



نگهداشت و افزایش تولید میدان نفتی بینک  
سطح الارض

احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک



شماره پیمان:

053 - 073 - 9184

#### CALCULATION NOTE FOR CONTROL VALVE SIZING

| نسخه | سریال | نوع مدرک | رشته | تسهیلات | صادرکننده | بسته کاری | پروژه |
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| D06  | 0006  | CN       | PR   | 120     | PEDCO     | GCS       | BK    |

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## طرح نگهداشت و افزایش تولید 27 مخزن

### CALCULATION NOTE FOR CONTROL VALVE SIZING

نگهداشت و افزایش تولید میدان نفتی بینک

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Status:

IDC: Inter-Discipline Check  
 IFC: Issued For Comment  
 IFA: Issued For Approval  
 AFD: Approved For Design  
 AFC: Approved For Construction  
 AFP: Approved For Purchase  
 AFQ: Approved For Quotation  
 IFI: Issued For Information  
 AB-R: As-Built for CLIENT Review  
 AB-A: As-Built -Approved



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| پروژه                                                                                     | بسته کاری                                                                                                                                                                                                                                                                                                                           | صادرکننده                                                                          | تسهیلات | رشته | نوع مدرک | سریال | نسخه |  |  |       |           |           |         |      |          |       |      |    |     |       |     |    |    |      |     |                     |
| BK                                                                                        | GCS                                                                                                                                                                                                                                                                                                                                 | PEDCO                                                                              | 120     | PR   | CN       | 0006  | D06  |  |  |       |           |           |         |      |          |       |      |    |     |       |     |    |    |      |     |                     |

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| BK                                                                                        | GCS                                                                                                                                                                                                                                                                                                                                 | PEDCO                                                                              | 120     | PR   | CN       | 0006  | D06  |  |  |       |           |           |         |      |          |       |      |    |     |       |     |    |    |      |     |                     |

## 1.0 INTRODUCTION

Binak oilfield in Bushehr province is a part of the southern oilfields of Iran, is located 20 km northwest of Genaveh city.

With the aim of increasing production of oil from Binak oilfield, an EPC/EPD Project has been defined by NIOC/NISOC and awarded to Petro Iran Development Company (PEDCO). Also PEDCO (as General Contractor) has assigned the EPC-packages of the Project to "Hirgan Energy - Design and Inspection" JV.

As a part of the Project, a New Gas Compressor Station (adjacent to existing Binak GCS) shall be constructed to gather of 15 MMSCFD (approx.) associated gases and compress & transfer them to Siahmakan GIS.

### GENERAL DEFINITION

The following terms shall be used in this document.

|                              |                                                                                                                    |
|------------------------------|--------------------------------------------------------------------------------------------------------------------|
| CLIENT:                      | National Iranian South Oilfields Company (NISOC)                                                                   |
| PROJECT:                     | Binak Oilfield Development – Surface Facilities; New Gas Compressor Station                                        |
| EPD/EPC CONTRACTOR (GC):     | Petro Iran Development Company (PEDCO)                                                                             |
| EPC CONTRACTOR:              | Joint Venture of : Hirgan Energy – Design & Inspection(D&I) Companies                                              |
| VENDOR:                      | The firm or person who will fabricate the equipment or material.                                                   |
| EXECUTOR:                    | Executor is the party which carries out all or part of construction and/or commissioning for the project.          |
| THIRD PARTY INSPECTOR (TPI): | The firm appointed by EPC CONTRACTOR and approved by GC & CLIENT (in writing) for the inspection of goods.         |
| SHALL:                       | Is used where a provision is mandatory.                                                                            |
| SHOULD:                      | Is used where a provision is advisory only.                                                                        |
| WILL:                        | Is normally used in connection with the action by CLIENT rather than by an EPC/EPD CONTRACTOR, supplier or VENDOR. |
| MAY:                         | Is used where a provision is completely discretionary.                                                             |

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| پروژه                                                                            | بسته کاری                                                                                                                                                                                                                                                                                                                           | صادرکننده                                                                          | تسهیلات | رشته | نوع مدرک | سریال | نسخه |  |  |       |           |           |         |      |          |       |      |    |     |       |     |    |    |      |     |                     |
| BK                                                                               | GCS                                                                                                                                                                                                                                                                                                                                 | PEDCO                                                                              | 120     | PR   | CN       | 0006  | D06  |  |  |       |           |           |         |      |          |       |      |    |     |       |     |    |    |      |     |                     |

## 2.0 SCOPE

The purpose of this document is to provide report for sizing of all control valves used in Gas Compressor station of Binak Plant.

## 3.0 NORMATIVE REFERENCES

### 3.1 Local Codes and Standard

|              |                                             |
|--------------|---------------------------------------------|
| IPS-E-IN-160 | Engineering Standard for Control Valves     |
| IPS-M-IN-160 | Material Standard for Control Valves        |
| IPS-E-PR-830 | Process design of valves and control valves |

### 3.2 International Codes and Standards

|            |                                                                             |
|------------|-----------------------------------------------------------------------------|
| API RP 553 | Refinery Valves and Accessories for Control and Safety Instrumented Systems |
|------------|-----------------------------------------------------------------------------|

### 3.3 The Project Documents

|                              |                            |
|------------------------------|----------------------------|
| BK-GCS-PEDCO-120-PR-PF-0001  | Process Flow Diagram (PFD) |
| BK-GNRL-PEDCO-000-PR-DB-0001 | Process Basis of Design    |
| BK-GNRL-PEDCO-000-PR-DC-0001 | Process Design Criteria    |

### 3.4 ENVIRONMENTAL DATA

Refer to "Process Basis of Design"; Doc. No. Process Basis of Design BK-00-HD-000-PR-DB-0001

### 3.5 Order of Precedence

In case of any conflict between the contents of this document or any discrepancy between this document and other project documents or reference standards, this issue must be reported to the CLIENT. The final decision in this situation will be made by CLIENT.

## 4.0 ABBREVIATIONS

|        |                                    |
|--------|------------------------------------|
| NISOC: | National Iranian South Oil Company |
| PFD:   | Process Flow Diagram               |
| P&ID:  | Piping and Instrumentation Diagram |

| <br>NISOC | <p>نگهداشت و افزایش تولید میدان نفتی بینک</p> <p>سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>                                                                                                                                                                                                                 |  |      |         |           |           |       |  |  |      |       |          |      |         |           |           |       |     |      |    |    |     |       |     |    |                    |
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| شماره پیمان:<br>053-073-9184                                                              | <table><tr><th colspan="8">CALCULATION NOTE FOR CONTROL VALVE SIZING</th></tr><tr><th>نسخه</th><th>سریال</th><th>نوع مدرک</th><th>رشته</th><th>تسهیلات</th><th>صادرکننده</th><th>بسته کاری</th><th>پروژه</th></tr><tr><td>D06</td><td>0006</td><td>CN</td><td>PR</td><td>120</td><td>PEDCO</td><td>GCS</td><td>BK</td></tr></table> | CALCULATION NOTE FOR CONTROL VALVE SIZING                                          |      |         |           |           |       |  |  | نسخه | سریال | نوع مدرک | رشته | تسهیلات | صادرکننده | بسته کاری | پروژه | D06 | 0006 | CN | PR | 120 | PEDCO | GCS | BK | شماره صفحه: 6 از 8 |
| CALCULATION NOTE FOR CONTROL VALVE SIZING                                                 |                                                                                                                                                                                                                                                                                                                                     |                                                                                    |      |         |           |           |       |  |  |      |       |          |      |         |           |           |       |     |      |    |    |     |       |     |    |                    |
| نسخه                                                                                      | سریال                                                                                                                                                                                                                                                                                                                               | نوع مدرک                                                                           | رشته | تسهیلات | صادرکننده | بسته کاری | پروژه |  |  |      |       |          |      |         |           |           |       |     |      |    |    |     |       |     |    |                    |
| D06                                                                                       | 0006                                                                                                                                                                                                                                                                                                                                | CN                                                                                 | PR   | 120     | PEDCO     | GCS       | BK    |  |  |      |       |          |      |         |           |           |       |     |      |    |    |     |       |     |    |                    |

## 5.0 CONTROL VALVE SIZING

### 5.1 Software

- The software using for sizing control valves is Fisher.

### 5.2 Case Study

Three cases have been considered for control valve sizing:

- Case 1: Minimum operating flow is equal to 30% of normal operating flow (the lowest flow rate between two case,( summer / winter) considered as normal flow).
- Case 2: Normal operating flow.
- Case 3: Maximum operating flow is equal to 110% of normal operating flow. (the highest flow rate between two case (summer / winter ) considered as normal flow).

Note: It should be noted that the special conditions, related to each control valve is taken into account.

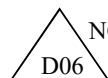
### 5.3 SIZING



The below table contains the details sizing for the control vales that installed in GCS.

| Table 5.1: Control Valve Sizing result |           |                |                        |                                 |                                   |                           |           |                      |                    |                                         |
|----------------------------------------|-----------|----------------|------------------------|---------------------------------|-----------------------------------|---------------------------|-----------|----------------------|--------------------|-----------------------------------------|
| NO                                     | LINE SIZE | Valve No.      | Normal Flow Rate Kg/hr | Normal Upstream Pressure (Barg) | Normal Downstream Pressure (Barg) | Calculated CV Min/Nor/Max | % Opening | Calculated SIZE (in) | Selected SIZE (in) | P&ID                                    |
| 1                                      | 6         | FCV-2101       | 6564.1                 | 6.5                             | 5.5                               | 28.427/95.156/104.857     | 39~65     | 4                    | 4                  | BK-GCS-PEDCO-120-PR-PI-0002             |
| 2                                      | 8         | FCV-2102       | 11269.0                | 6.5                             | 5.5                               | 51.333/170.869/188.064    | 33~63     | 6                    | 6                  | BK-GCS-PEDCO-120-PR-PI-0003             |
| 3                                      | 3         | FCV-2111       | 7158.0                 | 19.5                            | 18.5                              | 3.430/9.817/10.80         | 35~69     | 2                    | 2                  | BK-GCS-PEDCO-120-PR-PI-0004(2/2)        |
| 4                                      | 2         | LCV-2114       | 1017.8                 | 5.3                             | 1.0                               | 0.186/0.619/0.681         | 39~63     | 1                    | 1.5                | BK-GCS-PEDCO-120-PR-PI-0005             |
|                                        |           |                |                        |                                 |                                   | 0.186/0.619/0.681         | 16~19     | 1.5                  |                    |                                         |
| 5                                      | 4         | PCV-2135 A/B/C | 8664.0                 | 54.1                            | 0.5                               | 2.736/11.25/12.390        | 21~51     | 2                    | 3                  | BK-GCS-PEDCO-120-PR-PI-0011(1,2,3 OF 3) |
|                                        |           |                |                        |                                 |                                   | 2.231/10.406/11.447       | 11~51     | 3                    |                    |                                         |
| 6                                      | 6         | PCV-2151       | 17170.8                | 52.9                            | 51.9                              | 26.124/87.644/96.547      | 37~64     | 4                    | 4                  | BK-GCS-PEDCO-120-PR-PI-0013(1/3)        |
| 7                                      | 4         | PCV-2152       | 17170.8                | 52.9                            | 0.5                               | 6.084/20.848/22.988       | 36~67     | 2                    | 3                  | BK-GCS-PEDCO-120-PR-PI-0013(1/3)        |
|                                        |           |                |                        |                                 |                                   | 5.956/21.585/26.114       | 35~68     | 3                    |                    |                                         |
| 8                                      | 1.5       | PCV-2201       | 38.8                   | 9.0                             | 4.5                               | 0.077/0.255/0.281         | 43~65     | 1                    | 1                  | BK-GCS-PEDCO-120-PR-PI-0015(1/2)        |
| 9                                      | 2         | PCV-2211       | 38.6                   | 8.0                             | 7.5                               | 0.204/0.681/0.749         | 19~22     | 1.5                  | 1.5                | BK-GCS-PEDCO-120-PR-PI-0016(1/2)        |
|                                        |           |                |                        |                                 |                                   | 0.204/0.681/0.749         | 26~62     | 1                    |                    |                                         |
| 10                                     | 3         | PCV-2272       | 505.8                  | 5.1                             | 4.9                               | 5.206/17.423/19.182       | 41~78     | 2                    | 2                  | BK-GCS-PEDCO-120-PR-PI-0022             |
| 11                                     | 1         | PRV-2161       | 15.5                   | 0.05                            | 0.0                               | 0.500/2.513/3.267         | 24 ~ 66   | 1                    | 1                  | BK-GCS-PEDCO-120-PR-PI-0014             |
| 12                                     | 1         | PRV-2162       | 17.9                   | 7.5                             | 0.01                              | 0.048/0.139/0.180         | 29~54     | 1                    | 1                  | BK-GCS-PEDCO-120-PR-PI-0014             |
| 13                                     | 2         | PRV-2201       | 118.9                  | 9.0                             | 8.0                               | 0.427/1.426/1.856         | 19~63     | 1                    | 1.5                | BK-GCS-PEDCO-120-PR-PI-0015(2/2)        |
|                                        |           |                |                        |                                 |                                   | 0.427/1.425/1.853         | 25~52     | 1.5                  |                    |                                         |
| 14                                     | 1         | PRV-2291       | 4.5                    | 7.5                             | 0.01                              | 0.033/0.038/0.050         | 34~44     | 1                    | 1                  | BK-GCS-PEDCO-120-PR-PI-0025             |
| 15                                     | 1         | PRV-2292       | 4.3                    | 0.05                            | 0.00                              | 0.585/0.697/0.906         | 26~35     | 1                    | 1                  | BK-GCS-PEDCO-120-PR-PI-0025             |

NOTE 1:Control Valve Size Will Be Considered Based On Letter No. 02/2294/127226 (attachment no.2)



|                                                                                   |                                                                                                                  |                  |                  |                |             |                 |              |             |                                                                                    |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------|------------------|----------------|-------------|-----------------|--------------|-------------|------------------------------------------------------------------------------------|
|  | <p>نگهداشت و افزایش تولید میدان نفتی بینک<br/>سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p> |                  |                  |                |             |                 |              |             |  |
| <p>شماره پیمان:</p> <p>053 – 073 – 9184</p>                                       | <p>CALCULATION NOTE FOR CONTROL VALVE SIZING</p>                                                                 |                  |                  |                |             |                 |              |             | <p>شماره صفحه : 7 از 8</p>                                                         |
|                                                                                   | <p>پروژه</p>                                                                                                     | <p>بسته کاری</p> | <p>صادرکننده</p> | <p>تسهیلات</p> | <p>رشته</p> | <p>نوع مدرک</p> | <p>سریال</p> | <p>نسخه</p> |                                                                                    |
|                                                                                   | <p>BK</p>                                                                                                        | <p>GCS</p>       | <p>PEDCO</p>     | <p>120</p>     | <p>PR</p>   | <p>CN</p>       | <p>0006</p>  | <p>D06</p>  |                                                                                    |

NOTE 2: Control Valve Size Will Be Finalized By Vendor

| <br>NISOC | <p>نگهداشت و افزایش تولید میدان نفتی بینک</p> <p>سطح الارض</p> <p>احداث ردیف تراکم گاز در ایستگاه جمع آوری بینک</p>                                                                                                                                                                                                                 |  |      |         |           |           |       |  |  |      |       |          |      |         |           |           |       |     |      |    |    |     |       |     |    |                     |
|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------|---------|-----------|-----------|-------|--|--|------|-------|----------|------|---------|-----------|-----------|-------|-----|------|----|----|-----|-------|-----|----|---------------------|
| شماره پیمان:<br>053 - 073 - 9184                                                          | <table><tr><th colspan="8">CALCULATION NOTE FOR CONTROL VALVE SIZING</th></tr><tr><th>نسخه</th><th>سریال</th><th>نوع مدرک</th><th>رشته</th><th>تسهیلات</th><th>صادرکننده</th><th>بسته کاری</th><th>پروژه</th></tr><tr><td>D06</td><td>0006</td><td>CN</td><td>PR</td><td>120</td><td>PEDCO</td><td>GCS</td><td>BK</td></tr></table> | CALCULATION NOTE FOR CONTROL VALVE SIZING                                          |      |         |           |           |       |  |  | نسخه | سریال | نوع مدرک | رشته | تسهیلات | صادرکننده | بسته کاری | پروژه | D06 | 0006 | CN | PR | 120 | PEDCO | GCS | BK | شماره صفحه : 8 از 8 |
| CALCULATION NOTE FOR CONTROL VALVE SIZING                                                 |                                                                                                                                                                                                                                                                                                                                     |                                                                                    |      |         |           |           |       |  |  |      |       |          |      |         |           |           |       |     |      |    |    |     |       |     |    |                     |
| نسخه                                                                                      | سریال                                                                                                                                                                                                                                                                                                                               | نوع مدرک                                                                           | رشته | تسهیلات | صادرکننده | بسته کاری | پروژه |  |  |      |       |          |      |         |           |           |       |     |      |    |    |     |       |     |    |                     |
| D06                                                                                       | 0006                                                                                                                                                                                                                                                                                                                                | CN                                                                                 | PR   | 120     | PEDCO     | GCS       | BK    |  |  |      |       |          |      |         |           |           |       |     |      |    |    |     |       |     |    |                     |

#### 5.4 DETAILS OF CALCULATION RESULT



# ATTACHMENT 1

(SOFTWARE RESULT)

# ATTACH MENT2

Letter No. 02/2294/127226