FINAL EXAMINATION – 2018-02-26

## name:

# Scheduling with Uncertainty (6 points)

Your company has just been awarded a design-build contract to develop a new manufacturing facility for a large pharmaceutical client company. The contract is as follows:

* target cost plus incentive fixed fee payment scheme
* fixed fee: 400 k€,
* 50/50% total cost overrun/savings share
* budgeted direct cost: 6,000 k€, o/h cost (100k€/month) are also reimbursed.
* effective date of contract: April 1st, 2018
* time penalty: 50 k€/month

The project will develop as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| Task | Immediate Predecessor | BAC | Duration [months] |
| 1. Basic design and building permits | - | 200 | 2 |
| 1. Detailed design | A | 300 | 2 |
| 1. Procurement of precast building | A | 1400 | 6 |
| 1. Procurement of production equipment | B | 1600 | 3 |
| 1. Site preparation and foundations | A | 300 | 2 |
| 1. Precast building erection | E, C | 700 | 4 |
| 1. Internal utilities | F | 1000 | 1 |
| 1. Installation of production line | B, F, G | 400 | 2 |
| 1. Test | H | 100 | 1 |
|  |  | 6000 |  |

During the kick-off meeting the Project Manager has anticipated a 40% likelihood of heavy snow storms likely starting December 1st that could force suspension of the works until the end of February. A possible corrective action is to pay the supplier an extra 800k€ price to get the procurement of precast building in just 3 months.

Recommend whether to mitigate risk or not and provide a quantitative justification.

# Performance Monitoring (6 points)

Take the contract as per Exercise 1. Assume you are now on February 28th, 2019 when the snowstorm risk has ended and no preventive action has been taken. The actual status of the project is given in the following EV report.

|  |  |  |  |
| --- | --- | --- | --- |
| *Task* | *BCWS* | *BCWP* | *ACWP* |
| A.     Basic design and building permits | 200 | 200 | 220 |
| B.     Detailed design | 280 | 300 | 200 |
| C.    Procurement of precast building | 1400 | 1450 | 1600 |
| D.    Procurement of production equipment | 1000 | 1200 | 800 |
| E.     Site preparation and foundations | 280 | 300 | 250 |
| F.     Precast building erection | 700 | 500 | 600 |
| G.    Internal utilities |  |  |  |
| H.    Installation of production line |  |  |  |
| I.      Test |  |  |  |
| TOTAL | 3860 | 3950 | 3670 |

Determine the most suitable expected price and profit.

# Project Financing (6 points)

Determine the approximate debt leverage required to finance a 15,000,000€ BOT capital project. The project is supposed to be operated over 24 years, with 1,000,000€ annual expected pre-tax cash flow before repayment of debt to the bank.

Assume that cost of equity is 10% and cost of debt 5%. Fell free to make other reasonable financial assumptions, if needed.

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