HERMES PROJECT

HERMES III USER'S MANUAL

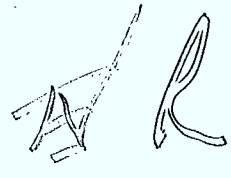
prepared for the

NATIONAL TELECOMMUNICATIONS BRANCH

DEPARTMENT OF COMMUNICATIONS

by

GELLER & ASSOCIATES INC.



March 31, 1975

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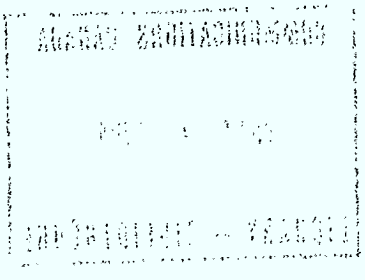

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1. INTRODUCTION

This manual provides necessary information to perform simulations on a switching network, a transmission facilities network or simultaneously on both a switching and transmission facilities network.

Simulations on the original Hermes III software were restricted to small networks only. This manual describes a revised version of the original Hermes III Model software. While the revised software permits simulations on larger networks, the program is no longer executed in one job step. Intermediate results are obtained between job steps. As was the case in the original version, manual intervention is not required.

In addition to the larger network simulation capability, the software was modified such that the number of contemplated high usage and full groups have been increased from a previous maximum of ten to a forseeable maximum of fifty.

Simulations on large networks created problems previously not anticipated. These problems were overcome by further modification of existing software and the development of new software. In particular the MPSX control programs were revised. This new facility permits the saving on file of the

continuous optimal solution or a non-optimal integer solution. If additional solutions are required, the search is started from the last saved solution on file.

Decoding MPSX output was found tedious and time consuming for large networks. As an interim solution, software was developed to interrogate the files and present the integer solution in a readable format.

The manual 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 two 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.

2.0 CAPABILITIES AND SIMULATIONS

The Hermes III Model in its present form is a network model of switching and transmission capable of satisfying a given demand at minimum cost. The Model deals with increased demand on existing networks (initial traffic not equal to zero) as well as the creation of new networks (initial traffic equals zero), or a combination of both. The following lists the simulations possible with the revised Hermes III Model.

A) Increased Demand (initial traffic greater than zero)

a) Switching Network

i) Initial traffic equals zero between some demand pairs.

ii) Initial traffic greater than zero

iii) Changes in final basic trees

iv) Changes in blocking probabilities

v) Changes in overflow probabilities

vi) Changes in hierarchical status

vii) Changes in contemplated high usage groups

viii) Changes in installed high usage groups

ix) Changes in contemplated full groups

x) Changes in installed full groups

xi) Changes in capacities of switching machines at switching nodes

xii) Changes in cost functions at switching nodes

b) Transmission Facilities Network

i) Changes in network configurations

ii) Changes in type and capacity of transmission equipment

iii) Changes in cost functions of transmission equipment

iv) Zero installed capacity on some links

v) Non zero installed capacity on some links

vi) Unswitched demand traffic in voice circuits divisible

vii) Unswitched demand in voice circuits non-divisible

viii) Switched demand in voice circuits divisible

ix) Changes in carriers

B) Network Creation (initial traffic equals zero)

a) Switching Network

i) Initial traffic equals zero

ii) Initial traffic greater than zero between some demand pairs

iii) Changes in final basic trees

iv) Changes in blocking probabilities

v) Changes in overflow probabilities

vi) Changes in hierarchical status

vii) Changes in contemplated high usage groups

viii) Changes in installes high usage groups

ix) Changes in contemplated full groups

x) Changes in installed full groups

xi) Changes in capacities of switching machines at switching nodes

xii) Changes in cost functions at switching nodes

b) Transmission Facilities Network

i) Changes in network configurations

ii) Changes in type and capacity of transmission equipment

iii) Changes in cost functions of transmission equipment

iv) Zero installed capacity on some links

v) Non zero installed capacity on some links

vi) Unswitched demand traffic in voice circuits divisible

vii) Unswitched demand in voice circuits non-divisible

viii) Switched demand in voice circuits divisible

ix) Changes in carriers

The Model while originally developed as an optimizing model can also be used as a simulation model. In particular the switching network model CHARGE becomes a simulation model when contemplated groups are omitted.

The number of simulations possible in switching and transmission is very large. A complete description of all simulation combinations is beyond the scope of this report. The singular simulations are therefore only described.

SWITCHING NETWORK SINGULAR SIMULATIONS

i) Initial traffic equals zero between some demand pairs: This facility permits the design of a new network or

an extension of an existing network. The demand in terms of voice circuits on the links of the switching network are derived from the origin of the circuit conversion curve (Erlang B formuls).

ii) Initial traffic greater than zero: permits the formulation of capacity expansion simulations. For additional offered demand traffic on an existing network, the demand traffic in terms of voice circuits on the links of the switching network are derived from an initial point on the circuit conversion curve.

iii) Changes in final basic trees: permits various configurations of basic trees composed of final groups.

iv) Changes in blocking probabilities: blocking probabilities for final, installed full or contemplated full groups are variable. Blocking probabilities need not be the same for each group and are defined by the user.

v) Changes in overflow probabilities: overflow probabilities for high usage groups are variable. The user defines the overflow probability for each high usage group (installed or contemplated).

vi) Changes in hierarchical status: since the homing rules are determined by the final basic tree configuration and the configuration of the installed or contemplated full or high usage groups, the model deals with any hierarchical configuration.

vii) Changes in contemplated high usage groups: permits various configurations of contemplated high usage groups.

viii) Changes in installed high usage groups: allows for various configurations of installed high usage groups.

ix) Changes in contemplated full groups: permits various configurations of contemplated full groups.

x) Changes in installed full groups: permits various configurations of installed full groups.

xi) Changes in capacities of switching machines: permits simulations of different types of switching machines at switching nodes. A maximum of twenty switching machines are permitted at any switching node of the switching network. The switching capacity of the switching machines are defined by the user(lines switched per machine). Switching nodes may have up to four types of switching machines.

xii) Changes in cost functions of switching nodes: in order to compare the trade off between switching and transmission costs, this facility permits the definition of cost functions for the switching node switching machines.

TRANSMISSION FACILITIES NETWORK SINGULAR SIMULATIONS

i) Changes in transmission facilities network configurations: permits various types of transmission facilities network configurations.

ii) Changes in equipment type and capacities: permits the utilization of different transmission equipment for all types of nominal R.F. channel capacities.

iii) Changes in cost functions of transmission equipment: permits any increasing step cost function up to a maximum of twenty steps.

iv) Zero installed capacity on some links: permits simulations for creating new networks or the extension of existing tansmission facilities networks.

v) Non zero installed capacity on some links: permits simulations for expanding existing networks for increased demand traffic.

vi) Unswitched demand traffic in voice circuits divisible: In addition to demand traffic generated by the switching network, demand for divisible traffic may be included for any transmission facilities network simulation.

vii) Unswitched demand traffic in voice circuits non-divisible: In addition to demand traffic generated by by the switching network, demand for non-divisible traffic may be included for any transmission facilities network simulation.

viii) Switched demand in voice circuits divisible: offered demand traffic as generated in the switching network is converted to demand in voice circuits for the transmission facilities network.

ix) Changes in carriers: permits the simulation of carrier interconnects with associated costs.

2.1 SWITCHING NETWORK CONSTRAINTS

The software is presently dimensioned for the following switching network elements:

Maximum number of demand pairs	600
Maximum number of switching nodes	100
Maximum number of intermediary switching nodes	60
Maximum number of contemplated full groups	A
Maximum number of installed full groups	B
Maximum number of installed high usage groups	C
Maximum number of contemplated high usage groups	D
Maximun number of final groups	E
A+B+C+D+E = total number of links	
A+D less than or equal to	50
Maximum total number of links	100
Maximum number of contemplated for any demand pair	6

2.2 TRANSMISSION FACILITIES NETWORK CONSTRAINTS

The software is presently dimensioned for the following transmission facilities network elements:

Maximum number of nodes	300
Maximum number of links	300
Maximum number of demand pairs originating from switching network	100
Maximun number of unswitched non divisible demand pairs	A
Maximum number of unswitched divisible demand pairs	B
A+B = total number of unswitched demand pairs	
Maximum number of unswitched demand pairs	50

3.0 SOFTWARE CONSIDERATIONS

The Hermes III Model software is made up of nine separate job steps. A brief description of each of the job steps is presented in this section.

STEP 1 CATLG: This step catalogues 21 files which are required for the transfer of data between job steps.

STEP 2 CHARGE: This step is only required for simulations involving switching networks. It's principle function is to calculate the traffic on the links of the switching network. Data associated (except switching node capacity and costs) with the switching network configuration is read in at this job step.

STEP 3 BORNE: All data pretaining to the transmission facilities network configuration and all capacity and cost functions are read in at this step.

STEP 4 CADUCE: This step generates the set of admissible chains for each paired point of demand.

STEP 5 CONTRA: The ordering constraints of the profiles generated in CHARGE are derived in this step.

STEP 6 SETUP: Converts all necessary data into formats as required by step 7.

STEP 7 TRANCHE: Computes the minimum cost integer solution. This step is the mixed integer linear programming package utilizing a branch and bound algorithm.

STEP 8 RESULTS: Presents a user oriented format of the integer solution. A minimal amount of manual intervention is required.

STEP 9 DELETT: At the completion of the simulations, this last step deletes and uncatalogues all files created in step 1.

3.1 CORE SIZE AND TIME REQUIREMENTS

The inherent difficulty of predicting time requirements

for all problem sizes and types is quite aparent. Only after many simulations of various problem types and sizes can a relatively accurate prediction be made. Table 3.1 illustrates the size and time parameters of two simulations.

Problem Definitions:

Maritimes Network

Switching Network	Transmission Facilities Network
506 demand pairs of offered traffic, initial traffic equal to zero.	63 Nodes including dummy nodes.
22 final groups	88 Links including dummy links.
27 contemplated high usage groups.	
13 installed high usage groups.	

Northern Network

	51 Nodes
	88 Links
NO SWITCHING NETWORK:	36 Demand pairs unswitched and divisible.
	2 Demand pairs unswitched and non divisible.

JOB STEPS	CORE SIZE	TIME IN MINUTES	
		MARITIMES NETWORK	NORTHERN NETWORK
CATLG	100 K	.10	.10
CHARGE	218 K	3.00	N.A.
BORNE	242 K	.05	.045
CADUCE	394 K	6.0	2.0
CONTRA	350 K	.9	N.A.
SETUP	198 K	.8	.25
TRANCHE	400 K	one integer solution 13.6	1 st. integer .5 2 nd. integer 8.0
RESULTS	138 K	.5	.15
DELETT	100 K	.02	.02

TABLE 3.1 Size And Time Requirements

4.0 SAMPLE PROBLEMS

The two problems used in revising the software (Maritimes Network, Northern Network) were very helpful in testing the software. As the large size of the two problems does not permit a complete description, the presentation is limited to the major aspects of each. The outputs of the software are described and are used as an aid in problem definition.

4.1 Maritimes Problem

The Maritimes Network was a simulation of a switching network and a transmission facilities network. The switching network assumed zero initial traffic and the cost functions of the transmission facilities links were defined at zero installed capacity. The simulation is therefore one of network creation.

While Hermes III is an optimizing model, it is important to note that the model optimizes only for a given configuration of a switching network and a transmission facilities network. The model does not generate nodes or links for network creation.

Figure 4.1 represents the basic final tree of the switching network. Two rules apply to the basic final tree:

i) All nodes are connected by final groups.

ii) Closed loops composed of final groups are not permitted.

Table 4.1 represents the point to point offered traffic matrix in C.C.S. units for the Maritimes Network problem. There are 506 demand pairs including two directional traffic. As can be seen from table 4.1, traffic can be unidirectional if required and not necessarily symetrical if traffic is bi-directional.

In addition to the basic final tree shown in Figure 4.1, the switching network included 27 contemplated high usage groups as well as 13 installed high usage groups.

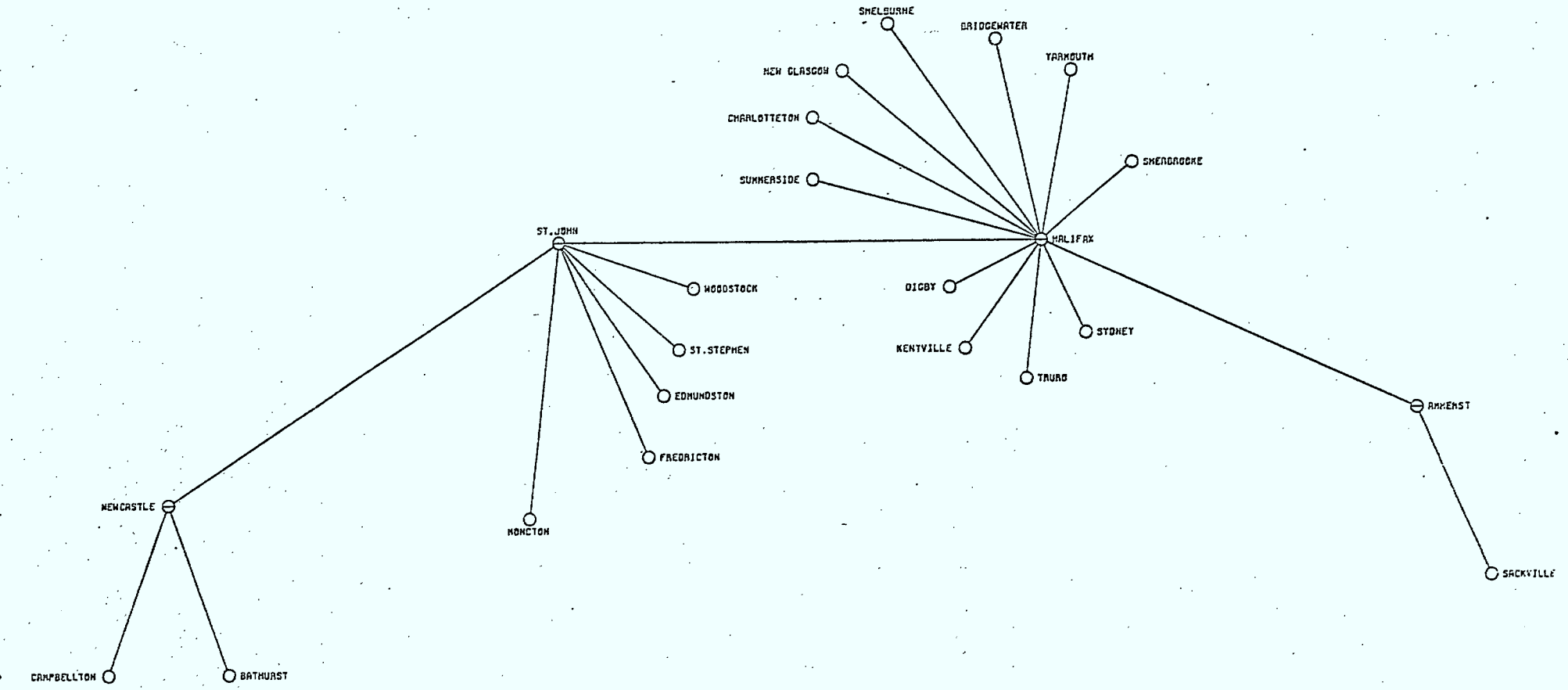


FIGURE 4.1 BASIC FINAL TREE

	Amh.	Bath.	Brid.	Camp.	Char.	Digby.	Edms.	Fred.	Hali.	Kent.	Monc.	Newc.	New G.	Sackv.	St. John	St. Ste.	Shelb.	Sherbr.	Summ.	Sydney	Truro	Woods.	Yarm.
Amherst		8	5	5	10	3	5	10	187	5	170	8	51	42	101	5	5	5	10	8	36	5	5
Bathurst	7		5	51	8	3	8	10	10	5	84	211	5	5	134	5	3	3	8	5	8	5	5
Bridgewater	5	5		3	5	5	3	5	352	23	8	5	5	5	8	3	23	3	5	5	8	3	5
Campbellton	5	51	2		5	3	8	8	10	3	36	128	5	5	51	3	3	3	5	5	5	5	3
Charlotteton	10	7	5	5		5	5	10	228	5	51	8	36	10	208	5	5	8	378	10	10	5	5
Digby	2	2	5	2	5		3	3	112	101	5	3	5	3	119	3	3	3	3	5	5	3	51
Edmundston	5	7	2	7	5	2		10	8	3	8	36	10	3	174	5	3	3	5	5	5	36	3
Fredericton	10	10	5	7	10	2	10		51	5	155	134	8	8	497	10	3	5	8	8	8	188	5
Halifax	186	10	351	10	228	112	7	51		470	438	51	451	10	637	5	73	25	96	424	433	10	194
Kentville	5	5	22	2	5	101	2	5	469		23	3	8	3	101	3	5	5	5	5	36	3	5
Moncton	170	84	7	35	51	5	7	155	437	42		188	5	5	1460	8	5	5	36	10	23	8	5
Newcastle	7	211	5	188	7	2	35	134	51	2	187		5	5	239	5	3	3	5	5	5	5	3
New Glasgow	51	5	5	5	35	5	10	7	452	7	5	5		5	245	3	3	10	10	245	134	3	5
Sackville	42	5	5	5	10	2	2	7	10	2	5	5	5		10	3	3	3	10	5	7	3	3
St. John	101	139	7	51	207	119	174	497	636	101	1460	239	245	10		194	8	5	101	134	3	264	69
St. Stephen	5	5	2	2	5	2	5	10	5	2	7	5	2	2	194		3	3	3	3	3	5	3
Shelburne	5	2	22	2	5	2	2	2	73	5	5	2	2	2	7	2		3	3	3	5	3	69
Sherbrooke	5	2	2	2	7	2	2	5	25	5	5	2	10	2	5	2	2		3	8	5	3	3
Summerside	10	7	5	5	377	2	5	7	96	5	35	5	10	10	101	2	2	2		8	8	5	5
Sydney	7	5	5	5	10	5	5	7	423	5	10	5	245	5	134	2	2	7	7		10	5	8
Truro	35	7	7	5	10	5	5	7	433	35	22	5	134	7	2	2	5	5	7	10		5	5
Woodstock	5	5	2	5	5	2	35	187	10	2	7	5	2	2	263	5	2	2	5	5	5		3
Yarmouth	5	5	5	2	5	51	2	5	194	5	5	2	5	2	69	2	69	2	5	7	5	2	

Table 4.1 Estimated Point to Point Traffic in C.C.S.

HERMES III

:M DEFINITION

506 DEMAND PAIRS 44 FINAL GROUPS

54 CONTEMPLATED HU GROUPS

26 INSTALLED HU GROUPS

0 CONTEMPLATED FULL GROUPS

0 INSTALLED FULL GROUPS

NOTE: IN ORDER TO CALCULATE THE OVERFLOW TRAFFIC, IT IS NECESSARY TO DEFINE EACH LINK FOR TWO DIRECTIONS OF TRAFFIC FLOW. THE USER NEED NOT CONCERN HIMSELF WITH DIRECTIONALITY OF SWITCHING NETWORK LINKS AS THE SWITCHING NETWORK LINKS ARE DOUBLED AND DIRECTION IS ASSIGNED INTERNALLY.

TABLE 4.2 SWITCHING NETWORK PROBLEM DEFINITION

ORIGIN	DESTINATION.	NODE	TO	NODE	LINK NO.	LINK NO.	TYPE	COEFF.
WOODSTOC	FREDRICT	1		2	1	1	CHU	0.15
FREDRICT	WOODSTOC	2		1	2	1	CHU	0.15
WOODSTOC	EDMUNDST	1		3	3	3	CHU	0.15
EDMUNDST	WOODSTOC	3		1	4	3	CHU	0.15
EDMUNDST	NEWCASTL	3		4	5	5	CHU	0.15
NEWCASTL	EDMUNDST	4		3	6	5	CHU	0.15
FREDRICT	NEWCASTL	2		4	7	7	CHU	0.15
NEWCASTL	FREDRICT	4		2	8	7	CHU	0.15
FREDRICT	MONCTON	2		5	9	9	CHU	0.15
MONCTON	FREDRICT	5		2	10	9	CHU	0.15
CAMPBELL	MONCTON	6		5	11	11	CHU	0.15
MONCTON	CAMPBELL	5		6	12	11	CHU	0.15
CAMPBELL	BATHURST	6		7	13	13	CHU	0.15
BATHURST	CAMPBELL	7		6	14	13	CHU	0.15
BATHURST	MONCTON	7		5	15	15	CHU	0.15
MONCTON	BATHURST	5		7	16	15	CHU	0.15
NEWCASTL	MONCTON	4		5	17	17	CHU	0.15
MONCTON	NEWCASTL	5		4	18	17	CHU	0.15
SUMMERSI	MONCTON	8		5	19	19	CHU	0.15
MONCTON	SUMMERSI	5		8	20	19	CHU	0.15
SUMMERSI	CHARLOTT	8		9	21	21	CHU	0.15
CHARLOTT	SUMMERSI	9		8	22	21	CHU	0.15
CHARLOTT	MONCTON	9		5	23	23	CHU	0.15
MONCTON	CHARLOTT	5		9	24	23	CHU	0.15
CHARLOTT	NEW GLAS	9		10	25	25	CHU	0.15
NEW GLAS	CHARLOTT	10		9	26	25	CHU	0.15
MONCTON	TRURO	5		11	27	27	CHU	0.15
TRURO	MONCTON	11		5	28	27	CHU	0.15
MONCTON	AMHERST	5		12	29	29	CHU	0.15
AMHERST	MONCTON	12		5	30	29	CHU	0.15
MONCTON	KENTVILL	5		13	31	31	CHU	0.15
KENTVILL	MONCTON	13		5	32	31	CHU	0.15
NEW GLAS	AMHERST	10		12	33	33	CHU	0.15
AMHERST	NEW GLAS	12		10	34	33	CHU	0.15
NEW GLAS	TRURO	10		11	35	35	CHU	0.15
TRURO	NEW GLAS	11		10	36	35	CHU	0.15
NEW GLAS	SHERBROO	10		14	37	37	CHU	0.15
SHERBROO	NEW GLAS	14		10	38	37	CHU	0.15
NEW GLAS	SYDNEY	10		15	39	39	CHU	0.15
SYDNEY	NEW GLAS	15		10	40	39	CHU	0.15
BATHURST	TRURO	7		11	41	41	CHU	0.15
TRURO	BATHURST	11		7	42	41	CHU	0.15
KENTVILL	TRURO	13		11	43	43	CHU	0.15
TRURO	KENTVILL	11		13	44	43	CHU	0.15
KENTVILL	BRIDGEWA	13		16	45	45	CHU	0.15
BRIDGEWA	KENTVILL	16		13	46	45	CHU	0.15
KENTVILL	DIGBY	13		17	47	47	CHU	0.15
DIGBY	KENTVILL	17		13	48	47	CHU	0.15
DIGBY	YARMOUTH	17		18	49	49	CHU	0.15
YARMOUTH	DIGBY	18		17	50	49	CHU	0.15
YARMOUTH	SHELBURN	18		19	51	51	CHU	0.15
SHELBURN	YARMOUTH	19		18	52	51	CHU	0.15
SHELBURN	BRIDGEWA	19		16	53	53	CHU	0.15
BRIDGEWA	SHELBURN	16		19	54	53	CHU	0.15
ST. JOHN	CAMPBELL	20		6	55	55	IHU	0.15
CAMPBELL	ST. JOHN	6		20	56	55	IHU	0.15
ST. JOHN	BATHURST	20		7	57	57	IHU	0.15
BATHURST	ST. JOHN	7		20	58	57	IHU	0.15
ST. JOHN	SUMMERSI	20		8	59	59	IHU	0.15

NOTE: THE ODD NUMBERED LINKS ARE DEFINED BY THE USER WHILE THE EVEN NUMBERED LINKS ARE GENERATED INTERNALLY. THE USER ONLY DEFINES THE NODE NAMES, TYPE, AND COEFF. COEFF REFERS TO THE BLOCKING PROBABILITIES FOR FINALS AND FULL GROUPS AND OVERFLOW PROBABILITIES FOR HIGH USAGE GROUPS.

TABLE 4.3 SWITCHING NETWORK LINKS

ORIGIN	DESTINATION.	NODE	TO	NODE	LINK NO.	LINK NO.	TYPE	COEFF.
SUMMERSI	ST. JOHN	8		20	60	59	IHU	0.15
ST. JOHN	CHARLOTT	20		9	61	61	IHU	0.15
CHARLOTT	ST. JOHN	9		20	62	61	IHU	0.15
ST. JOHN	NEW GLAS	20		10	63	63	IHU	0.15
NEW GLAS	ST. JOHN	10		20	64	63	IHU	0.15
ST. JOHN	SYDNEY	20		15	65	65	IHU	0.15
SYDNEY	ST. JOHN	15		20	66	65	IHU	0.15
ST. JOHN	AMHERST	20		12	67	67	IHU	0.15
AMHERST	ST. JOHN	12		20	68	67	IHU	0.15
ST. JOHN	KENTVILL	20		13	69	69	IHU	0.15
KENTVILL	ST. JOHN	13		20	70	69	IHU	0.15
ST. JOHN	DIGBY	20		17	71	71	IHU	0.15
DIGBY	ST. JOHN	17		20	72	71	IHU	0.15
ST. JOHN	YARMOUTH	20		18	73	73	IHU	0.15
YARMOUTH	ST. JOHN	18		20	74	73	IHU	0.15
MONCTON	HALIFAX	5		21	75	75	IHU	0.15
HALIFAX	MONCTON	21		5	76	75	IHU	0.15
NEWCASTL	HALIFAX	4		21	77	77	IHU	0.15
HALIFAX	NEWCASTL	21		4	78	77	IHU	0.15
FREDRICT	HALIFAX	2		21	79	79	IHU	0.15
HALIFAX	FREDRICT	21		2	80	79	IHU	0.15
ST. JOHN	ST. STEP	20		22	81	81	FING	0.01
ST. STEP	ST. JOHN	22		20	82	81	FING	0.01
ST. JOHN	WOODSTOC	20		1	83	83	FING	0.01
WOODSTOC	ST. JOHN	1		20	84	83	FING	0.01
ST. JOHN	EDMUNDST	20		3	85	85	FING	0.01
EDMUNDST	ST. JOHN	3		20	86	85	FING	0.01
ST. JOHN	FREDRICT	20		2	87	87	FING	0.01
FREDRICT	ST. JOHN	2		20	88	87	FING	0.01
ST. JOHN	NEWCASTL	20		4	89	89	FING	0.01
NEWCASTL	ST. JOHN	4		20	90	89	FING	0.01
ST. JOHN	MONCTON	20		5	91	91	FING	0.01
MONCTON	ST. JOHN	5		20	92	91	FING	0.01
ST. JOHN	HALIFAX	20		21	93	93	FING	0.01
HALIFAX	ST. JOHN	21		20	94	93	FING	0.01
CAMPBELL	NEWCASTL	6		4	95	95	FING	0.01
NEWCASTL	CAMPBELL	4		6	96	95	FING	0.01
BATHURST	NEWCASTL	7		4	97	97	FING	0.01
NEWCASTL	BATHURST	4		7	98	97	FING	0.01
SUMMERSI	HALIFAX	8		21	99	99	FING	0.01
HALIFAX	SUMMERSI	21		8	100	99	FING	0.01
CHARLOTT	HALIFAX	9		21	101	101	FING	0.01
HALIFAX	CHARLOTT	21		9	102	101	FING	0.01
NEW GLAS	HALIFAX	10		21	103	103	FING	0.01
HALIFAX	NEW GLAS	21		10	104	103	FING	0.01
SHELBURN	HALIFAX	19		21	105	105	FING	0.01
HALIFAX	SHELBURN	21		19	106	105	FING	0.01
BRIDGEWA	HALIFAX	16		21	107	107	FING	0.01
HALIFAX	BRIDGEWA	21		16	108	107	FING	0.01
YARMOUTH	HALIFAX	18		21	109	109	FING	0.01
HALIFAX	YARMOUTH	21		18	110	109	FING	0.01
DIGBY	HALIFAX	17		21	111	111	FING	0.01
HALIFAX	DIGBY	21		17	112	111	FING	0.01
KENTVILL	HALIFAX	13		21	113	113	FING	0.01
HALIFAX	KENTVILL	21		13	114	113	FING	0.01
AMHERST	HALIFAX	12		21	115	115	FING	0.01
HALIFAX	AMHERST	21		12	116	115	FING	0.01
TRURO	HALIFAX	11		21	117	117	FING	0.01
HALIFAX	TRURO	21		11	118	117	FING	0.01

TABLE 4.3 Cont'd SWITCHING NETWORK LINKS

ORIGIN	DESTINATION.	NODE	TO NODE	LINK NO.	LINK NO.	TYPE	COEFF.
SYDNEY	HALIFAX	15	21	119	119	FING	0.01
HALIFAX	SYDNEY	21	15	120	119	FING	0.01
SHERBROO	HALIFAX	14	21	121	121	FING	0.01
HALIFAX	SHERBROO	21	14	122	121	FING	0.01
SACKVILL	AMHERST	23	12	123	123	FING	0.01
AMHERST	SACKVILL	12	23	124	123	FING	0.01

TABLE 4.3 Cont'd. SWITCHING NETWORK LINKS

INTERNAL NODE NO.	EXTERNAL NODE NAME
1	WOODSTOCK
2	FREDRICTON
3	EDMUNDSTON
4	NEWCASTLE
5	MONCTON
6	CAMPBELLTON
7	BATHURST
8	SUMMERSIDE
9	CHARLOTTETON
10	NEW GLASGOW
11	TRURO
12	AMHERST
13	KENTVILLE
14	SHERBROOKE
15	SYDNEY
16	BRIDGEWATER
17	DIGBY
18	YARMOUTH
19	SHELBURNE
20	ST. JOHN
21	HALIFAX
22	ST. STEPHEN
23	SACKVILLE

NOTE: NODE NUMBERS ARE ASSIGNED INTERNALLY

TABLE 4.4 LISTING OF INTERNAL NODE NUMBER AND CORRESPONDING NODE NAMES

INTERNAL LINK NO.	EXTERNAL INDENTIFICATION OF LINKS BY EXTERNAL NODE NAMES
1	WOODSTOCK -- FREDRICTON
2	FREDRICTON -- WOODSTOCK
3	WOODSTOCK -- EDMUNDSTON
4	EDMUNDSTON -- WOODSTOCK
5	EDMUNDSTON -- NEWCASTLE
6	NEWCASTLE -- EDMUNDSTON
7	FREDRICTON -- NEWCASTLE
8	NEWCASTLE -- FREDRICTON
9	FREDRICTON -- MONCTON
10	MONCTON -- FREDRICTON
11	CAMPBELLTON -- MONCTON
12	MONCTON -- CAMPBELLTON
13	CAMPBELLTON -- BATHURST
14	BATHURST -- CAMPBELLTON
15	BATHURST -- MONCTON
16	MONCTON -- BATHURST
17	NEWCASTLE -- MONCTON
18	MONCTON -- NEWCASTLE
19	SUMMERSIDE -- MONCTON
20	MONCTON -- SUMMERSIDE
21	SUMMERSIDE -- CHARLOTTETON
22	CHARLOTTETON -- SUMMERSIDE
23	CHARLOTTETON -- MONCTON
24	MONCTON -- CHARLOTTETON
25	CHARLOTTETON -- NEW GLASGOW
26	NEW GLASGOW -- CHARLOTTETON
27	MONCTON -- TRURO
28	TRURO -- MONCTON
29	MONCTON -- AMHERST
30	AMHERST -- MONCTON
31	MONCTON -- KENTVILLE
32	KENTVILLE -- MONCTON
33	NEW GLASGOW -- AMHERST
34	AMHERST -- NEW GLASGOW
35	NEW GLASGOW -- TRURO
36	TRURO -- NEW GLASGOW
37	NEW GLASGOW -- SHERBROOKE
38	SHERBROOKE -- NEW GLASGOW
39	NEW GLASGOW -- SYDNEY
40	SYDNEY -- NEW GLASGOW
41	BATHURST -- TRURO
42	TRURO -- BATHURST
43	KENTVILLE -- TRURO
44	TRURO -- KENTVILLE
45	KENTVILLE -- BRIDGEWATER
46	BRIDGEWATER -- KENTVILLE
47	KENTVILLE -- DIGBY
48	DIGBY -- KENTVILLE
49	DIGBY -- YARMOUTH
50	YARMOUTH -- DIGBY
51	YARMOUTH -- SHELBURNE
52	SHELBURNE -- YARMOUTH
53	SHELBURNE -- BRIDGEWATER
54	BRIDGEWATER -- SHELBURNE
55	ST. JOHN -- CAMPBELLTON
56	CAMPBELLTON -- ST. JOHN
57	ST. JOHN -- BATHURST
58	BATHURST -- ST. JOHN

NOTE: INTERNAL LINK NUMBERS ARE ASSIGNED INTERNALLY.

TABLE 4.5 LISTING OF INTERNAL LINK NUMBERS AND CORRESPONDING LINK NODE NAMES

INTERNAL LINK NO.	EXTERNAL INDENTIFICATION OF LINKS BY EXTERNAL NODE NAMES		
59	ST. JOHN	--	SUMMERSIDE
60	SUMMERSIDE	--	ST. JOHN
61	ST. JOHN	--	CHARLOTTETON
62	CHARLOTTETON	--	ST. JOHN
63	ST. JOHN	--	NEW GLASGOW
64	NEW GLASGOW	--	ST. JOHN
65	ST. JOHN	--	SYDNEY
66	SYDNEY	--	ST. JOHN
67	ST. JOHN	--	AMHERST
68	AMHERST	--	ST. JOHN
69	ST. JOHN	--	KENTVILLE
70	KENTVILLE	--	ST. JOHN
71	ST. JOHN	--	DIGBY
72	DIGBY	--	ST. JOHN
73	ST. JOHN	--	YARMOUTH
74	YARMOUTH	--	ST. JOHN
75	MONCTON	--	HALIFAX
76	HALIFAX	--	MONCTON
77	NEWCASTLE	--	HALIFAX
78	HALIFAX	--	NEWCASTLE
79	FREDRICTON	--	HALIFAX
80	HALIFAX	--	FREDRICTON
81	ST. JOHN	--	ST. STEPHEN
82	ST. STEPHEN	--	ST. JOHN
83	ST. JOHN	--	WOODSTOCK
84	WOODSTOCK	--	ST. JOHN
85	ST. JOHN	--	EDMUNDSTON
86	EDMUNDSTON	--	ST. JOHN
87	ST. JOHN	--	FREDRICTON
88	FREDRICTON	--	ST. JOHN
89	ST. JOHN	--	NEWCASTLE
90	NEWCASTLE	--	ST. JOHN
91	ST. JOHN	--	MONCTON
92	MONCTON	--	ST. JOHN
93	ST. JOHN	--	HALIFAX
94	HALIFAX	--	ST. JOHN
95	CAMPBELLTON	--	NEWCASTLE
96	NEWCASTLE	--	CAMPBELLTON
97	BATHURST	--	NEWCASTLE
98	NEWCASTLE	--	BATHURST
99	SUMMERSIDE	--	HALIFAX
100	HALIFAX	--	SUMMERSIDE
101	CHARLOTTETON	--	HALIFAX
102	HALIFAX	--	CHARLOTTETON
103	NEW GLASGOW	--	HALIFAX
104	HALIFAX	--	NEW GLASGOW
105	SHELBURNE	--	HALIFAX
106	HALIFAX	--	SHELBURNE
107	BRIDGEWATER	--	HALIFAX
108	HALIFAX	--	BRIDGEWATER
109	YARMOUTH	--	HALIFAX
110	HALIFAX	--	YARMOUTH
111	DIGBY	--	HALIFAX
112	HALIFAX	--	DIGBY
113	KENTVILLE	--	HALIFAX
114	HALIFAX	--	KENTVILLE
115	AMHERST	--	HALIFAX
116	HALIFAX	--	AMHERST

TABLE 4.5 Cont'd. LISTING OF INTERNAL LINK NUMBER AND CORRESPONDING LINK NODE NAMES

INTERNAL LINK NO.	EXTERNAL INDENTIFICATION OF LINKS BY EXTERNAL NODE NAMES	
117	TRURO	-- HALIFAX
118	HALIFAX	-- TRURO
119	SYDNEY	-- HALIFAX
120	HALIFAX	-- SYDNEY
121	SHERBROOKE	-- HALIFAX
122	HALIFAX	-- SHERBROOKE
123	SACKVILLE	-- AMHERST
124	AMHERST	-- SACKVILLE

TABLE 4.5 Cont'd. LISTING OF INTERNAL LINK NUMBER AND CORRESPONDING LINK NODE NAME

PROBLEM DESCRIPTION

					DEMAND (ERLANGS) INITIAL	TOTAL	INCREASE
DE	BATHURST	A	FREDRICTON	:	0.0	0.278	0.278
DE	FREDRICTON	A	BATHURST	:	0.0	0.278	0.278
DE	AMHERST	A	BATHURST	:	0.0	0.222	0.222
DE	BATHURST	A	AMHERST	:	0.0	0.194	0.194
DE	AMHERST	A	BRIDGEWATER	:	0.0	0.139	0.139
DE	BRIDGEWATER	A	AMHERST	:	0.0	0.139	0.139
DE	AMHERST	A	CAMPBELLTON	:	0.0	0.139	0.139
DE	CAMPBELLTON	A	AMHERST	:	0.0	0.139	0.139
DE	AMHERST	A	CHARLOTTETON	:	0.0	0.278	0.278
DE	CHARLOTTETON	A	AMHERST	:	0.0	0.278	0.278
DE	AMHERST	A	DIGBY	:	0.0	0.083	0.083
DE	DIGBY	A	AMHERST	:	0.0	0.056	0.056
DE	AMHERST	A	EDMUNDSTON	:	0.0	0.139	0.139
DE	EDMUNDSTON	A	AMHERST	:	0.0	0.139	0.139
DE	AMHERST	A	FREDRICTON	:	0.0	0.278	0.278
DE	FREDRICTON	A	AMHERST	:	0.0	0.278	0.278
DE	AMHERST	A	HALIFAX	:	0.0	5.194	5.194
DE	HALIFAX	A	AMHERST	:	0.0	5.167	5.167
DE	AMHERST	A	KENTVILLE	:	0.0	0.139	0.139
DE	KENTVILLE	A	AMHERST	:	0.0	0.139	0.139
DE	AMHERST	A	MONCTON	:	0.0	4.722	4.722
DE	MONCTON	A	AMHERST	:	0.0	4.722	4.722
DE	AMHERST	A	NEWCASTLE	:	0.0	0.222	0.222
DE	NEWCASTLE	A	AMHERST	:	0.0	0.194	0.194
DE	AMHERST	A	NEW GLASGOW	:	0.0	1.417	1.417
DE	NEW GLASGOW	A	AMHERST	:	0.0	1.417	1.417
DE	AMHERST	A	SACKVILLE	:	0.0	1.167	1.167
DE	SACKVILLE	A	AMHERST	:	0.0	1.167	1.167
DE	AMHERST	A	ST. JOHN	:	0.0	2.806	2.806

NOTE: Initial demand is zero and total demand is equal to increased demand since the problem is one of zero initial state.

TABLE 4.6 SWITCHING NETWORK POINT TO POINT DEMAND.

DE	ST. JOHN	A	AMHERST	:	0.0	2.806	2.806
DE	AMHERST	A	ST. STEPHEN	:	0.0	0.139	0.139
DE	ST. STEPHEN	A	AMHERST	:	0.0	0.139	0.139
DE	AMHERST	A	SHELBURNE	:	0.0	0.139	0.139
DE	SHELBURNE	A	AMHERST	:	0.0	0.139	0.139
DE	AMHERST	A	SHERBROOKE	:	0.0	0.139	0.139
DE	SHERBROOKE	A	AMHERST	:	0.0	0.139	0.139
DE	AMHERST	A	SUMMERSIDE	:	0.0	0.278	0.278
DE	SUMMERSIDE	A	AMHERST	:	0.0	0.278	0.278
DE	AMHERST	A	SYDNEY	:	0.0	0.222	0.222
DE	SYDNEY	A	AMHERST	:	0.0	0.194	0.194
DE	AMHERST	A	TRURO	:	0.0	1.000	1.000
DE	TRURO	A	AMHERST	:	0.0	0.972	0.972
DE	AMHERST	A	WOODSTOCK	:	0.0	0.139	0.139
DE	WOODSTOCK	A	AMHERST	:	0.0	0.139	0.139
DE	AMHERST	A	YARMOUTH	:	0.0	0.139	0.139
DE	YARMOUTH	A	AMHERST	:	0.0	0.139	0.139
DE	BATHURST	A	BRIDGEWATER	:	0.0	0.139	0.139
DE	BRIDGEWATER	A	BATHURST	:	0.0	0.139	0.139
DE	BATHURST	A	CAMPBELLTON	:	0.0	1.417	1.417
DE	CAMPBELLTON	A	BATHURST	:	0.0	1.417	1.417
DE	BATHURST	A	CHARLOTTETON	:	0.0	0.222	0.222
DE	CHARLOTTETON	A	BATHURST	:	0.0	0.194	0.194
DE	BATHURST	A	DIGBY	:	0.0	0.083	0.083
DE	DIGBY	A	BATHURST	:	0.0	0.056	0.056
DE	BATHURST	A	EDMUNDSTON	:	0.0	0.222	0.222
DE	EDMUNDSTON	A	BATHURST	:	0.0	0.194	0.194
DE	BATHURST	A	HALIFAX	:	0.0	0.278	0.278
DE	HALIFAX	A	BATHURST	:	0.0	0.278	0.278
DE	BATHURST	A	KENTVILLE	:	0.0	0.139	0.139
DE	KENTVILLE	A	BATHURST	:	0.0	0.139	0.139
DE	BATHURST	A	MONCTON	:	0.0	2.333	2.333
DE	MONCTON	A	BATHURST	:	0.0	2.333	2.333

TABLE 4.6 cont'd POINT TO POINT DEMAND

DE	BATHURST	A	NEWCASTLE	:	0.0	5.861	5.861
DE	NEWCASTLE	A	BATHURST	:	0.0	5.861	5.861
DE	BATHURST	A	NEW GLASGOW	:	0.0	0.139	0.139
DE	NEW GLASGOW	A	BATHURST	:	0.0	0.139	0.139
DE	BATHURST	A	SACKVILLE	:	0.0	0.139	0.139
DE	SACKVILLE	A	BATHURST	:	0.0	0.139	0.139
DE	BATHURST	A	ST. JOHN	:	0.0	3.722	3.722
DE	ST. JOHN	A	BATHURST	:	0.0	3.722	3.722
DE	BATHURST	A	ST. STEPHEN	:	0.0	0.139	0.139
DE	ST. STEPHEN	A	BATHURST	:	0.0	0.139	0.139
DE	BATHURST	A	SHELBURNE	:	0.0	0.083	0.083
DE	SHELBURNE	A	BATHURST	:	0.0	0.056	0.056
DE	BATHURST	A	SHERBROOKE	:	0.0	0.083	0.083
DE	SHERBROOKE	A	BATHURST	:	0.0	0.056	0.056
DE	BATHURST	A	SUMMERSIDE	:	0.0	0.222	0.222
DE	SUMMERSIDE	A	BATHURST	:	0.0	0.194	0.194
DE	BATHURST	A	SYDNEY	:	0.0	0.139	0.139
DE	SYDNEY	A	BATHURST	:	0.0	0.139	0.139
DE	BATHURST	A	TRURO	:	0.0	0.222	0.222
DE	TRURO	A	BATHURST	:	0.0	0.194	0.194
DE	BATHURST	A	WOODSTOCK	:	0.0	0.139	0.139
DE	WOODSTOCK	A	BATHURST	:	0.0	0.139	0.139
DE	BATHURST	A	YARMOUTH	:	0.0	0.139	0.139
DE	YARMOUTH	A	BATHURST	:	0.0	0.139	0.139
DE	BRIDGEWATER	A	CAMPBELLTON	:	0.0	0.083	0.083
DE	CAMPBELLTON	A	BRIDGEWATER	:	0.0	0.056	0.056
DE	BRIDGEWATER	A	CHARLOTTETON	:	0.0	0.139	0.139
DE	CHARLOTTETON	A	BRIDGEWATER	:	0.0	0.139	0.139
DE	BRIDGEWATER	A	DIGBY	:	0.0	0.139	0.139
DE	DIGBY	A	BRIDGEWATER	:	0.0	0.139	0.139
DE	BRIDGEWATER	A	EDMUNDSTON	:	0.0	0.083	0.083
DE	EDMUNDSTON	A	BRIDGEWATER	:	0.0	0.056	0.056
DE	BRIDGEWATER	A	FREDRICTON	:	0.0	0.139	0.139

TABLE 4.6 Cont'd. POINT TO POINT DEMAND

DE	FREDRICTON	A	BRIDGEWATER	:	0.0	0.139	0.139
DE	BRIDGEWATER	A	HALIFAX	:	0.0	9.778	9.778
DE	HALIFAX	A	BRIDGEWATER	:	0.0	9.750	9.750
DE	BRIDGEWATER	A	KENTVILLE	:	0.0	0.639	0.639
DE	KENTVILLE	A	BRIDGEWATER	:	0.0	0.611	0.611
DE	BRIDGEWATER	A	MONCTON	:	0.0	0.222	0.222
DE	MONCTON	A	BRIDGEWATER	:	0.0	0.194	0.194
DE	BRIDGEWATER	A	NEWCASTLE	:	0.0	0.139	0.139
DE	NEWCASTLE	A	BRIDGEWATER	:	0.0	0.139	0.139
DE	BRIDGEWATER	A	NEW GLASGOW	:	0.0	0.139	0.139
DE	NEW GLASGOW	A	BRIDGEWATER	:	0.0	0.139	0.139
DE	BRIDGEWATER	A	SACKVILLE	:	0.0	0.139	0.139
DE	SACKVILLE	A	BRIDGEWATER	:	0.0	0.139	0.139
DE	BRIDGEWATER	A	ST. JOHN	:	0.0	0.222	0.222
DE	ST. JOHN	A	BRIDGEWATER	:	0.0	0.194	0.194
DE	BRIDGEWATER	A	ST. STEPHEN	:	0.0	0.083	0.083
DE	ST. STEPHEN	A	BRIDGEWATER	:	0.0	0.056	0.056
DE	BRIDGEWATER	A	SHELBURNE	:	0.0	0.639	0.639
DE	SHELBURNE	A	BRIDGEWATER	:	0.0	0.611	0.611
DE	BRIDGEWATER	A	SHERBROOKE	:	0.0	0.083	0.083
DE	SHERBROOKE	A	BRIDGEWATER	:	0.0	0.056	0.056
DE	BRIDGEWATER	A	SUMMERSIDE	:	0.0	0.139	0.139
DE	SUMMERSIDE	A	BRIDGEWATER	:	0.0	0.139	0.139
DE	BRIDGEWATER	A	SYDNEY	:	0.0	0.139	0.139
DE	SYDNEY	A	BRIDGEWATER	:	0.0	0.139	0.139
DE	BRIDGEWATER	A	TRURO	:	0.0	0.222	0.222
DE	TRURO	A	BRIDGEWATER	:	0.0	0.194	0.194
DE	BRIDGEWATER	A	WOODSTOCK	:	0.0	0.083	0.083
DE	WOODSTOCK	A	BRIDGEWATER	:	0.0	0.056	0.056
DE	BRIDGEWATER	A	YARMOUTH	:	0.0	0.139	0.139
DE	YARMOUTH	A	BRIDGEWATER	:	0.0	0.139	0.139
DE	CAMPBELLTON	A	CHARLOTTETON	:	0.0	0.139	0.139
DE	CHARLOTTETON	A	CAMPBELLTON	:	0.0	0.139	0.139

TABLE 4.6 Cont'd. POINT TO POINT DEMAND

DE	CAMPBELLTON	A	DIGBY	:	0.0	0.083	0.083
DE	DIGBY	A	CAMPBELLTON	:	0.0	0.056	0.056
DE	CAMPBELLTON	A	EDMUNDSTON	:	0.0	0.222	0.222
DE	EDMUNDSTON	A	CAMPBELLTON	:	0.0	0.194	0.194
DE	CAMPBELLTON	A	FREDRICTON	:	0.0	0.222	0.222
DE	FREDRICTON	A	CAMPBELLTON	:	0.0	0.194	0.194
DE	CAMPBELLTON	A	HALIFAX	:	0.0	0.278	0.278
DE	HALIFAX	A	CAMPBELLTON	:	0.0	0.278	0.278
DE	CAMPBELLTON	A	KENTVILLE	:	0.0	0.083	0.083
DE	KENTVILLE	A	CAMPBELLTON	:	0.0	0.056	0.056
DE	CAMPBELLTON	A	MONCTON	:	0.0	1.000	1.000
DE	MONCTON	A	CAMPBELLTON	:	0.0	0.972	0.972
DE	CAMPBELLTON	A	NEWCASTLE	:	0.0	3.556	3.556
DE	NEWCASTLE	A	CAMPBELLTON	:	0.0	3.556	3.556
DE	CAMPBELLTON	A	NEW GLASGOW	:	0.0	0.139	0.139
DE	NEW GLASGOW	A	CAMPBELLTON	:	0.0	0.139	0.139
DE	CAMPBELLTON	A	SACKVILLE	:	0.0	0.139	0.139
DE	SACKVILLE	A	CAMPBELLTON	:	0.0	0.139	0.139
DE	CAMPBELLTON	A	ST. JOHN	:	0.0	1.417	1.417
DE	ST. JOHN	A	CAMPBELLTON	:	0.0	1.417	1.417
DE	CAMPBELLTON	A	ST. STEPHEN	:	0.0	0.083	0.083
DE	ST. STEPHEN	A	CAMPBELLTON	:	0.0	0.056	0.056
DE	CAMPBELLTON	A	SHELBURNE	:	0.0	0.083	0.083
DE	SHELBURNE	A	CAMPBELLTON	:	0.0	0.056	0.056
DE	CAMPBELLTON	A	SHERBROOKE	:	0.0	0.083	0.083
DE	SHERBROOKE	A	CAMPBELLTON	:	0.0	0.056	0.056
DE	CAMPBELLTON	A	SUMMERSIDE	:	0.0	0.139	0.139
DE	SUMMERSIDE	A	CAMPBELLTON	:	0.0	0.139	0.139
DE	CAMPBELLTON	A	SYDNEY	:	0.0	0.139	0.139
DE	SYDNEY	A	CAMPBELLTON	:	0.0	0.139	0.139
DE	CAMPBELLTON	A	TRURO	:	0.0	0.139	0.139
DE	TRURO	A	CAMPBELLTON	:	0.0	0.139	0.139
DE	CAMPBELLTON	A	WOODSTOCK	:	0.0	0.139	0.139

TABLE 4.6 Cont'd. POINT TO POINT DEMAND

DE	WOODSTOCK	A	CAMPBELLTON	:	0.0	0.139	0.139
DE	CAMPBELLTON	A	YARMOUTH	:	0.0	0.083	0.083
DE	YARMOUTH	A	CAMPBELLTON	:	0.0	0.056	0.056
DE	CHARLOTTETON	A	DIGBY	:	0.0	0.139	0.139
DE	DIGBY	A	CHARLOTTETON	:	0.0	0.139	0.139
DE	CHARLOTTETON	A	EDMUNDSTON	:	0.0	0.139	0.139
DE	EDMUNDSTON	A	CHARLOTTETON	:	0.0	0.139	0.139
DE	CHARLOTTETON	A	FREDRICTON	:	0.0	0.278	0.278
DE	FREDRICTON	A	CHARLOTTETON	:	0.0	0.278	0.278
DE	CHARLOTTETON	A	HALIFAX	:	0.0	6.333	6.333
DE	HALIFAX	A	CHARLOTTETON	:	0.0	6.333	6.333
DE	CHARLOTTETON	A	KENTVILLE	:	0.0	0.139	0.139
DE	KENTVILLE	A	CHARLOTTETON	:	0.0	0.139	0.139
DE	CHARLOTTETON	A	MONCTON	:	0.0	1.417	1.417
DE	MONCTON	A	CHARLOTTETON	:	0.0	1.417	1.417
DE	CHARLOTTETON	A	NEWCASTLE	:	0.0	0.222	0.222
DE	NEWCASTLE	A	CHARLOTTETON	:	0.0	0.194	0.194
DE	CHARLOTTETON	A	NEW GLASGOW	:	0.0	1.000	1.000
DE	NEW GLASGOW	A	CHARLOTTETON	:	0.0	0.972	0.972
DE	CHARLOTTETON	A	SACKVILLE	:	0.0	0.278	0.278
DE	SACKVILLE	A	CHARLOTTETON	:	0.0	0.278	0.278
DE	CHARLOTTETON	A	ST. JOHN	:	0.0	5.778	5.778
DE	ST. JOHN	A	CHARLOTTETON	:	0.0	5.750	5.750
DE	CHARLOTTETON	A	ST. STEPHEN	:	0.0	0.139	0.139
DE	ST. STEPHEN	A	CHARLOTTETON	:	0.0	0.139	0.139
DE	CHARLOTTETON	A	SHELBURNE	:	0.0	0.139	0.139
DE	SHELBURNE	A	CHARLOTTETON	:	0.0	0.139	0.139
DE	CHARLOTTETON	A	SHERBROOKE	:	0.0	0.222	0.222
DE	SHERBROOKE	A	CHARLOTTETON	:	0.0	0.194	0.194
DE	CHARLOTTETON	A	SUMMERSIDE	:	0.0	10.500	10.500
DE	SUMMERSIDE	A	CHARLOTTETON	:	0.0	10.472	10.472
DE	CHARLOTTETON	A	SYDNEY	:	0.0	0.278	0.278
DE	SYDNEY	A	CHARLOTTETON	:	0.0	0.278	0.278

TABLE 4.6 Cont'd. POINT TO POINT DEMAND

DE	CHARLOTTETON	A	TRURO	:	0.0	0.278	0.278
DE	TRURO	A	CHARLOTTETON	:	0.0	0.278	0.278
DE	CHARLOTTETON	A	WOODSTOCK	:	0.0	0.139	0.139
DE	WOODSTOCK	A	CHARLOTTETON	:	0.0	0.139	0.139
DE	CHARLOTTETON	A	YARMOUTH	:	0.0	0.139	0.139
DE	YARMOUTH	A	CHARLOTTETON	:	0.0	0.139	0.139
DE	DIGBY	A	EDMUNDSTON	:	0.0	0.083	0.083
DE	EDMUNDSTON	A	DIGBY	:	0.0	0.056	0.056
DE	DIGBY	A	FREDRICTON	:	0.0	0.083	0.083
DE	FREDRICTON	A	DIGBY	:	0.0	0.056	0.056
DE	DIGBY	A	HALIFAX	:	0.0	3.111	3.111
DE	HALIFAX	A	DIGBY	:	0.0	3.111	3.111
DE	DIGBY	A	KENTVILLE	:	0.0	2.806	2.806
DE	KENTVILLE	A	DIGBY	:	0.0	2.806	2.806
DE	DIGBY	A	MONCTON	:	0.0	0.139	0.139
DE	MONCTON	A	DIGBY	:	0.0	0.139	0.139
DE	DIGBY	A	NEWCASTLE	:	0.0	0.083	0.083
DE	NEWCASTLE	A	DIGBY	:	0.0	0.056	0.056
DE	DIGBY	A	NEW GLASGOW	:	0.0	0.139	0.139
DE	NEW GLASGOW	A	DIGBY	:	0.0	0.139	0.139
DE	DIGBY	A	SACKVILLE	:	0.0	0.083	0.083
DE	SACKVILLE	A	DIGBY	:	0.0	0.056	0.056
DE	DIGBY	A	ST. JOHN	:	0.0	3.306	3.306
DE	ST. JOHN	A	DIGBY	:	0.0	3.306	3.306
DE	DIGBY	A	ST. STEPHEN	:	0.0	0.083	0.083
DE	ST. STEPHEN	A	DIGBY	:	0.0	0.056	0.056
DE	DIGBY	A	SHELBURNE	:	0.0	0.083	0.083
DE	SHELBURNE	A	DIGBY	:	0.0	0.056	0.056
DE	DIGBY	A	SHERBROOKE	:	0.0	0.083	0.083
DE	SHERBROOKE	A	DIGBY	:	0.0	0.056	0.056
DE	DIGBY	A	SUMMERSIDE	:	0.0	0.083	0.083
DE	SUMMERSIDE	A	DIGBY	:	0.0	0.056	0.056
DE	DIGBY	A	SYDNEY	:	0.0	0.139	0.139

TABLE 4.6 Cont'd. POINT TO POINT DEMAND

DE	SYDNEY	A	DIGBY	:	0.0	0.139	0.139
DE	DIGBY	A	TRURO	:	0.0	0.139	0.139
DE	TRURO	A	DIGBY	:	0.0	0.139	0.139
DE	DIGBY	A	WOODSTOCK	:	0.0	0.083	0.083
DE	WOODSTOCK	A	DIGBY	:	0.0	0.056	0.056
DE	DIGBY	A	YARMOUTH	:	0.0	1.417	1.417
DE	YARMOUTH	A	DIGBY	:	0.0	1.417	1.417
DE	EDMUNDSTON	A	FREDRICTON	:	0.0	0.278	0.278
DE	FREDRICTON	A	EDMUNDSTON	:	0.0	0.278	0.278
DE	EDMUNDSTON	A	HALIFAX	:	0.0	0.222	0.222
DE	HALIFAX	A	EDMUNDSTON	:	0.0	0.194	0.194
DE	EDMUNDSTON	A	KENTVILLE	:	0.0	0.083	0.083
DE	KENTVILLE	A	EDMUNDSTON	:	0.0	0.056	0.056
DE	EDMUNDSTON	A	MONCTON	:	0.0	0.222	0.222
DE	MONCTON	A	EDMUNDSTON	:	0.0	0.194	0.194
DE	EDMUNDSTON	A	NEWCASTLE	:	0.0	1.000	1.000
DE	NEWCASTLE	A	EDMUNDSTON	:	0.0	0.972	0.972
DE	EDMUNDSTON	A	NEW GLASGOW	:	0.0	0.278	0.278
DE	NEW GLASGOW	A	EDMUNDSTON	:	0.0	0.278	0.278
DE	EDMUNDSTON	A	SACKVILLE	:	0.0	0.083	0.083
DE	SACKVILLE	A	EDMUNDSTON	:	0.0	0.056	0.056
DE	EDMUNDSTON	A	ST. JOHN	:	0.0	4.833	4.833
DE	ST. JOHN	A	EDMUNDSTON	:	0.0	4.833	4.833
DE	EDMUNDSTON	A	ST. STEPHEN	:	0.0	0.139	0.139
DE	ST. STEPHEN	A	EDMUNDSTON	:	0.0	0.139	0.139
DE	EDMUNDSTON	A	SHELBURNE	:	0.0	0.083	0.083
DE	SHELBURNE	A	EDMUNDSTON	:	0.0	0.056	0.056
DE	EDMUNDSTON	A	SHERBROOKE	:	0.0	0.083	0.083
DE	SHERBROOKE	A	EDMUNDSTON	:	0.0	0.056	0.056
DE	EDMUNDSTON	A	SUMMERSIDE	:	0.0	0.139	0.139
DE	SUMMERSIDE	A	EDMUNDSTON	:	0.0	0.139	0.139
DE	EDMUNDSTON	A	SYDNEY	:	0.0	0.139	0.139
DE	SYDNEY	A	EDMUNDSTON	:	0.0	0.139	0.139

TABLE 4.6 Cont'd. POINT TO POINT DEMAND

DE	EDMUNDSTON	A	TRURO	:	0.0	0.139	0.139
DE	TRURO	A	EDMUNDSTON	:	0.0	0.139	0.139
DE	EDMUNDSTON	A	WOODSTOCK	:	0.0	1.000	1.000
DE	WOODSTOCK	A	EDMUNDSTON	:	0.0	0.972	0.972
DE	EDMUNDSTON	A	YARMOUTH	:	0.0	0.083	0.083
DE	YARMOUTH	A	EDMUNDSTON	:	0.0	0.056	0.056
DE	FREDRICTON	A	HALIFAX	:	0.0	1.417	1.417
DE	HALIFAX	A	FREDRICTON	:	0.0	1.417	1.417
DE	FREDRICTON	A	KENTVILLE	:	0.0	0.139	0.139
DE	KENTVILLE	A	FREDRICTON	:	0.0	0.139	0.139
DE	FREDRICTON	A	MONCTON	:	0.0	4.306	4.306
DE	MONCTON	A	FREDRICTON	:	0.0	4.306	4.306
DE	FREDRICTON	A	NEWCASTLE	:	0.0	3.722	3.722
DE	NEWCASTLE	A	FREDRICTON	:	0.0	3.722	3.722
DE	FREDRICTON	A	NEW GLASGOW	:	0.0	0.222	0.222
DE	NEW GLASGOW	A	FREDRICTON	:	0.0	0.194	0.194
DE	FREDRICTON	A	SACKVILLE	:	0.0	0.222	0.222
DE	SACKVILLE	A	FREDRICTON	:	0.0	0.194	0.194
DE	FREDRICTON	A	ST. JOHN	:	0.0	13.806	13.806
DE	ST. JOHN	A	FREDRICTON	:	0.0	13.806	13.806
DE	FREDRICTON	A	ST. STEPHEN	:	0.0	0.278	0.278
DE	ST. STEPHEN	A	FREDRICTON	:	0.0	0.278	0.278
DE	FREDRICTON	A	SHELBURNE	:	0.0	0.083	0.083
DE	SHELBURNE	A	FREDRICTON	:	0.0	0.056	0.056
DE	FREDRICTON	A	SHERBROOKE	:	0.0	0.139	0.139
DE	SHERBROOKE	A	FREDRICTON	:	0.0	0.139	0.139
DE	FREDRICTON	A	SUMMERSIDE	:	0.0	0.222	0.222
DE	SUMMERSIDE	A	FREDRICTON	:	0.0	0.194	0.194
DE	FREDRICTON	A	SYDNEY	:	0.0	0.222	0.222
DE	SYDNEY	A	FREDRICTON	:	0.0	0.194	0.194
DE	FREDRICTON	A	TRURO	:	0.0	0.222	0.222
DE	TRURO	A	FREDRICTON	:	0.0	0.194	0.194
DE	FREDRICTON	A	WOODSTOCK	:	0.0	5.222	5.222

TABLE 4.6 Cont'd. POINT TO POINT DEMAND

DE	WOODSTOCK	A	FREDRICTON	:	0.0	5.194	5.194
DE	FREDRICTON	A	YARMOUTH	:	0.0	0.139	0.139
DE	YARMOUTH	A	FREDRICTON	:	0.0	0.139	0.139
DE	HALIFAX	A	KENTVILLE	:	0.0	13.056	13.056
DE	KENTVILLE	A	HALIFAX	:	0.0	13.028	13.028
DE	HALIFAX	A	MONCTON	:	0.0	12.167	12.167
DE	MONCTON	A	HALIFAX	:	0.0	12.139	12.139
DE	HALIFAX	A	NEWCASTLE	:	0.0	1.417	1.417
DE	NEWCASTLE	A	HALIFAX	:	0.0	1.417	1.417
DE	HALIFAX	A	NEW GLASGOW	:	0.0	12.528	12.528
DE	NEW GLASGOW	A	HALIFAX	:	0.0	12.528	12.528
DE	HALIFAX	A	SACKVILLE	:	0.0	0.278	0.278
DE	SACKVILLE	A	HALIFAX	:	0.0	0.278	0.278
DE	HALIFAX	A	ST. JOHN	:	0.0	17.694	17.694
DE	ST. JOHN	A	HALIFAX	:	0.0	17.667	17.667
DE	HALIFAX	A	ST. STEPHEN	:	0.0	0.139	0.139
DE	ST. STEPHEN	A	HALIFAX	:	0.0	0.139	0.139
DE	HALIFAX	A	SHELBURNE	:	0.0	2.028	2.028
DE	SHELBURNE	A	HALIFAX	:	0.0	2.028	2.028
DE	HALIFAX	A	SHERBROOKE	:	0.0	0.694	0.694
DE	SHERBRODKE	A	HALIFAX	:	0.0	0.694	0.694
DE	HALIFAX	A	SUMMERSIDE	:	0.0	2.667	2.667
DE	SUMMERSIDE	A	HALIFAX	:	0.0	2.667	2.667
DE	HALIFAX	A	SYDNEY	:	0.0	11.778	11.778
DE	SYDNEY	A	HALIFAX	:	0.0	11.750	11.750
DE	HALIFAX	A	TRURO	:	0.0	12.028	12.028
DE	TRURO	A	HALIFAX	:	0.0	12.028	12.028
DE	HALIFAX	A	WOODSTOCK	:	0.0	0.278	0.278
DE	WOODSTOCK	A	HALIFAX	:	0.0	0.278	0.278
DE	HALIFAX	A	YARMOUTH	:	0.0	5.389	5.389
DE	YARMOUTH	A	HALIFAX	:	0.0	5.389	5.389
DE	KENTVILLE	A	MONCTON	:	0.0	0.639	0.639
DE	MONCTON	A	KENTVILLE	:	0.0	0.611	0.611

TABLE 4.6 Cont'd. POINT TO POINT DEMAND

DE	KENTVILLE	A	NEWCASTLE	:	0.0	0.083	0.083
DE	NEWCASTLE	A	KENTVILLE	:	0.0	0.056	0.056
DE	KENTVILLE	A	NEW GLASGOW	:	0.0	0.222	0.222
DE	NEW GLASGOW	A	KENTVILLE	:	0.0	0.194	0.194
DE	KENTVILLE	A	SACKVILLE	:	0.0	0.083	0.083
DE	SACKVILLE	A	KENTVILLE	:	0.0	0.056	0.056
DE	KENTVILLE	A	ST. JOHN	:	0.0	2.806	2.806
DE	ST. JOHN	A	KENTVILLE	:	0.0	2.806	2.806
DE	KENTVILLE	A	ST. STEPHEN	:	0.0	0.083	0.083
DE	ST. STEPHEN	A	KENTVILLE	:	0.0	0.056	0.056
DE	KENTVILLE	A	SHELBURNE	:	0.0	0.139	0.139
DE	SHELBURNE	A	KENTVILLE	:	0.0	0.139	0.139
DE	KENTVILLE	A	SHERBROOKE	:	0.0	0.139	0.139
DE	SHERBROOKE	A	KENTVILLE	:	0.0	0.139	0.139
DE	KENTVILLE	A	SUMMERSIDE	:	0.0	0.139	0.139
DE	SUMMERSIDE	A	KENTVILLE	:	0.0	0.139	0.139
DE	KENTVILLE	A	SYDNEY	:	0.0	0.139	0.139
DE	SYDNEY	A	KENTVILLE	:	0.0	0.139	0.139
DE	KENTVILLE	A	TRURO	:	0.0	1.000	1.000
DE	TRURO	A	KENTVILLE	:	0.0	0.972	0.972
DE	KENTVILLE	A	WOODSTOCK	:	0.0	0.083	0.083
DE	WOODSTOCK	A	KENTVILLE	:	0.0	0.056	0.056
DE	KENTVILLE	A	YARMOUTH	:	0.0	0.139	0.139
DE	YARMOUTH	A	KENTVILLE	:	0.0	0.139	0.139
DE	MONCTON	A	NEWCASTLE	:	0.0	5.222	5.222
DE	NEWCASTLE	A	MONCTON	:	0.0	5.222	5.222
DE	MONCTON	A	NEW GLASGOW	:	0.0	0.139	0.139
DE	NEW GLASGOW	A	MONCTON	:	0.0	0.139	0.139
DE	MONCTON	A	SACKVILLE	:	0.0	0.139	0.139
DE	SACKVILLE	A	MONCTON	:	0.0	0.139	0.139
DE	MONCTON	A	ST. JOHN	:	0.0	40.556	40.556
DE	ST. JOHN	A	MONCTON	:	0.0	40.556	40.556
DE	MONCTON	A	ST. STEPHEN	:	0.0	0.222	0.222

TABLE 4.6 Cont'd. POINT TO POINT DEMAND

DE	ST. STEPHEN	A	MONCTON	:	0.0	0.194	0.194
DE	MONCTON	A	SHELBURNE	:	0.0	0.139	0.139
DE	SHELBURNE	A	MONCTON	:	0.0	0.139	0.139
DE	MONCTON	A	SHERBROOKE	:	0.0	0.139	0.139
DE	SHERBROOKE	A	MONCTON	:	0.0	0.139	0.139
DE	MONCTON	A	SUMMERSIDE	:	0.0	1.000	1.000
DE	SUMMERSIDE	A	MONCTON	:	0.0	0.972	0.972
DE	MONCTON	A	SYDNEY	:	0.0	0.278	0.278
DE	SYDNEY	A	MONCTON	:	0.0	0.278	0.278
DE	MONCTON	A	TRURO	:	0.0	0.639	0.639
DE	TRURO	A	MONCTON	:	0.0	0.611	0.611
DE	MONCTON	A	WOODSTOCK	:	0.0	0.222	0.222
DE	WOODSTOCK	A	MONCTON	:	0.0	0.194	0.194
DE	MONCTON	A	YARMOUTH	:	0.0	0.139	0.139
DE	YARMOUTH	A	MONCTON	:	0.0	0.139	0.139
DE	NEWCASTLE	A	NEW GLASGOW	:	0.0	0.139	0.139
DE	NEW GLASGOW	A	NEWCASTLE	:	0.0	0.139	0.139
DE	NEWCASTLE	A	SACKVILLE	:	0.0	0.139	0.139
DE	SACKVILLE	A	NEWCASTLE	:	0.0	0.139	0.139
DE	NEWCASTLE	A	ST. JOHN	:	0.0	8.028	8.028
DE	ST. JOHN	A	NEWCASTLE	:	0.0	8.028	8.028
DE	NEWCASTLE	A	ST. STEPHEN	:	0.0	0.139	0.139
DE	ST. STEPHEN	A	NEWCASTLE	:	0.0	0.139	0.139
DE	NEWCASTLE	A	SHELBURNE	:	0.0	0.083	0.083
DE	SHELBURNE	A	NEWCASTLE	:	0.0	0.056	0.056
DE	NEWCASTLE	A	SHERBROOKE	:	0.0	0.083	0.083
DE	SHERBROOKE	A	NEWCASTLE	:	0.0	0.056	0.056
DE	NEWCASTLE	A	SUMMERSIDE	:	0.0	0.139	0.139
DE	SUMMERSIDE	A	NEWCASTLE	:	0.0	0.139	0.139
DE	NEWCASTLE	A	SYDNEY	:	0.0	0.139	0.139
DE	SYDNEY	A	NEWCASTLE	:	0.0	0.139	0.139
DE	NEWCASTLE	A	TRURO	:	0.0	0.139	0.139
DE	TRURO	A	NEWCASTLE	:	0.0	0.139	0.139

TABLE 4.6 Cont'd. POINT TO POINT DEMAND

DE	NEWCASTLE	A	WOODSTOCK	:	0.0	0.139	0.139
DE	WOODSTOCK	A	NEWCASTLE	:	0.0	0.139	0.139
DE	NEWCASTLE	A	YARMOUTH	:	0.0	0.083	0.083
DE	YARMOUTH	A	NEWCASTLE	:	0.0	0.056	0.056
DE	NEW GLASGOW	A	SACKVILLE	:	0.0	0.139	0.139
DE	SACKVILLE	A	NEW GLASGOW	:	0.0	0.139	0.139
DE	NEW GLASGOW	A	ST. JOHN	:	0.0	6.806	6.806
DE	ST. JOHN	A	NEW GLASGOW	:	0.0	6.806	6.806
DE	NEW GLASGOW	A	ST. STEPHEN	:	0.0	0.083	0.083
DE	ST. STEPHEN	A	NEW GLASGOW	:	0.0	0.056	0.056
DE	NEW GLASGOW	A	SHELBURNE	:	0.0	0.083	0.083
DE	SHELBURNE	A	NEW GLASGOW	:	0.0	0.056	0.056
DE	NEW GLASGOW	A	SHERBROOKE	:	0.0	0.278	0.278
DE	SHERBROOKE	A	NEW GLASGOW	:	0.0	0.278	0.278
DE	NEW GLASGOW	A	SUMMERSIDE	:	0.0	0.278	0.278
DE	SUMMERSIDE	A	NEW GLASGOW	:	0.0	0.278	0.278
DE	NEW GLASGOW	A	SYDNEY	:	0.0	6.806	6.806
DE	SYDNEY	A	NEW GLASGOW	:	0.0	6.806	6.806
DE	NEW GLASGOW	A	TRURO	:	0.0	3.722	3.722
DE	TRURO	A	NEW GLASGOW	:	0.0	3.722	3.722
DE	NEW GLASGOW	A	WOODSTOCK	:	0.0	0.083	0.083
DE	WOODSTOCK	A	NEW GLASGOW	:	0.0	0.056	0.056
DE	NEW GLASGOW	A	YARMOUTH	:	0.0	0.139	0.139
DE	YARMOUTH	A	NEW GLASGOW	:	0.0	0.139	0.139
DE	SACKVILLE	A	ST. JOHN	:	0.0	0.278	0.278
DE	ST. JOHN	A	SACKVILLE	:	0.0	0.278	0.278
DE	SACKVILLE	A	ST. STEPHEN	:	0.0	0.083	0.083
DE	ST. STEPHEN	A	SACKVILLE	:	0.0	0.056	0.056
DE	SACKVILLE	A	SHELBURNE	:	0.0	0.083	0.083
DE	SHELBURNE	A	SACKVILLE	:	0.0	0.056	0.056
DE	SACKVILLE	A	SHERBROOKE	:	0.0	0.083	0.083
DE	SHERBROOKE	A	SACKVILLE	:	0.0	0.056	0.056
DE	SACKVILLE	A	SUMMERSIDE	:	0.0	0.278	0.278

TABLE 4.6 Cont'd. POINT TO POINT DEMAND

DE	SUMMERSIDE	A	SACKVILLE	:	0.0	0.278	0.278
DE	SACKVILLE	A	SYDNEY	:	0.0	0.139	0.139
DE	SYDNEY	A	SACKVILLE	:	0.0	0.139	0.139
DE	SACKVILLE	A	TRURO	:	0.0	0.222	0.222
DE	TRURO	A	SACKVILLE	:	0.0	0.194	0.194
DE	SACKVILLE	A	WOODSTOCK	:	0.0	0.083	0.083
DE	WOODSTOCK	A	SACKVILLE	:	0.0	0.056	0.056
DE	SACKVILLE	A	YARMOUTH	:	0.0	0.083	0.083
DE	YARMOUTH	A	SACKVILLE	:	0.0	0.056	0.056
DE	ST. JOHN	A	ST. STEPHEN	:	0.0	5.389	5.389
DE	ST. STEPHEN	A	ST. JOHN	:	0.0	5.389	5.389
DE	ST. JOHN	A	SHELBURNE	:	0.0	0.222	0.222
DE	SHELBURNE	A	ST. JOHN	:	0.0	0.194	0.194
DE	ST. JOHN	A	SHERBROOKE	:	0.0	0.139	0.139
DE	SHERBROOKE	A	ST. JOHN	:	0.0	0.139	0.139
DE	ST. JOHN	A	SUMMERSIDE	:	0.0	2.806	2.806
DE	SUMMERSIDE	A	ST. JOHN	:	0.0	2.806	2.806
DE	ST. JOHN	A	SYDNEY	:	0.0	3.722	3.722
DE	SYDNEY	A	ST. JOHN	:	0.0	3.722	3.722
DE	ST. JOHN	A	TRURO	:	0.0	0.083	0.083
DE	TRURO	A	ST. JOHN	:	0.0	0.056	0.056
DE	ST. JOHN	A	WOODSTOCK	:	0.0	7.333	7.333
DE	WOODSTOCK	A	ST. JOHN	:	0.0	7.306	7.306
DE	ST. JOHN	A	YARMOUTH	:	0.0	1.917	1.917
DE	YARMOUTH	A	ST. JOHN	:	0.0	1.917	1.917
DE	ST. STEPHEN	A	SHELBURNE	:	0.0	0.083	0.083
DE	SHELBURNE	A	ST. STEPHEN	:	0.0	0.056	0.056
DE	ST. STEPHEN	A	SHERBROOKE	:	0.0	0.083	0.083
DE	SHERBROOKE	A	ST. STEPHEN	:	0.0	0.056	0.056
DE	ST. STEPHEN	A	SUMMERSIDE	:	0.0	0.083	0.083
DE	SUMMERSIDE	A	ST. STEPHEN	:	0.0	0.056	0.056
DE	ST. STEPHEN	A	SYDNEY	:	0.0	0.083	0.083
DE	SYDNEY	A	ST. STEPHEN	:	0.0	0.056	0.056

TABLE 4.6 Cont'd. POINT TO POINT DEMAND

DE	ST. STEPHEN	A	TRURO	:	0.0	0.083	0.083
DE	TRURO	A	ST. STEPHEN	:	0.0	0.056	0.056
DE	ST. STEPHEN	A	WOODSTOCK	:	0.0	0.139	0.139
DE	WOODSTOCK	A	ST. STEPHEN	:	0.0	0.139	0.139
DE	ST. STEPHEN	A	YARMOUTH	:	0.0	0.083	0.083
DE	YARMOUTH	A	ST. STEPHEN	:	0.0	0.056	0.056
DE	SHELBURNE	A	SHERBROOKE	:	0.0	0.083	0.083
DE	SHERBROOKE	A	SHELBURNE	:	0.0	0.056	0.056
DE	SHELBURNE	A	SUMMERSIDE	:	0.0	0.083	0.083
DE	SUMMERSIDE	A	SHELBURNE	:	0.0	0.056	0.056
DE	SHELBURNE	A	SYDNEY	:	0.0	0.083	0.083
DE	SYDNEY	A	SHELBURNE	:	0.0	0.056	0.056
DE	SHELBURNE	A	TRURO	:	0.0	0.139	0.139
DE	TRURO	A	SHELBURNE	:	0.0	0.139	0.139
DE	SHELBURNE	A	WOODSTOCK	:	0.0	0.083	0.083
DE	WOODSTOCK	A	SHELBURNE	:	0.0	0.056	0.056
DE	SHELBURNE	A	YARMOUTH	:	0.0	1.917	1.917
DE	YARMOUTH	A	SHELBURNE	:	0.0	1.917	1.917
DE	SHERBROOKE	A	SUMMERSIDE	:	0.0	0.083	0.083
DE	SUMMERSIDE	A	SHERBROOKE	:	0.0	0.056	0.056
DE	SHERBROOKE	A	SYDNEY	:	0.0	0.222	0.222
DE	SYDNEY	A	SHERBROOKE	:	0.0	0.194	0.194
DE	SHERBROOKE	A	TRURO	:	0.0	0.139	0.139
DE	TRURO	A	SHERBROOKE	:	0.0	0.139	0.139
DE	SHERBROOKE	A	WOODSTOCK	:	0.0	0.083	0.083
DE	WOODSTOCK	A	SHERBROOKE	:	0.0	0.056	0.056
DE	SHERBROOKE	A	YARMOUTH	:	0.0	0.083	0.083
DE	YARMOUTH	A	SHERBROOKE	:	0.0	0.056	0.056
DE	SUMMERSIDE	A	SYDNEY	:	0.0	0.222	0.222
DE	SYDNEY	A	SUMMERSIDE	:	0.0	0.194	0.194
DE	SUMMERSIDE	A	TRURO	:	0.0	0.222	0.222
DE	TRURO	A	SUMMERSIDE	:	0.0	0.194	0.194
DE	SUMMERSIDE	A	WOODSTOCK	:	0.0	0.139	0.139

TABLE 4.6 Cont'd. POINT TO POINT DEMAND

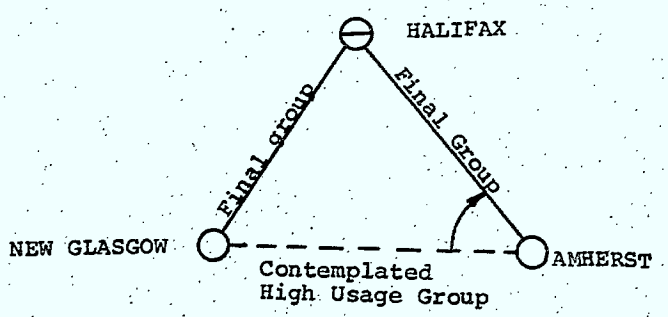
DE	WOODSTOCK	A	SUMMERSIDE	:	0.0	0.139	0.139
DE	SUMMERSIDE	A	YARMOUTH	:	0.0	0.139	0.139
DE	YARMOUTH	A	SUMMERSIDE	:	0.0	0.139	0.139
DE	TRURO	A	SYDNEY	:	0.0	0.278	0.278
DE	SYDNEY	A	TRURO	:	0.0	0.278	0.278
DE	SYDNEY	A	WOODSTOCK	:	0.0	0.139	0.139
DE	WOODSTOCK	A	SYDNEY	:	0.0	0.139	0.139
DE	SYDNEY	A	YARMOUTH	:	0.0	0.222	0.222
DE	YARMOUTH	A	SYDNEY	:	0.0	0.194	0.194
DE	TRURO	A	WOODSTOCK	:	0.0	0.139	0.139
DE	WOODSTOCK	A	TRURO	:	0.0	0.139	0.139
DE	TRURO	A	YARMOUTH	:	0.0	0.139	0.139
DE	YARMOUTH	A	TRURO	:	0.0	0.139	0.139
DE	WOODSTOCK	A	YARMOUTH	:	0.0	0.083	0.083
DE	YARMOUTH	A	WOODSTOCK	:	0.0	0.056	0.056

TABLE 4.6 Cont'd. POINT TO POINT DEMAND

POUR UNE DEMANDE ENTRE AMHERST ET NEW GLASGOW
VOICI L'ENSEMBLE DES CHAINES (EXPRIMEES EN NOM EXTERNE DES SOMMETS) :

NOMBRE D'ARETES	NOM DES SOMMETS		
1	AMHERST	NEW GLASGOW	
2	AMHERST	HALIFAX	NEW GLASGOW

NOTE: VARIABLE JIMY EQUAL TO 1
FOR THIS OUTPUT. SEE SECTION 5.0.



FOR A DEMAND OF 1.42 ERLANGS OF TRAFFIC FROM AMHERST TO NEW GLASGOW THERE ARE TWO POSSIBLE PATHS.

1) AMHERST - NEW GLASGOW VIA CONTEMPLATED GROUP
2) AMHERST - HALIFAX - NEW GLASGOW VIA FINAL GROUPS

TABLE 4.7 EXAMPLE OF CIRCUIT ASSIGNMENT BY CHARGE

CHARGES SUPPLEMENTAIRES GENEREES SUR LES ARCS DU RESEAU DE COMMUTATION

POUR UN ACCROISSEMENT DE 1.42 ERLANGS ENTRE LE COUPLE (AMHERST .NEW GLASGOW)

HU OU FULL GROUP POTENTIELS		PROFILS	
NEW GLASGOW	AMHERST	0	1
ARC		CHARGES SUPPLEMENTAIRES (EN CIRCUITS)	
ST. JOHN	CAMPBELLTON	0	0
ST. JOHN	BATHURST	0	0
ST. JOHN	SUMMERSIDE	0	0
ST. JOHN	CHARLOTTETON	0	0
ST. JOHN	NEW GLASGOW	0	0
ST. JOHN	SYDNEY	0	0
ST. JOHN	AMHERST	0	0
ST. JOHN	KENTVILLE	0	0
ST. JOHN	DIGBY	0	0
ST. JOHN	YARMOUTH	0	0
WOODSTOCK	FREDRICTON	0	0
WOODSTOCK	EDMUNDSTON	0	0
EDMUNDSTON	NEWCASTLE	0	0
FREDRICTON	NEWCASTLE	0	0
FREDRICTON	MONCTON	0	0
FREDRICTON	HALIFAX	0	0
CAMPBELLTON	MONCTON	0	0
CAMPBELLTON	BATHURST	0	0
BATHURST	MONCTON	0	0
NEWCASTLE	HALIFAX	0	0
NEWCASTLE	MONCTON	0	0
SUMMERSIDE	MONCTON	0	0
SUMMERSIDE	CHARLOTTETON	0	0
CHARLOTTETON	MONCTON	0	0
CHARLOTTETON	NEW GLASGOW	0	0
MONCTON	TRURO	0	0
MONCTON	AMHERST	0	0
MONCTON	HALIFAX	0	0
MONCTON	KENTVILLE	0	0
NEW GLASGOW	AMHERST	0	3
NEW GLASGOW	TRURO	0	0
NEW GLASGOW	SHERBROOKE	0	0
NEW GLASGOW	SYDNEY	0	0
BATHURST	TRURO	0	0
KENTVILLE	TRURO	0	0
KENTVILLE	BRIDGEWATER	0	0
KENTVILLE	DIGBY	0	0
DIGBY	YARMOUTH	0	0
YARMOUTH	SHELBURNE	0	0
SHELBURNE	BRIDGEWATER	0	0
EFFICACITE DU PROFIL		98.0	99.7

NOTE: IF THE CONTEMPLATED IS NOT INSTALLED THEN THE FIRST COLUMN REPRESENTS THE NUMBER OF VOICE CIRCUITS ASSIGNED TO EACH LINK OF THE SWITCHING NETWORK

COLUMN 2 REPRESENTS THE CIRCUIT ASSIGNMENT INCLUDING OVERFLOWS IF THE CONTEMPLATED HIGH USAGE GROUP IS INSTALLED.

VARIABLE JIMY EQUALS ONE FOR THIS OUTPUT.

TABLE 4.8 EXAMPLE OF CIRCUIT ASSIGNMENT BY CHARGE

CHARGES SUPPLEMENTAIRES GENEREES SUR LES ARCS DU RESEAU DE COMMUTATION

POUR UN ACCROISSEMENT DE 1.42 ERLANGS ENTRE LE COUPLE (AMHERST ,NEW GLASGOW)

HU OU FULL GROUP POTENTIELS		PROFILS	
NEW GLASGOW	AMHERST	0	1
ARC		CHARGES SUPPLEMENTAIRES (EN CIRCUITS)	
ST. JOHN	ST. STEPHEN	0	0
ST. JOHN	WOODSTOCK	0	0
ST. JOHN	EDMUNDSTON	0	0
ST. JOHN	FREDRICTON	0	0
ST. JOHN	NEWCASTLE	0	0
ST. JOHN	MONCTON	0	0
ST. JOHN	HALIFAX	0	0
CAMPBELLTON	NEWCASTLE	0	0
BATHURST	NEWCASTLE	0	0
SUMMERSIDE	HALIFAX	0	0
CHARLOTTETON	HALIFAX	0	0
NEW GLASGOW	HALIFAX	6	3
SHELBURNE	HALIFAX	0	0
BRIDGEWATER	HALIFAX	0	0
YARMOUTH	HALIFAX	0	0
DIGBY	HALIFAX	0	0
KENTVILLE	HALIFAX	0	0
AMHERST	HALIFAX	6	3
TRURO	HALIFAX	0	0
SYDNEY	HALIFAX	0	0
SHERBROOKE	HALIFAX	0	0
SACKVILLE	AMHERST	0	0
EFFICACITE DU PROFIL		98.0	99.7

NOTE: EFFACITE DU PROFIL REFERS TO THE EFFICIENCY OF THE PATH.

i.e. $\frac{\text{TRAFFIC ARRIVING NEW GLASGOW}}{\text{TRAFFIC LEAVING AMHERST}} \times 100$

TABLE 4.8 Cont'd. EXAMPLE OF CIRCUIT ASSIGNMENT BY CHARGE

COMMUTATION SUPPLEMENTAIRE AUX SOMMETS DU RESEAU DE COMMUTATION

POUR UN ACCROISSEMENT DE 1.42 ERLANGS ENTRE LE COUPLE (AMHERST .NEW GLASGOW)

HU OU FULL GROUP POTENTIELS		PROFILS	
NEW GLASGOW AMHERST		0	1
SOMMET		COMMUTATION SUPPLEMENTAIRES (EN LIGNES)	
ST. JOHN		0.0	0.0
CAMPBELLTON		0.0	0.0
BATHURST		0.0	0.0
SUMMERSIDE		0.0	0.0
CHARLOTTETON		0.0	0.0
NEW GLASGOW		0.0	0.0
SYDNEY		0.0	0.0
AMHERST		0.0	0.0
KENTVILLE		0.0	0.0
DIGBY		0.0	0.0
YARMOUTH		0.0	0.0
WOODSTOCK		0.0	0.0
FREDRICTON		0.0	0.0
EDMUNDSTON		0.0	0.0
NEWCASTLE		0.0	0.0
MONCTON		0.0	0.0
HALIFAX		2.4	0.4
TRURO		0.0	0.0
SHERBROOKE		0.0	0.0
BRIDGEWATER		0.0	0.0
SHELBURNE		0.0	0.0
ST. STEPHEN		0.0	0.0
SACKVILLE		0.0	0.0

TABLE 4.9 NUMBER OF LINES SWITCHED AT NODES FOR EACH PROFILE

DEMANDE TOTALE MAXIMUM PAR ARC
LA DEMANDE ETANT EXPRIMEE EN NOMBRE DE CIRCUITS

		NUMERO	DEMANDE
WOODSTOCK	FREDRICTON	1	14
WOODSTOCK	EDMUNDSTON	3	6
EDMUNDSTON	NEWCASTLE	5	12
FREDRICTON	NEWCASTLE	7	18
FREDRICTON	MONCTON	9	12
CAMPBELLTON	MONCTON	11	6
CAMPBELLTON	BATHURST	13	6
BATHURST	MONCTON	15	8
NEWCASTLE	MONCTON	17	24
SUMMERSIDE	MONCTON	19	6
SUMMERSIDE	CHARLOTTETON	21	24
CHARLOTTETON	MONCTON	23	6
CHARLOTTETON	NEW GLASGOW	25	6
MONCTON	TRURO	27	4
MONCTON	AMHERST	29	16
MONCTON	KENTVILLE	31	4
NEW GLASGOW	AMHERST	33	8
NEW GLASGOW	TRURO	35	12
NEW GLASGOW	SHERBROOKE	37	4
NEW GLASGOW	SYDNEY	39	18
BATHURST	TRURO	41	4
KENTVILLE	TRURO	43	6
KENTVILLE	BRIDGEWATER	45	4
KENTVILLE	DIGBY	47	10
DIGBY	YARMOUTH	49	6
YARMOUTH	SHELBURNE	51	8
SHELBURNE	BRIDGEWATER	53	4

NOTE: The demand in voice circuits for each link in the switching network is not the true demand. This demand is the result of summing of the maximum demand for each profile for each demand (point to point) pair. This demand value is used for dimensioning purposes for the job step CADUCE only.

TABLE 4.10 SWITCHED DEMAND DIVISIBLE

DEMANDE TOTALE MAXIMUM PAR ARC
LA DEMANDE ETANT EXPRIMEE EN NOMBRE DE CIRCUITS

		NUMERO	DEMANDE
ST. JOHN	CAMPBELLTON	55	59
ST. JOHN	BATHURST	57	71
ST. JOHN	SUMMERSIDE	59	32
ST. JOHN	CHARLOTTETON	61	40
ST. JOHN	NEW GLASGOW	63	39
ST. JOHN	SYDNEY	65	32
ST. JOHN	AMHERST	67	60
ST. JOHN	KENTVILLE	69	28
ST. JOHN	DIGBY	71	26
ST. JOHN	YARMOUTH	73	25
MONCTON	HALIFAX	75	72
NEWCASTLE	HALIFAX	77	93
FREDRICTON	HALIFAX	79	40
ST. JOHN	ST. STEPHEN	81	118
ST. JOHN	WOODSTOCK	83	149
ST. JOHN	EDMUNDSTON	85	138
ST. JOHN	FREDRICTON	87	195
ST. JOHN	NEWCASTLE	89	273
ST. JOHN	MONCTON	91	285
ST. JOHN	HALIFAX	93	520
CAMPBELLTON	NEWCASTLE	95	116
BATHURST	NEWCASTLE	97	130
SUMMERSIDE	HALIFAX	99	149
CHARLOTTETON	HALIFAX	101	169
NEW GLASGOW	HALIFAX	103	189
SHELBURNE	HALIFAX	105	116
BRIDGEWATER	HALIFAX	107	138
YARMOUTH	HALIFAX	109	126

TABLE 4.10 SWITCHED DEMAND DIVISIBLE Cont'd.

DEMANDE TOTALE MAXIMUM PAR ARC
LA DEMANDE ETANT EXPRIMEE EN NOMBRE DE CIRCUITS

		NUMERO	DEMANDE
DIGBY	HALIFAX	111	121
KENTVILLE	HALIFAX	113	154
AMHERST	HALIFAX	115	230
TRURO	HALIFAX	117	172
SYDNEY	HALIFAX	119	165
SHERBROOKE	HALIFAX	121	102
SACKVILLE	AMHERST	123	116

TABLE 4.10 Cont'd. SWITCHED DEMAND DIVISIBLE

```
FIN NORMALE DES CALCULS
 THERE ARE     580PROFILES FOR     506DEMAND PAIRS
```

TABLE 4.11 SUMMARRY OF PROFILES

4.2 ENLARGED TRANSMISSION FACILITIES NETWORK

The major point of departure of Hermes III from Hermes II with regards to the transmission facilities network is the capability of recognizing enlarged networks internally. As implied by the term enlarged networks, the transmission facilities network is enlarged by the addition of nodes and links. Enlargement of networks permits the user to introduce interconnects between different carriers when they exist at certain geographic nodes. Parrallel routes can also be handled by enlargement methods. The enlargement procedure is carried out by the user.

Figures 4.2 to 4.6 illustrate the enlargement of transmission facilities networks. Examples were chosen from the Maritimes transmission facilities network.

Figure 4.2 refers to a case where the enlargement of a node is not required because there is no change in carrier.

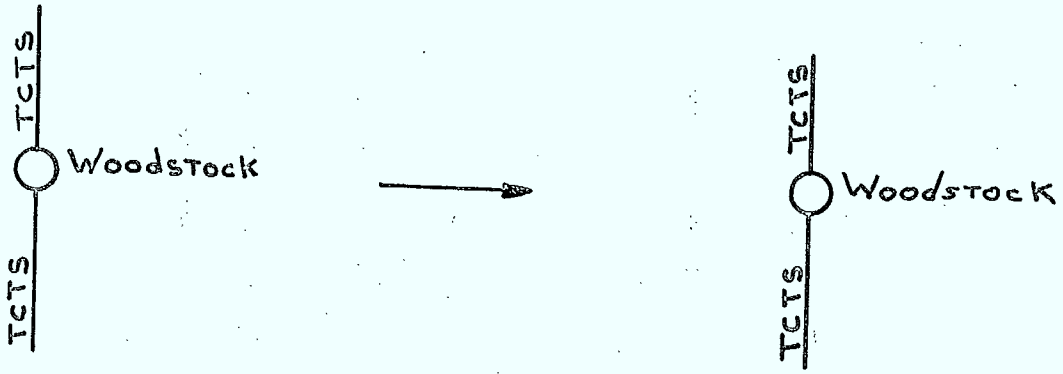


Figure 4.2 Simple Node

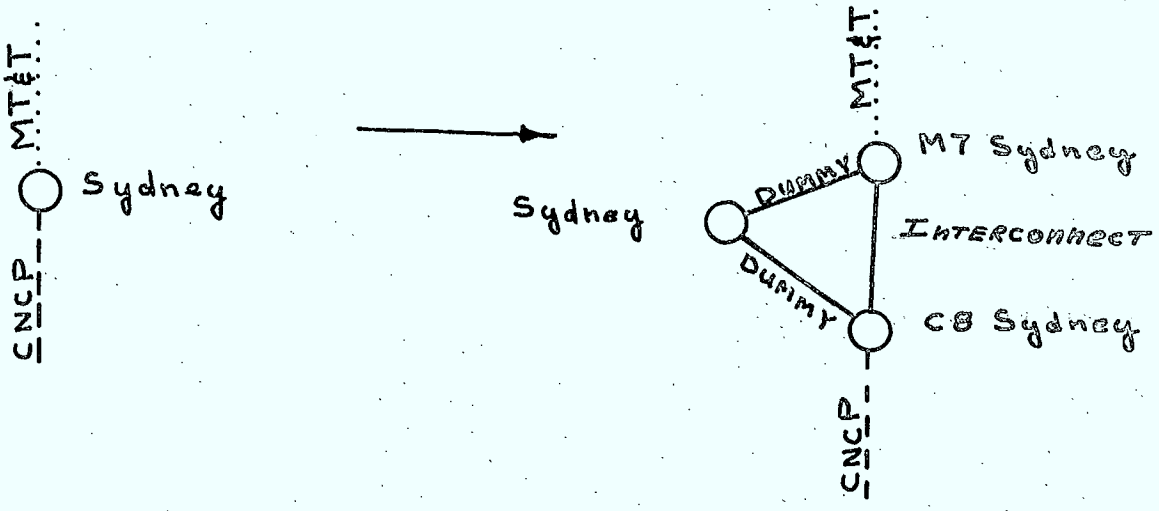


Figure 4.3 Interconnects

The interconnect link (figure 4.3) is treated as all other transmission links and has associated cost functions defined by the user. The dummy links are also treated as other transmission links. To ensure that traffic flowing through the Sydney geographic node is routed through the interconnect and is assigned associated costs, the sum of the two dummy links cost functions must be greater than the interconnect cost function. The dummy link costs are removed in the optimizing procedure and do not influence the solution. The capacities of the dummy links should be of at least the same magnitude as the adjoining geographic links.

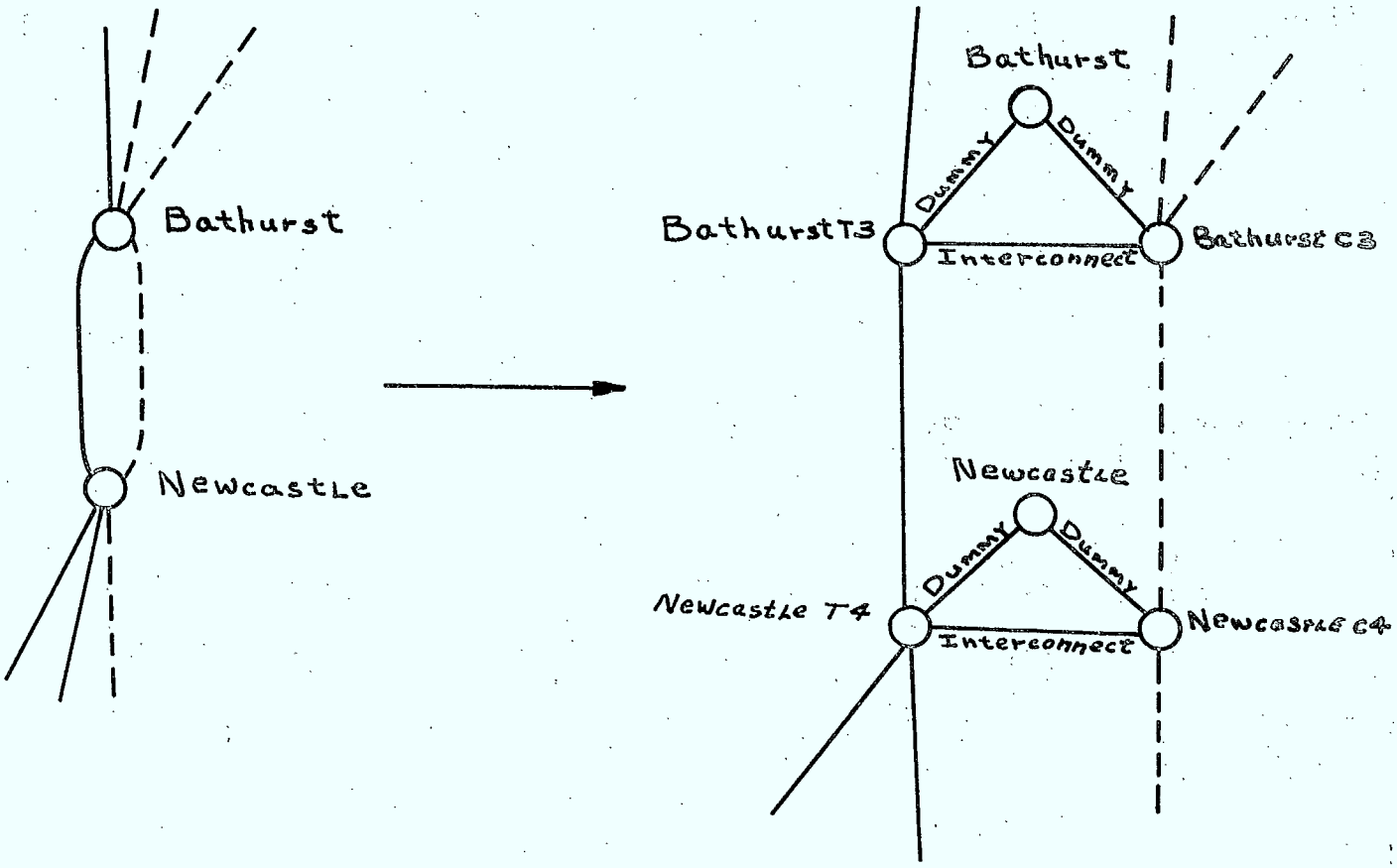


Figure 4.4 Series Interconnects

Figure 4.4 illustrates two interconnects in series. It is important to note that any additional TCTS links joining another particular node in the network would start from node Newcastle T4. Similarily node Bathurst C3 is a CNCP starting node for all CNCP links in the transmission facilities network joining Bathurst. The original geographic nodes remain geographic. Dummy nodes are identified by the user and the names chosen are optional to the user.

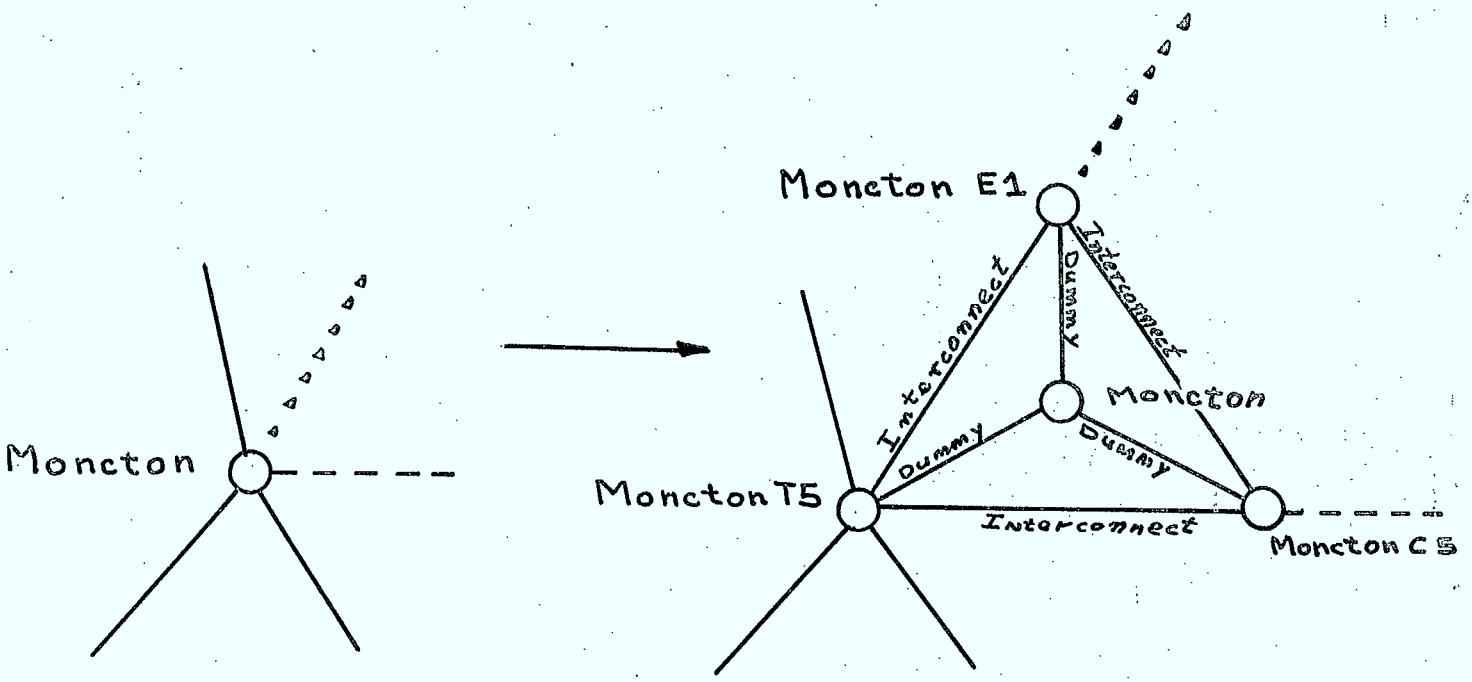


Figure 4.5 Interconnects of Three Carriers

Figure 4.5 illustrates the enlargement of a node with three carriers. The expansion procedure for more than three carriers is similar to that of three except that the configuration is difficult to visualize in three dimensions. From the above example it can be seen that one node and five links is enlarged to four nodes and eleven links. The maximum number of nodes and links for the software as presently dimensioned is 300 nodes and 300 links. These maximums include dummy links, interconnect links and dummy nodes.

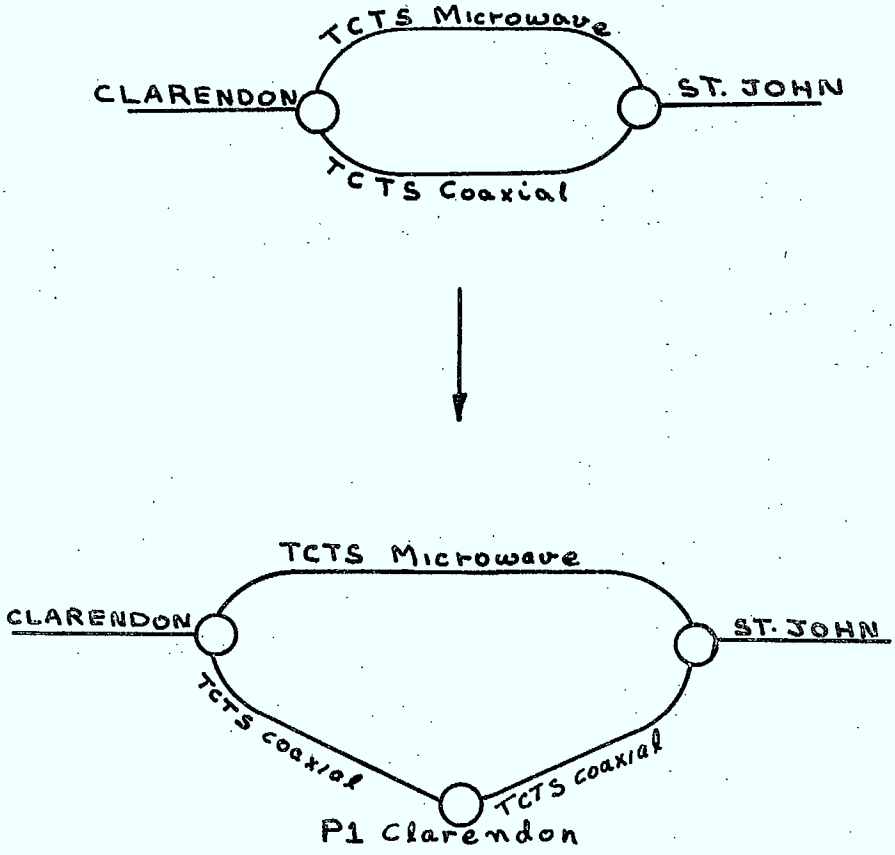


Figure 4.6 Parrallel Routes

The Hermes III software does not permit two or more routes of same ownership to exist in parrallel. The splitting of either link by the inclusion of a dummy node and the division of the original associated cost function eliminates this particular constraint.

Figure 4.7 shows the transmission facilities network for the Maritimes problem. Tables 4.12 to 4.16 inclusive list the output tables from BORNE.

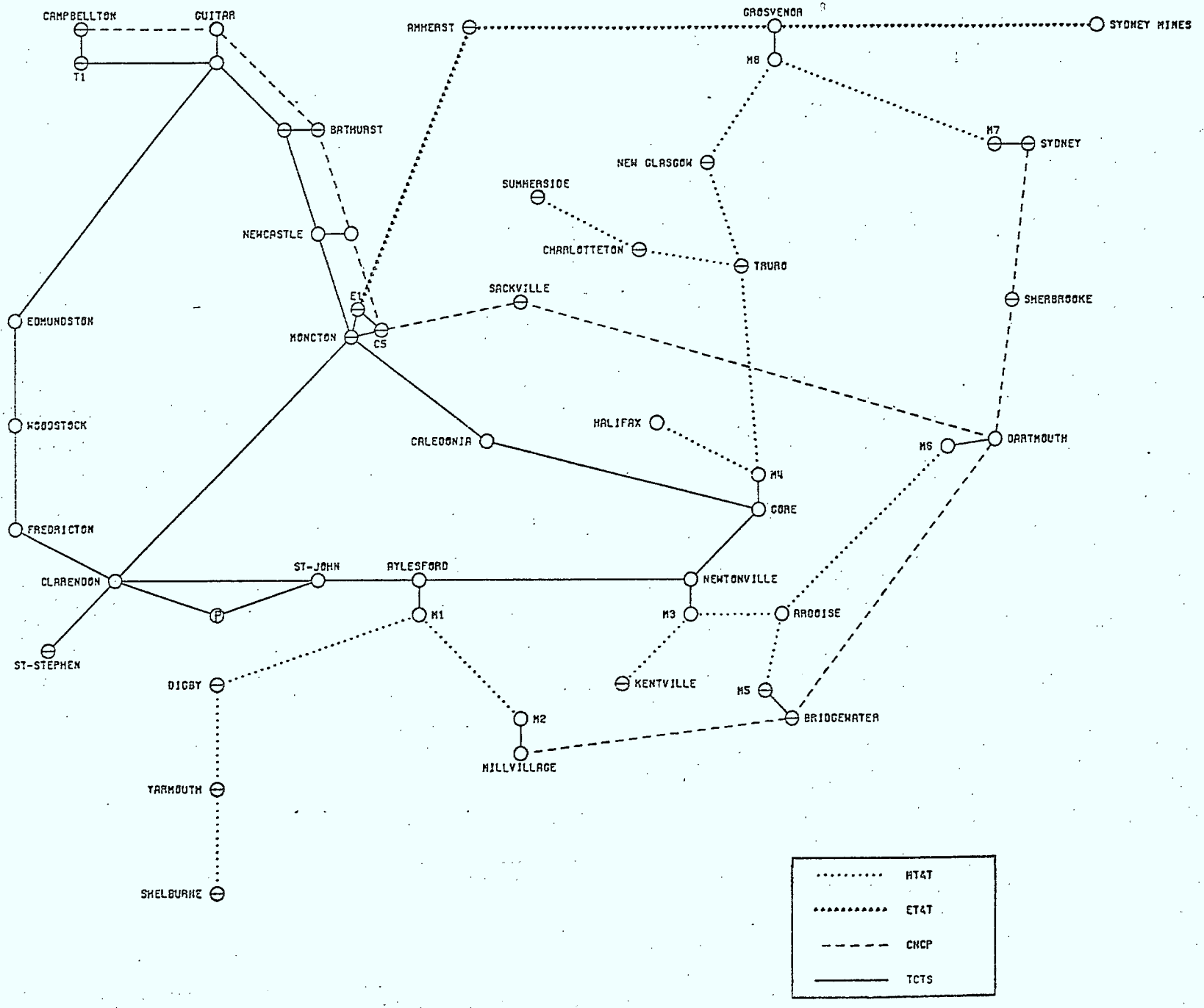


Figure 4.7 Maritimes Transmission Facilities Network

EXTERNAL NODE NAME	INTERNAL NODE NUMBER
WOODSTOC	1
FREDRICT	2
EDMUNDST	3
NEWCASTL	4
MONCTON	5
CAMPBELL	6
BATHURST	7
SUMMERSI	8
CHARLOTT	9
NEW GLAS	10
TRURO	11
AMHERST	12
KENTVILL	13
SHERBROO	14
SYDNEY	15
BRIDGEWA	16
DIGBY	17
YARMOUTH	18
SHELBURN	19
ST. JOHN	20
HALIFAX	21
ST. STEP	22
SACKVILL	23
M4 GORE	24
M8 GROSV	25
M7 SYDNE	26

TABLE 4.12 EXTERNAL NODE NAMES AND CORRESPONDING INTERNAL NODE NUMBERS

EXTERNAL NODE NAME	INTERNAL NODE NUMBER
ARDOISE	27
M6 DARTM	28
M3 NEWTO	29
M5 BRIDG	30
M2 MILLV	31
M1 AYLES	32
E1 MONCT	33
E2 GROSV	34
SYDNEY M	35
C1 CAMPB	36
C2 GUITA	37
C3 BATHU	38
C4 NEWCA	39
C5 MONCT	40
C7 DARTM	41
C6 BRIDG	42
C9 MILLV	43
C8 SYDNE	44
T1 CAMPB	45
T2 GUITA	46
T3 BATHU	47
T4 NEWCA	48
T5 MONCT	49
CALEDONI	50
CLARENDO	51
T8 GORE	52
P1 CLARE	53

TABLE 4.12 Cont'd. EXTERNAL NODE NAMES AND CORRESPONDING INTERNAL NODE NUMBERS

EXTERNAL NODE NAME	INTERNAL NODE NUMBER
T7 NEWTO	54
T6 AYLES	55
GUITAR	56
AYLESFOR	57
MILLVILL	58
NEWTONVI	59
GORE	60
DARTMOUT	61
GROSVENO	62
SWIT	63

TABLE 4.12 cont'd. EXTERNAL NODE NAMES AND CORRESPONDING INTERNAL NODE NUMBERS

FROM	TO	CARRIER	MILES	INTER LINK NO	QTY	V.C. TYPE(1)	QTY	V.C. TYPE(2)	QTY	V.C. TYPE(3)	QTY	V.C. TYPE(4)	TOTAL
SUMMERSI	CHARLOTT	MT&T	35	1	2	960	0	0	0	0	0	0	2
CHARLOTT	TRURO	MT&T	75	2	2	960	0	0	0	0	0	0	2
TRURO	NEW GLAS	MT&T	41	3	3	1200	0	0	0	0	0	0	3
TRURO	M4 GORE	MT&T	24	4	3	960	0	0	0	0	0	0	3
NEW GLAS	M8 GROSV	MT&T	58	5	4	1200	0	0	0	0	0	0	4
M4 GORE	HALIFAX	MT&T	31	6	6	960	0	0	0	0	0	0	6
M8 GROSV	M7 SYDNE	MT&T	71	7	4	1200	0	0	0	0	0	0	4
ARDOISE	M6 DARTM	MT&T	26	8	3	960	0	0	0	0	0	0	3
ARDOISE	M3 NEWTO	MT&T	22	9	2	600	0	0	0	0	0	0	2
ARDOISE	M5 BRIDG	MT&T	58	10	3	960	0	0	0	0	0	0	3
M3 NEWTO	KENTVILL	MT&T	10	11	2	600	0	0	0	0	0	0	2
M2 MILLV	M1 AYLES	MT&T	64	12	3	1200	0	0	0	0	0	0	3
M1 AYLES	DIGBY	MT&T	52	13	3	240	0	0	0	0	0	0	3
DIGBY	YARMOUTH	MT&T	53	14	2	240	0	0	0	0	0	0	2
YARMOUTH	SHELBURN	MT&T	55	15	2	240	0	0	0	0	0	0	2
E1 MONCT	AMHERST	ET&T	34	16	3	480	0	0	0	0	0	0	3
E2 GROSV	AMHERST	ET&T	142	17	3	480	0	0	0	0	0	0	3
E2 GROSV	SYDNEY M	ET&T	83	18	3	480	0	0	0	0	0	0	3
C1 CAMPB	C2 GUITA	CNCP	43	19	3	600	0	0	0	0	0	0	3
C2 GUITA	C3 BATHU	CNCP	20	20	3	600	0	0	0	0	0	0	3
C3 BATHU	C4 NEWCA	CNCP	33	21	3	600	0	0	0	0	0	0	3
C4 NEWCA	C5 MONCT	CNCP	74	22	3	600	0	0	0	0	0	0	3
C5 MONCT	SACKVILL	CNCP	27	23	2	1200	0	0	0	0	0	0	2
SACKVILL	C7 DARTM	CNCP	102	24	2	1200	0	0	0	0	0	0	2
C7 DARTM	C6 BRIDG	CNCP	57	25	2	960	0	0	0	0	0	0	2
C7 DARTM	SHERBROO	CNCP	60	26	3	1200	0	0	0	0	0	0	3
C6 BRIDG	C9 MILLV	CNCP	15	27	2	960	0	0	0	0	0	0	2

TABLE 4.13 TRANSMISSION LINKS CAPACITY FUNCTIONS

FROM	TO	CARRIER	MILES	INTER LINK NO	QTY	V.C. TYPE(1)	QTY	V.C. TYPE(2)	QTY	V.C. TYPE(3)	QTY	V.C. TYPE(4)	TOTAL
SHERBROO	C8 SYDNE	CNCP	143	28	2	1200	0	0	0	0	0	0	2
T1 CAMPB	T2 GUITA	TCTS	43	29	2	1200	0	0	0	0	0	0	2
T2 GUITA	T3 BATHU	TCTS	20	30	2	1200	0	0	0	0	0	0	2
T2 GUITA	EDMUNDST	TCTS	149	31	2	1200	0	0	0	0	0	0	2
T3 BATHU	T4 NEWCA	TCTS	33	32	2	1200	0	0	0	0	0	0	2
EDMUNDST	WOODSTOC	TCTS	105	33	5	480	0	0	0	0	0	0	5
T4 NEWCA	T5 MONCT	TCTS	74	34	2	1200	0	0	0	0	0	0	2
WOODSTOC	FREDRICT	TCTS	53	35	5	480	0	0	0	0	0	0	5
T5 MONCT	CALEDONI	TCTS	16	36	5	960	0	0	0	0	0	0	5
T5 MONCT	CLARENDO	TCTS	96	37	2	1200	0	0	0	0	0	0	2
FREDRICT	CLARENDO	TCTS	35	38	7	480	0	0	0	0	0	0	7
CALEDONI	T8 GORE	TCTS	77	39	4	960	0	0	0	0	0	0	4
CLARENDO	ST. STEP	TCTS	49	40	2	600	0	0	0	0	0	0	2
CLARENDO	ST. JOHN	TCTS	21	41	9	480	0	0	0	0	0	0	9
CLARENDO	P1 CLARE	TCTS	10	42	8	1800	0	0	0	0	0	0	8
P1 CLARE	ST. JOHN	TCTS	11	43	8	1800	0	0	0	0	0	0	8
T8 GORE	T7 NEWTO	TCTS	32	44	5	240	0	0	0	0	0	0	5
ST. JOHN	T6 AYLES	TCTS	65	45	5	600	0	0	0	0	0	0	5
T6 AYLES	T7 NEWTO	TCTS	24	46	5	240	0	0	0	0	0	0	5
CAMPBELL	C1 CAMP8	DUMM	1	47	10	1800	0	0	0	0	0	0	10
CAMPBELL	T1 CAMPB	DUMM	1	48	10	1800	0	0	0	0	0	0	10
GUITAR	C2 GUITA	DUMM	1	49	10	1800	0	0	0	0	0	0	10
GUITAR	T2 GUITA	DUMM	1	50	10	1800	0	0	0	0	0	0	10
BATHURST	C3 BATHU	DUMM	1	51	10	1800	0	0	0	0	0	0	10
BATHURST	T3 BATHU	DUMM	1	52	10	1800	0	0	0	0	0	0	10
NEWCASTL	C4 NEWCA	DUMM	1	53	10	1800	0	0	0	0	0	0	10
NEWCASTL	T4 NEWCA	DUMM	1	54	10	1800	0	0	0	0	0	0	10
AYLESFOR	T6 AYLES	DUMM	1	55	10	1800	0	0	0	0	0	0	10

TABLE 4.13 cont'd. TRANSMISSION LINKS CAPACITY FUNCTIONS

FROM	TO	CARRIER	MILES	INTER LINK NO	QTY	V.C. TYPE(1)	QTY	V.C. TYPE(2)	QTY	V.C. TYPE(3)	QTY	V.C. TYPE(4)	TOTAL
AYLESFOR	M1 AYLES	DUMM	1	56	10	1800	0	0	0	0	0	0	10
MILLVILL	M2 MILLV	DUMM	1	57	10	1800	0	0	0	0	0	0	10
MILLVILL	C9 MILLV	DUMM	1	58	10	1800	0	0	0	0	0	0	10
NEWTONVI	T7 NEWTO	DUMM	1	59	10	1800	0	0	0	0	0	0	10
NEWTONVI	M3 NEWTO	DUMM	1	60	10	1800	0	0	0	0	0	0	10
BRIDGEWA	M5 BRIDG	DUMM	1	61	10	1800	0	0	0	0	0	0	10
BRIDGEWA	C6 BRIDG	DUMM	1	62	10	1800	0	0	0	0	0	0	10
GORE	M4 GORE	DUMM	1	63	10	1800	0	0	0	0	0	0	10
GORE	T8 GORE	DUMM	1	64	10	1800	0	0	0	0	0	0	10
DARTMOUT	C7 DARTM	DUMM	1	65	10	1800	0	0	0	0	0	0	10
DARTMOUT	M6 DARTM	DUMM	1	66	10	1800	0	0	0	0	0	0	10
SYDNEY	M7 SYDNE	DUMM	1	67	10	1800	0	0	0	0	0	0	10
SYDNEY	C8 SYDNE	DUMM	1	68	10	1800	0	0	0	0	0	0	10
GROSVENO	E2 GROSV	DUMM	1	69	10	1800	0	0	0	0	0	0	10
GROSVENO	M8 GROSV	DUMM	1	70	10	1800	0	0	0	0	0	0	10
MONCTON	C5 MONCT	DUMM	1	71	10	1800	0	0	0	0	0	0	10
MONCTON	E1 MONCT	DUMM	1	72	10	1800	0	0	0	0	0	0	10
MONCTON	T5 MONCT	DUMM	1	73	10	1800	0	0	0	0	0	0	10
C1 CAMPB	T1 CAMPB	SWCH	10	74	10	1800	0	0	0	0	0	0	10
C2 GUITA	T2 GUITA	SWCH	10	75	10	1800	0	0	0	0	0	0	10
C3 BATHU	T3 BATHU	SWCH	10	76	10	1800	0	0	0	0	0	0	10
C4 NEWCA	T4 NEWCA	SWCH	10	77	10	1800	0	0	0	0	0	0	10
M1 AYLES	T6 AYLES	SWCH	10	78	10	1800	0	0	0	0	0	0	10
M2 MILLV	C9 MILLV	SWCH	10	79	10	1800	0	0	0	0	0	0	10
M3 NEWTO	T7 NEWTO	SWCH	10	80	10	1800	0	0	0	0	0	0	10
C6 BRIDG	M5 BRIDG	SWCH	10	81	10	1800	0	0	0	0	0	0	10
T8 GORE	M4 GORE	SWCH	10	82	10	1800	0	0	0	0	0	0	10
M6 DARTM	C7 DARTM	SWCH	10	83	10	1800	0	0	0	0	0	0	10

TABLE 4.13 Cont'd. TRANSMISSION LINKS CAPACITY FUNCTIONS

FROM	TO	CARRIER	MILES	INTER LINK NO	QTY	V.C. TYPE(1)	QTY	V.C. TYPE(2)	QTY	V.C. TYPE(3)	QTY	V.C. TYPE(4)	TOTAL
M8 GROSV	E2 GROSV	SWCH	10	84	10	1800	0	0	0	0	0	0	10
M7 SYDNE	C8 SYDNE	SWCH	10	85	10	1800	0	0	0	0	0	0	10
T5 MONCT	E1 MONCT	SWCH	10	86	10	1800	0	0	0	0	0	0	10
E1 MONCT	C5 MONCT	SWCH	10	87	10	1800	0	0	0	0	0	0	10
T5 MONCT	C5 MONCT	SWCH	10	88	10	1800	0	0	0	0	0	0	10

NOTE: Of the 10 total channels available for this link, each of the 10 channels has a capacity of 1800 voice circuits. There are four columns named QTY indicating that up to a maximum of four voice circuit types are permitted on each link of the transmission facilities network. The total number of channels permitted for any link is twenty.

TABLE 4.13 Cont'd. TRANSMISSION LINKS CAPACITY FUNCTIONS

SWITCHING NODE DATA

NODE	INTER NODE NUMBER	QTY	LINE TYPE(1)	QTY	LINE TYPE(2)	QTY	LINE TYPE(3)	QTY	LINE TYPE(4)	TOTAL
ST. JOHN	20	20	300	0	0	0	0	0	0	20
HALIFAX	21	20	300	0	0	0	0	0	0	20
NEWCASTL	4	20	300	0	0	0	0	0	0	20
AMHERST	12	20	300	0	0	0	0	0	0	20

NOTE: This output refers to the intermediary nodes of the switching network. The intermediary nodes of this example have a maximum capacity of twenty switching machines at each node and each switching machine has a capacity of 300 lines. The maximum number of different switching machine types at any intermediary node is four.

TABLE 4.14 SWITCHING NODE CAPACITY FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL (NO.)	COST(S)					
SUMMERSI	CHARLOTT	MT&T	1	35	960	2	134750	13475			
CHARLOTT	TRURO	MT&T	2	75	960	2	288750	28875			
TRURO	NEW GLAS	MT&T	3	41	1200	3	172200	17220	17220		
TRURO	M4 GORE	MT&T	4	24	960	3	92400	9240	9240		
NEW GLAS	M8 GROSV	MT&T	5	58	1200	4	243600	24360	24360	24360	
M4 GORE	HALIFAX	MT&T	6	31	960	6	119350	11935	11935	11935	11935	35805
M8 GROSV	M7 SYDNE	MT&T	7	71	1200	4	298200	29820	29820	29820	
ARDOISE	M6 DARTM	MT&T	8	26	960	3	100100	10010	10010		
ARDOISE	M3 NEWTO	MT&T	9	22	600	2	77000	7700			
ARDOISE	M5 BRIDG	MT&T	10	58	960	3	223300	22330	22330		
M3 NEWTO	KENTVILL	MT&T	11	10	600	2	35000	3500			
M2 MILLV	M1 AYLES	MT&T	12	64	1200	3	268800	26880	26880		
M1 AYLES	DIGBY	MT&T	13	52	240	3	145600	14550	14560		
DIGBY	YARMOUTH	MT&T	14	53	240	2	148400	14840			
YARMOUTH	SHELBURN	MT&T	15	55	240	2	154000	15400			
E1 MONCT	AMHERST	ET&T	16	34	480	3	95200	9520	9520		
E2 GROSV	AMHERST	ET&T	17	142	480	3	397600	39760	39760		

NOTE: Link number 17 may be interpreted as follows:

The link joins node E2 GROS and AMHERST.
The link is owned by ET&T.
The distance between the two nodes is 142 miles.
There are three channels available. Each of the three channels has a capacity of 480 voice circuits.
The first channel costs $ 397,600.00
The second channel costs $ 39,760.00
The third channel costs $ 39,760.00

TABLE 4.15 TRANSMISSION LINKS COST FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL (NO.)		COST($)				
E2 GROSV	SYDNEY M	ET&T	18	83	480	3	232400	23240	23240		
C1 CAMPB	C2 GUITA	CNCP	19	43	600	3	120400	15050	15050		
C2 GUITA	C3 BATHU	CNCP	20	20	600	3	56000	7000	7000		
C3 BATHU	C4 NEWCA	CNCP	21	33	600	3	92400	11550	11550		
C4 NEWCA	C5 MONCT	CNCP	22	74	600	3	207200	25900	25900		
C5 MONCT	SACKVILL	CNCP	23	27	1200	2	75600	9450			
SACKVILL	C7 DARTM	CNCP	24	102	1200	2	285600	35700			
C7 DARTM	C6 BRIDG	CNCP	25	57	960	2	159600	19950			
C7 DARTM	SHERBROO	CNCP	26	60	1200	3	168000	21000	21000		
C6 BRIDG	C9 MILLV	CNCP	27	15	960	2	42000	5250			
SHERBROO	C8 SYDNE	CNCP	28	143	1200	2	400400	50050			
T1 CAMPB	T2 GUITA	TCTS	29	43	1200	2	180600	18060			
T2 GUITA	T3 BATHU	TCTS	30	20	1200	2	84000	8400			
T2 GUITA	EDMUNDST	TCTS	31	149	1200	2	625800	62580			
T3 BATHU	T4 NEWCA	TCTS	32	33	1200	2	138600	13860			
EDMUNDST	WOODSTOC	TCTS	33	105	480	5	294000	29400	29400	29400	29400
T4 NEWCA	T5 MONCT	TCTS	34	74	1200	2	310800	31080			
WOODSTOC	FREDRICT	TCTS	35	53	480	5	148400	14840	14840	14840	14840

TABLE 4.15 Cont'd. TRANSMISSION LINKS COST FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL (NO.)		COST($)								
T5 MONCT	CALEDONI	TCTS	36	16	960	5	61600	6160	6160	6160	6160				
T5 MONCT	CLARENDO	TCTS	37	96	1200	2	403200	40320							
FREDRICT	CLARENDO	TCTS	38	35	480	7	98000	9800	9800	9800	9800	29400	9800		
CALEDONI	T8 GORE	TCTS	39	77	960	4	296450	29645	29645	29645					
CLARENDO	ST. STEP	TCTS	40	49	600	2	171500	17150							
CLARENDO	ST. JOHN	TCTS	41	21	480	9	58800	5880	5880	5880	5880	17640	5880	5880	5880
CLARENDO	P1 CLARE	TCTS	42	10	1800	8	21000	2100	2100	2100	2100	6300	2100	2100	
P1 CLARE	ST. JOHN	TCTS	43	11	1800	8	23100	2310	2310	2310	2310	6930	2310	2310	
T8 GORE	T7 NEWTO	TCTS	44	32	240	5	89600	8960	8960	8960	8960				
ST. JOHN	T6 AYLES	TCTS	45	65	600	5	227500	22750	22750	22750	22750				
T6 AYLES	T7 NEWTO	TCTS	46	24	240	5	67200	6720	6720	6720	6720				
CAMPBELL	C1 CAMPB	DUMM	47	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
CAMPBELL	T1 CAMPB	DUMM	48	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
GUITAR	C2 GUITA	DUMM	49	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
GUITAR	T2 GUITA	DUMM	50	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
BATHURST	C3 BATHU	DUMM	51	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
BATHURST	T3 BATHU	DUMM	52	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
NEWCASTL	C4 NEWCA	DUMM	53	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000

TABLE 4.15 Cont'd. TRANSMISSION LINKS COST FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL (NO.)		COST(S)									
NEWCASTL	T4 NEWCA	DUMM	S4	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
AYLESFOR	T6 AYLES	DUMM	S5	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
AYLESFOR	M1 AYLES	DUMM	S6	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
MILLVILL	M2 MILLV	DUMM	S7	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
MILLVILL	C9 MILLV	DUMM	S8	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
NEWTONVI	T7 NEWTO	DUMM	S9	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
NEWTONVI	M3 NEWTO	DUMM	60	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
BRIDGEWA	M5 BRIDG	DUMM	61	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
BRIDGEWA	C6 BRIDG	DUMM	62	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
GORE	M4 GORE	DUMM	63	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
GORE	T8 GORE	DUMM	64	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
DARTMOUT	C7 DARTM	DUMM	65	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
DARTMOUT	M6 DARTM	DUMM	66	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
SYDNEY	M7 SYDNE	DUMM	67	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
SYDNEY	C8 SYDNE	DUMM	68	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
GROSVENO	E2 GROSV	DUMM	69	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
GROSVENO	M8 GROSV	DUMM	70	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
MONCTON	C5 MONCT	DUMM	71	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000

TABLE 4.15 Cont'd. TRANSMISSION LINKS COST FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL (NO.)	COST(S)									
MONCTON	E1 MONCT	DUMM	72	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
MONCTON	T5 MONCT	DUMM	73	1	1800	10	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
C1 CAMPB	T1 CAMPB	SWCH	74	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
C2 GUITA	T2 GUITA	SWCH	75	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
C3 BATHU	T3 BATHU	SWCH	76	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
C4 NEWCA	T4 NEWCA	SWCH	77	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
M1 AYLES	T6 AYLES	SWCH	78	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
M2 MILLV	C9 MILLV	SWCH	79	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
M3 NEWTO	T7 NEWTO	SWCH	80	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
C6 BRIDG	M5 BRIDG	SWCH	81	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
T8 GORE	M4 GORE	SWCH	82	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
M6 DARTM	C7 DARTM	SWCH	83	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
M8 GROSV	E2 GROSV	SWCH	84	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
M7 SYDNE	C8 SYDNE	SWCH	85	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
T5 MONCT	E1 MONCT	SWCH	86	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
E1 MONCT	C5 MONCT	SWCH	87	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000
T5 MONCT	C5 MONCT	SWCH	88	10	1800	10	100000	100000	100000	100000	100000	100000	100000	100000	100000	100000

TABLE 4.15 Cont'd. TRANSMISSION LINKS COST FUNCTIONS

SWITCHING NODE COST DATA

NODE	INTERNAL NODE NUMBER	CARRIER	LINES/MACHINE (NO.)	COST($)									
ST. JOHN	20	SWIT	300	20	3000	800	800	800	800	800	800	800	800	800
					1800	800	800	800	800	800	800	800	800	800
HALIFAX	21	SWIT	300	20	3000	800	800	800	800	800	800	800	800	800
					1800	800	800	800	800	800	800	800	800	800
NEWCASTL	4	SWIT	300	20	3000	800	800	800	800	800	800	800	800	800
					1800	800	800	800	800	800	800	800	800	800
AMHERST	12	SWIT	300	20	3000	800	800	800	800	800	800	800	800	800
					1800	800	800	800	800	800	800	800	800	800

NOTE: Intermediary switching node AMHERST may be interpreted as follows:

There are twenty switching machines at AMHERST.
Each of the twenty switching machines has a capacity of 300 lines.
The first switching machine costs $ 3000.00
The next nine machines cost $ 800.00 each
The 11th switching machine costs $ 1800.00
The remaining nine machines cost $ 800.00 each

TABLE 4.16 SWITCHING NODES COST FUNCTIONS

4.3 MARITIMES NETWORK SOLUTION

Job steps CADUCE, CONTRA & SETUP generate output onto disc files.

Job step TRANCHE (MPSX Mixed Integer Linear Programming) generates large volumes of output data. It is not in the scope of this manual to describe the full MPSX output. In order to fully comprehend all the output data generated by MPSX, the user should become familiar with the IBM program product manual number 5734-XM4 entitled"Mathematical Programming System Extended (MPSX) Mixed Integer Programming (MIP) Program Description".

The addition of job step RESULTS has simplified the output interpretation of the MPSX package. At the present stage of development, manual intervention is required between job steps TRANCHE and RESULTS. The following tables contain the MPSX output required for coding job step results. Included in the tables are notes describing the interpretation of variables considered significant.

SECTION 1 - ROWS

	NUMBER	...ROW..	AT	...ACTIVITY...	SLACK ACTIVITY	..LOWER LIMIT.	..UPPER LIMIT.	.DUAL ACTIVITY
	1	COST1	BS	6148.00000	6148.00000-	NONE	NONE	1.00000
	2	SN001002	UL	•	•	NONE	•	.30633
A	3	SN001003	UL	•	•	NONE	•	•
	4	SN003004	BS	•	•	NONE	•	•
	5	SN002004	BS	•	•	NONE	•	•
A	6	SN002005	UL	•	•	NONE	•	•
A	7	SN006005	UL	•	•	NONE	•	•
A	8	SN006007	UL	•	•	NONE	•	•
A	9	SN007005	UL	•	•	NONE	•	•
A	10	SN004005	UL	•	•	NONE	•	•
A	11	SN008005	UL	•	•	NONE	•	•
A	12	SN008009	UL	•	•	NONE	•	•
A	13	SN009005	UL	•	•	NONE	•	•
A	14	SN009010	UL	•	•	NONE	•	•
A	15	SN005011	UL	•	•	NONE	•	•
A	16	SN005012	UL	•	•	NONE	•	•
A	17	SN005013	UL	•	•	NONE	•	•
A	18	SN010012	UL	•	•	NONE	•	•
A	19	SN010011	UL	•	•	NONE	•	•
A	20	SN010014	UL	•	•	NONE	•	•
A	21	SN010015	UL	•	•	NONE	•	•
A	22	SN007011	UL	•	•	NONE	•	•
A	23	SN013011	UL	•	•	NONE	•	•
A	24	SN013016	UL	•	•	NONE	•	•
A	25	SN013017	UL	•	•	NONE	•	•
A	26	SN017018	UL	•	•	NONE	•	•
A	27	SN018019	UL	•	•	NONE	•	•
A	28	SN019016	UL	•	•	NONE	•	•
A	29	SN020006	UL	•	•	NONE	•	•
A	30	SN020007	UL	•	•	NONE	•	•
A	31	SN020008	UL	•	•	NONE	•	•
A	32	SN020009	UL	•	•	NONE	•	•
A	33	SN020010	UL	•	•	NONE	•	•
A	34	SN020015	UL	•	•	NONE	•	•
A	35	SN020012	UL	•	•	NONE	•	•
A	36	SN020013	UL	•	•	NONE	•	•
A	37	SN020017	UL	•	•	NONE	•	•
A	38	SN020018	UL	•	•	NONE	•	•
A	39	SN005021	UL	•	•	NONE	•	•
A	40	SN004021	UL	•	•	NONE	•	•
A	41	SN002021	UL	•	•	NONE	•	•
A	42	SN020022	UL	•	•	NONE	•	•
A	43	SN020001	UL	•	•	NONE	•	•
A	44	SN020003	UL	•	•	NONE	•	•
A	45	SN020002	UL	•	•	NONE	•	•
A	46	SN020004	UL	•	•	NONE	•	•
A	47	SN020005	UL	•	•	NONE	•	•
A	48	SN020021	UL	•	•	NONE	•	•
A	49	SN006004	UL	•	•	NONE	•	•

COST1 ---- Total cost of transmission and switching $ 6,614,800.00

SN004005 ---- Identifies demand from switching network between internal node number 4 & 5. Refering to Table 4.4 page 21 it is seen that SN004005 identifies link of switching network joining nodes Newcastle to Moncton.

----Similarly SN013011 identifies switching network link Kentville to Truro.

TABLE 4.17 ROWS SECTION INTEGER SOLUTION

	NUMBER	...ROW..	AT	...ACTIVITY...	SLACK ACTIVITY	..LOWER LIMIT.	..UPPER LIMIT.	.DUAL ACTIVITY
A	50	SN007004	UL	.	.	NONE	.	.
A	51	SN008021	UL	.	.	NONE	.	.
A	52	SN009021	UL	.	.	NONE	.	.
A	53	SN010021	UL	.	.	NONE	.	.
A	54	SN019021	UL	.	.	NONE	.	.
A	55	SN016021	UL	.	.	NONE	.	.
A	56	SN018021	UL	.	.	NONE	.	.
A	57	SN017021	UL	.	.	NONE	.	.
A	58	SN013021	UL	.	.	NONE	.	.
A	59	SN012021	UL	.	.	NONE	.	.
A	60	SN011021	UL	.	.	NONE	.	.
A	61	SN015021	UL	.	.	NONE	.	.
A	62	SN014021	UL	.	.	NONE	.	.
A	63	SN023012	UL	.	.	NONE	.	.
	64	LN000001	BS	780.00000-	780.00000	NONE	.	.
	65	LN000002	BS	619.00000-	619.00000	NONE	.	.
	66	LN000003	BS	375.00000-	375.00000	NONE	.	.
	67	LN000004	BS	791.00000-	791.00000	NONE	.	.
	68	LN000005	BS	477.00000-	477.00000	NONE	.	.
	69	LN000006	BS	571.00000-	571.00000	NONE	.	.
	70	LN000007	BS	1003.00000-	1003.00000	NONE	.	.
	71	LN000008	BS	720.00000-	720.00000	NONE	.	.
	72	LN000009	BS	360.00000-	360.00000	NONE	.	.
	73	LN000010	UL	.	.	NONE	.	.23229
	74	LN000011	BS	418.00000-	418.00000	NONE	.	.
	75	LN000012	UL	.	.	NONE	.	.22333
	76	LN000013	BS	92.00000-	92.00000	NONE	.	.
	77	LN000014	BS	227.00000-	227.00000	NONE	.	.
	78	LN000015	BS	123.00000-	123.00000	NONE	.	.
	79	LN000016	BS	406.00000-	406.00000	NONE	.	.
	80	LN000017	BS	370.00000-	370.00000	NONE	.	.
	81	LN000019	BS	427.00000-	427.00000	NONE	.	.
	82	LN000020	UL	.	.	NONE	.	.38889
	83	LN000021	UL	.	.	NONE	.	.64111
	84	LN000022	UL	.	.	NONE	.	.43167
	85	LN000023	BS	1084.00000-	1084.00000	NONE	.	.
	86	LN000024	UL	.	.	NONE	.	1.33875
	87	LN000025	BS	822.00000-	822.00000	NONE	.	.
	88	LN000026	BS	1098.00000-	1098.00000	NONE	.	.
	89	LN000027	UL	.	.	NONE	.	.24583
A	90	LN000028	UL	.	.	NONE	.	.
	91	LN000029	UL	.	.	NONE	.	.15000
	92	LN000030	BS	752.00000-	752.00000	NONE	.	.
	93	LN000031	BS	925.00000-	925.00000	NONE	.	.
	94	LN000032	BS	554.00000-	554.00000	NONE	.	.
	95	LN000033	BS	811.00000-	811.00000	NONE	.	.
	96	LN000034	BS	427.00000-	427.00000	NONE	.	.
	97	LN000035	UL	.	.	NONE	.	.30833
	98	LN000036	UL	.	.	NONE	.	.17917
	99	LN000037	BS	80.00000-	80.00000	NONE	.	.
	100	LN000038	BS	245.00000-	245.00000	NONE	.	.

LN000001 ---- Identifies transmission facilities link number 1 (table 4.13 page 58 Summerside to Charlotteton). Activity 780. indicates that 780 voice circuits are **unused** for this solution and may be used at a future time at a minimal cost or at zero cost.

LN000024 --- Identifies transmission facilities link number 24 as being eliminated for this solution. Not in basis indicated by the absence of BS in column AT.

TABLE 4.17 Cont'd. ROWS SECTION INTEGER SOLUTION

	NUMBER	...ROW..	AT	...ACTIVITY...	SLACK ACTIVITY	..LOWER LIMIT.	..UPPER LIMIT.	.DUAL ACTIVITY	
	101	LN000039	UL	.	.	NONE	.	.30833	
	102	LN000040	BS	462.00000-	482.00000	NONE	.	.	
	103	LN000041	BS	71.00000-	71.00000	NONE	.	.	
	104	LN000042	UL	.	.	NONE	.	.02771	
	105	LN000043	UL	.	.	NONE	.	.02130	
A	106	LN000044	UL	.	.	NONE	.	.	
	107	LN000045	BS	26.00000-	26.00000	NONE	.	.	
	108	LN000046	BS	100.00000-	100.00000	NONE	.	.	
	109	LN000075	BS	1627.00000-	1627.00000	NONE	.	.	
	110	LN000076	UL	.	.	NONE	.	.55556	
	111	LN000077	UL	.	.	NONE	.	.55556	
	112	LN000078	BS	1412.00000-	1412.00000	NONE	.	.	
	113	LN000079	UL	.	.	NONE	.	.55556	
	114	LN000080	BS	1378.00000-	1378.00000	NONE	.	.	
	115	LN000081	BS	.	.	NONE	.	.	
	116	LN000082	BS	600.00000-	600.00000	NONE	.	.	
	117	LN000083	BS	1560.00000-	1560.00000	NONE	.	.	
	118	LN000084	BS	1210.00000-	1210.00000	NONE	.	.	
	119	LN000085	BS	.	.	NONE	.	.	
	120	LN000086	BS	1457.00000-	1457.00000	NONE	.	.	
	121	LN000087	BS	1684.00000-	1684.00000	NONE	.	.	
	122	LN000088	UL	.	.	NONE	.	.55556	P0000001
A	123	P0000001	EQ	1.00000	.	1.00000	1.00000	.	------Internal ordering constraint
A	124	P0000002	EQ	1.00000	.	1.00000	1.00000	.	of compatability of profiles
A	125	P0000021	EQ	1.00000	.	1.00000	1.00000	.	from switching network.
A	126	P0000022	EQ	1.00000	.	1.00000	1.00000	.	
A	127	P0000025	EQ	1.00000	.	1.00000	1.00000	.	
A	128	P0000026	EQ	1.00000	.	1.00000	1.00000	.	
A	129	P0000049	EQ	1.00000	.	1.00000	1.00000	.	
A	130	P0000050	EQ	1.00000	.	1.00000	1.00000	.	
A	131	P0000055	EQ	1.00000	.	1.00000	1.00000	.	
A	132	P0000056	EQ	1.00000	.	1.00000	1.00000	.	
A	133	P0000061	EQ	1.00000	.	1.00000	1.00000	.	
A	134	P0000062	EQ	1.00000	.	1.00000	1.00000	.	
A	135	P0000081	EQ	1.00000	.	1.00000	1.00000	.	
A	136	P0000082	EQ	1.00000	.	1.00000	1.00000	.	
A	137	P0000099	EQ	1.00000	.	1.00000	1.00000	.	
A	138	P0000100	EQ	1.00000	.	1.00000	1.00000	.	
A	139	P0000113	EQ	1.00000	.	1.00000	1.00000	.	
A	140	P0000114	EQ	1.00000	.	1.00000	1.00000	.	
A	141	P0000131	EQ	1.00000	.	1.00000	1.00000	.	
A	142	P0000132	EQ	1.00000	.	1.00000	1.00000	.	
A	143	P0000133	EQ	1.00000	.	1.00000	1.00000	.	
A	144	P0000134	EQ	1.00000	.	1.00000	1.00000	.	
A	145	P0000139	EQ	1.00000	.	1.00000	1.00000	.	
A	146	P0000140	EQ	1.00000	.	1.00000	1.00000	.	
A	147	P0000175	EQ	1.00000	.	1.00000	1.00000	.	
A	148	P0000176	EQ	1.00000	.	1.00000	1.00000	.	
A	149	P0000179	EQ	1.00000	.	1.00000	1.00000	.	
A	150	P0000180	EQ	1.00000	.	1.00000	1.00000	.	
A	151	P0000191	EQ	1.00000	.	1.00000	1.00000	.	

TABLE 4.17 Cont'd. ROWS SECTION INTEGER SOLUTION

	NUMBER	...ROW..	AT	...ACTIVITY...	SLACK ACTIVITY	..LOWER LIMIT.	..UPPER LIMIT.	.DUAL ACTIVITY
A	152	P0000192	EQ	1.00000	.	1.00000	1.00000	.
A	153	P0000207	EQ	1.00000	.	1.00000	1.00000	.
A	154	P0000208	EQ	1.00000	.	1.00000	1.00000	.
A	155	P0000233	EQ	1.00000	.	1.00000	1.00000	.
A	156	P0000234	EQ	1.00000	.	1.00000	1.00000	.
A	157	P0000243	EQ	1.00000	.	1.00000	1.00000	.
A	158	P0000244	EQ	1.00000	.	1.00000	1.00000	.
A	159	P0000263	EQ	1.00000	.	1.00000	1.00000	.
A	160	P0000264	EQ	1.00000	.	1.00000	1.00000	.
A	161	P0000271	EQ	1.00000	.	1.00000	1.00000	.
A	162	P0000272	EQ	1.00000	.	1.00000	1.00000	.
A	163	P0000273	EQ	1.00000	.	1.00000	1.00000	.
A	164	P0000274	EQ	1.00000	.	1.00000	1.00000	.
	165	P0000293	EQ	1.00000	.	1.00000	1.00000	2.15833-
	166	P0000294	EQ	1.00000	.	1.00000	1.00000	2.15833
A	167	P0000325	EQ	1.00000	.	1.00000	1.00000	.
A	168	P0000326	EQ	1.00000	.	1.00000	1.00000	.
A	169	P0000345	EQ	1.00000	.	1.00000	1.00000	.
A	170	P0000346	EQ	1.00000	.	1.00000	1.00000	.
A	171	P0000351	EQ	1.00000	.	1.00000	1.00000	.
A	172	P0000352	EQ	1.00000	.	1.00000	1.00000	.
A	173	P0000355	EQ	1.00000	.	1.00000	1.00000	.
A	174	P0000356	EQ	1.00000	.	1.00000	1.00000	.
A	175	P0000365	EQ	1.00000	.	1.00000	1.00000	.
A	176	P0000366	EQ	1.00000	.	1.00000	1.00000	.
A	177	P0000369	EQ	1.00000	.	1.00000	1.00000	.
A	178	P0000370	EQ	1.00000	.	1.00000	1.00000	.
A	179	P0000397	EQ	1.00000	.	1.00000	1.00000	.
A	180	P0000398	EQ	1.00000	.	1.00000	1.00000	.
A	181	P0000405	EQ	1.00000	.	1.00000	1.00000	.
A	182	P0000406	EQ	1.00000	.	1.00000	1.00000	.
A	183	P0000409	EQ	1.00000	.	1.00000	1.00000	.
A	184	P0000410	EQ	1.00000	.	1.00000	1.00000	.
A	185	P0000411	EQ	1.00000	.	1.00000	1.00000	.
A	186	P0000412	EQ	1.00000	.	1.00000	1.00000	.
A	187	P0000475	EQ	1.00000	.	1.00000	1.00000	.
A	188	P0000476	EQ	1.00000	.	1.00000	1.00000	.
	189	Q0000001	BS	.	.	NONE	.	.
A	190	Q0000002	UL	.	.	NONE	.	.
	191	Q0000003	BS	.	.	NONE	.	.
	192	Q0000004	BS	.	.	NONE	.	.
	193	Q0000005	BS	.	.	NONE	.	.
A	194	Q0000006	UL	.	.	NONE	.	.
	195	Q0000007	BS	.	.	NONE	.	.
	196	Q0000008	BS	.	.	NONE	.	.
	197	Q0000009	BS	.	.	NONE	.	.
	198	Q0000010	BS	.	.	NONE	.	.
	199	Q0000011	BS	.	.	NONE	.	.
	200	Q0000012	BS	.	.	NONE	.	.
	201	Q0000013	BS	.	.	NONE	.	.
	202	Q0000014	BS	.	.	NONE	.	.

Q0000001
---- Identifies ordering constraints for switching network profiles.

TABLE 4.17 Cont'd. ROWS SECTION INTEGER SOLUTION

	NUMBER	...ROW..	AT	...ACTIVITY...	SLACK ACTIVITY	..LOWER LIMIT.	..UPPER LIMIT.	.DUAL ACTIVITY
	203	Q0000015	BS	.	.	NONE	.	.
	204	Q0000016	BS	.	.	NONE	.	.
	205	Q0000017	BS	.	.	NONE	.	.
	206	Q0000018	BS	.	.	NONE	.	.
	207	Q0000019	BS	.	.	NONE	.	.
	208	Q0000020	BS	.	.	NONE	.	.
A	209	Q0000021	UL	.	.	NONE	.	.
	210	Q0000022	BS	.	.	NONE	.	.
	211	Q0000023	BS	.	.	NONE	.	.
	212	Q0000024	BS	.	.	NONE	.	.
	213	Q0000025	BS	.	.	NONE	.	.
	214	Q0000026	BS	.	.	NONE	.	.
	215	Q0000027	BS	.	.	NONE	.	.
	216	Q0000028	BS	.	.	NONE	.	.
A	217	Q0000029	UL	.	.	NONE	.	.
	218	Q0000030	BS	.	.	NONE	.	.
	219	Q0000031	BS	.	.	NONE	.	.
	220	Q0000032	BS	.	.	NONE	.	.
	221	Q0000033	BS	.	.	NONE	.	.
	222	Q0000034	BS	.	.	NONE	.	.
	223	Q0000035	BS	.	.	NONE	.	.
	224	Q0000036	BS	.	.	NONE	.	.
	225	Q0000037	BS	.	.	NONE	.	.
	226	Q0000038	BS	.	.	NONE	.	.
	227	Q0000039	BS	.	.	NONE	.	.
	228	Q0000040	BS	.	.	NONE	.	.
	229	Q0000041	BS	.	.	NONE	.	.
	230	Q0000042	BS	.	.	NONE	.	.
	231	Q0000043	BS	.	.	NONE	.	.
	232	Q0000044	BS	.	.	NONE	.	.
	233	Q0000045	BS	.	.	NONE	.	.
	234	Q0000046	BS	.	.	NONE	.	.
	235	Q0000047	BS	.	.	NONE	.	.
	236	Q0000048	BS	.	.	NONE	.	.
	237	Q0000049	BS	.	.	NONE	.	.
	238	Q0000050	BS	.	.	NONE	.	.
A	239	Q0000051	UL	.	.	NONE	.	.
A	240	Q0000052	UL	.	.	NONE	.	.
	241	Q0000053	BS	.	.	NONE	.	.
	242	Q0000054	BS	.	.	NONE	.	.
	243	Q0000055	BS	.	.	NONE	.	.
	244	Q0000056	BS	.	.	NONE	.	.
	245	Q0000057	BS	.	.	NONE	.	.
	246	Q0000058	BS	.	.	NONE	.	.
A	247	Q0000059	UL	.	.	NONE	.	.
A	248	Q0000060	UL	.	.	NONE	.	.
	249	Q0000061	BS	.	.	NONE	.	.
	250	Q0000062	BS	.	.	NONE	.	.
	251	Q0000063	BS	.	.	NONE	.	.
	252	Q0000064	BS	.	.	NONE	.	.
	253	Q0000065	BS	.	.	NONE	.	.

TABLE 4.17 Cont'd. ROWS SECTION INTEGER SOLUTION

	NUMBER	...ROW..	AT	...ACTIVITY...	SLACK ACTIVITY	..LOWER LIMIT.	..UPPER LIMIT.	.DUAL ACTIVITY
	254	Q0000066	BS	•	•	NONE	•	•
	255	Q0000067	BS	•	•	NONE	•	•
	256	Q0000068	BS	•	•	NONE	•	•
A	257	Q0000069	UL	•	•	NONE	•	•
	258	Q0000070	BS	1.00000-	1.00000	NONE	•	•
	259	Q0000071	BS	1.00000-	1.00000	NONE	•	•
	260	Q0000072	BS	1.00000-	1.00000	NONE	•	•
	261	Q0000073	BS	1.00000-	1.00000	NONE	•	•
A	262	Q0000074	UL	•	•	NONE	•	•
	263	Q0000075	BS	•	•	NONE	•	•
A	264	Q0000076	UL	•	•	NONE	•	•
	265	Q0000077	BS	•	•	NONE	•	•
	266	Q0000078	BS	•	•	NONE	•	•
	267	Q0000079	BS	•	•	NONE	•	•
	268	Q0000080	BS	•	•	NONE	•	•
	269	Q0000081	BS	•	•	NONE	•	•
	270	Q0000082	BS	•	•	NONE	•	•
	271	Q0000083	BS	•	•	NONE	•	•
	272	Q0000084	BS	•	•	NONE	•	•
	273	Q0000085	BS	•	•	NONE	•	•
	274	Q0000086	BS	•	•	NONE	•	•
	275	Q0000087	BS	1.00000-	1.00000	NONE	•	•
	276	Q0000088	BS	1.00000-	1.00000	NONE	•	•
	277	Q0000089	BS	1.00000-	1.00000	NONE	•	•
	278	Q0000090	BS	1.00000-	1.00000	NONE	•	•
	279	Q0000091	BS	•	•	NONE	•	•
	280	Q0000092	BS	•	•	NONE	•	•
	281	Q0000093	BS	•	•	NONE	•	•
A	282	Q0000094	UL	•	•	NONE	•	•
	283	Q0000095	BS	•	•	NONE	•	•
A	284	Q0000096	UL	•	•	NONE	•	•
A	285	Q0000097	UL	•	•	NONE	•	•
	286	Q0000098	BS	•	•	NONE	•	•
	287	Q0000099	BS	•	•	NONE	•	•
	288	Q0000100	BS	•	•	NONE	•	•
	289	Q0000101	BS	•	•	NONE	•	•
	290	Q0000102	BS	•	•	NONE	•	•
	291	Q0000103	BS	•	•	NONE	•	•
	292	Q0000104	BS	•	•	NONE	•	•
	293	Q0000105	BS	•	•	NONE	•	•
	294	Q0000106	BS	•	•	NONE	•	•
A	295	Q0000107	UL	•	•	NONE	•	•
	296	Q0000108	BS	•	•	NONE	•	•
	297	Q0000109	BS	•	•	NONE	•	•
	298	Q0000110	BS	•	•	NONE	•	•
	299	Q0000111	BS	•	•	NONE	•	•
	300	Q0000112	BS	•	•	NONE	•	•
	301	Q0000113	BS	•	•	NONE	•	•
	302	Q0000114	BS	•	•	NONE	•	•
	303	Q0000115	BS	•	•	NONE	•	•
	304	Q0000116	BS	•	•	NONE	•	•

TABLE 4.17 Cont'd. ROWS SECTION INTEGER SOLUTION

	NUMBER	...ROW..	AT	..ACTIVITY...	SLACK ACTIVITY	..LOWER LIMIT.	..UPPER LIMIT.	.DUAL ACTIVITY
A	305	Q0000117	UL	•	•	NONE	•	•
	306	Q0000118	BS	•	•	NONE	•	•
	307	Q0000119	BS	•	•	NONE	•	•
	308	Q0000120	BS	•	•	NONE	•	•
	309	Q0000121	BS	•	•	NONE	•	•
	310	Q0000122	BS	•	•	NONE	•	•
	311	Q0000123	BS	•	•	NONE	•	•
	312	Q0000124	BS	•	•	NONE	•	•
	313	Q0000125	BS	•	•	NONE	•	•
	314	Q0000126	BS	•	•	NONE	•	•
A	315	Q0000127	UL	•	•	NONE	•	•
	316	Q0000128	BS	1.00000-	1.00000	NONE	•	•
	317	Q0000129	BS	1.00000-	1.00000	NONE	•	•
	318	Q0000130	BS	•	•	NONE	•	•
	319	Q0000131	BS	•	•	NONE	•	•
	320	Q0000132	BS	•	•	NONE	•	•
	321	Q0000133	BS	•	•	NONE	•	•
	322	Q0000134	BS	•	•	NONE	•	•
A	323	Q0000135	UL	•	•	NONE	•	•
	324	Q0000136	BS	•	•	NONE	•	•
	325	Q0000137	BS	1.00000-	1.00000	NONE	•	•
	326	Q0000138	BS	1.00000-	1.00000	NONE	•	•
	327	Q0000139	BS	•	•	NONE	•	•
	328	Q0000140	BS	•	•	NONE	•	•
	329	Q0000141	BS	•	•	NONE	•	•
	330	Q0000142	BS	•	•	NONE	•	•
	331	Q0000143	BS	•	•	NONE	•	•
	332	Q0000144	BS	•	•	NONE	•	•
A	333	Q0000145	UL	•	•	NONE	•	•
	334	Q0000146	BS	•	•	NONE	•	•
A	335	Q0000147	UL	•	•	NONE	•	•
	336	Q0000148	BS	•	•	NONE	•	•
	337	Q0000149	BS	•	•	NONE	•	•
	338	Q0000150	BS	•	•	NONE	•	•
A	339	Q0000151	UL	•	•	NONE	•	•
	340	Q0000152	BS	•	•	NONE	•	•
A	341	Q0000153	UL	•	•	NONE	•	•
	342	Q0000154	BS	•	•	NONE	•	•
A	343	Q0000155	UL	•	•	NONE	•	•
	344	Q0000156	BS	•	•	NONE	•	•
A	345	Q0000157	UL	•	•	NONE	•	•
	346	Q0000158	BS	•	•	NONE	•	•
	347	Q0000159	UL	•	•	NONE	•	2.15833
	348	Q0000160	BS	•	•	NONE	•	•
	349	Q0000161	BS	•	•	NONE	•	•
	350	Q0000162	BS	•	•	NONE	•	•
	351	Q0000163	BS	•	•	NONE	•	•
	352	Q0000164	BS	•	•	NONE	•	•
A	353	Q0000165	UL	•	•	NONE	•	•
	354	Q0000166	BS	•	•	NONE	•	•
	355	Q0000167	BS	•	•	NONE	•	•

TABLE 4.17 Cont'd. ROWS SECTION INTEGER SOLUTION

	NUMBER	...ROW..	AT	...ACTIVITY...	SLACK ACTIVITY	..LOWER LIMIT.	..UPPER LIMIT.	.DUAL ACTIVITY
A	356	Q0000168	UL	•	•	NONE	•	•
	357	Q0000169	BS	•	•	NONE	•	•
	358	Q0000170	BS	•	•	NONE	•	•
A	359	Q0000171	UL	•	•	NONE	•	•
	360	Q0000172	BS	•	•	NONE	•	•
	361	Q0000173	BS	•	•	NONE	•	•
	362	Q0000174	BS	•	•	NONE	•	•
A	363	Q0000175	UL	•	•	NONE	•	•
	364	Q0000176	BS	•	•	NONE	•	•
	365	Q0000177	BS	•	•	NONE	•	•
	366	Q0000178	BS	•	•	NONE	•	•
	367	Q0000179	BS	•	•	NONE	•	•
	368	Q0000180	BS	•	•	NONE	•	•
A	369	Q0000181	UL	•	•	NONE	•	•
	370	Q0000182	BS	•	•	NONE	•	•
	371	SW000004	BS	285.80000-	285.80000	NONE	•	•
	372	SW000012	BS	285.60000-	285.60000	NONE	•	•
	373	SW000020	BS	194.80000-	194.80000	NONE	•	•
	374	SW000021	BS	203.80000-	203.80000	NONE	•	•
	375	Y0001001	BS	1.00000	1.00000-	•	NONE	•
	376	Y0001002	BS	1.00000	1.00000-	•	NONE	•
	377	Y0001003	BS	2.00000	2.00000-	•	NONE	•
	378	Y0001004	BS	1.00000	1.00000-	•	NONE	•
	379	Y0001005	BS	3.00000	3.00000-	•	NONE	•
	380	Y0001006	BS	2.00000	2.00000-	•	NONE	•
	381	Y0002006	BS	2.00000	2.00000-	•	NONE	•
	382	Y0001007	BS	3.00000	3.00000-	•	NONE	•
	383	Y0001008	BS	2.00000	2.00000-	•	NONE	•
	384	Y0001009	BS	1.00000	1.00000-	•	NONE	•
	385	Y0001010	BS	•	•	•	NONE	•
	386	Y0001011	BS	1.00000	1.00000-	•	NONE	•
	387	Y0001012	BS	•	•	•	NONE	•
	388	Y0001013	BS	1.00000	1.00000-	•	NONE	•
	389	Y0001014	BS	•	•	•	NONE	•
	390	Y0001015	BS	1.00000	1.00000-	•	NONE	•
	391	Y0001016	BS	1.00000	1.00000-	•	NONE	•
	392	Y0001017	BS	1.00000	1.00000-	•	NONE	•
	393	Y0001019	BS	2.00000	2.00000-	•	NONE	•
	394	Y0001020	LL	•	•	•	NONE	163.33333-
	395	Y0001021	LL	•	•	•	NONE	269.66667-
	396	Y0001022	BS	•	•	•	NONE	•
	397	Y0001023	BS	1.00000	1.00000-	•	NONE	•
	398	Y0001024	LL	•	•	•	NONE	1249.50000-
	399	Y0001025	BS	1.00000	1.00000-	•	NONE	•
	400	Y0001026	BS	2.00000	2.00000-	•	NONE	•
	401	Y0001027	LL	•	•	•	NONE	184.00000-
	402	Y0001028	BS	•	•	•	NONE	•
	403	Y0001029	BS	•	•	•	NONE	•
	404	Y0001030	BS	1.00000	1.00000-	•	NONE	•
	405	Y0001031	BS	1.00000	1.00000-	•	NONE	•
	406	Y0001032	BS	1.00000	1.00000-	•	NONE	•

SW000004
----- Identifies intermediary switching node 4 (Table 4.4 page 21 Newcastle) as being in the solution and having 285.8 lines of unused switching capacity.

Y0001011
------Identifies ordering constraints of transmission facilities link investments.

TABLE 4.17 Cont'd. ROWS SECTION INTEGER SOLUTION

NUMBER	...ROW..	AT	...ACTIVITY...	SLACK ACTIVITY	..LOWER LIMIT.	..UPPER LIMIT.	.DUAL ACTIVITY	
407	Y0001033	BS	3.00000	3.00000-	.	NONE	.	
408	Y0001034	BS	1.00000	1.00000-	.	NONE	.	
409	Y0001035	BS	.	.	.	NONE	.	
410	Y0001036	LL	.	.	.	NONE	111.00000-	
411	Y0001037	BS	1.00000	1.00000-	.	NONE	.	
412	Y0001038	BS	4.00000	4.00000-	.	NONE	.	
413	Y0002038	BS	.	.	.	NONE	.	
414	Y0003038	BS	.	.	.	NONE	.	
415	Y0001039	BS	.	.	.	NONE	.	
416	Y0001040	BS	1.00000	1.00000-	.	NONE	.	
417	Y0001041	BS	2.00000	2.00000-	.	NONE	.	
418	Y0002041	BS	2.00000	2.00000-	.	NONE	.	
419	Y0003041	BS	.	.	.	NONE	.	
420	Y0001042	LL	.	.	.	NONE	40.03125-	
421	Y0002042	LL	.	.	.	NONE	11.15625-	
422	Y0003042	LL	.	.	.	NONE	28.87500-	
423	Y0001043	LL	.	.	.	NONE	15.33333-	
424	Y0002043	BS	.	.	.	NONE	.	
425	Y0003043	LL	.	.	.	NONE	15.33333-	
426	Y0001044	BS	.	.	.	NONE	.	
427	Y0001045	BS	4.00000	4.00000-	.	NONE	.	
428	Y0001046	BS	1.00000	1.00000-	.	NONE	.	
429	Z0001004	BS	9.00000	9.00000-	.	NONE	.	
430	Z0002004	LL	.	.	.	NONE	8.00000-	
431	Z0003004	BS	.	.	.	NONE	.	
432	Z0001012	BS	9.00000	9.00000-	.	NONE	.	---------Identifies ordering const-
433	Z0002012	BS	.	.	.	NONE	.	raints of intermediary
434	Z0003012	BS	.	.	.	NONE	.	switching nodes investments.
435	Z0001020	BS	9.00000	9.00000-	.	NONE	.	
436	Z0002020	BS	.	.	.	NONE	.	
437	Z0003020	LL	.	.	.	NONE	2.00000-	
438	Z0001021	BS	9.00000	9.00000-	.	NONE	.	
439	Z0002021	BS	.	.	.	NONE	.	
440	Z0003021	LL	.	.	.	NONE	2.00000-	

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TABLE 4.17 Cont'd. ROWS SECTION INTEGER SOLUTION

SECTION 2 - COLUMNS

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	441	S0001001	BS	•	•	•	NONE	•
	442	S0002001	BS	6.00000	•	•	NONE	•
	443	S0002002	LL	•	•	•	NONE	.30833
	444	S0002003	LL	•	•	•	NONE	.79583
	445	S0002004	LL	•	•	•	NONE	.84484
A	446	S0003001	LL	•	•	•	NONE	•
	447	S0003002	LL	•	•	•	NONE	1.03000
	448	S0003003	LL	•	•	•	NONE	1.19667
	449	S0003004	LL	•	•	•	NONE	.30833
	450	S0003005	LL	•	•	•	NONE	1.29556
	451	S0003006	LL	•	•	•	NONE	.79583
	452	S0003007	LL	•	•	•	NONE	1.78306
	453	S0003008	LL	•	•	•	NONE	.84484
A	454	S0004001	LL	•	•	•	NONE	•
	455	S0004002	LL	•	•	•	NONE	.98722
	456	S0004003	LL	•	•	•	NONE	.30833
	457	S0004004	LL	•	•	•	NONE	1.33833
	458	S0004005	LL	•	•	•	NONE	1.50500
	459	S0004006	LL	•	•	•	NONE	.48750
	460	S0004007	LL	•	•	•	NONE	1.47472
	461	S0004008	LL	•	•	•	NONE	.53650
	462	S0004009	LL	•	•	•	NONE	1.52373
	463	S0004010	LL	•	•	•	NONE	2.79514
	464	S0004011	LL	•	•	•	NONE	1.77042
	465	S0004012	LL	•	•	•	NONE	1.89431
	466	S0004013	LL	•	•	•	NONE	2.00271
	467	S0004014	LL	•	•	•	NONE	2.84414
	468	S0004015	LL	•	•	•	NONE	1.81942
	469	S0004016	LL	•	•	•	NONE	1.94331
	470	S0004017	LL	•	•	•	NONE	2.05171
	471	S0004018	LL	•	•	•	NONE	.43167
	472	S0004019	LL	•	•	•	NONE	.48067
	473	S0004020	LL	•	•	•	NONE	1.77042
	474	S0004021	LL	•	•	•	NONE	1.81942
	475	S0005001	BS	12.00000	•	•	NONE	•
	476	S0005002	LL	•	•	•	NONE	.30833
	477	S0005003	LL	•	•	•	NONE	1.77000
	478	S0005004	LL	•	•	•	NONE	1.93667
	479	S0005005	LL	•	•	•	NONE	1.29556
	480	S0005006	LL	•	•	•	NONE	.48750
	481	S0005007	LL	•	•	•	NONE	1.89389
	482	S0005008	LL	•	•	•	NONE	.53650
	483	S0005009	LL	•	•	•	NONE	2.36347
	484	S0005010	LL	•	•	•	NONE	1.33875
	485	S0005011	LL	•	•	•	NONE	1.57104
	486	S0005012	LL	•	•	•	NONE	2.41248
	487	S0005013	LL	•	•	•	NONE	1.38775
A	488	S0005014	LL	•	•	•	NONE	•
	489	S0005015	LL	•	•	•	NONE	1.62005

S0002001 ----Identifies transmission facilities chain number 1 as being chosen in the solution for switching network link number 2. Also 6 voice circuits of traffic is transmitted along chain number 1.

S0005001 ----- Similarily this identifies chain number 1 as being chosen for 12 voice circuits of traffic for demand on switching network link number 5.

TABLE 4.18 COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	490	S0005016	LL	•	•	•	NONE	.04900
	491	S0006001	LL	•	•	•	NONE	1.46167
	492	S0006002	LL	•	•	•	NONE	.15000
	493	S0006003	LL	•	•	•	NONE	1.58556
	494	S0006004	LL	•	•	•	NONE	.94444
	495	S0006005	BS	6.00000	•	•	NONE	•
	496	S0006006	LL	•	•	•	NONE	1.61167
	497	S0006007	LL	•	•	•	NONE	1.77833
	498	S0006008	LL	•	•	•	NONE	1.13722
	499	S0006009	LL	•	•	•	NONE	.45833
	500	S0006010	LL	•	•	•	NONE	1.73556
	501	S0006011	LL	•	•	•	NONE	.30833
	502	S0007001	LL	•	•	•	NONE	.38889
	503	S0007002	LL	•	•	•	NONE	.15000
	504	S0008001	LL	•	•	•	NONE	1.07278
	505	S0008002	BS	8.00000	•	•	NONE	•
	506	S0008003	LL	•	•	•	NONE	1.19667
	507	S0008004	LL	•	•	•	NONE	.30833
	508	S0008005	LL	•	•	•	NONE	.79583
	509	S0008006	LL	•	•	•	NONE	.84484
	510	S0009001	LL	•	•	•	NONE	.43167
	511	S0009002	BS	19.00000	•	•	NONE	•
	512	S0009003	LL	•	•	•	NONE	.30833
	513	S0010001	LL	•	•	•	NONE	.48750
	514	S0010002	BS	6.00000	•	•	NONE	•
A	515	S0010003	LL	•	•	•	NONE	•
	516	S0010004	LL	•	•	•	NONE	1.33875
	517	S0010005	LL	•	•	•	NONE	.04900
	518	S0010006	LL	•	•	•	NONE	1.33875
	519	S0010007	LL	•	•	•	NONE	1.57104
	520	S0010008	LL	•	•	•	NONE	2.36347
	521	S0010009	LL	•	•	•	NONE	.30833
	522	S0010010	LL	•	•	•	NONE	1.77000
	523	S0010011	LL	•	•	•	NONE	1.93667
	524	S0010012	LL	•	•	•	NONE	1.29556
	525	S0010013	LL	•	•	•	NONE	.35734
	526	S0010014	LL	•	•	•	NONE	1.61900
	527	S0010015	LL	•	•	•	NONE	1.98567
	528	S0010016	LL	•	•	•	NONE	1.34456
	529	S0011001	BS	24.00000	•	•	NONE	•
	530	S0012001	LL	•	•	•	NONE	.48750
	531	S0012002	BS	6.00000	•	•	NONE	•
A	532	S0012003	LL	•	•	•	NONE	•
	533	S0012004	LL	•	•	•	NONE	1.33875
	534	S0012005	LL	•	•	•	NONE	.04900
	535	S0012006	LL	•	•	•	NONE	1.33875
	536	S0012007	LL	•	•	•	NONE	1.57104
	537	S0012008	LL	•	•	•	NONE	2.36347
	538	S0012009	LL	•	•	•	NONE	.30833
	539	S0012010	LL	•	•	•	NONE	1.77000
	540	S0012011	LL	•	•	•	NONE	1.93667

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	...ACTIVITY...	..INPUT COST..	..LOWER LIMIT.	..UPPER LIMIT.	•REDUCED COST.
	541	S0012012	LL	.	.	.	NONE	1.29556
	542	S0012013	LL	.	.	.	NONE	.35734
	543	S0012014	LL	.	.	.	NONE	1.81900
	544	S0012015	LL	.	.	.	NONE	1.98567
	545	S0012016	LL	.	.	.	NONE	1.34456
	546	S0013001	BS	5.00000	.	.	NONE	.
	547	S0014001	LL	.	.	.	NONE	.48750
	548	S0014002	BS	4.00000	.	.	NONE	.
A	549	S0014003	LL	.	.	.	NONE	.
	550	S0014004	LL	.	.	.	NONE	1.33875
	551	S0014005	LL	.	.	.	NONE	.04900
	552	S0014006	LL	.	.	.	NONE	1.33875
	553	S0014007	LL	.	.	.	NONE	1.57104
	554	S0014008	LL	.	.	.	NONE	2.36347
	555	S0014009	LL	.	.	.	NONE	.30833
	556	S0014010	LL	.	.	.	NONE	1.77000
	557	S0014011	LL	.	.	.	NONE	1.93667
	558	S0014012	LL	.	.	.	NONE	1.29556
	559	S0014013	LL	.	.	.	NONE	.35734
	560	S0014014	LL	.	.	.	NONE	1.81900
	561	S0014015	LL	.	.	.	NONE	1.98567
	562	S0014016	LL	.	.	.	NONE	1.34456
	563	S0015001	BS	16.00000	.	.	NONE	.
	564	S0016001	LL	.	.	.	NONE	.48750
	565	S0016002	LL	.	.	.	NONE	1.33875
A	566	S0016003	LL	.	.	.	NONE	.
	567	S0016004	LL	.	.	.	NONE	1.57104
	568	S0016005	LL	.	.	.	NONE	.04900
	569	S0016006	BS	4.00000	.	.	NONE	.
A	570	S0016007	LL	.	.	.	NONE	.
	571	S0016008	LL	.	.	.	NONE	.23229
	572	S0016009	LL	.	.	.	NONE	.30833
	573	S0016010	LL	.	.	.	NONE	1.77000
	574	S0016011	LL	.	.	.	NONE	1.93667
	575	S0016012	LL	.	.	.	NONE	1.29556
	576	S0016013	LL	.	.	.	NONE	.35734
	577	S0016014	LL	.	.	.	NONE	1.81900
	578	S0016015	LL	.	.	.	NONE	1.98567
	579	S0016016	LL	.	.	.	NONE	1.34456
	580	S0016017	LL	.	.	.	NONE	1.89389
	581	S0016018	LL	.	.	.	NONE	1.94269
	582	S0017001	BS	8.00000	.	.	NONE	.
	583	S0017002	LL	.	.	.	NONE	.48750
	584	S0017003	LL	.	.	.	NONE	1.33875
A	585	S0017004	LL	.	.	.	NONE	.
	586	S0017005	LL	.	.	.	NONE	.04900
	587	S0017006	LL	.	.	.	NONE	1.33875
	588	S0017007	LL	.	.	.	NONE	1.57104
	589	S0017008	LL	.	.	.	NONE	2.36347
	590	S0017009	LL	.	.	.	NONE	.30833
	591	S0017010	LL	.	.	.	NONE	1.77000

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	592	S0017011	LL	•	•	•	NONE	1.93667
	593	S0017012	LL	•	•	•	NONE	1.29556
	594	S0017013	LL	•	•	•	NONE	.35734
	595	S0017014	LL	•	•	•	NONE	1.81900
	596	S0017015	LL	•	•	•	NONE	1.98567
	597	S0017016	LL	•	•	•	NONE	1.34456
	598	S0018001	BS	12.00000	•	•	NONE	•
	599	S0019001	BS	•	•	•	NONE	•
	600	S0019002	LL	•	•	•	NONE	1.33875
	601	S0019003	LL	•	•	•	NONE	2.38181
	602	S0019004	BS	•	•	•	NONE	•
	603	S0019005	LL	•	•	•	NONE	.23229
	604	S0019006	LL	•	•	•	NONE	1.02472
	605	S0019007	LL	•	•	•	NONE	1.89431
	606	S0019008	LL	•	•	•	NONE	1.94331
	607	S0019009	LL	•	•	•	NONE	.48750
	608	S0019010	LL	•	•	•	NONE	1.51222
	609	S0019011	LL	•	•	•	NONE	.71979
	610	S0019012	LL	•	•	•	NONE	1.02472
A	611	S0019013	LL	•	•	•	NONE	•
	612	S0019014	LL	•	•	•	NONE	1.56123
	613	S0019015	LL	•	•	•	NONE	1.51222
	614	S0019016	LL	•	•	•	NONE	.23229
	615	S0019017	LL	•	•	•	NONE	1.07373
	616	S0019018	LL	•	•	•	NONE	.04900
	617	S0019019	LL	•	•	•	NONE	.28130
	618	S0019020	LL	•	•	•	NONE	3.10675
	619	S0019021	LL	•	•	•	NONE	3.27542
	620	S0019022	LL	•	•	•	NONE	2.63431
	621	S0019023	LL	•	•	•	NONE	2.20264
	622	S0019024	LL	•	•	•	NONE	3.15775
	623	S0019025	LL	•	•	•	NONE	3.32442
	624	S0019026	LL	•	•	•	NONE	2.68331
	625	S0019027	LL	•	•	•	NONE	2.25164
	626	S0020001	BS	13.00000	•	•	NONE	•
	627	S0020002	LL	•	•	•	NONE	2.38181
A	628	S0020003	LL	•	•	•	NONE	•
	629	S0020004	LL	•	•	•	NONE	.23229
	630	S0020005	LL	•	•	•	NONE	1.02472
	631	S0020006	LL	•	•	•	NONE	1.89431
	632	S0020007	LL	•	•	•	NONE	1.94331
	633	S0021001	LL	•	•	•	NONE	.48750
	634	S0021002	LL	•	•	•	NONE	2.11583
	635	S0021003	LL	•	•	•	NONE	1.68417
	636	S0021004	LL	•	•	•	NONE	1.07276
	637	S0021005	BS	4.00000	•	•	NONE	•
	638	S0021006	LL	•	•	•	NONE	1.19667
A	639	S0021007	LL	•	•	•	NONE	•
	640	S0021008	LL	•	•	•	NONE	2.41153
	641	S0021009	LL	•	•	•	NONE	1.62833
	642	S0021010	LL	•	•	•	NONE	1.19667

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	COLUMN.	AT	...ACTIVITY...	..INPUT COST..	..LOWER LIMIT.	..UPPER LIMIT.	.REDUCED COST.
	643	S0021011	LL	.	.	.	NONE	.79583
	644	S0021012	LL	.	.	.	NONE	.04900
	645	S0021013	LL	.	.	.	NONE	2.41153
	646	S0021014	LL	.	.	.	NONE	1.67734
	647	S0021015	LL	.	.	.	NONE	1.24567
	648	S0021016	LL	.	.	.	NONE	.30833
	649	S0021017	LL	.	.	.	NONE	1.89431
	650	S0021018	LL	.	.	.	NONE	2.64382
	651	S0021019	LL	.	.	.	NONE	.30833
	652	S0021020	LL	.	.	.	NONE	.35734
	653	S0021021	LL	.	.	.	NONE	3.43625
	654	S0021022	LL	.	.	.	NONE	2.20264
	655	S0022001	BS	6.00000	.	.	NONE	.
A	656	S0022002	LL	.	.	.	NONE	.
	657	S0023001	LL	.	.	.	NONE	.23229
A	658	S0023002	LL	.	.	.	NONE	.
	659	S0023003	LL	.	.	.	NONE	2.38181
	660	S0024001	BS	10.00000	.	.	NONE	.
	661	S0024002	LL	.	.	.	NONE	1.25701
	662	S0024003	LL	.	.	.	NONE	1.02472
	663	S0025001	BS	6.00000	.	.	NONE	.
	664	S0026001	BS	8.00000	.	.	NONE	.
	665	S0027001	LL	.	.	.	NONE	1.02472
	666	S0027002	LL	.	.	.	NONE	.23229
	667	S0027003	BS	4.00000	.	.	NONE	.
	668	S0027004	LL	.	.	.	NONE	1.89431
	669	S0027005	LL	.	.	.	NONE	1.94331
	670	S0027006	LL	.	.	.	NONE	2.38181
	671	S0027007	LL	.	.	.	NONE	3.10875
	672	S0027008	LL	.	.	.	NONE	3.27542
	673	S0027009	LL	.	.	.	NONE	2.63431
	674	S0027010	LL	.	.	.	NONE	3.15775
	675	S0027011	LL	.	.	.	NONE	3.32442
	676	S0027012	LL	.	.	.	NONE	2.68331
	677	S0028001	LL	.	.	.	NONE	.45833
	678	S0028002	LL	.	.	.	NONE	.15000
	679	S0028003	LL	.	.	.	NONE	.30833
	680	S0028004	LL	.	.	.	NONE	2.01722
	681	S0028005	LL	.	.	.	NONE	1.58556
	682	S0028006	LL	.	.	.	NONE	.94444
	683	S0028007	BS	55.00000	.	.	NONE	.
	684	S0028008	LL	.	.	.	NONE	.50734
	685	S0028009	LL	.	.	.	NONE	.19900
	686	S0028010	LL	.	.	.	NONE	2.16722
	687	S0028011	LL	.	.	.	NONE	2.33389
	688	S0028012	LL	.	.	.	NONE	1.69278
	689	S0028013	LL	.	.	.	NONE	1.73556
	690	S0028014	LL	.	.	.	NONE	.35734
	691	S0028015	LL	.	.	.	NONE	2.06623
	692	S0028016	LL	.	.	.	NONE	1.63456
	693	S0028017	LL	.	.	.	NONE	.99345

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
694	S0028018	LL	•	•	•	NONE	.04900
695	S0028019	LL	•	•	•	NONE	2.21623
696	S0028020	LL	•	•	•	NONE	2.38289
697	S0028021	LL	•	•	•	NONE	1.74178
698	S0028022	LL	•	•	•	NONE	1.78456
699	S0028023	LL	•	•	•	NONE	.63750
700	S0028024	LL	•	•	•	NONE	2.50472
701	S0028025	LL	•	•	•	NONE	2.07306
702	S0028026	LL	•	•	•	NONE	1.43194
703	S0028027	LL	•	•	•	NONE	.48750
704	S0028028	LL	•	•	•	NONE	2.65472
705	S0028029	LL	•	•	•	NONE	2.82139
706	S0028030	LL	•	•	•	NONE	2.18028
707	S0028031	LL	•	•	•	NONE	2.22306
708	S0028032	LL	•	•	•	NONE	3.82514
709	S0028033	LL	•	•	•	NONE	2.80042
710	S0028034	LL	•	•	•	NONE	3.97514
711	S0028035	LL	•	•	•	NONE	4.14181
712	S0028036	LL	•	•	•	NONE	3.50069
713	S0028037	LL	•	•	•	NONE	3.06903
714	S0028038	LL	•	•	•	NONE	2.95042
715	S0028039	LL	•	•	•	NONE	3.11708
716	S0028040	LL	•	•	•	NONE	2.47597
717	S0028041	LL	•	•	•	NONE	2.04431
718	S0028042	LL	•	•	•	NONE	3.03271
719	S0028043	LL	•	•	•	NONE	3.86347
720	S0028044	LL	•	•	•	NONE	2.91903
721	S0028045	LL	•	•	•	NONE	2.83875
722	S0028046	LL	•	•	•	NONE	1.89431
723	S0028047	LL	•	•	•	NONE	3.18271
724	S0028048	LL	•	•	•	NONE	3.34937
725	S0028049	LL	•	•	•	NONE	2.70826
726	S0028050	LL	•	•	•	NONE	2.27660
727	S0028051	LL	•	•	•	NONE	3.07104
728	S0028052	LL	•	•	•	NONE	2.12660
729	S0028053	LL	•	•	•	NONE	1.46167
730	S0028054	LL	•	•	•	NONE	1.61167
731	S0028055	LL	•	•	•	NONE	1.77833
732	S0028056	LL	•	•	•	NONE	1.13722
733	S0028057	LL	•	•	•	NONE	2.80042
734	S0028058	LL	•	•	•	NONE	2.95042
735	S0028059	LL	•	•	•	NONE	3.11708
736	S0028060	LL	•	•	•	NONE	2.47597
737	S0029001	BS	65.00000	•	•	NONE	•
738	S0029002	LL	•	•	•	NONE	1.62833
739	S0029003	LL	•	•	•	NONE	1.19667
740	S0029004	LL	•	•	•	NONE	.04900
741	S0029005	LL	•	•	•	NONE	.30833
742	S0029006	LL	•	•	•	NONE	1.67734
743	S0029007	LL	•	•	•	NONE	1.24567
744	S0029008	LL	•	•	•	NONE	.35734

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	745	S0029009	LL	•	•	•	NONE	.48750
	746	S0029010	LL	•	•	•	NONE	2.11583
	747	S0029011	LL	•	•	•	NONE	1.68417
	748	S0029012	LL	•	•	•	NONE	3.43625
	749	S0029013	LL	•	•	•	NONE	2.41153
	750	S0029014	LL	•	•	•	NONE	2.91903
	751	S0029015	LL	•	•	•	NONE	1.89431
	752	S0029016	LL	•	•	•	NONE	2.64382
	753	S0029017	LL	•	•	•	NONE	2.12660
	754	S0029018	LL	•	•	•	NONE	1.07278
	755	S0029019	LL	•	•	•	NONE	2.41153
A	756	S0030001	LL	•	•	•	NONE	•
	757	S0030002	LL	•	•	•	NONE	.48750
	758	S0030003	LL	•	•	•	NONE	.53650
	759	S0030004	BS	30.00000	•	•	NONE	•
	760	S0030005	LL	•	•	•	NONE	.04900
	761	S0030006	LL	•	•	•	NONE	1.89431
	762	S0030007	LL	•	•	•	NONE	.79583
	763	S0030008	LL	•	•	•	NONE	1.94331
	764	S0030009	LL	•	•	•	NONE	.84484
	765	S0030010	LL	•	•	•	NONE	2.81306
	766	S0030011	LL	•	•	•	NONE	2.38139
	767	S0030012	LL	•	•	•	NONE	2.97972
	768	S0030013	LL	•	•	•	NONE	2.33861
	769	S0030014	LL	•	•	•	NONE	.30833
	770	S0030015	LL	•	•	•	NONE	1.77000
	771	S0030016	LL	•	•	•	NONE	1.93667
	772	S0030017	LL	•	•	•	NONE	1.29556
	773	S0030018	LL	•	•	•	NONE	2.86206
	774	S0030019	LL	•	•	•	NONE	2.43039
	775	S0030020	LL	•	•	•	NONE	3.02873
	776	S0030021	LL	•	•	•	NONE	2.38762
	777	S0030022	LL	•	•	•	NONE	.35734
	778	S0030023	LL	•	•	•	NONE	1.81900
	779	S0030024	LL	•	•	•	NONE	1.98567
	780	S0030025	LL	•	•	•	NONE	1.34456
	781	S0030026	LL	•	•	•	NONE	3.10875
	782	S0030027	LL	•	•	•	NONE	3.27542
	783	S0030028	LL	•	•	•	NONE	2.63431
	784	S0030029	LL	•	•	•	NONE	2.20264
	785	S0030030	LL	•	•	•	NONE	3.15775
	786	S0030031	LL	•	•	•	NONE	3.32442
	787	S0030032	LL	•	•	•	NONE	2.68331
	788	S0030033	LL	•	•	•	NONE	2.25164
A	789	S0031001	LL	•	•	•	NONE	•
	790	S0031002	LL	•	•	•	NONE	.48750
	791	S0031003	LL	•	•	•	NONE	.53650
	792	S0031004	BS	38.00000	•	•	NONE	•
	793	S0031005	LL	•	•	•	NONE	.04900
	794	S0031006	LL	•	•	•	NONE	1.89431
	795	S0031007	LL	•	•	•	NONE	.79583

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	796	S0031008	LL	•	•	•	NONE	1.94331
	797	S0031009	LL	•	•	•	NONE	.84484
	798	S0031010	LL	•	•	•	NONE	2.81306
	799	S0031011	LL	•	•	•	NONE	2.38139
	800	S0031012	LL	•	•	•	NONE	2.97972
	801	S0031013	LL	•	•	•	NONE	2.33861
	802	S0031014	LL	•	•	•	NONE	.30833
	803	S0031015	LL	•	•	•	NONE	1.77000
	804	S0031016	LL	•	•	•	NONE	1.93667
	805	S0031017	LL	•	•	•	NONE	1.29556
	806	S0031018	LL	•	•	•	NONE	2.86206
	807	S0031019	LL	•	•	•	NONE	2.43039
	808	S0031020	LL	•	•	•	NONE	3.02873
	809	S0031021	LL	•	•	•	NONE	2.38762
	810	S0031022	LL	•	•	•	NONE	.35734
	811	S0031023	LL	•	•	•	NONE	1.81900
	812	S0031024	LL	•	•	•	NONE	1.98567
	813	S0031025	LL	•	•	•	NONE	1.34456
	814	S0031026	LL	•	•	•	NONE	3.10875
	815	S0031027	LL	•	•	•	NONE	3.27542
	816	S0031028	LL	•	•	•	NONE	2.63431
	817	S0031029	LL	•	•	•	NONE	2.20264
	818	S0031030	LL	•	•	•	NONE	3.15775
	819	S0031031	LL	•	•	•	NONE	3.32442
	820	S0031032	LL	•	•	•	NONE	2.68331
	821	S0031033	LL	•	•	•	NONE	2.25164
A	822	S0032001	LL	•	•	•	NONE	•
	823	S0032002	BS	39.00000	•	•	NONE	•
	824	S0032003	LL	•	•	•	NONE	.48750
	825	S0032004	LL	•	•	•	NONE	.04900
	826	S0032005	LL	•	•	•	NONE	.53650
	827	S0032006	LL	•	•	•	NONE	1.89431
	828	S0032007	LL	•	•	•	NONE	.48750
	829	S0032008	LL	•	•	•	NONE	1.94331
	830	S0032009	LL	•	•	•	NONE	1.02472
A	831	S0032010	LL	•	•	•	NONE	•
	832	S0032011	LL	•	•	•	NONE	.30833
	833	S0032012	LL	•	•	•	NONE	.79583
	834	S0032013	LL	•	•	•	NONE	1.77000
	835	S0032014	LL	•	•	•	NONE	1.93667
	836	S0032015	LL	•	•	•	NONE	1.29556
	837	S0032016	LL	•	•	•	NONE	.35734
	838	S0032017	LL	•	•	•	NONE	.84484
	839	S0032018	LL	•	•	•	NONE	2.81306
	840	S0032019	LL	•	•	•	NONE	1.89389
	841	S0032020	LL	•	•	•	NONE	2.38139
	842	S0032021	LL	•	•	•	NONE	2.97972
	843	S0032022	LL	•	•	•	NONE	2.33861
	844	S0032023	LL	•	•	•	NONE	1.81900
	845	S0032024	LL	•	•	•	NONE	1.98567
	846	S0032025	LL	•	•	•	NONE	1.34456

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	847	S0032026	LL	•	•	•	NONE	3.10875
	848	S0032027	LL	•	•	•	NONE	3.27542
	849	S0032028	LL	•	•	•	NONE	2.63431
	850	S0032029	LL	•	•	•	NONE	2.20264
	851	S0032030	LL	•	•	•	NONE	2.86206
	852	S0032031	LL	•	•	•	NONE	1.94289
	853	S0032032	LL	•	•	•	NONE	2.43039
	854	S0032033	LL	•	•	•	NONE	3.02873
	855	S0032034	LL	•	•	•	NONE	2.38762
	856	S0032035	LL	•	•	•	NONE	3.15775
	857	S0032036	LL	•	•	•	NONE	3.32442
	858	S0032037	LL	•	•	•	NONE	2.68331
	859	S0032038	LL	•	•	•	NONE	2.25164
	860	S0033001	BS	32.00000	•	•	NONE	•
	861	S0033002	LL	•	•	•	NONE	1.89431
	862	S0033003	LL	•	•	•	NONE	.04900
	863	S0033004	LL	•	•	•	NONE	1.94331
	864	S0033005	LL	•	•	•	NONE	1.02472
A	865	S0033006	LL	•	•	•	NONE	•
A	866	S0033007	LL	•	•	•	NONE	•
	867	S0033008	LL	•	•	•	NONE	.48750
	868	S0033009	LL	•	•	•	NONE	.23229
	869	S0033010	LL	•	•	•	NONE	.53650
	870	S0033011	LL	•	•	•	NONE	.48750
	871	S0033012	LL	•	•	•	NONE	2.38181
	872	S0033013	LL	•	•	•	NONE	.48750
	873	S0033014	LL	•	•	•	NONE	.71979
	874	S0033015	LL	•	•	•	NONE	.53650
	875	S0033016	LL	•	•	•	NONE	3.10875
	876	S0033017	LL	•	•	•	NONE	3.27542
	877	S0033018	LL	•	•	•	NONE	2.63431
	878	S0033019	LL	•	•	•	NONE	.30833
	879	S0033020	LL	•	•	•	NONE	2.20264
	880	S0033021	LL	•	•	•	NONE	1.51222
	881	S0033022	LL	•	•	•	NONE	.76880
	882	S0033023	LL	•	•	•	NONE	2.36347
	883	S0033024	LL	•	•	•	NONE	1.33875
	884	S0033025	LL	•	•	•	NONE	1.77000
	885	S0033026	LL	•	•	•	NONE	1.93667
	886	S0033027	LL	•	•	•	NONE	1.29556
	887	S0033028	LL	•	•	•	NONE	3.15775
	888	S0033029	LL	•	•	•	NONE	3.32442
	889	S0033030	LL	•	•	•	NONE	2.68331
	890	S0033031	LL	•	•	•	NONE	.35734
	891	S0033032	LL	•	•	•	NONE	2.25164
	892	S0033033	LL	•	•	•	NONE	1.56123
	893	S0033034	LL	•	•	•	NONE	1.57104
	894	S0033035	LL	•	•	•	NONE	1.89389
	895	S0033036	LL	•	•	•	NONE	.79583
	896	S0033037	LL	•	•	•	NONE	1.81900
	897	S0033038	LL	•	•	•	NONE	1.98567

TABLE 4.18 COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	898	S0033039	LL	.	.	.	NONE	1.34456
	899	S0033040	LL	.	.	.	NONE	1.94289
	900	S0033041	LL	.	.	.	NONE	.84484
	901	S0033042	LL	.	.	.	NONE	2.81306
	902	S0033043	LL	.	.	.	NONE	2.38139
	903	S0033044	LL	.	.	.	NONE	2.97972
	904	S0033045	LL	.	.	.	NONE	2.33861
	905	S0033046	LL	.	.	.	NONE	.79583
	906	S0033047	LL	.	.	.	NONE	1.02612
	907	S0033048	LL	.	.	.	NONE	2.86206
	908	S0033049	LL	.	.	.	NONE	2.43039
	909	S0033050	LL	.	.	.	NONE	3.02873
	910	S0033051	LL	.	.	.	NONE	2.38762
	911	S0033052	LL	.	.	.	NONE	.84484
	912	S0033053	LL	.	.	.	NONE	1.82056
	913	S0033054	LL	.	.	.	NONE	1.07713
	914	S0033055	LL	.	.	.	NONE	1.86956
	915	S0034001	BS	54.00000	.	.	NONE	.
	916	S0034002	LL	.	.	.	NONE	.04900
	917	S0034003	LL	.	.	.	NONE	.48750
A	918	S0034004	LL	.	.	.	NONE	.
	919	S0034005	LL	.	.	.	NONE	.30833
	920	S0034006	LL	.	.	.	NONE	2.36347
	921	S0034007	LL	.	.	.	NONE	1.33875
	922	S0034008	LL	.	.	.	NONE	1.77000
	923	S0034009	LL	.	.	.	NONE	1.93667
	924	S0034010	LL	.	.	.	NONE	1.29556
	925	S0034011	LL	.	.	.	NONE	.35734
	926	S0034012	LL	.	.	.	NONE	1.57104
	927	S0034013	LL	.	.	.	NONE	1.89389
	928	S0034014	LL	.	.	.	NONE	1.81900
	929	S0034015	LL	.	.	.	NONE	1.98567
	930	S0034016	LL	.	.	.	NONE	1.34456
	931	S0034017	LL	.	.	.	NONE	1.02472
A	932	S0034018	LL	.	.	.	NONE	.
	933	S0034019	LL	.	.	.	NONE	1.94289
	934	S0034020	LL	.	.	.	NONE	.23229
	935	S0035001	BS	27.00000	.	.	NONE	.
	936	S0035002	LL	.	.	.	NONE	.48750
	937	S0035003	LL	.	.	.	NONE	.53650
	938	S0035004	LL	.	.	.	NONE	1.89431
	939	S0035005	LL	.	.	.	NONE	2.12660
	940	S0035006	LL	.	.	.	NONE	1.94331
	941	S0035007	LL	.	.	.	NONE	2.17560
	942	S0035008	LL	.	.	.	NONE	.79583
	943	S0035009	LL	.	.	.	NONE	.84484
	944	S0036001	BS	26.00000	.	.	NONE	.
	945	S0036002	LL	.	.	.	NONE	.48750
	946	S0036003	LL	.	.	.	NONE	.53650
	947	S0036004	LL	.	.	.	NONE	.79583
	948	S0036005	LL	.	.	.	NONE	.84484

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	949	S0037001	BS	25.00000	•	•	NONE	•
	950	S0037002	LL	•	•	•	NONE	.48750
	951	S0037003	LL	•	•	•	NONE	.53650
	952	S0037004	LL	•	•	•	NONE	.79583
	953	S0037005	LL	•	•	•	NONE	.84484
	954	S0038001	LL	•	•	•	NONE	.48750
	955	S0038002	BS	59.00000	•	•	NONE	•
A	956	S0038003	LL	•	•	•	NONE	•
	957	S0038004	LL	•	•	•	NONE	.04900
	958	S0038005	LL	•	•	•	NONE	1.33875
	959	S0038006	LL	•	•	•	NONE	1.33875
	960	S0038007	LL	•	•	•	NONE	1.57104
	961	S0038008	LL	•	•	•	NONE	2.36347
	962	S0038009	LL	•	•	•	NONE	.30833
	963	S0038010	LL	•	•	•	NONE	1.77000
	964	S0038011	LL	•	•	•	NONE	1.93667
	965	S0038012	LL	•	•	•	NONE	1.29556
	966	S0038013	LL	•	•	•	NONE	.35734
	967	S0038014	LL	•	•	•	NONE	1.81900
	968	S0038015	LL	•	•	•	NONE	1.98567
	969	S0038016	LL	•	•	•	NONE	1.34456
	970	S0039001	LL	•	•	•	NONE	.48750
	971	S0039002	LL	•	•	•	NONE	1.47472
A	972	S0039003	LL	•	•	•	NONE	•
	973	S0039004	LL	•	•	•	NONE	.43167
	974	S0039005	LL	•	•	•	NONE	.98722
	975	S0039006	BS	92.00000	•	•	NONE	•
	976	S0039007	LL	•	•	•	NONE	.04900
	977	S0039008	LL	•	•	•	NONE	1.77042
	978	S0039009	LL	•	•	•	NONE	1.03623
	979	S0039010	LL	•	•	•	NONE	1.77042
	980	S0039011	LL	•	•	•	NONE	2.00271
	981	S0039012	LL	•	•	•	NONE	.79583
	982	S0039013	LL	•	•	•	NONE	1.82583
	983	S0039014	LL	•	•	•	NONE	1.99250
	984	S0039015	LL	•	•	•	NONE	2.79514
	985	S0039016	LL	•	•	•	NONE	.30833
	986	S0039017	LL	•	•	•	NONE	1.89431
	987	S0039018	LL	•	•	•	NONE	1.33833
	988	S0039019	LL	•	•	•	NONE	1.50500
	989	S0039020	LL	•	•	•	NONE	.35734
	990	S0039021	LL	•	•	•	NONE	1.38734
	991	S0039022	LL	•	•	•	NONE	1.55400
	992	S0039023	LL	•	•	•	NONE	.30833
	993	S0040001	LL	•	•	•	NONE	.48750
A	994	S0040002	LL	•	•	•	NONE	•
	995	S0040003	LL	•	•	•	NONE	.04900
	996	S0040004	LL	•	•	•	NONE	.79583
	997	S0040005	BS	40.00000	•	•	NONE	•
	998	S0040006	LL	•	•	•	NONE	2.61306
	999	S0040007	LL	•	•	•	NONE	2.58139

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
1000	S0040008	LL	•	•	•	NONE	2.97972
1001	S0040009	LL	•	•	•	NONE	2.33861
1002	S0040010	LL	•	•	•	NONE	1.89431
1003	S0040011	LL	•	•	•	NONE	.30833
1004	S0040012	LL	•	•	•	NONE	1.77000
1005	S0040013	LL	•	•	•	NONE	1.93667
1006	S0040014	LL	•	•	•	NONE	1.29556
1007	S0040015	LL	•	•	•	NONE	3.10875
1008	S0040016	LL	•	•	•	NONE	3.27542
1009	S0040017	LL	•	•	•	NONE	2.63431
1010	S0040018	LL	•	•	•	NONE	2.20264
1011	S0041001	BS	118.00000	•	•	NONE	•
1012	S0041002	LL	•	•	•	NONE	.04900
1013	S0042001	LL	•	•	•	NONE	.30833
1014	S0042002	LL	•	•	•	NONE	.35734
1015	S0042003	BS	143.00000	•	•	NONE	•
1016	S0042004	LL	•	•	•	NONE	.04900
1017	S0042005	LL	•	•	•	NONE	.48750
1018	S0043001	LL	•	•	•	NONE	.30833
1019	S0043002	LL	•	•	•	NONE	.35734
1020	S0043003	BS	132.00000	•	•	NONE	•
1021	S0043004	LL	•	•	•	NONE	.04900
1022	S0043005	LL	•	•	•	NONE	2.01722
1023	S0043006	LL	•	•	•	NONE	2.18389
1024	S0043007	LL	•	•	•	NONE	1.54278
1025	S0043008	LL	•	•	•	NONE	1.58556
1026	S0043009	LL	•	•	•	NONE	2.06623
1027	S0043010	LL	•	•	•	NONE	2.23289
1028	S0043011	LL	•	•	•	NONE	1.59178
1029	S0043012	LL	•	•	•	NONE	1.63456
1030	S0043013	LL	•	•	•	NONE	.48750
1031	S0043014	LL	•	•	•	NONE	2.50472
1032	S0043015	LL	•	•	•	NONE	2.67139
1033	S0043016	LL	•	•	•	NONE	2.03028
1034	S0043017	LL	•	•	•	NONE	2.07306
1035	S0043018	LL	•	•	•	NONE	3.82514
1036	S0043019	LL	•	•	•	NONE	3.99181
1037	S0043020	LL	•	•	•	NONE	3.35069
1038	S0043021	LL	•	•	•	NONE	2.91903
1039	S0043022	LL	•	•	•	NONE	2.80042
1040	S0043023	LL	•	•	•	NONE	2.96708
1041	S0043024	LL	•	•	•	NONE	2.32597
1042	S0043025	LL	•	•	•	NONE	1.89431
1043	S0043026	LL	•	•	•	NONE	3.03271
1044	S0043027	LL	•	•	•	NONE	3.19937
1045	S0043028	LL	•	•	•	NONE	2.55826
1046	S0043029	LL	•	•	•	NONE	2.12660
1047	S0044001	BS	183.00000	•	•	NONE	•
1048	S0044002	LL	•	•	•	NONE	.04900
1049	S0045001	BS	249.00000	•	•	NONE	•
1050	S0045002	LL	•	•	•	NONE	.98722

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	1051	S0045003	LL	•	•	•	NONE	.04900
	1052	S0045004	LL	•	•	•	NONE	1.03623
	1053	S0045005	LL	•	•	•	NONE	.48750
	1054	S0045006	LL	•	•	•	NONE	.30833
	1055	S0045007	LL	•	•	•	NONE	1.47472
	1056	S0045008	LL	•	•	•	NONE	1.33833
	1057	S0045009	LL	•	•	•	NONE	1.50500
	1058	S0045010	LL	•	•	•	NONE	.35734
	1059	S0045011	LL	•	•	•	NONE	1.38734
	1060	S0045012	LL	•	•	•	NONE	1.55400
	1061	S0045013	LL	•	•	•	NONE	2.79514
	1062	S0045014	LL	•	•	•	NONE	1.77042
	1063	S0045015	LL	•	•	•	NONE	2.91903
	1064	S0045016	LL	•	•	•	NONE	1.89431
	1065	S0045017	LL	•	•	•	NONE	2.00271
	1066	S0045018	LL	•	•	•	NONE	2.12660
	1067	S0045019	LL	•	•	•	NONE	.43167
	1068	S0045020	LL	•	•	•	NONE	1.77042
	1069	S0046001	BS	217.00000	•	•	NONE	•
	1070	S0046002	LL	•	•	•	NONE	.04900
	1071	S0046003	LL	•	•	•	NONE	.48750
	1072	S0046004	LL	•	•	•	NONE	.30833
	1073	S0046005	LL	•	•	•	NONE	2.36347
	1074	S0046006	LL	•	•	•	NONE	1.33875
	1075	S0046007	LL	•	•	•	NONE	1.77000
	1076	S0046008	LL	•	•	•	NONE	1.93667
	1077	S0046009	LL	•	•	•	NONE	1.29556
	1078	S0046010	LL	•	•	•	NONE	.35734
	1079	S0046011	LL	•	•	•	NONE	1.57104
	1080	S0046012	LL	•	•	•	NONE	1.89389
	1081	S0046013	LL	•	•	•	NONE	1.81900
	1082	S0046014	LL	•	•	•	NONE	1.98567
	1083	S0046015	LL	•	•	•	NONE	1.34456
A	1084	S0046016	LL	•	•	•	NONE	•
	1085	S0046017	LL	•	•	•	NONE	1.94289
	1086	S0047001	BS	496.00000	•	•	NONE	•
	1087	S0047002	LL	•	•	•	NONE	.48750
	1088	S0047003	LL	•	•	•	NONE	.53650
	1089	S0047004	BS	14.00000	•	•	NONE	•
	1090	S0047005	LL	•	•	•	NONE	.04900
	1091	S0047006	LL	•	•	•	NONE	.79583
	1092	S0047007	LL	•	•	•	NONE	1.89431
	1093	S0047008	LL	•	•	•	NONE	.84484
	1094	S0047009	LL	•	•	•	NONE	2.81306
	1095	S0047010	LL	•	•	•	NONE	2.38139
	1096	S0047011	LL	•	•	•	NONE	2.97972
	1097	S0047012	LL	•	•	•	NONE	2.33861
	1098	S0047013	LL	•	•	•	NONE	1.94331
	1099	S0047014	LL	•	•	•	NONE	2.86206
	1100	S0047015	LL	•	•	•	NONE	2.43039
	1101	S0047016	LL	•	•	•	NONE	3.02873

TABLE 4.18 Cont'. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	1102	S0047017	LL	•	•	•	NONE	2.38762
	1103	S0047018	LL	•	•	•	NONE	.30833
	1104	S0047019	LL	•	•	•	NONE	.35734
	1105	S0048001	LL	•	•	•	NONE	1.03000
	1106	S0048002	LL	•	•	•	NONE	.15000
	1107	S0048003	BS	112.00000	•	•	NONE	•
	1108	S0048004	LL	•	•	•	NONE	1.18000
	1109	S0048005	LL	•	•	•	NONE	1.34667
	1110	S0048006	LL	•	•	•	NONE	.45833
	1111	S0048007	LL	•	•	•	NONE	.94583
	1112	S0048008	LL	•	•	•	NONE	.99484
	1113	S0049001	LL	•	•	•	NONE	.64111
	1114	S0049002	BS	121.00000	•	•	NONE	•
	1115	S0050001	BS	120.00000	•	•	NONE	•
	1116	S0051001	BS	135.00000	•	•	NONE	•
	1117	S0052001	BS	149.00000	•	•	NONE	•
	1118	S0053001	BS	105.00000	•	•	NONE	•
	1119	S0053002	LL	•	•	•	NONE	.48750
	1120	S0053003	LL	•	•	•	NONE	.53650
	1121	S0054001	LL	•	•	•	NONE	.23229
	1122	S0054002	LL	•	•	•	NONE	2.38181
	1123	S0054003	BS	134.00000	•	•	NONE	•
	1124	S0054004	LL	•	•	•	NONE	1.02472
A	1125	S0054005	LL	•	•	•	NONE	•
	1126	S0054006	LL	•	•	•	NONE	.23229
	1127	S0054007	LL	•	•	•	NONE	1.33875
	1128	S0054008	LL	•	•	•	NONE	1.89431
	1129	S0054009	LL	•	•	•	NONE	1.51222
	1130	S0054010	LL	•	•	•	NONE	1.94331
	1131	S0054011	LL	•	•	•	NONE	1.56123
	1132	S0054012	LL	•	•	•	NONE	3.10875
	1133	S0054013	LL	•	•	•	NONE	3.27542
	1134	S0054014	LL	•	•	•	NONE	2.63431
	1135	S0054015	LL	•	•	•	NONE	2.20264
	1136	S0054016	LL	•	•	•	NONE	3.15775
	1137	S0054017	LL	•	•	•	NONE	3.32442
	1138	S0054018	LL	•	•	•	NONE	2.68331
	1139	S0054019	LL	•	•	•	NONE	2.25164
	1140	S0055001	BS	113.00000	•	•	NONE	•
	1141	S0055002	LL	•	•	•	NONE	.48750
	1142	S0055003	LL	•	•	•	NONE	.53650
	1143	S0056001	BS	105.00000	•	•	NONE	•
	1144	S0056002	LL	•	•	•	NONE	.48750
	1145	S0056003	LL	•	•	•	NONE	.53650
	1146	S0057001	BS	135.00000	•	•	NONE	•
	1147	S0058001	LL	•	•	•	NONE	.48750
	1148	S0058002	BS	214.00000	•	•	NONE	•
A	1149	S0058003	LL	•	•	•	NONE	•
	1150	S0058004	LL	•	•	•	NONE	.04900
	1151	S0058005	LL	•	•	•	NONE	1.33875
	1152	S0058006	LL	•	•	•	NONE	1.33875

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	1153	S0058007	LL	•	•	•	NONE	1•57104
	1154	S0058008	LL	•	•	•	NONE	2•36347
	1155	S0058009	LL	•	•	•	NONE	•30833
	1156	S0058010	LL	•	•	•	NONE	1•77000
	1157	S0058011	LL	•	•	•	NONE	1•93667
	1158	S0058012	LL	•	•	•	NONE	1•29556
	1159	S0058013	LL	•	•	•	NONE	•35734
	1160	S0058014	LL	•	•	•	NONE	1•81900
	1161	S0058015	LL	•	•	•	NONE	1•98567
	1162	S0058016	LL	•	•	•	NONE	1•34456
	1163	S0059001	BS	149•00000	•	•	NONE	•
	1164	S0060001	BS	147•00000	•	•	NONE	•
	1165	S0060002	LL	•	•	•	NONE	•48750
	1166	S0060003	LL	•	•	•	NONE	2•36181
A	1167	S0060004	LL	•	•	•	NONE	•
	1168	S0060005	LL	•	•	•	NONE	•23229
	1169	S0060006	LL	•	•	•	NONE	1•02472
A	1170	S0060007	LL	•	•	•	NONE	•
	1171	S0060008	LL	•	•	•	NONE	1•89431
	1172	S0060009	LL	•	•	•	NONE	•04900
	1173	S0060010	LL	•	•	•	NONE	1•94331
	1174	S0060011	LL	•	•	•	NONE	1•51222
	1175	S0060012	LL	•	•	•	NONE	1•56123
A	1176	S0061001	LL	•	•	•	NONE	•
	1177	S0061002	LL	•	•	•	NONE	2•38181
	1178	S0061003	BS	102•00000	•	•	NONE	•
	1179	S0061004	LL	•	•	•	NONE	•23229
	1180	S0061005	LL	•	•	•	NONE	1•02472
	1181	S0061006	LL	•	•	•	NONE	1•33875
	1182	S0061007	LL	•	•	•	NONE	1•89431
	1183	S0061008	LL	•	•	•	NONE	•48750
	1184	S0061009	LL	•	•	•	NONE	1•94331
	1185	S0061010	LL	•	•	•	NONE	1•51222
	1186	S0061011	LL	•	•	•	NONE	1•56123
A	1187	S0061012	LL	•	•	•	NONE	•
	1188	S0061013	LL	•	•	•	NONE	•04900
	1189	S0061014	LL	•	•	•	NONE	3•10875
	1190	S0061015	LL	•	•	•	NONE	3•27542
	1191	S0061016	LL	•	•	•	NONE	2•63431
	1192	S0061017	LL	•	•	•	NONE	2•20264
	1193	S0061018	LL	•	•	•	NONE	3•15775
	1194	S0061019	LL	•	•	•	NONE	3•32442
	1195	S0061020	LL	•	•	•	NONE	2•68331
	1196	S0061021	LL	•	•	•	NONE	2•25164
	1197	S0062001	BS	116•00000	•	•	NONE	•
A	1198	C0001001	IV	1•00000	•	•	1•00000	•
	1199	C0001002	IV	•	•	•	1•00000	•
	1200	C0002001	IV	1•00000	•	•	1•00000	•
	1201	C0002002	IV	•	•	•	1•00000	•
A	1202	C0003001	EQ	1•00000	•	1•00000	1•00000	•
A	1203	C0004001	EQ	1•00000	•	1•00000	1•00000	•

TABLE 4.18 COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
A	1204	C0005001	EQ	1.00000	•	1.00000	1.00000	•
A	1205	C0006001	EQ	1.00000	•	1.00000	1.00000	•
A	1206	C0007001	EQ	1.00000	•	1.00000	1.00000	•
A	1207	C0008001	EQ	1.00000	•	1.00000	1.00000	•
A	1208	C0009001	EQ	1.00000	•	1.00000	1.00000	•
A	1209	C0010001	EQ	1.00000	•	1.00000	1.00000	•
A	1210	C0011001	EQ	1.00000	•	1.00000	1.00000	•
A	1211	C0012001	EQ	1.00000	•	1.00000	1.00000	•
A	1212	C0013001	EQ	1.00000	•	1.00000	1.00000	•
A	1213	C0014001	EQ	1.00000	•	1.00000	1.00000	•
A	1214	C0015001	EQ	1.00000	•	1.00000	1.00000	•
A	1215	C0016001	EQ	1.00000	•	1.00000	1.00000	•
A	1216	C0017001	EQ	1.00000	•	1.00000	1.00000	•
A	1217	C0018001	EQ	1.00000	•	1.00000	1.00000	•
A	1218	C0019001	EQ	1.00000	•	1.00000	1.00000	•
A	1219	C0020001	EQ	1.00000	•	1.00000	1.00000	•
A	1220	C0021001	IV	•	•	•	1.00000	•
	1221	C0021002	IV	1.00000	•	•	1.00000	•
A	1222	C0022001	IV	•	•	•	1.00000	•
	1223	C0022002	IV	1.00000	•	•	1.00000	•
A	1224	C0023001	EQ	1.00000	•	1.00000	1.00000	•
A	1225	C0024001	EQ	1.00000	•	1.00000	1.00000	•
	1226	C0025001	IV	•	•	•	1.00000	•
A	1227	C0025002	IV	1.00000	•	•	1.00000	•
	1228	C0026001	IV	•	•	•	1.00000	•
	1229	C0026002	IV	1.00000	•	•	1.00000	•
A	1230	C0027001	EQ	1.00000	•	1.00000	1.00000	•
A	1231	C0028001	EQ	1.00000	•	1.00000	1.00000	•
A	1232	C0029001	EQ	1.00000	•	1.00000	1.00000	•
A	1233	C0030001	EQ	1.00000	•	1.00000	1.00000	•
A	1234	C0031001	EQ	1.00000	•	1.00000	1.00000	•
A	1235	C0032001	EQ	1.00000	•	1.00000	1.00000	•
A	1236	C0033001	EQ	1.00000	•	1.00000	1.00000	•
A	1237	C0034001	EQ	1.00000	•	1.00000	1.00000	•
A	1238	C0035001	EQ	1.00000	•	1.00000	1.00000	•
A	1239	C0036001	EQ	1.00000	•	1.00000	1.00000	•
A	1240	C0037001	EQ	1.00000	•	1.00000	1.00000	•
A	1241	C0038001	EQ	1.00000	•	1.00000	1.00000	•
A	1242	C0039001	EQ	1.00000	•	1.00000	1.00000	•
A	1243	C0040001	EQ	1.00000	•	1.00000	1.00000	•
A	1244	C0041001	EQ	1.00000	•	1.00000	1.00000	•
A	1245	C0042001	EQ	1.00000	•	1.00000	1.00000	•
A	1246	C0043001	EQ	1.00000	•	1.00000	1.00000	•
A	1247	C0044001	EQ	1.00000	•	1.00000	1.00000	•
A	1248	C0045001	EQ	1.00000	•	1.00000	1.00000	•
A	1249	C0046001	EQ	1.00000	•	1.00000	1.00000	•
A	1250	C0047001	EQ	1.00000	•	1.00000	1.00000	•
A	1251	C0048001	EQ	1.00000	•	1.00000	1.00000	•
	1252	C0049001	IV	1.00000	•	•	1.00000	•
	1253	C0049002	IV	•	•	•	1.00000	•
A	1254	C0050001	IV	1.00000	•	•	1.00000	•

C0009001
---- Identifies demand pair number 9 from switching network and the profile number 1. This demand pair has only one profile and therefore no contemplated groups.

C0021001
----Identifies demand pair 21 from switching network and profile number 1.

C0026002
----Identifies demand pair 26 from switching network and profile number 2.

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	...ACTIVITY...	..INPUT COST..	..LOWER LIMIT.	..UPPER LIMIT.	•REDUCED COST•
	1255	C0050002	IV	•	•	•	1.00000	•
A	1256	C0051001	EQ	1.00000	•	1.00000	1.00000	•
A	1257	C0052001	EQ	1.00000	•	1.00000	1.00000	•
A	1258	C0053001	EQ	1.00000	•	1.00000	1.00000	•
A	1259	C0054001	EQ	1.00000	•	1.00000	1.00000	•
A	1260	C0055001	IV	1.00000	•	•	1.00000	•
	1261	C0055002	IV	•	•	•	1.00000	•
	1262	C0056001	IV	1.00000	•	•	1.00000	•
	1263	C0056002	IV	•	•	•	1.00000	•
A	1264	C0057001	EQ	1.00000	•	1.00000	1.00000	•
A	1265	C0058001	EQ	1.00000	•	1.00000	1.00000	•
A	1266	C0059001	EQ	1.00000	•	1.00000	1.00000	•
A	1267	C0060001	EQ	1.00000	•	1.00000	1.00000	•
A	1268	C0061001	IV	•	•	•	1.00000	•
A	1269	C0061002	IV	•	•	•	1.00000	•
	1270	C0061003	IV	•	•	•	1.00000	•
	1271	C0061004	IV	1.00000	•	•	1.00000	•
	1272	C0062001	IV	•	•	•	1.00000	•
	1273	C0062002	IV	•	•	•	1.00000	•
A	1274	C0062003	IV	•	•	•	1.00000	•
	1275	C0062004	IV	1.00000	•	•	1.00000	•
A	1276	C0063001	EQ	1.00000	•	1.00000	1.00000	•
A	1277	C0064001	EQ	1.00000	•	1.00000	1.00000	•
A	1278	C0065001	EQ	1.00000	•	1.00000	1.00000	•
A	1279	C0066001	EQ	1.00000	•	1.00000	1.00000	•
A	1280	C0067001	EQ	1.00000	•	1.00000	1.00000	•
A	1281	C0068001	EQ	1.00000	•	1.00000	1.00000	•
A	1282	C0069001	EQ	1.00000	•	1.00000	1.00000	•
A	1283	C0070001	EQ	1.00000	•	1.00000	1.00000	•
A	1284	C0071001	EQ	1.00000	•	1.00000	1.00000	•
A	1285	C0072001	EQ	1.00000	•	1.00000	1.00000	•
A	1286	C0073001	EQ	1.00000	•	1.00000	1.00000	•
A	1287	C0074001	EQ	1.00000	•	1.00000	1.00000	•
A	1288	C0075001	EQ	1.00000	•	1.00000	1.00000	•
A	1289	C0076001	EQ	1.00000	•	1.00000	1.00000	•
A	1290	C0077001	EQ	1.00000	•	1.00000	1.00000	•
A	1291	C0078001	EQ	1.00000	•	1.00000	1.00000	•
A	1292	C0079001	EQ	1.00000	•	1.00000	1.00000	•
A	1293	C0080001	EQ	1.00000	•	1.00000	1.00000	•
	1294	C0081001	IV	•	•	•	1.00000	•
	1295	C0081002	IV	1.00000	•	•	1.00000	•
	1296	C0082001	IV	•	•	•	1.00000	•
A	1297	C0082002	IV	1.00000	•	•	1.00000	•
A	1298	C0083001	EQ	1.00000	•	1.00000	1.00000	•
A	1299	C0084001	EQ	1.00000	•	1.00000	1.00000	•
A	1300	C0085001	EQ	1.00000	•	1.00000	1.00000	•
A	1301	C0086001	EQ	1.00000	•	1.00000	1.00000	•
A	1302	C0087001	EQ	1.00000	•	1.00000	1.00000	•
A	1303	C0088001	EQ	1.00000	•	1.00000	1.00000	•
A	1304	C0089001	EQ	1.00000	•	1.00000	1.00000	•
A	1305	C0090001	EQ	1.00000	•	1.00000	1.00000	•

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
A	1306	C0091001	EQ	1.00000	•	1.00000	1.00000	•
A	1307	C0092001	EQ	1.00000	•	1.00000	1.00000	•
A	1308	C0093001	EQ	1.00000	•	1.00000	1.00000	•
A	1309	C0094001	EQ	1.00000	•	1.00000	1.00000	•
A	1310	C0095001	EQ	1.00000	•	1.00000	1.00000	•
A	1311	C0096001	EQ	1.00000	•	1.00000	1.00000	•
A	1312	C0097001	EQ	1.00000	•	1.00000	1.00000	•
A	1313	C0098001	EQ	1.00000	•	1.00000	1.00000	•
	1314	C0099001	IV	1.00000	•	•	1.00000	•
	1315	C0099002	IV	•	•	•	1.00000	•
	1316	C0100001	IV	1.00000	•	•	1.00000	•
	1317	C0100002	IV	•	•	•	1.00000	•
A	1318	C0101001	EQ	1.00000	•	1.00000	1.00000	•
A	1319	C0102001	EQ	1.00000	•	1.00000	1.00000	•
A	1320	C0103001	EQ	1.00000	•	1.00000	1.00000	•
A	1321	C0104001	EQ	1.00000	•	1.00000	1.00000	•
A	1322	C0105001	EQ	1.00000	•	1.00000	1.00000	•
A	1323	C0106001	EQ	1.00000	•	1.00000	1.00000	•
A	1324	C0107001	EQ	1.00000	•	1.00000	1.00000	•
A	1325	C0108001	EQ	1.00000	•	1.00000	1.00000	•
A	1326	C0109001	EQ	1.00000	•	1.00000	1.00000	•
A	1327	C0110001	EQ	1.00000	•	1.00000	1.00000	•
A	1328	C0111001	EQ	1.00000	•	1.00000	1.00000	•
A	1329	C0112001	EQ	1.00000	•	1.00000	1.00000	•
A	1330	C0113001	IV	•	•	•	1.00000	•
	1331	C0113002	IV	1.00000	•	•	1.00000	•
A	1332	C0114001	IV	•	•	•	1.00000	•
	1333	C0114002	IV	1.00000	•	•	1.00000	•
A	1334	C0115001	EQ	1.00000	•	1.00000	1.00000	•
A	1335	C0116001	EQ	1.00000	•	1.00000	1.00000	•
A	1336	C0117001	EQ	1.00000	•	1.00000	1.00000	•
A	1337	C0118001	EQ	1.00000	•	1.00000	1.00000	•
A	1338	C0119001	EQ	1.00000	•	1.00000	1.00000	•
A	1339	C0120001	EQ	1.00000	•	1.00000	1.00000	•
A	1340	C0121001	EQ	1.00000	•	1.00000	1.00000	•
A	1341	C0122001	EQ	1.00000	•	1.00000	1.00000	•
A	1342	C0123001	EQ	1.00000	•	1.00000	1.00000	•
A	1343	C0124001	EQ	1.00000	•	1.00000	1.00000	•
A	1344	C0125001	EQ	1.00000	•	1.00000	1.00000	•
A	1345	C0126001	EQ	1.00000	•	1.00000	1.00000	•
A	1346	C0127001	EQ	1.00000	•	1.00000	1.00000	•
A	1347	C0128001	EQ	1.00000	•	1.00000	1.00000	•
A	1348	C0129001	EQ	1.00000	•	1.00000	1.00000	•
A	1349	C0130001	EQ	1.00000	•	1.00000	1.00000	•
	1350	C0131001	IV	1.00000	•	•	1.00000	•
	1351	C0131002	IV	•	•	•	1.00000	•
	1352	C0132001	IV	1.00000	•	•	1.00000	•
	1353	C0132002	IV	•	•	•	1.00000	•
	1354	C0133001	IV	1.00000	•	•	1.00000	•
	1355	C0133002	IV	•	•	•	1.00000	•
	1356	C0134001	IV	1.00000	•	•	1.00000	•

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST••
	1357	C0134002	IV	•	•	•	1.00000	•
A	1358	C0135001	EQ	1.00000	•	1.00000	1.00000	•
A	1359	C0136001	EQ	1.00000	•	1.00000	1.00000	•
A	1360	C0137001	EQ	1.00000	•	1.00000	1.00000	•
A	1361	C0138001	EQ	1.00000	•	1.00000	1.00000	•
A	1362	C0139001	IV	•	•	•	1.00000	•
	1363	C0139002	IV	•	•	•	1.00000	•
A	1364	C0139003	IV	•	•	•	1.00000	•
	1365	C0139004	IV	1.00000	•	•	1.00000	•
	1366	C0140001	IV	•	•	•	1.00000	•
	1367	C0140002	IV	•	•	•	1.00000	•
	1368	C0140003	IV	•	•	•	1.00000	•
	1369	C0140004	IV	1.00000	•	•	1.00000	•
A	1370	C0141001	EQ	1.00000	•	1.00000	1.00000	•
A	1371	C0142001	EQ	1.00000	•	1.00000	1.00000	•
A	1372	C0143001	EQ	1.00000	•	1.00000	1.00000	•
A	1373	C0144001	EQ	1.00000	•	1.00000	1.00000	•
A	1374	C0145001	EQ	1.00000	•	1.00000	1.00000	•
A	1375	C0146001	EQ	1.00000	•	1.00000	1.00000	•
A	1376	C0147001	EQ	1.00000	•	1.00000	1.00000	•
A	1377	C0148001	EQ	1.00000	•	1.00000	1.00000	•
A	1378	C0149001	EQ	1.00000	•	1.00000	1.00000	•
A	1379	C0150001	EQ	1.00000	•	1.00000	1.00000	•
A	1380	C0151001	EQ	1.00000	•	1.00000	1.00000	•
A	1381	C0152001	EQ	1.00000	•	1.00000	1.00000	•
A	1382	C0153001	EQ	1.00000	•	1.00000	1.00000	•
A	1383	C0154001	EQ	1.00000	•	1.00000	1.00000	•
A	1384	C0155001	EQ	1.00000	•	1.00000	1.00000	•
A	1385	C0156001	EQ	1.00000	•	1.00000	1.00000	•
A	1386	C0157001	EQ	1.00000	•	1.00000	1.00000	•
A	1387	C0158001	EQ	1.00000	•	1.00000	1.00000	•
A	1388	C0159001	EQ	1.00000	•	1.00000	1.00000	•
A	1389	C0160001	EQ	1.00000	•	1.00000	1.00000	•
A	1390	C0161001	EQ	1.00000	•	1.00000	1.00000	•
A	1391	C0162001	EQ	1.00000	•	1.00000	1.00000	•
A	1392	C0163001	EQ	1.00000	•	1.00000	1.00000	•
A	1393	C0164001	EQ	1.00000	•	1.00000	1.00000	•
A	1394	C0165001	EQ	1.00000	•	1.00000	1.00000	•
A	1395	C0166001	EQ	1.00000	•	1.00000	1.00000	•
A	1396	C0167001	EQ	1.00000	•	1.00000	1.00000	•
A	1397	C0168001	EQ	1.00000	•	1.00000	1.00000	•
A	1398	C0169001	EQ	1.00000	•	1.00000	1.00000	•
A	1399	C0170001	EQ	1.00000	•	1.00000	1.00000	•
A	1400	C0171001	EQ	1.00000	•	1.00000	1.00000	•
A	1401	C0172001	EQ	1.00000	•	1.00000	1.00000	•
A	1402	C0173001	EQ	1.00000	•	1.00000	1.00000	•
A	1403	C0174001	EQ	1.00000	•	1.00000	1.00000	•
A	1404	C0175001	IV	•	•	•	1.00000	•
	1405	C0175002	IV	1.00000	•	•	1.00000	•
A	1406	C0176001	IV	•	•	•	1.00000	•
	1407	C0176002	IV	1.00000	•	•	1.00000	•

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
A	1408	C0177001	EQ	1.00000	•	1.00000	1.00000	•
A	1409	C0178001	EQ	1.00000	•	1.00000	1.00000	•
A	1410	C0179001	IV	•	•	•	1.00000	•
	1411	C0179002	IV	1.00000	•	•	1.00000	•
A	1412	C0180001	IV	•	•	•	1.00000	•
	1413	C0180002	IV	1.00000	•	•	1.00000	•
A	1414	C0181001	EQ	1.00000	•	1.00000	1.00000	•
A	1415	C0182001	EQ	1.00000	•	1.00000	1.00000	•
A	1416	C0183001	EQ	1.00000	•	1.00000	1.00000	•
A	1417	C0184001	EQ	1.00000	•	1.00000	1.00000	•
A	1418	C0185001	EQ	1.00000	•	1.00000	1.00000	•
A	1419	C0186001	EQ	1.00000	•	1.00000	1.00000	•
A	1420	C0187001	EQ	1.00000	•	1.00000	1.00000	•
A	1421	C0188001	EQ	1.00000	•	1.00000	1.00000	•
A	1422	C0189001	EQ	1.00000	•	1.00000	1.00000	•
A	1423	C0190001	EQ	1.00000	•	1.00000	1.00000	•
A	1424	C0191001	IV	•	•	•	1.00000	•
	1425	C0191002	IV	1.00000	•	•	1.00000	•
	1426	C0192001	IV	•	•	•	1.00000	•
	1427	C0192002	IV	1.00000	•	•	1.00000	•
A	1428	C0193001	EQ	1.00000	•	1.00000	1.00000	•
A	1429	C0194001	EQ	1.00000	•	1.00000	1.00000	•
A	1430	C0195001	EQ	1.00000	•	1.00000	1.00000	•
A	1431	C0196001	EQ	1.00000	•	1.00000	1.00000	•
A	1432	C0197001	EQ	1.00000	•	1.00000	1.00000	•
A	1433	C0198001	EQ	1.00000	•	1.00000	1.00000	•
A	1434	C0199001	EQ	1.00000	•	1.00000	1.00000	•
A	1435	C0200001	EQ	1.00000	•	1.00000	1.00000	•
A	1436	C0201001	EQ	1.00000	•	1.00000	1.00000	•
A	1437	C0202001	EQ	1.00000	•	1.00000	1.00000	•
A	1438	C0203001	EQ	1.00000	•	1.00000	1.00000	•
A	1439	C0204001	EQ	1.00000	•	1.00000	1.00000	•
A	1440	C0205001	EQ	1.00000	•	1.00000	1.00000	•
A	1441	C0206001	EQ	1.00000	•	1.00000	1.00000	•
A	1442	C0207001	IV	•	•	•	1.00000	•
	1443	C0207002	IV	1.00000	•	•	1.00000	•
	1444	C0208001	IV	•	•	•	1.00000	•
	1445	C0208002	IV	1.00000	•	•	1.00000	•
A	1446	C0209001	EQ	1.00000	•	1.00000	1.00000	•
A	1447	C0210001	EQ	1.00000	•	1.00000	1.00000	•
A	1448	C0211001	EQ	1.00000	•	1.00000	1.00000	•
A	1449	C0212001	EQ	1.00000	•	1.00000	1.00000	•
A	1450	C0213001	EQ	1.00000	•	1.00000	1.00000	•
A	1451	C0214001	EQ	1.00000	•	1.00000	1.00000	•
A	1452	C0215001	EQ	1.00000	•	1.00000	1.00000	•
A	1453	C0216001	EQ	1.00000	•	1.00000	1.00000	•
A	1454	C0217001	EQ	1.00000	•	1.00000	1.00000	•
A	1455	C0218001	EQ	1.00000	•	1.00000	1.00000	•
A	1456	C0219001	EQ	1.00000	•	1.00000	1.00000	•
A	1457	C0220001	EQ	1.00000	•	1.00000	1.00000	•
A	1458	C0221001	EQ	1.00000	•	1.00000	1.00000	•

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	...ACTIVITY...	..INPUT COST..	..LOWER LIMIT.	..UPPER LIMIT.	•REDUCED COST•
A	1459	C0222001	EQ	1.00000	•	1.00000	1.00000	•
A	1460	C0223001	EQ	1.00000	•	1.00000	1.00000	•
A	1461	C0224001	EQ	1.00000	•	1.00000	1.00000	•
A	1462	C0225001	EQ	1.00000	•	1.00000	1.00000	•
A	1463	C0226001	EQ	1.00000	•	1.00000	1.00000	•
A	1464	C0227001	EQ	1.00000	•	1.00000	1.00000	•
A	1465	C0228001	EQ	1.00000	•	1.00000	1.00000	•
A	1466	C0229001	EQ	1.00000	•	1.00000	1.00000	•
A	1467	C0230001	EQ	1.00000	•	1.00000	1.00000	•
A	1468	C0231001	EQ	1.00000	•	1.00000	1.00000	•
A	1469	C0232001	EQ	1.00000	•	1.00000	1.00000	•
A	1470	C0233001	IV	•	•	•	1.00000	•
	1471	C0233002	IV	1.00000	•	•	1.00000	•
A	1472	C0234001	IV	•	•	•	1.00000	•
	1473	C0234002	IV	1.00000	•	•	1.00000	•
A	1474	C0235001	EQ	1.00000	•	1.00000	1.00000	•
A	1475	C0236001	EQ	1.00000	•	1.00000	1.00000	•
A	1476	C0237001	EQ	1.00000	•	1.00000	1.00000	•
A	1477	C0238001	EQ	1.00000	•	1.00000	1.00000	•
A	1478	C0239001	EQ	1.00000	•	1.00000	1.00000	•
A	1479	C0240001	EQ	1.00000	•	1.00000	1.00000	•
A	1480	C0241001	EQ	1.00000	•	1.00000	1.00000	•
A	1481	C0242001	EQ	1.00000	•	1.00000	1.00000	•
	1482	C0243001	IV	1.00000	•	•	1.00000	•
A	1483	C0243002	IV	•	•	•	1.00000	•
	1484	C0244001	IV	1.00000	•	•	1.00000	•
	1485	C0244002	IV	•	•	•	1.00000	•
A	1486	C0245001	EQ	1.00000	•	1.00000	1.00000	•
A	1487	C0246001	EQ	1.00000	•	1.00000	1.00000	•
A	1488	C0247001	EQ	1.00000	•	1.00000	1.00000	•
A	1489	C0248001	EQ	1.00000	•	1.00000	1.00000	•
A	1490	C0249001	EQ	1.00000	•	1.00000	1.00000	•
A	1491	C0250001	EQ	1.00000	•	1.00000	1.00000	•
A	1492	C0251001	EQ	1.00000	•	1.00000	1.00000	•
A	1493	C0252001	EQ	1.00000	•	1.00000	1.00000	•
A	1494	C0253001	EQ	1.00000	•	1.00000	1.00000	•
A	1495	C0254001	EQ	1.00000	•	1.00000	1.00000	•
A	1496	C0255001	EQ	1.00000	•	1.00000	1.00000	•
A	1497	C0256001	EQ	1.00000	•	1.00000	1.00000	•
A	1498	C0257001	EQ	1.00000	•	1.00000	1.00000	•
A	1499	C0258001	EQ	1.00000	•	1.00000	1.00000	•
A	1500	C0259001	EQ	1.00000	•	1.00000	1.00000	•
A	1501	C0260001	EQ	1.00000	•	1.00000	1.00000	•
A	1502	C0261001	EQ	1.00000	•	1.00000	1.00000	•
A	1503	C0262001	EQ	1.00000	•	1.00000	1.00000	•
A	1504	C0263001	IV	•	•	•	1.00000	•
	1505	C0263002	IV	1.00000	•	•	1.00000	•
	1506	C0264001	IV	•	•	•	1.00000	•
	1507	C0264002	IV	1.00000	•	•	1.00000	•
A	1508	C0265001	EQ	1.00000	•	1.00000	1.00000	•
A	1509	C0266001	EQ	1.00000	•	1.00000	1.00000	•

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
A	1510	C0267001	EQ	1.00000	•	1.00000	1.00000	•
A	1511	C0268001	EQ	1.00000	•	1.00000	1.00000	•
A	1512	C0269001	EQ	1.00000	•	1.00000	1.00000	•
A	1513	C0270001	EQ	1.00000	•	1.00000	1.00000	•
	1514	C0271001	IV	•	•	•	1.00000	•
A	1515	C0271002	IV	1.00000	•	•	1.00000	•
	1516	C0272001	IV	•	•	•	1.00000	•
	1517	C0272002	IV	1.00000	•	•	1.00000	•
	1518	C0273001	IV	1.00000	•	•	1.00000	•
A	1519	C0273002	IV	•	•	•	1.00000	•
	1520	C0274001	IV	1.00000	•	•	1.00000	•
	1521	C0274002	IV	•	•	•	1.00000	•
A	1522	C0275001	EQ	1.00000	•	1.00000	1.00000	•
A	1523	C0276001	EQ	1.00000	•	1.00000	1.00000	•
A	1524	C0277001	EQ	1.00000	•	1.00000	1.00000	•
A	1525	C0278001	EQ	1.00000	•	1.00000	1.00000	•
A	1526	C0279001	EQ	1.00000	•	1.00000	1.00000	•
A	1527	C0280001	EQ	1.00000	•	1.00000	1.00000	•
A	1528	C0281001	EQ	1.00000	•	1.00000	1.00000	•
A	1529	C0282001	EQ	1.00000	•	1.00000	1.00000	•
A	1530	C0283001	EQ	1.00000	•	1.00000	1.00000	•
A	1531	C0284001	EQ	1.00000	•	1.00000	1.00000	•
A	1532	C0285001	EQ	1.00000	•	1.00000	1.00000	•
A	1533	C0286001	EQ	1.00000	•	1.00000	1.00000	•
A	1534	C0287001	EQ	1.00000	•	1.00000	1.00000	•
A	1535	C0288001	EQ	1.00000	•	1.00000	1.00000	•
A	1536	C0289001	EQ	1.00000	•	1.00000	1.00000	•
A	1537	C0290001	EQ	1.00000	•	1.00000	1.00000	•
A	1538	C0291001	EQ	1.00000	•	1.00000	1.00000	•
A	1539	C0292001	EQ	1.00000	•	1.00000	1.00000	•
	1540	C0293001	IV	1.00000	•	•	1.00000	•
	1541	C0293002	IV	•	•	•	1.00000	•
	1542	C0294001	IV	1.00000	•	•	1.00000	•
	1543	C0294002	IV	•	•	•	1.00000	4.31667
A	1544	C0295001	EQ	1.00000	•	1.00000	1.00000	•
A	1545	C0296001	EQ	1.00000	•	1.00000	1.00000	•
A	1546	C0297001	EQ	1.00000	•	1.00000	1.00000	•
A	1547	C0298001	EQ	1.00000	•	1.00000	1.00000	•
A	1548	C0299001	EQ	1.00000	•	1.00000	1.00000	•
A	1549	C0300001	EQ	1.00000	•	1.00000	1.00000	•
A	1550	C0301001	EQ	1.00000	•	1.00000	1.00000	•
A	1551	C0302001	EQ	1.00000	•	1.00000	1.00000	•
A	1552	C0303001	EQ	1.00000	•	1.00000	1.00000	•
A	1553	C0304001	EQ	1.00000	•	1.00000	1.00000	•
A	1554	C0305001	EQ	1.00000	•	1.00000	1.00000	•
A	1555	C0306001	EQ	1.00000	•	1.00000	1.00000	•
A	1556	C0307001	EQ	1.00000	•	1.00000	1.00000	•
A	1557	C0308001	EQ	1.00000	•	1.00000	1.00000	•
A	1558	C0309001	EQ	1.00000	•	1.00000	1.00000	•
A	1559	C0310001	EQ	1.00000	•	1.00000	1.00000	•
A	1560	C0311001	EQ	1.00000	•	1.00000	1.00000	•

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
A	1561	C0312001	EQ	1.00000	•	1.00000	1.00000	•
A	1562	C0313001	EQ	1.00000	•	1.00000	1.00000	•
A	1563	C0314001	EQ	1.00000	•	1.00000	1.00000	•
A	1564	C0315001	EQ	1.00000	•	1.00000	1.00000	•
A	1565	C0316001	EQ	1.00000	•	1.00000	1.00000	•
A	1566	C0317001	EQ	1.00000	•	1.00000	1.00000	•
A	1567	C0318001	EQ	1.00000	•	1.00000	1.00000	•
A	1568	C0319001	EQ	1.00000	•	1.00000	1.00000	•
A	1569	C0320001	EQ	1.00000	•	1.00000	1.00000	•
A	1570	C0321001	EQ	1.00000	•	1.00000	1.00000	•
A	1571	C0322001	EQ	1.00000	•	1.00000	1.00000	•
A	1572	C0323001	EQ	1.00000	•	1.00000	1.00000	•
A	1573	C0324001	EQ	1.00000	•	1.00000	1.00000	•
A	1574	C0325001	IV	•	•	•	1.00000	•
	1575	C0325002	IV	1.00000	•	•	1.00000	•
A	1576	C0326001	IV	•	•	•	1.00000	•
	1577	C0326002	IV	1.00000	•	•	1.00000	•
A	1578	C0327001	EQ	1.00000	•	1.00000	1.00000	•
A	1579	C0328001	EQ	1.00000	•	1.00000	1.00000	•
A	1580	C0329001	EQ	1.00000	•	1.00000	1.00000	•
A	1581	C0330001	EQ	1.00000	•	1.00000	1.00000	•
A	1582	C0331001	EQ	1.00000	•	1.00000	1.00000	•
A	1583	C0332001	EQ	1.00000	•	1.00000	1.00000	•
A	1584	C0333001	EQ	1.00000	•	1.00000	1.00000	•
A	1585	C0334001	EQ	1.00000	•	1.00000	1.00000	•
A	1586	C0335001	EQ	1.00000	•	1.00000	1.00000	•
A	1587	C0336001	EQ	1.00000	•	1.00000	1.00000	•
A	1588	C0337001	EQ	1.00000	•	1.00000	1.00000	•
A	1589	C0338001	EQ	1.00000	•	1.00000	1.00000	•
A	1590	C0339001	EQ	1.00000	•	1.00000	1.00000	•
A	1591	C0340001	EQ	1.00000	•	1.00000	1.00000	•
A	1592	C0341001	EQ	1.00000	•	1.00000	1.00000	•
A	1593	C0342001	EQ	1.00000	•	1.00000	1.00000	•
A	1594	C0343001	EQ	1.00000	•	1.00000	1.00000	•
A	1595	C0344001	EQ	1.00000	•	1.00000	1.00000	•
A	1596	C0345001	IV	•	•	•	1.00000	•
	1597	C0345002	IV	1.00000	•	•	1.00000	•
A	1598	C0346001	IV	•	•	•	1.00000	•
	1599	C0346002	IV	1.00000	•	•	1.00000	•
A	1600	C0347001	EQ	1.00000	•	1.00000	1.00000	•
A	1601	C0348001	EQ	1.00000	•	1.00000	1.00000	•
A	1602	C0349001	EQ	1.00000	•	1.00000	1.00000	•
A	1603	C0350001	EQ	1.00000	•	1.00000	1.00000	•
	1604	C0351001	IV	•	•	•	1.00000	•
	1605	C0351002	IV	1.00000	•	•	1.00000	•
	1606	C0352001	IV	•	•	•	1.00000	•
	1607	C0352002	IV	1.00000	•	•	1.00000	•
A	1608	C0353001	EQ	1.00000	•	1.00000	1.00000	•
A	1609	C0354001	EQ	1.00000	•	1.00000	1.00000	•
	1610	C0355001	IV	•	•	•	1.00000	•
	1611	C0355002	IV	1.00000	•	•	1.00000	•

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	1612	C0356001	IV	•	•	•	1.00000	•
	1613	C0356002	IV	1.00000	•	•	1.00000	•
A	1614	C0357001	EQ	1.00000	•	1.00000	1.00000	•
A	1615	C0358001	EQ	1.00000	•	1.00000	1.00000	•
A	1616	C0359001	EQ	1.00000	•	1.00000	1.00000	•
A	1617	C0360001	EQ	1.00000	•	1.00000	1.00000	•
A	1618	C0361001	EQ	1.00000	•	1.00000	1.00000	•
A	1619	C0362001	EQ	1.00000	•	1.00000	1.00000	•
A	1620	C0363001	EQ	1.00000	•	1.00000	1.00000	•
A	1621	C0364001	EQ	1.00000	•	1.00000	1.00000	•
A	1622	C0365001	IV	•	•	•	1.00000	•
	1623	C0365002	IV	1.00000	•	•	1.00000	•
	1624	C0366001	IV	•	•	•	1.00000	•
A	1625	C0366002	IV	1.00000	•	•	1.00000	•
A	1626	C0367001	EQ	1.00000	•	1.00000	1.00000	•
A	1627	C0368001	EQ	1.00000	•	1.00000	1.00000	•
	1628	C0369001	IV	•	•	•	1.00000	•
A	1629	C0369002	IV	1.00000	•	•	1.00000	•
	1630	C0370001	IV	•	•	•	1.00000	•
	1631	C0370002	IV	1.00000	•	•	1.00000	•
A	1632	C0371001	EQ	1.00000	•	1.00000	1.00000	•
A	1633	C0372001	EQ	1.00000	•	1.00000	1.00000	•
A	1634	C0373001	EQ	1.00000	•	1.00000	1.00000	•
A	1635	C0374001	EQ	1.00000	•	1.00000	1.00000	•
A	1636	C0375001	EQ	1.00000	•	1.00000	1.00000	•
A	1637	C0376001	EQ	1.00000	•	1.00000	1.00000	•
A	1638	C0377001	EQ	1.00000	•	1.00000	1.00000	•
A	1639	C0378001	EQ	1.00000	•	1.00000	1.00000	•
A	1640	C0379001	EQ	1.00000	•	1.00000	1.00000	•
A	1641	C0380001	EQ	1.00000	•	1.00000	1.00000	•
A	1642	C0381001	EQ	1.00000	•	1.00000	1.00000	•
A	1643	C0382001	EQ	1.00000	•	1.00000	1.00000	•
A	1644	C0383001	EQ	1.00000	•	1.00000	1.00000	•
A	1645	C0384001	EQ	1.00000	•	1.00000	1.00000	•
A	1646	C0385001	EQ	1.00000	•	1.00000	1.00000	•
A	1647	C0386001	EQ	1.00000	•	1.00000	1.00000	•
A	1648	C0387001	EQ	1.00000	•	1.00000	1.00000	•
A	1649	C0388001	EQ	1.00000	•	1.00000	1.00000	•
A	1650	C0389001	EQ	1.00000	•	1.00000	1.00000	•
A	1651	C0390001	EQ	1.00000	•	1.00000	1.00000	•
A	1652	C0391001	EQ	1.00000	•	1.00000	1.00000	•
A	1653	C0392001	EQ	1.00000	•	1.00000	1.00000	•
A	1654	C0393001	EQ	1.00000	•	1.00000	1.00000	•
A	1655	C0394001	EQ	1.00000	•	1.00000	1.00000	•
A	1656	C0395001	EQ	1.00000	•	1.00000	1.00000	•
A	1657	C0396001	EQ	1.00000	•	1.00000	1.00000	•
A	1658	C0397001	IV	•	•	•	1.00000	•
	1659	C0397002	IV	1.00000	•	•	1.00000	•
A	1660	C0398001	IV	•	•	•	1.00000	•
	1661	C0398002	IV	1.00000	•	•	1.00000	•
A	1662	C0399001	EQ	1.00000	•	1.00000	1.00000	•

TABLE 4.18 Cont'd. - COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
A	1663	C0400001	EQ	1.00000	•	1.00000	1.00000	•
A	1664	C0401001	EQ	1.00000	•	1.00000	1.00000	•
A	1665	C0402001	EQ	1.00000	•	1.00000	1.00000	•
A	1666	C0403001	EQ	1.00000	•	1.00000	1.00000	•
A	1667	C0404001	EQ	1.00000	•	1.00000	1.00000	•
	1668	C0405001	IV	1.00000	•	•	1.00000	•
	1669	C0405002	IV	•	•	•	1.00000	•
A	1670	C0406001	IV	1.00000	•	•	1.00000	•
	1671	C0406002	IV	•	•	•	1.00000	•
A	1672	C0407001	EQ	1.00000	•	1.00000	1.00000	•
A	1673	C0408001	EQ	1.00000	•	1.00000	1.00000	•
A	1674	C0409001	IV	•	•	•	1.00000	•
	1675	C0409002	IV	1.00000	•	•	1.00000	•
	1676	C0410001	IV	•	•	•	1.00000	•
A	1677	C0410002	IV	1.00000	•	•	1.00000	•
A	1678	C0411001	IV	•	•	•	1.00000	•
	1679	C0411002	IV	1.00000	•	•	1.00000	•
A	1680	C0412001	IV	•	•	•	1.00000	•
	1681	C0412002	IV	1.00000	•	•	1.00000	•
A	1682	C0413001	EQ	1.00000	•	1.00000	1.00000	•
A	1683	C0414001	EQ	1.00000	•	1.00000	1.00000	•
A	1684	C0415001	EQ	1.00000	•	1.00000	1.00000	•
A	1685	C0416001	EQ	1.00000	•	1.00000	1.00000	•
A	1686	C0417001	EQ	1.00000	•	1.00000	1.00000	•
A	1687	C0418001	EQ	1.00000	•	1.00000	1.00000	•
A	1688	C0419001	EQ	1.00000	•	1.00000	1.00000	•
A	1689	C0420001	EQ	1.00000	•	1.00000	1.00000	•
A	1690	C0421001	EQ	1.00000	•	1.00000	1.00000	•
A	1691	C0422001	EQ	1.00000	•	1.00000	1.00000	•
A	1692	C0423001	EQ	1.00000	•	1.00000	1.00000	•
A	1693	C0424001	EQ	1.00000	•	1.00000	1.00000	•
A	1694	C0425001	EQ	1.00000	•	1.00000	1.00000	•
A	1695	C0426001	EQ	1.00000	•	1.00000	1.00000	•
A	1696	C0427001	EQ	1.00000	•	1.00000	1.00000	•
A	1697	C0428001	EQ	1.00000	•	1.00000	1.00000	•
A	1698	C0429001	EQ	1.00000	•	1.00000	1.00000	•
A	1699	C0430001	EQ	1.00000	•	1.00000	1.00000	•
A	1700	C0431001	EQ	1.00000	•	1.00000	1.00000	•
A	1701	C0432001	EQ	1.00000	•	1.00000	1.00000	•
A	1702	C0433001	EQ	1.00000	•	1.00000	1.00000	•
A	1703	C0434001	EQ	1.00000	•	1.00000	1.00000	•
A	1704	C0435001	EQ	1.00000	•	1.00000	1.00000	•
A	1705	C0436001	EQ	1.00000	•	1.00000	1.00000	•
A	1706	C0437001	EQ	1.00000	•	1.00000	1.00000	•
A	1707	C0438001	EQ	1.00000	•	1.00000	1.00000	•
A	1708	C0439001	EQ	1.00000	•	1.00000	1.00000	•
A	1709	C0440001	EQ	1.00000	•	1.00000	1.00000	•
A	1710	C0441001	EQ	1.00000	•	1.00000	1.00000	•
A	1711	C0442001	EQ	1.00000	•	1.00000	1.00000	•
A	1712	C0443001	EQ	1.00000	•	1.00000	1.00000	•
A	1713	C0444001	EQ	1.00000	•	1.00000	1.00000	•

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
A	1714	C0445001	EQ	1.00000	•	1.00000	1.00000	•
A	1715	C0446001	EQ	1.00000	•	1.00000	1.00000	•
A	1716	C0447001	EQ	1.00000	•	1.00000	1.00000	•
A	1717	C0448001	EQ	1.00000	•	1.00000	1.00000	•
A	1718	C0449001	EQ	1.00000	•	1.00000	1.00000	•
A	1719	C0450001	EQ	1.00000	•	1.00000	1.00000	•
A	1720	C0451001	EQ	1.00000	•	1.00000	1.00000	•
A	1721	C0452001	EQ	1.00000	•	1.00000	1.00000	•
A	1722	C0453001	EQ	1.00000	•	1.00000	1.00000	•
A	1723	C0454001	EQ	1.00000	•	1.00000	1.00000	•
A	1724	C0455001	EQ	1.00000	•	1.00000	1.00000	•
A	1725	C0456001	EQ	1.00000	•	1.00000	1.00000	•
A	1726	C0457001	EQ	1.00000	•	1.00000	1.00000	•
A	1727	C0458001	EQ	1.00000	•	1.00000	1.00000	•
A	1728	C0459001	EQ	1.00000	•	1.00000	1.00000	•
A	1729	C0460001	EQ	1.00000	•	1.00000	1.00000	•
A	1730	C0461001	EQ	1.00000	•	1.00000	1.00000	•
A	1731	C0462001	EQ	1.00000	•	1.00000	1.00000	•
A	1732	C0463001	EQ	1.00000	•	1.00000	1.00000	•
A	1733	C0464001	EQ	1.00000	•	1.00000	1.00000	•
A	1734	C0465001	EQ	1.00000	•	1.00000	1.00000	•
A	1735	C0466001	EQ	1.00000	•	1.00000	1.00000	•
A	1736	C0467001	EQ	1.00000	•	1.00000	1.00000	•
A	1737	C0468001	EQ	1.00000	•	1.00000	1.00000	•
A	1738	C0469001	EQ	1.00000	•	1.00000	1.00000	•
A	1739	C0470001	EQ	1.00000	•	1.00000	1.00000	•
A	1740	C0471001	EQ	1.00000	•	1.00000	1.00000	•
A	1741	C0472001	EQ	1.00000	•	1.00000	1.00000	•
A	1742	C0473001	EQ	1.00000	•	1.00000	1.00000	•
A	1743	C0474001	EQ	1.00000	•	1.00000	1.00000	•
	1744	C0475001	IV	•	•	•	1.00000	•
A	1745	C0475002	IV	1.00000	•	•	1.00000	•
	1746	C0476001	IV	•	•	•	1.00000	•
	1747	C0476002	IV	1.00000	•	•	1.00000	•
A	1748	C0477001	EQ	1.00000	•	1.00000	1.00000	•
A	1749	C0478001	EQ	1.00000	•	1.00000	1.00000	•
A	1750	C0479001	EQ	1.00000	•	1.00000	1.00000	•
A	1751	C0480001	EQ	1.00000	•	1.00000	1.00000	•
A	1752	C0481001	EQ	1.00000	•	1.00000	1.00000	•
A	1753	C0482001	EQ	1.00000	•	1.00000	1.00000	•
A	1754	C0483001	EQ	1.00000	•	1.00000	1.00000	•
A	1755	C0484001	EQ	1.00000	•	1.00000	1.00000	•
A	1756	C0485001	EQ	1.00000	•	1.00000	1.00000	•
A	1757	C0486001	EQ	1.00000	•	1.00000	1.00000	•
A	1758	C0487001	EQ	1.00000	•	1.00000	1.00000	•
A	1759	C0488001	EQ	1.00000	•	1.00000	1.00000	•
A	1760	C0489001	EQ	1.00000	•	1.00000	1.00000	•
A	1761	C0490001	EQ	1.00000	•	1.00000	1.00000	•
A	1762	C0491001	EQ	1.00000	•	1.00000	1.00000	•
A	1763	C0492001	EQ	1.00000	•	1.00000	1.00000	•
A	1764	C0493001	EQ	1.00000	•	1.00000	1.00000	•

TABLE 4.18 Cont'd., COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
A	1765	C0494001	EQ	1.00000	•	1.00000	1.00000	•
A	1766	C0495001	EQ	1.00000	•	1.00000	1.00000	•
A	1767	C0496001	EQ	1.00000	•	1.00000	I.00000	•
A	1768	C0497001	EQ	1.00000	•	1.00000	1.00000	•
A	1769	C0498001	EQ	1.00000	•	1.00000	1.00000	•
A	1770	C0499001	EQ	1.00000	•	1.00000	1.00000	•
A	1771	C0500001	EQ	1.00000	•	1.00000	1.00000	•
A	1772	C0501001	EQ	1.00000	•	1.00000	1.00000	•
A	1773	C0502001	EQ	1.00000	•	1.00000	1.00000	•
A	1774	C0503001	EQ	1.00000	•	1.00000	1.00000	•
A	1775	C0504001	EQ	1.00000	•	1.00000	1.00000	•
A	1776	C0505001	EQ	1.00000	•	1.00000	1.00000	•
A	1777	C0506001	EQ	1.00000	•	1.00000	1.00000	•
	1778	X0001001	IV	1.00000	1347.00000	•	1.00000	1347.00000
	1779	X0002001	IV	•	134.00000	•	1.00000	134.00000
	1780	X0001002	IV	1.00000	2887.00000	•	1.00000	2887.00000
	1781	X0002002	IV	•	288.00000	•	1.00000	288.00000
	1782	X0001003	IV	1.00000	1722.00000-	•	1.00000	1722.00000
	1783	X0002003	IV	•	172.00000	•	2.00000	172.00000
	1784	X0001004	IV	1.00000	924.00000	•	1.00000	924.00000
	1785	X0002004	IV	1.00000	92.00000	•	2.00000	92.00000
	1786	X0001005	IV	1.00000	2436.00000	•	1.00000	2436.00000
	1787	X0002005	IV	•	243.00000	•	3.00000	243.00000
	1788	X0001006	IV	1.00000	1193.00000	•	1.00000	1193.00000
	1789	X0002006	IV	2.00000	119.00000	•	4.00000	119.00000
	1790	X0003006	IV	•	358.00000	•	1.00000	358.00000
	1791	X0001007	IV	1.00000	2982.00000	•	1.00000	2982.00000
	1792	X0002007	IV	•	298.00000	•	3.00000	298.00000
	1793	X0001008	IV	1.00000	1001.00000	•	1.00000	1001.00000
	1794	X0002008	IV	•	100.00000	•	2.00000	100.00000
	1795	X0001009	IV	1.00000	770.00000	•	1.00000	770.00000
	1796	X0002009	IV	•	77.00000	•	1.00000	77.00000
	1797	X0001010	IV	•	2233.00000	•	1.00000	2010.00000
	1798	X0002010	IV	•	223.00000	•	2.00000	•
	1799	X0001011	IV	1.00000	350.00000	•	1.00000	350.00000
	1800	X0002011	IV	•	35.00000	•	1.00000	35.00000
	1801	X0001012	IV	•	2688.00000	•	1.00000	2420.00000
	1802	X0002012	IV	•	268.00000	•	2.00000	•
	1803	X0001013	IV	1.00000	1456.00000	•	1.00000	1456.00000
	1804	X0002013	IV	1.00000	145.00000	•	2.00000	145.00000
	1805	X0001014	IV	1.00000	1484.00000	•	1.00000	1484.00000
	1806	X0002014	IV	1.00000	148.00000	•	1.00000	148.00000
	1807	X0001015	IV	1.00000	1540.00000	•	1.00000	1540.00000
	1808	X0002015	IV	•	154.00000	•	1.00000	154.00000
	1809	X0001016	IV	1.00000	952.00000	•	1.00000	952.00000
	1810	X0002016	IV	1.00000	95.00000	•	2.00000	95.00000
	1811	X0001017	IV	1.00000	3976.00000	•	1.00000	3976.00000
	1812	X0002017	IV	1.00000	397.00000	•	2.00000	397.00000
	1813	X0001019	IV	1.00000	1204.00000	•	1.00000	1204.00000
	1814	X0002019	IV	•	150.00000	•	2.00000	150.00000
	1815	X0001020	IV	•	560.00000	•	1.00000	•

X0001001 ---- Identifies first step of capacity function of transmission facilities internal link number 1. (Table 4.13 page 58.)

X0002008 ---- Identifies second step of capacity function of transmission facilities internal link number 8.

TABLE 4.18 Cont'd.. COLUMNS SECTION INTEGER SOLUTION

NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
1816	X0002020	IV	•	70.00000	•	2.00000	•
1817	X0001021	IV	•	924.00000	•	1.00000	•
1818	X0002021	IV	•	115.00000	•	2.00000	•
1819	X0001022	IV	•	2072.00000	•	1.00000	1813.00000
1820	X0002022	IV	•	259.00000	•	2.00000	•
1821	X0001023	IV	1.00000	756.00000	•	1.00000	756.00000
1822	X0002023	IV	•	94.00000	•	1.00000	94.00000
1823	X0001024	IV	•	2856.00000	•	1.00000	•
1824	X0002024	IV	•	357.00000	•	1.00000	•
1825	X0001025	IV	1.00000	1596.00000	•	1.00000	1596.00000
1826	X0002025	IV	•	199.00000	•	1.00000	199.00000
1827	X0001026	IV	1.00000	1680.00000	•	1.00000	1680.00000
1828	X0002026	IV	•	210.00000	•	2.00000	210.00000
1829	X0001027	IV	•	420.00000	•	1.00000	•
1830	X0002027	IV	•	52.00000	•	1.00000	•
1831	X0001028	IV	•	4004.00000	•	1.00000	4004.00000
1832	X0002028	IV	•	500.00000	•	1.00000	500.00000
1833	X0001029	IV	•	1806.00000	•	1.00000	1626.00000
1834	X0002029	IV	•	180.00000	•	1.00000	•
1835	X0001030	IV	1.00000	840.00000	•	1.00000	840.00000
1836	X0002030	IV	•	84.00000	•	1.00000	84.00000
1837	X0001031	IV	1.00000	6258.00000	•	1.00000	6258.00000
1838	X0002031	IV	•	625.00000	•	1.00000	625.00000
1839	X0001032	IV	1.00000	1386.00000	•	1.00000	1386.00000
1840	X0002032	IV	•	138.00000	•	1.00000	138.00000
1841	X0001033	IV	1.00000	2940.00000	•	1.00000	2940.00000
1842	X0002033	IV	1.00000	294.00000	•	4.00000	294.00000
1843	X0001034	IV	1.00000	3108.00000	•	1.00000	3108.00000
1844	X0002034	IV	•	310.00000	•	1.00000	310.00000
1845	X0001035	IV	•	1484.00000	•	1.00000	1336.00000
1846	X0002035	IV	•	148.00000	•	4.00000	•
1847	X0001036	IV	•	616.00000	•	1.00000	•
1848	X0002036	IV	•	61.00000	•	4.00000	•
1849	X0001037	IV	1.00000	4032.00000	•	1.00000	4032.00000
1850	X0002037	IV	•	403.00000	•	1.00000	403.00000
1851	X0001038	IV	1.00000	980.00000	•	1.00000	980.00000
1852	X0002038	IV	•	98.00000	•	4.00000	98.00000
1853	X0003038	IV	•	294.00000	•	1.00000	294.00000
1854	X0004038	IV	•	98.00000	•	1.00000	98.00000
1855	X0001039	IV	•	2964.00000	•	1.00000	2668.00000
1856	X0002039	IV	•	296.00000	•	3.00000	•
1857	X0001040	IV	1.00000	1715.00000	•	1.00000	1715.00000
1858	X0002040	IV	•	171.00000	•	1.00000	171.00000
1859	X0001041	IV	1.00000	588.00000	•	1.00000	588.00000
1860	X0002041	IV	2.00000	58.00000	•	4.00000	58.00000
1861	X0003041	IV	•	176.00000	•	1.00000	176.00000
1862	X0004041	IV	•	58.00000	•	3.00000	58.00000
1863	X0001042	IV	•	210.00000	•	1.00000	•
1864	X0002042	IV	•	21.00000	•	4.00000	•
1865	X0003042	IV	•	63.00000	•	1.00000	•
1866	X0004042	IV	•	21.00000	•	2.00000	•

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

NUMBER	.COLUMN.	AT	...ACTIVITY...	..INPUT COST..	..LOWER LIMIT.	..UPPER LIMIT.	.REDUCED COST.
1867	X0001043	IV	.	231.00000	.	1.00000	131.33333
1868	X0002043	IV	.	23.00000	.	4.00000	.
1869	X0003043	IV	.	69.00000	.	1.00000	.
1870	X0004043	IV	.	23.00000	.	2.00000	.
1871	X0001044	IV	1.00000	896.00000	.	1.00000	896.00000
1872	X0002044	IV	4.00000	89.00000	.	4.00000	89.00000
1873	X0001045	IV	1.00000	2275.00000	.	1.00000	2275.00000
1874	X0002045	IV	.	227.00000	.	4.00000	227.00000
1875	X0001046	IV	1.00000	672.00000	.	1.00000	672.00000
1876	X0002046	IV	3.00000	67.00000	.	4.00000	67.00000
1877	X0001075	IV	1.00000	1000.00000	.	10.00000	1000.00000
1878	X0001076	IV	.	1000.00000	.	10.00000	.
1879	X0001077	IV	.	1000.00000	.	10.00000	.
1880	X0001078	IV	1.00000	1000.00000	.	10.00000	1000.00000
1881	X0001079	IV	.	1000.00000	.	10.00000	.
1882	X0001080	IV	1.00000	1000.00000	.	10.00000	1000.00000
1883	X0001081	IV	.	1000.00000	.	10.00000	1000.00000
1884	X0001082	IV	1.00000	1000.00000	.	10.00000	1000.00000
1885	X0001083	IV	1.00000	1000.00000	.	10.00000	1000.00000
1886	X0001084	IV	1.00000	1000.00000	.	10.00000	1000.00000
1887	X0001085	IV	.	1000.00000	.	10.00000	1000.00000
1888	X0001086	IV	1.00000	1000.00000	.	10.00000	1000.00000
1889	X0001087	IV	1.00000	1000.00000	.	10.00000	1000.00000
1890	X0001088	IV	.	1000.00000	.	10.00000	.
1891	N0001004	IV	1.00000	30.00000	.	1.00000	30.00000
1892	N0002004	IV	.	8.00000	.	9.00000	.
1893	N0003004	IV	.	18.00000	.	1.00000	90.00000
1894	N0004004	IV	.	8.00000	.	9.00000	8.00000
1895	N0001012	IV	1.00000	30.00000	.	1.00000	30.00000
1896	N0002012	IV	.	8.00000	.	9.00000	8.00000
1897	N0003012	IV	.	18.00000	.	1.00000	18.00000
1898	N0004012	IV	.	8.00000	.	9.00000	8.00000
1899	N0001020	IV	1.00000	30.00000	.	1.00000	30.00000
1900	N0002020	IV	.	8.00000	.	9.00000	8.00000
1901	N0003020	IV	.	18.00000	.	1.00000	.
1902	N0004020	IV	.	8.00000	.	9.00000	10.00000
1903	N0001021	IV	1.00000	30.00000	.	1.00000	30.00000
1904	N0002021	IV	.	8.00000	.	9.00000	8.00000
1905	N0003021	IV	.	18.00000	.	1.00000	.
1906	N0004021	IV	.	8.00000	.	9.00000	10.00000

N0001004 ----Identifies first step of capacity function of intermediary switching node internal node number 4. (Table 4.16 page 68)

N0004012 ----Identifies 4th step of capacity function of intermediary switching node internal node number 12

TABLE 4.18 Cont'd. COLUMNS SECTION INTEGER SOLUTION

MIXSAVE - TIME = 4.00

NAME = TREE1

NODE SAVED	FUNCTIONAL VALUE	ESTIMATION
164	66148.0000	INTEGER
3	16255.7243	35605.2
7	18402.0900	37451.4
10	22309.2100	35966.0
19	29643.2673	37451.0
21	32773.0430	42469.4
23	32228.7733	40146.5
28	41549.2092	46128.0
30	41346.0993	48451.0
34	42925.1688	49150.4
41	45850.7354	49241.1
47	47876.7002	51851.4
49	49566.7002	52436.8
57	52963.3683	54097.3
58	53542.2593	54577.0
62	54699.9516	55589.7
66	54568.9418	55275.6
69	19969.8279	34583.0
70	23955.4071	39786.4
79	33281.9819	40676.7
89	43719.3958	48397.3
96	45732.7244	48047.2
101	47961.1302	50281.5
104	50308.2202	52156.7
108	52816.5214	53418.3
112	53594.0288	54260.4
116	54574.4620	54657.7
119	54510.1266	55103.1
122	54537.5608	54819.4
123	54461.8336	54545.1
125	54462.5595	54545.8
128	54489.5355	54572.8
132	56612.8334	56696.1
133	54614.0339	54951.6
136	54614.0310	54951.6
138	54615.2483	54953.4
140	54618.2439	54952.0
142P	56941.2995	57465.4
144	54949.3347	56068.1
145	56010.2014	56262.1
148	55949.3347	57068.1
150	58075.1477	58327.0
151	57115.1989	57690.7
158	63465.7392	64543.1

MIXSTATS - TIME = 4.01

NOTE: Node saved refers to internal nodes of branch and bound tree generation of the M.P.S.X. program. These nodes have no correspondence with either the transmission facilities or switching networks.

TABLE 4.19 MPSX LANGUAGE NODES SAVED ON TAPE FILE FOR ADDITIONAL SOLUTIONS

INTEGER NODES

NODE	164
FUNCTIONAL	66148.0000
ESTIMATION	INTEGER

1198= C0001001	1.0000	←First profile of demand pair 1 from switching network is in the solution.
1199= C0001002	•	
1200= C0002001	1.0000	←First profile of demand pair 2 from switching network is in the solution.
1201= C0002002	•	
1220= C0021001	•	
1221= C0021002	1.0000	←Second profile of demand pair number 21 from switching network is in the solution.
1222= C0022001	•	
1223= C0022002	1.0000	
1226= C0025001	•	
1227= C0025002	1.0000	
1228= C0026001	•	
1229= C0026002	1.0000	
1252= C0049001	1.0000	
1253= C0049002	•	
1254= C0050001	1.0000	
1255= C0050002	•	
1260= C0055001	1.0000	
1261= C0055002	•	
1262= C0056001	1.0000	
1263= C0056002	•	
1268= C0061001	•	
1269= C0061002	•	
1270= C0061003	•	
1271= C0061004	1.0000	
1272= C0062001	•	
1273= C0062002	•	
1274= C0062003	•	
1275= C0062004	1.0000	
1294= C0081001	•	
1295= C0081002	1.0000	
1296= C0082001	•	
1297= C0082002	1.0000	
1314= C0099001	1.0000	
1315= C0099002	•	
1316= C0100001	1.0000	
1317= C0100002	•	
1330= C0113001	•	
1331= C0113002	1.0000	

TABLE 4.20 ELEMENTS OF PROBLEM WHICH ARE ASSIGNED INTEGER VARIABLES IN SOLUTION

I	1332= C0114001	.	I
I	1333= C0114002	1.0000	I
I	1350= C0131001	1.0000	I
I	1351= C0131002	.	I
I	1352= C0132001	1.0000	I
I	1353= C0132002	.	I
I	1354= C0133001	1.0000	I
I	1355= C0133002	.	I
I	1356= C0134001	1.0000	I
I	1357= C0134002	.	I
I	1362= C0139001	.	I
I	1363= C0139002	.	I
I	1364= C0139003	.	I
I	1365= C0139004	1.0000	I
I	1366= C0140001	.	I
I	1367= C0140002	.	I
I	1368= C0140003	.	I
I	1369= C0140004	1.0000	I
I	1404= C0175001	.	I
I	1405= C0175002	1.0000	I
I	1406= C0176001	.	I
I	1407= C0176002	1.0000	I
I	1410= C0179001	.	I
I	1411= C0179002	1.0000	I
I	1412= C0180001	.	I
I	1413= C0180002	1.0000	I
I	1424= C0191001	.	I
I	1425= C0191002	1.0000	I
I	1426= C0192001	.	I
I	1427= C0192002	1.0000	I
I	1442= C0207001	.	I
I	1443= C0207002	1.0000	I
I	1444= C0208001	.	I
I	1445= C0208002	1.0000	I
I	1470= C0233001	.	I
I	1471= C0233002	1.0000	I
I	1472= C0234001	.	I
I	1473= C0234002	1.0000	I
I	1482= C0243001	1.0000	I
I	1483= C0243002	.	I
I	1484= C0244001	1.0000	I
I	1485= C0244002	.	I
I	1504= C0263001	.	I
I	1505= C0263002	1.0000	I
I	1506= C0264001	.	I
I	1507= C0264002	1.0000	I
I	1514= C0271001	.	I
I	1515= C0271002	1.0000	I
I	1516= C0272001	.	I
I	1517= C0272002	1.0000	I
I	1518= C0273001	1.0000	I
I	1519= C0273002	.	I
I	1520= C0274001	1.0000	I
I	1521= C0274002	.	I

TABLE 4.20 Cont'd. ELEMENTS OF PROBLEM WHICH ARE ASSIGNED INTEGER VARIABLES IN SOLUTION

I	1540= C0293001	I	1.0000	I
I	1541= C0293002	I	•	I
I	1542= C0294001	I	1.0000	I
I	1543= C0294002	I	•	I
I	1574= C0325001	I	•	I
I	1575= C0325002	I	1.0000	I
I	1576= C0326001	I	•	I
I	1577= C0326002	I	1.0000	I
I	1596= C0345001	I	•	I
I	1597= C0345002	I	1.0000	I
I	1598= C0346001	I	•	I
I	1599= C0346002	I	1.0000	I
I	1604= C0351001	I	•	I
I	1605= C0351002	I	1.0000	I
I	1606= C0352001	I	•	I
I	1607= C0352002	I	1.0000	I
I	1610= C0355001	I	•	I
I	1611= C0355002	I	1.0000	I
I	1612= C0356001	I	•	I
I	1613= C0356002	I	1.0000	I
I	1622= C0365001	I	•	I
I	1623= C0365002	I	1.0000	I
I	1624= C0366001	I	•	I
I	1625= C0366002	I	1.0000	I
I	1628= C0369001	I	•	I
I	1629= C0369002	I	1.0000	I
I	1630= C0370001	I	•	I
I	1631= C0370002	I	1.0000	I
I	1658= C0397001	I	•	I
I	1659= C0397002	I	1.0000	I
I	1660= C0398001	I	•	I
I	1661= C0398002	I	1.0000	I
I	1668= C0405001	I	1.0000	I
I	1669= C0405002	I	•	I
I	1670= C0406001	I	1.0000	I
I	1671= C0406002	I	•	I
I	1674= C0409001	I	•	I
I	1675= C0409002	I	1.0000	I
I	1676= C0410001	I	•	I
I	1677= C0410002	I	1.0000	I
I	1678= C0411001	I	•	I
I	1679= C0411002	I	1.0000	I
I	1680= C0412001	I	•	I
I	1681= C0412002	I	1.0000	I
I	1744= C0475001	I	•	I
I	1745= C0475002	I	1.0000	I
I	1746= C0476001	I	•	I
I	1747= C0476002	I	1.0000	I
I	1778= X0001001	I	1.0000	I ←---- First voice circuit channel step of internal link number 1 is installed in the solution.
I	1779= X0002001	I	•	I
I	1780= X0001002	I	1.0000	I
I	1781= X0002002	I	•	I
I	1782= X0001003	I	1.0000	I
I	1783= X0002003	I	•	I

TABLE 4.20 Cont'd. ELEMENTS OF PROBLEM WHICH ARE ASSIGNED INTEGER VARIABLES IN SOLUTION

I	1784= X0001004	1.0000	I
I	1785= X0002004	1.0000	I
I	1786= X0001005	1.0000	I
I	1787= X0002005	.	I
I	1788= X0001006	1.0000	I
I	1789= X0002006	2.0000	I
I	1790= X0003006	.	I
I	1791= X0001007	1.0000	I
I	1792= X0002007	.	I
I	1793= X0001008	1.0000	I
I	1794= X0002008	.	I
I	1795= X0001009	1.0000	I
I	1796= X0002009	.	I
I	1797= X0001010	.	I
I	1798= X0002010	.	I
I	1799= X0001011	1.0000	I
I	1800= X0002011	.	I
I	1801= X0001012	.	I
I	1802= X0002012	.	I
I	1803= X0001013	1.0000	I
I	1804= X0002013	1.0000	I
I	1805= X0001014	1.0000	I
I	1806= X0002014	1.0000	I
I	1807= X0001015	1.0000	I
I	1808= X0002015	.	I
I	1809= X0001016	1.0000	I
I	1810= X0002016	1.0000	I
I	1811= X0001017	1.0000	I
I	1812= X0002017	1.0000	I
I	1813= X0001019	1.0000	I
I	1814= X0002019	.	I
I	1815= X0001020	.	I
I	1816= X0002020	.	I
I	1817= X0001021	.	I
I	1818= X0002021	.	I
I	1819= X0001022	.	I
I	1820= X0002022	.	I
I	1821= X0001023	1.0000	I
I	1822= X0002023	.	I
I	1823= X0001024	.	I
I	1824= X0002024	.	I
I	1825= X0001025	1.0000	I
I	1826= X0002025	.	I
I	1827= X0001026	1.0000	I
I	1828= X0002026	.	I
I	1829= X0001027	.	I
I	1830= X0002027	.	I
I	1831= X0001028	.	I
I	1832= X0002028	.	I
I	1833= X0001029	.	I
I	1834= X0002029	.	I
I	1835= X0001030	1.0000	I
I	1836= X0002030	.	I
I	1837= X0001031	1.0000	I

TABLE 4.20 Cont'd.ELEMENTS OF PROBLEM WHICH ARE ASSIGNED INTEGER VARIABLES IN SOLUTION

I	1838= X0002031	.	I
I	1839= X0001032	1.0000	I
I	1840= X0002032	.	I
I	1841= X0001033	1.0000	I
I	1842= X0002033	1.0000	I
I	1843= X0001034	1.0000	I
I	1844= X0002034	.	I
I	1845= X0001035	.	I
I	1846= X0002035	.	I
I	1847= X0001036	.	I
I	1848= X0002036	.	I
I	1849= X0001037	1.0000	I
I	1850= X0002037	.	I
I	1851= X0001038	1.0000	I
I	1852= X0002038	.	I
I	1853= X0003038	.	I
I	1854= X0004038	.	I
I	1855= X0001039	.	I
I	1856= X0002039	.	I
I	1857= X0001040	1.0000	I
I	1858= X0002040	.	I
I	1859= X0001041	1.0000	I
I	1860= X0002041	2.0000	I
I	1861= X0003041	.	I
I	1862= X0004041	.	I
I	1863= X0001042	.	I
I	1864= X0002042	.	I
I	1865= X0003042	.	I
I	1866= X0004042	.	I
I	1867= X0001043	.	I
I	1868= X0002043	.	I
I	1869= X0003043	.	I
I	1870= X0004043	.	I
I	1871= X0001044	1.0000	I
I	1872= X0002044	4.0000	I
I	1873= X0001045	1.0000	I
I	1874= X0002045	.	I
I	1875= X0001046	1.0000	I
I	1876= X0002046	3.0000	I
I	1877= X0001075	1.0000	I
I	1878= X0001076	.	I
I	1879= X0001077	.	I
I	1880= X0001078	1.0000	I
I	1881= X0001079	.	I
I	1882= X0001080	1.0000	I
I	1883= X0001081	.	I
I	1884= X0001082	1.0000	I
I	1885= X0001083	1.0000	I
I	1886= X0001084	1.0000	I
I	1887= X0001085	.	I
I	1888= X0001086	1.0000	I
I	1889= X0001087	1.0000	I
I	1890= X0001088	.	I
I	1891= N0001004	1.0000	I

TABLE 4.20 Cont'd. ELEMENTS OF PROBLEM WHICH ARE ASSIGNED INTEGER VARIABLES IN SOLUTION

1892=	N0002004	•	
1893=	N0003004	•	
1894=	N0004004	•	
1895=	N0001012	1.0000	----First switching machine of intermediary switching node internal node number 12 is
1896=	N0002012	•	installed for this solution.
1897=	N0003012	•	
1898=	N0004012	•	
1899=	N0001020	1.0000	
1900=	N0002020	•	
1901=	N0003020	•	
1902=	N0004020	•	
1903=	N0001021	1.0000	
1904=	N0002021	•	
1905=	N0003021	•	
1906=	N0004021	•	

TABLE 4.20 Cont'd. ELEMENTS OF PROBLEM WHICH ARE ASSIGNED INTEGER VARIABLES IN SOLUTION

MPSX - MIXED INTEGER PROGRAM - RELEASE 1 MOD LEVEL 4

PROBLEM NAME = PROB DATE = 75/023

.....PROBLEM STATISTICS.....		...COMPUTATIONAL ELEMENTS....		.........ENVIRONMENT..........	
ROWS	440	FUNCTIONAL (MIN)	COST1	C.P.U	
COLUMNS	1466	RESTRAINTS	RHS1	CORE ALLOCATED	350280
VARIABLES	1906	BOUNDS	BND1		
INTEGER VARIABLES	269			SCRATCH ON ......DISK	3330
ELEMENTS	13409			MATRIX ON ......DISK	3330
DENSITY	1.59			ETA ON ......DISK	3330
				MIXWORK ON ......DISK	3330
				PROBFILE ON ......TAPE	3400

	TIME SINCE MIXSTART	ITERATION NO. SINCE SETUP	NODE NO.	FUNCTIONAL VALUE	STRATEGY
CONTINUOUS OPTIMUM		637	1	13984.6053	
FIRST INTEGER SOLUTION	13.60	2096	164	66148.0000	
BEST INTEGER SOLUTION	13.60	2096	164	66148.0000	
TIME OF SEARCH	13.60	2096	164		

NUMBER OF INTEGER VARIABLES NOT INTEGER AT CONTINUOUS OPTIMUM = 99

NUMBER OF INTEGER SOLUTIONS FOUND = 1

IF RESUMED, SEARCH CANNOT PRODUCE NEW INTEGER SOLUTION BETTER THAN 16255.7227

BRANCHES ABANDONED WHILE COMPUTING = 76

NOTE: The first integer solution and the best integer solution are identical since only one integer solution was requested.

TABLE 4.21 SUMMARY OF STATISTICS

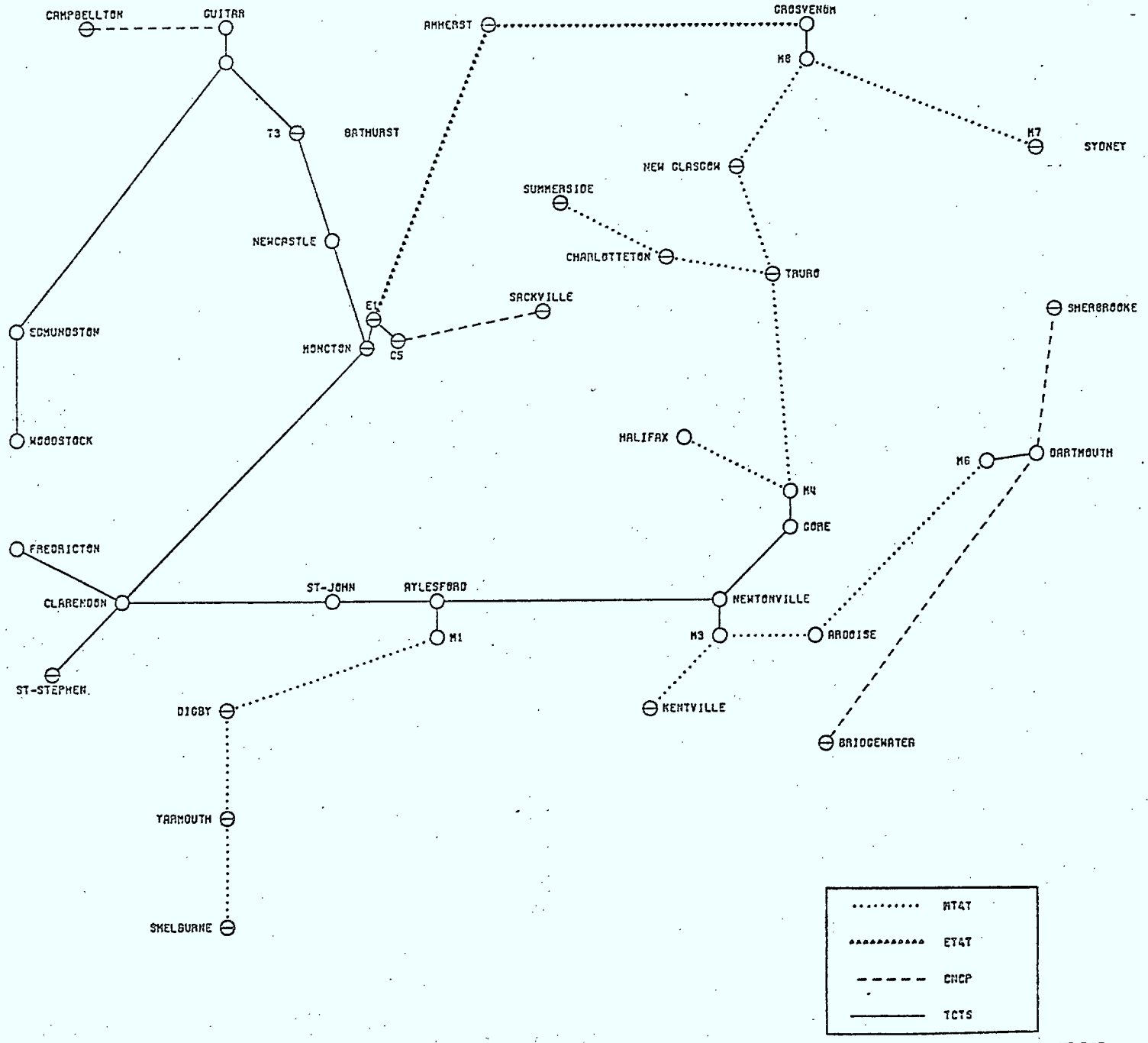


FIGURE 4.8 MARITIMES NETWORK TRANSMISSION FACILITIES SOLUTION

LINK			TOTAL VOICE CIRCUITS PER LINK IN SWITCHING NETWORK
WOODSTOC	-	FREDRICT	
WOODSTOC	-	EDMUNDST	6.0
EDMUNDST	-	NEWCASTL	
FREDRICT	-	NEWCASTL	
FREDRICT	-	MONCTON	12.0
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	18.0
BATHURST	-	TRURO	4.0
KENTVILL	-	TRURO	6.0
KENTVILL	-	BRIDGEWA	
KENTVILL	-	DIGBY	10.0
DIGBY	-	YARMOUTH	6.0
YARMOUTH	-	SHELBURN	8.0
SHELBURN	-	BRIDGEWA	4.0
ST. JOHN	-	CAMPBELL	55.0

TABLE 4.22 JOB STEP RESULTS OUTPUT

LINK	TOTAL VOICE CIRCUITS PER LINK IN SWITCHING NETWORK
ST. JOHN - BATHURST	65.0
ST. JOHN - SUMMERSI	30.0
ST. JOHN - CHARLOTT	38.0
ST. JOHN - NEW GLAS	39.0
ST. JOHN - SYDNEY	32.0
ST. JOHN - AMHERST	54.0
ST. JOHN - KENTVILL	27.0
ST. JOHN - DIGBY	26.0
ST. JOHN - YARMOUTH	25.0
MONCTON - HALIFAX	59.0
NEWCASTL - HALIFAX	92.0
FREDRICT - HALIFAX	40.0
ST. JOHN - ST. STEP	118.0
ST. JOHN - WOODSTOC	143.0
ST. JOHN - EDMUNDST	132.0
ST. JOHN - FREDRICT	183.0
ST. JOHN - NEWCASTL	249.0
ST. JOHN - MONCTON	217.0
ST. JOHN - HALIFAX	510.0
CAMPBELL - NEWCASTL	112.0
BATHURST - NEWCASTL	121.0
SUMMERSI - HALIFAX	120.0
CHARLOTT - HALIFAX	135.0
NEW GLAS - HALIFAX	149.0
SHELBURN - HALIFAX	105.0
BRIDGEWA - HALIFAX	134.0
YARMOUTH - HALIFAX	113.0
DIGBY - HALIFAX	105.0

TABLE 4.22 Cont'd. JOB STEP RESULTS OUTPUT

LINK	TOTAL VOICE CIRCUITS PER LINK IN SWITCHING NETWORK
KENTVILL - HALIFAX	135.0
AMHERST - HALIFAX	214.0
TRURO - HALIFAX	149.0
SYDNEY - HALIFAX	147.0
SHERBROO - HALIFAX	102.0
SACKVILL - AMHERST	116.0

TABLE 4.22 Cont'd. JOB STEP RESULTS OUTPUT

NODES	TOTAL NUMBER OF LINES SWITCHED PER NODE IN SWITCHING NETWORK
WOODSTOC	
FREDRICT	
EDMUNDST	
NEWCASTL	14.3
MONCTON	
CAMPBELL	
BATHURST	
SUMMERSI	
CHARLOTT	
NEw GLAS	
TRURO	
AMHERST	14.7
KENTVILL	
SHERBROO	
SYDNEY	
BRIDGEWA	
DIGBY	
YARMOUTH	
SHELBURN	
ST. JOHN	107.4
HALIFAX	101.0
ST. STEP	
SACKVILL	

TABLE 4.22 Cont'd. JOB STEP RESULTS OUTPUT

CHAINS AS SELECTED BY MPSX(LINK NO.)

FROM	TO
WOODSTOC-EDMUNDST	WOODST-EDMUND-
FREDRICT-MONCTON	FREDRI-CLAREN-T5 MON-MONCTO-
CAMPBELL-MONCTON	CAMPBE-C1 CAM-C2 GUI-T2 GUI-T3 BAT-T4 NEW-T5 MON-MONCTO-
BATHURST-MONCTON	BATHUR-T3 BAT-T4 NEW-T5 MON-MONCTO-
NEWCASTL-MONCTON	NEWCAS-T4 NEW-T5 MON-MONCTO-
SUMMERSI-MONCTON	SUMMER-CHARLO-TRURO -NEW GL-M8 GRO-E2 GRO-AMHERS-E1 MON-MONCTO-
SUMMERSI-CHARLOTT	SUMMER-CHARLO-
CHARLOTT-MONCTON	CHARLO-TRURO -NEW GL-M8 GRO-E2 GRO-AMHERS-E1 MON-MONCTO-
CHARLOTT-NEW GLAS	CHARLO-TRURO -NEW GL-
MONCTON -TRURO	MONCTO-E1 MON-AMHERS-E2 GRO-M8 GRO-NEW GL-TRURO -
MONCTON -AMHERST	MONCTO-E1 MON-AMHERS-
MONCTON -KENTVILL	MONCTO-E1 MON-AMHERS-E2 GRO-M8 GRO-NEW GL-TRURO -M4 GOR-T8 GOR-T7 NEW-M3 NEW-KENTVI-
NEW GLAS-AMHERST	NEW GL-M8 GRO-E2 GRO-AMHERS-
NEW GLAS-TRURO	NEW GL-TRURO -

TABLE 4.22 Cont'd. JOB STEP RESULTS OUTPUT

CHAINS AS SELECTED BY MPSX(LINK NO.)

FROM	TO
NEW GLAS-SYDNEY	NEW GL-M8 GRO-M7 SYD-SYDNEY-
BATHURST-TRURO	BATHUR-T3 BAT-T4 NEW-T5 MON-E1 MON-AMHERS-E2 GRO-M8 GRO-NEW GL-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-
SHELBURN-BRIDGEWA	SHELBU-YARMOU-DIGBY -M1 AYL-T6 AYL-T7 NEW-M3 NEW-ARDOIS-M6 DAR-C7 DAR-C6 BRI-BRIDGE-
ST. JOHN-CAMPBELL	ST. JO-CLAREN-T5 MON-T4 NEW-T3 BAT-T2 GUI-C2 GUI-C1 CAM-CAMPBE-
ST. JOHN-BATHURST	ST. JO-CLAREN-T5 MON-T4 NEW-T3 BAT-BATHUR-
ST. JOHN-SUMMERSI	ST. JO-CLAREN-T5 MON-E1 MON-AMHERS-E2 GRO-M8 GRO-NEW GL-TRURO -CHARLO-SUMMER-
ST. JOHN-CHARLOTT	ST. JO-CLAREN-T5 MON-E1 MON-AMHERS-E2 GRO-M8 GRO-NEW GL-TRURO -CHARLO-
ST. JOHN-NEW GLAS	ST. JO-CLAREN-T5 MON-E1 MON-AMHERS-E2 GRO-M8 GRO-NEW GL-
ST. JOHN-SYDNEY	ST. JO-CLAREN-T5 MON-E1 MON-AMHERS-E2 GRO-M8 GRO-M7 SYD-SYDNEY-
ST. JOHN-AMHERST	ST. JO-CLAREN-T5 MON-E1 MON-AMHERS-
ST. JOHN-KENTVILL	ST. JO-T6 AYL-T7 NEW-M3 NEW-KENTVI-

TABLE 4.22 Cont'd. JOB STEP RESULTS OUTPUT

CHAINS AS SELECTED BY MPSX(LINK NO.)

FROM	TO
ST. JOHN-DIGBY	ST. JO-T6 AYL-M1 AYL-DIGBY -
ST. JOHN-YARMOUTH	ST. JO-T6 AYL-M1 AYL-DIGBY -YARMOU-
MONCTON -HALIFAX	MONCTO-E1 MON-AMHERS-E2 GRO-M8 GRO-NEW GL-TRURO -M4 GOR-HALIFA-
NEWCASTL-HALIFAX	NEWCAS-T4 NEW-T5 MON-E1 MON-AMHERS-E2 GRO-M8 GRO-NEW GL-TRURO -M4 GOR-HALIFA-
FREDRICT-HALIFAX	FREDRI-CLAREN-T5 MON-E1 MON-AMHERS-E2 GRO-M8 GRO-NEW GL-TRURO -M4 GOR-HALIFA-
ST. JOHN-ST. STEP	ST. JO-CLAREN-ST. ST-
ST. JOHN-WOODSTOC	ST. JO-CLAREN-T5 MON-T4 NEW-T3 BAT-T2 GUI-EDMUND-WOODST-
ST. JOHN-EDMUNDST	ST. JO-CLAREN-T5 MON-T4 NEW-T3 BAT-T2 GUI-EDMUND-
ST. JOHN-FREDRICT	ST. JO-CLAREN-FREDRI-
ST. JOHN-NEWCASTL	ST. JO-CLAREN-T5 MON-T4 NEW-NEWCAS-
ST. JOHN-MONCTON	ST. JO-CLAREN-T5 MON-MONCTO-
ST. JOHN-HALIFAX	ST. JO-T6 AYL-T7 NEW-T8 GOR-M4 GOR-HALIFA-
ST. JOHN-HALIFAX	ST. JO-CLAREN-T5 MON-E1 MON-AMHERS-E2 GRO-M8 GRO-NEW GL-TRURO -M4 GOR-HALIFA-
CAMPBELL-NEWCASTL	CAMPBE-C1 CAM-C2 GUI-T2 GUI-T3 BAT-T4 NEW-NEWCAS-

TABLE 4.22 Cont'd. JOB STEP RESULTS OUTPUT

CHAINS AS SELECTED BY MPSX(LINK NO.)

FROM	TO
BATHURST-NEWCASTL	BATHUR-T3 BAT-T4 NEW-NEWCAS-
SUMMERSI-HALIFAX	SUMMER-CHARLO-TRURO -M4 GOR-HALIFA-
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-E2 GRO-M8 GRO-NEW GL-TRURO -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-

TABLE 4.22 Cont'd. JOB STEP RESULTS OUTPUT

TRANSMISSION LINKS STATISTICS

LINK	CHANNELS INSTALLED	COST($)	UNUSED CAPACITY	USED CAPACITY
SUMMERSI-CHARLOTT	1	134750	780	180
CHARLOTT-TRURO	1	288750	619	341
TRURO -NEW GLAS	1	172200	375	825
TRURO -M4 GORE	2	101640	791	1129
NEW GLAS-M8 GROSV	1	243600	477	723
M4 GORE -HALIFAX	3	143220	571	2309
M8 GROSV-M7 SYDNE	1	298200	1003	197
ARDOISE -M6 DARTM	1	100100	720	240
ARDOISE -M3 NEWTO	1	77000	360	240
M3 NEWTO-KENTVILL	1	35000	418	182
M1 AYLES-DIGBY	2	160160	92	388
DIGBY -YARMOUTH	2	163240	227	253
YARMOUTH-SHELBURN	1	154000	123	109
E1 MONCT-AMHERST	2	104720	406	554
E2 GROSV-AMHERST	2	437360	370	590
C1 CAMPB-C2 GUITA	1	120400	427	173
C5 MONCT-SACKVILL	1	75600	1084	116
C7 DARTM-C6 BRIDG	1	159600	822	138
C7 DARTM-SHERBROO	1	168000	1098	102
T2 GUITA-T3 BATHU	1	84000	752	448
T2 GUITA-EDMUNDST	1	625800	925	275
T3 BATHU-T4 NEWCA	1	138600	554	646
EDMUNDST-WOODSTOC	2	323400	81	149
T4 NEWCA-T5 MONCT	1	310800	427	773
T5 MONCT-CLARENDO	1	403200	80	1120
FREDRICT-CLARENDO	1	98000	245	235
CLARENDO-ST. STEP	1	171500	482	118
CLARENDO-ST. JOHN	3	70560	71	1369
T8 GORE -T7 NEWTO	5	125440		1200
ST. JOHN-T6 AYLES	1	227500	26	574
T6 AYLES-T7 NEWTO	4	87360	100	860
C2 GUITA-T2 GUITA	1	100000	1627	173
M1 AYLES-T6 AYLES	1	100000	1412	388
M3 NEWTO-T7 NEWTO	1	100000	1378	422
T8 GORE -M4 GORE	1	100000	600	1200
M6 DARTM-C7 DARTM	1	100000	1560	240
M8 GROSV-E2 GROSV	1	100000	1210	590
T5 MONCT-E1 MONCT	1	100000	1457	343
E1 MONCT-C5 MONCT	1	100000	1684	116
TOTAL COST OF TRANSMISSION		6603700		

TABLE 4.22 Cont'd. JOB STEP RESULTS OUTPUT

SWITCHING NODE STATISTICS

NODE	SWITCHING MACHINES INSTALLED	COST($)	UNUSED CAPACITY
ST. JOHN	1	3000	285.8
HALIFAX	1	3000	285.6
NEWCASTL	1	3000	194.8
AMHERST	1	3000	203.8
TOTAL SWITCHING NODE COSTS		12000	

TOTAL COST TRANSMISSION AND SWITCHING ($) 6615700

TABLE 4.22 Cont'd. JOB STEP RESULTS OUTPUT

4.4 NORTHERN NETWORK PROBLEM

The Northern Network problem is a combination of network creation and network expansion. The problem consisted of creating a new transmission facilities network in Northern Ontario and the expansion of the existing transmission facilities network.

Point to point traffic in C.C.S. or Erlangs was not available for the switching network. Although CHARGE was not used in the simulation, figure 4.9 illustrates the switching network configuration.

Table 4.23 represents the demand traffic in voice circuits. Demand on the transmission facilities network consisted of thirty six demand pairs of unswitched divisible traffic and two demand pairs of unswitched non divisible traffic.

The very low values of demand (table 4.23) resulted in only one transmission facilities chain for each demand pair. This was due to the minimum cost chain (costs set at upper bounds) being equal to the cost chains set at lower bounds. This problem was remedied by spliting the capacity and cost functions such that the marginal upper and lower bound costs were not equal. The procedure followed was to execute job step BORNE with split capacity and cost functions and then to execute CADUCE. Job step BORNE was then rerun with the original capacity and cost functions. Job steps SETUP, TRANCHE, and RESULTS were then executed in the above order. Job step

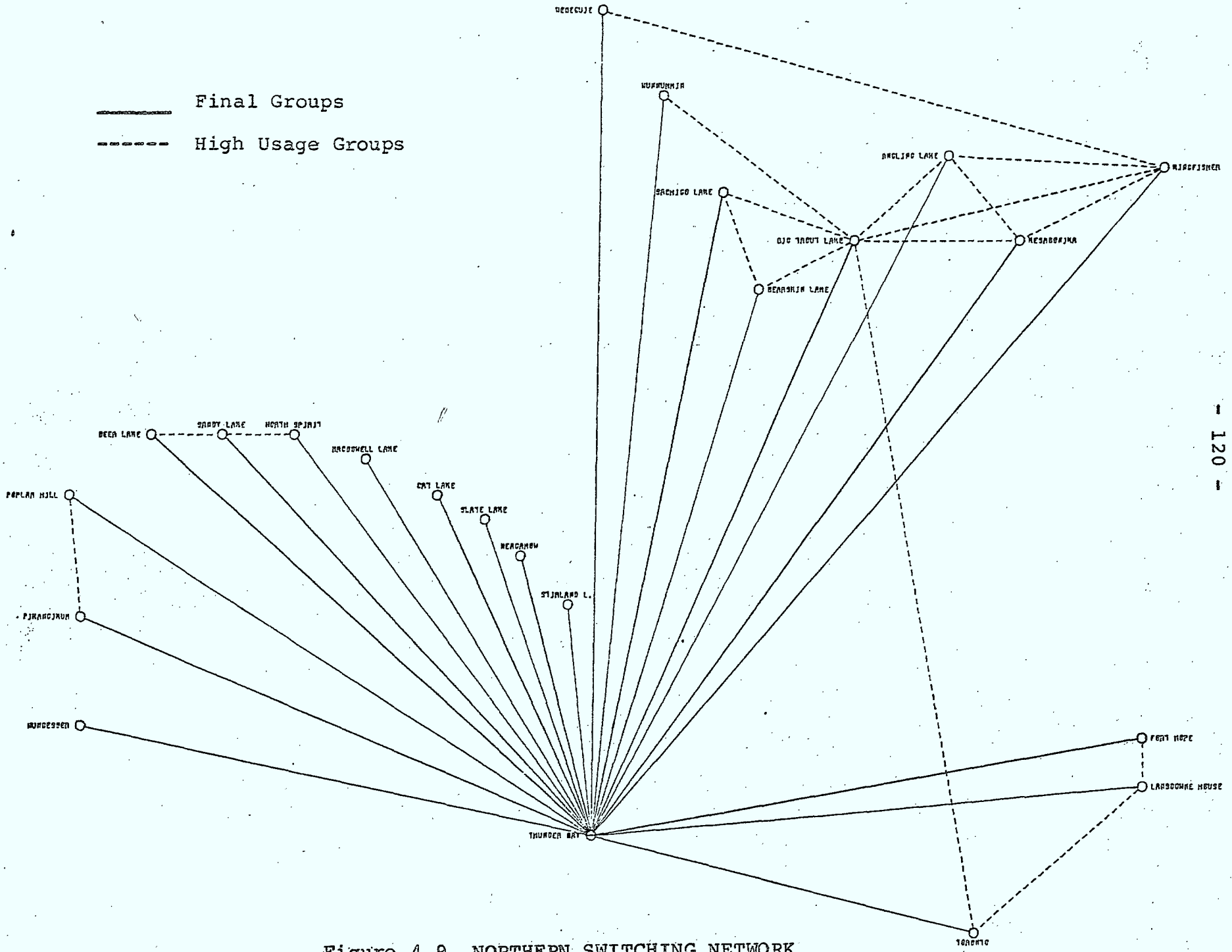


Figure 4.9 NORTHERN SWITCHING NETWORK

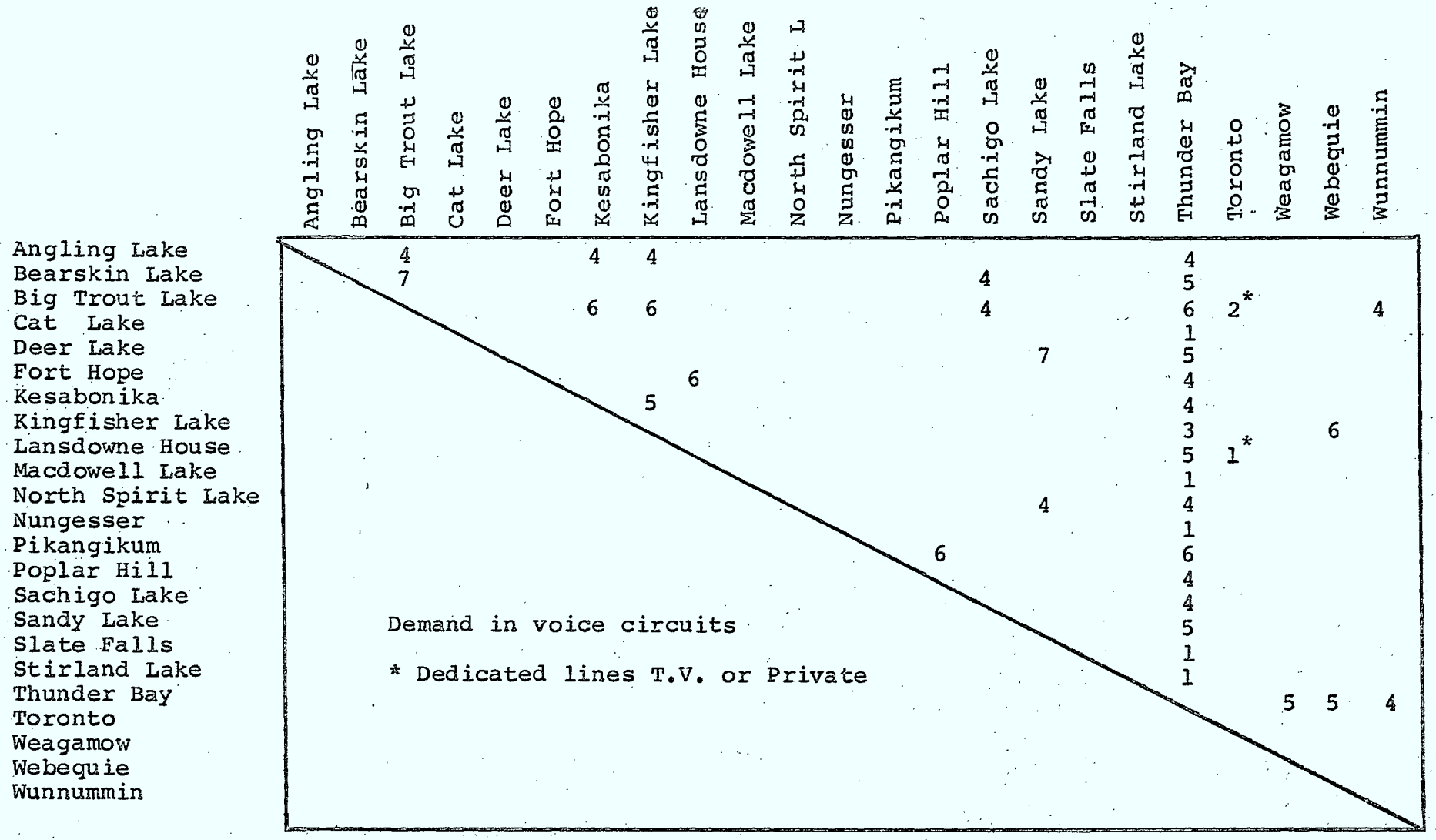


TABLE 4.23 TRAFFIC DEMAND MATRIX FOR NORTHERN PROBLEM

CONTRA was not executed because there were no switching network profiles (CHARGE not executed).

Figure 4.10 illustrates the initial or starting transmission facilities network. Figure 4.11 illustrates the transmission facilities links installed for the integer solution.

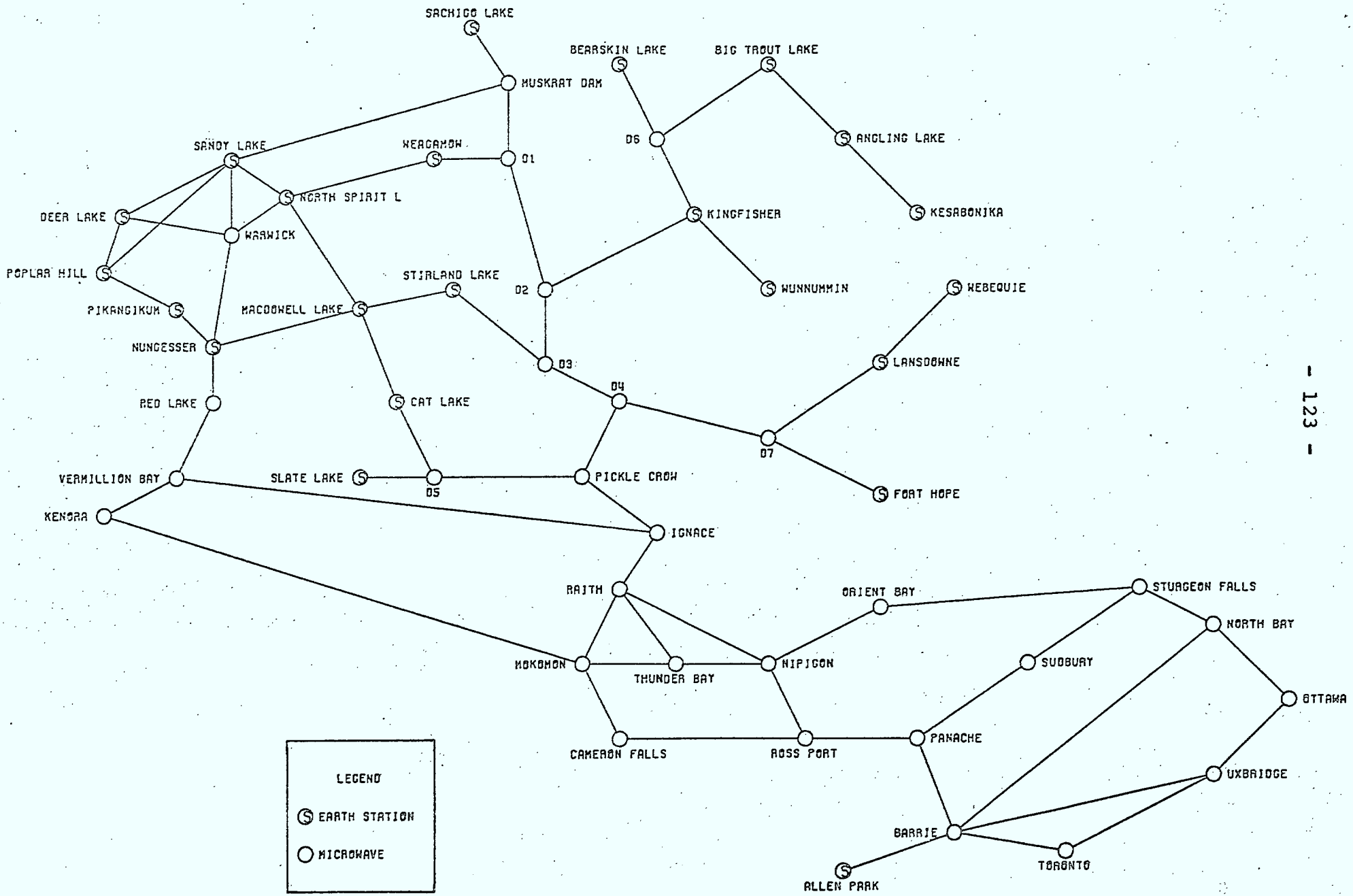


Figure 4.10 Initial Transmission Facilities Network

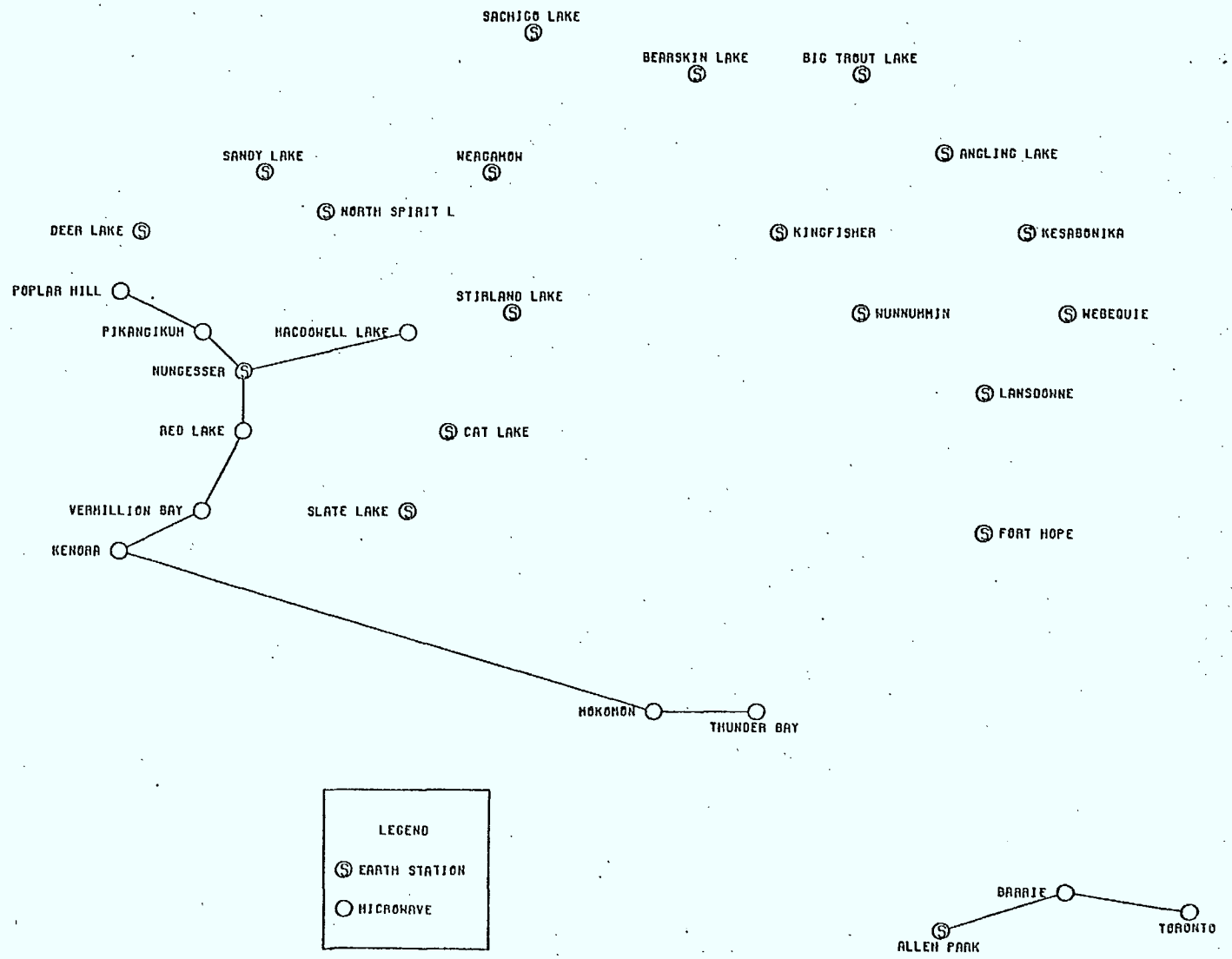


Figure 4.11 Integer Solution of Transmission Facilities

EXTERNAL NODE NAME	INTERNAL NODE NUMBER
PIKANGIK	1
ALLEN PA	2
POPLAR H	3
DEER LAK	4
SANDY LA	5
MACDOWEL	6
NUNGESSE	7
NORTH SP	8
WEAGAMOW	9
FORT HOP	10
LANSDOWN	11
KINGFISH	12
WUNNUMMI	13
BIG TROU	14
WEBEQUIE	15
KESABONI	16
BEARSKIN	17
SACHIGO	18
ANGLING	19
CAT LAKE	20
SLATE FA	21
STIRLAND	22
D6	23
D2	24
D3	25
D4	26

TABLE 4.24 EXTERNAL NODE NAMES AND INTERNAL NODE NUMBERS

EXTERNAL NODE NAME	INTERNAL NODE NUMBER
D7	27
D1	28
MUSKRAT	29
PICKLE C	30
D5	31
WARWICK	32
RED LAKE	33
VERMILLI	34
KENORA	35
IGNACE	36
RAITH	37
THUNDER	38
NCKOMON	39
CAMERON	40
NIPIGON	41
ROSS POR	42
ORIENT B	43
PANACHE	44
STURGEON	45
NORTH BA	46
OTTAWA	47
UXBRIDGE	48
TORONTO	49
BARRIE	50
SUDBURY	51

TABLE 4.24 Cont'd. EXTERNAL NODE NAMES AND INTERNAL NODE NUMBERS

FROM	TO	CARRIER	MILES	INTER LINK NO	QTY	V.C. TYPE(1)	QTY	V.C. TYPE(2)	QTY	V.C. TYPE(3)	QTY	V.C. TYPE(4)	TOTAL
PIKANGIK	ALLEN PA	SAT	10	1	1	1	1	299	0	0	0	0	2
POPLAR H	ALLEN PA	SAT	10	2	1	1	1	299	0	0	0	0	2
DEER LAK	ALLEN PA	SAT	10	3	1	1	1	299	0	0	0	0	2
SANDY LA	ALLEN PA	SAT	10	4	1	1	1	299	0	0	0	0	2
MACDOWEL	ALLEN PA	SAT	10	5	1	1	1	299	0	0	0	0	2
NUNGESSE	ALLEN PA	SAT	10	6	1	1	1	299	0	0	0	0	2
NORTH SP	ALLEN PA	SAT	10	7	1	1	1	299	0	0	0	0	2
WEAGAMOW	ALLEN PA	SAT	10	8	1	1	1	299	0	0	0	0	2
FORT HOP	ALLEN PA	SAT	10	9	1	1	1	299	0	0	0	0	2
LANSDOWN	ALLEN PA	SAT	10	10	1	1	1	299	0	0	0	0	2
KINGFISH	ALLEN PA	SAT	10	11	1	1	1	299	0	0	0	0	2
WUNNUMMI	ALLEN PA	SAT	10	12	1	1	1	299	0	0	0	0	2
BIG TROU	ALLEN PA	SAT	10	13	1	1	1	299	0	0	0	0	2
WEBEQUIE	ALLEN PA	SAT	10	14	1	1	1	299	0	0	0	0	2
KESABONI	ALLEN PA	SAT	10	15	1	1	1	299	0	0	0	0	2
BEARSKIN	ALLEN PA	SAT	10	16	1	1	1	299	0	0	0	0	2
SACHIGO	ALLEN PA	SAT	10	17	1	1	1	299	0	0	0	0	2
ANGLING	ALLEN PA	SAT	10	18	1	1	1	299	0	0	0	0	2
CAT LAKE	ALLEN PA	SAT	10	19	1	1	1	299	0	0	0	0	2
SLATE FA	ALLEN PA	SAT	10	20	1	1	1	299	0	0	0	0	2
STIRLAND	ALLEN PA	SAT	10	21	1	1	1	299	0	0	0	0	2
ANGLING	KESABONI	TCTS	63	22	1	1	1	959	0	0	0	0	2
ANGLING	BIG TROU	TCTS	25	23	1	1	1	959	0	0	0	0	2
D6	BIG TROU	TCTS	35	24	1	1	1	959	0	0	0	0	2
D6	BEARSKIN	TCTS	57	25	1	1	1	959	0	0	0	0	2
D6	KINGFISH	TCTS	70	26	1	1	1	959	0	0	0	0	2
WUNNUMMI	KINGFISH	TCTS	42	27	1	1	1	959	0	0	0	0	2

TABLE 4.25 TRANSMISSION FACILITY LINKS SPLIT CAPACITY FUNCTIONS

FROM	TO	CARRIER	MILES	INTER LINK NO	QTY	V.C. TYPE(1)	QTY	V.C. TYPE(2)	QTY	V.C. TYPE(3)	QTY	V.C. TYPE(4)	TOTAL
D2	KINGFISH	TCTS	53	28	1	1	1	959	0	0	0	0	2
D2	D3	TCTS	57	29	1	1	1	959	0	0	0	0	2
D4	D3	TCTS	59	30	1	1	1	959	0	0	0	0	2
D4	D7	TCTS	85	31	1	1	1	959	0	0	0	0	2
FORT HOP	D7	TCTS	42	32	1	1	1	959	0	0	0	0	2
LANSDOWN	D7	TCTS	28	33	1	1	1	959	0	0	0	0	2
LANSDOWN	WEBEQUIE	TCTS	106	34	1	1	1	959	0	0	0	0	2
D2	D1	TCTS	59	35	1	1	1	959	0	0	0	0	2
MUSKRAT	D1	TCTS	59	36	1	1	1	959	0	0	0	0	2
MUSKRAT	SACHIGO	TCTS	70	37	1	1	1	959	0	0	0	0	2
WEAGAMOW	D1	TCTS	25	38	1	1	1	959	0	0	0	0	2
WEAGAMOW	NORTH SP	TCTS	140	39	1	1	1	959	0	0	0	0	2
STIRLAND	D3	TCTS	42	40	1	1	1	959	0	0	0	0	2
STIRLAND	MACDOWEL	TCTS	106	41	1	1	1	959	0	0	0	0	2
PICKLE C	D4	TCTS	42	42	1	1	1	959	0	0	0	0	2
PICKLE C	D5	TCTS	83	43	1	1	1	959	0	0	0	0	2
SLATE FA	D5	TCTS	42	44	1	1	1	959	0	0	0	0	2
CAT LAKE	D5	TCTS	42	45	1	1	1	959	0	0	0	0	2
CAT LAKE	MACDOWEL	TCTS	70	46	1	1	1	959	0	0	0	0	2
NORTH SP	MACDOWEL	TCTS	31	47	1	1	1	959	0	0	0	0	2
MUSKRAT	SANDY LA	TCTS	106	48	1	1	1	959	0	0	0	0	2
NORTH SP	SANDY LA	TCTS	56	49	1	1	1	959	0	0	0	0	2
NORTH SP	WARWICK	TCTS	42	50	1	1	1	959	0	0	0	0	2
SANDY LA	WARWICK	TCTS	56	51	1	1	1	959	0	0	0	0	2
DEER LAK	WARWICK	TCTS	25	52	1	1	1	959	0	0	0	0	2
DEER LAK	SANDY LA	TCTS	56	53	1	1	1	959	0	0	0	0	2
POPLAR H	SANDY LA	TCTS	112	54	1	1	1	959	0	0	0	0	2
POPLAR H	DEER LAK	TCTS	56	55	1	1	1	959	0	0	0	0	2

TABLE 4.25 Cont'd. TRANSMISSION FACILITY LINKS SPLIT CAPACITY FUNCTIONS

FROM	TO	CARRIER	MILES	INTER LINK NO	QTY	V.C. TYPE(1)	QTY	V.C. TYPE(2)	QTY	V.C. TYPE(3)	QTY	V.C. TYPE(4)	TOTAL
POPLAR H	PIKANGIK	TCTS	35	56	1	1	1	959	0	0	0	0	2
NUNGESSE	PIKANGIK	TCTS	42	57	1	1	1	959	0	0	0	0	2
NUNGESSE	WARWICK	TCTS	112	58	1	1	1	959	0	0	0	0	2
NUNGESSE	MACDOWEL	TCTS	98	59	1	1	1	959	0	0	0	0	2
NUNGESSE	RED LAKE	TCTS	42	60	1	1	1	959	0	0	0	0	2
RED LAKE	VERMILLI	TCTS	94	61	1	1	1	959	0	0	0	0	2
KENORA	VERMILLI	TCTS	48	62	1	1	1	959	0	0	0	0	2
IGNACE	VERMILLI	TCTS	88	63	1	1	1	959	0	0	0	0	2
IGNACE	PICKLE C	TCTS	160	64	1	1	1	959	0	0	0	0	2
IGNACE	RAITH	TCTS	89	65	1	1	1	959	0	0	0	0	2
THUNDER	RAITH	TCTS	42	66	1	1	1	959	0	0	0	0	2
THUNDER	NOKOMON	TCTS	19	67	1	1	1	479	0	0	0	0	2
RAITH	NOKOMON	TCTS	24	68	1	1	1	479	0	0	0	0	2
KENORA	NOKOMON	TCTS	278	69	1	1	1	959	0	0	0	0	2
CAMERON	NOKOMON	TCTS	67	70	1	1	1	299	0	0	0	0	2
THUNDER	NIPIGON	TCTS	60	71	1	1	1	959	0	0	0	0	2
CAMERON	ROSS POR	TCTS	37	72	1	1	1	959	0	0	0	0	2
NIPIGON	ROSS POR	TCTS	31	73	1	1	1	299	0	0	0	0	2
NIPIGON	ORIENT B	TCTS	31	74	1	1	1	959	0	0	0	0	2
ROSS POR	PANACHE	TCTS	426	75	1	1	1	959	0	0	0	0	2
ORIENT B	STURGEON	TCTS	531	76	1	1	1	959	0	0	0	0	2
NORTH BA	STURGEON	TCTS	23	77	1	1	1	479	0	0	0	0	2
NORTH BA	OTTAWA	TCTS	207	78	1	1	1	959	0	0	0	0	2
OTTAWA	UXBRIDGE	TCTS	210	79	1	1	1	959	0	0	0	0	2
TORONTO	UXBRIDGE	TCTS	30	80	1	1	1	959	0	0	0	0	2
TORONTO	BARRIE	TCTS	25	81	1	1	1	1199	0	0	0	0	2
ALLEN PA	BARRIE	TCTS	72	82	1	1	1	299	0	0	0	0	2
PANACHE	BARRIE	TCTS	173	83	1	1	1	959	0	0	0	0	2

TABLE 4.25 Cont'd. TRANSMISSION FACILITY LINKS SPLIT CAPACITY FUNCTIONS

FROM	TO	CARRIER	MILES	INTER LINK NO	QTY	V.C. TYPE(1)	QTY	V.C. TYPE(2)	QTY	V.C. TYPE(3)	QTY	V.C. TYPE(4)	TOTAL
PANACHE	SUDBURY	TCTS	16	84	1	1	1	479	0	0	0	0	2
STURGEON	SUDBURY	TCTS	50	85	1	1	1	479	0	0	0	0	2
BARRIE	NORTH BA	TCTS	78	86	1	1	1	959	0	0	0	0	2
BARRIE	UXBRIDGE	TCTS	37	87	1	1	1	1199	0	0	0	0	2
RAITH	NIPIGON	TCTS	73	88	1	1	1	959	0	0	0	0	2

TABLE 4.25 Cont'd. TRANSMISSION FACILITY LINKS SPLIT CAPACITY FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL (NO.)		COST($)
PIKANGIK	ALLEN PA	SAT	1	10	1	1	249240
					299	1	100000
POPLAR H	ALLEN PA	SAT	2	10	1	1	249240
					299	1	100000
DEER LAK	ALLEN PA	SAT	3	10	1	1	249240
					299	1	100000
SANDY LA	ALLEN PA	SAT	4	10	1	1	249240
					299	1	100000
MACDOWEL	ALLEN PA	SAT	5	10	1	1	249240
					299	1	100000
NUNGESSE	ALLEN PA	SAT	6	10	1	1	249240
					299	1	100000
NORTH SP	ALLEN PA	SAT	7	10	1	1	249240
					299	1	100000
WEAGAMOW	ALLEN PA	SAT	8	10	1	1	249240
					299	1	100000
FORT HOP	ALLEN PA	SAT	9	10	1	1	249240
					299	1	100000
LANSDOWN	ALLEN PA	SAT	10	10	1	1	249240
					299	1	100000
KINGFISH	ALLEN PA	SAT	11	10	1	1	249240
					299	1	100000
WUNNUMMI	ALLEN PA	SAT	12	10	1	1	249240
					299	1	100000
BIG TROU	ALLEN PA	SAT	13	10	1	1	249240
					299	1	100000
WEBEQUIE	ALLEN PA	SAT	14	10	1	1	249240
					299	1	100000
KESABONI	ALLEN PA	SAT	15	10	1	1	249240
					299	1	100000
BEARSKIN	ALLEN PA	SAT	16	10	1	1	249240
					299	1	100000
SACHIGO	ALLEN PA	SAT	17	10	1	1	249240
					299	1	100000

TABLE 4.26 Cont'd. TRANSMISSION FACILITY LINKS SPLIT COST FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL (NO.)		COST($)
ANGLING	ALLEN PA	SAT	18	10	1	1	249240
					299	1	100000
CAT LAKE	ALLEN PA	SAT	19	10	1	1	249240
					299	1	100000
SLATE FA	ALLEN PA	SAT	20	10	1	1	249240
					299	1	100000
STIRLAND	ALLEN PA	SAT	21	10	1	1	249240
					299	1	100000
ANGLING	KESABONI	TCTS	22	63	1	1	630000
					959	1	63000
ANGLING	BIG TROU	TCTS	23	25	1	1	250000
					959	1	25000
D6	BIG TROU	TCTS	24	35	1	1	350000
					959	1	35000
D6	BEARSKIN	TCTS	25	57	1	1	570000
					959	1	57000
D6	KINGFISH	TCTS	26	70	1	1	700000
					959	1	70000
WUNNUMMI	KINGFISH	TCTS	27	42	1	1	420000
					959	1	42000
D2	KINGFISH	TCTS	28	53	1	1	530000
					959	1	53000
D2	D3	TCTS	29	57	1	1	570000
					959	1	57000
D4	D3	TCTS	30	59	1	1	590000
					959	1	59000
D4	D7	TCTS	31	85	1	1	850000
					959	1	85000
FORT HOP	D7	TCTS	32	42	1	1	420000
					959	1	42000
LANSDOWN	D7	TCTS	33	28	1	1	280000
					959	1	28000
LANSDOWN	WEBEQUIE	TCTS	34	106	1	1	1060000
					959	1	106000
D2	D1	TCTS	35	59	1	1	590000
					959	1	59000

TABLE 4.26 Cont'd. TRANSMISSION FACILITY LINKS SPLIT COST FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL (NO.)		COST($)
MUSKRAT	D1	TCTS	36	59	1	1	590000
					959	1	59000
MUSKRAT	SACHIGO	TCTS	37	70	1	1	700000
					959	1	70000
WEAGAMOW	D1	TCTS	38	25	1	1	250000
					959	1	25000
WEAGAMOW	NORTH SP	TCTS	39	140	1	1	1400000
					959	1	140000
STIRLAND	D3	TCTS	40	42	1	1	420000
					959	1	42000
STIRLAND	MACDOWEL	TCTS	41	106	1	1	1060000
					959	1	106000
PICKLE C	D4	TCTS	42	42	1	1	420000
					959	1	42000
PICKLE C	D5	TCTS	43	83	1	1	830000
					959	1	83000
SLATE FA	D5	TCTS	44	42	1	1	420000
					959	1	42000
CAT LAKE	D5	TCTS	45	42	1	1	420000
					959	1	42000
CAT LAKE	MACDOWEL	TCTS	46	70	1	1	700000
					959	1	70000
NORTH SP	MACDOWEL	TCTS	47	31	1	1	310000
					959	1	31000
MUSKRAT	SANDY LA	TCTS	48	106	1	1	1060000
					959	1	106000
NORTH SP	SANDY LA	TCTS	49	56	1	1	560000
					959	1	56000
NORTH SP	WARWICK	TCTS	50	42	1	1	420000
					959	1	42000
SANDY LA	WARWICK	TCTS	51	56	1	1	560000
					959	1	56000
DEER LAK	WARWICK	TCTS	52	25	1	1	250000
					959	1	25000
DEER LAK	SANDY LA	TCTS	53	56	1	1	560000
					959	1	56000

TABLE 4.26 Cont'd. TRANSMISSION FACILITY LINKS SPLIT COST FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL (NO.)		COST($)
POPLAR H	SANDY LA	TCTS	54	112	1	1	1120000
					959	1	112000
POPLAR H	DEER LAK	TCTS	55	56	1	1	560000
					959	1	56000
POPLAR H	PIKANGIK	TCTS	56	35	1	1	350000
					959	1	35000
NUNGESSE	PIKANGIK	TCTS	57	42	1	1	420000
					959	1	42000
NUNGESSE	WARWICK	TCTS	58	112	1	1	1120000
					959	1	112000
NUNGESSE	MACDOWEL	TCTS	59	98	1	1	980000
					959	1	98000
NUNGESSE	RED LAKE	TCTS	60	42	1	1	420000
					959	1	42000
RED LAKE	VERMILLI	TCTS	61	94	1	1	75200
					959	1	28200
KENORA	VERMILLI	TCTS	62	48	1	1	38400
					959	1	14400
IGNACE	VERMILLI	TCTS	63	88	1	1	70400
					959	1	26400
IGNACE	PICKLE C	TCTS	64	160	1	1	128000
					959	1	48000
IGNACE	RAITH	TCTS	65	89	1	1	71200
					959	1	26700
THUNDER	RAITH	TCTS	66	42	1	1	33600
					959	1	12600
THUNDER	NOKOMON	TCTS	67	19	1	1	11400
					479	1	3800
RAITH	NOKOMON	TCTS	68	24	1	1	14400
					479	1	4800
KENORA	NOKOMON	TCTS	69	278	1	1	222400
					959	1	83400
CAMERON	NOKOMON	TCTS	70	67	1	1	40200
					299	1	13400
THUNDER	NIPIGON	TCTS	71	60	1	1	48000
					959	1	18000

TABLE 4.26 Cont'd. TRANSMISSION FACILITY LINKS SPLIT COST FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL (NO.)		COST($)
CAMERON	ROSS POR	TCTS	72	37	1	1	29600
					959	1	11100
NIPIGON	ROSS POR	TCTS	73	31	1	1	18600
					299	1	6200
NIPIGON	ORIENT B	TCTS	74	31	1	1	62000
					959	1	40300
ROSS POR	PANACHE	TCTS	75	426	1	1	340800
					959	1	127800
ORIENT B	STURGEON	TCTS	76	531	1	1	1062000
					959	1	690300
NORTH BA	STURGEON	TCTS	77	23	1	1	34500
					479	1	20700
NORTH BA	OTTAWA	TCTS	78	207	1	1	165600
					959	1	62100
OTTAWA	UXBRIDGE	TCTS	79	210	1	1	168000
					959	1	63000
TORONTO	UXBRIDGE	TCTS	80	30	1	1	105000
					959	1	60000
TORONTO	BARRIE	TCTS	81	25	1	1	20000
					1199	1	10000
ALLEN PA	BARRIE	TCTS	82	72	1	1	43200
					299	1	14400
PANACHE	BARRIE	TCTS	83	173	1	1	138400
					959	1	51900
PANACHE	SUDBURY	TCTS	84	16	1	1	9600
					479	1	3200
STURGEON	SUDBURY	TCTS	85	50	1	1	30000
					479	1	10000
BARRIE	NORTH BA	TCTS	86	78	1	1	62400
					959	1	23400
BARRIE	UXBRIDGE	TCTS	87	37	1	1	29600
					1199	1	14800
RAITH	NIPIGON	TCTS	88	73	1	1	146000
					959	1	94900

TABLE 4.26 Cont'd. TRANSMISSION FACILITY LINKS SPLIT COST FUNCTIONS

FROM	TO	TYPE
BEARSKIN	BIG TROU	2
BEARSKIN	SACHIGO	2
BEARSKIN	THUNDER	2
BIG TROU	KESABONI	2
BIG TROU	KINGFISH	2
BIG TROU	WUNNUMMI	2
BIG TROU	ANGLING	2
BIG TROU	SACHIGO	2
BIG TROU	THUNDER	2
DEER LAK	SANDY LA	2
DEER LAK	THUNDER	2
FORT HOP	LANSDOWN	2
FORT HOP	THUNDER	2
KESABONI	KINGFISH	2
KESABONI	ANGLING	2
KESABONI	THUNDER	2
KINGFISH	WEBEQUIE	2
KINGFISH	ANGLING	2
KINGFISH	THUNDER	2
LANSDOWN	THUNDER	2
PIKANGIK	POPLAR H	2
PIKANGIK	THUNDER	2
POPLAR H	THUNDER	2
SANDY LA	NORTH SP	2
SANDY LA	THUNDER	2
WEAGAMOW	THUNDER	2
WEBEQUIE	THUNDER	2
WUNNUMMI	THUNDER	2
ANGLING	THUNDER	2
NORTH SP	THUNDER	2
SACHIGO	THUNDER	2
CAT LAKE	THUNDER	2
MACDOWEL	THUNDER	2
NUNGESSE	THUNDER	2
SLATE FA	THUNDER	2
STIRLAND	THUNDER	2
BIG TROU	TORONTO	3
LANSDOWN	TORONTO	3

NOTE: TYPE

1 - SWITCHED TRAFFIC DIVISIBLE

2 - UNSWITCHED TRAFFIC DIVISIBLE

3 - UNSWITCHED TRAFFIC NON DIVISIBLE

TABLE 4.27 IDENTIFICATION OF DEMAND NODES

FROM	TO	CARRIER	MILES	INTER LINK NO	QTY	V.C. TYPE(1)	QTY	V.C. TYPE(2)	QTY	V.C. TYPE(3)	QTY	V.C. TYPE(4)	TOTAL
PIKANGIK	ALLEN PA	SAT	10	1	1	300	0	0	0	0	0	0	1
POPLAR H	ALLEN PA	SAT	10	2	1	300	0	0	0	0	0	0	1
DEER LAK	ALLEN PA	SAT	10	3	1	300	0	0	0	0	0	0	1
SANDY LA	ALLEN PA	SAT	10	4	1	300	0	0	0	0	0	0	1
MACDOWEL	ALLEN PA	SAT	10	5	1	300	0	0	0	0	0	0	1
NUNGESSE	ALLEN PA	SAT	10	6	1	300	0	0	0	0	0	0	1
NORTH SP	ALLEN PA	SAT	10	7	1	300	0	0	0	0	0	0	1
WEAGAMOW	ALLEN PA	SAT	10	8	1	300	0	0	0	0	0	0	1
FORT HOP	ALLEN PA	SAT	10	9	1	300	0	0	0	0	0	0	1
LANSDOWN	ALLEN PA	SAT	10	10	1	300	0	0	0	0	0	0	1
KINGFISH	ALLEN PA	SAT	10	11	1	300	0	0	0	0	0	0	1
WUNNUMMI	ALLEN PA	SAT	10	12	1	300	0	0	0	0	0	0	1
BIG TROU	ALLEN PA	SAT	10	13	1	300	0	0	0	0	0	0	1
WEBEQUIE	ALLEN PA	SAT	10	14	1	300	0	0	0	0	0	0	1
KESABONI	ALLEN PA	SAT	10	15	1	300	0	0	0	0	0	0	1
BEARSKIN	ALLEN PA	SAT	10	16	1	300	0	0	0	0	0	0	1
SACHIGO	ALLEN PA	SAT	10	17	1	300	0	0	0	0	0	0	1
ANGLING	ALLEN PA	SAT	10	18	1	300	0	0	0	0	0	0	1
CAT LAKE	ALLEN PA	SAT	10	19	1	300	0	0	0	0	0	0	1
SLATE FA	ALLEN PA	SAT	10	20	1	300	0	0	0	0	0	0	1
STIRLAND	ALLEN PA	SAT	10	21	1	300	0	0	0	0	0	0	1
ANGLING	KESABONI	TCTS	63	22	1	960	0	0	0	0	0	0	1
ANGLING	BIG TROU	TCTS	25	23	1	960	0	0	0	0	0	0	1
D6	BIG TROU	TCTS	35	24	1	960	0	0	0	0	0	0	1
D6	BEARSKIN	TCTS	57	25	1	960	0	0	0	0	0	0	1
D6	KINGFISH	TCTS	70	26	1	960	0	0	0	0	0	0	1
WUNNUMMI	KINGFISH	TCTS	42	27	1	960	0	0	0	0	0	0	1

TABLE 4.28 TRANSMISSION FACILITY LINKS CAPACITY FUNCTIONS

FROM	TO	CARRIER	MILES	INTER LINK NO	QTY	V.C. TYPE(1)	QTY	V.C. TYPE(2)	QTY	V.C. TYPE(3)	QTY	V.C. TYPE(4)	TOTAL
D2	KINGFISH	TCTS	53	28	1	960	0	0	0	0	0	0	1
D2	D3	TCTS	57	29	1	960	0	0	0	0	0	0	1
D4	D3	TCTS	59	30	1	960	0	0	0	0	0	0	1
D4	D7	TCTS	85	31	1	960	0	0	0	0	0	0	1
FORT HOP	D7	TCTS	42	32	1	960	0	0	0	0	0	0	1
LANSDOWN	D7	TCTS	28	33	1	960	0	0	0	0	0	0	1
LANSDOWN	WEBEQUIE	TCTS	106	34	1	960	0	0	0	0	0	0	1
D2	D1	TCTS	59	35	1	960	0	0	0	0	0	0	1
MUSKRAT	D1	TCTS	59	36	1	960	0	0	0	0	0	0	1
MUSKRAT	SACHIGO	TCTS	70	37	1	960	0	0	0	0	0	0	1
WEAGAMOW	D1	TCTS	25	38	1	960	0	0	0	0	0	0	1
WEAGAMOW	NORTH SP	TCTS	140	39	1	960	0	0	0	0	0	0	1
STIRLAND	D3	TCTS	42	40	1	960	0	0	0	0	0	0	1
STIRLAND	MACDOWEL	TCTS	106	41	1	960	0	0	0	0	0	0	1
PICKLE C	D4	TCTS	42	42	1	960	0	0	0	0	0	0	1
PICKLE C	D5	TCTS	83	43	1	960	0	0	0	0	0	0	1
SLATE FA	D5	TCTS	42	44	1	960	0	0	0	0	0	0	1
CAT LAKE	D5	TCTS	42	45	1	960	0	0	0	0	0	0	1
CAT LAKE	MACDOWEL	TCTS	70	46	1	960	0	0	0	0	0	0	1
NORTH SP	MACDOWEL	TCTS	31	47	1	960	0	0	0	0	0	0	1
MUSKRAT	SANDY LA	TCTS	106	48	1	960	0	0	0	0	0	0	1
NORTH SP	SANDY LA	TCTS	56	49	1	960	0	0	0	0	0	0	1
NORTH SP	WARWICK	TCTS	42	50	1	960	0	0	0	0	0	0	1
SANDY LA	WARWICK	TCTS	56	51	1	960	0	0	0	0	0	0	1
DEER LAK	WARWICK	TCTS	25	52	1	960	0	0	0	0	0	0	1
DEER LAK	SANDY LA	TCTS	56	53	1	960	0	0	0	0	0	0	1
POPLAR H	SANDY LA	TCTS	112	54	1	960	0	0	0	0	0	0	1
POPLAR H	DEER LAK	TCTS	56	55	1	960	0	0	0	0	0	0	1

TABLE 4.28 Cont'd. TRANSMISSION FACILITY LINKS CAPACITY FUNCTIONS

FROM	TO	CARRIER	MILES	INTER LINK NO	QTY	V.C. TYPE(1)	QTY	V.C. TYPE(2)	QTY	V.C. TYPE(3)	QTY	V.C. TYPE(4)	TOTAL
POPLAR H	PIKANGIK	TCTS	35	56	1	960	0	0	0	0	0	0	1
NUNGESSE	PIKANGIK	TCTS	42	57	1	960	0	0	0	0	0	0	1
NUNGESSE	WARWICK	TCTS	112	58	1	960	0	0	0	0	0	0	1
NUNGESSE	MACOOWEL	TCTS	98	59	1	960	0	0	0	0	0	0	1
NUNGESSE	RED LAKE	TCTS	42	60	1	960	0	0	0	0	0	0	1
RED LAKE	VERMILLI	TCTS	94	61	1	960	0	0	0	0	0	0	1
KENORA	VERMILLI	TCTS	48	62	1	960	0	0	0	0	0	0	1
IGNACE	VERMILLI	TCTS	88	63	1	960	0	0	0	0	0	0	1
IGNACE	PICKLE C	TCTS	160	64	1	960	0	0	0	0	0	0	1
IGNACE	RAITH	TCTS	89	65	1	960	0	0	0	0	0	0	1
THUNDER	RAITH	TCTS	42	66	1	960	0	0	0	0	0	0	1
THUNDER	NOKOMON	TCTS	19	67	1	480	0	0	0	0	0	0	1
RAITH	NOKOMON	TCTS	24	68	1	480	0	0	0	0	0	0	1
KENORA	NOKOMON	TCTS	278	69	1	960	0	0	0	0	0	0	1
CAMERON	NOKOMON	TCTS	67	70	1	300	0	0	0	0	0	0	1
THUNDER	NIPIGON	TCTS	60	71	1	960	0	0	0	0	0	0	1
CAMERON	ROSS POR	TCTS	37	72	1	960	0	0	0	0	0	0	1
NIPIGON	ROSS POR	TCTS	31	73	1	300	0	0	0	0	0	0	1
NIPIGON	ORIENT B	TCTS	31	74	1	960	0	0	0	0	0	0	1
ROSS POR	PANACHE	TCTS	426	75	1	960	0	0	0	0	0	0	1
ORIENT B	STURGEON	TCTS	531	76	1	960	0	0	0	0	0	0	1
NORTH BA	STURGEON	TCTS	23	77	1	480	0	0	0	0	0	0	1
NORTH BA	OTTAWA	TCTS	207	78	1	960	0	0	0	0	0	0	1
OTTAWA	UXBRIDGE	TCTS	210	79	1	960	0	0	0	0	0	0	1
TORONTO	UXBRIDGE	TCTS	30	80	1	960	0	0	0	0	0	0	1
TURONTO	BARRIE	TCTS	25	81	1	1200	0	0	0	0	0	0	1
ALLEN PA	BARRIE	TCTS	72	82	1	300	0	0	0	0	0	0	1
PANACHE	BARRIE	TCTS	173	83	1	960	0	0	0	0	0	0	1

TABLE 4.28 Cont'd. TRANSMISSION FACILITY LINKS CAPACITY FUNCTIONS

FROM	TO	CARRIER	MILES	INTER LINK NO	QTY	V.C. TYPE(1)	QTY	V.C. TYPE(2)	QTY	V.C. TYPE(3)	QTY	V.C. TYPE(4)	TOTAL
PANACHE	SUDBURY	TCTS	16	84	1	480	0	0	0	0	0	0	1
STURGEON	SUDBURY	TCTS	50	85	1	480	0	0	0	0	0	0	1
BARRIE	NORTH BA	TCTS	78	86	1	960	0	0	0	0	0	0	1
BARRIE	UXBRIDGE	TCTS	37	87	1	1200	0	0	0	0	0	0	1
RAITH	NIPIGON	TCTS	73	88	1	960	0	0	0	0	0	0	1

TABLE 4.28 Cont'd. TRANSMISSION FACILITY LINKS CAPACITY FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL (NO.)		COST($)
PIKANGIK	ALLEN PA	SAT	1	10	300	1	349240
POPLAR H	ALLEN PA	SAT	2	10	300	1	349240
DEER LAK	ALLEN PA	SAT	3	10	300	1	349240
SANDY LA	ALLEN PA	SAT	4	10	300	1	349240
MACDOWEL	ALLEN PA	SAT	5	10	300	1	349240
NUNGESSE	ALLEN PA	SAT	6	10	300	1	349240
NORTH SP	ALLEN PA	SAT	7	10	300	1	349240
WEAGAMOW	ALLEN PA	SAT	8	10	300	1	349240
FORT HOP	ALLEN PA	SAT	9	10	300	1	349240
LANSDOWN	ALLEN PA	SAT	10	10	300	1	349240
KINGFISH	ALLEN PA	SAT	11	10	300	1	349240
WUNNUMMI	ALLEN PA	SAT	12	10	300	1	349240
BIG TROU	ALLEN PA	SAT	13	10	300	1	349240
WEBEQUIE	ALLEN PA	SAT	14	10	300	1	349240
KESABONI	ALLEN PA	SAT	15	10	300	1	349240
BEARSKIN	ALLEN PA	SAT	16	10	300	1	349240
SACHIGO	ALLEN PA	SAT	17	10	300	1	349240

TABLE 4.28 Cont'd. TRANSMISSION FACILITY LINKS CAPACITY FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL	(NO.)	COST($)
ANGLING	ALLEN PA	SAT	18	10	300	1	349240
CAT LAKE	ALLEN PA	SAT	19	10	300	1	349240
SLATE FA	ALLEN PA	SAT	20	10	300	1	349240
STIRLAND	ALLEN PA	SAT	21	10	300	1	349240
ANGLING	KESABONI	TCTS	22	63	960	1	693000
ANGLING	BIG TROU	TCTS	23	25	960	1	275000
D6	BIG TROU	TCTS	24	35	960	1	385000
D6	BEARSKIN	TCTS	25	57	960	1	627000
D6	KINGFISH	TCTS	26	70	960	1	770000
WUNNUMMI	KINGFISH	TCTS	27	42	960	1	462000
D2	KINGFISH	TCTS	28	53	960	1	583000
D2	D3	TCTS	29	57	960	1	627000
D4	D3	TCTS	30	59	960	1	649000
D4	D7	TCTS	31	85	960	1	935000
FORT HOP	D7	TCTS	32	42	960	1	462000
LANSDOWN	D7	TCTS	33	28	960	1	308000
LANSDOWN	WEBEQUIE	TCTS	34	106	960	1	1166000
D2	D1	TCTS	35	59	960	1	649000

TABLE 4.29 Cont'd. TRANSMISSION FACILITY LINKS COST FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL (NO.)		COST($)
MUSKRAT	D1	TCTS	36	59	960	1	649000
MUSKRAT	SACHIGO	TCTS	37	70	960	1	770000
WEAGAMOW	D1	TCTS	38	25	960	1	275000
WEAGAMOW	NORTH SP	TCTS	39	140	960	1	1540000
STIRLAND	D3	TCTS	40	42	960	1	462000
STIRLAND	MACDOWEL	TCTS	41	106	960	1	1166000
PICKLE C	D4	TCTS	42	42	960	1	462000
PICKLE C	D5	TCTS	43	83	960	1	913000
SLATE FA	D5	TCTS	44	42	960	1	462000
CAT LAKE	D5	TCTS	45	42	960	1	462000
CAT LAKE	MACDOWEL	TCTS	46	70	960	1	770000
NORTH SP	MACDOWEL	TCTS	47	31	960	1	341000
MUSKRAT	SANDY LA	TCTS	48	106	960	1	1166000
NORTH SP	SANDY LA	TCTS	49	56	960	1	616000
NORTH SP	WARWICK	TCTS	50	42	960	1	462000
SANDY LA	WARWICK	TCTS	51	56	960	1	616000
DEER LAK	WARWICK	TCTS	52	25	960	1	275000
DEER LAK	SANDY LA	TCTS	53	56	960	1	616000

TABLE 4.29 Cont'd. TRANSMISSION FACILITY LINKS COST FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL (NO.)		COST($)
POPLAR H	SANDY LA	TCTS	54	112	960	1	1232000
POPLAR H	DEER LAK	TCTS	55	56	960	1	616000
POPLAR H	PIKANGIK	TCTS	56	35	960	1	385000
NUNGESSE	PIKANGIK	TCTS	57	42	960	1	462000
NUNGESSE	WARWICK	TCTS	58	112	960	1	1232000
NUNGESSE	MACDOWEL	TCTS	59	98	960	1	1078000
NUNGESSE	RED LAKE	TCTS	60	42	960	1	462000
RED LAKE	VERMILLI	TCTS	61	94	960	1	103400
KENORA	VERMILLI	TCTS	62	48	960	1	52800
IGNACE	VERMILLI	TCTS	63	88	960	1	96800
IGNACE	PICKLE C	TCTS	64	160	960	1	176000
IGNACE	RAITH	TCTS	65	89	960	1	97900
THUNDER	RAITH	TCTS	66	42	960	1	46200
THUNDER	NOKOMON	TCTS	67	19	480	1	15200
RAITH	NOKOMON	TCTS	68	24	480	1	19200
KENORA	NOKOMON	TCTS	69	278	960	1	305800
CAMERON	NOKOMON	TCTS	70	67	300	1	53600
THUNDER	NIPIGON	TCTS	71	60	960	1	66000

TABLE 4.29 Cont'd. TRANSMISSION FACILITY LINKS COST FUNCTIONS

TRANSMISSION FACILITIES LINK COST DATA

FROM	TO	CARRIER	LINK NO.	MILES	V.C./CHANNEL	(NO.)	COST($)
CAMERON	ROSS POR	TCTS	72	37	960	1	40700
NIPIGON	ROSS POR	TCTS	73	31	300	1	24800
NIPIGON	ORIENT B	TCTS	74	31	960	1	102300
ROSS POR	PANACHE	TCTS	75	426	960	1	468600
ORIENT B	STURGEON	TCTS	76	531	960	1	1752300
NORTH BA	STURGEON	TCTS	77	23	480	1	55200
NORTH BA	OTTAWA	TCTS	78	207	960	1	227700
OTTAWA	UXBRIDGE	TCTS	79	210	960	1	231000
TORONTO	UXBRIDGE	TCTS	80	30	960	1	165000
TORONTO	BARRIE	TCTS	81	25	1200	1	30000
ALLEN PA	BARRIE	TCTS	82	72	300	1	57600
PANACHE	BARRIE	TCTS	83	173	960	1	190300
PANACHE	SUDBURY	TCTS	84	16	480	1	12800
STURGEON	SUDBURY	TCTS	85	50	480	1	40000
BARRIE	NORTH BA	TCTS	86	78	960	1	85800
BARRIE	UXBRIDGE	TCTS	87	37	1200	1	44400
RAITH	NIPIGON	TCTS	88	73	960	1	240900

TABLE 4.29 Cont'd. TRANSMISSION FACILITY LINKS COST FUNCTIONS

SECTION 1 - ROWS

	NUMBER	...ROW..	AT	...ACTIVITY...	SLACK ACTIVITY	..LOWER LIMIT.	..UPPER LIMIT.	.DUAL ACTIVITY
	1	COST1	BS	9238119.99990	9238119.99990-	NONE	NONE	1.00000----
A	2	RT017014	LL	7.00000	•	7.00000	NONE	•
A	3	RT017018	LL	4.00000	•	4.00000	NONE	•
A	4	RT017038	LL	5.00000	•	5.00000	NONE	•
A	5	RT014016	LL	6.00000	•	6.00000	NONE	•
A	6	RT014012	LL	6.00000	•	6.00000	NONE	•
A	7	RT014013	LL	6.00000	•	6.00000	NONE	•
A	8	RT014019	LL	4.00000	•	4.00000	NONE	•
A	9	RT014018	LL	4.00000	•	4.00000	NONE	•
A	10	RT014038	LL	6.00000	•	6.00000	NONE	•
A	11	RT004005	LL	7.00000	•	7.00000	NONE	•
A	12	RT004038	LL	5.00000	•	5.00000	NONE	•
A	13	RT010011	LL	6.00000	•	6.00000	NONE	•
A	14	RT010038	LL	4.00000	•	4.00000	NONE	•----
A	15	RT016012	LL	5.00000	•	5.00000	NONE	•
A	16	RT016019	LL	4.00000	•	4.00000	NONE	•
A	17	RT016038	LL	4.00000	•	4.00000	NONE	•
A	18	RT012015	LL	6.00000	•	6.00000	NONE	•
A	19	RT012019	LL	4.00000	•	4.00000	NONE	•
A	20	RT012038	LL	3.00000	•	3.00000	NONE	•
A	21	RT011038	LL	5.00000	•	5.00000	NONE	•
A	22	RT001003	LL	6.00000	•	6.00000	NONE	•
A	23	RT001038	LL	6.00000	•	6.00000	NONE	•
A	24	RT003038	LL	4.00000	•	4.00000	NONE	•
A	25	RT005008	LL	4.00000	•	4.00000	NONE	•
A	26	RT005038	LL	5.00000	•	5.00000	NONE	•
A	27	RT009038	LL	5.00000	•	5.00000	NONE	•
A	28	RT015038	LL	5.00000	•	5.00000	NONE	•
A	29	RT013038	LL	4.00000	•	4.00000	NONE	•
A	30	RT019038	LL	4.00000	•	4.00000	NONE	•
A	31	RT008038	LL	4.00000	•	4.00000	NONE	•
A	32	RT018038	LL	4.00000	•	4.00000	NONE	•
A	33	RT020038	LL	1.00000	•	1.00000	NONE	•
A	34	RT006038	LL	1.00000	•	1.00000	NONE	•
A	35	RT007038	LL	1.00000	•	1.00000	NONE	•
A	36	RT021038	LL	1.00000	•	1.00000	NONE	•
A	37	RT022038	LL	1.00000	•	1.00000	NONE	•
A	38	DD014049	LL	2.00000	•	2.00000	NONE	•-----
A	39	DD011049	LL	1.00000	•	1.00000	NONE	•
	40	LN000001	UL	•	•	NONE	•	1164.13333
	41	LN000002	UL	•	•	NONE	•	1164.13333
	42	LN000003	BS	288.00000-	288.00000	NONE	•	•
	43	LN000004	BS	284.00000-	284.00000	NONE	•	•
	44	LN000005	UL	•	•	NONE	•	1164.13333
	45	LN000006	BS	234.00000-	234.00000	NONE	•	•
	46	LN000007	BS	292.00000-	292.00000	NONE	•	•
	47	LN000008	BS	295.00000-	295.00000	NONE	•	•
	48	LN000009	BS	290.00000-	290.00000	NONE	•	•
	49	LN000010	BS	288.00000-	288.00000	NONE	•	•

COST1
Total cost of transmission for integer solution.

RT010038
Identifies unswitched divisible demand between internal node number 10 and 38 (See table 4.24 Fort Hope and Thunder Bay) The demand is for 4 voice circuits.

DD014049
Identifies unswitched non divisible demand between internal node number 14 and 49(Big Trout Lake and Toronto). The demand is for 2 voice circuits.

TABLE 4.30 ROWS SECTION INTEGER SOLUTION

NUMBER	...ROW..	AT	...ACTIVITY...	SLACK ACTIVITY	..LOWER LIMIT.	..UPPER LIMIT.	.DUAL ACTIVITY
50	LN000011	BS	276.00000-	276.00000	NONE	.	.
51	LN000012	BS	290.00000-	290.00000	NONE	.	.
52	LN000013	BS	259.00000-	259.00000	NONE	.	.
53	LN000014	BS	289.00000-	289.00000	NONE	.	.
54	LN000015	BS	281.00000-	281.00000	NONE	.	.
55	LN000016	BS	284.00000-	284.00000	NONE	.	.
56	LN000017	BS	288.00000-	288.00000	NONE	.	.
57	LN000018	BS	284.00000-	284.00000	NONE	.	.
58	LN000019	BS	299.00000-	299.00000	NONE	.	.
59	LN000020	BS	299.00000-	299.00000	NONE	.	.
60	LN000021	BS	299.00000-	299.00000	NONE	.	.
61	LN000022	BS	.	.	NONE	.	.
62	LN000023	BS	.	.	NONE	.	.
63	LN000024	UL	.	.	NONE	.	401.04167
64	LN000025	BS	.	.	NONE	.	.
65	LN000026	BS	.	.	NONE	.	.
66	LN000027	BS	.	.	NONE	.	.
67	LN000028	UL	.	.	NONE	.	607.29167
68	LN000029	UL	.	.	NONE	.	653.12500
69	LN000030	BS	.	.	NONE	.	.
70	LN000031	UL	.	.	NONE	.	973.95833
71	LN000032	BS	.	.	NONE	.	.
72	LN000033	UL	.	.	NONE	.	320.83333
73	LN000034	UL	.	.	NONE	.	1214.58333
74	LN000035	UL	.	.	NONE	.	676.04167
75	LN000036	UL	.	.	NONE	.	676.04167
76	LN000037	UL	.	.	NONE	.	802.08333
77	LN000038	UL	.	.	NONE	.	286.45833
78	LN000039	UL	.	.	NONE	.	1604.16667
79	LN000040	UL	.	.	NONE	.	481.25000
80	LN000041	UL	.	.	NONE	.	1214.58333
81	LN000042	UL	.	.	NONE	.	481.25000
82	LN000043	BS	.	.	NONE	.	.
83	LN000044	UL	.	.	NONE	.	481.25000
84	LN000045	BS	.	.	NONE	.	.
85	LN000046	BS	.	.	NONE	.	.
86	LN000047	BS	.	.	NONE	.	.
87	LN000048	UL	.	.	NONE	.	1214.58333
88	LN000049	BS	.	.	NONE	.	.
89	LN000050	UL	.	.	NONE	.	481.25000
90	LN000051	BS	.	.	NONE	.	.
91	LN000052	UL	.	.	NONE	.	286.45833
92	LN000053	BS	.	.	NONE	.	.
93	LN000054	BS	.	.	NONE	.	.
94	LN000055	UL	.	.	NONE	.	641.66667
95	LN000056	BS	950.00000-	950.00000	NONE	.	.
96	LN000057	BS	950.00000-	950.00000	NONE	.	.
97	LN000058	UL	.	.	NONE	.	1283.33333
98	LN000059	BS	959.00000-	959.00000	NONE	.	.
99	LN000060	BS	882.00000-	882.00000	NONE	.	.
100	LN000061	BS	882.00000-	882.00000	NONE	.	.

TABLE 4.30 Cont'd. ROWS SECTION INTEGER SOLUTION

NUMBER	...ROW..	AT	...ACTIVITY...	SLACK ACTIVITY	..LOWER LIMIT.	..UPPER LIMIT.	.DUAL ACTIVITY
101	LN000062	BS	882.00000-	882.00000	NONE	.	.
102	LN000063	UL	.	.	NONE	.	100.83333
103	LN000064	UL	.	.	NONE	.	183.33333
104	LN000065	UL	.	.	NONE	.	101.97917
105	LN000066	UL	.	.	NONE	.	48.12500
106	LN000067	BS	402.00000-	402.00000	NONE	.	.
107	LN000068	UL	.	.	NONE	.	40.00000
108	LN000069	BS	882.00000-	882.00000	NONE	.	.
109	LN000070	UL	.	.	NONE	.	178.66667
110	LN000071	UL	.	.	NONE	.	68.75000
111	LN000072	UL	.	.	NONE	.	42.39583
112	LN000073	BS	.	.	NONE	.	.
113	LN000074	UL	.	.	NONE	.	106.56250
114	LN000075	UL	.	.	NONE	.	488.12500
115	LN000076	UL	.	.	NONE	.	1825.31250
116	LN000077	UL	.	.	NONE	.	115.00000
117	LN000078	UL	.	.	NONE	.	237.18750
118	LN000079	UL	.	.	NONE	.	240.62500
119	LN000080	UL	.	.	NONE	.	171.87500
120	LN000081	BS	1197.00000-	1197.00000	NONE	.	.
121	LN000082	BS	297.00000-	297.00000	NONE	.	.
122	LN000083	UL	.	.	NONE	.	198.22917
123	LN000084	UL	.	.	NONE	.	26.66667
124	LN000085	UL	.	.	NONE	.	83.33333
125	LN000086	UL	.	.	NONE	.	89.37500
126	LN000087	UL	.	.	NONE	.	37.00000
127	LN000088	UL	.	.	NONE	.	250.93750

TABLE 4.30 Cont'd. ROWS SECTION INTEGER SOLUTION

SECTION 2 - COLUMNS

NUMBER		•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	128	R0001001	BS	7.00000	•	•	NONE	•
	129	R0001002	LL	•	•	•	NONE	401.04167
A	130	R0001003	LL	•	•	•	NONE	•
	131	R0001004	LL	•	•	•	NONE	401.04167
	132	R0002001	BS	4.00000	•	•	NONE	•
A	133	R0002002	LL	•	•	•	NONE	•
	134	R0002003	LL	•	•	•	NONE	401.04167
	135	R0002004	LL	•	•	•	NONE	401.04167
	136	R0003001	LL	•	•	•	NONE	755.10417
	137	R0003002	BS	5.00000	•	•	NONE	•
	138	R0003003	LL	•	•	•	NONE	250.93750
	139	R0003004	LL	•	•	•	NONE	333.43750
	140	R0004001	BS	6.00000	•	•	NONE	•
A	141	R0004002	LL	•	•	•	NONE	•
A	142	R0004003	LL	•	•	•	NONE	•
A	143	R0004004	LL	•	•	•	NONE	•
	144	R0005001	BS	6.00000	•	•	NONE	•
	145	R0005002	LL	•	•	•	NONE	401.04167
A	146	R0005003	LL	•	•	•	NONE	•
A	147	R0005004	LL	•	•	•	NONE	•
	148	R0006001	BS	6.00000	•	•	NONE	•
A	149	R0006002	LL	•	•	•	NONE	•
A	150	R0006003	LL	•	•	•	NONE	•
	151	R0006004	LL	•	•	•	NONE	401.04167
A	152	R0007001	LL	•	•	•	NONE	•
	153	R0007002	BS	4.00000	•	•	NONE	•
	154	R0008001	BS	4.00000	•	•	NONE	•
A	155	R0008002	LL	•	•	•	NONE	•
A	156	R0008003	LL	•	•	•	NONE	•
	157	R0008004	LL	•	•	•	NONE	401.04167
	158	R0009001	LL	•	•	•	NONE	755.10417
	159	R0009002	BS	6.00000	•	•	NONE	•
	160	R0009003	LL	•	•	•	NONE	250.93750
	161	R0009004	LL	•	•	•	NONE	333.43750
A	162	R0010001	LL	•	•	•	NONE	•
	163	R0010002	BS	7.00000	•	•	NONE	•
	164	R0010003	LL	•	•	•	NONE	641.66667
	165	R0010004	LL	•	•	•	NONE	286.45833
	166	R0011001	LL	•	•	•	NONE	755.10417
	167	R0011002	BS	5.00000	•	•	NONE	•
	168	R0011003	LL	•	•	•	NONE	250.93750
	169	R0011004	LL	•	•	•	NONE	333.43750
	170	R0012001	BS	6.00000	•	•	NONE	•
	171	R0012002	LL	•	•	•	NONE	320.83333
	172	R0012003	LL	•	•	•	NONE	1214.58333
	173	R0013001	LL	•	•	•	NONE	755.10417
	174	R0013002	LL	•	•	•	NONE	1788.64583
	175	R0013003	BS	4.00000	•	•	NONE	•
	176	R0013004	LL	•	•	•	NONE	250.93750

R0001001 ------Identifies first chain for demand pair 1 as the chain chosen to satisfy 7 voice circuits of unswitched divisible demand.

----Identifies first chain for demand pair 6 as being chosen to satisfy 6 voice circuits of unswitched divisible demand.

TABLE 4.31 COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	177	R0014001	BS	5.00000	•	•	NONE	•
A	178	R0014002	LL	•	•	•	NONE	•
A	179	R0014003	LL	•	•	•	NONE	•
	180	R0014004	LL	•	•	•	NONE	401.04167
A	181	R0015001	LL	•	•	•	NONE	•
	182	R0015002	BS	4.00000	•	•	NONE	•
A	183	R0015003	LL	•	•	•	NONE	•
	184	R0015004	LL	•	•	•	NONE	401.04167
	185	R0016001	LL	•	•	•	NONE	755.10417
	186	R0016002	BS	4.00000	•	•	NONE	•
	187	R0016003	LL	•	•	•	NONE	250.93750
	188	R0016004	LL	•	•	•	NONE	333.43750
	189	R0017001	BS	6.00000	•	•	NONE	•
	190	R0017002	LL	•	•	•	NONE	1214.58333
A	191	R0017003	LL	•	•	•	NONE	•
	192	R0017004	LL	•	•	•	NONE	1214.58333
	193	R0018001	BS	4.00000	•	•	NONE	•
A	194	R0018002	LL	•	•	•	NONE	•
A	195	R0018003	LL	•	•	•	NONE	•
A	196	R0018004	LL	•	•	•	NONE	•
	197	R0019001	LL	•	•	•	NONE	755.10417
	198	R0019002	BS	3.00000	•	•	NONE	•
	199	R0019003	LL	•	•	•	NONE	250.93750
	200	R0019004	LL	•	•	•	NONE	333.43750
	201	R0020001	LL	•	•	•	NONE	755.10417
	202	R0020002	BS	5.00000	•	•	NONE	•
	203	R0020003	LL	•	•	•	NONE	250.93750
	204	R0021001	BS	6.00000	•	•	NONE	•
	205	R0021002	LL	•	•	•	NONE	2328.26667
	206	R0021003	LL	•	•	•	NONE	1805.80000
	207	R0021004	LL	•	•	•	NONE	1164.13333
	208	R0022001	LL	•	•	•	NONE	1919.23750
	209	R0022002	BS	6.00000	•	•	NONE	•
	210	R0022003	LL	•	•	•	NONE	250.93750
	211	R0022004	LL	•	•	•	NONE	1164.13333
	212	R0023001	LL	•	•	•	NONE	1919.23750
	213	R0023002	LL	•	•	•	NONE	1919.23750
	214	R0023003	BS	4.00000	•	•	NONE	•
	215	R0023004	LL	•	•	•	NONE	250.93750
A	216	R0024001	LL	•	•	•	NONE	•
	217	R0024002	BS	4.00000	•	•	NONE	•
	218	R0024003	LL	•	•	•	NONE	481.25000
	219	R0024004	LL	•	•	•	NONE	1164.13333
	220	R0025001	LL	•	•	•	NONE	755.10417
	221	R0025002	BS	5.00000	•	•	NONE	•
	222	R0025003	LL	•	•	•	NONE	250.93750
	223	R0025004	LL	•	•	•	NONE	333.43750
	224	R0026001	LL	•	•	•	NONE	755.10417
	225	R0026002	BS	5.00000	•	•	NONE	•
	226	R0026003	LL	•	•	•	NONE	250.93750
	227	R0026004	LL	•	•	•	NONE	333.43750

TABLE 4.31 Cont'd. COLUMNS SECTION INTEGER SOLUTION

	NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
	228	R0027001	LL	•	•	•	NONE	755.10417
	229	R0027002	BS	5.00000	•	•	NONE	•
	230	R0027003	LL	•	•	•	NONE	250.93750
	231	R0027004	LL	•	•	•	NONE	333.43750
	232	R0028001	LL	•	•	•	NONE	755.10417
	233	R0028002	BS	4.00000	•	•	NONE	•
	234	R0028003	LL	•	•	•	NONE	250.93750
	235	R0028004	LL	•	•	•	NONE	333.43750
	236	R0029001	LL	•	•	•	NONE	755.10417
	237	R0029002	BS	4.00000	•	•	NONE	•
	238	R0029003	LL	•	•	•	NONE	250.93750
	239	R0029004	LL	•	•	•	NONE	333.43750
	240	R0030001	LL	•	•	•	NONE	755.10417
	241	R0030002	BS	4.00000	•	•	NONE	•
	242	R0030003	LL	•	•	•	NONE	250.93750
	243	R0030004	LL	•	•	•	NONE	333.43750
	244	R0031001	LL	•	•	•	NONE	755.10417
	245	R0031002	BS	4.00000	•	•	NONE	•
	246	R0031003	LL	•	•	•	NONE	250.93750
	247	R0031004	LL	•	•	•	NONE	333.43750
	248	R0032001	LL	•	•	•	NONE	333.43750
	249	R0032002	LL	•	•	•	NONE	755.10417
	250	R0032003	LL	•	•	•	NONE	325.31250
	251	R0032004	BS	1.00000	•	•	NONE	•
	252	R0033001	LL	•	•	•	NONE	1919.23750
	253	R0033002	BS	1.00000	•	•	NONE	•
	254	R0033003	LL	•	•	•	NONE	250.93750
	255	R0033004	LL	•	•	•	NONE	333.43750
	256	R0034001	BS	1.00000	•	•	NONE	•
	257	R0034002	LL	•	•	•	NONE	250.93750
	258	R0034003	LL	•	•	•	NONE	755.10417
	259	R0034004	LL	•	•	•	NONE	242.81250
	260	R0035001	LL	•	•	•	NONE	814.68750
	261	R0035002	LL	•	•	•	NONE	755.10417
	262	R0035003	LL	•	•	•	NONE	806.56250
	263	R0035004	BS	1.00000	•	•	NONE	•
	264	R0036001	LL	•	•	•	NONE	755.10417
	265	R0036002	LL	•	•	•	NONE	1295.93750
	266	R0036003	BS	1.00000	•	•	NONE	•
	267	R0036004	LL	•	•	•	NONE	250.93750
	268	D0037001	IV	1.00000	•	•	1.00000	•
A	269	D0037002	IV	•	•	•	1.00000	•
A	270	D0037003	IV	•	•	•	1.00000	•
	271	D0037004	IV	•	•	•	1.00000	802.08333
	272	D0038001	IV	1.00000	•	•	1.00000	•
	273	D0038002	IV	•	•	•	1.00000	1214.58333
	274	D0038003	IV	•	•	•	1.00000	320.83333
	275	X0001001	IV	•	349240.00000	•	1.00000	•
	276	X0001002	IV	•	349240.00000	•	1.00000	•
	277	X0001003	IV	1.00000	349240.00000	•	1.00000	349240.00000
	278	X0001004	IV	1.00000	349240.00000	•	1.00000	349240.00000

--- Identifies first chain for demand pair 38 as being chosen to satisfy the demand for unswitched non divisible traffic.

TABLE 4.31 Cont'd. COLUMNS SECTION INTEGER SOLUTION

NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
279	X0001005	IV	•	349240.00000	•	1.00000	•
280	X0001006	IV	1.00000	349240.00000	•	1.00000	349240.00000
281	X0001007	IV	1.00000	349240.00000	•	1.00000	349240.00000
282	X0001008	IV	1.00000	349240.00000	•	1.00000	349240.00000
283	X0001009	IV	1.00000	349240.00000	•	1.00000	349240.00000
284	X0001010	IV	1.00000	349240.00000	•	1.00000	349240.00000
285	X0001011	IV	1.00000	349240.00000	•	1.00000	349240.00000
286	X0001012	IV	1.00000	349240.00000	•	1.00000	349240.00000
287	X0001013	IV	1.00000	349240.00000	•	1.00000	349240.00000
288	X0001014	IV	1.00000	349240.00000	•	1.00000	349240.00000
289	X0001015	IV	1.00000	349240.00000	•	1.00000	349240.00000
290	X0001016	IV	1.00000	349240.00000	•	1.00000	349240.00000
291	X0001017	IV	1.00000	349240.00000	•	1.00000	349240.00000
292	X0001018	IV	1.00000	349240.00000	•	1.00000	349240.00000
293	X0001019	IV	1.00000	349240.00000	•	1.00000	349240.00000
294	X0001020	IV	1.00000	349240.00000	•	1.00000	349240.00000
295	X0001021	IV	1.00000	349240.00000	•	1.00000	349240.00000
296	X0001022	IV	•	692999.99999	•	1.00000	692999.99999
297	X0001023	IV	•	275000.00000	•	1.00000	275000.00000
298	X0001024	IV	•	385000.00000	•	1.00000	•
299	X0001025	IV	•	627000.00000	•	1.00000	627000.00000
300	X0001026	IV	•	769999.99999	•	1.00000	769999.99999
301	X0001027	IV	•	462000.00000	•	1.00000	462000.00000
302	X0001028	IV	•	583000.00000	•	1.00000	•
303	X0001029	IV	•	627000.00000	•	1.00000	•
304	X0001030	IV	•	649000.00000	•	1.00000	649000.00000
305	X0001031	IV	•	935000.00000	•	1.00000	•
306	X0001032	IV	•	462000.00000	•	1.00000	462000.00000
307	X0001033	IV	•	307999.99999	•	1.00000	•
308	X0001034	IV	•	1165999.99999	•	1.00000	•
309	X0001035	IV	•	649000.00000	•	1.00000	•
310	X0001036	IV	•	649000.00000	•	1.00000	•
311	X0001037	IV	•	770000.00000	•	1.00000	•
312	X0001038	IV	•	275000.00000	•	1.00000	•
313	X0001039	IV	•	1539999.99999	•	1.00000	•
314	X0001040	IV	•	462000.00000	•	1.00000	•
315	X0001041	IV	•	1166000.00000	•	1.00000	•
316	X0001042	IV	•	462000.00000	•	1.00000	•
317	X0001043	IV	•	912999.99999	•	1.00000	912999.99999
318	X0001044	IV	•	462000.00000	•	1.00000	•
319	X0001045	IV	•	462000.00000	•	1.00000	462000.00000
320	X0001046	IV	•	769999.99999	•	1.00000	769999.99999
321	X0001047	IV	•	340999.99999	•	1.00000	340999.99999
322	X0001048	IV	•	1166000.00000	•	1.00000	•
323	X0001049	IV	•	616000.00000	•	1.00000	616000.00000
324	X0001050	IV	•	462000.00000	•	1.00000	•
325	X0001051	IV	•	616000.00000	•	1.00000	616000.00000
326	X0001052	IV	•	275000.00000	•	1.00000	•
327	X0001053	IV	•	616000.00000	•	1.00000	616000.00000
328	X0001054	IV	•	1231999.99999	•	1.00000	1231999.99999
329	X0001055	IV	•	616000.00000	•	1.00000	•

TABLE 4.31 Cont'd. COLUMNS SECTION INTEGER SOLUTION

NUMBER	•COLUMN•	AT	•••ACTIVITY•••	••INPUT COST••	••LOWER LIMIT•	••UPPER LIMIT•	•REDUCED COST•
330	X0001056	IV	1.00000	385000.00000	•	1.00000	385000.00000
331	X0001057	IV	1.00000	462000.00000	•	1.00000	462000.00000
332	X0001058	IV	•	1231999.99999	•	1.00000	•
333	X0001059	IV	1.00000	1078000.00000	•	1.00000	1078000.00000
334	X0001060	IV	1.00000	462000.00000	•	1.00000	462000.00000
335	X0001061	IV	1.00000	103400.00000	•	1.00000	103400.00000
336	X0001062	IV	1.00000	52800.00000	•	1.00000	52800.00000
337	X0001063	IV	•	96800.00000	•	1.00000	•
338	X0001064	IV	•	176000.00000	•	1.00000	•
339	X0001065	IV	•	97900.00000	•	1.00000	•
340	X0001066	IV	•	46200.00000	•	1.00000	•
341	X0001067	IV	1.00000	15200.00000	•	1.00000	15200.00000
342	X0001068	IV	•	19200.00000	•	1.00000	•
343	X0001069	IV	1.00000	305800.00000	•	1.00000	305800.00000
344	X0001070	IV	•	53600.00000	•	1.00000	•
345	X0001071	IV	•	66000.00000	•	1.00000	•
346	X0001072	IV	•	40700.00000	•	1.00000	•
347	X0001073	IV	•	24800.00000	•	1.00000	24800.00000
348	X0001074	IV	•	102300.00000	•	1.00000	•
349	X0001075	IV	•	468600.00000	•	1.00000	•
350	X0001076	IV	•	1752300.00000	•	1.00000	•
351	X0001077	IV	•	55200.00000	•	1.00000	•
352	X0001078	IV	•	227700.00000	•	1.00000	•
353	X0001079	IV	•	231000.00000	•	1.00000	•
354	X0001080	IV	•	165000.00000	•	1.00000	•
355	X0001081	IV	1.00000	30000.00000	•	1.00000	30000.00000
356	X0001082	IV	1.00000	57600.00000	•	1.00000	57600.00000
357	X0001083	IV	•	190300.00000	•	1.00000	•
358	X0001084	IV	•	12800.00000	•	1.00000	•
359	X0001085	IV	•	40000.00000	•	1.00000	•
360	X0001086	IV	•	85800.00000	•	1.00000	•
361	X0001087	IV	•	44400.00000	•	1.00000	•
362	X0001088	IV	•	240900.00000	•	1.00000	•

TABLE 4.31 COLUMNS SECTION INTEGER SOLUTION

INTEGER NODES

NODE	55	1214
FUNCTIONAL	9262920.000	9238120.000
ESTIMATION	INTEGER	INTEGER
268= D0037001	1.0000	1.0000
269= D0037002	.	.
270= D0037003	.	.
271= D0037004	.	.
272= D0038001	1.0000	1.0000
273= D0038002	.	.
274= D0038003	.	.
275= X0001001	.	.
276= X0001002	.	.
277= X0001003	1.0000	1.0000
278= X0001004	1.0000	1.0000
279= X0001005	.	.
280= X0001006	1.0000	1.0000
281= X0001007	1.0000	1.0000
282= X0001008	1.0000	1.0000
283= X0001009	1.0000	1.0000
284= X0001010	1.0000	1.0000
285= X0001011	1.0000	1.0000
286= X0001012	1.0000	1.0000
287= X0001013	1.0000	1.0000
288= X0001014	1.0000	1.0000
289= X0001015	1.0000	1.0000
290= X0001016	1.0000	1.0000
291= X0001017	1.0000	1.0000
292= X0001018	1.0000	1.0000
293= X0001019	1.0000	1.0000
294= X0001020	1.0000	1.0000
295= X0001021	1.0000	1.0000
296= X0001022	.	.
297= X0001023	.	.
298= X0001024	.	.
299= X0001025	.	.
300= X0001026	.	.
301= X0001027	.	.
302= X0001028	.	.
303= X0001029	.	.
304= X0001030	.	.
305= X0001031	.	.

TABLE 4.32 ELEMENTS OF PROBLEM WHICH ARE ASSIGNED INTEGER VARIABLES IN SOLUTION

306=	X0001032	.	.	
307=	X0001033	.	.	
308=	X0001034	.	.	
309=	X0001035	.	.	
310=	X0001036	.	.	
311=	X0001037	.	.	
312=	X0001038	.	.	
313=	X0001039	.	.	
314=	X0001040	.	.	
315=	X0001041	.	.	
316=	X0001042	.	.	
317=	X0001043	.	.	
318=	X0001044	.	.	
319=	X0001045	.	.	
320=	X0001046	.	.	
321=	X0001047	.	.	
322=	X0001048	.	.	
323=	X0001049	.	.	
324=	X0001050	.	.	
325=	X0001051	.	.	
326=	X0001052	.	.	
327=	X0001053	.	.	
328=	X0001054	.	.	
329=	X0001055	.	.	
330=	X0001056	1.0000	1.0000	
331=	X0001057	1.0000	1.0000	
332=	X0001058	.	.	
333=	X0001059	1.0000	1.0000	
334=	X0001060	1.0000	1.0000	
335=	X0001061	1.0000	1.0000	
336=	X0001062	1.0000	1.0000	
337=	X0001063	.	.	
338=	X0001064	.	.	
339=	X0001065	.	.	
340=	X0001066	.	.	
341=	X0001067	1.0000	1.0000	
342=	X0001068	.	.	
343=	X0001069	1.0000	1.0000	
344=	X0001070	.	.	
345=	X0001071	.	.	
346=	X0001072	.	.	
347=	X0001073	1.0000	.	
348=	X0001074	.	.	
349=	X0001075	.	.	
350=	X0001076	.	.	
351=	X0001077	.	.	
352=	X0001078	.	.	
353=	X0001079	.	.	
354=	X0001080	.	.	
355=	X0001081	1.0000	1.0000	
356=	X0001082	1.0000	1.0000	
357=	X0001083	.	.	
358=	X0001084	.	.	
359=	X0001085	.	.	

TABLE 4.32 Cont'd. ELEMENTS OF PROBLEM WHICH ARE ASSIGNED INTEGER VARIABLES IN SOLUTION

360= X0001086	.	.	.
361= X0001087	.	.	.
362= X0001088	.	.	.

TABLE 4.32 Cont'd. ELEMENTS OF PROBLEM ASSIGNED INTEGER VARIABLES IN SOLUTION

MPSX - MIXED INTEGER PROGRAM - RELEASE 1 MOD LEVEL 4

PROBLEM NAME = PROB DATE = 75/046

.....PROBLEM STATISTICS.....		...COMPUTATIONAL ELEMENTS....		.....ENVIRONMENT.....			
ROWS	127	FUNCTIONAL (MIN)	COST1	C.P.U			
COLUMNS	235	RESTRAINTS	RHS1	CORE ALLOCATED	110712		
VARIABLES	362	BOUNDS	END1				
INTEGER VARIABLES	95			SCRATCH	ON	.....DISK	3330
ELEMENTS	1171			MATRIX	ON	.....DISK	3330
DENSITY	2.54			ETA	ON	.....DISK	3330
				MIXWORK	ON	.....DISK	3330
				PROBFILE	ON	.....TAPE	3400

	TIME SINCE MIXSTART	ITERATION NO. SINCE SETUP	NODE NO.	FUNCTIONAL VALUE	STRATEGY
CONTINUOUS OPTIMUM		217	1	268095.8500	
FIRST INTEGER SOLUTION	0.50	485	55	9262919.9999	
BEST INTEGER SOLUTION	8.52	3742	1214	9238119.9999	
TIME OF SEARCH	12.13	5174	1733		

NUMBER OF INTEGER VARIABLES NOT INTEGER AT CONTINUOUS OPTIMUM = 45

NUMBER OF INTEGER SOLUTIONS FOUND = 2

IF RESUMED, SEARCH CANNOT PRODUCE NEW INTEGER SOLUTION BETTER THAN 1593085.0000

BRANCHES ABANDONED WHILE COMPUTING = 168

TABLE 4.33 SUMMARY OF STATISTICS

CHAINS AS SELECTED BY MPSX(LINK NO.)

FROM	TO
BEARSKIN-BIG TROU	BEARSK-ALLEN -BIG TR-
BEARSKIN-SACHIGO	BEARSK-ALLEN -SACHIG-
BEARSKIN-THUNDER	BEARSK-ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
BIG TROU-KESABONI	BIG TR-ALLEN -KESABO-
BIG TROU-KINGFISH	BIG TR-ALLEN -KINGFI-
BIG TROU-WUNNUMMI	BIG TR-ALLEN -WUNNUM-
BIG TROU-ANGLING	BIG TR-ALLEN -ANGLIN-
BIG TROU-SACHIGO	BIG TR-ALLEN -SACHIG-
BIG TROU-THUNDER	BIG TR-ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
DEER LAK-SANDY LA	DEER L-ALLEN -SANDY -
DEER LAK-THUNDER	DEER L-ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
FORT HOP-LANSDOWN	FORT H-ALLEN -LANSDO-
FORT HOP-THUNDER	FORT H-ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
KESABONI-KINGFISH	KESABO-ALLEN -KINGFI-

TABLE 4.34 JOB STEP RESULTS OUTPUT

CHAINS AS SELECTED BY MPSX(LINK NO.)

FROM	TO
KESABUNI-ANGLING	KESABU-ALLEN -ANGLIN-
KESABUNI-THUNDER	KESABU-ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
KINGFISH-WEBEQUIE	KINGFI-ALLEN -WEBEQU-
KINGFISH-ANGLING	KINGFI-ALLEN -ANGLIN-
KINGFISH-THUNDER	KINGFI-ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
LANSDOWN-THUNDER	LANSDO-ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
PIKANGIK-POPLAR H	PIKANG-POPLAR-
PIKANGIK-THUNDER	PIKANG-NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
POPLAR H-THUNDER	POPLAR-PIKANG-NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
SANDY LA-NORTH SP	SANDY -ALLEN -NORTH -
SANDY LA-THUNDER	SANDY -ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
WEAGAMOW-THUNDER	WEAGAM-ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
WEBEQUIE-THUNDER	WEBEQU-ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
WUNNUMMI-THUNDER	WUNNUM-ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-

TABLE 4.34 JOB STEP RESULTS OUTPUT

CHAINS AS SELECTED BY MPSX(LINK NO.)

FROM	TO
ANGLING -THUNDER	ANGLIN-ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
NORTH SP-THUNDER	NORTH -ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
SACHIGO -THUNDER	SACHIG-ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
CAT LAKE-THUNDER	CAT LA-ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
MACDOWEL-THUNDER	MACDOW-NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
NUNGESSE-THUNDER	NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
SLATE FA-THUNDER	SLATE -ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
STIRLAND-THUNDER	STIRLA-ALLEN -NUNGES-RED LA-VERMIL-KENORA-NOKOMO-THUNDE-
BIG TROU-TORONTO	BIG TR-ALLEN -BARRIE-TORONT-
LANSDOWN-TORONTO	LANSDO-ALLEN -BARRIE-TORONT-

TABLE 4.34 Cont'd. JOB STEP RESULTS OUTPUT

TRANSMISSION LINKS STATISTICS

LINK	CHANNELS INSTALLED	COST($)	UNUSED CAPACITY	USED CAPACITY
DEER LAK-ALLEN PA	1	349240	288	12
SANDY LA-ALLEN PA	1	349240	284	16
NUNGESSE-ALLEN PA	1	349240	234	66
NORTH SP-ALLEN PA	1	349240	292	8
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
BIG TROU-ALLEN PA	1	349240	259	41
WEBEQUIE-ALLEN PA	1	349240	289	11
KESABONI-ALLEN PA	1	349240	281	19
BEARSKIN-ALLEN PA	1	349240	284	16
SACHIGO -ALLEN PA	1	349240	288	12
ANGLING -ALLEN PA	1	349240	284	16
CAT LAKE-ALLEN PA	1	349240	299	1
SLATE FA-ALLEN PA	1	349240	299	1
STIRLAND-ALLEN PA	1	349240	299	1
POPLAR H-PIKANGIK	1	385000	950	10
NUNGESSE-PIKANGIK	1	462000	950	10
NUNGESSE-MACDOWEL	1	1078000	959	1
NUNGESSE-RED LAKE	1	462000	882	78
RED LAKE-VERMILLI	1	103400	882	78
KENORA -VERMILLI	1	52800	882	78
THUNDER -NOKOMON	1	15200	402	78
KENORA -NOKOMON	1	305800	882	78
TORONTO -BARRIE	1	30000	1197	3
ALLEN PA-BARRIE	1	57600	297	3

TOTAL COST OF TRANSMISSION 9238120

TOTAL COST TRANSMISSION AND SWITCHING ($) 9238120

PRINT REPEATED BY OPERATOR

TABLE 4.34 JOB STEP RESULTS OUTPUT

5.0 INPUT DATA FORMATS

The input data formats described in the following sections refer only to card inputs. The job steps requiring card data input are CHARGE,BORNE and RESULTS.While the remaining job steps require input data, the data is supplied internally through disk and tape files.

5.1 CHARGE

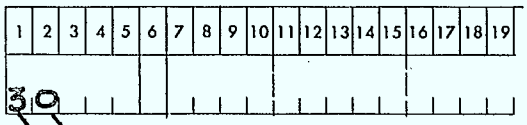
FIRST DATA CARD	FIELD	COLUMNS	VARIABLE	CONTENTS	DESCRIPTION
Defines the type of switching network simulation	1	1	IPROG	2	Switching network simulation only.
				3	Switching and transmission facilities network simulation.
	2	2	JIMY	0	Switching network profiles not printed.
				1	Switching network profiles are printed.
SECOND DATA CARD	1	1-3	NFG	Integer	Number of final groups in switching network configuration.
Defines the number and types of links in the switching network configuration.	2	4-6	NCHU	Integer	Number of contemplated high usage groups in switching network configuration.
	3	7-9	NIHU	Integer	Number of installed high usage groups in switching network configuration.

SECOND DATA CARD Cont'd.	FIELD	COLUMNS	VARIABLE	CONTENTS	DESCRIPTION
	4	10-12	NCFG	Integer	Number of contemplated full groups in switching network configuration.
	5	13-15	NIFG	Integer	Number of installed full groups in switching network configuration.
	6	16-18	NDP	Integer	Number of demand pairs in the switching network configuration.
THIRD GROUP OF DATA CARDS	1	1-12	BVD(1-3)	Alphanumeric	External node name of link in switching network configuration.
The maximum number of cards in this group is 100. The links in the switching network are fully described by this group of data cards.	2	14-25	BVD(4-6)	Alphanumeric	Corresponding node name of link in the switching network configuration.
	3	27-30	BVD(7)	CHU	Contemplated high usage group
				CFG	Contemplated full group.
				IHU	Installed high usage group.
				IFG	Installed full group.
				FING	Final group.
	4	35-37	ZZZ	Real	Blocking probability or overflow probability for switching network link. Decimal point in column 35.

FOURTH GROUP OF DATA CARDS	FIELD	COLUMNS	VARIABLE	CONTENTS	DESCRIPTION
	1	1-12	BULL(1)	Alphanumeric	Name of demand node in switching network configuration.
The number of cards in this group is equal to the number of demand pairs of switched traffic in switching network. The maximum number of cards in this group is 600. If traffic is specified in both directions for each pair of points in the switching network, the software can only handle a maximum of 24 switching nodes.	2	14-25	BULL(2)	Alphanumeric	Name of corresponding demand node in switching network configuration.
	3	26-32	DEM	Real	Initial traffic in C.C.S. Decimal point in column 30.
	4	33-39	DEL	Real	Total demand in C.C.S. (Initial plus increase). Decimal point in column 37.

The following is a partial coding of the switching network configuration of the Maritimes problem described in section 4.0.

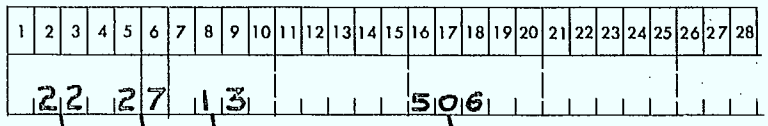
FIRST DATA CARD:



Switching network profiles not required.

Switching and transmission facilities network simulation.

SECOND DATA CARD:



506 Demand pairs

13 Installed high usage groups

27 Contemplated high usage groups

22 Final groups

THIRD GROUP OF DATA CARDS

27 Contemplated high usage groups.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
1	W	O	O	D	S	T	O	C	K					F	R	E	D	R	I	C	T	O	N			C	H	U									.	1	5							
2	W	O	O	D	S	T	O	C	K					E	D	M	U	N	D	S	T	O	N			C	H	U									.	1	5							
3	E	D	M	U	N	D	S	T	O	N				N	E	W	C	A	S	T	L	E				C	H	U									.	1	5							
4	F	R	E	D	R	I	C	T	O	N				N	E	W	C	A	S	T	L	E				C	H	U									.	1	5							

External Node name	External Node name	Contemplated high usage group	Overflow probability

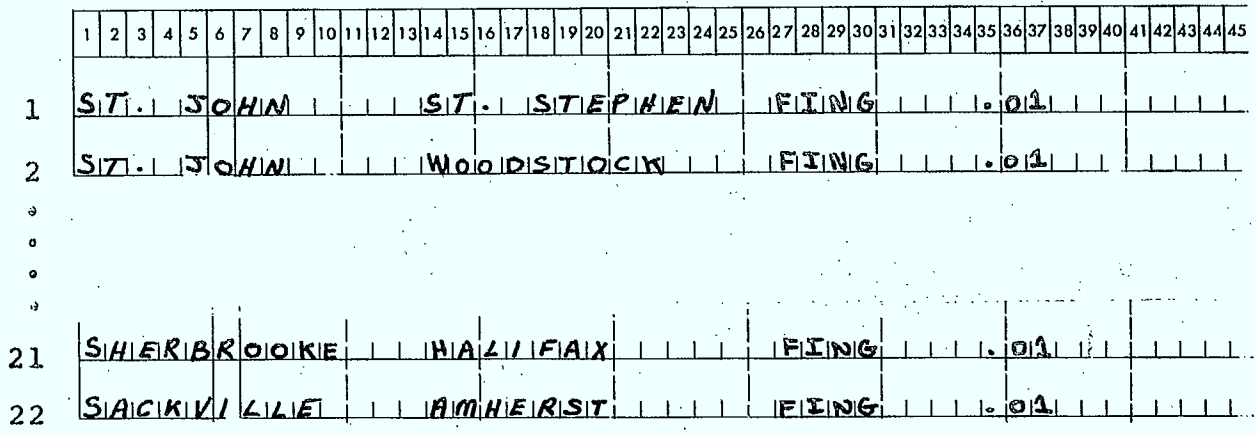
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
26	Y	A	R	M	O	U	T	H						S	H	E	L	B	U	R	N	E				C	H	U									.	1	5							
27	S	H	E	L	B	U	R	N	E					B	R	I	D	G	E	W	A	T	E	R		C	H	U									.	1	5							

13 Installed high usage groups

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
1	S	T	.		J	O	H	N						C	A	M	P	B	E	L	L	T	O	N		I	H	U									.	1	5							
2	S	T	.		J	O	H	N						B	A	T	H	U	R	S	T					I	H	U									.	1	5							

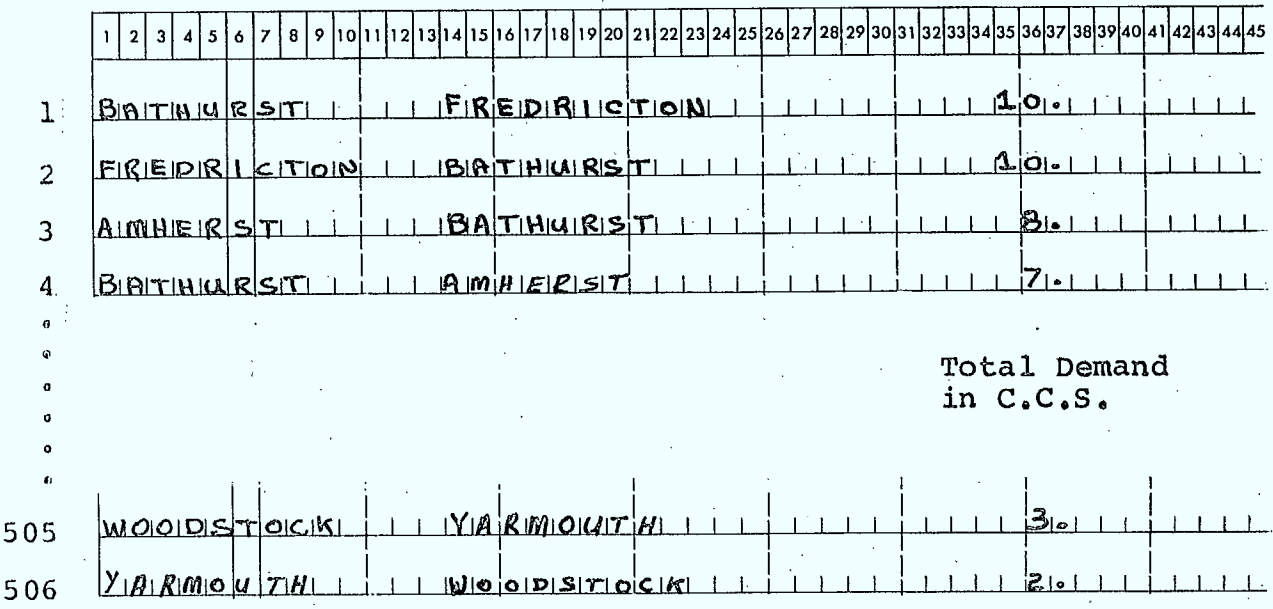
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
12	N	E	W	C	A	S	T	L	E					H	A	L	I	F	A	X						I	H	U									.	1	5							
13	F	R	E	D	R	I	C	T	O	N				H	A	L	I	F	A	X						I	H	U									.	1	5							

22 Final groups



FOURTH GROUP OF DATA CARDS

506 Demand pairs



Total Demand in C.C.S.

5.2 BORNE:

FIRST DATA CARD	FIELD	COLUMNS	VARIABLE	CONTENTS	DESCRIPTION
	1	1	IPROG	1	Transmission facilities network simulation only.
				3	Switching and transmission facilities network simulation.
	2	2	MIJ	0	Switched demand only.
				1	Non switched demand only or a combination of switched and non switched demand.

SECOND GROUP OF DATA CARDS

This group of data cards describe the cost and capacity functions of the links in the transmission facilities network as well as the cost and capacity functions of the intermediary nodes of the switching network. The maximum number of cards is 300 for the transmission facilities links and 60 for the intermediary nodes of the switching network.

	1	1-12	AVD(1-3)	Alphanumeric	Node name of transmission facilities network link.
	2	13	AVD(4)	1	CNCP ┐
				2	MT&T ├ Link ownership
				3	TCTS ├ Link ownership
				4	ET&T ┘ Link ownership
				5	SWCH- Interconnect link.
				6	DUMM- Dummy link.
				7	SWIT- Intermediary switching node.
	3	14-25	AVD(5-7)	Alphanumeric	Name of corresponding node of transmission facilities network link.

NOTE: For intermediary switching network nodes, field 1 contains the switching node name, field 2 contains the integer 7 and field 3 contains the name SWIT.

SECOND GROUP OF DATA CARDS Cont'd.

FIELD	COLUMNS	VARIABLE	CONTENTS	DESCRIPTION
4	26-28	AVD(8)	Integer	Number of miles between the nodes of the transmission facilities link.
5	29-30	AVD(9)	Integer	Number of fields/2 still to be read for this link.
6	31-32	AVD(10)	Integer	Total number of channels of first voice circuit type.
7	33-37	AVD(11)	Integer	Number of voice circuits per channel of 1st voice circuit type.
8	38-39	AVD(12)	Integer	Number of channels of type AVD(11) with cost function AVD(13).
9	40-44	AVD(13)	Integer	Cost per channel AVD(11) as a function of miles. This cost function only applies to the number of channels specified by AVD(12).
10	45-46	AVD(14)	Integer	If i) AVD(12) < AVD(10) AVD(14) contains number of channels of type AVD(11) with new cost function AVD(15). If AVD(12) AVD(14) is less than AVD(10), then AVD(16) will contain the number of remaining channels of type AVD(11). This procedure to continue till all channels as defined by AVD(10) of type AVD(11) are cost defined.

SECOND GROUP OF DATA CARDS Cont'd.

FIELD	COLUMNS	VARIABLES	CONTENTS	DESCRIPTION
				If ii) AVD(12)=AVD(10) or if all channels of a voice circuit type have been cost defined, then the following field contains the total number of channels of the second voice circuit type . The same procedure is followed as was the case of the first voice circuit type. The maximum number of voice circuit types which can be defined is four.
				NOTE: If it becomes necessary to use more than one data card for a particular transmission facilities link or switching node, the user should not enter data beyond column 77 of the first data card.Any continuation data cards are of format 11(I2,I5). The maximum number of data cards for a particular link or node is 4. A maximum of twenty channels may be defined for any transmission facilities link. An intermediary switching node may be defined for up to a maximum of twenty switching machines.
THIRD GROUP OF DATA CARDS	1			
	1	1-4	FIN	FIN. Marker denoting the end of transmission facilities link cost and capacity functions as well as switching network node cost and capacity functions.

FOURTH GROUP OF DATA CARDS

FIELD	COLUMNS	VARIABLE	CONTENTS	DESCRIPTION
1	1-7	ITYPE(1)	Integer	Artificial lower bound cost.
2	8-14	ITYPE(2)	Integer	Artificial upper bound cost.

NOTE: The artificial upper and lower bound costs are required for the special case where the demand for voice circuits on a particular transmission facilities link is greater than the defined capacity. The values chosen for the upper and lower bound costs should be in the same order of magnitude as the real typical costs of the links under study.

FIFTH GROUP OF DATA CARDS

1	1-7	NBDEM	Integer	Number of non switched demand pairs which are divisible.
2	8-14	NBINDI	Integer	Number of non switched pairs of demand points which are non divisible i.e. T.V.

SIXTH GROUP OF DATA CARDS

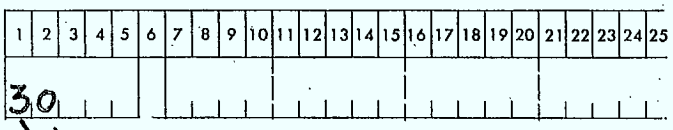
The number of cards in this group should equal the value assigned to NBDEM.	1	1-12	BULL(1)	Alphanumeric	Node name of non switched divisible demand pair.
	2	14-25	BULL(2)	Alphanumeric	Corresponding node name of non switched divisible demand pair.
	3	27-31	Dem(1)	Integer	Demand in Voice Circuits.

SEVENTH GROUP OF DATA CARDS

	FIELD	COLUMNS	VARIABLE	CONTENTS	DESCRIPTION
The number of cards in this group should equal the value assigned to NBINDI.	1	1-12	BULL(1)	Alphanumeric	Node name of non switched non divisible demand pair.
	2	14-25	BULL(2)	Alphanumeric	Corresponding node name of non switched non divisible demand pair.
	3	27-31	DEM(1)	Integer	Demand in voice circuits.

The following is a partial coding of the transmission facilities network of the Maritimes problem described in section 4.0.

FIRST DATA CARD

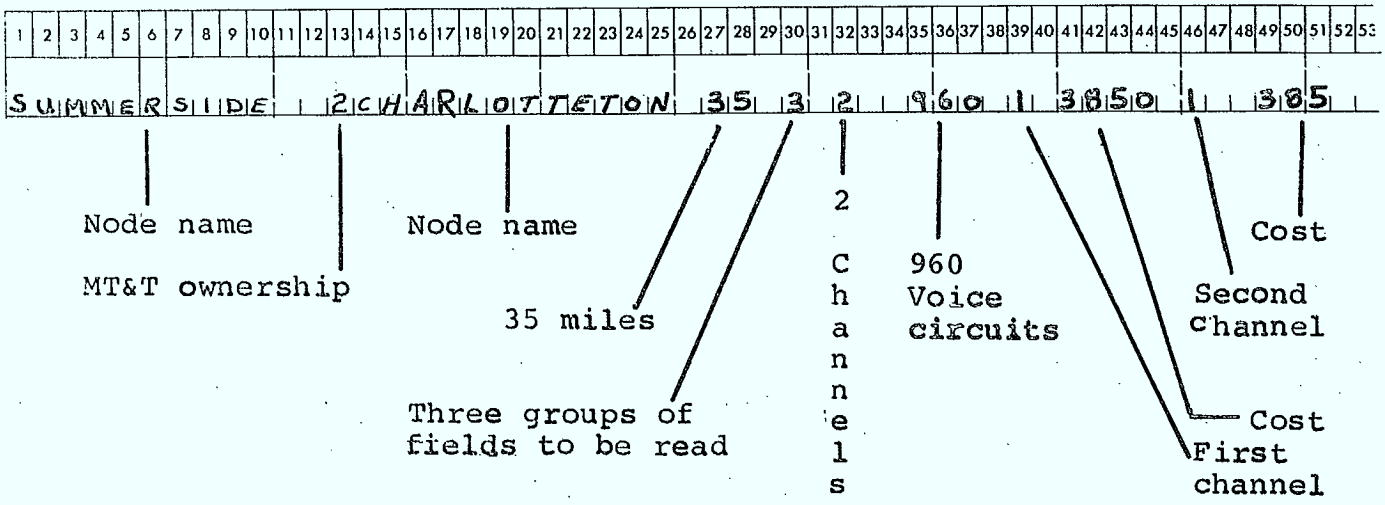


Switched demand only.

Switching and transmission facilities network simulation.

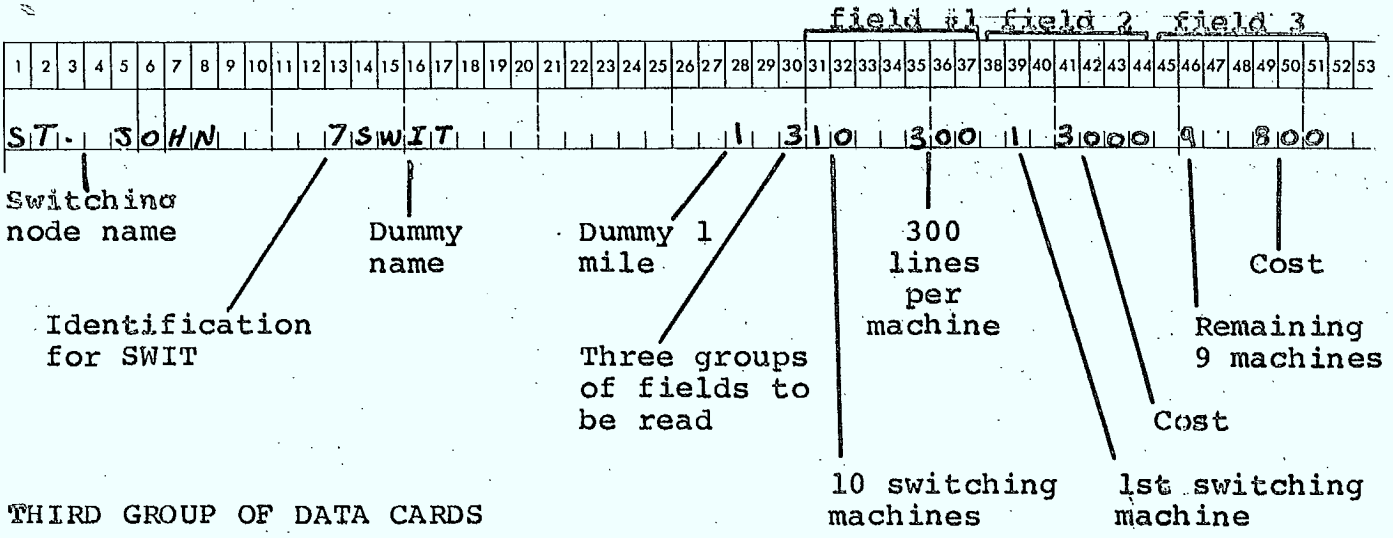
SECOND GROUP OF DATA CARDS

Cost and capacity functions of transmission facilities link.

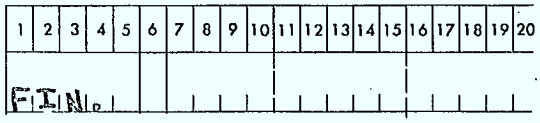


SECOND GROUP OF DATA CARDS Cont'd.

Cost and capacity functions of intermediary switching nodes.

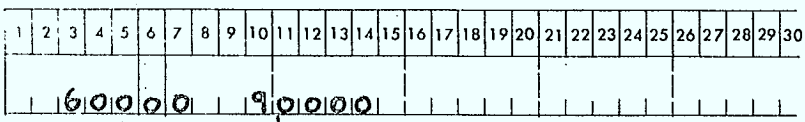


THIRD GROUP OF DATA CARDS



Marker indicating the end of cost and capacity functions.

FOURTH GROUP OF DATA CARDS

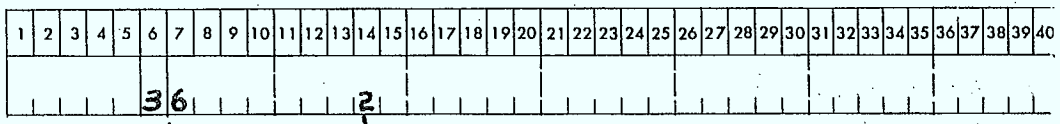


Artificial upper bound cost.

Artificial lower bound cost.

FIFTH GROUP OF DATA CARDS

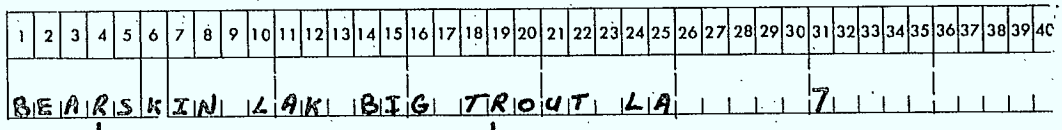
Data for Northern problem.



Two demand pairs of unswitched non divisible demand.

Thirty six demand pairs of unswitched divisible demand.

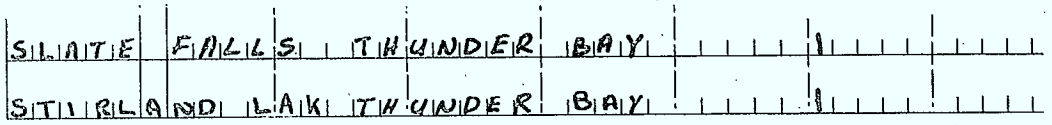
SIXTH GROUP OF DATA CARDS



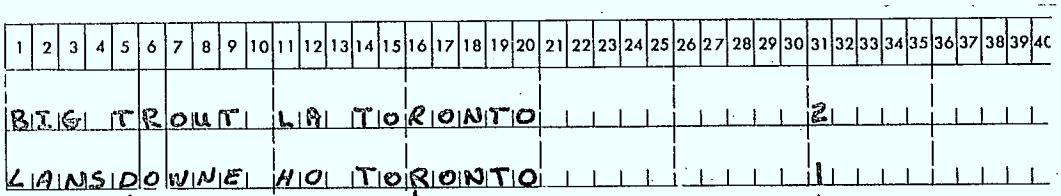
Node name

Node name

Divisible demand



SEVENTH GROUP OF DATA CARDS



Node name

Node name

Non divisible demand

5.3 TRANCHE

The job step TRANCHE consists of two job steps, MP1 and MP2. By dividing the job step into two, the solutions which otherwise might have been lost due to exceeding the time parameters can now be saved on file. In all previous HERMES models, if the TRANCHE step terminated without finding the solutions required, then the entire step would have to be rerun resulting in large computer costs. Although the two job steps do not require input data on cards, the user must specify some elements of the macro-instructions.

MP1 is the first job step executed. The input data was prepared and formatted for MPSX input by the job step SETUP and is stored on disc files. MP1 finds the continuous optimal solution and the first integer solution. The first integer solution is saved on a tape file called PROBFILE.

The user must specify two parameters for the MP1 job step. Refer to Appendix A for the listing of MP1 and MP2.

i) XMXDROP this parameter must be a real number, that is, one to seven digits with a decimal point, optionally followed by the letter E and a decimal exponent. The first integer solution obtained, if any, will have a functional value (value of the objective function COST1) which is not worse than the value for XMXDROP. XMXDROP is the 23rd statement of the MP1 listing found in Appendix A.

ii) XDELTM this parameter specifies the number of minutes of execution time for MP1. If the first integer solution has not been found before the time parameter has expired , then the run will terminate. The run will also terminate when the first integer solution has been found.

The second TRANCHE job step ,MP2, is executed if more than one integer solution is required or if optimality is sought. Two parameters must be specified by the user. While XMXDROP appears in the macro-instructions of the MP2 listing, it is ignored since the first integer solution objective cost function COST1 is stored on PROBFILE and is chosen for the value of XMXDROP.

i) XDELTM as was the case for MP1, the user must specify the execution time for MP2.

ii) Statement 24 of the MP2 listing is an IF statement. This statement tests the number of integer solutions found . IF(CT.EQ.9.STOP) implies that up to nine integer solutions if they exist are required. By changing the value of this statement the user therefore can limit the number of solutions to be searched for.

The step MP2 will terminate when either the number of specified integer solutions have been found, or the optimal integer solution has been obtained ,or if the time parameter XDELTM has been exceeded. If the XDELTM parameter has been exceeded,then the current solution is saved on PROBFILE.If the search for solutions is to be continued,then MP2 is rerun. This procedure is continued until the number of integer solutions specified has been attained or if optimality is proven.

5.4 RESULTS

Due to the time and complexity required to decode the TRANCHE output, job step RESULTS was developed as a temporary measure. Coding of input data is required as well as coding in the program itself.

5.4.1 SWITCHING NETWORK OUTPUT DATA

The column elements beginning with the letter 'C' (Refer to page 85 table 4.18) are the ones of interest for this data group. From page 85 begin counting the 'C' column elements. The first 'C' element is C0001001 and it's activity column is equal to 1.0. The second 'C' element is C0001002 with an activity of 0.0. The third 'C' element is C0002001 with activity of 1.0. The fourth 'C' element is C0002002 with an activity equal to 0.0.

The 'C' element columns of interest are those with zero activity level.As is seen from page 85, the 'C' elements having 0.0 activity are the elements 2,4,23,25,29,31,56, 58,64,66,71,72,73,.....547,549,581. The total number of elements with zero activity is 75. (NP=75). For the Maritimes network problem there were 506 demand pairs (NPD=506) and 4 intermediary switching nodes(NN=4). Statements 23,24 & 25 from job step RESULTS are therefore coded as follows;

```
23        NPD=506
24        NP=75
25        NN=4
```

The second group of data cards contain the link numbers of the switching network, the transmission facilities chain or chains serving the switching network link and the number of voice circuits required for each switching network link. This coded information is found on page 71 table 4.18. The column elements of interest are those beginning with the letter 'S' and having an activity greater than zero.

COLUMN	ACTIVITY	INPUT DATA
S0002001	6	2,1,6
S0005001	12	5,1,12
S0006005	6	6,5,6
S0008002	8	8,2,8
S0009002	19	9,2,19
.	.	
.	.	
.	.	
S0061003	102	61,3,102
S0062001	116	62,1,116

Activity in voice circuits

Chain number

Switching network internal link number

The third group of data cards contain information relating to transmission facilities links, the number of channels installed and the number of unused voice circuits for each transmission facilities link. The elements appearing on page 103 table 4.20 and beginning with the letter 'X' are the elements of interest for the third group of data cards. All 'X' elements with activity level 1.0 are in the solution.

ELEMENT		ACTIVITY	UNUSED CAPACITY	DATA INPUT
X0001001	link 1	1.0	LN000001 780.0	1,1,780
X0001002	link 2	1.0	LN000002 619.0	2,1,619
X0001003	link 3	1.0	LN000003 375.0	3,1,375
X0001004 X0002004	link 4	2.0	LN000004 791.0	4,2,791

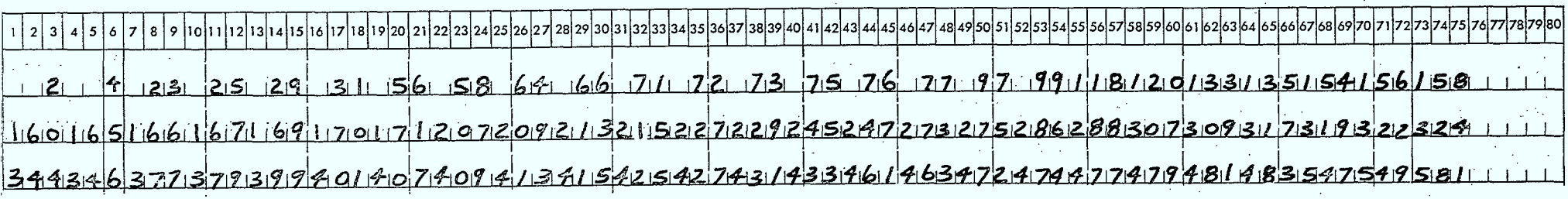
Refering to page 71,table 4.17, elements beginning with the letters 'LN' indicate the transmission facilities internal link number and the number of unused voice circuits or slack capacity.

The fourth group of data cards contain information regarding the intermediary switching nodes. The procedure is the same as outlined for the third group of data cards. The elements of interest for this group of data cards are those beginning with the letter 'N'(page 106)and the letters 'SW' (page 77)

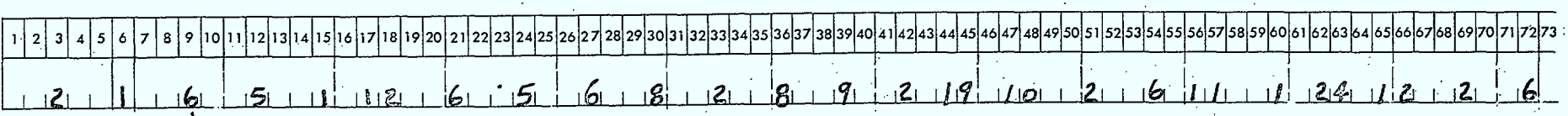
ELEMENT	ACTIVITY A	UNUSED CAPACITY	DATA INPUT
N0001004	1.0	SW000004 285.8	4,1,285.8
N0001012	1.0	SW000012 285.6	12,1,285.6
N0001020	1.0	SW000020 194.8	20,1,194.8
N0001021	1.0	SW000021 203.8	21,1,203.8

FIRST GROUP OF DATA CARDS

'C' elements with zero activity



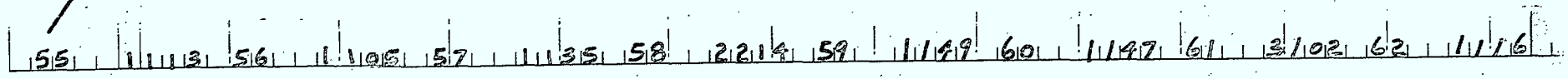
SECOND GROUP OF DATA CARDS



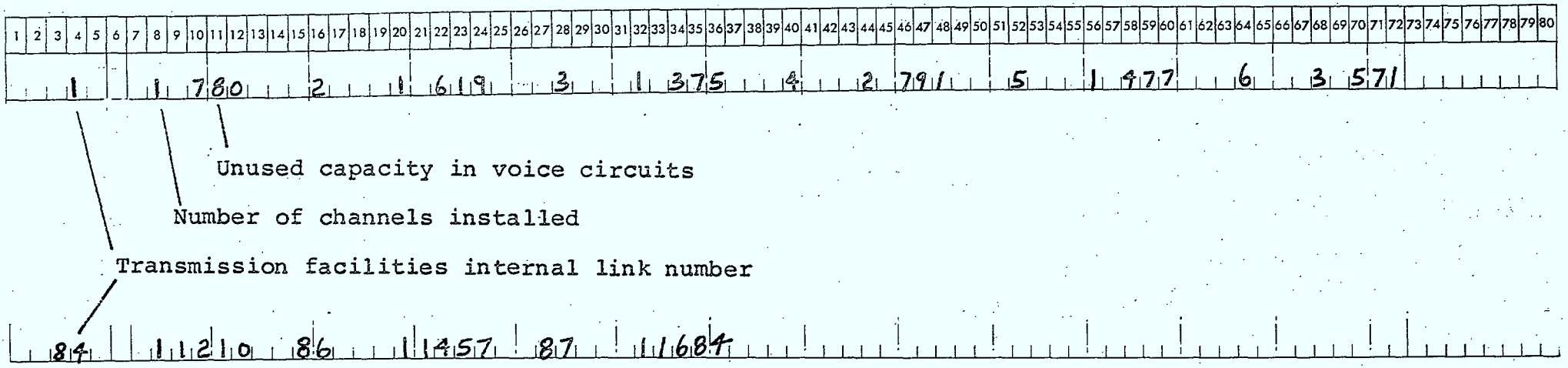
Activity in voice circuits

Transmission facilities chain number (internal number).

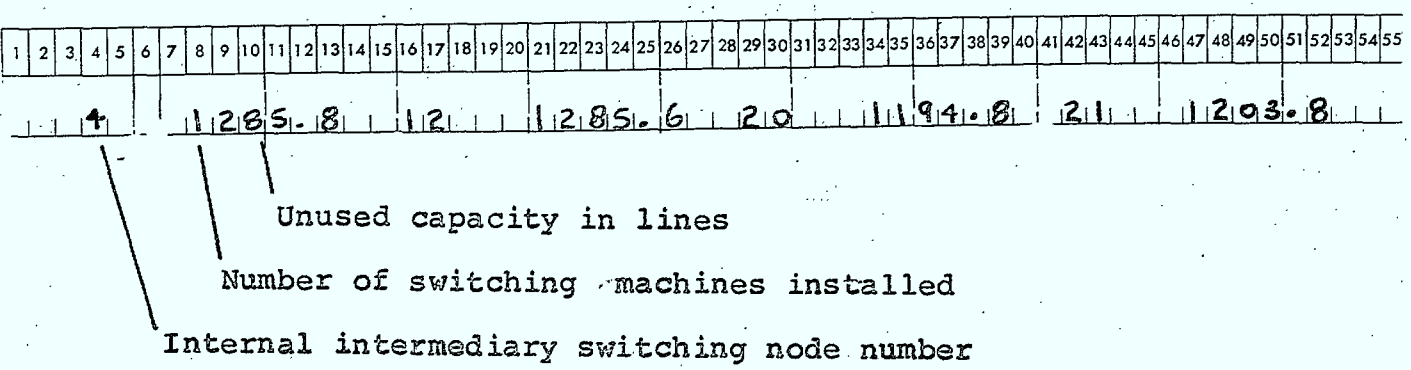
Switching network internal link number



THIRD GROUP OF DATA CARDS



FOURTH GROUP OF DATA CARDS



5.4.2 NON SWITCHED NETWORK OUTPUT DATA

The coding requirement for non switched networks is similar to that of the switched networks. Statements 143 & 144 of the job step RESULTS require modification for each problem type. For the Northern network problem there were a total of 38 demand pairs (ID 38) . Also there were 28 transmission facilities links present in the solution (LN 28).

The first group of data cards contain information relating to the transmission facilities chains and the number of voice circuits carried. The elements of interest those beginning with the letter 'R' and the letter 'D' (page 149 table 4.31).

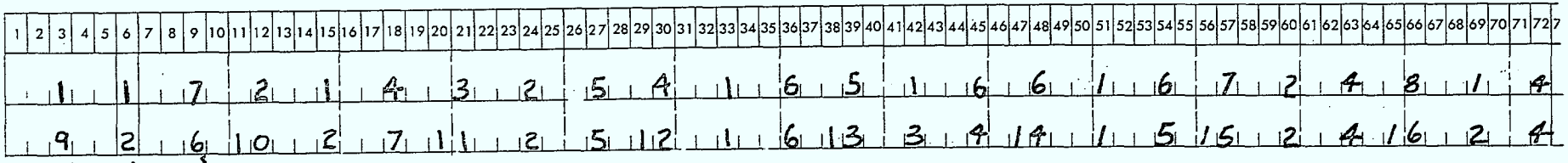
COLUMN	ACTIVITY	INPUT DATA
R0001001	7.0	1,1,7
R0002001	4.0	2,1,4
R0003002	5.0	3,2,5
R0004001	6.0	4,1,6
R0005001	6.0	5,1,6
°	°	°
°	°	°
°	°	°
D0037001	2 non divisible demand	37,1,2
D0038001	1 non divisible demand	38,1,1

The second group of data cards contain the transmission facilities link numbers in the solution,the number of channels installed and the amount of unused capacity.The elements of interest are those beginning with the letter 'X'(see table 4.32 page 146). The unused capacity is found

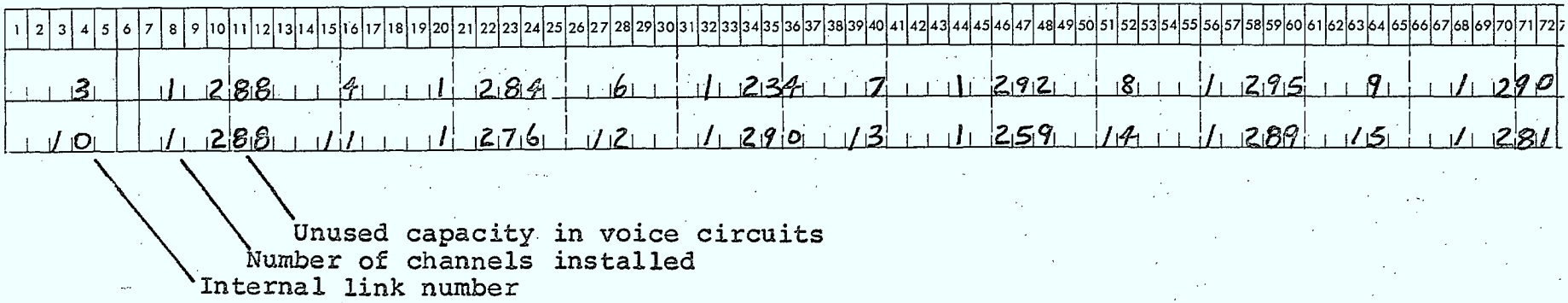
on page 146 table 4.30. The elements of interest are those beginning with the letters 'LN'.

COLUMN	ACTIVITY	UNUSED CAPACITY		INPUT DATA
X0001003	1.0	LN000003	288	3,1,288
X0001004	1.0	LN000004	284	4,1,284
X0001006	1.0	LN000006	234	6,1,234
.	.		.	.
.	.		.	.
.	.		.	.
X0001081	1.0	LN000081	1197	81,1,1197
X0001082	1.0	LN000082	297	82,1,297

FIRST GROUP OF DATA CARDS



SECOND GROUP OF DATA CARDS



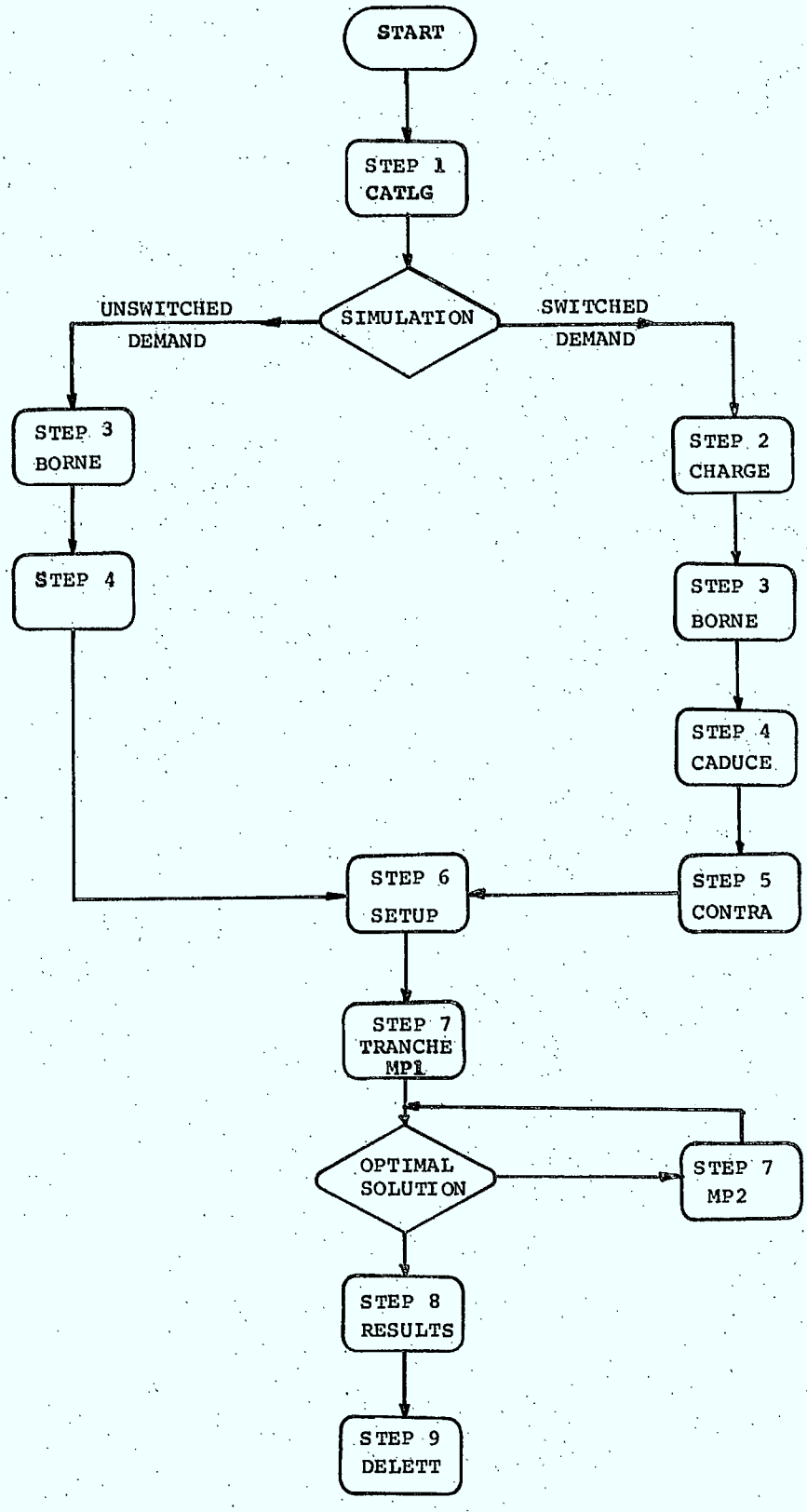


TABLE 5.1 HERMES 111 SIMULATION FLOWCHART

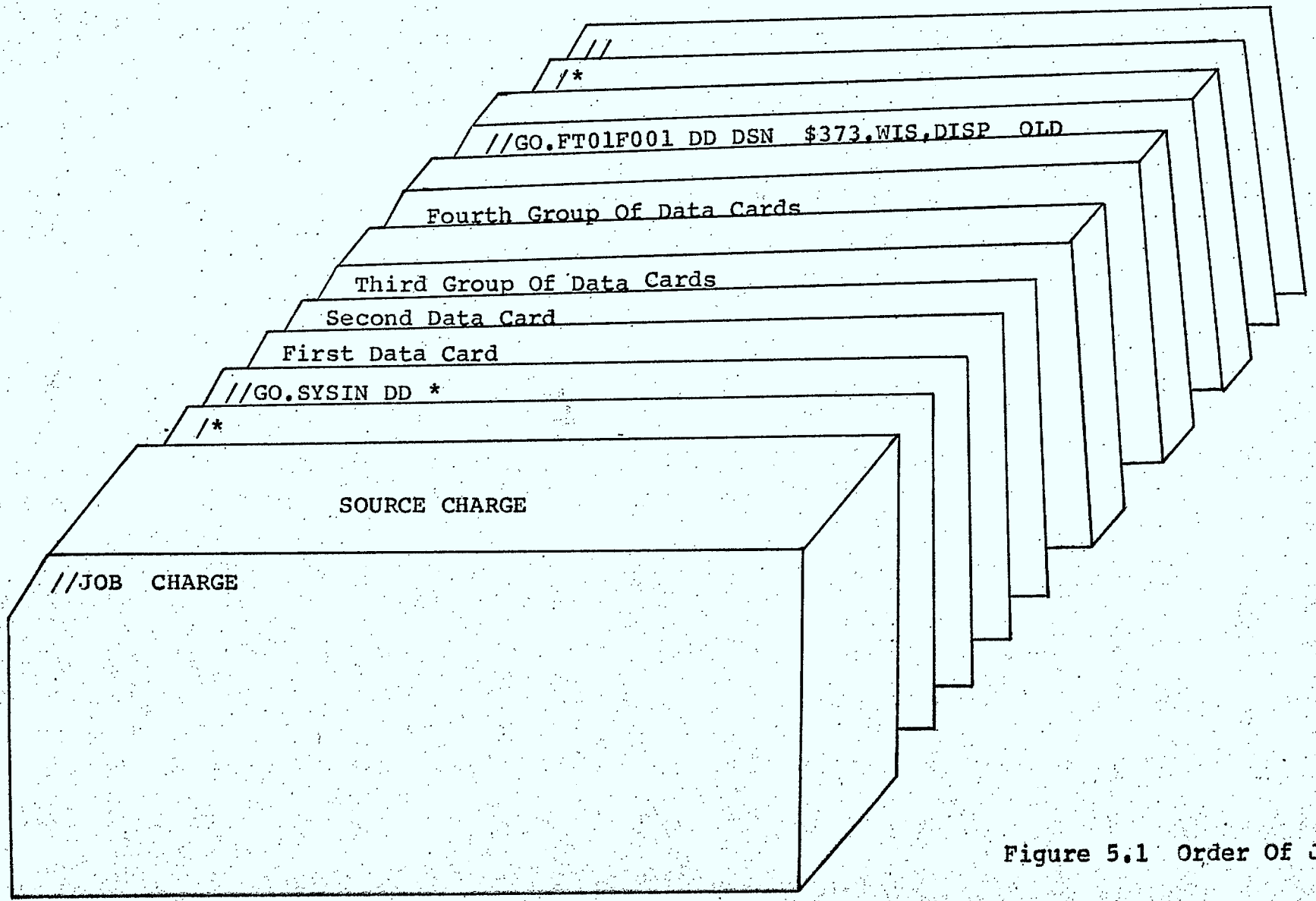


Figure 5.1 Order Of Job CHARGE

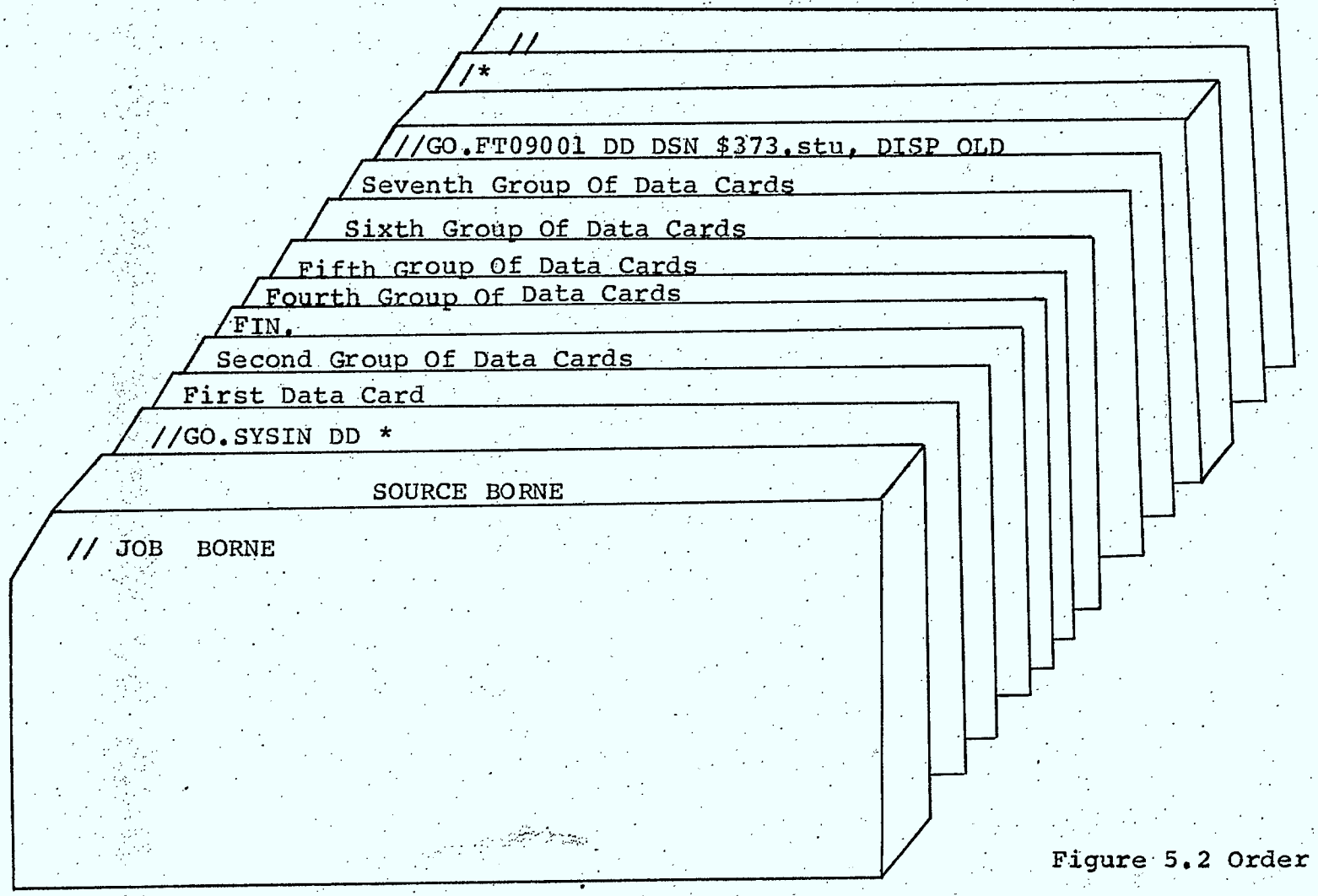


Figure 5.2 Order Of Job BORNE

APPENDIX A

```
1  //DELETT   JOB (S600,002,010,0100,0000,14,,1),'GELLER  '          CAT 0001
2  //*PASSWORD=HERMES                                               CAT 0002
3  //    EXEC FORTGCLG                                              CAT 0003
4  //FORT.SYSIN DD *                                                CAT 0004
5        DEFINE FILE 9(300,91,U,IDA)                                CAT 0005
6         DEFINE FILE 10(2000,200,U,ID2S)                           CAT 0006
7        DEFINE FILE 12(2500,100,U,ID4)                             CAT 0007
8        DEFINE FILE 14(1250,200,U,IDS)                             CAT 0008
9        I=1                                                        CAT 0009
10       WRITE(9'1) I                                               CAT 0010
11        WRITE(10'1) I                                             CAT 0011
12       WRITE(12'1) I                                              CAT 0012
13       WRITE(14'1) I                                              CAT 0013
14        STOP                                                      CAT 0014
15        END                                                       CAT 0015
16 /*                                                               CAT 0016
17 //GO.FT01F001 DD DSN=S373.WIS,                                   CAT 0017
18 //    UNIT=ONLN,                                                 CAT 0018
19 //    DISP=(,CATLG),                                             CAT 0019
20 //    DCB=(RECFM=FB,LRECL=85,BLKSIZE=850),                       CAT 0020
21 //    SPACE=(CYL,(1,1),RLSE)                                     CAT 0021
22 //GO.FT09F001 DD DSN=S373.STU,                                   CAT 0022
23 //    UNIT=SYSDA,                                                CAT 0023
24 //    DISP=(,CATLG),                                             CAT 0024
25 //    SPACE=(CYL,(1,1),RLSE)                                     CAT 0025
26 //GO.FT10F001 DD DSN=S373.ABC,                                   CAT 0026
27 //    UNIT=SYSDA,                                                CAT 0027
28 //    DISP=(,CATLG),                                             CAT 0028
29 //    SPACE=(CYL,(2,1),RLSE)                                     CAT 0029
30 //GO.FT12F001 DD DSN=S373.HIJ,                                   CAT 0030
31 //    UNIT=SYSDA,                                                CAT 0031
32 //    DISP=(,CATLG),                                             CAT 0032
33 //    SPACE=(CYL,(2,1),RLSE)                                     CAT 0033
34 //GO.FT14F001 DD DSN=S373.ROB,                                   CAT 0034
35 //    UNIT=SYSDA,                                                CAT 0035
36 //    DISP=(,CATLG),                                             CAT 0036
37 //    SPACE=(CYL,(2,1),RLSE)                                     CAT 0037
38 //GO.FT15F001 DD DSN=S373.ROWS,                                  CAT 0038
39 //    UNIT=ONLN,                                                 CAT 0039
40 //    DCB=(RECFM=FB,LRECL=80,BLKSIZE=800),                       CAT 0040
41 //    DISP=(,CATLG),                                             CAT 0041
42 //    SPACE=(CYL,(1,1),RLSE)                                     CAT 0042
43 //GO.FT16F001 DD DSN=S373.COLUMN,                                CAT 0043
44 //    UNIT=ONLN,                                                 CAT 0044
45 //    DCB=(RECFM=FB,LRECL=80,BLKSIZE=800),                       CAT 0045
46 //    DISP=(,CATLG),                                             CAT 0046
47 //    SPACE=(CYL,(1,1),RLSE)                                     CAT 0047
48 //GO.FT17F001 DD DSN=S373.MARKER,                                CAT 0048
49 //    UNIT=ONLN,                                                 CAT 0049
50 //    DCB=(RECFM=FB,LRECL=80,BLKSIZE=800),                       CAT 0050
51 //    DISP=(,CATLG),                                             CAT 0051
52 //    SPACE=(CYL,(1,1),RLSE)                                     CAT 0052
53 //GO.FT18F001 DD DSN=S373.RHS,                                   CAT 0053
54 //    UNIT=ONLN,                                                 CAT 0054
55 //    DCB=(RECFM=FB,LRECL=80,BLKSIZE=800),                       CAT 0055
56 //    DISP=(,CATLG),                                             CAT 0056
57 //    SPACE=(CYL,(1,1),RLSE)                                     CAT 0057
58 //GO.FT19F001 DD DSN=S373.BOUNDS,                                CAT 0058
```

```
59  //    UNIT=ONLN,                                          CAT 0059
60  //    DCB=(RECFM=FB,LRECL=80,BLKSIZE=800),                CAT 0060
61  //    DISP=(,CATLG),                                      CAT 0061
62  //    SPACE=(CYL,(1,1),RLSE)                              CAT 0062
63  //GO.FT20F001 DD DSN=S373.DEF,                            CAT 0063
64  //    UNIT=ONLN,                                          CAT 0064
65  //    DISP=(,CATLG),                                      CAT 0065
66  //    DCB=(RECFM=FB,LRECL=815,BLKSIZE=815),               CAT 0066
67  //    SPACE=(CYL,(1,1),RLSE)                              CAT 0067
68  //GO.FT21F001 DD DSN=S373.GHI,                            CAT 0068
69  //    UNIT=ONLN,                                          CAT 0069
70  //    DISP=(,CATLG),                                      CAT 0070
71  //    DCB=(RECFM=FB,LRECL=90,BLKSIZE=12870),              CAT 0071
72  //    SPACE=(CYL,(1,1),RLSE)                              CAT 0072
73  //GO.FT22F001 DD DSN=S373.JKL,                            CAT 0073
74  //    UNIT=ONLN,                                          CAT 0074
75  //    DISP=(,CATLG),                                      CAT 0075
76  //    DCB=(RECFM=FB,LRECL=430,BLKSIZE=8600),              CAT 0076
77  //    SPACE=(CYL,(1,1),RLSE)                              CAT 0077
78  //GO.FT23F001 DD DSN=S373.MNO,                            CAT 0078
79  //    UNIT=ONLN,                                          CAT 0079
80  //    DISP=(,CATLG),                                      CAT 0080
81  //    DCB=(RECFM=FB,LRECL=1100,BLKSIZE=1100),             CAT 0081
82  //    SPACE=(CYL,(1,1),RLSE)                              CAT 0082
83  //GO.FT24F001 DD DSN=S373.PQR,                            CAT 0083
84  //    UNIT=ONLN,                                          CAT 0084
85  //    DISP=(,CATLG),                                      CAT 0085
86  //    DCB=(RECFM=FB,LRECL=90,BLKSIZE=12870),              CAT 0086
87  //    SPACE=(CYL,(1,1),RLSE)                              CAT 0087
88  //GO.FT25F001 DD DSN=S373.VWX,                            CAT 0088
89  //    UNIT=ONLN,                                          CAT 0089
90  //    DISP=(,CATLG),                                      CAT 0090
91  //    DCB=(RECFM=FB,LRECL=140,BLKSIZE=5600),              CAT 0091
92  //    SPACE=(CYL,(1,1),RLSE)                              CAT 0092
93  //GO.FT26F001 DD DSN=S373.XYZ,                            CAT 0093
94  //    UNIT=ONLN,                                          CAT 0094
95  //    DISP=(,CATLG),                                      CAT 0095
96  //    DCB=(RECFM=FB,LRECL=2015,BLKSIZE=12090),            CAT 0096
97  //    SPACE=(CYL,(1,1),RLSE)                              CAT 0097
98  //GO.FT27F001 DD DSN=S373.BCD,                            CAT 0098
99  //    UNIT=ONLN,                                          CAT 0099
100 //    DISP=(,CATLG),                                      CAT 0100
101 //    DCB=(RECFM=FB,LRECL=90,BLKSIZE=12870),              CAT 0101
102 //    SPACE=(CYL,(1,1),RLSE)                              CAT 0102
103 //GO.FT28F001 DD DSN=S373.EFG,                            CAT 0103
104 //    UNIT=ONLN,                                          CAT 0104
105 //    DISP=(,CATLG),                                      CAT 0105
106 //    DCB=(RECFM=FB,LRECL=80,BLKSIZE=800),                CAT 0106
107 //    SPACE=(CYL,(1,1),RLSE)                              CAT 0107
108 //GO.FT29F001 DD DSN=S373.MIC,                            CAT 0108
109 //    UNIT=ONLN,                                          CAT 0109
110 //    DCB=(RECFM=FB,LRECL=110,BLKSIZE=330),               CAT 0110
111 //    DISP=(,CATLG),                                      CAT 0111
112 //    SPACE=(CYL,(1,1),RLSE)                              CAT 0112
113 //GO.FT30F001 DD DSN=S373.JAR,                            CAT 0113
114 //    UNIT=ONLN,                                          CAT 0114
115 //    DISP=(,CATLG),                                      CAT 0115
116 //    DCB=(RECFM=FB,LRECL=140,BLKSIZE=5600),              CAT 0116
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117  //   SPACE=(CYL,(1,1),RLSE)                                    CAT 0117
118  /*                                                             CAT 0118
119  //                                                             CAT 0119
```

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//CHARGE   JOB (0373,007,100,0100,0000,34,,1),'GELLER  '                  CHA 0001
//*PASSWORD=HERMES                                                        CHA 0002
//   EXEC   FORTGCLG                                                      CHA 0003
//FORT.SYSIN DD *                                                         CHA 0004
C                                                                         CHA 0005
C     PROGRAMME CHARGE                                                    CHA 0006
C                                                                         CHA 0007
C   DIMENSIONING IS SET FOR A MAXIMUM OF 6 CONTEMPLATED PER DEMAND PAIR   CHA 0008
C   IE 2**6. ANY CHANGES REQUIRING AN INCREASE REQUIRES THAT MATRICES     CHA 0009
C WITH A 64 DIMENSION MUST BE CHANGED TO 2**N FOR N CONTEMPLATED .MATRIXCHA60010
C SHOULD BE CHANGED TO B(N,2**N)                                          CHA 0011
C   THESE DIMENSIONS ARE FIXED FOR  THE SWITCHING NETWORK                 CHA 0012
      INTEGER*2  IDHU(100)                                                CHA 0013
      INTEGER P,PI,PP,PAL,PS,BVD(7),LTYPE(5)                              CHA 0014
      INTEGER*2 L2LINK,N2DP,LTREF,NDIM,DWS,DWSS,NSU,GENLNB,GENNNB,DEMAX,CHA 0015
     1IDNDP                                                               CHA 0016
      INTEGER*2 JOT(5),IVECT(64), JHU(10),F(60,15),G(60,15),VECT(20),     CHA 0017
     1IMA(60,2),PROF(60,15),CH(60,15),B(6,64),   PB(10),          RP(10),CHA 0018
     2WS(25),WSS(25),IDU(10)                                              CHA 0019
C            DIMENSIONING OF LINK DATA  MAXIMUM 100 LINKS IN SWITCHING    CHAW0020
      INTEGER*2 A(200,10),JAR(200,10),ELN1(200),ELN(201),NICK(200)        CHA 0021
      REAL CR(200),NCC(200),CC1(200),C1(200),CHARD(200),CHAR(200),        CHA 0022
     1CCD(200),BLOV(200)                                                  CHA 0023
      INTEGER DMAX(200)                                                   CHA 0024
C   DIMENSIONING OF DEMAND ,MAXIMUM DEMAND IS 1000 PAIRS IN SWITCHING NECHAR0025
      REAL DEM(1000),DEL(1000),DELTA(1000)                                CHA 0026
      INTEGER*2 DP(1000,2),IDISK(1000)                                    CHA 0027
C    DIMENSIONING OF NODES  MAXIMUM NODES IN SWITCHING NETWORK IS  100    CHA 0028
      REAL*8  BULL(2),XNODNM(100)                                         CHA 0029
      REAL   COM(100),COM1(100),COM2(100), CCOM(100,64),DPROB(64)         CHA 0030
      INTEGER NODNAM(2,100),NODNM(100,3)                                  CHA 0031
      INTEGER*2  ENN(100),VSU(100),TREF(100,100),CHA(100,64)              CHA 0032
      EQUIVALENCE (JAR,A)                                                 CHA 0033
      EQUIVALENCE (CH,PROF)                                               CHA 0034
      EQUIVALENCE (NODNAM,XNODNM)                                         CHA 0035
      DATA LTYPE/'CHU ','CFG ','IHU ','IFG ','FING'/                      CHA 0036
C                                                                         CHA 0037
      DEFINE FILE  8 (10,1025,U,ID1)                                      CHA 0038
      DEFINE FILE 10 (2000,200,U,ID25)                                    CHA 0039
C                                                                         CHA 0040
      READ (5,9) IPROG,JIMY                                               CHA 0041
 9    FORMAT(2I1)                                                         CHA 0042
      IP=6                                                                CHA 0043
      P=5                                                                 CHA 0044
      WRITE(IP,500)                                                       CHA 0045
 500  FORMAT(1H1,////,25(/,4X,'CETTE VERSION GENERE LES NUMEROS DES ARC'CHA 0046
     1,  'S A PARTIR DE NOMS DE NOEUDS , GENERANT EGALEMENT LES NUMEROS'CHA 0047
     2,  ' DE NOEUDS CORRESPONDANT',/))                                   CHA 0048
      READ(P,1)NFG,NCHU,NIHU,NCFG,NIFG,NDP                                CHA 0049
 1    FORMAT(6I3)                                                         CHA 0050
      N2DP=NDP                                                            CHA 0051
      IDNDP=NDP                                                           CHA 0052
      NFG=NFG*2                                                           CHA 0053
      NCFG=NCFG*2                                                         CHA 0054
      NIFG=NIFG*2                                                         CHA 0055
      NCHU=NCHU*2                                                         CHA 0056
      NIHU=NIHU*2                                                         CHA 0057
C    NFG=NUMBER OF FINAL GROUPS                                           CHA 0058
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      C     NCHU=NUMBER OF CONTEMPLATED HU GROUPS                              CHA 0059
      C     NIHU=NUMBER OF INSTALLED  HU GROUPS                                CHA 0060
      C     NCFG=NUMBER OF CONTEMPLATED FULL GROUPS                            CHA 0061
      C     NIFG=NUMBER OF INSTALLED FULL GROUPS                               CHA 0062
      C     NDP =NUMBER OF PAIRS OF DEMAND POINTS                              CHA 0063
            PP=NFG+NCHU+NIHU+NCFG+NIFG                                         CHA 0064
            LLINK=PP/2                                                         CHA 0065
            L2LINK=LLINK                                                       CHA 0066
      C PP= TOTAL NUMBER OF LINKS IN NETWORK                                   CHA 0067
            WRITE(IP,501) NDP,NFG,NCHU,NIHU,NCFG,NIFG                          CHA 0068
        501 FORMAT('1',21X,'HERMES III'/'0',1X,'PROBLEM DEFINITION'/'0',5X,I3,CHA 0069
           1X,'DEMAND PAIRS',5X,I2,1X,'FINAL GROUPS'/'0',5X,I2,1X,'CONTEMPLATCHA 0070
           2ED HU GROUPS'/'0',5X,I2,1X,'INSTALLED HU GROUPS'/'0',5X,I2,1X,'CONCHA 0071
           3TEMPLATED FULL GROUPS'/'0',5X,I2,1X,'INSTALLED FULL GROUPS')       CHA 0072
      C THIS PROCEDURE READS IN THE SWITCHING NETWORK, SORTS THE TYPES OF      CHA 0073
      C GROUPS,AND PLACES THEM IN THE PROPER FILE  IN  MATRIX A.               CHA 0074
            JOT(1)=1                                                           CHA 0075
            JOT(2)=NCHU+ JOT(1)                                                CHA 0076
            JOT(3)=NCFG+JOT(2)                                                 CHA 0077
            JOT(4)=NIHU+JOT(3)                                                 CHA 0078
            JOT(5)=NIFG+JOT(4)                                                 CHA 0079
            PI=0                                                               CHA 0080
            LIM23=0                                                            CHA 0081
            GENLN8=1                                                           CHA 0082
          4 READ(P,2) (BVD(J),J=1,7),ZZZ                                       CHA 0083
          2 FORMAT(3A4,1X,3A4,1X,A4,F7.2)                                      CHA 0084
            DO 3 I=1,5                                                         CHA 0085
            LTYP=I                                                             CHA 0086
            IF(BVD(7).EQ.LTYPE(I)) GO TO 5                                     CHA 0087
          3 CONTINUE                                                           CHA 0088
            WRITE(IP,8) (BVD(I),I=1,7),(LTYPE(I),I=1,5)                        CHA 0089
          8 FORMAT('0ERREUR SURVENUE ENTRE ',1H',3A4,6H' ET ',3A4,1H'          CHA 0090
           1       ,/,2H0',A4,1H',' EST UN TYPE INACCEPTABLE . ON LE SUPPOSE'   CHA 0091
           2,      ' ALORS COMME ETANT ',8H'IHU ' ,,/,                         CHA 0092
           3       '0LES SEULS TYPES ACCEPTABLES SONT :',(/,2H0',A4,1H'))      CHA 0093
            LTYP=3                                                             CHA 0094
          5 KK=JOT(LTYP)                                                       CHA 0095
            A(KK,5)=LTYP                                                       CHA 0096
            A(KK+1,5)=LTYP                                                     CHA 0097
            BLOV(KK)=ZZZ                                                       CHA 0098
            BLOV(KK+1)=ZZZ                                                     CHA 0099
      C                                                                        CHA 0100
      C     RECHERCHE DANS 'NODNM' POUR RECONNAITRE LES NOEUDS QUI ONT DEJA    CHA 0101
      C     PARU DANS LA DEFINITION DU RESEAU, SINON DE GENERER DES NOUVEAUX   CHA 0102
      C     NOS. DE NOEUDS.                                                    CHA 0103
      C                                                                        CHA 0104
      C     'LIM23' = NOBRE TOTAL DE NOEUDS DANS LE RESEAU .                   CHA 0105
      C                                                                        CHA 0106
            IF(LIM23.EQ.0) GO TO 25                                            CHA 0107
            DO 23 I=1,LIM23                                                    CHA 0108
            GENNN8=I                                                           CHA 0109
            IF(BVD(1).EQ.NODNM(I,1)) GO TO 26                                  CHA 0110
            GO TO 23                                                           CHA 0111
         26 IF(BVD(2).EQ.NODNM(I,2)) GO TO 27                                  CHA 0112
         23 CONTINUE                                                           CHA 0113
            A(KK,1)=LIM23+1                                                    CHA 0114
            A(KK+1,2)=LIM23+1                                                  CHA 0115
            NODNAM(1,LIM23+1)=BVD(1)                                           CHA 0116
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      NODNM(LIM23+1,1)=BVD(1)                                          CHA 0117
      NODNAM(2,LIM23+1)=BVD(2)                                         CHA 0118
      NODNM(LIM23+1,2)=BVD(2)                                          CHA 0119
      NODNM(LIM23+1,3)=BVD(3)                                          CHA 0120
      LIM23=LIM23+1                                                    CHA 0121
      GO TO 28                                                         CHA 0122
   27 A(KK,1)=GENNNB                                                   CHA 0123
      A(KK+1,2)=GENNNB                                                 CHA 0124
   28 DO 32 I=1,LIM23                                                  CHA 0125
      GENNNB=I                                                         CHA 0126
      IF(BVD(4).EQ.NODNM(I,1)) GO TO 31                                CHA 0127
      GO TO 32                                                         CHA 0128
   31 IF(BVD(5).EQ.NODNM(I,2)) GO TO 33                                CHA 0129
   32 CONTINUE                                                         CHA 0130
      A(KK,2)=LIM23+1                                                  CHA 0131
      A(KK+1,1)=LIM23+1                                                CHA 0132
      NODNAM(1,LIM23+1)=BVD(4)                                         CHA 0133
      NODNM(LIM23+1,1)=BVD(4)                                          CHA 0134
      NODNAM(2,LIM23+1)=BVD(5)                                         CHA 0135
      NODNM(LIM23+1,2)=BVD(5)                                          CHA 0136
      NODNM(LIM23+1,3)=BVD(6)                                          CHA 0137
      LIM23=LIM23+1                                                    CHA 0138
      GO TO 34                                                         CHA 0139
   33 A(KK,2)=GENNNB                                                   CHA 0140
      A(KK+1,1)=GENNNB                                                 CHA 0141
      GO TO 34                                                         CHA 0142
   25 A(KK,1)=1                                                        CHA 0143
      A(KK,2)=2                                                        CHA 0144
      A(KK+1,1)=2                                                      CHA 0145
      A(KK+1,2)=1                                                      CHA 0146
      NODNM(1,1)=BVD(1)                                                CHA 0147
      NODNM(1,2)=BVD(2)                                                CHA 0148
      NODNM(1,3)=BVD(3)                                                CHA 0149
      NODNM(2,1)=BVD(4)                                                CHA 0150
      NODNM(2,2)=BVD(5)                                                CHA 0151
      NODNM(2,3)=BVD(6)                                                CHA 0152
      NODNAM(1,1)=BVD(1)                                               CHA 0153
      NODNAM(2,1)=BVD(2)                                               CHA 0154
      NODNAM(1,2)=BVD(4)                                               CHA 0155
      NODNAM(2,2)=BVD(5)                                               CHA 0156
      LIM23=2                                                          CHA 0157
   34 A(KK,3)=GENLNB                                                   CHA 0158
      A(KK,4)=GENLNB                                                   CHA 0159
      A(KK+1,4)=GENLNB                                                 CHA 0160
      A(KK+1,3)=GENLNB+1                                               CHA 0161
      GENLNB=GENLNB+2                                                  CHA 0162
C                                                                      CHA 0163
C     'LIM23' = NOMBRE TOTAL DE NOEUDS DANS LE RESEAU .                CHA 0164
C                                                                      CHA 0165
      JOT(LTYP)=JOT(LTYP)+2                                            CHA 0166
      PI=PI+2                                                          CHA 0167
      IF(PI.LT.PP)GO TO 4                                              CHA 0168
      WRITE(IP,502)                                                    CHA 0169
      DO 504 I=1,PP                                                    CHA 0170
      IK1=A(I,1)                                                       CHA 0171
      IK2=A(I,2)                                                       CHA 0172
      IK3=A(I,5)                                                       CHA 0173
      WRITE(IP,503) (NODNM(IK1,J),J=1,2),(NODNM(IK2,J),J=1,2),         CHA 0174
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      1                (A(I,J),J=1,4),LTYPE(IK3),BLOV(I)                    CHA 0175
  502 FORMAT('1  ORIGIN    DESTINATION,   NODE  TO  NODE  LINK NO,  '       CHA 0176
     1,'LINK NO,   TYPE    COEFF,')                                         CHA 0177
  503 FORMAT(2X,2A4,5X,2A4,2(5X,I3,7X,I3),6X,A4,5X,F4,2)                     CHA 0178
      IF(59*(I/59),EQ,I) WRITE(IP,502)                                       CHA 0179
  504 CONTINUE                                                               CHA 0180
C                                                                            CHA 0181
C     ELN CONTIENT LES NOS DES ARETES , ( ELN(I) = I )                       CHA 0182
C     ENN CONTIENT LES NOS DES NOEUDS , ( ENN(I) = I ) ,                     CHA 0183
C                                                                            CHA 0184
      DO 6 I=1,PP                                                            CHA 0185
      ELN(I)=A(I,3)                                                          CHA 0186
    6 CONTINUE                                                               CHA 0187
      DO 7 I=1,LIM23                                                         CHA 0188
      ENN(I)=I                                                               CHA 0189
      VSU(I)=0                                                               CHA 0190
    7 CONTINUE                                                               CHA 0191
      KAP=LIM23                                                              CHA 0192
      LTREF=LIM23                                                            CHA 0193
C                                                                            CHA 0194
C     CREATION DU TABLEAU DE REFERENCE 'TREF' ,                              CHA 0195
C                                                                            CHA 0196
      DO 53 I=1,LIM23                                                        CHA 0197
      DO 53 J=1,LIM23                                                        CHA 0198
      TREF(I,J)=0                                                            CHA 0199
   53 CONTINUE                                                               CHA 0200
C                                                                            CHA 0201
C     CI-HAUT LE TABLEAU 'TREF' EST INITIALISE A ZERO,                       CHA 0202
C                                                                            CHA 0203
C     AFFECTATION A 'TREF(I,J)' DU NUMERO INTERNE DE L'ARC I-J               CHA 0204
C                                                                            CHA 0205
      DO 54 I=1,PP                                                           CHA 0206
      J=A(I,1)                                                               CHA 0207
      K=A(I,2)                                                               CHA 0208
      TREF(J,K)=I                                                            CHA 0209
   54 CONTINUE                                                               CHA 0210
C READS IN  DEMAND  PAIRS  AND  CONVERTS  EXTERNAL NODE  NUMBERS TO          CHA 0211
C INTERNAL ONES                                                              CHA 0212
      DO 58 I=1,NDP                                                          CHA 0213
      READ(P,14) (BULL(J),J=1,2),DEM(I),DEL(I)                               CHA 0214
   14 FORMAT(A8,5X,A8,4X,2F7,2)                                              CHA 0215
      DEM(I)=DEM(I)/36,                                                      CHA 0216
      DEL(I)=DEL(I)/36,                                                      CHA 0217
      DELTA(I)=DEL(I)-DEM(I)                                                 CHA 0218
      DO 52 J=1,LIM23                                                        CHA 0219
      IF(BULL(1),EQ,XNODNM(J)) GO TO 51                                      CHA 0220
      GO TO 52                                                               CHA 0221
   51 DP(I,1)=J                                                              CHA 0222
      GO TO 55                                                               CHA 0223
   52 CONTINUE                                                               CHA 0224
   55 DO 57 J=1,LIM23                                                        CHA 0225
      IF(BULL(2),EQ,XNODNM(J)) GO TO 56                                      CHA 0226
      GO TO 57                                                               CHA 0227
   56 DP(I,2)=J                                                              CHA 0228
      GO TO 58                                                               CHA 0229
   57 CONTINUE                                                               CHA 0230
   58 CONTINUE                                                               CHA 0231
      WRITE(IP,505)                                                          CHA 0232
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      DO 507 J=1,KAP                                                    CHA 0233
      WRITE(IP,506) J,(NODNM(J,IKI),IKI=1,3)                            CHA 0234
      IF(58*(J/58).EQ.J) WRITE(IP,505)                                  CHA 0235
  507 CONTINUE                                                          CHA 0236
      WRITE(IP,509)                                                     CHA 0237
      DO 510 I=1,PP                                                     CHA 0238
      IND1=A(I,1)                                                       CHA 0239
      IND2=A(I,2)                                                       CHA 0240
      WRITE(IP,511) I,(NODNM(IND1,IKI),IKI=1,3),(NODNM(IND2,IK),IK=1,3) CHA 0241
      IF(58*(I/58).EQ.I) WRITE(IP,509)                                  CHA 0242
  510  CONTINUE                                                         CHA 0243
      WRITE(IP,515)                                                     CHA 0244
      WRITE(IP,516)((NODNM(DP(I,1),IK),IK=1,3),                         CHA 0245
     1              (NODNM(DP(I,2),IK),IK=1,3),                         CHA 0246
     2DEM(I),DEL(I),DELTA(I),I=1,NDP)                                   CHA 0247
  505 FORMAT('1 INTERNAL',8X,'EXTERNAL',/,'  NODE NO.',7X,'NODE  NAME') CHA 0248
  506 FORMAT(5X,I2,9X,3A4)                                              CHA 0249
  509 FORMAT('1 INTERNAL',4X,'EXTERNAL INDENTIFICATION OF LINKS',/,     CHA 0250
     1       '  LINK NO.',9X,'BY EXTERNAL NODE NAMES')                  CHA 0251
  511 FORMAT(5X,I3,9X,3A4,' -- ',3A4)                                   CHA 0252
  515 FORMAT('1 PROBLEM DESCRIPTION',/,51X,'DEMAND (ERLANGS)',          CHA 0253
     1/,45X,'INITIAL',5X,'TOTAL  INCREASE',//)                          CHA 0254
  516 FORMAT('0',5X,'DE  ',3A4,'  A  ',3A4,' : ',3F10.3)                CHA 0255
C                                                                       CHA 0256
C     NDIM=NUMBER OF POSSIBLE PROFILES (OVERALL)                        CHA 0257
C                                                                       CHA 0258
      NHU=(NCHU+NCFG)/2                                                 CHA 0259
C   IMPORTANT  IF MORE THAN 6 CONTEMPLATEDS ARE REQUIRED  NDIM= 2**N CONCHAM0260
      NDIM=64                                                           CHA 0261
C                                                                       CHA 0262
C     SEARCH FOR CONTEMPLATED HU OR FG                                  CHA 0263
C                                                                       CHA 0264
      NARCS=PP                                                          CHA 0265
      ELN1(1)=ELN(JAR(1,4))                                             CHA 0266
      K=1                                                               CHA 0267
      DO 48 I=2,NARCS                                                   CHA 0268
      IF (JAR(I,4).EQ.JAR(I-1,4)) GO TO 48                              CHA 0269
      K=K+1                                                             CHA 0270
      ELN1(K)=ELN(JAR(I,4))                                             CHA 0271
   48 CONTINUE                                                          CHA 0272
      IND=0                                                             CHA 0273
      DO 49 I=1,NARCS                                                   CHA 0274
      IF (JAR(I,5).GT.2)GO TO 49                                        CHA 0275
      IND=IND+1                                                         CHA 0276
      IDHU(IND)=JAR(I,3)                                                CHA 0277
      IF (I.EQ.1)GO TO 49                                               CHA 0278
      IF (JAR(I-1,4).EQ.JAR(I,4))IND=IND-1                              CHA 0279
   49 CONTINUE                                                          CHA 0280
      IF (NHU.NE.IND) GO TO 2015                                        CHA 0281
C                                                                       CHA 0282
C    DEFINIR LES COMBINAISONS DES NHU (HU OU FG)                        CHA 0283
C    POTENTIELS                                                         CHA 0284
C                                                                       CHA 0285
      J=0                                                               CHA 0286
   29 J=J+1                                                             CHA 0287
C  IMPORTANT FOR CHANGE IN CONTEMPLATEDS. IF MORE THAN 6 CONTEMPLATEDS  CHA 0288
C   REQUIRED  THEN  IF(J.GT.N) GO TO 50 FOR N CONTEMPLATED              CHA 0289
      IF(J.GT.6) GO TO 50                                               CHA 0290
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      DO 30 I=1,NDIM                                                    CHA 0291
      IVECT(I)=1                                                        CHA 0292
   30 CONTINUE                                                          CHA 0293
      IDEB=1                                                            CHA 0294
      IFIN=2**(J-1)                                                     CHA 0295
   39 DO 40 I=IDEB,IFIN                                                 CHA 0296
      IVECT(I)=0                                                        CHA 0297
   40 CONTINUE                                                          CHA 0298
      IDEB=IFIN+1+2**(J-1)                                              CHA 0299
      IFIN=IDEB-1+2**(J-1)                                              CHA 0300
      IF (IFIN.GT.NDIM) GO TO 41                                        CHA 0301
      GO TO 39                                                          CHA 0302
   41 WRITE(8'J) (IVECT(L),L=1,NDIM)                                    CHA 0303
      GO TO 29                                                          CHA 0304
   50 CONTINUE                                                          CHA 0305
      KPA=0                                                             CHA 0306
C  THIS PROCEDURE FINDS  THE CHAIN MADE UP OF  FINAL GROUPS BETWEEN     CHA 0307
C  ONE PAIR OF DEMAND POINTS  AND STORES THE CHAIN  IN VECTOR VECT      CHA 0308
      ID=0                                                              CHA 0309
C                                                                       CHA 0310
C     INITIALISATION DU VECTEUR DEMANDE MAXIMUM.                        CHA 0311
C                                                                       CHA 0312
      DO 105 I=1,200                                                    CHA 0313
      DMAX(I)=0                                                         CHA 0314
  105 CONTINUE                                                          CHA 0315
  100 ID=ID+1                                                           CHA 0316
      IF(ID.GT.NDP) GO TO 711                                           CHA 0317
C                                                                       CHA 0318
C  THIS PROCEDURE FINDS THE FINAL GROUP CHAIN FOR DEMAND PAIR  ID       CHA 0319
C                                                                       CHA 0320
      DO 104 IRIS=1,PP                                                  CHA 0321
      DO 104 JRIS=6,10                                                  CHA 0322
      A(IRIS,JRIS)=0                                                    CHA 0323
  104 CONTINUE                                                          CHA 0324
      DO 177 I=1,10                                                     CHA 0325
      JHU(I)=0                                                          CHA 0326
  177 CONTINUE                                                          CHA 0327
      L=1                                                               CHA 0328
      LM=1                                                              CHA 0329
      NORG=DP(ID,1)                                                     CHA 0330
      NEST=DP(ID,2)                                                     CHA 0331
      PAL=JOT(4)                                                        CHA 0332
      DO 101 JJ=PAL,PP                                                  CHA 0333
      IF(NORG.EQ.A(JJ,1)) GO TO 102                                     CHA 0334
      GO TO 101                                                         CHA 0335
  102 F(L,LM)=NORG                                                      CHA 0336
      F(L,LM+1)=A(JJ,2)                                                 CHA 0337
      L=L+1                                                             CHA 0338
  101 CONTINUE                                                          CHA 0339
      LM=LM+1                                                           CHA 0340
      L=L-1                                                             CHA 0341
  113 LOP=0                                                             CHA 0342
      DO 103 IC=1,L                                                     CHA 0343
      IIC=IC                                                            CHA 0344
      IF(F(IC,LM).EQ.NEST) GO  TO 1000                                  CHA 0345
  103 CONTINUE                                                          CHA 0346
      DO 107 LP=1,L                                                     CHA 0347
      NORG=F(LP,LM)                                                     CHA 0348
```

```
      DO 108 LA=2,LM                                                    CHA 0349
      IF(NORG.EQ.F(LP,LM-LA+1))GO TO 107                                CHA 0350
  108 CONTINUE                                                          CHA 0351
      DO 109 JJ=PAL,PP                                                  CHA 0352
      IF(NORG.EQ.A(JJ,1)) GO TO 110                                     CHA 0353
      GO TO 109                                                         CHA 0354
  110 LOP=LOP+1                                                         CHA 0355
      DO 111 JK=1,LM                                                    CHA 0356
  111 G(LOP,JK)=F(LP,JK)                                                CHA 0357
      G(LOP,LM+1)=A(JJ,2)                                               CHA 0358
  109 CONTINUE                                                          CHA 0359
  107 CONTINUE                                                          CHA 0360
      L=LOP                                                             CHA 0361
      LM=LM+1                                                           CHA 0362
      DO 112 LA=1,L                                                     CHA 0363
      DO 112 LQ=1,LM                                                    CHA 0364
      F(LA,LQ)=G(LA,LQ)                                                 CHA 0365
  112 CONTINUE                                                          CHA 0366
      GO TO 113                                                         CHA 0367
 1000 DO 114 I=1,LM                                                     CHA 0368
      VECT(I)=F(IIC,I)                                                  CHA 0369
  114 CONTINUE                                                          CHA 0370
C THIS PROCEDURE USES THE FINAL GROUP CHAIN  TO FIND ALL POSSIBLE       CHA 0371
C COMBINATIONS OF POSSIBLE LINKS JOINING THE NODES OF THE FINAL GROUP CHCHA 0372
      IF(LM.EQ.2) GO TO  70                                             CHA 0373
      L=0                                                               CHA 0374
      KKK=LM-2                                                          CHA 0375
      DO 19 I=1,KKK                                                     CHA 0376
      NORG=VECT(I)                                                      CHA 0377
      DO 19 J=I,KKK                                                     CHA 0378
      NEST=VECT(J+2)                                                    CHA 0379
      L=L+1                                                             CHA 0380
      IMA(L,1)=NORG                                                     CHA 0381
      IMA(L,2)=NEST                                                     CHA 0382
   19 CONTINUE                                                          CHA 0383
C  FROM THE SET OF POSSIBLE  HU, FULL, INSTALLED OR NOT INSTALLED GROUPSCHA 0384
C  THIS PROCEDURE FINDS THE LINKS  APPLICABLE TO THIS SIMULATION        CHA 0385
      JK=0                                                              CHA 0386
      NS=JOT(4)-1                                                       CHA 0387
      DO 22 I=1,L                                                       CHA 0388
      DO 21 J=1,NS                                                      CHA 0389
      IJ=J                                                              CHA 0390
      IF((IMA(I,1).EQ.A(J,1)).AND.(IMA(I,2).EQ.A(J,2))) GO TO 20        CHA 0391
   21 CONTINUE                                                          CHA 0392
      GO TO 22                                                          CHA 0393
20     IF((A(IJ,5).EQ.2).OR.(A(IJ,5).EQ.4)) GO TO 2221                 CHA 0394
       GO TO 2222                                                       CHA 0395
2221   IF((IMA(I,1).EQ.DP(ID,1)).AND.(IMA(I,2).EQ. DP(ID,2))) GO TO 2222CHA 0396
       GO TO 22                                                         CHA 0397
2222   JK=JK+1                                                          CHA 0398
      IMA(JK,1)=A(IJ,1)                                                 CHA 0399
      IMA(JK,2)=A(IJ,2)                                                 CHA 0400
   22 CONTINUE                                                          CHA 0401
      NO=LM-1                                                           CHA 0402
      DO 24 I=1,NO                                                      CHA 0403
      IMA(JK+I,1)=VECT(I)                                               CHA 0404
      IMA(JK+I,2)=VECT(I+1)                                             CHA 0405
   24 CONTINUE                                                          CHA 0406
```

```
      C  THIS PROCEDURE  GENERATES ALL THE POSSIBLE CHAINS BETWEEN A PAIR
      C  OF DEMAND POINTS USING FINAL.FULL.HU. INSTALLED OR CONTEMPLATED
            DO 774 I=1.60
             DO 774 J=1.15
            F(I.J)=0
            G(I.J)=0
      774   CONTINUE
            DO 98 J=1.15
            DO 98 I=1.60
            PROF(I.J)=0
      98    CONTINUE
            JB=0
            L=1
            PS=JK+NO
            LM=1
            NORG=DP(ID.1)
            NEST=DP(ID.2)
            DO 201 JJ=1.PS
            IF(NORG.EQ.IMA(JJ.1))GO TO 202
            GO TO 201
        202 F(L.LM)=NORG
            F(L.LM+1)=IMA(JJ.2)
            L=L+1
        201 CONTINUE
            LM=LM+1
            L=L-1
        213 LOP=0
            DO 203 IC=1.L
            IF(F(IC.LM).EQ.NEST) GO TO 1001
            NORG=F(IC.LM)
            GO TO 214
       1001 JB=JB+1
            PROF(JB.1)=LM-1
            DO 218 I=1.LM
            PROF(JB.I+1)=F(IC.I)
        218 CONTINUE
            GO TO 203
      214   DO 215 JJ=1.PS
            IF(NORG.EQ.IMA(JJ.1))GO TO 216
            GO TO 215
        216 LOP=LOP+1
            DO 217 JK=1.LM
            G(LOP.JK)=F(IC.JK)
        217 CONTINUE
            G(LOP.LM+1)=IMA(JJ.2)
        215 CONTINUE
        203 CONTINUE
            IF(LOP.EQ.0) GO TO 220
            L=LOP
            LM=LM+1
            DO 219 LA=1.L
            DO 219 LQ=1.LM
            F(LA.LQ)=G(LA.LQ)
        219 CONTINUE
            GO TO 213
      C  JB=NUMBER OF CHAINS
      C  PROF(JB.1)=NUMBER OF LINKS IN CHAIN JB
      C     INITIALIZE VECTOR NICK =0
```

```
CHA 0407
CHA 0408
CHA 0409
CHA 0410
CHA 0411
CHA 0412
CHA 0413
CHA 0414
CHA 0415
CHA 0416
CHA 0417
CHA 0418
CHA 0419
CHA 0420
CHA 0421
CHA 0422
CHA 0423
CHA 0424
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CHA 0426
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CHA 0454
CHA 0455
CHA 0456
CHA 0457
CHA 0458
CHA 0459
CHA 0460
CHA 0461
CHA 0462
CHA 0463
CHA 0464
```

```
      70    IF(LM.NE.2) GO TO 220                                          CHA 0465
            JB=1                                                           CHA 0466
            PROF(1,1)=JB                                                   CHA 0467
             PROF(1,2)=DP(ID,1)                                            CHA 0468
            PROF(1,3)=DP(ID,2)                                             CHA 0469
     220    DO 299 I=1,PP                                                  CHA 0470
            NICK(I)=0                                                      CHA 0471
     299 CONTINUE                                                          CHA 0472
C  CONVERT PROF TO INTERNAL LINK NUMBERS                                   CHA 0473
C  NICK(I)IS A VECTOR  WHERE NICK(I)=1 IF LINK I IS PRESENT.               CHA 0474
             DO 300 I=1,JB                                                 CHA 0475
            NUM=PROF(I,1)                                                  CHA 0476
            DO 301J=1,NUM                                                  CHA 0477
            NORG=PROF(I, J+1)                                              CHA 0478
            NEST=PROF(I, J+2)                                              CHA 0479
            DO 302 JK=1,PP                                                 CHA 0480
            IF((NORG.EQ.A(JK,1)).AND.(NEST.EQ.A(JK,2))) GO TO 303          CHA 0481
            GO TO 302                                                      CHA 0482
     303 PROF(I,J+1)=A(JK,3)                                               CHA 0483
            NICK(A(JK,3))=1                                                CHA 0484
     302 CONTINUE                                                          CHA 0485
     301 CONTINUE                                                          CHA 0486
     300 CONTINUE                                                          CHA 0487
            IF(A(PROF(1,2),5).EQ.4) JB=1                                   CHA 0488
            IF(JIMY.EQ.0) GO TO 74403                                      CHA 0489
            WRITE(IP,517)              (NODNM(DP(ID,1),IK),IK=1,3),        CHA 0490
           1                          (NODNM(DP(ID,2),IK),IK=1,3)         CHA 0491
     517 FORMAT('1 POUR UNE DEMANDE ENTRE ',3A4,' ET ',3A4,/,              CHA 0492
           1            '  VOICI L''ENSEMBLE DES CHAINES (EXPRIMEES EN NOM ',CHA 0493
           2       'EXTERNE DES SOMMETS) :',///'  NOMBRE D''ARETES  NOM DES ',CHA 0494
           3        'SOMMETS')                                             CHA 0495
            DO 518 I=1,JB                                                  CHA 0496
            N=PROF(I ,1)+1                                                 CHA 0497
            WRITE(IP,519) PROF(I,1),(NODNM(A(PROF(I,2),1),IK),IK=1,3),     CHA 0498
           1                        ((NODNM(A(PROF(I,J),2),IK),IK=1,3),J=2,N) CHA 0499
     519  FORMAT(///,8X,I2,10X,(3A4,'    ',3A4,'    ',3A4,'    ',3A4,'CHA 0500
           1        '    ',3A4,'    ',3A4,'    ',3A4,'    ',3A4,/,20X)) CHA 0501
     518    CONTINUE                                                       CHA 0502
   74403  CONTINUE                                                        CHA 0503
C                                                                         CHA 0504
C      CETTE PROCEDURE TROUVE LES NOS INTERNES DES ARCS QUI DEBORDENT     CHA 0505
C      SUR D'AUTRES ARCS. PLACE CES NOS DANS 'JAR' (OU 'A') A LA LIGNE    CHA 0506
C      CORRESPONDANT A L'ARC QUI RECOIT LES DEBORDEMENTS.                 CHA 0507
C                                                                         CHA 0508
            IF(JB.EQ.1) GO TO 521                                          CHA 0509
            LMSUB2=LM-2                                                    CHA 0510
            DO 529 I=1,LMSUB2                                              CHA 0511
            IDEBU=I+1                                                      CHA 0512
            IFIN=LM-1                                                      CHA 0513
            DO 528 K=IDEBU,IFIN                                            CHA 0514
            IDEB=K+1                                                       CHA 0515
            NDIS=5                                                         CHA 0516
            INDEX=0                                                        CHA 0517
            DO 520 J=IDEB,LM                                               CHA 0518
            INDISI=VECT(I)                                                 CHA 0519
            INDISJ=VECT(J)                                                 CHA 0520
            INDISK=VECT(K)                                                 CHA 0521
            INOIS=TREF(INDISI,INDISJ)                                      CHA 0522
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      IF(INDIS.EQ.0) GO TO 520                                          CHA 0523
      NDIC=A(INDIS,5)                                                   CHA 0524
      IF(NDIC.EQ.2.OR.NDIC.EQ.4.OR.NDIC.EQ.5) GO TO 520                 CHA 0525
      NDIS=NDIS+1                                                       CHA 0526
      NDISS=TREF(INDISI,INDISK)                                         CHA 0527
      IF(NDISS.EQ.0) GO TO 520                                          CHA 0528
      IF(NDIS.GT.10) GO TO 512                                          CHA 0529
      IF(A(NDISS,5).EQ.2.OR.A(NDISS,5).EQ.4) GO TO 746                  CHA 0530
      A(NDISS,NDIS)=INDIS                                               CHA 0531
      GO TO 520                                                         CHA 0532
  746 NDIS=NDIS-1                                                       CHA 0533
      GO TO 520                                                         CHA 0534
  512 IF(INDEX.GT.0) GO TO 520                                          CHA 0535
      INDEX=ELN(NDISS)                                                  CHA 0536
      WRITE(IP,513) INDEX,DP(ID,1),DP(ID,2)                             CHA 0537
  513 FORMAT(/////,5X,'**** ERREUR **** IL Y A PLUS DE 5 DEBORDEMENTS ' CHA 0538
     1,       'SUR L''ARETE ND : ',I3,/,22X,'ERREUR RENCONTREE DANS LA ' CHA 0539
     2,       'PAIRE DE DEMANDE ENTRE LES NOEUDS  ',I3,'  ET  ',I3,/,22X,CHA 0540
     3,       'POUR LA PAIRE EN QUESTION ON CONSERVERA SEULEMENT LES 5 ' CHA 0541
     4,       'PREMIERS DEBORDEMENTS ; LES CALCULS NE TIENDRONT PAS'    CHA 0542
     5,       ' COMPTE DU RESTE ')                                      CHA 0543
  520 CONTINUE                                                          CHA 0544
  528 CONTINUE                                                          CHA 0545
  529 CONTINUE                                                          CHA 0546
  521 CONTINUE                                                          CHA 0547
C                                                                       CHA 0548
C     NOTE : IL N'Y A PAS DE 'DO 521 ...', L'ENONCE-BIDON 521 SERT A    CHA 0549
C     PASSER PAR DESSUS LA PROCEDURE DES DEBORDEMENTS DANS LE CAS DU    CHA 0550
C      'JB' = 1. (LORSQU'IL N'Y A QU'UNE CHAINE, ON NE PEUT DEBORDER)   CHA 0551
C                                                                       CHA 0552
C     MOD:NOMBRE DE CHAINES                                             CHA 0553
C      III: NUMERO DU COUPLE .                                          CHA 0554
C                                                                       CHA 0555
      MOD=JB                                                            CHA 0556
      III=ID                                                            CHA 0557
C     CALCUL DE LA CHARGE GENERE PAR LE COUPLE III                      CHA 0558
C   JHU IS A VECTOR CONTAINING THE CONTEMPLATED HU OR FG                CHA 0559
C                                                                       CHA 0560
      NHUP=0                                                            CHA 0561
C                                                                       CHA 0562
C     TROUVER LES HU DU FG PERTINENTS POUR LE COUPLE III                CHA 0563
      LL=0                                                              CHA 0564
      DO 150 I=1,MOD                                                    CHA 0565
      IFIN=CH(I,1)+1                                                    CHA 0566
      IDEP=JAR(CH(I,2),1)                                               CHA 0567
      IARR=JAR(CH(I,IFIN),2)                                            CHA 0568
      IF ((IDEP.NE.DP(III,1)).OR.(IARR.NE.DP(III,2)))GO TO 2001         CHA 0569
      DO 140 J=2,IFIN                                                   CHA 0570
      IF (JAR(CH(I,J),5).GT.2)GO TO 140                                 CHA 0571
      IF (NHUP.LT.1) GO TO 142                                          CHA 0572
      DO 144 IZ=1,NHUP                                                  CHA 0573
      IF (JAR(CH(I,J),4).EQ.JHU(IZ)) GO TO 140                          CHA 0574
  144 CONTINUE                                                          CHA 0575
  142 NHUP=NHUP+1                                                       CHA 0576
      JHU(NHUP)=JAR(CH(I,J),4)                                          CHA 0577
  140 CONTINUE                                                          CHA 0578
  150 CONTINUE                                                          CHA 0579
      IFIN=2**NHUP                                                      CHA 0580
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      KTT=0                                                                    CHA 0581
      IF (NHUP.EQ.0)GO TO 139                                                  CHA 0582
C                                                                              CHA 0583
C     IDENTIFIER LES IFIN PROFILS POSSIBLES A                                  CHA 0584
C     PARTIR DES HU OU FG TROUVES .                                            CHA 0585
C                                                                              CHA 0586
      DO 141 I=1,NHUP                                                          CHA 0587
      READ(8'I)(B(I,J),J=1,IFIN)                                               CHA 0588
  141 CONTINUE                                                                 CHA 0589
      GO TO 155                                                                CHA 0590
  139 NHUP=1                                                                   CHA 0591
      JHU(1)=PP+1                                                              CHA 0592
      ELN(PP+1)=999                                                            CHA 0593
      PB(1)=-1                                                                 CHA 0594
      KTT=1                                                                    CHA 0595
C                                                                              CHA 0596
C                                                                              CHA 0597
  155 DO 280 KPR=1,IFIN                                                        CHA 0598
      NKOD=2                                                                   CHA 0599
C                                                                              CHA 0600
C     DETERMINATION DU PROFIL KPR                                              CHA 0601
C                                                                              CHA 0602
      IF (KTT.EQ.1) GO TO 156                                                  CHA 0603
      DO 148 I=1,NHUP                                                          CHA 0604
      PB(I)=B(I,KPR)                                                           CHA 0605
  148 CONTINUE                                                                 CHA 0606
      NPOINT=2**NHUP                                                           CHA 0607
      GO TO 157                                                                CHA 0608
  156 NPOINT=2**NHUP                                                           CHA 0609
  157 IF((JAR(CH(1,2),5).NE.4).AND.(JAR(CH(1,2),5).NE.2)) GO TO 2220           CHA 0610
      IF (JAR(CH(1,2),5).EQ.2) GO TO 2240                                      CHA 0611
      NKOD=1                                                                   CHA 0612
 2216  DO 2219 I=1,NARCS                                                       CHA 0613
       CHAR(I)=0                                                               CHA 0614
      CHARD(I)=0                                                               CHA 0615
 2219  CONTINUE                                                                CHA 0616
       CHAR(CH(1,2))=DEM(ID)                                                   CHA 0617
      IF (NKOD.EQ.0) CHAR(CH(1,2))=0                                           CHA 0618
      CHARD(CH(1,2))=DEL(ID)                                                   CHA 0619
      IF (NKOD.EQ.1) GO TO 8430                                                CHA 0620
      DO 4444 KL=1,LLINK                                                       CHA 0621
      CR(KL)=-NCC(KL)                                                          CHA 0622
 4444 CONTINUE                                                                 CHA 0623
      GO TO 2218                                                               CHA 0624
 2240 DO 2239 I=1,NHUP                                                         CHA 0625
      IF (JAR(CH(1,2),4).NE.JHU(I)) GO TO 2239                                 CHA 0626
      IF (PB(I).EQ.0) GO TO 2220                                               CHA 0627
      NKOD=0                                                                   CHA 0628
      GO TO 2216                                                               CHA 0629
 2239 CONTINUE                                                                 CHA 0630
      GO TO 2003                                                               CHA 0631
 2220 DO 260 LLL=1,NARCS                                                       CHA 0632
      CHAR(LLL)=0                                                              CHA 0633
      CHARD(LLL)=0                                                             CHA 0634
      IF (KPR.EQ.1) C1(LLL)=0                                                  CHA 0635
C     CALCUL DE LA CHARGE SUR L'ARC LLL POUR LE PROFIL KPR                     CHA 0636
C     ET LA PAIRE III                                                          CHA 0637
C                                                                              CHA 0638
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      C                                                                 CHA 0639
      C                                                                 CHA 0640
      C                                                                 CHA 0641
            IF  (NICK(LLL).EQ.0) GO TO 260                              CHA 0642
            DO 170 IC=1.MOD                                             CHA 0643
            LFIN=CH(IC.1)+1                                             CHA 0644
            KPOINT=0                                                    CHA 0645
            NCON=0                                                      CHA 0646
            DO 160 KJ=2.LFIN                                            CHA 0647
            IF (JAR(CH(IC.KJ).5).LT.3)NCON=NCON+1                       CHA 0648
            IF (CH(IC.KJ).EQ.LLL)KPOINT=KJ                              CHA 0649
        160 CONTINUE                                                    CHA 0650
            IF(KPOINT.EQ.0) GO TO 170                                   CHA 0651
      C                                                                 CHA 0652
      C     LA CHAINE IC PASSE PAR LLL                                  CHA 0653
      C                                                                 CHA 0654
      C     INITIALISATION DE WS.WSS.DWS.DWSS.                          CHA 0655
      C                                                                 CHA 0656
            DO 161 I=1.25                                               CHA 0657
            WS(I)=-1                                                    CHA 0658
            WSS(I)=-1                                                   CHA 0659
        161 CONTINUE                                                    CHA 0660
            DWS=0                                                       CHA 0661
            DWSS=0                                                      CHA 0662
            IF (NCON.EQ.0) GO TO 188                                    CHA 0663
            NN=0                                                        CHA 0664
            DO 162 KJ=2.LFIN                                            CHA 0665
            IF (JAR(CH(IC.KJ).5).GT.2)GO TO 162                         CHA 0666
            NN=NN+1                                                     CHA 0667
            IF (KJ.GT.KPOINT) GO TO 170                                 CHA 0668
            DO 163 I=1.NHUP                                             CHA 0669
            IF (JAR(CH(IC.KJ).4).NE.JHU(I)) GO TO 163                   CHA 0670
            IF (PB(I).EQ.0) GO TO 170                                   CHA 0671
            GO TO 162                                                   CHA 0672
        163 CONTINUE                                                    CHA 0673
            GO TO 2003                                                  CHA 0674
        162 CONTINUE                                                    CHA 0675
            IF (NN.NE.NCON) GO TO 2004                                  CHA 0676
        188 INDEX=KPOINT-1                                              CHA 0677
            IF (INDEX.LT.2) GO TO 169                                   CHA 0678
      C     DEFINIR WS ET DWS                                           CHA 0679
            DO 164 I=2.INDEX                                            CHA 0680
            WS(I-1)=CH(IC.I)                                            CHA 0681
        164 CONTINUE                                                    CHA 0682
            DWS=INDEX-1                                                 CHA 0683
      C                                                                 CHA 0684
      C     DEFINIR WSS ET DWSS                                         CHA 0685
      C                                                                 CHA 0686
        169 IEND=INDEX+1                                                CHA 0687
            LZ=0                                                        CHA 0688
            DO 167 I=2.IEND                                             CHA 0689
            LKJ=CH(IC.I)                                                CHA 0690
            DO 166 J=6.10                                               CHA 0691
            IF (JAR(LKJ.J).EQ.0) GO TO 167                              CHA 0692
            NDUM=JAR(JAR(LKJ.J).4)                                      CHA 0693
            IF (JAR(JAR(LKJ.J).5).EQ.3) GO TO 168                       CHA 0694
            DO 165 K=1.NHUP                                             CHA 0695
            LKK=JHU(K)                                                  CHA 0696
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      IF ((LKK.EQ.NDUM      ).AND.(PB(K).EQ.1)) GO TO 168                    CHA 0697
  165 CONTINUE                                                               CHA 0698
      GO TO 166                                                              CHA 0699
  168 IF (NICK(JAR(JAR(LKJ,J),3)).EQ.0) GO TO 166                            CHA 0700
      LZ=LZ+1                                                                CHA 0701
      WSS(LZ)=JAR(LKJ,J)                                                     CHA 0702
  166 CONTINUE                                                               CHA 0703
  167 CONTINUE                                                               CHA 0704
      DWSS=LZ                                                                CHA 0705
      IF (DWSS.EQ.0) GO TO 171                                               CHA 0706
C                                                                            CHA 0707
C     CALCUL DE P.                                                           CHA 0708
C                                                                            CHA 0709
  171 PZ=1                                                                   CHA 0710
      IF (DWSS.EQ.0) GO TO 189                                               CHA 0711
      DO 187 I=1,DWSS                                                        CHA 0712
      LK=WSS(I)                                                              CHA 0713
      PZ=PZ*BLOV(LK)                                                         CHA 0714
  187 CONTINUE                                                               CHA 0715
C                                                                            CHA 0716
C     CALCUL DE LA CHARGE.                                                   CHA 0717
C                                                                            CHA 0718
  189 ZZ=PZ*DEM(III)                                                         CHA 0719
      ZZD=PZ*DEL(III)                                                        CHA 0720
      AA=1                                                                   CHA 0721
      IF (DWS.EQ.0) GO TO 192                                                CHA 0722
      DO 190 I=1,DWS                                                         CHA 0723
      LK=WS(I)                                                               CHA 0724
      COEF=1-BLOV(LK)                                                        CHA 0725
      AA=AA*COEF                                                             CHA 0726
  190 CONTINUE                                                               CHA 0727
  192 CHAR(LLL)=CHAR(LLL)+ ZZ*AA                                             CHA 0728
      CHARD(LLL)=CHARD(LLL)+ZZD*AA                                           CHA 0729
      IF (KPR.EQ.1) C1(LLL)=CHAR(LLL)                                        CHA 0730
  170 CONTINUE                                                               CHA 0731
  260 CONTINUE                                                               CHA 0732
C                                                                            CHA 0733
C     ECRIRE LA CHARGE SUR LE RC POUR                                        CHA 0734
C     LA PAIRE III ET LE PROFIL KPR                                          CHA 0735
C                                                                            CHA 0736
      IF (KPR.NE.1) GO TO 2218                                               CHA 0737
 8430 J=0                                                                    CHA 0738
      DO 840 I=1,NARCS,2                                                     CHA 0739
      KOD=0                                                                  CHA 0740
      J=J+1                                                                  CHA 0741
      CR(J)=0                                                                CHA 0742
      NCC(J)=0                                                               CHA 0743
      CC1(I)=CHAR(I)                                                         CHA 0744
      CC1(I+1)=CHAR(I+1)                                                     CHA 0745
      C1(J)=CHAR(I)+CHAR(I+1)                                                CHA 0746
      CCD(J)=CHARD(I)+CHARD(I+1)                                             CHA 0747
      Y=C1(J)                                                                CHA 0748
 2154 PXX=1                                                                  CHA 0749
      K=1                                                                    CHA 0750
      IF (Y.LT.0.001) GO TO 2152                                             CHA 0751
 2119 U=Y/K                                                                  CHA 0752
      W=(1/PXX)+U                                                            CHA 0753
      PXX=U/W                                                                CHA 0754
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      K=K+1                                                              CHA 0755
      IF (PXX.GT.BLOV(I)) GO TO 2119                                     CHA 0756
 2152 K=K-1                                                              CHA 0757
      CR(J)=K-NCC(J)                                                     CHA 0758
      IF (KOD.EQ.1) GO TO 840                                            CHA 0759
      NCC(J)=CR(J)                                                       CHA 0760
 2153 Y=CCD(J)                                                           CHA 0761
      KOD=1                                                              CHA 0762
      GO TO 2154                                                         CHA 0763
  840 CONTINUE                                                           CHA 0764
      GO TO 841                                                          CHA 0765
 2218 J=0                                                                CHA 0766
      DO 691 I=1.NARCS.2                                                 CHA 0767
      J=J+1                                                              CHA 0768
      IF ((NKOD.EQ.0).AND.(I.NE.JAR(CH(1.2).3))) GO TO 691               CHA 0769
      CCD(J)=CHARD(I)+CHARD(I+1)                                         CHA 0770
      Y=CCD(J)                                                           CHA 0771
      PXX=1                                                              CHA 0772
      K=1                                                                CHA 0773
      IF (Y.LT.0.001     ) GO TO 642                                     CHA 0774
  651 U=Y/K                                                              CHA 0775
      U=(1/PXX)+U                                                        CHA 0776
      PXX=U/U                                                            CHA 0777
      K=K+1                                                              CHA 0778
      IF(PXX.GT.BLOV(I)) GO TO 651                                       CHA 0779
  642 K=K-1                                                              CHA 0780
      CR(J)=K-NCC(J)                                                     CHA 0781
  691 CONTINUE                                                           CHA 0782
C                                                                        CHA 0783
  841 KPA=KPA+1                                                          CHA 0784
      IF (KPR.NE.1) GO TO 842                                            CHA 0785
      DO 843 I=1.KAP                                                     CHA 0786
      COM1(I)=0                                                          CHA 0787
  843 CONTINUE                                                           CHA 0788
  842 DO 1200 I=1.KAP                                                    CHA 0789
      COM(I)=0                                                           CHA 0790
      IF ((I.EQ.DP(ID.1)).OR.(I.EQ.DP(ID.2))) GO TO 1200                 CHA 0791
      DO 1220 J=1.NARCS                                                  CHA 0792
      IF (JAR(J.2).NE.I) GO TO 1220                                      CHA 0793
      L=JAR(J.3)                                                         CHA 0794
      IF (KPR.NE.1) GO TO 1221                                           CHA 0795
      XX=CC1(L)                                                          CHA 0796
      COM1(I)=COM1(I)+XX*(1-BLOV(L))                                     CHA 0797
 1221 XXD=CHARD(L)                                                       CHA 0798
      COM(I)=COM(I)+XXD*(1-BLOV(L))                                      CHA 0799
 1220 CONTINUE                                                           CHA 0800
      COM(I)=(COM(I)-COM1(I))*36./21.                                    CHA 0801
      IF(COM(I).GT.0.00001) VSU(I)=1                                     CHA 0802
 1200 CONTINUE                                                           CHA 0803
      PZP=0.0                                                            CHA 0804
      DO 193 I=1.NARCS                                                   CHA 0805
      IF(JAR(I.2).NE.DP(ID.2)) GO TO 193                                 CHA 0806
      PZP=PZP+CHARD(I)*(1-BLOV(I))                                       CHA 0807
  193 CONTINUE                                                           CHA 0808
      PROB=(PZP/DEL(ID))*100.                                            CHA 0809
      NPZINT=NPOINT                                                      CHA 0810
      IF (KTT.NE.1) GO TO 699                                            CHA 0811
      NPZINT=9999                                                        CHA 0812
```

```
      699 WRITE(10'KPA)III,NHUP,KPR,(JHU(I),I=1,NHUP),(PB(L),L=1,NHUP),      CHA 0813
     1NPZINT,((CR(LL),LL=1,LLINK),(COM(I),I=1,KAP),PROB                      CHA 0814
      280 CONTINUE                                                           CHA 0815
          IDISK(III)=KPA                                                     CHA 0816
C                                                                            CHA 0817
C     IMPRESSION DES RESULTATS                                               CHA 0818
C                                                                            CHA 0819
          ITOT=2**NHUP                                                       CHA 0820
          IF (KTT.EQ.1) ITOT=1                                               CHA 0821
          NCHECK=ITOT                                                        CHA 0822
          IF (III.EQ.1) GO TO 701                                            CHA 0823
          NCHECK=NCHECK+IDISK(III-1)                                         CHA 0824
      701 IDEB=0                                                             CHA 0825
          IF (III.NE.1)IDEB=IDISK(III-1)                                     CHA 0826
          DO 710 I=1,ITOT                                                    CHA 0827
          KEY=IDEB+I                                                         CHA 0828
          READ(10'KEY)JJJ,N1,N2,(IDU(L),L=1,N1),(RP(LL),LL=1,N1),NPT,        CHA 0829
     1((CR(LL),LL=1,LLINK),(COM(L),L=1,KAP),PROB                             CHA 0830
          IF (JJJ.NE.III) GO TO 2007                                         CHA 0831
          IF (N1.NE.NHUP) GO TO 2008                                         CHA 0832
          IF (N2.NE.I) GO TO 2009                                            CHA 0833
          IF (KTT.EQ.1) GO TO 709                                            CHA 0834
          DO 703 L=1,N1                                                      CHA 0835
          IF (IDU(L).NE.JHU(L))GO TO 2010                                    CHA 0836
          IF (RP(L).NE.B(L,I))GO TO 2011                                     CHA 0837
      703 CONTINUE                                                           CHA 0838
      709 DPROB(N2)=PROB                                                     CHA 0839
          DO 740 L=1,LLINK                                                   CHA 0840
          CHA(L,N2)=CR(L)                                                    CHA 0841
      740 CONTINUE                                                           CHA 0842
          DO 750 L=1,KAP                                                     CHA 0843
          CCOM(L,N2)=COM(L)                                                  CHA 0844
      750 CONTINUE                                                           CHA 0845
      710 CONTINUE                                                           CHA 0846
C                                                                            CHA 0847
C     CALCUL DE LA DEMANDE MAXIMUM (EN CIRCUITS) POUR CHACUNE DES ARETES     CHA 0848
C                                                                            CHA 0849
          DO 717 I=1,LLINK                                                   CHA 0850
          DEMAX=0                                                            CHA 0851
          DO 714 J=1,ITOT                                                    CHA 0852
          IF(CHA(I,J).GT.DEMAX) DEMAX=CHA(I,J)                               CHA 0853
      714 CONTINUE                                                           CHA 0854
          DMAX(I)=DMAX(I)+DEMAX                                              CHA 0855
      717 CONTINUE                                                           CHA 0856
C     FIN DU CALCUL.                                                         CHA 0857
          IF(JIMY.EQ.0) GO TO 51760                                          CHA 0858
          ISTART=1                                                           CHA 0859
          NX=0                                                               CHA 0860
      713 NX=NX+16                                                           CHA 0861
          MARCS=0                                                            CHA 0862
          IF (NX.GT.ITOT)NX=ITOT                                             CHA 0863
      712 LIGNE=0                                                            CHA 0864
          WRITE(IP,800)DELTA(III) ,(NODNM(IDEP,IK),IK=1,3),                  CHA 0865
     1                            (NODNM(IARR,IK),IK=1,3)                  CHA 0866
          IF (JHU(I).EQ.(PP+1)) GO TO 777                                    CHA 0867
          DO 715 I=1,NHUP                                                    CHA 0868
          LZL=JAR(ELN(JHU(I)),1)                                             CHA 0869
          LZ2=JAR(ELN(JHU(I)),2)                                             CHA 0870
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      WRITE(IP,801)(NODNM(LZL,K),K=1,3),(NODNM(LZ2,JI),JI=1,3),          CHA 0871
     1(B(I,J),J=ISTART,NX)                                               CHA 0872
  715 CONTINUE                                                           CHA 0873
  777 WRITE(IP,802)                                                      CHA 0874
  716 LIGNE=LIGNE+1                                                      CHA 0875
      IF(LIGNE.LE.40) GO TO 729                                          CHA 0876
      WRITE(IP,804)(DPROB(I),I=ISTART,NX)                                CHA 0877
      GO TO 712                                                          CHA 0878
  729 MARCS=MARCS+1                                                      CHA 0879
      IF (MARCS.LE.LLINK) GO TO 730                                      CHA 0880
      WRITE(IP,804)(DPROB(I),I=ISTART,NX)                                CHA 0881
      IF (NX.EQ.ITOT) GO TO  450                                         CHA 0882
      ISTART=NX+1                                                        CHA 0883
      GO TO 713                                                          CHA 0884
  730 WRITE(IP,803)(NODNM(JAR(2*MARCS-1,1),K),K=1,3),                    CHA 0885
     1              (NODNM(JAR(2*MARCS-1,2),K),K=1,3),                  CHA 0886
     2(CHA(MARCS,LL),LL=ISTART,NX)                                       CHA 0887
      GO TO 716                                                          CHA 0888
  450 CONTINUE                                                           CHA 0889
  800 FORMAT(1H1,28X,'CHARGES SUPPLEMENTAIRES GENEREES SUR LES ARCS DU RCHA 0890
     1ESEAU DE COM',                                                     CHA 0891
     2'MUTATION',//,23X,'POUR UN ACCROISSEMENT DE ',F7.2,' ERLANGS ENTRECHA 0892
     3 ',                                                                CHA 0893
     4'LE COUPLE ( ',3A4,',',',3A4,' )',//,1X, 'HU OU FULL GROUP POTENTIELCHA 0894
     5S',,40X,'PROFILS',//)                                              CHA 0895
  801 FORMAT(1X,3A4,1X,3A4,3X,16(1X,I5))                                 CHA 0896
  802 FORMAT(//,1X,'ARC',43X,'CHARGES SUPPLEMENTAIRES ( EN CIRCUITS )',  CHA 0897
     1//)                                                                CHA 0898
  803 FORMAT(1X,3A4,1X,3A4,3X,16(1X,I5))                                 CHA 0899
  804 FORMAT(//,1X,'EFFICACITE DU PROFIL',8X,16(F6.1))                   CHA 0900
  805 FORMAT(1X,3A4,16X,16F6.1)                                          CHA 0901
      ISTART=1                                                           CHA 0902
      NX=0                                                               CHA 0903
 2713 NX=NX+16                                                           CHA 0904
      MARCS=0                                                            CHA 0905
      IF (NX.GT.ITOT)NX=ITOT                                             CHA 0906
 2712 LIGNE=0                                                            CHA 0907
      WRITE(IP,810)DELTA(III),(NODNM(IDEP,IK),IK=1,3),                   CHA 0908
     1                        (NODNM(IARR,IK),IK=1,3)                   CHA 0909
      IF (JHU(I).EQ.(PP+1)) GO TO 2777                                   CHA 0910
      DO 2715 I=1,NHUP                                                   CHA 0911
      LZL=JAR(ELN(JHU(I)),1)                                             CHA 0912
      LZ2=JAR(ELN(JHU(I)),2)                                             CHA 0913
      WRITE(IP,801)(NODNM(LZL,K),K=1,3),(NODNM(LZ2,JI),JI=1,3),          CHA 0914
     1(B(I,J),J=ISTART,NX)                                               CHA 0915
 2715 CONTINUE                                                           CHA 0916
 2777 WRITE(IP,812)                                                      CHA 0917
 2716 LIGNE=LIGNE+1                                                      CHA 0918
      IF (LIGNE.GT.40) GO TO 2712                                        CHA 0919
      MARCS=MARCS+1                                                      CHA 0920
      IF (MARCS.LE.KAP) GO TO 2730                                       CHA 0921
      IF (NX.EQ.ITOT) GO TO  2750                                        CHA 0922
      ISTART=NX+1                                                        CHA 0923
      GO TO 2713                                                         CHA 0924
 2730 WRITE(IP,805)(NODNM(ENN(MARCS),KL),KL=1,3),(CCOM(MARCS,LL),LL=ISTACHA 0925
     1RT,NX)                                                             CHA 0926
      GO TO 2716                                                         CHA 0927
 2750 CONTINUE                                                           CHA 0928
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      810 FORMAT(1H1,40X,'COMMUTATION SUPPLEMENTAIRE AUX SOMMETS DU RESEAU D  CHA 0929
     1E COMMUTATION',//,30X,'POUR UN ACCROISSEMENT DE ',F7.2,' ERLANGS E  CHA 0930
     2NTRE ',                                                             CHA 0931
     3'LE COUPLE ( ',3A4,',',',3A4,' )',//,1X, 'HU OU FULL GROUP POTENTIEL CHA 0932
     4S',40X,'PROFILS',//)                                                CHA 0933
      812 FORMAT(//,1X,'SOMMET',40X,'COMMUTATION SUPPLEMENTAIRES ( EN LIGNES  CHA 0934
     1)',//)                                                              CHA 0935
51760 CONTINUE                                                            CHA 0936
      GO TO 100                                                           CHA 0937
 2015 LII=124                                                             CHA 0938
      WRITE(IP,3005) NHU,IND,LII                                          CHA 0939
 3005 FORMAT(2X,20I5)                                                     CHA 0940
      GO TO 711                                                           CHA 0941
 2001 LII=302                                                             CHA 0942
      WRITE(IP,3005) IDEP,DP(III,1),IARR,DP(III,2),LII                    CHA 0943
      GO TO 711                                                           CHA 0944
 2003 LII=361                                                             CHA 0945
      WRITE(IP,3005) NHUP,IFIN,(JHU(I),I=1,NHUP),(JAR(IC,LI),LI=2,IFIN),  CHA 0946
     1LII                                                                 CHA 0947
      GO TO 711                                                           CHA 0948
 2004 LII=363                                                             CHA 0949
      WRITE(IP,3005) NN,NCON,LII                                          CHA 0950
      GO TO 711                                                           CHA 0951
 2007 LII=425                                                             CHA 0952
      WRITE(IP,3005) JJJ,III,LII                                          CHA 0953
      GO TO 711                                                           CHA 0954
 2008 LII=426                                                             CHA 0955
      WRITE(IP,3005) N1,NHUP,LII                                          CHA 0956
      GO TO 711                                                           CHA 0957
 2009 LII=427                                                             CHA 0958
      WRITE(IP,3005) N2,I,LII                                             CHA 0959
      GO TO 711                                                           CHA 0960
 2010 LII=429                                                             CHA 0961
      WRITE(IP,3005) (JHU(LL),LL=1,NHUP),(IDU(LK),LK=1,NHUP),LII          CHA 0962
      GO TO 711                                                           CHA 0963
 2011 LII=430                                                             CHA 0964
      WRITE(IP,3005)(RP(K),K=1,NHUP),(B(L,I),L=1,NHUP),LII                CHA 0965
  711 WRITE(IP,988)                                                       CHA 0966
      DO 720 I=1,LLINK                                                    CHA 0967
      IF(28*(I/28).EQ.I) WRITE(IP,988)                                    CHA 0968
      J=2*I-1                                                             CHA 0969
      WRITE(IP,989)(NODNM(A(J,1),JERK),JERK=1,3),                         CHA 0970
     1(NODNM(A(J,2),JERK),JERK=1,3),J,DMAX(I)                             CHA 0971
  720 CONTINUE                                                            CHA 0972
      WRITE(IP,987)                                                       CHA 0973
  987 FORMAT(1H1,//,2X,'FIN NORMALE DES CALCULS')                         CHA 0974
  988 FORMAT(1H1,1X,'DEMANDE TOTALE MAXIMUM PAR ARC'                      CHA 0975
     1         ,//,2X,'LA DEMANDE ETANT EXPRIMEE EN NOMBRE DE CIRCUITS'   CHA 0976
     2,///,35X,'NUMERO    DEMANDE')                                      CHA 0977
  989 FORMAT(1X,3A4,3X,3A4,7X,I6,4X,I7,/,1X,60(1H-))                      CHA 0978
      IDC=LLINK                                                           CHA 0979
C                                                                         CHA 0980
C     CONCATENATION DU VECTEUR DE SOMMETS QUI SERVENT A COMMUTER .        CHA 0981
C                                                                         CHA 0982
      JUMP=0                                                              CHA 0983
      DO 60 I=1,LIM23                                                     CHA 0984
      IF(VSU(I).EQ.0) GO TO 60                                            CHA 0985
      JUMP=JUMP+1                                                         CHA 0986
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      VSU(JUMP)=I                                                       CHA 0987
   60 CONTINUE                                                          CHA 0988
      NSU=JUMP                                                          CHA 0989
C     FIN DE LA CONCATENATION .                                         CHA 0990
      IF (IPROG.EQ.2) GO TO 1555                                        CHA 0991
      WRITE(20,4000) IPROG,LIM23,        (XNODNM(I),I=1,LIM23)          CHA 0992
4000  FORMAT(' ',2I6,2X,100A8)                                          CHA 0993
      ITREF=LTREF                                                       CHA 0994
      WRITE(1,79245) PP,((JAR(I,J),J=1,2),I=1,PP)                       CHA 0995
79245 FORMAT(27I3)                                                      CHA 0996
      WRITE(21,4001)LTREF,ITREF,((TREF(I,J),I=1,LTREF),J=1,ITREF)       CHA 0997
4001  FORMAT(' ',2I3,2X,(26I3))                                         CHA 0998
      WRITE(22,4002)NSU,IDNDP,NDIM,NHU,(IDHU(J),J=1,NHU),(VSU(I),I=1,NSUCHA 0999
     1),(IDISK(J),J=1,IDNDP)                                            CHA 1000
4002  FORMAT(' ',4I4,10I3,100I3,(20I4))                                CHA 1001
      WRITE(23,4003)KAP, L2LINK,(DMAX(I),I=1,L2LINK)                    CHA 1002
4003  FORMAT(' ',2I3,2X,20015)                                          CHA 1003
1555  CONTINUE                                                          CHA 1004
      ENDFILE 20                                                        CHA 1005
      ENDFILE 21                                                        CHA 1006
      ENDFILE 22                                                        CHA 1007
      ENDFILE 23                                                        CHA 1008
       WRITE(IP,72941) IDISK(IDNDP),IDNDP                               CHA 1009
72941 FORMAT(' ',2X,'THERE ARE   ',I5,'  PROFILES FOR  ',I5,'DEMAND PAIRCHA 1010
     1S')                                                               CHA 1011
      STOP                                                              CHA 1012
      END                                                               CHA 1013
/*                                                                      CHA 1014
//GO.SYSIN DD *                                                         CHA 1015
//GO.FT01F001 DD DSN=S373.WIS,DISP=OLD                                  CHA 1016
//GO.FT08F001 DD UNIT=SYSDA,SPACE=(CYL,(05,1))                          CHA 1017
//GO.FT10F001 DD DSN=S373.ABC,DISP=OLD                                  CHA 1018
//GO.FT20F001 DD DSN=S373.DEF,DISP=OLD                                  CHA 1019
//GO.FT21F001 DD DSN=S373.GHI,DISP=OLD                                  CHA 1020
//GO.FT22F001 DD DSN=S373.JKL,DISP=OLD                                  CHA 1021
//GO.FT23F001 DD DSN=S373.MNO,DISP=OLD                                  CHA 1022
/*                                                                      CHA 1023
//                                                                      CHA 1024
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//BORNE    JOB ($600,002,010,0100,0000,34,,1),'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
     1MK(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(IPRDG.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(15)=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
     115))                                                              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
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```
      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 JAR(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
     1NUMBER')                                                         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
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      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
     1I2,3X,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
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      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
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      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
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      DAVE(KONT,1)=J                                                    BOR 0407
      SOMMET(KONT,1)=J                                                  BOR 0408
      SOMMET(KONT,2)=K                                                  BOR 0409
      CONDEM(KONT)=OMAX(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(1HI,/,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
     *   OP(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)=OP(I,1)                                            BOR 0432
      SOMMET(ISUM,2)=OP(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
      LCONO=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,LCONO),J=1,2),(CONDEM(I),I=BOR 0450
     11,LCONO),(IDENT(I),I=1,LCOND)                                     BOR 0451
 4006 FORMAT(' ',I3,2X,200I5,2X,100I5,2X,100I5)                         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
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      REAL*8  YAVD(300)                                                    BOR 0465
       COMMON/RRAJ/ JARR,JACC,YAVD                                         BOR 0466
      DATA CTYPE/'CNCP','MT&T','TCTS','ET&T','SWCH','DUMM','SUIT'/        BOR 0467
      IP=6                                                                 BOR 0468
      WRITE(IP,23)                                                         BOR 0469
   23 FORMAT('1',20X,'SWITCHING NODE COST DATA',//,3X,'NODE',3X,'INTERNA BOR 0470
     1L',5X,'CARRIER',13X,'LINES/MACHINE',1X,'(NO.) COST(S)',     /,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+1)+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=S373.STU,DISP=OLD                                    BOR 0498
//GO.FT20F001 DD DSN=S373.DEF,DISP=OLD                                    BOR 0499
//GO.FT21F001 DD DSN=S373.GHI,DISP=OLD                                    BOR 0500
//GO.FT23F001 DD DSN=S373.MNO,DISP=OLD                                    BOR 0501
//GO.FT24F001 DD DSN=S373.PQR,DISP=OLD                                    BOR 0502
//GO.FT25F001 DD DSN=S373.VWX,DISP=OLD                                    BOR 0503
//GO.FT26F001 DD DSN=S373.XYZ,DISP=OLD                                    BOR 0504
//GO.FT27F001 DD DSN=S373.BCD,DISP=OLD                                    BOR 0505
/*                                                                        BOR 0506
//                                                                        BOR 0507
```

```
 1 //CADUCE   JOB (5600,002,050,0200,0000,41,,I),'GELLER  '                CAD 0001
 2 //*PASSWORD=HERMES                                                      CAD 0002
 3 //    EXEC   FORTGCLG                                                   CAD 0003
 4 //FORT.SYSIN DD *                                                      CAD 0004
 5 C                                                                       CAD 0005
 6 C     ALL MATRICES WITH DIMENSIONS OF 300 IN THEM ARE FOR A NETWORK OF  CAD 0006
 7 C     300 TRANSMISSION FACILITIES LINKS INCLUDING DUMMY NODES           CAD 0007
 8 C    THE MATRIX MA    AND MCOST  ARE ONLY SET TO A NETWORK OF 150 LINKS FOCAD 0008
 9 C  PURPOSES OF THIS TEST RUN. NORMALLY THEY SHOULD BE SET TO THE MAX NUMCAD 0009
10 C OF LINKS INCLUING DUMMY LINKS                                         CAD 0010
11       INTEGER*2 MA(150,150),MCOST(150,150)                              CAD 0011
12 C                                                                       CAD 0012
13 C                                                                       CAD 0013
14       INTEGER*2 NOMINE(300),CBI1( 800,25),CBI2( 800,25)                 CAD 0014
15       INTEGER*2  MCOUT(20), MCH1( 800,25),MCH2( 800,25)                 CAD 0015
16        INTEGER  JAR(300,17), JAC(300,20)                                CAD 0016
17       INTEGER*2 MDE(100,2),DEM(100),          JVAD(300),NST(300)        CAD 0017
18       INTEGER*2  NPOINT(300), MDT(300), MRDA(300),MRD(300)              CAD 0018
19       INTEGER  ITYPE(2)                                                 CAD 0019
20       INTEGER*2              ZT(300), IDISK(100)                        CAD 0020
21       INTEGER  MCU(20),MCAP(20),MCL(20)                                 CAD 0021
22       INTEGER  MMCU(20),MMCAP(20),MMCL(20),CBIA(300),CBSA(300)          CAD 0022
23       INTEGER *2  KOD(100),NGT,KLON,NTO,NORG,NDEST,NT2                  CAD 0023
24       INTEGER*2 NPDE,NAR,NSOM,IDUM,NTCH                                 CAD 0024
25       DIMENSION TIME(2)                                                 CAD 0025
26 C                                                                       CAD 0026
27 C                                                                       CAD 0027
28 C                                                                       CAD 0028
29       COMMON  /DOM / MCOST,JVAD,NOMINE                                  CAD 0029
30       COMMON/REF/ITYPE,MA,NSOM                                          CAD 0030
31       COMMON  / JOB / JAR,JAC,NAR                                       CAD 0031
32 C                                                                       CAD 0032
33 C                                                                       CAD 0033
34 C                                                                       CAD 0034
35 C                                                                       CAD 0035
36 C                  CADUCEE 3                                           CAD 0036
37 C                                                                       CAD 0037
38 C                                                                       CAD 0038
39 C                                                                       CAD 0039
40       DEFINE FILE 11 (100,310,U,ID3)                                    CAD 0040
41       DEFINE FILE 9 (300,91,U,IDA)                                      CAD 0041
42 C                                                                       CAD 0042
43 C      CETTE FILIERE CONTIENT TOUTES LES CHAINES ADMISSIBLES .          CAD 0043
44 C                                                                       CAD 0044
45       DEFINE FILE 12 (2500,100,U,ID4)                                   CAD 0045
46 C                                                                       CAD 0046
47 C                                                                       CAD 0047
48       IU=6                                                              CAD 0048
49 C                                                                       CAD 0049
50 C                                                                       CAD 0050
51 C                                                                       CAD 0051
52 C     INITIALISATION                                                    CAD 0052
53 C                                                                       CAD 0053
54       ITER=0                                                            CAD 0054
55       REWIND 25                                                         CAD 0055
56       REWIND 26                                                         CAD 0056
57       READ(25,4005)  NSOM, ITYPE(1),ITYPE(2),NAR,((JAR(I,J),I=1,NAR),J=1CAD 0057
58      1,17),((JAC(I,J),I=1,NAR),J=1,20)                                  CAD 0058
```

```
      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)=1                                                          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
      WRITE(6,6610) KDEP,KARR,NGT,NCAC                                      CAD 0139
 6610  FORMAT(' ',2X,'KDEP=',I5,'KARR=',I5,'NGT=',I5,'NCAC=',I5)            CAD 0140
C                                                                           CAD 0141
      WRITE(11'NGT)(JVAD(K),K=1,NSOM   ),NPT,(NPOINT(K), K=1,NPT)           CAD 0142
C                                                                           CAD 0143
C     EFFECTUER LES CALCULS POUR LA PAIRE NGT                               CAD 0144
C                                                                           CAD 0145
      DO 417 IV=1,800                                                       CAD 0146
      DO 417 IU=1,25                                                        CAD 0147
      CBI1(IV,IU)=0                                                         CAD 0148
      CBI2(IV,IU)=0                                                         CAD 0149
  417 CONTINUE                                                              CAD 0150
      DO 23 I=1,NSOM                                                        CAD 0151
      NST(I)=0                                                              CAD 0152
   23 CONTINUE                                                              CAD 0153
      DO 821I=1,NAR                                                         CAD 0154
      MDT(I)=0                                                              CAD 0155
  821 CONTINUE                                                              CAD 0156
  699 NS=NSOM-1                                                             CAD 0157
      KD=KDEP+1                                                             CAD 0158
      KLON=0                                                                CAD 0159
      IRES=1                                                                CAD 0160
      MCH1(1,1)=KDEP                                                        CAD 0161
  110 KLON=KLON+1                                                           CAD 0162
      L=0                                                                   CAD 0163
C                                                                           CAD 0164
C     CONSTRUCTION DES CHAINES                                              CAD 0165
C                                                                           CAD 0166
      K=0                                                                   CAD 0167
      JK=KLON+1                                                             CAD 0168
      ICOMB=KLON-1                                                          CAD 0169
      DO 140 I=1,IRES                                                       CAD 0170
      N1=MCH1(I,KLON)                                                       CAD 0171
      DO 150 JS=1,NPT                                                       CAD 0172
      J=NPOINT(JS)                                                          CAD 0173
      IF (MA(N1,J).EQ.0) GO TO 150                                          CAD 0174
```

```
      DO 160 J1=1,KLON                                                  CAD 0175
      IF (J.EQ.MCH1(I,J1))GO TO 150                                     CAD 0176
      IF (J1.LT.KLON) GO TO 160                                         CAD 0177
C                                                                       CAD 0178
C     VERIFICATION  D'ADMISSIBILITE                                     CAD 0179
C                                                                       CAD 0180
      K=K+1                                                             CAD 0181
      IF(K.GT.799) GO TO 35148                                          CAD 0182
      MCH1(I,JK)=J                                                      CAD 0183
      JX=MA(MCH1(I,JK-1),MCH1(I,JK))                                    CAD 0184
      IF (KLON.NE.1) GO TO 410                                          CAD 0185
      CBI2(K,KLON)=JAR(JX,15)                                           CAD 0186
      GO TO 312                                                         CAD 0187
  410 DO 411 IV=1,KLON                                                  CAD 0188
      CBI2(K,IV)=CBI1(I,IV)+JAR(JX,15)                                  CAD 0189
  411 CONTINUE                                                          CAD 0190
  312 CONTINUE                                                          CAD 0191
C                                                                       CAD 0192
C     TEST                                                              CAD 0193
C                                                                       CAD 0194
      DO 414 IV=1,KLON                                                  CAD 0195
      N4=MCH1(I,IV)                                                     CAD 0196
      IF (J.GT.N4) GO TO 415                                            CAD 0197
      NHAUT=N4                                                          CAD 0198
      NBAS=J                                                            CAD 0199
      GO TO 416                                                         CAD 0200
  415 NHAUT=J                                                           CAD 0201
      NBAS=N4                                                           CAD 0202
  416 IF (CBI2(K,IV)-MCOST(NBAS,NHAUT)) 414,414,149                     CAD 0203
  414 CONTINUE                                                          CAD 0204
      GO TO 599                                                         CAD 0205
  149 K=K-1                                                             CAD 0206
      GO TO 150                                                         CAD 0207
C                                                                       CAD 0208
C     REMISER LA CHAINE ADMISSIBLE                                      CAD 0209
C                                                                       CAD 0210
  599 DO 153 K1=1,JK                                                    CAD 0211
      IF (K1.EQ.JK)GO TO 154                                            CAD 0212
      MCH2(K,K1)=MCH1(I,K1)                                             CAD 0213
      GO TO 153                                                         CAD 0214
  154 MCH2(K,K1)=J                                                      CAD 0215
  153 CONTINUE                                                          CAD 0216
  160 CONTINUE                                                          CAD 0217
  150 CONTINUE                                                          CAD 0218
  140 CONTINUE                                                          CAD 0219
      IF (K.EQ.0) GO TO 80                                              CAD 0220
      DO 151 I=1,K                                                      CAD 0221
      DO 151 J=1,JK                                                     CAD 0222
      MCH1(I,J)=MCH2(I,J)                                               CAD 0223
      CBI1(I,J)=CBI2(I,J)                                               CAD 0224
  151 CONTINUE                                                          CAD 0225
      L3=0                                                              CAD 0226
C                                                                       CAD 0227
C     STOCKER LES CHAINES TERMINEES: ELIMINER LES CHAINES               CAD 0228
C     NON TERMINEES DONT LE DERNIER SOMMET EST PENDANT                  CAD 0229
C                                                                       CAD 0230
      DO 180 I=1,K                                                      CAD 0231
       IF(NTO.GT.10) GO TO 30                                           CAD 0232
```

```
      IF (MCH1(I,JK).NE.KARR) GO TO 190                                 CAD 0233
      NCAC=NCAC+1                                                       CAD 0234
      IF (NTO.EQ.0)IDISK(NGT)=NCAC                                      CAD 0235
      NTO=NTO+1                                                         CAD 0236
      WRITE(12'NCAC)NGT,KLON,NTO,MDE(NGT,1),MDE(NGT,2),(MCH1(I,I4),     CAD 0237
     1I4=1,JK),KOD(NGT)                                                 CAD 0238
      DO 800 J=2,JK                                                     CAD 0239
      LI=J-1                                                            CAD 0240
      IF (MA(MCH1(I,LI),MCH1(I,J)).EQ.0) GO TO 800                      CAD 0241
      MDT(MA(MCH1(I,LI),MCH1(I,J)))=1                                   CAD 0242
  800 CONTINUE                                                          CAD 0243
      NST(KLON)=NST(KLON)+1                                             CAD 0244
      GO TO 180                                                         CAD 0245
  190 NTES=MCH1(I,JK)                                                   CAD 0246
      ICTR=0                                                            CAD 0247
      DO 184 J6=1,NSOM                                                  CAD 0248
      IF (MA(NTES,J6).EQ.0) GO TO 184                                   CAD 0249
      ICTR=ICTR+1                                                       CAD 0250
  184 CONTINUE                                                          CAD 0251
      IF (ICTR.EQ.1) GO TO 180                                          CAD 0252
      L3=L3+1                                                           CAD 0253
      DO 183 J2=1,JK                                                    CAD 0254
      MCH2(L3,J2)=MCH1(I,J2)                                            CAD 0255
      CBI2(L3,J2)=CBI1(I,J2)                                            CAD 0256
  183 CONTINUE                                                          CAD 0257
  180 CONTINUE                                                          CAD 0258
C                                                                       CAD 0259
C     NE GARDER DANS MCH1 QUE LES CHAINES NON TERMINEES                 CAD 0260
C                                                                       CAD 0261
      IRES=L3                                                           CAD 0262
      IF (IRES.EQ.0) GO TO 8844                                         CAD 0263
      DO 181 I=1,L3                                                     CAD 0264
      DO 181 J=1,JK                                                     CAD 0265
      MCH1(I,J)=MCH2(I,J)                                               CAD 0266
      CBI1(I,J)=CBI2(I,J)                                               CAD 0267
  181 CONTINUE                                                          CAD 0268
 8844 IF (KLON.EQ.NS) GO TO 80                                          CAD 0269
      IF (L3.NE.0)GO TO 110                                             CAD 0270
   80 DO  803 JX=1,NAR                                                  CAD 0271
      IF (MDT(JX).GT.0) ZT(JX)=ZT(JX)+DEM(NGT)                          CAD 0272
  803 CONTINUE                                                          CAD 0273
C                                                                       CAD 0274
      GO TO 30                                                          CAD 0275
35148 WRITE(6,35149)                                                    CAD 0276
35149 FORMAT(' ',1X,'MESSAGE*** NUMBER OF SUB CHAINS EXCEEDS MAT SIZE') CAD 0277
   30 CONTINUE                                                          CAD 0278
C                                                                       CAD 0279
C                                                                       CAD 0280
C     TEST DE CONVERGENCE                                               CAD 0281
C                                                                       CAD 0282
 8879 IT=0                                                              CAD 0283
      DO 8880 I=1,NAR                                                   CAD 0284
      IF (ZT(I).LT.0.001) GO TO 8867                                    CAD 0285
      M1=JAR(I,14)                                                      CAD 0286
      INDEX=M1                                                          CAD 0287
      READ(9'I) (MMCL(J),J=1,M1), (MMCU(J),J=1,M1),(MMCAP(J),J=1,M1)    CAD 0288
      DO 90911 J=1,M1                                                   CAD 0289
      MCL(J)=MMCL(J)/100                                                CAD 0290
```

```
      MCU(J)=MMCU(J)/100                                                CAD 0291
      MCAP(J)=MMCAP(J)/100                                              CAD 0292
90911 CONTINUE                                                          CAD 0293
      NK=0                                                              CAD 0294
      DO 8869 K=1,M1                                                    CAD 0295
      IF (ZT(I).GT.MCAP(K)) GO TO 8869                                  CAD 0296
      INDEX=K                                                           CAD 0297
      GO TO 8805                                                        CAD 0298
 8869 CONTINUE                                                          CAD 0299
      NK=1                                                              CAD 0300
      GO TO 8805                                                        CAD 0301
 8867 MRD(I)=0                                                          CAD 0302
      JAR(I,17)=0                                                       CAD 0303
      JAR(I,15)=32700                                                   CAD 0304
      JAR(I,16)=32700                                                   CAD 0305
      GO TO 8804                                                        CAD 0306
 8805 MRD(I)=INDEX                                                      CAD 0307
      JAR(I,17)=INDEX                                                   CAD 0308
      JAR(I,15)=MCL(INDEX)                                              CAD 0309
      JAR(I,16)=MCU(INDEX)                                              CAD 0310
      IF (NK.EQ.0) GO TO  8804                                          CAD 0311
      KKK1=MCL(INDEX)                                                   CAD 0312
      KKK2=MCU(INDEX)                                                   CAD 0313
      KKK3=ITYPE(1)                                                     CAD 0314
      KKK4=ITYPE(2)                                                     CAD 0315
      JAR(I,15)=MIN0(    KKK1,KKK3)                                     CAD 0316
      JAR(I,16)=MAX0(KKK2,KKK4)                                         CAD 0317
C                                                                       CAD 0318
C     TEST                                                              CAD 0319
C                                                                       CAD 0320
 8804 IF (((CBIA(I).NE.JAR(I,15)).OR.(CBSA(I).NE.JAR(I,16)))IT=1        CAD 0321
 8880 CONTINUE                                                          CAD 0322
      IF (IT.EQ.0) GO TO  9999                                          CAD 0323
      ITER=ITER+1                                                       CAD 0324
       WRITE(6,73301)  ITER                                             CAD 0325
73301 FORMAT(' ','ITER=',I5)                                            CAD 0326
      GO TO 50                                                          CAD 0327
C                                                                       CAD 0328
C     LECTURE DES CHAINES ET VERIFICATION DE LEUR ADMISSIBILITE         CAD 0329
C                                                                       CAD 0330
 9000 CONTINUE                                                          CAD 0331
      NTCH=0                                                            CAD 0332
      NPAIR=0                                                           CAD 0333
      DO 9209 I=1,NAR                                                   CAD 0334
      ZT(I)=0                                                           CAD 0335
 9209 CONTINUE                                                          CAD 0336
      DO 9500 KP=1,NCAC                                                 CAD 0337
      READ(12'KP) NGT,KLON,NTO,NORG     , NDEST   ,(NST(J),J=1,KLON)    CAD 0338
     1,IDUM,KOD(NGT)                                                    CAD 0339
      M=KLON+1                                                          CAD 0340
      NST(M)=NDEST                                                      CAD 0341
      IF (NPAIR.EQ.NGT) GO TO 9009                                      CAD 0342
      DO 9001 I=1,NAR                                                   CAD 0343
      MDT(I)=0                                                          CAD 0344
 9001 CONTINUE                                                          CAD 0345
      NPAIR=NGT                                                         CAD 0346
      NT2=0                                                             CAD 0347
      N1=NORG                                                           CAD 0348
```

```
      N4=NDEST                                                          CAD 0349
      IF (N4.LE.N1) GO TO 9002                                          CAD 0350
      NBAS=N4                                                           CAD 0351
      NHAUT=N1                                                          CAD 0352
      GO TO 9009                                                        CAD 0353
 9002 NBAS=N1                                                           CAD 0354
      NHAUT=N4                                                          CAD 0355
 9009 MCOUT(1)=0                                                        CAD 0356
      DO 9010 I=2,M                                                     CAD 0357
      MCOUT(I)=MCOUT(I-1)+JAR(MA(NST(I-1),NST(I)),15)                   CAD 0358
 9010 CONTINUE                                                          CAD 0359
      IF (MCOUT(M).GT.MCOST(NHAUT,NBAS)) GO TO 9500                     CAD 0360
      DO 9011 I=2,M                                                     CAD 0361
      K=MA(NST(I-1),NST(I))                                             CAD 0362
      IF (MDT(K).EQ.1) GO TO 9011                                       CAD 0363
      MDT(K)=1                                                          CAD 0364
      ZT(K)=ZT(K)+DEM(NGT)                                              CAD 0365
 9011 CONTINUE                                                          CAD 0366
      NT2=NT2+1                                                         CAD 0367
      NTCH=NTCH+1                                                       CAD 0368
      WRITE(12'NTCH) NGT,KLON,NT2,NORG      ,NDEST   ,(NST(J),J=1,KLON)  CAD 0369
     1,NST(M),KOD(NGT)                                                  CAD 0370
C                                                                       CAD 0371
C                                                                       CAD 0372
C                                                                       CAD 0373
 9500 CONTINUE                                                          CAD 0374
C                                                                       CAD 0375
C                                                                       CAD 0376
C                                                                       CAD 0377
      NCAC=NTCH                                                         CAD 0378
C                                                                       CAD 0379
C     TEST DE CONVERGENCE                                               CAD 0380
C                                                                       CAD 0381
      GO TO 8879                                                        CAD 0382
C                                                                       CAD 0383
C     CONVERGENCE ATTEINTE                                              CAD 0384
C                                                                       CAD 0385
 9999 DO 3333 KP=1,NTCH                                                 CAD 0386
      READ(12'KP) NGT,KLON,NT2,NORG,NDEST,(NST(J),J=1,KLON),            CAD 0387
     1IDUM,KOD(NGT)                                                     CAD 0388
      M=KLON+1                                                          CAD 0389
      NST(M)=NDEST                                                      CAD 0390
      DO 3331 I=2,M                                                     CAD 0391
      JVAD(I-1)=MA(NST(I-1),NST(I))                                     CAD 0392
 3331 CONTINUE                                                          CAD 0393
      WRITE(12'KP) NGT,KLON,NT2,NORG,NDEST,(JVAD(J),J=1,KLON),KOD(NGT)  CAD 0394
 3333 CONTINUE                                                          CAD 0395
      WRITE(IW,9998)                                                    CAD 0396
 9998 FORMAT(////////,10X,'FIN NORMALE DES CALCULS')                    CAD 0397
      WRITE(28,4008)NTCH                                                CAD 0398
 4008 FORMAT(' ',I5)                                                    CAD 0399
       REWIND 30                                                        CAD 0400
      WRITE(30,4005)  NSOM, ITYPE(1),ITYPE(2), NAR,((JAR(I,J),I=1,NAR),JCAD 0401
     1=1,17),((JAC (I,J),I=1,NAR),J=1,20)                               CAD 0402
      ENDFILE 25                                                        CAD 0403
      ENDFILE 28                                                        CAD 0404
      STOP                                                              CAD 0405
      END                                                               CAD 0406
```

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

```
      C                                                                 CAD 0465
      C     CHAINES DE LONGUEUR 1.                                      CAD 0466
      C                                                                 CAD 0467
            NDMI(NORG)=0                                                CAD 0468
            DO 13 I=1.N                                                 CAD 0469
            IF (MA(NORG.I).EQ.0)GO TO 13                                CAD 0470
            INOM=I                                                      CAD 0471
            IF ((INOM.LT.NDRG).OR.(JVAD(INOM).EQ.0)) GO TO 13           CAD 0472
            NDMI(INOM)=JAR(MA(NORG.I).NTC)                              CAD 0473
         13 CONTINUE                                                    CAD 0474
            LON=1                                                       CAD 0475
      C                                                                 CAD 0476
      C     CHAINES DE LONGUEUR >1.                                     CAD 0477
      C                                                                 CAD 0478
         27 DO 16 I=NORG.N                                              CAD 0479
            NOME(I)=NOMI(I)                                             CAD 0480
         16 CONTINUE                                                    CAD 0481
            LON=LON+1                                                   CAD 0482
            DO 25 I=L.N                                                 CAD 0483
            IF (JVAD(I).EQ.0)GO TO 25                                   CAD 0484
            DO  22 LL=1.N                                               CAD 0485
            IF (MA(I.LL).EQ.0)GO TO 22                                  CAD 0486
            INODE=LL                                                    CAD 0487
            IF (JVAD(INODE).EQ.0) GO TO 22                              CAD 0488
            ICOUT=JAR(MA(I.LL).NTC)+NOME(INODE)                         CAD 0489
            IF ((ICOUT.LT.NOMI(I)) NOMI(I)=ICOUT                        CAD 0490
         22 CONTINUE                                                    CAD 0491
         25 CONTINUE                                                    CAD 0492
      C                                                                 CAD 0493
      C     TEST DE CONVERGENCE                                         CAD 0494
      C                                                                 CAD 0495
      C                                                                 CAD 0496
            DO 26 MM=L.N                                                CAD 0497
            IF (NDME(MM).NE.NDMI(MM)) GO TO 27                          CAD 0498
         26 CONTINUE                                                    CAD 0499
            DO 33 I=NORG.N                                              CAD 0500
            IF (NTC.EQ.15)MCOST(I.NDRG)=NOME(I)                         CAD 0501
            IF (NTC.EQ.16)MCOST(NORG.I)=NDME(I)                         CAD 0502
         33 CONTINUE                                                    CAD 0503
            GO TO 5                                                     CAD 0504
        998 MCOST(N.N)=0                                                CAD 0505
            IF (NTC.EQ.16) GO TO 1000                                   CAD 0506
            NTC=16                                                      CAD 0507
            GO TO 3                                                     CAD 0508
       1000 RETURN                                                      CAD 0509
            END                                                         CAD 0510
      /*                                                                CAD 0511
      //GO.FT09F001 DD DSN=S373.STU.DISP=OLD                            CAD 0512
      //GO.FT11F001 DD UNIT=SYSDA.SPACE=(CYL.(03.1))                    CAD 0513
      //GO.FT12F001 DD DSN=S373.HIJ.DISP=OLD                            CAD 0514
      //GO.FT25F001 DD DSN=S373.VWX.DISP=OLD                            CAD 0515
      //GO.FT26F001 DD DSN=S373.XYZ.DISP=OLD                            CAD 0516
      //GO.FT28F001 DD DSN=S373.EFG.DISP=OLD                            CAD 0517
      //GO.FT30F001 DD DSN=S373.JAR.DISP=OLD                            CAD 0518
      /*                                                                CAD 0519
      //                                                                CAD 0520
```

```
//CONTRA   JOB (6373,007,010,0050,0000,42,,1),'GELLER '                  CON 0001
//*PASSWORD=HERMES                                                       CON 0002
//    EXEC   FORTGCLG                                                    CON 0003
//FORT.SYSIN DD *                                                        CON 0004
C      LTRAN    :  NOMBRE DE CONTRAINTES GENEREES .                     CON 0005
C      IMI      :  NOMBRE TOTAL DE 'CHU' ET DE 'CFG' .                  CON 0006
C      IMJ      :  NOMBRE DE PROFILS .                                  CON 0007
C      LILI     :  NOMBRE DE PAIRES DE DEMANDE .                        CON 0008
C  |                                                                    |CON 0009
C  |   MATLI    :  NOMBRE DE LIGNES DANS "MAT" .                        |CON 0010
C  |   MATCO    :  NOMBRE DE COLONNES DANS "MAT" .                      |CON 0011
C  |   TRANLI   :  NOMBRE DE LIGNES DANS "TRAN" .                       |CON 0012
C  |   TRANCO   :  NOMBRE DE COLONNES DANS "TRAN" .                     |CON 0013
C  |   VECLI    :  NOMBRE DE LIGNES DANS "VEC" .                        |CON 0014
C  |   VECCO    :  NOMBRE DE COLONNES DANS "VEC" .                      |CON 0015
C  |   INBEL    :  NOMBRE D'ELEMENTS DANS "INB" .                       |CON 0016
C  |   INBDEL   :  NOMBRE D'ELEMENTS DANS "INBD" .                      |CON 0017
C  |   VEKEL    :  NOMBRE D'ELEMENTS DANS "VEK" .                       |CON 0018
C  |                                                                    |CON 0019
C  |____________________________________________________________________|CON 0020
C                                                                        CON 0021
      INTEGER VEKEL,TRANCO,TRANLI,VECCO,VECLI                            CON 0022
      INTEGER*2  IDHU(100)                                               CON 0023
      INTEGER*2 PB(10),JHU(10),IDISK(1000),        IDNDP,NDIM            CON 0024
      INTEGER*2 A,B,C,D,E,F,U,V,W,X,Y,Z                                  CON 0025
      INTEGER*2 VSU(100),NSU                                             CON 0026
C  COLUMN DIMENSIONS IN MAT  AND TRAN SHOULD BE GREATER OR EQUAL TO THE CONA0027
C  NUMBER OF PROFILES FOR  N  DEMAND PAIRS                               CON 0028
      INTEGER*2 MAT(27,600 ), VEC(1000,2),TRAN(182,600 ), IPOS(27,506)   CON 0029
      INTEGER*2  INB(100)                                                CON 0030
      INTEGER*2 VEK(100),INBD(100),IDEBU(1250),IFIN(1250),VEKMAX(1250)   CON 0031
      EQUIVALENCE            (MATLI,INBEL,INBDEL,VEKEL),(MATCO,TRANCO)   CON 0032
C                                                                        CON 0033
      DEFINE FILE 14 (1250,200,U,IDS)                                    CON 0034
      DEFINE FILE 10(2000,200,U,ID25)                                    CON 0035
C                                                                        CON 0036
      REWIND 22                                                          CON 0037
      READ(22,4002) NSU,IDNDP,NDIM,NHU,(IDHU(J),J=1,NHU),(VSU(I),I=1,NSUCON 0038
     1),(IDISK(J),J=1,IDNDP)                                             CON 0039
 4002 FORMAT(' ',4I4,10I3,100I3,(20I4))                                  CON 0040
      IMI=NHU                                                            CON 0041
      MATLI=27                                                           CON 0042
C  MATCO SHOULD BE SET TO THE MAXIMUM TOTAL NUMBER OF COLUMNS IN MATRIX  CON 0043
C   TOTAL NUMBER OF PROFILES FOR N  DEMAND PAIRS                         CON 0044
       MATCO=600                                                         CON 0045
      TRANLI=182                                                         CON 0046
      VECLI=1000                                                         CON 0047
      VECCO=2                                                            CON 0048
      DO 225 I=1,MATLI                                                   CON 0049
      DO 225 J=1,MATCO                                                   CON 0050
  225 MAT(I,J)=0                                                         CON 0051
      DO 226 I=1,VECLI                                                   CON 0052
      DO 226 J=1,VECCO                                                   CON 0053
  226 VEC(I,J)=0                                                         CON 0054
      DO 227 I=1,TRANLI                                                  CON 0055
      DO 227 J=1,TRANCO                                                  CON 0056
  227 TRAN(I,J)=0                                                        CON 0057
      DO 228 I=1,INBEL                                                   CON 0058
```

```
      INSD(I)=0                                                          CON 0059
  228 INS(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(10'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(I,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)+1                                                    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=S373.ABC,DISP=OLD                                  CON 0309
     //GO.FT14F001 DD DSN=S373.ROB,DISP=OLD                                  CON 0310
     //GO.FT22F001 DD DSN=S373.JKL,DISP=OLD                                  CON 0311
     //GO.FT29F001 DD DSN=S373.MIC,DISP=OLD                                  CON 0312
     /*                                                                      CON 0313
     //                                                                      CON 0314
```

```
//SETUP    JOB (S600,002,010,0100,0000,31,,1),'GELLER '                    SET 0001
//*PASSWORD=HERMES                                                         SET 0002
//   EXEC   FORTGCLG                                                       SET 0003
//FORT.SYSIN DD *                                                          SET 0004
      INTEGER*2  IDHU(100)                                                SET 0005
      INTEGER NASS, NOTT                                                  SET 0006
       INTEGER*2 NOTS,JPO                                                 SET 0007
      INTEGER*2 IIDP,NNLINK,NNCHAI,NNORG,NNDEST                           SET 0008
      INTEGER ROWS(9),COLUM(6),CONST(9),RHS,A(20),DMAX(200)               SET 0009
      REAL*8  BOUNDS(3),COS                                               SET 0010
      REAL   BA(3),CA(3),COM(100),CCR(200)                                SET 0011
C  DIMENSIONS FOR IDEBU AND IFIN ARE FOR 2**N  FOR N CONTEMPLATED PER DSETN0012
C PAIR FROM SWITCHING NETWORK                                             SET 0013
      INTEGER*2 IDEBU(1000),IFIN(1000),ICL(100)                           SET 0014
      INTEGER*2 LINKS(20)                                                 SET 0015
      INTEGER*2 JHU(10),PB(10)                                            SET 0016
      INTEGER*2           LLINK,KED                                       SET 0017
      INTEGER*2  SOMMET(100,2),CONDEM(100),IDENT(100),LCOND               SET 0018
      INTEGER*2 KL                                                        SET 0019
      INTEGER   JAR(300,17),JAC(300,20)                                   SET 0020
      INTEGER JSU(100)                                                    SET 0021
      INTEGER   JARR( 60,17),JACC( 60,20)                                 SET 0022
      INTEGER*2                              KZ,NDIM                      SET 0023
      INTEGER*2 IDISK(1000),ID                                            SET 0024
      INTEGER*2  VSU(100),NSU                                             SET 0025
      REAL  CR(200)                                                       SET 0026
      INTEGER*2  DAVE(100,4),KONT                                         SET 0027
      REAL       TYPE(10),COST(10),BOUND(10),SAST(2,10)                   SET 0028
      IC(I1,I2)=10000000+I2+I1*1000                                       SET 0029
      DEFINE FILE 10(2000,200,U,ID25)                                     SET 0030
      DEFINE FILE 14 (1250,200,U,ID5)                                     SET 0031
      DEFINE FILE 12 (2500,100,U,ID4)                                     SET 0032
      DATA ROWS/'SN','RT','DD','LN','Y','SW','Z','P','Q'/                 SET 0033
      DATA COLUM/'S','R','D','C','X','N'/                                 SET 0034
      DATA BOUNDS/' UP BND1',' LO BND1',' FX BND1'/                       SET 0035
      DATA RHS/'RHS1'/                                                    SET 0036
      DATA CONST/'L','G','G','L','G','L','G','E','N'/                     SET 0037
      DATA COS/'COST1    '/                                               SET 0038
      REWIND 20                                                           SET 0039
      REWIND 22                                                           SET 0040
      REWIND 23                                                           SET 0041
      REWIND 24                                                           SET 0042
      REWIND 25                                                           SET 0043
      REWIND 26                                                           SET 0044
      REWIND 27                                                           SET 0045
      REWIND 28                                                           SET 0046
      REWIND 29                                                           SET 0047
      REWIND 30                                                           SET 0048
       READ(20,4023) IPROG                                                SET 0049
4023  FORMAT(' ',I6)                                                      SET 0050
      READ(30,4005)NOTS,NASS,NOTT,KL,((JAR(I,J),I=1,KL),J=1,17),((JAC(I,SET 0051
     1J),I=1,KL),J=1,20)                                                  SET 0052
4005  FORMAT(' ',I3,2I7,I3,2X, (16I7))                                    SET 0053
      READ(26,4006) LCOND,((SOMMET(I,J),I=1,LCOND),J=1,2),(CONDEM(I),I=1SET 0054
     1,LCOND),(IDENT(I),I=1,LCOND)                                        SET 0055
4006  FORMAT(' ',I3,2X,200I5,2X,100I5,2X,100I5)                           SET 0056
      READ(27,4007)  KONT,((DAVE(I,J),I=1,KONT),J=1,4)                    SET 0057
4007  FORMAT(' ',I3,2X,(16I5))                                            SET 0058
```

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

```
      KP=KC                                                              SET 0117
      IF(IT.EQ.3)KP=KI                                                   SET 0118
C                                                                        SET 0119
      ICC=IC(IDP,NCHAI)                                                  SET 0120
      ICD=IC(NORG,NDEST)                                                 SET 0121
       WRITE(KP,50) ICC,COLUM(IT),ICD,ROWS(IT),CA(IT)                    SET 0122
   50 FORMAT(' ',T5,I8,T5,A1,T15,I8,T15,A2,T25,F9.1)                     SET 0123
C WRITE CHAINS.                                                          SET 0124
      KC=16                                                              SET 0125
      IF(IT.EQ.3)KC=KI                                                   SET 0126
      DO 51 I=1,NLINK                                                    SET 0127
      IK=LINKS(I)                                                        SET 0128
      IF(JAR(IK,3).EQ.6) GO TO 51                                        SET 0129
      ICC=IC(IDP,NCHAI)                                                  SET 0130
       ICD=IC(IZ,IK)                                                     SET 0131
       WRITE(KC,52) ICC,COLUM(IT),ICD,ROWS(4),BA(IT)                     SET 0132
   52 FORMAT(' ',T5,I8,T5,A1,T15,I8,T15,A2,T25,F9.1)                     SET 0133
   51 CONTINUE                                                           SET 0134
      IF(NCHAI.NE.1) GO TO 7434                                          SET 0135
      ICC=IC(NORG,NDEST)                                                 SET 0136
      IF(IT.NE.1) WRITE(KH,1291) RHS,ICC,ROWS(IT),CA(3)                  SET 0137
1291   FORMAT(' ',T5,A4,T15,I8,T15,A2,T25,F9.1)                          SET 0138
C  WRITE BOUNDS OF INDIVISIBLE CHAINS                                    SET 0139
7434  ICC=IC(IDP,NCHAI)                                                  SET 0140
      IF(IT.EQ.3) WRITE(KB,53) BOUNDS(1),ICC,COLUM(IT),BA(1)             SET 0141
   53 FORMAT(' ',T1,A8,T15,I8,T15,A1,T25,F9.1)                           SET 0142
1357   CONTINUE                                                          SET 0143
C  WRITE ROWS FOR DEMAND PAIRS IE  L SN001002                            SET 0144
 1000 DO 60 I=1,LCOND                                                    SET 0145
      IK=SOMMET(I,1)                                                     SET 0146
      IKK=SOMMET(I,2)                                                    SET 0147
      ICC=IC(IK,IKK)                                                     SET 0148
      WRITE(KR,61) CONST(IDENT(I)),ICC,ROWS(IDENT(I))                    SET 0149
   61 FORMAT(' ',T2,A1,T5,I8,T5,A2)                                      SET 0150
   60  CONTINUE                                                          SET 0151
      DO 62 I=1,KL                                                       SET 0152
      ICC=IC(IZ,I)                                                       SET 0153
      IF(JAR(I,3).EQ.6) GO TO 62                                         SET 0154
      IF(JAR(I,17).GT.0) WRITE(KR,63)  CONST(1),ICC,ROWS(4)              SET 0155
   63 FORMAT(' ',T2,A1,T5,I8,T5,A2)                                      SET 0156
   62 CONTINUE                                                           SET 0157
C  READS IN DATA FROM CHARGE                                             SET 0158
      IF(IPROG.EQ.1) GO TO 200                                           SET 0159
      READ(22,4002) NSU,ID    ,NDIM,NHU,(IDHU(J),J=1,NHU),(VSU(I),I=1,NSUSET 0160
     1),(IDISK(J),J=1,ID)                                                SET 0161
4002  FORMAT(' ',4I4,10I3,100I3,(20I4))                                  SET 0162
      READ(23,4003)KAP,LLINK,(DMAX(I),I=1,LLINK)                         SET 0163
4003  FORMAT(' ',2I3,2X,200I5)                                           SET 0164
      READ(24,4004) KZ,((JARR(I,J),I=1,KZ),J=1,17),((JACC(I,J),I=1,KZ),  SET 0165
     1J=1,20)                                                            SET 0166
4004  FORMAT(' ',I2,2X,(16I5))                                           SET 0167
      JPO=IDISK(ID)                                                      SET 0168
      READ(29,7013) LTRAN,LILI,(IDEBU(I),I=1,JPO ),(IFIN(I),I=1,JPO )    SET 0169
7013  FORMAT(' ',(20I5))                                                 SET 0170
      DO 73922 I=1,KZ                                                    SET 0171
      DO 73922 J=1,20                                                    SET 0172
      JACC(I,J)=JACC(I,J)/100                                            SET 0173
73922  CONTINUE                                                          SET 0174
```

```
      DO 75491 I=1,NSU                                                  SET 0175
      JSU(I)=VSU(I)                                                     SET 0176
75491 CONTINUE                                                          SET 0177
      JP=IDISK(ID)                                                      SET 0178
      LANT=0                                                            SET 0179
      DO 199 KEY=1,JP                                                   SET 0180
C  III=  DEMAND PAIR NUMBER                                            SET 0181
C  NHUP= NUMBER OF POTENTIAL FG OR HU                                   SET 0182
C  KPR = PROFILE NUMBER                                                 SET 0183
C  JHU(I)=INTERNAL LINK NUMBERS  OF CONT.FG AND HU.                     SET 0184
C  PB(L) =BOOLEAN PROFILES                                              SET 0185
C  CR(LL)= CHARGES ON SWITCHING LINKS IN VOICE CIRCUITS                 SET 0186
C  COM(I)=CHARGES ON SWITCHING NODES IN LINES                           SET 0187
      READ(10'KEY)III,NHUP,KPR,(JHU(I),I=1,NHUP),(PB(L),L=1,NHUP),NPOINTSET 0188
     1,(CR(LL),LL=1,LLINK),(COM(I),I=1,KAP),PROB                        SET 0189
      DO 1276 JJ=1,LLINK                                                SET 0190
      CCR(JJ)=CR(JJ)                                                    SET 0191
1276   CONTINUE                                                         SET 0192
      KANT=III                                                          SET 0193
       DO 1273 I=1,KONT                                                 SET 0194
      IF(CCR(DAVE(I,4)).EQ.0) GO TO 1273                                SET 0195
      IK=DAVE(I,1)                                                      SET 0196
      IKK=DAVE(I,2)                                                     SET 0197
       ICC=IC(III,KPR)                                                  SET 0198
      ICD=IC(IK,IKK)                                                    SET 0199
      WRITE(KI,75) ICC,COLUM(4),ICD,ROWS(1),CCR(DAVE(I,4))              SET 0200
   75 FORMAT(' ',T5,I8,T5,A1,T15,I8,T15,A2,T25,F9.1)                    SET 0201
1273  CONTINUE                                                          SET 0202
      DO 1274 I=1,NSU                                                   SET 0203
      IF(COM(VSU(I)).EQ.0) GO TO 1274                                   SET 0204
      IK=VSU(I)                                                         SET 0205
      ICC=IC(III,KPR)                                                   SET 0206
      ICD=IC(IZ,IK)                                                     SET 0207
      WRITE(KI,76) ICC,COLUM(4),ICD,ROWS(6),COM(VSU(I))                 SET 0208
1274   CONTINUE                                                         SET 0209
   76 FORMAT(' ',T5,I8,T5,A1,T15,I8,T15,A2,T25,F9.1)                    SET 0210
C  INSERT CONSTRAINTS FOR ORDER OF PROFILES                             SET 0211
C  BOUNDS IN CHARGE  COLUMS                                             SET 0212
      IN=1                                                              SET 0213
      IF(NPOINT.EQ.9999) IN=3                                           SET 0214
       ICC=IC(III,KPR)                                                  SET 0215
       WRITE(KB,77) BOUNDS(IN),ICC,COLUM(4), BA(1)                      SET 0216
   77 FORMAT(' ',T1,A6,T15,I8,T15,A1,T25,F9.1)                          SET 0217
      IF(IN.EQ.3) GO TO 199                                             SET 0218
      ICC=IC(III,KPR)                                                   SET 0219
      ICD=IC(IZ,III)                                                    SET 0220
       WRITE(KI,1843)  ICC,COLUM(4),ICD,ROWS(8),BA(1)                   SET 0221
1843  FORMAT(' ',T5,I8,T5,A1,T15,I8,T15,A1,T25,F9.1)                    SET 0222
      IF(KANT.EQ.LANT) GO TO 1999                                       SET 0223
      LANT=KANT                                                         SET 0224
      ICC=IC(IZ,III)                                                    SET 0225
       WRITE(KH,1876) RHS,ICC,ROWS(8),BA(1)                             SET 0226
1876   FORMAT(' ',T5,A4,T15,I8,T15,A1,T25,F9.1)                        SET 0227
       ICC=IC(IZ,III)                                                   SET 0228
      WRITE(KR,1877) CONST(8),ICC,ROWS(8)                               SET 0229
 1877 FORMAT(' ',T2,A1,T5,I8,T5,A1)                                     SET 0230
1999   CONTINUE                                                         SET 0231
      IF(IFIN(KEY).EQ.0) GO TO 199                                      SET 0232
```

```
      ICP=IDEBU(KEY)                                                    SET 0233
      ICQ=IFIN(KEY)                                                     SET 0234
      READ(14'KEY)(ICL(JQ),JQ=1,ICQ)                                   SET 0235
      ICC=IC(III,KPR)                                                   SET 0236
      DO 2999 KS=ICP,ICQ                                                SET 0237
      IF(ICL(KS).EQ.0) GO TO 2999                                       SET 0238
      ZP=ICL(KS)                                                        SET 0239
      ICD=IC(IZ,KS)                                                     SET 0240
      WRITE(KI,1843) ICC,COLUM(4),ICD,ROWS(9),ZP                        SET 0241
 2999  CONTINUE                                                         SET 0242
  199 CONTINUE                                                          SET 0243
      IF (LTRAN.EQ.0) GO TO 2121                                        SET 0244
      DO 3999 KS=1,LTRAN                                                SET 0245
      ICC=IC(IZ,KS)                                                     SET 0246
      WRITE(KR,1877) CONST(1),ICC,ROWS(9)                               SET 0247
 3999 CONTINUE                                                          SET 0248
 2121 DO 1275 I=1,NSU                                                   SET 0249
      IK=VSU(I)                                                         SET 0250
      ICC=IC(IZ,IK)                                                     SET 0251
       WRITE(KR,79) CONST(6),ICC,ROWS(6)                                SET 0252
 1275  CONTINUE                                                         SET 0253
   79 FORMAT(' ',T2,A1,T5,I8,T5,A2)                                     SET 0254
  200 KON=5                                                             SET 0255
  999 JJ=KL                                                             SET 0256
      DO 400 I=1,JJ                                                     SET 0257
      IF(KON.NE.5)GO TO 487                                             SET 0258
      IF(JAR(I,3).EQ.6) GO TO 400                                       SET 0259
      IF(JAR(I,17).EQ.0)GO TO 400                                       SET 0260
      GO TO 401                                                         SET 0261
 487   DO 488 IP=1,NSU                                                 SET 0262
      IF(JAR(I,1).EQ.VSU(IP)) GO TO 401                                 SET 0263
 488    CONTINUE                                                       SET 0264
      GO TO 400                                                         SET 0265
  401 NA=4                                                              SET 0266
      NO=0                                                              SET 0267
      DO 405 IT=1,10                                                    SET 0268
      TYPE(IT)=0                                                        SET 0269
      COST(IT)=0                                                        SET 0270
      BOUND(IT)=0                                                       SET 0271
      SAST(1,IT)=0                                                      SET 0272
      SAST(2,IT)=0                                                      SET 0273
  405 CONTINUE                                                          SET 0274
      KK=0                                                              SET 0275
      IPIP=1                                                            SET 0276
  450 NA=NA+2                                                           SET 0277
      JIM=1                                                             SET 0278
       KK=JAR(I,NA)+KK                                                  SET 0279
          DO 402 J=IPIP,KK                                              SET 0280
      IF (JAC(I,J).EQ.JAC(I,J+1))GO TO 403                              SET 0281
      NO=NO+1                                                           SET 0282
      TYPE(NO)=-JAR(I,NA+1)                                             SET 0283
      BOUND(NO)=JIM                                                     SET 0284
      COST(NO)=JAC(I,J)                                                 SET 0285
      JIM=1                                                             SET 0286
      GO TO 402                                                         SET 0287
  403 JIM=JIM+1                                                         SET 0288
  402 CONTINUE                                                          SET 0289
      IPIP=IPIP+JAR(I,NA)                                               SET 0290
```

```
      SUM=0                                                                    SET 0291
      DO 404 IM=1,NO                                                           SET 0292
      SUM=SUM+BOUND(IM)                                                        SET 0293
  404 CONTINUE                                                                 SET 0294
      IF(KON.NE.5) GO TO 449                                                   SET 0295
      IF((JAR(I,17).GT.SUM).AND.(JAR(I,14).GE.JAR(I,17)))GO TO 450             SET 0296
      IF(KON.EQ.5)GO TO 448                                                    SET 0297
  449  IF((JAR(I,17).GT.SUM).AND.(SUM.LT.JAR(I,14))) GO TO 450                 SET 0298
  448 IF(NO.EQ.1) GO TO 447                                                    SET 0299
      SAST(1,1)=BOUND(2)                                                       SET 0300
      DO 406 IT=2,NO                                                           SET 0301
      SAST(1,IT)=-BOUND(IT-1)                                                  SET 0302
  406 SAST(2,IT)=BOUND(IT+1)                                                   SET 0303
  447 CONTINUE                                                                 SET 0304
      NB=1                                                                     SET 0305
      DO 452 N=1,NO                                                            SET 0306
      NN=1                                                                     SET 0307
      IF(N.GT.1) NN=2                                                          SET 0308
      IF(N.EQ.NO) NN=1                                                         SET 0309
      KX=6                                                                     SET 0310
      IF(KON.EQ.5)KX=4                                                         SET 0311
       ICC=IC(N,I)                                                             SET 0312
      ICD=IC(IZ,I)                                                             SET 0313
      IF(KON.EQ.6) ICD=IC(IZ,JSU(I))                                           SET 0314
      IF(KON.EQ.6) ICC=IC(N,JSU(I))                                            SET 0315
      WRITE(KI,451) ICC,COLUM(KON),ICD,ROWS(KX),TYPE(N)                        SET 0316
  451 FORMAT(' ',T5,I8,T5,A1,T15,I8,T15,A2,T25,F9.1)                           SET 0317
      ICC=IC(N,I)                                                              SET 0318
      IF(KON.EQ.6) ICC=IC(N,JSU(I))                                            SET 0319
      WRITE(KI,456) ICC,COLUM(KON),COS,COST(N)                                 SET 0320
  456 FORMAT(' ',T5,I8,T5,A1,T15,A8,T25,F9.1)                                  SET 0321
       ICC=IC(N,I)                                                             SET 0322
      IF(KON.EQ.6) ICC=IC(N,JSU(I))                                            SET 0323
      WRITE(K8,453) BOUNDS(1),ICC,COLUM(KON),BOUND(N)                          SET 0324
  453 FORMAT(' ',T1,A8,T15,I8,T15,A1,T25,F9.1)                                 SET 0325
      IF(NO.EQ.1) GO TO 400                                                    SET 0326
      DO 454 NI=1,NN                                                           SET 0327
       IF(NI.EQ.2) NB=NB+1                                                     SET 0328
       ICC=IC(N,I)                                                             SET 0329
      ICD=IC(NB,I)                                                             SET 0330
      IF(KON.EQ.6) ICD=IC(NB,JSU(I))                                           SET 0331
      IF(KON.EQ.6) ICC=IC(N,JSU(I))                                            SET 0332
      WRITE(KI,455) ICC,COLUM(KON),ICD,ROWS(KX+1),SAST(NI,N)                   SET 0333
  455 FORMAT(' ',T5,I8,T5,A1,T15,I8,T15,A1,T25,F9.1)                           SET 0334
  454 CONTINUE                                                                 SET 0335
      IF(N.EQ.NO) GO TO 452                                                    SET 0336
       ICC=IC(NB,I)                                                            SET 0337
      IF(KON.EQ.6) ICC=IC(NB,JSU(I))                                           SET 0338
       WRITE(KR,457) CONST(2),ICC,ROWS(KX+1)                                   SET 0339
  457 FORMAT(' ',T2,A1,T5,I8,T5,A1)                                            SET 0340
  452 CONTINUE                                                                 SET 0341
  400 CONTINUE                                                                 SET 0342
      IF(IPROG.EQ.1)GO TO 500                                                  SET 0343
      IPROG=1                                                                  SET 0344
      KL=KZ                                                                    SET 0345
      KON=6                                                                    SET 0346
      DO 501 I=1,KZ                                                            SET 0347
      DO 501 J=1,17                                                            SET 0348
```

```
      JAR(I,J)=JARR(I,J)                                                SET 0349
      JAR(I,17)=20                                                      SET 0350
      DO 501  K=1,20                                                    SET 0351
      JAC(I,K)=JACC(I,K)                                                SET 0352
  501 CONTINUE                                                          SET 0353
      GO TO 999                                                         SET 0354
  500 WRITE(KB,600)                                                     SET 0355
600   FORMAT(     'ENDATA')                                             SET 0356
      DO 601 I=15,19                                                    SET 0357
      ENDFILE I                                                         SET 0358
      REWIND  I                                                         SET 0359
  601 CONTINUE                                                          SET 0360
      STOP                                                              SET 0361
      END                                                               SET 0362
/*                                                                      SET 0363
//GO.FT10F001  DD DSN=S373.ABC,DISP=OLD                                 SET 0364
//GO.FT12F001  DD DSN=S373.HIJ,DISP=OLD                                 SET 0365
//GO.FT14F001  DD DSN=S373.ROB,DISP=OLD                                 SET 0366
//GO.FT15F001  DD DSN=S373.ROWS,DISP=OLD                                SET 0367
//GO.FT16F001  DD DSN=S373.COLUMN,DISP=OLD                              SET 0368
//GO.FT17F001  DD DSN=S373.MARKER,DISP=OLD                              SET 0369
//GO.FT18F001  DD DSN=S373.RHS,DISP=OLD                                 SET 0370
//GO.FT19F001  DD DSN=S373.BOUNDS,DISP=OLD                              SET 0371
//GO.FT20F001  DD DSN=S373.DEF,DISP=OLD                                 SET 0372
//GO.FT22F001  DD DSN=S373.JKL,DISP=OLD                                 SET 0373
//GO.FT23F001  DD DSN=S373.MNO,DISP=OLD                                 SET 0374
//GO.FT24F001  DD DSN=S373.PQR,DISP=OLD                                 SET 0375
//GO.FT26F001  DD DSN=S373.XYZ,DISP=OLD                                 SET 0376
//GO.FT27F001  DD DSN=S373.BCD,DISP=OLD                                 SET 0377
//GO.FT28F001  DD DSN=S373.EFG,DISP=OLD                                 SET 0378
//GO.FT29F001  DD DSN=S373.MIC,DISP=OLD                                 SET 0379
//GO.FT30F001  DD DSN=S373.JAR,DISP=OLD                                 SET 0380
/*                                                                      SET 0381
//                                                                      SET 0382
```

```
//HERMES3  JOB (3600,002,035,1000,0000,30,,1),'GELLER  '                MP1 0001
//*PASSWORD=HERMES                                                      MP1 0002
// EXEC SETUP                                                           MP1 0003
//SETUP.SYSIN DD *                                                      MP1 0004
T9=BABA(RI,NL,C-20 )                                                    MP1 0005
//MPS       EXEC MPSX                                                   MP1 0006
//COMP.SYSIN DD *                                                       MP1 0007
          PROGRAM                                                       MP1 0008
          INITIALZ                                                      MP1 0009
          XPROC=9000                                                    MP1 0010
          MOVE(XDATA,'TRANCHE')                                         MP1 0011
          MOVE(XPBNAME,'PROB')                                          MP1 0012
          CONVERT                                                       MP1 0013
          SETUP('BOUND','BND1')                                         MP1 0014
          MOVE(XOBJ,'COST1')                                            MP1 0015
          MOVE(XRHS,'RHS1')                                             MP1 0016
          OPTIMIZE                                                      MP1 0017
          SOLUTION                                                      MP1 0018
          SAVE('NAME','OPTC')                                           MP1 0019
          INIMIX                                                        MP1 0020
          MIXSTART('COST')                                              MP1 0021
          XMXDROP=9900000.                                              MP1 0022
          XDELTM=4                                                      MP1 0023
          CT=0                                                          MP1 0024
          MVADR(XOOPRINT,INT)                                           MP1 0025
          MVADR(XDODELTM,STOP)                                          MP1 0026
          MIXFLOW                                                       MP1 0027
STOP      MIXSAVE('NAME','TREE1')                                       MP1 0028
          MIXSTATS                                                      MP1 0029
          EXIT                                                          MP1 0030
INT       SOLUTION                                                      MP1 0031
          CT=CT+1                                                       MP1 0032
          IF(CT.EQ.1,STOP)                                              MP1 0033
          CONTINUE                                                      MP1 0034
CT        DC(0)                                                         MP1 0035
          PEND                                                          MP1 0036
/*                                                                      MP1 0037
//EXEC.PROBFILE DD UNIT=TAPE9,VOL=SER=BABA,DISP=(OLD,PASS),LABEL=(,NL)  MP1 0038
//EXEC.SYSIN DD DSN=$373.ROWS,DISP=(OLD)                                MP1 0039
//            DD DSN=$373.COLUMN,DISP=(OLD)                             MP1 0040
//            DD DSN=$373.MARKER,DISP=(OLD)                             MP1 0041
//            DD DSN=$373.RHS,DISP=(OLD)                                MP1 0042
//            DD DSN=$373.BOUNDS,DISP=(OLD)                             MP1 0043
/*                                                                      MP1 0044
//                                                                      MP1 0045
```

```
 1  //HERMES3  JOB (3600,002,070,1000,0000,30,,1),'GELLER  '                MP2 0001
 2  //*PASSWORD=HERMES                                                      MP2 0002
 3  // EXEC SETUP                                                           MP2 0003
 4  //SETUP.SYSIN DD *                                                     MP2 0004
 5  T9=BABA(RI,NL,C-20 )                                                    MP2 0005
 6  //MPS       EXEC MPSX                                                  MP2 0006
 7  //COMP.SYSIN DD *                                                      MP2 0007
 8            PROGRAM                                                      MP2 0008
 9            INITIALZ                                                     MP2 0009
10            MOVE(XPBNAME,'PROB')                                         MP2 0010
11            SETUP('BOUND','BND1')                                        MP2 0011
12            INIMIX                                                       MP2 0012
13            MIXSTART('RESTORE','NAME','TREE1')                           MP2 0013
14            XMXDROP=9238119,                                             MP2 0014
15            XDELTM=12                                                    MP2 0015
16            CT=0                                                         MP2 0016
17            MVADR(XDOPRINT,INT)                                          MP2 0017
18            MVADR(XDODELTM,STOP)                                         MP2 0018
19            MIXFLOW                                                      MP2 0019
20  STOP      MIXSAVE('NAME','TREE1')                                      MP2 0020
21            EXIT                                                         MP2 0021
22  INT       SOLUTION                                                     MP2 0022
23            CT=CT+1                                                      MP2 0023
24            IF(CT.EQ.9,STOP)                                             MP2 0024
25            CONTINUE                                                     MP2 0025
26  CT        DC(0)                                                        MP2 0026
27            PEND                                                         MP2 0027
28  /*                                                                     MP2 0028
29  //EXEC.MIXWORK  DD  SPACE=(CYL,4,,CONTIG)                              MP2 0029
30  //EXEC.PROBFILE DD UNIT=TAPE9,VOL=SER=BABA,DISP=(OLD,PASS),LABEL=(,NL)  MP2 0030
31  /*                                                                     MP2 0031
32  //                                                                     MP2 0032
```

```
//RESULTS  JOB (S373,007,005,0100,0000,24,,1),'GELLER  '                  RES 0001
//*PASSWORD=HERMES                                                        RES 0002
//    EXEC   FORTGCLG                                                     RES 0003
//FORT.SYSIN DD *                                                         RES 0004
      REAL  RNSLAC(60)                                                    RES 0005
      INTEGER*2 A(200,2)                                                  RES 0006
      INTEGER*2 JHU(10),PB(10),KL,KZ,NB,NGT,KLON,NORG,NDEST,NT2,JVAD(300RES 0007
     1)                                                                   RES 0008
      INTEGER NODES(30)                                                   RES 0009
      INTEGER MRT(100,22)                                                 RES 0010
      REAL MRS(60,22)                                                     RES 0011
      REAL CR(200),COM(100),CCR(200),CCOM(100)                            RES 0012
      INTEGER NPIN(500),IDPCA(100,3),ITYPE(2),_NSLAC(300,3),NNSLAC(100,4RES 0013
     1),  LINK(300,4),  JAR(300,17),JARR(60,17),JAC(300,20),JACC(60,20)   RES 0014
      REAL*8 XNODNM(300)                                                  RES 0015
      DEFINE FILE 10(2000,200,U,ID25)                                     RES 0016
      DEFINE FILE 12(2500,100,U,ID4)                                      RES 0017
      CALL ZSUPRS                                                         RES 0018
      READ(20,4000) IPROG,LIM23, (XNODNM(I),I=1,LIM23)                    RES 0019
4000  FORMAT(' ',2I6,2X,100A8)                                            RES 0020
      KCOST=0                                                             RES 0021
      IF (IPROG.LE.1) GO TO 17430                                         RES 0022
      NPD=506                                                             RES 0023
      NP=75                                                               RES 0024
      NN=4                                                                RES 0025
      DO 1032 K=1,200                                                     RES 0026
1032    CCR(K)=0                                                          RES 0027
      DO 1033 K=1,100                                                     RES 0028
1033  CCOM(K)=0                                                           RES 0029
      READ(5,999) (NPIN(J),J=1,NP)                                        RES 0030
999   FORMAT(25I3)                                                        RES 0031
      READ(5,996) ((NNSLAC(I,J),J=1,2), RNSLAC(I) ,I=1,NN)                RES 0032
 996   FORMAT( 6(I4,I4,F5.1))                                             RES 0033
       READ(1,79245)IPP,(( A (I,J),J=1,2),I=1,IPP)                       RES 0034
79245 FORMAT(27I3)                                                        RES 0035
      READ(23,77) KAP,LLINK                                               RES 0036
77    FORMAT(' ',2I3)                                                     RES 0037
      DO 36 IB=1,LLINK                                                    RES 0038
 36   MRT(IB+1,1)=IB                                                      RES 0039
       DO 38 IB=1,KAP                                                     RES 0040
 38   MRS(IB,1)=IB                                                        RES 0041
      READ(24,4004) KZ,((JARR(I,J),I=1,KZ),J=1,17),((JACC(I,J),I=1,KZ),  RES 0042
     1 J=1,20)                                                            RES 0043
      JO=21                                                               RES 0044
      IJ=1                                                                RES 0045
      N1=0                                                                RES 0046
      I=0                                                                 RES 0047
      N2=NPIN(1)                                                          RES 0048
       IF(N2.NE.1) GO TO 5                                                RES 0049
 1    I=I+1                                                               RES 0050
      N1=NPIN(I)                                                          RES 0051
      N2= NPIN(I+1)                                                       RES 0052
      IF(N2-N1.EQ.1) GO TO 1                                              RES 0053
 5    N3=N1+1                                                             RES 0054
      N4=N2-1                                                             RES 0055
      DO 4 JJ=N3,N4                                                       RES 0056
      IJ=IJ+1                                                             RES 0057
      READ(10'JJ) III,NHUP,KPR,(JHU(IT),IT=1,NHUP),(PB(IT),IT=1,NHUP),    RES 0058
```

```
      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,A8,6X,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), CCOM(I)                                       RES 0113
19     FORMAT(' ',A8,12X,F6.1)                                                RES 0114
18     CONTINUE                                                               RES 0115
       KCOST=0                                                                RES 0116
```

```
117         DO 73 I=1,NN                                                    RES 0117
118         N1=NNSLAC(I,1)                                                  RES 0118
119         N2=NNSLAC(I,2)                                                  RES 0119
120         N3=RNSLAC(I)                                                    RES 0120
121          ICOST=0                                                        RES 0121
122         DO 74 J=1,KAP                                                   RES 0122
123         JP=J                                                            RES 0123
124         IF(N1.EQ.JARR(J,1)) GO TO 80                                    RES 0124
125    74    CONTINUE                                                       RES 0125
126   80    COST=0                                                          RES 0126
127          DO 85 J=1,N2                                                   RES 0127
128    85   ICOST=ICOST+ JACC(JP,J)                                         RES 0128
129         KCOST=KCOST+ICOST                                               RES 0129
130         NNSLAC(I,4)=ICOST                                               RES 0130
131    73    CONTINUE                                                       RES 0131
132         WRITE(6,400)                                                    RES 0132
133    400  FORMAT('1' ,1X 'SWITCHING NODE STATISTICS',//,1X,'NODE',10X,'SWITCRES 0133
134        1HING',5X,'COST(S)',5X,'UNUSED',/,15X,'MACHINES',18X,'CAPACITY',/, RES 0134
135        1 15X,'INSTALLED',/)                                             RES 0135
136         DO 500 I=1,KZ                                                   RES 0136
137         WRITE(6,501) XNODNM(JARR( I,1)),NNSLAC(I,2),NNSLAC(I,4),RNSLAC(I) RES 0137
138    501  FORMAT(' ',1X,A8,7X,I2,10X,I7,4X,F6.1)                          RES 0138
139    500   CONTINUE                                                       RES 0139
140         WRITE(6,602) KCOST                                              RES 0140
141    602  FORMAT(' ',30X,'------',/,1X,'TOTAL SWITCHING NODE COSTS',2X,I7) RES 0141
142   17430  CONTINUE                                                       RES 0142
143         LN=28                                                           RES 0143
144         ID=38                                                           RES 0144
145         READ(5,998) (((IDPCA(J,K),K=1,3),J=1,ID)                        RES 0145
146   998   FORMAT(24I3)                                                    RES 0146
147         READ(5,997) (((LNSLAC(J,K),K=1,3),J=1,LN)                       RES 0147
148   997   FORMAT(18I4)                                                    RES 0148
149         READ(25,4005) NB,ITYPE(1),ITYPE(2), KL,((JAR(I,J),I=1,KL),J=1,17),RES 0149
150        1 ((JAC(I,J),I=1,KL),J=1,20)                                     RES 0150
151    4004  FORMAT(' ',I2,2X,(16I5))                                       RES 0151
152    4005  FORMAT(' ',I3,2I7,I3,2X,(16I7))                               RES 0152
153         WRITE(6,50)                                                     RES 0153
154    50   FORMAT('1',25X,'CHAINS AS SELECTED BY MPSX(LINK NO.)',//,1X,'FROM'RES 0154
155        1,10X,'TO',/)                                                    RES 0155
156         IP=0                                                            RES 0156
157         DO 51 I=1,300                                                   RES 0157
158         DO 51 J=1,4                                                     RES 0158
159    51    LINK(I,J)=0                                                    RES 0159
160          DO 40 I=1,ID                                                   RES 0160
161          N1=IDPCA(I,1)                                                  RES 0161
162         N2=IDPCA(I,2)                                                   RES 0162
163         N3=IDPCA(I,3)                                                   RES 0163
164    39   IP=IP+1                                                         RES 0164
165          READ(12'IP) NGT,KLON,NT2,NORG,NDEST,(JVAD(J),J=1,KLON)         RES 0165
166         IF((N1.EQ.NGT).AND.(N2.EQ.NT2)) GO TO 41                        RES 0166
167          GO TO 39                                                       RES 0167
168    41   NODES(1)=NORG                                                   RES 0168
169         NODES(KLON+1)=NDEST                                             RES 0169
170         IF(KLON.EQ.1) GO TO 93157                                       RES 0170
171         JJ=1                                                            RES 0171
172         DO 93156 J=1,KLON                                               RES 0172
173         NODES(JJ+1)= JAR(JVAD(J),1)                                     RES 0173
174          IF(NODES(JJ).EQ.JAR(JVAD(J),1)) NODES(JJ+1)=JAR(JVAD(J),2)     RES 0174
```

```
      JJ=JJ+1                                                                  RES 0175
93156 CONTINUE                                                                 RES 0176
93157 IOI=KLON+1                                                               RES 0177
      WRITE(6,42) XNODNM(NORG),XNODNM(NDEST),(XNOONM(NODES(N)),N=1,IOI)        RES 0178
 42   FORMAT(' ',//,1X,A8,'-',A8,2X,15(A6,'-'),/,20X,15(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($)',4X,'UNUSED',5X,'USED',/,25X,'INSTALLED',17RES 0200
     1X,'CAPACITY',3X,'CAPACITY')                                              RES 0201
       DO 300 I=1,300                                                          RES 0202
       IF(LINK(I,3).EQ.0) GO TO 300                                            RES 0203
       WRITE(6,301) XNODNM(JAR(I,1)),XNODNM(JAR(I,2)),LINK(I,2),LINK(I,3)RES 0204
     1,LINK(I,4),LINK(I,1)                                                     RES 0205
 301    FORMAT(' ',1X,A8,'-',A8,8X,I2,10X,I8,4X,I5,6X,I5)                      RES 0206
 300   CONTINUE                                                                 RES 0207
       WRITE(6,302) JCOST                                                      RES 0208
 302  FORMAT(' ',39X,'--------',/,10X,'TOTAL COST OF TRANSMISSION',4X,I9)RES 0209
       ITCOST=JCOST+KCOST                                                      RES 0210
      WRITE(6,8881)  ITCOST                                                    RES 0211
8881  FORMAT(' ', 'TOTAL COST TRANSMISSION AND SWITCHING ($)',2X,I9)           RES 0212
      STOP                                                                     RES 0213
      END                                                                      RES 0214
//GO.SYSIN DD *                                                                RES 0215
//GO.FT01F001 DD DSN=S373.WIS.DISP=OLD                                         RES 0216
//GO.FT10F001 DD DSN=S373.ABC.DISP=OLD                                         RES 0217
//GO.FT12F001 DD DSN=S373.HIJ.DISP=OLD                                         RES 0218
//GO.FT20F001 DD DSN=S373.DEF.DISP=OLD                                         RES 0219
//GO.FT23F001 DD DSN=S373.MNO.DISP=OLD                                         RES 0220
//GO.FT24F001 DD DSN=S373.PQR.DISP=OLD                                         RES 0221
//GO.FT25F001 DD DSN=S373.VWX.DISP=OLD                                         RES 0222
/*                                                                             RES 0223
//                                                                            RES 0224
```

```
1  //DELETT   JOB (S373,007,010,0100,0000,14,,1),'GELLER  ',MSGLEVEL=(1,1) DEL 0001
2  //*PASSWORD=HERMES                                                      DEL 0002
3  //    EXEC  PGM=IEFBR14                                                 DEL 0003
4  //DD1   DD DSN=S373.STU,DISP=(OLD,DELETE)                               DEL 0004
5  //DD2   DD DSN=S373.WIS,DISP=(OLD,DELETE)                               DEL 0005
6  //DD3   DD DSN=S373.ABC,DISP=(OLD,DELETE)                               DEL 0006
7  //DD4   DD DSN=S373.HIJ,DISP=(OLD,DELETE)                               DEL 0007
8  //DD5   DD DSN=S373.ROB,DISP=(OLD,DELETE)                               DEL 0008
9  //DD6   DD DSN=S373.ROWS,DISP=(OLD,DELETE)                              DEL 0009
10 //DD7   DD DSN=S373.COLUMN,DISP=(OLD,DELETE)                            DEL 0010
11 //DD8   DD DSN=S373.MARKER,DISP=(OLD,DELETE)                            DEL 0011
12 //DD9   DD DSN=S373.RHS,DISP=(OLD,DELETE)                               DEL 0012
13 //DD10  DD DSN=S373.BOUNDS,DISP=(OLD,DELETE)                            DEL 0013
14 //DD11  DD DSN=S373.DEF,DISP=(OLD,DELETE)                               DEL 0014
15 //DD12  DD DSN=S373.GHI,DISP=(OLD,DELETE)                               DEL 0015
16 //DD13  DD DSN=S373.JKL,DISP=(OLD,DELETE)                               DEL 0016
17 //DD14  DD DSN=S373.MNO,DISP=(OLD,DELETE)                               DEL 0017
18 //DD15  DD DSN=S373.PQR,DISP=(OLD,DELETE)                               DEL 0018
19 //DD16  DD DSN=S373.VWX,DISP=(OLD,DELETE)                               DEL 0019
20 //DD17  DD DSN=S373.XYZ,DISP=(OLD,DELETE)                               DEL 0020
21 //DD18  DD DSN=S373.BCD,DISP=(OLD,DELETE)                               DEL 0021
22 //DD19  DD DSN=S373.EFG,DISP=(OLD,DELETE)                               DEL 0022
23 //DD20  DD DSN=S373.MIC,DISP=(OLD,DELETE)                               DEL 0023
24 //DD21  DD DSN=S373.JAR,DISP=(OLD,DELETE)                               DEL 0024
25 /*                                                                       DEL 0025
26 //                                                                      DEL 0026
```

HERMES III USER'S MANUAL