Final OC Approved

TOTAL EAST STABILITY LIMITS ANALYSIS FOR ALL LINES I/S AND OUTAGE CONDITIONS (TE-16)

A report from the New York Independent System Operator

August 10th 2017

NEW YORK INDEPENDENT SYSTEM OPERATOR

Executive Summary

This study was conducted as a periodic review of stability limits for the Total East interface. The Total East Interface is a closed interface linking central NY to eastern NY. For more details refer to Table 2 and Fig 1.The study provides updates to the all-lines-in-service limit as well as the two equipment outage limits associated with Total East. The transfer limits developed in this analysis increase by 300 to 500 MW as shown on Table 1.

The limits recommended in this report are all based on stable system response at the highest transfer level tested. There were no instances of any system or unit instability observed in this analysis.

This study confirmed the lack of sensitivity of the Total East stability limits to the status of the recently installed Marcy South Series Capacitors. The results show that the stability limits are all valid with or without the Marcy South Series Capacitors in-service.

On an informational basis, this study examined the system responses for contingencies involving three-phase faults, line-to-line-to-ground faults as well as the normal criteria single-phase line-to-ground faults. The new all-lines-in-service stability limits for Total East is valid for either form of contingency at the levels tested.

It is recommended that the Total East stability transfer limits be updated as reported on Table 1. Implementing these increased limits are anticipated to have no impact on NYISO operations, since the current stability limits Total East have not historically constrained in day-ahead or real-time operations.

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1. Introduction

The purpose of this study was to conduct a periodic re-evaluation the Total East Stability Transfer Limits.

The study evaluated the all lines in-service condition, outage on the 5018 line and outage of an SVC/STATCOM. These system scenarios were also subjected to the outage of the MSSC to study the dynamic response of the system. The dynamic response of the system was gauged by examining the voltage response at Edic and generator angles at Athens and Somerset.

On an informational basis, this study examined the system response to the extreme contingency three-phase line-to-line-to-ground faults as well as the normal criteria single-phase line-to-line-to-ground faults.

Transfer cases were developed with two configurations: one with the 2 Oswego and 5 Sithe units in-service (2 Oswego 5 Sithe) and the other with the 3 Oswego and 5 Sithe units in service (3 Oswego 5 Sithe). Both configurations and were subjected to outage conditions and contingencies.

2 . Summary of proposed Limits

Table 1 shows the new proposed limits and the existing limits for Total East. The existing limits imposes a 100 MW reduction for outages on the 5018 Ramapo-Branchburg 500kV Line and a further 100MW reduction for the outage of any SVC/STATCOM. The new proposed limits would be having a single stability limit for all outage conditions across the board.

Table 1

Proposed and Existing Total East Stability Limits

	Scenario	Proposed Limit (MW)		Existing Limit (MW)		Diff (MW)
1	All Lines In	6800		6500		300
2	5018 Ramapo-Hotpatcong 500kV O/S	6800		6400		400
3	5018 Ramapo-Hopatcong 500kV & (SVC or Statcom O/S)	6800		6300		500

3. System Operating Limit Methodology

"NYSRC Reliability Rules for Planning and Operating the New York State Power System" (NYSRC Rules) provides the methodology for developing System Operating Limits (SOLs) within the NYISO Reliability Coordinator Area. Rule C of the NYSRC Rules sets forth the contingencies to be evaluated and the performance requirements to be applied in developing SOLs. Rule C also incorporates NYISO Transmission Planning Guideline #3-1, "Guideline for Stability Analysis and Determination of Stability-Based Transfer Limits" set forth in Attachment H to the NYISO "Transmission Expansion and Interconnection Manual."

4. Interface Summary

The Total East interface definition is given in Table 2 and illustrated in Figure 1.

Table 2

Total East Interface Definition

Name	Line ID	(kV)		Name	Line ID	(kV)
Edic-New Scotland*	14	345		*Waldwick-S. Mahwah	K3411	345
Marcy-New Scotland*	18	345		Hudson-Farragut*	C3403	345
*Fraser-Gilboa	GF5-35	345		Hudson-Farragut*	B3402	345
Porter-Rotterdam*	30	230		Linden-Goethals*	A2253	230
Porter-Rotterdam*	31	230		*Cresskill – Sparkill	751	69
East Springfield - Inghams*	7	115		*Harings Corners – W. Nyack	701	69
Inghams PAR	PAR	115		*Harings Corners – Corporate Drive	703	138
Inghams Bus Tie	R81	115		*Montvale – Bluehill	44	69
Middletown-Rock Tavern*	CCRT34	345		*Montvale – Bluehill	43	69
Coopers Corners- Dolson Ave*	CCDA42	345		*Montvale – Pearl River	491	69
Middletown 345*/138	BK114	345/138		*Harings Corners – Pearl River	45	34
West Woodbourne 115/69*	BK1	115/69		*S. Mahwah – Ramapo	51	138
*Plattsburgh-Sand Bar	PV20	115		*S. Mahwah - Hilburn	65	69
Hopatcong-Ramapo*	5018	500		S. Mahwah 138/345*	BK258	138/345
*Waldwick- S. Mahwah	J3410	345				

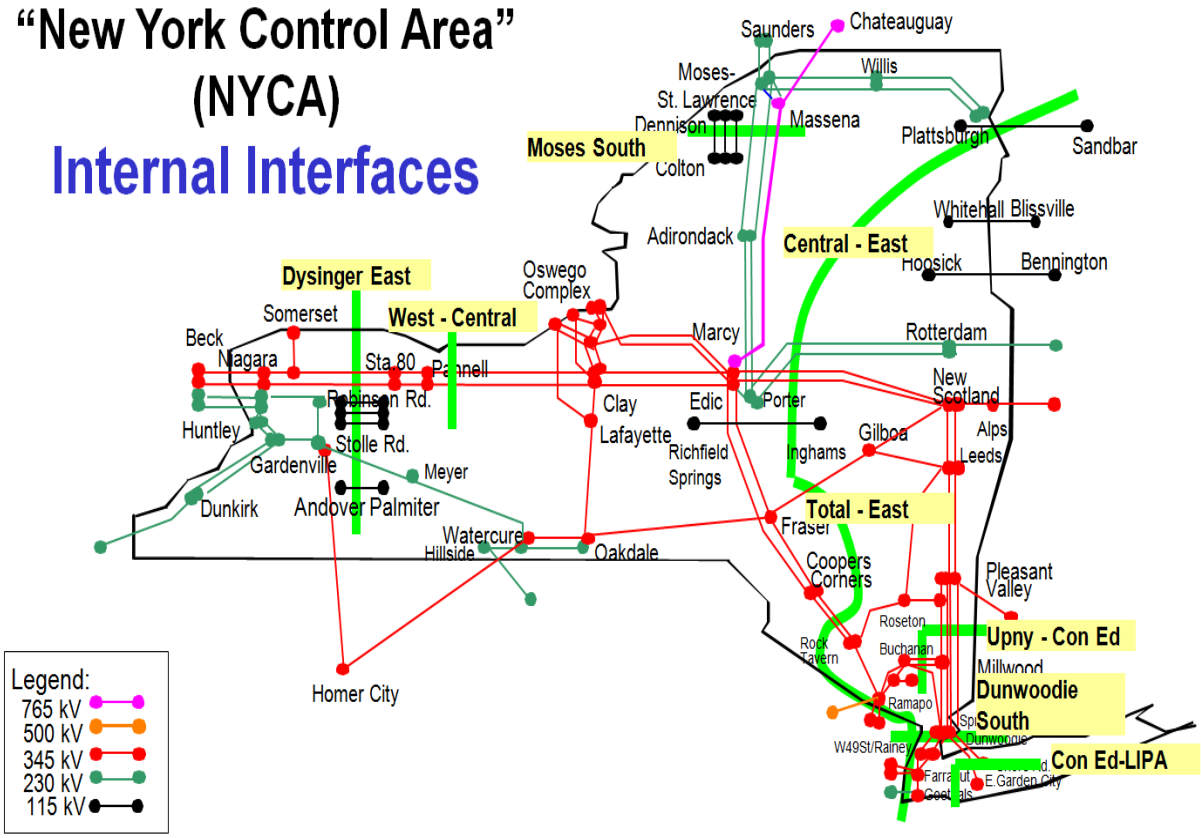

Figure 1. NYCA Transmission System Interface (Total East inset)

5. System Representation and Transfer Case Development

The analysis was based on the 2016 NYISO Dynamics Base Case that was developed from the 2016 MMWG Dynamics Base Case with the NYISO representation updated to reflect the results of the NYISO 2016 Summer Operating Study.

The base case model includes the following:

- the NYISO Transmission Operator area;
- all Transmission Operator areas contiguous with NYISO;
- all system elements modeled as in-service;
- all generation represented;
- phase shifters in the regulating mode;
- the NYISO Load Forecast;
- transmission facility additions and retirements;
- generation facility additions and retirements;
- Remedial Action Scheme (RAS) models currently existing or projected for implementation within the studied time horizon;
- series compensation for each line at the expected operating level; and
- facility Ratings as provided by the Transmission Owner and Generator Owner.

Eight transfer cases were developed as shown on Table 3. One set varied 5018 line status and Marcy South Series Compensation Status with 2 Oswego and 5 Sithe units in-service, and the other set varied 5018 line status and Marcy South Series Compensation Status with 3 Oswego and 5 Sithe units in-service. The capacitor banks at Oakdale and Edic were producing maximum VAR output of 135MVAR and 200MVAR respectively. All Athens generators were set to generate maximum power output. The 7040 tie line between Hydro-Quebec and the NYCA was importing 1180MW(all AC) with the DC lines put out of service.

Table 3 Transfer Cases	
LF1	TE 7758, 2 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 I/S, MSSC I/S
LF2	TE 7758, 2 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 I/S, MSSC O/S
LF3	TE 7758, 2 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 O/S, MSSC I/S
LF4	TE 7758, 2 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 O/S, MSSC O/S
LF5	TE 7758, 3 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 I/S, MSSC I/S
LF6	TE 7758, 3 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 I/S, MSSC O/S
LF7	TE 7758, 3 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 O/S, MSSC I/S
LF8	TE 7758, 3 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 O/S, MSSC O/S

In all these cases the Statcom and SVC were idling at zero reactive output. For the stability simulations the Statcom or the SVC can be switched out of service without affecting the power flow.

6. Tested Contingencies

Twenty two (22) contingencies were tested for each developed Total East transfer case scenario. Table 4 provides the identification and description of these contingencies.

Table 4.
Contingencies applied for evaluating Total East stability transfer limits.

#	ID	Description
1	TE02	3PH@FISHKILL-L/O TOWER(2-1938)FISHKILL*PLEASANTVILLE
2	TE02(LLG)	LLG@FISHKILL-L/O TOWER(2-1938)FISHKILL*PLEASANTVILLE
3	TE03	3PH@SPRAIN BK-L/O TOWER(2-1956)MILLWOOD*SPRAIN BROOK
4	TE03(LLG)	LLG@SPRAIN BK-L/O TOWER(2-1956)MILLWOOD*SPRAIN BROOK
5	TE14	SLG/STK@LEEDS*GILBOA / STK R391 / CLR#91 PL.VALLEY
6	TE15	SLG/STK@LEEDS*PLEASANT VALLEY/STK R9293/CLR#93 NS
7	TE16	SLG/STK @ ROSETON/ROSETON*ROCK TAVERN#311/STK 31151
8	TE18	3PH@LADENTOWN-L/OTOWER Y88/Y94 DOUBLE CIRCUIT
9	TE18(LLG)	LLG@LADENTOWN-L/OTOWER Y88/Y94 DOUBLE CIRCUIT
10	TE20	3PH@DUNWOODIE-L/O TOWER(2-1938)PLEASANTVILLE*DUNWO.
11	TE20(LLG)	LLG@DUNWOODIE-L/O TOWER(2-1938)PLEASANTVILLE*DUNWO.
12	TE21	3PH@PLEAS.VAL-L/O TOWER(2-1961)PV*MILLWOOD DBL CKT
13	TE27	SLG/STK@ROCK TAVERN*COOPERS/CLR ROCK TAVN*RAMAPO
14	TE29	3PH@N.SCOT / N.SCOT-LEEDS#93 W/HS RCL
15	TE30	3PH@LEEDS / GILBOA * LEEDS GL-3
16	TE32	3PH@NEW SCOTLAND - 77 BUS
17	TE33	3PH@NEW SCOTLAND - 99 BUS
18	TE34	SLG-STK@GILBOA/GILBOA*NSCOT / STUCK 3208
19	TE36	3PH @ LEEDS / LEEDS - HURLEY AVENUE
20	TE38	3PH/NC @ ROCK TAVERN / ROSETON * ROCK TAVERN #311
21	CE07	LLG@MARCY/EDIC - L/O MARCY-COOPERS (UCC2-41) & EDIC-FRASER (EF24-40) DCT
22	CE15	SLG-STK@MARCY345(BKR 3108) – L/O VOLNEY-MARCY (VU-19) / BKUP CLR#UE1-7

Contingencies 1, 3, 8, 10 and 12 are tower three-phase faults, which are beyond NYSRC criteria for the determination of NYISO System Operating Limits. Those contingencies were only examined on an informational basis.

7. Monitored Parameters

In order to assess system stability response for the Total East power transfer scenarios considering contingencies, the following parameters were monitored and analyzed:

- Generators' angles, power outputs, terminal voltages in the following areas/zones (West, Genesee, North, Mohawk, Capital, representative generators from West, Central, Hudson and Capital);

- Bus voltages around Total East, Western NY and Central East especially at Edic and Pleasant Valley.

8. Discussion

8.1 Total East Historical Flows versus Stability Limit

The Total East stability limit has not historically been a constraint on NYISO system operations. Since the formation of the NYISO in 1999 there has only been one day when real-time flow approached within 100 MW of the stability limit.

8.2 Angle, Voltage, and Frequency Monitoring

Machine angle, voltage and frequency were employed in this analysis as the key indicators of system stability. Machine angles at Somerset and Ravenswood 3, voltages at Edic and Pleasant Valley stations and frequency at New Scotland station were plotted for the TE-32 contingency on the all equipment in-service scenario, as shown in Figure 2. The TE32 contingency consists of a 3PH fault on the New Scotland - 77 Bus.

Edic voltage was selected as the representative indicator of system performance for the TE-32 contingency in the discussions that follow. Similar plots for all the Total East contingencies simulated are included in the appendices.

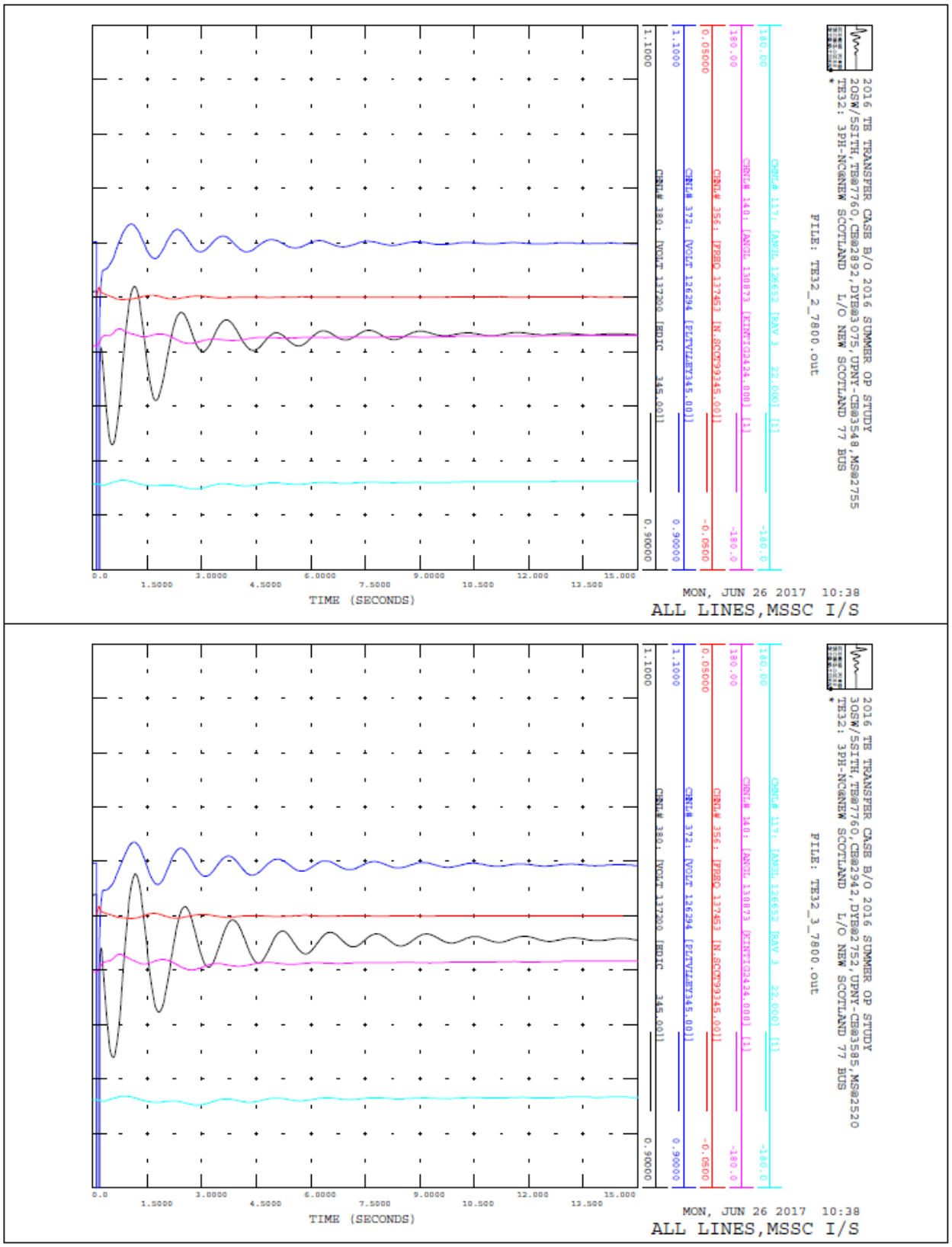

Figure 2. Voltage Angle and Frequency for scenario with 2 Oswego and 3 Oswego units in-service and all equipment in-service

8.3 Most Severe Contingency

The most severe system responses occurred for TE32 contingency. As seen in Fig 3, 4, 5, 6 under different outage conditions (SVC,STATCOM,5018 Line Outages), the Edic voltage waveform takes approximately 9 seconds to dampen and attain steady state after the contingency is applied. Edic voltages were plotted for all the Total East contingencies as shown in Figure 7, 8.

It can be seen from Figure 5 that the voltage response at Edic 345KV is most severe for TE-32 contingency compared to all other Total East contingencies. The magnitude of the post contingency voltage swings was found to be the largest when the TE32 contingency was applied. The TE-32 contingency was selected as the most severe contingency in the discussions that follow. Similar plots for all the Total East contingencies simulated are included in the appendices.

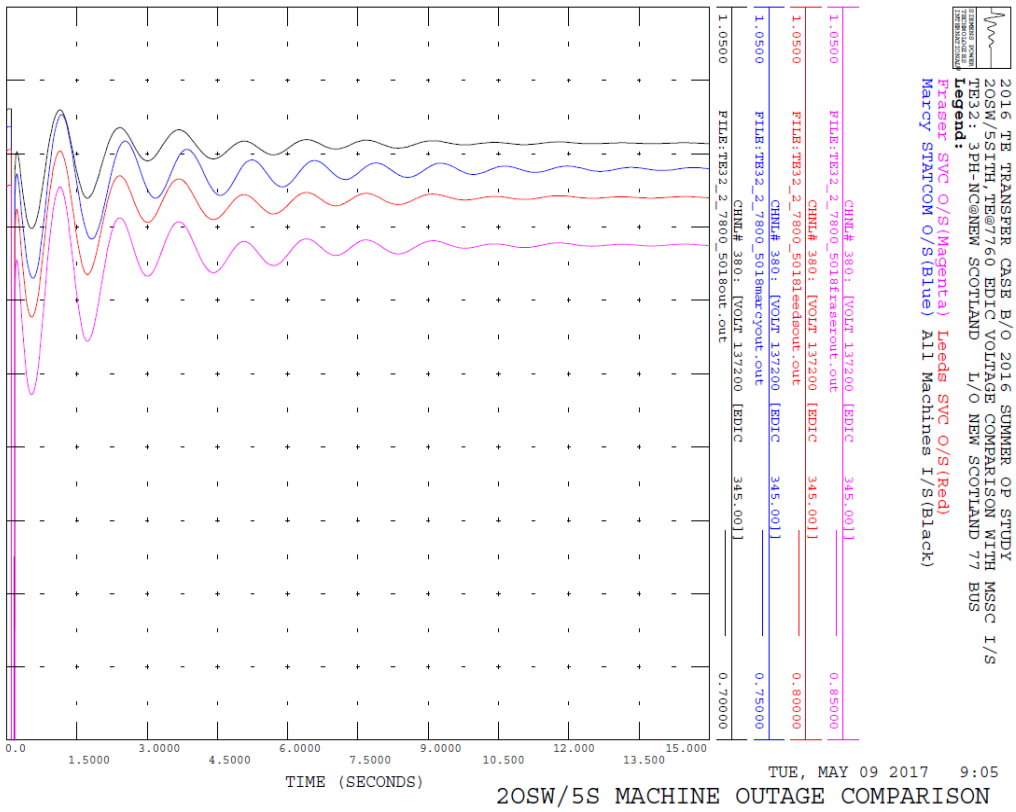

Fig 3: Edic Voltage for scenario with 2 Oswego 5 Sithe in-service with MSSC in-service under different outage conditions

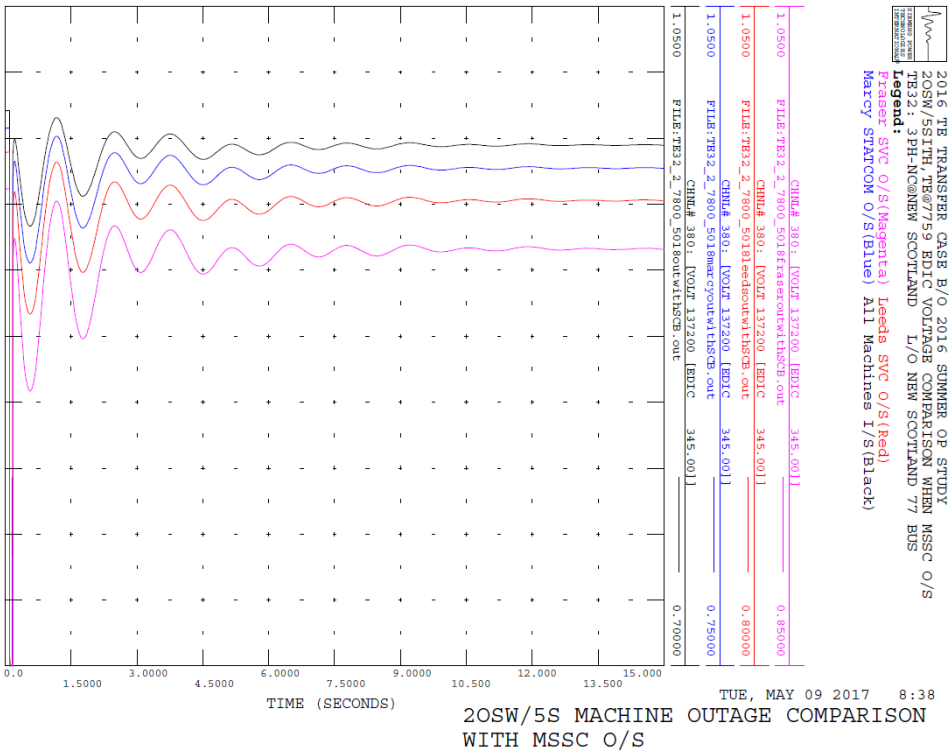

Fig 4: Edic Voltage for scenario with 2 Oswego 5 Sithe in-service with MSSC out of service, and 5018 out of service under different outage conditions

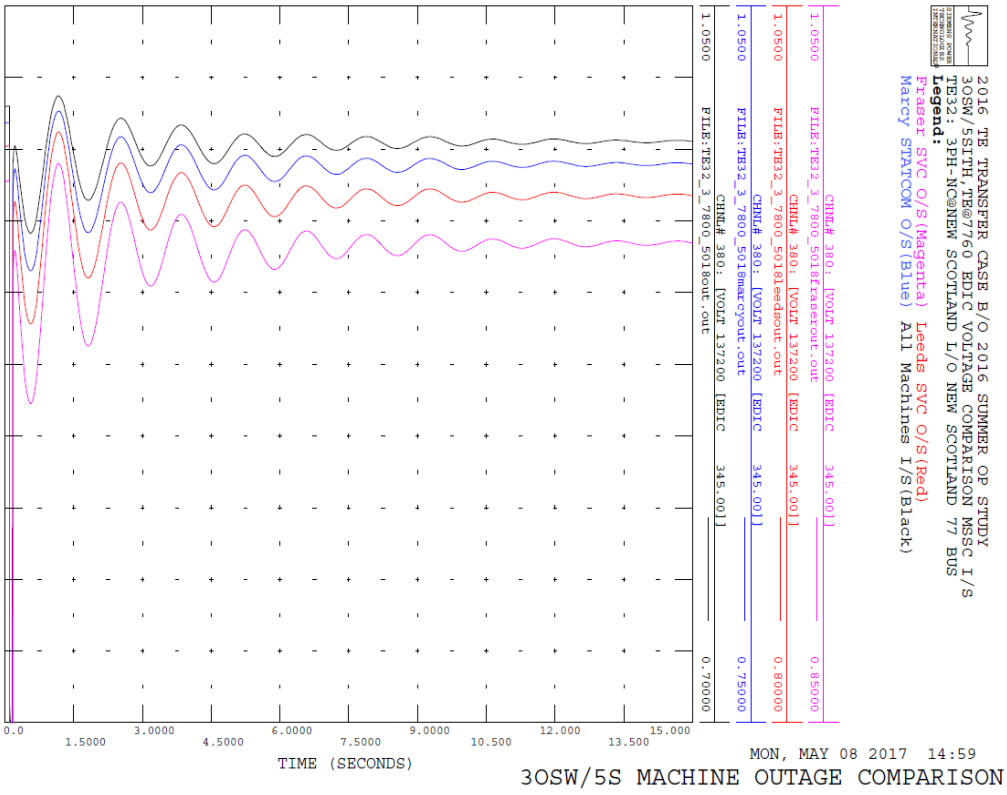

Fig 5: Edic Voltage for scenario with 3 Oswego 5 Sithe in-service with MSSC in-service under different outage conditions

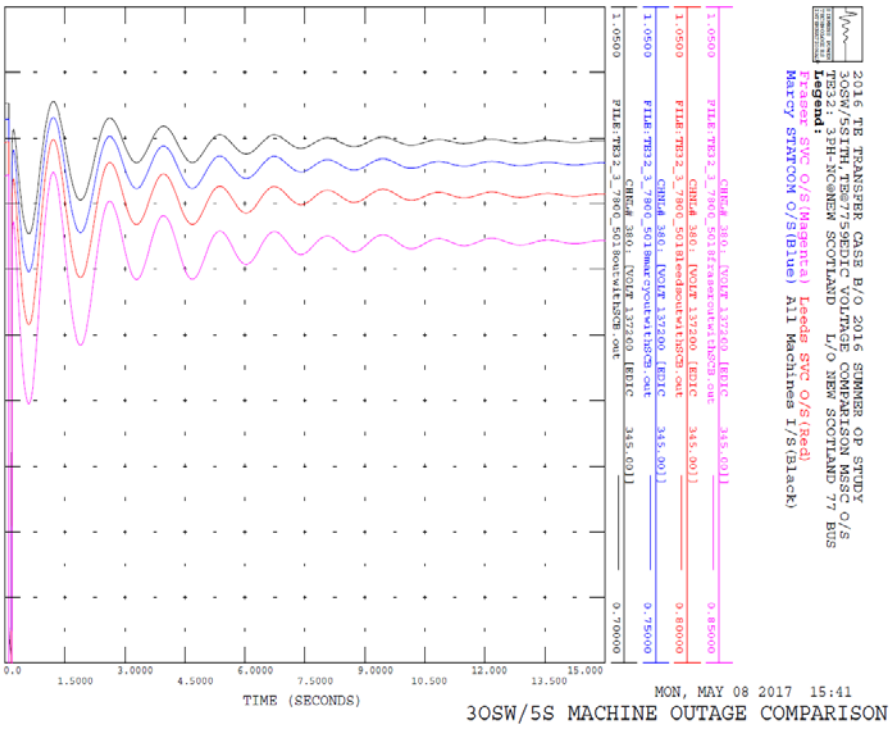

Fig 6: Edic Voltage for scenario with 3 Oswego 5 Sithe in-service with MSSC out of service and 5018 out of service under different outage conditions

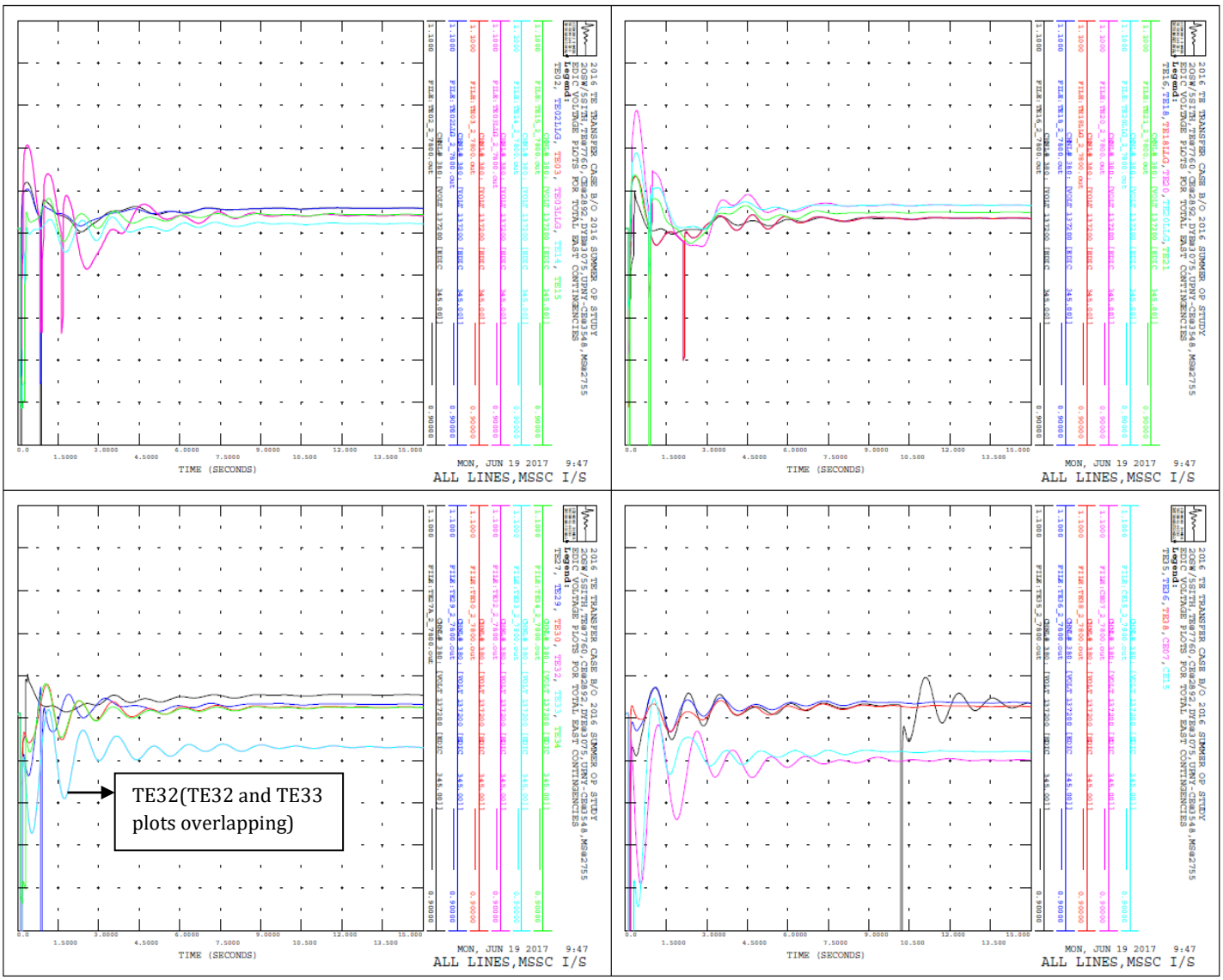

Figure7. Edic Voltage response for all contingencies for 2 Oswego 5 Sithe in-service and all equipment in-service

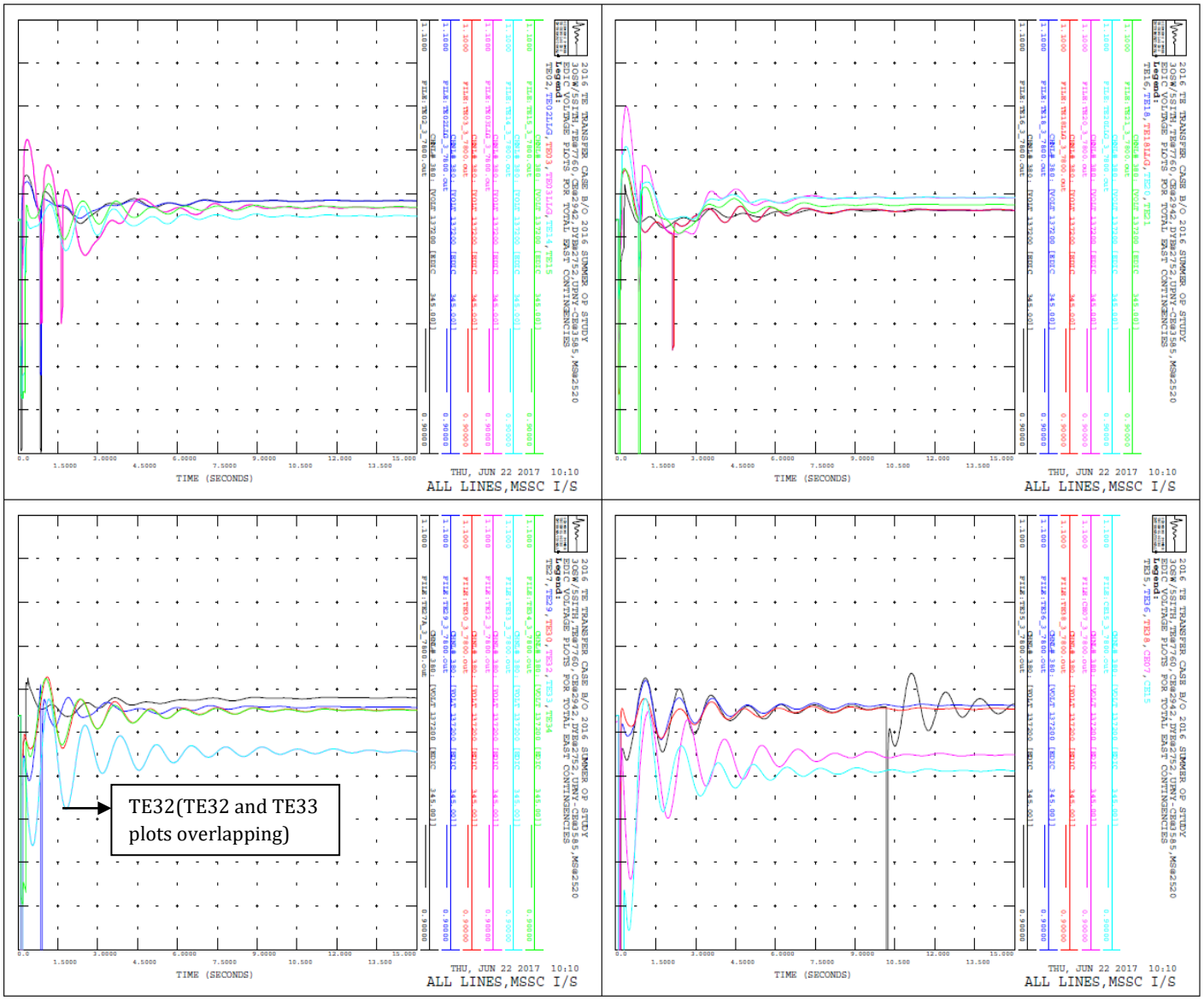

Figure8. Edic Voltage response for all contingencies for 3 Oswego 5 Sithe in –service and all equipment in-service

8.3.1 2/3 Oswego 5 Sithe with All Lines In-Service and MSSC Out of Service

Machine angle, voltage and frequency were employed in this analysis as the key indicators of system stability and the dynamic response of the system under this outage condition is shown in Fig 9. All dynamic responses were clearly stable for this configuration at a test level of 7758 MW. The Edic voltage response for all 22 contingencies on the 2 Oswego a5 Sithe case and 3 Oswego 5 Sithe case with All Lines in and MSSC out of service is found in Attachment LF2 and LF6 respectively.

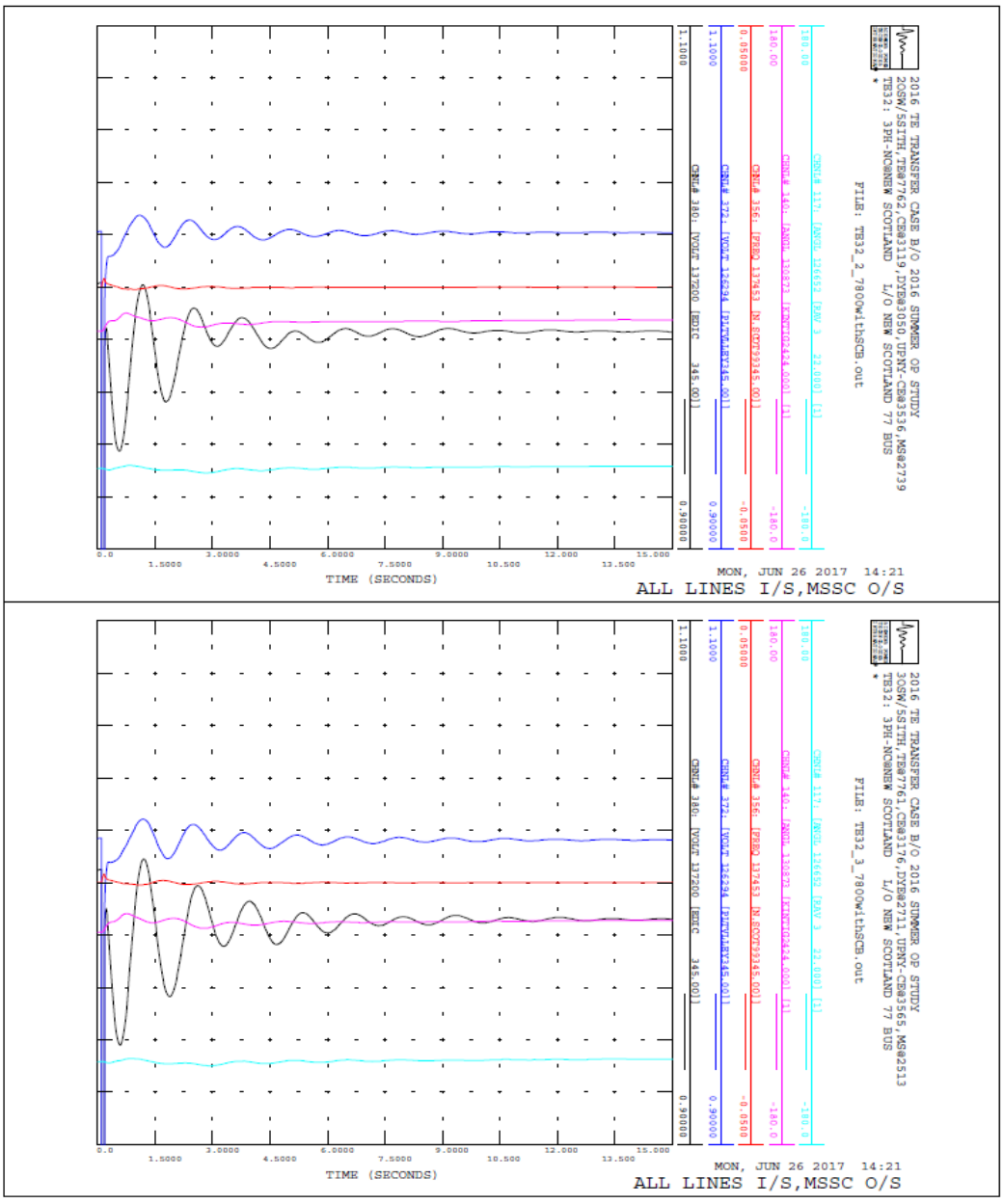

Figure 9. Voltage Angle and Frequency for scenario with 2 Oswego and 3 Oswego in-service, All Lines in-service, and MSSC out of service

8.3.2 2/3 Oswego 5 Sithe with 5018 Out of Service and MSSC In-Service

Machine angle, voltage and frequency were employed in this analysis as the key indicators of system stability and the dynamic response of the system under this outage condition is shown in Fig 10. All dynamic responses were clearly stable for this configuration at a test level of 7758 MW. The Edic voltage response for all 22 contingencies on the 2 Oswego 5 Sithe case and 3 Oswego 5 Sithe case with 5018 Line out of service and MSSC in-service is found in Attachment LF3 and LF7 respectively.

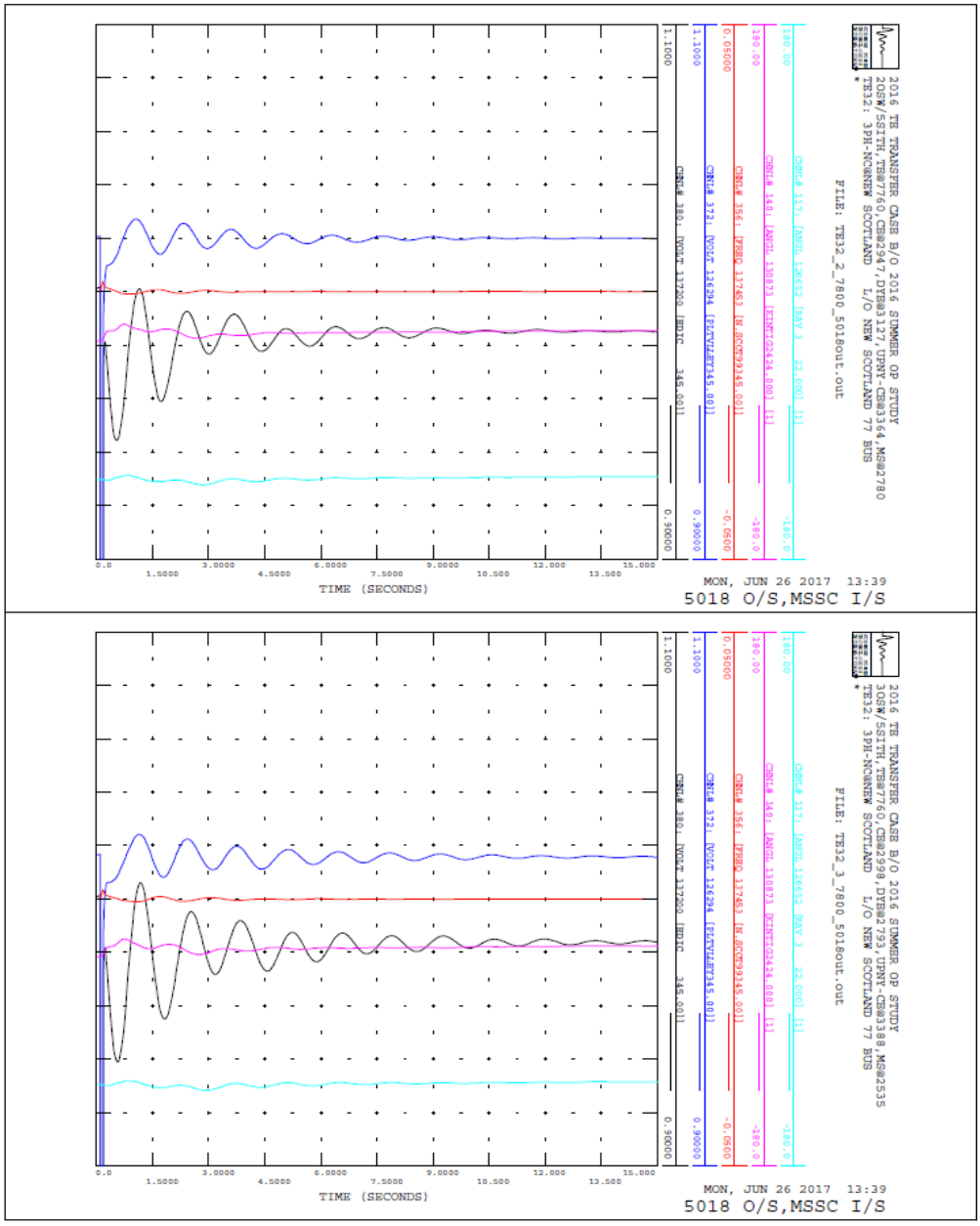

Figure 10. Voltage Angle and Frequency for scenario with 2 Oswego and 3 Oswego in-service, 5018 out of service and MSSC in-service

8.3.3 2/3 Oswego 5 Sithe with 5018 and MSSC Out of Service

Machine angle, voltage and frequency were employed in this analysis as the key indicators of system stability and the dynamic response of the system under this outage condition is shown in Fig 11. All responses were clearly stable for this configuration at a test level of 7758 MW. The Edic voltage response for all 22 contingencies on the case with 2 Oswego 5 Sithe case and 3 Oswego 5 Sithe case with 5018 out of service and MSSC out of service is found in Attachment LF4 and LF8 respectively.

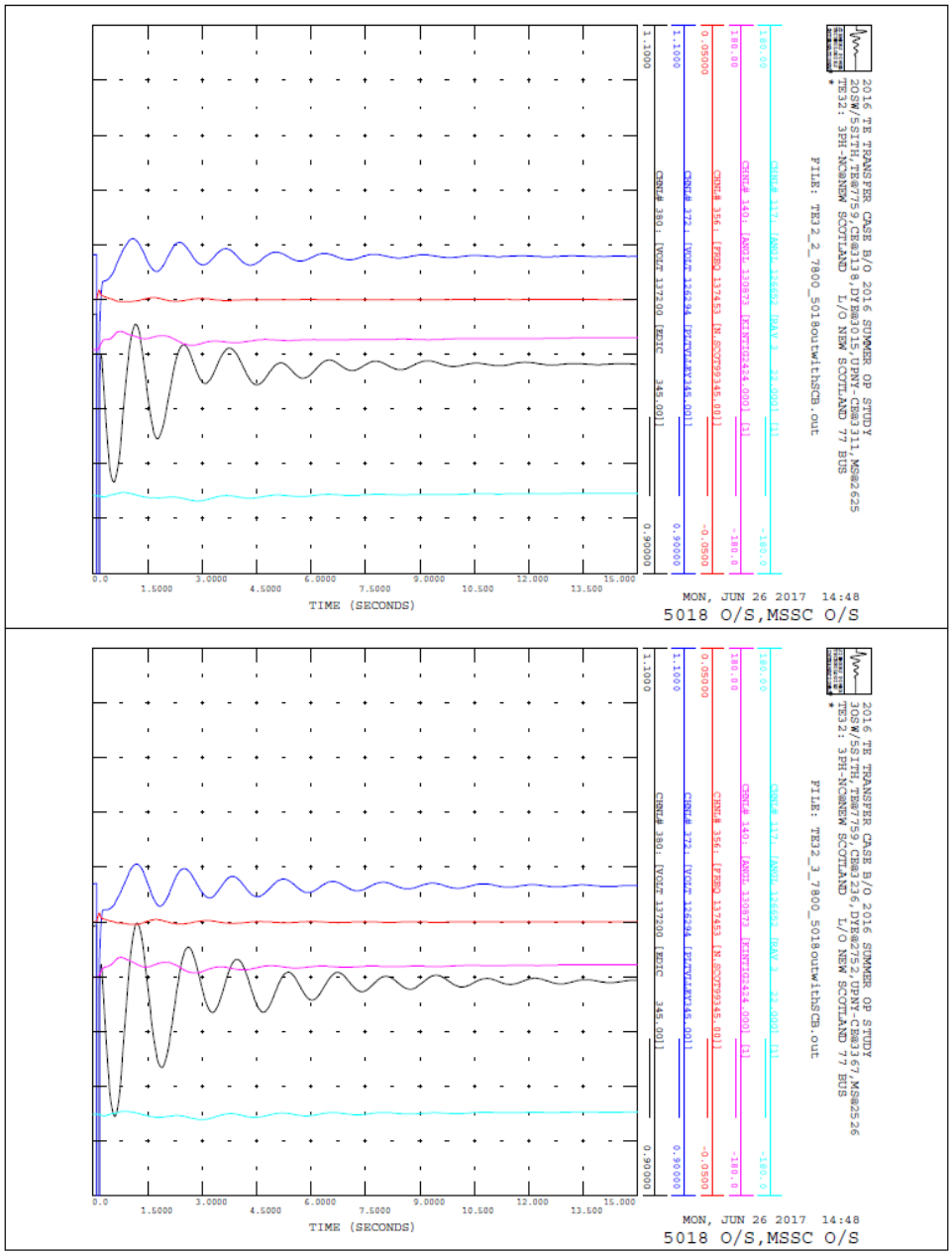

Figure 11. Voltage Angle and Frequency for scenario with 2 Oswego and 3 Oswego in-service, 5018 out of service, and MSSC out of service

8.3.4 2/3 Oswego 5 Sithe with 5018 Out of Service, MSSC In-Service, and SVCs and STATCOM's Out of Service

Machine angle, voltage and frequency were employed in this analysis as the key indicators of system stability and the dynamic response of the system under this outage condition is shown in Fig 12,13,14. All responses were clearly stable for this configuration at a test level of 7758 MW.

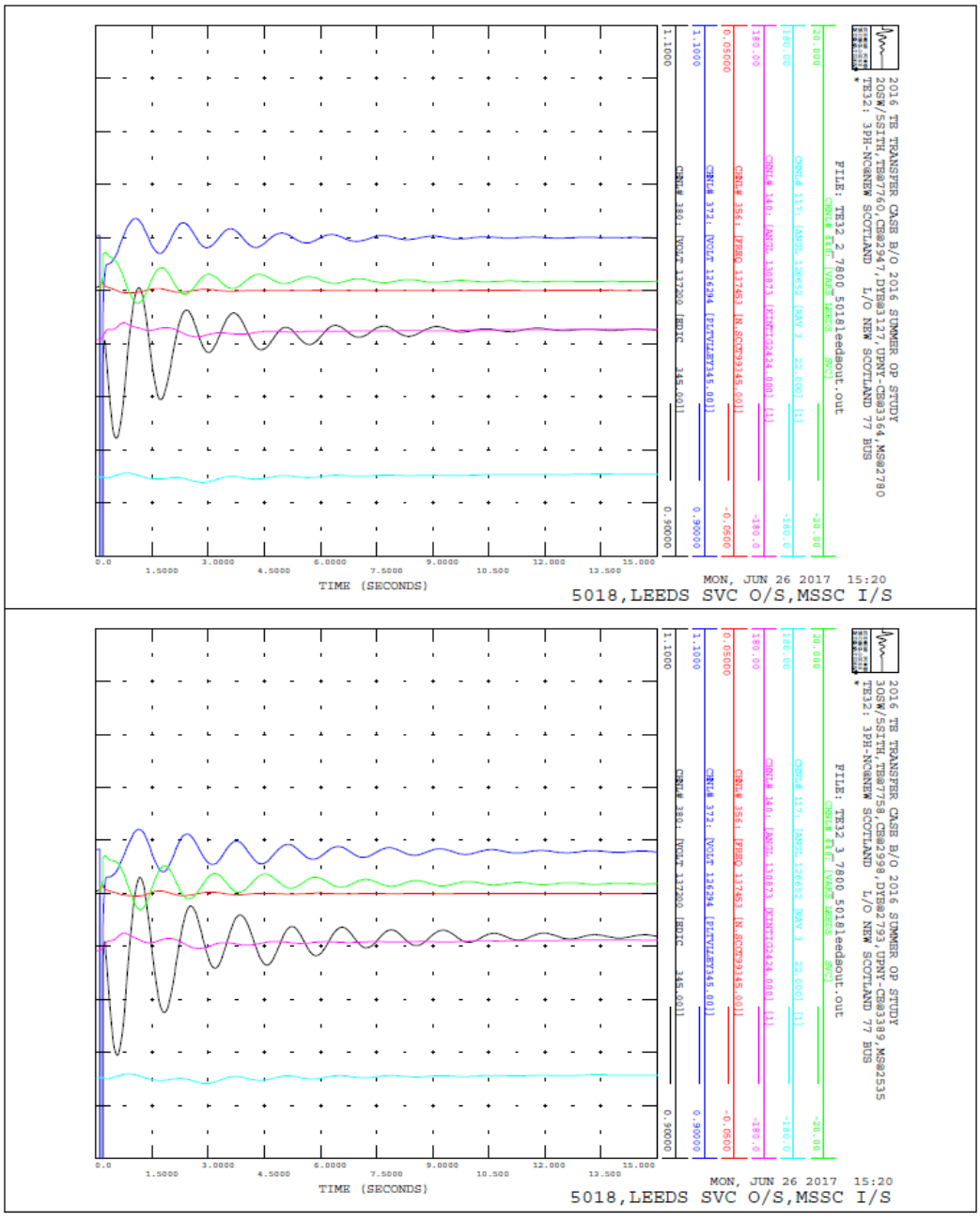

Figure 12. Voltage Angle and Frequency for scenario with 2 Oswego and 3 Oswego in-service, 5018 out of service, Leeds SVC out of service, and MSSC in-service

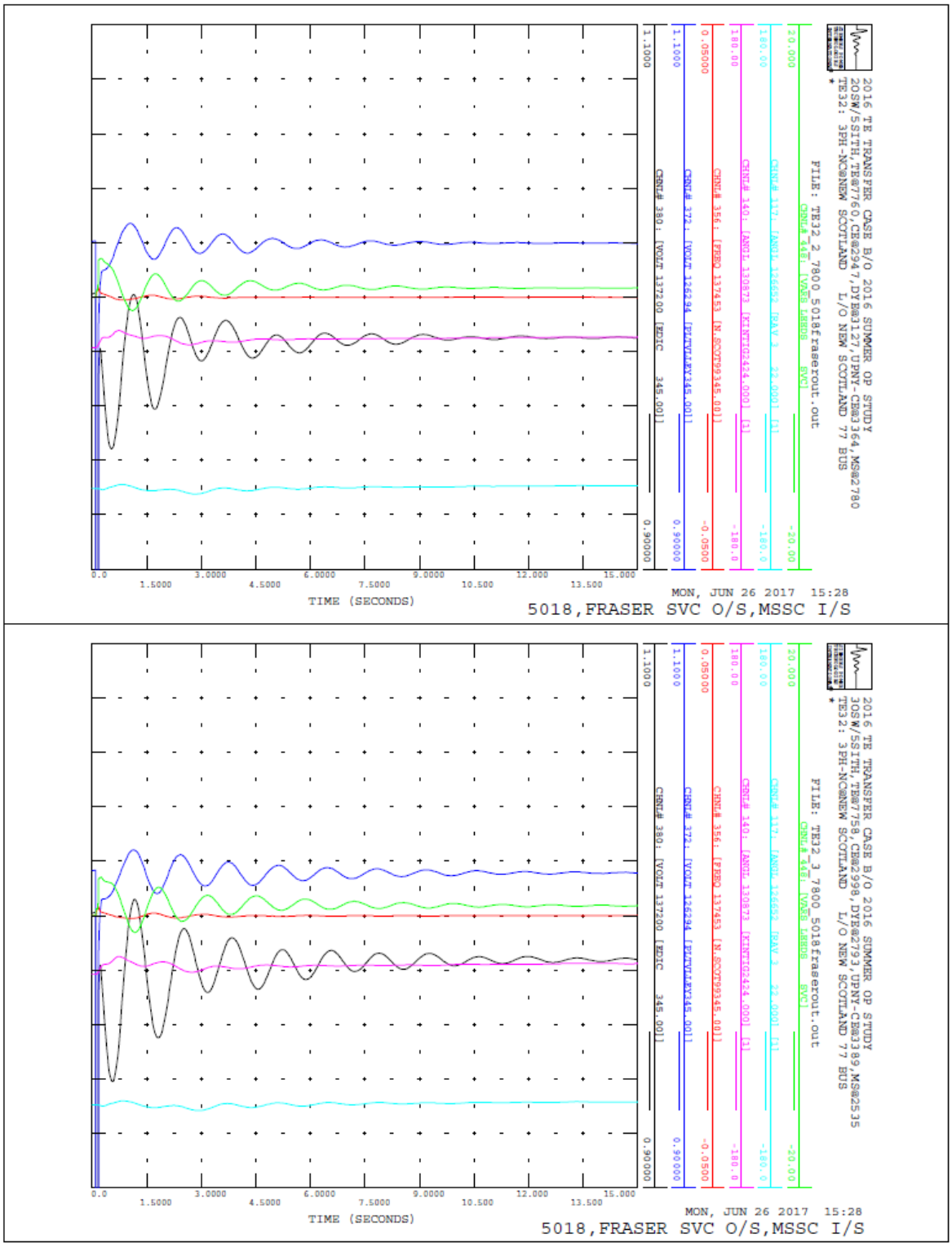

Figure 13. Voltage Angle and Frequency for scenario with 2 Oswego and 3 Oswego in-service, 5018 out of service, Fraser SVC out of service, and MSSC in-service

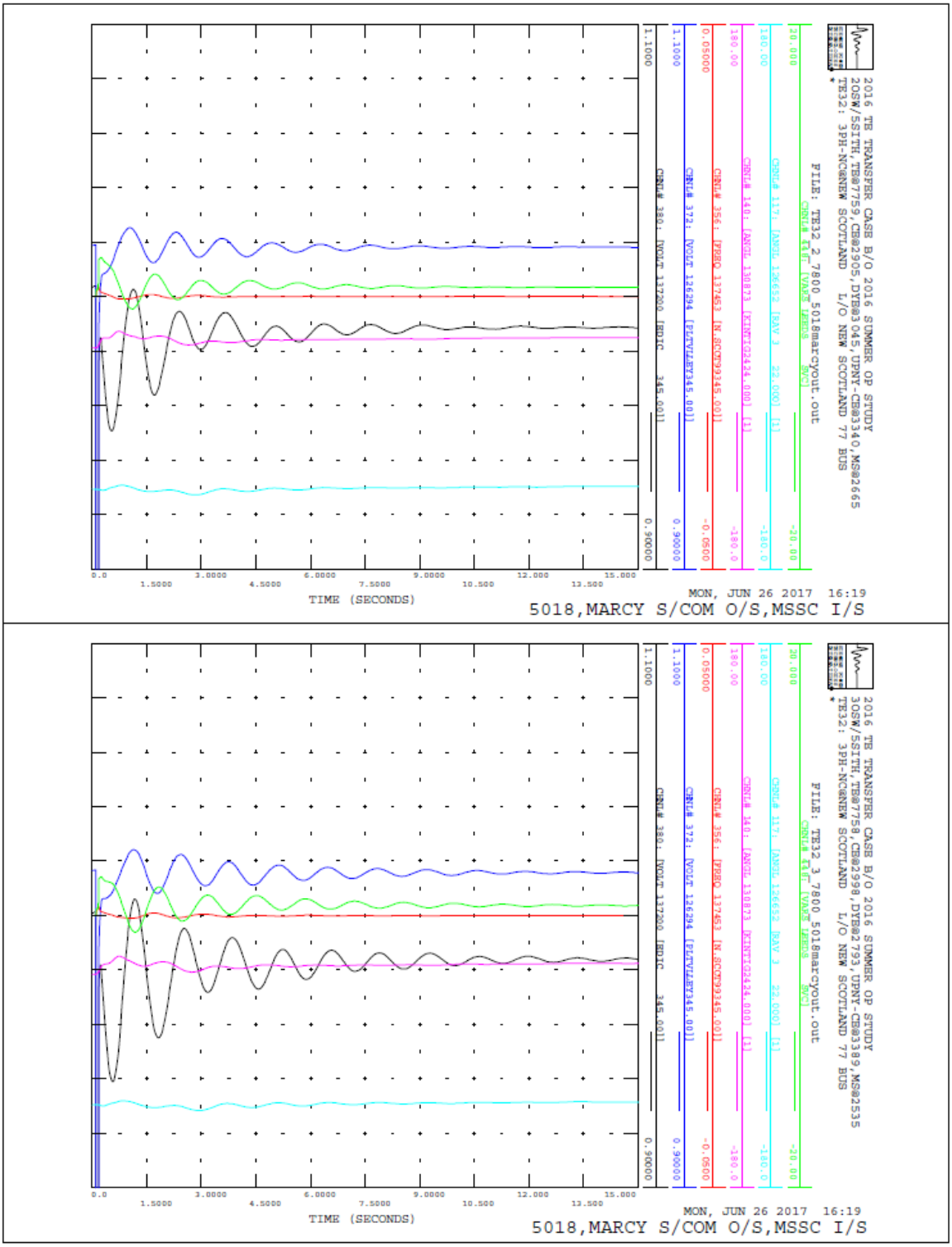

Figure 14. Voltage Angle and Frequency for scenario with 2 Oswego and 3 Oswego in-service, 5018 out of service, Marcy STATCOM out of service and MSSC in-service

8.3.5 2/3 Oswego 5 Sithe with 5018 O/S, MSSC O/S, SVCs and STATCOM's O/S

Machine angle, voltage and frequency were employed in this analysis as the key indicators of system stability and the dynamic response of the system under this outage condition is shown in Fig 15,16,17. All responses were clearly stable for this configuration at a test level of 7758 MW.

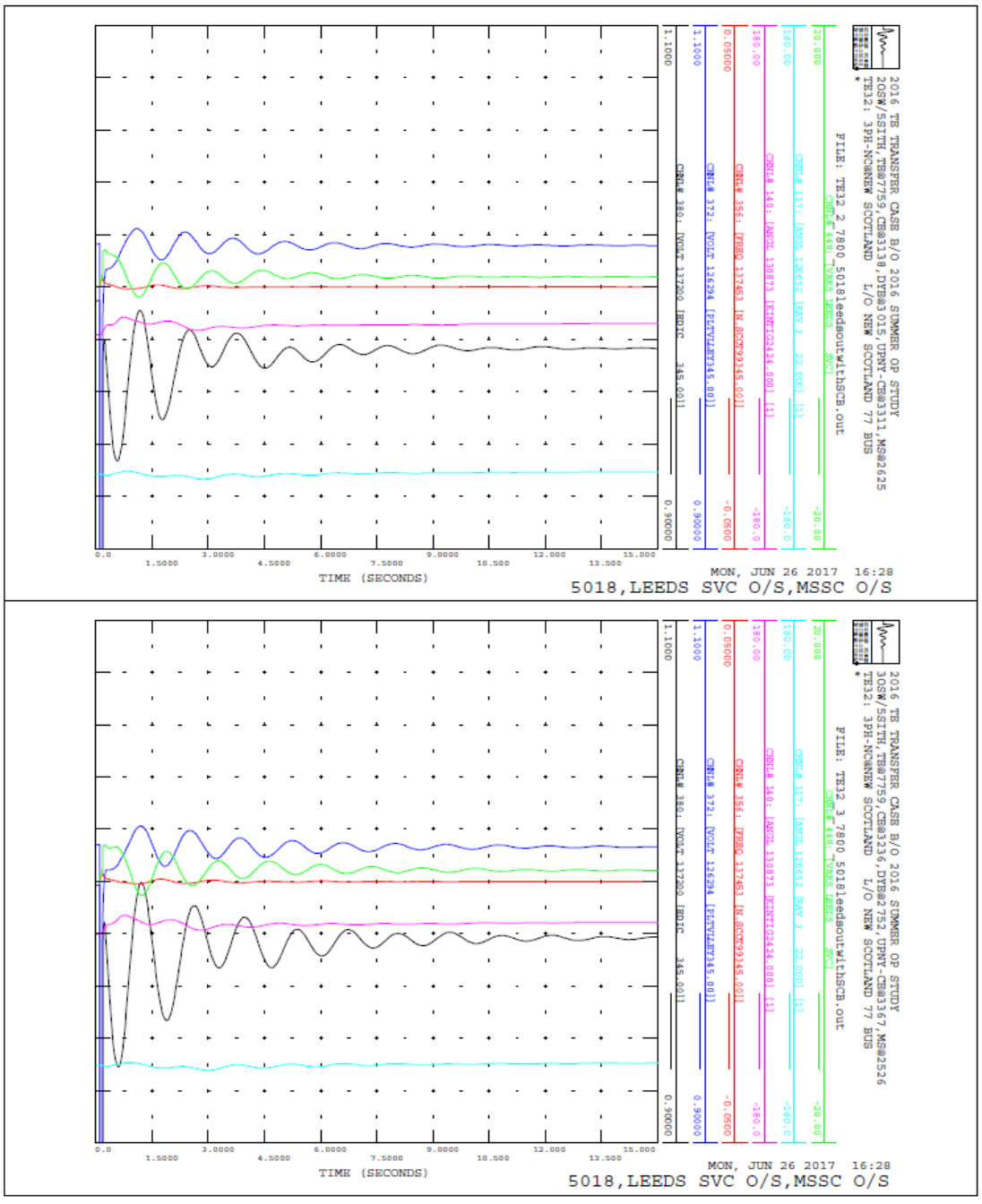

Figure 15. Voltage Angle and Frequency for scenario with 2 Oswego and 3 Oswego in-service, 5018, Leeds SVC out of service, and MSSC out of service

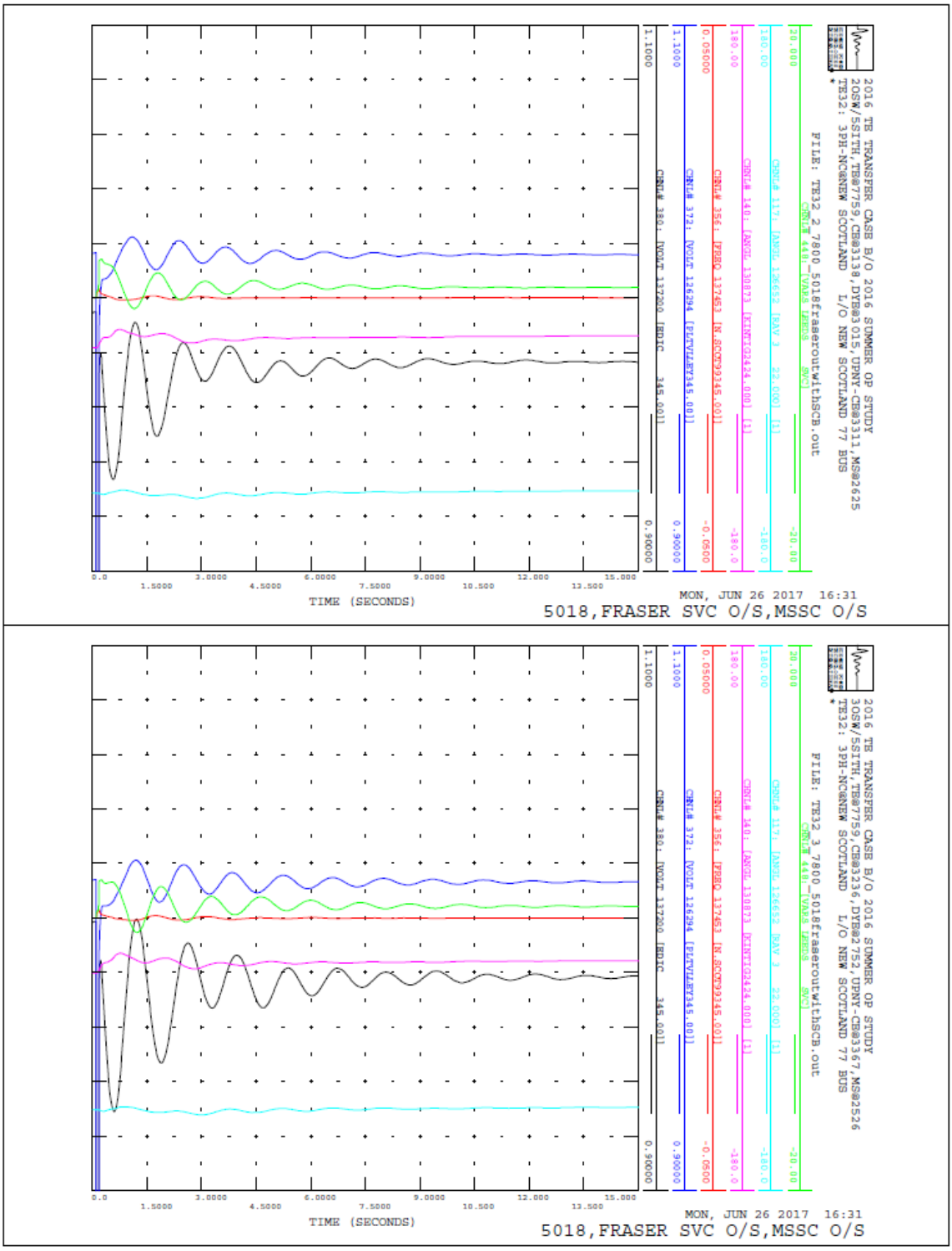

Figure 16. Voltage Angle and Frequency for scenario with 2 Oswego and 3 Oswego in-service and 5018out of service, , Fraser SVC out of service, , and MSSC out of service

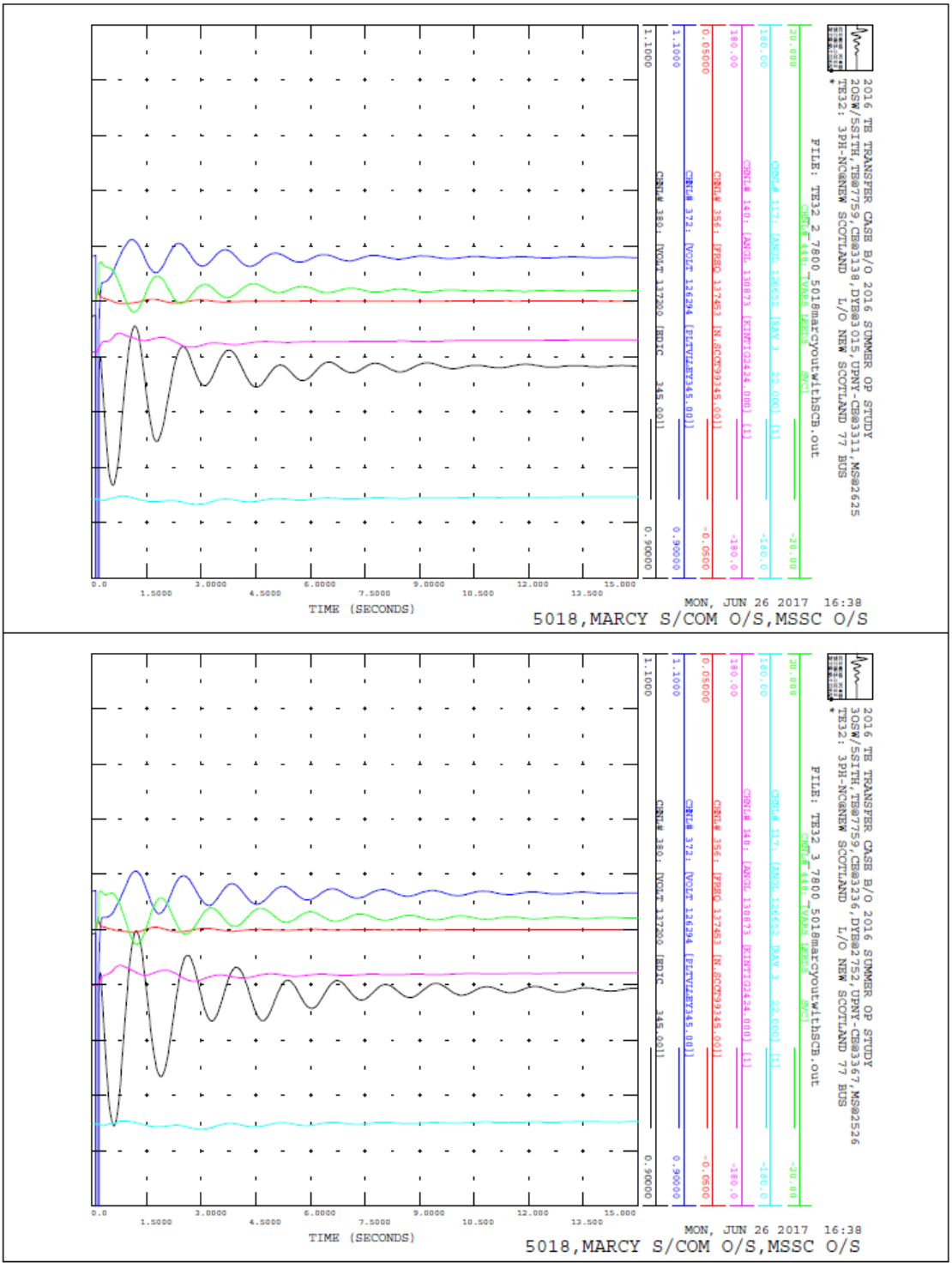

Figure 17. Voltage Angle and Frequency for scenario with 2 Oswego and 3 Oswego in-service and 5018out of service, , Marcy STATCOM out of service, and MSSC out of service

8.4 Three-Phase LLG vs Single-Phase LLG system performance with MSSC In-Service

The dynamic responses of the system when subjected to a 3PH and LLG faults were compared for the 2 Oswego 5 Sithe configuration case. It was observed that the responses were stable for both types of faults and there was no significant difference in Edic voltage levels in the post contingency voltage levels. Edic voltage showed no signs of instability or voltage collapse.

The contingencies applied were TE02, TE02(LLG), TE03, TE03(LLG), TE18 and TE18(LLG) and the system dynamic response for these contingencies are shown in Fig 18.

On these lines, similar responses were observed for the 3 Oswego 5 Sithe configuration.

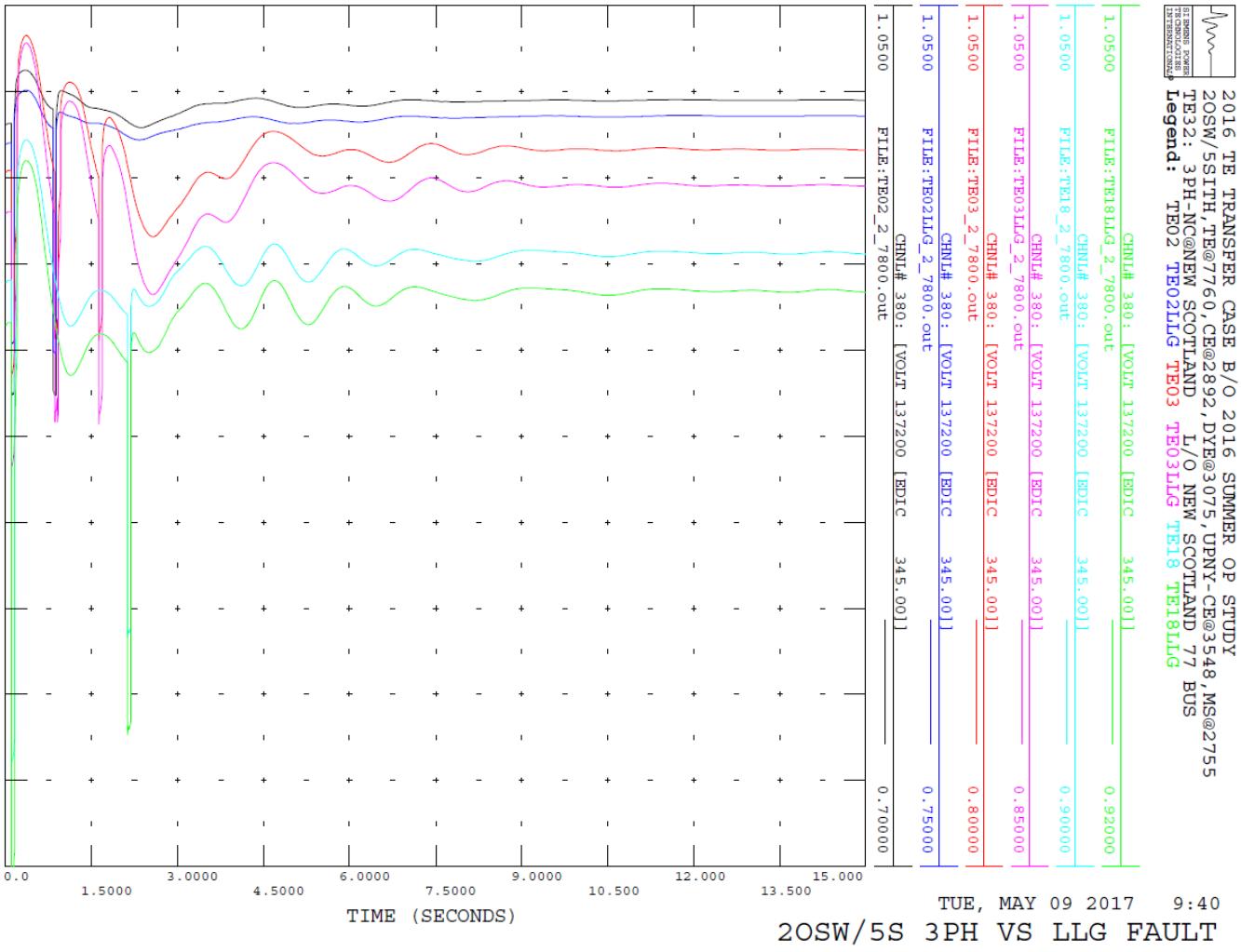

Fig 18: Comparison of Edic Voltage response to 3PH and LLG faults for 2 Oswego 5 Sithe Configuration

9. Recommendations

This report has been reviewed and recommended for NYISO Operating Committee approval by the NYISO Operating Studies Task Force (OSTF) and the System Operations Advisory Subcommittee (SOAS).

It is recommended that the stability limit of Total East be raised. The transfer case was set up for a transfer level of 7758MW and a stability limit of 6800MW across Total East. Table 5 outlines the proposed stability limits for Total East and also the stability limit under outage conditions.

#	Scenario	2017			2004		Difference of Proposed limit from the existing Total East Stability Limit (MW)
		Total East Stability Limit(MW)	Total East Tested Transfer Level(MW)	Total East Stability Limit with MSSC Bypassed(MW)	Total East Stability Limit (MW)	Total East Tested Transfer Level (MW)	
1	All Lines In	6800	7758	6800	6500	7458	300
2	5018 Ramapo-Hopatcong 500kV O/S	6800	7758	6800	6400	7112	400
3	5018 Ramapo-Hopatcong 500kV & Any SVC/STATCOM O/S	6800	7758	6800	6300	7112	500

Table 5: Summary of proposed Total East Stability Transfer Limits

Attachments

Att No.	Attachment Name
LF1	TE 7758, 2 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 I/S, MSSC I/S
LF2	TE 7758, 2 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 I/S, MSSC O/S
LF3	TE 7758, 2 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 O/S, MSSC I/S
LF4	TE 7758, 2 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 O/S, MSSC O/S
LF5	TE 7758, 3 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 I/S, MSSC I/S
LF6	TE 7758, 3 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 I/S, MSSC O/S
LF7	TE 7758, 3 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 O/S, MSSC I/S
LF8	TE 7758, 3 Osw, 5 Sithe Marcy Statcom I/S, Leeds I/S, Fraser I/S, 5018 O/S, MSSC O/S

1. LF1:TE 7758, 2 Osw, 5 Sithe, Marcy Statcom I/S, Leeds SVC I/S, Fraser SVC I/S, MSSC I/S

Interface	MW	MVAr	Interface	MW	MVAr
DYSINGER-EAST	3075.7	-111.2	DYSE-CLOSE	6667.3	-36
WEST-CENTRAL	1750.2	-207.6	WESTC-CLOSE	5341.3	125.7
VOLNEY-EAST	3647.6	23.6	VOLNEY-CLOSE	6373.7	449.4
MOSES-SOUTH	2755.2	94.1	MOSES-CLOSE	2326.6	13.5
CENTRAL-EAST	2892	-646.5	TOTAL-EAST	7760.4	-1226.8
UPNY-SENY	5930.6	-226.1	UPNY-SENY-CL	7862.3	-128.8
UPNY-CONED	3548.7	188	UPNY-CON-CL	6586.3	273.7
MILLWOOD-SO	8031.1	527	LIPA-IMPORT	2020.7	-122.1
DNWDIE-SO-PL	3461.3	-359.1	DNWDIE-SO-PC	6498.9	-273.4
DNWDIE-SO-OP	2531	-160.3	ABC-JK-PAR	681.8	174.2
SENY-115kV	235.7	-64.8	SENY-F-To-G	3285.2	135.4
PJM-NY	2775.9	-39.6	NE-NY-WCSC	494.4	5.8
ON-NY	2644.7	251.6	ONT-MICH-PAR	461.3	-26.7

Table LF1.1: Interface Flows for LF1 Powerflow case

Bus Number	Bus Name	Nominal kV	Actual kV	Bus Number	Bus Name	Nominal kV	Actual kV	Bus Number	Bus Name	Nominal kV	Actual kV
126260	BOWLINE1	345	353.6	126261	BOWLINE2	345	353.4	126263	BUCHANAN S	345	350.3
136150	CLAY	345	352	130750	COOPC 345	345	344.7	126266	DUNWOODIE	345	346
137200	EDIC	345	344.9	126277	FARRAGUT	345	350.3	130753	FRASR 345	345	349.1
135413	GRDNVL2	230	235.9	147831	GILB 345	345	356.4	126283	GOTHLSN	345	348.8
126286	GOWANUSN	345	347.4	126290	LADEN TOWN	345	352.3	137451	LEEDS 3	345	359.1
147833	MARCYT1	345	345.4	126291	MILL WOOD	345	348.2	137452	N.SCOT77	345	356.4
137453	N.SCOT99	345	356.4	147841	NIAGAR 2E	230	235.8	147842	NIAGAR2W	230	235.8
147834	NIAG 345	345	359.3	129341	NRTHPRT1	138	143	130755	OAKDL 345	345	347.5
149001	PANNELL3	345	347.9	126294	PLTVLLEY	345	351.7	126295	RAINEY	345	351
126600	REAC71	345	352.2	126601	REAC72	345	352.2	126297	RAMAPO	345	351
126250	RAMAPO5	500	513.7	125001	ROCK TAV	345	353.1	125002	ROSETON	345	357.6
130754	SOMERSET 345	345	358	126298	SPRAIN BROOK	345	346.3	149000	ROCH 345	345	345.4
147840	MOSESW	230	242.4	130768	WATRC 230	230	236.1	180819	CHA-NY	765	764

Table LF1.2: Bus Voltage Levels for LF1 Powerflow Case

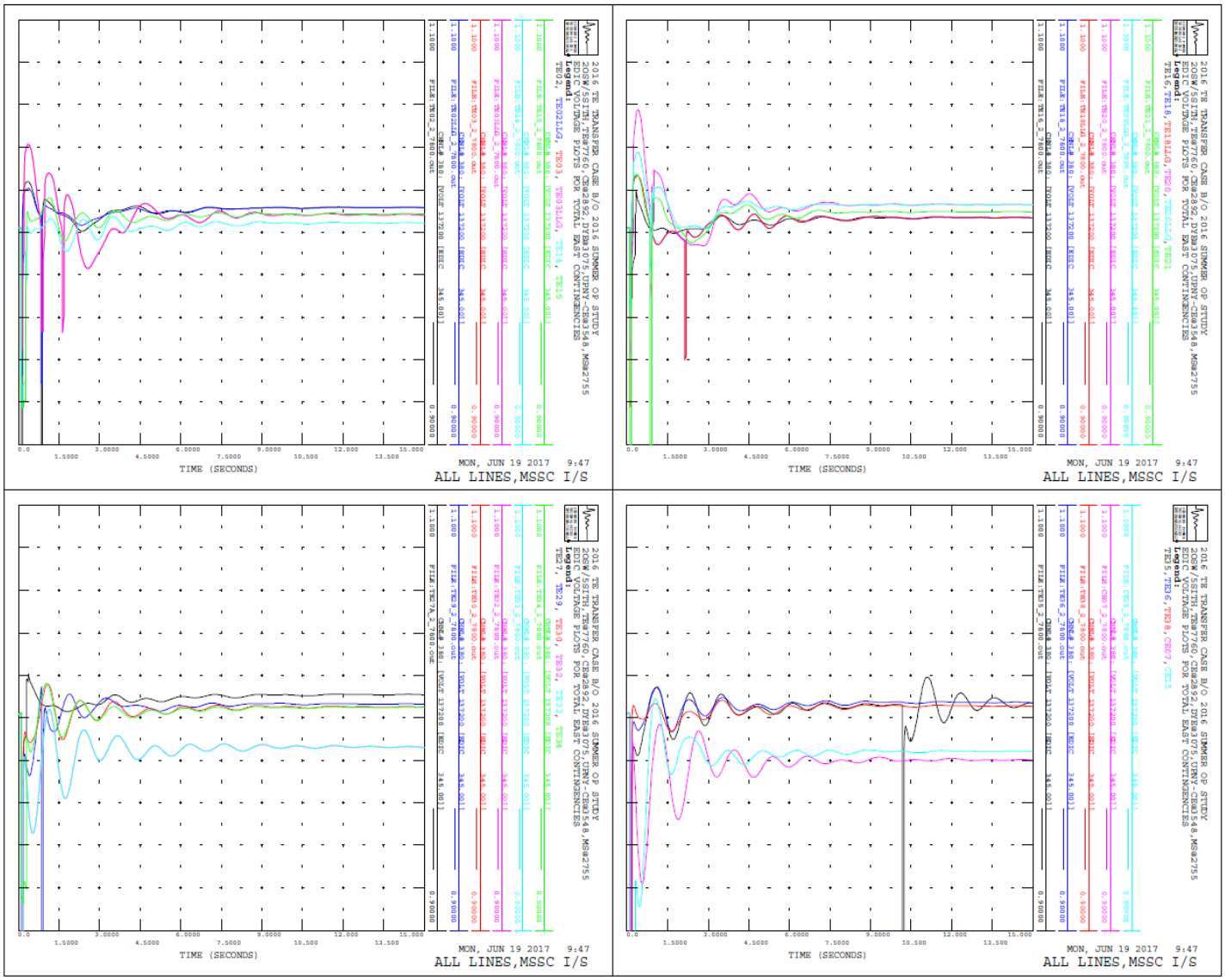

Fig LF1.1:Edic Voltage Plots for Total East, CE07 and CE15 contingencies for 2 Oswego 5 Sithe, All Lines and MSSC in-service

Attachment LF2: Transfer Case Power Flow Summaries and Plots

2. LF2: TE 7758, 2 Osw, 5 Slthe, Marcy Statcom I/S, Leeds SVC I/S, Fraser SVC I/S, MSSC O/S

Interface	MW	MVAr	Interface	MW	MVAr
DYSINGER-EAST	3050.4	-127.8	DYSE-CLOSE	6669.1	-137.3
WEST-CENTRAL	1724.9	-198.9	WESTC-CLOSE	5343.2	51.5
VOLNEY-EAST	3597.7	87.7	VOLNEY-CLOSE	6372.7	428.9
MOSES-SOUTH	2739.5	100.9	MOSES-CLOSE	2326.6	71.8
CENTRAL-EAST	3119.2	-781	TOTAL-EAST	7762.6	-1295.2
UPNY-SENY	5863.6	-95.2	UPNY-SENY-CL	7864.7	-17.9
UPNY-CONED	3536.6	222	UPNY-CON-CL	6587.9	307.4
MILLWOOD-SO	8032.4	530.3	LIPA-IMPORT	2020.7	-126.2
DNWDIE-SO-PL	3447.5	-347.8	DNWDIE-SO-PC	6498.9	-262.4
DNWDIE-SO-OP	2516.3	-147.2	ABC-JK-PAR	752.4	153.5
SENY-115kV	244.9	-65	SENY-F-To-G	3482.4	161.6
PJM-NY	2792.4	-58.6	NE-NY-WCSC	494.4	-1.7
ON-NY	2630.2	194.1	ONT-MICH-PAR	474.2	-37.4

Table LF2.1: Interface Flows for LF2 Powerflow Case

Bus Number	Bus Name	Nominal kV	Actual kV	Bus Number	Bus Name	Nominal kV	Actual kV	Bus Number	Bus Name	Nominal kV	Actual kV
126260	BOWLINE 1	345	354.4	126261	BOWLINE 2	345	354.2	126263	BUCHANAN S	345	350.9
136150	CLAY	345	353.7	130750	COOPC 345	345	349.6	126266	DUNWOODIE	345	346.6
137200	EDIC	345	344.8	126277	FARRAGUT	345	350.5	130753	FRASR 345	345	350.6
135413	GRDNVL2	230	235.6	147831	GILB 345	345	359.9	126283	GOTHLSN	345	348.8
126286	GOWANUSN	345	347.5	126290	LADENTWN	345	353.2	137451	LEEDS 345	345	359.7
147833	MARCY T1	345	345.2	126291	MILLWOOD	345	348.8	137452	N.SCOT77	345	356.5
137453	N.SCOT99	345	356.5	147841	NIAGAR2E	230	235.8	147842	NIAGAR2W	230	235.8
147834	NIAG 345	345	359.5	129341	NRTHPRT1	138	143	130755	OAKDL345	345	348.6
149001	PANNELL3	345	349.4	126294	PLTVLLY	345	352	126295	RAINEY	345	351.2
126600	REAC71	345	352.4	126601	REAC72	345	352.5	126297	RAMAPO	345	352.1
126250	RAMAPO5	500	514.1	125001	ROCK TAV	345	355.6	125002	ROSETON	345	358.5
130754	SOMERSET345	345	358.4	126298	SPRAINBROOK	345	346.9	149000	ROCH 345	345	346.8
147840	MOSES W	230	242.6	130768	WATRC 230	230	236	180819	CHA-NY	765	764.5

Table LF2.2: Bus Voltage Levels for LF2 Powerflow Case

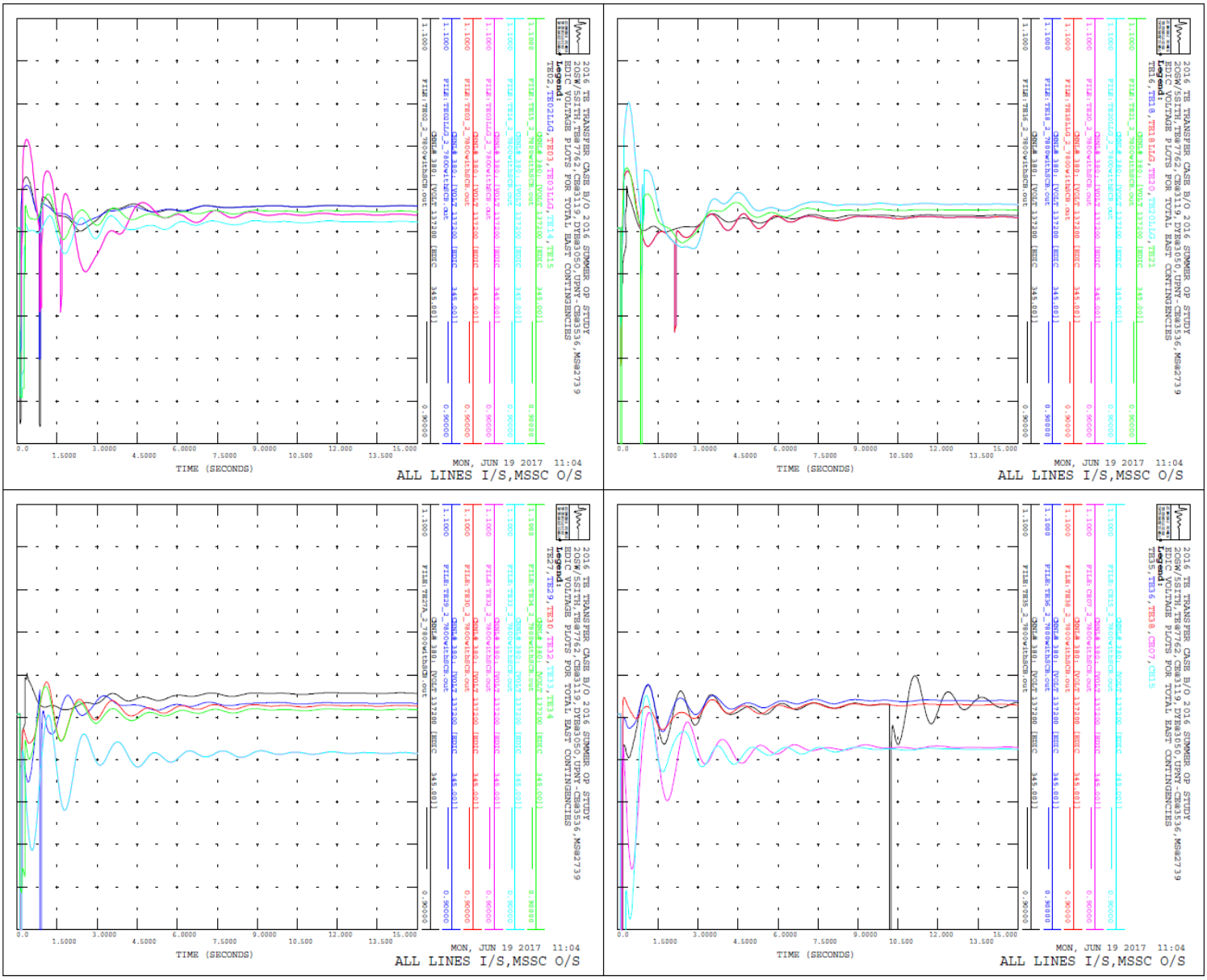

Fig LF2.1:Edic Voltage Plots for Total East, CE07 and CE15 contingencies for 2 Oswego 5 Sithe in-service, All Lines in service and MSSC out of service

Attachment LF3: Transfer Case Power Flow Summaries and Plots

3. LF3: TE 7758, 2 Osw, 5 Sithe, Marcy Statcom I/S, Leeds SVC I/S, Fraser SVC I/S, 5018 O/S,MSSC I/S

Interface	MW	MVAr	Interface	MW	MVAr
DYSINGER-EAST	3123.7	-120.5	DYSE-CLOSE	6664.7	-208.2
WEST-CENTRAL	1797.9	-266.3	WESTC-CLOSE	5338.7	-95
VOLNEY-EAST	3768.6	121.3	VOLNEY-CLOSE	6375.6	356.5
MOSES-SOUTH	2781.4	98.3	MOSES-CLOSE	2326.9	33.9
CENTRAL-EAST	2947.1	-683.1	TOTAL-EAST	7761	-1502.8
UPNY-SENY	5391.2	-363.2	UPNY-SENY-CL	7862.4	-351
UPNY-CONED	3363.7	160.5	UPNY-CON-CL	6586.3	234.3
MILLWOOD-SO	8031.2	501.5	LIPA-IMPORT	2020.8	-132.2
DNWDIE-SO-PL	3275.9	-328.1	DNWDIE-SO-PC	6498.5	-254.3
DNWDIE-SO-OP	2344.3	-144.3	ABC-JK-PAR	1207.4	98.3
SENY-115kV	242.4	-65.8	SENY-F-To-G	3356.6	132.9
PJM-NY	2727.4	-168.2	NE-NY-WCSC	494.2	6
ON-NY	2690.1	280.4	ONT-MICH-PAR	417.6	-26.1

Table LF3.1: Interface Flows for LF3 Powerflow Case

Bus Number	Bus Name	Nominal kV	Actual kV	Bus Number	Bus Name	Nominal kV	Actual kV	Bus Number	Bus Name	Nominal kV	Actual kV
126260	BOWLINE 1	345	354.5	126261	BOWLINE 2	345	354	126263	BUCHANAN S	345	350.7
136150	CLAY	345	353.7	130750	COOPC345	345	343	126266	DUNWOODIE	345	346.6
137200	EDIC	345	344.7	126277	FARRAGUT	345	350.1	130753	FRASR345	345	348.3
135413	GRDNVL2	230	235.1	147831	GILB 345	345	356.7	126283	GOTHLSN	345	348
126286	GOWANUSN	345	346.6	126290	LADENTWN	345	352.7	137451	LEEDS 3	345	358.9
147833	MARCY T1	345	345.1	126291	MILLWOOD	345	348.7	137452	N.SCOT77	345	356.2
137453	N.SCOT99	345	356.2	147841	NIAGAR2E	230	234.7	147842	NIAGAR2W	230	234.7
147834	NIAG 345	345	359.9	129341	NRTHPRT1	138	143	130755	OAKDL345	345	348.5
149001	PANNELL3	345	347.2	126294	PLTVLLEY	345	351.8	126295	RAINEY	345	350.8
126600	REAC71	345	352	126601	REAC72	345	352.1	126297	RAMAPO	345	350.8
126250	RAMAPO5	500	513.9	125001	ROCK TAV	345	352.4	125002	ROSETON	345	357.8
130754	SOMERSET345	345	357.7	126298	SPRAINBROOK	345	346.9	149000	ROCH 345	345	344.5
147840	MOSES W	230	241.8	130768	WATRC230	230	236.9	180819	CHA-NY	765	762.7
147827	MARCY765	765	741.1	147828	MASS 765	765	757.8	126281	E FISHKILL	345	354.4

Table LF3.2: Bus Voltage Levels for LF3 Powerflow Case

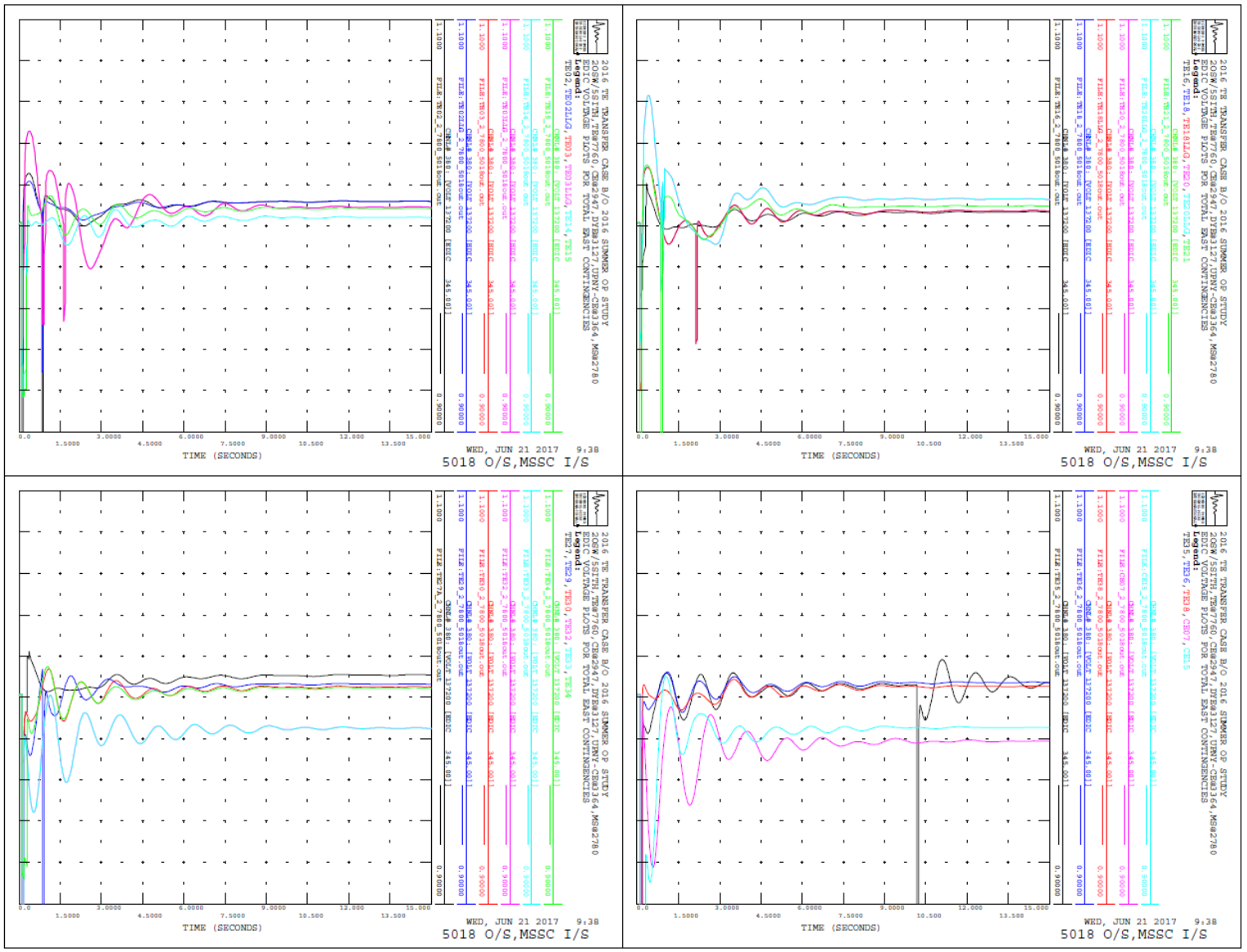

Fig LF3.1:Edic Voltage Plots for Total East, CE07 and CE15 contingencies for 2 Oswego 5 Sithe in-service. 5018 Line out of service and MSSC in-service

4. LF4: TE 7758, 2 Osw, 5 Sithe, Marcy Statcom I/S, Leeds SVC I/S, Fraser SVC I/S, 5018 O/S,MSSC O/S

Interface	MW	MVAr	Interface	MW	MVAr
DYSINGER-EAST	3015.2	-94.6	DYSE-CLOSE	6764.4	-206.1
WEST-CENTRAL	1689.5	-193.1	WESTC-CLOSE	5438.8	-46.2
VOLNEY-EAST	3759.4	127.5	VOLNEY-CLOSE	6572.9	316.2
MOSES-SOUTH	2625.3	116.6	MOSES-CLOSE	2126.3	67.2
CENTRAL-EAST	3137.7	-760.2	TOTAL-EAST	7759.4	-1502.7
UPNY-SENY	5242.5	-272.2	UPNY-SENY-CL	7861.8	-295.3
UPNY-CONED	3310.8	128.1	UPNY-CON-CL	6585	186.9
MILLWOOD-SO	8029.5	466.2	LIPA-IMPORT	2020.6	-141.8
DNWDIE-SO-PL	3224.2	-342.7	DNWDIE-SO-PC	6498.4	-283.9
DNWDIE-SO-OP	2285.8	-155.1	ABC-JK-PAR	1357.2	69.2
SENY-115kV	251.3	-60.9	SENY-F-To-G	3504.2	102.9
PJM-NY	2860.9	-204.1	NE-NY-WCSC	494.4	35.8
ON-NY	2656.8	230.2	ONT-MICH-PAR	450.9	-23.1

Table LF4.1: Interface Flows for LF4 Powerflow Case

Bus Number	Bus Name	Nominal kV	Actual kV	Bus Number	Bus Name	Nominal kV	Actual kV	Bus Number	Bus Name	Nominal kV	Actual kV
126260	BOWLINE 1	345	353.1	126261	BOWLINE 2	345	352.9	126263	BUCHANAN S	345	350
136150	CLAY	345	352.9	130750	COOPC345	345	345	126266	DUNWOODIE	345	345.9
137200	EDIC	345	342.4	126277	FARRAGUT	345	349.6	130753	FRASR345	345	344.3
135413	GRDNVL2	230	236.9	147831	GILB 345	345	353.6	126283	GOTHLSN	345	347.4
126286	GOWANUSN	345	346	126290	LADENTWN	345	351.8	137451	LEEDS 3	345	356.3
147833	MARCY T1	345	342.9	126291	MILLWOOD	345	347.9	137452	N.SCOT77	345	352.4
137453	N.SCOT99	345	352.4	147841	NIAGAR2E	230	236.5	147842	NIAGAR2W	230	236.5
147834	NIAG 345	345	359.4	129341	NRTHPRT1	138	142.9	130755	OAKDL345	345	342.3
149001	PANNELL 3	345	348.1	126294	PLTVLLEY	345	350.3	126295	RAINEY	345	350.3
126600	REAC71	345	351.5	126601	REAC72	345	351.5	126297	RAMAPO	345	350.3
126250	RAMAPO 5	500	514.2	125001	ROCK TAV	345	353.1	125002	ROSETON	345	356.8
130754	SOMERSET345	345	358.1	126298	SPRAINBROOK	345	346.2	149000	ROCH 345	345	345.6
147840	MOSES W	230	243.1	130768	WATRC230	230	236.2	180819	CHA-NY	765	765.2

Table LF4.2: Bus Voltage Levels for LF4 Powerflow Case

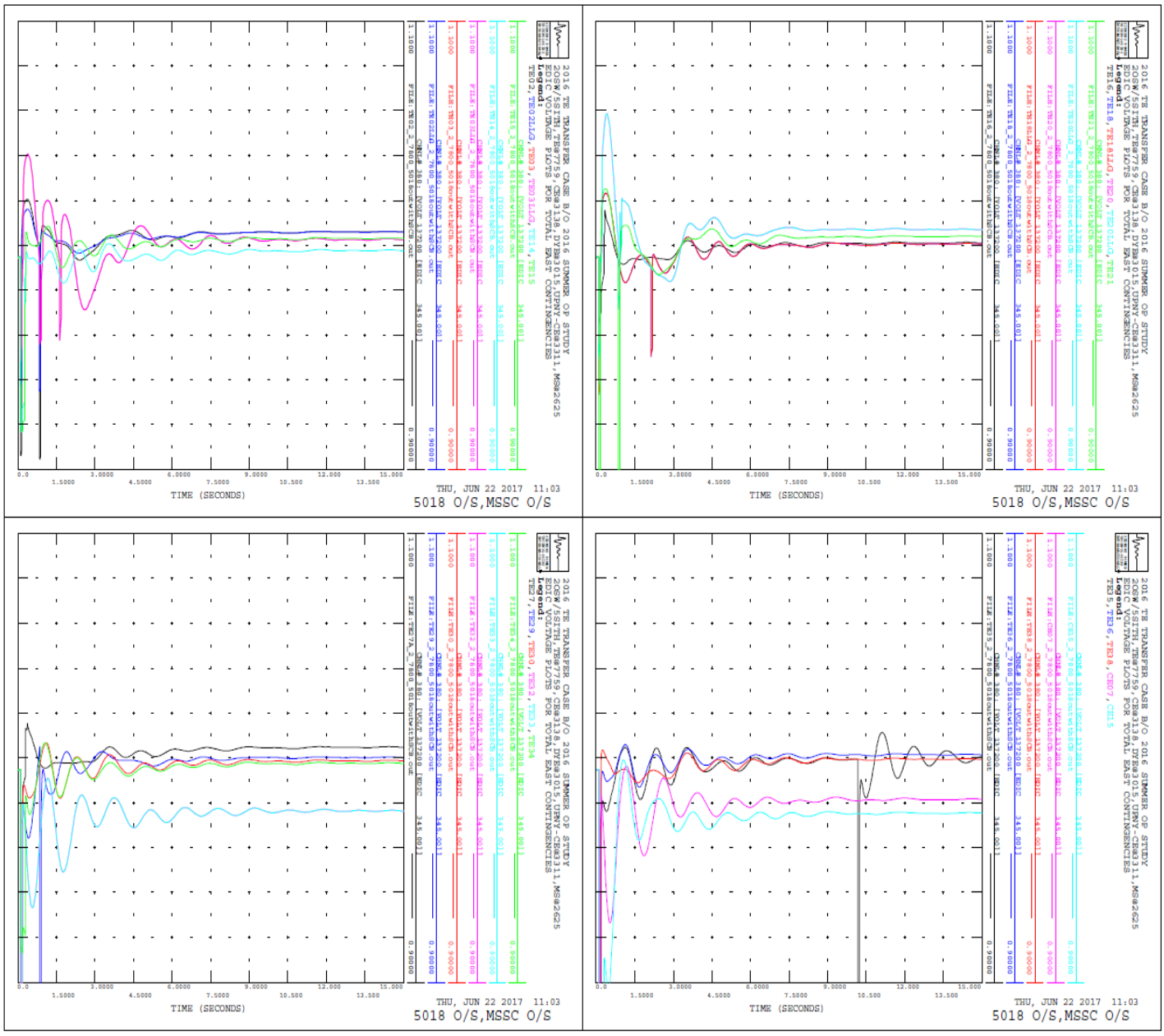

Fig LF4.1:Edic Voltage Plots for Total East, CE07 and CE15 contingencies for 3 Oswego 5 Sithe in-service, 5018 out of service and MSSC out of service

5. LF5: TE 7758, 3 Osw, 5 Sithe, Marcy Statcom I/S, Leeds SVC I/S, Fraser SVC I/S, 5018 I/S,MSSC I/S

Interface	MW	MVAr	Interface	MW	MVAr
DYSINGER-EAS	2752.7	-213.2	DYSE-CLOSE	6168.8	-141.8
WEST-CENTRAL	1327.5	-11.7	WESTC-CLOSE	4743.1	317.2
VOLNEY-EAST	3993.7	63.3	VOLNEY-CLOSE	6578.5	504.9
MOSES-SOUTH	2520.7	54.8	MOSES-CLOSE	2127	-20.5
CENTRAL-EAST	2942.1	-623.1	TOTAL-EAST	7760.7	-1176.9
UPNY-SENY	6025.9	-205.7	UPNY-SENY-CL	7862.5	-97.9
UPNY-CONED	3585.7	194.7	UPNY-CON-CL	6586.2	283.2
MILLWOOD-SO	8030.9	526.7	LIPA-IMPORT	2020.7	-124.4
DNWDIE-SO-PL	3498.5	-373.7	DNWDIE-SO-PC	6499	-285.3
DNWDIE-SO-OP	2568.9	-165.9	ABC-JK-PAR	586.5	183.7
SENY-115kV	241.3	-61.7	SENY-F-To-G	3339	151
PJM-NY	2731.3	-103.9	NE-NY-WCSC	494.4	2.2
ON-NY	2689.7	201.6	ONT-MICH-PAR	419.1	-21.5

Table LF5.1: Interface Flows for LF5 Powerflow Case

Bus Number	Bus Name	Nominal kV	Actual kV	Bus Number	Bus Name	Nominal kV	Actual kV	Bus Number	Bus Name	Nominal kV	Actual kV
126260	BOWLINE 1	345	353.5	126261	BOWLINE 2	345	353.3	126263	BUCHANAN S	345	350.1
136150	CLAY	345	355.4	130750	COOPC345	345	344.7	126266	DUNWOODIE	345	345.8
137200	EDIC	345	347	126277	FARRAGUT	345	350.3	130753	FRASR345	345	350.3
135413	GRDNVL2	230	239.1	147831	GILB 345	345	356.6	126283	GOTHLSN	345	348.8
126286	GOWANUSN	345	347.4	126290	LADENTWN	345	352.2	137451	LEEDS 3	345	358.9
147833	MARCY T1	345	347.5	126291	MILLWOOD	345	348	137452	N.SCOT77	345	356.6
137453	N.SCOT99	345	356.6	147841	NIAGAR2E	230	238.1	147842	NIAGAR2W	230	238.1
147834	NIAG 345	345	359.9	129341	NRTHPRT1	138	143	130755	OAKDL345	345	351.1
149001	PANNELL 3	345	357.1	126294	PLTVLLEY	345	351.4	126295	RAINEY	345	351
126600	REAC71	345	352.2	126601	REAC72	345	352.2	126297	RAMAPO	345	350.9
126250	RAMAPO 5	500	514.3	125001	ROCK TAV	345	352.9	125002	ROSETON	345	357.3
130754	SOMERSET345	345	360	126298	SPRAINBROOK	345	346.1	149000	ROCH 345	345	355
147840	MOSES W	230	245	130768	WATRC230	230	237.7	180819	CHA-NY	765	771.5

Table LF5.2: Bus Voltage Levels for LF5 Powerflow Case

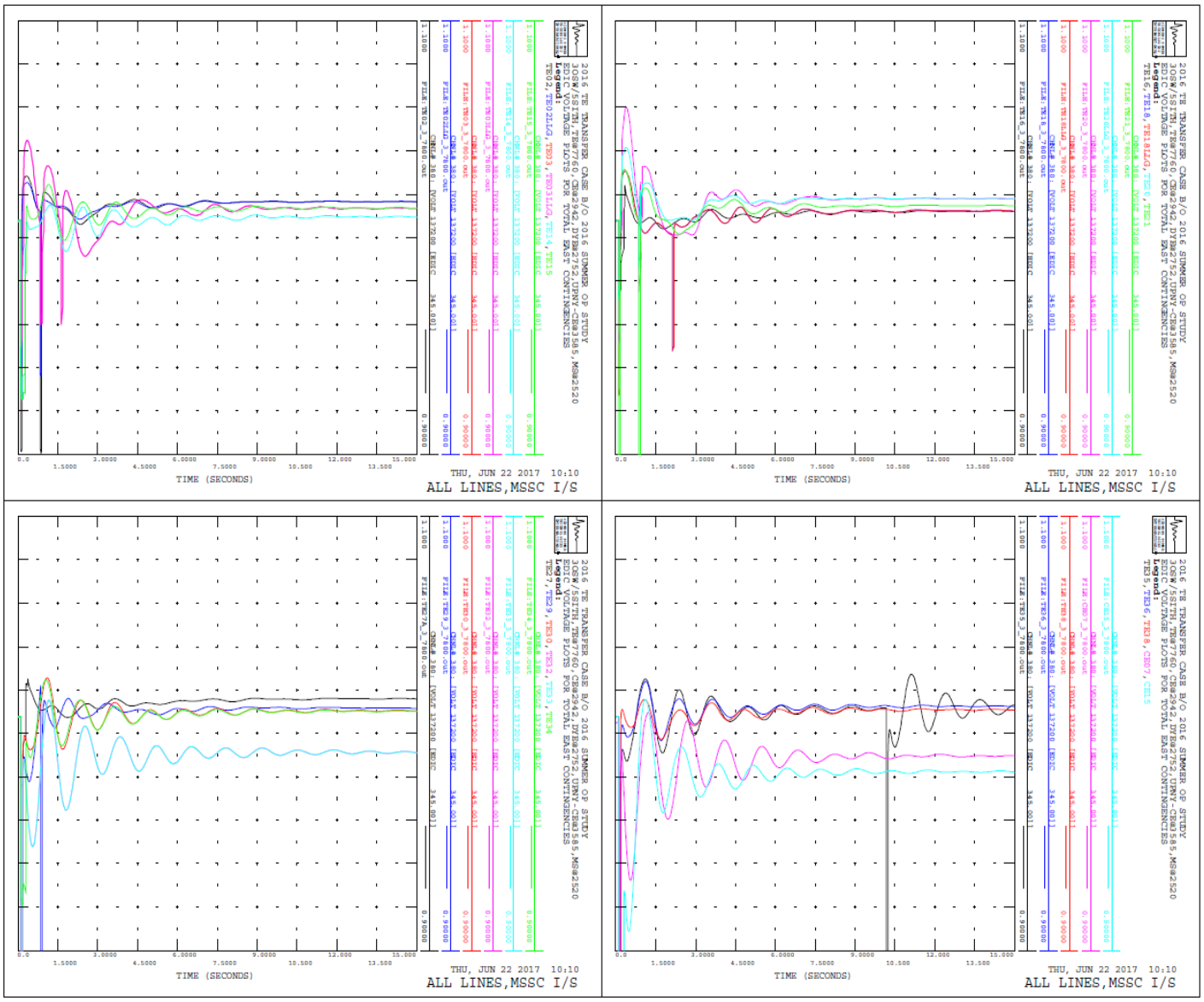

Fig LF5.1:Edic Voltage Plots for Total East, CE07 and CE15 contingencies for 3 Oswego 5 Sithe in-service, All Lines in-service and MSSC in-service

6. LF6: TE 7758, 3 Osw, 5 Sithe, Marcy Statcom I/S, Leeds SVC I/S, Fraser SVC I/S, 5018 I/S,MSSC O/S

Interface	MW	MVAr	Interface	MW	MVAr
DYSINGER-EAS	2711.5	-233.5	DYSE-CLOSE	6169.1	-168.3
WEST-CENTRAL	1286.6	-1.6	WESTC-CLOSE	4743.8	322.3
VOLNEY-EAST	3918.8	212.4	VOLNEY-CLOSE	6575.4	638.7
MOSES-SOUTH	2512.9	69.1	MOSES-CLOSE	2126.8	-12.4
CENTRAL-EAST	3176.4	-734.4	TOTAL-EAST	7761	-1196.5
UPNY-SENY	5950.4	-138.4	UPNY-SENY-CL	7863.3	-43.4
UPNY-CONED	3565.4	200.6	UPNY-CON-CL	6586.5	289.1
MILLWOOD-SO	8030.9	513.2	LIPA-IMPORT	2020.7	-135.9
DNWDIE-SO-PL	3477.8	-382.5	DNWDIE-SO-PC	6498.9	-294.1
DNWDIE-SO-OP	2548.8	-166.6	ABC-JK-PAR	662.1	171.2
SENY-115kV	252.1	-61.7	SENY-F-To-G	3528.6	120.7
PJM-NY	2749.9	-109.2	NE-NY-WCSC	494.4	25.2
ON-NY	2672.1	235.9	ONT-MICH-PAR	436	-23.5

Table LF6.1: Interface Flows for LF6 Powerflow Case

Bus Number	Bus Name	Nominal kV	Actual kV	Bus Number	Bus Name	Nominal kV	Actual kV	Bus Number	Bus Name	Nominal kV	Actual kV
126260	BOWLINE 1	345	353.9	126261	BOWLINE 2	345	353.7	126263	BUCHANAN S	345	350.2
136150	CLAY	345	357.7	130750	COOPC345	345	347.5	126266	DUNWOODIE	345	345.9
137200	EDIC	345	346	126277	FARRAGUT	345	350.3	130753	FRASR345	345	348.7
135413	GRDNVL2	230	239.1	147831	GILB 345	345	355.1	126283	GOTHLSN	345	348.8
126286	GOWANUSN	345	347.4	126290	LADENTWN	345	352.6	137451	LEEDS 3	345	357
147833	MARCY T1	345	346.5	126291	MILLWOOD	345	347.9	137452	N.SCOT77	345	353.7
137453	N.SCOT99	345	353.7	147841	NIAGAR2E	230	238.6	147842	NIAGAR2W	230	238.6
147834	NIAG 345	345	360.5	129341	NRTHPRT1	138	142.9	130755	OAKDL345	345	350.1
149001	PANNELL 3	345	359.2	126294	PLTVLLEY	345	350.5	126295	RAINEY	345	351
126600	REAC71	345	352.2	126601	REAC72	345	352.2	126297	RAMAPO	345	351.5
126250	RAMAPO 5	500	514.2	125001	ROCK TAV	345	354.3	125002	ROSETON	345	357.3
130754	SOMERSET345	345	360.4	126298	SPRAINBROOK	345	346.2	149000	ROCH 345	345	357.1
147840	MOSES W	230	244.9	130768	WATRC230	230	237.6	180819	CHA-NY	765	771

Table LF6.2: Bus Voltage Levels for LF6 Powerflow Case

Fig LF6.1:Edic Voltage Plots for Total East, CE07 and CE15 contingencies for 3 Oswego 5 Sithe in-service, All Lines in-service and MSSC out of service

Attachment LF7: Transfer Case Power Flow Summaries and Plots

7. LF7: TE 7758, 3 Osw, 5 Sithe, Marcy Statcom I/S, Leeds SVC I/S, Fraser SVC I/S, 5018 O/S,MSSC I/S

Interface	MW	MVAr	Interface	MW	MVAr
DYSINGER-EAS	2793.6	-202.6	DYSE-CLOSE	6165	-284.5
WEST-CENTRAL	1368.4	-25	WESTC-CLOSE	4739.7	150.1
VOLNEY-EAST	4094.2	133.5	VOLNEY-CLOSE	6578.3	417.3
MOSES-SOUTH	2535.2	84.6	MOSES-CLOSE	2126.9	10.4
CENTRAL-EAST	2998.3	-671.1	TOTAL-EAST	7758.2	-1466.8
UPNY-SENY	5468.1	-347.1	UPNY-SENY-CL	7860.7	-302.7
UPNY-CONED	3388.9	125.7	UPNY-CON-CL	6584.1	202.5
MILLWOOD-SO	8028.8	484.7	LIPA-IMPORT	2020.6	-135.3
DNWDIE-SO-PL	3303.3	-364.1	DNWDIE-SO-PC	6498.5	-287.3
DNWDIE-SO-OP	2374	-173	ABC-JK-PAR	1126.4	131.2
SENY-115kV	248.6	-60.8	SENY-F-To-G	3399.8	149.3
PJM-NY	2690.7	-263.2	NE-NY-WCSC	494.4	19.6
ON-NY	2726.4	202	ONT-MICH-PAR	383.4	-20.2

Table LF7.1: Interface Flows for LF7 Powerflow Case

Bus	Bus Name	Nomina	Actual	Bus	Bus Name	Nomina	Actual	Bus	Bus	Nomina	Actual

Number		l kV	kV	Number		l kV	kV	Number	Name	l kV	kV
126260	BOWLINE 1	345	352.5	126261	BOWLINE 2	345	352.2	126263	BUCHANAN S	345	349.5
136150	CLAY	345	354.8	130750	COOPC345	345	341	126266	DUNWOODIE	345	345.4
137200	EDIC	345	344.7	126277	FARRAGUT	345	349.7	130753	FRASR345	345	346.8
135413	GRDNVL2	230	239.2	147831	GILB 345	345	355.1	126283	GOTHLSN	345	347.9
126286	GOWANUSN	345	346.5	126290	LADENTWN	345	351.1	137451	LEEDS 3	345	357.7
147833	MARCY T1	345	345.2	126291	MILLWOOD	345	347.4	137452	N.SCOT77	345	355
137453	N.SCOT99	345	355	147841	NIAGAR2E	230	238	147842	NIAGAR2W	230	238
147834	NIAG 345	345	359.7	129341	NRTHPRT1	138	143	130755	OAKDL345	345	347.5
149001	PANNELL 3	345	356.2	126294	PLTVLLEY	345	350.4	126295	RAINEY	345	350.4
126600	REAC71	345	351.6	126601	REAC72	345	351.6	126297	RAMAPO	345	349.4
126250	RAMAPO 5	500	514.3	125001	ROCK TAV	345	350.7	125002	ROSETON	345	356.2
130754	SOMERSET345	345	359.7	126298	SPRAINBROOK	345	345.7	149000	ROCH 345	345	354
147840	MOSES W	230	244.5	130768	WATRC230	230	236.3	180819	CHA-NY	765	769.2

Table LF7.2: Bus Voltage Levels for LF7 Powerflow Case

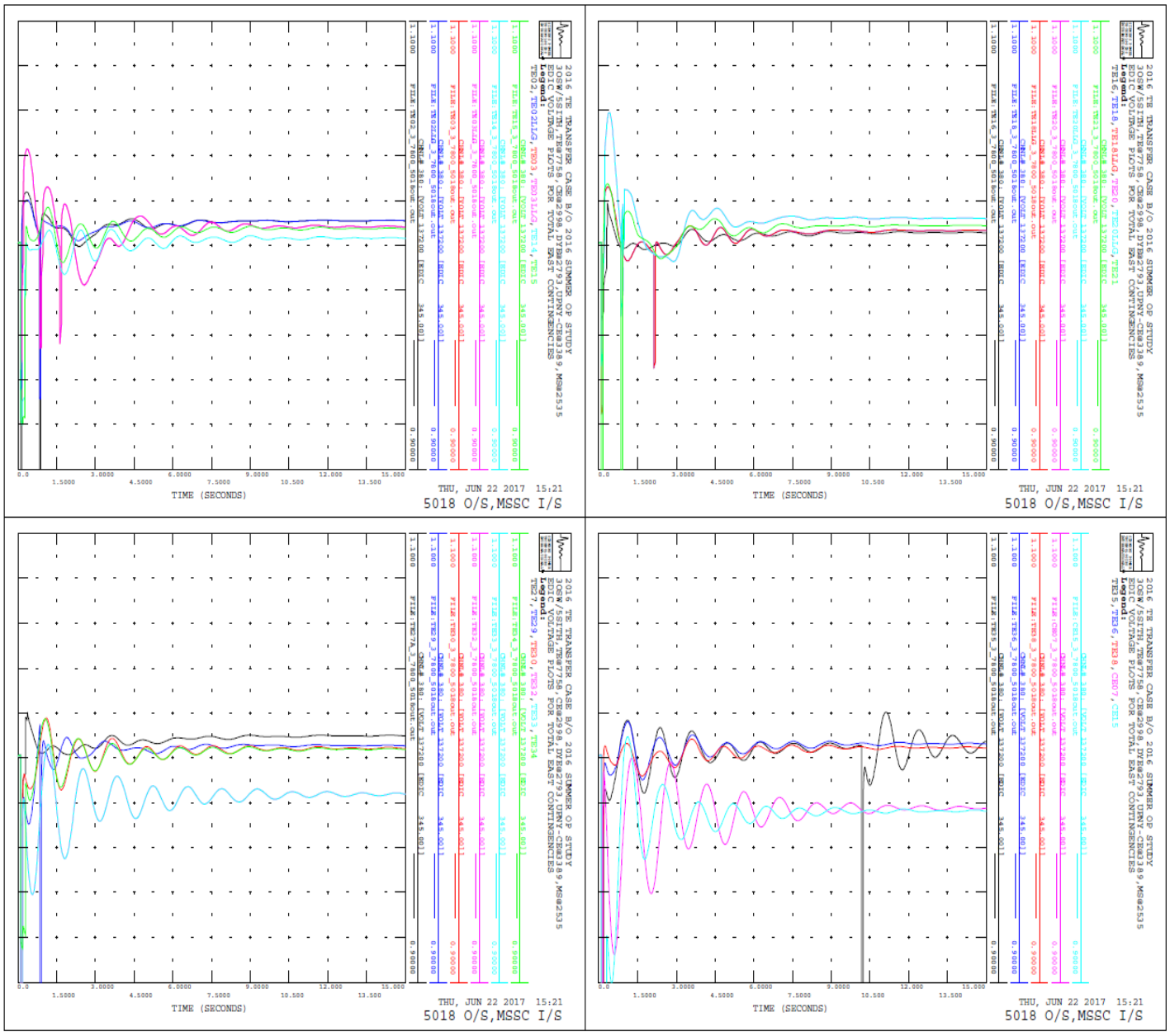

Fig LF7.1:Edic Voltage Plots for Total East, CE07 and CE15 contingencies for 3 Oswego 5 Sithe in service, 5018 Line out of service and MSSC in-service

8. LF8: TE 7758, 3 Osw, 5 Sithe, Marcy Statcom I/S, Leeds SVC I/S, Fraser SVC I/S, 5018 O/S,MSSC O/S

Interface	MW	MVAr	Interface	MW	MVAr
DYSINGER-EAS	2752.1	-231.3	DYSE-CLOSE	6166.2	-296.6
WEST-CENTRAL	1326.8	-22.3	WESTC-CLOSE	4740.9	171.1
VOLNEY-EAST	4017.7	295.5	VOLNEY-CLOSE	6575.8	588.5
MOSES-SOUTH	2526.1	97.9	MOSES-CLOSE	2126.4	17.4
CENTRAL-EAST	3236.5	-778.4	TOTAL-EAST	7758.9	-1462.3
UPNY-SENY	5387.1	-279.4	UPNY-SENY-CL	7861.6	-232.5
UPNY-CONED	3367.5	147	UPNY-CON-CL	6584.3	215.7
MILLWOOD-SO	8028.5	477.7	LIPA-IMPORT	2020.6	-136.7
DNWDIE-SO-PL	3281.5	-359.1	DNWDIE-SO-PC	6498.3	-290.4
DNWDIE-SO-OP	2353.5	-170.5	ABC-JK-PAR	1206.8	136.4
SENY-115kV	259.8	-61.7	SENY-F-To-G	3592.4	114.4
PJM-NY	2710.7	-245.5	NE-NY-WCSC	494.4	44.5
ON-NY	2707.8	209.5	ONT-MICH-PAR	400.9	-22.3

Table LF8.1: Interface Flows for LF8 Powerflow Case

Bus Number	Bus Name	Nominal kV	Actual kV	Bus Number	Bus Name	Nominal kV	Actual kV	Bus Number	Bus Name	Nominal kV	Actual kV
126260	BOWLINE 1	345	353.1	126261	BOWLIN E2	345	352.9	126263	BUCHAN AN S	345	349.6
136150	CLAY	345	357.5	130750	COOPC3 45	345	344	126266	DUNWOO DIE	345	345.4
137200	EDIC	345	343.8	126277	FARRAG UT	345	349.6	130753	FRASR34 5	345	344.9
135413	GRDNVL2	230	239.1	147831	GILB 345	345	353.4	126283	GOTHLS N	345	347.8
126286	GOWANUS N	345	346.4	126290	LADENT WN	345	351.7	137451	LEEDS 3	345	355.5
147833	MARCY T1	345	344.3	126291	MILLWO OD	345	347.4	137452	N.SCOT7 7	345	351.7
137453	N.SCOT99	345	351.7	147841	NIAGAR 2E	230	238.3	147842	NIAGAR2 W	230	238.3
147834	NIAG 345	345	359.5	129341	NRTHPR T1	138	142.9	130755	OAKDL34 5	345	346.4
149001	PANNELL3	345	358.4	126294	PLTVLL EY	345	349.5	126295	RAINEY	345	350.3
126600	REAC71	345	351.5	126601	REAC72	345	351.5	126297	RAMAPO	345	350.3
126250	RAMAPO 5	500	514.2	125001	ROCK TAV	345	352.5	125002	ROSETON	345	356.2
130754	SOMERSE T345	345	360.1	126298	SPRAIN BRO	OK 345.00	345.7	149000	ROCH 345	345	356.1
147840	MOSES W	230	244.4	130768	WATRC 230	230	236.8	180819	CHA-NY	765	768.8

Table LF8.2: Bus Voltage Levels for LF8 Powerflow Case

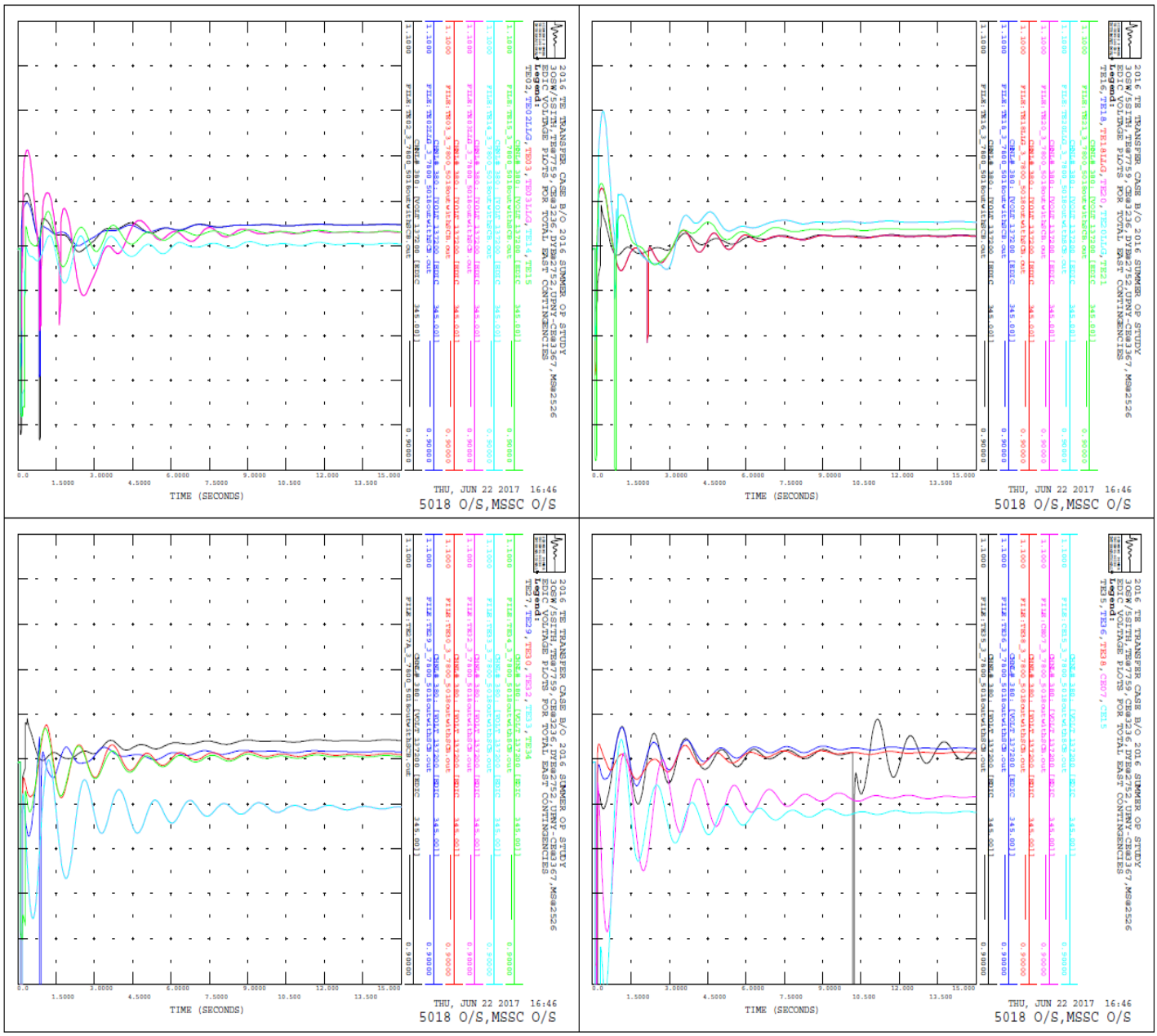

Fig LF8.1:Edic Voltage Plots for Total East, CE07 and CE15 contingencies for 3 Oswego 5 Sithe in-service, 5018 Line out of service and MSSC out of service