**Introduction**

The report presented is focused on capital analysis of two different investment proposals available for investment to Ashley a patent holder whereas actual project returns are uncertain and inclusive of options to either invest further or abandon project investment in year 2. Further actual project reruns are estimated to either increase or decrease by 64.9% and 39.3% over the project life.

**Assumptions**

The investment evaluations for the purpose of this report were carried out using the following assumptions;

* Probability of increase or decrease in Project cash flows is 50% each.
* Projects will entirely be funded by equity.
* Cost of capital was calculated using CAPM.
* Investment in project 1 and initial cash flows both begin in Year 2001.

**Analysis 1**

Initially project 1 was evaluated over its life of 6 years between 2001-2006 whereas annual cash flows were calculated by adding depreciation back to net income. Base case cash flows and net present value for the project is presented below;

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | **0** | **1** | **2** | **3** | **4** | **5** |
| Initial Investment | (10,000,000) |  |  |  |  |  |
| Net Earning | - | - | 2,405,000 | 2,285,000 | (65,000) | (900,000) |
| Depreciation | 900,000 | 900,000 | 900,000 | 900,000 | 900,000 | 900,000 |
| Working Capital Investment | (1,500,000) | - | - | - | - | 1,500,000 |
| Net Cash Flows | (10,600,000) | 900,000 | 3,305,000 | 3,185,000 | 835,000 | 1,500,000 |
|  |  |  |  |  |  |  |
| **NPV - Base Case** | **(3,691,636)** |  |  |  |  |  |

Further, the project was analyzed by taking into account the uncertainty related to future project cash flow. Revised net present value along with expected net present value is presented below;

|  |  |  |
| --- | --- | --- |
|  | **NPV** | **Probability** |
| NPV (U) | (1,691,614) | 50% |
| NPV (D) | (4,902,744) | 50% |
|  |  |  |
| **Expected Value** | **(3,297,179)** |  |

Based on the net present value presented above the project does not add value for Ashley as both base case and expected net present value is negative.

**Analysis 2**

Analysis 2 takes into account the option to abandon the project investment in year 2 which will generate a onetime cash inflow of $4 million. Annual cash flows and net present value under this option in base case scenario are presented below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **0** | **1** | **2** |
| Initial Investment | (10,000,000) |  |  |
| Net Earning | - | - | 2,405,000 |
| Depreciation | 900,000 | 900,000 | 900,000 |
| Working Capital Investment | (1,500,000) | - | 1,500,000 |
| Sale Proceeds | - | - | 4,000,000 |
| Net Cash Flows | (10,600,000) | 900,000 | 8,805,000 |
|  |  |  |  |
| **Net Present Value (Base Case)** | **(2,919,662)** |  |  |

Further, the option was analyzed by taking into account the uncertainty related to future project cash flow. Revised net present value along with expected net present value is presented below;

|  |  |  |
| --- | --- | --- |
|  | **NPV** | **Probability** |
| NPV (U) | (1,950,097) | 50% |
| NPV (D) | (3,506,779) | 50% |
|  |  |  |
| **Expected Value** | **(2,728,438)** |  |
| **Option Value** | **568,741** |  |

Results of the analysis indicate that if option to abandon is exercise the expected value of net present value will be higher whereas the difference is accounted for as value of the option which as was determined as $568,740.

However, even with the option to abandon net present value of the project remains negative and hence project should not be taken on by Ashley.

**Analysis 3**

The final analysis takes into account option to make a further investment of $ 100 million in a new project in year 2. Specifically, the analysis used expected annual cash flows for project 1 along with the required investment in project 2 to determine the net present value that must be generated by project 2 for investment to be made in both projects. Further, Option values are generally positively correlated to increases in volatility hence present value will increase with increases in volatility.

The minimum required present value of project 2 was calculated as $55 million (approx.) which will enable Ashley to break even on both projects as shown below;

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | **0** | **1** | **2** | **3** | **4** | **5** |
| Net Cash Flow (U) | (10,600,000) | 900,000 | 4,865,845 | 4,667,965 | 877,185 | 2,084,100 |
| Net Cash Flow (D) | (10,600,000) | 900,000 | 2,359,835 | 2,286,995 | 809,455 | 1,146,300 |
| **Expected Cash Flows** | **(10,600,000)** | **900,000** | **3,612,840** | **3,477,480** | **843,320** | **1,615,200** |
| Investment in Project 2 |  |  |  |  | (100,000,000) |  |
| **Overall Cash Flows** | **(31,800,000)** | **2,700,000** | **10,838,520** | **10,432,440** | **(97,470,040)** | **4,845,600** |
|  |  |  |  |  |  |  |
| **NPV** | (55,114,805) |  |  |  |  |  |