



| BILL OF MATERIAL (FOR ONE)   |                                     |   |                |                   |                     |                                  |  |  |  |
|--|-------------------------------------|---|----------------|-------------------|---------------------|----------------------------------|--|--|--|
| ITEM NO.   |                                     | DESCRIPTION   | ORDERED LENGTH | QUANTITY          | MATERIAL            | REMARKS                          |  |  |  |
| ECON.  | 1                                   | 3" I.P.S. x SCH. 80 PIPE MK-T1  | 20'-8"         | 42                | ASME SA-106 GR-B    | FINNED                           |  |  |  |
|  | 2                                   | do MK-T2  | 23'-9"         | 2                 | do                  | do                               |  |  |  |
|  | 3                                   | 3" I.P.S. x SCH. 80, S.R. 180° WELDING U-BEND   |                | 43                | ASTM A-234 WPB      |                                  |  |  |  |
|  | 4                                   | 3" I.P.S. x SCH. 40 PIPE MK-T3  | 23'-9"         | 4                 | ASTM A-106 GR-B     | FINNED                           |  |  |  |
|  | 5                                   | do MK-T4  | 20'-8"         | 8                 | ASTM A-213 T-11     | do                               |  |  |  |
|  | 6                                   | do MK-T5  | 20'-8"         | 4                 | ASTM A-213 T-22     | do                               |  |  |  |
|  | 7                                   | do  | 20'-8"         | 8                 | do                  |                                  |  |  |  |
|  | 8                                   | do  | 20'-8"         | 4                 | ASTM A-312, TP 304H |                                  |  |  |  |
|  | 9                                   | 3 1/2" O.D. x 0.219" M.W. TUBE  | 23'-9"         | 2                 | INCOLOY 800 GR. II  | *                                |  |  |  |
|  | 10                                  | do  | 24'-9"         | 2                 | do                  | *                                |  |  |  |
| H.C. COILS   | 11                                  | 2" I.P.S. x SCH. 80 PIPE  | 8'-0"          |                   | ASTM A-106 GR-B     | CUT 1" TO 1.5" O.D. ONLY TO SUIT |  |  |  |
|  | 12                                  | 2" BUTT WELDING ELBOW, 3" I.P.S. x SCH. 40 S.R. 180° WELDING U-BEND, 2" I.P.S. x SCH. 40 BRANCH |                | 4                 | ASTM A-105 G-2      |                                  |  |  |  |
|  | 13                                  | 3" I.P.S. x SCH. 40, S.R. 180° WELDING U-BEND   |                | 4                 | ASTM A-234 WPB      |                                  |  |  |  |
|  | 14                                  | do  |                | 8                 | ASTM A-234 WPB      |                                  |  |  |  |
|  | 15                                  | do  |                | 12                | ASTM A-213 T-11     |                                  |  |  |  |
|  | 16                                  | do  |                | 4                 | ASTM A-213 T-22     |                                  |  |  |  |
|  | 17                                  | 1 1/2" XXS LONG SOCKET WELD ELBOW   |                | 4                 | ASTM A-403 TP 304H  |                                  |  |  |  |
|  | 18                                  | 1 1/2" XXS LONG PIPE  | AS REQ'D       | 4                 | ASTM A-105          | FABRICATOR                       |  |  |  |
|  | 19                                  | 1 1/2" XXS LONG FLANGE WELD TO 1 1/2" I.D. AND COUNTER BORE 1 1/2" TO 1 5/8" I.D.               |                | 4                 | ASTM A-106 GR-B     | "                                |  |  |  |
|  | BILL OF SPARE PARTS - TOTAL FOR TWO |   |                |                   |                     |                                  |  |  |  |
| TWO - AS ITEM #3   |                                     | ONE - AS ITEM #7  |                | ONE - AS ITEM #13 |                     | ONE - AS ITEM #16                |  |  |  |
| ONE - AS ITEM #5   |                                     | ONE - AS " #8   |                | ONE - AS " #14    |                     | TWO - AS ITEM #2                 |  |  |  |
| ONE - AS ITEM #6   |                                     | ONE - AS " #10  |                | TWO - AS " #15    |                     | ONE - AS ITEM #4                 |  |  |  |
| * NOTE ON ITEM #9 & #10:<br>CHROME-NICKEL IRON TUBE PER ASME CODE CASE 1325-G AND APPLICABLE PORTION OF SB 401   |                                     |   |                |                   |                     |                                  |  |  |  |
| ECONOMIZER COIL  |                                     |   |                |                   |                     |                                  |  |  |  |
| 1. ALL PRESSURE PARTS ARE DESIGNED IN ACCORDANCE WITH ASME POWER BOILER CODE SECTION I, 1971 EDITION.  |                                     |   |                |                   |                     |                                  |  |  |  |
| 2. STAMPING AND CERTIFICATION NOT REQUIRED   |                                     |   |                |                   |                     |                                  |  |  |  |
| 3. COIL SHALL BE SHOP HYDROSTATICALLY TESTED TO 2575 PSIG  |                                     |   |                |                   |                     |                                  |  |  |  |
| 4. PRESSURE PARTS TO BE FABRICATED & INSPECTED IN ACCORDANCE WITH ASME POWER BOILER CODE SECTION I, 1971 EDITION, PETRO CHEM. SPEC. TD-S & M-7, REV. 9, DATED 4/1/73 & PETRO CHEM. SPEC. ASME BOILER CODE FABRICATION SUPPLEMENTARY INSTRUCTIONS, DATED 4/1/73. WHERE CONFLICTS OCCUR, THE REQUIREMENTS OF THE ASME CODE SHALL GOVERN. |                                     |   |                |                   |                     |                                  |  |  |  |
| 5. RADIOGRAPHY NOT REQUIRED  |                                     |   |                |                   |                     |                                  |  |  |  |
| 6. SEE GENERAL NOTES   |                                     |   |                |                   |                     |                                  |  |  |  |
| H.C. COILS AND CROSS-OVERS   |                                     |   |                |                   |                     |                                  |  |  |  |
| 1. ALL PRESSURE PARTS ARE DESIGNED IN ACCORDANCE WITH API-RP-530   |                                     |   |                |                   |                     |                                  |  |  |  |
| 2. COILS SHALL BE SHOP AND FIELD HYDROSTATICALLY TESTED TO 925 PSIG (FIELD TEST AFTER CROSS-OVER TUBES ARE WELDED IN PLACE)  |                                     |   |                |                   |                     |                                  |  |  |  |
| 3. FABRICATION, INSPECTION & TESTING SHALL BE IN ACCORDANCE WITH ANSI-B31.3 AND PETRO CHEM SPECIFICATION TD-S & M-7, DATED 4/1/73  |                                     |   |                |                   |                     |                                  |  |  |  |
| 4. STRESS RELIEVING REQUIRED FOR ALL CHROME-MOLY WELDS AND WELDS MADE OF CHROME-MOLY AND DISSIMILAR MATERIALS.   |                                     |   |                |                   |                     |                                  |  |  |  |
| 5. THE FOLLOWING TESTS SHALL BE MADE AND THE ACCEPTABILITY OF WELDS, THE EXAMINATION PROCEDURE AND INTERPRETATION OF RESULTS SHALL CONFORM TO ANSI-B31.3   |                                     |   |                |                   |                     |                                  |  |  |  |
| (a) 10% OF GIRTH WELDS OF EACH SIZE SHALL BE INSPECTED BY 100% RADIOGRAPHY, 3 SHOTS PER WELD. REMAINDER OF WELDS WITH ONE SHOT PER WELD.   |                                     |   |                |                   |                     |                                  |  |  |  |
| (b) 100% OF NOZZLE WELDS OF EACH SIZE SHALL BE INSPECTED BY MAGNETIC PARTICLE METHOD. EXCEPT LIQUID DYE PENETRANT SHALL BE USED FOR STAINLESS STEEL MATERIAL   |                                     |   |                |                   |                     |                                  |  |  |  |
| 6. (c) 75% OF ALL CHROME-MOLY WELDS SHALL HAVE A HARDNESS TEST PERFORMED AFTER STRESS RELIEVING. POSTHEAT TREATMENT TEMPERATURES SHALL BE CHECKED BY USE OF THERMOCOUPLES AND TEMPERATURE RECORDERS.   |                                     |   |                |                   |                     |                                  |  |  |  |
| 7. SEE GENERAL NOTES.  |                                     |   |                |                   |                     |                                  |  |  |  |
| STONE & WEBSTER ENG. CORP.   |                                     |   |                |                   |                     |                                  |  |  |  |
| for  |                                     |   |                |                   |                     |                                  |  |  |  |
| HEMIJSKA INDUSTRIJA "PANCEVO"  |                                     |   |                |                   |                     |                                  |  |  |  |
| PETROCHEMICAL COMPLEX  |                                     |   |                |                   |                     |                                  |  |  |  |
| PANCEVO YUGOSLAVIA   |                                     |   |                |                   |                     |                                  |  |  |  |
| ETHYLENE PLANT   |                                     |   |                |                   |                     |                                  |  |  |  |
| ETHANE CRACKING FURNACE  |                                     |   |                |                   |                     |                                  |  |  |  |
| S & W JOB No: 12205.01 AREA No: 14   |                                     |   |                |                   |                     |                                  |  |  |  |
| COST CODE No: F1 ITEM No: F2A F2B  |                                     |   |                |                   |                     |                                  |  |  |  |
| MATERIAL SHOWN FOR ONE UNIT (2) REQD   |                                     |   |                |                   |                     |                                  |  |  |  |
| PETRO-CHEM DEVELOPMENT Co., Inc.   |                                     |   |                |                   |                     |                                  |  |  |  |
| 122 EAST 42 STREET NEW YORK, N.Y.  |                                     |   |                |                   |                     |                                  |  |  |  |
| F2A2B 4E ISO-FLOW FURNACE  |                                     |   |                |                   |                     |                                  |  |  |  |
| CONVECTION COIL DETAILS  |                                     |   |                |                   |                     |                                  |  |  |  |
| DWG. NO. 73-F-1167-6   |                                     |   |                |                   |                     |                                  |  |  |  |