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Executive Summary

The Roseville Energy Park is a combined cycle (gas turbine/steam generator) generation facility located in Roseville, CA with a peak output capability of 160MW. The REP was put in service in October 2007. The original plan was to connect the REP to Roseville Electric's 60-kV transmission system with two power lines extending from the REP to the Fiddyment substation. Also, in the original application, an additional two 60-kV lines extending from the REP to the West Roseville Specific Plan (WRSP) substation were proposed to be completed at a later date. Since the Application for Certification (03-AFC-1) was approved, the City of Roseville Electric Department has made changes to the transmission system, including the completion of the REP to WRSP substation double circuit 60-kv lines. These additional two lines were put in service in July 2008. Adding these lines now provides a total of four outlet 60-kV lines from the REP switchyard, each with a 145MVA capacity. With the addition of the two new lines, the original mitigation measure (Remedial Action Scheme) to avoid criteria overload violations is no longer necessary. With a peak 160MW generation capacity, the REP will not cause any criteria overload violations on any of the four 60-kV outlet transmission lines under any N-1 or credible N-2 contingency. Also, since the RAS was implemented solely to avoid overloading either of the two 60-kV REP to Fiddyment lines, there will be no impact on WAPA's 230kV transmission system. The City of Roseville Electric Department proposes to remove the Remedial Action Scheme from service, as it is no longer needed.

Section 2 Description of Proposed Amendment

2.1 Current Mitigation for Criteria Violations

When the Roseville Energy Park was initially certified under 03-AFC-1 in April 2005, there were only two transmission lines connecting the project to the Roseville 60-kV transmission system. This a double circuit 666.6 ACSS high temperature aluminum conductor line with a summer normal rating of 125MVA and emergency rating of 145MVA. These two lines connect the REP 60-kV switchyard to the Fiddyment substation. Under an N-1 contingency with either of the two transmission lines tripping, the plant output capability exceeds the capacity of the remaining transmission line. As part of the original certification, Western Area Power Administration (WAPA) performed a Detailed Facilities Study (DFS). This study indicated all facilities (WAPA, SMUD, Roseville Electric, etc.) that had criteria overload violations due to the addition of the REP. The two 60-kV lines connecting the REP to Fiddyment were identified as being overloaded under the contingency of either of them tripping (N-1) since the remaining one line could not support the REP running at full capacity (160MW). The mitigation measure selected to avoid overloading the transmission lines was the installation of a Remedial Action Scheme.

The Remedial Action Scheme is implemented using SEL 351-6 Directional Overcurrent relays in conjunction with SEL 2505 Remote I/O modules to communicate directly with the REP DCS control system. These relays are installed on both REP to Fiddyment transmission lines and they continually monitor the line loading conditions. If the relays detect either line loading exceeding 120MW, a RAS signal is sent to the DCS to reduce the plant output to below 140MW in 10 seconds and to further reduce to below 120MW in 10 minutes. If the line loading exceeds either of the limits for the specified duration, the relay will trip the associated 60-kV line breakers to avoid overloading the remaining transmission line. The sole purpose of the RAS was to prevent overloading either of the REP to Fiddyment 60-kV lines. The RAS scheme, either in service or removed from service, has no impact on the bulk electric system (i.e. WAPA).

2.2 Description of Proposed Changes

Since the Roseville Energy Park came on line in October 2007, the proposed double circuit line from the REP 60-kV Switchyard to the West Roseville Specific Plan substation was completed in July 2008 (see *Figure 4.1*). This line also consists of double circuit 666.6 ACSS high temperature aluminum conductors with normal and emergency ratings of 125MVA and 145MVA respectively. With the addition of the REP to WRSP double circuit 60-kV lines, a total of four 60-kV lines connect the REP to Roseville Electric's transmission system. Under an N-1 contingency (any one of the four outlet transmission lines tripping) the remaining line loading capacity (360MW) exceeds the plant output capability (160MW). Even under a credible N-2 contingency (either double circuit line tripping) the remaining line loading (240MW) exceeds the plant output capability. See *Figures 4.2-4.13* for more details.

The City of Roseville Electric Department proposes to remove the Remedial Action Scheme from the REP. With the transmission system improvements, it is no longer necessary to have an automated control scheme to curtail generation at the REP. Under all pertinent N-1 and credible N-2 contingencies, no transmission lines will be overloaded even with REP

running at a full capacity of 160MW. The actual physical changes consist only of removing some control wiring and changing relay settings on existing equipment. All of the changes occur within our existing REP 60-kV Switchyard and the DCS control center within the REP Plant. Removing the RAS will enhance the reliability of the City of Roseville's electric system by removing an unnecessary relay control scheme that could result in the automatic curtailment of the generation output of the REP when it is not required.

2.3 Proposed Changes to Roseville Energy Park AFC (03-AFC-1)

Section IV, Subsection D. Page 86:

CONDITIONS OF CERTIFICATION

TSE-1 The Project owner shall ensure that the design, construction and operation of the REP's transmission facilities shall conform to all applicable LORS including the requirements 1a) through 1h) listed below:

a) The Project shall connect to the WRSP 60 kV double circuit lines of the Roseville Electric transmission system using about 100 foot of 60 kV double circuit transmission line. Interconnection will be executed through the power plant 60 kV switchyard located at the REP Project site.
b) The Project's 60 kV switchyard shall have a breaker and a half configuration.
c) The Project conductors shall be sized to accommodate the full output from the Project.
d) The power plant switchyard, outlet line and termination shall meet or exceed the electrical, mechanical, civil and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations (Title 8), Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders", National Electric Code (NEC) and related industry standards.
e) Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.
f) Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner's standards.
g) Termination facilities to the Roseville 60 kV line shall comply with applicable Roseville Electric interconnection standards.
h) The Project Owner shall provide to the CPM:
    i) The final Detailed Facility Study (DFS), if modified, including a description of new facilities, facility upgrades, operational mitigation measures, and/or Special Protection System (SPS) sequencing and timing if applicable,
    ii) A letter from transmission owner(s) stating that the mitigation measures or projects for each criteria violation selected by the Project owner are acceptable.

Verification: At least 30 days prior to the start of grading of the power plant switchyard or transmission facilities, the Project Owner shall submit to the CPM for approval:

- Electrical one line diagrams signed and sealed by a registered professional electrical engineer in responsible charge (or other approval acceptable to the CPM), a route map, and an engineering description of equipment and the configurations covered by the requirements 1a) through 1h) above.
- The final Detailed Facility Study, if modified, shall include a description of facility upgrades~~,~~ and operational mitigation measures ~~and/or RAS or SPS~~. Substitution of equipment and substation configurations shall be identified and justified by the Project Owner for CPM approval.

2.4 Transmission System Contingency Analysis

G.E. PSLF transmission load flow contingency studies were performed with the current Roseville Electric 60-kV transmission system configuration. The analyses were performed under two different loading conditions: SPRING (using the 2011 WECC HSP1 Operating Case at a Roseville system load of 160MW) and SUMMER (using the approved 2010 SVSG high summer case of 360MW).

All N-1 contingency cases that would affect the REP output were studied for criteria violations. These cases consist of the loss of any one of the four 60-kV transmission lines that connect the REP to the Roseville Electric transmission grid. Also credible N-2 contingencies were also studied for criteria violations (the loss of any one of the double-circuit single-pole construction lines). The results of these simulations are summarized in the following table (for more detail, see *Figures 4.2-4.13*):

N-1 Contingency	**FDY-REP#1**		**FDY-REP#2**		**REP-WESTRSC#1**		**REP-WESTRSC#2**	
(Circuit Outage)	**Spring**	**Summer**	**Spring**	**Summer**	**Spring**	**Summer**	**Spring**	**Summer**
	MW	**MW**	**MW**	**MW**	**MW**	**MW**	**MW**	**MW**
FDY-REP#1 Line (REP 160MW)	0	0	59	49	50	55	50	55
FDY-REP#2 Line (REP 160MW)	59	49	0	0	50	55	50	55
REP-WESTRSC#1 Line (REP 160MW)	43	37	43	37	0	0	74	86
REP-WESTRSC#2 Line (REP 160MW)	43	37	43	37	74	86	0	0
N-2 Contingency (Circuit Outage)								
REP-WESTRSC#1 & #2 Line (REP 160MW)	79	79	79	79	0	0	0	0
FDY-REP#1 & #2 Line (REP 160MW)	0	0	0	0	80	80	80	80
% Loading (Max)	56%	56%	56%	56%	57%	61%	57%	61%

2.5 Conclusions

With the transmission system improvements adding the additional two outlet lines from the REP 60-kV switchyard, there is no longer a need for a Remedial Action Scheme. Under all pertinent N-1 and credible N-2 contingencies, the maximum facility loading on any of the four 60-kV lines is 61%. With maximum line load not exceeding 86MW under any plausible contingency, the RAS scheme will never arm or operate, making it superfluous. The transmission system improvements have alleviated all criteria violations, eliminating the need for a RAS. Also, since the RAS was implemented soley to protect either of the REP to Fiddyment 60-kV lines from overloading, removing the RAS will have no impact on WAPA's 230-kV system. The continued service of the RAS adds no benefit as well as makes possible lower reliability due to personnel error, equipment failure or improper generation curtailment, therefore it should be removed from service.

Section 3 Ancillary Impacts

3.1 Environmental Impacts

Removing the Remedial Action Scheme will not cause any adverse environmental impacts. All physical modifications necessary are within existing facilities and consist of removing relays and wiring.

3.2 LORS Compliance

Removing the RAS is in compliance with all applicable laws, ordinances, regulations and standards. The current transmission system configuration and contingency analysis with the removal of the RAS is in accordance with good utility practices.

3.3 Public Effects

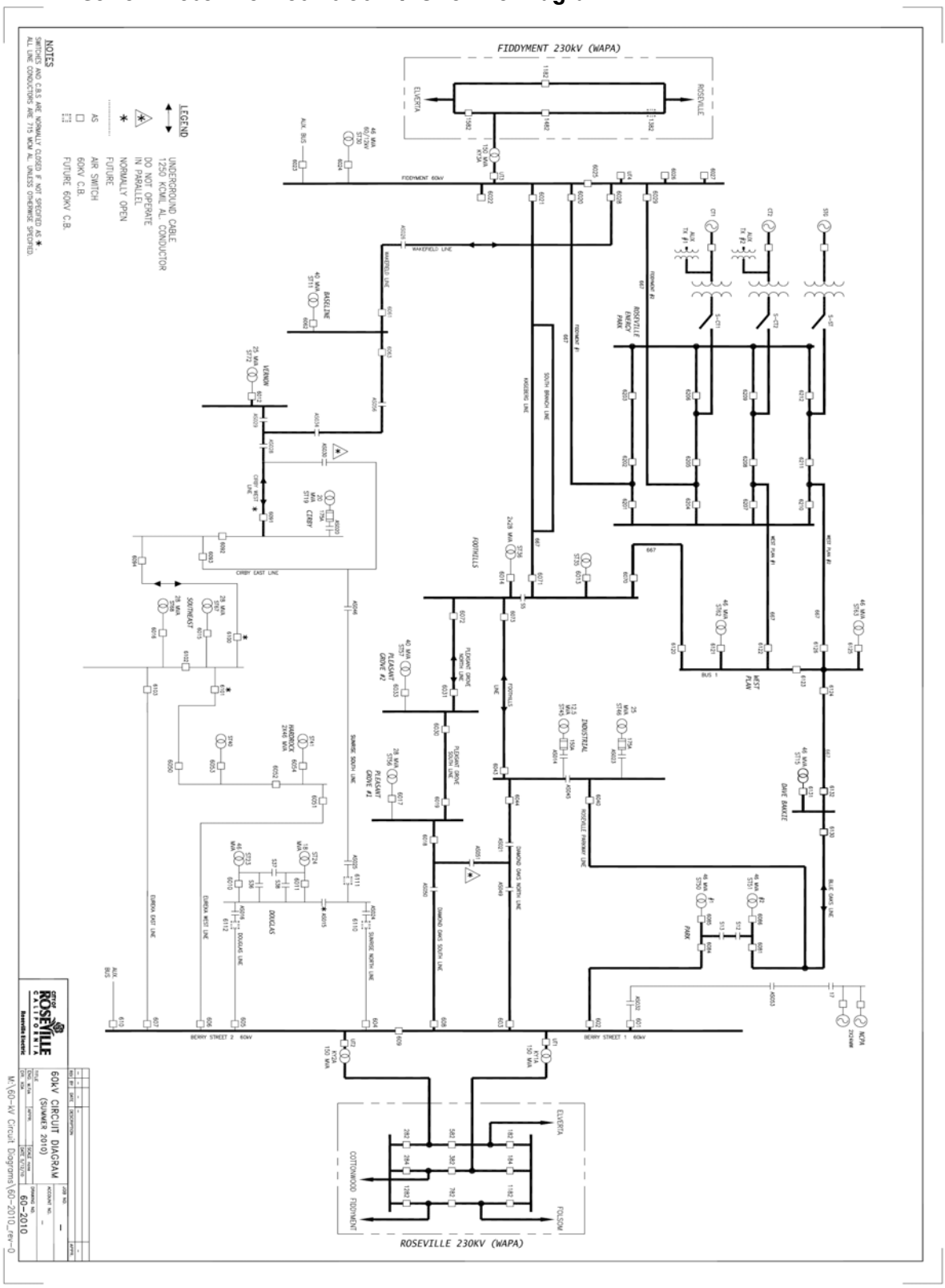
There will be no adverse effects on the public. The RAS is a special protection scheme that was only in place to protect electric facilities from overloading so removing it will not affect the public.

3.4 Effects on Property Owners

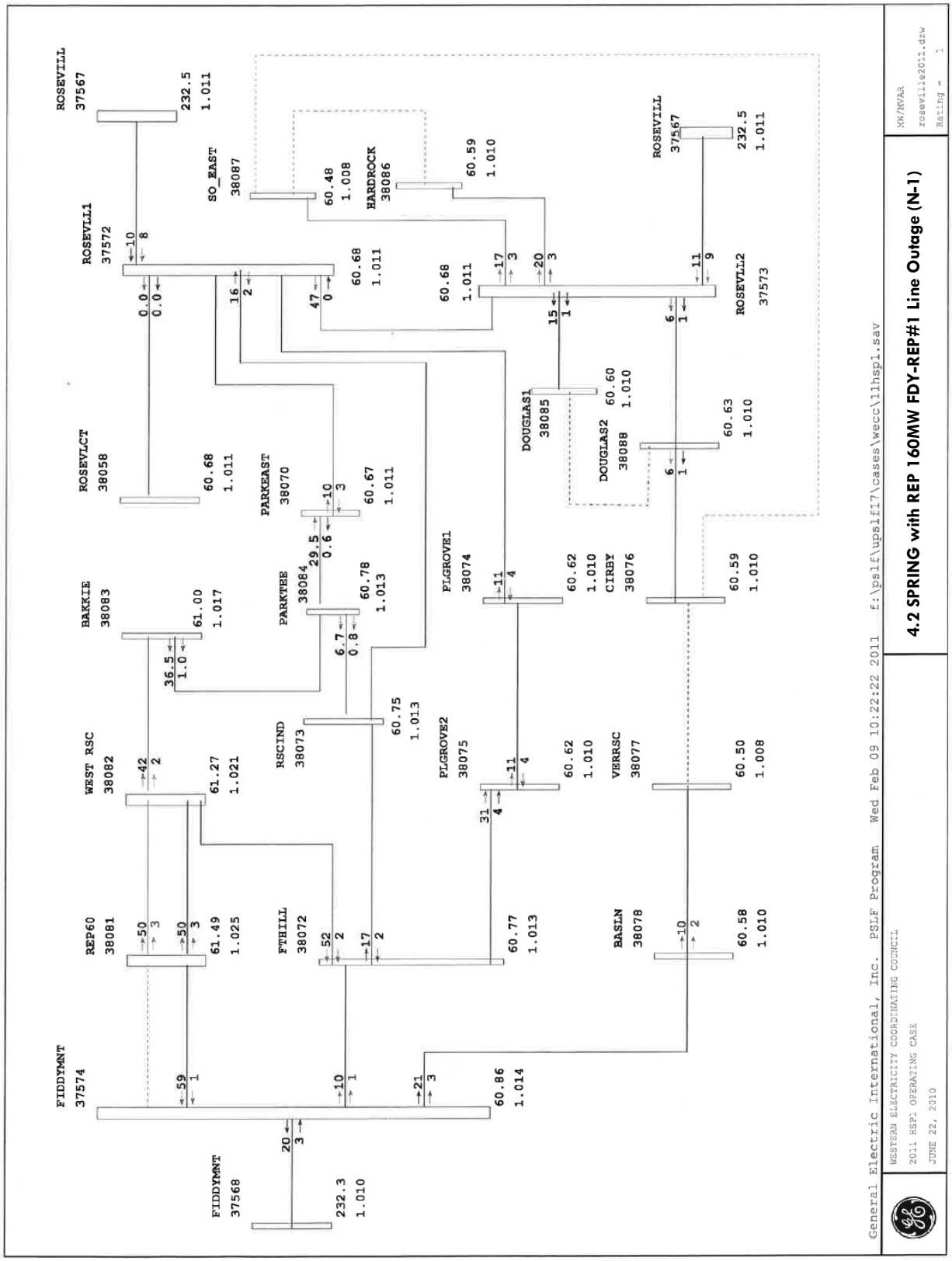
There will be no adverse effects on nearby property owners. The RAS is a special protection scheme that was only in place to protect electric facilities from overloading so removing it will not affect nearby property owners.

Section 4 Figures

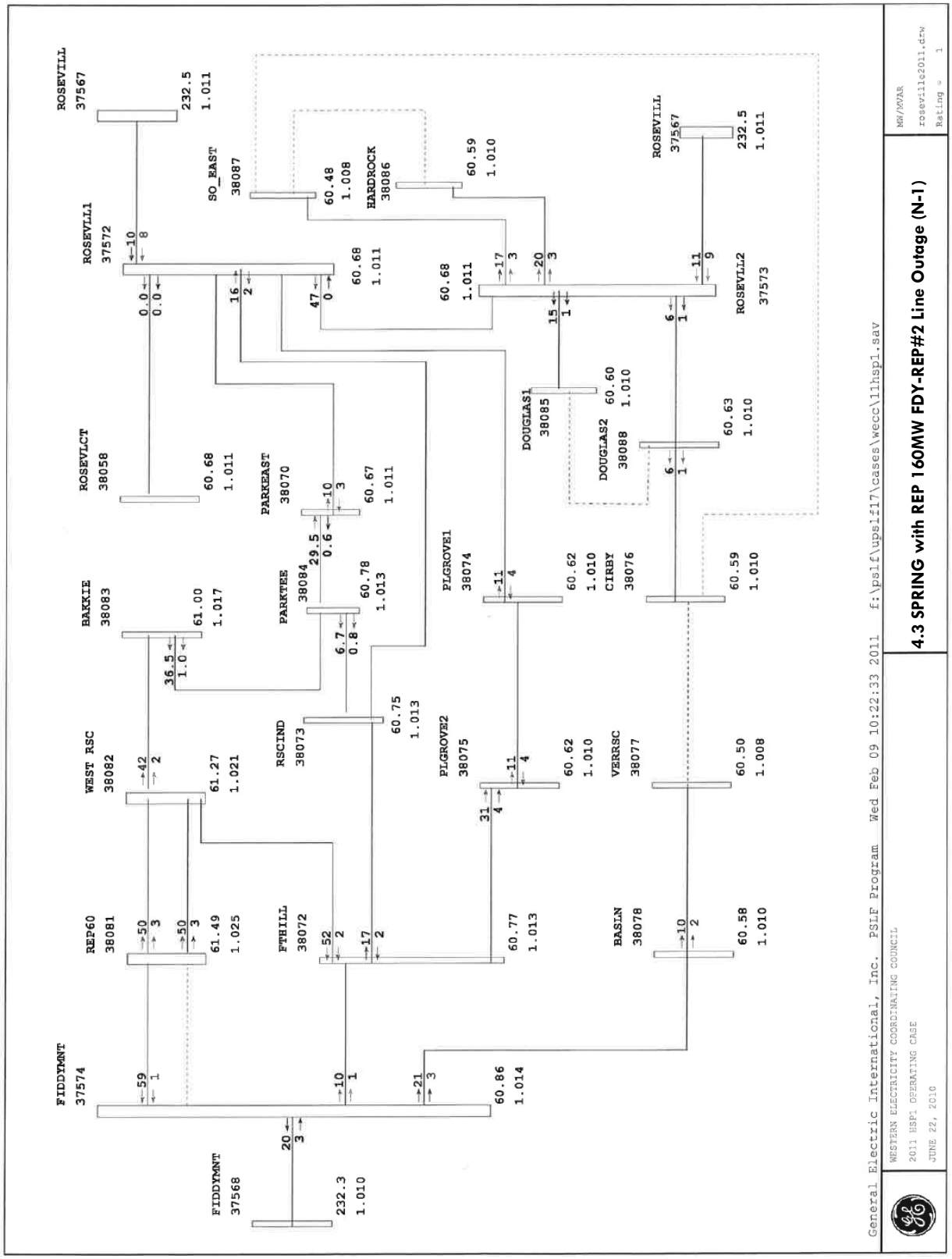
4.1 Current Roseville Electric 60-kV One-line Diagram



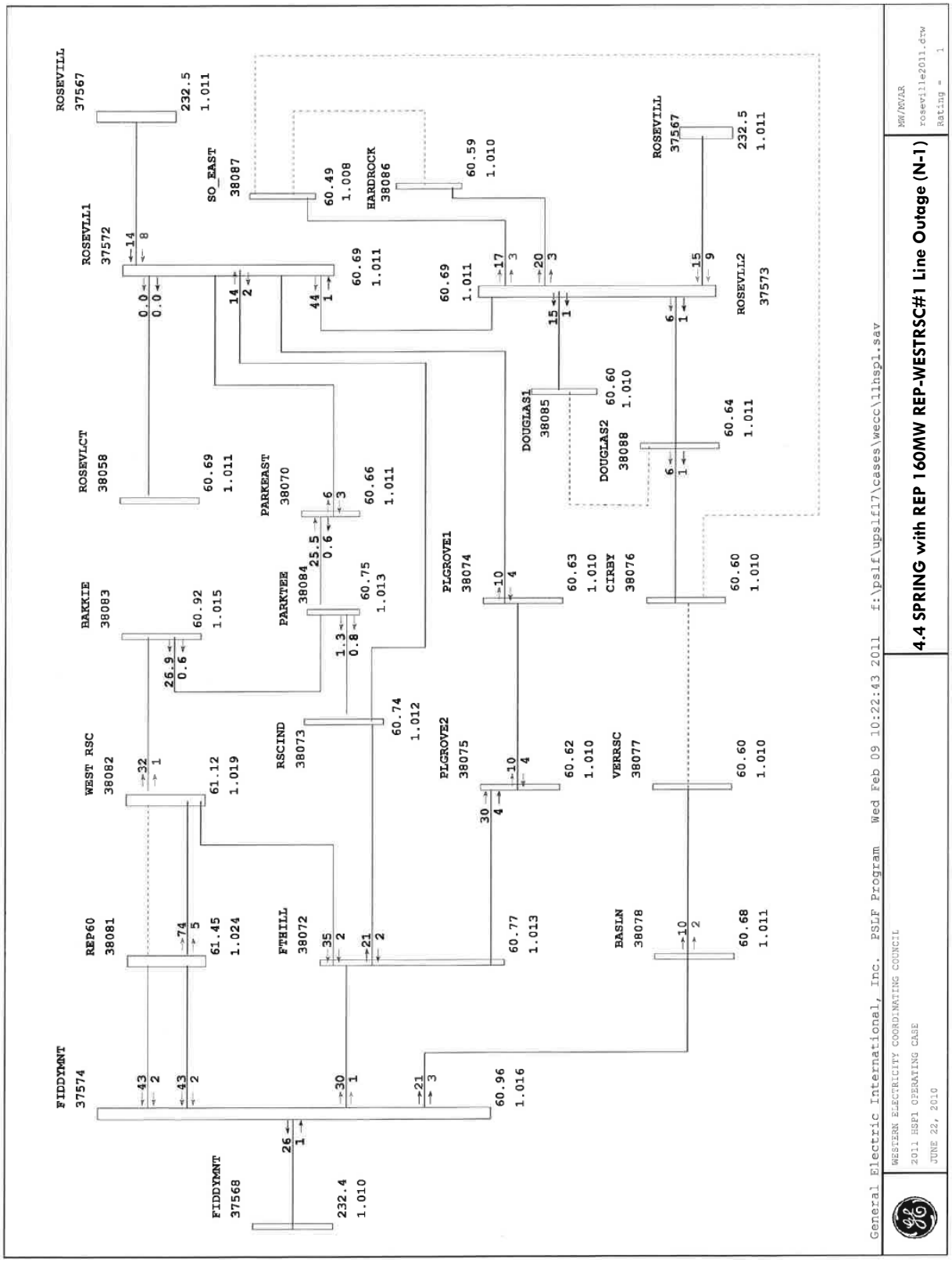
4.2 SPRING with REP 160MW FDY-REP#1 Line Outage (N-1)



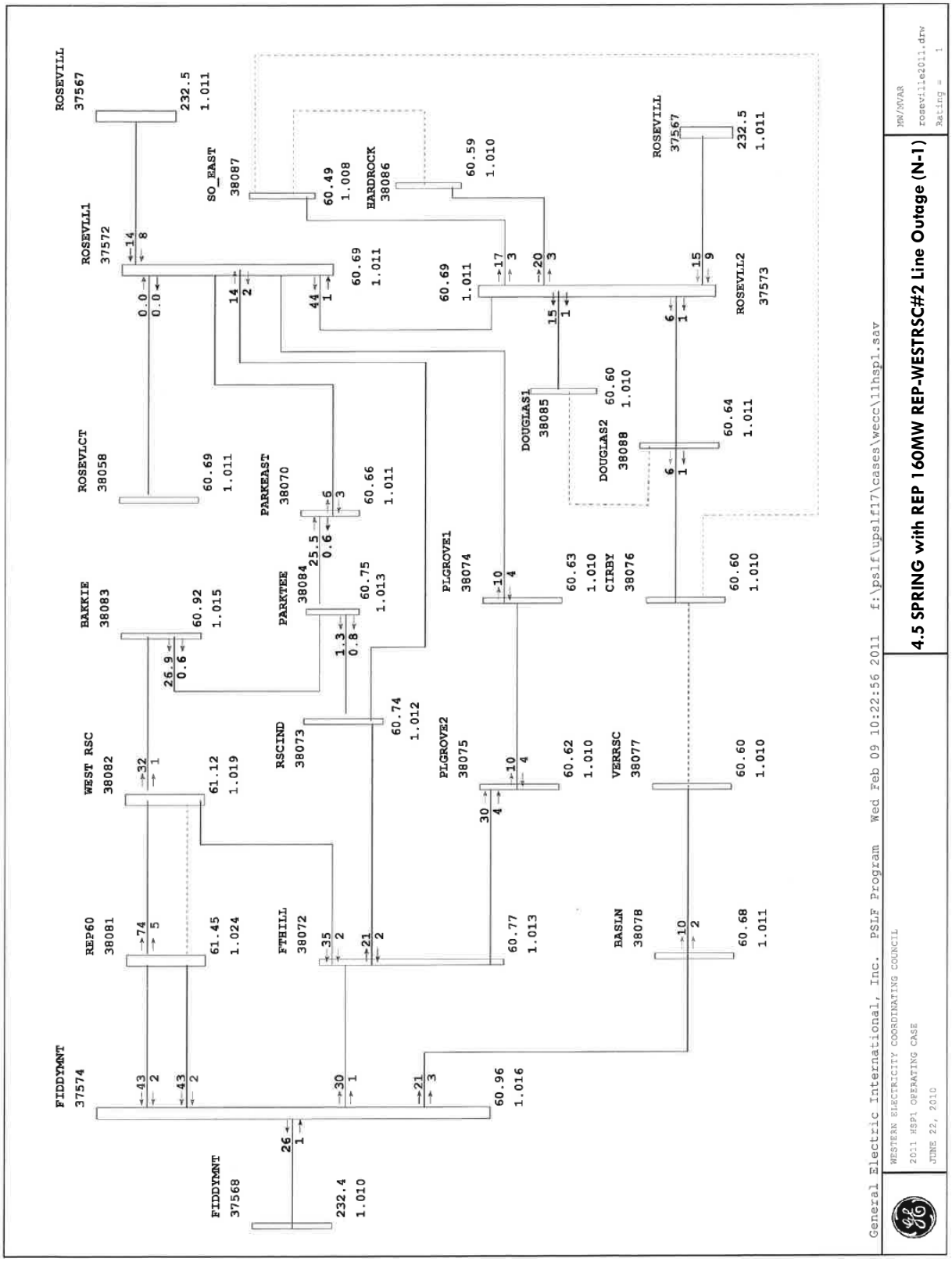
4.3 SPRING with REP 160MW FDY-REP#2 Line Outage (N-1)



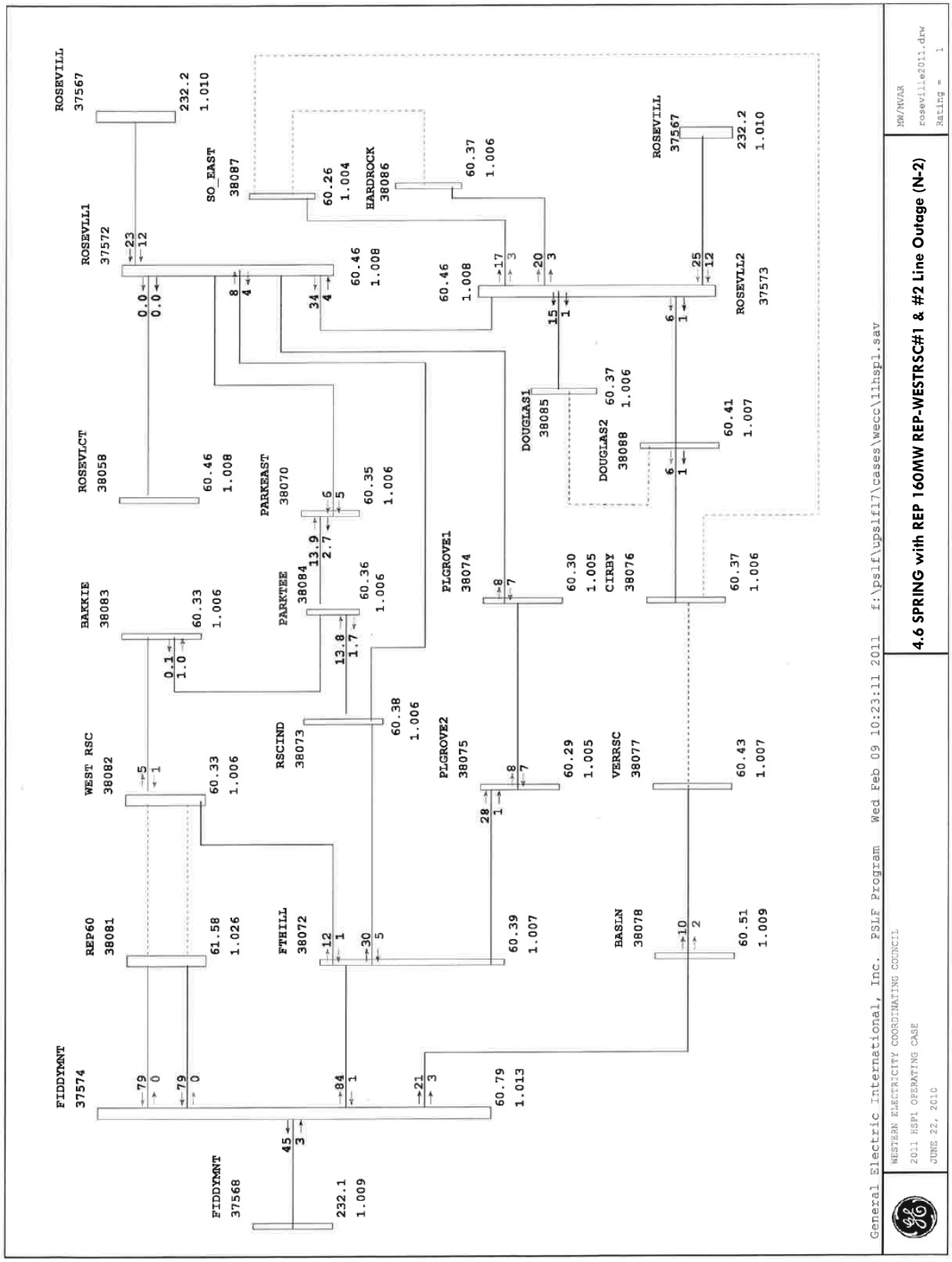
4.4 SPRING with REP 160MW REP-WESTRSC#1 Line Outage (N-1)



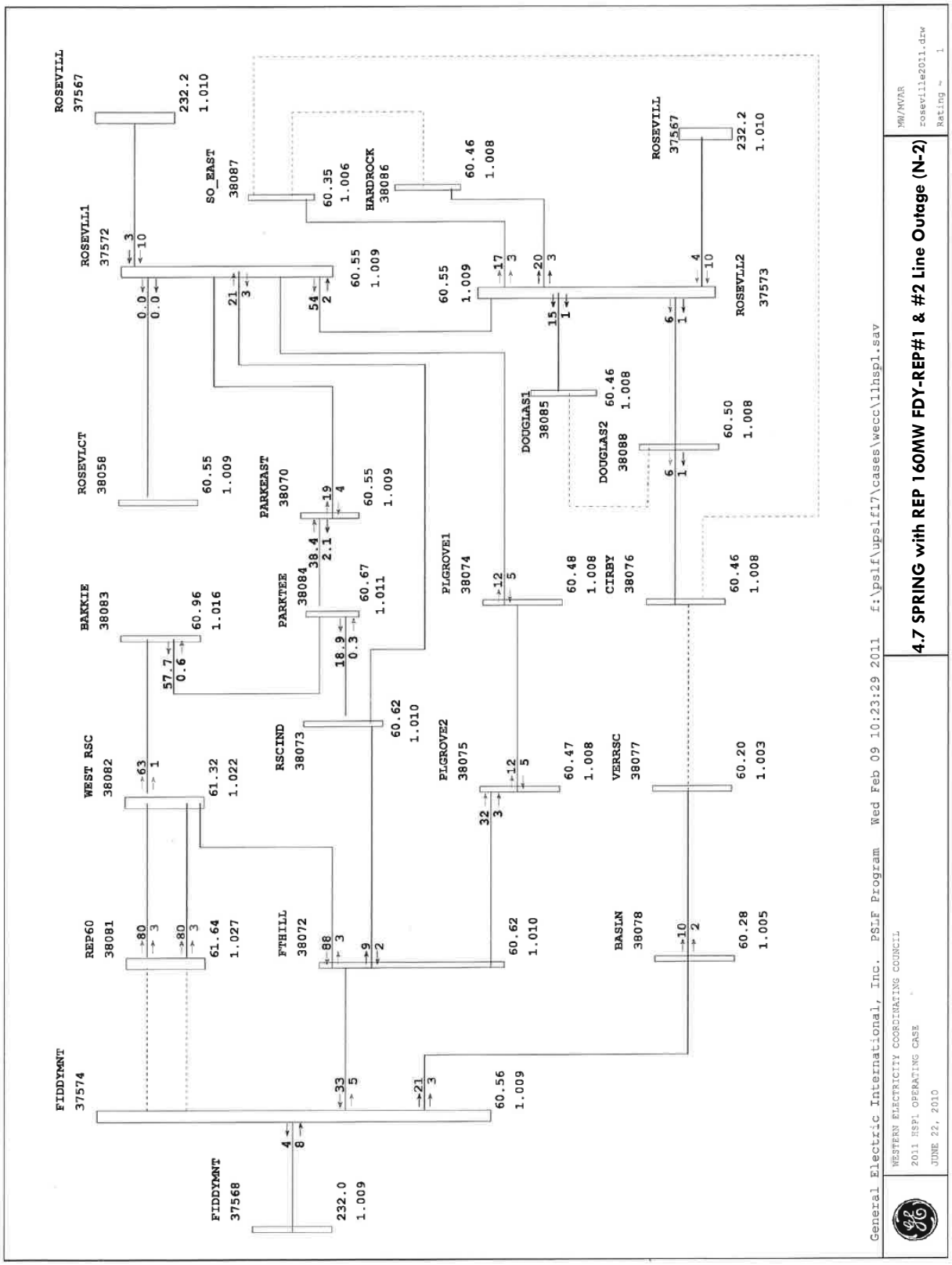
4.5 SPRING with REP 160MW REP-WESTRSC#2 Line Outage (N-1)



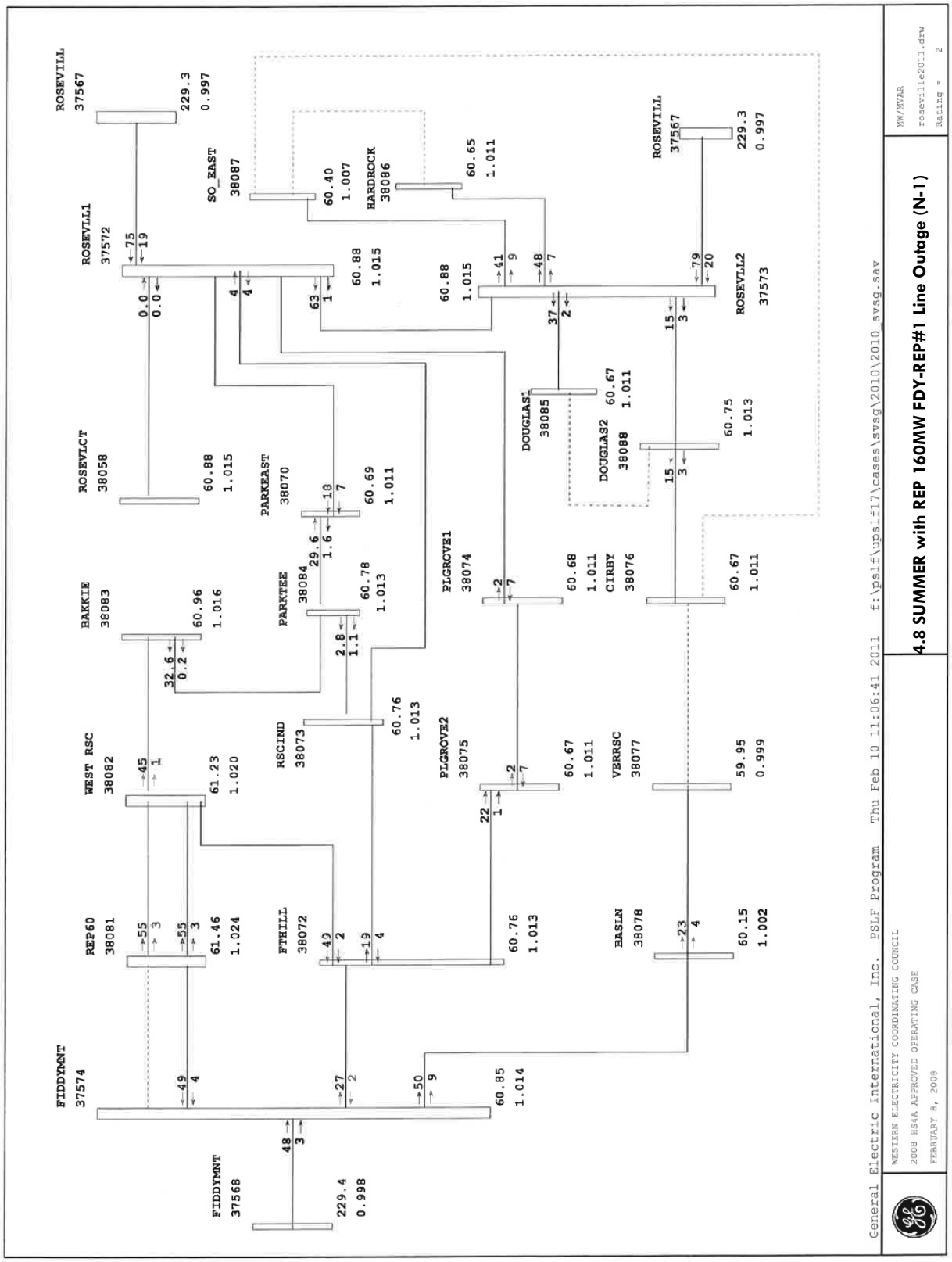
4.6 SPRING with REP 160MW REP-WESTRSC#1 & #2 Line Outage (N-2)



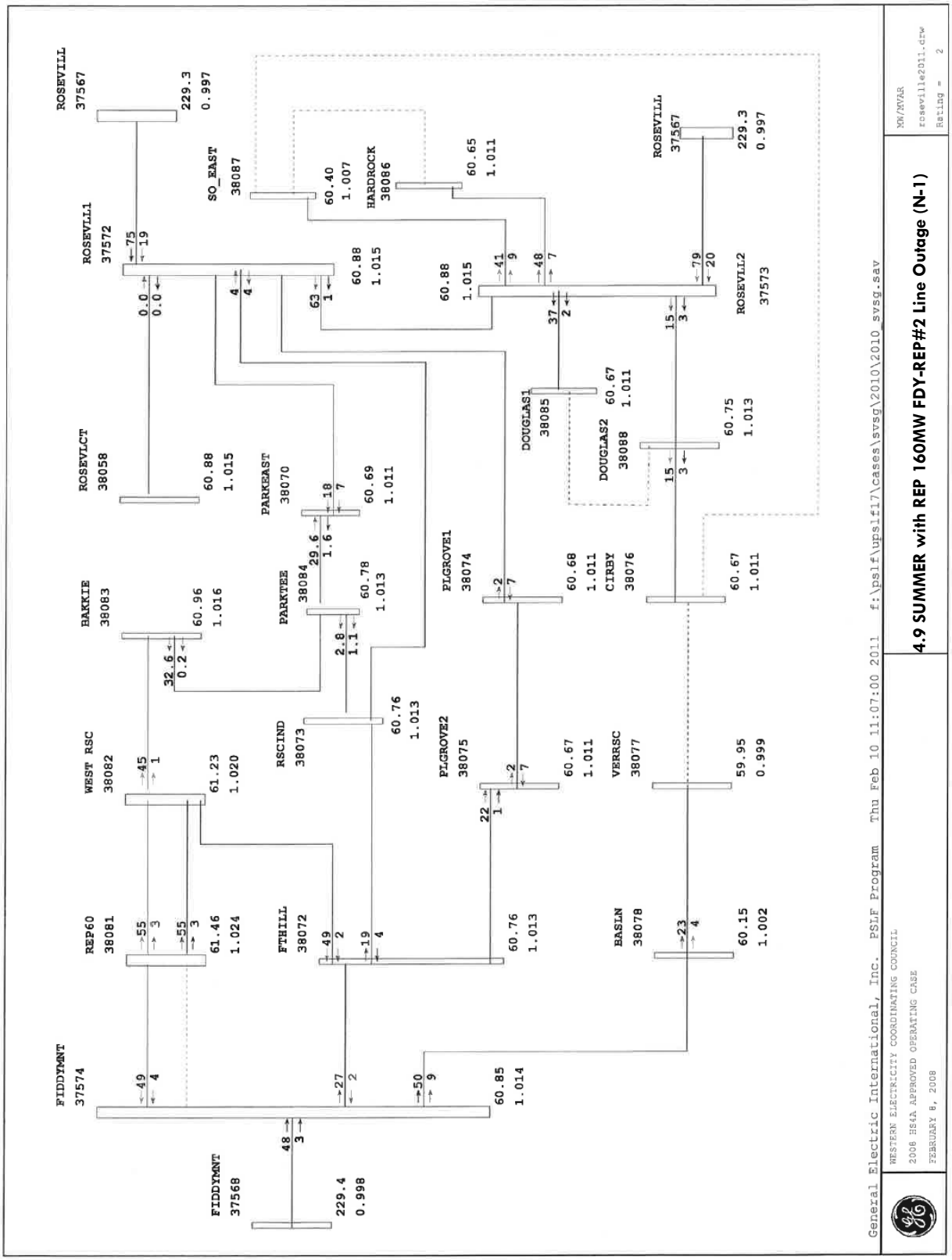
4.7 SPRING with REP 160MW FDY-REP#1 & #2 Line Outage (N-2)



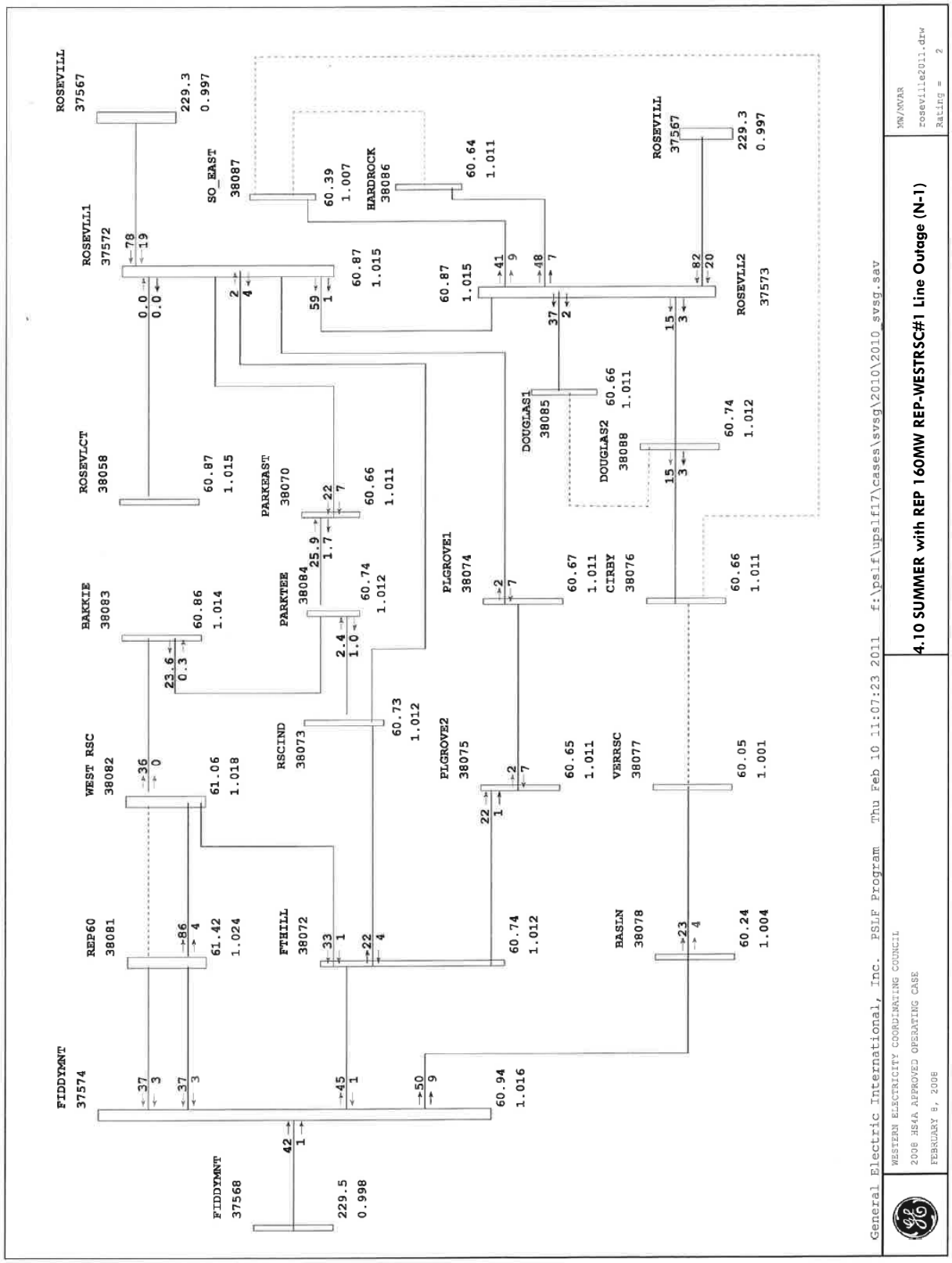
4.8 SUMMER with REP 160MW FDY-REP#1 Line Outage (N-1)



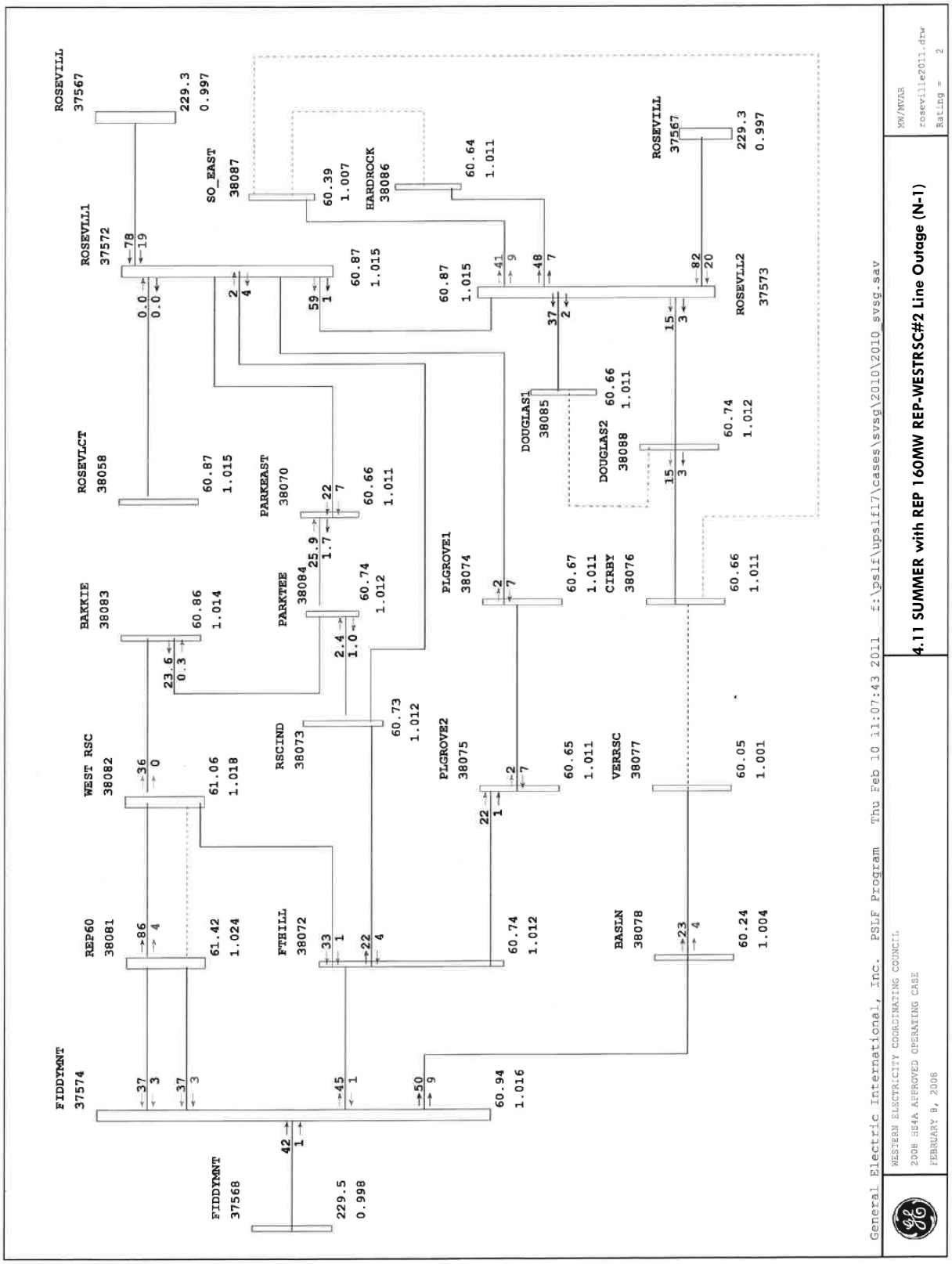
4.9 SUMMER with REP 160MW FDY-REP#2 Line Outage (N-1)



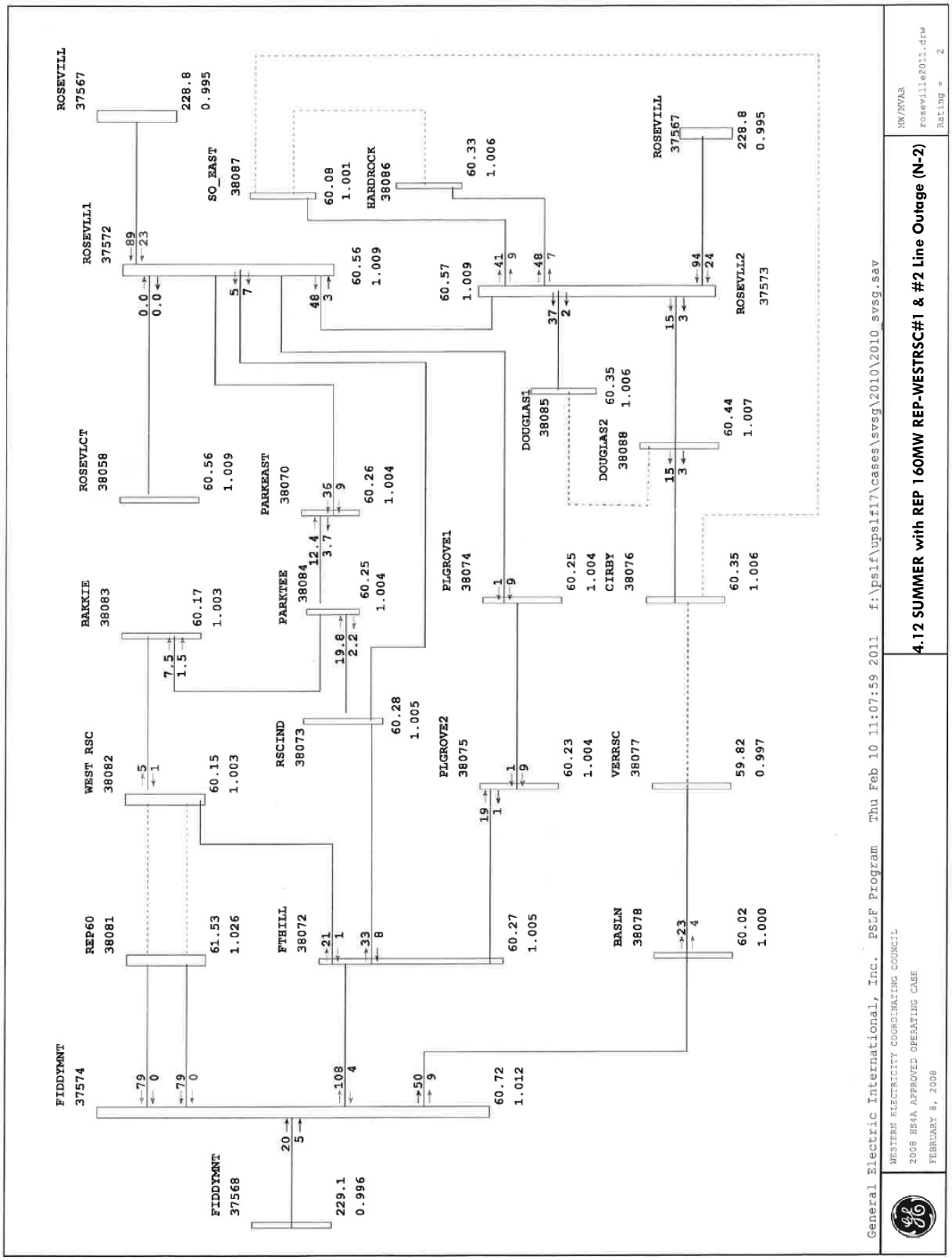
4.10 SUMMER with REP 160MW REP-WESTRSC#1 Line Outage (N-1)



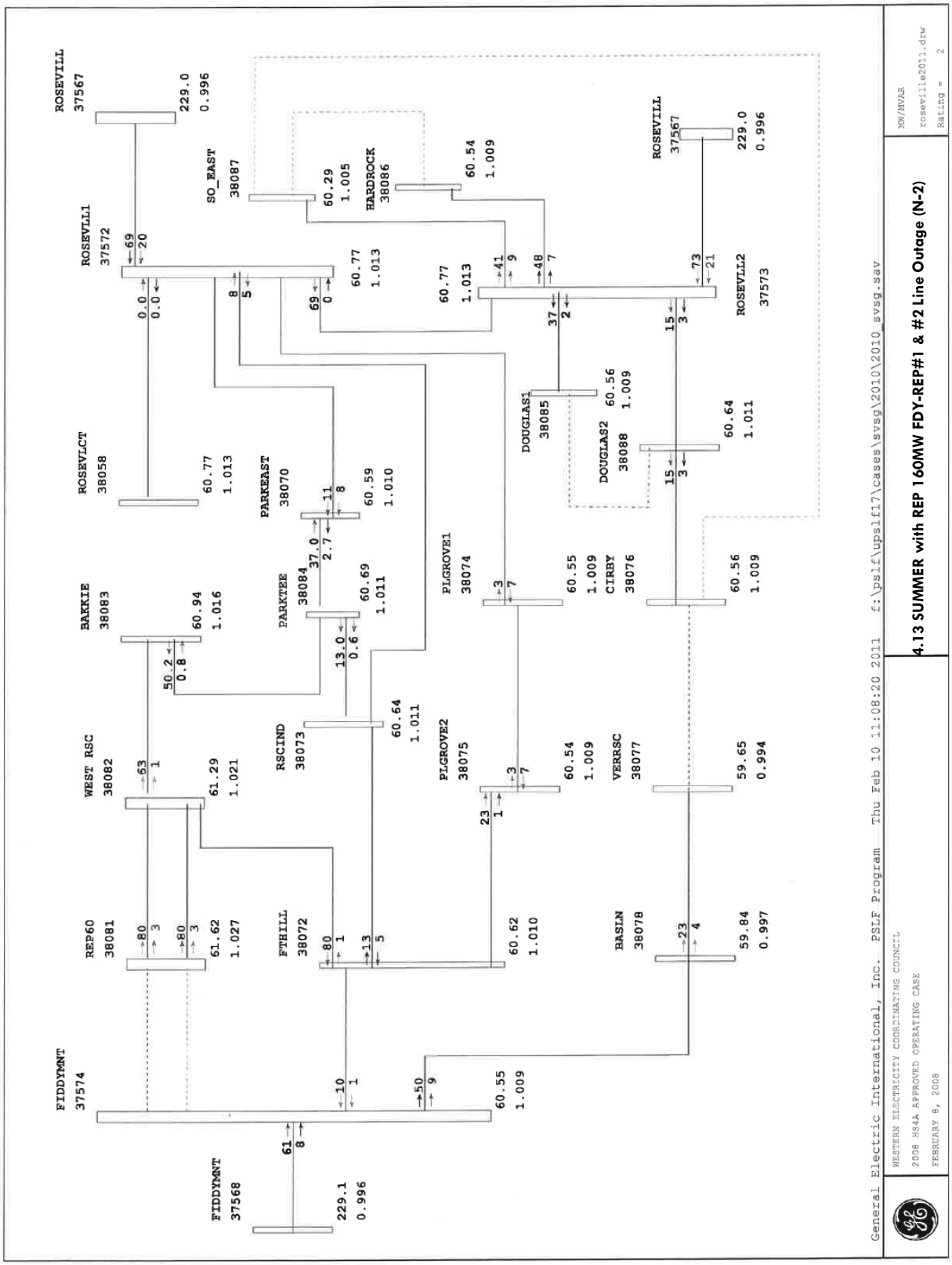
4.11 SUMMER with REP 160MW REP-WESTRSC#2 Line Outage (N-1)



4.12 SUMMER with REP 160MW REP-WESTRSC#1 & #2 Line Outage (N-2)



4.13 SUMMER with REP 160MW FDY-REP#1 & #2 Line Outage (N-2)



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