

AWP-IM-WFP PROCEDURES

2.0 INFORMATION MANAGEMENT PROCEDURE

This procedure “2.0 Information Management” is the second of three procedures that define the application of Advanced Work Packaging (AWP), Information Management (IM) and Workface Planning (WFP).

These three core procedures are supported by a suite of templates and supplemental procedures that are stored in the WFP Toolbox.

At the discretion of the COMPANY any or all of the foundational procedures and supplemental procedures may be applied to a project in support of the core procedures.

Revision	Date	Description	Originator	
0	Oct 1, 2017	IM procedure	Insight-awp	
Approvals: Name		Position	Signature	Date
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WFP Toolbox

Sample Documents		Supplemental Procedures		Job Descriptions	
SD01	WFP Cold Eyes Review	SP01	Scaffold Management	JD01	AWP Champion
SD02	WFP Bid Assessment	SP02	Equipment Management	JD02	Information Manager
SD03	Path of Construction	SP03	Training	JD03	WFP Coordinator
SD04	Installation Work Package	SP04	Work Packaging	JD04	Workface Planner
SD05	Foreman's Daily Plan			JD05	Workface Planning Lead
SD06	Weekly Project Controls Report				
SD07	WFP Audit Template				

1. PURPOSE

The purpose of this document is to define the COMPANY's expectations for the Project Management's team's application of AWP. The procedure outlines the activities required to align Engineering and Procurement with the needs of Construction. The standards establish in this document will support the application of the Information Management procedure by the Information Manager and the WFP procedure by the Construction Contractors. This procedure may also be used periodically to audit the application for compliance.

Objectives

The ultimate goal of AWP-IM-WFP is to optimize project performance through the application of a structured planning process. This is expected to create a model for construction execution that will minimize risk and deliver predictable results. Project management activities detailed in this procedure will establish the Stakeholder deliverables that will facilitate AWP.

Scope

This document will address the:

- Obligations of the Engineering organization and their subcontractors, vendors and fabricators to produce and deliver CADD attributes that will populate the 3D model.
- Ongoing population and maintenance of the 3D model
- The identification, development and maintenance of the WFP software
- The mapping and execution of data exchange processes for :
 - a. Engineering data
 - b. Fabrication data
 - c. Document Control
 - d. Material Management.
- Development of information specifications
- Dissections of the CADD model to support the creation of EWPs and CWPs
- Application of lessons learned
- Process for determining factors for the selection of WFP software.
- Hardware requirements

Other procedures in this series will address:

- The Engineering team's activities that will support the wider concept of AWP.
- Procurement contracts that will support information deliverables
- The construction contractor's utilization of WFP software
- Work Packaging
- Scaffold Management
- Construction Equipment Management
- Training

Method

The Information Manager is responsible to apply this procedure across all project stakeholders with support from the AWP Champion and the Project Management Team. This IM procedure will be included in all contracts as a required component of contract compliance.

2 DEFINITIONS

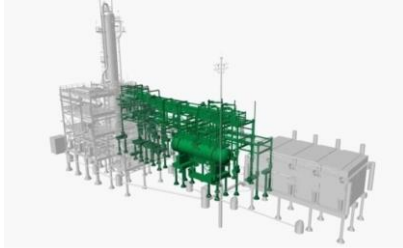
- **Workface:** Is that geographic point where labor converts materials into a facility.
- **Workface Planning:** The process of organizing and delivering all the elements necessary, prior to the commencement of work, to enable labor to perform quality work in a safe, effective, and efficient manner.
- **Workface Planner:** A dedicated construction planner who has hands on construction skills and experience as a supervisor. Responsible for developing IWPs and removing constraints, reports directly to the construction superintendent.
- **Workface Planning Coordinator:** Owners representative who reports directly to the AWP Champion. Responsible to manage Contractor's WFP department, coordinate the turnover of CWP's from the Construction Management Team to the Contractors, and oversee the function of IWP development and constraint management.
- **Information Manager:** Owner's representative who reports directly to the AWP Champion. Responsible to develop systems and processes that govern the generation and transfer of project information. Responsible to facilitate the development of the project cloud with a document management system, material management database and Workface Planning software.
- **AWP Champion:** Owner's representative and member of the Project Management Team, responsible for the application and oversight of AWP, IM and WFP by all of the Project Stakeholders.
- **Labor:** Skilled or unskilled trades people, craft workers, artisans or workforce, divided by discipline, who are responsible for the actual physical work that converts materials into facilities.
- **Constraints:** The Information, Tools, Materials, and Access that are required to execute work.
- **Work Packaging:** The progressive elaboration of work from Engineering Work Packages to Procurement Work Packages and Module Work Packages based upon the requirements of Construction Work Packages. Further dissected into Installation Work Package and then into Daily Plans. The sequence of work dissection follows the path identified in the Path of Construction with the components modeled upon the structure of the WBS.
- **Owner:** The COMPANY that initiates a project by developing a business requirement.
- **Project Management Team:** A division of the COMPANY who are responsible to synchronize and manage Engineering, Procurement and Construction for the entire life cycle of the project.
- **Engineering:** Includes COMPANY Engineering and a series of specialized engineering companies who report directly to the Engineering Manager who is a member of the PMT. Engineering are responsible to elaborate the owner's concepts into a detailed design. This organization is directly responsible for the functionality of the process and the generation of project information.
- **Procurement:** The procurement division of the PMT or a division of the Engineering Team. This team is responsible to engage contractors and suppliers, fabricators, module assembly yards and construction contractors through the development of contracts. Also responsible to manage the procurement of bulk materials, components and oversee the fabrication and delivery of equipment, pipe and steel components.

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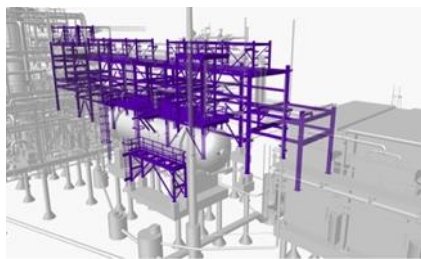


- **Material Management:** The organization who are responsible for receiving all project material from the procurement team. Responsible to manage onsite warehousing and the distribution of all site materials.
- **Construction Contractor:** The organization engaged to construct the project utilizing direct hire labor and subcontractors.
- **Discipline:** A unique trade identified as: Civil, Structural Steel, Pipe, Mechanical, Electrical, Instrumentation or insulation etc.

Construction Work Area (CWA) – A geographical division of work defined by Construction. It

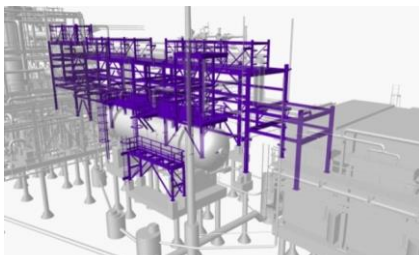


includes all disciplines, with the exception of cables and undergrounds that are also divided into work areas, but across the entire project. Each CWA has boundaries defined by the logical association of work and becomes one activity on the Level 2 Schedule.

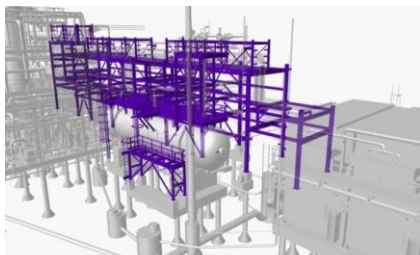


Construction Work Package (CWP) – A single discipline of a CWA that defines a logical division of construction work with less than 40,000 work-hours. A CWP is a component of the WBS, a single level 3 activity on the project schedule and is the downstream product of a single EWP and PWP when prepared for construction. The division of work is defined such that CWPs do not overlap and they can be used as contractual boundaries of work. Each CWP is dissected into a series of IWPs by the Workface Planners.

Engineering Work Package (EWP) - An engineering deliverable, single discipline that contains all of the engineering data required for a single Construction Work Package: Scope of Work, Drawings, Vendor Data, Bill of Materials and Specifications, in both PDF and electronic 3D model files. EWPs are developed sequentially to satisfy elements of the Path of Construction, which will facilitate sequential procurement and the execution of CWPs. A single EWP is represented in the schedule as a single level 3 activity.



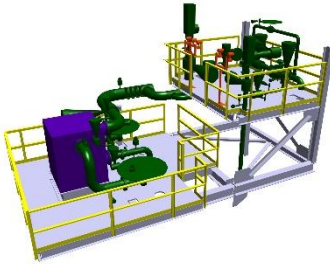
Procurement Work Package (PWP) – A procurement deliverable, that contains all of the materials required to satisfy a single CWP. Typically, a single discipline, in the case of steel and pipe the PWP becomes a discrete fabrication package that is expected to be manufactured and delivered as a distinct group of components.



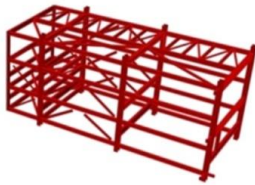
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Module Work Package (MWP): A subset of a group of single discipline EWP's that contains all of the Issued For Construction (IFC) engineering data for all disciplines required for the construction of a single module. A group of modules (<10) is a single CWP. The steel and pipe EWP's for a CWP of modules becomes discrete fabrication packages that identify all of the spools and steel piece marks for the CWP (group) of modules.



Installation Work Package (IWP): A discrete portion of constraint free, construction work that can be executed by a single foreman and crew, in a single 7 Day period. Dissected from a single CWP and made up of whole drawings. Each IWP becomes a single level 5 schedule activity.



Work Breakdown Structure (WBS) – A hierarchical representation of a complete project with its components being arrayed in ever-increasing detail. The WBS forms a direct alignment between Work, Time and Cost by serving as the basis of Work Packaging, Schedule Development and Cost Coding.

WTF-I-12-E4-C05-14

WTF- Water Treatment Facility (Plant)

I-ISBL: O-OSBL

12 - CWA

E - Major discipline (Earthworks)

4 - Sub Discipline (Excavation)

C05 - CWP (C- Construction, E-Engineering, M- Modules, F- Fabrication, P-Procurement)

14 - IWP or Drawing and spool

Project Nomenclature:

The creation of the WBS and the development of the WBS library forms the template for the project nomenclature. This naming convention (WTF-I-12-E4-C05-14) will then be used to identify physical components, drawings, spools, steel members, schedule activities, cost codes and work packages.

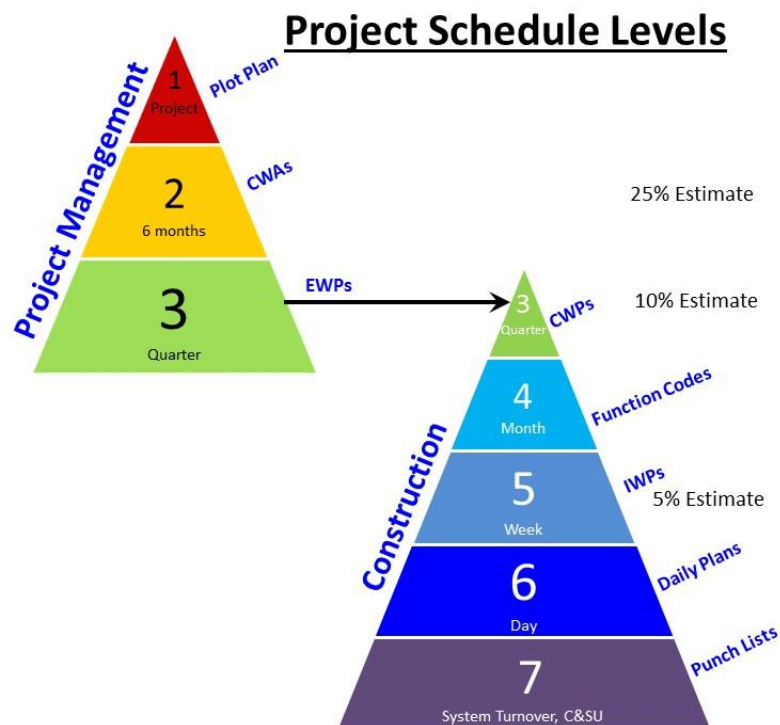
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Field Supervision: For the purpose of this procedure these terms are used to describe the three basic levels of field supervision that exist within the Construction Contractor or Subcontractor organizations. Ratios are expected to vary based upon the complexity and critical nature of the tasks. Terms and ratios may be changed to suit the local standards.

- Foreman:** Responsible for the direct supervision of one labor crew in a single discipline, with typically 1 foreman to 10 crew members.
- General Foreman:** Responsible to directly supervise up to 4 foremen in a single discipline.
- Superintendent:** Responsible to supervise up to 3 General Foremen in a single discipline. May be a member of staff or hired through the labor providers.

Schedule Dissections: For the purpose of this procedure this hierarchy will be used to describe schedule activities:

- Level 1: Plant and year
- Level 2: CWA and 6 months
- Level 3: CWP and 3 months
- Level 4: Function code and month
- Level 5: IWP and week
- Level 6: Daily plan and day
- Level 7: Task and hour



3 HOW TO APPLY THIS PROCEDURE

Project Management Team:

This procedure will be used to support the development of the Project Management Team's Organisation chart and will then be used to define the roles and responsibilities of the AWP-IM-WFP Team positions.

This procedure will be added to all Engineering and Procurement contracts and identified as the standard for compliance with the application of Advanced Work Packaging.

Contract Language:

Within 30 days of award the Engineering and Procurement successful bidders will submit an Execution Plan for the integration of Advanced Work Packaging based upon the standards identified in this procedure.

The procedure will be utilized to measure compliance through periodical audits conducted by the project management team or 3rd party auditors. The contractors are responsible to address issues from the audits and strive for substantial compliance.

COMPANY reserves the right to periodically review this procedure and apply amendments through the management of change process.

4 INFORMATION MANAGEMENT OVERVIEW

Information management is a system that considers all of the generators and users of data and designs naming conventions and data exchange processes to satisfy all of the local users (Engineering, Procurement, Material Management, Document Control and Project Controls) without losing sight of the needs of the end users, the Workface Planners and the Foremen.

Data Nomenclature: The issue of data composition (what should we call things) is complicated by the different ways that we use that data in the different phases of the project:

The users of project data can be summarised as:

Engineering: Designed by system

Procurement: Purchased by commodity

Fabrication: Built by size

Construction: Constructed by geographic area

Operations: Turned over by system

To satisfy all of the project stakeholders and to enable the Workface Planners to match scope with documents, materials, schedule and cost, every component should be identified primarily by: the WBS then Process system and spec, commodity, vendor spec, size, and Turnover system.

The processes that we use to manage project data: Document Control, Material Management, Project Controls and WFP, are expected to utilize this naming convention as their primary identifier for components. Extra information that is used by the local management systems (Suppliers, purchase orders, document types, shipping loads etc) can be added after the primary identifier.

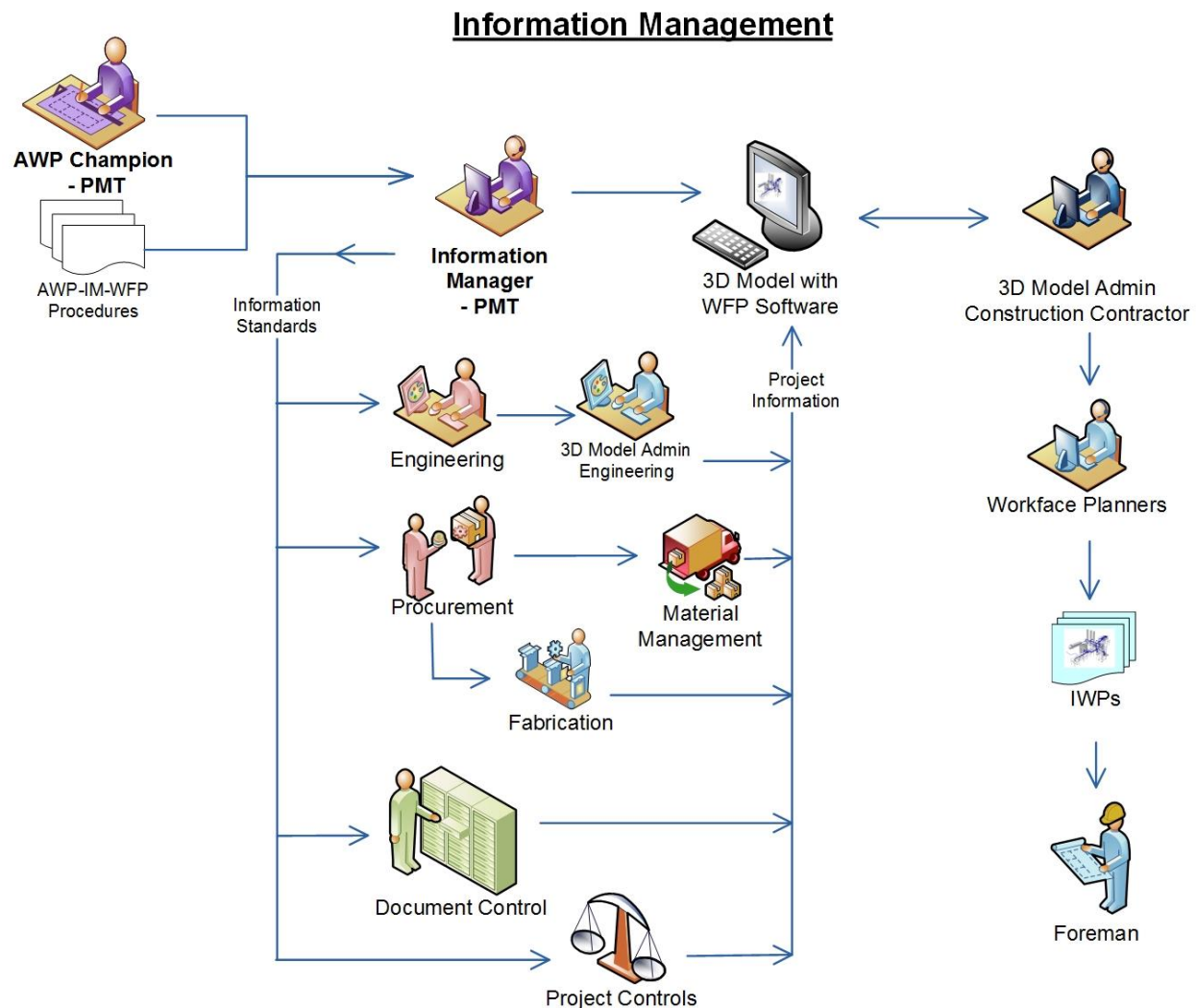
This creates a common denominator that is meaningful to all project stakeholders.

Data Exchange: The primary vault for project data is the Engineering 3D model, the primary format for transferring data is native electronic files, intelligent PDFs and in some cases, excel spreadsheets. The ideal process for developing a transfer of data is to understand the recipient's requirements (content and schedule) and capacity to receive data (format).

Some common data exchange events:

	Data Format
Engineering to Procurement:	Vendor equipment: 3D model, intelligent PDFs. Bulk commodities: Excel spreadsheet Steel and Pipe fabrication: 3D model, PCF/IDF files, Intelligent PDFs
Engineering - Doc Control:	Drawings: PCF/IDF files, intelligent PDFs Specs, data sheets: Intelligent PDFs
Procurement - Material Mgt:	Vendor equipment: Common database, excel Steel and Pipe Fabrication: Excel
Fabrication - Construction:	Steel: CIS2 files, intelligent PDFs Pipe: PCF/IDF files, intelligent PDFs
Engineering - Construction:	3D model: Fully attributed Revisions: Updated PCF/IDF files, 3D model with changes Asbuilt, Redlines: Updated PCF/IDF files, 3D model with changes
Construction - Project Controls:	Progress: Excel spreadsheet (from WFP software) Cost: Excel spreadsheet, intelligent PDFs (timesheets)

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The Information Manager will work with the Engineering team and the WFP Software vendors to establish protocols for the application of the project nomenclature, WBS components and 3D model attributes prior to the development of the CADD model. The Information Manager is then responsible to steward the Project Stakeholders to ensure that protocols are followed and that all project information is compliant with the standards.

The expected outcome is to create and populate a fully functional WFP Software model that will facilitate the communication and validation of project data and ultimately support the creation of IWPs by the Construction Contractor.

5 HARDWARE AND INFRASTRUCTURE

The extension of information management, into the construction environment raises the requirement for hardware and infrastructure capacity. High functioning laptops and desktop computers with extra screens and high-speed connections are required to manage the level of data behind these systems. In the field the field supervisors will need intrinsically safe tablets connected through the mobile network or Wifi that give them direct access to cloud based websites that house the 3D model, documents and the data behind the IWPs.

The Information Manager is responsible to work with the IT group to identify the system requirements that will support the administration and exchange of data on this platform. The IT group will support the application of Information Management and ultimately the application of WFP by purchasing hardware that will exceed the minimal requirements of the Information Management specifications. Typically end user laptops require 16MB of RAM and 512 of hard drive, servers if used will require 32MB of RAM and 1 TB (Terabyte) of hard drive.

6 WORKFACE PLANNING SOFTWARE

WFP Software is proprietary software that renders PCF or IDF files from the 3D model or the 2D -CADD model into an intelligent 3D model for construction. The software then allows Workface Planners to create virtual Installation Work Packages by selecting components in the 3D model and adding them to a plan. Beyond this key function the software also allows users to group components based upon the status of attributes.

This allows the users to visually represent construction data that may include:

- The IFC status of documents.
- The project schedule (4D)
- Materials received on site (5D).
- Physical progress
- Open work-fronts
- Users Defined groups of components

Which facilitates the creation of:

- Installation Work Packages



- The calculation of Planned Value

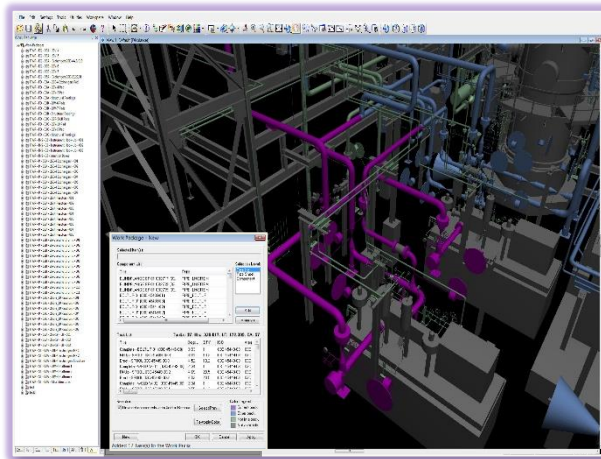
In this example the documents released IFC have been colored orange, with the components fabricated and received by the warehouse colored blue.

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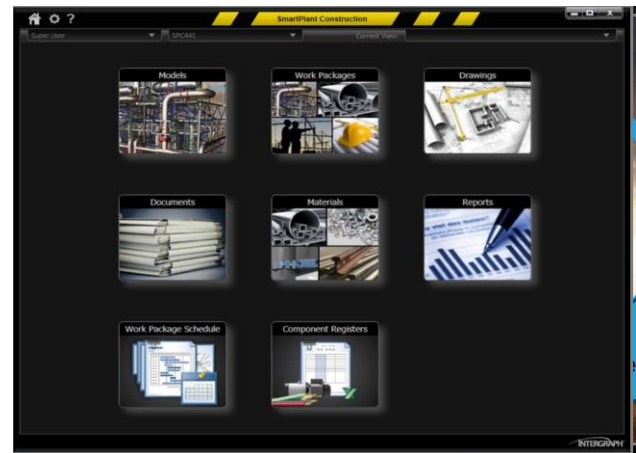
Prior to the start of detailed design the Information Manager, working with the Engineering and Procurement Teams will evaluate and select a WFP Software that supports the needs of the project. The decision will be in consideration of the software used for the Engineering 3D model, Procurement/Material management and Document Control. The software will be hosted on the project cloud so that all stakeholders have managed access.

Commercially Available Software

There are presently two companies that have products that facilitate the automation of information in a 3D environment for the purpose of work packaging:









The software accommodates the calculation of planned value through the insertion of installation rates and rules of progress from the estimate. The intelligent model then allows the users to see the planned value for each component or the cumulative value of a group of objects (an IWP or CWP).

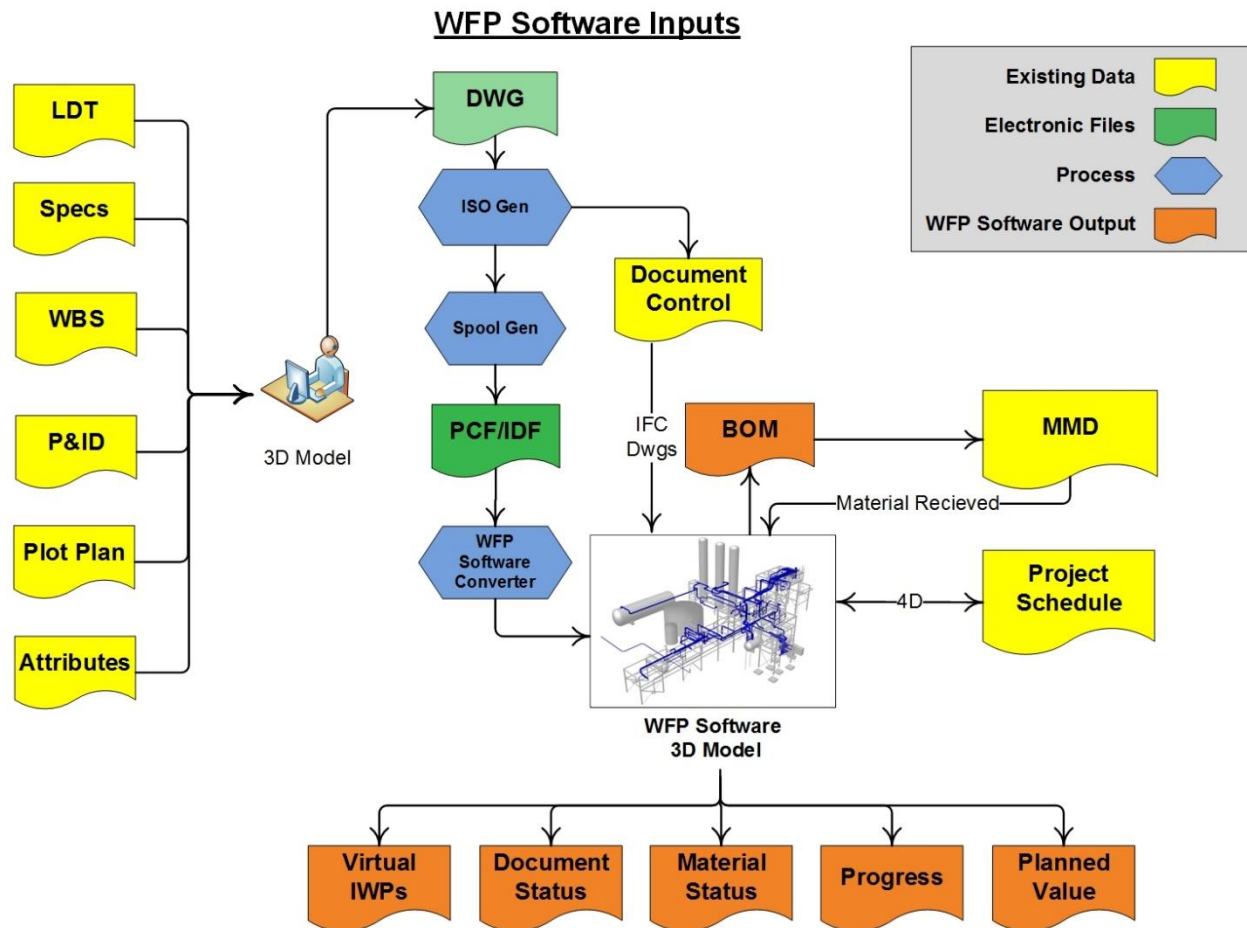
The software will then be used to show the state of readiness for IWPs by showing the actual received materials and drawings (in another color). As the work is executed and progressed the Planner will progress the individual objects, earning value against the total Planned Value.

The culmination of these fragments of information visualized in the 3D environment upon the Workface Planner's desktop facilitates the development of virtual IWPs, based upon the current reality. Objects in the model can be grouped (IWPs or CWPs) to represent schedule activities. This creates a visual schedule that can be rolled out one activity at a time to visually simulate construction: (4D modeling).

The software facilitates WFP by visualizing the answers to these complex questions:

- Which components have been engineered and released IFC?
- Which components have been fabricated, shipped and received?
- Which components have been installed (progressed)?
- Which components are scheduled to be installed?
- Which components have been allocated to an IWP?
- Have the WFP constraints for a specific IWP been removed?

Populating the Software



The Information Manager is responsible to facilitate the process of Information Management through the identification and coordination of key inputs that will produce a fully functional 3D model with WFP software.

7 STANDARD MODEL ATTRIBUTES

In order to fully functionalize the WFP Software, the Information Manager, The AWP Champion and the Engineering Manager will develop a standard list of key attributes that will form the minimal requirements for attribution in the 3D model. The standard for attribution will be applied across all project stakeholders including but not limited to: Engineering, Vendor Equipment, Suppliers and Fabrication.

The development team will use this matrix as a starting place for the development of the attributes that will be unique to every project and developed to be fit for purpose. Ultimately the finalized list of attributes will be developed to satisfy all of the possible data mining scenarios that could be required by the Workforce Planners.

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KEY ATTRIBUTES				COMMODITY								
Requirement Status	Attribute	Division Of Responsibility	Source	Civil	Piling	Concrete	Steel	Equipment	Pipe	Electrical Equipment	Cable	Instruments
Must	Unique Tag #	Engineering	Engineering	Y	Y	Y	Y	Y	Y	Y	Y	Y
Must	Piece Mark #	Engineering	Engineering	N/A	N/A	N/A	Y	N/A	N/A	N/A	N/A	N/A
Must	Spool #	Workface Planning	Fabrication	N/A	N/A	N/A	N/A	N/A	Y	N/A	N/A	N/A
Must	Component type	Engineering	Engineering	N/A	Y	N/A	Y	Y	Y	Y	Y	Y
Must	Weight (Design Quantity)	Engineering	Engineering	N/A	N/A	N/A	Y	Y	N/A	N/A	N/A	N/A
Must	Length (Design Quantity)	Engineering	Engineering	N/A	N/A	N/A	Y	N/A	Y	N/A	Y	N/A
Must	Volume	Engineering	Engineering	Y	N/A	Y	N/A	N/A	N/A	N/A	N/A	N/A
Must	Class (Spec)	Engineering	Engineering	N/A	Y	Y	Y	Y	Y	Y	Y	Y
Must	Diameter	Engineering	Engineering	N/A	N/A	N/A	N/A	N/A	Y	N/A	Y	N/A
Must	Wall Thickness	Engineering	Engineering	N/A	N/A	N/A	N/A	N/A	Y	N/A	N/A	N/A
Secondary	Service	Engineering	Engineering	N/A	N/A	N/A	N/A	N/A	Y	N/A	N/A	N/A
Must	Insulation	Engineering	Engineering	N/A	N/A	N/A	N/A	Y	Y	Y	Y	Y
Must	Fireproof	Engineering	Engineering	N/A	N/A	N/A	Y	N/A	N/A	Y	Y	N/A
Must	Heat Trace	Engineering	Engineering	N/A	N/A	N/A	N/A	Y	Y	Y	N/A	Y
Must	On/Off Module	Engineering	Engineering	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y
Must	Module #	Engineering	Engineering	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y
Must	CWA	Engineering	Construction	Y	Y	Y	Y	Y	Y	Y	Y	Y
Must	EWB	Engineering	Engineering	Y	Y	Y	Y	Y	Y	Y	Y	Y
Must	CWP	Construction	Construction	Y	Y	Y	Y	Y	Y	Y	Y	Y
Must	IWP	Workface Planning	Construction	Y	Y	Y	Y	Y	Y	Y	Y	Y
Secondary	WBS	Engineering	Project Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Secondary	Material Type	Engineering	Procurement	Y	Y	Y	Y	N/A	Y	N/A	N/A	N/A
Must	Material Stock Code	Engineering	Procurement	Y	Y	Y	Y	N/A	Y	N/A	Y	N/A
Must	Design Drawing	Engineering	Engineering	Y		Y	Y	Y	Y	Y	Y	YN
Must	Fabrication Drawing	Fabricator	Fabricator	N/A	N/A	N/A	Y	Y	Y	Y	N/A	N/A
Must	P&ID	Engineering	Engineering	N/A	N/A	N/A	N/A	Y	Y	Y	N/A	Y
Secondary	General Arrangement	Engineering	Engineering	N/A	Y	N/A	N/A	Y	Y	Y	N/A	Y
Secondary	Connection detail	Fabricator	Fabricator	N/A	Y	N/A	Y	Y	Y	Y	N/A	Y
Secondary	RFID#/Bar code	Fabricator	Procurement	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y
Must	Engineering System #	Engineering	Engineering	N/A	N/A	N/A	Y	Y	Y	Y	Y	Y
Must	Turnover system #	Engineering	Operations	Y	Y	Y	Y	Y	Y	Y	Y	Y
Secondary	Activity ID	Workface Planning	Project Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Secondary	PC Cost code	Engineering	Project Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y

8 PROJECT CONTROLS

The creation of the Work Breakdown Structure based upon the dissection of work into packages (CWPs and IWPs) provides a platform for the alignment of **work, time and cost**.

Schedule

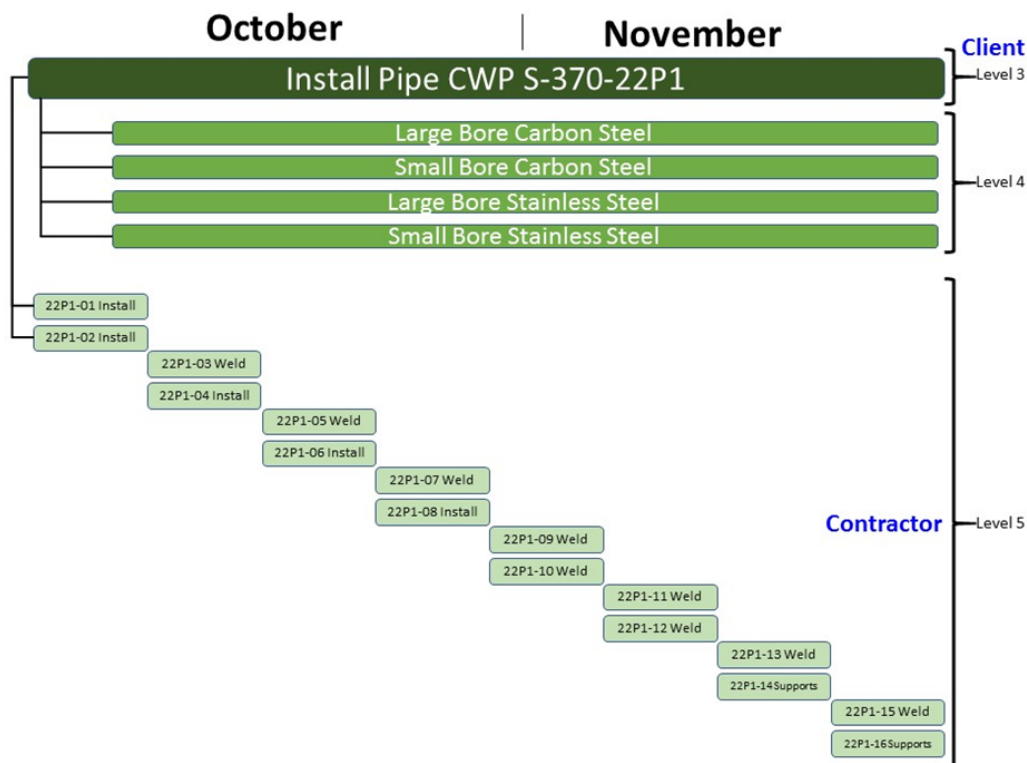
The level 3 project schedule will contain CWPs and the level 5 construction schedule will contain IWPs. The IWP naming convention is based upon the WBS and this is expected to be the activity name in the Schedule. Planned Value and duration for CWPs will be developed with a ROM estimate (+/- 25%) from model take offs and expert judgement at the 60% model review.

A Budget estimate (+/- 10%) will be developed when the CWP is released IFC with quantities drawn from the WFP software 3D model. Planned value will be calculated from the standard for installation rates that have been applied to the software.

As the IWPs are developed in the WFP Software 3D model and rolled up to the CWP they will form the Definitive estimate (+/-5%).

If cost management require tracking by commodity type (Large bore stainless steel) then the schedulers will include level 4 activities that identify planned value taken from quantities extracted by the WFP Software, with durations across the entire the CWP.

It is very important that the schedule activities are identified as their WBS name from the IWPs, as it will link activity start dates extracted from the schedule to IWPs in the model and facilitate 4D simulations.



Installation Unit Rates and Rules of Credit

The Project Management's Project Controls Team is responsible to establish a single standard for Installation Unit Rates and Rules of Credit for all commodities. This may be the adoption of the installation unit rates provided by the Construction Contractors or Sub-contractors or could be based upon published performance data (Page and Nations, Neca 3) multiplied by a regional factor. The Unit Rate tables and the Rules of Progress will be submitted to the WFP software vendor for application to the software. This will facilitate the calculation of Planned Value for steel and pipe components.

Progress and Performance

The Project Controls Team will develop a communication plan that includes a standard for the weekly progress and performance report and a distribution matrix for project stakeholders.

The standard Stewardship Report will include but not be limited to:

- Total Workforce
- Productivity by CWP and Overall ($\frac{\text{Hours Earned}}{\text{Hours Burned}}$)
- Schedule performance
- Pack Track by IWP and CWP
- Barrier Report
- Scaffold Hrs as a % of Directs
- RFI cycle time
- Commodity Performance for each Discipline

(Total hrs per unit of measure: Yards of concrete, Tons of Steel or Feet of pipe or cable)

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Cost Codes

The Foreman will apply the IWP number to the timesheet as the cost code for hours spent executing the scope. The Project Controls team will determine which other project costs they need to track, outside of hours spent directly on scope, (safety meetings, training, traffic control, etc.) and develop cost codes for the allocation of time. This will facilitate the direct alignment between hours burned and hours earned for each IWP, which will roll up to the CWP or any other level of the WBS.

Delay Codes

The Construction Contractor will develop timesheets with a matrix of delay codes printed on the back. The Foremen are responsible to track deviations from the plan in the notes section of the daily timesheet, shown has whole hours that capture the total crew time lost to the deviation.

The Construction Contractor's Timekeepers will tally the hours and produce a weekly report that shows a total for each category.

DELAY CODES		
Delay Title	Code	Description
Safety - Concerns	S 1	Task could not be performed safely
Safety - Inadequate Training	S 2	Safety training requirements not met.
Plan - Preparation Not Complete	PL 1	Preparation for task execution inadequate.
Plan - Preparation - Scaffolding	PL 2	Delayed by the lack of scaffold or modifications
Plan - Trade Coordination	PL 3	Access to the workface restricted by other trades
Plan - Work Scope Insufficient	PL 4	Insufficient instruction, scope not identified / understood.
Plan - Change to Workfront	PL 5	Workforce delayed due to unplanned change in workfront
Rework - Fabrication / Engineering	RW 1	Components do not fit
Rework - Workmanship	RW 2	Rework task due to poor workmanship.
Resources - Material Unavailable	RS 1	Materials for the task were not available
Resources - Equipment Unavailable	RS 2	Equipment not available. (Cranes, lifts, welders, pumps)
Resources - Tools Unavailable	RS 3	Tools not available. (equipment under \$1500 in value)
Resources - Trades Absent	RS 4	Workforce did not show up (sick/absent/late/).
Resources - Trades Unavailable	RS 5	Workforce shortages
Permit Delays - Issuer	PM 1	Permitting not efficient. (permit not ready at start of shift)
Permit Delays - Operating Unit	PM 2	Operating unit withheld permits for operational activities
Permit Delays - Other	PM 3	Permits not requested in time. (previous day)
Permit Delays - Unit Upset	PM 4	Permits cancelled due to Unit upset.
Travel Delay	T 1	Travel between facilities and the workface > 5 minutes.
Travel Delay - Vehicle	T 2	Travel delays created by lack of access to vehicles
Weather - Precipitation	W 1	Rain, Fog, Snow.
Weather - Wind	W 2	Wind creates a hazardous environment
Weather - Temperature	W 3	Too hot or too cold

9 DOCUMENT CONTROL

The Information Manager will facilitate the development of processes that create a cloud based Hub for the storage and exchange of project data. The Engineering section of the online Document management system will be utilized by Engineering to store and manage project drawings and data. Drawings released IFC will be transferred into the Construction Management section of the Hub and developed into CWP's. Completed CWP's will be transferred into the Construction Contractor's section of the Hub and released to the contractor for execution. The Construction Contractor's Workforce Planners will store project documents and IWP's in the Hub.

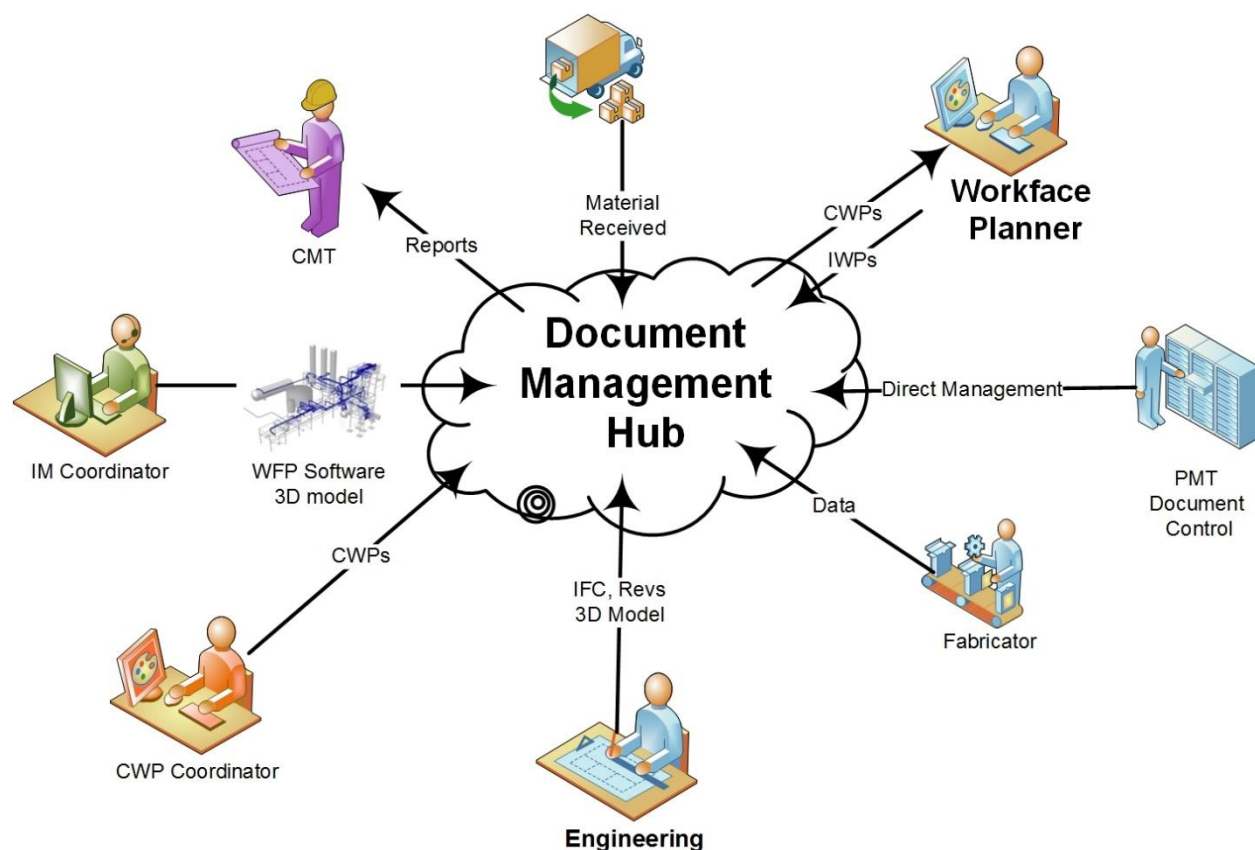
The IM Coordinator will then develop a set of access rights for all of the project Stakeholders and they will effectively utilize the Hub as their own document control database.

The Project Management Team's Document Control Department will manage the Hub and issue transmittals to notify the Stakeholders that documents have been released to them.

The creation of a secure external Hub for project data facilitates stakeholder access to project data without the need to access the Owner's network and ensures that there is a single version of up to date documents and project data.

As revisions are issued the Engineering team upload them to the Hub, superseding the existing revision, this will trigger a notification to the Document Control Team who will issue a transmittal to the appropriate Stakeholders.

Both of the companies that provide the WFP Software have Document Control software that will facilitate this model.



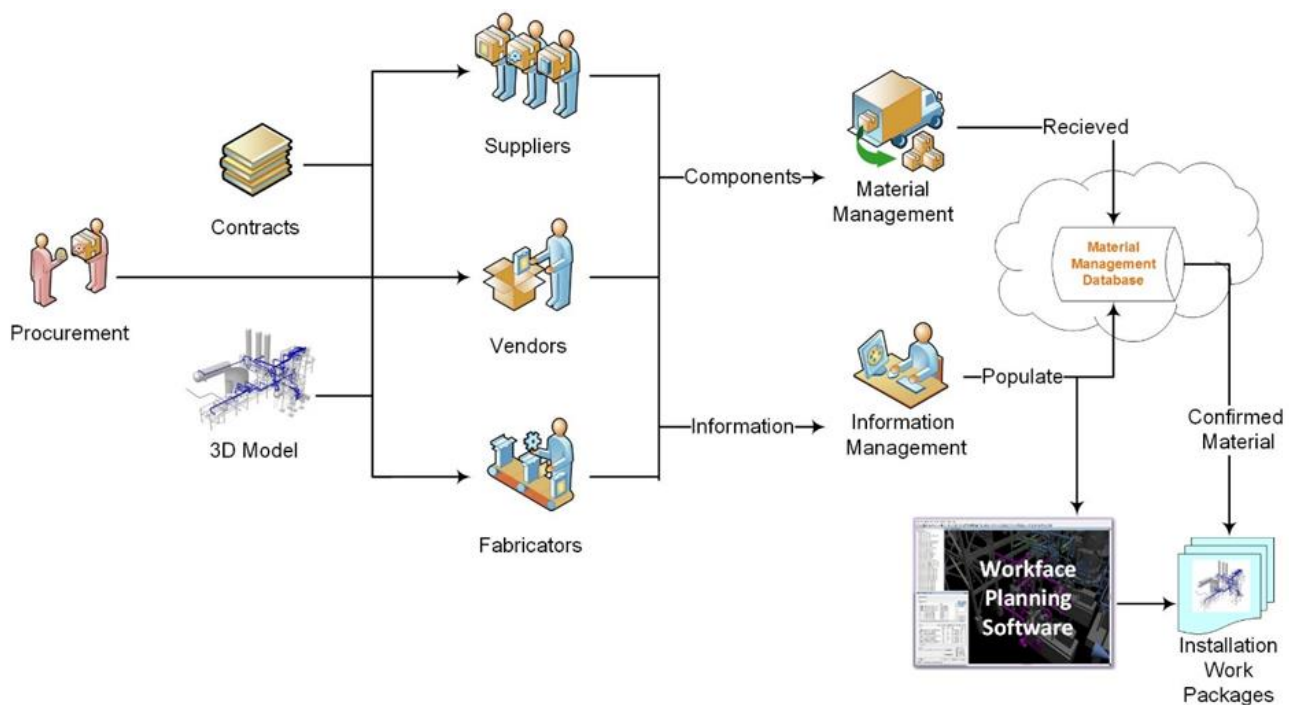
10 PROCUREMENT AND MATERIAL MANAGEMENT

To satisfy the data requirements for a fully attributed 3D model, the procurement team will need to establish contractual obligations for vendors, suppliers and fabricators to supply comprehensive data along with their products.

The attributes listed under section 7 of this document have a detailed list of requirements for Suppliers and Vendors. The requirement for Fabricators will be that they deliver a weekly upload of model data by transmitting the appropriate files. Steel: CIS2 STP file and Pipe: IDF or PCF file. The Information Manager will work directly with the fabricators to develop file extracts that satisfy the needs of the WFP software.

A data dump from the fully attributed 3D model can then be used to populate the Material Management Database. This will create an exact alignment between the naming convention used by the Workforce Planners and the material received.

The WFP Team will transmit the BOM and the scheduled execution date for IWPs to the onsite Material Management team as they are created. The database used by the Material Management team will import the BOM from Excel and then match the request to the list of expected components from the model dump. A column in the database will identify the IWP and the scheduled execution date allowing the database to dynamically allocate bulk materials based upon the sequence of execution.



11 MODEL MAINTENANCE

The utilization of the 3D model for the communication of project information during construction creates the need for model maintenance and sustained integrity. Beyond construction this is expected to create a model that can be utilized as a communication tool during commissioning and start up, operation training, maintenance, retrofits and decommissioning.

In order to meet this standard, the Engineering Project Team will:

- Be responsible to maintain the integrity of the 3D model for the entire life cycle of the project through onsite administration.
- Apply Field Change Notices and As-built information to the model on a weekly schedule.
- Submit weekly updates of the model to a common folder within Document Control for the utilization of all project stakeholders.
- Facilitate the progressive turnover of the 3D model to operations in sequence with system turnover.
- Perform other assignments as directed by construction management that support the intent of this procedure to effectively communicate project information on the platform of the 3D model.

12 AUDITS

In order to optimize the Project Team's support for Information Management and the application of WFP software and WFP, the Information Manager will initiate audits of the process against this procedure at 20, 40 and 60% design complete.

The AWP Champion will then develop a schedule for periodic 3rd Party audits in between these audits points. The Information Manager will facilitate access to the necessary personnel and information.

These audit points will appear in the project schedule.

A Summary of the report will contain the following:

- Scorecard of adherence to this procedure as a % of total attainable
- A list of recommendations for alignment.
- Demographics of the project: Phase, Workforce and % Complete
- Comments and observations
- A list of acclamations and recommendations

The audits will utilize the audit template from the WFP Toolbox: **SD07**

The audits will be presented to the WFP Champion and then presented to the Project Manager. The Project Management Team will develop a list of action items and assign accountable personnel. The AWP Champion is then responsible to progress the action items and produce a follow up report within one month of the audit.

13 PROCEDURE MAINTENANCE

This procedure is the third in a series of three core procedures that are interdependent to each other, therefore care should be taken that changes initiated here are not already covered in one of the other procedures or that the changes do not have a negative impact upon the effectiveness of the process as a whole.

The local maintenance of this procedure is the responsibility of the AWP Champion over the course of the project and should reflect the reality of application.

At the completion of the project the AWP Champion is responsible to capture the actions taken by the project team to improve the procedure's effectiveness.

This report should include a detailed list of:

- The audit results that show trends in conformance or diversions from the procedure.
- Changes made to the procedure during the project c/w with an explanation of the reason for the changes.
- Lesson learned captured at the end of the project phases from all stakeholders.
- Project management end of project assessment that captures the effectiveness of the process and procedures.

The final report developed by the AWP Champion will be submitted to project procedures owner for consideration as a suggestion for continuous improvement.