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International Construction Consulting, LLC

Upstream & Midstream Pipelines, Facilities, and Field Developments

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Inside This Issue

Independent Project Assessments

I have an Independent Project Assessment (IPA) Program consisting of a suite of 4 modules. The Program covers 4 distinct types of IPA's at critical decision points along the project execution timeline. The modules consist of:

1. **Risk Assessments**
2. **Constructability Reviews**
3. **Construction Readiness Assessment**
4. **Operational Readiness Assessment**

1. Risk Assessments (RA) – these are scenario based and would normally be conducted at:

- Conceptual
- FEED
- Detail Design
- Prior to start of construction

RA's, typically specified in the Risk Management Plan (RMP), would be to develop a detailed listing of project and execution vulnerabilities along with mitigations and in some high impact issues, a resolution plan for close out. An RMP should cover:

- Prioritize key risks
- Communicate those risks to stakeholders
- Develop a clear path to address and/or mitigate the key risks

The goal is to reach an understanding of the risk, its management, and achieving alignment with stakeholders.

2. Constructability Reviews – these would typically be performed at:

- Conceptual
- FEED
- Early in Detail Design
- At 50% completion of detailed design

The objectives of Constructability Reviews is to meet the objectives of sound Project Management which is to assist in the identification of upgrades/ initiatives which will enhance project safety, quality, cost, schedule and risk management early in the project.

3. Construction Readiness Assessment (CRA) – to be conducted prior to start of construction and would be to assess that adequate progress and plans are in place to initiate specific construction, fabrication or installation activities.

CRA's are not meant to be a technical audit or a complete validation of the project cost and schedule estimate. Specific deliverables are reviewed for the primary purpose of confirming the status and effectiveness of existing project & construction management systems, processes, procedures, and plans.

The primary objectives of the CRA are to:

- Provide an unequivocal message to Management
- Provide an independent assessment to Project Management and Senior Management
- Provide a Management tool for stewardship of risks and vulnerabilities
- Assess deliverables
- Assess adequate readiness to proceed to initiate specific site activities
- Identify risks and vulnerabilities related to the both the PMT and construction Contractor activities
- Gain co-venture and stakeholder alignment (i.e. by participating in the CRA if appropriate)

4. Operational Readiness Assessment (ORA) – to be conducted:

- FEED
- Detail Design
- At start of construction
- At a predetermined time prior to construction completion & turn over

The ORA is tailored to assess the current state of a project's pre-operations planning. The results are an upgrade to operational assurance, identifying gaps in deliverables, prioritizing the focus items, and agreeing on actions required to achieve operational readiness by the end of the current project phase.

This process can be applied on an existing project regardless of the phase or where a change in project scope or direction might determine that a re-look at a project's pre-operational activities is prudent.

I can assist in developing and performing Independent Project Assessments and related tools such as Risk Management Plans; Constructability Plans; Project Execution Plans, etc.

Piping Code Rules of Thumb

I have attempted to capture some useful rules of thumb where it comes to piping code selection and use. The following are in no particular order.

Onshore Piping

Elements such as service, safety, environmental protection, Company liability, cost effectiveness and local government regulations should be considered if more than one code is allowed for a particular application.

When a particular code is selected for use in a certain piping segment, that code should be followed throughout the piping design, fabrication, construction and testing of that segment.

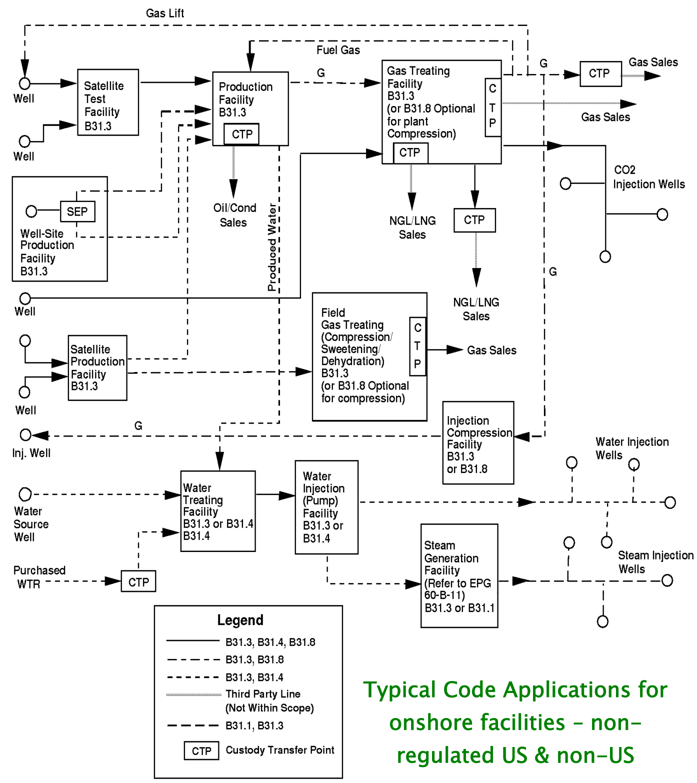
None of the piping codes are written to be detailed design handbooks. However, they do provide general guidelines and engineering requirements, which are deemed necessary and adequate for safe design and construction of piping systems covered by that code.

Lines regulated by the U.S. Department of Transportation (DOT) should be in accordance with 49 CFR 192 or 49 CFR 195. ASME B31.8 shall be followed as required by Part 192 and ASME B31.4 should be followed as required by Part 195.

The selection of the applicable piping code shall be as specified, unless superseded by more stringent local regulations and/or Client requirements. In non-U.S. locations, local governmental regulations should be reviewed prior to starting the piping design.

For above grade lines that use API SPEC 5L Grade B pipe or non-metallic piping, ASME B31.3 may be the more appropriate code to use. When the lines are below grade or API SPEC 5L X-grades of pipe are used, then ASME B31.4 (liquids) or ASME B31.8 (gas or liquid and gas) may be more appropriate and cost effective.

Under ASME B31.8 – the location derating factors (Basic Design Factors) vary between 0.80 (sparsely populated area) and 0.40 (heavily populated area). The smaller factors can greatly increase wall thickness requirements.



Typical Code Applications for onshore facilities – non-regulated US & non-US

Offshore Piping

Piping design and construction should be in accordance with ASME B31.3 as modified by API RP 14E. Additionally, for U.S. locations, the requirements of 30 CFR 250 should be followed.

Unless superseded by more stringent local regulations and/or Client requirements, for non-US offshore work, the selection of the applicable piping code should be:

- Flowlines – ASME B31.8
- Platforms – ASME B31.3
- Pipelines/Gathering Lines (Liquid Only) – ASME B31.4
- Pipelines/Gathering Lines (Gas or Gas/Liquid) – ASME B31.8

In non-U.S. locations, local governmental regulations shall be reviewed prior to starting the piping design.

Piping design and construction for offshore platform piping should be in accordance with ASME B31.3 as modified by API RP 14E.

Cash Flow Development

Cash Flow Overview

After an opportunity has been defined, cash flows must be developed in order to model the economic and financial impact of an investment.

Cash flow analysis is a globally-accepted method to quantitatively evaluate an investment opportunity. It consists of estimating the timing and amount of all of a project's cash inflows and outflows. There are two aspects of a forecast of future cash flow:

- First is developing the ***right*** cash flow in time.
- Second is assessing what that uncertain time series of cash flow is worth today.

It should be recognized that many of the variables that go into cash flow models are uncertain and chooses to incorporate probabilities into the cash flow modeling, generally using the approaches and techniques that are part of the decision analysis process when appropriate for the type of investment decision. The goal of developing the cash flows is to compare the timing and magnitude of the flows with the timing and magnitude of flows resulting from alternative uses of resources.

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It is important to understand how to incorporate risks into the cash flow and how to develop the revenue and cost components of cash flow.

Cash Flow Components

The components of cash flow are:

- Revenue: the cash flow received from goods or services.
- Cost: the cash spent in making, operating, and marketing the investment.
- Terms: the framework of how the revenue and costs are treated (i.e. taxes, foreign currency issues, financing, payment terms, etc.).

The Cash Flow Equation

The basic cash flow equation is very simple:

Revenue - **Costs** - **Tax** = **After Tax Cash Flow**.

As noted, many of the variables that go into the calculation of revenues and costs such as volumes, prices, capital, operating expense, etc. are generally not known for certain at the time decisions must be made. Sensitivity analysis is used to see how changing one or more of the variables will affect the decision, or more frequently, a representation of the range of uncertainty for those variables with probabilities is developed.

It is prudent practice to quantify as many risks as practical in cash flow assessments, rather than adjusting the discount rate for risk.

A common practice is to use a standard ten percent discount rate for all investments, regardless of the types of risk the investment is exposed to. This avoids the complexity of determining project-specific discount rates. However, it is a business decision regarding how to set investment decision criteria based on the specific risks the investment faces.