experts are involved, and adequate supporting documentation exists prior to startup.
Operations Representative (Required PSSR Team Member) Serves as the operations contact from the organization that will be accepting the installation / modification. This is a key role and can be thought of as the gatekeeper before the change is started up and handed over.	Is familiar with operation of the installation / modification. Inspect jobs during construction and verifies that construction is being completed per design specifications. Participate in PSSR planning and walkthroughs. Validate the final PSSR checklist prior to the walkthrough to ensure it contains all essential checks. Ensure that systems, equipment, lines, etc., are clearly labeled. Ensure that new or revised Operating Manuals, Operating Procedures, Maintenance Procedures, and Emergency Procedures are in place and updated and that appropriate personnel have been trained. Ensure employees are aware of new hazards specific to a process. Coordinate with the HES Representative to review operating plans and ensure safety requirements have been met. Ensure that all required actions are completed prior to startup. Review and sign the PSSR checklist to confirm the PSSR has been performed.
Technical Representative Serves as the technical focal point for the area(s) covered by the PSSR checklist. Systems Engineer, Mechanical Engineer, Electrical Engineer, Process Engineer, Facility Engineer, Field Engineer, Equipment Inspector, Sr. Operator, Maintenance Rep, Control System Technician, etc.	Participate in PSSR planning and walkthroughs. Confirm that installation or modification of the equipment / system / facility has been completed and commissioned in accordance with design specifications. Ensure the installation / modification complies with appropriate codes, standards, and regulations from both Chevron and the host region. Process controls, emergency shutdowns, safety systems, and integrity critical elements are in place, tested, and can function as designed. Ensure any non-conformance items defined by Asset Integrity Standards are either resolved or suitable for continued service. Leverage information from previous reviews to ensure equipment has been completed as per design. Verify that updated PSI has been incorporated into the existing facility's PSI. Review and sign the PSSR checklist to confirm the PSSR has been performed.
Maintenance Representative Serves as the maintenance contact from the organization that will be accepting the installation / modification.	Participate in PSSR planning and walkthroughs. Ensure that work is completed in accordance with the design and maintenance specifications. Verify the equipment has been added to the equipment inspection and maintenance records.

	Verify that new equipment has been added into the Preventive Maintenance (PM) schedule as required.
	Ensure that appropriate and accurate maintenance procedures have been included in the operating and maintenance procedures and personnel have been trained in their use.
	Confirm that tools and equipment have been supplied to maintain new equipment and that maintenance plans and spares have been provided and documented.
	Review and sign the PSSR checklist to confirm the PSSR has been performed.
Health, Environmental and Safety Specialist (HES) Serves as the HES contact from the organization that will be accepting the installation / modification. This role is especially important on scope / changes with a large impact.	Participate in PSSR planning and walkthroughs.
	Ensure the installation complies with applicable Chevron standards and local regulations.
	Validate that the installation / modification is free of recognizable hazards.
	Verify that warnings signs and required safety or emergency response equipment (e.g., fire extinguishers, flange shields, safety showers) are installed and ready for service.
	Ensure recommendations resulting from the PHA (e.g., HAZOP) have been addressed and signed off as closed.
	Ensure that emergency response and safety procedures have been included in the operating and maintenance procedures, coordinate with operations.
	Ensure that adequate personal protective equipment has been provided for operating the equipment or facility.
	Review and sign the PSSR checklist to confirm the PSSR has been performed.
Commissioning Representative Serves as the link between commissioning and startup. Generally, this position is related to MCPs.	Participate in PSSR planning and walkthroughs.
	Ensure all documentation and plans from commissioning phase are included in PSSR support documentation.
	Use knowledge of work that took place during commissioning phase to support PSSR.
	Review and sign the PSSR checklist to confirm the PSSR has been performed.
Construction Representative Serves as the link between construction and startup. Generally, this position is related to small projects in BUs.	Participate in PSSR planning and walkthroughs.
	Ensure all documentation and plans from construction phase are included in PSSR support documentation.
	Use knowledge of work that took place during construction phase to support PSSR.
	Review and sign the PSSR checklist to confirm the PSSR has been performed.
External Subject Matter Expert Has a specific skill set that is relevant to change? For example,	Participate in PSSR planning and walkthroughs.

an SME who may have experience with a particular process or piece of equipment.	Leverage experience on an analogous project or change to complete checklist questions or support others on the PSSR Team. Review and sign the PSSR checklist to confirm the PSSR has been performed.

PSSR Training

The two key roles on PSSR Team, the PSSR Team Leader and Final Approver should be familiar with the PSSR Program and understand their roles as well as the roles of the rest of the PSSR Team. Pre-work for the PSSR Team Leader and Final Approver includes:

Reading and review of the PSSR Standard Procedure

Existing MOC Training (if applicable)

If possible, participation on another PSSR

Specifically, the PSSR Team Leader and Final Approver should have:

Familiarity with Process Safety elements within OEMS

Understanding of the purpose of performing a PSSR

Understanding of when a PSSR needs to performed

Familiarity with PSSR Procedure specifics including the PSSR workflow and the roles and responsibilities of all PSSR Team Members

PSSR Deviation Management

For MOC F&O and non-MOC PSSR deviations will be tracked on the PSSR form. Factory PSSR deviations will be tracked on a “punch list register”.

Upon completion of the PSSR Checklist, there may be some items that were checked as “No” or “Not Complete” on the checklist. These need to be evaluated to determine whether they are critical or non-critical for startup. If they are determined to be non-critical, they must still be addressed and entered into a deviation management process to be completed post-startup. If they are determined to be critical, they must be addressed prior to startup. This process should be led by the PSSR Team Leader in consultation with operations, HES, and the Final Approver.

An example of a deviation might be checking “No” to “Has all process safety information required for commissioning and operation been made available to all affected operators, updated and stored in the system of record?” If, for example, P&IDs were red-lined, but not yet updated in the document management system, this question could not be answered as a “Yes”. A determination must be made whether this is a critical item that must be completed prior to startup. The deviation management workflow provides guidance for these types of scenarios.

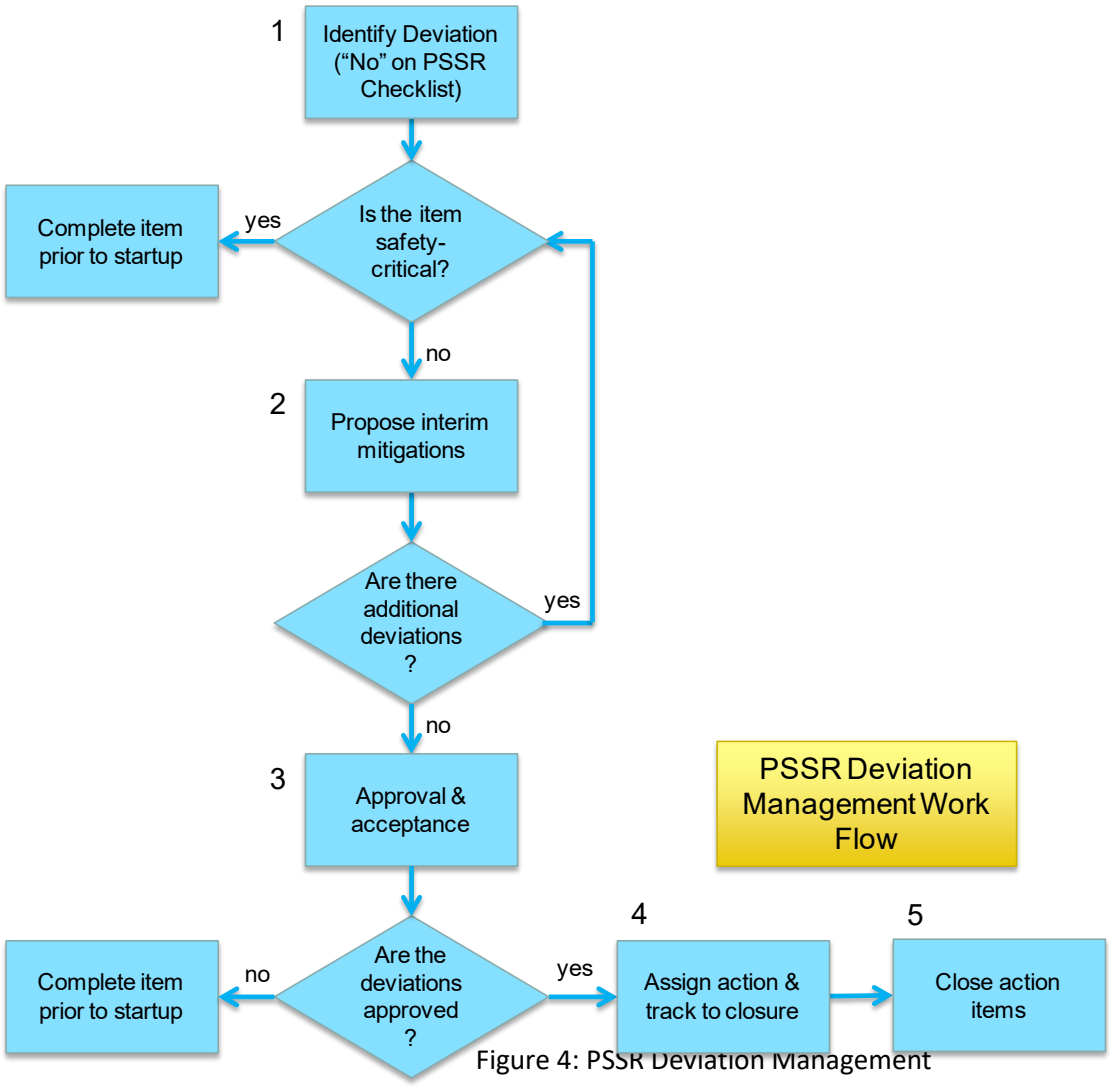

Figure 4: PSSR Deviation Management

Identify Deviation

Upon completion of the PSSR Checklist, the PSSR Team Leader should identify items checked as “No”.

Perform analysis to determine if the item must be completed prior to startup:

Complete BEFORE- A deficiency that could cause, or result in, actual or potential release of hazardous chemicals or energy sources to environment. The process cannot be safely started or operated until the issue is corrected.

Complete AFTER - An issue that does not impact safe startup or operation but, if corrected, enhances process or personal safety.

Propose Interim Mitigations

If it is determined that the item checked “No” is appropriate to be completed after startup, then actions to mitigate the interim risk of the open PSSR item should be identified.

Record the interim actions for each deviation and prepare for submittal to the PSSR Final Approver.

Approval and Acceptance

All deviations should be submitted to the PSSR Final Approver and receive approval prior to the PSSR final approval and startup.

If approval is not gained from PSSR Final Approver, the item must be completed prior to start up.

Assign Actions and Track to Closure

Prior to startup, deviations are recorded, and each has corresponding actions with assigned owners and timing. Deviations must be tracked and closed out in a timely manner after startup. (In MOC F&O terminology, this is considered a P4 action item.)

An action tracking system is used to record actions and ensure that those are completed to close the deviation. It is likely that both BUs and MCPs have an existing action tracking system already in place, which should be used in this case. For example, for changes managed within the MOC F&O process, tracking of action items should occur in the OE IMPACT MOC Tool.

Close Action Items

As actions are completed for each deviation, they will be documented.

Action owners are responsible for their assigned action, while the PSSR Team Leader is responsible for completion of the PSSR Deviation Management Process.

The PSSR Final Approver is responsible for accepting the risk associated with all deviations.

PSSR Workflow

PSSR Workflow

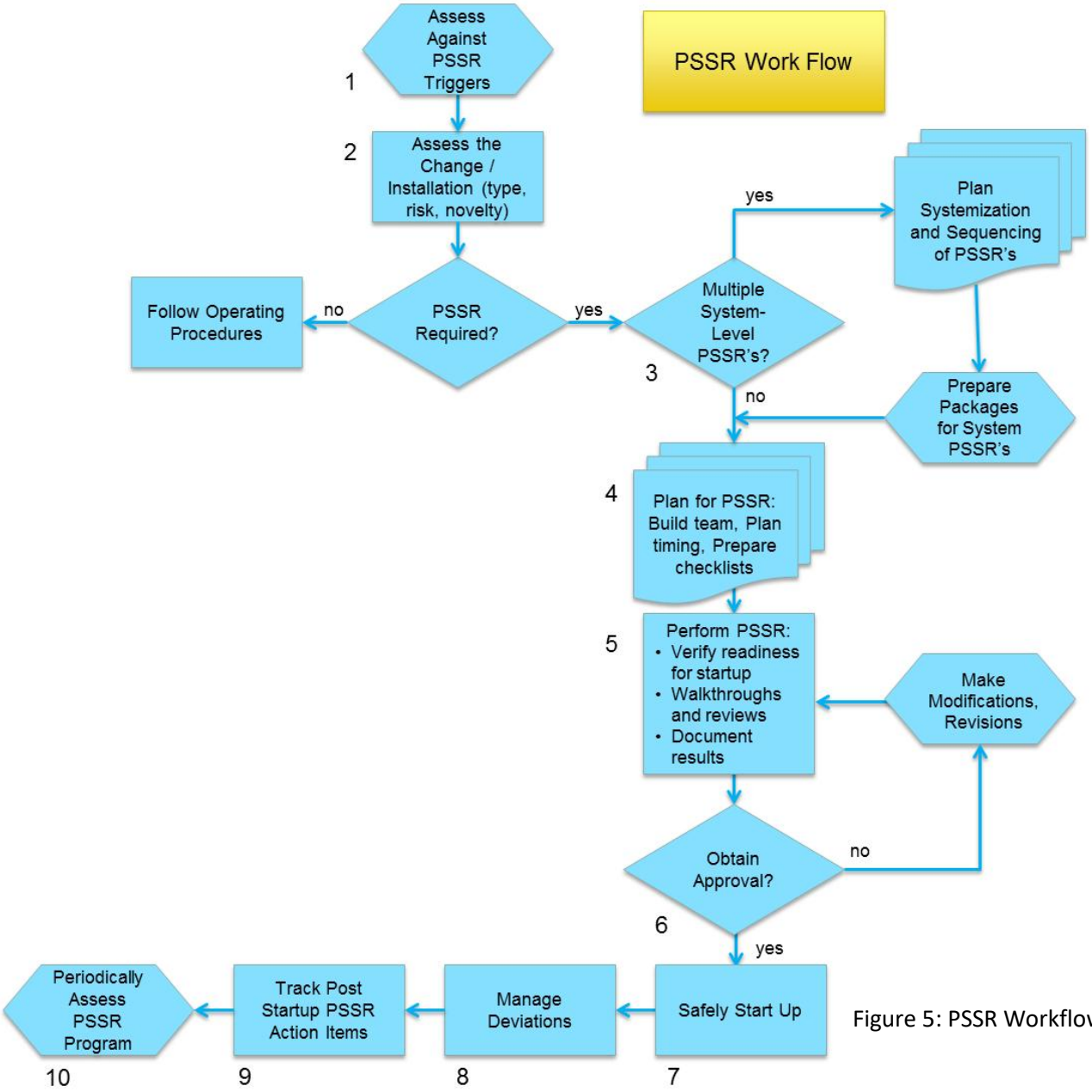

Figure 5: PSSR Workflow

Assess Against PSSR Triggers

The PSSR Trigger section defines when a PSSR needs to be performed.

Assess the Change / Installation

The extent and of the change / installation is assessed and considered under the context of understanding the scope, risk, and novelty.

Determine if Multiple PSSRs are Required

The need for multiple PSSRs is determined by the scope of the change. Multiple PSSRs are required when multiple system startups are occurring over a period as in an MCP or major turnaround.

If multiple PSSRs are required, a PSSR Coordinator is assigned to plan the scope of each PSSR by working in coordination with the systems completion team (if applicable) and operations team. The PSSR Coordinator will ensure that the entire scope of the change will be assessed by PSSRs as well as ensuring that completed PSSRs and associated actions are stored and tracked.

A PSSR Team Leader is assigned for each individual PSSR to lead the planning, execution, and follow up.

Plan for the PSSR

It is unacceptable to perform the PSSR walkthrough before adequate pre-work has been done. This includes identifying the PSSR Team, compiling the PSSR checklist, gathering documentation, and scheduling.

Perform PSSR Walkthrough

The PSSR will at a minimum include a walkthrough and visual inspection of the change / installation with the entire PSSR Team present.

Sections of the PSSR Checklist will be divided among members of the PSSR Team based upon their area of expertise. The sections' owners are responsible for being able to answer each checklist question with certainty or seeking assistance to do so.

The PSSR walkthrough should not be conducted too early, allowing additional changes to potentially occur post-PSSR and pre-startup.

Obtain Approval

PSSR checklists will receive signoffs from each of the PSSR Team Members.

The results of the PSSR will be shared with the Final Approver prior to start up.

The Final Approver will review the completed checklist, understand deviations, and decide if the asset is ready for startup and issue his or her approval.

If approval is not issued by the Final Approver, then the PSSR Team must ensure necessary changes are made to rectify all gap(s) and then re-perform the affected PSSR sections and resubmit to the Final Approver.

The PSSR Checklist will be stored in the system of record.

Safely Start Up

Startup may commence.

Manage Deviations

As deviations arise, the PSSR Team Leader will note these and follow the PSSR deviation management process. See above for PSSR Deviation Management.

Track Post Startup PSSR Actions (from deviations)

Actions stemming from PSSR deviations will be tracked to closure post-startup.

Periodically Assess / Audit the PSSR Program

Assess deficiencies as well as excesses. Determine whether aspects of the program need to be streamlined and are the efforts generating positive returns. This step does not occur for every PSSR but should occur periodically. Further detail is found the PSSR Audit section.

Multiple PSSRs

Large-scale installations and modifications will require more than one PSSR to start-up the entire scope. In this case, the PSSR is not a single event, but is a series of PSSRs that have divided up the scope of the installation into manageable and logical components for startup. On large MCPs prior to completing a PSSR, projects follow the systems completion process which is the sequential activities within a project that prove construction, installation, testing, and preparation of systems have been completed as designed, and thus, the facility is ready for start-up and operations. An illustration of this process is shown in Appendix D.

The key points recognized are:

More than one PSSR is required on an MCP or major turnaround.

PSSRs are not meant to simply re-check previous assurances and reviews. The PSSR is a verification and validation, but not intended as rework.

The purpose is not to plan excessive numbers of PSSRs, but to determine the systems on which PSSRs should be conducted so that they are impactful.

In close consultation with the Systems Completion Team, the installation / modification will be systemized and sequenced for startup and PSSRs should mirror this structure.

There should be consistency in PSSR Final Approvers' signoffs on each level.

Timing for Multiple PSSRs

MCPs must plan for PSSR performance during CPDEP Phase 3 and update this plan during Phase 4. Significant effort is required to gather required information, ensure budget allocation, assemble PSSR Teams, and schedule. Below are key activities related to PSSRs in Phase 4 along with the timing for when PSSRs occur – during pre-commissioning and commissioning.

Refer to the POP Milestones and Deliverables Map (MDM) for details on the deliverables related to PSSRs.

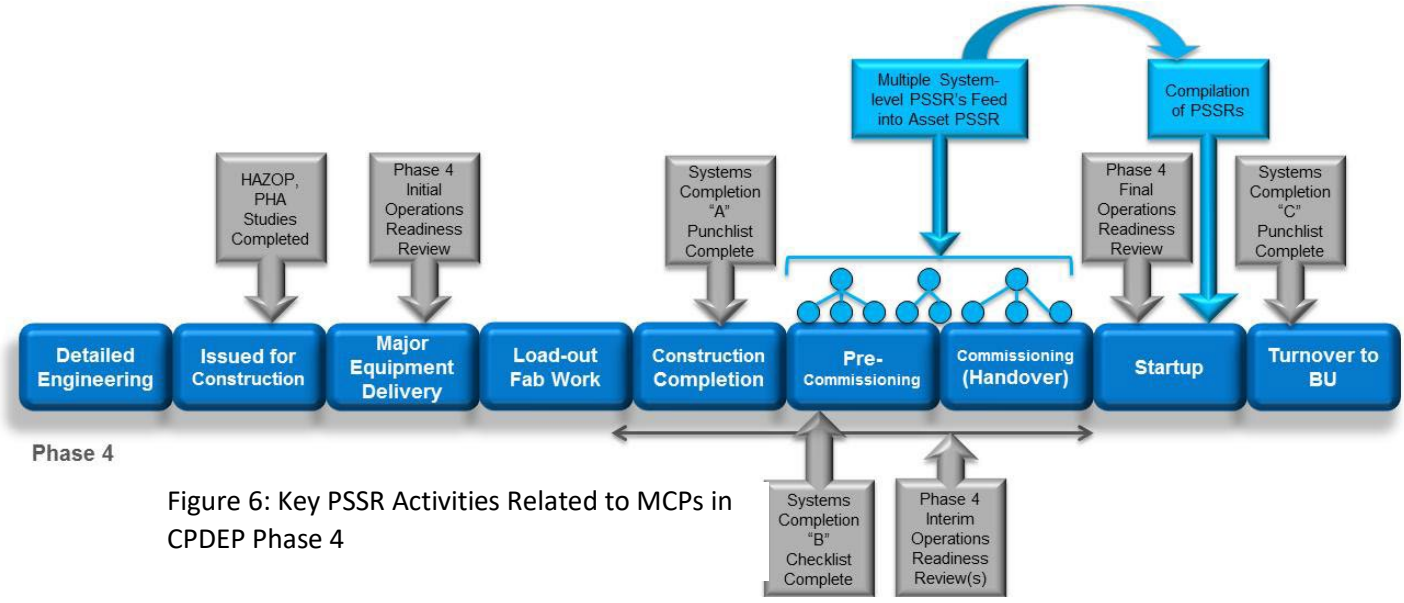

Figure 6: Key PSSR Activities Related to MCPs in CPDEP Phase 4

Considerations for Multiple PSSRs:

Assign a project wide PSSR Coordinator in Phase 4 (typically this is the Start-up Manager).

Establish the particulars of the PSSR procedure and checklist based on project needs.

The Pre-Operations Team on an MCP should either be leading the PSSR effort or heavily involved.

There is interaction between multiple project disciplines for a successful PSSR including: BU Operations (owns PSSR), Commissioning and Startup Teams, Systems Completion, Construction, HES, Subsea, Drilling1, and Facility Engineering

Include PSSR timing and resources in the Project-level resource loaded schedule.

During Mechanical Completion walk downs, the PSSR Team Leader (at a minimum) will be present with the PSSR checklist to identify items that can be addressed by the Systems Completions team prior to the PSSR.

The startup of systems (particularly of utility systems) frequently begins in fabrication yards, which tend to be at a different location than the final facility location. The project should plan for having the right PSSR Team in the fabrication yard for system startup.

PSSR Team Members including the PSSR Team Leader and Final Approver may be rotating to international locations and have a “back-to-back”. Ideally, the PSSR activities on a single system will be performed by the same Team Members. If this is not possible, additional effort (thorough turnover coverage) must be made to share information with back-to-backs or a designee assigned to the PSSR Team. This is especially important for those in the Final Approver role.

Contracting strategy can influence PSSRs. For projects where a third-party contractor is responsible for commissioning or startup, Chevron must still lead a PSSR and gain approval from the accepting BUs Operations team.

Subsea installations by their nature do not allow for a final “walkthrough”. Projects should at a minimum do a desktop PSSR “walkthrough” and use ROV (remote operated vehicle) capabilities where possible. Additionally, emphasis should be put on early planning of PSSRs for subsea systems so that the proper documentation can be gathered, and systems reviewed prior to installation.

On brownfield installations, because work is being done on an existing facility, there will be significant interfacing with the BUs MOC procedure. Each tie-in point will have a BU MOC associated with it. Because of this, additional effort should be made to coordinate and stay aligned with the BU Operations.

Projects have the responsibility to build continuity between MCPs and the accepting BU in many aspects of project work. Related to PSSRs, MCPs should:

Use the Upstream PSSR Standard that allows for fluency of terms and procedure.

Ensure transfer of PSSR Checklists and PSSR supporting documentation to the BU.

Major turnarounds can be treated similarly to MCPs when planning PSSRs due to their large scope and effect on multiple systems that will need to be restarted. Typically, a turnaround involves a shutdown of an entire facility or major unit and offers the chance for installations and changes to be made outside of normal operations.

Work pack for Multiple PSSRs

PSSR Team Leaders develop work packages and gather the documentation that is needed to validate the checks and questions for each PSSR. For each system on which a PSSR is performed, there will be a work pack that includes the following documentation:

Commissioning & Startup Procedures and Standard Operating Procedures

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1 The PSSR Standard is not intended to govern the startup of drilling equipment. It is noted in this case because information from the drilling discipline may be required for the facility PSSR.

MOC (if relevant, as in tie-ins to an existing facility)

A & B Check Sheets and Punch lists

Operations Readiness Review (ORR) action items

HAZID / HAZOP / What-if action items and results

Operations and Maintenance Training Records

System Test Records (hydrotests, welding certifications, loop checks, etc.)

Single PSSRs

Considerations for Single PSSRs:

PSSRs are required by the MOC Facilities & Operation Procedure, and most PSSRs are tied to and triggered by an MOC.

The PSSR Team is likely to be made up of team members who are familiar with the operation. This does not negate the need for a multi-functional team or having operations represented and a representative from operations serving as the Final Approver.

Determine PSSR timing and incorporate in relevant work-planning schedules.

PSSR Team Leader and Operations Representative (at a minimum) should be present during key construction / installation milestones with the PSSR checklist to identify items that can be addressed prior to the PSSR.

Work pack for Single PSSRs

PSSR Team Leaders develop work packages and gather the documentation that is needed to validate the questions for each PSSR. The following information should be available to verify PSSR questions:

MOC(s) (if applicable)

HAZID / HAZOP / What-if action items and results

Operations and Maintenance training records

System test records (hydrotests, welding certifications, loop checks, etc.)

PSSR Checklists

There are four main dimensions that must be validated by a PSSR prior to start up. The PSSR checklist must address:

Design and Construction Specifications

Procedures

Process Hazard Analysis

Training

Additionally, there are specific components that must be included in a PSSR checklist, they are listed below and mapped to the OEMS Elements.

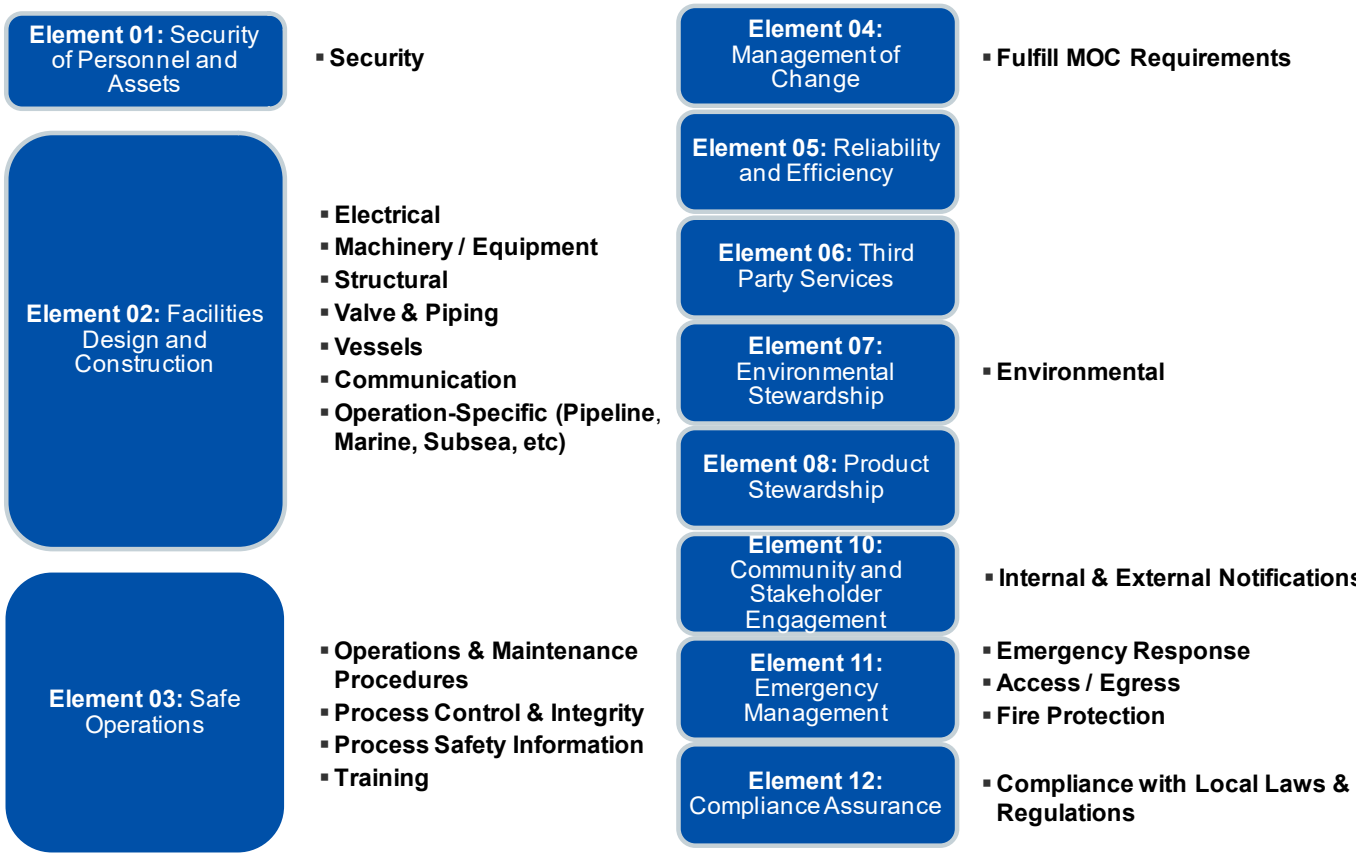


Figure 7: PSSR Expectations Mapped to OE Elements

Further PSSR Checklists Considerations

Use of Supporting Information

The PSSR checklist does not preclude taking credit for checks or reviews that have already occurred elsewhere (for example Zenator as part of mechanical completion software, or other documented systems completion reviews, ORRs, or CRRs). Previous reviews should be used to support answering questions on the PSSR checklist, but do not take the place of a PSSR.

Scalability

The PSSR checklist is scalable. Effective PSSR checklists can have a variety of approaches to their design. PSSR can be done simply (for example, a visual inspection and documentation using a shorter checklist) or performed in a more rigorous fashion due to the type of startup and equipment involved. The goal is to make the best use of resources based upon the risk attributed to the equipment and startup.

Signoffs and Approvals

To promote accountability, all PSSR Team Members shall sign off on the checklist as well as the Final Approver.

Continuous Improvement

Formal PSSR Audit

The PSSR Procedure will be reviewed during the OE Management System Audits to ensure the procedures are being properly used and updated. For PSSRs performed within the context of the Management of Change for Facilities and Operations Process, this will be part of the audit of the MOC process.

A PSSR Procedure Review should be conducted (in BUs) every three years to validate compliance and efficacy. For PSSRs performed as part of MOC F&O, this review will be part of the MOC review step.

Informal PSSR Audit

Much of the PSSR Procedure relies upon consistent, high-level human performance. Reviewers are expected to examine complex systems and then identify risks or issues that have likely been overlooked on a previous reviews or assurances. While training is critical in ensuring performance, audits are an additional way to identify gaps in the PSSR Procedure.

Operations Managers or Production Supervisors are typically the Final Approvers of PSSRs and have the ultimate responsibility to ensure that PSSRs are being performed effectively. These approvers do not have the ability to be present for every PSSR, but they do have the ability to lead audits on the procedure. In a sense, the PSSR is a final audit before a system startup and Operations Managers need to essentially "audit that audit." Formal OEMS Audits support this, but informal audits are equally important and can occur on a more frequent basis.

When to perform an internal, informal audit:

Determine if changes have occurred in the organization that should be reflected in the PSSR Program such as regulatory changes, workforce reductions or turnover, or organizational restructuring.

Internal audits will be conducted under the OE Assurance/PSM audit process scope, if PSSR is identified as an OE priority for a business cycle.

Guidelines for performing an internal, informal audit on the PSSR Procedure include:

Interview of PSSR Team Members and those involved in PSSRs. Determine whether participants understand their role and audit the efficacy of the checklists.

Desktop review of a representative sampling of several recently performed PSSR Checklists and associated PSSR Deviations

Desktop review of the PSSR Procedure

As part of the audit, the following topics should be addressed to ensure that the PSSR Procedure is functioning and effective:

Are there written procedures for performing PSSRs and are they clear and understandable?

Have the PSSR Team Leader and PSSR Final Approver been trained on the PSSR Procedure?

Did the Final Approver approve the content of the checklist prior to the PSSR?

Do PSSR Teams represent multi-functional roles and contain the right skill sets?

Did all Team Members sign off on the PSSR?

What is the level of operations' involvement in PSSRs prior to the start-up date?

Can PSSR records including signed checklists be easily retrieved? Does the PSSR database work properly?

Were review techniques driven by a risk-based approach to PSSRs applied?

Were trigger events pre-determined for a facility or MCP and were they identified for each PSSR?

How often did a PSSR delay its associated startup? Was the delay helpful in assuring long-term personal and process safety?

How often did a PSSR “catch” issues prior to start up?

Did startups occur when there were critical to start up items left uncompleted on the PSSR Checklist?

Are there overdue action items or deviations in the PSSR Deviation Management system?

Were there any bottlenecks in this procedure?

What other resources, techniques, or tools could be used to make future PSSRs more effective?

Were the questions on the PSSR forms answered with individual consideration (in other words, not just “checking the box” or “pencil-whipping”)?

Are regular PSSR audits occurring and are PSSR checklist forms being reviewed?

Metrics

Below are suggested leading and lagging metrics to validate the efficacy of the PSSR Procedure.

Measurement Objective	Process	Metric
PSSR Execution	Adherence to PSSR Procedure	Number of PSSRs that were not completed prior to startup of a system and why incomplete. (MOC F&O Process requires 100% completion of PSSRs for MOC.) This is already tracked through the MOC process and Non-MOC PSSR metrics will not be developed or tracked as part of this Standard.
Post-startup actions are being completed	PSSR Deviation Management	Number of open and overdue PSSR deviations. This will not be tracked at this point.
PSSR Checklist Quality	PSSR as Related to MOCs	Quality review is performed on 10% of all PSSRs submitted to close MOCs (Required by MOC F&O Process). This is already tracked through the MOC process and Non-MOC PSSR metrics will not be developed or tracked as part of this Standard.
Strive for 0 incidents in startup and continued operations	Procedure Effectiveness	Startup-related incidents with PSSR failure as an identified root cause. This will not be tracked at this point.

Improvements to Upstream PSSR Standard

Upstream Capability - Base Business & Operations is the owner of the Upstream PSSR Standard and is responsible for its review and update. A review of this procedure is required every three years at a minimum to ensure it remains relevant and current. The Upstream PSSR Standard falls under Upstream governance and requires endorsement by the Enterprise Governance Board for any major changes. Suggested improvements to the procedure should be routed to Upstream Capability - Operations.

Abbreviations

Acronym	Definition
AI	Asset Integrity
BU	Business Unit
CPDEP	Chevron Project Development and Execution Process
CRR	Construction Readiness Review
DRM	Deliverables Reference Manual
FD&C	Facilities, Design & Construction
FE	Facilities Engineer
HAZOP	Hazard and Operability
HES	Health, Environment and Safety
HUC	Hook-up and Commissioning
JSA	Job Safety Analysis
MCC	Motor Control Center
MDM	Milestones & Deliverables Map
MOC F&O	Management of Change for Facilities & Operations
OE	Operational Excellence
OEMS	Operational Excellence Management System
ORR	Operations Readiness Reviews – PRC Ph 4 Assurance or; Operational Readiness Review – start-up review called for in Upstream Operating Procedures Guidance
OSHA	Occupational Safety and Health Administration
P&ID	Piping and Instrumentation Diagram
PFD	Process Flow Diagram
PHA	Process Hazard Analysis
POB	Persons on Board
POP	Project Operations Planning
PPE	Personal Protection Equipment
PRC	Project Resources Company
PSI	Process Safety Information
PSM	Process Safety Management

PSSR	Pre-Startup Safety Review
PSV	Pressure Safety Valve
RACI	Responsible, Accountable, Consulted, Informed
RFSU	Ready for Startup
ROV	Remote Operated Vehicle
SDS	Safety Data Sheet
SME	Subject Matter Expert
SOP	Standard Operating Procedures
TCCC	Transfer of Care, Custody, and Control

Definitions

Term	Definition
Brownfield Projects	Projects in which an existing facility or system is modified or upgraded.
Deviations	The use of the word deviations in this document is specific to PSSR deviations, which are instances when a “No” is checked on the PSSR checklist.
Greenfield Projects	Projects in which no work is needed on an existing facility or system.
Major Capital Projects (MCPs)	Projects with CAPEX ≥ $50 MM Chevron share. These may be managed by PRC or within the BU.
Ongoing Operations	When an asset is operating in accordance with its intended use in a routine manner
Operational Readiness Review	Organizations may use the term Operational Readiness Review (ORR) to describe the check that occurs to restart a process after no change has occurred or as an operational check that occurs at some time after the PSSR.
Operations Readiness Review	The PRC Assurance event undertaken on MCPs at pre-determined intervals in CPDEP Phase 4 to demonstrate and to determine the status of the following: Project Readiness to complete and turnover an asset that is ready to operate in conformance with Chevron’s OEMS and BU expectations. Business Unit Readiness to receive and operate the Asset in conformance with Chevron’s OEMS requirements.
Small Projects	Projects with CAPEX ≤ $50 MM Chevron share. These may be expense, capital, or abandonment projects, etc. and are managed within the BU.

Risk	A measure of potential loss in terms of the consequences and likelihood that the loss will occur.

References

EPA regulation 40 CFR Part 68

OSHA regulation 29 CFR 1910.119

Petroleum and natural gas industries – Health, Safety, and Environmental Management Systems

Guidelines for Performing Effective Pre-Startup Safety Reviews (Center for Chemical Process Safety)

Project Operations Planning (POP): Handbook, Milestones & Deliverables Map, and Deliverables Reference Manual (Owned by Production Support – Base Business & Operations)

Systems Completion Handbook (Owned by PRC Systems Completion Center of Expertise)

Upstream MOC for Facilities & Operations (Owned by Production Support – HES)

Upstream Standard Operating Procedures (Owned by Production Support – Base Business & Operations)

Appendix A: PSSR Checklist Example (Use of the MCBU PSSR Checklist is required)

Change Definition	
MOC Number	OR Work pack Number
MOC Title	OR System Name
Field / Facility / System	
Description of System Under Review	
Linkage to Other PSSRs (MCPs or Turnarounds)	

List of Participants on PSSR Team			
Name (Print)	Signature	Position / Section of PSSR Covered	Date
Name (Print)	Signature	Position / Section of PSSR Covered	Date
Name (Print)	Signature	Position / Section of PSSR Covered	Date
Name (Print)	Signature	Position / Section of PSSR Covered	Date

Final Approval (Operations)

To be filled out after completion of the PSSR Checklist Questions below

This checklist is acceptance of new or modified equipment and systems and verification that they are ready for start-up. The Final Approver acknowledges the validity of the questions asked below as well as accepts PSSR Deviations to be managed post-start-up.

Name (Print)	Signature	Position / Title	Date

Approval ☐ Yes ☐ No Comment

Pre-Start-up Operations Checks (Required For All Changes)
This section of checks is required for all changes.

Overarching PSSR Checks: Design & Construction Specs, Procedures, PHA, Training	Yes	No	N/A	Name/Date:
Has the equipment design, construction, and commissioning been completed in accordance with specifications?	☐	☐	☐	

Example Only

For MCPs: Were systems completion database and check sheets reviewed?	☐	☐	☐
Has all process safety information (SDS, P&IDs, C&Es, SLDs, plot plans, operating limits and parameters, alarms, safe practices and shutdowns etc.) required for commissioning and operation been made available to all affected operators, updated and stored in the system of record?	☐	☐	☐
Are commissioning and start-up procedures and plans in place and approved?	☐	☐	☐
Are appropriate procedures in place and adequate? (start-up, safety, environmental, operating, maintenance and emergency)	☐	☐	☐
Has the communication or training of affected operating, maintenance, emergency, and contractor workers been completed?	☐	☐	☐
Has a PHA been completed and are all PHA/HAZOP/HAZID/safety related actions closed out?	☐	☐	☐
Have changes made been reviewed and authorized by the facility management of change (MOC) program?	☐	☐	☐

Operations Rep: Confirm Overarching PSSR Checks Complete (Name/Sign/Date)

Operational Checks	Yes	No	N/A	Name/Date:
Have new types of controls/equipment been introduced at this facility?	☐	☐	☐	
Has there been adequate training conducted on the new equipment and operation?	☐	☐	☐	
Are personnel whose jobs are impacted by this change knowledgeable of the change (all shifts)?	☐	☐	☐	
Is start-up of this process/equipment compatible with simultaneous operations (e.g., drilling, hot work, plant, compression, operations, etc.)?	☐	☐	☐	
Has CMMS been updated with maintenance routines for new / modified equipment?	☐	☐	☐	
Have critical / operations spares been defined / purchased?	☐	☐	☐	
Have walk downs been complete?	☐	☐	☐	
Are open-ended valves and piping such as vents and drains, plugged, blinded, or capped?	☐	☐	☐	
Is any new Fire / Safety Equipment in place (including any required PPE)?	☐	☐	☐	
Are bypass valves around equipment or control valves either closed or in the correct position for start-up operations?	☐	☐	☐	
Is all appropriate instrumentation / measurement equipment open to process? (Sensing ports & valves open)	☐	☐	☐	
Is all new operation & safety signage in place?	☐	☐	☐	

Example Only

Upstream Pre-Startup Safety Review Standard

Operational Checks	Yes	No	N/A	Name/Date:
Has loose material been removed from near air intakes, air-cooled exchangers, rotating equipment, or other areas where it could cause damage when equipment is started?	☐	☐	☐	
Operations Rep: Confirm Operational Checks Complete (Name(s)/Signature(s)/Date)				

Pre-Start-up Checks (For More Complex Changes & Projects)				
Facilities, Design & Construction				
Electrical & Instrumentation Completion	Yes	No	N/A	Name/Date:
Has the newly installed or modified equipment been tied-in to the ESD system?	☐	☐	☐	
Does the electrical system comply with the area electrical classification?	☐	☐	☐	
Are all electrical covers and housings installed properly and bolts in place and tight? Are conduits sealed?	☐	☐	☐	
Can emergency automatic isolation valves be activated without exposing personnel to hazardous atmospheres in an emergency involving the equipment they are installed to isolate?	☐	☐	☐	
Are motors, control stations, motor control centres, starters, breakers, junction boxes, apparatus and devices used for operation of control circuits and appliances properly identified with nameplates?	☐	☐	☐	
Was grounding for new/modified critical equipment installed and function checked?	☐	☐	☐	
Are all cable trays, conduits, junction boxes, transformers, starters, etc. supported rigidly in place (do not use process or utility piping for support)?	☐	☐	☐	
Is all wiring routed a sufficient distance from hot surfaces to prevent damage?	☐	☐	☐	
Are cathodic protection systems installed and reconnected properly?	☐	☐	☐	
Machinery & Equipment	Yes	No	N/A	Name/Date:
Has the machinery/equipment been installed so it will be stable and secure during operation?	☐	☐	☐	
Is the equipment provided with a clearly identified means to securely isolate from all energy sources?	☐	☐	☐	
Has equipment alignment and rotation been checked?	☐	☐	☐	
Is belt driven equipment “sheaved” to run at the specified RPM as per the design? Are drive belts installed and properly tightened?	☐	☐	☐	
Are start/stop switches properly protected from accidental activation by bumping?	☐	☐	☐	

Example Only

Where required, has an inlet piping strainer been installed to protect equipment?	☐	☐	☐	
Per Chevron SID is safe access provided and equipment properly guarded?	☐	☐	☐	
Can newly installed equipment be cleaned, isolated and locked out for maintenance work?	☐	☐	☐	
Structural	**Yes**	**No**	**N/A**	**Name/Date:**
Have all handrails, toe boards and floor grating been installed and secured where needed?	☐	☐	☐	
Are ladders, scaffolds, platforms, ramps, stairs, and walkways caged and guarded adequately, do they meet Chevron's (SID) safety in design standards?	☐	☐	☐	
Valve & Piping	**Yes**	**No**	**N/A**	**Name/Date:**
Is piping constructed per the piping specs? (Does pipe wall, flange ratings, gaskets, welds coincide with design requirements?)	☐	☐	☐	
Has a pressure / leak testing been performed on both piping and applicable vessels / equipment?	☐	☐	☐	
Have temporary / commissioning pipe work and equipment been removed?	☐	☐	☐	
Are utility systems commissioned and ready?	☐	☐	☐	
Have instrument air lines and process tubing been properly supported?	☐	☐	☐	
Are piping supports adequate, as per design, to prevent damage or undue stress due to pipe span, vibration, valve weight, misalignment, etc.?	☐	☐	☐	
Where PSVs are relieved to atmosphere, is the discharge routed to prevent injury or damage?	☐	☐	☐	
Are PSVs in the correct location per P&IDs?	☐	☐	☐	
Are PSVs set at the relieving pressure designated on the P&IDs?	☐	☐	☐	
Is safe access to all new/existing control valves or isolation block valves provided?	☐	☐	☐	
Is back flow protection (check valve) provided where required and are check valves in the correct orientation?	☐	☐	☐	
Has all buried piping, conduit and wiring been correctly identified and indicated on drawings?	☐	☐	☐	
Have lines been properly labelled?	☐	☐	☐	
Have all isolation blinds been returned to their proper start-up positions?	☐	☐	☐	
Are there sufficient clearances between piping (including insulation, pipe clamps, etc.) and surrounding structure and equipment in the expected hot position during and after thermal expansion?	☐	☐	☐	
Vessel	**Yes**	**No**	**N/A**	**Name/Date:**

Example Only

Has work done to the separators/vessels been made as per code and specifications and is documentation complete?	☐	☐	☐	
Have all packing materials, shipping blocks, stops, preservatives, etc. been removed from equipment?	☐	☐	☐	
Are vessel internals (e.g., trays, packing, mist pads) in place and secured?	☐	☐	☐	
Have all man ways / openings been properly closed and nozzle connections bolted up correctly?	☐	☐	☐	
Do pressure vessels have name plates with code stamp and the correct pressure / temperature rating as shown on the P&IDs?	☐	☐	☐	
Where required and in accordance with design, have anchor bolts and tie-downs been installed to secure pressure vessels or equipment, correct size & type of bolt?	☐	☐	☐	
Additional Design Checks	**Yes**	**No**	**N/A**	**Name/Date:**
Add any BU operation-specific questions, such as questions around pipelines, marine, subsea, or specific equipment.				
Has new technology, processes, or equipment that is new to the facility been supported by SMEs been involved in its implementation?	☐	☐	☐	
Has necessary telecom / communication equipment been provided and function tested?	☐	☐	☐	
Are the utility systems (flare, electrical, process water, etc.) connected at the correct points?	☐	☐	☐	
Are the utility systems (flare, electrical, process water, etc.) properly sized?	☐	☐	☐	
Are hot surfaces adequately protected from exposure to flammable materials?	☐	☐	☐	
Are hot surfaces adequately protected from exposure to employees? Has personal protection been specified for hot surfaces?	☐	☐	☐	
Are there adequate measures/safeguards in place to prevent unauthorized access to facility, equipment, computers, process systems/software?	☐	☐	☐	
Are dissimilar metals (such as between aluminium fittings, conduits, etc and steel) kept from contact to prevent galvanic corrosion?	☐	☐	☐	
Is the commissioning and start-up plan approved?	☐	☐	☐	
Technical Rep: Confirm Facilities, Design & Construction Checks Complete (Name(s)/Signature(s)/Date)				
Asset Integrity & Process Control	**Yes**	**No**	**N/A**	**Name/Date:**
Have checks and inspections been made to ensure that integrity critical equipment is installed properly and consistent with design specifications,	☐	☐	☐	

Example Only

Asset Integrity & Process Control	Yes	No	N/A	Name/Date:
material verification, vendor's recommendations and meets operational performance standards?				
Are current planned operating conditions within equipment operating limits (i.e., temperature, pressure, flow, concentration)?	☐	☐	☐	
Have the following Asset Integrity Management items been considered/completed for integrity critical equipment?				
Equipment Criticality Assessment?				
Reliability Centered Maintenance?	☐	☐	☐	
Safety Integrity Level Assessment?				
Risk Based Inspection?				
Preventative Maintenance Program?				
Have critical controls and shutdowns been function tested? (e.g., alarm and interlock tests)	☐	☐	☐	
Have alarm and emergency shutdown devices (ESD) been checked for fail safe operation and trip points verified?	☐	☐	☐	
Have all control valve bypasses (where installed) been verified in their correct positions for start-up?	☐	☐	☐	
Have critical control valves/instruments been fireproofed?	☐	☐	☐	
Are there any known discrepancies as defined by Asset Integrity standards?	☐	☐	☐	
Has the computer control graphics been updated to reflect changes in controls?	☐	☐	☐	
Confirm Asset Integrity & Process Control Checks Complete (Name/Sign/Date)				

HES				
Occupational Health	Yes	No	N/A	Name/Date:
Have H2S, fire, oxygen, and hydrocarbon monitors/detectors been calibrated and tested?	☐	☐	☐	
Have all high noise areas requiring special hearing protection properly marked with the appropriate warning signs?	☐	☐	☐	
Are HAZCOM signs installed for all chemicals, products and materials handled, stored or processed at the facility?	☐	☐	☐	
Emergency Management	Yes	No	N/A	Name/Date:
Are all muster points, emergency escape routes, and access and egress appropriate / adequate?	☐	☐	☐	

Example Only

HES				
Is emergency lighting provided?	☐	☐	☐	
Have the emergency alarms/alerting systems been checked to ensure they are operational?	☐	☐	☐	
Have pre-incident plans been developed for major incident scenarios?	☐	☐	☐	
Have emergency drills been conducted to ensure all personnel know the proper escape routes, muster points, and relevant actions?	☐	☐	☐	
Have fire and gas detection systems been calibrated and tested?	☐	☐	☐	
Have sprinkler, deluge systems, or other fire protection systems been tested?	☐	☐	☐	
Are fire protection facilities (e.g., fire extinguishers, fire walls, sprinkler systems, alarm boxes etc.) installed as per design?	☐	☐	☐	
Environmental	**Yes**	**No**	**N/A**	**Name/Date:**
Have adequate provisions been made to avoid venting or draining of flammable materials to the environment?	☐	☐	☐	
Have adequate arrangements been made, prior to start-up for the identification, classification, and safe disposal of all waste materials?	☐	☐	☐	
Are dykes, drainage system and curbing adequate?	☐	☐	☐	
Are all the applicable Construction, Environmental and Operating Permits up-to-date and approved?	☐	☐	☐	
HES Rep: Confirm HES Checks Complete (Name(s)/Signature(s)/Date)				

PSSR Deviations

This section lists items that were checked “No” and will be managed by the PSSR Deviation Management Process.

Deviation	Signature	Position / Title	Date
Deviation	Signature	Position / Title	Date
Deviation	Signature	Position / Title	Date

Example Only

Appendix B: Linkages to Related Processes and Documents

Pre-Startup Safety Reviews link to several existing standards within Chevron. It is relevant to note the key standards and processes to ensure that criteria detailed in those are being met with respect to PSSRs.

Linkage to Operational Excellence

Chevron's standard approach for conducting its business is guided by OEMS. PSSRs fulfill OE Expectation 2.4 that requires a PSSR prior to start up. Additionally, PSSRs support components of several of the OE Elements, but most notably links to Element 3: Safe Operations and Element 4: Management of Change.

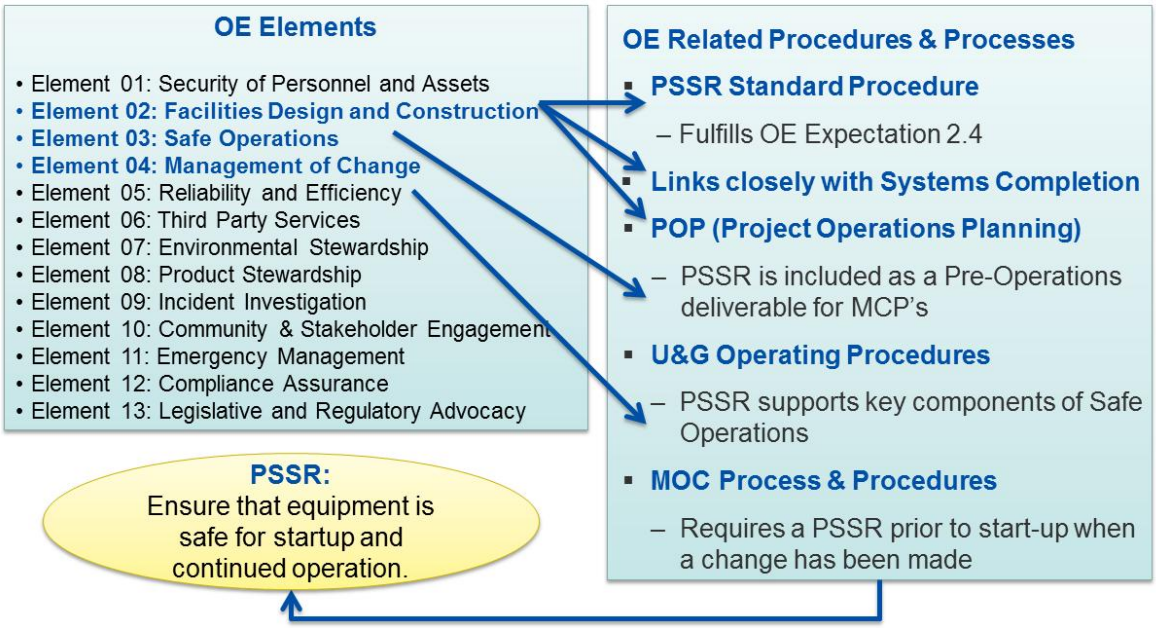


Figure 8: PSSRs Linkage to OE

Linkage to Process Safety

Chevron has defined fourteen elements of process safety that are mapped to the OEMS and align with OSHA process safety management regulations. PSSR is linked to all the process safety elements as the main purpose of a PSSR is to verify that all process safety systems are in place and ready for startup. Though the performance of PSSRs supports all the process safety elements, it most directly relates to the following elements:

Process Safety Elements Directly Supported by PSSRs

Process Safety Element	How PSSR Supports Element
Operations Readiness and Pre-Startup Procedures	Fulfills need for a pre-startup safety review.
Asset Integrity	Questions future inspection, testing, and preventative maintenance tasks.
Process Safety Information	Verification that process safety information is accurate and in place prior to start up.
Management of Change	PSSRs are required by the Upstream MOC Facilities & Operations Guidance prior to start up after a change has been made.

Operating Procedures	PSSRs are required by the Upstream Guidance for Operating Procedures prior to start up after a change has been made. Verification that operating procedures are accurate and in place prior to start up.
Technical Codes & Standards	Verification that design intent has been met prior to start up.

Linkage to Project Operations Planning (POP)

Project Operations Planning (POP) is the framework to ensure that projects have effectively incorporated operability, maintainability, and reliability requirements in their project scope. PSSRs are deliverables that are referenced in POP.

Terminology Relevant to POP and PSSRs

Term	Relevant to POP:
Pre-Startup Safety Review (PSSR)	Focuses on evaluating a system / equipment prior to start up to assess whether it is safe to start up and continue operations. Included as an operations deliverable on the Milestones and Deliverables Map (MDM)
Operations Readiness Review (ORR)	ORRs are part of PRC's Project Assurance effort and are undertaken on MCPs at pre-determined intervals in CPDEP Phase 4 to demonstrate and to determine the status of the following: Project Readiness to complete and turnover an asset that is ready to operate in conformance with Chevron's OEMS and BU expectations. Business Unit Readiness to receive and operate the Asset in conformance with Chevron's OEMS requirements. PSSRs occur after ORRs. Information / open actions from an ORR should flow into the PSSR.

Linkage to Upstream Guidance for Operating Procedures

PSSRs are called for in the Upstream Guidance for Operating Procedures. Specifically:

"A Pre-Startup Safety Review must be performed for new or modified facilities if required as part of the Management of Change process – and in this case the Pre-Startup Safety Review is conducted in place of an Operational Readiness Review."

To clarify further, PSSRs are a management system and tactical check to ensure a system is safe for startup and continued operations, while the ORR is a tactical, detailed check immediately prior to start up to verify operational readiness to start up. (As a note, the Operational Readiness Review referred to here is different from the ORR – Operations Readiness Review – that is a Phase 4 MCP Assurance.)

Linkage to Upstream Management of Change (MOC) for Facilities & Operations (F&O) Guidance

The Upstream MOC for F&O Guidance states that a “Fit-for-purpose PSSR that includes appropriate equipment and facility readiness checks were performed prior to approval to start-up” is required. Specifically,

“Within the Upstream MOC process, a Pre-Start-up Safety Review (PSSR) is a final check prior to initiating the use of process equipment to verify that all related process safety requirements have been met and that the condition and readiness of the physical equipment and facilities are safe to start up. This PSSR shall cover the review of all modified equipment in the scope of the MOC and other related equipment that has been shut down during construction and installation of the change.”

All MOCs require the performance of a PSSR. Conversely, all PSSRs are not triggered by MOCs.

Linkage to Systems Completion

The systems completion team within an MCP supports the planning of the PSSR due to their role of systemization of the facility. During CPDEP Phases 3 and 4, the team responsible for leading the PSSR will work to develop a strategy and plans around PSSR execution. The PSSR is owned by operations and supported by the project. Any discipline may take the lead of planning the PSSRs, but typically this is led by the Start-Up Team or Pre-Operations Team on an MCP. The project PSSR lead should also participate in systems completion work and be in essence a “systems completion champion” to ensure integration with the PSSR planning.

If a robust systems completion method exists that is overseen by the owner’s team (Chevron) or closely signed off and witnessed by the owner’s team, the systems completion work may be utilized as appropriate in the PSSR. A full re-verification of their work is not needed. However, the extent of use of the systems completion checks in a PSSR should be at the discretion of operations and the PSSR lead. Considerations on the extent of use of systems completion work includes:

Timing of the previously done systems completion checks (How much time has passed and how much travel / transportation has the system undergone between mechanical completion / testing / commissioning and startup?)

Systems completion process execution. A robust systems completion method should include a database and the proper organizational capability.

Extent of Chevron involvement in systems completion.

Continuity of personnel between systems completion and PSSR teams.

Spot checks planned in PSSR.

PSSR Activities as Related to Systems Completion

Phase	Activity:
CPDEP Phase 3	Systemization of asset.
	Develop strategy on systems or subsystems on which PSSRs will be completed.
	Develop strategy around timing of system commissioning and startup. Typically, a fishbone diagram may be used.
CPDEP Phase 4	Finalize systemization during detailed engineering.
	Develop detailed plan on which sub-systems / systems / areas PSSRs are to be performed along with associated timing. Provide PSSR work packs for each system with a PSSR.

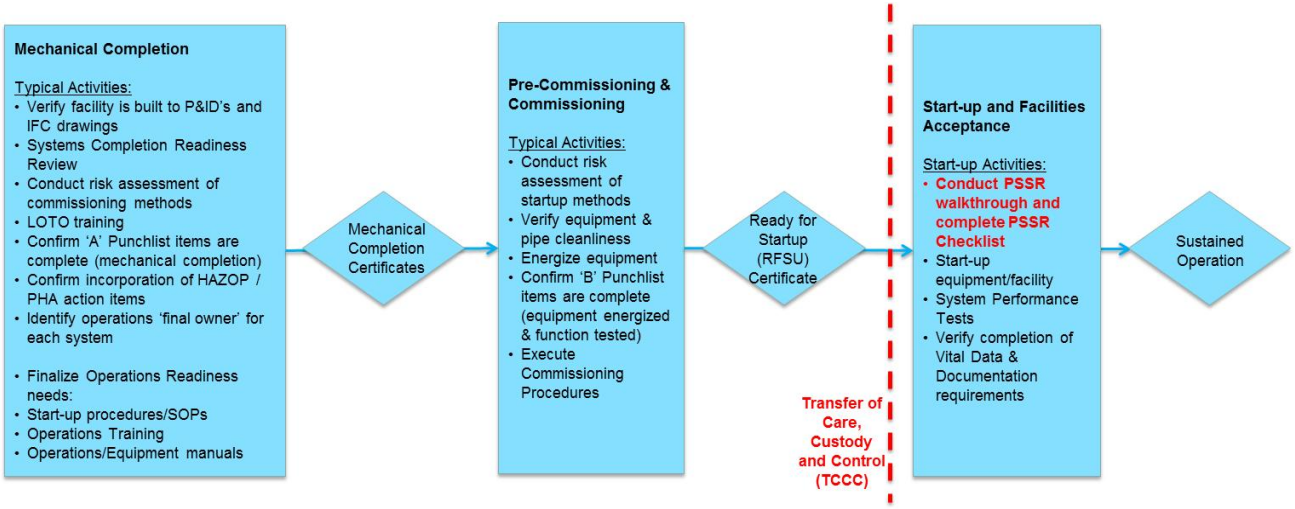
Systems Completion Documents to Leverage in PSSR

In addition to supporting planning for the PSSRs, systems completion inputs may be used to verify components of the PSSR. These are detailed in the two documents listed below and summarized in the chart.

Phase	Activity:
Check sheet and Certificate Requirements Specification MCP-7214-SC-SPC-PRC-0000-00820-00 Refer to the above document for a detailed list of documents associated with each category to the right.	Inspection Release Notes “A” Check sheets (A: Mechanical completion) “B” Check sheets (B: Equipment is energized, and function tested) Mechanical Completion Certificates Ready For Commissioning Certificates “C” Check sheets (C: System is commissioned) Associated A, B, C Punchlists (closeout verification) Functional Test Procedures Pre-Start-Up Procedures Ready For Start-Up Certificates Systems Acceptance Certificates
Database Functional Requirements Specification MCP-7214-SC-SPC-PRC-0000-00821-00 To the right are the types of reports that are run from the systems completion database. Refer to the document above for further details on database requirements and specific report types.	Systems Completion Database: Software application that provides Project Management Team and Contractors with the means to organize and manage progress of all Systems Completion activities. Standard reports: Reports that are required on every project. Custom reports: Queries, filters, or temporary variation of a standard report.

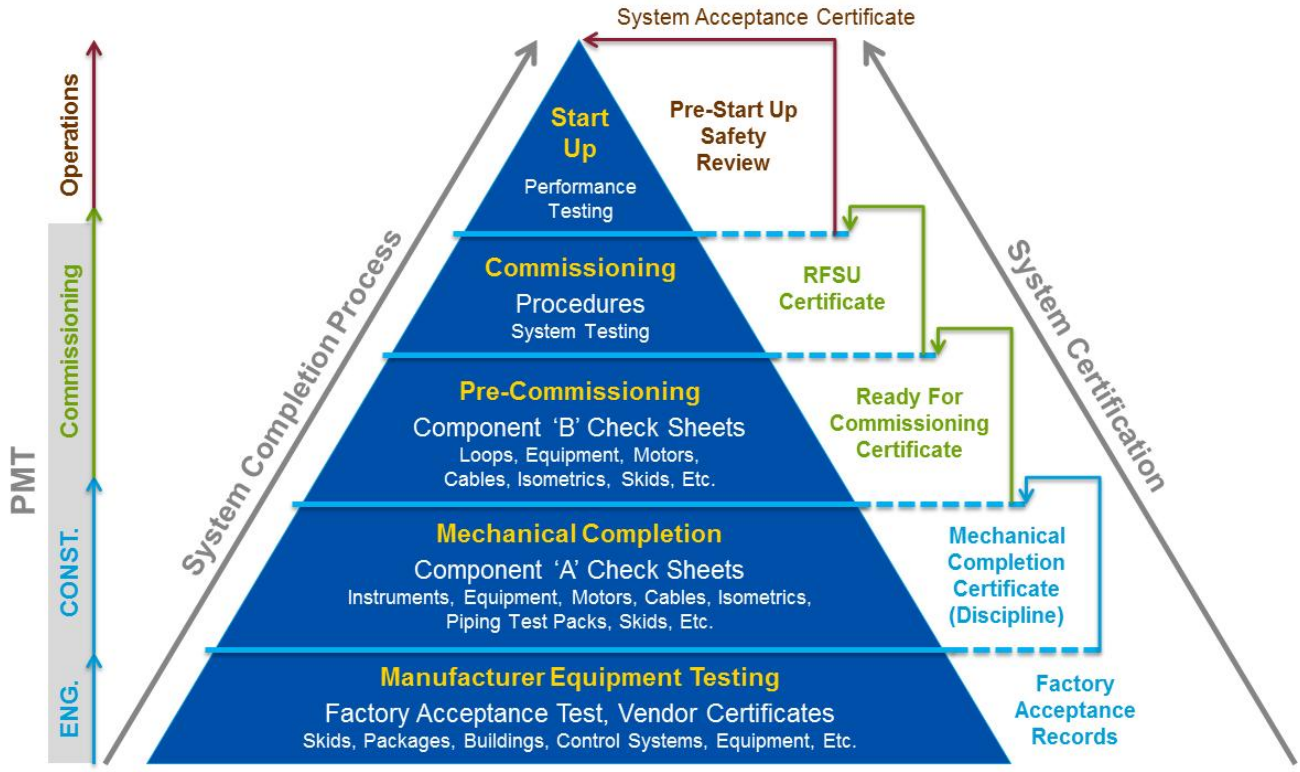
Appendix C: Interface with Mechanical Completion, Commissioning, and Startup

Below is a flowchart outlining the interface with mechanical completion, commissioning, and startup.



Appendix D: Systems Completion Certification Process

The PSSR is the culmination of the systems completion process and is the certification that the system is mechanically complete. Though there are additional components to the PSSR that are not in the scope of systems completion (such as training and operating procedures), all mechanical completion items checked in the PSSR are supported by systems completion. Ultimately, systems completion work is validated by operating organization's PSSR in Phase 5



Appendix E: PSSR Standard Requirements

Throughout the document several requirements or "shall" statements are outlined that apply to any PSSR performed. Those basic requirements are outlined below.

Defining when a PSSR is to be performed is a required component of a PSSR program and shall be clearly documented. Below are the minimum instances when a PSSR shall be performed.

All changes that are in the scope of the Upstream MOC for Facilities and Operations Process.

Changes in process safety information (PSI), including greenfield installations or modifications to an existing (brownfield) facility. (See the Upstream Facility Information Management Standard Process, FEF-STD-CUG-0002-Z01, for a full catalogue of PSI.)

A significant replacement in kind (complex in scope or affecting multiple systems) has been made to an existing system / facility, such as a unit turnaround.

After an intrusive inspection effort or major repair. For example, disassembly and inspection of an entire train or system within a train of equipment.

A temporary change has been made. Perform a PSSR to start-up the process with the temporary change and again when the system is reconfigured to its permanent condition.

A “mothballed” or idled process (one that has been out of service for a length of time) is restarting.

For large MCPs, a PSSR is required for new systems being put into operation for the first time where there is risk for impact to safety upon startup.

A system walkthrough shall occur.

A PSSR shall be performed prior to a system operating in accordance with its “intended use”.

PSSRs shall follow OEMS principles and must conform to local regulations.

The PSSR Procedure and completed PSSRs shall be stored in a system of record.

The PSSR Team shall comprise of a PSSR Team Leader and a Final Approver; these shall not be the same person. Additionally, there must be representation from operations on the PSSR Team as well as a person with competency to answer technical questions.

All PSSR Team Members shall sign off on the PSSR.

PSSR Programs shall have a method to manage items that are checked as “No”.