



# Cost Breakdown Structure




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## 1.0 INTRODUCTION

This procedure defines the cost breakdown structure (CBS) as applied to the CKPC project. The CBS is applicable to all phases of the asset life cycle, but this procedure specifically addresses the engineering, procurement and construction (EPC) contractor for creation, modification or termination of a process facility. This procedure does not apply to codes of accounts supporting ongoing operations of process facilities.

## 2.0 PURPOSE

The purpose of this procedure is to establish a common understanding of the attributes of the project CBS to improve communication among all project stakeholders. The intent of this procedure is to help cost management practitioners to manage costs in an organized fashion in accordance with the CBS.

Common understanding is important because all projects are the product of team endeavours in which timely and accurate flow of project cost, resource, progress and other information is essential to project success. The effort in producing this document has the result of cost alignment across all functions i.e. Finance, Supply Chain Management, Engineering, etcetera.

## 3.0 RESPONSIBILITIES

The project controls manager shall steward use of this procedure on all facets of the project.

## 4.0 DEFINITIONS AND ACRONYMS

Allowances	Cut and waste allowances are included with the applicable commodity's account codes. Design allowances and material take off (MTO) allowances in the estimates shall always be mapped to the applicable secondary code of account (CoA) identified as general.
Account Codes	Defined by the combination of levels one and two codes along with the cost type codes, these are based on allowable codes mapped out in the CBS matrix.
CoA	Code of account – Entire Cost Breakdown Structure.
CBS (cost breakdown structure)	Code defines all resources necessary for the planning and execution of a CKPC project or facility from the FEED stage through ICSU.
EBS (estimate breakdown structure)	The lowest common denominator at which all project goods (at stock code or commodity code levels) and services are defined for the purpose of assigning material, labour and associated costs.
FEED (front end engineering development)	This consists of preliminary design engineering activities and initiates the first phase of project realization. All FEED stages lead through to a design basis and project execution plan sufficient for

	detailed design activities to commence.
MTO	Material take off.
NDE	Non-destructive examination.
Rework	Activities in the field done more than once or activities which remove work previously installed as part of the project regardless of source, where no change order has been issued and no change of scope has been identified are called rework. All field rework will be coded to CBS code 65-100. All other rework will be coded under the appropriate primary code of account (CoA).

## 5.0 PRE-REQUISITES

The detailed Basis of Estimate, Project Execution Plan, Contracting Strategy and Engineering Work Package (EWP) plans are required to map the estimate line items to the CBS control accounts in establishing the budget.

## 6.0 PROCEDURE

The CBS is a hierarchical breakdown code structure of project cost, resource and activity categories. A complete CBS includes definitions of the content of each account code and is methodically structured to facilitate finding, sorting, compiling, summarizing, defining and otherwise managing the project information linked to the code. The information is used to support total cost management practices such as cost estimating, cost reporting, cost accounting, planning and scheduling.

The CBS is a seven-digit numeric code that is assigned to each cost item. A Project CBS is made up of three types of code of accounts (CoAs). The primary CoA (CBS level one) is a two-digit code defining the disciplines or functions. The secondary CoA (CBS level two) is a three-digit code defining the commodity or activity as a subset of the primary CoA. The third level CoA is a two-digit code assigned to every primary and secondary CoA to complete the CBS code. The third level CoA (CBS level three) is divided into several capital or expense cost categories such as material, labour, sub- contractor, general expense or cost type.

BB Prime Account (Level One)  
CCC Activity Account (Level Two)  
DD Cost Type (Level Three)

### 6.1 Field Directs – Civil/Structural/Architectural

#### 10-000 Earth Works and Civil

This applies to all permanent earthworks, roads, crossings, ponds, basins, sewage and water systems as well as related field activities needed to transform the site from its original raw state into its permanent form. Temporary facilities such as temporary ponds, sewage systems, etcetera shall be allocated to the indirect codes under temporary facilities and utilities.

This account also includes:

- Soil tests
- Soil bioremediation.

This excludes temporary work areas, roads, laydown areas, etcetera which will not remain as part of the permanent plant when it is placed into operation. Refer to temporary construction facilities, 72-000 herein.

## 10-010 Civil General

This includes design and MTO (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design) and this shall be retained as an identified part of the element.

## 10-020 Site-Clearing, Grading and Compacting

This is required to render the site sufficiently graded and cleared to allow structural earthwork, undergrounds and other civil works to proceed and includes:

- Removing vegetation, rocks and debris from the site
- Stripping the portion of the earth in which organic materials are present
- Processing and hauling materials to stockpile area.
  - i. Clear and Grub
    - Site and aerial surveys and subsurface investigations
    - Perform work:
      - remove trees, grass, shrubs, brush
      - break up soil as necessary – may include blasting if required
      - dislodge roots, rocks, rock like materials and debris at the work site surface
      - process cut and removed materials to facilitate subsequent removal; breakup, mulch or burn (include fire tender), for instance
      - remove both raw and processed materials from site to stockpile area (local or remote)
      - minor site drainage

- remove any incidental monuments or structures found at site but not associated with part of an existing plant and abandoned by the original owner(s). If necessary, refer to the demolition section herein.
- ii. Strip, Stockpile, Grading, Fill and Compact
  - Strip overburden or topsoil from work area and stockpile at local site or load for removal to remote site
  - All mass excavation and fill to bring work area to approximate contour and grade before any structural earthwork or underground utilities work begins.
- iii. Topsoil Replacement
- iv. Import Fill and Compact
- v. Aggregates
  - Clean gravel and pit run, all sizes.
- vi. Loading and Hauling
- vii. Soil Inspection and Disposal
  - In-situ or lab inspection of soil
  - Load stripped or excavated soil to be disposed of at work area or local site, and transport to disposal location (local or remote).
- viii. Site Dewatering
  - Well point dewatering and surface trench pumping
  - Unloading, handling, installing, operating, maintaining and removing pumps, well points, hosing/piping, etcetera as required to remove or exclude ground water, rain (including storm water) or other water as well as mire from an excavation
  - Excludes caissons and cofferdams.
- ix. Wells
- x. Blasting, Boring and Tunneling
  - Test boring, rock coring, rock pressure testing and drilling
  - Excludes third party compaction testing (see Field Inspection and Testing, #65-050 herein).

## 10-030 Structural and Trench Excavation and Backfill

This includes all civil earthworks and rock structural and trench excavation, both machine and manual, as needed to lay pipe or to construct foundations required to construct foundations and set underground services.

- i. Aggregates
  - Clean gravel and pit run, all sizes.
- ii. Loading and Hauling
- iii. Material Clarification
  - Remove oversized rocks, debris, vegetable matter and other unsuitable matter from soils in order to facilitate re-use of the parent material.
- iv. Shoring and Bracing Excavations
- v. Dewatering
  - Groundwater control systems including construction dewatering techniques utilizing vacuum well points, eductor wells and deep wells.
- vi. Backfill and Compaction
  - Imported fill
  - Both machine and manual backfill to move infill material (including imported select fill, aggregate, sub-base materials) from stockpile location as required; place under and around foundations, structures, underground piping, etcetera in preparation for compaction
  - Both machine and manual consolidation and compaction of backfilled material.
- vii. Hydrovac
  - Truck mounted units use pressurized water and vacuum to expose underground pipes and utilities and for safe digging in congested grounds and challenging conditions.

## 10-040 Underground Services, Drainage and Sewers

Gravity surface drainage (open ditch or formed / poured), underground sewers (piped or formed / poured) and underground pressure piping (firewater lines, natural gas, potable water, etcetera).

- i. Pipe and Fittings, including:
  - Ductile iron
  - Corrugated metal
  - Vitrified clay
  - Concrete
  - HDPE
  - Polypropylene
  - PVC
  - ABS



- ii. Valves and Hydrants
- iii. Catch Basins
- iv. Manholes and Other Structures

## 10-050 Site Improvements and Erosion Protection

This involves permanent improvements to the plant site.

- i. Site Infrastructure
  - Installation, grading and compacting including crushed rock or concrete base course for paved and unpaved plant roads, patrol roads
  - Stairs (over berms, for example), guard posts, guard rails, posts and dividers, specialties, markings and signs.
- ii. Access Ramps and Approaches
  - Installation, grading and compacting including crushed rock or concrete base course for paved and unpaved access ramps and approaches.
- iii. Surface Drainage Control
  - Surface run off, ditches, swales, weirs, culverts, etcetera
  - Permanent gravity drainage ditches at surface including placement of riprap at outfalls.
- iv. Erosion Protection
  - Permanent slope and area protection, including all surfacing of crushed rock, geoweb, riprap, hydro- seeding, asphalt, oil, special planting, etcetera to provide dust and erosion control.
- v. Geotextiles and Membranes
  - Supply and install geosynthetics (geogrid or geotextile)
- vi. Containment Protection
  - Earth or concrete tank dykes complete with linings of geotextiles and membranes
- vii. Ponds
  - Permanent ponds, reservoirs and dykes complete with lining of impervious geotextiles and membranes or gunnite/concrete materials
  - Large, unobstructed quantity of excavation, backfill, compaction and fine grading on a cut and fill balance
  - Excludes temporary construction ponds (see the temporary construction facilities section herein)
- viii. Tank Bases

- Supply, placement and compaction of selected material to form the bases of tanks complete with linings of geotextiles and membranes
- Earth or concrete tank dykes /berms

ix. Fencing and Gates

- Permanent fencing to the standard specified including embedded corner and line posts (usually carried in the estimate as a sub-contract item and including excavation, setting posts, placing footings, stringing fencing, hanging gates and painting)
- Associated gates for traffic and personnel

x. Landscaping

- Furnish, spread, condition and grade topsoil
- Plant lawns, shrubs, trees, etcetera
- Furnish and install irrigation and sprinkler systems; includes other related installations.

xi. Guard Posts and Rails

- Guard rails, posts and dividers

xii. Specialties, Markings and Signs

## 10-060 Railways

Railways scope includes beds, rails, ties, ballast and all railway ancillaries.

## 11-000 Piling

This account applies to work performed by a piling contractor on a sub-contract basis for piling operations/ activities including the use of hydraulic pile hammers/ drivers or augers and the crews to supply and install piles to specified depths for foundations of structures. This includes test piles and compression load testing of piles.

This excludes shoring (see the civil and earthwork section herein) and bush hammering of piles and pile caps (see the concrete section herein).

### 11-010 Piling General

Includes design and material take off (MTO) allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

## 11-020 Drilled, Cast in Place

Includes cased and uncased piles, reinforcing cages, concrete and belled footings where applicable. If required, dewatering of drill holes is included in this account.

## 11-030 Driven, Steel Caisson

Includes wood piles (treated or untreated), Raymond step- tapered piles, steel H piles, pre-cast concrete piles and steel caissons/ pipes.

## 11-040 Screw Piles

Also referred to as torque piles and helical anchors. Consists of center steel pipe and one or more steel screw flights.

## 11-050 Specialty Piles

**Micro-piles** Also called mini piles. Micro-piles are normally made of steel with diameters of 60 to 200 mm. Micro-piles can be installed using drilling, impact driving, jacking, vibrating or screwing machinery.

**Tripod piles** The use of a tripod rig to install piles is one of the more traditional ways of forming piles. Although unit costs are generally higher than most other forms of piling, these have several advantages which have ensured continued use through to the present day. The tripod system is easy to use and inexpensive to bring to site making it ideal for jobs with a small number of piles. Tripods can work in restricted areas (particularly where height limits exist); they are reliable and usable in almost all ground conditions.

**Sheet piles** Sheet piling is a form of driven piling using interlocking sheets of steel to form a continuous barrier in the ground. The main use for steel sheet piles is in retaining walls and cofferdams to enable permanent works to proceed. Vibrating hammer, t-crane and crawler drilling are normally used to establish sheet piles.

**Soldier piles** A soldier pile wall uses reclaimed railway sleepers as lagging. Soldier piles, also known as king piles or Berlin walls, are constructed of wide flange steel H sections spaced about 2 to 3 m apart and driven prior to excavation. As the excavation proceeds, horizontal timber sheeting (lagging) is inserted behind the H pile flanges.

## 12-000 Concrete

Includes work hours for loading material at the jobsite yard, hauling to and unloading at the job work site; local layout, 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.

### 12-010 Concrete General

Includes design and MTO allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

### 12-020 Cast in Place Concrete

All cast in place or pre-cast concrete work such as pile caps, equipment and building foundations, buildings up to and including main floor slabs (where concrete), pipe thrust blocks, steps and stairs not associated with buildings, ladder pads, conveyor counterweights, light post bases, grouting, structures and facilities in the permanent plant Includes:

- Core drilling existing adjacent structures for rebar installation
- Bush hammering of concrete blocks and / or piling ends as required
- Supplying and placing formwork including permanent steel forms
- Embedded steel and anchor bolts
- Supplying, placing, vibrating and finishing concrete
- Stripping, cleaning and oiling forms
- Post-pour clean up
- Coating underground structures

Excludes:

- Excavation, placement, levelling and compaction of sub-base materials, backfill / compaction (see the earthworks and civil section herein)
- Concrete for temporary facilities (see the indirect costs section of temporary facilities, herein)
- Excludes third party concrete testing (see Field Inspection and Testing, #65-050, herein)

### 12-030 Pre-cast Concrete

- Setting pre-cast concrete components on site. Fabrication of precast is classified a material cost.

## 12-040 Grout

- Placing and packing of grout under equipment, structural columns, etcetera and usually associated with bases.

## 12-050 Paving

- Area paving around and near machinery equipment and facilities which would otherwise be surfaced in native materials such as earth, rocks, gravel is paved with concrete and facilitates safe, orderly, clean access to the area
- Includes concrete walkways, curbs, gutters and asphalt paving
- Excludes aggregate base and preparation of sub- grade

## 12-060 Masonry

Includes hollow and solid block concrete masonry and bond beam and vertical reinforcing. Excludes brick and stone masonry (see the architectural finishes section herein).

## 13-000 Structural Steel

Detailed (shop) design, material, fabrication, delivery and erection required for all structural steel including associated miscellaneous steel for equipment and personnel platforms, walkways and ladders for any element of permanent plant facility.

Includes:

- Shake out and transportation
- Surface preparation and shop application of primer, paint or galvanizing
- Miscellaneous steel plate caps for steel driven piles

Excludes fireproofing (see the protective coatings section herein) and architectural work such as siding, roofing and vents.

## 13-010 Steel General

Includes design and material take off allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

## 13-020 Equipment Structures

Structures for housing and/or physically supporting aboveground equipment including mounting pads for equipment.

Service structures providing access to the equipment but not supporting any equipment or other elements.

Structures whose sole or primary purpose is to support large items of aboveground non-equipment elements such as large diameter piping, ductwork, exhaust stacks and electrical apparatus. Distinguishing features include significance in size and structural complexity and necessary to support only one or a relative few major pieces of non-equipment elements.

### 13-030 Pipe Racks

Structures whose sole or primary purpose is to support runs of multiple aboveground piping lines, often along with support trays for electrical cables and instrumentation components/piping/tubing.

May be required to support major equipment as a secondary function (for example, air coolers, pumps, EHT enclosures).

### 13-040 Ladders, Platforms, Stairs, Walkways, Etcetera

Major structural support members such as bents, T supports, sleepers, etcetera erected by the ironworker trades and used to provide support for installed runs of pipe spools, mechanical ducting, electrical bus ducts or cable trays, crane or elevator rails or individual items of equipment including:

- Framing steel, handrails and kick plates
- Platform coverings installed at the shop such as grating and/or checker plates supplied as an integral part of platform assemblies
- Handrails
- Stair treads such as grating and/or checker plates

### 13-050 Miscellaneous Support Steel

- Grating
- Plate
- Structural enclosures
- Corrugated steel

### 14-000 Architectural and Buildings

Permanent buildings and structures to house or safeguard property or persons, including the following:

- Architectural buildings
- Industrial buildings
- Industrial shelters
- Superstructure
- Exterior closure
- Roofing

- Interior construction
- Flooring
- Special construction

Includes:

- All building elements above the main floor slab including:
  - structural framing such as concrete, concrete block, steel or other metal, wood and so forth
  - roofing, walls, ceilings, floors, doors, windows
  - exterior and interior stairs, platforms, catwalks
  - exterior and interior finishes including paint, wallpaper and floor coverings
  - interior utilities to within five feet of building exterior
  - all mill work systems and equipment including fire extinguishers, elevators, locker facilities, coffee bars and dining areas
  - permanently installed lockers, storage shelves, bins, appliances, etcetera
  - any necessary additional structural steel for shop equipment including trolley hoists or cranes.

Excludes:

- Concrete foundations, concrete grade beams, basement floors/walls, main floor slab, approach ramps and aprons
- Any mechanical systems classified as such in the mechanical section of this document

## 14-010 Architectural General

Includes design and material take off (MTO) allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

## 14-020 Stick Built Buildings

Foundations, masonry, and structural steel costs shall be budgeted against their respective prime accounts. This account shall be used to capture those architectural items not included in other prime accounts or as part of cost codes 18-200 and 18-250 including:

- Interior finishes
- Framework
- Exterior insulation
- Exterior finishes

## 14-030 Pre-Engineered Buildings

Includes pre-engineered metal buildings (PEMB or EMB) and pre-fabricated steel as well as modular buildings.

## 14-040 Fabric Structures

Includes steel and aluminum framed pre-fabricated, clear- span, tension fabric membrane buildings, shelters and structures.

## 14-050 Buildings Services

- Mechanical
  - water, drainage and sanitary piping and components
  - HVAC systems and equipment
- Electrical
  - power and lighting
  - security
  - communication and data
  - CCTV
  - gas, smoke and fire detection
- Elevators

## 14-060 Furniture, Equipment and Accessories

- Labour to complete furnishings
- Furniture
  - office furniture
  - lockers
  - storage shelves and bins
  - mill work
- Equipment and appliances
  - laboratory outfitting
  - kitchen outfitting
  - laundry outfitting
  - stores outfitting
  - workshops outfitting
  - health center outfitting
  - excludes bridge cranes and hoists
- Accessories
  - art
  - interior signage (directional, safety and information)



- directional signage exterior to the building
- fire extinguishers
- area markings for offices, rooms, etcetera

## 6.2 FIELD DIRECTS – MECHANICAL AND E&I

These accounts include material handling involving equipment and vehicles as well as material handled by installation crew members dedicated to picking up materials from offsite storage areas or local fabrication yards and delivering to work areas for unloading and installation by onsite installation crew members.

Excludes material handling within receiving areas or warehouses where materials are retained until needed for installation. Refer to the material handling and warehousing section of this document.

### 20-000 Equipment and Modules

Includes miscellaneous steel (ladders, platforms, walkways, handrails, etcetera) supplied and installed by the original fabricator as an integral part of the shipped element. Also includes any equipment storage and preservation costs until turnover to the owner.

Excludes:

- Electrical or instrumentation/ automation equipment
- Heavy lift (see the construction equipment section herein)
- Vendor assistance costs prior to start up and commissioning (see the vendor support section herein)
- Pre-commissioning, commissioning and startup including catalyst, first fills, chemicals and vendor assistance costs for commissioning and start up
- Mobile equipment (emergency services equipment, fork lifts, vehicles, etcetera)
- Scaffolding
- Water or glycol used for hydro-testing, including reclamation and / or disposal (see the small tools and consumables section herein).

The common inclusions and exclusions noted above apply to all elements of major equipment. The elements in each classification of major equipment following may have additional unique inclusions and exclusions. Some of these are noted below.

### 20-010 Equipment General

Includes design and material take off (MTO) allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in

design). This shall be retained as an identified part of the element but does not include.

- Storage costs
- Preservation

Refer to Freight, Storage and Offsite Preservation, section #65-300 of this document.

## 20-020 Exchangers

Applies to heat transfer equipment such as:

- Shell and tube exchangers
- Plate exchangers
- Condensers
- Evaporators
- Reboilers
- Coolers (including finfan coolers and cooling towers)
- Evaporators
- Waste heat recovery units

Excludes condensers associated with vacuum equipment.

## 20-030 Rotating Equipment and Drivers

Applies to all types of rotating equipment, pumps and drivers.

- Delivery and complete installation of the element including base plate, driver, guards, couplings, drip pans, lubrication system, lubrication gear box as well as auxiliary equipment, devices and systems where provided as an integral part of the element
- Rotation checks, hot and cold alignment, shimming, first oil fill and preservation activities until turnover
- Pickling and flushing of auxiliary piping provided as an integral part of the element
- Compressors and drivers
  - Centrifugal
  - Reciprocating
  - Screw/ rotary
  - Axial
  - Diaphragm
- Compressors (only)
- Drivers (only)
- Expanders

## 20-040 Direct-Fired Equipment

- Fired heaters
- Furnaces
- Boilers
- Kilns
- Dryers
- Waste heat boilers

Includes associated equipment such as super-heaters, air pre-heaters, burners, stacks, flues, draft fans and drivers, etcetera and equipment, stack and duct refractory linings.

## 20-050 Columns and Pressure Vessels

- Towers
- Columns
- Reactors
- Unfired pressure vessels
- Bulk storage spheres
- Unfired kilns

Includes internals such as trays and packing.

Excludes supply and installation of catalysts, catalyst handling equipment and chemicals (see the ICSU section on materials, consumables, and first fills herein).

## 20-060 Tanks

- Atmospheric storage
- Floating roof tanks
- Low pressure storage
- Bins
- Hoppers
- Project area (silo)s and cyclones
- Cryogenic and low temperature tanks

Excludes civil, pipe, electrical, instrumentation.

## 20-070 Vacuum Equipment

- Mechanical vacuum pumps
- Ejectors
- Other vacuum producing apparatus and integral auxiliary equipment

## 20-080 Material Handling Equipment

- Elevators - personnel
- Elevators – freight
- Conveyors
  - supply and installation of the complete element including tables with idlers, pulleys, counterweights (shop, yard or field installed)
  - structural gallery, belt enclosures, walkways, fire protection systems and/or piping where provided as an integral part of the element
  - transition chutes including hoppers and flop gates
  - covers and dust collection/suppression systems
- Feeders
- Bag houses
- Weighing devices
- Star valves
- Slide valves
- Pneumatic conveyors
- Filters
- Cranes, trolleys and hoists
- Chutes
- Scales and other weighing devices
- Packaging machines
- Lift trucks

## 20-090 Package Units

Packaged units consist of multiple integrated pre- engineered components combined by supplier bought as a package. They satisfy needs otherwise handled by a grouping of custom engineered individual elements. They include:

- Air dryers
- Air compressors
- Refrigeration systems
- Ion exchange systems
- Make-up air units
- Generators

## 20-100 Special Processing Equipment

- Agitators
- Blenders
- Centrifuges
- Chemical feeders
- Clarifiers
- Crushers

- Cyclones
- Dryers
- Extruders
- Fermenters
- Filters / liquid filters
- Mixers
- Separators
- Settlers
- Waste treatment equipment not bought as packaged equipment and other such machinery with their drivers.

## 20-110 Modules Setting

Includes labour, materials and sub-contracts necessary to receive, inspect, set and erect or install the elements into a module or pre-fabricated building which is fabricated offsite including:

- Pipe rack modules setting
- Equipment and process modules setting.

Building modules setting such as EHT buildings, electrical MCC buildings, piping manifold buildings, remote instrument/control buildings, etcetera.

Assembly and installation of shipped loose module components are covered by their respective prime accounts (steel, pipe, electrical, etcetera).

## 20-120 Mobile Equipment

Includes labour, materials and sub-contracts necessary to receive, inspect and deliver all mobile equipment for the facility including:

- Emergency services equipment
- Cranes and fork Lifts
- Vehicles

## 30-000 Piping

Each work element of piping includes all the procurement and installation activities necessary to the permanent plant above ground piping being designed in detail, manufactured, delivered, installed in final position (including installation only of inline instrumentation valves and control devices) and fully aligned, tested and cleaned, mechanically complete and ready for use or commissioning.

Includes:

- Procurement and delivery of bulk piping materials to receiving area, including:
  - all random length pipe spools
  - valves, fittings, flanges, fasteners, gaskets
  - saddles, pipe supports, minor pipe support items such as loose hangers, clips, shoes, etcetera
- Fabrication of finished pipe spools, supports, saddles, etcetera and delivery to receiving area (onsite or offsite)
- All pipe surface preparation and protective coatings work performed in shop, including pickling, sandblasting, painting, etcetera
- Process and / or air piping up to and including the first block valve
- Installation (receiving / offloading, assembly and erection) of all finished piping elements noted above as well as inline instrumentation valves and control devices
- Miscellaneous piping operations including:
  - testing, inspection, stress relieving
  - temporary removal and subsequent re-installation of existing pipe where required to facilitate installation of new pipe or other equipment
  - installation of inline instruments and control devices
  - firewater, storm water sewer, etcetera
  - spring hangers, bellows, expansion joints, etcetera.

Excludes procurement, delivery and installation of instrumentation tubing (see the instrumentation and controls section herein) and material handling within receiving/ laydown area including delivery to installation crews.

### 30-010 Piping General

Includes design and MTO allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

### 30-020 Pipe, Fittings, Flanges, Valves & Attachments

Includes:

- Cost of bulk order commodity purchase orders (POs) placed in accordance with bills of materials (BOMs) with suppliers, for delivery to offsite or onsite fabrication
- Field run pipe, in place fabrication and installation
- Module completion work including installation of shipped loose piping and weld out interconnecting modules.
- Tie ins (excluding hot taps)

- Material handling (from laydown yard to the field)
- Stress relieving
  - all field costs associated with stress relieving of field welds including setting up heaters, moving, insulation blanket, connecting leads for heating, monitoring
  - temporary insulation for stress relieving or dry out
  - documenting results
  - removal of stress relieving equipment
- Flushing and hydrotesting
- Temporary test pipe install and removal
  - installation and removal of temporary test piping
  - removal of permanent pipe for jumpers, steam blow silencers
  - restoration of the piping

Excludes loading chemicals, flushing, steam blowing and draining lines (see the pre-commissioning section of this document).

- Pipe fittings and flanges
- Couplings
- Plugs and bushings
- Caps
- Blinds
- Bolt, nuts and gaskets
- Mechanical joints, connectors and couplings.

Excludes field or shop fabrication.

Manually operated valves includes delivered cost of bulk order commodity POs placed with suppliers for delivery to site for ball/ globe/ gate/ check/ butterfly/ needle and plug valve types as well as other manually operated valves.

Installation (only) of inline instrumentation, control and relief valves and devices.

### 30-030 Pipe Field Fabrication

Includes offsite fabrication and subsequent delivery of spools and tie ins to receiving location (this may be a module shop or field receiving location).

Excludes the material costs of pipe, fittings and flanges which are included in the above accounts.

### 30-040 Piping Shop Fabrication

Includes receiving, handling, cutting, beveling, shaping, fitting, welding and testing completed pipe spools. All shop fabrication shall be coded to the bulk material type of cost.

Excludes the material costs of pipe, fittings and flanges which are included in the above accounts.

### 30-050 Glycol/Steam Tracing

Glycol/steam trace piping includes steam manifolds, the first block valve off the manifold, trap assemblies and all condensate piping after the traps.

### 30-060 Fire Protection

- Sprinkler systems
- Deluge systems
- Monitors
- Specialty systems

### 30-070 Specialties and Miscellaneous

Includes bulk and custom tag order material POs (placed in accordance with BOMs/ MRs) from suppliers/fabricators and delivered to point of fabrication or installation as well as installation of these materials in conjunction with the associated piping, so as to result in a completed piping system. These include:

- Fixed hangers
- Spring hangers
- Supports
- Brackets
- Braces
- Shoes, guides and anchors
- Filters and strainers
- Hoses and hose reels and cabinets
- Valve interlocks and spectacle blinds
- Expansion bellows and flexible connectors
- Steam traps and manifolds
- Cleanouts
- Chain wheels
- Safety showers
- Safety eye wash stations
- Sample coolers
- Blinds



- Eductors and ejectors, silencers (non-tagged)

### 30-080 Testing and Non-Destructive Examination

Line testing and inspection includes set up, flushing and removal of temporary lines, screens, spacers, operating and removing air, purging or hydrostatic testing equipment for the purpose of clearing of pipe lines after installation.

Excludes:

- Repairing detected leaks (see respective direct piping account sections herein)
- Water or glycol used for hydrotesting, including reclamation and / or disposal (see the small tools and consumables section of this document)
- Non-destructive examination (NDE)

Includes X-Ray, hydro test, visual or other non-destructive examination of pipe, welds, bolt tightness.

### 40-000 Electrical

General scope: electrical includes all tagged and bulk electrical elements necessary for the permanent electrical facilities being designed in detail, manufactured, delivered, installed in final position, fully aligned, balanced, tested and cleaned, electrically complete and ready for use or commissioning.

Excludes:

- Pre-cast concrete cable trenches, duct bank envelopes, pits, manholes and vaults
- Labour, materials and sub-contracts necessary to receive, inspect, set and erect or install the elements into a module or pre-fabricated building fabricated offsite
- Vendor assistance costs prior to start up and commissioning (see the vendor support section herein)
- Pre-commissioning including vendor assistance costs for pre-commissioning
- Commissioning and startup including vendor assistance costs for commissioning and start
- Equipment and wiring associated with temporary electrical facilities (see the temporary construction facilities portion of this document)

The common inclusions and exclusions noted above apply to all elements of electrical equipment. The elements in each classification of electrical equipment following may have additional unique inclusions and exclusions. Some of these are noted below.

## 40-010 Electrical General

Includes design and MTO allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

## 40-020 Electrical Equipment

Electrical equipment includes equipment items and packages required for and associated with electrical power generation, transforming and distribution, power supply, control, protection and regulation. Electrical equipment defined herein are units/ items/ equipment which are normally specially fabricated/ manufactured to conform to separate design specifications and therefore not considered part of bulk material.

- High voltage (>36kV), medium (5 to 36 kV), low voltage (below 5 kV) equipment including:
  - cooling equipment and initial charge of transformer oil
  - load center transformers when purchased separately from the switchgear lineup
  - HV switchgear
  - distribution transformers in support of general or process loads
- Bus duct and supports
- Medium voltage power distribution (5 to 36 kV)
  - switchgear, local switchracks and components, motor starters, breakers
  - motor control centers (MCCs), variable speed drives, power factor (PF) correction capacitors
- Low voltage power distribution (below 5 kV)
- DC and emergency / UPS systems including:
  - uninterruptible power supplies (UPS) and all associated components
  - static inverters (UPS), constant voltage transformers, battery sets, transfer switches
  - distribution panels including direct current MCCs, direct current (DC) switchboards, distribution panels and cyclo-converters
- Protection and control, relay panels including control and gauge boards outside of control room equipment
- Pre-fabricated electrical equipment modules including:
  - detail design, procurement, fabrication of a pre- fabricated shelter for electrical equipment
  - setting, installation and pre-wiring inside the shelter of equipment being housed such as MV through LV power distribution equipment, DC equipment, control and alarm monitoring, etcetera
- Electrical testing and system testing

- Electrical devices

Includes control station, breaker, starter, switch, push button, control transformer, receptacle, etcetera.

- Panels

Includes all panels except heat tracing control panels. Excludes:

- Generation equipment (see the equipment and modules pages of this document)
- Foundations and / or support structures (see the major commodity elements portion herein)
- Enclosures or containment building where the equipment is not installed in the open (refer to the major commodity elements section of this document).

#### 40-030 Lighting and Devices

General scope: towers, poles, street lighting attached to poles, cross arms, pole line hardware, guy wires and anchors, pole mounted transformers, disconnect switches, lightning arrestors, pots and aerial wire and cable.

- Lighting and lightning protection
- Panels
- Transformers
- Receptacles and switches
- Photo cells
- Contactors
- Lighting fixtures
- Lighting poles

#### 40-040 Cable Tray, Conduit, Raceways and Fittings

- Cable tray and conduit
- Channel and raceway
- Supports: this element covers only electrical-related hangers, supports and installation materials (knee braces, channels, angle iron, etcetera) used to directly support the electrical elements and installed by electrical trades

#### 40-050 Cables and Wires

Includes installation, terminations, labelling, testing, etcetera for:

- Power and control – low voltage
- Power – medium voltage
- Power – high voltage

- Instrumentation
- Fibre optic, COAX, data, communication, etcetera
- Lighting other wiring for installation in conduit systems

#### **40-060 Detection and Alarm Systems**

Includes:

- Fire and smoke detection
- Gas detection
- Public address system
- Alarm systems
- Environmental monitoring systems (temperature, rain/ snow, wind, emissions, etcetera)

#### **40-070 Communication & Security Systems**

- Communication system towers, telephones, PABX system equipment, emergency alarms, plant radio etcetera
- Multi-plexer and network switch
- Common telecommunications equipment Security system including building management system (plant security) and other such elements as magnetic switches, card readers, closed circuit televisions (CCTVs), towers, microwave, e-field, etc.

#### **40-080 Electrical Heat Trace Systems**

- Heat tracing
- Self-limiting
- Mineral insulated
- FM heat trace
- Instrument EHT
- Tube bundles
- O'Brian boxes and mounting
- EHT power and control equipment
- Power distribution
- Controllers and sensors
- Buildings

#### **40-090 Grounding, Lightning & Cathodic Protection**

- Grounding & Lightning protection
- Cathodic protection system

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## 40-100 Overhead Distribution Systems

Generally, applies to any bulk power transmission systems between substations and/ or switchyards at voltages of 72kV or higher.

Generally, applies to power distribution systems from switchyards or substations to various types of load centers at voltage less than 72kV. This includes:

- Poles
- Lines
- Hardware
- Pole mounted transformers
- Pole mounted switches, fuses and lightning protection

## 50-000 Instrumentation and Automation (I&A)

Instrumentation includes all tagged and bulk control instruments and devices with associated piping, tubing, raceways, racks, stands and other supports, including electrical and mechanical boards, provided for the purpose of controlling, measuring, observing, indicating or recording both process and utility variables in the permanent plant facility.

All the procurement and installation activities necessary to the element or system being designed in detail, manufactured, delivered, installed in final position, fully aligned, balanced, calibrated, tested and cleaned, mechanically complete and ready for use or commissioning.

Includes labour required to install, interconnect, power up and functional test all automation equipment in this category. Automation equipment/ material costs will be coded to the applicable commodity listed below.

Includes connection of instrument air and hydraulic system piping and pneumatic signal transmission tubing to the respective piping sources.

Excludes:

- Instrument air system piping including instrument air manifolds, pneumatic signal transmission tubing, steam supply piping, condensate return piping (see the piping section of this document)
- Installation (only) of inline instrumentation control and relief valves and devices (refer to the piping section herein)
- Instrumentation wire and cable and associated connections including electrical instruments in motor control and switchgear areas (see the portion of this document pertaining to electrical costs)

- Labour, materials and sub-contracts necessary to receive, inspect, set and erect or install the elements into a module or pre- fabricated building which is fabricated off-site (see the modularization section of this document)
- Vendor assistance for startup and commissioning
- Pre-commissioning or commissioning and start up support

The common inclusions and exclusions noted above apply to all elements of Instrumentation equipment. The elements in each different classification of instrumentation equipment following may have additional unique inclusions / exclusions. Some of these are noted below.

### **50-010 I&A General**

Includes design and MTO allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

### **50-020 Instrumentation - Tagged**

This classification covers materials ordered in bulk form and installed at site or in vendors' shops, generally including instrumentation bulks such as piping, tubing, raceways, racks, stands and other supports.

Includes:

- Identifying and tagging where applicable
- Instruments - electronic
- Instruments - pneumatic
- Inline instruments (piping installed)
- Instruments - panel mounted

Excludes installation of inline instruments (see the piping portion of this document).

### **50-030 Instrumentation – Bulk Material**

- Junction boxes
- Multi-function controllers
- Instrument accessories
- Instrument bulks (tubing, channels, valves, etcetera)

### **50-040 Analyzers, Shelters and Sample Stations**

- Analyzer system
- Analyzers and shelters
- Sample stations

## 50-050 Loop and Functional Check

- Loop checks
- Bench testing and calibration

## 50-060 Process Control Automation

- Distributed control system (DCS)
- Programmable logic controller (PLC)
- Simulator
- SCADA (supervisory control and data acquisition system); an integrated control system
- Multi-plexer

## 50-070 Equipment Control Systems

- Burner management
- Boiler control system

## 50-080 Safety Systems

- Emergency shutdown (ESD).

## 50-090 Control Room Equipment

- Control consoles or equipment (if provided separate from DCS purchase)
- Audio / visual aids (CCTVs, stereo systems, etcetera)

Excludes furniture (see the architectural section herein).

## 6.3 FIELD DIRECTS - OTHER

### 60-000 Protective Coatings

#### 60-010 Coatings General

Includes design and MTO allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

#### 60-020 Painting

All field applied protective and appearance painting including field touchup of damaged paint or completion of areas intentionally left bare at the shop.

Includes:

- At site surface preparation, primer, finish coats and touching up equipment, structural steel, concrete, pipe, paved areas, pavement striping or road markings, signage on pavement, etcetera
- Colour coding or identification marking of piping, conduit and cable tray
- Equipment
- Structural
- Piping

Excludes:

- Field touchups of damaged coatings or completion of areas intentionally left bare at the shop if executed by or on behalf of and back charged to the vendor / supplier as part of the cost of the element
- Protective coatings applied to a module or pre- fabricated building which is fabricated offsite (see the modularization section of this document)
- Building painting and coatings (refer to the buildings portion herein)
- Rubbings and patching concrete surfaces (refer to the piles and concrete portions of this document)
- Coatings underground structures (see the major commodity element of this document)

## 60-030 Fire Proofing

Includes all labour, equipment, handling and materials (in the shop, at a yard or in the field) required to prepare surface, form, fashion as well as apply reinforcing mesh as required and apply Nelson studs / pins as required to apply and finish fireproofing materials for structural steel, process equipment, etcetera to equipment and structures.

## 60-040 Insulation

General scope: all field applied protective and appearance coatings including field material handling, jacketing overall vessels, tanks and exchangers, installation of equipment blankets and field touchup of damaged coatings or completion of areas intentionally left bare at the shop (to facilitate field inspection, handling and erection) including:

- Removal of protective coatings to leave neat joints for repair or to facilitate tieins
- Subsequent replacement upon completion of the repair or tieins
- Thermal and acoustic insulation for permanent plant facilities and equipment
- Equipment
- Piping



- Instrumentation

Excludes:

- Field touch ups of damaged coatings or completion of areas intentionally left bare at the shop if executed by or on behalf of and back charged to the vendor / supplier as part of the cost of the element
- Protective coatings for buildings (see the portion on buildings in this document)
- Protective coatings applied to a module or pre- fabricated building which is fabricated offsite (see the modularization section of this document)
- Building insulation (see the buildings section herein)
- Temporary insulation for stress relieving or dry out (see the piping or equipment portions of this document)

## 60-050 Miscellaneous Coatings

- Floor toppings
- Metallic coating (galvanizing, electroplating, sprayed hot metal)
- Non-metallic coating (lining, rubber, wax, plastics, neoprene, enamel, concrete (not fireproofing), etcetera)

## 65-000 Site General Directs

General scope: this section is intended to capture miscellaneous items not specific to other direct accounts.

### 65-010 Site Directs General

Includes design and MTO development allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

### 65-020 Scaffold Installation

Includes cost of labour associated with transportation, erection, maintenance and dismantling of scaffold (which is charged to the appropriate direct account). Includes overhead protection where installed by scaffolders.

### 65-030 Survey & Technical Support

Technical and supporting labour (for all production surveying, technical support required on site during erection, vendor erection support, etcetera). This may be a sub-contract item and includes all personnel working full time with a crew for all needs. Includes surveying for audit functions. Excludes vendor support for pre-commissioning, commissioning and start up.

## 65-040 Field Craft Support

This applies to all craft labour up to and including general foremen. Included are any craft or support at the workface necessary to the work. The direct labour cost is the burdened cost (excluding premium portion of any overtime or shift premium) of labour associated with work hours by craft persons as listed below:

- Load and haul
- Oilers
- Operating engineer
- Safety meetings (and tool room talks)
- Truck drivers
- Direct craft helpers
- Fire watch
- Fall restraint/fall protection
  - labour costs to install, maintain, and remove fall restraint systems during construction period
- Spark watch/man watch
  - costs for all manual labour required to provide spark watch and man watch duties during the course of construction
- Flag person
- Overhead protection
  - costs of labour for the installation, maintenance and removal of temporary overhead protection of manual workers
- General site cleanup (if a permanently assigned crews is designated for cleanup around the construction area, these hours and costs should be collected under a separate direct account)
- Construction dewatering

## 65-050 Field Inspection and Testing – Direct QA/QC

Quality control costs (mechanical, electrical, instrumentation) not including supervisors (who are under CM account).

Includes third party testing such as:

- Party soils compaction testing
- Concrete testing
- Electrical Doble or hi-pot testing

Excludes piping NDE.

## 65-060 Demolition

Applies to removal and disposal of above and underground facilities and services.

Excludes removal and disposal of temporary construction facilities at the conclusion of the construction phase. These are included in the indirect accounts as part of demobilization.

## 65-070 Freight, Storage and Offsite Preservation

This cost code captures all project freight costs. This applies to free on board (FOB) site (with any documentation and domestic or export packing cost, transport from point of manufacture to final pickup area including permits, escorts, wire lifting, ocean, rail and truck freight, special roadwork, bridges, dunnage, etcetera, if required) including:

- Off-site storage and preservation costs for equipment and material in transit
- Continental freight includes land transportation from point of manufacture to port facility or to site
- Ocean freight
- Air freight
- Agents
- Staging and marshalling areas

Excludes customs charges (see Import Duty and Brokerage Fees, section #65-350).

Scenarios:

- i. Freight identified as a separate line item on a requisition associated with a piece of equipment or bulk materials.
- ii. Freight identified as a prepay and charge item (usually associated with POs, but not identified as a separate item). No impact on CBS due to the fact that freight would be captured as part of the purchase of equipment or bulk materials.
- iii. Contractor supplied (or supply and install) physical goods where the contractor systems capture the freight cost. Unless specifically noted by Owner as a requirement, Owner will see it buried within the bulk materials invoice. No specific way to identify freight as a separate item on a PO. No impact on CKPC Project Cost Breakdown Structure.
- iv. Adhoc freight costs have minimal risk; however, several invoices will be generated needing a simple, consistent code. Blanket purchase orders should be considered when using these accounts.

- v. Hot shots; special express deliveries required to maintain schedules.
- vi. Module transportation.
- vii. Storage of offsite equipment.
- viii. Storage of material offsite. For example, SoC for cable: stores the big reels of cable until cut lengths are ordered by the contractor.
- ix. Preservation of equipment while in storage

#### **65-080 Import Duty and Brokerage Fees**

- Statutory charges, fees and duties for importing goods
- Brokerage services

#### **65-090 Cancellation Charges**

These would be charges associated with any contracts/PO/work orders released to the contractors who subsequently decide not to proceed or withdraw the work request due to any unforeseen circumstances. Monies held by contractors towards any advance / milestone payments would qualify for any cancellation charges incurred by Owner.

#### **65-100 Field Re-Work**

Field rework includes repeating the performance of a task after having been reported as completed, regardless of the reason. Except as noted below, incidents involving less than ten hours of work are not considered rework. In addition, new work as a result of added scope should be considered normal work rather than rework. Changes to completed work to incorporate new work are considered rework.

The budget for this is always zero. This CoA is used for tracking actual rework costs.

Cost of rework recovered as a back charge to another contractor or vendor will be captured against appropriate installation prime CoAs, but offset with recovered costs.

### **6.4 MODULARIZATION**

#### **68-000 Module Yards**

These costs are inclusive of all module yard indirect costs for each account. All costs herein are to be coded as direct, material cost type.

Excludes module transportation costs (see the freight portion of this document).

## 68-010 Module Yard General

Includes design and MTO allowances (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

## 68-020 Modularization - Mechanical

General scope: the broad scope of this mechanical portion of modularization is essentially the same as for structural modules noted below. This is sometimes referred to as a process module.

The distinction is this; instead of going to site as a bare module, a mechanical module has at least one element of major equipment installed in it at the module yard. It is described by the piece of major equipment dominant in the structure.

Further, the equipment in it may be partially or fully dressed at the module yard with integral sub-elements and materials such as interconnecting piping, wiring, heat tracing, coatings, etcetera.

Inclusions and exclusions are the same as shown below for structural steel modules.

- Exchangers
- Pumps and drivers
- Direct fired equipment
- Columns and pressure vessels
- Tanks
- Material handling equipment
- Packaged units
- Special processing equipment

## 68-030 Modularization – Structural Steel

General scope: the broad scope of this structural steel portion of modularization is essentially the same as defined for direct structural steel.

The distinction is this; instead of shipping the fabricated stick steel directly to site, the stick steel for a structural module is shipped to a module yard where it is constructed into a sub-assembly.

Includes:

- Equipment or pipe rack structures
  - light
  - medium

- heavy
- extra heavy
- Access steel (stairs, ladders and platforms)
- Grating and plate
- Steel enclosures

## 68-040 Modularization – Buildings

The broad scope of this buildings portion of modularization is essentially the same as defined for direct, buildings.

The distinction is this; instead of being shipped to site in pieces and assembled at site, the modularized buildings here are pre-assembled off site (usually in a shop or assembly yard) and transported to site in complete or largely complete condition.

Modularized buildings include shelters and the installation of any internals for the buildings installed at the fabrication location.

## 68-050 Modularization – Piping

The broad scope of this piping portion of modularization is essentially the same as for direct piping.

The module will be fully dressed at the module yard with integral sub-elements and materials including:

- Spooled bulk piping material
- Field bulk piping material
- Spooled pipe shop fabrication
- Field run pipe, in place fabrication and installation
- Installation spools
- Tieins
- Hangers, supports and install material
- Miscellaneous piping operations

## 68-060 Modularization – Electrical

The broad scope of this electrical portion of modularization is essentially the same as for direct electrical.

The module will be fully dressed at the module yard with integral sub-elements and materials including:

- Electrical equipment
- Cable tray, conduit and supports
- Wire and cable

- Connections and splices
- Grounding
- Lighting system
- Electric heat tracing
- Electrical testing

#### **68-070 Modularization – Instrumentation**

The broad scope of this instrumentation portion of modularization is essentially the same as for direct instrumentation.

The module will be fully dressed at the module yard with integral sub-elements and materials including:

- Instrumentation and panels

#### **68-080 Modularization – Protective Coatings**

- Paint
- Fire proofing
- Insulation

#### **68-090 Offsite Warehouse, Laydown and Module Staging Area**

This applies to all labour, equipment, preservation and facility costs and expenses for Owner or contractor offsite storage, laydown or staging areas for bulk material, major equipment and modules.

#### **68-100 Modularization – Rework**

- Refer to Field Re-Work, section #65-100 of this document for definitions and scope.

### **6.5 FIELD INDIRECT COSTS**

This section contains all cost requirements for construction site indirect costs. Project indirect costs including owner's costs, engineering and professional services are included in separate account groupings.

#### **70-000 Construction Management (CM) and Administration – Site**

##### **Staff**

Construction Management includes both Owner and contractor staff required to monitor, control and verify construction of the facilities. Owner staff thus engaged are not to be coded to owner's costs.

This category includes all payroll costs related to non-manual field staff assigned to the jobsite. Also included are material and sub-contract costs associated with the operation of the field office including purchase cost and labour for distribution of all manual and non-manual safety, milestone and recognition awards earned during the construction period.

## **70-010 CM and Administration General**

Includes design and MTO allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

## **70-100 Contractor Field - Bonuses, Incentives and Penalties**

An EPC contractor shall be entitled to bonuses and incentives for an early completion of the project or for the early delivery of equipment / machinery as per purchase order and subject to the early completion of works as per schedule. At the same time the EPC contractor shall be subjected to penalties as per contract based on X % of the contract value for each week of delay subject to a maximum of Y% of the total contracted value

## **70-120 Contractor Field - LOA and Living Expenses**

Contractor costs including relocation, subsistence, reimbursable personal travel, accommodation, LOA, etcetera for all non-manual positions working on the project (management, supervisory, administration, engineering, project controls, quality, procurement and services manpower for training, medical, HR, etcetera).

Excludes travel costs on Owner or contractor business (see Contractor Field – Office Support, Services and Supplies, section #70-130 of this document).

## **70-130 Contractor Field – Office Support, Services and Supplies**

- Computer and communication systems and support
- Office supplies and services
- Business travel and meals

## **71-000 Temporary Facilities and Utilities**

Includes the material, manual labour and/or sub-contract costs for the construction, maintenance and removal of temporary facilities required for construction purposes after all site grading has been performed.

Temporary construction facilities provided under this account:

- Are required during the construction period



- Do not become part of the permanent plant
- Are removed under this account after they have served their purpose
- Have any salvage value credited to this account

If the facilities provided under this account remain in place for the commissioning period, all associated additional costs such as rental, maintenance and upkeep expenses shall be borne by the integrated commissioning and start up (ICSU) account from the time the facilities are no longer required for construction.

Excludes any temporary construction facilities required solely for the ICSU phase of the work (i.e., not needed for the construction period). These will be covered under the ICSU account.

Note: all sub-contracted work (site preparation, piling, etcetera) should be estimated with all indirects supplied by the sub- contractor for this scope of work.

## 71-010 Temporary Facilities General

Includes design and MTO allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

## 71-020 Temporary Buildings and Shelters

This includes labour and material to supply, install and commission these temporary services. This also includes costs to de-commission, remove and dispose of systems not left in place.

- Temporary building structures, including totally enclosed structures
  - offices
  - lunch rooms
  - wash cars
  - change rooms
  - tool cribs
  - sea cans
- Furniture
- Temporary warehouses
- Temporary field fabrication shops
- Building services
  - lighting
  - heating and ventilating
  - air conditioning
  - plumbing

- built in racks
- cabinet work, etcetera
- piping and wiring inside building (to 2m outside building / battery limit. Beyond 2m, this cost is charged to temporary piping and wiring accounts.

This code can be expanded should a need arise to keep the costs of large temporary buildings isolated (job offices, warehouses, lunchrooms, etcetera).

## 71-030 Temporary Work and Laydown Areas

This includes labour and material to supply, install and commission these temporary services. This also includes costs to de-commission, remove and dispose of those systems not left in place.

- Clearing in excessive of overall site clearing
- Excavating/backfill (possibly purchased fill) and compacting
- Shoring supply and install and remove/ dispose of shoring if required
- Grading (possible cost for fill)
- Fencing
- Restoration
- Shelters
- Work tables
- Benches
- Shelves
- Racks
- Monorails, lifting devices, etcetera
- Totally enclosed structures are charged to temporary buildings

Note: all piping and wiring serving temporary work areas charged to temporary piping and wiring accounts.

## 71-040 Temporary Roads, Walkways, Parking, Fences, etcetera

This includes labour and material to supply, install and commission these temporary services. This also includes costs to de-commission, remove and dispose of systems not left in place.

- Plugins needed in parking area (if required)
- Cost of base preparation
- Finish grading
- Surfacing
- Maintenance and removal
- Temporary fencing and/or railing, including temporary job site perimeter fencing

Note: if facilities become part of permanent plant, only maintenance costs during construction are charged to this account unless the temporary roads, walks and parking areas will become a part of the permanent plant.

This code may be expanded if a need arises to isolate the cost of major items such as heavy haul roads, etcetera.

## 71-050 Temporary Power, Light and Communications

This includes labour and material to supply, install and commission these temporary services. This also includes costs to de-commission, remove and dispose of those systems not left in place.

- Overhead distribution lines, switchgear, pole mounted transformers and lightning protection
- Main power transformer and HV switchgear
- Low voltage switch gear
- Distribution panels
- Wire and cable
- Switchboards
- Generators (in the event temporary construction power is not completed)
- Site and area lighting (excludes building interior lighting)
- Telephone systems (not cost of long distance or service)
- Intercom systems
- Portable handheld radios, base stations and towers.
- Signal whistles or sirens
- Related temporary items
- LAN systems, services, etcetera

All lighting facilities in temporary buildings shall be charged to the Temporary Buildings and Shelters account, #71-020.

## 71-060 Temporary Water, Sewage and Natural Gas

This includes labour and material to supply, install and commission these temporary services. This also includes costs to de-commission, remove and dispose of those systems not left in place.

- Storage and distribution systems for water, air, sewage, steam or air, including piping, drinking fountains, water and septic tanks as well as temporary sewage treatment facilities

Note: purchase of water/ sewer treatment plant is a direct cost item.

- Labour assigned to maintenance and operation of air compressors and distribution system.

Note: cost of compressors themselves charged to equipment account if they are permanent equipment vs. rentals.

## 71-070 Winterization and Weather Protection

- Temporary facilities and labour required to protect permanent plant equipment and materials from the elements
- Facilities provided to allow work to continue during adverse weather (hoarding, for example)
- Cost of labour for heater watch
- Excludes equipment such as heaters and their fuels (heaters are covered by rental equipment codes, fuel by fuel account codes).

## 71-080 Temporary Construction Facility Support

- Minor Temporary Construction Items
  - Gang boxes
  - Sheds/ shacks
  - Construction and safety signage
  - Guard rails/ barriers
  - Stairs
  - Platforms
  - Wooden walkways
  - Construction equipment foundations (crane pads, for instance)
  - Other minor temporary construction items not covered elsewhere.
- Preventative Maintenance
  - Labour and maintenance costs for regular inspection and preventative maintenance of permanent plant equipment (preservation costs) while in storage and during construction up to mechanical completion and turnover (turning rotating equipment, maintaining nitrogen purges, etcetera).
- Mobilization and Demobilization
  - Materials and labour costs for unloading, assembling, dismantling, crating and loading for shipment construction facilities, tools and equipment
  - Includes transportation/ freight for these items.
- Temporary Building Maintenance/ Repair
  - General repairs, upkeep, painting, HVAC upkeep, etcetera.

## **71-090 Fuel Supply Facilities**

Applies to the installation, operation and maintenance of temporary facilities for storage and distribution of propane, diesel and gasoline. This also includes costs to de- commission, remove and dispose of these facilities.

This does not apply to facilities to be turned over to operations. Also excludes the cost of the fuels (see Fuels, section #71-090).

Excludes propane and fuel oil used in space heaters, etcetera. See Fuels, section #71-090 herein.

Includes other utilities used during the construction phase of the project.

## **72-000 Temporary Services and Supplies**

These costs Includes the material, manual labour and / or sub-contract costs for the construction, maintenance and removal of temporary services and supplies required for construction purposes.

### **72-010 Temporary Services General**

Includes design and MTO allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

### **72-020 Material Handling and Warehousing**

These costs apply to both Owner and EPC contractors and include:

- Manual labour costs associated with initial unloading, handling and warehousing of permanent plant bulk and permanent plant major equipment (columns, vessels, exchangers, pumps/motors, etcetera) delivered to jobsite
- All costs of manual personnel assigned to warehouse
- All costs associate with inspection, preservation and maintenance of equipment in the warehouse
- Pallet jacks

### **72-030 Scaffolding, Cribbing and Dunnage**

- Costs of all purchased scaffolding, cribbing and dunnage materials
- Labour to manage and handle central storage yard(s), laydown area(s) or warehouse(s) – (indirects)
- Maintenance and repairs/replacement of damaged scaffolding material

Excludes cost of labour associated with transportation, erection, maintenance and dismantling of scaffold (which is charged to the appropriate direct account).

## **72-040 Snow Removal, Dust Control and Road Maintenance**

- Cost of labour and materials for ploughing, clearing, shoveling, de-icing, loading and hauling snow from all construction sites including temporary roads, walkways and parking areas
- Cost of labour and materials to control dust around construction areas
- Cost of labour and material to maintain the roadways, parking lots and lay down areas
- Cost of supply and handling rock chips and sand

Excludes cost of tools and equipment if services performed by a general contractor. If sub-contracted, all-in rates shall apply and appropriate budgets transferred to this account from the construction equipment accounts.

## **72-050 Craft Training and Orientation**

Includes all costs associated with manual labour training (orientation, aerial work platforms, fall restraint, other safety training including emergency response, etcetera).

Excludes welder training and on the job training of craft and apprentices.

## **72-060 Craft Overhead Charges**

- All preparatory work such as cutting coupons, setting up bending jigs
- All testing time and instruction of welders for job qualification testing or new/special welding techniques
- Cost incurred when manual employees report to work but are not put to work (rainouts, for example)
- Work disruptions as a result of plant evacuation alarms, revoked or delayed work permits
- Includes payments made to manual employees for travel time and expenses based on the terms of labour contract/agreements.
- Includes all costs incurred when craftsmen are paid in accordance with union, non-union and government regulations without performing work.
- Payments made to manual employees for travel time and expenses based on terms of labour contracts/agreements.

## **72-070 Construction Services Support**

Includes all manual labour operations which cannot be charged to the direct accounts or temporary construction facilities. Sub-contracts such as security are also included.

i. General Clean Up Includes:

- Garbage collection and cost of containers
- Final job cleanup operations
- Garbage and recycling containers, drums and buckets
- Janitorial services for all temporary buildings
- Cleanup, handling, storage and disposal of all construction generated hazardous materials (lubricating oil spills, for example)
- Collection of construction debris
- Excludes any day-to-day cleanup operations by trades (charged to associate direct accounts)

ii. Maintenance of Temporary Facilities, Tools and Equipment

- Routine inspections and upkeep of owned and rented facilities, tools and equipment, including required material, parts, and charges for outside shops, etcetera for such repair /calibration
- Maintenance and cleaning of tools
- Fuel truck crew and costs of operating and shop repairs, including costs of mechanics
- Excludes costs of fuel, lubricants and consumable supplies

iii. Tool Crib and Clothing Handling

- Cost of the labour for tool crib and clothing handling facilities
- Excludes cost of tools, clothing and cleaning services

Note: this may be a part of cost for tools and consumables; check contract.

## 72-080 Construction Safety Services

This would include non-manual professional services.

## 72-090 Medical and Safety Supplies

i. Medical Supplies

- Costs of all purchased and/ or rented medical supplies.

ii. Safety Supplies

- Cost of all purchased and/or rented safety supplies (safety glasses, gas detectors, etcetera)
- Emergency response team (ERT) equipment
- Eye wash stations

iii. Fall Restraint/Fall Protection

- Purchase of body harnesses, lanyards, shock absorbers, lifelines, etcetera.

## **72-100 Security Services**

Includes all labour, facilities, equipment (scanners, access cards, CCTV, etcetera) for integrated temporary security systems and services.

- Costs of personnel employed directly or sub- contracted to provide security services, traffic control, etcetera on the jobsite
- Excludes cost of flagmen directing traffic, which should be charged to the appropriate direct account.

## **73-000 Construction Tools and Equipment**

Includes the rental and/ or purchased material costs incurred during the construction of a project for construction equipment, tools, consumable supplies and purchased utilities.

A sample equipment list will be supplied to construction indirects estimators to assist in the development of the estimate.

Note: cost estimate for this account can vary depending on the work to be sub-contracted. A list of sub-contracts must be developed by the project team before an estimate can be completed.

### **73-010 Tools and Equipment General**

Includes design and MTO allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

### **73-020 Construction Equipment**

Purchased Construction Equipment

- Cost of equipment purchased for use on the project (vehicles, specialized testing equipment, etcetera)
- Revenue from sale of job owned equipment is credited to this account
- i. Construction Rental Tools and Equipment – Non- Operated
  - Rental costs of all construction equipment rented from third party sources (can include maintenance, repairs and insurances). This account applies to all tools and equipment valued at more than \$2500
  - Pallet jacks and tools. This account applies to all tools with a value greater than \$2500
- ii. Construction Rental Equipment – Operated and Maintained



- Rental costs of all operated and maintained construction equipment from third parties for general use during construction (dump trucks/operators, self-propelled mobile transports (SPMTs)/operators), cranes/operators and oilers, etcetera)
- Includes heavy lifts

### **73-030 Small Tools and Consumables - Purchases**

Includes tools valued at less than \$2,000.

Purchase costs of tools obtained from third party suppliers.

- Revenue received from sale of purchased tools will be credited to this account
- Supplies consumed during construction of project which are not directly incorporated into the permanent plant or temporary construction facilities (welding rods, oxygen/acetylene, etcetera)
- Rental costs of tools obtained from third party suppliers.

### **73-040 Construction Fuel**

Includes (for construction equipment, on site vehicles, temporary facilities, etcetera):

- Purchase and dispensing costs associated with fueling onsite construction equipment and site vehicles (plates removed), buildings, heaters, welders, generators, light plants, etcetera
- Diesel
- Gasoline
- Propane
- Card lock system

Note: fuel delivery costs are included.

Excludes fuel costs for any construction vehicles travelling offsite.

### **74-000 General Construction Overheads**

#### **74-010 Field Indirects General**

Includes design and MTO allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

## **74-020 Mobilization and Demobilization**

Mobilization includes the establishment of the site such that the site is ready to receive personnel, materials and construction equipment in order to carry out the work. This includes the transportation of personnel, temporary facilities, construction equipment and tools to site.

Demobilization is the removal, demolition and/ or disposal of all construction temporary facilities and services, tools, equipment and surplus material from site.

## **74-030 Travel and Transportation**

- Offsite busing, transportation of personnel (craftsmen) to and from various locations as required (Edmonton, for instance)
- Onsite busing, costs to transfer personnel from a designated site such as the staging areas to and from a work area
- Fly in/Fly out

Excludes cost of transportation equipment (shuttles and buses) which should be included in the equipment account.

## **74-040 Construction Insurance**

Cost for the premiums associated with course of construction or builders risk insurance.

## **74-050 Contractor Fee and Overhead**

- Contractor fee or profit
- Contractor home office overhead

## **74-060 Allowances, Bonuses and Incentives**

- i. Bonuses/ Incentives
  - Allowance for bonus/ penalties or incentives as defined in the project's contracting strategy.
- ii. Retention Allowance
  - Funds to cover costs to retain personnel on the project. This fund is usually established through a joint effort of owner and the contractors.

Excludes recognition and awards.

## 74-070 Permits

Includes all safety code type permits for both permanent work and temporary installations not covered under owners licensing and regulatory permits.

- Costs of local permits (temporary gas, potable water, power, radio frequency, etcetera) required during the construction phase of the project
- Costs to establish building occupancy permits
- Costs for transportation permits for oversized construction material loads on country and provincial highways
- Costs for any necessary road closures

## 74-080 Close Out Reports and Costs

- Capitalization
- Benchmark report
- Close out report
- Ready for use report
- Filing and storage of documents, etcetera
- As built services

## 6.6 PROJECT INDIRECT COSTS

This section contains all cost requirements for project indirect costs. Construction site indirect costs are included in separate account groupings.

### 80-000 Detailed Engineering and Procurement

- Engineering, procurement and construction management (EPCM) professional services necessary to develop and execute the project from concept through to commissioning and start up
- Engineering / procurement home office work is performed by one (or more) contracted EP firm(s)
- Third party consulting firms employed during the course of the project to augment the efforts of the EP firm(s) and Owner personnel.

Excludes specialty consultants retained by the owner (see Engineering and Technical services, cost code #80-030).

### 80-010 Engineering General

Includes design and MTO allowance (an adjustment to the estimated cost of an element to provide for nominal and routine changes in design). This shall be retained as an identified part of the element.

## 80-020 Project Management and Administration

Staffing and expenses for one (or more) independently contracted EPCM firm(s) including:

- Project managers, project engineers
- Project controls managers, project planners, project schedulers, project estimators, cost engineers / analysts
- Quality management
- Systems support
- Document control
- Project control
- Home office construction management
- Health and safety
- Supply chain management
  - purchasing and expediting
  - shop inspection
  - warehousing and material control
  - contracts administration
  - logistics and transportation
- Administrative assistants and other office support personnel

## 80-030 Engineering and Technical Services

- Process
- Mechanical
- Electrical
- Piping
- Civil/ structural
- Instrumentation and controls
- HVAC

## 80-040 EP Overhead

- Office overhead
  - offices and facilities
  - finance
  - furniture and office equipment
  - IT/IS
  - corporate staff (payroll, HR, senior management, business development, etcetera)
  - Office consumables and supplies
  - Communications

- Project specific computer costs

## 80-050 Fee

- Fee/ profit

## 80-060 Sub-Contracts (3<sup>rd</sup> Party Consultants)

- Engineering and technical consultants
  - HAZOPs
  - process safety reviews
  - geotechnical
- Non-engineering consultants
  - risk analysis
  - team building

Includes engineering or technical services contracted directly by the owner.

## 80-070 Bonuses, Incentives and Penalties

An EPC contractor shall be entitled to bonuses and incentives for early completion of the project or for the early delivery of equipment / machinery as per purchase order and subject to the early completion of works as per schedule. At the same time the EPC contractor shall be subjected to penalties as per contract based on X % of the contract value for each week of delay subject to a maximum of Y% of the total contracted value.

## 80-080 LOA and Living Expenses

- Travel, meals, accommodation
- Living out allowance (LOA)
- Compensates for variances between home and host locations
- Location premium
- Applies where living location is deemed an increased hardship
- Assignment Incentive
- Paid in order to recognize temporary disruption to usual lifestyle

## 80-090 Engineering Rework

Base line budget should be zero. Applies to tracking costs of engineering changes post IFC categorized by cause as follows:

- Owner initiated change
- Vendor initiated change
- Other EP initiated change
- Construction initiated change

- Regulatory change
- Internal change

## 6.7 COST TYPES

Cost type generally refers to the type of resources such as labour, material (i.e., equipment and bulk materials) or sub-contract (i.e., a combination of labour and material). This account type also may be used for organizational and accounting breakdowns. In organizational usage it may segregate owner costs from contractor costs and may further identify contract type (sub-contract, service, turnkey supply and install, design, labour and so on). In accounting usage, it may segregate rental and lease costs from purchases. Also, asset owners need to separate capital costs from expense costs (demolition and software development are often expensed, for instance) because they affect depreciation, taxation and ultimately profitability.

### Direct Labour

- 11 Direct Field Internal/External
- 12 Engineering & Support Services

### Material and Equipment

- 21 Process equipment
- 22 Bulk material

### Sub-contracts

- 31 Supply and install

### General Costs and Overhead

- 41 Allowances

Appendices A and B include such additional information such as training requirements and safety apparel and supplies.

Other Examples are:

Site fire truck

Site conveyance vehicle

Site foam wagon

All firefighting equipment (bunker gear, for instance)

Breathing air equipment (SCBA) include recharge compressor

Laboratory equipment

Tools / machines for maintenance shop

Tools for trades / operators

Outfit of all buildings (exercise equipment for the administrative building, for example)

## 7.0 IMPLEMENTATION

Each element of the scope of work defined under the project work breakdown structure will have the cost estimate detailed by the EBS. All elements of the estimate will be mapped to the budget in accordance with the cost breakdown structure as defined.

## 8.0 ACKNOWLEDGEMENTS

This CBS procedure and the associated, above-mentioned standard were developed with input from:

- AACEI Recommended Practice 21R-98, Project Code of Accounts – as Applied in Engineering, Procurement and Construction for the Process Industries
- NORSOK Standard Z-014, Standard Cost Coding System (SCCS), Rev. 1
- OEC Industrial Project Services Ltd.'s Estimate Breakdown Structure (EBS)

Construction Owners Association of Alberta (COAA), Alberta Major Projects Benchmarking Program, in conjunction with the Construction Industry Institute ([www.construction-institute.org](http://www.construction-institute.org)).

### Appendix A - Health Safety Environment Management System Competency Requirements

#### Competencies (Training)

H<sub>2</sub>S (hydrogen sulphide)

Workplace hazardous materials information system (WHMIS)

Petroleum safety training (PST)

Investigation training

Hazard and risk management

Confined space entry

Lifting and rigging

Forklift

HSE leadership development

First aid and CPR

Advance first aid

Respiratory protective equipment (RPE)

High angle rescue

Transportation of dangerous goods (TDG)

Document Title:

Cost Breakdown Structure

Fall protection  
 Safety watch  
 Hearing conservation  
 Harassment  
 Resuscitation  
 NORMS  
 Gas detection  
 Incident command terminology  
 Incident command system (ICS) basic  
 ICS commander  
 Environment of care (EOC)  
 National Fire Protection Association (NFPA) 1081(Standard for Industrial Fire  
 NFPA1006 (Standard for Technical Rescuer Professional Qualifications)  
 NFPA472 (Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction  
 NFPA operator  
 NFPA technician  
 Aerial platform  
 Ground disturbance  
 All terrain vehicle (ATV)/Quads/Gator  
 Quality improvement training  
 Health safety environment management system (HSEMS) interface orientation sessions  
 Worksite inspection training  
 Observation training  
 Employee wellness training

## Appendix B - Safety Equipment List

### Equipment Type

#### Personal Protection

Safety glasses  
 Goggles  
 Face shields  
 Fire retardant clothing - summer  
 Fire retardant clothing - winter  
 Hard hat - with liner  
 Hearing protection - muffs  
 Shop coveralls



Document Title:

## Cost Breakdown Structure

Protective footwear - summer

Protective footwear - winter

Gloves - green kings

Gloves - rubber

Personal lower explosive limit (LEL) detectors

Cradles includes calibration and bump test capabilities

Reflective vests

Chemical suits

Rain suits

### **Respiratory**

Portable air carts - 4 wheeled units

Self contained breathing apparatus (SCBA) and portable air carts

Air compressor tank/cascade system

H2S escape masks

### **Fall Protection**

Fall protection - harness with lanyard

### **Instrumentation**

Computerized scan inventory system

Air monitoring system

Air monitoring portable units

Plume dispersion modeling system

### **First Aid and Medical**

First aid kits

Eye washing stations

Stretchers

Medical room equipment

### **Fire Protection**

Pumper truck and equipment

Command/rescue unit

Foam trailer

Fire extinguishers

### **Signs and Lockouts**

Lockout and tagout equipment

### **Traffic Safety**

Roadblock kits

Signage

Document Title:

## Cost Breakdown Structure

### **Rescue Equipment**

High angle rescue equipment

Bunker gear

### **Hazmat Storage and Spill Control**

Spill kits

Communication/Warning Systems

Siren/alarm/horns

Strobes/lighting

Public address system

Portable 2-way radios

Pagers

Satellite phone

## Appendix C – WBS and CBS Breakdown

### CoA (WBS/CBS)

**AAA-BB-CCC-DD**

**AAA** WBS

**BB** Prime Account

**CCC** Activity Account

**DD** Cost Type

### CoA Example

PDH-20-100-21

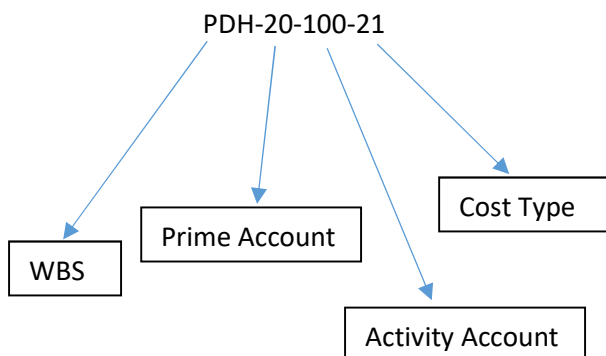
**PDH** Unit

**20** Equipment

**100** Pumps & Drivers

**21** Process Equipment

### CKPC Phase 1



PRIME/ ACTIVITY Code	Descriptions	Direct Field Labour	Engineering & Support Services	Equipment	Material	Subcontract	Allowances
		11	12	21	22	31	41
<b>10-000</b>	<b>EARTH WORKS &amp; CIVIL</b>						
10-010	Civil General						
10-020	Site Clearing, Grading, Fill & Compacting						
10-030	Structural & Trench Excavation & Backfill						
10-040	U/G Services, Drainage & Sewers						
10-050	Site Improvements & Erosion Protection						
10-060	Railway						
<b>11-000</b>	<b>PILING</b>						
11-010	Piling General						
11-020	Drilled, Cast in Place						
11-030	Driven, Steel Caisson						
11-040	Screw Piles						
11-050	Specilty Piles						
<b>12-000</b>	<b>CONCRETE</b>						
12-010	Concrete General						
12-020	Cast-in-Place Concrete						
12-030	Precast Concrete						
12-040	Grout						
12-050	Paving						
12-060	Masonry						
<b>13-000</b>	<b>STRUCTURAL STEEL</b>						
13-010	Steel General						
13-020	Equipment Structures						
13-030	Pipe Racks						
13-040	Ladders, Platforms, Stairs & Walkways, Misc Steel						
13-050	Misc. Support Steel						
<b>14-000</b>	<b>ARCHITECTURAL &amp; BUILDINGS</b>						
14-010	Architectural General						
14-020	Stick Built Buildings						
14-030	Pre-Engineered Buildings						
14-040	Fabric Structures						
14-050	Building Services						
14-060	Furniture, Equipment & Accessories						
<b>20-000</b>	<b>EQUIPMENT</b>						
20-010	Equipment General						
20-020	Exchangers						
20-030	Rotating Equipment & Drivers						
20-040	Direct Fired Equipment						
20-050	Columns & Pressure Vessels						
20-060	Tanks						

<b>PRIME/ ACTIVITY Code</b>	<b>Descriptions</b>	<b>Direct Field Labour</b>	<b>Engineering &amp; Support Services</b>	<b>Equipment</b>	<b>Material</b>	<b>Subcontract</b>	<b>Allowances</b>
		<b>11</b>	<b>12</b>	<b>21</b>	<b>22</b>	<b>31</b>	<b>41</b>
20-070	Vacuum Equipment						
20-080	Material Handling Equipment						
20-090	Package Units						
20-100	Special Processing Equipment						
20-110	Modules Setting						
20-120	Mobile Equipment						
<b>30-000</b>	<b>PIPING</b>						
30-010	Piping General						
30-020	Pipe, Fittings, Flanges, Valves & Attachments						
30-030	Piping Field Fabrication						
30-040	Piping Shop Fabrication						
30-050	Glycol/ Steam Tracing						
30-060	Fire Protection						
30-070	Specialties & Misc						
30-080	Testing & NDE						
<b>40-000</b>	<b>ELECTRICAL</b>						
40-010	Electrical General						
40-020	Electrical Equipment						
40-030	Lighting & Devices						
40-040	Cable Tray, Conduit, Raceways & Fittings						
40-050	Cables & Wires						
40-060	Detection & Alarm Systems						
40-070	Communication & Security Systems						
40-080	Electric Heat Trace Systems						
40-090	Grounding, Lightning & Cathodic Protection						
40-100	Overhead Distribution Systems						
<b>50-000</b>	<b>INSTRUMENTATION &amp; AUTOMATION</b>						
50-010	I & A General						
50-020	Instrumentation - Tagged						
50-030	Instrumentation - Bulk Material						
50-040	Analyzers, Shelters & Sample Stations						
50-050	Loop & Functional Checks						
50-060	Process Control Automation						
50-070	Equipment Control Systems						
50-080	Safety Systems						
50-090	Control Room Equipment						
<b>60-000</b>	<b>PROTECTIVE COATINGS</b>						
60-010	Coatings General						
60-020	Painting						
60-030	Fireproofing						

PRIME/ ACTIVITY Code	Descriptions	Direct Field Labour	Engineering & Support Services	Equipment	Material	Subcontract	Allowances
		11	12	21	22	31	41
60-040	Insulation						
60-050	Misc. Coatings						
<b>65-000</b>	<b>SITE GENERAL DIRECTS</b>						
65-010	Site Directs General						
65-020	Scaffold Installation						
65-030	Survey & Technical Support						
65-040	Field Craft Support						
65-050	Field Inspection - Direct QA/QC						
65-060	Demolition						
65-070	Freight Costs						
65-080	Import Duty & Brokerage Fees						
65-090	Cancellation Charges						
65-100	Field Rework						
<b>68-000</b>	<b>MODULE YARDS</b>						
68-010	Mod Yard General						
68-020	Modularization - Mechanical						
68-030	Modularization - Structural Steel						
68-040	Modularization - Buildings						
68-050	Modularization - Piping						
68-060	Modularization - Electrical						
68-070	Modularization - Instrumentation						
68-080	Modularization - Protective Coatings						
68-090	Off Site Warehouse, Laydown & Module Staging Areas						
68-100	Mod Yard Rework						
<b>70-000</b>	<b>CM &amp; ADMIN SITE STAFF</b>						
70-010	CM & Admin General						
70-090	Staff Related Expenses						
70-100	Contractor Field - Bonuses, Incentives & Penalties						
70-110	Contractor Field - Non-Manual Salaries						
70-120	Contractor Field - LOA and Living Expenses						
70-130	Contractor Field - Office Support, Services & Supplies						
<b>71-000</b>	<b>TEMPORARY FACILITIES &amp; UTILITIES</b>						
71-010	Temp Facilities General						
71-020	Temporary Buildings & Shelters						
71-030	Temporary Work & Laydown Areas						
71-040	Temporary Roads, Walks, Parking, Fences, etc.						
71-050	Temporary Power, Light & Communications						
71-060	Temporary Water, Sewage & Natural Gas						
71-070	Winterization & Weather Protection						
71-080	Temporary Construction Facility Support						

PRIME/ ACTIVITY Code	Descriptions	Direct Field Labour	Engineering & Support Services	Equipment	Material	Subcontract	Allowances
		11	12	21	22	31	41
71-090	Fuel Supply Facilities						
<b>72-000</b>	<b>TEMPORARY SERVICES &amp; SUPPLIES</b>						
72-010	Temp Services General						
72-020	Material Handling & Warehousing						
72-030	Scaffolding, Cribbing & Dunnage						
72-040	Snow Removal , Dust Control & Road Maintenance						
72-050	Craft Training & Orientation						
72-060	Craft Overhead Charges						
72-070	Construction Services Support						
72-080	Construction Safety Services						
72-090	Medical & Safety Supplies						
72-100	Security Services						
<b>73-000</b>	<b>CONSTRUCTION TOOLS &amp; EQUIPMENT</b>						
73-010	Tools & Equip General						
73-020	Construction Equipment						
73-030	Small Tools & Consumables						
73-040	Construction Equipment Fuel						
<b>74-000</b>	<b>GENERAL CONSTRUCTION OVERHEADS</b>						
74-010	Field Indirects General						
74-020	Mobilization & Demobilization						
74-030	Travel & Transportation						
74-040	Construction Insurance						
74-050	Contractor Fee & Overhead						
74-060	Allowances, Bonuses & Incentives						
74-070	Permits						
74-080	Close-Out Reports & Costs						
<b>80-000</b>	<b>DETAILED ENGINEERING &amp; PROCUREMENT</b>						
80-010	Engineering General						
80-020	Project Management & Administration						
80-030	Engineering & Technical Services						
80-040	EP Overhead & Home Office Expenses (ODC)						
80-050	Fee						
80-060	Sub-Contracts (3rd Party Consultants)						
80-070	Bonuses, Incentives & Penalties						
80-080	LOA ,Living Expenses, Travel & Entertainment						
80-090	Engineering Rework						