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9. ABSTRACT
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Urban and industrial growth in developing countries has increased the demand for water and the related need for more information on water and sewage treatment. This project, conducted by the University of Oklahoma, focuses on that need by developing a global network of adaptive and innovative technologies based on economic, social, political and cultural factors. A series of detailed reports have been produced that are designed to assist planners in their selection of suitable water and wastewater treatment processes appropriate to the material and manpower resource capabilities of particular countries at particular times.

"Prediction Methodology for Suitable Water and Wastewater Processes," George W. Reid and Richard Discenza.
PN-AAB-491 English
PN-AAD-291 Spanish

"Prediction Methodology for Suitable Water and Wastewater Processes. Supplement I: Manual Computation Methods," George W. Reid and Richard Discenza.
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"Prediction Methodology for Suitable Water and Wastewater Processes. Supplement II: Computer Program," George W. Reid and Richard Discenza.
PN-AAD-293

"Data Requirement," University of Oklahoma Bureau of Water and Environmental Resources Research.
PN-AAD-295

"A Mathematical Model for Predicting Water Demand, Wastewater Disposal and Cost of Water and Wastewater Treatment Systems in Developing Countries," George W. Reid and Michael I. Muiga.
PN-AAD-294

"Treatment Methods for Water Supplies in Rural Areas of Developing Countries," Ir. L. Huisman.
PN-AAD-284
PN-AAD-285

"Sewage Treatment in Developing Countries," L.W. Canter and J.F. Malina.
PN-AAD-286

"Contributions to a Mail Survey on Practical Solutions in Drinking Water Supply and Wastes Disposal for Developing Countries," International Reference Centre for Community Water Supplies, The Hague.
PN-AAD-287

"A Catalog of Water Supply and Waste Disposal Methods for Individual Units," George W. Reid.
PN-AAD-283

"Historic Implication for Developing Countries of Developed Countries' Water and Wastewater Technology," George W. Reid and Kay Coffey.
PN-AAD-288

"Evaluation of Lower Cost Methods of Water Treatment in Latin America," Odyer A. Speirandio and Jose Perez C.
PN-AAD-289

"Socio-Economic Conditions which Pertain to Cost of Construction and Operation of Water and Sewage Treatment Facilities and Quality of Water Consumption in Kenya," Erasto Muga.
PN-AAD-290

"A Water Sterilization Study in the Philippines," Reynaldo M. Lesaca.
PN-AAD-282

"The Study of Microbial Treatment of Nightsoil," Taiwan Institute of Environmental Sanitation.
PN-AAD-281

"Study of an Existing Water Treatment Plant on Simple Design and Operating System for Supplying Drinking Water to Rural Communities in the Lower Mekong Basin Countries," Thailand Ministry of Public Health, Department of Health, Rural Water Supply Division.
PN-AAD-280

PREDICTION METHODOLOGY FOR SUITABLE WATER & WASTEWATER PROCESSES

SUPPLEMENT II

COMPUTER PROGRAM

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INTRODUCTION

This supplement includes a computer program for the "Prediction Methodology for Suitable Water and Wastewater Processes" which is a model for the selection of the most appropriate water and wastewater treatment method for developing countries. The detailed description of the model components is presented in the model publication.

This supplement consists of five parts:

(1) Listing of data to set up a temporary file in scratch tape for the program

(2) Main program listing

(3) Listing of subroutine model

(4) Listing of input data for a sample region

(5) Listing of sample output

Figure 1 shows the job deck set up of the computer program.

In addition to this computer program supplement there is also a Supplement I, Manual Computation Method, which presents a step by step method for implementing the model without using the computer.

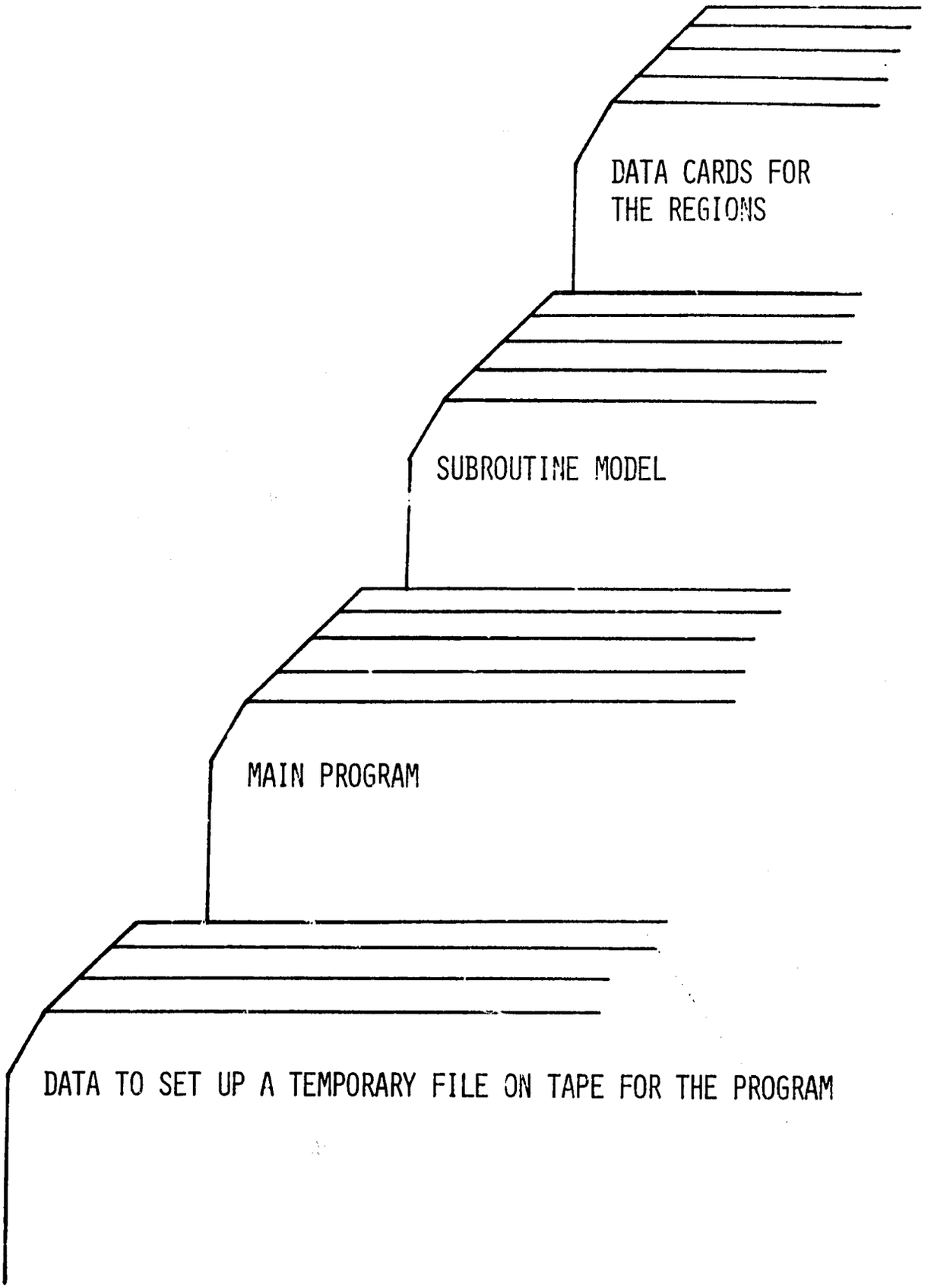

FIGURE 1: JOB DECK SETUP

LISTING OF DATA TO SET UP A TEMPORARY FILE IN SCRATCH TAPE FOR THE PROGRAM

FILE: FILE ETOIEC01 A

C11PW1	NC TREATMENT	665	645	550	600	50	90	102	200	1		
2PW1	NO TREATMENT	216	161	148	150	31	56	64	125	2		
3PW1	NC TREATMENT	109	80	66	75	12	25	31	50	4		
4PW1	NO TREATMENT	72	53	51	50	06	13	16	25	8		
C11PW2	PRE TREATMENT	887	1076	1251	1499	327	295	219	400	1	1	
2PW2	PRE TREATMENT	729	885	1056	1200	163	135	110	200	1	1	
3PW2	PRE TREATMENT	486	696	759	800	82	73	62	100	3	2	1
4PW2	PRE TREATMENT	122	149	203	200	41	37	31	50	5	4	1
C11PW3	SLOW SAND FILTER	1265	1650	1600	2000	133	200	233	500	1		
2PW3	SLOW SAND FILTER	903	1172	1185	1428	60	90	105	225	2		
3PW3	SLOW SAND FILTER	633	718	768	1001	33	58	73	125	5		
4PW3	SLOW SAND FILTER	395	698	521	625	20	35	55	75	8		
O11PW4	RAPID SAND FILTER-CONV.	951	924	1456	1120	180	220	217	400	1	1	
2PW4	RAPID SAND FILTER-CONV.	747	726	1151	890	90	110	108	200	1	1	1
3PW4	RAPID SAND FILTER-CONV.	424	558	525	500	79	105	112	175	8	2	1
4PW4	RAPID SAND FILTER-CONV.	225	296	283	265	67	90	89	150	10	3	1
C11PW5	RAPID SAND FILTER-ADV	3236	1280	2127	2352	950	1977	1577	1419	1777	1	1	1
2PW5	RAPID SAND FILTER-ADV	7275	6300	6161	4710	1337	1067	960	1202	1	1	1
3PW5	RAPID SAND FILTER-ADV	3244	2659	2204	2100	990	786	711	890	6	2	2
4PW5	RAPID SAND FILTER-ADV	1560	1284	1077	1010	495	393	355	445	10	5	2
O11PW6	SOFTENING	2559	5221	6221	5411	6570	1493	1191	1072	1342	1	1	1
2PW6	SOFTENING	1726	9149	5314	6231	1180	883	705	637	794	1	1	1
3PW6	SOFTENING	1279	0482	8091	8280	654	519	470	588	6	2	2
4PW6	SOFTENING	6395	5241	4416	4140	327	260	235	294	10	5	2
C11PW7	DISINFECTION	526	530	543	400	529	637	501	500	1		
2PW7	DISINFECTION	305	106	105	80	427	293	230	230	1	1	
3PW7	DISINFECTION	197	204	149	150	325	216	169	175	2	1	1
4PW7	DISINFECTION	158	163	121	120	279	185	145	150	4	1	1
O11PW8	TASTE-ODOR-FE, MN	2006	5173	7416	8871	2990	2341	1261	1680	2104	1	1	1
2PW8	TASTE-ODOR-FE, MN	1354	7117	3011	4716	1770	1581	1261	1135	1421	1	1	1
3PW8	TASTE-ODOR-FE, MN	4589	4089	3390	3230	1170	929	840	1052	6	2	2
4PW8	TASTE-ODOR-FE, MN	9438	7735	6517	6110	589	464	420	526	10	5	2
C11PW9	DESALTING-SALT	3268	5283	0127	5821	1160	823	657	591	740	1	1	1
2PW9	DESALTING-SALT	2335	5202	2319	7771	5120	768	612	551	690	1	1	1
3PW9	DESALTING-SALT	1674	4127	2311	3781	0840	512	406	367	460	6	2	2
4PW9	DESALTING-SALT	8326	6824	5749	5350	256	203	184	230	10	5	2
O11PW10	DESALTING-BRACKISH	2369	5205	1719	9421	5340	1566	1250	1125	1408	1	1	1
2PW10	DESALTING-BRACKISH	1600	3138	5613	5511	0360	1174	936	843	1055	1	1	1
3PW10	DESALTING-BRACKISH	11648	9710	8051	7670	782	621	561	703	6	2	2
4PW10	DESALTING-BRACKISH	5932	4861	4056	3840	397	315	285	357	10	5	2
C11PS1	PRIMARY-CONVENTIONAL	7034	8030	8800	8800	165	99	117	256	1		
2PS1	PRIMARY-CONVENTIONAL	1518	2150	2441	2400	125	75	89	194	1		
3PS1	PRIMARY-CONVENTIONAL	1559	1605	1691	1950	110	78	77	171	2	1	
4PS1	PRIMARY-CONVENTIONAL	1239	1435	1317	1550	93	69	67	151	4	2	
C11PS2	PRIMARY-STAB. POND	2846	4355	5527	6700	16	45	60	170	1		
2PS2	PRIMARY-STAB. POND	255	390	505	600	13	35	47	134	2		
3PS2	PRIMARY-STAB. POND	170	273	317	400	12	44	44	126	4		
4PS2	PRIMARY-STAB. POND	164	182	300	270	10	35	47	134	2		
C11PS3	SLUDGE-CONVENTIONAL	1624	9136	1399	4010	3720	804	669	683	1245	1	1	
2PS3	SLUDGE-CONVENTIONAL	9580	8026	6154	6115	474	395	403	734	1	1	
3PS3	SLUDGE-CONVENTIONAL	7094	6250	4976	4520	351	321	284	543	2	1	
4PS3	SLUDGE-CONVENTIONAL	5637	4966	3238	3598	278	255	215	431	4	2	1
C11PS4	SLUDGE-ADVANCED	2017	4169	6112	3401	2877	1643	1830	1348	2545	1	1	
2PS4	SLUDGE-ADVANCED	10387	8702	6672	6630	514	428	437	796	1	1	
3PS4	SLUDGE-ADVANCED	7442	6557	3830	4750	368	337	298	570	2	1	

FILE: FILE FTC1FCC1 A

4PS4 SLUDGE-ADVANCED	5787	5099	3325	3694	286	262	221	443	4	2 1
C11PS5 SLUDGE-COMBINED IMHOFF	197161384715158136				1000	882	900	1641	1	1
2PS5 SLUDGE-COMBINED IMHOFF	11223	7882	8815	7785	603	502	512	934	1	1
3PS5 SLUDGE-COMBINED IMHOFF	7058	5172	4196	4896	375	347	307	387	2	1
4PS5 SLUDGE-COMBINED IMHOFF	4982	3651	3110	3456	267	245	206	414	4	1
C11PS6 SECONDARY-STD FILTER	112891215514157137C0				140	181	206	392	1	
2PS6 SECONDARY-STD FILTER	3237	3594	4322	4050	81	105	119	227	1	1
3PS6 SECONDARY-STD FILTER	2719	3083	3122	3300	64	94	91	179	4	1 1
5PS6 SECONDARY-STD FILTER	2184	2476	2385	2650	51	75	70	142	6	2 1
C11PS7 SECDRY-HI-RATE FILTER	33679491212384627500				3548	4031	4033	4215	1	
2PS7 SECDRY-HI-RATE FILTER	20526177541510817979				470	530	534	1035	2	1
3PS7 SECDRY-HI-RATE FILTER	14009135561231212971				141	173	152	310	4	1 1
4PS7 SECDRY-HI-RATE FILTER	4938	4534	4460	4325	42	52	63	93	6	1 1
C11PS8 SECDRY-ACTIVATED SLUDGE	19705162471E648134CC				288	312	334	520	1	1
2PS8 SECDRY-ACTIVATED SLUDGE	5882	4874	5467	4000	194	211	226	352	2	1
3PS8 SECDRY-ACTIVATED SLUDGE	4706	3894	3174	3200	164	194	181	298	4	1 1
4PS8 SECDRY-ACTIVATED SLUDGE	3823	3164	2933	2600	139	164	145	252	8	2 2
C11PS9 SECDRY-EXT A AERATION	154001588125537165CC				3321	5282	3886	7314	1	1
2PS9 SECDRY-EXT A AERATION	1C27810599106341101?				338	531	396	745	2	1
3PS9 SECDRY-EXT A AERATION	8867	9326	8145	9500	126	208	155	278	4	1 1
4PS9 SECDRY-EXT A AERATION	2333	2454	2125	2500	24	39	28	52	6	2 2
C11PS1CDISINFECTION	2201	4872	5413	2432	212	420	423	750	1	
2PS1CDISINFECTION	4293	3641	3560	1742	242	271	273	150	2	
3PS1CDISINFECTION	2055	2786	2725	1561	121	246	217	75	4	1 1
4PS1CDISINFECTION	1410	2018	1907	1071	58	179	149	36	6	1 1

MAIN PROGRAM LISTING

```
FILE SOURCE
                      C     PROGRAM AIDMAIN
                      C     WRITTEN BY RICHARD DISCENZA   MAY, 1974 REVISED FEBRUARY,1976
                      C     THIS PROGRAM SIMULATES THE DECISION MAKING PROCESS FOR THE
                      C       SELECTION OF WATER AND SEWAGE TREATMENT METHODS FOR
                      C       COMMUNITIES IN LESS DEVELOPED COUNTRIES
                      C     THIS VERSION IS FOR THE IBM 370/CS FORTRAN IV  LEVEL G
      0001                  DIMENSION WORK(3)
      0002                  COMMON IYEAR,PP1,BASYR,LFT,JA
      0003                  INTEGER BACKYR,BASYR,PROJYR,CNME
      0004                  JA =  0
      0005            10    READ(5,200,END=999)KE,BACKYR,POP,PGR,BASYR,PROJYR,CNME
      0006           200    FORMAT(I2,I4,F6.0,F4.1,2I4,10A4)
      0007                  PGR = PGR * .01
      0008                  M = BASYR - BACKYR
      0009                  IF (M) 16,16,12
      0010            12    DO 14 JS= 1,M
      0011                  POP = POP * PGR  + POP
      0012            14    CONTINUE
      0013            16    PP1 = POP
      0014                  IYEAR = BASYR
      0015                  LFT =  0
      0016                  CALL MODEL
      0017                  IP = PROJYR - 5
      0018                  DO  40 I=BASYR,IP,5
      0019                  DO 18 J=1,5
      0020                  POP = POP * PGR + POP
      0021           18     CONTINUE
      0022                  IYEAR =IYEAR
      0023                  PP1 = POP
      0024                  LFT = 1
      0025                  JA = JA + 5
      0026            40    CALL MODEL
      0027                  GO TO 10
      0028           999    STOP
      0029                  END
```

LISTING OF SUBROUTINE MODEL

```
FILE SOURCE
0001            SUBROUTINE MODEL
0002            COMMON IYEAR,PP1,BASYR,LFT,JA
0003            INTEGER PC,PS,STL,CCLI,TURB,RWV,TM1(13),TM2(13),TM3(13),
               *WTM1(10),WTM2(10),WTM3(10)
0004            DOUBLE PRECISION X,R1,R2,R3,R4,R5,R6,R7,R8,R9,R10,R11,
               *R12,R13,
               *CT(13),C3,C1,C2,CS(13)
0005            DIMENSION LL(60),LB(10),JP(11),CN(5),ST(5),COM(4),AG(5),
               *CW(4),PS(5),CC(4),CC(4),WC(10),WC(10)
0006            DIMENSION W(13), S(13),JW(13),PNME(6)
0007            DATA PW11/4HPW11/,BK/1H /
0008            DATA LL/55*0/
0009            LOGICAL LA(10)
0010            LA(3) = .TRUE.
0011            LA(4) = .TRUE.
0012            LA(5) = .TRUE.
0013            LA(6) = .TRUE.
0014            LA(7) = .TRUE.
0015            JB = 0
0016            POP = 0.
0017            IF(LFT.EQ.1)GO TO 91
0018            READ(5,201)R7,CN,ST,COM,AG
0019        201 FORMAT(12,5A4,5A4,4A4,5A4)
0020            READ(5,202)R8,   (LL(J),J=1,5),L2,(LL(J),J=7,47), L3,L4,LL(50)
               *LL(51),LL(52),L5,L6,L7,CCLI,TURB,RWV
0021        202 FORMAT(12,5I1,I2,4I1,2I3,3I1,3I2,3I4)
C           LOC. LEVEL OF TECHNOLOGY INDEX DETERMINATION
0022            IF(LL(1).EQ.0)GO TO 13
0023            IF(LL(1)-3)10,11,12
0024         10 JA=JA+5
0025            GO TO 13
0026         11 JA = JA + 10
0027            GO TO 13
0028         12 JA=JA+15
0029         13 IF(LL(2).EQ.0)GO TO 17
0030            IF(LL(2)-3)14,15,16
0031         14 JA=JA+5
0032            GO TO 17
0033         15 JA=JA+10
0034            GO TO 17
0035         16 JA=JA+15
0036         17 IF(LL(3).EQ.0)GO TO 21
0037            IF(LL(3)-3)18,19,20
0038         18 JA = JA + 5
0039            GO TO 21
0040         19 JA = JA + 10
0041            GO TO 21
0042         20 JA = JA + 15
C           QUESTION = 6
0043         21 IF(LL(4).EQ.5)GO TO 27
0044            IF(LL(4)-2)22,23,24
```

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FILE SOURCE
0045                  22 JA = JA + 4
0046                     GO TO 27
0047                  23 JA = JA + 3
0048                     GO TO 27
0049                  24 IF(LL(4)-4)26,25,27
004A                  25 JA = JA + 1
004B                     GO TO 27
004C                  26 JA = JA + 2
                    C  QUESTION = 7
004D                  27 IF (LL(5).EQ.1)GO TO 28
004E                     JA = JA + 5
004F                  28 IF(L2.EQ.0)GO TO 33
0050                     IF(L2.LE.6.AND.L2.GE.1) GO TO 30
0051                     IF(L2.LE.10.AND.L2.GE.7)GO TO 31
0052                     IF(L2.LE.12.AND.L2.GE.11)GO TO 32
0053                     JA = JA + 10
0054                     GO TO 33
0055                  30 JA = JA + 2
0056                     GO TO 33
0057                  31 JA = JA + 4
0058                     GO TO 33
0059                  32 JA = JA + 7
                    C  QUESTION = 9
005A                  33 IF(LL(7).EQ.4.OR.LL(7).EQ.8)GO TO 37
005B                     IF(LL(7)-2)34,35,36
005C                  34 JA = JA + 3
005D                     GO TO 37
005E                  35 JA = JA + 2
005F                     GO TO 37
0060                  36 JA = JA + 1
                    C  QUESTION = 10
0061                  37 IF(LL(8).EQ.2)GO TO 38
0062                     JA = JA + 5
0063                  38 IF(LL(9).EQ.2)GO TO 39
0064                     JA = JA + 10
                    C  QUESTION = 12
0065                  39 IF(LL(10).EQ.2)GO TO 40
0066                     JA = JA + 5
0067                  40 IF(LL(11).EQ.2)GO TO 41
0068                     JA = JA + 10
0069                  41 IF(LL(12).EQ.2)GO TO 42
006A                     JA = JA + 3
                    C  QUESTION = 16
                    C  QUESTION = 16
006B                  42 IF(LL(14).EQ.1)GO TO 43
006C                     JA = JA + 5
                    C  QUESTION = 17
006D                  43 IF(LL(15).EQ.1)GO TO 44
006E                     JA = JA + 3
006F                  44 IF (LL(16).EQ.1)GO TO 45
0070                     JA = JA + 3
```

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FILE SCURCE

                C  QUESTION = 19
CC89              45 IF(ILL(17).EC.1)GC TC 49
CC90                 IF(LLL(17)-3)46,47,48
CC91              46 JA = JA + 5
CC92                 GC TC 49
CC93              47 JA = JA + 1C
CC94                 GO TC 49
CC95              48 JA = JA + 15
CC96              49 IF(LL(18).EC.1)GC TC 5C
CC97                 JA = JA + 1C
                C  QUESTION = 21
CC9E              50 IF(LL(19).EC.2)GC TC 51
CC9S                 JA = JA + 5
C10C                 IF(LL(47).EC.4)GC TC 1CO
              C  COMPUTE THE LEVEL CF TECHNOLCGY FCR THE COMMUNITY
0101              51 WRITE(6,251)CN,ST,CCM,AG,BASYR
0102            251 FORMAT(1H1 ,25X,'THE LCC WATER AND SEWAGE TREATMENT PLANNING MODEL
                   2   '////,25X,'FCR THE COMMUNITY ',20X,5A4,//,25X,'IN THE STATE OR
                   *PROVINCE CF',10X,5A4,//,25X,'IN THE COUNTRY CF',20X,4A4,//,25X,'FO
                   *R THE PLANNING GROUP',2CX,5A4,9X,'PASE YEAR = ',I4)
0103                 IF(JA.GT.93)GO TC 52
01C4                 IF(JA.GT.51)GC TC 53
C105                 IF(JA.GT.23)GO TC 54
0106                 STL = 1
0107                 GC TC 103
0108              52 STL = 2
0109                 GC TC 56
C11C              53 STL = 3
0111                 GO TO 56
0112              54 STL = 2
0113              56 JB = 0
                C        COMPUTES CPERATION EQUIP AVAILABILITY
0114                 DO 65 J = 2C,27
0115                 IF(LL(J).EC.C)GC TC 65
0116                 JB = JB + 1
0117              65 CONTINUE
0118                 IF(JB.GE.4)LA(3) = .FALSE.
                C           COMPUTES  PRCCESS MATERIALS AVAILABILITY
C119                 JB = C
0120                 DO 66 J = 2E,34
0121                 IF(LL(J).EC.C)GO TO 66
C122                 JB = JB + 1
0123              66 CONTINUE
C124                 IF(JB.GE.3)LA(4) = .FALSE.
                C           COMPUTES CPERATION AND MAINTENANCE SUPPLIES AVAILABILITY
0125                 JB = 0
0126                 DC 67 J = 2E,34
0127                 IF(LL(J).EC.C)GC TO 67
0128                 JP = JB + 1
0129              67 CONTINUE
0130                 IF(JP.GE.3)LA(5) = .FALSE.
```

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FILE SOURCE
                C     COMPUTES SUPPLIES AVAILABILITY
      0131            JB = C
      0132            DO 68 J = 25,46
      0133            IF(LL(J).EQ.C)GO TO 68
      0134            JB = JB + 1
      0135        68 CONTINUE
      0136            IF(JB.GE.4)LA(6) = .FALSE.
                C  CHECK FOR GROUNDWATER AVAILABILITY
      0137            IF(LL(50).EQ.2)LA(7) = .FALSE.
                C COMPUTE THE TOTAL COST OF THE VARIOUS PROCESSES
                C   LEVEL 2 AND LEVEL 3 UNDER 50000 POPULATION
      0138        69 GO TO ( 94,70,93,93 ),STL
      0139        70 IF(LA(3).AND.LA(4).AND.LA(5).AND.LA(6).AND.LA(7)) GO TO 92
      0140            IF(LA(3).AND.LA(4).AND.LA(5).AND.LA(6)) GO TO 57
      0141            IF(LA(4).AND.LA(7)) GO TO 193
      0142            IF(LA(5)) GO TO 292
      0143            GO TO 99
      0144        95 JP(6) = 9
      0145            JP(7) = 9
      0146            JP(8) = 9
      0147            JP(9) = 9
      0148            JP(12) = 9
      0149            JP(13) = 9
      0150            GO TO 57
      0151        92 JP(1) = 9
      0152        57 JP(2) = 9
      0153       292 JP(3) = 9
      0154            JP(4) = 9
      0155            JP(5) = 9
      0156            GO TO  99
      0157       193 JP(1) = 9
      0158            GO TO 99
                C   LEVEL 3 OVER 50000
                C   POPULATION CHECK
      0159        93 IF (PP1.LT.50000) GO TO 70
      0160            IF (LA(3).AND.LA(4).AND.LA(5).AND.LA(6).AND.LA(7))  GO TO 94
      0161            IF (LA(3).AND.LA(4).AND.LA(5).AND.LA(6)) GO TO 95
      0162            IF(LA(4).AND.LA(7))  GO TO 193
      0163            IF(LA(5))  GO TO 292
      0164        94 JP(6) = 9
      0165            JP(7) = 9
      0166            JP(8) = 9
      0167            JP(9) = 9
      0168            JP(12) = 9
      0169            JP(13) = 9
      0170            GO TO 92
                C  THE COST CALCULATION PROCEDURE BY PROCESS COMBINATION
      0171        99 CONTINUE
                C  TEST TO DETERMINE IF ANY BASIC PROCESSES HAVE BEEN SELECTED.
      0172            JZ = C
      0173            DO 101 J = 1,13
```

```
FILE SOURCE
      C174            IF (JP(J).NE.9)GO TO 97
      C175              JZ = JZ + 1
      0176              W(J) = 0
      C177              CS(J) = 0
      0178            CT(J) = 0
      C179              GO TO 101
      0180         97 W(J) = 13.0**2C
      0181              CS(J) = 13.0**2C
      0182        101 CONTINUE
      0183              IF(JZ.EC.0)GO TO 103
                  C PUT OUT COLUMN HEADINGS FOR INDIVIDUAL PROCESSES
                  C
      0184        100 WRITE(6,400)IYEAR
      0185        40C FORMAT('-','****** SUITABLE WATER TREATMENT PROCESSES FOR ',
                     *'IMPLEMENTATION IN...',I4,'******')
      0186              WRITE(6,441)
      0187        441 FORMAT(' ',6X,'FEASIBLE',11X,
                     *          'INITIAL',9X,'YEARLY',9X'TOTAL',8X,'REQUIRED',
                     *24X,'PLANT')
      0188              WRITE(6,442)
      0189        442 FORMAT(6X,'PROCESS',8X,'CONSTRUCTION',6X,'MAINTENANCE',7X,
                     *'COST',9X,'MANPOWER',6X,'POPULATION',10X,'SCALE')
      019C              WRITE(6,443)
      C191        443 FORMAT(6X,'COMBINATIONS',4X,
                     *                    'COST(U.S.$)',5X,'COST(U.S.$)',6X,
                     *'20 YEARS',2X,'(SKIL(SKIL(PROF)',4X,'SERVED',9X,'U.S.GALLONS')
                  C SCALE CONVERSION FACTORS
      C192              GO TO(105,106,107,108),STL
      C193        105 GAL = .25 * PP1
      C194              GO TO 109
      C195        106 GAL = .50 * PP1
      C196              GO TO 109
      C197        107 GAL = .75 * PP1
      C198              GO TO 109
                  C NOTE THAT THE SCALE FACTOR IS THE SAME AS THE POP BECAUSE 100 GALLONS
      0199        108 GAL = PP1
                  C POPULATION GROUP DETERMINATION STORED IN LC
      02CC        109 POP = PP1
      0201              IF(PCP.GE.125.AND.POP.LT.2500)GO TO 110
      0202              IF(PCP.GE.2500.AND.PCP.LT.15000)GO TO 111
      02C3              IF(POP.GE.15000.AND.PCP.LT.50000)GO TO 112
      0204              IF(POP.GE.50000.AND.PCP.LT.125001)GO TO 113
      C205              WRITE (6,207)
      0206        207 FORMAT(1H-,2CX, '  THE POPULATION PARAMETERS GIVEN DO NOT FIT THE
                     * MODEL')
      0207              GO TO 998
      0208        103 WRITE(6,208)
      0209        208 FORMAT(1H-,'NO WATER TREATMENT PROCESSES HAVE BEEN SELECTED')
      021C              GO TO 140
      C211        104 WRITE(6,307)
      0212        307 FORMAT(1H-,10X,'NO WASTE TREATMENT PROCESSES HAVE BEEN SELECTED')
```

```
FILE SOURCE
  0213              GO TO 998
                  C     LD  = POPULATION GROUP
 -0214            ------110 LD = 1
  0215                GO TO 114
  0216              111 LD = 2
  0217                GO TO 114
  0218              112 LD = 3
  0219                GO TO 114
  0220            ------113 LD = 4
                  C     COST CALCULATION PROCEDURE BY PROCESS COMBINATION
                  C     M1   CALCULATIONS   LEVEL 2
                  C       PUTS COST IN TERMS OF THOUSANDS OF DOLLARS
  0221              114 POP = PP1 / 1000.
  0222                IF(JP(1) .NE.9 )  GO TO 277
  0223            ------- KZ = 1
  0224                IF( CCLI.GE.2.AND.TURB.GT.10) GO TO 215
  0225                IZ = LD
  0226                DO 76 JF =  1,IZ
  0227              ------READ(1,203)KC,KS,PAUM,PNME,
                     *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),CC(3),CC(4),M1,M2,M3
  0228            ------203 FORMAT(I2,I1,A4,6A4,8F5.2,1X,3I2)
  0229              76 CONTINUE
  0230            ------- C1 =  POP *  CC(STL)
  0231                C2 = (POP * CC(STL))
  0232                CT(1) = CT(1) + C1
  0233                CS(1) = CS(1) + C2
  0234            ---------TM1(1) = M1
  0235                TM2(1) = M2
  0236              ------TM3(1) = M3
  0237                REWIND 1
  0238              ------W(KZ)  = (CS(KZ) * 20) + CT(KZ)
  0239                WRITE(6,261)KZ,CT(KZ),CS(KZ), W(KZ),  TM1(KZ), TM2(KZ), TM3(KZ)
 -0240-           ------261 FORMAT(1H ,10X,'W',I2,F15.0,1X,F13.0,3X,F15.0,3X,3(3X,I2))
                  C
                  C     W2  CALCULATIONS   LEVEL 2
  0241              277 IF(JP(2).NE.9)  GO TO 270
  0242                KZ = 2
  0243                IF(CCLI.GT.100.AND.TURB.GT.10) GO TO 215
 -0244-           ---------IZ = LD
  0245                DO  116  K = 1,IZ
  0246              ------READ(1,203)KC,KS,PAUM,PNME,
                     *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),CC(3),CC(4),M1,M2,M3
  0247              ------116 CONTINUE
  0248                C1 =  POP *  CC(STL)
  0249              ------C2 = (POP * CC(STL))
  0250                CT(2) = CT(2) + C1
  0251                CS(2) = CS(2) + C2
  0252                TM1(2) = M1
  0253                TM2(2) = M2
  0254                TM3(2) = M3
 -0255-             ------IZ = LD + 20  + (LC -4)
```

FILE SOURCE

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0256              DO 77 JF = 1,IZ
0257              READ(1,203)KC,KS,PNUM,PNME,
                 *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),CC(3),OC(4),M1,M2,M3
0258           77 CONTINUE
0259              C1 =  POP *  CC(STL)
0260              C2 = (POP * CC(STL))
0261              CS(2) = CS(2) + C2
0262              CT(2) = CT(2) + C1
0263              TM1(2) = M1 + TM1(2)
0264              TM2(2) = M2 + TM2(2)
0265              TM3(2) = M3  + TM3(2)
                C  NOTE THAT PROCESS W2 CONSISTS OF PW1 + PW7
0266              REWIND 1
0267              W(K7)  = (CS(KZ) * 20) + CT(KZ)
0268              WRITE(6,261)KZ,CT(KZ),CS(KZ), W(KZ),  TM1(KZ), TM2(KZ), TM3(KZ)
                C      W3  CALCULATIONS
0269           270 IF(JF(3) .NE.9)  GO TO 271
0270              KZ = 3
0271              IF(CCLI.GT.100.AND.TURB.GT.100)  GO TO 215
0272              IZ  =  8 +  LD
0273              DO 71 JF = 1,IZ
0274              READ(1,203)KC,KS,PNUM,PNME,
                 *CC(1),CC(2),CC(3),CC(4),CC(1),OC(2),OC(3),OC(4),M1,M2,M3
0275           71 CONTINUE
                C  CONSTRUCTION COST CALCULATION
0276              C1 =  POP *  CC(STL)
                C  OPERATION COST CALCULATION
0277              C2 = (POP * CC(STL))
0278              CT(3) = C1
0279              CS(3) = C2
0280              TM1(3) = M1
0281              TM2(3) = M2
0282              TM3(3) = M3
0283              REWIND 1
0284              W(K7)  = (CS(KZ) * 20) + CT(KZ)
0285              WRITE(6,261)KZ,CT(KZ),CS(KZ), W(KZ),  TM1(KZ), TM2(KZ), TM3(KZ)
                C  W4  CALCULATIONS---FIRST PROCESS--2
0286           271 IF (JF(4).NE.9) GO TO 275
0287              KZ = 4
0288              IF (CCLI.GT.300.AND.TURB.GT.800)  GO TO 215
0289              IZ =  4 +  LD
0290              DO 72 JF = 1,IZ
0291              READ(1,203)KC,KS,PNUM,PNME,
                 *CC(1),CC(2),CC(3),CC(4),CC(1),OC(2),OC(3),OC(4),M1,M2,M3
0292           72 CONTINUE
                C     CONSTRUCTION COST CALCULATION
0293              C1 =  POP *  CC(STL)
                C     OPERATION COST CALCULATION
0294              C2 = (POP * CC(STL))
0295              CT(4) = CT(3) + C1
0296              CS(4) = CS(3) + C2
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FILE SCURCE

    0297              TM1(4) = M1
    0298              TM2(4) = M2
    0299              TM3(4) = M3
                   C    W4  CALCULATIONS SECOND PROCESS--3
    0300              IZ  =  4
    0301              DO 73  JF = 1,IZ
    0302              READ(1,203)KC,KS,PNUM,PNME,
                     *CC(1),CC(2),CC(3),CC(4),OC(1),OC(2),OC(3),OC(4),M1,M2,M3
    0303           73 CONTINUE
    0304              C1 =  POP *  CC(STL)
    0305              C2 = (POP * CC(STL))
    0306              CT(4) = CT(4) + C1
    0307              CS(4) = CS(4) + C2
    0308              TM1(4) = TM1(4) + M1
    0309              TM2(4) = TM2(4) + M2
    0310              TM3(4) = TM3(4) + M3
    0311              REWIND 1
    0312              W(KZ)  = (CS(KZ) * 20) + CT(KZ)
    0313              WRITE(6,261)KZ,CT(KZ),CS(KZ), W(KZ),  TM1(KZ), TM2(KZ), TM3(KZ)
                   C
                   C       W5  CALCULATIONS
    0314           275 IF (JP(5).NE.9)  GO TO 279
    0315              KZ = 5
    0316              IF (CCLI.GT.200.AND.TURB.GT.800)  GO TO 215
    0317              IZ = 16 + LC
    0318              DO 75 JF = 1,IZ
    0319              READ(1,203)KC,KS,PNUM,PNME,
                     *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),OC(3),OC(4),M1,M2,M3
    0320           75 CONTINUE
    0321              C1 =  POP *  CC(STL)
    0322              C2 = (POP * CC(STL))
    0323              CT(5) = CT(5) + C1
    0324              CS(5) = CS(5) + C2
    0325              TM1(5) = M1
    0326              TM2(5) = M2
    0327              TM3(5) = M3
    0328              REWIND 1
    0329              W(KZ)  = (CS(KZ) * 20) + CT(KZ)
    0330              WRITE(6,261)KZ,CT(KZ),CS(KZ), W(KZ),  TM1(KZ), TM2(KZ), TM3(KZ)
    0331              KZ = 6
    0332              IF (CCLI.GT.2000.AND.TURB.GT.100)  GO TO 215
    0333           279 IF (JP(6).NE.9)  GO TO 281
                   C    PROCESS W6 CALCULATION FIRST PROCESS    (PW 4)
                   C
    0334              IZ = 12 + LC
    0335              DO 79 JF = 1,IZ
    0336              READ(1,203)KC,KS,PNUM,PNME,
                     *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),CC(3),OC(4),M1,M2,M3
    0337           79 CONTINUE
    0338              C1 =  POP *  CC(STL)
    0339              C2 = (POP * CC(STL))
```

FILE SOURCE

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C340                CT(6) = CT(6) + C1
0341                CS(6) = CS(6) + C2
0342                TM1(6) = M1
0343                TM2(6) = M2
0344                TM3(6) = M3
                C
                C       PROCESS W6 CALCULATION SECOND PROCESS (PW 7)
                C
0345                IZ = (4 - LC) + 8 + LC
0346                DO 80 JF = 1,IZ
0347                READ(1,203)KC,KS,PNUM,PNME,
                   *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),CC(3),OC(4),M1,M2,M3
0348             80 CONTINUE
0349                C1 =  POP *  CC(STL)
C350                C2 = (POP * CC(STL))
0351                CT(6) = CT(6) + C1
0352                CS(6) = CS(6) + C2
0353                TM1(6) = M1 + TM1(6)
0354                TM2(6) = M2  + TM2(6)
0355                TM3(6) = M3  + TM3(6)
0356                W(KZ)  = (CS(K7) * 20) + CT(KZ)
0357                WRITE(6,261)KZ,CT(KZ),CS(KZ), W(KZ),  TM1(KZ), TM2(KZ), TM3(KZ)
0358                REWIND 1
                C
                C       PROCESS W7  CALCULATION PROCEDURE---FIRST PROCESS
0359             281 IF (JP(7).NE.9)  GO TO 284
0360                KZ = 7
C361                IF (CCLI.GT.3000.AND.TURB.GT.1000)  GO TO 215
                C
0362                IZ = 4 + LD
0363                DO 81 JF = 1,IZ
C364                READ(1,203)KC,KS,PNUM,PNME,
                   *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),OC(3),OC(4),M1,M2,M3
0365             81 CONTINUE
0366                C1 =  POP *  CC(STL)
0367                C2 = (POP * CC(STL))
0368                CT(7) = CT(7) + C1
C369                CS(7) = CS(7) + C2
C370                TM1(7) = M1
0371                TM2(7) = M2
0372                TM3(7) = M3
0373                IZ = (LC - 4) + 4 + LC
0374                DO 82 JF = 1,IZ
C375                READ(1,203)KC,KS,PNUM,PNME,
                   *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),OC(3),OC(4),M1,M2,M3
0376             82 CONTINUE
C377                C1 =  POP *  CC(STL)
0378                C2 = (POP * CC(STL))
C379                CT(7) = CT(7) + C1
0380                CS(7) = CS(7) + C2
0381                TM1(7) = M1   + TM1(7)
```

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FILE SCURCE
   0382              TM2(7) = M2    + TM2(7)
   0383              TM3(7) = M3    + TM3(7)
                    THE THIRD PROCESS
   0384              IZ = (4 - LC) + 8 + LC
   0385              DO 83 JF = 1,IZ
   0386              READ(1,203)KC,KS,PNUM,PNME,
                    *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),CC(3),CC(4),M1,M2,M3
   0387             83 CONTINUE
   0388              C1 =  POP * CC(STL)
   0389              C2 = (POP * CC(STL))
   0390              CT(7) = CT(7) + C1
   0391              CS(7) = CS(7) + C2
   0392              TM1(7) = M1    + TM1(7)
   0393              TM2(7) = M2    + TM2(7)
   0394              TM3(7) = M3 + TM3(7)
   0395              W(KZ)  = (CS(KZ) * 2C
   0396              WRITE(6,261)KZ,CT(KZ),CS(KZ), W(KZ),  TM1(KZ), TM2(KZ), TM3(KZ)
   0397              REWIND 1
                     PROCESS W8 CALCULATION PROCEDURE---FIRST PW5
   0398             284 IF (JP(8).NE.9)  GO TO 286
   0399              KZ = 8
   0400              IF (CCLI.GT.2000.AND.TURB.GT.100)  GO TO 215
   0401              IZ = 16 + LD
   0402              DO 84 JF = 1,IZ
   0403              READ(1,203)KC,KS,PNUM,PNME,
                    *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),CC(3),CC(4),M1,M2,M3
   0404             84 CONTINUE
   0405              C1 =  POP *  CC(STL)
   0406              C2 = (POP * CC(STL))
   0407              CT(8) = CT(8) + C1
   0408              CS(8) = CS(8) + C2
   0409              TM1(8) = M1
   0410              TM2(8) = M2
   0411              TM3(8) = M3
                     THE SECOND PROCESS (PW 7)
   0412              IZ = (4 - LC) + 4 + LC
   0413              DO 85 JF = 2,IZ
   0414              READ(1,203)KC,KS,PNUM,PNME,
                    *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),CC(3),CC(4),M1,M2,M3
   0415             85 CONTINUE
   0416              C1 =  POP *  CC(STL)
   0417              C2 = (POP * CC(STL))
   0418              CT(8) = CT(8) + C1
   0419              CS(8) = CS(8) + C2
   0420              TM1(8) = M1 + TM1(8)
   0421              TM2(8) = M2 + TM2(8)
   0422              TM3(8) = M3  + TM3(8)
   0423              REWIND 1
   0424              W(KZ)  = (CS(KZ) * 2C) + CT(KZ)
```

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FILE SCURCE
 0425          WRITE(6,261)KZ,CT(KZ),CS(KZ), W(KZ),  TM1(KZ), TM2(KZ), TM3(KZ)
               C
               C     PROCESS W9  CALCULATION PROCEDURE  (FIRST--PW2)
               C
 0426      286 IF (JP(9).NE.9)  GO TO 289
 0427          KZ = 9
 0428          IF (COLI.GT.3000.AND.TURB.GT.1000)  GO TO 215
 0429          IZ = 4 + LC
 0430          DO 86 JF = 1,IZ
 0431          READ(1,203)KC,KS,PNUM,PNME,
              *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),CC(3),CC(4),M1,M2,M3
 0432       86 CONTINUE
 0433          C1 =  POP *  CC(STL)
 0434          C2 = (POP * CC(STL))
 0435          CT(9) = CT(9) + C1
 0436          CS(9) = CS(9) + C2
 0437          TM1(9) = M1
 0438          TM2(9) = M2
 0439          TM3(9) = M3
              THE SECOND PROCESS  (PW 5)
 0440          IZ = (4 - LC) + 8 + LC
 0441          DO  87 JF = 1,IZ
 0442          READ(1,203)KC,KS,PNUM,PNME,
              *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),CC(3),CC(4),M1,M2,M3
 0443       87 CONTINUE
 0444          C1 =  POP *  CC(STL)
 0445          C2 = (POP * CC(STL))
 0446          CT(9) = CT(9) + C1
 0447          CS(9) = CS(9) + C2
 0448          TM1(9) = M1  + TM1(9)
 0449          TM2(9) = M2  + TM2(9)
 0450          TM3(9) = M3  + TM3(9)
               THE THIRD PROCESS  (PW 7)
 0451          IZ = (4 - LC) + 4 + LC
 0452          DO 88 JF = 1,IZ
 0453          READ(1,203)KC,KS,PNUM,PNME,
              *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),CC(3),CC(4),M1,M2,M3
 0454       88 CONTINUE
 0455          C1 =  POP *  CC(STL)
 0456          C2 = (POP * CC(STL))
 0457          CT(9) = CT(9) + C1
 0458          CS(9) = CS(9) + C2
 0459          TM1(9) = M1 + TM1(9)
 0460          TM2(9) = M2 + TM2(9)
 0461          TM3(9) = M3  + TM3(9)
 0462          W(KZ)  = (CS(KZ) * 20) + CT(KZ)
 0463          WRITE(6,261)KZ,CT(KZ),CS(KZ), W(KZ),  TM1(KZ), TM2(KZ), TM3(KZ)
 0464          REWIND 1

               PROCESS W12  CALCULATION (FIRST--PW7)
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FILE SOURCE

0465          289 IF (JP(12).NE.9)  GO TO 290
C466                KZ = 12
0467                IF (TCS.GT.3000)  GO TO 215
0468                IZ = 24 + LC
0469                DO 89 JF = 1,IZ
C470                READ(1,203)KC,KS,PNUM,PNME,
                   *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),CC(3),CC(4),M1,M2,M3
0471             89 CONTINUE
C472                C1 =  POP *  CC(STL)
0473                C2 = (PCP * CC(STL))
0474                CT(12) = CT(12) + C1
0475                CS(12) = CS(12) + C2
0476                TM1(12) = M1
C477                TM2(12) = M2
0478                TM3(12) = M3
                    THE SECOND PROCESS  (PW9)
0479                IZ = (4 - LC) + 4 + LC
0480                DO 90 JF = 1,IZ
C481                READ(1,203)KC,KS,PNUM,PNME,
                   *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),CC(3),CC(4),M1,M2,M3
C482             90 CONTINUE
C483                C1 =  POP *  CC(STL)
0484                C2 = (PCP * CC(STL))
0485                CT(12) = CT(12) + C1
0486                CS(12) = CS(12) + C2
0487                TM1(12) = M1    + TM1(12)
C488                TM2(12) = M2    + TM2(12)
0489                TM3(12) = M3  + TM3(12)
C490                REWIND 1
C491                W(KZ)  = (CS(KZ) * 20) + CT(KZ)
0492                WRITE(6,261)KZ,CT(KZ),CS(KZ), W(KZ),  TM1(KZ), TM2(KZ), TM3(KZ)
                  PROCESS  W13  CALCULATION  (FIRST PW7)

C493          290 IF (JP(13).NE.9)  GO TO 291
C494                KZ = 13
C495                IF (TCS.GT.2000)  GO TO 215
C496                IZ = 24 + LC
C497                DO 91 JF = 1,IZ
C498                READ(1,203)KC,KS,PNUM,PNME,
                   *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),CC(3),CC(4),M1,M2,M3
C499             91 CONTINUE
C500                C1 =  PCP *  CC(STL)
C501                C2 = (PCP * CC(STL))
0502                CT(13) = CT(13) + C1
C503                CS(13) = CS(13)  + C2
C504                TM1(13)   M1
0505                TM2(13) = M2
C506                TM3(13) = M3
                    THE SECOND PROCESS OF W13 COMBINATION  (PW10)
0507                IZ = (4 - LC) + 8 + LC
050E                DO 98 JF = 1,IZ
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FILE SOURCE

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0509            READ(1,203)KC,KS,PNUM,FNME,
                *CC(1),CC(2),CC(3),CC(4),CC(1),CC(2),OC(3),OC(4),M1,M2,M3
0510          58 CONTINUE
0511            C1 =  PCP *  CC(STL)
0512            C2 = (PCP * CC(STL))
0513            CT(13) = CT(13) + C1
0514            CS(13) = CS(13)  + C2
0515            TM1(13) = M1    + TM1(13)
0516            TM2(13) = M2    + TM2(13)
0517            TM3(13) = M3    + TM3(13)
0518            W(KZ)  = (CS(KZ) * 20) + CT(KZ)
0519            WRITE(6,261)KZ,CT(KZ),CS(KZ), W(KZ),  TM1(KZ), TM2(KZ), TM3(KZ)
0520            REWIND 1
              C CHECK FOR LOW MAINTENANCE REQUIREMENT
0521          291 IF(LL(13).EQ.2)GO TO 213
              C  CALCULATION OF THE LOWEST TOTAL COST METHOD
0522            WRITE(6,204)
0523          204 FORMAT(1H-,10X,'THE LOWEST TOTAL COST WATER TREATMENT',
                *' PROCESS IS THE FOLLOWING')
              C  DETERMINATION OF THE LOWEST TOTAL COST PROCESS
0524            R1 =  W(1)
0525            R2 =  W(2)
0526            R3 =  W(3)
0527            R4 =  W(4)
0528            R5 =  W(5)
0529            R6 =  W(6)
0530            R7 =  W(7)
0531            R8 =  W(8)
0532            R9 =  W(9)
0533            R10 =  W(10)
0534            R11 =  W(11)
0535            R12 =  W(12)
0536            R13 =  W(13)
0537            K = DMIN1(R1, R2, R3, R4, R5,R6,R7,R8,R9,R10,R11,R12,R13)
0538            IF(R1.EQ.X) GO TO 125
0539            IF(R2.EQ.X) GO TO 126
0540            IF(R3.EQ.X) GO TO 127
0541            IF(R4.EQ.X) GO TO 128
0542            IF(R5.EQ.X) GO TO 129
0543            IF(R6.EQ.X) GO TO 131
0544            IF(R7.EQ.X) GO TO 132
0545            IF(R8.EQ.X) GO TO 133
0546            IF(R9.EQ.X) GO TO 134
0547            IF(R10.EQ.X) GO TO 135
0548            IF(R11.EQ.X) GO TO 136
0549            IF(R12.EQ. X) GO TO 137
0550            IF (R13.EQ. X) GO TO 138
0551          125 KZ = 1
0552            GO TO 198
0553          126 KZ = 2
0554            GO TO 198
```

FILE SCURCE

```
0555          127 KZ = 3
0556              GC TC 198
0557          128 KZ = 4
0558              GO TC 198
0559          129 KZ = 5
0560              GO TC 198
0561          131 KZ = 6
0562              GC TC 198
0563          132 KZ = 7
0564              GO TO 198
0565          133 KZ = 8
0566              GO TO 198
0567          134 KZ = 9
0568              GO TC 198
0569          135 KZ = 10
0570              GO TC 198
0571          136 KZ = 11
0572              GO TC 198
0573          137 KZ = 12
0574              GO TC 198
0575          138 KZ = 13
0576          198 WRITE(6,211)KZ,CT(KZ),CS(KZ), W(KZ),TM1(KZ),TM2(KZ),TM3(KZ),PP1,
                 *GAL
0577          211 FORMAT(1H ,10X,'W',I2,5X          ,'$',F12.0,'  $',F10.0,'  $',
                 * F15.0,3X,I2,3X,I2,3X,I2,5X,F9.0,5X,F16.0)
0578              GC TC 140
0579          215 W(KZ) = 10.0**20
0580              CS(KZ) = 10.0**20
0581              GO TC (277,270,271.275,279,281,281,286,289,291,291,290,291),KZ
0582          213 WRITE(6,205)
0583          205 FORMAT(1HC,20X,'THE LCWEST MAINTENANCE COST PROCESS IS THE FOLLOWI
                 *NG')
              C  LCW MAINTENANCE REQUIREMENT CALCULATIONS
0584              R1 = CS(1)
0585              R2 = CS(2)
0586              R3 = CS(3)
0587              R4 = CS (4)
0588              R5 = CS (5)
0589              R6 = CS (6)
0590              R7 = CS (7)
0591              R8 = CS (8)
0592              R9 = CS (9)
0593              R10 = CS (10)
0594              R11 = CS (11)
0595              R12 = CS (12)
0596              R13 = CS (13)
0597              X = DMIN1(R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11,R12,R13)
0598              IF(R1.EQ.X) GC TC 125
0599              IF(R2.EQ.X) GC TC 126
0600              IF(R3.EQ.X) GC TC 127
0601              IF(R4.EQ.X) GO TC 128
```

FILE SCURCE

```
0602          IF(R5.EC.X) GC TC 129
0603          IF(R6.EC.X) GC TC 131
0604          IF(R7.EQ.X) GO TC 132
0605          IF(R8.EC.X) GO TC 133
0606          IF(R9.EQ.X) GC TC 134
0607          IF(R10.EQ.X) GC TO 135
0608          IF(R11.EQ.X) GC TC 136
0609          IF(R12.EQ. X) GC TC 137
0610          IF (R13.EC.X ) GC TO 138
          C  NOW THE MODEL CONSIDERS  WASTE WATER TREATMENT
          C    A CHECK FOR A CENTRAL WASTE WATER COLLECTION SYSTEM
0611        140 IF(LL(52).EC.2)GC TC 340
          C THE DETERMINATION OF THE SUITABLE PROCESSES
0612          GC TC (304,300,293,293),STL
0613        148 WRITE(6,225)
0614        225 FORMAT(1HC,1CX,'WASTE WATER TREATMENT NOT RECOMMENDED BECAUSE OF
               *THE TECHNOLOGY LEVEL')
0615          GO TC 998
          C   LEVEL 2 AND LEVEL 3 UNDER 50000 POPULATION
0616        300 IF (LA(3).AND.LA(4).AND.LA(5).AND.LA(6))  GO TO 301
0617          IF (LA(4).AND.LA(5).AND.LA(6))  GC TC 302
0618          IF (LA(3).AND.LA(5))  GC TO 303
0619          GC TC 299
0620        301 JW(1) = 9
0621          JW(2) = 9
0622          JW(3) = 9
0623          JW(4) = 9
0624          JW(5) = 9
0625          JW(6) = 9
0626          GC TC 299
0627        302 JW(2) = 9
0628          JW(3) = 9
0629          GO TC 299
0630        303 JW(1) = 9
0631          JW(3) = 9
0632          JW(4) = 9
0633          JW(5) = 9
0634          GC TC 299
0635        293 IF (PPI.LT.50000)  GC TO 300
0636          IF (LA(3).AND.LA(4).AND.LA(5).AND.LA(6))  GO TO 304
0637          IF (LA(4).AND.LA(5).AND.LA(6))  GO TO 302
0638          IF (LA(3).AND.LA(5))  GO TO 303
0639          GC TC 299
0640        304 JW(7) = 9
0641          JW(8) = 9
0642          GC TC 301
0643        299 WRITE (6,15,
0644        157 FORMAT (1H-,' ****** SUITABLE WASTE WATER TREATMENT PROCESSES',
               * ' FOR IMPLEMENTATION IN . . . ',I4,' ******')
          C     CLEARS THE STORAGE AREAS
0645          DO 298 K = 1,10
```

FILE SCURCE

```
0646                WC(K) = 0
0647                CT(K) = 0
0648                WC(K) = 0
0649              298 CONTINUE
065C                KZ = 1
                C   WASTE WATER CCMBINATICNS   CCMBINATION S1
                C
0651                IZ = LC  + 4C
0652                DC 349 JF = 1,IZ
0653                READ(1,203)KC,KS,PNUM,FNME,CC,CC,M1,M2,M3
0654              349 CCNTINUE
0655                C1 =  PCP *  CC(STL)
0656                C2 = (PCP * CC(STL))
0657                WC(1) = WC(1) + C1
065E                WC(1) = WC(1) + C2
0659                WTM1(1) = M1
066C                WTM2(1) = M2
0661                WTM3(1) = M3
                C    THE SECCND PRCCESS CF CCMBINATION S1   (PS1)
0662                IZ = (4 - LC) + 12 + LC
0663                DO 35C JF = 1,IZ
0664                READ(1,203)KC,KS,PNUM,FNME,CC,CC,M1,M2,M3
0665              35C CONTINUE
0666                C1 =  PCP *  CC(STL)
0667                C2 = (PCP * CC(STL))
0668                WC(1) = WC(1) + C1
0669                WC(1) = WC(1) + C2
067C                WTM1(1) = M1     + WTM1(1)
0671                WTM2(1) = M2  + WTM2(1)
0672                WTM3(1) = M3   + WTM3(1)
0673                CT(KZ) = (WC(KZ) * 2C) + WC(KZ)
0674                REWIND 1
0675                IF (RWV.GT.2C)  GO TC 552
0676                IF (JW(1).NE.9)  GC TO 552
0677                WRITE(6,351)KZ,WC(KZ),WC(KZ),CT(KZ), WTM1(KZ),WTM2(KZ),WTM3(KZ)
0678              351 FORMAT(1H ,1CX,'P',I2,5X          ,'$',F12.0,'  $',F10.0,'  $',
                   * F15.0,3X,I2,3X,I2,3X,I2)
0679              552 KZ = 2
                C
                C   WASTE CCMBINATICN CALCULATICN S2
                C
068C                IZ = LC  + 40
0681                DO 352 JF = 1,IZ
0682                READ(1,203)KC,KS,PNUM,FNME,CC,CC,M1,M2,M3
0683              352 CCNTINUE
0684                C1 =  PCP *  CC(STL)
0685                C2 = (PCP * CC(STL))
0686                WC(2) = WC(2) + C1
0687                WC(2) = WC(2) + C2
0688                WTM1(2) = M1
0689                WTM2(2) = M2
```

FILE SOURCE

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C69C                WTM3(2) = M3
                C     THE SECOND PROCESS OF COMBINATION:  S2  (PS3)
0691                IZ = (4 - LC) + 4    + LC
C692                DO 353 JF = 1,IZ
0693                READ(1,203)KC,KS,PNUM,PNME,CC,OC,M1,M2,M3
C694              353 CONTINUE
C695                C1 =  POP *  CC(STL)
C696                C2 = (POP * CC(STL))
C697                WC(2) = WC(2) + C1
0698                WC(2) = WC(2) + C2
C699                WTM1(2) = M1  + WTM1(2)
07CC                WTM2(2) = M2    + WTM2(2)
C701                WTM3(2) = M3  + WTM3(2)
C7C2                REWIND 1
0703                CT(KZ) = (WC(KZ) * 20) + WC(KZ)
C7C4                IF (RWV.GT.2C)  GO TO 554
07C5                IF (JW(2).NE.9)  GO TO 554
0706                WRITE(6,351)KZ,WC(KZ),WC(KZ),CT(KZ), WTM1(KZ),WTM2(KZ),WTM3(KZ)
                C
                C     WASTE COMBINATION S3  ONE PROCESS ONLY  (PS2)
                C
C7C7              554 KZ = 3
07C8                IZ = 44 + LC
C7C9                DO 354 JF = 1,IZ
C71C                READ(1,203)KC,KS,PNUM,PNME,CC,OC,M1,M2,M3
0711              354 CONTINUE
C712                C1 =  POP *  CC(STL)
0713                C2 = (POP * CC(STL))
0714                WC(3) = WC(3) + C1
C715                WC(3) = WC(3) + C2
0716                WTM1(3) = M1
0717                WTM2(3) = M2
C718                WTM3(3) = M3
0719                CT(KZ) = (WC(KZ) * 20) + WC(KZ)
C72C                REWIND 1
C721                IF (RWV.GT.1C)  GO TO 555
0722                IF (JW(3).NE.9)  GO TO 555
0723                WRITE(6,351)KZ,WC(KZ),WC(KZ),CT(KZ), WTM1(KZ),WTM2(KZ),WTM3(KZ)
                C
                C     WASTE COMBINATION S4  FIRST PROCESS
                C
0724              555 KZ = 4
C725                IZ = 60 + LC
C726                DO 355 JF = 1,IZ
0727                READ(1,203)KC,KS,PNUM,PNME,CC,OC,M1,M2,M3
C728              355 CONTINUE
C729                C1 =  POP *  CC(STL)
0730                C2 = (POP * CC(STL))
C731                WC(4) = WC(4) + C1 + WC(1)
0732                WO(4) = WO(4) + C2 + WC(1)
0733                WTM1(4) = M1 + WTM1(1)
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FILE SCURCE
0734                WTM2(4) = M2 + WTM2(1)
0735                WTM3(4) = M3 + WTM3(1)
                C   NOTE THAT COMBINATION S1 IS ADDED TO THE ABOVE DATA THIS GIVES
                C   A COMBINATION OF PS1, PS5 AND PS6
0736                CT(KZ) = (WC(KZ) * 2C) + WC(KZ)
0737                REWIND 1
0738                IF (RWV.GT.6) GO TO 558
0739                IF (JW(4).NE.9) GO TO 556
0740                WRITE(6,351)KZ,WC(KZ),WO(KZ),CT(KZ), WTM1(KZ),WTM2(KZ),WTM3(KZ)
                C
                C  WASTE COMBINATION PROCESSES S5
                C
0741              556 KZ = 5
0742                IZ = LD   + 40
0743                DO 356 JF = 1,IZ
0744                READ(1,203)KC,KS,PNUM,PNME,CC,DC,M1,M2,M3
0745              356 CONTINUE
0746                C1 =  POP *  CC(STL)
0747                C2 = (POP * CC(STL))
0748                WC(5) = WC(5) + C1
0749                WC(5) = WC(5) + C2
0750                WTM1(5) = M1
0751                WTM2(5) = M2
0752                WTM3(5) = M3
                C   THE SECOND PROCESS OF COMBINATION S5  (PROCESS S9)
0753                IZ =  4 - LC + 28 + LC
0754                DO 357 JF = 1,IZ
0755                READ(1,203)KC,KS,PNUM,PNME,CC,DC,M1,M2,M3
0756              357 CONTINUE
0757                C1 =  POP *  CC(STL)
0758                C2 = (POP * CC(STL))
0759                WC(5) = WC(5) + C1
0760                WO(5) = WO(5) + C2
0761                WTM1(5) = M1   + WTM1(5)
0762                WTM2(5) = M2  + WTM2(5)
0763                WTM3(5) = M3  + WTM3(5)
0764                CT(KZ) = (WC(KZ) * 20) + WC(KZ)
0765                REWIND 1
0766                WRITE(6,351)KZ,WC(KZ),WO(KZ),CT(KZ), WTM1(KZ),WTM2(KZ),WTM3(KZ)
0767                IF (RWV .GT.3 ) GO TO 558
0768                IF (JW(5).NE.9) GO TO 558
                C
                C   WASTE COMBINATION S6  FIRST PROCESS  (PW6)
                C
0769              558 KZ = 6
0770                IZ = 60 + LD
0771                DO 358 JF = 1,IZ
0772                READ(1,203)KC,KS,PNUM,PNME,CC,DC,M1,M2,M3
0773              358 CONTINUE
0774                C1 =  POP *  CC(STL)
0775                C2 = (POP * CC(STL))
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LE SCURCE

0776                WC(6) = WC(4) + C1 + WC(2)
0777                WC(6) = WC(4) + C2 + WC(2)
0778                WTM1(6) = M1 + WTM1(2)
0779                WTM2(6) = M2 + WTM2(2)
0780                WTM3(6) = M3 + WTM3(2)
                C     NOTE THAT A COMBINATION OF S2 IS ADDED TO THE ABOVE DATA    THIS
                C    GIVES A COMBINATION OF PS1, PS3 AND PS6
0781                CT(KZ) = (WC(KZ) * 20) + WC(KZ)
0782                REWIND 1
0783                IF (JW(6).NE .9) GO TO 559
0784                IF (RWV.GT. 6) GO TO 559
0785                WRITE(6,351)KZ,WC(KZ),WC(KZ),CT(KZ), WTM1(KZ),WTM2(KZ),WTM3(KZ)
                C
                C    WASTE COMBINATION S7  FIRST PROCESS  (PS7)
                C
0786              559 KZ = 7
0787                  IZ = 64 + LD
0788                  DO 359 JF = 1,IZ
0789                  READ(1,203)KC,KS,PNUM,PNME,CC,OC,M1,M2,M3
0790              359 CONTINUE
0791                  C1 =  POP *  CC(STL)
0792                  C2 = (POP * CC(STL))
0793                  WC(7) = WC(7) + C1 + WC(2)
0794                  WC(7) = WC(7) + C2 + WC(2)
0795                  WTM1(7) = M1 + WTM1(2)
0796                  WTM2(7) = M2 + WTM2(2)
0797                  WTM3(7) = M3 + WTM3(2)
                C    NOTE THAT S2 US ADDED TO THE ABOVE DATA    THIS GIVES
                C  A COMBINATION OF PS1, PS3 AND PS7
0798                CT(KZ) = (WC(KZ) * 20) + WC(KZ)
0799                REWIND 1
0800                IF (RWV.GT.    5 ) GO TO 560
0801                IF (JW(7).NE.9) GO TO 560
0802                WRITE(6,351)KZ,WC(KZ),WC(KZ),CT(KZ), WTM1(KZ),WTM2(KZ),WTM3(KZ)
                C
                C     WASTE COMBINATION S8   FIRST PROCESS
                C
0803              560 KZ = 8
0804                  IZ = 68 + LD
0805                  DO 360 JF = 1,IZ
0806                  READ(1,203)KC,KS,PNUM,PNME,CC,OC,M1,M2,M3
0807              360 CONTINUE
0808                  C1 =  POP *  CC(STL)
0809                  C2 = (POP * CC(STL))
0810                  WC(8) = WC(8) + C1 + WC(2)
0811                  WC(8) =  WC(8) + C2 + WC(2)
0812                  WTM1(8) = M1 + WTM1(2)
0813                  WTM2(8) = M2 + WTM2(2)
0814                  WTM3(8) = M3 + WTM3(2)
                C    NOTE THAT COMBINATION S2 IS ADDED TO THE ABOVE DATA    THIS GIVES
                C  A COMBINATION OF PS1, PS3  AND PS8
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FILE SCURCE

0815                CT(KZ) = (WC(KZ) * 2C) + WC(KZ)
0816                IF (RWV .GT. 4) GC TC 599
0817                IF (JW(8).NE. 9) GC TC 599
0818                WRITE(6,351)KZ,WC(KZ),WC(KZ),CT(KZ), WTM1(KZ),WTM2(KZ),WTM3(KZ)
0819              599 CONTINUE
                C  PUTS HIGH #'S IN PRCCESSES NCT CCNSIDERED
082C              318 DO 322 K = 1,1C
0821                IF(JW(K).EC.9)GC TC 323
0822                WC(K) = 10.C**20
0823                CT(K) = 10.C**20
0824              323 CCNTINUE
0825                IF (RWV.GT.2C)  GC TC 361
0826              342 IF (RWV.GT.20)  GO TC 362
0827              343 IF (RWV.GT.1C)  GC TC 363
0828              344 IF (RWV.GT.6) GC TC 364
0829              345 IF (RWV .GT.3 ) GO TC 365
083C              346 IF (RWV.GT. 6) GC TC 366
0831              347 IF (RWV.GT.    5 ) GC TO 367
0832              348 IF (RWV .GT. 4) GC TC 368
0833                GO TC 322
0834              361 KZ = 1
0835                GC TC 339
0836              362 KZ = 2
0837                GC TC 339
0838              363 KZ = 3
0839                GO TO 339
0840              364 KZ = 4
0841                GO TO 339
0842              365 KZ = 5
0843                GO TC 339
0844              366 KZ = 6
0845                GO TC 339
0846              367 KZ = 7
0847                GO TC 339
0848              368 KZ = 8
0849                GC TC 339
                C CHECK FOR LOW MAINTENANCE REQUIREMENT
085C              322 IF(LL(13).EC.2)GC TO 330
                C  CALCULATICN OF THE LCWEST TOTAL CCST METHCD
0851                WRITE(6,324)
0852              324 FORMAT(1H-,1CX,'THE LCWEST WASTE WATER TREATMENT PROCESS IS THE
                   /FOLLCWING')
                C  DETERMINATICN CF THE LOWEST TCTAL CCST PROCESS
0853                R1 = CT(1)
0854                R2 = CT(2)
0855                R3 = CT(3)
0856                R4 = CT(4)
0857                R5 = CT(5)
0858                R6 = CT(6)
0859                R7 = CT(7)
086C                R8 = CT(8)
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FILE SOURCE

0861              R9 = CT(9)
0862              R10 = CT(10)
0863              X = DMIN1(R1,R2,R3,R4,R5,R6,R7,R8,R9,R10)
0864              IF(R1.EQ.X) GO TO 325
0865              IF(R2.EQ.X) GO TO 326
0866              IF(R3.EQ.X) GO TO 327
0867              IF(R4.EQ.X) GO TO 328
0868              IF(R6.EQ.X) GO TO 331
0869              IF(R5.EQ.X) GO TO 329
0870              IF(R7.EQ.X) GO TO 332
0871              IF(R8.EQ.X) GO TO 333
0872              IF(R9.EQ.X) GO TO 334
0873              IF(R10.EQ.X) GO TO 335
0874          325 KZ = 1
0875              GO TO 398
0876          326 KZ = 2
0877              GO TO 398
0878          327 KZ = 3
0879              GO TO 398
0880          328 KZ = 4
0881              GO TO 398
0882          329 KZ = 5
0883              GO TO 398
0884          331 KZ = 6
0885              GO TO 398
0886          332 KZ = 7
0887              GO TO 398
0888          333 KZ = 8
0889              GO TO 398
0890          334 KZ = 9
0891              GO TO  398
0892          335 KZ = 10
0893          398 WRITE(6,336)KZ,WC(KZ),WC(KZ),CT(KZ),WTM1(KZ),WTM2(KZ),WTM3(KZ),
                 *PP1,GAL
0894          336 FORMAT(1H ,10X,'F',I2,5X          ,'$',F12.0,'  $',F10.0,'  $',
                 * F15.0,3X,I2,3X,I2,3X,I2,5X,F9.0,5X,F16.0)
0895              GO TO 340
0896          339 WO(KZ) = 10.0**20
0897              CT(KZ) = 10.0**20
0898              GO TO (342,343,344,345,346,347,348,322),KZ
0899          330 WRITE(6,305)
0900          305 FORMAT(1H-,20X,'THE LOWEST MAINTENANCE COST PROCESS IS THE FOLLOWI
                 *NG')
              C  LOW MAINTENANCE REQUIREMENT CALCULATIONS
0901              R1 = WC(1)
0902              R2 = WC(2)
0903              R3 = WO(3)
0904              R4 = WC (4
0905              R5 = WO (5
0906              R6 = WC (6
0907              R7 = WC (7
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FILE SOURCE

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0908              R8 = WC (8)
0909              R9 = WC (9)
0910              R10 = WC (10)
0911              X = DMIN1(R1,R2,R3,R4,R5,R6,R7,R8,R9,R10)
0912              IF(R1.EQ.X) GO TO 325
0913              IF(R2.EQ.X) GO TO 326
0914              IF(R3.EQ.X) GO TO 327
0915              IF(R4.EQ.X) GO TO 328
0916              IF(R5.EQ.X) GO TO 329
0917              IF(R6.EQ.X) GO TO 331
0918              IF(R7.EQ.X) GO TO 332
0919              IF(R8.EQ.X) GO TO 333
0920              IF(R9.EQ.X) GO TO 334
0921                IF(R10.EQ.X) GO TO 335
0922          340 WRITE (6,341)
0923          341 FORMAT(1H ,///,25X,'ALL COST AMOUNTS ARE IN THOUSANDS OF U.S. $')
0924          958 CONTINUE
0925              REWIND 1
0926              RETURN
0927              END
```

LISTING OF INPUT DATA FOR THE REGIONS

```
011974 60181 1.P1974194RIFT VALLEY REGION
98NAKURU                RIFT VALLEY REGION  KENYA              RIFT WATER CENTER
993233213 121221?11321                        78   2 751001210000000000000000000n0
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LISTING OF OUTPUT

THE LDC WATER AND SEWAGE TREATMENT PLANNING MODEL

FOR THE COMMUNITY NAKURU

IN THE STATE OR PROVINCE OF RIFT VALLEY REGION

IN THE COUNTRY OF KENYA

FOR THE PLANNING GROUP RIFT WATER CENTER BASE YEAR = 1974

****** SUITABLE WATER TREATMENT PROCESSES FOR IMPLEMENTATION IN...1974******

FEASIBLE PROCESS COMBINATIONS	INITIAL CONSTRUCTION COST(U.S.$)	YEARLY MAINTENANCE COST(U.S.$)	TOTAL COST 20 YEARS	REQUIRED MANPOWER USKIL	SKIL	PROF	POPULATION SERVED	PLANT SCALE U.S.GALLONS
W 1	32.	8.	188.	8	0	0		
W 2	130.	119.	2513.	12	1	1		
W 3	420.	21.	841.	8	0	0		
W 4	930.	64.	2218.	13	4	1		
W 5	773.	237.	5503.	10	5	2		
W 6	276.	165.	3586.	14	4	2		
W 7	366.	188.	4121.	19	8	3		
W 8	855.	367.	8226.	12	6	3		
W 9	960.	370.	8363.	19	10	4		

THE LOWEST TOTAL COST WATER TREATMENT PROCESS IS THE FOLLOWING

W 1	$	32.	$	8.	$	188.	8	0	0	60181.	30091.

****** SUITABLE WASTE WATER TREATMENT PROCESSES FOR IMPLEMENTATION IN . . . 1974 ******

P 1	$	3061.	$	189.	$	6840.	8	3	0		
P 2	$	3852.	$	195.	$	7752.	8	4	1		
P 3	$	110.	$	21.	$	531.	0	20	0		
P 4	$	4551.	$	234.	$	9233.	14	5	1		
P 5	$	2340.	$	65.	$	3640.	10	4	2		
P 6	$	9893.	$	474.	$	19378.	14	6	2		
P 7	$	6581.	$	226.	$	11106.	14	5	2		
P 8	$	5756.	$	9707.	$	199900.	16	6	3		

THE LOWEST WASTE WATER TREATMENT PROCESS IS THE FOLLOWING

P 3	$	110.	$	21.	$	531.	0	20	0	60181.	30091.

ALL COST AMOUNTS ARE IN THOUSANDS OF U.S. $

THE LDC WATER AND SEWAGE TREATMENT PLANNING MODEL

FOR THE COMMUNITY NAKURU

IN THE STATE OR PROVINCE OF RIFT VALLEY REGION

IN THE COUNTRY OF KENYA

FOR THE PLANNING GROUP RIFT WATER CENTER BASE YEAR = 1974

****** SUITABLE WATER TREATMENT PROCESSES FOR IMPLEMENTATION IN...1979******

FEASIBLE PROCESS COMBINATIONS	INITIAL CONSTRUCTION COST(U.S.$)	YEARLY MAINTENANCE COST(U.S.$)	TOTAL COST 20 YEARS	REQUIRED MANPOWER [USKIL	SKIL	PROF]	POPULATION SERVED	PLANT SCALE U.S.GALLONS
W 1	35.	9.	206.	8	0	0		
W 2	142.	130.	2748.	12	1	1		
W 3	459.	23.	920.	8	0	0		
W 4	1017.	70.	2425.	13	4	1		
W 5	845.	259.	6016.	10	5	2		
W 6	302.	181.	3921.	14	4	2		
W 7	400.	205.	4506.	19	8	3		
W 8	975.	401.	8993.	12	6	3		
W 9	1050.	405.	9143.	19	10	4		

THE LOWEST TOTAL COST WATER TREATMENT PROCESS IS THE FOLLOWING

W 1	$	35.	$	9.	$	206.	8	0	0	65796.	32898.

****** SUITABLE WASTE WATER TREATMENT PROCESSES FOR IMPLEMENTATION IN . . . 1979 ******

P 1	$	3346.	$	207.	$	7478.	8	3	0		
P 2	$	4212.	$	213.	$	8475.	8	4	1		
P 3	$	120.	$	23.	$	580.	0	20	0		
P 4	$	4975.	$	256.	$	10094.	14	5	1		
P 5	$	2559.	$	71.	$	3980.	10	4	2		
P 6	$	10816.	$	518.	$	21186.	14	6	2		
P 7	$	7195.	$	247.	$	12143.	14	5	2		
P 8	$	6293.	$	10613.	$	218550.	16	6	3		

THE LOWEST WASTE WATER TREATMENT PROCESS IS THE FOLLOWING

P 3	$	120.	$	23.	$	580.	0	20	0	65796.	32898.

ALL COST AMOUNTS ARE IN THOUSANDS OF U.S. $

THE LCC WATER AND SEWAGE TREATMENT PLANNING MODEL

CP THE COMMUNITY NAKURU

N THE STATE CR PROVINCE CF RIFT VALLEY REGION

N THE CCUNTRY CF KENYA

CR THE PLANNING CROUP RIFT WATER CENTER BASE YEAR = 1974

****** SUITABLE WATER TREATMENT PROCESSES FCR IMPLEMENTATION IN...1984******

FEASIBLE PRCCESS COMBINATIONS	INITIAL CONSTRUCTION COST(U.S.$)	YEARLY MAINTENANCE CCST(U.S.$)	TOTAL CCST 20 YEARS	REQUIRED MANPOWER USKIL	SKIL	PROF	POPULATION SERVED	PLANT SCALE U.S.GALLONS
W 1	3E.	9.	225.	8	0	0		
W 2	155.	142.	3004.	12	1	1		
W 3	5C2.	25.	1006.	8	0	0		
W 4	1111.	77.	2651.	13	4	1		
W 5	924.	2E3.	6578.	10	5	2		
W 6	330.	198.	4287.	14	4	2		
W 7	437.	224.	4926.	19	8	3		
W 8	1C7C.	43E.	9832.	12	6	3		
W 9	1148.	442.	9996.	19	10	4		

THE LOWEST TOTAL CCST WATER TREATMENT PROCESS IS THE FOLLOWING

W 1	$	38.	$	9.	$	225.	E	0	0	71934.	35967.

****** SUITABLE WASTE WATER TREATMENT PRCCESSES FCR IMPLEMENTATION IN . . . 1984 ******

P 1	$	3659.	$	226.	$	E176.	8	3	0
P 2	$	46C5.	$	233.	$	9266.	8	4	1
P 3	$	131.	$	25.	$	634.	0	20	0
P 4	$	5440.	$	28C.	$	11036.	14	5	1
P 5	$	2798.	$	78.	$	4351.	10	4	2
P 6	$	11825.	$	567.	$	23162.	14	6	2
P 7	$	7866.	$	27C.	$	13275.	14	5	2
P 8	$	6881.	$	11603.	$	238940.	16	6	3

THE LOWEST WASTE WATER TREATMENT PRCCESS IS THE FOLLOWING

P 3	$	131.	$	25.	$	634.	0	20	0	71934.	35967.

ALL COST AMCUNTS ARE IN THCUSANCS CF U.S. $

THE LDC WATER AND SEWAGE TREATMENT PLANNING MODEL

FOR THE COMMUNITY NAKURU

IN THE STATE OR PROVINCE OF RIFT VALLEY REGION

IN THE COUNTRY OF KENYA

FOR THE PLANNING GROUP RIFT WATER CENTER BASE YEAR = 1974

****** SUITABLE WATER TREATMENT PROCESSES FOR IMPLEMENTATION IN...1989******

FEASIBLE PROCESS COMBINATIONS	INITIAL CONSTRUCTION COST(U.S.$)	YEARLY MAINTENANCE COST(U.S.$)	TOTAL COST 20 YEARS	REQUIRED MANPOWER USKIL	SKIL	PROF	POPULATION SERVED	PLANT SCALE U.S.GALLONS
W 1	42.	10.	246.	8	0	0		
W 2	170.	156.	3284.	12	1	1		
W 3	549.	28.	1099.	8	0	0		
W 4	1215.	84.	2898.	13	4	1		
W 5	1010.	305.	7191.	10	5	2		
W 6	361.	216.	4686.	14	4	2		
W 7	478.	245.	5386.	19	8	3		
W 8	1170.	479.	10749.	12	6	3		
W 9	1255.	484.	10929.	19	10	4		

THE LOWEST TOTAL COST WATER TREATMENT PROCESS IS THE FOLLOWING

W 1	$	42.	$	10.	$	246.	8	0	0	78645.	39323.

****** SUITABLE WASTE WATER TREATMENT PROCESSES FOR IMPLEMENTATION IN . . . 1989 ******

P 1	$	4000.	$	247.	$	8939.	8	3	0		
P 2	$	5034.	$	255.	$	10130.	8	4	1		
P 3	$	143.	$	28.	$	694.	0	20	0		
P 4	$	5947.	$	306.	$	12066.	14	5	1		
P 5	$	3059.	$	85.	$	4757.	10	4	2		
P 6	$	12929.	$	620.	$	25323.	14	6	2		
P 7	$	8600.	$	296.	$	14514.	14	5	2		
P 8	$	7522.	$	12685.	$	261232.	16	6	3		

THE LOWEST WASTE WATER TREATMENT PROCESS IS THE FOLLOWING

P 3	$	143.	$	28.	$	694.	0	20	0	78645.	39323.

ALL COST AMOUNTS ARE IN THOUSANDS OF U.S. $

THE LCC WATER AND SEWAGE TREATMENT PLANNING MODEL

FOR THE COMMUNITY NAKURU

IN THE STATE OR PROVINCE OF RIFT VALLEY REGION

IN THE COUNTRY OF KENYA

FOR THE PLANNING GROUP RIFT WATER CENTER BASE YEAR = 1974

****** SUITABLE WATER TREATMENT PROCESSES FOR IMPLEMENTATION IN...1994******

FEASIBLE PROCESS COMBINATIONS	INITIAL CONSTRUCTION COST(U.S.$)	YEARLY MAINTENANCE COST(U.S.$)	TOTAL COST 20 YEARS	REQUIRED MANPOWER USKIL	SKIL	PROF	POPULATION SERVED	PLANT SCALE U.S.GALLONS
W 1	46.	11.	269.	8	0	0		
W 2	186.	170.	3591.	12	1	1		
W 3	600.	30.	1202.	8	0	0		
W 4	1328.	92.	3168.	13	4	1		
W 5	1104.	328.	7862.	10	5	2		
W 6	395.	236.	5124.	14	4	2		
W 7	523.	268.	5888.	19	8	3		
W 8	1219.	524.	11752.	12	6	3		
W 9	1372.	529.	11948.	19	10	4		

THE LOWEST TOTAL COST WATER TREATMENT PROCESS IS THE FOLLOWING

W 1	$	46.	$	11.	$	269.	8	0	0	85983.	42991.

****** SUITABLE WASTE WATER TREATMENT PROCESSES FOR IMPLEMENTATION IN . . . 1994 ******

P 1	$	4373.	$	270.	$	9773.	8	3	0		
P 2	$	5504.	$	279.	$	11075.	8	4	1		
P 3	$	156.	$	30.	$	758.	0	20	0		
P 4	$	6502.	$	334.	$	13191.	14	5	1		
P 5	$	3344.	$	93.	$	5201.	10	4	2		
P 6	$	14135.	$	678.	$	27686.	14	6	2		
P 7	$	9402.	$	323.	$	15868.	14	5	2		
P 8	$	8224.	$	13869.	$	285604.	16	6	3		

THE LOWEST WASTE WATER TREATMENT PROCESS IS THE FOLLOWING

P 3	$	156.	$	30.	$	758.	0	20	0	85983.	42991.

ALL COST AMOUNTS ARE IN THOUSANDS OF U.S. $