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# ENGINEERING – PROCUREMENT – CONSTRUCTION RESUME HIGHLIGHTS

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# 1. INTRODUCTION

Over the 32 years with FortisBC Energy Inc, and additional years with others, I have gained a wide variety of project management experience on large infrastructure projects. I have crossed many jurisdictional boundaries, industry levels and all phases of the project life cycle. I will be focusing only on some of my leadership, direction, experiences and contributions to successfully deliver on the Engineering, Procurement and Construction ("EPC") Phase. While I have worked on the other phases of a Project, those experiences are not included to keep things brief.

I believe in the "goldilocks" project system – not too complicated, not too simple, size the system so that it is just right for a given project (and not a one size fits all approach).

# 2. MAJOR EPC PHASES

Major projects approved by the BCUC and other regulators and were constructed wherein my responsibilities were either as a project engineer, project manager, assistant project director, and project director which were all successfully delivered with expected benefits, on-schedule and onbudget include<sup>1</sup>:

- 2.1 Eagle Mountain Woodfibre Gas Pipeline Project<sup>2</sup>: 9 km tunnel, 50 km NPS 24 pipeline extension, 2 compressor stations and custody transfer station that traverses environmentally sensitive mountainous terrain, a wildlife management area, and an urban community;
- 2.2 Pattullo Gas Line Project: a \$100 million 6 km NPS 20 pipeline and associated stations through a major urban community in the Lower Mainland of BC (Burnaby);
- 2.3 Lower Mainland Intermediate Pressure System Upgrade Project: a \$400 million 20 km NPS
  30 pipeline and pressure control station through 3 densely populated urban communities (Vancouver, Burnaby and Coquitlam);

<sup>&</sup>lt;sup>1</sup> EPC phase - up to \$400 million per project in dollars spent during construction which includes Owner Obtained Materials and Equipment, Owner Obtained Permits, excludes concept, feasibility, FEED, Regulatory phases where noted <sup>2</sup> Involved in Project from the Concept, FEED, Environmental Assessment, to Pre-Construction Phases Only – Construction expected to commence in 2023.

- 2.4 Fraser River Horizontal Directional Drill Crossing Project: a \$34 million 1.35 km NPS 24 and NPS 20 crossings of the largest river in BC (Fraser River);
- 2.5 Whistler Natural Gas Project: a \$36 million 50 km NPS 8 pipeline from Squamish to Whistler, B.C. to change its energy profile within a major highway concurrently and separately undergoing major upgrades;
- 2.6 Southern Crossing Project: a \$400 million 303 km NPS 24 pipeline across southeast BC via a route that covered several environmentally sensitive areas, mountainous terrain, and numerous external stakeholders and Indigenous Communities;
- 2.7 Sparwood Restoration Project: restoration of some 35 sites damaged by floods within an extremely tight window before the winter seasonal demands for services from the system (required emergency response plans and construction management);
- 2.8 South Okanagan Natural Gas Project: a \$35 million 32 km NPS 16 pipeline and control stations through environmentally sensitive areas, under Skaha Lake (10 km), numerous external stakeholders and Indigenous Communities in the Okanagan region of BC; and
- 2.9 Surrey Langley Natural Gas Pipeline Project: a \$52 million 25 km NPS 42 pipeline and control stations through environmentally sensitive lands and some 600 residential properties.

# **3. PRE-CONSTRUCTION PHASE ACHIEVEMENTS**

Managed and/or drafted the assembly of the construction contracts (some required 6,000 pages) for the foregoing. Deliverables have included:

3.1 Substantial planning with a timely and comprehensive focus on such sections as:

- (1) Scope of Work
- (2) Contract Prices
- (3) Identification of Milestones
- (4) Engineering Specifications Drawings
- (5) Environmental Specifications
- (6) Community Relations Indigenous Communities Requirements
- (7) Owner Provided Permits and Approvals
- (8) Owner Provided Equipment and Materials
- (9) General Terms and Conditions (from an engineering perspective)
- 3.2 Selection of the Project Delivery Process:
  - (1) Design Bid- Build; or
  - (2) Construction Management at Risk ("CMAR"); or (3) Early Contractor Involvement; or
  - (4) Time and Materials.

3.3 Selection of the Form of the Construction Contract:

- Linear (typically 60 80% of the contract value as a family of lump sums, 15 25% as a unit price items dependent on quantities used, and 5 – 15% as force account and as needed performance or liquidated damage provisions); or
- (2) Time and Materials.

3.4 Familiar with Other Project Delivery - Forms of Contract such as:

- (1) Design Build;
- (2) Target Price;
- (3) Guaranteed Price;
- (4) Integrated Project Delivery; (5) Job Order Contracting; and
- (6) Fixed Price.
- 3.5 Management, Oversight, Evaluation, Clarifications Negotiations With, and Selection of the Construction Contractor(s) and Inspection Monitoring Teams.
- 3.6 Successful management of the process to acquire an Environmental Assessment Certificate (Permit) from the BC Environmental Assessment Office and one of the first of its kind, an Environmental Certificate from an Indigenous Community that included addressing site selection – utilization issues for two compressor stations and other facilities in a timely and cost effective manner.

# 4. CHANGE MANAGEMENT

Construction contracts are rarely perfect upon execution of the agreements and therefore judgement is required to ascertain whether the documents are adequate to start construction and management of the changes can be kept within a pre-approved contingency allowance (and management reserves during construction). Some notable construction change management strategies to minimize adverse impacts included:

4.1 Supported Change of Construction Method With Prime Contractor

A major approval was reached with the municipal government to completely close a critical active road in its infrastructure for a period of 2 months to construct a pipeline more quickly under the road. Once construction was underway, it became evident that the rate of progress was not going to be sufficient to complete this work in this section on time and would have a significantly adverse impact on the obligations committed to the municipal government, and reputation of the Owner (and Contractor). Lead the Project team to identify a completely different backfill process, obtained approval from all stakeholders and incorporated contract changes and implemented the change within the remaining time left. With this accomplishment, the construction was completed on time, fulfilling the obligations and maintaining the reputation of both the Owner and the Contractor.

# 4.2 Changed Prime Contractor

The prime contractor, who was awarded the bulk of the work, quoted an exorbitant price of \$20 million for a particular task involving a limited amount of sheet piling, after final permit conditions were obtained from the regulator. Other methods discussed with the prime contractor were only marginally less. Conventional wisdom is to keep the scope of work between two points with the same prime contractor, but only if practical. After it became evident that the Owner's interests would not be achieved, it was decided to descope the work from the initial prime contractor since among other considerations safety and lower costs could be achieved. Identified, negotiated, and awarded the work to a different prime contractor for \$3 million, an approximately \$17 million savings (and work was safely completed).

# 4.3 Changed Design – Construction Method Due to Anticipated Sub-surface Conditions

Geotechnical investigations on a river crossing suggested less than ideal sub-surface conditions would likely be encountered for a sub-surface construction method. Contractors were also pessimistic on the likelihood of success and declined to bid. I had an aboveground design prepared and obtained internal and external stakeholders' approval within a tight window. Tendered the work to several potential prime contractors. Awarded the work to different prime contractors while maintaining the same and different contractor up stream and down stream of the site. Environmental, operational and Indigenous Communities' objectives and requirements as well as cost and schedule objectives were achieved.

### 4.4 Changed Design Due To Increasing Challenges To Meet Requirements

While the FEED phase concluded an above ground structure would be the ideal concept and work proceed on with this concept, further investigation determined increasing challenges to satisfactorily meet all the design criteria. Stopped work on the concept and had design team change to a sub-surface design (horizontal directional drilling) that saved approximately \$10 million (\$17 million for above versus \$7 million for sub-surface) that met all technical, environmental, safety and social requirements.

#### 4.5 Started Construction Without Major Approvals In Place

After briefing senior management on the project's challenges, I recommended that construction should start as scheduled on those parts that had approval. Further delays would have an even greater impact than despite, amongst other things, that the remaining 1/3 of the route for the project had not received all the necessary major regulatory approvals. A mitigation plan and agreement with the prime contractor was prepared, negotiated and obtained that included a \$3 million liquidated damages provision if the Owner didn't obtain approval by a specific date. Furthermore, a proposal was submitted to the regulator to act as an independent third party to assess the differences between the Owner and external parties. The regulator substantially approved the proposed solution by the Owner, and the Project was able to avoid a major delay (and consequential additional costs).

### 5. POST CONSTRUCTION CLAIMS (DISPUTE RESOLUTION)

The general practice used been to negotiate resolution of potential changes during construction on a weekly basis and have appropriate Change Orders issued wherever possible and/or to minimize the accumulation of contract issues that need to be, or can be only, resolved after construction has been completed ("Construction Claim"). While the specific and detailed nature of the Construction Claims are confidential, and the vast number of changes been resolved in short order, the notable resolution of major Construction Claims after substantial completion was reached have included:

### 5.1 Construction Productivity Delay Claim

At the end of construction, the Prime Contractor tabled a \$50 million productivity delay claim. To obtain a timely resolution the merits were firstly carefully assessed from the lens of the initial contractor's claims and that of the Owner's position in comparison to the applicable contract. The parties also agreed to negotiation as a means to reach resolution and only if the parties were unable to reach a mutually acceptable agreement that a third party dispute resolution process such as mediation, rigorous arbitration or some in-between process would be considered (the contract stipulated that litigation was not an option). A key step to reaching resolution was to objectively determine what actually occurred, as if assessing from a third-party perspective, and to understand how the actions or inactions of each party contributed to the costs of the work. By adopting this approach, a negotiated settlement agreement of about \$5.5 million was reached within 4 months after construction completion as opposed to years if arbitration has been the chosen path.

### 5.2 Extra Construction Costs Incurred Claim

Similarly, at the end of construction, the Prime Contractor submitted a claim of approximately \$6.5 million in addition to a base contract value of approximately \$20 million before previously approved Change Orders. The claim contained numerous elements including the additional cost impact on the contractor due to COVID-19 and design changes. Initial negotiations failed to reach agreement between the parties during construction on their own. The Prime Contractor elected to use arbitration as a means to reach resolution over the complex, interrelated factors once it had reached substantial completion. Nonetheless, after further investigation of the facts, estimating the costs of the arbitration process and in anticipation of the range of outcomes by the arbitrator, the parties agreed to use a non-binding mediation process notwithstanding that the arbitration was now underway. The mediation process successfully facilitated a settlement as the parties agreed to settle at approximately \$2.9 million.

#### 5.3 Changed Sub-Surface Conditions vs. Construction Methods Claims

During construction, two major mechanical failures using the horizontal direction drilling method occurred that threatened whether it was possible to even complete and have useful and useable assets or it was better to cancel the project until a more reliable plan could be developed (sunk costs at this point in time were approximately \$18 million). Substantial collaboration between the Owner and Prime Contractor yielded a plan that included changing a major sub-contractor, developing a massive deep cofferdam structure to reach the failed areas, and creating a unique mechanical design.

This plan provided the confidence needed to complete the project as originally envisioned. After the remedial challenges were successfully achieved the parties turned their attention to address the compensation issues. The Prime Contractor tabled a claim in the order \$3.5 million. The parties were able to negotiate on their own a settlement of approximately \$1.5 million after a comprehensive examination of the facts of the case.

# 5.4 Extra Construction Costs Incurred Claim

At the end of construction, the Prime Contractor submitted a claim for approximately \$30 million, in addition to the base contract value of approximately \$200 million, excluding previously approved Change Orders. The claims had numerous interrelated elements. After

further investigation of the facts, the costs of the arbitration process and the range of outcomes that could be anticipated by an arbitrator, the parties were able to reach an agreement of approximately \$13 million.

# 5.5 Environmental Damage Claim

An environmental damage claim was tabled by the Ministry of Environment against the Owner and Horizontal Directional Drilling ("HDD") Sub-contractor after a mud fracture occurred in the middle of a HDD river crossing. Prepared and supported a substantial rebuttal detailing all the steps in the process that the Owner had undertaken, clearly establishing that the Owner had met all reasonable expectations. Upon review of the documentation provided, the Ministry of Environment dropped its claim against the Owner in its entirety and that the failure occurred through no fault of the Owner.

# 6. EMPLOYMENT SUMMARY

6.1 Kanzaki Project Management Consultants Inc. – Sept 2022 to Present

- Created company to provide senior project management services
- Vision: To help projects get set-up for success either before, during or even after construction

6.2 FortisBC or its Predecessors – May 1990 to March 2022 (Retired)

• Held positions as Project Engineer, Engineering Manager, Project Manager, Project Director

6.3 Kanzaki Project Management 1985 – 1989

• Self employed – Project Engineering Consultant

6.4 BC Hydro – Vancouver Island Gas Project 1980 – 1984

- Materials Project Engineering Consultant
- 6.5 Shell Canada Resources 1976 1980
  - Metallurgical Materials Engineer

# 7. CURRENT, PAST MEMBERSHIPS INCLUDE

- 7.1 Member of the CSA Z662 Design Sub-committee since 2005;
- 7.2 Member and Guest Speaker at the Pipeline Integrity Institute (University of BC) since 2014;
- 7.3 Project Management Professional (PMP) Project Management Institute;
- 7.4 Registered professional engineer (P.Eng.) Association of BC Professional Engineers & Geoscientists;
- 7.5 Qualified Arbitrator (Q. Arb.) Alternative Dispute Resolution Institute of BC;
- 7.6 Passed examinations, proceeding to complete qualifications for Qualified Adjudicator and Qualified Mediator Alternative Dispute Resolution Institute of Canada;
- 7.7 Various committees for Project Management Institute; and
- 7.8 Past Membership Chair for Project Management Institute (Vancouver Chapter)

# 8. KEY EDUCATION

- 8.1 MBA University of B.C. 1993; and
- 8.2 B.Ap.Sc. (Metallurgical Engineering) University of B.C. 1976