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***                                           ***
***                  O O C                    ***
***                                           ***
***       D I S C H A R G E    M O D E L      ***
***      -------------------------------      ***
***      MUD, CUTTINGS AND PRODUCED WATER     ***
***                                           ***
***              VERSION: 2.5                 ***
***            2 DECEMBER 1999                ***
***                                           ***
***            PRODUCTION VERSION             ***
***                                           ***
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***            (970) 259-3487                 ***
***                                           ***
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ERROR MESSAGES WILL BE WRITTEN TO A FILE NAMED 'OOCERROR'
INSTEAD OF APPEARING IN THIS OUTPUT LISTING.

Warranty Disclaimer

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A set of "Release and Installation Notes" and a report entitled "Offshore Operators Committee Mud and Produced Water Discharge Model - Report and User Guide" have been provided with this software. These documents provide information about the use of the OOC Model and about its purpose, capabilities, and limitations. The information in these documents and in the software itself is considered to be accurate as of December 1998. Users should consult these documents prior to using the OOC Model. Familiarity with this information may affect the user's ability to prepare input data and interpret model results.

```
**************************************************************************
1                                  INPUT DATA FILE
  LINE
   NO.  ----+----1----+----2----+----3----+----4----+----5----+----6----+----7--
--+----8

    0:  PW
    1:  EX048B.IN
    2:  Example produced water FPSO P48
    3:  Petrobras Campo de Caratinga

    0:  NOSQUEEZE

    0:  FULL

    0:  PVALL

    0:  SAVEDYN

    0:  GRID
    1:  34  91    ! 34 GRID SQUARES IN E-W AND 91 IN N-S DIRECTIONS
    2:  100.       ! 100 FT SIDES OF GRID SQUARE
    3:  CONSTANT  ! CONSTANT DEPTH OF 328. FEET = 100 m
    4:  328.

    0:  OUTPUT
    1:  0 0 1 1 10
    2:   20        ! 20 POINTS PER SPOT PROFILE
    3:   0          ! NO PLUME PROFILES
    4:  67         ! Request 67 spot profiles
    5:  625.0  2300.0  !specific spot profiles by global coordinates
    6:  725.0  2300.0
    7:  825.0  2300.0
    8:  925.0  2300.0
    9:  1025.0  2300.0
   10:  1125.0  2300.0
   11:  1225.0  2300.0
   12:  1325.0  2300.0
   13:  1425.0  2300.0
   14:  1525.0  2300.0
   15:  1625.0  2300.0
   16:  1725.0  2300.0
   17:  1825.0  2300.0
   18:  1925.0  2300.0
   19:  2025.0  2300.0
   20:  2125.0  2300.0
   21:  2225.0  2300.0
   22:  2325.0  2300.0
   23:  2425.0  2300.0
   24:  2525.0  2300.0
   25:  2625.0  2300.0
   26:  2725.0  2300.0
   27:  2825.0  2300.0
   28:  2925.0  2300.0
   29:  3025.0  2300.0
   30:  3125.0  2300.0
   31:  3225.0  2300.0
   32:  3325.0  2300.0
   33:  3425.0  2300.0
   34:  3525.0  2300.0
```

```
35:  3625.0  2300.0
36:  3725.0  2300.0
37:  3825.0  2300.0
38:  3925.0  2300.0
39:  4025.0  2300.0
40:  4125.0  2300.0
41:  4225.0  2300.0
42:  4325.0  2300.0
43:  4425.0  2300.0
44:  4525.0  2300.0
45:  4625.0  2300.0
46:  4725.0  2300.0
47:  4825.0  2300.0
48:  4925.0  2300.0
49:  5025.0  2300.0
50:  5125.0  2300.0
51:  5225.0  2300.0
52:  5325.0  2300.0
53:  5425.0  2300.0
54:  5525.0  2300.0
55:  5625.0  2300.0
56:  5725.0  2300.0
57:  5825.0  2300.0
58:  5925.0  2300.0
59:  6025.0  2300.0
60:  6125.0  2300.0
61:  6225.0  2300.0
62:  6325.0  2300.0
63:  6425.0  2300.0
64:  6525.0  2300.0
65:  6625.0  2300.0
66:  6725.0  2300.0
67:  6825.0  2300.0
68:  6925.0  2300.0
69:  7025.0  2300.0
70:  7125.0  2300.0
71:  7225.0  2300.0
72:   164  90  0  ! ASK FOR RADIUS PROFILES AT 50 M
73:   0
74:   0
75:  FLUID/TRACER   !ASK FOR RADIUS AND SPOT PROFILES AT 3600 S.
76:  SP
77:  3 3600.
78:  -1
79:  RA
80:  3 3600.
81:  -1
82:  LA
83:  3 3600.
84:  -1

 0:  DISCHARGE
 1:  13624.1,  0.42, 0.5, 90., 90. ! Vazão de 13624.1 bbl/h para 6 hs
 2:  625.    2300.                 ! XRIG AND ZRIG
 3:  21600.                      ! DURATION OF DISCHARGE (6 hs)
 4:  38.0  056.                 ! TEMPERATURE and SALINITY OF EFFLUENT
 5:  'oleo' 0.9041 2.0e-5 -1.66e-5  ! Dados sobre o óleo a traçar

 0:  AMBIENT
 1:      3    1
```

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    2:     -3
    3:     0.0   1.47  180.  !UNIFORM CURRENT
    4:  164.00   1.47  180.
    5:  328.00   1.47  180.
    6:      1   3
    7:      0.  25.13   36.69   ! TEMP AND SALINITY OF AMBIENT
    8:  164.00  23.33   36.71
    9:  328.00  21.04   36.48
   10:      1
   11:  6.5  6. 21.57 24.0

    0:  TIMESTEP
    1:  3600.              !

    0:  WAKE
    1:  1105.8 178.8 69. 551.2 0.1 0 0

    0:  TRACER
    1:  20.0 0.    !
    0:  END
    1:
        ----+----1----+----2----+----3----+----4----+----5----+----6----+----7--
--+----8
1

 ************************** PRODUCED WATER DISCHARGE
*************************

 EX048B.IN
 Example produced water FPSO P48
 Petrobras Campo de Caratinga


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1


================================================================================
                  D I S C H A R G E   S P E C I F I C A T I O N

================================================================================


 RATE (BBLPH, BBL/HR) ..........................................    13624.1
(    21.248 CUFT/SEC)
 DURATION (TJET, SECONDS) ......................................    21600.0


 DEPTH OF MOUTH OF DISCHARGE PIPE (DJET, FT) ...................        .5
 DISTANCE FROM NORTH BOUNDARY SOUTH TO DISCHARGE PT. (XRIG, FT) ...    625.0
 DISTANCE FROM WEST  BOUNDARY EAST  TO DISCHARGE PT. (ZRIG, FT) ...   2300.0


 RADIUS OF DISCHARGE PIPE (FT) .................................       .420
 ANGLE BELOW HORIZONTAL OF DISCHARGE PIPE (DEGREES) ............      90.0
 BEARING OF DISCHARGE PIPE (DEGREES FROM NORTH).................      90.0


 TEMPERATURE OF PRODUCED WATER (DEGREES C) .....................      38.00
 SALINITY OF PRODUCED WATER (PARTS/THOUSAND) ...................      56.00
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 DENSITY OF PRODUCED WATER + CONSTITUENTS (ROIM, GM/CM3) .........   1.0315921
(     8.609 LBS/GAL)


   -------------- CONSTITUENTS INCLUDED IN THE DISCHARGE --------------


                          DENSITY      CONCENTRATION    SETTLING VELOCITY
VELOCITY VARIATION LIMITS (FT/SEC)
    NO.   NAME....       (GM/CC)       (CUFT/CUFT)         (FT/SEC)
LOWER                UPPER

     1    OLEO            .9041        .2000E-04          -.1660E-04           -
.1162E-04           -.2158E-04
     2    FLUID          1.0316        1.000               .0000
   ---------------------------------------------------------------------


 CONCENTRATION OF TOTAL  SUSPENDED OIL   AT PIPE EXIT =    18.0819     MG/LITER.

 EXIT VELOCITY (FT/SEC) ..........................................      38.34



 ============================================
 MODEL WILL TRACK SOLUBLE TRACER IN DISCHARGE
 ============================================
 CONCENTRATION IN UNDILUTED DISCHARGE  (MG/LITER OF FILTRATE) .....   20.00
 BACKGROUND CONCENTRATION IN SEA WATER (MG/LITER OF FILTRATE) .....   .0000


 ================================================
 EFFECTS OF PLATFORM WAKE WILL BE ACCOUNTED FOR
 ================================================
 PLATFORM DIMENSIONS USED IN ESTIMATING WAKE EFFECTS:
     LENGTH (FT) ..............................   1105.80
     WIDTH (FT)  ..............................    178.80
     WORKING DRAFT (FT) .......................     69.00
     TYP. DIAMETER OF STRUCTURAL MEMBERS (FT)...   551.20
     TYP. SPACING OF STRUCTURAL MEMBERS (FT) ...      .10
 QUANTITIES USED FOR DEFINING WAKE ZONE:
     NO. OF B-V OSCILLATIONS (LENGTH) ..........     3.00
     MULTIPLE OF RIG DRAFT (DEPTH) .............     1.30
     CHARACTERISTIC RIG DIMENSION (FT) .........   642.30

================================================================================
1===============================================================================
=
        D E S C R I P T I O N    O F    R E C E I V I N G    W A T E R

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 CURRENTS:
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           BEGIN                 ----- VECTORS ------   --- COMPONENTS ----
 PROF.     TIME    PROF.   DEPTH    SPEED     DIRECTION       U          W
```

NO.	(SEC)	PT.	(FT)	(FT/SEC)	(DEGREES)	(FT/SEC)	(FT/SEC)
1	.0	1	.0	1.470	180.0	1.470	.000
		2	164.0	1.470	180.0	1.470	.000
		3	328.0	1.470	180.0	1.470	.000

NOTE: U VELOCITIES ARE POSITIVE SOUTH (+X-AXIS)
W VELOCITIES ARE POSITIVE EAST (+Z-AXIS)

DENSITY STRATIFICATION:

PROF. NO.	TIME (SEC)	PT. NO.	DEPTH (FT)	SALINITY (O/OO)	TEMPERATURE (DEG C)	SIGMA-T	DENSITY (GM/ML)
1	.0	1	.0	36.690	25.130	24.60182	1.02460182
		2	164.0	36.710	23.330	25.15642	1.02515642
		3	328.0	36.480	21.040	25.63076	1.02563076

SEA STATE:

NO.	TIME (SEC)	SIGNIFICANT WAVE H1/3 (FT)	SIGNIFICANT WAVE T1/3 (SEC)	--- SURFACE AIR --- SPEED (FT/SEC)	TEMPERATURE (DEG C)
1	.0	6.5	6.0	21.6	24.0

DISSIPATION PARAMETER FUNCTION FOR HORIZONTAL DISPERSION COEFFICIENT BASED ON ALAMDA = .00100

LENGTH SCALE (FT)	FRAC. OF ALAMDA	DISS. PARAM. FT 2/3 / SEC
.0	1.000	.00100
1000.0	.750	.00075
30000.0 +	.330	.00033

1----------
VERTICAL DISPERSION COEFFICIENTS:

PROF. NO.	TIME (SEC)	PT. NO.	DEPTH (FT)	COEFFICIENT (FT2/S)
1	.0	1	.0	.1408
		2	10.2	.9934E-01
		3	20.5	.7007E-01
		4	30.7	.4943E-01
		5	41.0	.3487E-01
		6	51.2	.2459E-01
		7	61.4	.1735E-01
		8	71.7	.1224E-01

```
                 9      81.9    .8631E-02
                10      92.2    .6491E-02
                11     164.0    .9940E-02
                12     323.0    .4191E-04
                13     328.0    .1000E-05

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1



================================================================================
                        G R I D   S P E C I F I C A T I O N

================================================================================

 GRID DIMENSIONS:
      NMAX .................    34 (EAST-WEST)
      MMAX .................    91 (NORTH-SOUTH)

 GRID CELL SIZE:
      DX (FT) ..............    100.0

 GRID DEPTH SUMMARY (FOR DEPTHS > 0):
      MINIMUM DEPTH (FT) ...    328.0
      AVERAGE DEPTH (FT) ...    328.0
      MAXIMUM DEPTH (FT) ...    328.0

 GRID IS CONSTANT DEPTH, IT WILL NOT BE PRINTED

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 RUN COMPLETED


            2 WARNING MESSAGE(S) ISSUED FOR THIS SIMULATION.
           THE WARNING MESSAGES IN FILE 'OOCERROR' SHOULD BE
           EXAMINED TO SEE IF THEY AFFECT VALIDITY OF RESULTS.
           (FILE 'OOCERROR' MAY HAVE BEEN RENAMED BY A
           SCRIPT OR BATCH FILE SUPERVISING MODEL EXECUTION.)

 TOTAL CPU TIME (SEC) =       1.92
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