Final – OC Approved

DYSINGER EAST / WEST CENTRAL STABILITY LIMITS

ALL LINES I/S AND OUTAGE CONDITIONS

Report #: DE/WC-14

Prepared by
Operations Engineering Staff
New York Independent System Operator, Inc

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Executive Summary

This study was conducted as a periodic review of Dysinger East and West Central stability limits.

The study recommends updates to the existing Dysinger East limits for two (2) system configurations and the introduction of nine (9) new Dysinger East limits for additional system configurations. The proposed limits are shown below on Table 1. “Summary of Proposed Stability Limit Changes”.

In all cases the existing Dysinger East stability limits were increased to higher attainable transfer test levels. It is recommended that the West Central stability limits no longer be evaluated individually in light of changes in Zone B load and generation over the years that have resulted in the loss of the capability to stress West Central independent of Dysinger East. Going forward the contingencies previously evaluated for West Central will be evaluated in determining the Dysinger East interface limit.

All identified limits are defined from the highest attainable transfer test levels. No instances of system or unit instability were observed under the configurations examined and the contingencies evaluated.

It is recommended that the Dysinger East and West Central stability transfer limits be updated on the basis of this report.

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1. Summary of Proposed Limits

Table 1
Summary of Proposed Stability Limit Changes (MW)

DYSINGER-EAST	Existing (MW)	Proposed (MW)	Delta (MW)
SEASONAL LIMIT	2850	3150	+300
STOLLE ROAD-MEYER 230kV path O/S (67/81/83/85)	2650	2850	+200
MEYER-HILLSIDE 230kV path O/S (60/68/72)	2650	3050	+400
NR-2 NIAGARA - ROCHESTER 345 KV **OR** SR-1 SOMERST - ROCHESTER 345 KV O/S	2350	2350	-
ROCHESTER – PANNELL 345kV path O/S (RP-1/RP-2)	N/A	3100	-
PANNELL – CLAY 345KV path O/S (PC-1/PC-2)	N/A	3000	-
NR-2 NIAGARA - ROCHESTER 345 KV O/S AND SR-1 SOMERST - ROCHESTER 345 KV O/S	N/A	1250	-
NR-2 NIAGARA - ROCHESTER 345 KV O/S AND 67 STOLLE ROAD-MEYER 230 KV	N/A	2100	-
STOLE RD – HIGH SHELDN (67) 230 kV O/S AND S. RIPLEY – ERIE E (69) 230 kV O/S	N/A	2850	-
ROCH. – PANNELL (RP-1) 345 kV O/S AND ROCH. – PANNELL (RP-2) 345 kV O/S	N/A	2450	-
PANNELL-CLAY (PC-1) 345 kV O/S AND PANNELL-CLAY (PC-2) 345 kV O/S	N/A	2550	-
WEST CENTRAL			
SEASONAL LIMIT	2250	9999	Note 1
RP-1 ROCHESTER – PANNELL 345 KV O/S	1900	9999	Note 1
PC-1 PANNELL – CLAY 345 KV O/S	1900	9999	Note 1
NR-2 NIAGARA-ROCHESTER 345 KV OR SR-1 SOMERST-ROCHESTER 345 KV O/S	1750	9999	Note 1

NOTE 1 System stability limits which previously were defined in for West Central have been redefined in terms of Dysinger East, an interface directly controllable through dispatch.

2. Introduction

This report addresses a revaluation of the Dysinger East and West Central interface transient stability limits for all-lines-in-service and line outage conditions. This analysis was conducted as a periodic limit review. The geographic location of these interfaces is shown on the "Internal Interfaces" diagram below.

The stability transfer limit study for the Dysinger East/West Central interface was conducted in accordance with the stability criteria indicated in NPCC Regional Reliability Reference Directory # 1 Design and Operation of the Bulk Power System Section 5.4.1 and the NYSRC Reliability Rules for Planning and Operating the New York State Power System Section E-R3.

The stability transfer limits were determined using the methodology cited in the NYISO Transmission Expansion and Interconnection Manual Attachment H NYISO Transmission Planning Guideline #3-1 Section 2.

There were twelve (12) western transfer test level power flow cases developed using the 2014 NYISO Dynamics Base Case power flow case and twenty-One (21) contingencies were applied to each power flow case to evaluate system stability. Appropriate generators' angles, power output, terminal voltages and speed in the study area were monitored with bus voltages and frequencies; internal and external interface power flows, SVCs and FACTs voltage and MVar outputs and HVDC parameters to assess system dynamic response.

Representative plots of the system response at the transfer test levels can be found in Section 10, below. Appendixes B1 – B12 contain the power flow summaries in graphical format and a select simulation plots for the most severe contingencies evaluated. The complete set of all the simulation plots will be made available on request.

3. Interface Summary

Tables 2 and 3 below show the interface definition for the Dysinger East and West Central Interfaces.

Table 2

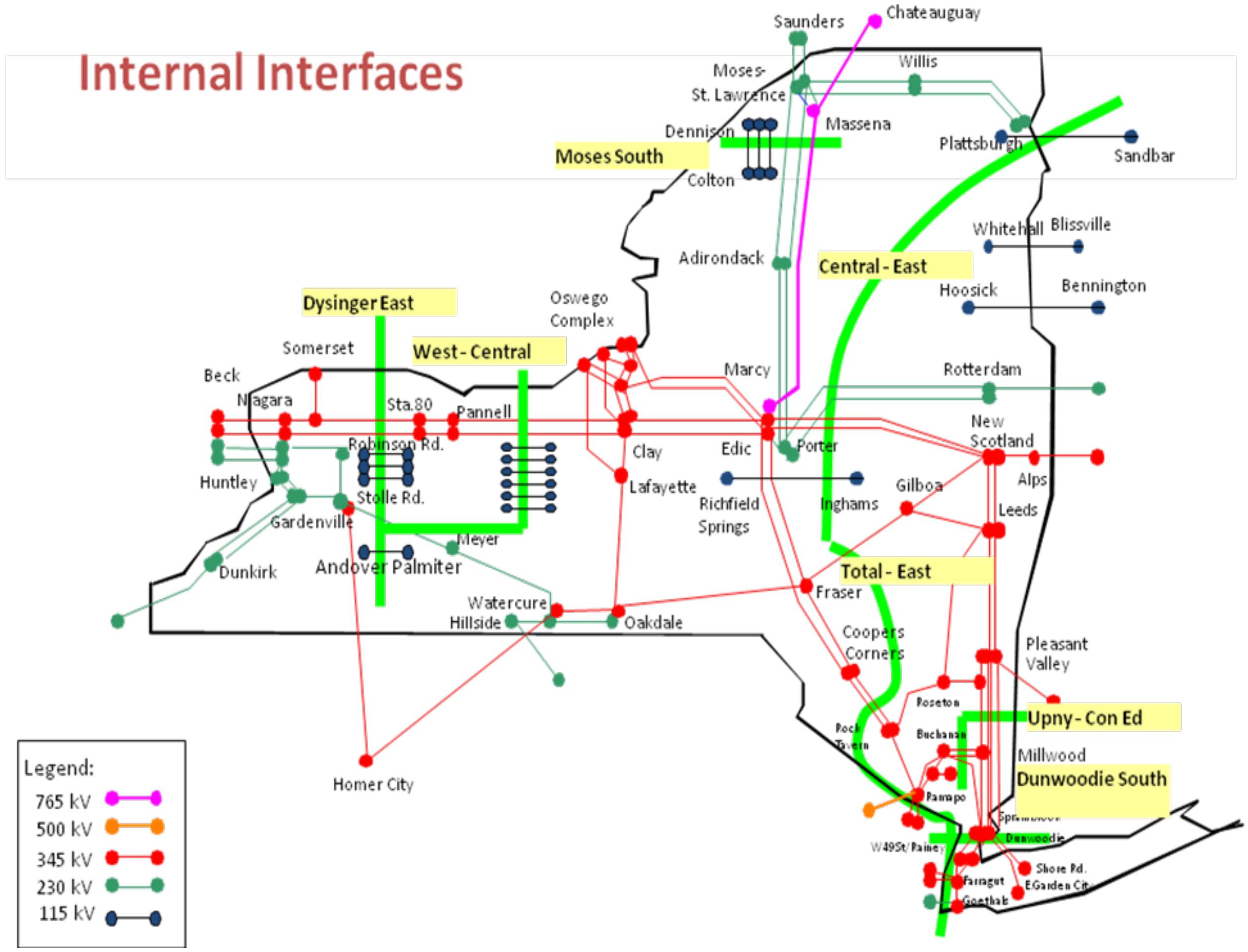
DYSINGER EAST

Name	Line ID	Voltage (kV)
West (Zone A) – Genesee (Zone B)		
*Somerset-Rochester (Station 80)	SR1-39	345
Niagara-Rochester*	NR2	345
*Lockport-Batavia	107	115
*Lockport-N. Akron	108	115
*Lockport-Oakfield	112	115
*Lockport-Sweden 1	111	115
*Lockport-Sweden 3	113	115
*Lockport-Telegraph	114	115
West (Zone A) – Central (Zone C)		
*Stolle Road – High Sheldon	67	230
*Andover - Palmiter	932	115

Table 3

WEST CENTRAL

Name	Line ID	Voltage (kV)
Genesee (Zone B) – Central (Zone C)		
Pannell Rd-Clay*	PC1	345
Pannell Rd-Clay*	PC2	345
*Quaker-Macedon	930	115
*Mortimer-Hook Rd-Elbridge	1/7	115
*Mortimer-Elbridge	2	115
*Pannell-Farmington	4	115
*Quaker-Sleight Rd	13	115
*St. 162 - S. Perry	906	115
Hook Rd (RGE-NGRID)	TB#3	34.5/115
Clyde	TR1	34.5/115
(Farmington 34.5/115kV)	#7	34.5/115
(Farmtn 34.5/115kV&12/115 kV)	#4	34.5/115 & 12/115
West (Zone A) – Central (Zone C)		
*Stolle Road – High Sheldon	67	230
*Andover - Palmiter	932	115


Internal Interfaces
Saunders
Chateauguay
Moses-
St. Lawrence
Willis
Massena
Dennison
Moses South
Colton
Plattsburgh
Sandbar
Whitehall
Blissville
Adirondack
Central - East
Hoosick
Bennington
Dysinger East
Oswego
Complex
West - Central
Somerset
Beck
Niagara
Sta.80
Pannell
Marcy
Rotterdam
New
Scotland
Robinson Rd.
Clay
Edic
Porter
Alps
Huntley
Stolle Rd.
Lafayette
Richfield
Springs
Inghams
Gilboa
Leeds
Gardenville
Meyer
Dunkirk
Andover
Palmiter
Total - East
Fraser
Watercure
Hillside
Oakdale
Coopers
Corners
Pleasant
Valley
Upny - Con Ed
Millwood
Dunwoodie South
Homer City
Legend:
765 kV
500 kV
345 kV
230 kV
115 kV

4. Criteria Statement

This study is conducted in accordance with NYSRC Reliability Rules for Planning and Operating the New York State Power System, Section E-R3, as excerpted below:

NYSRC Reliability Rules Section E-R3

E-R3. Stability Assessment

System stability transfer limits shall be consistent with the Reliability Rules and all applicable guidelines and procedures in the NYISO Guideline #3-0, "Guideline for Stability Analysis and Determination of Stability-Based Transfer Limits".

a. For normal transfers, stability of the NYS Bulk Power System shall be maintained during and after the most severe of contingencies "a" through "g" specified in Table A[1]. The NYS Bulk Power System must also be stable if the faulted element as described in Table A is re-energized by delayed reclosing before any manual system adjustment, unless specific alternate procedures are documented.

b. For emergency transfers, when firm load cannot be served, stability of the NYS Bulk Power System shall be maintained during and after contingencies "a" through "g" specified in Table A. The NYS bulk power system must also be stable if the faulted element as described in Table A is re-energized by delayed reclosing before any manual system adjustment.

Table A **Design Criteria Contingencies**
a. A permanent three-phase *fault* on any generator, transmission circuit, transformer or bus section, with *normal fault clearing*.
b. Simultaneous permanent phase-to-ground *faults* on different phases of each of two adjacent transmission circuits on a multiple circuit tower, with *normal fault clearing*. If multiple circuit towers are used only for station entrance and exit purposes, and if they do not exceed five towers at each station, then this condition is not applicable.
c. A permanent phase-to-ground *fault* on any generator, transmission circuit, transformer or bus section, with *delayed fault clearing*.
d. Loss of any *element* without a *fault*.
e. A permanent phase-to-ground *fault* on a circuit breaker, with *normal fault clearing*. (*Normal fault clearing* time for this condition may not always be high speed.)
f. Simultaneous permanent loss of both poles of a direct current bipolar HVDC facility without an ac *fault*.
g. The failure of a circuit breaker to operate when initiated by a *special protection*

5. System Representation

This analysis utilized the 2014 NYISO Operations Dynamics Base Case. The 2014 NYISO Operations Dynamics Base Case was developed from the NYISO Summer 2014 Operating Study base case for the New York representation and the 2013 series NERC/MMWG dynamic base case for the external network representation.

The NYISO load was modeled at **32,539 MW**.

6. Transfer Case Development

Appendixes B1 – B12 provide overview and summary of all the transfer base cases for the all-lines-in service and line outage scenarios evaluated.

Dysinger East transfers were developed from generation shifts between IESO and NYISO Zone A to Central (Zone C), Capital (Zone F), South East New York and ISO New England.

Over the years, load growth and generation retirements have converted the Genesee Area (Zone B) from a region which possessed excess generating capability and was capable of stressing West Central independent of Dysinger East to a load pocket. Presently, and for the foreseeable future, Genesee Area will continue to be a load pocket 24 x 7 x 365.

The difference between Dysinger East and West Central is the load between them. West Central flow is Dysinger East flow adjusted for the load consumed in Genesee (Zone B). If there is no system control available specifically for West Central, there is no application for defining an operating stability limit on West Central. When generation is added to the Genesee area to the extent that generation could once again exceed the load, West Central stability limits could be reinstituted.

7. Tested Contingencies

Table 4 WEST CENTRAL CONTINGENCIES	
WC01	3PH @ NIAGARA/NIAGARA ROCHESTER NR-2 /N.C.
WC01AR	3PH @ NIAGARA/NIAGARA ROCHESTER NR-2 W/RECLOSING
WC02	3PH @ ROCHESTER/NIAGARA-ROCHESTER NR-2 /N.C
WC02AR	3PH @ ROCHESTER/NIAGARA-ROCHESTER NR-2 W/RECLOSING
WC03	3PH@NIAGARA/NIAGARA-SOMERSET NS-1/38 /N.C
WC03AR	3PH@NIAGARA/NIAGARA-SOMERSET NS-1/38 W/RECLOSING
WC04	3PH @ ROCHESTER/SOMERSET-ROCHESTER SR-1/39 /N.C.
WC04AR	3PH@ROCHESTER/SOMERSET-ROCHESTER SR-1/39 W/RECLOSING
WC05	SLG/STK @ NIAGARA 345KV/NIAG-ROCH NR-2
WC06	SLG/STK @ SOMERSET/NIAGARA-SOMERSET NS-1/38
WC07	3PH @ ROCHESTER/ROCHESTER-PANNELL RP-1 /N.C.
WC07AR	3PH @ ROCHESTER/ROCHESTER-PANNELL RP-1 /RECLOSING
WC08AR	3PH @ PANNELL/PANNELL-CLAY PC-1 /RECLOSING
WC09	3PH @ PANNELL/ROCHESTER-PANNELL RP-1 NORM.CLR.
WC09AR	3PH @ PANNELL/ROCHESTER-PANNELL RP-1 /RECLOSING
WC10	SLG @ ROCHESTER 345KV ON ROCHESTER-PANNELL RP-1
WC11	SLG/STK @ PANNELL/ROCHESTER-PANNELL RP-1
WC12	SLG/STK @ ROCHESTER/SOMERSET-ROCHESTER SR-1/39
WC13	3PH @ NIAGARA 345KV / BECK-NIAGARA 345KV /N.C.
WC14	SLG/STK3502 @ ROCHESTER/KINTIGH-ROCHESTER SR-1/39
WC15	LLG @ BECK/NIAGARA-PACKARD

8. Monitored Parameters

In order to assess system stability response for the Dysinger East/ West Central interface power transfer scenarios considering contingencies, the following parameters were monitored and analyzed:

- Generators' angles, power outputs, terminal voltages, and speeds in the following areas/zones (HQ, ONT, North, Mohawk, Capital, representative generators from West, Central, ISO-NE, Hudson and NYC)
- Bus voltages and frequencies around Dysinger East and West Central
- Internal and External Interface flows
- SVCs and FACTs voltage and MVar output
- HVDC parameters

9. Limit Development Process

The stability transfer limits indicated in this study were developed in accordance with the NYISO Transmission Expansion and Interconnection Manual Attachment H, NYISO Transmission Planning Guideline #3-1, Section 2 excerpted below:

2 TRANSFER LEVEL

The determination of interface transfer limits requires the consideration of thermal, voltage and stability limitations. When determining a stability limit, a margin also shall be applied to the power transfer level to allow for uncertainties associated with system modeling. This margin shall be the largest of ten percent of the highest stable transfer level simulated or 200 MW. The margin also shall be applied in establishing a stability limit for faults remote from the interface for which the power transfer limit is being determined.

To confirm that power transfer levels will not be restricted by a stability constraint, the stability simulation shall be initially conducted at a value of at least ten percent above the controlling thermal or voltage-based transfer limit. The voltage-based transfer limit (“voltage transfer limit”) shall be determined in accordance with NYISO Transmission Planning Guideline #2, "Guideline for Voltage Analysis and Determination of Voltage-Based Transfer Limits." If a converged powerflow cannot be achieved at this higher transfer level, then the stability simulation shall be conducted at the highest achievable transfer level above the voltage transfer limit. If the stability simulation at that level is deemed to be stable, then voltage control facilities in the form of capacitive compensation shall be artificially added to the powerflow case to achieve a convergence at a transfer level equal to the voltage transfer limit divided by 0.90. This procedure ensures that the application of the margin does not result in the determination of a “stability limit” that is lower than the voltage transfer limit when the restriction is actually due to voltage. The amount and location of any such artificially added capacitive compensation shall be reported in the study results.

Stability limits shall be determined for interfaces on an independent basis. In doing so, it is recognized that interfaces for which the stability limit is not being determined may exceed their thermal, voltage or stability transfer capabilities. To assess the stability performance of the bulk power system, system stability and generator unit stability shall be considered.

2.1 System Stability

Overall power system stability is that property of a power system which ensures that it will remain in operating equilibrium through normal and abnormal conditions. The bulk power system shall be deemed unstable if, following a disturbance, the stability analysis indicates increasing angular displacement between various groups of machines characterizing system separation. Further, a power system exhibits "oscillatory instability" (sustained or cumulative oscillations) for a particular steady-state operating condition if, following a disturbance, its instability is caused by insufficient damping torque.

For a stability simulation to be deemed stable, oscillations in angle and voltage must exhibit positive damping within ten seconds after initiation of the disturbance. If a secondary mode of oscillation exists within the initial ten seconds, then the simulation time shall be increased sufficiently to demonstrate that successive modes of oscillation exhibit positive damping before the simulation may be deemed stable.

2.2 Generator Unit Stability

A generator is in synchronous operation with the network to which it is connected if its average electrical speed (the product of its rotor angular velocity and the number of pole pairs) is equal to the angular frequency of the alternating current network voltage.
For those cases where the stability simulation indicates generator unit instability, the NYISO shall determine whether a power transfer limit shall be invoked or whether the unit instability shall be considered to be acceptable. To determine whether the generator unit instability may be deemed acceptable, the stability simulation shall be re-run with either the generator unit in question tripped due to relay action or modeled unstable to assess such impact on overall bulk power system performance. The

result of this latter simulation shall determine whether a stability-based transfer limit shall be applied at the simulated power transfer level.

10. Discussion

Appendixes B1 –B12 contain the powerflow summaries in graphical format and a select simulation plots for the most severe contingencies evaluated. The complete set of all the simulation plots will be made available on request.

Categorization of system response

All identified limits are defined from the highest attainable transfer test levels. No instances of system or unit instability were observed under the configurations examined and the contingencies evaluated. The remarks column on Table 5 categorizes the stability transfer limits as follows:

- Power Flow Transfer Limit – the test transfer level case no longer solves prior to utilization of all generation in the Zone A and available transfer capacity from neighboring systems.
- Capacity Transfer Limit – all generation in the Zone A and available transfer capacity from neighboring systems have been utilized.

Table 5 summarizes the Dysinger East limits, the test levels, outage conditions, the most limiting contingencies, and the characterization of the limits. Scenarios 1-5 have always been evaluated for Dysinger East. Scenarios 6 and 7 have been historically been employed to define West Central stability limits. As discussed in the Introduction, these outage conditions have now been added to the Dysinger East limits.

The limits developed for outages of Stolle-Meyer and Meyer-Canandaigua is to be applied to opening of the 230 KV paths anywhere between Stolle and Hillside. With the introduction of wind farm stations along this path, there are numerous locations where the flow can be interrupted.

In Table 5, scenarios 8-12 represent extreme outage conditions under which the NYISO would not typically plan to operate. The limits are provided here as boundary conditions to address any potential maintenance plus forced outage conditions that may occur in real time.

All identified limits are defined from the highest attainable transfer test levels. No instances of system or unit instability were observed under the configurations examined and the contingencies evaluated. Figure 1 provides a summary of the Angle/voltage response to the limiting contingency for the all-lines-in-service scenario. Figures 2 through 12 provide summaries of the machine angle/voltage responses for the line outage scenarios.

Table 5 Dysinger East Limit Testing						
#	**NYISO Interface/ Study Scenario**	**Existing Limit (MW)**	**Test Level (MW)**	**Limiting Event**	**Stability Limit 10% Margin (MW)**	**Remarks**
	Dysinger East Interface					
1	Seasonal Limit (ALI)	2850	3540	WC-12 Fig 1	3150	Power Flow Transfer Limit
2	Stolle Road – Meyer 230kV path O/S (67/81/83/85)	2650	3170	WC-12 Fig 2	2850	Power Flow Transfer Limit
3	Meyer-Hillside 230kV path O/S (60/68/72)	2650	3410	WC-12 Fig 3	3050	Power Flow Transfer Limit
4	Niagara – Rochester (NR2) 345 kV O/S	2350	2630	WC-12 Fig 4	2350	Power Flow Transfer Limit
5	Somerset – Rochester (SR1-39) 345 kV O/S	2350	2650	WC-05 Fig 5	2350	Power Flow Transfer Limit
6	Rochester – Pannell 345kV path O/S (RP-1/RP-2)	N/A	3470	WC-10 Fig 6	3100	Power Flow Transfer Limit
7	Pannell – Clay 345KV path O/S (PC-1/PC-2)	N/A	3360	WC-12 Fig 7	3000	Power Flow Transfer Limit
8	NR-2 NIAGARA - ROCHESTER 345 KV O/S AND SR-1 SOMERST - ROCHESTER 345 KV O/S	N/A	1460	WC-13 Fig 8	1250	Power Flow Transfer Limit
9	NR-2 NIAGARA - ROCHESTER 345 KV O/S AND 67 STOLLE ROAD-MEYER 230 KV O/S	N/A	2378	WC-12 Fig 9	2100	Power Flow Transfer Limit
10	Stolle Road – Meyer (67/81/83/85) 230 kV O/S AND S. Ripley – Erie E (69) 230 kV O/S	N/A	3210	WC-12 Fig10	2850	Power Flow Transfer Limit
11	Rochester – Pannell (RP-1) 345 kV O/S AND Rochester – Pannell (RP-2) 345 kV O/S	N/A	2756	WC-12 Fig 11	2450	Power Flow Transfer Limit
12	Pannell - Clay (PC-1) 345 kV O/S AND Pannell - Clay (PC-2) 345 kV O/S	N/A	2846	WC-12 Fig 12	2550	Power Flow Transfer Limit

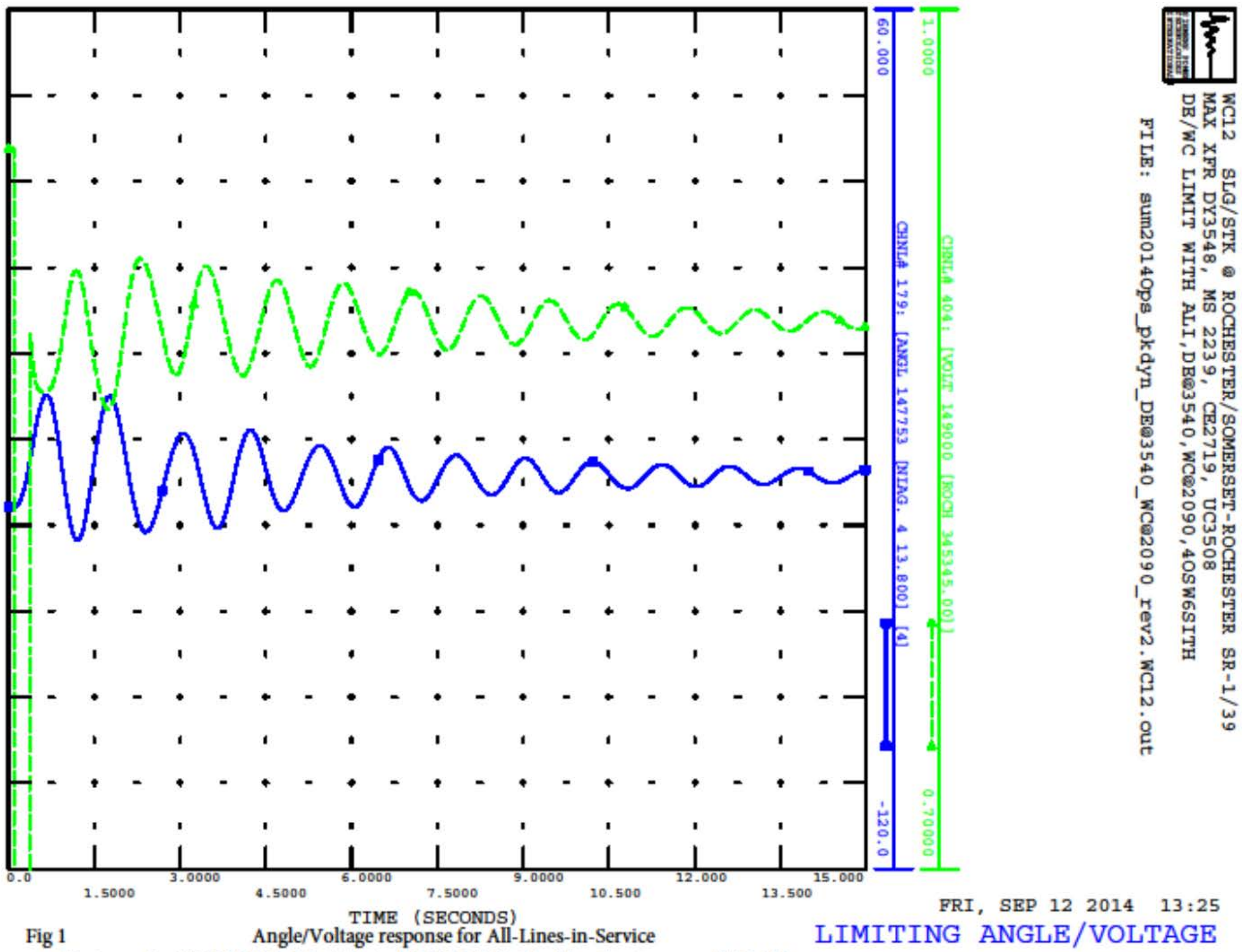


Fig 1 Angle/Voltage response for All-Lines-in-Service

Dysinger East (3450 MW), West Central (2090 MW) Limiting Contingency (WC-12)

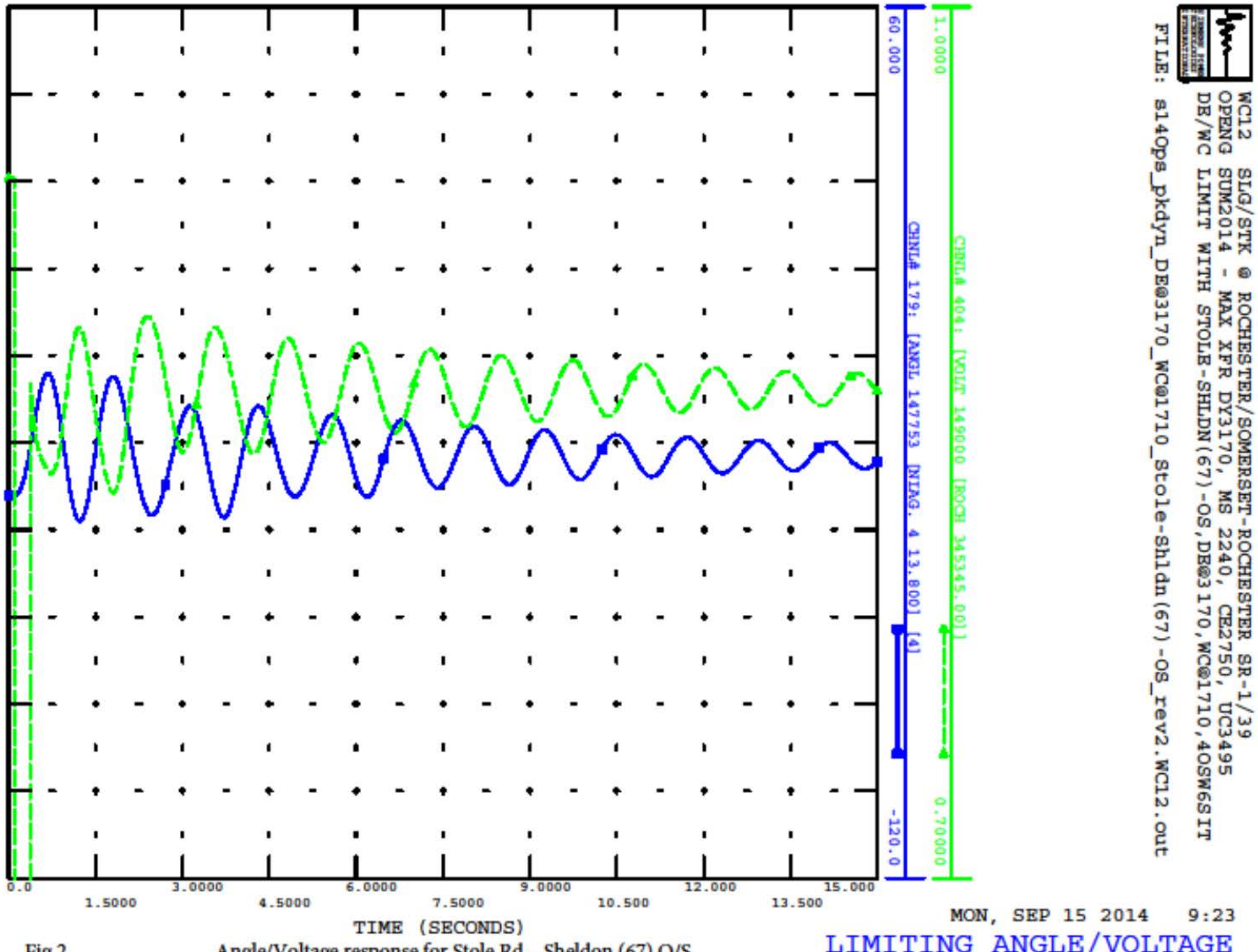


Fig 2 Angle/Voltage response for Stole Rd – Sheldon (67) O/S
Dysinger East (3170 MW), West Central (1710 MW) Limiting Contingency (WC-12)

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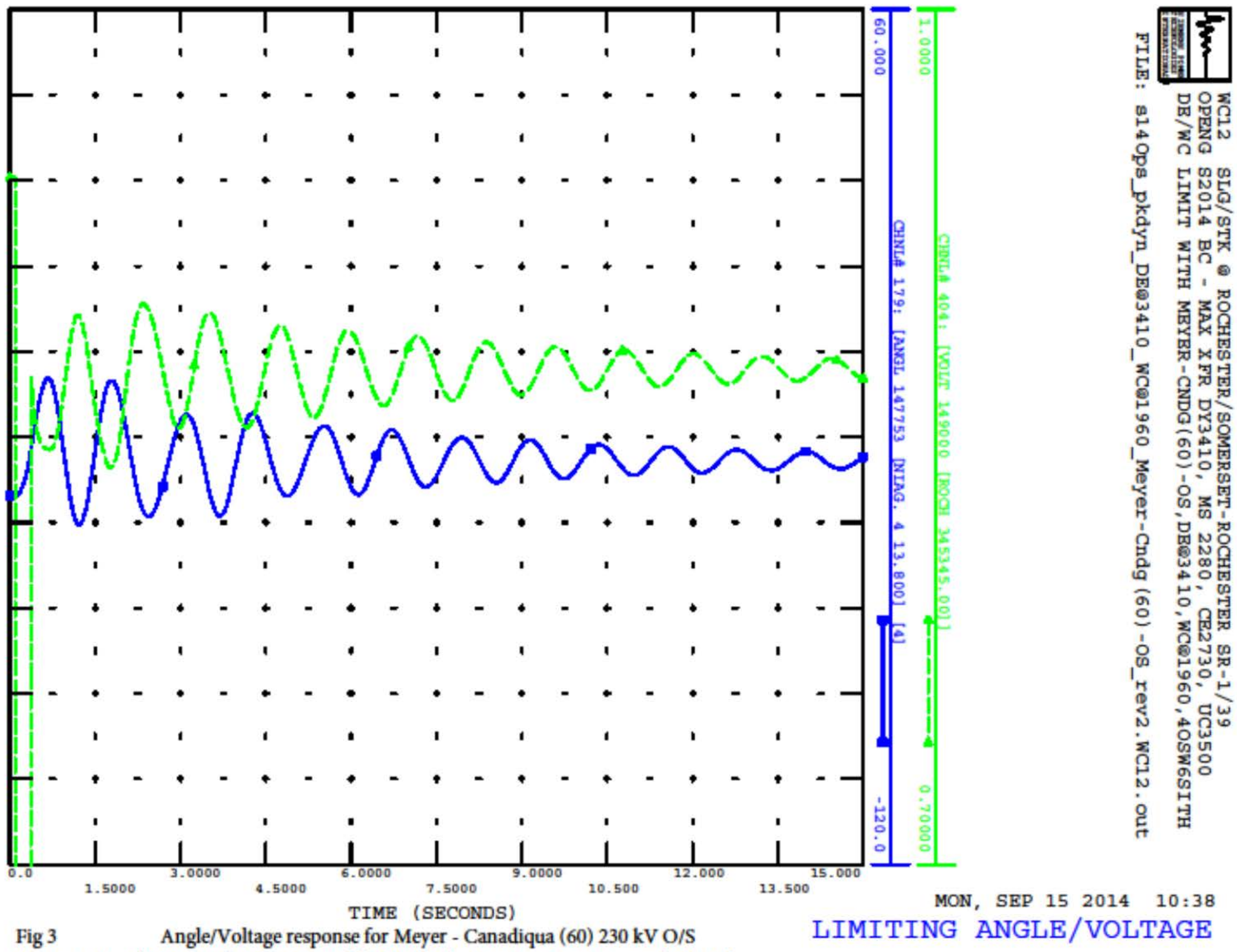

Fig 3 Angle/Voltage response for Meyer - Canadiqua (60) 230 kV O/S
Dysinger East (3410 MW), West Central (1960 MW) Limiting Contingency (WC-12)

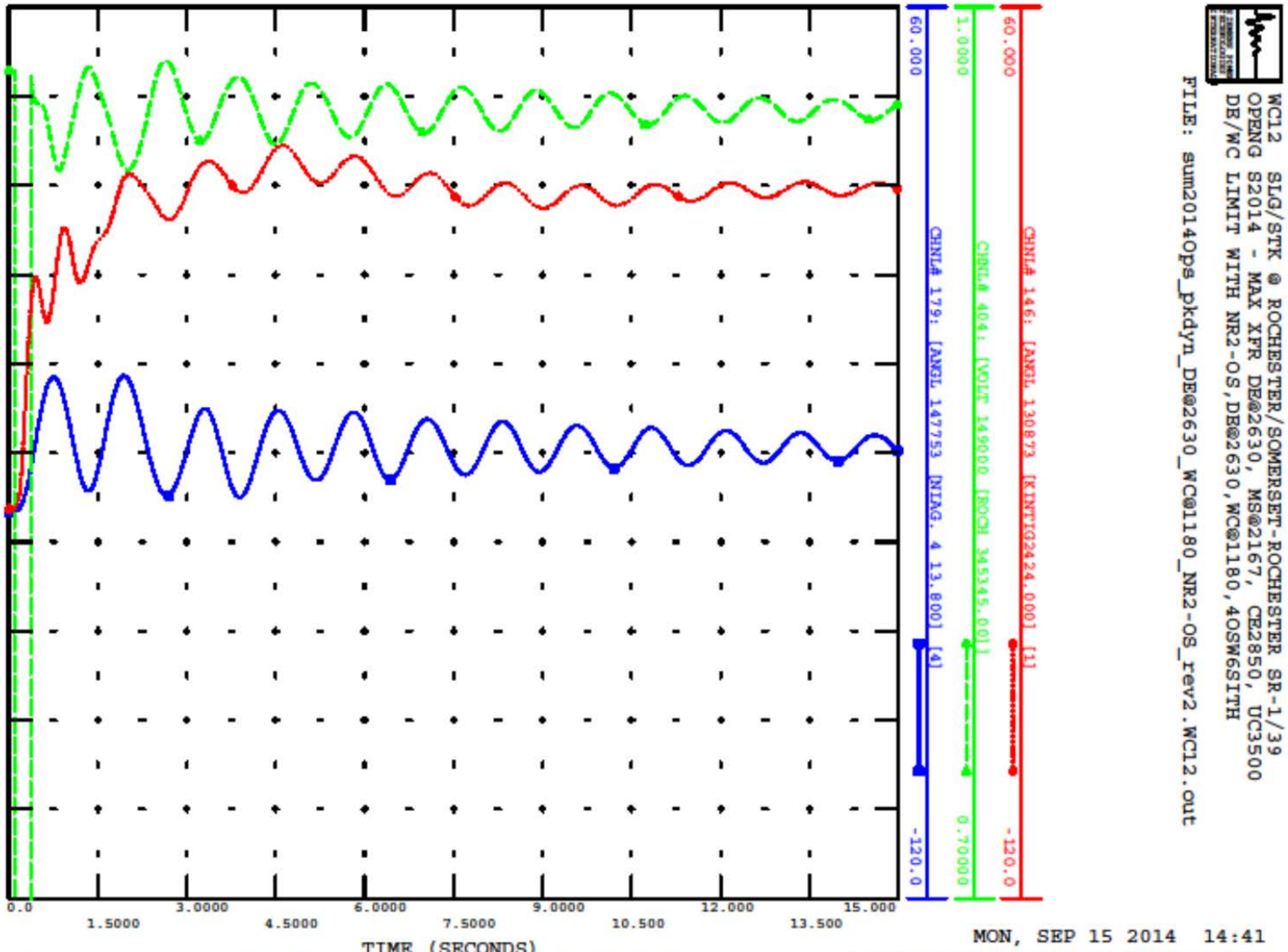

Fig 4 Angle/Voltage response for Niag - Roch (NR2) 345 kV O/S
Dysinger East (2630MW), West Central (1180 MW) Limiting Contingency (WC-12)

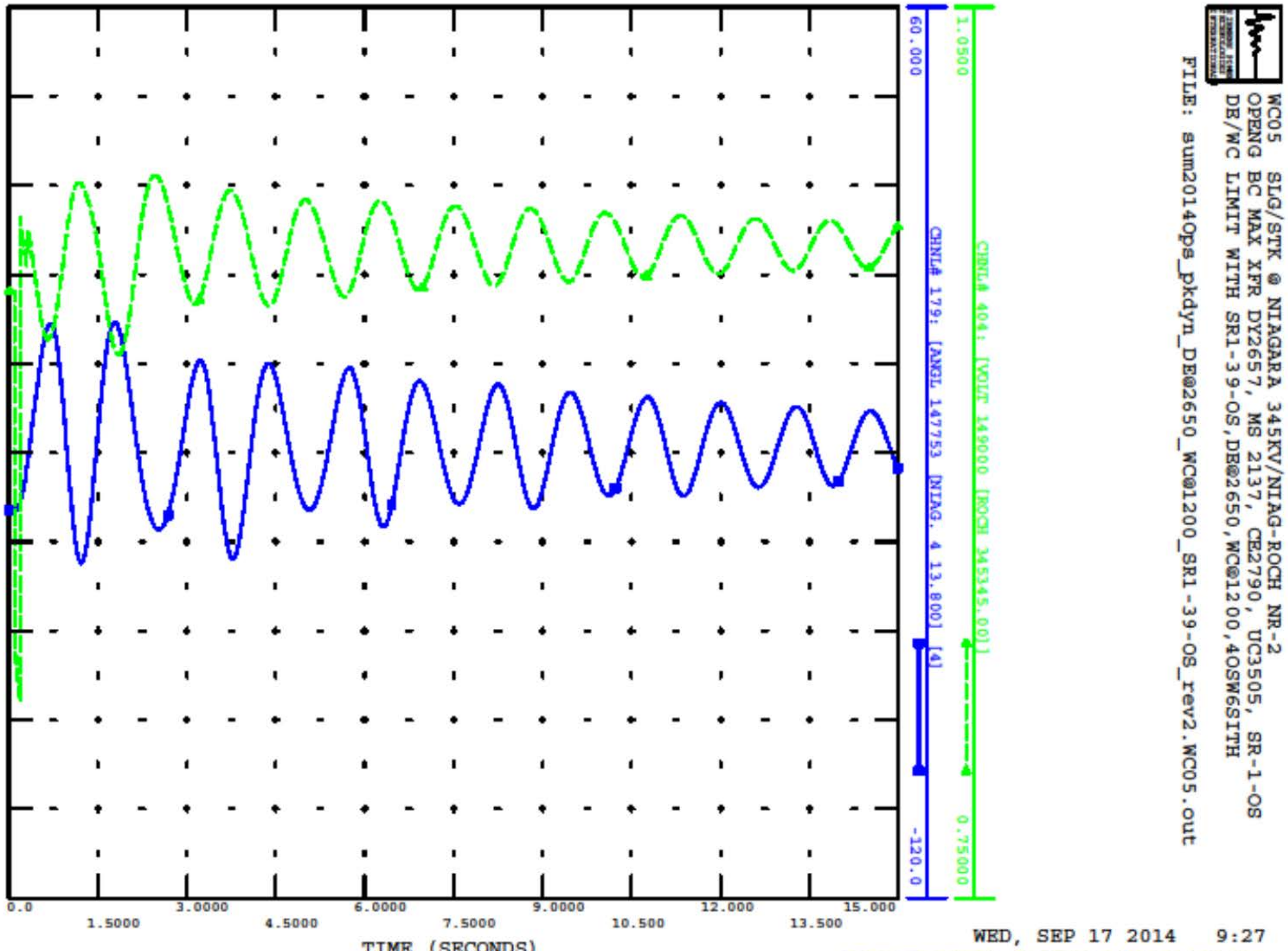

Fig 5 Angle/Voltage response for Sommerset- Roch (SR1-39) 345 kV O/S
Dysinger East (2650MW), West Central (1200 MW) Limiting Contingency (WC-05)

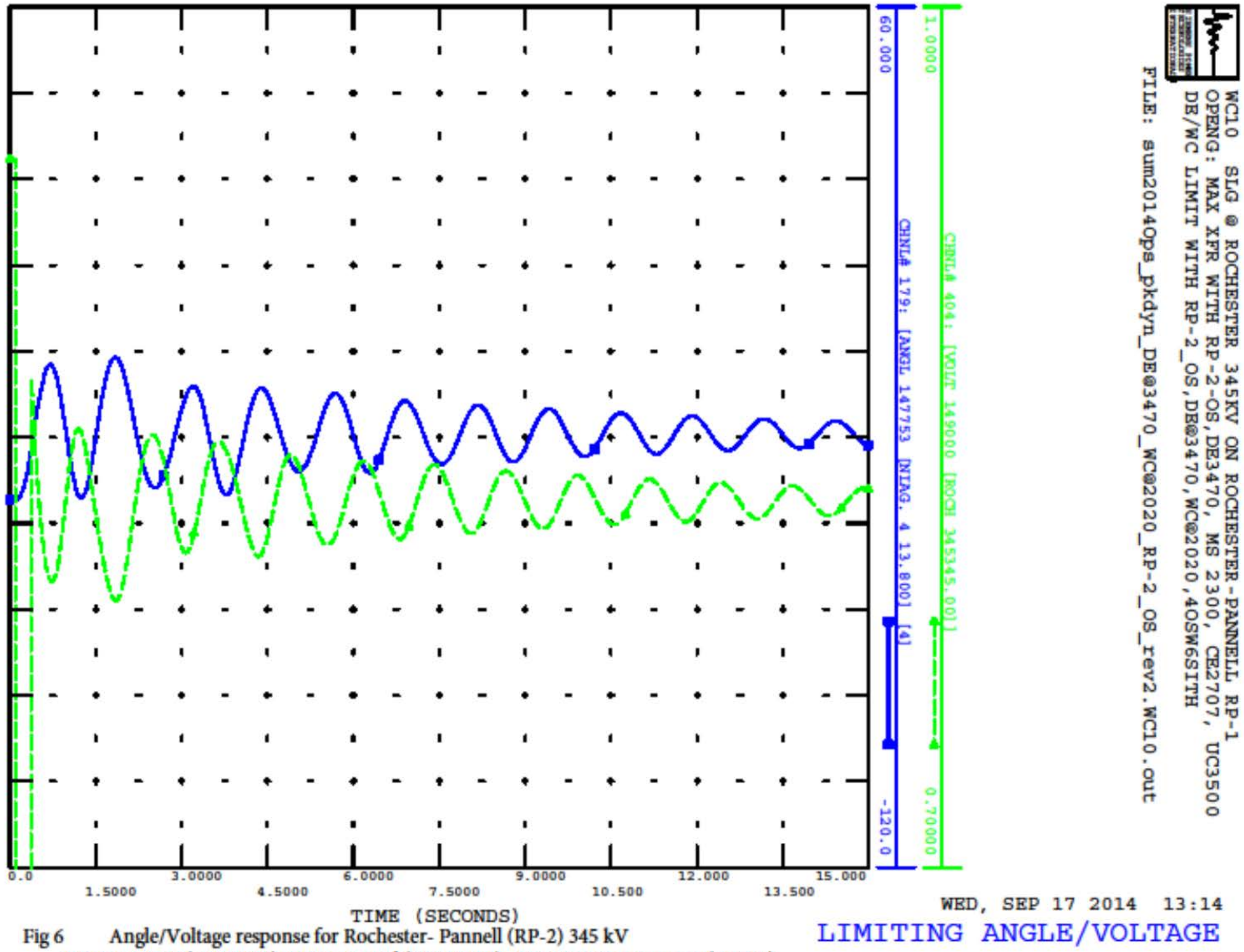

Fig 6 Angle/Voltage response for Rochester- Pannell (RP-2) 345 kV
Dysinger East (3470MW), West Central (2020 MW) Limiting Contingency (WC10)

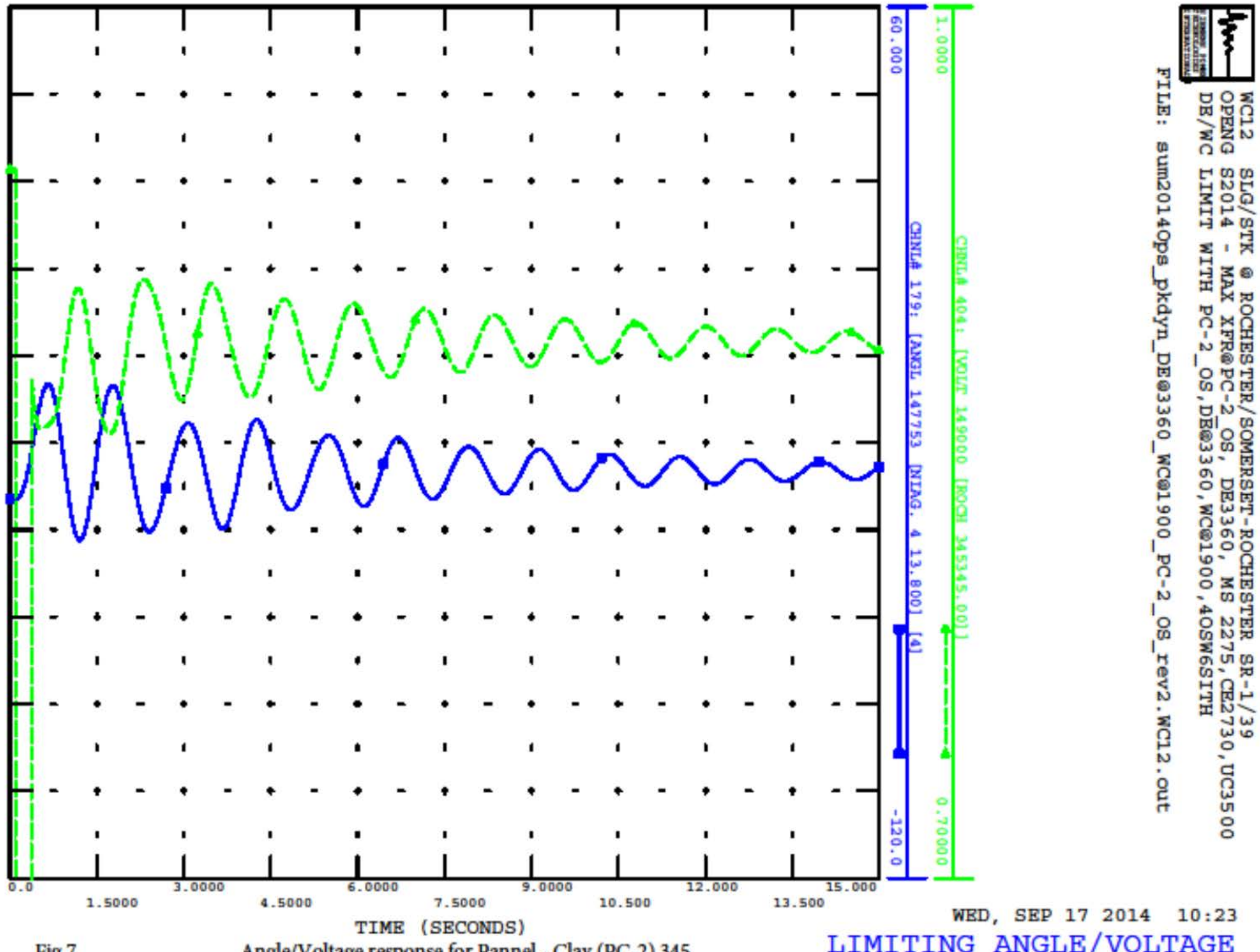

Fig 7 Angle/Voltage response for Pannel - Clay (PC-2) 345
Dysinger East (3360MW), West Central (1900 MW) Limiting Contingency (WC-12)

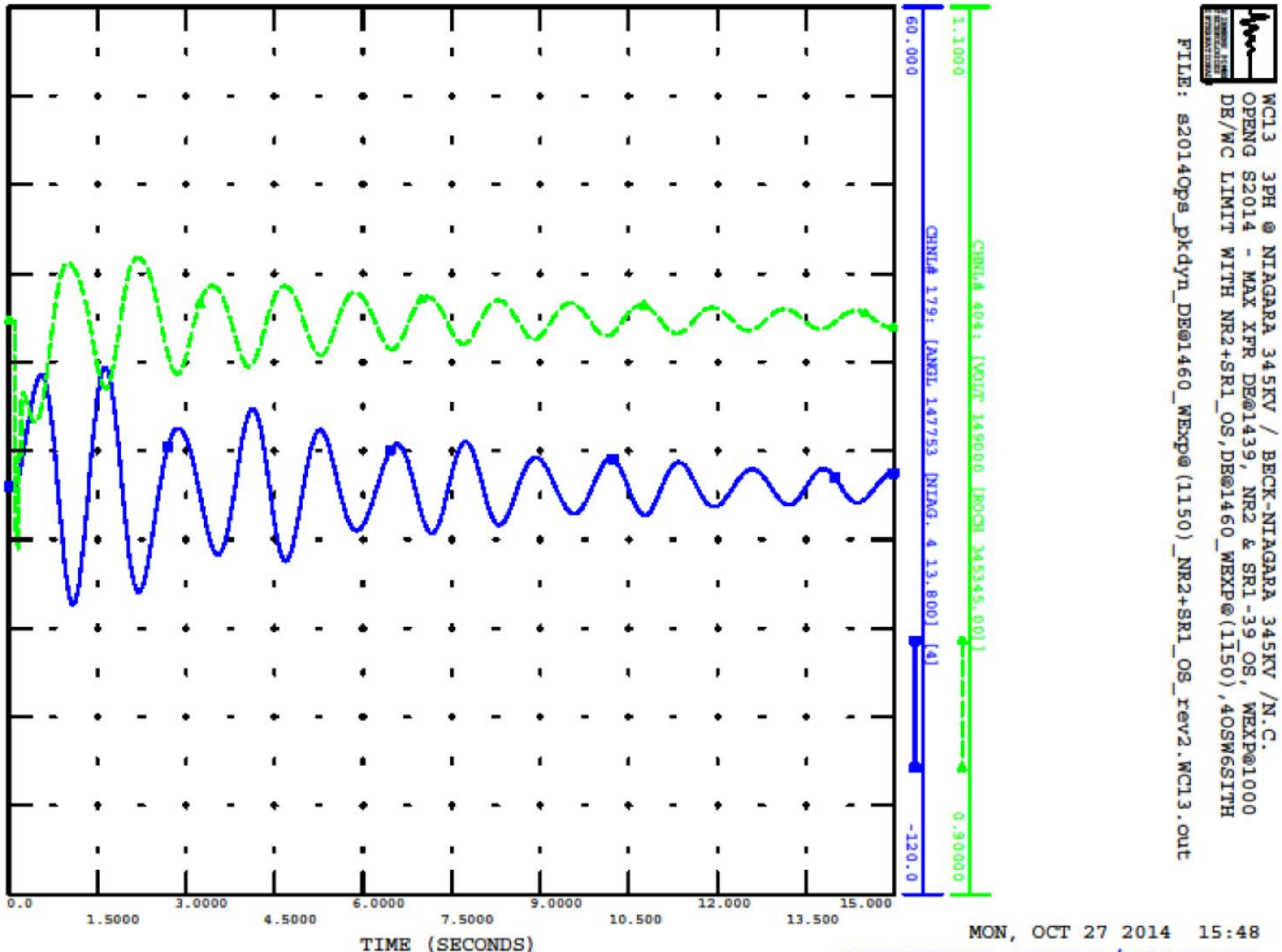

Fig 8 Angle/Voltage response for Niag- Roch (NR2)& Somerset-Roch (SR1-39) 345 kV O/S Dysinger East (1460 MW), W.Export(1150), Limiting Contingency (WC13)

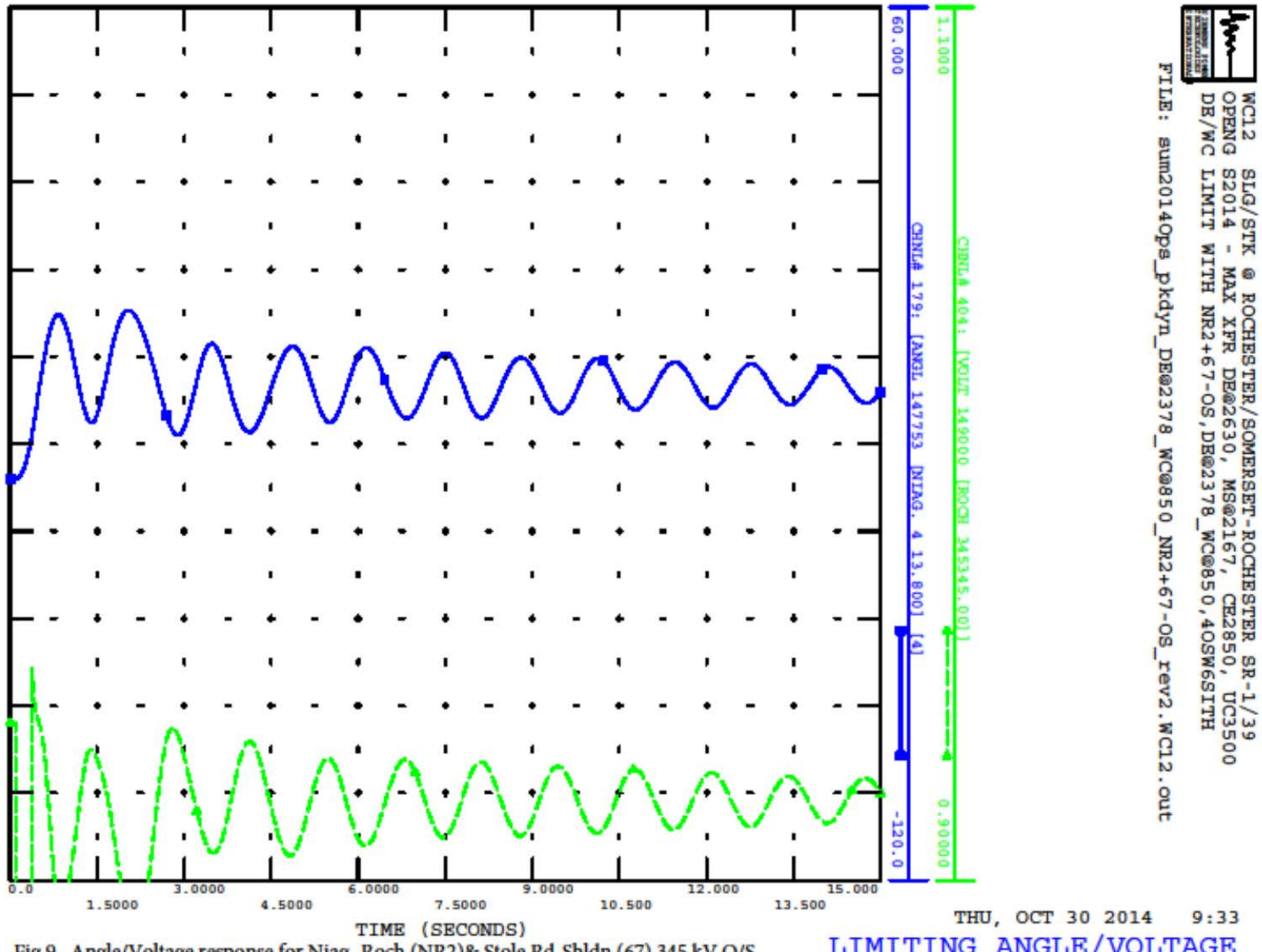

Fig 9 Angle/Voltage response for Niag- Roch (NR2)& Stole Rd-Shldn (67) 345 kV O/S
Dysinger East (2378 MW), WC (850), Limiting Contingency (WC12)

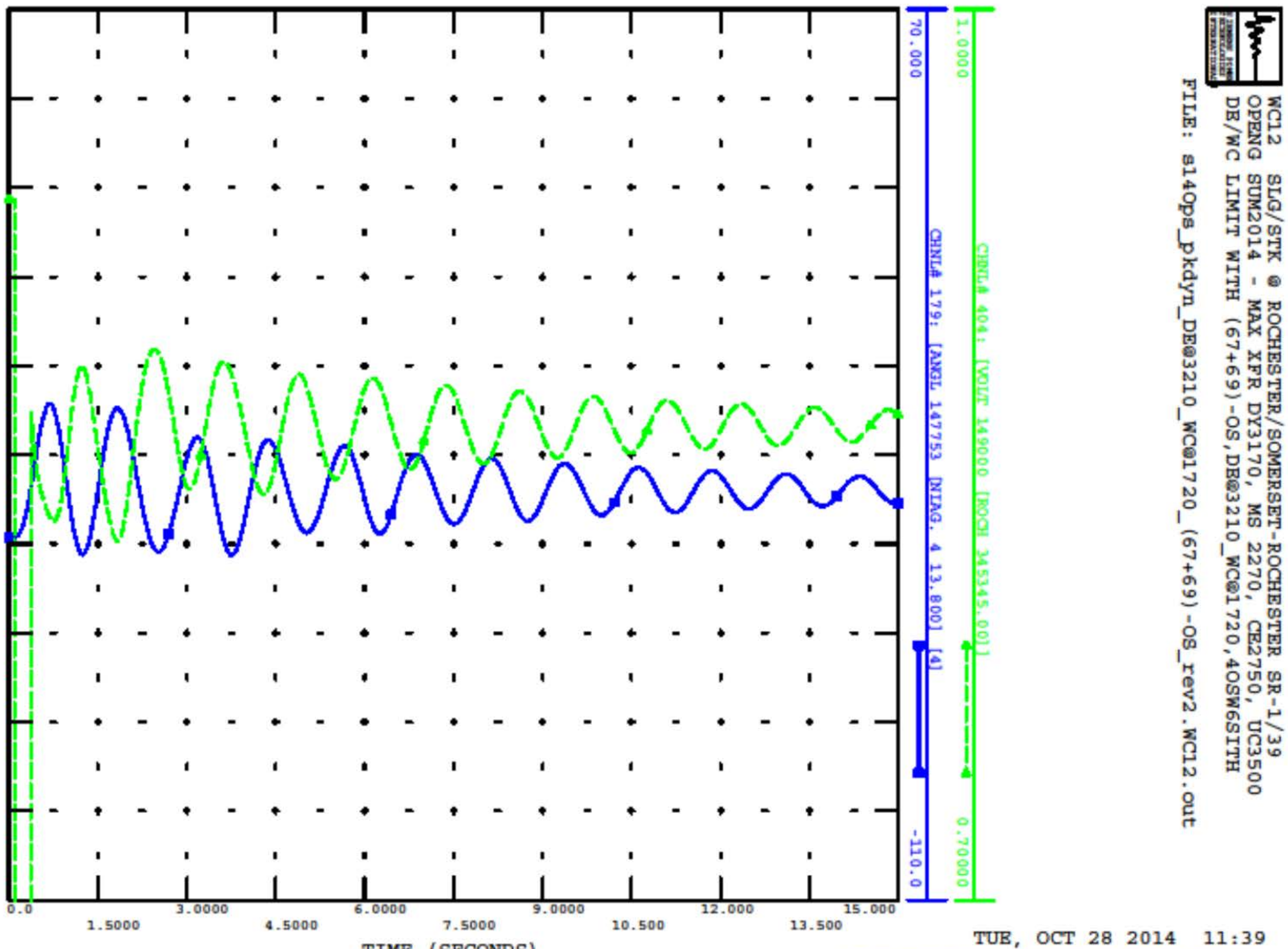

Fig 10 Angle/Voltage response for Stole Rd-Shldn (67) & S.Ripley-ErieE (69) 345 kV O/S Dysinger East (3210 MW), WC (1718), Limiting Contingency (WC12)

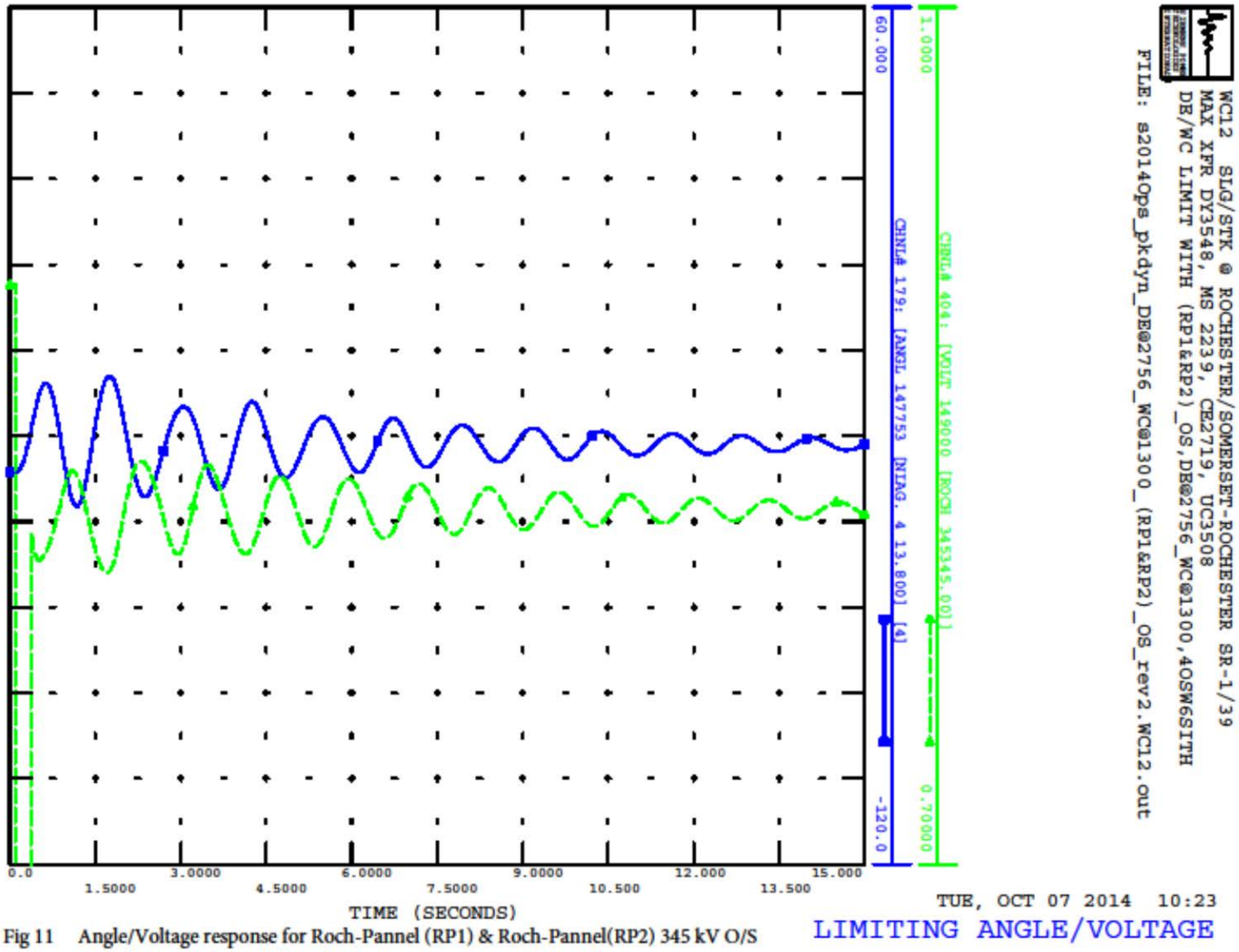

Fig 11 Angle/Voltage response for Roch-Pannel (RP1) & Roch-Pannel(RP2) 345 kV O/S Dysinger East (2756 MW), WC (1300), Limiting Contingency (WC12)

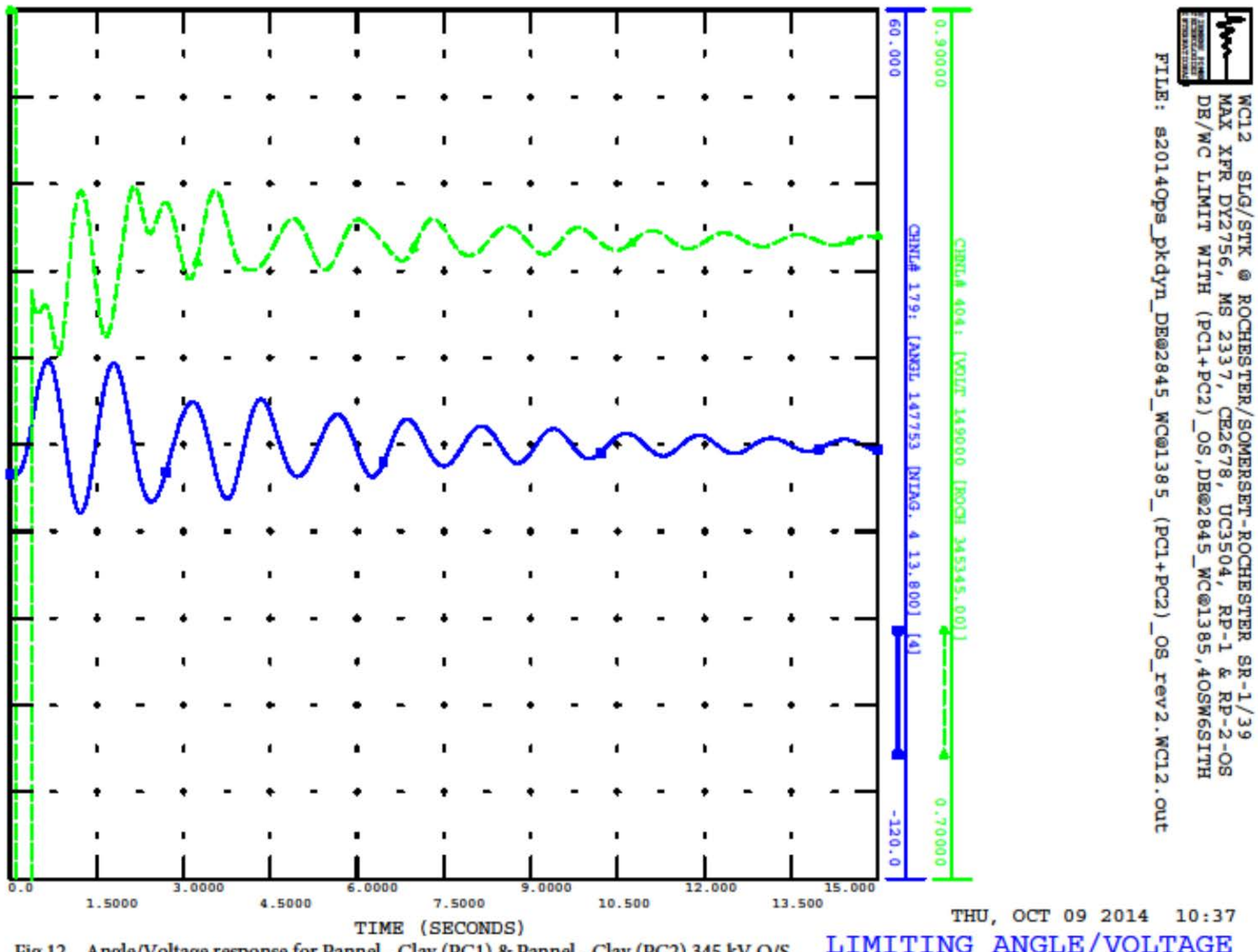

Fig 12 Angle/Voltage response for Pannel - Clay (PC1) & Pannel - Clay (PC2) 345 kV O/S Dysinger East (2845 MW), WC (1385), Limiting Contingency (WC12)

11. Recommendations

Based on the results of this study, it is recommended that the NYISO Dysinger East/West Central stability transfer limits on "Summary of Interface Limits & Operating Studies" posted on NYISO website be updated according to Table 6 below.

Table 6.

Recommended Dysinger East stability transfer limits.

DYSINGER-EAST	Proposed Limit (MW)	Report	Date
SEASONAL LIMIT	3150	DE/WC-14	2/15
STOLLE ROAD-MEYER 230kV path O/S (67/81/83/85)	2850	DE/WC-14	2/15
MEYER-HILLSIDE 230kV path O/S (60/68/72)	3050	DE/WC-14	2/15
NR-2 NIAGARA - ROCHESTER 345 KV **OR** SR-1 SOMERST - ROCHESTER 345 KV O/S	2350	DE/WC-14	2/15
ROCHESTER – PANNELL 345kV path O/S (RP-1/RP-2)	3100	DE/WC-14	2/15
PANNELL – CLAY 345KV path O/S (PC-1/PC-2)	3000	DE/WC-14	2/15
NR-2 NIAGARA - ROCHESTER 345 KV O/S AND SR-1 SOMERST - ROCHESTER 345 KV O/S	1250	DE/WC-14	2/15
NR-2 NIAGARA - ROCHESTER 345 KV O/S AND 67 STOLLE ROAD-MEYER 230 KV	2100	DE/WC-14	2/15
STOLE RD – HIGH SHELDN (67) 230 kV O/S AND S. RIPLEY – ERIE E (69) 230 kV O/S	2850	DE/WC-14	2/15
ROCH. – PANNELL (RP-1) 345 kV O/S AND ROCH. – PANNELL (RP-2) 345 kV O/S	2450	DE/WC-14	2/15
PANNELL-CLAY (PC-1) 345 kV O/S AND PANNELL-CLAY (PC-2) 345 kV O/S	2550	DE/WC-14	2/15
WEST CENTRAL			
SEASONAL LIMIT	9999	DE/WC-14	2/15
RP-1 ROCHESTER – PANNELL 345 KV O/S	9999	DE/WC-14	2/15
PC-1 PANNELL – CLAY 345 KV O/S	9999	DE/WC-15	2/15
NR-2 NIAGARA-ROCHESTER 345 KV OR SR-1 SOMERST-ROCHESTER 345 KV O/S	9999	DE/WC-14	2/15