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| **طرح نگهداشت و افزایش تولید 27 مخزن** | | | | | | |
| **MTO FOR EARTHING & LIGHTNING SYSTEMS**  **نگهداشت و افزایش تولید میدان نفتی بینک** | | | | | | |
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| D00 | Oct. 2022 | IFI | H.Shakiba | M.Fakharian | M.Mehrshad |  |
| **Rev.** | **Date** | **Purpose of Issue/Status** | **Prepared by:** | **Checked by:** | **Approved by:** | **CLIENT Approval** |
| **Class:3** | | **CLIENT Doc. Number: F8Z-709073** | | | | |
| **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** | | | | | |

**REVISION RECORD SHEET**

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| **PAGE** | **D00** | **D01** | **D02** | **D03** | **D04** |  | **PAGE** | **D00** | **D01** | **D02** | **D03** | **D04** |
| **1** | X |  |  |  |  | **51** |  |  |  |  |  |
| **2** | X |  |  |  |  | **52** |  |  |  |  |  |
| **3** | X |  |  |  |  | **53** |  |  |  |  |  |
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| **6** | X |  |  |  |  | **56** |  |  |  |  |  |
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**Bill of Material**

| **Overall Earthing System (BK-GCS-PEDCO-120-EL-PY-0001)** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Item** | **Description** | **Unit** | **Earthing** | **Lightning** | **Spare** | **Total** |
|  | Bare Round Earthing Copper Conductor 70 mm2 | m | 960 | 0 | 40 | **1000** |
|  | Bare Round Earthing Copper Conductor 240 mm2 | m | 275 | 0 | 25 | **300** |
|  | Earthing Copper Wire, G/Y PVC Insulated 16 mm2 | m | 1110 | 0 | 4090 | **1200** |
|  | Earthing Copper Wire, G/Y PVC Insulated 35 mm2 | m | 755 | 0 | 45 | **800** |
|  | Earthing Copper Wire, G/Y PVC Insulated 70 mm2 | m | 555 | 0 | 45 | **600** |
|  | Earthing Copper Wire, G/Y PVC Insulated 300 mm2 | m | 30 | 0 | 20 | **50** |
|  | Stainless Steel 316L/Copper Earthing Rod with 19 mm Diameter and 2x1.5 m Length (One End Sharp, One End Flat) With All Accessories. | Set. | 4 | 0 | 1 | **5** |
|  | Stainless Steel 316L /Copper Earthing Rod with 19 mm Diameter and 2x1.5m Length (One End Sharp, One End Flat) With All Accessories. &Test Earth Pit | Set. | 6 | 0 | 0 | **6** |
|  | Copper Clamp for Connecting Round Conductor Size of 70 mm2 to Earth Rod | No | 7 | 0 | 1 | **8** |
|  | Copper Clamp for Connecting Round Conductor Size of 300 mm2 to Earth Rod | No. | 3 | 0 | 1 | **4** |
|  | Tinned Copper Earth Bar with disconnect link on both end with 10 Holes, HDG Fixing Base , "Ω" Base, | Set. | 11 | 0 | 1 | **12** |
|  | Crimp Type Earthing Terminal Lug 300 mm2, Tinned Copper Type (With Suitable Bolt & Nut With 1-Spring,2-Flat Washers, Size M12, tin plated or bronze) | No. | 3 | 0 | 2 | **10** |
|  | Crimp Type Earthing Terminal Lug 240 mm2, Tinned Copper Type (With Suitable Bolt & Nut With 1-Spring,2-Flat Washers, Size M12, tin plated or bronze) | No. | 8 | 0 | 2 | **10** |
|  | Crimp Type Earthing Terminal Lug 70 mm2, Tinned Copper Type (With Suitable Bolt & Nut With 1-Spring,2-Flat Washers, Size M12, tin plated or bronze | No. | 31 | 0 | 4 | **35** |
|  | Crimp Type Earthing Terminal Lug 35 mm2, Tinned Copper Type (With Suitable Bolt & Nut With 1-Spring,2-Flat Washers, Size M12, tin plated or bronze | No. | 41 | 0 | 4 | **45** |
|  | Crimp Type Earthing Terminal Lug 16 mm2, Tinned Copper Type (With Suitable Bolt & Nut With 1-Spring,2-Flat Washers, Size M12, tin plated or bronze | No. | 48 | 0 | 2 | **50** |
|  | Exothermic Mould for T Connection 240/300/240 mm2 | Set. | 1 | 0 | 0 | **1** |
|  | Exothermic Mould for T Connection 240/240/240 mm2 | Set. | 1 | 0 | 0 | **1** |
|  | Exothermic Mould for T Connection240/70/240 mm2 | Set. | 2 | 0 | 0 | **2** |
|  | Exothermic Mould for T Connection240/35/240 mm2 | Set. | 1 | 0 | 0 | **1** |
|  | Exothermic Mould for T Connection240/16/240 mm2 | Set. | 1 | 0 | 0 | **1** |
|  | Exothermic Mould for T Connection70/70/70 mm2 | Set. | 5 | 0 | 0 | **5** |
|  | Exothermic Mould for T Connection70/35/70 mm2 | Set. | 4 | 0 | 0 | **4** |
|  | Exothermic Mould for T Connection70/16/70 mm2 | Set. | 4 | 0 | 0 | **4** |
|  | Exothermic Welding Powder Suitable for 3 Ways Connections240/300/240 including disc and starter | No. | 6 | 0 | 0 | **6** |
|  | Exothermic Welding Powder Suitable for 3 Ways Connections240/240/240 including disc and starter | No. | 4 | 0 | 0 | **4** |
|  | Exothermic Welding Powder Suitable for 3 Ways Connections 240/70/240 including disc and starter | No. | 17 | 0 | 1 | **18** |
|  | Exothermic Welding Powder Suitable for 3 Ways Connections 240/35/240 including disc and starter | No. | 6 | 0 | 0 | **6** |
|  | Exothermic Welding Powder Suitable for 3 Ways Connections 240/16/240 including disc and starter | No. | 2 | 0 | 0 | **2** |
|  | Exothermic Welding Powder Suitable for 3 Ways Connections 70/70/70 including disc and starter | No. | 34 | 0 | 1 | **35** |
|  | Exothermic Welding Powder Suitable for 3 Ways Connections 70/35/70 including disc and starter | No. | 30 | 0 | 1 | **31** |
|  | Exothermic Welding Powder Suitable for 3 Ways Connections 70/16/70 including disc and starter | No. | 32 | 0 | 1 | **32** |
|  | Installation tools kit for thermo weld connection comprising flint gun, glove, scraper & brush | Set | 1 | | 0 | **1** |

| **Earthing & Lightning Layout for Building & Shelter (BK-GCS-PEDCO-120-EL-PY-0002)** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Item** | **Description** | **Unit** | **Earthing** | **Lightning** | **Spare** | **Total** |
|  | Bare Round Earthing Copper Conductor 70 mm2 | m | 50 | 0 | 10 | **60** |
|  | Earthing Copper Wire, G/Y PVC Insulated 35 mm2 | m | 15 | 0 | 5 | **20** |
|  | Earthing Copper Wire, G/Y PVC Insulated 70 mm2 | m | 595 | 0 | 55 | **650** |
|  | Earthing Copper Wire, B/Y PVC Insulated 70 mm2 | m | 55 | 0 | 15 | **702** |
|  | Stainless Steel 316L/Copper Earthing Rod with 19 mm Diameter and 2x1.5 m Length (One End Sharp, One End Flat) With All Accessories. | Set. | 0 | 24 | 1 | **25** |
|  | Stainless Steel 316L/Copper Earthing Rod with 19 mm Diameter and 1 m Length (One End Sharp, One End Flat) With All Accessories. | Set. | 12 | 0 | 1 | **13** |
|  | Stainless Steel 316L/Copper Earthing Rod with 19 mm Diameter and 1 m Length (One End Sharp, One End Flat) With All Accessories & Test Pit | Set. | 2 | 0 | 0 | **2** |
|  | Stainless Steel 316L/Copper Earthing Rod with 19 mm Diameter and 2x1.5 m Length (One End Sharp, One End Flat) With All Accessories & Test Pit | Set. | 0 | 4 | 0 | **4** |
|  | Copper Clamp for Connecting Round Conductor Size of 70 mm2 to Earth Rod | No | 14 | 0 | 1 | **15** |
|  | Copper Clamp for Connecting Round Conductor Size of 70 mm2 to Earth Rod | No | 0 | 28 | 3 | **31** |
|  | Tinned Copper Earth Bar with disconnect link on both end with 10 Holes, HDG Fixing Base , "Ω" Base, | Set. | 6 | 0 | 1 | **7** |
|  | Crimp Type Earthing Terminal Lug 70 mm2, Tinned Copper Type (With Suitable Bolt & Nut With 1-Spring,2-Flat Washers, Size M12, tin plated or bronze | No. | 12 | 0 | 1 | **13** |
|  | Crimp Type Earthing Terminal Lug 35 mm2, Tinned Copper Type (With Suitable Bolt & Nut With 1-Spring,2-Flat Washers, Size M12, tin plated or bronze | No. | 1 | 0 | 1 | **2** |
|  | Exothermic Mould for T Connection70/70/70 mm2 | Set. | 3 | 6 | 1 | **10** |
|  | Exothermic Welding Powder Suitable for 3 Ways Connections 70/70/70 including disc and starter | No. | 19 | 34 | 2 | **55** |
|  | Copper nickel Chrome Coated Air Terminal Class I, 19mm Diameter, 0.6m Length with, with all accessories Thread | Set. | 0 | 19 | 1 | **20** |
|  | Air Terminal Saddle Suitable for 0.6m Air Terminal, also Suitable for Connecting 25x3 mm2 Flat tape to rod | Set. | 0 | 19 | 1 | **20** |
|  | Flat Copper Tape with 25 mm Width and 3 mm Thickness | m. | 0 | 461 | 39 | **500** |
|  | Clip Suitable for 25\*3 mm2 Flat Copper Tape fixing, with all accessories | No. | 0 | 233 | 17 | **250** |
|  | Test Link Suitable for 25\*3 mm2 Copper Tape and 70 mm2 Round Wire, with all accessories | Set. | 0 | 14 | 1 | **15** |
|  | Installation tools kit for thermo weld connection comprising flint gun, glove, scraper & brush | Set | 1 | | 1 | Set |

| **Earthing Layout for Desalting Unit (BK-GCS-PEDCO-120-EL-PY-0014)** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Item** | **Description** | **Unit** | **Earthing** | **Lightning** | **Spare** | **Total** |
|  | Earthing Copper Wire, G/Y PVC Insulated 70 mm2 | m | 50 | 0 | 0 | **50** |
|  | Tinned Copper Earth Bar with disconnect link on both end with 10 Holes, HDG Fixing Base , "Ω" Base, | Set. | 6 | 0 | 1 | **7** |
|  | Exothermic Welding Powder Suitable for 3 Ways Connections 70/70/70 including disc and starter | Set. | 1 | 0 | 0 | **1** |

| **Earthing Layout for Production Unit (BK-GCS-PEDCO-120-EL-PY-0015)** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Item** | **Description** | **Unit** | **Earthing** | **Lightning** | **Spare** | **Total** |
|  | Earthing Copper Wire, G/Y PVC Insulated 70 mm2 | m | 50 | 0 | 0 | **50** |
|  | Tinned Copper Earth Bar with disconnect link on both end with 10 Holes, HDG Fixing Base , "Ω" Base, | Set. | 6 | 0 | 1 | **7** |
|  | Exothermic Welding Powder Suitable for 3 Ways Connections 70/70/70 including disc and starter | Set. | 1 | 0 | 0 | **1** |

1. This document shall be Based on below references:

* Calculation Note for Earthing & Lightning System BK-GCS-PEDCO-120-EL-CN-0006
* Overall Earthing Layout BK-GCS-PEDCO-120-EL-PY-0001
* Earthing & Lightning Layout for Building & Shelter BK-GCS-PEDCO-120-EL-PY-0002
* Earthing Layout for Desalting Unit BK-GCS-PEDCO-120-EL-PY-0014
* Earthing Layout for Production Unit BK-GCS-PEDCO-120-EL-PY-0015