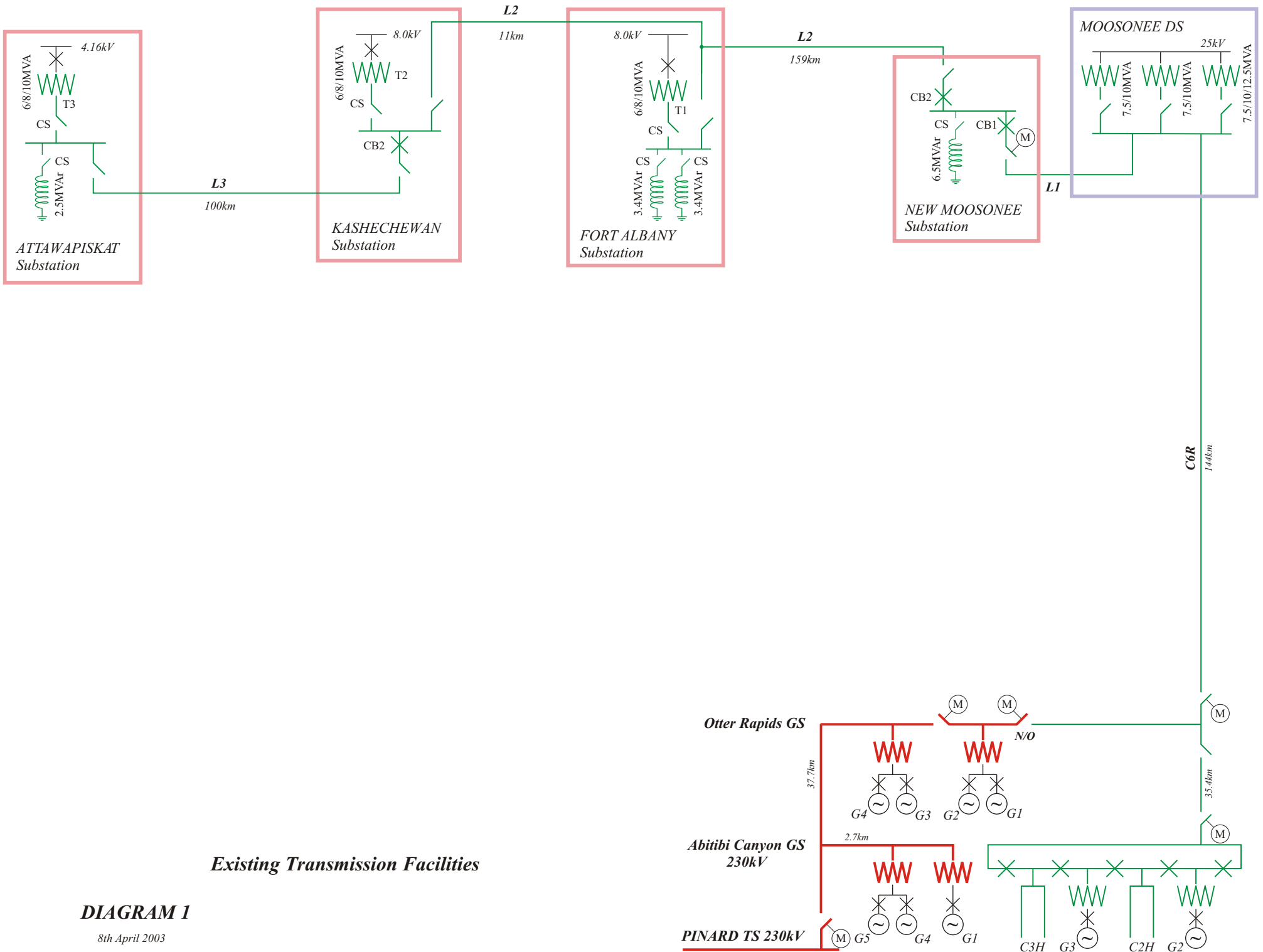


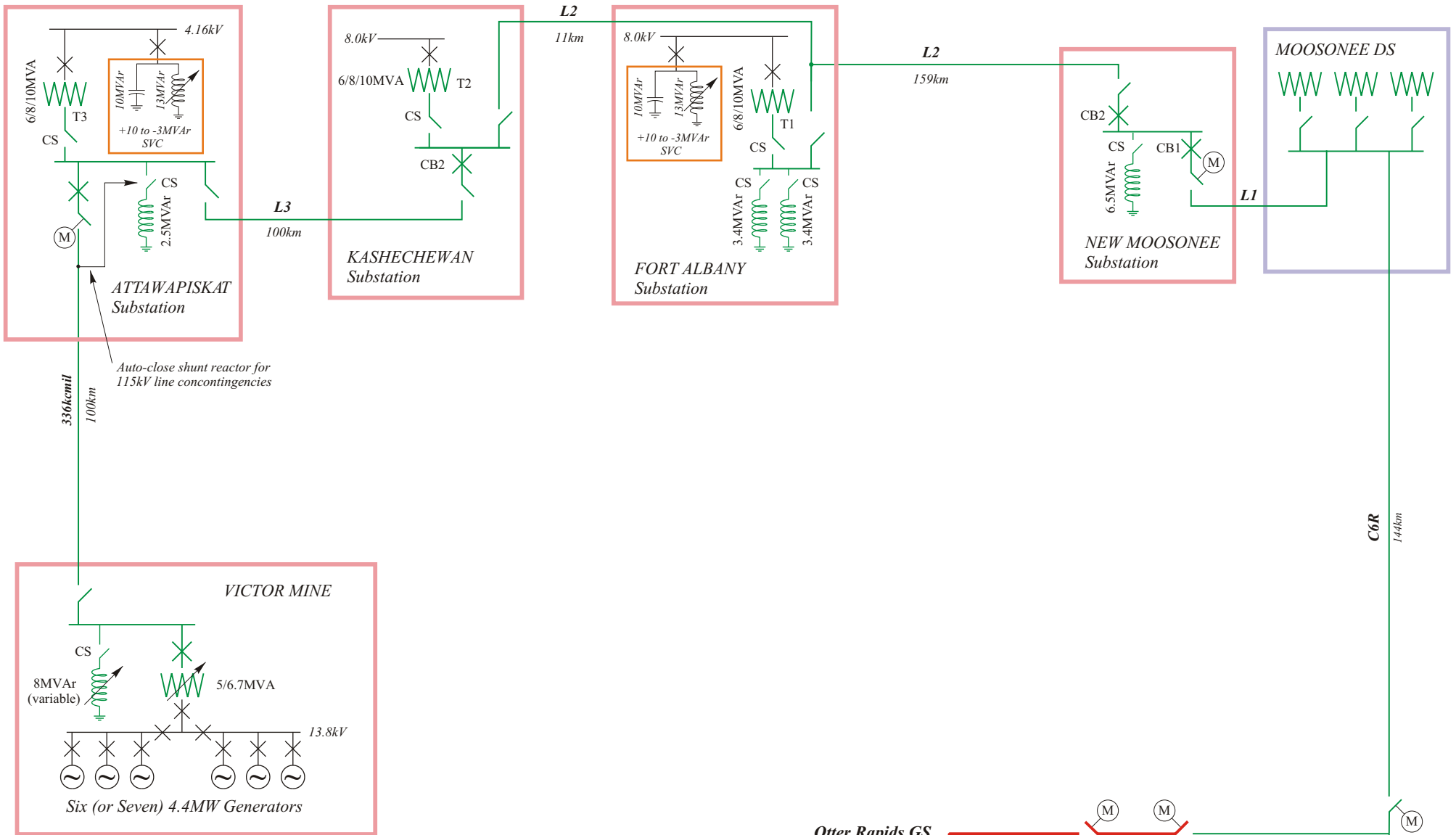
DIAGRAMS



Existing Transmission Facilities

DIAGRAM 1

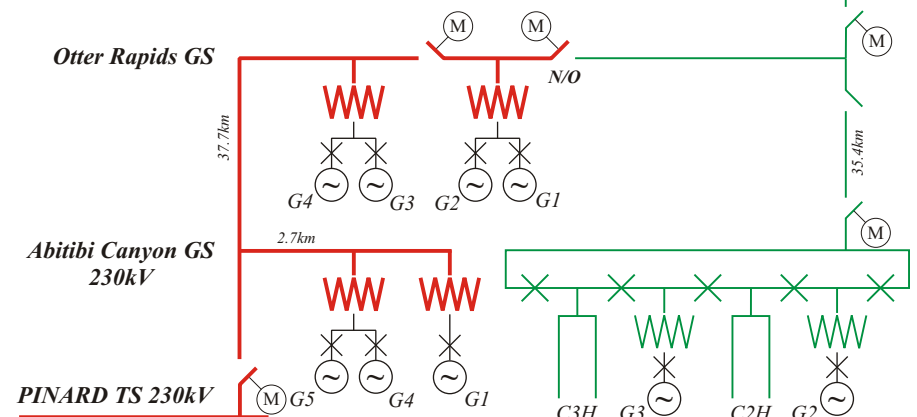
8th April 2003

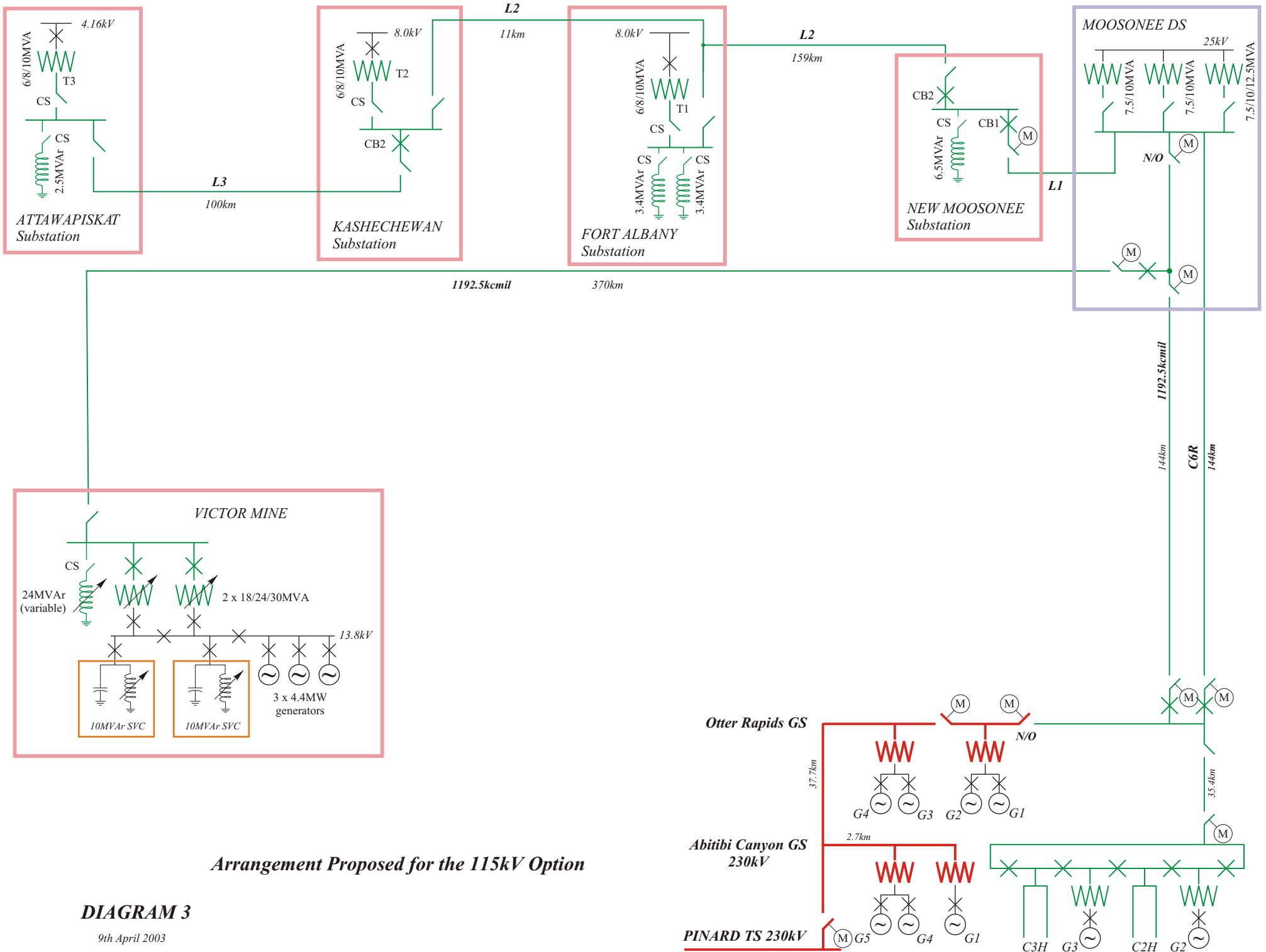


Proposed Arrangement for the Generation Option

DIAGRAM 2

12th April 2003

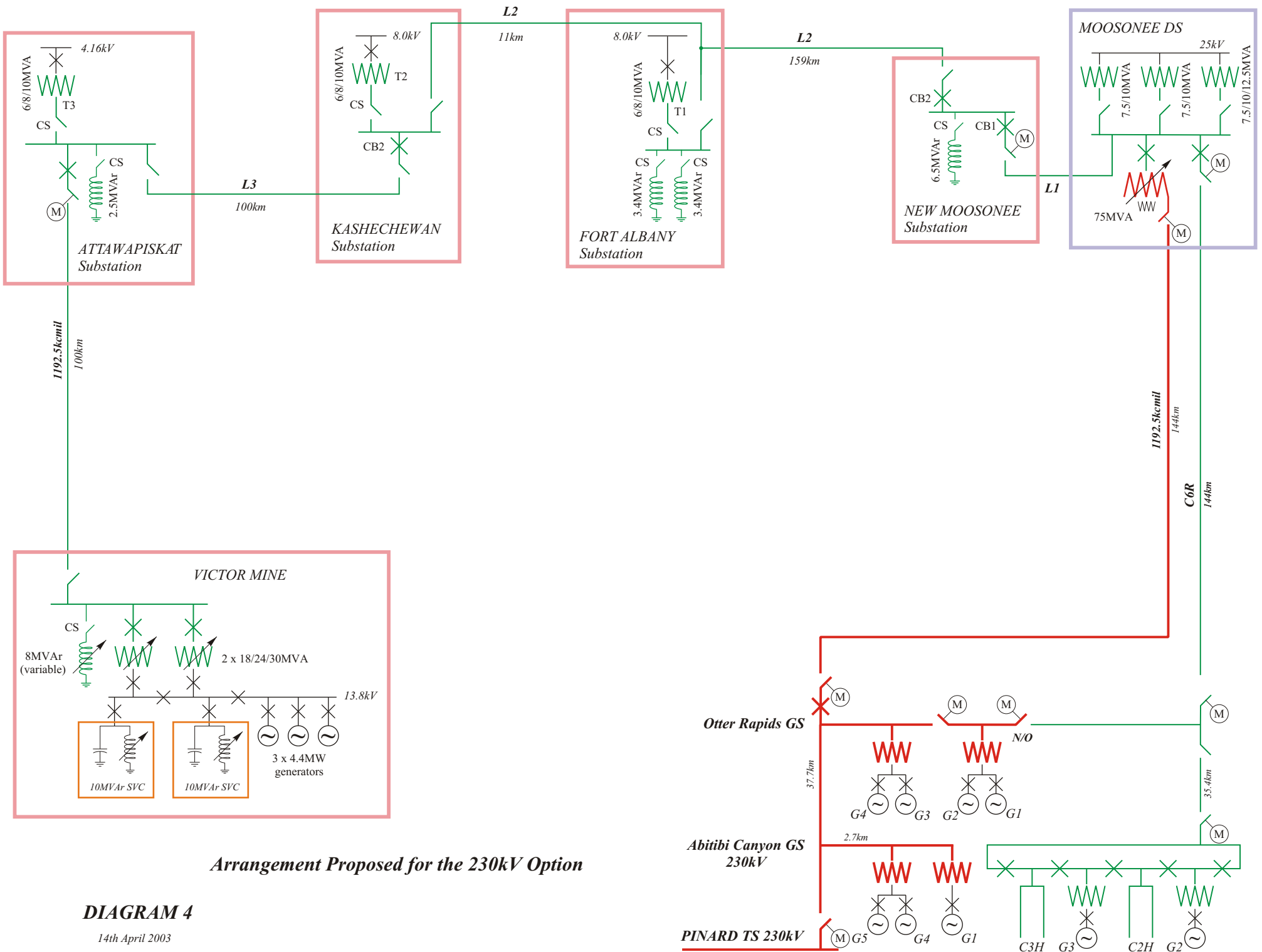




Arrangement Proposed for the 115kV Option

DIAGRAM 3

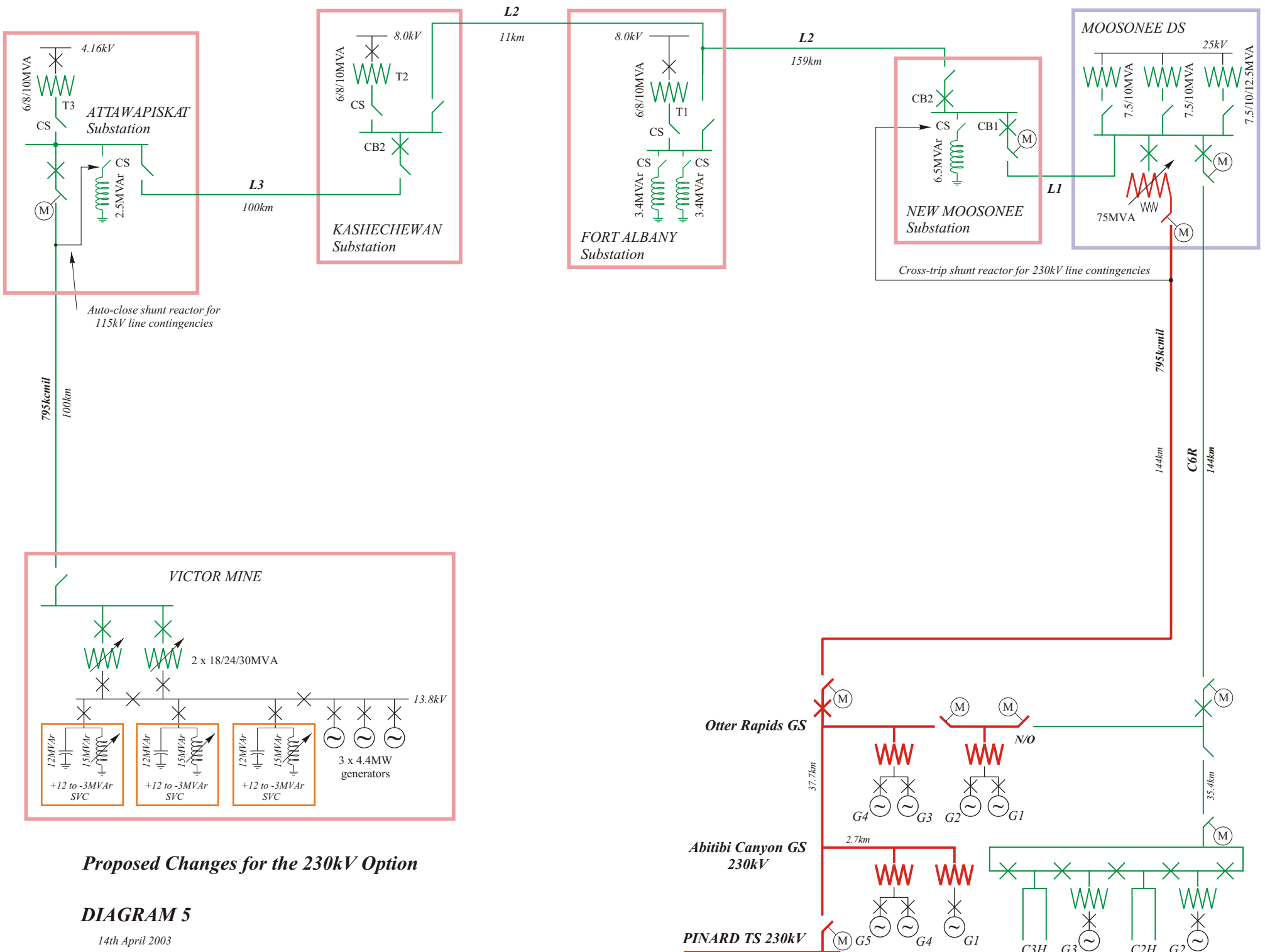
9th April 2003



Arrangement Proposed for the 230kV Option

DIAGRAM 4

14th April 2003



Proposed Changes for the 230kV Option

DIAGRAM 5

14th April 2003

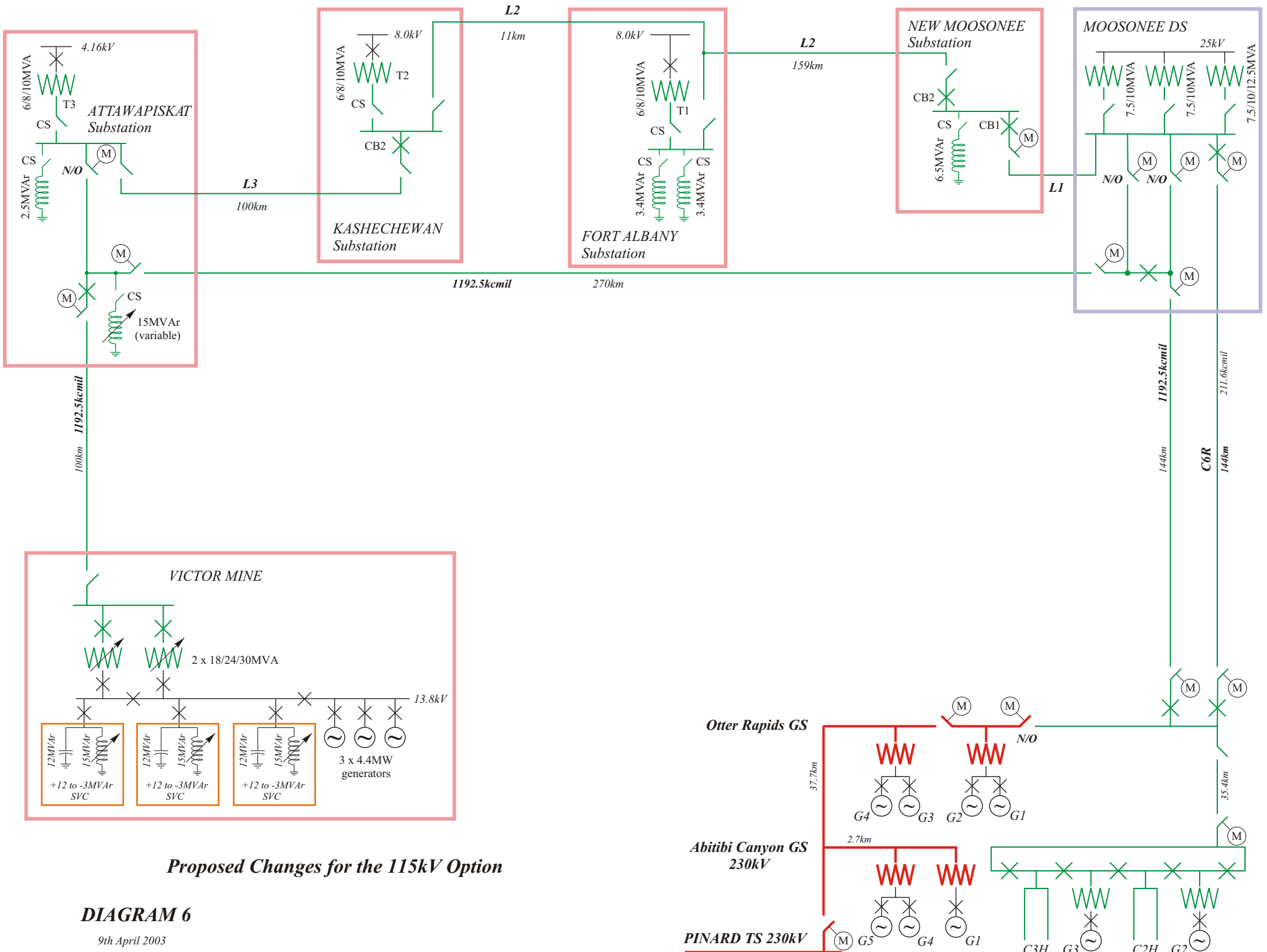
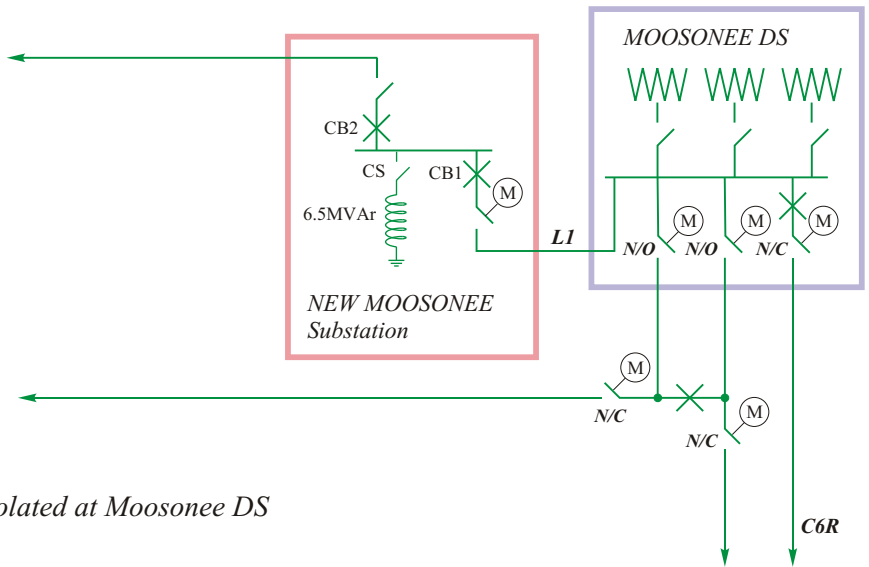


DIAGRAM 6

9th April 2003

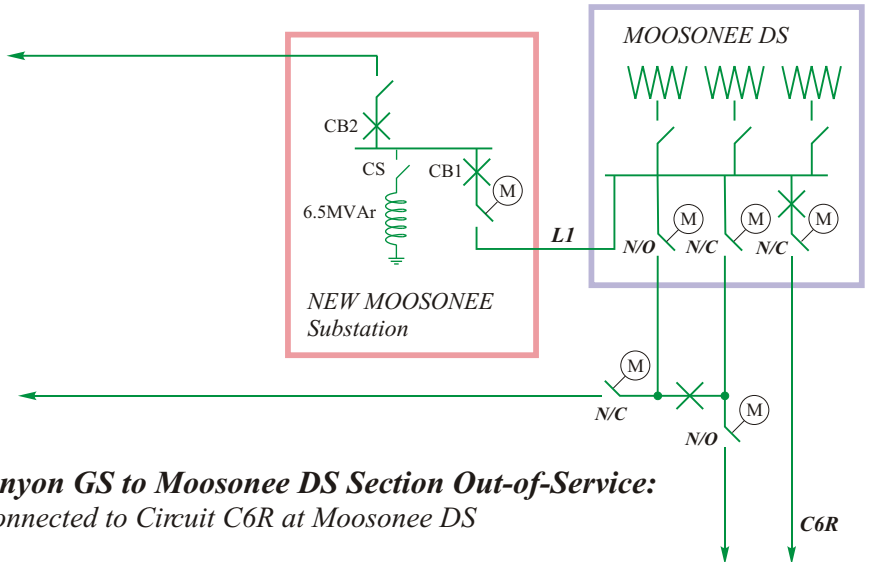
DIAGRAM 7

9th April 2003



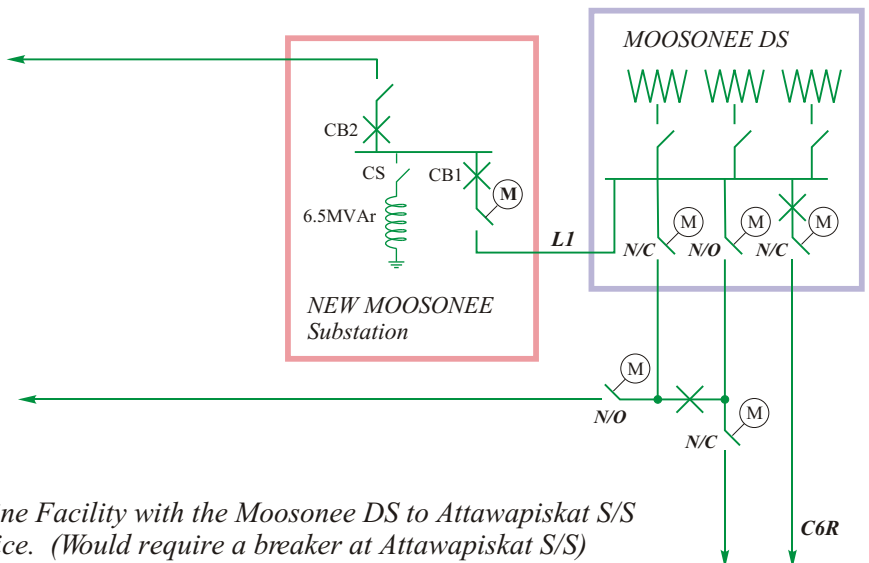
Normal Supply Arrangement:

115kV Line to the Victor Mine Facility Isolated at Moosonee DS



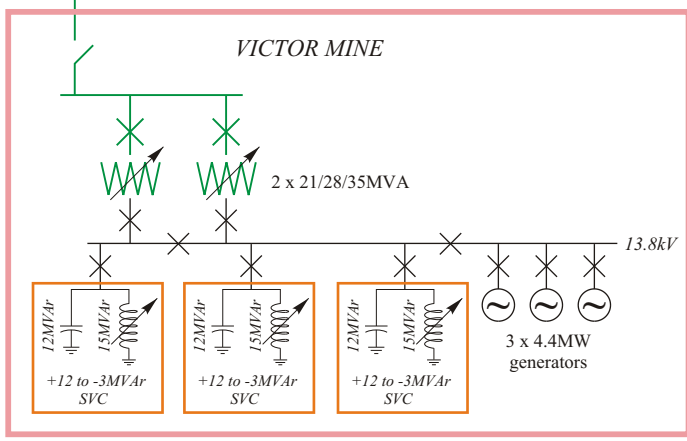
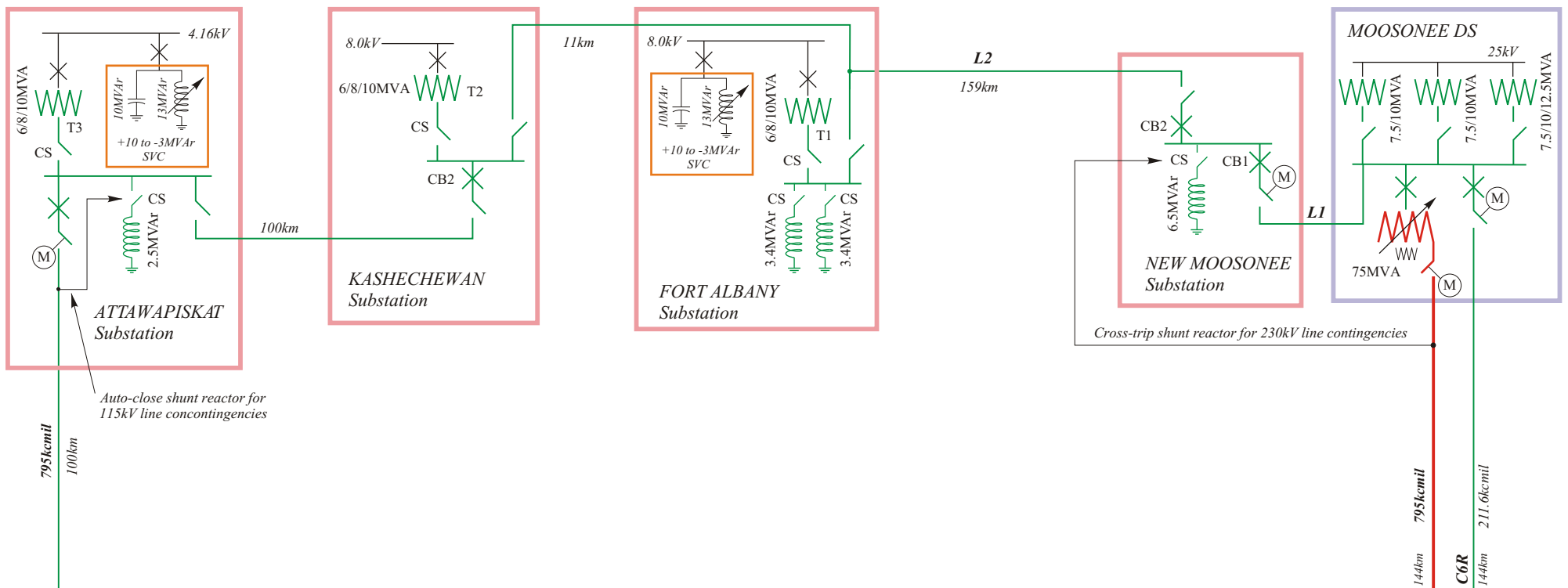
Supply Arrangement With Abitibi Canyon GS to Moosonee DS Section Out-of-Service:

115kV Line to the Victor Mine Facility Connected to Circuit C6R at Moosonee DS



Revised Supply Arrangement:

To allow a limited supply to the Victor Mine Facility with the Moosonee DS to Attawapiskat S/S section of the new 115kV line out-of-service. (Would require a breaker at Attawapiskat S/S)



Changes required to the 230kV Transmission Option to supply the forecast loads at the Five Nations communities in 2020

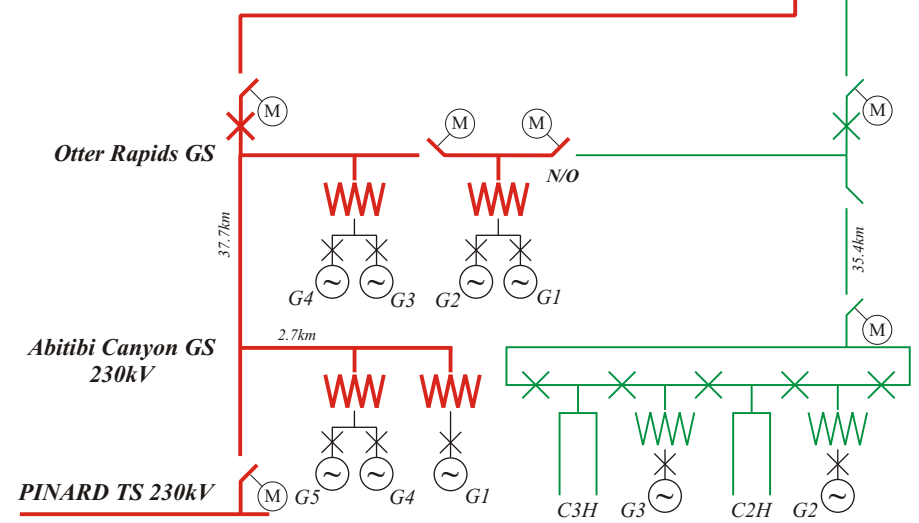
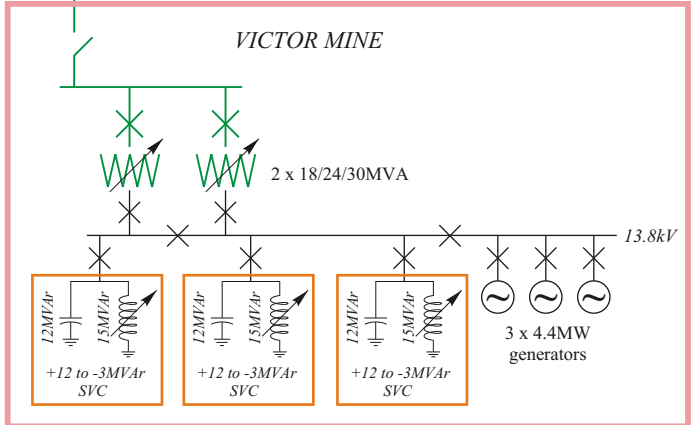
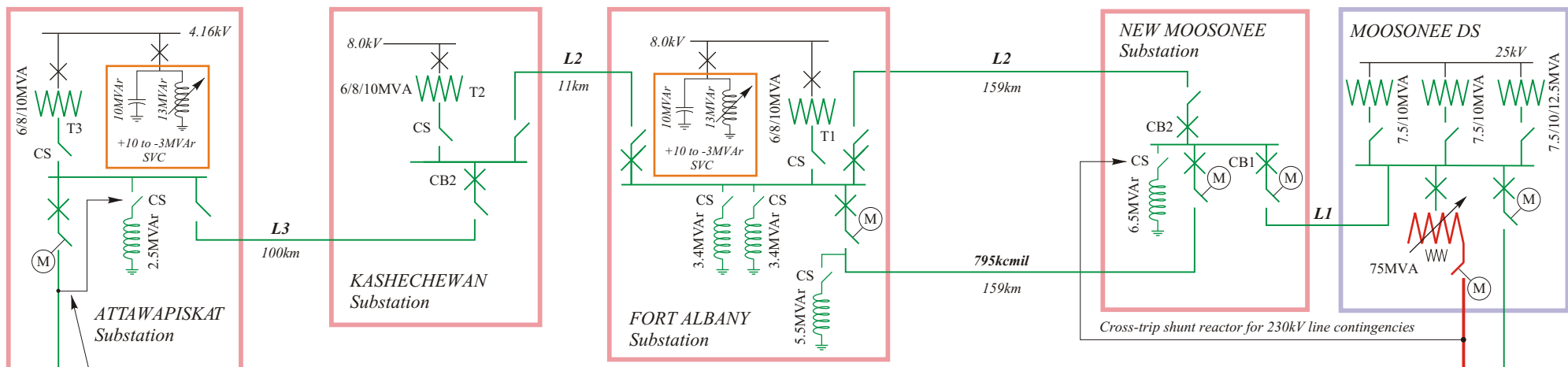


DIAGRAM 8

7th April 2003



Changes required to the 230kV Transmission Option to supply the forecast loads at the Five Nations communities in 2020
 (With an additional 115kV line between Moosonee DS & Fort Albany S/S)

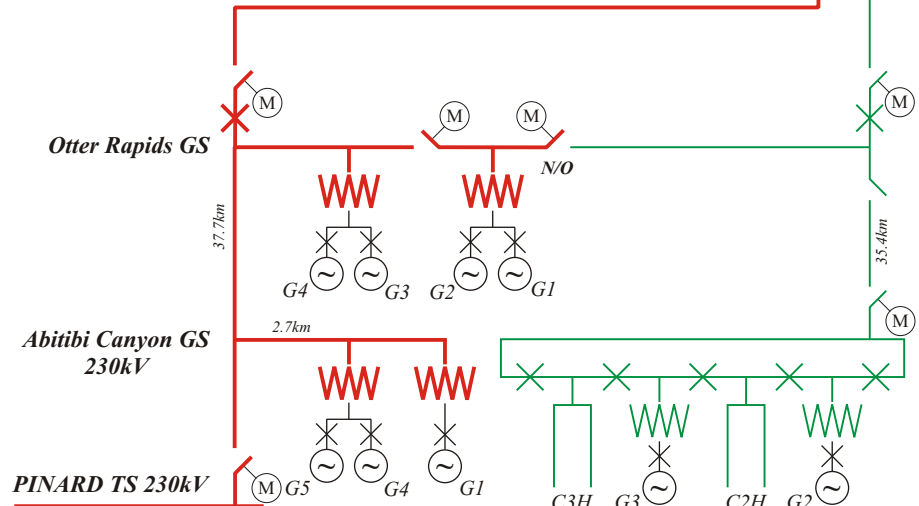
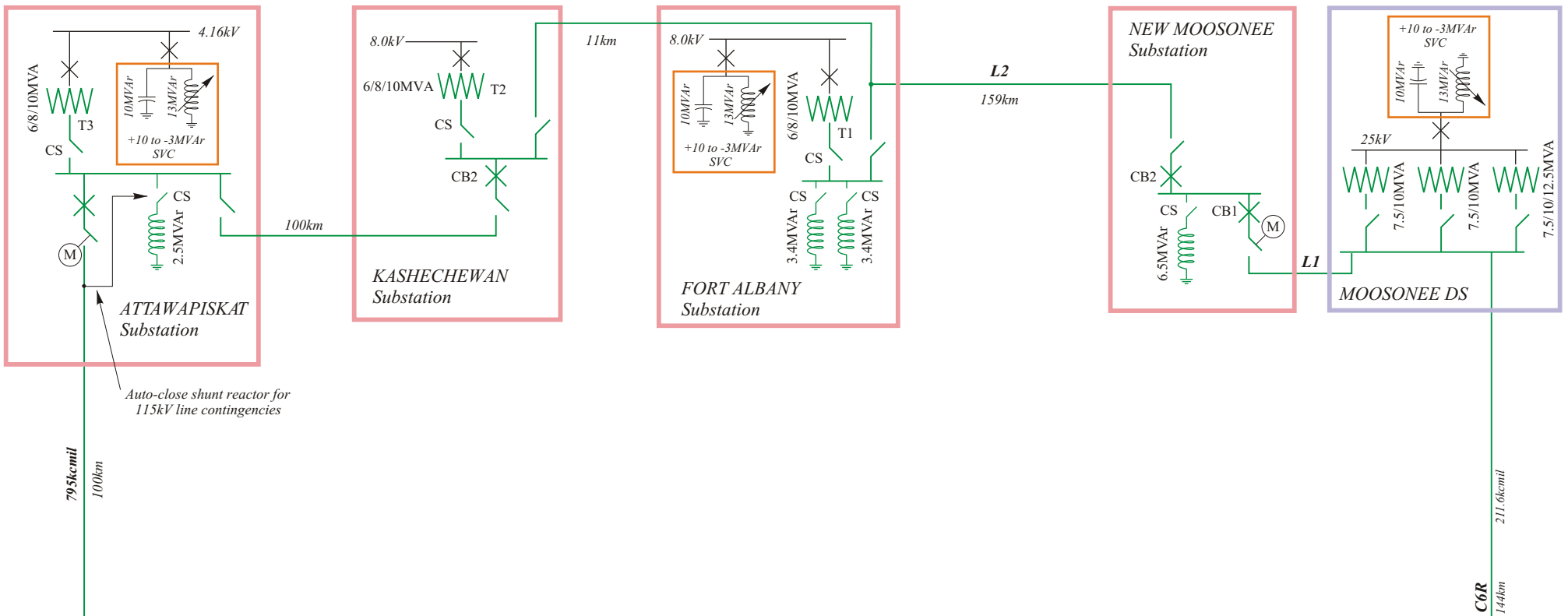


DIAGRAM 9
 14th April 2003



Proposed Enhancement of the Existing Transmission Facilities

(Hybrid Transmission/Generation Option)

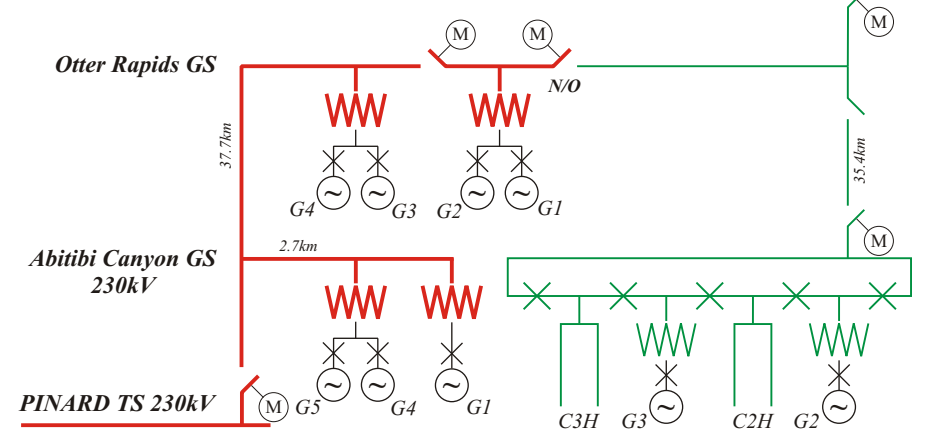
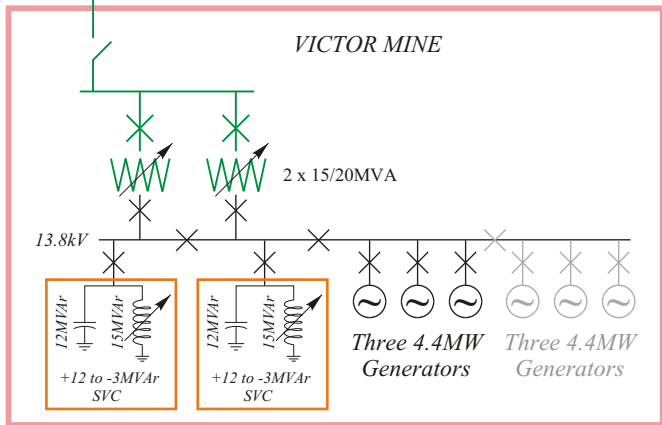
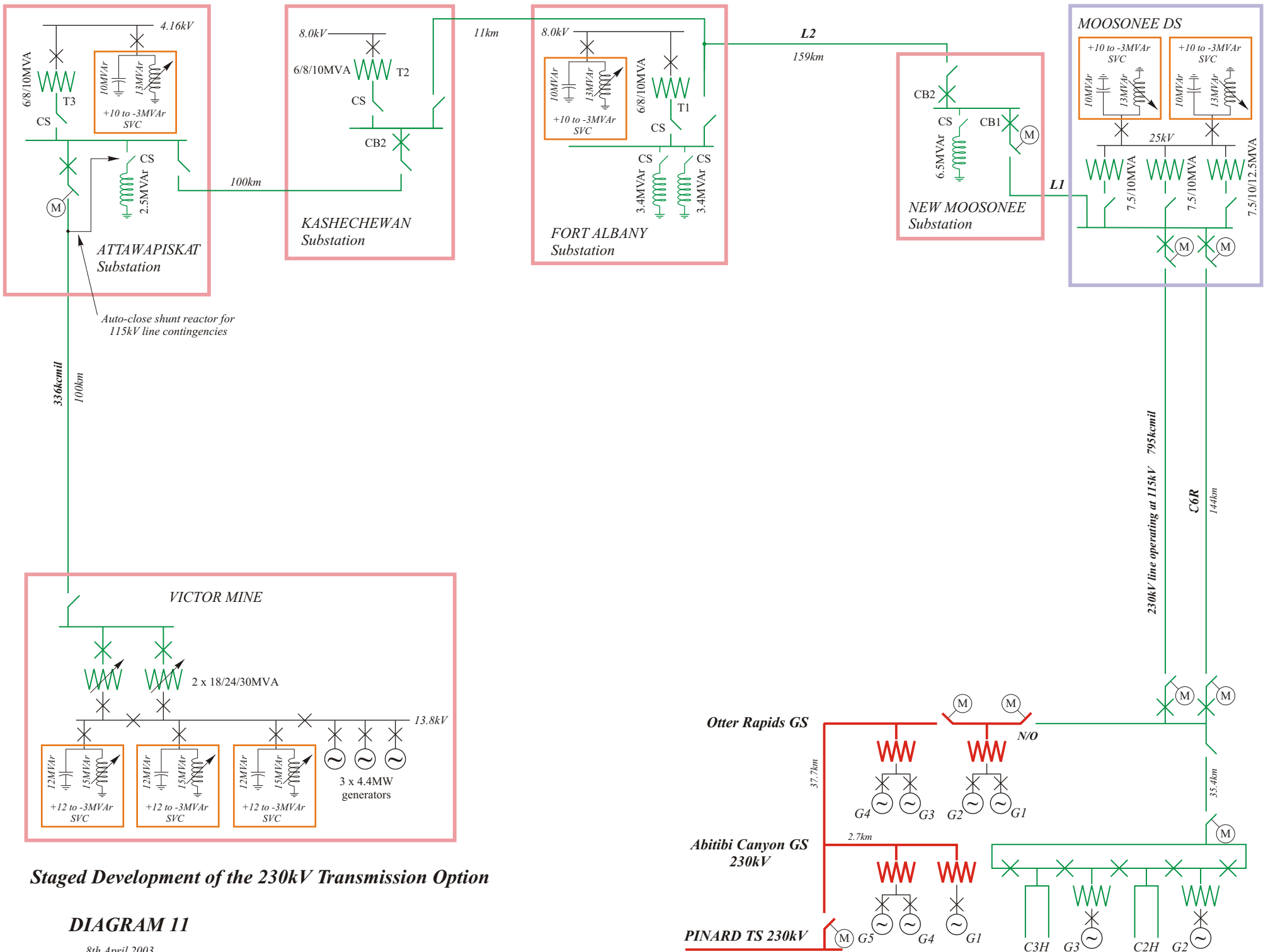


DIAGRAM 10

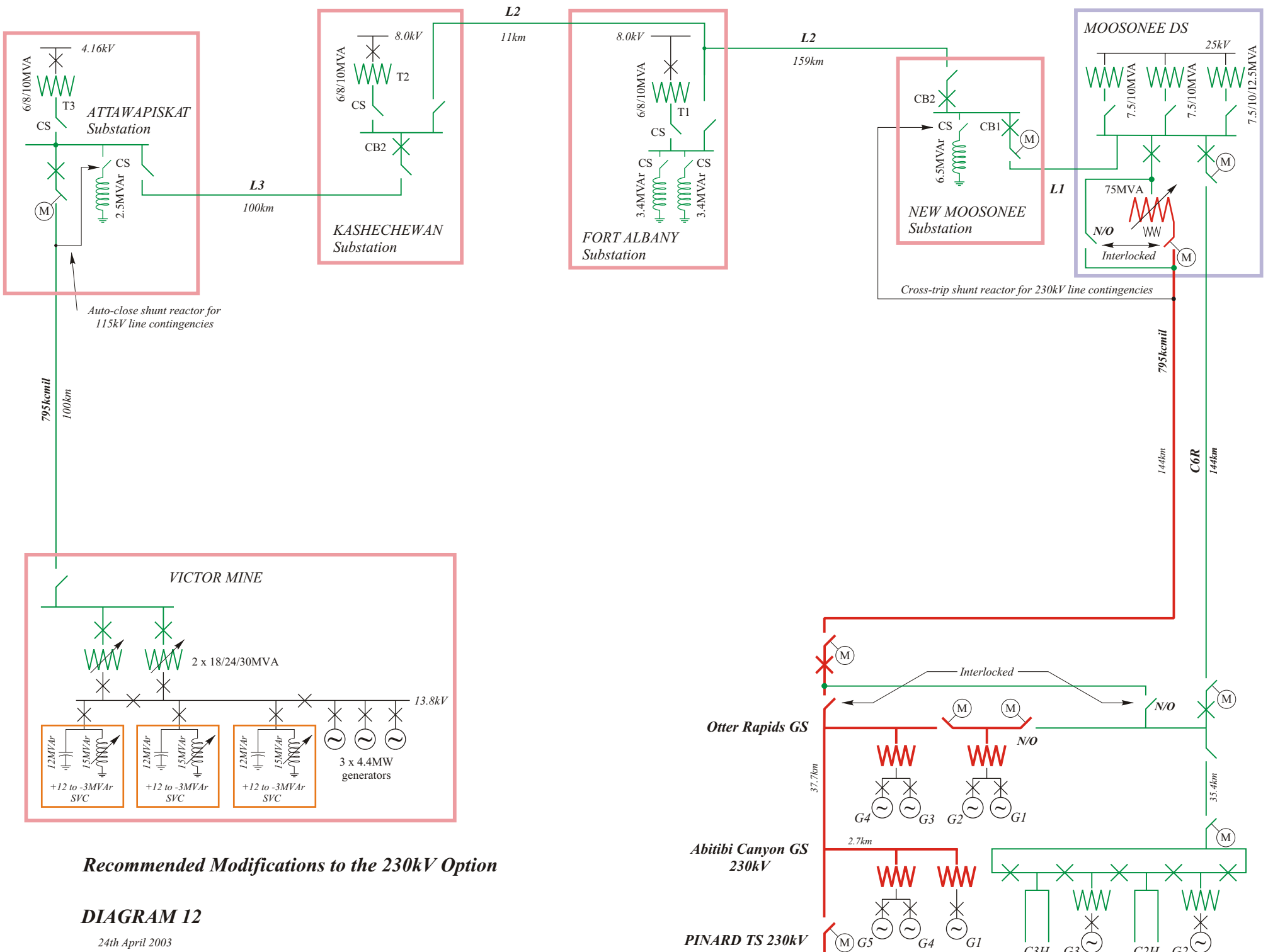
8th April 2003



Staged Development of the 230kV Transmission Option

DIAGRAM 11

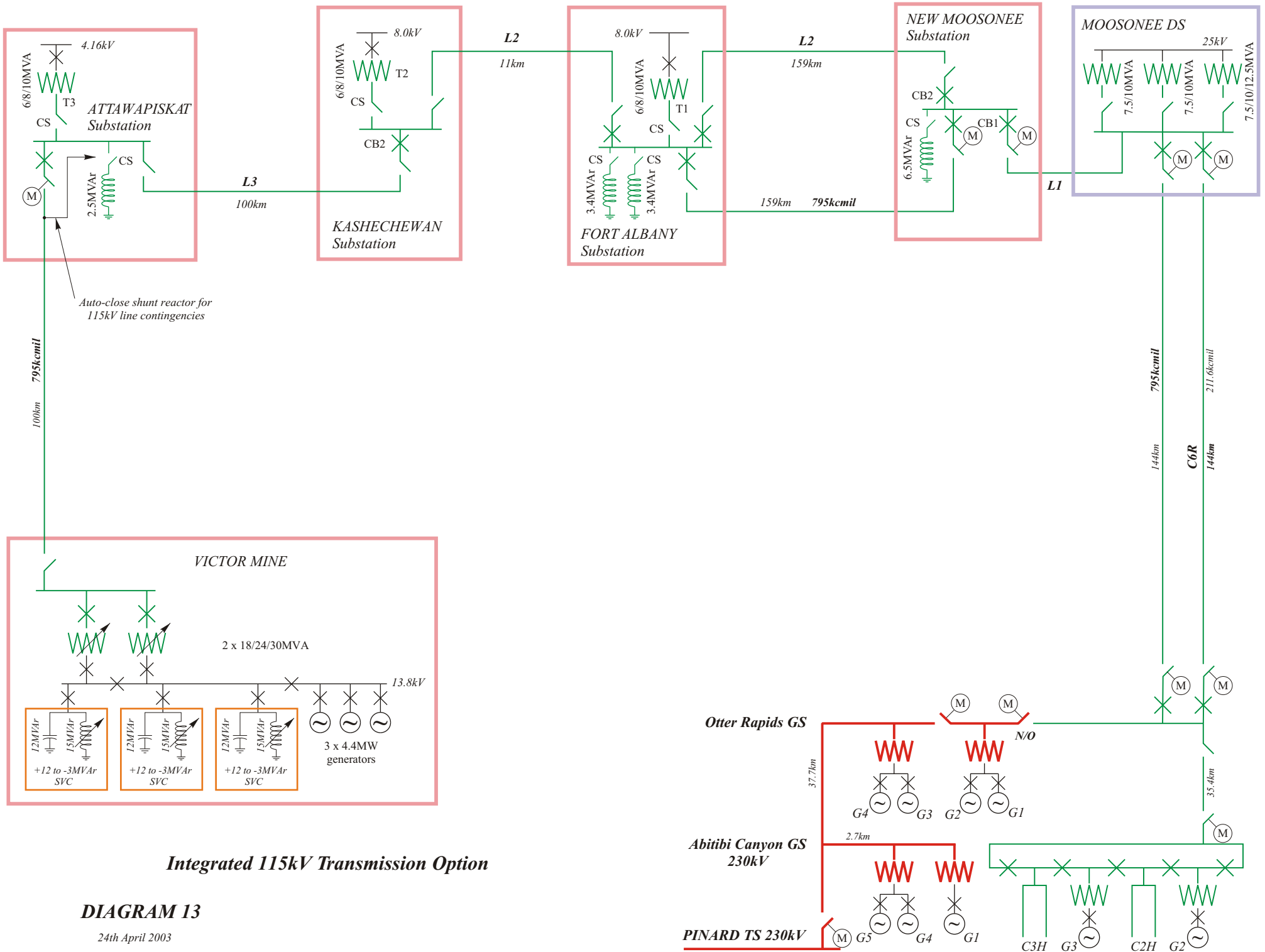
8th April 2003



Recommended Modifications to the 230kV Option

DIAGRAM 12

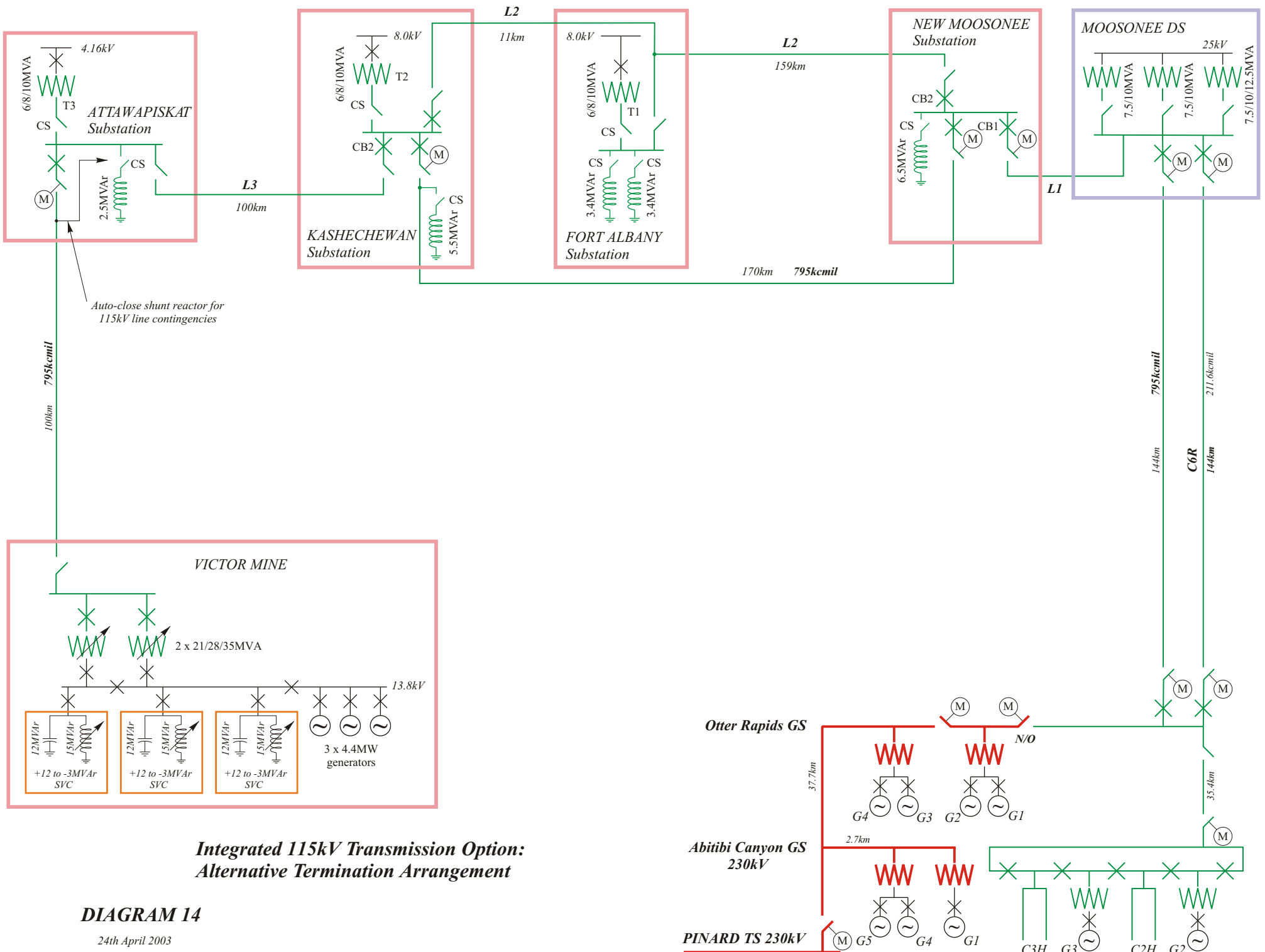
24th April 2003



Integrated 115kV Transmission Option

DIAGRAM 13

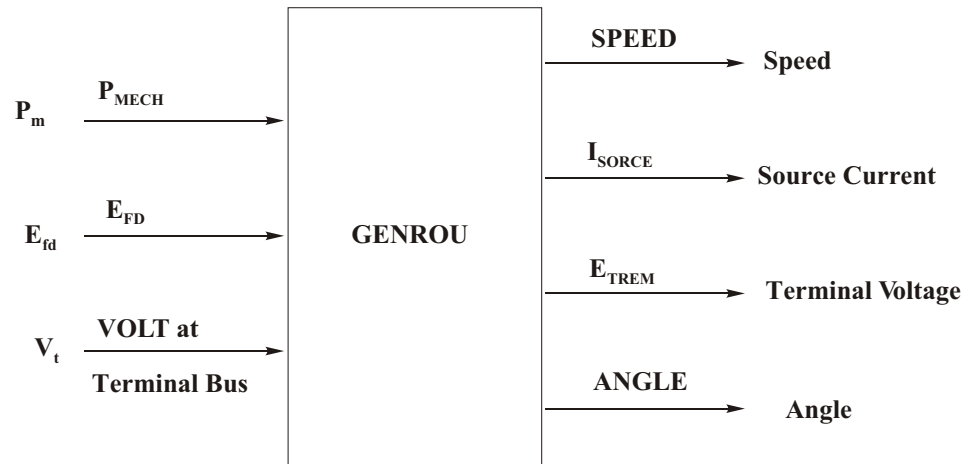
24th April 2003



**Integrated 115kV Transmission Option:
Alternative Termination Arrangement**

DIAGRAM 14

24th April 2003



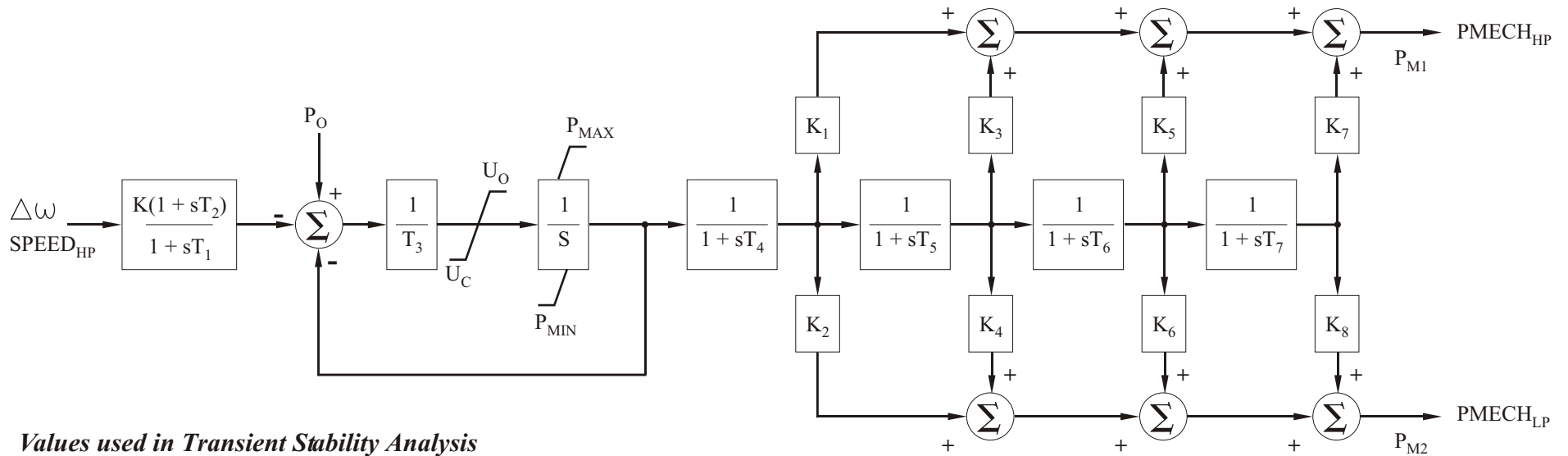
Values used in Transient Stability Analysis

X_d	1.208
X_q	0.704
X'_d	0.241
X'_q	0.704
$X''_d = X''_q$	0.202
X_l	0.01
S(1.0)	0.30
S(1.2)	0.40
T'_{do} (>0) seconds	4.436 sec
T''_{do} (>0) seconds	0.044 sec
T'_{qo} (>0) seconds	1.000 sec
T''_{qo} (>0) seconds	0.022 sec
Inertia H	2
Speed damping D	0.0

GENROU
Round Rotor Generator Model

Data used for modelling the Diesel Generating units

DIAGRAM 15



Values used in Transient Stability Analysis

K	20.00	T ₁	0.00 sec
K ₁	1.00	T ₂	0.00 sec
K ₂	0.00	T ₃	0.10 sec
K ₃	0.00	T ₄	0.50 sec
K ₄	0.00	T ₅	0.00 sec
K ₅	0.00	T ₆	0.00 sec
K ₆	0.00	T ₇	0.00 sec
K ₇	0.00	U _O	0.1
K ₈	0.00	U _C	-0.1
		P _{MAX}	1.00
		P _{MIN}	0.00

IEEEG1 Governor Model

Data used for modelling the Governors on the Diesel Generating Units

~ which therefore reduces to

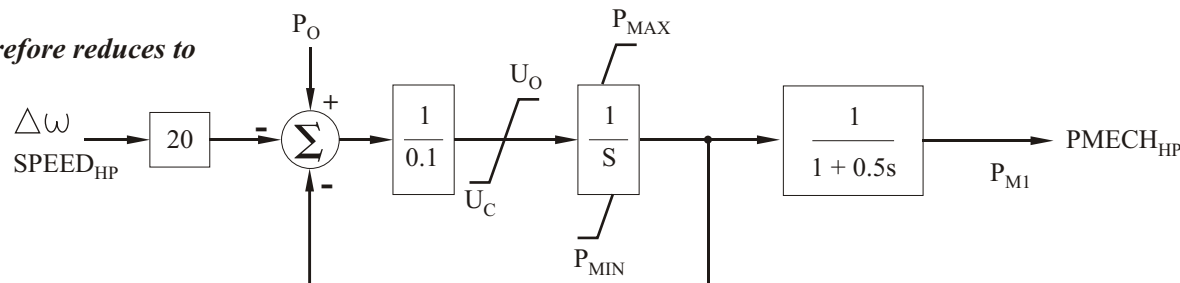
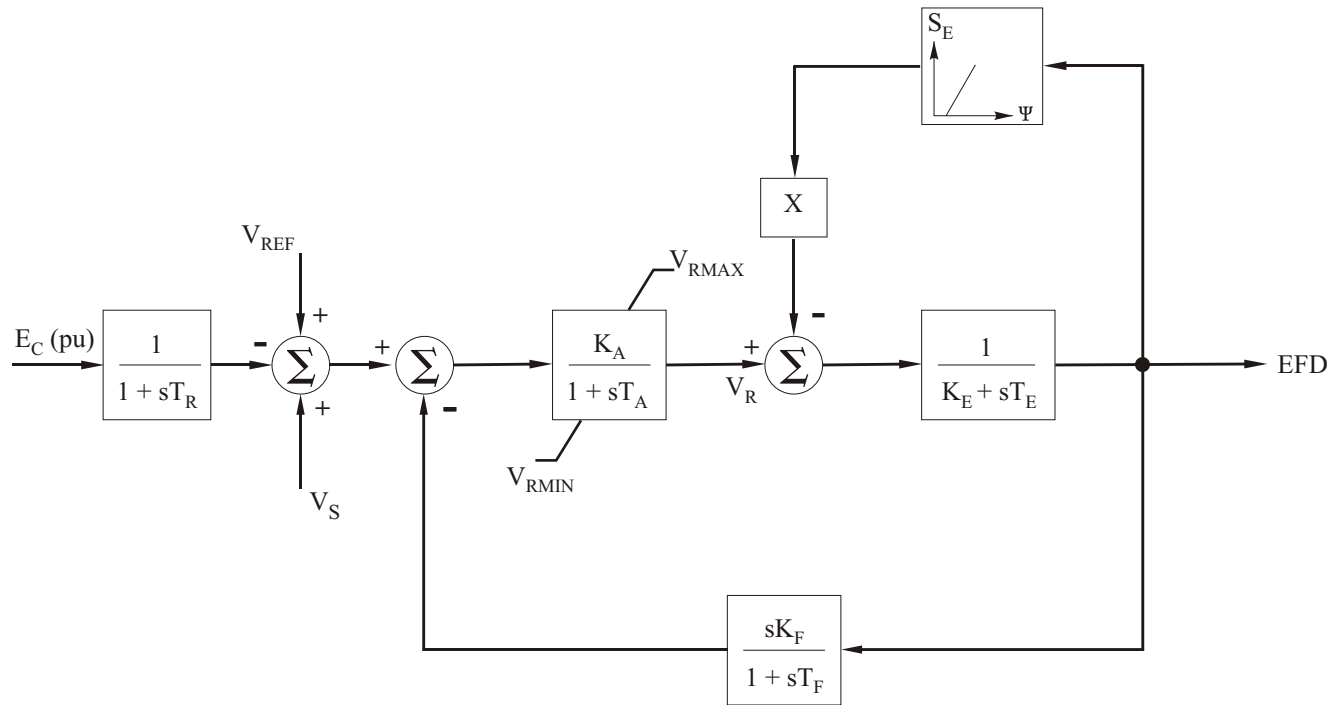


DIAGRAM 16

24th April 2003



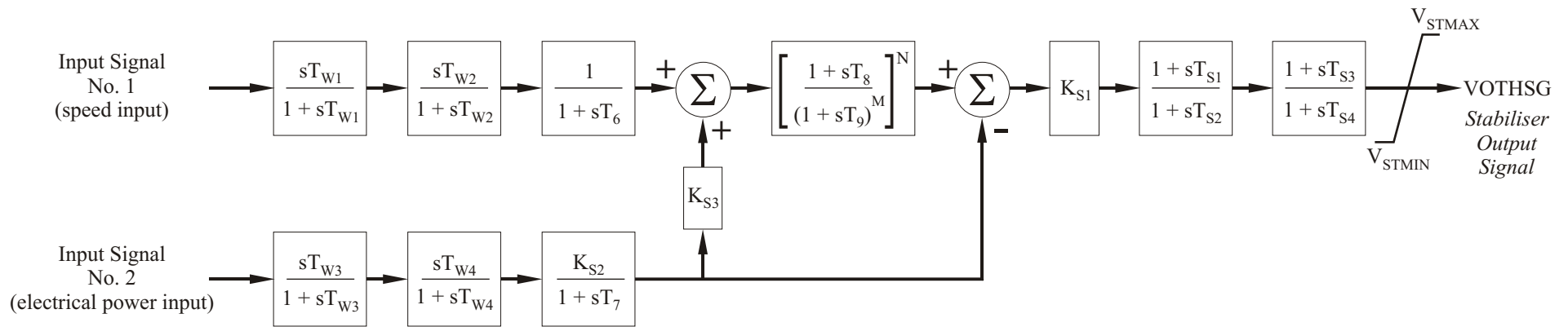
Values used in Transient Stability Analysis

E_1	2.20	T_A	0.04 sec
E_2	4.50	T_E	0.80 sec
K_A	400.00	$T_F (> 0)$	1.00 sec
K_E	1.00	T_R	0.00 sec
K_F	0.03	V_{RMAX}	7.0
$S_E(E_1)$	0.035	V_{RMIN}	-7.0
$S_E(E_2)$	0.470	Switch	0.0

IEEE T1 Excitation System Model

**Data used for modelling the Exciters
on the Diesel Generating Units**

DIAGRAM 17



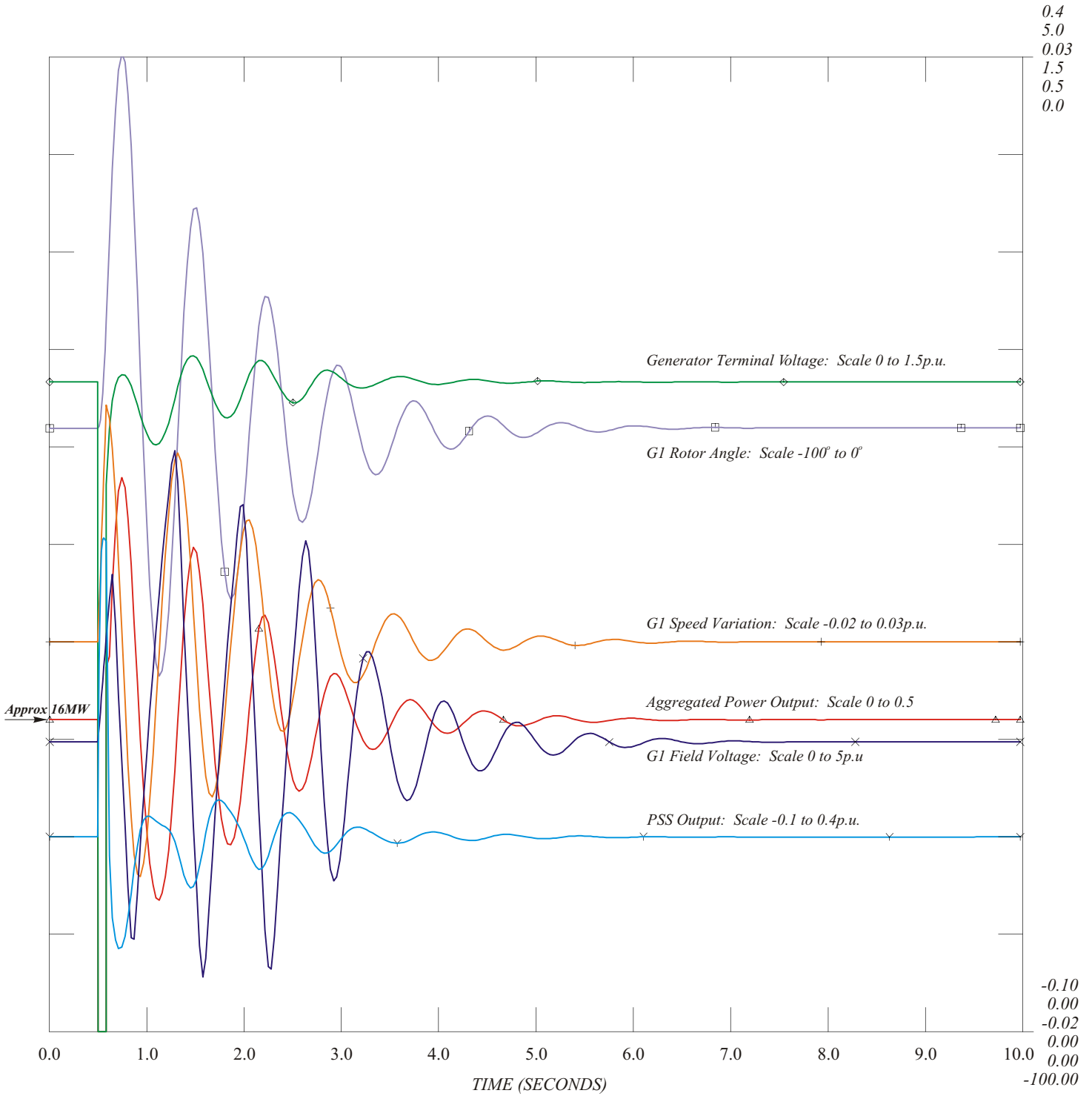
***PSS2A Power System Stabiliser Model
(IEEE Dual-Input Stabiliser)***

Values used in Transient Stability Analysis

ICS1	1 (rotor speed deviation pu)	T ₁	0.15 sec
ICS2	3 (generator electrical power pu)	T ₂	0.03 sec
REMBUS1	0	T ₃	0.15 sec
REMBUS2	0	T ₄	0.03 sec
M	5	T ₆	0.00 sec
N	1	T ₇	10.00 sec
K _{S1}	10	T ₈	0.30 sec
K _{S2}	0.67	T ₉	0.15 sec
K _{S3}	1.0	T _{W1}	10.00 sec
V _{STMAX}	0.2	T _{W2}	10.00 sec
V _{STMIN}	-0.066	T _{W3}	10.00 sec
		T _{W4}	0.00 sec

Data used for modelling the Power System Stabilisers on the Diesel Generating units

3-Phase on the LV Busbar at the Victor Mine: Normally-cleared

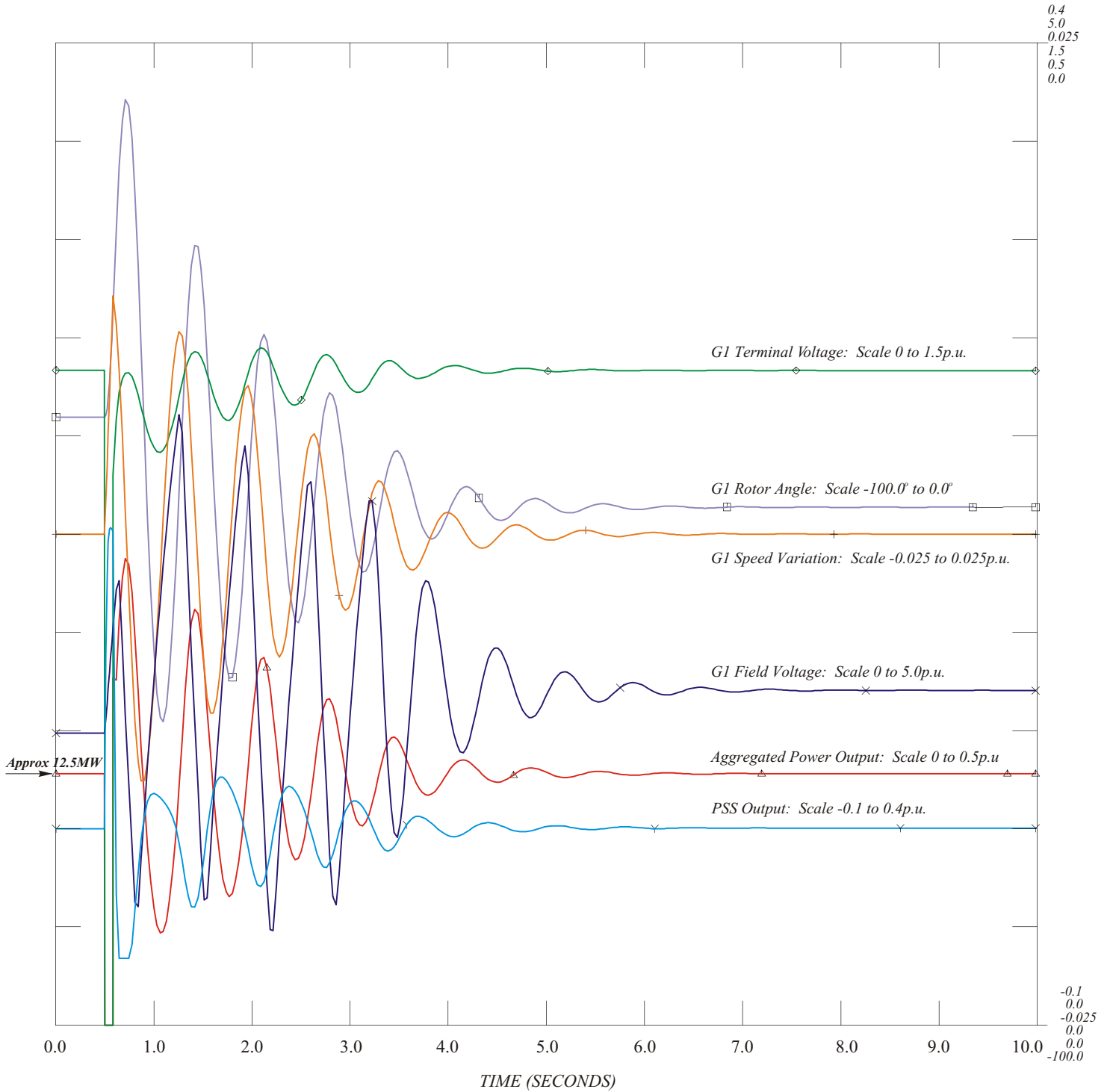


- PSS Output: Scale -0.1 to 0.4p.u.
- × G1 Field Voltage: Scale 0 to 5p.u
- + G1 Speed Variation: Scale -0.02 to 0.03p.u.
- ◇ Generator Terminal Voltage: Scale 0 to 1.5p.u.
- ← Aggregated Power Output: Scale 0 to 0.5
- G1 Rotor Angle: Scale -100° to 0°

DIAGRAM 19

24th April 2003

3-Phase fault on Unit G2 at the Victor Mine

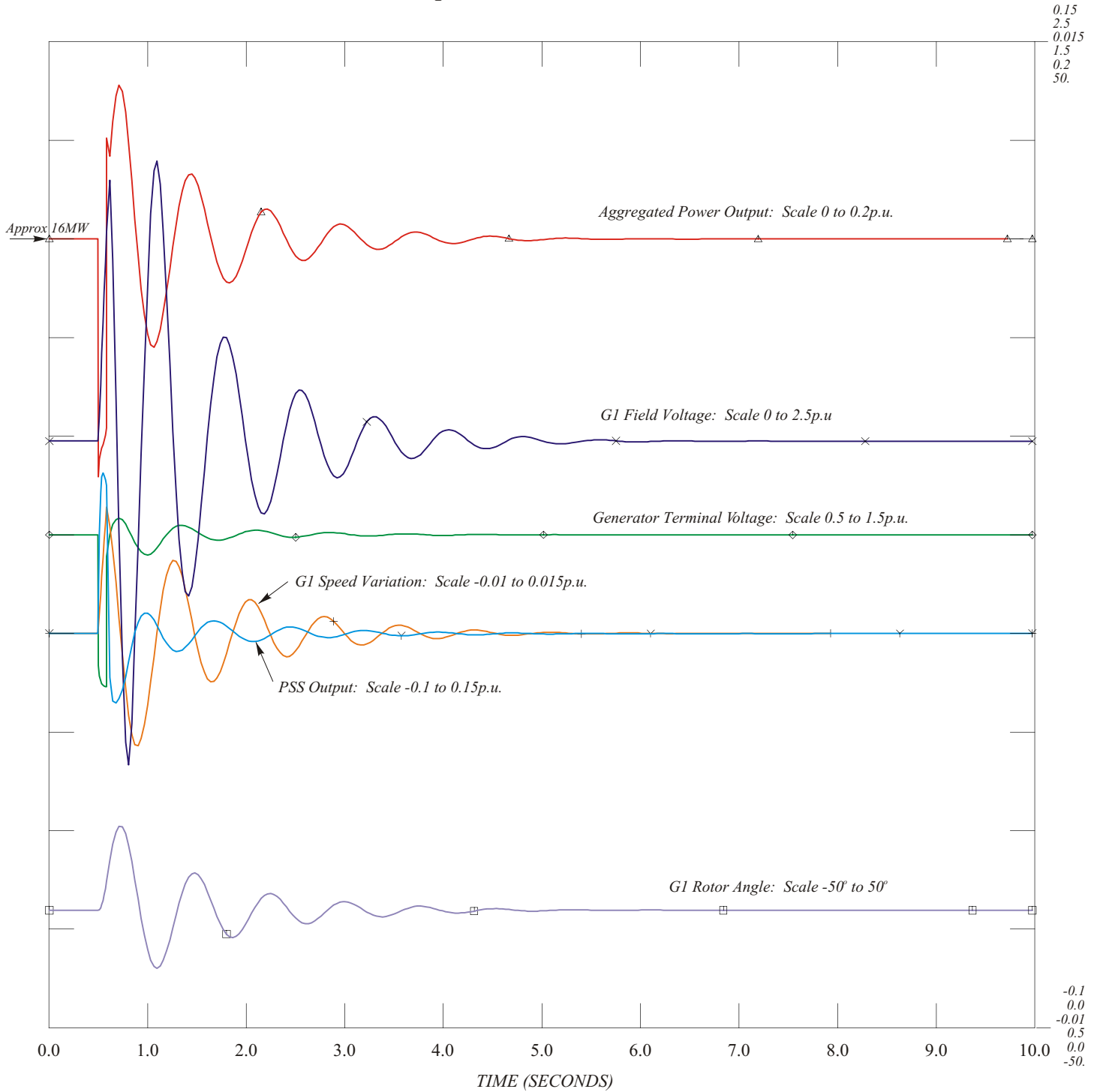


- PSS Output: Scale -0.1 to 0.4p.u.
- × G1 Field Voltage: Scale 0 to 5p.u
- + G1 Speed Variation: Scale -0.02 to 0.03p.u.
- ◇ Generator Terminal Voltage: Scale 0 to 1.5p.u.
- ← Aggregated Power Output: Scale 0 to 0.5
- G1 Rotor Angle: Scale -100° to 0°

DIAGRAM 20

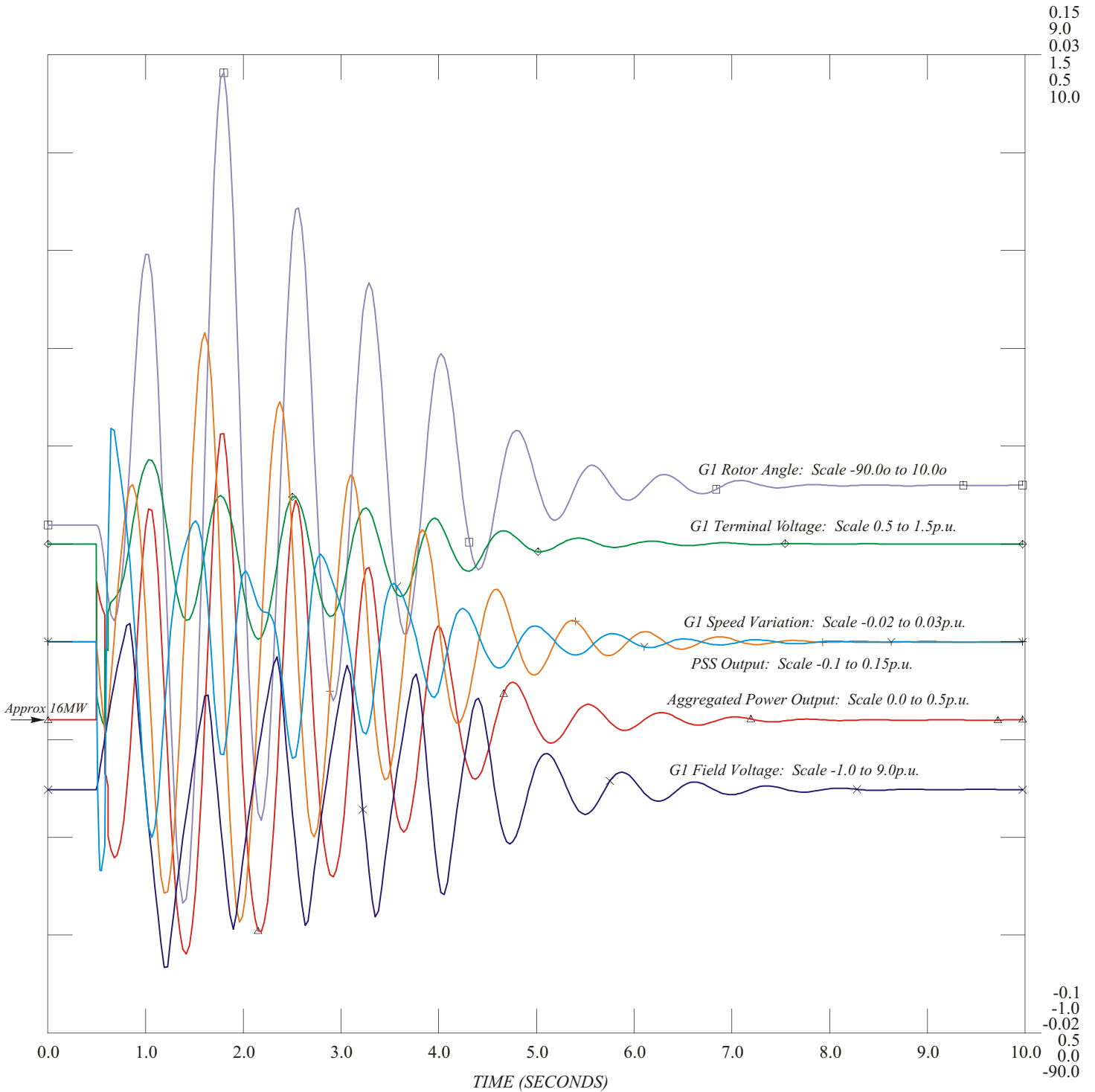
24th April 2003

3-Phase Fault on LV Busbar at Attawapiskat S/S



- PSS Output: Scale -0.1 to 0.15p.u.
- × G1 Field Voltage: Scale 0 to 2.5p.u
- + G1 Speed Variation: Scale -0.01 to 0.015p.u.
- ◇ Generator Terminal Voltage: Scale 0.5 to 1.5p.u.
- ← Aggregated Power Output: Scale 0 to 0.2p.u.
- G1 Rotor Angle: Scale -50° to 50°

3-Phase Fault on 115kV Circuit C3H at Abitibi Canyon GS

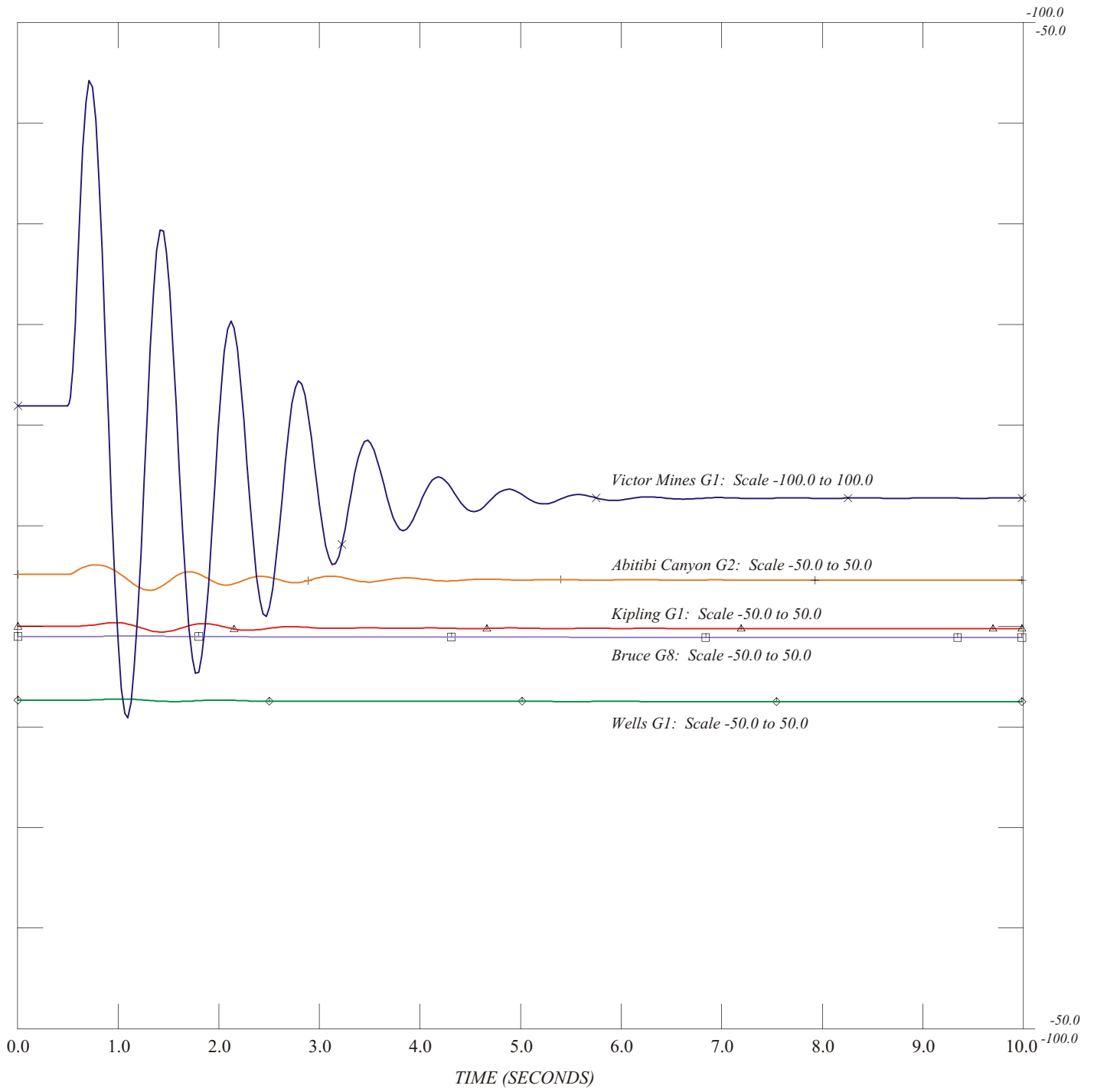


- PSS Output: Scale -0.1 to 0.15p.u.
- × G1 Field Voltage: Scale -1.0 to 9.0p.u.
- + G1 Speed Variation: Scale -0.02 to 0.03p.u.
- ◇ G1 Terminal Voltage: Scale 0.5 to 1.5p.u.
- ← Aggregated Power Output: Scale 0.0 to 0.5p.u.
- G1 Rotor Angle: Scale -90.0° to 10.0°

DIAGRAM 22

24th April 2003

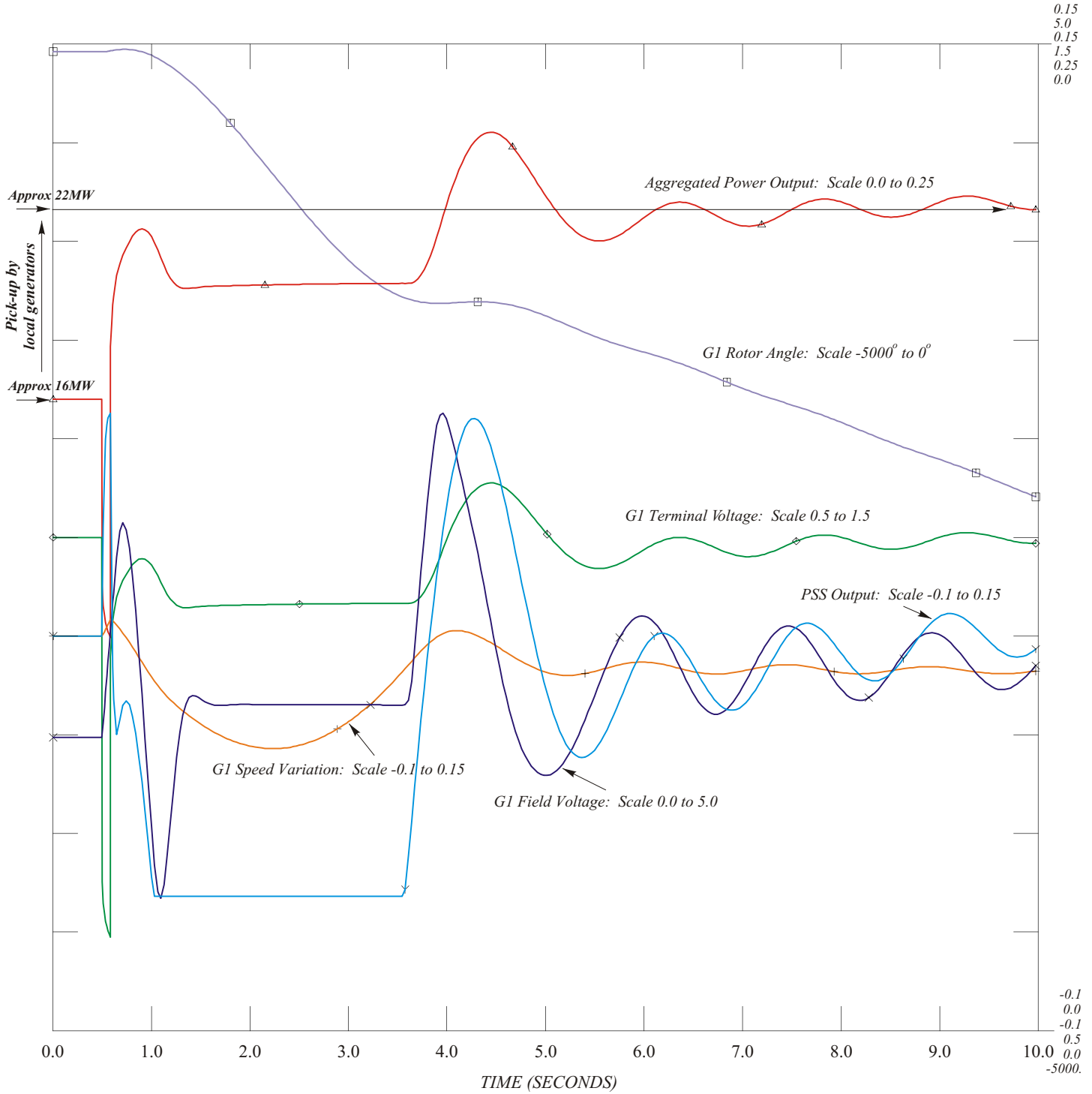
3-Phase Fault on 115kV Circuit C3H at Abitibi Canyon GS



ROTOR ANGLES

- × — × Victor Mines G1: Scale -100.0 to 100.0
- + — + Abitibi Canyon G2: Scale -50.0 to 50.0
- ◇ — ◇ Wells G1: Scale -50.0 to 50.0
- ◀ — ▶ Kipling G1: Scale -50.0 to 50.0
- — □ Bruce G8: Scale -50.0 to 50.0

3-Phase Fault on the 115kV Circuit to the Victor Mine: Islanded Operation



- PSS Output: Scale -0.1 to 0.15
- × G1 Field Voltage: Scale 0.0 to 5.0
- + G1 Speed Variation: Scale -0.1 to 0.15
- ◇ G1 Terminal Voltage: Scale 0.5 to 1.5
- ◀ Aggregated Power Output: Scale 0.0 to 0.25
- G1 Rotor Angle: Scale -5000° to 0°

DIAGRAM 24