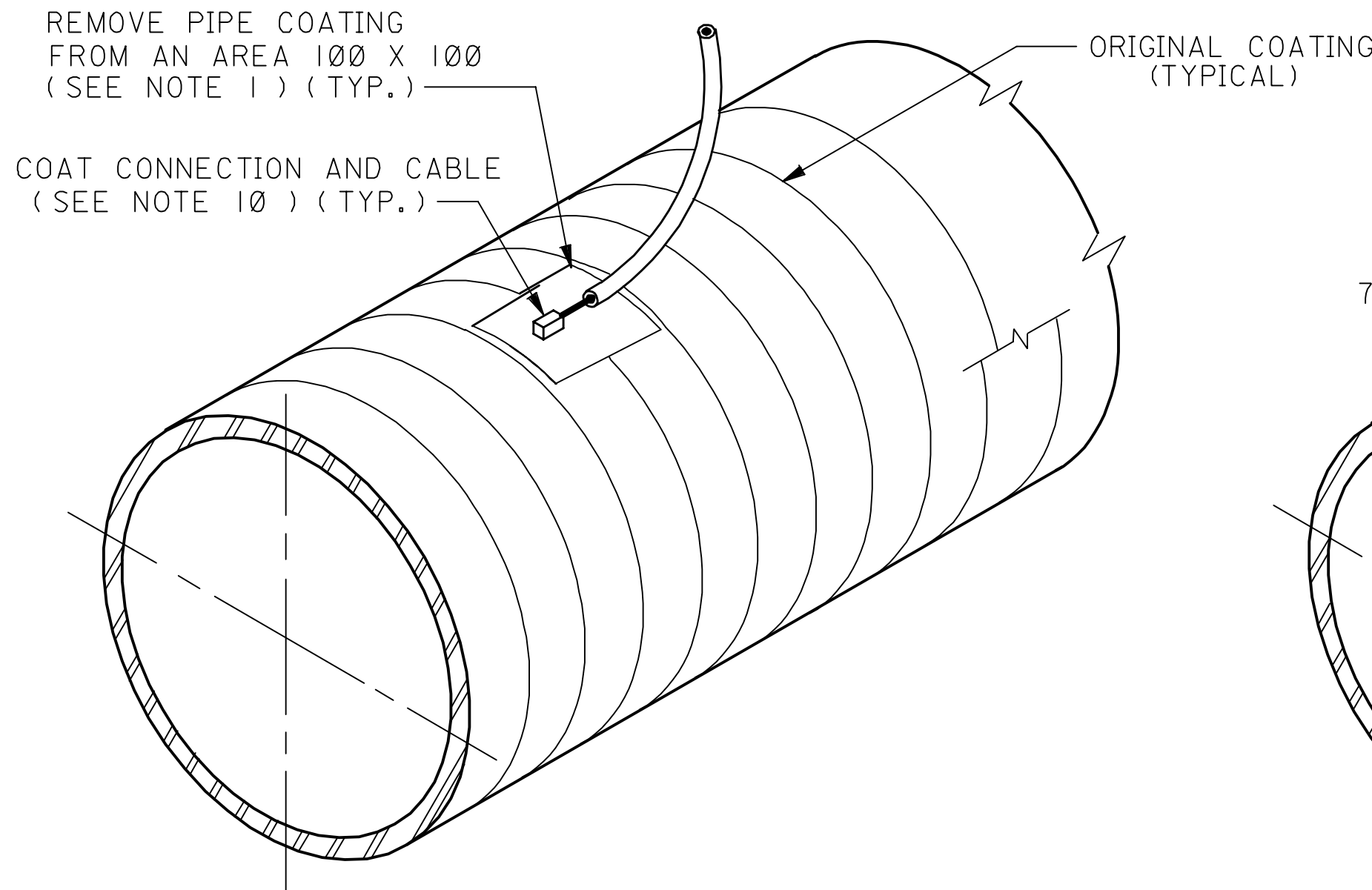
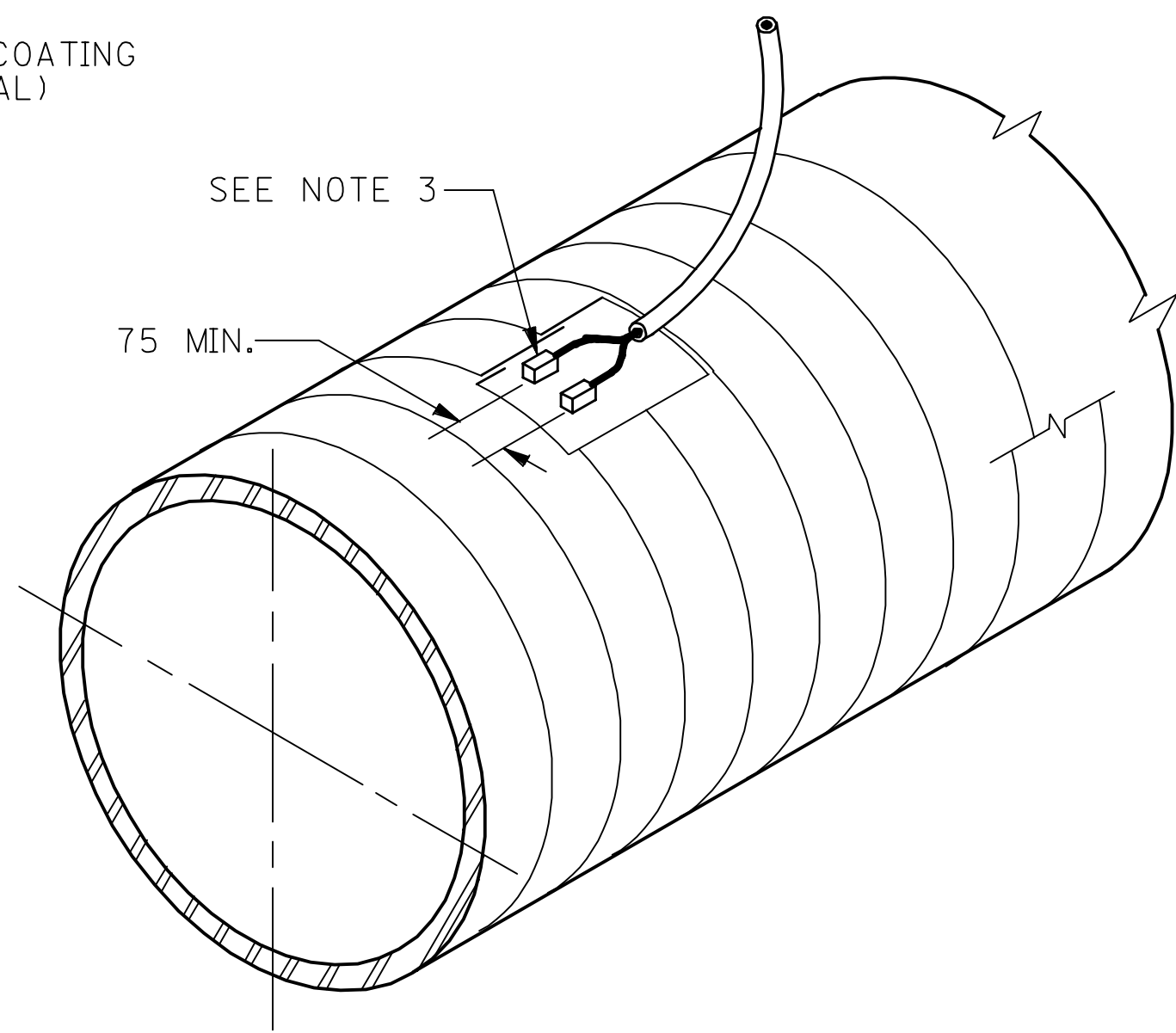


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| 01        | 100   | 1836381        | AB-036381 | X        | 066 |
| PLANT NO. | INDEX | DRAWING NUMBER | SHT. NO.  | REV. NO. |     |

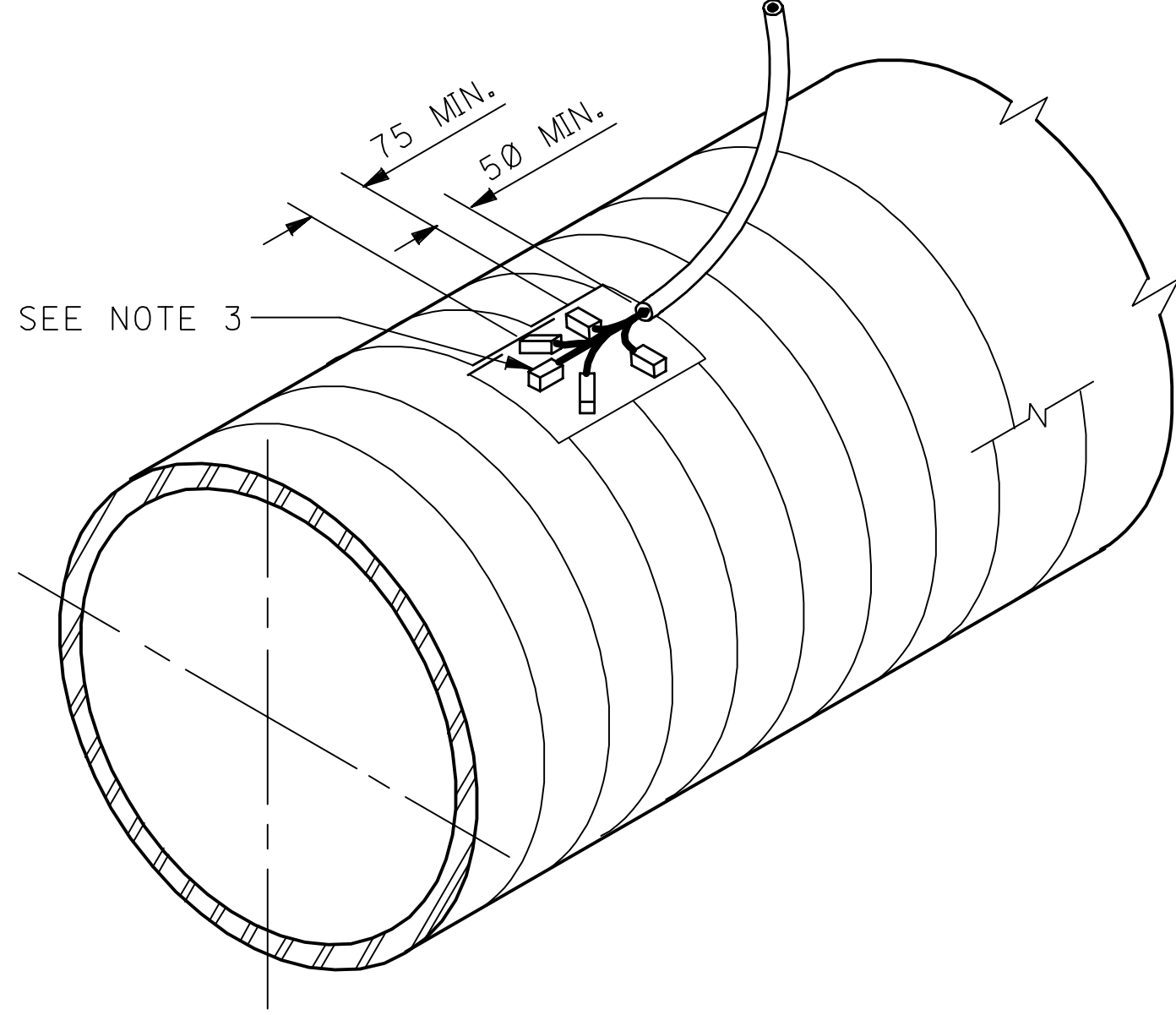
| INSTALLATION TABLE |     |                                 |                                                    |                            |
|--------------------|-----|---------------------------------|----------------------------------------------------|----------------------------|
| CABLE SIZE         |     | NO. OF STRANDS<br>(SEE NOTE 14) | NO. OF INSTALLATION GROUPS<br>PER CABLE CONNECTION | CABLE STRANDS<br>PER GROUP |
| mm <sup>2</sup>    | AWG |                                 |                                                    |                            |
| 10                 | 8   | 19                              | 1                                                  | 19                         |
| 16                 | 6   | 7                               | 1                                                  | 7                          |
|                    |     | 19                              |                                                    | 19                         |
| 25                 | 4   | 7                               | 2                                                  | 3-4                        |
|                    |     | 19                              |                                                    | 10-9                       |
| 35                 | 2   | 7                               | 3                                                  | 3-2-2                      |
|                    |     | 19                              |                                                    | 7-6-6                      |
| 50                 | 1/0 | 19                              | 4                                                  | 5-5-5-4                    |
|                    |     | 37                              |                                                    | 10-9-9-9                   |
| 70                 | 2/0 | 19                              | 5                                                  | 4-4-4-4-3                  |
|                    |     | 37                              |                                                    | 8-8-7-7-7                  |
| 120                | 4/0 | 19                              | 7                                                  | 3-3-3-3-3-2-2              |
|                    |     | 37                              | 8                                                  | 5-5-5-5-5-4-4-4            |



DETAIL 1  
TYPICAL CONNECTIONS OF NO.6 AWG (16mm<sup>2</sup>)  
CABLE AND SMALLER CABLES



DETAIL 2  
TYPICAL CONNECTIONS OF  
NO.4 AWG (25mm<sup>2</sup>) CABLE



DETAIL 3  
TYPICAL CONNECTIONS OF NO.2 AWG (35mm<sup>2</sup>)  
CABLE AND LARGER CABLES  
SEE ABOVE INSTALLATION TABLE  
FOR NUMBER OF INSTALLATION  
GROUPS PER CABLE CONNECTION

| LIST OF MATERIALS |            |                                                      |
|-------------------|------------|------------------------------------------------------|
| ITEM NO.          | SAP NOS.   | DESCRIPTION                                          |
| 1                 | 1000112646 | POWDER: WELD METAL; CADWELD; CA15; F-33; 20/BOX      |
| 2                 | 1000116831 | KIT: MAINTENANCE, TOOL, CADWELD                      |
| 3                 | 1000114762 | MOLD: HORIZONTAL; CABLE TO STEEL; 6-8 AWG TO 4" PIPE |
| 4                 | 1000114766 | MOLD: VERTICAL; CABLE TO STEEL; 6-8 AWG TO 4" PIPE   |
| 5                 | 1000405805 | COMPOUND, SEALING: WIRE & CABLE                      |
| 6                 | D/C        | PIN BRAZING EQUIPMENT                                |
|                   |            |                                                      |

- NOTES:**
- REMOVE PIPE COATING FROM AN AREA OF APPROXIMATELY 100 X 100 OR LARGER AS REQUIRED
  - CLEAN AREA OF PIPE APPROXIMATELY 50 X 50 FOR EACH CONNECTION, WIRE BRUSH AND FILE TO OBTAIN "SA3" WHITE METAL SURFACE PREPARATION QUALITY. (SWEDISH STANDARD SIS 055900, ADOPTED BY ASTM D2200).
  - STRIP CABLE END AND TWIST CONDUCTORS TO FIT MOLD OR BRAZING LUG. CABLE SIZES LARGER THAN #6 AWG (16mm<sup>2</sup>) SHALL BE FORKED BY TWISTING CONDUCTORS INTO GROUPS, APPROXIMATELY #6 AWG (16mm<sup>2</sup>) SIZE (SEE TABLE-1). THESE GROUPS SHALL THEN BE INDIVIDUALLY WELDED. MINIMUM SPACING BETWEEN WELDS SHALL BE NORMALLY 75mm.
  - TEST STRENGTH OF CONNECTION BY LIGHTLY TAPPING TOP OF WELD WITH A ONE POUND HAMMER. IF WELD FAILS AND MUST BE REPEATED, A NEW PIPE SURFACE MUST BE PREPARED AT LEAST 75mm FROM THE ORIGINAL WELD ATTEMPT. MORE THAN ONE WELD ATTEMPT ON THE SAME SPOT SHALL NOT BE PERMITTED.
  - REMOVE ALL WELD SLAG AND SPATTER, SHARP EDGES AND BURRS WITH METAL FILE & WIRE BRUSH.
  - WIPE PIPE SURFACE WITH CLEAN, OIL FREE RAGS TO REMOVE ANY LOOSE DUST AND ENSURE THE SURFACE IS DRY.
  - CADWELD CARTRIDGE CA15F33 SAP NUMBER 1000112646 SHALL BE USED FOR ALL CADWELD CONNECTIONS.
  - RESTRICTIONS ON WELDING CONTAINED IN SAEP-310 & SAEP-311 DO NOT APPLY WHEN CABLE CONNECTIONS ARE MADE ACCORDANCE WITH THIS DRAWING.
  - ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.
  - ALL THERMITE WELDS OR PIN BRAZING (ABOVE GROUND OR BELOW GROUND) TO ALL PIPELINES AND STRUCTURES ARE TO BE COATED PER THE APPLICABLE SAUDI ARAMCO PAINT AND COATING STANDARD.
  - PACK SEALING COMPOUND (ITEM 5) AROUND MOLD BASE TO PREVENT LEAKAGE OF MOLTEN METAL.
  - PIN TYPE BRAZING MAY BE USED AS AN ALTERNATIVE TO THERMITE WELDING. FOLLOW THE PIN BRAZING EQUIPMENT MANUFACTURER'S PROCEDURE WHEN MAKING THESE CONNECTIONS. FOLLOWING IS A BRIEF SUMMARY OF THE REQUIRED STEPS:
    - CRIMP WELDING LUG ON TO CABLE END.
    - PREPARE PIPE SURFACE PER THE MANUFACTURER'S PROCEDURE.
    - PREPARE BRAZING GUN & CONNECTION WITH BRAZING PIN & FERRULE PER THE MANUFACTURER'S PROCEDURE.
    - USE BRAZING GUN TO BRAZE THE LUG TO THE PIPE.
    - TEST, CLEAN & COAT CONNECTION PER NOTES 5, 6 AND 10.
  - DO NOT USE THERMITE WELDING OR PIN BRAZING FOR STAINLESS STEEL PIPING.
  - "NO. OF STRANDS" GIVEN IN THE TABLE ARE FOR GUIDANCE ONLY AND NOT AS SPECIFICATION FOR REQUIRED NUMBER OF STRANDS.
- REFERENCES TO ANY PARTICULAR MANUFACTURER BY NAME IN CONNECTION WITH ANY PRODUCT ARE INTENDED ONLY FOR PURPOSE OF EXAMPLE OR DESCRIPTION (I.E. TYPE, SPECIFICATION AND QUALITY) OF THAT PRODUCT AND ITEMS PURCHASED MAY BE OF ANY MANUFACTURER THAT MEETS TECHNICAL REQUIREMENTS.

| DRAWING RESPONSIBILITY:<br>CATHODIC PROTECTION & COATING COMMITTEE                                       |       |                                |                                                 |                                        |                 |                 |                 |
|----------------------------------------------------------------------------------------------------------|-------|--------------------------------|-------------------------------------------------|----------------------------------------|-----------------|-----------------|-----------------|
| 07                                                                                                       | FEB93 | ESSD<br>MAQ                    | REVISED LIST OF MATERIALS<br>AND ADDED NOTE 13. |                                        | ORIG.<br>SIGNED | ORIG.<br>SIGNED | ORIG.<br>SIGNED |
| 08                                                                                                       | SEP93 | ESSD<br>RCR                    | REVISED NOTE 7 AND ADDED<br>NOTES ON DETAIL 3.  |                                        |                 |                 |                 |
| 09                                                                                                       | OCT01 | MHJ                            | ADDED NOTE-14 AND DRAWING<br>RESPONSIBILITY     |                                        |                 |                 |                 |
| 10                                                                                                       | DEC06 | EKRD<br>MHJ                    | REVISED NOTES AND<br>LIST OF MATERIAL           |                                        |                 |                 |                 |
| REV.<br>NO.                                                                                              | DATE  | BY                             | JO/EWO                                          | DESCRIPTION                            | CHKD.           | CERT.           | APPD.           |
| SAUDI ARABIAN OIL COMPANY                                                                                |       |                                |                                                 |                                        |                 |                 |                 |
| DRAWN BY <u>M. NIAZI</u> CHECKED BY _____ SCALE <u>NONE</u>                                              |       |                                |                                                 |                                        |                 |                 |                 |
| DATE STARTED _____                                                                                       |       | DATE COMPLETED <u>06.08.78</u> |                                                 |                                        |                 |                 |                 |
| OPR'G. DEPT. _____                                                                                       |       | ENG. DEPT. _____               |                                                 |                                        |                 |                 |                 |
| APP'D FOR CONSTR. _____                                                                                  |       |                                |                                                 |                                        |                 |                 |                 |
| THIS DRAWING IS NOT TO BE USED FOR<br>CONSTRUCTION OR FOR ORDERING<br>MATERIAL UNTIL CERTIFIED AND DATED |       |                                |                                                 | CERTIFIED _____<br>BY _____ DATE _____ |                 |                 |                 |
| CATHODIC PROTECTION                                                                                      |       |                                |                                                 |                                        |                 |                 |                 |
| CABLE CONNECTIONS                                                                                        |       |                                |                                                 |                                        |                 |                 |                 |
| TO PIPELINES AND STRUCTURES                                                                              |       |                                |                                                 |                                        |                 |                 |                 |
| STD. DWG.                                                                                                |       |                                |                                                 | METRIC                                 |                 |                 |                 |
| PLANT NO.                                                                                                | INDEX | DRAWING NUMBER                 |                                                 |                                        | SHT. NO.        | REV. NO.        |                 |
| 990                                                                                                      | X     | AB-036381                      |                                                 |                                        | 001             | 10              |                 |