HERMES PROJECT

REVISIONS TO THE HERMES III MODEL FINAL REPORT

prepared for the

NATIONAL TELECOMMUNICATIONS BRANCH
DEPARTMENT OF COMMUNICATIONS

by

GELLER & ASSOCIATES INC.

NOVEMBER 30,1975

GELLER & ASSOC

GELLER & ASSOCIATES
6600 Cote des Neiges,
Montreal,Quebec.

Mr. J. Guerin,
Department of Communications,
18th Floor, Journal North,
300 Slater st.,
Ottawa,Ontario.

November 30,1975.

Dear Mr. Guerin:

GELLER & ASSOCIATES is pleased to submit the final report on the current HERMES III project. We are also submitting a punched card deck of the new revised version of the Model.

Please do not hesitate to contact us should you require assistance.

Respectfully

David Geller

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GELLER & ASSOCIATES

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1. INTRODUCTION

HERMES III is a network optimizing model using advanced integer programming techniques. While the model had been established as a powerful simulation tool, changes of initial assumptions were necessary for the model to be more practicable.

The HERMES III model was originally designed to deal with traffic at sufficiently high levels such that a linear transformation of the load to circuit conversion could be assumed.

While this assumption held true at the development stage (hypothetical networks and high levels of demand traffic); application of the model to operational switching networks and actual demand traffic has proven this hypothesis incorrect.

The original HERMES III model treated demand pairs independently. This resulted in demand pairs, not utilizing contemplated groups, to be treated in the same manner as those demand pairs utilizing contemplated groups within their final group chain. In fact, the combination of low level demand and independent demand pairs resulted in overcapacities in some instances by as much as 1000%. During the current phase of the project, the software was redesigned and the critical problem of overcapacities eliminated.

The prototype switching network module CHARGE treated nodes (switching network) of demand pairs as terminating nodes. Switched traffic (lines) was therefore only computed for intermediary switching nodes. The present revised model treats

origin destination nodes as non terminal and computes switched traffic at each node of the switching network. Tradeoffs between transmission and switching costs can therefore be more readily assessed.

In an effort to improve the running efficiency of the model (i.e. reduce running costs) a new general algorithm was developed. The algorithm identifies those transmission links and switching nodes which must be installed apriori. A reduction of integer variables having zero lower bound is achieved and the search for integer solutions is started from a larger value optimal continuous solution.

The software was redimensioned for a switching network capability of 3600 demand pairs. This increased capacity was not tested due to the non availability of data.

The inherent difficulties encountered in the software changes (patchwork and reorganization) were magnified to a large degree by the constraint that input data structure and output files to the remaining job steps remain constant.

During the interim period, the D.O.C. was also assisted in the formulation and solution of various network problems. This report does not attempt to describe the underlying theory and development of the model. In order to fully comprehend the rational of the model, the user is advised to become familiar with the following reports:

i) INTERIM REPORT ON THE DEVELOPMENT OF THE HERMES III MODEL, November 15,1972.

ii) FINAL REPORT ON THE DEVELOPMENT OF THE HERMES III MODEL, March 31,1973.

iii) HERMES III USER'S MANUAL, March 31,1975.

2. INDEPENDENT DEMAND PAIRS

The major point of departure between the revised and original CHARGE module is the notion of independent demand pairs. The original module treated each demand pair separately. That is, for each demand pair,the module calculated the component charge on each link(based on the link's overflow and blocking probabilities) and converted the charges (erlangs) to voice circuits on each link in the switching network. The revised module first computes the load in erlangs on each link for all demand pairs and only then is the conversion made to voice circuits.

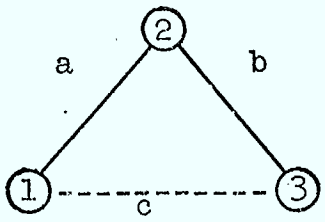
The difference between the original and revised modules can best be illustrated by means of a simplified example. Diagram 2.1 represents a simple switching network. For clarity, a zero blocking probability and an overflow probability of α is assumed. Also all total and initial demands are equal and symetric.

$$(D_{12}=D_{21}=D_{13}=D_{31} \ldots), \quad (i_{12}=i_{21}=i_{13}=i_{31} \ldots.)$$

2.1 ORIGINAL CHARGE MODULE

For each demand pair, a profile or profiles is constructed. The profile is a distribution of charges in voice circuits on each

link of the switching network. Let T denote the transformation from erlangs to voice circuits.



—— final group
---- contemplated

$D > i$
$\alpha \leq 1$
I_{12} = Increased traffic from node 1 to 2 = $D_{12} - i_{12}$

TOTAL DEMAND MATRIX

$$\begin{array}{c|ccc} & 1 & 2 & 3 \\ \hline 1 & 0 & D_{12} & D_{13} \\ 2 & D_{21} & 0 & D_{23} \\ 3 & D_{31} & D_{32} & 0 \end{array}$$

INITIAL DEMAND MATRIX

$$\begin{array}{c|ccc} & 1 & 2 & 3 \\ \hline 1 & 0 & i_{12} & i_{13} \\ 2 & i_{21} & 0 & i_{23} \\ 3 & i_{31} & i_{32} & 0 \end{array}$$

Diagram 2.1 Simple Switching Network

<u>Demand pair 1:</u> (node 1 to 2)

Link			
a	T(D) - T(i)	V	profile 1 in voice circuits
b	T(0) - T(0)	0	
c	T(0) - T(0)	0	
		1	

<u>Demand pair 2:</u> (node 2 to 1)

Link			
a	T(D)- T(i)	V	profile 2 in voice circuits
b	T(0)- T(0)	0	
c	T(0)- T(0)	0	
		2	

Similarily for demand pairs 3 and 4:

O	O
V	V
O	O
3	4

Demand pair 5: (node 1 to 3)

Since the demand pair involves a contemplated group joining two nodes in the basic final tree, two profile are generated for the 5th demand pair.

Profile 5: contemplated link c not installed:

Link		
a	T(D) - T(i)	V
b	T(D) - T(i)	V
c	T(O) - T(O)	O
		5

Profile 6: contemplated link c installed:

Link			
a	T(αD) - T(i)	W	
b	T(αD) - T(i)	W	S≥W
c	T(D)	S	
		6	

Demand pair 6 : (node 3 to node 1)

Profiles 7 and 8 same as profiles 5 and 6 from demand pair 5:

V	W
V	W
O	S
7	8

Profile	1	2	3	4	5	6	7	8
Link								
a	V	V	O	O	V	W	V	W
b	O	O	V	V	V	W	V	W
c	O	O	O	O	O	S	O	S

Link	Voice circuit requirements
a	$2V + \left\{ 2V. \text{ or } . 2W \right\} = 4V \text{ .or. } 2(V+W)$
b	4V .or. 2(V+W)
c	0 .or. 2S

The two possible solutions are therefore:

Link	1	2
a	4V	2(V+W)
b	4V	2(V+W)
c	0	2S

2.2 REVISED CHARGE MODULE

For all demand pairs not utilizing a contemplated group, sum erlang traffic on each link.

Link		
a	T(2D) - T(2i)	R
b	T(2D) - T(2i)	R
c	0	O
		1

Demand pair 5: (node 1 to 3)

Since the demand pair involves a contemplated group joining two nodes in the basic tree, two profiles are generated for the 5th demand pair.

Profile 2: contemplated link c not installed

Link		
a	T(3D) - T(2i+i)	P
b	T(3D) - T(2i + i)	P
c	0	O

2

Profile 3: contemplated link c installed

Link		
a	T(2D + α D) - T(2i + i)	Q
b	T(2D + α D) - T(2i + i)	Q
c	T(D)	S

3

Demand pair 6: (node 3 to 1)

Profiles 4 and 5 same as profiles 1 and 2 from demand pair 5:

P	Q
P	Q
O	S
4	5

Profile	1	2	3	4	5
Link					
a	R	P	Q	P	Q
b	R	P	Q	P	Q
c	O	O	S	O	S

Link	Voice circuit requirements
a	R + (2P .or. 2Q) = R + 2P .or. R + 2Q
b	R + 2P .or. R + 2Q
c	O .or. 2S

The two possible solutions are therefore:

Link	1	2
a	R + 2P	R + 2Q
b	R + 2P	R + 2Q
c	0	2S

As is seen from the two solutions of the two methods, link c (the contemplated group) traffic remains constant in both cases. In order to compare the 2 solutions by each method it is only necessary to compare R + 2P with 4V and R + 2Q with 2(V + W).

For further simplification assume α to be negligible and $D = 2i$.

$$V = T(D) - T(i) = T(2i) - T(i)$$

$$W = T(\alpha D) - T(i) = -T(i) = 0$$

$$R = T(2D) - T(2i) = T(4i) - T(2i)$$

$$P = T(3D) - T(2i + i) = T(6i) - T(5i)$$

$$Q = T(2D + \alpha D) - T(2i + i) = T(4i) - T(5i) = 0$$

Diagram 2.2.a and 2.2.b illustrate the differences in the two solution methods. It is clearly seen that the original module CHARGE over capacities the switching network links a and b in both possible solutions.

For the general case it can be shown that

$$T(A) + T(B) \geqslant T(A + B)$$

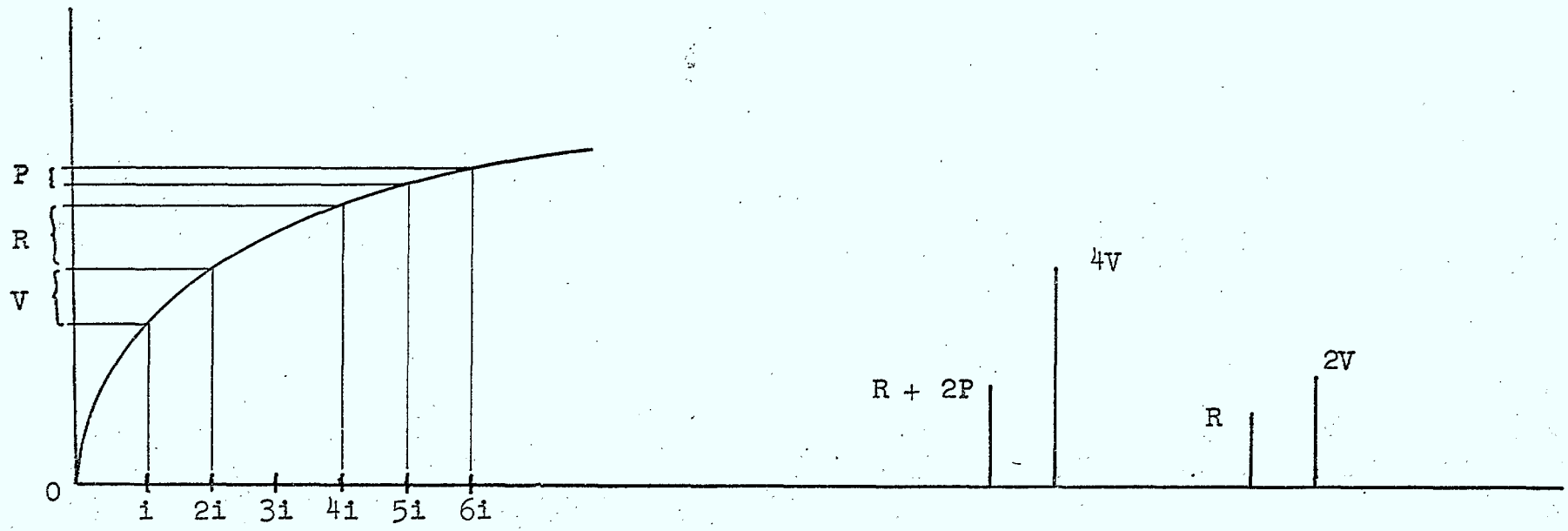


Diagram 2.2.a Erlangs To Circuit Transformation

Diagram 2.2.b Solution In Voice Circuits

3. INTERMEDIARY SWITCHING NODES

The original switching network module CHARGE treated origin destination nodes as terminal points. The revised software assumes non terminating nodes and switched traffic is computed at each node of the switching network. Tradeoffs between transmission and switching costs can therefore be measured more effectively. Diagram 3.1 illustrates a simple switching network. For a demand between A and C, switched traffic was computed at node B only (intermediary node) for the original CHARGE module. The revised version computes switched traffic at nodes A,B, and C.

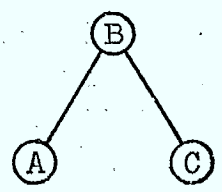


Diagram 3.1 Simple Switching Network

4. MPSX EFFICIENCY

The major barrier to simulating large network models has been the relatively high running costs of the MPSX module. Optimal solutions previously unatainable were completed at moderately low costs during this phase of the project. The changes incorporated were in problem reformulation and a control program change.

4.1 PROBLEM REFORMULATION

The MPSX procedure starts the search for an integer solution

using the continuous optimal solution as a starting point. The further an optimal continuous solution is from an optimal integer solution, the greater the time required for the integer solution search. The improvements introduced effectively raise the optimal continuous solution closer to the optimal integer solution.

In the previous formulation of the HERMES III model, each transmission link or investment variable had a range of integer values from a lower bound of zero to n investment activities. The integer variable being assigned the lower bound zero value implied that this transmission link or investment activity was not installed. The optimal continuous solution assigned activities very close to zero resulting in very low objective function values. By eliminating wherever possible the lower zero bound, the optimal continuous solution is increased.

The elimination of zero lower bounds wherever possible was carried out by analizing the transmission link chains produced by the module CADUCE. For each demand pair (switched or non switched), the transmission link chains are searched for common links. The transmission link or links common to all chains for a demand pair are assigned a lower bound of one.

4.2 MPSX CONTROL PROGRAM

The order by which integer variables are entered into the basis during the search for integer solutions is a significant factor on running time efficiency. The original MPSX control program used the "COST" parameter for controlling the order

of the search. This parameter forced the integer variables to be processed in the priority order of their decreasing absolute cost values. For a maximizing problem, this order would be correct while for a minimizing problem, the order is in the reverse.

The parameter MATRIX was chosen to replace the COST parameter. The MATRIX parameter processes the integer variables in the same order as they are inserted into the problem matrix. While there was no significance in the order of the investment variables for the two problems simulated,it is strongly suggested that for future simulations, the transmission link data(page 173 HERMES III USER'S MANUAL) be entered in the order of (first steps only) their increasing absolute cost values. This would further increase the running time efficiency.

5. SOFTWARE CONSIDERATIONS

In order to facilitate the required changes a large degree of software modification was required. Input requirements and formats remain constant while various output tables were modified. In particular, only the output tables of the CHARGE module are described.

For each demand pair of the switching network not utilizing a contemplated group, a description of the distribution of load (erlangs) on switching network links and the traffic switched at switching network nodes is printed. Tables 5.1 and 5.2 represent two such demand pairs.

DEMAND(ERLANGS) FROM FREDERICTON TO EDMUNSTON

INITIAL	0.0
INCREASED	0.278

		(I)	(J)	(K)	(L)
ST JOHN	CAMPBELLTON	0.0	0.0	0.0	0.0
MONCTON	CAMPBELLTON	0.0	0.0	0.0	0.0
EDMUNSTON	NEWCASTLE	0.0	0.0	0.0	0.0
CAMPBELLTON	BATHURST	0.0	0.0	0.0	0.0
MONCTON	BATHURST	0.0	0.0	0.0	0.0
MONCTON	NEWCASTLE	0.0	0.0	0.0	0.0
ST JOHN	BATHURST	0.0	0.0	0.0	0.0
FREDERICTON	NEWCASTLE	0.0	0.0	0.0	0.0
FREDERICTON	MONCTON	0.0	0.0	0.0	0.0
ST JOHN	EDMUNSTON	0.0	0.0	0.27	0.27
ST JOHN	FREDERICTON	0.0	0.0	0.28	0.28
ST JOHN	NEWCASTLE	0.0	0.0	0.0	0.0
ST JOHN	MONCTON	0.0	0.0	0.0	0.0
NEWCASTLE	CAMPBELLTON	0.0	0.0	0.0	0.0
NEWCASTLE	BATHURST	0.0	0.0	0.0	0.0

TRAFFIC AT SWITCHING NODES(LINES)

	(M)	(N)
ST JOHN	0.47	0.47
CAMPBELLTON	0.0	0.0
MONCTON	0.0	0.0
EDMUNSTON	0.47	0.47
NEWCASTLE	0.0	0.0
BATHURST	0.0	0.0
FREDERICTON	0.48	0.48

Table 5.1 Traffic distribution (erlangs) of demand pair not utilizing contemplated groups.

DEMAND(ERLANGS) FROM EDMUNSTON TO FREDERICTON

INITIAL	0.0
INCREASED	0.278

		(I)	(J)	(K)	(L)
ST JOHN	CAMPBELLTON	0.0	0.0	0.0	0.0
MONCTON	CAMPBELLTON	0.0	0.0	0.0	0.0
EDMUNSTON	NEWCASTLE	0.0	0.0	0.0	0.0
CAMPBELLTON	BATHURST	0.0	0.0	0.0	0.0
MONCTON	BATHURST	0.0	0.0	0.0	0.0
MONCTON	NEWCASTLE	0.0	0.0	0.0	0.0
ST JOHN	BATHURST	0.0	0.0	0.0	0.0
FREDERICTON	NEWCASTLE	0.0	0.0	0.0	0.0
FREDERICTON	MONCTON	0.0	0.0	0.0	0.0
ST JOHN	EDMUNSTON	0.0	0.0	0.28	0.55
ST JOHN	FREDERICTON	0.0	0.0	0.27	0.55
ST JOHN	NEWCASTLE	0.0	0.0	0.0	0.0
ST JOHN	MONCTON	0.0	0.0	0.0	0.0
NEWCASTLE	CAMPBELLTON	0.0	0.0	0.0	0.0
NEWCASTLE	BATHURST	0.0	0.0	0.0	0.0

TRAFFIC AT SWITCHING NODES(LINES)

	(M)	(N)
ST JOHN	0.47	0.94
CAMPBELLTON	0.0	0.0
MONCTON	0.0	0.0
EDMUNSTON	0.48	0.94
NEWCASTLE	0.0	0.0
BATHURST	0.0	0.0
FREDERICTON	0.47	0.94

Table 5.2 Traffic distribution (erlangs) of demand pair not utilizing contemplated groups.

(I)— The distribution of initial demand(erlangs) for demand pair X.

(J)— The sum of all distributions of initial demand (erlangs) for all previous demand pairs.

(K)— The distribution of total (initial plus increased) demand(erlangs) for demand pair X.

(L)— The sum of all distributions of total (initial plus increased) demand (erlangs) for all previous demand pairs.

(M)—The traffic at switching nodes(lines) for demand pair X.

(N)—The sum of all switched node traffic (lines) for all previous demand pairs.

Columns (I) and (K) list the distribution in erlangs for demand pair X while columns (J),(L) and (N) list the updated sum for all previous demand pairs.

The second set of tables printed list the voice circuit requirements for demand pairs utilizing contemplated groups. Table 5.3 and 5.4 refer to the distributions for profile 1 and 2 for a demand pair utilizing a contemplated group. Profile 1 assumes the contemplated group is not installed while profile 2 assumes it is installed.

(O)—Distribution of initial demand(erlangs) for demand pair Y utilizing a contemplated group.

(P)— Distribution of total (initial plus increased) demand(erlangs) for demand pair Y utilizing a contemplated group.

DEMAND(ERLANGS) FROM ST JOHN TO CAMPBELLTON

INITIAL 0.0
INCREASED 0.278
PROFILE NO. 1

		(O)	(P)	(Q)	(R)	(S)
ST JOHN	CAMPBELLTON	0.0	0.0	0.0	0.0	0.0
MONCTON	CAMPBELLTON	0.0	0.0	0.0	0.0	0.0
EDMUNSTON	NEWCASTLE	0.0	0.0	0.0	0.0	0.0
CAMPBELLTON	BATHURST	0.0	0.0	0.0	0.0	0.0
MONCTON	BATHURST	0.0	0.0	4.67	4.67	0.0
MONCTON	NEWCASTLE	0.0	0.0	10.82	10.82	0.0
ST JOHN	BATHURST	0.0	0.0	8.17	8.17	0.0
FREDERICTON	NEWCASTLE	0.0	0.0	7.76	7.76	0.0
FREDERICTON	MONCTON	0.0	0.0	8.61	8.61	0.0
ST JOHN	EDMUNSTON	0.0	0.0	10.63	10.63	0.0
ST JOHN	FREDERICTON	0.0	0.0	30.89	30.89	0.0
ST JOHN	NEWCASTLE	0.0	1.42	19.86	21.28	1.00
ST JOHN	MONCTON	0.0	0.0	11.78	11.78	0.0
NEWCASTLE	CAMPBELLTON	0.0	1.40	7.11	8.51	1.00
NEWCASTLE	BATHURST	0.0	0.0	13.57	13.57	0.0

TRAFFIC AT SWITCHING NODES(LINES)

	(T)
ST JOHN	2.43
CAMPBELLTON	2.38
MONCTON	0.0
EDMUNSTON	0.0
NEWCASTLE	2.40
BATHURST	0.0
FREDERICTON	0.0

Table 5.3 Profile 1 of demand pair utilizing a contemplated group.

DEMAND(ERLANGS) FROM ST JOHN TO CAMPBELLTON

INITIAL 0.0
INCREASED 0.278
PROFILE NO. 2

		(O)	(P)	(Q)	(R)	(S)
ST JOHN	CAMPBELLTON	0.0	1.42	0.0	1.42	3.00
MONCTON	CAMPBELLTON	0.0	0.0	0.0	0.0	0.0
EDMUNSTON	NEWCASTLE	0.0	0.0	0.0	0.0	0.0
CAMPBELLTON	BATHURST	0.0	0.0	0.0	0.0	0.0
MONCTON	BATHURST	0.0	0.0	4.67	4.67	0.0
MONCTON	NEWCASTLE	0.0	0.0	10.82	10.82	0.0
ST JOHN	BATHURST	0.0	0.0	8.17	8.17	0.0
FREDERICTON	NEWCASTLE	0.0	0.0	7.76	7.76	0.0
FREDERICTON	MONCTON	0.0	0.0	8.61	8.61	0.0
ST JOHN	EDMUNSTON	0.0	0.0	10.63	10.63	0.0
ST JOHN	FREDERICTON	0.0	0.0	30.89	30.89	0.0
ST JOHN	NEWCASTLE	0.0	0.21	19.86	20.07	0.0
ST JOHN	MONCTON	0.0	0.0	11.78	11.78	0.0
NEWCASTLE	CAMPBELLTON	0.0	0.21	7.11	7.32	0.0
NEWCASTLE	BATHURST	0.0	0.0	13.57	13.57	0.0

TRAFFIC AT SWITCHING NODES(LINES)

	(T)
ST JOHN	2.43
CAMPBELLTON	2.42
MONCTON	0.0
EDMUNSTON	0.0
NEWCASTLE	0.36
BATHURST	0.0
FREDERICTON	0.0

Table 5.4 Profile 2 of demand pair utilizing contemplated group.

(Q)— (V) + (O) (erlangs)

(R)— (V) + (P) (erlangs)

(S)—T(Q) - T(R) transformation from erlangs to voice circuits.

(T)—Traffic at switching network nodes(lines).

After summation of all demand pairs not utilizing contemplated groups, the conversion from erlangs to voice circuits is initiated. Table 5.5 lists the total erlang distribution on all installed switching network links and their voice circuit equivalent.

(U)—The sum of all distributions of initial demand (erlangs) for all demand pairs not utilizing contemplated groups.

(V)— The sum of all distributions of total(initial plus increased) demand (erlangs) for all previous demand pairs.

(W)— T(V) - T(U) Transformation of erlangs to voice circuits for all demand pairs not utilizing contemplated groups.

It should be noted that the first four links of table 5.5 are equal to zero. These four links are contemplated groups and are therefore empty of any demand traffic.

Tables 5.6 and 5.7 list all the demand pairs in the categories of non utilizing and utilizing contemplated groups. It is not necessary to enter the demand pairs in this same order since the software categorizes the demand pairs internally.

SUMMATION OF TRAFFIC ON LINKS FOR ALL DEMAND PAIRS NOT UTILIZING CONTEMPLATED GROUPS

		(U)	(V)	(W)
ST JOHN	CAMPBELLTON	0.0	0.0	0.0
MONCTON	CAMPBELLTON	0.0	0.0	0.0
EDMUNSTON	NEWCASTLE	0.0	0.0	0.0
CAMPBELLTON	BATHURST	0.0	0.0	0.0
MONCTON	BATHURST	0.0	4.67	7.00
MONCTON	NEWCASTLE	0.0	10.82	13.00
ST JOHN	BATHURST	0.0	8.17	10.00
FREDERICTON	NEWCASTLE	0.0	7.76	10.00
FREDERICTON	MONCTON	0.0	8.61	10.00
ST JOHN	EDMUNSTON	0.0	10.63	12.00
ST JOHN	FREDERICTON	0.0	30.89	30.00
ST JOHN	NEWCASTLE	0.0	19.86	21.00
ST JOHN	MONCTON	0.0	11.78	13.00
NEWCASTLE	CAMPBELLTON	0.0	7.11	9.00
NEWCASTLE	BATHURST	0.0	13.57	15.00

Table 5.5 Summation of traffic for all demand pairs not utilizing contemplated groups.

DEMAND PAIRS UTILIZING CONTEMPLATED GROUPS

					DEMAND (ERLANGS) INITIAL	TOTAL	INCREASE
DE	ST JOHN	A	CAMPBELLTON	:	0.0	1.417	1.417
DE	CAMPBELLTON	A	ST JOHN	:	0.0	1.417	1.417
DE	NEWCASTLE	A	EDMUNSTON	:	0.0	0.972	0.972
DE	EDMUNSTON	A	NEWCASTLE	:	0.0	1.000	1.000
DE	MONCTON	A	CAMPBELLTON	:	0.0	0.972	0.972
DE	CAMPBELLTON	A	MONCTON	:	0.0	1.000	1.000
DE	FREDERICTON	A	CAMPBELLTON	:	0.0	0.194	0.194

Table 5.6 Demand pairs utilizing contemplated groups

DEMAND PAIRS UTILIZING INSTALLED GROUPS ONLY

					DEMAND (ERLANGS) INITIAL	TOTAL	INCREASE
DE	FREDERICTON	A	EDMUNSTON	:	0.0	0.278	0.278
DE	EDMUNSTON	A	FREDERICTON	:	0.0	0.278	0.278
DE	FREDERICTON	A	BATHURST	:	0.0	0.278	0.278
DE	BATHURST	A	FREDERICTON	:	0.0	0.278	0.278
DE	MONCTON	A	FREDERICTON	:	0.0	4.306	4.306
DE	FREDERICTON	A	MONCTON	:	0.0	4.306	4.306
DE	MONCTON	A	EDMUNSTON	:	0.0	0.194	0.194

Table 5.7 Demand pairs utilizing installed groups only

5.1 RUNNING TIME

The two problems used for testing the modifications incorporated are identical to the two problems described in the HERMES III USER'S MANUAL. The solutions employing the revised software are found in appendix A. A comparison of the software modifications with respect to running time is illustrated in Table 5.8. The greater reduction in running time for the Maritimes Network Problem (in addition to common transmission links and the MATRIX parameter) can be attributed to the following:

i) Reduction in the overall number of profiles.

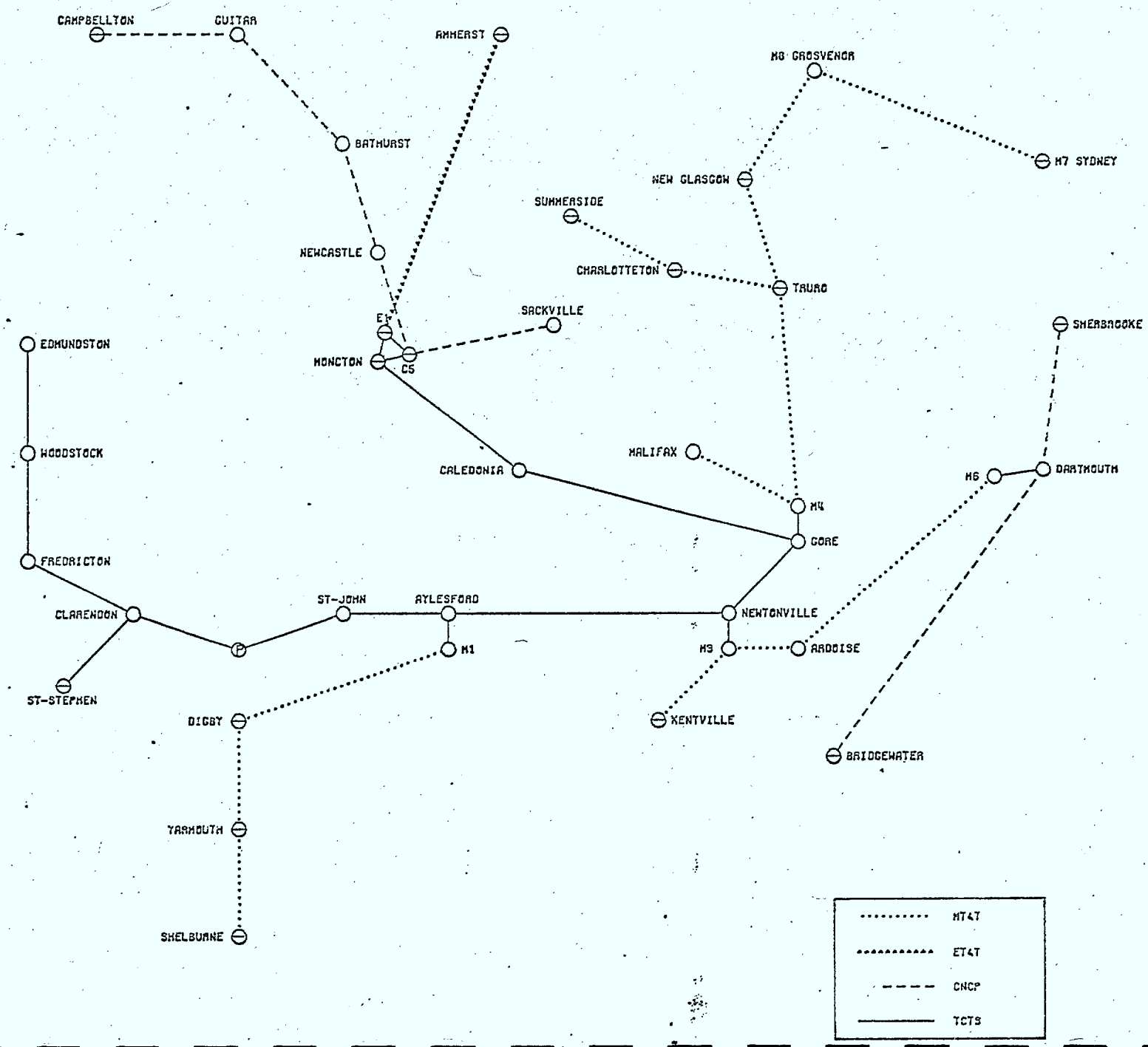
ii) Reduction in the number of transmission facilities chains due to the greater accuracy in circuit allocations.

iii) Reduction in investment activity variables due to the greater accuracy in circuit allocations.

Table 5.8 Comparison of running times.

	TIME IN MINUTES			
	HERMES III		REVISED HERMES III	
JOB STEPS	Maritimes Network	Northern Network	Maritimes Network	Northern Network
CATIG	.10	.10	.10	.10
CHARGE	3.00	N.A.	2.15	N.A.
BORNE	.05	.045	.33	.045
CADUCE	6.00	2.00	1.75	2.00
CONTRA	.90	N.A.	.90	N.A.
SETUP	.80	.25	.6	.25
TRANCHE	1st integer 13.60	2nd integer 8.0	optimal integer 4.05	optimal integer 14.51
DELETT	.02	.02	.02	.02
TOTAL	24.47	10.41	9.90	16.92

A P P E N D I X A



MARITIMES NETWORK OPTIMAL SOLUTION

LINK	TOTAL VOICE CIRCUITS PER LINK IN SWITCHING NETWORK
WOODSTOC - FREDRICT	14.0
WOODSTOC - EDMUNDST	6.0
EDMUNDST - NEWCASTL	
FREDRICT - NEWCASTL	
FREDRICT - MONCTON	
CAMPBELL - MONCTON	6.0
CAMPBELL - BATHURST	
BATHURST - MONCTON	8.0
NEWCASTL - MONCTON	19.0
SUMMERSI - MONCTON	6.0
SUMMERSI - CHARLOTT	24.0
CHARLOTT - MONCTON	6.0
CHARLOTT - NEW GLAS	6.0
MONCTON - TRURO	4.0
MONCTON - AMHERST	16.0
MONCTON - KENTVILL	4.0
NEW GLAS - AMHERST	8.0
NEW GLAS - TRURO	12.0
NEW GLAS - SHERBROO	
NEW GLAS - SYDNEY	
BATHURST - TRURO	4.0
KENTVILL - TRURO	6.0
KENTVILL - BRIDGEWA	
KENTVILL - DIGBY	10.0
DIGBY - YARMOUTH	6.0
YARMOUTH - SHELBURN	8.0
SHELBURN - BRIDGEWA	
ST. JOHN - CAMPBELL	9.0

LINK	TOTAL VOICE CIRCUITS PER LINK IN SWITCHING NETWORK
ST. JOHN - BATHURST	15.0
ST. JOHN - SUMMERSI	10.0
ST. JOHN - CHARLOTT	16.0
ST. JOHN - NEW GLAS	17.0
ST. JOHN - SYDNEY	11.0
ST. JOHN - AMHERST	13.0
ST. JOHN - KENTVILL	9.0
ST. JOHN - DIGBY	10.0
ST. JOHN - YARMOUTH	7.0
MONCTON - HALIFAX	27.0
NEWCASTL - HALIFAX	9.0
FREDRICT - HALIFAX	8.0
ST. JOHN - ST. STEP	17.0
ST. JOHN - WOODSTOC	23.0
ST. JOHN - EDMUNDST	19.0
ST. JOHN - FREDRICT	45.0
ST. JOHN - NEWCASTL	33.0
ST. JOHN - MONCTON	86.0
ST. JOHN - HALIFAX	53.0
CAMPBELL - NEWCASTL	13.0
BATHURST - NEWCASTL	18.0
SUMMERSI - HALIFAX	17.0
CHARLOTT - HALIFAX	24.0
NEW GLAS - HALIFAX	41.0
SHELBURN - HALIFAX	12.0
BRIDGEWA - HALIFAX	26.0
YARMOUTH - HALIFAX	16.0
DIGBY - HALIFAX	12.0

LINK	TOTAL VOICE CIRCUITS PER LINK IN SWITCHING NETWORK
KENTVILL - HALIFAX	37.0
AMHERST - HALIFAX	22.0
TRURO - HALIFAX	33.0
SYDNEY - HALIFAX	41.0
SHERBROO - HALIFAX	8.0
SACKVILL - AMHERST	12.0

NODES	TOTAL NUMBER OF LINES SWITCHED PER NODE IN SWITCHING NETWORK
WOODSTOC	54.0
FREDRICT	108.4
EDMUNDST	32.4
NEWCASTL	118.9
MONCTON	259.1
CAMPBELL	33.0
BATHURST	55.5
SUMMERSI	67.9
CHARLOTT	96.6
NEW GLAS	118.8
TRURO	72.3
AMHERST	79.8
KENTVILL	77.7
SHERBROO	10.4
SYDNEY	87.1
BRIDGEWA	46.0
DIGBY	42.1
YARMOUTH	43.4
SHELBURN	21.7
ST. JOHN	560.9
HALIFAX	527.4
ST. STEP	26.2
SACKVILL	14.3

SWITCHING NODE STATISTICS

NODE	SWITCHING MACHINES INSTALLED	COST($)	UNUSED CAPACITY
WOODSTOC	1	3000	246.0
FREDRICT	1	3000	191.5
EDMUNDST	1	3000	267.6
NEWCASTL	1	3000	181.0
MONCTON	1	3000	41.0
CAMPBELL	1	3000	267.0
BATHURST	1	3000	244.5
SUMMERSI	1	3000	232.1
CHARLOTT	1	3000	203.5
NEW GLAS	1	3000	181.1
TRURO	1	3000	227.7
AMHERST	1	3000	220.4
KENTVILL	1	3000	222.3
SHERBROO	1	3000	289.6
SYDNEY	1	3000	212.9
BRIDGEWA	1	3000	254.0
DIGBY	1	3000	258.0
YARMOUTH	1	3000	256.0
SHELBURN	1	3000	278.3
ST. JOHN	2	3800	39.3
HALIFAX	2	3800	72.7
ST. STEP	1	3000	273.8
SACKVILL	1	3000	285.8
TOTAL SWITCHING NODE COSTS		75600	

CHAINS AS SELECTED BY MPSX(LINK NO.)

FROM	TO
WOODSTOC-FREDRICT	WOODST-FREDRI-
WOODSTOC-EDMUNDST	WOODST-EDMUND-
CAMPBELL-MONCTON	CAMPBE-C1 CAM-C2 GUI-C3 BAT-C4 NEW-C5 MON-MONCTO-
BATHURST-MONCTON	BATHUR-C3 BAT-C4 NEW-C5 MON-MONCTO-
NEWCASTL-MONCTON	NEWCAS-C4 NEW-C5 MON-MONCTO-
SUMMERSI-MONCTON	SUMMER-CHARLO-TRURO -M4 GOR-T8 GOR-CALEDO-T5 MON-MONCTO-
SUMMERSI-CHARLOTT	SUMMER-CHARLO-
CHARLOTT-MONCTON	CHARLO-TRURO -M4 GOR-T8 GOR-CALEDO-T5 MON-MONCTO-
CHARLOTT-NEW GLAS	CHARLO-TRURO -NEW GL-
MONCTON -TRURO	MONCTO-T5 MON-CALEDO-T8 GOR-M4 GOR-TRURO -
MONCTON -AMHERST	MONCTO-E1 MON-AMHERS-
MONCTON -KENTVILL	MONCTO-T5 MON-CALEDO-T8 GOR-T7 NEW-M3 NEW-KENTVI-
NEW GLAS-AMHERST	NEW GL-TRURO -M4 GOR-T8 GOR-CALEDO-T5 MON-E1 MON-AMHERS-
NEW GLAS-TRURO	NEW GL-TRURO -

CHAINS AS SELECTED BY MPSX(LINK NO.)

FROM	TO
BATHURST-TRURO	BATHUR-C3 BAT-C4 NEW-C5 MON-T5 MON-CALEDO-T8 GOR-M4 GOR-TRURO -
KENTVILL-TRURO	KENTVI-M3 NEW-T7 NEW-T8 GOR-M4 GOR-TRURO -
KENTVILL-DIGBY	KENTVI-M3 NEW-T7 NEW-T6 AYL-M1 AYL-DIGBY -
DIGBY -YARMOUTH	DIGBY -YARMOU-
YARMOUTH-SHELBURN	YARMOU-SHELBU-
ST. JOHN-CAMPBELL	ST. JO-T6 AYL-T7 NEW-T8 GOR-CALEDO-T5 MON-C5 MON-C4 NEW-C3 BAT-C2 GUI-C1 CAM-CAMPBE-
ST. JOHN-BATHURST	ST. JO-T6 AYL-T7 NEW-T8 GOR-CALEDO-T5 MON-C5 MON-C4 NEW-C3 BAT-BATHUR-
ST. JOHN-SUMMERSI	ST. JO-T6 AYL-T7 NEW-T8 GOR-M4 GOR-TRURO -CHARLO-SUMMER-
ST. JOHN-CHARLOTT	ST. JO-T6 AYL-T7 NEW-T8 GOR-M4 GOR-TRURO -CHARLO-
ST. JOHN-NEW GLAS	ST. JO-T6 AYL-T7 NEW-T8 GOR-M4 GOR-TRURO -NEW GL-
ST. JOHN-SYDNEY	ST. JO-T6 AYL-T7 NEW-T8 GOR-M4 GOR-TRURO -NEW GL-M8 GRO-M7 SYD-SYDNEY-
ST. JOHN-AMHERST	ST. JO-T6 AYL-T7 NEW-T8 GOR-CALEDO-T5 MON-E1 MON-AMHERS-
ST. JOHN-KENTVILL	ST. JO-T6 AYL-T7 NEW-M3 NEW-KENTVI-
ST. JOHN-DIGBY	ST. JO-T6 AYL-M1 AYL-DIGBY -

CHAINS AS SELECTED BY MPSX(LINK NO.)

FROM	TO
ST. JOHN-YARMOUTH	ST. JC-T6 AYL-M1 AYL-DIGBY -YARMOU-
MONCTON -HALIFAX	MONCTO-T5 MON-CALEDO-T8 GOR-M4 GOR-HALIFA-
NEWCASTL-HALIFAX	NEWCAS-C4 NEW-C5 MON-T5 MON-CALEDO-T8 GOR-M4 GOR-HALIFA-
FREDRICT-HALIFAX	FREDRI-CLAREN-P1 CLA-ST. JO-T6 AYL-T7 NEW-T8 GOR-M4 GOR-HALIFA-
ST. JOHN-ST. STEP	ST. JC-P1 CLA-CLAREN-ST. ST-
ST. JOHN-WOODSTOC	ST. JO-P1 CLA-CLAREN-FREDRI-WOODST-
ST. JOHN-EDMUNDST	ST. JC-P1 CLA-CLAREN-FREDRI-WOODST-EDMUND-
ST. JOHN-FREDRICT	ST. JO-P1 CLA-CLAREN-FREDRI-
ST. JOHN-NEWCASTL	ST. JO-T6 AYL-T7 NEW-T8 GOR-CALEDO-T5 MON-C5 MON-C4 NEW-NEWCAS-
ST. JOHN-MONCTON	ST. JC-T6 AYL-T7 NEW-T8 GOR-CALEDO-T5 MON-MONCTO-
ST. JOHN-HALIFAX	ST. JC-T6 AYL-T7 NEW-T8 GOR-M4 GOR-HALIFA-
CAMPBELL-NEWCASTL	CAMPBE-C1 CAM-C2 GUI-C3 BAT-C4 NEW-NEWCAS-
BATHURST-NEWCASTL	BATHUR-C3 BAT-C4 NEW-NEWCAS-
SUMMERSI-HALIFAX	SUMMER-CHARLO-TRURO -M4 GOR-HALIFA-

CHAINS AS SELECTED BY MPSX(LINK NO.)

FROM	TO
CHARLOTT-HALIFAX	CHARLO-TRURO -M4 GOR-HALIFA-
NEW GLAS-HALIFAX	NEW GL-TRURO -M4 GOR-HALIFA-
SHELBURN-HALIFAX	SHELBU-YARMOU-DIGBY -M1 AYL-T6 AYL-T7 NEW-T8 GOR-M4 GOR-HALIFA-
BRIDGEWA-HALIFAX	BRIDGE-C6 BRI-C7 DAR-M6 DAR-ARDOIS-M3 NEW-T7 NEW-T8 GOR-M4 GOR-HALIFA-
YARMOUTH-HALIFAX	YARMOU-DIGBY -M1 AYL-T6 AYL-T7 NEW-T8 GOR-M4 GOR-HALIFA-
DIGBY -HALIFAX	DIGBY -M1 AYL-T6 AYL-T7 NEW-T8 GOR-M4 GOR-HALIFA-
KENTVILL-HALIFAX	KENTVI-M3 NEW-T7 NEW-T8 GOR-M4 GOR-HALIFA-
AMHERST -HALIFAX	AMHERS-E1 MON-T5 MON-CALEDO-T8 GOR-M4 GOR-HALIFA-
TRURO -HALIFAX	TRURO -M4 GOR-HALIFA-
SYDNEY -HALIFAX	SYDNEY-M7 SYD-M8 GRO-NEW GL-TRURO -M4 GOR-HALIFA-
SHERBROO-HALIFAX	SHERBR-C7 DAR-M6 DAR-ARDOIS-M3 NEW-T7 NEW-T8 GOR-M4 GOR-HALIFA-
SACKVILL-AMHERST	SACKVI-C5 MON-E1 MON-AMHERS-

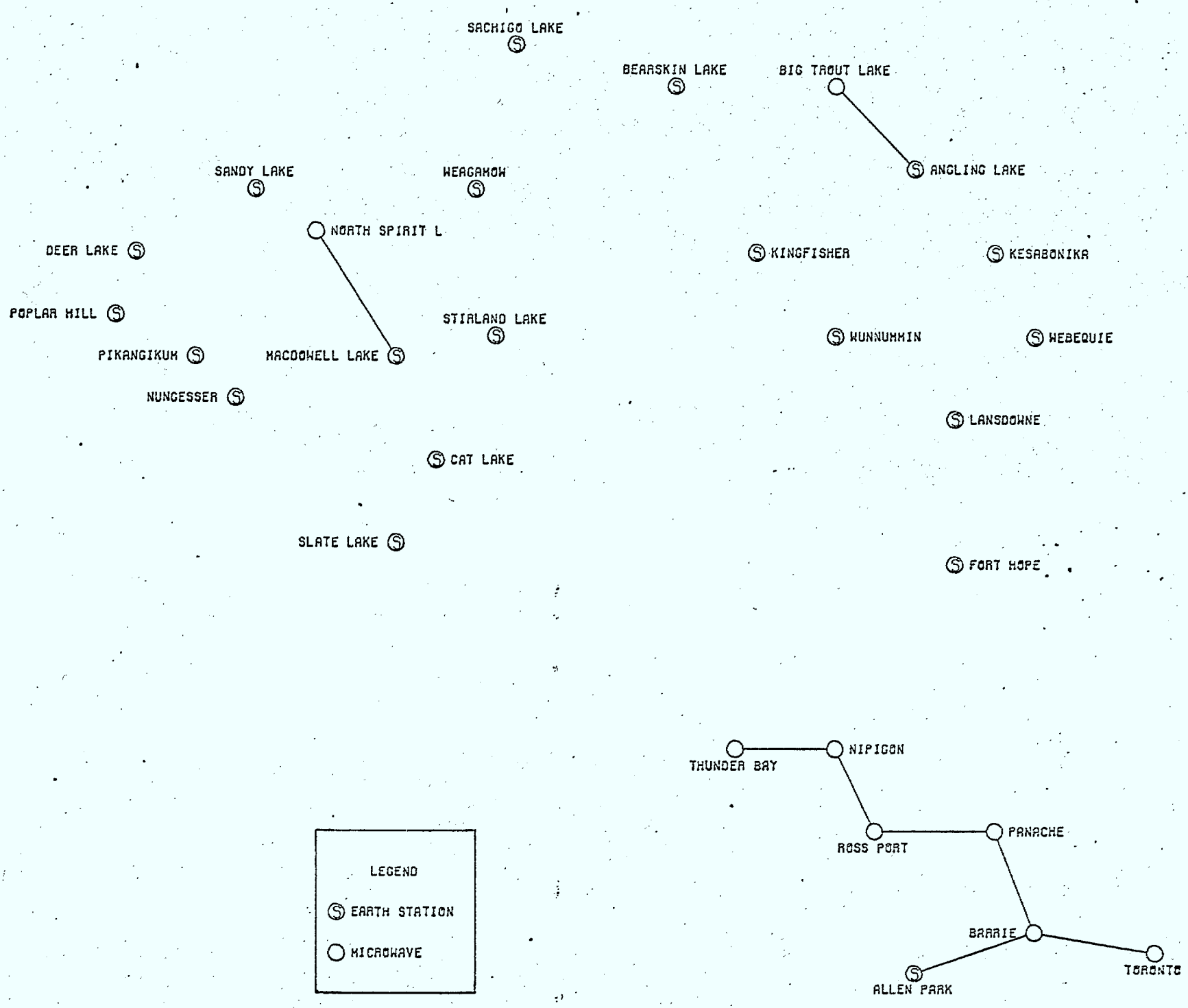
TRANSMISSION LINKS STATISTICS

LINK	CHANNELS INSTALLED	COST($)	UNUSED CAPACITY	USED CAPACITY
SUMMERSI-CHARLOTT	1	134750		960
CHARLOTT-TRURO	1	288750	161	799
TRURO -NEW GLAS	1	172200		1200
TRURO -M4 GORE	1	92400	2	958
NEW GLAS-M8 GROSV	1	243600	1148	52
M4 GORE -HALIFAX	1	119350	574	386
M8 GROSV-M7 SYDNE	1	298200	1148	52
ARDOISE -M6 DARTM	1	100100	926	34
ARDOISE -M3 NEWTO	1	77000	566	34
M3 NEWTO-KENTVILL	1	35000	534	66
M1 AYLES-DIGBY	1	145600	173	67
DIGBY -YARMOUTH	1	148400	199	41
YARMOUTH-SHELBURN	1	154000	220	20
E1 MONCT-AMHERST	1	95200	409	71
C1 CAMPB-C2 GUITA	1	120400	572	28
C2 GUITA-C3 BATHU	1	56000	572	28
C3 BATHU-C4 NEWCA	1	92400	527	73
C4 NEWCA-C5 MONCT	1	217200	497	103
C5 MONCT-SACKVILL	1	75600	1188	12
C7 DARTM-C6 BRIDG	1	159600	934	26
C7 DARTM-SHERBROO	1	168000	1192	8
EDMUNDST-WOODSTOC	1	294000	455	25
WOODSTOC-FREDRICT	1	148400	424	56
T5 MONCT-CALEDONI	1	61600		960
FREDRICT-CLARENDO	1	98000	385	95
CALEDONI-T8 GORE	1	296450		960
CLARENDO-ST. STEP	1	171500	583	17
CLARENDO-P1 CLARE	1	21000	1688	112
P1 CLARE-ST. JOHN	1	23100	1688	112
T8 GORE -T7 NEWTO	2	98560	88	392
ST. JOHN-T6 AYLES	1	227500	303	297
T6 AYLES-T7 NEWTO	2	73920	150	330
M1 AYLES-T6 AYLES	1	170000	1733	67
M3 NEWTO-T7 NEWTO	1	100000	1700	100
T8 GORE -M4 GORE	1	100000	768	1032
M6 DARTM-C7 DARTM	1	100000	1766	34
T5 MONCT-E1 MONCT	1	100000	1757	43
E1 MONCT-C5 MONCT	1	100000	1788	12
T5 MONCT-C5 MONCT	1	100000	1730	70

TOTAL COST OF TRANSMISSION 5197780

TOTAL COST TRANSMISSION AND SWITCHING ($) 5268380

5166288



[redacted]TH[redacted]N [redacted]WO[redacted] OF[redacted]MA[redacted]OL[redacted]IO[redacted]

CHAINS AS SELECTED BY MPSX(LINK NO.)

FROM	TO
BEARSKIN-BIG TROU	BEARSK-ALLEN -ANGLIN-BIG TR-
BEARSKIN-SACHIGO	BEARSK-ALLEN -SACHIG-
BEARSKIN-THUNDER	BEARSK-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
BIG TROU-KESABONI	BIG TR-ANGLIN-ALLEN -KESABO-
BIG TROU-KINGFISH	BIG TR-ANGLIN-ALLEN -KINGFI-
BIG TROU-WUNNUMMI	BIG TR-ANGLIN-ALLEN -WUNNUM-
BIG TROU-ANGLING	BIG TR-ANGLIN-
BIG TROU-SACHIGO	BIG TR-ANGLIN-ALLEN -SACHIG-
BIG TROU-THUNDER	BIG TR-ANGLIN-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
DEER LAK-SANDY LA	DEER L-ALLEN -SANDY -
DEER LAK-THUNDER	DEER L-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
FORT HOP-LANSDOWN	FORT H-ALLEN -LANSDO-
FORT HOP-THUNDER	FORT H-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
KESABONI-KINGFISH	KESABO-ALLEN -KINGFI-

CHAINS AS SELECTED BY MPSX(LINK NO.)

FROM	TO
KESABONI-ANGLING	KESABO-ALLEN -ANGLIN-
KESABONI-THUNDER	KESABO-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
KINGFISH-WEBEQUIE	KINGFI-ALLEN -WEBEQU-
KINGFISH-ANGLING	KINGFI-ALLEN -ANGLIN-
KINGFISH-THUNDER	KINGFI-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
LANSDOWN-THUNDER	LANSDO-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
PIKANGIK-POPLAR H	PIKANG-ALLEN -POPLAR-
PIKANGIK-THUNDER	PIKANG-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
POPLAR H-THUNDER	POPLAR-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
SANDY LA-NORTH SP	SANDY -ALLEN -MACDOW-NORTH -
SANDY LA-THUNDER	SANDY -ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
WEAGAMOW-THUNDER	WEAGAM-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
WEBEQUIE-THUNDER	WEBEQU-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
WUNNUMMI-THUNDER	WUNNUM-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-

CHAINS AS SELECTED BY MPSX(LINK NO.)

FROM	TO
ANGLING -THUNDER	ANGLIN-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
NORTH SP-THUNDER	NORTH -MACDOW-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
SACHIGO -THUNDER	SACHIG-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
CAT LAKE-THUNDER	CAT LA-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
MACDOWEL-THUNDER	MACDOW-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
NUNGESSE-THUNDER	NUNGES-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
SLATE FA-THUNDER	SLATE -ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
STIRLAND-THUNDER	STIRLA-ALLEN -BARRIE-PANACH-ROSS P-NIPIGO-THUNDE-
BIG TROU-TORONTO	BIG TR-ANGLIN-ALLEN -BARRIE-TORONT-
LANSDOWN-TORONTO	LANSDO-ALLEN -BARRIE-TORONT-

TRANSMISSION LINKS STATISTICS

LINK	CHANNELS INSTALLED	COST($)	UNUSED CAPACITY	USED CAPACITY
PIKANGIK-ALLEN PA	1	349240	288	12
POPLAR H-ALLEN PA	1	349240	290	10
DEER LAK-ALLEN PA	1	349240	288	12
SANDY LA-ALLEN PA	1	349240	284	16
MACDOWEL-ALLEN PA	1	349240	291	9
NUNGESSE-ALLEN PA	1	349240	299	1
WEAGAMOW-ALLEN PA	1	349240	295	5
FORT HOP-ALLEN PA	1	349240	290	10
LANSDOWN-ALLEN PA	1	349240	288	12
KINGFISH-ALLEN PA	1	349240	276	24
WUNNUMMI-ALLEN PA	1	349240	290	10
WEBEQUIE-ALLEN PA	1	349240	289	11
KESABONI-ALLEN PA	1	349240	281	19
BEAPSKIN-ALLEN PA	1	349240	284	16
SACHIGO -ALLEN PA	1	349240	288	12
ANGLING -ALLEN PA	1	349240	251	49
CAT LAKE-ALLEN PA	1	349240	299	1
SLATE FA-ALLEN PA	1	349240	299	1
STIRLAND-ALLEN PA	1	349240	299	1
ANGLING -BIG TROU	1	275000	919	41
NORTH SP-MACDOWEL	1	341000	952	8
THUNDER -NIPIGON	1	66000	682	78
NIPIGON -POSS POR	1	24800	222	78
POSS POR-PANACHE	1	468600	882	78
TORONTO -BARRIE	1	30000	1197	3
ALLEN PA-BARRIE	1	57600	219	81
PANACHE -BARRIE	1	190300	882	78

TOTAL COST OF TRANSMISSION 8088860

TOTAL COST TRANSMISSION AND SWITCHING ($) 8088860

A P P E N D I X B

```
//DELETT  JOB ($600,002,010,0100,0000,14,,1),'GELLER  '
//*PASSWORD=HERMES
//    EXEC FORTGCLG
//FORT.SYSIN DD *
      DEFINE FILE 2(1000,100,U,ID2)
      DEFINE FILE 9(300,91,U,IDA)
       DEFINE FILE 10(1000,200,U,ID25)
      DEFINE FILE 12(2500,100,U,ID4)
      DEFINE FILE 14(1000,200,U,ID5)
      I=1
      WRITE(2'1) I
      WRITE(9'1) I
       WRITE(10'1) I
      WRITF(12'1) I
      WRITE(14'1) I
       STOP
       END
/*
//GO.FT01F001 DD DSN=$600.WIS,
//    UNIT=ONLN,
//    DISP=(,CATLG),
//    DCB=(RECFM=FB,LRECL=85,BLKSIZE=850),
//    SPACE=(CYL,(1,1),RLSE)
//GO.FT02F001 DD DSN=$600.MKG,
//    UNIT=SYSDA,
//    DISP=(,CATLG),
//    SPACE=(CYL,(3,1),RLSE)
//GO.FT09F001 DD DSN=$600.STU,
//    UNIT=SYSDA,
//    DISP=(,CATLG),
//    SPACE=(CYL,(1,1),RLSE)
//GO.FT10F001 DD DSN=$600.ABC,
//    UNIT=SYSDA,
//    DISP=(,CATLG),
//    SPACE=(CYL,(4,1),RLSE)
//GO.FT12F001 DD DSN=$600.HIJ,
//    UNIT=SYSDA,
//    DISP=(,CATLG),
//    SPACE=(CYL,(5,1),RLSE)
//GO.FT14F001 DD DSN=$600.ROB,
//    UNIT=SYSDA,
//    DISP=(,CATLG),
//    SPACE=(CYL,(4,1),RLSE)
//GO.FT15F001 DD DSN=$600.ROWS,
//    UNIT=ONLN,
//    DCB=(RECFM=FB,LRECL=80,BLKSIZE=800),
//    DISP=(,CATLG),
//    SPACE=(CYL,(1,1),RLSE)
//GO.FT16F001 DD DSN=$600.COLUMN,
//    UNIT=ONLN,
//    DCB=(RECFM=FB,LRECL=80,BLKSIZE=800),
//    DISP=(,CATLG),
//    SPACE=(CYL,(1,1),RLSE)
//GO.FT17F001 DD DSN=$600.MARKER,
//    UNIT=ONLN,
//    DCB=(RECFM=FB,LRECL=80,BLKSIZE=800),
//    DISP=(,CATLG),
//    SPACE=(CYL,(1,1),RLSE)
```

```
//GO.FT18F001 DD DSN=$600.RHS,                                  CAT 0059
//    UNIT=ONLN,                                                CAT 0060
//    DCB=(RECFM=FB,LRECL=80,BLKSIZE=800),                      CAT 0061
//    DISP=(,CATLG),                                            CAT 0062
//    SPACE=(CYL,(1,1),RLSE)                                    CAT 0063
//GO.FT19F001 DD DSN=$600.BOUNDS,                               CAT 0064
//    UNIT=ONLN,                                                CAT 0065
//    DCB=(RECFM=FB,LRECL=80,BLKSIZE=800),                      CAT 0066
//    DISP=(,CATLG),                                            CAT 0067
//    SPACE=(CYL,(1,1),RLSE)                                    CAT 0068
//GO.FT20F001 DD DSN=$600.DEF,                                  CAT 0069
//    UNIT=ONLN,                                                CAT 0070
//    DISP=(,CATLG),                                            CAT 0071
//    DCB=(RECFM=FB,LRECL=815,BLKSIZE=815),                     CAT 0072
//    SPACE=(CYL,(1,1),RLSE)                                    CAT 0073
//GO.FT21F001 DD DSN=$600.GHI,                                  CAT 0074
//    UNIT=ONLN,                                                CAT 0075
//    DISP=(,CATLG),                                            CAT 0076
//    DCB=(RECFM=FB,LRECL=90,BLKSIZE=12870),                    CAT 0077
//    SPACE=(CYL,(1,1),RLSE)                                    CAT 0078
//GO.FT22F001 DD DSN=$600.JKL,                                  CAT 0079
//    UNIT=ONLN,                                                CAT 0080
//    DISP=(,CATLG),                                            CAT 0081
//    DCB=(RECFM=FB,LRECL=430,BLKSIZE=8600),                    CAT 0082
//    SPACE=(CYL,(1,1),RLSE)                                    CAT 0083
//GO.FT23F001 DD DSN=$600.MNO,                                  CAT 0084
//    UNIT=ONLN,                                                CAT 0085
//    DISP=(,CATLG),                                            CAT 0086
//    DCB=(RECFM=FB,LRECL=2100,BLKSIZE=2100),                   CAT 0087
//    SPACE=(CYL,(1,1),RLSE)                                    CAT 0088
//GO.FT24F001 DD DSN=$600.PQR,                                  CAT 0089
//    UNIT=ONLN,                                                CAT 0090
//    DISP=(,CATLG),                                            CAT 0091
//    DCB=(RECFM=FB,LRECL=90,BLKSIZE=12870),                    CAT 0092
//    SPACE=(CYL,(1,1),RLSE)                                    CAT 0093
//GO.FT25F001 DD DSN=$600.VWX,                                  CAT 0094
//    UNIT=ONLN,                                                CAT 0095
//    DISP=(,CATLG),                                            CAT 0096
//    DCB=(RECFM=FB,LRECL=140,BLKSIZE=5600),                    CAT 0097
//    SPACE=(CYL,(1,1),RLSE)                                    CAT 0098
//GO.FT26F001 DD DSN=$600.XYZ,                                  CAT 0099
//    UNIT=ONLN,                                                CAT 0100
//    DISP=(,CATLG),                                            CAT 0101
//    DCB=(RECFM=FB,LRECL=2015,BLKSIZE=12090),                  CAT 0102
//    SPACE=(CYL,(1,1),RLSE)                                    CAT 0103
//GO.FT27F001 DD DSN=$600.BCD,                                  CAT 0104
//    UNIT=ONLN,                                                CAT 0105
//    DISP=(,CATLG),                                            CAT 0106
//    DCB=(RECFM=FB,LRECL=90,BLKSIZE=12870),                    CAT 0107
//    SPACE=(CYL,(1,1),RLSE)                                    CAT 0108
//GO.FT28F001 DD DSN=$600.EFG,                                  CAT 0109
//    UNIT=ONLN,                                                CAT 0110
//    DISP=(,CATLG),                                            CAT 0111
//    DCB=(RECFM=FB,LRECL=80,BLKSIZE=800),                      CAT 0112
//    SPACE=(CYL,(1,1),RLSE)                                    CAT 0113
//GO.FT29F001 DD DSN=$600.MIC,                                  CAT 0114
//    UNIT=ONLN,                                                CAT 0115
//    DCB=(RECFM=FB,LRECL=110,BLKSIZE=330),                     CAT 0116
```

```
//    DISP=(,CATLG),                                          CAT 0117
//    SPACE=(CYL,(1,1),RLSE)                                  CAT 0118
//GO.FT30F001 DD DSN=$600.JAR,                                CAT 0119
//    UNIT=ONLN,                                              CAT 0120
//    DISP=(,CATLG),                                          CAT 0121
//    DCB=(RECFM=FB,LRECL=140,BLKSIZE=5600),                  CAT 0122
//    SPACE=(CYL,(1,1),RLSE)                                  CAT 0123
/*                                                            CAT 0124
//                                                            CAT 0125
```

```
//CHARGE   JOB ($600,002,020,0500,0000,44,,2),'GELLER  '
//*PASSWORD=HERMES
//    EXEC   FORTGCLG
//FORT.SYSIN DD *
C
C      PROGRAMME CHARGE
C
C    :IMENSIONING IS SET FOR A MAXIMUM OF 6 CONTEMPLATED PER DEMAND PAIR
C    IE 2**6. ANY CHANGES REQUIRING AN INCREASE REQUIRES THAT MATRICES
C WITH A 64 DIMENSION MUST BE CHANGED TO 2**N FOR N CONTEMPLATED .MATRIX
C SHOULD BE CHANGED TO B(N,2**N)
C    THESE DIMENSIONS ARE FIXED FOR  THE SWITCHING NETWORK
      INTEGER*2  IDHU(100)
      INTEGER P,PI,PP,PAL,PS,BVD(7),LTYPE(5)
      INTEGER*2 L2LINK,N2DP,LTREF,NDIM,DWS,DWSS,NSU,GENLNB,GENNNB,DEMAX,
     1IDNDP
      INTEGER*2 JOT(5),IVECT(64), JHU(10),F(60,15),G(60,15),VECT(20),
     1IMA(60,2),PROF(60,15),CH(60,15),B(6,64),   PB(10),          RP(10),
     2WS(25),WSS(25),IDU(10)
C            DIMENSIONING OF LINK DATA  MAXIMUM 100 LINKS IN SWITCHING
      INTEGER*2 A(200,10),JAR(200,10),ELN1(200),ELN(201),NICK(200)
      REAL CR(200),NCC(200),CC1(200),C1(200),CHARD(200),CHAR(200),
     1CCD(200),BLOV(200)
      REAL CHUR(100)/100*0./,CHURD(100)/100*0./,CHIR(100)/100*0./
       REAL CHIRD(100)/100*0./, CRI(100)/100*0./
       REAL  CHOR(100), CHURD(100)
      INTEGER DDMAX(200)/200*0/
      INTEGER DMAX(200)/200*0/
      REAL  DDMAS(100)/100*0./,DMAS(100)/100*0./
C   DIMENSIONING OF DEMAND ,MAXIMUM DEMAND IS 3600 PAIRS IN SWITCHING NE
      REAL DEM(3600),DEL(3600),DELTA(3600)
      REAL  DEMM(3600) ,DELL(3600),DELTAA(3600)
       INTEGER*2 DDPP(3600,2)
      INTEGER*2 DP(3600,2),IDISK(3600)
C    DIMENSIONING OF NODES  MAXIMUM NODES IN SWITCHING NETWORK IS  100
      REAL*8  BULL(2),XNODNM(100)
      REAL   COM(100),COM1(100),COM2(100), CCOM(100,64),DPROB(64)
      REAL COMM(60)/60*0./
      INTEGER NODNAM(2,100),NODNM(100,3)
      INTEGER*2   ENN(100),VSU(100),TREF(100,100),CHA(100,64)
      EQUIVALENCE (JAR,A)
      EQUIVALENCE (CH,PROF)
      EQUIVALENCE (NODNAM,XNODNM)
      DATA LTYPE/'CHU ','CFG ','IHU ','IFG ','FING'/
C
      DEFINE FILE 2 (1000,100,U,ID2)
      DEFINE FILE  8 (10,1025,U,IDI)
      DEFINE FILE 10 (1000,200,U,ID25)
C
      READ (5,9) IPROG,JIMY
9     FORMAT(2I1)
      IP=6
      P=5
      WRITE(IP,500)
500   FORMAT(1H1,////,25(/,4X,'CETTE VERSION GENERE LES NUMEROS DES ARC'
     1,  'S A PARTIR DE NOMS DE NOEUDS , GENERANT EGALEMENT LES NUMEROS'
     2,   ' DE NOEUDS CORRESPONDANT',/))
      READ(P,1)NFG,NCHU,NIHU,NCFG,NIFG,NDP
```

```
    1 FORMAT(6I3)                                                       CHA 0059
      N2DP=NDP                                                          CHA 0060
      IDNDP=NDP                                                         CHA 0061
      NFG=NFG*2                                                         CHA 0062
      NCFG=NCFG*2                                                       CHA 0063
      NIFG=NIFG*2                                                       CHA 0064
      NCHU=NCHU*2                                                       CHA 0065
      NIHU=NIHU*2                                                       CHA 0066
C     NFG=NUMBER OF FINAL GROUPS                                        CHA 0067
C     NCHU=NUMBER OF CONTEMPLATED HU GROUPS                             CHA 0068
C     NIHU=NUMBER OF INSTALLED  HU GROUPS                               CHA 0069
C     NCFG=NUMBER OF CONTEMPLATED FULL GROUPS                           CHA 0070
C     NIFG=NUMBER OF INSTALLED FULL GROUPS                              CHA 0071
C     NDP =NUMBER OF PAIRS OF DEMAND POINTS                             CHA 0072
      PP=NFG+NCHU+NIHU+NCFG+NIFG                                        CHA 0073
      LLINK=PP/2                                                        CHA 0074
      L2LINK=LLINK                                                      CHA 0075
C PP= TOTAL NUMBER OF LINKS IN NETWORK                                  CHA 0076
      WRITE(IP,501) NDP,NFG,NCHU,NIHU,NCFG,NIFG                         CHA 0077
  501 FORMAT('1',21X,'HERMES III'/'0',1X,'PROBLEM DEFINITION'/'0',5X,I3,CHA 0078
     11X,'DEMAND PAIRS',5X,I2,1X,'FINAL GROUPS'/'0',5X,I2,1X,'CONTEMPLATCHA 0079
     2ED HU GROUPS'/'0',5X,I2,1X,'INSTALLED HU GROUPS'/'0',5X,I2,1X,'CONCHA 0080
     3TEMPLATED FULL GROUPS'/'0',5X,I2,1X,'INSTALLED FULL GROUPS')      CHA 0081
C THIS PROCEDURE READS IN THE SWITCHING NETWORK, SORTS THE TYPES OF     CHA 0082
C GROUPS,AND PLACES THEM IN THE PROPER  FILE  IN  MATRIX A.             CHA 0083
      JOT(1)=1                                                          CHA 0084
      JOT(2)=NCHU+ JOT(1)                                               CHA 0085
      JOT(3)=NCFG+JOT(2)                                                CHA 0086
      JOT(4)=NIHU+JOT(3)                                                CHA 0087
      JOT(5)=NIFG+JOT(4)                                                CHA 0088
      PI=0                                                              CHA 0089
      LIM23=0                                                           CHA 0090
      GENLNB=1                                                          CHA 0091
    4 READ(P,2) (BVD(J),J=1,7),ZZZ                                      CHA 0092
    2 FORMAT(3A4,1X,3A4,1X,A4,F7.2)                                     CHA 0093
      DO 3 I=1,5                                                        CHA 0094
      LTYP=I                                                            CHA 0095
      IF(BVD(7).EQ.LTYPE(I)) GO TO 5                                    CHA 0096
    3 CONTINUE                                                          CHA 0097
      WRITE(IP,8) (BVD(I),I=1,7),(LTYPE(I),I=1,5)                       CHA 0098
    8 FORMAT('0ERREUR SURVENUE ENTRE ',1H',3A4,6H' ET ',3A4,1H'         CHA 0099
     1        ,/,2H0',A4,1H','EST UN TYPE INACCEPTABLE . ON LE SUPPOSE' CHA 0100
     2,       ' ALORS COMME ETANT ',8H'IHU ' .,/,                       CHA 0101
     3        '0LES SEULS TYPES ACCEPTABLES SONT :',(/,2H0',A4,1H'))    CHA 0102
      LTYP=3                                                            CHA 0103
    5 KK=JOT(LTYP)                                                      CHA 0104
      A(KK,5)=LTYP                                                      CHA 0105
      A(KK+1,5)=LTYP                                                    CHA 0106
      BLOV(KK)=ZZZ                                                      CHA 0107
      BLOV(KK+1)=ZZZ                                                    CHA 0108
C                                                                       CHA 0109
C     RECHERCHE DANS 'NODNM' POUR RECONNAITRE LES NOEUDS QUI ONT DEJA   CHA 0110
C     PARU DANS LA DEFINITION DU RESEAU. SINON DE GENERER DES NOUVEAUX  CHA 0111
C     NOS. DE NOEUDS.                                                   CHA 0112
C                                                                       CHA 0113
C     'LIM23' = NOBRE TOTAL DE NOEUDS DANS LE RESEAU .                  CHA 0114
C                                                                       CHA 0115
      IF(LIM23.EQ.0) GO TO 25                                           CHA 0116
```

```
      DO 23 I=1,LIM23                                                   CHA 0117
      GENNNB=I                                                          CHA 0118
      IF(BVD(1).EQ.NODNM(I,1)) GO TO 26                                 CHA 0119
      GO TO 23                                                          CHA 0120
   26 IF(BVD(2).EQ.NODNM(I,2)) GO TO 27                                 CHA 0121
   23 CONTINUE                                                          CHA 0122
      A(KK,1)=LIM23+1                                                   CHA 0123
      A(KK+1,2)=LIM23+1                                                 CHA 0124
      NODNAM(1,LIM23+1)=BVD(1)                                          CHA 0125
      NODNM(LIM23+1,1)=BVD(1)                                           CHA 0126
      NODNAM(2,LIM23+1)=BVD(2)                                          CHA 0127
      NODNM(LIM23+1,2)=BVD(2)                                           CHA 0128
      NODNM(LIM23+1,3)=BVD(3)                                           CHA 0129
      LIM23=LIM23+1                                                     CHA 0130
      GO TO 28                                                          CHA 0131
   27 A(KK,1)=GENNNB                                                    CHA 0132
      A(KK+1,2)=GENNNB                                                  CHA 0133
   28 DO 32 I=1,LIM23                                                   CHA 0134
      GENNNB=I                                                          CHA 0135
      IF(BVD(4).EQ.NODNM(I,1)) GO TO 31                                 CHA 0136
      GO TO 32                                                          CHA 0137
   31 IF(BVD(5).EQ.NODNM(I,2)) GO TO 33                                 CHA 0138
   32 CONTINUE                                                          CHA 0139
      A(KK,2)=LIM23+1                                                   CHA 0140
      A(KK+1,1)=LIM23+1                                                 CHA 0141
      NODNAM(1,LIM23+1)=BVD(4)                                          CHA 0142
      NODNM(LIM23+1,1)=BVD(4)                                           CHA 0143
      NODNAM(2,LIM23+1)=BVD(5)                                          CHA 0144
      NODNM(LIM23+1,2)=BVD(5)                                           CHA 0145
      NODNM(LIM23+1,3)=BVD(6)                                           CHA 0146
      LIM23=LIM23+1                                                     CHA 0147
      GO TO 34                                                          CHA 0148
   33 A(KK,2)=GENNNB                                                    CHA 0149
      A(KK+1,1)=GENNNB                                                  CHA 0150
      GO TO 34                                                          CHA 0151
   25 A(KK,1)=1                                                         CHA 0152
      A(KK,2)=2                                                         CHA 0153
      A(KK+1,1)=2                                                       CHA 0154
      A(KK+1,2)=1                                                       CHA 0155
      NODNM(1,1)=BVD(1)                                                 CHA 0156
      NODNM(1,2)=BVD(2)                                                 CHA 0157
      NODNM(1,3)=BVD(3)                                                 CHA 0158
      NODNM(2,1)=BVD(4)                                                 CHA 0159
      NODNM(2,2)=BVD(5)                                                 CHA 0160
      NODNM(2,3)=BVD(6)                                                 CHA 0161
      NODNAM(1,1)=BVD(1)                                                CHA 0162
      NODNAM(2,1)=BVD(2)                                                CHA 0163
      NODNAM(1,2)=BVD(4)                                                CHA 0164
      NODNAM(2,2)=BVD(5)                                                CHA 0165
      LIM23=2                                                           CHA 0166
   34 A(KK,3)=GENLNB                                                    CHA 0167
      A(KK,4)=GENLNB                                                    CHA 0168
      A(KK+1,4)=GENLNB                                                  CHA 0169
      A(KK+1,3)=GENLNB+1                                                CHA 0170
      GENLNB=GENLNB+2                                                   CHA 0171
C                                                                       CHA 0172
C     'LIM23' = NOMBRE TOTAL DE NOEUDS DANS LE RESEAU .                 CHA 0173
C                                                                       CHA 0174
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      JOT(LTYP)=JOT(LTYP)+2                                             CHA 0175
      PI=PI+2                                                           CHA 0176
      IF(PI.LT.PP)GO TO 4                                               CHA 0177
      WRITE(IP,502)                                                     CHA 0178
      DO 504 I=1,PP                                                     CHA 0179
      IK1=A(I,1)                                                        CHA 0180
      IK2=A(I,2)                                                        CHA 0181
      IK3=A(I,5)                                                        CHA 0182
      WRITE(IP,503) (NODNM(IK1,J),J=1,2),(NODNM(IK2,J),J=1,2),          CHA 0183
     1              (A(I,J),J=1,4),LTYPE(IK3),BLOV(I)                   CHA 0184
  502 FORMAT('1  ORIGIN    DESTINATION.   NODE  TO  NODE  LINK NO.  '   CHA 0185
     1,       'LINK NO.   TYPE    COEFF.')                              CHA 0186
  503 FORMAT(2X,2A4,5X,2A4,2(5X,I3,7X,I3),6X,A4,5X,F4.2)                CHA 0187
      IF(59*(I/59).EQ.I) WRITE(IP,502)                                  CHA 0188
  504 CONTINUE                                                          CHA 0189
C                                                                       CHA 0190
C     ELN CONTIENT LES NOS DES ARETES , ( ELN(I) = I )                  CHA 0191
C     ENN CONTIENT LES NOS DES NOEUDS , ( ENN(I) = I ) .                CHA 0192
C                                                                       CHA 0193
      DO 6 I=1,PP                                                       CHA 0194
      ELN(I)=A(I,3)                                                     CHA 0195
    6 CONTINUE                                                          CHA 0196
      DO 7 I=1,LIM23                                                    CHA 0197
      ENN(I)=I                                                          CHA 0198
      VSU(I)=0                                                          CHA 0199
    7 CONTINUE                                                          CHA 0200
      KAP=LIM23                                                         CHA 0201
      LTREF=LIM23                                                       CHA 0202
C                                                                       CHA 0203
C     CREATION DU TABLEAU DE REFERENCE 'TREF' .                         CHA 0204
C                                                                       CHA 0205
      DO 53 I=1,LIM23                                                   CHA 0206
      DO 53 J=1,LIM23                                                   CHA 0207
      TREF(I,J)=0                                                       CHA 0208
   53 CONTINUE                                                          CHA 0209
C                                                                       CHA 0210
C     CI-HAUT LE TABLEAU 'TREF' EST INITIALISE A ZERO.                  CHA 0211
C                                                                       CHA 0212
C     AFFECTATION A 'TREF(I,J)' DU NUMERO INTERNE DE L'ARC I-J          CHA 0213
C                                                                       CHA 0214
      DO 54 I=1,PP                                                      CHA 0215
      J=A(I,1)                                                          CHA 0216
      K=A(I,2)                                                          CHA 0217
      TREF(J,K)=I                                                       CHA 0218
   54 CONTINUE                                                          CHA 0219
C READS IN  DEMAND  PAIRS  AND  CONVERTS  EXTERNAL NODE  NUMBERS TO     CHA 0220
C INTERNAL ONES                                                         CHA 0221
      DO 58 I=1,NDP                                                     CHA 0222
      READ(P,14) (BULL(J),J=1,2),DEM(I),DEL(I)                          CHA 0223
   14 FORMAT(A8,5X,A8,4X,2F7.2)                                         CHA 0224
      DEM(I)=DEM(I)/36.                                                 CHA 0225
      DEL(I)=DEL(I)/36.                                                 CHA 0226
      DELTA(I)=DEL(I)-DEM(I)                                            CHA 0227
      DO 52 J=1,LIM23                                                   CHA 0228
      IF(BULL(1).EQ.XNODNM(J)) GO TO 51                                 CHA 0229
      GO TO 52                                                          CHA 0230
   51 DP(I,1)=J                                                         CHA 0231
      GO TO 55                                                          CHA 0232
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   52 CONTINUE                                                          CHA 0233
   55 DO 57 J=1,LIM23                                                   CHA 0234
      IF(BULL(2).EQ.XNODNM(J)) GO TO 56                                 CHA 0235
      GO TO 57                                                          CHA 0236
   56 DP(I,2)=J                                                         CHA 0237
      GO TO 58                                                          CHA 0238
   57 CONTINUE                                                          CHA 0239
   58 CONTINUE                                                          CHA 0240
      WRITE(IP,505)                                                     CHA 0241
      DO 507 J=1,KAP                                                    CHA 0242
      WRITE(IP,506) J,(NODNM(J,IKI),IKI=1,3)                            CHA 0243
      IF(58*(J/58).EQ.J) WRITE(IP,505)                                  CHA 0244
  507 CONTINUE                                                          CHA 0245
      WRITE(IP,509)                                                     CHA 0246
      DO 510 I=1,PP                                                     CHA 0247
      IND1=A(I,1)                                                       CHA 0248
      IND2=A(I,2)                                                       CHA 0249
      WRITE(IP,511) I,(NODNM(IND1,IKI),IKI=1,3),(NODNM(IND2,IK),IK=1,3) CHA 0250
      IF(58*(I/58).EQ.I) WRITE(IP,509)                                  CHA 0251
  510  CONTINUE                                                         CHA 0252
  505 FORMAT('1 INTERNAL',8X,'EXTERNAL',/,'  NODE NO.',7X,'NODE  NAME') CHA 0253
  506 FORMAT(5X,I2,9X,3A4)                                              CHA 0254
  509 FORMAT('1 INTERNAL',4X,'EXTERNAL INDENTIFICATION OF LINKS',/,     CHA 0255
     1        '  LINK NO.',9X,'BY EXTERNAL NODE NAMES')                 CHA 0256
  511 FORMAT(5X,I3,9X,3A4,' -- ',3A4)                                   CHA 0257
C                                                                       CHA 0258
C     NDIM=NUMBER OF POSSIBLE PROFILES (OVERALL)                        CHA 0259
C                                                                       CHA 0260
      NHU=(NCHU+NCFG)/2                                                 CHA 0261
C   IMPORTANT  IF MORE THAN 6 CONTEMPLATEDS ARE REQUIRED  NDIM= 2**N CONCHAM0262
      NDIM=64                                                           CHA 0263
C                                                                       CHA 0264
C     SEARCH FOR CONTEMPLATED HU OR FG                                  CHA 0265
C                                                                       CHA 0266
      NARCS=PP                                                          CHA 0267
      ELN1(1)=ELN(JAR(1,4))                                             CHA 0268
      K=1                                                               CHA 0269
      DO 48 I=2,NARCS                                                   CHA 0270
      IF (JAR(I,4).EQ.JAR(I-1,4)) GO TO 48                              CHA 0271
      K=K+1                                                             CHA 0272
      ELN1(K)=ELN(JAR(I,4))                                             CHA 0273
   48 CONTINUE                                                          CHA 0274
      IND=0                                                             CHA 0275
      DO 49 I=1,NARCS                                                   CHA 0276
      IF (JAR(I,5).GT.2)GO TO 49                                        CHA 0277
      IND=IND+1                                                         CHA 0278
      IDHU(IND)=JAR(I,3)                                                CHA 0279
      IF (I.EQ.1)GO TO 49                                               CHA 0280
      IF (JAR(I-1,4).EQ.JAR(I,4))IND=IND-1                              CHA 0281
   49 CONTINUE                                                          CHA 0282
      IF (NHU.NE.IND) GO TO 2015                                        CHA 0283
C                                                                       CHA 0284
C    DEFINIR LES COMBINAISONS DES NHU (HU OU FG)                        CHA 0285
C    POTENTIELS                                                         CHA 0286
C                                                                       CHA 0287
      J=0                                                               CHA 0288
   29 J=J+1                                                             CHA 0289
C  IMPORTANT FOR CHANGE IN CONTEMPLATEDS. IF MORE THAN 6 CONTEMPLATEDS  CHA 0290
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C   REQUIRED  THEN  IF(J.GT.N) GO TO 50 FOR N CONTEMPLATED
      IF(J.GT.6) GO TO 50
      DO 30 I=1,NDIM
      IVECT(I)=1
   30 CONTINUE
      IDEB=1
      IFIN=2**(J-1)
   39 DO 40 I=IDEB,IFIN
      IVECT(I)=0
   40 CONTINUE
      IDEB=IFIN+1+2**(J-1)
      IFIN=IDEB-1+2**(J-1)
      IF (IFIN.GT.NDIM) GO TO 41
      GO TO 39
   41 WRITE(8'J) (IVECT(L),L=1,NDIM)
      GO TO 29
   50 CONTINUE
      KPA=0
C  THIS PROCEDURE FINDS  THE CHAIN MADE UP OF  FINAL GROUPS BETWEEN
C  ONE PAIR OF DEMAND POINTS  AND STORES THE CHAIN  IN VECTOR VECT
      ID=0
C
C     INITIALISATION DU VECTEUR DEMANDE MAXIMUM.
C
      DO 105 I=1,200
      DMAX(I)=0
  105 CONTINUE
       III=0
      I4=0
  100 ID=ID+1
      III=III+1
      DO 17862 I=1,100
      CHOR(I)=0.0
17862   CHORD(I)=0.0
      IF(ID.GT.NDP) GO TO 711
C
C  THIS PROCEDURE FINDS THE FINAL GROUP CHAIN FOR DEMAND PAIR  ID
C
      DO 104 IRIS=1,PP
      DO 104 JRIS=6,10
      A(IRIS,JRIS)=0
  104 CONTINUE
      DO 177 I=1,10
      JHU(I)=0
  177 CONTINUE
      L=1
      LM=1
      NORG=DP(ID,1)
      NEST=DP(ID,2)
      PAL=JOT(4)
      DO 101 JJ=PAL,PP
      IF(NORG.EQ.A(JJ,1)) GO TO 102
      GO TO 101
  102 F(L,LM)=NORG
      F(L,LM+1)=A(JJ,2)
      L=L+1
  101 CONTINUE
      LM=LM+1
```

```
      L=L-1                                                             CHA 0349
  113 LOP=0                                                             CHA 0350
      DO 103 IC=1,L                                                     CHA 0351
      IIC=IC                                                            CHA 0352
      IF(F(IC,LM).EQ.NEST) GO  TO 1000                                  CHA 0353
  103 CONTINUE                                                          CHA 0354
      DO 107 LP=1,L                                                     CHA 0355
      NORG=F(LP,LM)                                                     CHA 0356
      DO 108 LA=2,LM                                                    CHA 0357
      IF(NORG.EQ.F(LP,LM-LA+1))GO TO 107                                CHA 0358
  108 CONTINUE                                                          CHA 0359
      DO 109 JJ=PAL,PP                                                  CHA 0360
      IF(NORG.EQ.A(JJ,1)) GO TO 110                                     CHA 0361
      GO TO 109                                                         CHA 0362
  110 LOP=LOP+1                                                         CHA 0363
      DO 111 JK=1,LM                                                    CHA 0364
  111 G(LOP,JK)=F(LP,JK)                                                CHA 0365
      G(LOP,LM+1)=A(JJ,2)                                               CHA 0366
  109 CONTINUE                                                          CHA 0367
  107 CONTINUE                                                          CHA 0368
      L=LOP                                                             CHA 0369
      LM=LM+1                                                           CHA 0370
      DO 112 LA=1,L                                                     CHA 0371
      DO 112 LQ=1,LM                                                    CHA 0372
      F(LA,LQ)=G(LA,LQ)                                                 CHA 0373
  112 CONTINUE                                                          CHA 0374
      GO TO 113                                                         CHA 0375
 1000 DO 114 I=1,LM                                                     CHA 0376
      VECT(I)=F(IIC,I)                                                  CHA 0377
  114 CONTINUE                                                          CHA 0378
C THIS PROCEDURE USES THE FINAL GROUP CHAIN  TO FIND ALL POSSIBLE       CHA 0379
C COMBINATIONS OF POSSIBLE LINKS JOINING THE NODES OF THE FINAL GROUP.CHCHA 0380
      IF(LM.EQ.2) GO TO  70                                             CHA 0381
      L=0                                                               CHA 0382
      KKK=LM-2                                                          CHA 0383
      DO 19 I=1,KKK                                                     CHA 0384
      NORG=VECT(I)                                                      CHA 0385
      DO 19 J=I,KKK                                                     CHA 0386
      NEST=VECT(J+2)                                                    CHA 0387
      L=L+1                                                             CHA 0388
      IMA(L,1)=NORG                                                     CHA 0389
      IMA(L,2)=NEST                                                     CHA 0390
   19 CONTINUE                                                          CHA 0391
C  FROM THE SET OF POSSIBLE  HU, FULL, INSTALLED OR NOT INSTALLED GROUPSCHA 0392
C  THIS PROCEDURE FINDS THE LINKS  APPLICABLE TO THIS SIMULATION        CHA 0393
      JK=0                                                              CHA 0394
      NS=JOT(4)-1                                                       CHA 0395
      DO 22 I=1,L                                                       CHA 0396
      DO 21 J=1,NS                                                      CHA 0397
      IJ=J                                                              CHA 0398
      IF((IMA(I,1).EQ.A(J,1)).AND.(IMA(I,2).EQ.A(J,2))) GO TO 20        CHA 0399
   21 CONTINUE                                                          CHA 0400
      GO TO 22                                                          CHA 0401
20     IF((A(IJ,5).EQ.2).OR.(A(IJ,5).EQ.4)) GO TO 2221                  CHA 0402
       GO TO 2222                                                       CHA 0403
2221   IF((IMA(I,1).EQ.DP(ID,1)).AND.(IMA(I,2).EQ. DP(ID,2))) GD TO 2222CHA 0404
       GO TO 22                                                         CHA 0405
2222   JK=JK+1                                                          CHA 0406
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      IMA(JK,1)=A(IJ,1)                                                 CHA 0407
      IMA(JK,2)=A(IJ,2)                                                 CHA 0408
   22 CONTINUE                                                          CHA 0409
      NO=LM-1                                                           CHA 0410
      DO 24 I=1,NO                                                      CHA 0411
      IMA(JK+I,1)=VECT(I)                                               CHA 0412
      IMA(JK+I,2)=VECT(I+1)                                             CHA 0413
   24 CONTINUE                                                          CHA 0414
C  THIS PROCEDURE  GENERATES ALL THE POSSIBLE CHAINS BETWEEN A PAIR     CHA 0415
C  OF DEMAND POINTS USING FINAL,FULL,HU, INSTALLED OR CONTEMPLATED      CHA 0416
      DO 774 I=1,60                                                     CHA 0417
       DO 774 J=1,15                                                    CHA 0418
      F(I,J)=0                                                          CHA 0419
      G(I,J)=0                                                          CHA 0420
774   CONTINUE                                                          CHA 0421
      DO 98 J=1,15                                                      CHA 0422
      DO 98 I=1,60                                                      CHA 0423
      PROF(I,J)=0                                                       CHA 0424
98    CONTINUE                                                          CHA 0425
      JB=0                                                              CHA 0426
      L=1                                                               CHA 0427
      PS=JK+NO                                                          CHA 0428
      LM=1                                                              CHA 0429
      NORG=DP(ID,1)                                                     CHA 0430
      NEST=DP(ID,2)                                                     CHA 0431
      DO 201 JJ=1,PS                                                    CHA 0432
      IF(NORG.EQ.IMA(JJ,1))GO TO 202                                    CHA 0433
      GO TO 201                                                         CHA 0434
  202 F(L,LM)=NORG                                                      CHA 0435
      F(L,LM+1)=IMA(JJ,2)                                               CHA 0436
      L=L+1                                                             CHA 0437
  201 CONTINUE                                                          CHA 0438
      LM=LM+1                                                           CHA 0439
      L=L-1                                                             CHA 0440
  213 LOP=0                                                             CHA 0441
      DO 203 IC=1,L                                                     CHA 0442
      IF(F(IC,LM).EQ.NEST) GO TO 1001                                   CHA 0443
      NORG=F(IC,LM)                                                     CHA 0444
      GO TO 214                                                         CHA 0445
 1001 JB=JB+1                                                           CHA 0446
      PROF(JB,1)=LM-1                                                   CHA 0447
      DO 218 I=1,LM                                                     CHA 0448
      PROF(JB,I+1)=F(IC,I)                                              CHA 0449
  218 CONTINUE                                                          CHA 0450
      GO TO 203                                                         CHA 0451
214   DO 215 JJ=1,PS                                                    CHA 0452
      IF(NORG.EQ.IMA(JJ,1))GO TO 216                                    CHA 0453
      GO TO 215                                                         CHA 0454
  216 LOP=LOP+1                                                         CHA 0455
      DO 217 JK=1,LM                                                    CHA 0456
      G(LOP,JK)=F(IC,JK)                                                CHA 0457
  217 CONTINUE                                                          CHA 0458
      G(LOP,LM+1)=IMA(JJ,2)                                             CHA 0459
  215 CONTINUE                                                          CHA 0460
  203 CONTINUE                                                          CHA 0461
      IF(LOP.EQ.0) GO TO 220                                            CHA 0462
      L=LOP                                                             CHA 0463
      LM=LM+1                                                           CHA 0464
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      DO 219 LA=1,L                                                     CHA 0465
      DO 219 LQ=1,LM                                                    CHA 0466
      F(LA,LQ)=G(LA,LQ)                                                 CHA 0467
  219 CONTINUE                                                          CHA 0468
      GO TO 213                                                         CHA 0469
C  JB=NUMBER OF CHAINS                                                  CHA 0470
C  PROF(JB,1)=NUMBER OF LINKS IN CHAIN JB                               CHA 0471
C     INITIALIZE VECTOR NICK =0                                         CHA 0472
70    IF(LM.NE.2) GO TO 220                                             CHA 0473
      JB=1                                                              CHA 0474
      PROF(1,1)=JB                                                      CHA 0475
      PROF(1,2)=DP(ID,1)                                                CHA 0476
      PROF(1,3)=DP(IO,2)                                                CHA 0477
  220 DO 299 I=1,PP                                                     CHA 0478
      NICK(I)=0                                                         CHA 0479
  299 CONTINUE                                                          CHA 0480
C  CONVERT PROF TO INTERNAL LINK NUMBERS                                CHA 0481
C  NICK(I)IS A VECTOR  WHERE NICK(I)=1 IF LINK I IS PRESENT.            CHA 0482
       DO 300 I=1,JB                                                    CHA 0483
      NUM=PROF(I,1)                                                     CHA 0484
      DO 301J=1,NUM                                                     CHA 0485
      NORG=PROF(I, J+1)                                                 CHA 0486
      NEST=PROF(I, J+2)                                                 CHA 0487
      DO 302 JK=1,PP                                                    CHA 0488
      IF((NORG.EQ.A(JK,1)).AND.(NEST.EQ.A(JK,2))) GO TO 303             CHA 0489
      GO TO 302                                                         CHA 0490
  303 PROF(I,J+1)=A(JK,3)                                               CHA 0491
      NICK(A(JK,3))=1                                                   CHA 0492
  302 CONTINUE                                                          CHA 0493
  301 CONTINUE                                                          CHA 0494
  300 CONTINUE                                                          CHA 0495
C                                                                       CHA 0496
C     CETTE PROCEDURE TROUVE LES NOS INTERNES DES ARCS QUI DEBORDENT    CHA 0497
C     SUR D'AUTRES ARCS, PLACE CES NOS DANS 'JAR' (OU 'A') A LA LIGNE   CHA 0498
C     CORRESPONDANT A L'ARC QUI RECOIT LES DEBORDEMENTS.                CHA 0499
C                                                                       CHA 0500
      IF(JB.EQ.1) GO TO 521                                             CHA 0501
      LMSUB2=LM-2                                                       CHA 0502
      DO 529 I=1,LMSUB2                                                 CHA 0503
      IDEBU=I+1                                                         CHA 0504
      IFIN=LM-1                                                         CHA 0505
      DO 528 K=IDEBU,IFIN                                               CHA 0506
      IDEB=K+1                                                          CHA 0507
      NDIS=5                                                            CHA 0508
      INDEX=0                                                           CHA 0509
      DO 520 J=IDEB,LM                                                  CHA 0510
      INDISI=VECT(I)                                                    CHA 0511
      INDISJ=VECT(J)                                                    CHA 0512
      INDISK=VECT(K)                                                    CHA 0513
      INDIS=TREF(INDISI,INDISJ)                                         CHA 0514
      IF(INDIS.EQ.0) GO TO 520                                          CHA 0515
      NDIC=A(INDIS,5)                                                   CHA 0516
      IF(NDIC.EQ.2.OR.NDIC.EQ.4.OR.NDIC.EQ.5) GO TO 520                 CHA 0517
      NDIS=NDIS+1                                                       CHA 0518
      NDISS=TREF(INDISI,INDISK)                                         CHA 0519
      IF(NDISS.EQ.0) GO TO 520                                          CHA 0520
      IF(NDIS.GT.10) GO TO 512                                          CHA 0521
      IF(A(NDISS,5).EQ.2.OR.A(NDISS,5).EQ.4) GO TO 746                  CHA 0522
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      A(NDISS,NDIS)=INDIS                                               CHA 0523
      GO TO 520                                                         CHA 0524
  746 NDIS=NDIS-1                                                       CHA 0525
      GO TO 520                                                         CHA 0526
  512 IF(INDEX.GT.0) GO TO 520                                          CHA 0527
      INDEX=FLN(NDISS)                                                  CHA 0528
      WRITE(IP,513) INDEX,DP(ID,1),DP(ID,2)                             CHA 0529
  513 FORMAT(/////,5X,'**** ERREUR **** IL Y A PLUS DE 5 DEBORDEMENTS ' CHA 0530
     1,      'SUR L''ARETE NO : ',I3,/,22X,'ERREUR RENCONTREE DANS LA ' CHA 0531
     2,      'PAIRE DE DEMANDE ENTRE LES NOEUDS  ',I3,'  ET  ',I3,/,22X,CHA 0532
     3       'POUR LA PAIRE EN QUESTION ON CONSERVERA SEULEMENT LES 5 ' CHA 0533
     4,      'PREMIERS DEBORDEMENTS , LES CALCULS NE TIENDRONT PAS'    CHA 0534
     5,      ' COMPTE DU RESTE ')                                      CHA 0535
  520 CONTINUE                                                          CHA 0536
  528 CONTINUE                                                          CHA 0537
  529 CONTINUE                                                          CHA 0538
  521 CONTINUE                                                          CHA 0539
C                                                                       CHA 0540
C     NOTE : IL N'Y A PAS DE 'DO 521 ...', L'ENONCE-BIDON 521 SERT A    CHA 0541
C     PASSER PAR DESSUS LA PROCEDURE DES DEBORDEMENTS DANS LE CAS OU    CHA 0542
C      'JB' = 1. (LORSQU'IL N'Y A QU'UNE CHAINE, ON NE PEUT DEBORDER)   CHA 0543
C                                                                       CHA 0544
C     MOD:NOMBRE DE CHAINES                                             CHA 0545
C      III: NUMERO DU COUPLE .                                          CHA 0546
C                                                                       CHA 0547
      MOD=JB                                                            CHA 0548
C     CALCUL DE LA CHARGE GENERE PAR LE COUPLE III                      CHA 0549
C   JHU IS A VECTOR CONTAINING THE CONTEMPLATED HU OR FG                CHA 0550
C                                                                       CHA 0551
      NHUP=0                                                            CHA 0552
C                                                                       CHA 0553
C     TROUVER LES HU OU FG PERTINENTS POUR LE COUPLE III                CHA 0554
      LL=0                                                              CHA 0555
      DO 150 I=1,MOD                                                    CHA 0556
      IFIN=CH(I,1)+1                                                    CHA 0557
      IDEP=JAR(CH(I,2),1)                                               CHA 0558
      IARR=JAR(CH(I,IFIN),2)                                            CHA 0559
      IF ((IDEP.NE.DP(ID ,1)).OR.(IARR.NE.DP(ID ,2)))GO TO 2001         CHA 0560
      DO 140 J=2,IFIN                                                   CHA 0561
      IF (JAR(CH(I,J),5).GT.2)GO TO 140                                 CHA 0562
      IF (NHUP.LT.1) GO TO 142                                          CHA 0563
      DO 144 IZ=1,NHUP                                                  CHA 0564
      IF (JAR(CH(I,J),4).EQ.JHU(IZ)) GO TO 140                          CHA 0565
  144 CONTINUE                                                          CHA 0566
  142 NHUP=NHUP+1                                                       CHA 0567
      JHU(NHUP)=JAR(CH(I,J),4)                                          CHA 0568
  140 CONTINUE                                                          CHA 0569
  150 CONTINUE                                                          CHA 0570
      IFIN=2**NHUP                                                      CHA 0571
      KTT=0                                                             CHA 0572
      IF (NHUP.EQ.0)GO TO 139                                           CHA 0573
C                                                                       CHA 0574
C     IDENTIFIER LES IFIN PROFILS POSSIBLES A                           CHA 0575
C     PARTIR DES HU OU FG TROUVES .                                     CHA 0576
C                                                                       CHA 0577
      DO 141 I=1,NHUP                                                   CHA 0578
      READ(8'I)(B(I,J),J=1,IFIN)                                        CHA 0579
  141 CONTINUE                                                          CHA 0580
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      GO TO 155                                                         CHA 0581
  139 NHUP=1                                                            CHA 0582
      JHU(1)=PP+1                                                       CHA 0583
      ELN(PP+1)=999                                                     CHA 0584
      PB(1)=-1                                                          CHA 0585
      KTT=1                                                             CHA 0586
C                                                                       CHA 0587
C                                                                       CHA 0588
  155 DO 280 KPR=1,IFIN                                                 CHA 0589
      NKOD=2                                                            CHA 0590
C                                                                       CHA 0591
C     DETERMINATION DU PROFIL KPR                                       CHA 0592
C                                                                       CHA 0593
      IF (KTT.EQ.1) GO TO 156                                           CHA 0594
      DO 148 I=1,NHUP                                                   CHA 0595
      PB(I)=B(I,KPR)                                                    CHA 0596
  148 CONTINUE                                                          CHA 0597
      NPOINT=2**NHUP                                                    CHA 0598
      GO TO 157                                                         CHA 0599
  156 NPOINT=2**NHUP                                                    CHA 0600
  157 IF((JAR(CH(1,2),5).NE.4).AND.(JAR(CH(1,2),5).NE.2)) GO TO 2220    CHA 0601
      IF (JAR(CH(1,2),5).EQ.2) GO TO 2240                               CHA 0602
      NKOD=1                                                            CHA 0603
 2216  DO 2219 I=1,NARCS                                                CHA 0604
       CHAR(I)=0                                                        CHA 0605
      CHARD(I)=0                                                        CHA 0606
 2219  CONTINUE                                                        CHA 0607
       CHAR(CH(I,2))=DEM(ID)                                            CHA 0608
      IF (NKOD.EQ.0) CHAR(CH(1,2))=0                                    CHA 0609
      CHARD(CH(1,2))=DEL(ID)                                            CHA 0610
      IF (NKOD.EQ.1) GO TO 8430                                         CHA 0611
      DO 4444 KL=1,LLINK                                                CHA 0612
      CR(KL)=-NCC(KL)                                                   CHA 0613
 4444 CONTINUE                                                          CHA 0614
      GO TO 2281                                                        CHA 0615
 2240 DO 2239 I=1,NHUP                                                  CHA 0616
      IF (JAR(CH(1,2),4).NE.JHU(I)) GO TO 2239                          CHA 0617
      IF (PB(I).EQ.0) GO TO 2220                                        CHA 0618
      NKOD=0                                                            CHA 0619
      GO TO 2216                                                        CHA 0620
 2239 CONTINUE                                                          CHA 0621
      GO TO 2003                                                        CHA 0622
 2220 DO 260 LLL=1,NARCS                                                CHA 0623
      CHAR(LLL)=0                                                       CHA 0624
      CHARD(LLL)=0                                                      CHA 0625
      IF (KPR.EQ.1) C1(LLL)=0                                           CHA 0626
C     CALCUL DE LA CHARGE SUR L'ARC LLL POUR LE PROFIL KPR              CHA 0627
C     ET LA PAIRE III                                                   CHA 0628
C                                                                       CHA 0629
C                                                                       CHA 0630
C                                                                       CHA 0631
C                                                                       CHA 0632
      IF  (NICK(LLL).EQ.0) GO TO 260                                    CHA 0633
      DO 170 IC=1,MOD                                                   CHA 0634
      LFIN=CH(IC,1)+1                                                   CHA 0635
      KPOINT=0                                                          CHA 0636
      NCON=0                                                            CHA 0637
      DO 160 KJ=2,LFIN                                                  CHA 0638
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      IF (JAR(CH(IC,KJ),5).LT.3)NCON=NCON+1                              CHA 0639
      IF (CH(IC,KJ).EQ.LLL)KPOINT=KJ                                     CHA 0640
  160 CONTINUE                                                           CHA 0641
      IF(KPOINT.EQ.0) GO TO 170                                          CHA 0642
C                                                                        CHA 0643
C     LA CHAINE IC PASSE PAR LLL                                         CHA 0644
C                                                                        CHA 0645
C     INITIALISATION DE WS,WSS,DWS,DWSS.                                 CHA 0646
C                                                                        CHA 0647
      DO 161 I=1,25                                                      CHA 0648
      WS(I)=-1                                                           CHA 0649
      WSS(I)=-1                                                          CHA 0650
  161 CONTINUE                                                           CHA 0651
      DWS=0                                                              CHA 0652
      DWSS=0                                                             CHA 0653
      IF (NCON.EQ.0) GO TO 188                                           CHA 0654
      NN=0                                                               CHA 0655
      DO 162 KJ=2,LFIN                                                   CHA 0656
      IF (JAR(CH(IC,KJ),5).GT.2)GO TO 162                                CHA 0657
      NN=NN+1                                                            CHA 0658
      IF (KJ.GT.KPOINT) GO TO 170                                        CHA 0659
      DO 163 I=1,NHUP                                                    CHA 0660
      IF (JAR(CH(IC,KJ),4).NE.JHU(I)) GO TO 163                          CHA 0661
      IF (PB(I).EQ.0) GO TO 170                                          CHA 0662
      GO TO 162                                                          CHA 0663
  163 CONTINUE                                                           CHA 0664
      GO TO 2003                                                         CHA 0665
  162 CONTINUE                                                           CHA 0666
      IF (NN.NE.NCON) GO TO 2004                                         CHA 0667
  188 INDEX=KPOINT-1                                                     CHA 0668
      IF (INDEX.LT.2) GO TO 169                                          CHA 0669
C     DEFINIR WS ET DWS                                                  CHA 0670
      DO 164 I=2,INDEX                                                   CHA 0671
      WS(I-1)=CH(IC,I)                                                   CHA 0672
  164 CONTINUE                                                           CHA 0673
      DWS=INDEX-1                                                        CHA 0674
C                                                                        CHA 0675
C     DEFINIR WSS ET DWSS                                                CHA 0676
C                                                                        CHA 0677
  169 IEND=INDEX+1                                                       CHA 0678
      LZ=0                                                               CHA 0679
      DO 167 I=2,IEND                                                    CHA 0680
      LKJ=CH(IC,I)                                                       CHA 0681
      DO 166 J=6,10                                                      CHA 0682
      IF (JAR(LKJ,J).EQ.0) GO TO 167                                     CHA 0683
      NDUM=JAR(JAR(LKJ,J),4)                                             CHA 0684
      IF (JAR(JAR(LKJ,J),5).EQ.3) GO TO 168                              CHA 0685
      DO 165 K=1,NHUP                                                    CHA 0686
      LKK=JHU(K)                                                         CHA 0687
      IF ((LKK.EQ.NDUM       ).AND.(PB(K).EQ.1)) GO TO 168               CHA 0688
  165 CONTINUE                                                           CHA 0689
      GO TO 166                                                          CHA 0690
  168 IF (NICK(JAR(JAR(LKJ,J),3)).EQ.0) GO TO 166                        CHA 0691
      LZ=LZ+1                                                            CHA 0692
      WSS(LZ)=JAR(LKJ,J)                                                 CHA 0693
  166 CONTINUE                                                           CHA 0694
  167 CONTINUE                                                           CHA 0695
      DWSS=LZ                                                            CHA 0696
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      IF (DWSS.EQ.0) GO TO 171                                          CHA 0697
C                                                                       CHA 0698
C     CALCUL DE P.                                                      CHA 0699
C                                                                       CHA 0700
  171 PZ=1                                                              CHA 0701
      IF (DWSS.EQ.0) GO TO 189                                          CHA 0702
      DO 187 I=1,DWSS                                                   CHA 0703
      LK=WSS(I)                                                         CHA 0704
      PZ=PZ*BLOV(LK)                                                    CHA 0705
  187 CONTINUE                                                          CHA 0706
C                                                                       CHA 0707
C     CALCUL DE LA CHARGE.                                              CHA 0708
C                                                                       CHA 0709
  189 ZZ=PZ*DEM(ID)                                                     CHA 0710
      ZZD=PZ*DEL(ID)                                                    CHA 0711
      AA=1                                                              CHA 0712
      IF (DWS.EQ.0) GO TO 192                                           CHA 0713
      DO 190 I=1,DWS                                                    CHA 0714
      LK=WS(I)                                                          CHA 0715
      COEF=1-BLOV(LK)                                                   CHA 0716
      AA=AA*COEF                                                        CHA 0717
  190 CONTINUE                                                          CHA 0718
  192 CHAR(LLL)=CHAR(LLL)+ ZZ*AA                                        CHA 0719
      CHARD(LLL)=CHARD(LLL)+ZZD*AA                                      CHA 0720
      IF (KPR.EQ.1) C1(LLL)=CHAR(LLL)                                   CHA 0721
  170 CONTINUE                                                          CHA 0722
  260 CONTINUE                                                          CHA 0723
C                                                                       CHA 0724
C     ECRIRE LA CHARGE SUR LE RC POUR                                   CHA 0725
C     LA PAIRE III ET LE PROFIL KPR                                     CHA 0726
C                                                                       CHA 0727
8430  CONTINUE                                                          CHA 0728
2281   CONTINUE                                                         CHA 0729
      IF(KTT.NE.1) GO TO 1738                                           CHA 0730
      J=0                                                               CHA 0731
      DO 1737 I=1,NARCS,2                                               CHA 0732
      J=J+1                                                             CHA 0733
      CHUR(J)=CHAR(I)+CHAR(I+1)+CHUR(J)                                 CHA 0734
      CHURD(J)=CHARD(I)+CHARD(I+1)+CHURD(J)                             CHA 0735
      CHOR(J)=CHAR(I)+CHAR(I+1)                                         CHA 0736
      CHORD(J)=CHARD(I)+CHARD(I+1)                                      CHA 0737
      CC1(I)=CHAR(I)                                                    CHA 0738
      CC1(I+1)=CHAR(I+1)                                                CHA 0739
1737  CONTINUE                                                          CHA 0740
      IF(JIMY.EQ.0) GO TO 28807                                         CHA 0741
      WRITE(IP,20771) (NODNM(DP(ID,1),IK),IK=1,3),(NODNM(DP(ID,2),IK),IKCHA 0742
     I=1,3),DEM(ID),DELTA(ID)                                           CHA 0743
20771 FORMAT('1',3X,'DEMAND(ERLANGS) FROM ',3A4,' TO ',3A4/57X,'INITIAL'CHA 0744
     1,3X,F10.3/57X,'INCREASED',1X,F10.3///32X,'(I)',10X,'(J)',10X,'(K)'CHA 0745
     1,10X,'(L)'/)                                                      CHA 0746
      WRITE(IP,2099) ((NODNM(JAR(2*J-1 ,1),K),K=1,3),(NODNM(JAR(2*J-1,2)CHA 0747
     1,K),K=1,3),CHOR(J),CHUR(J),CHORD(J),CHURD(J),J=1,LLINK)           CHA 0748
2099  FORMAT(1X,3A4,1X,3A4,2X,F8.2,5X,F8.2,5X,F8.2,5X,F8.2)             CHA 0749
28807  CONTINUE                                                         CHA 0750
      GO TO 1739                                                        CHA 0751
1738  J=0                                                               CHA 0752
      DO 1740 I=1,NARCS,2                                               CHA 0753
      J=J+1                                                             CHA 0754
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      CC1(I)=CHAR(I)                                                    CHA 0755
      CC1(I+1)=CHAR(I+1)                                                CHA 0756
     CRI(J)=0                                                           CHA 0757
     CR(J)=0                                                            CHA 0758
     CRI(J)=CHAR(I)+CHAR(I+1)                                           CHA 0759
     CR(J)=CHARD(I)+CHARD(I+1)                                          CHA 0760
 1740 CONTINUE                                                          CHA 0761
 1739  CONTINUE                                                         CHA 0762
  841 KPA=KPA+1                                                         CHA 0763
     IF(KTT.EQ.1)KPA=KPA-1                                              CHA 0764
      IF(KTT.EQ.1) III=III-1                                            CHA 0765
     IF (KPR.NE.1) GO TO 842                                            CHA 0766
     DO 843 I=1,KAP                                                     CHA 0767
     COM1(I)=0                                                          CHA 0768
  843 CONTINUE                                                          CHA 0769
  842 DO 1200 I=1,KAP                                                   CHA 0770
     COM(I)=0                                                           CHA 0771
     DO 1220 J=1,NARCS                                                  CHA 0772
     IF (JAR(J,2).NE.I) GO TO 1220                                      CHA 0773
     L=JAR(J,3)                                                         CHA 0774
     IF (KPR.NE.1) GO TO 1221                                           CHA 0775
     XX=CC1(L)                                                          CHA 0776
     COM1(I)=COM1(I)+XX*(1-BLOV(L))                                     CHA 0777
 1221 XXD=CHARD(L)                                                      CHA 0778
     COM(I)=COM(I)+XXD*(1-BLOV(L))                                      CHA 0779
 1220 CONTINUE                                                          CHA 0780
     COM(I)=(COM(I)-COM1(I))*36./21.                                    CHA 0781
     IF(COM(I).GT.0.00001) VSU(I)=1                                     CHA 0782
 1200 CONTINUE                                                          CHA 0783
      COM(DP(ID,1))=(DEL(ID)-DEM(ID))*36./21.                           CHA 0784
     IF(KTT.NE.1) GO TO 1741                                            CHA 0785
      DO 1742 I=1,KAP                                                   CHA 0786
 1742  COMM(I)=COMM(I)+COM(I)                                           CHA 0787
     IF(JIMY.EQ.0) GO TO 28808                                          CHA 0788
     IF(KTT.NE.1) GO TO 28808                                           CHA 0789
     WRITE(IP,2094)                                                     CHA 0790
 2094 FORMAT(//,3X,'TRAFFIC AT SWITCHING NODES(LINES)'/19X,'(M)',11X,'(NCHA 0791
    1)'/)                                                               CHA 0792
     WRITE(IP,28809)((NCDNM(J,K),K=1,3),COM(J),COMM(J),J=1,KAP)         CHA 0793
 28809 FORMAT(1X,3A4,1X,F9.2,5X,F9.2)                                   CHA 0794
 28808 CONTINUE                                                         CHA 0795
      I4=I4+1                                                           CHA 0796
     DP(I4,1)=DP(ID,1)                                                  CHA 0797
     DP(I4,2)=DP(ID,2)                                                  CHA 0798
     DEM(I4)=DEM(ID)                                                    CHA 0799
      DEL(I4)=DEL(ID)                                                   CHA 0800
      DELTA(I4)=DELTA(ID)                                               CHA 0801
      GO TO 100                                                         CHA 0802
 1741 PZP=0.0                                                           CHA 0803
     DO 193 I=1,NARCS                                                   CHA 0804
     IF(JAR(I,2).NE.DP(ID,2)) GO TO 193                                 CHA 0805
     PZP=PZP+CHARD(I)*(1-BLOV(I))                                       CHA 0806
  193 CONTINUE                                                          CHA 0807
     PROB=(PZP/DEL(ID))*100.                                            CHA 0808
     NPZINT=NPOINT                                                      CHA 0809
     IF (KTT.NE.1) GO TO 699                                            CHA 0810
     NPZINT=9999                                                        CHA 0811
  699 WRITE(10'KPA)III,NHUP,KPR,(JHU(I),I=1,NHUP),(PB(L),L=1,NHUP),     CHA 0812
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      1NPZINT,(CR(LL),LL=1,LLINK),(COM(I),I=1,KAP),PROB                 CHA 0813
       IF(KPR.EQ.1) WRITE(2'KPA)(CRI(J),J=1,LLINK)                      CHA 0814
  280 CONTINUE                                                          CHA 0815
       DDPP(III,1)=DP(ID,1)                                             CHA 0816
       DDPP(III,2)=DP(ID,2)                                             CHA 0817
       DEMM(III)=DEM(ID)                                                CHA 0818
       DELL(III)=DEL(ID)                                                CHA 0819
       DELTAA(III)=DELTA(ID)                                            CHA 0820
       IDISK(III)=KPA                                                   CHA 0821
       GO TO 100                                                        CHA 0822
C                                                                       CHA 0823
 2015 LII=124                                                           CHA 0824
       WRITE(IP,3005) NHU,IND,LII                                       CHA 0825
 3005 FORMAT(2X,20I5)                                                   CHA 0826
       GO TO 711                                                        CHA 0827
 2001 LII=302                                                           CHA 0828
       WRITE(IP,3005) IDEP,DP(ID ,1),IARR,DP(ID ,2),LII                 CHA 0829
       GO TO 711                                                        CHA 0830
 2003 LII=361                                                           CHA 0831
       WRITE(IP,3005) NHUP,IFIN,(JHU(I),I=1,NHUP),(JAR(IC,LI),LI=2,IFIN),CHA 0832
      1LII                                                              CHA 0833
       GO TO 711                                                        CHA 0834
 2004 LII=363                                                           CHA 0835
       WRITE(IP,3005) NN,NCON,LII                                       CHA 0836
 711   CONTINUE                                                         CHA 0837
       KPAA=KPA+1                                                       CHA 0838
       DO 1751 KEY=1,KPAA                                               CHA 0839
       IF(KPA.EQ.0) GO TO 1755                                          CHA 0840
       IF(KEY.EQ.KPAA) GO TO 1755                                       CHA 0841
       READ(10'KEY)III,NHUP,KPR,(JHU(I),I=1,NHUP),(PB(L),L=1,NHUP),NPZINTCHA 0842
      1,(CHIRD(LL),LL=1,LLINK),(COM(I),I=1,KAP),PROB                    CHA 0843
       KPRR=2**NHUP                                                     CHA 0844
       IF(KPR.NE.1) GO TO 1753                                          CHA 0845
       READ(2'KEY)(CHIR(I),I=1,LLINK)                                   CHA 0846
        DO 1752 I=1,LLINK                                               CHA 0847
 1752  CHAR(I)=CHIR(I)+CHURD(I)                                         CHA 0848
 1753  DO 1754 I=1,LLINK                                                CHA 0849
 1754  CHARD(I)=CHIRD(I)+CHURD(I)                                       CHA 0850
       GO TO 1756                                                       CHA 0851
 1755  KPA=KPA+1                                                        CHA 0852
       III=III+1                                                        CHA 0853
       IDISK(III)=KPA                                                   CHA 0854
       IDNDP=III                                                        CHA 0855
       NHUP=1                                                           CHA 0856
       KPR=1                                                            CHA 0857
       JHU(1)=PP+1                                                      CHA 0858
       PB(1)=-1                                                         CHA 0859
       PROB=0.0                                                         CHA 0860
        NPZINT=9999                                                     CHA 0861
       DO 1757 I=1,KAP                                                  CHA 0862
 1757  COM(I)=COMM(I)                                                   CHA 0863
       DO 1758 I=1,LLINK                                                CHA 0864
       CHAR(I)=CHUR(I)                                                  CHA 0865
 1758  CHARD(I)=CHURD(I)                                                CHA 0866
 1756  IF (KPR.NE.1) GO TO 2218                                         CHA 0867
       J=0                                                              CHA 0868
       DO 840 I=1,NARCS                                                 CHA 0869
       KOD=0                                                            CHA 0870
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      J=J+1                                                             CHA 0871
      CR(J)=0                                                           CHA 0872
      NCC(J)=0                                                          CHA 0873
      C1(J)=CHAR(I)                                                     CHA 0874
      CCD(J)=CHARD(I)                                                   CHA 0875
      Y=C1(J)                                                           CHA 0876
 2154 PXX=1                                                             CHA 0877
      K=1                                                               CHA 0878
      IF (Y.LT.0.001) GO TO 2152                                        CHA 0879
 2119 U=Y/K                                                             CHA 0880
      W=(1/PXX)+U                                                       CHA 0881
      PXX=U/W                                                           CHA 0882
      K=K+1                                                             CHA 0883
      IF (PXX.GT.BLOV(I)) GO TO 2119                                    CHA 0884
 2152 K=K-1                                                             CHA 0885
      CR(J)=K-NCC(J)                                                    CHA 0886
      IF (KOD.EQ.1) GO TO 840                                           CHA 0887
      NCC(J)=CR(J)                                                      CHA 0888
 2153 Y=CCD(J)                                                          CHA 0889
      KOD=1                                                             CHA 0890
      GO TO 2154                                                        CHA 0891
  840 CONTINUE                                                          CHA 0892
       GO TO 8412                                                       CHA 0893
 2218 J=0                                                               CHA 0894
      DO 691 I=1,NARCS                                                  CHA 0895
      J=J+1                                                             CHA 0896
      CCD(J)=CHARD(I)                                                   CHA 0897
      Y=CCD(J)                                                          CHA 0898
      PXX=1                                                             CHA 0899
      K=1                                                               CHA 0900
      IF (Y.LT.0.001     ) GO TO 642                                    CHA 0901
  651 U=Y/K                                                             CHA 0902
      W=(1/PXX)+U                                                       CHA 0903
      PXX=U/W                                                           CHA 0904
      K=K+1                                                             CHA 0905
      IF(PXX.GT.BLOV(I)) GO TO 651                                      CHA 0906
  642 K=K-1                                                             CHA 0907
      CR(J)=K-NCC(J)                                                    CHA 0908
  691 CONTINUE                                                          CHA 0909
 8412  IF(JIMY.EQ.0) GO TO 20881                                        CHA 0910
       IF(PB(1).EQ.-1) GO TO 20881                                      CHA 0911
       WRITE(IP,20772)  (NODNM(DDPP(III,1),IK),IK=1,3),(NODNM(DDPP(III,2)CHA 0912
      1,IK),IK=1,3),DEMM(III),DELTA(III),KPR                            CHA 0913
20772  FORMAT('1',3X,'DEMAND(ERLANGS) FROM ',3A4,' TO ',3A4/57X,'INITIALCHA 0914
      1',3X,F10.3,/57X,'INCREASED',1X,F10.3/57X,'PROFILE NO.',1X,I3///,  CHA 0915
      232X,'(O)',10X,'(P)',10X,'(Q)',10X,'(R)',10X,'(S)'/)              CHA 0916
       WRITE(IP,20775) ((NODNM(JAR(2*J-1,1),K),K=1,3),(NODNM(JAR(2*J-1,2)CHA 0917
      1,K),K=1,3), CHIR(J),CHIRD(J),CHAR(J),CHARD(J), CR(J),J=1,LLINK)  CHA 0918
20775 FORMAT(1X,3A4,1X,3A4,2X,F8.2,5X,F8.2,5X,F8.2,5X,F8.2,5X,F8.2)     CHA 0919
       WRITE(IP,20776)                                                  CHA 0920
20776 FORMAT(//,3X,'TRAFFIC AT SWITCHING NODES(LINES)'/19X,'(T)'/)      CHA 0921
       WRITE(IP,20777) ((NODNM(J,K),K=1,3),COM(J),J=1,KAP)              CHA 0922
20777 FORMAT(1X,3A4,1X,F9.2)                                            CHA 0923
       GO TO 20883                                                      CHA 0924
20881 IF(JIMY.EQ.0) GO TO 20883                                         CHA 0925
       WRITE(IP,20889)                                                  CHA 0926
20889  FORMAT('1',2X,'SUMMATION OF TRAFFIC ON LINKS FOR ALL DEMAND PAIRSCHA 0927
      1 NOT UTILIZING CONTEMPLATED GROUPS'//,32X,'(U)',10X,'(V)',10X,'(W)CHA 0928
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      1'//)                                                             CHA 0929
       WRITE(IP,20890)((NODNM(JAR(2*J-1,1),K),K=1,3),(NODNM(JAR(2*J-1,2),CHA 0930
      1K),K=1,3),CHUR(J),CHURD(J),CR(J),J=1,LLINK)                      CHA 0931
20890 FORMAT(1X,3A4,1X,3A4,2X,F8.2,5X,F8.2,5X,F8.2)                     CHA 0932
20883 WRITE(10'KEY)III,NHUP,KPR,(JHU(I),I=1,NHUP),(PB(L),L=1,NHUP),     CHA 0933
      1NPZINT,(CR(LL),LL=1,LLINK),(COM(I),I=1,KAP),PROB                 CHA 0934
        DO 1759 I=1,LLINK                                               CHA 0935
       DMAXX=DDMAX(I)                                                   CHA 0936
1759    DDMAX(I)=AMAX1(DMAXX,CR(I))                                     CHA 0937
        DO 17591 I=1,KAP                                                CHA 0938
        DMASS=DDMAS(I)                                                  CHA 0939
17591   DDMAS(I)=AMAX1(DMASS,COM(I))                                    CHA 0940
       IF((KPRR.EQ.KPR).OR.(PB(I).EQ.-1)) GO TO 15420                   CHA 0941
       GO TO 1751                                                       CHA 0942
15420 DO 15419 I=1,LLINK                                               CHA 0943
       DMAX(I)=DDMAX(I)+DMAX(I)                                         CHA 0944
15419 DDMAX(I)=0                                                       CHA 0945
        DO 16420 I=1,KAP                                                CHA 0946
        DMAS(I)=DDMAS(I)+DMAS(I)                                        CHA 0947
16420    DDMAS(I)=0                                                     CHA 0948
C                                                                      CHA 0949
1751   CONTINUE                                                        CHA 0950
       NANDP=III-1                                                     CHA 0951
        IF(NANDP.EQ.0) GO TO 33041                                     CHA 0952
       WRITE(IP,51415)                                                 CHA 0953
51415   FORMAT('1',21X,'DEMAND PAIRS UTILIZING CONTEMPLATED GROUPS'/)  CHA 0954
       WRITE(IP,51515)                                                 CHA 0955
51515 FORMAT(51X,'DEMAND (ERLANGS)',/,45X,'INITIAL',5X,'TOTAL  INCREASE'CHA 0956
      1,//)                                                            CHA 0957
       WRITE(IP,51616) ((NODNM(DDPP(III,1),IK),IK=1,3),(NODNM(DDPP(III,2)CHA 0958
      1,IK),IK=1,3),DEMM(III),DELL(III),DELTAA(III),III=1,NANDP)        CHA 0959
51616 FORMAT('0',5X,'DE  ',3A4,'  A  ',3A4,' : ',3F10.3)               CHA 0960
33041   IF(I4.EQ.0) GO TO 33402                                        CHA 0961
       WRITE(IP,33403)                                                 CHA 0962
33403   FORMAT('1',21X,'DEMAND PAIRS UTILIZING INSTALLED GROUPS ONLY'/) CHA 0963
       WRITE(IP,51515)                                                 CHA 0964
        WRITE(IP,51616)((NODNM(DP(III,1),IK),IK=1,3),(NODNM(DP(III,2),IK)CHA 0965
      1,IK=1,3),DEM(III),DEL(III),DELTA(III),III=1,I4)                 CHA 0966
33402   WRITE(IP,988)                                                  CHA 0967
       DO 720 I=1,LLINK                                                CHA 0968
       IF(28*(I/28).EQ.I) WRITE(IP,988)                                CHA 0969
       J=2*I-1                                                         CHA 0970
       WRITE(IP,989)(NODNM(A(J,1),JERK),JERK=1,3),                     CHA 0971
      1(NODNM(A(J,2),JERK),JERK=1,3),J,DMAX(I)                         CHA 0972
 720   CONTINUE                                                        CHA 0973
       WRITE(IP,987)                                                   CHA 0974
  987 FORMAT(1H1,//,2X,'FIN NORMALE DES CALCULS')                      CHA 0975
 988   FORMAT(1H1,1X,'DEMANDE TOTALE MAXIMUM PAR ARC'                  CHA 0976
      1        ,/,2X,'LA DEMANDE ETANT EXPRIMEE EN NOMBRE DE CIRCUITS' CHA 0977
      2,///,35X,'NUMERO    DEMANDE')                                   CHA 0978
  989 FORMAT(1X,3A4,3X,3A4,7X,I6,4X,I7,/,1X,60(1H-))                   CHA 0979
       IDC=LLINK                                                       CHA 0980
C                                                                      CHA 0981
C      CONCATENATION DU VECTEUR DE SOMMETS QUI SERVENT A COMMUTER .    CHA 0982
C                                                                      CHA 0983
       JUMP=0                                                          CHA 0984
       DO 60 I=1,LIM23                                                 CHA 0985
       IF(VSU(I).EQ.0) GO TO 60                                        CHA 0986
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      JUMP=JUMP+1                                                       CHA 0987
      VSU(JUMP)=I                                                       CHA 0988
   60 CONTINUE                                                          CHA 0989
      NSU=JUMP                                                          CHA 0990
C     FIN DE LA CONCATENATION .                                         CHA 0991
      IF (IPROG.EQ.2) GO TO 1555                                        CHA 0992
      WRITE(20,4000) IPROG,LIM23,        (XNODNM(I),I=1,LIM23)          CHA 0993
 4000 FORMAT(' ',2I6,2X,100A8)                                          CHA 0994
      ITREF=LTREF                                                       CHA 0995
      WRITE(1,79245) PP,((JAR(I,J),J=1,2),I=1,PP)                       CHA 0996
79245 FORMAT(27I3)                                                      CHA 0997
      WRITE(21,4001)LTREF,ITREF,((TREF(I,J),I=1,LTREF),J=1,ITREF)       CHA 0998
 4001 FORMAT(' ',2I3,2X,(26I3))                                         CHA 0999
      WRITE(22,4002)NSU,IDNDP,NDIM,NHU,(IDHU(J),J=1,NHU),(VSU(I),I=1,NSUCHA 1000
     1),(IDISK(J),J=1,IDNDP)                                            CHA 1001
 4002 FORMAT(' ',4I4,10I3,100I3,(20I4))                                 CHA 1002
      DO 14521 IA=1,PP                                                  CHA 1003
      IPT=IA                                                            CHA 1004
      IF(JAR(IA,5).GE.3) GO TO 35428                                    CHA 1005
14521 CONTINUE                                                          CHA 1006
35428 IFX=(IPT+1)/2                                                     CHA 1007
      WRITE(23,4003)KAP, L2LINK,(DMAX(I),I=1,200   ),(DMAS(I),I=1,100), CHA 1008
     1IFX                                                               CHA 1009
 4003 FORMAT(' ',2I3,2X,200I5,100E10.2,I4)                              CHA 1010
 1555 CONTINUE                                                          CHA 1011
      ENDFILE 20                                                        CHA 1012
      ENDFILE 21                                                        CHA 1013
      ENDFILE 22                                                        CHA 1014
      ENDFILE 23                                                        CHA 1015
       WRITE(IP,72941) IDISK(IDNDP),  NDP                               CHA 1016
72941 FORMAT(' ',2X,'THERE ARE   ',I5,  'PROFILES FOR  ',I5,'DEMAND PAIRCHA 1017
     1S')                                                               CHA 1018
      STOP                                                              CHA 1019
      END                                                               CHA 1020
/*                                                                      CHA 1021
//GO.SYSIN DD *                                                         CHA 1022
//GO.FT01F001 DD DSN=$600.WIS,DISP=OLD                                  CHA 1023
//GO.FT02F001 DD DSN=$600.MKG,DISP=OLD                                  CHA 1024
//GO.FT08F001 DD UNIT=SYSDA,SPACE=(CYL,(05,1))                          CHA 1025
//GO.FT10F001 DD DSN=$600.ABC,DISP=OLD                                  CHA 1026
//GO.FT20F001 DD DSN=$600.DEF,DISP=OLD                                  CHA 1027
//GO.FT21F001 DD DSN=$600.GHI,DISP=OLD                                  CHA 1028
//GO.FT22F001 DD DSN=$600.JKL,DISP=OLD                                  CHA 1029
//GO.FT23F001 DD DSN=$600.MNO,DISP=OLD                                  CHA 1030
/*                                                                      CHA 1031
//                                                                      CHA 1032
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//CHARGE   JOB ($600,002,010,0100,0000,32,,2),'GELLER  '                BOR 0001
//*PASSWORD=HERMES                                                      BOR 0002
//    EXEC   FORTGCLG                                                   BOR 0003
//FORT.SYSIN DD *                                                       BOR 0004
C                                                                       BOR 0005
C      BORNE      BORNE      BORNE      BORNE      BORNE      BORNE      BORNE BOR 0006
C                                                                       BOR 0007
C  THESE DIMENSIONS ARE FIXED                                           BOR 0008
       INTEGER P,PR,PS,PK,FIN,CTYPE(7),AVD(31),JAP(34),IAVD(4)          BOR 0009
       INTEGER*2 KL,LCOND,LTR,NB,LDMAX,LKONT,KZ                         BOR 0010
       INTEGER   IVECBI(20),IVECBS(20),IVECUM(20),CBI(20), CBS(20),     BOR 0011
      IMK(20),          MCAP(20)                                        BOR 0012
       INTEGER ITYPE(2)                                                 BOR 0013
       REAL*8 XAVD(2),BULL(2)                                           BOR 0014
C   SWITCHING NODE DIMENSION DATA  MAXIMUM # OF NODES WITH COST FUNCTIONBORT0015
C  SWITCHING NODES IS 60                                                BOR 0016
       INTEGER   JARR(60,17),JACC(60,20)                                BOR 0017
       INTEGER*2                          IDENT(100),SOMMET(100,2),CONDEM BOR 0018
      1(100),DAVE(100,4),TREF(100,100),DP(200,2)                        BOR 0019
       INTEGER  DMAX(200)                                               BOR 0020
C      DIMENSIONS FOR TRANSMISSION FACILITIES LINK DATA MAX 300 LINKS   BOR 0021
       INTEGER    JAR(300,17), JAC(300,20)                              BOR 0022
C     DIMENSION FOR  DEM DIVISIBLE AND NON DIVISIBLE AS IN HERMES 2  MAX=BOR 0023
       INTEGER*2  DEM(50)                                               BOR 0024
C     DIMENSION FOR NODE NAMES  MAX NUMBER OF NODES IS 300 INCLUDING SWITBORN0025
C    NODES                                                              BOR 0026
       REAL*8   YAVD(300)                                               BOR 0027
        COMMON/RRAJ/ JARR,JACC,YAVD                                     BOR 0028
       DATA FIN/'FIN.'/                                                 BOR 0029
       EQUIVALENCE (AVD(9),IST), (XAVD,IAVD)                            BOR 0030
       DATA CTYPE/'CNCP','MT&T','TCTS','ET&T','SWCH','DUMM','SWIT'/     BOR 0031
C                                                                       BOR 0032
       DEFINE FILE 9 (300,91,U,IDA)                                     BOR 0033
C                                                                       BOR 0034
       KZ=0                                                             BOR 0035
       P=5                                                              BOR 0036
       IP=6                                                             BOR 0037
       KL=0                                                             BOR 0038
       REWIND 20                                                        BOR 0039
       REWIND 21                                                        BOR 0040
       REWIND 23                                                        BOR 0041
       READ(P,75045) IPROG,MIJ                                          BOR 0042
75045  FORMAT(2I1)                                                      BOR 0043
       JPP=1                                                            BOR 0044
       IF(IPROG.LE.1) GO TO 17430                                       BOR 0045
       READ(20,4000)IPROG,JPP,          (YAVD(I),I=1,JPP)               BOR 0046
4000   FORMAT(' ',2I6,2X,100A8)                                         BOR 0047
       READ(21,4001) LTR,ITREF,((TREF(I,J),I=1,LTR),J=1,ITREF)          BOR 0048
4001   FORMAT(' ',2I3,2X,(26I3))                                        BOR 0049
       READ(23,4003)KAP, LDMAX,(DMAX(I),I=1,LDMAX)                      BOR 0050
4003   FORMAT(' ',2I3,2X,200I5)                                         BOR 0051
17430   CONTINUE                                                        BOR 0052
       DO 82 I=1,60                                                     BOR 0053
       DO 83 J=1,17                                                     BOR 0054
       JARR(I,J)=0                                                      BOR 0055
83      CONTINUE                                                        BOR 0056
  82    CONTINUE                                                        BOR 0057
        DO 84 I=1,60                                                    BOR 0058
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      DO 84 J=1,20                                                      BOR 0059
       JACC(I,J)=0                                                      BOR 0060
 84    CONTINUE                                                         BOR 0061
      DO 9738 I=1,300                                                   BOR 0062
      DO 9738 J=1,20                                                    BOR 0063
      JAC(I,J)=0                                                        BOR 0064
 9738  CONTINUE                                                         BOR 0065
      DO 9739  I=1,300                                                  BOR 0066
      DO 9739 J=1,14                                                    BOR 0067
      JAR(I,J)=0                                                        BOR 0068
 9739  CONTINUE                                                         BOR 0069
      DO 15 I=1,300                                                     BOR 0070
      DO 15 J=15,17                                                     BOR 0071
      JAR(I,J)=32700                                                    BOR 0072
  15  CONTINUE                                                          BOR 0073
      DO 16 I=1,50                                                      BOR 0074
      DEM(I)=0.0                                                        BOR 0075
  16  CONTINUE                                                          BOR 0076
      IF(IPROG.NE.1) JPP=JPP+1                                          BOR 0077
      ICH=JPP                                                           BOR 0078
C AVD  LINK DATA VECTOR                                                 BOR 0079
C IAVD TEMP STORAGE OF FIRST 8 LETTERS OF NODE NAMES                    BOR 0080
C XAVD IS EQUIVALENT TO IAVD BUT STORES 8 CHARACTER WORDS               BOR 0081
C YAVD STORES NODE NAMES IN 8 CHARACTER FORMAT AND THE POSITION OF THE NBOR 0082
C IS THE INTERNAL NODE NUMBER                                           BOR 0083
C JAR IS THE MATRIX CONTAINING LINK DATA                                BOR 0084
C JAC IS THE MATRIX CONTAINING LINK COSTS PER CHANNEL I.E.COLUMN 1=COST BOR 0085
C                                                  COLUMN 2= COST OBOR 0086
C                                                  COLUMN N = COST BOR 0087
C KL=NUMBER OF TRANSMISSION LINKS ON PHYSICAL NETWORK.                  BOR 0088
C READ IN LINK DATA OF TRANSMISSION FACILITIES                          BOR 0089
C AVD(1),AVD(2),AVD(3) = NODE NAME                                      BOR 0090
C   AVD(4)=TYPE OF CARRIER                                              BOR 0091
C AVD(5),AVD(6),AVD(7) = NODE NAME                                      BOR 0092
C AVD(8)=MILEAGE                                                        BOR 0093
C AVD(9)=NUMBER OF COLUMNS USED IN DATA LISTING(FOR INT.ONLY)           BOR 0094
C AVD(10)=NUMBER OF CHANNELS AVAILABLE FOR VOICE CIRCUIT TYPE AVD(11)   BOR 0095
C AVD(12) = NUMBER OF CHANNELS OF TYPE AVD(11)                          BOR 0096
C AVD(13)=COST PER CHANNEL OF TYPE AVD(11)                              BOR 0097
      DO 2 I=ICH,300                                                    BOR 0098
 2    YAVD(I)=0                                                         BOR 0099
C AVD(14)=NUMBER OF CHANNELS OF TYPE AVD(11)                            BOR 0100
C AVD(15) COST PER CHANNEL OF TYPE AVD(11)                              BOR 0101
C AVD(16)=NUMBER OF CHANNELS AVAILABLE OF VOICE CIRCUIT TYPE AVD(17)    BOR 0102
C AVD(18)=NUMBER OF CHANNELS OF TYPE AVD(17)                            BOR 0103
C AVD(19)=COST PER CHANNEL OF TYPE AVD(17)                              BOR 0104
C A MAXIMUM OF 4 TYPES OF VOICE CIRCUITS ARE PERMITTED ON ANY LINK      BOR 0105
 100  DO 7 I=1,31                                                       BOR 0106
 7    AVD(I)=0                                                          BOR 0107
      DO 8 I=1,34                                                       BOR 0108
  8   JAP(I)=0                                                          BOR 0109
      READ(P,1) (AVD(J),J=1,3),AVD(4),(AVD(J),J=5,9), (AVD(2*J+8)       BOR 0110
     1,AVD(2*J+9) ,J=1,IST)                                             BOR 0111
 1    FORMAT(3A4,I1,3A4,I3,I2,7(I2,I5),/,11(I2,I5),/,11(I2,I5),/,11(I2,IBOR 0112
     15))                                                               BOR 0113
      IF(AVD(1).EQ.FIN) GO TO 99                                        BOR 0114
      IF(AVD(4).NE.7) KL=KL+1                                           BOR 0115
      IF(AVD(4).EQ.7)KZ=KZ+1                                            BOR 0116
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      IAVD(1)=AVD(1)                                                    BOR 0117
      IAVD(2)=AVD(2)                                                    BOR 0118
      IAVD(3)=AVD(5)                                                    BOR 0119
      IAVD(4)=AVD(6)                                                    BOR 0120
C  THE FOLLOWING PROCEDURE STORES THE NODE NAMES IN YAVD AND ASSIGNS INTBOR 0121
C NODE NUMBERS.                                                         BOR 0122
      DO 4 I=1,2                                                        BOR 0123
      DO 3 J=1,JPP                                                      BOR 0124
      IJ=J                                                              BOR 0125
      IF(XAVD(I).EQ.YAVD(J)) GO TO 5                                    BOR 0126
    3 CONTINUE                                                          BOR 0127
      YAVD(JPP)=XAVD(I)                                                 BOR 0128
       AVD(I)=JPP                                                       BOR 0129
      JPP=JPP+1                                                         BOR 0130
      GO TO 4                                                           BOR 0131
    5 AVD(I)=IJ                                                         BOR 0132
    4 CONTINUE                                                          BOR 0133
C  JAP(1) = INTERNAL NODE NUMBER                                        BOR 0134
C  JAP(2) = INTERNAL NODE NUMBER                                        BOR 0135
C  JAP(3)=CARRIER TYPE                                                  BOR 0136
C  JAP(4) = MILES                                                       BOR 0137
C  JAP(5) = NUMBER OF DIFFERENT TYPES OF VOICE CIRCUITS (MAX=4)         BOR 0138
C  JAP(6) = NUMBER OF 1ST TYPE IN CHANNELS                              BOR 0139
C  JAP(7) = 1ST TYPE I.E. 1CHANNE= 240 VOICE CIRCUITS                   BOR 0140
C  JAP(8) = NUMBER OF SECOND TYPE IF ANY                                BOR 0141
C  JAP(9) = 2ND TYPE IE. 1 CHANNEL=900 VOICE CIRCUITS                   BOR 0142
C     JAP(10)=NUMBER OF 3RD TYPE IF ANY                                 BOR 0143
C     JAP(11) = THIRD TYPE                                              BOR 0144
C     JAP(12) = NUMBER OF 4TH TYPE IF ANY                               BOR 0145
C     JAP(13) = FOURTH TYPE                                             BOR 0146
C     JAP(14) = TOTAL NUMBER OF CHANNELS AVAILABLE                      BOR 0147
C     JAP(15) = COST OF FIRST CHANNEL                                   BOR 0148
C     JAP(16) = COST OF SECOND CHANNEL                                  BOR 0149
C      .                                                                BOR 0150
C      .                                                                BOR 0151
C     JAP(54)   MAX                                                     BOR 0152
C THIS PROCEDURE SETS UP THE COSTS PER CHANNEL                          BOR 0153
C                                                                       BOR 0154
C  JP = POSITION IN AVD                                                 BOR 0155
C  KI= POSITION IN JAP                                                  BOR 0156
      IL=6                                                              BOR 0157
      JP=12                                                             BOR 0158
      KI=15                                                             BOR 0159
      IAT=0                                                             BOR 0160
      KP=14                                                             BOR 0161
      PEP=1                                                             BOR 0162
      JAP(4)=AVD(8)                                                     BOR 0163
   18 ICH=AVD(JP-2)                                                     BOR 0164
   14 KP=KP+AVD(JP)                                                     BOR 0165
      DO 12  KK=KI,KP                                                   BOR 0166
      JAP(KK)=JAP(4) *AVD(JP+1)                                         BOR 0167
   12 CONTINUE                                                          BOR 0168
      IAT=IAT+AVD(JP)                                                   BOR 0169
      IF(IAT.EQ.ICH) GO TO 13                                           BOR 0170
      KI=KP+1                                                           BOR 0171
      JP=JP+2                                                           BOR 0172
      GO TO 14                                                          BOR 0173
   13 IF(AVD(JP+2).EQ.0) GO TO 17                                       BOR 0174
```

```
      IL=IL+2                                                           BOR 0175
      JP=JP+4                                                           BOR 0176
      KI=KP+1                                                           BOR 0177
      PEP=PEP+1                                                         BOR 0178
      JAP(IL)=AVD(JP-2)                                                 BOR 0179
      JAP(IL+1)=AVD(JP-1)                                               BOR 0180
      IAT=0                                                             BOR 0181
      GO TO 18                                                          BOR 0182
   17 JAP(1)=AVD(1)                                                     BOR 0183
      JAP(2)=AVD(2)                                                     BOR 0184
      JAP(3)=AVD(4)                                                     BOR 0185
      JAP(5)=PEP                                                        BOR 0186
      JAP(6)=AVD(10)                                                    BOR 0187
      JAP(7)=AVD(11)                                                    BOR 0188
      JAP(14)=KP-14                                                     BOR 0189
       IF(JAP(3).EQ.7) GO TO 85                                         BOR 0190
      DO 6  I=1,14                                                      BOR 0191
    6 JAP(KL,I)=JAP(I)                                                  BOR 0192
      IF(JAP(3).NE.7) GO TO 60                                          BOR 0193
   85  DO 61 J=1,14                                                     BOR 0194
      JARR(KZ,J)=JAP(J)                                                 BOR 0195
   61 CONTINUE                                                          BOR 0196
      IF(JAP(3).EQ.7) GO TO 1497                                        BOR 0197
   60 CONTINUE                                                          BOR 0198
      NB=JPP                                                            BOR 0199
C     NB : RANG DE LA SOUS-MATRICE DE 'MA' CONTENANT TOUTE              BOR 0200
C          L'INFORMATION UTILE .                                        BOR 0201
 1497 NOP=JAP(14)                                                       BOR 0202
        IF(JAP(3).EQ.7) GO TO 81                                        BOR 0203
      DO 19 I=1,NOP                                                     BOR 0204
   19 JAC(KL,I)=JAP(I+14)                                               BOR 0205
      IF(JAP(3).NE.7) GO TO 62                                          BOR 0206
   81  DO 63 J=1,NOP                                                    BOR 0207
       JACC(KZ,J)=JAP(J+14)                                             BOR 0208
   63 CONTINUE                                                          BOR 0209
   62 LIM=JAP(14)                                                       BOR 0210
      WRITE(9'KL) (JAC(KL,I),I=1,LIM)                                   BOR 0211
C     WRITE(IP,207) (JAC(KL,I),I=1,LIM)                                 BOR 0212
C207  FORMAT(' DEBUG ******  ',(10I10,/,15X))                           BOR 0213
      GO TO 100                                                         BOR 0214
C  THE FOLLOWING PROCEDURE PRINTS THE TRANS. FACIL. LINK DATA           BOR 0215
 99   CONTINUE                                                          BOR 0216
C                                                                       BOR 0217
C        ITYPE(1) : CBI       ITYPE(2) : CBS                            BOR 0218
C                                                                       BOR 0219
      READ(P,201) (ITYPE(I),I=1,2)                                      BOR 0220
  201 FORMAT(2I7)                                                       BOR 0221
      WRITE(IP,32)                                                      BOR 0222
 32   FORMAT('1',2X,'EXTERNAL NODE',3X,'INTERNAL NODE',/,5X,'NAME',12X,'BOR 0223
     INUMBER')                                                          BOR 0224
      IF(IPROG.NE.2)JPP=JPP-1                                           BOR 0225
      ILB=JPP                                                           BOR 0226
      DO 106 IT=1,JPP                                                   BOR 0227
      IF(27*(IT/27).EQ.IT) WRITE(IP,32)                                 BOR 0228
      WRITE(IP,10) YAVD(IT),IT                                          BOR 0229
 106  CONTINUE                                                          BOR 0230
 10   FORMAT('0',2X,A8,11X,I3)                                          BOR 0231
      WRITE(IP,33)                                                      BOR 0232
```

```
 33    FORMAT('1',2X,'FROM',7X,'TO',5X,'CARRIER',2X,'MILES',4X,'INTER',4XBOR 0233
      1,'QTY',3X,'V.C.',2X,'QTY',3X,'V.C.',2X,'QTY',3X,'V.C.',2X,'QTY',3XBOR 0234
      1,'V.C.',3X,'TOTAL',/,38X,'LINK NO  ',7X,'TYPE(1)',5X,'TYPE(2)',5X,BOR 0235
      1'TYPE(3)',5X,'TYPE(4)',2X,I3 )                                   BOR 0236
       DO 105 IS=1,KL                                                   BOR 0237
       IF(28*(IS/28).EQ.IS)WRITE(IP,33)                                 BOR 0238
       WRITE(IP,9) YAVD(JAR(IS,1)),YAVD(JAR(IS,2)),CTYPE(JAR(IS,3)), JAR(BOR 0239
      1IS,4),IS,(JAR(IS,IN),IN=6,14)                                    BOR 0240
 105   CONTINUE                                                         BOR 0241
     9 FORMAT('0',A8,2X,A8,3X,A4,5X,I3,6X,I3,6X,I2,3X,I4,3X,I2,3X,I4,3X,IBOR 0242
      12,3X,I4,3X,I2,3X,I4,4X,I3)                                       BOR 0243
       IF(KZ.EQ.0) GO TO 22                                             BOR 0244
       WRITE(IP,972)                                                    BOR 0245
 972   FORMAT('1',20X,'SWITCHING NODE DATA',//,3X,'NODE',3X,'INTER',3X,'QBOR 0246
      1TY',3X,'LINE',3X,'QTY',3X,'LINE',3X,'QTY',3X,'LINE',3X,'QTY',3X,'LBOR 0247
      2INE',9X,'TOTAL',/,10X,'NODE',9X,'TYPE(1)',6X,'TYPE(2)',6X,'TYPE(3)BOR 0248
      3',6X,'TYPE(4)',/,9X,'NUMBER')                                    BOR 0249
       DO 973 I=1,KZ                                                    BOR 0250
       IF(28*(I/28).EQ.I) WRITE(IP,972)                                 BOR 0251
       WRITE(IP,974) YAVD(JARR(I,1)),JARR(I,1), (JARR(I,IN),IN=6,14)    BOR 0252
   974 FORMAT('0',A8,2X,I3,5X,4(I2,2X,I5,4X),6X,I3)                     BOR 0253
 973   CONTINUE                                                         BOR 0254
  22   WRITE(IP,23)                                                     BOR 0255
  23   FORMAT('1',20X,'TRANSMISSION FACILITIES LINK COST DATA',//,1X,'FROBOR 0256
      1M',6X,'TO',6X,'CARRIER',2X,'LINK',4X,'MILES',3X,'V.C,/CHANNEL',1X,BOR 0257
      2'(NO.) COST($)',    /,29X,'NO.')                                 BOR 0258
       DO 101 I=1,KL                                                    BOR 0259
       IF(18*(I/18).EQ.I)WRITE(IP,23)                                   BOR 0260
       PR=JAR(I,5)                                                      BOR 0261
       PS=1                                                             BOR 0262
       IC=5                                                             BOR 0263
       PK=0                                                             BOR 0264
       KKK=1                                                            BOR 0265
 24    WRITE(IP,25) YAVD(JAR(I,1)),YAVD(JAR(I,2)),CTYPE(JAR(I,3)),I,JAR(IBOR 0266
      1,4)                                                              BOR 0267
  25   FORMAT('0',A8,1X,A8,2X,A4,2X,I5,6X,I3)                           BOR 0268
       DO 29 II=1,PR                                                    BOR 0269
       PK=JAR(I,IC+1)+PK                                                BOR 0270
       GO TO (102,103,104),KKK                                          BOR 0271
 102   WRITE(IP,27) JAR(I,IC+2),JAR(I,IC+1),(JAC(I,JJ),JJ=PS,PK)        BOR 0272
       KKK=2                                                            BOR 0273
       GO TO 104                                                        BOR 0274
 103   WRITE(IP,31)JAR(I,IC+2),JAR(I,IC+1),(JAC(I,JJ),JJ=PS,PK)         BOR 0275
 27    FORMAT('+',42X,I4,5X,I2,1X,10I7,/,55X,10I7,/,55X,10I7,/,55X,10I7) BOR 0276
  31   FORMAT(' ',42X,I4,5X,I2,1X,10I7,/,55X,10I7,/,55X,10I7,/,55X,10I7) BOR 0277
 104   IC=IC+2                                                          BOR 0278
       PS=PK+1                                                          BOR 0279
    29 CONTINUE                                                         BOR 0280
 101    CONTINUE                                                        BOR 0281
       IF(KZ.GT.0) CALL COST(KZ)                                        BOR 0282
C                                                                       BOR 0283
C      ----------------------   MODIFICATION DE MICHEL   --------------BOR 0284
C                                                                       BOR 0285
C      CREATION  DU FICHIER DES CBS,CBI ET DES CAPACITES CUMULEES.      BOR 0286
C                                                                       BOR 0287
       DO 300  L=1,KL                                                   BOR 0288
       NOP=JAR(L,14)                                                    BOR 0289
       NT=JAR(L,5)                                                      BOR 0290
```

```
      IDEB=6                                                            BOR 0291
      IFIN=6+(NT-1)*2                                                   BOR 0292
      KKK=0                                                             BOR 0293
      DO 400  IZ=IDEB,IFIN,2                                            BOR 0294
      KBLOC=JAR(L,IZ+1)                                                 BOR 0295
      NO=JAR(L,IZ)                                                      BOR 0296
      DO 399 IW=1,NO                                                    BOR 0297
      KKK=KKK+1                                                         BOR 0298
      MCAP(KKK)=KBLOC                                                   BOR 0299
      IF (KKK.EQ.1)GO TO 399                                            BOR 0300
      MCAP(KKK)=MCAP(KKK-1)+MCAP(KKK)                                   BOR 0301
  399 CONTINUE                                                          BOR 0302
  400 CONTINUE                                                          BOR 0303
      IF (KKK.NE.NOP) GO TO  501                                        BOR 0304
      READ(9'L) (MK(J),J=1,NOP)                                         BOR 0305
      CBI(1)=MK(1)                                                      BOR 0306
      CBS(1)=MK(1)                                                      BOR 0307
      IF (NOP.LE.1) GO TO 299                                           BOR 0308
      DO 290 J=2,NOP                                                    BOR 0309
      IARG1=CBI(J-1)                                                    BOR 0310
      IARG2=MK(J)                                                       BOR 0311
      IARG3=CBS(J-1)                                                    BOR 0312
      CBI(J)=MIN0(IARG1,IARG2)                                          BOR 0313
      CBS(J)=MAX0(IARG3,IARG2)                                          BOR 0314
  290 CONTINUE                                                          BOR 0315
  299 WRITE(9'L) (CBI(J),J=1,NOP),(CBS(J),J=1,NOP),(MCAP(J),J=1,NOP)    BOR 0316
  300 CONTINUE                                                          BOR 0317
      GO TO  1000                                                       BOR 0318
  501 WRITE(IP,502) L                                                   BOR 0319
  502 FORMAT(///,10X,'******ERREUR DANS LA SPECIFICATION DE LA LIGNE  ',BOR 0320
     12X,I5,3X,'******',//)                                             BOR 0321
 1000 CONTINUE                                                          BOR 0322
C                                                                       BOR 0323
C     ---------------------      MODIFICATION A      ---------------------BOR 0324
C                                                                       BOR 0325
C     NBDEM : NOMBRE DE PAIRES DE DEMANDE DANS LE RESEAU PHYSIQUE.      BOR 0326
C     NBINDI: NOMBRE DE PAIRES DE DEMANDE INDIVISIBLE.                  BOR 0327
C     NDEMTO: NOMBRE TOTAL DE PAIRES DE DEMANDE SOUMISES A BORNE .      BOR 0328
C             LES DEMANDES ETANT EXPRIMEES EN CIRCUITS .                BOR 0329
C                                                                       BOR 0330
      IF(MIJ.EQ.0) GO TO 79901                                          BOR 0331
      READ(P,203) NBDEM,NBINDI                                          BOR 0332
      NDEMTO=NBDEM+NBINDI                                               BOR 0333
      KONT=0                                                            BOR 0334
   40 READ(P,202) (BULL(I),I=1,2),DEM(KONT+1)                           BOR 0335
      KONT=KONT+1                                                       BOR 0336
      K=1                                                               BOR 0337
   41 DO 42 I=1,JPP                                                     BOR 0338
      IJ=I                                                              BOR 0339
      IF(BULL(K).EQ.YAVD(I)) GO TO 43                                   BOR 0340
   42 CONTINUE                                                          BOR 0341
      WRITE(IP,204) (BULL(J),J=1,2),DEM(KONT)                           BOR 0342
      KONT=KONT-1                                                       BOR 0343
      IF(KONT.LT.NBDEM) NBDEM=NBDEM-1                                   BOR 0344
      IF(KONT.GE.NBDEM) NBINDI=NBINDI-1                                 BOR 0345
      NDEMTO=NBDEM+NBINDI                                               BOR 0346
      GO TO 40                                                          BOR 0347
   43 DP(KONT,K)=IJ                                                     BOR 0348
```

```
      K=K+1                                                             BOR 0349
      IF(K.LE.2) GO TO 41                                               BOR 0350
      IF(KONT.LT.NDEMTO) GO TO 40                                       BOR 0351
79901  CONTINUE                                                         BOR 0352
      ICU=0                                                             BOR 0353
      IF(IPROG.EQ.1) GO TO 54                                           BOR 0354
      DO 44 I=1,LDMAX                                                   BOR 0355
      ICU=ICU+DMAX(I)                                                   BOR 0356
   44 CONTINUE                                                          BOR 0357
      IF(MIJ.EQ.0) GO TO 79902                                          BOR 0358
   54 DO 45 I=1,NDEMTO                                                  BOR 0359
      ICU=ICU+DEM(I)                                                    BOR 0360
   45 CONTINUE                                                          BOR 0361
79902  CONTINUE                                                         BOR 0362
      DO 47 L=1,KL                                                      BOR 0363
      NOP=JAR(L,14)                                                     BOR 0364
      READ(9'L) (IVECBI(J),J=1,NOP),(IVECBS(J),J=1,NOP),                BOR 0365
     1          (IVECUM(J),J=1,NOP)                                     BOR 0366
      DO 46 J=1,NOP                                                     BOR 0367
      IF(ICU.GT.IVECUM(J)) GO TO 46                                     BOR 0368
      JJ=J-1                                                            BOR 0369
      IF(JJ.EQ.0) JJ=1                                                  BOR 0370
      IF(ICU.GT.IVECUM(JJ)) JJ=JJ+1                                     BOR 0371
      JAR(L,17)=JJ                                                      BOR 0372
      JAR(L,16)=IVECBS(JJ)                                              BOR 0373
      JAR(L,15)=IVECBI(JJ)                                              BOR 0374
      GO TO 47                                                          BOR 0375
   46 CONTINUE                                                          BOR 0376
      JAR(L,17)=JAR(L,14)                                               BOR 0377
      KKK1=ITYPE(1)                                                     BOR 0378
      KKK2=ITYPE(2)                                                     BOR 0379
      KKK3=IVECBS(NOP)                                                  BOR 0380
      KKK4=IVECBI(NOP)                                                  BOR 0381
      JAR(L,16)=MAX0(KKK2,KKK3)                                         BOR 0382
      JAR(L,15)=MIN0(KKK1,KKK4)                                         BOR 0383
   47 CONTINUE                                                          BOR 0384
  202 FORMAT(A8,5X,A8,5X,I5)                                            BOR 0385
  203 FORMAT(2I7)                                                       BOR 0386
  204 FORMAT(//,5X,'**** ERREUR ****  SOMMETS NON RECONNAISSABLES DANS',BOR 0387
     1          ' LA DEMANDE :',/,23X,A8,'-',A8,I10,' CIRCUITS .',//)BOR 0388
C                                                                       BOR 0389
C     ----------------------      MODIFICATION B      ---------------------BOR 0390
C                                                                       BOR 0391
      DO 48 I=1,100                                                     BOR 0392
      CONDEM(I)=0                                                       BOR 0393
   48 CONTINUE                                                          BOR 0394
      KONT=0                                                            BOR 0395
      IF(IPROG.EQ.1) GO TO 55                                           BOR 0396
      DO 50 I=1,LDMAX                                                   BOR 0397
      IF(DMAX(I).EQ.0) GO TO 50                                         BOR 0398
      KONT=KONT+1                                                       BOR 0399
      L=2*I-1                                                           BOR 0400
      DAVE(KONT,4)=I                                                    BOR 0401
      DAVE(KONT,3)=L                                                    BOR 0402
      DO 49 J=1,LTR                                                     BOR 0403
      DO 49 K=1,LTR                                                     BOR 0404
      IF(L.NE.TREF(J,K)) GO TO 49                                       BOR 0405
      DAVE(KONT,2)=K                                                    BOR 0406
```

```
      DAVE(KONT,1)=J                                                    BOR 0407
      SOMMET(KONT,1)=J                                                  BOR 0408
      SOMMET(KONT,2)=K                                                  BOR 0409
      CONDEM(KONT)=DMAX(I)                                              BOR 0410
      IDENT(KONT)=1                                                     BOR 0411
      GO TO 50                                                          BOR 0412
   49 CONTINUE                                                          BOR 0413
   50 CONTINUE                                                          BOR 0414
   55 ISUM=KONT                                                         BOR 0415
      LKONT=ISUM                                                        BOR 0416
      IF(MIJ.EQ.0) GO TO 79903                                          BOR 0417
      WRITE(IP,5793)                                                    BOR 0418
 5793 FORMAT(1H1,/,1X,'  FROM        TO          TYPE',//)              BOR 0419
      DO 53 I=1,NDEMTO                                                  BOR 0420
      IF(IPROG.EQ.1) GO TO 56                                           BOR 0421
      DO 52 J=1,KONT                                                    BOR 0422
      IF(DP(I,1).EQ.SOMMET(J,1).AND.DP(I,2).EQ.SOMMET(J,2).OR.          BOR 0423
     *   DP(I,1).EQ.SOMMET(J,2).AND.DP(I,2).EQ.SOMMET(J,1)) GO TO 51    BOR 0424
      GO TO 52                                                          BOR 0425
   51 CONDEM(J)=CONDEM(J)+DEM(I)                                        BOR 0426
   52 CONTINUE                                                          BOR 0427
   56 ISUM=ISUM+1                                                       BOR 0428
      IDENT(ISUM)=2                                                     BOR 0429
      IF(I.GT.NBDEM) IDENT(ISUM)=3                                      BOR 0430
      CONDEM(ISUM)=DEM(I)                                               BOR 0431
      SOMMET(ISUM,1)=DP(I,1)                                            BOR 0432
      SOMMET(ISUM,2)=DP(I,2)                                            BOR 0433
      WRITE(IP,5792) YAVD(SOMMET(ISUM,1)),YAVD(SOMMET(ISUM,2)),         BOR 0434
     1 IDENT(ISUM)                                                      BOR 0435
 5792 FORMAT(' ',1X,A8,3X,A8,4X,I2)                                     BOR 0436
   53 CONTINUE                                                          BOR 0437
79903  CONTINUE                                                         BOR 0438
      LCOND=ISUM                                                        BOR 0439
      REWIND 20                                                         BOR 0440
      WRITE(20,4000) IPROG,JPP, (YAVD(I),I=1,JPP)                       BOR 0441
      IF(IPROG.LE.1) GO TO 17431                                        BOR 0442
      WRITE(24,4004)  KZ,((JARR(I,J),I=1,KZ),J=1,17),((JACC(I,J),I=1,KZ)BOR 0443
     1,J=1,20)                                                          BOR 0444
 4004 FORMAT(' ',I2,2X,(16I5))                                          BOR 0445
17431  CONTINUE                                                         BOR 0446
      WRITE(25,4005) NB,ITYPE(1),ITYPE(2),KL,((JAR(I,J),I=1,KL),J=1,17),BOR 0447
     1((JAC(I,J),I=1,KL),J=1,20)                                        BOR 0448
 4005 FORMAT(' ',I3,2I7,I3,2X, (16I7))                                  BOR 0449
      WRITE(26,4006) LCOND,((SOMMET(I,J),I=1,LCOND),J=1,2),(CONDEM(I),I=BOR 0450
     1I,LCOND),(IDENT(I),I=1,LCOND)                                     BOR 0451
 4006 FORMAT(' ',I3,2X,20015,2X,10015,2X,10015)                         BOR 0452
      WRITE(27,4007) LKONT,((DAVE(I,J),I=1,LKONT),J=1,4)                BOR 0453
 4007 FORMAT(' ',I3,2X,(16I5))                                          BOR 0454
      ENDFILE 24                                                        BOR 0455
      ENDFILE 25                                                        BOR 0456
      ENDFILE 26                                                        BOR 0457
      ENDFILE 27                                                        BOR 0458
      STOP                                                              BOR 0459
      END                                                               BOR 0460
      SUBROUTINE COST(KZ)                                               BOR 0461
      INTEGER   JARR(60,17),JACC(60,20)                                 BOR 0462
      INTEGER*2 KZ                                                      BOR 0463
      INTEGER PR,PS,PK,CTYPE(7)                                         BOR 0464
```

```
      'REAL*8  YAVD(300)                                                BOR 0465
        COMMON/RRAJ/ JARR,JACC,YAVD                                     BOR 0466
      DATA CTYPE/'CNCP','MT&T','TCTS','ET&T','SWCH','DUMM','SWIT'/      BOR 0467
      IP=6                                                              BOR 0468
      WRITE(IP,23)                                                      BOR 0469
   23 FORMAT('1',20X,'SWITCHING NODE COST DATA',//,3X,'NODE',3X,'INTERNABOR 0470
     1L',5X,'CARRIER',13X,'LINES/MACHINE',1X,'(NO.) COST($)',    /,10X,'BOR 0471
     2NODE',/,10X,'NUMBER')                                             BOR 0472
      DO 101 I=1,KZ                                                     BOR 0473
      IF(18*(I/18).EQ.I)WRITE(IP,23)                                    BOR 0474
      PR=JARR(I,5)                                                      BOR 0475
      PS=1                                                              BOR 0476
      IC=5                                                              BOR 0477
      PK=0                                                              BOR 0478
      KKK=1                                                             BOR 0479
   24  WRITE(IP,25) YAVD(JARR(I,1)),JARR(I,1), CTYPE(JARR(I,3))         BOR 0480
25    FORMAT('0',A8,4X,I3,9X,A4)                                        BOR 0481
      DO 29 II=1,PR                                                     BOR 0482
      PK=JARR(I,IC+I)+PK                                                BOR 0483
      GO TO (102,103,104),KKK                                           BOR 0484
  102 WRITE(IP,27) JARR(I,IC+2),JARR(I,IC+1),(JACC(I,JJ),JJ=PS,PK)      BOR 0485
      KKK=2                                                             BOR 0486
      GO TO 104                                                         BOR 0487
103   WRITE(IP,31) JARR(I,IC+2),JARR(I,IC+1),(JACC(I,JJ),JJ=PS,PK)      BOR 0488
27    FORMAT('+',42X,I4,5X,I2,1X,10I7,/,55X,10I7,/,55X,10I7,/,55X,10I7) BOR 0489
 31   FORMAT(' ',42X,I4,5X,I2,1X,10I7,/,55X,10I7,/,55X,10I7,/,55X,10I7) BOR 0490
104   IC=IC+2                                                           BOR 0491
      PS=PK+1                                                           BOR 0492
   29 CONTINUE                                                          BOR 0493
101    CONTINUE                                                         BOR 0494
      RETURN                                                            BOR 0495
       END                                                              BOR 0496
//GO.SYSIN DD *                                                         BOR 0497
//GO.FT09F001 DD DSN=$600.STU,DISP=OLD                                  BOR 0498
//GO.FT20F001 DD DSN=$600.DEF,DISP=OLD                                  BOR 0499
//GO.FT21F001 DD DSN=$600.GHI,DISP=OLD                                  BOR 0500
//GO.FT23F001 DD DSN=$600.MNO,DISP=OLD                                  BOR 0501
//GO.FT24F001 DD DSN=$600.PQR,DISP=OLD                                  BOR 0502
//GO.FT25F001 DD DSN=$600.VWX,DISP=OLD                                  BOR 0503
//GO.FT26F001 DD DSN=$600.XYZ,DISP=OLD                                  BOR 0504
//GO.FT27F001 DD DSN=$600.BCD,DISP=OLD                                  BOR 0505
/*                                                                      BOR 0506
```

```
//CHARGE   JOB ($600,002,050,0200,0000,42,,2),'GELLER  '
//*PASSWORD=HERMES
//    EXEC   FORTGCLG
//FORT.SYSIN DD *
C
C     ALL MATRICES WITH DIMENSIONS OF 300 IN THEM ARE FOR A NETWORK OF
C     300 TRANSMISSION FACILITIES LINKS INCLUDING DUMMY NODES
C    THE MATRIX MA   AND MCOST  ARE ONLY SET TO A NETWORK OF 150 LINKS FO
C  PURPOSES OF THIS TEST RUN. NORMALLY THEY SHOULD BE SET TO THE MAX NUM
C OF LINKS INCLUING DUMMY LINKS
      INTEGER*2 MA(150,150),MCOST(150,150)
C
C
      INTEGER*2 NOMINE(300),CBI1( 800,25),CBI2( 800,25)
      INTEGER*2  MCOUT(20), MCH1( 800,25),MCH2( 800,25)
       INTEGER  JAR(300,17), JAC(300,20)
      INTEGER*2 MDE(100,2),DEM(100),              JVAD(300),NST(300)
      INTEGER*2  NPOINT(300), MDT(300), MRDA(300),MRD(300)
      INTEGER  ITYPE(2)
      INTEGER*2                ZT(300), IDISK(100)
      INTEGER  MCU(20),MCAP(20),MCL(20)
      INTEGER  MMCU(20),MMCAP(20),MMCL(20),CBIA(300),CBSA(300)
      INTEGER *2  KOD(100),NGT,KLON,NTO,NDRG,NDEST,NT2
      INTEGER*2 NPDE,NAR,NSOM,IDUM,NTCH
      DIMENSION TIME(2)
C
C
C
      COMMON  /DDM / MCOST,JVAD,NOMINE
      COMMON/REF/ITYPE,MA,NSOM
      COMMON  / JOB / JAR,JAC,NAR
C
C
C
C
C                 CADUCEE 3
C
C
C
      DEFINE FILE 11 (100,310,U,ID3)
      DEFINE FILE 9 (300,91,U,IDA)
C
C      CETTE FILIERE CONTIENT TOUTES LES CHAINES ADMISSIBLES .
C
      DEFINE FILE 12 (2500,100,U,ID4)
C
C
      IW=6
C
C
C
C     INITIALISATION
C
      ITER=0
      REWIND 25
      REWIND 26
      READ(25,4005)  NSOM, ITYPE(1),ITYPE(2),NAR,((JAR(I,J),I=1,NAR),J=1
     1,17),((JAC(I,J),I=1,NAR),J=1,20)
```

```
 4005  FORMAT(' ',I3,2I7,I3,2X, (16I7))                                CAD 0059
       ITYPE(1)=ITYPE(1)/100                                           CAD 0060
       ITYPE(2)=ITYPE(2)/100                                           CAD 0061
       READ(26,4006)  NPDE,((MDE(I,J),I=1,NPDE),J=1,2),(DEM(I),I=1,NPDE),CAD 0062
      1(KOD(I),I=1,NPDE)                                               CAD 0063
 4006   FORMAT(' ',I3,2X,200I5,2X,100I5,2X,100I5)                     CAD 0064
       DO 7 I=1,150                                                    CAD 0065
       DO 7 J=1,150                                                    CAD 0066
       MA(I,J) =0                                                      CAD 0067
    7  CONTINUE                                                        CAD 0068
        DO 73541 I=1,NAR                                               CAD 0069
       JAR(I,15)=JAR(I,15)/100                                         CAD 0070
       JAR(I,16)=JAR(I,16)/100                                         CAD 0071
       DO 73541 J=1,20                                                 CAD 0072
       JAC(I,J)=JAC(I,J)/100                                           CAD 0073
 73541      CONTINUE                                                  CAD 0074
       DO 8 I=1,NAR                                                    CAD 0075
       MA(JAR(I,1),JAR(I,2))=I                                         CAD 0076
       MA(JAR(I,2),JAR(I,1))=I                                         CAD 0077
    8  CONTINUE                                                        CAD 0078
       NCAC=0                                                          CAD 0079
   50  IB=15                                                           CAD 0080
       DO 6300 I=1,NAR                                                 CAD 0081
       CBIA(I)=JAR(I,15)                                               CAD 0082
       CBSA(I)=JAR(I,16)                                               CAD 0083
       MRDA(I)=JAR(I,17)                                               CAD 0084
       ZT(I)=0                                                         CAD 0085
 6300  CONTINUE                                                        CAD 0086
       DO 48 I=1,NSOM                                                  CAD 0087
       JVAD(I)=I                                                       CAD 0088
   48  CONTINUE                                                        CAD 0089
       IF (ITER.NE.0) IB=16                                            CAD 0090
       CALL DOMINO(IB)                                                 CAD 0091
C                                                                      CAD 0092
       IF (ITER.NE.0) GO TO 9000                                       CAD 0093
C                                                                      CAD 0094
       DO 30 NGT=1,NPDE                                                CAD 0095
C                                                                      CAD 0096
C      ITERER SUR LES PAIRES DE DEMANDES .                             CAD 0097
C                                                                      CAD 0098
       NTO=0                                                           CAD 0099
C                                                                      CAD 0100
C                                                                      CAD 0101
C                                                                      CAD 0102
C      CALCULER SOMMETS ADMISSIBLES POUR LA PAIRE NGT .                CAD 0103
C                                                                      CAD 0104
       NPT=0                                                           CAD 0105
       KDEP=MDE(NGT,1)                                                 CAD 0106
       KARR=MDE(NGT,2)                                                 CAD 0107
       IF (KDEP.GT.KARR) GO TO 40                                      CAD 0108
       N5=KDEP                                                         CAD 0109
       N6=KARR                                                         CAD 0110
       GO TO 45                                                        CAD 0111
   40  N5=KARR                                                         CAD 0112
       N6=KDEP                                                         CAD 0113
C                                                                      CAD 0114
   45  DO 60 I=1,NSOM                                                  CAD 0115
       IF (I.LT.KDEP) GO TO 46                                         CAD 0116
```

```
      N1=I                                                              CAD 0117
      N2=KDEP                                                           CAD 0118
      GO TO 47                                                          CAD 0119
   46 N1=KDEP                                                           CAD 0120
      N2=I                                                              CAD 0121
C                                                                       CAD 0122
   47 IF (I.LT.KARR) GO TO 44                                           CAD 0123
C                                                                       CAD 0124
      N3=I                                                              CAD 0125
      N4=KARR                                                           CAD 0126
      GO TO 49                                                          CAD 0127
   44 N3=KARR                                                           CAD 0128
      N4=I                                                              CAD 0129
C                                                                       CAD 0130
   49 IF ((MCOST(N1,N2)+MCOST(N3,N4)).GT.MCOST(N5,N6)) GO TO 58         CAD 0131
C                                                                       CAD 0132
      NPT=NPT+1                                                         CAD 0133
      JVAD(I)=1                                                         CAD 0134
      NPOINT(NPT)=I                                                     CAD 0135
      GO TO 60                                                          CAD 0136
   58 JVAD(I)=0                                                         CAD 0137
   60 CONTINUE                                                          CAD 0138
C                                                                       CAD 0139
      WRITE(11'NGT)(JVAD(K),K=1,NSOM   ),NPT,(NPOINT(K), K=1,NPT)       CAD 0140
C                                                                       CAD 0141
C     EFFECTUER LES CALCULS POUR LA PAIRE NGT                           CAD 0142
C                                                                       CAD 0143
      DO 417 IV=1,800                                                   CAD 0144
      DO 417 IU=1,25                                                    CAD 0145
      CBI1(IV,IU)=0                                                     CAD 0146
      CBI2(IV,IU)=0                                                     CAD 0147
  417 CONTINUE                                                          CAD 0148
      DO 23 I=1,NSOM                                                    CAD 0149
      NST(I)=0                                                          CAD 0150
   23 CONTINUE                                                          CAD 0151
      DO 821I=1,NAR                                                     CAD 0152
      MDT(I)=0                                                          CAD 0153
  821 CONTINUE                                                          CAD 0154
  699 NS=NSOM-1                                                         CAD 0155
      KD=KDEP+1                                                         CAD 0156
      KLON=0                                                            CAD 0157
      IRES=1                                                            CAD 0158
      MCH1(1,1)=KDEP                                                    CAD 0159
  110 KLON=KLON+1                                                       CAD 0160
      L=0                                                               CAD 0161
C                                                                       CAD 0162
C     CONSTRUCTION DES CHAINES                                          CAD 0163
C                                                                       CAD 0164
      K=0                                                               CAD 0165
      JK=KLON+1                                                         CAD 0166
      ICOMB=KLON-1                                                      CAD 0167
      DO 140 I=1,IRES                                                   CAD 0168
      N1=MCH1(I,KLON)                                                   CAD 0169
      DO 150 JS=1,NPT                                                   CAD 0170
      J=NPOINT(JS)                                                      CAD 0171
      IF (MA(N1,J).EQ.0) GO TO 150                                      CAD 0172
      DO 160 J1=1,KLON                                                  CAD 0173
      IF (J.EQ.MCH1(I,J1))GO TO 150                                     CAD 0174
```

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      IF (J1.LT.KLON) GO TO 160                                         CAD 0175
C                                                                       CAD 0176
C     VERIFICATION  D'ADMISSIBILITE                                     CAD 0177
C                                                                       CAD 0178
      K=K+1                                                             CAD 0179
      IF(K.GT.799) GO TO 35148                                          CAD 0180
      MCH1(I,JK)=J                                                      CAD 0181
      JX=MA(MCH1(I,JK-1),MCH1(I,JK))                                    CAD 0182
      IF (KLON.NE.1) GO TO 410                                          CAD 0183
      CBI2(K,KLON)=JAR(JX,15)                                           CAD 0184
      GO TO 312                                                         CAD 0185
  410 DO 411 IV=1,KLON                                                  CAD 0186
      CBI2(K,IV)=CBI1(I,IV)+JAR(JX,15)                                  CAD 0187
  411 CONTINUE                                                          CAD 0188
  312 CONTINUE                                                          CAD 0189
C                                                                       CAD 0190
C     TEST                                                              CAD 0191
C                                                                       CAD 0192
      DO 414 IV=1,KLON                                                  CAD 0193
      N4=MCH1(I,IV)                                                     CAD 0194
      IF (J.GT.N4) GO TO 415                                            CAD 0195
      NHAUT=N4                                                          CAD 0196
      NBAS=J                                                            CAD 0197
      GO TO 416                                                         CAD 0198
  415 NHAUT=J                                                           CAD 0199
      NBAS=N4                                                           CAD 0200
  416 IF (CBI2(K,IV)-MCOST(NBAS,NHAUT)) 414,414,149                     CAD 0201
  414 CONTINUE                                                          CAD 0202
      GO TO 599                                                         CAD 0203
  149 K=K-I                                                             CAD 0204
      GO TO 150                                                         CAD 0205
C                                                                       CAD 0206
C     REMISER LA CHAINE ADMISSIBLE                                      CAD 0207
C                                                                       CAD 0208
  599 DO 153 K1=1,JK                                                    CAD 0209
      IF (K1.EQ.JK)GO TO 154                                            CAD 0210
      MCH2(K,K1)=MCH1(I,K1)                                             CAD 0211
      GO TO 153                                                         CAD 0212
  154 MCH2(K,K1)=J                                                      CAD 0213
  153 CONTINUE                                                          CAD 0214
  160 CONTINUE                                                          CAD 0215
  150 CONTINUE                                                          CAD 0216
  140 CONTINUE                                                          CAD 0217
      IF (K.EQ.0) GO TO 80                                              CAD 0218
      DO 151 I=1,K                                                      CAD 0219
      DO 151 J=1,JK                                                     CAD 0220
      MCH1(I,J)=MCH2(I,J)                                               CAD 0221
      CBI1(I,J)=CBI2(I,J)                                               CAD 0222
  151 CONTINUE                                                          CAD 0223
      L3=0                                                              CAD 0224
C                                                                       CAD 0225
C     STOCKER LES CHAINES TERMINEES; ELIMINER LES CHAINES               CAD 0226
C     NON TERMINEES DONT LE DERNIER SOMMET EST PENDANT                  CAD 0227
C                                                                       CAD 0228
      DO 180 I=1,K                                                      CAD 0229
       IF(NTO.GT.10) GO TO 30                                           CAD 0230
      IF (MCH1(I,JK).NE.KARR) GO TO 190                                 CAD 0231
      NCAC=NCAC+1                                                       CAD 0232
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      IF (NTO.EQ.0)IDISK(NGT)=NCAC                                      CAD 0233
      NTO=NTO+1                                                         CAD 0234
      WRITE(12'NCAC)NGT,KLON,NTO,MDE(NGT,1),MDE(NGT,2),(MCH1(I,I4),     CAD 0235
     1I4=1,JK),KOD(NGT)                                                 CAD 0236
      DO 800 J=2,JK                                                     CAD 0237
      LI=J-1                                                            CAD 0238
      IF (MA(MCH1(I,LI),MCH1(I,J)).EQ.0) GO TO 800                      CAD 0239
      MDT(MA(MCH1(I,LI),MCH1(I,J)))=1                                   CAD 0240
  800 CONTINUE                                                          CAD 0241
      NST(KLON)=NST(KLON)+1                                             CAD 0242
      GO TO 180                                                         CAD 0243
  190 NTES=MCH1(I,JK)                                                   CAD 0244
      ICTR=0                                                            CAD 0245
      DO 184 J6=1,NSOM                                                  CAD 0246
      IF (MA(NTES,J6).EQ.0) GO TO 184                                   CAD 0247
      ICTR=ICTR+1                                                       CAD 0248
  184 CONTINUE                                                          CAD 0249
      IF (ICTR.EQ.1) GO TO 180                                          CAD 0250
      L3=L3+1                                                           CAD 0251
      DO 183 J2=1,JK                                                    CAD 0252
      MCH2(L3,J2)=MCH1(I,J2)                                            CAD 0253
      CBI2(L3,J2)=CBI1(I,J2)                                            CAD 0254
  183 CONTINUE                                                          CAD 0255
  180 CONTINUE                                                          CAD 0256
C                                                                       CAD 0257
C     NE GARDER DANS MCH1 QUE LES CHAINES NON TERMINEES                 CAD 0258
C                                                                       CAD 0259
      IRES=L3                                                           CAD 0260
      IF (IRES.EQ.0) GO TO 8844                                         CAD 0261
      DO 181 I=1,L3                                                     CAD 0262
      DO 181 J=1,JK                                                     CAD 0263
      MCH1(I,J)=MCH2(I,J)                                               CAD 0264
      CBI1(I,J)=CBI2(I,J)                                               CAD 0265
  181 CONTINUE                                                          CAD 0266
 8844 IF (KLON.EQ.NS) GO TO 80                                          CAD 0267
      IF (L3.NE.0)GO TO 110                                             CAD 0268
   80 DO 803 JX=1,NAR                                                   CAD 0269
      IF (MDT(JX).GT.0) ZT(JX)=ZT(JX)+DEM(NGT)                          CAD 0270
  803 CONTINUE                                                          CAD 0271
C                                                                       CAD 0272
      GO TO 30                                                          CAD 0273
35148 WRITE(6,35149)                                                    CAD 0274
35149 FORMAT(' ',1X,'MESSAGE*** NUMBER OF SUB CHAINS EXCEEDS MAT SIZE') CAD 0275
   30 CONTINUE                                                          CAD 0276
C                                                                       CAD 0277
C                                                                       CAD 0278
C     TEST DE CONVERGENCE                                               CAD 0279
C                                                                       CAD 0280
 8879 IT=0                                                              CAD 0281
      DO 8880 I=1,NAR                                                   CAD 0282
      IF (ZT(I).LT.0.001) GO TO 8867                                    CAD 0283
      M1=JAR(I,14)                                                      CAD 0284
      INDEX=M1                                                          CAD 0285
      READ(9'I) (MMCL(J),J=1,M1), (MMCU(J),J=1,M1),(MMCAP(J),J=1,M1)    CAD 0286
      DO 90911 J=1,M1                                                   CAD 0287
      MCL(J)=MMCL(J)/100                                                CAD 0288
      MCU(J)=MMCU(J)/100                                                CAD 0289
      MCAP(J)=MMCAP(J)                                                  CAD 0290
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90911 CONTINUE                                                          CAD 0291
      NK=0                                                              CAD 0292
      DO 8869 K=1,M1                                                    CAD 0293
      IF (ZT(I).GT.MCAP(K)) GO TO 8869                                  CAD 0294
      INDEX=K                                                           CAD 0295
      GO TO 8805                                                        CAD 0296
 8869 CONTINUE                                                          CAD 0297
      NK=1                                                              CAD 0298
      GO TO 8805                                                        CAD 0299
 8867 MRD(I)=0                                                          CAD 0300
      JAR(I,17)=0                                                       CAD 0301
      JAR(I,15)=32700                                                   CAD 0302
      JAR(I,16)=32700                                                   CAD 0303
      GO TO 8804                                                        CAD 0304
 8805 MRD(I)=INDEX                                                      CAD 0305
      JAR(I,17)=INDEX                                                   CAD 0306
      JAR(I,15)=MCL(INDEX)                                              CAD 0307
      JAR(I,16)=MCU(INDEX)                                              CAD 0308
      IF (NK.EQ.0) GO TO  8804                                          CAD 0309
      KKK1=MCL(INDEX)                                                   CAD 0310
      KKK2=MCU(INDEX)                                                   CAD 0311
      KKK3=ITYPE(1)                                                     CAD 0312
      KKK4=ITYPE(2)                                                     CAD 0313
      JAR(I,15)=MIN0(    KKK1,KKK3)                                     CAD 0314
      JAR(I,16)=MAX0(KKK2,KKK4)                                         CAD 0315
C                                                                       CAD 0316
C     TEST                                                              CAD 0317
C                                                                       CAD 0318
 8804 IF ((CBIA(I).NE.JAR(I,15)).OR.(CBSA(I).NE.JAR(I,16)))IT=1         CAD 0319
 8880 CONTINUE                                                          CAD 0320
      IF (IT.EQ.0) GO TO  9999                                          CAD 0321
      ITER=ITER+1                                                       CAD 0322
      GO TO 50                                                          CAD 0323
C                                                                       CAD 0324
C     LECTURE DES CHAINES ET VERIFICATION DE LEUR ADMISSIBILITE         CAD 0325
C                                                                       CAD 0326
 9000 CONTINUE                                                          CAD 0327
      NTCH=0                                                            CAD 0328
      NPAIR=0                                                           CAD 0329
      DO 9209 I=1,NAR                                                   CAD 0330
      ZT(I)=0                                                           CAD 0331
 9209 CONTINUE                                                          CAD 0332
      DO 9500 KP=1,NCAC                                                 CAD 0333
      READ(12'KP) NGT,KLON,NTO,NORG    , NDEST   ,(NST(J),J=1,KLON)     CAD 0334
     1,IDUM,KOD(NGT)                                                    CAD 0335
      M=KLON+1                                                          CAD 0336
      NST(M)=NDEST                                                      CAD 0337
      IF (NPAIR.EQ.NGT) GO TO 9009                                      CAD 0338
      DO 9001 I=1,NAR                                                   CAD 0339
      MDT(I)=0                                                          CAD 0340
 9001 CONTINUE                                                          CAD 0341
      NPAIR=NGT                                                         CAD 0342
      NT2=0                                                             CAD 0343
      N1=NORG                                                           CAD 0344
      N4=NDEST                                                          CAD 0345
      IF (N4.LE.N1) GO TO 9002                                          CAD 0346
      NBAS=N4                                                           CAD 0347
      NHAUT=N1                                                          CAD 0348
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      GO TO 9009                                                        CAD 0349
 9002 NBAS=N1                                                           CAD 0350
      NHAUT=N4                                                          CAD 0351
 9009 MCOUT(1)=0                                                        CAD 0352
      DO 9010 I=2,M                                                     CAD 0353
      MCOUT(I)=MCOUT(I-1)+JAR(MA(NST(I-1),NST(I)),15)                   CAD 0354
 9010 CONTINUE                                                          CAD 0355
      IF (MCOUT(M).GT.MCOST(NHAUT,NBAS)) GO TO 9500                     CAD 0356
      DO 9011 I=2,M                                                     CAD 0357
      K=MA(NST(I-1),NST(I))                                             CAD 0358
      IF (MDT(K).EQ.1) GO TO 9011                                       CAD 0359
      MDT(K)=1                                                          CAD 0360
      ZT(K)=ZT(K)+DEM(NGT)                                              CAD 0361
 9011 CONTINUE                                                          CAD 0362
      NT2=NT2+1                                                         CAD 0363
      NTCH=NTCH+1                                                       CAD 0364
      WRITE(12'NTCH) NGT,KLON,NT2,NORG      ,NDEST   ,(NST(J),J=1,KLON) CAD 0365
     1,NST(M),KOD(NGT)                                                  CAD 0366
C                                                                       CAD 0367
C                                                                       CAD 0368
C                                                                       CAD 0369
 9500 CONTINUE                                                          CAD 0370
C                                                                       CAD 0371
C                                                                       CAD 0372
C                                                                       CAD 0373
      NCAC=NTCH                                                         CAD 0374
C                                                                       CAD 0375
C     TEST DE CONVERGENCE                                               CAD 0376
C                                                                       CAD 0377
      GO TO 8879                                                        CAD 0378
C                                                                       CAD 0379
C     CONVERGENCE ATTEINTE                                              CAD 0380
C                                                                       CAD 0381
 9999 DO 3333 KP=1,NCAC                                                 CAD 0382
      READ(12'KP) NGT,KLON,NT2,NORG,NDEST,(NST(J),J=1,KLON),            CAD 0383
     1IDUM,KOD(NGT)                                                     CAD 0384
      M=KLON+1                                                          CAD 0385
      NST(M)=NDEST                                                      CAD 0386
      DO 3331 I=2,M                                                     CAD 0387
      JVAD(I-1)=MA(NST(I-1),NST(I))                                     CAD 0388
 3331 CONTINUE                                                          CAD 0389
      WRITE(12'KP) NGT,KLON,NT2,NORG,NDEST,(JVAD(J),J=1,KLON),KOD(NGT)  CAD 0390
 3333 CONTINUE                                                          CAD 0391
      WRITE(IW,9998)                                                    CAD 0392
 9998 FORMAT(////////,10X,'FIN NORMALE DES CALCULS')                    CAD 0393
      WRITE(28,4008)NCAC                                                CAD 0394
 4008 FORMAT(' ',I5)                                                    CAD 0395
       REWIND 30                                                        CAD 0396
      WRITE(30,4005)  NSOM, ITYPE(1),ITYPE(2), NAR,((JAR(I,J),I=1,NAR),JCAD 0397
     I=1,17),((JAC (I,J),I=1,NAR),J=1,20)                               CAD 0398
      ENDFILE 25                                                        CAD 0399
      ENDFILE 28                                                        CAD 0400
      STOP                                                              CAD 0401
      END                                                               CAD 0402
      SUBROUTINE DOMINO (NTC)                                           CAD 0403
C                                                                       CAD 0404
C                                                                       CAD 0405
C                                                                       CAD 0406
```

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C        OODOOODDO     OOOOOOOO   M          M  II  N         N   OOOOOOOO CAD 0407
C         D        D  O        O  MM        MM  II  NN        N  O        OCAD 0408
C         D        D  O        O  M M      M M  II  N N       N  O        OCAD 0409
C         D        D  O        O  M  M    M  M  II  N  N      N  O        OCAD 0410
C         D        D  O        O  M   M M   M  II  N   N     N  O        OCAD 0411
C         D        O  O        O  M    M    M  II  N    N    N  O        OCAD 0412
C         D        D  O        O  M         M  II  N     N   N  O        OCAD 0413
C         O        D  O        O  M         M  II  N      N N  O        OCAD 0414
C         D        D  O        O  M         M  II  N       NN  O        OCAD 0415
C         DDDDODDDD     OOOOOOOO   M         M  II  N        N   OOOOOOOO CAD 0416
C                                                                          CAD 0417
      INTEGER*2 MA(150,150),MCOST(150,150)                                 CAD 0418
C                                                                          CAD 0419
C                                                                          CAD 0420
      INTEGER JAR(300,17), JAC(300,20)                                     CAD 0421
       INTEGER*2 JVAD(300),NAR,N                                           CAD 0422
      INTEGER*2                          NOME(300),NOMI(300)              CAD 0423
         INTEGER ITYPE(2)                                                  CAD 0424
C                                                                          CAD 0425
C                                                                          CAD 0426
C                                                                          CAD 0427
      COMMON  / JOB / JAR,JAC,NAR                                          CAD 0428
      COMMON/REF/ITYPE,MA,N                                                CAD 0429
      COMMON  /DOM / MCOST,JVAD,NOME                                       CAD 0430
C                                                                          CAD 0431
C                                                                          CAD 0432
C                                                                          CAD 0433
C                  DOMINO                                                  CAD 0434
C                                                                          CAD 0435
C                                                                          CAD 0436
C                                                                          CAD 0437
    3 NORG=0                                                               CAD 0438
    5 NORG=NORG+1                                                          CAD 0439
      IF (NORG.GE.N) GO TO 998                                             CAD 0440
      IF (JVAD(NORG).EQ.0) GO TO 5                                         CAD 0441
      IX=NORG-1                                                            CAD 0442
      IF(IX.EQ.0) GO TO 4                                                  CAD 0443
      DO 6 I=1,IX                                                          CAD 0444
      IF (NTC.EQ.16) GO TO 12                                              CAD 0445
      NOME(I)=MCOST(NORG,I)                                                CAD 0446
      NOMI(I)=MCOST(NORG,I)                                                CAD 0447
      GO TO 6                                                              CAD 0448
   12 NOME(I)=MCOST(I,NORG)                                                CAD 0449
      NOMI(I)=MCOST(I,NORG)                                                CAD 0450
    6 CONTINUE                                                             CAD 0451
    4 NOME(NORG)=0                                                         CAD 0452
      L=NORG+1                                                             CAD 0453
C                                                                          CAD 0454
C     INITIALISATION DES VECTEURS.                                         CAD 0455
C                                                                          CAD 0456
      DO 2 I=L,N                                                           CAD 0457
      NOME(I)=32700                                                        CAD 0458
      NOMI(I)=32700                                                        CAD 0459
    2 CONTINUE                                                             CAD 0460
C                                                                          CAD 0461
C     CHAINES DE LONGUEUR 1.                                               CAD 0462
C                                                                          CAD 0463
      NOMI(NORG)=0                                                         CAD 0464
```

```
      DO 13 I=1,N                                                       CAD 0465
      IF (MA(NORG,I).EQ.0)GO TO 13                                      CAD 0466
      INOM=I                                                            CAD 0467
      IF ((INOM.LT.NORG).OR.(JVAD(INOM).EQ.0)) GO TO 13                 CAD 0468
      NOMI(INOM)=JAR(MA(NORG,I),NTC)                                    CAD 0469
   13 CONTINUE                                                          CAD 0470
      LON=1                                                             CAD 0471
C                                                                       CAD 0472
C     CHAINES DE LONGUEUR >1.                                           CAD 0473
C                                                                       CAD 0474
   27 DO 16 I=NORG,N                                                    CAD 0475
      NOME(I)=NOMI(I)                                                   CAD 0476
   16 CONTINUE                                                          CAD 0477
      LON=LON+1                                                         CAD 0478
      DO 25 I=L,N                                                       CAD 0479
      IF (JVAD(I).EQ.0)GO TO 25                                         CAD 0480
      DO  22 LL=I,N                                                     CAD 0481
      IF (MA(I,LL).EQ.0)GO TO 22                                        CAD 0482
      INODE=LL                                                          CAD 0483
      IF (JVAD(INODE).EQ.0) GO TO 22                                    CAD 0484
      ICOUT=JAR(MA(I,LL),NTC)+NOME(INODE)                               CAD 0485
      IF (ICOUT.LT.NOMI(I)) NOMI(I)=ICOUT                               CAD 0486
   22 CONTINUE                                                          CAD 0487
   25 CONTINUE                                                          CAD 0488
C                                                                       CAD 0489
C     TEST DE CONVERGENCE                                               CAD 0490
C                                                                       CAD 0491
C                                                                       CAD 0492
      DO 26 MM=L,N                                                      CAD 0493
      IF (NOME(MM).NE.NOMI(MM)) GO TO 27                                CAD 0494
   26 CONTINUE                                                          CAD 0495
      DO 33 I=NORG,N                                                    CAD 0496
      IF (NTC.EQ.15)MCOST(I,NORG)=NOME(I)                               CAD 0497
      IF (NTC.EQ.16)MCOST(NORG,I)=NOME(I)                               CAD 0498
   33 CONTINUE                                                          CAD 0499
      GO TO 5                                                           CAD 0500
  998 MCOST(N,N)=0                                                      CAD 0501
      IF (NTC.EQ.16) GO TO 1000                                         CAD 0502
      NTC=16                                                            CAD 0503
      GO TO 3                                                           CAD 0504
 1000 RETURN                                                            CAD 0505
      END                                                               CAD 0506
/*                                                                      CAD 0507
//GO.FT09F001 DD DSN=$600.STU,DISP=OLD                                  CAD 0508
//GO.FT11F001 DD UNIT=SYSDA,SPACE=(CYL,(03,1))                          CAD 0509
//GO.FT12F001 DD DSN=$600.HIJ,DISP=OLD                                  CAD 0510
//GO.FT25F001 DD DSN=$600.VWX,DISP=OLD                                  CAD 0511
//GO.FT26F001 DD DSN=$600.XYZ,DISP=OLD                                  CAD 0512
//GO.FT28F001 DD DSN=$600.EFG,DISP=OLD                                  CAD 0513
//GO.FT30F001 DD DSN=$600.JAR,DISP=OLD                                  CAD 0514
/*                                                                      CAD 0515
//                                                                      CAD 0516
```

```
 1  //CHARGE   JOB ($600,002,010,0050,0000,41,,1),'GELLER  '                CON 0001
 2  //*PASSWORD=HERMES                                                      CON 0002
 3  //   EXEC   FORTGCLG                                                    CON 0003
 4  //FORT.SYSIN DD *                                                       CON 0004
 5  C     LTRAN   :  NOMBRE DE CONTRAINTES GENEREES .                       CON 0005
 6  C     IMI     :  NOMBRE TOTAL DE 'CHU' ET DE 'CFG' .                    CON 0006
 7  C     IMJ     :  NOMBRE DE PROFILS .                                    CON 0007
 8  C     LILI    :  NOMBRE DE PAIRES DE DEMANDE .                          CON 0008
 9  C  |                                                                   |CON 0009
10  C  |  MATLI   :  NOMBRE DE LIGNES DANS "MAT" .                          |CON 0010
11  C  |  MATCO   :  NOMBRE DE COLONNES DANS "MAT" .                        |CON 0011
12  C  |  TRANLI  :  NOMBRE DE LIGNES DANS "TRAN" .                         |CON 0012
13  C  |  TRANCO  :  NOMBRE DE COLONNES DANS "TRAN" .                       |CON 0013
14  C  |  VECLI   :  NOMBRE DE LIGNES DANS "VEC" .                          |CON 0014
15  C  |  VECCO   :  NOMBRE DE COLONNES DANS "VEC" .                        |CON 0015
16  C  |  INBEL   :  NOMBRE D'ELEMENTS DANS "INB" .                         |CON 0016
17  C  |  INBDEL  :  NOMBRE D'ELEMENTS DANS "INBD" .                        |CON 0017
18  C  |  VEKEL   :  NOMBRE D'ELEMENTS DANS "VEK" .                         |CON 0018
19  C  |                                                                   |CON 0019
20  C  |___________________________________________________________________|CON 0020
21  C                                                                       CON 0021
22        INTEGER VEKEL,TRANCO,TRANLI,VECCO,VECLI                           CON 0022
23        INTEGER*2  IDHU(100)                                              CON 0023
24        INTEGER*2 PB(10),JHU(10),IDISK(1000),          IDNDP,NDIM         CON 0024
25        INTEGER*2 A,B,C,D,E,F,U,V,W,X,Y,Z                                 CON 0025
26        INTEGER*2 VSU(100),NSU                                            CON 0026
27  C  COLUMN DIMENSIONS IN MAT  AND TRAN SHOULD BE GREATER OR EQUAL TO THE CON0027
28  C  NUMBER OF PROFILES FOR  N  DEMAND PAIRS                              CON 0028
29        INTEGER*2 MAT(27,600 ), VEC(1000,2),TRAN(182,600 ), IPOS(27,506)  CON 0029
30        INTEGER*2  INB(100)                                               CON 0030
31        INTEGER*2 VEK(100),INBD(100),IDEBU(1250),IFIN(1250),VEKMAX(1250)  CON 0031
32        EQUIVALENCE            (MATLI,INBEL,INBDEL,VEKEL),(MATCO,TRANCO)  CON 0032
33  C                                                                       CON 0033
34        DEFINE FILE 14 (1000,200,U,ID5)                                   CON 0034
35        DEFINE FILE 10(1000,200,U,ID25)                                   CON 0035
36  C                                                                       CON 0036
37        REWIND 22                                                         CON 0037
38        READ(22,4002) NSU,IDNDP,NDIM,NHU,(IDHU(J),J=1,NHU),(VSU(I),I=1,NSUCON 0038
39       1),(IDISK(J),J=1,IDNDP)                                            CON 0039
40  4002  FORMAT(' ',4I4,10I3,100I3,(20I4))                                 CON 0040
41        IMI=NHU                                                           CON 0041
42        MATLI=27                                                          CON 0042
43  C  MATCO SHOULD BE SET TO THE MAXIMUM TOTAL NUMBER OF COLUMNS IN MATRIX CON 0043
44  C   TOTAL NUMBER OF PROFILES FOR N  DEMAND PAIRS                        CON 0044
45         MATCO=600                                                        CON 0045
46        TRANLI=182                                                        CON 0046
47        VECLI=1000                                                        CON 0047
48        VECCO=2                                                           CON 0048
49        DO 225 I=1,MATLI                                                  CON 0049
50        DO 225 J=1,MATCO                                                  CON 0050
51   225  MAT(I,J)=0                                                        CON 0051
52        DO 226 I=1,VECLI                                                  CON 0052
53        DO 226 J=1,VECCO                                                  CON 0053
54   226  VEC(I,J)=0                                                        CON 0054
55        DO 227 I=1,TRANLI                                                 CON 0055
56        DO 227 J=1,TRANCO                                                 CON 0056
57                                                                          CON 0057
58                                                                          CON 0058
```

```
      INBD(I)=0                                                         CON 0059
  228 INB(I)=0                                                          CON 0060
      NDP=IDNDP                                                         CON 0061
C                                                                       CON 0062
C     -------------        PARTIE DE MICHEL        ------------------------CON 0063
C                                                                       CON 0064
      MAXI=IDISK(NDP)                                                   CON 0065
      DO 2000 KPA=1,MAXI                                                CON 0066
      READ(IO'KPA) III,NHUP,KPR,(JHU(I),I=1,NHUP),(PB(L),L=1,NHUP),N1Z  CON 0067
      IF (N1Z.EQ.9999) GO TO 2000                                       CON 0068
      DO 1950 I=1,NHUP                                                  CON 0069
      DO 1900 J=1,NHU                                                   CON 0070
      IF (IDHU(J).NE.JHU(I)) GO TO 1900                                 CON 0071
      MAT(J,KPA)=PB(I)                                                  CON 0072
      GO TO 1950                                                        CON 0073
 1900 CONTINUE                                                          CON 0074
      GO TO 2929                                                        CON 0075
 1950 CONTINUE                                                          CON 0076
 2000 CONTINUE                                                          CON 0077
      VEC(1,1)=IDISK(1)                                                 CON 0078
      VEC(1,2)=1                                                        CON 0079
      IF (NDP.EQ.1) GO TO 2928                                          CON 0080
      DO 2100 I=2,NDP                                                   CON 0081
      VEC(I,1)=IDISK(I)-IDISK(I-1)                                      CON 0082
      VEC(I,2)=IDISK(I-1)+1                                             CON 0083
 2100 CONTINUE                                                          CON 0084
      GO TO 1                                                           CON 0085
 2929 WRITE(6,97)                                                       CON 0086
   97 FORMAT(//,' ***** ERREUR *** , ENONCE NO. 2929  //')              CON 0087
      GO TO 1                                                           CON 0088
 2928 WRITE(6,94)                                                       CON 0089
   94 FORMAT(//,' ***** ERREUR ***** , ENONCE NO. 2928  //')            CON 0090
C                                                                       CON 0091
C     ---------------------------------------------------------------CON 0092
C                                                                       CON 0093
    1 CONTINUE                                                          CON 0094
      IMJ=MAXI                                                          CON 0095
      DO 50 J=1,IMJ                                                     CON 0096
   50 VEKMAX(J)=0                                                       CON 0097
 C223 FORMAT(4X,I3,11X,I2,1X,I1)                                        CON 0098
 C224 FORMAT(10I5)                                                      CON 0099
 C229 FORMAT(31A1)                                                      CON 0100
      DO 230 I=1,VEKEL                                                  CON 0101
  230 VEK(I)=0                                                          CON 0102
      DO 231 I=1,MATLI                                                  CON 0103
      DO 231 J=1,MATCO                                                  CON 0104
  231 VEK(I)=VEK(I)+MAT(I,J)                                            CON 0105
      JND=0                                                             CON 0106
      DO 232 I=1,VEKEL                                                  CON 0107
      IF(VEK(I).EQ.0)GO TO 232                                          CON 0108
      JND=I                                                             CON 0109
  232 CONTINUE                                                          CON 0110
      LILI=NDP                                                          CON 0111
      ISUM=0                                                            CON 0112
      ICLE=0                                                            CON 0113
      DO 235 I=1,IMI                                                    CON 0114
      DO 235 J=1,LILI                                                   CON 0115
  235 IPOS(I,J)=0                                                       CON 0116
```

```
C     CREATION DE INB                                          CON 0117
      DO 238 I=1,IMI                                           CON 0118
      DO 237 K=1,LILI                                          CON 0119
      KONT=0                                                   CON 0120
      IDEB=VEC(K,2)                                            CON 0121
      IFI=IDEB+VEC(K,1)-1                                      CON 0122
      IF(IFI.EQ.IDEB) GO TO 237                                CON 0123
      DO 236 J=IDEB,IFI                                        CON 0124
      KONT=KONT+MAT(I,J)                                       CON 0125
  236 CONTINUE                                                 CON 0126
      IF(KONT.EQ.0) GO TO 237                                  CON 0127
      INB(I)=INB(I)+1                                          CON 0128
      INBD(I)=INB(I)                                           CON 0129
  237 CONTINUE                                                 CON 0130
  238 CONTINUE                                                 CON 0131
C     FIN .                                                    CON 0132
C     CREATION DE IPOS                                         CON 0133
      DO 241 K=1,LILI                                          CON 0134
      IPOS(1,K)=NPUIS(VEC(K,1))                                CON 0135
      IDEB=VEC(K,2)                                            CON 0136
      IFI=IDEB+VEC(K,1)-1                                      CON 0137
      ICLE=1                                                   CON 0138
      DO 240 I=1,IMI                                           CON 0139
      KONT=0                                                   CON 0140
      DO 239 J=IDEB,IFI                                        CON 0141
  239 KONT=KONT+MAT(I,J)                                       CON 0142
      IF(KONT.EQ.0) GO TO 240                                  CON 0143
      ICLE=ICLE+1                                              CON 0144
      IPOS(ICLE,K)=I                                           CON 0145
  240 CONTINUE                                                 CON 0146
  241 CONTINUE                                                 CON 0147
C     FIN .                                                    CON 0148
C                                                              CON 0149
C     GENERATION DES 1 DANS TRAN                               CON 0150
C                                                              CON 0151
      LILY=LILI-1                                              CON 0152
      JD2=0                                                    CONE0153
      ITRAN=0                                                  CON 0154
      KOMPT=0                                                  CON 0155
      KLE=0                                                    CON 0156
      DO 330 I=1,LILY                                          CON 0157
      IF(KLE.EQ.1) GO TO 290                                   CON 0158
      IF(IPOS(1,I).EQ.0) KOMPT=KOMPT+1                         CON 0159
  290 IF(IPOS(1,I).EQ.0) GO TO 330                             CON 0160
      KLE=1                                                    CON 0161
      LIM1=IPOS(1,I)+1                                         CON 0162
      MAX=0                                                    CON 0163
      DO 310 J=2,LIM1                                          CON 0164
      NARG=INBD(IPOS(J,I))                                     CON 0165
      IF(NARG.GT.MAX) GO TO 300                                CON 0166
      GO TO 310                                                CON 0167
  300 MAX=NARG                                                 CON 0168
      IND1=IPOS(J,I)                                           CON 0169
      INDJ=J                                                   CON 0170
  310 CONTINUE                                                 CON 0171
      IF(MAX.GT.0) INBD(IND1)=INBD(IND1)-1                     CON 0172
      MAX=MAX-1                                                CON 0173
      ID1=VEC(1,2)                                             CON 0174
```

```
      IF1=ID1+VEC(I,1)-1                                                CON 0175
C     KONT=0                                                            CON 0176
      DO 320 I1=ID1,IF1                                                 CON 0177
C     KONT=KONT+1                                                       CON 0178
C      IF(KONT.EQ.1) ID2=(I1-1)*MAX+1                                   CON 0179
C     ID2=(I1-1)*MAX+1                                                  CON 0180
      IF(JD2.EQ.0) ID2=(I1-1)*MAX+1                                     CON 0181
  315 IF2=ID2+MAX-1                                                     CON 0182
      LTRAN=IF2                                                         CON 0183
      IF(MAX.EQ.0) GO TO 320                                            CON 0184
      DO 325 I2=ID2,IF2                                                 CON 0185
      IS=I2                                                             CON 0186
      TRAN(IS,I1)=1                                                     CON 0187
      IF(IS.GT.ITRAN) ITRAN=IS                                          CON 0188
  325 CONTINUE                                                          CON 0189
      ID2=IF2+1                                                         CON 0190
  320 CONTINUE                                                          CON 0191
      VEKMAX(I)=MAX+1                                                   CON 0192
      JD2=1                                                             CON 0193
  330 CONTINUE                                                          CON 0194
      VEKMAX(LILI)=1                                                    CON 0195
      IF(VEC(LILI,1).EQ.1) VEKMAX(LILI)=0                               CON 0196
      LTRAN=ITRAN                                                       CON 0197
      WRITE(6,60061) LTRAN                                              CON 0198
60061 FORMAT(' ','LTRAN=',I6)                                           CON 0199
C     FIN .                                                             CON 0200
C     ------------------------------------------------------------------CON 0201
C                                                                       CON 0202
C     GENERATION DES -1                                                 CON 0203
C                                                                       CON 0204
      DO 340 I=1,IMI                                                    CON 0205
      INBD(I)=INB(I)                                                    CON 0206
  340 CONTINUE                                                          CON 0207
      DO 350 K1=1,LILI                                                  CON 0208
      IDEBU(K1)=VEC(K1,2)                                               CON 0209
      IFIN(K1)=VEC(K1,2)+VEC(K1,1)-1                                    CON 0210
  350 CONTINUE                                                          CON 0211
      DO 470 K=1,LILY                                                   CON 0212
      IF(VEKMAX(K).LT.2) GO TO 470                                      CON 0213
      IMAX=0                                                            CON 0214
      B=IPOS(1,K)+1                                                     CON 0215
      IF(B.LE.1) GO TO 470                                              CON 0216
      DO 370 X=2,B                                                      CON 0217
      IARG=INBD(IPOS(X,K))                                              CON 0218
      IF(IARG.GT.IMAX) GO TO 360                                        CON 0219
      GO TO 370                                                         CON 0220
  360 IMAX=IARG                                                         CON 0221
      INDX=X                                                            CON 0222
      INDB=IPOS(X,K)                                                    CON 0223
  370 CONTINUE                                                          CON 0224
      INBD(INDB)=INBD(INDB)-1                                           CON 0225
      A=K+1                                                             CON 0226
      DO 460 J=A,LILI                                                   CON 0227
      IF(VEKMAX(J).EQ.0) GO TO 460                                      CON 0228
      DO 380 IX=1,IMI                                                   CON 0229
      VEK(IX)=0                                                         CON 0230
  380 CONTINUE                                                          CON 0231
      KONT=0                                                            CON 0232
```

```
      C=IPOS(1,J)+1                                                     CON 0233
      B=IPOS(1,K)+I                                                     CON 0234
      DO 390 X=2,B                                                      CON 0235
      DO 390 Y=2,C                                                      CON 0236
      IF(IPOS(X,K).NE.IPOS(Y,J)) GO TO 390                              CON 0237
      VEK(IPOS(X,K))=1                                                  CON 0238
      KONT=KONT+1                                                       CON 0239
  390 CONTINUE                                                          CON 0240
      IF (KONT.EQ.0) GO TO 460                                          CON 0241
      IDEBUK=IDEBU(K)                                                   CON 0242
      IFINK=IFIN(K)                                                     CON 0243
      DO 450 Y=IDEBUK,IFINK                                             CON 0244
      IERK=0                                                            CON 0245
      DO 400 X=1,IMI                                                    CON 0246
      IF(VEK(X).EQ.0) GO TO 400                                         CON 0247
      IERK=10*IERK+MAT(     X ,Y)                                       CON 0248
  400 CONTINUE                                                          CON 0249
      IFINJ=IFIN(J)                                                     CON 0250
      IDEBUJ=IDEBU(J)                                                   CON 0251
      DO 440 W=IDEBUJ,IFINJ                                             CON 0252
      JERK=0                                                            CON 0253
      DO 410 Z=1,IMI                                                    CON 0254
      IF(VEK(Z).EQ.0) GO TO 410                                         CON 0255
      JERK=10*JERK+MAT(     Z ,W)                                       CON 0256
  410 CONTINUE                                                          CON 0257
      IF(JERK.NE.IERK) GO TO 440                                        CON 0258
      DO 420 Z=1,LTRAN                                                  CON 0259
      INX=Z                                                             CON 0260
      IF(TRAN(Z,Y).EQ.1) GO TO 430                                      CON 0261
  420 CONTINUE                                                          CON 0262
  430 INLI=INX+VEKMAX(K)-VEKMAX(J)-1                                    CON 0263
      TRAN(INLI,W)=-1                                                   CON 0264
  440 CONTINUE                                                          CON 0265
  450 CONTINUE                                                          CON 0266
  460 CONTINUE                                                          CON 0267
  470 CONTINUE                                                          CON 0268
C     FIN.                                                              CON 0269
      DO 550 KLE=1,MAXI                                                 CON 0270
      WRITE(14'KLE) (TRAN(I,KLE),I=1,LTRAN)                             CON 0271
  550 CONTINUE                                                          CON 0272
      DO 650 J=1,IMJ                                                    CON 0273
      IDEBU(J)=0                                                        CON 0274
      DO 600 I=1,LTRAN                                                  CON 0275
      KI=I                                                              CON 0276
      IF(TRAN(I,J).NE.0) GO TO 625                                      CON 0277
      KI=0                                                              CON 0278
  600 CONTINUE                                                          CON 0279
  625 IDEBU(J)=KI                                                       CON 0280
  650 CONTINUE                                                          CON 0281
      DO 725 J=1,IMJ                                                    CON 0282
      IFIN(J)=0                                                         CON 0283
      LTRAN1=LTRAN+1                                                    CON 0284
      DO 675 I=1,LTRAN                                                  CON 0285
      KI=LTRAN1-I                                                       CON 0286
      IF(TRAN(KI,J).NE.0) GO TO 700                                     CON 0287
      KI=0                                                              CON 0288
  675 CONTINUE                                                          CON 0289
  700 IFIN(J)=KI                                                        CON 0290
```

```
  725 CONTINUE                                                          CON 0291
      WRITE(29,7013) LTRAN,LILI,(IDEBU(I),I=1,IMJ ),(IFIN(I),I=1,IMJ )  CON 0292
 7013 FORMAT(' ',(20I5))                                                CON 0293
      ENDFILE 29                                                        CON 0294
      STOP                                                              CON 0295
      END                                                               CON 0296
      FUNCTION NPUIS(M)                                                 CON 0297
      INTEGER*2 M                                                       CON 0298
      N=M                                                               CON 0299
      K=0                                                               CON 0300
   10 N=N/2                                                             CON 0301
      K=K+1                                                             CON 0302
      IF(N.GT.1) GO TO 10                                               CON 0303
      NPUIS=K                                                           CON 0304
      IF(M.EQ.1) NPUIS=0                                                CON 0305
      RETURN                                                            CON 0306
      END                                                               CON 0307
/*                                                                      CON 0308
//GO.FT10F001 DD DSN=$600.ABC,DISP=OLD                                  CON 0309
//GO.FT14F001 DD DSN=$600.ROB,DISP=OLD                                  CON 0310
//GO.FT22F001 DD DSN=$600.JKL,DISP=OLD                                  CON 0311
//GO.FT29F001 DD DSN=$600.MIC,DISP=OLD                                  CON 0312
/*                                                                      CON 0313
```

```
 1  //CHARGE'  JOB ($600,002,010,0100,0000,34,,2),'GELLER  '                SET 0001
 2  //*PASSWORD=HERMES                                                      SET 0002
 3  //   EXEC   FORTGCLG                                                    SET 0003
 4  //FORT.SYSIN DD *                                                       SET 0004
 5        INTEGER*2  IDHU(100)                                             SET 0005
 6        INTEGER NASS, NOTT                                               SET 0006
 7         INTEGER*2 NOTS,JPO                                              SET 0007
 8        INTEGER*2 IIDP,NNLINK,NNCHAI,NNORG,NNDEST                        SET 0008
 9        INTEGER TOUND                                                    SET 0009
10        INTEGER ROWS(9),COLUM(6),CONST(9),RHS,A(20),DMAX(200)            SET 0010
11        REAL DMAS(100)                                                   SET 0011
12        REAL*8  BOUNDS(3),COS                                            SET 0012
13        REAL   BA(3),CA(3),COM(100),CCR(200)                             SET 0013
14  C   DIMENSIONS FOR IDEBU AND IFIN ARE FOR 2**N  FOR N CONTEMPLATED PER DSETN0014
15  C PAIR FROM SWITCHING NETWORK                                           SET 0015
16        INTEGER*2 IDEBU(1000),IFIN(1000),ICL(1000)                       SET 0016
17        INTEGER*2 LINKS(20)                                              SET 0017
18        INTEGER*2 JHU(10),PB(10)                                         SET 0018
19        INTEGER*2            LLINK,KED                                   SET 0019
20        INTEGER*2  SOMMET(100,2),CONDEM(100),IDENT(100),LCDND            SET 0020
21        INTEGER*2 KL                                                     SET 0021
22        INTEGER   JAR(300,17),JAC(300,20)                                SET 0022
23        INTEGER PT                                                       SET 0023
24         INTEGER COLT(300)/300*0/,KOLT(300)/300*0/,CLOT(100)/100*0/      SET 0024
25        INTEGER JSU(100)                                                 SET 0025
26        INTEGER   JARR( 60,17),JACC( 60,20)                              SET 0026
27        INTEGER*2                          KZ,NDIM                       SET 0027
28        INTEGER*2 IDISK(1000),ID                                         SET 0028
29        INTEGER*2  VSU(100),NSU                                          SET 0029
30        REAL  CR(200)                                                    SET 0030
31        INTEGER*2  DAVE(100,4),KONT                                      SET 0031
32        REAL       TYPE(10),COST(10),BOUND(10),SAST(2,10)                SET 0032
33        IC(I1,I2)=10000000+I2+I1*1000                                    SET 0033
34        DEFINE FILE 10(1000,200,U,ID25)                                  SET 0034
35        DEFINE FILE 12 (2500,100,U,ID4)                                  SET 0035
36        DEFINE FILE 14 (1000,200,U,ID5)                                  SET 0036
37        DATA ROWS/'SN','RT','DD','LN','Y','SW','Z','P','Q'/               SET 0037
38        DATA COLUM/'S','R','D','C','X','N'/                               SET 0038
39        DATA BOUNDS/' UP BND1',' LO BND1',' FX BND1'/                    SET 0039
40        DATA RHS/'RHS1'/                                                 SET 0040
41        DATA CONST/'L','G','G','L','G','L','G','E','N'/                   SET 0041
42        DATA COS/'COST1   '/                                             SET 0042
43        REWIND 20                                                        SET 0043
44        REWIND 22                                                        SET 0044
45        REWIND 23                                                        SET 0045
46        REWIND 24                                                        SET 0046
47        REWIND 25                                                        SET 0047
48        REWIND 26                                                        SET 0048
49        REWIND 27                                                        SET 0049
50        REWIND 28                                                        SET 0050
51        REWIND 29                                                        SET 0051
52        REWIND 30                                                        SET 0052
53         READ(20,4023) IPROG                                             SET 0053
54  4023  FORMAT(' ',I6)                                                   SET 0054
55        READ(23,4003)KAP,LLINK,(DMAX(I),I=1,200  ),(DMAS(I),I=1,100),IFX SET 0055
56  4003  FORMAT(' ',2I3,2X,2D0I5,1D0F10.2,I4)                             SET 0056
57        READ(30,4005)NOTS,NASS,NOTT,KL,((JAR(I,J),I=1,KL),J=1,17),((JAC(I,SET 0057
58       1J),I=1,KL),J=1,20)                                               SET 0058
```

```
 4005  FORMAT(' ',I3,2I7,I3,2X, (16I7))                                SET 0059
       READ(26,4006) LCOND,((SOMMET(I,J),I=1,LCOND),J=1,2),(CONDEM(I),I=1SET 0060
      1,LCOND),(IDENT(I),I=1,LCOND)                                    SET 0061
 4006  FORMAT(' ',I3,2X,20OI5,2X,10OI5,2X,10OI5)                       SET 0062
       READ(27,4007)  KONT,((DAVE(I,J),I=1,KONT),J=1,4)                SET 0063
 4007  FORMAT(' ',I3,2X,(16I5))                                        SET 0064
       READ(28,4008)KED                                                SET 0065
 4008   FORMAT(' ',I5)                                                 SET 0066
 C      FILE      IDENT     VARIABLE                                   SET 0067
 C                                                                     SET 0068
 C        15      ROWS      KR                                         SET 0069
 C        16      COLUMNS   KC                                         SET 0070
 C        17      INTEGERS  KI                                         SET 0071
 C        18      RHS       KH                                         SET 0072
 C        19      BOUNDS    KB                                         SET 0073
 C                                                                     SET 0074
 C        12   ADMISSIBLE CHAINS   KA                                  SET 0075
       KA=12                                                           SET 0076
       KR=15                                                           SET 0077
       KC=16                                                           SET 0078
        KI=17                                                          SET 0079
       KH=18                                                           SET 0080
       KB=19                                                           SET 0081
 C                                                                     SET 0082
       DO179 I=15,19                                                   SET 0083
 179   REWIND I                                                        SET 0084
 C  THE  FOLLOWING WRITES HEADINGS ON ASSOCIATED FILES                 SET 0085
       WRITE(KR,1)                                                     SET 0086
     1 FORMAT(     'NAME',10X,'TRANCHE',/,'ROWS')                      SET 0087
       WRITE(KC,2)                                                     SET 0088
     2 FORMAT(                          'COLUMNS')                    SET 0089
       WRITE(KI,3)                                                     SET 0090
     3 FORMAT(     4X,'MARKER1',3X,'''MARKER''',17X,'''INTORG''')      SET 0091
       WRITE(KH,4)                                                     SET 0092
     4 FORMAT(     4X,'MARKER2',3X,'''MARKER''',17X,'''INTEND''' /'RHS') SET 0093
       WRITE(KB,5)                                                     SET 0094
     5 FORMAT(     'BOUNDS')                                           SET 0095
 C                                                                     SET 0096
       WRITE(KR,786)CONST(9),COS                                       SET 0097
   786 FORMAT(' ',T2,A1,T5,A8)                                         SET 0098
       IZ=0                                                            SET 0099
       CA(1)=-1.0                                                      SET 0100
       CA(2)=1.0                                                       SET 0101
       BA(1)=1.0                                                       SET 0102
       BA(2)=1.0                                                       SET 0103
 C                                                                     SET 0104
       NID=1                                                           SET 0105
       ISK=0                                                           SET 0106
 C  READ ADMISSIBLE CHAINS FROM FILE KA                                SET 0107
 C IDP=DEMAND PAIR                                                     SET 0108
 C NLINK=NUMBER OF LINKS IN CHAIN                                      SET 0109
 C NCHAI=CHAIN NUMBER FOR DEMAND PAIR IDP                              SET 0110
 C NORG =ORIGIN                                                        SET 0111
 C NDEST=DESTINATION                                                   SET 0112
 C LINKS=LINKS IN CHAIN                                                SET 0113
       DO 1357 KOD=1,KED                                               SET 0114
        READ(KA'KOD) IIDP,NNLINK,NNCHAI,NNORG,NNDEST,(LINKS(I),I=1,    SET 0115
      1NNLINK)                                                         SET 0116
```

```
      IDP=IIDP                                                          SET 0117
      NLINK=NNLINK                                                      SET 0118
      NCHAI=NNCHAI                                                      SET 0119
      NORG=NNORG                                                        SET 0120
      NDEST=NNDEST                                                      SET 0121
      IT=IDENT(IDP)                                                     SET 0122
       IF(IIDP.EQ.NID)GO TO 27614                                       SET 0123
       DO 27612 I=1,KL                                                  SET 0124
      IF((COLT(I).EQ.ISK).AND.(NID .GE.IFX)) KOLT(I)=99999              SET 0125
27612  COLT(I)=0                                                        SET 0126
      ISK=0                                                             SET 0127
       NID=IIDP                                                         SET 0128
27614  ISK=ISK+1                                                        SET 0129
      DO 27615 NI=1,NLINK                                               SET 0130
27615  COLT(LINKS(NI))=COLT(LINKS(NI))+1                                SET 0131
      IF(KOD.NE.KED) GO TO 26715                                        SET 0132
      DO 27619 I=1,KL                                                   SET 0133
27619 IF((COLT(I).EQ.ISK).AND.(NID .GE.IFX)) KOLT(I)=99999              SET 0134
26715 CA(3)=CONDEM(IDP)                                                 SET 0135
      BA(3)=CA(3)                                                       SET 0136
      KP=KC                                                             SET 0137
      IF(IT.EQ.3)KP=KI                                                  SET 0138
C                                                                       SET 0139
      ICC=IC(IDP,NCHAI)                                                 SET 0140
      ICD=IC(NORG,NDEST)                                                SET 0141
       WRITE(KP,50) ICC,COLUM(IT),ICD,ROWS(IT),CA(IT)                   SET 0142
   50 FORMAT(' ',T5,I8,T5,A1,T15,I8,T15,A2,T25,F9.1)                   SET 0143
C WRITE CHAINS.                                                         SET 0144
      KC=16                                                             SET 0145
      IF(IT.EQ.3)KC=KI                                                  SET 0146
      DO 51 I=1,NLINK                                                   SET 0147
      IK=LINKS(I)                                                       SET 0148
      IF(JAR(IK,3).EQ.6) GO TO 51                                       SET 0149
      ICC=IC(IDP,NCHAI)                                                 SET 0150
       ICD=IC(IZ,IK)                                                    SET 0151
       WRITE(KC,52) ICC,COLUM(IT),ICD,ROWS(4),BA(IT)                    SET 0152
52    FORMAT(' ',T5,I8,T5,A1,T15,I8,T15,A2,T25,F9.1)                    SET 0153
   51 CONTINUE                                                          SET 0154
      IF(NCHAI.NE.1) GO TO 7434                                         SET 0155
      ICC=IC(NORG,NDEST)                                                SET 0156
      IF(IT.NE.1) WRITE(KH,1291) RHS,ICC,ROWS(IT),CA(3)                 SET 0157
1291   FORMAT(' ',T5,A4,T15,I8,T15,A2,T25,F9.1)                         SET 0158
C  WRITE BOUNDS OF INDIVISIBLE CHAINS                                   SET 0159
7434  ICC=IC(IDP,NCHAI)                                                 SET 0160
      IF(IT.EQ.3) WRITE(KB,53) BOUNDS(1),ICC,COLUM(IT),BA(1)            SET 0161
   53 FORMAT(' ',T1,A8,T15,I8,T15,A1,T25,F9.1)                          SET 0162
1357   CONTINUE                                                         SET 0163
C  WRITE ROWS FOR DEMAND PAIRS IE  L SN001002                           SET 0164
 1000 DO 60 I=1,LCOND                                                   SET 0165
      IK=SOMMET(I,1)                                                    SET 0166
      IKK=SOMMET(I,2)                                                   SET 0167
      ICC=IC(IK,IKK)                                                    SET 0168
      WRITE(KR,61) CONST(IDENT(I)),ICC,ROWS(IDENT(I))                   SET 0169
   61 FORMAT(' ',T2,A1,T5,I3,T5,A2)                                     SET 0170
      IF(IDENT(I).NE.1) GO TO 60                                        SET 0171
      CLOT(IK)=99999                                                    SET 0172
       CLOT(IKK)=99999                                                  SET 0173
   60 CONTINUE                                                          SET 0174
```

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      DO 62 I=1,KL                                                      SET 0175
      ICC=IC(IZ,I)                                                      SET 0176
      IF(JAR(I,3).EQ.6) GO TO 62                                        SET 0177
      IF(JAR(I,17).GT.0) WRITE(KR,63)  CONST(1),ICC,ROWS(4)             SET 0178
   63 FORMAT(' ',T2,A1,T5,I8,T5,A2)                                     SET 0179
   62 CONTINUE                                                          SET 0180
C READS IN DATA FROM CHARGE                                             SET 0181
      IF(IPROG.EQ.1) GO TO 200                                          SET 0182
      READ(22,4002) NSU,ID   ,NDIM,NHU,(IDHJ(J),J=1,NHU),(VSU(I),I=1,NSUSET 0183
     1),(IDISK(J),J=1,ID)                                               SET 0184
4002  FORMAT(' ',4I4,10I3,100I3,(20I4))                                 SET 0185
      READ(24,4004) KZ,((JARR(I,J),I=1,KZ),J=1,17),((JACC(I,J),I=1,KZ), SET 0186
     1J=1,20)                                                           SET 0187
4004  FORMAT(' ',I2,2X,(16I5))                                          SET 0188
      JPO=IDISK(ID)                                                     SET 0189
      READ(29,7013) LTRAN,LILI,(IDEBU(I),I=1,JPO ),(IFIN(I),I=1,JPO )   SET 0190
7013  FORMAT(' ',(20I5))                                                SET 0191
      DO 73922 I=1,KZ                                                   SET 0192
      DO 73922 J=1,20                                                   SET 0193
      JACC(I,J)=JACC(I,J)/100                                           SET 0194
73922  CONTINUE                                                         SET 0195
      DO 75491 I=1,NSU                                                  SET 0196
      JSU(I)=VSU(I)                                                     SET 0197
75491 CONTINUE                                                          SET 0198
      JP=IDISK(ID)                                                      SET 0199
      LANT=0                                                            SET 0200
      DO 199 KEY=1,JP                                                   SET 0201
C  III=  DEMAND PAIR NUMBER                                             SET 0202
C  NHUP= NUMBER OF POTENTIAL FG OR HU                                   SET 0203
C  KPR = PROFILE NUMBER                                                 SET 0204
C  JHU(I)=INTERNAL LINK NUMBERS  OF CONT.FG AND HU.                     SET 0205
C  PB(L) =BOOLEAN PROFILES                                              SET 0206
C  CR(LL)= CHARGES ON SWITCHING LINKS IN VOICE CIRCUITS                 SET 0207
C  COM(I)=CHARGES ON SWITCHING NODES IN LINES                           SET 0208
      READ(10'KEY)III,NHJP,KPR,(JHU(I),I=1,NHUP),(PB(L),L=1,NHUP),NPOINTSET 0209
     1,(CR(LL),LL=1,LLINK),(COM(I),I=1,KAP),PROB                        SET 0210
      IF(PB(1).NE.-1) GO TO 19286                                       SET 0211
       DO 19287 PT=1,KAP                                                SET 0212
19287 IF(COM(PT).GT.0.) CLOT(PT)=99999                                  SET 0213
19286 DO 1276 JJ=1,LLINK                                                SET 0214
      CCR(JJ)=CR(JJ)                                                    SET 0215
1276   CONTINUE                                                         SET 0216
      KANT=III                                                          SET 0217
       DO 1273 I=1,KONT                                                 SET 0218
      IF(CCR(DAVE(I,4)).EQ.0) GO TO 1273                                SET 0219
      IK=DAVE(I,1)                                                      SET 0220
      IKK=DAVE(I,2)                                                     SET 0221
       ICC=IC(III,KPR)                                                  SET 0222
      ICD=IC(IK,IKK)                                                    SET 0223
      WRITE(KI,75) ICC,COLUM(4),ICD,ROWS(1),CCR(DAVE(I,4))              SET 0224
   75 FORMAT(' ',T5,I8,T5,A1,T15,I8,T15,A2,T25,F9.1)                    SET 0225
1273  CONTINUE                                                          SET 0226
      DO 1274 I=1,NSU                                                   SET 0227
      IF(COM(VSU(I)).EQ.0) GO TO 1274                                   SET 0228
      IK=VSU(I)                                                         SET 0229
      ICC=IC(III,KPR)                                                   SET 0230
      ICD=IC(IZ,IK)                                                     SET 0231
      WRITE(KI,76) ICC,COLUM(4),ICD,ROWS(6),COM(VSU(I))                 SET 0232
```

```
1274   CONTINUE                                                    SET 0233
   76 FORMAT(' ',T5,I8,T5,A1,T15,I8,T15,A2,T25,F9.1)               SET 0234
C  INSERT CONSTRAINTS FOR ORDER OF PROFILES                        SET 0235
C  BOUNDS IN CHARGE  COLUMS                                        SET 0236
      IN=1                                                         SET 0237
      IF(NPOINT.EQ.9999) IN=3                                      SET 0238
       ICC=IC(III,KPR)                                             SET 0239
       WRITE(KB,77) BOUNDS(IN),ICC,COLUM(4), BA(1)                 SET 0240
   77 FORMAT(' ',T1,A8,T15,I8,T15,A1,T25,F9.1)                     SET 0241
      IF(IN.EQ.3) GO TO 199                                        SET 0242
      ICC=IC(III,KPR)                                              SET 0243
      ICD=IC(IZ,III)                                               SET 0244
       WRITE(KI,1843)  ICC,COLUM(4),ICD,ROWS(8),BA(1)              SET 0245
1843  FORMAT(' ',T5,I8,T5,A1,T15,I8,T15,A1,T25,F9.1)               SET 0246
      IF(KANT.EQ.LANT) GO TO 1999                                  SET 0247
      LANT=KANT                                                    SET 0248
      ICC=IC(IZ,III)                                               SET 0249
       WRITE(KH,1876) RHS,ICC,ROWS(8),BA(1)                        SET 0250
1876   FORMAT(' ',T5,A4,T15,I8,T15,A1,T25,F9.1)                    SET 0251
       ICC=IC(IZ,III)                                              SET 0252
      WRITE(KR,1877) CONST(8),ICC,ROWS(8)                          SET 0253
 1877 FORMAT(' ',T2,A1,T5,I8,T5,A1)                                SET 0254
1999   CONTINUE                                                    SET 0255
      IF(IFIN(KEY).EQ.0) GO TO 199                                 SET 0256
      ICP=IDEBU(KEY)                                               SET 0257
      ICD=IFIN(KEY)                                                SET 0258
      READ(14'KEY)(ICL(JQ),JQ=1,ICD)                               SET 0259
      ICC=IC(III,KPR)                                              SET 0260
      DO 2999 KS=ICP,ICD                                           SET 0261
      IF(ICL(KS).EQ.0) GO TO 2999                                  SET 0262
      ZP=ICL(KS)                                                   SET 0263
      ICD=IC(IZ,KS)                                                SET 0264
      WRITE(KI,1843) ICC,COLUM(4),ICD,ROWS(9),ZP                   SET 0265
2999   CONTINUE                                                    SET 0266
  199 CONTINUE                                                     SET 0267
      IF (LTRAN.EQ.0) GO TO 2121                                   SET 0268
      DO 3999 KS=1,LTRAN                                           SET 0269
      ICC=IC(IZ,KS)                                                SET 0270
      WRITE(KR,1877) CONST(1),ICC,ROWS(9)                          SET 0271
 3999 CONTINUE                                                     SET 0272
 2121 DO 1275 I=1,NSU                                              SET 0273
      IK=VSU(I)                                                    SET 0274
      ICC=IC(IZ,IK)                                                SET 0275
       WRITE(KR,79) CONST(6),ICC,ROWS(6)                           SET 0276
1275   CONTINUE                                                    SET 0277
   79 FORMAT(' ',T2,A1,T5,I8,T5,A2)                                SET 0278
  200 KON=5                                                        SET 0279
  999 JJ=KL                                                        SET 0280
      DO 400 I=1,JJ                                                SET 0281
      IF(KON.NE.5)GO TO 487                                        SET 0282
      IF(JAR(I,3).EQ.6) GO TO 400                                  SET 0283
      IF(JAR(I,17).EQ.0)GO TO 400                                  SET 0284
      GO TO 401                                                    SET 0285
487    DO 488 IP=1,NSU                                             SET 0286
      IF(JAR(I,1).EQ.VSU(IP)) GO TO 401                            SET 0287
 488    CONTINUE                                                   SET 0288
      GO TO 400                                                    SET 0289
  401 NA=4                                                         SET 0290
```

```
      NO=0                                                              SET 0291
        XDMAS=0.0                                                       SET 0292
      YDMAS=DMAS(I)                                                     SET 0293
      DO 405 IT=1,10                                                    SET 0294
      TYPE(IT)=0                                                        SET 0295
      COST(IT)=0                                                        SET 0296
      BOUND(IT)=0                                                       SET 0297
      SAST(1,IT)=0                                                      SET 0298
      SAST(2,IT)=0                                                      SET 0299
  405 CONTINUE                                                          SET 0300
      KK=0                                                              SET 0301
      IPIP=1                                                            SET 0302
      TOUND=0                                                           SET 0303
  450 NA=NA+2                                                           SET 0304
      JIM=1                                                             SET 0305
       KK=JAR(I,NA)+KK                                                  SET 0306
          DO 402 J=IPIP,KK                                              SET 0307
      IF (JAC(I,J).EQ.JAC(I,J+1))GO TO 403                              SET 0308
      NO=NO+1                                                           SET 0309
      TYPE(NO)=-JAR(I,NA+1)                                             SET 0310
      BOUND(NO)=JIM                                                     SET 0311
      COST(NO)=JAC(I,J)                                                 SET 0312
      TOUND=TOUND+JIM                                                   SET 0313
      IF(KON.EQ.5) GO TO 27528                                          SET 0314
      XDMAS=XDMAS+(BOUND(NO)*(-TYPE(NO)))                               SET 0315
      IF(YDMAS.LE.XDMAS) GO TO 448                                      SET 0316
27528 IF(TOUND.GE.JAR(I,17)) GO TO 448                                  SET 0317
      JIM=1                                                             SET 0318
      GO TO 402                                                         SET 0319
  403 JIM=JIM+1                                                         SET 0320
  402 CONTINUE                                                          SET 0321
      IPIP=IPIP+JAR(I,NA)                                               SET 0322
      SUM=0                                                             SET 0323
      DO 404 IM=1,NO                                                    SET 0324
      SUM=SUM+BOUND(IM)                                                 SET 0325
  404 CONTINUE                                                          SET 0326
      IF(KON.NE.5) GO TO 449                                            SET 0327
      IF((JAR(I,17).GT.SUM).AND.(JAR(I,14).GE.JAR(I,17)))GO TO 450      SET 0328
      IF(KON.EQ.5)GO TO 448                                             SET 0329
449    IF((XDMAS.LT.YDMAS).AND.(SUM.LT.JAR(I,14)))GO TO 450             SET 0330
  448 IF(NO.EQ.1) GO TO 447                                             SET 0331
      SAST(1,1)=BOUND(2)                                                SET 0332
      DO 406 IT=2,NO                                                    SET 0333
      SAST(1,IT)=-BOUND(IT-1)                                           SET 0334
  406 SAST(2,IT)=BOUND(IT+1)                                            SET 0335
  447 CONTINUE                                                          SET 0336
      NB=1                                                              SET 0337
      DO 452 N=1,NO                                                     SET 0338
      NN=1                                                              SET 0339
      IF(N.GT.1) NN=2                                                   SET 0340
      IF(N.EQ.NO) NN=1                                                  SET 0341
      KX=6                                                              SET 0342
      IF(KON.EQ.5)KX=4                                                  SET 0343
       ICC=IC(N,I)                                                      SET 0344
      ICD=IC(IZ,I)                                                      SET 0345
      IF(KON.EQ.6) ICD=IC(IZ,JSU(I))                                    SET 0346
      IF(KON.EQ.6) ICC=IC(N,JSU(I))                                     SET 0347
      WRITE(KI,451) ICC,COLUM(KON),ICD,ROWS(KX),TYPE(N)                 SET 0348
```

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  451 FORMAT(' ',T5,I8,T5,A1,T15,I8,T15,A2,T25,F9.1)                SET 0349
      ICC=IC(N,I)                                                   SET 0350
      IF(KON.EQ.6) ICC=IC(N,JSU(I))                                 SET 0351
      WRITE(KI,456) ICC,COLUM(KON),COS,COST(N)                      SET 0352
  456 FORMAT(' ',T5,I8,T5,A1,T15,A8,T25,F9.1)                       SET 0353
       ICC=IC(N,I)                                                  SET 0354
      IF(KON.EQ.6) ICC=IC(N,JSU(I))                                 SET 0355
      WRITE(KB,453) BOUNDS(1),ICC,COLUM(KON),BOUND(N)               SET 0356
      IF((KOLT(I).EQ.99999).AND.(N.EQ.1).AND.(KON.EQ.5)) WRITE(KB,453) SET 0357
     1BOUNDS(2),ICC,COLUM(KON),BA(1)                                SET 0358
      IF((CLOT(I).EQ.99999).AND.(N.EQ.1).AND.(KON.EQ.6)) WRITE(KB,453) SET 0359
     1BOUNDS(2),ICC,COLUM(KON),BA(1)                                SET 0360
  453 FORMAT(' ',T1,A8,T15,I8,T15,A1,T25,F9.1)                      SET 0361
      IF(NO.EQ.1) GO TO 400                                         SET 0362
      DO 454 NI=1,NN                                                SET 0363
       IF(NI.EQ.2) NB=NB+1                                          SET 0364
       ICC=IC(N,I)                                                  SET 0365
      ICD=IC(NB,I)                                                  SET 0366
      IF(KON.EQ.6) ICD=IC(NB,JSU(I))                                SET 0367
      IF(KON.EQ.6) ICC=IC(N,JSU(I))                                 SET 0368
      WRITE(KI,455) ICC,COLUM(KON),ICD,ROWS(KX+1),SAST(NI,N)        SET 0369
  455 FORMAT(' ',T5,I8,T5,A1,T15,I8,T15,A1,T25,F9.1)                SET 0370
  454 CONTINUE                                                      SET 0371
      IF(N.EQ.ND) GO TO 452                                         SET 0372
       ICC=IC(NB,I)                                                 SET 0373
      IF(KON.EQ.6) ICC=IC(NB,JSU(I))                                SET 0374
       WRITE(KR,457) CONST(2),ICC,ROWS(KX+1)                        SET 0375
  457 FORMAT(' ',T2,A1,T5,I8,T5,A1)                                 SET 0376
  452 CONTINUE                                                      SET 0377
  400 CONTINUE                                                      SET 0378
      IF(IPROG.EQ.1)GO TO 500                                       SET 0379
      IPROG=1                                                       SET 0380
      KL=KZ                                                         SET 0381
      KON=6                                                         SET 0382
      DO 501 I=1,KZ                                                 SET 0383
      DO 502 J=1,17                                                 SET 0384
502   JAR(I,J)=JARR(I,J)                                            SET 0385
      JAR(I,17)=JAR(I,14)                                           SET 0386
      DO 501  K=1,20                                                SET 0387
      JAC(I,K)=JACC(I,K)                                            SET 0388
  501 CONTINUE                                                      SET 0389
      GO TO 999                                                     SET 0390
  500 WRITE(KB,600)                                                 SET 0391
600   FORMAT(     'ENDATA')                                         SET 0392
      DO 601 I=15,19                                                SET 0393
      ENDFILE I                                                     SET 0394
      REWIND  I                                                     SET 0395
  601 CONTINUE                                                      SET 0396
      STOP                                                          SET 0397
      DEBUG SUBCHK                                                  SET 0398
      END                                                           SET 0399
/*                                                                  SET 0400
//GO.FT10F001 DD DSN=$600.ABC,DISP=OLD                              SET 0401
//GO.FT12F001 DD DSN=$600.HIJ,DISP=OLD                              SET 0402
//GO.FT14F001 DD DSN=$600.ROB.DISP=OLD                              SET 0403
//GO.FT15F001 DD DSN=$600.ROWS.DISP=OLD                             SET 0404
//GO.FT16F001 DD DSN=$600.COLUMN,DISP=OLD                           SET 0405
//GO.FT17F001 DD DSN=$600.MARKER,DISP=OLD                           SET 0406
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//GO.FT18F001 DD DSN=$600.RHS,DISP=OLD                    SET 0407
//GO.FT19F001 DD DSN=$600.BOUNDS,DISP=OLD                 SET 0408
//GO.FT20F001 DD DSN=$600.DEF,DISP=OLD                    SET 0409
//GO.FT22F001 DD DSN=$600.JKL,DISP=OLD                    SET 0410
//GO.FT23F001 DD DSN=$600.MNO,DISP=OLD                    SET 0411
//GO.FT24F001 DD DSN=$600.PQR,DISP=OLD                    SET 0412
//GO.FT25F001 DD DSN=$600.VWX,DISP=OLD                    SET 0413
//GO.FT26F001 DD DSN=$600.XYZ,DISP=OLD                    SET 0414
//GO.FT27F001 DD DSN=$600.BCD,DISP=OLD                    SET 0415
//GO.FT28F001 DD DSN=$600.EFG,DISP=OLD                    SET 0416
//GO.FT29F001 DD DSN=$600.MIC,DISP=OLD                    SET 0417
//GO.FT30F001 DD DSN=$600.JAR,DISP=OLD                    SET 0418
/*                                                        SET 0419
//                                                        SET 0420
```

```
//RESULTS JOB ($600,002,005,0100,0000,24,,2),'GELLER  '
//*PASSWORD=HERMES
//    EXEC   FORTGCLG
//FORT.SYSIN DD *
      REAL  RNSLAC(60)
      INTEGER*2 A(200,2)
      INTEGER*2 JHU(10),PB(10),KL,KZ,NB,NGT,KLON,NORG,NDEST,NT2,JVAD(300
     1)
      INTEGER NODES(30)
      INTEGER MRT(100,22)
      REAL MRS(60,22)
      REAL CR(200),COM(100),CCR(200),CCOM(100)
      INTEGER NPIN(500),IDPCA(100,3),ITYPE(2),LNSLAC(300,3),NNSLAC(100,4
     1), LINK(300,4), JAR(300,17),JARR(60,17),JAC(300,20),JACC(50,20)
      REAL*8 XNODNM(300)
      DEFINE FILE 10(1000,200,U,ID25)
      DEFINE FILE 12(2500,100,U,ID4)
      CALL ZSUPRS
      READ(20,4000) IPROG,LIM23, (XNODNM(I),I=1,LIM23)
 4000 FORMAT(' ',2I6,2X,100A8)
      KCOST=0
      IF (IPROG.LE.1) GO TO 17430
      NPD=67
      NP=75
      NN=23
      DO 1032 K=1,200
 1032   CCR(K)=0
      DO 1033 K=1,100
 1033 CCOM(K)=0
      READ(5,999) (NPIN(J),J=1,NP)
 999  FORMAT(25I3)
      READ(5,996) ((NNSLAC(I,J),J=1,2), RNSLAC(I) ,I=1,NN)
 996   FORMAT( 6(I4,I4,F5.1))
       READ(1,79245)IPP,(( A (I,J),J=1,2),I=1,IPP)
79245 FORMAT(27I3)
      READ(23,77) KAP,LLINK
 77   FORMAT(' ',2I3)
      DO 36 IB=1,LLINK
 36   MRT(IB+1,1)=IB
       DO 38 IB=1,KAP
  38  MRS(IB,1)=IB
      READ(24,4004) KZ,((JARR(I,J),I=1,KZ),J=1,17),((JACC(I,J),I=1,KZ),
     1 J=1,20)
      JO=21
      IJ=1
      N1=0
      I=0
      N2=NPIN(1)
       IF(N2.NE.1) GO TO 5
 1    I=I+1
      N1=NPIN(I)
      N2= NPIN(I+1)
      IF(N2-N1.EQ.1) GO TO 1
  5   N3=N1+1
      N4=N2-1
      DO 4 JJ=N3,N4
      IJ=IJ+1
      READ(10'JJ) III,NHUP,KPR,(JHU(IT),IT=1,NHUP),(PB(IT),IT=1,NHUP),
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      1NPOINT,(CR(LL),LL=1,LLINK),(COM(IX),IX=1,KAP),PROB                RES 0059
       MRT(1,IJ) =III                                                    RES 0060
       DO 2 K=1,LLINK                                                    RES 0061
       CCR(K)=CR(K)+CCR(K)                                               RES 0062
2      MRT(K+1,IJ)=CR(K)                                                 RES 0063
       MRT(LLINK+2,IJ)=PROB                                              RES 0064
       DO 3 KK=1,KAP                                                     RES 0065
       CCOM(KK)=COM(KK)+CCOM(KK)                                         RES 0066
       MRS(KK,IJ)=COM(KK)                                                RES 0067
  3    CONTINUE                                                          RES 0068
       IF(IJ.EQ.21) GO TO 7                                              RES 0069
       IF(III.EQ.NPD) GO TO 771                                          RES 0070
        GO TO 4                                                          RES 0071
771    JO=III-((III/20)*20)+1                                            RES 0072
  7    WRITE(6,8)                                                        RES 0073
  8    FORMAT('1',25X,'DEMAND PAIRS FROM SWITCHING NETWORK(VOICE CIRCUITSRES 0074
      1)',//,1X,'SWITCHING',/,1X,'NETWORK',/,1X,'LINKS',/)               RES 0075
       WRITE(6,10) (MRT(1,INJ),INJ=2,JO)                                 RES 0076
 10    FORMAT(' ',18X,20I5)                                              RES 0077
       KK=LLINK+1                                                        RES 0078
       DO 73582  K=2,KK                                                  RES 0079
       IF(K.EQ.55) WRITE(6,8)                                            RES 0080
       I1=MRT(K,1)                                                       RES 0081
       I2=2*I1-1                                                         RES 0082
       WRITE(6,73581) XNODNM(A(I2,1)),XNODNM(A(I2,2)),(MRT(K,INJ),INJ=2, RES 0083
      1JO)                                                               RES 0084
73581  FORMAT(' ',A8,'-',A8,1X,20I5)                                     RES 0085
73582  CONTINUE                                                          RES 0086
       WRITE(6,12)  (MRT(KK+1,INJ),INJ=2,JO)                             RES 0087
 12    FORMAT(' ',8X,'EFFICIENCY',20I5)                                  RES 0088
        WRITE(6,13)                                                      RES 0089
 13    FORMAT(' ',/,5X,'SWITCHING',/,5X,'NETWORK',20X,'LINES SWITCHED',/,RES 0090
      15X,'NODES'/)                                                      RES 0091
       DO 745 INJ=1,KAP                                                  RES 0092
       JOP=MRS(INJ,1)                                                    RES 0093
       WRITE(6,14) XNODNM(JOP),(MRS(INJ,KK),KK=2,JO)                     RES 0094
745    CONTINUE                                                          RES 0095
 14    FORMAT(' ',4X,A8,5X,20F5.1)                                       RES 0096
        IJ=1                                                             RES 0097
 4     CONTINUE                                                          RES 0098
       IF(I.LT.NP-1) GO TO 1                                             RES 0099
        WRITE(6,701)                                                     RES 0100
 701   FORMAT('1','LINK'    ,10X,'TOTAL VOICE CIRCUITS PER LINK IN SWITCHRES 0101
      1ING NETWORK')                                                     RES 0102
        DO 15 I=1,LLINK                                                  RES 0103
       II=2*I-1                                                          RES 0104
       WRITE(6,16) XNODNM(A(II,1)),XNODNM(A(II,2)), CCR(I)               RES 0105
 16    FORMAT(' ',/, 1X,A8,1X,'-',1X,A8,1X,F6.1)                         RES 0106
       IF(28*(I/28).EQ.I) WRITE(6,701)                                   RES 0107
 15    CONTINUE                                                          RES 0108
       WRITE(6,17)                                                       RES 0109
 17    FORMAT('1','NODES'   ,10X,'TOTAL NUMBER OF LINES SWITCHED PER NODERES 0110
      1 IN SWITCHING NETWORK'/)                                          RES 0111
        DO 18 I=1,KAP                                                    RES 0112
        WRITE(6,19)  XNODNM(I), CCDM(I)                                  RES 0113
 19    FORMAT(' ',A8,12X,F6.1)                                           RES 0114
 18     CONTINUE                                                         RES 0115
       KCOST=0                                                           RES 0116
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      DO 73 I=1,NN                                                      RES 0117
      N1=NNSLAC(I,1)                                                    RES 0118
      N2=NNSLAC(I,2)                                                    RES 0119
      N3=RNSLAC(I)                                                      RES 0120
       ICOST=0                                                          RES 0121
      DO 74 J=1,KAP                                                     RES 0122
      JP=J                                                              RES 0123
      IF(N1.EQ.JARR(J,1)) GO TO 80                                      RES 0124
   74  CONTINUE                                                         RES 0125
80    COST=0                                                            RES 0126
       DO 85 J=1,N2                                                     RES 0127
   85 ICOST=ICOST+ JACC(JP,J)                                           RES 0128
      KCOST=KCOST+ICOST                                                 RES 0129
      NNSLAC(I,4)=ICOST                                                 RES 0130
   73  CONTINUE                                                         RES 0131
      WRITE(6,400)                                                      RES 0132
  400 FORMAT('1' ,1X 'SWITCHING NODE STATISTICS',//,1X,'NODE',10X,'SWITCRES 0133
     1HING',5X,'COST($)',5X,'UNUSED',/,15X,'MACHINES',18X,'CAPACITY',/, RES 0134
     1 15X,'INSTALLED',/)                                               RES 0135
      DO 500 I=1,KZ                                                     RES 0136
      WRITE(6,501) XNODNM(JARR( I,1)),NNSLAC(I,2),NNSLAC(I,4),RNSLAC(I) RES 0137
  501 FORMAT(' ',1X,A8,7X,I2,10X,I7,4X,F6.1)                            RES 0138
  500  CONTINUE                                                         RES 0139
      WRITE(6,602) KCOST                                                RES 0140
  602 FORMAT(' ',30X,'-----',/,1X,'TOTAL SWITCHING NODE COSTS',2X,I7)   RES 0141
17430 CONTINUE                                                          RES 0142
      ID=54                                                             RES 0143
      LN=39                                                             RES 0144
      READ(5,998) ((IDPCA(J,K),K=1,3),J=1,ID)                           RES 0145
998   FORMAT(18I4)                                                      RES 0146
      READ(5,997) ((LNSLAC(J,K),K=1,3),J=1,LN)                          RES 0147
997   FORMAT(18I4)                                                      RES 0148
      READ(25,4005) NB,ITYPE(1),ITYPE(2), KL,((JAR(I,J),I=1,KL),J=1,17),RES 0149
     1 ((JAC(I,J),I=1,KL),J=1,20)                                       RES 0150
 4004 FORMAT(' ',I2,2X,(16I5))                                          RES 0151
 4005  FORMAT(' ',I3,2I7,I3,2X,(16I7))                                 RES 0152
      WRITE(6,50)                                                       RES 0153
   50 FORMAT('1',25X,'CHAINS AS SELECTED BY MPSX(LINK NO.)',//,1X,'FROM'RES 0154
     1,10X,'TO',/)                                                      RES 0155
      IP=0                                                              RES 0156
      DO 51 I=1,300                                                     RES 0157
      DO 51 J=1,4                                                       RES 0158
   51  LINK(I,J)=0                                                      RES 0159
       DO 40 I=1,ID                                                     RES 0160
       N1=IDPCA(I,1)                                                    RES 0161
      N2=IDPCA(I,2)                                                     RES 0162
      N3=IDPCA(I,3)                                                     RES 0163
   39 IP=IP+1                                                           RES 0164
       READ(12'IP) NGT,KLON,NT2,NORG,NDEST,(JVAD(J),J=1,KLON)           RES 0165
      IF((N1.EQ.NGT).AND.(N2.EQ.NT2)) GO TO 41                          RES 0166
       GO TO 39                                                         RES 0167
   41 NODES(1)=NORG                                                     RES 0168
      NODES(KLON+1)=NDEST                                               RES 0169
      IF(KLON.EQ.1) GO TO 93157                                         RES 0170
      JJ=1                                                              RES 0171
      DO 93156 J=1,KLON                                                 RES 0172
      NODES(JJ+1)= JAR(JVAD(J),1)                                       RES 0173
       IF(NODES(JJ).EQ.JAR(JVAD(J),1)) NODES(JJ+1)=JAR(JVAD(J),2)       RES 0174
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      JJ=JJ+1                                                           RES 0175
93156 CONTINUE                                                          RES 0176
93157 IOI=KLON+1                                                        RES 0177
      WRITE(6,42) XNODNM(NORG),XNODNM(NDEST),(XNODNM(NODES(N)),N=1,IOI) RES 0178
 42   FORMAT(' ',//,1X,A6,'-',A8,2X,I5(A6,'-'),/,20X,I5(A6,'-'))       RES 0179
      DO 43 J=1,KLON                                                    RES 0180
      LINK(JVAD(J),1)=LINK(JVAD(J),1)+N3                                RES 0181
 43   CONTINUE                                                          RES 0182
      IF(14*(I/14).EQ.I) WRITE(6,50)                                    RES 0183
40    CONTINUE                                                          RES 0184
      JCOST=0                                                           RES 0185
      DO 70 I=1,LN                                                      RES 0186
      N1=LNSLAC(I,1)                                                    RES 0187
      N2=LNSLAC(I,2)                                                    RES 0188
      N3=LNSLAC(I,3)                                                    RES 0189
      LINK(N1,2)=N2                                                     RES 0190
      LINK(N1,4)=N3                                                     RES 0191
      ICOST=0                                                           RES 0192
       DO 71 J=1,N2                                                     RES 0193
   71 ICOST=ICOST+JAC(N1,J)                                             RES 0194
      LINK(N1,3)=ICOST                                                  RES 0195
      JCOST=JCOST+ICOST                                                 RES 0196
  70  CONTINUE                                                          RES 0197
       WRITE(6,200)                                                     RES 0198
200   FORMAT('1',1X,'TRANSMISSION LINKS STATISTICS',//,1X,'LINK',20X,   RES 0199
     1'CHANNELS',7X,'COST($)',4X,'UNUSED',5X,'USED',/,25X,'INSTALLED',17RES 0200
     1X,'CAPACITY',3X,'CAPACITY')                                       RES 0201
       DO 300 I=1,300                                                   RES 0202
      IF(LINK(I,3).EQ.0) GO TO 300                                      RES 0203
      WRITE(6,301) XNODNM(JAR(I,1)),XNODNM(JAR(I,2)),LINK(I,2),LINK(I,3)RES 0204
     1,LINK(I,4),LINK(I,1)                                              RES 0205
 301   FORMAT(' ',1X,A8,'-',A8,8X,I2,10X,I3,4X,I5,6X,I5)                RES 0206
 300   CONTINUE                                                         RES 0207
       WRITE(6,302) JCOST                                               RES 0208
 302  FORMAT(' ',39X,'-------',/,10X,'TOTAL COST OF TRANSMISSION',4X,   RES 0209
     1I11)                                                              RES 0210
       ITCOST=JCOST+KCOST                                               RES 0211
      WRITE(6,8881)  ITCOST                                             RES 0212
8881  FORMAT(' ', 'TOTAL COST TRANSMISSION AND SWITCHING ($)',2X,I11)   RES 0213
      STOP                                                              RES 0214
      END                                                               RES 0215
//GO.SYSIN DD *                                                         RES 0216
//GO.FT01F001 DD DSN=$600.WIS,DISP=OLD                                  RES 0240
//GO.FT10F001 DD DSN=$600.ABC,DISP=OLD                                  RES 0241
//GO.FT12F001 DD DSN=$600.HIJ,DISP=OLD                                  RES 0242
//GO.FT20F001 DD DSN=$600.DEF,DISP=OLD                                  RES 0243
//GO.FT23F001 DD DSN=$600.MNO,DISP=OLD                                  RES 0244
//GO.FT24F001 DD DSN=$600.PQR,DISP=OLD                                  RES 0245
//GO.FT25F001 DD DSN=$600.VWX,DISP=OLD                                  RES 0246
/*                                                                      RES 0247
```

```
//DELETT   JOB ($600,002,010,0100,0000,14,,1),'GELLER  ',MSGLEVEL=(1,1) DEL 0001
//*PASSWORD=HERMES                                                     DEL 0002
//    EXEC  PGM=IEFBR14                                                DEL 0003
//DD1   DD DSN=$600.STU,DISP=(OLD,DELETE)
//DD2   DD DSN=$600.WIS,DISP=(OLD,DELETE)
//DD3   DD DSN=$600.ABC,DISP=(OLD,DELETE)
//DD4   DD DSN=$600.HIJ,DISP=(OLD,DELETE)
//DD5   DD DSN=$600.ROB,DISP=(OLD,DELETE)
//DD6   DD DSN=$600.ROWS,DISP=(OLD,DELETE)
//DD7   DD DSN=$600.COLUMN,DISP=(OLD,DELETE)
//DD8   DD DSN=$600.MARKER,DISP=(OLD,DELETE)
//DD9   DD DSN=$600.RHS,DISP=(OLD,DELETE)
//DD10  DD DSN=$600.BOUNDS,DISP=(OLD,DELETE)
//DD11  DD DSN=$600.DEF,DISP=(OLD,DELETE)
//DD12  DD DSN=$600.GHI,DISP=(OLD,DELETE)
//DD13  DD DSN=$600.JKL,DISP=(OLD,DELETE)
//DD14  DD DSN=$600.MNO,DISP=(OLD,DELETE)
//DD15  DD DSN=$600.POR,DISP=(OLD,DELETE)
//DD16  DD DSN=$600.VWX,DISP=(OLD,DELETE)
//DD17  DD DSN=$600.XYZ,DISP=(OLD,DELETE)
//DD18  DD DSN=$600.BCD,DISP=(OLD,DELETE)
//DD19  DD DSN=$600.EFG,DISP=(OLD,DELETE)
//DD20  DD DSN=$600.MIC,DISP=(OLD,DELETE)
//DD21  DD DSN=$600.JAR,DISP=(OLD,DELETE)
//DD22  DD DSN=$600.MKG,DISP=(OLD,DELETE)
/*                                                                     DEL 0025
//                                                                     DEL 0026
```

REVISIONS TO THE HERMES III MODEL:
FINAL REPORT.