

AWP Data Requirements Implementation Guideline



Special Report 19-01
Version 1.4

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AWP Data Requirements Implementation Guideline

Working Group 19-01, AWP Data Requirements

Construction Industry Institute

Special Report 19-01

Version 1.4

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The University of Texas at Austin

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Executive Summary

Advanced Work Packaging (AWP) has become a necessary best practice for stakeholders on capital projects. AWP facilitates a more productive and progressive construction project through the identification, categorization, and information sharing of work process flows. By standardizing the information-sharing process and components, capital project stakeholders are more transparent and proactively plan and adapt to the inherent challenges of construction projects. This information sharing fosters alignment across stakeholders who reduce risk on a capital project.

Prior to the completion of this *AWP Data Requirements Implementation Guideline*, both CII's Body of Knowledge and the construction industry at large lacked a vetted, comprehensive set of data requirements for AWP. To address this need, CII's AWP Community for Business Advancement formed CII Working Group 19-01, AWP Data Requirements, to develop a comprehensive set of AWP data requirements for capital project stakeholders.

In an attempt to maximize the extent to which these AWP data requirements were leveraged and implemented by the construction industry, the AWP Working Group invited several academics to join some of its members to create a project team. This project team refined, reviewed, and published this implementation guideline. (Team members who contributed to the guideline development are listed in the Appendix.)

The project team intends for this guideline to accomplish several objectives:

- To support efforts to implement the assembled AWP data requirements.
- To encourage companies to standardize information flow for work processes on capital projects.
- To serve as a critical reference as companies create contracts that include data to support AWP.

Table of Contents

<i>Chapter</i>	<i>Page</i>
Executive Summary	iii
1. Introduction	1
2. Project Framework	3
3. Data Requirements	7
3.1. DR010 – AWP Master Index	10
3.2. DR020 – Project Schedule	23
3.3. DR050 – Equipment Design	26
3.4. DR070 – Piping Design	29
3.5. DR080 – 3D Modeling	37
3.6. DR090 – Civil-Structural Design	45
3.7. DR100 – Electrical & Instrumentation Design	53
3.8. DR120 – Document Control	75
3.9. DR140 – Estimating and Cost	78
3.10. DR150 – Procurement	82
3.11. DR170 – Structural Detailing	96
3.12. DR180 – Steel Fabrication	104
3.13. DR190 – Pipe Detailing	109
3.14. DR200 – Pipe Fabrication	115
3.15. DR230 – Contractor Scope Items	121
3.16. DR260 – Constraints	123
3.17. DR270 – Site Materials	125
3.18. DR290 – Site Progress	133
3.19. DR310 – Completions	140
4. Conclusions and Recommendations	149
Bibliography	151
Revision Log	153
Acronym Glossary	155
Appendix: Top-level Data Requirements	157
AWP Working Group	159

Chapter 1: Introduction

The primary objective of this project was to create this AWP Data Requirements Implementation Guideline. In August 2019, the CII AWP Community for Business Advancement identified this project objective. In September 2019, CII formed an AWP Working Group to identify the AWP data requirements detailed in this guideline. The Working Group created and vetted the AWP data requirements for stakeholders on capital projects. The Working Group then assembled a project team to develop implementation guidelines for these requirements, an owner-led initiative that worked in partnership with contractors and service providers. In 2021, the AWP Working Group stewarded an activity related to keeping the data requirements evergreen, resulting in the first revised version of AWP data requirements based on industry feedback.

1.1. Work Packaging for Capital Projects

In 2013, a study completed by CII Research Team 272 found that 70 percent of industrial construction projects surpassed 10 percent variation from anticipated project cost and schedule. RT-272 also identified a lack of standardization for information sharing on capital projects (CII/COAA 2013).

Project stakeholders have found it challenging to plan and manage project controls as the complexity of industrial projects increases (Bosch-Rekvelde et al. 2011). As industrial projects become more complex and have increasing budgets, construction planning must adapt to remain continually effective. A variety of work package methods have been implemented attempting to maximize efficiencies (Isaac et al. 2017). One such method was WorkFace Planning (WFP), which is the process of organizing and informing site personnel about work items a considerable time before the work is scheduled to begin (Halala and Fayek 2019). Another method was Advanced Work Packaging (AWP).

A study showed that AWP practices on the capital project delivery process obtained the following benefits (Ponticelli et al. 2015; CII/COAA 2015):

- Up to 25% increase in field productivity
- Up to 10% decrease in total installed cost (TIC), with expanded reserve funds for owners and contractors
- Improved schedule performance with project delivered on schedule
- Improved safety performance with zero lost-time accident records
- Increased quality with decreased rework
- Improved forecast for cost and schedule estimation

1.2. CII Advanced Work Packaging

In 2015, CII officially designated AWP as a CII Best Practice. CII currently defines AWP as, “The overall process flow of all the detailed work packages including construction, engineering, and installation work packages” (CII 2020). CII’s Body of Knowledge that pertains to AWP indicates that it is a planned and executable process that exists during the inception through the final construction execution of a project. Several research teams within CII have investigated various aspects of AWP for capital projects:

- The integration of the supply chain with AWP practices (RT-363)
- Supply chain integration of materials planning and work packaging (RT-344)
- The value quantified in integrating supply components to front end planning efforts (RT-272)
- Making the case for AWP as a standard practice (RT-319)
- AWP “Digital Threads” to enable supply chain visibility on capital projects (RT-TC-03)

The need for the *AWP Data Requirements Implementation Guideline* was essentially a culmination of the findings from these previous CII research teams and the implementation experience of CII member companies. Figure 1 provides a framework for past and current CII AWP research. This figure shows how this project fits with the current CII Body of Knowledge.

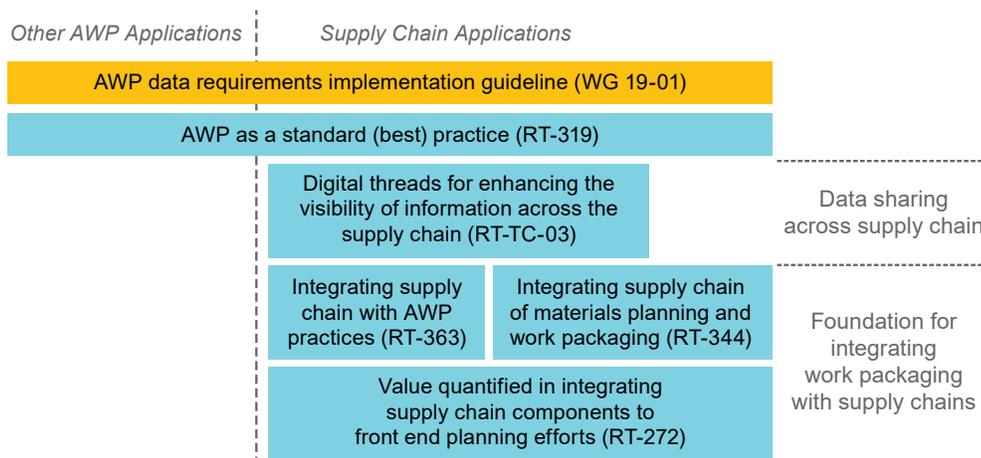


Figure 1. Framework for CII Research of AWP

1.3. Project Guideline

The remainder of this guideline details the project framework and presents the AWP data requirements. Chapter 2 discusses the framework this project implemented to produce its findings. Chapter 3 contains the industry-vetted AWP data requirements. The final section presents the project’s conclusions, including recommended practices.

Chapter 2: Project Framework

This project was started by the CII AWP Community of Business Advancement and executed by CII Working Group 19-01. CII's Technology & Innovation Committee provided funding for this publication, and two academic faculty members were added to the working group to create a project team that conducted meetings through in-person workshops, virtual platforms, and email in the process of writing this guide. The goal of this project was that the published Implementation Guidelines will orient organizations to successfully implement AWP data requirements for capital projects. (The contributors to this project are listed in an appendix.)

After this section, the survey offered two questions to support other CII research teams contemporaneously working on AWP topics, Research Teams 364 and 365. These questions addressed barriers related to the integration of AWP with procurement and supply chain management, and its integration with commissioning and startup.

2.1. Purpose, Objective, and Scope

The primary purpose of this project was to refine, review, and publish the *AWP Data Requirements Implementation Guideline*. The objectives of the project were to refine the AWP data requirements and to publish the *AWP Data Requirements Implementation Guideline*. The original scope of this project focused on the data required to enable implementation of AWP, as defined by the CII Best Practice formulated by CII RT-272 (CII/COAA 2013). Original project results were obtained by leveraging inter-team coordination to capture evolving practices, including supply chain and completions research teams.

The scope of this revision focused on refining, reviewing, and publishing the first revision of the AWP Data Requirements Guideline. Its scope remained aligned to the original approach by including primary feedback from the industry, in addition to keeping consistent with the documents now published by RT-363, Integrating the Supply Chain with AWP Practices, and RT-364, AWP-integrated Practices for Construction Completions, Commissioning, and Startup.

The unique contribution of the group that created the original *AWP Data Requirements Implementation Guideline* was the format, structure, and description of the data requirement content, and coordination with other related ongoing AWP projects. This approach allowed for a more cohesive, consistent, and technical document. Questions about data requirements were answered by members of the team and external resources, as needed.

The project team IS NOT:

- Creating an international standard
- Defining acceptable values or required units
- Creating a reference data library
- Developing data requirements for full digital project execution
- Overlapping its scope with other existing data initiatives

The project is also not building a toolset, but rather is software-agnostic and is publishing common data requirements. Lastly, the project team did not create a fully inclusive database set, but included fields thought to be instrumental in a successful AWP program.

2.2. Project Framework

The project team had weekly virtual meetings as well as face-to-face workshops in Houston, Texas. During these meetings, project team members on the AWP Working Group spent the majority of their time vetting AWP data requirement content, discussing progress, and updating this guideline. Some Working Group members shared their internal work products, and those became some of the fundamental building blocks for this project.

The project team selected the data requirements shown in Table 1 to further refine and develop the *AWP Data Requirements Implementation Guideline*.

Table 1. AWP Data Requirements Specified in this Project

DR010	AWP Master Index
DR020	Project Schedule
DR050	Equipment Design
DR070	Piping Design
DR080	3D Modeling
DR090	Civil-Structural Design
DR100	Electrical & Instrumentation Design
DR120	Document Control
DR140	Estimating and Cost
DR150	Procurement
DR170	Structural Detailing
DR180	Steel Fabrication
DR190	Pipe Detailing
DR200	Pipe Fabrication
DR230	Contractor Scope Items
DR260	Constraints
DR270	Site Materials
DR290	Site Progress
DR310	Completions

The project team mapped the existing digital threads to the flowcharts in IR272-2, Volume I (CII/COAA 2013), then prioritized the digital threads for further investigation to determine the scope of the publication. RT-364 had updated the original AWP flowchart developed by RT-272, expanding its three AWP stages by adding a fourth stage for Energization and Commissioning (CII 2020a). Figure 2 shows the graphic that resulted.

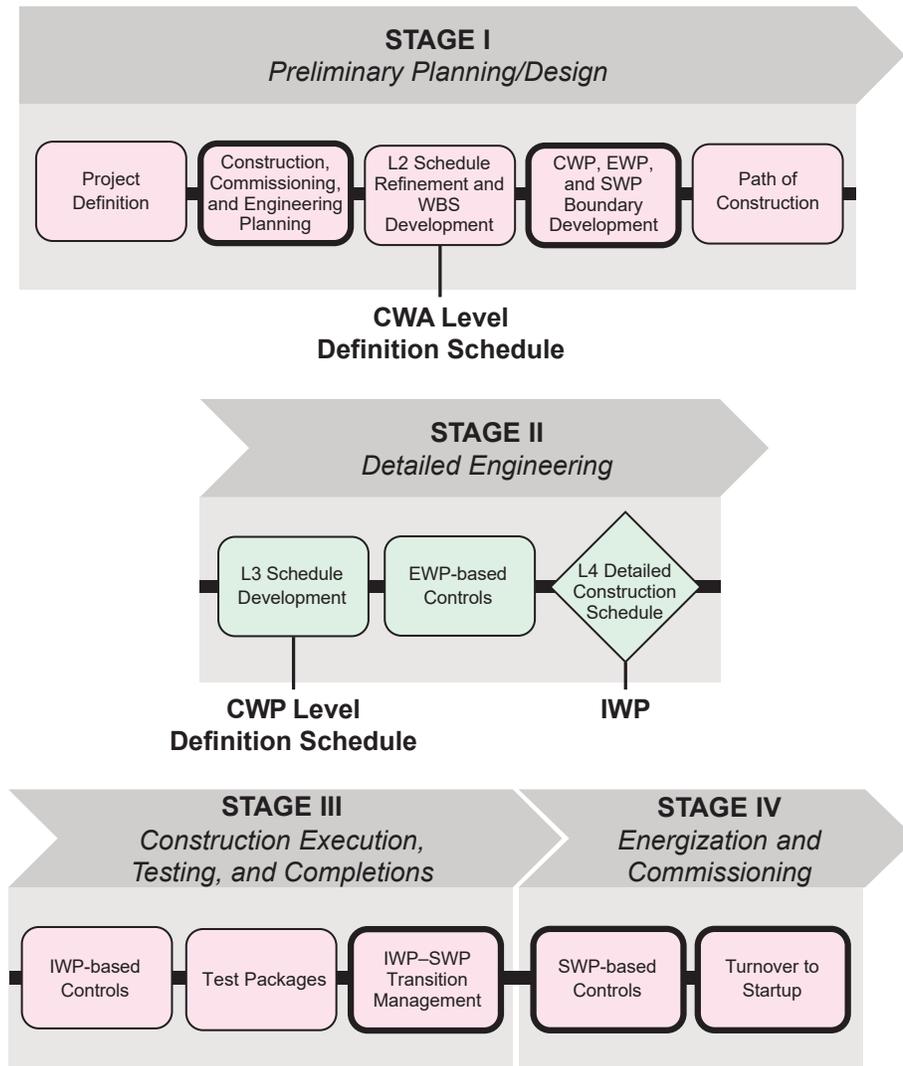


Figure 2. Overview of CSU-Integrated AWP Flowchart (Adapted from CII 2020a)

Figure 3 shows the same map updated with detailed data requirements developed from this study.

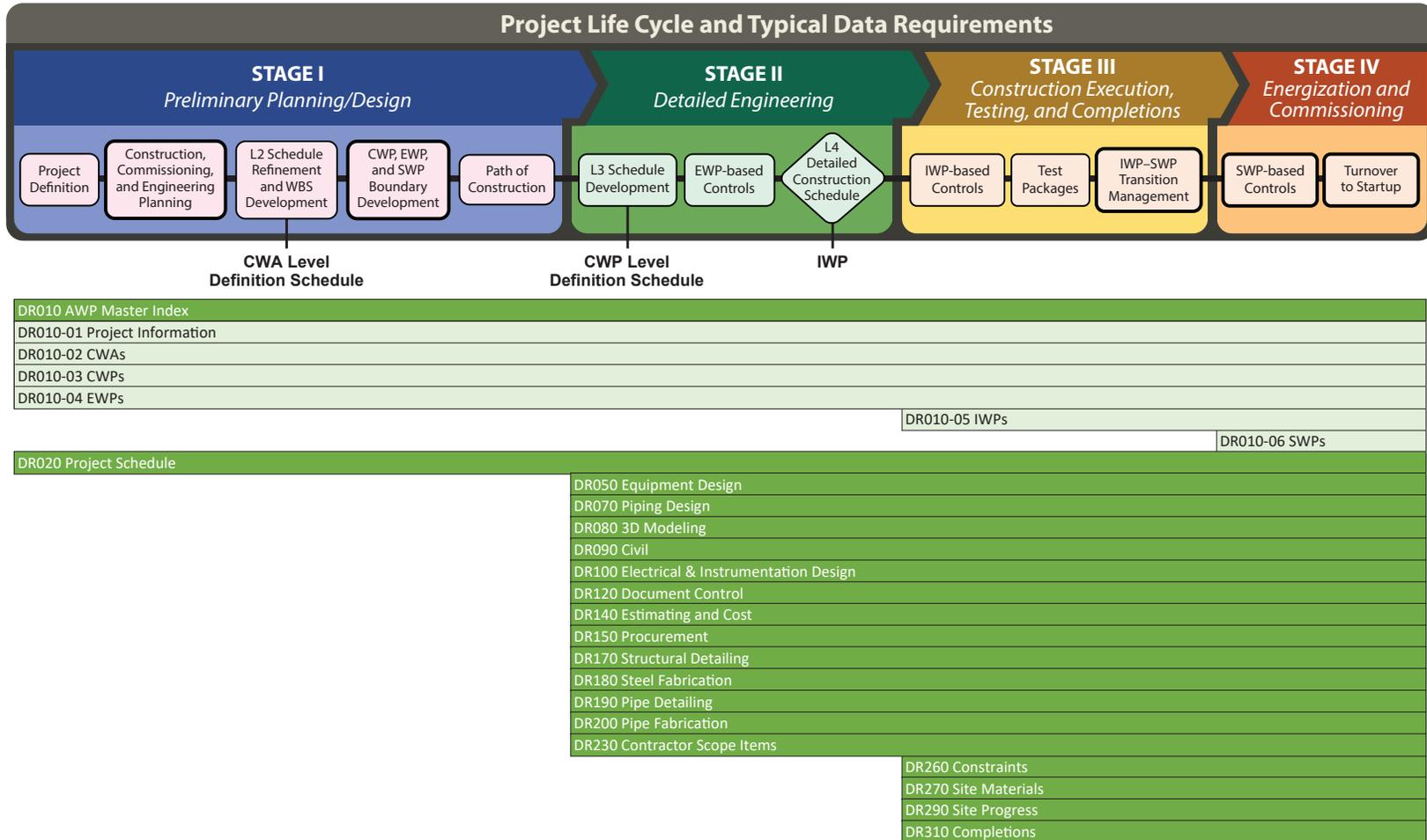


Figure 3. AWP Data Requirements Flow Chart

Chapter 3: Data Requirements

The project team created a set of general conditions to guide the rationalization efforts through all the selected data requirements. These general conditions are shared in this section to inform the user and frame the narrative.

- The project team created specifications for assessing existing requirements when singular relationships were not apparent.
- Detailed implementation recommendations address how these relationships will be handled for specific projects.
- The project team included an optional revision field for use with future AWP integration.
- Designated field names are descriptive and listed with the intent to allow companies to rename however they deem appropriate.
- Fields designated as “required” indicate that the data is required to support Advanced Work Packaging and WorkFace Planning. This is not a full digital enablement specification.
- The project team did not cover normal procurement data sets, as those are assumed by the project stakeholders.
- When accessing the data requirements, one should assume common definitions for the following field names:
 - Plan* – the unchanging contract or original baseline.
 - Forecast* – the updated or reissued future completion date through estimations and adjustment.
 - Actual Date* – the calendar date when work actually started or finished.
- Lastly, standard attributes and metadata fields should be added as necessary based on the source of information, including variables such as timestamps, date created, and refresh date.

Sample Entries for Data Requirements

This guideline provides “sample entries” for each field within the data requirements. In most cases, the sample entries provide actual project data that would be appropriate for the given field. In all cases, the sample entries reflect information – either actual project data or simulated data – which would satisfy the specification for a particular field entry. The diversity of sample entries is intentional to be more illustrative of the variability of individual project data. The sample entries were generated by members of the project team who used their professional experience with project data to populate the fields. The initial data was reviewed by members of the team to validate that the provided data was appropriate for the suggested field.

Excel Workbook for Data Requirements

A downloadable Excel workbook of the data tables in this report has been developed and is available in the CII Knowledge Base page for Working Group 19-01, AWP Data Requirements.

How Are Data Requirements Interpreted

Figure 4 shows how the 60 data requirements follow a consistent format across all 19 categories. The structure is the same, but the details vary from data requirement to data requirement. The particular data requirement shown in Figure 4 is relatively brief.

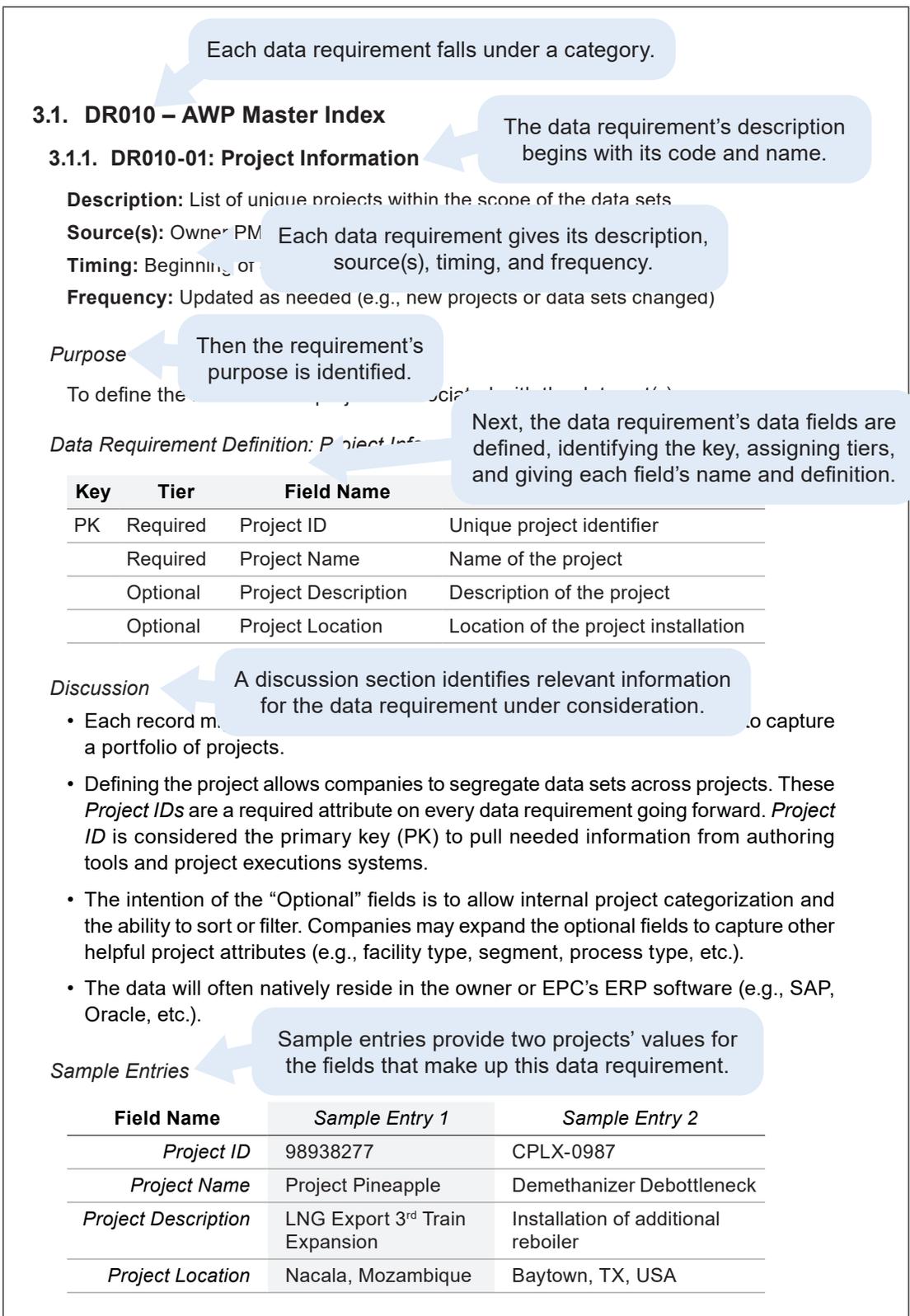


Figure 4. The Elements of a Data Requirement

3.1. DR010 – AWP Master Index

3.1.1. DR010-01: Project Information

Description: List of unique projects within the scope of the data sets

Source(s): Owner PM organization

Timing: Beginning of Stage 1 (Preliminary Planning & Design)

Frequency: Updated as needed (e.g., new projects or data sets changed)

Purpose

To define the master list of projects associated with the data set(s).

Data Requirement Definition: Project Information

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
	Required	Project Name	Name of the project
	Optional	Project Description	Description of the project
	Optional	Project Location	Location of the project installation

Discussion

- Each record might be a single entry for a large project, or multiple entries to capture a portfolio of projects.
- Defining the project allows companies to segregate data sets across projects. These *Project IDs* are a required attribute on every data requirement going forward. *Project ID* is considered the primary key (PK) to pull needed information from authoring tools and project executions systems.
- The intention of the “Optional” fields is to allow internal project categorization and the ability to sort or filter. Companies may expand the optional fields to capture other helpful project attributes (e.g., facility type, segment, process type, etc.).
- The data will often natively reside in the owner or EPC’s ERP software (e.g., SAP, Oracle, etc.).

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	98938277	CPLX-0987
<i>Project Name</i>	Project Pineapple	Demethanizer Debottleneck
<i>Project Description</i>	LNG Export 3 rd Train Expansion	Installation of additional reboiler
<i>Project Location</i>	Nacala, Mozambique	Baytown, TX, USA

3.1.2. DR010-02: CWAs

Description: List of unique construction work areas (CWAs) within a given project

Source(s): Construction management team

Timing: Early Stage 1 (Preliminary Planning & Design) after project definition

Frequency: Continuous as revised – at a minimum weekly through Stage 1 (Preliminary Planning & Design) until the Path of Construction is defined

Purpose

To define the master list of construction work areas (CWAs) for a project.

A CWA is a geographical designation of areas on a plot plan that has been defined by construction as being logical areas of work. The CWA includes all disciplines with work in that geographical area.

Data Requirement Definition: CWAs

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	CWA	Unique construction work area identifier
	Required	CWA Description	CWA description
	Optional	CWA GIS Boundary	GIS information defining the CWA
	Optional	CWA Ground Level	CWA above ground, below ground, or mixed
	Optional	CWA Plot Plan Drawing	Drawing number capturing the CWA plot delineation

Discussion

- Typically, areas do not overlap, but underground (UG) is often separated as unique CWAs and only appears overlapping with the above ground (AG) on a 2D plot plan.
- The key relationship with CWAs is to construction work packages (CWPs), which are at the third level in the AWP hierarchy below the project (i.e., first level: Project; second level: CWA; third level: CWP)
- Similar to *Project ID*, many data tables capture *CWA*.
- CWAs can be determined via the CWP.
- *CWA GIS Boundary* is meant to be a set of GIS coordinates to define the bounds of a CWA independent of a drawing. Alternatively, the CWA coordinates could be in model space.
- *CWA Ground Level* – often there is a need or desire to quickly sort CWAs by UG or AG, or to understand if they are mixed.
- CWA delineation usually natively lives on a plot plan, but it is ideally captured in the 3D model.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	98938277	CPLX-0987
<i>CWA</i>	FZABD001	Area 2
<i>CWA Description</i>	Furnace Block	Cold Train
<i>CWA GIS Boundary</i>	(29.757061, -95.006500), (29.756915, -95.005135), (29.757425, -95.005087), (29.757558, -95.006463)	(450.058, 378.382, 33.224), (450.058, 410.562, 33.224), (436.863, 378.382, 33.224), (436.863, 410.562, 33.224)
<i>CWA Ground Level</i>	AG	AG
<i>CWA Plot Plan Drawing</i>	PLT-PLN-001-04	009-382-BZ-0910890

3.1.3. DR010-03: CWPs

Description: Contains the project's construction work package (CWP) definitions

Source(s): Construction management team

Timing: During Stage 1 (Preliminary Planning & Design) after CWP boundary development

Frequency: Continuous as revised – at a minimum, weekly through Stage 2 (Detailed Engineering) Detailed Construction Schedule development

Purpose

To define the master list of construction work packages (CWPs) for a project. All CWPs for the project must be listed in this table.

A CWP defines a logical and manageable division of work within the construction scope (typically 10k to 40k craft hours). CWPs are aligned with the project execution plan (which includes the construction plan) and the WBS. The division of work is defined such that CWPs do not overlap within a discipline. CWPs are to be measurable and in alignment with project controls. CWPs are the basis for the development of detailed installation work packages (IWPs).

Data Requirement Definition: CWPs

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	CWP	Unique construction work package identifier
	Required	CWP Contract	Unique identifier of contract responsible for CWP execution
	Required	CWA	Unique construction work area identifier
	Required	CWP Description	CWP description
	Required	CWP Status	Status of the construction work package
	Required	CWP Discipline	Discipline responsible for CWP execution
	Optional	CWP Type	Construction work package type (e.g., install, insulate, fabricate, etc.)
	Optional	CWP Estimate Hours	Current control budget construction workhours of the CWP (aligned to schedule)
	Optional	CWP Revision	Current revision of the CWP
	Optional	CWP Sequence	Sequence of the CWP within the CWA (i.e., represents the path of construction)

Discussion

- Consistent with standard industry guidance, this data model operates on the assumption that CWPs do not cross disciplines, companies, or contract types. If this is so, the existing CWPs should be further split such that they do not cross discipline or contractual boundaries. They may also contain more than one engineering work package.
- CWPs are subsets of CWAs. Subsequent data requirement tables assume that CWA can be extracted from CWP as needed.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	98938277	CPLX-0987
<i>CWA</i>	FZABD001	002
<i>CWP</i>	FZABD001-PIP	002P
<i>CWP Contract</i>	PIP-001	GEN-ABC
<i>CWP Description</i>	Furnace Block Pipe Installation	Cold Train Piping
<i>CWP Status</i>	Issued for Construction	On Hold
<i>CWP Discipline</i>	Piping	Piping & Pipeline
<i>CWP Type</i>	Install	Fabricate
<i>CWP Estimate Hours</i>	15000	28000
<i>CWP Revision</i>	01	A
<i>CWP Sequence</i>	1	3/5

3.1.4. DR010-04: EWPs

Description: List of unique engineering work packages (EWPs) within a given project

Source(s): Engineering management team

Timing: During Stage 1 (Preliminary Planning & Design) after CWP definitions

Frequency: Continuous as revised – at a minimum, weekly through Stage 2 (Detailed Engineering) Detailed Construction Schedule development

Purpose

To define the master list of engineering work packages (EWPs) for a project.

An EWP is an engineering deliverable that is used to develop CWPs and define a scope of work to support construction in the form of drawings, procurement deliverables, specifications, and vendor support. The EWP is released in an approved sequence that is consistent with the CWP schedule and the path of construction. An EWP scope of work is typically defined by discipline and area.

Data Requirement Definition: EWPs

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	EWP	Unique engineering work package identifier
	Required	CWP	Unique construction work package identifier
	Required	EWP Description	Engineering work package description
	Required	EWP Discipline	Discipline responsible for EWP execution
	Required	EWP Status	Status of the engineering work package
	Required	EWP Contract	Unique identifier of contract responsible for EWP execution
	Optional	EWP Owner	Name responsible for EWP (typically the discipline lead)
	Optional	EWP Revision	Current revision of the EWP

Discussion

- IR272-2 specifies that any given EWP relates only to a single CWP. Often EWPs and CWPs are 1:1, but IR272-2 does allow for multiple EWPs to be related to a single CWP (e.g., primary steel and secondary steel as separate EWPs) (CII/COAA 2013).
- Some EPCs create “common” EWPs for common deliverables (e.g., plot plans, pipe support detail, etc.). In this case, the *CWP* attribute would be intentionally left blank.
- This table captures the relationship of EWPs to CWPs.
- The *EWP Contract* field captures which engineering contractor is responsible for the development of deliverables for the EWP. This is useful for large projects where there may be multiple engineering contractors or where vendors are responsible for developing deliverables for the EWP.
- Originating data source – typically live in some sort of master index for the project and are mapped to engineering deliverables in the MDL/MDI and/or the engineering progress database.
- *EWP Discipline* is redundant to the related CWP discipline but allows for testing of data consistency.

Sample Entries

Field Name	<i>Sample Entry 1</i>	<i>Sample Entry 2</i>
<i>Project ID</i>	98938277	CPLX-0987
<i>CWP</i>	CWP-0012-00A1-Pipe	CWP-DA02-Equip-01
<i>EWP</i>	EWP-0012-00A1-Pipe	EWP-DA02-Equip-01
<i>EWP Description</i>	North Rack LB Piping	Pumps P9101A/B
<i>EWP Discipline</i>	Piping	Equipment
<i>EWP Status</i>	Issued	Working
<i>EWP Contract</i>	Acme Engineers, Inc.	89655312
<i>EWP Owner</i>	Smith	Jones
<i>EWP Revision</i>	0	2

3.1.5. DR010-05: IWPs

Description: List of unique installation work packages (IWPs) within a given project

Source(s): Construction management team

Timing: Stage 3 (Construction)

Frequency: Continuous as revised – at a minimum, weekly through Stage 3

Purpose

To define the master list of installation work packages (IWPs) for a project.

An IWP is a detailed execution plan that describes all elements necessary to complete a scope of work. This detailed planning document enables craft persons to perform high-quality work in a safe, effective, and efficient manner without constraints. Generally, the scope of work associated with the IWP is small enough that it could be completed by a single-foreman team, typically in a one- or two-week timeframe.

Data Requirement Definition: IWPs

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	IWP	Unique installation work package identifier
	Required	IWP Description	IWP description
	Required	IWP Discipline	IWP discipline
	Required	IWP Contract	Unique identifier of contract responsible for IWP execution
	Required	CWP	Unique construction work package identifier
	Required	IWP Planner	WorkFace Planner responsible for the IWP
	Optional	IWP Foreman	Foreman responsible for executing the IWP
	Optional	IWP General Foreman	General foreman responsible for overseeing execution of the IWP
	Optional	IWP Superintendent	Superintendent responsible for overseeing execution of the IWP
	Required	IWP Status	Status of the IWP (e.g., in development, in execution, completed, etc.)
	Required	IWP Forecast Start	Forecast schedule start date of the IWP
	Required	IWP Forecast Completion	Forecast schedule completion date of the IWP
	Required	IWP Actual Start	Actual schedule start date of the IWP
	Required	IWP Actual Completion	Actual schedule completion date of the IWP

Data Requirement Definition: IWPs (continued)

Key	Tier	Field Name	Definition
	Optional	IWP Estimate Hours	Current control budget construction workhours of the IWP
	Optional	IWP Revision	Current revision of the IWP
	Optional	IWP Sequence	Sequence of the IWP within the CWP (i.e., represents the path of construction)
	Optional	IWP Type	Installation work package type (e.g., install, insulate, fabricate, etc.)
	Optional	IWP Key Quantity	Sum up of main quantity to install as part of the IWP
	Optional	IWP Key Quantity UOM	Unit of measurement for IWP key quantity (e.g., linear feet of pipe, tons of steel, etc.)

Discussion

- IWP disciplines are expected to be the same as their parent CWP, but may be further broken down. For example, the “piping” discipline may be further broken down into “welding” and “pipe fitting.”
- IWP relates to the rest of the WBS through its CWP.
- An IWP master list typically resides in the construction contractor’s WorkFace Planning software.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	98938277	CPLX-0987
<i>IWP</i>	IWP-0012-00A1-Pipe-003	IWP-DA02-Equip-01-001
<i>IWP Description</i>	Set and Connect 5 LB Spools	Set P9101A
<i>IWP Discipline</i>	Piping	Equipment
<i>IWP Contract</i>	Acme Contractors, Inc.	K-200-896
<i>CWP</i>	CWP-0012-00A1-Pipe	CWP-DA02-Equip-01
<i>IWP Planner</i>	Johnson	Williams
<i>IWP Foreman</i>	Brown	Garcia
<i>IWP General Foreman</i>	Miller	Davis
<i>IWP Superintendent</i>	Martinez	Wilson
<i>IWP Status</i>	QA/QC	Closed
<i>IWP Forecast Start</i>	29/05/2020	10-15-2019
<i>IWP Forecast Completion</i>	15/06/2020	10-21-2019

Field Name	Sample Entry 1	Sample Entry 2
<i>IWP Actual Start</i>	30/05/2020	10-20-2019
<i>IWP Actual Completion</i>	14/05/2020	10-30-2019
<i>IWP Estimate Hours</i>	892	112
<i>IWP Revision</i>	0	A
<i>IWP Sequence</i>	003	001
<i>IWP Type</i>	Install	Install
<i>IWP Key Quantity</i>	20	5
<i>IWP Key Quantity UOM</i>	m	ft

3.1.6. DR010-06: SWPs

Description: List of unique system work packages (SWPs) within a given project

Source(s): Construction management team

Timing: Stage 4 (Energization and Commissioning)

Frequency: Continuous as revised – at a minimum, weekly through Stage 4

Purpose

To define the master list of system work packages (SWPs) for a project.

An SWP is a deliverable that enables a commissioning work crew to perform work in a safe, predictable, measurable, and efficient manner. An SWP is associated with a system or part of a system that the plant wants turned over to commissioning or startup. In this respect, it may pertain to part of a system, a whole system, or an entire unit, but it must include some work (including work hours) and not just represent a turnover milestone.

Data Requirement Definition: SWPs

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	SWP	Unique system work package identifier
	Required	SWP Description	SWP description
	Required	SWP Discipline	SWP discipline
	Required	SWP Contract	Unique identifier of contract responsible for SWP execution
	Optional	Commissioning Zone ID	Unique commissioning zone identifier
	Required	System ID	Unique turnover system identifier
	Required	Sub-System ID	Unique turnover sub-system identifier
	Required	SWP Construction Manager	Construction Manager responsible for the SWP
	Required	SWP Commissioning Manager	Commissioning Manager responsible for executing the SWP
	Required	SWP Status	Status of the SWP (e.g., in development, in execution, completed, etc.)
	Required	SWP Forecast Start	Forecast schedule start date of the SWP
	Required	SWP Forecast Completion	Forecast schedule completion date of the SWP
	Required	SWP Actual Start	Actual schedule start date of the SWP
	Required	SWP Actual Completion	Actual schedule completion date of the SWP
	Optional	Related CWP	Related construction work package

Key	Tier	Field Name	Definition
	Required	Related IWP	Related installation work package
	Optional	Related Tag	Related tag for the SWP
	Optional	SWP Estimate Hours	Current control budget construction workhours of the SWP
	Optional	SWP Revision	Current revision of the SWP
	Optional	SWP Sequence	Sequence of the SWP within the sub-system

Discussion

- An SWP should also be mapped to predecessor IWPs in order to ensure that the path of construction enables an efficient startup sequence.
- IWPs, including their test packages, are compiled into turnover documentation that collectively triggers the Ready for Commissioning milestone. Thereafter, commissioning and energization efforts should be managed and controlled via SWPs.
- An SWP should be scoped to be manageable and “progressable,” and is typically scoped in a way that maps to existing commissioning zones, systems, sub-systems, or sub-system components.
- Typically, multiples entries are expected for related Tags, CWPs, and IWPs in a single SWP.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	98938277	CPLX-0987
<i>SWP</i>	GS-AC-001-001	41-AS-A-001
<i>SWP Description</i>	Pump #1	Gas Detector
<i>SWP Discipline</i>	Mechanical	Instrumentation
<i>SWP Contract</i>	ACC-A	K001
<i>Commissioning Zone ID</i>	GS	41
<i>System ID</i>	GS-AC	41-AS
<i>Sub-System ID</i>	GS-AC-001	41-AS-A
<i>SWP Construction Manager</i>	P. Parker	B. Johnson
<i>SWP Commissioning Manager</i>	B. Diaz	S. Stone
<i>SWP Status</i>	Draft	Closed
<i>SWP Forecast Start</i>	12-01-2021	01/10/2021

Sample Entries (continued)

Field Name	Sample Entry 1	Sample Entry 2
<i>SWP Forecast Completion</i>	12-11-2021	21/10/2021
<i>SWP Actual Start</i>	12-01-2021	05/10/2021
<i>SWP Actual Completion</i>	12-10-2021	18/10/2021
<i>Related CWP</i>	400AS01	410EDS, 510AU
<i>Related IWP</i>	400AS01-01, 400AS01-02, 400AS01-10	410EDS01, 410EDS11, 510AU03
<i>Related Tag</i>	41-PU-001	41-G-A, 41-G-B
<i>SWP Estimate Hours</i>	200	400
<i>SWP Revision</i>	A	1
<i>SWP Sequence</i>	1	2

3.2. DR020 – Project Schedule

3.2.1. DR020-01: Schedule Activities

Description: List of unique project schedule activities

Source(s): Project controls team

Timing: End of Stage 1 (CWP/EWP boundaries preliminarily developed).
IWP and data feeds back at Stage 3 (Construction)

Frequency: Continuous as revised – at a minimum, monthly through Stage 3

Purpose

To define the master list of level 3 schedule activities for the project and their associated key attributes (e.g., dates)

Data Requirement Definition: Schedule Activities

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Activity ID	Unique identifier for the schedule activity
	Required	Activity Name	Descriptive name for the schedule activity
	Required	WBS	Work breakdown structure code for the activity
	Required	Baseline Start Date	Baseline schedule start date of the activity
	Required	Baseline Completion Date	Baseline schedule completion date of the activity
	Optional	Current Re-baselined Start	Current re-baselined schedule start date of the activity
	Optional	Current Re-baselined Completion	Current re-baselined schedule completion date of the activity
	Required	Forecast Start	Forecast schedule start date of the activity
	Required	Forecast Completion	Forecast schedule completion date of the activity
	Required	Actual Start	Actual schedule start date of the activity
	Required	Actual Completion	Actual schedule completion date of the activity
	Required	Early Start	Early schedule start date of the activity
	Required	Early Completion	Early schedule completion date of the activity
	Required	Late Start	Late schedule start date of the activity
	Required	Late Completion	Late schedule completion date of the activity
	Required	Total Float	Total float of the activity in days

Data Requirement Definition: Schedule Activities (continued)

Key	Tier	Field Name	Definition
	Required	CWA	Unique construction work area identifier
	Required	CWP	Unique construction work package identifier
	Required	EWP	Unique engineering work package identifier
	Optional	IWP	Unique installation work package identifier
	Required	Estimate Hours	Current control budget construction workhours of the activity (CWA, CWP, EWP, IWP)
	Optional	Contract Reference	Contract information (e.g., contract identifier, contract release, etc.)
	Optional	Parent Activity ID	Unique identifier for the schedule parent activity
	Optional	Percent Complete	Percentage complete for the work activity

Discussion

- The primary intent of these requirements is to relate schedule dates to packages.
- It is expected that schedule activities are tagged to EWPs or CWPs via a mechanism such as activity codes.
- Scheduling software can capture a wide range of attributes. The intent here is to capture the core data needed to analyze AWP planning and execution (e.g., package dates, path of construction, critical packages, etc.).
- For integrated schedules that span contractual boundaries, the *Contract Reference* field captures which contractor is responsible for executing an activity.
- This data is intended to capture a level 3 schedule. It is expected that detailed level 4 schedules with IWP detail will be prepared in planning tools that align back to the bounds of a parent CWP in the level 3 schedule and will feed the schedule back as needed.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	566985	9988854-236
<i>Activity ID</i>	ENJ100011980	CNKCGNRL12256
<i>Activity Name</i>	EWP-1190-90-2200 Chiller Structure Elev. 0-3	CWP-T1P0-88-1900 Duct Banks Train 1
<i>WBS</i>	NP-JE-CN-1-2.EWP.11.90.22.00	NP-KC-C-1-2.CWP.88.19.00
<i>Baseline Start Date</i>	01-Oct-19	20200307
<i>Baseline Completion Date</i>	09-Feb-20	20200519
<i>Current Re-baselined Start</i>	11-Oct-19	20200407
<i>Current Re-baselined Completion</i>	09-Feb-20	20200619
<i>Forecast Start</i>	11-Oct-19	20200409
<i>Forecast Completion</i>	21-Feb-19	20200709
<i>Actual Start</i>	11-Oct-19	20200409
<i>Actual Completion</i>	21-Feb-19	–
<i>Early Start</i>	11-Oct-19	20200409
<i>Early Completion</i>	21-Feb-19	20200708
<i>Late Start</i>	11-Oct-19	20200410
<i>Late Completion</i>	21-Feb-19	20200710
<i>Total Float</i>	36d	-2d
<i>CWA</i>	1190-90	P0-88-1900
<i>CWP</i>	–	CWP-T1-P0-88-1900
<i>EWP</i>	EWP-1190-90-2200	–
<i>IWP</i>	–	IWP-1-P0-88-1900-001
<i>Estimate Hours</i>	10000	1820
<i>Contract Reference</i>	–	ACME INC
<i>Parent Activity ID</i>	–	CNKCGNRL1566
<i>Percent Complete</i>	100%	46%

3.3. DR050 – Equipment Design

3.3.1. DR050-01: Equipment List

Description: List of major mechanical equipment

Source(s): Engineering management team

Timing: Stage 2

Frequency: Continuous as revised – at a minimum, weekly through Stage 2
(Detailed Engineering) Detailed Construction Schedule development

Purpose

To control project scope identification in the virtual construction model and assign equipment to appropriate CWPs.

Data Requirement Definition: Equipment List

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Tag	Unique tag number assigned to identify a project item
	Required	Construction Requirement	Specifies whether it is new or existing and to be refurbished or modified
	Required	CWA	Unique construction work area identifier
	Required	CWP	Unique construction work package identifier
	Required	EWP	Unique engineering work package identifier
	Required	Equipment Type	Type of equipment
	Optional	Fireproof Code	Code that specifies the type of fireproofing required
	Optional	Insulation Class – Channel	Type of insulation on tube side of tube exchanger
	Optional	Insulation Class – Shell	Type of insulation on shell side of tube heat exchanger
	Required	Manufacturer	Manufacturer of tagged item
	Optional	Motor	Tag of the motor on equipment (e.g., pump compressor)
	Optional	Paint Code	Code that provides the paint color and mill thickness requirements
	Required	PID	Piping and instrumentation diagram drawing number
	Required	PO	Purchase order number
	Optional	Requisition	Requisition number

Key	Tier	Field Name	Definition
	Optional	Equipment Revision	Current revision
	Required	Skid	Skid tag number the equipment is part of
	Required	Sub-System ID	Unique turnover sub-system identifier
	Optional	Test Package ID	Unique test package identifier (e.g., hydrotest package)
	Optional	Tracing Code	Code that specifies the type of heat tracing required
	Required	Module	Module the component belongs to, when applicable
	Optional	Equipment Location Plan	Number of location drawing (e.g., B01-xxxx-yyyyy)
	Optional	Responsible Discipline	Discipline responsible for the equipment
	Optional	Specification	Equipment specification number
	Optional	Weight	Weight of the item
	Optional	Weight UOM	Unit of measurement for weight of the item (e.g., TN, Lbs, MT, Kg, etc.)

Discussion

- *Weight* is necessary if AWP project planning includes advance crane and rigging planning.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	PR001	AN.9892
<i>Tag</i>	KD-1007A1	280-E-10092
<i>Construction Status</i>	New	NEW CONSTRUCTION
<i>CWA</i>	CWA-1000	280X510A-01
<i>CWP</i>	CWP-1001	280X510A-01-01
<i>EWP</i>	EWP-1001-001	280X510A-01-01-E
<i>Equipment Type</i>	Vessel – Knockout Drum	CHILLER
<i>Fireproof Code</i>	–	FPC-01
<i>Insulation Class – Channel</i>	–	–
<i>Insulation Class – Shell</i>	2" Polyisocyanurate	4" FLEXIBLE EASTOMERIC CELLULAR
<i>Manufacturer</i>	Tate	TRANE
<i>Motor</i>	–	280-M-10092
<i>Paint Code</i>	GRN-0008	–
<i>PID</i>	APX-200-PX-2365-0170002-001	SCO-280-9T-90084
<i>PO</i>	PO-00121	PO-1225674
<i>Requisition</i>	RQ-00121	RQ-8443785
<i>Equipment Revision</i>	Approved for Construction	ISSUED FOR APPROVAL
<i>Skid</i>	SKD-1000	–
<i>Sub-System ID</i>	OWO-01	CHILLED WATER
<i>Test Package ID</i>	HT-00001	TP-280X510A-01
<i>Tracing Code</i>	–	–
<i>Module</i>	MOD-SKD-1000	–
<i>Equipment Location Plan</i>	UPDK-976-007	SCO-280-1A-0943
<i>Responsible Discipline</i>	Mechanical	MECHANICAL
<i>Specification</i>	PT-RSMT-0011	–
<i>Weight</i>	1234	18922
<i>Weight UOM</i>	Kg	Lbs

3.4. DR070 – Piping Design

3.4.1. DR070-01: Line List

Description: Piping line list

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, weekly through the end of Stage 2

Purpose

To identify test package relationships and track key attributes per unique line identifier and inform requirements for work package relationships built with the isometric list (DR070-02).

Data Requirement Definition: Line List

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Line Number	Unique pipeline identifier per segment
	Required	AG-UG	Is the pipeline above ground (AG) or underground (UG)?
	Required	Construction Requirement	Specifies whether it is new or existing and to be refurbished or modified
	Optional	From Tag	Tag number that this specific Tag is connected from
	Optional	Insulation Spec	Insulation specification of the item
	Optional	Insulation Thickness	Insulation thickness of the item
	Optional	Insulation Thickness UOM	Unit of measurement for insulation thickness (e.g., In, MM, etc.)
	Required	Nominal Size	Nominal size of the pipe
	Required	Size UOM	Unit of measurement for size of the pipe (e.g., EA, LF, M, In, etc.)
	Optional	Paint Code	Code that provides the paint color and mill thickness requirements
	Optional	PID Drawing Number(s)	Related piping and instrumentation diagram drawing number
	Optional	PWHT	Is the pipeline post-weld heat treated (i.e., yes or no)?
	Optional	Service	Fluid code associated to the item
	Required	Spec	Piping specification
	Optional	To Tag	Tag number that this specific Tag is connected to

Data Requirement Definition: Line List (continued)

Key	Tier	Field Name	Definition
	Optional	Tracing Code	Code that specifies the type of heat tracing required
	Required	Sub-System ID	Unique turnover sub-system identifier
	Optional	Test Pressure	Testing pressure
	Optional	Test Pressure UOM	Unit of measurement for testing pressure (e.g., PSI, Bar, Pa)
	Optional	Test Temperature	Testing temperature
	Optional	Test Temperature UOM	Unit of measurement for testing temperature (e.g., F°, C°)
	Optional	Design Pressure	Design pressure
	Optional	Design Pressure UOM	Unit of measurement for design pressure (e.g., PSI, Bar, Pa)
	Optional	Design Temperature	Design temperature
	Optional	Design Temperature UOM	Unit of measurement for design temperature (e.g., F°, C°)
	Optional	Operating Pressure	Operating pressure
	Optional	Operating Pressure UOM	Unit of measurement for operating pressure (e.g., PSI, Bar, Pa)
	Optional	Operating Temperature	Operating temperature
	Optional	Operating Temperature UOM	Unit of measurement for operating temperature (e.g., F°, C°)
	Optional	Line Status	Status of the line (e.g., released to construction, etc.)
	Optional	Line Revision	Current revision

Discussion

- Several attributes on the line list will logically flow into the isometric drawing list.
- Optional attributes can be used for a fully data-integrated AWP process.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	90000801	1684972
<i>Line Number</i>	32-6"-O-CS150-IH-2"	0-SYNP-28"-1201-001-SCFR94-R2.2-WS150
<i>AG-UG</i>	Above Ground	Underground
<i>Construction Requirement</i>	New	Existing
<i>From Tag</i>	TK-100	P-101
<i>Insulation Spec</i>	Insulated for Heat Conservation (IH)	WS
<i>Insulation Thickness</i>	2	150
<i>Insulation Thickness UOM</i>	Inch	MM
<i>Nominal Size</i>	6	28
<i>Size UOM</i>	Inch	Inch
<i>Paint Code</i>	Green (14-E-53)	Signal Red (04-E-53)
<i>PID Drawing Number(s)</i>	PD-01-1658-001	&AA-12-P-FP 0010 (EN)
<i>PWHT</i>	Yes	No
<i>Service</i>	O	SYNP (SynGas)
<i>Spec</i>	CS150	SCFR94
<i>To</i>	P-101	TK-100
<i>Tracing Code</i>	ET	ST
<i>Sub-System</i>	13-01	AA
<i>Test Pressure</i>	425	100
<i>Test Pressure UOM</i>	PSI	Bar
<i>Test Temperature</i>	75	30.00
<i>Test Temperature UOM</i>	F°	C°
<i>Design Pressure</i>	150	73.20
<i>Design Pressure UOM</i>	PSI	Bar
<i>Design Temperature</i>	75	Design Temp 1: 265.00 Design Temp 2: 10.00
<i>Design Temperature UOM</i>	F°	C°
<i>Operating Pressure</i>	80	53.20
<i>Pressure UOM</i>	PSI	Bar
<i>Operating Temperature</i>	60	220.00
<i>Operating Temperature UOM</i>	F°	C°
<i>Line Status</i>	Released for Review	Released for Construction
<i>Line Revision</i>	0	A

3.4.2. DR070-02: Isometric List

Description: Piping isometric drawing list

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, weekly through the end of Stage 2

Purpose

To define the master list of isometric drawings for the project and their associated key attributes (especially CWP).

Data Requirement Definition: Isometric List

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Isometric Drawing	Piping isometric drawing number
	Required	Line Number(s)	Pipeline identifier(s)
	Required	CWA	Unique construction work area identifier
	Required	CWP	Unique construction work package identifier
	Required	EWP	Unique engineering work package identifier
	Required	Isometric Drawing Status	Status of issued isometric (e.g., issued for construction [IFC], IFI, IFR, etc.)
	Required	Isometric Drawing Revision	Current revision of isometric drawing

Discussion

- Attributes from the Line List can be pulled into the Isometric List by the associated line numbers.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	90000801	1684972
<i>Isometric Drawing</i>	LB-0900-01-010	0-1201-001-02
<i>Line Number(s)</i>	0900	0-SYNP-28"-1201-001-SCFR94-R2.2-WS150
<i>CWA</i>	CWA-001	1A70
<i>CWP</i>	CWP-PI-001	1A7001X
<i>EWP</i>	EWP-PI-001	1A7001X
<i>Isometric Drawing Status</i>	IFC	Approved
<i>Isometric Drawing Revision</i>	0	A

3.4.3. DR070-03: Tie-in List

Description: List of unique piping tie-ins

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, weekly through the end of Stage 2

Purpose

To define the master list of piping tie-ins associated with the data set(s).

Data Requirement Definition: Tie-in List

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Tie-in ID	Unique tie-in identifier from engineering
	Required	CWA	Unique construction work area identifier
	Required	CWP	Unique construction work package identifier
	Required	EWP	Unique engineering work package identifier
	Required	Downtime	Is downtime required (i.e., yes or no)?
	Required	Construction Requirement	Specifies whether it is new or existing and to be refurbished or modified
	Required	Hot Tap	Is hot tap required (i.e., yes or no)?
	Required	Isometric Drawing	Piping isometric drawing number
	Required	New	Is new line or equipment being tied in (i.e., yes or no)?
	Required	PID	Piping and instrumentation diagram drawing number
	Required	Tie-In Type	Tie-in connection type (e.g., weld, flange, threaded, etc.)
	Required	Sub-System ID	Unique turnover system identifier
	Optional	Comments	Comment section
	Optional	Plant Coordinate East	Plant coordinates east
	Optional	Plant Coordinate Elevation	Plant coordinates elevation
	Optional	Plant Coordinate North	Plant coordinates north
	Optional	Real World East	Real-world coordinates east
	Optional	Real World Elevation	Real-world coordinates elevation
	Optional	Real World North	Real-world coordinates north
	Optional	Tie-In Category	Gross connection category (e.g., module to module, module to stick built, etc.)

Discussion

- The intent of the *New* field is to flag when a tie-in is added after a certain agreed-upon milestone (e.g., IFC or Released to construction).

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	90000801	1684972
<i>Tie-in ID</i>	T-401	T-002
<i>CWA</i>	CWA-001	1A70
<i>CWP</i>	CWP-PI-001	1A7001X
<i>EWP</i>	EWP-PI-001	1A7001X
<i>Downtime</i>	Yes	No
<i>Construction Requirement</i>	Existing	New
<i>Hot Tap</i>	Yes	No
<i>Isometric Drawing</i>	LB-0900-01-010-X	0-1201-001-02-TP
<i>New</i>	Yes	No
<i>PID</i>	PD-01-1658-001	&AA-12-P-FP 0010 (EN)
<i>Tie-In Type</i>	Buttweld	Bolt-up
<i>Sub-System ID</i>	13-01	AA
<i>Comments</i>	sdfasdfasdf	asdfadsfasdf
<i>Plant Coordinate East</i>	E.1037-6"	E.1037-6"
<i>Plant Coordinate Elevation</i>	EL 27' 6"	EL 27' 6"
<i>Plant Coordinate North</i>	N.932-3"	N.932-3"
<i>Real World East</i>	-95°09'57.7"E	-95°09'57.7"E
<i>Real World Elevation</i>	10'	0'
<i>Real World North</i>	29°28'08.8"N	29°28'08.8"N
<i>Tie-In Category</i>	Module to stick built	New to existing

3.4.4. DR070-04: Pipe Support List

Description: List of unique piping supports

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, weekly through the end of Stage 2

Purpose

To define the master list of piping supports associated with the data set(s).

Data Requirement Definition: Pipe Support List

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Support Group ID	Unique identifier for pipe support
PK	Required	Isometric Drawing	Piping isometric drawing number
	Required	CWP	Unique construction work package identifier
	Required	Support Quantity	Quantity of support
	Required	Support Type	Type of support
	Required	PO	Purchase order number
	Optional	Support Description	Description of the support
	Optional	Support Size	Size of the pipe support (or size of item being supported)
	Optional	Support Size UOM	Unit of measurement for pipe support size
	Optional	Support Tag	Unique tag number assigned to identify the project item

Discussion

- Includes piping standard supports, while miscellaneous special supports might be treated as structures.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	90000801	1684972
<i>Support Group ID</i>	GS-20001-001-AS5C	42-FW-10010-A01
<i>Isometric Drawing</i>	GS-20001-001	42-FW-10010-A01
<i>CWP</i>	4102AS120A	4202FS058A
<i>Support Quantity</i>	2	1
<i>Support Type</i>	Shoe	F17
<i>PO</i>	PGS-SUPP-001	TBD
<i>Support Description</i>	Shoe	Design Pipe Support
<i>Support Size</i>	3	2
<i>Support Size UOM</i>	In	In
<i>Support Tag</i>	AS5C-01, AS5C-02	SH-1460-02

3.5. DR080 – 3D Modeling

General discussion for 3D modeling data requirements:

- The intent is for the 3D model components to be captured on two lists (Piping and Generic).
- Length and weight are required due to downstream use (e.g., lift plans, etc.).
- Some fields are required for AWP, but many are optional and may not natively live inside the model but can be related to component identifiers in other tools.

3.5.1. DR080-01: Pipe Components

Description: Piping component list

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, weekly through the end of Stage 2

Purpose

To define detailed piping design component data set(s).

Data Requirement Definition: Pipe Components

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Tag	Unique tag number assigned to identify a project item
	Required	Commodity Code	Commodity code
	Required	Type	Type of item (e.g., spool, weld, foundation, mechanical equipment, instrument, cable tray, etc.)
	Required	Construction Requirement	Specifies whether it is new or existing and to be refurbished or modified
	Required	CWA	Unique construction work area identifier
	Required	CWP	Unique construction work package identifier
	Required	EWP	Unique engineering work package identifier
	Optional	Design System Path	Hierarchy placement of the model component in the design hierarchy or system breakdown structure (SBS)
	Required	Discipline	Discipline responsible for the engineering design
	Optional	Fluid Code (Service)	Line service designation
	Required	Isometric Drawing	Piping isometric drawing number

Data Requirement Definition: Pipe Components (continued)

Key	Tier	Field Name	Definition
	Optional	Module	Module the pipe component belongs to, when applicable
	Optional	Length	Length of the item
	Optional	Length UOM	Unit of measurement for length of the item (e.g., FT, M, etc.)
	Optional	Weight	Weight of the item
	Optional	Weight UOM	Unit of measurement for weight of the item (e.g., TN, Lbs, MT, Kg, etc.)
	Optional	Insulation Spec	Insulation specification of the item
	Optional	Insulation Thickness	Insulation thickness of the item
	Optional	Insulation Thickness UOM	Unit of measurement for insulation thickness (e.g., In, MM, etc.)
	Optional	Line No.	Unique line number sequence
	Optional	NPD – Size 1	Nominal pipe diameter 1 – pipe size at a first connection
	Optional	NPD – Size 2	Nominal pipe diameter 2 – pipe size at a second connection
	Optional	NPD – Size 3	Nominal pipe diameter 3 – pipe size at a third connection (for a tee)
	Optional	Pipe Components Description	Description of the item in the 3D design model
	Optional	Pressure Rating 1	Pipe pressure rating 1 – at a first connection
	Optional	Pressure Rating 2	Pipe pressure rating 2 – at a second connection
	Optional	Pressure Rating 3	Pipe pressure rating 3 – at a third connection (three-way valve)
	Optional	Pressure Rating UOM	Unit of measurement for pressure rating (e.g., PSI, bar, Pa)
	Optional	Temperature Rating 1	Pipe temperature rating 1 – at a first connection
	Optional	Temperature Rating 2	Pipe temperature rating 2 – at a second connection
	Optional	Temperature Rating 3	Pipe temperature rating 3 – at a third connection (three-way valve)
	Optional	Temperature Rating UOM	Unit of measurement for temperature rating (e.g., F°, C°)
	Optional	Schedule 1	Nominal pipe schedule 1 – schedule or thickness of pipe at a first connection
	Optional	Schedule 2	Nominal pipe schedule 2 – schedule or thickness of pipe at a second connection

Key	Tier	Field Name	Definition
	Optional	Schedule 3	Nominal pipe schedule 3 – schedule or thickness of pipe at a third connection (for a tee)
	Optional	Shop/Field Flag	Indicates shop or field material
	Optional	Spec	Piping specification
	Optional	Tie-In ID	Unique tie-in identifier from engineering
	Optional	Test Package ID	Unique test package identifier (e.g., hydrotest package)
	Optional	Train	Process train designation
	Optional	Sub-System ID	Unique turnover system identifier
	Required	PID	Piping and instrumentation diagram drawing number
	Required	Piping Material Type	Type of piping material
	Optional	Paint Code	Code that provides the paint color and mill thickness requirements
	Required	Weld Type	Type of weld
	Optional	Heat Trace	Heat trace
	Optional	Test Type	Type of test
	Optional	Inspection Test Plan	Inspection test plan
	Optional	From Tag	Tag number that this specific Tag is connected from
	Optional	To Tag	Tag number that this specific Tag is connected to

Discussion

- *Tag Number* is considered the primary key to pull needed information from authoring tools and project executions systems; however, it is recognized that a tag item might be modeled as a group of components, where each component has a unique OID.
- Workforce planners will need to be able to build IWPs. Typically, they plan and construct by *Spool*, *Field/Field-Fit Welds*, and *Bolt Up*. They also need to know the *Valve Tags*, *Instrument Tags*, *SP Items*, and *Equipment Nozzles*. Such “Tags” shall be available in the 3D model to allow work packaging and to allow the data link with other project systems for visualization.
- *NPD – Size 1* is used for the primary size. *NPD – Size 2* and *NPD – Size 3* are used only when necessary.
- The model OID tag is different from the tag when represented elsewhere (e.g., on a P&ID), but this field is flexible. It can be the parent assembly tag or the object tag. This allows the 3D OID tag to be related to the Item tag as it is known elsewhere.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	98938277	CPLX-0987
<i>Tag</i>	SP-P22L08-SN-784153-1-01	UL08-JN784153-191-03
<i>Commodity Code</i>	T02BCC24Z58	F-9A-234Z44
<i>Type</i>	Spool	Field Weld
<i>Construction Requirement</i>	New	New
<i>CWA</i>	CWA01	A2
<i>CWP</i>	CWP-0012-00A1-Pipe	A2-C-P-02
<i>EWP</i>	EWP-0012-00A1-Pipe	A2-E-P-02
<i>Design System Path</i>	P4019\CHEMICAL South – SPV\IVSU – SPV – OU\ Piping\S14S01\OH-7086005\ OH-7086895-6"-D3A-4HV	P890\Ref – HT\JNK – HT – STM\Piping\C115602\ BB-70546040\BB-08455-8"- DD2A-99B
<i>Discipline</i>	Piping	Piping
<i>Fluid Code (Service)</i>	CG	WCA
<i>Isometric Drawing</i>	P22L08-SN-784153-1	UL08-JN784153-191
<i>Module</i>	–	PAU-A2-P02
<i>Length</i>	14	–
<i>Length UOM</i>	FT	–
<i>Weight</i>	265.86	89.36
<i>Weight UOM</i>	Lbs	Kg
<i>Insulation Spec</i>	–	FG-89-Z-12
<i>Insulation Thickness</i>	0	5
<i>Insulation Thickness UOM</i>	–	MM
<i>Line No..</i>	O-70536001-6"-D1A-3TM	P-415641-8"-D22-002
<i>NPD – Size 1</i>	6	8
<i>NPD – Size 2</i>	–	–
<i>NPD – Size 3</i>	–	–
<i>Pipe Components Description</i>	PIPE – A672-C60 PE EFW CL.22 T02BCC24Z58 S-STD	WN FLANGE ASME B16.5 300# A105 RFFE BE 125 – 250 AARH F-9A-234Z44 S-XS
<i>Pressure Rating 1</i>	304	4510.87
<i>Pressure Rating 2</i>	–	–
<i>Pressure Rating 3</i>	–	–
<i>Pressure Rating UOM</i>	PSIG	PSIG

Field Name	Sample Entry 1	Sample Entry 2
<i>Temperature Rating 1</i>	302	662.00
<i>Temperature Rating 2</i>	–	–
<i>Temperature Rating 3</i>	–	–
<i>Temperature Rating UOM</i>	F°	F°
<i>Schedule 1</i>	40	40
<i>Schedule 2</i>	–	–
<i>Schedule 3</i>	–	–
<i>Shop/Field Flag</i>	Shop	Shop
<i>Spec</i>	D1A-3	U1-7A
<i>Tie-In ID</i>	–	TC-129
<i>Test Package ID</i>	TP.ETH2.2A.029	HT-A2-29-001
<i>Train</i>	1	2
<i>Sub-System ID</i>	ET-00012-1	HGT-DKD-2001
<i>PID</i>	PID-001	42-PID-405000-011
<i>Piping Material Type</i>	Carbon Steel	Stainless Steel
<i>Paint Code</i>	Green (14-E-53)	Signal Red (04-E-53)
<i>Weld Type</i>	–	FW
<i>Heat Trace</i>	HC	–
<i>Test Type</i>	Hydrotest	X-Ray
<i>Inspection Test Plan</i>	PLN-PIP-001	425-DFC-TTTT-0001
<i>From Tag</i>	EQP-P22L08	SP-UL08-JN784153-191-02
<i>To Tag</i>	SP-P22L08-SN-784153-1-02	SP-UL08-JN784153-191-03

3.5.2. DR080-02: Generic Components

Description: Generic component list

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, weekly through the end of Stage 2

Purpose

To define detailed generic design component data set(s).

Data Requirement Definition: Generic Components

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Tag	Unique tag number assigned to identify a project item
	Required	CWA	Unique construction work area identifier
	Required	CWP	Unique construction work package identifier
	Required	EWP	Unique engineering work package identifier
	Required	Module	Module the tag belongs to, when applicable
	Required	Construction Requirement	Specifies whether it is new or existing and to be refurbished or modified
	Required	Description	Description of the Tag function
	Required	Design System Path	Hierarchy placement of the model component in the design hierarchy or system breakdown structure (SBS)
	Optional	BOM Number	Bill of materials number
	Required	Discipline	Discipline responsible for the engineering design
	Required	Type	Type of item (e.g., foundation, mechanical equipment, instrument, cable tray, etc.)
	Required	Commodity Code	Commodity code
	Required	Qty	Key quantity of the item
	Required	Qty UOM	Unit of measurement for key quantity of the item (e.g., FT, M, M ³ , PC)
	Optional	Length	Length of the item
	Optional	Length UOM	Unit of measurement for length of the item (e.g., FT, M, etc.)
	Optional	Width	Width of the item
	Optional	Width UOM	Unit of measurement for width of the item (e.g., FT, M, etc.)
	Optional	Height	Height of the item
	Optional	Height UOM	Unit of measurement for height of the item (e.g., FT, M, etc.)

Key	Tier	Field Name	Definition
	Optional	Weight	Weight of the item
	Optional	Weight UOM	Unit of measurement for weight of the item (e.g., TN, Lbs, MT, Kg, etc.)
	Optional	Parent Tag	Parent tag associated to the item, if applicable
	Optional	Tie-In ID	Unique tie-in identifier from engineering
	Optional	Train	Process train designation
	Optional	Sub-System ID	Unique turnover system identifier
	Optional	PID	Piping and instrumentation diagram drawing number

Discussion

- The *Tag* number is considered the primary key to pull needed information from authoring tools and project executions systems; however, it is recognized that a tag item might be modeled as a group of components, where each component has a unique OID.
- The model OID tag is different from the tag when represented elsewhere (e.g., on a P&ID), but this field is flexible. If needed, it can be the parent assembly tag or the object tag. It allows the 3D OID tag to be related to the item tag as it is known elsewhere.
- Quantity varies depending on the type of item: for foundations, it can be the volume; for cable trays, the length; for equipment or a device, it is typically a piece.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	98938277	CPLX-0987
<i>Tag</i>	NW-E-3207	ETH-D-3104
<i>CWA</i>	CWA0A1	B1200
<i>CWP</i>	CWP-0012-00A1-Mechanical-E3207	A2-C-E-02
<i>EWP</i>	EWP-0012-00A1-Mechanical-E3207	A2-E-E-02
<i>Module</i>	–	PAU-A2-P02
<i>Construction Requirement</i>	New	New
<i>Description</i>	R2 FEED Cooler	Junction Box
<i>Design System Path</i>	P4018\CHEMICALS NORTH – NW\IVSC – NW – Catalyst Prep and Polymerization\ Equipment\0A01\0A01	P4018\CHEMICALS NORTH – B1200\IVSF – JNK – Feeds\Equipment\ B1200

Sample Entries (continued)

Field Name	Sample Entry 1	Sample Entry 2
<i>BOM Number</i>	NW-E-3207-TAG	A2-C-E-02-ELE
<i>Discipline</i>	Mechanical	Electrical
<i>Type</i>	Equipment	Devices & Fixtures
<i>Commodity Code</i>	NW-E-3207	526485987
<i>Qty</i>	1	1
<i>Qty UOM</i>	Pc	Each
<i>Length</i>	172-5/8	4.285
<i>Length UOM</i>	Inch	M
<i>Width</i>	12-5/8	2.85
<i>Width UOM</i>	Inch	M
<i>Height</i>	17-5/8	4.5
<i>Height UOM</i>	Inch	M
<i>Weight</i>	17,318	2,489.2
<i>Weight UOM</i>	Lbs	Kg
<i>Parent Tag</i>	NW-E-32	–
<i>Tie-In ID</i>	–	–
<i>Train</i>	–	2
<i>Sub-System ID</i>	DF-22-22-05	HE-555-055-001
<i>PID</i>	51-DTI-50-00001	40-PID-000-000-0001

3.6. DR090 – Civil-Structural Design

3.6.1. DR090-01: Structures List

Description: Structures list

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the master list of structures.

Data Requirement Definition: Structures List

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Structure Tag	Unique tag number assigned to identify a project item
	Required	Construction Requirement	Specifies whether it is new or existing and to be refurbished or modified
	Required	CWA	Unique construction work area identifier
	Required	CWP	Unique construction work package identifier
	Required	EWP	Unique engineering work package identifier
	Required	Structure Description	Description of structure (e.g., cylinder purging, purging platform, etc.)
	Required	Structure Type	Type of structure (e.g., building, process, rack, platform, MPS, etc.)
	Optional	Detailing Contract/PO	Detailing contract number or purchase order
	Optional	Fabrication Contract/PO	Fabrication contract number or purchase order
	Optional	Structure Revision	Current revision

Discussion

- Optional fields (*Detailing Contract/PO* and *Fabrication Contract/PO*) may not be done by the same party, which the CWP may not capture; only include if necessary.
- Project to work through specific implementations where a single structure spans through multiple CWPs or even CWAs.
- Revision attributes are used when a fully data integrated AWP process is used.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	DD 031779	FF 357162
<i>Structure Tag</i>	UR14-4	STR-2709
<i>Construction Requirement</i>	New	New
<i>CWA</i>	40	60
<i>CWP</i>	S1601B-2.5-40-02	S1501C-2.5-60-01
<i>EWP</i>	S1601B-2.5	S1501C-2.5
<i>Structure Description</i>	North/South Pipe Rack	Blending Structure Level 3
<i>Structure Type</i>	Rack	Building
<i>Detailing Contract/PO</i>	2802	2803
<i>Fabrication Contract/PO</i>	3512	3516
<i>Structure Revision</i>	01	02

3.6.2. DR090-02: Rebar

Description: Rebar

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the master list of rebar.

Data Requirement Definition: Rebar List

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Bar Mark	Mark of the bar
PK	Required	Related Foundation Tag	Related foundation tag
	Required	Construction Requirement	Specifies whether it is new or existing and to be refurbished or modified
	Required	CWP	Unique construction work package identifier
	Required	Drawing Number	Location drawing number
	Required	Bar Quantity	Quantity of rebar required
	Required	Bar Quantity UOM	Unit of measurement for quantity of rebar required
	Required	Bar Diameter	Diameter of rebar required
	Required	Bar Diameter UOM	Unit of measurement for diameter of rebar required
	Required	Bar Length	Length of rebar required
	Required	Bar Length UOM	Unit of measurement for length of rebar required
	Required	Bar Weight	Weight of rebar required
	Required	Bar Weight UOM	Unit of measurement for weight of rebar required
	Required	Bar Type/Shape/Detail	Description of rebar required
	Required	PO	Purchase order number

Discussion

- Typically, rebar is a fabricated item similar to steel or pipe. Each rebar has a mark number on the drawing. A mark number may be unique or there may be many with the same mark number. The drawings will be issued to a rebar fabricator responsible for the concrete work. Appropriate tagging information will ensure that the right rebar will be fabricated and delivered in the required sequence to support the path of construction.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	DD 031779	FF 357162
<i>Bar Mark</i>	20	STR-2709-120
<i>Related Foundation Tag</i>	UR14-4	STR-2709
<i>Construction Requirement</i>	New	New
<i>CWP</i>	S1601B-2.5-40-02	S1501C-2.5-60-01
<i>Drawing Number</i>	CSA-DWG-LAY-001	S1-SSS-STR-010
<i>Bar Quantity</i>	13	38
<i>Bar Quantity UOM</i>	each	pc
<i>Bar Diameter</i>	1/2	20
<i>Bar Diameter UOM</i>	in	m
<i>Bar Length</i>	6-9 7/8	40
<i>Bar Length UOM</i>	ft-in	ft
<i>Bar Weight</i>	64	109.27
<i>Bar Weight UOM</i>	lb	lb
<i>Bar Type/Shape/Detail</i>	17.PNG	32
<i>PO</i>	DD-031779-030	STR-2709-010

3.6.3. DR090-03: Anchor Bolts

Description: Anchor bolts

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the master list of anchor bolts.

Data Requirement Definition: Anchor Bolts List

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Structure Tag	Unique tag number assigned to identify a project item
PK	Required	Anchor Bolt ID	Unique identifier of the anchor bolt
	Required	Construction Requirement	Specifies whether it is new or existing and to be refurbished or modified
	Required	CWP	Unique construction work package identifier
	Required	Drawing Number	Location drawing number
	Required	Anchor Bolts	Type of anchor bolts required
	Required	Bolt Dia	Diameter of bolts
	Required	Bolt Dia UOM	Unit of measurement for bolt diameter
	Required	No. of Anchor Bolts	Number of anchor bolts required
	Required	Bolt Length	Length of bolts required
	Required	Bolt Length UOM	Unit of measurement for bolt length
	Required	Projection Length	Projection length
	Required	Projection Length UOM	Unit of measurement for projection length

Discussion

- N/A

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	DD 031779	FF 357162
<i>Structure Tag</i>	UR14-4	STR-2709
<i>Anchor Bolt ID</i>	01	10003
<i>Construction Requirement</i>	New	New
<i>CWP</i>	S1601B-2.5-40-02	S1501C-2.5-60-01
<i>Drawing Number</i>	40-STD-SSS-000101	51-001-0-SSSS-FND-0019
<i>Anchor Bolts</i>	L-shaped	Headed
<i>Bolt Dia</i>	3/8	1
<i>Bolt Dia UOM</i>	in	in
<i>No. of Anchor Bolts</i>	4	6
<i>Bolt Length</i>	1.78	4.69
<i>Bolt Length UOM</i>	ft	ft
<i>Projection Length</i>	2	5
<i>Projection Length UOM</i>	in	in

3.6.4. DR090-04: Foundations

Description: Foundations

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the master list of concrete foundations.

Data Requirement Definition: Foundations List

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Foundation Tag	Unique tag number assigned to identify a project item
	Required	Related Structure/ Equipment Tag	Related structure or equipment tag
	Required	CWP	Unique construction work package identifier
	Required	Drawing Number	Location drawing number
	Required	Construction Requirement	Specifies whether it is new or existing and to be refurbished or modified
	Required	Concrete Volume	Volume of concrete
	Required	Concrete Volume UOM	Unit of measurement for the volume of concrete
	Required	Foundation Type	Type of foundation (e.g., foundation, pedestal, deck, elevated slab)
	Required	Concrete Strength	Strength of the concrete
	Required	Concrete Strength UOM	Unit of measurement for the strength of the concrete

Discussion

- Typically, each foundation has a tag to clearly identify segments (e.g., footing, caps, piers, slabs, grout). All foundations are installed separately, so the craft must know the size, concrete volume, and rebar for each.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	DD 031779	FF 357162
<i>Foundation Tag</i>	UR14-4	STR-2709
<i>Related Structure/ Equipment Tag</i>	EQP-UR14-4	PR-2709
<i>CWP</i>	S1601B-2.5-40-02	S1501C-2.5-60-01
<i>Drawing Number</i>	10-FND-1010-10002	3000-SSS-TTT-RR-00020
<i>Construction Requirement</i>	New	New
<i>Concrete Volume</i>	200	50
<i>Concrete Volume UOM</i>	m ³	m ³
<i>Foundation Type</i>	Pier	Pad
<i>Concrete Strength</i>	725	1087
<i>Concrete Strength UOM</i>	psi	psi

3.7. DR100 – Electrical & Instrumentation Design

3.7.1. DR100-01: Cable Schedule

Description: Cable schedule

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To capture master cable schedule data for the project.

Data Requirement Definition: Cable Schedule

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Cable Tag	Unique tag number assigned to identify a project item
	Required	Description	Description of the Tag function
	Required	Cable Status	Progress status of cable writing/routing process (e.g., written, checked, routed, route checked, released to construction)
	Required	Cable Type	Gives the engineered description of the type of cable (e.g., controls, high voltage, etc.)
	Required	Color Code	Industry color code for conductor designations
	Required	Conductors Config	Configuration of the conductors within the cable (e.g., single conductor, pairs, etc.)
	Required	Construction Requirement	Specifies whether it is new or existing and to be refurbished or modified
	Required	Cable Route	List of what cable runs through (e.g., cable tray, conduit, etc.)
	Required	CWA	Unique construction work area identifier
	Required	CWP	Unique construction work package identifier
	Required	EWP	Unique engineering work package identifier
	Required	Cable Schedule	Cable schedule document number
	Required	Cable Schedule Revision	Current revision of the cable schedule document
	Required	Layout Drawing – From	Number of layout drawing where a user will be able to locate the “From Tag”
	Required	Layout Dwg From Rev	Layout drawing – from revision

Data Requirement Definition: Cable Schedule (continued)

Key	Tier	Field Name	Definition
	Required	Layout Drawing – To	Number of layout drawing where a user will be able to locate the “To Tag”
	Required	Layout Dwg To Rev	Layout drawing – to revision
	Required	Length Engineered	Estimated design length of the cable
	Required	Length Pull	Actual length of the cable
	Required	Length UOM	Unit of measurement for length of the cable (e.g., F, IN, M, etc.)
	Required	Number	Number of actual conductors/pairs/triads within the cable
	Required	Shield	Shielding type (e.g., IS = inside shield and OS = outside shield)
	Required	Conductor Size	Size of the conductor cable
	Required	Conductor Size UOM	Unit of measurement for cable size (e.g., AWG/American wire gauge, metric mm, etc.)
	Required	Voltage Rating	Voltage rating of the cable’s jackets
	Required	From Equipment	Equipment tag that circuit originates from (e.g., junction box, etc.)
	Required	To Equipment	Equipment tag that circuit terminates at (e.g., pump, etc.)
	Required	From Equipment Termination Type	Type of connection for the “From Equipment” side (e.g., hard wire, plug and socket, etc.)
	Required	To Equipment Termination Type	Type of connection for the “To Equipment” side (e.g., hard wire, plug and socket, etc.)
	Optional	Discipline	Discipline responsible for the engineering design
	Optional	Comments	Any comments related to the cable from engineering
	Required	Cable Drum Number	Cable drum number
	Required	Cable Gland Size	Cable gland size
	Required	Cable Gland Size UOM	Unit of measurement for cable gland size
	Required	Cable Routing Drawings	Cable routing drawings
	Required	Cable Joint	Cable joint
	Required	Cable Installation Details	Cable installation details

Discussion

- Cable schedule data requirements are expected to include data from electrical, instrumentation, and controls. It is up to the project on how to structure their data tables to support this.
- The *Shield* field is not intended to determine man-hours, but for identifying the right type of cable. This will affect the size of the connector for a cable.
- The *From Equipment* and *To Equipment* fields are used to track the equipment's electrical connections for filtering purposes.
- Conduit and raceway tags are typically included as a CSV list per cable for associating to all raceways and conduits that the cable touches.
- *Cable Status* should include "Released to Construction." Tracking when an engineer modifies a cable already released to construction is imperative.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	1234	5678
<i>Cable Tag</i>	111-000-ESM-61201-CMV100-3A	111-000-ESM-61201-CEG100-3G
<i>Description</i>	Power cable for amine electrical building switchgear (111-000-ESM-61201)	Power cable for amine electrical building switchgear (111-000-ESM-61201)
<i>Cable Status</i>	Route Checked	Written
<i>Cable Type</i>	MV05-1C500	GN06-1C4/0
<i>Color Code</i>	EC2 (black)	EC1 (green)
<i>Conductors Config</i>	Single	Single
<i>Construction Requirement</i>	New	Existing
<i>Cable Route</i>	T1-1603-100 D52016 111-000-EPB-61004 D52116 111-000-EPB-61005 D52016 T1-1901-100	T1-1603-100 D52016 111-000-EPB-61004 D52116 111-000-EPB-61005 D52016 T1-1901-100
<i>CWA</i>	CWA-A2	CWA-A2
<i>CWP</i>	CWP-A2-ELE-01	CWP-A2-ELE-01
<i>EWP</i>	EWP-A2-ELE-01	EWP-A2-ELE-01
<i>Cable Schedule</i>	CX-100000-ELE-KXX-10000	CX-100000-ELE-KXX-10000
<i>Cable Schedule Revision</i>	000	001
<i>Layout Drawing – From</i>	CX-100000-ELE-SLN-KXX-21200-001	CX-100000-ELE-SLN-KXX-21200-001

Sample Entries (continued)

Field Name	Sample Entry 1	Sample Entry 2
<i>Layout Dwg From Rev</i>	000	001
<i>Layout Drawing – To</i>	CX-100000-ELE-SLN-KXX-21200-002	CX-100000-ELE-SLN-KXX-21200-002
<i>Layout Dwg To Rev</i>	000	001
<i>Length Engineered</i>	25	110
<i>Length Pull</i>	35	100
<i>Length UOM</i>	FT	FT
<i>Number</i>	1	1
<i>Shield</i>	IS	OS
<i>Conductor Size</i>	14	18
<i>Conductor Size UOM</i>	AWG	AWG
<i>Voltage Rating</i>	240	240
<i>From Equipment</i>	111-000-ESM-61001	111-000-ESM-61001
<i>To Equipment</i>	111-000-ESM-61201	111-000-ESM-61201
<i>From Equipment Termination Type</i>	Hard Wire	Hard Wire
<i>To Equipment Termination Type</i>	Hard Wire	Plug and Socket
<i>Discipline</i>	ELE	ELE
<i>Comments</i>	4.16KV FEED TO S. STORM SWGR 61201	4.16KV FEED TO S. STORM SWGR 61201
<i>Cable Drum Number</i>	D-1000-01	D-1010-01
<i>Cable Gland Size</i>	20	40
<i>Cable Gland Size UOM</i>	MM	MM
<i>Cable Routing Drawings</i>	DWG-001, DWG-002, DWG-003	DWG-101, DWG-002, DWG-030
<i>Cable Joint</i>	CCSJ	CCSK
<i>Cable Installation Details</i>	IBS-001	DX-528

3.7.2. DR100-02: Electrical Equipment

Description: List of electrical equipment

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To capture a master list of electrical equipment on the project.

Data Requirement Definition: Electrical Equipment

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Tag	Unique tag number assigned to identify a project item
	Required	Description	Description of the Tag function
	Required	Tag Status	Which engineering phase the tag is in
	Required	Equipment Type	Type of equipment (e.g., motor, junction box, etc.)
	Required	CWA	Unique construction work area identifier
	Required	CWP	Unique construction work package identifier
	Required	EWP	Unique engineering work package identifier
	Required	Manufacturer	Manufacturer of tagged item
	Optional	Supplier	Supplier of tagged item
	Required	Serial Number	Serial number of tagged item
	Required	Catalog Number	Model number
	Required	Equipment Layout Drawing	Electrical layout drawing
	Required	Equipment Layout Drawing Revision	Equipment layout drawing revision
	Required	PO	Purchase order number
	Required	Skid	Skid tag number the equipment is part of
	Required	Sub-System ID	Unique turnover sub-system identifier
	Optional	Test Package ID	Unique test package identifier (e.g., hydrotest package)
	Optional	Equipment Location Plan	Number of location drawing (e.g., B01-xxxx-yyyyy)
	Optional	Weight	Weight of the item

Data Requirement Definition: Electrical Equipment (continued)

Key	Tier	Field Name	Definition
	Optional	Weight UOM	Unit of measurement for item weight (e.g., TN, Lbs, MT, Kg, etc.)
	Required	Vendor Drawing	Vendor drawing
	Required	Vendor Drawing Revision	Vendor drawing revision
	Required	Equipment Standard Detail Drawing	Equipment standard detail drawing
	Required	Equipment Standard Detail Revision	Current revision of the equipment standard detail drawing

Discussion

- The *Serial Number* is data that may not be available until after PO delivery to site, but it is crucial information for AWP through turnover.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	1234	5678
<i>Tag</i>	JB-12673	480-MCC-1A-10
<i>Description</i>	Junction box in amine electrical building	Compressor auxiliary motor MCC for Propane Cryo Unit (1401-A)
<i>Tag Status</i>	In Design	Released to Construction
<i>Equipment Type</i>	Junction Box	Motor Control Center
<i>CWA</i>	CWA-A2	CWA-A2
<i>CWP</i>	CWP-A2-ELE-01	CWP-A2-ELE-01
<i>EWP</i>	EWP-A2-ELE-01	EWP-A2-ELE-01
<i>Manufacturer</i>	Crouse Hinds	Eaton
<i>Supplier</i>	McMaster	Eaton
<i>Serial Number</i>	32164698789312	315598745
<i>Catalog Number</i>	1041N351	FZ206EEASC12P57
<i>Equipment Layout Drawing</i>	CX-100000-ELE-SLN-KXX-21200-001	CX-100000-ELE-SLN-KXX-21200-001
<i>Equipment Layout Drawing Revision</i>	000	001
<i>PO</i>	1234-POA-00123	5678-POA-00123

Field Name	Sample Entry 1	Sample Entry 2
<i>Skid</i>	123000-XXX	–
<i>Sub-System ID</i>	12-01	14-08
<i>Test Package ID</i>	TP-11111	TP-11111
<i>Equipment Location Plan</i>	CX-100000-ELE-SLN-KXX-21200-001	CX-100000-ELE-SLN-KXX-21200-001
<i>Weight</i>	30	1500
<i>Weight UOM</i>	lbs	lbs
<i>Vendor Drawing</i>	SUPP-100000-ELE-SLN-KXX-21200-101	DCKS-100000-ELE-SLN-KXX-21200-001
<i>Vendor Drawing Revision</i>	1	X01
<i>Equipment Standard Detail Drawing</i>	EQP-100000-ELE-SLN-KXX-21200-001	CX-SLN-KXX-21200-001
<i>Equipment Standard Detail Revision</i>	2	W01

3.7.3. DR100-03: Instrument Index

Description: List of instruments

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, weekly through the end of Stage 2

Purpose

To capture a master list of instrumentation on the project.

Data Requirement Definition: Instrument Index

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Tag	Unique tag number assigned to identify a project item
	Required	Description	Description of the Tag function
	Required	Tag Status	Which engineering phase the tag is in
	Required	CWA	Unique construction work area identifier
	Required	CWP	Unique construction work package identifier
	Required	EWP	Unique engineering work package identifier
	Required	IWP	Unique installation work package identifier
	Optional	Related Tag	Equipment or line number tag associated with the item
	Optional	I/O Type	Input/output type
	Required	Instrument Type	Type of the instrument
	Required	Location	Location details of the instrument in the plant facility
	Optional	Manufacturer	Manufacturer of tagged item
	Required	PID	Piping and instrumentation diagram drawing number
	Optional	Instrument Revision	Revision number of instrument design
	Required	PO	Purchase order number
	Optional	Requisition Number	Material requisition number for the item
	Required	Service	Process service associated with the item
	Optional	Sub-System ID	Unique turnover sub-system identifier
	Optional	Test Package ID	Unique test package identifier (e.g., hydrotest package)
	Optional	Model Number	Manufacturer model number
	Optional	Remarks	Any remarks or notes

Key	Tier	Field Name	Definition
	Optional	Face to Face	For inline instruments
	Optional	Instrument Rating	Rating of the instrument
	Optional	Weight	Weight of the item
	Optional	Weight UOM	Unit of measurement for item weight (e.g., TN, Lbs, MT, Kg, etc.)
	Optional	Control System Type	Type of control system (e.g., SIS, BPCS)
	Optional	Instrument Range	Minimum and maximum
	Required	Data Sheet Number	Data sheet number
	Required	Data Sheet Number Revision	Data sheet number revision
	Required	Hook-up Drawing Number	Hook-up drawing number
	Required	Hook-up Drawing Number Revision	Hook-up drawing number revision
	Required	Installation Drawing Number	Installation drawing number
	Required	Installation Drawing Number Revision	Installation drawing number revision
	Required	Location Layout Drawing	Location layout drawing
	Required	Location Layout Drawing Revision	Location layout drawing revision

Discussion

- Many key relationships tie the instruments to related drawings, IWP, PO, major equipment, etc.
- Originating data source – typically lives in some sort of master index for the project within the engineer's tools.
- The *Location* field is used to indicate a specific geographical location, in addition to system/unit number.
- The Optional field's *Model Number* may not be known until after POs are issued.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	1234	5678
<i>Tag</i>	123000-LT	154856-FM
<i>Description</i>	Level transmitter for V-1246 Amine coalescer	Analog Flow meter for V-1246 Amine coalescer
<i>Tag Status</i>	In Design	Released to Construction
<i>CWA</i>	CWA-A2	CWA-A2
<i>CWP</i>	CWP-A2-ELE-01	CWP-A2-ELE-01
<i>EWP</i>	EWP-A2-ELE-01	EWP-A2-ELE-01
<i>IWP</i>	IWP-A2-ELE-01-001	IWP-A2-ELE-01-001
<i>Related Tag</i>	V-1246	V-1246
<i>I/O Type</i>	Digital	Analog
<i>Instrument Type</i>	Level Transmitter (GWR)	Flow Meter
<i>Tag Location</i>	North West side of vessel at ground level	East side of vessel at 2 nd deck
<i>Manufacturer</i>	Emerson Rosemount	Yokogawa
<i>PID</i>	CX-000000-PIP-PID-00001	CX-000000-PIP-PID-00001
<i>Instrument Revision</i>	000	001
<i>PO</i>	1234-POA-00123	5678-POA-00123
<i>Requisition Number</i>	1234-FMR-00123	5678-FMR-00123
<i>Service</i>	Amine	Amine
<i>Sub-System ID</i>	12-01-011	12-01-003
<i>Test Package ID</i>	TP-11111	TP-11111
<i>Model Number</i>	5300	D-79660
<i>Remarks</i>	Guided Wave Radar	Stainless, 0-700 bar
<i>Face to Face</i>	20	40
<i>Instrument Rating</i>	150	600
<i>Weight</i>	2	5
<i>Weight UOM</i>	kg	kg
<i>Control System Type</i>	SIS	BPCS
<i>Instrument Range</i>	300LB	600LB
<i>Data Sheet Number</i>	DH-12100	DHS-101
<i>Data Sheet Number Revision</i>	1	S1
<i>Hook-up Drawing Number</i>	HKP-010	HKP-25-2555

Field Name	Sample Entry 1	Sample Entry 2
<i>Hook-up Drawing Number Revision</i>	2	SW1
<i>Installation Drawing Number</i>	INS-5823	DDSD-855
<i>Installation Drawing Number Revision</i>	F1	G4
<i>Location Layout Drawing</i>	LAY-000-42555-0001	DWG-LAY-LOC-252
<i>Location Layout Drawing Revision</i>	1	B

3.7.4. DR100-04: Conduit

Description: List of conduit

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To capture a master list of conduits on the project.

Data Requirement Definition: Conduit

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Tag	Unique tag number assigned to identify a project item
	Required	Description	Description of the Tag function
	Required	Tag Status	Which engineering phase the tag is in
	Required	% Filled	Calculation showing the percentage of the tray/conduit that has been used
	Required	Construction Requirement	Specifies whether it is new or existing and to be refurbished or modified
	Required	CWP	Unique construction work package identifier
	Required	EWP	Unique engineering work package identifier
	Optional	Fitting Style	Fitting style of a conduit fitting (e.g., EMT, rigid, LR 90, LL 90, etc.)
	Optional	Fitting Type	Fitting type of a conduit fitting (e.g., straight thread, tapered thread, etc.)
	Optional	Conduit Part No.	Manufacturer's part number for the conduit
	Optional	Manufacturer	Manufacturer of tagged item
	Optional	From Tag	Tag number that the specific conduit is connected from
	Optional	To Tag	Tag number that the specific conduit is connected to
	Required	Layout Dwg – Ref 1	Number of layout drawing that shows the conduit
	Required	Drawing Revision – Ref 1	Revision of layout drawing 1
	Optional	Layout Dwg – Ref 2	Number of second layout drawing that shows the conduit
	Optional	Drawing Revision – Ref 2	Revision of layout drawing 2

Data Requirement Definition: Conduit (continued)

Key	Tier	Field Name	Definition
	Required	Length	Length of the item
	Required	Length UOM	Unit of measurement for length of the item
	Required	Nominal Diameter	Nominal diameter of a conduit
	Required	Diameter UOM	Unit of measurement for diameter of the item
	Required	Material Type	Type of material the conduit is made of (e.g., rigid metal, electro-metallic tubing, etc.)
	Optional	Max Conduit Filled %	Maximum percent fill the conduit is allowed under code
	Required	Voltage Type	Compatible voltages for circuits run in the conduit (e.g., segregation level: control, instrument, low/medium/high voltage, etc.)

Discussion

- The project team determines the best breakdown for conduit tag numbers as either section or at the component level.
 - *Fitting Style*, *Fitting Type*, and *Conduit Part No.* are only useful if tagged at the component level.
- *From* and *To* are intended to be the tag numbers of the conduit/tray that a particular conduit number is physically connected to.

Sample Entries

Field Name	Sample Entry 1 (section tag)	Sample Entry 2 (component tag)
<i>Project ID</i>	1234	5678
<i>Tag</i>	C-12382 (section)	C-12382-E01 (section component)
<i>Description</i>	Medium Voltage Conduit for amine pumps	Control Conduit for amine instrumentation
<i>Status</i>	In Design	Released to Construction
<i>% Filled</i>	40%	60%
<i>Construction Requirement</i>	New	Existing
<i>CWP</i>	CWP-A2-ELE-01	CWP-A2-ELE-01
<i>EWP</i>	EWP-A2-ELE-01	EWP-A2-ELE-01
<i>Fitting Style</i>	–	LL 90
<i>Fitting Type</i>	–	Elbow
<i>Conduit Part No</i>	–	65215465
<i>Manufacturer</i>	American Conduit	Allied

Sample Entries (continued)

Field Name	Sample Entry 1 (section tag)	Sample Entry 2 (component tag)
<i>From Tag</i>	C-12381 (conduit section)	C-12382 (parent conduit section)
<i>To Tag</i>	JB-12673 (junction box)	C-12382 (parent conduit section)
<i>Layout Dwg – Ref 1</i>	CX-100000-ELE-SLN-KXX-21200-001	CX-100000-ELE-SLN-KXX-21200-001
<i>Drawing Revision – Ref 1</i>	000	001
<i>Layout Dwg – Ref 2</i>	CX-100000-ELE-SLN-KXX-21200-002	CX-100000-ELE-SLN-KXX-21200-002
<i>Drawing Revision – Ref 2</i>	000	001
<i>Length</i>	30	13
<i>Length UOM</i>	FT	Inch
<i>Nominal Diameter</i>	4	3
<i>Diameter UOM</i>	Inch	Inch
<i>Material Type</i>	Electrical Metallic Tubing (EMT)	Galvanized Rigid Conduit (GRC)
<i>Max Conduit Filled %</i>	70%	65%
<i>Voltage Type</i>	Medium Voltage	Control

3.7.5. DR100-05: Cable Tray

Description: List of cable tray

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To capture a master list of cable trays on the project.

Data Requirement Definition: Cable Tray

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Tag	Unique tag number assigned to identify a project item
	Required	Description	Description of the Tag function
	Required	Tag Status	Which engineering phase the tag is in
	Optional	% Filled	Calculation showing the percentage of the tray that has been used
	Required	Tray Type	Type of bottom of a tray (e.g., ladder, solid, etc.)
	Required	Construction Requirement	Specifies whether it is new or existing and to be refurbished or modified
	Required	Cover Type	Type of tray cover, if necessary
	Required	CWP	Unique construction work package identifier
	Required	EWP	Unique engineering work package identifier
	Optional	Manufacturer	Manufacturer of tagged item
	Optional	Tray Part Type	Type of tray piecemark (e.g., straight run, elbow, T, cross, etc.)
	Optional	Tray Part No.	Manufacturer's part number for the tray
	Optional	Style	Type of raceway that represents the tag (e.g., tray, snap track, etc.)
	Optional	From Tag	Tag number that the specific tray is connected from
	Optional	To Tag	Tag number that the specific tray is connected to
	Required	Layout Dwg – Ref 1	Number of layout drawing that shows the conduit
	Required	Drawing Revision – Ref 1	Revision of layout drawing 1

Data Requirement Definition: Cable Tray (continued)

Key	Tier	Field Name	Definition
	Optional	Layout Dwg – Ref 2	Number of second layout drawing that shows the conduit
	Optional	Drawing Revision – Ref 2	Revision of layout drawing 2
	Required	Length	Length of the item
	Required	Length UOM	Unit of measurement for length of the item
	Required	Siderail Depth	Depth of the side rail on a tray
	Required	Siderail Depth UOM	Unit of measurement for depth of the side rail
	Required	Width 1	Width of a tray
	Required	Width 2	Width of a tray if more than one is applicable
	Required	Width UOM	Unit of measurement for width of the item
	Required	Material Type	Material type of the tray
	Optional	Max Cable Tray Filled %	Maximum percent fill the tray is allowed under code
	Optional	Voltage Type	Compatible voltages for circuits run in the tray (e.g., segregation level: control, instrument, low/medium/high voltage, etc.)

Discussion

- The project team determines the best breakdown for tray tag numbers as either section or at the component level.
 - *Tray Part Type* and *Tray Part No.* are only useful if tagged at the component level.
- *From* and *To* are intended to be the tag numbers of the conduit/tray that a particular tray is physically connected to.

Sample Entries

Field Name	Sample Entry 1 (section tag)	Sample Entry 2 (component tag)
<i>Project ID</i>	1234	5678
<i>Tag</i>	CT-11183 (section)	CT-11184-R01 (section component)
<i>Description</i>	Cable tray section between V-1146 control valves and Unit 11 electrical building	Cable tray reducer

Field Name	Sample Entry 1 (section tag)	Sample Entry 2 (component tag)
<i>Tag Status</i>	In Design	Released to Construction
<i>% Filled</i>	40%	50%
<i>Tray Type</i>	Solid	Ladder
<i>Construction Requirement</i>	New	New
<i>Cover Type</i>	Solid Plain Cover	Ventilated Flanged Cover
<i>CWP</i>	CWP-A2-ELE-01	CWP-A2-ELE-01
<i>EWP</i>	EWP-A2-ELE-01	EWP-A2-ELE-01
<i>Manufacturer</i>	Atkor	Eaton
<i>Tray Part Type</i>	–	Reducer
<i>Tray Part No</i>	–	1236545
<i>Style</i>	Tray	Snap Track
<i>From Tag</i>	C-12381 (tray section)	C-12382 (parent snap track section)
<i>To Tag</i>	JB-12673 (junction box)	C-12382 (parent snap track section)
<i>Layout Dwg – Ref 1</i>	CX-100000-ELE-SLN-KXX-21200-001	CX-100000-ELE-SLN-KXX-21200-001
<i>Drawing Revision – Ref 1</i>	000	001
<i>Layout Dwg – Ref 2</i>	CX-100000-ELE-SLN-KXX-21200-002	CX-100000-ELE-SLN-KXX-21200-002
<i>Drawing Revision – Ref 2</i>	000	001
<i>Length</i>	55	2
<i>Length UOM</i>	FT	FT
<i>Siderail Depth</i>	4	3
<i>Depth UOM</i>	Inch	Inch
<i>Width 1</i>	12	12
<i>Width 2</i>	–	6
<i>Width UOM</i>	Inch	Inch
<i>Material Type</i>	Galvanized Steel	Aluminum
<i>Max Cable Tray Filled %</i>	70%	65%
<i>Voltage Type</i>	Low Voltage	Instrumentation

3.7.6. DR100-06: Lighting & Devices

Description: List of lighting and devices

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the project list of lighting and miscellaneous devices.

Data Requirement Definition: Lighting & Devices

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Tag	Unique tag number assigned to identify a project item
	Required	Description	Description of the Tag function
	Required	Item Type	Accessories type (e.g., light receptacle, junction box, etc.)
	Required	Cable Size	Cable size
	Required	Circuit Number	Number of the circuit feeding lights and/or device
	Required	Construction Requirement	Specifies whether it is new or existing and to be refurbished or modified
	Required	CWP	unique construction work package identifier
	Required	EWP	unique engineering work package identifier
	Optional	Manufacturer	Manufacturer of tagged item
	Optional	Supplier	Supplier of tagged item
	Optional	Catalog Number	Catalog number
	Optional	Mounting Style	Mounting style
	Optional	Operating Current Amp	Operating current amperage
	Optional	Panel Name Tag	Engineered tag of panel feeding light and or receptacle
	Optional	Terminals	Location and number of wire terminals
	Required	Panel Schedule	Panel schedule wiring drawing reference
	Required	Panel Schedule Revision	Revision of equipment design
	Required	Drawing Number	Drawing number of lighting or device
	Required	Equipment Revision	Current revision of equipment

Data Requirement Definition: Lighting & Devices (continued)

Key	Tier	Field Name	Definition
	Required	Standard Detail	Standard installation detail drawing reference for light and/or receptacle
	Required	Standard Detail Revision	Revision of equipment design
	Required	Test Package ID	Unique test package identifier
	Required	Voltage	Voltage in operation
	Required	Power (Watts)	Wattage in operation
	Required	Usage	Type (e.g., emergency, general, etc.)
	Required	Single Line Diagram	Single line diagram
	Required	Single Line Diagram Rev	Revision of the single line diagram

Discussion

- The device list contains many miscellaneous items not captured elsewhere (e.g., electrical heat trace panels, welding receptacles, small lighting panels and transformers, photo sensors, IO devices, etc.).

Sample Entries

Field Name	<i>Sample Entry 1</i>	<i>Sample Entry 2</i>
<i>Project ID</i>	1234	5678
<i>Tag</i>	WR-12837	L-165-3
<i>Description</i>	Welding Receptacle	Light
<i>Item Type</i>	Welding Receptacle	Light
<i>Cable Size</i>	3/C 10 w/G	3/C 14
<i>Circuit Number.</i>	111-000-ESM-61201-CMV100-3A	111-000-ESM-61201-CEG100-3G
<i>Construction Requirement</i>	New	New
<i>CWP</i>	CWP-A2-ELE-01	CWP-A2-ELE-01
<i>EWP</i>	EWP-A2- ELE-01	EWP-A2-ELE-01
<i>Manufacturer</i>	Meltric	Eaton
<i>Supplier</i>	McMaster	Eaton
<i>Catalog Number</i>	PNHT	–
<i>Mounting Style</i>	Bolt	Stanchion
<i>Operating Current Amp.</i>	20	2

Sample Entries (continued)

Field Name	Sample Entry 1	Sample Entry 2
<i>Panel Name Tag</i>	LP-28747	LP-74729
<i>Terminals</i>	4	3
<i>Panel Schedule</i>	1234-ELE-DEV-PNL-00001	5678-ELE-LGT-PNL-00001
<i>Panel Schedule Revision</i>	003	000
<i>Drawing Number</i>	CX-100000-ELE-SLN-KXX-21200-001	CX-100000-ELE-SLN-KXX-21200-001
<i>Current Revision</i>	002	000
<i>Standard Detail</i>	1234-ELE-DEV-STD-00001	5678-ELE-LGT-STD-00001
<i>Standard Detail Revision</i>	000	000
<i>Test Package ID</i>	TP-22222	TP-22222
<i>Voltage</i>	480	220
<i>Power (Watts)</i>	9,600	440
<i>Usage</i>	Maintenance	Emergency
<i>Single Line Diagram</i>	SL-5255-5	DWH-255-555-SL-0001
<i>Single Line Diagram Rev</i>	A	A01

3.7.7. DR100-07: Electrical Heat Tracing

Description: List of electrical heat tracing (EHT)

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the project list of all electrical heat tracing.

Data Requirement Definition: Electrical Heat Tracing

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Tag	Unique tag number assigned to identify a project item
	Required	Heat Trace Description	EHT circuit description
	Required	Manufacturer	Manufacturer of tagged item
	Optional	Catalog Part Number	EHT cable manufacturer part number
	Required	Construction Requirement	Specifies whether it is new or existing and to be refurbished or modified
	Required	CWA	Unique construction work area identifier
	Required	CWP	Unique construction work package identifier
	Required	EWP	Unique engineering work package identifier
	Required	Length	Length of the item
	Required	Length UOM	Unit of measurement for length of the item
	Required	From Tag (Power)	Tag of a panel the circuit is connected from
	Required	To Tag (Customer)	Tag of equipment or piping line number the circuit is connected to
	Required	Typical Detail Drawing	Drawing of the EHT components used for the circuit
	Optional	Equipment Revision	Current revision of the EHT tag
	Required	Test Package ID	Unique test package identifier (e.g., megger test)
	Optional	Control Type	Type of protection this circuit protects against (e.g., freezing, process control, etc.)
	Optional	Cable Rating	Classification rating of the cable (e.g., Class 1 Division 2, etc.)
	Optional	Cable Joint	Cable joint

Discussion

- The implementation team expects the EHT tag to be handled similarly to spools, where the tag is at the assembly level. Material takeoffs happen at the component level (e.g., controller, wire, end seal kit, power termination kit, temperature controller, pipe mounts, junction boxes, etc.).
 - Typically, each “EHT circuit” is per isometric drawing and may daisy chain several separate cables depending on power supply rating.
- The *Catalog Part Number* is determined by engineering calculations for process conditions.
- The *Cable Rating* is typically used to confirm that cable can be installed in certain hazardous locations.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	1234	5678
<i>Tag</i>	101-100-EHT-61002	EHT-PS-129438
<i>Heat Trace Description</i>	Cryo rack 1 heat trace on propane rack	Power supply to heat trace on V-1246
<i>Manufacturer</i>	Protherm Industries	Chromalox
<i>Catalog Part Number</i>	6852524	465892PS
<i>Construction Requirement</i>	New	New
<i>CWA</i>	CWA-A2	CWA-A2
<i>CWP</i>	CWP-A2-ELE-01	CWP-A2-ELE-01
<i>EWP</i>	EWP-A2- ELE-01	EWP-A2-ELE-01
<i>Length</i>	50	10
<i>Length UOM</i>	FT	Inch
<i>From Tag (Power)</i>	EHT-PS-129438	SG17283
<i>To Tag (Customer)</i>	LNG-100A-12-01SS-6.5CC	V-1246
<i>Typical Detail Drawing</i>	1234-ELE-DEV-STD-00001	5678-ELE-LGT-STD-00001
<i>Equipment Revision</i>	000	001
<i>Test Package ID</i>	TP-33333	TP-11111
<i>Control Type</i>	Freezing	Process Control
<i>Cable Rating</i>	Class 1 Division 2	Class 1 Division 3
<i>Cable Joint</i>	RS PRO	CCE-03-CR

3.8. DR120 – Document Control

3.8.1. DR120-01: Document Register

Description: Document register

Source(s): Document control team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define a list of all documents on the project.

Data Requirement Definition: Document Register

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Document Repository	Document repository identifier
PK	Required	Document Number	Document number
PK	Required	Version Number	Controlled version number
PK	Required	Revision Number	Revision number of the document
	Required	Document Discipline	Document discipline code (which discipline this document comes from)
	Required	Document File Name	Document filename (allows access to the file)
	Required	Document File Type	Document type (e.g., PDF, DOC, etc.)
	Required	Document Status	Document status values (e.g., IFD, IFA, IFC)
	Required	Document Title	Document title
	Required	Document Type	Document type (e.g., P&ID, arrangement, wiring diagram, data sheet, etc.)
	Required	Revision Date	Revision date
	Required	Transmittal Date	Receiving transmittal date
	Required	Transmittal Number	Receiving transmittal number
	Required	Vendor Document Number	Vendor's document number
	Required	Vendor Revision	Vendor's document revision number
	Required	Vendor Revision Date	Vendor's revision date
	Optional	Remarks	Any remarks or notes

Discussion

- The implementation team expects *Version* to be separate from *Revision* and used for tracking version editions through review workflows (e.g., IFR routed through several iterative updates).

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	90000801	1684972
<i>Document Repository</i>	–	EDMS
<i>Document Number</i>	985D	A-1-48104
<i>Version Number</i>	1	2
<i>Revision Number</i>	0	B
<i>Document Discipline</i>	Piping	Instrumentation & Control
<i>Document File Name</i>	S5-1-985D.dwg	A-1-48104.pdf
<i>Document File Type</i>	DWG	PDF
<i>Document Status</i>	IFC	IFA
<i>Document Title</i>	Piping & Instrument Diagram Process Water	Temperature Valve Datasheet
<i>Document Type</i>	P&ID	Requisition
<i>Revision Date</i>	10/25/19	01/10/20
<i>Transmittal Date</i>	10/26/19	01/20/20
<i>Transmittal Number</i>	001	053
<i>Vendor Document Number</i>	R740278	5100001576
<i>Vendor Revision</i>	1	3
<i>Vendor Revision Date</i>	10/14/19	12/20/19
<i>Remarks</i>	Issued for Construction	Issued for Bid

3.8.2. DR120-02: Document to Entity

Description: Project document relationships

Source(s): Document control team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the relationships between a project's documents and any related "object" to create complex relationships between documents and components.

Data Requirement Definition: Document to Entity

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Document ID	Unique document identifier
PK	Required	Relationship Type	Type of related ID (e.g., EWP, CWP, equipment tag, PO, system, etc.)
PK	Required	Related Tag	Unique identifier of the related entity

Discussion

- This is intended to be a relationship table for capturing any documents to tag relationships desired (e.g., document to equipment tag, CWP, PO, etc.).

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	90000801	1684972
<i>Document ID</i>	XAA53Y64XQF4-60-3	DocID-H1L0FX1S
<i>Relationship Type</i>	EWP	Purchase Order (PO)
<i>Related Tag</i>	EWP-PI-001	P0061500

3.9. DR140 – Estimating and Cost

3.9.1. DR140-01: EWP Estimate

Description: EWP cost estimate

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the key attributes of the project EWP estimate data.

Data Requirement Definition: EWP Estimate

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	EWP	Unique engineering work package identifier
	Required	Actual Expended Hours	Actual expended hours
	Required	Control Budget Hours	Construction hours allotted to the EWP per the control budget
	Required	Key Quantity	Sum total of key quantity for the EWP (e.g., 1000)
	Required	Key Quantity UOM	Unit of measurement for the key quantity (e.g., LF of pipe, etc.)
	Optional	Actual Expended Cost	Actual expended cost
	Optional	Total Estimated Cost	Total estimated construction cost of the EWP

Discussion

- *Key Quantity* for EWP should be the same *Key Quantity* for related CWP.
- The *Actual Expended Hours* and *Actual Expended Cost* values may not be available initially, but they should be captured as EWP execution progresses to enable productivity analysis.
- *Actual Expended Cost* values may be sensitive in traditional lump-sum contracts, but allow useful internal analytics.

Sample Entries

Field Name	<i>Sample Entry 1</i>	<i>Sample Entry 2</i>
<i>Project ID</i>	98938277	CPLX-0987
<i>EWP</i>	EWP-0012-00A1-Pipe	EWP-DA02-Equip-01
<i>Actual Expended Hours</i>	847	Undisclosed
<i>Control Budget Hours</i>	800	80
<i>Key Quantity</i>	2,248	3
<i>Key Quantity UOM</i>	Linear Feet	EA
<i>Actual Expended Cost</i>	\$127,050	Undisclosed
<i>Total Estimated Cost</i>	\$120,000	Undisclosed

3.9.2. DR140-02: CWP Estimate

Description: CWP cost estimate

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the key attributes of the project CWP estimate data.

Data Requirement Definition: CWP Estimate

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	CWP	Unique construction work package identifier
	Required	Actual Expended Hours	Actual expended hours
	Required	Control Budget Hours	Construction hours allotted to the CWP per the control budget
	Required	Key Quantity	Sum total of key quantity for the CWP (e.g., 1000)
	Required	Key Quantity UOM	Unit of measurement for the key quantity (e.g., LF of pipe, etc.)
	Optional	Actual Expended Cost	Actual expended cost
	Optional	Total Estimated Cost	Total estimated construction cost of the CWP

Discussion

- *Key Quantity* for EWP should be the same *Key Quantity* for related CWP.
- The *Actual Expended Hours* and *Actual Expended Cost* values may not be available initially, but they should be captured as EWP execution progresses to enable productivity analysis.
- *Actual Expended Cost* values may be sensitive in traditional lump-sum contracts, but allow useful internal analytics.

Sample Entries

Field Name	<i>Sample Entry 1</i>	<i>Sample Entry 2</i>
<i>Project ID</i>	98938277	CPLX-0987
<i>CWP</i>	CWP-0012-00A1-Pipe	CWP-DA02-Equip-01
<i>Actual Expended Hours</i>	11,997	1,190
<i>Control Budget Hours</i>	12,364	980
<i>Key Quantity</i>	2,248	3
<i>Key Quantity UOM</i>	Linear Feet	EA
<i>Actual Expended Cost</i>	\$515,871	\$57,002
<i>Total Estimated Cost</i>	\$494,560	\$60,000

3.10. DR150 – Procurement

General discussion for shipment model:

- Define common definitions of DR150 and DR270 – more narrative on shipment, container, etc.
- The data requirements establish a standard hierarchy to track material logistics, consisting of a shipment, load, container, and finally, material. This model is implemented in the relevant tables of DR150 (Procurement) and DR270 (Site Materials).

Shipment – shipping release requested by the supplier, and typically approved and assigned a number by the receiving organization (typically the EPC contractor). There will typically be one or more shipments per PO.

Load – A further breakdown of a shipment, often at the same level as a bill of lading. For example, a shipment may be spread over two truck loads.

Container – Further breakdown of a load. For example, a truck may be carrying two containers.

Material – the lowest level, capturing individual components and quantities.

- The shipment-load-container-material hierarchy model is intended to be flexible and able to support a wide variety of scenarios. There will often be cases where not all levels of the hierarchy will be needed. For example, a small shipment of pipe spools may fit on a single truck and not have any containers.

3.10.1. DR150-01: Material Requisition Tracking

Description: List of material requisitions

Source(s): Procurement team

Timing: Beginning of Stage 2 (i.e., long lead)

Frequency: Continuous as revised – at a minimum, weekly through the end of Stage 3

Purpose

To define the master list of material requisitions and their key attributes, including the resulting PO number.

Data Requirement Definition: Material Requisition Tracking

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Requisition Number	Material requisition identifier
	Optional	Requisition Description	Description of the requisition
	Optional	Requisition – Actual	Actual date to complete material requisition request
	Optional	Requisition – Forecast	Forecast date to complete material requisition request
	Optional	Requisition – Plan	Planned date to complete material requisition request
	Optional	Inquiry – Actual	Actual date to complete vendor inquiries
	Optional	Inquiry – Forecast	Forecast date to complete vendor inquiries
	Optional	Inquiry – Plan	Planned date to complete vendor inquiries
	Optional	CBE – Actual	Actual date to complete commercial bid evaluation
	Optional	CBE – Forecast	Forecast date to complete commercial bid evaluation
	Optional	CBE – Plan	Planned date to complete commercial bid evaluation
	Optional	TBE – Actual	Actual date to complete commercial bid evaluation
	Optional	TBE – Forecast	Forecast date to complete commercial bid evaluation
	Optional	TBE – Plan	Planned date to complete commercial bid evaluation
	Optional	Purchasing Agent	Group or division making purchase
	Required	Vendor	Vendor name

Data Requirement Definition: Material Requisition Tracking (continued)

Key	Tier	Field Name	Definition
	Required	Vendor ID	Unique vendor identifier
	Required	PO	Purchase order number
	Required	PO Description	Purchase order description
	Required	PO Status	Status of the PO (e.g., draft, issued)
	Required	PO Revision	Current revision of the PO
	Required	PO Date	Purchase order date (i.e., when PO is cut)
	Optional	Incoterm	Applicable predefined international commercial terms as published by the International Chamber of Commerce (e.g., DDP, FCA)
	Optional	Requisition By	Team member
	Optional	Unit Price	Unit price
	Optional	Unit Price Currency	Unit price currency (e.g., USD, CAD)

Discussion

- Table data requirements are formed such that a requisition and PO are 1:1. If a requisition has a different relationship to a PO, it is up to the implementing organization to handle it appropriately within its data structures/governance.
- The table is designed to track the procurement steps required to get to a PO, so the team tracks the requisition process and expects the PO number to be populated once the process has progressed enough to generate a PO number.
- Off-the-shelf items can be marked as “N/A.”

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	123544	BT-HT-00987
<i>Requisition Number</i>	958564485	BT-HT-00987-BNHT-09821
<i>Requisition Description</i>	Piping Fabrication	P9807 Upgrade
<i>Requisition – Actual</i>	3/5/2020	20200122
<i>Requisition – Forecast</i>	3/5/2020	20200122
<i>Requisition – Plan</i>	3/2/2020	20200120
<i>Inquiry – Actual</i>	3/24/2020	20200217
<i>Inquiry – Forecast</i>	3/24/2020	20200217
<i>Inquiry – Plan</i>	3/23/2020	20200221

Field Name	Sample Entry 1	Sample Entry 2
<i>CBE – Actual</i>	4/3/2020	20200310
<i>CBE – Forecast</i>	4/3/2020	20200310
<i>CBE – Plan</i>	4/6/2020	20200320
<i>TBE – Actual</i>	4/1/2020	20200331
<i>TBE – Forecast</i>	4/1/2020	20200331
<i>TBE – Plan</i>	4/6/2020	20200320
<i>Purchasing Agent</i>	EPC Engineers Inc	Oil Owner Company
<i>Vendor</i>	Acme Piping Fabrication	Acme Rotating Specialists
<i>Vendor ID</i>	451236	12368
<i>PO</i>	PO-001-AC-0898	25698BT58894
<i>PO Description</i>	Piping Fabrication	Pump P9807A
<i>PO Status</i>	Open	Closed
<i>PO Revision</i>	R1	Rev 0
<i>PO Date</i>	4/13/2020	20200410
<i>Incoterm</i>	DDP	EXW
<i>Requisition By</i>	Smith	Jones
<i>Unit Price</i>	Confidential	8,699
<i>Unit Price Currency</i>	–	USD

3.10.2. DR150-02: Purchase Order Line Items

Description: List of PO line items

Source(s): Procurement team

Timing: Beginning of Stage 2 – line items populated after PO generation

Frequency: Continuous as revised – at a minimum, weekly through delivery

Purpose

To define the master list of PO line items and their key attributes

Data Requirement Definition: PO Line Items

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	PO	Purchase order number
PK	Required	Requisition Line Item	Line item on the requisition
PK	Required	Line Item Revision	Current revision of the line item
	Optional	Approve to Fab – Actual	Actual date for approval to fabricate
	Optional	Approve to Fab – Forecast	Forecast date for approval to fabricate
	Optional	Approve to Fab – Plan	Planned date for approval to fabricate
	Optional	Approve to Ship – Actual	Actual date for approval to ship
	Optional	Approve to Ship – Forecast	Forecast date for approval to ship
	Optional	Approve to Ship – Plan	Planned date for approval to ship
	Required	BOM Description	Bill of materials description
	Required	BOM ID	Materials identification code or stock code
	Required	CWP	Unique construction work package identifier
	Required	Discipline	Discipline responsible for the engineering design
	Required	ROS Date	Required on-site date for the needed quantity
	Required	Material Category	Material category
	Required	Material Type	Material type within the category
	Required	Qty PO	Quantity purchased

Key	Tier	Field Name	Definition
	Required	Qty UOM	Unit of measurement for quantity purchased (e.g., EA, LF, M, etc.)
	Required	Tag	Unique tag number assigned to identify a project item
	Required	Vendor Drawings – Actual	Actual date of receiving vendor drawings
	Required	Vendor Drawings – Forecast	Forecast date of receiving vendor drawings
	Required	Vendor Drawings – Plan	Planned date of receiving vendor drawings
	Optional	Size	Material sizing information
	Optional	Size UOM	Unit of measurement for material sizing (e.g., EA, LF, M, etc.)

Discussion

- *Size UOM* is intended to be more useful for bulk items, not necessarily a skid or a piece of equipment.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	326895	BT-CP-0388
<i>PO</i>	PO-001-AC-0898	25698BT58894
<i>Line Item</i>	005	001
<i>Line Item Revision</i>	R1	Rev 0
<i>Approve to Fab – Actual</i>	06/06/2020	20200315
<i>Approve to Fab – Forecast</i>	06/06/2020	20200315
<i>Approve to Fab – Plan</i>	06/15/2020	20200330
<i>Approve to Ship – Actual</i>	08/02/2020	20200618
<i>Approve to Ship – Forecast</i>	08/02/2020	20200618
<i>Approve to Ship – Plan</i>	08/01/2020	20200610
<i>BOM Description</i>	4" A-106 Seamless Pipe	T9809 Bottoms Pump
<i>BOM ID</i>	PX05321A	P9807A
<i>CWP</i>	CWP-0012-00A1-Pipe	CWP-DA02-Equip-01
<i>Discipline</i>	Piping	Equipment
<i>ROS Date</i>	09/01/2020	20200715
<i>Material Category</i>	Prefabricated Pipe	Mechanical Equipment
<i>Material Type</i>	Carbon Steel	Pump

Sample Entries (continued)

Field Name	Sample Entry 1	Sample Entry 2
<i>Qty PO</i>	5,312	1
<i>Qty UOM</i>	Linear Feet	EA
<i>Tag</i>	–	P9807A
<i>Vendor Drawings – Actual</i>	05/26/2020	20200219
<i>Vendor Drawings – Forecast</i>	05/26/2020	20200219
<i>Vendor Drawings – Plan</i>	05/20/2020	20200228
<i>Size</i>	4	–
<i>Size UOM</i>	Inch	–

3.10.3. DR150-03: Supplier Purchase Order Shipments

Description: List of supplier shipments per PO line item

Source(s): Vendor/fabricator

Timing: Beginning of Stage 2 – generated after a supplier creates a shipping plan

Frequency: Continuous as revised – at a minimum, weekly through delivery

Purpose

To define the list of shipments and their associations to their PO Line Items.

Data Requirement Definition: Supplier PO Shipments

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Shipment ID	Shipment identifier
PK	Required	PO	Purchase order number
PK	Required	PO Line Item	Line item on the purchase order
PK	Required	Material ID	Material identifier code
	Required	CWP	Unique construction work package identifier
	Optional	ETA Refresh Date	Date when ETA information was updated from the supplier
	Required	Date Ship – Actual	Actual date to ship in shipment lot
	Required	Date Ship – Forecast	Forecast date to ship in shipment lot
	Required	Date Ship – Plan	Planned date to ship in shipment lot
	Required	Date Delivered – Actual	Actual date delivered
	Required	Date Delivered – Forecast	Forecast delivery date
	Required	Date Delivered – Plan	Planned delivery date
	Required	Discipline	Discipline responsible for the engineering design
	Required	Material Category	Material category
	Required	Material Type	Material type within the category
	Required	Qty Line Item	Quantity purchased
	Required	Qty Ship – Actual	Actual quantity to ship in shipment lot
	Required	Qty Ship – Forecast	Forecast quantity to ship in shipment lot
	Required	Qty Ship – Plan	Planned quantity to ship in shipment lot
	Required	Qty Received	Total quantity received
	Required	Qty UOM	Unit of measurement for total quantity received (e.g., EA, LF, M, etc.)

Data Requirement Definition: Supplier PO Shipments (continued)

Key	Tier	Field Name	Definition
	Required	Size	Material sizing information
	Required	Size UOM	Unit of measurement for material sizing (e.g., EA, LF, M, IN, etc.)
	Required	Tag	Unique tag number assigned to identify a project item

Discussion

- Company to decide on relationships between *PO* and *Shipment ID*, as it is not always 1:1.
- *Shipment ID* is known by many names in the industry, including “shipment control number” or “shipment release number.” It is intended to uniquely identify the shipment authorized by the receiving party (EPC or owner).
- *Qty Received* data does not come from a supplier; it comes from a site receiving group described in DR270-02. It is pertinent information to be aligned with the data from the supplier.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	326895	BT-CP-0388
<i>Shipment ID</i>	STK2-0369	
<i>PO</i>	PO-001-AC-0898	25698BT58894
<i>PO Line Item</i>	005	001
<i>Materials ID</i>	PX05321A	P9807A
<i>CWP</i>	CWP-0012-00A1-Pipe	CWP-DA02-Equip-01
<i>ETA Refresh Date</i>	07/17/2020	20200801
<i>Date Ship – Actual</i>	8/2/2020	2020419
<i>Date Ship – Forecast</i>	8/2/2020	2020419
<i>Date Ship – Plan</i>	8/15/2020	20200501
<i>Date Delivered – Actual</i>	8/10/2020	20200424
<i>Date Delivered – Forecast</i>	8/10/2020	20200424
<i>Date Delivered – Plan</i>	8/20/2020	20200510
<i>Discipline</i>	Piping	Mechanical
<i>Material Category</i>	Prefabricated Pipe	Mechanical Equipment
<i>Material Type</i>	Carbon Steel	Pump

Field Name	Sample Entry 1	Sample Entry 2
<i>Qty Line Item</i>	5,312	1
<i>Qty Ship – Actual</i>	5,312	1
<i>Qty Ship – Forecast</i>	5,312	1
<i>Qty Ship – Plan</i>	5,312	1
<i>Qty Received</i>	5,312	1
<i>Qty UOM</i>	Linear Feet	EA
<i>Size</i>	4	–
<i>Size UOM</i>	Inch	–
<i>Tag</i>	–	P9807A

3.10.4. DR150-04: Supplier Load Detail

Description: List of supplier load detail

Source(s): Vendor/fabricator

Timing: Beginning of Stage 2 – generated after a supplier creates a shipping plan

Frequency: Continuous as revised – at a minimum, weekly through delivery

Purpose

To define the list of loads and their relationship to shipment and their shipping/delivery schedule dates.

Data Requirement Definition: Supplier Load Detail

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Shipment ID	Shipment identifier
PK	Required	Load List ID	Load list identifier
PK	Required	Container ID	Identifier of container, box, pallet, etc.
	Optional	ETA Refresh Date	Date when ETA information was updated from the supplier
	Required	Date Ship – Actual	Actual date to ship in shipment lot
	Required	Date Ship – Forecast	Forecast date to ship in shipment lot
	Required	Date Ship – Plan	Planned date to ship in shipment lot
	Required	Date Delivered – Actual	Actual date delivered
	Required	Date Delivered – Forecast	Forecast date delivered
	Required	Date Delivered – Plan	Planned date delivered
	Required	Discipline	Discipline responsible for the engineering design
	Optional	CWP	Unique construction work package identifier

Discussion

- *CWP* is optional as a single container/pallet may or may not pertain to a single *CWP*. Best practice should be shipping per *CWP* for future site material control.
- The implementation team realizes that not every commodity can be broken down into shipment/load/container/line item. Our intention is to provide a generic framework that can be flexibly applied against a wide range of commodities and shipping configurations.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	326895	BT-CP-0388
<i>Shipment ID</i>	STK2-0369	4553158
<i>Load List ID</i>	BOL-00892-1A	56368
<i>Container ID</i>	TCU-845365	Crate 001
<i>ETA Refresh Date</i>	07/17/2020	20200801
<i>Date Ship – Actual</i>	8/2/2020	2020419
<i>Date Ship – Forecast</i>	8/2/2020	2020419
<i>Date Ship – Plan</i>	8/15/2020	20200501
<i>Date Delivered – Actual</i>	8/10/2020	20200424
<i>Date Delivered – Forecast</i>	8/10/2020	20200424
<i>Date Delivered – Plan</i>	8/20/2020	20200510
<i>Discipline</i>	Piping	Mechanical
<i>CWP</i>	CWP-0012-00A1-Pipe	CWP-DA02-Equip-01

3.10.5. DR150-05: Supplier Container Detail

Description: List of supplier container details

Source(s): Vendor/fabricator

Timing: Beginning of Stage 2 – generated after a supplier creates a shipping plan

Frequency: Continuous as revised – at a minimum, weekly through delivery

Purpose

To define the list of shipments and their detailed breakout across containers and packing lists to enable onsite material control.

Data Requirement Definition: Supplier Container Detail

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Shipment ID	Shipment identifier
PK	Required	Load List ID	Load list identifier
PK	Required	Container ID	Identifier of container, box, pallet, etc.
PK	Required	Material ID	Material identifier for the BOM item(s) (bulk) or unique tag identifier if applicable (e.g., tag, spool number, commodity, etc.)
	Required	Item Description	Material description
	Required	Qty	Quantity of item
	Required	Qty UOM	Unit of measurement for quantity (e.g., EA, LF, M, etc.)
	Required	CWP	Unique construction work package identifier
	Required	Discipline	Discipline responsible for the engineering design
	Required	Material Category	Material category
	Required	Material Type	Material type within the category
	Required	Qty Received	Total quantity received
	Optional	Size	Material sizing information
	Optional	Size UOM	Unit of measurement for material sizing
	Optional	Weight	Weight of item
	Optional	Weight UOM	Unit of measurement for weight (e.g., TN, LBS, MT, Kg, etc.)

Discussion

- *Qty Received* data does not come from a supplier; it comes from a site receiving group, but is pertinent information to be aligned to the data from the supplier.
- *Size* and *Weight* data are required project information but not necessarily needed strictly for AWP. Site material control can use to understand potential offloading and laydown requirements.
 - *Weight* is required for AWP through the Engineering Data for AWP planning (e.g., crane usage).
- Not every commodity can be broken down into shipment/load/container/line item. The intent is to provide a generic framework that can be flexibly applied against a wide range of commodities and shipping configurations.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	326895	BT-CP-0388
<i>Shipment ID</i>	STK2-0369	4553158
<i>Load List ID</i>	BOL-00892-1A	56368
<i>Container ID</i>	TCU-845365	Crate 001
<i>Material ID</i>	SP-9081-002	P9807A
<i>Item Description</i>	Pipe Spool	Centrifugal Pump
<i>Qty</i>	1	1
<i>Qty UOM</i>	EA	EA
<i>CWP</i>	CWP-0012-00A1-Pipe	CWP-DA02-Equip-01
<i>Discipline</i>	Piping	Mechanical
<i>Material Category</i>	Prefabricated Pipe	Mechanical Equipment
<i>Material Type</i>	Carbon Steel	Pump
<i>Qty Received</i>	1	1
<i>Size</i>	4	–
<i>Size UOM</i>	NPD	–
<i>Weight</i>	91	232
<i>Weight UOM</i>	lbs	Kg

3.11. DR170 – Structural Detailing

3.11.1. DR170-01: Steel Detailing Deliverables

Description: List of steel detailing deliverables

Source(s): Engineering management team

Timing: Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define planned/forecast/actual milestones for the structural steel detailing process between engineer and detailer.

Data Requirement Definition: Steel Detailing Deliverables

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Structure Tag	Unique tag number assigned to identify a project item
	Required	CWP	Unique construction work package identifier
	Optional	Designs to Detailer – Actual	Actual date for the engineer to provide designs to detailing
	Optional	Designs to Detailer – Forecast	Forecast date for the engineer to provide designs to detailing
	Optional	Designs to Detailer – Plan	Planned date for the engineer to provide designs to detailing
	Optional	Detail File Name	Structural detail file name
	Optional	Erection Dwgs from Detailer – Actual	Actual date for the tracking of delivery of steel erection from detailer
	Optional	Erection Dwgs from Detailer – Forecast	Forecast date for the tracking of delivery of steel erection from detailer
	Optional	Erection Dwgs from Detailer – Plan	Planned date for the tracking of delivery of steel erection from detailer
	Optional	Models from Detailer – Actual	Actual date for steel models and drawings to arrive from a detailer
	Optional	Models from Detailer – Forecast	Forecast date for steel models and drawings to arrive from a detailer
	Optional	Models from Detailer – Plan	Planned date for steel models and drawings to arrive from a detailer
	Optional	Structure Type	Type of structure (e.g., piperack, ladder, etc.)

Discussion

- Requires collaboration between the engineering management team and the steel detailer to fully populate the data set.
- Large structures may be multiple CWPs. The project may handle this mapping and its detailed implementation, or substitute CWP to CWA if it makes sense to the situation.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	DD 031779	FF 357162
<i>Structure Tag</i>	UR14-4	STR-2709
<i>CWP</i>	S1601B-2.5-40-02	S1501C-2.5-60-01
<i>Designs to Detailer – Actual</i>	02-07-2019	02-07-2019
<i>Designs to Detailer – Forecast</i>	01-24-2019	01-31-2019
<i>Designs to Detailer – Plan</i>	01-31-2019	02-15-2019
<i>Detail File Name</i>	UR14-4.IFC	STR-2709.IFC
<i>Erection Dwgs from Detailer – Actual</i>	03-21-2019	03-31-2019
<i>Erection Dwgs from Detailer – Forecast</i>	03-07-2019	03-11-2019
<i>Erection Dwgs from Detailer – Plan</i>	03-15-2019	03-15-2019
<i>Models from Detailer – Actual</i>	03-31-2019	03-31-2019
<i>Models from Detailer – Forecast</i>	03-15-2019	03-24-2019
<i>Models from Detailer – Plan</i>	03-16-2019	04-02-2019
<i>Structure Type</i>	Piperack	Ladder

3.11.2. DR170-02: Steel Detail Drawings

Description: List of steel detail drawings

Source(s): Engineering management team/detailer

Timing: Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define structural steel drawings data sets between engineer and detailer.

Data Requirement Definition: Steel Detail Drawings

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Drawing ID	Document number
PK	Required	Revision Number	Revision number of the issued document
	Required	Structure Tag	Unique tag number assigned to identify a project item
	Required	Drawing Type	Drawing class (e.g., GA, erection drawing)
	Required	Drawing Filename	Drawing (PDF) filename
	Optional	Sequence	Sequence of the steel drawing within the IWP (i.e. represents the path of construction)
	Optional	Transmittal Date	Transmittal date
	Optional	Transmittal ID	Transmittal ID number

Discussion

- *Sequence* can be used to further delineate sub-assembly order within a structure.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	FF 357162	FF 357162
<i>Drawing ID</i>	E1011	E1010
<i>Revision Number</i>	01	01
<i>Structure Tag</i>	STR-2709	STR-2709
<i>Drawing Type</i>	General Arrangement	General Arrangement
<i>Drawing Filename</i>	E1011.PDF	E1010.PDF
<i>Sequence</i>	01	01
<i>Transmittal Date</i>	03-31-2019	03-31-2019
<i>Transmittal ID</i>	FF_357162_01	FF_357162_01

3.11.3. DR170-03: Steel Piecemarks

Description: List of steel piecemarks

Source(s): Engineering management team

Timing: Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define individual steel piecemarks of this data set.

Data Requirement Definition: Steel Piecemarks

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Structure Tag	Unique tag number assigned to identify a project item
PK	Required	Piecemark	Piecemark identifier
	Required	Count	Piecemark count
	Required	Structural Shape	Type of structural steel (e.g., W, angle, etc.)
	Required	Length	Length of the item
	Required	Length UOM	Unit of measurement for length of the item (e.g., FT, M, etc.)
	Required	Weight	Weight of the item
	Required	Weight UOM	Unit of measurement for weight of the item (e.g., TN, Lbs, Mt, Kg, etc.)

Discussion

- N/A

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	FF 357162	FF 357162
<i>Structure Tag</i>	STR-2709	STR-2709
<i>Piecemark</i>	B1053	T1004
<i>Count</i>	1	76
<i>Structural Shape</i>	I-BEAM	TOEBOARD
<i>Length</i>	10	38
<i>Length UOM</i>	FT	FT
<i>Weight</i>	30.78	30.78
<i>Weight UOM</i>	lbs	lbs

3.11.4. DR170-04: Steel 3D Model Relationship

Description: List of steel 3D model relationships (guide to piecemark/drawing)

Source(s): Engineering management team (detailer input)

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define steel detailing to be populated into the 3D design model and eventually the erection drawings generated for IWPs on site.

Data Requirement Definition: Steel 3D Model Relationship

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Global Unique Identifier	Global unique identifier (GUID)
	Required	Piecemark	Assembly mark number
	Required	Erection Drawing ID	Unique identifier of the erection drawing
	Required	Drawing Name	Title of drawing (e.g., hot oil heater erection drawing)
	Required	Count of Connections	Count of connections per piecemark assembly (e.g., a beam has two connections)

Discussion

- CWP tied to Structure ID in 12-01, Structure ID tied to Drawing in 12-02, Piecemark to Counts per Structure in 12-03, allocating Piecemark to a specific tag on a drawing in 12-04.
- The implementation team acknowledges that piecemark comprises several GUIDs. The intent of the *GUID* field is to capture the main element (e.g., beam, not connection parts).
- Typical process flow would be an engineer who provides a structure design to a detailer, then the detailer completes a detailed design, and these details can be incorporated into a construction model.
- This table creates the relationship between erection drawings as that is needed for installation work packaging on site.

Sample Entries

Field Name	<i>Sample Entry 1</i>	<i>Sample Entry 2</i>
<i>Project ID</i>	FF 357162	FF 357162
<i>Global Unique Identifier</i>	E4979294-1054-4078-AABD-6135C6DFEC9D	819FBDCF-A37D-4271-8BD5-A48BB6A852BC
<i>Pieacemark</i>	B1053	B1070
<i>Erection Drawing ID</i>	E1011	E1010
<i>Drawing Name</i>	Elevation Views	Elevation Views
<i>Count of Connections</i>	6	2

3.11.5. DR170-05: Steel Connection Details

Description: List of steel connection details

Source(s): Engineering management team (detailer input)

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define connection details to individual piecemark.

Data Requirement Definition: Steel Connection Details

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Piecemark	Assembly mark number
PK	Required	Assembly Global ID	Assembly global identifier (Connection ID)
	Required	Bolt Acceptance Criteria	Method of acceptance for confirming fully installed (e.g., direct tension indicator [DTI], turn-of-nut, torsion, etc.)
	Required	Bolt Details	Bolt details, including diameter and length
	Required	Bolt Quantity	Quantity of bolts
	Required	Bolt Type	Bolt type, such as ASTM A325 (heavy hex structural steel bolts)
	Optional	Connect To	Connect to assembly mark number
	Optional	Connection Type	Classification of the particular connection type (e.g., weld, bolt)
	Optional	Weld Joint Designation Code	Welding joint code per AWS D1.1/D1.1M (e.g., B-P1A, butt weld/partial penetration joint [PPJ]/square groove weld/SMAW)
	Optional	Weld Joint Thickness	Thickness of the steel to be welded
	Optional	Thickness UOM	Unit of measurement for weld joint thickness (e.g., FT, M, IN, etc.)
	Optional	Weld Quantity	Linear inches of weld
	Optional	Weld Type	Specific welding machine or method used for this connection (e.g., SMAW, FCAW, GMAW, etc.)

Discussion

- This table is essentially an IFC export of data in the model. If an IFC file meets the intent of this data set, it is not needed separately.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	FF 357162	FF 357162
<i>Piecemark</i>	B1522	B1326
<i>Assembly Global ID</i>	1QgTd\$5ub8mgcVpXtQN4ba	3T_rPphcH5f94cUXvQpo3e
<i>Bolt Acceptance Criteria</i>	Direct Tension Indicator	–
<i>Bolt Details</i>	BOLT 3/4"DIA A325 1"3/4	–
<i>Bolt Quantity</i>	3	–
<i>Bolt Type</i>	A325N	–
<i>Connect To</i>	B1463	B1056
<i>Connection Type</i>	Bolt	Weld
<i>Weld Joint Designation Code</i>	–	Butt Weld
<i>Weld Joint Thickness</i>	–	0.5
<i>Thickness UOM</i>	–	Inch
<i>Weld Quantity</i>	–	5.5
<i>Weld Type</i>	–	Shielded Metal Arc Welding

3.12. DR180 – Steel Fabrication

3.12.1. DR180-01: Steel Fabrication CWP Tracking

Description: List of steel fabrication CWP tracking

Source(s): Engineering management team (fabricator input)

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the fabrication schedule milestones of a steel CWP.

Data Requirement Definition: Steel Fabrication CWP Tracking

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Fabrication Scope	Unique scope identifier (e.g., PWP, fabrication contract/PO, etc.)
PK	Required	CWP	Unique construction work package identifier
	Optional	Drawings to Shop Complete – Actual	Actual date for the complete drawings to reach the shop
	Optional	Drawings to Shop Complete – Forecast	Forecast date for the drawings to reach the shop complete
	Optional	Drawings to Shop Complete – Plan	Planned date for the drawings to reach the shop complete
	Optional	Fabrication Complete – Actual	Actual date for fabrication to be complete
	Optional	Fabrication Complete – Forecast	Forecast date for fabrication to be complete
	Optional	Fabrication Complete – Plan	Planned date for fabrication to be complete
	Optional	Fabrication Percent Complete	Fabrication completeness as a percentage
	Optional	Shipment Complete – Actual	Actual date for shipment to be complete
	Optional	Shipment Complete – Forecast	Forecast date for shipment to be complete
	Optional	Shipment Complete – Plan	Planned date for shipment to be complete
	Optional	Shipment Percent Complete	Percentage of shipment complete by piecemark count

Key	Tier	Field Name	Definition
	Optional	CWP Steel Delivery – Actual	Actual date to deliver all steel for the CWP
	Optional	CWP Steel Delivery – Forecast	Forecast date to deliver all steel for the CWP
	Optional	CWP Steel Delivery – Plan	Planned date to deliver all steel for the CWP
	Optional	CWP Steel Delivery – ROS	Required on-site date specified for the CWP
	Optional	Detailer	Name of the detailer (company name)
	Optional	Specialty Coating Complete – Actual	Actual date for specialty coating to be complete
	Optional	Specialty Coating Complete – Forecast	Forecast date for specialty coating to be complete
	Optional	Specialty Coating Complete – Plan	Planned date for specialty coating to be complete
	Optional	CWP Weight	Actual weight of the CWP
	Optional	Weight UOM	Unit of measurement for weight of the CWP (e.g., TN, lbs, Mt, Kg, etc.)

Discussion

- *Fabrication Scope* is used to differentiate fabricators by contract or PO if needed.
- Specialty coatings are optional, but if needed can be expanded to include necessary fields (e.g., specialty coating type, thickness, etc.)
- *Weight* is only intended to be an order of magnitude value for understanding if needed.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	FF 357162	FF 357162
<i>Fabrication Scope</i>	237-18	107-19
<i>CWP</i>	S1601A-2.5-60-01	S1501B-2.5-80-03
<i>Drawings to Shop Complete – Actual</i>	05-07-2019	05-28-2019
<i>Drawings to Shop Complete – Forecast</i>	04-24-2019	05-15-2019
<i>Drawings to Shop Complete – Plan</i>	04-30-2019	05-30-2019
<i>Fabrication Complete – Forecast</i>	05-21-2019	06-21-2019
<i>Fabrication Complete – Plan</i>	05-21-2019	06-21-2019
<i>Fabrication Complete – Actual</i>	05-31-2019	06-30-2019
<i>Fabrication Percent Complete</i>	100	100
<i>Shipment Complete – Actual</i>	06-22-2019	07-22-2019
<i>Shipment Complete – Forecast</i>	06-06-2019	07-07-2019
<i>Shipment Complete – Plan</i>	06-15-2019	07-15-2019
<i>Shipping Percent Complete</i>	90	80
<i>CWP Delivery – Actual</i>	07-07-2019	08-15-2019
<i>CWP Delivery – Forecast</i>	06-15-2019	07-15-2019
<i>CWP Delivery – Planned</i>	06-24-2019	07-24-2019
<i>CWP Delivery – ROS</i>	06-30-2019	08-11-2019
<i>Detailer</i>	Fergusson Atlantic Inc.	Reliable Structures
<i>Specialty Coating Complete – Actual</i>	06-15-2019	07-15-2019
<i>Specialty Coating Complete – Forecast</i>	06-01-2019	07-01-2019
<i>Specialty Coating Complete – Plan</i>	06-01-2019	07-01-2019
<i>CWP Weight</i>	103.5	52.4
<i>Weight UOM</i>	Tons	Tons

3.12.2. DR180-02: Steel Fabrication Details Tracking

Description: List of steel fabrication details tracking

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the status of detailed piecemark fabrication.

Data Requirement Definition: Steel Fabrication Details Tracking

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	CWP	Unique construction work package identifier
PK	Required	Piecemark	Assembly mark number
	Required	Structure Tag	Unique tag number assigned to identify a project item
	Required	Member Type	Piecemark member type (e.g., beam, column, brace, etc.)
	Required	Count Fabricated	Piecemark count fabricated
	Required	Count Required	Piecemark count required
	Required	Count Shipped	Piecemark count shipped
	Required	Length	Length of the item
	Required	Length UOM	Unit of measurement for length of the item (e.g., FT, M, etc.)
	Required	Weight	Weight of the item
	Required	Weight UOM	Unit of measurement for weight of the item (e.g., TN, Lbs, Mt, Kg, etc.)
	Optional	3D GUID	Comma-separated list of 3D model piecemark GUIDs within the CWP
	Optional	Galvanizing Required	Indicates whether structure requires galvanizing
	Optional	Fireproofing Required	Indicates whether structure requires fireproofing

Discussion

- N/A

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	FF 357162	FF 357162
<i>CWP</i>	S1601A-2.5-60-01	S1501B-2.5-80-03
<i>Piecemark</i>	VB1035	A67
<i>Structure Tag</i>	S1601A-2.5-60-01-PR-001	S1501B-2.5-80-03-SP-020
<i>Member Type</i>	VERTICAL_BRACE_6X15	ANGLE_8x4x1
<i>Count Fabricated</i>	2	2
<i>Count Required</i>	2	4
<i>Count Shipped</i>	2	2
<i>Length</i>	17.067	16
<i>Length UOM</i>	FT	FT
<i>Weight</i>	512	99.76
<i>Weight UOM</i>	lbs	lbs
<i>3D GUID</i>	1eNj8eJPf1T8u9z9fi_KDb, 3vRk_ljHT8vg0H7VLTktVK	2aOjkrMs55qB6DCAo\$D660, 2HnIBtHkD28PYLSJBXLypF, 3KH9v6pPP5leF3ThHUGyIE, 1Qwq20c1bDw9eB7mYylez
<i>Galvanizing Required</i>	Yes	No
<i>Fireproofing Required</i>	No	Yes

3.13. DR190 – Pipe Detailing

3.13.1. DR190-01: Pipe Isometric Detailing

Description: List of pipe isometric detailing

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To track the commitments and progress against the detailing of piping isometrics.

Data Requirement Definition: Pipe Isometric Detailing

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Isometric Drawing	Piping isometric drawing number
	Required	CWP	Unique construction work package identifier
	Optional	Engineering Isos to Detailer – Actual	Actual date for engineer to transmit pipe isometrics
	Optional	Engineering Isos to Detailer – Forecast	Forecast date for engineer to transmit pipe isometrics
	Optional	Engineering Isos to Detailer – Plan	Planned date for engineer to transmit pipe isometrics
	Optional	Fabricator Detailing Delivery – Actual	Actual date for delivery of pipe drawings from a detailer
	Optional	Fabricator Detailing Delivery – Forecast	Forecast date for delivery of pipe drawings from a detailer
	Optional	Fabricator Detailing Delivery – Plan	Planned date for delivery of pipe drawings from a detailer
	Optional	Piping Line Number	Parent line number of associated isometric

Discussion

- The assumption is that an isometric should not split CWP boundaries, as this would mean that engineering was not following construction's direction or construction was not involved in the engineering process (different entities).

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	PR001	AN.9892
<i>Isometric Drawing</i>	HOR-CX-1492-04	AA-IX-732-01
<i>CWP</i>	CWP-1001	280X810A-01
<i>Engineering Isos to Detailer – Actual</i>	01/03/2020	06/04/2020
<i>Engineering Isos to Detailer – Forecast</i>	01/03/2020	06/01/2020
<i>Engineering Isos to Detailer – Plan</i>	01/03/2020	04/08/2020
<i>Fabricator Detailing Delivery – Actual</i>	01/17/2020	07/01/2020
<i>Fabricator Detailing Delivery – Forecast</i>	01/16/2020	07/03/2020
<i>Fabricator Detailing Delivery – Plan</i>	01/16/2020	05/01/2020
<i>Piping Line Number</i>	HOR-CX-1492	AA-IX-732

3.13.2. DR190-02: Pipe Isometric Transmittals

Description: List of pipe isometric transmittals

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the unique list of transmittals and their relation to the isometric files.

Data Requirement Definition: Pipe Isometric Transmittals

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Isometric Drawing	Piping isometric drawing number
PK	Required	Isometric File Type	File type of isometric (e.g., PDF, PCF, etc.)
PK	Required	Transmittal ID	Transmittal ID the document was issued under
	Required	Isometric Revision	Pipe isometric's revision released version
	Required	Doc Status	Current state of release of the pipe isometric (e.g., IFA, IFC)
	Required	CWP	Unique construction work package identifier
	Required	On Hold	Indicates whether the isometric is currently on hold
	Required	Deleted	Indicates whether the ISO has been deleted
	Required	Isometric File Name	Name of isometric (includes extension)
	Optional	Isometric File Title	Title of isometric

Discussion

- The implementation team recognizes that isometric transmittals are key data sets needed to link transmittal to isometrics that require additional attributes not captured in the DR120 Document Control data sets.
- The implementation team included *Isometric File Type* as part of Primary Key, but it is up to the project team to determine how document control is structured (e.g., isometrics with multiple file type attachments or separate isometric per file type).

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	PR001	AN.9892
<i>Isometric Drawing</i>	HOR-CX-1492-04	AA-IX-732-01
<i>Isometric File Type</i>	DGN	PDF
<i>Transmittal ID</i>	PR001-004-023	XMTL-007
<i>Isometric Revision</i>	01	-01A
<i>Doc Status</i>	ISSUED FOR CONSTRUCTION	ISSUED FOR CONSTRUCTION
<i>CWP</i>	CWP-1001	280X810A-01-01
<i>On Hold</i>	ON HOLD	NOT ON HOLD
<i>Deleted</i>	NOT DELETED	NOT DELETED
<i>Isometric File Name</i>	HOR-CX-1492-04.DGN	AA-IX-732-01.PDF
<i>Isometric File Title</i>	KNOCKOUT DRUM VENT LINE	80# INSTRUMENT AIR

3.13.3. DR190-03: Pipe Spools

Description: List of pipe spools by CWP

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define a unique spool list with an association to an isometric drawing.

Data Requirement Definition: Pipe Spools

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Spool Tag	Pipe spool unique identifier
	Required	Isometric Drawing	Piping isometric drawing number
	Required	CWP	Unique construction work package identifier
	Required	Length	Length of the item
	Required	Length UOM	Unit of measurement for length of the item (e.g., FT, M, etc.)
	Required	Material	Spool material of construction
	Required	Weight	Weight of the item
	Required	Weight UOM	Unit of measurement for weight of the item (e.g., TN, LBS, Mt, Kg, etc.)
	Required	Schedule/ Thickness	Spool schedule or wall thickness

Discussion

- Assumption: *Spool Tag* contains the isometric number plus spool sequence number, but a separate *Isometric* field is included for the isometric drawing number, as this is useful for database manipulation.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	PR001	AN.9892
<i>Spool Tag</i>	HOR-CX-1492-0401	AA-IX-732-0101
<i>Isometric Drawing</i>	HOR-CX-1492-04	AA-IX-732-01
<i>CWP</i>	CWP-1001	280X810A-01-01
<i>Length</i>	40	18
<i>Length UOM</i>	M	Linear Feet
<i>Material</i>	STAINLESS STEEL	C156
<i>Weight</i>	320	180
<i>Weight UOM</i>	Kg	lbs
<i>Schedule/ Thickness</i>	SCH-STD	12MM

3.14. DR200 – Pipe Fabrication

3.14.1. DR200-01: Pipe CWP Fabrication Delivery Requirements

Description: List of pipe spool delivery requirements

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the delivery schedule of each CWP by fabrication scope/contract.

Data Requirement Definition: Pipe CWP Fabrication Delivery Requirements

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Fabrication Scope	Unique scope identifier (e.g., PWP, fabrication contract/PO, etc.)
PK	Required	CWP	Unique construction work package identifier
	Required	CWP Pipe Spools Delivery – ROS	Required on site date specified for the CWP
	Required	CWP Pipe Spools Delivery – Planned	Planned date to deliver all pipe spools for CWP
	Required	CWP Pipe Spools Delivery – Forecast	Forecast date to deliver all pipe spools for CWP
	Optional	CWP Pipe Spools Delivery – Actual	Actual date to deliver all pipe spools for CWP

Discussion

- The implementation team recognizes that the actual delivery date will most likely come from on-site material controls and not from the fabricator.
- The team also expects that the ROS date can be a moving target based on the refined path of construction as it is updated. As such, the planned delivery date was the locked baseline for comparison purposes.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	PR001	AN.9892
<i>Fabrication Scope</i>	PWP-001	PO-1240095
<i>CWP</i>	CWP-1001	280X810A-01-01
<i>CWP Pipe Spools Delivery – ROS</i>	08/15/2020	06/19/2020
<i>CWP Pipe Spools Delivery – Planned</i>	08/10/2020	06/15/2020
<i>CWP Pipe Spools Delivery – Forecast</i>	08/11/2020	12/15/2020
<i>CWP Pipe Spools Delivery – Actual</i>	08/11/2020	TBD

3.14.2. DR200-02: Pipe Spool Fabrication Tracking

Description: List of pipe spool fabrication tracking

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the list of piping spools and track their status through the fabrication cycle.

Data Requirement Definition: Pipe Spool Fabrication Tracking

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Spool Tag	Unique tag number assigned to identify a project item
	Required	CWP	unique construction work package identifier
	Required	CWA	construction work area identifier
	Required	EWP	engineering work package identifier
	Required	Isometric Drawing	Piping isometric drawing number
	Required	In Production	Date pipe spool fabrication began
	Required	Fabrication Complete	Date pipe spool fabrication was completed
	Optional	Painting Complete	Date pipe spool painting was completed
	Optional	PWHT Complete	Date the pipe spool had post weld heat treatment, if required
	Required	Length	Length of the item
	Required	Length UOM	Unit of measurement for length of the item (e.g., FT, M, etc.)
	Required	Weight	Weight of the item
	Required	Weight UOM	Unit of measurement for weight of the item (e.g., TN, lbs, Kg, etc.)
	Optional	Material Allocated	Date spool material was allocated
	Required	On Hold Date	Date engineering placed a hold on fabrication of the pipe spool
	Required	Release Hold	Date engineering released a hold on the spool
	Required	ROS	Required onsite date for this pipe spool
	Optional	QA/QC Complete	Date QA/QC completed inspection

Data Requirement Definition: Pipe Spool Fabrication Tracking (continued)

Key	Tier	Field Name	Definition
	Optional	Header Size	Maximum size of the header
	Optional	Priority	Project priority
	Optional	Transmittal No.	Transmittal number
	Optional	Material Type	Material type
	Optional	Material Type Description	Material type description
	Optional	Line Spec	Specification of the line
	Optional	Heat Treat	Heat treatment requirement
	Optional	Shop Test	Hydrotest or pneumatic requirement
	Optional	Surface Area	Surface area of the spool
	Optional	FDI	Field diameter inch
	Optional	Last Status	Last status numerical identifier
	Optional	Last Status Desc	Last status text identifier
	Optional	Next Status	Next status numerical identifier
	Optional	Next Status Desc	Next status text identifier
	Optional	Paint System	Paint code
	Optional	Released to Shop Date	Status date timestamp – released to shop
	Optional	Cut Complete Date	Status date timestamp – cut complete
	Optional	Weld Complete Date	Status date timestamp – weld complete
	Optional	QC Complete Date	Status date timestamp – quality control complete
	Optional	Ship Complete Date	Status date timestamp – shipping complete
	Optional	Delivery No.	Delivery number
	Optional	Ship To Name	Shipping name received
	Optional	Hold Code	Hold code
	Optional	Hold Date	Hold date timestamp
	Optional	Data Date	Current record data date
	Optional	Remarks	Any remarks or notes

Discussion

- ROS dates of spool should match CWP ROS dates. However, ROS dates specific to a spool can allow for prioritization within a CWP.
- The *Spool Piecemark* tag is tied to *Shipment ID*, *Load List ID*, *Container ID*, and line item (*Material ID*) on DR150-04 and DR150-05.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	PR001	AN.9892
<i>Spool Tag</i>	HOR-CX-1492-0401	AA-IX-732-0101
<i>CWP</i>	CWP-1001	280X810A-01-01
<i>CWA</i>	10	280X810A
<i>EWP</i>	1001	280X810A-01-01
<i>Isometric Drawing</i>	HOR-CX-1492-04	AA-IX-732-01
<i>In Production</i>	04/02/2020	03/21/2019
<i>Fabrication Complete</i>	04/04/2020	–
<i>Painting Complete</i>	05/01/2020	–
<i>PWHT Complete</i>	–	–
<i>Length</i>	40	18
<i>Length UOM</i>	M	Linear Feet
<i>Weight</i>	320	180
<i>Weight UOM</i>	Kg	lbs
<i>Material Allocated</i>	03/27/2020	02/10/2019
<i>On Hold Date</i>	–	03/26/2019
<i>Release Hold</i>	–	08/22/2020
<i>ROS</i>	05/06/2020	09/24/2020
<i>QA/QC Complete</i>	05/02/2020	–
<i>Header Size</i>	040	060
<i>Priority</i>	0	High
<i>Transmittal No.</i>	001	252
<i>Material Type</i>	60	CS
<i>Material Type Description</i>	A333 GR1, 6 LTCS @ <=50F	A33
<i>Line Spec</i>	G3B-1TM-B-60	1CS1
<i>Heat Treat</i>	N	Y
<i>Shop Test</i>	Hydro	Pneumatic
<i>Surface Area</i>	64.56	50.25
<i>FDI</i>	107.54	109
<i>Last Status</i>	880	50
<i>Last Status Desc</i>	880 – Final Update	50-Checking
<i>Next Status</i>	999	52
<i>Next Status Desc</i>	999 – Complete – Ready to Purge	52-Approved

Sample Entries (continued)

Field Name	Sample Entry 1	Sample Entry 2
<i>Paint System</i>	9B	10
<i>Released to Shop Date</i>	4/29/2020	29-05-2021
<i>Cut Complete Date</i>	05/12/2020	30-06-2021
<i>Weld Complete Date</i>	6/1/2020	31-07-2021
<i>QC Complete Date</i>	6/8/2020	01-08-2021
<i>Ship Complete Date</i>	6/17/2020	10-08-2021
<i>Delivery No.</i>	2	1
<i>Ship To Name</i>	RSJA	FOX
<i>Hold Code</i>	1	–
<i>Hold Date</i>	7/17/2020	–
<i>Data Date</i>	6/17/2020	10/08/2021
<i>Remarks</i>	–	SPOOL FABRICATION DELAYED DUE TO ENGINEERING HOLD AND GLOBAL PANDEMIC

3.15. DR230 – Contractor Scope Items

3.15.1. DR230-01: Contractor Scope

Description: List of contractor scope

Source(s): Engineering management team

Timing: Beginning of Stage 2

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 2

Purpose

To define the breakdown of scope items per contractor.

Data Requirement Definition: Contractor Scope

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Contractor ID	Labor contractor on the project that performed the material take-off (MTO) for the CWP
	Required	Scope Item	Item that may be from the construction contractor's take-off or progress database, line items from an estimate, IFC drawings, schedule activities, installation work packages, or any other basis of defining scope
	Optional	CWP	Unique construction work package identifier
	Optional	IWP	Unique installation work package identifier
	Required	Discipline	Discipline responsible for the engineering design
	Optional	Est Hrs	Estimated hours for installation activities associated with the reported quantities
	Optional	Tag	Unique tag number assigned to identify a project item
	Optional	Test Package Designation	Test package identifier
	Required	Scope Total QTY	Total quantity of the material type within the CWP for the primary and secondary classifications
	Required	Scope QTY UOM	Unit of measurement for the total quantity field (e.g., EA, LF, Dia. In, M)
	Optional	Sub-System ID	Unique turnover sub-system identifier
	Optional	Phase	Field phase of execution (e.g., construction, testing, etc.)
	Optional	Material Take-off Document Number	Document number of the MTO

Data Requirement Definition: Contractor Scope (continued)

Key	Tier	Field Name	Definition
	Optional	Material Description	Short description of the material in consideration for the MTO analysis
	Optional	Material Type	Specific type of material within scope of the CWP

Discussion

- This table is intended to provide a very flexible model to define construction contractor scope to be executed and to liken that scope to the delineations of the AWP packages (e.g., CWP, IWP, etc.).
- Testing and turnover attributes may not be available until later in the project.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	98938277	CPLX-0987
<i>Contractor ID</i>	Acme Mechanical Works, Inc.	56484987
<i>Scope Item</i>	Install Spool SP-9882-002	Set Pump P9101A
<i>CWP</i>	CWP-0012-00A1-Pipe	CWP-DA02-Equip-01
<i>IWP</i>	IWP-0012-00A1-Pipe-003	IWP-DA02-Equip-01-001
<i>Discipline</i>	Piping	Mechanical
<i>Est Hrs</i>	14	80
<i>Tag</i>	SP-9882-002	P-9101A
<i>Test Package Designation</i>	TP.12.A1.9882.01	–
<i>Scope Total QTY</i>	9	1
<i>Scope QTY UOM</i>	Linear Feet	Ea
<i>Sub-System ID</i>	20-EF-001-001	DEM-25-002-023
<i>Phase</i>	Construction	Construction
<i>Material Take-off Document Number</i>	P22L08-SN-784153-1	EQP-P8392-9101-28B
<i>Material Description</i>	Piping Spool	Centrifugal Pump
<i>Material Type</i>	Carbon Steel	Mechanical Equipment

3.16. DR260 – Constraints

3.16.1. DR260-01: Constraints

Description: List of constraints

Source(s): Engineering management team

Timing: Beginning of Stage 3

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 3

Purpose

To capture a list of execution constraints against all package types.

Data Requirement Definition: Constraints

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Package ID	Unique package identifier (e.g., the IWP or CWP number)
PK	Required	Package Type	Type of package (e.g., IWP, CWP, STR, etc.)
PK	Required	Constraint ID	Unique constraint identifier within the package
	Required	Assigned To	Party responsible for clearing the constraint
	Required	Constraint Description	Specific description of the constraint
	Required	Constraint Type	Type of constraint (e.g., materials, scaffold, manpower, etc.)
	Required	Date Identified	Date the constraint was identified
	Required	Date Required	Date the constraint is due to be cleared
	Required	Date Resolved	Date the constraint is resolved
	Required	Constraint Status	Current status (e.g., working, on hold, cleared, etc.)
	Optional	Notes	Miscellaneous notes

Discussion

- This is intended to be a flexible model, to capture any constraint type per package that the project chooses to track.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	98938277	CPLX-0987
<i>Package ID</i>	IWP-0012-00A1-Pipe-003	IWP-DA02-Equip-01-001
<i>Package Type</i>	IWP	IWP
<i>Constraint ID</i>	IWP-0012-00A1-Pipe-003-Const-02	45612
<i>Assigned To</i>	Smith	Jones
<i>Constraint Description</i>	Two of five spools have not yet been received on-site	Pending resolution of foundation RFI
<i>Constraint Type</i>	Material Availability	RFI
<i>Date Identified</i>	09/02/2020	20200718
<i>Date Required</i>	09/15/2020	20200730
<i>Date Resolved</i>	–	20200721
<i>Constraint Status</i>	Open	Resolved
<i>Notes</i>	Expediating w/ fabricator	RFI cleared, installation greenlighted

3.17. DR270 – Site Materials

3.17.1. DR270-01: Materials Location

Description: List of material storage locations

Source(s): Engineering management team

Timing: Beginning of Stage 3

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 3

Purpose

To define all possible locations where material can be stored on site.

Data Requirement Definition: Materials Location

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Facility ID	Short identifier to uniquely mark the materials location (e.g., warehouse, container number, yard number, etc.)
PK	Required	Location ID	Bin identifier for correct location of the item (e.g., warehouse location, shelf and bay or box)
	Optional	Facility Description	Description of the materials location
	Optional	Facility Site	Site where the materials location resides
	Optional	Facility Type	Type of location (e.g., warehouse, laydown, etc.)

Discussion

- N/A

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	98938277	CPLX-0987
<i>Facility ID</i>	Laydown 1	Warehouse 1
<i>Location ID</i>	A1	R02.A.02
<i>Facility Description</i>	Outdoor Laydown	Indoor Warehouse
<i>Facility Site</i>	Construction Site	Offsite Warehouse
<i>Facility Type</i>	Laydown Yard	Offsite Storage

3.17.2. DR270-02: Material Receiving Report

Description: List of material receiving reports

Source(s): Engineering management team

Timing: Beginning of Stage 3

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 3

Purpose

To capture material receiving information

Data Requirement Definition: Material Receiving Reports

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Material Receiving Report	Unique identifier of the delivery
PK	Required	Shipment ID	Shipment identifier
PK	Required	Load List ID	Load list identifier
PK	Required	Container ID	Identifier of container, box, pallet, etc.
PK	Required	Material ID	Material identifier for the BOM item(s) (bulk) or unique tag ID if applicable (e.g., tag, spool number, commodity, etc.)
	Required	PO	Purchase order number
	Optional	Requisition Line	Line item on the requisition
	Required	Item Description	Material description
	Optional	Date Received	Date material received – site takes custody
	Required	Expected Qty	Quantity of item identifier
	Required	Expected Qty UOM	Unit of measurement for quantity of item (e.g., EA, LF, Dia. In, M, etc.)
	Required	Qty Received	Total quantity received
	Optional	Qty Overage	Quantity overage of the received item(s)
	Optional	Qty Shortage	Quantity shortage of the received item(s)
	Optional	Qty Damage	Quantity damaged of the received item(s)
	Required	CWP	Unique construction work package identifier
	Required	Tag	Unique tag number assigned to identify a project item
	Required	Discipline	Discipline responsible for the engineering design
	Optional	Material Category	Material category
	Optional	Material Type	Material type within the category

Key	Tier	Field Name	Definition
	Optional	Facility ID	Short identifier to uniquely mark the location of the materials (e.g., warehouse, container number, yard number, etc.)
	Optional	Location ID	Bin identifier for correct location of the item (e.g., warehouse location, shelf and bay or box)
	Optional	Material Size	Material sizing information
	Optional	Material Size UOM	Unit of measurement for material sizing (e.g., EA, LF, M, In, etc.)
	Optional	Weight	Weight of Item ID
	Optional	Weight UOM	Unit of measurement for weight of the item (e.g., TN, lbs, Kg, etc.)

Discussion

- This utilizes the same shipping material model as Procurement data sets. See DR150 for more detail.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	98938277	CPLX-0987
<i>Material Receiving Report</i>	MRR-454562	12355689
<i>Shipment ID</i>	STK2-0369	4553158
<i>Load List ID</i>	BOL-00892-1A	56368
<i>Container ID</i>	TCU-845365	Crate 001
<i>Material ID</i>	SP-9081-002	P9807A
<i>PO</i>	PO-001-AC-0898	25698BT58894
<i>Requisition Line Item</i>	005	001
<i>Item Description</i>	Pipe Spool	Centrifugal Pump
<i>Date Received</i>	07/15/2020	20200418
<i>Expected Qty</i>	1	1
<i>Expected Qty UOM</i>	EA	EA
<i>Qty Received</i>	2	1
<i>Qty Overage</i>	1	0
<i>Qty Shortage</i>	0	0
<i>Qty Damage</i>	0	0
<i>CWP</i>	CWP-0012-00A1-Pipe	CWP-DA02-Equip-01
<i>Tag</i>	SP-9081-002	P9807A

Sample Entries (continued)

Field Name	Sample Entry 1	Sample Entry 2
<i>Discipline</i>	Piping	Equipment
<i>Material Category</i>	Prefabricated Pipe	Mechanical Equipment
<i>Material Type</i>	Carbon Steel	Pump
<i>Facility ID</i>	Laydown 1	Warehouse 1
<i>Location ID</i>	A1	R02.A.02
<i>Material Size</i>	4	–
<i>Material Size UOM</i>	NPD	–
<i>Weight</i>	91	223
<i>Weight UOM</i>	lbs	Kg

3.17.3. DR270-03: Materials Inventory

Description: List of materials inventory

Source(s): Engineering management team

Timing: Beginning of Stage 3

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 3

Purpose

To define the list of materials in inventory and key attributes, including package relationships.

Data Requirement Definition: Materials Inventory

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Material ID	Material identifier for the BOM item(s) (bulk) or unique tag identifier, if applicable (e.g., tag, spool number, commodity, etc.)
	Required	Item Description	Material description
	Optional	CWP	Unique construction work package identifier
	Optional	IWP	Unique installation work package identifier
	Required	Discipline	Discipline responsible for the engineering design
	Required	Facility ID	Location identifier for the material item(s)
	Required	Location ID	Bin identifier for correct location of the item (e.g., warehouse location, shelf and bay or box)
	Required	Material Category	Material category
	Required	Material Description	Material description
	Required	Material Type	Material type within the category
	Required	Qty Inventory	Current quantity in inventory at location
	Required	Qty Issued	Quantity issued
	Required	Qty Purchased	Total quantity purchased for the project to date
	Required	Qty Received	Total quantity received for the project to date
	Required	Qty UOM	Unit of measurement for quantity of the item (e.g., Dia. In, M, etc.)
	Required	Tag	Unique tag number assigned to identify a project item
	Optional	Material Size	Material sizing information
	Optional	Material Size UOM	Unit of measurement for material size (e.g., EA, LF, Dia. In, M, etc.)

Discussion

- This table is meant to be flexible by associating components to a broader parent tag.
- For many materials, the *Material ID* and the *Tag* will be 1:1 (e.g., spool), but for many other materials, multiple *Material IDs* will link to a parent *Tag* (e.g., ship loose components to a pump).

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	98938277	CPLX-0987
<i>Material ID</i>	SP-9081-002	P9807A
<i>Item Description</i>	Pipe Spool	Centrifugal Pump
<i>CWP</i>	CWP-0012-00A1-Pipe	CWP-DA02-Equip-01
<i>IWP</i>	IWP-0012-00A1-Pipe-003	IWP-DA02-Equip-01-001
<i>Discipline</i>	Piping	Mechanical
<i>Facility ID</i>	Laydown 1	Warehouse 1
<i>Location ID</i>	A1	R02.A.02
<i>Material Category</i>	Prefabricated Pipe	Mechanical Equipment
<i>Material Description</i>	Pipe Spool	Centrifugal Pump
<i>Material Type</i>	Carbon Steel	Pump
<i>Qty Inventory</i>	1	1
<i>Qty Issued</i>	1	0
<i>Qty Purchased</i>	1	1
<i>Qty Received</i>	1	1
<i>Qty UOM</i>	EA	EA
<i>Tag</i>	SP-9081-002	P9807A
<i>Material Size</i>	4	–
<i>Material Size UOM</i>	NPD	–

3.17.4. DR270-04: Materials Issue**Description:** List of materials issue**Source(s):** Engineering management team**Timing:** Beginning of Stage 3**Frequency:** Continuous as revised – at a minimum, monthly through the end of Stage 3*Purpose*

To capture materials issued from inventory to the field for installation.

Data Requirement Definition: Materials Issue

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Materials Issue Request ID	Material requisition identifier for the materials issue request
PK	Required	Material ID	Material identifier for the BOM item(s)
	Required	Material Description	Material description
	Required	Delivered To	Responsible stakeholder that the materials issue was provided to
	Required	Issued Date	Date of materials issue
	Required	IWP	Unique installation work package identifier
	Required	Qty Issued	Total quantity issued
	Required	Qty Requested	Total quantity requested for issue
	Required	Qty Shortage	Total quantity shortage
	Required	Qty UOM	Unit of measurement for quantity (e.g., EA, LF, Dia. In, M, etc.)
	Required	Requested By	Responsible stakeholder who requested the issuance of materials
	Required	Requested Date	Date of materials issue request
	Required	Tag	Unique tag number assigned to identify a project item

Discussion

- N/A

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	98938277	CPLX-0987
<i>Materials Issue Request ID</i>	MIR-12569	1549875
<i>Material ID</i>	SP-9081-002	P9807A
<i>Material Description</i>	Pipe Spool	Centrifugal Pump
<i>Delivered To</i>	Smith	Jones
<i>Issued Date</i>	08/19/2020	05/02/2020
<i>IWP</i>	IWP-0012-00A1-Pipe-003	IWP-DA02-Equip-01-001
<i>Qty Issued</i>	1	1
<i>Qty Requested</i>	1	1
<i>Qty Shortage</i>	0	0
<i>Qty UOM</i>	EA	EA
<i>Requested By</i>	Martinez	Williams
<i>Requested Date</i>	08/11/2020	04/29/2020
<i>Tag</i>	SP-9081-002	P9807A

3.18. DR290 – Site Progress

3.18.1. DR290-01: Rules of Credit

Description: List of rules of credit

Source(s): Engineering management team

Timing: Beginning of Stage 3

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 3

Purpose

To define rules of credit for claiming progress per component type groupings.

Data Requirement Definition: Rules of Credit

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	IWP Type	Type of installation work package (e.g., install, hydrotest, etc.)
PK	Required	Work Type	Type of work (e.g., spool, cable, foundation, etc.)
PK	Required	Work Sub Type	Subset of typical steps for a specific type grouping
PK	Required	Typical Step Number	Sequencing order for typical steps
	Required	Discipline	Discipline responsible for the engineering design
	Required	Typical Step Description	Short description for the typical step (e.g., stage, erect, connect, support, punch)
	Required	Typical Step Spread	Percentage spread factor that the typical step “earns” of Total Qty upon completion of the step

Discussion

- The implementation team understands that data should be grouped by type (e.g., spools), but different rules of credit may apply, depending on the sub type (e.g., carbon steel above ground spool).

Sample Entries

Field Name	<i>Sample Entry 1</i>	<i>Sample Entry 2</i>
<i>Project ID</i>	24198	350-10046
<i>IWP Type</i>	Install	Hydrotest
<i>Work Type</i>	Pipe Spool	Pipe Fitting
<i>Work Sub Type</i>	Underground	Flange
<i>Typical Step Number</i>	4	2
<i>Discipline</i>	Piping	Piping
<i>Typical Step Description</i>	Fusion Complete	Restoration/Punch Complete
<i>Typical Step Spread</i>	25%	15

3.18.2. DR290-02: IWP Work Steps

Description: List of IWP work steps

Source(s): Engineering management team

Timing: Beginning of Stage 3

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 3

Purpose

To define progress through rules of credit for each IWP work step.

Data Requirement Definition: IWP Work Steps

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	IWP	Unique installation work package identifier
PK	Required	Tag	Unique tag number assigned to identify a project item
PK	Required	Work Step Number	Sequencing number of the work step in the IWP for the specified material component
	Required	Component or Assembly Name	Name for the component or assembly
	Required	Work Type	Type of work (e.g., spool, cable, foundation, etc.)
	Required	Work Sub Type	Subset of typical steps for a specific type grouping
	Required	Discipline	Discipline responsible for the engineering design
	Required	IWP Type	Type of installation work package (e.g., install, hydrotest, etc.)
	Required	Percent Complete	Percentage complete of the specified work step
	Required	Total QTY	Total quantity of the specified material component in the specified IWP
	Required	QTY UOM	Unit of measurement for the quantity reported (e.g., EA, LF, Dia. In, M, CY, etc.)
	Required	Work Step Description	Short description of the work step
	Optional	Work Step Earnable QTY	Quantity “to earn” with 100% progress of the specified work step
	Optional	Component or Assembly Description	Short description for the component or assembly
	Optional	Total Budget HRS	Total budget hours of the specified material component in the specified IWP

Discussion

- This table captures the component-level progressing information for each IWP for each rule of credit step.
 - *Percent Complete* should capture how far along the component is in each typical step (e.g., 20% complete of installing pipe component).
 - *Work Step Earnable Qty* should calculate value earned for a particular step of a single component once complete. Although this is a calculated field, this simplifies claiming steps in the field.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	24198	350-10046
<i>IWP</i>	0AB1-STG-MS-BYPASS	IWP-A2-Civil-01-001
<i>Tag</i>	01AB23PS001	017111-DB-00234
<i>Work Step Number</i>	1	2
<i>Component or Assembly Name</i>	Spool	Pier-02
<i>Work Type</i>	Pipe Spool	Foundation
<i>Work Sub Type</i>	Aboveground	Pier
<i>Discipline</i>	Piping	Civil
<i>IWP Type</i>	Install	Install
<i>Percent Complete</i>	.05	80%
<i>Total QTY</i>	10	488
<i>QTY UOM</i>	LF	CY
<i>Work Step Description</i>	Stage	Pour
<i>Work Step Earnable QTY</i>	1	390.4
<i>Component or Assembly Description</i>	Shop Fabricated Pipe Spool	Cast-in-place Concrete
<i>Total Budget HRS</i>	.56	256

3.18.3. DR290-03: IWP Execution

Description: IWP execution progress

Source(s): Engineering management team

Timing: Beginning of Stage 3

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 3

Purpose

To capture the actual progress of each IWP on the project.

Data Requirement Definition: IWP Execution

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	IWP	Unique installation work package identifier
	Required	IWP – HRS Actual	Actual man-hours expended on IWP based upon actual installation work
	Required	IWP – HRS Earned	Total man-hours “earned” in the IWP based upon installed quantity and rules of progress
	Required	IWP – HRS To Go	Total man-hours to be able “to be earned” in the IWP based upon quantity of IWP scope
	Required	IWP Percentage Complete	Total percentage complete of work steps in the IWP
	Required	IWP Start – Actual	Actual start date of the IWP in the short-range lookahead schedule
	Required	IWP Start – Forecast	Forecast start date of the IWP in the short-range lookahead schedule
	Required	IWP Start – Plan	Planned start date of the IWP in the baseline lookahead schedule
	Required	IWP Finish – Actual	Actual finish date of the IWP in the short-range lookahead schedule
	Required	IWP Finish – Forecast	Forecast finish date of the IWP in the short-range lookahead schedule
	Required	IWP Finish – Plan	Planned finish date of the IWP in the baseline lookahead schedule

Discussion

- This table may be an export of progress, as captured in scheduling or WorkFace Planning tools.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	24198	350-10046
<i>IWP</i>	0AB1-STG-MS-BYPASS	IWP-A2-Civil-01-001
<i>IWP – HRS Actual</i>	800	1500
<i>IWP – HRS Earned</i>	600	1500
<i>IWP – HRS To Go</i>	200	0
<i>IWP Percentage Complete</i>	75%	1.00
<i>IWP Start – Actual</i>	7/20/2020	6/4/2020
<i>IWP Start – Forecast</i>	7/18/2020	6/4/2020
<i>IWP Start – Plan</i>	7/3/2020	6/9/2020
<i>IWP Finish – Actual</i>	–	6/16/2020
<i>IWP Finish – Forecast</i>	7/29/2020	6/16/2020
<i>IWP Finish – Plan</i>	7/14/2020	6/21/2020

3.18.4. DR290-04: IWP Delays

Description: List of IWP delays

Source(s): Construction management team

Timing: Beginning of Stage 3

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 3

Purpose

To capture the IWP execution delay and constraint data.

Data Requirement Definition: IWP Delays

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	IWP	Unique installation work package identifier
PK	Required	Tag	Unique tag number assigned to identify a project item
PK	Required	Work Step Number	Sequencing number of the work step in the IWP for the specified material component
PK	Required	Delay Code	Standard code used for trending reasons for the delay
PK	Required	Delay Date	Date when delay was captured
	Required	IWP – HRS Delayed	Delayed man-hours wasted on IWP due to unforeseen field constraints stopping IWP close
	Optional	Comments	Short description of the reason for delay and inability to close out the IWP

Discussion

- *Delay Date* is part of the primary key to capture unique delays for the same reason (e.g., lightning/weather delay on Monday and Wednesday of the same IWP).

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	24198	24198
<i>IWP</i>	IWP-B2-Elect-01-001	IWP-B2-Elect-01-001
<i>Tag</i>	01EKF36XF001	01EKF36XF001
<i>Work Step Number</i>	2	2
<i>Delay Code</i>	4X	4X
<i>Delay Date</i>	7/14/2020	7/15/2020
<i>IWP – HRS Delayed</i>	4	15
<i>Comments</i>	Rain out	Second weather day in a row

3.19. DR310 – Completions

3.19.1. DR310-01: Sub-Systems Index

Description: List of sub-systems index

Source(s): Engineering management team

Timing: Beginning of Stage 3

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 3

Purpose

Defines the list of sub-systems and key attributes, including turnover forecasting and relationship to parent system.

Data Requirement Definition: Sub-Systems Index

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Sub-System ID	Unique turnover sub-system identifier
	Required	Sub-System Description	Description of the sub-system
	Required	Plan TCCC Date	Baseline plan date for transfer of care, custody, and control (TCCC)
	Required	Forecast TCCC Date	Current forecast date for TCCC
	Required	Actual TCCC Date	Actual date for TCCC
	Required	Current Custody Status	Current status of the turnover system (e.g., construction, pre-com, CSU, client, etc.)
	Optional	System Type	Type of system (e.g., process, fire detection, safety, telecom, etc.)
	Required	Related Tag	Related tag for the sub-system
	Required	Related IWP	Related installation work package for the sub-system
	Required	Related SWP	Related system work package for the sub-system
	Required	Commissioning Zone ID	Unique commissioning zone identifier
	Required	Commissioning Zone Description	Description of commissioning zone
	Required	System ID	Unique turnover system identifier
	Required	System Description	Description of system

Discussion

- Commissioning zones can consist of multiple operating systems, each of which can consist of multiple sub-systems.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	24198	350-10046
<i>Sub-System ID</i>	01AB01	01-35
<i>Sub-System Description</i>	Unit 1 Main Steam AB	Fuel Gas Pump
<i>Plan TCCC date</i>	8/24/2020	9/15/2020
<i>Forecast TCCC Date</i>	8/31/2020	9/15/2020
<i>Actual TCCC Date</i>	8/31/2020	–
<i>Current Custody Status</i>	Const	Pre-commissioning
<i>System Type</i>	Process	Process
<i>Related Tag</i>	52-PU-2501	44-SU-582.1
<i>Related IWP</i>	52-CWP-001	44250-45-0001
<i>Related SWP</i>	01AB-02	01-A
<i>Commissioning Zone ID</i>	01	01
<i>Commissioning Zone Description</i>	Unit 1	Fuel Gas North
<i>System ID</i>	01AB	01
<i>System Description</i>	Unit 1 Main Steam A	Fuel Gas North General

3.19.2. DR310-02: Test Packages

Description: List of test packages

Source(s): Engineering management team

Timing: Beginning of Stage 3

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 3

Purpose

To capture a list of project test packages with the status of each.

Data Requirement Definition: Test Packages

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Test Package ID	Unique test package identifier (e.g., hydrotest package)
	Required	Sub-System ID	Unique turnover sub-system identifier
	Required	Plan Test Date	Baseline plan date for test
	Required	Actual Test Date	Actual date for test
	Required	Forecast Test Date	Current forecast date for test
	Required	Test Status	Current status of the system test (e.g., construction, ready for test, complete, etc.)
	Required	Test Type	Type of test to be performed (e.g., hydro, loop check, megger, etc.)
	Optional	Test Discipline	Discipline responsible for the test (e.g., piping, electrical, etc.)
	Required	Related Tag	Related tag for the test package
	Required	Related IWP	Related installation work package for the test package
	Required	Related SWP	Related system work package for the test package

Discussion

- A typical use for this table would be to understand all testing required per sub-system or system and its status.

Sample Entries

Field Name	<i>Sample Entry 1</i>	<i>Sample Entry 2</i>
<i>Project ID</i>	24198	350-10046
<i>Test Package ID</i>	001-PZQ-AB-00101	145674009
<i>Sub-System ID</i>	01AB01	01-35-001
<i>Plan Test Date</i>	7/20/2020	8/09/2020
<i>Actual Test Date</i>	7/21/2020	8/09/2020
<i>Forecast Test Date</i>	7/21/2020	8/09/2020
<i>Test Status</i>	Ready for Test	Construction
<i>Test Type</i>	Hydrostatic	Holiday inspection
<i>Test Discipline</i>	Pipe	Coatings
<i>Related Tag</i>	52-PU-2501	44-SU-582.1
<i>Related IWP</i>	52-CWP-001	44250-45-0001
<i>Related SWP</i>	01AB01-A	01-35-001-003

3.19.3. DR310-03: Punch List Items

Description: List of punch list items

Source(s): Engineering management team

Timing: Beginning of Stage 3

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 3

Purpose

To capture a punch list of items, status, and other key attributes.

Data Requirement Definition: Punch List Items

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Punch List	Identifies specific walkdown that the punch list was captured in (e.g., mechanical completion walkdown, commissioning walkdown, client turnover walkdown, etc.)
PK	Required	Punch Item ID	Unique identifier used to track the punch list item
	Required	Punch Item Description	Description of the punch list item
	Required	Related Sub-System	Related sub-system package for the punch list item
	Required	Priority	Priorities as defined by project (e.g., A, B, C)
	Required	Assigned Date	Date that the punch list item was assigned
	Required	Assigned To	Individual that the punch list item was assigned to
	Required	Originator By	Individual or team that identified the punch list item
	Required	Originator Date	Date that the punch list item was created
	Required	Resolution Date	Date that the punch list item was resolved
	Required	Punch Item Status	Status of the punch list item (i.e., open or closed)
	Optional	Originating IWP	IWP scope from which the punch item originated (e.g., IWP tag where valve tag was missing)
	Optional	Related Tag	Related equipment tag for the punch list item
	Optional	Related Drawing	Related drawing for the punch list item
	Optional	Exception Flag	Identifies whether punch list item will be received without completing
	Optional	Remarks	Any remarks or notes

Discussion

- A *Punch List ID* can be used to specify the walkdown where the punch list items were captured (e.g., phases of the project where custody transfers between construction, commissioning, and client).
- The *Exception Flag* is typically a checkbox with the signature of the receiving party that is taking custody of the sub-system.
 - Project guidelines should define priority codes and which item requires an exception flag signature.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	24198	350-10046
<i>Punch List</i>	Mech. Comp.	Client Turnover
<i>Punch Item ID</i>	10489	126734
<i>Punch Item Description</i>	Remove spring can hydrotest blocks	Complete tagging of Fuel Gas inlet valve station
<i>Related Sub-System</i>	01-AB-001	01-35-001
<i>Priority</i>	A	2
<i>Assigned Date</i>	6/13/2020	7/15/2020
<i>Assigned To</i>	CSMCINTY	Jones, Brett J.
<i>Originator By</i>	ASANUSI	Brummert, Brian K.
<i>Originator Date</i>	6/1/2020	7/4/2020
<i>Resolution Date</i>	6/14/2020	7/31/2020
<i>Punch Item Status</i>	Complete	Verified
<i>Originating IWP</i>	01AB01-STG-MS-TIEINS	IWP-A4-PIPE-04-003
<i>Related Tag</i>	01AB24PHE001	01-35-01-004-3A
<i>Related Drawing</i>	001-PHE-AB-0024	01-35-XFA-04-003
<i>Exception Flag</i>	–	–
<i>Remarks</i>	–	–

3.19.4. DR310-04: Check & Test Sheets

Description: List of check and test sheets

Source(s): Engineering management team

Timing: Beginning of Stage 3

Frequency: Continuous as revised – at a minimum, monthly through the end of Stage 3

Purpose

To capture check and test sheets, status, and other key attributes.

Data Requirement Definition: Check & Test Sheets Items

Key	Tier	Field Name	Definition
PK	Required	Project ID	Unique project identifier
PK	Required	Check & Test Sheet Number	Unique identifier of the check and test sheet
	Required	Check & Test Sheet Description	Description of the check and test sheet
	Required	Check & Test Sheet Revision	Current revision of the check and test sheet
	Required	Check & Test Sheet Discipline	Discipline of the check and test sheet
	Required	Check & Test Sheet Type	Type of the check and test sheet
	Required	Originator	Name of the originator
	Required	Document Type	Type of document
	Required	Related Sub-System	Related sub-system package for the check and test sheet
	Required	Priority	Priorities as defined by project (e.g., A, B, C)
	Required	Check & Test Sheet Status	Status of the check and test sheet (i.e., open or closed)
	Required	Related IWP	Related installation work package for the check and test sheet
	Required	Related SWP	Related system work package for the check and test sheet
	Required	Related Tag	Related equipment tag for the check and test sheet
	Optional	Related Drawing	Related drawing for the check and test sheet
	Optional	Remarks	Any remarks or notes

Discussion

- Each sub-system can consist of check and test sheets that document the completion of commissioning activities.
- An SWP can be small in scope and magnitude and be a collection of check and test sheets or it can be scoped at a system or multi-sub-system level.
- Related IWPs correspond to pre-energization scope (i.e., all items documented on construction and pre-commissioning check sheets).
- Related SWPs correspond to post-energization scope.
- Some companies establish the association of IWPs to sub-systems and SWPs for every IWP. Additional effort or sophisticated software may be required to handle these relationships. Other companies wait for construction to make progress (typically over 60% or 70%) before they make that association, then focus on highlighting the remaining work required to complete a system, transitioning from bulk construction to execution driven by system completion.

Sample Entries

Field Name	Sample Entry 1	Sample Entry 2
<i>Project ID</i>	24198	52423
<i>Check & Test Sheet Number</i>	ECS-002-A (A2)	G-001 (A2)
<i>Check & Test Sheet Description</i>	LV/Control Cable Test Record	Act of Inspection of Concealed Works
<i>Check & Test Sheet Revision</i>	U07	U06
<i>Check & Test Sheet Discipline</i>	Electrical	General
<i>Check & Test Sheet Type</i>	Construction	Construction
<i>Originator</i>	QC/RA	RA
<i>Document Type</i>	Checksheet	RVD
<i>Related Sub-System</i>	40-1200-0111	52-1522-0001
<i>Priority</i>	High	1A
<i>Check & Test Sheet Status</i>	Open	Closed
<i>Related IWP</i>	45-4000E-0052	–
<i>Related SWP</i>	40-1200-0111-D	52-1522-0001-07
<i>Related Tag</i>	45-CAB-052	51-AC-201-015-001
<i>Related Drawing</i>	45-SCA-000-000-001	–
<i>Remarks</i>	–	–

Chapter 4: Conclusions and Recommendations

4.1. Conclusions

The primary conclusion of the project outcomes was the promotion of more productive information sharing for capital project stakeholders through AWP. The project team developed, wrote, reviewed, refined, and published the data requirements to augment the CII Best Practice of AWP. The project team collected data from the SMEs in CII Working Group 19-01 and utilized them to create this Implementation Guideline, which is this project's main deliverable.

This *AWP Data Requirements Implementation Guideline* satisfies an identified need from CII's membership. This need was largely derived from experience implementing AWP as defined by CII RT-272. Results from RT-272 provided foundational project framework elements for the *AWP Data Requirements Implementation Guideline*. The results of this project also support and facilitate the CII Best Practice of AWP.

4.2. Recommendations

The essential recommendation is for stakeholders on capital projects to implement these AWP Data Requirements to facilitate the standardization of information flow for work processes. More specifically, the AWP Data Requirements should be adopted as a reference for contractual requirements for data sharing among stakeholders on capital projects. Industrial and academic research showed a strong relationship between AWP implementation and higher project performance, compared to traditional planning and execution processes: up to 25% increase in field productivity and up to 10% decrease in total installed cost (CII/COAA 2015).

The project team envisions the following benefits for implementation of the *AWP Data Requirements Implementation Guideline*:

- Improving alignment among stakeholders
- Identifying and potentially mitigating risk
- Increasing the transparency surrounding AWP data sharing through standardization
- Enabling better proactive planning for stakeholders

The project team encourages personnel responsible for implementing this guide to select data requirement categories that are applicable to the work being performed. A project may require the use of all or only some of the data requirements, depending on the scope of work. The Working Group encourages project stakeholders to modify the recommended AWP Data Requirements to match their specific project needs to promote the implementation of the key project findings so their companies will experience the anticipated benefits.

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Revision Log

Versioning Convention

This guideline utilizes a two-field convention for version numbers, XX.YY:

XX: Major changes (e.g., added or removed major tables)

YY: Minor changes (e.g., added minor table; added, edited, or removed attributes); updates and clarification in documentation; no change to the data requirements (e.g., added to discussion sections but made no changes to the data requirements themselves)

Revision Log

Version	Date	Revision Description
1.0	Sep-18-2020	Initial issue
1.1	Dec-01-2021	First revision based on industry feedback
1.2	Jun-15-2022	Figures 2 and 3 updated based on RT-364 – no changes to the data requirements
1.3	Sep-07-2022	Added Figure 4. Added appendix to present Top-level Data Requirements.
1.4	Apr-24-2023	Added Companion Document

Acronym Glossary

AG	Above Ground
AWG	American Wire Gauge
AWP	Advanced Work Packaging
AWS	American Welding Society
BOM	Bill of Materials
CBA	Community for Business Advancement
CBE	Commercial Bid Evaluation
CII	Construction Industry Institute
CSU	Cost Schedule Update
CSV	Comma-separated Value
CWA	Construction Work Area
CWP	Construction Work Package
DR	Data Requirement
DTI	Direct Tension Indicator
EHT	Electrical Heat Tracing
EMT	Electrical Metallic Tube
EPC	Engineering, Procurement, and Construction
ERP	Enterprise Resource Planning
ETA	Estimated Time of Arrival
EWP	Engineering Work Package
GUID	Global Unique Identifier
IFA	Issue for Approval
IFC	Issued for Construction
IFI	Issued for Information
IFR	Issued for Review
IS	Inside Shield
IWP	Installation Work Package

KPI	Key Performance Indicator
MDL	Minimum Detectable Level
MDI	Manual Data Input
MTO	Material Take-off
NPD	Nominal Pipe Diameter
OID	Object Identifier
OS	Outside Shield
PCF	Portable Compiled Format
PO	Purchase Order
PPJ	Partial Penetration Joint
PWP	Procurement Work Package
RFI	Request for Information
ROS	Required on Site
SBS	System Breakdown Structure
SMAW	Shielded Metal Arc Welding
STR	Structural
SWP	System Work Package
TBE	Technical Bid Evaluation
TCCC	Transfer of Care, Custody, and Control
TP	Test Package
UCI	Unique Component Identification
UG	Underground
UOM	Unit of Measure
WBS	Work Breakdown Structure
WFP	WorkFace Planning

Appendix: Top-level Data Requirements

3.1. DR010 – AWP Master Index (6)

- 3.1.1. DR010-01: Project Information
- 3.1.2. DR010-02: CWAs
- 3.1.3. DR010-03: CWP
- 3.1.4. DR010-04: EWP
- 3.1.5. DR010-05: IWP
- 3.1.6. DR010-06: SWP

3.2. DR020 – Project Schedule (1)

- 3.2.1. DR020-01: Schedule Activities

3.3. DR050 – Equipment Design (1)

- 3.3.1. DR050-01: Equipment List

3.4. DR070 – Piping Design (4)

- 3.4.1. DR070-01: Line List
- 3.4.2. DR070-02: Isometric List
- 3.4.3. DR070-03: Tie-in List
- 3.4.4. DR070-04: Pipe Support List

3.5. DR080 – 3D Modeling (2)

- 3.5.1. DR080-01: Pipe Components
- 3.5.2. DR080-02: Generic Components

3.6. DR090 – Civil-Structural Design (4)

- 3.6.1. DR090-01: Structures List
- 3.6.2. DR090-02: Rebar
- 3.6.3. DR090-03: Anchor Bolts
- 3.6.4. DR090-04: Foundations

3.7. DR100 – Electrical & Instrumentation Design (7)

- 3.7.1. DR100-01: Cable Schedule
- 3.7.2. DR100-02: Electrical Equipment
- 3.7.3. DR100-03: Instrument Index
- 3.7.4. DR100-04: Conduit
- 3.7.5. DR100-05: Cable Tray
- 3.7.6. DR100-06: Lighting & Devices
- 3.7.7. DR100-07: Electrical Heat Tracing

3.8. DR120 – Document Control (2)

- 3.8.1. DR120-01: Document Register
- 3.8.2. DR120-02: Document to Entity

3.9. DR140 – Estimating and Cost (2)

- 3.9.1. DR140-01: EWP Estimate
- 3.9.2. DR140-02: CWP Estimate

3.10. DR150 – Procurement (5)

- 3.10.1. DR150-01: Material Requisition Tracking
- 3.10.2. DR150-02: Purchase Order Line Items
- 3.10.3. DR150-03: Supplier Purchase Order Shipments
- 3.10.4. DR150-04: Supplier Load Detail
- 3.10.5. DR150-05: Supplier Container Detail

3.11. DR170 – Structural Detailing (5)

- 3.11.1. DR170-01: Steel Detailing Deliverables
- 3.11.2. DR170-02: Steel Detail Drawings
- 3.11.3. DR170-03: Steel Piecemarks
- 3.11.4. DR170-04: Steel 3D Model Relationship
- 3.11.5. DR170-05: Steel Connection Details

3.12. DR180 – Steel Fabrication (2)

- 3.12.1. DR180-01: Steel Fabrication CWP Tracking
- 3.12.2. DR180-02: Steel Fabrication Details Tracking

3.13. DR190 – Pipe Detailing (3)

- 3.13.1. DR190-01: Pipe Isometric Detailing
- 3.13.2. DR190-02: Pipe Isometric Transmittals
- 3.13.3. DR190-03: Pipe Spools

3.14. DR200 – Pipe Fabrication (2)

- 3.14.1. DR200-01: Pipe CWP Fabrication Delivery Requirements
- 3.14.2. DR200-02: Pipe Spool Fabrication Tracking

3.15. DR230 – Contractor Scope Items (1)

- 3.15.1. DR230-01: Contractor Scope

3.16. DR260 – Constraints (1)

- 3.16. DR260-01 – Constraints (1)

3.17. DR270 – Site Materials (4)

- 3.17.1. DR270-01: Materials Location
- 3.17.2. DR270-02: Material Receiving Report
- 3.17.3. DR270-03: Materials Inventory
- 3.17.4. DR270-04: Materials Issue

3.18. DR290 – Site Progress (4)

- 3.18.1. DR290-01: Rules of Credit
- 3.18.2. DR290-02: IWP Work Steps
- 3.18.3. DR290-03: IWP Execution
- 3.18.4. DR290-04: IWP Delays

3.19. DR310 – Completions (4)

- 3.19.1. DR310-01: Sub-Systems Index
- 3.19.2. DR310-02: Test Packages
- 3.19.3. DR310-03: Punch List Items
- 3.19.4. DR310-04: Check & Test Sheets

CII Working Group 19-01

Phase I. Data Requirements Definition Team *(Second Half of 2019)*

Tom Morris, ExxonMobil Corporation
Stephen Jones, Shell Global Solutions US Inc.
Jacob Bubalo, Eastman Chemical Company
Manoj Dharwadkar, The Dow Chemical Company
Tedd Weitzman, Construct-X, LLC
John Banda, Autodesk, Inc.
Adam Messersmith, Kiewit Corporation
Srinivas Avantsa, AVEVA Solutions Ltd.
Colin McIntyre, Bechtel Group, Inc.
Ted Blackmon, Construct-X, LLC
Eric Crivella, Digital Construction Works

Phase II. Publication Team *(First Half of 2020)*

Tom Morris, ExxonMobil Corporation
Stephen Jones, Shell Global Solutions US Inc.
Jacob Bubalo, Eastman Chemical Company
Manoj Dharwadkar, The Dow Chemical Company
Tedd Weitzman, Construct-X, LLC
John Banda, Autodesk, Inc.
Adam Messersmith, Kiewit Corporation
Srinivas Avantsa, AVEVA Solutions Ltd.
Colin McIntyre, Bechtel Group, Inc.
John Walker, Atlas RFID Solutions
Yong Cho, Georgia Institute of Technology
Eric Marks, Georgia Institute of Technology

Phase III. Industry Feedback from ExxonMobil Corporation, Shell Global Solutions US Inc., Fluor Corporation, Hexagon, O3 Solutions, Insight-AWP Inc.
Joint Working Group (*Second Half of 2021*)

Tom Morris, ExxonMobil Corporation
Steve Jones, Shell Global Solutions US Inc.
Dario Rigaud, Fluor Corporation
Ajitesh Pahari, Fluor Corporation
Anabella Martin, Hilti Corporation
Bob Wible, Construction Industry Institute
Chuck Mies, Autodesk, Inc.
Eric Crivella, The Dow Chemical Company
Eric Dechoz, Shell Global Solutions US Inc.
Gregorio Labbozzetta, Insight-AWP Inc.
Jay Moser, Shell Global Solutions US Inc.
John Banda, Autodesk, Inc.
John Fish, FB&D
Lloyd Rankin, Group ASI
Mark Mehta, iConstruct
Mick Hayashi, JGC Corporation
Nagendra Koripalli, XOM
Silvana Lara, Fluor Corporation
Tedd Weitzman, Worley

Editor: Michael E. Burns

Construction Industry Institute
The University of Texas at Austin
3925 W. Braker Lane (R4500)
Austin, Texas 78759-5316



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