# COAA

#### Owner Questionnaire Version 8.4

**Table of Contents**

1. [General Information Form 1](#_TOC_250053)
   1. [Project Description 1](#_TOC_250052)
   2. [Project Nature 2](#_TOC_250051)
   3. [Project Characteristics 3](#_TOC_250050)
   4. [Project Delivery System 4](#_TOC_250049)
   5. [Project Complexity 4](#_TOC_250048)
   6. [Engineering Standards and Specifications 5](#_TOC_250047)
   7. [Project Scope 6](#_TOC_250046)
   8. [Project Participation 7](#_TOC_250045)
   9. [Percentage Union Workforce 9](#_TOC_250044)
2. [Performance 10](#_TOC_250043)
   1. [Budgeted and Actual Project Costs by Phase 10](#_TOC_250042)
   2. [Planned and Actual Project Schedule 14](#_TOC_250041)
   3. [Project Development Changes and Scope Changes 15](#_TOC_250040)
   4. [Field Rework 16](#_TOC_250039)
3. [Engineering Productivity Metrics 17](#_TOC_250038)
   1. [Concrete 18](#_TOC_250037)
   2. [Structural Steel 20](#_TOC_250036)
   3. [Electrical 22](#_TOC_250035)
   4. [Piping 24](#_TOC_250034)
   5. [Instrumentation 25](#_TOC_250033)
   6. [Equipment 26](#_TOC_250032)
4. [Construction Productivity Metrics 29](#_TOC_250031)
   1. [Concrete 30](#_TOC_250030)
   2. [Structural Steel 33](#_TOC_250029)
   3. [Electrical 35](#_TOC_250028)
   4. [Piping 41](#_TOC_250027)
   5. [Instrumentation 45](#_TOC_250026)
   6. [Equipment 46](#_TOC_250025)
   7. [Insulation 52](#_TOC_250024)
   8. [Modules Installation 54](#_TOC_250023)
   9. [Scaffolding 56](#_TOC_250022)
   10. [Construction Work-Hours 57](#_TOC_250021)
5. [Practices 58](#_TOC_250020)
   1. [Front End Planning 58](#_TOC_250019)
      1. [Full Building PDRI 60](#_TOC_250018)
      2. [Full Industrial PDRI 65](#_TOC_250017)
   2. [Project Risk Assessment 71](#_TOC_250016)
   3. [Team Building 73](#_TOC_250015)
   4. [Alignment during Front End Planning 75](#_TOC_250014)
   5. [Design for Maintainability 77](#_TOC_250013)
   6. [Constructability 79](#_TOC_250012)
   7. [Materials Management 81](#_TOC_250011)
   8. [Project Change Management 84](#_TOC_250010)
   9. [Zero Accident Techniques 87](#_TOC_250009)
   10. [Quality Management 90](#_TOC_250008)
   11. [Automation/Integration (AI) Technology 94](#_TOC_250007)
   12. [Planning for Startup 97](#_TOC_250006)
   13. [Prefabrication/ Preassembly/ Modularization 100](#_TOC_250005)
6. [Closeout 101](#_TOC_250004)
   1. [Achieving Facility Capacity 101](#_TOC_250003)
   2. [Work-hours and Accident Data 102](#_TOC_250002)
   3. [Project Impacts 104](#_TOC_250001)
   4. [Workforce Conditions 108](#_TOC_250000)

i

ii

**COAA**

#### Owner Questionnaire Version 8.4

# General Information Form

Your Company Name: Please provide the Name that you will use to refer to this Project: Location of Project:

City:

Province: Country:

Contact Person: (Benchmarking Associate) Contact's Phone:

Contact's Fax:

Contact's E-mail Address: All Project costs should be recorded herein using Canadian Dollars (CAD).

Project quantities to be recorded as:

* Metric(cm., m., tonne)
* Imperial(in., ft., ton)

Expected project Completion Date (MM/DD/Year):

## Project Description

#### Principle Type of Project:

Choose a Project Type which **best** describes the project from the categories below. If the project is a mixture of two or more of those listed, select the principle type. If the project type does not appear in the list, select other under the appropriate industry group and specify the project type.

#### Heavy Industrial Light Industrial

Chemical Manufacturing Automotive Manufacturing

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Electrical (Generating) Consumer Products Manufacturing

Environmental Foods

Metals Refining/Processing Microelectronics Manufacturing

Mining Office Products Manufacturing

Natural Gas Processing Pharmaceutical Manufacturing

Oil Exploration/Production Pharmaceutical Labs

Oil Refining Clean Room (Hi-Tech)

Oil Sands Mining/Extraction Other Light Industrial Oil Sands SAGD

Oil Sands Upgrading Cogeneration

Pulp and Paper

#### Heavy Industrial

Pipeline

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| --- |
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Gas Distribution

Other Heavy Industrial

#### Buildings Infrastructure

Communications Center Airport

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Courthouse Electrical Distribution

Dormitory/Hotel/Housing/Residential Flood Control

Embassy Highway

Low rise Office (≤3 floors) Marine Facilities

High rise Office (>3 floors) Navigation

Hospital Rail

Laboratory Tunneling

Maintenance Facilities Water/Wastewater

Movie Theatre Telecom, Wide Area Network

Parking Garage Other Infrastructure Physical Fitness Center

Prison Restaurant/Nightclub Retail Building School

Warehouse Other Buildings

If other, please describe:

## Project Nature

From the list below select the category that best describes the nature of this project. If your project is a combination of these natures, select the category that you would like your project to be benchmarked against. Please see the glossary for definitions.

The Project Nature was: Grass Roots, Green Field

|  |
| --- |
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|  |

Modernization, Renovation Addition, Expansion

Other Project Nature (Please describe):

Is this project part of a larger project? **◘ Yes ◘ No**

If Yes, please describe:

## Project Characteristics

1. **Project Drivers**

Select the primary driver influencing the execution of this project. Assume safety is a given for all projects. This section must be verified again at project closeout.

The primary driver was: Cost

|  |
| --- |
|  |
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|  |

Schedule

Meeting Product Specifications Production Capacity

Other (Please describe): No primary driver

## Turnarounds/Shutdowns/Outages

Construction performance (cost, schedule and quality) during project turnarounds, shutdowns, and outages may be impacted by schedule demands of the turnaround. These turnarounds may be scheduled or unscheduled. Please complete the blocks below to indicate the percentage of construction work completed during turnaround.

|  |  |  |
| --- | --- | --- |
| 1. Percent construction during **scheduled turnaround:** |  | % |
| 2. Percent construction during **unscheduled turnaround:** |  | % |
| 3. Percent construction during **non-turnaround:** |  | % |

**Note: the percentages should add up to 100 %**

## Percent Modularization

Choose a percentage value that best describes the level of modularization (offsite construction) used. This value should be determined as a ratio of the cost of all modules divided by total installed cost.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **0%** | **10%** | **20%** | **30%** | **40%** | **50%** | **60%** | **70%** | **80%** | **90%** | **100%** |

## Percent Offsite Construction Labour Hours

Choose a percentage value that best describes the level of offsite labour hours for building modules. This value should be determined as a ratio of the offsite labour hours of all modules divided by **total construction hours**.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **0%** | **10%** | **20%** | **30%** | **40%** | **50%** | **60%** | **70%** | **80%** | **90%** | **100%** |

## Project Delivery System

Please choose the project delivery system from those listed below that most closely characterizes the delivery system used for your project. If more than one delivery system was used, select the primary system.

|  |  |  |
| --- | --- | --- |
| **Delivery System** | | **Description** |
|  | Traditional Design-Bid-Build | Serial sequence of design and construction phases; Owner contracts separately with designer and constructor. |
|  | Design-Build (or EPC) | Overlapped sequence of design and construction phase; procurement normally begins during design; owner contracts with Design-Build (or EPC) contractor. |
|  | CM at Risk | Overlapped sequence of design and construction phases; procurement normally begins during design; owner contracts separately with designer and CM at Risk (constructor). CM holds the contracts. |
|  | Multiple Design-Build | Overlapped sequence of design and construction phases; procurement normally begins during design; owner contracts with two Design-Build (or EPC) contractors, one for process and one for facilities. |
|  | Parallel Primes | Overlapped sequence of design and construction phases; Procurement normally begins during design. Owner contracts separately with designer and multiple prime constructors. |
|  | Other Delivery System | |

Did you use a Construction Manager not at Risk in conjunction with the selected delivery system? Yes No

## Project Complexity

Choose a value that best describes the level of complexity for this project as compared to other projects from all the companies within the same industry sector. For example, if this is a heavy industrial project, how does it compare in complexity to other heavy industrial projects? Use the definitions below as general guidelines.

* **Low** - Characterized by the use of no unproven technology, small number of process steps, small facility size or process capacity, previously used facility configuration or geometry, proven construction methods, etc.
* **High**- Characterized by the use of unproven technology, an unusually large number of process steps, large facility size or process capacity, new facility configuration or geometry, new construction methods, etc.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Low Average High** | | | | | | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |

## Engineering Standards and Specifications

Please provide information about this project’s use of engineering standards and specifications.

Process Industry Practices (PIP) is a consortium of process industry owners and engineering construction contractors who serve the industry. PIP publishes documents called “Practices" that reflect standards in many engineering discipline.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Source of Standards and Specifications** | **Strongly Disagree 0** | **Disagree**  **1** | **Neutral**  **2** | **Agree**  **3** | **Strongly Agree**  **4** | **NA / UNK** |
|  |
| A | The project was executed with internal owner engineering standards and specifications. | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| B | The project was executed with contractor engineering standards and specifications. | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| C | The project was executed using industry consortia engineering practices for standards and specifications. | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| D | The project was executed using Process Industry Practices (PIP) standards and specifications. | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

# Engineering Deliverables

1. Engineering deliverables were released in a timely manner to support construction operations?

Not at all Sometimes Always

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Engineering deliverables were complete and accurate (minimal errors and omission)? Not at all Sometimes Always

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Please rate the usability of the engineering deliverables?

Poor Adequate Excellent

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

## Project Scope

Please provide a brief description of the project scope (what is actually being designed / constructed). Limit your response to 200 words.

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## Project Participation

First, indicate the percentage of each **function** performed by your company.

Next, for each function at least partially performed by a contractor, indicate the **principle contract type** used. If more than one contract type was used, indicate the most prevalent.

**Principle Type of Contract for each company:** Unit price refers to a price for in place units of work and does not refer to hourly charges for skill categories or time card mark-ups. Hourly rate payment schedules should be categorized as cost reimbursable. The contract type for your own company's contribution should be recorded as In House.

* + Cost Reimbursable/Target Price
  + Guaranteed Maximum Price
  + Lump Sum
  + Unit Price

Finally, indicate if **incentives** were used, if you had an **Alliance** with the contractors for each function, and whether **COAA or CII Member** companies were involved.

**Contract Incentives:** Please indicate whether cost, schedule, safety, and quality incentives were used. Incentives may be positive (a financial incentive for attaining an objective), negative (a financial disincentive for failure to achieve an objective), or both. Indicate "none" if no incentives were used for a category.

**Alliance Use:** Was the participating company an Alliance Partner? An alliance partner is a company with whom your company has a long-term formal strategic agreement that ordinarily covers multiple projects.

**COAA or CII Member:** Was the company that involved this function a COAA or CII Member?

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Functions** | **Owner Response Table** | | | | | | | | |
| **Your Company Self Perform** (0-100%) | **Principle Contract Type**  (select one per phase) | **Contractor Incentive Use**  (select one for each incentive type) | | | | **Alliance Use** | | **COAA or CII**  **Member** |
| Front End Planning | % | * Cost Reimbursable / Target Price * Guaranteed Max Price * Lump Sum * Unit Price |  | **Cost**   * Positive * Negative * Both ◘ None | **Schedule**   * Positive * Negative * Both ◘ None |  | Yes No | | * COAA * CII * Both * None |
| **Safety**   * Positive * Negative * Both ◘ None | **Quality**   * Positive * Negative * Both ◘ None |
|  |  |  |  | **Cost** | **Schedule** |  |  | |  |
| Detailed Engineering | % | * Cost Reimbursable /   Target Price   * Guaranteed Max Price * Lump Sum * Unit Price | * Positive * Negative * Both ◘ None | * Positive * Negative * Both ◘ None | * COAA * CII * Both * None |
|  | Yes No |
| **Safety**   * Positive * Negative | **Quality**   * Positive * Negative |  |
|  | |
|  |  |  | * Both ◘ None | * Both ◘ None |  |
| Procurement | % | * Cost Reimbursable / Target Price * Guaranteed Max Price * Lump Sum * Unit Price |  | |  |  | Yes No | | * COAA * CII * Both * None |
|  | **Cost** | **Schedule** |
| * Positive | * Positive |
| * Negative | * Negative |
| * Both ◘ None | * Both ◘ None |
| **Safety** | **Quality** |
| * Positive | * Positive |
| * Negative | * Negative |
| * Both ◘ None | * Both ◘ None |
| Construction | % | * Cost Reimbursable / Target Price * Guaranteed Max Price * Lump Sum * Unit Price |  | **Cost**   * Positive * Negative * Both ◘ None | **Schedule**   * Positive * Negative * Both ◘ None |  |  | | * COAA * CII * Both * None |
|  | Yes No |
| **Safety** | **Quality** |  |
| * Positive | * Positive |  | |
| * Negative | * Negative |
| * Both ◘ None | * Both ◘ None |
| Startup | % | * Cost Reimbursable / Target Price * Guaranteed Max Price * Lump Sum * Unit Price |  | **Cost**   * Positive * Negative * Both ◘ None | **Schedule**   * Positive * Negative * Both ◘ None |  | Yes No | | * COAA * CII * Both * None |
| **Safety** | **Quality** |
| * Positive | * Positive |
| * Negative | * Negative |
| * Both ◘ None | * Both ◘ None |



## Percentage Union Workforce

Please indicate the percentage of Building Trades, Alternate Union and Non Union Labour employed for the following disciplines. Each row should sum up to 100%.

**Building Trades Unions** are organizations of workers formed for the purpose of advancing their members' interests in respect to wages, benefits and working conditions. Building trades unions typically represent single trades.

Example: IBEW - International Brotherhood of Electrical Workers

**Alternate Unions** are multicraft unions or wall-to-wall unions similar in purpose to building trades unions but are inclusive of mulitiple trades and industries.

Example: CLAC - Christian Labour Association of Canada

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Discipline** | **Percentage Building Trades** | **Percentage Alternate Union** | **Percentage Non Union** | **Total (%)** |
| Concrete | %   * NA ◘Unknown | %   * NA ◘Unknown | %   * NA ◘Unknown | 100% |
| Structural Steel | %   * NA ◘Unknown | %   * NA ◘Unknown | %   * NA ◘Unknown | 100% |
| Electrical | %   * NA ◘Unknown | %   * NA ◘Unknown | %   * NA ◘Unknown | 100% |
| Piping | %   * NA ◘Unknown | %   * NA ◘Unknown | %   * NA ◘Unknown | 100% |
| Instrumentation | %   * NA ◘Unknown | %   * NA ◘Unknown | %   * NA ◘Unknown | 100% |
| Equipment | %   * NA ◘Unknown | %   * NA ◘Unknown | %   * NA ◘Unknown | 100% |
| Insulation | %   * NA ◘Unknown | %   * NA ◘Unknown | %   * NA ◘Unknown | 100% |

# Performance

## Budgeted and Actual Project Costs by Phase

Please indicate the Budgeted (Baseline) and Actual Project Costs by phase. All project costs should be recorded using Canadian Dollars (CAD).

1. Budget amounts include contingency and correspond to funding approved at time of Project Sanction. This is the original baseline budget, and should not be updated to include any changes since change data are collected in a later section. Metrics definitions specifically address changes as appropriate.
2. Click on the project phase links below for phase definitions and typical cost elements.
3. If this project did not include a particular phase, please select N/A.
4. The total project **budget** amount should include all **planned expenses (**excluding the cost of land**)** from front end planning through startup, including amounts estimated for in-house salaries, overhead, travel, etc.
5. The total **actual** project cost should include all **actual** project costs at time of project closeout **(**excluding the cost of land**)** from front end planning through startup, including amounts expended for in-house salaries, overhead, travel.
6. **If you know total project costs but have incomplete phase information**, you may enter as much phase information as you know and override the automatic totaling function by manually filling in the total project cost. As long as you don't click back into a phase field, your total will be accepted and recorded.



**Project Phase**

**Baseline Budget (Including Contingency)**

**Amount of Contingency in Budget**

**Actual Phase Cost**

Front End Planning

* NA ◘Unknown

◘NA ◘Unknown

◘NA ◘Unknown

Detail Engineering

* NA ◘Unknown

◘NA ◘Unknown

◘NA ◘Unknown

* NA ◘Unknown

◘NA ◘Unknown

◘NA ◘Unknown

Construction2

* NA ◘Unknown

◘NA ◘Unknown

◘NA ◘Unknown

* NA ◘Unknown

◘NA ◘Unknown

◘NA ◘Unknown

Total Project

If you track the cost of construction management, please provide it. $

Procurement1

Directs

Indirects

Total

Startup

Remark: 1 **Procurement Phase Cost** – Costs of **Major Equipment** including process and mechanical equipment, construction equipment left on site and used after commissioning (see table p.13) and modules fabricated offsite.

#### 2 Construction Cost – See “Instructions for Construction Direct and Indirect Costs” below.

**Construction Direct and Indirect Cost**

Direct costs are those which are readily or directly attributed to, or become an identifiable part of, the final project (e.g., piping labour and material). Indirect costs are costs that cannot be attributed readily to a part of the final product (e.g. temporary facilities).

Please use the following table as a guide in categorizing direct and indirect construction cost.

|  |  |
| --- | --- |
| **Direct Construction Cost** | **Indirect Construction Cost** |
| Direct labour  - See construction productivity table (p.27) | Indirect labour  - See construction productivity table |
| Labour burdens and fringe benefits | Overtime premium (additional cost for which no work is performed) |
| Direct subcontracts | Mobilization, Demobilization |
| Bulk materials  - See bulk material table (p.12) | Construction office trailers and equipment. |
|  | Construction utilities (power, water etc.) |
|  | Temporary construction (e.g. roads, fencing, fab. shops, etc.) |
|  | Construction equipment (rental/ ownership& consumerables – fuel, oil, etc.) |
|  | Other consumables- small tools, supplies |
|  | Scaffolding materials (rental/ ownership) |
|  | Field services |
|  | Permits (construction related) |
|  | Vendor representatives |
|  | Freight (for items listed in this table) |
|  | Catering, accommodations |
|  | Travel |
|  | Misc. (insurance, etc.) |
|  | Indirect subcontracts |
| Note: For benchmarking purposes exclude the following:   * Demolition cost * Remediation cost * Site preparation cost (construction cost begins with excavation for foundations or driving of piles)   Provide data for Construction subtotal if indirect and indirect breakout is not available. | |

# Bulk Material

**Bulk materials** are generally defined as the balance of construction components outside the major equipment classification. Bulks are commonly referred to as commodity materials. In general bulks do not include tagged/numbered equipment. Please use the following table as a guide in categorizing cost of bulk materials.

|  |  |
| --- | --- |
| **Bulk Material Reference Table** | |
| **Craft** | **Examples of Bulk Material** |
| Civil/Structural | Concrete |
| Reinforcing Steel |
| Concrete Embeds |
| Structural Steel |
| Piling |
| Pipe | Pipe |
| Fittings |
| Manual valves |
| Hangers / Supports |
| Process Air Duct |
| Instrumentation | Control valves |
| Control panels |
| Field instrumentation |
| Instrument air tubing |
| Electrical | Cable tray |
| Conduit |
| Wire/Cable |
| Light fixtures |
| Electrical heat tracing |
| Grounding |
| Misc. | Insulation |
| Paint |
| Fireproofing |

#### Total Cost of Major Equipment

The purpose of this question is to determine the extent to which the overall project cost is driven by the purchase of **major equipment in general and more particularly, mechanical and process equipment.** Please see the Equipment Reference Table provided below. Record the total purchase cost of major equipment overall as well as the total purchase cost of mechanical and process equipment.

Total Cost of Major Equipment $ Total Cost of Mechanical and process Equipment $

* N/A ◘ Unknown
* N/A ◘ Unknown

|  |  |
| --- | --- |
| **Equipment Reference Table** | |
| **Examples of Major Equipment** | **Kinds of Equipment Covered** |
| **Electrical Equipment** | |
| HVAC Systems | Prefabricated air supply houses |
| Motors | 600V and above |
| Electricity Generation and Transmission | Major electrical items (e.g., unit substations, transformers, switch gear, motor-control centers, batteries, battery chargers, turbines and other miscellaneous power generation equipment). |
| **Mining Equipment** | |
| Loaders and Haulers | Dozers, haul trucks, graders. |
| Excavators | Hydraulic/ electric shovels, draglines, etc. |
| Material Handling Equipment | |
| **Mechanical & Process Equipment** | |
| Exchangers | Heat transfer equipment: tubular exchangers, condensers, evaporators, reboilers, coolers (including fin-fan coolers and cooling towers). |
| Pumps | All types of liquid pumps and drivers. |
| Direct-fired Equipment | Fired heaters, furnaces, boilers, kilns, and dryers, including associated equipment such as super-heaters, air preheaters, burners, stacks, flues, draft fans and drivers, etc. |
| Columns and Pressure Vessels | Towers, columns, reactors, unfired pressure vessels, bulk storage spheres, and unfired kilns; includes internals such as trays and packing. |
| Tanks | Atmospheric storage tanks, bins, hoppers, and silos. |
| Vacuum Equipment | Mechanical vacuum pumps, ejectors, and other vacuum producing apparatus and integral auxiliary equipment. |
| Material Handling Equipment | Conveyers, cranes, hoists, chutes, feeders, scales and other weighing devices, packaging machines, and lift trucks. |
| Package Units | Integrated systems bought as a package (e.g., air dryers, air compressors, refrigeration systems, ion exchange systems, etc.). |
| Special Processing Equipment | Agitators, crushers, pulverizers, blenders, separators, cyclones, filters, centrifuges, mixers, dryers, extruders, fermenters, reactors, pulp and paper, and other such machinery with their drivers. |
| Include freight. Exclude costs of project team, costs for field services, bulk construction equipment (such as valves, bus duct etc.) and off-the-shelf equipment. | |

## Planned and Actual Project Schedule

Please indicate your company's Planned Baseline and Actual Project Schedule by phase:

* + 1. The dates for the planned schedule should be those in effect at Project Sanction. If you cannot provide an exact day for either the planned or actual, estimate to the nearest week.
    2. Click on the project phase links below for a description of starting and stopping points for each phase.
    3. If this project did not include a particular phase please select N/A.
    4. **If you have incomplete phase information**, you must enter overall project start and stop dates. Please enter as much phase information as possible.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Project Phase** | **Baseline Schedule** | | **Actual Schedule** | |
| Start  **mm/dd/yyyy** | Stop  **mm/dd/yyyy** | Start  **mm/dd/yyyy** | Stop  **mm/dd/yyyy** |
| Front End Planning |  |  |  |  |
| ◘Unknown | ◘Unknown | ◘Unknown | ◘Unknown |
| Detail Engineering |  |  |  |  |
| ◘Unknown | ◘Unknown | ◘Unknown | ◘Unknown |
| Procurement |  |  |  |  |
| ◘Unknown | ◘Unknown | ◘Unknown | ◘Unknown |
| Construction |  |  |  |  |
| ◘Unknown | ◘Unknown | ◘Unknown | ◘Unknown |
| Startup |  |  |  |  |
| ◘Unknown | ◘Unknown | ◘Unknown | ◘Unknown |
| Overall Project Start and Stop Dates |  |  |  |  |
| ◘Unknown | ◘Unknown | ◘Unknown | ◘Unknown |

#### % Design Complete

What percentage of detailed engineering work-hours was completed

as of total Project Sanction? %

* + - * Unknown

What percentage of detailed engineering work-hours was completed

as of start of the construction phase? %

* + - * Unknown

## Project Development Changes and Scope Changes

Please record the **approved** changes to your project by phase in the table provided below. For each phase indicate the net cost impact, and the net schedule impact resulting from project **approved** development changes and scope changes. Either the owner or contractor may initiate changes. **All costs should be recorded using Canadian Dollars (CAD).**

**Project Development Changes** include those changes required to execute the original scope of work or obtain original process basis.

**Scope Changes** include changes in the base scope of work or process basis.

* + 1. Changes should be included in the phase in which they were initiated. Click on the project phase links below for assistance in classifying the changes by project phase. **If you cannot provide the requested change information by phase** but can provide the information for the total project, please fill in the totals field manually, thereby overriding the totaling function. As long as you don’t click back into a phase field, your total will be accepted and recorded.
    2. Indicate whether the net impact was a decrease (-) or an increase (+) by indicating a negative number for a decrease and a positive number for an increase. If no change orders were granted during a phase, write "0" in that row.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Project Phase** | **Cost Increase (+) / Decrease (-) of**  **Project Development Changes** | **Cost Increase (+) / Decrease (-) of**  **Scope Changes** | **Schedule Increase (+) / Decrease (-) of Project Development Changes (weeks)** | **Schedule Increase (+) / Decrease (-) of Scope Changes (weeks)** |
| Pre- Construction | $   * Unknown | $  ◘Unknown | ◘Unknown | ◘Unknown |
| Construction thru Startup | $   * Unknown | $   * Unknown | ◘Unknown | ◘Unknown |
| Totals | $ | $ |  |  |

## Field Rework

#### Did you track field rework for this project?

◘Yes ◘No ◘Unknown

If Yes:

* + 1. Please indicate the Direct Cost and Schedule Impact of Field Rework for each source shown below. The **direct cost of field rework** relates to all costs needed to perform the rework itself.
    2. If there was no direct cost of field rework for a category, please enter “0”.
    3. **If you cannot provide the requested information by source**, but can provide the total for the project, please click unknown in the source fields and **enter the project total**. This will override the totaling function. As long as you don’t click back into a phase field, your total will be accepted and recorded.
    4. All costs should be recorded using Canadian Dollars (CAD).

.

|  |  |  |
| --- | --- | --- |
| **Source of Field Rework** | **Direct Cost of Field Rework** | **Schedule Impact of Field Rework (weeks)** |
| Design | $  ◘Unknown | ◘Unknown |
| Vendor | $  ◘Unknown | ◘Unknown |
| Owner | $  ◘Unknown | ◘Unknown |
| Contractor | $  ◘Unknown | ◘Unknown |
| Other | $  ◘Unknown | ◘Unknown |
| Total | $ |  |

# Engineering Productivity Metrics

### Instructions for Computation of Work-Hours and Rework-Hours

Work-hours are computed by the summation of all the account hours that are listed as **Direct** in the following table. All the account hours listed as **Indirect** are to be **excluded** from the work-hours that are submitted in the productivity data for the following sections.

**Direct work-hours should include all detailed engineering hours used to produce deliverables including site investigations, meetings, planning, constructability, RFIs, etc., and rework.** Specifically exclude work-hours for operating manuals and demolition drawings. Engineering work-hours reported should only be for the categories requested and may not equal the total engineering work-hours for the project.

**Exclude the following categories: architectural design, plumbing, process design, civil/site prep, HVAC, insulation and paint, sprinkler/deluge systems, etc.** Within a category, direct work-hours that cannot be specifically assigned into the provided classifications, and have not been excluded, should be prorated based on known work-hours or quantities as appropriate. Please review this table completely before providing data in the following sections.

|  |  |  |
| --- | --- | --- |
|  | **Direct** | **Indirect** |
| **Account** | Discipline Engineer | Document Control |
| Designer | Reproduction Graphics |
| Technician | Project Management |
|  | Project Controls (cost/schedule/estimating) |
|  | Project Engineer |
|  | Secretary/clerk |
|  | Procurement (supply management) |
|  | Construction Support  (test package support, commissioning, etc.) |
|  | Quality Assurance |
|  | Accounting |
|  | Legal |

#### Unit of Measure Legend:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| cm.  mm. | centimeter millimeter | SM MT | Square Meter Metric Ton | WH HP | Work-hour Horse Power |
| LM | Linear Meter | CM | Cubic Meter | kW | kilo-watts |

* 1. **Concrete**

**Instructions**

Please complete the following tables indicating quantity and engineering work-hours for the categories appropriate to your project. If you cannot enter all data then enter totals only. Include rework in the work-hours only. If the project had no work-hours or quantities for a category, enter none.

The quantity of concrete is the amount of concrete that is required for the specified slab, foundation, or structure provided in the final Issued for Construction (IFC) drawings.

Refer to the section “Instructions for Computation of Work-Hours and Rework-Hours” for a detailed listing of direct hours to be included and indirect hours that are to be excluded from the computation of the work-hours.

Which design platform was used for this category in this project? Check all that apply.

2D ( )

3D ( )

|  |  |  |  |
| --- | --- | --- | --- |
| **Slabs** | **None** | **IFC**  **Quantity (CM)** | **Engineering WH (including rework) (hours)** |
| Ground & Supported Slabs |  |  |  |
| Area Paving |  |  |  |
| **Total Slabs** |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Foundations** | **None** | **IFC**  **Quantity (CM)** | **Engineering WH (including rework) (hours)** |
| Piling (each) |  |  |  |
| Foundations (< 4CM) |  |  |  |
| Foundations (≥ 4CM) |  |  |  |
| **Total Foundations (CM)**  (Excluding piling) |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Concrete Structures** | **None** | **IFC**  **Quantity (CM)** | **Engineering WH (including rework) (hours)** |
| **Concrete Structures** |  |  |  |
| Concrete Structures include concrete structures, columns, beams, cooling tower basins, trenches, formed elevated slabs/structures, and retaining walls. | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Total Concrete** | **None** | **IFC**  **Quantity (CM)** | **Engineering WH (including rework) (hours)** |
| **Total Concrete** |  |  |  |

#### Concrete Design Reuse

If the project design includes multiple similar components that allow reuse of design effort, estimate the percentage of the total quantity for concrete that did not require unique design.

**Example:** The total concrete quantity for a project is 5,000 CM. The design includes three identical foundations of 1,000 CM each. There are no other identical components. The estimated design reuse for concrete is: 3(1,000)- 1,000 CM = 2,000 CM = 40%

5000 CM 5,000 CM

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No Response | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |
| < 10% | ≥ 10% | > 20% | >30% | > 40% | >50% | > 60% | > 70% | > 80% | > 90% |

### Structural Steel

#### Instructions

Please complete the following tables indicating quantity and engineering work-hours for the categories appropriate to your project. If possible, separate data for structural steel, pipe racks & utility bridges and miscellaneous steel. If you can not separate structural steel from pipe racks & utility bridges, combine these data in the space provided below. If you cannot enter all data then enter totals only. Include rework in the work-hours only. If the project had no work-hours or quantities for a category, enter none.

The quantity of steel is the amount of steel provided in the final Issued for Construction (IFC) drawings.

Refer to the section “Instructions for Computation of Work-Hours and Rework-Hours” for an additional detailed listing of direct hours to be included and indirect hours that are to be excluded from the computation of the work-hours.

Which design platform was used for this category in this project? Check all that apply.

2D ( )

3D ( )

|  |  |  |  |
| --- | --- | --- | --- |
| **Structural Steel** | **None** | **IFC**  **Quantity (MT)** | **Engineering WH (including rework) (hours)** |
| Structural Steel |  |  |  |
| This includes trusses, columns, girders, beams, struts, girts, purlins, vertical and horizontal bracing, bolts, and nuts. | | | |
| Pipe Racks & Utility Bridges |  |  |  |
| This includes steel structures outside the physical boundaries of a major structure, which are used to support pipe, conduit, and/or cable tray. | | | |
| **Combined**  **Structural Steel / Pipe Racks & Utility Bridges\*** |  |  |  |
| \* Enter combined structural steel and pipe racks & utility bridges if you cannot separate the quantities above. | | | |
| Miscellaneous Steel |  |  |  |
| This includes handrails, toe plate, grating, checker plate, stairs, ladders, cages, miscellaneous platforms, pre-mounted ladders and platforms, miscellaneous support steel including scab on supports, “T” and “H” type supports, trench covers, and Q decking. | | | |
| **Total Steel** |  |  |  |
| This is the total of structural steel, pipe racks & utility bridges, and miscellaneous steel from above or the total of combined structural steel, pipe racks & utility bridges (if not separated) and miscellaneous steel. If you have quantities for steel not included in the breakouts above, include them in the totals here. | | | |

#### Structural Steel Design Reuse

If the project design includes multiple similar components that allow reuse of design effort, estimate the percentage of the total quantity for structural steel that did not require unique design.

**Example:** The total structural steel quantity for a project is 5,000 MT. The design includes three identical structural steel frames of 1,000 MT each. There are no other identical components. The estimated repeated quantity for structural steel is: 3(1,000)- 1,000 MT = 2,000 MT = 40%

5,000 MT 5,000 MT

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No Response | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |
| < 10% | ≥ 10% | > 20% | >30% | > 40% | >50% | > 60% | > 70% | > 80% | > 90% |



### Electrical

#### Instructions

Please complete the following tables indicating quantity and engineering work-hours for the categories appropriate to your project. If you cannot enter all data then enter totals only. Include rework in the work-hours only. If the project had no work-hours or quantities for a category, enter none.

* Total Direct Engineering Electrical Work-Hours for This Project
* Total Connected Horsepower of Motors
* Number of Motors
* Total KVA Load of Project

The quantity of electrical equipment, conduit, cable trays, wire, termination, and lighting fixtures are the amount of each provided in the final Issued for Construction (IFC) drawings.

Refer to the section “Instructions for Computation of Work-Hours and Rework-Hours” for an additional detailed listing of direct hours to be included and indirect hours that are to be excluded from the computation of the work-hours.

Which design platform was used for this category in this project? Check all that apply.

2D ( )

3D ( )

|  |  |  |  |
| --- | --- | --- | --- |
| **Electrical Equipment** | **None** | **IFC**  **Quantity (each)** | **Engineering WH (including rework) (hours)** |
| Electrical Equipment 600V & Below |  |  |  |
| Electrical Equipment Over 600V |  |  |  |
| Electrical equipment includes transformers, switchgear, UPS systems, MCCs, rectifiers, motors, generators, etc. This also includes work-hours for single line, elementary diagrams and studies. | | | |
| **Total Electrical Equipment** |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Conduit** | | **None** | **IFC**  **Quantity** | **Engineering WH (including rework) (hours)** |
| Conduit | LM |  |  |  |
| Number of Runs |  |  |
| This includes power plan, cable and conduit schedule and interconnects. Exposed / aboveground and underground | | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Cable Tray** | **None** | **IFC**  **Quantity (LM)** | **Engineering WH (including rework) (hours)** |
| Cable Tray |  |  |  |
| This includes electrical and instrument cable trays, channels, supports, covers, etc. | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Wire & Cable** | | **None** | **IFC**  **Quantity** | **Engineering WH (including rework) (hours)** |
| Wire & Cable  (w/o conduit or tray) | LM |  |  |  |
| Number of Terminations |  |  |
| This includes power, control and grounding cables. | | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Other Electrical** | **None** | **IFC**  **Quantity** | **Engineering WH (including rework) (hours)** |
| Lighting Fixtures (each) |  |  |  |
| This includes fixtures, conduit, wiring, panels, and control devices. Quantity is the number of fixtures. | | | |
| Electrical Heat Tracing (LM) |  |  |  |
| This includes electric heat trace cable, power feeds to the cable, control accessories, end of line devices, connectors, tape or other strapping/support materials, and any other items needed to complete the heat trace system. Length is based on the lineal meter of process and utility piping heat traced. | | | |



### Piping

#### Instructions

Please complete the following tables indicating quantity, percent hot and cold, and engineering work-hours for the categories appropriate to your project. Piping includes under ground pressure pipe. **Exclude tubing except where indicated**. If you cannot enter all data then enter totals only. Include rework in the work-hours only. If the project had no work- hours or quantities for a category, enter none.

The quantity of piping is the amount of piping specified in the final Issued for Construction (IFC) drawings. This quantity should not be “cut lengths” but should be measured “center-to- center” through valves and fittings as with the quantity for the construction metric. Most “CADD dumps” are cut lengths. The quantity should be adjusted to be the length measured as noted above.

Refer to the section “Instructions for Computation of Work-Hours and Rework-Hours” for an additional detailed listing of direct hours to be included and indirect hours that are to be excluded from the computation of the work-hours.

Which design platform was used for this category in this project? Check all that apply.

2D ( )

3D ( )

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Piping** | **None** | **IFC**  **Quantity** | **Percent Hot and Cold (%)** | **Engineering WH (including rework) (hours)** |
| Small Bore  (2-1/2” and Smaller) (LM) |  |  |  |  |
| Large Bore  (3” and Larger) (LM) |  |  |  |  |
| Engineered Hangers and Supports (each)  (Includes stress analysis) |  |  |  |  |
| Number of pipe fittings\* |  |  |  |  |
| **Total Piping\*\* (LM)** |  |  |  |  |

\* Elbows, flanges, reducers, branch connection fittings e.g. o-lets, saddles etc., Y’s, T’s, caps, unions, couplings, etc.



\*\* Total piping quantity is linear meter only. The total piping work-hours include those hours for small & large bore piping, engineered hangers and supports and fittings.

|  |  |  |  |
| --- | --- | --- | --- |
| **Heat Tracing Tubing** | **None** | **IFC**  **Quantity (LM)** | **Engineering WH (including rework) (hours)** |
| **Total Heat Tracing Tubing** |  |  |  |



### Instrumentation

#### Instructions

Please complete the following tables indicating quantity and engineering work-hours for the categories appropriate to your project. If you cannot enter all data then enter totals only. Include rework in the work-hours only. If the project had no work-hours or quantities for a category, enter none.

The quantity of instrumentation is the amount provided in the final Issued for Construction (IFC) drawings.

Refer to the section “Instructions for Computation of Work-Hours and Rework-Hours” for an additional detailed listing of direct hours to be included and indirect hours that are to be excluded from the computation of the work-hours.

Which design platform was used for this category in this project? Check all that apply.

2D ( )

3D ( )

|  |  |  |  |
| --- | --- | --- | --- |
| **Instrumentation** | **None** | **IFC**  **Quantity** | **Engineering WH (including rework) (hours)** |
| Loops (count) |  |  |  |
| Tagged Devices (count) |  |  |
| I/O (count) |  |  |
| This includes all instrument and control design work-hours except DCS/PLC Configuration and Programming. I/O (count) includes the I/O that comes over digital communication interfaces from outside of the control system. For such interfaces, count the addressable points. For fieldbus interfaces, count only the devices. | | | |
| * DCS/PLC Design included | | | |
| DCS/PLC Configuration and Programming |  |  |  |



### Equipment

#### Instructions

Please complete the following tables indicating quantity and engineering work-hours for the categories appropriate to your project. If you cannot enter all data then enter totals only. Include rework in the work-hours only. If the project had no work-hours or quantities for a category, enter none.

The Total Quantity of equipment is the amount of tagged items provided in the final Issued for Construction (IFC) drawings with vendor designed skids being counted as a single item. The Individually Designed quantity is the quantity defined by unique data sheets. For example, pump P201a/b is one unique data sheet, but is a total of two items.

These hours include only mechanical discipline hours.

Refer to the section “Instructions for Computation of Work-Hours and Rework-Hours” for an additional detailed listing of direct hours to be included and indirect hours that are to be excluded from the computation of the work-hours.

Which design platform was used for this category in this project? Check all that apply.

2D ( )

3D ( )

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pressure Vessels** | **None** | **Individually Designed (each)** | **Total Quantity (each)** | **Engineering WH (including rework) (hours)** |
|  |  |  |  |
| This includes tray/packed towers, columns, reactors/regenerators, and miscellaneous other pressure vessels.  Field fabricated towers, columns, reactors and regenerators are to be included. | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Atmospheric Tanks** | **None** | **Individually Designed (each)** | **Total Quantity (each)** | **Engineering WH (including rework) (hours)** |
|  |  |  |  |
| This includes storage tanks, floating roof tanks, bins/hoppers/silos/cyclones, cryogenic & low temperature tanks and miscellaneous other atmospheric tanks. | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Heat Transfer Equipment** | **None** | **Individually Designed (each)** | **Total Quantity (each)** | **Engineering WH (including rework) (hours)** |
|  |  |  |  |
| This includes heat exchangers, fin fan coolers, evaporators, cooling towers and miscellaneous other heat transfer equipment. | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Boiler & Fired Heaters** | **None** | **Individually Designed (each)** | **Total Quantity (each)** | **Engineering WH (including rework) (hours)** | **Total (BTU/Hr)** |
|  |  |  |  |  |
| This includes packaged boilers, field erected boilers, fired heaters, waste heat boilers, stand- alone stacks, and miscellaneous other boilers and fired heaters. | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Rotating Equipment (w/drivers)** | **None** | **Individually Designed (each)** | **Total Quantity (each)** | **Engineering WH (including rework) (hours)** | **Total (horsepower)** |
|  |  |  |  |  |
| This includes compressors (centrifugal/reciprocating), blowers, screw rotary compressors, metering/in-line pumps, pumps (centrifugal/reciprocating), positive displacement pumps, agitators, mixers, blenders and other miscellaneous compressors, fans and pumps. | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Material Handling Equipment (w/drivers)** | **None** | **Individually Designed (each)** | **Total Quantity (each)** | **Engineering WH (including rework) (hours)** |
|  |  |  |  |
| This includes conveyors (belt, chain, screen, rotor, etc.), cranes & hoists, scales, lifts, stackers, reclaimers, ship loaders, compactors, feeders and baggers, and miscellaneous other material handling equipment. | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Power Generation Equipment** | **None** | **Individually Designed (each)** | **Total Quantity (each)** | **Engineering WH (including rework) (hours)** | **Total (kilo-watts)** |
|  |  |  |  |  |
| This includes gas turbines, steam turbines, diesel, and other miscellaneous power generation equipment. | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Other Process Equipment** | **None** | **Individually Designed (each)** | **Total Quantity (each)** | **Engineering WH (including rework) (hours)** |
|  |  |  |  |
| This includes specialty gas equipment, bulk chemical equipment, process equipment, particle extraction (bag houses, scrubbers, etc.), treatment systems (water treatment, etc.), incinerators, and flares/flare systems. | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Vendor-Designed Modules & Pre- Assembled Skids** | **None** | **Individually Designed (each)** | **Total Quantity (each)** | **Engineering WH (including rework) (hours)** |
|  |  |  |  |
| This includes modules (partial units) and complete skids units. | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Total Equipment Count\*** | **None** | **Individually Designed (each)** | **Total Quantity (each)** | **Engineering WH (including rework) (hours)\*\*** |
|  |  |  |  |
| Skids & modules with multiple equipments are counted still as a single entry.  \* Total equipment count may include items not identified above.  \*\* This is total mechanical discipline direct work-hours. | | | | |



# Construction Productivity Metrics

**Instructions for Computation of Actual Work-Hours, Rework-Hours, and Installed Costs**

**Actual work-hours** are computed by the summation of all the account hours that are listed as **Direct** in the following table. All the account hours listed as **Indirect** are to be **excluded** from the actual work-hours that are submitted in the productivity data for the following sections.

**Estimated quantities** and work-hours should be updated to include all change orders. **Actuals**

include all quantities installed and work-hours, to include rework-hours for these quantities.

**Total Installed Unit Costs** are the burdened **direct cost of labour, material and equipment** which are directly attribute to, or become a part of the final product. The **direct labour costs** are those associated with work-hours by craft persons listed as **Direct** in the following table.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Direct** | **Indirect** | |
| **Account** | Direct Craft Labour | Accounting | Procurement |
| Foreman | Area Superintendent | Process Equipment Maintenance |
| General Foreman | Assistant Project Manager | Project Controls |
| Load and Haul | Bus Drivers | Project Manager |
| Oilers | Clerical | QA/QC |
| Operating Engineer | Craft Planners | Quantity Surveyors |
| Safety Meetings | Craft Superintendent | Receive and Offload |
| Scaffolding | Craft Training | Recruiting |
| Truck Drivers Direct | Crane Setup/take down | Safety |
|  | Document Control | Safety Barricades |
|  | Drug Testing | Security |
|  | Equipment Coordinator | Show-up/Travel Time |
|  | Evacuation Time | Site Construction Manager |
|  | Field Administration Staff | Site Maintenance |
|  | Field Engineer-Project | Subcontract Administrator |
|  | Field Staff (Hourly) | Supervision (Hourly) |
|  | Field Staff (Salary) | Surveying Crews |
|  | Fire Watch | Temporary Facilities |
|  | Flag Person | Temporary Utilities |
|  | General Superintendent | Test Welders |
|  | Hole Watch | Tool Room |
|  | Janitorial | Truck Drivers Indirect |
|  | Job Clean-Up | Warehouse |
|  | Master Mechanic | Warehousing |
|  | Material Control | Water Hauling |
|  | Mobilization |  |
|  | Nomex Distribution |  |
|  | Orientation Time |  |
|  | Payroll Clerks/ Timekeepers |  |

#### Unit of Measure Legend:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| cm.  mm. | centimeter  millimeter | SM  MT | Square Meter  Metric Ton | WH  HP | Work-hour  Horse Power |
| LM | Linear Meter | CM | Cubic Meter | kW | kilo-watts |

* 1. **Concrete**

**Instructions**

Please provide estimated and actual productivity below for the categories appropriate to your project for the installation of concrete.

#### In the first section of each category include the estimated quantity to be installed, the estimated work-hours required for the installation and the estimated total installed unit cost including labour and material cost at the time of project sanction (or as soon as available following sanction).

**In the second section for each category, provide the actual installed neat quantity, the work-hours** (including rework), and the actual **total installed unit cost which is the burdened cost** including labour, material and equipment from both direct hire and subcontract. Indicate if the work performed for each category was subcontracted or not. If work was both subcontracted and in-house, indicate the type that was more predominant.

Include work-hours for the following selected activities:

Loading material at the jobsite yard, hauling to, and unloading at the job work site; local layout, excavation and backfill, fabrication, installation, stripping and cleaning forms; field installation of reinforcing material; field installation of all embeds; all concrete pours, curing, finishing, rubbing, mud mats; and anchor bolt installation.

Do not include work-hours for:

Piling, drilled piers, wellpoints and major de-watering, concrete fireproofing, batch plants, non-permanent roads and facilities, third party testing, mass excavations, rock excavations, site survey, q-deck, sheet piles, earthwork shoring, cold pour preparation, grouting, precast tees, panels, decks, vaults, manholes, etc.

#### Definitions

The **Installed Neat Quantity** of concrete is the amount of concrete that is required for the specified slab, foundation, or structure provided in the project’s plans and specifications and does not include any quantity of concrete that is used due to rework.

Refer to the section “**Instructions for Computation of Actual Work-Hours, Rework- Hours and Installed Cost**” for a detailed listing of direct hours and their associated costs to be included as well as indirect hours and their associated costs to be excluded.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Slabs** | **Estimated Productivity** | | | |
| **None** | **Quantity (CM)** | **WH** | **Total Installed Unit Cost ($/CM)** |
| On-Grade |  |  |  |  |
| Elevated Slabs /On Deck |  |  |  |  |
| Area Paving |  |  |  |  |
| **Total Slabs** |  |  |  |  |
| Total Installed Unit Cost (TIUC) for Total Slabs is the weighted average by quantity of the On-Grade, Elevated Slabs/ On Deck, Area Paving and any other slabs not included above. | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Slabs** | **Actual Productivity** | | | | |
| **None** | **Sub contracted (Yes or No)** | **Installed Quantity**  **(CM)** | **Actual WH (including rework) (hours)** | **Total Installed Unit Cost ($/CM)** |
| On-Grade |  |  |  |  |  |
| Elevated Slabs /On Deck |  |  |  |  |  |
| Area Paving |  |  |  |  |  |
| **Total Slabs** |  |  |  |  |  |
| Total Installed Unit Cost (TIUC) for Total Slabs is the weighted average by quantity of the On-Grade, Elevated Slabs/ On Deck, Area Paving and any other slabs not included above. | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Foundations** | **Estimated Productivity** | | | |
| **None** | **Quantity (CM)** | **WH** | **Total Installed Unit Cost ($/CM)** |
| < 4 CM |  |  |  |  |
| 4 – 15 CM |  |  |  |  |
| 16– 38 CM |  |  |  |  |
| ≥ 38 CM |  |  |  |  |
| **Total Foundations** |  |  |  |  |
| Total Installed Unit Cost (TIUC) for Total Foundations is the weighted average by quantity of the each category above. | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Foundations** | **Actual Productivity** | | | | |
| **None** | **Sub contracted (Yes or No)** | **Installed Quantity (CM)** | **Actual WH (including rework)**  **(hours)** | **Total Installed Unit Cost ($/CM)** |
| < 4 CM |  |  |  |  |  |
| 4 – 15 CM |  |  |  |  |  |
| 16– 38 CM |  |  |  |  |  |
| ≥ 38 CM |  |  |  |  |  |
| **Total Foundations** |  |  |  |  |  |
| Total Installed Unit Cost (TIUC) for Total Foundations is the weighted average by quantity of the each category above. | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Concrete Structures** | **Estimated Productivity** | | | |
| **None** | **Quantity (CM)** | **WH** | **Total Installed Unit Cost ($/CM)** |
| Concrete Structures |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Concrete Structures** | **Actual Productivity** | | | | |
| **None** | **Sub contracted (Yes or No)** | **Installed Quantity (CM)** | **Actual WH (including rework) (hours)** | **Total Installed Unit Cost ($/CM)** |
| Concrete Structures |  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Total Concrete** | **Estimated Productivity** | | | |
| **None** | **Quantity (CM)** | **WH** | **Total Installed Unit Cost ($/CM)** |
| **Total Concrete** |  |  |  |  |
| Total Installed Unit Cost (TIUC) for Total Concrete is the weighted average by quantity of the total slabs, total foundations, total concrete structures and any other concrete not included above. | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Total Concrete** | **Actual Productivity** | | | | |
| **None** | **Sub contracted (Yes or No)** | **Installed Quantity (CM)** | **Actual WH (including rework)**  **(hours)** | **Total Installed Unit Cost ($/CM)** |
| **Total Concrete** |  |  |  |  |  |
| Total Installed Unit Cost (TIUC) for Total Concrete is the weighted average by quantity of the total slabs, total foundations, total concrete structures and any other concrete not included above. | | | | | |

#### Concrete Repetitive Construction

If the project includes multiple similar components that allow construction efficiencies (i.e. based on learning curve, formwork reuse, etc.), estimate the percentage of the total quantity for concrete that was repeated.

**Example:** The total concrete quantity for a project is 5,000 CM. The design includes three identical foundations of 1,000 CM each. There are no other identical components. The estimated repeated quantity for concrete is: 3(1,000)- 1,000 CM = 2000 CM = 40%

5,000 CM 5,000 CM

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No Response | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |
| < 10% | ≥ 10% | > 20% | >30% | > 40% | >50% | > 60% | > 70% | > 80% | > 90% |



* 1. **Structural Steel**

#### Instructions

Please provide estimated and actual productivity below for the categories appropriate to your project for the installation of structural steel.

#### In the first section of each category include the estimated quantity to be installed, the estimated work-hours required for the installation and the estimated total installed unit cost including labour and material cost at the time of project sanction (or as soon as available following sanction).

**In the second section for each category, provide the actual installed quantity, the work- hours** (including rework), and the actual **total installed unit cost which is the burdened cost** including labour, material and equipment from both direct hire and subcontract. Indicate if the work performed for each category was subcontracted or not. If work was both subcontracted and in-house, indicate the type that was more predominant.

Include work-hours for the following selected activities:

Shake-out, transporting, erection, plumbing, leveling, bolting, and welding.

Do not include work-hours for:

Fabrication, demolition, and architectural work, such as roofing, siding and vents.

#### Definitions

The **Installed Quantity** of steel is the amount of steel provided in the project’s plans and specifications and does not include any quantity of steel that is used due to rework.

Refer to the section “**Instructions for Computation of Actual Work-Hours, Rework- Hours and Installed Cost**” for a detailed listing of direct hours and their associated costs to be included as well as indirect hours and their associated costs to be excluded.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Structural Steel** | **Estimated Productivity** | | | |
| **None** | **Quantity (MT)** | **WH** | **Total Installed Unit Cost ($/MT)** |
| Structural Steel |  |  |  |  |
| This includes trusses, columns, girders, beams, struts, girts, purlins, vertical and horizontal bracing, bolts, and nuts. | | | | |
| Pipe Racks  & Utility Bridges |  |  |  |  |
| This includes steel structures outside the physical boundaries of a major structure, which is used to support pipe, conduit, and/or cable tray. | | | | |
| Miscellaneous Steel |  |  |  |  |
| This includes handrails, toe plate, grating, checker plate, stairs, ladders, cages, miscellaneous platforms, pre-mounted ladders and platforms, miscellaneous support steel including scab on supports, “T” and “H” type supports, trench covers, and Q decking. | | | | |
| **Total Structural Steel** |  |  |  |  |
| Total Installed Unit Cost (TIUC) for Structural Steel is the weighted average by quantity of Structural Steels, Pipe Racks & Utility Bridges, Miscellaneous Steel and any other Structural Steel not included above. | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Structural Steel** | **Actual Productivity** | | | | |
| **None** | **Sub contracted (Yes or No)** | **Installed Quantity (MT)** | **Actual WH (including rework)**  **(hours)** | **Total Installed Unit Cost ($/ MT)** |
| Structural Steel |  |  |  |  |  |
| This includes trusses, columns, girders, beams, struts, girts, purlins, vertical and horizontal bracing, bolts, and nuts. | | | | | |
| Pipe Racks  & Utility Bridges |  |  |  |  |  |
| This includes steel structures outside the physical boundaries of a major structure, which is used to support pipe, conduit, and/or cable tray. | | | | | |
| Miscellaneous Steel |  |  |  |  |  |
| This includes handrails, toe plate, grating, checker plate, stairs, ladders, cages, miscellaneous platforms, pre-mounted ladders and platforms, miscellaneous support steel including scab on supports, “T” and “H” type supports, trench covers, and Q decking. | | | | | |
| **Total Structural Steel** |  |  |  |  |  |
| Total Installed Unit Cost (TIUC) for **Structural Steel** is the weighted average by quantity of Structural Steels, Pipe Racks & Utility Bridges, Miscellaneous Steels and any other Structural Steel not included above. | | | | | |

#### Structural Steel Repetitive Construction

If the project includes multiple similar components that allow construction efficiencies (i.e. based on learning curve, formwork reuse, etc.), estimate the percentage of the total quantity for structural steel that was repeated.

**Example:** The total structural steel quantity for a project is 5,000 MT. The design includes three identical structural steel frames of 1,000 MT each. There are no other identical components. The estimated repeated quantity for structural steel is :

3(1,000)- 1,000 MT = 2,000 MT = 40%

5,000 MT 5,000 MT

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No Response | | | | | | | | | |
|  |  |  |  |  |  |  |  |  |  |
| < 10% | ≥ 10% | > 20% | >30% | > 40% | >50% | > 60% | > 70% | > 80% | > 90% |



### Electrical

#### Instructions

Please provide estimated and actual productivity below for the categories appropriate to your project for the installation of electrical.

#### In the first section of each category include the estimated quantity to be installed, the estimated work-hours required for the installation and the estimated total installed unit cost including labour and material cost at the time of project sanction (or as soon as available following sanction).

**In the second section for each category, provide the actual installed quantity, the work- hours** (including rework), and the actual **total installed unit cost which is the burdened cost** including labour, material and equipment from both direct hire and subcontract. Indicate if the work performed for each category was subcontracted or not. If work was both subcontracted and in-house, indicate the type that was more predominant.

Include work-hours for the following selected activities: Installation, testing, labeling, etc.

#### Definitions

The **Installed Quantity** of electrical equipment, devices, conduit and cable trays are the amount of each provided in the project’s plans and specifications and does not include any quantity that is used due to rework.

Refer to the section “**Instructions for Computation of Actual Work-Hours, Rework- Hours and Installed Cost**” for a detailed listing of direct hours and their associated costs to be included as well as indirect hours and their associated costs to be excluded.

* Total Direct Electrical Work-Hours for This Project
* Total Connected Horsepower of Motors
* Number of Motors
* Total KVA Load of Project

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Electrical Equipment and Devices** | **Estimated Productivity** | | | |
| **None** | **Quantity (each)** | **WH** | **Total Installed Unit Cost ($/Each)** |
| Panels and Small Devices |  |  |  |  |
| This includes all labour for the installation of lighting and power panels, dry type transformers, control stations (pushbuttons, small local panels, etc.), welding receptacles and their supports. Count includes only actual electrical devices - not supports. | | | | |
| Electrical Equipment 1kV & Below |  |  |  |  |
| Electrical Equipment Over 1kV |  |  |  |  |
| **Total Electrical Equipment** |  |  |  |  |
| * This includes all labour for the installation of transformers, switchgear, UPS systems, MCCs, DCS/PLC racks and panels, etc. * Total Installed Unit Cost (TIUC) for **Electrical Equipment** is the weighted average by quantity of Electrical Equipments 1kV & Below, Electrical Equipments Over 1kV. | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Electrical Equipment and Devices** | **Actual Productivity** | | | | |
| **None** | **Sub contracted (Yes or No)** | **Installed Quantity (each)** | **Actual WH (including rework) (hours)** | **Total Installed Unit Cost ($/Each)** |
| Panels and Small Devices |  |  |  |  |  |
| This includes all labour for the installation of lighting and power panels, dry type transformers, control stations (pushbuttons, small local panels, etc.), welding receptacles and their supports. Count includes only actual electrical devices - not supports. | | | | |  |
| Electrical Equipment 1kV & Below |  |  |  |  |  |
| Electrical Equipment Over 1kV |  |  |  |  |  |
| **Total Electrical Equipment** |  |  |  |  |  |
| * This includes all labour for the installation of transformers, switchgear, UPS systems, MCCs, DCS/PLC racks and panels, etc. * Total Installed Unit Cost (TIUC) for **Electrical Equipment** is the weighted average by quantity of Electrical Equipments 1kV & Below, Electrical Equipments Over 1kV. | | | | | |

Instructions for calculation of Weighted-Average Diameter of Conduit (Hyperlink)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Conduit** | **Weighted Average Diameter (inches)** | **Estimated Productivity** | | | |
| **None** | **Quantity (LM)** | **WH** | **Total Installed Unit Cost ($/LM)** |
| Exposed or Aboveground Conduit |  |  |  |  |  |
| This includes all labour for installation of conduit, hangers, supports, fittings, flexible connections, marking, grounding jumpers, seals, boxes, etc.  This excludes lighting conduit. | | | | | |
| Underground, Duct Bank or Embedded Conduit |  |  |  |  |  |
| This includes all labour for installation of conduit, supports, grounding jumpers, etc. Does not include excavation, backfill, concrete, manholes, etc. | | | | | |
| **Total Conduit** |  |  |  |  |  |
| - Total Installed Unit Cost (TIUC) for **Conduit** is the weighted average by quantity of Exposed or Aboveground Conduits, Underground, Duct Bank or Embedded Conduit. | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Conduit** | **Weighted Average Diameter (inches)** | **Actual Productivity** | | | | |
| **None** | **Sub Contracted (Yes or No)** | **Installed Quantity (LM)** | **Actual WH (including rework)**  **(hours)** | **Total Installed Unit Cost ($/LM)** |
| Exposed or Aboveground Conduit |  |  |  |  |  |  |
| This includes all labour for installation of conduit, hangers, supports, fittings, flexible connections, marking, grounding jumpers, seals, boxes, etc.  This excludes lighting conduit. | | | | | | |
| Underground, Duct Bank or Embedded Conduit |  |  |  |  |  |  |
| This includes all labour for installation of conduit, supports, grounding jumpers, etc. Does not include excavation, backfill, concrete, manholes, etc. | | | | | | |
| **Total Conduit** |  |  |  |  |  |  |
| - Total Installed Unit Cost (TIUC) for **Conduit** is the weighted average by quantity of Exposed or Aboveground Conduits, Underground, Duct Bank or Embedded Conduit. | | | | | | |

Instructions for calculation of Weighted-Average Size of Cable Tray (Hyperlink)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cable Tray** | **Weighted Average Size (inches)** | **Estimated Productivity** | | | |
| **None** | **Quantity (LM)** | **WH** | **Total Installed Unit Cost ($/LM)** |
| Cable Tray |  |  |  |  |  |
| - This includes all labour for the installation of tray, channel, supports, covers, grounding jumpers, marking, etc. Includes cable tray for instrument cable but does not include fire stop. | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Cable Tray** | **Weighted Average Size (inches)** | **Actual Productivity** | | | | |
| **None** | **Sub Contracted (Yes or No)** | **Installed Quantity (LM)** | **Actual WH (including rework)**  **(hours)** | **Total Installed Unit Cost ($/LM)** |
| Cable Tray |  |  |  |  |  |  |
| This includes all labour for the installation of tray, channel, supports, covers, grounding jumpers, marking, etc. Includes cable tray for instrument cable but does not include fire stop. | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Wire and Cable** | **Estimated Productivity** | | | |
| **None** | **Quantity (LM)** | **WH** | **Total Installed Unit Cost ($/LM)** |
| Control Cable |  |  |  |  |
| Power Cable below 1kV |  |  |  |  |
| Power Cable above 1kV |  |  |  |  |
| This includes all labour for the installation, termination, labeling, and testing of 1kV and below power and control cable. It does not include heat-tracing cable. | | | | |
| **Total Wire and Cable** |  |  |  |  |
| - Total Installed Unit Cost (TIUC) for **Wire and Cable** is the weighted average by quantity of Control Cables, Power Cable below 1kV, Power Cable above 1kV and any other listed above. | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Wire and Cable** | **Actual Productivity** | | | | |
| **None** | **Sub Contracted (Yes or No)** | **Installed Quantity (LM)** | **Actual WH (including rework)**  **(hours)** | **Total Installed Unit Cost ($/LM)** |
| Control Cable |  |  |  |  |  |
| Power Cable below 1kV |  |  |  |  |  |
| Power Cable above 1kV |  |  |  |  |  |
| This includes all labour for the installation, termination, labeling, and testing of 1kV and below power and control cable. It does not include heat-tracing cable. | | | | | |
| **Total Wire and Cable** |  |  |  |  |  |
| - Total Installed Unit Cost (TIUC) for **Wire and Cable** is the weighted average by quantity of Control Cables, Power Cable below 1kV, Power Cable above 1kV listed above. | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Transmission Line** | **Estimated Productivity** | | | |
| **None** | **Quantity (LM)** | **WH** | **Total Installed Unit Cost ($/LM)** |
| High Voltage above 25kV |  |  |  |  |
| This includes all labour for the installation of line, tower, foundations, switch yards and testing of power and control line. | | | | |
| **Total Transmission Line** |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Transmission Line** | **Actual Productivity** | | | | |
| **None** | **Sub Contracted (Yes or No)** | **Installed Quantity (LM)** | **Actual WH (including rework)**  **(hours)** | **Total Installed Unit Cost ($/LM)** |
| High Voltage above 25kV |  |  |  |  |  |
| This includes all labour for the installation of line, tower, foundations, switch yards and testing of power and control line. | | | | | |
| **Total Transmission Line** |  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Other Electrical** | **Estimated Productivity** | | | |
| **None** | **Quantity** | **WH** | **Total Installed Unit Cost ($/each or $/LM)** |
| Lighting Fixtures (each) |  |  |  |  |
| This includes all labour for the installation of fixtures (including lamps and supports) and for the installation of conduit and wiring from the lighting panel to the fixtures. Includes any control equipment, switches, conduit, wiring and accessories installed on the load side of the lighting panel. Installation of lighting panels is included in Panels and Small Devices and power feeder wiring for the panel is included in Power and Control Cable – 1kV. | | | | |
| Grounding (LM) |  |  |  |  |
| This includes all the labour for the installation of cable, ground rods, connectors and all accessories for the installation of conduit and wiring from the lighting panel to the fixtures. Includes work-hours for the installation of ground cables pulled into cable trays, duct banks, and installed exposed in electric or other rooms. The Length is based on the total meters of ground cable installed. | | | | |
| Electrical Heat Tracing (LM) |  |  |  |  |
| This includes the labour for the installation of electric heat trace cable, power feeds to the cable, control accessories, end of line devices, connectors, tape or other strapping/support materials, and any other items needed to complete the heat trace system. Length is based on the total meters of process and utility piping heat traced. | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Other Electrical** | **Actual Productivity** | | | | |
| **None** | **Sub Contracted (Yes or No)** | **Installed Quantity** | **Actual WH (including rework)**  **(hours)** | **Total Installed Unit Cost ($/each or**  **$/LM)** |
| Lighting Fixtures (each) |  |  |  |  |  |
| This includes all labour for the installation of fixtures (including lamps and supports) and for the installation of conduit and wiring from the lighting panel to the fixtures. Includes any control equipment, switches, conduit, wiring and accessories installed on the load side of the lighting panel. Installation of lighting panels is included in Panels and Small Devices and power feeder wiring for the panel is included in Power and Control Cable – 1kV. | | | | | |
| Grounding (LM) |  |  |  |  |  |
| This includes all the labour for the installation of cable, ground rods, connectors and all accessories for the installation of conduit and wiring from the lighting panel to the fixtures. Includes work-hours for the installation of ground cables pulled into cable trays, duct banks, and installed exposed in electric or other rooms. The Length is based on the total meters of ground cable installed. | | | | | |
| Electrical Heat Tracing (LM) |  |  |  |  |  |
| This includes the labour for the installation of electric heat trace cable, power feeds to the cable, control accessories, end of line devices, connectors, tape or other strapping/support materials, and any other items needed to complete the heat trace system. Length is based on the total meters of process and utility piping heat traced. | | | | | |



### Piping

#### Instructions

Please provide estimated and actual productivity below for the categories appropriate to your project for the installation of piping.

#### In the first section of each category include the estimated quantity to be installed, the estimated work-hours required for the installation and the estimated total installed unit cost including labour and material cost at the time of project sanction (or as soon as available following sanction).

**In the second section for each category, provide the actual installed quantity, the work- hours** (including rework), and the actual **total installed unit cost which is the burdened cost** including labour, material and equipment from both direct hire and subcontract. Indicate if the work performed for each category was subcontracted or not. If work was both subcontracted and in-house, indicate the type that was more predominant.

Include work-hours for the following selected activities:

Erecting and installing large bore piping, including welding, valves, in-line specials, flushing/hydro testing, tie-ins (excluding hot taps), material handling (from the laydown yard to the field), in-line devices, specialties, equipment operators, and hangers & supports.

Do not include work-hours for:

Non-destructive evaluation (NDE), steam tracing, stress relieving, underground piping, offloading pipe as it is received, commissioning, and field fabrication of large bore.

#### Definitions

The **Installed Quantity** of piping is the amount of piping specified in the project’s plans and specifications and does not include any quantity of piping that is used due to rework.

Refer to the section “**Instructions for Computation of Actual Work-Hours, Rework- Hours and Installed Cost**” for a detailed listing of direct hours and their associated costs to be included as well as indirect hours and their associated costs to be excluded.

Instructions for calculation of Small Bore Weighted Diameter (Hyperlink)

#### Small Bore (2-1/2” and Smaller)

- Field and Shop Fabricated and Field Run (Excludes Tubing)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Small Bore** | **Weighted Diameter (inches)** | **Percent Shop Fabricated (%)** | **Estimated Productivity** | | | |
| **None** | **Quantity (LM)** | **WH** | **Total Installed Unit Cost ($/LM)** |
| Carbon Steel |  |  |  |  |  |  |
| Stainless Steel |  |  |  |  |  |  |
| Chrome |  |  |  |  |  |  |
| Other Alloys |  |  |  |  |  |  |
| Non Metallic |  |  |  |  |  |  |
| **Total Small Bore** |  |  |  |  |  |  |
| - Total Installed Unit Cost (TIUC) for **Small Bore** is the weighted average by quantity of types of small bore listed above and any other small bore not listed above. | | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Small Bore** | **Weighted Diameter (inches)** | **Percent Shop Fabricated (%)** | **Actual Productivity** | | | | |
| **None** | **Sub Contracted (Yes or No)** | **Installed Quantity (LM)** | **Actual WH (including rework) (hours)** | **Total Installed Unit Cost**  **($/LM)** |
| Carbon Steel |  |  |  |  |  |  |  |
| Stainless Steel |  |  |  |  |  |  |  |
| Chrome |  |  |  |  |  |  |  |
| Other Alloys |  |  |  |  |  |  |  |
| Non Metallic |  |  |  |  |  |  |  |
| **Total Small Bore** |  |  |  |  |  |  |  |
| - Total Installed Unit Cost (TIUC) for **Small Bore** is the weighted average by quantity of types of small bore listed above and any other small bore not listed above. | | | | | | | |

In the following section for large bore piping, the following definitions apply for hot and

cold piping: Hot piping is that which has a design temperature greater than 121 degrees Celsius. Cold Piping is that which has a design temperature less than minus 28 degrees Celsius.

Instructions for calculation of ISBL and OSBL Large Bore Weighted Diameter (Hyperlink)

#### Inside Battery Limits (ISBL) Large Bore (3” and Larger) (Excludes Tubing) Estimated Productivity

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Large Bore (ISBL)** | **None** | **Weighted Diameter (inches)** | **Average Schedule** | **Quantity (LM)** | **WH** | **% Shop Fabricated** | **Total Installed Unit Cost ($/LM)** |
| Carbon Steel |  |  |  |  |  |  |  |
| Stainless Steel |  |  |  |  |  |  |  |
| Chrome |  |  |  |  |  |  |  |
| Other Alloys |  |  |  |  |  |  |  |
| Non Metallic |  |  |  |  |  |  |  |
| **Total**  **Large Bore (ISBL)** |  |  |  |  |  |  |  |
| - Total Installed Unit Cost (TIUC) for **Large Bore (ISBL)** is the weighted average by quantity of types of large bore listed above and any other large bore pipe not listed above. | | | | | | | |

**Actual Productivity**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Large Bore (ISBL)** | **None** | **Sub contracted (Yes or No)** | **Weighted Diameter (inches)** | **Average Schedule** | **Installed Quantity (LM)** | **Actual WH (including rework) (hours)** | **% Shop Fabricated** | **Total Installed Unit Cost ($/LM)** |
| Carbon Steel |  |  |  |  |  |  |  |  |
| Stainless Steel |  |  |  |  |  |  |  |  |
| Chrome |  |  |  |  |  |  |  |  |
| Other Alloys |  |  |  |  |  |  |  |  |
| Non Metallic |  |  |  |  |  |  |  |  |
| **Total Large Bore (ISBL)** |  |  |  |  |  |  |  |  |
| - Total Installed Unit Cost (TIUC) for **Large Bore (ISBL)** is the weighted average by quantity of types of large bore listed above and any other large bore pipe not listed above. | | | | | | | | |

**Outside Battery Limits (OSBL) Large Bore (3” and Larger) (Excludes Tubing) Estimated Productivity**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Large Bore (OSBL)** | **None** | **Weighted Diameter (inches)** | **Average Schedule** | **Quantity (LM)** | **WH** | **% Shop Fabricated** | **Total Installed Unit Cost ($/LM)** |
| Carbon Steel |  |  |  |  |  |  |  |
| Stainless Steel |  |  |  |  |  |  |  |
| Chrome |  |  |  |  |  |  |  |
| Other Alloys |  |  |  |  |  |  |  |
| Non Metallic |  |  |  |  |  |  |  |
| **Total Large Bore (OSBL)** |  |  |  |  |  |  |  |
| - Total Installed Unit Cost (TIUC) for **Large Bore (OSBL)** is the weighted average by quantity of types of large bore listed above and any other large bore not listed above. | | | | | | | |

**Actual Productivity**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Large Bore (ISBL)** | **None** | **Sub contracted (Yes or No)** | **Weighted Diameter (inches)** | **Average Schedule** | **Installed Quantity (LM)** | **Actual WH (including rework) (hours)** | **% Shop Fabricated** | **Total Installed Unit Cost ($/LM)** |
| Carbon Steel |  |  |  |  |  |  |  |  |
| Stainless Steel |  |  |  |  |  |  |  |  |
| Chrome |  |  |  |  |  |  |  |  |
| Other Alloys |  |  |  |  |  |  |  |  |
| Non Metallic |  |  |  |  |  |  |  |  |
| **Total Large Bore (OSBL)** |  |  |  |  |  |  |  |  |
| - Total Installed Unit Cost (TIUC) for **Large Bore (OSBL)** is the weighted average by quantity of types of large bore listed above and any other large bore not listed above. | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Heat Tracing Tubing** | **Estimated Productivity** | | | |
| **None** | **Quantity (LM)** | **WH** | **Total Installed Unit Cost ($/LM)** |
| **Total Heat Tracing Tubing** |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Heat Tracing Tubing** | **Actual Productivity** | | | | |
| **None** | **Sub Contracted (Yes or No)** | **Installed Quantity (LM)** | **Actual WH (including rework) (hours)** | **Total Installed Unit Cost ($/LM)** |
| **Total Heat Tracing Tubing** |  |  |  |  |  |



* 1. **Instrumentation**

**Instructions**

Please provide estimated and actual productivity below for the categories appropriate to your project for the installation of instrumentation.

#### In the first section of each category include the estimated quantity to be installed, the estimated work-hours required for the installation and the estimated total installed unit cost including labour and material cost at the time of project sanction (or as soon as available following sanction).

**In the second section for each category, provide the actual installed quantity, the work- hours** (including rework), and the actual **total installed unit cost which is the burdened cost** including labour, material and equipment from both direct hire and subcontract. Indicate if the work performed for each category was subcontracted or not. If work was both subcontracted and in-house, indicate the type that was more predominant.

Include work-hours for the following selected activities:

Installation, calibration, testing, check out, and otherwise field certify the devices. A device is a physical device that has a tag number. This category includes process tubing, instrument air tubing, cable trays, conduits, instrument wire and cable, junction boxes, etc.

Do not include work-hours for:

DCS, software, installation of in-line devices, programming and configuration.

#### Definitions

The **Installed Quantity** of instrumentation is the amount provided in the project’s plans and specifications and does not include any quantity of instrumentation that is used due to rework.

Refer to the section “**Instructions for Computation of Actual Work-Hours, Rework- Hours and Installed Cost**” for a detailed listing of direct hours and their associated costs to be included as well as indirect hours and their associated costs to be excluded.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Estimated Productivity** | | | |
| **Instrumentation** | **None** | **Quantity (each)** | **WH** | **Total Installed Unit Cost ($/ each)** |
| Loops (count) |  |  |  |  |
| Devices (Instruments, count) |  |  |  |  |
| Unit of measure: Dual – Each based on loop check quantity.  Each based on field-installed devices. (Instrumentation wire and cable are recorded in Electrical, Section 4.3.) | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Instrumentation** | **Actual Productivity** | | | | |
| **None** | **Sub contracted (Yes or No)** | **Installed Quantity (each)** | **Actual WH (including rework) (hours)** | **Total Installed Unit Cost ($/ each)** |
| Loops (count) |  |  |  |  |  |
| Devices (Instruments, count) |  |  |  |  |  |
| Unit of measure: Dual – Each based on loop check quantity.  Each based on field-installed devices.  Instrumentation wire and cable are recorded in electrical section (4.3). | | | | | |



### Equipment

#### Instructions

Please provide estimated and actual productivity below for the categories appropriate to your project for the installation of equipment.

#### In the first section of each category include the estimated quantity to be installed, the estimated work-hours required for the installation and the estimated total installed unit cost including labour and material cost at the time of project sanction (or as soon as available following sanction).

**In the second section for each category, provide the actual installed quantity, the work- hours** (including rework), and the actual **total installed unit cost which is the burdened cost** including labour, material and equipment from both direct hire and subcontract. Indicate if the work performed for each category was subcontracted or not. If work was both subcontracted and in-house, indicate the type that was more predominant.

#### Definitions

The **Installed Quantity** of equipment is the amount provided in the project’s plans and specifications and does not include any quantity of equipment that is used due to rework.

Refer to the section “**Instructions for Computation of Actual Work-Hours, Rework- Hours and Installed Cost**” for a detailed listing of direct hours and their associated costs to be included as well as indirect hours and their associated costs to be excluded.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pressure Vessels Field Fab. & Erected** | **Estimated Productivity** | | | | |
| **None** | **Quantity (each)** | **WH** | **Total Weight (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Pressure Vessels |  |  |  |  |  |
| This includes tray/packed towers, columns, reactors/regenerators, and miscellaneous other pressure vessels. Work-hours should include installation of trays and packing if installed in the field. | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Pressure Vessels Field Fab. & Erected** | **Actual Productivity** | | | | | |
| **None** | **Sub contracted (Yes or No)** | **Installed Quantity (each)** | **Actual WH (including rework) (hours)** | **Total Weight (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Pressure Vessels |  |  |  |  |  |  |
| This includes tray/packed towers, columns, reactors/regenerators, and miscellaneous other pressure vessels. Work-hours should include installation of trays and packing if installed in the field. | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pressure Vessels Shop Fab./ Field Erected** | **Estimated Productivity** | | | | |
| **None** | **Quantity (each)** | **WH** | **Total Weight (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Pressure Vessels |  |  |  |  |  |
| This includes tray/packed towers, columns, reactors/regenerators, and miscellaneous other pressure vessels. Work-hours should include installation of trays and packing if installed in the field. | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Pressure Vessels Shop Fab./ Field Erected** | **Actual Productivity** | | | | | |
| **None** | **Sub contracted (Yes or No)** | **Installed Quantity (each)** | **Actual WH (including rework) (hours)** | **Total Weight (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Pressure Vessels |  |  |  |  |  |  |
| This includes tray/packed towers, columns, reactors/regenerators, and miscellaneous other pressure vessels. Work-hours should include installation of trays and packing if installed in the field. | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Atmospheric Tanks**  **– Shop Fabricated** | **Estimated Productivity** | | | | |
| **None** | **Quantity (each)** | **WH** | **Total Capacity (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Atmospheric Tanks – Shop Fabricated |  |  |  |  |  |
| This includes storage tanks, floating roof tanks, bins/hoppers/silos/cyclones, cryogenic & low temperature tanks and miscellaneous other atmospheric tanks. Include all shop built-up and field-erected tanks. Excluded are field fabricated and assembled tanks. | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Atmospheric Tanks – Shop Fabricated** | **Actual Productivity** | | | | | |
| **None** | **Sub contracted (Yes or No)** | **Installed Quantity (each)** | **Actual WH (including rework) (hours)** | **Total Capacity (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Atmospheric Tanks – Shop Fabricated |  |  |  |  |  |  |
| This includes storage tanks, floating roof tanks, bins/hoppers/silos/cyclones, cryogenic & low temperature tanks and miscellaneous other atmospheric tanks. Include all shop built-up and field-erected tanks.  Excluded are field fabricated and assembled tanks. | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Atmospheric Tanks –**  **Field Fabricated** | **Estimated Productivity** | | | | |
| **None** | **Quantity (each)** | **WH** | **Total Capacity (MT)** | **Total Installed Unit Cost ($/ MT)** |
| Atmospheric Tanks –  Field Fabricated |  |  |  |  |  |
| This includes storage tanks, floating roof tanks, bins/hoppers/silos/cyclones, cryogenic and low temperature tanks, and other miscellaneous atmospheric tanks. | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Atmospheric Tanks –**  **Field Fabricated** | **Actual Productivity** | | | | | |
| **None** | **Sub contracted (Yes or No)** | **Installed Quantity (each)** | **Actual WH (including rework) (hours)** | **Total Capacity (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Atmospheric Tanks –  Field Fabricated |  |  |  |  |  |  |
| This includes storage tanks, floating roof tanks, bins/hoppers/silos/cyclones, cryogenic and low temperature tanks, and other miscellaneous atmospheric tanks. | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Heat Transfer Equipment** | **Estimated Productivity** | | | | |
| **None** | **Quantity (each)** | **WH** | **Total Weight (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Heat Transfer Equipment |  |  |  |  |  |
| This includes heat exchangers, fin fan coolers, evaporators, package cooling towers and miscellaneous other heat transfer equipment. | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Actual Productivity** | | | | | |
| **Heat Transfer Equipment** | **None** | **Sub contracted (Yes or No)** | **Installed Quantity (each)** | **Actual WH (including rework) (hours)** | **Total Weight (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Heat Transfer Equipment |  |  |  |  |  |  |
| This includes heat exchangers, fin fan coolers, evaporators, package cooling towers and miscellaneous other heat transfer equipment. | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Boiler & Fired Heaters** | **Estimated Productivity** | | | | |
| **None** | **Quantity (each)** | **WH** | **Total (MBTU)** | **Total Installed Unit Cost ($/ MBTU)** |
| Boiler & Fired Heaters |  |  |  |  |  |
| This includes packaged boilers, field erected boilers, fired heaters, waste heat boilers, stand-alone stacks, and miscellaneous other boilers and fired heaters. | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Actual Productivity** | | | | | |
| **Boiler & Fired Heaters** | **None** | **Sub contracted (Yes or No)** | **Installed Quantity (each)** | **Actual WH (including rework) (hours)** | **Total (MBTU)** | **Total Installed Unit Cost ($/ MBTU)** |
| Boiler & Fired Heaters |  |  |  |  |  |  |
| This includes packaged boilers, field erected boilers, fired heaters, waste heat boilers, stand-alone stacks, and miscellaneous other boilers and fired heaters. | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Rotating Equipment (w/drivers)** | **Estimated Productivity** | | | | |
| **None** | **Quantity (each)** | **WH** | **Total (HP)** | **Total Installed Unit Cost**  **($/ HP)** |
| Rotating Equipment (w/drivers) |  |  |  |  |  |
| This includes compressors (centrifugal/reciprocating), blowers, screw rotary compressors, metering/in-line pumps, pumps (centrifugal/reciprocating), positive displacement pumps, agitators, mixers, blenders and other miscellaneous compressors, fans and pumps. | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Rotating Equipment (w/drivers)** | **Actual Productivity** | | | | | |
| **None** | **Sub contracted (Yes or No)** | **Installed Quantity (each)** | **Actual WH (including rework) (hours)** | **Total (HP)** | **Total Installed Unit Cost**  **($/ HP)** |
| Rotating Equipment (w/drivers) |  |  |  |  |  |  |
| This includes compressors (centrifugal/reciprocating), blowers, screw rotary compressors, metering/in-line pumps, pumps (centrifugal/reciprocating), positive displacement pumps, agitators, mixers, blenders and other miscellaneous compressors, fans and pumps. | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Material Handling Equipment (w/drivers)** | **Estimated Productivity** | | | | |
| **None** | **Quantity (each)** | **WH** | **Total Weight (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Material Handling Equipment (w/drivers) |  |  |  |  |  |
| This includes conveyors (belt, chain, screen, rotor, etc.), cranes & hoists, scales, lifts, stackers, reclaimers, ship loaders, compactors, feeders and baggers, and miscellaneous other material handling equipment. | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Actual Productivity** | | | | | |
| **Material Handling Equipment (w/drivers)** | **None** | **Sub contracted (Yes or No)** | **Installed Quantity (each)** | **Actual WH (including rework) (hours)** | **Total Weight (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Material Handling Equipment (w/drivers) |  |  |  |  |  |  |
| This includes conveyors (belt, chain, screen, rotor, etc.), cranes & hoists, scales, lifts, stackers, reclaimers, ship loaders, compactors, feeders and baggers, and miscellaneous other material handling equipment. | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Power Generation Equipment** | **Estimated Productivity** | | | | |
| **None** | **Quantity (each)** | **WH** | **Total (kW)** | **Total Installed Unit Cost**  **($/ kW)** |
| Power Generation Equipment |  |  |  |  |  |
| This includes gas turbines, steam turbines, diesel, and other miscellaneous power generation equipment. | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Actual Productivity** | | | | | |
| **Power Generation Equipment** | **None** | **Sub contracted (Yes or No)** | **Installed Quantity (each)** | **Actual WH (including rework) (hours)** | **Total (kW)** | **Total Installed Unit Cost**  **($/ kW)** |
| Power Generation Equipment |  |  |  |  |  |  |
| This includes gas turbines, steam turbines, diesel, and other miscellaneous power generation equipment. | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Other Process Equipment** | **Estimated Productivity** | | | | |
| **None** | **Quantity (each)** | **WH** | **Total weight (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Other Process Equipment |  |  |  |  |  |
| This includes specialty gas equipment, bulk chemical equipment, process equipment, particle extraction (bag houses, scrubbers, etc.), treatment systems (water treatment, etc.), incinerators, and flares/flare systems. | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Other Process Equipment** | **Actual Productivity** | | | | | |
| **None** | **Sub contracted (Yes or No)** | **Installed Quantity (each)** | **Actual WH (including rework) (hours)** | **Total weight (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Other Process Equipment |  |  |  |  |  |  |
| This includes specialty gas equipment, bulk chemical equipment, process equipment, particle extraction (bag houses, scrubbers, etc.), treatment systems (water treatment, etc.), incinerators, and flares/flare systems. | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Modules & Pre-Assembled Skids** | **Estimated Productivity** | | | | |
| **None** | **Quantity (each)** | **WH** | **Total weight (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Modules &  Pre-Assembled Skids |  |  |  |  |  |
| This includes modules (partial units) and complete skids units. | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Actual Productivity** | | | | | |
| **Modules & Pre-Assembled Skids** | **None** | **Sub contracted (Yes or No)** | **Installed Quantity (each)** | **Actual WH (including rework) (hours)** | **Total weight (MT)** | **Total Installed Unit Cost**  **($/ MT)** |
| Modules &  Pre-Assembled Skids |  |  |  |  |  |  |
| This includes modules (partial units) and complete skids units. | | | | | | |



### Insulation

#### Instructions

Please provide estimated and actual productivity below for the categories appropriate to your project for the installation of insulation.

#### In the first section of each category include the estimated quantity to be installed, the estimated work-hours required for the installation and the estimated total installed unit cost including labour and material cost at the time of project sanction (or as soon as available following sanction).

**In the second section for each category, provide the actual installed quantity, the work- hours** (including rework), and the actual **total installed unit cost which is the burdened cost** including labour, material and equipment from both direct hire and subcontract. Indicate if the work performed for each category was subcontracted or not. If work was both subcontracted and in-house, indicate the type that was more predominant.

#### Definitions

The **Installed Quantity** of insulation is the amount of insulation that is required for the equipment and piping provided in the project’s plans and specifications and does not include any quantity of insulation that is used due to rework.

Refer to the section “**Instructions for Computation of Actual Work-Hours, Rework- Hours and Installed Cost**” for a detailed listing of direct hours and their associated costs to be included as well as indirect hours and their associated costs to be excluded.

#### Equipment

Include work-hours for the following selected activities:

Installation of insulation, jacketing overall vessels, tanks, exchangers, etc.; installation of equipment blankets for pumps, exchangers, etc.; material handling.

Do not include: **scaffolding.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Insulation** | **Average Thickness (inches)** | **Estimated Productivity** | | | |
| **None** | **Quantity (SM of**  **insulated area)** | **WH** | **Total Installed Unit Cost ($/ SM)** |
| Equipment |  |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Insulation** | **Average Thickness (inches)** | **Actual Productivity** | | | | |
| **None** | **Sub contracted (Yes or No)** | **Installed Quantity (SM of**  **insulated area)** | **Actual WH (including rework) (hours)** | **Total Installed Unit Cost**  **($/ SM)** |
| Equipment |  |  |  |  |  |  |

#### Piping

This includes work-hours for the following selected activities:

Installation of insulation and jacketing over pipe, valves and fittings; installation of valve insulation blankets and flange insulation.

Instructions for calculation of Weighted Diameter of Piping with Insulation (Hyperlink)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Insulation** | **Average Thickness (inches)** | **Estimated Productivity** | | | |
| **None** | **Quantity (ELM)** | **WH** | **Total Installed Unit Cost ($/ ELM)** |
| Piping |  |  |  |  |  |
| ELM – Equivalent Linear Meters of insulation applied to piping. Multiple layers count only one time in linear meters. | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Insulation** |  | **Actual Productivity** | | | | |
| **Average Thickness (inches)** | **None** | **Sub contracted (Yes or No)** | **Installed Quantity (ELM)** | **Actual WH (including rework) (hours)** | **Total Installed Unit Cost ($/ ELM)** |
| Piping |  |  |  |  |  |  |
| ELM – Equivalent Linear Meters of insulation applied to piping. Multiple layers count only one time in linear meters. | | | | | | |



## Modules Installation

#### Instructions

Please provide estimated and actual productivity below for the categories appropriate to your project for field installation of modules. This includes all modules fabricated offsite and transported to the work site as over-dimensional loads requiring special heavy haul/lifting equipment. (Applies to pipe rack modules, process modules and building modules) **Do not include large vessels, towers, columns or drums.**

#### In the first section of each category include the estimated quantity (MT) to be installed, the estimated work-hours required for the installation and the estimated total installed unit cost including labour and material cost at the time of project sanction (or as soon as available following sanction).

In the second section for each category, provide the **actual installed quantity (MT), the field installed work-hours** (including rework), and the actual **total installed unit cost which is the burdened cost** including labour, material and equipment from both direct hire and subcontract. Indicate if the work performed for each category was subcontracted or not. If work was both subcontracted and in-house, indicate the type that was more predominant.

#### Definitions

The **Installed Quantity** of offsite modules is the number of metric tones (MT) amount indicated in units shown below of offsite modules that are field-installed as provided in the project’s plans and specifications.

Refer to Section 4, “**Instructions for Computation of Actual Work-Hours, Rework- Hours and Installed Cost**” for a detailed listing of direct hours and their associated costs to be included as well as indirect hours and their associated costs to be excluded.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pipe Racks Modules** | **Estimated Productivity** | | | |
| **None** | **Quantity (MT)** | **WH** | **Total Installed Unit Cost ($/ MT)** |
|  |  |  |  |
| Pipe rack module structure may include several components such as structural steel for framework, walkway, platform to support the piping, piping c/w (cooling water) valving. It also may include electrical tray, heat tracing and insulation. | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pipe Racks Modules** | **Actual Productivity** | | | | |
| **None** | **Sub Contracted (Yes/No)** | **Installed Quantity (MT)** | **Actual WH (including rework) (hours)** | **Total Installed Unit Cost ($/ MT)** |
|  |  |  |  |  |
| Pipe rack module structure may include several components such as structural steel for framework, walkway, platform to support the piping, piping c/w (cooling water) valving. It also may include electrical tray, heat tracing and insulation. | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Estimated Productivity** | | | |
| **Process Equipment Modules** | **None** | **Quantity (MT)** | **WH** | **Total Installed Unit Cost ($/ MT)** |
|  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Actual Productivity** | | | | |
| **Process Equipment Modules** | **None** | **Sub Contracted (Yes/No)** | **Installed Quantity (MT)** | **Actual WH (including rework) (hours)** | **Total Installed Unit Cost ($/ MT)** |
|  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Building Modules** | **Estimated Productivity** | | | |
| **None** | **Quantity (SM)** | **WH** | **Total Installed Unit Cost ($/ SM)** |
|  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Building Modules** | **Actual Productivity** | | | | |
| **None** | **Sub Contracted (Yes/No)** | **Installed Quantity (SM)** | **Actual WH (including rework) (hours)** | **Total Installed Unit Cost ($/ SM)** |
|  |  |  |  |  |



## Scaffolding

#### Instructions

Please provide estimated and actual productivity for scaffolding:

Enter the ***estimated total work-hours*** required for **scaffolding installation**, the ***estimated scaffolding work-hours divided by total direct hours***, and the ***estimated total installed scaffolding cost*** including materials and labour cost for installation at the time of project sanction (or as soon as available following sanction).

For ***actual*** productivity, please indicate whether the Scaffolding activity was ***subcontracted or not***. If work was both subcontracted and in-house, indicate which was more predominant.

Last, please provide the ***actual total work-hours*** (including rework) required for scaffolding installation, the ***actual scaffolding work-hours divided by total direct hours***, and the ***actual total installed scaffolding cost*** which include material, labour and equipment cost for installation from both direct hire and subcontract.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Scaffolding** | **Estimated** | | | |
| **None** | **Total Scaffolding Work- Hours** | **Scaffolding WH/ Total direct hours** | **Total Installed Scaffolding Cost ($)** |
|  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Scaffolding** | **Actual** | | | | |
| **None** | **Sub contracted (Yes or No)** | **Total Scaffolding Work- Hours** | **Scaffolding WH/ Total direct hours** | **Total Installed Scaffolding Cost ($)** |
|  |  |  |  |  |

**Scaffold Materials** ◘ Free Issue to Contractor

* + - Rented
    - Purchased & Included as part of Scaffold Cost



## Construction Work-Hours

#### Instructions

Please provide estimated and actual Construction Indirect and Direct Work-hours. If either estimated or actual work-hours are not available, please provide your estimated and actual ratio of indirect work-hours to direct work-hours.

Refer to the section “**Instructions for Computation of Actual Work-Hours and Rework- Hours**” in the construction productivity section and “**Instruction for Construction Direct and Indirect Costs”** for a detailed listing of directs and indirects.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Construction Work-hours** | **Estimated** | | **Actual** | |
| **Total Work-hours** | **Total Indirect WH/ Total Direct WH** | **Total Work- hours** | **Total Indirect WH/ Total Direct WH** |
| **Direct** |  |  |  |  |
| **Indirect** |  |  |



# Practices

## Front End Planning

Front End Planning involves the process of developing sufficient strategic information that owners can address risk and decide to commit resources to maximize the chance for a successful project. Front End Planning includes putting together the project team, selecting technology, selecting project site, developing project scope, and developing project alternatives. Front End Planning is often perceived as synonymous with front-end loading, front-end planning, feasibility analysis, and conceptual planning.

Your Front End Planning score is based on your response to the questions below (4 for owners or 6 for contractors) and to selected questions from the PDRI (Project Definition Rating Index) which follows. If you use the PDRI as part of your project planning process, please respond to the following questions and then complete the PDRI (either Industrial, Building, or both) which follow. If you do not desire to use the full PDRI(s), you may obtain your Front End Planning score by completing the questions below (4 for owners or 6 for contractors) and completing only the PDRI questions that are highlighted by italics. You will obtain the same Front End Planning score that you would have received if you completed the full PDRI. Those completing the full PDRI(s) will also receive their score(s) on the 0 to 1000 scale used for PDRI assessments.

#### Contractor Question Only

Select the response below that best describes your company’s participation in the Front End Planning effort.

Did your company participate in the Front End Planning effort?

* + - Yes, as the pre-project planner.
    - Yes, as a consultant.
    - No, my company did not participate in the preplanning effort. Please skip following Front End Planning questions and continue with the next best practice (Team

Building).

#### Contractor Question Only

Did your company formally assess the quality of the Front End Planning effort? Yes ◘ No ◘

#### Owner and Contractor Questions

Select a number below that best describes the composition of the Front End Planning team using the scale and definitions provided.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Poor Average Excellent** | | | | | | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |

1. **Excellent** - Highly skilled and experienced members with authority; representation from business, project management, technical disciplines, and operations; able to respond to both business and project objectives.
2. **Poor** - Members with a poor combination of skill or experience that lack authority; insufficient representation from business, project management, technical disciplines, and operations; unable to respond to both business and project objectives.

#### Select a number below that best describes the technology evaluation performed for this project during Front End Planning.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Poor Average Excellent** | | | | | | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |

1. **Excellent** - Thorough and detailed identification and analysis of existing and emerging technologies for feasibility and compatibility with corporate business and operations objectives. Scale-up problems and hands-on process experience were considered.
2. **Poor** - Poor or no technology evaluation.

Select a number below that best describes the evaluation of alternate siting locations.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Poor Average Excellent** | | | | | | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |

1. **Excellent** - Thorough and detailed assessment of relative strengths and weaknesses of alternate locations to meet owner requirements.
2. **Poor** - Poor or no evaluation of alternate siting locations.

Select a number below that best describes the risk analysis performed for project alternatives.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Poor Average Excellent** | | | | | | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |

1. **Excellent** - Risks associated with the selected project alternatives were identified and analyzed. These analyses included financial/business, regulatory, project and operational risk categories in order to minimize the impacts of risks on project success.
2. **Poor** - Poor or no risk analysis performed for project alternatives.

## Full Building PDRI

Was a Front End Loading Index used to determine the quality of Front End Planning for this project? (Includes PDRI, FEL, or an in-house developed system.)

Yes ◘ No ◘

Was the Project Definition Rating Index (PDRI) utilized on this project? Yes ◘ No ◘

If yes, please copy your original responses to the PDRI below, if not, please fill in the PDRI below using existing, available information.

Please complete the following matrix using the ***appropriate definition levels*** given below. Indicate how well defined each element was ***prior to the contract awarded*** by selecting the appropriate definition level.

1. Complete definition
2. Minor deficiencies
3. Some deficiencies
4. Major deficiencies
5. Incomplete or poor definition
6. Not Applicable
7. Unknown

Note: If this is an infrastructure project some of the following elements may not apply to your project. Please fill in "Not Applicable" to indicate if any element does not apply to your project. ***Italicized questions will be scored for your Front End Planning Score***

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **A. Business Strategy** | **(1) Complete <---------->Poor (5)** | | | | | | | | | |
| A1. ***Building Use*** | 1 | 2 | 3 | 4 | 5 | | NA | | UNK | |
| ◘ | ◘ | ◘ | ◘ | ◘ | | ◘ | | ◘ | |
| A2. ***Business Justification*** | 1 | 2 | 3 | 4 | 5 | NA | | UNK | |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | | ◘ | |  |
| A3. ***Business Plan*** | 1 | 2 | 3 | 4 | 5 | NA | | UNK | |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | | ◘ | |  |
| A4. ***Economic Analysis*** | 1 | 2 | 3 | 4 | 5 | NA | | UNK | |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | | ◘ | |  |
| A5. ***Facility Requirements*** | 1 | 2 | 3 | 4 | 5 | NA | | UNK | |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | | ◘ | |  |
| A6. ***Future Expansion/Alternate Consideration*** | 1 | 2 | 3 | 4 | 5 | NA | | UNK | |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | | ◘ | |  |
| A7. ***Site Selection Consideration*** | 1 | 2 | 3 | 4 | 5 | NA | | UNK | |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | | ◘ | |  |
| A8. ***Project Objectives Statement*** | 1 | 2 | 3 | 4 | 5 | | NA | | UNK | |
| ◘ | ◘ | ◘ | ◘ | ◘ | | ◘ | | ◘ | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **B. Owner Philosophies** | **(1) Complete <---------->Poor (5)** | | | | | | |
| B1. Reliability Philosophy | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| B2. Maintenance Philosophy | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| B3. Operating Philosophy | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| B4. Design Philosophy | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **C. Project Requirements** | **(1) Complete <---------->Poor (5)** | | | | | | |
| C1. Value-Analysis Process | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| C2. ***Project Design Criteria*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| C3. ***Evaluation of Existing Facilities*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| C4. Scope of Work Overview | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| C5. Project Schedule | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| C6. ***Project Cost Estimate*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **D. Site Information** | **(1) Complete <---------->Poor (5)** | | | | | | |
| D1. Site Layout | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| D2. Site Surveys | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| D3. ***Civil/Geotechnical Information*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| D4. Governing Regulatory Requirements | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| D5. ***Environmental Assessment*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| D6. Utility Sources with Supply Conditions | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
|  |  | | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| D7. Site Life Safety Considerations | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| D8. Special Water and Waste Treatment Requirements | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **E. Building Programming** | **(1) Complete <---------->Poor (5)** | | | | | | |
| E1. ***Program Statement*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| E2. ***Building Summary Space List*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| E3. Overall Adjacency Diagrams | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| E4. Stacking Diagrams | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| E5. ***Growth and Phased Development*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| E6. Circulation and Open Space Requirements | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| E7. Functional Relationship Diagrams/Room by Room | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| E8. Loading/Unloading/Storage Facilities Requirements | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| E9. Transportation Requirements | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| E10. ***Building Finishes*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| E11. Room Data Sheets | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| E12. Furnishings, Equipment, and Built-Ins | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| E13. Window Treatment | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **F. Building/Project Design Parameters** | **(1) Complete <---------->Poor (5)** | | | | | | |
| F1. Civil/Site Design | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| F2. ***Architectural Design*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| F3. ***Structural Design*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| F4. ***Mechanical Design*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| F5. ***Electrical Design*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| F6. Building Life Safety Requirements | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| F7. Constructability Analysis | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| F8. Technological Sophistication | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **G. Equipment** | **(1) Complete <---------->Poor (5)** | | | | | | |
| G1. ***Equipment List*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| G2. Equipment Location Drawings | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| G3. Equipment Utility Requirements/TD> | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **H. Procurement Strategy** | **(1) Complete <---------->Poor (5)** | | | | | | |
| H1. Identify Long-Lead/Critical Equip. and Materials | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| H2. Procurement Procedures and Plans | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **J. Deliverables** | **(1) Complete <---------->Poor (5)** | | | | | | |
| J1. CADD/Model Requirements | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| J2. Documentation/Deliverables | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **K. Project Control** | **(1) Complete <---------->Poor (5)** | | | | | | |
| K1. Project Quality Assurance and Control | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| K2. Project Cost Control | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| K3. Project Schedule Control | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| K4. ***Risk Management*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| K5. Safety Procedures | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **L. Project Execution Plan** | **(1) Complete <---------->Poor (5)** | | | | | | |
| L1. Project Organization | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| L2. Owner Approval Requirements | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| L3. ***Project Delivery Method*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| L4. ***Design/Construction Plan & Approach*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| L5. Substantial Completion Requirements | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

## Full Industrial PDRI

Was a Front End Loading Index used to determine the quality of Front End Planning for this project? (Includes PDRI, FEL, or an in-house developed system.)

Yes ◘ No ◘

Was the Project Definition Rating Index (PDRI) utilized on this project? Yes ◘ No ◘

Please complete the following matrix using the ***appropriate definition levels*** given below. Indicate how well defined each element ***was prior to the total Contract Awarded*** by selecting the appropriate definition level.

1. Complete definition
2. Minor deficiencies
3. Some deficiencies
4. Major deficiencies
5. Incomplete or poor definition
6. Not Applicable
7. Unknown

Note: If this is an infrastructure project some of the following elements may not apply to your project. Please fill in "Not Applicable" to indicate if any element does not apply to your project. ***Italicized questions will be scored for your Front End Planning Score***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Industrial PDRI** | **Definition Level at Authorization** | | | | | | | |
| **A. Manufacturing Objectives Criteria** | **(1) Complete <---------->Poor (5)** | | | | | | | |
| A1. ***Reliability Philosophy*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| A2. Maintenance Philosophy | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| A3. Operating Philosophy | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **B. Business Objectives** | **(1) Complete <---------->Poor (5)** | | | | | | | |
| B1. ***Products*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| B2. ***Market Strategy*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| B3. ***Project Strategy*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| B4. Affordability/Feasibility | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| B5. ***Capacities*** | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| B6. Future Expansion Considerations | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| B7. Expected Project Life Cycle | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| B8. Social Issues | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| **C. Basic Data Research & Development** | **(1) Complete <---------->Poor (5)** | | | | | | | | |
| C1. ***Technology*** | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| C2. ***Processes*** | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| **D. Project Scope** | **(1) Complete <---------->Poor (5)** | | | | | | | | |
| D1. ***Project Objectives Statement*** | Yes | | | No | | | NA | UNK |  |
| ◘ | | | ◘ | | | ◘ | ◘ |
| D2. ***Project Design Criteria*** | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| D3. ***Site Characteristics Available vs. Required*** | Yes | | | No | | | NA | UNK |  |
| ◘ | | | ◘ | | | ◘ | ◘ |
| D4. Dismantling and Demolition Requirements | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| D5. Lead/Discipline Scope of Work | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| D6. Project Schedule | Yes | | | No | | | NA | UNK |  |
| ◘ | | | ◘ | | | ◘ | ◘ |
| **E. Value Engineering** | **(1) Complete <---------->Poor (5)** | | | | | | | | |
| E1. Process Simplification | Yes | | | No | | | NA | UNK |  |
| ◘ | | | ◘ | | | ◘ | ◘ |
| E2. Design & Material Alternatives | Yes | | | No | | | NA | UNK |  |
| ◘ | | | ◘ | | | ◘ | ◘ |
| E3. Design for Constructability Analysis | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| **F. Site Information** | **(1) Complete <---------->Poor (5)** | | | | | | | | |
| F1. ***Site Location*** | Yes | | | No | | | NA | UNK |  |
| ◘ | | | ◘ | | | ◘ | ◘ |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| F2. Surveys & Soil Tests | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| F3. ***Environmental Assessment*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| F4. Permit Requirements | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| F5. ***Utility Sources with Supply Conditions*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| F6. Fire Protection & Safety Considerations | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **G. Process/Mechanical** | **(1) Complete <---------->Poor (5)** | | | | | | | |
| G1. ***Process Flow Sheets*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| G2. ***Heat & Material Balances*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| G3. ***Piping & Instrumentation Diagrams*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| G4. Process Safety Management | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| G5. Utility Flow Diagrams | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| G6. ***Specifications*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| G7. Piping System Requirements | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| G8. ***Plot Plan*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| G9. ***Mechanical Equipment List*** | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| G10. Line List | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| G11. Tie-In List | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| G12. Piping Specialty Items List | 1 | 2 | 3 | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
|  |  | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| G13. Instrument Index | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| **H. Equipment Scope** | **(1) Complete <---------->Poor (5)** | | | | | | | | |
| H1. ***Equipment Status*** | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| H2. Equipment Location Drawings | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| H3. Equipment Utility Requirements | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| **I. Civil, Structural, & Architectural** | **(1) Complete <---------->Poor (5)** | | | | | | | | |
| I1. Civil/Structural Requirements | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| I2. Architectural Requirements | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| **J. Infrastructure** | **(1) Complete <---------->Poor (5)** | | | | | | | | |
| Water Treatment Requirements | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| J2. Loading/Unloading/Storage Facilities Requirements | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| J3. Transportation Requirements | Yes | | | No | | | NA | UNK |  |
| ◘ | | | ◘ | | | ◘ | ◘ |
| **K. Instrument & Electrical** | **(1) Complete <---------->Poor (5)** | | | | | | | | |
| K1. Control Philosophy | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| K2. Logic Diagrams | Yes | | | No | | | NA | UNK |  |
| ◘ | | | ◘ | | | ◘ | ◘ |
| K3. Electrical Area Classifications | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| K4. Substation Requirements Power Sources Identification | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| K5. Electric Single Line Diagrams | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| K6. Instrument & Electrical Specifications | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
|  | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **L. Procurement Strategy** | **(1) Complete <---------->Poor (5)** | | | | | | | | |
| L1. ***Identify Long Lead/Critical Equip. & Materials*** |  | | | | | | | | |
| L2. Procurement Procedures and Plans | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| L3. Procurement Responsibility Matrix | Yes | | | No | | | NA | UNK |  |
| ◘ | | | ◘ | | | ◘ | ◘ |
| **M. Deliverables** | **(1) Complete <---------->Poor (5)** | | | | | | | | |
| M1. CADD/Model Requirements | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| M2. Deliverables Defined | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| M3. Distribution Matrix | Yes | | | No | | | NA | UNK |  |
| ◘ | | | ◘ | | | ◘ | ◘ |
| **N. Project Control** | **(1) Complete <---------->Poor (5)** | | | | | | | | |
| N1. ***Project Control Requirements*** | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| N2. Project Accounting Requirements | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| N3. Risk Analysis | Yes | | | No | | | NA | UNK |  |
| ◘ | | | ◘ | | | ◘ | ◘ |
| **P. Project Execution Plan** | **(1) Complete <---------->Poor (5)** | | | | | | | | |
| P1. Owner Approval Requirements | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| P2. ***Engineering/Construction Plan & Approach*** | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| P3. Shut Down/Turn-Around Requirements | Yes | | | No | | | NA | UNK |  |
| ◘ | | | ◘ | | | ◘ | ◘ |
| P4. Pre-Commissioned Turnover Sequence Requirements | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| P5. Startup Requirements | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |
| P6. Training Requirements | 1 | 2 | 3 | | 4 | 5 | NA | UNK |  |
| ◘ | ◘ | ◘ | | ◘ | ◘ | ◘ | ◘ |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

#### Please evaluate the overall effectiveness for each practice you used in this project. Respond with NA if you did not use a best practice.

**Front End Planning**

Front End Planning involves the process of developing sufficient strategic information that owners can address risk and decide to commit resources to maximize the chance for a successful project. Front End Planning includes putting together the project team, selecting technology, selecting project site, developing project scope, and developing project alternatives. Front End Planning is often perceived as synonymous with front-end loading, front-end planning, feasibility analysis, and conceptual planning.

On a scale of 0 to 10, with 0 indicating not effective and 10 indicating very effective, please assess ***the overall effectiveness of Front End Planning*** on this project.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

## Project Risk Assessment

Project risk assessment is the process to identify, assess and manage risk. The project team evaluates risk exposure for potential project impact to provide focus for mitigation strategies.

Select the response below that best describes your company’s participation in project risk assessment effort.

1. Was the project successful in including the appropriate parties to work through an assessment of risk posed to the project?

No Moderately Very

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA/UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was an environment created to encourage free discussions of risk concerns?

Not at all Moderately Very

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA/UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was a comprehensive and systematic process used to identify and assess risks posed to the project?

No Process Used

Most

Very Extensively Used

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA/UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Were effective mitigation strategies developed for the identified risks?

Not at all Moderate Very Effective

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA/UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Were effective mitigation strategies implemented?

Not at all Moderate Always

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA/UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent were the mitigation strategies successful?

Not Moderate Very

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA/UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Was a comprehensive risk assessment process used prior to Front End Planning?

Not at all Moderate As Appropriate

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA/UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was a comprehensive risk assessment process used prior to contract award?

Not at all Moderate Often

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA/UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Was the process re-visited at a later time to evaluate if any risks should be upgraded of downgraded?

Not at all Moderate As needed

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA/UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

#### Please evaluate the overall effectiveness for each practice you used in this project. Respond with NA if you did not use a best practice.

**Project Risk Assessment**

Project risk assessment is the process to identify, assess and manage risk. The project team evaluates risk exposure for potential project impact to provide focus for mitigation strategies.

On a scale of 0 to 10, with 0 indicating not effective and 10 indicating very effective, please assess ***the overall effectiveness of Project Risk Assessment*** on this project.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

## Team Building

Team Building is a ***formal*** project-focused process that builds and develops shared goals, interdependence, trust and commitment, and accountability among team members and that seeks to improve team members problem-solving skills.

Unless otherwise indicated, for each question select the single most appropriate response.

1. To what extent was a ***formal*** team building process used for this project?

Not at all Moderately Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent did upper management support the ***formal*** team building process (e.g. funding, training, etc.)?

Not at all Moderately Extensively No formal team building used

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. What was the level of involvement in the team building process of a facilitator who was external to this project?

None Moderate Extensive

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent were objectives of the team building process documented and clearly defined?

Very poorly

or not at all Moderately Very well

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent were objectives of the team building process achieved?

Not at all Moderately Fully

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent were new team members integrated into team building activities?

Not at all Moderately Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. For each project phase, please indicate the extent that your company was involved in the team building process using a scale from 0 to 4, with 0 indicating not at all and 4 indicating extensively.

Not at all Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

* + Front End Planning
  + Design

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

* + Procurement

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

* + Construction

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

* + Startup

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Please indicate the parties involved in the team building process? (Check all that apply)

◘Owner ◘Major Suppliers

◘Engineer(s) & Designer(s) ◘ Subcontractor(s)

◘Constructor(s) ◘Construction Manager

* Regulator(s) ◘Other. If other, please specify:

#### Please evaluate the overall effectiveness for each practice you used in this project. Respond with NA if you did not use a best practice.

**Team Building**

Team Building is a project-focused process that builds and develops shared goals, interdependence, trust and commitment, and accountability among team members and that seeks to improve team members’ problem-solving skills.

On a scale of 0 to 10, with 0 indicating not effective and 10 indicating very effective, please assess ***the overall effectiveness of Team Building*** on this project.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

## Alignment during Front End Planning

Alignment is the condition where appropriate project participants are working within acceptable tolerances to develop and meet a uniformly defined and understood set of project objectives.

For each question, select the single most appropriate response as it pertains to the Front End Planning phase of the project.

1. Were the stakeholders (individuals and organizations who are involved in or may be affected by project activities) appropriately represented on the Project Team (e.g., operations, business management, construction, security, etc.)?

Not at all Moderately Very

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How effective was project leadership in aligning team members to meet project objectives?

Not at all Moderately Very

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How well were project objectives defined and prioritized (cost, quality, security & schedule)?

Poorly Moderately Very well

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How effective was the communication within the team?

Not at all Moderately Very

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How effective was the communication with stakeholders?

Not at all Moderately Very

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How effective were team meetings in gaining alignment on project objectives?

Not at all Moderately Very productive

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was a clear reward & recognition system implemented to meet identified project objectives?

Not at all Moderately Very well

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How effectively were planning tools (e.g., aide-memoirs, analysis techniques, checklists, simulations, software programs, and work flow diagrams used to plan, develop, control and manage projects) used to promote alignment?

Not at all Moderately Very well

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

#### Please evaluate the overall effectiveness for each practice you used in this project. Respond with NA if you did not use a best practice.

**Alignment during Front End Planning**

Alignment is the condition where appropriate project participants are working within acceptable tolerances to develop and meet a uniformly defined and understood set of project objectives.

On a scale of 0 to 10, with 0 indicating not effective and 10 indicating very effective, please assess ***the overall effectiveness of Alignment during Front End Planning Practices*** on this project.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

## Design for Maintainability

Design for maintainability is the optimum use of facility maintenance knowledge and experience in the design/engineering of a facility to pertain the ease, accuracy, safety and economy in the performance of maintenance action; a design parameter related to the ability to maintain.”

For each question select the single most appropriate response.

1. How well were corporate maintainability strategies and standards communicated on this project?

Not at all Fully

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Was a designated maintainability person integrated into the project team?

Not at all Fully

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent were your organization’s maintainability standards used in the project design?

Not at all Fully

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Were formal maintainability review sessions held with your facility maintenance organization?

Not at all Sometimes As Appropriate

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Was a life cycle cost analysis tool used to determine equipment needs for the project?

No Sometimes Always

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was computerized maintenance management system data used in making design decisions for this project?

Not at all Fully

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Were maintainability objectives and targets considered in the design process?

Not at all Always

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Were operations and maintenance input integrated into the design process?

No Always

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA / UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

#### Please evaluate the overall effectiveness for each practice you used in this project. Respond with NA if you did not use a best practice.

**Design for Maintainability**

Design for maintainability is the optimum use of facility maintenance knowledge and experience in the design/engineering of a facility.

On a scale of 0 to 10, with 0 indicating not effective and 10 indicating very effective, please assess ***the overall effectiveness of Design for Maintainbility*** on this project.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

## Constructability

**Constructability** is the effective and timely integration of construction knowledge into the conceptual planning, design, construction and field operations of a project to achieve the overall project objectives in the best possible time and accuracy, at the most cost-effective levels.

For each question select the single most appropriate response.

1. To what extent was constructability implemented on this project?

Not at all Moderately Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was constructability an element addressed in this project’s formal written execution plan?

Not at all Moderately Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Which of the following best describes how constructability principles were emphasized and communicated on this project? (Select only one)

* No effort to emphasize and communicate
* Minimum effort through informal means such as on-the-job training
* Moderate effort as a component of ongoing management training (e.g. part of project management conference)
* Substantial effort through structured and dedicated formal constructability training
* Not Applicable
* Unknown

1. On what basis was a constructability coordinator assigned to this project? (Select only one)
   * No coordinator assigned
   * Assigned as a part-time responsibility
   * Assigned as a full-time responsibility
   * Not Applicable
   * Unknown
2. Which of the following best describes the constructability program documentation for this project? (Select only one)
   * None; no documentation existed.
   * Limited reference in any source (e.g. CII reference)
   * Project level constructability documents exist; may be included in other corporate documents
   * Project constructability manual is available, but neither widely used nor updated
   * Project constructability manual is available, widely used and periodically updated
   * Not Applicable
   * Unknown
3. Which of the following best describes the method(s) used to track lessons learned and savings/effects on this project due to the constructability program? (Select only one)
   * No tracking was used.
   * Ideas were conveyed via word of mouth and personal interaction; limited tracking of saving/effects
   * Some individual documentation existed; selected tracking of saving/ effects
   * System existed for capture and communication of lessons learned; extensive tracking of saving/effects
   * Not Applicable
   * Unknown
4. Please indicate the ***earliest time period*** of the first project meeting that deliberately and explicitly focused on constructability. Place a check below the ***earliest time period*** (Select only one).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Front End Planning | | | Detail engineering/ Procurement | | | Construction | | | NA | UNK |
| Early | Middle | Late | Early | Middle | Late | Early | Middle | Late |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

#### Please evaluate the overall effectiveness for each practice you used in this project. Respond with NA if you did not use a best practice.

**Constructability**

Constructability is the effective and timely integration of construction knowledge into the conceptual planning, design, construction and field operations of a project.

On a scale of 0 to 10, with 0 indicating not effective and 10 indicating very effective, please assess ***the overall effectiveness of Constructability*** on this project.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

## Materials Management

Materials management is an integrated process for planning and controlling all necessary efforts to make certain that the quality and quantity of materials and equipment are appropriately specified in a timely manner, are obtained at a reasonable cost, and are available when needed. The materials management systems combine and integrate the takeoff, vendor evaluation, purchasing, expediting, warehousing, distribution, and disposing of materials functions.

Unless otherwise indicated, select the single most appropriate response for each question.

1. To what extent did this project have a ***designated*** materials management organization that was ***integrated*** across project teams?

Not at all Fully

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How ***comprehensive*** was the ***written*** materials management plan for this project in addressing elements such as project goals, responsibility, cost & schedule, and transportation?

Not at all Very

Comprehensive

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How extensively was the written materials management plan utilized throughout the life of the project?

Not at all Very

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How adequate was the plan for addressing the effects of change orders on materials management?

Not at all Very

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How extensively was an ***automated system*** (or integrated set of computer systems) used to identify, track, report, and facilitate control of project material throughout the life of the project?

Not at all Very

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How effective was site materials management during the construction phase?

Not at all Very

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How effective was the materials tracking and reporting system?

Not at all Very

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How effective were purchasing plans & procedures over the life of the project?

Not at all Very

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How effective were receipt and inspection procedures for critical materials and equipment?

Not at all Very

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How adequate was the pre-qualification process for securing the appropriate suppliers of major equipment and materials?

Not at all Very

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent did the materials management plan utilize quality management practices?

Not at all Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How well were QA/QC plans implemented with the suppliers of major equipment and materials?

Not at all Very

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Were there other factors that critically impacted your materials management?

|  |  |  |  |
| --- | --- | --- | --- |
| No | Yes | NA | UNK |
| ◘ | ◘ | ◘ | ◘ |

If yes, please list the activities and indicate whether the impact was positive or negative.

|  |  |
| --- | --- |
| Negative | Positive |
| ◘ | ◘ |

#### Please evaluate the overall effectiveness for each practice you used in this project. Respond with NA if you did not use a best practice.

**Materials Management**

Materials management is an integrated process for planning and controlling all necessary efforts to make certain that the quality and quantity of materials and equipment are appropriately specified in a timely manner, are obtained at a reasonable cost, and are available when needed. The materials management systems combine and integrate the takeoff, vendor evaluation, purchasing, expediting, warehousing, distribution, and disposing of materials functions.

On a scale of 0 to 10, with 0 indicating no effectiveness and 10 indicating excellent effectiveness please rate ***the overall effectiveness of Materials Management*** on this project.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

## Project Change Management

Change Management is the process of incorporating a balanced change culture of recognition, planning and evaluation of project changes in an organization to effectively manage project changes.

Unless otherwise indicated, select the single most appropriate response for each question.

1. To what extent was a ***formal*** documented change management process used to ***actively***

manage changes on this project? Please answer for each phase.

Not at all Moderately Extensively

* + Detailed Design

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

* + Construction

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

* + Startup

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How often were major changes (i.e., those that exceed a project threshold) required to go through a formal change justification procedure?

Not at all Sometimes Always

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Was authorization for change required before implementation? No Sometimes Always

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How timely was communication of change information to the proper disciplines and project participants?

Not at all Moderately Very

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How well did the project contract identify the primary components and procedures of the project change management system?

Not at all Moderately Very well

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent were areas susceptible to change identified and evaluated for risk during review of the project design basis?

Not at all Moderately Fully

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent were changes on this project evaluated against the business drivers and success criteria for the project?

Not at all Moderately Fully

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. At what point were the criteria for change approval established and communicated to all appropriate project participants? Place ***a check*** below the earliest time period (Select only one).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Front End Planning | | | Detail engineering/ Procurement | | | Construction | | | NA | UNK |
| Early | Middle | Late | Early | Middle | Late | Early | Middle | Late |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How often were changes managed against a baseline established at authorization or contract award?

Not at all Sometimes Always

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. At project close-out, how extensive was the evaluation of changes and their impact on the project cost and schedule performance for future use as lessons learned?

Not at all Moderately Very

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Did project personnel settle, authorize, and execute change orders on this project in a timely manner?

Not at all Sometimes Always

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent did the formal change management process establish plans for mitigating cost and schedule impacts?

Not at all Partially Fully

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

#### Please evaluate the overall effectiveness for each practice you used in this project. Respond with NA if you did not use a best practice.

**Change Management**

Change Management is the process of incorporating a balanced change culture of recognition, planning and evaluation of project changes in an organization to effectively manage project changes.

On a scale of 0 to 10, with 0 indicating not effective and 10 indicating very effective, please assess ***the overall effectiveness of Project Change Management*** on this project.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

## Zero Accident Techniques

Zero accident techniques include the site specific safety programs and implementation, auditing and incentive efforts to create a project environment and a level of training that embraces the mind set that all accidents are preventable and that zero accidents is an obtainable goal.

For each question, select the single most appropriate response.

1. To what extent has an overall project safety plan been implemented?

Not at all Moderately Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was safety a priority topic at pre-construction and construction meetings?

Not at all Moderately Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was pre-task planning for safety conducted by contractor foremen or other site managers?

Not at all Moderately Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How often were safety toolbox meetings held?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| None | Monthly | Bi-weekly | Weekly | Daily | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How often were safety audits performed by corporate safety personnel?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Annually or Less frequently | Quarterly | Monthly | Biweekly | Weekly | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Which of the following best describes the time commitment of the site safety supervisor for this project?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No site safety supervisor | Part-time function | Full-time function | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ |

1. Overall how many workers per safety person were typically on site?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Over 200 | 151 to 200 | 71 to 150 | 21 to 70 | 1 to 20 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. What type of job-specific safety orientation was conducted for new contractor and subcontractor employees?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| None | Informal | Formal | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ |

1. On average how much ongoing formal safety training did workers receive each month?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| None | Less than 1 hr | 1 hr but less than 4 hrs | 4 hr but less than 7 hrs | Over 7 hrs | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent were safety incentives used?

Not at all Moderately Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was safety performance utilized a criterion for contractor /subcontractor selection?

Not at all Moderately Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How often were accidents formally investigated?

Not at all Sometimes Always

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | No accidents occurred | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How often were near-misses formally investigated?

Not at all Sometimes Always

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | None occurred | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How extensively was senior company management typically involved in the investigation of accidents?

Not at all Moderately Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | No accidents occurred | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Were pre-employment substance abuse tests for contractor employees conducted?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Never | Sometimes | Usually | Always | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Were contractor employees randomly screened for alcohol and drugs?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Not at all | Once a year or less | Twice a year or more | Quarterly or more | Monthly or more | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Were substance abuse tests conducted after accidents?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Never | Sometimes | Usually | Always | No accidents occurred | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Were ***reasonable cause substance abuse tests*** for contractor employees conducted?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Never | Sometimes | Usually | Always | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

***Reasonable cause test***: An employee who is reasonably suspected of using alcohol or illegal drugs in the workplace or performing official duties while under the influence of alcohol or illegal drugs will be required to undergo an alcohol and drug test.

#### Please evaluate the overall effectiveness for each practice you used in this project. Respond with NA if you did not use a best practice.

**Zero Accident Techniques**

Zero accident techniques include the site specific safety programs and implementation, auditing and incentive efforts to create a project environment and a level of training that embraces the mind set that all accidents are preventable and that zero accidents is an obtainable goal.

On a scale of 0 to 10, with 0 indicating not effective and 10 indicating very effective, please assess ***the overall effectiveness of the Safety Program*** on this project.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

## Quality Management

Quality Management incorporates all activities conducted to improve the efficiency, contract compliance and cost effectiveness of design, engineering, procurement, QA/QC, construction, and start-up elements of construction projects.

Unless otherwise indicated, select the single most appropriate response for each question.

1. To what extent did your company implement a formal ***corporate*** Quality Management System (QMS)?

Not at all Fully Implemented

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. (Owner Only) Rate the degree to which the engineering/construction QMS was considered in the selection process.

Not at all Moderate Extensive

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent were specific quality management goals & objectives included in the prime contract?

Not at all Entirely

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How extensively were quality management goals and objectives used to determine project reimbursement (e.g. Incentives)?

Not at all Moderately Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Is the Quality Management System a budgeted item?

|  |  |  |  |
| --- | --- | --- | --- |
| No | Yes | NA | UNK |
| ◘ | ◘ | ◘ | ◘ |

1. To what degree was a formal ***project*** Quality Management System used on this project?

Not at all Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Please indicate the earliest time period of the project that quality management planning was initiated. Place a check below the earliest time period.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Front End Planning | | | Detail engineering/ Procurement | | | Construction | | | NA | UNK |
| Early | Middle | Late | Early | Middle | Late | Early | Middle | Late |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How well was the Quality Management System communicated to key project personnel?

Not at all Very well

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was the Quality Management System implemented by key project personnel?

Not at all Very well

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent were the following elements or resources used to implement the Quality Management system on this project?

Not Used Extensively Used

* + External quality services

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

* + Internal quality manager
  + Discipline-specific quality program
  + Owner’s procedures
  + Contractor’s procedures

1. Does the QA/QC manager for this project have external certification?

|  |  |  |  |
| --- | --- | --- | --- |
| No | Yes | NA | UNK |
| ◘ | ◘ | ◘ | ◘ |

1. To what extent was corrective actions implemented for root cause quality defects?

Not at all Partially Fully

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Which of the following quality management techniques were used on this project by your company? Check all that apply:

◘Statistical methods

◘Audits

◘Quality cost tracking

◘Quality circles/quality improvement teams

◘Quality goals

◘Team building / alignment

◘Customer satisfaction measurement

◘Quality assurance & quality control requirements

◘Post project review

◘Rejection rate analysis

◘Reference documented quality policies and procedures (Quality manual, etc.)

◘Lessons learned systems

1. What are the primary sources of quality problems on this project? Check all that apply:

◘Design Engineering

◘Contractual

◘Procurement/Materials Management

◘Specifications

◘Sub-Contracted scope of services

◘Craft Labour

◘Civil/Concrete

◘Mechanical/Equipment

◘Electrical/Instrumentation

◘Piping

◘Fit-up or Welding

◘Start-up/Turnover of System

* Other(s); please specify:

#### Please evaluate the overall effectiveness for each practice you used in this project. Respond with NA if you did not use a best practice.

**Quality Management**

Quality Management incorporates all activities conducted to improve the efficiency, contract compliance and cost effectiveness of design, engineering, procurement, QA/QC, construction, and start-up elements of construction projects.

On a scale of 0 to 10, with 0 indicating not effective and 10 indicating very effective, please assess ***the overall effectiveness of Quality Management*** on this project.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

## Automation/Integration (AI) Technology

This section addresses ***the degree of automation/level of use and integration of automated systems*** for specific tasks/work functions common to most projects. Using the first matrix, please assess the degree of automation and level of use ***only***. Using the second matrix, please assess the level of integration of these automated systems among the tasks/work functions.

Referring to the use levels below, indicate how well for this project, the tasks/work functions were automated. Select the single most appropriate ***use level*** for the task/work functions listed.

#### USE LEVELS

* + **Level 1(None/Minimal):** Little or no utilization beyond e-mail.
  + **Level 2 (Some):** “Office” equivalent software, 2D CAD for detailed design.
  + **Level 3 (Moderate):** Standalone electronic/automated engineering discipline (3D CAD) and project services systems.
  + **Level 4 (Nearly Full):** Some automated input/output from multiple databases with automated engineering discipline design and project services systems.
  + **Level 5 (Full):** Fully or nearly fully automated systems dominate execution of all work functions.

**Automation** of Task/Work Functions

#### Use Level

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Task/Work Functions** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| **Business planning and analysis** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **Conceptual definition & design** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **Project (discipline) definition & facility design** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **Supply management** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **Project management** |  | | | | | | |
| Coordination system | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Communications system | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Cost system | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Schedule system | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Quality system | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **Off-site/pre-construction** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **Construction** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **As-built documentation** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **Facility start-up & life cycle support** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

Referring to the integration levels below, indicate how well for this project, the tasks/work functions were ***integrated across all other*** work functions. Select the single most appropriate ***integration level*** for the task/work functions listed.

#### INTEGRATION LEVELS

* + **Level 1(None/Minimal):** Little or no integration of electronic systems/applications.
  + **Level 2 (Some):** Manual transfer of information via hardcopy of email.
  + **Level 3 (Moderate):** Manual and some electronic transfer between automated systems.
  + **Level 4 (Nearly Full):** Most systems are integrated with significant human intervention for tracking inputs/outputs.
  + **Level 5 (Full):** All information is stored on a network system accessible to all automation systems and users. All routine communications are automated. The automated process and discipline design systems are fully integrated into 3D design, supply management, and project services systems (cost, schedule, quality, and safety).

**Integration** of Task/Work Functions

#### Integration Level

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Task/Work Functions** | 1 | 2 | 3 | 4 | 5 | NA | UNK |
| **Business planning & analysis** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **Conceptual definition & design** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **Project (discipline) definition & facility design** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **Supply management** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **Project management** |  | | | | | | |
| Coordination system | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Communications system | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Cost system | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Schedule system | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Quality system | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **Off-site/pre construction** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **Construction** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **As-built documentation** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| **Facility start-up & life cycle support** | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

**Please evaluate the overall effectiveness for each practice you used in this project. Respond with NA if you did not use a best practice.**

**Automation/Integration (AI) Technology**

The Automation and Integration Technology practice addresses the degree of automation/level of use and integration of automated systems for predefined tasks/work functions common to most projects.

On a scale of 0 to 10, with 0 indicating not effective and 10 indicating very effective, please **assess *the overall effectiveness of Automation/Integration Technology Practices*** on this project.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

## Planning for Startup

Startup is the transitional phase between plant construction completion and commercial operations, including all of the activities that bridge these two phases. Planning for Startup consists of a sequence of activities that begins during requirements definition and extends through initial operations. This section assesses the level of Startup Planning by evaluating the degree of implementation of specific activities throughout the various phases of a project.

Please select the single most appropriate response to each question below.

1. How well were startup objectives communicated?

Not at all Very well

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was a formal startup execution plan implemented?

Not at all Very extensive

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was commissioning plans developed during planning for startup?

None were developed

Developed for All systems

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How clearly was startup team key roles & responsibilities communicated?

Not at all Very

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was the startup schedule logic based on systems and sub-systems?

Not at all Fully

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was the startup schedule logic aligned with the EPC schedule?

Not at all Fully

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent were startup needs incorporated in procurement requirements?

Not at all Fully

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent were suppliers for startup services pre-qualified?

Not at all Fully

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. Please indicate the ***earliest time period*** of the first project meeting that deliberately and explicitly focused on planning for startup. Place a check below the ***earliest time period*** (Select only one).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Front End Planning | | | Detail engineering/ Procurement | | | Construction | | | NA | UNK |
| Early | Middle | Late | Early | Middle | Late | Early | Middle | Late |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How often were the startup risks assessed?

Not at all Sometimes Continuously

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent was formal operator/maintenance training conducted?

Not at all Extensively

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. How extensive was the system turnover plan?

Not at all Very

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

1. To what extent were startup and Process Safety Management (PSM) procedures communicated?

Not at all Fully

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

#### Please evaluate the overall effectiveness for each practice you used in this project. Respond with NA if you did not use a best practice.

**Planning for Startup**

Startup is the transitional phase between plant construction completion and commercial operations, including all of the activities that bridge these two phases. Planning for Startup consists of a sequence of activities that begins during requirements definition and extends through initial operations. This section assesses the level of Startup Planning by evaluating the degree of implementation of specific activities throughout the various phases of a project.

On a scale of 0 to 10, with 0 indicating not effective and 10 indicating very effective, please assess ***the overall effectiveness of the Planning for Startup process*** on this project.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

## Prefabrication/ Preassembly/ Modularization

1. To what extent did the project team consider prefabrication, preassembly or modularization?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Not at all |  |  |  | Fully | NA | UNK |
| 0 | 1 | 2 | 3 | 4 | ◘ | ◘ |

1. To what extent did the project team consider the cost impact of using prefabrication, preassembly or modularization?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Not at all |  |  |  | Fully | NA | UNK |
| 0 | 1 | 2 | 3 | 4 | ◘ | ◘ |

1. To what extent were labor availability and labor cost considered in evaluation of using prefabrication, preassembly or modularization?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Not at all |  |  |  | Fully | NA | UNK |
| 0 | 1 | 2 | 3 | 4 | ◘ | ◘ |

1. To what extent were shipping routes and options considered in the prefabrication, preassembly or modularization decision?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Not at all |  |  |  | Fully | NA | UNK |
| 0 | 1 | 2 | 3 | 4 | ◘ | ◘ |

1. To what extent were safety and quality issues considered in the prefabrication, preassembly or modularization decision?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Not at all |  |  |  | Fully | NA | UNK |
| 0 | 1 | 2 | 3 | 4 | ◘ | ◘ |

1. To what extent was the construction schedule considered in the prefabrication, preassembly or modularization decision?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Not at all |  |  |  | Fully | NA | UNK |
| 0 | 1 | 2 | 3 | 4 | ◘ | ◘ |

#### Please evaluate the overall effectiveness for each practice you used in this project. Respond with NA if you did not use a best practice.

**Prefabrication/ Preassemble/ Modularization Effectiveness**

On a scale of 0 to 10, with 0 indicating not effective and 10 indicating very effective, please assess ***the overall effectiveness of the Prefabrication/ Preassembly/ Modularization*** on this project.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NA | UNK |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |

# Closeout

## Achieving Facility Capacity

Indicate the **primary** product or function of the completed facility and the unit of measure which best relates the product or function capacity of the completed facility.

|  |  |
| --- | --- |
| **Product or Function** | **Unit of Measure** |
|  |  |

*Examples:*

|  |  |
| --- | --- |
| ***Product or Function*** | ***Unit of Measure*** |
| *Chemical Products* | *Tonnes / Day* |
| *Oil and Gas* | *BOE / Day*  *(BOE = Barrel Oil Equivalent)* |

Were initial planned capacities achieved during Startup?

Not at all Moderately Fully Achieved

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **0** | **1** | **2** | **3** | **4** |
| ◘ | ◘ | ◘ | ◘ | ◘ |

Were product quality specifications achieved?

Not at all Moderately Fully Achieved

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **0** | **1** | **2** | **3** | **4** |
| ◘ | ◘ | ◘ | ◘ | ◘ |

#### Achieving Facility Capacity (For Building projects)

Please indicate the size and the unit of measure of the completed facility

|  |  |  |  |
| --- | --- | --- | --- |
| **Size** | | **Unit of Measure** | |
|  |  | Square Footage | ◘ |
| Square Meter | ◘ |
| Cubic Footage | ◘ |
|  |
| Cubic Meter | ◘ |

Were project quality specifications achieved?

Not at all Moderately Fully Achieved

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **0** | **1** | **2** | **3** | **4** |
| ◘ | ◘ | ◘ | ◘ | ◘ |

## Work-hours and Accident Data

To measure Safety Performance and with the goal of achieving zero injuries and illnesses, the recording and classification of occupational injuries and illnesses of all direct hire workers and contractors are reported following the industry guidelines in Canada (WCB and CAPP).

In the spaces below, please record the **Total Number of Fatalities, Lost Time Cases, Medical Aid Cases and First Aid Cases and the Total Number of Restricted Work Cases, Restricted Medical Aid Cases and Restricted First Aid Cases.** With the exception of fatalities, also provide the total number of days away from work for each.

Next, record the number of **Near Misses,** the **Total Site Work-hours (Exposure Hours), Total Number of Employees, the Average Full Time Equivalent,** and the **Number of Hours in Your Normal Work Week.**

Use WCB and CAPP definitions. If you do not track in accordance with these definitions, click Unknown in the boxes below.

|  |  |
| --- | --- |
| **Please provide the Total Number of Fatalities from:**  Workplace occupational injuries or illnesses  ◘Unknown  Travel-related  ◘Unknown | |
| **Please provide the Total Number of Lost Time Cases, Medical Aid Cases and First Aid Cases:** | **Please provide the total workdays away for Lost Time, Medical Aid and First Aid incidents:** |
| Lost Time Cases ◘ Unknown  Medical Aid Cases ◘ Unknown  First Aid Cases ◘ Unknown | Lost Time Days ◘ Unknown  Medical Aid Days ◘ Unknown  First Aid Days ◘ Unknown |
| **Please provide the Total Number of Restricted Work Cases, Restricted**  **Medical Aid Cases and Restricted First Aid Cases:** | **Please provide the Total Workdays for Restricted Work, Restricted Medical Aid and Restricted First Aid incidents:** |
| Total Restricted Work Cases   * Unknown | Total Restricted Workdays   * Unknown |
| **Near Misses**  Near Misses are common at many worksites. They do not result in injury-but they may cause property damage. If, say, an employee had been in a slightly different position or place, or the equipment or product placement had been to the left or right, serious injury and/or damages could have resulted. A lot depends on sheer luck and circumstance (Heberle, 1998).  How many near misses occurred? ◘Unknown | |
| **Total Site Work-hours (Exposure Hours):** ◘Unknown  **Peak Workforce Number of Employees:** ◘Unknown | |

### Project Impacts

The following section is intended to assess whether environmental or market conditions adversely or positively affected project performance ***beyond the conditions for which you planned*.**

Impacts may be assessed ranging from “highly negative”, to “highly positive”. If the factor was adequately planned for, please indicate “As Planned”. If it was not adequately planned for, please indicate the impact, positive or negative. Negative impacts adversely affect the metrics and positive impacts favorably affect the metrics.

#### Weather Conditions

* N/A ◘ UNK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Labour Availability

* N/A ◘ UNK

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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Materials Availability

* N/A ◘ UNK

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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Site Conditions

* N/A ◘ UNK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Project Complexity

* N/A ◘ UNK

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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Regulatory Requirements

* N/A ◘ UNK

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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Quality of Field Level Supervision

* N/A ◘ UNK

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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Amount of Scheduled Overtime

* N/A ◘ UNK

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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Amount of Unplanned Overtime

* N/A ◘ UNK

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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | No Effect | Pos | Hi Pos | Hi Neg | Neg | No Effect | Pos | Hi Pos | Hi Neg | Neg | No Effect | Pos | Hi Pos | Hi Neg | Neg | No Effect | Pos | Hi Pos | Hi Neg | Neg | No Effect | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Project Team Experience

* N/A ◘ UNK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Craft Labour Skill

* N/A ◘ UNK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Engineering Labour Skill

* N/A ◘ UNK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Project Team Turnover

* N/A ◘ UNK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Detailed Engineering Design Location (Use of Offshore Engineering)

* N/A ◘ UNK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Business Market Conditions

* N/A ◘ UNK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Coordination with Plant Shutdown

* N/A ◘ UNK

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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

#### Were there other significant factors not listed above that affected performance?

* Yes ◘ No

If ‘Yes’, please list each factor separately and assess the impact using the table below:

* N/A ◘ UNK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

Please assess below the impact of the **percentage of engineering completed prior to project sanction**

* N/A ◘ UNK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

Please assess below the impact of the **percentage of engineering completed prior to construction start**

* N/A ◘ UNK

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cost** | | | | | **Schedule** | | | | | **Safety** | | | | | **Construction Productivity** | | | | | **Engineering Productivity** | | | | |
| ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ | ◘ |
| Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos | Hi Neg | Neg | As Planned | Pos | Hi Pos |
| * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | | * N/A ◘ UNK | | | | |

### Workforce Conditions

#### Percentage of workweek by workforce shifts and schedules:

Indicate on average, the predicted and actual percentage of the project’s workforce working day, evening and night shifts, by work week schedules. If the actual percentage cannot be calculated, please provide your best assessment. Answer Unknown only if you cannot make a reasonable assessment. Percentages may be indicated in increments of 5 %.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **As budgeted in AFE** | | | | |
| Work Schedule (days) | Days | | Nights | |
| 4-3 | % | * Unknown | % | * Unknown |
| 5-2 | % | * Unknown | % | * Unknown |
| 10-4 | % | * Unknown | % | * Unknown |
| 11-3 | % | * Unknown | % | * Unknown |
| 12-2 | % | * Unknown | % | * Unknown |
| Other | % | * Unknown | % | * Unknown |
| Total | 100 % |  | 100 % |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Actual at project completion** | | | | |
| Work Schedule (days) | Days | | Nights | |
| 4-3 | % | * Unknown | % | * Unknown |
| 5-2 | % | * Unknown | % | * Unknown |
| 10-4 | % | * Unknown | % | * Unknown |
| 11-3 | % | * Unknown | % | * Unknown |
| 12-2 | % | * Unknown | % | * Unknown |
| Other | % | * Unknown | % | * Unknown |
| Total | 100 % |  | 100 % |  |

#### Level of Overtime as % of total field Work-hours

Indicate below the planned and actual percentage of field work-hours classified as overtime.

|  |  |
| --- | --- |
| **Planned overtime** | **Actual overtime** |
| % ◘ Unknown | % ◘ Unknown |

If the ratio of Actual exceeds Planned overtime, please provide the reason why:

#### Worker accommodations

Indicate below the planned and actual percentage of workers living in camps and with living out allowance (LOA).

|  |  |
| --- | --- |
| **Planned % of workers in camps** | **Actual % of workers in camps** |
| % ◘ Unknown | % ◘ Unknown |

|  |  |
| --- | --- |
| **Planned % of workers with LOA** | **Actual % of workers with LOA** |
| % ◘ Unknown | % ◘ Unknown |

#### Peak construction work force

Indicate the peak construction work force planned and achieved for this project by inputting the maximum number of working personnel at the jobsite at one time:

|  |  |
| --- | --- |
| **Planned Peak Work Force** | **Actual Peak Work Force** |
| * Unknown | * Unknown |

#### Indicate as a percentage below the planned and actual methods utilized by personnel for travel to the worksite.

|  |  |  |
| --- | --- | --- |
| **Mode of Travel** | **Planned** | **Actual** |
| Bus | % ◘ Unknown | % ◘ Unknown |
| Air | % ◘ Unknown | % ◘ Unknown |
| Personal Vehicle | % ◘ Unknown | % ◘ Unknown |
| Other | % ◘ Unknown | % ◘ Unknown |
| Total | 100 % | 100 % |

1. **Percentage of winter work:**

What percentage of **winter work was performed in outdoor conditions from October 15 to April 15?** If the actual percentage cannot be calculated, please provide your best assessment. Answer Unknown only if you cannot make a reasonable assessment.

|  |  |
| --- | --- |
| **Planned Outdoor Work in Winter** | **Actual Outdoor Work in Winter** |
| % ◘ Unknown | % ◘ Unknown |