IN-FULL ON-TIME

Overhaul Management System Manual

IFOT-OMS

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Obligations

The provisions in this manual apply to all sites within the CS Energy Generation Portfolio

FOREWORD

A competitive environment for electricity generation has significant implications for coal fired power plant operators within the Queensland Electricity Market. It was vital for CS Energy to develop a plant overhaul management system that focused on key objectives that would deliver safe and economic power plant performance. Many contributing factors were considered such as safety policies, co-ordination of available resources, regulatory and technical requirements and, all activities and work hazards, before and during an overhaul.

To achieve these objectives, CS Energy has developed the In-Full On-time Overhaul Management System (IFOT-OMS). This system aligns CS Energy's overhauling methods with its ***Life Savers, Core Values and Constructive Culture***. By incorporating the basic fundamentals of working safely, creating value, taking accountability and acting with integrity, we can ensure everyone takes personal responsibility for safety and works constructively as a team to support one another.

IFOT-OMS is a five phased system that focuses on working safely, detailed planning, timely execution and properly documenting lessons learnt for portfolio wide sharing. It has been developed in accordance with current Australian Standards, legislative requirements and based on industry best practices.

This manual discusses CS Energy's overhaul strategy and how this strategy is actually implemented. The key objectives of CS Energy's Overhaul Management System is to ensure the practice of overhauling plant equipment is done safely, to the highest standard of quality and to achieve positive economic outcomes for the benefit of the business. Conducting overhauls safely is CS Energy's highest priority as we genuinely care about the health and welfare of everyone at our sites.

I encourage you to familiarise yourself with this manual as only with the dedication of every person at CS Energy's site, can we achieve great overhauling outcomes at our goal of ZERO HARM.

Kevin Lines

Group Manager Asset Management

CONTENTS

1 CS ENERGY LIFE SAVERS

1.1 Responsibilities

All CS Energy personnel have a responsibility to themselves, their family and work colleagues to work safely. To support this, CS Energy has developed a set of non-negotiable health and safety rules, which shall be applied by all CS Energy personnel.

These health and safety rules are called "Life Savers". The Life Savers are based on historical incident management system data, consultation with managers and employee representatives and the procedure for Minimum Health and Safety Standards for Critical Risks, CS-OHS-48. The objective of the Life Savers is to target and reinforce crucial behaviours and processes that ensure safety performance, particularly in high risk areas of the business.

1.2 Compliance and Breaches

Life Savers are rules that, if not followed, are considered to be serious safety breaches and will result in predefined disciplinary action applying the procedure for Fair and Just Culture, CS-OHS-47. Any such breach is considered a serious matter by CS Energy as it has the potential to cause serious injury or fatality of employees, contractors and/or members of the general public.

All managers/supervisors are to ensure that all personnel know, understand and apply these principles when conducting work for CS Energy. New employees and contractors will be familiarised with the standards in their induction and site-based safety training.

1.3 Visual Overview

- Insert bullet-points / numbers / letters as required (Arial Narrow Font – 11 pt)
- No person shall direct anyone to break a life savers rule.
- Only operate equipment for which you are trained, competent and authorised.
- Only commence work after all appropriate permits to work (PTW) are in place.
- All necessary isolations must be in place and verified as effective in accordance with your role, before work can commence.
- Do not remove, bypass or modify a safety protection device without appropriate authorisation.
- Do not work at heights without appropriate fall protection systems in place for people and objects.

All personnel must work to ensure compliance with the health and safety Life Savers. Where a person's behaviour or action has breached one or more of the Life Savers, disciplinary action will be taken. This action will be in accordance with the CS Energy Fair and Just Culture Procedure, CS-OHS-47 and the performance management process as outlined in the procedure, Performance and Misconduct, CS-HR-63.

2 INTRODUCTION

2.1 Overhaul Success

Assets within CS Energy's generation portfolio have the ability to achieve a high level of safe performance and operational reliability. As part of CS Energy's ongoing business operational improvement practices, it is important to ensure the existing power generation assets can sustain safe operational and environmental performance driving high unit availability with an operating philosophy of best value from money spent.

Overhaul resources whether human, material or equipment and total overhaul duration (i.e. planning, execution and closeout), are primary factors that directly influence the safe operation, availability and all costs, be they direct or indirect associated with each unit overhaul. Recognising this, CS Energy has developed a comprehensive strategy known as the In-Full On-Time Overhaul Management System or IFOT-OMS. This portfolio wide system has been specifically designed to balance the alignment of CS Energy's business goals, values, strategies and practices to the assets mechanical and electrical integral needs and all regulatory requirements.

2.1.1 CS Energy Strategic Overhaul Alignment Model

2.2 Overhaul Vision

The fundamental basis for overhauling during the lifetime of a power plant is heavily affected by the plants design, layout and is driven by =business goals and needs.

Fuel quality specifications, desired mode of operation, maintenance periods and quality of workmanship, as well as statutory requirements and the demands of the electricity market have directly affected the strategy determining durations and frequencies of each overhaul.

Simply, Overhauls are defined as equipment outages in which activities are carried out between disconnection and connection of the unit to the electrical grid. Thus, the overhaul is the period where significant resources are expended at the plant, while replacement power must be purchased to meet CS Energy's supply obligations. Most of the main components of CS Energy's diverse power generation portfolio are designed for plant lifetime operation, while some equipment will need to be updated or exchanged within the normal operating life cycle. CS Energy's capital program plays a key role in short, mid and long term activities ensuring effective spending occurs to reduce risk, improved safety and increase availability.

2.3 Overhaul Scope

Each station develops its own asset strategy that outlines short term (mini) and long term (major) overhauls. This plan is known as the Strategic Asset Management Plan or SAMP. Scope development, preparation and management are complex processes which involve the review of all previous reports, lessons learnt, technical reviews, risks, outstanding corrective maintenance and proposed capital investment. When these activities have been challenged and verified, the individual equipment strategy and SAMP is updated to reflect the plants overhauling needs at this point in the plants whole of life strategy. This is known as the overhaul's frozen scope. The identification of a suitable primary contractor, the coordination of available trained and competent resources (internal & external), play a key role in the development and implementation of safety overhauling methodologies with committed to expectations. Compliance with unit specific regulatory requirements play a key role in SAMP updates and scope development.

2.4 Overhaul Planning

Extensive efforts will be directed towards detailed and comprehensive preplanning to minimise personnel and equipment risks, to avoid schedule extensions or any increases in total costs and to ensure the future safe and reliable operation of the unit. Planning and preparation are the most important phases (1 & 2) in the optimisation of any CS Energy overhaul. These phases ensure safe, timely and successful execution of all activities in Phase 4 Overhaul Execution. Phase 5 Overhaul Review & Closeout, ensures important technical & systems updates occur, lessons learnt are completed and shared across the portfolio. The overhaul team review and feedback lessons learnt which support the optimisation of the next unit overhaul planning, preparation and execution cycle and are incorporated into CS Energy's overhauling strategy.

2.5 Overview of Manual Content

2.5.1 Requirements

This manual outlines requirements, best practices and optimisation methods that shall be used when planning, executing and closing out any CS Energy Overhaul. It also provides guidelines to follow for the overhaul Project Managers/Specialists, core team members and contractors in respect to planning, executing and the closing out/demobilisation of all work activities, as well as examples and strategies experienced from current plants in operation, to enables better understanding and performances.

2.5.2 Publications

This manual is part of the overall IFOT-OMS series of technical publications related to leading practices for overhaul management. Major Projects has produced detailed training modules, procedures and strategies, which are aimed to identify, explain and educate CS Energy staff on world best practices in overhaul management methods.

2.5.3 Primary Sections

The manual contains nine primary sections. The introduction contains preliminary remarks on why and how the overhaul management system was developed. Section 2 presents considerations in the strategy for overhaul optimization. Section 3 presents identified leading practices on the implementation of plant strategy during all stages of overhaul planning, preparation, execution and post overhaul review. Section 4 presents key issues to consider in the safety reviews of overhaul preparation and execution. Section 5 points out which economic considerations are needed in the process of optimising overhauls. Section 6 presents causes and countermeasures to avoid extension of overhaul duration, and Section 7 presents fundamentals for forced overhaul management.

2.6 Implementation

This overhaul strategy will be carefully implemented within CS Energy through the use of the ADKAR process. This process will enable the development of a comprehensive and effective overhaul work program. This is to minimise overhaul duration in connection with improvements in overhaul safety, quality and confidence in achieving scheduled duration and costs. This manual outlines the five main aspects to consider when implementing IFOT-OMS:

- Safety
- Organisation and management support
- Best practices for planning and preparation,
- Requirements for execution
- Post overhaul technical/system update and closeout

3 OBJECTIVES AND STRATEGY

The Overhaul Management System has been developed to align CS Energy's overhauling methods to its Life Savers, Core Values and Constructive Culture. This system is based on four fundamental objectives Safety, Quality, Schedule and Budget to ensure success throughout CS Energy's diverse generation portfolio (refer Figure 1.1).

The Overhaul Management System considers all overhauls being planned, executed and in the closeout phase. It compares how those interactions will affect resourcing, start/finish timeframes, project funding and trading strategies. It implements a framework that allows users to develop a comprehensive and strategic approach for critical overhaul planning.

All successful management systems require defined guidelines, leadership and governance. The business has appointed a single System Owner, with a System Manager managing the portfolio wide overhaul program. All overhaul documentation has been standardised creating one CS Energy Registered System. Detailed training plans, with voiced presentation modules have been placed online to inform and support users. Site based IFOT Representatives acting as the single point of accountability, will be functionally led by the System Manager. The System Manager will work collectively ensuring all overhaul are being executed in accordance with this strategic management system.

3.1 Objectives

3.1.1 Safety

Safety **shall** be the first consideration in the planning, execution and closeout of all CS Energy overhauls. An Overhaul Safety/Environmental Management Plan shall be developed to align with CS Energy Safety Management System, Environmental Management Plan and the safety management plan of the primary overhaul contractor.

3.1.1.1 Measures

Safety measures should be prepared and implemented through the entire operating lifetime of the plant and for all conditions (operation, off normal and accident). The overhaul period should be considered as part of operation. This is due to the fact that certain functional systems fulfil their specific duty under these conditions, such as cooling the fuel and preventing radioactive release to the environment. When optimising overhaul duration and costs, safety will not be jeopardised or reduced in any way. Best safety practices should be considered during overhaul planning and preparation, and monitored during execution of overhaul. Safety culture should be fostered to always support plant personnel in setting up first safety.

3.1.2 Quality

Works **shall** be executed to the highest standard of quality. This methodology of workmanship directly underpins the forecast capacity, availability and reliability (CAR) of CS Energy generation assets.

3.1.2.1 Policy

The SAMP should provide means for continuing improvements, including long, medium and short term planning, asset ownership as well as good engineering and workmanship assisting to keep the plant in good condition. A capital program should be available as a long term activity. Capital programs should take into account safety and environment improvements, plant lifetime extension and overhaul optimization. Execution of capital activities should be planned in such way that they have a minimum effect on the overhaul duration.

3.1.2.2 Maintenance and Inspections

An efficient computerised work control system (SAP) is a key tool for managing and shortening the overhaul duration. Maintenance and inspection strategies should include the on-line maintenance policy, advanced equipment monitoring philosophy, design improvements to optimise overhaul duration and programs for the interchange of components and equipment during overhaul.

3.1.3 Schedule

3.1.3.1 Standard

A detailed schedule by use of a CS Energy approved scheduling **software shall** be development and utilised with overhaul reports being issued on a regular bases.

3.1.3.2 Planning Considerations

Overhaul planning involves many different issues such as co-ordination of available resources, scheduling, safety, regulatory and technical requirements and, all activities and work before and during the overhaul. For each overhaul period a detailed schedule to support execution should be prepared well in advance, including all necessary work files and support needed.

The overhaul schedule should ensure plant safety during all phases of the overhaul. Besides all activity details required for efficient, safe and successful execution of the overhaul management plan. The planning of activities should further consider the local conditions inside the plan, industrial safety, necessary outside support, and internal and external information media.

3.1.3.3 Effective Schedule Optimisation

Increased use of on-line maintenance could significantly reduce the duration of the overhaul, when the design and the regulatory requirements enable such a procedure. On-line maintenance makes it possible to keep safety systems operable during overhaul and enables more effective maintenance and better utilisation of critical resources. Reliability centred maintenance (RCM), Risk-informed inspection and testing have been identified as good tools for optimization of maintenance activities. Condition monitoring must also be used.

3.1.3.4 Milestones and Activates

A certain number of activities should be considered and planned in sufficient advance to the overhaul. Each activity should be seriously assessed on its potential to extend the overhaul target and to prevent unplanned overhaul during power plant operation.

In the detailed planning and preparation, the following items should be considered:

- Pre-overhaul milestones including planning, materials, schedule development, external services contracts, clearance preparation, ALARA reviews, design issues, regulatory issues, etc.
- Duration for all 3 execution phases: shutdown, execution of work and start up
- Final scope of work/activities
- Master schedule, including the main overhaul schedule and work and safety related schedules (separate schedules for systems, boiler, turbine, start up, etc.). Those schedules shall comply with the main overhaul schedule. For each activity in the critical path, a separate schedule is made.
- Work packages, including work orders and permits, instructions and procedures, materials, spare parts, consumables, human and material resources, special tools, post maintenance testing and startup programs, etc.

- The working details should be described for the respective activity incorporating planning time, procurement, manufacturing, and preparation of the plant, the expected workload, safety measures, necessary support and quality assurance programs. The availability of the hardware in due time is as important as the preparation of the software including licensing documentation.

3.1.4 Budget

All overhaul budgets **shall** be developed to an accuracy of +/- 10% as compared to the five year forecast. Developing an accurate overhaul budget and executing to that budget is critical to realise the best economic outcomes for the business.

3.1.4.1 Decision Making

Plant design, resources, safety requirements and electricity market conditions should be considered in the economic business cased performed to choose the optimal length and positioning of the various overhauls. Respective technical analysis and financial provisions should be organised in due time and would constitute the basis for the realisation of all proposed updating and maintenance measures during plant life. All final decisions on the financial provisions should be made by the Executive Leadership Group or the Board of CS Energy. One main goal in the decision making process should be the optimisation of plant safety and availability and reduce the overhaul duration.

3.1.4.2 Estimating Practices

Long term budget planning and financing provisions should be flexible to enable the Overhaul team to optimise the overhaul. Early cost estimates are essential for a successful optimisation of any overhaul. Cost estimates should take into account all needed internal and external expenditures and financing.

All different parties should be considered in the cost estimates, e.g. contractors, spare parts, materials, own staff salary, and other running costs. A good practice is to report on the cost weekly during Phase 1 – 3 and daily during Phase 4. This should allow the final cost to be predicted much easier.

3.1.4.3 Improving Economics

Improving the overall economics of each station requires a comprehensive understanding of the relationship between O&M spending and the performance of the plant. It should be recognised that there is a real cost associated with poor performance (lost opportunity for receiving revenues, higher than necessary cost to generate, etc.) as well as the corrective maintenance cost associated with repairing equipment.

In addition, there is a mutual interaction between O&M spending and the performance of the plant. Too little pro-active (preventative) O&M spending results in a high frequency of unplanned breakdowns with high corrective maintenance cost and high cost associated with unavailability. The practice of too much O&M spending can put the plant past the point of diminishing returns.

The goal, therefore, is not to minimise O&M cost or to maximise performance (availability, etc.) but rather to minimise the total cost by optimising the O&M cost. In order to achieve this potential improvement, however, individual day-to-day decision making should be enhanced (bottom-up).

Typical improvement methodology consists of three basic steps:

- Identification: identifying all potential improvement options to address plant problem areas,
- Evaluation: the economic justification and prioritisation of options identified,
- Implementation: the choosing of the economic optional option and the comparison of expected to actual results.

By following this type of process the best use of the plant's limited resources (money, time, and manpower) will allow the plant to optimise its cost and performance.

3.2 Strategy

3.2.1 Historic

IFOT and IFOT-A1 are basic process roadmaps with the philosophy of milestone tracking that incorporated phase (6) peer reviews. Unfortunately these processes provided unclear roles & responsibilities with minimum guidelines. These conditions made performance accountabilities easily shifted, as no single point of accountability for process ownership or duties for site users were clearly defined. As a result the complete execution of the process roadmap was difficult and in recent cases nonexistent with several recovery plans having to be implemented.

These factors have contributed to CS Energy having no consistent overhauling methodology with little ability to develop overhaul options, analysis real resourcing requirements or introduce best practice methods or standards.

Most significantly this process roadmap did not strategically focus on CS Energy overhauls as a singular event, allowing for coordination of resources, start/finish timeframes or sharing lessons learnt across the generation portfolio. As a result IFOT (2006- 2011) and IFOT-A1 (2012 – 2015) has been assessed as not meeting CS Energy's business goal or overhauling objectives.

3.2.2 Business

CS Energy business strategy has change establishing Life Savers, Core Values and Constructive Culture. In consideration of these factors, IFOT-OMS focuses on safety objectives, maintenance objectives and availability requirements, then creates overhaul options to support financial decisions making.

IFOT-OMS creates mechanisms to enable all plant management levels to be involved in the overhaul planning, preparation, execution and review. Responsibilities within the organisation should be clearly defined. Management expectations should be well communicated to the staff. Objectives and goals should also be clearly established and communicated

Organisational and management principles applied in overhaul management should be based more on process and quality management procedures than on those procedures applied in multi-layer hierarchical organisations. Good examples of implemented processes are shown on annexes (see Annex F).

Self assessment processes on plant level as well as on individual level should be enhanced and a questioning attitude fostered to make organisation sensitive in a proactive way to foresee disturbances and avoid extensions.

Cross-functional expertise is necessary to take responsibility for equipment as well as for maintenance, control, scheduling and engineering that have direct influence on plant performance.

Extensive training and retraining program should be implemented to keep plant and contractor staff motivated and up to the latest state of the art of the plant technology during overhaul. The operating and maintenance personnel should be ready to react correctly in case of malfunctions, incidents or accidents that could occur at any time.

A job rotation program inside the owner's organisation should be considered. A comprehensive knowledge of the complete plant eases the understanding and communication especially at interfaces.

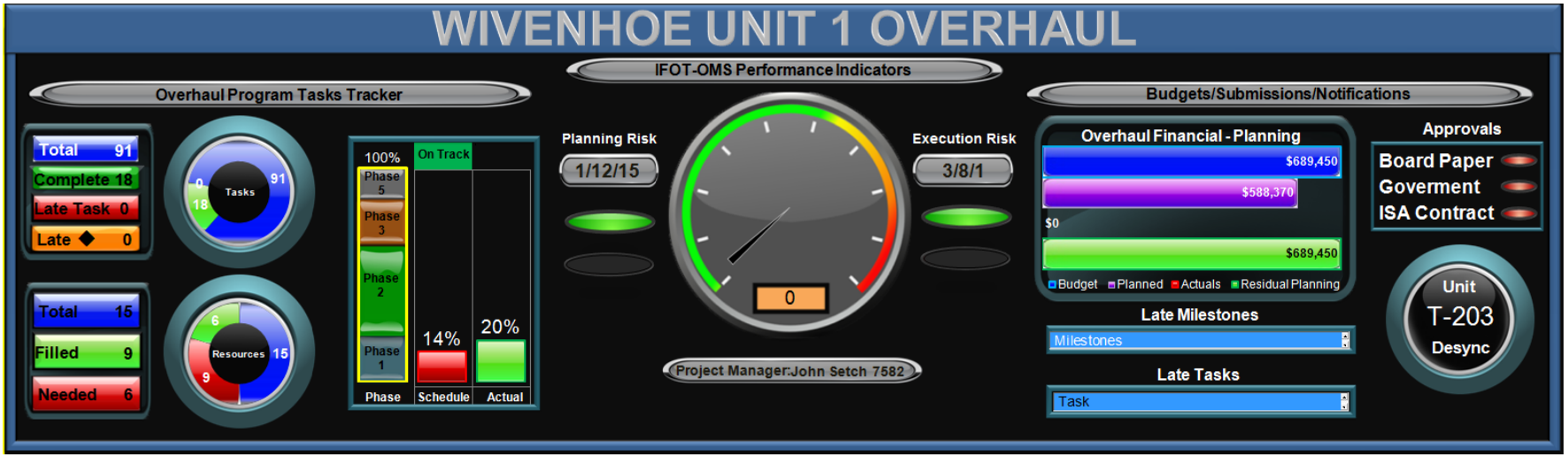
3.2.3 Overhauling Principles

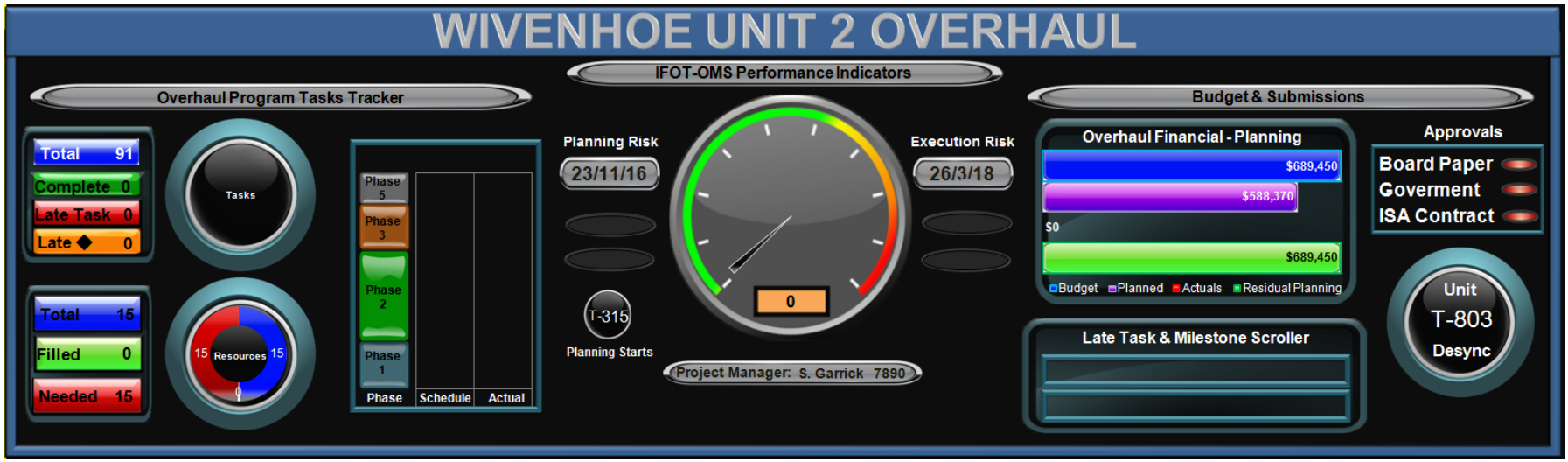
IFOT-OMS achieves a delicate balance between the company's financial goals and the plant's operational, mechanical and electrical integrity needs. Business objectives were directly compared to asset objectives so the best overhaul result could be achieved for both as shown below.

3.2.3.1 IFOT Integrated Dashboard System (IFOT-IDS)

This is a fully automated integrated tool that through innovation allows the full transparency of each phase of IFOT in relation to all activities associated with properly scoping, planning, executing and closing out an overhaul being performed by CS Energy. Listed within this section is a detailed description of how the system is a key and vital contributor to IFOT-OMS and without the implementation and use of the system in full form will dramatically limit CS Energy's ability to safely deliver overhaul on-time, on-budget and to a high levels of quality.

IFOT Integrated Dashboard System (IFOT-IDS





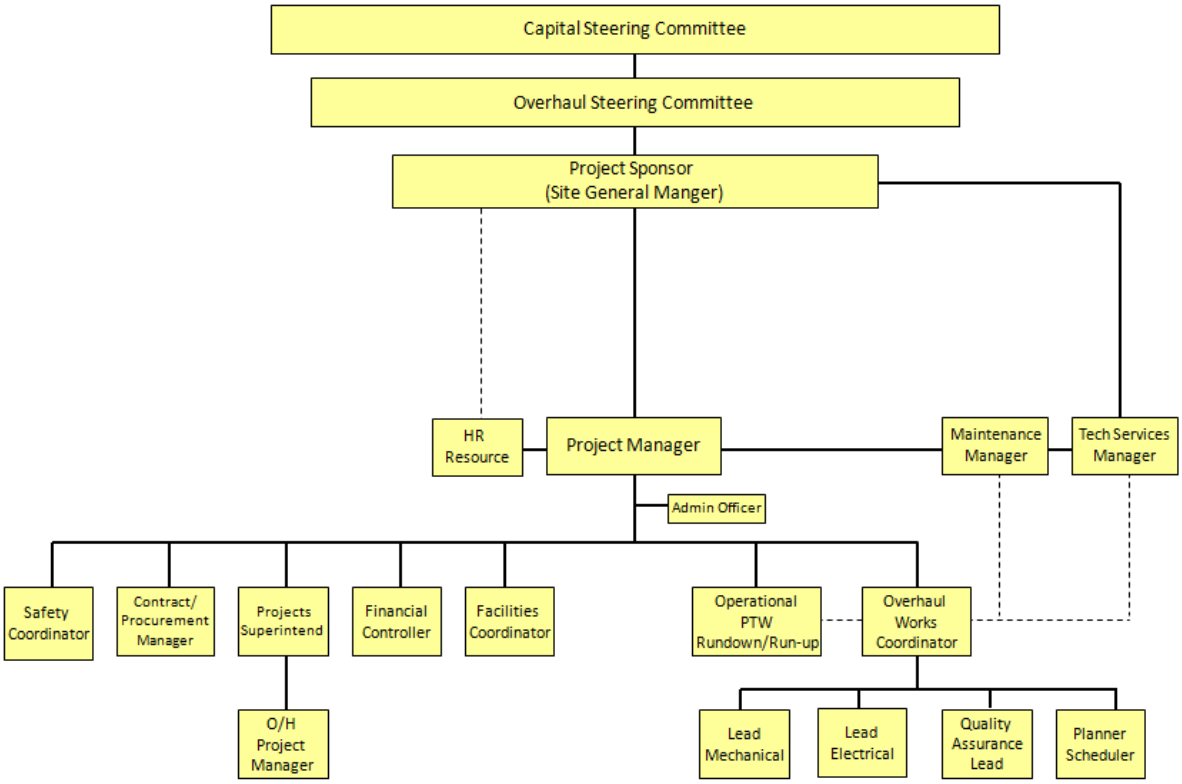
3.2.3.2 Organisational Structure

Different overhaul organisational structures depending on the plant infrastructure, station culture and other factors have been implemented by IFOT-OMS. Many plants do not change their organisation during overhauls; the same individuals are in charge of on-line maintenance and overhauls. Others have a separate but temporary overhaul team or a permanent overhaul structure. Each station chooses the organisation that will give the best results with respect to their culture.

The need of coordinating the efforts with all key stakeholders has led to radical changes in the method of overhauling for CS Energy. There are two predominant overhaul organisational structures within IFOT-OMS:

- Permanent overhaul team structure
- Temporary overhaul project team

Temporary Overhaul Project Team Structure



The structure above has been the most efficient, so far, is the Temporary overhaul project team which comprised of staff from the different plant departments, e.g. maintenance, operations and engineering. This team co-ordinates the overhaul planning and execution and brings together all the personnel involved in the overhaul, which report to a decision making body or Overhaul Steering Committee. In particular, the team includes a co-ordinator for each major function and/or equipment that is under maintenance, test or inspection during overhaul. The co-ordinator makes the bridge between the operations and maintenance departments and the overhaul project team.

3.2.3.3 Overhaul Work Scope

CS Energy's fundamental belief is all overhaul shall be scoped to an accuracy of 90% in association with all work activities related to the plant equipment strategy and the Station Asset Management Plan. The remain 10% of work activities shall be comprised of 5% anticipated work (mostly Z100 WO Corrective Maintenance) and 5% emergent work which has been discovered during 1st / 3rd inspections or breakdown activities during planning and has been risk assessed to corrective action during the overhaul.

Consistently meeting the 90% scoping practice is vital to successfully delivering any positive economic outcomes for the business. This can only be accomplished if the Site Technical Services Team, Corporate Asset Management Team, Site Maintenance Team and Overhaul Team work in a collaborative and constructive manner to ensure all known, anticipated and "it could be, if" type work activities have been identified and thoroughly reviewed ruled in or out of the overhaul scope of work.

IFOT-OMS has developed two key Phases 1 and 5 that's primary purpose is to properly scope the overhaul in a manner that focuses on safe outcomes and quality workmanship while attempting to optimised schedule and maximise value.

All overhaul scopes of work are made up of four primary types of work.

Work Type	Classification Guidelines	WO-Type	O/H %
Routine	These are work task or activities that are required to be completed that have been clearly indentified defined by the OEM. These tasks have then been reviewed and incorporated within the equipment strategies and imputed to the Station Asset Management Plan.	Z110 Z120	90%
Anticipated	These are work activates that may have occurred in previous overhaul or condition monitoring has set a corrective action that is required to be done during the overhaul. The key factors is this type of scope may not need to be done or all aspects of these tasks have then been reviewed and incorporated within the equipment strategies and imputed to the Station Asset Management Plan.	Z100	5%
Emergent	Additional work activities that are unplanned and unanticipated discovered during 1st and 3rd inspections in Phase 4 or equipment failures that have been risk assessed and determined the business can wait until the overhaul outage period to make repairs while in Phase 3 T-4 / T-0.5	Z100 Z110 Z120	5%
Opportunistic	Is capital work that has been approved within the 5 yr forecast with the specific purpose to improve the asset, often called infrastructure.	Z200 Z210	N/A

3.2.3.4 R0 Scope Development

One of Phase 5's primary objectives is to update all SAP WO associated with the overhaul that has just been completed. These work orders are required to be listed under the new revision and certificated that all relevant information hs been reviewed, verified and signed off by the Site Technical Services Manager.

Phase 5 Requirements

Phase 5 Post Overhaul Closeout / Subsequent Overhaul Starting Point	RTS		Department Responsibilities
Return to Normal Operating Conditions	RNOC		O/H Execution Team
Lessons Learned Workshop (exceptions, anomalies and wins)	0.5	◆	O/H Execution Team/ Major Projects
Comprehensive Review, Update & Validation of All Work Orders	1		Dedicated Planning Resource
Agreement of Performance of KPI's (less quality)	0.75		Contracts / OH Team / Site GM
Update Offline Maintenance Plans (SAP)	2	◆	Dedicated Planning Resource
Preliminary Work Scope / Subsequent Overhaul	2.25	◆	STS / AM / O/H Team
Identify Long Lead Items, set order date & develop capital request	2.5		Incident Management System
IFOT-OMS Close out Work Shop	2.75		Site General Manager
Overhaul Completion Audit / Post All Completion Dates	**3**	◆	**Site General Manager / Group Managers (2)**
Final Report / Performance Metrics	3		Site General Manager
Action Items, Owners and completion dates	3		Incident Management System

Review Criteria WO

- Work Order
  - Materials
  - Tooling and special equipment
  - Man-hours (verify correctness or update with correct)
  - Task actions (flow of work)
  - Job setup ("example-scaffolding, etc.)

- Work Order Long Text
  - Procedures
  - Drawings
  - Technical Scopes of Work

If there is a need to reference other documents these must be included in the long text of the work order in SAP, with SAP serving as the master data base for all scope of work.

If the work is not in SAP it will not be considered part of the next overhaul scope of work.

3.2.3.5 R1 Scope Development

This occurs in Phase 1 of IFOT-OMS and it is when the site based technical services team, corporate asset management teams (Major Project Services Manage & Specialist Engineer, Asset Management) and site based overhauling teams perform the following activities; review the previous overhaul report, lessons learnt, technical review (current yr), enterprise risks system, outstanding corrective maintenance (Z100) and needed capital investment (5yr plan).

When these activities have been challenged and verified by Phase 1 indentified Key Stakeholders (see table 1 below), the individual equipment strategy and SAMP is updated to reflect the plants overhauling needs at that point in the plants whole of life strategy, this is known as the overhaul's frozen scope or R1.

Phase 1 Scope Milestones

Phase 1 Overhaul Preliminary Development	Timing	Mil	Departmental Responsibilities
Project Manager Appointed	-16		Asset Management (Major Projects - MP)
Overhaul Start Kickoff Meeting	-15.9		Overhaul Project Manager
Enterprise Risk Workshop / Asset Technical Review	-15.75		STS / Asset Management (AM/MP)/OH/PT
Overhaul Documentation Identification and (WO) Download (R0) • Z100 Corrective Maintenance Order • Z110 Preventive Maintenance Order • Z120 Overhaul Order • Z200 Expensed Modification / Project Order • Z210 Capital Modification / Project Order • Z300 Training and Meeting Order	-15.5	◆	O/H Schedule / Site Technical Services (STS)
Scope Development Information Sent To Participants • previous overhaul report, • lessons learnt, • technical review (current yr), • enterprise risks system, • outstanding corrective maintenance (Z100) • capital investment (5yr plan)	-15.25		STS / Asset Management (AM/MP)/OH/PT
Scope Development Workshop (R1)	-14.75	◆	STS / Asset Management (AM/MP) / OH/PT
Scope Challenge Completed/Signoff (TSM, SGM & AMSE)	-14.7		Overhaul Project Manager
Scope Finalisation (SAP) (Freeze)	-14.6	◆	Overhaul Project Manager

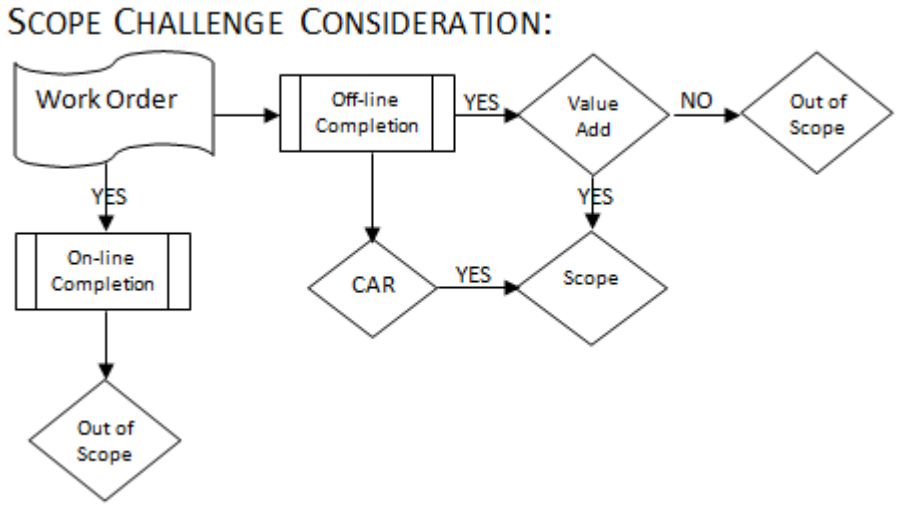
Scope Development / Challenge Key Stakeholders (Participants)

Table 1. Department	Point of Contract
Technical Services (Site)	Site Technical Service Manager
Operations (Site & Corp)	GM Corp Operations / Site General Manager
Asset Management (Corp)	Specialist - Asset Management/Major Project Services Manager
Capital Effectiveness (Corp)	Capital Project System Manager
Contracting/Procurement (Corp)	Contract Manager
Risk, Governance & Assurance (Corp)	GM Risk and Assurance
Safety & Environment (Site & Corp)	Site Safety Officer / Manager Safety

Phase 1 Work Scope Development

- The latest version of the Asset Strategy Document relevant to the unit overhaul
- The latest version of the Plant Asset strategy document for the particular piece of plant relevant to the upcoming unit overhaul
- Enterprise Risk registers associated with particular piece of plant
- Request from Technical Services the following:
  - plant failure reports
  - reliability data to include
  - incidents in the Incident Management Database
  - PI data for trending
  - control system trends
  - root cause analysis reports
- Request from Health and Safety
  - incident investigations
  - 2 by 2 information
  - near miss reports
  - leading safety indicator
  - current lagging safety indicators
- Review past Overhaul reports
  - Review Major Overhaul Final Reports – Refer to Final Report Register
  - Review Mini Overhaul Final Reports – Refer to Final Report Register
- Review SAP work order history
  - all backlogs for the unit in question,
  - inclusive of Corrective maintenance (Z100)
- Modifications forms
- Safety Notifications
- Review relevant unit performance and reliability data, for example:
  - Vibration analysis results
  - Oil analysis results
  - Thermography analysis results
  - Synengco performance reports

Work Scope Challenge Process



Challenge Question for Consideration

1. Can the work be completed with the unit on-line? If yes, not in overhaul scope without robust justification.
2. Does the work add value to the business or have a reason for being included in the Overhaul?

Value Factors

- Work is safer to perform while the unit is off line
- More cost effective to complete large scale inspection/testing

3. Does the work align with current asset strategies? (YES – In Scope) / NO –Value Review)
4. Is the work required to ensure plant can operate reliably for 3 years? (Yes In scope / NO Value Review)
5. Is it a legal or statutory requirement? (YES – In Scope / NO Value Review)

3.2.3.6 Process Tools for Overhaul Optimisation

Current good practices for shortening overhauls during planning and preparation are:

- Work scope predictable up to 90% and about 5–10% emergent work,
- General proactive planning attitude: anticipating unexpected problems which could impact safety, schedule and costs (see RASP in Annex G),
- Early execution of planned inspection of system and components to help avoiding overhaul extensions
- Proper and adequate re-scheduling of activities assessing safety and other risks
- Revision of frequency of inspections based on experience
- Streamlining activities without influencing safety
- Integration of unit start up tests
- Freeze overhaul scope three to six months before the overhaul start date
- Utilisation of computerised tooling for high risk task execution
- Usage of modern scheduling and engineering tools, e.g. MS Project or Primavera software
- Improved communications / co-ordination between overhaul and operations team
- Usage of international and own experience team members from CS Energy's portfolio

- Benchmarking with other similar plants to optimised overhaul activities and scheduled timeframes
- Qualification and training of contractors on safety culture and work procedures
- Involvement of the contractors from the early steps of overhaul preparation (scope challenges)
- Identification of critical work areas from the scheduling point of view
- Preparation of site locations, workshops and offices for contractors
- Actions to prevent short comings of materials and human resources
- Walk-downs of preparation team (coordinators, system engineers, contractors including foremen) to the working place to overview equipment and discuss requirements for overhaul activities

Some design modifications could also be carried out to minimise overhaul time depending on the boiler type, such as:

- Easily removable insulation
- Local cranes
- Permanent working platforms
- Special cooling systems that would allow for the earlier start of work
- Inspection devices enabling inspection without dismantling components
- Support water storage for efficient water handling during overhauls

3.2.3.7 Execution

Objectives for good and efficient outage execution are safe operation of the unit during outage, disturbance free operation of next cycle, execution of the outage according to schedule and budget, good industrial safety and low dose rate.

- Planning the outage is the foundation of success for managing the outage execution in an optimal manner. It is of importance that the same team responsible for outage planning will manage the execution. Detailed schedules for preparation and execution should be developed and frequently updated.
- The outage project team can be built from operating and maintenance staff. In case the utility operates several units, a separate engineering group acts for outage preparation and execution.
- In such a structure the interface between the operating personnel, maintenance and repair groups with the outage staff has to be carefully organized.
- Prefabrication of parts of modifications, control and assembly of tools, training of personnel including motivation aspects, job training, acceptance of spare parts and materials should be prepared in good time before the outage start.
- Measures should be planned and executed to minimise the waste volume. A good practice is to establish standardized environmental system such as ISO 14001.

3.2.3.8 Extension of Outage

Outage extension is the increase of overhaul duration beyond the planned time, if and when it this happens after the overhaul execution plan and schedule is frozen. It is a negative effect that should be avoided as it can cause unplanned energy loss, requirement for additional manpower, increases to the overhaul cost and may result in exposing CS Energy to additional risk and safety incidents i.e. personnel, equipment and production losses.

Generally, if the overhaul is planned and managed accordingly, the extension of the execution timeframe may be initiated by a reason that has been discovered during the 1st and 3rd inspections. With the increase of overhaul experience, the risk of execution extensions could be reduced. However, it may be recognised that while optimisation of execution duration is desirable, making the execution duration shorter may increase the probability of an extension due to minimisation of margin for resolving unexpected problems within the appropriate given time.

To handle these unexpected events, the overhaul team should make efforts from the very beginning in the detailed planning phase to predict and prevent extensions by using a proactive and constructive approach, questioning attitude, proper motivation and lessons learn results. The most frequent causes and their counter measures to avoid outage extension are listed in section 6.1 and 6.2. These causes should be used in the plants self-assessment process to assess the probability that similar causes can occur.

The following are some of the causes of outage extension commonly encountered:

- Non identified system or equipment or component deficiency
  - lack of condition monitoring and trending
  - equipment or component failure during outage execution
  - ISI program and tests results
- Quality of work performed
  - lack of quality consciousness and procedure usage
  - poor quality of material
  - lack of mock up structures
  - lack of skilled or trained manpower
  - improper work execution control
  - casual attitude to work execution resulting in waste of working time
- Deficient outage management
  - late order of equipment, material and spares
  - insufficient cooperation among the parties
  - deficiencies in interdisciplinary communication
  - quality control deficiencies
- Regulatory impacts
  - last moment regulatory requirements added
  - misinterpretation of regulatory requirements
- Failure of inspection or special maintenance tools (lack of preventive maintenance of special tools)
- Inadequate spare parts or lack of spare parts
- Inadequate vendor support
  - lack of technical support and unreliable sub-contractors
  - lack of equipment or material supply or late delivery
- Deficient outage planning
  - under estimation of activity duration or work force
  - improper scheduling of work activities
  - support activities (scaffolding, etc.), tools, materials not clearly defined
  - plant status prerequisites, work permits and approvals not clearly defined
  - Lessons Learnt results were not taken into account or OEF actions were not adequately implemented while planning reoccurring outage activities.
  - lack of leadership and control over the plan activities

- lack of motivation
- lack of budget

3.2.3.9 Countermeasures to avoid outage extension

Taking into consideration the causes of the outage extension mentioned in the previous section, the following possible countermeasures can be applied:

- Improve condition monitoring by:
  - reviewing and revising the condition monitoring, trending and preventive maintenance programs using industrial experience
  - conducting ISI program on critical components in the initial phase of outage.
- Improve work quality through:
  - development of quality consciousness among the employees and put quality check/hold points in the maintenance procedures
  - pre-qualification of the spares and supplies
  - development of mock-up facilities based on the industrial experiences
  - training/re-training of the manpower to be deployed
  - strict control of work execution to avoid extension;
  - early warnings on critical items or milestones
  - analysing time spent on work to increase effectiveness
  - applying proper workers motivation such as incentives and awards
  - development of the FME program based on the latest industrial experience.
- Improve outage management by:
  - implementing management and project management development programs to strengthening the leadership and control of outage activities
  - establishing clear goals, responsibilities and ownership
  - implementing self-assessment processes on plant and individual level
  - prioritising activities according to their sensitivity and selectivity strengthening safety awareness and culture
  - conducting organisational development programs with cohesive approach and motivation
  - promoting a "do it right the first time" approach
  - anticipating of budgetary requirements and ensuring allocation of the same
  - preparation of well documented quality assurance (QA) and quality control (QC) program for the outage activities with the help of QA/QC group
  - listing and ordering spare parts to assure their availability at warehouse well in time based on the past experiences
  - interdisciplinary communication on critical subjects, support, approvals, tools, etc.
  - using of fixed teams of very experienced specialists for critical jobs (integrity checking, etc.)
- Anticipate regulatory requirements based on in-house and industrial experiences
- Ensure reliable inspection and maintenance tools through:
  - pre-qualification of special inspection and maintenance tools
  - redundancy of special tools

- Spare Part Policy
  - QC of received material well in advance
  - spare part storage control system
  - partnership with vendors
  - joining a pool for common spare parts or inventory management
- Deploy reliable and experienced contractor or subcontractors by:
  - seeking international nuclear industry help through international networks
  - establishing long term partnership
  - providing timely and clear purchase orders, signing the contracts and controlling the process development
- Improve outage planning based on in-house and industrial feedback by:
  - setting-up clear goals
  - defining outage milestones and freeze dates for different phases of outage
  - proactive planning and scheduling, i.e. predicting and considering possible problems and planning in advance the time for corrective actions
  - considering OEF program and plant history files during the planning phase.

The list of causes and countermeasures could be used for self-assessment of plants own performance and in that way identify areas for improvement in optimising outages.

3.2.4 Contractors

The scope of work can be prepared and executed by core team staff, external contractors or a combination of both. External contractors are often specialized for inspection and maintenance or repairs where special tools and processes are needed. All contractors performing work during any overhaul shall be deemed competent to work within IFOT-OMS by the system owner.

3.2.4.1 Integration

The incorporation of external contractors needs a specific workload breakdown with identification of interfaces and responsibilities. Nevertheless, the project overhaul team encompasses the overall preparation, planning, management, contracting, financing as well as all technical features.

As the contractors are normally coming from, and used to work in, other industries, a considerable amount of training should be given to introduce them to safety aspects, safety culture and self assessment aspects of the plant.

3.2.4.2 Agreements, Outsourcing and Good Practice

The interest of long term contract arrangements with experienced service companies or with the main plant supplier should be assessed. CS Energy should choose between the development of its own capabilities for overhaul work and/or arranging support from external companies to improve their overhaul performance.

Different outsourcing approaches may be utilised for the maintenance, modifications and/or refurbishment. The type of outsourcing depends on various parameters including capability and experience of CS Energy's staff. The choice in this matter is an important subject that has to be decided by the operator rather early. In general, the more the contract responsibilities are sub-divided, the higher would be the risk for good overhaul performance.

Usually it is a good practice to use long term contracts with partnership relations including deep ownership of the contractors for overhaul tasks. When establishing long term contracts it is important to preserve a competitive market situation. The use of local industry capability is also preferable and cost effective.

3.2.5 Best Practice Group

3.2.5.1 Purpose

The Best Practice Group provides direct and functional leadership to all users of IFOT-OMS. The Mission o fthe Best Practices Group is "To lead the continuous improvement of CS Energy overhaul systems through common learning and application of market leading practices".

The group will review the portfolio overhaul program and work as a team to resolve any overhaul conflicts ranging from critical resource clashes to overhaul start / finish overlay issues.

On a monthly bases, the site based Representatives will work with the local SLT (via SLT meeting) to discuss resources that will support a 24 month project resource plan (Attachment 3). The group will review methods, processes and activities that potentially could be more effective in delivering overhauls and will be the foundation members of the Overhaul Strategic Team.

The findings of the group will be supplied quarterly to the Operational Senior Leadership Team (SLT) with any applicable recommendation. Final changes to the system will be an accountability of the Owner based on the recommendations of the SLT

3.2.5.2 Members

Chair: System Manager

Member: Kogan A Representative

Member: Callide Representative

Member: Wivenhoe Representative

Member: ISA Preferred Contractor Representative

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3.2.5.3 Value-Add Contributors

Value-add contributors may be invited to attend a BPG meeting from time to time. These contributors are drawn from different areas of the business such as:

- Engineering
- IT
- Contracts and Procurement
- Risk
- Finance

3.2.5.4 Charter

The best Practices Group shall conduct itself in accordance with the Group Charter ("B/D/16/872"). The charter documents that defined purpose of the Best Practices Group, how it will work, and what the expected outcomes are. The Charter shall be review on a two yearly basis.

3.2.5.5 Meetings

The BPG shall meet in accordance with the meeting calendar as laid out in Attachment 1. These meetings will be a blend of face to face and teleconference style meetings. Quarterly site based face to face meeting will be conducted. Where feasible, these will be planned in a manner that the BPG visit the host site while there is an overhaul in progress. Additional out of sequence meetings may be convened from time to time to address specific priorities as they arise.

3.2.5.6 Agenda

The BPG agenda shall be issued to all core group members and contributors seven days prior to the meeting occurring. This standing agenda is based on BPG agenda template ("B/D/16/873").

The content of the standing agenda is reviewed during the February face to face meeting each year.

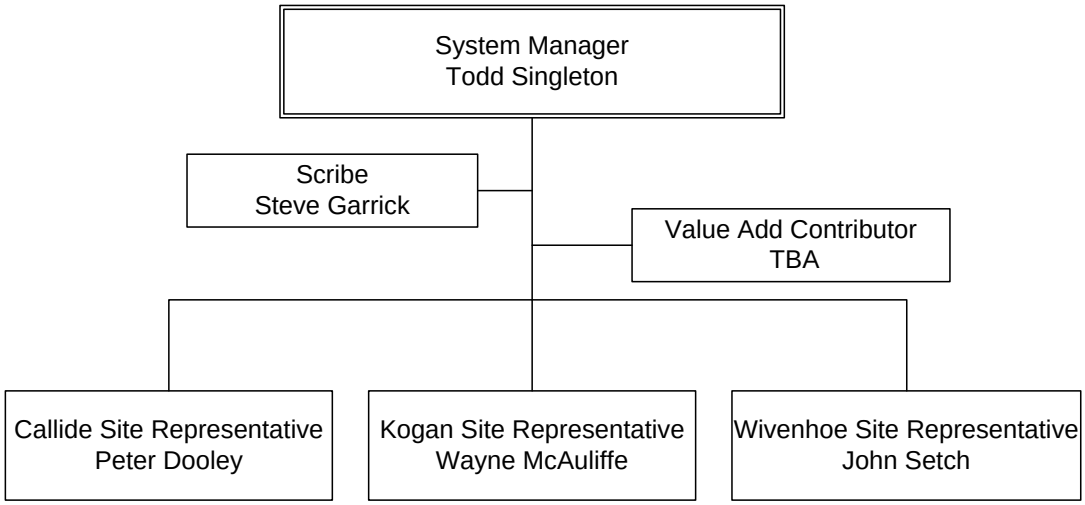
3.2.5.7 Business Results and Outcomes

The effectiveness of IFOT-OMS within CS Energy has a direct impact on overhaul durations, cost and HSE performance. Therefore IFOT-OMS is critical to the financial performance of CS Energy.

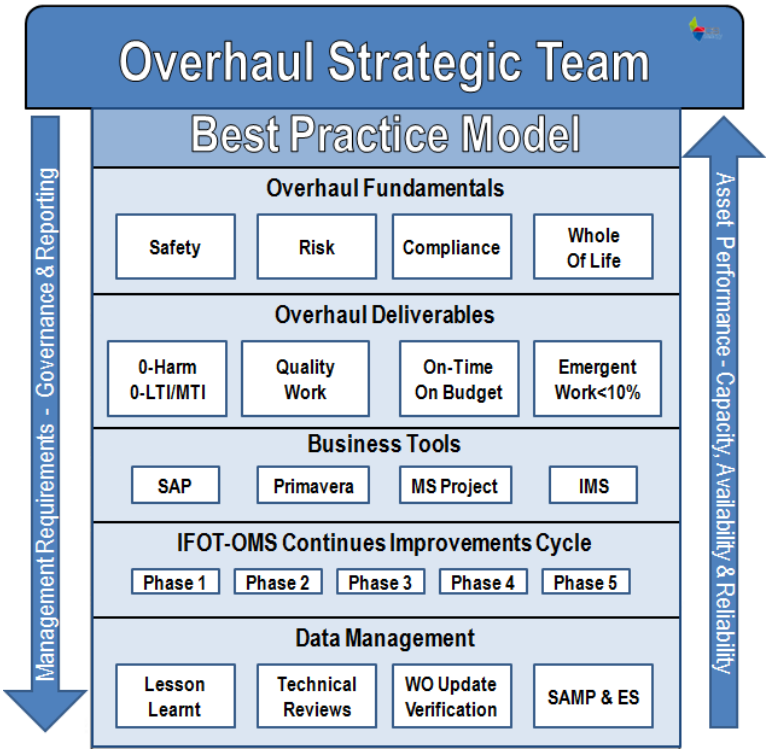
To support the success of the BPG, a shared commitment to the application of IFOT-OMS by each site is critical. The site based Representative will champion this process through cross boundary engagement and consultation processes.

Through a greater level of engagement, the business will see an increase in motivation towards IFOT-OMS and a greater level of trust in the framework as a whole.

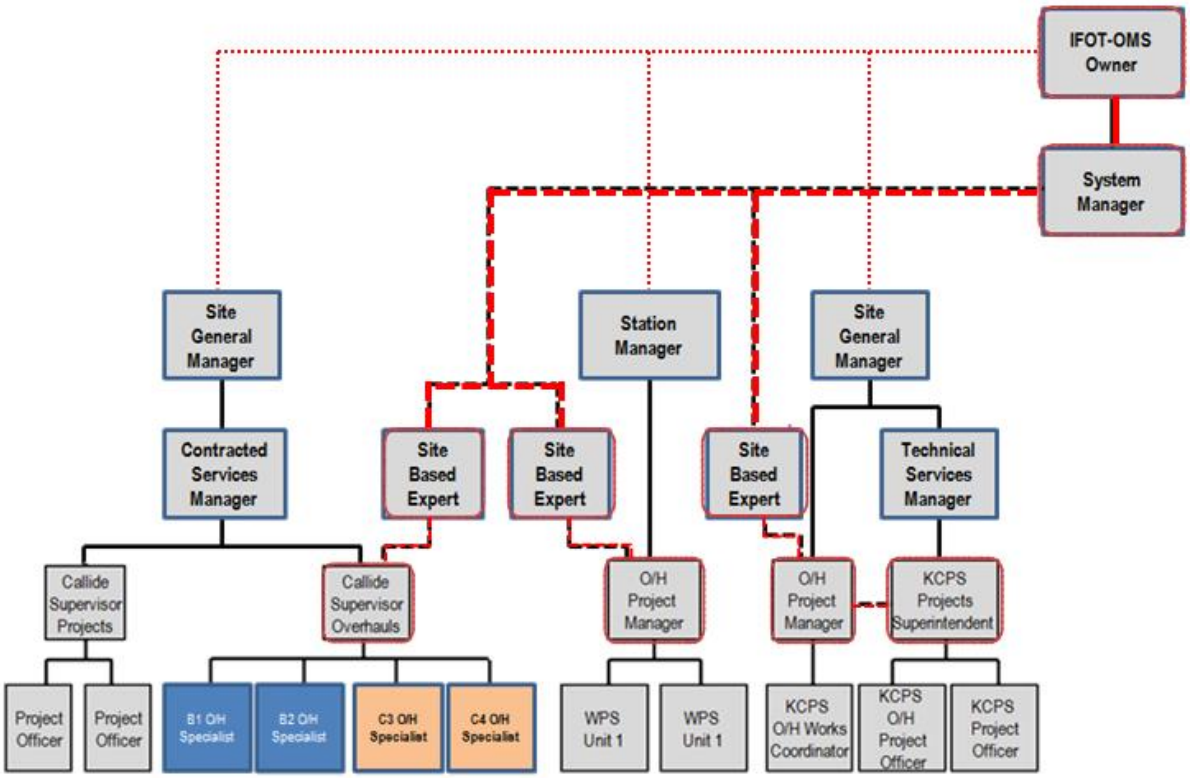
3.2.5.8 Organisational Chart



3.2.5.9 Best Practice Model



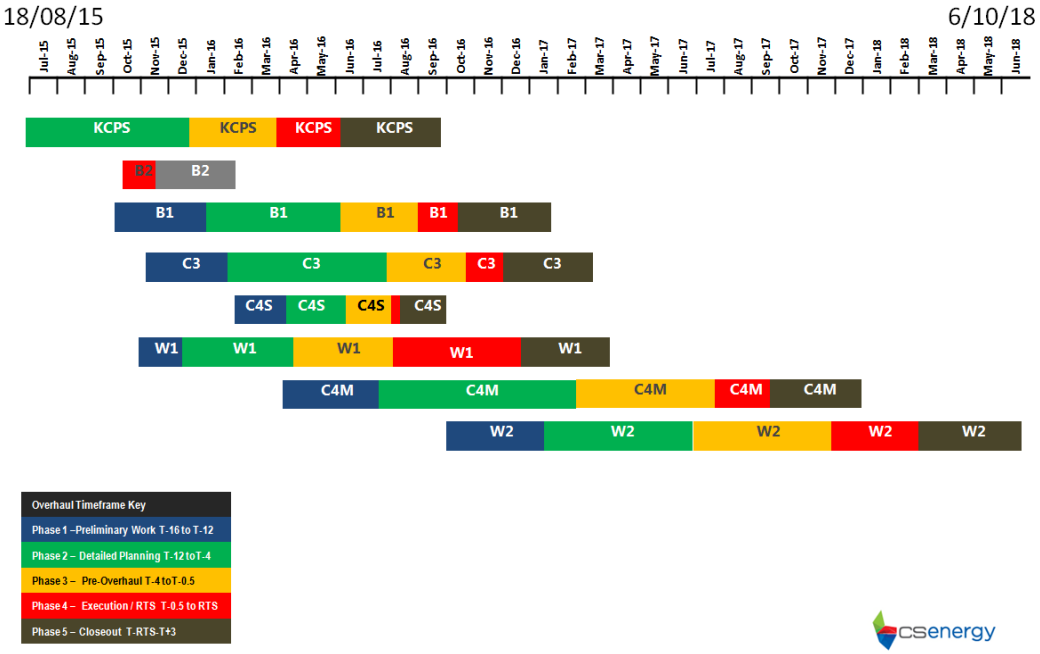
3.2.5.10 Functional Leadership Structure



4 OVERHAUL ALIGNMENT

4.1 Purpose

The alignment of all CS Energy overhauls under one comprehensive program and establishing a portfolio manager is vital to the success of IFOT-OMS. The System Manager's primary focus is working with all sites to effectively coordinate each phase of IFOT-OMS and to minimise the impact across the portfolio. This is to ensuring phase overlap does not occur and priority CS Energy and Contractors resources can be disturbed evenly across all sites (refer Figure 3.2).



4.1.1 Range of Planning

According to the SAMP, overhauls are planned on long (major) and short (mini) terms. These plans differ in time, level of details and scope of activities.

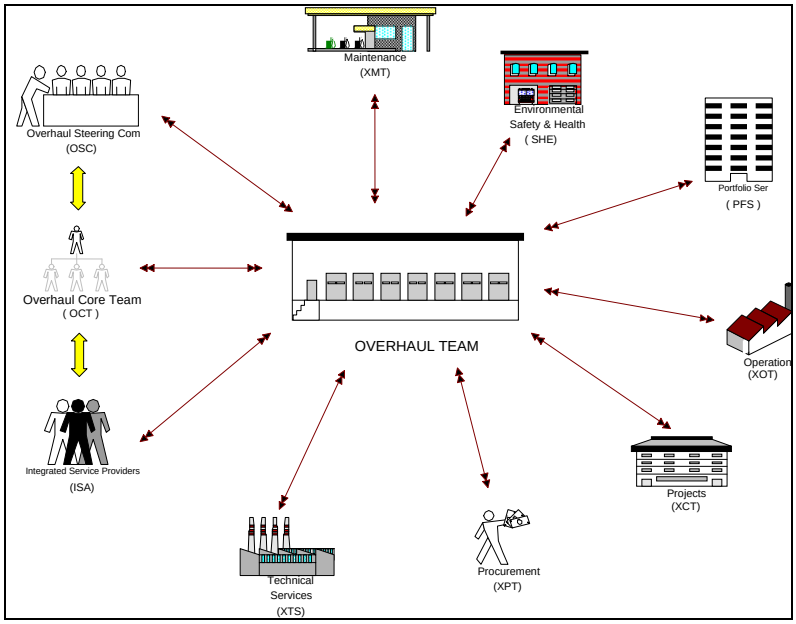
In the long term planning, the plant establishes the occurrence and duration of overhauls according to the fuel management, equipment ageing, need of major backfittings and refurbishment. The long term plan optimises plant availability to the grid, total overhaul duration and cost estimates. In order to optimise the different overhauls duration over longer time period heavy and time consuming work should be allocated to specific overhauls. It allows flexible planning and distribution of workload during a period varying from 5 to 10 years. It also includes preliminary cost and budget estimates in the frame of the expected scope of supplies and services.

4.2 Overhaul Communications

4.2.1 Primary Contact

Under approval and empowerment of the Project Sponsor, the Overhaul Project Manager / Specialist shall be the prime contact for all overhaul related matters, but the Project Sponsor reserves the right at any time to discuss any overhaul related matters with the stakeholders. They have been tasked to develop and maintain effective and amicable communication relations with other Stakeholders and all contractors to avoid potential work scope conflicts arising.

The CSE Overhaul Project Manager / Specialist will report to the Overhaul Superintendant / Supervisor and the OCC. It is the responsible of the System Manager to ensure the Overhaul Core Teams are complying with this procedure and ensure all stakeholders are informed effectively. The Overhaul Specialist will review and confirm all minutes of meetings between the stakeholders, review and confirm Monthly Report and ensure Daily OCC Reports are posted correctly.



4.2.2 Core Teams Communication

Staff involved in the overhaul should be well informed. IFOT-OMS implements a mechanism to communicate status and progress of the overhaul should be implemented. Modern electronic media should ease the communication inside the plant and with the headquarters.

Short bulletins or reports distributed to the personnel familiarises the entire staff and enables rather early countermeasures. Special dispositions, such as daily meetings could be adopted to improve relation between operation and maintenance personnel.

Walk-downs by the overhaul, station and corporate management teams are good means of communicating management expectations and monitoring the situation in the plant. It is good practice to inform the contractors about the overhaul planning progress. It is also important to co-ordinate their work sites and gets their feedback on the work schedule.

The flow of information from and between the various activity centres should avoid conflicts in the process and acts as a management tool with clear delegation of responsibility and assignment of work.

IFOT-OMS create mechanisms to promote safety culture, foreign material exclusion and high level housekeeping to all personnel involved in overhaul execution. The distribution of daily reports to all overhaul participants is another good practice. Means of communications could be overhaul progress reports disseminated through newsletters, Intranet, video systems etc. Some utilities have used wall posters to motivate overhaul staff and communicate overhaul progress.

Another good practice is to prepare and distribute an overhaul information handbook with all needed information including: overhaul plan summary with critical path, objectives, goals, telephone directory, security, emergency signals used, meeting reports, parking lots, restaurants, etc.

4.2.3 Stakeholder Communications

IFOT-OMS establishes guidelines for the Overhaul Steering Committee (OSC), Overhaul Core Teams and other concerned parties that will plan, execute and closeout overhaul activities. The primary intent is to establish means and methods for the overhaul team, to communicate their objectives, requirements, progress, etc in an efficient and effective manner to all the other stakeholders associated with the overhaul.

Typically the Overhaul Steering Committee and Overhaul Core Team do have direct channels of communication by the various team members. However the common functionality is by persons assigned to the Overhaul Steering Committee or Overhaul Core Team

4.2.4 List of Stakeholders

The following groups are required to be effectively communicated to by the Overhaul Project Manager / Specialist. Several of these groups will contain members of the overhaul team. However documented communications will be maintained.

The groups are identified as follows:

Department	Point of Contract
Technical Services (Site)	Site Manager
Operations (Site & Corp)	GM Corp Operations / Site General Manager
Asset Management (Corp)	Specialist - Asset Management
Capital Effectiveness (Corp)	Capital Project System Manager
Contracting/Procurement (Corp)	Contract Manager
Risk, Governance & Assurance (Corp)	GM Risk and Assurance
Safety & Environment (Site & Corp)	Site Safety Officer / Manager Safety
Human Resources & Industrial Relations (Site & Corp)	P&C Business Partner
Energy Markets	GM Energy & Carbon

4.2.5 Records of Conversations

Records of Conversations will be maintained to provide written records of discussions between two stakeholders or other third parties. Records of conversations is a tool to record commitments for deliverables or other services which if not adequately managed may have a detrimental impact to the overhaul success.

Where there is no planned agenda but the conversation progresses and commitments given by any party, these will be recorded on a similar format to the minutes of meeting.

These will contain:

- Item Number
- Description of discussion item
- Action by attendee
- Date of delivery

It will be the responsibility of the record of conversation author to follow up and close out the action items.

The Overhaul Administration Officer will maintain a central register and issue report weekly to all authors of records of conversations

Records of Conversations will be stored in the relevant TRIM Overhaul Tag with the signed original filed as per the Document Control Procedure.

Registered Communications Matrix

Record Number	Date	Time	Type	Initiator	Participant (s)	TRIM Ref	Status	Description of Communication	Actions Generated

4.2.6 External Communications (Community / Neighbours)

All external communications will be made through the existing Power Station Management Process. No member of the overhaul team will provide information to Community or Neighbours.

The overhaul team will furnish all necessary reports, statements to the CSE Public Relations personnel as deemed necessary to thoroughly communicate with Community or Neighbours upon request.

Areas that may impact adversely on the Community or Neighbours shall be considered prior to the overhaul and communicated effectively. Any issues and preventative measures will be clearly identified to the CSE personnel responsible for conducting the Community and Neighbourhood briefings

All facets of work from will be addressed and the potential impact to the community or neighbours will be disclosed.

- unit run down
- overhaul execution
- re-commissioning
- start up

4.2.7 Meetings

Meetings are a necessary and effective medium to deliver and receive information necessary to prepare and achieve a successful overhaul. The level of meeting requirements and scheduling will vary as the stages during the planning, pre-overhaul and overhaul work progress.

Agenda for meetings will be issued to Stakeholders prior to the first 'Kick off Meeting'. Subsequent meetings held will use the previous meeting minutes for the agenda. A typical meeting for the overhaul team may include the following topics:

- Health, Safety and Environment
- Quality Control
- Power Station Operations - Issues, progress, resources
- Planning and Scheduling
- Procedural and Technical
- Logistics - Facilities, tools, cranes, etc
- Other issues

All meetings held between the various stakeholders will be recorded in minutes of meeting. Once prepared, these minutes should be distributed to the persons in attendance for review and approval and signed off as a true record of the meeting.

Minutes of meetings will record key points and actions required with assigned person to resolve. Delivery date of actions required will be provided and remain until the item is closed out. Each meeting these outstanding items will be discussed and expedited. It will be the responsibility of the chairperson of each meeting to ensure timely closure of issues.

Minutes of meetings will be stored in the relevant TRIM Overhaul Tag with the signed original filed as per the Document Control Procedure.

5 IN-FULL ON-TIME OVERHAUL MANAGEMENT SYSTEM

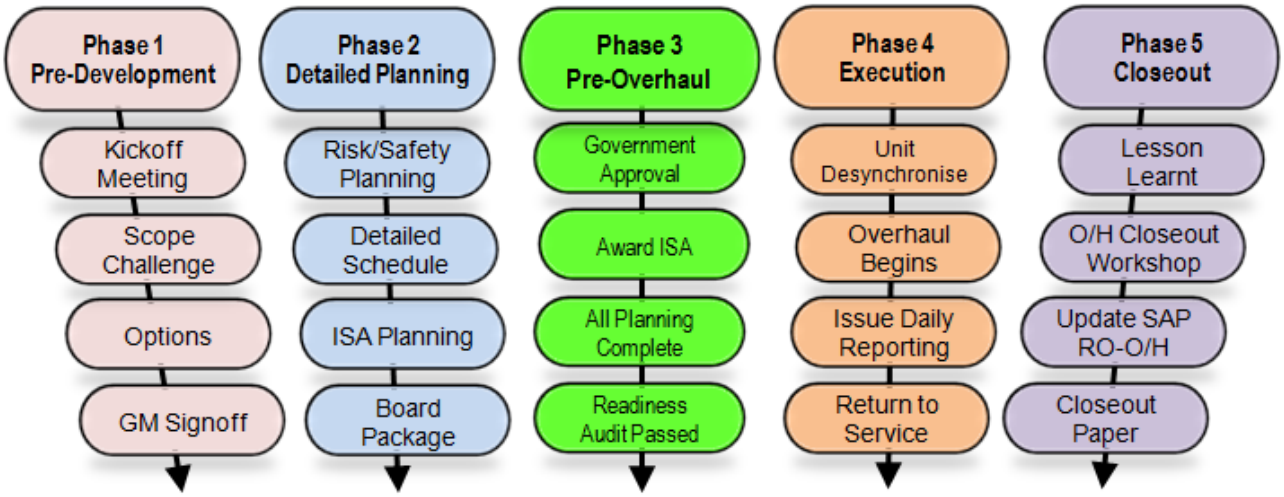
The CS Energy Overhaul Management System has been developed to conform to PAS 55-1:2008 Specification that optimises the management of physical assets and the recently released ISO 55001 Asset Management Standard. Each phase of the management system will be independently audited under AS/NZS 4801:2001 (Safety) and the ISO 9001 QA Management System (Quality) ensuring results will be achieved in the appropriate timeframe.

The overhaul management system covers the life cycle management of CS Energy's core physical assets at each power generation site. The prime objective of this system is to deliver value without impacting safety. Careful considerations have been made between required unit performance, cost, and risk over all phases of this management system.

5.1 Purpose

CS Energy overhauls can be extremely complex events with a number of additional features that make them unique. IFOT-OMS address these challenges by utilising a cross boundary framework requiring contribution from other key stakeholders. These key stakeholders or (Contributors) work constructively to establish all overhaul execution objectives and ensure these objectives are done to the expectations of the Business Plan, Executive Leadership Team and Site General Managers.

5.1.1 Key Objectives Per-Phase



Phase 1, Key Focus Summary **(Scoping)**

- Appoint a Project Manager
- Guide / assist Technical Services in the development of the overhaul scope.
- Submit for planning funding
- Guide / assist Capital Effectiveness in the development of overhaul option.
- Present frozen overhaul scope with, key findings to Site Leadership for signoff

Phase 2, Key Focus Summary **(Planning)**

- Start Detailed Planning
- Guide / assist ISA contractor in the development of the detailed overhaul execution plan.
- Receive TCE from ISA Contractor
- Submit Board Paper and Business Case

Phase 3, Key Focus Summary **(Readiness)**

- Receive all final approvals for the overhaul (GOV)
- Award TEC to ISA Contractor
- Finalise all plans for execution
- Conduct Readiness review and audit to start execution
- ISA Contractor mobilise to site
- Hold Safety Workshop

Phase 4, Key Focus Summary **(Execution)**

- Desynchronise from Grid
- Start execution program
- Hold daily status meetings and issue reports
- Finalise all execution activities gain REPQ signoff
- Present readiness to Site GM for RTS Signoff
- Begin Return to Service Program
- Resynchronise with Grid
- Hold ISA Contractors debrief / lessons learnt
- Clean up site and demobilise

Phase 5, Key Focus Summary **(Execution)**

- Final lessons learnt
- Finalise all closeout reports
- Update all WO
- Update all Maintenance Plans
- Update all Equipment Strategies
- Update all SAMPs
- Hold Final Overhaul Closeout Workshop
- Write and issue final overhaul report
- Prepare ELT presentation on overhaul matrix for EGM Operations

5.1.2 Detailed Phase Reportable

Phase 1 Overhaul Preliminary Development	Timing	Mil	Departmental Responsibilities
Project Manager Appointed	-16		Asset Management (Major Projects - MP)
Overhaul Start Kickoff Meeting	-15.9		Overhaul Project Manager
Verify Risk Enterprise System Up To date	-15.8		STS / Asset Management (AM/MP) / OH/PT
Start Phase 2 Overhaul Management Plan	-15.7		Overhaul Project Manager
Start Detailed Project Schedule & 12 Month Resource Plan	-15.6		Overhaul Project Manager
Overhaul Documentation Identification and (WO) Download (R0)	-15.5	◆	O/H Schedule / Site Technical Services (STS)
Submit SPIA/MPIA (Planning & Spare Funding Approval)	-15.4		Overhaul Project Manager
Scope Development Information Sent To Participants	-15.25		Major Projects - MP / Capital Effectiveness
Scope Development Workshop (R1)	-14.75	◆	STS / Asset Management (AM/MP) / OH/PT
Scope Challenge Completed/Signoff (TSM, SGM & AMSE)	-14.7		Overhaul Project Manager
Scope Finalisation in SAP (Scope Freeze)	-14.6	◆	Overhaul Project Manager
Options Developed Workshop	-14.5		STS / OH Planning Team (OH/PT)
Capital Effectiveness Estimate +/-20%	-14.25		STS / Asset Management (AM) / OH/PT
Start Contracting Strategy (TCE)	-14		STS / Asset Management (AM) / OH/PT
All Overhaul Scoping Document / Completed	-13		STS / MP / OH/PT
Final O/H Scope of Work / Estimate +/- 20% (R1)	-12.75		Site Technical Services
Approved SPIA/MPIA (Planning & Spare Funding Approval)	-12.5		Overhaul Project Manager
Overhaul Presentation To Site Senior Leadership Team (GM Sign-off)	-12.25	◆	STS / MP / OH/PT
Phase 1 Overhaul Scope Audit & Signoff (3 Man Team)	-12.1		Site General Manager/Group Managers (2)

Phase 2 Overhaul Detail Planning	Timing		Department Responsibilities
Issue PO to ISA Contractor For Detailed Planning Services	-12		Overhaul Project Manager
Finalise Detailed Planning Schedule & 12 Month Resource Plan	-11.85	◆	O/H Team
Overhaul Planning Phase Kick Off Meeting	11.8		Overhaul Project Manager/Specialist
Contracting Strategy Completed (TCE)	11.75		Contracts / Procurement / O/H Team / Risk
Issue Scope (R1) to Contractors for Quotation	-11.75	◆	O/H Team
Start Business Case and Board Paper	-11.75		O/H Team / Capital Effectiveness (CF)
Start Phase 3 Overhaul Management Plan	-11.7		Overhaul Project Manager/Specialist
Verify Long Lead Items - Order Status (Tracking & or Order)	-11.65		O/H Team
Sign off All Resourcing	-11.5		Site General Manager/Station Manager
Safety Forum Day 1 (Leadership)	-11.25		CSE Leadership / ISA Leadership
TCE Development Clarification Meeting 1	-10.75		O/H Team/ISA /Site Technical Services
Start Area Work Packs Development (AC/ISA)	-10.5	◆	O/H Team
Review All Capital Projects	-10		O/H Team
Capital Projects Scheduled & Integrated	-9.5		O/H Team
Review & Validate ISA KPI's	-9.25		Contracts / Procurement / O/H Team / Risk
Mini Audit Work Pack Development Status	-9	◆	Best Practices
Receive submission from contractor Target Cost Estimate (TCE)	-8.5		Contracts / Procurement
Final Challenge Target Cost Estimate (TCE)	-8.25		O/H Team / STS / AM
Board Paper (BP) & Business Case (BC) Completed	-8	◆	O/H Team / Capital Effectiveness (CF)
Site General Manager Signoff on TCE, Board Paper and Business Case	-7.75	◆	O/H Team
Submit Board Paper Final Expenditure Approval +/-10%	-7.5		Executive General Manager Operation
Board Approval Received	-7		Executive General Manager Operation
Submit Governmental Expenditure Approval +/-10%	-6.8		Executive General Manager Operation
Permit to Work Strategy Develop and Implementation	-6.5		O/H Team / Site GM / GM Operations
Capital Projects Scheduled & Integrated	-6.25		Capital Project Manager
Phase 3 Overhaul Management Plan Completed	-6.2		O/H Team
Executions Risk Review & Contingency Workshop	-6.1		O/H Team
AWR Freeze (Planning)	-6.0	◆	O/H Team
Quality Documentation Development	-5		O/H Team
Government Approval	-4.75		Executive General Counsel

Overhaul Optimisation Workshop (Performance & Schedule)	-4.5	◆	Best Practices/Capital Effectiveness/O/H Team
Finalise ISA KPI's	-4.25	◆	Contracts / Procurement / O/H Team
Phase 2 Audit & Signoff (3 Man Team)	-4.1	◆	Site General Manager/Group Managers (2)
Phase 3 Pre-Overhaul Work / Final Readiness	-4		Department Responsibilities
Award and Execute Contract	-4	◆	Contracts/Procurement/O/H Team
Work Pack Documentation Finalisation	-3.5		O/H Team
O/H Execution Schedule Finalised	-3.25	◆	TCE Contractor / O/H Team
Site Facilities and Accommodation (Finalised)	-3		O/H Team
Review Return to Service Procedures Completed	-2.5	◆	O/H Team
Consumables/Materials/Spares/Tools/Equipment (Final check)	-2		Contracts / Procurement / O/H Team
60 Day Technical Inspection for (Current Plant Description-AWR)	-2		Best Practices / Value Contributor
Mini Audit Readiness Status	-1.75		Best Practices
Complete Readiness Check Sheet	-1.25		O/H Team / STS / AM
30 Day Technical Inspection for (Current Plant Description-AWR)	-1		Best Practices / Value Contributor
Phase 3 Audit Site GM Execution Signoff (3 Man Team)	-1	◆	Site General Manager/Group Managers (2)
Field Mobilization	-0.75	◆	TCE Contractor / O/H Team
Pre-Work Complete (fabrication & online work)	-0.5		TCE Contractor / O/H Team
Safety Forum Day	-0.25		Safety Manager
Phase 4 Overhaul Execution / Return To Normal Operating Conditions			Department Responsibilities
	0		O/H Execution Team (OET)
O/H Execution (Detailed Schedule Driven)	0		O/H Execution Team / TCE Contractor
Daily Schedule and Cost Reports	0		O/H Execution Team
Productivity Review 1	0.25		BP / Capital Effectiveness / OET / ISA
Productivity Review 2	0.5		BP / Capital Effectiveness / OET / ISA
Productivity Review 3	1		BP / Capital Effectiveness / OET / ISA
Return to Service	1.5		O/H Execution Team
Overhaul Execution Work Completed	RTS		O/H Execution Team
Post Overhaul Debrief / Lessons Learnt	0.25		O/H Team / Major Projects
Post O/H Cleanup of Unit & Demobilisation	0.5	◆	O/H Team / Major Projects
Phase 5 Post Overhaul Closeout / Subsequent Overhaul Starting Point			Department Responsibilities
Lessons Learned Workshop (exceptions, anomalies and wins)	3 Days	◆	O/H Execution Team/ Major Projects
Comprehensive Review, Update & Validation of Maintenance Plans	15		O/H Execution Team/ Major Projects
•Review Additional Work Request (AWR)			O/H Execution Team/ Major Projects
•Review Contractor Reports For Inclusion in MP & ES Updates			O/H Execution Team/ Major Projects
•Review PTW Reports For WO Accuracy			O/H Execution Team/ Major Projects
•Review Asset Owner Reports For Inclusion in MP & ES Updates			O/H Execution Team/ Major Projects
•Verify Classification of Work On AWR (Additional, Emergent or Missed Scope)			O/H Execution Team/ Major Projects
•Review Inspection & Finding Reports			O/H Execution Team/ Major Projects
•Engage With O/H Area Coordinator To Discuss O/H Findings Report			O/H Execution Team/ Major Projects
Review Each (Plant Area) WO For Updating/Verifying The Following	42		Planning Resource
•Confirm Revision Number Structure For Subsequent Overhaul			Planning Resource
Verify WO Type Is Correct (exp -Z120, Z200 ect…)			Planning Resource
Verify Functional Location Is Correct			Planning Resource
Verify Functional Location Description			Planning Resource
Verify Maintenance Work Centre			Planning Resource
Verify Header Text			Planning Resource
Verify Operation Number			Planning Resource
Verify Work Centre			Planning Resource
Verify Operation Short Text			Planning Resource
Verify & Update Operation Long Text			Planning Resource
•Drawings			Planning Resource

•Procedures			Planning Resource
•Work Task Specifications			Planning Resource
•Verify Any New Attachment Have Been Completed			Planning Resource
Component Verification			Planning Resource
•Create Usage Report / Verified Against Actual WO			Planning Resource
•Verify Accuracy of Bill of Material			Planning Resource
Bill Of Material Discrepancy (ZSIR) Verification			Planning Resource
Verify Estimated Hours For Completion Of Work Order			Planning Resource
Input Actual Hours For Completion Of Work Order			Planning Resource
Input Actual Hours For Into CF Estimating Tool			Planning Resource
Verify Number of Personnel Required			Planning Resource
Validate and Gain Approval Signoff From Owner Of Maintenance Plan		◆	Site GM
Update Applicable Maintenance Plans (SAP Upload)			Planning Resource
Updates Equipment Strategy To Reflect Maintenance Plan			Engineer
Validate and Gain Approval Signoff From Owner Equipment Strategy			Technical Service Manager
IFOT-OMS Close Out Work Shop	7		O/H Execution Team/ Major Projects
Identify Long Lead Items, set order date & develop capital request			O/H Execution Team/ Major Projects
Action Items Owners assigned			O/H Execution Team/ Major Projects
Assign 12 Month Warranty and Defect Action Item		◆	O/H Execution Team/ Major Projects
Assign Post Investment Review Timing (9-12)			O/H Execution Team/ Major Projects
Overhaul Completion Audit	3		O/H Execution Team/ Major Projects
Develop Final Overhaul Report / Performance Metrics For Site GM	10		O/H Execution Team/ Major Projects
Develop Board Presentation Performance Metrics Submit To EGM Operations	10	◆	O/H Execution Team/ Major Projects

5.2 Execution Objectives

Objectives for good and efficient overhaul execution are safe post overhaul operation of the unit, minimum operational disturbance until the next cycle, execution of the overhaul according to schedule and budget.

Detailed planning of the overhaul is the foundation of success for managing the overhaul execution in an optimal manner. It is of importance that the same team responsible for overhaul planning will manage the execution.

The overhaul project team can be built from operating and maintenance staff. In case of Wivenhoe, a separate overhaul group preparation and executes all activities. In such a structure the interface between the operating personnel, maintenance and repair groups with the overhaul staff has to be carefully organised.

Prefabrication of parts of modifications, control and assembly of tools, training of personnel including motivation aspects, job training, acceptance of spare parts and materials should be prepared in good time before the overhaul start.

Additional waste can be created during the overhaul period. Measures should be planned and executed to minimise the waste volume and properly disposed of any contaminates that shutting down the unit potentially created. A good practice is to establish standardized environmental system such as ISO 14001.

5.2.1 Mobilisation of Resources, Material and Equipment

Some good practices that should be taken into account during planning and preparation are:

- Mobilisation of resources and material (2 weeks prior to execution)
- Signing all contracts according to the IFOT milestone schedule
- Planning and training in-house and outside resources in advance
- Identifying shared resources
- Checking for and reserving, material, spare parts and consumables available on site, at least 2 or 4 months before the overhaul start
- Sharing resources and material (cranes, hoist, special tools, etc.) in CS Energy and among other utilities.

5.2.2 Flexibility of Use

With any overhaul management system flexibility is essential. IFOT-OMS has been developed with a priority rating system.

- Priority 1 Activities – Ensures the safe delivery of the overhaul (schedule & budget is not a factor).
- Priority 2 Activities – Ensures the safe delivery of the overhaul on time (budget is not a factor).

In the event an overhaul is brought forward by more than 3 months of the original scheduled start date, priority 2 activates will be enacted within the current phase to execution. Safety and schedule will be the key focus with a secondary focus on delivering the unit on budget.

In the event an overhaul is brought forward by more than 6 months of the original scheduled start date, priority 1 activates will be enacted within the current phase to execution. Safe delivery of the overhaul will be the key focus, with a secondary focus on the timeframe and the budget.

5.3 System Documentation

5.3.1 Safety/Environmental Management Plan

Safety shall be the first consideration of IFOT-OMS. An overhaul specific Safety/Environmental Management Plan shall be developed in conjunction with the established CS Energy Safety Management System and the Safety Management System of the overhauling contractor. The plan shall be endorsed the system Owner and approved by the Site General Manager

5.3.1.1 Safety Forums

Two major safety forums are conducted during IFOT-OMS and these are key drivers to ensure the overhaul is conducted in the safest possible manner.

Phase 2 Safety Forum – This will be conducted with the leadership of the primary contractor and other leading contractors. This forum will to clearly define CS Energy's expectations on safety and identify how both company with collectively be responsible for safety and deliver safe outcomes during all aspects of each phase.

Phase 4 Safety Forum, conducted with all Contractors that will be executing work during the overhaul. This forum set out detailed instructions, induction requirements and CS Energy's expectations on safety and how both company with collectively are responsible for safety and deliver safe outcomes during all aspects of each phase.

5.3.2 Overhaul Management Plan

An Overhaul Management Plan (OMP) shall be written at the beginning of Phase 1 and this will serve as the primary agreement between the system Owner and System Users. This plan will outline the agreed to bounties in which each phase of IFOT-OMS (1-5) will be conducting under and the level of decision making ability the Project Manger / Specialist has.

The primary purpose focus of the plan shall be to clearly define how the overhaul will be planning, execute, monitor, govern and closed out. This plan also serves as the main communication vehicle to all key stakeholders, ensuring they are aware and knowledgeable of overhaul objectives and how they will be accomplished.

Development of the OMP shall be the responsibility of the appointed Project Manager in consultation, support and assistance from the Representative and System Manager. This plan shall be considered a living document as update may be required to describe future plant conditions. The plan and any revisions of this plan requires approval from the Site General Manger and the System Owner

5.3.3 Detailed Schedule

5.3.3.1 Standard

A Detailed Schedule shall be developed to start Phase 1 by the use of an approved CS Energy scheduling software system. The schedule must be specifically lays out a in the following format, see Attachment 1 (17.1) for Coal Fired Station Template.

Each subtask must have a start / finish date and a CS Energy employee name assigned. This shall be completed for each of the IFOT-OMS phases (excluding Phase 4 Execution).

It is the responsibilities of the Project Manager to develop the detailed schedule in consultation, support and assistants from the Representative and System Manager with final endorsement of the schedule from the Site General Manager. Considerations are the effective management of Core Team members, safe overhaul outcomes and to identify technical experts to support planning and execution work.

5.3.4 Overhaul Scope Document

An approved Overhaul Scope Document (OSD) **shall** be developed which summarises the key objectives and all relevant elements of the overhaul. It is the responsibility of the Site Technical Service team (STS) to develop this document and it will serve as one of the primary sources of information for the Overhaul Management Plan. This document should give a detailed overview of what the project is intended to achieve and how this will be done. It will include specifically what is in the scope and what has been removed from the scope as compared to the SAMP.

5.3.5 Work Order Integration and Strategy Ownership

Overhauling plant equipment is one means that CS Energy's uses to address known and unknown risk associated with specific Equipment Strategies located within the Station Asset Management Plan. The work orders (WO) associated with these two systems, are referred to as Z100, Z120 Z200 and Z210.

Each equipment strategy has an associated number of WO's that list specific actions or tasks that are required to be undertaken and in what order they are to be performed. These WO are the fundamental backbone of the equipment strategy as without these tasks being performed at a designated scheduled timeframe the equipment would breakdown or permanently cease to operate.

In addition to these, corrective maintenance (Z100) that require the unit to be offline and capital works / modification changes (Z200 & Z210) are also integrated within most overhauls as a point of opportunity, so not to impact the CAR factors. The Owner of each area will be the accountable individual to ensure the corresponding WO are within the SAP system, are fully up to date and have been reviewed by the appropriated resource.

This resource will verify all task have been identified with and listed in a step by step cytological order. Consideration will be given to correct listing of materials, task hours, jobs set-up requirements (i.e. scaffolding, tools, cranes and any special requirements).

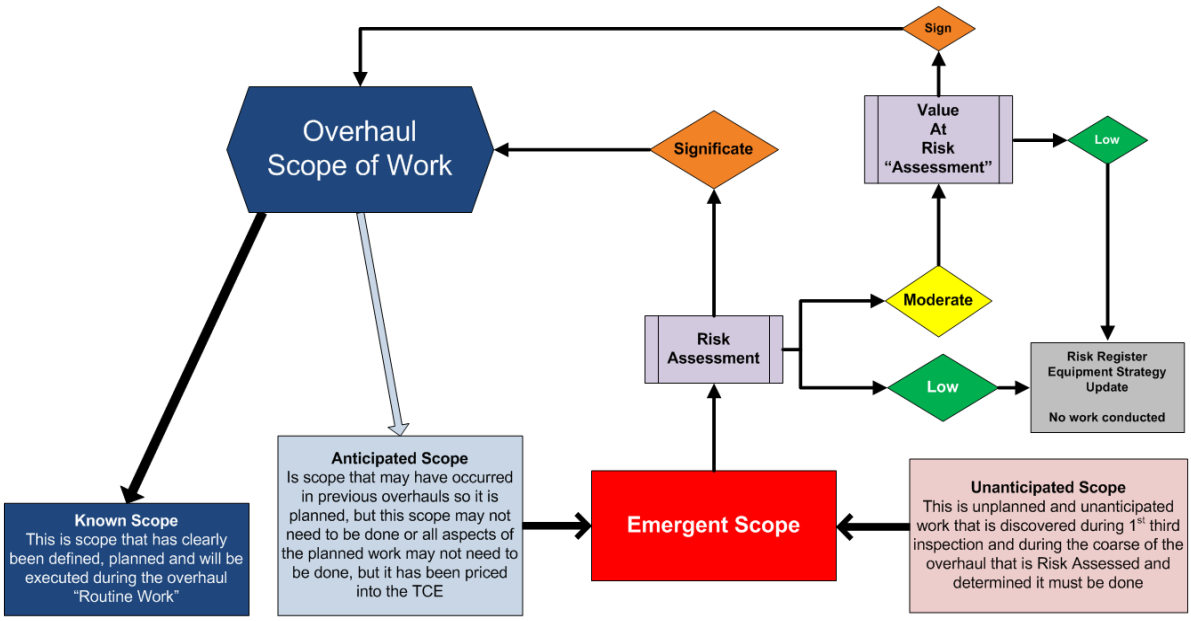
Work Order types used in SAP are defined below:

Work Order Type	Description
Z100	Corrective Maintenance Order
Z110	Preventive Maintenance Order
Z120	Overhaul Order
Z200	Expensed Modification / Project Order
Z210	Capital Modification / Project Order
Z300	Training and Meeting Order

5.3.6 Work Classification Procedure

The Work Classification Procedure (WCP) shall be used in all phases IFOT-OMS. This document defines how CS Energy classifies what is routine, emergent and capital work. It sets out a process to capture missed scope, so it is not missed again and set guidelines for the approval of emergent work, establishes a cut-off timeframe for inclusion in the overhaul. It also outlines a Value At Risk process.

5.3.7 Work Classification Flow Diagram



5.3.8 Overhaul Scope of Work

5.3.8.1 Routine - Known Scope (Z110/Z120)

These are work task or activities that are required to be completed that have been clearly indentified defined by the OEM. These tasks have then been reviewed and incorporated within the equipment strategies and imputed to the Station Asset Management Plan. This type of work is refereed as Z110 within CS Energy's (Work Order Type)

5.3.8.2 Routine – Anticipated Scope (Z100/Z110/Z120)

These are work activates that may have occurred in previous overhaul or condition monitoring has set a corrective action that is required to be done during the overhaul. The key factors is this type of scope may not need to be done or all aspects of these tasks have then been reviewed and incorporated within the equipment strategies and imputed to the Station Asset Management Plan.

5.3.8.3 Emergent Work

This is unplanned and unanticipated work that is discovered during 1st and 3rd inspections and during the course of the overhaul that is risk assessed and determined it must be done. In addition to this, it is corrective maintenance that has been determined it can only be conducted off-line and it can be consolidated into the overhaul with an acceptable level of risk.

5.3.8.4 Capital Work

These are normally classified as Z200 Work and are integrated into the execution schedule within Phase 2 (Detailed Planning). They are classified in two categories, work directly related to the overhaul scope or work that is being preformed while the unit is off line. These projects may have a separate Project Managers during their development phase, but will become responsibility of the O/H Project Manager upon integration in to the execution schedule.

5.3.9 Return to Service Strategy

The Return to Service Strategy shall be completed by the Project Manager / Specialist under consultation, support and assistance of the Representative and System Manager. The Site General Manager will approve this plan no later than one month from the completion of phase three. This plan is the 'road map' enabling the controls for the return to service process and should clearly define the requirements to safety return the unit to normal operating conditions.

This strategy is part of the overhaul execution schedule and the Project Manager / Specialist and the Core Team Execution are responsible for the return of the unit to normal operating conditions. The overhaul will not be completed and accountability of the unit will not pass to Operations until the unit has been returned to normal operating conditions as defined within the Overhaul Scope Document.

Below describe "only" the generic process and quality assurance requirements for a unit RTS after an overhaul. The specific milestones for the RTS are:

- unit release for commissioning; and
- hand-over to Operations group after all commissioning activities are completed.

This is to be applied for all planned unit outages, this procedure is not intended for use on short unplanned outages, however some elements may be relevant.

Note that this procedure does not define the specific content of any document. The different types of documentation will be site and overhaul specific.

5.3.9.1 RTS Deliverables

Required documentation:

- Final handover from Overhaul to Operations is documented in the Inspection & Test Plan (ITP) for Unit Commissioning & RTS
  - Includes references to other documents (see below)
  - Summary of any risk assessments undertaken as part of the RTS process
  - Summary of any changes or exceptions to normal O&M practices
  - Summary of any temporary or conditional issues that may affect unit operation (e.g. items that are being monitored / validated during initial operating period)
- Completion documentation for each Plant Area will include:
  - References to other documents (see below)
  - Work on plant completed
  - Testing / commissioning on plant completed

- Items to be rectified after overhaul (Outstanding Issues List)
- List of any incomplete work items (with all completed Change of Work Request forms)
- Risk assessments undertaken as part of the RTS process (e.g. due to work not performed)
- Summary of any changes or exceptions to normal O&M practices
- Duration and conditions of release

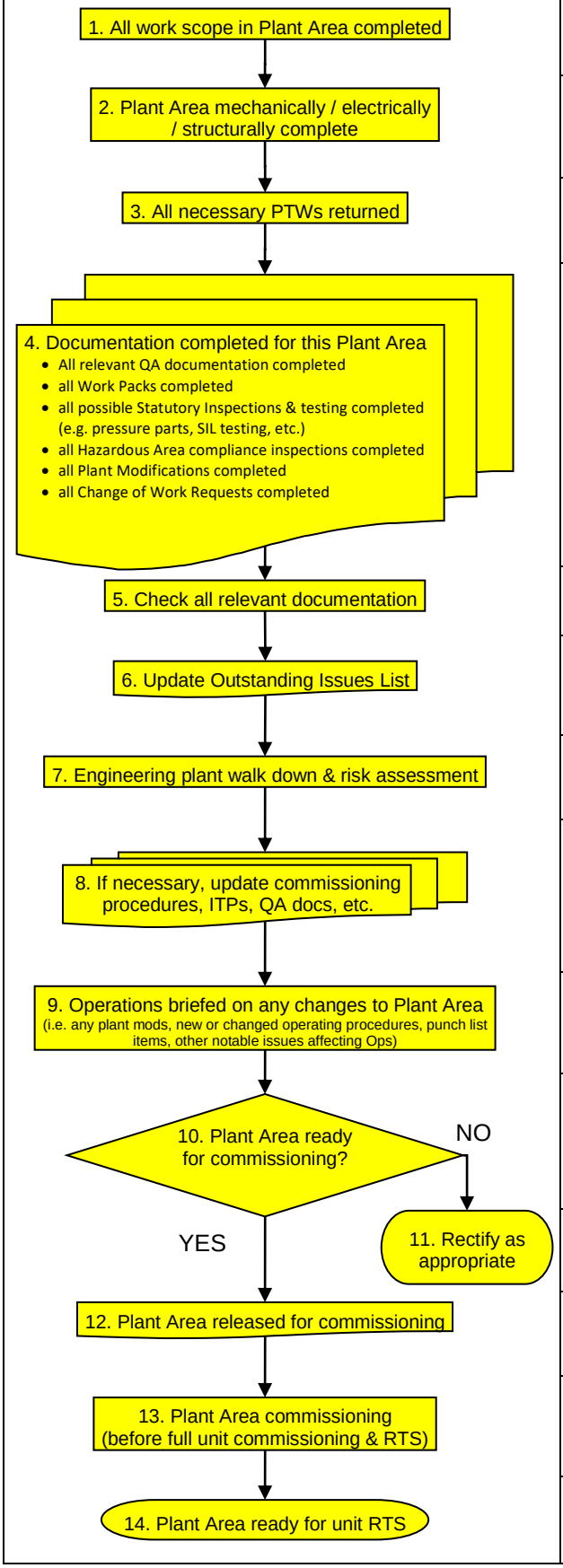
- All statutory compliance certificates
  - Pressure parts compliance
  - NER compliance
  - Safety systems compliance
- All plant modifications implemented
- Inspection checklist prior to Unit Commissioning & Handover
- Inspection and Test Plan's ITP's and Work Packs complete
- Permit To Work signed off and returned
- Operations pre start check list
- Engineering plant walk down inspection.

5.3.9.2 Process Flow

There are two processes outlined in this section:

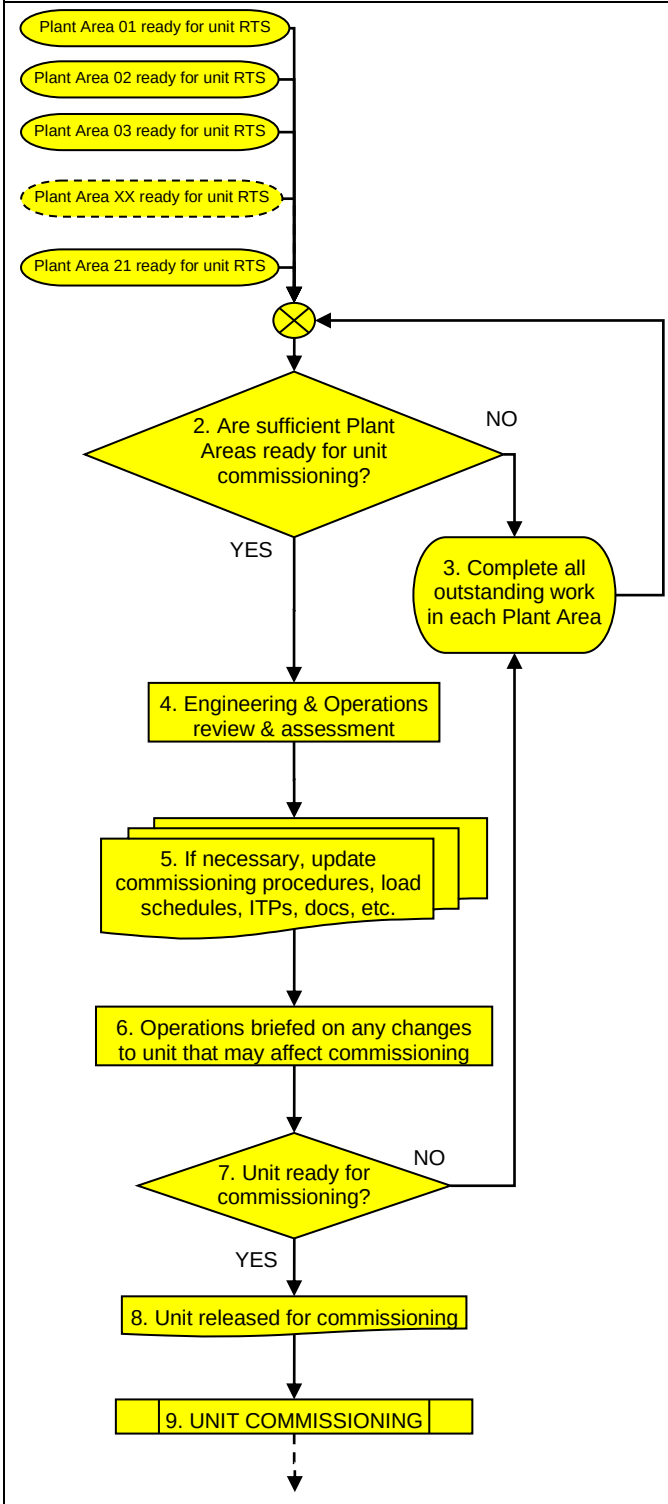
- RTS for a single plant area, i.e. to bring a single system(s) in service before the complete generating unit is returned to service; and
- RTS for the complete generating unit after all plant areas are ready for service.

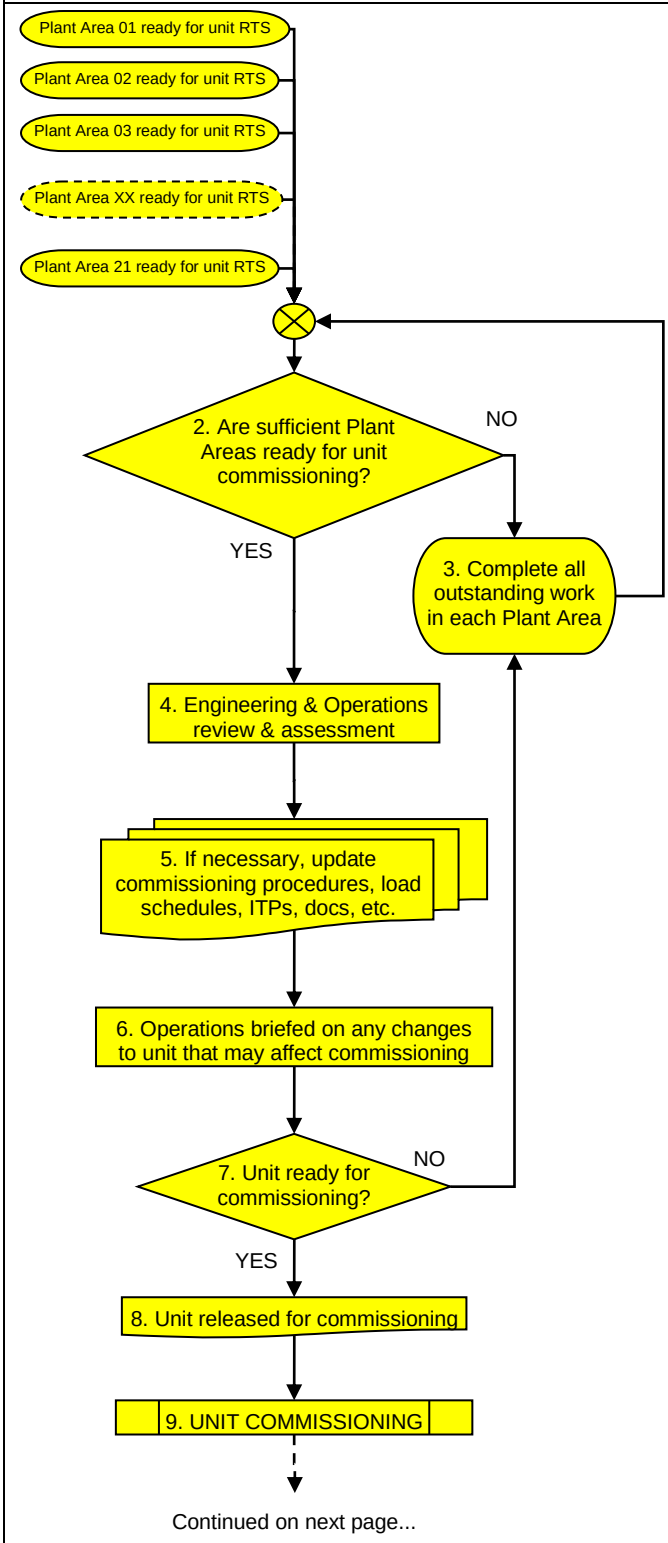
Single Plant Area RTS

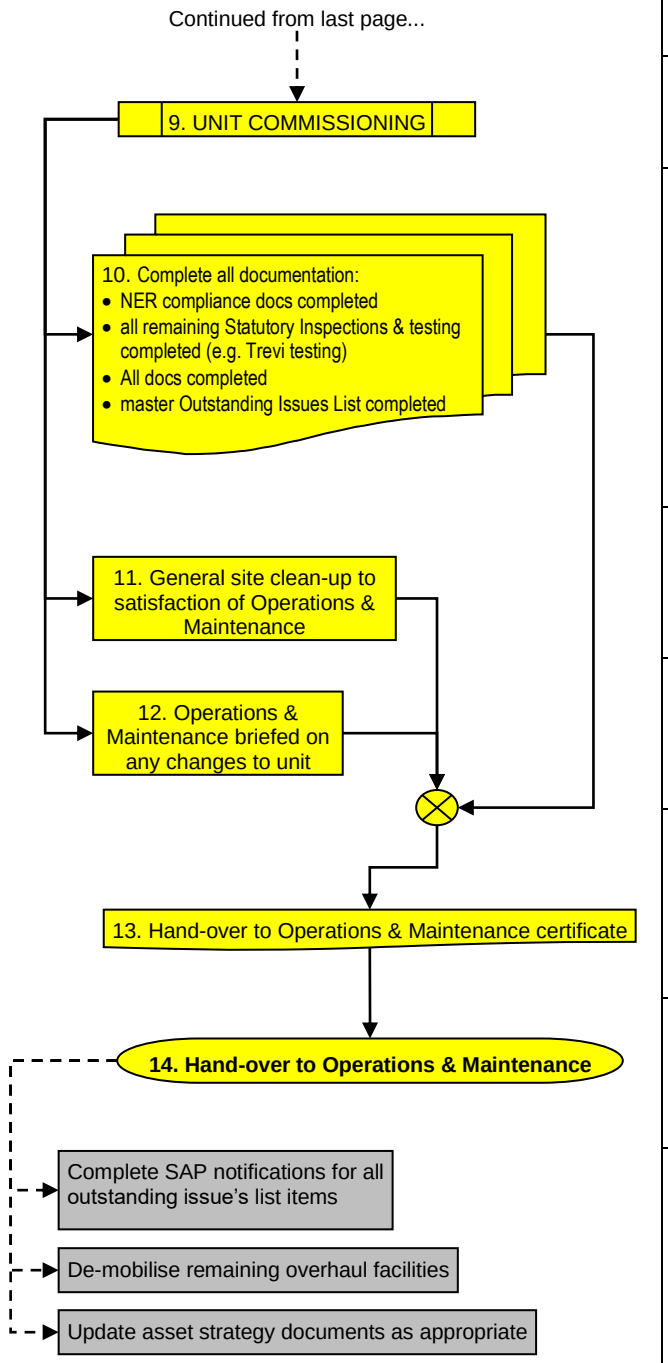


Process	*Step*	*Responsible*	*Comments*
	1	Plant Area Supervisor	
	2	Plant Area Supervisor	
	3	Plant Area Supervisor	
	4	Plant Area Supervisor, Project Manager, Engineer responsible for modifications	All documentation must be completed before work is considered completed.
	5	Plant Area Engineer	
	6	Plant Area Supervisor	
	7	Plant Area Engineer	See notes on review and risk assessment below.
	8	Plant Area Engineer	
	9	Plant Area Engineer	
	10	Plant Area Engineer	Can the Plant Area be energised and tested? Operations pre start checklist completed?
	11	Plant Area Supervisor	Rectification works will be case dependent.
	12	Plant Area Engineer	RTS document
	13	Commissioning Manager	
	14	Commissioning Manager	

5.4 Unit commissioning and RTS

Process	Step	Responsible	Comments
	1	Commissioning Manager	all necessary Plant Area (systems) must be ready
	2	Commissioning Manager	
	3	Plant Area Engineer	Rectification works will be case dependent.
	4	Commissioning Manager; Plant Area Engineer(s)	See notes on review and risk assessment below.
	5	Commissioning Manager; Plant Area Engineer(s)	
	6	Commissioning Manager	
	7	Commissioning Manager	
	8	Commissioning Manager	RTS document
	9	Commissioning Manager	

Process	Step	Responsible	Comments
	1	Commissioning Manager	all necessary Plant Area (systems) must be ready
	2	Commissioning Manager	
	3	Plant Area Engineer	Rectification works will be case dependent.
	4	Commissioning Manager; Plant Area Engineer(s)	See notes on review and risk assessment below.
	5	Commissioning Manager; Plant Area Engineer(s)	
	6	Commissioning Manager	
	7	Commissioning Manager	
	8	Commissioning Manager	RTS document
	9	Commissioning Manager	

Process	Step	Responsible	Comments
			
	9	Commissioning Manager	
	10	Commissioning Manager	
	11	Overhaul Manager	
	12	Commissioning Manager	
	13	Overhaul Manager	RTS document
	14	Senior Operator	
			These processes are outside the scope of this process.

5.4.1 Standards

5.4.1.1 Requirements to commence commissioning:

- Documentation requirements before release for commissioning of a single plant area:
  - All documentation regarding the works performed must be completed (including sign-off by *Plant Area Supervisor*)
  - All work scope items must be completed unless a *Change of Work Request (CWR)* has been submitted and approved
  - *Work Packs* must be completed with any certificates and other documentation complete (including any sign-off required)
  - All *Statutory Inspection & Testing* documentation has been completed (with exception of tests that require the unit to be on-line, e.g. trevi testing of safety valves)
  - All *Hazardous Area* inspection documentation must be completed
  - *RPEQ*'s have checked and approved any work scope items that require their authority (see Section 5.3)
  - The master *Outstanding Issues List* has been updated to include any known issues (that do not prevent commissioning)
- Engineering & *Operation*s review & assessment:
  - All plant modifications (including associated documentation) have been completed and key technical staff have been adequately briefed on how the changes may affect commissioning.
  - The relevant *Plant Area Engineer* and *Senior Operator* (or delegate) must independently check the physical condition of each *Plant Area* (i.e. thorough inspection).
  - Risk assessment is only required if there are exceptions to normal operation or condition of the plant. For example: changes to plant or procedures; minor maintenance issues (e.g. minor oil leaks); work a rounds due to delays; etc.
  - In the event of any requirement for a risk assessment for a single *Plant Area*, the relevant *Plant Area Engineer* will oversee the review and document the risk assessment and any resulting actions. All key stakeholders, including technical specialists of all necessary disciplines (see Section 5.3), must be involved. The *Technical Services Superintendent* must endorse the recommendations.
  - A risk assessment is mandatory for unit commissioning (i.e. step 4 of section 5.4). The *Commissioning Manager* will oversee the review and document the risk assessment and any resulting actions. All key stakeholders, including technical specialists of all necessary disciplines (see Section 5.3) must be involved. The *Technical Services Superintendent* must endorse the recommendations.
  - Any changes to commissioning procedures must be documented and discussed with *Operations* before commissioning commences.

5.5 Plant hand-over documentation:

- *RTS* document is an Inspection and Test Plan (*ITP)* showing commissioning status of each *Plant Area* release for unit commissioning and final hand-over to *Operations* Technical Sign off Requirements:

5.5.1 Technical / Engineering

- The Professional Engineers Act Qld (2002) has placed special responsibilities of staff involved in engineering activities. In particular, any work requiring engineering skill or judgement is required to be performed or supervised by a qualified Registered Professional Engineer or Queensland (*RPEQ*). Specifically, RPEQ approval is required for the addition and removal of scope items post scope challenge and other items listed below.
- Endorse all risk assessments and commissioning plans.
- Endorse commissioning procedure.
- Approve all non standard repairs.

- Inspect all plant modifications.
- Review all *Statutory Inspection* findings.
- Endorse all Inspection and Test Plans, outstanding issues and OK for commissioning and handover.
- Endorse all changes in normal operating processes or procedures.

5.5.2 Operations

- Complete pre-start checks & plant walk downs prior to commissioning.
- Follow commissioning plans and procedures.
- Accept handover.

5.5.3 Chemical

- Endorse all risk assessments and commissioning plans.
- Endorse inspection and test plans, commissioning plans and procedures.
- Check and approve water condition to enable commissioning to start.
- Complete cold clean-up process steps.

5.5.4 Environmental

- Endorse the overhaul environmental management plan.
- Endorse inspection and test plans.

5.5.5 Health & Safety

- Endorse overhaul safety plan.
- Endorse handover to *Operations*.

5.5.6 Service Providers

- Complete all *Work Packs* and inspection and test plans.
- Report all findings and exceptions.

6 OVERHAUL CLOSEOUT

Planning for the overhaul closeout shall be developed during the detailed planning phase (2) of IFOT-OMS. This planning will outline the key processes and activities which shall occur following the units return to commercial operations.

The use of all relevant CS Energy registered documents and templates are required for the separate workshops and forums during this phase of the overhaul. Within the Overhaul Management Plan lies specific background and guidance information on each of the key aspects to Phase 5.

6.1.1 Work Shops and Reviews

After the unit has returned to normal service, a review of the entire process is necessary to assess the work done and provide feedback to further optimise the next overhauls. This will occur through four key workshops / reviews.

Key Workshops / Reviews

- Lessons Learnt Workshop
- Close Out Workshop
- Close Out Report
- Post Investment Review

Post overhaul workshops and reviews should consider:

- Achievement of objectives, goals and budget
- Technical status of the unit after the overhaul
- Evaluation of a list of problems and contingencies
- Events occurred during overhaul and on the first period of operation after overhaul,
- Complete analysis of overhaul execution performance indicators, such as effective use of working time, waiting hours, availability of support, volume of radioactive and other waste, collective dose, industrial accident, etc.
- Evaluation of contractors performance (KPI finalisation)
- Identification of possibilities to shorter work processes
- Identification of technical or administrative measures enabling an earlier plant restart
- Analysis of shutdown and start up procedures
- Analysis of working procedures, organisations and safety culture attitude
- Transfer of overhaul experience feedback to other units
- Other suggestions and recommendations for the next overhaul

Following overhaul analysis, action plans should recommend solutions such as:

- Elimination of unnecessary activities by reduction of component maintenance and inspections
- Alternatives for shutdown and start up procedures.

Special attention should be given to causes leading to overhaul extensions such as delays of material deliveries including documentation, testing, commissioning and restart problems. To prevent such delays during the next overhauls, countermeasures could be initiated for continuous update of the time schedule assisting the management in earlier identification of delays. Section 3.2.3.6 discusses causes and countermeasures for overhaul extension.

A review report should be prepared including a summary on above mentioned aspects from which lessons can be learned and applied in the next overhaul. A good practice is to have the full overhaul report ready latest one or two months after the overhaul to provide feedback in time to improve the next overhaul. Another good practice is to arrange a meeting with the main players in the overhaul to discuss their experience and improvements.

7 RESPONSIBILITIES & ACCOUNTABILITIES

The Overhaul Manager is responsible to ensure all overhaul work scope items, Statutory Inspections, non-compliances and incomplete overhaul work have been reviewed and approved as appropriate and all relevant documentation is complete. The overhaul manager is also responsible to ensure all plant modifications have achieved sign off for approval to implement before being accepted in the overhaul scope.

Completion of the modification, including all relevant documentation, updated drawings, training, commissioning and pre-start checks remains the responsibility of the plant modification implementation officer.

All Plant Area Supervisors / Project Managers are responsible to ensure the Overhaul Manager receives completed documentation and have resolved any outstanding issues. Where necessary, the relevant technical review (including RPEQ requirements as appropriate) should be completed with any exceptions noted. The Overhaul Manager must then coordinate resolution of any outstanding issues (seeking any necessary technical approvals).

7.1.1 Governance and Reporting Strategy

Governance and reporting **shall** be established by the end of Phase 1. This should clearly outlining the duties, responsibilities, member's names and potions held within of the overhaul governing body which will be known as the Overhaul Steering Committee (OSC). All OSC members will be nominated by the System Manager and approved in consultation with the system Owner and Site General Manager. A monthly meeting will be held and it is the responsibility of the Project Manager to prepare all relevant information for review, but this duty may be delegated.

7.1.2 Governance

The overhaul governing body of the overhaul will be known as the Overhaul Steering Committee (OSC). All OSC members will be nominated by the System Manager and approved in consultation with the System Owner and Site General Manager. A monthly meeting will be held and it is the responsibility of the Project Manager to prepare all relevant information for review at this meeting, but this duty may be delegated.

7.1.3 Overhaul Steering Committee

7.1.3.1 Function

The primary function of the Overhaul Steering Committee (OSC) is to provide leadership and governance for the feasibility, business case and the achievement of overhaul outcomes. The OSC will monitor and review the overhaul status, as well as provide oversight of the overhaul deliverables.

The Steering Committee provides a stabilising influence so CS Energy organisational concepts and directions are established and maintained with a visionary view. The Steering Committee provides insight on the application of CS Energy strategies in a supporting and constructive model. Members of the Steering Committee ensure business objectives are being adequately addressed and the overhaul remains under control.

7.1.3.2 Members

The Overhaul Steering Committee comprises of personnel representing strategic parts of the organisation. The System Manager facilitates an effective and functional meeting. The Site General Manager retains final decision making authority,

- Facilitator – System Manager
- Site General Manger
- Group Manager – Asset Management
- Group Manager – Capital Effectiveness
- Group Manager – Governance, Risk & Compliance
- Head of Health, Safety and Security
- Senior Contracts Manager

7.1.3.3 Charter

The Steering Committee conducts itself in accordance with the Committee Charter ("B/D/16/1011"). The charter documents that defined purpose of the Committee, how it will work, and what the expected outcomes are. The Charter shall be review on a two yearly basis.

7.1.3.4 Meetings and Agenda

The Committee shall meet in accordance with the requirements of IFOT-OMS. These meetings will be a blend of face to face and teleconference style meetings. Additional out of sequence meetings may be convened from time to time to address specific priorities as they arise. These meetings will be manage don a case by case basis through consultation with Committee members.

7.1.3.5 Agenda

The Committee agenda shall be issued to all members seven (7) days prior to the meeting occurring. This standing agenda is based on the Committee agenda template ("B/D/16/1012").

The content of the standing agenda should be reviewed at the first meeting of each overhaul to ensure its contents and direction meet the specific needs of the committee.

7.1.3.6 Decision Making Process

The System Manger should facilitate the discussion and decision making processes. This process is supported by the input of each committee member and contributors. The final decision making accountability remains with the Site General Manager. The Site Manager shall sign off on the philosophy and key objectives of the overhaul:

- Health, Safety & Environmental deliverables
- Scope philosophy
- Duration
- Timing
- Budget

Post-Completion Steering Committee Meeting

The Steering Committee shall participate in the post-overhaul review.

7.1.4 Reporting

IFOT-OMS Phase 1, Phase 2 and Phase 3 shall be reporting on weekly. This report will be generated from the Detailed Schedule and be based on the following criteria (minimum standard below) refer Attachment 2

- Planned vs. Actual (task completion)
- Weekly Safety Statistics
- Resourcing Requirements
- Monthly Milestone (Completed or Late)
- Risk Report (Planning & Execution)
- Capital Projects
- Last Task/At Risk Task

7.1.5 Risk and Contingency Strategy

Risk and contingency strategies has been established to set guidelines on what activities are required to be completed prior to IFOT-OMS Phase 1 starting and who is accountable to perform these actions.

IFOT-OMS Pre-Requirements

- Risk Enterprise System (Updated)
- Equipment Strategy (Updated)
- Strategic Asset Management Plan (Updated)
- See CS Energy Risk Enterprise System Manual for further detail.

7.1.6 Risk Work Shops

To ensure the successful delivery of the overhaul project it is essential to understand the risks that will potentially impact the cost, duration, safety outcomes and overall objectives of the overhaul in terms of availability and reliability for the subsequent unit run period. Firstly these key objectives must be understood and documented on the first page of the IFOT overhaul risk assessment spreadsheet.

- Phase 2 risk work shop will address overhaul planning and execution risk.
- Phase 3 risk work shop will integrate all contractors, outline execution risk and establish controls to address that risk.

7.1.6.1 Workshop Objectives

The documented overhaul objectives will be the basis on which to undertake a project risk assessment to consider those risks they may impact CS Energy in achieving those overhaul objectives, including:

1. Potential emergent works based on unknown plant condition
2. AWR's and other late scope or uncertain scope items
3. Safety risk issues related to the tasks to be completed
4. Project risks related to overhaul planning, contracting and resourcing
5. Critical path activities / work areas and potential risks to duration
6. Long lead items and critical spares required
7. Safety risks related to contractors, PTW and other abnormal activities
8. Market risks that include impacts of contracting periods, peak trading periods and other unit outages across the portfolio

This process should be undertaken as a facilitated workshop with the assistance of the Governance Risk and Compliance team or the project manager. The facilitated workshop should be undertaken with a multi disciplinary team consisting of:

- Overhaul project team
- Overhaul specialists
- Technical services specialist
- Asset Management
- Production and maintenance team members with strong knowledge of the works and work areas
- Capital projects team members where a significant amount of capital project work is being completed during the overhaul.

The deliverable of the risk workshop will be the IFOT overhaul risk assessment spreadsheet, which outlines the key risk areas for consideration.

It is recommended that to most effectively consider the risks, workshops should be held over a couple of days to review each core work area and to undertake an in-depth review of any work areas that have TCE estimate of greater than 10% degree of uncertainty. The session should be done after some level of detailed planning is complete so there is clarity in regard to the actual scoped work and timings allocated.

The risk matrix to be utilised will be the project risk matrix calculated in the template spreadsheet adopting percentage duration and cost ranges to rate the risks. This rating process enables the project team to determine the extent to which we believe a risk should be managed and the prioritisation of risk management activity. These risk ratings will assist in providing clarity to stakeholders on estimates of the potential cost and duration impacts in total for the project.

7.1.6.2 Actions and Action Management

During the workshop after each risk is rated, consideration should be given to the acceptability of the risk and whether further action is required to reduce the risk. These decisions should be made making risk v value decisions, particularly where there is an additional cost to reduce the risk, i.e. buying additional spares. This should include consideration of the impact if the activity does not occur, for example the cost of an outage after the overhaul to undertake a repair.
Actions should be assigned an owner and timeframe to ensure absolute accountability to manage the risk and how it is addressed. Actions can be designed to eliminate the risk, reduce the likelihood of a risk occurring or to minimise the impact should it occur.

7.1.6.3 Communication and Escalation

Significant project risks should be escalated and communicated to the project sponsor and to the overhaul steering committee. Need to work out what goes to the capital steering committee throughout the early phases of the project.
Prior to project execution all remaining risks are to be escalated to the Executive Leadership team, capital steering committee, and market risk committee to ensure management have a clear understanding of risks that still have the potential to impact cost, duration, environment and health and safety outcomes.

7.1.6.4 Tracking and Updating

Throughout the duration of the project risks should be tracked and updated to ensure there is clarity of the current risk position of the project. Risk management is an ongoing process, and each workshop provides merely a starting point for risk management, it is the fulfilment of actions that manages the risk. In addition changes and movement in the project may cause risks to be re-assessed or new risks to be identified; as such the management of risk needs to continue outside of the key risk activities outlined in the IFOT process. This should be achieved by the continued engagement of stakeholders across the business.

7.1.6.5 Phase three IFOT Risk Assessments

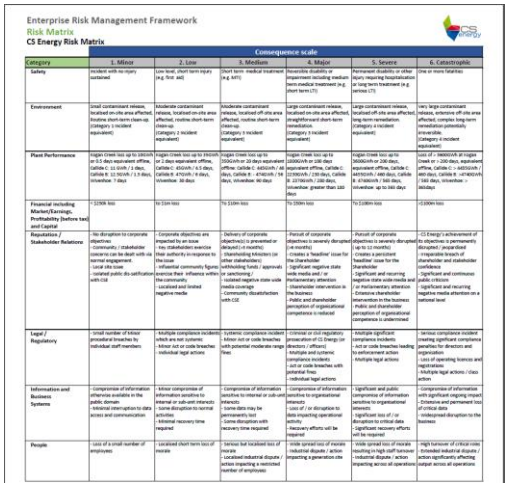
Building on the work from the Phase 2 workshop it is important to engage with core contractors to ensure a shared understanding of the risks that the project is likely to face and a shared view and approach on how these risks are best managed. This process has the added benefit of identifying additional risks based on the contractor experience and also drawing on their experience in terms of management techniques.

Again this should be undertaken in a workshop forum to ensure engagement and contribution from all parties. The workshop process can be fluid but should engage particularly on work methods, those areas of potential emergent works, AWR's and those work areas where the TCE has a greater than 10% level of uncertainty. (See section 7.1.6.1 for detailed outline)

This workshop should build on the work undertaken in Phase 2 and will follow them same process of rating, development of actions, follow up and reporting and escalation.

At this point in the overhaul process the Project Manager should consider how to move from risk management activities that are planning and preparation activities to contingency planning for risk events that occur during the actual project execution. These plans should consider how you respond to events such as emergent work programs requiring additional resourcing, potential short timeframe suppliers and fabricators etc. For those risks that could not be mitigate / reduced prior to project commencement. Again, engagement with contractors in this activity assists in expediting activity during execution.

7.1.6.6 Examples of Risk Management Framework (Risk Matrix) (INSERT TRIM LINK)


Enterprise Risk Management Framework
Risk Matrix
CS Energy Risk Matrix

Category	Consequence scale 1. Minor	2. Low	3. Medium	4. Major	5. Severe	6. Catastrophic
Safety	incident with no injury sustained	Low-level, short term injury (e.g. first aid)	Short term medical treatment (e.g. MTI)	Reversible disability or impairment including medium term medical treatment (e.g. short term LTI)	Permanent disability or other injury requiring hospitalisation (or long term treatment (e.g. serious LTI)	One or more fatalities
Environment	Small containment release, localised on-site area affected, routine short-term clean-up. (Category 1 incident equivalent)	Moderate containment release, localised on-site area affected, routine short-term clean-up. (Category 2 incident equivalent)	Moderate containment release, localised off-site area affected, routine short-term clean-up. (Category 3 incident equivalent)	Large containment release, localised on-site area affected, straightforward short-term remediation. (Category 4 incident equivalent)	Large containment release, localised off-site area affected, long-term remediation. (Category 4 incident equivalent)	Very large containment release, extensive off-site area affected, complex long-term remediation potentially irreversible. (Category 4 incident equivalent)
Plant Performance	Kogan Creek loss up to 180GWh or 0.5 days equivalent offline, Callide C: 10.1kWh / 1 days, Callide B: 12.9GWh / 1.5 days, Wivenhoe: 7 days	Kogan Creek loss up to 350GWh or 2 days equivalent offline, Callide C: 45GWh / 4.5 days, Callide B: 47GWh / 6 days, Wivenhoe: 30 days	Kogan Creek loss up to 550GWh or 20 days equivalent offline: Callide C: 64GWh / 40 days, Callide B: 47.4GWh / 56 days, Wivenhoe: 90 days	Kogan Creek loss up to 1050GWh or 180 days equivalent offline, Callide C: 223GWh / 239 days, Callide B: 227GWh / 200 days, Wivenhoe: greater than 120 days	Kogan Creek loss up to 3650GWh or 200 days equivalent offline, Callide C: 447GWh / 480 days, Callide B: 474GWh / 365 days, Wivenhoe: up to 365 days	Loss of > 3600GWh at Kogan Creek or > 200 days, equivalent offline, Callide C: > 447GWh / 480 days, Callide B: >474GWh / 365 days, Wivenhoe: > 365days
Financial including Market/Earnings, Profitability [before tax] and Capital	~ $250K loss	to $1m loss	To $10m loss	To $50m loss	To $100m loss	>$100m loss
Reputation / Stakeholder Relations	- No disruption to corporate objectives - Community / stakeholder concern so can be dealt with via normal engagement. - Local site issue - Isolated public dis-satisfaction with CSE	- Corporate objectives are impacted by an issue - Key stakeholders exercise their authority in response to the issue - Influential community figures exercise their influence within the community - Localised and limited negative media	- Delivery of corporate objectives is prevented or delayed (<6 months) - Shareholding Ministers (or other stakeholders) withholding funds / approvals or sanctioning / - Isolated negative state wide media coverage - Community dissatisfaction with CSE	- Pursuit of corporate objectives is severely disrupted (>6 months) - creates a 'headline' issue for the shareholder - Significant negative state wide media and / or Parliamentary attention - shareholder intervention in the business - Public and shareholder perception of organisational competence is reduced	- Pursuit of corporate objectives is severely disrupted (up to 12 months) - Creates a persistent 'headline' issue for the Shareholder - Significant and recurring negative state-wide media and / or Parliamentary attention - Crisis in shareholder intervention in the business - Public and shareholder perception of organisational competence is undermined	- CS Energy's achievement of its objectives is permanently disrupted / jeopardised - irreparable breach of shareholder and stakeholder confidence - Significant and continuous public criticism - significant and recurring negative media attention on a national level
Legal / Regulatory	- Small number of minor procedural breaches by individual staff members	- Multiple compliance incidents which are not systemic - Minor not on code breaches - Individual legal actions	- Systemic compliance incident - Minor not or code breaches with potential moderate fines	- Criminal or civil regulatory prosecution of CS Energy (or individuals) or both - Multiple and systemic compliance incidents - not or code breaches with potential fines - Individual legal actions	- Multiple significant compliance incidents - Act or code breaches leading to enforcement action - Multiple legal actions	- Serious compliance incident creating significant compliance issues for directors and organisation - Loss of operating licences and registrations - Multiple legal actions / class actions
Information and Business Systems	- Compromise of information otherwise available in the public domain - Minimal interruption to data access and communication	- Minor compromise of information sensitive to internal or sub-unit interests - Some disruption to normal activities - Minimal recovery time required	- Compromise of information sensitive to internal or sub-unit interests - Some data may be permanently lost - Some disruption with recovery time required	- Compromise of information sensitive to organisational interests - Loss of / or disruption to data impacting operational activity - Recovery efforts will be required	- Significant and public compromise of information sensitive to organisational interests - significant loss of / or disruption to critical data - Significant recovery efforts will be required	- Compromise of information with significant ongoing impact - Extensive and permanent loss of critical data - Widespread disruption to the business
People	- Loss of a small number of employees	- Localised short term loss of morale	- Serious but localised loss of morale - Localised industrial dispute / action impacting a restricted number of employees	- Wide spread loss of morale - Industrial dispute / action impacting a generation site	- Wide spread loss of morale resulting in high staff turnover - Industrial dispute / action impacting across all operations	- High turnover of critical roles - Extended industrial dispute / action significantly affecting output across all operations

7.1.7 Contracting and Procurement

All overhauls should be managed by one primary contractor. This primary contractor should plan, prepare and execute the overhaul reducing CS Energy's exposure risk to the lowest possible level. The primary contractor should taking full ownership for all specified Overhaul tasks, suppling area specialists to plan, execute and manage the overhaul.

These specialists provide safe and effective results by incorporating best practices, work processes and experienced supervision garnered from pasted CS Energy overhauls or other power stations.

Strategically the contract should focus on how the Contractor and CS Energy can prevent emergent work from being introduced and impacting the overhaul execution schedule and budget.

7.1.8 Contractor Selection Consideration

- Safety performance: What is there record & are they experienced at working in hazardous sites.
- Unavailability when required – What other work are they doing (conflict with other companies at same time).
- Contractors not always as effective as their proposals suggest (evidence of meeting cost/budget).
- Lower skilled staff may be used to supplement skilled ones to make up the number. (Resourcing)
- Difficult client-contractor relationship
- Agency labour content / FTE content contractors might resort to use of agency workers.

7.1.9 Procurement Requirements

Procurement of all items within and associated to the overhaul will be managed in the following manner:

- establishing the objectives of the procurement; and specifying how the procurement supports the overhaul
- analysing and identifying the goods and services, the quantities and when they will be required
- establishing the status of the supply market
- identifying and establishing the best approach and strategies to procure the goods and services
- identifying the risks and determining the risk mitigation strategies
- specifying measures of the supply strategy; and the monitoring of the performance of the contract

8 HUMAN RESOURCES AND INDUSTRIAL RELATIONS

8.1 Objectives

The objective of this planning is to clearly establish guidelines for all industrial relation matters, to identify any associated risk with the manning and execution of all phases of IFOT-OMS.

A proactive approach shall be used to manage industrial relations issues for the Overhaul with a clear industrial relations management plan established. Dispute resolution processes to address all potential issues shall be developed and communicated before commencing the execution phase of the Overhaul.

Contractors during execution will have a mechanism in place to manage industrial relations, the identification of potential issues and the development of processes for conflict resolution.

For all industrial matters relating to the overhaul, any grievance or dispute affecting the working conditions of employees or any other industrial matter pertaining to the relations between the employer and employees shall be dealt with by the following grievance procedure as continued in Part 7 of Callide Power Station Enterprise Agreement 2011, Part 8 Kogan Creek Power Station Enterprise Agreement 2014, Part 2 Wivenhoe Power Station Enterprise Agreement 2012, or contractors equivalent grievance procedure.

The plan shall consider the follow areas as a minimum:

- Early planning and strategic assessment of industrial environment

- Merit based recruitment and selection processes
- Open and transparent communication with employees, union representatives and the forging of close working relationships with the Overhaul Management Team.
- Grievance procedures
- CSE Manning Rosters (voting conditions)
- Risk and controls identification

RISK	CONTROL
Availability of skilled workforce	Recruitment near completion.
Callide teams releasing manning to meet planning and execution requirements of the overhaul.	Communication and planning strategy for Callide Superintendents and Supervisors outlining requirements and timelines of required manning.
Status of Contractor EBA documents.	CSE to monitor and audit through CSE Corporate Industrial Relations.
Safety compliance record of contractors.	Safety Management Plans are sighted and audited for each contracting company.
Availability of accommodation for contractors.	Pre-planning/ booking / and community consultation by appropriate organisations.
Industrial unrest due to contractor / contractor and employee / employee wage disparity.	Pre-emptive communication strategy. In term industrial instruments and agreements between contractors and their employees for the duration of the overhaul.
Contractor induction and security access.	Contractor induction plan and compliance. Provide timely contractor manning lists one month prior to shut down for security access cards.
Not availing of opportunities for employee experience/ learning/ development – plant knowledge.	Ensure exposure for appropriate people to learn / gain experience opportunities during shutdown.
Creation of Short Term Shift Roster.	Duration of shifts, roster format and manning will be determined by Overhaul Management Team with consideration to business need, personal circumstances and overhaul scope of work.
Short Term Shift Communication.	Develop communications strategy with C4 workforce to discuss rostering issues and manning requirements.
Short Term Shift Voting.	Ensure Overhaul Management team implement voting conditions as approved by BIC 30/07/09.
Higher duties of CSE manning.	Higher duties are determined for Plant Area Coordinators and paperwork completed and submitted to HR.
Scope of Duties	Agreement by all Plant Area Coordinators before commencement of overhaul.
Fatigue Management, Alcohol and other Drugs.	Compliance with CSE policies.

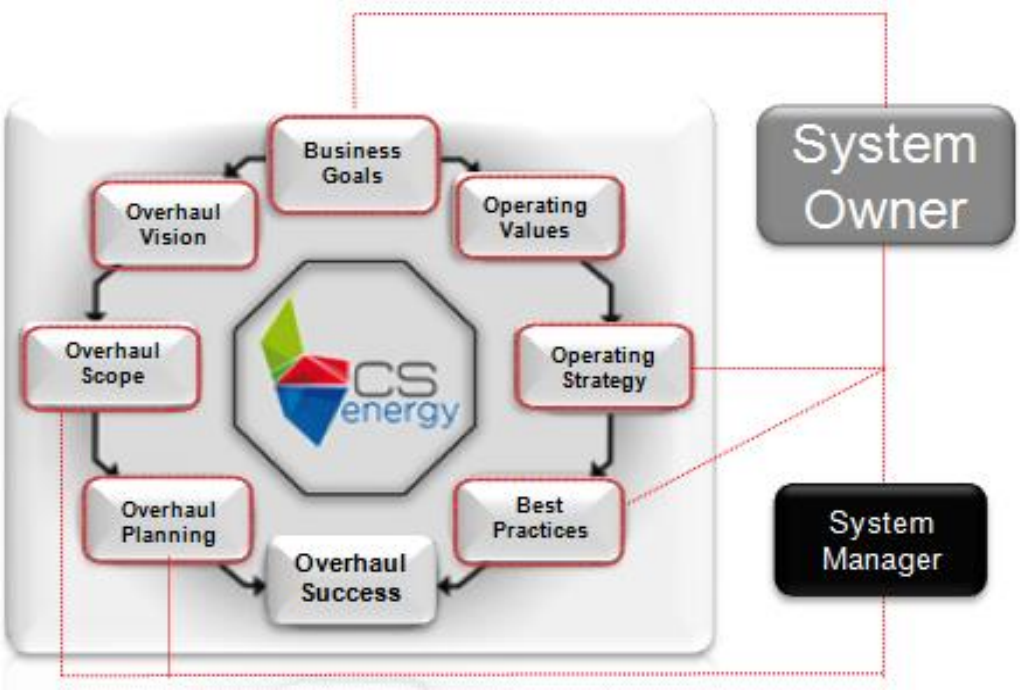
8.2 Roles and Individual Accountabilities

IFOT-OMS is directly tied to CS Energy's Values and Constructive Culture it is then a requirement for all personnel working within the any phase to follow the guidelines of the system. IFOT-OM is broken into four clearly defined user levels each with differing responsibilities and accountability. These user levels are classified as Owner, System Manager, Site Representative and Site User. Each level of classification is accountable for specific aspects of the system and equally contributes to the functional success of the system.

8.2.1 Owner

The Owner of IFOT-OMS is the Group Manager, Asset Management and has been entrusted by the business as the custodian and decision maker for all matters related to this management system;

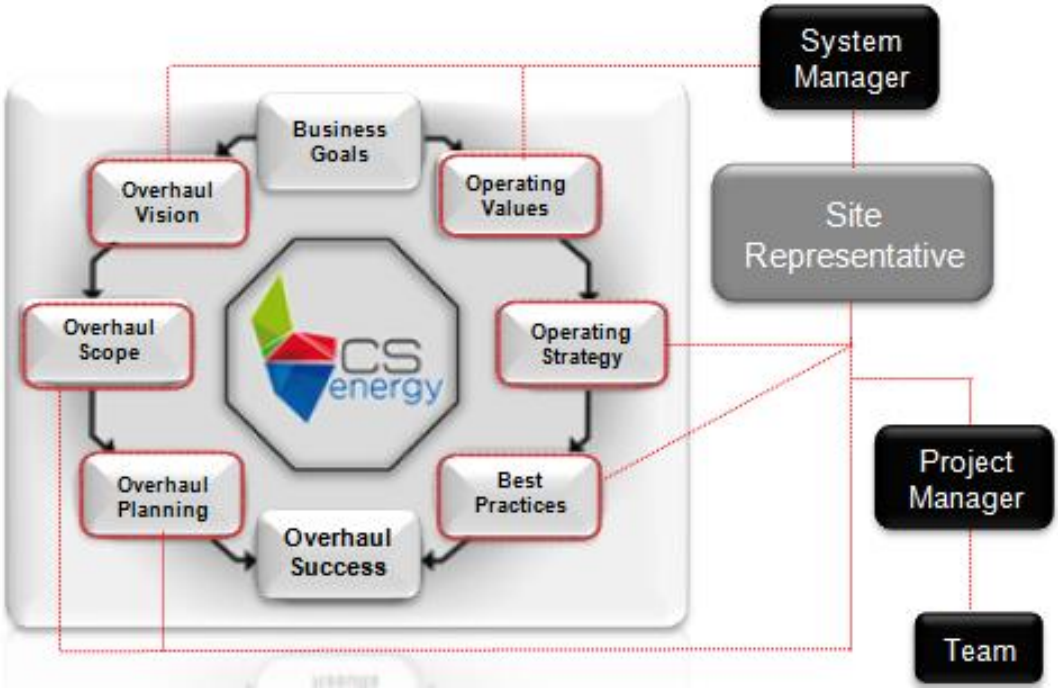
- Ensures (IFOT-OMS) is effectively implemented across the portfolio
- Ensures suitable consultation has occurred with respect to changes and updates
- Authorise any changes to (IFOT-OMS) after consultation has occurred
- Owns all documentation, software packages and supporting materials
- Empower the System Manager to effectively fulfil their Role & Responsibilities
- Provided direct leadership to the System Manager (Line Manager)



8.2.2 System Manager

The System Manager is the Major Projects Services Manager and has been empowered by the Owner to act on his behalf as the as the custodian of this management system;

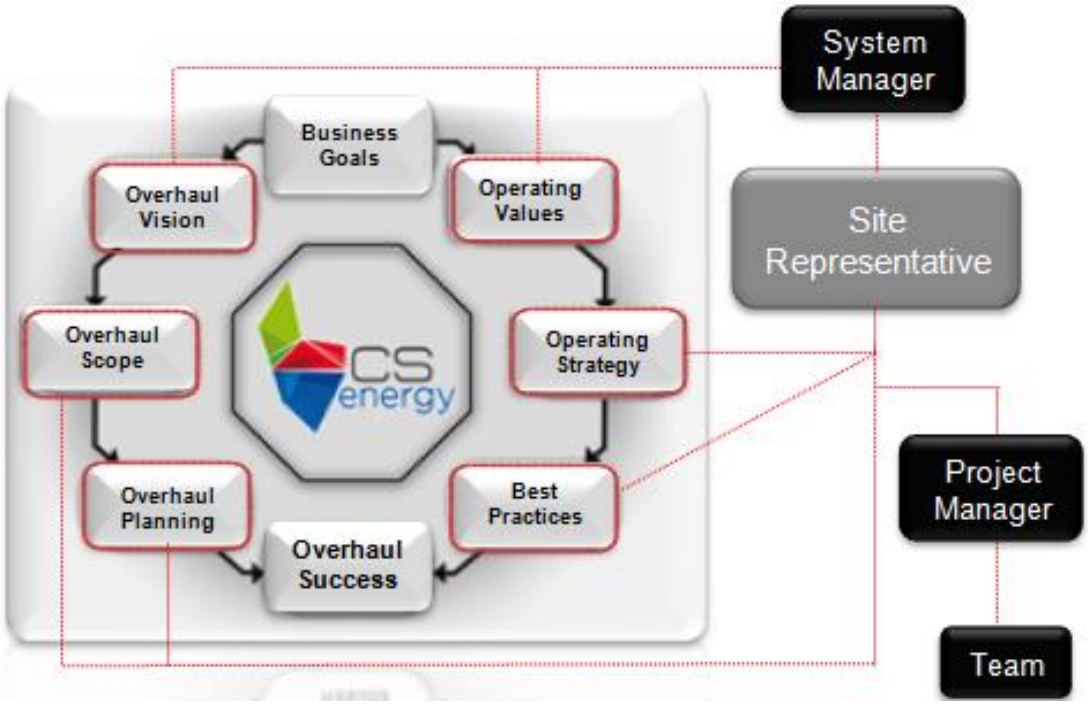
- Manages (IFOT-OMS) on a portfolio bases ensuring all overhaul are meeting each phase requirements
- Act as the Subject Matter Expert to the Site Representative
- Conducts spot audits on any phase while being preformed
- Reviews and updates the management system with approval of the Owner
- Act as the IFOT custodian with respect to the intent and interpretation of the management system.
- Consults on the approval of the Overhaul Project Manager / Specialist
- Empower the Site Representative to effectively fulfil their Role & Responsibilities
- Provided functional leadership to the Site Representative



8.2.3 Site Representative

The Superintendent is the single point of contact at the CS Energy Sites for all matter related to IFOT-OMS.

- Manage (IFOT-OMS) on a site bases ensuring all overhaul are meeting each phase requirements
- Act as the Subject Matter Expert to the User Group
- Conducts spot audits on any phase while being preformed
- Reviews and make recommendations on system improvements to the System Manager
- Consults on the approval of the Overhaul Project Manager / Specialist
- Provided functional leadership to the Project Manager



8.2.4 Site Users

Site Users are those individuals that have been trained and endorsed to work within the IFOT Overhaul Management System. These individuals have been resourced allocated within one of the phase as a direct overhaul team member reporting to the Project Manager / Specialist.

8.2.4.1 Project Manager / Specialist

Selected under consultation of the Representative and System Manager, the Overhaul Project Manager / Specialist is the individual who is responsible for ensuring that the overhaul is planned, executed and closed out in accordance with IFOT-OMS. They is empowered to make day to day decision to progress the detailed plan; however the they cannot make decisions that would cause the project to exceed one of its overall boundaries, such as total budget, project completion date, or compliance to external requirement or the CS Energy's Overhaul Management System.

Phase 1 is heavily supported and executed by the Contributors with the Project Managers / Specialist primary role is focusing on the coordination of these contributions.

8.2.4.2 Phase 2 / Phase 3 - Core Team Members Pre-Overhaul Work and Planning

The Core Team Planning, are individuals who been selected under site consultation and approval of the Site General Manager. They perform the day-to-day tasks focusing on planning and managing the overhaul activities. These members are typically a cross-functional group which represents different levels of expertise required during the planning phases.

Staffing Requirements (Max 6 in Phase)

- Project Manager
- O/H Works Coordinator
- Quality Assurance Officer
- Planner/Scheduler
- Admin Officer
- Financial Officer
- Capital Project Manager
- 13 Area Coordinators

8.2.4.3 Phase 4 Core Team Members Execution

Is a group of individuals who been selected under consultation and approval of the Superintendent and have day-to-day responsibility for specific area planning activities. During Phase 4 Overhaul Execution these individuals lead these areas and the Area Coordinators ensuring work is conducted safely to a high level of quality and within the boundaries of time and budget. These members are typically a cross-functional group which represents different levels of expertise required during the execution phases.

Staffing Requirements (All Required)

- 1 Project Manager
- 1 O/H Works Coordinator
- Quality Assurance Officer
- 1 Planner/Scheduler
- 1 Admin Officer
- 1 Financial Officer
- 1 Capital Project Manager
- 13 Area Coordinators
- Plus all required ISA execution personnel as set out by the execution schedule

8.2.4.4 Phase 5 Core Team Members Closeout

Is a group of individuals who been selected under consultation and approval of the Superintendent and have day-to-day responsibility for closeout of the overhaul. These members are typically a cross-functional group which represents different levels of expertise required during Phase 5.

8.2.5 Contributor

Contributors are individuals who have taken direct accountability to perform action within the IFOT-OMS that directly impacts the progress of the five phases, but do not set within the Overhaul Team.

- Technical Services (Site)
- Maintenance (Site)
- Operations (Site & Corp)
- Asset Management (Corp)
- Capital Effectiveness (Corp)
- Contracting/Procurement (Corp)
- Risk, Governance & Assurance (Corp)
- Safety & Environment (Site & Corp)
- Human Resources & Industrial Relations (Site & Corp)

9 PHASE DETAIL

9.1 Phase 1 - Overhaul Preliminary Development T-16 to T-12

Focus Points	Critical Activities
• Reviewing historical events/data • Updating Overhaul Risk Register • Obtain planning funding • Fix overhaul objectives • Identify key stakeholders • Option development completed • Challenge and lock scope • Measuring and monitoring performance	• Overhaul manager is to be appointed who will be responsible for the overhaul • Overhaul manager organizes and leads preparation team for collection and collation of basic overhaul data • Plant team provides local knowledge, technical data, plant history and current problems • Steering committee is formed consisting of senior managers

9.2 Phase 2 - Overhaul Detailed Planning T-12 to T-4

Focus Points	Critical Activities
• Leading a planning team • Translating ideas into a defined project • Reviewing scope of work and preparing activity–wise cost • Reviewing contracts and setting targets & milestones • Indentifying critical path activities • Consolidating team members, contributing teams and delegating work • Resolving issues arising during the overhaul process • Monitoring delivery, schedule and performance of the entire event.	• Area Coordinators and preparation team prepare job specification, plan pre-shutdown work and ensure procurement of all necessary items and materials. Allocate contracts and arrange site logistics. • ISA Contractors works up major tasks while Project Manager optimizes work schedule, organisation chart, cost estimation, expenditure control and resources. • Project manager also finalizes contractor as well as project list. Ensures safety of personnel and quality of the entire event. • Steering group analyses, discusses and provides their decision/approval to the plan forwarded by the Project Manager.

9.3 Phase 3 - Pre Overhaul T-4 to T-0.5

Focus Points	Critical Activities
• Final risks reviewed • Optimisation of execution schedule • Final Readiness established • Safety forum completed • Inductions completed and site read for mobilisation	• Risk and contingency workshop conducted to address any last minute risk items with contingency plans established • Workshop conducted to review all schedules to ensure tasks do not conflict, but to ensure all WO are being performed in the most effective manner possible. • Safety Day conducted with all contractors and key CSE overhaul participates. • All contractor execution documents are received and checked for accuracy

9.4 Phase 4 - Overhaul Execution T-0.5 to RTS

Focus Points	Critical Activities
• Coordinating all activities • Controlling planned as well as • emergency work within the • schedule • Monitoring safety & quality while • minimizing expenditure • Preparing for Return to Service	• Operational team shuts plant down as planned to facilitate execution team to perform the overhaul event as per the execution plan. • Cost and expenditure are analysed by Capital Effectiveness Once execution team completes entire work Project Manager demobilizes execution team and mobilises start-up team. • Return to Service team supports plant team to start-up the plant as planned

9.5 Phase 5 - Post Closeout RTS to T+3

Focus Points	Critical Activities
• Lessons Learnt Workshop • Close Out Workshop • Long lead spares identified • Close Out Report • Post Investment Review	• Project Manager Coordinates lessons learned • Site Technical Services review equipment strategy and makes update (base Scope next overhaul) • Closeout report is written • Post overhaul review scheduled and preformed by Capital Effectiveness • Long lead spare order date is confirmed

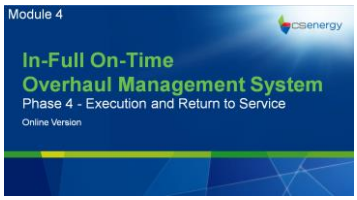
10 TRAINING AND COMPETENCY

An effective training and competence framework shall be has developed to underpin the successful application and usage of IFOT-OMS. This targeted training will focus on each specific role within the system with the objective to provide the user with the knowledge and skill to be able to effectively navigate and deliver results.

Training Matrix

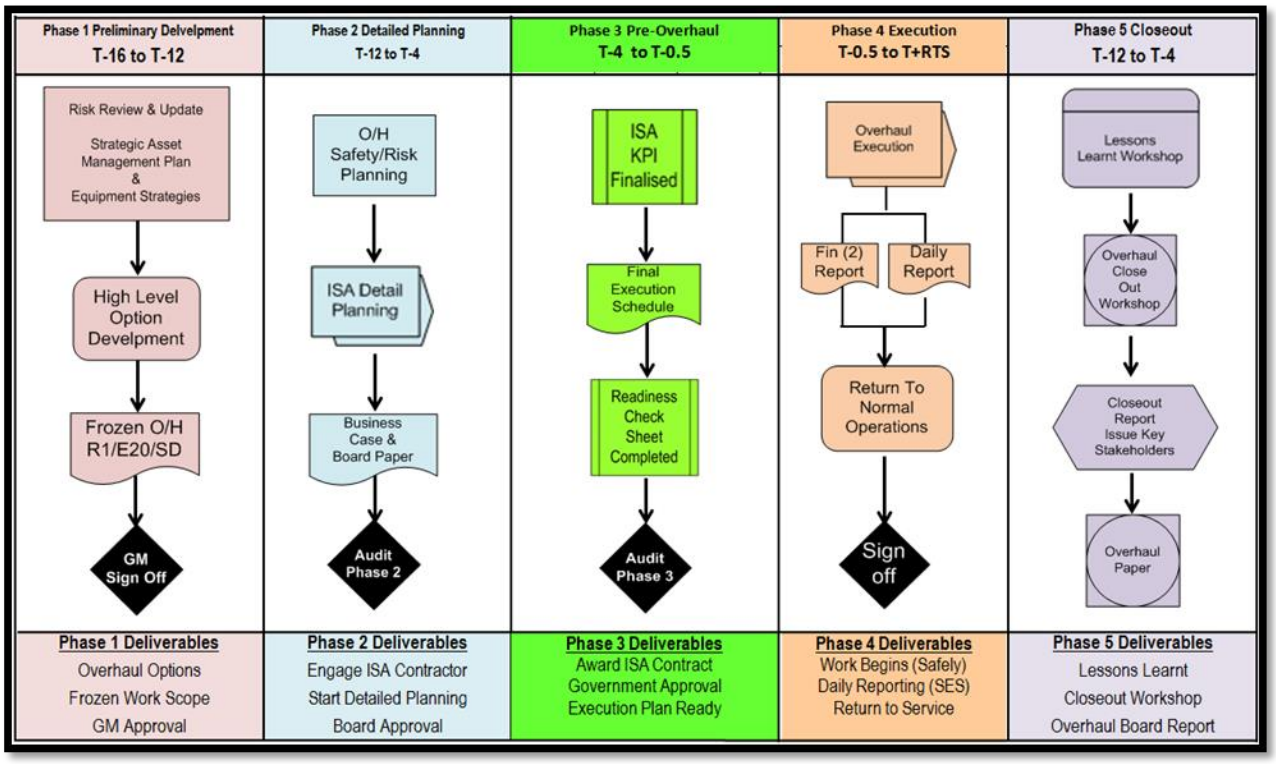
Defined IFOT-OMS Role		Modules										
		IFOT-OMS Awareness	Safety Awareness	Phase 1 Pre-Work	Phase 2 Detail Planning	Phase 3 Readiness	Phase 4 Execution	Phase 5 Close-out	Area Coordinator	System Manager	System Rep	Return to Service
User	Core Team Planning	☑	☑	☑	☑	☑	☒	☒	☒	☒	☒	☒
	Core Team Execution	☑	☑	☒	☒	☑	☑	☑	☑	☒	☒	☑
	Core Team Closeout	☑	☒	☒	☒	☒	☒	☑	☒	☒	☒	☒
Contributor	Site Technical Services	☑	☑	☑	☑	☑	☑	☑	☒	☒	☒	☑
	Asset Management	☑	☑	☑	☑	☑	☑	☑	☒	☒	☒	☑
	Capital Effectiveness	☑	☑	☑	☑	☑	☑	☑	☒	☒	☒	☒
	Contracts	☑	☒	☑	☑	☑	☒	☑	☒	☒	☒	☒
	Risk Management	☑	☒	☒	☑	☑	☒	☑	☒	☒	☒	☑
	Safety	☑	☒	☒	☒	☒	☑	☒	☒	☒	☒	☑
Area Coordinator	As Appointed	☑	☑	☒	☑	☑	☑	☑	☑	☒	☒	☑
Project Manager/ Specialist	As Appointed	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Site Representative	As Appointed	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
System Manager	As Appointed	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑

Training Modules



11 HIGH LEVEL PROCESS FLOW

11.1 Simplified Diagram



12 REGISTERED DOCUMENTATION

One of the most important objectives in the success of any overhaul program is using documentation that is consistent and that adds value. CSE has created a suite of online registered plans, procedures, documents, schedules and registers that are required to be used within specific phases of IFOT-OMS.

No CSE site will use non-registered plans, procedures, documents, schedules and registers in any phase of IFOT-OMS.

13 DOCUMENT MANAGEMENT

13.1 Owner

It is the responsibility of the system Owner to ensure all registered documents are prepared, approved, handled, filed and archived using a controlled systematic approach. All registered documentation will be reviewed on a two yearly bases. In the event documentation needs to be updated, altered or tailored to a specific site, upon submission and recommendation of the System Manager, the system Owner will /or will not approve the change on a case by case bases (refer Figure 2.1).

14 DEFINITIONS

Term	Definition
CS Energy Personnel	CS Energy Employees, Contractors and Visitors

15 REFERENCES

Reference No	Reference Title	Author

16 REVIEW AND UPDATE

This document shall be reviewed on a three (3) monthly basis in 2016. The document shall then be reviewed on a two (2) yearly basis commencing 2017.

17 RECORDS MANAGEMENT

In order to maintain continual improvement, suitability, safety and effectiveness of the organisation, registered documents will be reviewed on a two yearly basis, or where it has been identified that there are changes in technology, legislation, standards, regulations or where experience identifies the need for alteration to the content. Registered documents should also be reviewed following an incident, change management process, modification or where directed as part of a risk assessment process.

CS Energy must ensure that records are retained according to accountability, legal, administrative, financial, commercial and operational requirements and expectations. In compliance with records retention and disposal, all documentation created in relation to CS Energy business must be retained in line with minimum retention periods as detailed in legal retention and disposal schedules.

ATTACHMENTS

17.1 Attachment 1 – Example: Detailed Schedule (Coal Fired Station)

Task Name	Start	Finish	Resource	% Complete
Coal Fired Station - Detailed Schedule				
Phase 1 - Overhaul Preliminary Development				
Part 1 Funding - Detailed Planning				
Enterprise Risk Strategy Development				
Strategic Asset Management Plan Update				
Execution Strategy Development				
Overhaul Kick Off Meeting				
Department Engagement				
High Level Option Development (Operations, Finance, Risk, Trading)				
Estimating Tool Development				
Overhaul Scope Development				
Download latest revision of SAP work orders (Z120)				
Identify all Z100 WO's in scope challenge session				
Identify all Z200 projects and work orders				
FREEZE SCOPE (RO)				
Set scope challenge meeting				
Issue scope to challenger 1 week prior to meeting				
Conduct Scope Challenge Meeting	01/01/16	15/01/16	T. Singleton	100%
Revision and finalise overhaul scope	01/01/16	15/01/16	T. Singleton	100%
Overhaul Scope (R1) completed	01/01/16	15/01/16	T. Singleton	100%
Contract Strategy Development				
Overhaul Steering Committee Selection				
PHASE AUDIT				
Phase 2 - Overhaul Detailed Planning				
Part 2 - TCE Development				
CSE 3rd Party Contractor Scope Development, Estimation & Award				
Board Package				
Overhaul Organisation				
Core Team				
Project Execution Plan				
Overhaul Capital Projects				
Work Pack Registers				
Work Pack Development - Part 1 & 2 Condensed Timeframe				
Phase 3 - Overhaul Pre-Work / Final Execution Readiness				
Quality Documentation				
Overhaul Safety				
Overhaul Approvals				
Work Pack Sign Off				
Return to Service				

Phase Header

1 of the 6 items to deliver within the Phase 1

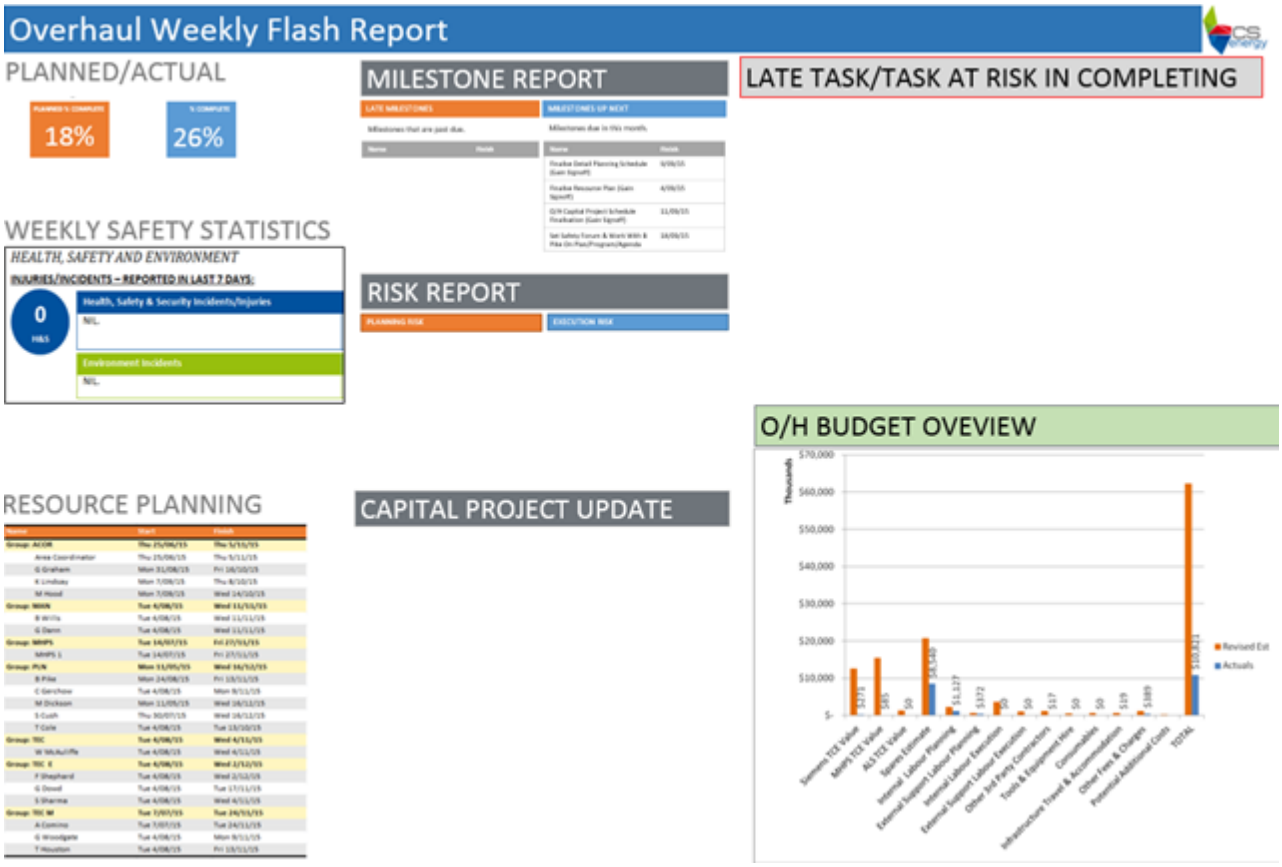
1 of the 6 required primary tasks that needs to be completed to deliver the item

Sub task that detail how to deliver the primary task

Sub task, start, finish, resource & % complete

Task Name	Start	Finish	Resource	% Complete
Site Facilities and Lay-Down Plan				
Part 2 - TCE Execution				
O/H Execution Schedule				
Financial Review				
Critical Supporting Work				
Non Critical Support Work				
Risk Review / Contingency Workshop				
Overhaul Readiness				
PHASE AUDIT				
Field Mobilization				
Phase 4 - Overhaul Execution to Return to Normal Operating Conditions				
Rundown Program Begins				
O/H Execution (Detailed Schedule Driven)				
Daily Schedule and Cost Reports				
Return to Service				
Phase 5 - Post Overhaul Close Out to Subsequent Overhaul Starting Point				
Lessons Learned Captured (exceptions, anomalies and wins)				
Agreement of Performance of KPI's (less quality)				
Post O/H Clean-up of Unit & demobilisation				
Post Overhaul Debrief / Lessons Learnt				
Final Report / Performance Metrics				
Update O/H Maintenance Plans(SAP)				
Overhaul Completion Review Workshop				
Close out Return To Normal Operating Conditions				
Starting Point for Next O/H				
Preliminary Work Scope				
Identify Long Lead Items, set order date & develop capital request				
Action Items, Owners and completion dates				

17.2 Attachment 2 – Example: Weekly Flash Report



17.3 Attachment 3 – Example: 24 Month Resource