AMPCO Interrogatory #85

Interrogatory

Reference: Ex D2 T2 S10 P6-7

The total cost of the D2O project is $509.3 M. The 2013 Full Release Execution Business Case anticipated spending on the project of $110 M. At pages 6-7, OPG provides the major elements of the project's construction.

a) Please provide the final costs to undertake each of these major elements, compared to the original budget.

b) Please indicate which Contractor was responsible for starting and completing each major construction element.

c) Please identify all challenges related to undertaking each major construction element.

d) Please identify the major project elements allocated to only DRP Storage.

e) Please provide all Project Over-Variance Approvals related to the D2O Storage Project.

f) Please provide the CPI and SPI performance metric results for the D2O Storage Project by year.

Response

a) OPG did not track project costs according to the major elements of the project's construction listed in the above reference. These major elements were provided in summary form to orient the reader to the D2O Storage Projects' design, complexity and functionality. Each of the major elements is comprised of numerous individual work packages, some with overlapping scopes. Therefore, OPG is generally unable to attribute precise costs to the listed events, beyond what is provided in Ex. L-D2-02-Staff-162 and in Ex. D2-2-10, Attachments 2m-2q.

b) Please see the below list of the major elements of the D2O Storage Project's construction and the associated responsible contractor:
   - Relocating numerous pipes, cable lines and trailers that occupied the project site – Started and completed under B&M.

- Removing water during buried services removal and underground construction because the water table is approximately 2 to 2.5 m below the surface at the project site – Started under B&M and completed under OPG.
- Installation of a caisson wall (a concrete and steel shoring wall to support excavation) with 12 tie backs into the surrounding soil and bedrock – Started and completed under B&M.
- Excavation 15 m below the surface to solid bedrock – Started under B&M, and completed under OPG.
- Construction of a seismically qualified reinforced concrete dike that is 13 m deep and anchored to bedrock using 221 rock anchors – Started and completed under OPG.
- Placement of 25 large stainless steel nuclear grade 6 tanks within the seismic dike to store various streams of heavy water – Started under OPG and completed under CanAtom.
- Installation of three smaller nuclear grade stainless steel tanks required for the operation of the D2O Storage Project – Started and completed under CanAtom.
- Fabrication and installation of the nuclear grade stainless steel piping, valves, pumps and controls required to move heavy water among the tanks, to and from the adjacent Heavy Water Management Building ("HWMB"), and to the drum handling facility – Started under B&M and completed under CanAtom.
- Installation of active and inactive drainage systems – Started and completed under CanAtom.
- Connection of the piping in the D2O Storage Project facility to the HWMB via a seismically qualified tunnel that runs between the two facilities – Started and completed under CanAtom.
- Construction of a 16.5 m tall steel frame and concrete building above the dike – Started and completed under CanAtom.
- Erection of a 15.5 m monitored emission stack on the roof of the building – Started and completed under CanAtom.
- Installation of drum handling, testing and cleaning equipment on the ground floor of the facility – Started and completed under CanAtom.
- Installation of the electrical (including a 1,000 kW standby generator and battery backup), mechanical, alarm, heating and cooling, compressed air, vapour recovery for emission 18 control and emission monitoring systems – Started and completed under CanAtom.
- Installation of instrument controls to integrate the D2O Storage Project facility's monitoring, operating and alarm systems with those of the HWMB to allow the facility to be operated remotely by personnel located in the control room of the HWMB – Started and completed under CanAtom.
- Testing and commissioning all systems and ensuring that the tanks, valves and piping 23 operate as designed, are clean and free of any foreign materials and do not leak – Started under CanAtom and completed under OPG.

c) Challenges faced by the D2O Storage Project related to each of the major construction elements are detailed in Ex. D2-2-10 and Ex. D2-2-10, pp.52-104 and Ex. D2-2-10 Attachments 2m-2q.

d) It is not possible to identify the major project elements allocated to only DRP Storage. Once the operational improvement storage needs were merged with the DRP storage needs to form the D2O Storage Project, the project formed a single integrated whole and was completed as such. See also Ex. L-D2-02-AMPCO-83.

e) Please see Ex. D2-2-10, Attachments 2o-2q, for Project Over-Variance Approvals related to the D2O Storage Project. See also the funding increase approval memoranda at Attachment 1 and Attachment 2 (marked “commercially sensitive” but OPG has determined the document is non-confidential in its entirety).

f) Please see the CPI and SPI performance metric results for the D2O Storage Project by year in Chart 1 below:

Chart 1: D2O Storage Project CPI and SPI

Year	CPI	SPI
2012 LTD	0	0
2013	0.93	1.05
2014	0.48	0.63
2015	1.12	0.92
2016	0.90	0.84
2017	0.90	0.90
2018	1.00	0.94
2019	1.00	0.99
2020	1.00	1.00
2021	1.00	1.00