A USER'S MANUAL FOR

"CAFE-1"

A TWO-DIMENSIONAL FINITE ELEMENT CIRCULATION MODEL

by

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ABSTRACT

A detailed user's manual for "CAFE-1", a two dimensional, depth-averaged finite element circulation model, is presented. A description of all input data requirements is given, as well as an explanation of printed, punched and file written output information. Two example problems are given. In the first, "CAFE-1" is used to calculate the solution of tide and wind induced flow in a rectangular estuary. In the second, wind induced flow is calculated in a rectangular lake. A flow chart is presented defining the basic solution procedure of the model, as well as a listing of the program itself. Additionally included are descriptions of three accessory programs which utilize velocity output from "CAFE-1". The first is a depth-averaged drogue path program, and the second and third plot drogue paths and velocity vectors, respectively. This user's manual should be used in conjunction with the references listed in the bibliography on page 116, which describe important aspects of model application such as parameter estimation, grid set-up and numerical stability.

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This report is a user's guide to an updated version of the previous modeling efforts made by John D. Wang.

Appreciation is expressed here to Ms. Myra L. Kelly for her excellent typing of this manuscript.

1.0 Introduction

The following describes the requirements of the 2-D vertically integrated circulation model, CAFE-1. The model predicts current magnitudes and directions and tidal rise at the nodal points of a two-dimensional finite element triangular grid representing the solution field given the following information:

i) the geometry of the solution field in the form of a triangular finite element grid, including the mean-low-water depth of each node.

ii) bottom friction and eddy viscosity coefficients, average latitude, tidal period, water density and coriolis component.

iii) prescribed tidal amplitudes and phase lag information along the ocean boundary of the grid, including variations per tidal cycle in the mean-low-water datum and tidal amplitude at the ocean boundary.

iv) location and magnitude of prescribed water heights and flows.

v) magnitude and direction of 10-meter wind force over time.

vi) initial water heights and fluxes at each node (initial conditions).

The user is constrained to metric units in this version of CAFE-1. Units of length (meters) and time (seconds) are indicated in the input description.

2.0 Input Data Requirements

The following describes the specific input data requirements.

Variable Array Dimension Specifications:

The subscripted variable arrays are dimensioned automatically given the following information - in the main calling routine of the program, two cards must be specified for MSIZE:

```
DIMENSION ARAY (MSIZE), IARAY(MSIZE) . . . . MAIN0009
DATA MSIZE/MSIZE/ . . . . . .MAIN0010
```

```
where MSIZE = (NMEL+1)*14+(NMNP+1)*(38+5*MAXBWH)
+ (MAXHBN+1)*(3+2*MAXBWH)+(MAXQBN+1)*(4+4*MAXBWH)
+ (MAXPT+1)*2+(MAXLB+1)*(1+MAXLBN)+(MAXOB+1)*(2+MAXOBN)
+ (MAXLW+1)+(MAXDT+1)+(MAXWI+1)*5+24
```

Generalized Input Data Description:

Card group 1: Parameters and Options. One card (11I5)

IVERSN	=1 Lake problem - no prescribed height boundaries =2 Coastal problem - prescribed height on ocean boundaries
NMEL	number of elements
NMNP	number of nodes
IBFRIC	=1, variable bottom friction coefficient, values to be read for each element, see card group 5 =2, constant bottom friction coefficient, value of first element used, see card group 5
IDEPTH	=1, variable depth, values to be read for each node, see card group 4 =2, constant depth, value of first node used, see card group 4
IEDVIS	=1, variable viscosity coefficient =2, constant viscosity coefficient values as for IBFRIC
IWIND	=1, variable wind stress in time =2, constant wind stress in time =0, wind stress is ignored
INPUTH	=1, ETA initially set to zero =2, ETA initially to be read in
INPUTQ	=1, Q initially set to zero =2, Q initially to be read in
ICNVEC	=1, convective terms ignored =2, convective terms included
NRUN	number of run

Card group 2: Continuation of Parameters. One Card (11I5)

MAXHBN	total number of nodes on all ocean boundaries
MAXQBN	total number of nodes on all land boundaries
MAXBWH	the bandwidth of the grid, NBANDH, which is defined under card group 4
MAXPT	number of locations (other than nodes) for interpolating U, V, H and ETA.
MAXLB	number of land boundaries
MAXLBN	number of nodes on the largest land boundary, including first and last
MAXOB	number of ocean boundaries
MAXOBN	number of nodes on the largest ocean boundary, including first and last
MAXLW	number of changes in mean-low-water datum for the exercise = 0 or TRUNCATE((ENDTIM-STRTIM)/PERIOD)+2. (A value at the next tidal period is required even if a full period is not calculated since a linear interpolation is used in time).
MAXDT	number of changes in ocean boundary tidal amplitude =0 or TRUNCATE((ENDTIM-STRTIM)/PERIOD)+1. (The amplitude adjustment remains constant for that tidal period)

MAXWI number of wind data intervals if IWIND=1, = TRUNCATE(ENDTIM-STRTIM)/WFREQ)+1. (Wind force is linearly interpolated between data points)

Card group 3: Title. One Card (20 A4)

Card group 4: Nodal Information. NMNP Cards (215, 7F10.0)
I=1, NMNP, 1
NEXT(I) external node number. NEXT(I) should be input so that NBANDH, the band width is minimized.

NBANDH=maximum over all elements (I=1, NMEL) of 1 plus maximum internal node number of element I minus the minimum internal node number of element I, where the internal node number, NINT(I), is determined by the ordering during read in: NINT(NEXT(I)) = I, I = 1, NMNP.

NBC(I) node code
= 0 internal node
= 1 prescribed normal flow
= 2 prescribed height
= 3 prescribed height and normal flow
= 4 prescribed normal and tangential flow (= 0)
= 5 prescribed height and both flows
= 6 source/sink node

XORD(I) x-coordinate in meters

YORD(I) y-coordinate in meters

DEPTH(I) bottom depth in meters referred to datum (usually MLW). Positive if bottom is below datum, negative if above.

DUM1, DUM2, DUM3, DUM4 dummy variables used to input prescribed values according to NBC as described below:

NBC = 0 not used (internal node)
1 DUM1 = QB, DUM2 = QBANG
2 DUM1 = HB, DUM2 = ALAG
3 DUM1 = HB, DUM2 = ALAG, DUM3 = QB, DUM4 = QBANG
4 DUM1 = QB, DUM2 = QBANG, DUM3 = 0
5 DUM1 = HB, DUM2 = ALAG, DUM3 = QB, DUM4 = QBANG
6 DUM1 = FLUX

where: QB is local x flow in meters^2/sec.
QBANG is the angle in degrees from x-axis to outward normal at node. The direction of the normal is determined by requiring net flow across adjoining segments to vanish. (See Appendix A)
HB is tidal amplitude in meters for the first tidal period
ALAG is time lag in seconds
FLUX is source flux in meters/sec

Card group 5: Element Data. NMEL Cards, (4I10, 4F10.0)
I = 1, NMEL, 1
N(I) element number
ICON (N,1)
ICON (N,2) } external node numbers e1, e2, e3 in sense from x toward y
ICON (N,3)

CF(I) bottom friction coefficient
EDXX(I)
EDYY(I) } eddy viscosities in meters^2/sec
EDXY(I)

Card group 6: Interpolation Option
Only if MAXPT ≠ 0: Interpolation Data. One Card (3 I 10)
NPOINT number of locations for interpolating velocity components, depths, and surface rise
ITIMT specified timestep for starting interpolation
ISTP3 interval of timesteps at which interpolation is repeated until the end of exercise

Only if MAXPT ≠ 0: Coordinates of Interpolation locations. NPOINT Cards (2F10.0)
I = 1, NPOINT
XM(I) x-coordinate in meters
YM(I) y-coordinate in meters

Card group 7: System Properties. One Card (F10.0, E10.3, 3F10.0)
ALATT latitude north (degrees N)
OMEGA phase velocity of earth's rotation = .72722 x 10^{-4}(sec^{-1})
GRAVT gravitational acceleration = 9.81(m/sec^2)
PERIOD period of tide (seconds)
DENSTY average density of water (kg/m^3)

Card group 8: Integration Parameters. One Card (3F10.0, I10, F10.0, 5I5)
STRTIM start time of integration
ENDTIM end time of integration
TINC time increment
NØ external node number for which stability is checked (Ø = zero)
BOUND bound on height variation at node NØ
IDT parameter to be used for variable time stepping, use 2 since this has not yet been implemented
NOUT hard copy output for every NOUT time steps
ITIMC time step at which fluxes and surface elevations are punched out for hot starting purposes. Usually at end of run. If not wanted, use a large number (ITIMC > ENDTIM/TINC)

IVELW
- =1, if writing velocities and depths on direct access file is desired
- =0, if writing on file is not desired

IVELP
- =1, if punching velocities for plotting purposes is desired
- =0, if punching velocities is not desired

Only if IVELP = 1: Punching Option for Plotting Velocities

Card group 9: Punch Data. One Card (2I10)
ITIMP specified timestep for starting punching
ISTP1 interval of timesteps at which punching is repeated until the end of exercize

Only if IVELW = 1: Writing on Direct Access File

Card group 10: Data for writing velocities and depths on a direct access file for use with "DISPER-1". One card (3I10)

ITIMW specified timestep for starting the write sequence
ISTP2 interval of timesteps at which file writing is repeated until ITIMWE (effectively this number (ISTP2*TINC) represents the timestep to be used in "DISPER-1" so one must plan accordingly!)
ITIMWE specified timestep at which file writing ends

Important! If IVELW = 1, then the DEFINE FILE statement in SUBROUTINE SBMAIN must be properly introduced as follows:

DEFINE FILE A(B, C, U, IPOINT) SBMA0292
where A is normally a two digit integer used for JCL purposes,
B is an integer, and is the total number of storage points created on the file, and is equal to TRUNCATE ((ITIMWE-ITIMW)/ISTP2)+1
and C is an integer, and is equal to 3*NMNP

Card group 11A: Land Boundary Data. One Card (8I10)
NMLB number of land boundaries
(NMLBN(I), I = 1, NMLB) number of nodes on each land boundary, including first and last

Card group 11B: Segment Connectivity. One Card per Boundary (20I4)
I = 1, NMLB
(ICONL(I,J), J = 1, NMLBN(I)) external node numbers on boundary in sequential order such that flow domain is to left of direction of advance

Card group 12A: Ocean Boundary Data. One Card (8I10)
NSEGMT number of ocean boundaries
(NMHNPB (I), I = 1, NSEGMT) number of height nodes on ocean boundary, including first and last

Card group 12B: Segment Connectivity. One Card per Boundary (20I4)
I = 1, NSEGMT
(ICONB(I,J),J = 1, NMHNPB(I)) external node numbers on ocean boundary in sequential order such that flow domain is to left of direction of advance

Only if MAXLW ≠ 0: Optional Adjustment of Mean Low Water

Card group 13: Mean Low Water Datum Adjustment. MAXLW/10 cards (10F8.3)
I = 1, MAXLW
DHLOW(I) adjustment each tidal cycle or "PERIOD"(in meters) of

the initial mean low water datum (at the ocean boundary) set by the initial depths in card group 4. Positive adjustment for raising MLW at the ocean boundary, negative for lowering MLW.

Only if MAXDT ≠ 0: Optional Adjustment of Tidal Amplitude

Card group 14: Tidal Amplitude Adjustment. MAXDT/10 cards (10F8.3)
I = 1, MAXDT
DIRNL(I) adjustment each tidal cycle or "PERIOD" (in meters) of the initial ocean boundary tidal amplitudes "HB" defined in card group 4. Positive adjustment for increasing amplitude, negative for decreasing.

Only if INPUTH = 2: Hot Start Information

Card group 15A: ((NMNP - 1)/8 + 1) cards (8F10.0)
(ETA(I), I = 1, NMNP) initial surface elevations, internal n node ordering

Only if INPUTQ = 2: include data for initial values of flows

Card group 15B: ((2*NMNP - 1)/8 + 1) cards (8F10.0)
(Q(I), I = 1, 2*NMNP) initial flows in pairs of x- and y-components. Internal node ordering.

Card group 16: Wind data

Only if IWIND = 1: Variable Wind Magnitude and Direction in Time

Card group 16A: Variable Wind Data Parameters. One Card (F10.0, I10,F10.0)
WSTIM is equal to STRTIM in seconds.
LW is the number of wind data intervals and is equal to
TRUNCATE ((ENDTIM-STRTIM)/WFREQ) + 1
WFREQ the time interval in seconds between each set of wind data

Card group 16B: Variable Wind Data. LW*2/8 Cards (8F10.2)
I = 1, LW
DIRW(I) direction (degrees from North) from which wind is blowing
GAMW(I) wind speed in knots

Only if IWIND = 2: Constant Wind Stress in Time

Card group 16C: Constant Wind Data Parameters. One Card (3F10.0)
WTIME time in seconds to which the wind field is specified. Must be equal to or larger than ENDTIM
WMAG wind speed in knots
WDIR direction from which wind is blowing, in degrees from North.

Card group 17: Termination Card. One Card (16I5)
IVERSN = 0
Instead of termination card, which will stop the execution, input for a new problem may be inserted (repeat card groups 1 through 16).

3.0 Output Description

1: If the designated MSIZE is too small, the message
ERRORINSUFFICIENT CORE STORAGE ALLOCATION.
SIZE OF DATA VECTOR ARAY/IARAY MUST = . is printed
and the program is stopped.

2. Title

3. NMEL number of elements
NMNP number of nodes
IVERSN model version = 1 or 2
whether bottom friction, mean low water depth and eddy viscosity are spatially constant or varying
whether wind stress is constant or varying in time, or ignored
whether initial fluxes and depths are zero or are "hot" started
whether convective accelerations are included or ignored

4. I = 1, NMNP
NEXT(I) external node number
XORD(I) x-coordinate at external node NEXT(I) (meters)
YORD(I) y-coordinate at external node NEXT(I) (meters)
DEPTH(I) initial mean low water depth at external node NEXT(I)
NBC(I) node code

see card group 4 under Section2.0

if NBC(I) = 1	QB(I),QBANG(I)
if NBC(I) = 2	HB(I), ALAG(I)
if NBC(I) = 3	HB(I), ALAG(I), QB(I), QBANG(I)
if NBC(I) = 4	QB(I), QBANG(I)
if NBC(I) = 5	HB(I), ALAG(I), QB(I), QBANG(I)
if NBC(I) = 6	FLUX(I)

5. Prescribed Boundary and Internal Flux Nodes
NMHBN number of nodes with prescribed heights
NMQBN number of nodes with prescribed local x flux
NMVBN number of nodes with prescribed x and y flux
IFLUX number of internal flux nodes

6: Element Data
I = 1, NMEL
I element number
ICON(I,1), ICON(I,2), ICON(I,3) } external node numbers of the element
CF(I) bottom friction coefficient of the element
EDXX(I), EDYY(I), EDXY(I) } eddy viscosities of the element

7: If the x and y coordinates of one or more nodes are in error, the message NEGATIVE AREA IN ELEMENT: I is printed and the program is stopped.

8: Geometrical Relations
I element number (I = 1, NMEL)
A1(I) = XORD(ICON(I,3)) - XORD(ICON(I,2))
B1(I) = YORD(ICON(I,2)) - YORD(ICON(I,3))
A2(I) = XORD(ICON(I,1)) - XORD(ICON(I,3))
B2(I) = YORD(ICON(I,3)) - YORD(ICON(I,1))
A3(I) = XORD(ICON(I,2)) - XORD(ICON(I,1))
B3(I) = YORD(ICON(I,1)) - YORD(ICON(I,2))

9: NBANDH band width of the grid

10: If NBANDH is greater than MAXBWH the message ' MAXBWH IS TOO SMALL, NBANDH = ' is printed and the program is stopped.

11: Only if MAXPT ≠ 0
The heading INTERPOLATION OPTION---SELECTED LOCATIONS FOR FIELD DATA COMPARISONS OF CURRENTS AND TIDES is printed.
NPOINT number of points for interpolation of velocities and surface rise
ITIMT timestep at which interpolation starts
ISTP3 interval of timesteps at which interpolations are repeated
The heading INTERPOLATION POINT NO., X-COORDINATE, Y-COORDINATE is printed.
I = 1, NPOINT
I interpolation point number
XM(I) x-coordinate of point I
YM(I) y-coordinate of point I

12: SYSTEM PROPERTIES

ALATT	average latitude (degrees N)
CORIO	coriolis parameter
GRAVT	gravitational acceleration
OMEGA	angular velocity of earth rotation
PERIOD	period of harmonic tidal excitation
DENSTY	density of water

13: Only if IVELP = 1

ITIMP	timestep at which punching of nodal velocities for plotting purposes begins
ISTP1	interval of timesteps at which punching is repeated

14: Only if IVELW = 1

ITIMW	timestep at which writing of nodal velocities and depths on direct access file begins
ISTP2	interval of timesteps at which file writing is repeated
ITIMWE	timestep at which file writing ends
IPTS	total number of storage points created on the file
NMNP3	each storage point has one set of nodal velocities and depths which total to NMNP3 values per point

15: INTEGRATION PARAMETERS

STRTIM	start time of integration
ENDTIM	end time of integration
TINC	constant time increment
NØ	external node at which variation is bounded by BOUND
BOUND	crude stability control

whether the time increment is constant or varying

NOUT	interval of timesteps at which output is printed

16: I = 1, NMLB
LAND SEGMENT (I) NODES, NMLBN = (NMLBN(I))
EXTERNAL NODE NUMBERS - NEXT(ICONL(J,I),J = 1, NMLBN(I))
INTERNAL NODE NUMBERS - NINT(ICONL(J,I), J = 1, NMLBN(I))

17: Only if IVERSN = 2
The heading MODEL VERSION 2 CHOSEN. THE ADDITIONAL BOUNDARY SEGMENTS, NSEGMT = , is printed
I = 1, NSEGMT
SEGMENT(I) NUMBER OF NODES, NMHNPB = (NMHNPB(I))
EXTERNAL NODE NUMBERS - NEXT(ICONB(J,I), J = 1, NMHNPB(I))
INTERNAL NODE NUMBERS - NINT(ICONB(J,I), J = 1, NMHNPB(I))

18: Only if MAXLW ≠ 0
The heading INFORMATION FOR OPTIONAL ADJUSTMENT OF MEAN-LOW WATER DATUM EACH TIDAL CYCLE is printed.
I = 1, MAXLW
I tidal cycle
DHLOW(I) adjustment in MLW datum for tidal cycle (I).

19: Only if MAXDT ≠ 0
The heading INFORMATION FOR OPTIONAL ADJUSTMENT OF TIDAL AMPLITUDE EACH TIDAL CYCLE is printed.
I = 1, MAXDT
I tidal cycle
DIRNL(I) adjustment in tidal amplitude for tidal cycle(I).

20: Only if INPUTH = 0
ETA(I), I = 1, NMNP initial surface elevation vector, internal order

21: Only if INPUTQ = 0
Q(I), I = 1, NMNP2 initial flux vector, pair of x and y fluxes in internal order

22: If a nodal depth becomes negative, the message ERROR - DATUM DEPTH AT NODE(I) IS TOO SHALLOW TO PRESERVE NUMERICAL STABILITY, IF SURFACE ELEVATION(I) IS REASONABLE.
TOTAL DEPTH = DATUM DEPTH(I) + SURFACE ELEVATION(I) = _.
IF SURFACE ELEVATION(I) IS NOT REASONABLE, PROBLEM IS UNSTABLE FOR SOME OTHER REASON, I.E., TIMESTEP, EDDY VISCOSITY, ETC. is printed and the program is stopped.

23: Only if IWIND = 2
WTIME time to which constant wind field is specified (always greater than ENDTIM)
WMAG constant wind magnitude in knots
WDIR constant wind direction from true north
TAUX x-component of constant wind shear stress
TAUY y-component of constant wind shear stress

24: Only if IWIND = 1 (at intervals of WFREQ seconds)
GAMW variable wind magnitude in knots at given time
DIRW variable wind direction from true north at given time
TIME time at which wind data is updated
TAUX x-component of wind shear stress
TAUY y-component of wind shear stress

25: TIME time at which output is being printed
TINC time increment
ITIME time step at which output is being printed
VOL net volume above initial MLW
IPOINT the latest storage location filled on direct access file at the time output is printed. If velocities and depths are not being stored on file, IPOINT = -1.

26: I internal node number (I = 1, NMNP)
NEXT(I) external node number
H(I) total depth
Q(2*I-1) x-component of flux
Q(2*I) y-component of flux
ETA(I) surface elevation rise
U(I) x-component of velocity
V(I) y-component of velocity

27: If solution becomes numerically unstable, the message STABILITY CHECK: BOUND EXCEEDED AT NODE NØ is printed
H(NØ) total depth at stability check node NØ
DEPTH(N) MLW datum depth at stability check node NØ (see card group 8 in section 2.0)
BOUND specified limit on surface rise at node NØ

28: Only if IVELW = 1:
velocities and depths (U(I), V(I), H(I), I = 1, NMNP) are written on a direct access file in internal order starting at timestep ITIMW and from then on at intervals of ISTP2 timesteps until ITIMWE.

29: Only if IVELP = 1:
velocities (U(I), V(I), I = 1, NMNP) are punched on cards in internal order starting at timestep ITIMP and from then on at intervals of ISTP1 timesteps until the end. Preceding each set of velocities is a card with the timestep at which punching occurred.

30: Only if MAXPT ≠ 0 Interpolation Data
TIME time at which interpolation is executed
ITIME timestep at which interpolation is executed
I = 1, NPOINT
I interpolation point number
XVEL x-component of velocity
YVEL y-component of velocity
H total depth
ETA surface rise

31: Only if ITIMC is less than or equal to ENDTIM
Fluxes and surface elevations (Q(2*I-1), Q(2*I), ETA(I), I = 1, NMNP) are punched on cards in internal order for hot-starting at timestep ITIMC.

Steps 23-31 are repeated as necessary throughout the exercise. In particular steps 25 and 26 are printed every NOUT timesteps.

4.0 Example No. 1: Coastal Estuary Problem

The finite element grid used is shown in Figure 1. There are 80 elements and 63 nodes. The three nodes on the left end of the grid are the "ocean" boundary nodes, and the remaining three sides constitute a single no-flux or "land" boundary. A periodic tide is forced at the ocean boundary nodes 1, 2 and 3 with an initial amplitude of 1 meter and a period of 45000 seconds. The initial depth of each node is specified as a constant 8 meters. Since there is an open ocean boundary in this example, IVERSN = 2 is chosen as defined in section 2.0.

The Mean-Low-Water or initial depth datum is adjusted continuously at the ocean boundary to correspond to a hypothetical variation in tidal behavior. Since the adjustment in MLW is a continuous linear interpolation over the tidal period, and the computation runs 5000 seconds into the second tidal cycle (ENDTIM = 50000secs.), 3 MLW adjustment values are necessary in this case. In addition, the tidal amplitude is adjusted at the ocean boundary each tidal cycle (2 adjustments). The tidal amplitude adjustment remains constant in time for the corresponding tidal cycle. Note that adjustments in MLW and tidal amplitude can vary in time over any number of tidal cycles, but are constant across the ocean boundary itself, according to the present formulation. This is not true, however, for the initial tidal amplitudes (1 meter) specified in card group 4 , which may be chosen as any variation across the ocean boundary.

The computation is run from 0.0 seconds to 50 000 seconds with a time increment of 100 seconds. The crude stability control, BOUND, equals 5 meters at node 40. Output is printed every 25 timesteps. Two locations other than nodes are chosen to interpolate velocity, depth and surface rise information starting at 1000 seconds and from then on at intervals of 1000 seconds or 10 timesteps. Convective terms are ignored.

The eddy viscosity coefficients are held spatially constant with $E_{xx} = E_{yy} = E_{xy} = 500$ meters^2/second. The bottom friction coefficient is also spacially constant with a value of 0.01. Surface rise and flux are initially set to zero, as the problem begins as an approximation of low slack water. Nodal velocities are punched out for plotting purposes starting at 2500 seconds and from then on at intervals of 5000 seconds or 50 timesteps. Punching for hot starting purposes is not desired. The option for wind force to vary temporally is chosen. The wind data interval is chosen as 5000 seconds which requires 11 sets of wind magnitude and direction data.

A tidal amplitude of 1 meter and a tidal period of 45,000 seconds is prescribed at the ocean boundary formed by nodes 1, 2 and 3.

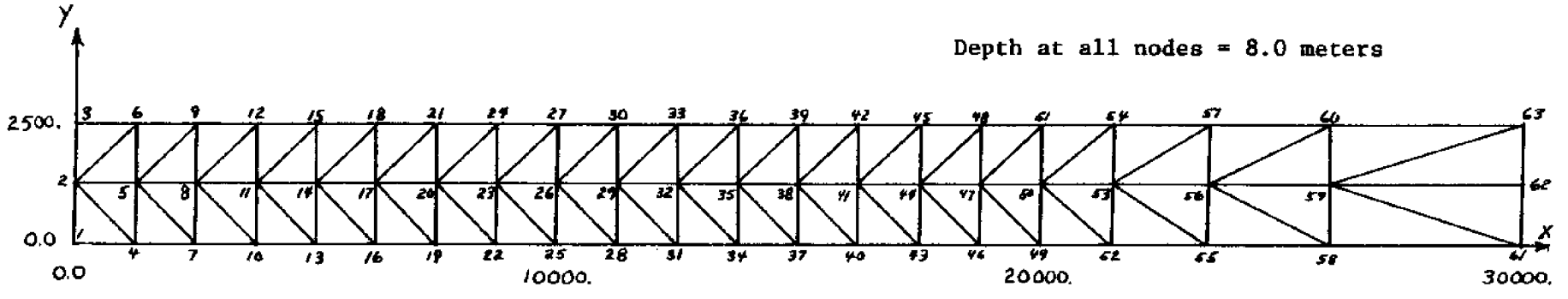

Figure 4-1 Finite element grid for the example No. 1

The input is as follows:

```
Variable Array Dimension Specification:
     MSIZE = (80+1)*14 + (63+1)*(38+5*5)
           + (3+1)*(3+2*5) + (43+1)*(4+4*5)
           + (2+1)*2 + (1+1)*(1+43) + (1+1)*(2+3)
           + (3+1) + (2+1) + (11+1)*5 + 24 = 6469

     DIMENSION ARAY (6469), IARAY (6469) . . . . . MAIN0009
     DATA MSIZE/6469/ . . . . . . . . . . . . . . . MAIN0017

Card 1:    IVERSN =  2
           NMEL   = 80
           NMNP   = 63
           IBFRIC =  2
           IDEPTH =  2
           IEDVIS =  2
           IWIND  =  1
           INPUTH =  1
           INPUTQ =  1
           ICNVEC =  1
           NRUN   =  1

Card 2:    MAXHBN    =   3
           MAXQBN    =  43
           MAXBWH    =   5
           MAXPT     =   2
           MAXLB     =   1
           MAXLBN    =  43
           MAXOB     =   1
           MAXOBN    =   3
           MAXLW     =   3
           MAXDT     =   2
           MAXWI     =  11

Card 3:    EXAMPLE NO. 1 = COASTAL ESTUARY PROBLEM
```

Cards 4-66:

NEXT(I)	NBC(I)	XORD(I)	YORD(I)	DEPTH(I)	DUM1	DUM2	DUM3	DUM4
1	3	0.0	0.0	8.0	1.0	0.0	0.0	270.0
2	2	0.0	1250.0	-	1.0	0.0	-	-
3	3	0.0	2500.0	-	1.0	0.0	0.0	90.0
4	1	1250.0	0.0	-	0.0	270.0	-	-
5	0	1250.0	1250.0	-	-	-	-	-
6	1	1250.0	2500.0	-	0.0	90.0	-	-
7	1	2500.0	0.0	-	0.0	270.0	-	-
8	0	2500.0	1250.0	-	-	-	-	-
9	1	2500.0	2500.0	-	0.0	90.0	-	-
10	1	3750.0	0.0	-	0.0	270.0	-	-
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
61	1	30000.0	0.0	-	0.0	315.0	-	-
62	1	30000.0	1250.0	-	0.0	0.0	-	-
63	1	30000.0	2500.0	-	0.0	45.0	-	-

Cards 67-146:

N(I)	ICON(N(I),1)	ICON(N(I),2)	ICON(N(I),3)	CF(I)	EDXX(1)	EDYY(I)	EDXY(I)
1	3	2	6	0.01	500.0	500.0	500.0
2	2	1	4	-	-	-	-
3	6	2	5	-	-	-	-
4	2	4	5	-	-	-	-
5	6	5	9	-	-	-	-
6	5	4	7	-	-	-	-
7	9	5	8	-	-	-	-
8	5	7	8	-	-	-	-
9	9	8	12	-	-	-	-
10	8	7	10	-	-	-	-

etc.

```
Card 147:     NPOINT = 2
              ITIMT  = 10
              ISTP3  = 10

Cards 148, 149:
              I = 1, NPOINT
               XM(I)              YM(I)
             4375.0             1250.0
            18125.0             1250.0

Card 150:  ALATT  =  40.0
           OMEGA  =  72.722E-06
           GRAVT  =  9.81
           PERIOD =  45000.0
           DENSTY =  1000.0

Card 151:  STRTIM =  0.0
           ENDTIM =  50,000.0
           TINC   =  100.0
           N Ø    =  40
           BOUND  =  5.0
           IDT    =  2
           NOUT   =  25
           ITIMC  =  501  (Note - punching for hot-start is not wanted)
           IVELW  =  0
           IVELP  =  1

Card 152:  ITIMP  =  25
           ISTP1  =  50

Card 153:  NMLB   =   1
           NMLBN(1)=  43

Cards 154-156:
           ICONL(I,1), I = 1, 43
           1,4,7,10,13,16,19,22,25,28,31,34,37,40,43,46,49,52,55,58,
         61,62,63,60,57,54,51,48,45,42,39,36,33,30,27,24,21,18,15,12,
           9,6,3

Card 157:  NSEGMT = 1
           NMHNPB(1) = 3

Card 158:
           ICONB(I,1), I = 1,3
           3,2,1

Card 159:
           DHLOW(I), I = 1, MAXLW
           0.0, 0.2, 0.0
```

Card 160:

DIRNL(I), I = 1, MAXDT
0.0, 0.15

Card 161:

WSTIM = 0.0
LW = 11
WFREQ = 5000.0

Cards 162-164:

DIRW(I), GAMW(I), I = 1, LW
270.0, 10.0, 270.0, 10.0, 270.0, 10.0, 270.0, 10.0
270.0, 10.0, 270.0, 10.0, 270.0, 10.0, 270.0, 10.0
270.0, 10.0, 270.0, 10.0, 270.0, 10.0

Card 165:

IVERSN = 0

The output for this example is given on pages 22 to 31.

Printed Output for Example 1.0

```
                                    1-D FINE GRID EXAMPLE FOR CAPE-1

* ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

THIS PROBLEM HAS THE FOLLOWING CHARACTERISTICS:

     NUMBER OF ELEMENTS, NMEL =    80
     NUMBER OF NODES, NNP =    81
     THE MODEL APPLIED IS VERSION 2
     IT IS ASSUMED THAT SPATIALLY
                                 BOTTOM FRICTION IS CONSTANT
                                 MEAN LOW WATER DEPTH IS CONSTANT
                                 EDDY VISCOSITY IS CONSTANT
                                 WIND STRESS IS VARYING   IN TIME AND IS SPATIALLY CONSTANT
     INITIAL VALUES OF N ARE SET TO 0
     INITIAL VALUES OF Q ARE SET TO 0
     CONVECTIVE ACCELERATIONS ARE IGNORED

* ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

 NODE NUMBER   X-COORDINATE (M)   Y-COORDINATE (M)   DEPTH (MLW) (M)   NODE CODE   DEPTH MEASURE (M)   TIME LAG (SEC)   LOCAL X FLUX (M2/SEC)   FLUX ANGLE (DEGREES)   GLOBAL Y FLUX (M2/SEC)   SOURCE FLUX (M/SEC)

     1          0.0              0.0              6.00          3          1.00              0.              0.0              270.0
     2          0.0           1250.00             6.00          2          1.00              0.
     3          0.0           2500.00             6.00          3          1.00              0.              0.0              90.0
     4       1250.00             0.0              6.00          1                                            0.0              270.0
     5       1250.00          1250.00             6.00          0
     6       1250.00          2500.00             6.00          1                                            0.0              90.0
     7       2500.00             0.0              6.00          1                                            0.0              270.0
     8       2500.00          1250.00             6.00          0
     9       2500.00          2500.00             6.00          1                                            0.0              90.0
    10       3750.00             0.0              6.00          1                                            0.0              270.0
    11       3750.00          1250.00             6.00          0
    12       3750.00          2500.00             6.00          1                                            0.0              90.0
    13       5000.00             0.0              6.00          1                                            0.0              270.0
    14       5000.00          1250.00             6.00          0
    15       5000.00          2500.00             6.00          1                                            0.0              90.0
    16       6250.00             0.0              6.00          1                                            0.0              270.0
    17       6250.00          1250.00             6.00          0
    18       6250.00          2500.00             6.00          1                                            0.0              90.0
    19       7500.00             0.0              6.00          1                                            0.0              270.0
    20       7500.00          1250.00             6.00          0
    21       7500.00          2500.00             6.00          1                                            0.0              90.0
    22       8750.00             0.0              6.00          1                                            0.0              270.0
    23       8750.00          1250.00             6.00          0
    24       8750.00          2500.00             6.00          1                                            0.0              90.0
    25      10000.00             0.0              6.00          1                                            0.0              270.0
    26      10000.00          1250.00             6.00          0
    27      10000.00          2500.00             6.00          1                                            0.0              90.0
    28      11250.00             0.0              6.00          1                                            0.0              270.0
    29      11250.00          1250.00             6.00          0
    30      11250.00          2500.00             6.00          1                                            0.0              90.0
    31      12500.00             0.0              6.00          1                                            0.0              270.0
    32      12500.00          1250.00             6.00          0
    33      12500.00          2500.00             6.00          1                                            0.0              90.0
    34      13750.00             0.0              6.00          1                                            0.0              270.0
    35      13750.00          1250.00             6.00          0
    36      13750.00          2500.00             6.00          1                                            0.0              90.0
    37      15000.00             0.0              6.00          1                                            0.0              270.0
    38      15000.00          1250.00             6.00          0
    39      15000.00          2500.00             6.00          1                                            0.0              90.0
    40      16250.00             0.0              6.00          1                                            0.0              270.0
    41      16250.00          1250.00             6.00          0
    42      16250.00          2500.00             6.00          1                                            0.0              90.0
    43      17500.00             0.0              6.00          1                                            0.0              270.0
    44      17500.00          1250.00             6.00          0
    45      17500.00          2500.00             6.00          1                                            0.0              90.0
    46      18750.00             0.0              6.00          1                                            0.0              270.0
    47      18750.00          1250.00             6.00          0
    48      18750.00          2500.00             6.00          1                                            0.0              90.0
    49      20000.00             0.0              6.00          1                                            0.0              270.0
    50      20000.00          1250.00             6.00          0
    51      20000.00          2500.00             6.00          1                                            0.0              90.0
    52      21500.00             0.0              6.00          1                                            0.0              270.0
    53      21500.00          1250.00             6.00          0
    54      21500.00          2500.00             6.00          1                                            0.0              90.0
    55      23500.00             0.0              6.00          1                                            0.0              270.0
    56      23500.00          1250.00             6.00          0
    57      23500.00          2500.00             6.00          1                                            0.0              90.0
    58      26000.00             0.0              6.00          1                                            0.0              270.0
    59      26000.00          1250.00             6.00          0
    60      26000.00          2500.00             6.00          1                                            0.0              90.0
    61      30000.00             0.0              6.00          1                                            0.0              315.0
    62      30000.00          1250.00             6.00          1                                            0.0               0.0
    63      30000.00          2500.00             6.00          1                                            0.0              45.0

* ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

NUMBER OF PRESCRIBED BOUNDARY AND INTERNAL FLUX NODES

     PRESCRIBED HEIGHTS, NPHBN =     1
     PRESCRIBED LOCAL X FLUX, NPQBN =    43
     PRESCRIBED X AND Y FLUX, NPVBN =     0
     INTERNAL FLUX NODES, IFLUX =     0

* ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *
```

ELEMENT CONNECTIVITIES.

ELEMENT NUMBER	NODE 1	NODE 2	NODE 3	FRICTION COEFFICIENT	EDDY XX	EDDY YY	EDDY XY
1	3	2	7	0.010000	500.00	500.00	500.00
2	2	1	6	0.010000	500.00	500.00	500.00
3	6	2	5	0.010000	500.00	500.00	500.00
4	2	4	5	0.010000	500.00	500.00	500.00
5	6	5	9	0.010000	500.00	500.00	500.00
6	5	4	7	0.010000	500.00	500.00	500.00
7	9	5	8	0.010000	500.00	500.00	500.00
8	5	7	8	0.010000	500.00	500.00	500.00
9	9	8	12	0.010000	500.00	500.00	500.00
10	8	7	10	0.010000	500.00	500.00	500.00
11	12	8	11	0.010000	500.00	500.00	500.00
12	8	10	11	0.010000	500.00	500.00	500.00
13	12	11	15	0.010000	500.00	500.00	500.00
14	11	10	13	0.010000	500.00	500.00	500.00
15	15	11	14	0.010000	500.00	500.00	500.00
16	11	13	14	0.010000	500.00	500.00	500.00
17	15	14	18	0.010000	500.00	500.00	500.00
18	14	13	16	0.010000	500.00	500.00	500.00
19	18	14	17	0.010000	500.00	500.00	500.00
20	14	16	17	0.010000	500.00	500.00	500.00
21	18	17	21	0.010000	500.00	500.00	500.00
22	17	16	19	0.010000	500.00	500.00	500.00
23	21	17	20	0.010000	500.00	500.00	500.00
24	17	19	20	0.010000	500.00	500.00	500.00
25	21	20	24	0.010000	500.00	500.00	500.00
26	20	19	22	0.010000	500.00	500.00	500.00
27	24	20	23	0.010000	500.00	500.00	500.00
28	20	22	23	0.010000	500.00	500.00	500.00
29	24	23	27	0.010000	500.00	500.00	500.00
30	23	22	25	0.010000	500.00	500.00	500.00
31	27	23	26	0.010000	500.00	500.00	500.00
32	23	25	26	0.010000	500.00	500.00	500.00
33	27	26	30	0.010000	500.00	500.00	500.00
34	26	25	28	0.010000	500.00	500.00	500.00
35	30	26	29	0.010000	500.00	500.00	500.00
36	26	28	29	0.010000	500.00	500.00	500.00
37	30	29	33	0.010000	500.00	500.00	500.00
38	29	28	31	0.010000	500.00	500.00	500.00
39	33	29	32	0.010000	500.00	500.00	500.00
40	29	31	32	0.010000	500.00	500.00	500.00
41	33	32	36	0.010000	500.00	500.00	500.00
42	32	31	34	0.010000	500.00	500.00	500.00
43	36	32	35	0.010000	500.00	500.00	500.00
44	32	34	35	0.010000	500.00	500.00	500.00
45	36	35	39	0.010000	500.00	500.00	500.00
46	35	34	37	0.010000	500.00	500.00	500.00
47	39	35	38	0.010000	500.00	500.00	500.00
48	35	37	38	0.010000	500.00	500.00	500.00
49	39	38	42	0.010000	500.00	500.00	500.00
50	38	37	40	0.010000	500.00	500.00	500.00
51	42	38	41	0.010000	500.00	500.00	500.00
52	38	40	41	0.010000	500.00	500.00	500.00
53	42	41	45	0.010000	500.00	500.00	500.00
54	41	40	43	0.010000	500.00	500.00	500.00
55	45	41	44	0.010000	500.00	500.00	500.00
56	41	43	44	0.010000	500.00	500.00	500.00
57	45	44	48	0.010000	500.00	500.00	500.00
58	44	43	46	0.010000	500.00	500.00	500.00
59	44	47	48	0.010000	500.00	500.00	500.00
60	44	46	47	0.010000	500.00	500.00	500.00
61	48	47	51	0.010000	500.00	500.00	500.00
62	47	46	49	0.010000	500.00	500.00	500.00
63	47	50	51	0.010000	500.00	500.00	500.00
64	47	49	50	0.010000	500.00	500.00	500.00
65	51	50	54	0.010000	500.00	500.00	500.00
66	50	49	52	0.010000	500.00	500.00	500.00
67	50	53	54	0.010000	500.00	500.00	500.00
68	50	52	53	0.010000	500.00	500.00	500.00
69	54	53	57	0.010000	500.00	500.00	500.00
70	53	52	55	0.010000	500.00	500.00	500.00
71	53	56	57	0.010000	500.00	500.00	500.00
72	53	55	56	0.010000	500.00	500.00	500.00
73	57	56	60	0.010000	500.00	500.00	500.00
74	56	55	58	0.010000	500.00	500.00	500.00
75	56	59	60	0.010000	500.00	500.00	500.00
76	56	58	59	0.010000	500.00	500.00	500.00
77	60	59	63	0.010000	500.00	500.00	500.00
78	59	58	61	0.010000	500.00	500.00	500.00
79	59	62	63	0.010000	500.00	500.00	500.00
80	59	61	62	0.010000	500.00	500.00	500.00

GEOMETRICAL RELATIONS

ELEMENT NUMBER	A1	B1	A2	B2	A3	B3	AREA
1	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
2	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
3	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
4	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
5	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
6	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
7	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
8	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
9	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
10	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
11	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
12	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
13	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
14	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0

15	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
16	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
17	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
18	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
19	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
20	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
21	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
22	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
23	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
24	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
25	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
26	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
27	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
28	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
29	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
30	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
31	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
32	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
33	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
34	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
35	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
36	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
37	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
38	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
39	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
40	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
41	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
42	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
43	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
44	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
45	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
46	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
47	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
48	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
49	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
50	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
51	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
52	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
53	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
54	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
55	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
56	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
57	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
58	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
59	0.0	-1250.0	-1250.0	1250.0	1250.0	0.0	781250.0
60	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
61	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
62	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
63	0.0	-1250.0	-1250.0	1250.0	1250.0	0.0	781250.0
64	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
65	1500.0	-1250.0	-1500.0	0.0	0.0	1250.0	937497.5
66	1500.0	0.0	-1500.0	-1250.0	0.0	1250.0	937497.5
67	0.0	-1250.0	-1500.0	1250.0	1500.0	0.0	937497.5
68	0.0	-1250.0	-1500.0	0.0	1500.0	1250.0	937497.5
69	2000.0	-1250.0	-2000.0	0.0	0.0	1250.0	1250002.0
70	2000.0	0.0	-2000.0	-1250.0	0.0	1250.0	1250002.0
71	0.0	-1250.0	-2000.0	1250.0	2000.0	0.0	1250002.0
72	0.0	-1250.0	-2000.0	0.0	2000.0	1250.0	1250002.0
73	2500.0	-1250.0	-2500.0	0.0	0.0	1250.0	1562500.0
74	2500.0	0.0	-2500.0	-1250.0	0.0	1250.0	1562500.0
75	0.0	-1250.0	-2500.0	1250.0	2500.0	0.0	1562500.0
76	0.0	-1250.0	-2500.0	0.0	2500.0	1250.0	1562500.0
77	4000.0	-1250.0	-4000.0	0.0	0.0	1250.0	2500000.0
78	4000.0	0.0	-4000.0	-1250.0	0.0	1250.0	2500000.0
79	0.0	-1250.0	-4000.0	1250.0	4000.0	0.0	2500000.0
80	0.0	-1250.0	-4000.0	0.0	4000.0	1250.0	2500000.0

BANDWIDTH OF THIS GRID IS, NBANDW = 5

INTERPOLATION OPTION---SELECTED LOCATIONS FOR FIELD DATA COMPARISONS OF CURRENTS AND TIDES

NUMBER OF POINTS FOR INTERPOLATION OF VELOCITIES AND SURFACE RISE = 2

INTERPOLATION STARTS AT TIMESTEP NO. 10 AND FROM THEN ON AT INTERVALS OF 10 TIMESTEPS

INTERPOLATION POINT NO.	X-COORDINATE (M)	Y-COORDINATE (M)
1	4375.00	1250.00
2	10125.00	1250.00

SYSTEM PROPERTIES.

AVERAGE LATITUDE, ALATT = 40.00 (DEGREES N)
CORIOLIS PARAMETER, CORIC = 2*OMEGA*SIN(ALATT) = 0.9358-04 (SEC-1)
GRAVITATIONAL ACCELERATION, GRAVT = 9.810 (M/SEC2)
ANGULAR VELOCITY OF EARTH ROTATION, OMEGA = 0.7272-04 (SEC-1)
PERIOD OF HARMONIC TIDAL EXCITATION, PERIOD = 45000. (SEC)
DENSITY OF WATER, DENSTY = 1000.00 (KG/M3)

NODAL VELOCITIES WILL BE PUNCHED FOR PLOTTING PURPOSES STARTING AT TIMESTEP NO. 25
AND FROM THEN ON AT INCREMENTS OF 50 TIMESTEPS

```
 INTEGRATION PARAMETERS,

      START TIME OF INTEGRATION, STRTIM =       0.0  SEC
      END TIME OF INTEGRATION, ENDTIM =    50000.0  SEC
      CONSTANT TIME INCREMENT, TINC =     100.0  SEC
      EXTERNAL NODP AT WHICH VARIATION IS BOUNDED BY BOUND, NB =    42
      CRUDE STABILITY CONTROL,BOUND =    5.00 M
      THE TIME INCREMENT IS ASSUMED CONSTANT
      OUTPUT WILL BE PRINTED FOR EVERY  25 TIMESTEPS

 * ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

 LAND SEGMENT  1     # NODES, NMLSN = 43
 EXTERNAL NODE NUMBERS:   1-  4-  7- 10- 13- 16- 19- 22- 25- 28- 31- 34- 37- 40- 43- 46- 49- 52- 55- 58- 61- 62- 63- 60- 57-
                         54- 51- 48- 45- 42- 39- 36- 33- 30- 27- 24- 21- 18- 15- 12-  9-  6-  3-
 INTERNAL NODE NUMBERS:   1-  4-  7- 10- 13- 16- 19- 22- 25- 28- 31- 34- 37- 40- 43- 46- 49- 52- 55- 58- 61- 62- 63- 60- 57-
                         54- 51- 48- 45- 42- 39- 36- 33- 30- 27- 24- 21- 18- 15- 12-  9-  6-  3-

 * ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

      MODEL VERSION 2 CHOSEN. THE ADDITIONAL BOUNDARY INFORMATION IS:

           NUMBER OF BOUNDARY SEGMENTS, NSEGMT =      1


 SEGMENT   1.  NUMBER OF NODES, NMNMPB =    1,  EXTERNAL NODE NUMBERS: =  1-  2-  1-
                                                 INTERNAL NODE NUMBERS: =  1-  2-  1-

 * ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *


INFORMATION FOR OPTIONAL ADJUSTMENT OF MEAN-LOW-WATER DATUM EACH TIDAL CYCLE


  TIDAL CYCLE       ADJUSTMENT IN NEW DATUM
                          (M)

        1                   0.0
        2                   0.200
        3                   0.0

     * ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *


INFORMATION FOR OPTIONAL ADJUSTMENT OF TIDAL AMPLITUDE EACH TIDAL CYCLE


  TIDAL CYCLE       ADJUSTMENT IN TIDAL AMPLITUDE
                          (M)

        1                   0.0
        2                   0.150

     * ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

     * ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *
     WIND MAGNITUDE=     10.00  KNOTS      WIND DIRECTION=     270.00  DEGREES TRUE      TIME=     100.00  SECONDS
 RESULTING STRESSES ARE TAUX=        0.000029    AND TAUY =        0.000000

     * ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

          TIME =       200.00 SEC     DELTA T WAS, TINC =    100.00 SEC.     TIME STEP, ITIME =      2

          NET VOLUME ABOVE NEW. VOL=  0.816471E+03     IPOINT=      -1

     * ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *
 NINT  NEXT      DEPTH         X-FLUX        Y-FLUX       ELEVATION      X-VEL         Y-VEL         SYSFN        SYSFQ-X       SYSFQ-Y
    1     1    8.00128       0.00419      -0.00000       0.00128      0.00052      -0.00000      0.1102E+00    -0.1682E+00    0.1036E+02
    2     2    8.00128       0.00424       0.00002       0.00128      0.00053       0.00000      0.4451E+00     0.2930E+02    0.1279E+00
    3     3    8.00128       0.00419      -0.00090       0.00128      0.00052      -0.00000     -0.3061E+00    -0.1042E+00   -0.1006E+02
    4     4    7.99981      -0.00243       0.00000      -0.00018     -0.00030       0.00000     -0.5164E+00     0.9981E+01    0.2882E+01
    5     5    8.00012      -0.00431       0.00003       0.00012     -0.00054       0.00000      0.5923E+00    -0.2207E+02    0.3420E+00
    6     6    7.99981      -0.00243       0.00000      -0.00018     -0.00030       0.00000     -0.5164E+00     0.1025E+02   -0.2882E+01
    7     7    8.00008      -0.00498       0.00000       0.00008     -0.00062       0.00000      0.2898E+00    -0.5303E+00   -0.2186E+02
    8     8    7.99996      -0.00465       0.00004      -0.00004     -0.00058       0.00001      0.3424E+01    -0.3823E+02    0.4182E+00
    9     9    8.00008      -0.00498       0.00000       0.00008     -0.00062       0.00000      0.2898E+00     0.9483E+00    0.2186E+02
   10    10    7.99998      -0.00566       0.00000      -0.00002     -0.00071       0.00000     -0.6038E-01    -0.7118E+00   -0.2209E+02
   11    11    8.00002      -0.00621       0.00004       0.00002     -0.00078       0.00000      0.3201E-01    -0.4443E+02    0.4182E+00
   12    12    7.99998      -0.00566       0.00000      -0.00002     -0.00071       0.00000     -0.6041E-01    -0.2938E+00    0.2209E+02
   13    13    8.00000      -0.00560       0.00000       0.00000     -0.00070       0.00000      0.4366E-02     0.2531E+00   -0.2234E+02
   14    14    7.99999      -0.00558       0.00004      -0.00001     -0.00070       0.00001     -0.1011E-01    -0.4417E+02    0.4182E+00
   15    15    8.00000      -0.00560       0.00000       0.00000     -0.00070       0.00000      0.6335E-02     0.6711E+00    0.2234E+02
   16    16    8.00000      -0.00581       0.00000       0.00000     -0.00073       0.00000      0.4258E-03    -0.3327E+00   -0.2243E+02
   17    17    8.00000      -0.00574       0.00004       0.00000     -0.00072       0.00001      0.1661E-02    -0.4480E+02    0.4182E+00
   18    18    8.00000      -0.00581       0.00000       0.00000     -0.00073       0.00000      0.3946E-03     0.8523E-01    0.2243E+02
   19    19    8.00000      -0.00569       0.00000      -0.00000     -0.00071       0.00000     -0.3238E-03    -0.2000E+00   -0.2232E+02
   20    20    8.00000      -0.00573       0.00004       0.00000     -0.00072       0.00001     -0.9267E-04    -0.4470E+02    0.4182E+00
   21    21    8.00000      -0.00569       0.00000      -0.00000     -0.00071       0.00000     -0.3554E-03     0.2180E+00    0.2232E+02
   22    22    8.00000      -0.00573       0.00000       0.00000     -0.00072       0.00000      0.9777E-04    -0.2041E+00   -0.2236E+02
   23    23    8.00000      -0.00572       0.00004      -0.00000     -0.00071       0.00001     -0.2940E-04    -0.4470E+02    0.4182E+00
   24    24    8.00000      -0.00573       0.00000       0.00000     -0.00072       0.00000      0.4611E-04     0.2139E+00    0.2236E+02
   25    25    8.00000      -0.00572       0.00000      -0.00000     -0.00072       0.00000      0.7327E-05    -0.2111E+00   -0.2235E+02
   26    26    8.00000      -0.00572       0.00004       0.00000     -0.00072       0.00001      0.1653E-04    -0.4470E+02    0.4182E+00
   27    27    8.00000      -0.00572       0.00000      -0.00000     -0.00072       0.00000     -0.2356E-04     0.2048E+00    0.2235E+02
   28    28    8.00000      -0.00572       0.00000       0.00000     -0.00072       0.00000      0.1719E-04    -0.2085E+00   -0.2235E+02
   29    29    8.00000      -0.00572       0.00004      -0.00000     -0.00072       0.00001      0.9537E-06    -0.4470E+02    0.4182E+00
   30    30    8.00000      -0.00572       0.00000      -0.00000     -0.00072       0.00000     -0.1418E-04     0.2094E+00    0.2235E+02
   31    31    8.00000      -0.00572       0.00000       0.00000     -0.00072       0.00000      0.1766E-04    -0.2089E+00   -0.2235E+02
   32    32    8.00000      -0.00572       0.00004       0.00000     -0.00072       0.00001      0.4490E-05    -0.4470E+02    0.4182E+00
   33    33    8.00000      -0.00572       0.00000      -0.00000     -0.00072       0.00000     -0.1369E-04     0.2090E+00    0.2235E+02
   34    34    8.00000      -0.00572       0.00000       0.00000     -0.00072       0.00000      0.1702E-04    -0.2091E+00   -0.2235E+02
   35    35    8.00000      -0.00572       0.00004      -0.00000     -0.00072       0.00001      0.0           -0.4470E+02    0.4182E+00
   36    36    8.00000      -0.00572       0.00000      -0.00000     -0.00072       0.00000     -0.1432E-04     0.2088E+00    0.2235E+02
   37    37    8.00000      -0.00572       0.00000       0.00000     -0.00072       0.00000      0.2290E-04    -0.2091E+00   -0.2235E+02
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38	38	8.00000	-0.00572	0.00004	0.00000	-0.00372	0.00001	0.38168-05	-0.4470F+02	0.4182E+00
39	39	8.00000	-0.00572	0.00000	0.00000	-0.00372	0.00000	+0.8440F+05	0.2384F+00	0.2235E+02
40	40	8.00000	-0.00573	0.00000	0.00000	-0.00372	0.00000	-0.1254E-34	-0.2054F+00	-0.2235E+02
41	41	8.00000	-0.00572	0.00000	-0.00000	-0.00372	0.00000	-0.1254E-34	-0.2054F+00	-0.2235E+02
42	42	8.00000	-0.00573	0.00000	0.00000	-0.00372	0.00001	3.9823E-04	-0.4473F+02	0.4182E+00
43	43	8.00000	-0.00571	0.00000	+0.00000	-0.00372	0.00000	-0.4341E-04	0.2124E+00	0.2235E+02
44	44	8.00000	-0.00574	0.00000	0.00000	-0.00371	0.00000	0.9427E-04	-0.2278F+00	-0.2234E+02
45	45	8.00000	-0.00571	0.00000	-0.00000	-0.00372	0.00001	-0.7516E-03	-0.4475E+02	0.4182E+00
46	46	8.00000	+0.00573	0.00000	0.00000	-0.00371	0.00000	0.6293E-04	0.1902E+00	0.2234E+02
47	47	8.00000	-0.00567	0.00004	-0.00000	-0.00372	0.00000	0.2678E-33	-0.1563E+02	-0.2235E+02
48	48	8.00000	-0.00573	0.00000	0.00000	-0.00371	0.00001	0.3211E-02	-0.4453F+02	0.4182E+00
49	49	8.00000	-0.00576	0.00000	-0.00000	-0.00372	0.00000	0.2159E-05	0.2817E+00	0.2235E+02
50	50	8.00000	-0.00581	0.00004	-0.00000	-0.00372	0.00000	-0.3402E-02	-0.2199E+00	-0.2193E+02
51	51	8.00000	-0.00576	0.00000	-3.00000	-0.00373	0.00001	-0.3907E-02	-0.5098E+02	0.4718E+00
52	52	8.00001	-0.00554	0.00001	-3.00000	-0.00372	0.00000	-0.3035E-02	0.2059F+00	0.2193E+02
53	53	8.00000	-0.00570	0.00004	-0.00000	-0.00371	0.00001	-0.1810E-01	-0.9149E+00	-0.2944E+02
54	54	8.00001	-0.00558	0.00000	0.00001	-0.00370	0.00000	-0.1671E-01	-0.6952E+02	0.6131E+00
55	55	7.99997	-0.00595	0.00000	-0.00003	-0.00374	0.00000	-0.5181E-01	0.2731E+01	-0.2944E+02
56	56	8.00003	+0.00538	0.00004	0.00003	-0.00047	0.00000	0.3955E+00	-0.8482F+02	0.7806E+00
57	57	7.99997	-0.00595	0.00000	-3.00003	-0.00374	0.00000	-0.5187E-01	0.3496F+01	0.3962E+02
58	58	8.00005	-0.00599	0.00000	0.00005	-0.00374	0.00000	-0.2648E-01	-0.7904E+01	-0.1191E+02
59	59	7.99993	-0.00730	0.00001	-0.00007	-0.00001	0.00001	-0.1671E-01	-0.1021E+03	0.1171E+01
60	60	8.00009	-0.00544	0.00000	0.00005	-0.00374	0.00000	-0.2648E-01	-0.6995E+01	0.5169E+02
61	61	7.99985	-0.00158	-0.00158	-0.00015	-0.00020	-0.00020	-0.2107E+01	-0.4018E+02	-0.1509E+02
62	62	7.99967	0.0	0.00000	-0.00033	0.0	0.00000	-0.3676E+01	-0.4202E+02	0.2134E+00
63	63	7.99985	-0.00159	0.00159	-0.00015	-0.00020	0.00020	-0.2107E+01	-0.3955E+02	0.1538E+02

TIME = 500.00 SEC DELTA T WAS, TIME = 100.00 SEC. TIME STEP, ITIME = 5

NET VOLUME ABOVE MLN, VOL= 0.9684326-04 IPOINT= -1

NINT	NEXT	DEPTH	X-FLUX	Y-FLUX	ELEVATION	X-VEL	Y-VEL	SYSFM	SYSFQ-X	SYSFQ-Y
1	1	8.00466	0.02598	-0.00000	0.00466	0.00320	-0.00000	0.2628E+01	0.2823E+00	0.1082E+02
2	2	8.00466	0.02598	-0.00033	0.00466	0.00329	-0.00004	0.1014F+02	0.8087E+02	+0.9393E+00
3	3	8.00466	0.02566	-0.00000	0.00466	0.00321	-0.00000	0.1767E+01	-0.5112F+00	-0.2098E+02
4	4	8.00206	0.01127	-0.00000	0.00206	0.00141	-0.00000	0.5534F+01	0.8276E+01	0.3347E+02
5	5	8.00229	0.01042	-0.00003	0.00229	0.00130	-0.00000	0.1275E+02	0.9994E+02	-0.4605E+00
6	6	8.00205	0.01101	-0.00000	0.00209	0.00138	-0.00000	0.5272E+01	0.7579E+01	-0.9298E+02
7	7	8.00102	-0.00222	0.00000	0.00102	-0.00028	0.00000	0.5463E+01	-0.4444E+01	0.3412E+02
8	8	8.00079	-0.00185	-0.00003	0.00079	-0.00023	-0.00000	0.4617E+01	0.5422E+02	-0.6264E+00
9	9	8.00105	-0.00249	0.00000	0.00105	-0.00031	0.00000	0.5478E+01	-0.4619E+01	-0.3339E+02
10	10	8.00018	-0.01089	0.00000	0.00018	-0.00136	0.00000	0.2177E+01	-0.4729E+01	0.4096E+01
11	11	8.00018	-0.01156	0.00003	0.00018	-0.00144	0.00000	0.2160E+01	-0.5763E+01	-0.3810E+00
12	12	8.00022	-0.01092	0.00000	0.00022	-0.00137	0.00000	0.2229E+01	-0.4864E+01	-0.8870E+01
13	13	7.99981	-0.01445	0.00000	-0.00019	-0.00181	0.00000	-0.3463E-02	0.6520E+01	-0.1726E+02
14	14	8.00003	-0.01442	0.00002	0.00003	-0.00183	0.00000	-0.8191E-01	-0.4374E+02	-0.4001E+00
15	15	7.99985	-0.01445	0.00000	-0.00015	+0.00181	0.00000	0.7064E-01	0.6281E+01	0.1729E+02
16	16	8.00001	-0.01479	0.00000	0.00001	-0.00185	0.00000	-0.1378E+00	0.8809E+00	-0.2379E+02
17	17	7.99996	-0.01300	0.00002	-0.00004	-0.00173	0.00000	0.4272E-01	-0.4497E+02	-0.4015E+00
18	18	8.00005	-0.01479	0.00000	0.00005	-0.00183	0.00000	-0.6430E-01	0.5416E+00	0.2378E+02
19	19	7.99999	-0.01446	0.00000	-0.00001	-0.00181	0.00000	0.2351E-01	-0.1831E+00	-0.2239E+02
20	20	8.00003	-0.01446	0.00002	0.00003	-0.00181	0.00000	-0.7518E+02	-0.4301E+02	-0.3852E+00
21	21	8.00005	-0.01446	0.00000	0.00003	-0.00181	0.00000	0.4751E-01	-0.4507E+00	0.2240E+02
22	22	7.99995	-0.01408	0.00000	-0.00005	-0.00176	0.00000	-0.1058E+00	0.1444E+01	-0.2232E+02
23	23	8.00000	-0.01435	0.00002	-0.00000	-0.00179	0.00000	0.3703E-01	-0.4537E+02	-0.3933E+00
24	24	7.99999	-0.01408	0.00000	-0.00001	-0.00176	0.00000	-0.3220E-31	0.1142E+01	0.2252E+02
25	25	8.00000	-0.01445	0.00000	0.00001	-0.00181	0.00000	0.8599E-02	-0.6343E+00	-0.2235E+02
26	26	7.99999	-0.01417	0.00002	-0.00001	-0.00177	0.00000	-0.4509E-01	-0.4404E+02	-0.3912E+00
27	27	8.00005	-0.01445	0.00000	0.00005	-0.00181	0.00000	0.8227E-01	-0.9816E+00	0.2235E+02
28	28	7.99987	-0.01426	0.00000	-0.00013	-0.00178	0.00000	-0.3589E-01	0.3071E+00	-0.2238E+02
29	29	8.00001	-0.01441	0.00002	0.00001	-0.00180	0.00000	0.3497E-01	-0.4506E+02	-0.3905E+00
30	30	8.00001	-0.01426	0.00000	0.00001	-0.00178	0.00000	0.1779E-01	0.1091E-01	0.2238E+02
31	31	7.99998	-0.01429	0.00000	-0.00002	-0.00179	0.00000	-0.3402E-01	0.2797E+00	-0.2227E+02
32	32	8.00000	-0.01424	0.00002	-0.00000	-0.00178	0.00000	+0.1623E-01	-0.4440E+02	-0.3919E+00
33	33	8.00002	-0.01429	0.00000	0.00002	-0.00179	0.00000	0.1882E-01	0.7722E-02	0.2227E+02
34	34	7.99998	-0.01418	0.00000	-0.00002	-0.00179	0.00000	-0.3168E-01	-0.4438E+00	-0.2234E+02
35	35	8.00000	-0.01436	0.00002	-0.00000	-0.00179	0.00000	+0.4086E-02	-0.4408E+02	-0.3903E+00
36	36	8.00002	-0.01430	0.00000	0.00002	-0.00179	0.00000	0.4226E-01	-0.6174E+00	0.2236E+02
37	37	7.99998	-0.01430	0.00000	-0.00002	-0.00179	0.00000	-0.4087E-01	0.3071E+00	-0.2232E+02
38	38	8.00001	-0.01428	0.00002	0.00001	-0.00178	0.00000	0.2120E-01	-0.4449E+02	-0.3923E+00
39	39	8.00002	+0.01430	0.00000	0.00002	-0.00179	0.00000	0.3269E-01	0.1153E+00	0.2232E+02
40	40	7.99997	-0.01437	0.00000	-0.00003	-0.00180	0.00000	-0.4408E-01	0.1085E+00	-0.2234E+02
41	41	7.99999	-0.01439	0.00002	-0.00001	-0.00180	0.00000	-0.2895E-01	-0.4494E+02	-0.3909E+00
42	42	8.00001	-0.01437	0.00000	0.00001	-0.00180	0.00000	0.2948E-01	0.3344E-01	0.2240E+02
43	43	8.00000	-0.01411	0.00000	0.00000	-0.00176	0.00000	-0.1114E-01	-0.9538E+00	-0.2221E+02
44	44	7.99994	-0.01438	0.00002	-0.00001	-0.00180	0.00000	-0.1187E-01	-0.4446E+02	-0.3874E+00
45	45	8.00004	-0.01411	0.00000	0.00004	-0.00176	0.00000	0.4208E-01	-0.1229E+01	0.2221E+02
46	46	7.99996	-0.01440	0.00000	-0.00004	-0.00181	0.00000	-0.6500E-01	0.1706E+01	-0.2236E+02
47	47	8.00005	-0.01390	0.00002	0.00005	-0.00174	0.00000	0.5477E-01	-0.4380E+02	-0.4016E+00
48	48	8.00000	-0.01440	0.00000	-0.00000	-0.00181	0.00000	0.9520E-02	0.1506E+01	0.2235E+02
49	49	7.99994	-0.01435	0.00000	+0.00004	-0.00179	0.00000	-0.6448E-01	-0.1761E+00	-0.2384E+02
50	50	7.99994	-0.01473	0.00002	-0.00004	-0.00184	0.00000	-0.8878E-01	-0.3211E+02	-0.4312E+00
51	51	8.00000	-0.01436	0.00000	0.00000	-0.00180	0.00000	0.9504E-02	-0.4360E+00	0.2385E+02
52	52	8.00007	-0.01377	0.00000	0.00007	-0.00172	0.00000	0.1080E+00	-0.4660E+01	-0.3852E+02
53	53	8.00000	-0.01468	0.00002	0.00000	-0.00184	0.00000	0.2981E+00	-0.4867E+02	-0.5908E+00
54	54	8.00011	-0.01376	0.00000	0.00011	-0.00172	0.00000	0.2116E+00	-0.5109E+01	0.3842E+02
55	55	7.99989	-0.01538	0.00000	-0.00011	-0.00192	0.00000	-0.1178E+00	0.1648E+02	0.3732E+02
56	56	8.00024	-0.01357	0.00002	0.00024	-0.00170	0.00000	-0.3591E+00	-0.6903E+02	-0.7368E+00
57	57	7.99991	-0.01546	0.00000	-0.00007	-0.00192	0.00000	-0.4906E-01	0.1660E+02	0.3731E+02
58	58	7.99985	-0.01220	0.00000	-0.00015	-0.00153	0.00000	-0.2699E+01	-0.1869E+02	-0.2575E+02
59	59	7.99991	-0.01341	0.00001	-0.00009	-0.00170	0.00000	-0.7901E+01	-0.4262E+02	-0.1878E+01
60	60	7.99984	-0.01220	0.00000	-0.00011	-0.00152	0.00000	-0.2547E+01	-0.2008E+02	0.2557E+02
61	61	7.99991	0.00188	0.00188	-0.00109	0.00023	0.00023	-0.4251E+01	-0.3244E+02	0.4098E+00
62	62	7.99880	0.0	-0.00069	-0.00120	0.0	-0.00001	-0.3243E+01	-0.2529E+02	-0.9948E+00
63	63	7.99893	0.00209	+0.00209	-0.00107	0.00026	-0.00026	-0.4143E+01	-0.3412E+02	-0.2134E+01

TIME= 1000.00SEC ITIME= 10

INTERPOLATION PT	X-VEL	Y-VEL	H	ETA
1	-0.00164	0.00000	8.00411	0.00411
2	-0.00177	0.00000	8.00011	0.00011

```
      TIME=     2300.00SEC      ITIME=    20
INTERPOLATION PT  X-VEL      Y-VEL          H          ETA
   1           -0.00164     0.00000      8.02695     3.02695
   2           -0.00177     0.00000      7.96819    -3.00181

      TIME =     2500.00 SEC     DELTA T WAS, FINC =   100.00 SEC.     TIME STEP, ITIME =    25

      NET VOLUME ABOVE MLW, VOL=  0.1124206+07     IPOINT=     -1

 NINF  NEXT     DEPTH        X-FLUX       Y-FLUX       ELEVATION      X-VEL        Y-VEL        SYSFH        SYSFQ-X      SYSFQ-Y
    1     1    8.07142      0.52830     -0.00000      8.07142      0.06547     -0.00000     0.1239E+02   0.1957E+02   0.1719E+03
    2     2    8.07142      0.54983     -0.01440      8.07142      0.06814     -0.00203     0.4056E+02   0.4108E+03  -0.7353E+01
    3     3    8.07142      0.57083     -0.00000      8.07142      0.07074     -0.00000     0.8751E+01  -0.1124E+02  -0.1090E+03
    4     4    8.06125      0.48296     -0.00000      8.06125      0.05991     -0.00000     0.2767E+02   0.4694E+02   0.3004E+03
    5     5    8.04148      0.48646     -0.00425      8.04148      0.06034     -0.00053     0.6659E+02   0.5960E+03  -0.5140E+01
    6     6    8.05981      0.49442     -0.00000      8.05981      0.06134     -0.00000     0.2715E+02   0.1659E+02  -0.3082E+03
    7     7    8.05320      0.42941     -0.00000      8.05320      0.05331     -0.00000     0.3536E+02   3.726+0E+01  0.2658E+03
    8     8    8.05391      0.42880     -0.00266      8.05391      0.05324     -0.00033     0.6471E+02   0.5908E+03  -0.2382E+01
    9     9    8.05423      0.42479     -0.00000      8.05423      0.05274     -0.00000     0.3487E+02  -0.1621E+02  -0.2859E+03
   10    10    8.04888      0.37369     -0.00000      8.04888      0.04640     -0.00000     0.3326E+02  -0.1218E+02   0.2690E+03
   11    11    8.04838      0.37100      0.00033      8.04838      0.04610      0.00004     0.6459E+02   0.5257E+03  -0.1327E+00
   12    12    8.04775      0.36819     -0.00000      8.04775      0.04575     -0.00000     0.3274E+02  -0.9908E+01  -0.2675E+03
   13    13    8.04218      0.32304     -0.00000      8.04218      0.04017     -0.00000     0.3099E+02   0.2067E+02   0.2936E+03
   14    14    8.04238      0.31844     -0.00044      8.04238      0.03960     -0.00005     0.6009E+02   0.4957E+03  -0.3605E+00
   15    15    8.04138      0.31701     -0.00000      8.04138      0.03942     -0.00000     0.3054E+02   0.2142E+02  -0.2516E+03
   16    16    8.03729      0.27250     -0.00000      8.03729      0.03391     -0.00000     0.2868E+02  -0.9975E+01   0.2387E+03
   17    17    8.03636      0.27136      0.00008      8.03636      0.03377      0.00001     0.5515E+02   0.4641E+03  -0.4295E-01
   18    18    8.03652      0.26762     -0.00000      8.03652      0.03330     -0.00000     0.2826E+02  -0.7553E+01  -0.2378E+03
   19    19    8.03185      0.22787     -0.00000      8.03185      0.02837     -0.00000     0.2615E+02  -0.6218E+01   0.2270E+03
   20    20    8.03185      0.22575     -0.00031      8.03185      0.02811     -0.00004     0.5019E+02   0.4437E+03  -0.2065E+00
   21    21    8.03128      0.22313     -0.00000      8.03128      0.02778     -0.00000     0.2575E+02  -0.4977E+01  -0.2252E+03
   22    22    8.02650      0.18828     -0.00000      8.02650      0.02346     -0.00000     0.2356E+02   0.1180E+02   0.2142E+03
   23    23    8.02658      0.18518     -0.00002      8.02658      0.02307     -0.00000     0.4917E+02   0.4177E+03  -0.8496E-01
   24    24    8.02601      0.18455     -0.00000      8.02601      0.02297     -0.00000     0.2318E+02   0.1349E+02  -0.2125E+03
   25    25    8.02224      0.15063     -0.00000      8.02224      0.01878     -0.00000     0.2112E+02  -0.7960E+01   0.2007E+03
   26    26    8.02169      0.14948     -0.00017      8.02169      0.01864     -0.00002     0.4018E+02   0.3904E+03  -0.1296E+00
   27    27    8.02187      0.14713     -0.00000      8.02187      0.01834     -0.00000     0.2076E+02  -0.6359E+01  -0.1990E+03
   28    28    8.01771      0.11741     -0.00000      8.01771      0.01444     -0.00000     0.1869E+02  -0.1538E+01   0.1682E+03
   29    29    8.01771      0.11621     -0.00004      8.01771      0.01449     -0.00001     0.3550E+02   0.3412E+03  -0.7493E-01
   30    30    8.01742      0.11454     -0.00000      8.01742      0.01429     -0.00000     0.1836E+02  -0.2255E+00  -0.1847E+03
   31    31    8.01346      0.08897     -0.00000      8.01346      0.01110     -0.00000     0.1631E+02   0.6874E+01   0.1711E+03
   32    32    8.01350      0.08692     -0.00009      8.01350      0.01085     -0.00001     0.3083E+02   0.3298E+03  -0.8851E-01
   33    33    8.01326      0.08660     -0.00000      8.01326      0.01081     -0.00000     0.1681E+02   0.7877E+01  -0.1696E+03
   34    34    8.01004      0.06251     -0.00000      8.01004      0.00780     -0.00000     0.1488E+02  -0.6335E+01   0.1544E+03
   35    35    8.00973      0.06208     -0.00004      8.00973      0.00775     -0.00001     0.2640E+02   0.2958E+03  -0.7119E-01
   36    36    8.00990      0.06072     -0.00000      8.00991      0.00758     -0.00000     0.1381E+02  -0.9176E+01  -0.1530E+03
   37    37    8.00647      0.03576     -0.00000      8.00647      0.00497     -0.00000     0.1191E+02  -0.2718E+01   0.1366E+03
   38    38    8.00645      0.03924     -0.00004      8.00645      0.00490     -0.00001     0.2221E+02   0.2586E+03  -0.7340E-01
   39    39    8.00640      0.03864     -0.00000      8.00640      0.00480     -0.00000     0.1167E+02   0.3518E+01  -0.1351E+03
   40    40    8.00347      0.02107     -0.00000      8.00347      0.00263     -0.00000     0.9808E+01   0.4078E+01   0.1174E+03
   41    41    8.00348      0.02000     -0.00001      8.00348      0.00250     -0.00000     0.1808E+02   0.2211E+03  -0.4917E-01
   42    42    8.00345      0.02025     -0.00000      8.00345      0.00253     -0.00000     0.9610E+01   0.4766E+01  -0.1162E+03
   43    43    8.00110      0.00468     -0.00000      8.00110      0.00058     -0.00000     0.7697E+01  -0.5134E+01   0.9805E+02
   44    44    8.00096      0.00458     -0.00001      8.00096      0.00057     -0.00000     0.1378E+02   0.1820E+03  -0.5317E-01
   45    45    8.00112      0.00425     -0.00000      8.00112      0.00053     -0.00000     0.7539E+01  -0.4590E+01  -0.9699E+02
   46    46    7.99869     -0.00788      0.00000     -0.00131     -0.00099      0.00000     0.5498E+01   0.8152E+01   0.7910E+02
   47    47    7.99898     -0.00780      0.00001     -0.00102     -0.00097      0.00000     0.9356E+01   0.1438E+03  -0.4090E-02
   48    48    7.99873     -0.00795      0.00000     -0.00126     -0.00099      0.00000     0.5337E+01   0.8599E+01  -0.7823E+02
   49    49    7.99895     -0.01648      0.00000     -0.00305     -0.00212      0.00000     0.3161E+01   0.4143E+01   0.6050E+02
   50    50    7.99897     -0.01674      0.00001     -0.00303     -0.00209      0.00000     0.5043E+01   0.1138E+03   0.5927E-02
   51    51    7.99702     -0.01675      0.00000     -0.00298     -0.00209      0.00000     0.3077E+01   0.4435E+01  -0.5979E+02
   52    52    7.99559     -0.02274      0.00000     -0.00441     -0.00285      0.00000     9.3094E+00  -0.4942E+01   0.4230E+02
   53    53    7.99541     -0.02350      0.00002     -0.00459     -0.00294      0.00000     -0.2845E+01  0.6350E+02   0.1379E+00
   54    54    7.99446     -0.02225      0.00000     -0.00434     -0.00278      0.00000     0.2726E+00  -0.9706E+01  -0.4196E+02
   55    55    7.99416     -0.02231      0.00000     -0.00584     -0.00279      0.00000     -0.3952E+01  0.1785E+02   0.9578E+01
   56    56    7.99459     -0.02176      0.00003     -0.00541     -0.00272      0.00000     -0.9668E+01  -0.9399E+01  0.2693E+00
   57    57    7.99422     -0.02168      0.00000     -0.00578     -0.00271      0.00000     -0.3957E+01  0.1761E+02  -0.9676E+01
   58    58    7.99354     -0.01347      0.00000     -0.00646     -0.00168      0.00000     -0.6372E+01  0.6664E+01  -0.3220E+01
   59    59    7.99348     -0.01285      0.00009     -0.00652     -0.00161      0.00001     -0.1405E+02  -0.1095E+01  0.5415E+00
   60    60    7.99356     -0.01269      0.00000     -0.00642     -0.00159      0.00000     -0.6393E+01  0.6033E+01  0.2747E+01
   61    61    7.99220     -0.00044     -0.00044     -0.00780     -0.00006     -0.00006     -0.5235E+01  -0.7844E+01  0.9577E+00
   62    62    7.99215      0.0         -0.00073     -0.00785      0.0         -0.00009     -0.5093E+01  -0.6123E+01  0.1753E+00
   63    63    7.99220      0.00108     -0.00108     -0.00780      0.00014     -0.00014     -0.5296E+01  -0.8543E+01  -0.1201E+01

      TIME=     3000.00SEC      ITIME=    30
INTERPOLATION PT  X-VEL      Y-VEL          H          ETA
   1            0.04285     -0.00002      8.06773     3.06773
   2           -0.00020     -0.00000      8.00480     0.00480

      TIME=     4000.00SEC      ITIME=    40
INTERPOLATION PT  X-VEL      Y-VEL          H          ETA
   1            0.04285     -0.00002      8.12289     0.12289
   2           -0.00020     -0.00000      8.03387     0.03387

     WIND MAGNITUDE=     10.00  KNOTS     WIND DIRECTION=    270.00  DEGREES TRUE     TIME=    5000.00  SECONDS
RESULTING STRESSES ARE TAUX=       0.000029   AND TAUY =       0.000000
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TIME = 5000.00 SEC DELTA T WAS: TINC = 100.00 SEC. TIME STEP, ITINC = 50

NET VOLUME ABOVE MLW, VOL= 0.8470ZDE+07 IPOINT= -1

NINT	NEXT	DEPTH	X-FLUX	Y-FLUX	ELEVATION	X-VEL	Y-VEL	SYSH	SYSFQ-X	SYSFQ-Y
1	1	0.25618	1.85734	-C.00001	0.25618	0.22509	-0.00000	0.2308F+02	0.3546F+02	0.1572F+03
2	2	0.25618	1.94759	-0.05968	0.25618	0.23A03	-0.00723	0.4682E+02	0.6449E+03	-0.1358E+02
3	3	0.25618	2.03667	-0.00001	0.25618	0.24685	-0.00000	0.1654E+02	-0.3830E+02	-0.1644E+03
4	4	0.23479	1.80454	-0.00001	0.23479	0.21914	-0.00000	0.5156E+02	0.1150E+03	0.4710E+03
5	5	0.23379	1.83251	-0.01712	0.23379	0.22256	-0.00208	0.1262E+03	0.4450E+03	-0.8931E+01
6	6	0.22912	1.86493	-0.00001	0.22912	0.22687	-0.00000	0.5072E+02	0.1334F+01	-0.4035F+03
7	7	0.21969	1.72856	-C.00001	0.21969	0.21006	-0.00000	0.4625E+02	-0.1360E+02	0.4667E+03
8	8	0.21967	1.72861	-C.01091	0.21967	0.21016	-0.00128	0.1294E+03	0.9183E+03	-0.3021E+01
9	9	0.21930	1.72232	-C.00001	0.21930	0.20965	-0.00000	0.4544E+02	-0.4438E+02	-0.4443E+03
10	10	0.20424	1.62567	-0.00001	0.20424	0.19813	-0.00000	0.4307F+02	-0.2435F+02	0.4534E+03
11	11	0.20144	1.62180	0.00175	0.20184	0.19764	0.00021	0.1232E+03	0.8932E+03	0.1590E+00
12	12	0.19920	1.61958	-0.00001	0.19920	0.19703	-0.00000	0.6217E+02	-0.1909E+02	-0.4504E+03
13	13	0.18782	1.53169	-0.00001	0.18782	0.18707	-0.00000	0.5999E+02	0.4506E+02	0.4393F+03
14	14	0.18705	1.52203	-0.00209	0.18705	0.18591	-0.00026	0.1173E+03	0.8694E+03	-0.2458E+00
15	15	0.18377	1.51775	-C.00000	0.18377	0.18544	-0.00000	0.5917E+02	0.4502E+02	-0.4382E+03
16	16	0.17564	1.43459	-0.00001	0.17564	0.17565	-0.00000	0.5727E+02	-0.2618E+02	0.4278E+03
17	17	0.17224	1.43067	C.00061	0.17224	0.17506	0.00007	0.1119E+03	0.8449E+03	0.1331E+00
18	18	0.17143	1.42350	-0.00000	0.17144	0.17420	-0.00000	0.5665E+02	-0.1988E+02	-0.4267F+03
19	19	0.16213	1.34466	-0.00001	0.16213	0.16474	-0.00000	0.5467E+02	-0.1287E+02	0.4184F+03
20	20	0.16056	1.33961	-0.00112	0.16056	0.16413	-0.00014	0.1068E+03	0.8453E+03	-0.1353E+00
21	21	0.15845	1.31298	-C.00000	0.15845	0.16339	-0.00000	0.5188E+02	-0.1127E+02	-0.4187E+03
22	22	0.14893	1.26075	-0.00001	0.14893	0.15471	-0.00000	0.5218E+02	0.1071E+02	0.4062E+03
23	23	0.14795	1.25339	-C.00006	0.14795	0.15384	-0.00001	0.1020E+03	0.8068E+03	0.2933E-01
24	24	0.14583	1.25061	-0.00000	0.14633	0.15351	-0.00000	0.4139E+02	0.3441E+02	-0.4033E+03
25	25	0.13829	1.17757	-C.00001	0.13829	0.14470	-0.00000	0.4982F+02	-0.2086F+02	0.3958E+03
26	26	0.13567	1.17379	-C.00072	0.13567	0.14428	-0.00009	0.9725F+02	0.7434E+03	-0.1130E+00
27	27	0.13502	1.16718	-0.00000	0.13502	0.14348	-0.00000	0.4907E+02	-0.1846E+02	-0.3948F+03
28	28	0.12679	1.09854	-C.00001	0.12679	0.13518	-0.00000	0.4751E+02	-0.4029E+01	0.3848E+03
29	29	0.12564	1.09034	-0.00030	0.12564	0.13468	-0.00004	0.4279E+02	0.7A02E+03	-0.2701E-01
30	30	0.12368	1.08891	-C.00000	0.12388	0.13404	-0.00000	0.4677E+02	-0.9795E+00	-0.3838F+03
31	31	0.11575	1.02557	-0.00000	0.11475	0.12637	-0.00000	0.4534E+02	0.2102E+02	0.3714E+03
32	32	0.11476	1.01903	-C.00052	0.11476	0.12558	-0.00006	0.8878E+02	0.7317E+03	-0.9773E-01
33	33	0.11289	1.01814	-0.00000	0.11289	0.12525	-0.00000	0.4403E+02	0.2327E+02	-0.3704E+03
34	34	0.10675	0.95195	-0.00000	0.10675	0.11743	-0.00000	0.4357E+02	-0.1912E+02	0.3549E+03
35	35	0.10466	0.94855	-0.00037	0.10466	0.11704	-0.00005	0.8561E+02	0.6998E+03	-0.4262E+01
36	36	0.10406	0.94306	-C.00000	0.10404	0.11637	-0.00000	0.4288F+02	-0.1659E+02	-0.3538E+03
37	37	0.09699	0.88109	-0.00000	0.09699	0.10892	-0.00000	0.4225E+02	0.4983E+01	0.3344E+03
38	38	0.09630	0.87716	-0.00043	0.09830	0.10834	-0.00005	0.8325E+02	0.6520E+03	-0.5196E-01
39	39	0.09451	0.87245	-C.00000	0.09451	0.10778	-0.00000	0.4160E+02	0.7286E+04	-0.3333E+03
40	40	0.08829	0.81312	-0.00000	0.08829	0.10093	-0.00000	0.4143E+02	0.1452E+02	0.3102E+03
41	41	0.08732	0.80747	-C.00036	0.08732	0.09984	-0.00004	0.8213E+02	0.6012E+03	-0.5673E-01
42	42	0.08600	0.80448	-C.00000	0.08600	0.09954	-0.00000	0.4081E+02	0.1485E+02	-0.3087E+03
43	43	0.08122	0.74307	-C.00000	0.08122	0.09195	-0.00000	0.4123E+02	-0.1383E+02	0.2829E+03
44	44	0.07965	0.73959	-0.00037	0.07965	0.09154	-0.00005	0.8148E+02	0.5444E+03	-0.4771E-01
45	45	0.07912	0.73504	-0.00000	0.07912	0.09098	-0.00000	0.4067E+02	-0.1367E+02	-0.2812E+03
46	46	0.07366	0.67350	-0.00000	0.07366	0.08339	-0.00000	0.4156E+02	0.1327E+02	0.2543E+03
47	47	0.07339	0.66952	-C.00033	0.07340	0.08290	-0.00004	0.8292E+02	0.4870E+03	-0.4136E-01
48	48	0.07179	0.66552	-0.00000	0.07179	0.08245	-0.00000	0.4103E+02	0.1568E+02	-0.2524E+03
49	49	0.06751	0.60390	-C.00000	0.06751	0.07486	-0.00000	0.4495E+02	0.1258E+02	0.2394E+03
50	50	0.06671	0.59888	-0.00027	0.06672	0.07424	-0.00003	0.9586E+02	0.4825E+03	-0.5316E-01
51	51	0.06579	0.59620	-C.00000	0.06580	0.07392	-0.00000	0.4444E+02	0.1565E+02	-0.2369E+03
52	52	0.06153	0.51728	-0.00000	0.06153	0.06417	-0.00000	0.5767E+02	-0.1242E+02	0.2568E+03
53	53	0.06055	0.51348	-0.00029	0.06059	0.06370	-0.00004	0.1270E+03	0.5176E+03	-0.8299E-01
54	54	0.06006	0.50992	-0.00000	0.06006	0.06326	-0.00000	0.5695E+02	-0.7999E+01	-0.2566E+03
55	55	0.05383	0.46017	-C.00000	0.05383	0.04971	-0.00000	0.7673E+02	0.4560E+02	0.2570E+03
56	56	0.05419	0.39951	-0.00009	0.05419	0.04911	-0.00001	0.1660E+03	0.4068E+03	-0.3923E+00
57	57	0.05265	0.38280	-C.00000	0.05265	0.04878	-0.00000	0.7621E+02	0.5531E+02	-0.2519E+03
58	58	0.04764	0.24941	-0.00000	0.04764	0.03099	-0.00000	0.1087E+03	0.4420E+02	0.2179E+03
59	59	0.04752	0.24590	-0.00069	0.04752	0.03054	-0.00009	0.2592E+03	0.3667E+03	0.6749E+01
60	60	0.04690	0.24287	-0.00000	0.04690	0.03018	-0.00000	0.1083E+03	0.6197E+02	-0.2080F+03
61	61	0.04261	0.00495	0.00095	0.04261	0.00001	0.00001	0.9796E+02	0.1075E+03	0.5837E+02
62	62	0.04312	0.0	C.CCA00	0.04312	0.0	0.00076	0.9791E+02	0.1309F+03	0.7973E+01
63	63	0.04234	-0.00044	0.00044	0.04234	-0.00040	0.00040	0.9785E+02	0.1293E+03	-0.3956E+02

TIME= 5000.00SEC ITIME= 50

INTERPOLATION PT	X-VEL	Y-VEL	H	ETA
1	0.19177	-0.00002	0.19444	0.19444
2	0.00722	-0.00004	0.07492	0.07492

TIME= 6000.00SEC ITIME= 60

INTERPOLATION PT	X-VEL	Y-VEL	H	ETA
1	0.19177	-0.00002	0.27868	0.27868
2	0.00722	-0.00004	0.14489	0.14489

TIME= 7000.00SEC ITIME= 70

INTERPOLATION PT	X-VEL	Y-VEL	H	ETA
1	0.19177	-0.00002	0.37987	0.37987
2	0.00722	-0.00004	0.23528	0.23528

TIME = 7500.00 SEC DELTA T WAS. TIME = 100.00 SEC. TIME STEP, ITIME = 75

NET VOLUME ABOVE MLW, VOL= 0.291557E+08 IPOINT= -1

NINT	NEXT	DEPTH	X-FLUX	Y-FLUX	ELEVATION	X-VEL	Y-VEL	SYSFM	SYSFQ-X	SYSFQ-Y
1	1	8.53333	3.19718	-0.00002	0.53333	0.37494	-0.00000	0.3140E+02	0.6205E+02	0.1014E+03
2	2	8.53333	3.34031	-0.16183	0.53333	0.39279	-0.01194	0.1190E+03	0.4145E+03	-0.6936E+01
3	3	8.53333	3.50097	-0.00001	0.53333	0.41057	-0.00000	0.2290E+02	-0.6649E+02	-0.1068E+03
4	4	8.50132	3.14505	-0.00001	0.50132	0.36995	-0.00000	0.7167E+02	3.1789E+03	0.3031E+03
5	5	8.49844	3.19370	-0.02892	0.49844	0.37578	-0.00317	0.1743E+03	0.8364E+03	-0.3958E+01
6	6	8.49144	3.24912	-0.00001	0.49144	0.38263	-0.00000	0.7116E+02	-0.5120E+01	-0.3097E+03
7	7	8.47668	3.04407	-0.00001	0.47668	0.35911	-0.00000	0.9449E+02	-0.1259E+02	0.2966E+03
8	8	8.47062	3.04403	-0.01642	0.47062	0.35936	-0.00194	0.1875E+03	0.5870E+03	-0.1460E+01
9	9	8.46935	3.03897	-0.00001	0.46935	0.35882	-0.00000	0.9400E+02	-0.6853E+02	-0.2968E+03
10	10	8.45322	2.89724	-0.00001	0.45322	0.34274	-0.00000	0.9317E+02	-0.6706E+02	0.2875E+03
11	11	8.44883	2.89042	0.00397	0.44883	0.34217	0.00047	0.1850E+03	0.5676E+03	0.4283E+00
12	12	8.44432	2.88499	-0.00001	0.44432	0.34154	-0.00000	0.9266E+02	-0.9005E+02	-0.2867E+03
13	13	8.42806	2.75449	-0.00001	0.42806	0.32665	-0.00000	0.9189E+02	0.6980E+02	0.2775E+03
14	14	8.42639	2.74201	-0.00301	0.42639	0.32561	-0.00036	0.1827E+03	0.5471E+03	-0.6679E+01
15	15	8.42078	2.73510	-0.00001	0.42078	0.32490	-0.00000	0.9141E+02	0.7012E+02	-0.2764E+03
16	16	8.40980	2.60319	-0.00001	0.40981	0.30954	-0.00000	0.9003E+02	-0.3791E+02	0.2669E+03
17	17	8.40411	2.59774	0.00160	0.40411	0.30910	0.00019	0.1804E+03	0.5253E+03	0.2239E+00
18	18	8.40220	2.58820	-0.00001	0.40220	0.30804	-0.00000	0.9035E+02	-0.2645E+02	-0.2659E+03
19	19	8.39035	2.45858	-0.00001	0.39035	0.29302	-0.00000	0.8977E+02	-0.2719E+02	0.2594E+03
20	20	8.38715	2.49031	-0.00143	0.38715	0.29215	-0.00017	0.1784E+03	0.5017E+03	0.5864E-01
21	21	8.38359	2.44165	-0.00001	0.38359	0.29124	-0.00000	0.8931E+02	-0.2377E+02	-0.2543E+03
22	22	8.37154	2.31643	-0.00001	0.37154	0.27670	-0.00000	0.8847E+02	0.5195E+02	0.2429E+03
23	23	8.36973	2.30423	0.00037	0.36973	0.27554	0.00004	0.1763E+03	0.4756E+03	0.8591E-01
24	24	8.36489	2.30102	-0.00001	0.36489	0.27508	-0.00000	0.8823E+02	0.5967E+02	-0.2416E+03
25	25	8.35735	2.17261	-0.00001	0.35735	0.25996	-0.00000	0.8766E+02	-0.2782E+02	0.2288E+03
26	26	8.35283	2.16606	-0.00077	0.35283	0.25932	-0.00009	0.1742E+03	0.4467E+03	0.1007E+01
27	27	8.35126	2.15636	-0.00001	0.35126	0.25821	-0.00000	0.8726E+02	-0.2294E+02	-0.2275E+03
28	28	8.34288	2.03137	-0.00001	0.34288	0.24349	-0.00000	0.8665E+02	-0.1763E+02	0.2138E+03
29	29	8.34026	2.02347	-0.00005	0.34026	0.24262	-0.00001	0.1722E+03	0.4156E+03	0.1032E+00
30	30	8.33706	2.01958	-0.00001	0.33706	0.24176	-0.00000	0.8627E+02	-0.1101E+02	-0.2125E+03
31	31	8.32888	1.89417	-0.00001	0.32888	0.22742	-0.00000	0.8564E+02	0.6299E+02	0.1980E+03
32	32	8.32737	1.88304	-0.00067	0.32738	0.22624	-0.00006	0.1704E+03	0.3838E+03	0.2435E+01
33	33	8.32393	1.87797	-0.00001	0.32393	0.22562	-0.00000	0.8529E+02	0.4841E+02	-0.1966E+03
34	34	8.31886	1.79464	-0.00001	0.31886	0.21092	-0.00000	0.8480E+02	-0.2179E+02	0.1819E+03
35	35	8.31529	1.74777	-0.00022	0.31529	0.21019	-0.00003	0.1687E+03	0.3520E+03	0.4337E-01
36	36	8.31385	1.73852	-0.00001	0.31385	0.20911	-0.00000	0.8448E+02	-0.1369E+02	-0.1806E+03
37	37	8.30845	1.61814	-0.00001	0.30845	0.19476	-0.00000	0.8407E+02	-0.7454E+01	0.1663E+03
38	38	8.30655	1.60971	-0.00036	0.30655	0.19379	-0.00004	0.1674E+03	0.3207E+03	0.4855E-01
39	39	8.30384	1.60169	-0.00001	0.30384	0.19288	-0.00000	0.8377E+02	-0.1730E+01	-0.1649E+03
40	40	8.29877	1.48415	-0.00001	0.29877	0.17884	-0.00000	0.8341E+02	0.3635E+02	0.1511E+03
41	41	8.29758	1.47426	-0.00026	0.29758	0.17767	-0.00003	0.1663E+03	0.2910E+03	-0.1492E-01
42	42	8.29453	1.46756	-0.00000	0.29453	0.17693	-0.00000	0.8315E+02	0.4223E+02	-0.1497E+03
43	43	8.29213	1.34855	-0.00001	0.29213	0.16261	-0.00000	0.8298E+02	-0.1501E+02	0.1362E+03
44	44	8.28938	1.34076	-0.00032	0.28938	0.16174	-0.00004	0.1654E+03	0.2615E+03	0.1520E-01
45	45	8.28827	1.33144	-0.00000	0.28827	0.16064	-0.00000	0.8273E+02	-0.9293E+01	-0.1349E+03
46	46	8.28515	1.21468	-0.00001	0.28515	0.14661	-0.00000	0.8267E+02	-0.1685E+00	0.1218E+03
47	47	8.28388	1.20952	-0.00023	0.28388	0.14553	-0.00003	0.1649E+03	0.2325E+03	0.5893E-01
48	48	8.28167	1.19767	-0.00000	0.28167	0.14459	-0.00000	0.8245E+02	0.5754E+01	-0.1204E+03
49	49	8.27885	1.08198	-0.00001	0.27885	0.13069	-0.00000	0.8790E+02	0.3570E+02	0.1136E+03
50	50	8.27612	1.07221	-0.00023	0.27612	0.12952	-0.00003	0.1867E+03	0.2278E+03	-0.2647E-01
51	51	8.27575	1.06494	-0.00000	0.27575	0.12863	-0.00000	0.8770E+02	0.4266E+02	-0.1120E+03
52	52	8.27401	0.92003	-0.00000	0.27401	0.11129	-0.00000	0.1098E+03	-0.1081E+02	0.1186E+03
53	53	8.27221	0.91243	-0.00027	0.27221	0.11030	-0.00003	0.2415E+03	0.2387E+03	-0.1753E+00
54	54	8.27134	0.90312	-0.00000	0.27134	0.10919	-0.00000	0.1096E+03	-0.3479E-01	-0.1166E+03
55	55	8.26795	0.78888	-0.00000	0.26795	0.09564	-0.00000	0.1431E+03	0.1632E+02	0.1165E+03
56	56	8.26750	0.69775	-0.00092	0.26750	0.08440	-0.00011	0.3084E+03	0.2168E+03	-0.7413E+00
57	57	8.26587	0.68962	-0.00000	0.26587	0.08343	-0.00000	0.1429E+03	0.3298E+02	-0.1133E+03
58	58	8.26272	0.44202	-0.00000	0.26272	0.05360	-0.00000	0.1989E+03	0.8204E+02	0.9508E+02
59	59	8.26293	0.43049	-0.00274	0.26293	0.05210	-0.00033	0.4449E+03	0.1936E+03	0.6711E+01
60	60	8.26138	0.41871	-0.00000	0.26138	0.05068	-0.00000	0.1987E+03	0.1144E+03	-0.8641E+02
61	61	8.25942	0.02503	0.02503	0.25942	0.00303	0.00303	0.1775E+03	0.7446F+02	0.3000E+02
62	62	8.25929	0.0	0.02369	0.25929	0.0	0.00287	0.1775F+03	0.1332E+03	0.8043E+01
63	63	8.25915	-0.02491	0.02491	0.25915	-0.00302	0.00302	0.1775E+03	0.1083E+03	-0.1129E+02

TIME= 8000.00SEC ITIME= 80

INTERPOLATION PT	X-VEL	Y-VEL	H	ETA
1	0.33379	0.00006	8.49805	0.49805
2	0.19369	-0.00003	8.34175	0.34175

TIME= 9000.00SEC ITIME= 90

INTERPOLATION PT	X-VEL	Y-VEL	H	ETA
1	0.33379	0.00006	8.62549	0.62550
2	0.19369	-0.00003	8.46209	0.46209

WIND MAGNITUDE= 10.00 KNOTS WIND DIRECTION= 270.00 DEGREES TRUE TIME= 10000.00 SECONDS
RESULTING STRESSES ARE TAUX= 0.000029 AND TAUY = 0.000000

Partial Listing of Punched Velocities for Example 1.
Data is punched in pairs of x and y velocity components
for each node in internal node numbering order.

ITIME = 25, TIME = 2500 seconds

0.07	-0.00	0.07	-0.00	0.07	-0.00	0.06	-0.00
0.06	-0.00	0.06	-0.00	0.05	-0.00	0.05	-0.00
0.05	-0.00	0.05	-0.00	0.05	0.00	0.05	-0.00
0.04	-0.00	0.04	-0.00	0.04	-0.00	0.03	-0.00
0.03	0.00	0.03	-0.00	0.03	-0.00	0.03	-0.00
0.03	-0.00	0.02	-0.00	0.02	-0.00	0.02	-0.00
0.02	-0.00	0.02	-0.00	0.02	-0.00	0.01	-0.00
0.01	-0.00	0.01	-0.00	0.01	-0.00	0.01	-0.00
0.01	-0.00	0.01	-0.00	0.01	-0.00	0.01	-0.00
0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00
0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00
0.00	-0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00
-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00
-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00
-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00
-0.00	-0.00	0.0	-0.00	0.00	-0.00		

ITIME = 75, TIME = 7500 seconds

0.37	-0.00	0.38	-0.01	0.41	-0.00	0.37	-0.00
0.36	-0.00	0.36	-0.00	0.36	-0.00	0.36	-0.00
0.36	-0.00	0.34	-0.00	0.34	0.00	0.34	-0.00
0.33	-0.00	0.33	-0.00	0.32	-0.00	0.31	-0.00
0.31	0.00	0.31	-0.00	0.29	-0.00	0.29	-0.00
0.29	-0.00	0.28	-0.00	0.28	0.00	0.28	-0.00
0.24	-0.00	0.24	-0.00	0.24	-0.00	0.24	-0.00
0.24	-0.00	0.24	-0.00	0.23	-0.00	0.23	-0.00
0.23	-0.00	0.21	-0.00	0.21	-0.00	0.21	-0.00
0.19	-0.00	0.19	-0.00	0.19	-0.00	0.18	-0.00
0.18	-0.00	0.19	-0.00	0.16	-0.00	0.16	-0.00
0.16	-0.00	0.15	-0.00	0.15	-0.00	0.14	-0.00
0.13	-0.00	0.13	-0.00	0.13	-0.00	0.11	-0.00
0.11	-0.00	0.11	-0.00	0.09	-0.00	0.08	-0.00
0.08	-0.00	0.08	-0.00	0.05	-0.00	0.05	-0.00
0.00	0.00	0.0	0.00	-0.00	0.00		

ITIME = 125, TIME = 12500 seconds

0.46	-0.00	0.49	-0.01	0.50	-0.00	0.46	-0.00
0.46	-0.00	0.47	-0.00	0.45	-0.00	0.45	-0.00
0.45	-0.00	0.43	-0.00	0.43	0.00	0.43	-0.00
0.41	-0.00	0.41	-0.00	0.41	-0.00	0.39	-0.00
0.39	0.00	0.39	-0.00	0.37	-0.00	0.37	-0.00
0.37	-0.00	0.35	-0.00	0.35	0.00	0.35	-0.00
0.33	-0.00	0.33	-0.00	0.33	-0.00	0.31	-0.00
0.31	0.00	0.31	-0.00	0.29	-0.00	0.29	-0.00
0.29	-0.00	0.27	-0.00	0.27	-0.00	0.27	-0.00
0.25	-0.00	0.25	-0.00	0.25	-0.00	0.23	-0.00
0.23	-0.00	0.23	-0.00	0.21	-0.00	0.21	-0.00
0.21	-0.00	0.19	-0.00	0.19	-0.00	0.19	-0.00
0.17	-0.00	0.17	-0.00	0.17	-0.00	0.14	-0.00
0.14	-0.00	0.14	-0.00	0.11	-0.00	0.11	-0.00

(continued from page 30)

0.11	-0.00	0.07	-0.00	0.07	-0.00	0.06	-0.00
0.01	0.01	0.0	0.01	-0.01	0.01		

ITIME = 175, TIME = 17500 seconds

0.38	-0.00	0.40	-0.01	0.42	-0.00	0.38	-0.00
0.39	-0.00	0.39	-0.00	0.37	-0.00	0.37	-0.00
0.37	-0.00	0.36	-0.00	0.36	0.00	0.36	-0.00
0.35	-0.00	0.35	-0.00	0.35	-0.00	0.33	-0.00
0.33	0.00	0.33	-0.00	0.32	-0.00	0.32	-0.00
0.32	-0.00	0.30	-0.00	0.30	0.00	0.30	-0.00
0.29	-0.00	0.29	-0.00	0.29	-0.00	0.27	-0.00
0.27	0.00	0.27	-0.00	0.25	-0.00	0.25	-0.00
0.25	-0.00	0.24	-0.00	0.24	0.00	0.24	-0.00
0.22	-0.00	0.22	-0.00	0.22	-0.00	0.20	-0.00
0.20	-0.00	0.20	-0.00	0.19	-0.00	0.18	-0.00
0.18	-0.00	0.17	-0.00	0.17	-0.00	0.17	-0.00
0.15	-0.00	0.15	-0.00	0.15	-0.00	0.13	-0.00
0.13	-0.00	0.12	-0.00	0.10	-0.00	0.10	-0.00
0.10	-0.00	0.08	-0.00	0.08	-0.00	0.08	-0.00
0.01	0.01	0.0	0.01	-0.01	0.01		

ITIME = 225, TIME = 22500 seconds

0.05	-0.00	0.07	-0.00	0.07	-0.00	0.11	-0.00
0.14	-0.00	0.12	-0.00	0.10	-0.00	0.02	-0.00
0.10	-0.00	0.07	-0.00	0.19	0.00	0.07	-0.00
0.13	-0.00	-0.03	-0.00	0.13	-0.00	0.02	-0.00
0.21	0.00	0.02	-0.00	0.18	-0.00	-0.04	-0.00
0.15	-0.00	-0.03	0.00	0.19	0.00	-0.03	0.00
0.20	-0.00	-0.03	-0.00	0.20	-0.00	-0.05	0.00
0.15	0.00	-0.05	0.00	0.19	-0.00	0.01	-0.00
0.13	-0.00	-0.04	0.00	0.10	0.00	-0.04	0.00
0.15	-0.00	0.05	0.00	0.14	-0.00	-0.01	0.00
0.09	-0.00	-0.01	0.00	0.09	-0.00	0.06	0.00
0.03	-0.00	0.03	-0.00	0.04	-0.00	0.02	-0.00
0.05	-0.00	0.05	0.00	0.05	-0.00	0.04	-0.00
0.03	-0.00	0.03	-0.00	0.03	-0.00	0.03	-0.00
0.03	-0.00	0.02	-0.00	0.02	-0.00	0.02	-0.00
0.00	0.00	0.0	0.00	-0.00	0.00		

5.0 Example 2: Lake Problem

The finite element grid used is the same as for example 1. The four sides together constitute a single no-flux land boundary. The initial depth is prescribed as a constant 8 meters. Since there are no prescribed height nodes (ocean boundary) in this problem IVERSN = 1 is chosen as defined in section 2.0. The option for wind force to remain constant over the entire run is chosen with wind at 10 knots at 270°N.

The computation is run from 0.0 seconds to 25 000 seconds with a time increment of 100 seconds. The crude stability control, BOUND, equals 5 meters at node 40. Output is printed every 25 timesteps. Convective terms are included.

The eddy viscosity coefficients are held spatially constant with $E_{xx} = E_{yy} = E_{xy} = 500$ meter^2/second. The bottom friction coefficient is spatially constant at 0.01. Initial flux and surface rise are set to zero. Punching for hot starting is desired at the last timestep.

The input is as follows:

```
Variable Array Dimension Specification:
          MSIZE = (80*1)*14 + (63+1)*(38+5*5)
                + (0+1)*(3+2*5) + (45+1)*(4+4*5)
                + (0+1)*2 + (1+1)*(1+45) + (0+1)*(2+0)
                + (0+1) + (0+1) + (0+1)*5 + 24 = 6386
          DIMENSION ARAY (6386), IARAY (6386) . . . . . MAIN0009
          DATA MSIZE/6386/ . . . . . .MAIN0011

Card 1:      IVERSN   =  1
             NMEL     = 80
             NMNP     = 63
             IBFRIC   =  2
             IDEPTH   =  2
             IEDVIS   =  2
             IWIND    =  2
             INPUTH   =  1
             INPUTQ   =  1
             ICNVEC   =  2
             NRUN     =  2

Card 2:      MAXHBN   =  0
             MAXQBN   = 45
             MAXBWH   =  5
             MAXPT    =  0
             MAXLB    =  1
             MAXLBN   = 45
             MAXOB    =  0
             MAXOBN   =  0
             MAXLW    =  0
             MAXDT    =  0
             MAXWI    =  0
```

Card 3: FINE GRID EXAMPLE FOR CAFE-1 LAKE PROBLEM

Cards 4-66:

NEXT(I)	NBC(I)	XORD(I)	YORD(I)	DEPTH(I)	DUM1	DUM2	DUM3	DUM4
1	1	0.0	0.0	8.0	0.0	225.0	-	-
2	1	0.0	1250.0	-	0.0	180.0	-	-
3	1	0.0	2500.0	-	0.0	135.0	-	-
4	1	1250.0	0.0	-	0.0	270.0	-	-
5	0	1250.0	1250.0	-	-	-	-	-
6	1	1250.0	2500.0	-	0.0	90.0	-	-
7	1	2500.0	0.0	-	0.0	270.0	-	-
8	0	2500.0	1250.0	-	-	-	-	-
9	1	2500.0	2500.0	-	0.0	90.0	-	-
10	1	3750.0	0.0	-	0.0	270.0	-	-
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
61	1	30000.0	0.0	-	0.0	315.0	-	-
62	1	30000.0	1250.0	-	0.0	0.0	-	-
63	1	30000.0	2500.0	-	0.0	45.0	-	-

Cards 66-146:

N(I)	ICON(N(I),1)	ICON(N(I),2)	ICON(N(I),3)	CF(I)	EDXX(I)	EDYY(I)	EDXY(I)
1	3	2	6	0.01	500.0	500.0	500.0
2	2	1	4	-	-	-	-
3	6	2	5	-	-	-	-
4	2	4	5	-	-	-	-
5	6	5	9	-	-	-	-
6	5	4	7	-	-	-	-
7	9	5	8	-	-	-	-
8	5	7	8	-	-	-	-
9	9	8	12	-	-	-	-
10	8	7	10	-	-	-	-

etc.

Card 147:

ALATT = 40.0
OMEGA = 72.722E-06
GRAVT = 9.81
PERIOD = 0.0
DENSTY = 1000.0

Card 148:

STRTIM = 0.0
ENDTIM = 25000.0
TINC = 100.0
N Ø = 40
BOUND = 5.0
IDT = 2
NOUT = 25
ITIMC = 250
IVELW = 0
IVELP = 0

Card 149:

NMLB = 1
NMLBN(1) = 45

Cards 150-152:

ICONL(I,1), I = 1, 45
1,4,7,10,13,16,19,22,25,28,31,34,37,40,43,46,49,52,55,58
61,62,63,60,57,54,51,48,45,42,39,36,33,30,27,24,21,18,15,12,
9,6,3,2,1

Card 153:

IVERSN = 0

The output for this example is given on pages 35 to 40.

Printed Output for Example 2.0

FINE GRID EXAMPLE FOR CASE=1 LAKE PROBLEM

THIS PROBLEM HAS THE FOLLOWING CHARACTERISTICS:

NUMBER OF ELEMENTS, NNEL = 40
NUMBER OF NODES, NNNP = 63
THE MODEL APPLIED IS VERSION 1
IT IS ASSUMED THAT SPATIALLY
BOTTOM FRICTION IS CONSTANT
MEAN LOW WATER DEPTH IS CONSTANT
EDDY VISCOSITY IS CONSTANT
WIND STRESS IS CONSTANT IN TIME AND IS SPATIALLY CONSTANT
INITIAL VALUES OF H ARE SET TO 0
INITIAL VALUES OF Q ARE SET TO 0
CONVECTIVE ACCELERATIONS ARE INCLUDED

NODE NUMBER	X-COORDINATE (M)	Y-COORDINATE (M)	DEPTH (MEAN) (M)	NODE CODE	DEPTH MEASURE (M)	TIME LAG (SEC)	LOCAL X FLUX (M2/SEC)	FLUX ANGLE (DEGREES)	GLOBAL Y FLUX (M2/SEC)	SOURCE FLUX (M/SEC)
1	0.0	0.0	9.00	1			0.0	225.0		
2	0.0	1250.00	9.00	1			0.0	180.0		
3	0.0	2500.00	9.00	1			0.0	135.0		
4	1250.00	0.0	9.00	1			0.0	270.0		
5	1250.00	1250.00	9.00	0						
6	1250.00	2500.00	9.00	1			0.0	90.0		
7	2500.00	0.0	8.00	1			0.0	270.0		
8	2500.00	1250.00	9.00	0						
9	2500.00	2500.00	8.00	1			0.0	90.0		
10	3750.00	0.0	9.00	1			0.0	270.0		
11	3750.00	1250.00	8.00	0						
12	3750.00	2500.00	9.00	1			0.0	90.0		
13	5000.00	0.0	9.00	1			0.0	270.0		
14	5000.00	1250.00	8.00	0						
15	5000.00	2500.00	9.00	1			0.0	90.0		
16	6250.00	0.0	8.00	1			0.0	270.0		
17	6250.00	1250.00	8.00	0						
18	6250.00	2500.00	9.00	1			0.0	90.0		
19	7500.00	0.0	8.00	1			0.0	270.0		
20	7500.00	1250.00	8.00	0						
21	7500.00	2500.00	8.00	1			0.0	90.0		
22	8750.00	0.0	8.00	1			0.0	270.0		
23	8750.00	1250.00	8.00	0						
24	8750.00	2500.00	8.00	1			0.0	90.0		
25	10000.00	0.0	9.00	1			0.0	270.0		
26	10000.00	1250.00	8.00	0						
27	10000.00	2500.00	8.00	1			0.0	90.0		
28	11250.00	0.0	9.00	1			0.0	270.0		
29	11250.00	1250.00	8.00	0						
30	11250.00	2500.00	8.00	1			0.0	90.0		
31	12500.00	0.0	9.00	1			0.0	270.0		
32	12500.00	1250.00	8.00	0						
33	12500.00	2500.00	8.00	1			0.0	90.0		
34	13750.00	0.0	8.00	1			0.0	270.0		
35	13750.00	1250.00	9.00	0						
36	13750.00	2500.00	8.00	1			0.0	90.0		
37	15000.00	0.0	8.00	1			0.0	270.0		
38	15000.00	1250.00	9.00	0						
39	15000.00	2500.00	8.00	1			0.0	90.0		
40	16250.00	0.0	9.00	1			0.0	270.0		
41	16250.00	1250.00	8.00	0						
42	16250.00	2500.00	8.00	1			0.0	90.0		
43	17500.00	0.0	8.00	1			0.0	270.0		
44	17500.00	1250.00	8.00	0						
45	17500.00	2500.00	8.00	1			0.0	90.0		
46	18750.00	0.0	8.00	1			0.0	270.0		
47	18750.00	1250.00	8.00	0						
48	18750.00	2500.00	9.00	1			0.0	90.0		
49	20000.00	0.0	8.00	1			0.0	270.0		
50	20000.00	1250.00	8.00	0						
51	20000.00	2500.00	9.00	1			0.0	90.0		
52	21500.00	0.0	8.00	1			0.0	270.0		
53	21500.00	1250.00	8.00	0						
54	21500.00	2500.00	8.00	1			0.0	90.0		
55	23500.00	0.0	8.00	1			0.0	270.0		
56	23500.00	1250.00	8.00	0						
57	23500.00	2500.00	8.00	1			0.0	90.0		
58	26000.00	0.0	8.00	1			0.0	270.0		
59	26000.00	1250.00	8.00	0						
60	26000.00	2500.00	8.00	1			0.0	90.0		
61	30000.00	0.0	9.00	1			0.0	315.0		
62	30000.00	1250.00	8.00	1			0.0	0.0		
63	30000.00	2500.00	8.00	1			0.0	45.0		

NUMBER OF PRESCRIBED BOUNDARY AND INTERNAL FLUX NODES

PRESCRIBED HEIGHTS, NHPN = 0
PRESCRIBED LOCAL X FLUX, NHUPN = 44
PRESCRIBED X AND Y FLUX, NHVPN = 5
INTERNAL FLUX NODES, IFLUX = 0

ELEMENT CONNECTIVITIES.

ELEMENT NUMBER	NODE 1	NODE 2	NODE 3	FRICTION COEFFICIENT	EDDY XX	EDDY YY	EDDY XY
1	3	2	6	0.010000	500.00	500.00	500.00
2	2	1	4	0.010000	500.00	500.00	500.00
3	5	2	5	0.010000	500.00	500.00	500.00
4	2	4	5	0.010000	500.00	500.00	500.00
5	6	5	9	0.010000	500.00	500.00	500.00
6	5	4	7	0.010000	500.00	500.00	500.00
7	9	5	8	0.010000	500.00	500.00	500.00
8	5	7	8	0.010000	500.00	500.00	500.00
9	9	8	12	0.010000	500.00	500.00	500.00
10	9	7	10	0.010000	500.00	500.00	500.00
11	12	8	11	0.010000	500.00	500.00	500.00
12	8	10	11	0.010000	500.00	500.00	500.00
13	12	11	15	0.010000	500.00	500.00	500.00
14	11	10	13	0.010000	500.00	500.00	500.00
15	15	11	14	0.010000	500.00	500.00	500.00
16	11	13	14	0.010000	500.00	500.00	500.00
17	15	14	18	0.010000	500.00	500.00	500.00
18	14	13	16	0.010000	500.00	500.00	500.00
19	15	14	17	0.010000	500.00	500.00	500.00
20	16	16	17	0.010000	500.00	500.00	500.00
21	18	17	21	0.010000	500.00	500.00	500.00
22	17	16	19	0.010000	500.00	500.00	500.00
23	21	17	20	0.010000	500.00	500.00	500.00
24	17	19	20	0.010000	500.00	500.00	500.00
25	21	20	24	0.010000	500.00	500.00	500.00
26	23	19	22	0.010000	500.00	500.00	500.00
27	24	20	23	0.010000	500.00	500.00	500.00
28	23	22	23	0.010000	500.00	500.00	500.00
29	24	23	27	0.010000	500.00	500.00	500.00
30	23	22	25	0.010000	500.00	500.00	500.00
31	27	23	26	0.010000	500.00	500.00	500.00
32	25	25	26	0.010000	500.00	500.00	500.00
33	27	26	27	0.010000	500.00	500.00	500.00
34	26	25	28	0.010000	500.00	500.00	500.00
35	33	26	29	0.010000	500.00	500.00	500.00
36	26	28	29	0.010000	500.00	500.00	500.00
37	33	29	33	0.010000	500.00	500.00	500.00
38	29	28	31	0.010000	500.00	500.00	500.00
39	31	29	32	0.010000	500.00	500.00	500.00
40	29	31	32	0.010000	500.00	500.00	500.00
41	31	32	36	0.010000	500.00	500.00	500.00
42	32	31	34	0.010000	500.00	500.00	500.00
43	36	32	35	0.010000	500.00	500.00	500.00
44	32	34	35	0.010000	500.00	500.00	500.00
45	35	35	39	0.010000	500.00	500.00	500.00
46	35	34	37	0.010000	500.00	500.00	500.00
47	39	35	38	0.010000	500.00	500.00	500.00
48	35	37	38	0.010000	500.00	500.00	500.00
49	39	38	42	0.010000	500.00	500.00	500.00
50	38	37	40	0.010000	500.00	500.00	500.00
51	42	38	41	0.010000	500.00	500.00	500.00
52	39	40	41	0.010000	500.00	500.00	500.00
53	42	41	45	0.010000	500.00	500.00	500.00
54	41	40	43	0.010000	500.00	500.00	500.00
55	45	41	44	0.010000	500.00	500.00	500.00
56	41	43	44	0.010000	500.00	500.00	500.00
57	45	44	48	0.010000	500.00	500.00	500.00
58	44	43	46	0.010000	500.00	500.00	500.00
59	44	47	48	0.010000	500.00	500.00	500.00
60	44	46	47	0.010000	500.00	500.00	500.00
61	48	47	51	0.010000	500.00	500.00	500.00
62	47	46	49	0.010000	500.00	500.00	500.00
63	47	50	51	0.010000	500.00	500.00	500.00
64	47	49	52	0.010000	500.00	500.00	500.00
65	51	50	54	0.010000	500.00	500.00	500.00
66	53	49	52	0.010000	500.00	500.00	500.00
67	53	53	54	0.010000	500.00	500.00	500.00
68	53	52	57	0.010000	500.00	500.00	500.00
69	56	53	57	0.010000	500.00	500.00	500.00
70	53	52	55	0.010000	500.00	500.00	500.00
71	53	56	57	0.010000	500.00	500.00	500.00
72	53	55	56	0.010000	500.00	500.00	500.00
73	57	56	60	0.010000	500.00	500.00	500.00
74	56	55	58	0.010000	500.00	500.00	500.00
75	58	59	60	0.010000	500.00	500.00	500.00
76	56	58	59	0.010000	500.00	500.00	500.00
77	60	59	63	0.010000	500.00	500.00	500.00
78	59	58	61	0.010000	500.00	500.00	500.00
79	59	62	63	0.010000	500.00	500.00	500.00
80	59	61	62	0.010000	500.00	500.00	500.00

GEOMETRICAL RELATIONS

ELEMENT NUMBER	A1	B1	A2	B2	A3	B3	AREA
1	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
2	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
3	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
4	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
5	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
6	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
7	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
8	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
9	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
10	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0
11	1250.0	0.0	0.0	-1250.0	-1250.0	1250.0	781250.0
12	0.0	-1250.0	-1250.0	0.0	1250.0	1250.0	781250.0
13	1250.0	-1250.0	-1250.0	0.0	0.0	1250.0	781250.0
14	1250.0	0.0	-1250.0	-1250.0	0.0	1250.0	781250.0

```
 15     1250.0        0.0          0.0     -1250.0     -1250.0     1250.0      781250.0
 16        0.0    -1250.0     -1250.0          0.0      1250.0     1250.0      781250.0
 17     1250.0     -1250.0     -1250.0          0.0         0.0     1250.0      781250.0
 18     1250.0        0.0     -1250.0     -1250.0         0.0     1250.0      781250.0
 19     1250.0        0.0         0.0     -1250.0     -1250.0     1250.0      781250.0
 20        0.0    -1250.0     -1250.0          0.0      1250.0     1250.0      781250.0
 21     1250.0     -1250.0     -1250.0          0.0         0.0     1250.0      781250.0
 22     1250.0        0.0     -1250.0     -1250.0         0.0     1250.0      781250.0
 23     1250.0        0.0         0.0     -1250.0     -1250.0     1250.0      781250.0
 24        0.0    -1250.0     -1250.0          0.0      1250.0     1250.0      781250.0
 25     1250.0     -1250.0     -1250.0          0.0         0.0     1250.0      781250.0
 26     1250.0        0.0     -1250.0     -1250.0         0.0     1250.0      781250.0
 27     1250.0        0.0         0.0     -1250.0     -1250.0     1250.0      781250.0
 28        0.0    -1250.0     -1250.0          0.0      1250.0     1250.0      781250.0
 29     1250.0     -1250.0     -1250.0          0.0         0.0     1250.0      781250.0
 30     1250.0        0.0     -1250.0     -1250.0         0.0     1250.0      781250.0
 31     1250.0        0.0         0.0     -1250.0     -1250.0     1250.0      781250.0
 32        0.0    -1250.0     -1250.0          0.0      1250.0     1250.0      781250.0
 33     1250.0     -1250.0     -1250.0          0.0         0.0     1250.0      781250.0
 34     1250.0        0.0     -1250.0     -1250.0         0.0     1250.0      781250.0
 35     1250.0        0.0         0.0     -1250.0     -1250.0     1250.0      781250.0
 36        0.0    -1250.0     -1250.0          0.0      1250.0     1250.0      781250.0
 37     1250.0     -1250.0     -1250.0          0.0         0.0     1250.0      781250.0
 38     1250.0        0.0     -1250.0     -1250.0         0.0     1250.0      781250.0
 39     1250.0        0.0         0.0     -1250.0     -1250.0     1250.0      781250.0
 40        0.0    -1250.0     -1250.0          0.0      1250.0     1250.0      781250.0
 41     1250.0     -1250.0     -1250.0          0.0         0.0     1250.0      781250.0
 42     1250.0        0.0     -1250.0     -1250.0         0.0     1250.0      781250.0
 43     1250.0        0.0         0.0     -1250.0     -1250.0     1250.0      781250.0
 44        0.0    -1250.0     -1250.0          0.0      1250.0     1250.0      781250.0
 45     1250.0     -1250.0     -1250.0          0.0         0.0     1250.0      781250.0
 46     1250.0        0.0     -1250.0     -1250.0         0.0     1250.0      781250.0
 47     1250.0        0.0         0.0     -1250.0     -1250.0     1250.0      781250.0
 48        0.0    -1250.0     -1250.0          0.0      1250.0     1250.0      781250.0
 49     1250.0     -1250.0     -1250.0          0.0         0.0     1250.0      781250.0
 50     1250.0        0.0     -1250.0     -1250.0         0.0     1250.0      781250.0
 51     1250.0        0.0         0.0     -1250.0     -1250.0     1250.0      781250.0
 52        0.0    -1250.0     -1250.0          0.0      1250.0     1250.0      781250.0
 53     1250.0     -1250.0     -1250.0          0.0         0.0     1250.0      781250.0
 54     1250.0        0.0     -1250.0     -1250.0         0.0     1250.0      781250.0
 55     1250.0        0.0         0.0     -1250.0     -1250.0     1250.0      781250.0
 56        0.0    -1250.0     -1250.0          0.0      1250.0     1250.0      781250.0
 57     1250.0     -1250.0     -1250.0          0.0         0.0     1250.0      781250.0
 58     1250.0        0.0     -1250.0     -1250.0         0.0     1250.0      781250.0
 59        0.0    -1250.0     -1250.0      1250.0      1250.0        0.0      781250.0
 60        0.0    -1250.0     -1250.0          0.0      1250.0     1250.0      781250.0
 61     1250.0     -1250.0     -1250.0          0.0         0.0     1250.0      781250.0
 62     1250.0        0.0     -1250.0     -1250.0         0.0     1250.0      781250.0
 63        0.0    -1250.0     -1250.0      1250.0      1250.0        0.0      781250.0
 64        0.0    -1250.0     -1250.0          0.0      1250.0     1250.0      781250.0
 65     1500.0     -1250.0     -1500.0          0.0         0.0     1250.0      937497.5
 66     1500.0        0.0     -1500.0     -1250.0         0.0     1250.0      937497.5
 67        0.0    -1250.0     -1500.0      1250.0      1500.0        0.0      937497.5
 68        0.0    -1250.0     -1500.0          0.0      1500.0     1250.0      937497.5
 69     2000.0     -1250.0     -2000.0          0.0         0.0     1250.0     1250322.0
 70     2000.0        0.0     -2000.0     -1250.0         0.0     1250.0     1250322.0
 71        0.0    -1250.0     -2000.0      1250.0      2000.0        0.0     1250322.0
 72        0.0    -1250.0     -2000.0          0.0      2000.0     1250.0     1250322.0
 73     2500.0     -1250.0     -2500.0          0.0         0.0     1250.0     1562530.0
 74     2500.0        0.0     -2500.0     -1250.0         0.0     1250.0     1562530.0
 75        0.0    -1250.0     -2500.0      1250.0      2500.0        0.0     1562530.0
 76        0.0    -1250.0     -2500.0          0.0      2500.0     1250.0     1562530.0
 77     4000.0     -1250.0     -4000.0          0.0         0.0     1250.0     2500000.0
 78     4000.0        0.0     -4000.0     -1250.0         0.0     1250.0     2500000.0
 79        0.0    -1250.0     -4000.0      1250.0      4000.0        0.0     2500000.0
 80        0.0    -1250.0     -4000.0          0.0      4000.0     1250.0     2500000.0

    BANDWIDTH OF THIS GRID IS, NBANDH =     5

* ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

SYSTEM PROPERTIES.

     AVERAGE LATITUDE, ALAFT =   40.00  (DEGREES N)
     CORIOLIS PARAMETER, CORIO = 2*OMEGA*SIN(ALATT) =  0.935E-04  (SEC-1)
     GRAVITATIONAL ACCELERATION, GRAVT =  9.810  (M/SEC2)
     ANGULAR VELOCITY OF EARTH ROTATION, OMEGA =  0.727E-04  (SEC-1)
     PERIOD OF HARMONIC TIDAL EXCITATION, PERIOD = 44600.  (SEC)
     DENSITY OF WATER, DENSTY = 1000.00 (KG/M3)

* ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

INTEGRATION PARAMETERS.

     START TIME OF INTEGRATION, STATIM =        0.0  SEC
     END TIME OF INTEGRATION, ENDTIM =   25000.0  SEC
     CONSTANT TIME INCREMENT, TINC =   100.0  SEC
     EXTERNAL NODE AT WHICH VARIATION IS BOUNDED BY BOUND, NO =   40
     CRUDE STABILITY CONTROL,BOUND =   5.00 M
     THE TIME INCREMENT IS ASSUMED CONSTANT
     OUTPUT WILL BE PRINTED FOR EVERY  25 TIMESTEPS

* ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

LAND SEGMENT  1     # NODES, NNLBY =  45
EXTERNAL NODE NUMBERS:   1-  4-  7- 10- 13- 16- 19- 22- 25- 28- 31- 34- 37- 40- 43- 46- 49- 52- 55- 58- 61- 62- 63- 63- 57-
                        54- 51- 48- 45- 42- 39- 36- 33- 30- 27- 24- 21- 18- 15- 12-  9-  6-  3-  2-  1-
INTERNAL NODE NUMBERS:   1-  4-  7- 10- 13- 16- 19- 22- 25- 28- 31- 34- 37- 40- 43- 46- 49- 52- 55- 58- 61- 62- 63- 63- 57-
                        54- 51- 48- 45- 42- 39- 36- 33- 30- 27- 24- 21- 18- 15- 12-  9-  6-  3-  2-  1-

* ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

* ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *
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WIND VELOCITY FIELD SET FOR TIME OF 100.SECS. THROUGH 2600.SECS.

WIND MAG.= 13.00 KNOTS AT A DIRECTION OF 270.00 FROM TRUE NORTH (Y-AXIS)

RESULTING STRESSES ARE TAUX= 0.000329611 AND TAUY= [illegible]

* *

TIME = 200.00 SEC DELTA T WAS, TIME = 100.00 SEC. TIME STEP, ITIME = 2

NET VOLUME ABOVE MLW, VOL= 0.419174E+03 IPOINT= -1

* ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

NINE	NEXT	DEPTH	X-FLUX	Y-FLUX	ELEVATION	X-VEL	Y-VEL
1	1	7.99963	0.00470	-0.00470	-0.00037	0.00059	-0.00059
2	2	7.99959	-0.00000	-0.00002	-0.00041	-0.00000	-0.00000
3	3	7.99963	0.00470	0.00470	-0.00037	0.00059	0.00059
4	4	7.99988	0.00417	-0.00000	-0.00012	0.00052	-0.00000
5	5	8.00000	0.00440	-0.00004	-0.00000	0.00055	-0.00001
6	6	7.99988	0.00417	-0.00000	-0.00012	0.00052	-0.00000
7	7	8.00010	0.00611	-0.00000	0.00010	0.00076	-0.00000
8	8	7.99997	0.00629	-0.00004	-0.00003	0.00078	-0.00000
9	9	8.00010	0.00611	-0.00007	0.00010	0.00075	-0.00000
10	10	7.99998	0.00576	-0.00000	-0.00002	0.00072	-0.00000
11	11	8.00002	0.00538	-0.00004	0.00002	0.00067	-0.00000
12	12	7.99998	0.00576	-0.00000	-0.00002	0.00072	-0.00000
13	13	8.00000	0.00585	-0.00005	-0.00000	0.00073	-0.00000
14	14	8.00000	0.00584	-0.00004	-0.00000	0.00073	-0.00000
15	15	8.00000	0.00580	-0.00000	-0.00000	0.00073	-0.00000
16	16	8.00000	0.00565	-0.00000	0.00000	0.00071	-0.00000
17	17	8.00000	0.00571	-0.00004	0.00000	0.00071	-0.00000
18	18	8.00000	0.00565	-0.00007	0.00000	0.00071	-0.00000
19	19	8.00000	0.00575	-0.00000	-0.00000	0.00072	-0.00000
20	20	8.00000	0.00572	-0.00004	0.00000	0.00071	-0.00000
21	21	8.00000	0.00575	-0.00000	-0.00000	0.00072	-0.00000
22	22	8.00000	0.00572	-0.00000	-0.00000	0.00071	-0.00000
23	23	8.00000	0.00573	-0.00004	-0.00000	0.00072	-0.00000
24	24	8.00000	0.00572	-0.00000	0.00000	0.00071	-0.00000
25	25	8.00000	0.00572	-0.00000	-0.00000	0.00072	-0.00000
26	26	8.00000	0.00572	-0.00004	0.00000	0.00072	-0.00000
27	27	8.00000	0.00572	-0.00000	0.00000	0.00072	-0.00000
28	28	8.00000	0.00572	-0.00000	-0.00000	0.00072	-0.00000
29	29	8.00000	0.00572	-0.00004	-0.00000	0.00072	-0.00000
30	30	8.00000	0.00572	-0.00000	0.00000	0.00072	-0.00000
31	31	8.00000	0.00572	-0.00000	-0.00000	0.00072	-0.00000
32	32	8.00000	0.00572	-0.00004	-0.00000	0.00072	-0.00000
33	33	8.00000	0.00572	-0.00000	0.00000	0.00072	-0.00000
34	34	8.00000	0.00572	-0.00000	-0.00000	0.00072	-0.00000
35	35	8.00000	0.00572	-0.00004	0.00000	0.00072	-0.00000
36	36	8.00000	0.00572	-0.00000	0.00000	0.00072	-0.00000
37	37	8.00000	0.00572	-0.00000	-0.00000	0.00072	-0.00000
38	38	8.00000	0.00572	-0.00004	-0.00000	0.00072	-0.00000
39	39	8.00000	0.00572	-0.00000	0.00000	0.00072	-0.00000
40	40	8.00000	0.00573	-0.00000	-0.00000	0.00072	-0.00000
41	41	8.00000	0.00572	-0.00004	-0.00000	0.00072	-0.00000
42	42	8.00000	0.00573	-0.00000	0.00000	0.00072	-0.00000
43	43	8.00000	0.00571	-0.00000	-0.00000	0.00071	-0.00000
44	44	8.00000	0.00574	-0.00004	0.00000	0.00072	-0.00000
45	45	8.00000	0.00571	-0.00000	0.00000	0.00071	-0.00000
46	46	8.00000	0.00573	-0.00000	-0.00000	0.00072	-0.00000
47	47	8.00000	0.00567	-0.00004	-0.00000	0.00071	-0.00000
48	48	8.00000	0.00573	-0.00000	0.00000	0.00072	-0.00000
49	49	8.00000	0.00576	-0.00000	0.00000	0.00072	-0.00000
50	50	8.00000	0.00581	-0.00004	0.00000	0.00073	-0.00000
51	51	8.00000	0.00576	-0.00000	0.00000	0.00072	-0.00000
52	52	7.99999	0.00558	-0.00000	-0.00001	0.00070	-0.00000
53	53	8.00000	0.00571	-0.00004	0.00000	0.00071	-0.00000
54	54	7.99999	0.00559	-0.00000	-0.00001	0.00073	-0.00000
55	55	8.00000	0.00596	-0.00000	0.00000	0.00074	-0.00000
56	56	7.99997	0.00536	-0.00004	-0.00003	0.00067	-0.00000
57	57	8.00000	0.00596	-0.00000	0.00000	0.00074	-0.00000
58	58	7.99995	0.00597	-0.00000	-0.00005	0.00075	-0.00000
59	59	8.00007	0.00737	-0.00005	0.00007	0.00092	-0.00001
60	60	7.99995	0.00596	-0.00000	-0.00005	0.00075	-0.00000
61	61	8.00015	0.00141	0.00141	0.00015	0.00018	0.00018
62	62	8.00033	0.0	0.00002	0.00033	0.0	0.00000
63	63	8.00015	0.00141	-0.00141	0.00015	0.00018	-0.00018

* *

TIME = 300.00 SEC DELTA T WAS, TIME = 100.00 SEC. TIME STEP, ITIME = 3

NET VOLUME ABOVE MLW, VOL= -0.445147E+03 IPOINT= -1

* ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

NINE	NEXT	DEPTH	X-FLUX	Y-FLUX	ELEVATION	X-VEL	Y-VEL
1	1	7.99855	0.01056	-0.01056	-0.00145	0.00132	-0.00132
2	2	7.99855	0.00000	0.00000	-0.00145	0.00000	0.00000
3	3	7.99853	0.01045	0.01045	-0.00147	0.00131	0.00131
4	4	7.99903	0.00422	-0.00000	-0.00097	0.00053	-0.00000
5	5	7.99903	0.00393	0.00001	-0.00097	0.00049	0.00000
6	6	7.99901	0.00437	-0.00000	-0.00099	0.00055	-0.00000
7	7	7.99949	0.00826	-0.00000	-0.00051	0.00103	-0.00000
8	8	7.99946	0.00802	-0.00001	-0.00054	0.00100	-0.00000
9	9	7.99946	0.00838	-0.00000	-0.00054	0.00105	-0.00000
10	10	7.99991	0.01163	-0.00000	-0.00009	0.00146	-0.00000
11	11	7.99992	0.01242	-0.00002	-0.00008	0.00155	-0.00000
12	12	7.99987	0.01185	-0.00000	-0.00013	0.00148	-0.00000
13	13	8.00006	0.01446	-0.00000	0.00006	0.00181	-0.00000
14	14	8.00005	0.01451	-0.00002	0.00005	0.00181	-0.00000
15	15	8.00002	0.01446	-0.00000	0.00002	0.00181	-0.00000
16	16	8.00005	0.01478	-0.00000	0.00005	0.00185	-0.00000
17	17	7.99997	0.01441	-0.00002	-0.00003	0.00180	-0.00000
18	18	8.00005	0.01478	-0.00000	0.00005	0.00185	-0.00000
19	19	8.00002	0.01414	-0.00000	0.00002	0.00177	-0.00000

20	20	8.00031	.01419	-0.0[illegible]	[illegible]	[illegible]	[illegible]
21	21	7.99998	0.01413	+0.00030	-0.00032	.00177	-.00[illegible]
22	22	8.00031	.01419	-0.0[illegible]	0.00031	0.00183	-0.00[illegible]
23	23	8.00000	0.01424	-0.0[illegible]	[illegible]	[illegible]	[illegible]
24	24	7.99997	0.01440	-0.00003	-0.00031	.00187	-0.00[illegible]
25	25	8.00339	.01427	-0.0[illegible]	0. 0033	[illegible]	+0.00[illegible]
26	26	7.99999	0.01437	+0.00002	-0.00[illegible]	[illegible]	[illegible]
27	27	7.99999	.01427	-0.00000	-0.00001	0.00179	-[illegible]
28	28	8.00002	.01429	-0.00[illegible]	0.00002	[illegible]	[illegible]
29	29	8.00000	0.01424	-0.00002	0.00001	0.00174	[illegible]
30	30	7.99997	0.01428	+0.00[illegible]	-0.00001	0.00179	+0.00[illegible]
31	31	8.00002	0.01416	+0.0[illegible]	0.00002	[illegible]	[illegible]
32	32	8.00000	0.01432	+0.00002	-0.00001	[illegible]	+0.00[illegible]
33	33	7.99998	.01436	+0.00[illegible]	-0.00002	[illegible]	[illegible]
34	34	8.00002	0.01424	-0.00004	0. [illegible]	[illegible]	[illegible]
35	35	8.00000	[illegible]	+0.00002	0.00001	0.00179	+0.00[illegible]
36	36	7.99998	.01424	-0.00[illegible]	-0.00002	[illegible]	[illegible]
37	37	8.00002	0.01434	+0.00004	0.00002	0.00179	[illegible]
38	38	7.99999	.01428	-0.00[illegible]	-0.00001	[illegible]	-0.00[illegible]
39	39	7.99998	0.01436	-0.00[illegible]	-0.00002	[illegible]	[illegible]
40	40	8.00003	0.01437	-0.00004	0.00003	0.00183	+0.00[illegible]
41	41	8.00001	[illegible]	-0.00002	0.00001	[illegible]	[illegible]
42	42	7.99999	0.01437	+0.00003	-0.00001	[illegible]	[illegible]
43	43	8.00000	.01433	-0.00003	-0.00000	0.00176	+0.00[illegible]
44	44	8.00001	.01442	+0.00002	0.00001	[illegible]	[illegible]
45	45	7.99996	0.01411	-0.00003	-0.00004	0.00176	+0.00[illegible]
46	46	8.00004	.01448	+0.00003	0.00004	0.00181	-0.00000
47	47	7.99995	0.01384	-0.00002	-0. 0005	[illegible]	[illegible]
48	48	8.00000	0.01447	+0.00003	0.00003	0.00181	+0.00000
49	49	8.00005	.01447	+0.00[illegible]	0. 0005	[illegible]	+0.00000
50	50	8.00036	0.01469	+0.00002	0.00036	0.00184	[illegible]
51	51	8.00001	0.01469	-0.00003	0.00001	0.00181	+0.00000
52	52	7.99991	.01458	-0.0000[illegible]	-0.00[illegible]	[illegible]	[illegible]
53	53	8.00003	0.01480	+0.00002	0.00003	0.00187	[illegible]
54	54	7.99987	.01456	-0.00[illegible]	-0.00013	0.00170	-0.00000
55	55	8.00011	0.01535	+0.00[illegible]	0.00011	[illegible]	[illegible]
56	56	7.99988	0.01408	-0.00003	-0.00012	0.00164	-0.00000
57	57	8.00038	.01498	-0.0000[illegible]	0.00038	[illegible]	+0.00000
58	58	8.00024	0.01261	+0.00003	0.00024	[illegible]	[illegible]
59	59	8.00042	0.01630	0.00002	0.00042	0.00234	[illegible]
60	60	8.00020	0.01252	+0.00[illegible]	0.00020	[illegible]	[illegible]
61	61	8.00136	-0.03692	-0.00692	0.00136	-0.00086	[illegible]
62	62	8.00075	.0	+0.00[illegible]	0.00075	0.0	+0.00000
63	63	8.00136	-0.03675	0.00675	0.00136	[illegible]	[illegible]

* *

TIME = 2500.00 SEC DELTA T WAS, TIME = 100.00 SEC, TIME STEP, ITIME = 25

NET VOLUME ABOVE MLW, VOL= -0.65A532E+05 [POINT= -1

* *

VINT	NEXT	DEPTH	X-FLUX	Y-FLUX	ELEVATION	X-VEL	Y-VEL
1	1	7.99191	0.01643	+0.01643	-0.00808	0.00239	-0.00238
2	2	7.99231	0.01700	0.00027	+0.00799	0.00330	0.00005
3	3	7.99190	0.01699	[illegible]	-0.00811	0.00219	[illegible]
4	4	7.99265	0.01365	+0.00000	-0.00735	0.00346	+0.00000
5	5	7.99282	0.01412	0.00406	-0.00718	0.00362	0.00000
6	6	7.99264	0.00421	-0.00001	-0.00736	[illegible]	-0.00000
7	7	7.99292	0.00752	-0.00002	-0.00708	0.00334	-0.00000
8	8	7.99318	0.01824	0.00[illegible]	-0.00692	0.00133	[illegible]
9	9	7.99280	0.00822	-0.00003	-0.00710	[illegible]	-0.00000
10	10	7.99355	0.01218	-0.00003	-0.00645	0.00152	-0.00000
11	11	7.99329	0.01207	-0.00002	-0.00671	0.00151	-0.00003
12	12	7.99352	0.01287	-0.00003	-0.00648	0.00161	+0.00[illegible]
13	13	7.99408	0.01615	+0.00003	-0.00600	0.00232	+0.00000
14	14	7.99398	0.01678	+0.00002	-0.00602	[illegible]	-0.00003
15	15	7.99396	0.01685	-0.00003	-0.00604	0.00211	-0.00003
16	16	7.99424	0.01895	-0.00003	-0.00576	[illegible]	-0.00003
17	17	7.99445	0.02011	-0.00002	-0.00555	0.00242	-0.00003
18	18	7.99419	0.01760	-0.00003	-0.00581	0.00245	-0.00000
19	19	7.99514	0.02275	-0.00003	-0.00486	0.00285	+0.00003
20	20	7.99467	0.02206	-0.00001	-0.00533	0.00276	[illegible]
21	21	7.99537	0.02336	-0.00001	-0.00463	0.00292	-0.00000
22	22	7.99575	0.02479	-0.00003	-0. 0425	[illegible]	[illegible]
23	23	7.99574	0.02600	+0.00003	-0.00426	0.00325	-0.00000
24	24	7.99567	0.02527	-0.00003	-0.00433	0.00316	-0.00000
25	25	7.99603	0.02564	-0.00003	-0.00397	0.00318	-0.00003
26	26	7.99628	0.02796	-0.00002	-0.00372	0.00348	+0.00000
27	27	7.99595	0.02592	-0.00003	-0.00405	0.00326	+0.00003
28	28	7.99734	0.02924	-0.00003	-0.00266	0.00366	[illegible]
29	29	7.99636	0.02459	+0.00001	-0.00364	0.00308	-0.00000
30	30	7.99725	0.02965	-0.00003	-0. 0275	0.00371	-0.00003
31	31	7.99795	0.03008	-0.00003	+0.00215	0.00376	-0.00003
32	32	7.99782	0.03124	-0.00001	-0.00218	[illegible]	+0.00000
33	33	7.99785	0.03046	-0.00003	-0.00215	0.00381	-0.00003
34	34	7.99838	0.02934	-0.00003	-0.00162	0.00367	-0.00003
35	35	7.99822	0.03619	-0.00002	-0.00178	[illegible]	[illegible]
36	36	7.99798	0.02959	-0.00003	+0.00202	0.00370	[illegible]
37	37	8.00332	0.03124	+0.00001	0.00332	0.00413	-0.00000
38	38	7.99797	0.03169	-0.00003	-0. 0203	[illegible]	[illegible]
39	39	7.99891	0.03323	-0.00003	-0.00109	0.00415	-0.00003
40	40	8.00363	0.03202	-0.00001	0.00361	[illegible]	-0.00000
41	41	8.00000	0.01963	-0.00004	-0. 0003	[illegible]	[illegible]
42	42	8.00352	[illegible]	-0.00003	0.00352	0.00432	-0.00000
43	43	8.00363	[illegible]	+0.00003	0. 0036	[illegible]	-0.00003
44	44	8.00302	0.04325	-0.00002	0.00303	0.00453	[illegible]
45	45	8.00348	.02954	+0.00[illegible]	0.00348	0.00349	-0.00003
46	46	8.00342	0.04405	-0.00[illegible]	0.00342	[illegible]	[illegible]
47	47	7.99912	0.03955	0.00001	-0.00088	0.00434	[illegible]
48	48	8.00330	.03194	-0.00[illegible]	0. 0033	[illegible]	[illegible]
49	49	8.00342	0.03154	-0.00001	0. 0342	[illegible]	[illegible]
50	50	8.00175	0.04781	+0.00004	0.00175	0.00599	-0.00001
51	51	8.00180	[illegible]	-0.00[illegible]	0. 0018	[illegible]	[illegible]
52	52	8.00372	0.04608	+0.00001	0.00372	0.00576	[illegible]
53	53	8.00135	0.04842	-0.00002	0.00135	[illegible]	-0.00000
54	54	8.00359	0.02567	-0.00[illegible]	0. 0036	[illegible]	[illegible]
55	55	8.00837	0.02747	+0.00000	0.00837	[illegible]	[illegible]

Listing of Punched Nodal Fluxes and Elevations for "hot starting" purposes for Example 2. ITIME = 250, TIME = 25000 sec.

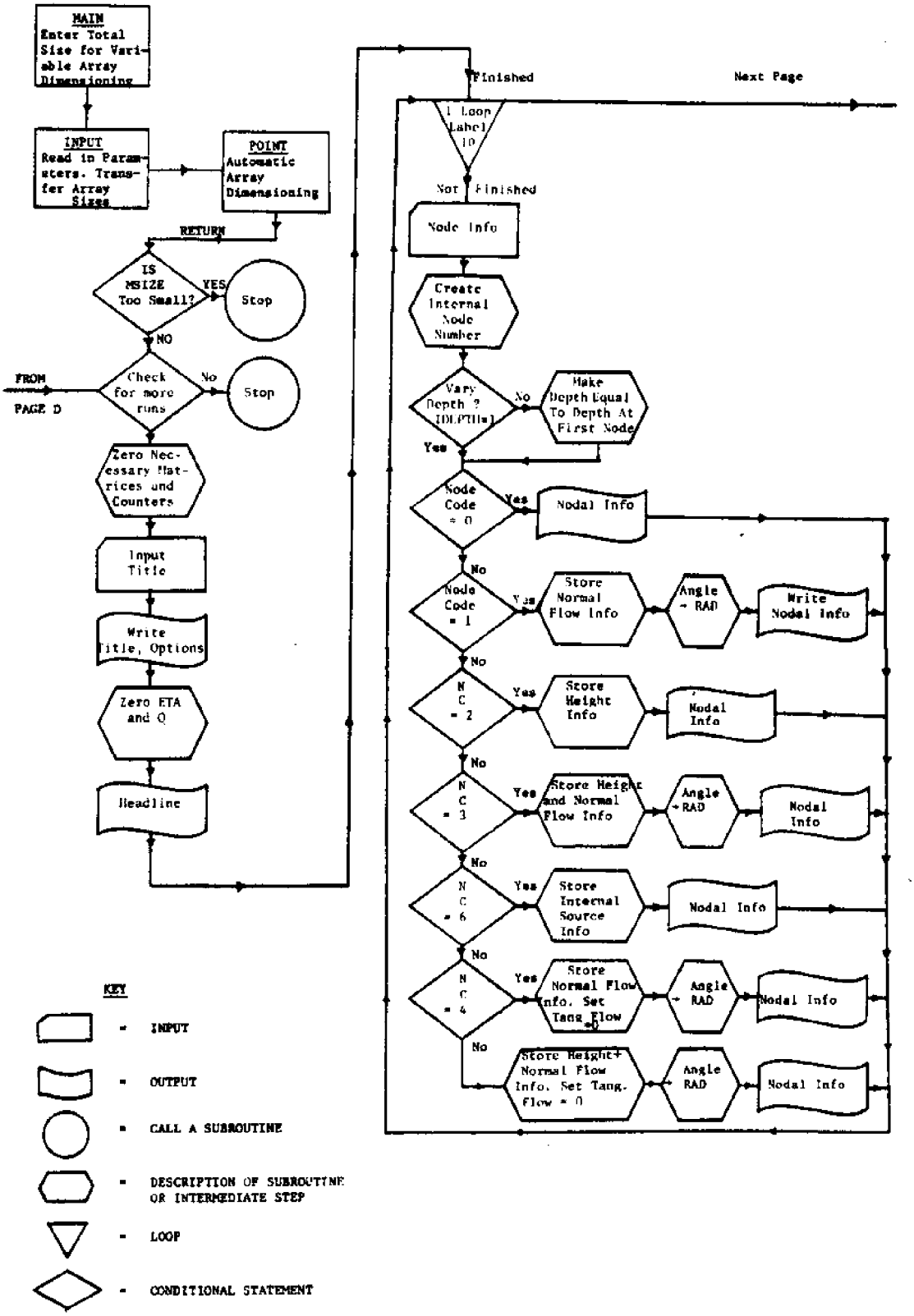
Flux data. Data is punched in pairs of x and y flux components for each node in internal numbering order.

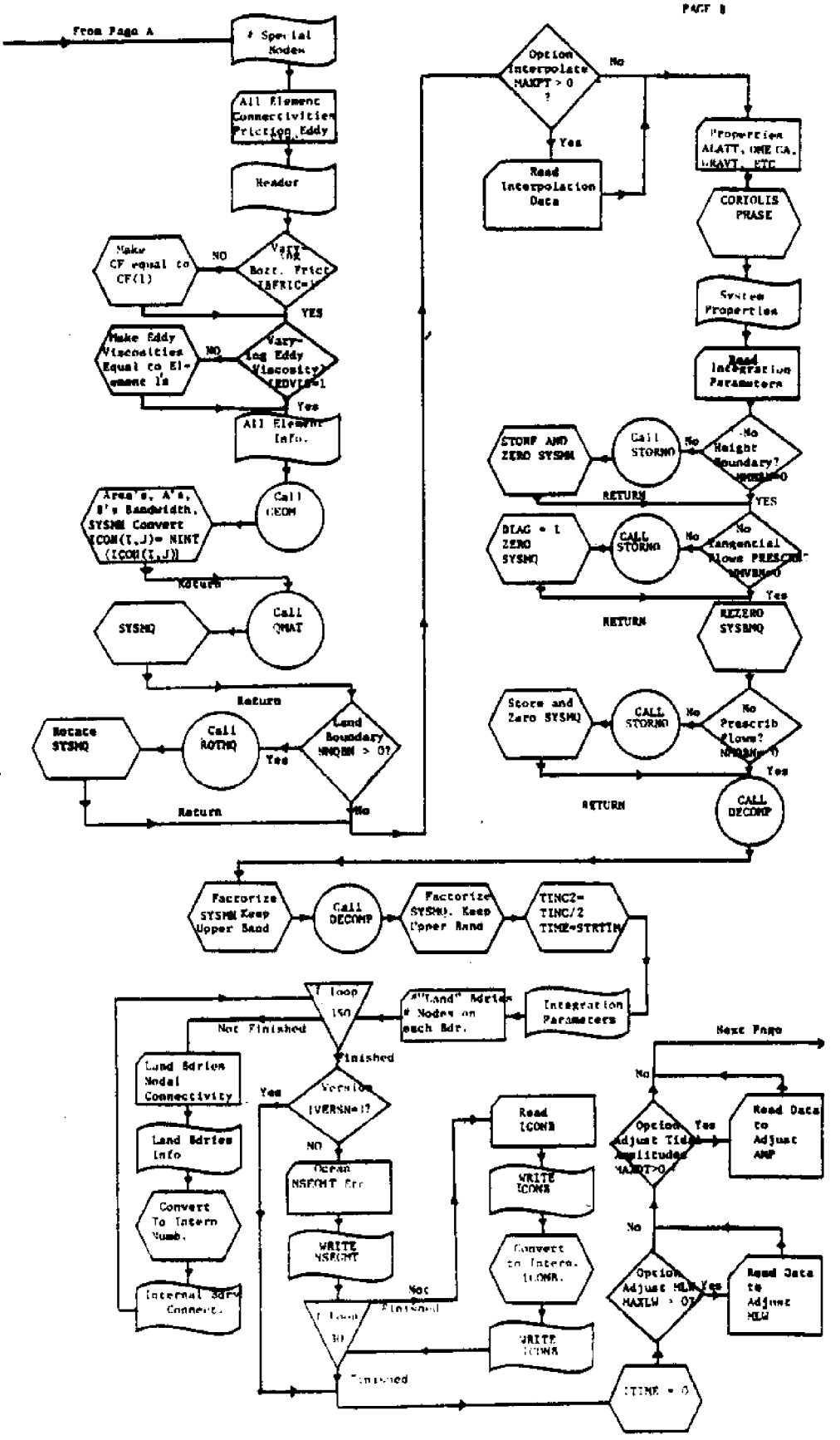
0.01525	-0.01525	0.00000	0.00005	0.01529	0.01529	0.00078	-0.00000
0.00042	0.00001	0.00098	-0.00000	0.00151	-0.00000	0.00177	0.00000
0.00164	-0.00000	0.00222	-0.00000	0.00251	-0.00000	0.00233	-0.00000
0.00314	-0.00000	0.00317	0.00000	0.00330	-0.00000	0.00384	-0.00000
0.00417	-0.00000	0.00394	-0.00000	0.00444	-0.00000	0.00471	-0.00000
0.00452	-0.00000	0.00546	-0.00000	0.00522	-0.00000	0.00554	-0.00000
0.00591	-0.00000	0.00614	-0.00001	0.00598	-0.00000	0.00646	-0.00000
0.00634	-0.00000	0.00651	-0.00000	0.00735	-0.00000	0.00679	-0.00000
0.00738	-0.00000	0.00739	-0.00000	0.00743	-0.00001	0.00742	-0.00000
0.00792	-0.00000	0.00716	-0.00000	0.00793	-0.00000	0.00835	-0.00000
0.00773	-0.00000	0.00835	-0.00000	0.00773	-0.00000	0.00795	-0.00001
0.00772	-0.00000	0.00827	-0.00000	0.00720	0.00000	0.00823	-0.00000
0.00747	-0.00000	0.00823	-0.00001	0.00786	-0.00000	0.00630	-0.00000
0.00795	-0.00000	0.00623	-0.00000	0.00650	-0.00000	0.00691	-0.00001
0.00544	-0.00000	0.00345	-0.00000	0.00949	0.00001	0.00330	-0.00000
-0.00295	-0.00295	0.0	-0.00001	-0.00290	0.00290		

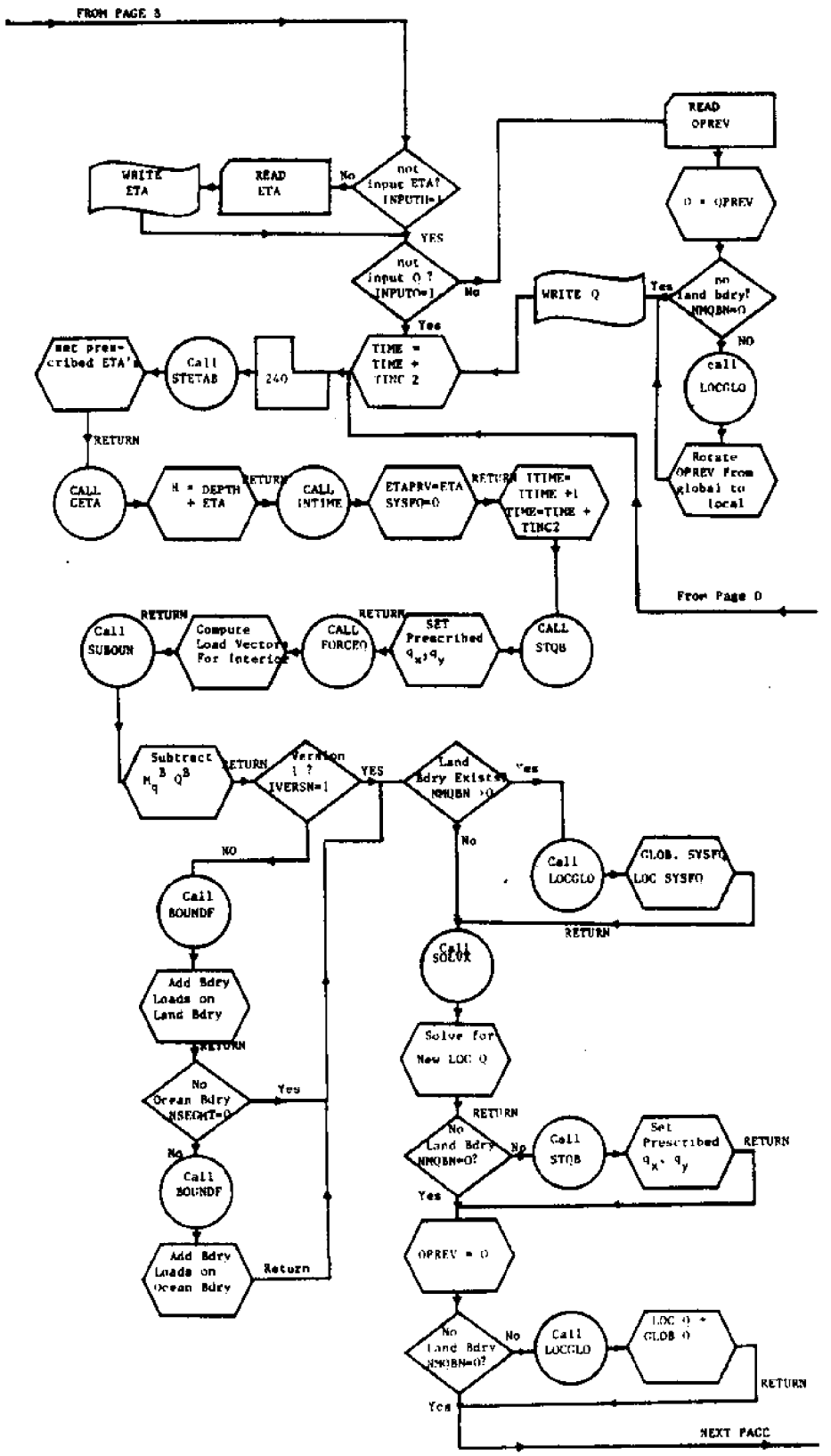
Elevation data. Data is punched at each node in internal order.

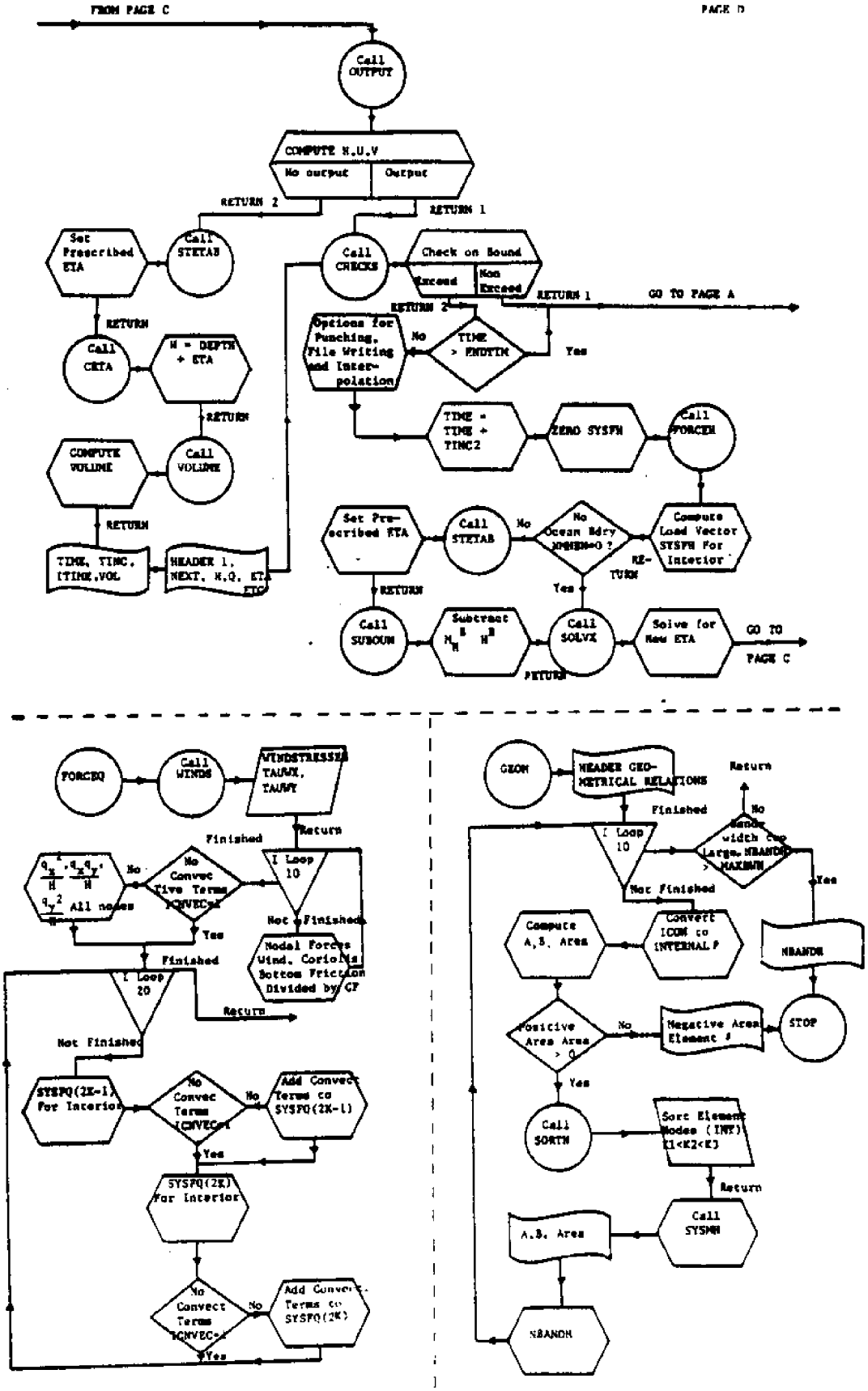
-0.00355	-0.01148	-0.00356	-0.00369	-0.01023	-0.00369	-0.00319	-0.01059
-0.00319	-0.00193	-0.01010	-0.00194	-0.00227	-0.00885	-0.00227	-0.00177
-0.00916	-0.00178	-0.00052	-0.00869	-0.00054	-0.00082	-0.00745	-0.00083
-0.00036	-0.00771	-0.00038	0.00087	-0.00728	0.00085	0.00061	-0.00604
0.00059	0.00099	-0.00625	0.00097	0.00223	-0.00590	0.00221	0.00201
-0.00450	0.00198	0.00229	-0.00480	0.00227	0.00363	-0.00459	0.00360
0.00342	-0.00317	0.00340	0.00371	-0.00337	0.00368	0.00559	-0.00315
0.00557	0.00592	-0.00119	0.00590	0.00744	-0.00145	0.00744	

6.0 Flow Diagram for "CAFE-1"




PAGE 8
From Page A
Special Nodes
All Element Connectivities Friction Eddy
Header
Make CF equal to CF(1)
NO
Vary (Bottom Fric IBFRIC=1
YES
Make Eddy Viscosities Equal to Element 1's
NO
Vary Eddy Viscosity? IEDVIS=1
Yes
All Element Info.
Area's, A's, B's Bandwidth, SYSMH Convert ICOM(I,J)= NINT (ICOM(I,J))
Call CEOM
Return
SYSMQ
Call QMAT
Return
Relocate SYSMQ
Call ROTHQ
Yes
Land Boundary NNQBN > 0?
Return
No
Option Interpolate MAXPT > 0 ?
No
Yes
Read Interpolation Data
Properties ALATT, OME GA, GAYT, ETC
CORIOLIS PHASE
System Properties
Read Integration Parameters
STORP AND ZERO SYSMH
Call STORMO
No
No Height Boundary? NHBDN=0
RETURN
YES
DIAG = 1 ZERO SYSMQ
CALL STORMO
No
No Tangencial Flows PRESCRI NNVBN=0
Yes
RETURN
REZERO SYSBMQ
Store and Zero SYSMQ
CALL STORMO
No
No Prescrib Flows? NNQBN= 0
Yes
RETURN
CALL DECOMP
Factorize SYSMH Keep Upper Band
Call DECOMP
Factorize SYSMQ. Keep Upper Band
TINC2= TINC/2 TIME=STRTIM
T Loop 150
Not Finished
Finished
"Land" Bdries # Nodes on each Bdr.
Integration Parameters
Land Bdries Nodal Connectivity
Land Bdries Info
Convert To Intern Numb.
Internal Bdry Connect.
Version IVERSN=1?
Yes
NO
Ocean NSPCNT Err
WRITE NSPCNT
T Loop 80
Not Finished
Finished
Read ICONB
WRITE ICONB
Convert to Intern. ICONB.
WRITE ICONB
Next Page
No
Option Adjust Tidal Amplitudes MAXPT>0 ?
Yes
Read Data to Adjust AMP
No
Option Adjust MLW MAXLW > 0?
Yes
Read Data to Adjust MLW
ITIME = 0


FROM PAGE 3
READ OPREV
WRITE ETA
READ ETA
No
not input ETA? INPUTH=1
YES
not input Q ? INPUTQ=1
No
WRITE Q
Yes
Q = QPREV
no land bdry? NMQBN=0
NO
call LOCGLO
Rotate QPREV From global to local
Yes
TIME = TIME + TINC 2
240
Call STETAB
RETURN
CALL CETA
H = DEPTH + ETA
RETURN
CALL INTIME
RETURN
ETAPRV=ETA SYSFO=0
RETURN
TTIME= TTIME +1 TIME=TIME + TINC2
From Page D
Call SUBOUN
RETURN
Compute Load Vector For Interior
CALL FORCEO
RETURN
SET Prescribed q_x, q_y
CALL STQB
Subtract $M_q^B Q^B$
RETURN
Version 1 ? IVERSN=1
YES
Land Bdry Exists NMQBN >0
Yes
NO
Call BOUNDF
Add Bdry Loads on Land Bdry
RETURN
No Ocean Bdry NSEGMT=0
Yes
No
Call BOUNDF
Add Bdry Loads on Ocean Bdry
Return
No
Call LOCGLO
GLOB. SYSFO LOC SYSFO
RETURN
Call SOLVR
Solve for New LOC Q
RETURN
No Land Bdry NMQBN=0?
No
Call STQB
Set Prescribed q_x, q_y
RETURN
Yes
QPREV = Q
No Land Bdry NMQBN=0?
No
Call LOCGLO
LOC Q = GLOB Q
RETURN
Yes
NEXT PAGE


FROM PAGE C
PAGE D
Call OUTPUT
COMPUTE H,U,V
No output
Output
RETURN 2
RETURN 1
Set Prescribed ETA
Call STETAB
Call CHECKS
Check on Bound
Exceed
Non Exceed
RETURN
Call CETA
H = DEPTH + ETA
RETURN
COMPUTE VOLUME
Call VOLUME
RETURN
TIME, TINC, ITIME, VOL
HEADER 1, NEXT, H,Q, ETA ETC
RETURN 2
RETURN 1
GO TO PAGE A
Options for Punching, File Writing and Interpolation
No
TIME > ENDTIM
Yes
TIME = TIME + TINC2
ZERO SYSFN
Call FORCEN
Set Prescribed ETA
Call STETAB
No
Ocean Bdry NMBEN=0 ?
RE-TURN
Compute Load Vector SYSFN For Interior
RETURN
Yes
Call SUBOUN
Subtract
Call SOLVX
Solve for New ETA
GO TO PAGE C
RETURN
FORCEQ
Call WINDS
WINDSTRESSX TAUWX, TAUWY
Return
Finished
I Loop 10
Not Finished
Nodal Forces Wind, Coriolis Bottom Friction Divided by CF
Return
Yes
No Convec Tive Terms (CNVEC=1
All nodes
Finished
I Loop 20
Not Finished
SYSFQ(2K-1) For Interior
No Convec Terms (CNVEC=1
No
Add Convect Terms to SYSFQ(2K-1)
Yes
SYSFQ(2K) For Interior
No Convect Terms (CNVEC=1
No
Add Convect Terms to SYSFQ(2K)
Yes
GEOM
HEADER GEO-METRICAL RELATIONS
Return
Finished
I Loop 10
No
Bandwidth Too Large, NBANDH > MAXBWH
Not Finished
Yes
Compute A,B, Area
Convert ICON to INTERNAL P
NBANDH
Positive Area Area > 0
No
Negative Area Element #
STOP
Yes
Call SORTH
Sort Element Nodes (INT) K1<K2<K3
Return
A,B, Area
Call SYSMH
NBANDH

```
C     'CAFE-1'..A TWO-DIMENSIONAL, DEPTH-AVERAGED, FINITE ELEMENT          MAIN0001
C     CIRCULATION MODEL.....COMPATIBLE WITH 'DISPER-1'                     MAIN0002
C     DISPERSION MODEL.....                                                MAIN0003
C     THE DIMENSION OF ARRAYS 'ARAY' AND 'IARAY' SHOULD BE SET             MAIN0004
C     EQUAL TO MSIZE,WHERE.....                                            MAIN0005
C     MSIZE=(NMEL+1)*14+(NMNP+1)*(38+5*MAXBWH)+(MAXHBN+1)*(3+2*MAXBWH)     MAIN0006
C     +(MAXQBN+1)*(4+4*MAXBWH)+(MAXPT+1)*2+(MAXLB+1)*(1+MAXLBN)            MAIN0007
C     +(MAXOB+1)*(2+MAXOBN)+(MAXLW+1)+(MAXDT+1)+(MAXWI+1)*5+24             MAIN0008
      DIMENSION ARAY(6409),IARAY(6409)                                     MAIN0009
      EQUIVALENCE(ARAY(1),IARAY(1))                                        MAIN0010
      DATA MSIZE/6409/                                                     MAIN0011
      CALL INPUT(MSIZE,ARAY,IARAY)                                         MAIN0012
      STOP                                                                 MAIN0013
      END                                                                  MAIN0014
```

```
      SUBROUTINE  INPUT(MSIZE,ARAY,IARAY)                                    INPU0001
      DIMENSION  ARAY(1),IARAY(1),IPT(70)                                    INPU0002
      COMMON/SCRTNO/K1,K2,K3                                        00001400 INPU0003
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,    00001500 INPU0004
     1   MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,         00001600 INPU0005
     2   MAXQBM,MAXHBM                                             00001700 INPU0006
      COMMON/COUTP/NOUT                                             00001800 INPU0007
      COMMON/CINTEG/TIME,TINC,RKFACT,RKFAC,ISTEP,PHASE,ITIME        00001900 INPU0008
      COMMON/COPT/ IBFRIC,IDEPTH,IEDVIS,ICNVEC,IWIND,IVERSN         00002000 INPU0009
      COMMON/CPRCP/GRAVT,CORIO,DENSTY                               00002100 INPU0010
      COMMON/CWIND/WTIME,WMAG,WDIR,MAXWI,STRTIM                              INPU0011
      COMMON/CTIDE/MAXLW,MAXDT                                               INPU0012
      COMMON/CINTR/MAXPT                                                     INPU0013
      COMMON/CLEFT/INPUTH,INPUTC,NRUN,MAXLB,MAXOB,MAXLBN,MAXOBN              INPU0014
      READ(5,1001) IVERSN,NMEL,NMNP,IBFRIC,IDEPTH,IEDVIS,IWIND,              INPU0015
     1INPUTH,INPUTQ,ICNVEC,NRUN                                              INPU0016
 1001 FORMAT(16I5)                                                           INPU0017
      READ(5,1001) MAXHBN,MAXQBN,MAXBWH,MAXPT,MAXLB,MAXLBN,MAXOB,            INPU0018
     1MAXOBN,MAXLW,MAXDT,MAXWI                                               INPU0019
      MAXEL=NMEL+1                                                           INPU0020
      MAXNOD=NMNP+1                                                          INPU0021
      MAXBWQ=2*MAXBWH                                                        INPU0022
      MAXHBN=MAXHBN+1                                                        INPU0023
      MAXQBN=MAXQBN+1                                                        INPU0024
      MAXMQ=2*MAXNOD                                                         INPU0025
      MAXLB=MAXLB+1                                                          INPU0026
      MAXOB=MAXOB+1                                                          INPU0027
      MAXOBN=MAXQBN+1                                                        INPU0028
      MAXHBM=2*MAXHBN                                                        INPU0029
      MAXQBM=2*MAXQBN                                                        INPU0030
      MAXPT=MAXPT+1                                                          INPU0031
      MAXLW=MAXLW+1                                                          INPU0032
      MAXDT=MAXDT+1                                                          INPU0033
      MAXWI=MAXWI+1                                                          INPU0034
      CALL POINT(IPT)                                                        INPU0035
      ITOTAL=IPT(70)                                                         INPU0036
```

```
C      MSIZE=(NMEL+1)*14+(NMNP+1)*(38+5*MAXBWH)+(MAXHBN+1)*(3+2*MAXBWH)          INPU0037
C      +(MAXQBN+1)*(4+4*MAXBWH)+(MAXPT+1)*2+(MAXLB+1)*(1+MAXLBN)                 INPU0038
C      +(MAXOB+1)*(2+MAXOBN)+(MAXLW+1)+(MAXDT+1)+(MAXWI+1)*5+24                  INPU0039
       IF(ITOTAL.LE.MSIZE) GO TO 5                                               INPU0040
       WRITE(6,110) ITOTAL                                                       INPU0041
  110  FORMAT(1H1,'***ERROR***INSUFFICIENT CORE STORAGE ALLOCATION. SIZE          INPU0042
      1OF DATA VECTOR ARAY/IARAY MUST =',I6)                                     INPU0043
       GO TO 200                                                                 INPU0044
    5  CONTINUE                                                                  INPU0045
       CALL S8MAIN(IARAY(IPT(1)),ARAY(IPT(2)),ARAY(IPT(3)),ARAY(IPT(4)),         INPU0046
      1IARAY(IPT(9)),IARAY(IPT(10)),ARAY(IPT(11)),ARAY(IPT(12)),                 INPU0047
      2ARAY(IPT(13)),IARAY(IPT(14)),ARAY(IPT(15)),ARAY(IPT(16)),                 INPU0048
      3ARAY(IPT(17)),ARAY(IPT(18)),ARAY(IPT(19)),ARAY(IPT(20)),                  INPU0049
      4ARAY(IPT(21)),ARAY(IPT(22)),ARAY(IPT(23)),ARAY(IPT(24)),                  INPU0050
      5ARAY(IPT(25)),ARAY(IPT(26)),ARAY(IPT(27)),ARAY(IPT(28)),                  INPU0051
      6ARAY(IPT(43)),ARAY(IPT(47)),IARAY(IPT(44)),IARAY(IPT(48)),                INPU0052
      7IARAY(IPT(49)),ARAY(IPT(45)),ARAY(IPT(46)),ARAY(IPT(50)),                 INPU0053
      8ARAY(IPT(51)),ARAY(IPT(29)),ARAY(IPT(30)),ARAY(IPT(31)),                  INPU0054
      9ARAY(IPT(5)),ARAY(IPT(6)),ARAY(IPT(7)),ARAY(IPT(8)),                      INPU0055
      1IARAY(IPT(66)),ARAY(IPT(67)),ARAY(IPT(52)),ARAY(IPT(53)),                 INPU0056
      2ARAY(IPT(32)),ARAY(IPT(33)),ARAY(IPT(34)),ARAY(IPT(35)),                  INPU0057
      3IARAY(IPT(54)),IARAY(IPT(55)),IARAY(IPT(56)),IARAY(IPT(57)),              INPU0058
      4ARAY(IPT(58)),ARAY(IPT(59)),ARAY(IPT(36)),ARAY(IPT(37)),                  INPU0059
      5ARAY(IPT(38)),ARAY(IPT(39)),ARAY(IPT(40)),ARAY(IPT(41)),                  INPU0060
      5ARAY(IPT(42)),ARAY(IPT(60)),ARAY(IPT(61)),ARAY(IPT(62)),                  INPU0061
      6ARAY(IPT(63)),ARAY(IPT(64)),ARAY(IPT(65)))                                INPU0062
  200  CONTINUE                                                                  INPU0063
       STOP                                                                      INPU0064
       END                                                                       INPU0065
```

```
      SUBROUTINE PCINT(IPT)                                                 POIN0001
      DIMENSION IPT(70)                                                     POIN0002
      COMMON/CWIND/WTIME,WMAG,WDIR,MAXWI,STRTIM                             POIN0003
      COMMON/CTIDE/MAXLW,MAXCT                                              POIN0004
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,            POIN0005
     1   MAXBWQ,NMHBN,NMQBN,NPVBN,MAXHBN,MAXQBN,MAXEL,NMEL,                 POIN0006
     2   MAXQBM,MAXHBM                                                      POIN0007
      COMMON/CLEFT/INPUTH,INPUTQ,NRUN,MAXLB,MAXOB,MAXLBN,MAXOBN             POIN0008
      COMMON/CINTR/MAXPT                                                    POIN0009
      IPT(1)=1                                                              POIN0010
      IPT(2)=IPT(1)+MAXEL*3                                                 POIN0011
      IPT(3)=IPT(2)+MAXEL*3                                                 POIN0012
      IPT(4)=IPT(3)+MAXEL*3                                                 POIN0013
      IPT(5)=IPT(4)+MAXEL                                                   POIN0014
      IPT(6)=IPT(5)+MAXEL                                                   POIN0015
      IPT(7)=IPT(6)+MAXEL                                                   POIN0016
      IPT(8)=IPT(7)+MAXEL                                                   POIN0017
      IPT(9)=IPT(8)+MAXEL                                                   POIN0018
      IPT(10)=IPT(9)+MAXNOD                                                 POIN0019
      IPT(11)=IPT(10)+MAXNOD                                                POIN0020
      IPT(12)=IPT(11)+MAXNOD                                                POIN0021
      IPT(13)=IPT(12)+MAXNOD                                                POIN0022
      IPT(14)=IPT(13)+MAXNOD                                                POIN0023
      IPT(15)=IPT(14)+MAXNOD                                                POIN0024
      IPT(16)=IPT(15)+MAXNOD*MAXBWH                                         POIN0025
      IPT(17)=IPT(16)+MAXMQ*MAXBWQ                                          POIN0026
      IPT(18)=IPT(17)+MAXNOD                                                POIN0027
      IPT(19)=IPT(18)+MAXMQ                                                 POIN0028
      IPT(20)=IPT(19)+MAXNOD                                                POIN0029
      IPT(21)=IPT(20)+MAXMQ                                                 POIN0030
      IPT(22)=IPT(21)+MAXNOD                                                POIN0031
      IPT(23)=IPT(22)+MAXMQ                                                 POIN0032
      IPT(24)=IPT(23)+MAXNOD                                                POIN0033
      IPT(25)=IPT(24)+MAXMQ                                                 POIN0034
      IPT(26)=IPT(25)+MAXNOD                                                POIN0035
      IPT(27)=IPT(26)+MAXMQ                                                 POIN0036
```

```
      IPT(28)=IPT(27)+MAXNOD                                            POIN0037
      IPT(29)=IPT(28)+MAXMQ                                             POIN0038
      IPT(30)=IPT(29)+MAXNOD                                            POIN0039
      IPT(31)=IPT(30)+MAXNOD                                            POIN0040
      IPT(32)=IPT(31)+MAXNOD                                            POIN0041
      IPT(33)=IPT(32)+MAXNOD                                            POIN0042
      IPT(34)=IPT(33)+MAXNOD                                            POIN0043
      IPT(35)=IPT(34)+MAXNOD                                            POIN0044
      IPT(36)=IPT(35)+MAXNOD                                            POIN0045
      IPT(37)=IPT(36)+MAXNOD                                            POIN0046
      IPT(38)=IPT(37)+MAXNOD                                            POIN0047
      IPT(39)=IPT(38)+MAXNOD                                            POIN0048
      IPT(40)=IPT(39)+MAXNOD                                            POIN0049
      IPT(41)=IPT(40)+MAXNOD                                            POIN0050
      IPT(42)=IPT(41)+MAXNOD                                            POIN0051
      IPT(43)=IPT(42)+MAXNOD                                            POIN0052
      IPT(44)=IPT(43)+MAXHBM*MAXBWH                                     POIN0053
      IPT(45)=IPT(44)+MAXHBN                                            POIN0054
      IPT(46)=IPT(45)+MAXHBN                                            POIN0055
      IPT(47)=IPT(46)+MAXHBN                                            POIN0056
      IPT(48)=IPT(47)+MAXQBM*MAXBWQ                                     POIN0057
      IPT(49)=IPT(48)+MAXQBN                                            POIN0058
      IPT(50)=IPT(49)+MAXQBN                                            POIN0059
      IPT(51)=IPT(50)+MAXQBN                                            POIN0060
      IPT(52)=IPT(51)+MAXQBN                                            POIN0061
      IPT(53)=IPT(52)+MAXPT                                             POIN0062
      IPT(54)=IPT(53)+MAXPT                                             POIN0063
      IPT(55)=IPT(54)+MAXLB                                             POIN0064
      IPT(56)=IPT(55)+MAXLB*MAXLBN                                      POIN0065
      IPT(57)=IPT(56)+MAXOB                                             POIN0066
      IPT(58)=IPT(57)+MAXOB*MAXCBN                                      POIN0067
      IPT(59)=IPT(58)+MAXLW                                             POIN0068
      IPT(60)=IPT(59)+MAXQT                                             POIN0069
      IPT(61)=IPT(60)+MAXWI                                             POIN0070
      IPT(62)=IPT(61)+MAXWI                                             POIN0071
      IPT(63)=IPT(62)+MAXWI                                             POIN0072
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IPT(64)=IPT(63)+MAXWI                                    POIN0073
IPT(65)=IPT(64)+MAXWI                                    POIN0074
IPT(66)=IPT(65)+20                                       POIN0075
IPT(67)=IPT(66)+1                                        POIN0076
IPT(68)=IPT(67)+1                                        POIN0077
IPT(69)=IPT(68)                                          POIN0078
IPT(70)=IPT(69)                                          POIN0079
RETURN                                                   POIN0080
END                                                      POIN0081
```

```
      SUBROUTINE SBMAIN(ICON,A,B,AREA,NEXT,NINT,XORD,YORD,DEPTH,NBC,
     1 SYSMH,SYSMQ,H,Q,HPREV,QPREV,HOLD,QOLD,H2,Q2,SYSFH,SYSFQ,SYSFHB,
     2 SYSFQB,SYSBMH,SYSBMQ,NHN,NQN,NVN,HB,ALAG,QB,QBANG,TAUWX,TAUWY,
     3 PSPLUS,CF,EDXX,EDYY,EDXY,NFLUX,FLUX,XM,YM,ETA,U,V,ETAPRV,NMLBN,
     4 ICONL,NMHNPB,ICONB,DHLOW,DIRNL,SX,SY,CXX,CYY,CXY,SBX,SBY,XW,
     5 YW,TT,DIRW,GAMW,TITLE)
      COMMON/CWIND/WTIME,WMAG,WDIR,MAXWI,STRTIM
      COMMON/CTIDE/MAXLW,MAXDT
      COMMON/SORTNO/K1,K2,K3
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,
     1   MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,
     2   MAXQBM,MAXHBM
      COMMON/COUTP/NOUT
      COMMON/CINTEG/TIME,TINC,RKFACT,RKFAC,ISTEP,PHASE,ITIME
      COMMON/COPT/ IBFRIC,IDEPTH,IEDVIS,ICNVEC,IWIND,IVERSN
      COMMON/CPRCP/GRAVT,CORIC,DENSTY
      COMMON/CINTR/MAXPT
      COMMON/CLEFT/INPUTH,INPUTC,NRUN,MAXLB,MAXOB,MAXLBN,MAXOBN
      DIMENSION ICON(MAXEL,3),A(MAXEL,3),B(MAXEL,3),AREA(MAXEL),
     1NEXT(MAXNOD),NINT(MAXNOD),XORD(MAXNOD),YORD(MAXNOD),DEPTH(MAXNOD),
     2NBC(MAXNOD),SYSMH(MAXNOD,MAXBWH),SYSMQ(MAXMQ,MAXBWQ),H(MAXNOD),
     4Q(MAXMQ) ,HPREV(MAXNOD),QPREV(MAXMQ) ,HOLD(MAXNOD),QOLD(MAXMQ),
     4H2(MAXNOD),Q2(MAXMQ),SYSFH(MAXNOD),SYSFQ(MAXMQ),SYSFHB(MAXNOD),
     5SYSFQB(MAXMQ),SYSBMH(MAXHBM,MAXBWH),SYSBMQ(MAXQBM,MAXBWQ),
     6NHN(MAXHBN),NQN(MAXQBN),NVN(MAXQBN),HB(MAXHBN),ALAG(MAXHBN),
     7QB(MAXQBN),QBANG(MAXQBN),TAUWX(MAXNOD),TAUWY(MAXNOD),
     9PSPLUS(MAXNOD),CF(MAXEL),EDXX(MAXEL),EDYY(MAXEL),EDXY(MAXEL),
     9NFLUX(1),FLUX(1),XM(MAXPT),YM(MAXPT),ETA(MAXNOD),U(MAXNOD),
     1V(MAXNOD),ETAPRV(MAXNOD),NMLBN(MAXLB),ICONL(MAXLB,MAXLBN),
     2NMHNPB(MAXOB),ICONB(MAXOB,MAXOBN),DHLOW(MAXLW),DIRNL(MAXDT),
     3SX(MAXNOD),SY(MAXNOD),CXX(MAXNOD),CYY(MAXNOD),CXY(MAXNOD),
     4SBX(MAXNOD),SBY(MAXNOD),XW(MAXWI),YW(MAXWI),TT(MAXWI),
     5DIRW(MAXWI),GAMW(MAXWI),TITLE(20),TEXT1(3,2),TEXT2(2,2),
     6 TEXT3(2,2)
      DATA TEXT1,TEXT2,TEXT3/4HVARY,4HCONS,4HSET ,3HING,4HTANT,4HTO O,
     1 4HSET ,4HREAD,4HTO O,3H IN,4HIGNO,4HINCL,4HRED ,4HUDED/
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      MAXO=MAXHBN                                                                  SBMA0037
      MAXL=MAXQBN                                                                  SBMA0038
      NBANDH=0                                                                     SBMA0039
      GO TO 1251                                                                   SBMA0040
  320 NBANDH=0                                                                     SBMA0041
      READ(5,1001)IVERSN,NMEL,NMNP,IBFRIC,IDEPTH,IEDVIS,IWIND,INPUTH,  00003600  SBMA0042
     1  INPUTQ,ICNVEC,NRUN                                                        SBMA0043
 1001 FORMAT(16I5)                                                     00003800  SBMA0044
      IF(IVERSN .EQ. 0) STOP                                                     SBMA0045
      READ(5,1001) MAXHBN,MAXQBN,MAXBWH,MAXPT,MAXLB,MAXLBN,MAXOB,               SBMA0046
     1MAXOBN,MAXLW,MAXDT,MAXWI                                                   SBMA0047
      MAXEL=NMEL+1                                                               SBMA0048
      MAXNOD=NMNP+1                                                              SBMA0049
      MAXBWQ=2*MAXBWH                                                            SBMA0050
      MAXHBN=MAXHBN+1                                                            SBMA0051
      MAXQBN=MAXQBN+1                                                            SBMA0052
      MAXHQ=2*MAXNOD                                                             SBMA0053
      MAXLB=MAXLB+1                                                              SBMA0054
      MAXOB=MAXOB+1                                                              SBMA0055
      MAXOBN=MAXOBN+1                                                            SBMA0056
      MAXHBM=2*MAXHBN                                                            SBMA0057
      MAXQBM=2*MAXQBN                                                            SBMA0058
      MAXPT=MAXPT+1                                                              SBMA0059
      MAXLW=MAXLW+1                                                              SBMA0060
      MAXDT=MAXDT+1                                                              SBMA0061
      MAXWI=MAXWI+1                                                              SBMA0062
 1251 LENGTH=MAXNOD*MAXBWH                                                       SBMA0063
      CALL AMATZR(SYSMH,LENGTH)                                     00004100  SBMA0064
      LENGTH=MAXNQ*MAXBWQ                                           00004200  SBMA0065
      CALL AMATZR(SYSMQ,LENGTH)                                     00004300  SBMA0066
      LENGTH=MAXHBM*MAXBWH                                          00004400  SBMA0067
      CALL AMATZR(SYSBMH,LENGTH)                                    00004500  SBMA0068
      LENGTH=MAXQBM*MAXBWQ                                          00004600  SBMA0069
      CALL AMATZR(SYSBMQ,LENGTH)                                    00004700  SBMA0070
      CALL AMATZR(PSPLUS,MAXNOD)                                              SBMA0071
      CALL AMATZR(ETA,MAXNOD)                                       00004900  SBMA0072
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      CALL AMATZR(Q,MAXMQ)                                                  00005000 SBMA0073
      CALL AMATZR(QPREV,MAXMQ)                                              00005100 SBMA0074
      TUPI=6.28318                                                          00005200 SBMA0075
      NMHBN=0                                                               00005300 SBMA0076
      NMVBN=0                                                               00005400 SBMA0077
      NMQBN=0                                                               00005500 SBMA0078
      IFLUX=0                                                               00005600 SBMA0079
      READ(5,1003) TITLE                                                    00005700 SBMA0080
 1003 FORMAT(20A4)                                                          00005800 SBMA0081
      WRITE(6,1002) TITLE                                                   00005900 SBMA0082
 1002 FORMAT(1H1//1H-,25X,20A4)                                             00006000 SBMA0083
      CALL SLINE(36)                                                        00006100 SBMA0084
      WRITE(6,1004)NMEL,NMNP,IVERSN,(TEXT1(IBFRIC,I),I=1,2),                00006200 SBMA0085
     1  (TEXT1(IDEPTH,I),I=1,2),(TEXT1(IEDVIS,I),I=1,2),                    00006300 SBMA0086
     2  (TEXT1(IWIND,I),I=1,2),(TEXT2(INPUTH,I),I=1,2),                     00006400 SBMA0087
     3  (TEXT2(INPUTQ,I),I=1,2),(TEXT3(ICNVEC,I),I=1,2)                     00006500 SBMA0088
 1004 FORMAT(1HO,5X,'THIS PROBLEM HAS THE FOLLOWING CHARACTERISTICS:'/      00006600 SBMA0089
     1  1HO,10X,'NUMBER OF ELEMENTS, NMEL = ',I5/1H ,                       00006700 SBMA0090
     2  10X,'NUMBER OF NODES, NMNP = ',I5/1H ,                              00006800 SBMA0091
     3  10X,'THE MODEL APPLIED IS VERSION ',I1/1H ,                         00006900 SBMA0092
     4  10X,'IT IS ASSUMED THAT SPATIALLY',/1H ,                                    SBMA0093
     5  40X,'BOTTOM FRICTION IS ',2A4/1H ,                                  00007100 SBMA0094
     6  40X,'MEAN LOW WATER DEPTH IS ',2A4/1H ,                             00007200 SBMA0095
     7  40X,'EDDY VISCOSITY IS ',2A4/1H ,                                   00007300 SBMA0096
     8  40X,'WIND STRESS IS ',2A4,2X,'IN TIME AND IS SPATIALLY CONSTANT'            SBMA0097
     9  /1H ,10X,'INITIAL VALUES OF H ARE ',2A4                                  SBMA0098
     A /1H ,10X,'INITIAL VALUES OF Q ARE ',2A4/1H ,                                SBMA0099
     B  10X,'CONVECTIVE ACCELERATIONS ARE ',2A4/1H )                     00007700 SBMA0100
      CALL SLINE(36)                                                     00007800 SBMA0101
      NMNP2=NMNP*2                                                       00007900 SBMA0102
      CALL AMATZR(ETA,MAXNOD)                                                     SBMA0103
      CALL AMATZR(Q,MAXMQ)                                                        SBMA0104
      WRITE(6,1010)                                                      00008200 SBMA0105
 1010 FORMAT(1HO,6X,'NODE',8X,'X-',11X,'Y-',8X,'DEPTH',4X,'NODE',5X,     00008300 SBMA0106
     1  'DEPTH',5X,'TIME',5X,'LOCAL X',6X,'FLUX',5X,'GLOBAL Y',4X,         00008400 SBMA0107
     3  'SOURCE'/1H ,5X,'NUMBER',3X,'COORDINATE',3X,'COORDINATE',4X,       00008500 SBMA0108
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     4   '(MLW)',4X,'CODE',4X,'MEASURE',5X,'LAG',6X,'FLUX',7X,'ANGLE',     00008600 SBMA0109
     5   7X,'FLUX',7X,'FLUX'/1H ,18X,'(M)',10X,'(M)',8X,'(M)',15X,         00008700 SBMA0110
     6   '(M)',6X,'(SEC)',3X,'(M2/SEC)',3X,'(DEGREES)',3X,'(M2/SEC)',      00008800 SBMA0111
     7   4X,'(M/SEC)'/1H0)                                                 00008900 SBMA0112
      DO 10 I=1,NMNP                                                       00009000 SBMA0113
      READ(5,1005)NEXT(I),NBC(I),XORD(I),YORD(I),DEPTH(I),DUM1,DUM2,       00009100 SBMA0114
     1   DUM3,DUM4                                                         00009200 SBMA0115
1005  FORMAT(2I5,7F10.0)                                                             SBMA0116
                                                                                     SBMA0117
                                                                                     SBMA0118
      NINT(NEXT(I))=I                                                      00009400 SBMA0119
      I1=NBC(I)                                                            00009500 SBMA0120
      N=NEXT(I)                                                            00009600 SBMA0121
      IF(IDEPTH .EQ. 1) GO TO 60                                           00009700 SBMA0122
      DEPTH(I)=DEPTH(1)                                                    00009800 SBMA0123
60    IF(I1 .EQ. 0) GO TO 70                                               00009900 SBMA0124
      IF(I1 .EQ. 1) GO TO 80                                               00010000 SBMA0125
      IF(I1 .EQ. 2) GO TO 90                                               00010100 SBMA0126
      IF(I1 .EQ. 3) GO TO 100                                              00010200 SBMA0127
      IF(I1 .EQ. 6) GO TO 50                                               00010300 SBMA0128
      IF(I1 .EQ. 4) GO TO 110                                              00010400 SBMA0129
      NMHBN=NMHBN+1                                                        00010500 SBMA0130
      NMQBN=NMQBN+1                                                        00010600 SBMA0131
      NMVBN=NMVBN+1                                                        00010700 SBMA0132
      NHN(NMHBN)=I                                                         00010800 SBMA0133
      NQN(NMQBN)=I                                                         00010900 SBMA0134
      NVN(NMVBN)=I                                                         00011000 SBMA0135
      HB(NMHBN)=DUM1                                                       00011100 SBMA0136
      ALAG(NMHBN)=DUM2                                                     00011200 SBMA0137
      QB(NMQBN)=DUM3                                                       00011300 SBMA0138
      WRITE(6,1006) N,XORD(I),YORD(I),DEPTH(I),NBC(I),HB(NMHBN),           00011400 SBMA0139
     1   ALAG(NMHBN),QB(NMQBN),DUM4                                        00011500 SBMA0140
1006  FORMAT(1H ,5X,I4,5X,F10.2,3X,F10.2,3X,F6.2,3X,I6,4X,F5.2,4X,         00011600 SBMA0141
     1   F6.0,3X,F8.4,5X,F6.1,7X,F3.1)                                     00011700 SBMA0142
      GO TO 10                                                             00011800 SBMA0143
110   NMQBN=NMQBN+1                                                        00011900 SBMA0144
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      NMVBN=NMVBN+1                                                          00012000 SBMA0145
      NQN(NMQBN)=I                                                           00012100 SBMA0146
      NVN(NMVBN)=I                                                           00012200 SBMA0147
      QB(NMQBN)=DUM1                                                         00012300 SBMA0148
      QBANG(NMQBN)=0.                                                        00012400 SBMA0149
      WRITE(6,1008)N,XORD(I),YORD(I),DEPTH(I),NBC(I),QB(NMQBN),DUM2          00012500 SBMA0150
 1008 FORMAT(1H ,5X,I4,5X,F10.2,3X,F10.2,3X,F6.2,3X,I5,24X,F8.4,17X,         00012600 SBMA0151
     1  F3.1)                                                               00012700 SBMA0152
      GO TO 10                                                               00012800 SBMA0153
  100 NMHBN=NMHBN+1                                                          00012900 SBMA0154
      NMQBN=NMQBN+1                                                          00013000 SBMA0155
      NHN(NMHBN)=I                                                           00013100 SBMA0156
      NQN(NMQBN)=I                                                           00013200 SBMA0157
      HB(NMHBN)=DUM1                                                         00013300 SBMA0158
      ALAG(NMHBN)=DUM2                                                       00013400 SBMA0159
      QB(NMQBN)=DUM3                                                         00013500 SBMA0160
      QBANG(NMQBN)=DUM4                                                      00013600 SBMA0161
      WRITE(6,1012)N,XORD(I),YORD(I),DEPTH(I),NBC(I),HB(NMHBN),              00013700 SBMA0162
     1  ALAG(NMHBN),QB(NMQBN),QBANG(NMQBN)                                  00013800 SBMA0163
 1012 FORMAT(1H ,5X,I4,5X,F10.2,3X,F10.2,3X,F6.2,3X,I4,6X,F5.2,4X,           00013900 SBMA0164
     1  F6.0,4X,F8.4,5X,F6.1)                                               00014000 SBMA0165
      QBANG(NMQBN)=QBANG(NMQBN)*3.14159/180.                                 00014100 SBMA0166
      GO TO 10                                                               00014200 SBMA0167
   90 NMHBN=NMHBN+1                                                          00014300 SBMA0168
      NHN(NMHBN)=I                                                           00014400 SBMA0169
      HB(NMHBN)=DUM1                                                         00014500 SBMA0170
      ALAG(NMHBN)=DUM2                                                       00014600 SBMA0171
      WRITE(6,1014)N,XORD(I),YORD(I),DEPTH(I),NBC(I),HB(NMHBN),              00014700 SBMA0172
     1  ALAG(NMHBN)                                                         00014800 SBMA0173
 1014 FORMAT(1H ,5X,I4,5X,F10.2,3X,F10.2,3X,F6.2,3X,I3,7X,F5.2,4X,F6.0)      00014900 SBMA0174
      GO TO 10                                                               00015000 SBMA0175
   80 NMQBN=NMQBN+1                                                          00015100 SBMA0176
      NQN(NMQBN)=I                                                           00015200 SBMA0177
      QB(NMQBN)=DUM1                                                         00015300 SBMA0178
      QBANG(NMQBN)=DUM2                                                      00015400 SBMA0179
      WRITE(6,1016)N,XORD(I),YORD(I),DEPTH(I),NBC(I),QB(NMQBN),              00015500 SBMA0180
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     1  QBANG(NMQBN)                                                    00015600 SBMA0181
1016 FORMAT(1H ,5X,I4,5X,F10.2,3X,F10.2,3X,F6.2,3X,I2,27X,F8.4,         00015700 SBMA0182
     1  5X,F6.1)                                                        00015800 SBMA0183
      QBANG(NMQBN)=QBANG(NMQBN)*3.14159/180.                          00015900 SBMA0184
      GO TO 10                                                        00016000 SBMA0185
70    WRITE(6,1018) N,XCRD(I),YCRD(I),DEPTH(I),NBC(I)                 00016100 SBMA0186
1018 FORMAT(1H ,5X,I4,5X,F10.2,3X,F10.2,3X,F6.2,3X,I1)                00016200 SBMA0187
      GO TO 10                                                        00016300 SBMA0188
50    IFLUX=IFLUX+1                                                   00016400 SBMA0189
      NFLUX(IFLUX)=I                                                  00016500 SBMA0190
      FLUX(IFLUX)=DUM1                                                00016600 SBMA0191
      WRITE(6,1020)N,XCRD(I),YCRD(I),DEPTH(I),NBC(I),FLUX(IFLUX)      00016700 SBMA0192
1020 FORMAT(1H ,5X,I4,5X,F10.2,3X,F10.2,3X,F6.2,3X,I6,56X,F6.4)       00016800 SBMA0193
10    CONTINUE                                                        00016900 SBMA0194
      CALL SLINE(15)                                                  00017000 SBMA0195
      WRITE(6,1030)NMHBN,NMQBN,NMVBN,IFLUX                            00017100 SBMA0196
1030 FORMAT(1HO,5X,'NUMBER OF PRESCRIBED BOUNDARY AND INTERNAL FLUX NOD00017200 SBMA0197
     1FS'/1HO,10X,'PRESCRIBED HEIGHTS, NMHBN =',I5/1H ,10X,           00017300 SBMA0198
     2  'PRESCRIBED LOCAL X FLUX, NMQBN =',I5/1H ,10X,                00017400 SBMA0199
     3  'PRESCRIBED X AND Y FLUX, NMVBN =',I5/1H ,10X,                00017500 SBMA0200
     4  'INTERNAL FLUX NODES, IFLUX =',I5)                            00017600 SBMA0201
      CALL SLINE(36)                                                  00017700 SBMA0202
      READ(5,1007)(N,(ICON(N,J),J=1,3),CF(N),EDXX(N),EDYY(N),EDXY(N),  00017800 SBMA0203
     1  L=1,NMEL)                                                     00017900 SBMA0204
1007 FORMAT(4I10,4F10.0)                                              00018000 SBMA0205
      WRITE(6,1022)                                                   00018100 SBMA0206
1022 FORMAT(1HO,5X,'ELEMENT CONNECTIVITIES.'/1HO,10X,'ELEMENT NUMBER', 00018200 SBMA0207
     1  3X,'NODE 1',3X,'NODE 2',3X,'NODE 3',3X,'FRICTION COEFFICIENT',  00018300 SBMA0208
     2  3X,'EDDY XX',3X,'EDDY YY',3X,'EDDY XY'/1HO)                     00018400 SBMA0209
      IF(IBFRIC .EQ. 1) GO TO 130                                     00018500 SBMA0210
      DO 120 I=2,NMEL                                                 00018600 SBMA0211
      CF(I)=CF(1)                                                     00018700 SBMA0212
120   CONTINUE                                                        00018800 SBMA0213
130   IF(IEDVIS.EQ.1) GO TO 200                                               SBMA0214
      DO 210 I=2,NMEL                                                 00019000 SBMA0215
      EDXX(I)=EDXX(1)                                                 00019100 SBMA0216
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      EDYY(I)=EDYY(1)                                                    00019200 SBMA0217
      EDXY(I)=EDXY(1)                                                    00019300 SBMA0218
  210 CONTINUE                                                           00019400 SBMA0219
  200 DO 220 I=1,NMEL                                                    00019500 SBMA0220
      WRITE(6,1024)I,(ICON(I,J),J=1,3),CF(I),EDXX(I),EDYY(I),EDXY(I)     00019600 SBMA0221
 1024 FORMAT(1H ,16X,I3,10X,I3,6X,I3,6X,I3,12X,F10.6,3X,F9.2,            00019700 SBMA0222
     1  1X,F9.2,1X,F9.2)                                                00019800 SBMA0223
  220 CONTINUE                                                           00019900 SBMA0224
      CALL SLINE(36)                                                     00020000 SBMA0225
      CALL GEOM(NINT,ICON,A,E,AREA,XORD,YORD,SYSMH)                      00020100 SBMA0226
      NBANDQ=2*NBANDH                                                    00020200 SBMA0227
      CALL QMAT(SYSMQ,SYSMH)                                             00020300 SBMA0228
      CALL ROTMQ(SYSMQ,NQN,QBANG)                                        00020400 SBMA0229
      IF(MAXPT.LE.1) ITIMT=9CCCC0000                                        SBMA0230
      IF(MAXPT.LE.1) GO TO 1071                                             SBMA0231
      WRITE(6,1094)                                                         SBMA0232
 1094 FORMAT(//10X,'INTERPOLATION OPTION---SELECTED LOCATIONS FOR FIELD     SBMA0233
     1DATA COMPARISONS OF CURRENTS AND TIDES'/)                             SBMA0234
      READ(5,1061) NPOINT,ITIMT,ISTP3                                       SBMA0235
 1061 FORMAT(3I10)                                                          SBMA0236
      WRITE(6,1066) NPOINT                                                  SBMA0237
 1066 FORMAT(/1X,'NUMBER OF POINTS FOR INTERPOLATION OF VELOCITIES AND S    SBMA0238
     1URFACE RISE =',I5)                                                    SBMA0239
      WRITE(6,1093) ITIMT,ISTP3                                             SBMA0240
 1093 FORMAT(/1X,'INTERPOLATION STARTS AT TIMESTEP NO.',I5,'  AND FROM T    SBMA0241
     1HEN ON AT INTERVALS OF ',I5,2X,'TIMESTEPS'/)                          SBMA0242
      WRITE(6,1067)                                                         SBMA0243
 1067 FORMAT(/1X,'INTERPOLATION POINT NO.',7X,'X-COORDINATE',4X,'Y-COORD    SBMA0244
     1INATE'/1X,35X,'(M)',13X,'(M)'/)                                       SBMA0245
      DO 1065 I=1,NPOINT                                                    SBMA0246
      READ(5,1062) XM(I),YM(I)                                              SBMA0247
 1062 FORMAT(2F10.0)                                                        SBMA0248
 1065 WRITE(6,1069) I,XM(I),YM(I)                                           SBMA0249
 1069 FORMAT(I13,19X,F10.2,7X,F10.2)                                        SBMA0250
      CALL SLINE(36)                                                        SBMA0251
 1071 CONTINUE                                                              SBMA0252
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      READ(5,1009) ALATT,OMEGA,GRAVT,PERIOD,DENSTY                                  SBMA0253
 1009 FORMAT(F10.0,E10.3,3F10.0,F10.3)                                              SBMA0254
      CORIO=2.*OMEGA*SIN(ALATT*3.14159/180.)                          00020700      SBMA0255
      PHASE=TUPI/PERIOD                                               00020800      SBMA0256
      WRITE(6,1026)ALATT,CORIO,GRAVT,OMEGA,PERIOD,DENSTY              00020900      SBMA0257
 1026 FORMAT(1H0,5X,'SYSTEM PROPERTIES.'/1H0,10X,                     00021000      SBMA0258
     1   'AVERAGE LATITUDE, ALATT = ',F7.2,2X,'(DEGREES N)'/1H ,      00021100      SBMA0259
     2   10X,'CORIOLIS PARAMETER, CORIO = 2*OMEGA*SIN(ALATT) = ',E10.3,  00021200  SBMA0260
     3   2X,'(SEC-1)'/1H ,10X,'GRAVITATIONAL ACCELERATION, GRAVT = ',F6.300021300  SBMA0261
     5   , 2X,'(M/SEC2)'/1H ,10X,'ANGULAR VELOCITY OF EARTH ROTATION, OME00021400  SBMA0262
     6GA = ',E10.3,2X,'(SEC-1)'/1H ,10X,                              00021500      SBMA0263
     7   'PERIOD OF HARMONIC TIDAL EXCITATION, PERIOD = ',F6.0,2X,    00021600      SBMA0264
     8 '(SEC)'/1H ,10X,'DENSITY OF WATER, DENSTY = ',F7.2,' (KG/M3)')               SBMA0265
      CALL SLINE(36)                                                  00021800      SBMA0266
      READ(5,1011)STRTIM,ENDTIM,TINC,NO,BOUND,IDT,NOUT,ITIMC,IVELW,IVELP            SBMA0267
 1011 FORMAT(3F10.0,I10,F10.0,5I5)                                                  SBMA0268
      IF(IVELP.EQ.0) ITIMP=9C00C0000                                                SBMA0269
      IF(IVELP.EQ.0) GO TO 1092                                                     SBMA0270
      READ(5,1061) ITIMP,ISTP1                                                      SBMA0271
      WRITE(6,1095) ITIMP,ISTP1                                                     SBMA0272
 1095 FORMAT(//1X,'NODAL VELOCITIES WILL BE PUNCHED FOR PLOTTING PURPOSE           SBMA0273
     1S STARTING AT TIMESTEP NO.',I5  /1X,'AND FROM THEN ON AT INCREMENT           SBMA0274
     2S OF',I5,2X,'TIMESTEPS'/)                                                    SBMA0275
      CALL SLINE(3C)                                                                SBMA0276
 1092 IF(IVELW.EQ.0) ITIMW=9C0000000                                                SBMA0277
      IF(IVELW.EQ.0) ITIMWE=1                                                       SBMA0278
      IF(IVELW.EC.0) GO TO 109C                                                     SBMA0279
      READ(5,1061) ITIMW,ISTP2,ITIMWE                                               SBMA0280
      WRITE(6,1097) ITIMW,ISTP2,ITIMWE                                              SBMA0281
 1097 FORMAT(//1X,'NODAL VELOCITIES AND DEPTHS WILL BE WRITTEN ON THE DI            SBMA0282
     1RECT ACCESS FILE STARTING AT TIMESTEP NO.',I5, /1X,'AND FROM THEN             SBMA0283
     2ON AT INTERVALS OF',I5,2X,'TIMESTEPS UNTIL TIMESTEP',I5/)                     SBMA0284
      IPTS=(ITIMWE-ITIMW)/ISTP2+1                                                   SBMA0285
      NMNP3=3*NMNP                                                                  SBMA0286
      WRITE(6,1098) IPTS,NMNP3                                                      SBMA0287
 1098 FORMAT(/1X,'TOTAL NUMBER OF STORAGE POINTS CREATED ON VELOCITY FIL            SBMA0288
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     1E =',15//1X,'EACH STORAGE POINT HAS ONE SET OF NODAL VELOCITIES AN      SBMA0289
     2D DEPTHS (U,V,AND DEPTH) WHICH TOTAL TO',I5,2X,'VALUES PER POINT'/      SBMA0290
     3)                                                                       SBMA0291
      DEFINE FILE 10(20 ,20 ,U,IPOINT)                                        SBMA0292
      IPOINT=1                                                                SBMA0293
      CALL SLINE(36)                                                          SBMA0294
1096  IF(NMHBN .EQ. 0) GO TO 40C                                              SBMA0295
      CALL STORNO(MAXNOD,MAXBWH,MAXHBM,MAXBWH,NBANDH,NMHBN,1,          00022200 SBMA0296
     1  SYSMH,NHN,SYSBMH,0,MAXHBN)                                            SBMA0297
 40C  IF(NMVBN .EQ. 0) GO TO 410                                        00022400 SBMA0298
      CALL STORNO(MAXMQ,MAXBWQ,MAXQBM,MAXBWQ,NBANDQ,NMVBN,2,SYSMQ,NVN, 00022500 SBMA0299
     1  SYSBMQ,1,MAXQBN)                                                      SBMA0300
      LENGTH=MAXQBN*MAXBWQ                                               00022700 SBMA0301
      CALL AMATZR(SYSBMQ,LENGTH)                                         00022800 SBMA0302
 410  IF(NMQBN .EQ. 0) GO TO 17C                                         00022900 SBMA0303
      CALL STORNO(MAXMQ,MAXBWQ,MAXQBM,MAXBWQ,NBANDQ,NMQBN,2,SYSMQ,      00023000 SBMA0304
     1  NQN,SYSBMQ,0,MAXQBN)                                                  SBMA0305
 17C  CALL DECOMP(NMNP,MAXNCD,MAXBWH,NBANCH,SYSMH)                      00023200 SBMA0306
      CALL DECOMP(NMNP2,MAXMQ,MAXBWQ,NBANDQ,SYSMQ)                       00023300 SBMA0307
      TINC2=TINC/2.                                                      00023400 SBMA0308
      TIME=STRTIM                                                        00023500 SBMA0309
      WRITE(6,1028)STRTIM,ENDTIM,TINC,NO,BOUND,(TEXTL(IOT,J),J=1,2),     00023600 SBMA0310
     1  NOUT                                                            00023700 SBMA0311
1028 FORMAT(1H0,5X,'INTEGRATION PARAMETERS,'/1H0,10X,                    00023800 SBMA0312
     1  'START TIME OF INTEGRATION, STRTIM = ',F9.1,2X,'SEC'/           00023900 SBMA0313
     2  1H ,10X,'END TIME OF INTEGRATION, ENDTIM = ',F9.1,2X,'SEC'/     00024000 SBMA0314
     3  1H ,10X,'CONSTANT TIME INCREMENT, TINC = ',F7.1,2X,'SEC'/1H ,10X00024100 SBMA0315
     4  ,'EXTERNAL NODE AT WHICH VARIATION IS BOUNDED BY BOUND, NO = ', 00024200 SBMA0316
     5  I4/1H ,10X,'CRUDE STABILITY CONTROL,BOUND = ',F6.2,' M'/1X,10X,       SBMA0317
     6  'THE TIME INCREMENT IS ASSUMED ',2A4/1H ,10X,                   00024400 SBMA0318
     7  'OUTPUT WILL BE PRINTED FOR EVERY ',I3,' TIMESTEPS')            00024500 SBMA0319
      NO=NINT(NO)                                                        00024600 SBMA0320
      CALL SLINE(36)                                                     00024700 SBMA0321
      READ(5,1015) NMLB,(NMLBN(L), L=1,NMLB)                             00024800 SBMA0322
      DO 350 I=1,NMLB                                                    00024900 SBMA0323
      JEND=NMLBN(I)                                                      00025000 SBMA0324
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      READ(5,1013)(ICONL(I,J), J=1,JEND)                                    00025100 SBMA0325
1015  FORMAT(8I10)                                                          00025200 SBMA0326
      WRITE(6,1052) I,NMLBN(I),(ICONL(I,J), J=1,JEND)                       00025500 SBMA0327
1052  FORMAT(1H0,5X,'LAND SEGMENT ',I2,5X,'# NODES, NMLBN = ',I2/1H ,5X,    00025600 SBMA0328
     1  'EXTERNAL NODE NUMBERS: ',25(I3,'-')/1H ,20X,25(I3,'-')/            SBMA0329
     2 1H ,20X,25(I3,'-')/1H ,20X,25(I3,'-'))                              SBMA0330
      DO 370 J=1,JEND                                                       00025800 SBMA0331
      ICONL(I,J)=NINT(ICONL(I,J))                                           00025900 SBMA0332
370   CONTINUE                                                              00026000 SBMA0333
      WRITE(6,1054) (ICONL(I,J), J=1,JEND)                                  00026100 SBMA0334
1054  FORMAT(1H ,5X,'INTERNAL NODE NUMBERS: ',25(I3,'-')/1H ,               00026200 SBMA0335
     120X,25(I3,'-')/1H ,20X,25(I3,'-')/1H ,20X,25(I3,'-'))                 SBMA0336
350   CONTINUE                                                              00025300 SBMA0337
      CALL SLINE(36)                                                        00026500 SBMA0338
      IF(IVERSN .EQ. 1) GO TO 20                                            00026600 SBMA0339
      READ(5,1015) NSEGMT,(NMHNPB(I), I=1,NSEGMT)                           00026700 SBMA0340
1013  FORMAT(20I4)                                                          00026800 SBMA0341
      WRITE(6,1046) NSEGMT                                                  00026900 SBMA0342
1046  FORMAT(1H0,10X,'MODEL VERSION 2 CHOSEN. THE ADDITIONAL',              00027000 SBMA0343
     1  ' BOUNDARY INFORMATION IS:'/1H0,15X,                                00027100 SBMA0344
     2  'NUMBER OF BOUNDARY SEGMENTS, NSEGMT = ',I5/1H0)                    00027200 SBMA0345
      IF(NSEGMT .EQ. 0) GO TO 40                                            00027300 SBMA0346
      DO 30 I=1,NSEGMT                                                      00027400 SBMA0347
      J1=NMHNPB(I)                                                          00027500 SBMA0348
      READ(5,1013)(ICONB(I,J), J=1,J1)                                      00027600 SBMA0349
      WRITE(6,1048)I,NMHNPB(I),(ICONB(I,J), J=1,J1)                         00027700 SBMA0350
1048  FORMAT(1H ,5X,'SEGMENT ',I3,',  NUMBER OF NODES, NMHNPB = ',          00027800 SBMA0351
     1  I3,',  EXTERNAL NODE NUMBERS: ',15('-',I3)/1H ,20X,                 SBMA0352
     225(I3,'-')/1H ,20X,25(I3,'-'))                                        SBMA0353
      DO 140 J=1,J1                                                         00028000 SBMA0354
      ICONB(I,J)=NINT(ICONB(I,J))                                           00028100 SBMA0355
140   CONTINUE                                                              00028200 SBMA0356
      WRITE(6,1050) (ICONB(I,J), J=1,J1)                                    00028300 SBMA0357
1050  FORMAT(1H ,51X,'INTERNAL NODE NUMBERS: ',15('-',I3)/1H0,20X,          SBMA0358
     125(I3,'-')/1H ,20X,25(I3,'-'))                                        SBMA0359
30    CONTINUE                                                              00028500 SBMA0360
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40    CALL SLINE(36)                                                    00028600 SBMA0361
20    ITIME=0                                                           00028700 SBMA0362
      IF(MAXLW.LE.1) GO TO 1080                                                  SBMA0363
      NLWS=MAXLW-1                                                               SBMA0364
      WRITE(6,1201)                                                              SBMA0365
1201 FORMAT(//1X,'INFORMATION FOR OPTIONAL ADJUSTMENT OF MEAN-LOW-WATER          SBMA0366
     1 DATUM EACH TIDAL CYCLE'/)                                                 SBMA0367
      READ(5,1090) (DHLOW(KT),KT=1,NLWS)                                        SBMA0368
1090 FORMAT(10F8.3)                                                             SBMA0369
      WRITE(6,1081)                                                              SBMA0370
1081 FORMAT(//3X,'TIDAL CYCLE',6X,'ADJUSTMENT IN MLW DATUM'/32X,'(M)'/)         SBMA0371
      DO 1083 KT=1,NLWS                                                          SBMA0372
1083 WRITE(6,1082) KT,DHLOW(KT)                                                 SBMA0373
1082 FORMAT(I10,17X,F10.3)                                                      SBMA0374
      CALL SLINE(36)                                                             SBMA0375
1080 IF(MAXDT.LE.1) GO TO 1085                                                  SBMA0376
      WRITE(6,1202)                                                              SBMA0377
1202 FORMAT(//1X,'INFORMATION FOR OPTIONAL ADJUSTMENT OF TIDAL AMPLITUD         SBMA0378
     1E EACH TIDAL CYCLE'/)                                                     SBMA0379
      NDTS=MAXDT-1                                                               SBMA0380
      READ(5,1090) (DIRNL(KT),KT=1,NDTS)                                        SBMA0381
      WRITE(6,1086)                                                              SBMA0382
1086 FORMAT(//3X,'TIDAL CYCLE',6X,'ADJUSTMENT IN TIDAL AMPLITUDE'/32X,          SBMA0383
     1 '(M)'/)                                                                  SBMA0384
      DO 1087 KT=1,NDTS                                                          SBMA0385
1087 WRITE(6,1082) KT,DIRNL(KT)                                                 SBMA0386
1085 CONTINUE                                                                   SBMA0387
      IF(INPUTH .EQ. 1) GO TO 230                                       00028800 SBMA0388
      CALL READX(ETA,NMNP,MAXNOD)                                                SBMA0389
      WRITE(6,1042)                                                     00029000 SBMA0390
1042 FORMAT(1HO,'INITIAL VALUES OF SURFACE ELEVATIONS ARE:'/1H )        00029100 SBMA0391
      WRITE(6,1040)(ETA(I), I=1,NMNP)                                   00029200 SBMA0392
1040 FORMAT(1H ,10(2X,F10.3))                                           00029300 SBMA0393
      CALL SLINE(40)                                                    00029400 SBMA0394
230   IF(INPUTQ .EQ. 1) GO TO 270                                       00029500 SBMA0395
      CALL READX(QPREV,NMNP2,MAXMO)                                              SBMA0396
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      DO 190 I=1,NMNP2                                                  00029700 SBMA0397
      Q(I)=QPREV(I)                                                     00029800 SBMA0398
  190 CONTINUE                                                          00029900 SBMA0399
      CALL LOCGLC(QBANG,NQN,QPREV,1.)                                   00030000 SBMA0400
      WRITE(6,1044)                                                     00030100 SBMA0401
 1044 FORMAT(1HO,10X,'INITIAL VALUES OF THE FLUXES ARE:'/1H )           00030200 SBMA0402
      WRITE(6,1040) (Q(I), I=1,NMNP2)                                   00030300 SBMA0403
  270 CALL SLINE(40)                                                    SBMA0404
      WTIME=-10.0                                                       SBMA0405
      TIME=TIME+TINC2                                                   00030500 SBMA0406
  240 CALL STETAB(ETA,HB,NHN,ALAG,DHLOW,DIRAL,PERIOD)                   SBMA0407
      CALL CETA(H,DEPTH,ETA)                                            00030700 SBMA0408
      CALL INTIME(ETA,ETAPRV,NMNP,SYSFQ,NMNP2,MAXNOD,MAXMQ)             SBMA0409
      ITIME =ITIME+1                                                    00030900 SBMA0410
      TIME=TIME+TINC2                                                   00031000 SBMA0411
      CALL FORCEQ(H,Q,TAUWX,TAUWY,DEPTH,AREA,CF,EDXX,EDYY,EDXY,ICON,    SBMA0412
     1  A,B,PSPLUS,SYSFQ,ETA,SX,SY,CXX,CYY,CXY,SBX,SBY,DIRW,GAMW,XW,     SBMA0413
     2 YW,TT)                                                           SBMA0414
      IF(IVERSN .EQ. 1) GO TO 250                                       00031300 SBMA0415
      CALL BOUNDF(SYSFQ,XORD,YCRD,NMLB,NMLBN,ICONL,ETA,DEPTH            SBMA0416
     1,MAXLBN,MAXLB)                                                    SBMA0417
      IF(NSEGMT .EQ. 0) GO TO 250                                       00031500 SBMA0418
      CALL BOUNDF(SYSFQ,XORD,YCRD,NSEGMT,NMHNPB,ICONB,ETA,DEPTH,        SBMA0419
     1MAXOBN,MAXOB)                                                     SBMA0420
  250 CALL LOCGLC(QBANG,NQN,SYSFQ,1.)                                   00031700 SBMA0421
      CALL SOLVX(Q,SYSFQ,QPREV,SYSMQ,NMNP2,NBANDQ,MAXMQ,MAXBWQ)         00031800 SBMA0422
      IF(NMQBN .EQ. 0) GO TO 180                                        00031900 SBMA0423
      CALL STQB(Q,QB,NQN,NVN)                                           00032000 SBMA0424
  180 DO 150 I=1,NMNP2                                                  00032100 SBMA0425
      QPREV(I)=Q(I)                                                     00032200 SBMA0426
  150 CONTINUE                                                          00032300 SBMA0427
      CALL LOCGLC(QBANG,NQN,Q,-1.)                                      00032400 SBMA0428
  251 CALL OUTPUT(H,Q,ETA,U,V,DEPTH,&330,&300)                          00032500 SBMA0429
  260 TIME=TIME+TINC2                                                   00032600 SBMA0430
      CALL AMATZR(SYSFH,MAXNOD)                                         SBMA0431
      CALL FORCFH(Q,SYSFH,A,B,ICON)                                     00032800 SBMA0432
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      IF(NMHBN .EQ. 0) GO TO 160                                          00032900 SBMA0433
      CALL STETAB(ETA,HB,NHN,ALAG,DHLOW,DIRNL,PERIOD)                              SBMA0434
      CALL SUBOUN(NMHBN,NHN,NBANDH,SYSFH,SYSBMH,ETA,ETAPRV,NMNP,          00033100 SBMA0435
     1  MAXHBM,MAXBWH,1,MAXHBN,MAXNOD)                                             SBMA0436
  160 CALL SOLVX(ETA,SYSFH,ETAPRV,SYSMH,NMNP,NBANDH,MAXNOD,MAXBWH)        00033500 SBMA0437
      IF(ITIME.EQ.ITIMC) CALL CARDO(ETA,Q,NMNP,NMNP2,2,MAXNOD,MAXMO)               SBMA0438
      GO TO 240                                                           00033600 SBMA0439
  300 CALL STETAB(ETA,HB,NHN,ALAG,DHLOW,DIRNL,PERIOD)                              SBMA0440
      CALL CETA(H,DEPTH,ETA)                                              00033800 SBMA0441
      CALL VOLUME(ETA,AREA,ICCN,VOL)                                      00033900 SBMA0442
      WRITE(6,1034) TIME,TINC,ITIME,VOL,IPOINT                                 SBMA0443
 1034 FORMAT(1HO,10X,'TIME = ',F12.2,' SEC',5X,'DELTA T WAS, TINC = ',    00034100 SBMA0444
     1  F8.2,1X,'SEC.',5X,'TIME STEP, ITIME = ',I5/1HO,10X,                00034200 SBMA0445
     2'NET VOLUME ABOVE MLW, VOL= ',F13.6,'      IPOINT=',I8)                 SBMA0446
      CALL SLINE(15)                                                      00034400 SBMA0447
      WRITE(6,7788)                                                            SBMA0448
 7788 FORMAT('    NINT  NEXT      DEPTH          X-FLUX         Y-FLUX       EL  SBMA0449
     1EVATION       X-VEL          Y-VEL')                                      SBMA0450
      DO 310 I=1,NMNP                                                     00034500 SBMA0451
      WRITE(6,1032)I,NEXT(I),H(I),Q(2*I-1),Q(2*I),ETA(I),U(I),V(I)             SBMA0452
 1032 FORMAT(1H ,2X,2(I4,2X),6(F10.5,3X))                                      SBMA0453
  310 CONTINUE                                                            00034900 SBMA0454
      CALL SLINE(36)                                                      00035000 SBMA0455
  330 CALL CHECKS(H(NO),DEPTH(NO),BCUND,&320)                             00035100 SBMA0456
      IF(ITIME.EQ.ITIMC) CALL CARDO(ETA,Q,NMNP,NMNP2,1,MAXNOD,MAXMO)               SBMA0457
      IF (ITIME.LT.ITIMP) GO TO 231                                                SBMA0458
      I3=ITIME-ITIMP                                                               SBMA0459
      IF (I3/ISTP1*ISTP1.EQ.I3) WRITE(7,999) (U(II),V(II),II=1,NMNP)               SBMA0460
  999 FORMAT(8F10.2)                                                               SBMA0461
  231 IF(ITIME.GT.ITIMWE) GO TO 233                                                SBMA0462
      IF(ITIME.LT.ITIMW) GO TO 233                                                 SBMA0463
      I9=ITIME-ITIMW                                                               SBMA0464
      IF(I9/ISTP2*ISTP2.EQ.I9) WRITE(10'IPOINT)  (U(II),V(II),H(II),               SBMA0465
     1 II=1,NMNP)                                                                  SBMA0466
  233 IF(ITIME.LT.ITIMT) GO TO 234                                                 SBMA0467
      I8=ITIME-ITIMT                                                               SBMA0468
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      IF(IB/ISTP3*ISTP3.NE.IB) GO TO 234                                    SBMA0469
      CALL SLINE(36)                                                        SBMA0470
      WRITE(6,1033) TIME,ITIME                                              SBMA0471
 1033 FORMAT(1H ,10X,'TIME= ',F12.2,'SEC',5X,'ITIME= ',I5)                  SBMA0472
      WRITE(6,1035)                                                         SBMA0473
 1035 FORMAT(1X,' INTERPOLATION PT  X-VEL      Y-VEL          H            SBMA0474
     1 ETA')                                                                SBMA0475
      DO 1070 I=1,NPOINT                                                    SBMA0476
      L=I                                                                   SBMA0477
      CALL INTEPO(U,V,XM,YM,L,UM,VM,ICON,NEXT,NINT,XORD,YORD)               SBMA0478
      CALL INTEPO(H,ETA,XM,YM,L,HM,ETAM,ICON,NEXT,NINT,XORD,YORD)           SBMA0479
      WRITE(6,1060) L,UM,VM,HM,ETAM                                         SBMA0480
 1060 FORMAT(1H ,I5,9X,4(F10.5,3X))                                         SBMA0481
 1070 CONTINUE                                                              SBMA0482
      CALL SLINE(36)                                                        SBMA0483
  234 IF(TIME.GT.ENDTIM+0.001) GO TO 320                                    SBMA0464
      GO TO 260                                                 00035300    SBMA0485
 2000 RETURN                                                                SBMA0486
      END                                                       00035400    SBMA0487
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      SUBROUTINE INTEPO(U,V,XM,YM,L,UM,VM,ICON,NEXT,NINT,XORD,YORD)          INTE0001
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,            INTE0002
     1   MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,                 INTE0003
     2   MAXQBM,MAXHBM                                                      INTE0004
      COMMON/CINTEG/TIME,TINC,RKFACT,RKFAC,ISTEP,PHASE,ITIME                INTE0005
      COMMON/CINTR/MAXPT                                                    INTE0006
      DIMENSION NEXT(MAXNOD),NINT(MAXNOD),XORD(MAXNOD),YORD(MAXNOD),        INTE0007
     1ICON(MAXEL,3),K(3),U(MAXNOD),V(MAXNOD),XM(MAXPT),YM(MAXPT)            INTE0008
      DO 800 I=1,NMEL                                                       INTE0009
      N1=ICON(I,1)                                                          INTE0010
      N2=ICON(I,2)                                                          INTE0011
      N3=ICON(I,3)                                                          INTE0012
      X1=XORD(N1)                                                           INTE0013
      X2=XORD(N2)                                                           INTE0014
      X3=XORD(N3)                                                           INTE0015
      Y1=YORD(N1)                                                           INTE0016
      Y2=YORD(N2)                                                           INTE0017
      Y3=YORD(N3)                                                           INTE0018
      U1=U(N1)                                                              INTE0019
      U2=U(N2)                                                              INTE0020
      U3=U(N3)                                                              INTE0021
      V1=V(N1)                                                              INTE0022
      V2=V(N2)                                                              INTE0023
      V3=V(N3)                                                              INTE0024
      A3=(Y2-Y1)                                                            INTE0025
      B3=-1.*(X2-X1)                                                        INTE0026
      C3=(Y1*X2-X1*Y2)                                                      INTE0027
      DIS3=A3*X3+B3*Y3+C3                                                   INTE0028
      DISM3=A3*XM(L)+B3*YM(L)+C3                                            INTE0029
      DIM3=ABS(DISM3)                                                       INTE0030
      IF(DIM3.LT.0.001) DISM3=0.                                            INTE0031
      T3=DIS3*DISM3                                                         INTE0032
      IF(T3.LT.0.) GO TO 810                                                INTE0033
      A2=(Y3-Y1)                                                            INTE0034
      B2=-1.*(X3-X1)                                                        INTE0035
      C2=(Y1*X3-Y3*X1)                                                      INTE0036
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      DIS2=A2*X2+B2*Y2+C2                                              INTE0037
      DISM2=A2*XM(L)+B2*YM(L)+C2                                       INTE0038
      DIM2=ABS(DISM2)                                                  INTE0039
      IF(DIM2.LT.0.001) DISM2=0.                                       INTE0040
      T2=DIS2*DISM2                                                    INTE0041
      IF(T2.LT.0.) GO TO 810                                           INTE0042
      A1=(Y3-Y2)                                                       INTE0043
      B1=-1.*(X3-X2)                                                   INTE0044
      C1=(Y2*X3-X2*Y3)                                                 INTE0045
      DIS1=A1*X1+B1*Y1+C1                                              INTE0046
      DISM1=A1*XM(L)+B1*YM(L)+C1                                       INTE0047
      DIM1=ABS(DISM1)                                                  INTE0048
      IF(DIM1.LT.0.001) DISM1=0.                                       INTE0049
      T1=DIS1*DISM1                                                    INTE0050
      IF(T1.LT.0.) GO TO 810                                           INTE0051
      R=(X2-X1)*(Y3-Y1)-(X3-X1)*(Y2-Y1)                                INTE0052
      UX=(Y2-Y1)*(U3-U1)-(Y3-Y1)*(U2-U1)                               INTE0053
      UY=(X2-X1)*(U3-U1)-(X3-X1)*(U2-U1)                               INTE0054
      VX=(Y2-Y1)*(V3-V1)-(Y3-Y1)*(V2-V1)                               INTE0055
      VY=(X2-X1)*(V3-V1)-(X3-X1)*(V2-V1)                               INTE0056
      UM=U1+(YM(L)-Y1)*UY/R-(XM(L)-X1)*UX/R                            INTE0057
      VM=V1+(YM(L)-Y1)*VY/R-(XM(L)-X1)*VX/R                            INTE0058
      GO TO 890                                                        INTE0059
810   IF (I.LT.NMEL ) GO TO 800                                        INTE0060
      WRITE(6,1080) I                                                  INTE0061
 1080 FORMAT(I10)                                                      INTE0062
      STOP                                                             INTE0063
800   CONTINUE                                                         INTE0064
 890  RETURN                                                           INTE0065
      END                                                              INTE0066
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      SUBROUTINE AMATZR(AMAT,N)                                    00000100 AMAT0001
      DIMENSION AMAT(N)                                            00000200 AMAT0002
      DO 10 I=1,N                                                  00000300 AMAT0003
      AMAT(I)=0.                                                   00000400 AMAT0004
10    CONTINUE                                                     00000500 AMAT0005
      RETURN                                                       00000600 AMAT0006
      END                                                          00000700 AMAT0007


      SUBROUTINE BAKSUB(NE,INDX1,INDX2,NBAND,B,X)                  BAKS0001
      DIMENSION B(INDX1,INDX2), X(INDX1)                           BAKS0002
      X(NE)=X(NE)/B(NE,1)                                          BAKS0003
      NDIF=NBAND-1                                                 BAKS0004
      DO 10 N=1,NDIF                                               BAKS0005
      J=NE-N                                                       BAKS0006
      J1=J+1                                                       BAKS0007
      A=0.                                                         BAKS0008
      DO 20 K=J1,NE                                                BAKS0009
      KJR=K-J+1                                                    BAKS0010
      A=A+B(J,KJR)*X(K)                                            BAKS0011
20    CONTINUE                                                     BAKS0012
      X(J)=(X(J)-A)/B(J,1)                                         BAKS0013
10    CONTINUE                                                     BAKS0014
      NE1=NE-1                                                     BAKS0015
      DO 30 N=NBAND,NE1                                            BAKS0016
      J=NE-N                                                       BAKS0017
      J1=J+1                                                       BAKS0018
      A=0.                                                         BAKS0019
      KT=J+NDIF                                                    BAKS0020
      DO 40 K=J1,KT                                                BAKS0021
      KJR=K-J+1                                                    BAKS0022
      A=A+B(J,KJR)*X(K)                                            BAKS0023
40    CONTINUE                                                     BAKS0024
      X(J)=(X(J)-A)/B(J,1)                                         BAKS0025
30    CONTINUE                                                     BAKS0026
      RETURN                                                       BAKS0027
      END                                                          BAKS0028
```

```
      SUBROUTINE BOUNDF(SYSFC,XORD,YORD,NMB,NMN,ICONB,ETA,DEPTH,MAX,
     1MAX1)                                                             BOUN0001
      COMMON/CPRCP/GRAVT,CORIO,DENSTY                                   BOUN0002
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,        00044300 BOUN0003
     1   MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,             00044400 BOUN0004
     2   MAXQBM,MAXHBM                                                  00044500 BOUN0005
      DIMENSION SYSFQ(MAXMQ),XORD(MAXNOD),YORD(MAXNOD),NMN(MAX1),       00044600 BOUN0006
     1ICONB(MAX1,MAX),ETA(MAXNOD),DEPTH(MAXNOD)                                 BOUN0007
      DO 10 I=1,NMB                                                             BOUN0008
      JEND=NMN(I)                                                       00044900 BOUN0009
      DO 20 J=2,JEND                                                    00045000 BOUN0010
      K1=ICONB(I,J-1)                                                   00045100 BOUN0011
      K2=ICONB(I,J)                                                     00045200 BOUN0012
      ANX=(YORD(K2)-YORD(K1))*GRAVT/12.                                 00045300 BOUN0013
      ANY=(XORD(K1)-XORD(K2))*GRAVT/12.                                 00045400 BOUN0014
      DSEGMT=DEPTH(K1)+DEPTH(K2)                                        00045500 BOUN0015
      ESEGMT=ETA(K1)+ETA(K2)                                            00045600 BOUN0016
      VAR1=DSEGMT*ESEGMT+ESEGMT**2/2.                                   00045700 BOUN0017
      VAR2=2.*DEPTH(K1)*ETA(K1)+ETA(K1)**2                              00045800 BOUN0018
      VAR3=2.*DEPTH(K2)*ETA(K2)+ETA(K2)**2                              00045900 BOUN0019
      SYSFQ(2*K1-1)=SYSFQ(2*K1-1)-ANX*(VAR1+VAR2)                       00046000 BOUN0020
      SYSFQ(2*K1)=SYSFQ(2*K1)-ANY*(VAR1+VAR2)                           00046100 BOUN0021
      SYSFQ(2*K2-1)=SYSFQ(2*K2-1)-ANX*(VAR1+VAR3)                       00046200 BOUN0022
      SYSFQ(2*K2)=SYSFQ(2*K2)-ANY*(VAR1+VAR3)                           00046300 BOUN0023
   20 CONTINUE                                                          00046400 BOUN0024
   10 CONTINUE                                                          00046500 BOUN0025
      RETURN                                                            00046600 BOUN0026
      END                                                               00046700 BOUN0027
                                                                        00046800 BOUN0028


      SUBROUTINE CARDQ(ETA,Q,NMNP,NMNP2,N,MAXNOD,MAXMQ)                         CARD0001
      DIMENSION ETA(MAXNOD),Q(MAXMQ)                                            CARD0002
      IF(N.EQ.1) WRITE(7,100) (Q(I),I=1,NMNP2)                                  CARD0003
      IF(N.EQ.2) WRITE(7,100) (ETA(I),I=1,NMNP)                                 CARD0004
  100 FORMAT(8F10.5)                                                    00052900 CARD0005
      RETURN                                                            00053000 CARD0006
      END                                                               00053100 CARD0007
```

```
      SUBROUTINE CETA(H,DEPTH,ETA)                                      00048800 CETA0001
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,        00048900 CETA0002
     1  MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,              00049000 CETA0003
     2  MAXQBM,MAXHBM                                                  00049100 CETA0004
      DIMENSION H(MAXNOD),DEPTH(MAXNOD),ETA(MAXNOD)                             CETA0005
      DO 10 I=1,NMNP                                                    00049300 CETA0006
      H(I)=DEPTH(I)+ETA(I)                                                      CETA0007
      IF(H(I).GT.0.0) GO TO 10                                                  CETA0008
      WRITE(6,30) I,H(I)                                                        CETA0009
30    FORMAT(//1X,'ERROR-DATUM DEPTH AT NODE ',I5,2X,'IS TOO  SHALLOW           CETA0010
     1TO PRESERVE NUMERICAL STABILITY. IF SURFACE ELEVATION (I) IS REASO        CETA0011
     2NABLE'/1X,'TOTAL DEPTH = DATUM DEPTH (I) + SURFACE ELEVATION(I) ='        CETA0012
     3,F10.3/1X,'IF SURFACE ELEVATION (I) IS NOT REASONABLE, PROBLEM IS         CETA0013
     4UNSTABLE FOR SOME OTHER REASON, I.E.,'/1X,'TIMESTEP, EDDY VISCOSIT        CETA0014
     5Y, ETC.')                                                                 CETA0015
      STOP                                                                      CETA0016
10    CONTINUE                                                          00049500 CETA0017
      RETURN                                                            00049600 CETA0018
      END                                                               00049700 CETA0019
```

```
      SUBROUTINE CHECKS(H,D,BOUND,*)                                    00000100 CHEC0001
      IF(ABS(H-D) .LT. BOUND) RETURN                                    00000200 CHEC0002
      WRITE(6,1002) H,D,BOUND                                           00000300 CHEC0003
1002  FORMAT(1HO,15X,'STABILITY CHECK: BOUND EXCEEDED AT NODE ',/       00000400 CHEC0004
     1  1H ,5X,'HEIGHT WAS ',E11.4,5X,'DEPTH ',F6.2,5X,'BOUND = ',F6.2) 00000500 CHEC0005
      RETURN 1                                                          00000600 CHEC0006
      END                                                               00000700 CHEC0007
```

```
      SUBROUTINE DECOMP(NEQT,INDX1,INDX2,NBAND,A)                       DEC00001
      DIMENSION A(INDX1,INDX2)                                          DEC00002
      I=1                                                               DEC00003
70    DIAG=A(I,1)                                                       DEC00004
      IF(DIAG .LT. 1.E-30) GO TO 10                                     DEC00005
      DIAG =SQRT(DIAG)                                                  DEC00006
      DO 20 K=1,NBAND                                                   DEC00007
      A(I,K)=A(I,K)/DIAG                                                DEC00008
20    CONTINUE                                                          DEC00009
      I=I+1                                                             DEC00010
      IF(I .GT. NEQT) RETURN                                            DEC00011
      LIM=NBAND-1                                                       DEC00012
      I4=I-LIM                                                          DEC00013
      I3=I-1                                                            DEC00014
50    DO 30 J=1,LIM                                                     DEC00015
      IF(I+J .GT. NEQT+1) GO TO 70                                      DEC00016
      I2=I4+J-1                                                         DEC00017
      IF(I .LT. NBAND) I2=1                                             DEC00018
      DO 40 I1=I2,I3                                                    DEC00019
      IF(I-I1+J .GT. NBAND) GO TO 40                                    DEC00020
      K=I-I1                                                            DEC00021
      A(I,J)= A(I,J)-A(I1,K+1)*A(I1,K+J)                                DEC00022
40    CONTINUE                                                          DEC00023
30    CONTINUE                                                          DEC00024
      GO TO 70                                                          DEC00025
10    WRITE(6,1002) I                                                   DEC00026
1002  FORMAT(1H-,5X,'SINGULAR ELEMENT IN ROW',I3)                       DEC00027
      STOP                                                              DEC00028
      END                                                               DEC00029
```

```
      SUBROUTINE FORCEH(Q,SYSFH,A,B,ICON)                                00000100 FORH0001
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,         00000200 FORH0002
     1  MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,                00000300 FORH0003
     2  MAXQBM,MAXHBM                                                    00000400 FORH0004
      COMMON/SORTNO/K(3)                                                 00000500 FORH0005
      DIMENSION Q(MAXMQ),SYSFH(MAXNOD),ICON(MAXEL,3),A(MAXEL,3),                 FORH0006
     1  B(MAXEL,3)                                                       00000700 FORH0007
      DO 10 I=1,NMEL                                                     00000800 FORH0008
      VAR=0.                                                             00000900 FORH0009
      DO 20 J=1,3                                                        00001000 FORH0010
      K(J)=ICON(I,J)                                                     00001100 FORH0011
      VAR=VAR+B(I,J)*Q(2*K(J)-1)+A(I,J)*Q(2*K(J))                        00001200 FORH0012
20    CONTINUE                                                           00001300 FORH0013
      VAR=-VAR/6.                                                        00001400 FORH0014
      DO 30 J=1,3                                                        00001500 FORH0015
      SYSFH(K(J))=VAR+SYSFH(K(J))                                        00001600 FORH0016
30    CONTINUE                                                           00001700 FORH0017
10    CONTINUE                                                           00001800 FORH0018
      RETURN                                                             00001900 FORH0019
      END                                                                00002000 FORH0020
```

```
      SUBROUTINE FORCEQ(H,Q,TAUWX,TAUWY,DEPTH,AREA,CF,EDXX,EDYY,                FOR00001
     1   EDXY,ICON,A,B,PSPLUS,SYSFQ,ETA,SX,SY,CXX,CYY,CXY,SBX,SBY,DIRW,        FOR00002
     2 GAMW,XW,YW,TT)                                                          FOR00003
      COMMON/CPROP/GRAVT,CORIO,DENSTY                                 00035700 FOR00004
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,      00035800 FOR00005
     1   MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,           00035900 FOR00006
     2   MAXQBM,MAXHBM                                               00036000 FOR00007
      COMMON/COPT/ IBFRIC,IDEPTH,IEDVIS,ICNVEC,IWIND,IVERSN           00036100 FOR00008
      COMMON/CWIND/WTIME,WMAG,WDIR,MAXWI,STRTIM                                FOR00009
      DIMENSION H(MAXNOD),Q(MAXMQ),TAUWX(MAXNOD),TAUWY(MAXNOD),                FOR00010
     1DEPTH(MAXNOD),AREA(MAXEL),CF(MAXEL),EDXX(MAXEL),EDYY(MAXEL),             FOR00011
     2EDXY(MAXEL),ICON(MAXEL,3),A(MAXEL,3),B(MAXEL,3),PSPLUS(MAXNOD),          FOR00012
     3SYSFQ(MAXMQ),ETA(MAXNOD),SX(MAXNOD),SY(MAXNOD),CXX(MAXNOD),              FOR00013
     4CYY(MAXNOD),CXY(MAXNOD),K(3),SBX(MAXNOD),SBY(MAXNOD),DIRW(MAXWI),        FOR00014
     5 GAMW(MAXWI),XW(MAXWI),YW(MAXWI),TT(MAXWI)                              FOR00015
      CALL WINDS(TAUWX,TAUWY,DIRW,GAMW,XW,YW,TT)                               FOR00016
      DO 10 I=1,NMNP                                              00036800 FOR00017
      SX(I)=TAUWX(I)+CORIO*Q(2*I)                                 00036900 FOR00018
      SY(I)=TAUWY(I)-CORIO*Q(2*I-1)                               00037000 FOR00019
      VAR=SQRT(Q(2*I-1)**2+Q(2*I)**2)/H(I)**2                     00037100 FOR00020
      SBX(I)=Q(2*I-1)*VAR                                         00037200 FOR00021
      SBY(I)=VAR*Q(2*I)                                           00037300 FOR00022
10    CONTINUE                                                    00037400 FOR00023
      IF(ICNVEC .EQ. 1) GO TO 40                                  00037500 FOR00024
      DO 90 I=1,NMNP                                              00037600 FOR00025
      CXX(I)=Q(2*I-1)**2/H(I)                                     00037700 FOR00026
      CYY(I)=Q(2*I)**2/H(I)                                       00037800 FOR00027
      CXY(I)=Q(2*I)*Q(2*I-1)/H(I)                                 00037900 FOR00028
90    CONTINUE                                                    00038000 FOR00029
40    DO 20 I=1,NMEL                                              00038100 FOR00030
      A12=AREA(I)/12.                                             00038200 FOR00031
      ETAEMT=0.                                                   00038300 FOR00032
      DEMT=0.                                                     00038400 FOR00033
      BDEMT=0.                                                    00038500 FOR00034
      EDEMT=0.                                                    00038600 FOR00035
      E2EMT=0.                                                    00038700 FOR00036
```

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      FXX=0.                                                                    00038800 FOR00037
      FXY=0.                                                                    00038900 FOR00038
      FYY=0.                                                                    00039000 FOR00039
      DO 30 J=1,3                                                               00039100 FOR00040
      K(J)=ICON(I,J)                                                            00039200 FOR00041
      ETAEMT=ETAEMT+ETA(K(J))                                                   00039300 FOR00042
      DEMT=DEMT+DEPTH(K(J))                                                     00039400 FOR00043
      BDEMT=BDEMT+B(I,J)*DEPTH(K(J))                                            00039500 FOR00044
      EDEMT=EDEMT+ETA(K(J))*DEPTH(K(J))                                         00039600 FOR00045
      E2EMT=E2EMT+ETA(K(J))**2                                                  00039700 FOR00046
      FXX=FXX+Q(2*K(J)-1)*B(I,J)                                                00039800 FOR00047
      FXY=FXY+Q(2*K(J)-1)*A(I,J)+Q(2*K(J))*B(I,J)                               00039900 FOR00048
      FYY=FYY+Q(2*K(J))*A(I,J)                                                  00040000 FOR00049
   30 CONTINUE                                                                  00040100 FOR00050
      PRESS=((DEMT*ETAEMT+EDEMT)*2+ETAEMT**2+E2EMT)*GRAVT/48.                   00040200 FOR00051
      VAR=(B(I,1)*DEPTH(K(1))+B(I,2)*DEPTH(K(2))+B(I,3)*DEPTH(K(3)))            00040300 FOR00052
     1  *GRAVT/24.                                                             00040400 FOR00053
      SXX=(SX(K(1))+SX(K(2))+SX(K(3)))*A12                                      00040500 FOR00054
      SBXX=-(SBX(K(1))+SBX(K(2))+SBX(K(3)))*A12*CF(I)                           00040600 FOR00055
      CONVEC=0.                                                                 00040700 FOR00056
      DO 50 J=1,3                                                               00040800 FOR00057
      COLL=PRESS*B(I,J)+SXX+SBXX+A12*SX(K(J))-A12*SBX(K(J))*CF(I)               00040900 FOR00058
     1  +VAR*ETAEMT+VAR*ETA(K(J))-(EDXX(I)*FXX*B(I,J)                           00041000 FOR00059
     2  +EDXY(I)*FXY*A(I,J))/AREA(I)/4.                                         00041100 FOR00060
      SYSFQ(2*K(J)-1)=SYSFQ(2*K(J)-1)+COLL                                      00041200 FOR00061
      IF(ICNVEC .EQ. 1) GO TO 50                                                00041300 FOR00062
      CONVEC=CONVEC+B(I,J)*CXX(K(J))+A(I,J)*CXY(K(J))                           00041400 FOR00063
   50 CONTINUE                                                                  00041500 FOR00064
      IF(ICNVEC .EQ. 1) GO TO 60                                                00041600 FOR00065
      CONVEC=-CONVEC/6.                                                         00041700 FOR00066
      DO 70 J=1,3                                                               00041800 FOR00067
      SYSFQ(2*K(J)-1)=SYSFQ(2*K(J)-1)+CONVEC                                    00041900 FOR00068
   70 CONTINUE                                                                  00042000 FOR00069
   60 CONVEC=0.                                                                 00042100 FOR00070
      VAR=(A(I,1)*DEPTH(K(1))+A(I,2)*DEPTH(K(2))+A(I,3)*DEPTH(K(3)))            00042200 FOR00071
     1  *GRAVT/24.                                                             00042300 FOR00072
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      SXX=(SY(K(1))+SY(K(2))+SY(K(3)))*A12                              00042400 FORQ0073
      SBXX=-(SBY(K(1))+SBY(K(2))+SBY(K(3)))*A12*CF(I)                   00042500 FORQ0074
      DO 80 J=1,3                                                       00042600 FORQ0075
      COLL=PRESS*A(I,J)+SXX+SBXX+A12*SY(K(J))-A12*SBY(K(J))*CF(I)       00042700 FORQ0076
     1   *VAR*ETAEMT+VAR*ETA(K(J))-(EDXY(I)*FXY*B(I,J)                  00042800 FORQ0077
     2   *EDYY(I)*FYY*A(I,J))/AREA(I)/4.                                00042900 FORQ0078
      SYSFQ(2*K(J))=SYSFQ(2*K(J))+COLL                                  00043000 FORQ0079
      IF(ICNVEC .EQ. 1) GO TO 80                                        00043100 FORQ0080
      CONVEC=CONVEC+B(I,J)*CXY(K(J))+A(I,J)*CYY(K(J))                   00043200 FORQ0081
80    CONTINUE                                                          00043300 FORQ0082
      IF(ICNVEC .EQ. 1) GO TO 20                                        00043400 FORQ0083
      CONVEC=-CONVEC/6.                                                 00043500 FORQ0084
      DO 100 J=1,3                                                      00043600 FORQ0085
      SYSFQ(2*K(J))=SYSFQ(2*K(J))+CONVEC                                00043700 FORQ0086
100   CONTINUE                                                          00043800 FORQ0087
20    CONTINUE                                                          00043900 FORQ0088
      RETURN                                                            00044000 FORQ0089
      END                                                               00044100 FORQ0090
```

```
      SUBROUTINE FORSUB(NE,INDX1,INDX2,NBAND,B,C)                       FORS0001
      DIMENSION B(INDX1,INDX2),C(INDX1)                                 FORS0002
      C(1)=C(1)/B(1,1)                                                  FORS0003
      DO 10 J=2,NBAND                                                   FORS0004
      A=0.                                                              FORS0005
      J1=J-1                                                            FORS0006
      DO 20 L=1,J1                                                      FORS0007
      LJR=J-L+1                                                         FORS0008
      A=A+B(L,LJR)*C(L)                                                 FORS0009
   20 CONTINUE                                                          FORS0010
      C(J)=(C(J)-A)/B(J,1)                                              FORS0011
   10 CONTINUE                                                          FORS0012
      NDIF=NBAND-1                                                      FORS0013
      NN=NBAND+1                                                        FORS0014
      DO 30 J=NN,NE                                                     FORS0015
      A=0.                                                              FORS0016
      J1=J-1                                                            FORS0017
      LT=J-NDIF                                                         FORS0018
      DO 40 L=LT,J1                                                     FORS0019
      LJR=J-L+1                                                         FORS0020
      A=A+B(L,LJR)*C(L)                                                 FORS0021
   40 CONTINUE                                                          FORS0022
      C(J)=(C(J)-A)/B(J,1)                                              FORS0023
   30 CONTINUE                                                          FORS0024
      RETURN                                                            FORS0025
      END                                                               FORS0026
```

```
      SUBROUTINE GEOM(NINT,ICON,A,B,AREA,XORD,YORD,SYSMH)                00000100 GEOM0001
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,         00000200 GEOM0002
     1   MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,              00000300 GEOM0003
     2   MAXQBM,MAXHBM                                                   00000400 GEOM0004
      COMMON/SORTNO/K(3)                                                 00000500 GEOM0005
      DIMENSION NINT(MAXNOD),ICON(MAXEL,3),A(MAXEL,3),B(MAXEL,3),               GEOM0006
     1AREA(MAXEL),SYSMH(MAXNOD,MAXBWH),XORD(MAXNOD),YORD(MAXNOD)               GEOM0007
      DIMENSION IPERM(3,2)                                               00000800 GEOM0008
      IPERM(1,1)=3                                                              GEOM0009
      IPERM(2,1)=1                                                              GEOM0010
      IPERM(3,1)=2                                                              GEOM0011
      IPERM(1,2)=2                                                              GEOM0012
      IPERM(2,2)=3                                                              GEOM0013
      IPERM(3,2)=1                                                              GEOM0014
      WRITE(6,1002)                                                     00001000 GEOM0015
1002  FORMAT(1H0,5X,'GEOMETRICAL RELATIONS'/1H ,10X,                    00001100 GEOM0016
     2   'ELEMENT'/1H ,10X,'NUMBER',4X,'A1',8X,'B1',                    00001200 GEOM0017
     3   8X,'A2',8X,'B2',8X,'A3',8X,'B3',8X,'AREA'/1H )                 00001300 GEOM0018
      DO 10 I=1,NMEL                                                    00001400 GEOM0019
      DO 20 J=1,3                                                       00001500 GEOM0020
      K(J)=NINT(ICON(I,J))                                              00001600 GEOM0021
      ICON(I,J)=K(J)                                                    00001700 GFOM0022
20    CONTINUE                                                          00001800 GEOM0023
      DO 40 J=1,3                                                       00001900 GEOM0024
      A(I,J)=XORD(K(IPERM(J,1)))-XORD(K(IPERM(J,2)))                    00002000 GEOM0025
      B(I,J)=YORD(K(IPERM(J,2)))-YORD(K(IPERM(J,1)))                    00002100 GEOM0026
40    CONTINUE                                                          00002200 GEOM0027
      AREA(I)=0.5*(B(I,1)*A(I,2)-B(I,2)*A(I,1))                         00002300 GEOM0028
      IF(AREA(I) .GT. 0.) GO TO 30                                      00002400 GEOM0029
      WRITE(6,1004) I                                                   00002500 GEOM0030
1004  FORMAT(1H0,5X,'NEGATIVE AREA IN ELEMENT:',I4)                     00002600 GEOM0031
      STOP                                                              00002700 GEOM0032
30    VAR=AREA(I)/12.                                                   00002800 GEOM0033
      CALL SORTN                                                        00002900 GEOM0034
      K1=K(1)                                                           00003000 GEOM0035
      K2=K(2)                                                           00003100 GEOM0036
```

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      K3=K(3)                                                          00003200 GEOM0037
      SYSMH(K1,1)=SYSMH(K1,1)+2.*VAR                                   00003300 GEOM0038
      K21=K2-K1+1                                                      00003400 GEOM0039
      SYSMH(K1,K21)=SYSMH(K1,K21)+VAR                                  00003500 GEOM0040
      K31=K3-K1+1                                                      00003600 GEOM0041
      SYSMH(K1,K31)=SYSMH(K1,K31)+VAR                                  00003700 GEOM0042
      SYSMH(K2,1)=SYSMH(K2,1)+2.*VAR                                   00003800 GEOM0043
      K32=K3-K2+1                                                      00003900 GEOM0044
      SYSMH(K2,K32)=SYSMH(K2,K32)+VAR                                  00004000 GEOM0045
      SYSMH(K3,1)=SYSMH(K3,1)+2.*VAR                                   00004100 GEOM0046
      WRITE(6,1006)I,A(I,1),B(I,1),A(I,2),B(I,2),A(I,3),B(I,3),AREA(I) 00004200 GEOM0047
1006  FORMAT(1H ,5X,I6,2X,6(F9.1,1X),F12.1)                            00004300 GEOM0048
      IF(K31 .LT. NBANDH) GO TO 10                                     00004400 GEOM0049
      NBANDH=K31                                                       00004500 GEOM0050
10    CONTINUE                                                         00004600 GEOM0051
      WRITE(6,1010) NBANDH                                             00004700 GEOM0052
1010  FORMAT(1H0,10X,'BANDWIDTH OF THIS GRID IS, NBANDH = ',I4)        00004800 GEOM0053
      CALL SLINE(36)                                                   00004900 GEOM0054
      IF(NBANDH .LE. MAXBWH) RETURN                                    00005000 GEOM0055
      WRITE(6,1008) NBANDH                                             00005100 GEOM0056
1008  FORMAT(1H0,5X,'BANDWIDTH IS TOO LARGE, NBANDH = ',I5)            00005200 GEOM0057
      STOP                                                             00005300 GEOM0058
      END                                                              00005400 GEOM0059
```

```
      SUBROUTINE INTIME(ETA,ETAPRV,NMNP,SYSFQ,NMNP2,MAXNOD,MAXMQ)              INTI0001
      DIMENSION ETA(MAXNOD),ETAPRV(MAXNOD),SYSFQ(MAXMQ)                        INTI0002
      DO 10 I=1,NMNP                                                   00000300 INTI0003
      ETAPRV(I)=ETA(I)                                                 00000400 INTI0004
      SYSFQ(I)=0.                                                      00000500 INTI0005
10    CONTINUE                                                         00000600 INTI0006
      I1=NMNP+1                                                        00000700 INTI0007
      DO 20 I=I1,NMNP2                                                 00000800 INTI0008
      SYSFQ(I)=0.                                                      00000900 INTI0009
20    CONTINUE                                                         00001000 INTI0010
      RETURN                                                           00001100 INTI0011
      END                                                              00001200 INTI0012
```

```
      SUBROUTINE LOCGLO(OBANG,NON,Q,GLTOLO)                              00000100 LOCG0001
      COMMON/ANGLE/S,C                                                   00000200 LOCG0002
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,         00000300 LOCG0003
     1   MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,              00000400 LOCG0004
     2   MAXQBM,MAXHBM                                                  00000500 LOCG0005
      DIMENSION OBANG(MAXQBN),Q(MAXMQ),NON(MAXQBN)                               LOCG0006
      DO 10 I=1,NMQBN                                                   00000700 LOCG0007
      I1=NON(I)                                                         00000800 LOCG0008
      ANG=GLTOLO*OBANG(I)                                               00000900 LOCG0009
      CALL  TRIGO(ANG)                                                  00001000 LOCG0010
      CALL  ROTV(Q(2*I1-1),Q(2*I1))                                     00001100 LOCG0011
10    CONTINUE                                                          00001200 LOCG0012
      RETURN                                                            00001300 LOCG0013
      END                                                               00001400 LOCG0014
```

```
      SUBROUTINE OUTPUT(H,Q,ETA,U,V,DEPTH,*,*)                          00049800 OUTP0001
      COMMON/CINTEG/TIME,TINC,RKFACT,RKFAC,ISTEP,PHASE,ITIME            00049900 OUTP0002
      COMMON/COUTP/NOUT                                                 00050000 OUTP0003
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,        00050100 OUTP0004
     1   MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,             00050200 OUTP0005
     2   MAXQBM,MAXHBM                                                  00050300 OUTP0006
      DIMENSION H(MAXNOD),Q(MAXMQ),ETA(MAXNOD),U(MAXNOD),V(MAXNOD),              OUTP0007
     1DEPTH(MAXNOD)                                                             OUTP0008
      IF(ITIME/NOUT*NOUT .EQ. ITIME) GO TO 10                           00050500 OUTP0009
      IF(ITIME .EQ. 2) GO TO 10                                                  OUTP0010
      IF(ITIME .EQ. 5) GO TO 10                                         00050700 OUTP0011
      RETURN 1                                                          00050800 OUTP0012
10    CALL CETA(H,DEPTH,ETA)                                            00050900 OUTP0013
      CALL VEL(H,Q,U,V)                                                 00051000 OUTP0014
      RETURN 2                                                          00051100 OUTP0015
      END                                                               00051200 OUTP0016
```

```
      SUBROUTINE POSTTT(A,B,C,D)                                00000100 POST0001
      COMMON/ANGLE/SIN,COS                                      00000200 POST0002
      A1=A*COS+B*SIN                                            00000300 POST0003
      B=-A*SIN+B*COS                                            00000400 POST0004
      C1=C*COS+D*SIN                                            00000500 POST0005
      D=-C*SIN+D*COS                                            00000600 POST0006
      A=A1                                                      00000700 POST0007
      C=C1                                                      00000800 POST0008
      RETURN                                                    00000900 POST0009
      END                                                       00001000 POST0010
```



```
      SUBROUTINE PRET(A,B,C,D)                                  00000100 PRET0001
      COMMON/ANGLE/SIN,COS                                      00000200 PRET0002
      A1=A*COS+C*SIN                                            00000300 PRET0003
      B1=B*COS+D*SIN                                            00000400 PRET0004
      C=-A*SIN+C*COS                                            00000500 PRET0005
      D=-B*SIN+D*COS                                            00000600 PRET0006
      A=A1                                                      00000700 PRET0007
      B=B1                                                      00000800 PRET0008
      RETURN                                                    00000900 PRET0009
      END                                                       00001000 PRET0010
```

```
      SUBROUTINE QMAT(SYSMQ,SYSMH)                                      00000100 QMAT0001
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,        00000200 QMAT0002
     1   MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,             00000300 QMAT0003
     2   MAXQBM,MAXHBM                                                  00000400 QMAT0004
      DIMENSION SYSMQ(MAXMQ,MAXBWQ),SYSMH(MAXNOD,MAXBWH)                00000500 QMAT0005
      NDIF=NMNP-NBANDH+1                                                00000600 QMAT0006
      DO 10 IR=1,NDIF                                                   00000700 QMAT0007
      DO 20 IC=1,NBANDH                                                 00000800 QMAT0008
      SYSMQ(2*IR-1,2*IC-1)=SYSMH(IR,IC)                                 00000900 QMAT0009
      SYSMQ(2*IR,2*IC-1)=SYSMH(IR,IC)                                   00001000 QMAT0010
20    CONTINUE                                                          00001100 QMAT0011
10    CONTINUE                                                          00001200 QMAT0012
      N1=NDIF+1                                                         00001300 QMAT0013
      J1=0                                                              00001400 QMAT0014
      DO 30 IR=N1,NMNP                                                  00001500 QMAT0015
      J1=J1+1                                                           00001600 QMAT0016
      LIM=NBANDH-J1                                                     00001700 QMAT0017
      DO 40 IC=1,LIM                                                    00001800 QMAT0018
      SYSMQ(2*IR-1,2*IC-1)=SYSMH(IR,IC)                                 00001900 QMAT0019
      SYSMQ(2*IR,2*IC-1)=SYSMH(IR,IC)                                   00002000 QMAT0020
40    CONTINUE                                                          00002100 QMAT0021
30    CONTINUE                                                          00002200 QMAT0022
      RETURN                                                            00002300 QMAT0023
      END                                                               00002400 QMAT0024

      SUBROUTINE READX(X,NMN,INDEX)                                              READ0001
      DIMENSION X(INDEX)                                                         READ0002
      DO 10 I=1,NMN,8                                                   00000300 READ0003
      READ(5,1001)X(I),X(I+1),X(I+2),X(I+3),X(I+4),X(I+5),X(I+6),X(I+7) 00000400 READ0004
10    CONTINUE                                                          00000500 READ0005
1001  FORMAT(8F10.0)                                                    00000600 READ0006
      RETURN                                                            00000700 READ0007
      END                                                               00000800 READ0008
```

```
      SUBROUTINE ROTMQ(SYSMQ,NQN,QBANG)                                 00000100 ROTM0001
      COMMON/ANGLE/S,C                                                  00000200 ROTM0002
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,        00000300 ROTM0003
     1  MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,              00000400 ROTM0004
     2  MAXQBM,MAXHBM                                                  00000500 ROTM0005
      DIMENSION SYSMQ(MAXMQ,MAXBWQ),NQN(MAXQBN),QBANG(MAXQBN)                 ROTM0006
      LIM1=NBANDQ/2-1                                                   00000700 ROTM0007
      DO 10 I=1,NMQBN                                                   00000800 ROTM0008
      IR=NQN(I)                                                         00000900 ROTM0009
      LIM=LIM1                                                          00001000 ROTM0010
      IF(IR .LE. LIM) GO TO 20                                          00001100 ROTM0011
      CALL TRIGQ(QBANG(I))                                              00001200 ROTM0012
40    DO 30 IC=1,LIM                                                    00001300 ROTM0013
      IR1=IR-IC                                                         00001400 ROTM0014
      CALL POSTTT(SYSMQ(2*IR1-1,2*IC+1),SYSMQ(2*IR1-1,2*IC+2),          00001500 ROTM0015
     1  SYSMQ(2*IR1,2*IC),SYSMQ(2*IR1,2*IC+1))                         00001600 ROTM0016
30    CONTINUE                                                          00001700 ROTM0017
      GO TO 10                                                          00001800 ROTM0018
20    IF(IR .EQ. 1) GO TO 10                                            00001900 ROTM0019
      CALL TRIGQ(QBANG(I))                                              00002000 ROTM0020
      LIM=IR-1                                                          00002100 ROTM0021
      GO TO 40                                                          00002200 ROTM0022
10    CONTINUE                                                          00002300 ROTM0023
      NDIF=(NMNP2-NBANDQ+2)/2                                           00002400 ROTM0024
      LIM1=NBANDQ/2                                                     00002500 ROTM0025
      DO 50 I=1,NMQBN                                                   00002600 ROTM0026
      IR=NQN(I)                                                         00002700 ROTM0027
      LIM=LIM1                                                          00002800 ROTM0028
      IF(IR .GT. NDIF) GO TO 60                                         00002900 ROTM0029
      CALL TRIGQ(QBANG(I))                                              00003000 ROTM0030
80    DO 70 IC=2,LIM                                                    00003100 ROTM0031
      CALL PRET(SYSMQ(2*IR-1,2*IC-1),SYSMQ(2*IR-1,2*IC),                00003200 ROTM0032
     1  SYSMQ(2*IR,2*IC-2),SYSMQ(2*IR,2*IC-1))                         00003300 ROTM0033
70    CONTINUE                                                          00003400 ROTM0034
      GO TO 50                                                          00003500 ROTM0035
60    IF(IR .EQ. NMNP) GO TO 50                                         00003600 ROTM0036
```

```
      LIM=LIM-(IR-NDIF)                                                 00003800 ROTM0038
      GO TO 80                                                          00003900 ROTM0039
 50   CONTINUE                                                          00004000 ROTM0040
      RETURN                                                            00004100 ROTM0041
      END                                                               00004200 ROTM0042

      SUBROUTINE ROTV(A,B)                                              00000100 ROTV0001
      COMMON/ANGLE/ S,C                                                 00000200 ROTV0002
      X=A*C+B*S                                                         00000300 ROTV0003
      B=-A*S+B*C                                                        00000400 ROTV0004
      A=X                                                               00000500 ROTV0005
      RETURN                                                            00000600 ROTV0006
      END                                                               00000700 ROTV0007

      SUBROUTINE SLINE(N)                                                        SLIN0001
      DATA STAR/3H* */                                                           SLIN0002
      WRITE(6,1002)(STAR,I=1,N)                                                  SLIN0003
1002  FORMAT(1HO,5X,42A3)                                                        SLIN0004
      RETURN                                                                     SLIN0005
      END                                                                        SLIN0006

      SUBROUTINE SOLVX(X,SYSFX,XPREV,SYSMX,NMN,NBAND,INDEX1,INDEX2)     00000100 SOLV0001
      COMMON/CINTEG/TIME,TINC,RKFACT,RKFAC,ISTEP,PHASE,ITIME            00000500 SOLV0002
      DIMENSION X(INDEX1),SYSFX(INDEX1),SYSMX(INDEX1,INDEX2),                    SOLV0003
     1 XPREV(INDEX1)                                                             SOLV0004
      DO 10 I=1,NMN                                                     00000800 SOLV0005
      X(I)=TINC*SYSFX(I)                                                00000900 SOLV0006
 10   CONTINUE                                                          00001000 SOLV0007
      CALL  FORSUB(NMN,INDEX1,INDEX2,NBAND,SYSMX,X)                     00001100 SOLV0008
      CALL  BAKSUB(NMN,INDEX1,INDEX2,NBAND,SYSMX,X)                     00001200 SOLV0009
      DO 20 I=1,NMN                                                     00001300 SOLV0010
      X(I)=X(I)+XPREV(I)                                                00001400 SOLV0011
 20   CONTINUE                                                          00001500 SOLV0012
      RETURN                                                            00001600 SOLV0013
      END                                                               00001700 SOLV0014
```

```
      SUBROUTINE SORTN                                                  SORT0001
      COMMON/SORTNO/K1,K2,K3                                            SORT0002
      IF(K1 .LT. K3)  GO TO 10                                          SORT0003
      K=K3                                                              SORT0004
      K3=K1                                                             SORT0005
      K1=K                                                              SORT0006
10    IF(K2 .LT. K3)  GO TO 20                                          SORT0007
      K=K3                                                              SORT0008
      K3=K2                                                             SORT0009
      K2=K                                                              SORT0010
20    IF(K1 .LT. K2)  RETURN                                            SORT0011
      K=K2                                                              SORT0012
      K2=K1                                                             SORT0013
      K1=K                                                              SORT0014
      RETURN                                                            SORT0015
      END                                                               SORT0016


      SUBROUTINE STETAB(ETA,HB,NHN,ALAG,QHLOW,QIRNL,PERIOD)             STET0001
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,  00051400 STET0002
     1  MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,         00051500 STET0003
     2  MAXQBM,MAXHBM                                             00051600 STET0004
      COMMON/CINTEG/TIME,TINC,RKFACT,RKFAC,ISTEP,PHASE,ITIME      00051700 STET0005
      COMMON/CTIDE/MAXLW,MAXQT                                          STET0006
      COMMON/COPT/ IBFRIC,IDEPTH,IFQVIS,ICNVEC,IWIND,IVERSN             STET0007
      DIMENSION ETA(MAXNOD),HB(MAXHBN),NHN(MAXHBN),ALAG(MAXHBN),        STET0008
     1 QHLOW(MAXLW),QIRNL(MAXQT)                                        STET0009
      CORR=0.0                                                          STET0010
      QH=0.0                                                            STET0011
      IF(IVERSN.EQ.1) GO TO 50                                          STET0012
30    KT=TIME/PERIOD                                                    STET0013
      IF(MAXLW.LE.1) GO TO 70                                           STET0014
      CORR=(QHLOW(KT+2)-QHLOW(KT+1))*(TIME-PERIOD*KT)/PERIOD+           STET0015
     1 QHLOW(KT+1)                                                      STET0016
70    IF(MAXQT.LE.1) GO TO 80                                           STET0017
      QH=QIRNL(KT+1)                                                    STET0018
```

```
80    CONTINUE                                                                  STET0019
      DO 10 I=1,NMHBN                                                           STET0020
      I1=NHN(I)                                                                 STET0021
      ETA(I1)=(HB(I)+DH)*(1.-COS(PHASE*(TIME-ALAG(I))))+CORR                    STET0022
10    CONTINUE                                                                  STET0023
 50   RETURN                                                                    STET0024
      END                                                          00052400     STET0025



      SUBROUTINE STORNO(INDX1,INDX2,INDX3,INDX4,NBAND,NMBN,NN,A,NB,C,           00000100 STOR0001
     1  NV,INDX5)                                                                 STOR0002
      COMMON/CINTFG/TIME,TINC,RKFACT,RKFAC,ISTEP,PHASE,ITIME                    00000300 STOR0003
      DIMENSION A(INDX1,INDX2),C(INDX3,INDX4),NB(INDX5)                         STOR0004
      NDIF=NBAND-1                                                              00000500 STOR0005
      DO 10 I=1,NMBN                                                            00000600 STOR0006
      IR=NB(I)                                                                  00000700 STOR0007
      IR1=NN*(IR-1)+1+NV                                                        00000800 STOR0008
      IF(IR1 .EQ. 1) GO TO 20                                                   00000900 STOR0009
      IF(IR1 .LE. NDIF) NDIF=NN*(IR-1)+NV                                       00001000 STOR0010
      DO 30 IC=1,NDIF                                                           00001100 STOR0011
      IR2=IR1-IC                                                                00001200 STOR0012
      C(2*I-1,IC)=-A(IR2,IC+1)/TINC                                             00001300 STOR0013
      A(IR2,IC+1)=0.                                                            00001400 STOR0014
30    CONTINUE                                                                  00001500 STOR0015
      NDIF=NBAND-1                                                              00001600 STOR0016
20    DO 40 IC=1,NDIF                                                           00001700 STOR0017
      C(2*I,IC)=-A(IR1,IC+1)/TINC                                               00001800 STOR0018
      A(IR1,IC+1)=0.                                                            00001900 STOR0019
40    CONTINUE                                                                  00002000 STOR0020
      A(IR1,1)=1.                                                               00002100 STOR0021
10    CONTINUE                                                                  00002200 STOR0022
      RETURN                                                                    00002300 STOR0023
      END                                                          00002400     STOR0024
```

```
      SUBROUTINE STOB(Q,QB,NQN,NVN)                                     00000100 STQB0001
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,        00000200 STQB0002
     1  MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,              00000300 STQB0003
     2  MAXQBM,MAXHBM                                                  00000400 STQB0004
      COMMON/CINTEG/TIME,TINC,RKFACT,RKFAC,ISTEP,PHASE,ITIME            00000500 STQB0005
      DIMENSION Q(MAXMQ),QB(MAXQBN),NQN(MAXQBN),NVN(MAXQBN)                      STQB0006
      DO 10 I=1,NMQBN                                                   00000700 STQB0007
      I1=2*NQN(I)-1                                                     00000800 STQB0008
      Q(I1)=QB(I)                                                       00000900 STQB0009
10    CONTINUE                                                          00001000 STQB0010
      IF(NMVBN .EQ. 0) GO TO 30                                         00001100 STQB0011
      DO 20 I=1,NMVBN                                                   00001200 STQB0012
      I1=2*NVN(I)                                                       00001300 STQB0013
      Q(I1)=0.                                                          00001400 STQB0014
20    CONTINUE                                                          00001500 STQB0015
30    RETURN                                                            00001600 STQB0016
      END                                                               00001700 STQB0017
```

```
      SUBROUTINE SUBDUN(NMBN,NN,NBAND,SYSFXB,SYSBMX,X,XPREV,                 SUB00001
     1  NEQT,INDX1,INDX2,NV,MAX1,MAX2)                                       SUB00002
      DIMENSION SYSBMX(INDX1,INDX2),NN(MAX1),SYSFXB(MAX2),X(MAX2),          SUB00003
     1 XPREV(MAX2)                                                         SUB00004
      DO 10 I=1,NMBN                                                       SUB00005
      I1=NV*(NN(I)-1)+1                                                    SUB00006
      NDIF=NBAND-1                                                         SUB00007
      IF(I1 .EQ. 1) GO TO 20                                               SUB00008
      IF(I1 .LT. NBAND) NDIF=I1-1                                          SUB00009
      DO 30 J=1,NDIF                                                       SUB00010
      SYSFXB(I1-J)=SYSFXB(I1-J)+SYSBMX(2*I-1,J)*(X(I1)-XPREV(I1))          SUB00011
30    CONTINUE                                                             SUB00012
      NDIF=NBAND-1                                                         SUB00013
20    IF(I1+NDIF .GT. NEQT) NDIF=NEQT-I1                                   SUB00014
      DO 40 J=1,NDIF                                                       SUB00015
      SYSFXB(I1+J)=SYSFXB(I1+J)+SYSBMX(2*I,J)*(X(I1)-XPREV(I1))            SUB00016
40    CONTINUE                                                             SUB00017
10    CONTINUE                                                             SUB00018
      RETURN                                                               SUB00019
      END                                                                  SUB00020
```

```
      SUBROUTINE TIMEN                                                  00000100 TIME0001
      COMMON/CINTFG/TIME,TINC,RKFACT,RKFAC,ISTEP,PHASE,ITIME            00000200 TIME0002
      TIME=TIME+TINC                                                    00000300 TIME0003
      RETURN                                                            00000400 TIME0004
      END                                                               00000500 TIME0005


      SUBROUTINE TRIGO(/A/)                                             00000100 TRIG0001
      COMMON/ANGLE/S,C                                                  00000200 TRIG0002
      S=SIN(A)                                                          00000300 TRIG0003
      C=COS(A)                                                          00000400 TRIG0004
      RETURN                                                            00000500 TRIG0005
      END                                                               00000600 TRIG0006


      SUBROUTINE VEL(H,Q,U,V)                                           00000100 VEL 0001
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,        00000200 VEL 0002
     1  MAXBWQ,NMHBN,NMQBN,NMVBN,MAXHBN,MAXQBN,MAXEL,NMEL,              00000300 VEL 0003
     2  MAXQBM,MAXHBM                                                  00000400 VEL 0004
      DIMENSION H(MAXNOD),Q(MAXMQ),U(MAXNOD),V(MAXNOD)                  VEL 0005
      DO 10 I=1,NMNP                                                    00000600 VEL 0006
      U(I)=Q(2*I-1)/H(I)                                                00000700 VEL 0007
      V(I)=Q(2*I)/H(I)                                                  00000800 VEL 0008
   10 CONTINUE                                                          00000900 VEL 0009
      RETURN                                                            00001000 VEL 0010
      END                                                               00001100 VEL 0011
```

```
      SUBROUTINE VOLUME(ETA,AREA,ICON,VOL)                              VOLU0001
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDQ,MAXNOD,MAXMQ,MAXBWH,        VOLU0002
     1   MAXBWQ,NMHBN,NMQBN,NPVBN,MAXHBN,MAXQBN,MAXEL,NMEL,             VOLU0003
     2   MAXQBM,MAXHBM                                                 VOLU0004
      DIMENSION ETA(MAXNOD),AREA(MAXEL),ICON(MAXEL,3)                   VOLU0005
      VOL=0.                                                            VOLU0006
      DO 10 I=1,NMEL                                                    VOLU0007
      SUM=0.                                                            VOLU0008
      DO 20 J=1,3                                                       VOLU0009
      SUM=SUM+ETA(ICON(I,J))                                            VOLU0010
20    CONTINUE                                                          VOLU0011
      VOL=AREA(I)*SUM/3.+VOL                                            VOLU0012
10    CONTINUE                                                          VOLU0013
      RETURN                                                            VOLU0014
      END                                                               VOLU0015
```

```
      SUBROUTINE WINDS (TAUWX,TAUWY,DIRW,GAMW,XW,YW,TT)                                  WIND0001
      COMMON/CINTEG/TIME,TINC,RKFACT,RKFAC,ISTEP,PHASE,ITIME                  00054500 WIND0002
      COMMON/COPT/ IBFRIC,IDEPTH,IEDVIS,ICNVEC,IWIND,IVERSN                   00054600 WIND0003
      COMMON/CGRID/NMNP,NMNP2,NBANDH,NBANDO,MAXNOD,MAXMQ,MAXBWH,              00054700 WIND0004
     1   MAXBWO,NMHBN,NMOBN,NMVBN,MAXHBN,MAXOBN,MAXEL,NMEL,                  00054800 WIND0005
     2   MAXOBM,MAXHBM                                                       00054900 WIND0006
      COMMON/CWIND/WTIME,WMAG,WDIR,MAXWI,STRTIM                                      WIND0007
      DIMENSION TAUWX(MAXNOD),TAUWY(MAXNOD),DIRW(MAXWI),GAMW(MAXWI),                 WIND0008
     1 XW(MAXWI),YW(MAXWI),TT(MAXWI)                                                 WIND0009
      IF(IWIND.EQ.4) RETURN                                                          WIND0010
      IF(IWIND.EQ.1) GO TO 500                                                       WIND0011
      IF(IWIND.EQ.2) GO TO 120                                                       WIND0012
      DO 270 I=1,NMNP                                                                WIND0013
      TAUWX(I)=0.0                                                                   WIND0014
  270 TAUWY(I)=0.0                                                                   WIND0015
      IWIND=4                                                                        WIND0016
      RETURN                                                                         WIND0017
  120 IF(TIME.LT.WTIME) RETURN                                                       WIND0018
      READ(5,100) WTIME,WMAG,WDIR                                                    WIND0019
  100 FORMAT(3F10.0)                                                                 WIND0020
      IF (WMAG.LT.14.0)AK=.0000011                                                   WIND0021
      IF (WMAG.GE.14.0)AK=.0000011+.0000025*(1.-14.0/WMAG)**2                        WIND0022
      TAU=-AK*(WMAG*.51)**2                                                          WIND0023
      TAUX=TAU*SIN(WDIR/57.3)                                                        WIND0024
      TAUY=TAU*COS(WDIR/57.3)                                                        WIND0025
      CALL SLINE(36)                                                                 WIND0026
      WRITE(6,1007) TIME,WTIME,WMAG,WDIR,TAUX,TAUY                                   WIND0027
 1007 FORMAT(' WIND VELOCITY FIELD SET FOR TIME OF',F7.0,' SECS. THROUGH'            WIND0028
     1,F7.0,'SECS.'//' WIND MAG.= ',F6.2,' KNOTS   AT A DIRECTION OF ',             WIND0029
     2F6.2,' FROM TRUE NORTH (+Y-AXIS)'//' RESULTING STRESSES ARE TAUX=             WIND0030
     3',F15.9,'   AND TAUY= ',F15.9)                                               WIND0031
      CALL SLINE(36)                                                                 WIND0032
      DO 10 I=1,NMNP                                                                 WIND0033
      TAUWX(I)=TAUX                                                                  WIND0034
      TAUWY(I)=TAUY                                                                  WIND0035
   10 CONTINUE                                                                       WIND0036
```

```
      RETURN                                                                    WIND0037
500   IF((TIME-STRTIM ).GT.TINC) GO TO 300                                      WIND0038
      READ(5,110) WSTIM,LW,WFREQ                                                WIND0039
110   FORMAT(F10.0,I10,F10.0)                                                   WIND0040
      TT(1)=WSTIM                                                               WIND0041
      PI=355./113.                                                              WIND0042
      READ (5,550) (DIRW(L),GAMW(L),L=1,LW)                                     WIND0043
550   FORMAT(8F10.2)                                                            WIND0044
      DO 200 L=1,LW                                                             WIND0045
      DIRW(L)=DIRW(L)*PI/180.                                                   WIND0046
      XW(L)=-GAMW(L)*SIN(DIRW(L))                                               WIND0047
      YW(L)=-GAMW(L)*COS(DIRW(L))                                               WIND0048
      TT(L+1)=TT(L)+WFREQ                                                       WIND0049
200   CONTINUE                                                                  WIND0050
      LWL=1                                                                     WIND0051
300   L=LWL                                                                     WIND0052
      TF=(TIME-TT(L))/WFREQ                                                     WIND0053
      WX=XW(L)+(XW(L+1)-XW(L))*TF                                               WIND0054
      WY=YW(L)+(YW(L+1)-YW(L))*TF                                               WIND0055
      WMAG=SQRT(WX**2+WY**2)                                                    WIND0056
      IF(WX.EQ.0.0) GO TO 900                                                   WIND0057
      WDIR=ATAN(WY/WX)                                                          WIND0058
      GO TO 901                                                                 WIND0059
900   IF(WY.GE.0.0) WDIR=PI/2.                                                  WIND0060
      IF(WY.LT.0.0) WDIR=-PI/2.                                                 WIND0061
901   IF(WX) 335,350,350                                                        WIND0062
335   IF(WY) 340,345,345                                                        WIND0063
340   WDIR=WDIR-PI                                                              WIND0064
      GO TO 350                                                                 WIND0065
345   WDIR=WDIR+PI                                                              WIND0066
350   IF(WMAG.LT.14.0) AK=0.0000011                                             WIND0067
      IF(WMAG.GE.14.0) AK=0.0000011+0.0000025*(1.-14./WMAG)**2                  WIND0068
      TAU= AK*(0.51*WMAG)**2                                                    WIND0069
      TAUX=TAU*COS(WDIR)                                                        WIND0070
      TAUY=TAU*SIN(WDIR)                                                        WIND0071
      TIMEN=TIME+TINC-TT(L)                                                     WIND0072
```

```
      AMAG=DIRW(L)*180./PI                                                    WIND0073
      BMAG=DIRW(L+1)*180./PI                                                  WIND0074
      DO 400 I=1,NMNP                                                         WIND0075
      TAUWX(I)=TAUX                                                           WIND0076
      TAUWY(I)=TAUY                                                           WIND0077
400   CONTINUE                                                                WIND0078
      IF(TIMEN.GT.WFREQ) CALL SLINE(36)                                       WIND0079
      IF(TIMEN.GT.WFREQ) WRITE(6,1000) GAMW(L+1),BMAG,TIME,TAUWX(1),          WIND0080
     1 TAUWY(1)                                                               WIND0081
      IF(TIMEN.GT.WFREQ) CALL SLINE(36)                                       WIND0082
      IF((TIME-STRTIM ).LE.TINC) CALL SLINE(36)                               WIND0083
      IF((TIMF-STRTIM ).LE.TINC) WRITE(6,1000) GAMW(L),AMAG,TIME,             WIND0084
     1 TAUWX(1),TAUWY(1)                                                      WIND0085
      IF((TIME-STRTIM ).LE.TINC) CALL SLINE(36)                               WIND0086
1000 FORMAT(1H ,5X,'WIND MAGNITUDE=',F10.2,2X,'KNOTS',5X,'WIND DIRECTIO      WIND0087
     1N=',F10.2,2X,'DEGREES TRUE',5X,'TIME=',F10.2,2X,'SECONDS'/1X,          WIND0088
     2'RESULTING STRESSES ARE TAUX=',F15.6,'    AND TAUY =',F15.6)           WIND0089
      IF(TIMEN.GT.WFREQ ) LWL=LWL+1                                           WIND0090
      RETURN                                                                  00056400 WIND0091
      END                                                                     00056500 WIND0092
```

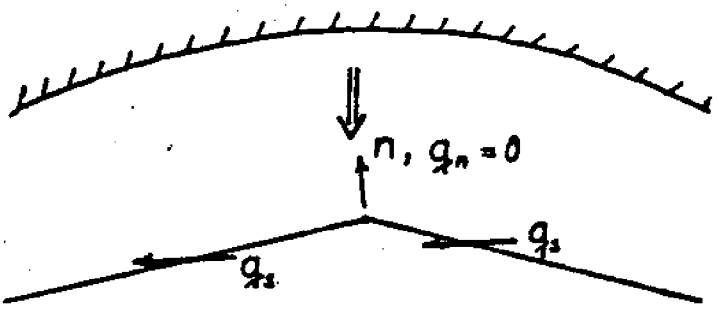
APPENDIX A

Explanation of Outward Normal For Land Boundary Nodes

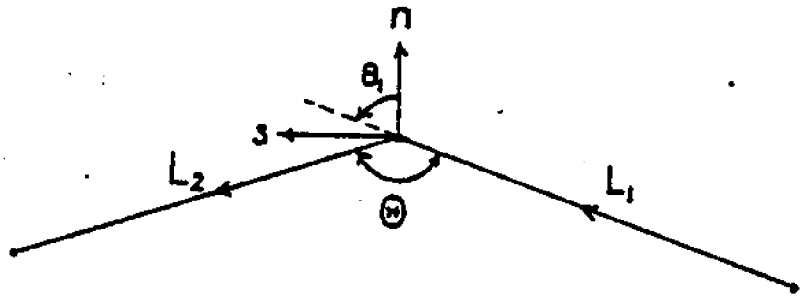
As part of the required input data defined under card group 4 in section 2.0, it is necessary to measure QBANG, the angle between the positive x-axis and the outward normal at each land boundary node. The outward normal is determined by requiring net flow across adjoining segments to vanish. Using the definitions in Figure A-1 which shows both a convex and a concave break, θ_1 is found by balancing the flow through segment 1 of length L_1 with flow through segment 2 of length L_2. To obtain a general relationship a positive direction of traverse of the segments is defined such that the flow domain is to the left and the normal to the right or land domain. For a contour enclosing the flow domain this will be a counterclockwise sense. The interior angle is denoted Θ and the angle from n to L is θ_1. Simple geometry yields

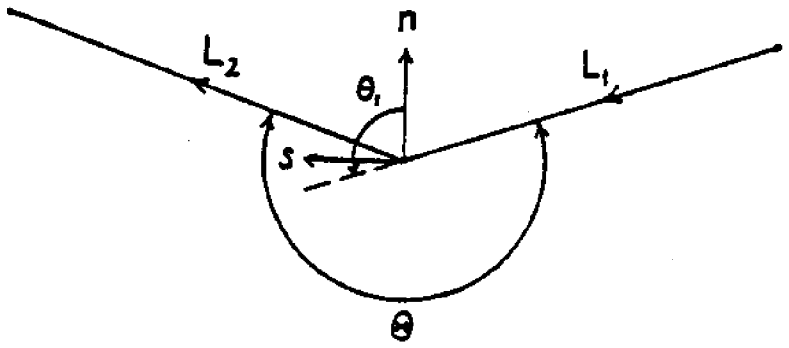
$$\cot \theta_1 = \frac{L_2 \sin\Theta}{L_1 - L_2 \cos\Theta} \qquad 0 < \theta_1 < \pi; \quad \frac{\pi}{2} < \Theta < 2\pi$$

for $\Theta < \frac{\pi}{2}$ both discharge components should be prescribed to zero since the existence of a tangential flow is physically unreasonable and also can introduce difficulties. For $\Theta < \frac{\pi}{2}$ use NBC = 4 in card group 4.



Curved boundary with FE approximation.





Definition sketches for boundary normals. Convex and concave corners.

Figure A-1

APPENDIX B

Particle-Path Program for "CAFE-1"

This short accessory program to "CAFE-1" calculates the depth-averaged movement of a simulated water "particle". The calculation is simply a progressive vectoral addition scheme using the resultant velocities computed in "CAFE-1". The program begins by reading the x and y coordinates of one or more starting locations for a "particle". Utilizing a set of nodal velocities generated by "CAFE-1" on a direct access file for one or more consecutive tidal periods, the program then calculates the movement of the drogue by continually interpolating velocity information in space and by vectorally adding in time to produce the net movement over time. This information is written and punched out in terms of x and y coordinates vs. time. If desired, the punched information may be used with the plotting program presented in APPENDIX C to produce a plot such as shown in Figure B-1. The use of the particle-path program is described below.

Input Data Requirements

Dimension Specifications:

The following cards in the main routine of the program must be adapted for sizes of the dimensioned variables used in the program.

```
DIMENSION NEXT(NUMNP),NINT(NUMNP),XORD(NUMNP),YORD(NUMNP)DEPTH(NUMNP)...DROG0002
DIMENSION ICON(NUMEL,3),K(3),U(NUMNP),V(NUMNP) . . . . . .DROG0003
DIMENSION XM(NSTEP),YM(NSTEP),XXM(NSTEP/3),YYM(NSTEP/3) . . . . . .DROG0004
```

where NUMNP and NUMEL are defined in card group B-2 and NSTEP is equal to (ENDTIM-STRTIM)/TINC.

Generalized Input Data Description

Card group B-1: Title. One card (20A4)

Card group B-2: Parameters. One card (3I10, 3F10.0, 2I10)

NUMNP	number of nodes
NUMEL	number of elements
IEND	the designated ending point for reading file data, which may be less than IPTS
ENDTIM	the end time, in seconds, of the calculation
STRTIM	the starting time, in seconds, of the calculation
TINC	the time step, in seconds, which is determined by the time step of the velocity file.
ISTRT2	the designated point for rereading the file, i.e., repeating a tidal cycle, if ENDTIM/TINC of the exercise is larger than (IEND-ISTRT1)(See card group B-5 for explanation of ISTRT1).

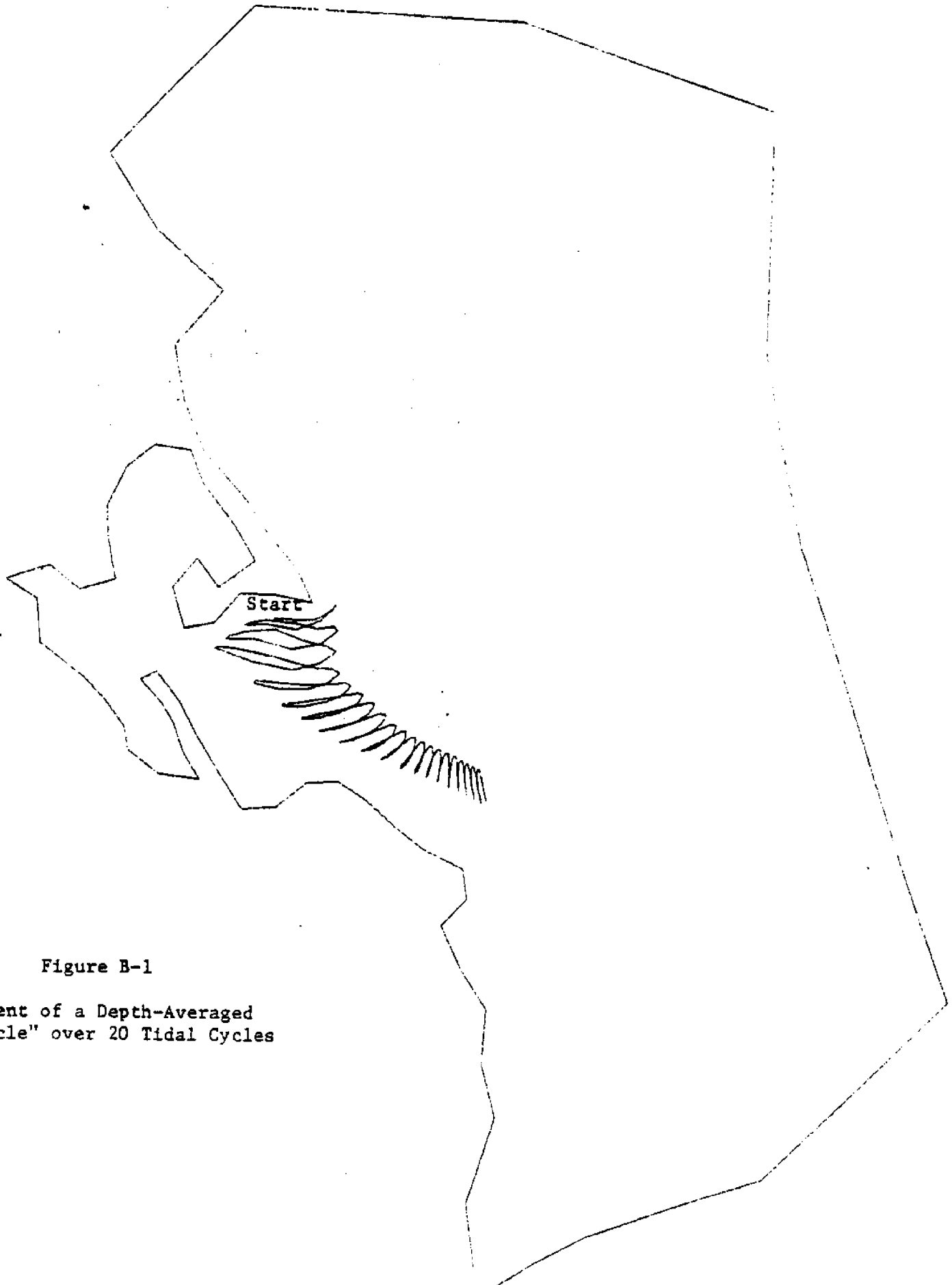


Figure B-1

ment of a Depth-Averaged
icle" over 20 Tidal Cycles

IPNCH { = 0 punching for plotting purposes is not desired
= 1 punching for plotting purposes is desired

Important! The DEFINE FILE statement must be properly introduced as follows:

DEFINE FILE A(B,C,U,IPOINT) DROG0009
where A is normally a two digit integer used for JCL purposes,
B is an integer, and is equal to IPTS, the total number of storage locations available on the file. (Each storage location has one set of x and y nodal velocity components and nodal depths)
and C is an integer, and is equal to 3*NUMNP.

Card group B-3: Nodal Information. NUMNP cards (I5, 5X, 2F10.0)
M = 1, NUMNP
NEXT(M) external node number
XORD(M) x-coordinate of external node NEXT(M)
YORD(M) y-coordinate of external node NEXT(M)
note: same as card group 4 in Section 2.0.

Card group B-4: Element Data. NUMEL cards (4I10)
I = 1, NUMEL
N(I) element number (in ascending order)
ICON(N(I),1), ICON(N(I),2), ICON(N(I),3) } external node numbers of the element given in sense of x towards y

note: same as card group 5 in Section 2.0.

Card group B-5: Particle Information. One card for each particle (I10, 2F10.0, I5)
NPOINT integer assigned to name the particle
XSTART x-coordinate in meters of the starting position of particle NPOINT
YSTART y-coordinate in meters of the starting position of particle NPOINT
ISTRT1 the designated starting point for reading the file velocity data ($1 \leq$ ISTRT1 < IPTS)

note: each "particle" may be started at different points in the velocity file.

Output Description

1: For each "particle", the headings "POINT NUMBER = , STARTING POINT ON FILE = " "TIME, XORD, YORD" are printed.

2: For each "particle", the x and y coordinates in meters of the moving particle along with the corresponding time in seconds are printed. This occurs every third timestep or 3*TINC seconds until either ENDTIM is reached or the particle hits the outer grid boundary. If the particle hits a grid boundary, the message "PARTICLE GOES OUT OF GRID DOMAIN" is printed and the computation proceeds to the next particle.

Only if IPNCH = 1: Plotting Information

3: For each"particle", two numbers are punched on one card. The first is NPOINT, and the second is the number of sets of x and y coordinates printed for that particle as described above.

4: For each "particle", the x and y coordinates are punched on cards after each header card described above for input into the plotting program described in APPENDIX C.

```
C  SIMULATION OF A DEPTH-AVERAGE DROGUE PATH BY THE CIRCULATION MODEL          DROGOOO1
      DIMENSION NEXT(14 ),NINT(14 ),XORD(14 ),YORD(14 ),DEPTH(14 )            DROGOOO2
      DIMENSION ICON(224,3),K(3),L(14 ),V(14 )                                DROGO  3
      DIMENSION XM(900),YM(900),XXM(300),YYM(300)                             DROGOOO4
      READ(5,1  3) TITLE                                                      DROGOOO5
 1003 FORMAT(20A4)                                                            DROG   6
      WRITE(6,71 ) TITLE                                                      DROGOOO7
 71   FORMAT(1H1//1H ,25X,2 A4)                                               DROG   8
      DEFINE FILE 1  (62,42 ,U,IPOINT)                                        DROG   9
      READ(5,72 ) NUMNP,NUMEL,IEND,ENDTIM,STRTIM,TINC,ISTRT2,IPNCH            DROGOO1O
 720  FORMAT(3I1 ,3F1 .0,2I1 )                                                DROG   11
      NSTEP=(ENDTIM-STRTIM)/TINC                                              DROG   12
      DO 7   M=1,NUMNP                                                        DROGOO13
      READ(5,735) NEXT(M),XORD(M),YORD(M)                                     DROG   14
735   FORMAT(I5,5X,2F1 .3)                                                    DROGOO15
      NINT(NEXT(M))=M                                                         DROG   16
700   CONTINUE                                                                DROG   17
      DO 76   II=1,NUMEL                                                      DROGOO18
      READ(5,755) N,(ICON(N,J),J=1,3)                                         DROG   19
755   FORMAT(4I10)                                                            DROGOO2O
      DO 759 J=1,3                                                            DROGOO21
      K(J)=NINT(ICON(N,J))                                                    DROG   22
759   ICON(N,J)=K(J)                                                          DROGOO23
76   CONTINUE                                                                 DROG   24
      WRITE(6,730) NUMNP,NUMEL,STRTIM,NSTEP,TINC,ENDTIM,IEND,ISTRT2           DROGOO25
73   FORMAT (3X,'NUMBER OF NODES=',I5/3X,'NUMBER OF ELEMENTS=',I5/3X,        DROGOO26
     1'START TIME=',F1 .3,2X,'SECONDS'/3X,'NUMBER OF STEPS=',I5/             DROG   27
     2 3X,'TIME STEP=',F1 .3,2X,'SECONDS'/3X,'END TIME=',F1 .0,2X,           DROGOO28
     3 'SECONDS'/3X,'END POINT ON FILE=',I5/3X,'THE DESIGNATED POINT FOR     DROG   29
     4  REREADING THE FILE=',I5/)                                            DROG   3.
78   READ(5,79 ) NPOINT,XM(1),YM(1),ISTRT1                                   DROGOO31
79   FORMAT(I1 ,2F10.3,I5)                                                   DROG   32
      IF(NPOINT.LT.0) GO TO 999                                              DROGOO33
      TIME=STRTIM                                                            DROGOO34
      IPOINT=ISTRT1                                                          DROG   35
      WRITE(6,794) NPOINT,ISTRT1                                             DROGOO36
```

```
794   FORMAT(///,3X,'POINT NUMBER=',I5,5X,'STARTING POINT ON FILE=',I5/)      DROG  37
     2 3X,'END POINT ON FILE=',I5/)                                           DROG  38
      WRITE(6,795)                                                            DROG0039
795   FORMAT(5X,'TIME',6X,'XORD',6X,'YORD')                                   DROG  4
      DO 900 L=1,NSTEP                                                        DROG0041
      LS=L                                                                    DROG0042
      LL=L-1                                                                  DROG  43
      IF((LL/3)*3.NE.LL) GO TO 880                                            DROG0044
      WRITE(6,870) TIME,XM(L),YM(L)                                           DROG  45
870   FORMAT(3F10.3)                                                          DROG  46
880   READ(10'IPOINT)(L(II),V(II),DEPTH(II),II=1,NUMNP)                       DROG0047
      DO 800 I=1,NUMEL                                                        DROG  48
      N1=ICON(I,1)                                                            DROG0049
      N2=ICON(I,2)                                                            DROG  50
      N3=ICON(I,3)                                                            DROG  51
      X1=XORD(N1)                                                             DROG0052
      X2=XORD(N2)                                                             DROG  53
      X3=XORD(N3)                                                             DROG0054
      Y1=YORD(N1)                                                             DROG  55
      Y2=YORD(N2)                                                             DROG  56
      Y3=YORD(N3)                                                             DROG0057
      U1=U(N1)                                                                DROG  58
      U2=U(N2)                                                                DROG0059
      U3=U(N3)                                                                DROG0060
      V1=V(N1)                                                                DROG  61
      V2=V(N2)                                                                DROG0062
      V3=V(N3)                                                                DROG  63
      A3=(Y2-Y1)                                                              DROG  64
      B3=-1.*(X2-X1)                                                          DROG0065
      C3=(Y1*X2-X1*Y2)                                                        DROG  66
      DIS3=A3*X3+B3*Y3+C3                                                     DROG0067
      DISM3=A3*XM(L)+B3*YM(L)+C3                                              DROG0068
      DIM3=ABS(DISM3)                                                         DROG  69
      IF(DIM3.LT.0.001) DISM3=0.                                              DROG0070
      T3=DIS3*DISM3                                                           DROG  71
      IF(T3.LT.0.) GO TO 810                                                  DROG  72
```

```
      A2=(Y3-Y1)                                                        DROG0073
      B2=-1.*(X3-X1)                                                    DROG0074
      C2=(Y1*X3-Y3*X1)                                                  DROG0075
      DIS2=A2*X2+B2*Y2+C2                                               DROG0076
      DISM2=A2*XM(L)+B2*YM(L)+C2                                        DROG0077
      DIM2=ABS(DISM2)                                                   DROG0078
      IF(DIM2.LT.(.001) DISM2=0.                                        DROG0079
      T2=DIS2*DISM2                                                     DROG0080
      IF(T2.LT.0.) GO TO 810                                            DROG0081
      A1=(Y3-Y2)                                                        DROG0082
      B1=-1.*(X3-X2)                                                    DROG0083
      C1=(Y2*X3-X2*Y3)                                                  DROG0084
      DIS1=A1*X1+B1*Y1+C1                                               DROG0085
      DISM1=A1*XM(L)+B1*YM(L)+C1                                        DROG0086
      DIM1=ABS(DISM1)                                                   DROG0087
      IF(DIM1.LT.0.001) DISM1=0.                                        DROG0088
      T1=DIS1*DISM1                                                     DROG0089
      IF(T1.LT.0.) GO TO 810                                            DROG0090
      R=(X2-X1)*(Y3-Y1)-(X3-X1)*(Y2-Y1)                                 DROG0091
      UX=(Y2-Y1)*(U3-U1)-(Y3-Y1)*(U2-U1)                                DROG0092
      UY=(X2-X1)*(U3-U1)-(X3-X1)*(U2-U1)                                DROG0093
      VX=(Y2-Y1)*(V3-V1)-(Y3-Y1)*(V2-V1)                                DROG0094
      VY=(X2-X1)*(V3-V1)-(X3-X1)*(V2-V1)                                DROG0095
      UM=U1+(YM(L)-Y1)*UY/R-(XM(L)-X1)*UX/R                             DROG0096
      VM=V1+(YM(L)-Y1)*VY/R-(XM(L)-X1)*VX/R                             DROG0097
      TIME=TIME+TINC                                                    DROG0098
      XM(L+1)=XM(L)+UM*TINC                                             DROG0099
      YM(L+1)=YM(L)+VM*TINC                                             DROG0100
      GO TO 890                                                         DROG0101
810   IF(I.LT.NUMEL) GO TO 800                                          DROG0102
      WRITE (6,820)                                                     DROG0103
820   FORMAT(3X,'PARTICLE GOES OUT OF GRID DOMAIN')                     DROG0104
      GO TO 910                                                         DROG0105
800   CONTINUE                                                          DROG0106
890   IF(IPOINT.EQ.IEND) IPOINT=ISTRT2                                  DROG0107
900   CONTINUE                                                          DROG0108
```

```
  910 LF=LS                                                              DROG 1  9
      DO 92  L=1,LF                                                      DROGG110
      LL=L-1                                                    9  952   DROG 111
      IF((LL/3)*3.NE.LL) GO TO 920                              0  953   DROG 112
      K1=LL/3+1                                                 0 9540   DROGG113
      XXM(K1)=XM(L)                                             .  955   DROGG114
      YYM(K1)=YM(L)                                             0 9560   DROGG115
  92  CONTINUE                                                  9  957C  DROGG116
      KK=K1                                                     .  958   DROGG117
      IF(IPNCH.EQ.0) GO TO 605                                           DROGG118
      WRITE(7,925) NPOINT,KK                                             DROGG119
  925 FORMAT(2I5)                                                        DROG 12
      WRITE(7,930) (XXM(K1),YYM(K1), K1=1,KK)                   0 9590   DROGG121
  605 CONTINUE                                                           DROGG122
  93  FORMAT(8F10.3)                                            0 9591   DROGG123
      GO TO 781                                                          DROGG124
  999 STOP                                                               DROG 125
      END                                                                DROGG126
```

APPENDIX C

Cal-Comp Plotting Program for "Particle-Path"

This program plots depth-averaged "particle" paths generated by the particle-path program in Appendix B using velocities from "CAFE-1". Although this plotting program was written using CAL-COMP routines, it should be readily adaptable for use with other plotters in the Fortran-4 system. An example of a typical plot is presented in Figure B-1. The use of the plotting program is described below.

Input Data Requirements

Dimension Specifications:

The following cards in the main routine of the program must be adapted for sizes of the dimensioned variables used in the program.

```
DIMENSION  NEXT(NUMNP),NINT(NUMNP),XORD(NUMNP),YORD(NUMNP)...MAIN0003
DIMENSION  ICON(NUMEL,3),NMBN(NMLB),ICONTU(NMLB,MAXLBN).....MAIN0004
DIMENSION  XO(MAXLBN),YO(MAXLBN),XM(MAXSTP),YM(MAXSTP).....MAIN0005
```

where NUMEL, NUMNP and MAXLBN are defined in card group C-1, NMLB is defined in card group C-4, and MAXSTP is equal to (ENDTIM-STRTIM)/(TINC*3), where ENDTIM, STRTIM and TINC are defined in card group B-2.

Generalized Input Data Description:

Card group C-1: Parameters. One card (4I10, E15.4)

NUMEL	number of elements
NUMNP	number of nodes
NPTS	number of particle paths to be plotted (in this version, each particle path is plotted on a separate plot)
MAXLBN	number of nodes on the longest land boundary, including first and last
MAXSTP	as defined above
SCALEF	scale conversion factor or coefficient required to reduce grid coordinate scale to desired plot size

Card group C-2: Nodal Information (I5, 5X, 2F10.0)

M = 1, NUMNP

NEXT(M)	external node number
XORD(M)	x-coordinate of external node NEXT(M)
YORD(M)	y-coordinate of external node NEXT(M)

note: same as card group 4 in Section 2.0.

Card group C-3: Element Data. NUMEL cards (4I10)
I = 1, NUMEL
N(I) element number (in ascending order)
ICON(N(I),1)
ICON(N(I),2)
ICON(N(I),3)
} external node numbers of the element given in sense of x toward y

note: same as card group 5 in Section 2.0.

Card group C-4: Land Boundary Data. One card (8I10)
NMLB number of land boundaries
(NMBN(I), I = 1, NMLB) number of nodes on each land boundary, including first and last.

note: same as card group 11A in Section 2.0.

Card group C-5: Land Segment Connectivity. NMBN(I)/20 cards per boundary (20I4)
I = 1, NMLB
(ICONTU(J,I), J = 1, NMBN(I)) external node numbers of boundary I, in sequential order such that the flow domain is to the left of the direction of advance.
note: same as card group 11B in Section 2.0.

Card group C-6: Punched "Particle-Path" coordinates from the Particle Path Program. (One card (2I5) + NSTEP3*2/8 cards (8F10.3)) x number of particles NPTS.
I = 1, NPTS
NPOINT the integer number assigned to the particle
NSTEP3 from the particle path program, it is (ENDTIM-STRTIM)/(TINC*3), where ENDTIM may be different for each particle if the particle leaves the grid before the end of computation.
(XM(L),YM(L),L=1, NSTEP3) the x and y coordinates in meters which describe the movement of the particle.

Additional Plotting Information:

The user should adjust the following cards according to plotting requirements:

CALL PLOT (X,Y, -3) PATH0044
where X and Y are the coordinates in inches of the origin of the grid such that the outer grid boundaries will fit onto the plotting paper. Note: this is where SCALEF becomes important.

CALL PLOT (A, 0.0, -3). PATH0053
where A is the length in inches required to advance the origin of the grid along the x-axis of the plotter for the next plot.

CALL ENDPLT(B, 0.0, 999) PATH0055
where B is the minimum length in inches for the plotter to clear the last plot and must be greater than the largest positive x-coordinate in inches of the grid.

```
C       THIS PROGRAM PLOTS DEPTH-AVERAGED "PARTICLE" PATHS                PATH0001
C       GENERATED FROM THE PARTICLE-PATH AND CAFE-1 PROGRAMS              PATH0002
        DIMENSION NEXT(140)  ,NINT(140),XORD(140),YORD(140)               PATH0003
        DIMENSION ICON(224,3),NMBN(1),ICONTU(1,46)                        PATH0004
        DIMENSION XO(46),YO(46),XM(500),YM(500)                           PATH0005
        COMMON/CPARM/NUMEL,NUMNP,NMLB,SCALEF,MAXLB,NSTEP                  PATH0006
        COMMON/CPATH/MAXSTP                                               PATH0007
        READ(5,720) NUMEL,NUMNP,NPTS,MAXLB, MAXSTP,SCALEF                PATH0008
  720   FORMAT(5I10,F15.4)                                                PATH0009
        WRITE(6,1011)                                                     PATH0010
 1011   FORMAT(1H ,'THIS PROGRAM PLOTS DEPTH-AVERAGED "PARTICLE" PATHS    PATH0011
       1GENERATED FROM THE PARTICLE-PATH AND CAFE-1 PROGRAMS'//)          PATH0012
        WRITE(6,1016)                                                     PATH0013
 1016   FORMAT(1H ,6X,'NODE',8X,'X-',11X,'Y-'/1H ,5X,'NUMBER',3X,         PATH0014
       1 'COORDINATE',3X,'COORDINATE'/)                                   PATH0015
        DO 760  M=1,NUMNP                                                 PATH0016
        READ(5,735) NEXT(M),XORD(NEXT(M)),YORD(NEXT(M))                   PATH0017
  735   FORMAT(I5,5X,3F10.0)                                              PATH0018
        WRITE(6,1055) NEXT(M),XORD(NEXT(M)),YORD(NEXT(M))                 PATH0019
 1055   FORMAT(1H ,5X,I4,5X,F10.2,3X,F10.2)                               PATH0020
        NINT(NEXT(M))=M                                                   PATH0021
  760   CONTINUE                                                          PATH0022
        WRITE(6,1022)                                                     PATH0023
 1022   FORMAT(1H ,5X,'ELEMENT CONNECTIVITIES.'/1H ,10X,'ELEMENT NUMBER', PATH0024
       1 3X,'NODE 1',3X,'NODE 2',3X,'NODE 3'/1H )                         PATH0025
        DO 760 II=1,NUMEL                                                 PATH0026
        READ(5,755) N,(ICON(N,J),J=1,3)                                   PATH0027
  755   FORMAT(4I10)                                                      PATH0028
        WRITE(6,1024) N,(ICON(N,J),J=1,3)                                 PATH0029
 1024   FORMAT(2H ,16X,I3,10X,I3,6X,I3,6X,I3)                             PATH0030
  760   CONTINUE                                                          PATH0031
        READ(5,1008) NMLB,(NMBN(J),J=1,NMLB)                              PATH0032
 1008   FORMAT(8I10)                                                      PATH0033
        DO 30 I=1,NMLB                                                    PATH0034
         NNN=NMBN(I)                                                      PATH0035
        READ(5,1007) (ICONTU(I,III),III=1,NNN)                            PATH0036
```

```
      WRITE(6,1052) I,NMBN(I),(ICONTU(I,III),III=1,NNN)                 PATH0037
 1052 FORMAT(1H ,5X,'LAND SEGMENT ',I2,5X,'# NODES, NMBN = ',I2/1H ,5X,  PATH0038
     1'EXTERNAL NODE NUMBERS: ',25(I3,'-')/1H ,20X,25(I3,'-')/           PATH0039
     2 1H ,20X,25(I3,'-')/1H ,20X,25(I3,'-'))                            PATH0040
 1007 FORMAT(20I4)                                                       PATH0041
   30 CONTINUE                                                           PATH0042
      CALL PLOTS(IDM,IDM,23)                                             PATH0043
      CALL PLOT(10.0,1.66,-3)                                            PATH0044
      DO 100 I=1,NPTS                                                    PATH0045
      CALL PLTCON(NMBN,XORD,YORD,ICONTU,XO,YO)                           PATH0046
      READ(5,110) NPOINT,NSTEP                                           PATH0047
  110 FORMAT(2I5)                                                        PATH0048
      READ(5,120) (XM(K1),YM(K1),K1=1,NSTEP)                             PATH0049
  120 FORMAT(8F10.3)                                                     PATH0050
      CALL PLPATH(XM,YM)                                                 PATH0051
      IF(I.EQ.NPTS) GO TO 130                                            PATH0052
      CALL PLOT (8.5,0.0,-3)                                             PATH0053
  100 CONTINUE                                                           PATH0054
  130  CALL ENDPLT(16.0,0.0,999)                                         PATH0055
      STOP                                                               PATH0056
      END                                                                PATH0057
```

```
      SUBROUTINE PLTCON(NMBN,XORD,YORD,ICONTU,XO,YO)                    PLTC   1
      COMMON/CPARM/NUMEL,NUMNP,NMLB,SCALEF,MAXLB,NSTEP                 PLTC0002
      DIMENSION NMBN(NMLB),XORD(NUMNP),YORD(NUMNP),ICONTU(NMLB,MAXLB),  PLTC0003
     1 XO(MAXLB),YO(MAXLB)                                             PLTC   4
      DO 2  J=1,NMLB                                                   PLTC0005
      NN=NMBN(J)                                                       PLTC   6
      DO 1  I=1,NN                                                     PLTC0007
      XO(I)= XORD(ICONTU(J,I))*SCALEF                                  PLTC   8
      YO(I)=YORD(ICONTU(J,I))*SCALEF                                   PLTC   9
1     CONTINUE                                                         PLTC0010
      N1=NMBN(J)                                                       PLTC  11
      CALL GRAPH(XO,YO,N1,0.,N1)                                       PLTC0012
2     CONTINUE                                                         PLTC0013
      WRITE(6,1002)                                                    PLTC  14
1002  FORMAT(1H ,1X,'CONTOUR PLOT COMPLETED')                          PLTC0015
      RETURN                                                           PLTC  16
      END                                                              PLTC0017
```



```
      SUBROUTINE PLPATH(XM,YM)                                         PLPA0001
      COMMON/CPARM/NUMEL,NUMNP,NMLB,SCALEF,MAXLB,NSTEP                 PLPA0002
      COMMON/CPATH/MAXSTP                                              PLPA0003
      DIMENSION XM(MAXSTP),YM(MAXSTP)                                  PLPA   4
      DO 50  L=1,NSTEP                                                 PLPA0005
       XM(L)=XM(L)*SCALEF                                              PLPA   6
       YM(L)=YM(L)*SCALEF                                              PLPA0007
50    CONTINUE                                                         PLPA   8
      N2=NSTEP                                                         PLPA0009
      CALL GRAPH(XOM,YOM,N2,0.,N2)                                     PLPA0010
      RETURN                                                           PLPA  11
      END                                                              PLPA0012
```

APPENDIX D

Cal-Comp Plotting Program for "CAFE-1" Velocities

This program plots depth-averaged resultant velocities at element centers. The velocity information is read from punched cards generated by "CAFE-1". Card group 9 in Section 2.0 describes instructions for the punched output. Although this plotting program was written using CAL-COMP routines, it is readily adaptable for use with other plotters in the Fortran-4 system. An example of a typical plot is presented in Figure D-1. Figure D-2 shows a typical grid element plot which is optional with this routine. The use of the plotting program is described below.

Input Data Requirements

Dimension Specifications:

The following cards in the main routine of the program must be adapted for sizes of the dimensioned variables used in the program.

```
DIMENSION ICON(NMEL,3),NINT(NMNP),XORD(NMNP),YORD(NMNP) . . . . MAIN0003
DIMENSION NMBN(NMLB),ICONTU(NMLB,MAXLBN) . . . . . .MAIN0004
DIMENSION NN(NMNP),XO(MAXLBN),YO(MAXLBN),XC(NMEL),YC(NMEL) . . .MAIN0005
DIMENSION U(NMNP*2) . . . . . MAIN0006
```

where NMEL, NMNP and MAXLBN are defined in card group D-1 and NMLB is defined in card group D-4.

Generalized Input Data Description:

Card group D-1: Parameters. One card (5I10, 2E15.4)

NMEL	number of elements
NMNP	number of nodes
NPLOTS	number of plots or sets of velocity components
MAXLBN	number of nodes on the longest land boundary, including first and last
IGRID	= 0 if plotting the element grid system is not desired = 1 if plotting the element grid system is desired
SCALEF	scale conversion factor or coefficient required to reduce grid coordinate scale to desired plot size
CSCALE	when CSCALE = 1.0, the velocity plot scale or ratio is 2.5 cm = 1m/sec. If the typical velocity calculated is much higher (or lower) than 1m/sec, the scale may be altered by changing CSCALE respectively. Figure D-1 shows a plot with CSCALE = 1.0.

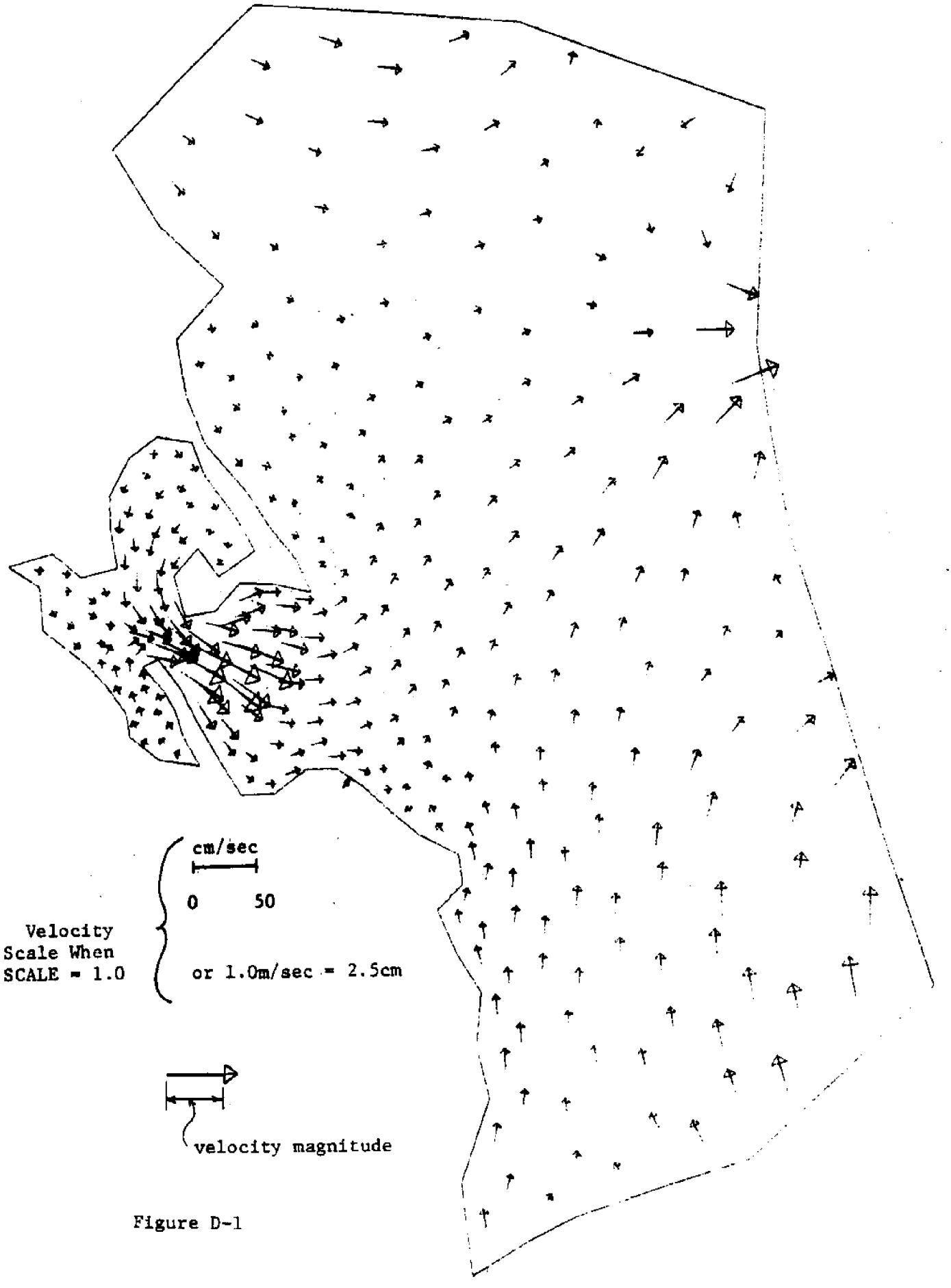

cm/sec
0
50
Velocity
Scale When
SCALE = 1.0
or 1.0m/sec = 2.5cm
velocity magnitude

Figure D-1

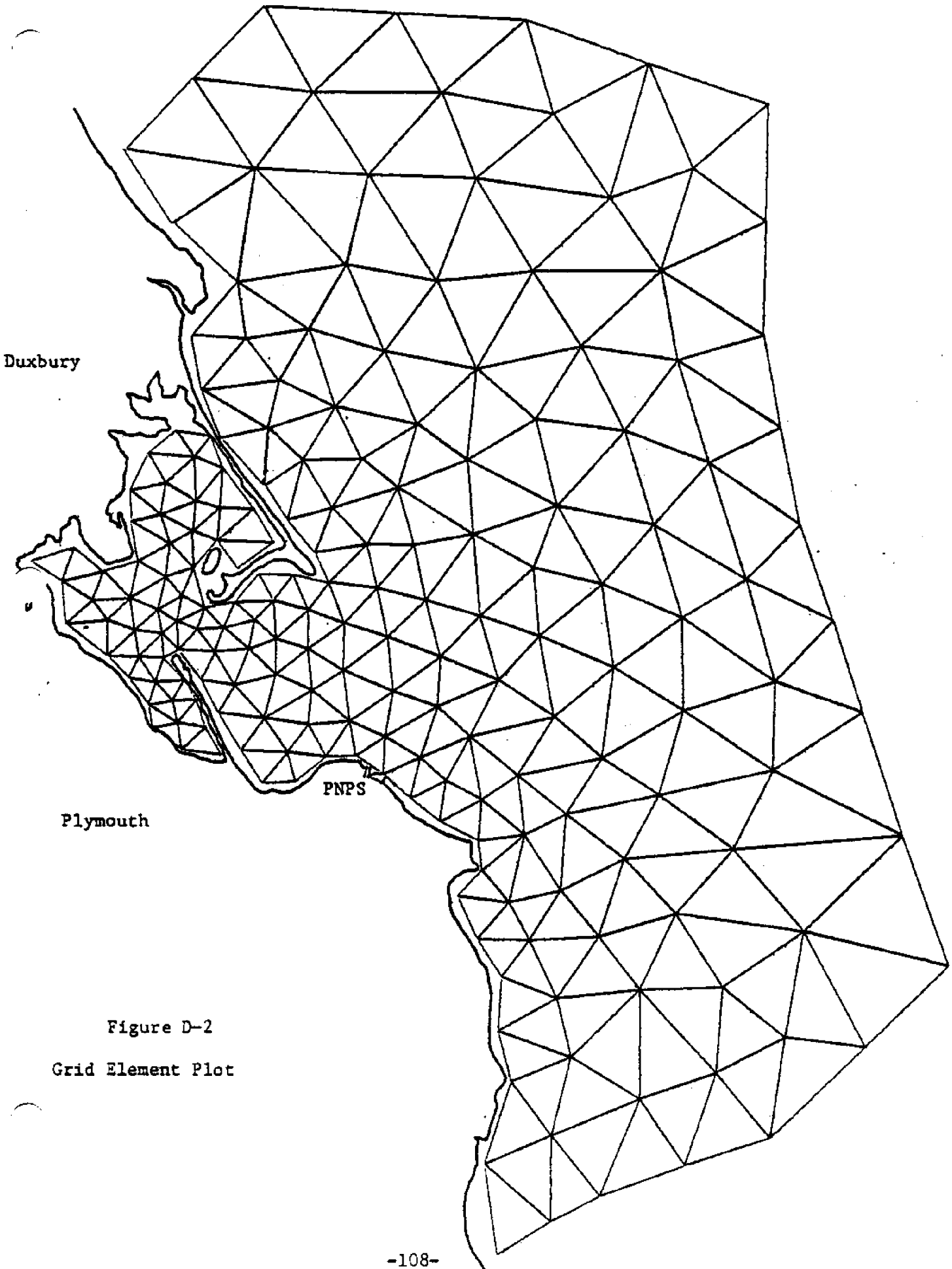


Figure D-2

Grid Element Plot

Card group D-2: Nodal Information. NMNP cards (I5, 5X, 2F10.0)
M = 1, NMNP
NEXT(M) external node number
XORD(M) x-coordinate of external node NEXT(M)
YORD(M) y-coordinate of external node NEXT(M)
note: same as card group 4 in Section 2.0.

Card group D-3: Element Data. NMEL cards (4I10)
I = 1, NMEL
N(I) element number (in ascending order)
ICON(N(I),1)
ICON(N(I),2) } external node numbers of the element given in sense of x toward y
ICON(N(I),3)

note: same as card group 5 in Section 2.0.

Card group D-4: Land Boundary Data. One card (8I10)
NMLB number of land boundaries
(NMBN(I),I=1,NMLB) number of nodes on each land boundary, including first and last.

note: same as card group 11A in Section 2.0.

Card group D-5: Land Segment Connectivity. NMBN(I)/20 cards per boundary (20I4)
I=1, NMLB
(ICONTU(J,I), J = 1, NMBN(I)) external node numbers of boundary I, in sequential order such that the flow domain is to the left of the direction of advance.

note: same as card group 11B in Section 2.0.

Card group D-6: Punched Velocity Components from "CAFE-1".
(One card (I10) + NMNP*3/8 cards (8F10.2)) x number of plots

I = 1, NPLOTS
ITIMP timestep in "CAFE-1" at which punching occurred for that set of velocity components.
(U(J),J=1,NMNP*2) nodal x and y velocity components in internal numbering order for NPLOT I.

Additional Plotting Information:

The user should adjust the following cards according to plotting requirements:

1.0 In Subroutine STRTPL:

CALL PLOT (X,Y,-3) STRT0010
where X and Y are the coordinates in inches of the origin of the grid such that the outer grid boundaries will fit onto the plotting paper. Note: this is where SCALEF becomes important.

CALL PLOT (A,0.0,-3) STRT0015
where A is the length in inches required to advance the origin of the grid along the x-axis of the plotter for the next plot.

CALL ENDPLT(B,0.0,999) STRT0019
where B is the minimum length in inches for the plotter to clear the last plot and must be greater than the largest positive x-coordinate in inches of the grid.

2.0 In Subroutine VELPLT

The size of the arrowhead is restricted to a minimum and a maximum size, depending on values given in cards VELP0032 and VELP0033. These size restrictions can be adjusted if the typical velocity magnitude requires it.

```
C       THIS PROGRAM PLOTS DEPTH-AVERAGED RESULTANT                      MAIN0001
C       VELOCITY VECTORS GENERATED BY "CAFE-1"                           MAIN0002
        DIMENSION ICON(224,3),NINT(140),XORD(140),YORD(140)              MAIN0003
        DIMENSION NMBN(1),ICONTU(1,46)                                   MAIN0004
        DIMENSION NN(140),XO(46),YO(46),XC(224),YC(224)                  MAIN0005
        DIMENSION U(280)                                                 MAIN0006
        COMMON/CPARM/NMEL,NMNP,NMLB,SCALEF,MAXLB,CSCALE                  MAIN0007
        COMMON/CPLOT/NPLOTS,IGRID                                        MAIN0008
        COMMON/CREAD/IEND                                                MAIN0009
        READ(5,1001) NMEL,NMNP,NPLOTS,MAXLB,IGRID,SCALEF,CSCALE         MAIN0010
 1001 FORMAT(5I10,2E15.4)                                                MAIN0011
        IEND=2*NMNP                                                      MAIN0012
        WRITE(6,1011)                                                    MAIN0013
 1011 FORMAT(1H ,'THIS PROGRAM PLOTS DEPTH-AVERAGED RESULTANT VELOCITY   MAIN0014
       1VECTORS GENERATED BY "CAFE-1"'//)                                MAIN0015
        WRITE(6,1012)                                                    MAIN0016
 1012 FORMAT(1H ,6X,'NODE',8X,'X-',11X,'Y-'/1H ,5X,'NUMBER',3X,          MAIN0017
       1 'COORDINATE',3X,'COORDINATE'/)                                  MAIN0018
        DO 10 I=1,NMNP                                                   MAIN0019
        READ(5,1005) NN(I),XORD(NN(I)),YORD(NN(I))                       MAIN0020
 1005 FORMAT(I5,5X,3F10.0)                                               MAIN0021
        WRITE(6,1055)NN(I),XORD(NN(I)),YORD(NN(I))                       MAIN0022
 1055 FORMAT(1H ,5X,I4,5X,F12.2,3X,F10.2)                                MAIN0023
        NINT(NN(I))=I                                                    MAIN0024
   10   CONTINUE                                                         MAIN0025
        WRITE(6,1022)                                                    MAIN0026
 1022 FORMAT(1H ,5X,'ELEMENT CONNECTIVITIES.'/1H ,10X,'ELEMENT NUMBER',  MAIN0027
       1 3X,'NODE 1',3X,'NODE 2',3X,'NODE 3'/1H )                        MAIN0028
        DO 20 K=1,NMEL                                                   MAIN0029
        READ(5,1003)  N,(ICON(N,J), J=1,3)                               MAIN0030
        WRITE(6,1024) N,(ICON(N,J),J=1,3)                                MAIN0031
 1003 FORMAT(4I10)                                                       MAIN0032
 1024 FORMAT(2H ,16X,I3,10X,I3,6X,I3,6X,I3)                              MAIN0033
   20   CONTINUE                                                         MAIN0034
        READ(5,1008) NMLB,(NMBN(J),J=1,NMLB)                             MAIN0035
 1008 FORMAT(8I10)                                                       MAIN0036
```

```
      DO 3  I=1,NMLB                                                    MAIN  37
       NNN=NMBN(I)                                                      MAIN  38
      READ(5,1  7) (ICONTU(I,III),III=1,NNN)                            MAIN0039
      WRITE(6,1052) I,NMBN(I),(ICONTU(I,III),III=1,NNN)                 MAIN  40
 1052 FORMAT(1H ,5X,'LAND SEGMENT ',I2,5X,'# NODES, NMBN = ',I2/1H ,5X,  MAIN0041
     1'EXTERNAL NODE NUMBERS: ',25(I3,'-')/1H ,20X,25(I3,'-')/          MAIN0042
     2 1H ,20X,25(I3,'-')/1H ,20X,25(I3,'-'))                           MAIN  43
 10  7  FORMAT(20I4)                                                    MAIN0044
  3   CONTINUE                                                          MAIN  45
      CALL STRTPL(ICON,NINT,XORD,YORD,U,NMBN,ICONTU,XO,YO,XC,YC)        MAIN  46
      STOP                                                              MAIN0047
      END                                                               MAIN  48


      SUBROUTINE STRTPL(ICON,NINT,XORD,YORD,U,NMBN,ICONTU,XO,YO,XC,YC)  STRT0001
      COMMON/CPARM/NMEL,NMNP,NMLB,SCALEF,MAXLB,CSCALE                   STRT  2
      COMMON/CPLOT/NPLOTS,IGRID                                         STRT  3
      COMMON/CREAD/IEND                                                 STRT0004
      DIMENSION ICON(NMEL,3),NINT(NMNP),XORD(NMNP),YORD(NMNP),U(IEND),  STRT  5
     1 NMBN(NMLB),ICONTU(NMLB,MAXLB),XO(MAXLB),YO(MAXLB),XC(NMEL),      STRT0006
     3 YC(NMEL)                                                         STRT0007
      CALL CNTCOR(ICON,XORD,YORD,XC,YC)                                 STRT  8
      CALL PLOTS(IDM,IDM,23)                                            STRT0009
      CALL PLOT ( 5.0,1.5 ,-3)                                          STRT  10
      IF(IGRID.EQ.0) GO TO 50                                           STRT  11
      CALL ELMPLT(ICON,NINT,XORD,YORD,XO,YO)                            STRT0012
 50   CONTINUE                                                          STRT  13
      DO 1  0 I=1,NPLOTS                                                STRT0014
      CALL PLOT( 8.5,0.  ,-3)                                           STRT  15
      CALL PLTCON(NMBN,XORD,YORD,ICONTU,XC,YO)                          STRT  16
      CALL VELPLT(ICON,NINT,XORD,YORD,U,XC,YC)                          STRT0017
 100  CONTINUE                                                          STRT  18
       CALL ENDPLT(10.0,0.0,999)                                        STRT0019
      RETURN                                                            STRT  20
      END                                                               STRT  21
```

```
      SUBROUTINE ELMPLT(ICON,NINT,XORD,YORD,XO,YO)                      ELMP0001
      COMMON/CPARM/NMEL,NMNP,NMLB,SCALEF,MAXLB,CSCALE                   ELMP0002
      DIMENSION ICON(NMEL,3),NINT(NMNP),XORD(NMNP),YORD(NMNP),          ELMP0003
     1 XO(MAXLB),YO(MAXLB)                                              ELMP0004
      DO 10 I=1,NMEL                                                    ELMP0005
      DO 20 J=1,3                                                       ELMP0006
      XO(J)= XORD(ICON(I,J))*SCALEF                                     ELMP0007
      YO(J)=YORD(ICON(I,J))*SCALEF                                      ELMP0008
   20 CONTINUE                                                          ELMP0009
      XO(4)=XO(1)                                                       ELMP0010
      YO(4)=YO(1)                                                       ELMP0011
      CALL GRAPH(XO(1),YO(1),-1,0.,I)                                   ELMP0012
      CALL GRAPH(XO,YO,4,0.,I)                                          ELMP0013
   10 CONTINUE                                                          ELMP0014
      WRITE(6,1002)                                                     ELMP0015
 1002 FORMAT(1HO,5X,'ELEMENT PLOT COMPLETED.')                          ELMP0016
      RETURN                                                            ELMP0017
      END                                                               ELMP0018
```



```
      SUBROUTINE PLTCON(NMBN,XORD,YORD,ICONTU,XO,YO)                    PLTC0001
      COMMON/CPARM/NMEL,NMNP,NMLB,SCALEF,MAXLB,CSCALE                   PLTC0002
      DIMENSION NMBN(NMLB),XORD(NMNP),YORD(NMNP),ICONTU(NMLB,MAXLB),    PLTC0003
     1 XO(MAXLB),YO(MAXLB)                                              PLTC0004
      DO 20 J=1,NMLB                                                    PLTC0005
      NNN=NMBN(J)                                                       PLTC0006
      DO 10 I=1,NNN                                                     PLTC0007
      XO(I)= XORD(ICONTU(J,I))*SCALEF                                   PLTC0008
      YO(I)=YORD(ICONTU(J,I))*SCALEF                                    PLTC0009
   10 CONTINUE                                                          PLTC0010
      N1=NMBN(J)                                                        PLTC0011
C                                                                       PLTC0012
      CALL GRAPH(XO,YO,N1,0.,N1)                                        PLTC0013
   20 CONTINUE                                                          PLTC0014
      WRITE(6,1002)                                                     PLTC0015
 1002 FORMAT(1HO,10X,'CONTOUR PLOT COMPLETED')                          PLTC0016
      RETURN                                                            PLTC0017
      END                                                               PLTC0018
```

```
      SUBROUTINE CNTCOR(ICON,XORD,YORD,XC,YC)                           CNTC0001
      COMMON/CPARM/NMEL,NMNP,NMLB,SCALEF,MAXLB,CSCALE                   CNTC0002
      DIMENSION ICON(NMEL,3),XORD(NMNP),YORD(NMNP),XC(NMEL),YC(NMEL)    CNTC0003
      DO 10 I=1,NMEL                                                    CNTC0004
      K1=ICON(I,1)                                                      CNTC0005
      K2=ICON(I,2)                                                      CNTC0006
      K3=ICON(I,3)                                                      CNTC0007
      XC(I)=(XORD(K1)+XORD(K2)+XORD(K3))/3.*SCALEF                      CNTC0008
      YC(I)=(YORD(K1)+YORD(K2)+YORD(K3))/3.*SCALEF                      CNTC0009
   10 CONTINUE                                                          CNTC0010
      RETURN                                                            CNTC0011
      END                                                               CNTC0012
```



```
      SUBROUTINE READU(U)                                               READ0001
      COMMON/CPARM/NMEL,NMNP,NMLB,SCALEF,MAXLB,CSCALE                   READ0002
      COMMON/CREAD/IEND                                                 READ0003
      DIMENSION U(IEND)                                                 READ0004
      READ(5,200) ITIME                                                 READ0005
  200 FORMAT(I10)                                                       READ0006
      READ(5,100) (U(I),I=1,IEND)                                       READ0007
  100 FORMAT(8F10.3)                                                    READ0008
      RETURN                                                            READ0009
      END                                                               READ0010
```

```
      SUBROUTINE VELPLT(ICON,NINT,XORD,YORD,U,XC,YC)                    VELP   1
      COMMON/CPARM/NMEL,NMNP,NMLP,SCALEF,MAXLB,CSCALE                   VELP   2
      COMMON/CREAD/IEND                                                 VELP0003
      DIMENSION ICON(NMEL,3),NINT(NMNP),XORD(NMNP),YORD(NMNP),          VELP   4
     1 U(IEND),XC(NMEL),YC(NMEL)                                        VELP0005
      CALL READU(U)                                                     VELP0006
      WRITE(6,1101) (U(IJ),IJ=1,IEND)                                   VELP   7
 1101 FORMAT(10F10.4)                                                   VELP0008
      DO 10 I=1,NMEL                                                    VELP   9
      K1=ICON(I,1)                                                      VELP   10
      K2=ICON(I,2)                                                      VELP0011
      K3=ICON(I,3)                                                      VELP   12
      K1=NINT(K1)*2                                                     VELP0013
      K2=NINT(K2)*2                                                     VELP0014
      K3=NINT(K3)*2                                                     VELP   15
      XX=XC(I)                                                          VELP0016
      YY=YC(I)                                                          VELP   17
      CALL PLOT (XX,YY,3)                                               VELP0018
      UVEL=(U(K1-1)+U(K2-1)+U(K3-1))/3.                                 VELP0019
      VVEL=(U(K1)+U(K2)+U(K3))/3.                                       VELP   20
      IF(ABS(UVEL) .LT. 1.E-20) GO TO 20                                VELP0021
      ANG=ATAN(VVEL/UVEL)                                               VELP   22
      IF(UVEL .LT. 0.) ANG=ANG+3.14159                                  VELP   23
      ANG=ANG/3.14159*180.-90.                                          VELP0024
      GO TO 30                                                          VELP   25
   20 IF(VVEL .LT. 0.) ANG=-90.                                         VELP0026
      IF(VVEL .GT. 0.) ANG=90.                                          VELP   27
   30 X=XC(I)+UVEL/1.016*CSCALE                                         VELP   28
      Y=YC(I)+VVEL/1.016*CSCALE                                         VELP0029
      S=SQRT(UVEL**2+VVEL**2)                                           VELP   30
      SIZE=S/2.                                                         VELP0031
      IF(SIZE .LT.  .07) SIZE=0.07                                      VELP0032
      IF(SIZE.GT.0.25) SIZE=0.25                                        VELP   33
      CALL SYMBOL(X,Y,SIZE, 6,ANG,-2)                                   VELP0034
   10 CONTINUE                                                          VELP   35
      WRITE(6,1002)                                                     VELP   36
 1002 FORMAT(1H0,5X,'VELOCITY PLOT COMPLETED')                          VELP0037
      RETURN                                                            VELP   38
      END                                                               VELP0039
```

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