

HAZOP STUDY WORKSHEET



|                       |    |                |       |
|-----------------------|----|----------------|-------|
| Project:              | t2 | NODE           | node2 |
| Design Intent :       |    | System         |       |
| Design Conditions:    |    | HAZOP Boundary |       |
| Operating Conditions: |    |                |       |
| PFD, PID No. :        |    | Date           |       |

| Guide Word | Deviation           | Causes | Consequences | Unmitigated Risk Assessment |   |   | Major Accident Event<br>(Y/N) | Existing Safeguards | Mitigated Risk Assessment Matrix |   |   | Action No | Recommendations | Action by          |
|------------|---------------------|--------|--------------|-----------------------------|---|---|-------------------------------|---------------------|----------------------------------|---|---|-----------|-----------------|--------------------|
|            |                     |        |              | S                           | L | R |                               |                     | S                                | L | R |           |                 |                    |
| Flow       | 1.4 Reverse Flow    | c1     |              | 4                           | 3 | H |                               | 5400                | 3                                | 3 | M |           | r1              | TOP CMDP-Jaruwat P |
| Flow       | 1.5 MisdirectedFlow | c2     |              | 4                           | 2 | M |                               | 5400                | 3                                | 2 | L |           | r2              | TOP CMDP-Jaruwat P |
| Flow       | 1.3 Less/Low Flow   | c3     |              |                             |   |   |                               |                     |                                  |   |   |           |                 | TOP CMDP-Jaruwat P |
| Flow       | 1.1 No Flow         | c4     |              |                             |   |   |                               |                     |                                  |   |   |           |                 | TOP CMDP-Jaruwat P |
| Flow       | 1.2 More/HighFlow   | c5     |              |                             |   |   |                               |                     |                                  |   |   |           |                 | TOP CMDP-Jaruwat P |
| Pressure   | 2.2 Less/Low Pressu | c6     |              |                             |   |   |                               |                     |                                  |   |   |           |                 | TOP CMDP-Jaruwat P |
| Pressure   | 2.1 More/High Press | c7     |              |                             |   |   |                               |                     |                                  |   |   |           |                 | TOP CMDP-Jaruwat P |
|            |                     |        |              |                             |   |   |                               |                     |                                  |   |   |           |                 |                    |

Note:

HAZOP STUDY WORKSHEET



|                       |    |                |       |
|-----------------------|----|----------------|-------|
| Project:              | t2 | NODE           | node1 |
| Design Intent :       |    | System         |       |
| Design Conditions:    |    | HAZOP Boundary |       |
| Operating Conditions: |    |                |       |
| PFD, PID No. :        |    | Date           |       |

| Guide Word | Deviation           | Causes | Consequences | Unmitigated Risk Assessment |   |   | Major Accident Event<br>(Y/N) | Existing Safeguards | Mitigated Risk Assessment Matrix |   |   | Action No | Recommendations | Action by        |
|------------|---------------------|--------|--------------|-----------------------------|---|---|-------------------------------|---------------------|----------------------------------|---|---|-----------|-----------------|------------------|
|            |                     |        |              | S                           | L | R |                               |                     | S                                | L | R |           |                 |                  |
| Flow       | 1.4 Reverse Flow    | x1     |              | 4                           | 4 | H | Y                             | ex1                 | 4                                | 3 | H |           | r1              | Dungrat (TOP-XX) |
| Flow       | 1.5 MisdirectedFlow | x2     | c1           |                             |   |   |                               | 41                  |                                  |   |   |           | r2              | Dungrat (TOP-XX) |
| Flow       | 1.3 Less/Low Flow   | x3     | c2           |                             |   |   |                               |                     |                                  |   |   |           |                 | Dungrat (TOP-XX) |
| Flow       | 1.1 No Flow         | x4     | c3           |                             |   |   |                               |                     |                                  |   |   |           |                 | Dungrat (TOP-XX) |
| Flow       | 1.2 More/HighFlow   | x5     | c4           |                             |   |   |                               |                     |                                  |   |   |           |                 | Dungrat (TOP-XX) |
| Pressure   | 2.2 Less/Low Pressu | x6     |              |                             |   |   |                               |                     |                                  |   |   |           |                 | Dungrat (TOP-XX) |
| Pressure   | 2.1 More/High Press | x7     |              |                             |   |   |                               |                     |                                  |   |   |           |                 | Dungrat (TOP-XX) |
|            |                     |        |              |                             |   |   |                               |                     |                                  |   |   |           |                 |                  |

Note: