AFRISTARCH PRODUCTION FACILITIES DEVELOPMENT

Project Execution Plan

Section 1 – Plan Overview

January 2019

Revision	Date	Prepared	Reviewed	Control
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Abbreviation and Acronym definition

Abbreviation or Acronym	Definition
BFW	Boiler Feed Water
CC	Construction Contractor
EC	Engineering Contractor
EIA	Environmental Impact Assessment
EOJ	End of Job
EPC	Engineering , procurement and construction
FY	Financial Year
IBL	Inside Battery Limit
MC	Managing Contractor
NEC	New Engineering Contract
OBL	Outside Battery Limit
O-FBL	Outside Facilities Battery Limit
PMT	Project Management Team
VIP’s	Value Improvement Practices

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1.0 PROJECT BACKGROUND

Afristarch (PTY) LTD is established for the purpose of entering the Native and Modified Starch business in Southern Africa with the aim of reducing South Africa's reliance on imported modified starch products on a cost-competitive basis.

In achieving this vision, Afristarch's intends to successfully construct, own and sustainably operate a Modified Starch Production Facility in South Africa. The facility will produce 100 tons per day of modified starches, such as yellow dextrin, liquid glucose and multo-dextrin, from the wet milling of maize.

Afristarch commenced with the pre-feasibility study for the starch manufacturing facilities in May 2018. The study evaluated the technical viability, determined the feedstock requirement, outlined the scope of facilities and analyzed the investment and cost benefit of the project. The study was completed in October 2018.

A bankable feasibility is proposed to be completed in order to further develop and firm up the project viability. In January 2019 the project highlighted a critical change in the project driver following engagements with potential funders from maximizing the production of the modified starch to demonstrating starch manufacturing capability at minimum cost given the start-up nature of Afristarch and the capital commitments required to fund such a project. The objective of the Project Execution Plan is to outline the step-wise approach towards the development of the ultimate 100 tons per day Native Starch production facilities. At the on-set the project will be developed in phases of increasing capacity and the facilities in an expandable nature.

1.1 PROJECT OVERVIEW

The production of modified starches is enabled by the selection of a wet milling technology that grinds maize grains into a pulp before extracting the different co-products making up the maize and washing them in various steps of decreasing solids concentration. The resultant starch product (native starch) from the wet milling of maize grains, as a key feedstock for modified starches, is liquefied and hydrolyzed in the presences of enzymes in order to convert it into the various modified starches.

The Afristarch facilities will produce 100 tons per day of the following modified starches from liquefaction/hydrolysis of wet-milling derived native starch from maize grains:

- Dextrin – A yellow roasted starch powder sprinkled with a pre-determined amount of hydrochloric acid
- Liquid Glucose – A sweet and colorless or slightly yellowish, refined and concentrated corn-syrup with a dextrose equivalent sweetness of 40 - 45
- Multo-Dextrin -

From the 150 tons per day grains of maize as feedstock to the Afristarch facilities, a total of 50 tons per day is made-up of wet milling co-products such as fibre, gluten and germ that will be sold to the animal feed industry.

In order to manage the business establishment risk given that Afristarch is a start-up organization, the project will be implemented in phases of progressive products launching from native starch to yellow dextrin and finally to the corn sugars (liquid glucose and multo-dextrin).

1.1.1 Phase 1

- Site preparation and construction for the establishment of facilities to wet mill 150 tons per day of maize grains and produce 100 tons per day of native starch and 50 tons per day of the co-products of wet milling;
- Construction of the supporting utilities facilities
- Commissioning and operation of the installed Phase 1 facilities

1.1.2 Phase 2

- Expansion of the Phase 1 facilities by adding a 50 tons per day Dextrin Production Unit to be fed by 50 tons per day of the native starch produced from the upstream wet milling facility.

1.1.3 Phase 3

- Expansion of the modified facilities section that was developed in Phase 2 by the addition of the enzymatic and liquefaction units of the native starch in order to produce 25 tons per day of liquid glucose and 25 tons per day of multo-dextrin.

1.1.4 Scope exclusions

The project will minimise capital cost as far as possible through integration of the facilities with nearby industrial facilities and infrastructure. Where such supporting infrastructure at the selected site is available, the scope will be limited to the integration / tie-in aspects.
The pre-feasibility phase scope exclusions are:

- Research and Development Facilities - Product development and testing shall be via collaboration with existing starch derivatives R&D facilities

1.2 CLIENT AND STAKEHOLDERS

Afristarch is the Business Owner of the Starch Manufacturing Project and proposed Facilities. An Engineering Contractor will be appointed to develop the Bankable Feasibility of the project will fulltime participation of Afristarch representatives as part of the Project Development Team who will be responsible for all matters relating to the execution and co-ordination of the project engineering during the bankable feasibility

phase and the procurement and construction deliverables on a turn-key basis during the execution phase.

Afristarch stakeholders are envisaged in accordance to the Grunig and Hunt Model model where the stakeholders are categorised as enabling, functional, normative and diffused stakeholders as outlined in the figure below.

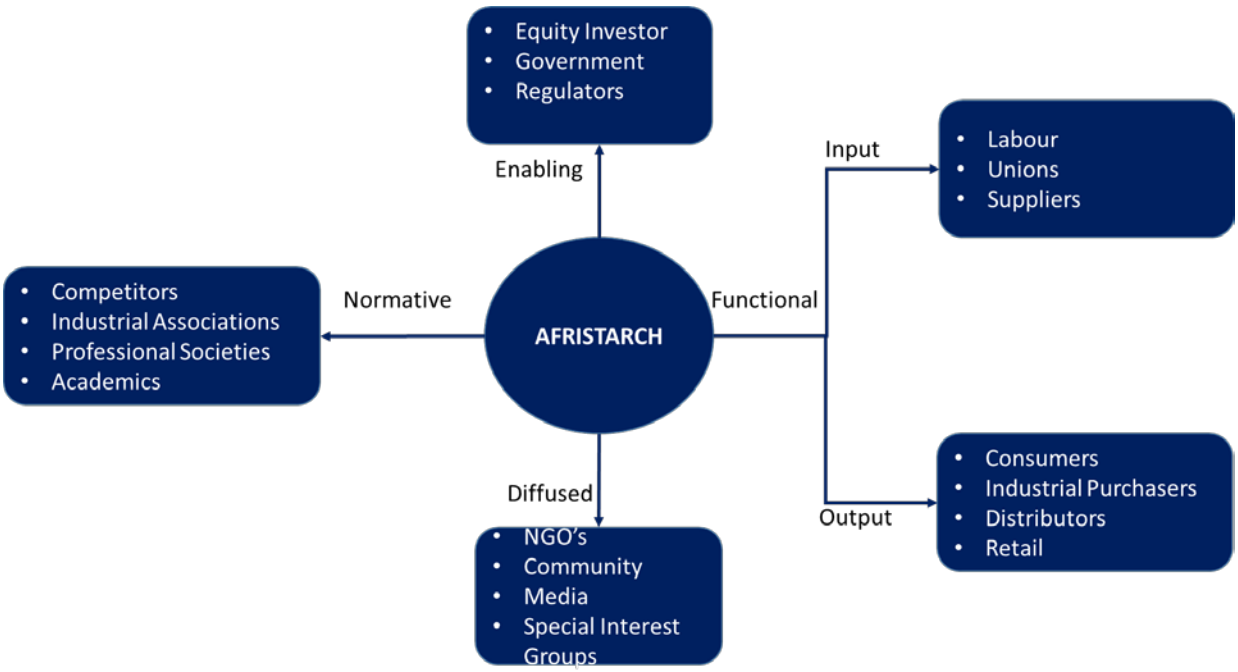


Figure 1 Afristarch Stakeholder (Source: Grunig and Hunt Linkage Model as cited in IDC Starch Report, 2017[1])

The stakeholders can be further described in detail as follows:

1.2.1 Businesses

The stakeholders from a business perspective are:

- Afristarch as the business and facilities owner and operator of the facility;
- Local Municipality as the Land Owner of the operating facilities
- Equity Investor as shareholder (40%) of Afristarch Project
- Banks for the financing of the project (IDC, NEF, etc.)
- Customers of products (TBC)
- Suppliers of utilities (Rand Water Board, Chemicals Supplier, Enzymes Supplier, etc.)
- Eskom for approval of additional power consumption and supply of such

[1] APCF-Research-Grant_Starch_Final-Report-October-2017 (https://www.idc.co.za/wp-content/uploads/2018/11/APCF-Research-Grant_Starch_Final-Report-2017-October-2017.pdf)

1.2.2 Government

- The Department of Agriculture for agro-processing legislation and specifications
- The Department of Environmental Affairs for authorisation of the EIA and
- SANS for legislation of fuel specifications for boiler package

1.2.3 Project and engineering

The stakeholders from the project and engineering point of view are:

- Afristarch Project Development as provider of project and engineering management services
- Engineering contractor for Bankable Feasibility and Execution Phase
- Starch Processing Vendor as technology supplier for wet milling and modified starches production units - TBC
- EIA Consultant for application of the EIA
- SHE consultant – TBC
- Geotechnical consultant – TBC

1.2.4 Other

Below is a list of other entities which potentially can or will have a stake in the project:

- Local government (provincial / municipal)
- Local DoE office
- Local community
- Local DoL office
- NGO's
- Labour unions
- Other starch processors in South Africa
- Press
- Neighbouring industries
- Construction companies
- Banks

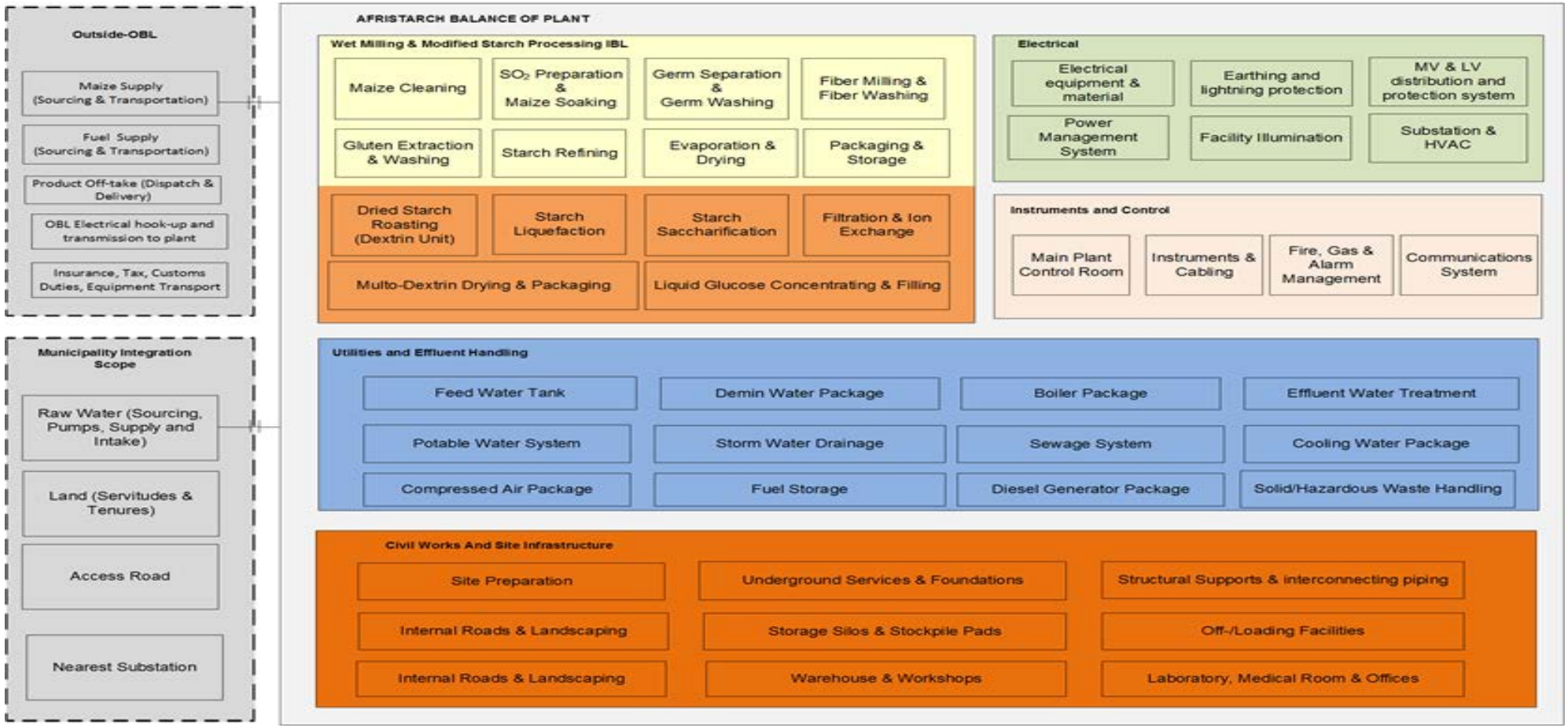
1.3 PROJECT DEFINITION OF VICTORY

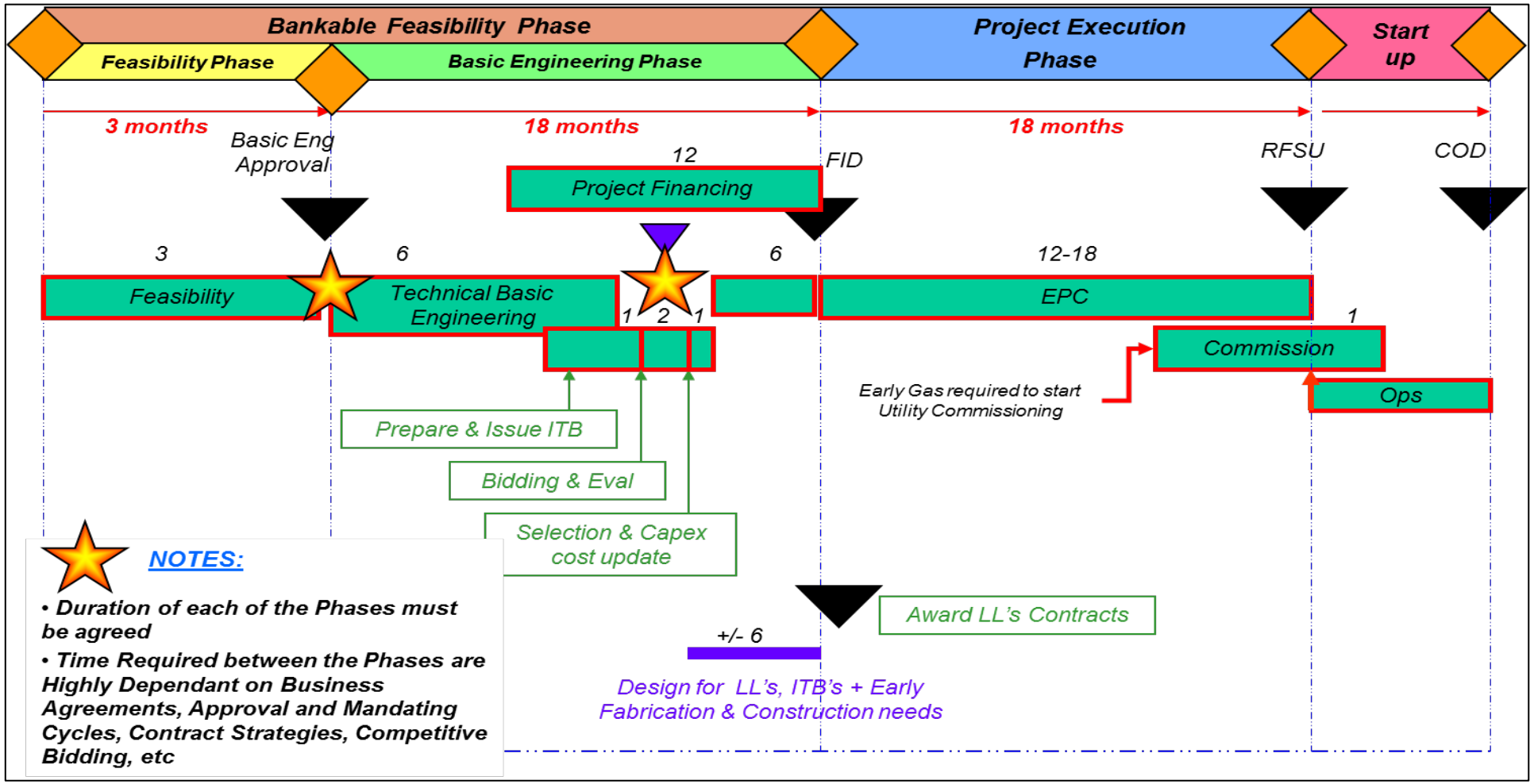
Afristarch Definition of Victory is to supply 50 tons per day dextrin, 25 tons per day liquid glucose and 25 tons per day multo-dextrin to the modified starches market that is currently sourcing these products through imports into South African and the Southern African region by CY22.

1.4 PROJECT SCOPE

The following is a high-level overview of the Project scope for the Bankable Feasibility phase.

1.4.1 Project Scope of Facilities




Bankable Feasibility Phase
Feasibility Phase
Basic Engineering Phase
Project Execution Phase
Start up
3 months
18 months
18 months
Basic Eng Approval
12
Project Financing
FID
RFSU
COD
3
6
6
12-18
Feasibility
Technical Basic Engineering
1
2
1
EPC
1
Commission
Ops
Early Gas required to start Utility Commissioning
Prepare & Issue ITB
Bidding & Eval
Selection & Capex cost update
NOTES:
• Duration of each of the Phases must be agreed
• Time Required between the Phases are Highly Dependant on Business Agreements, Approval and Mandating Cycles, Contract Strategies, Competitive Bidding, etc
Award LL's Contracts
+/- 6
Design for LL's, ITB's + Early Fabrication & Construction needs

1.4.2 Project Management Team (PMT)

The PMT, consisting of Afristarch representatives, Engineering Contractor and where required, equity shareholder representatives, will manage the integration and execution of the Project for the Bankable Feasibility Phase.

Key activities include the following:

- Overall management of the project using a project stage gate development model
- Ensuring the project achieves and delivers against the DOV
- Ensuring an optimised cost effective technical solution supporting the market needs
- Keeping key stakeholders informed on the status of the project
- Develop and manage against the project plan
- Overall project risk management
- Integration of the overall cost and schedule performance of the project

AFRISTARCH PRODUCTION FACILITIES DEVELOPMENT

Project Execution Plan

Section 2 – Kick Off, Planning and Alignment

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2.0 KICK-OFF, PLANNING AND ALIGNMENT

The well planned and structured kick-off, framing and alignment meeting with key Stakeholders for the Afristarch project is the most critical aspect to ensure its future success. Effective communication of the project objectives, definition of victory (DOV), scope of work, transfer of knowledge and alignment with all parties, and detailed planning by the project management team (PMT) will lay the groundwork for efficient execution of the project scope of work.

2.1 OBJECTIVES

The objectives of the kick-off, planning and execution phase of the project includes the orderly startup of the project, ensuring alignment on the project's goals, objectives, and execution strategy. It ensures the following:

- Performing sufficient early planning to ensure future success of the project;
- Refining the cost and schedule baseline to facilitate performance measurement
- Further defining the details of the project and aligning on roles and responsibilities
- Promoting an atmosphere that supports a team approach to project execution; and
- Analysing significant risks to the project to developing plans to mitigate them

2.2 KICK-OFF AND ALIGNMENT

Project initiation consists of several activities that occur at the start of the project to ensure alignment among all project participants.

2.2.1 Forming phase

The forming phase of the project is the period when the overall project/project scope is defined, determined and the project management strategies are reviewed and confirmed with all stakeholders. During this phase, the scope of services for the project management team (PMT) and Afristarch's responsibilities are defined and the teams mobilises the appropriate resources to its teams.

2.2.2 Internal kick-off | alignment

A formal internal kick-off or alignment meeting will be held with all stakeholders during start of Bankable Feasibility phase of the project. The purpose of this meeting will be to communicate and discuss within the PMT such items as the project safety culture, objectives, baseline for cost and schedule, contractual details with engineering contractor (EC), scope of work, construction-driven execution strategies, commercial elements, roles and responsibilities and project initiation details, e.g. mobilisation and governance before final capital approval.

Other items that will be discussed include key working processes, procedures, and activities that may improve the project cost or schedule.

2.2.3 External alignment

A formal alignment meeting will be held with all stakeholders and the EC at the start of the Bankable Feasibility phase. The deliverables from this alignment meeting includes defining the key project objectives also called key result areas. At the end of the alignment session, all parties should fully understand the project focus. All alignment sessions will be documented by conference notes.

2.3 WORK AND COST BREAKDOWN STRUCTURE

2.3.1 Work Breakdown Structure

A project work breakdown structure (WBS) will be created, which divides the project scope into discrete manageable work packages that are aligned with the construction and procurement execution plan and focus on the deliverables included in the individual project scopes of work.

The WBS will be considered as a physical breakdown of the facilities into projects, areas, sub-areas that are recognised in every aspect of the project i.e., the design, drawings, equipment and materials, construction, turnover, etc and not just cost, schedule, and budgets.

2.3.2 Construction work packages

Construction work packages (CWP) will be developed by the engineering contractor for their scope of work as a means to organise and sustain an effective construction effort by ensuring availability of associated engineering drawings, equipment, materials and construction resources.

2.4 PROJECT BASELINE DEVELOPMENT

The project baseline will be established, which is made up of the following components:

- Prime contract – The version of the contract signed by the EC and Afristarch
- Project scope – The written scope of work for the project and EC, which includes both the scope of facilities and the scope of services with expected deliverables;
- The Project execution philosophy (this document);
- Project estimate for which Bankable Feasibility Phase estimate is based
- Project estimate – The estimate to execute the total project including event driven risks (EDR), the commercial basis, and any other supporting documents;
- Management level schedule – The high-level schedule that defines major activities and interfaces, summarises the various phases of the project,
- Integrated risk assessment – The results of the project's risk analysis process. The risks are divided into three tracks namely business risks, project management risks and technical risks but will be consolidated in a single risk register.

2.5 PROJECT SCOPE DEFINITION

The Pre-Feasibility package defines the scope of the Afristarch Project. During the Bankable Feasibility phase, the scope definition process will be completed to assure that adequate baseline definition for execution is established. Key activities which were completed that further define and communicate the project scope of work include:

- Afristarch Business Strategy
- Afristarch Business assumptions;
- Pre-Feasibility Engineering Package (inclusive of flow schemes, mass balance, equipment list)
- Scope of Facilities
- Detailed Scope of Work for EC (TBC)

The Bankable Feasibility will enable further development of the following details:

2.5.1 Project design basis document

The engineering design package is used as the basis of the project to proceed effectively with detailed engineering design work. Such a design package will consist of various volumes design information and volumes of safety design files.

2.5.2 Basic engineering design basis

The basic engineering design basis is used to describe the technical information required to proceed effectively with the design work. The following information is required to define the design basis:

1.0 Introduction;
2.0 Codes and standards;
3.0 Units of measurement;
4.0 Unit and equipment numbering;
5.0 Unit definition;
6.0 Battery limit requirements;
7.0 Site meteorological data;
8.0 Utility conditions;
9.0 Environmental and safety requirements;
10.0 Equipment and design considerations; and
11.0 Economic evaluation criteria.

The EC shall as far as possible and based on knowledge of projects implemented in the vicinity of the Afristarch facilities as well as projects similar to the Afristarch project complete and define the required information before requesting additional information from Afristarch. Where Afristarch does not have the required information, the EC shall outline the proposal to source or generate the required information.

2.5 RISK MANAGEMENT

2.6.1 Purpose

The purpose of risk management is to minimise project and financial risk to the organisation through proactive management and early identification, planning, and selection of the best management and contracting strategies. The plan covers the following elements:

- Risk management objectives;
- Definitions of risk;
- Risk identification and mitigation;
- Suitable allocation of risk accountability; and
- Tracking critical controls with the appropriate KPI's

2.6.2 Plan- identify and understand

General process steps

The Plan phase ensures that the relevant project risks are identified, prioritised and understood. This facilitates the development of appropriate responses and effective controls for each risk event and associated instances through the following broad process steps:

Identify the project risk events:

a) Understand the aspects project context;
b) Identify relevant and applicable risk events;
c) Explore and analyse the causes and consequences of risk event; and
d) Assess the inherent risk level.

Understand the project risk events:

a) Prioritise risk events based on the inherent risk level;
b) Determine response and controls (Bow-tie);
c) Evaluate design and operating effectiveness of controls;
d) Assess the residual risk level;
e) Capture risk information in risk register; and
f) Update the project risk profile on risk matrix.

The outcome from the PLAN phase of the risk management process is clearly defined capital project risk events with their related responses and controls, captured in a project risk register and depicted in a project risk profile.

2.6.3 Do – Manage and Monitor

The DO phase of the risk management process is where the day to day management of the controls related to project risk events occur as an integral part of managing the execution of the project phase. The following are the broad process steps:

a) Execute controls (including an identification and implementation of new controls and action plans for control maintenance and improvement);
b) Monitor KPI's and KRI's of critical controls; and
c) Implement action plans when necessary (management action, decision making and intervention).

These process steps are important to ensure the consistent effective execution of controls which results in the effective management of project risks.

2.6.4 Review – Govern and Assurance

The REVIEW phase of the risk management process entails the consolidation of assurance information during monitor controls for operating effectiveness (Do-phase) in order to report on the effectiveness of controls and any movements on the risk profile as a result thereof according to the following broad process steps:

a) Report on project risk Bow-ties; and
b) Consolidate and report on control effectiveness evaluations, movement in risk level, progress with implementation of controls and audit findings

The outcome of the REVIEW phase of the risk management process is to give assurance, i.e. confidence must be created that the occurrence and recurrence of undesirable project events are proactively addressed through effective preventive and corrective controls.

2.6.5 Improve – Analyse and Improve

The IMPROVE phase of the project risk management process aims to ensure that the effectiveness of the risk management process continuously improve for the project and the broader organisation through the following broad process steps:

a) Assess and analyse project risk trends and review changes in project environment;
b) Incorporated project learnings, incident investigations and audit findings;
c) Identify gaps and improvement opportunities for the risk management process; and
d) Develop improvement plans.

The outcome of the IMPROVE phase is defined improvement plans to be taken back into the PLAN, DO and REVIEW phases of the process to ensure that it is integrated, implemented and embedded to deliver tangible, sustainable improvements.

AFRISTARCH PRODUCTION FACILITIES DEVELOPMENT
Project Execution Plan
Section 3 – Project Organisation and Administration
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3.0 PROJECT ORGANISATION AND ADMINISTRATION

3.1 ORGANISATION AND RESPONSIBILITIES

The project will be executed by a centralised task force under the direction of the Afristarch Technical Director. The project management team (PMT) will report to the Afristarch Technical Director.

The Project Team, together with the EC, will be located in Johannesburg. The Technology provider will be located in India.

3.2 ROLES AND RESPONSIBILITIES

The general roles of the key management team members are summarised below.

3.2.1 Project Sponsor

The Afristarch CEO acts as the Sponsor of the Afristarch Starch Manufacturing Facilities Project. He is a link between the Afristarch Business and the Special Purpose Vehicle Company that will be the PMT of the project.

High-level roles and responsibilities of the Project Sponsor includes:

- To develop and align with key stakeholders on the Definition of Victory (DOV) for the project.
- To answer to, engage and lobby with the appropriate Approval Body.
- Present the project for approval of capital expenditure.
- Set clear goals and objectives for each phase of the project.
- To sign off on Project Charter and Mandate, Business Case, Project Scope, Cost Estimate and Schedule.
- Ensure Key project deliverables e.g. Estimates, Schedules, Business plan etc. are:
    - Completed adequately as required at the applicable gate,
    - Aligned with the project key drivers and objectives,
    - Within acceptable norms and benchmark criteria.
- Ensure proper risk management practices and are adhered to and take personal responsibility for external risk killer concerns.
- Ensure all aspects of Project Team Development are executed according to the project best practices.

3.2.2 Project Business Lead

The project business lead is reporting to the Project Sponsor and is also a member of the Afristarch executive management team. Due to the size of Afristarch, the CEO fulfils the dual role as Sponsor and Business Lead

High-level roles and responsibilities of the Business Lead includes

- Leading the business track
- Leading the Afristarch team to deliver on all business track related requirements to progress the facilities development project towards achieving the Definition of Victory:
- Ensure that the business track solutions roadmap is delivered on (stakeholder, marketing plans, stranded product, component imports etc).
- Part of the Afristarch leadership team to drive the shaping, influencing, developing and implementing of the project.
- Responsible for all capital and development funds costing (budgets, approvals, governance) for Afristarch and the Afristarch project development.

3.2.3 Project Director

The project director is responsible for planning, organising, directing, coordinating, and control of the project. High-level roles and responsibilities of the project director include:

- Maintaining ongoing familiarity with all aspects of the project
- Rendering leadership, guidance and coaching to the project management teams.
- Assisting in the placement of resources enabling the project teams to execute the project in an efficient and successful manner.

The PMT project director has overall responsibility for the project and is responsible for integration, coordination and execution of the engineering, procurement, and construction effort to meet the requirements of the contract and other elements of the project baseline

- Ensuring that the project team is supporting the project DOV
- Managing the development of the execution philosophies and project strategy
- Developing and maintaining a culture and working environment that places top priority on safety.
- Providing guidance to the project teams and the EC in the scoping of the project.
- Directing and coaching the project teams
- Ensuring systems and procedures are implemented so the required quality as defined in the project baseline is achieved in the project design, equipment, and materials and construction of the facility.

- Managing the development of a realistic project capital cost estimate, based on a realistic execution plan and controlling and forecasting project costs against the baseline.
- Managing the development of a realistic project schedule and meeting the schedule requirements in a safe manner in compliance with health, safety and environmental requirements.
- Ensuring an effective and proactive change management system is implemented on the project and that changes are approved in a timely manner and as required in the prime contract, and then incorporated in the project baseline.
- Managing the project risk register. Championing, coordinating and stimulating internal risk mitigation efforts within the project team.
- Ensuring that proper tools, methods and training are in place to support the project team.
- Managing the development of contract packages and selection of potential contractors who will execute assigned project scopes of work.
- Leading the project management team (PMT) organisation to manage the different project teams
- Establishing and maintaining effective communications and relations within the project teams and external contractors.
- Supporting and promoting the development of project personnel and recognising the accomplishments of individuals and the project team.
- Delivering on the project commitments in accordance with the project baseline.
- Developing and maintaining working environments in all areas that places top priority on safety.
- Consistently evaluating safety, health and environmental requirements and concerns and ensuring that solutions are incorporated into the design and execution processes.
- Ensuring the project team is monitoring the engineering contractor's (EC's) performance and managing the EC as required to meet the project objectives/DOV.

3.2.4 Project Engineering Director

The engineering director leads the engineering and design group. The Lead discipline engineers report to the engineering director. The engineering director reports to the project director and is responsible for the lead discipline engineers to ensure the overall technical quality, integrity and adequacy of all design engineering work within the project budget.

The engineering director is responsible for providing technical supervision, staffing, resources, methods, procedures, standards, and quality control to meet the needs of the execution plan for the project. The engineering director is also responsible to ensure the implementation of the project teams and EC's environmental and safety activities relating to the design aspects of the project.

Specific responsibilities of the engineering director include:

- Cultivate a safety culture in the work place and engender safe working conditions in all engineering functions of the project.
- Check the implementation of technical design requirements to meet health, safety, and environmental (HSE), in particular, the OHS Act requirements.
- Issue and maintain a comprehensive set of engineering specifications and standards to the EC to cover every aspect of the engineering and design of the facilities.
- Promoting and supporting the value awareness effort in support of the project's value improvement program.
- Manage the engineering part of the risk register.
- Manage the value improvement practices (VIP's) identified.
- Develop and manage the engineering QA plan for the execution phase.
- Chair weekly engineering co-ordination meetings.
- Monitor engineering progress against the project schedule, identifying problem areas at an early stage. Plan corrective actions where required, expedite contractors work and give feed back to the project director, controls manager and project manager.
- Vetting of all requests for scope changes and making recommendations to the project director.
- Keep up to speed on the entire project with emphasis on the engineering content and ensure that the design intent is kept.
- Give engineering input where necessary.
- Monitor environmental, safety and permitting issues.
- Perform spot checks on the design where felt necessary. Arrange for spot audits over and above those called for in the project procedures.
- Identify risks in design and equipment and arrange for outside assistance where necessary.
- Maintain contact with technology providers to ensure that engineering documentation is adequately distributed, reviewed and approved.

3.2.5 Project Controls Manager

The PMT project controls manager reports directly to the project director and is responsible for all estimating, scheduling, financial, documentation and cost control activities necessary for the management of the project, including:

- Develop overall project budgets and master schedule based on the budget and schedule.
- Develop project control plan.

- Develop and implement overall project change management procedures.
- Help develop and maintain a culture and working environment that places top priority on safety.
- Manage the development of a meaningful work breakdown structure (WBS) for the project.
- Ensure that proper tools, methods and training are in place to support the project controls team.
- Support and promote the development of project control personnel and recognise the accomplishments of individuals and the project team.
- Evaluation and analysis (with recommendations) of cost, schedule and risks.
- Preparation of forecasts for cost and schedule in conjunction with the change management process.
- Management, guidance and review of the different project teams EC's practices, procedures, project controls execution methods and staffing.

3.2.6 Project Commercial Manager

The PMT commercial manager reports to the PMT project director and provides technical, commercial and functional direction related to all aspects of contracting, including the administration of project proposals, contracts and subcontracts. Specific responsibilities include:

- Provide sound contractual guidance and support to project management.
- Provide functional consistency of contracting practices and work processes across the project
- Initiate and maintain the project contracting plan; develops alternate strategies as required.
- Identify resources required to support the overall contracting activities.
- Ensure that the EC has an electronic system for tracking and reporting purposes.
- Manage and oversee all contracting activities to ensure compliance with project procedures, work processes, overall corporate policies and Afristarch governance requirements.
- Leads or supervises special contracts or claim issues when these arise
- Performs internal and EC audits of contracts execution processes.
- Ensure contractual compliance with all legal and regulatory
- Set up and maintain electronic and hard copy filing with archiving procedures.

3.2.7 Project Documentation Lead

The documentation lead reports to the project controls manager for the handling, filing and distribution of all in-house and third party generated project technical documentation including the establishment of document distribution matrices.

Specific responsibilities include:

- Ensuring a consistent approach by the different projects for the project on documentation management.
- Implement and integrate document procedures and workflows between Afristarch and the engineering contractors.
- Direct and oversee audits on the project team and engineering contractor's documentation.
- Provide guidance, direction and training to document controllers, specialists, supervisors and analysts (on and off site).
- Control and oversee the distribution of PMT documentation.
- Demonstrate the ability to manage all aspects of a project life-cycle, tracking, managing and communicating project status.
- Establish and maintain the documentation and review structure.

AFRISTARCH PRODUCTION FACILITIES DEVELOPMENT

Project Execution Plan

Section 4 – Project Controls

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4.1 PROJECT CONTROLS

The purpose of this plan is to establish the project controls approach for the project and define the roles and responsibilities of the PMT (project management team) project controls teams. An EC will be engaged to help with engineering services on specific scopes of work.

As part of the EC bidding process, the ECs will be required to provide an outline of their standard project procedures on implementing project controls and estimating activities.

4.1.1 Objective

The primary objective of the project controls function is to facilitate the following:

- Providing Afristarch with realistic plans for completing the project within an established time frame, budget and other baseline parameters.

- The necessary project controls for the bankable feasibility phase should be fit for purpose to ensure schedule and ultimately cost predictability and on-time reporting of any deviations.

- Providing a process for ensuring that the project proceeds in accordance with the baseline execution plan and for predicting and securing development and capital funds, measuring, and analysing any variations from the plan in a timely manner.

- Integrating the project controls plan with the change management process described in section six, change management, so that potential deviations from the project plan can be identified at an early stage and corrective action taken at the earliest possible time to minimise cost and schedule impacts.

  Reviewing and tracking requests for funding approval and making sure that the project receives the appropriate funding. That procedures address the governance and control of EC, technology vendor and other contractor invoice payments in relation to approved funds.

- Implementing work processes with the EC to achieve reporting on the actual man-hours spent and forecasting of the man-hours to complete the engineering work on specific scopes of work.

The above tasks will be performed by all members of the PMT, with project controls team acting as the focal point. The project controls plan integrates the elements of defining, planning, recording, monitoring, reporting, analysis and action. Through the use of these elements, potential deviations from the project plan will be identified at an early stage. Thus, all decisions affecting the established goals are evaluated and corrective actions are taken at the earliest possible time to minimise cost and schedule impacts.

4.2 Organisation and responsibility

The project controls function is responsible for cost and schedule related activities on the project. The organisational structure is included below and forms part of the PMT project organisation chart:

The project control manager

The project controls manager reports directly to the Afristarch Technical Director and has responsibility for all project controls functions, including funding applications, planning and roadmap development, schedule and estimate development, reporting, cost and schedule analysis, deviation control, and forecasting. Also taking the lead on the project to create a proper control base for the bankable feasibility.

The cost controller

The cost controller is responsible for taking the approved control base and incorporating it into the project cost reports. The cost controller is also responsible for establishing a cost reporting system that reflects the project approved funding, budget and all changes, current commitments and expenditures from the project accounting system and the current forecast.

The cost controller, with input and support from the PCM will lead the change management process, will be the key facilitator in the forecasting process (including cash flow), will provide the cost analysis input to the monthly project report and provide cost support to the PMT. The cost controller reports to the PMT project controls manager.

The lead estimator

The lead estimator is responsible for all activities relating to estimates produced on the project. He is responsible for establishing work plans, including detailed estimate basis, for the different classes of estimates. The lead estimator will also be responsible for preparing and/or reviewing estimates associated with the change management process, and will be responsible for coordinating activities associated with the change impact assessment (CIA) system.

The lead estimator reports to the PMT project controls manager. The PMT project management team and the project controls manager are responsible for the monitoring and analysing the cost and scheduling activities for the EC's.

The estimator

The estimator will assist the lead estimator to complete the estimates for the project. The estimator will report to the lead estimator.

4.3 WORK BREAKDOWN STRUCTURE (WBS) AND COST BREAKDOWN STRUCTURE (CBS)

These are the golden threads through which the whole project is managed and documentation structures, cost reporting structures, planning structures, organisation structures etc. are planned, managed and maintained for consistency and continuity during the project lifecycle.

4.3.1 Work breakdown

The project work breakdown structure (WBS) will be evaluated and updated to divide the project scope into discrete manageable work packages that focus on the deliverables included in the project scope of work. The WBS (work breakdown structure) is a logical structure that permits tracking of progress and schedule.

The WBS level of detail is adequate to support effective project phase execution and collection of historical data. Additional detail that does not add value or enhance our ability to execute the project will be discouraged. The WBS (work breakdown structure) should be considered as a physical breakdown of the facilities into areas, units and sub-units that are recognised in every aspect of the project (i.e., the design, drawings, materials, etc.) and not just the schedule.

The PMT should develop and maintain a WBS dictionary that provides a clear indication per WBS element as to what is included and excluded from each WBS element. Amendments and changes to the WBS will only be entertained once the necessary change management documentation has been signed off, which is done in accordance with the change management workflow process. The WBS is essentially an engineering management document (scope definition) but is administered and managed (via the WBS change management process) by the project controls team in order to ensure there is an early awareness of changes and the impacts thereof.

The PMT manages the WBS to project level. For formal project communication the PMT issues record of decisions (ROD's). These decisions will be formally communicated to the EC, Afristarch and other applicable role players.

4.3.2 Cost breakdown

After finalisation of the WBS (work breakdown structure) the CBS (cost breakdown structure) will be developed and implemented for each project. The cost breakdown structure (CBS) is an extension of the WBS and is used to segregate cost categories at lower levels.

The hierarchal cost breakdown structure will complement the most current WBS. It has to have the flexibility to add sub-projects within the elements of the WBS. The WBS and CBS will be used consistently by both Afristarch and the EC to ensure alignment of costs.

4.4 Estimating

The lead estimator, working with other project controls team members will be responsible for the management of project estimates utilising the WBS developed for the project.

4.4.1 Estimate preparation

Estimates shall be prepared according to the recommended practice of AACE international classification system (Table 1). The classification and accuracy of the estimate for the defined technical scope shall be indicated.

A class 3 estimate (FID) is a deliverable at the end of the Bankable Feasibility before the Financial Close readiness review.

This encompasses the scope of the facility and services for the project execution phase. It is based on the bankable feasibility package and the project execution strategy for the execution phase (engineering, procurement and construction) and will be subject to a risk analysis exercise in order to assess risk and contingency.

The PMT shall verify that factors and/or norms applied are appropriate

A definitive estimate (class two) will be done after the 60% model review for construction. Engineering. After the 60% model and estimate the construction portion will be fixed on placement of the construction contract.

4.4.2 Cost estimating deliverables

The estimating methodology, which will be followed for preparing the estimates, shall be discussed and agreed upon at an estimate kick off meeting. A pricing strategy and a gantt chart, outlining key estimating activities and corresponding durations, will be included. The estimates will indicate a value for the project that will be used to assist Afristarch to compile a Business Economic Model for the project.

4.4.3 Estimate format

The project work breakdown structure (WBS) shall form the basic structure of the estimate where IBLs and OBLs are clearly identified. The overall cost summary and the individual cost summaries, per WBS, shall be split into different categories to include the major cost elements, such as:

4.4.3.1 Direct field costs

Direct field costs must be categorised into civil works (earthworks, concrete, piling), structural steel, buildings, mechanical equipment, electrical, control systems, erection and painting and insulation (Material and Labour costs shall be shown separately).

4.4.3.2 Indirect field costs

Indirect field costs such as site establishment, temporary facilities (including camps and catering), construction services, supplies and consumables, scaffolding, construction equipment rental, e.g. heavy lifts (cranes above 80 tons), and transportation costs (sea freight and local transportation where applicable) must be identified.

4.4.3.3 Home office costs

Home office costs such as man-hours (engineering, procurement, project management, pre-commissioning assistance, vendor engineering support, construction management and supervision), disbursements, travel and subsistence must be quantified and included in the estimate. It should be clearly indicated which overheads are included in the construction cost and which form part of the in-direct or home office costs.

4.4.3.4 Owner's costs

Owner's costs such as spares (construction spares and maintenance spares), catalyst |chemicals, pre-production, custom duties, third party inspection, insurance, licensor fees, start-up modifications and escalation shall be discussed during the kick-off and review meetings.

The base currency make-up and foreign exchange impacts should also be provided. The cost of transportation for local and foreign supplies must be indicated separately. For detail type estimates the information should be available for review at the item level, i.e. price per item including duties, escalation, forward exchange, construction man-hour units and delivery costs.

4.4.4 Estimate reviews

An estimate review meeting shall be held with Afristarch to review and consider if the information presented is in a traceable format containing supporting documentation and technical data (supporting facts and findings). The review team must be able to, with the given information, trace all the final values within the presented cost estimate.

The information must be presented in a logical, cohesive and supportable manner with appropriate analogies and cost estimating relationships. All assumptions, and recommendations presented must be based on sound arguments. The final estimate must be easily verifiable by the review team.

4.4.5. Reconciliation

When applicable the lead estimator will provide a detailed reconciliation report of the differences between the latest estimate and the last published estimate prepared for the project. Cost impacts due to scope changes, pricing updates, labour productivity adjustments, estimate refinement, etc. must be identified.

4.4.6. General

Additional estimates will be prepared for special studies, for cost analysis of deviations that may be identified as the project proceeds, and as additional information becomes available during the life of the project. Each significant estimate will be subject to an extensive and thorough risk analysis exercise in order to realistically assess risk and contingency to be used in the estimate, considering the quality and detail of the available information.

4.5 Cost control

Cost control is the mechanism of capturing, reporting, and controlling project costs. Cost control starts at project inception and continues throughout the life of the project. Much of the framework for effective cost control is established during proposal preparation, gate three, and gate four estimate development.

4.5.1. Cost control summary

The project cost system will be set-up at project initiation and will keep track of original control base, current control base, indicated total cost, risk adjusted indicated total cost, commitments, and expenditures for overall project costs and work hours. A control base will be set up using the development funding estimates developed during pre-feasibility phase based on the estimates that have been developed in-house by Afristarch. Budgets and forecasts will be input to the cost system by the project controls teams from estimates and deviations.

The PMT project controls teams will on a monthly basis analyse the EC's data at a detail level (including commitments and expenditures) that will be rolled up into in a single report (all detail included) and issued to the PMT. Monthly forecasts will be produced and will include cash/cost-flow curves and any other reports or graphs that might be deemed appropriate. On an interim basis, the reporting systems will be reviewed for SOX compliance.

4.5.2. Capital approvals

The estimating function is responsible for the preparation and development of the project estimates. An estimate execution request that defines the methodology that will be adopted in the preparation of the project capital estimate will be developed. Estimates will be provided by the estimating function to be included in the business review that will identify resource requirements, and the hours required per resource. Estimates must be in a standard format and reflect the agreed WBS.

Only after capital has been approved at Financial Close may commitments be made on the project. The PMT will maintain a register of all development funding submissions and approvals for specific phases during the lifecycle of the project.

4.5.3. Cost control base and reporting

Approved cost estimates will be converted into an agreed cost breakdown structure (CBS) and loaded onto the project cost system. This will serve as the control budget. Committed

and expended costs will be recorded against the budgetary items at Cost Breakdown element (CBE) level. Cost reports will be generated by CBS|E code for specific units and totals will be rolled-up to project level. Variations to the control base will be identified and incorporated into the current Indicated total cost (ITC). For detail refer to section six change management.

Cost reporting

The cost management system will be used for reporting; consolidating, analysing and forecasting all project costs (i.e., home office engineering, procurement, and construction) and should include the following:

Original control base

This reflects work hours and costs that were approved for the Bankable Feasibility Phase by Afristarch. These approvals will be in the form of development funding cost estimates.

Current control base

Reflects the original control base, plus additional approved funding, plus approved variations to plan (VP's), and trends, which would include compensation events and budget shifts.

Indicated total cost (ITC)

This reflects the current control base plus potential variations to plan (PVP's).

Risk adjusted indicated total cost

Reflects the ITC plus identified risk costs. The RAITC represents the best estimate of the final end-of-job cost.

Committed

Represents the sum total of contracts, purchase orders, PMT man-hours and Afristarch man-hours placed on the project at a given cut-off date.

Expended

These are the monies paid to date against given invoices received in respect of goods or services provided for and on behalf of the project. Expenditures in respect of EC services.

The cost reporting system will be consistent with the CBS established for the project. By periodically analysing the cost data in a single reporting database, the PMT and EC will be aware of the cumulative impact of any cost changes to the control budget.

The cost database for the project will contain detailed information, suitable for reporting in various sorts and formats. It will also provide the ability to request reports containing information at various levels of detail.

The EC cost control teams will be responsible for incorporating all inputs, forecasts and assumptions at the detail level (project level) prior to issuing the project cost report and fortnightly project reports. It is in these reports that cost variations should be highlighted and reasons for deviations submitted. The EC will set-up monthly meetings where these deviations and the monthly forecasts will be discussed.

EC cost reports will be recorded in the PMT cost report as one liners per the most current WBS structure. The PMT deliverables and requirements will be similar to the EC's.

Project reporting

The EC cost reports together with the PMT related costs will be incorporated and be issued as part of the PMT's monthly progress report. These cost reports will be issued to Cost control Function for analysis and governance checks.

4.5.4. Man-hour control

This is the effective control of PMT man-hours, both spent and forecasted. The cost controller together with the project team forecasts and updates the man-hour report which forms part of the monthly cost report. Man-hour forecasts play a key role in the identification of project EOJ costs and as such should be signed-off by the project managers as part of the monthly cost report.

4.5.5. Risk management

Risks are events which may impact on project costs and or schedules. It is identified by the event with a trigger (action | point in time) which will cause the event to become a reality or cancel the event with no cost and or schedule impact. Risks are priced on a specific basis and reviewed | updated monthly (either known or assessed rates or quantities).

These identified risks must be quantifiable and should be accurately recorded in the project controls risk register and the impacts there-off reflected in the risk adjusted indicated total cost.

4.5.6. Forecasting

The successful management of any project relies not only on knowing the current status of the work, but also on being able to accurately predict the project control parameters (cost, schedule, etc.) at completion of the work.

Forecasting of project costs requires monitoring of the work performed against the project cost control base, analysing deviations from the control base, and predicting future performance. Forecasts should be updated with the same frequency as cost and progress reports.

The forecasting process will incorporate the change management process as well as the independent application of analytical techniques and tools. (earned value principles and

techniques must be applied). As changes are identified they will be captured in accordance with the change management process.

The PMT and EC cost controllers, together with the PMT project controls manager, are responsible for overall cost monitoring, analysis, trending, and forecasting of activities on the project. They develop recommendations for corrective actions to maintain or improve project performance

4.5.7. Cost flow forecasting

All cash or cost flow is based on the CBS at unit level which in turn is referenced to the project WBS. Forecasting cost flows in the early stages of the project will be based on graphical curves (linear or s-curves).

It is imperative that the project schedule durations | forecasts are translated into the project cost flow. All forecasting must be based on the ITC (i.e. approved funds less contingency). All forecasts will be based on the ITC – STD (spent to date).

A cost flow forecast will be developed and maintained, using the control budget, cost forecast, capital approval status and project schedule as its basis.

Cost flow forecasts will be prepared monthly to advise/inform Afristarch Principals of the monthly cash requirements throughout the life of the project. The cost forecast curve will represent an estimate of the distribution of monthly expenditures by both the PMT|EC's for the project phase duration.

The cost flow for a given month is defined as the gross value (exclusive of value added tax) of all correct, approved invoices presented to the PMT plus the gross value (exclusive of value added tax) of all approved requests for funds transfer schedules. The gross value referred to shall not take into account any deductions in respect of retentions, such deductions will be recorded against a separate retentions account. The cost flow forecast will be included in the monthly reporting package per unit and will spread the future expenditures by month based upon manpower forecasts.

The cost flow accuracy required is that the one month actual should be within 10% of the forecast. The total cost flow forecast is based on the ITC for the reporting period and relevant allowances should be included in the 3-month cost flow. The PMT will present cost flow information to Afristarch (financial department) on a monthly basis.

The annual forecast and the project EOJ will be measured against baselines developed at appropriate times, these forecasts will be directly linked to the project schedule which can only be changed through the formal change management process.

In order to add the cost flow process the following summary must be recognised:

- Assessment meetings will be conducted by the PMT and the contractor on or before the 25th of each month. During this meeting the final value of the contractor's invoice is greed.

- Pro-forma invoices are electronically submitted to the cost controller two days before the assessment meeting.
- The project controls manager and cost controller review and approve the invoice, per assessment meeting results and date stamp the invoice.
- The approved invoice is electronically submitted to Afristarch's financial department on the first working day of the following month.
- The invoice is logged by financial.
- Workflow completed the 10th of the month.
- Payments run on the 13th-14th of the month.
- Billing will run on the 15th of the month.
- 16-21st – Financial prepare electronic transfer.
- 22nd - Financial prepare cash flow.
- 30th to 31st – Invoices are paid in accordance with clause 51,2 of the NEC "each certified payment is made within three weeks of assessment date, or a
- Communication with and from the project manager is an absolute necessity to ensure accurate cash flow.
- Ensure that financial discuss the debits or credits with the relevant cost controller before posting costs to a project.

4.5.8 Contingency management

Contingency is the portion of any project budget that is allocated to address risk or unknowns within the individual elements that comprise the total project budget. Contingency is included as a safeguard against budget overrun, and applies to the known, approved scope of the project. Added, approved scope will be funded through the compensation event (change order) process and will include its own contingency.

The cost controller, under the direction of the project controls manager, is responsible for performing the periodic budget analysis, preparing the cost reports, and conducting the contingency analysis for forecast overruns. The PMT reviews the contingency analysis and determines any reallocation of contingency funds. The cost controller is responsible for managing any budget shifts or trends that result from contingency reallocation.

The cost controller prepares a cost report containing contingency amounts on a periodic (normally monthly) basis. Each component of the cost forecast in the report will be evaluated and the contingency will be analysed on a monthly basis to coincide with the publication of the monthly cost report. The PMT project managers and cost controllers will participate in the analysis.

The contingency element of the budget is typically at the highest value at the start of the project, because this is normally when the project is at the greatest risk of potential budget overrun. As the work proceeds, the budget is periodically compared with expenditures and commitments, and the contingency is adjusted as dictated by project requirements. As

work is completed, the risks decrease (unknowns become known). For instance, if a lump sum construction contract is awarded under budget, the risk of the bid exceeding the budget decreases, although the chance for cost growth is still a possibility.

Some element of the contingency funds may become available for allocation to other purposes (profit, covering other risks, etc.). A contingency drawdown curve will be issued monthly comparing actual drawdown versus an historical metric usage plan.

The PMT project manager and the project controls manager perform a review of the contingency analysis in relation to the current risk assessment model. The evaluation will identify areas of potential cost risk and assess the rand magnitude of each. Once again, contingency is not an allocation intended to accommodate changes in scope.

The PMT will manage client budgets on the cost-reimbursable project and a monthly contingency analysis review will be conducted with the client. Together, they will be responsible for determining any reallocation of contingency funds. The PMT (and the client where appropriate) will determine whether to recast the contingency or leave it as is. As risks are eliminated during the course of the project, the actual values can be trended into the forecast and the contingency reallocated as determined by the PMT.

The cost controller prepares project variations and trends based on the results of the PMT contingency analysis. Contingency will be allocated per WBS and must be managed by the responsible project manager. Transfer of contingency between WBS' must be approved as per the below approval limits.

4.6 PROGRESS AND PERFORMANCE MEASUREMENT

A key element for controlling project costs and schedule is the regular detailed assessment of earned progress, as well as commitments and expenditures. Measurement of project progress and performance is against the baseline criteria of the budget and schedule. An accurate measure of progress serves as the basis for assessing budget and schedule performance, forecasting costs, and requesting corrective actions.

Regular monitoring of project actuals against the control base provides immediate feedback to the Project Manager on the health of the project. Physical progress and performance is calculated monthly but this can vary depending on project specific requirements. Progress and performance measurements on the project are categorised as follows:

Progress

Physical progress is the measure of the completed portions of the work against the total work. It should not be linked to project effort-hours budgeted or spent. Physical progress should be based on the weighted value of actual work completed. Progress (percent complete) is measured by using a weighted average method of computing earned hours or work units (earned value).

Resource plans

Resource planning includes the development of staffing plans. These plans are developed based on the approved budget and | or forecast estimate of the effort-hours needed to accomplish the defined scope of work, together with the durations of time dictated by the project schedule.

The overall project staffing plan and the supporting discipline staffing plans are prepared initially by the lead planner and cost controller, under the direction of the project controls Manager, with input from the disciplines. Staffing plans will be based on equivalent personnel, in other words, the total hours worked each period will be divided by the normal straight time hours available for the period.

Available work hours will take into account four-week and five-week months, planned vacations, statutory holidays, and plant closure days that may occur. Staffing plans will be updated with actual data for each reporting period, and issued monthly as part of the monthly cost report. The staffing plans will be re-forecast as required if it becomes clear there are significant deviations from the original plan and mitigation plans will be incorporated.

4.6.1 Project progress reporting

The monthly progress report is produced to provide summary level information for the PMT team and client senior management regarding the status and forecasts relative to the project baseline. This report typically addresses the full cycle of the project and is frequently used as a reference document for client reviews.

The project controls manager is responsible for preparing the monthly report for recording and presenting project expenditures, progress, and performance. This presentation is made in both narrative and visual format, which may include charts, curves, and more. The project controls manager provides the cost, schedule, and progress input.

The importance of the monthly progress report, as not only a topical reporting document but also as a historical account of the project life cycle, cannot be overemphasised. It is essential for the project manager to be directly involved in developing the narrative elements of the report, as well as the approval process of the complete report. Project reports prepared on the project will include:

Monthly progress report

The PMT’s progress report will be submitted within the first ten working days of each month.

Steering committee report

This report will be compiled by the PMT and submitted as part of the monthly progress report and will be submitted by the eighth working day of each month.

4.6.2 Project status reviews and meeting requirements

The EC arranges the following meetings in conjunction with the employer during the execution of the project in the last week of every month for the duration of the contract. The contractor will minute all meetings listed below:

Project control alignment meeting

This meeting to be held at kick-off stage.

Monthly review cost report meeting

This meeting to be held within a week after the contractor “cut-off” date – any deviation of the contract value should be fully substantiated.

Bi-Weekly change review

Intended to engage PMT and EC personnel and effectively address change management as early in the process as possible. The EC will present any new changes that have been identified subsequent to the prior week’s meeting and answer any questions on outstanding Compensation events.

The objective will be to address potential changes the moment they surface so that they can be influenced and | or mitigated, and to sign-off on changes that are agreed in order to release the EC to proceed with its work. Consideration shall be given to make this part of the weekly project management meeting.

AFRISTARCH PRODUCTION FACILITIES DEVELOPMENT

Project Execution Plan

Section 5 – Quality Management

January 2019

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5 QUALITY MANAGEMENT

This section describes the quality system that will be implemented in the development Afristarch project. A Quality Management Plan (QMP) will be developed and implemented for the project.

5.1 OBJECTIVES OF THE QUALITY MANAGEMENT PLAN

The QMP describes the quality assurance and quality control requirements, organisation, division of responsibility, and procedures to be followed to meet the quality requirements of the project

The objectives of the QMP are to maintain oversight and give direction on the following major points:

- Ensuring that technical work meets the quality requirements of the project.
- Contractual quality requirements are effectively and accurately communicated to all stake holders.
- Selected Engineering Contractors & Technology Vendors have appropriate quality systems or services that will meet the contractual, technical and quality requirements.
- Design development is coordinated with the Project Team, Engineering Contractors, Technology Vendors, Regulatory/Certification organisations, and any other stakeholders to ensure that acceptable quality deliverables are produced.
- Constructability, Operability and Maintainability considerations are incorporated into the design.
- Quality system non-compliance and product non-conformance are promptly identified, evaluated, and appropriate corrective and/or preventive actions are taken to prevent recurrence.

5.2 ORGANISATION AND RESPONSIBILITIES

The Technical Director has responsibility for development of the Afristarch project quality system. In this effort, the Technical Director will enlist the services of the organisations listed below.

5.2.1 Quality Assurance

The Technical Director provides an independent overview of the project activities and has the authority to audit and monitor activities for compliance with Afristarch project requirements, to identify quality problems, to contribute to problem resolution, and to evaluate the effectiveness of solutions.

A Project Engineering Manager, either provided by the EC or Afristarch will have the responsibility to implement the quality activities outlined in this PEP, identify project conditions that may be adverse to quality, and to verify the closure of any Corrective Actions (CAs) or Preventive Actions (PAs) that may have been raised during project audits.

5.2.2 Construction Management

Site quality is focused on verifying that the desired level of quality is achieved on all field activities during the engineering and construction phases of the project. An audit plan will be developed covering Engineering Contractors site activities.

5.3 AFRISTARCH OPERATING SYSTEM

Afristarch will develop a Quality Management System that is structured to comply with the ISO 9001:2008 international standard. All engineering, procurement, and construction work will be performed according to these standards and follow a plan, do, review and approve cycle approach to the development of deliverables.

5.3.1 Requirements

The methods of Project Execution will include the development of the following documents:

- Project Baseline – Describes the scope, cost, schedule, and risk basis from which the project will be executed and controlled.
- Project Execution Plan (this document) – Outlines the strategic and tactical plan for executing each phase of the project.
- Project Procedures Manual – The procedure of the EC to be appointed to develop the Bankable Feasibility of the Afristarch project shall be procured by Afristarch as a basis for the company's development of an Afristarch Project Procedures Manual.
- Activity Plans, Work Instructions, Checklists, Practices, and Specifications for each Discipline – Provide guidance and direction for discipline-specific PMT activities.

5.3.2 Fundamental Principles

The following principles are proposed for the achievement of the quality objectives:

- The achievement of quality is a line responsibility wherein each team member is accountable for the quality of their work. This applies to all team members regardless of discipline.
- The PMT Quality organisation maintains a strong overview of work in progress to help verify compliance with specified requirements. This is accomplished by providing guidance and support during project initiation, performing key document reviews to verify compliance with requirements, conducting informal quality surveillance activities, formal quality audits, and planned inspections.
- The degree to which quality evaluation criteria are applied to an item is dependent on the importance (i.e. criticality), of the system, structure, or component to the safety of the project.
- The review and approval of quality records is commensurate with the importance of the item under consideration.

5.3.3 Key Elements of the Operating System

Key elements that support product realization include:

- Employing EC as partners to Afristarch.
- Providing project specific orientation / training when required.
- Utilising only validated and approved reference software.
- Preparing and maintaining a detailed scope of work.
- Documenting the basis of the design.
- Preparing Activity Plans for each discipline as per ETQP.
- Assessing the criticality of each major system or component in the project.
- Performing all required checks and reviews for each deliverable.
- Obtaining required reviews / approvals by regulatory bodies.
- Controlling changes to the design through a formal change management process.

These activities are discussed in more detail elsewhere in other sections of this PEP.

5.4 AUDITS AND SURVEILLANCE

Audits and surveillances will be performed on the PMT to verify that Project activities are being implemented according to the PMT quality system.

5.4.1 Quality Audits

The project will be subjected to periodic internal quality auditing. In addition to office audits, other Quality Audits will be performed, including:

- Quality Audits of other participants (e.g. Engineering Contractors) will be performed as deemed necessary by the Afristarch Technical Director.
- Site audits of construction activities will be conducted as deemed necessary in conjunction with the site Quality organisation.
- The project may also be subject to external audits (e.g., audits conducted by an Independent ISO 9001:2000 registrar).

The Auditing lead, will document the results of the audit, issue a formal report, and follow up on any audit findings requiring action.

5.4.2 Discipline Audits

The PMT will be subject to periodic discipline auditing. A Discipline Audit is a review of a specific discipline to verify that the proper work processes are being followed and that the deliverables produced are technically correct.

An experienced member of the discipline being audited will conduct the audit using that discipline's audit checklist. The discipline auditor must not be the person responsible for the work being performed.

The auditor will document the results of the audit and forward this report to the Technical Director. The Technical Director will then issue a formal report and follow up on any items requiring action.

5.4.3 Audit Strategy

Audits will be conducted early and often to clearly set expectations and standards, assure Quality Systems execution and compliance with requirements, and to determine opportunities to improve performance. Quality audits will be planned and performed on a regular basis to determine effectiveness of quality systems implemented by the Engineering Contractors and subcontractors. Engineering Contractors, technical discipline and quality system audits will be scheduled based on the status, quality and safety importance of activities being performed, and will be initiated early enough to assure effective quality system implementation.

Engineering Contractor audit plans will be prepared that define the extent of quality system and technical discipline audits to be undertaken. Audits will be conducted to correspond with planned and actual engineering, procurement and construction phases and activities. Audit teams will be led by a lead auditor and will consist of Quality staff, and where appropriate, technical specialists, who are independent of the activities and organisation being audited.

Audits should be reported in a timely manner and clearly describe areas addressed, areas of concern, opportunities for improvement, and details of system deficiencies with specific objective evidence. Audit reports, including reported audit findings, observations, Non-conformance and Corrective Action Reports, and opportunities for improvement will be issued to manager or supervisor responsible for the audited activity.

Audits will be recorded in an audit register or equivalent and the PMT will be informed of all scheduled Engineering Contractor audits and status.

A follow-up surveillance or audit will be performed in cases where implementation of required corrective action is unable to be verified by use of information or documentation received from the affected discipline or group. The follow-up may be performed in the same manner as the initial audit, and by the original auditor but should be limited to only those areas for which the corrective action had been issued. The follow-up

should verify completion of actions noted and will be considered closed upon verification that the required corrective action is complete.

5.4.4 Project Audit Plan

Based on the Audit Strategy, Audit Plans will be developed that schedules both Quality Audits and Discipline Audits over the course of the project. Audits will be scheduled at the optimum stages of the work (i.e., while the activities to be audited are in progress, yet early enough to address any problems discovered).

Audit Plans are prepared and published by the Technical Director. Progress and status of Audit Plans will be updated as necessary. Audit Plans may be modified based on audit or surveillance results.

5.5 NON-CONFORMANCE

Auditing, in any of its forms, may reveal situations in which specified requirements are not being fulfilled. An instance of this is called a non-conformance. To qualify as non-conformance, there must be a clear violation of a requirement.

Discovery of a genuine non-conformance during an audit may result in the issuing of a Corrective Action (CA) or Preventive Action (PA) report, which describes the specific nature of the nonconformance. Any team member can highlight the existence of nonconformance, but only a representative of the COE group is authorised to issue a CA or PA.

Conditions that can be improved but do not constitute nonconformance may be documented in the audit report as an Observation. Observations do not require follow up to verify that they have been implemented.

In addition, strengths may be highlighted. Strength is a positive finding that validates good work or positive conditions beyond the expected norms.

5.6 CORRECTIVE AND/OR PREVENTIVE ACTION

Non-conformances will be addressed with suitable corrective and/or preventive action. Corrective action is defined as action taken to eliminate the cause of nonconformance. Preventive action is defined as action taken to eliminate the cause of a potential nonconformance.

The CA / PA will be documented in a report and transmitted to the organization responsible for addressing the nonconformity. The responsible organization then develops a plan to address the nonconformity, along with an estimated date by which this plan will be implemented. Action taken to address nonconformity should be commensurate with the magnitude of the problem.

5.7 MANAGEMENT OF THE AUTHORISED INSPECTION AUTHORITIES (AIA'S)

The EC's will manage the AIA function on the project. Starch manufacturing processes are low pressure operations and the extent Inspections is not expected to be significant. The Management activities will include:

- Providing technical scopes and obtain competitive bids from AIAs on EC Work Packages.
- Placement of Work Assignments.
- Tracking of AIA inspection resource allocation.
- Oversight of documentation turnaround times.
- Oversight of design verification engineering resources.
- Verification of work performed against invoicing.
- Quality audits of AIAs.

AFRISTARCH PRODUCTION FACILITIES DEVELOPMENT

Project Execution Plan

Section 6 – Change Management

January 2019

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6.1 CHANGE MANAGEMENT

The key to mitigating adverse impacts to the project is rapid identification, notification and evaluation of changes and potential changes from the project control base. The project will implement a change management process that will provide for timely identification of changes and potential changes to the project.

Identifying, communicating, and managing changes to the project Baseline is the responsibility of all members of the PMT, the EC and Afristarch. This Process is to be followed stringently by the EC. Names and terminology might differ but the principals remain the same.

6.1.1 Objectives

The Change Management process provides the PMT and EC with proactive warnings of conditions that might affect the project cost and/or schedule. The change management process will be the mechanism for documenting trends and changes. Quantity tracking and re-estimates will provide the necessary data to alert management of potential changes. This process allows project management the opportunity to minimize or negate impacts of the potential change. This will be achieved by maintaining transparency at all levels and consolidated reporting by the PMT and EC .

The intention is not to escalate every change to the highest hierarchical level for approval, but to allow each entity to manage within their appropriate budgets and Levels of Authority. The overall perspective and control of the Total Project Costs. The EC will operate within an agreed project Scope of Work. For any expenditure or delays outside the Scope of Work, the EC is responsible for immediate communication of any such changes to the PMT and may not spend either time or money on the changes without proper authorisation.

Proper authorisation is a Compensation Event (CE). In certain cases (as authorised by the PMT) this may be in the form of a written instruction from the PMT to perform the work and also states that the CE requiring approval will follow.
Traditionally the requirement for an effective change management process is a clearly defined scope of work. The project work scope basis is contained in the seven project Baseline documents. These documents are developed during the bid request/proposal effort and by the contract negotiations prior to contract award. These Baseline documents are:

- Prime Contract
- Scope of Work
- Project Execution Plan
- Cost Estimate (budget including effort-hours and material quantities, and estimate basis)
- Management Level Schedule
- Risk Assessment
- Commercial Model

The Change Management Workflow applicable to the interfaces between the PMT and the EC will be developed.

6.2 ORGANISATION AND RESPONSIBILITIES

Change management is a shared responsibility among all organisations on the project. It will be the responsibility of all personnel to notify their respective Project Management and Project Controls Teams of any potential changes or changes in project scope as soon as they are recognised so that processing thereof may be initiated.

The focus on the project will be to identify changes as early as possible, communicate them and ensure that all impacts of the change (for example, cost, schedule, resources) are considered. Early identification is critical in order to manage and mitigate the effect that changes might have on the project, because the opportunity to influence the final result of the project decreases as the project progresses.

Identification and documentation of changes will be initiated by the Project Management Team (PMT) and the Engineering Contractor (EC). When a project member becomes aware of a condition that may result in a potential change to the control base (control budget, estimated quantities, project schedule, etc.) an early warning (EW) or in some instance a Project Managers Instruction (PMI) will be initiated.

The PMT Project Controls team will administer and manage their Project change management systems, so doing ensuring that all project team members understand the process; logging and maintaining the status of all identified changes; facilitating change management meetings; expediting the approval / disposition stage; and incorporating changes in the cost reports and schedule updates. The most recent change register will be included in the monthly progress report.

The EC will adhere to its Contractual requirements using Early Warnings and Compensation Events as well as Trends.

The Project teams will be the key contributors to the change management process, as it will often be that they will first to recognise changes to their scope of work. The Project teams will be responsible for controlling its scope of work and will be responsible for identifying any cost / schedule impacts to the facilities they are engineering, especially with respect to quantity growth.

6.3 IDENTIFYING POTENTIAL CHANGES

The project team will use the following strategy to ensure that engineering, procurement, and construction efforts are appropriately connected to the project cost estimate and any potential changes identified will be reported to Project Management and Project Controls:

- Project deliverables and effort-hour estimates will be compared with the initial estimate to identify any significant changes in scope, duty, size, etc. (and hence in the anticipated cost).

6.4 TYPES OF CHANGES

- Changes may fall into a number of categories, which have been listed below. A brief description of how they will be funded is also indicated.
- Potential Variation to Plan (PVP): Resolved by using the schedule float and/or cost contingency.
- Variation to Plan (VP): Resolved by using the schedule float and/or cost contingency.
- Scope Variation to Plan (SVP): Resolved through the application for additional funding
- Price Variation (PV) also known as a Trend: Usually resolved by using the schedule float and/or cost contingency.
- Budget Shift Generally resolved by moving budgets from one CBS to another.
- Early Warnings (EW): Possible or immanent change to contract. Depending on it nature raise a risk or a PVP
- Compensation Event (CE): Contractual change. Leads to VP. In the early stages raise a PVP and when the cost are certain convert to a VP or PV.
- Project Managers Instruction (PMI): This is an instruction by the project manager for the EC to proceed with a specific task or submit a quotation which in turn might lead to a CE.
- Potential Impacts (PI): Impacts that might have a significant impact on the project, these costs are recorded outside of the cost report until such time that they are mitigated or they become an official project change.
- Varying degrees of authorisation for PV's, VPs, PVPs and Compensation events are required.

6.4.1 Potential Variation from Plan (PVP)

A PVP is the initial document, which identifies a potential change to the project Scope of Work. This change could have a harmful effect on the project (e.g. vendor delays, required equipment that was omitted from the preliminary design package, unanticipated weather conditions, etc.) or in some cases a helpful effect (e.g., improvements as a result of the Value Awareness program or value engineering activities).

A PVP can be initiated by anyone on the project team (PMT). It will contain a brief description of the potential change, all contractor correspondence, identify and quantify all impacts (plus or minus), include a rough order of magnitude cost estimate and an

indication of the impact on the schedule. The goal is to develop this initial PVP package within 24 hours of its identification. PVPs will not be worked on until the relevant authorities have approved them.

Estimated cost impacts of PVPs must be allocated in accordance with the Project Cost Breakdown Structure i.e. it should have a particular/specific Cost Breakdown Element number (CBE).

When the PMT identifies a PVP and produces a PVP Document it will be assigned a PVP number and entered into the PVP register. Under no circumstances may a commitment (placement of a contract or purchase order) be made against a PVP.

The PMT will review the package and either:

- Approve or receive approval for the PVP.
- Reject the PVP as not valid. An invalid PVP will be cancelled. The cancelled PVP will be returned with an explanation to the originator. The originator may revise the rejected PVP and resubmit it. It might be appropriate to raise a Trend or Budget Shift, in place of the cancelled PVP.
- Adjust the project cost forecast (ITC) and schedule forecast. PVPs will not result in an overall change to the project current budget.
- Identify and initiate corrective action that will eliminate its need.
- Initiate preparation of a Compensation Event or Trend, if it is agreed to be a valid change. This also constitutes approval of the cost of preparing the CE or end, even if they are subsequently rejected.

6.4.2 Variation from Plan (VP)

A VP is the result of a change in the project Scope of Work (not additional scope). The VP documentation must define the specifics of the scope change, identify and quantify all impacts (plus or minus), and include a detailed quotation for work to be performed as well as the impact on the project schedule. VP's should be a combination of the following costs (EC materials, contracts and services as well as any associated Afristarch costs). The relevant authorities must approve the VP before work can be initiated. Once approved, VPs will affect the current project budget, forecast, and / or schedule.

If a VP is approved in principle, a VP number is assigned and entered in the VP Register. The PMT will carry out further analysis including, as appropriate, work hour estimates, material quantities and prices, and changes to the project schedules.

After this analysis is completed, the PMT will prepare the formal Compensation Event document and forward it to the relevant authorities for approval. The signed approved Compensation Event document is returned to the Cost Controller who will distribute copies of the approved Compensation Event to all relevant parties via Document Control. Only at this time, is the PMT/EC authorised to do the work described in the VP. Should the VP be rejected for any reason the description and VP number may not be re-used for any other VP.

Upon approval of the VP the PMT will:

- Record the approved VP amount into the Register.
- Adjust the overall project current budget, cost forecast and schedule.
- Update the progress reporting systems to reflect the new work plans.

Approved VPs may not be revised. Any revisions must lead to the generation of a new VP.

If the VP is rejected or stopped for any reason, the current budget will be updated with the cost of preparing the VP.

6.4.3 Scope Variation to Plan (SVP)

A SVP is the result of an addition to the project Scope of Work (additional scope). The SVP documentation must define the specifics of the scope change, identify and quantify all impacts (plus or minus), and include a detailed quotation for work to be performed as well as the impact on the project schedule.

SVPs should be a combination of the following costs (EC materials, contracts and services as well as any associated Afristarch costs). The relevant authorities must approve the SVP before it is submitted to the steering committee or board for sanction. Once approved, SVPs will affect the project's original approved funding value and / or schedule.

6.4.4 Price Variations (PV's)

A Price variation is the formal documentation that a change, which does not affect the project scope of work that has occurred. These PV's are due to changes in for e.g. quantities, price fluctuations, productivity trends, errors and omissions, or currency exchange rates. It provides a detailed description of the change, its cost and schedule impacts (either a rough order of magnitude or detailed estimate will be prepared).

PV's require approval by the Project Manager and will be communicated to the PMT immediately. They will impact the project forecast and change the current budget.
When the PMT identifies a PV, they will produce a PV Document, assign a PV number and enter it in the VP, PVP and PV register.

The PMT will review the package and either:

- Approve or receive approval for the PV.
- Reject the PV on the grounds that mitigating actions may void the impacts.
- Record the Value and description of each PV into the PV register.
- Adjust the project current budget and schedule forecast.
- Update the progress reporting systems to reflect the project status.

6.4.5 Budget Shift

A Budget Shift is a change that does not alter the total project cost or schedule, but serves to document redistribution of the approved budget. Budget Shifts are often caused by changes in project execution, such as shifting work. Budget Shifts will be processed as zero value VPs.

6.4.6 Early Warnings

In terms of the Contract between the PMT and the EC, Early Warnings will be used to identify deviations from the project scope of work and identify trends relating to the cost of services.

Early Warnings once approved or rejected will be returned to the EC via the formal document control process. Early Warnings are generally translated into project risk or PVPs.

The EC will report any Early Warning to the PMT as soon as they become aware of an EW.

6.4.7 Compensation Events

In terms of the Contract between the PMT and the EC, Compensation Events will be used to identify deviations from the project scope of work and identify trends relating to the cost of services. The EC will report Compensation Events to the PMT as soon as they become aware of a CE. The Compensation Events must be reported within eight weeks of becoming aware of for the EC to be entitled to a change.

6.4.8 Project Managers Instruction (PMI)

In certain instances the PMT project manager might issue the EC with an instruction to commence work on a new idea, value engineering plan or procurement strategy. These instructions are communicated to the EC in the form of an official PMI.

6.4.9 Potential Impacts

In terms of Potential Impacts the EC will report any Costs that may occur as soon as the EC becomes aware of the potential impact. This may be as simple as notification of possible FOREX spikes and the impact that it would have on a particular budget or unit. Potential impacts require no formal authorisation as there are no deductions or changes made to the ITC or Contingency.

6.5 CHANGE MANAGEMENT REPORTING

It must be clear to all parties that in cost reporting, the Original Budget is maintained and together with Approved SVPs, VPs and Trends forms the Current Budget. The ITC (Indicated Total Cost) is the sum of the current budget plus approved PVPs.

Cost change summaries will be included in the EC monthly progress reports and the PMT will include these in their overall reports. The change management process will be tracked, monitored and submitted to the PMT for approval.

In addition, through the normal forecasting process, the Project Controls team will perform comparisons to the control base that will include, but not be limited to, take-off quantities, unit prices, effort-hours, changes to equipment or specifications, and changes in project schedule or project execution. Any potential changes identified, as a result of these comparisons, will be processed through the change management system.

6.6 ESTIMATING THE IMPACT OF CHANGE

Initially, all potential changes will be accompanied by a rough order of magnitude (ROM) cost. The accuracy of this ROM estimate need only be in the range of 30 – 50 %. The purpose of the ROM is to assist in evaluating the change and its impact. It is essential that in developing either a ROM estimate or any subsequent detailed estimates, all cost and schedule impacts be considered, rather than just the impact on the person originating the potential change.

For example, if the EC makes a change that increases his services hours and cost, it is important that the change also documents whether the change will result in any increase or decrease to direct field material, labour, other costs or project schedule, even though construction will only occur in the execution phase of the project.

6.7 CHANGE REGISTERS

Change Registers will be maintained throughout the life of the Afristarch project. All PVPs, VPs, PV's, and Budget Shifts will be recorded and tracked on the Change Register. A separate Change Register will be kept for all EWs and CEs. A Register will be maintained detailing all requests for additional funds. Progress on when they will be submitted and whether or not they were approved will be included. Change Registers will be included as part of the monthly progress report.

6.8 MANAGING CONTINGENCY, SCOPE DEVELOPMENT AND GROWTH

Contingencies will be reviewed on a regular basis by evaluating each component of the ITC. The PMT and the EC will participate in the analysis. The evaluation will identify areas of potential cost and schedule risks and assess the cost impact of each. As risks are eliminated during the course of the project, the actual values will be trended into the ITC and the contingency will be adjusted accordingly.
As scopes are more clearly defined and understood so it becomes important to adjust and maintain the ITC as accurately as possible. This element forms a large part of Contingency management and maintenance of scope development.

AFRISTARCH PRODUCTION FACILITIES DEVELOPMENT

Project Execution Plan

Section 7 – Programme Document Management

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7. PROJECT INFORMATION MANAGEMENT

The purpose of this plan is to define the tools and strategies necessary for managing all manner of information. The information management requirements are determined based on elements of the project as a start-up project, the proposed execution strategy, the needs of Afristarch principal personnel, project site & location, budget constraints, fit-for-purpose solutions, and cost savings ideas.

7.1 OBJECTIVES

The management of information and the provision of productive tools are a key aspect of project automation. The information management objectives for the project are:

- Establish the procedures with regard to automation and information exchange with the various parties and locations involved on this project.
- Utilise standard reference systems and proven information management procedures wherever possible.
- Improve project communications and reduce overall project costs through the use of Information Management.
- Provide for the integration of the e-mail, collaboration and other systems in use by the Project and others associated with the Project.
- Move data electronically whenever and wherever reasonably practical, secure, and cost effective.
- Evaluate compatibility and availability of infrastructure (hardware, software and network) that will be required at each site.
- Accumulate project information in an easily archived format.
- Ensure access to data that is secure from unauthorised users and prevent inadvertent or intentional loss of data.
- Mitigate automation / information technology risk.
- Provide clear definition and scope of project electronic deliverables.

- Establish standard formats for data exchange and retention among all phases and stakeholders.
- Minimise manual entry of data.
- Address level of access to data required by stakeholders (access rights).

7.2 ORGANISATION AND RESPONSIBILITIES

Afristarch will employ the services of a part-time Document Manager. The Document Manager will be responsible for the management of all information and automation related activities on the development of the Afristarch project. The Document manager will also be responsible for software and hardware requirements during the project development.

The Document manager is responsible for overall coordination of information management efforts regarding both hardware and systems support, and is the primary link to other information services support groups. The Document manager will be responsible for the interfaces between the Programme and all the projects and information management infrastructures. The Document manager will support the disciplines in identifying and implementing the automation tools to most effectively execute the work.

The ultimate project responsibility for assuring the automation network and systems coordination functions are addressed will reside with the Document manager.

7.3 PROJECT NETWORK REQUIREMENT

7.3.1 External Connections

The EC's Information Specialists will be required to ensure proper interfacing between the Afristarch and EC's electronic systems at the kick-off meeting with the EC.

7.4 AUTOMATION SECURITY REQUIREMENTS

All personnel with access to project data will comply with the IT security policies and procedures. These include but are not limited to an authorised log-in ID to protect the security of the project information. Details of the security access rights, virus detection, and data backup plan will be detailed in project reference documents.

7.5 PROJECT ELECTRONIC COMMUNICATIONS AND COLLABORATION

7.5.1 Electronic Mail

E-Mails will be used for informal and formal communications between all project team members and the EC. Electronic file attachments may be supported as an expedient method of communicating or transferring files in the standard project file formats. Internet e-mail will be used for communications external to the project network.

A project email database will be created for permanent storage of correspondence regarding cost, schedule and project scope or other project-specific correspondence. All E-mail file attachments should not exceed the 5MB size limit.

The EC will be required, during bidding, to provide an example of their typical Information Management Plan for the bankable feasibility.

7.5.2 Remote Document and Model Review

Remote collaboration technology will be used whenever possible for the project drawing and document review and collaboration process. Utilization of this technology will minimize project-required travel and cost.

7.6 INFORMATION MANAGEMENT DELIVERABLES AND CLOSE-OUT

The Document manager will facilitate and coordinate with the disciplines to ensure that the deliverables are transmitted as scheduled, in accordance with the appropriate format. Drawings and data for the project will be archived for records.

AFRISTARCH PRODUCTION FACILITIES DEVELOPMENT

Project Execution Plan

Section 8 – Engineering and Design

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8. ENGINEERING / DESIGN

The ultimate goal of the Afristarch Project is to produce 100 tons per day of modified starches at the Afristarch's Starch Manufacturing Facilities for the South African and Southern African market as set out in Section 1 of this execution plan. This execution plan has been developed for the Project Development Management Team (PDMT) and is aimed at ensuring that the engineering and designs produced by the individual Engineering Contractors (ECs) will reflect business requirements and facilitate the engineering, design and construction of facilities that meet Afristarch's strategic objectives.

The bankable feasibility /engineering and design phases of the project will be executed by a single engineering contractor, with the technology vendor providing specialty turnkey services for their technology package.

8.1 OBJECTIVES

The primary objectives of the PMT Feasibility and Engineering effort are to:

- Manage the engineering activities in accordance with the requirements for the development and implementation of the Afristarch business
- Develop and progress the project to meet the Financial Close requirements to enter into the execution phase of the project
- Provide quality assurance in line with Section 12 of the Project Execution Plan (PEP).
- Integration of engineering:
    - Control and coordinate plot space identification, allocation and utilization;
    - Coordinate battery limit and other interfaces between the PMT and EC; and
    - Manage the bankable feasibility and engineering support of the design and construction of the starch production facilities through to commissioning and beneficial operation, by obtaining the support from the technology vendors, ECs, CC's and suppliers where this assistance may be required.
- Integrate process and utility streams, and process controls, to provide a fully integrated facility.
- Provide an operating plant at the completion of the project that meets Health, Safety, and Environmental (HSE) requirements as set out in the Occupational Health and Safety (OHS) act.
- Provide the engineering management resources to enable the supply of accurate and complete compilation of contractually required documentation
- Attend the following activities and verify that the designs meet the requirements for safety, constructability, operability, reliability, and maintainability:
    - BFD reviews,
    - PFD reviews;
    - P& ID reviews; and
    - HAZOP; and

- Model reviews.

8.2 ORGANISATION AND RESPONSIBILITIES

The EC will provide the resources for the engineering effort as envisaged, as a minimum, in this section. The engineering effort will be coordinated by the technical director to ensure a consistent approach on the Afristarch project. Weekly engineering sessions will be held to ensure that a common approach is implemented and maintained.

8.2.1 Process Engineering

The lead process engineer has overall responsibility for all process engineering activities on the project and will hold responsibility for the technical integrity of the design. The lead process engineer will provide overall high level technical and execution guidance.

8.2.2 Disciplines Engineering

The engineering function consists of the following disciplines:

- Mechanical engineering; and
- Control Systems & Instrumentation engineering; and
- Electrical engineering; and
- Civil & Structural Engineering

Each discipline lead is responsible to provide overall high level technical and execution guidance.

8.3 ENGINEERING PHASES

The engineering development activities will be managed according to a stage-gated process. The project has completed the pre-feasibility phase of development and is under preparation for the development of a Bankable Feasibility.

8.4 DESIGN BASIS

The technical director, supported by the other directors will check and rule on the clarity of the basis of design completed for the prefeasibility phase prior to engaging the EC for the bankable feasibility. For the subsequent phases, this assurance will be the responsibility of the EC before engaging construction contractors.

Once the design basis has been signed off, changes or other modifications will be processed through a formal change management process.

8.4.1 Specifications, Standards and Standard Details

Afristarch will prepare a scope of work for an EC defining the work together with a set of specifications and standards

Where reference is made to an industry Code or industry Specification, this shall mean to be the latest revision of the document including addenda or revisions thereto.

8.4.2 Language

Engineering documents prepared for this project will be in the English language.

8.4.3 Measurement System

Engineering documents prepared / used for the project will use SI units of measurement.

8.5 ENGINEERING DEVELOPMENT DELIVERABLES

8.5.1 General

The engineering and design document deliverables such as drawings, specifications, calculations, studies and reports required for the project will be generated and delivered by the EC with input from the technology package vendors.

8.5.2 EC Engineering / Design Deliverables

The deliverables for the EC will be defined in the contract for the project.

8.6 MANAGEMENT OF THE EC

The Afristarch core team will engage in the following:

- Attend EC Engineering review meetings in order to monitor progress of the Engineering/design activity;
- Review and process Technical Queries from the EC; and
- Report on quality of engineering done by each EC.

8.7 ENGINEERING QUALITY

The management of Engineering Quality will be achieved as described in Section 12 of the PEP.

AFRISTARCH PRODUCTION FACILITIES DEVELOPMENT

Project Execution Plan

Section 9 – Stakeholder Management Plan

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9.0 PURPOSE OF DOCUMENT

The purpose of the document is to establish a process of identifying and engaging the appropriate influential stakeholders and the appropriate sequence, in order for Afristarch, to execute an effective and timeous stakeholder engagement strategy that will ensure that the project achieves its objectives to successfully establish a Modified Starches Manufacturing Business and the development of the Afristarch Production Facilities Project.

Once the key stakeholders are identified, a stakeholder engagement plan will be outlined with a clear set of well-defined activities of schedules, outcomes and key messages for each respective stakeholder entity.
:

9.1 Stakeholder engagement principles

Supported by Afristarch values as the foundation principles, the stakeholder engagement guiding principles are envisaged to be as follows:

Proactive engagement of key stakeholders on an on-going basis to communicate Afristarch Project Development progress, strategic contribution to the afro-processing sector and the local community where the facilities will be established

Securing of access to key and critical external stakeholders and decision makers within the identified organisations to enable Afristarch to be kept abreast industry issues that will have a direct and indirect bearing on Afristarch's business objectives.

Workshop developed and aligned messaging of the Afristarch market, technical, environmental and business solution strategies that which will enhance and favourably position Afristarch's reputation with stakeholders and the broader South African public as a committed industry player and corporate citizen.

9.2 Success Measurement

Success measurements of the stakeholder engagements will be via quarterly reporting within Afristarch on the status of engagement actions, stakeholder responses to Afristarch engagement and progress against the engagement plans. Key focus areas of engagement are:

- Secure the viability and sustainability of the Afristarch Modified Starches Business
- All key external stakeholders are engaged to secure outcomes
- Secure government and industry support for Afristarch's stated business objectives
- Secure a regulatory framework that supports Afristarch's business objectives
- Ensure security of supply of Afristarch Modified Starch Products to the current import-starch served Southern African market
- Ensure mutually beneficial outcomes in the delivery of the Afristarch Project
- Educating stakeholders about Afristarch activities and ensuring that our communications are transparent and executed in an honest manner.
- Identifying co-investment opportunities in the agro-processing sector

9.3 Stakeholder identification

Afristarch stakeholders are envisaged in accordance to the Grunig and Hunt Model model where the stakeholders are categorised as enabling, functional, normative and diffused stakeholders as outlined in the figure below.

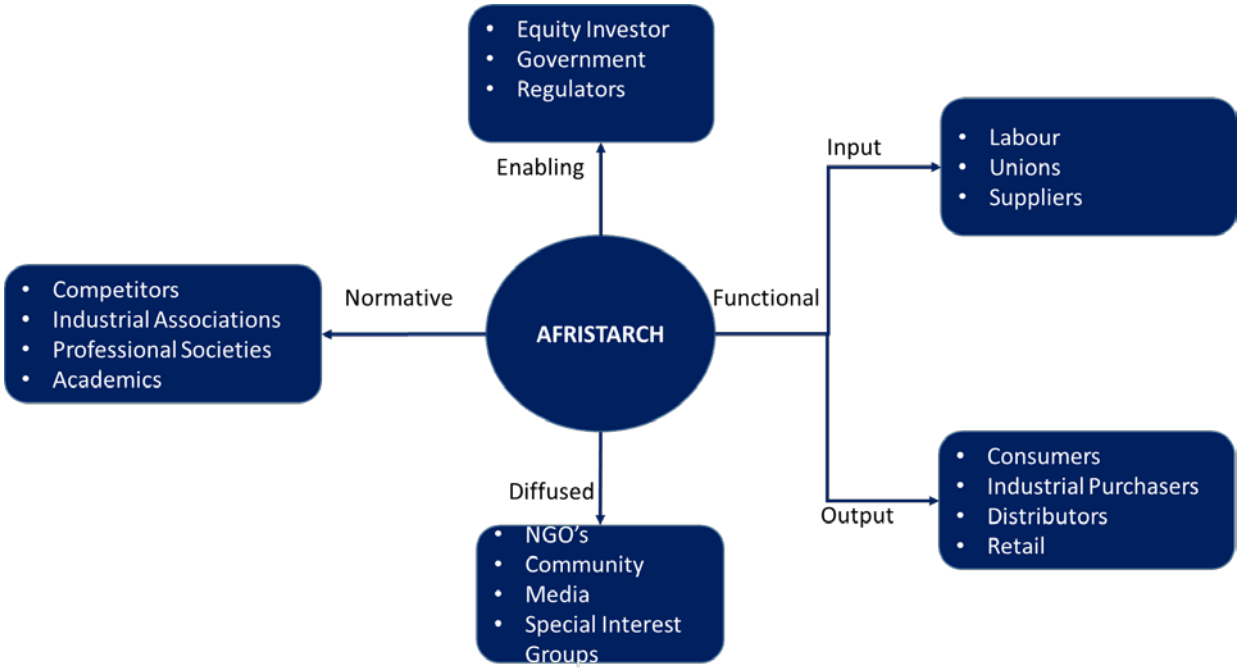


Figure 1 Afristarch Stakeholder (Source: Grunig and Hunt Linkage Model as cited in IDC Starch Report, 2017[1])

The stakeholders can be further described in detail as follows:

9.3.1 Afristarch

Afristarch is the owner of the business and of the facilities for the manufacturing of 100 tons per day of modified starches. Afristarch is also the operator and maintainer of the modified starch production facilities. Afristarch internal stakeholders for the Bankable Feasibility Phase of the development of the 100 tons per day facilities are:

- Business Development
- Finance and Investor Relations
- Technical and Project Management
- Operations and Facilities Management

[1] APCF-Research-Grant_Starch_Final-Report-October-2017 (https://www.idc.co.za/wp-content/uploads/2018/11/APCF-Research-Grant_Starch_Final-Report-2017-October-2017.pdf)

9.3.2 Maize Grain Suppliers

Maize feedstock is delivered by farmers to grain storage facilities owned by grain intermediaries. These grain intermediaries role is to store, hold and market the grain. The potential grain intermediaries are summarised in the figure below

Figure 2 Potential grain intermediaries

9.3.3 Starch Distribution Stakeholders

- Cell Chem – This is the largest distributor of starch in South Africa and is identified by Afristarch as a potential anchor distributor of Afristarch products. This is due to their large network of starch end-users.
- Other starch distributors, are for example, Vuma Feeds who are used by Charka when for their preparation of charcoals where the starch is used as a binder. Charka purchases this starch at R5500 per ton (R5.5 / kg) compared to when it is self-produced at R4500 per ton at their 10 – 20 tons per day starch production facilities in Rosslyn, Pretoria. Charka sells their animal feed products at 70% the price of maize.
- Most of the starch distributors support Tongaat Hullet whereas the balance of distributors import their products from major international starch. Typical internation produces are Roquette, Avebe, Cargill, Tate and Lyle

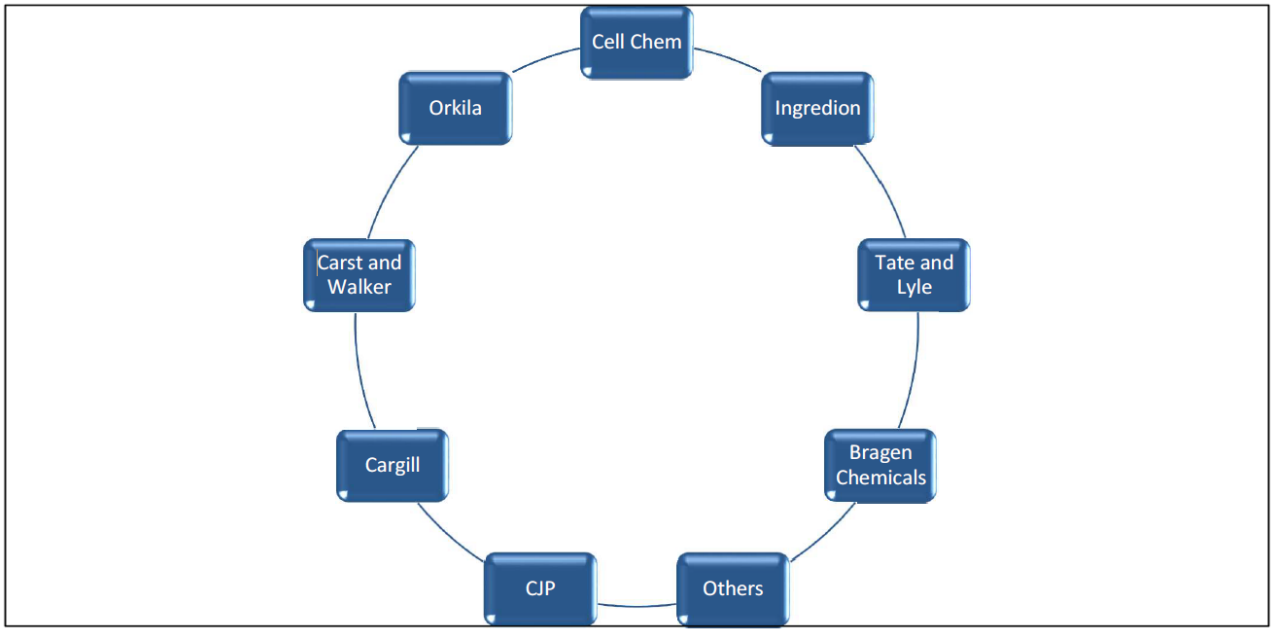


Figure 3 Summary of Starch Distributors in RSA

9.3.4 Customers of Afristarch Products (TBC)

The following users of starch are identified as key stakeholders for the Afristarch products to replace imported starches:

- South African Breweries
- Mondi Paper
- Tiger Food Brands
- Nestle
- Rymco
- Distell
- National brands
- DD Williamson
- Candy T ops
- SAPPI
- Cadbbury
- Clover SA
- Colgate Palmolive
- Glaxo Smith Kline
- Mr Sweet
- Protea Chemicals
- Nampak

9.3.5 Funding and Equity Suppliers

- Equity Investor – Shareholding to a maximum of 40% will be made available to equity investor (s) into the Afristarch Business in order to co-fund the development and implementation of the Afristarch Manufacturing Facilities
- Commercial Banks – Commercial banks funding will be sourced for the project development and implementation as Debt Funding
- Government Funding / Grant Providers – These stakeholders provide funding incentives as provided by the various South African government departments towards realising the macro-economic objectives for the New Growth Path (NGP) for the development of manufacturing and small medium enterprises.

The figure below summarises the potential incentives to be explored by Afristarch towards realising the establishment of the Afristarch business.

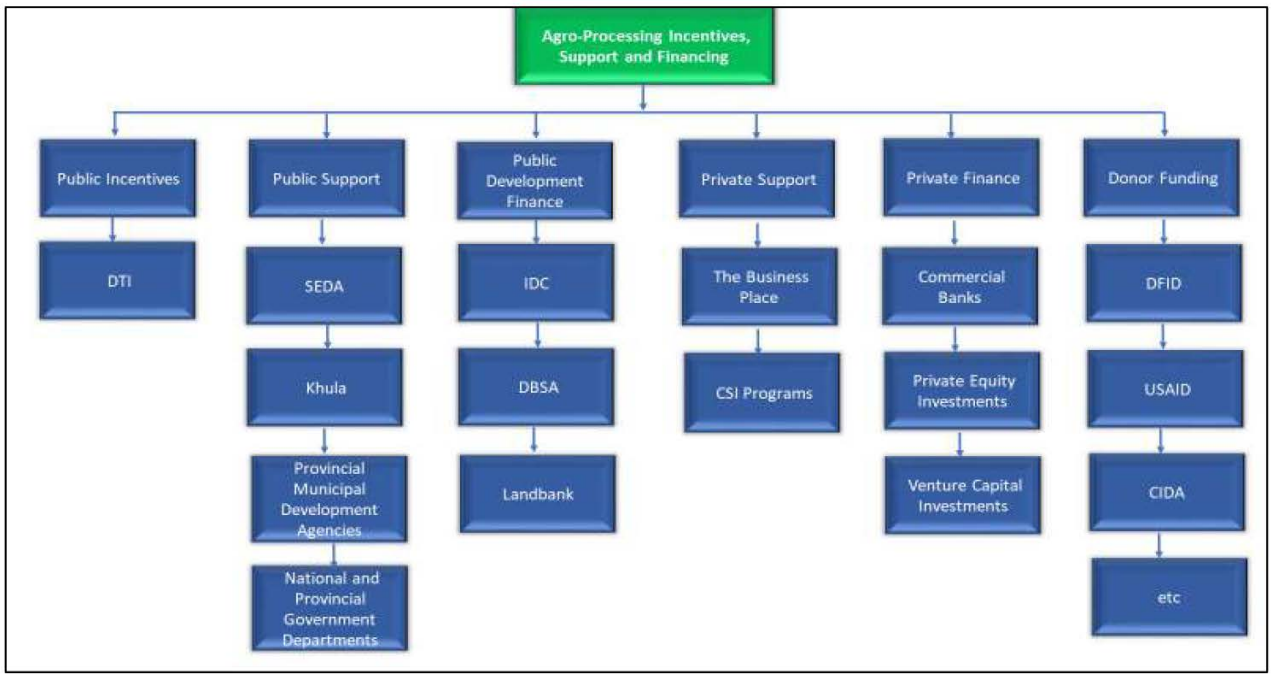


Figure 4 Potential Incentives, Support and Financing provided for the agro-processing industry

9.3.6 Operational Utilities and Chemicals Suppliers

- Rand Water Board – Supply of raw water to the Afristarch facilities
- Enzyme Co – Supply of native starch modifying enzymes
- Chemicals Co – Supply of processing chemicals and water treatment chemicals
- Eskom - For the approval of additional power consumption and supply of such

9.3.7 Government

- Local Municipality as the Land Owner of the operating facilities and surrounding supporting infrastructure
- The Department of Agriculture, Forestry and Fisheries for agro-processing legislation and specifications
- The Department of Environmental Affairs for authorization of the EIA and
- Legislators of applicable regulatory requirements
    - SANS for boiler package
    - NOSA five-star systems
    - OHSAS 18001
    - FSSC 22000 food safety management systems
    - Certification to the ISO 14001 environmental management
    - Certification to the ISO 9001: 2008 quality management
    - Hazard Analysis Critical Control Points (HACCP)
    - Water Act - requiring water purification units

9.3.8 Project and engineering stakeholders

The stakeholders from the project and engineering point of view are:

- Afristarch Project Development as provider of project and engineering management services
- Engineering contractor for Bankable Feasibility and Execution Phase
- Starch Processing Vendor as technology supplier for wet milling and modified starches production units - TBC
- EIA Consultant for application of the EIA
- SHE consultant – TBC
- Geotechnical consultant – TBC

9.3.9 Interested parties

Below is a list of other entities which potentially can or will have a stake in the project:

- Provincial government
- Local DoE office
- Local community
- Local DoL office
- NGO’s
- Labour unions
- Press
- Neighbouring industries
- Construction companies

9.3.10 Starch manufacturers in South Africa

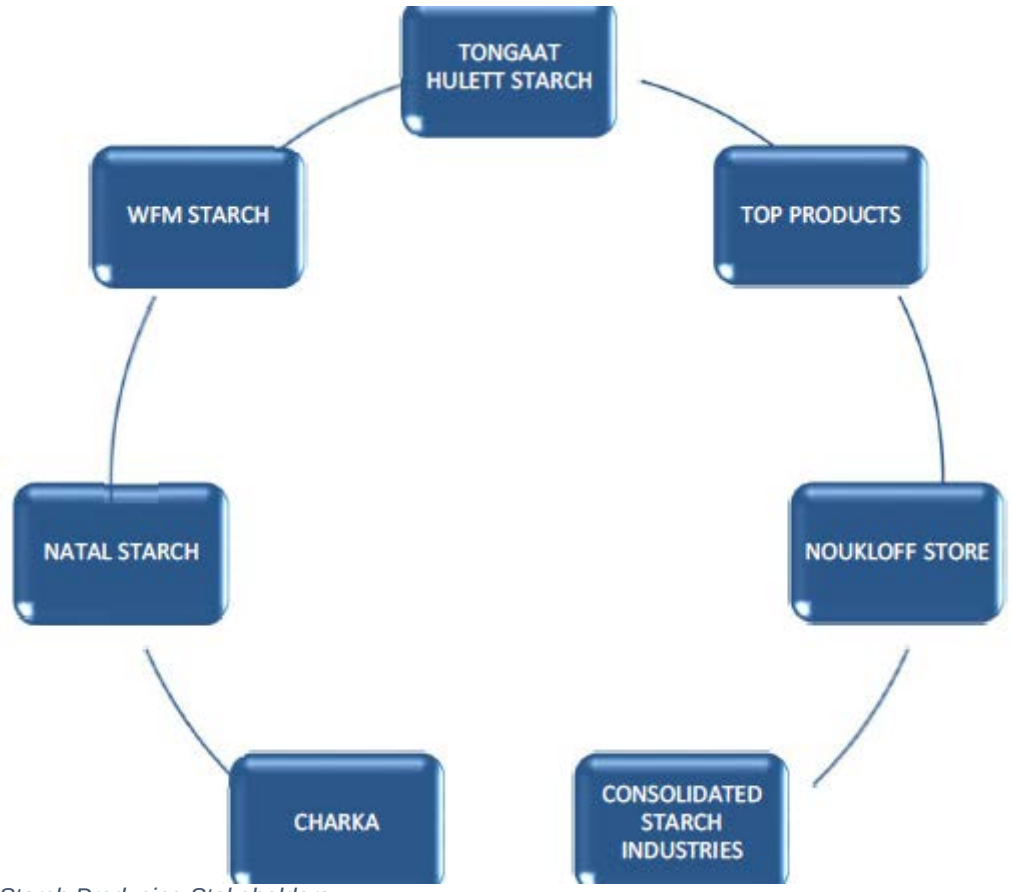


Figure 5 Starch Producing Stakeholders

The majority of the country's starch producers are located in the Gauteng region with the exception of Tongaat Hulett Bellville which is located in the Western Cape region. Tongaat Hulett Starch is the only company in Africa, south of Egypt that uses wet milling processes. Tongaat Hulett Starch is the largest starch producer in South Africa. There are five other smaller maize starch producers in the country that use a dry milling technology for the production of starch. Natal Starch and Noukloof Store, which are smaller starch producers, are located in KwaZulu-Natal. Top Products is located in the Free State. Consolidated Starch Industries and Charka are located in Mpumalanga

9.4 Key Generic Messages

The South African manufacturing sector is limited in capacity to effectively contribute to the GDP
The South African starch market is partially importing value-added starch derivatives

Afristarch has an important role to play towards meeting the objectives of the country to grow the manufacturing sector through the reduction of reliance on starch imports.

Afristarch as a start-up company requires mechanisms to make the investments to develop the Starch Production Facilities affordable.

Afristarch is open to being a BEE partner to major local starch producers with the aim of expanding into the local production of the high-value added starch products that are otherwise currently being imported.

9.5 Risks & Mitigations

	Risk	Mitigation Step
1	Misalignment of messaging, from Afristarch	
2	Unrealistic expectations by stakeholders	

AFRISTARCH PRODUCTION FACILITIES DEVELOPMENT

Project Execution Plan

Section 10 – Construction Philosophy

January 2019

Revision	Date	Prepared	Reviewed	Control
0	04/01/2019	AKM	JS, NM, SP	Issued for Review

Contents

10 CONSTRUCTION PHILOSOPHY

The intent of the Construction Philosophy is to provide a summary description on:

- A Safety guideline for the Afristarch Manufacturing Project Development ;
- The Construction environment considered;
- Basic construction methodology for the different disciplines;
- Proposed mobilization dates, agreed/approved construction areas and lay-down areas in an agreed overall site plot plan; and

The document contains site information, construction interface and activities planned by others as pre-activities to be considered during Bankable Feasibility.

10.1 Project Background and Objectives

The objectives of the construction effort on the Afristarch Manufacturing Facilities Development Project include:

- Construction activities at the project site. A detailed construction execution plan supporting the construction activities will be developed during Bankable Feasibility
- Perform oversight of Engineering Contractor activities in a safe and professional manner. Zero accidents and incidents is the project goal.
- Assure that all construction activities are performed with as little impact to operating facilities as feasible.
- Create a team environment between Afristarch, Engineering Contractor and Construction Contractor.
- Construct facilities that are safe, reliable, operable and maintainable.
- Complete the scope of work within the approved schedule and budget.
- Meet the Afristarch DOV and Objectives.

10.2 Site Location

The Starch Manufacturing facilities are earmarked for installation in previously mothballed Eskom facilities or surrounding farms in Colenso. Colenso is a town in KwaZulu-Natal, South Africa. It is located on the southern bank of the Tugela River. It lies on the main Durban - Johannesburg railway line some 190 km north-west of Durban and it is located halfway between Durban and Johannesburg.

Figure 1 Afristarch Proposed Site at previously Eskom's Colenso Power Station

10.3 Scope of work overview

Typical facilities layout for the Wet Milling Unit at the proposed site, as obtained from open literature, are outlined below. During bankable feasibility, Afristarch specific facilities construction model will be developed, including the Modified Starch Manufacturing facilities layout.

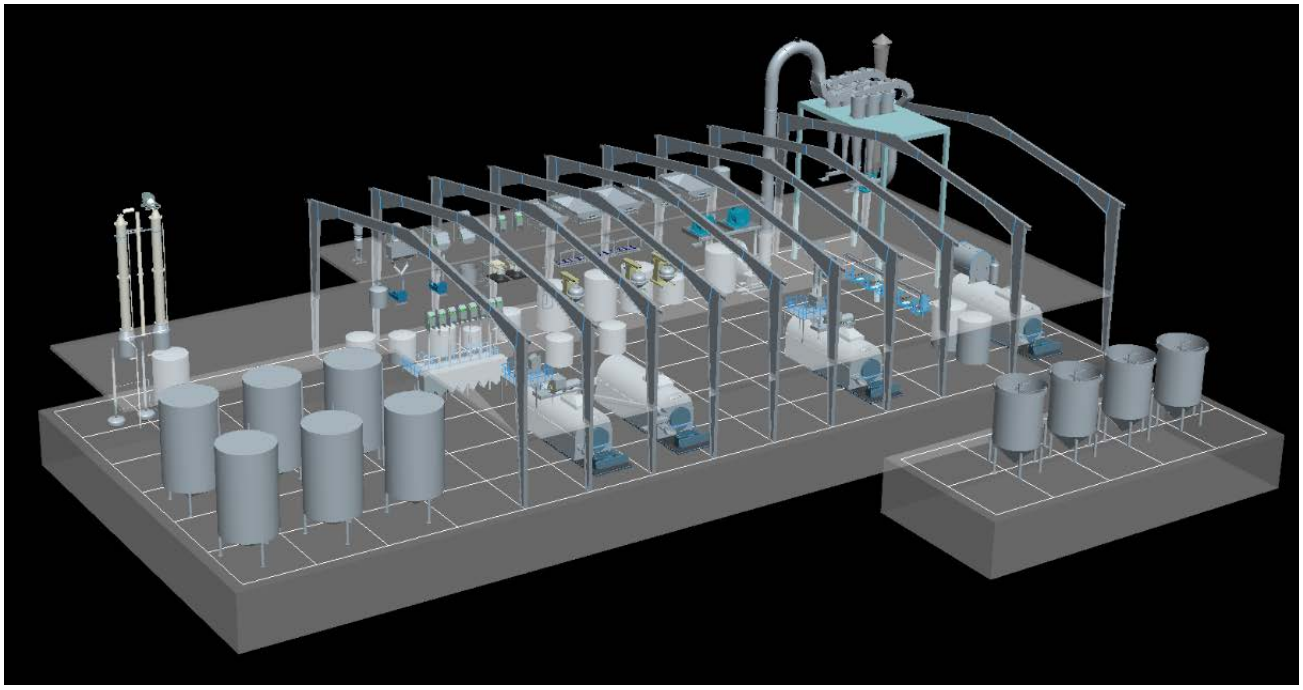
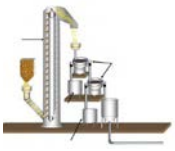


Figure 2 Wet Milling Unit layout (Source: *https://www.meckey.com/solution/corn-starch.html*)

10.3.1 Construction of Wet Milling IBL Equiment

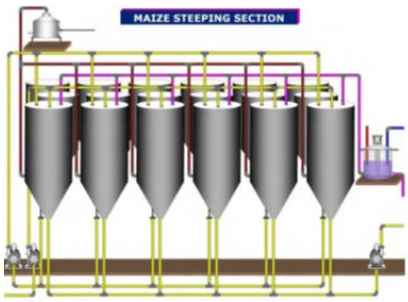
The scope of the project includes the construction of corn wet milling facilities integrated downstream with modified starch production units and associated infrastructure. The construction of the Wet Milling Plant IBL will include the construction of the following components:

Maize Cleaning System



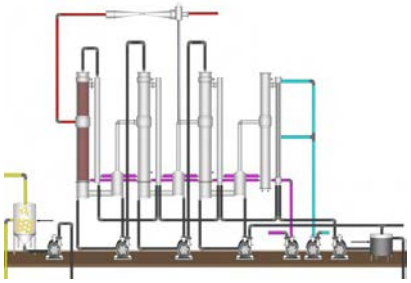
Maize grain is received from farmers or market at the wet milling plant in bulk. It is prepared for milling by screening to remove all large and small pieces of cob, chaff, sand, and other undesirable foreign material. Dust and light chaff are removed by aspiration. Cleaning of the Maize is an important first step in the wet milling process.

Steeping Tanks



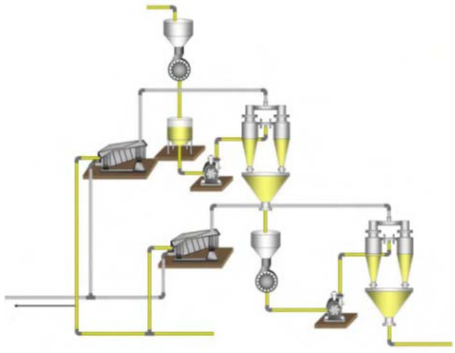
Prior to the wet milling, the Maize must be softened by steeping process developed to produce optimum milling and separation of Maize products. It involves maintaining the correct balance of water flow, temperature, sulfur dioxide concentration, and is normally steeped in between 40 to 60 hours at a temperature of 48° to 52° C. By the end of steeping the Maize should have absorbed water to 38-42% (wet basis) and become sufficiently soft to liberate the Germ easily and free from adhering endosperm/hull. The starch will then be readily freed from fiber by fine milling and screening.

Maize Steeped Liquor Vaporisers



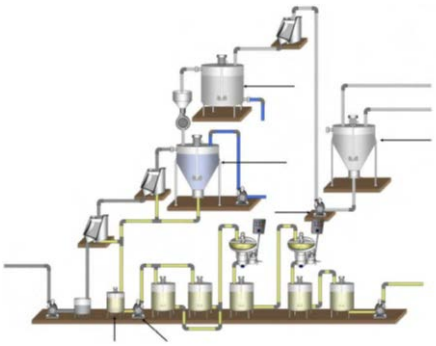
Feed is received in a level controlled balance tank and passed through pre-heaters, calandrias and vapor separators of various effects. The evaporation takes place under vacuum, which is maintained mainly by vacuum system. Steam issupplied as a heating medium to high heater and through thermal vapor recompression (TVR) to the first effect jacket. The concentrated product is having 50% concentration is continuously taken out from the plant.

De –Germing Mills & Germ Washing Screens



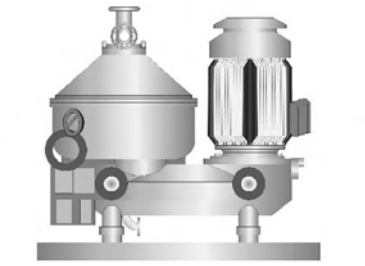
The object of the milling process is to provide optimum separation of components of the maize kernel. After steeping, the Maize is coarsely ground or pulped with water in such a way that the grind will be split into two or three pieces and the Germ portion is liberated with minimum breakage. The De-germing mill will have one rotating and one stationary tooth discs with a pyramidal knobs on the surface. The ground (primary) slurry and pulp is dropped to primary germ separation system. The large difference in density between the germ and the other kernel components results easy separation in the system and the germs are forwarded to germ washing, moisture squeezing, drying and packing for dispatch or for oil extraction.

Fibre Milling Washing Screens and Dewatering Press



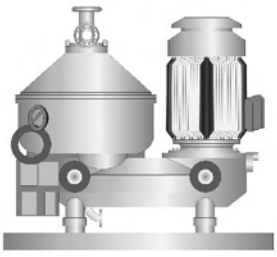
Here the specially designed self-agitating sumps and screens are employed. The water form of slurry carries maximum starch and gluten, and fibres are washed well without any free starch. The slurry is forwarded to millstream tank for preceding step of process. The washed fiber is sent to a collecting tank. The washed fiber is transferred to the fiber de-watering screw press, in this water is squeezed off from the coarse fiber (60%) and squeezed fiber is blended with concentrated CSL obtained from CSL Evaporator, dried in a Spin Flash Dryer and directly sold as cattle feed to the dairy farm farmers.

Primary Separation Centrifuges



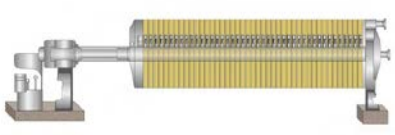
The main separation of protein from starch takes place at the Primary Separator in a nozzle-bowl centrifuge equipped for washing, and is operated at a high starch density through the nozzles so that the lighter gluten is dicharged from the overflow.

Gluten Thickener



The Gluten from the centrifuges is dewatered in a gluten thickener. The concentration of gluten from gluten thickener is between 8 to 12%.

Gluten De-watering Filter Press

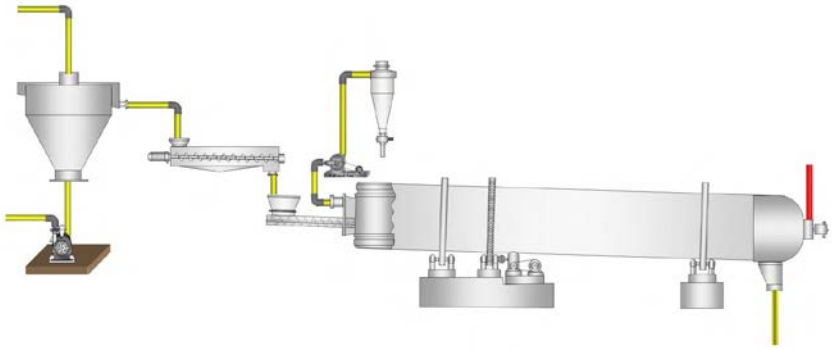


The gluten received from gluten thickener is further dewatered through filter press. Cake received from filter press has 40 to 45% concentration and is dried to a powder form in a Spin Flash Dryer.

Gluten Spin Flash Driers

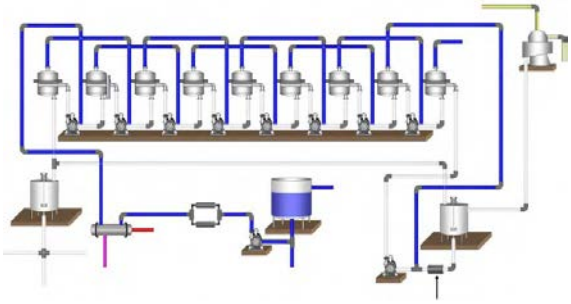
Spin flash dryers are used for drying gluten. The hot drying air from the air distributor carries away the dried particles to the cyclonic separator. The fresh drying air is taken in and heated in the steam radiator or direct gas fired air heater. The powder loaded air is taken out at the chamber top, led to the cyclonic separator and separated through the rotary valve. t.

Germ Drier



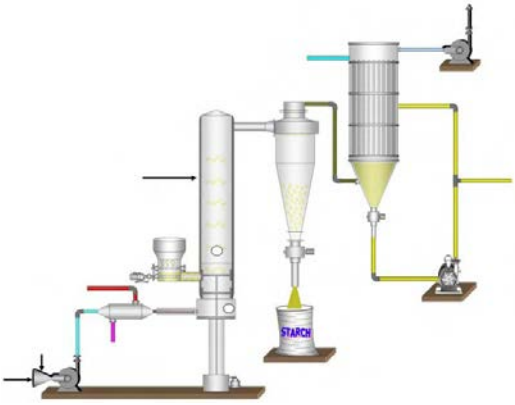
Wet Germ will be fed into the dryer shell through a suitable screw feeder at the desired rate. The dryer shell contains a bundle of tube though which steam will be passed as heating media. Adequate nos. of steam tubes are provided for steam, which is the heating medium.

Starch Slurry Hydro Cyclones



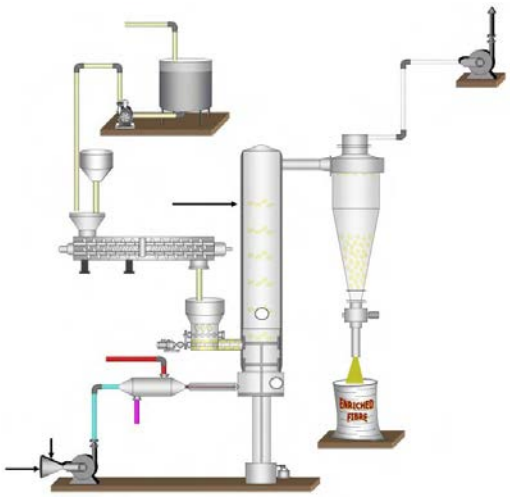
To make quality starch it is necessary to remove the soluble and insoluble material that is remaining in the starch slurry from the primary separator centrifuges. The slurry contains 2- 4% protein and 12-17 g/l of soluble impurities. The multi-stage (9-15), counter current, hydro-cyclones will be constructed to achieve the further purification.

Starch Spin Flash Driers



Spin flash dryers will be installed to dry the wet starch product introduced in the feed hopper in the form of wet cake from peeler centrifuge. The incoming feed is partially grated, homogenized and forced down into the screw feeder. The powder loaded air is taken out at the chamber top, led to the cyclone separator and separated through the rotary valve. The exhaust air is then pass through wet scrubber which will arrest fine particles from exhaust air. Fine particles get dissolved into water and recycled to milling section.

Enriched Fibre Dryer

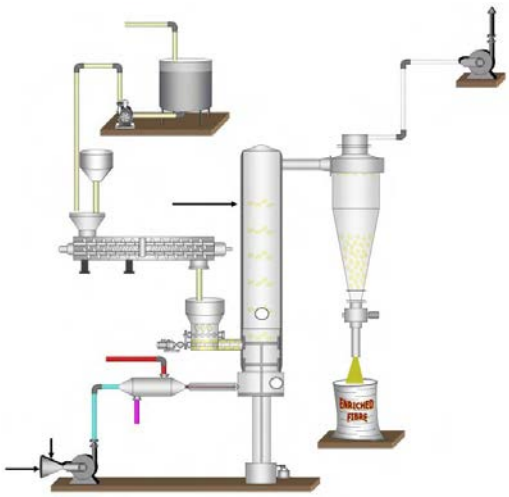


Spin flash dryers are used for drying Enriched Fibre obtained by mixing of concentrated CSL (Maize Steeped Liquor) with Fibre. The hot drying air from the air distributor carries away the dried particles to the cyclonic separator. The fresh drying air is taken in and heated in the steam radiator or direct gas fired air heater. The powder loaded air is taken out at the chamber top, led to the cyclonic separator and separated through the rotary valve.

10.3.2 Construction of Modified Starch Production Equiment

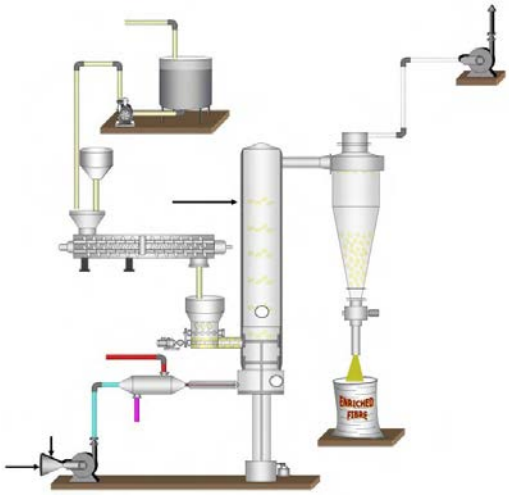
The construction of the Modified Starch Production Plant IBL will include the construction of the following components:

Dextrin Roaster (tbc)



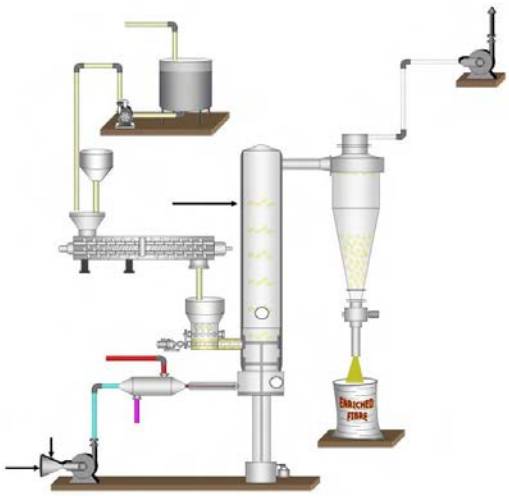
Dried starch from the spin flash dryers is sprinked with dilute hydrochloric acid. A dextrin roaster will be constructed to modify the native starch into yellow dextrin before cooling and packaging for dispatch as final product.

Acid/Enzyme Hydrolysis Tanks (tbc)



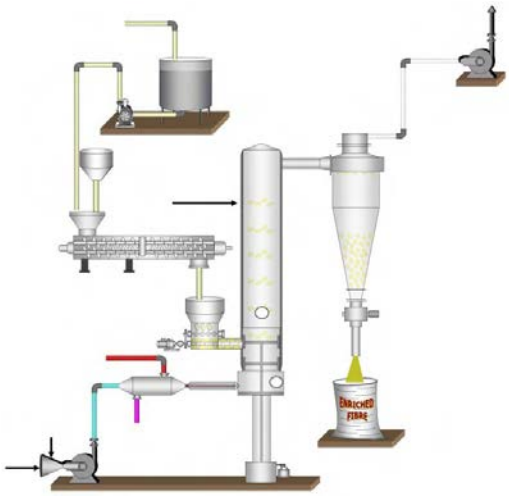
Starch hydrolysis tanks are constructed to mix the native starch with enzymes in order to produce liquid glucose or liquid multo-dextrin.

Filters and Activated Carbon (tbc)



The hydrolysate from the enzyme/acid tanks is refined in a set of filters and activated carbon beds for the removal of any contaminants.

Multo-dextrin dryer (tbc)



Spin flash dryers are used for drying the multo-dextrin.

10.3.3 Construction of supporting utility facilities

The construction of the supporting utilities will include the construction of the following components:

i) Diesel/Gas Fired Boiler Package
ii) Main control Building
iii) Substation and transformers
iv) Demineralised Water Storage tank
v) Waste Water treatment plant
vi) Condensate tank
vii) Construction Lay-down area
viii) Long Term Corn storage yard with weigh bridge
ix) Administration Building
x) Workshop and Stores
xi) Access security post

10.3.4 Construction of supporting infrastructure

The construction of the associated infrastructure will include the construction of the following components.

i) Upgrade of access road
ii) Construction of internal roads
iii) Construction of water supply pipeline
iv) Connection of amenities including potable water, sanitary and sewer utilities
v) Construction of sewage treatment plant
vi) Construction of water storage reservoir for raw water supply
vii) Construction of raw water treatment plant
viii) Construction of zero effluent/evaporation ponds
ix) Construction of return water dam / recycling pond

10.4 Construction Management

Construction planning will commence with developing the sequence of the works from the site establishment, through to RFC:

10.4.1 Site Establishment and laydown areas

A suitable site establishment area will be identified. (List) This will accommodate eating facilities, ablution facilities, offices and store-rooms for tools and miscellaneous equipment to be used on site.

Additional areas will be identified for use as laydown areas for scaffold material, electrical equipment and welding bays (List). Potable water and toilets will be considered for the initial site establishment.

10.4.2 Permit Philosophy

The site is a greenield area and thus construction will be on an open permit basis.

10.4.3 Civil works for crane pads

The starch manufacturing equipment is does not require heavy lifting to the extent that the area where a crane will be established would require the ground to be re-enforced. A highlevel crane location map shall be developed during bankable feasibility once the wet milling and modified starch units layout has been determined.

10.4.4 Scaffold erection

Scaffold will be required to access structural steel works, piping, piping and instrumentation. A scaffold philosophy will be required to be developed by the construction contractor to include the main scaffolding works to be erected systematically to reduce cycles of building and breaking, but this will depend entirely on the access required. The scaffold philosophy will be included in the phase planning durations and sequencing.

10.4.5 Crane Philosophy

Lifts utilising cranes, hoists, or other mechanical lifting devices must not commence unless the following have been observed:

- An assessment of the lift has been completed and the lift method and equipment has been determined by competent personnel.
- Operators of powered lifting devices are trained and certified for that equipment.
- Rigging of the load is carried out by competent person.
- Lifting devices and equipment have been certified for use.
- The load does not exceed the dynamic and/or static capacities of the lifting equipment.
- All safety devices installed on lifting equipment are operational.
- The area in which the lift will take place is properly barricaded.

10.4.6 Rigging activities

Detailed rigging studies will be performed on the latest approved plot plans. All engineering disciplines will be involved in the plant constructability review.

10.4.7 Communication management

During construction, all written communication will be via E-mail or Hard copies. The construction contractors will supply their own infrastructure and cater for their own telecommunication and Internet needs. The timing of deliveries will, as far as practically possible, not be done during peak traffic periods (06H45 to 07H30 and 15H45 to 17H15).

10.4.8 Safety, Health and Environmental management

All staff will be made familiar with the Worksite HSE Plan. All site personnel will carry a shared responsibility for safety of all personnel on the project and will at all times maintain awareness of health, safety and environmental concerns.

The EC shall be contracted to deliver a specific HSE Plan in accordance with and including all applicable Legislation, Regulations, Rules, Practices and Procedures that are in compliance with the new construction regulation requirements. The plan will provide a mechanism for communication and co-ordination required to be followed for the site.

Contractors and sub-contractors will have their full time site based safety professionals on site before work can commence. As such, sufficient time, resources and budgets will be required to be clearly identified by the Appointed Contractors in their bid documents to ensure that adequate allowances have been made to cover all aspects of HSE Training, PPE, etc.

The following environmental issues shall be considered and managed during construction;

- Waste materials
- Domestic sewerage
- Emissions to air
- Effects on ground water, soil erosion and drainage
- Control and recovery measures following environmental incident

10.4.9 Construction Quality Plan

A quality policy will be set out to which construction and all parties accessing the construction site shall have to adhere to. The quality assurance in terms of SABS ISO 9000 will be imposed on the contractors and suppliers of materials. Quality assurance will be managed by attending to the following:

- Applicable specifications are written in accordance with the required standards.
- Set a quality plan that includes regulations and procedures.
- Set and measure planned and expected results.
- Set “hold points”.
- Monitor the quality plan.
- Implement a quality-auditing schedule.
- Define what constitutes deviations.
- Propose corrective actions and get appropriate approvals.
- Implement corrective actions

Unless otherwise specified, directed or approved, all materials and workmanship on the works complies with the appropriate SABS specifications or codes, or in absence thereof, the appropriate SABS specifications or codes, and bears the official mark of the appropriate standard. The latest revisions of all specifications and codes shall be applicable.

10.4.10 Required Project services

The services required for the laydown and construction site are:

Potable water

Mobile potable water tanks shall be made available during the establishment of the construction site and laydown area. Initial connections to nearby mains previously used for the power station shall be made where possible.

Construction water

Construction water will be extracted from the nearby Tugela River and tested to ensure suitability as construction water, to be used in concrete mixing, as hydro testing and flushing water. The monthly /annual usage will be calculated during the Bankable Feasibility stage.

Domestic Sewer

Chemical toilets or toilet blocks will have to be utilized where no domestic sewer tie in points exists.

Construction power

Construction power points will not be provided to the Contractors in the laydown areas, nor for construction needs. Contractors will provide generators to supply for all their needs.

Refuse disposal

All waste generated on site will be collected by contractor for disposal at appropriate licenced landfill site.

10.4.11 Pre-commissioning

- Pre-commissioning activities will be executed prior to Ready For Commissioning (RFC)
- Pre-commissioning support resources and discipline construction contractors will provide equipment as necessary

10.4.12 Completion and handover

A single handover plan will be developed for the handover of the Afristarch facilities from the construction contractor to Afristarch Operations. The Afristarch Operations Director is the final signatory to the receipt of the completed facilities. A completion and handover plan will include for the following:

- It is intended that the work will be divided into systems at the engineering stage.
- These systems will be utilised to work towards the completion of systems in the right priority and order
- A System Breakdown Structure will developed by the EC
- Every component of the entire work scope will be allocated to either a process or non-process system to ensure a well-ordered documented handover of completed system/facilities in line with the commissioning schedule
- This will be validated or updated during construction when engineering and construction contractors are appointed

10.5 Early Construction Involvement (ECI)

The objectives of early involvement of the construction resources are:

- **Cost reduction –** Using the constructability process to identify potential cost reduction opportunities is a fundamental part of the process
- **Schedule optimisation** – Integrating engineering, procurement and construction schedules

10.5.1 ECI effectiveness factors:

- Early and effective planning of the constructability process with clearly defined responsibilities and expectations:
- Integration of constructability methodology into all work processes to maximise benefits and to minimise disruption to those processes. The focus must be on timely input of construction knowledge. Reviews are held only to verify that the input has already been incorporated into the deliverables.
- Understanding of the process by all entities and their personnel, and recognition of their individual responsibilities with regard to constructability.
- Support and guidance from Afristarch, and all Service Provider leadership.
- Simple but effective interfaces between all participants.
- Continuous evaluation and improvement of the constructability process.
- Communication of Shared Experiences between participants, which will enable modification of work processes to incorporate proven good ideas.

10.5.2 Constructability during EPC phase

During Basic Engineering more in depth studies on the Plot plan as well as rigging studies will be completed. All engineering disciplines will be involved in an official constructability

study. Construction will participate in model reviews and drawings squad checks and advice engineering on any comments they might have.

10.5.3 Authorisations

During Basic Engineering activities that require authorisation are as follows:

i) Vegetation Clearance approval for the clearing of all vegetation and top soil

ii) Use, storage, transport and treatment of water / waste water / effluent to support the extraction of water from the Tugela River where weirs, abstraction Works, primary treatment, pumping stations and pipelines will be required. An alternative will be the supply of water from the municipality, depending on the agreement with the various authorities.

iii) Storage & handling of diesel, acids and chemicals (dangerous goods). An emergency diesel generator will be required in order to provide power for the plant's essential services in the event the plant becomes disconnected from the electrical supply grid. This generator would be provided with a small dedicated fuel tank. Chemicals likely to be used and stored on site include:

a. Enzymes for the hydrolysis of native starch to glucose and multo-dextrin
b. Hydrochloric Acids for the production of dextrin and for the water treatment, ion exchange and resin generation
c. Sodium hypochlorite for the water treatment to prevent the build-up of organic growth in water tanks and pipework
d. Caustic Soda Liquor for the water treatment, Ion Exchange and Resin Regeneration
e. Sulphuric acid for the water treatment, Ion Exchange and Resin Regeneration and generation of steeping SO2
f. Hydrazine as an Oxygen scavenger for boiler feed water treatment
g. Carbohydrazide as an Oxygen scavenger for boiler feed water treatment
h. Hydrazine Hydrate 7.5%w/w / Ammonia Mix for the treatment of boiler feed water
i. Ammonium Hydroxide for the boiler feedwater corrosion control

iv) Roads to allow for industrial access and personnel/employee access

v) Waste handling for the disposal and treatment of waste generated during wet milling of the corn and in accordance to its waste classification. The development of waste classification will be done during Bankable Feasibility.

vi) Emissions, pollution or effluent generation/release permits required:
   a. Air emission license (National legislation)
   b. Waste management license (National – Hazardous; Provincial – General waste)
   c. Water Use License (21 (g) disposing of waste in a manner which may detrimentally impact on a water resource)

vii) Grid Connection to the eskom grid will be in accordance to Eskom permits and requirements to be established and outlined during bankable feasibility

10.5.4 Plot Plan Development

During this process, both construction and operational access need to be considered in the layout of the roads and plant footprint. Particular attention to the interface between existing and new facilities in consideration of the access needs to existing areas, heavy lift equipment location and access requirements and heavy haul turning radius and clearances will be undertaken.

Given that the proposed site was previously used as a power station, early exploratory excavation must be carried out in all areas to ascertain any undergrounds that might affect the plot plan layout where applicable for the information to be inputted into the Basic Design.

Crane access during shutdowns need to be considered and requires studies were applicable to ensure cranes could install key equipment with ease.

10.5.5 Constructability Organisation

The early construction involvement effort will be led by the PMT Construction Director, fully supported by the PMT Technical Director and the EC. Construction team members are responsible for performing their work to meet the requirements of this plan. Key construction personnel and the Construction Organisation will be developed after the Bankable Feasibility. The construction organisation will be further developed as the project progresses.

10.5.6 ECI Constructability Implementation

Constructability implementation requires the inclusion of construction personnel, without any barrier or limits, into the engineering, design, and planning process to enable the input of their expertise and field construction knowledge. The opportunities for cost savings are at the highest during the early phases of the project. Constructability thinking and attitudes, will be injected into meetings and discussions during the project. All team members shall be aware of their responsibilities to provide constructability input and follow through, to maximize the constructability benefits for the project.

Constructability checklists and responsibility assignments will be developed and maintained on the basis of work type and will provide a disciplined method of ensuring, that key items and activities are appropriately identified, evaluated and addressed. These checklists, together with applicable ideas and lessons learned, will be used as a stimulus for further discussions between the construction, engineering, design and procurement personnel with commencement of and during detail engineering.

AFRISTARCH PRODUCTION FACILITIES DEVELOPMENT

Project Execution Plan

Section 11 – Planning and Reporting

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11 INTRODUCTION

A schedule model is one of the fundamental elements of project controls. An effective schedule model organizes the work through a Work Breakdown Structure (WBS) into a fixed time frame which supports the overall project plan. The schedule represents the project plan over time to ensure that the work is being performed within the established milestones. The schedule must match the overall execution plan, and is a product of all of the project team's input, relative to their specific area of work.

11.1 PURPOSE

This global guideline describes:

- Basic scheduling process
- Standardized planning framework
- Project-specific planning information
- Workflow for elaboration of the schedule model until the approval of the initial baseline
- Procedure for applying to re-baseline

This global guideline ensures the following:

- Aligned structures between scheduling and all technical disciplines and project phases
- Aligned structures between scheduling and progress assessment
- Aligned scope of project-specific information required for the schedule model
- Aligned workflows during elaboration of the schedule model
- Reliable and conclusive analysis of the schedule model

- Targeted project controlling based on reliable information
- Informative internal and external reporting

11.2 BASIC SCHEDULING PROCESS

The scheduling process described below aims to produce a detailed schedule model and project schedule(s) used for project controlling during project execution. After preparation, checking and approval, the initial version of the schedule model will be frozen as baseline schedule. The complete scheduling process is shown schematically in Figure 1.

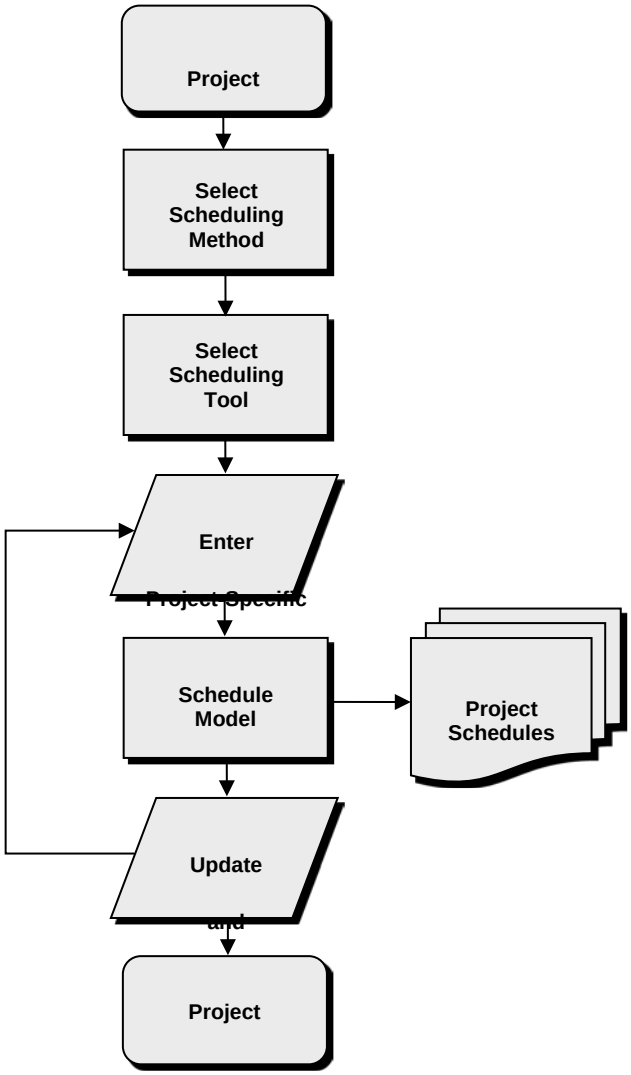


Figure 1: Scheduling process

11.2.1 SCHEDULING METHOD

The scheduling method is the framework within which the schedule model is build.

To establish a meaningful critical path, the schedule network must be developed without open ends (activities without predecessor and successor, respectively) other than the project start and finish milestones. Resources shall be allocated to network schedule activities.

11.2.2 SCHEDULING TOOL

The scheduling tool contains schedule components as well as the rules for relating and using these components to represent the project execution plan by connecting project activities and milestones to the schedule network. The current Afristarch project schedule/roadmap is based on Microsoft Projects 2010. Microsoft Projects is limited to 5 000 activities and this

Primavera is best suited for controlling large and complex projects which the Starch Manufacturing Facilities Development are not seen to be complex and large. During the appointment of the EC, the EC may use the latest version of Primavera P6 and ensure that additional licenses for Afristarch personnel or convert the output to Microsoft Projects or PDF.

11.2.3 SCHEDULE LEVELS

Level 1 – This is a general overview used as a management document. It is displays in bar chart format, the major work functions, targets, project objectives and constraints.

Level 2 –A Level 2 Schedule is prepared by Afristarch for the purpose of overall Integration of the Afristarch business risk

Levels 3 & 4 – A single Project Level Critical Path Method (CPM) Schedule developed and maintained by an EC for their scope of work.

- **Level 3** – for summary level reporting, this is a primary integration schedule for any given scope of work interfacing the EC, Technology provider, EC management contractors and Afristarch provided activities.
- **Level 4** - a further level of detail within the schedule where critical path analyses and resource levelling are done. This is the level of detail where specific tie-in points are defined and scheduled.

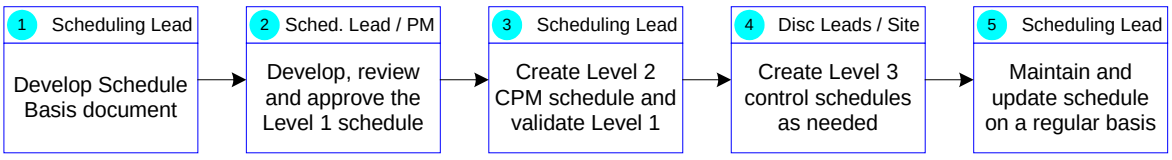
These four levels range from general work functions at the management level to detailed tasks at the control level. Reporting begins with the control level and is rolled up into the project level and then into the management level schedule.

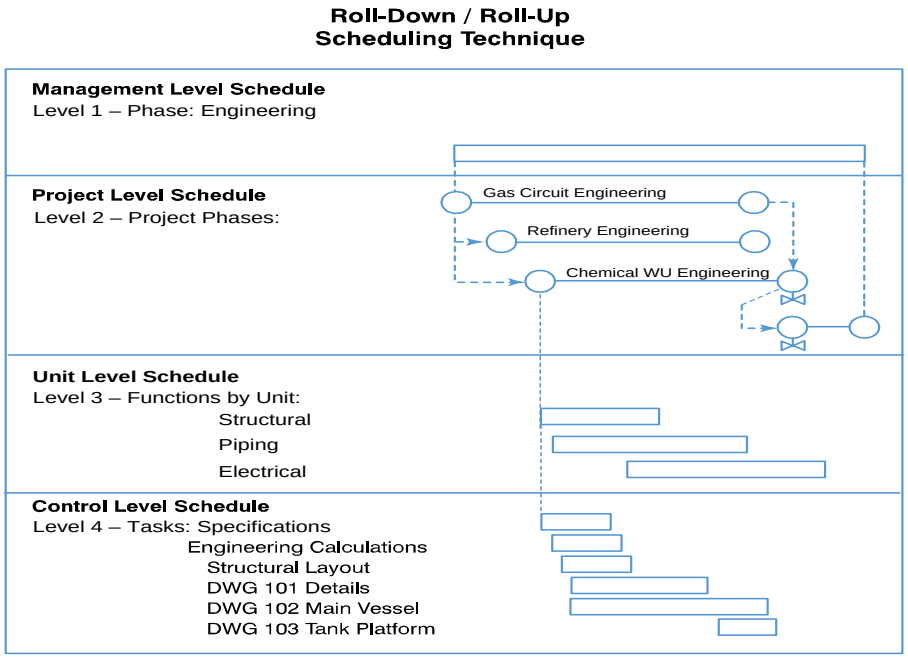
11.3 SCHEDULE DEVELOPMENT

Before the preparation of the Level 2 Project Schedule by the EC, a Schedule Basis document will be prepared. The starting point for preparation of this document will be the EC's Project Execution Plan. The EC Scheduling Lead is responsible for developing this Schedule Basis document for the EC scope.

The Project Master Schedule will encompass all phases of the project life (EPC, commissioning and start-up, etc.), regardless of whose scope of services. This is necessary for the project (EC) to be managed, as an entity rather than as a group of unrelated phase's or projects.

The key steps in this procedure include:





11.3.1 SCHEDULE RISK ANALYSIS

A schedule risk analysis will be carried out within the framework of project risk management to assess the probability of an overrun of the project completion date(s).

11.3.2 SCHEDULE SAFETY REQUIREMENTS

The EC will be required to capture the aspects related to planning for safety activities in all project phases; this includes safety training, permit requirements, safety considerations for construction planning and safety contingency durations for selected construction activities (if applicable).

11.3.3 INTERFACE SCHEDULING REQUIREMENTS

The EC schedules shall contain adequate detail of design, procurement and construction to facilitate interface management with Afristarch, Technology vendor and Construction through the period of the project.

The EC Schedule shall indicate, where Afristarch has an obligation, and the EC preferred timing for later obligations, once agreed are to be met.

Vendor data requirements shall show clearly in the schedule as activities with description of contents (for example, prelim –or- final vendor data). The important task of development and delivery of the vendor data shall not be hidden in “lags” within the schedule logic.

Shipping, clearance and forwarding of major equipment to the site will show clearly in the schedule as activities with descriptions. These shall not be hidden in “lags” within the schedule logic. The delivery of bulks, if not critical or near-critical, can be indicated using lags.

The EC shall formulate a method for summary reporting of available schedule float and for management of that float over the full term of the project.

11.3.4 RESOURCES

The EC’s project schedule is required to be loaded with man-hours (engineering, procurement and construction) to form the basis for manpower and progress forecasting. During the main execution phase, the schedules will also be loaded with key quantities.

11.3.5 SCHEDULE TRACKING AND PROGRESS UPDATES

Once the Project Master Schedule has been developed, it will be monitored against the Baseline plan and updated using the change management process.

11.4 PROJECT REPORTING REQUIREMENTS

The purpose of this Section is to establish the minimum requirements for the EC with respect to Project Controls and reporting to Afristarch. The EC is required to establish its own Project Controls procedures and processes, as shall be proposed by the EC during the bidding process.

During the Bankable Feasibility, Engineering Phase and Procurement phases, process progress and performance will be measured and reported to Afristarch by the EC for each Discipline, based on earned “man-hours” for the completed deliverable.

During the execution phase of the project the same principle will apply for Engineering but since equipment and material cost is normally a higher portion of the overall costs than engineering and construction, the procurement progress will be based on “Earned Rand Value”, derived from a physical progress assessment multiplied by each purchase order value. In this way, total project progress, based on earned Rand value, can be calculated by adding the earned ZAR value of engineering, procurement and construction.

Construction progress will be measured according to physical progress against each defined field measurement, supplemented by drawing take offs, as the basis for reporting quantities installed. Partial credits will be given to multi-step activities that extend over several reporting periods.

The EC will roll-up progress, performance, man-hours and staffing levels by the different project phases, i.e., Bankable Feasibility, Detailed Engineering, Procurement and Construction and by the different disciplines. The EC will report this information for the incremental period and cumulative to date, as well as for plan, actual and forecast values.

11.4.1 WORK SCOPE QUANTITIES AND QUANTITY TRACKING

The Contractor shall track all major commodities, including:

- Engineering
    - Drawings – The number of drawings by type, with stages of issue
    - Drawings – for various classes of work, quantities issued AFC (concrete, steel, etc.)
- Contracts & Procurement
    - RFQ issue vs., Purchase Order Issue curves
    - RFP issue vs. Contract Award curves
- Construction
    - Piling – Pieces precast, driven or bored (as appropriate)
    - Concrete - Cubic meters placed
    - Steel Tanks and Structures – metric tons (Te) - curves will show tons of work represented by AFC shop drawings issued, fabrication completed and field erection completed
    - Mechanical Equipment – metric tons erected, based on equipment lists, and stages
    - Piping - inch-meters (erection) and diameter-inches (welding)
    - Hydro testing – number of test packs, stages of work through reinstatement
    - Cabling – Linear meters pulled, terminations complete
    - Instruments – loops installed and checked
    - Most notably for major civil commodities and piping in particular, the Contractor will prepare charts with individual S-curves showing planned, actual and forecast profiles for:
        - Quantity Issued on Approved for Construction Drawings (shop level)
        - Quantity Fabricated or Delivered to Site
        - Quantity Erected or Installed

AFRISTARCH FACILITIES DEVELOPMENT PROJECT

Project Execution Plan

Section 12 - Project Close-Out Strategy

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12. PROJECT CLOSE-OUT

Project close-out is the sequence of activities required to complete all remaining project financial matters, satisfy all outstanding contractual requirements, and document project history. It is the formal, planned termination of the contractual relationship between the Afristarch Project Management Team and the EC, as well as terminating the relationship with technology and package vendors, consultants and contractors. Following is a summary of the close-out activities which will be implemented on the project.

All Project close-out activities will be performed in accordance with the Afristarch requirements and implemented using the EC's standards. Such EC standards shall be procured by Afristarch to form the basis of the production facilities standards and procedures. Close out of the project will be the responsibility of the EC, with management and support by the Afristarch PMT.

12.1 Objective

The primary objectives of the project close-out includes:

- Settling all outstanding issues and completing final negotiations with contractors and vendors regarding change orders, claims or adjustments so that final payments can be made or received.
- Finalising formal notifications of completion and acceptance.
- Transferring and | or properly disposing of project property and records.
- Issuing the project completion report and the project profile to record project history, performance, and to identify lessons learned to aid future projects.

Planning for close-out will begin at project initiation and will be performed in compliance with the requirements of the contract with the EC. Project close-out will address both office and field efforts, where applicable, and must have the participation and support of project personnel.

12.2 Organisation and responsibilities

The technical director is responsible to ensure that PMT completes the implementation of the close-out requirements of the project. A project close-out responsibility checklist will be prepared and made available to the PMT, which will identify the individuals or groups that perform close-out activities, or that assist in providing input for key areas of project close-out.

12.3 Final negotiations and financial close-out

Final negotiations of outstanding financial items between the Afristarch, vendors, EC, CC and other entities will be concluded prior to close-out of the contract. This includes items such as final invoices and payments, change orders, back charges, etc.

12.4 Formal notice of completion and acceptance

A notice of contract completion will be issued by the EC to Afristarch after all project close-out activities are complete and all the contractors have fulfilled all contractual obligations. The Notice of contract completion, final reimbursement, and fee payment constitute completion of the contract and end the contractor's responsibilities.

12.5 Records disposition and acceptance

Project records are made up of both hardcopy and electronic versions. Electronic data shall be in both Native and PDF issued on an external storage device. Final records and electronic files from the EC will be transferred directly from the EC to Afristarch.

Prior to completion of the project, all project documents and engineering information required to be turned over to the project will be transferred to the project as agreed and stipulated in the EC's contract and contracts with other contractors.

All EC copies of project records will be disposed of, either by forwarding to the EC's records centre, as outlined in the project file index and retention schedule, or destruction. All project records and written material will be disposed of per standard EC procedures as shall be outlined by the EC during the project development.

The transfer and disposition of project records held by other project contractors will be turned over to the PMT as stipulated in their contracts.

12.6 Transfer and disposition of property

Property or equipment used by the project during the execution of the project will be transferred to the business or properly disposed of before close-out.

12.7 Documenting project history

12.7.1 Project completion report

The project will be documented in a project completion report, which summarises all aspects of this phase of the project as below and to be issued at completion of the facilities start-up phase:

- Project Close-Out
    - Contractual and Financial Closure
    - Project Close-Out as per plan
    - Lessons Learn
- Project Management
    - Continued Project Management Support to Business Owner
    - Risk Management
    - Contract Management Support on Guarantee issues
- Procurement and Supply
    - Services and Goods Supplier Evaluation
    - Contract Management Support on active agreements

The project manager is responsible for the overall preparation, review, and distribution of the project completion report. Planning for the preparation of the project completion report will begin at project initiation with the assignment of responsibilities and identification of documents to be retained.

A key aspect of the report is the inclusion of lessons learned and success stories and other shared experiences which can aid future projects. These will be fed back into the PMT standard practices to continuously improve execution effectiveness on future projects.

12.8 Warranty management

Upon reaching completion, the defect correction period starts on the completion date and terminates on the defects date, which is proposed to be 52 weeks from completion of the EC's services. During this period, the EC will be obliged to correct any defects in the scope of services provided by the PMT.

The project will obtain, for and on behalf of business, adequate guarantees and warranties from the EC and other parties contracted to provide services and supply materials for the project.

AFRISTARCH FACILITIES DEVELOPMENT PROJECT

Project Execution Plan

Section 13 – Corporate Social Investment Strategy

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13. CORPORATE SOCIAL INVESTMENT STRATEGY

Corporate Social Investment is the business imperative of Afristarch to ensure that the local communities within which the Afristarch facility is established is thriving through quality primary health care, childhood development, quality vocational education and relevant practical training, whilst also promoting careers in science, technology, engineering and mathematics for women in particular and enabling the mentored development of local small medium enterprises as suppliers of services and material to Afristarch during the construction and operation of the facilities.

Following is a summary of the Corporate Social Investments and Community Development activities which will be considered for implementation during the Afristarch project development and facilities operation.

13.1 Local Infrastructure Development

The land identification process has been established. The land that will be identified is not services. Thus the utility servitudes need to be provided to integrate the Afristarch facilities to the nearest utility supply centres. This integration provides an opportunity for Afristarch to support the local infrastructure development such that the services supply enables connections and tie-offs as part of the local residential plans implementation.

Afristarch will develop the local community infrastructure by implementing the main domestic sewer pipeline from the Afristarch facilities to the nearest district domestic water treatment system. This main sewer line will enable the connection of residential development sewer systems.

Afristarch will also treat raw water intake where the excess water, that will be treated to potable water quality, may be made available to the local municipality for distribution to the community.

Afristarch will also establish a local clinic and a child-development service centre to assist young mothers in child rearing and early-childhood development. The clinic and child-development centre will be established in the vicinity of the Afristarch facilities for use by the Afristarch personnel and female staff as well the communities along the fence-line of the facility. These facilities will include multi-purpose centre that will also house a state-of-the computing centre for advanced training in 4th Industrial Revolution technology.

13.2 Training and Development Investment

Afristarch will enable skills transfer on the Maize Wet Milling technology to the local community through providing of training of Afristarch personnel that will be sourced as far as practically possible from the local community

There are three Technical Vocational Education and Training (TVET) centres within the district of the earmarked Afristarch facilities. Afristarch will establish a practical training curriculum for the engineering learners graduating from these local TVET centers. The curriculum will enable the graduates to learn practical mechanical welding, electrical fitting and process operations skill. In providing the practical training of the TVET learners, youth, the priority will be given to black women in order to increase the female interest in Science, Technology, Electronics and Mathematics careers.

13.3 Supplier Development Program for local SMEs

Commercial agreements with engineering contractor services providers will include requirements for the training and mentoring of local SMEs with the aim of subcontracting their services towards the construction of the Afristarch facilities. Preference for these mentorship and subcontracting services will be black women owned companies.

AFRISTARCH PRODUCTION FACILITIES DEVELOPMENT

Project Execution Plan

Section 14 – Environmental Authorisation Plan

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14 ENVIRONMENTAL AUTHORISATION

The requirements of the Environmental Authorisation process are as regulated in the Environmental Impact Assessment Regulations of 2014 and as amended by GN No. 326 of 7 April 2017. In accordance to these regulations, the Afristarch facilities, in terms of these being maize wet milling facilities, trigger activities specified in Listing Notice 1 where a Basic Assessment process must be applied to the environmental authorization.

This Environmental Authorisation framework therefore describes the process that Afristarch will undertake to ensure that the applicable environmental authorizations are applied for before commencement of the Afristarch activities.

The competent authority for the Afristarch Maize Wet Milling project is uThukela District Municipality

14.1 OBJECTIVES OF AN ENVIRONMENTAL AUTHORISATION PLAN

The Environmental Authorisation Plan describes the legislative authorization requirements and roadmap towards the final application for environmental authorization to establish an Afristarch Corn Wet Milling Facility for the production of modified starches.

The objectives of an EAP are to maintain oversight and give direction on the following major points:

- Oversight in the outlining of relevant technical details that will support the application of an environmental authorization
- Outlining of the roadmap towards the submission of the environmental authorization package
- Listing of specialist studies to be included during the environmental authorization process

14.2 BASIC ASSESSMENT PREPARATION

The development and operation of the Afristarch maize wet milling facilities requires the authorization of a competent authority before any of the activities required to establish such a facility can comment. In accordance to the EIA Regulations 2014 (as amended), the said activities that are triggered require a Basic Assessment process. The BA process is used to inform the environmental authorization application.

14.2.1 Independent Environmental Consultant

An independent environmental consultant will be appointed to undertake the Basic Assessment process for the Afristarch wet milling facilities. The consultant will be appointed to

- make the application for Environmental Authorisation of the project
- undertake the communication and formal public participation process
- undertake specialist studies required to support the BAR
- integrate all relevant information required for compile the Basic Assessment Report in line to the EIA Regulations 2014 (as amended)

The Technical Director has responsibility for development of the Afristarch Scope of Work for issuing to potential Environmental Authorisation Partners who will develop the Basic Assessment Report as part of the requirements set out in the EIA Regulations 2014 (as amended).

14.2.2 Provincial Department of Agriculture and Rural Development Engagement

Afristarch will engage and align with the provincial and municipal authority wherein the facilities will be established to align on the template and specific National Environment Management Act requirements which the Basic Assessment will need to meet. The key provincial office foreseen for authorization is Provincial Department of Agricultural and Rural Development

14.2.3 Department of Water and Sanitation Engagement

Afristarch strategy for sourcing of water is via the local municipality raw waters supply system. Afristarch will establish adequate capacity of raw water treatment to support both the Afristarch requirements and a balance of treated raw water produced to potable water quality to be integrated into the municipality's potable water system. Notwithstanding the integration of the Afristarch water treatment facility into the local municipality water infrastructure, Afristarch will also require authorization of the Department of Water and Sanitation (DWS) for the specific use in Afristarch under Section 21 of the National Water Act, 1998 (No. 36 of 1998) (NWA).

14.2.4 Local Air Quality Officer Engagement

Afristarch energy supply will be via coal fired boilers due to the currently limited size of natural gas supply within the uThukela District Municipality. The size of the facility is small enough (less than 50 MW) to can be categorized as a NEMAQA listed activity. Nonetheless, Afristarch will engage with the local Air Quality Officer to socialize the project and ensure responsible environmental compliance even if not legislated for the size of boilers in the Afristarch facilities.

14.3 LEGAL FRAMEWORK

A number of applicable legislation and guidelines to be included and considered in the Environmental Authorisation application is listed below as accorded by the EIA Regulations 2014 (as amended):

- National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003) (NEM:PAA)
- National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA) and EIA Regulations 2014, as amended.
- Occupational Health and Safety Act, 1993 (No. 85 of 1993) and Major Hazard Installation Regulations
- National Environmental Management Air Quality Act, 2004 (No. 57 of 2003) (NEM:AQA)
- National Environmental Management Biodiversity Act, 2004 (No. 10 of 2004) (NEM:BA).
- National Water Act, 1998 (No. 36 of 1989) (NWA)
- National Environmental Management Waste Act, 2008 (No. 59 of 2008) (NEM:WA) and associated regulations.
- National Heritage Resources Act, 1999 (No. 25 of 1999) (NHRA)
- National Forests Act, 1998 (No 84 of 1998)
- Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) and the Conservation of Agricultural Resources Act Regulations, 1984 (GN No. 1048)
- The Spatial Planning and Land Use Management Act, 2013 (No. 6 of 2013) (SPLUMA)

Other applicable South African National and International Standards and Guidelines as shall be required during the environmental authorization application process will be considered. These standards may be as a result of being referenced by the above listed legal frameworks during the assessment or to support possible international financing requirements.

14.4 SPECIALIST STUDIES

A total of 12 specialist studies will be developed as part of the Environmental Authorisation application and these include:

- Heritage specialist report
- Soils and contaminated land specialist report
- Surface water specialist report
- Terrestrial and freshwater specialist reports
- Groundwater specialist report
- Air quality specialist report
- Noise specialist report
- Visual specialist report
- Traffic specialist report
- Social specialist report
- Economic specialist report
- Paleontological specialist report

14.5 FRAMEWORK PLAN

A framework plan is developed estimating a total of 7 - 10 months for the completion of the Environmental Authorisation.

ID	Task Name	Duration (days)	Start	Finish	Predecessor	Resource Names
		179.88	**22-Jan-20**	**Mon 16-Nov-20**		
1	Inception Meeting	1	Wed 22-Jan-20	Thu 23-Jan-20		
2	EA Application Forms	10	Wed 29-Jan-20	Wed 12-Feb-20		
3	Afristarch review of EA application forms	16	Wed 12-Feb-20	Thu 05-Mar-20	2	
4	Submit EA application form to Competent Authority (CA)	1	Thu 05-Mar-20	Fri 06-Mar-20	3	
5	CA Acknowledgement and Issue of Referene Number	10	Fri 06-Mar-20	Mon 23-Mar-20	4	
6	Compile BID, Advert and Notice	16	Mon 09-Mar-20	Tue 31-Mar-20		
7	Afristarch Review of BID	5	Tue 31-Mar-20	Tue 07-Apr-20	6	
8	Compile Draft BAR for Review (Incl. Specialist Studies)	30	Wed 22-Jan-20	Wed 04-Mar-20		
9	Afristarch Review & Amendment	10	Wed 04-Mar-20	Wed 18-Mar-20	8	
10	Interested & Affected Parties (I&APs) Review of Draft Report	30	Wed 18-Mar-20	Mon 11-May-20	9	11 days Easter/May Day Holidays
11	Amend draft Scoping Report	5	Mon 11-May-20	Mon 18-May-20	10	
12	Submit Final Scoping Report to CA	1	Thu 21-May-20	Thu 21-May-20	11	
13	CA Acknowledgement and Issue of Referene Number	15	Thu 21-May-20	Thu 11-Jun-20	12	
14	CA Decision (Refuse EA or Grant EA)	107	Thu 21-May-20	Mon 19-Oct-20	13	
15	Notify I&APs	5	Mon 19-Oct-20	Mon 26-Oct-20	13	
16	Appeal Period (If applicable)	15	Mon 26-Oct-20	Mon 16-Nov-20	14	