

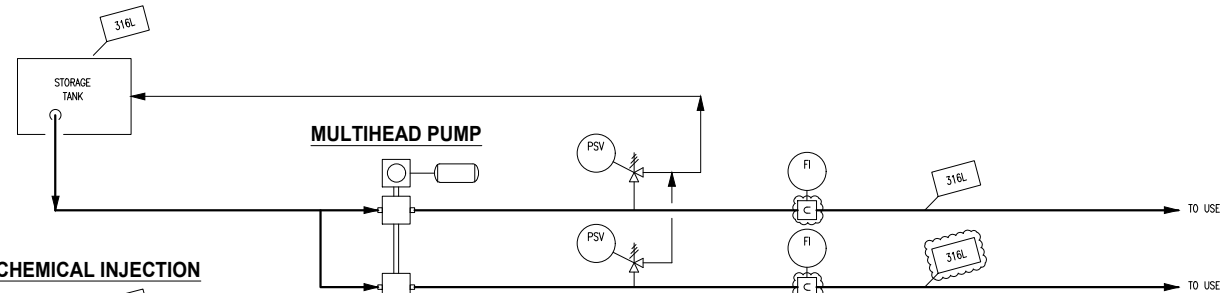
**COMMON CHEMICALS**

| CHEMICAL  | USER                                 | STORAGE TANK      | TANK VOLUME          | INJECTION PUMPS               | PUMP FLOWRATE  | PUMP DISCHARGE                        |        |
|---|--------------------------------------|-------------------|----------------------|-------------------------------|--|---------------------------------------|--------|
| UNITS   |                                      |                   | (m <sup>3</sup> )    |                               | (LPH)  | kPag                                  |        |
| GAS HYDRATE INHIBITOR (ETHANOL)                       | SUBSEA                               | ABJ-3335          | 30.0                 | PBE-3336A/B (2x100%) (NOTE 1) | 200/ HEAD 2800 (TOTAL)   | 25,115                                |        |
|   |                                      |                   |                      | PBE-3339A/B (2x100%)          | 200  | 25,599                                |        |
|   | TOPSIDES                             |                   |                      | PBE-3338A/B (2x100%)          | 200  | 4,700                                 |        |
| GAS HYDRATE INHIBITOR (MEG)                           | SUBSEA                               | ABJ-3315          | 20.0                 | PBE-3337A/B (2x100%)          | 200  | 12,700                                |        |
|   |                                      |                   |                      | PBE-3316A/B (2x100%)          | 5,000  | 25,599                                |        |
|   | TOPSIDES                             |                   |                      | PBE-3317A/B (2x100%)          | 200  | 4,700                                 |        |
| DEMULSIFIER   | TOPSIDE                              | (NOTE 2)          |                      | PBE-3332A/B (2x100%)          | HEAD1-126.4<br>HEAD2-17.7<br>HEAD3-126.2   | 2,600                                 |        |
|   | SUBSEA                               | ABJ-3330 (NOTE 2) | 33.0                 | PBE-3331A/B (2x100%) (NOTE 1) | 17/ HEAD 238 (TOTAL)   | 25,115                                |        |
|   | SCALE INHIBITOR                      | SUBSEA            | ABJ-3365 (NOTE 6)    | 15.0                          | PBE-3366A/B (2x100%) (NOTE 1)  | 8.3/ HEAD 116.2 (TOTAL)               | 25,115 |
| SCALE INHIBITOR                                       | TOPSIDES                             | ABJ-3370          | 8.0                  | PBE-3371A/B (2x100%) (NOTE 5) | HEAD1-14.0<br>HEAD2-2.3<br>HEAD3-58.3<br>HEAD4-8.0<br>HEAD5-56.2<br>HEAD6-53.6<br>HEAD7-8.0<br>HEAD8-13.6<br>HEAD9-2.1 | 2,600                                 |        |
|   | OIL DEFOAMER                         | TOPSIDES          | ABJ-3350             | 14.0                          | PBE-3351A/B (2x100%) (NOTE 4)  | HEAD1-101<br>HEAD2-14.1<br>HEAD3-99.7 | 2,600  |
|   | H <sub>2</sub> S SCAVENGER           | SUBSEA            | ABJ-3340A/B (NOTE 6) | 30.0/ TANK<br>60.0 (TOTAL)    | PBE-3341A/B (2x100%) (NOTE 1)  | 42/ HEAD 588 (TOTAL)                  | 25,115 |
| GAS CORROSION INHIBITOR                               | TOPSIDES (EXPORT PIPELINE)           | ABJ-3380          | 2.0                  | PBE-3381A/B (2x100%)          | 2.2  | 12,367                                |        |
| SCALE INHIBITOR (SRU)                                 | TOPSIDES                             | ABJ-3375          | 6.0                  | PBE-3376A/B (2x100%)          | 21   | 1,060                                 |        |
| POLYELECTROLYTE (INVERTED EMULSION INHIBITOR)         | TOPSIDES                             | ABJ-3360          | 8.0                  | PBE-3361A/B (2x100%) (NOTE 3) | HEAD1-58<br>HEAD2-1.180 DILUTION WATER   | 1,443                                 |        |
| OXYGEN SCAVENGER                                      | TOPSIDES                             | ABJ-3355          | 6.0                  | PBE-3356A/B (2x100%)          | 31   | 1,200                                 |        |
|   |                                      |                   |                      | PBE-3357A/B (2x100%)          | 314  | 1,200                                 |        |
|   |                                      |                   |                      | PBE-3362 (1x100%)             | 314  | 2,200                                 |        |
| SHOCK BIOCIDES (SRU)                                  | TOPSIDES                             | ABJ-3310          | 4.0                  | PBE-3311A/B (2x100%)          | 2108   | 1,060                                 |        |
| H <sub>2</sub> S SCAVENGER                            | MARINE CARGO OFFLOADING PUMP SUCTION | ABJ-3385          | 10                   | PBE-3386 A/B (2x100%)         | 1,000  | 810                                   |        |
| BIOCIDES (SLOP TANK AND OFF-SPEC TANK)                | MARINE                               | ABJ-3345          | 2.0                  | PBE-3346A/B (2x100%)          | 1,000  | 2,600                                 |        |
| SPARE CHEMICAL  | TOPSIDES / MARINE                    | ABJ-3395          | 3.0                  | PBE-3396 (1x100%)             | 100  | 2,600                                 |        |
|   | SUBSEA                               |                   |                      | PBE-3397 (1x100%)             | 5,000  | 25,115                                |        |
| POLYELECTROLYTE (SRU)                                 | TOPSIDES                             | ABJ-3390          | 2.0                  | PBE-3391A/B (2x100%)          | 5.1  | 1,060                                 |        |
| COOLING MEDIUM HEATING MEDIUM CHEMICAL INJECTION PUMP | TOPSIDES                             | -                 | -                    | PBE-3398 (1x100%)             | 50   | 1,600                                 |        |
| OXYGEN SCAVENGER                                      | MARINE                               | -                 | -                    | PBE-3326 (1x100%)             | 50   | 700                                   |        |
| AMINE CHEMICAL  | TOPSIDES                             | ABJ-3377          | 3.0                  | PBE-3378 (1x100%)             | 1000   | 900                                   |        |
| AMINE ANTIFOAM  | TOPSIDES                             | ABJ-3305          | 1.5                  | PBE-3306A/B (2x100%)          | 4.0  | 700                                   |        |
| CHLORINE SCAVENGER                                    | TOPSIDES                             | ABJ-3359          | 6.0                  | PBE-3358A/B (2x100%)          | 42   | 1,060                                 |        |
| WATER INJECTION SHOCK BIOCIDES THPS                   | TOPSIDES                             | ABJ-3320          | 4.0                  | PBE-3321A/B (2x100%)          | 1572   | 20,700                                |        |
| BIOFOULING DISPENSER (HYPOCHLORITE)                   | TOPSIDES                             | ABJ-3325          | 5.0                  | PBE-3327A/B (2x100%)          | 31.4   | 20,700                                |        |
|   | TOPSIDES                             | ABJ-3307          | 3.0                  | PBE-3306A/B (2x100%)          | 233.2  | 1,361                                 |        |

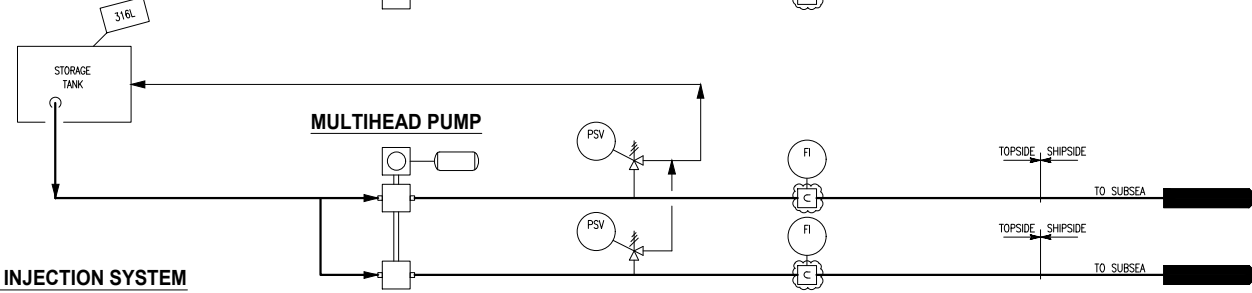
- NOTES:
- MULTI-HEAD TYPE PUMPS WITH 14 HEADS.
  - ABJ-3330 CAN BE USED AS FOR BOTH SUBSEA AND TOPSIDES INJECTION.
  - MULTI-HEAD TYPE PUMPS WITH 2 HEADS ONE FOR WATER AND OTHER FOR POLYELECTROLYTE.
  - MULTI-HEAD TYPE PUMPS WITH 3 HEADS.
  - MULTI-HEAD TYPE PUMPS WITH 9 HEADS.
  - ONE OF H<sub>2</sub>S SCAVENGER TANKS CAN BE USED TO STORE SUBSEA SCALE INHIBITOR.

HOLDS: ~~DELETED~~

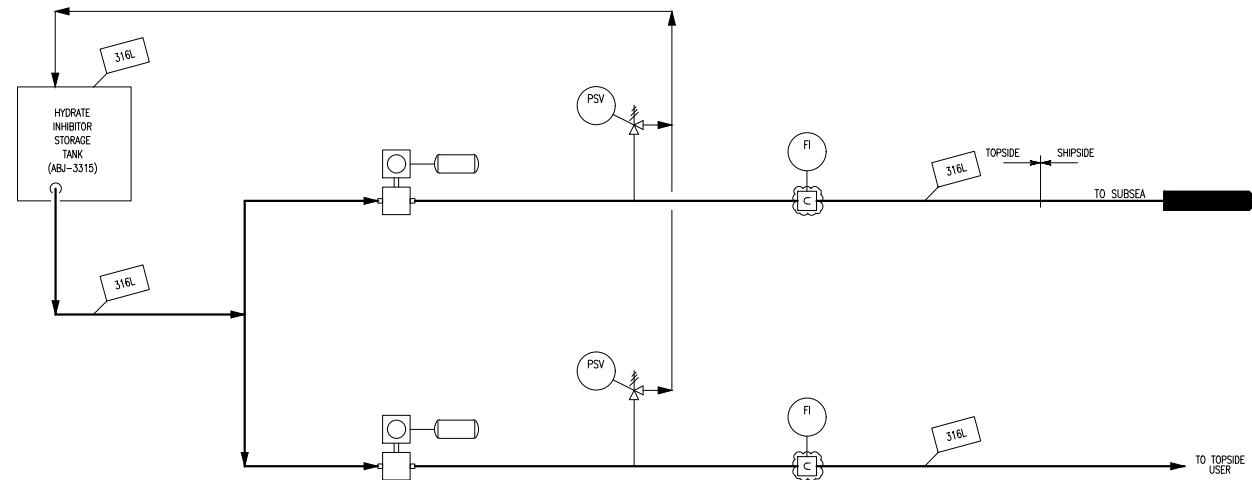
**1) TYPICAL FOR TOPSIDE CHEMICAL INJECTION**



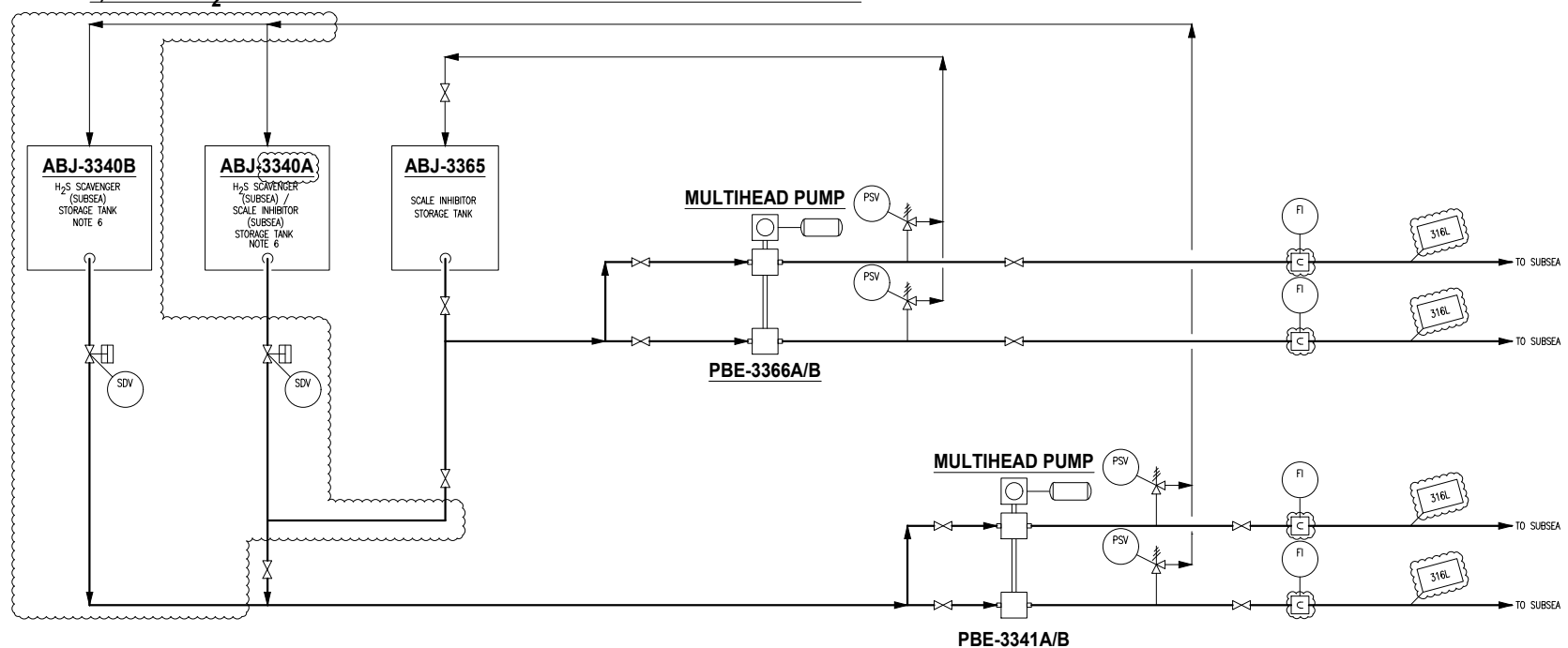
**2) TYPICAL FOR OTHER SUBSEA CHEMICAL INJECTION**



**3) HYDRATE INHIBITOR (SUBSEA) INJECTION SYSTEM**



**4) SUBSEA H<sub>2</sub>S SCAVENGER AND SCALE INHIBITOR INTEGRATION INJECTION SCHEME**



ISSUED FOR CONSTRUCTION  
25 AUGUST 2015

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| 0   | 25AUG15 | IFC                  | VPN  | LAL  | SVK | TJM |
| C1  | 13APR15 | REVISED - IFD        | VPN  | SAH  | SVK | TJM |
| C   | 19JAN15 | IFR                  | VPN  | SAH  | SVK | TJM |
| B4  | 04NOV14 | IFR                  | VPN  | KN   | MY  | TJM |

|  |                       |
|--|-----------------------|
| DRAWN BY: V. NUESTRO                         | DESIGNED BY: S. ANAND |
| DATE: 03 NOVEMBER 2014                       | SCALE: NONE           |
| MODEC DOC FILE: 0428-MI20-90DP-3029-01-0.dwg |                       |

PROJECT: FPSO Cidade de Campos dos Goytacazes MV29

TITLE: PROCESS / UTILITY FLOW DIAGRAM CHEMICAL INJECTION SYSTEM

MODEC DOCUMENT NUMBER: 0428-MI20-90DP-3029  
REV: 0