Appendix C

Energy Vision 2020

Selected Dynamic Simulations

for

2021-22 HW Cases with Gateway D_2

(C7_22HW2AP-4B-100)

March 29, 2018

(Turn on Adobe Acrobat Bookmarks for Index)

Selected Dynamic Simulation Plots

for

2021-22 HW Case with Gateway D_2 and 1808 MW Aeolus West Transfer

(C7_22HW2AP-4B-100)

Dynamic simulation summary - Cases 1a - 1b

Case	Disturbance Simulation		Significant Results	Performance
	Timing	Event		
	N-1			
1a	Aeolus-Anticline 500 kV line outage with 607 MW wtg tripping			
	34 cyc.	No fault, open Aeolus-Anticline 500 kV line, trip 200 MVAR shunt capacitors at Aeolus and Anticline 500 kV subs	Aeolus 230 kV voltage 0.69 pu min. first swing	**Poor** **long duration low voltage swing**
	40 cyc.	Trip High Plains wtg (127.5 MW)	< 0.8 pu for ≈ 0.8 sec.	Latham SVC - 54 MVAR initial
		Trip 7 Mile Hill wtg (118.5 MW)	Platte 230 kV voltage	B_{out} 3.5 pu for 1.2 sec
		Trip Q0706 A&B (Ekola Flats) wtg (249.8 MW)	0.62 pu min. first swing	265 MVAR at 5 sec.
		Trip Dunlap wtg (111.0 MW)		Latham 230 voltage
	5 sec.	Terminate simulation		0.69 pu min. first swing
	Disturbance creates first swing low voltage conditions on remaining 230 kV system between Dave Johnston and Point of Rocks. WTGs at Q0707 and Q0708 provide very limited voltge support during low voltage conditions. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology wtgs.			
1b	Aeolus-Anticline 500 kV line outage with 607 MW wtg tripping			
	30 cyc.	3 phase Aeolus 500 kV fault, limit SVC to 100 MVAR	First swing main grid voltages > 0.8 pu	**Acceptable**
	34 cyc.	Clear fault, open Aeolus-Anticline 500 kV line, trip 200 MVAR shunt capacitors at Aeolus and Anticline 500 kV subs		Latham SVC - 54 MVAR initial
	36 cyc.	Remove 100 MVAR SVC limiter		Max. B_{out} 3.1 pu
	40 cyc.	Trip High Plains wtg (127.5 MW)		275 MVAR at 5 sec.
		Trip 7 Mile Hill wtg (118.5 MW)		Latham 230 voltage
		Trip Q0706 A&B (Ekola Flats) wtg (249.8 MW)		0.97 pu min. first swing
		Trip Dunlap wtg (111.0 MW)		
	5 sec.	Terminate simulation		
	First swing voltages > 0.8 pu on remaining 230 kV system between Dave Johnston and Point of Rocks. "Low voltage ride through performance" at Q0707 and Q0708 and subsequent power ramp minimize 230 kV system stress during first swing. Q0707 and Q0708 reactive output supporting local area 230 kV system voltage. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			

Dynamic simulation summary - Cases 1c - 1d1

Case	Disturbance Simulation		Significant Results	Performance
	Timing	Event		
1c	Anticline-Aeolus 500 kV line outage with 607 MW wtg tripping		First swing main grid voltages > 0.8 pu	**Acceptable**
	30 cyc.	3 phase Anticline 500 kV fault, limit SVC to 100 MVAR		
	34 cyc.	Clear fault, open Anticline-Aeolus 500 kV line, trip 200 MVAR shunt capacitors at Aeolus and Anticline 500 kV subs		Latham SVC - 54 MVAR initial Max. B_{out} 3.1 pu 275 MVAR at 5 sec. Latham 230 voltage 0.95 pu min. first swing
	36 cyc.	Remove 100 MVAR SVC limiter		
	40 cyc.	Trip High Plains wtg (127.5 MW)		
		Trip 7 Mile Hill wtg (118.5 MW)		
		Trip Q0706 A&B (Ekola Flats) wtg (249.8 MW)		
		Trip Dunlap wtg (111.0 MW)		
	5 sec.	Terminate simulation		
	First swing voltages > 0.8 pu on remaining 230 kV system between Dave Johnston and Point of Rocks. "Low voltage ride through performance" at Q0707 and Q0708 and subsequent power ramp minimize 230 kV system stress during first swing. Q0707 and Q0708 reactive output supporting local area 230 kV system voltage. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			
1d1	Aeolus 230/500 kV transformer outage with 607 MW wtg tripping		First swing main grid voltages > 0.8 pu	**Acceptable**
	30 cyc.	3 phase Aeolus 230 kV fault, limit SVC to 100 MVAR		
	34 cyc.	Clear fault, open Aeolus 230/500 kV transformer, trip 200 MVAR shunt capacitors at Aeolus and Anticline 500 kV subs		Latham SVC - 54 MVAR initial Max. B_{out} 3.05 pu 275 MVAR at 5 sec. Latham 230 voltage 0.96 pu min. first swing
	36 cyc.	Remove 100 MVAR SVC limiter		
	40 cyc.	Trip High Plains wtg (127.5 MW)		
		Trip 7 Mile Hill wtg (118.5 MW)		
		Trip Q0706 A&B (Ekola Flats) wtg (249.8 MW)		
		Trip Dunlap wtg (111.0 MW)		
	5 sec.	Terminate simulation		
	First swing voltages > 0.8 pu on remaining 230 kV system between Dave Johnston and Point of Rocks. "Low voltage ride through performance" at Q0707 and Q0708 and subsequent power ramp minimize 230 kV system stress during first swing. Q0707 and Q0708 reactive output supporting local area 230 kV system voltage. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			

Dynamic simulation summary - Cases 1d2 - 1e

Case	Disturbance Simulation		Significant Results	Performance
	Timing	Event		
1d2	Aeolus 230/500 kV transformer outage with 628 MW wtg tripping			
	30 cyc.	3 phase Aeolus 230 kV fault, limit SVC to 100 MVAR	First swing main grid voltages > 0.8 pu	**Acceptable**
	34 cyc.	Clear fault, open Aeolus 230/500 kV transformer, trip 200 MVAR shunt capacitors at Aeolus and Anticline 500 kV subs		Latham SVC - 54 MVAR initial
	36 cyc.	Remove 100 MVAR SVC limiter		Max. B_{out} 3.3 pu
	40 cyc.	Trip High Plains wtg (127.5 MW)		265 MVAR at 5 sec.
		Trip Q0706 A&B (Ekola Flats) wtg (249.8 MW)		Latham 230 voltage
		Trip Q0707 1&2 (TB Flats I) wtg (250.6 MW)		0.96 pu min. first swing
	5 sec.	Terminate simulation		
	First swing voltages > 0.8 pu on remaining 230 kV system between Dave Johnston and Point of Rocks. "Low voltage ride through performance" at 7 Mile Hill, Q0708 and Dunlop and subsequent power ramp minimize 230 kV system stress during first swing. 7 Mile Hill, Q0708 and Dunlop reactive output supporting local area 230 kV system voltage. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			
1e	Anticline 345/500 kV transformer outage with 607 MW wtg tripping			
	30 cyc.	3 phase Anticline 345 kV fault, limit SVC to 100 MVAR	First swing main grid voltages > 0.8 pu on Dave Johnston to Point of Rocks 230 kV system	**Acceptable**
	34 cyc.	Clear fault, open Anticline 345/500 kV transformer, trip 200 MVAR shunt capacitors at Anticline and Aeolus 500 kV subs		Latham SVC - 54 MVAR initial
	36 cyc.	Remove 100 MVAR SVC limiter		B_{out} 3.5 pu for 0.3 sec
	40 cyc.	Trip High Plains wtg (127.5 MW)	Whiskey Peak 115 kV voltage	260 MVAR at 5 sec.
		Trip 7 Mile Hill wtg (118.5 MW)	0.76 pu min. first swing	Latham 230 voltage
		Trip Q0706 A&B (Ekola Flats) wtg (249.8 MW)	< 0.8 pu for ≈ 0.2 sec.	0.91 pu min. first swing
		Trip Dunlap wtg (111.0 MW)	(transmission parallel	
	5 sec.	Terminate simulation	with DJ-POR 230 line)	
	First swing voltages > 0.8 pu on remaining 230 kV system between Dave Johnston and Point of Rocks. "Low voltage ride through performance" at Q0707 and Q0708 and subsequent power ramp minimize 230 kV system stress during first swing. Q0707 and Q0708 reactive output supporting local area 230 kV system voltage. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			

Dynamic simulation summary - Cases 1f1 - 1f2

Case	Disturbance Simulation		Significant Results	Performance
	Timing	Event		
1f1	Bridger-Anticline 345 kV line outage with 607 MW wtg tripping			
	30 cyc.	3 phase Bridger 345 kV fault, limit SVC to 100 MVAR	Platte 230 kV voltage	**Acceptable**
	34 cyc.	Clear fault, open Bridger-Anticline 345 kV line, trip 200 MVAR shunt capacitors at Anticline and Aeolus 500 kV subs	0.79 pu min. first swing < 0.8 pu for ≈ 0.1 sec.	Latham SVC - 54 MVAR initial
	36 cyc.	Remove 100 MVAR SVC limiter	Whiskey Peak 115 kV voltage	B_{out} 3.5 pu for 0.3 sec
	40 cyc.	Trip High Plains wtg (127.5 MW)	0.74 pu min. first swing	260 MVAR at 5 sec.
		Trip 7 Mile Hill wtg (118.5 MW)	< 0.8 pu for ≈ 0.3 sec.	Latham 230 voltage
		Trip Q0706 A&B (Ekola Flats) wtg (249.8 MW)	(transmission parallel	0.88 pu min. first swing
		Trip Dunlap wtg (111.0 MW)	with DJ-POR 230 line)	
	5 sec.	Terminate simulation		
	First swing voltages ≈/> 0.8 pu on remaining 230 kV system between Dave Johnston and Point of Rocks. "Low voltage ride through performance" at Q0707 and Q0708 and subsequent power ramp minimize 230 kV system stress during first swing. Q0707 and Q0708 reactive output supporting local area 230 kV system voltage. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			
1f2	Bridger-Anticline 345 kV line outage with 628 MW wtg tripping			
	30 cyc.	3 phase Anticline 345 kV fault, limit SVC to 100 MVAR	First swing main grid	**Acceptable**
	34 cyc.	Clear fault, open Anticline 345/500 kV transformer, trip 200 MVAR shunt capacitors at Anticline and Aeolus 500 kV subs	voltages > 0.8 pu on Dave Johnston to Point of Rocks	Latham SVC - 54 MVAR initial
	36 cyc.	Remove 100 MVAR SVC limiter	230 kV system	B_{out} 3.5 pu for 0.3 sec
	40 cyc.	Trip High Plains wtg (127.5 MW)	Whiskey Peak 115 kV voltage	250 MVAR at 5 sec.
		Trip Q0706 A&B (Ekola Flats) wtg (249.8 MW)	0.74 pu min. first swing	Latham 230 voltage
		Trip Q0707 1&2 (TB Flats I) wtg (250.6 MW)	< 0.8 pu for ≈ 0.3 sec.	0.88 pu min. first swing
	5 sec.	Terminate simulation	(transmission parallel with DJ-POR 230 line)	
	First swing voltages > 0.8 pu on remaining 230 kV system between Dave Johnston and Point of Rocks. "Low voltage ride through performance" at 7 Mile Hill, Q0708 and Dunlop and subsequent power ramp minimize 230 kV system stress during first swing. 7 Mile Hill, Q0708 and Dunlop reactive output supporting local area 230 kV system voltage. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			

Dynamic simulation summary - Cases 2 - 4

Case	Disturbance Simulation		Significant Results	Performance
	Timing	Event		
2	Bridger-Point of Rocks-Rock Springs 230 kV line outage		First swing main grid voltages > 0.8 pu	**Acceptable**
	30 cyc.	3 phase Bridger 230 kV fault, limit SVC to 100 MVAR		
	34 cyc.	Clear fault, open Bridger-Point of Rocks-Rock Springs 230 kV line		
	36 cyc.	Remove 100 MVAR SVC limiter		Latham SVC - 54 MVAR initial Min. B_{out} -0.5 pu -25 MVAR at 5 sec. Latham 230 voltage 1.14 pu max. post fault
	5 sec.	Terminate simulation		
	First swing voltages > 0.8 pu. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			
3	Point of Rocks-Latham 230 kV line outage		First swing main grid voltages > 0.8 pu	**Acceptable**
	30 cyc.	3 phase Point of Rocks 230 kV fault, limit SVC to 100 MVAR		
	34 cyc.	Clear fault, open Point of Rocks-Latham 230 kV line		
	36 cyc.	Remove 100 MVAR SVC limiter		Latham SVC - 54 MVAR initial Min. B_{out} 0. pu 10 MVAR at 5 sec. Latham 230 voltage 1.13 pu max. post fault
	5 sec.	Terminate simulation		
	First swing voltages > 0.8 pu. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			
4	Latham-Platte 230 kV line outage		First swing main grid voltages > 0.8 pu	**Acceptable**
	30 cyc.	3 phase Latham 230 kV fault, limit SVC to 100 MVAR		
	34 cyc.	Clear fault, open Latham-Platte 230 kV line		
	36 cyc.	Remove 100 MVAR SVC limiter		Latham SVC - 54 MVAR initial Min. B_{out} -0.4 pu -20 MVAR at 5 sec. Latham 230 voltage 1.08 pu max. post fault
	5 sec.	Terminate simulation		
	First swing voltages > 0.8 pu. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			

Dynamic simulation summary - Cases 5 - 7

Case	Disturbance Simulation		Significant Results	Performance
	Timing	Event		
5	Standpipe-Platte 230 kV line outage			
	30 cyc.	3 phase Standpipe 230 kV fault, limit SVC to 100 MVAR	First swing main grid voltages > 0.8 pu	**Acceptable**
	34 cyc.	Clear fault, open Standpipe-Platte 230 kV line		
	36 cyc.	Remove 100 MVAR SVC limiter		Latham SVC - 54 MVAR initial Min. B_{out} -0.2 pu -5 MVAR at 5 sec. Latham 230 voltage 1.07 pu max. post fault
	5 sec.	Terminate simulation		
	First swing voltages > 0.8 pu. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			
6	Standpipe-Foote Creek 230 kV line outage with loss of 262 MW wtg			
	30 cyc.	3 phase Standpipe 230 kV fault, limit SVC to 100 MVAR	First swing main grid voltages > 0.8 pu	**Acceptable**
	34 cyc.	Clear fault, open Standpipe-Foote Creek 230 kV line, trip islanded system		Latham SVC - 54 MVAR initial Min. B_{out} -0.45 pu 25 MVAR at 5 sec. Latham 230 voltage 1.07 pu max. post fault
	36 cyc.	Remove 100 MVAR SVC limiter		
	5 sec.	Terminate simulation		
	First swing voltages > 0.8 pu. System is stable and damped.			
7	Standpipe-Freezeout 230 kV line outage			
	30 cyc.	3 phase Standpipe 230 kV fault, limit SVC to 100 MVAR	First swing main grid voltages > 0.8 pu High frequency, 50 MVAR oscillations at Q0706, Q0707 & Q0708 between 0.6 and 0.7 sec.	**Unacceptable** **(See case notes below.)**
	34 cyc.	Clear fault, open Standpipe-Freezeout 230 kV line		
	36 cyc.	Remove 100 MVAR SVC limiter		Latham SVC - 54 MVAR initial Min. B_{out} -0.35 pu 0 MVAR at 5 sec. Latham 230 voltage 1.11 pu max. post fault
	5 sec.	Terminate simulation		
	First swing voltages > 0.8 pu. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology. The large magnitue, high frequency oscillations at Q0706, Q0707 & Q0708 WTGs are believed to be due to a limitation with the wtg model used in the dynamics studies. Many of these disturbances will be simulated in PSCAD for further analysis and verification of results.			

Dynamic simulation summary - Cases 8 - 10

Case	Disturbance Simulation		Significant Results	Performance
	Timing	Event		
8	Aeolus-Freezeout 230 kV line outage			
	30 cyc.	3 phase Aeolus 230 kV fault, limit SVC to 100 MVAR	First swing main grid voltages > 0.8 pu	**Acceptable**
	34 cyc.	Clear fault, open Aeolus-Freezeout 230 kV line		
	36 cyc.	Remove 100 MVAR SVC limiter		Latham SVC - 54 MVAR initial
	5 sec.	Terminate simulation		Min. B_{out} -0.2 pu 22 MVAR at 5 sec. Latham 230 voltage 1.11 pu max. post fault
	First swing voltages > 0.8 pu. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			
9	Aeolus-Shirley Basein #2 230 kV line outage			
	30 cyc.	3 phase Aeolus 230 kV fault, limit SVC to 100 MVAR	First swing main grid voltages > 0.8 pu	**Acceptable**
	34 cyc.	Clear fault, open Aeolus-Shirley Basin #2 230 kV line		
	36 cyc.	Remove 100 MVAR SVC limiter		Latham SVC - 54 MVAR initial
	5 sec.	Terminate simulation		Min. B_{out} -0.1 pu 55 MVAR at 5 sec. Latham 230 voltage 1.09 pu max. post fault
	First swing voltages > 0.8 pu. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			
10	Shirley Basin-Q0707 230 kV line outage with loss of 251 MW wtg			
	30 cyc.	3 phase Shirley Basin 230 kV fault, limit SVC to 100 MVAR	First swing main grid voltages > 0.8 pu	**Acceptable**
	34 cyc.	Clear fault, open Shirley Basin-Q0707 230 kV line, trip islanded system		
	36 cyc.	Remove 100 MVAR SVC limiter		Latham SVC - 54 MVAR initial
	5 sec.	Terminate simulation		Min. B_{out} -0.2 pu 30 MVAR at 5 sec. Latham 230 voltage 1.08 pu max. post fault
	First swing voltages > 0.8 pu. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			

Dynamic simulation summary - Cases 11 - 13

Case	Disturbance Simulation		Significant Results	Performance
	Timing	Event		
11	Shirley Basin-Difficulty 230 kV line outage			
	30 cyc.	3 phase Shirley Basin 230 kV fault, limit SVC to 100 MVAR	Aeolus 230 kV voltage	**Poor**
	34 cyc.	Clear fault, open Shirley Basin-Difficulty 230 kV line	1.2 pu max. @ .9 sec.	**high post-fault voltage swing**
	36 cyc.	Remove 100 MVAR SVC limiter	1.06 pu @ 5 sec.	Latham SVC - 54 MVAR initial
	5 sec.	Terminate simulation		Min. B_{out} -1.0 pu
				20 MVAR at 5 sec.
				Latham 230 voltage
				1.09 pu max. post fault
	First swing voltages > 0.8 pu. Short duration high Aelous area voltages driven by reactive output of Q0706, Q0707 & Q0708 during "low voltage ride through" power ramp. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			
12	Dave Johnston-Amasa 230 kV line outage			
	30 cyc.	3 phase Dave Johnston 230 kV fault, limit SVC to 100 MVAR	Aeolus 230 kV voltage	**Acceptable**
	34 cyc.	Clear fault, open Dave Johnston-Amasa 230 kV line	1.15 pu max. @ .85 sec.	
	36 cyc.	Remove 100 MVAR SVC limiter	1.065 pu @ 5 sec.	Latham SVC - 54 MVAR initial
	5 sec.	Terminate simulation		Min. B_{out} -0.6 pu
				15 MVAR at 5 sec.
				Latham 230 voltage
				1.065 pu max. post fault
	First swing voltages > 0.8 pu. Short duration high Aelous area voltages driven by reactive output of Q0706, Q0707 & Q0708 during "low voltage ride through" power ramp. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			
13	Casper PP-Spence 230 kV line outage			
	30 cyc.	3 phase Casper PP 230 kV fault, limit SVC to 100 MVAR	First swing main grid	**Acceptable**
	34 cyc.	Clear fault, open Casper PP-Spence 230 kV line	voltages > 0.8 pu	
	36 cyc.	Remove 100 MVAR SVC limiter		Latham SVC - 54 MVAR initial
	5 sec.	Terminate simulation		Max. B_{out} 1.15 pu
				70 MVAR at 5 sec.
				Latham 230 voltage
				1.04 pu max. post fault
	First swing voltages > 0.8 pu. System is stable and damped. Note - Foote Creek WTG performance poor due to older technology.			

Dynamic Simulation

Case 1a – No fault loss of Aeolus-Anticline 500 kV line with 607 MW generator tripping

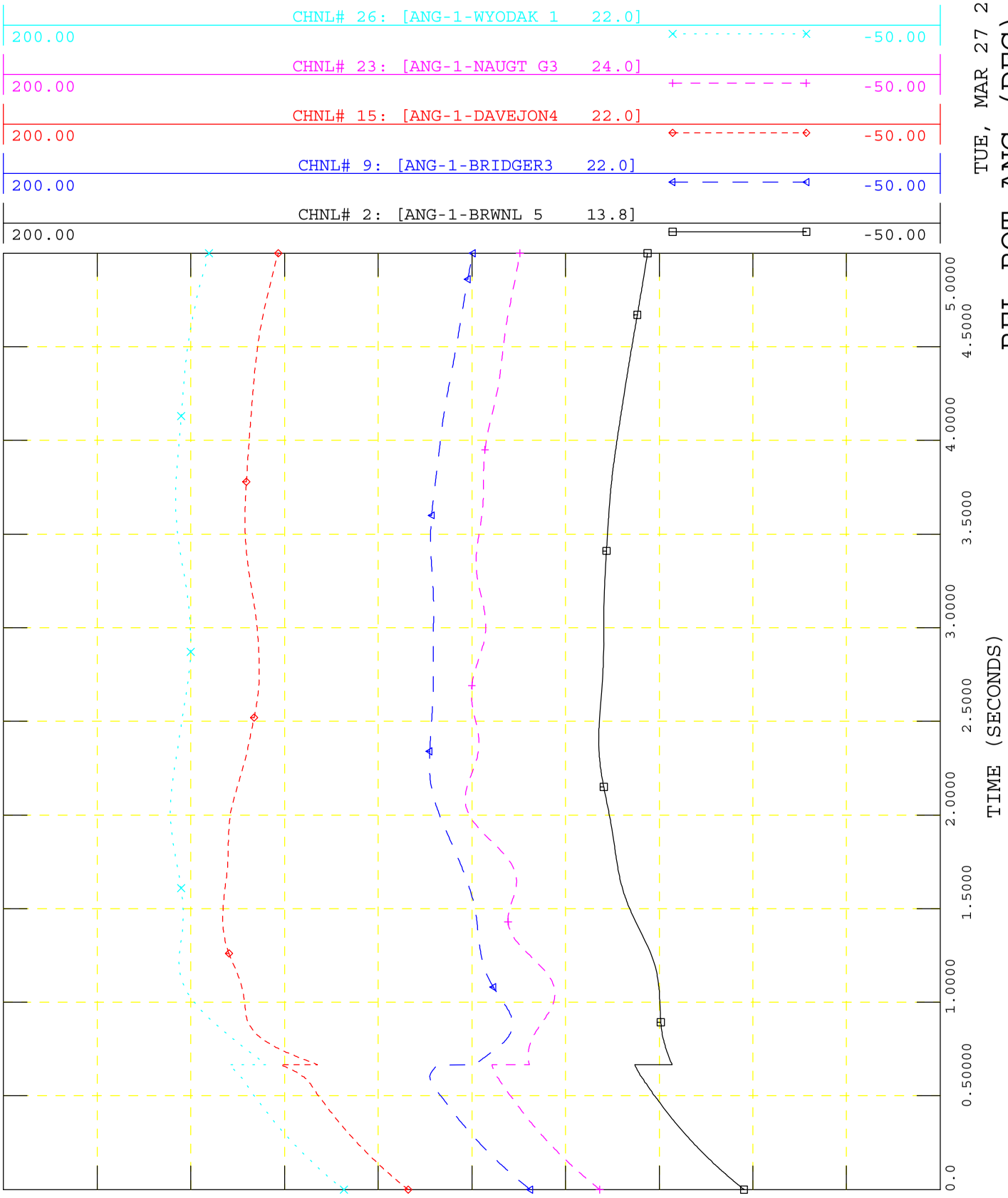
34 cycles	**No fault, open Anticline-Aeolus 500 kV line, trip 200 MVAR shunt capacitors at Aeolus and Anticline 500 kV subs**
40 cycles	**Trip High Plains wind generation (127.5 MW)** **Trip 7 Mile Hill wind generation (118.5)** **Trip Q0706 A&B (Ekola Flats) wind generation (249.8 MW)** **Dunlap wind generation (111.0 MW)**
5 sec.	**Terminate simulation**

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-NO FAULT. 34CY-OPEN AEOLUS-ANTICLINE 500 KV LINE
40CY-TRIP 607 MW WIND GENERATION. OUTAGE 1A
FILE: c7_svc_mtrld_NF_AEOL-ANTI_607gt_out1a.out

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

TUE, MAR 27 2018 21:27

REL ROT ANG (DEG) PLT 1



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-NO FAULT. 34CY-OPEN AEOLUS-ANTICLINE 500 KV LINE
40CY-TRIP 607 MW WIND GENERATION. OUTAGE 1A
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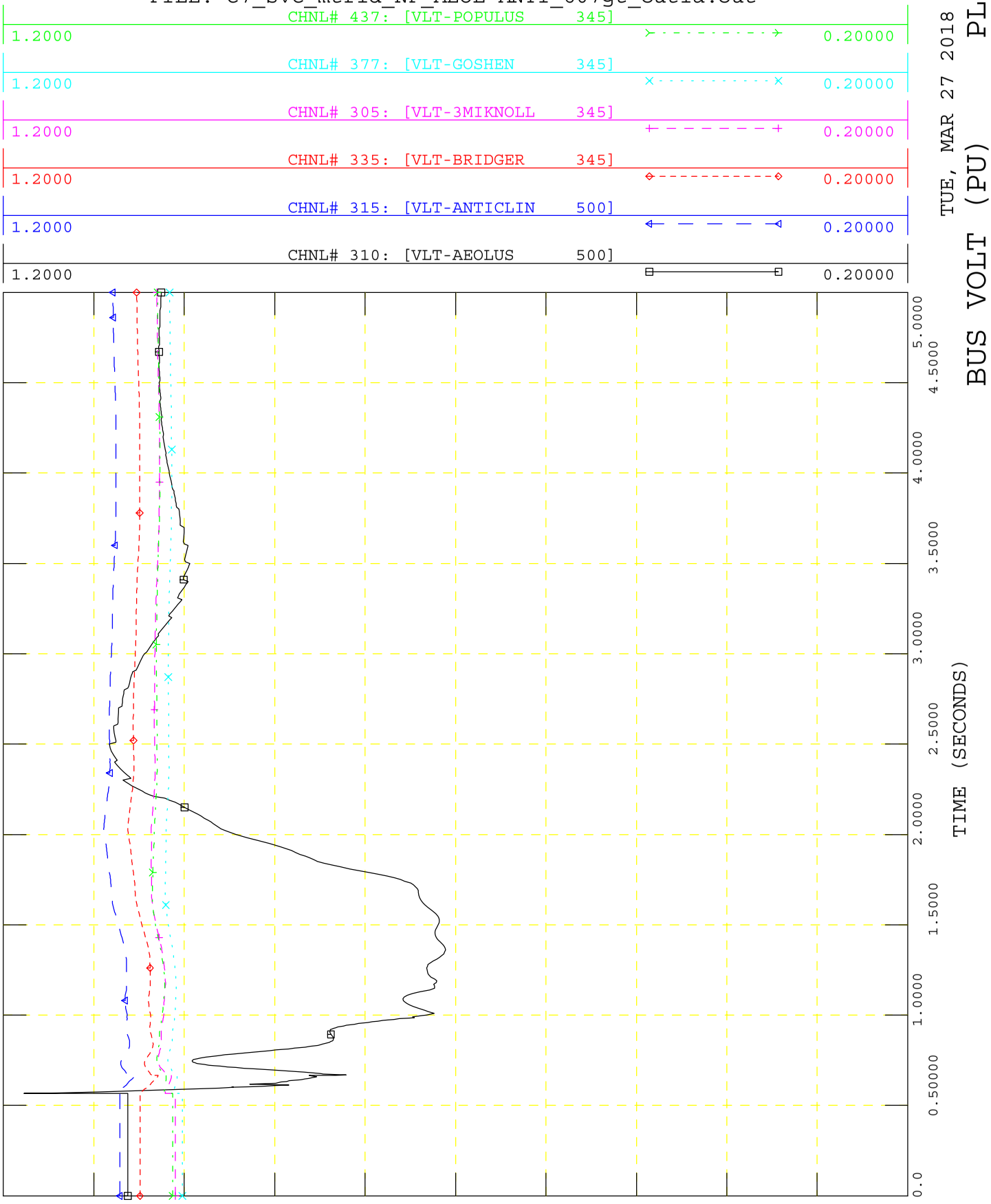

TUE, MAR 27 2018 21:27
PLT 2
BUS VOLT (PU)

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-NO FAULT. 34CY-OPEN AEOLUS-ANTICLINE 500 KV LINE
40CY-TRIP 607 MW WIND GENERATION. OUTAGE 1A
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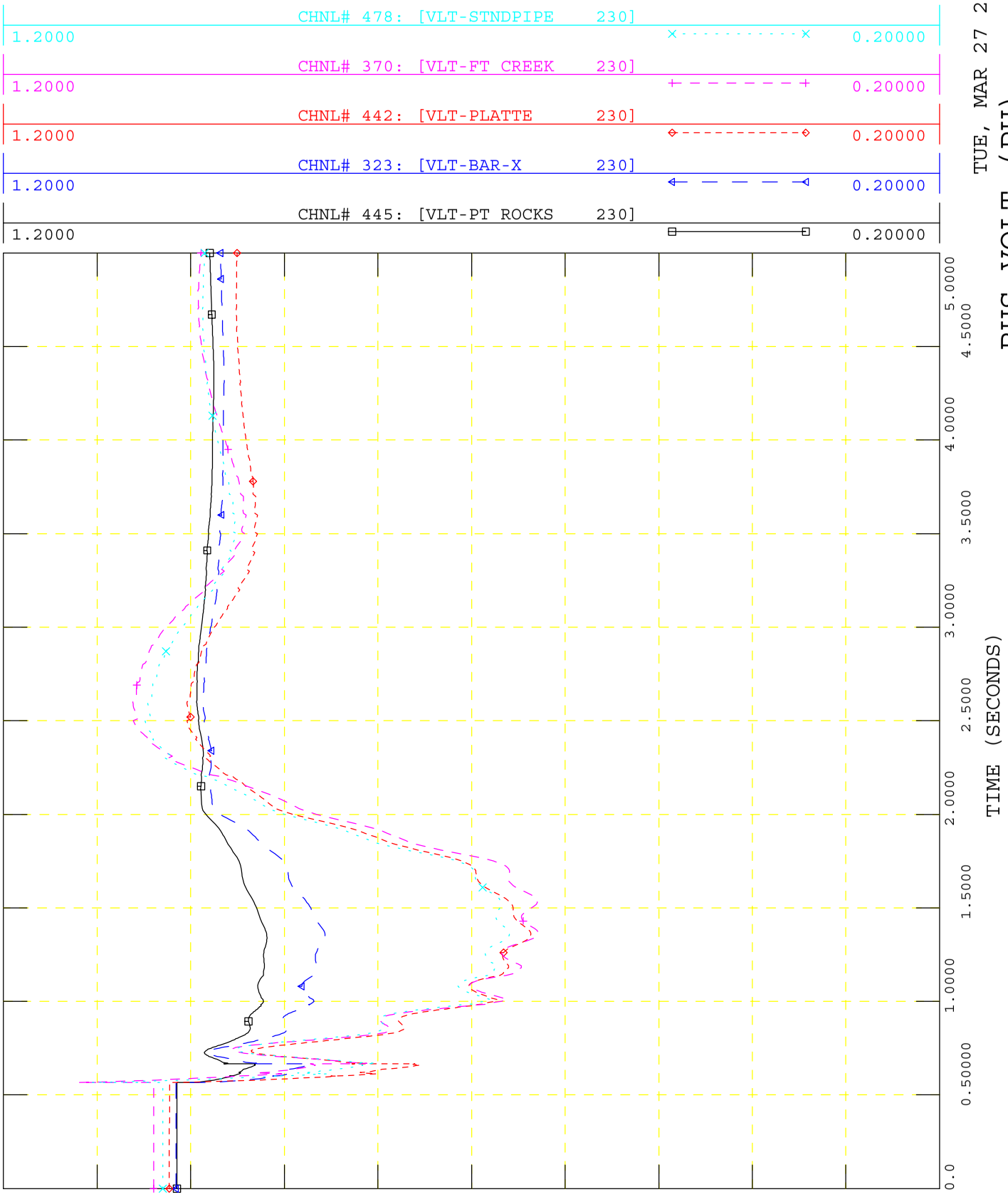

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2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-NO FAULT. 34CY-OPEN AEOLUS-ANTICLINE 500 KV LINE
40CY-TRIP 607 MW WIND GENERATION. OUTAGE 1A
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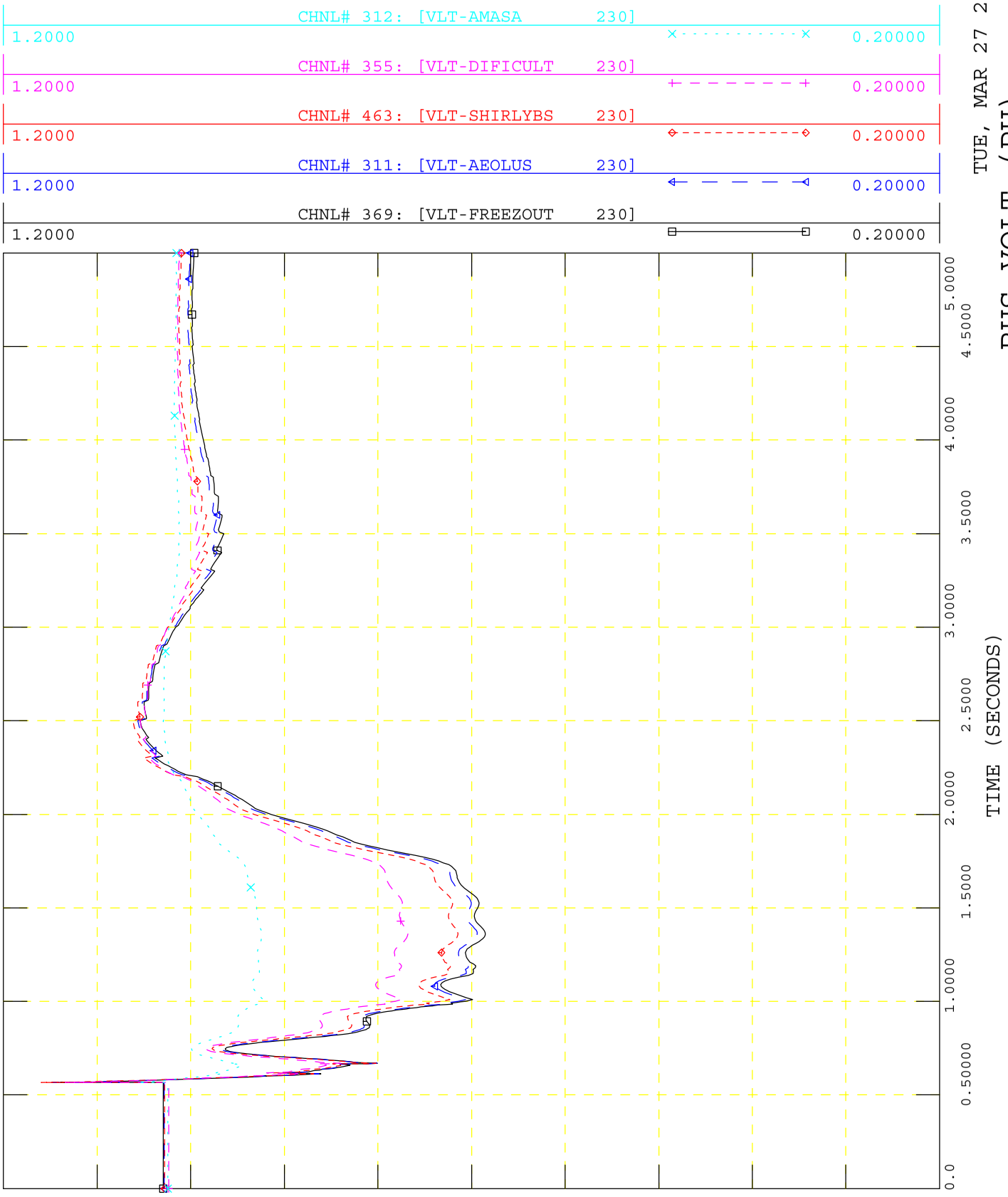

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-NO FAULT. 34CY-OPEN AEOLUS-ANTICLINE 500 KV LINE
40CY-TRIP 607 MW WIND GENERATION. OUTAGE 1A
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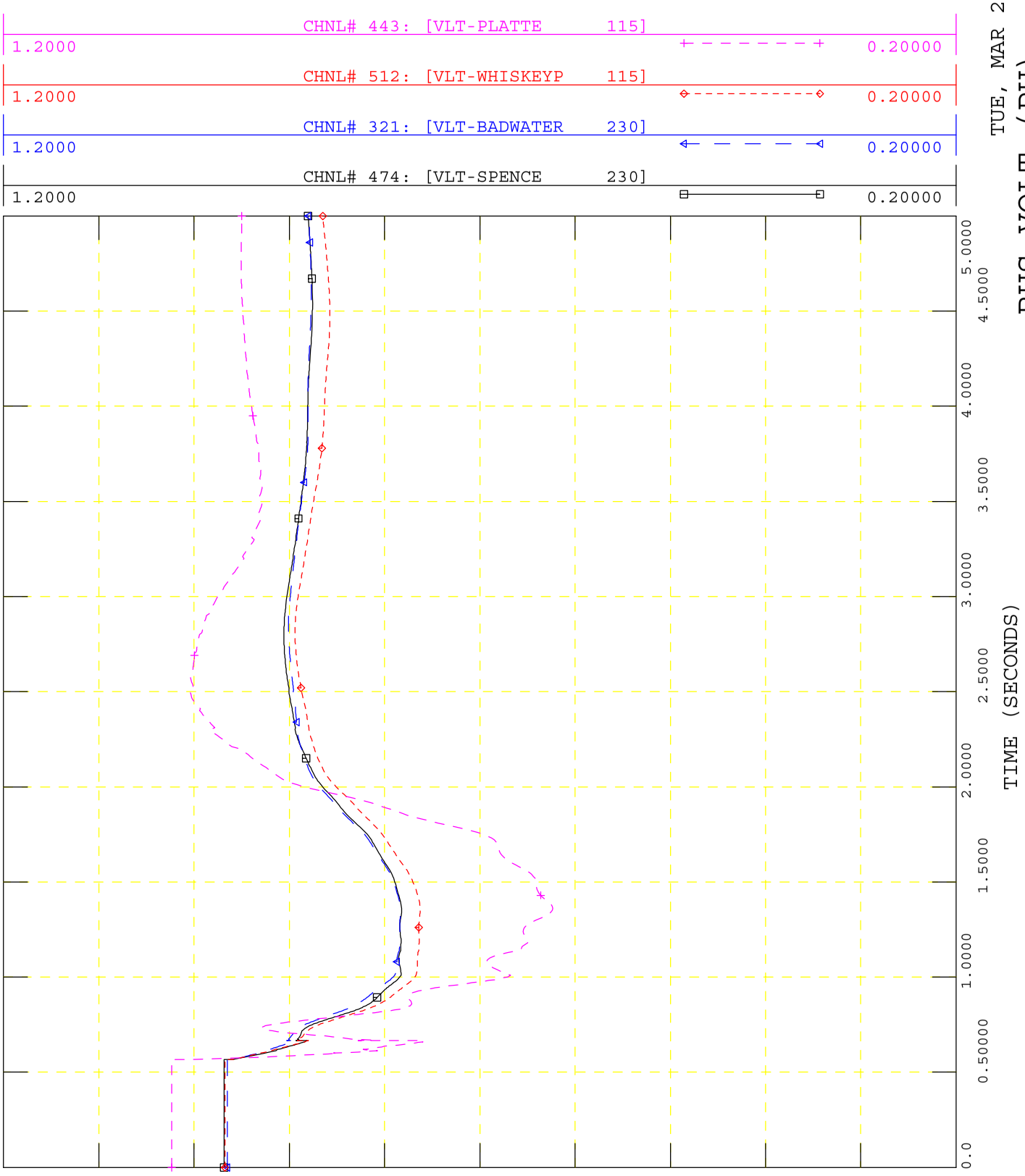

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-NO FAULT. 34CY-OPEN AEOLUS-ANTICLINE 500 KV LINE
40CY-TRIP 607 MW WIND GENERATION. OUTAGE 1A
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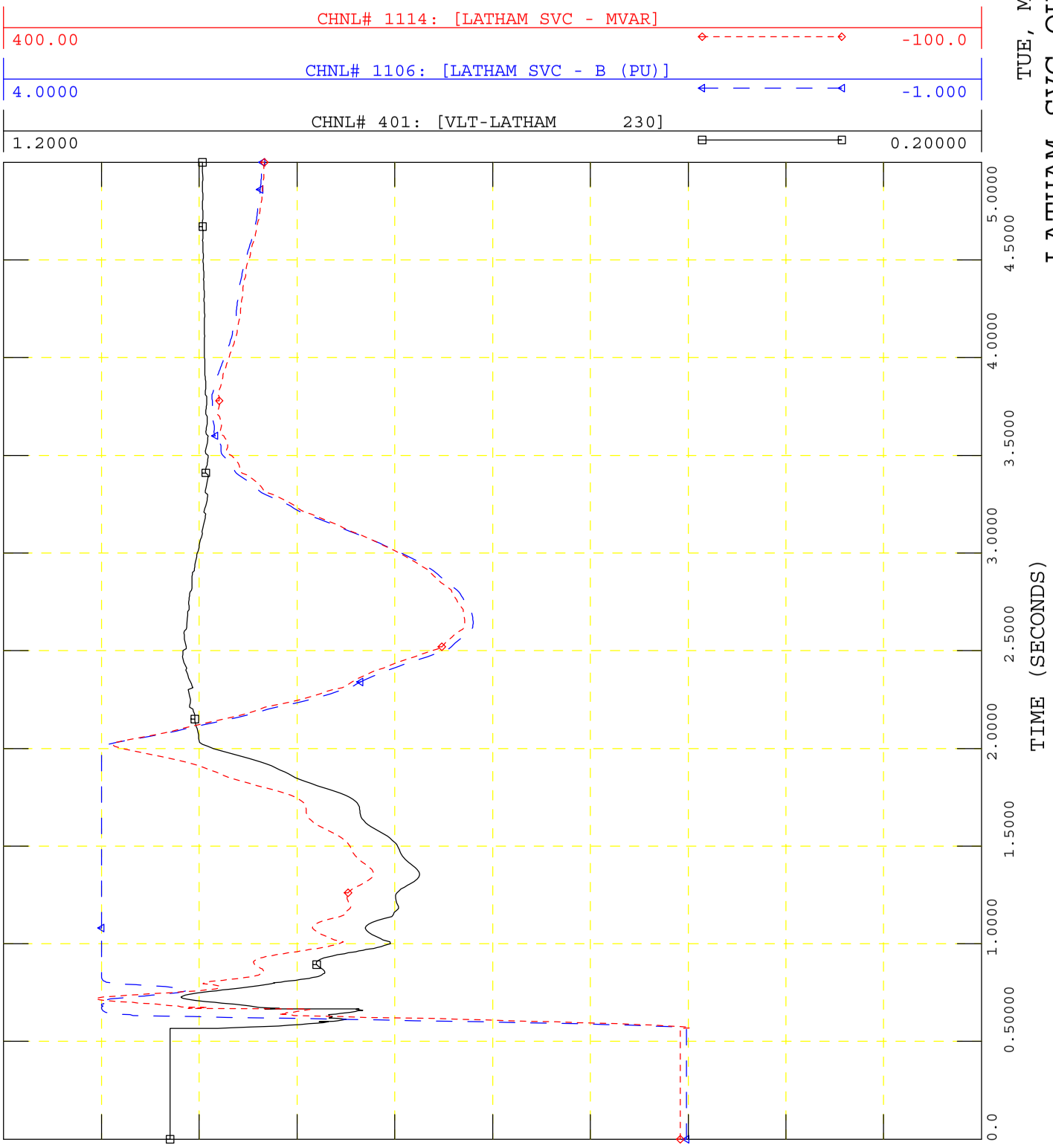
TUE, MAR 27 2018 21:27 PLT 6

LATHAM SVC OUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-NO FAULT. 34CY-OPEN AEOLUS-ANTICLINE 500 KV LINE
40CY-TRIP 607 MW WIND GENERATION. OUTAGE 1A
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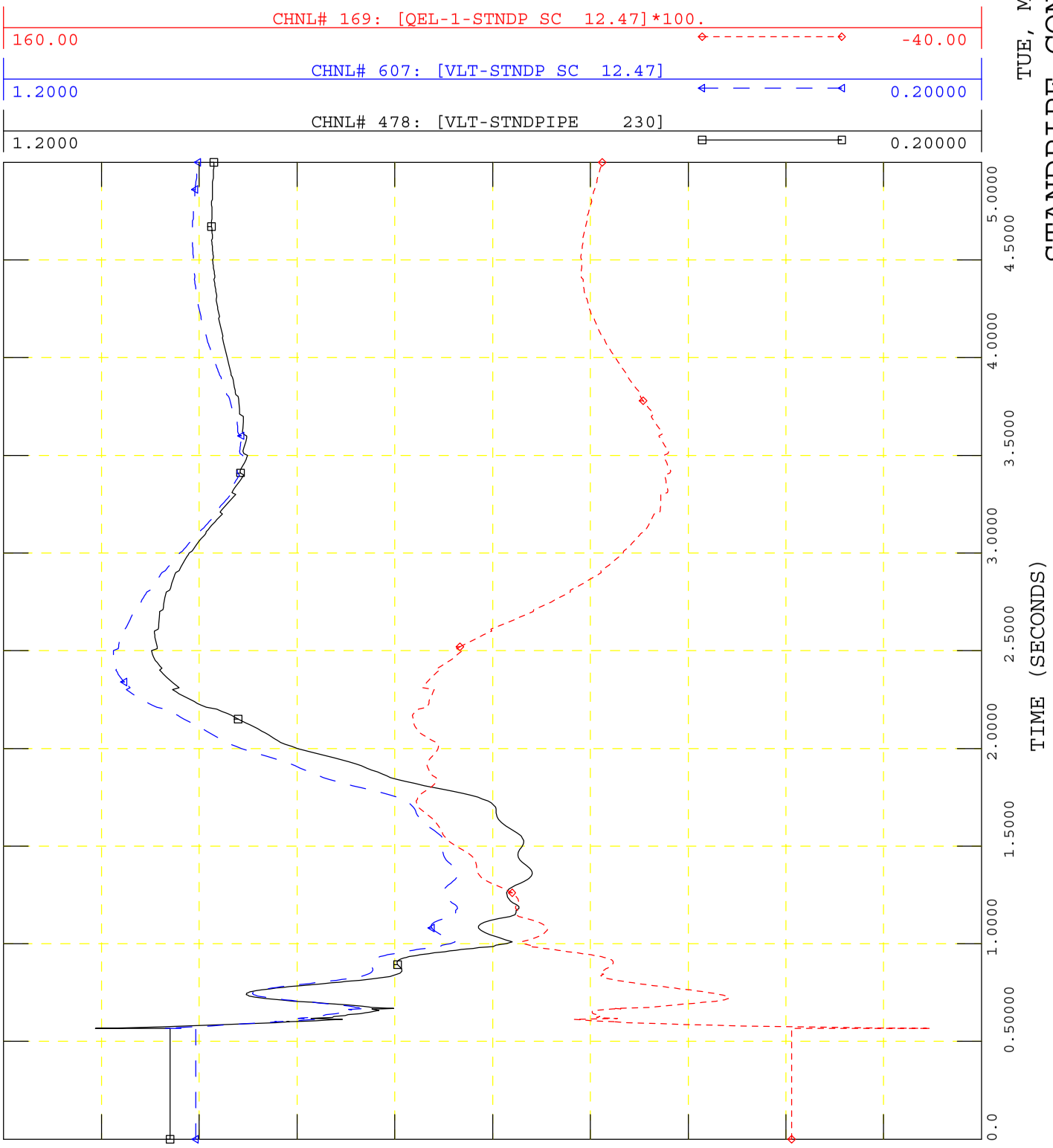
TUE, MAR 27 2018 21:27

STANDPIPE CONDNSR PLT 7



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-NO FAULT. 34CY-OPEN AEOLUS-ANTICLINE 500 KV LINE
40CY-TRIP 607 MW WIND GENERATION. OUTAGE 1A
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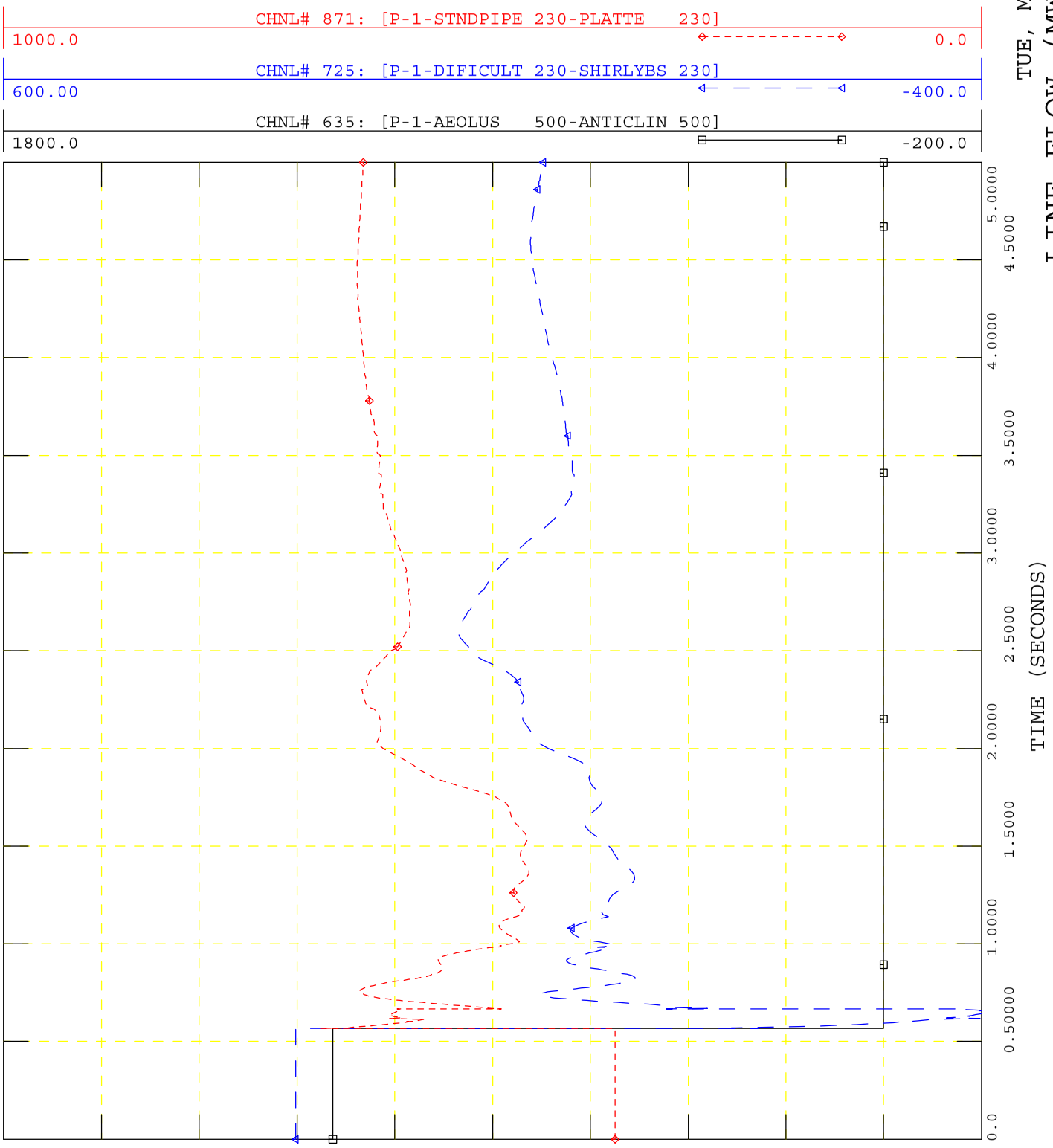
TUE, MAR 27 2018 21:27 PLT 8



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TUE, MAR 27 2018 21:27 PLT 9

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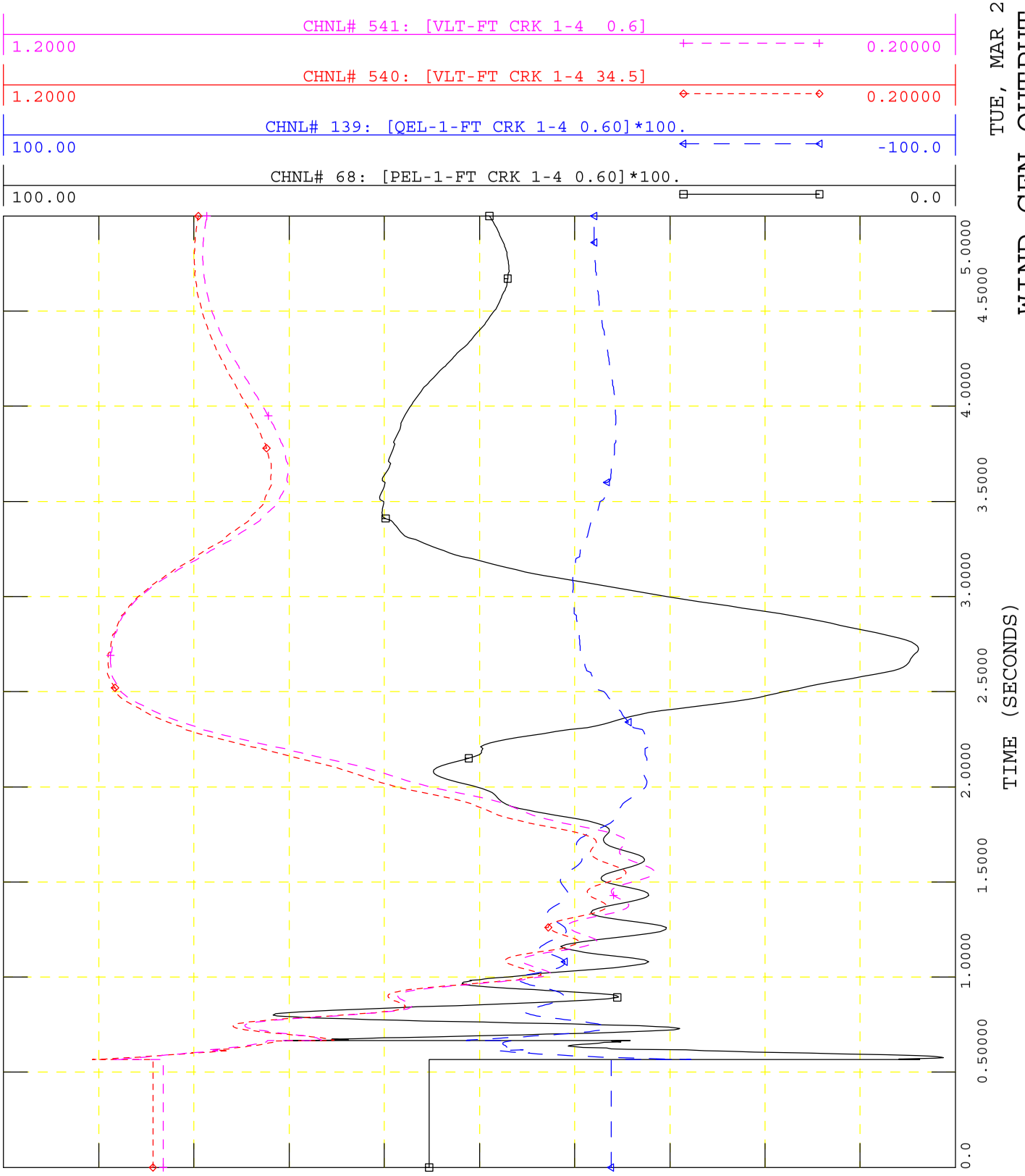

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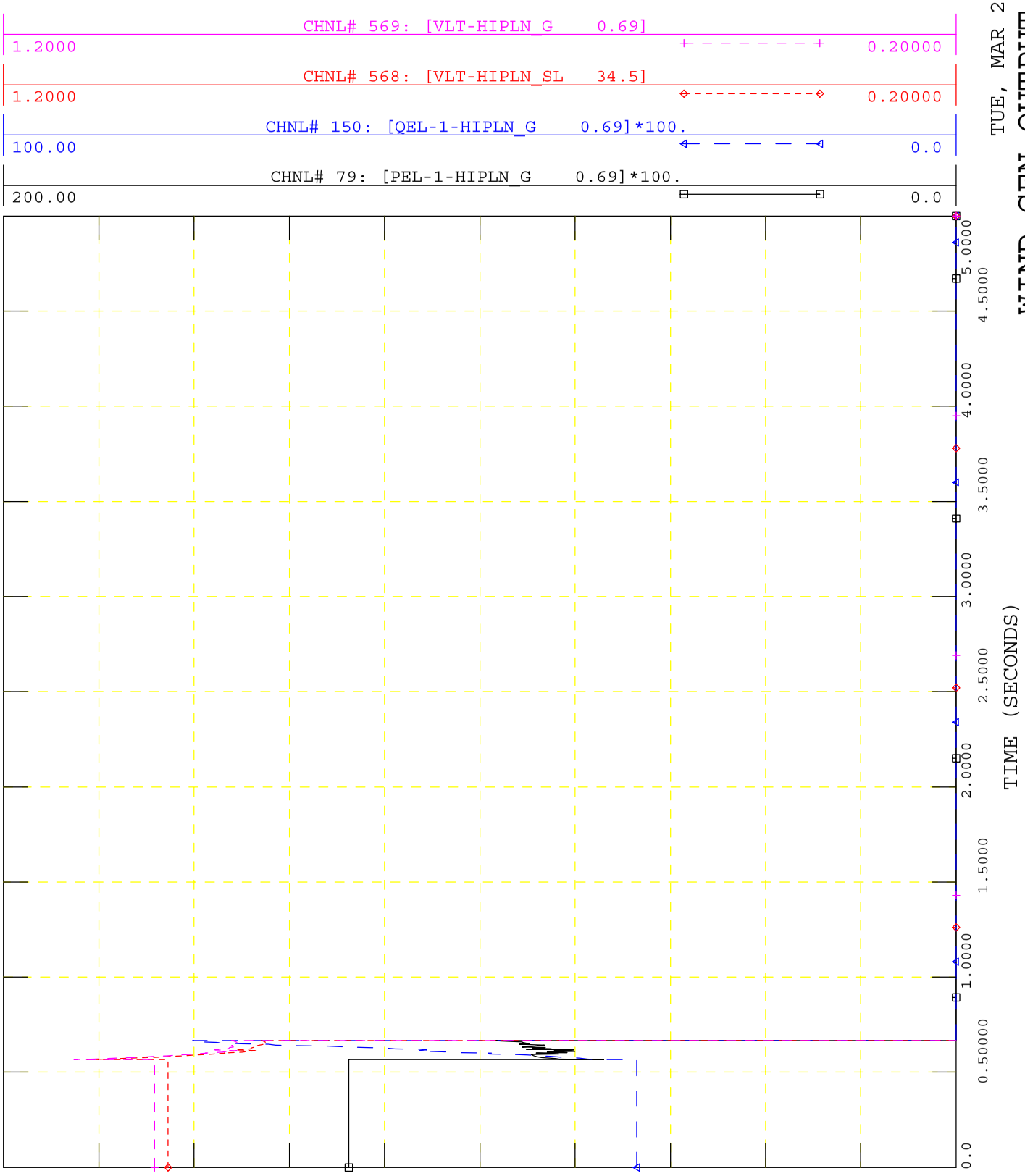

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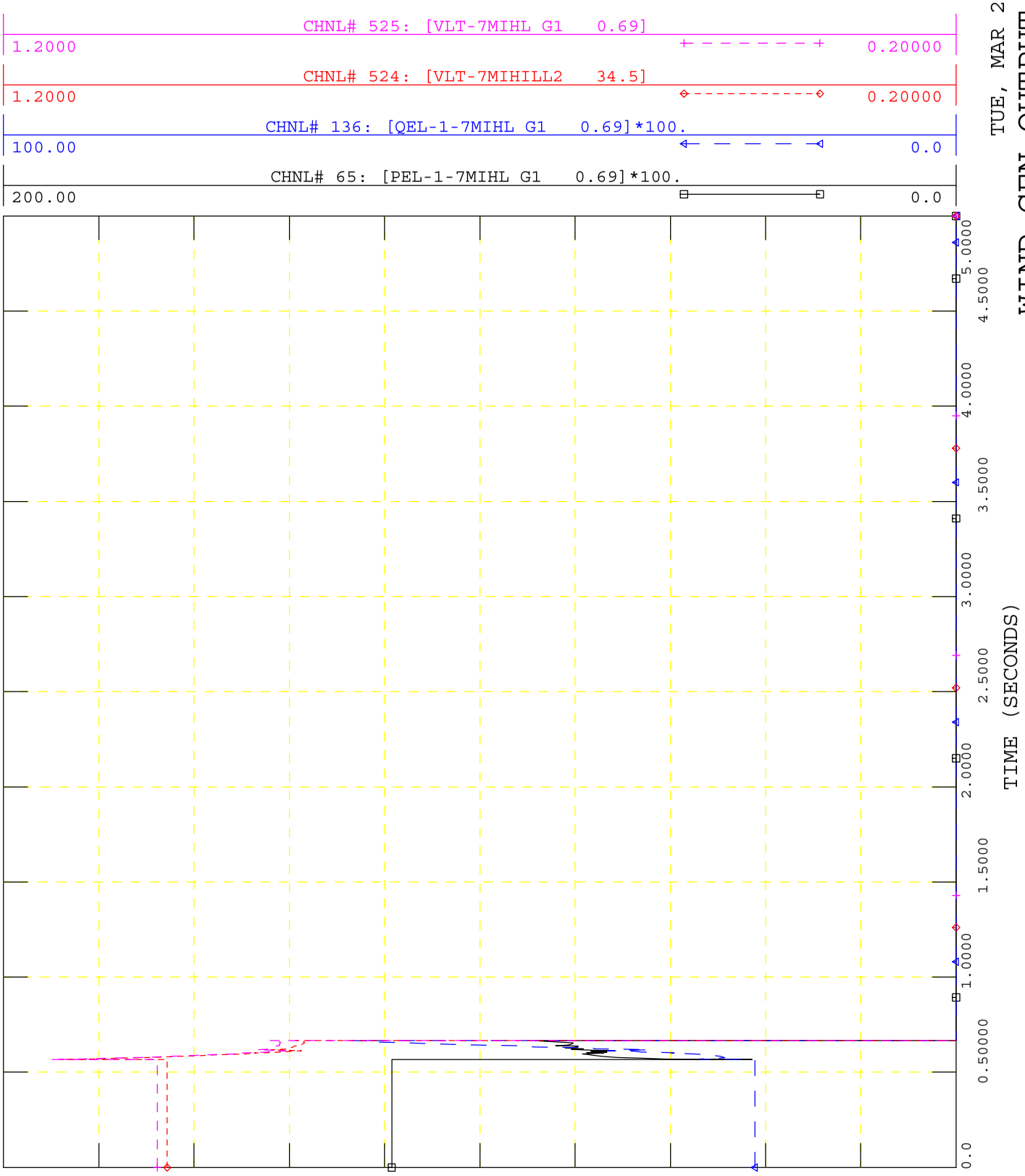

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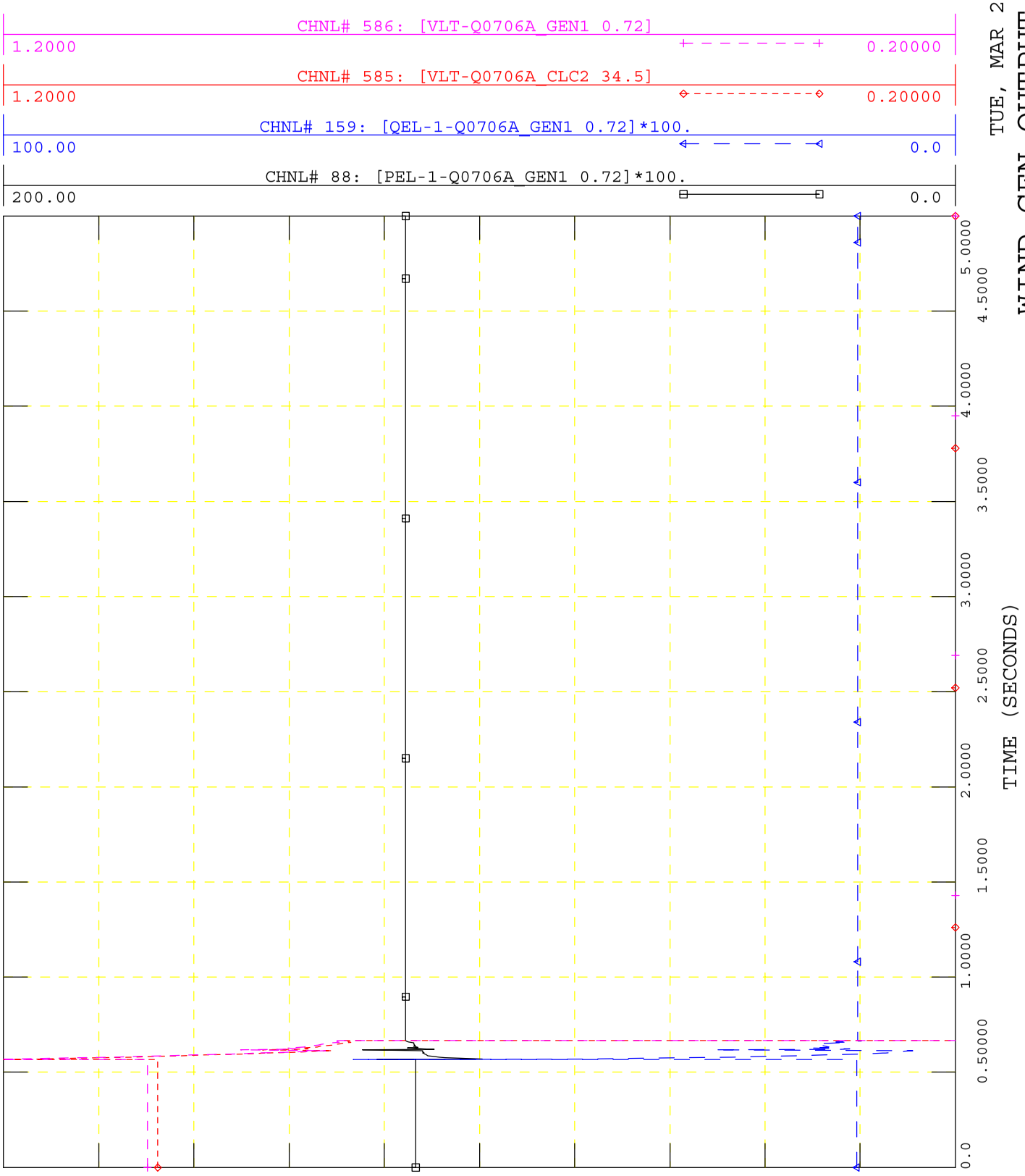

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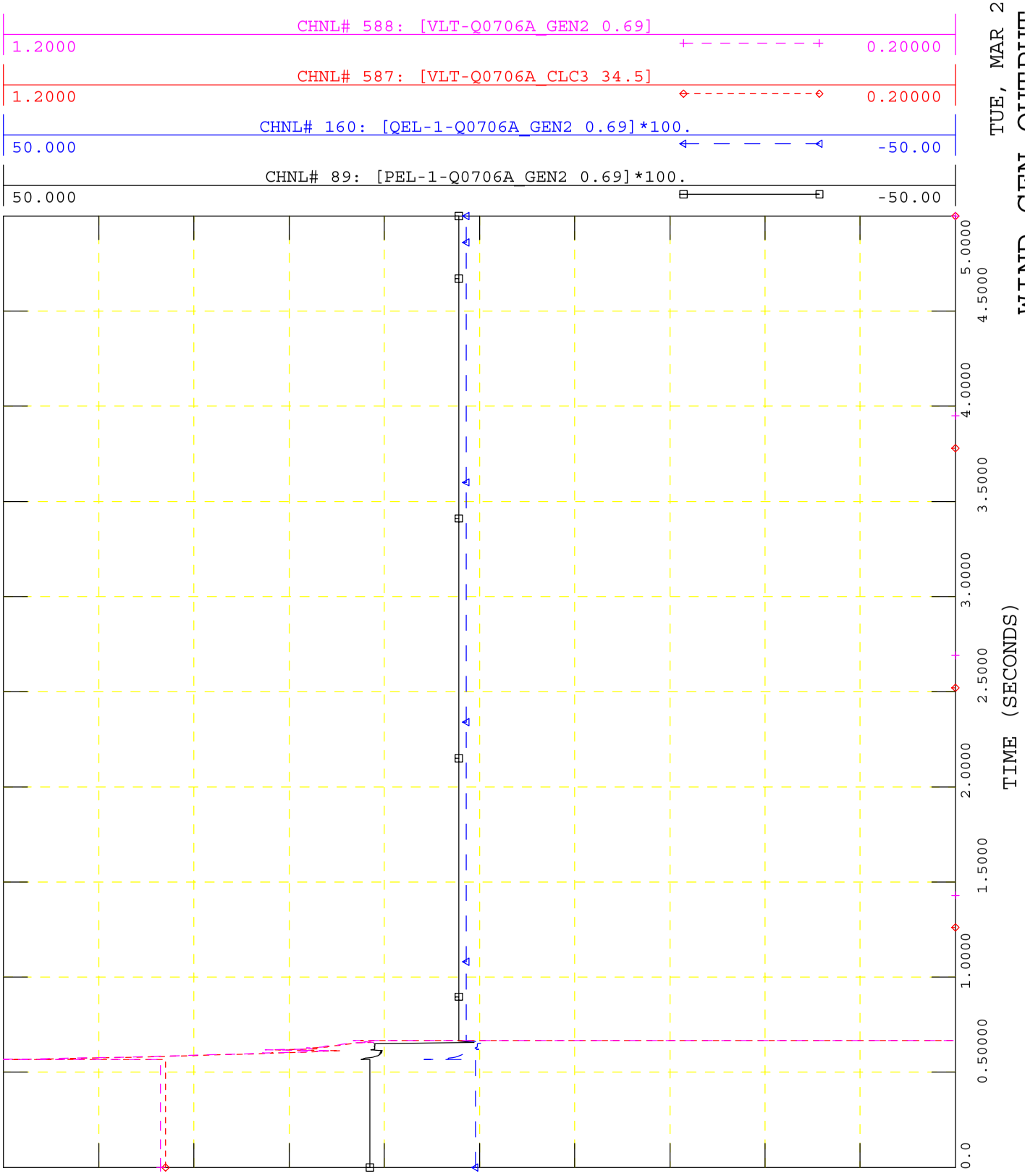

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TUE, MAR 27 2018 21:27 PLT 14

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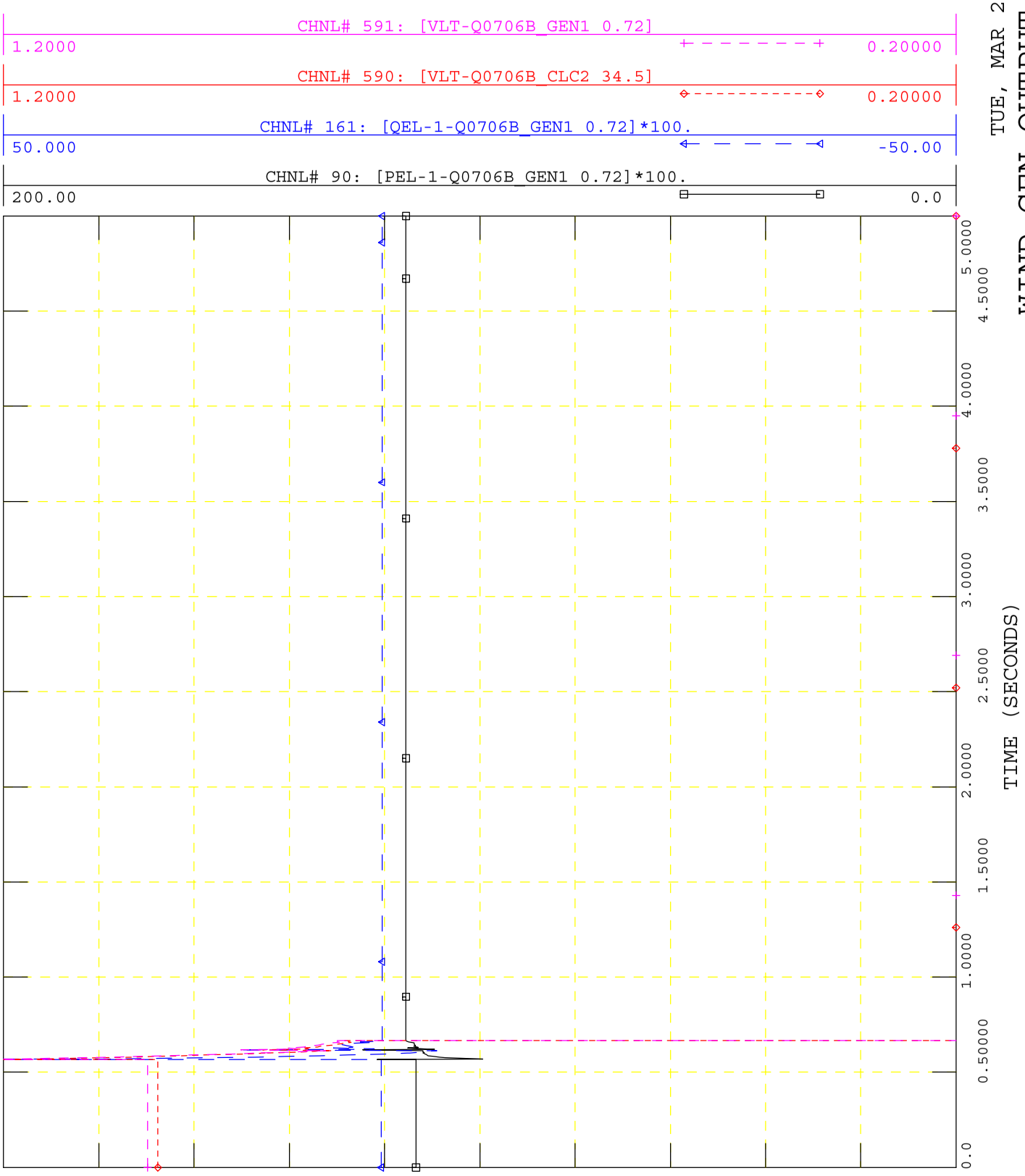

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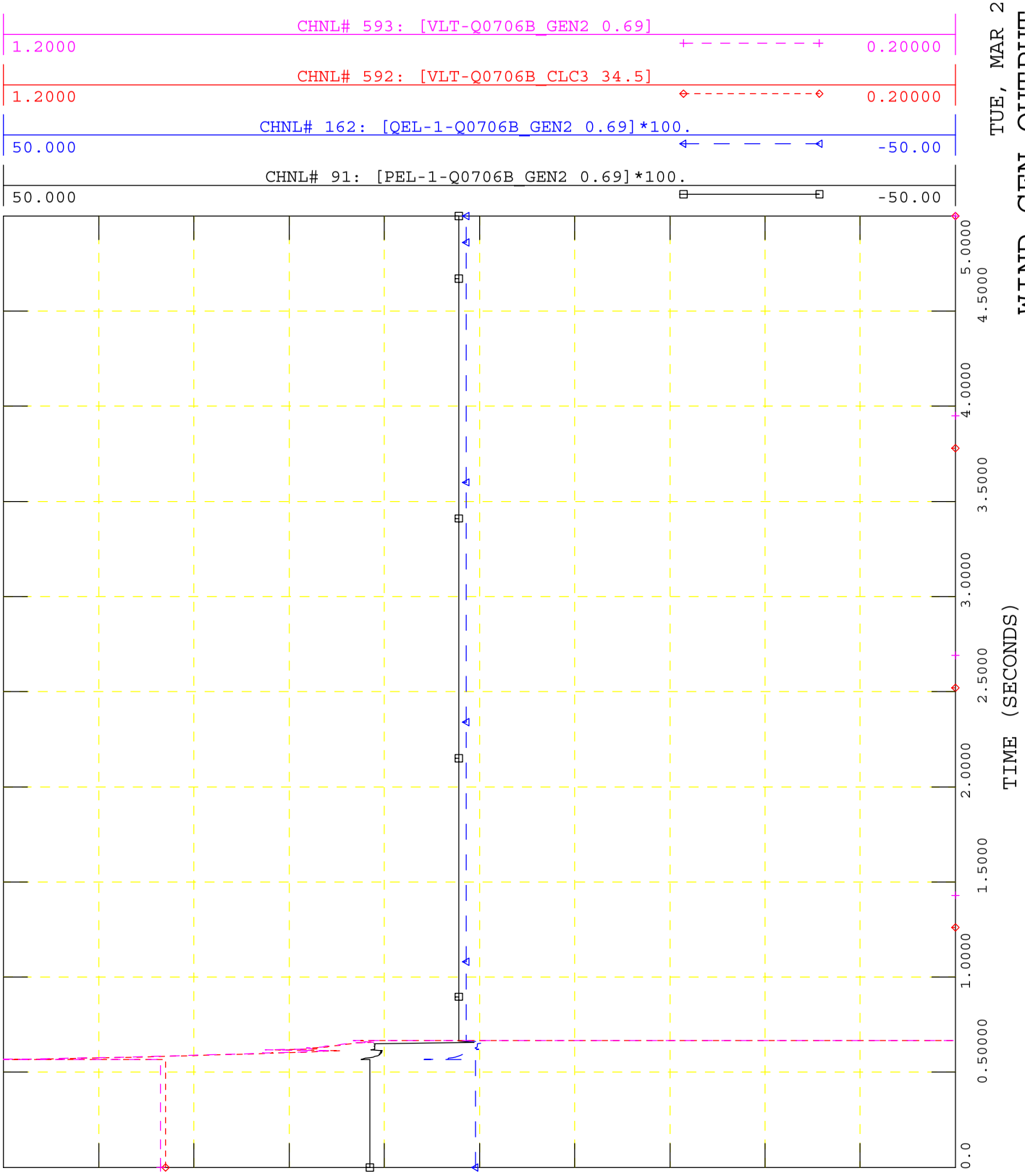
TUE, MAR 27 2018 21:27 PLT 15

WIND GEN OUTPUT



SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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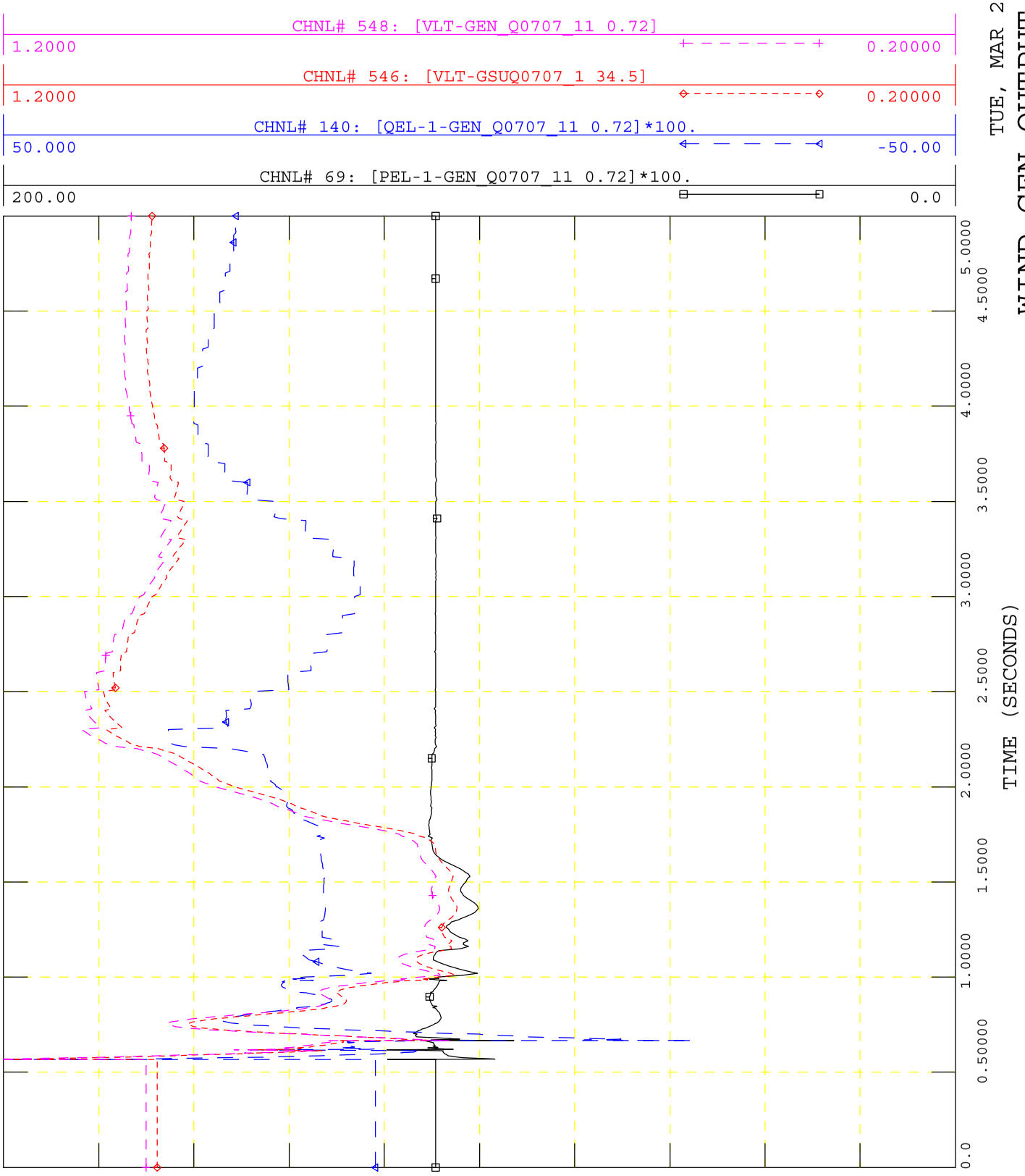
TUE, MAR 27 2018 21:27 PLT 16

WIND GEN OUTPUT



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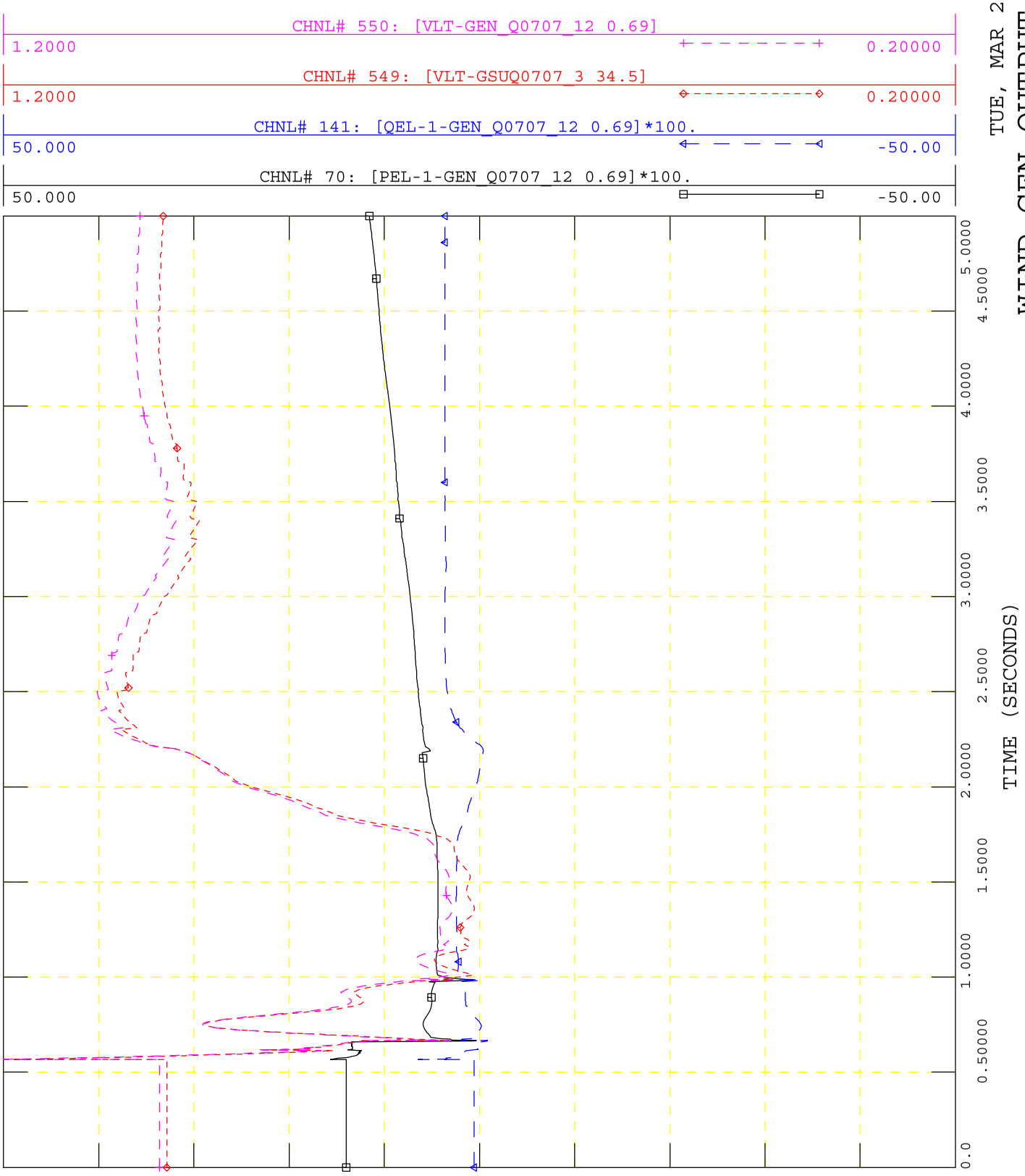

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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TUE, MAR 27 2018 21:27 PLT 18

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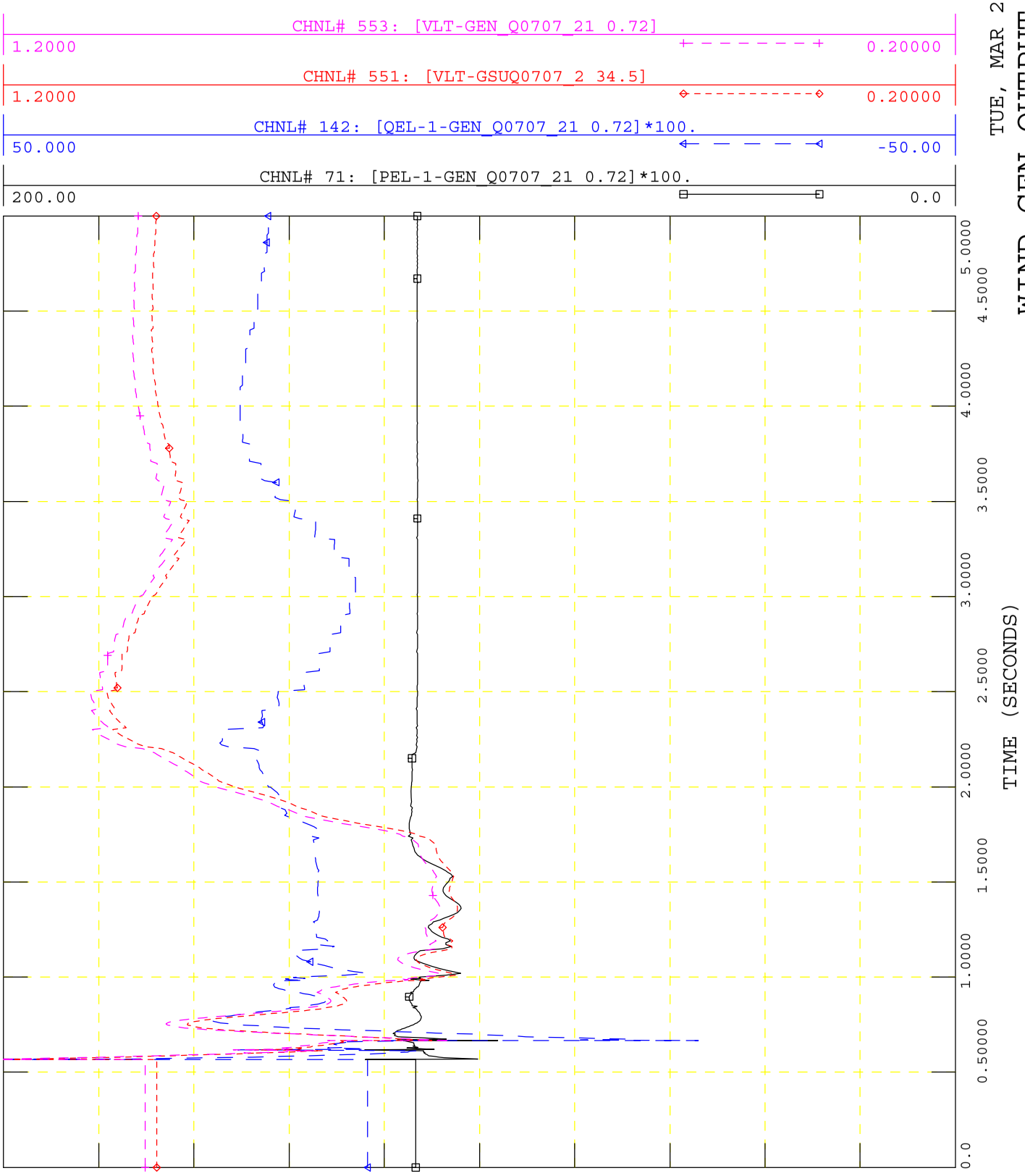

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TUE, MAR 27 2018 21:27 PLT 19

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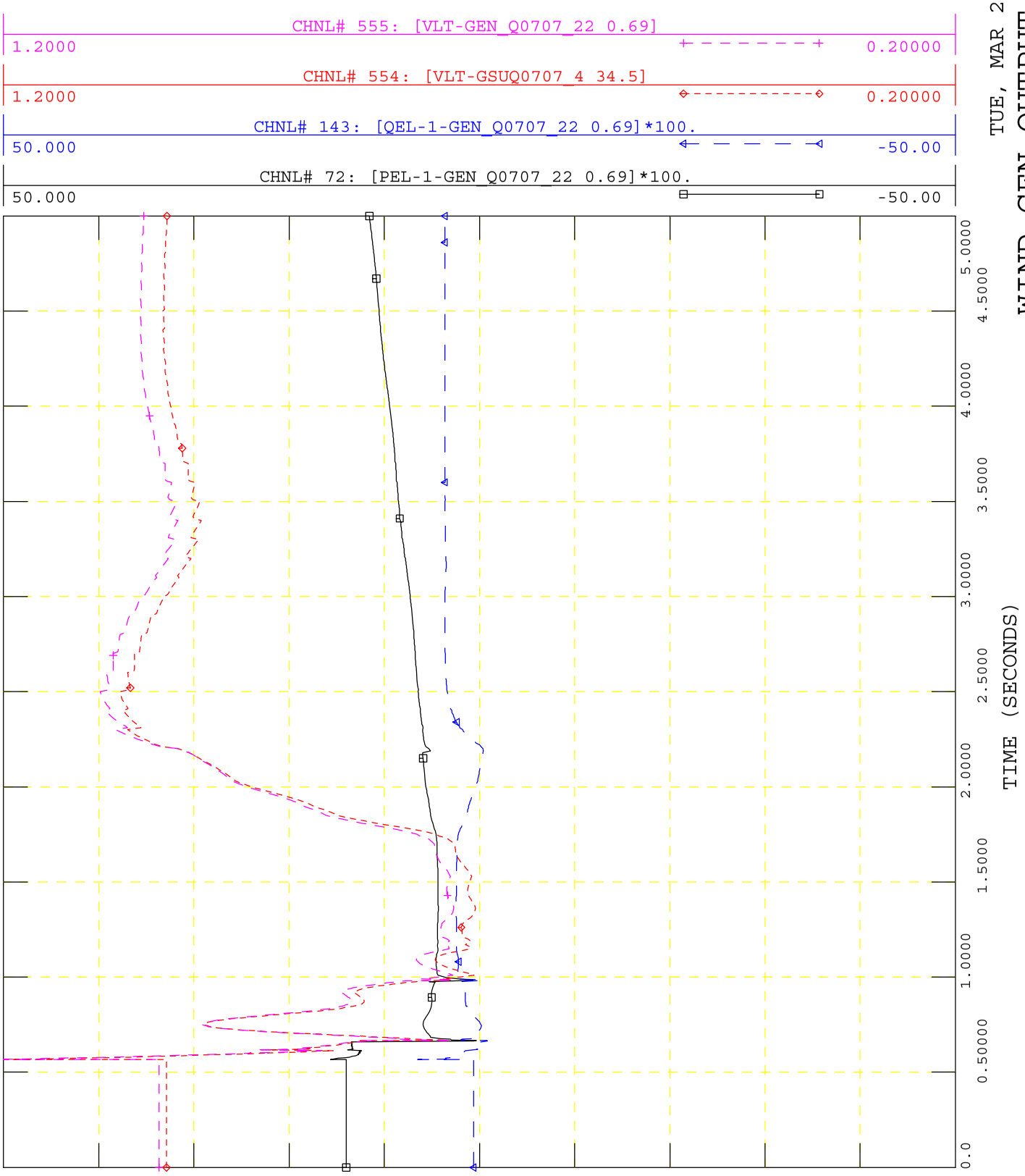

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TUE, MAR 27 2018 21:27 PLT 20

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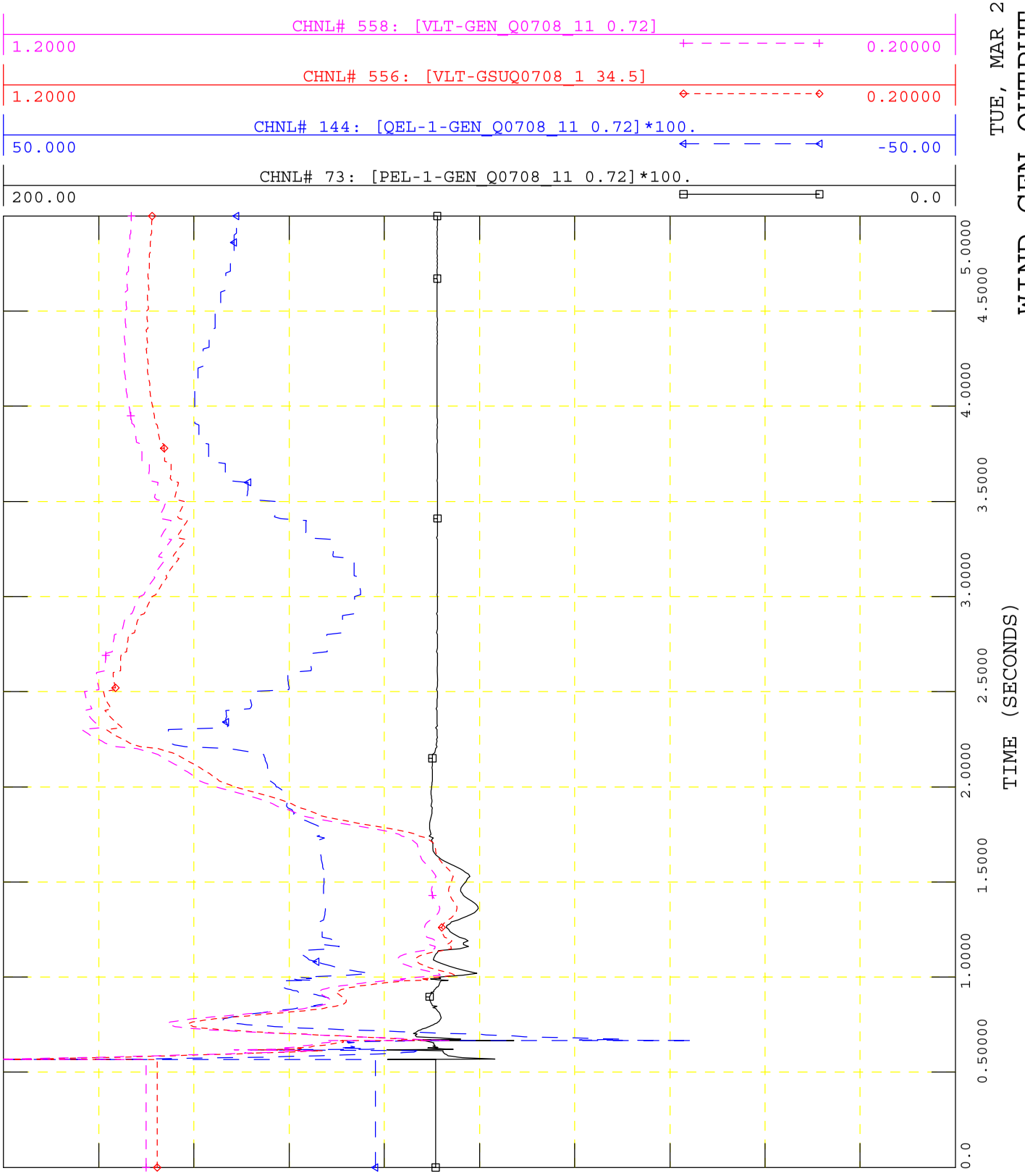

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TUE, MAR 27 2018 21:27 PLT 21

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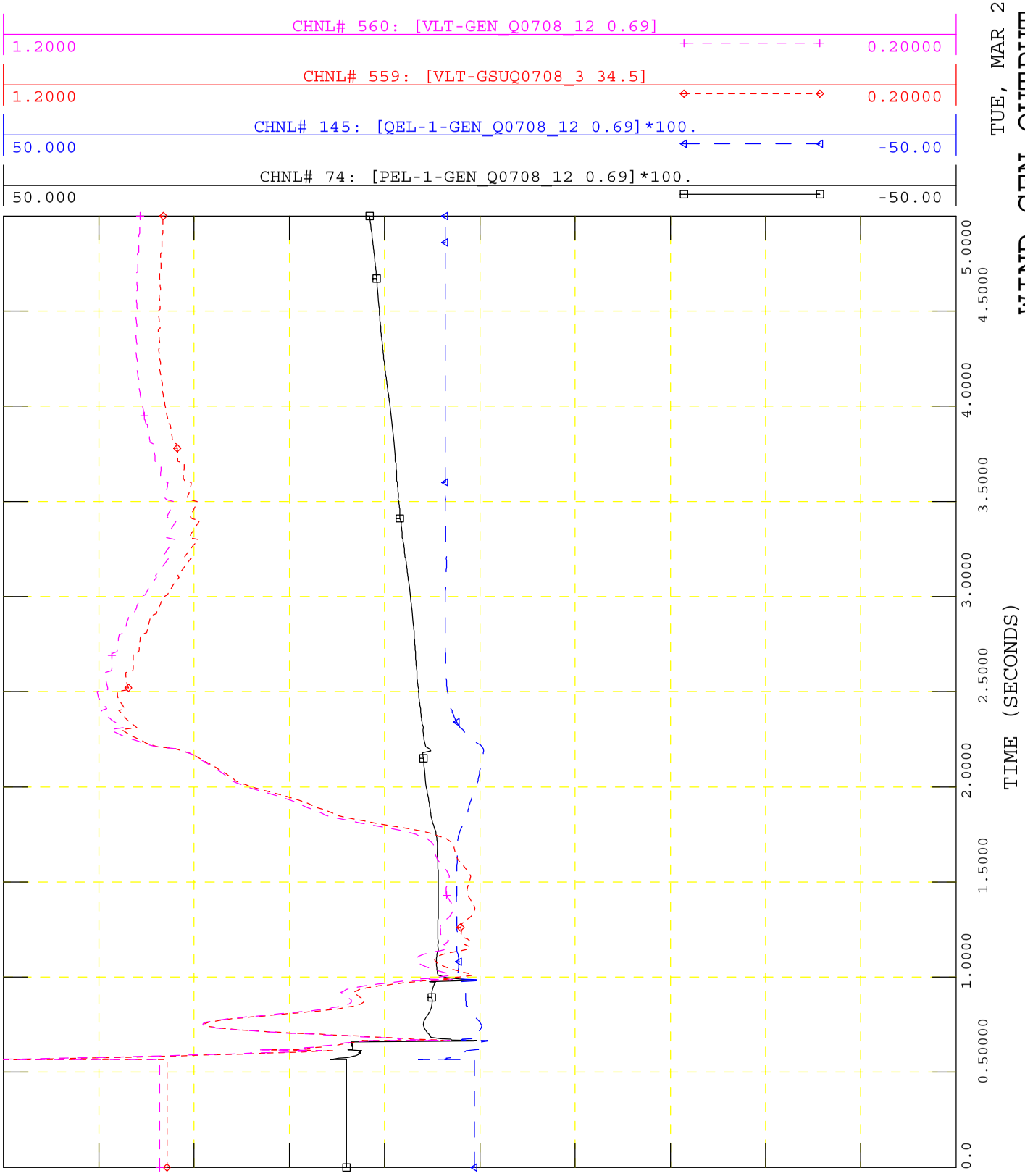

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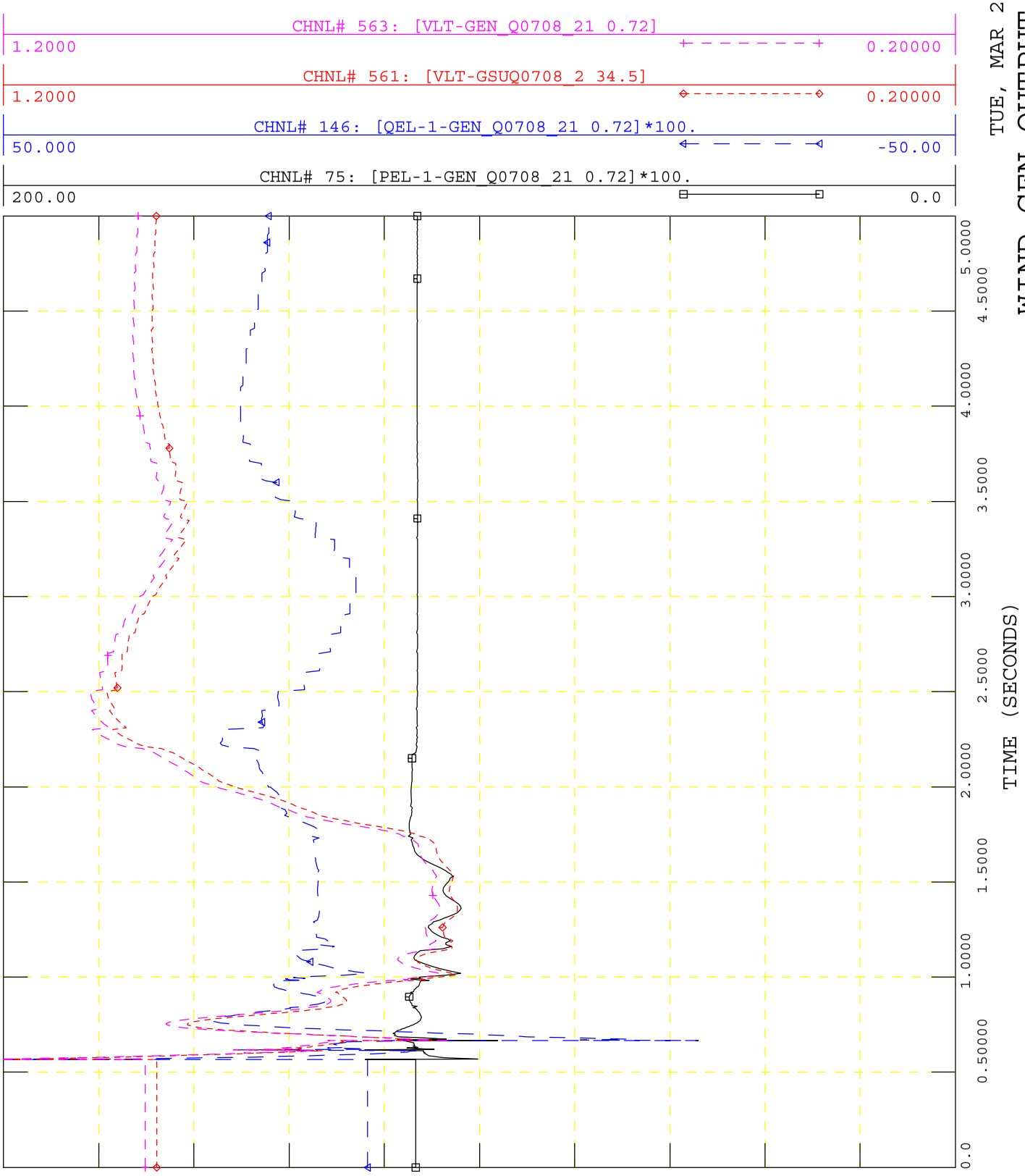

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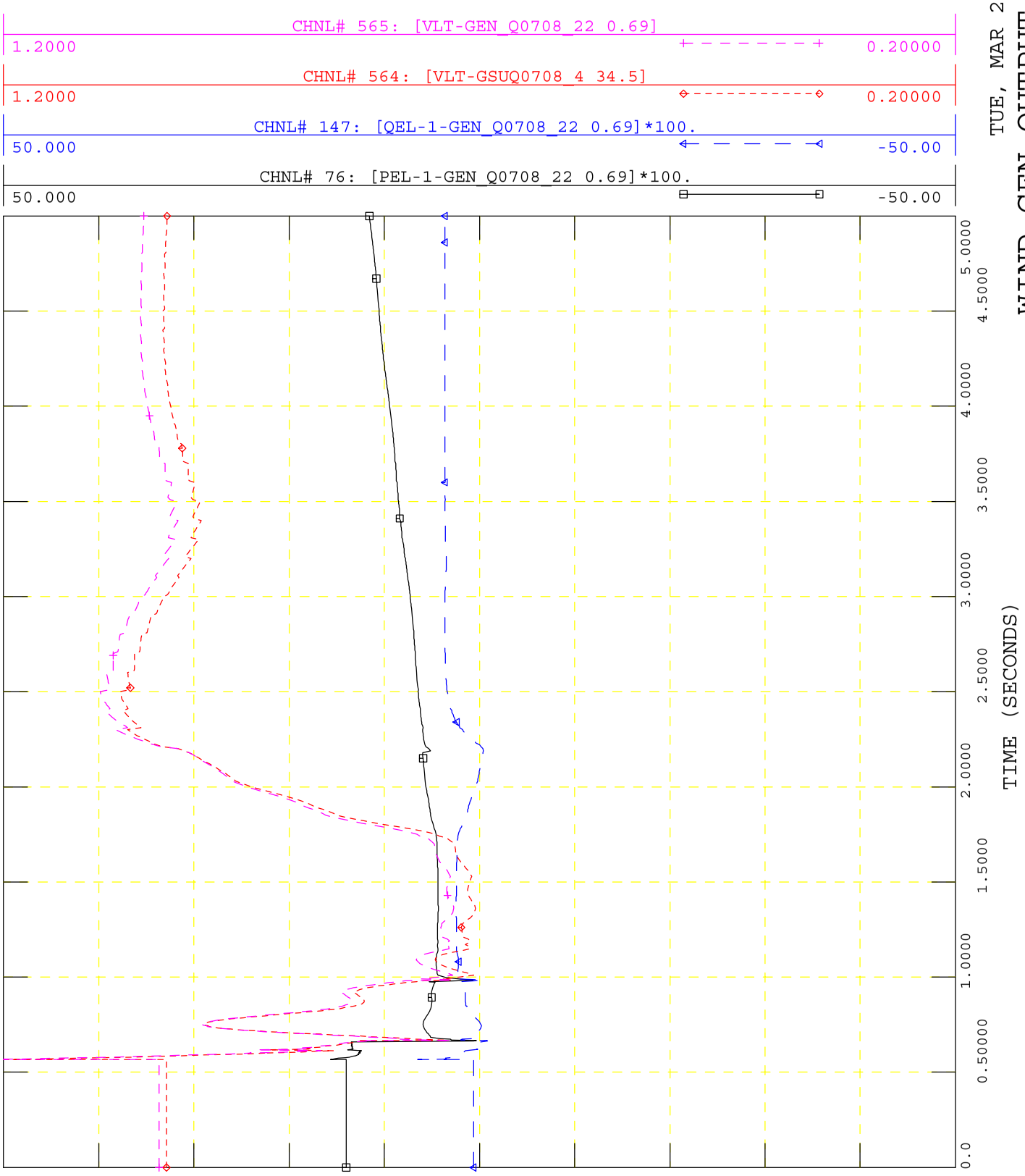

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TUE, MAR 27 2018 21:27 PLT 24

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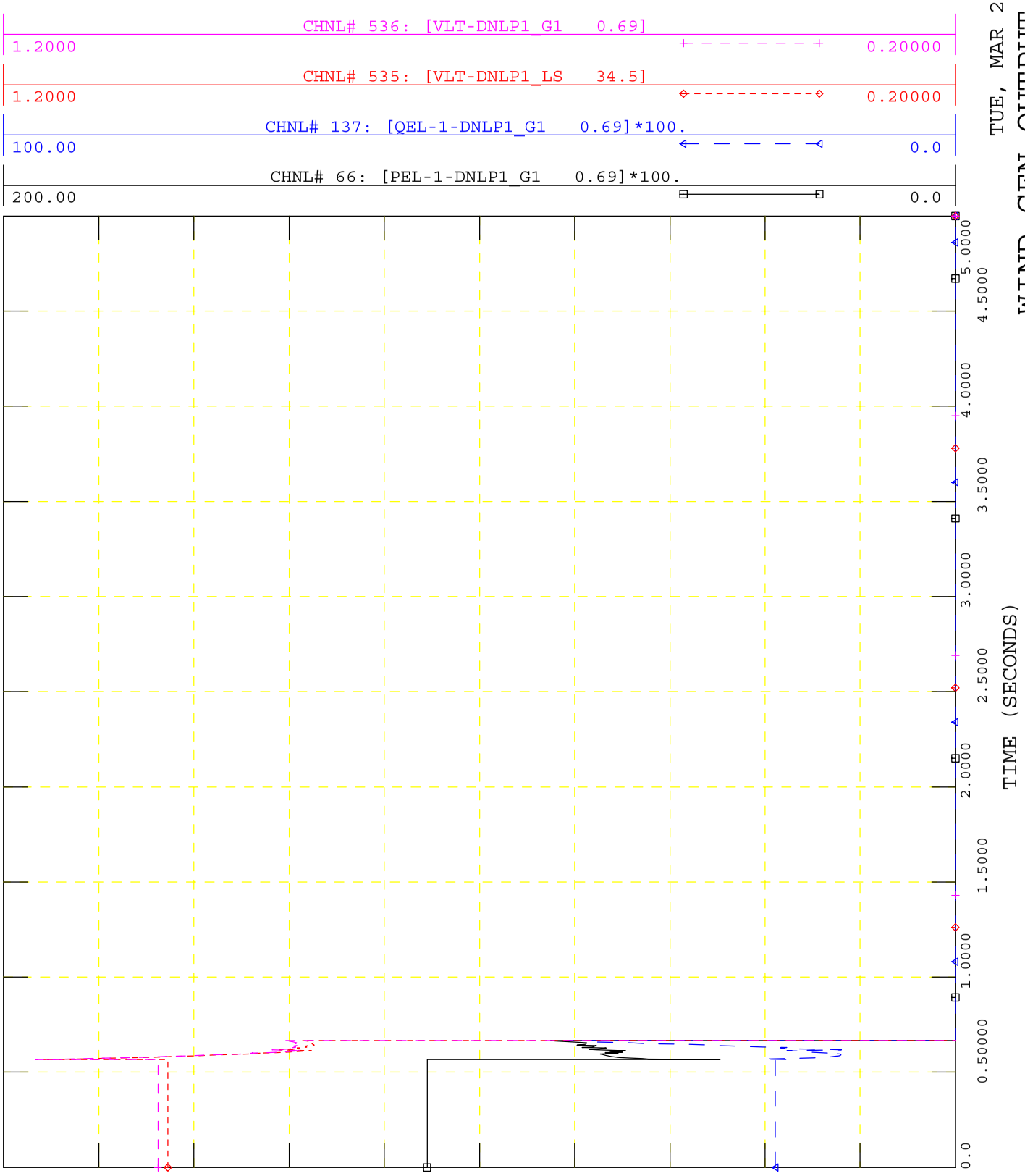

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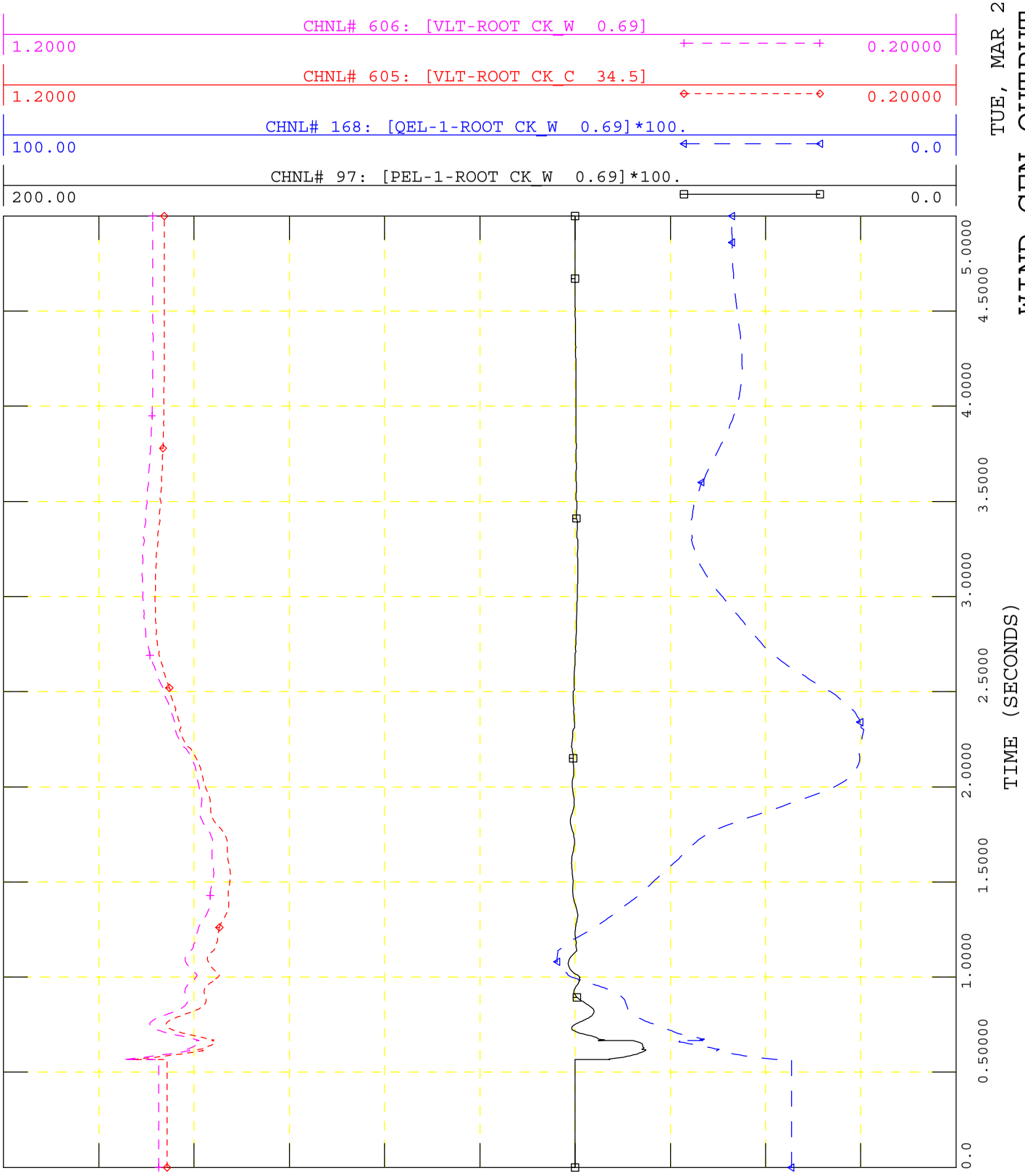

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TUE, MAR 27 2018 21:27 PLT 26

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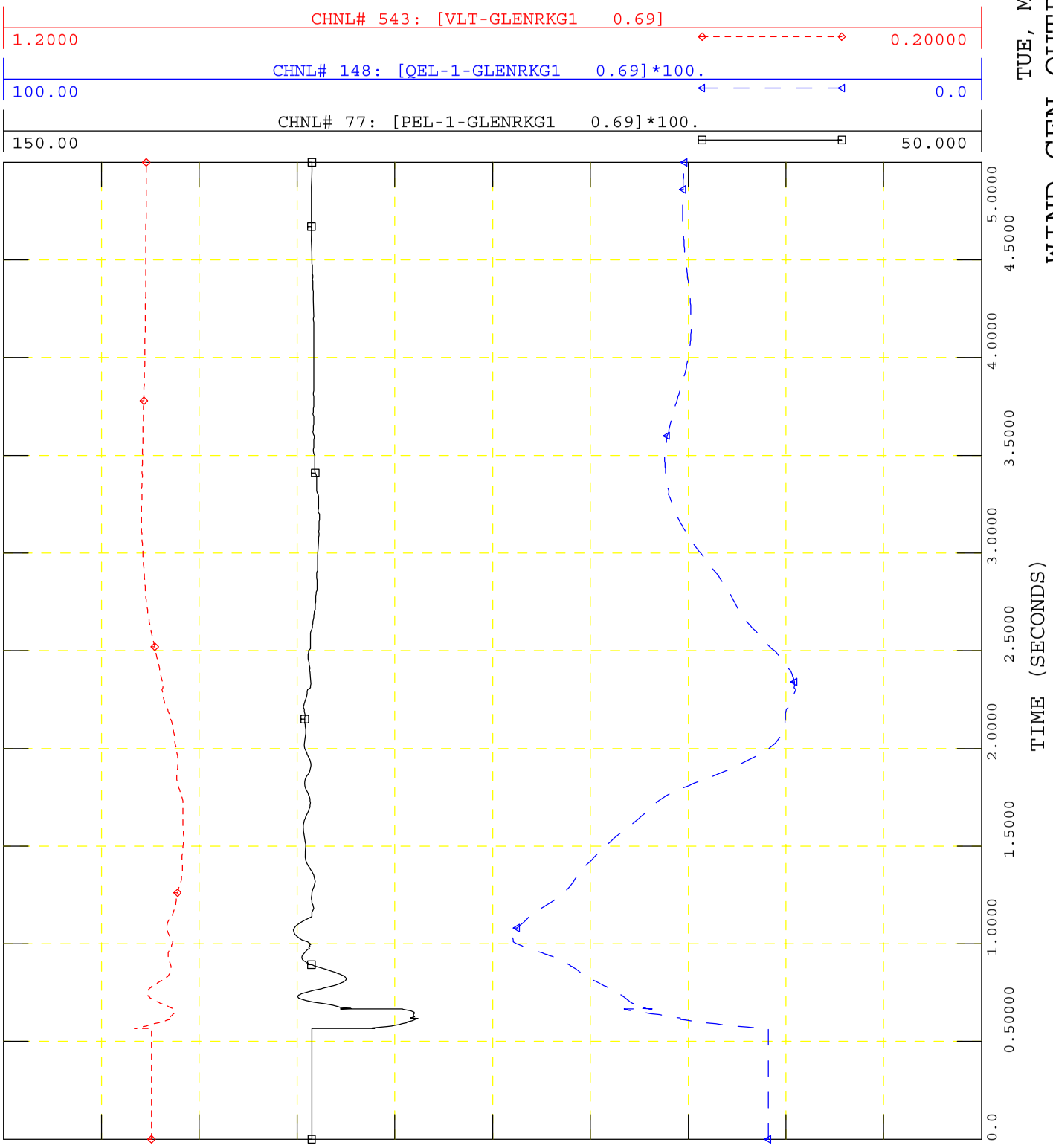

Dynamic Simulation

Case 1b – Loss of Aeolus-Anticline 500 kV line with 607 MW generator tripping

30 cycles	**3 phase Aeolus 500 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Aeolus-Anticline 500 kV line, trip 200 MVAR shunt capacitors at Aeolus and Anticline 500 kV subs**
36 cycles	**Remove SVC MVAR limiter**
40 cycles	**Trip High Plains wind generation (127.5 MW)** **Trip 7 Mile Hill wind generation (118.5)** **Trip Q0706 A&B (Ekola Flats) wind generation (249.8 MW)** **Dunlap wind generation (111.0 MW)**
5 sec.	**Terminate simulation**

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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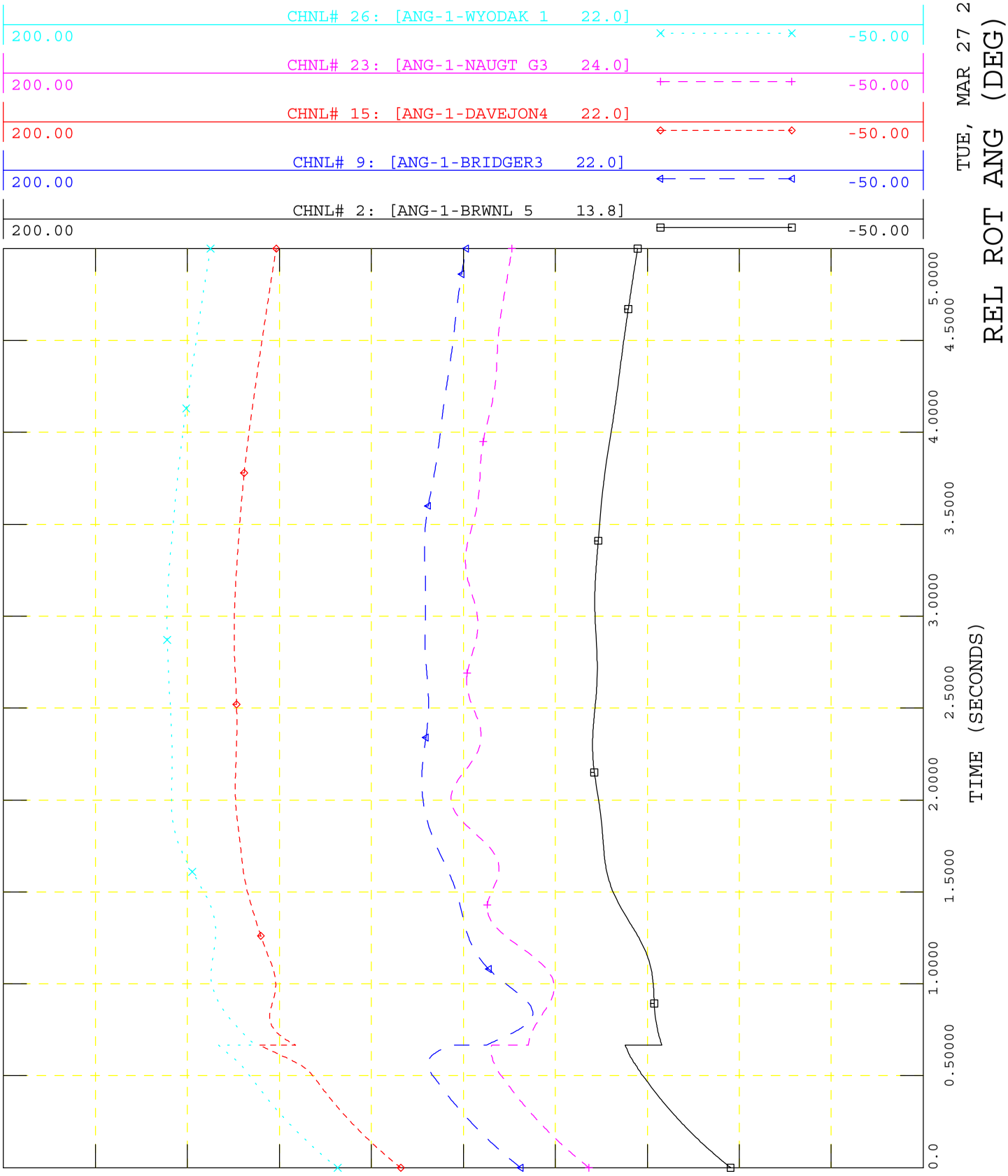

TUE, MAR 27 2018 21:27
REL ROT ANG (DEG) PLT 1

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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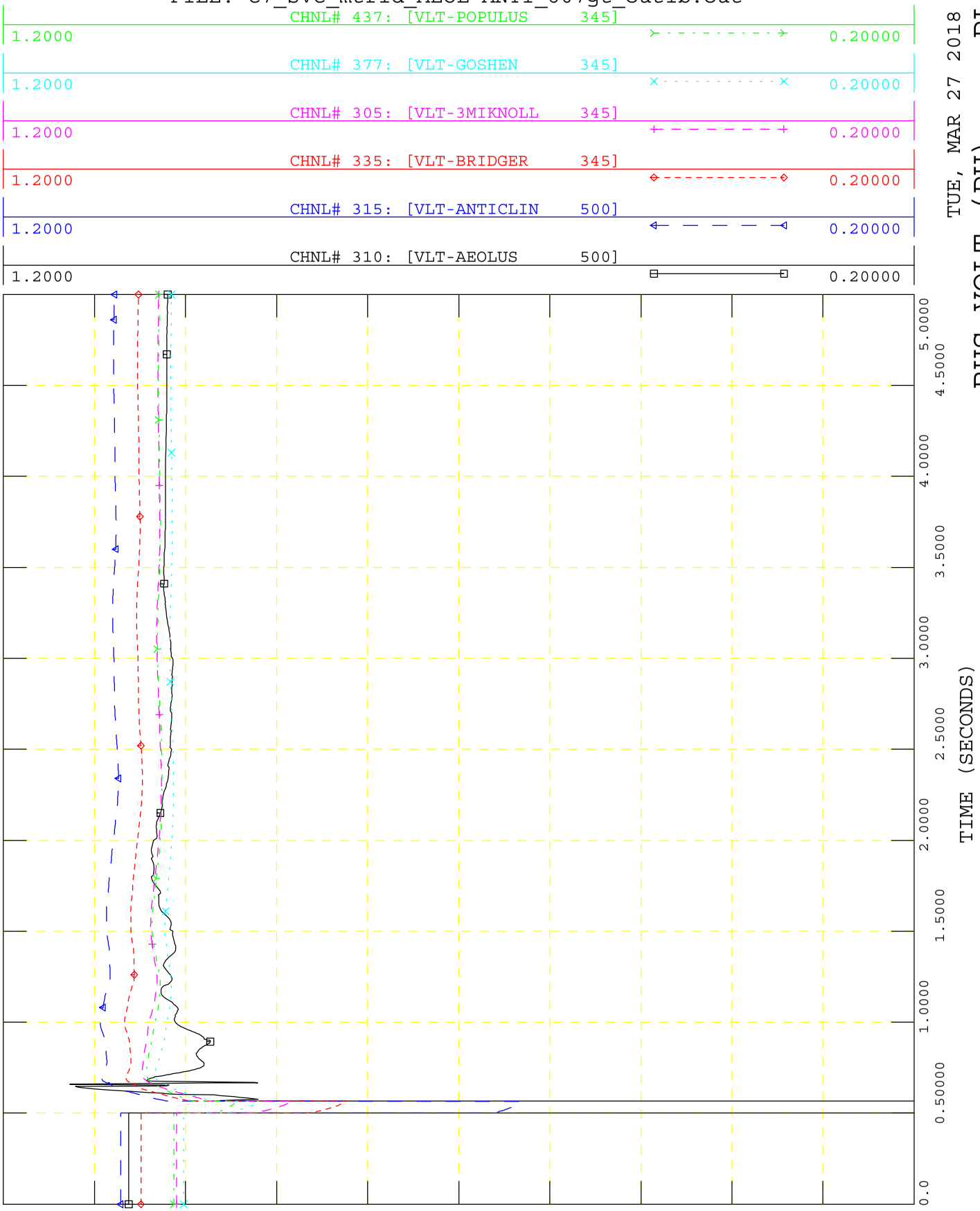
TUE, MAR 27 2018 21:27 PLT 2



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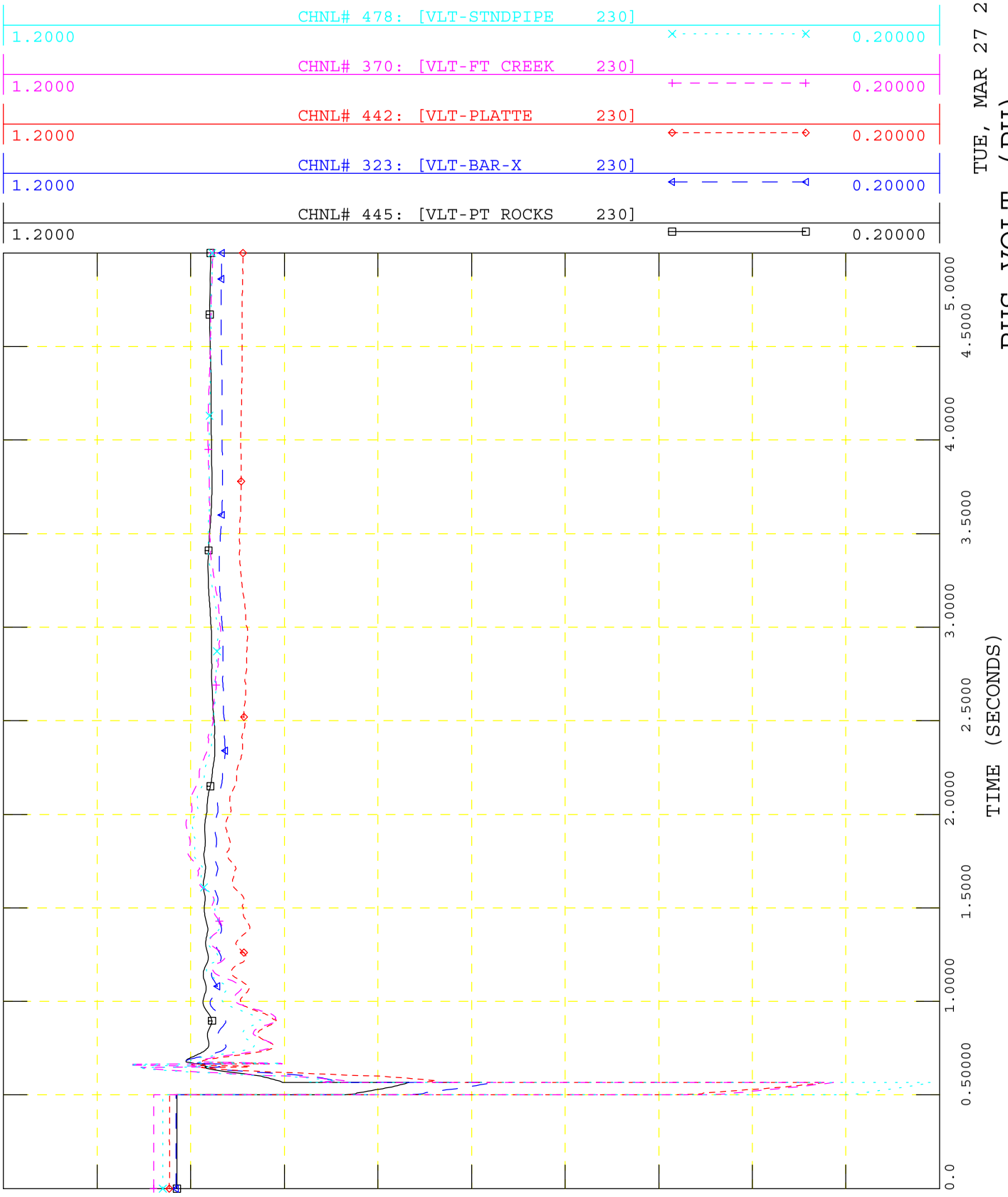
TUE, MAR 27 2018 21:27 PLT 3



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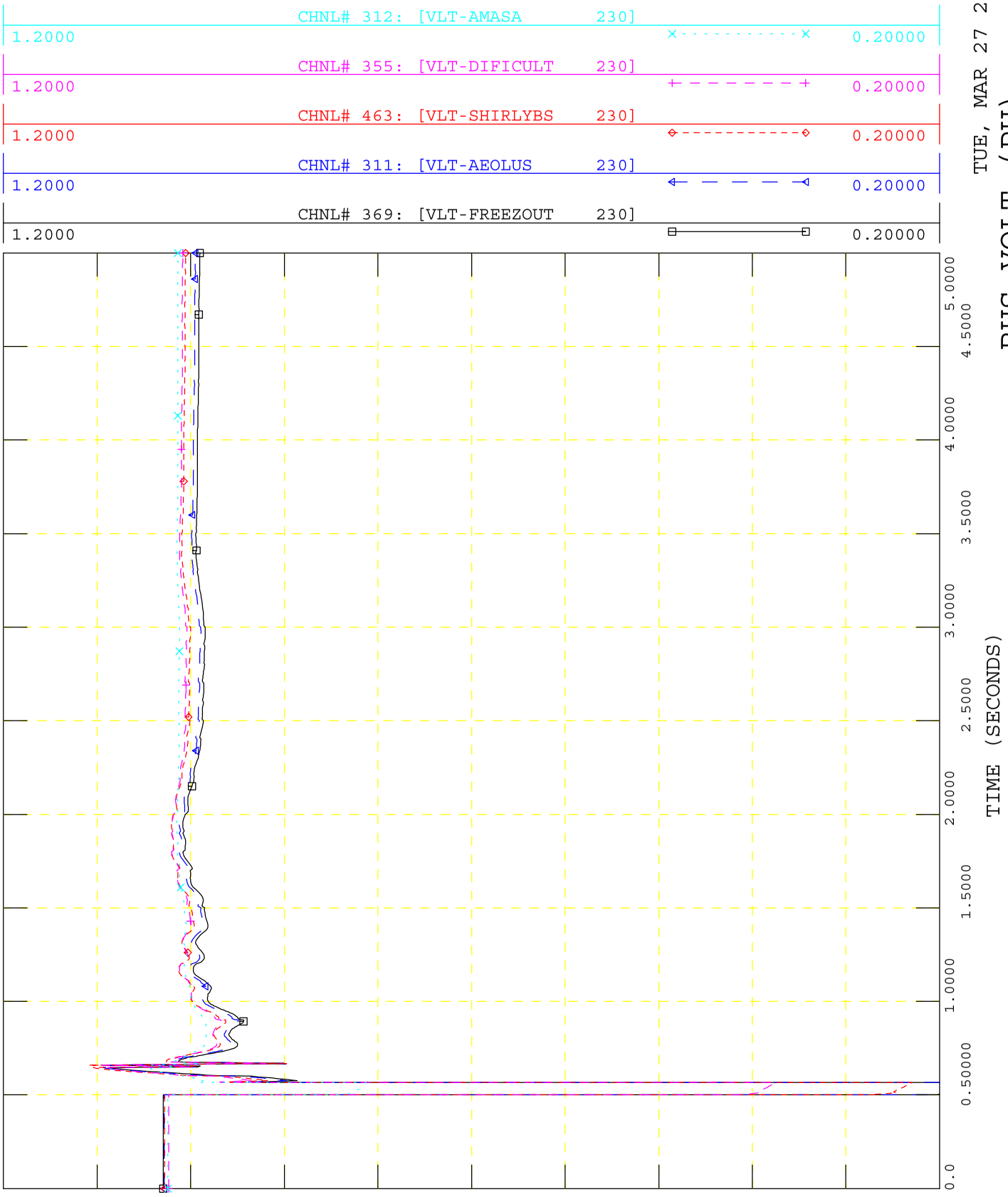
TUE, MAR 27 2018 21:27 PLT 4



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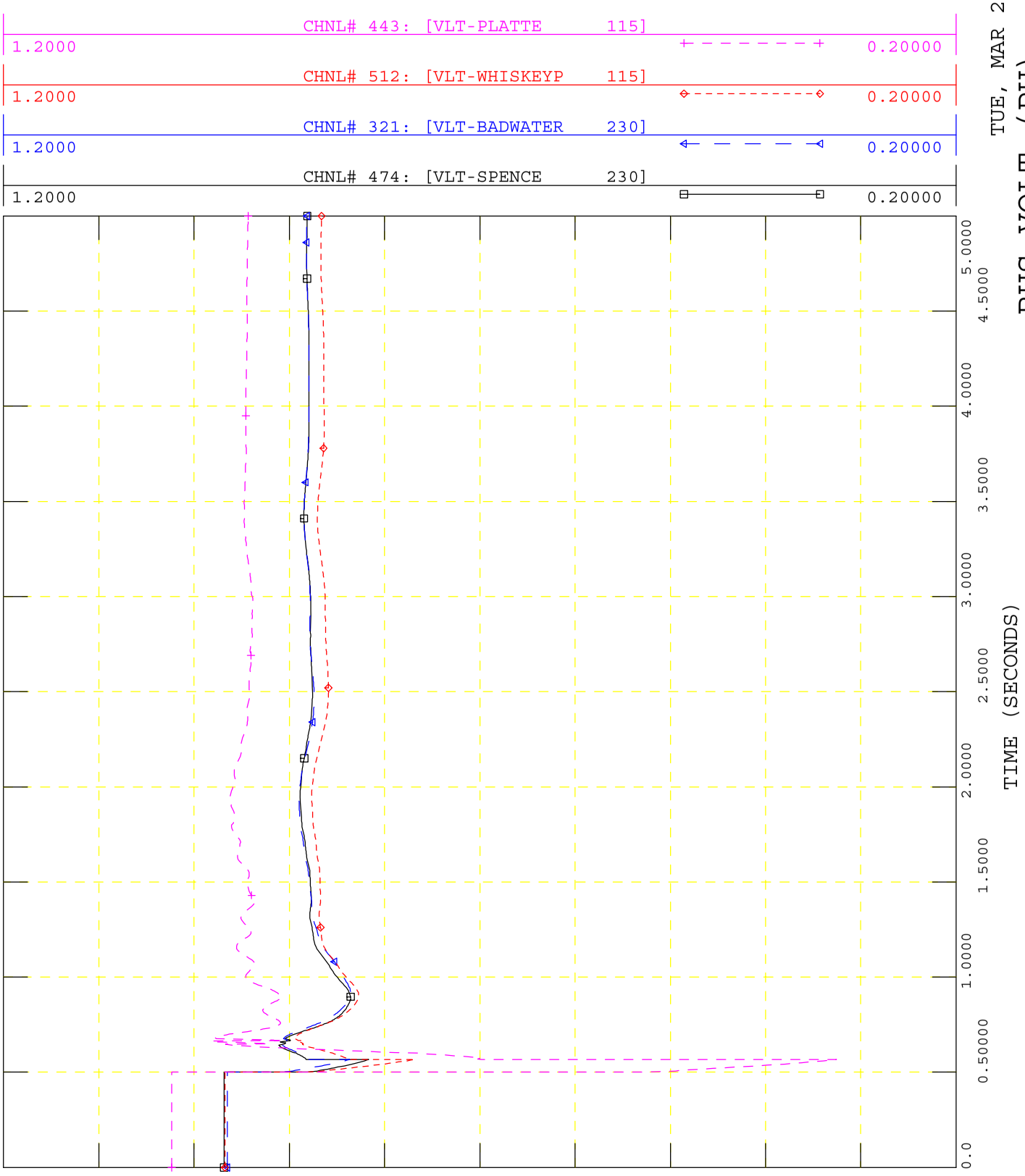
TUE, MAR 27 2018 21:27 PLT 5



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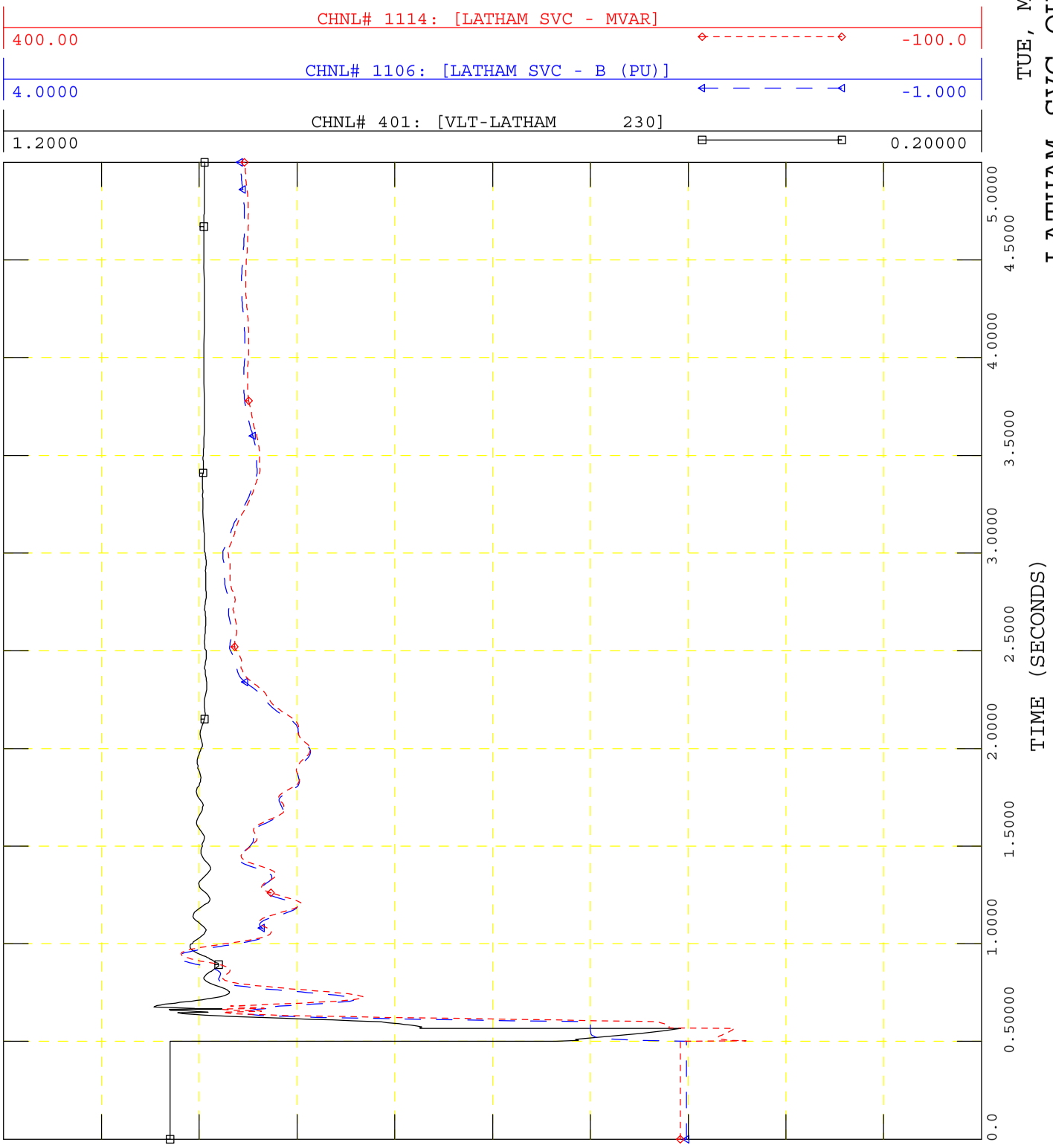
TUE, MAR 27 2018 21:27 PLT 6

LATHAM SVC OUT



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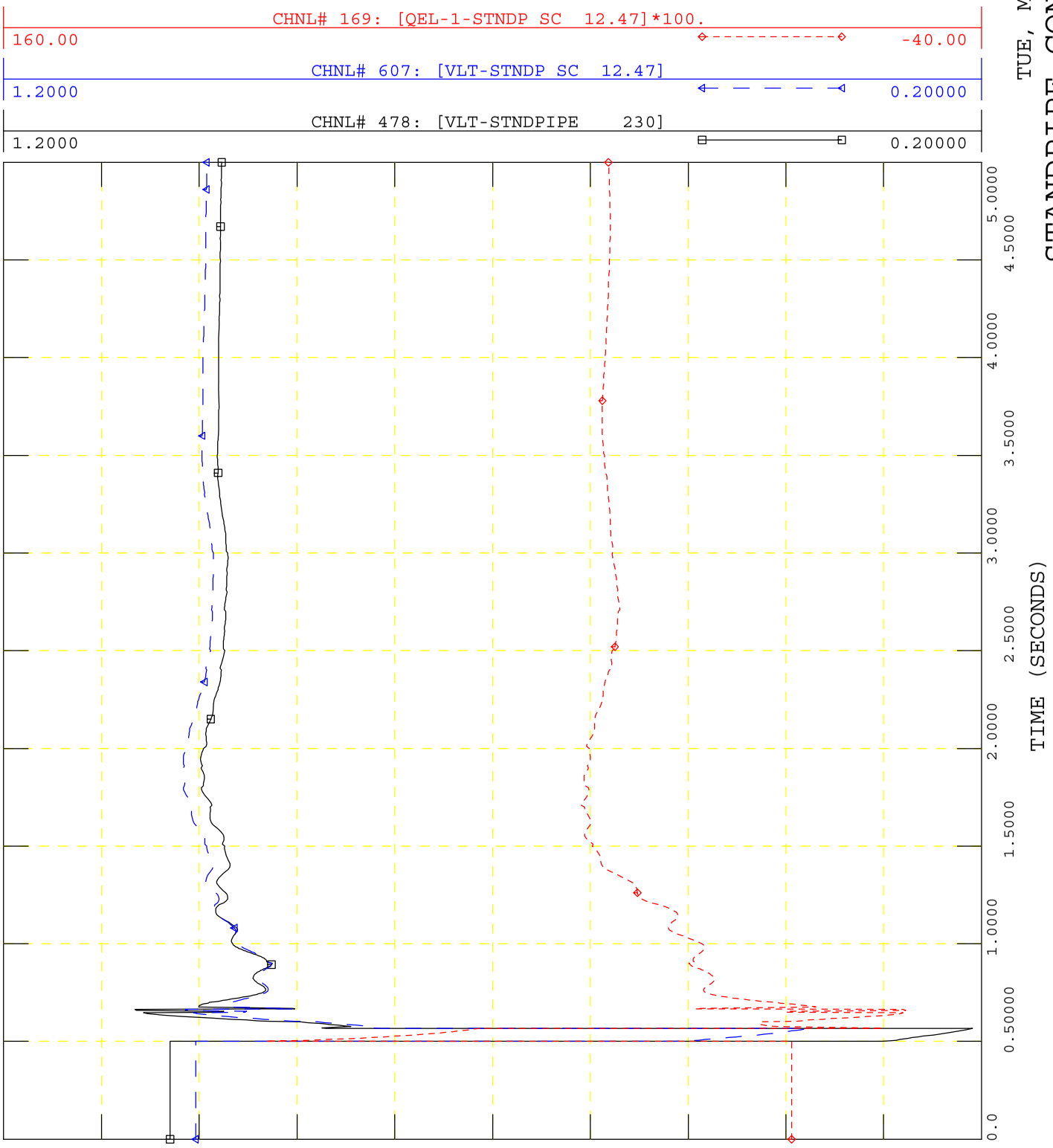
TUE, MAR 27 2018 21:27

STANDPIPE CONDNSR PLT 7



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS AEOLUS 500 KV FLT. 34CY-CLR FLT & OPEN AEOL-ANTI
500 LN. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1B
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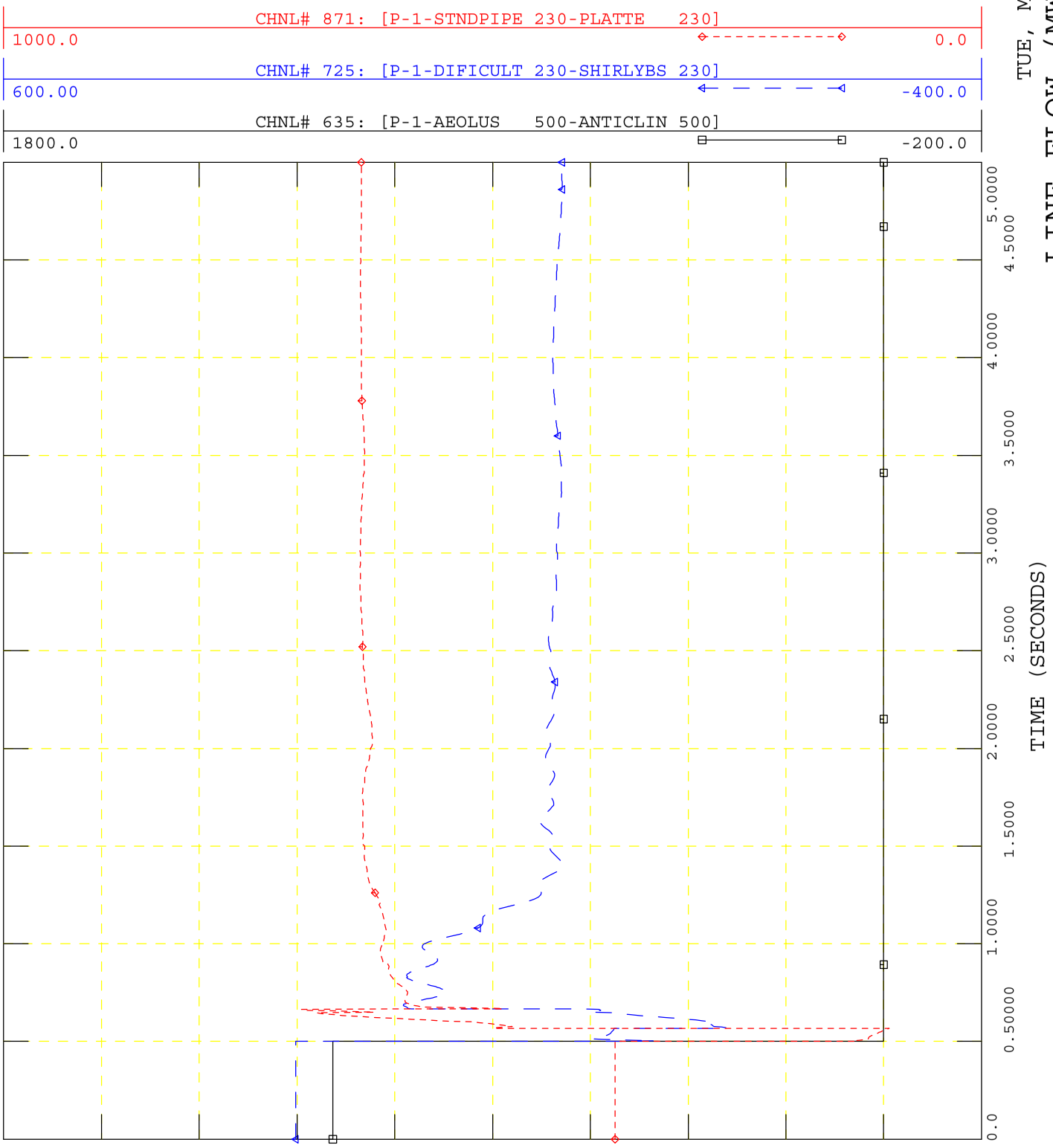
TUE, MAR 27 2018 21:27 PLT 8



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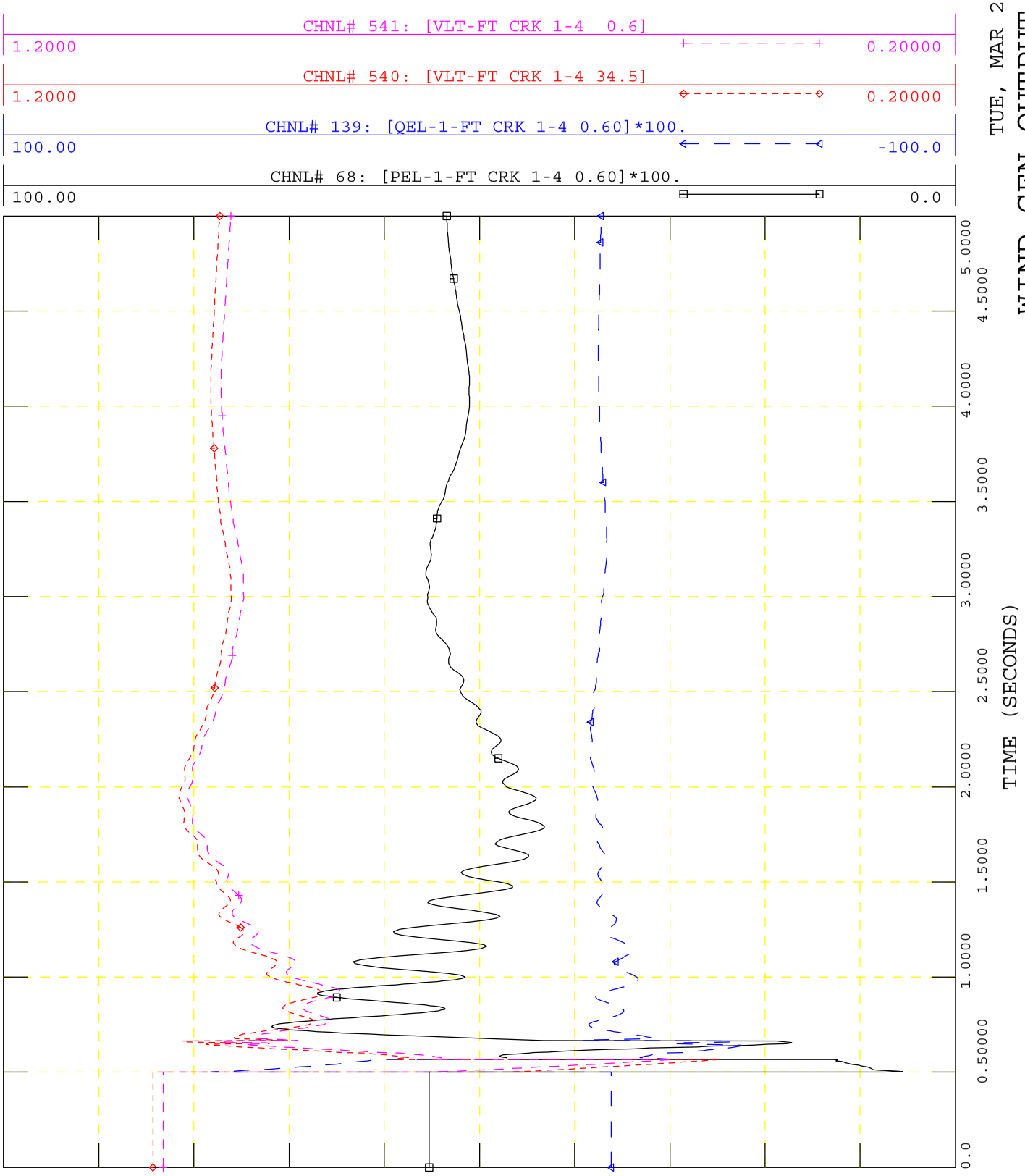
WIND GEN OUTPUT PLT 9



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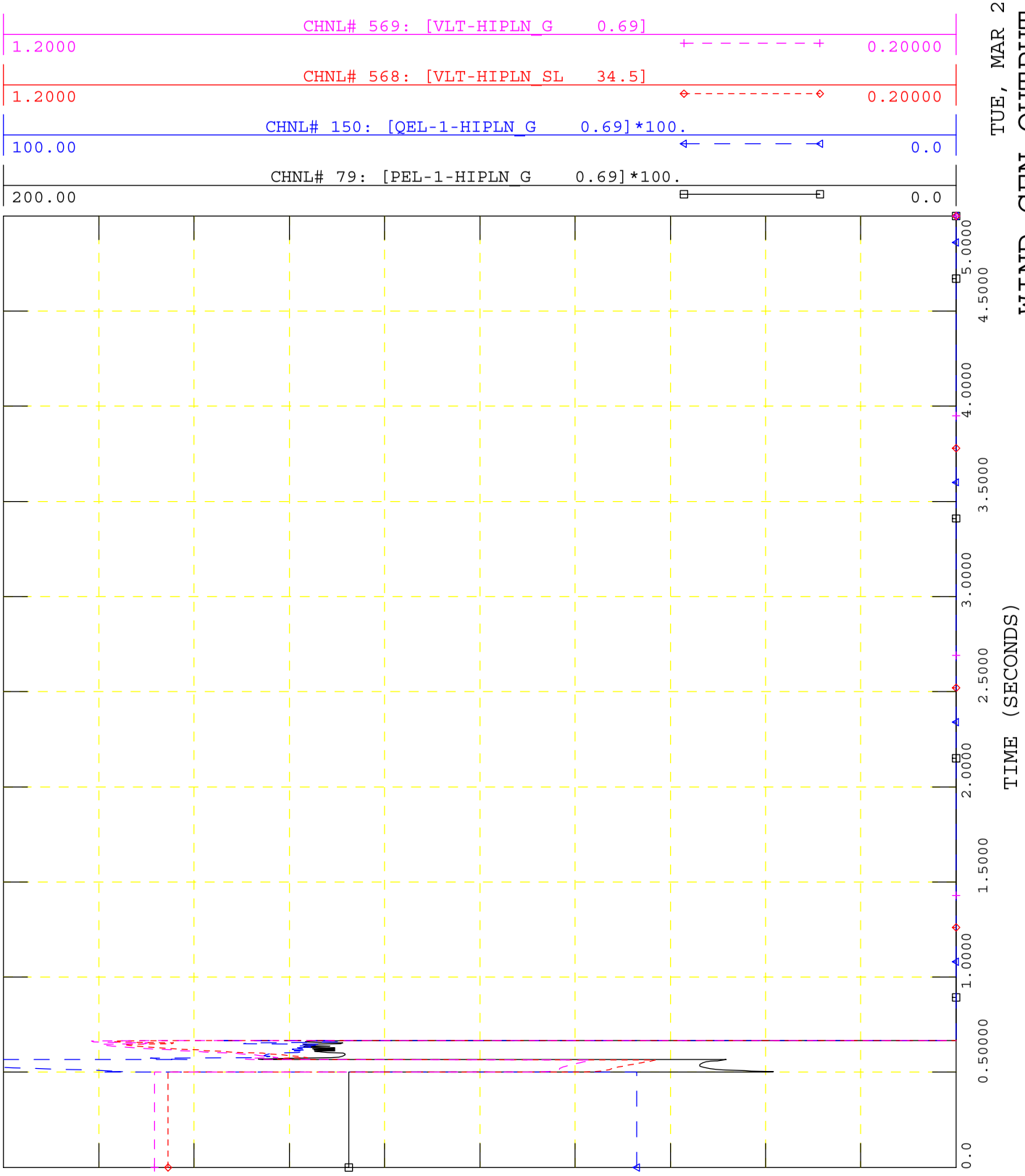

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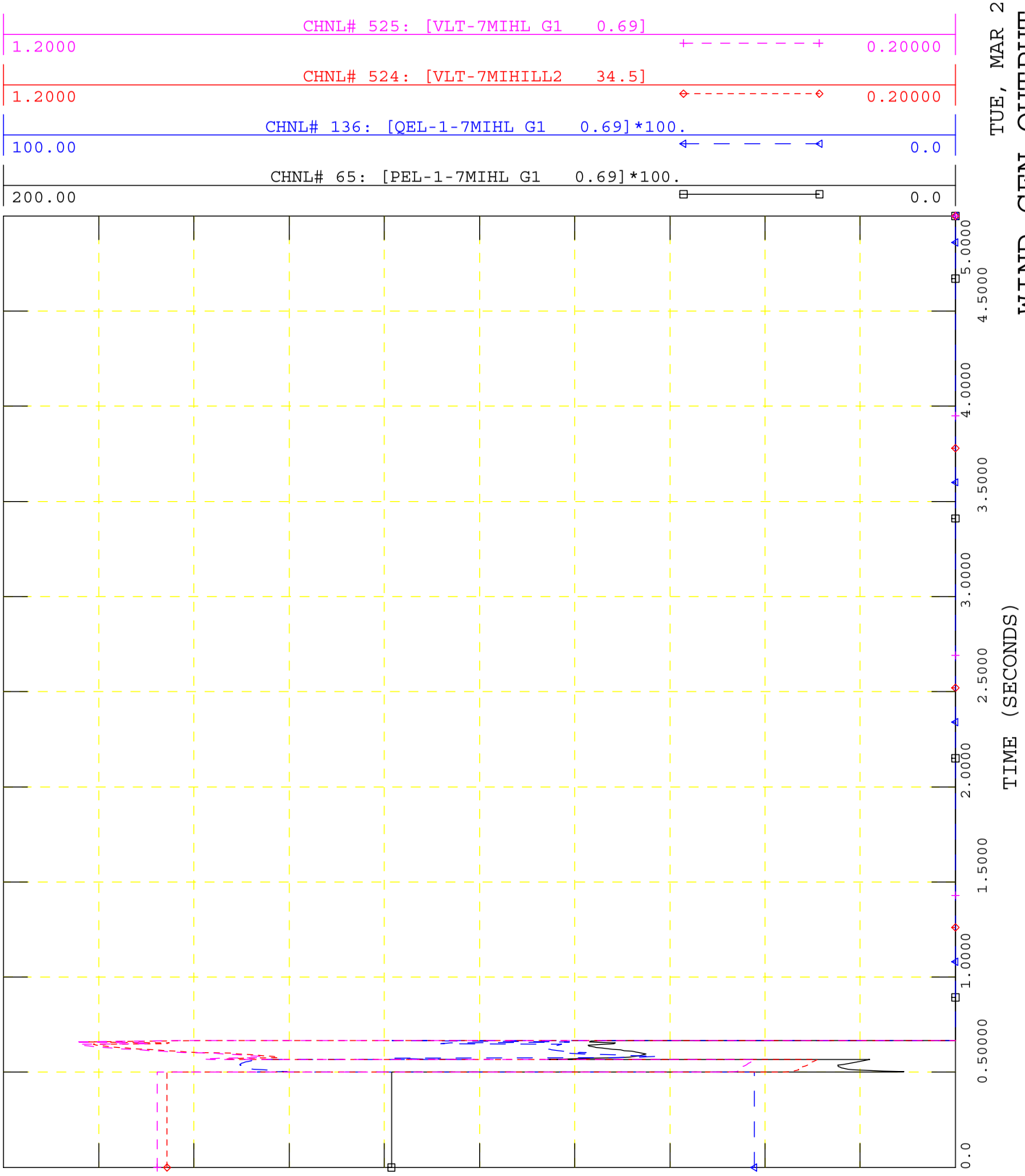
WIND GEN OUTPUT PLT 11



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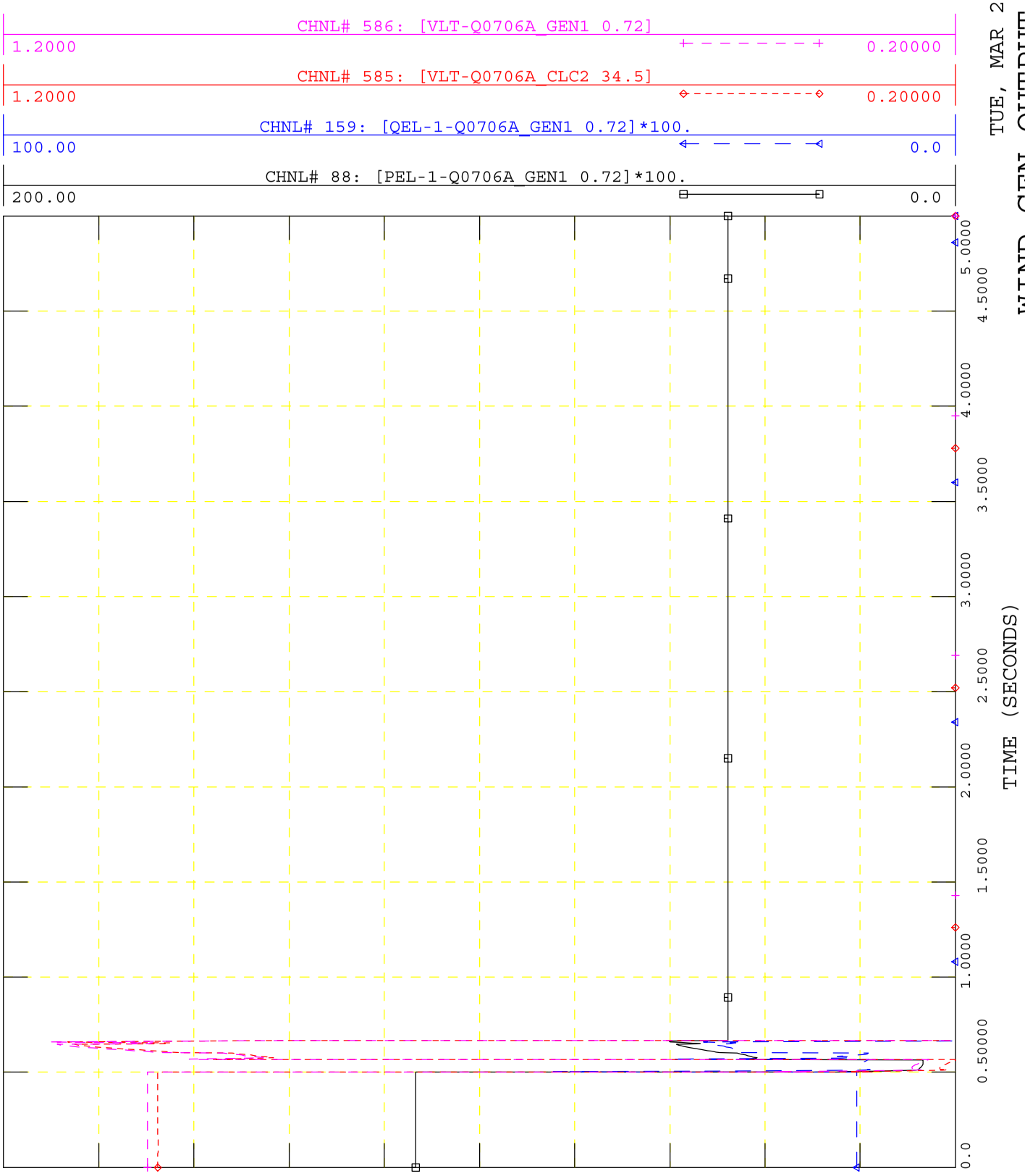

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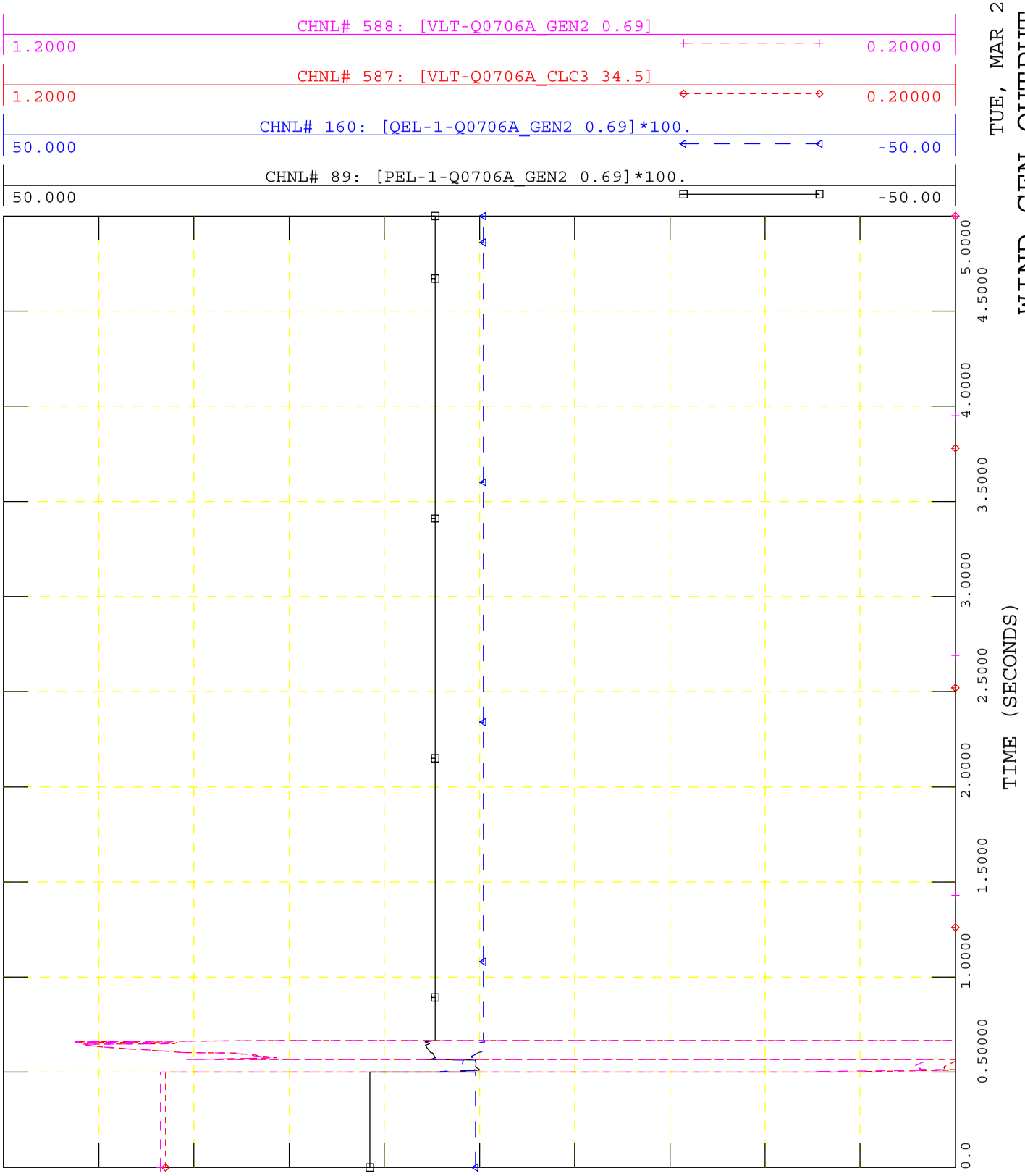

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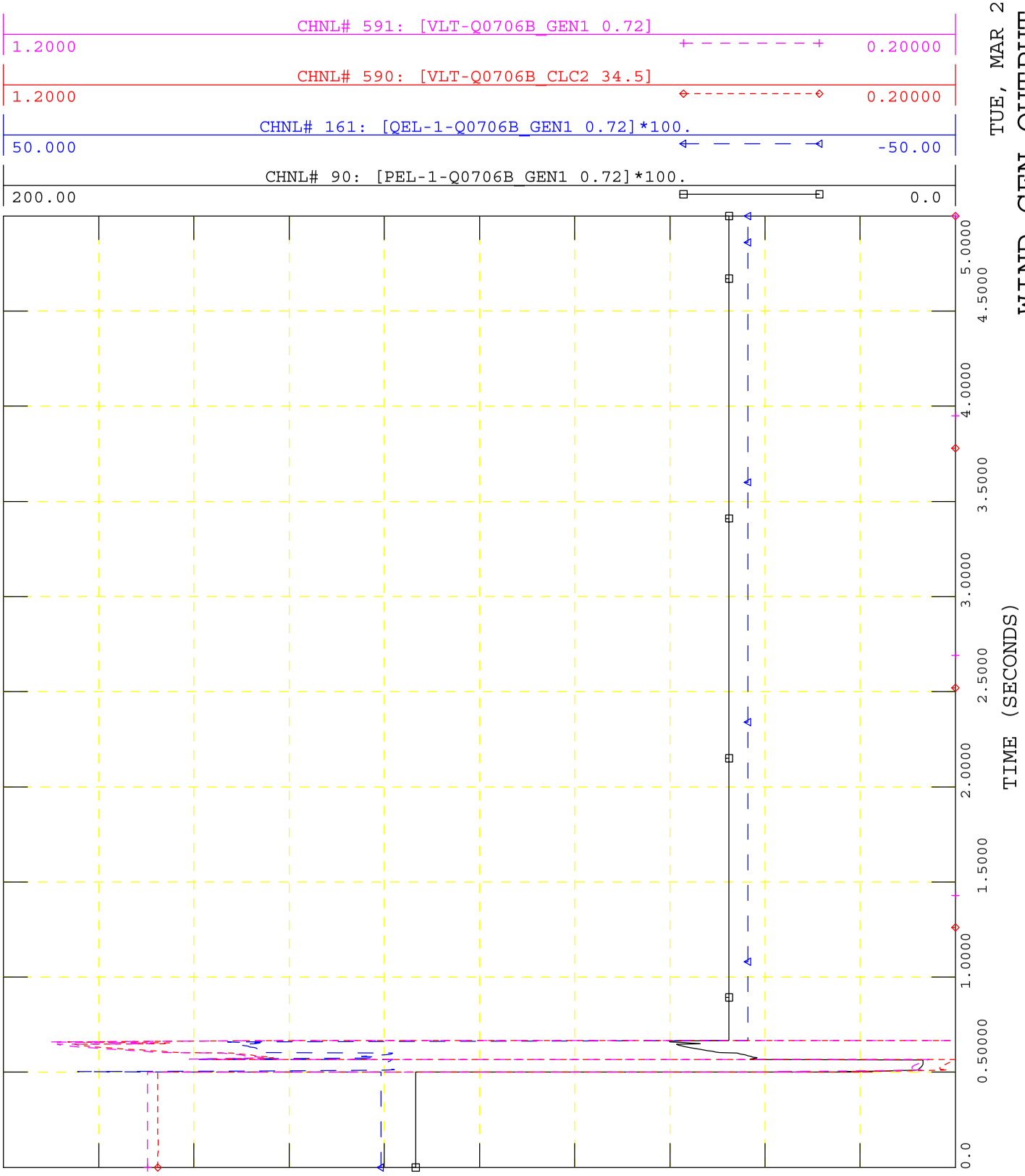

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TUE, MAR 27 2018 21:27 PLT 15

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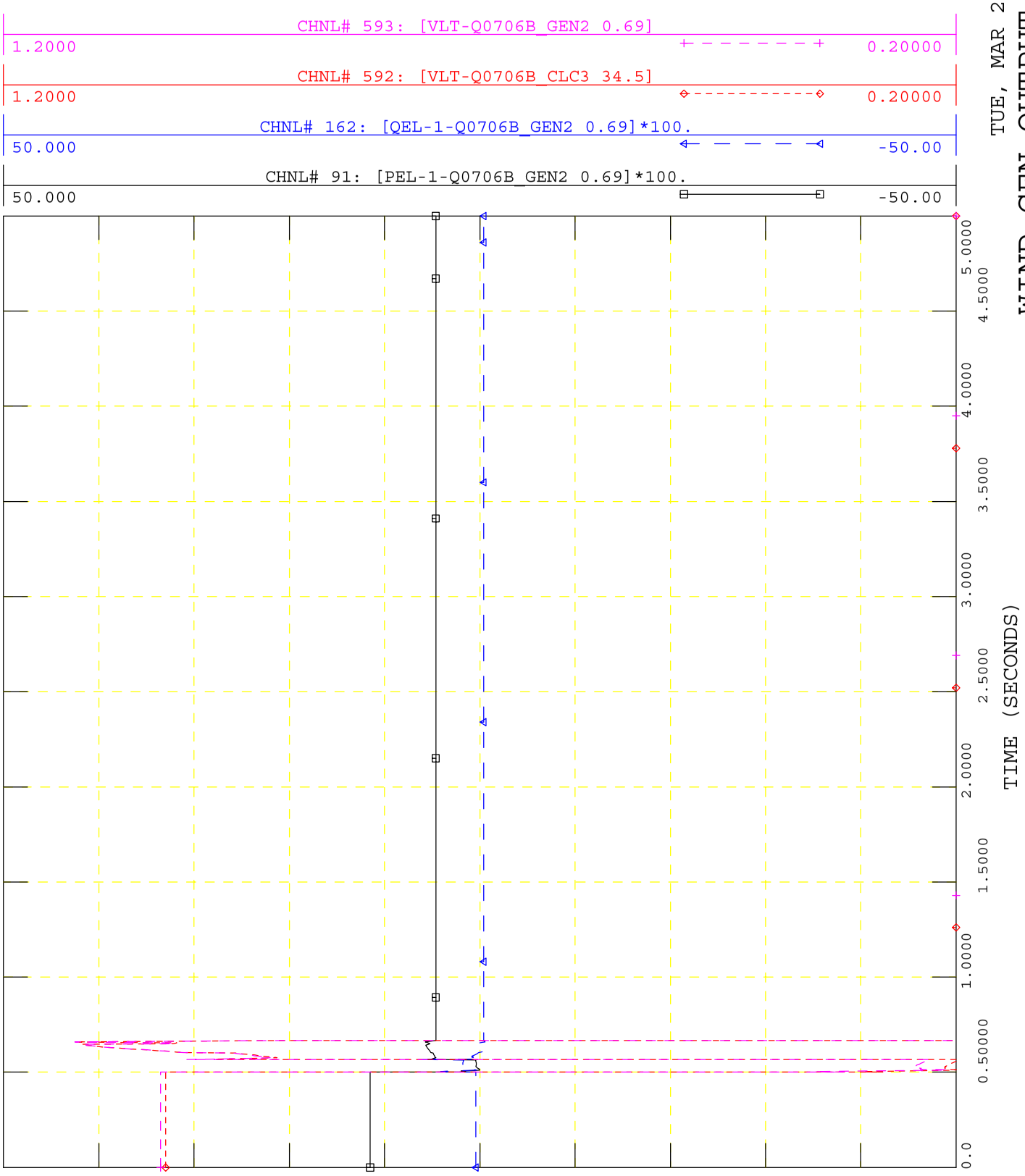

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TUE, MAR 27 2018 21:27 PLT 16

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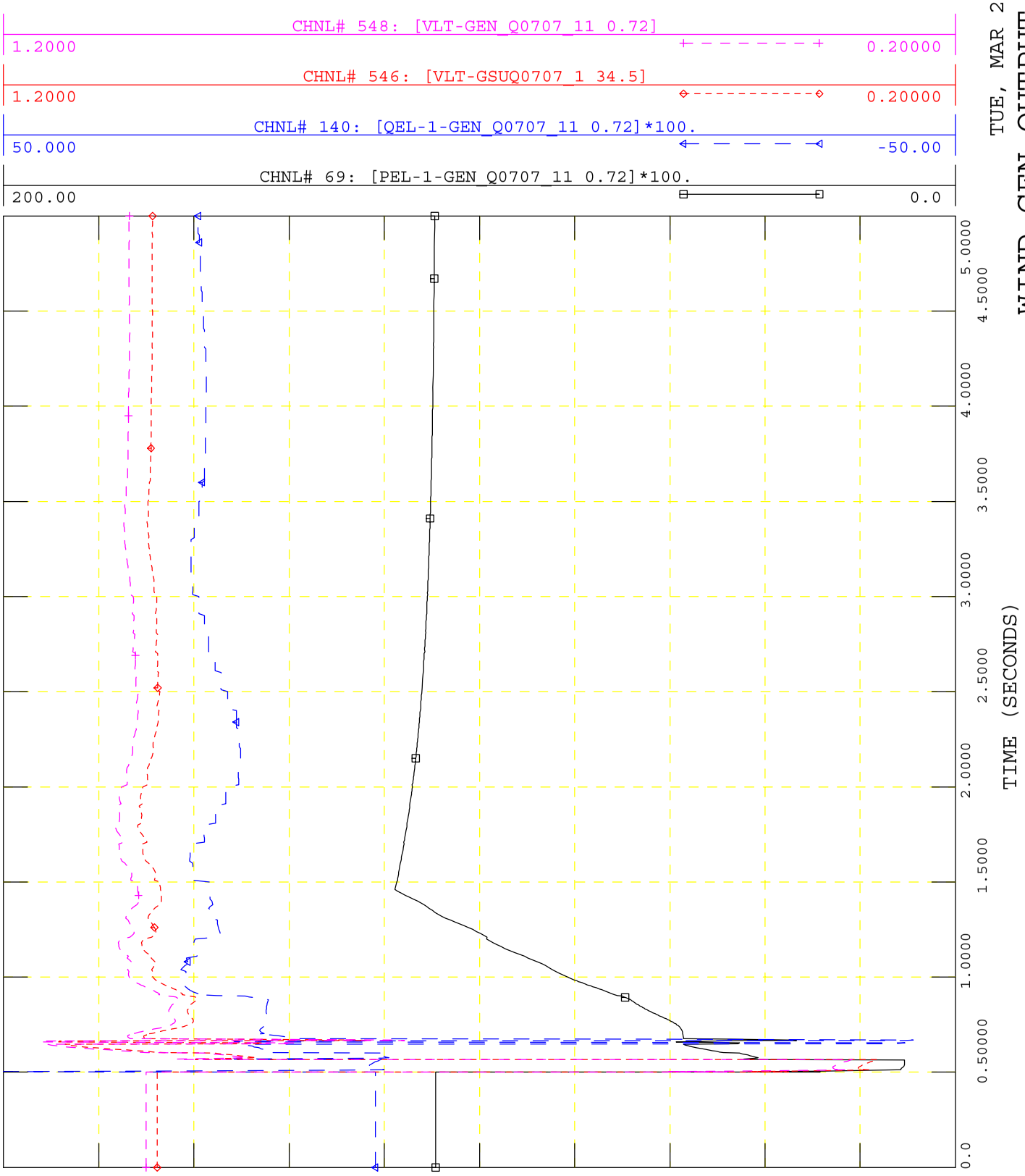

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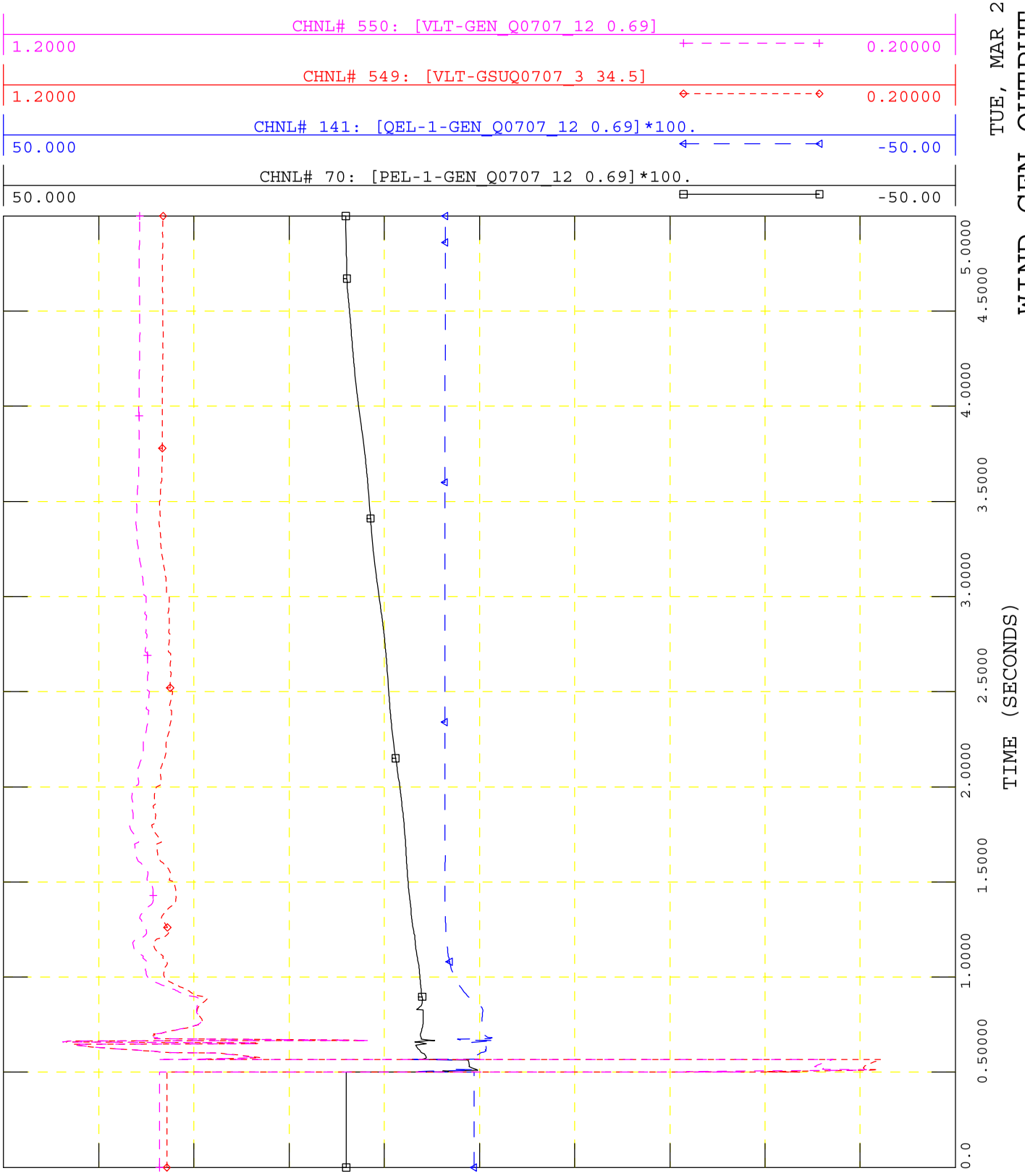
TUE, MAR 27 2018 21:27

WIND GEN OUTPUT PLT 17



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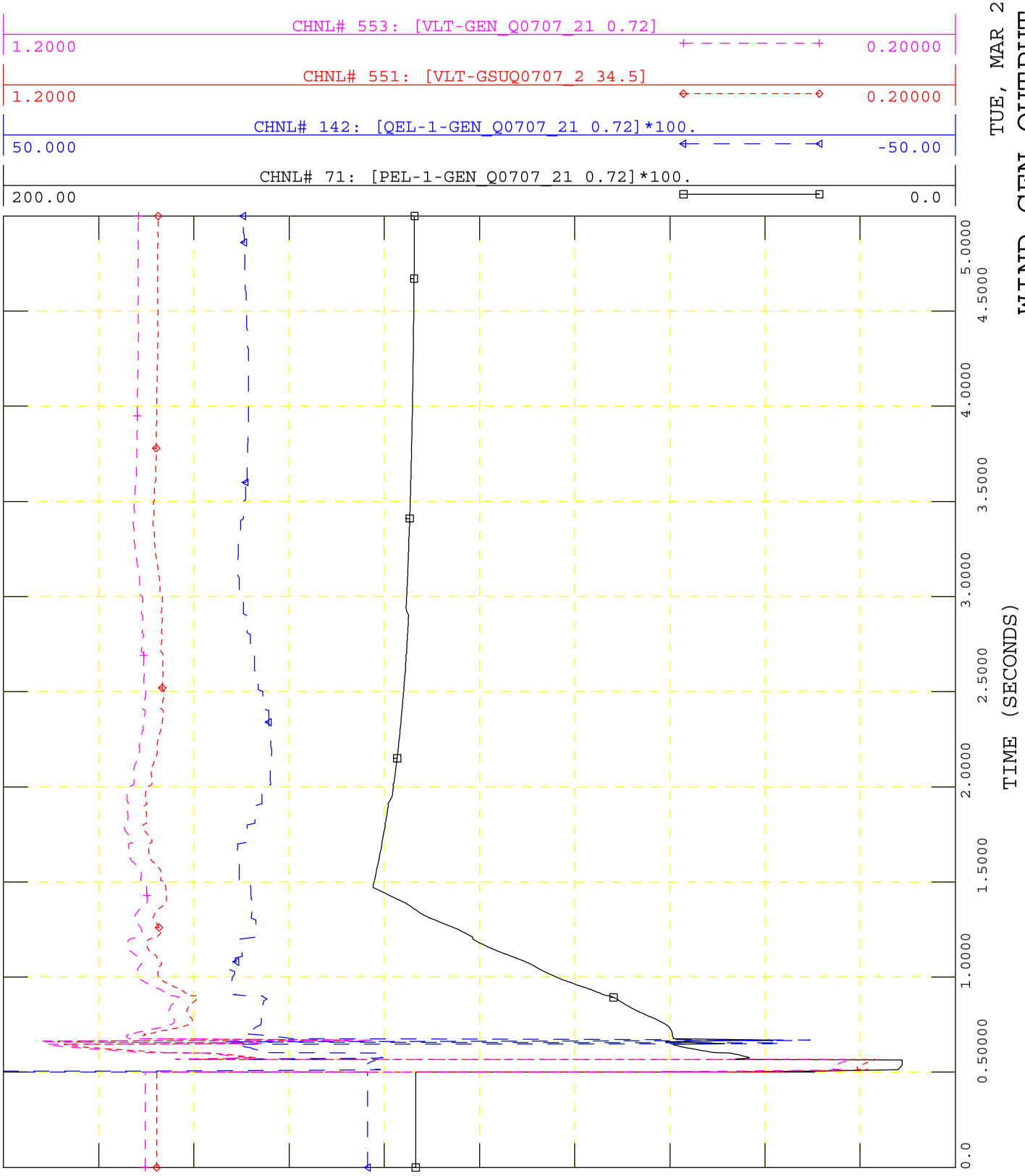

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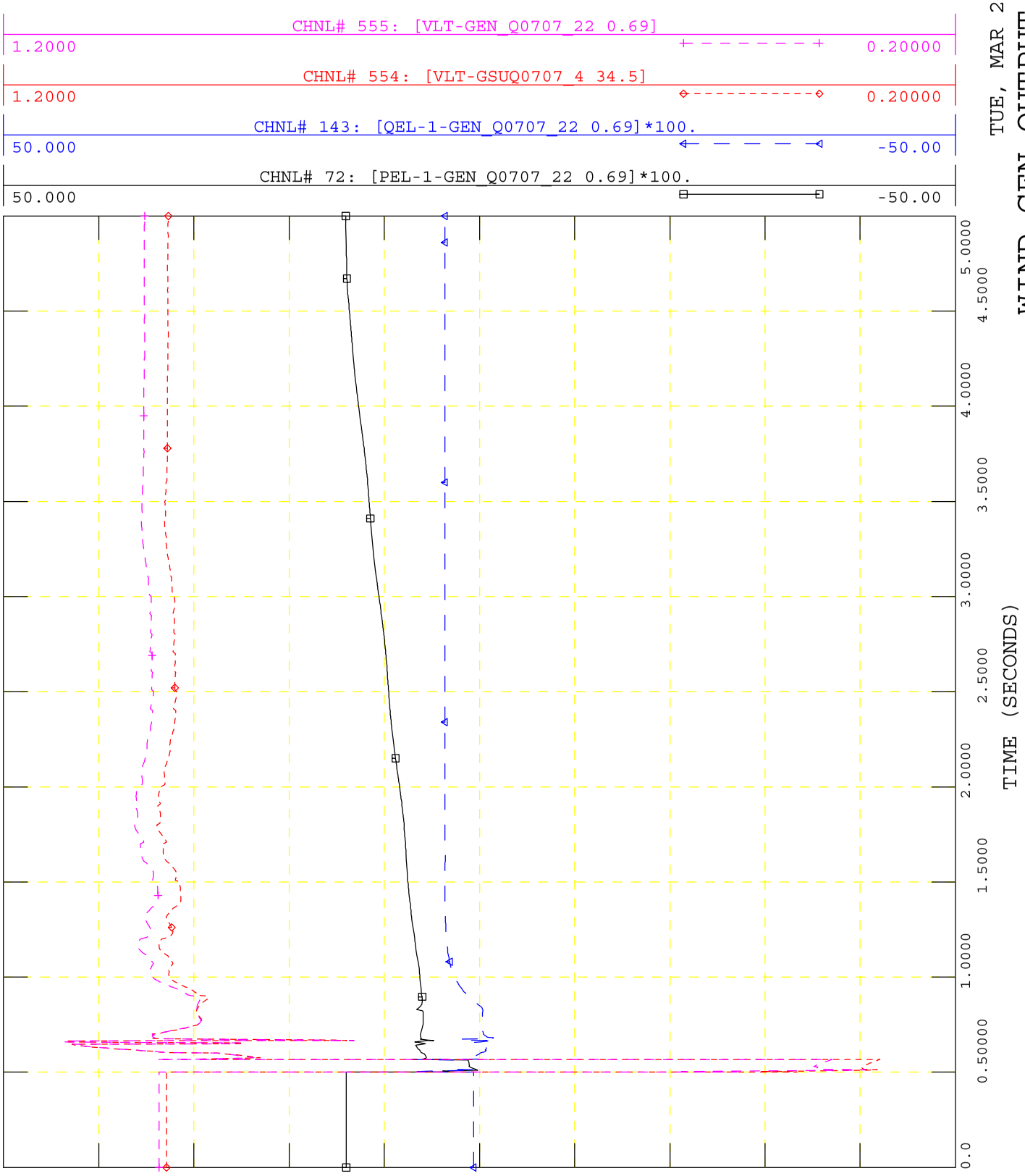

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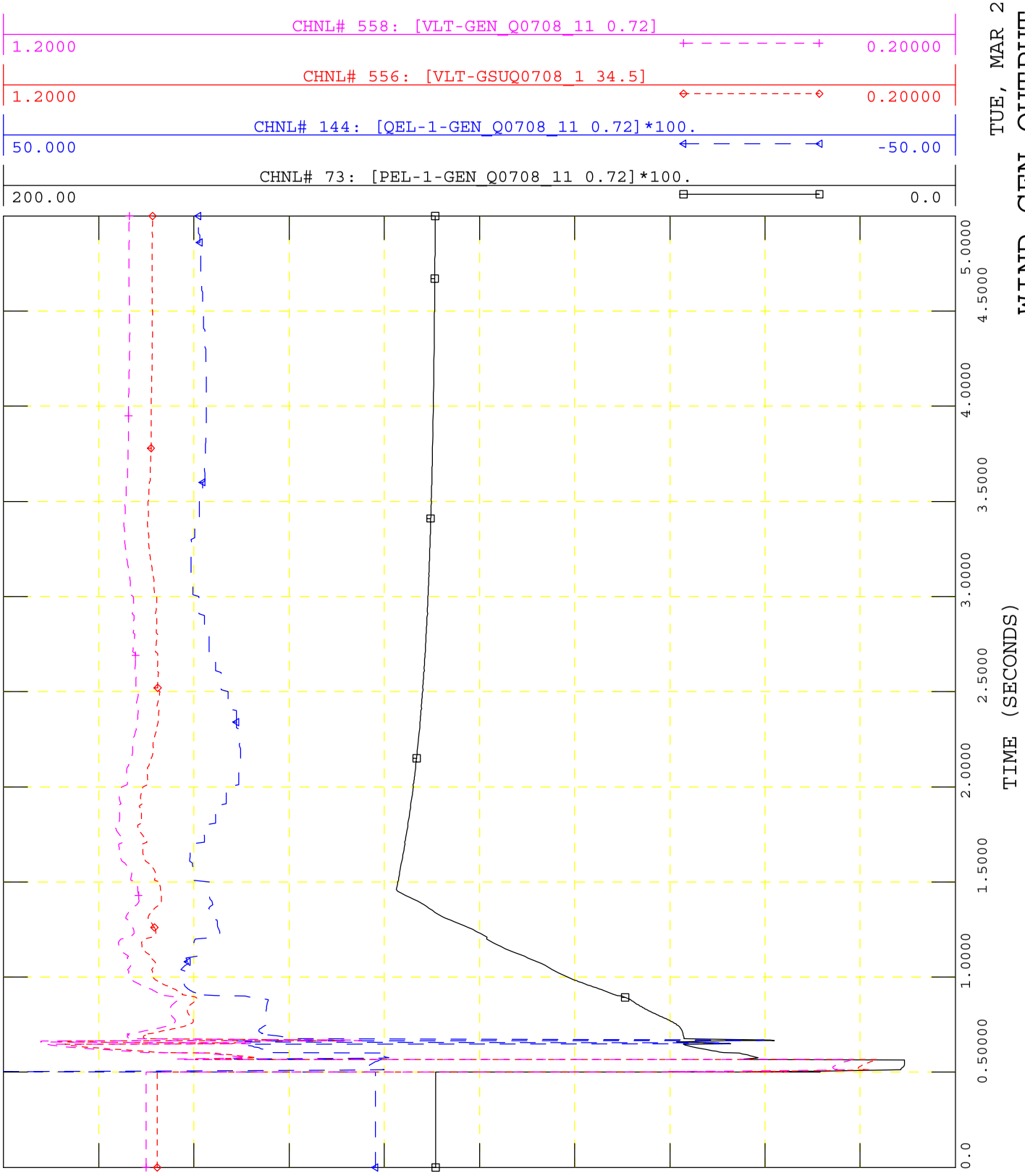

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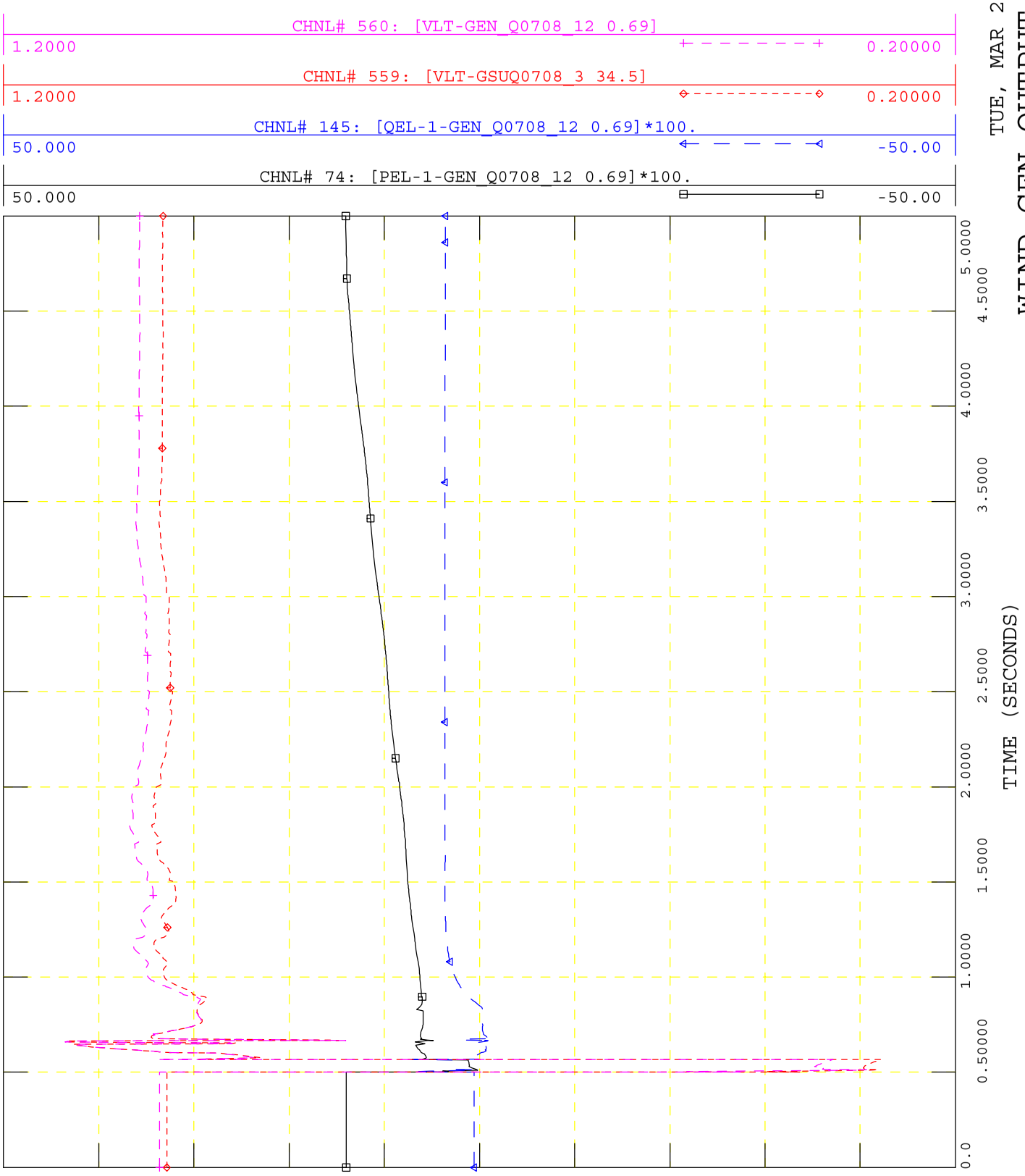

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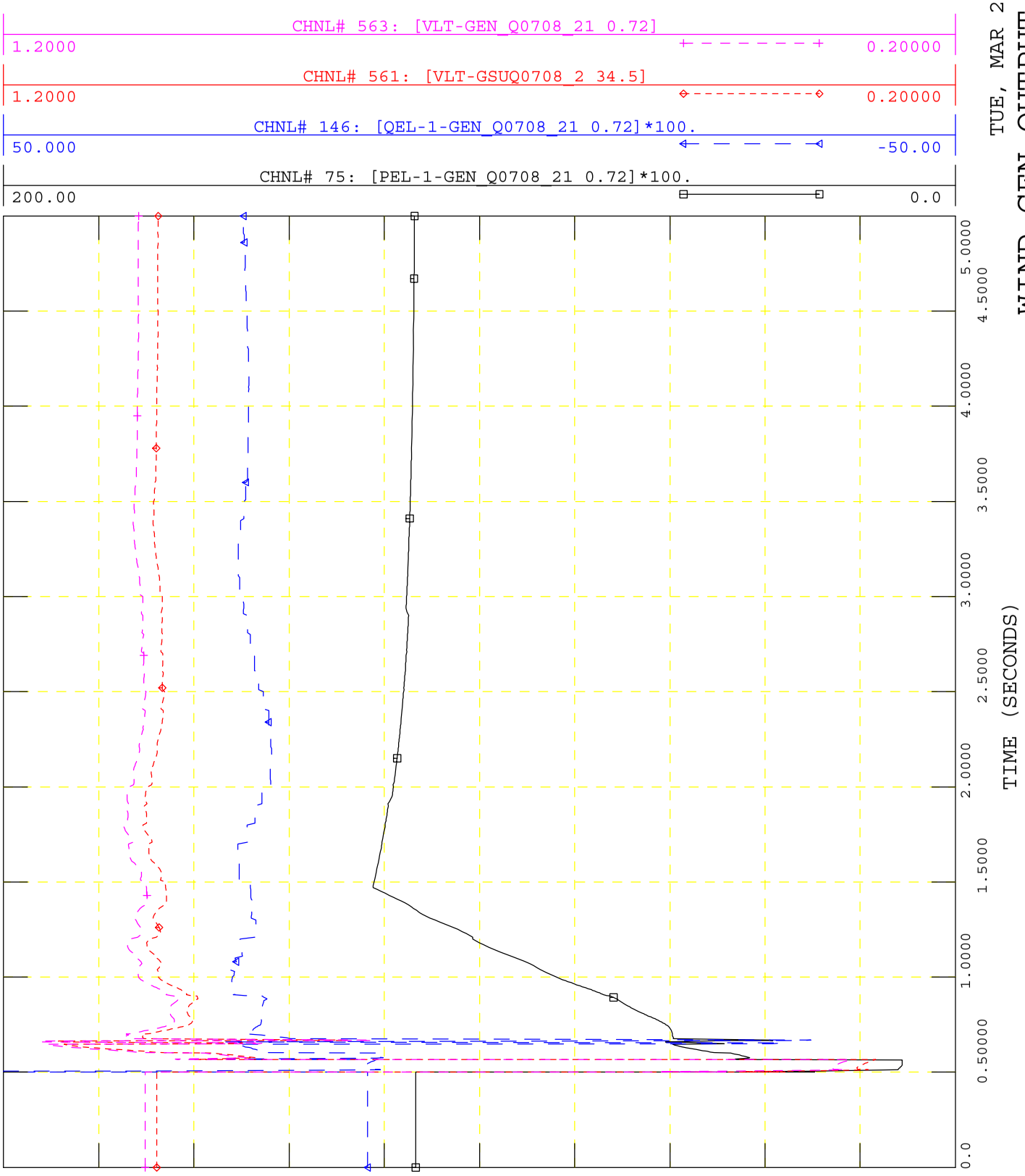

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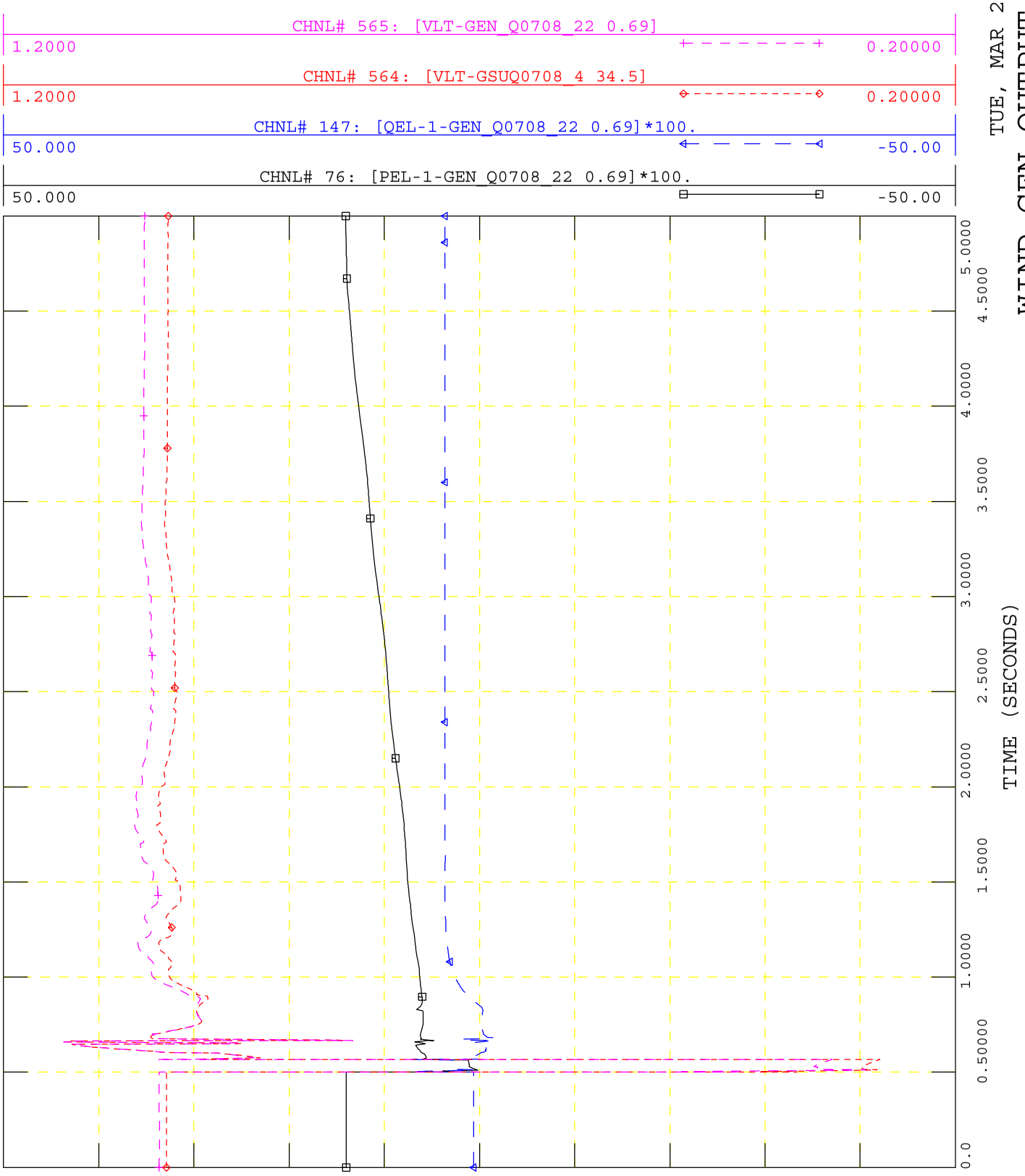

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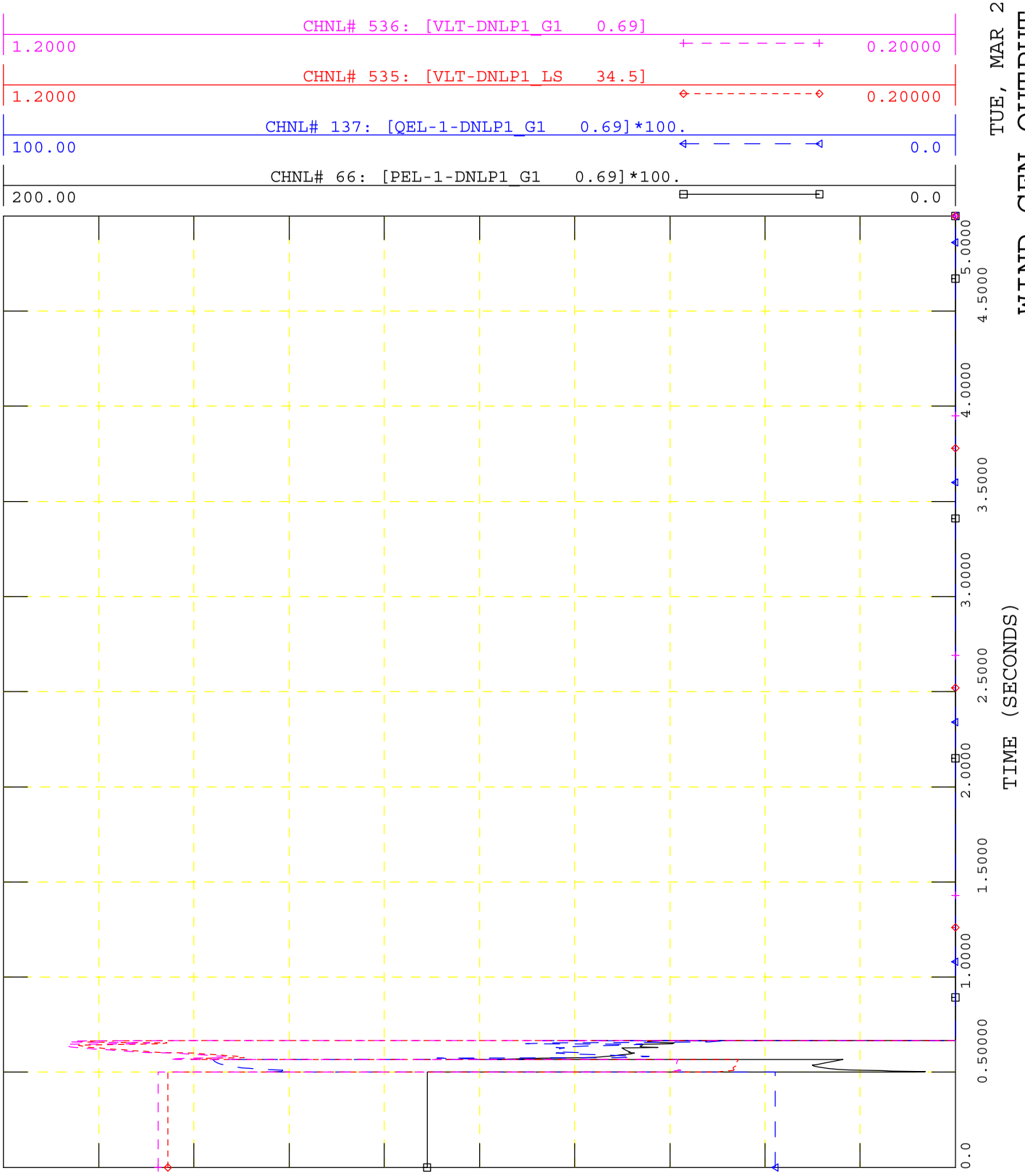

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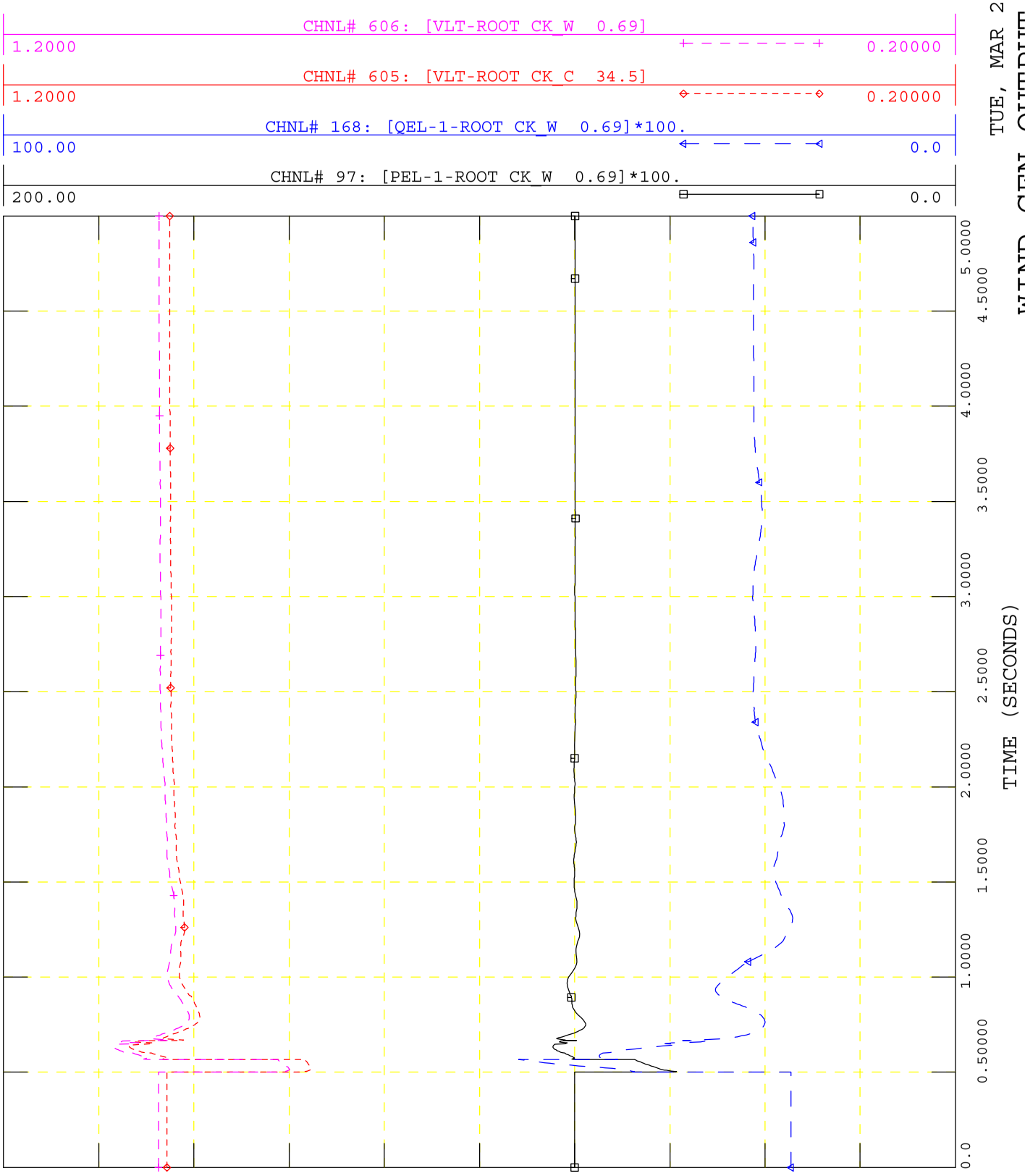

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TUE, MAR 27 2018 21:27 PLT 26

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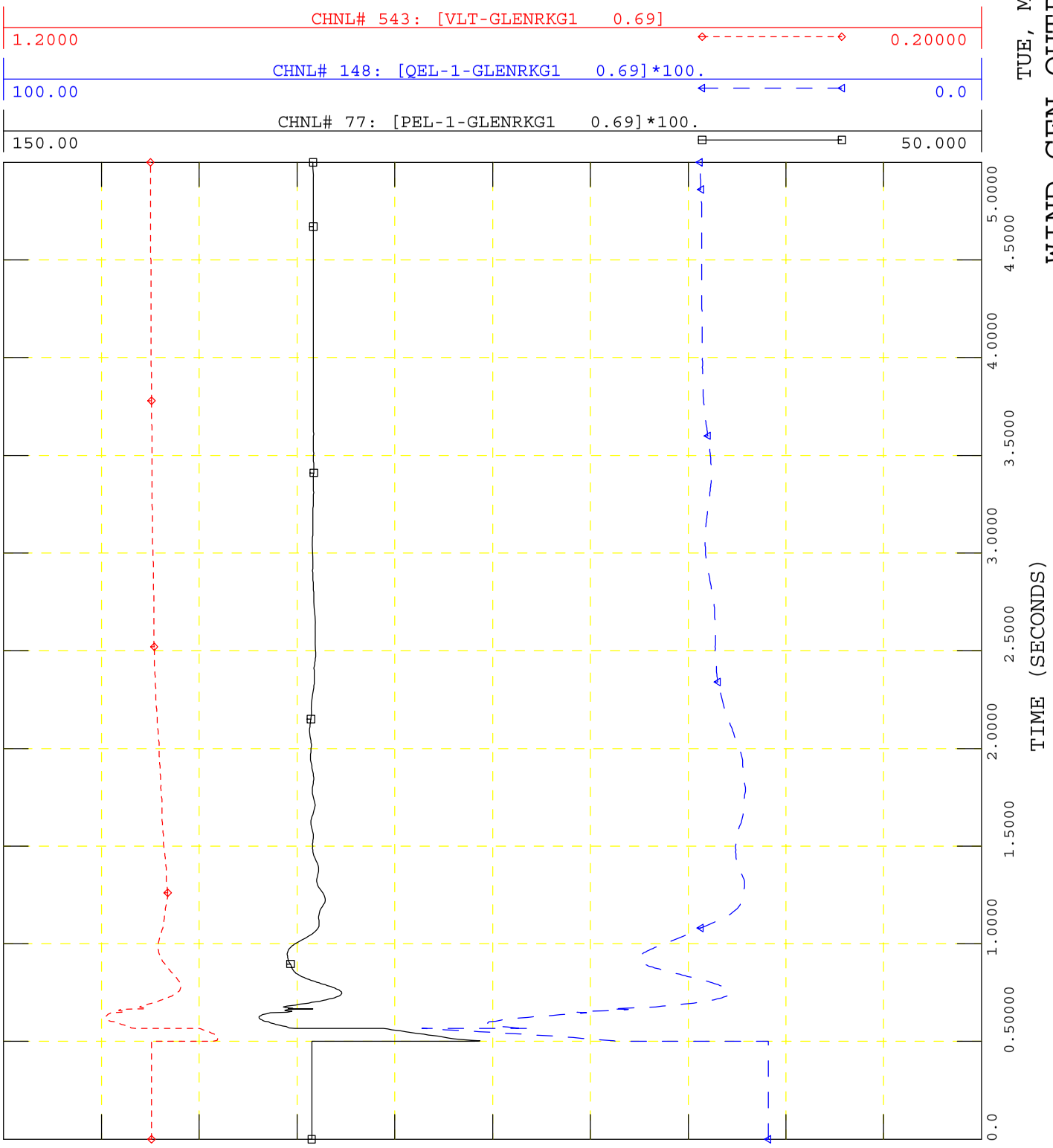

Dynamic Simulation

Case 1c – Loss of Anticline-Aeolus 500 kV line with 607 MW generator tripping

30 cycles	**3 phase Anticline 500 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Anticline-Aeolus 500 kV line, trip 200 MVAR shunt capacitors at Anticline and Aeolus 500 kV subs**
36 cycles	**Remove SVC MVAR limiter**
40 cycles	**Trip High Plains wind generation (127.5 MW)** **Trip 7 Mile Hill wind generation (118.5)** **Trip Q0706 A&B (Ekola Flats) wind generation (249.8 MW)** **Dunlap wind generation (111.0 MW)**
5 sec.	**Terminate simulation**

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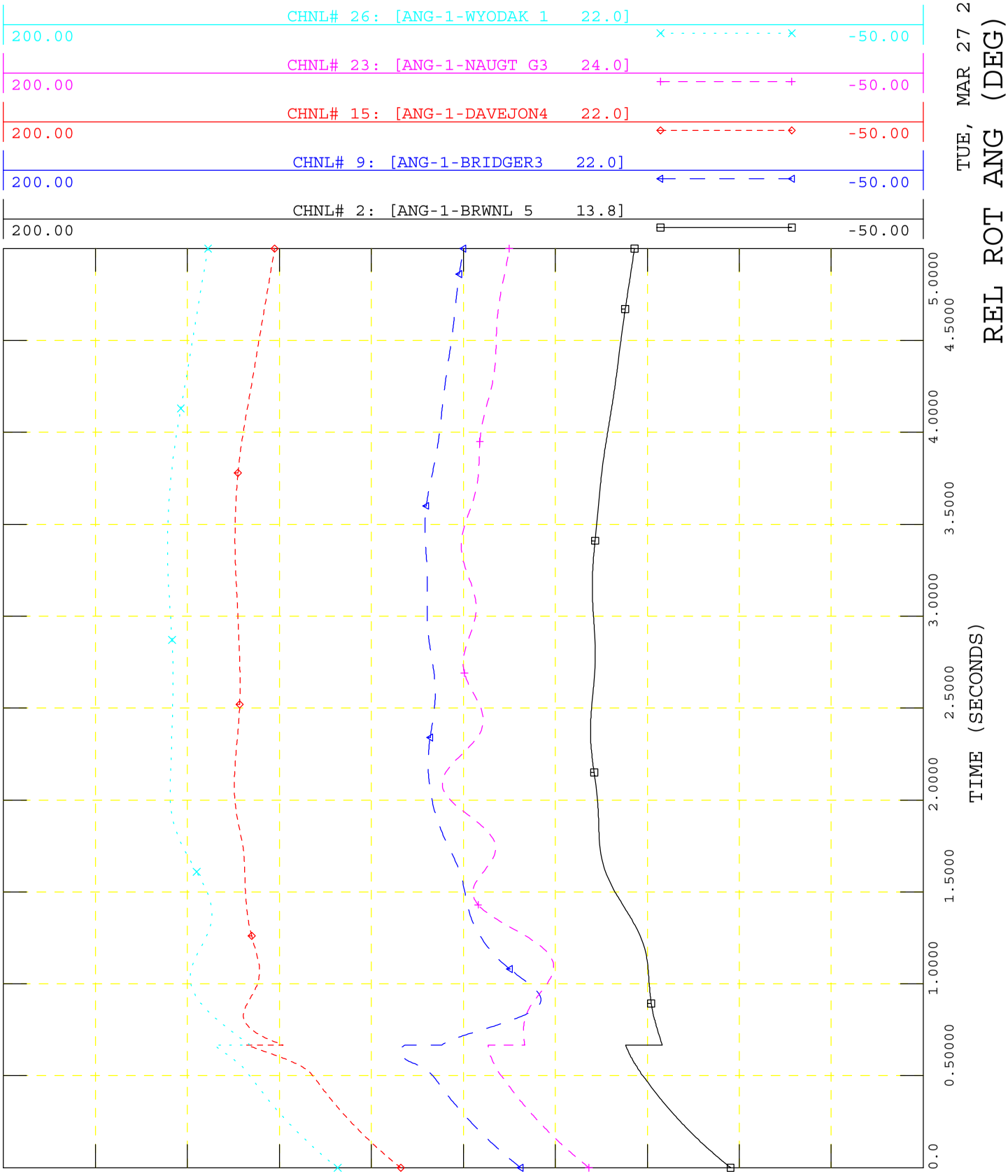

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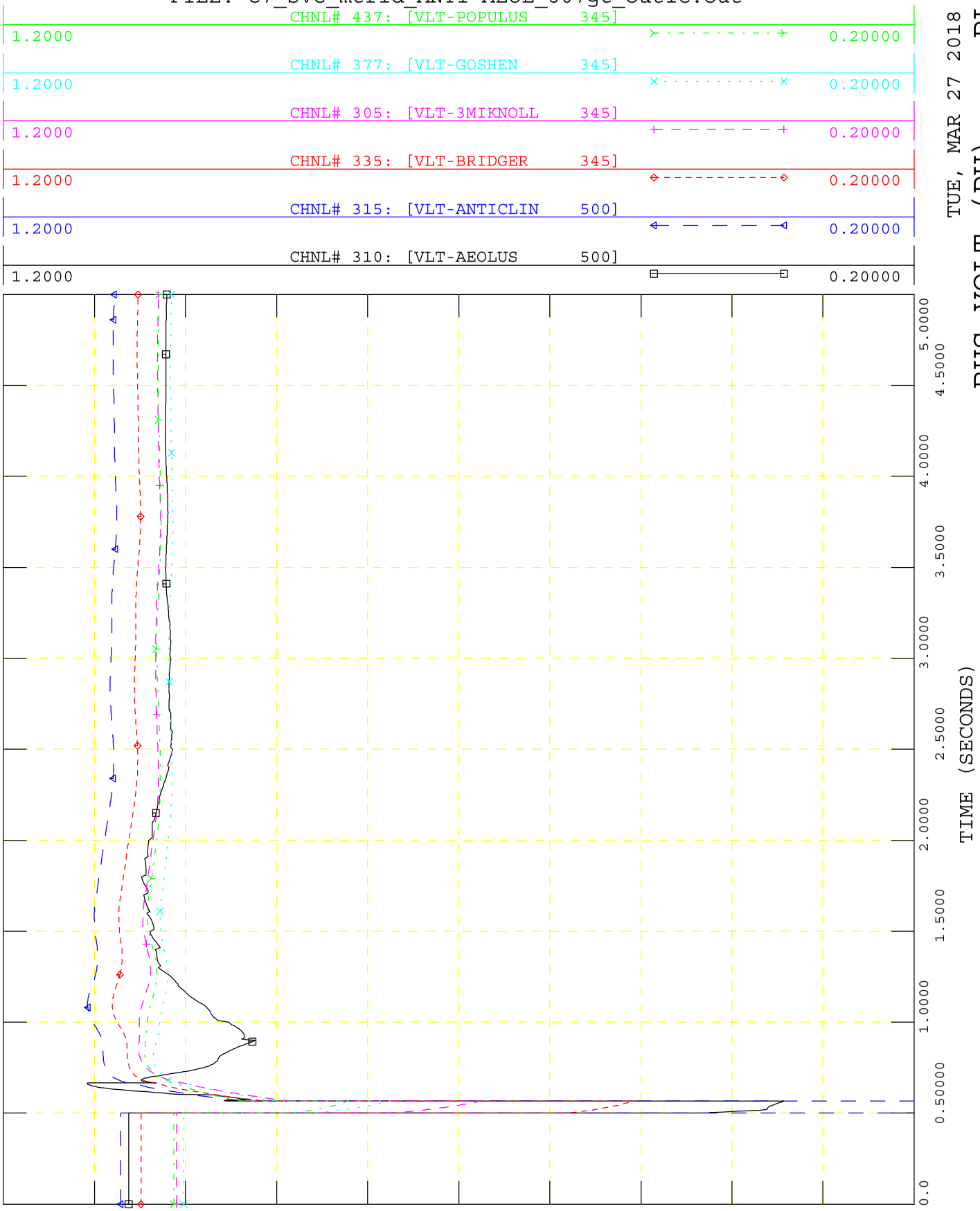

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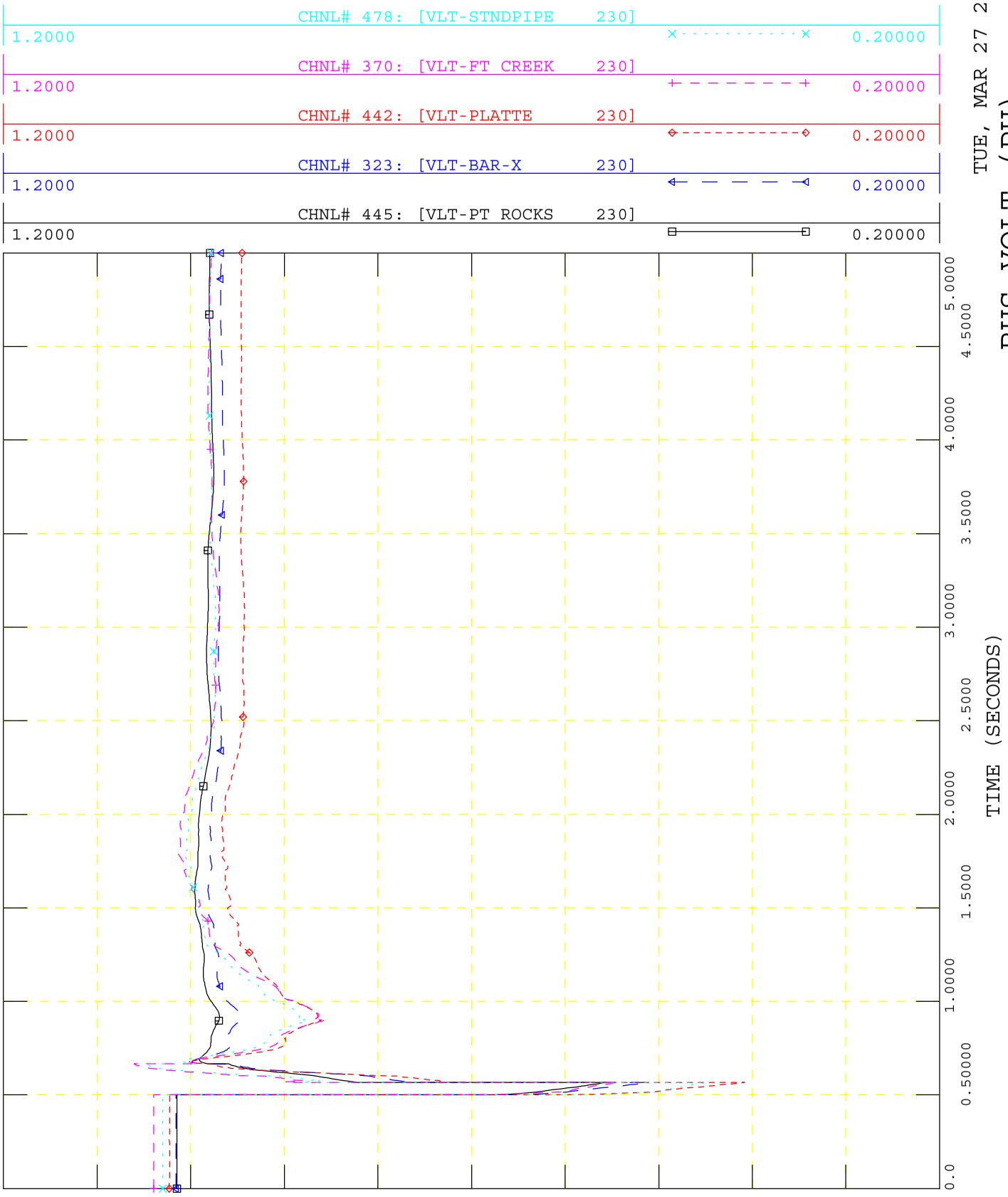
TUE, MAR 27 2018 21:27 PLT 3



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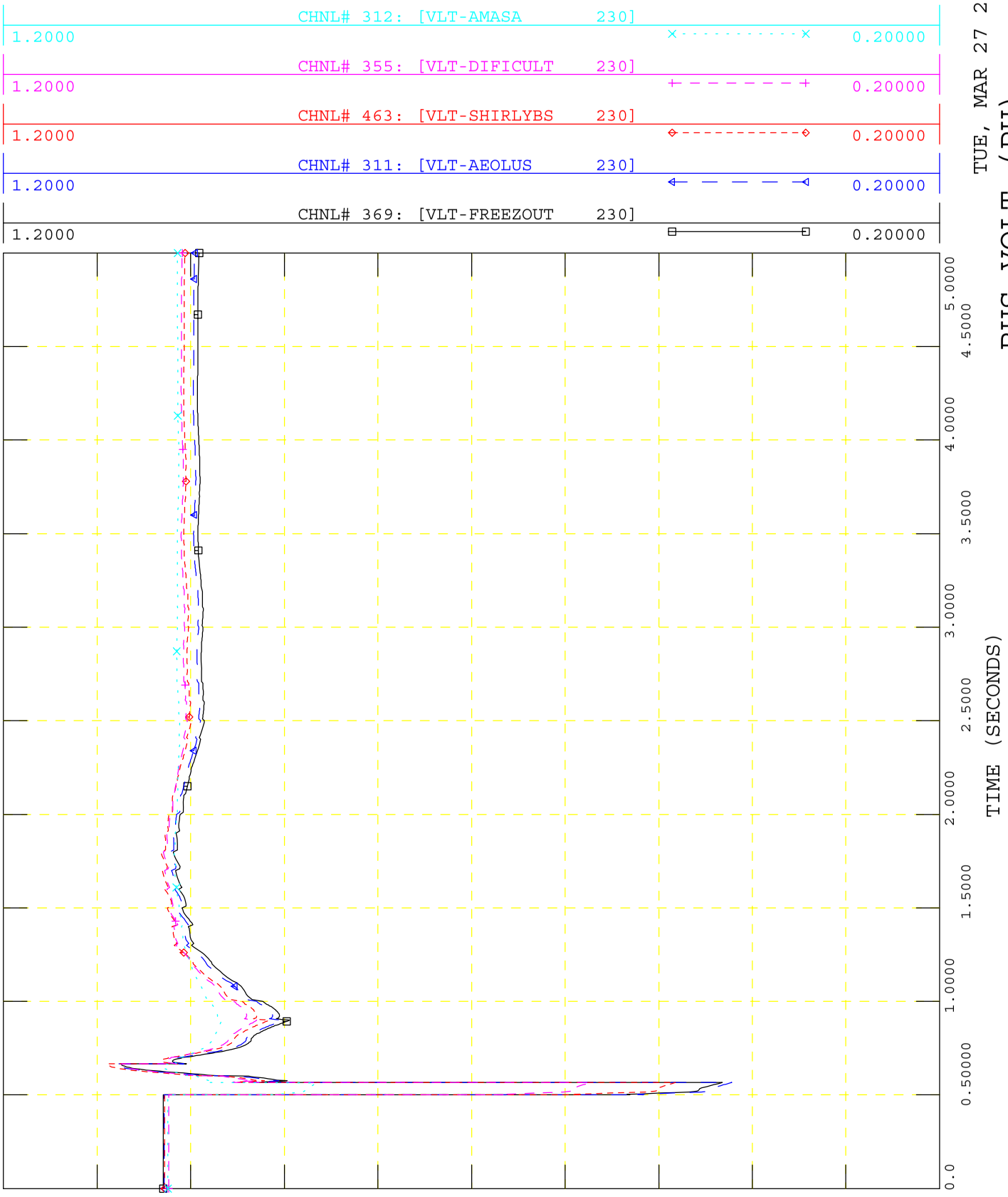
TUE, MAR 27 2018 21:27 PLT 4



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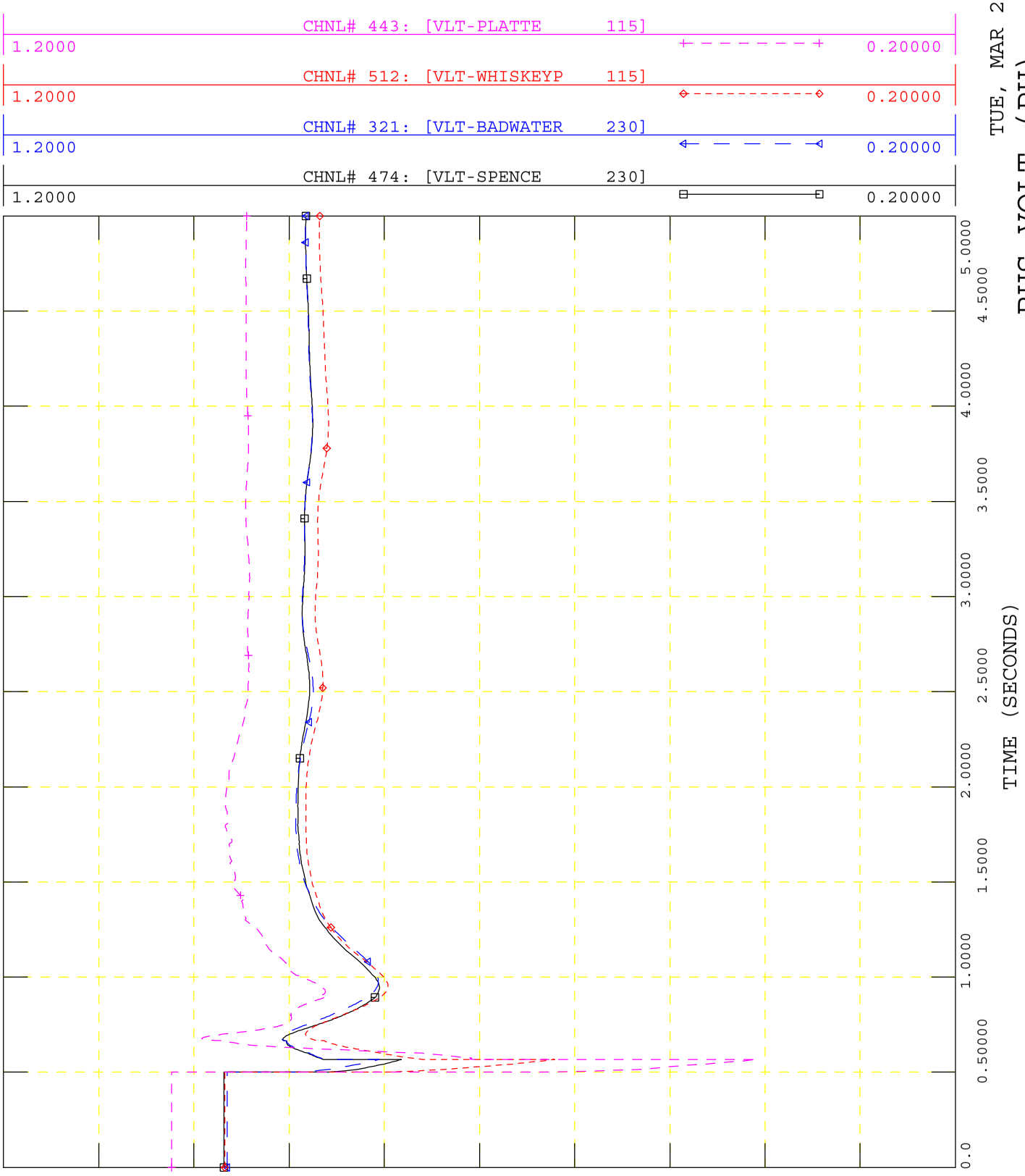

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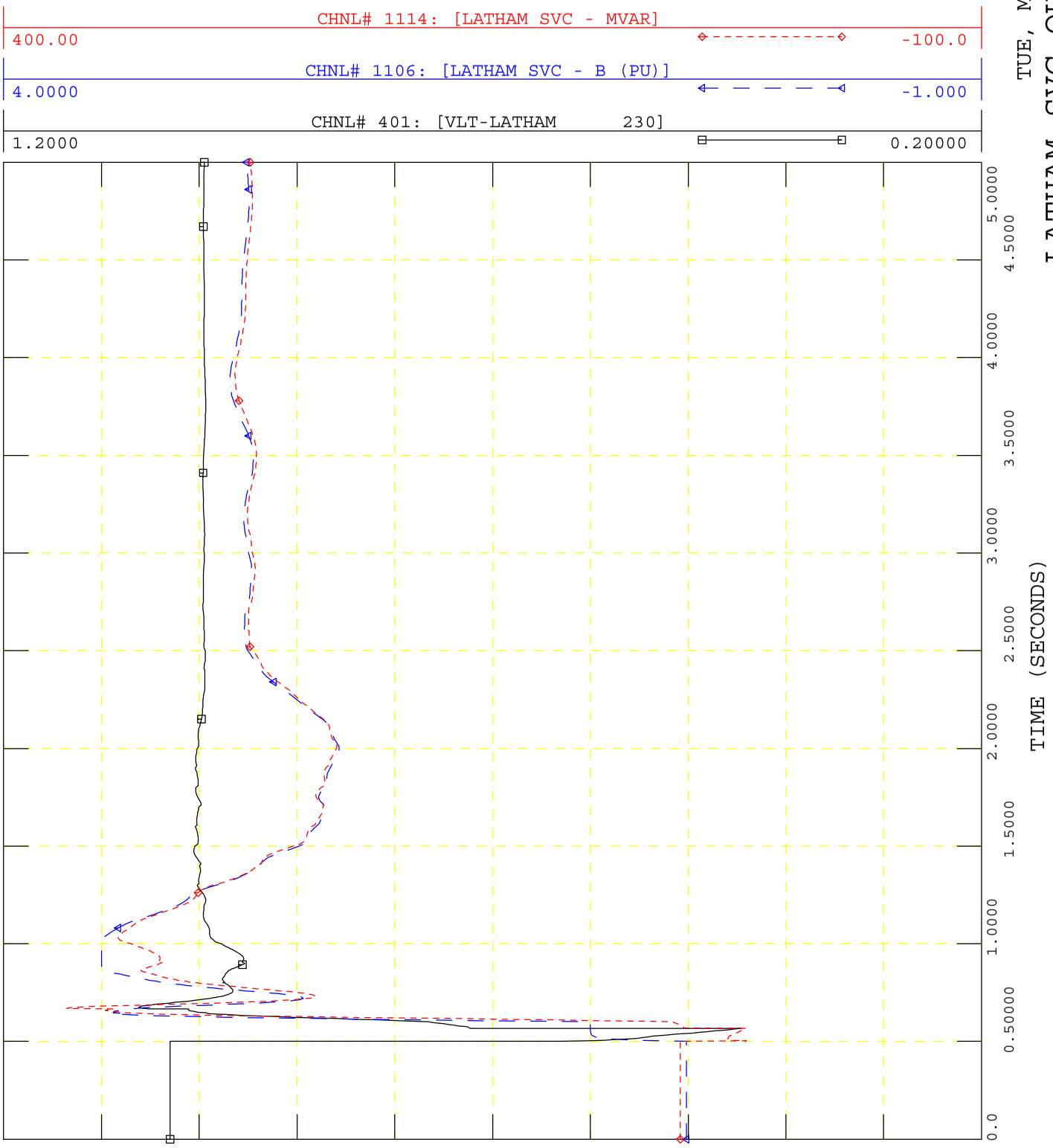
TUE, MAR 27 2018 21:27 PLT 6

LATHAM SVC OUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS ANTICLINE 500 FLT. 34CY-CLR FLT & OPEN ANTI-AEOL
500 LN. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1C
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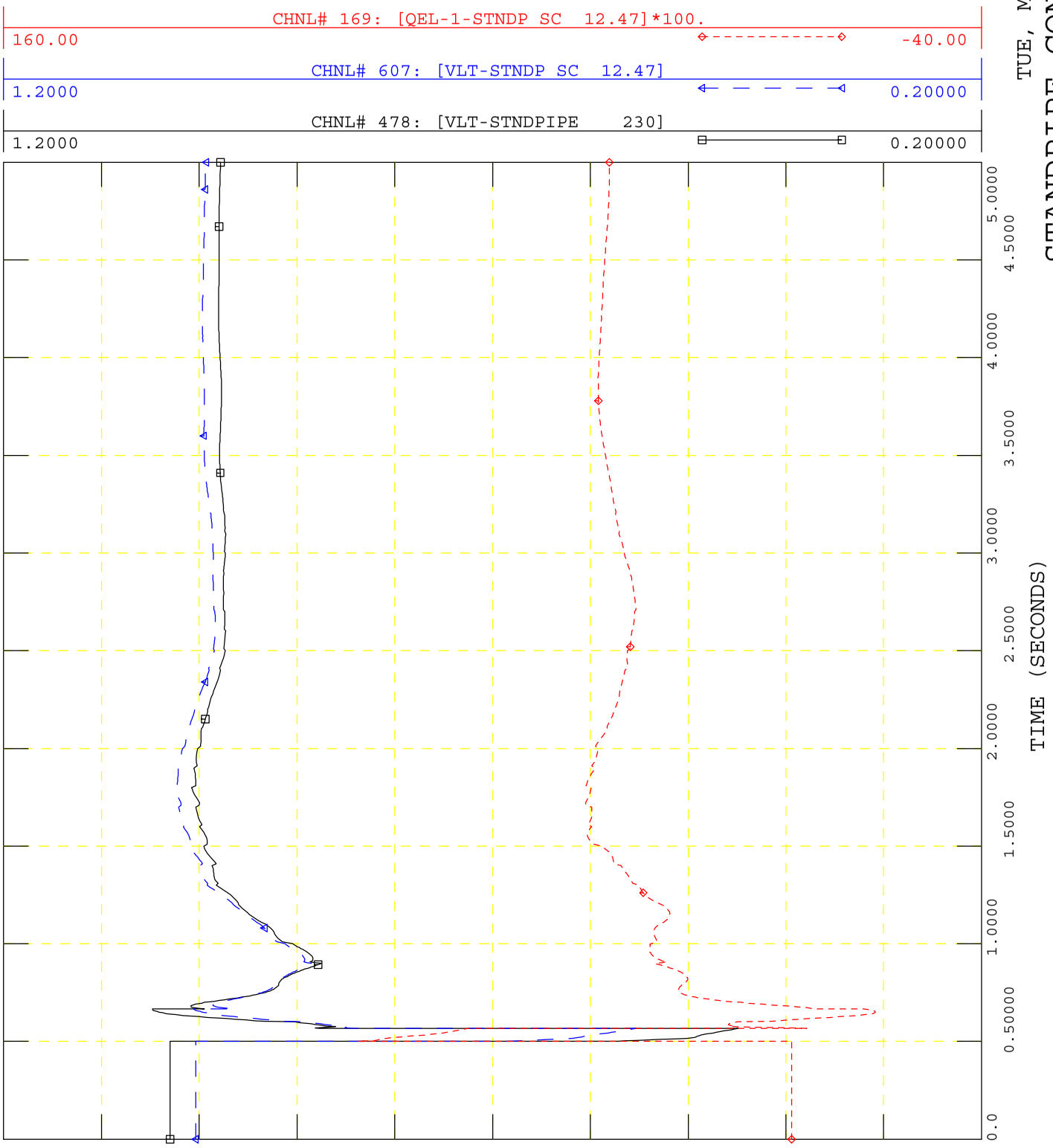
TUE, MAR 27 2018 21:27

STANDPIPE CONDNSR PLT 7



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS ANTICLINE 500 FLT. 34CY-CLR FLT & OPEN ANTI-AEOL
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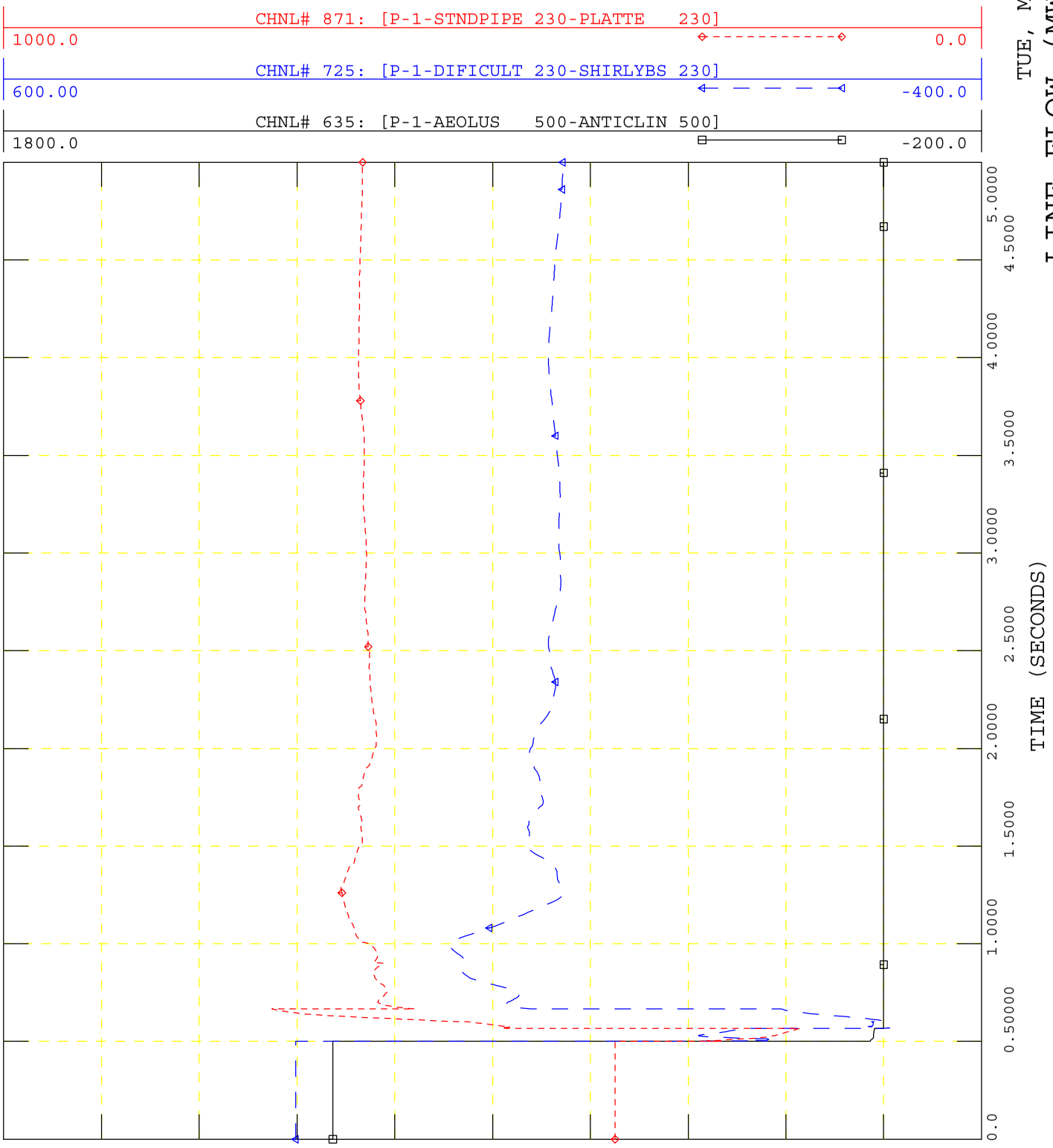
TUE, MAR 27 2018 21:27 PLT 8



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30CY-3PHS ANTICLINE 500 FLT. 34CY-CLR FLT & OPEN ANTI-AEOL
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TUE, MAR 27 2018 21:27 PLT 9

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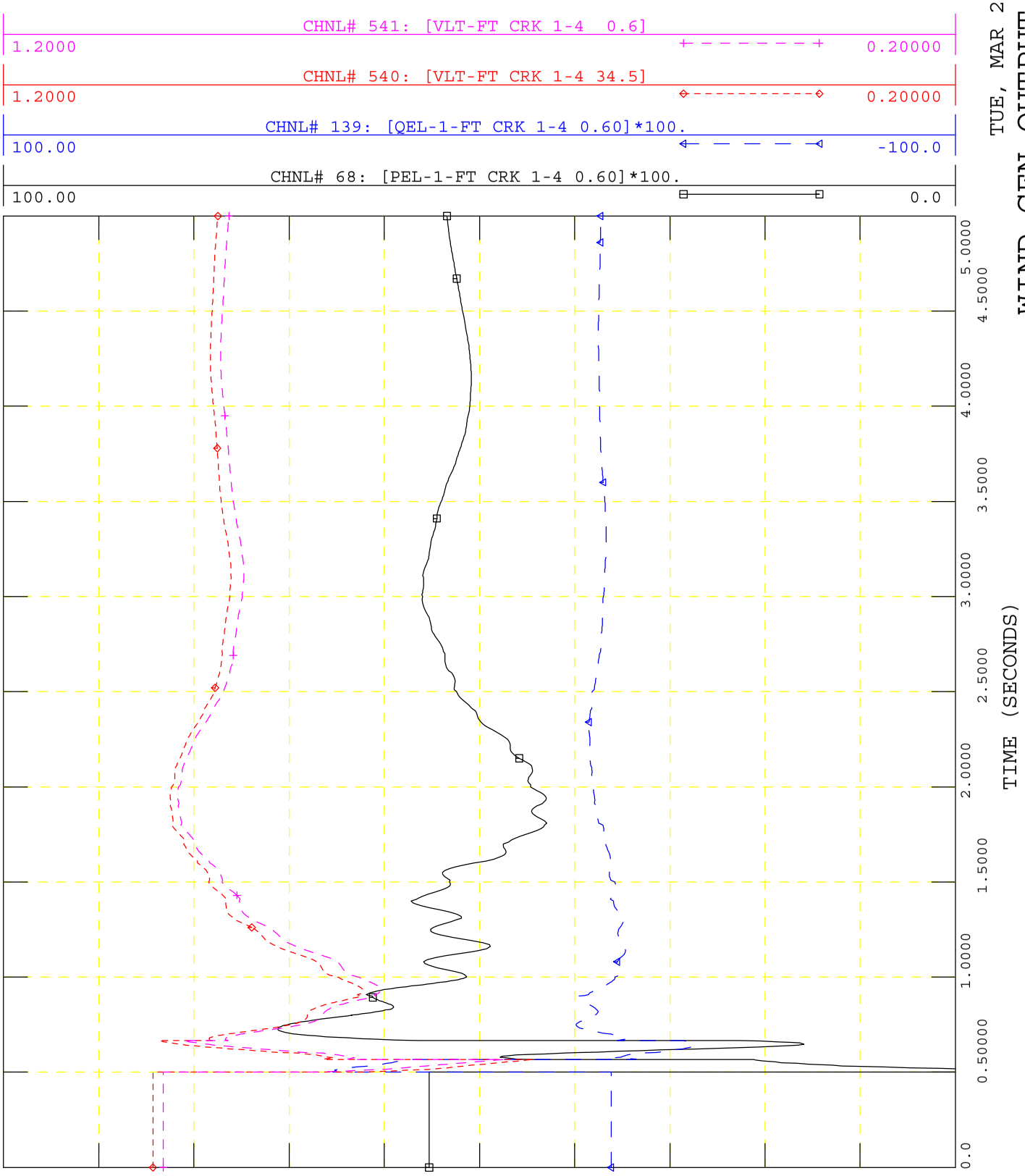

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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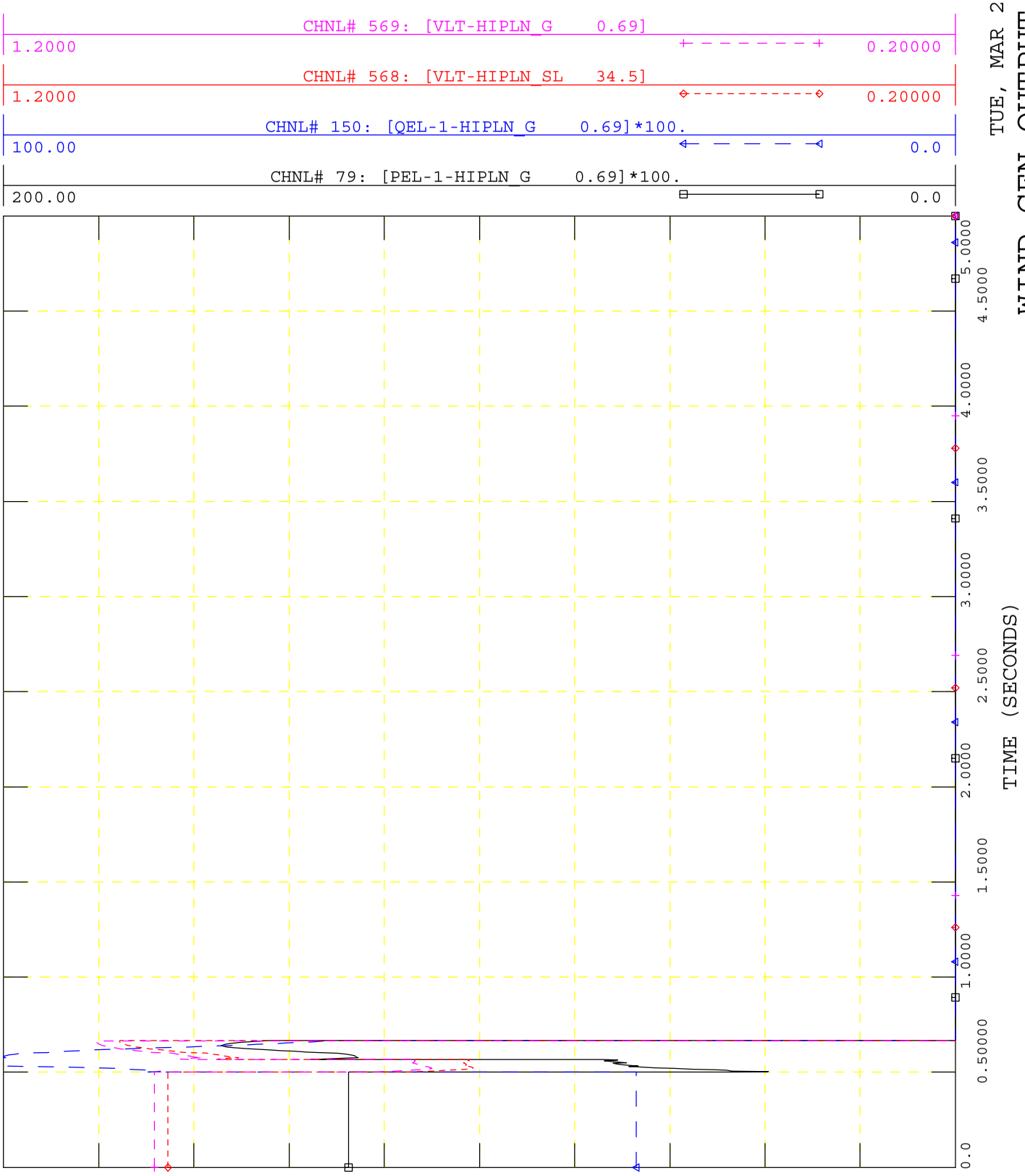

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30CY-3PHS ANTICLINE 500 FLT. 34CY-CLR FLT & OPEN ANTI-AEOL
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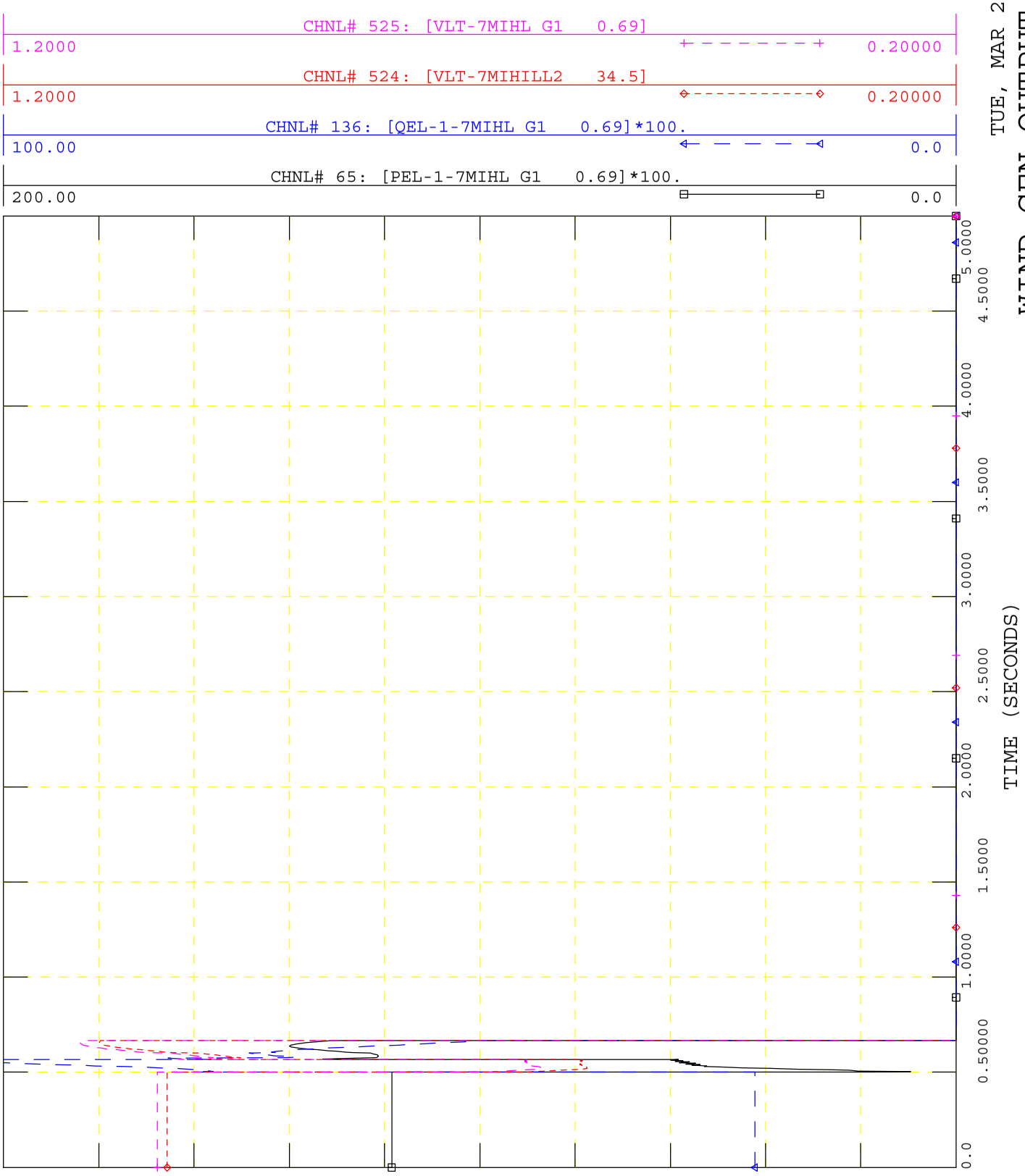

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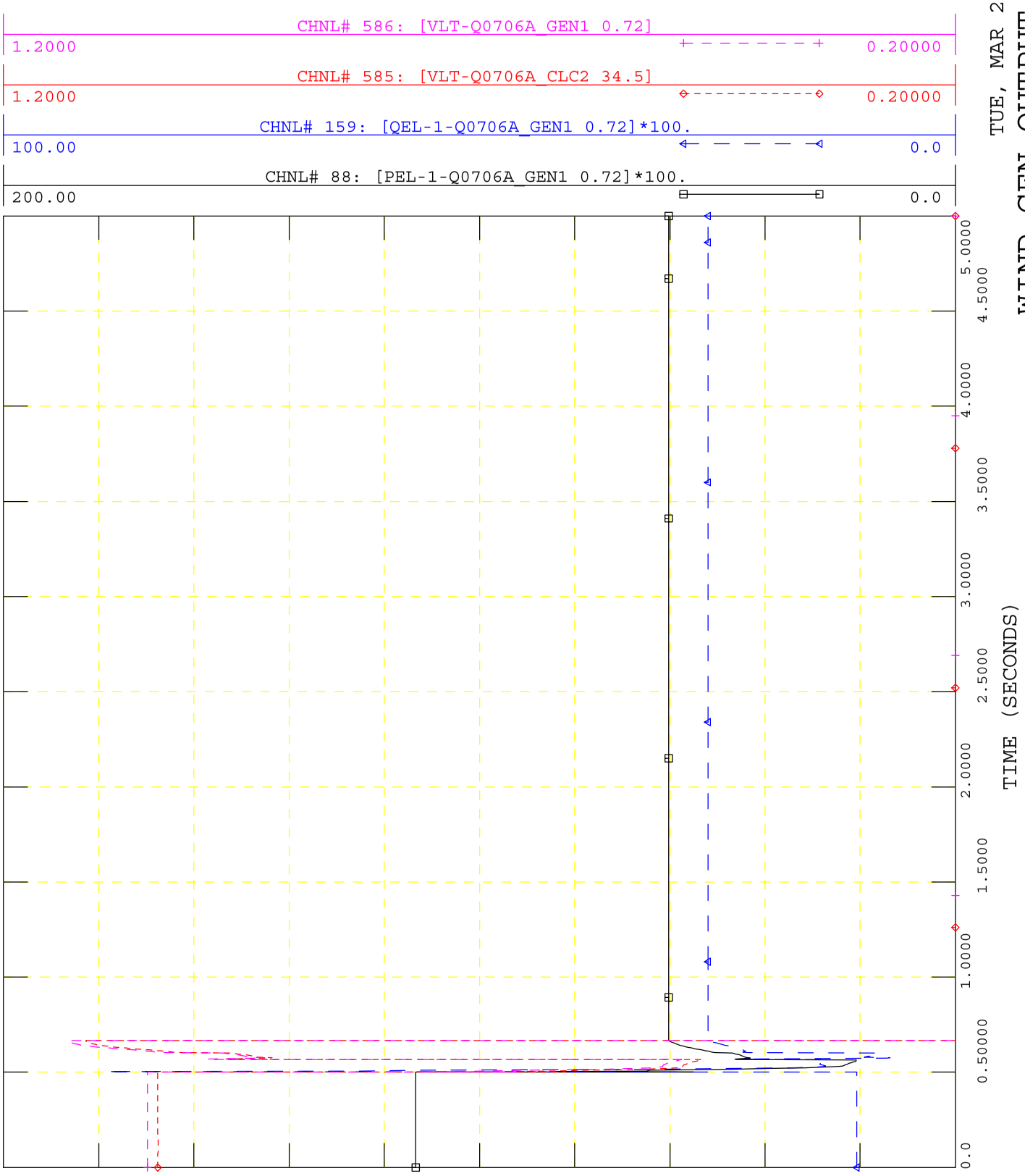

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TUE, MAR 27 2018 21:27 PLT 13

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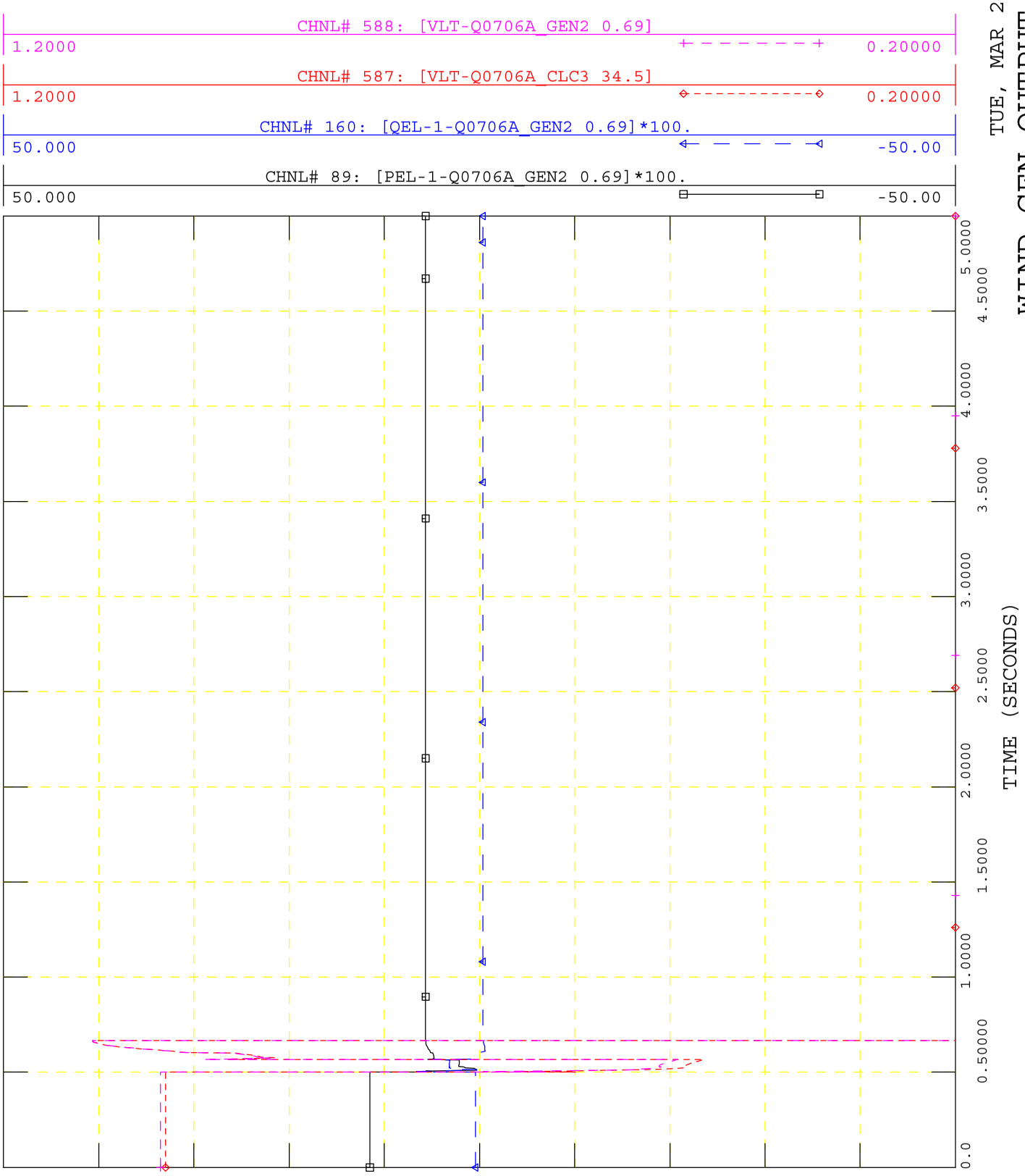

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TUE, MAR 27 2018 21:27 PLT 14

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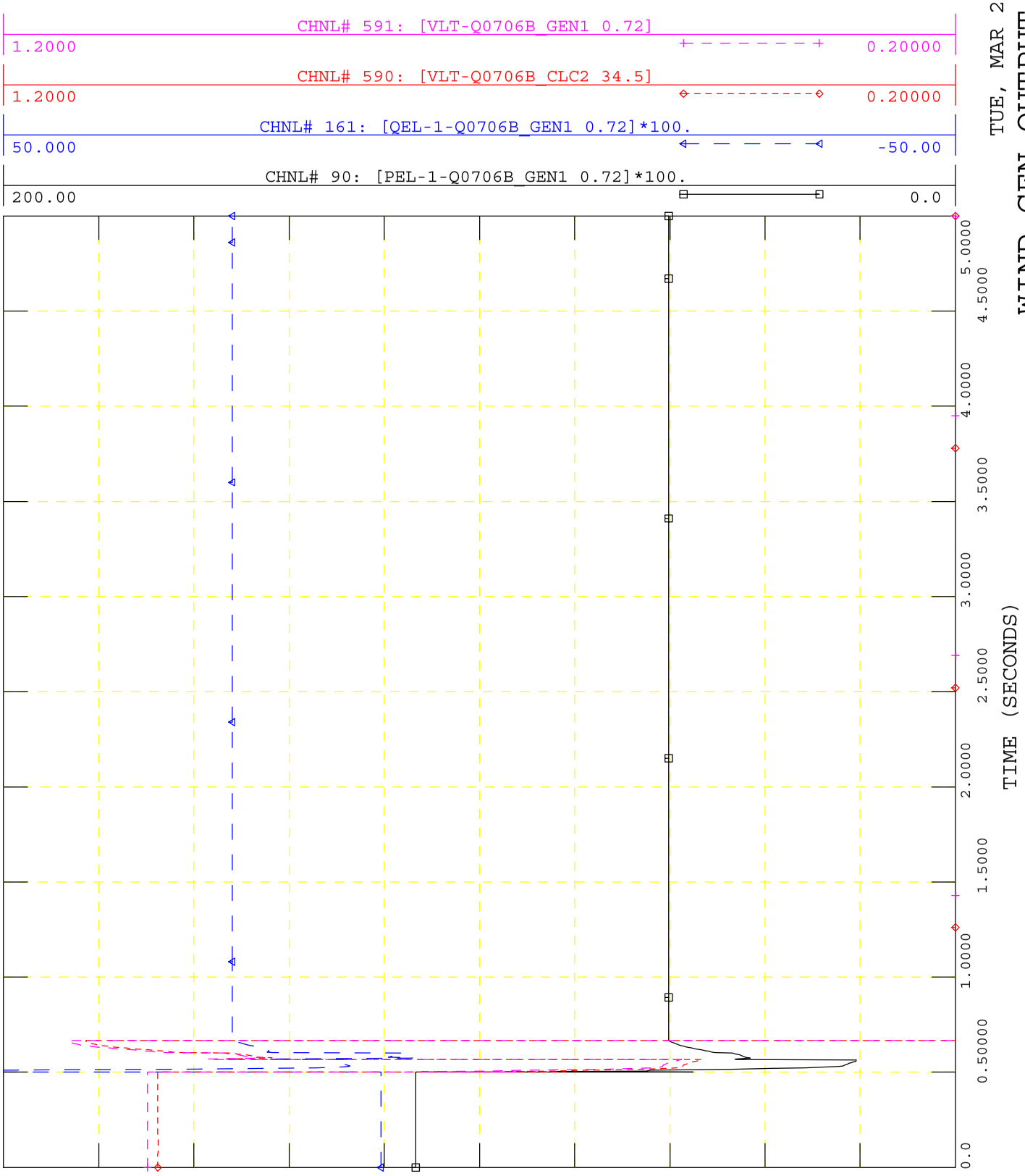

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30CY-3PHS ANTICLINE 500 FLT. 34CY-CLR FLT & OPEN ANTI-AEOL
500 LN. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1C
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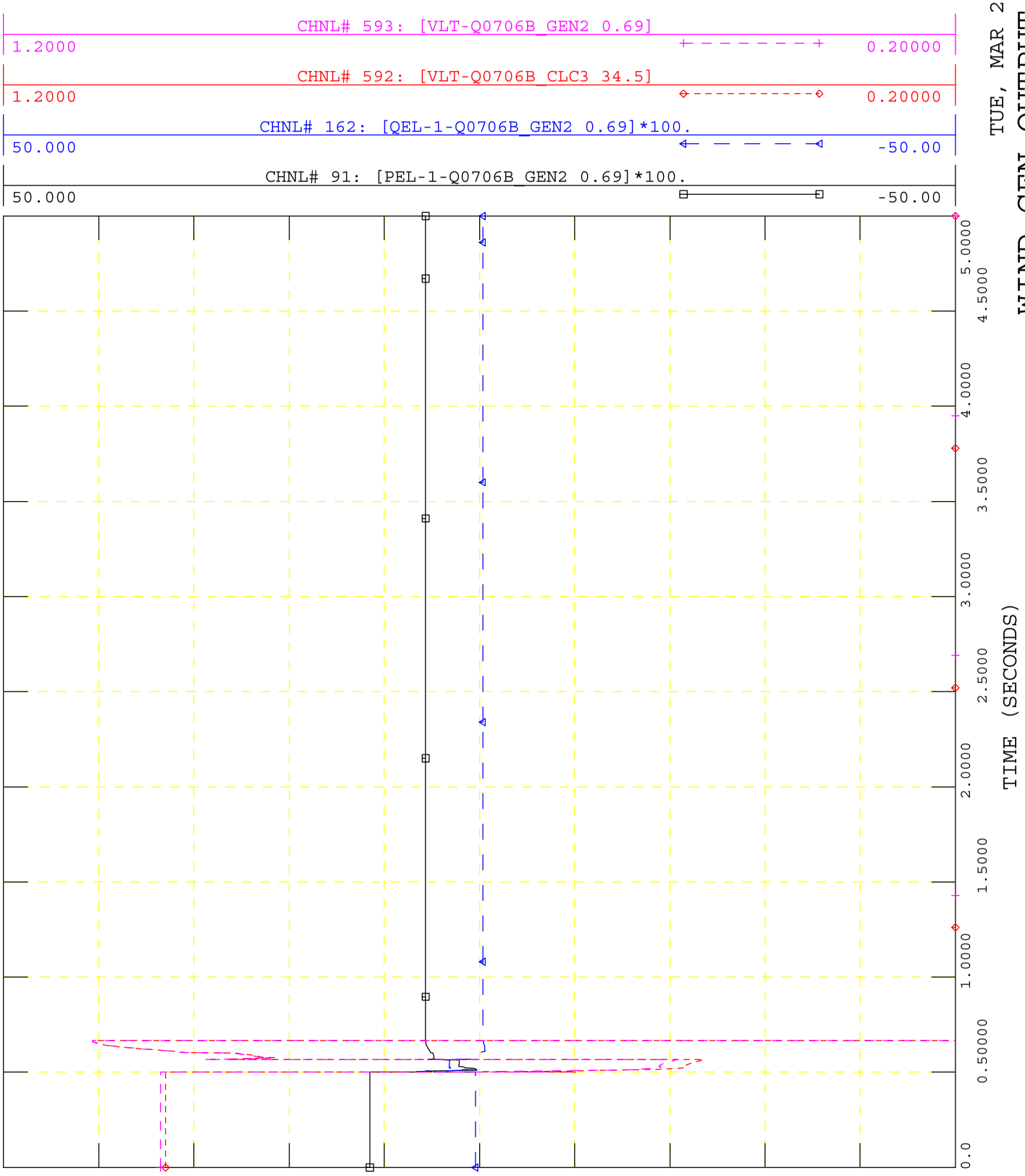

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30CY-3PHS ANTICLINE 500 FLT. 34CY-CLR FLT & OPEN ANTI-AEOL
500 LN. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1C
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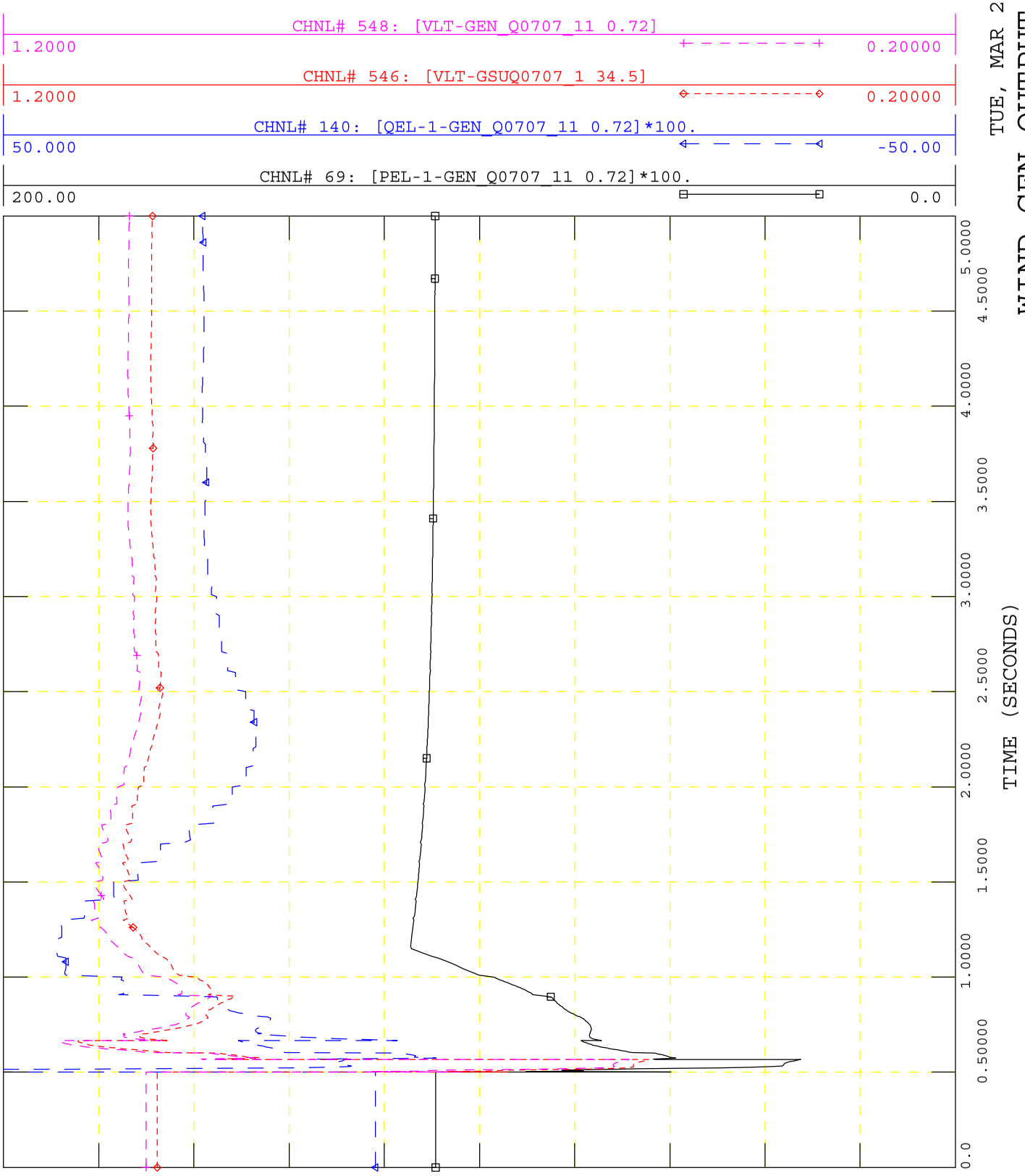

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30CY-3PHS ANTICLINE 500 FLT. 34CY-CLR FLT & OPEN ANTI-AEOL
500 LN. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1C
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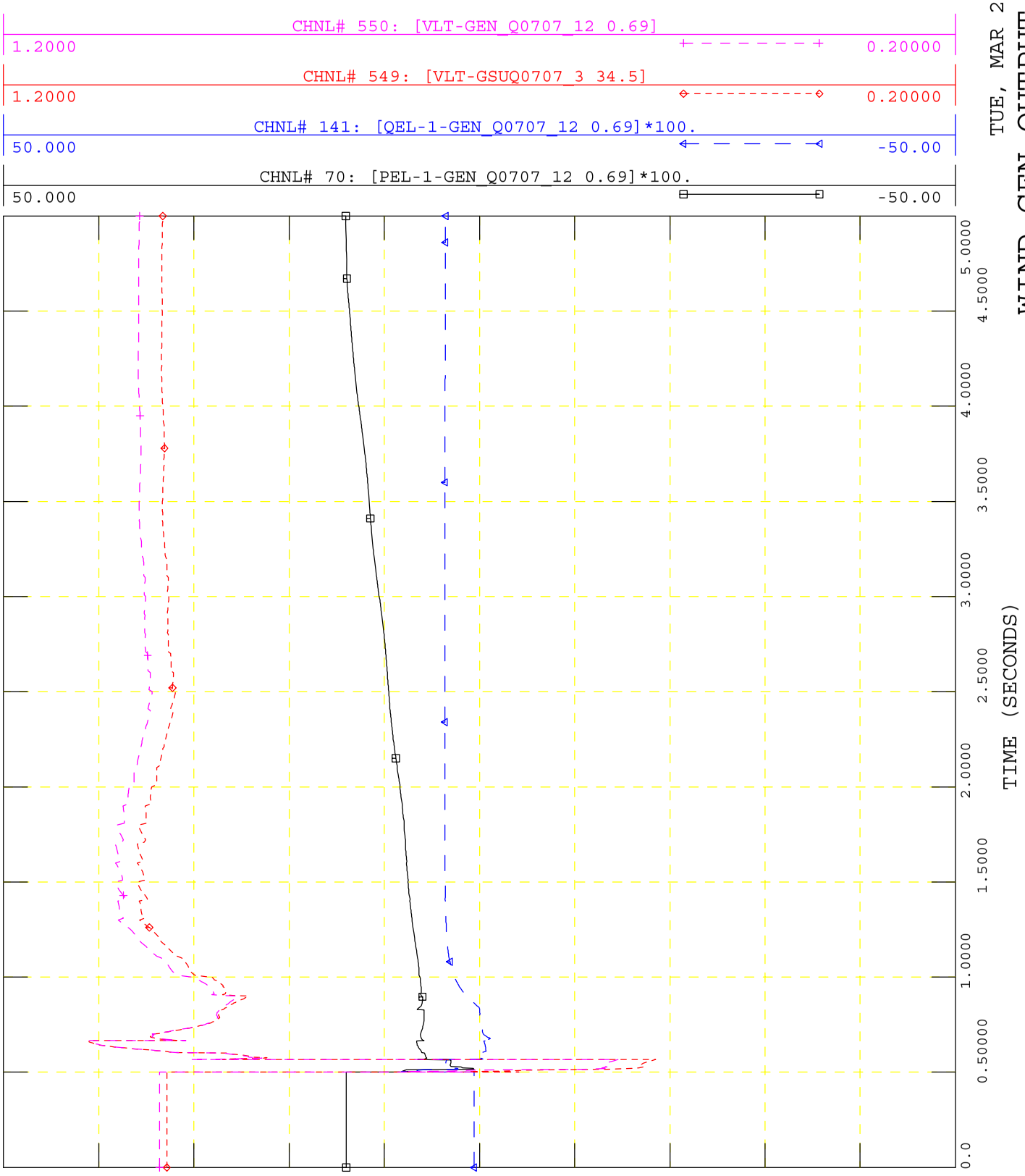

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500 LN. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1C
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TUE, MAR 27 2018 21:27 PLT 18

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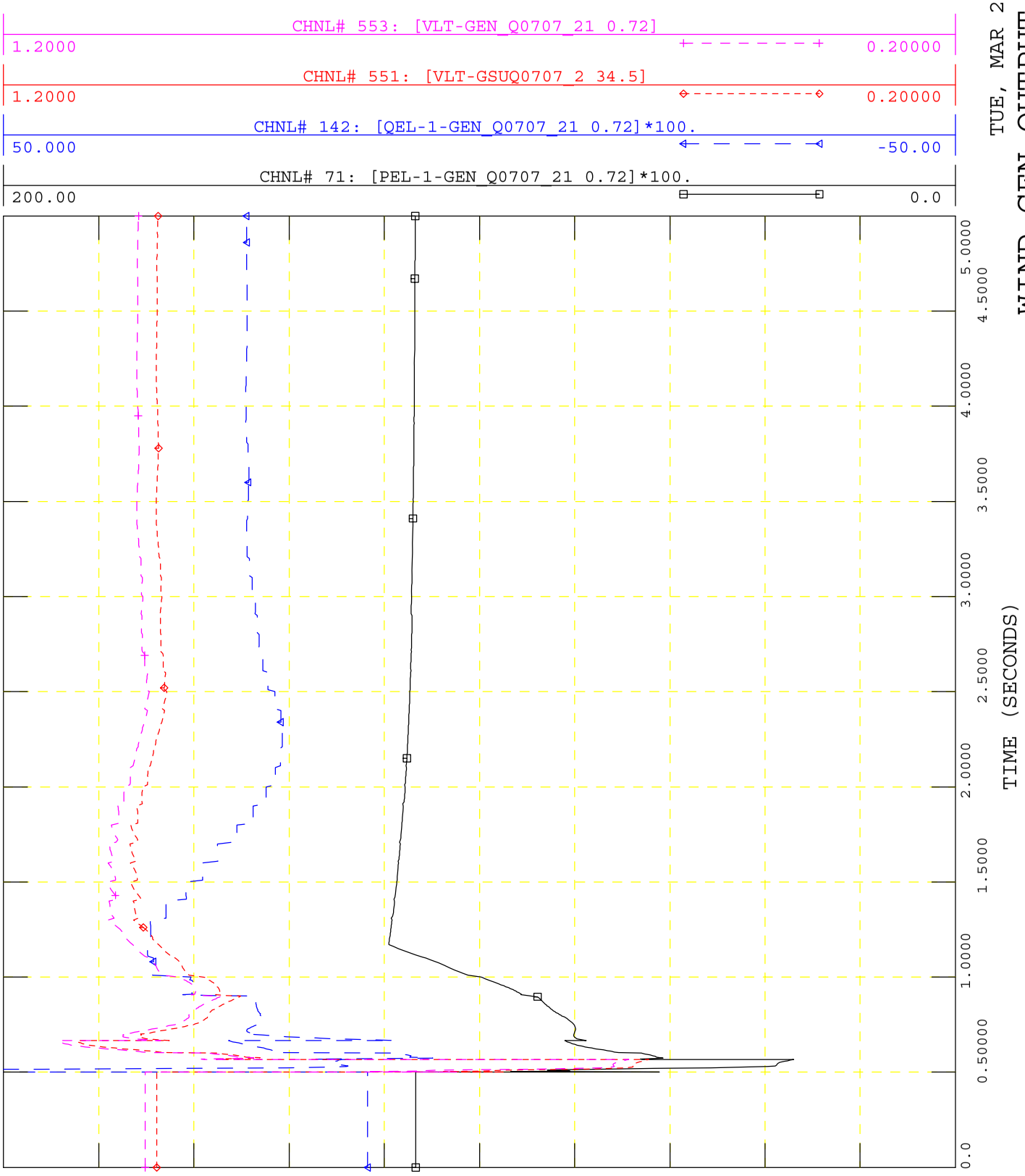

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TUE, MAR 27 2018 21:27 PLT 19

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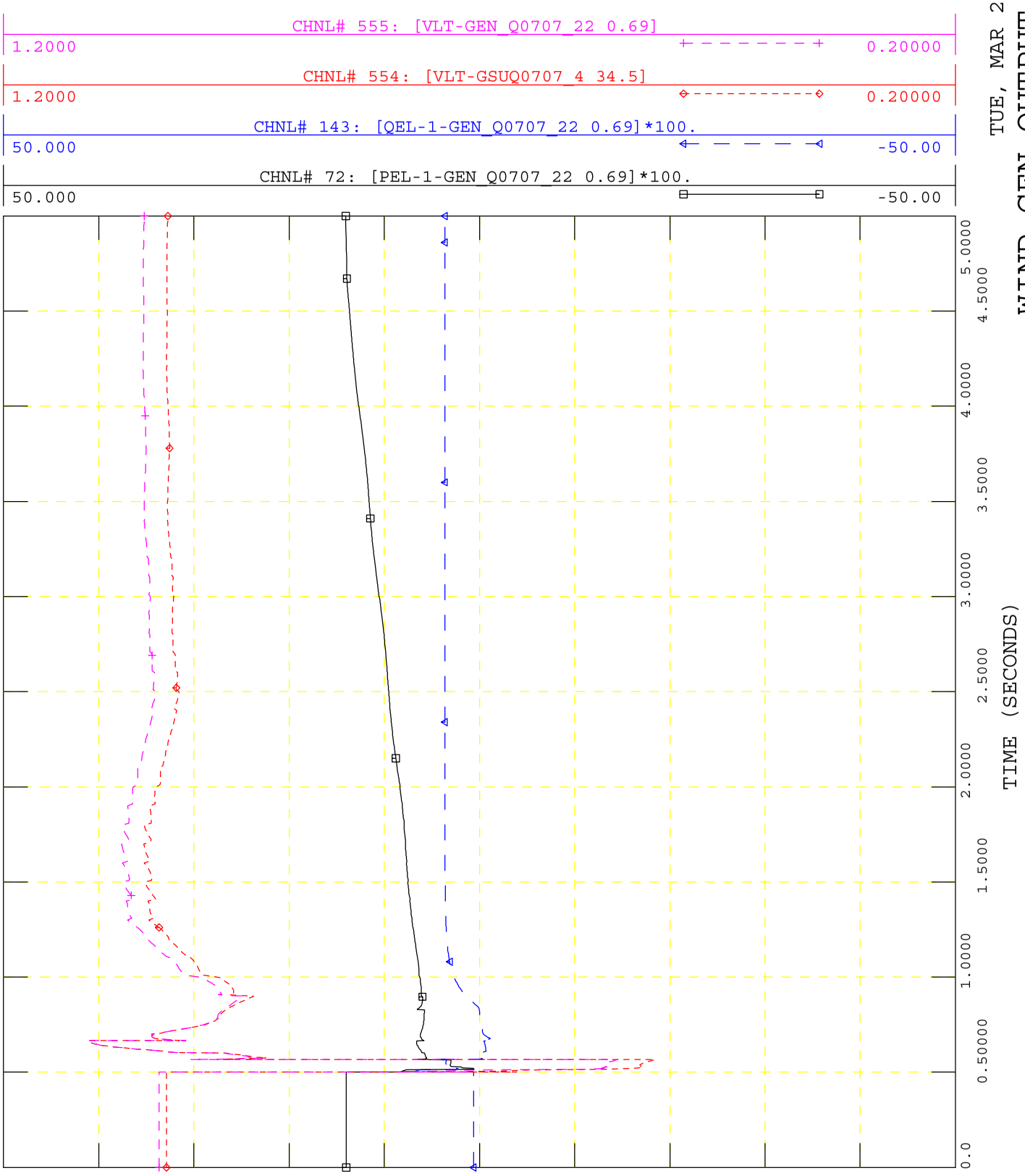

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500 LN. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1C
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TUE, MAR 27 2018 21:27 PLT 20

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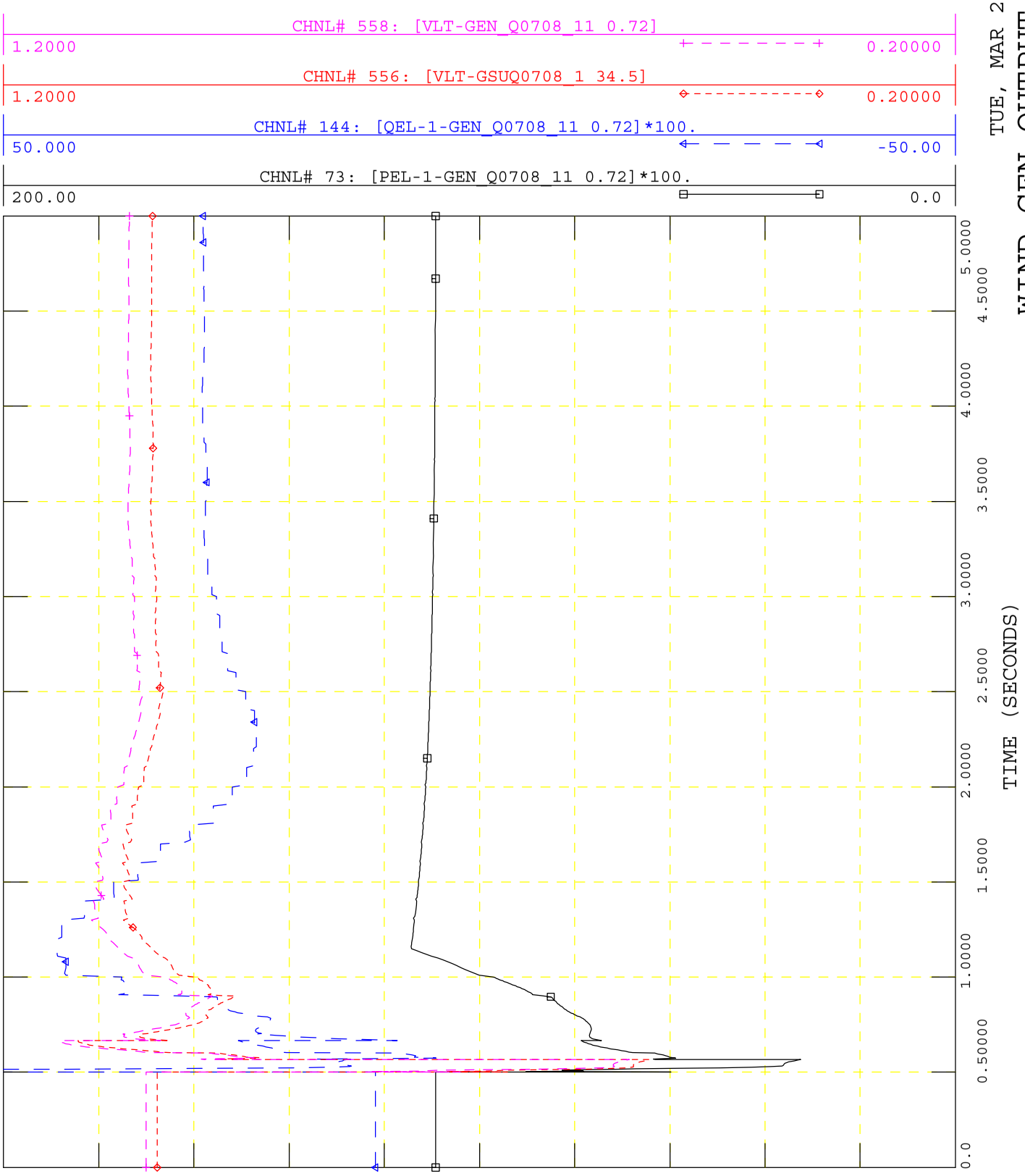

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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500 LN. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1C
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TUE, MAR 27 2018 21:27 PLT 21

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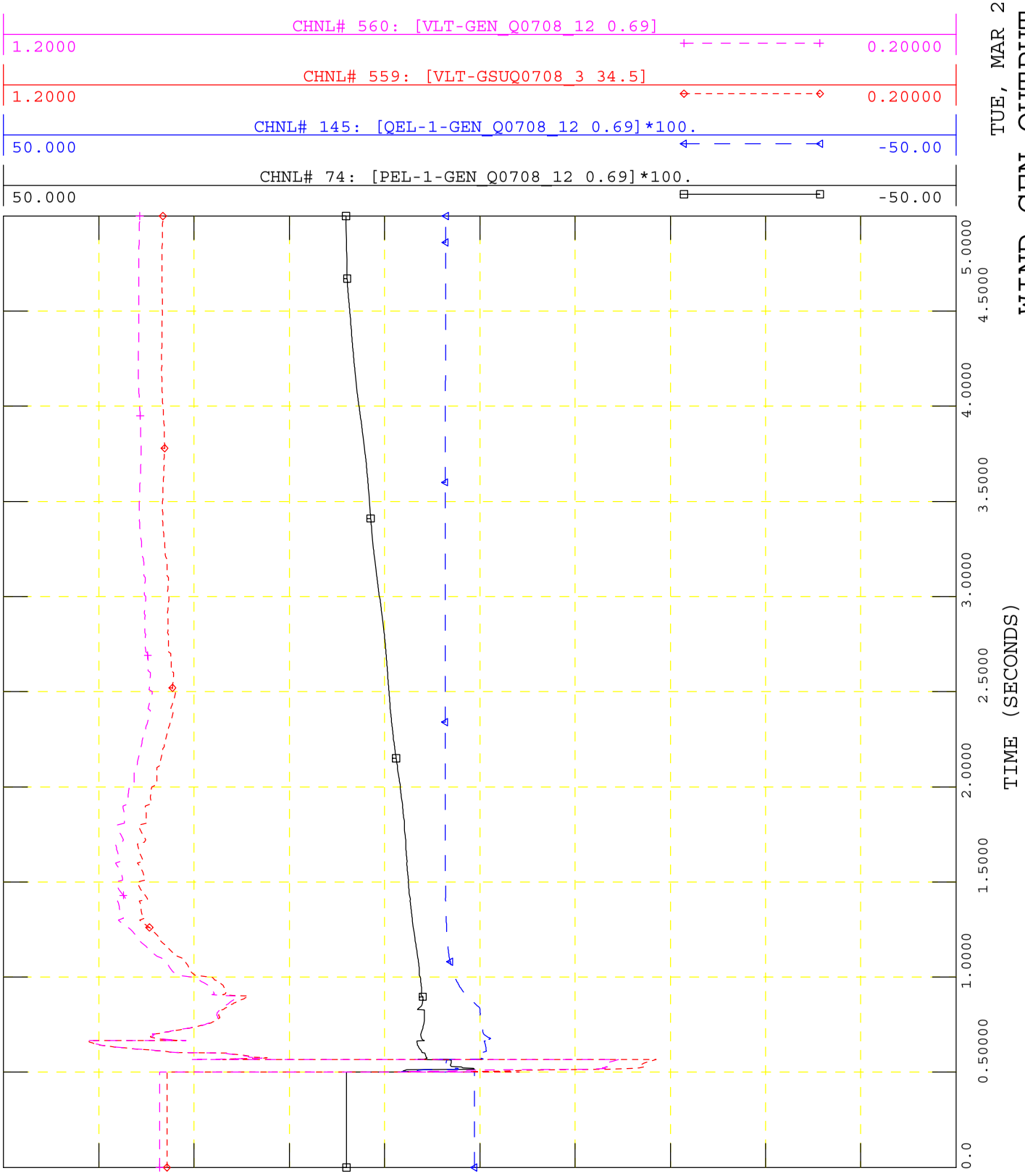

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500 LN. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1C
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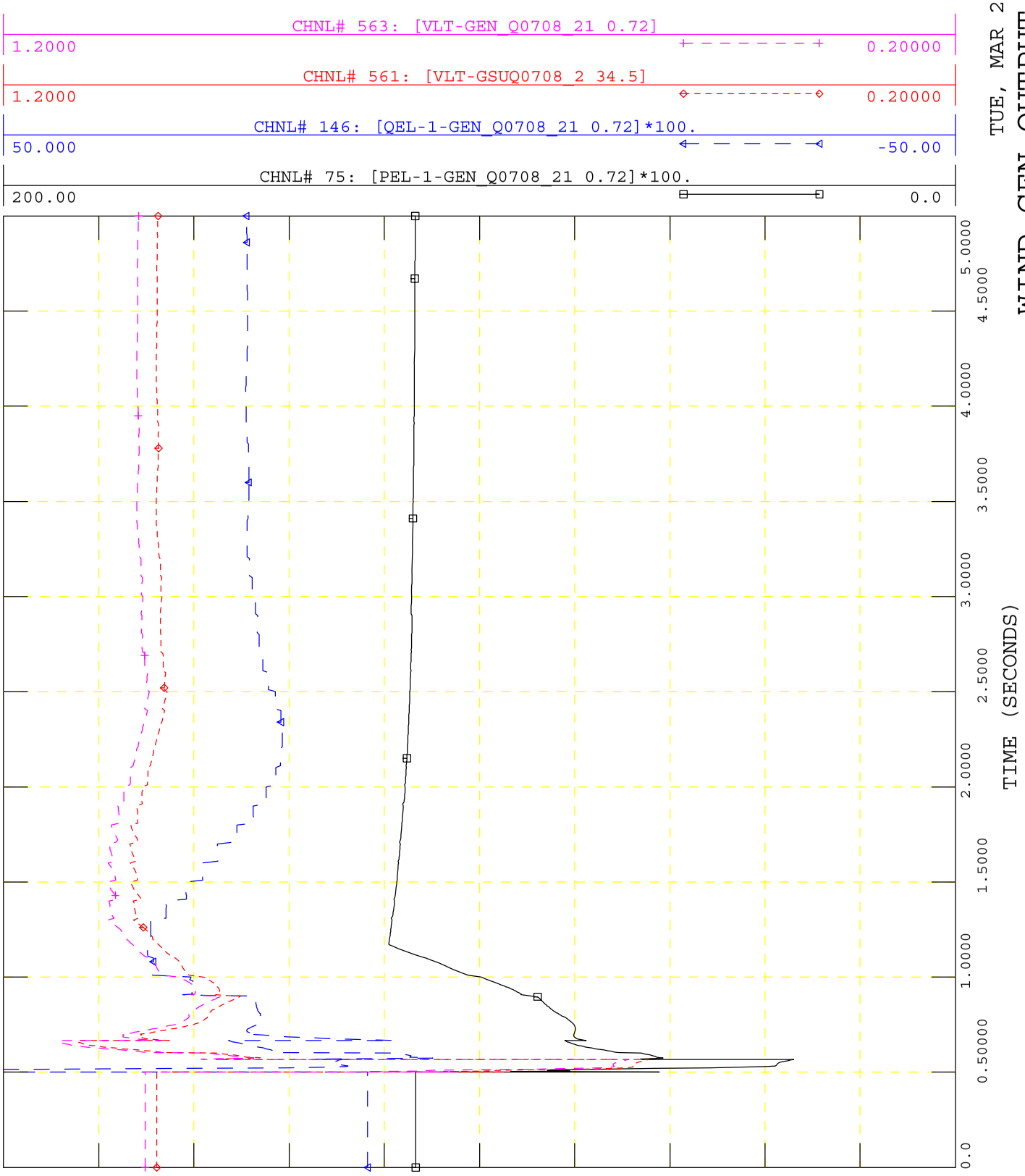

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500 LN. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1C
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TUE, MAR 27 2018 21:27 PLT 23

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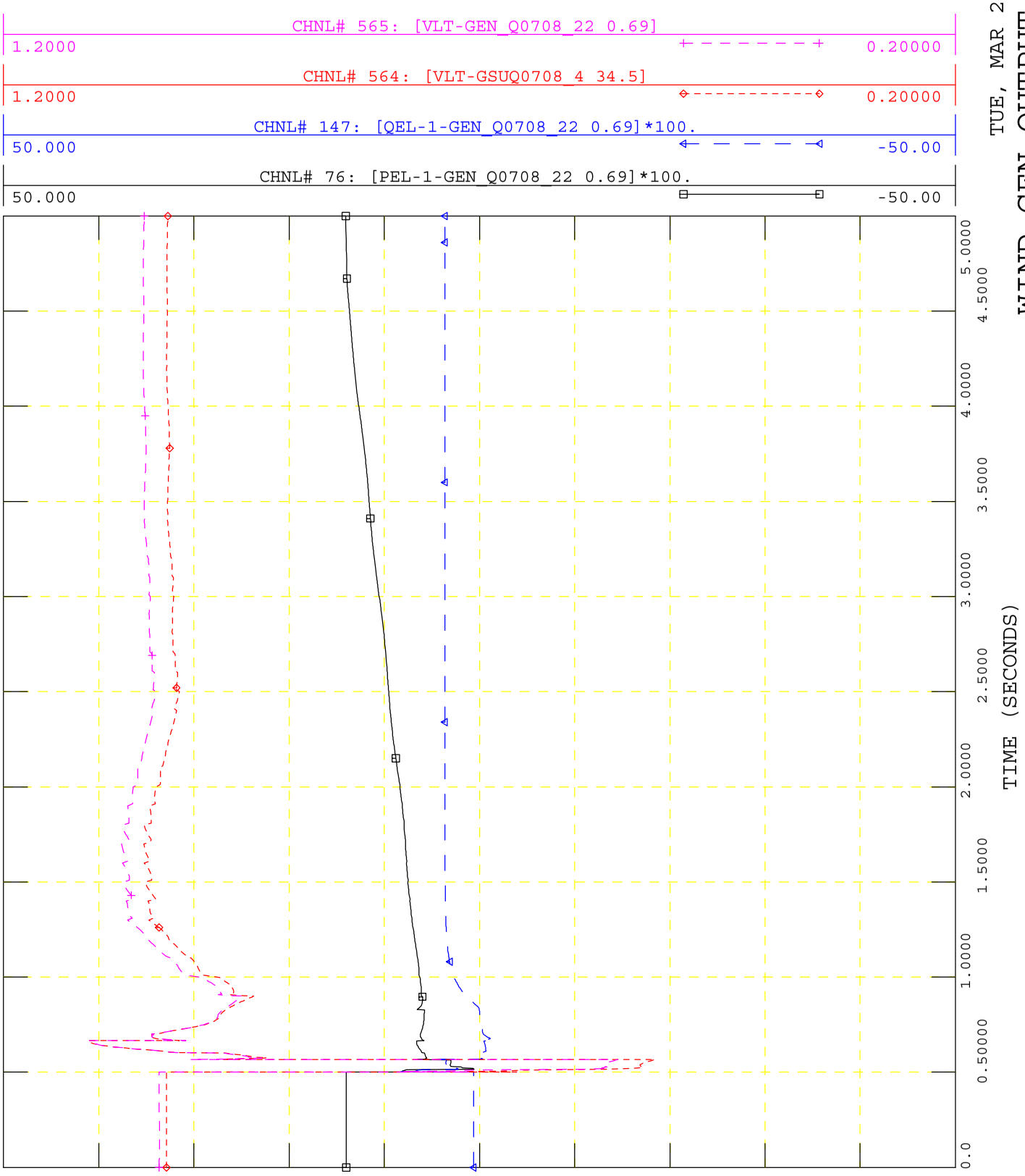

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500 LN. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1C
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TUE, MAR 27 2018 21:27 PLT 24

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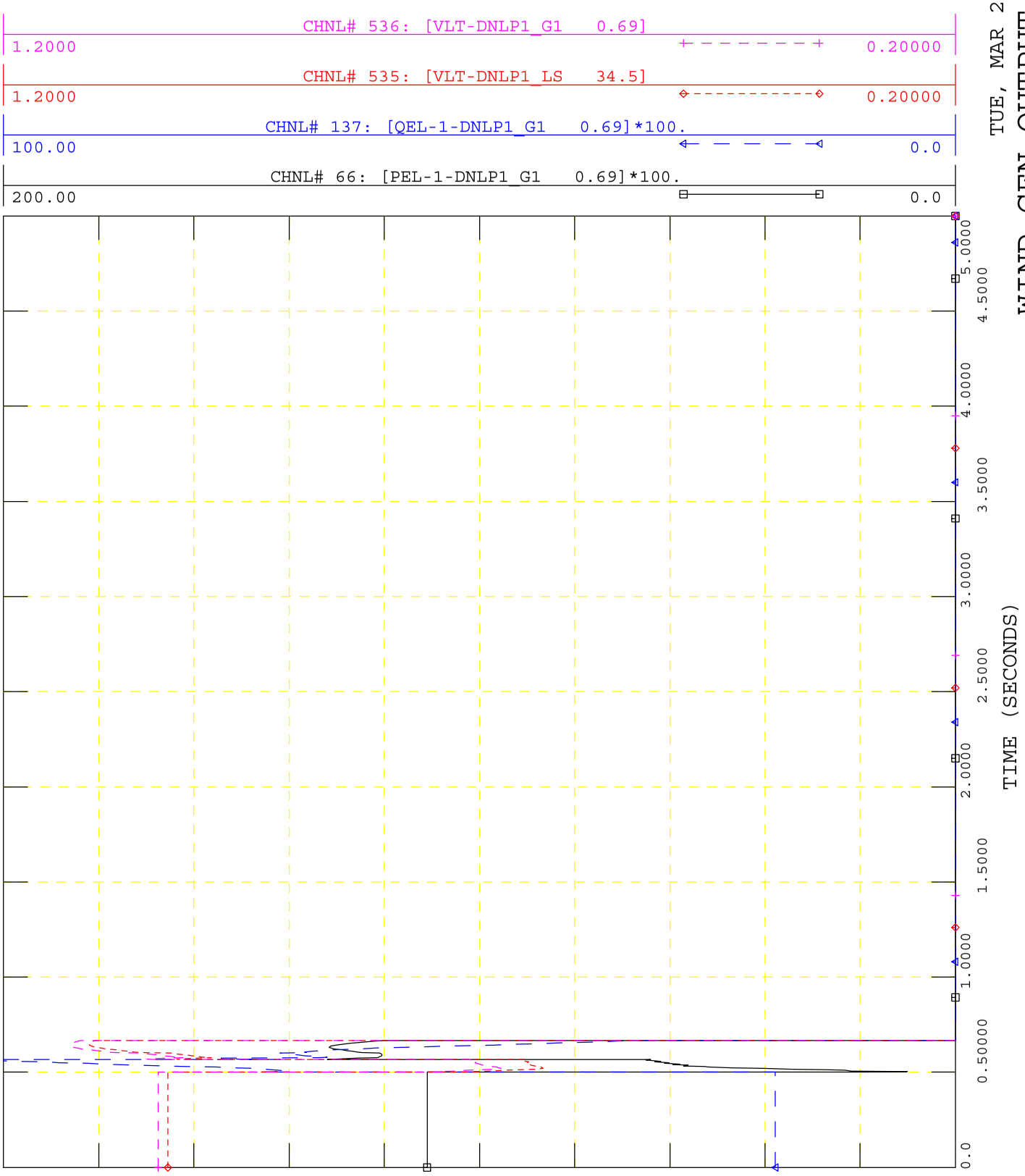

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500 LN. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1C
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TUE, MAR 27 2018 21:27 PLT 25

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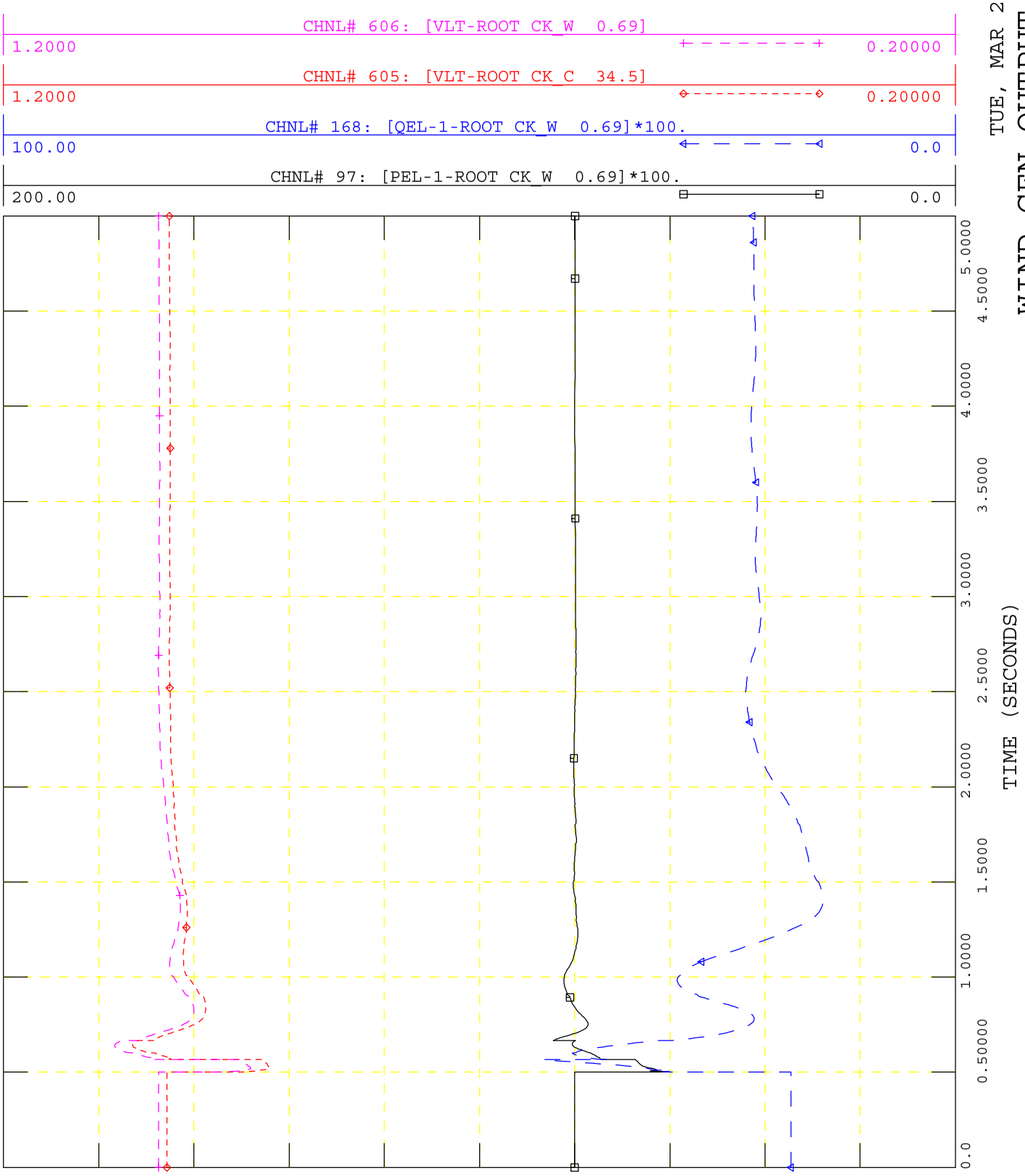

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30CY-3PHS ANTICLINE 500 FLT. 34CY-CLR FLT & OPEN ANTI-AEOL
500 LN. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1C
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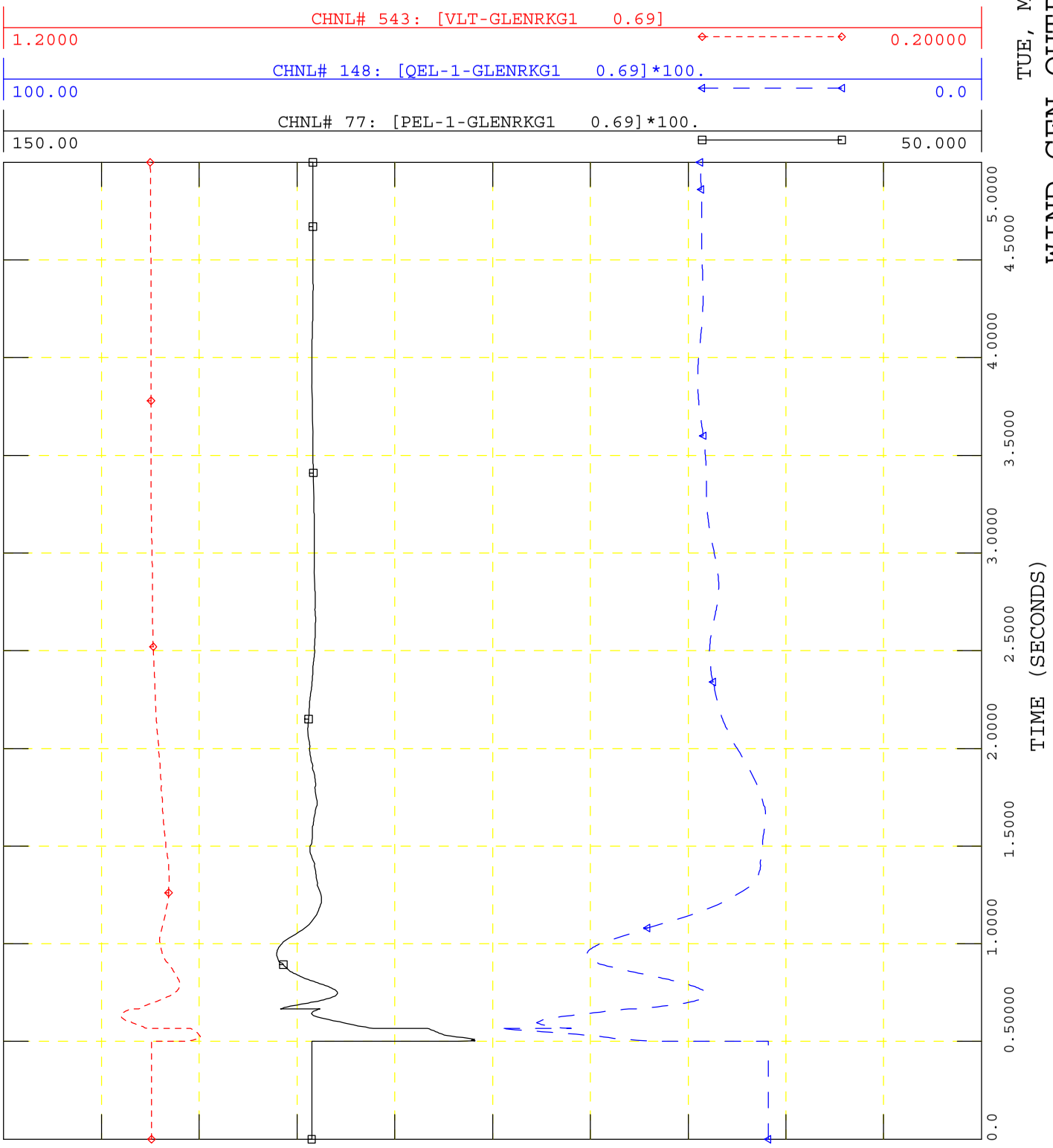
TUE, MAR 27 2018 21:27

WIND GEN OUTPUT PLT 26



Dynamic Simulation

Case 1d1 – Loss of Aeolus 230/500 kV transformer with 607 MW generator tripping

30 cycles	**3 phase Aeolus 230 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Aeolus 230/500 kV transformer, trip 200 MVAR shunt capacitors at Aeolus and Anticline 500 kV subs**
36 cycles	**Remove SVC MVAR limiter**
40 cycles	**Trip High Plains wind generation (127.5 MW)** **Trip 7 Mile Hill wind generation (118.5)** **Trip Q0706 A&B (Ekola Flats) wind generation (249.8 MW)** **Dunlap wind generation (111.0 MW)**
5 sec.	**Terminate simulation**

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS AEOLUS 230 FLT. 34CY-CLR FLT & OPEN AEOL 230/500
XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1D1
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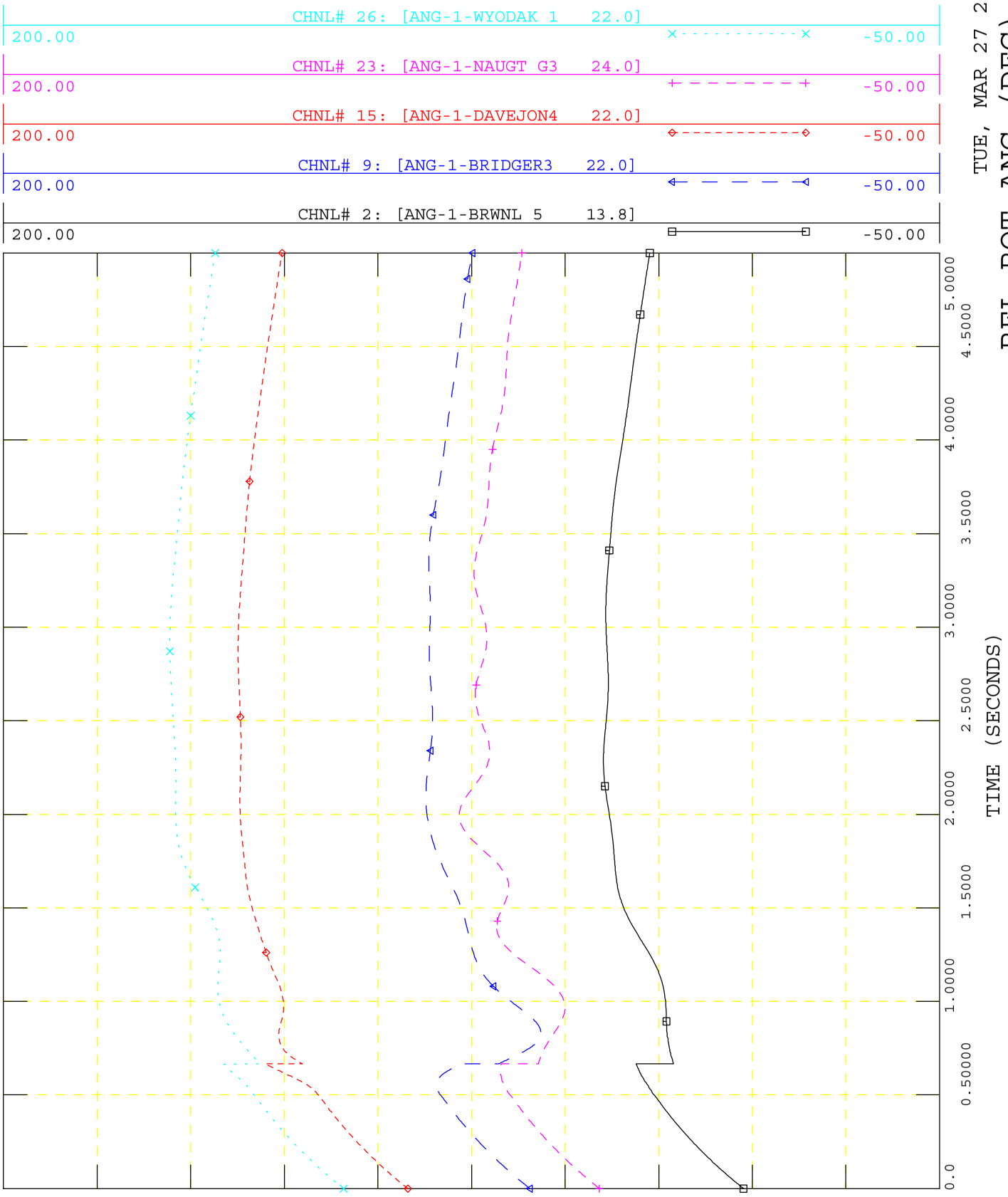
TUE, MAR 27 2018 21:27

REL ROT ANG (DEG) PLT 1



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS AEOLUS 230 FLT. 34CY-CLR FLT & OPEN AEOL 230/500
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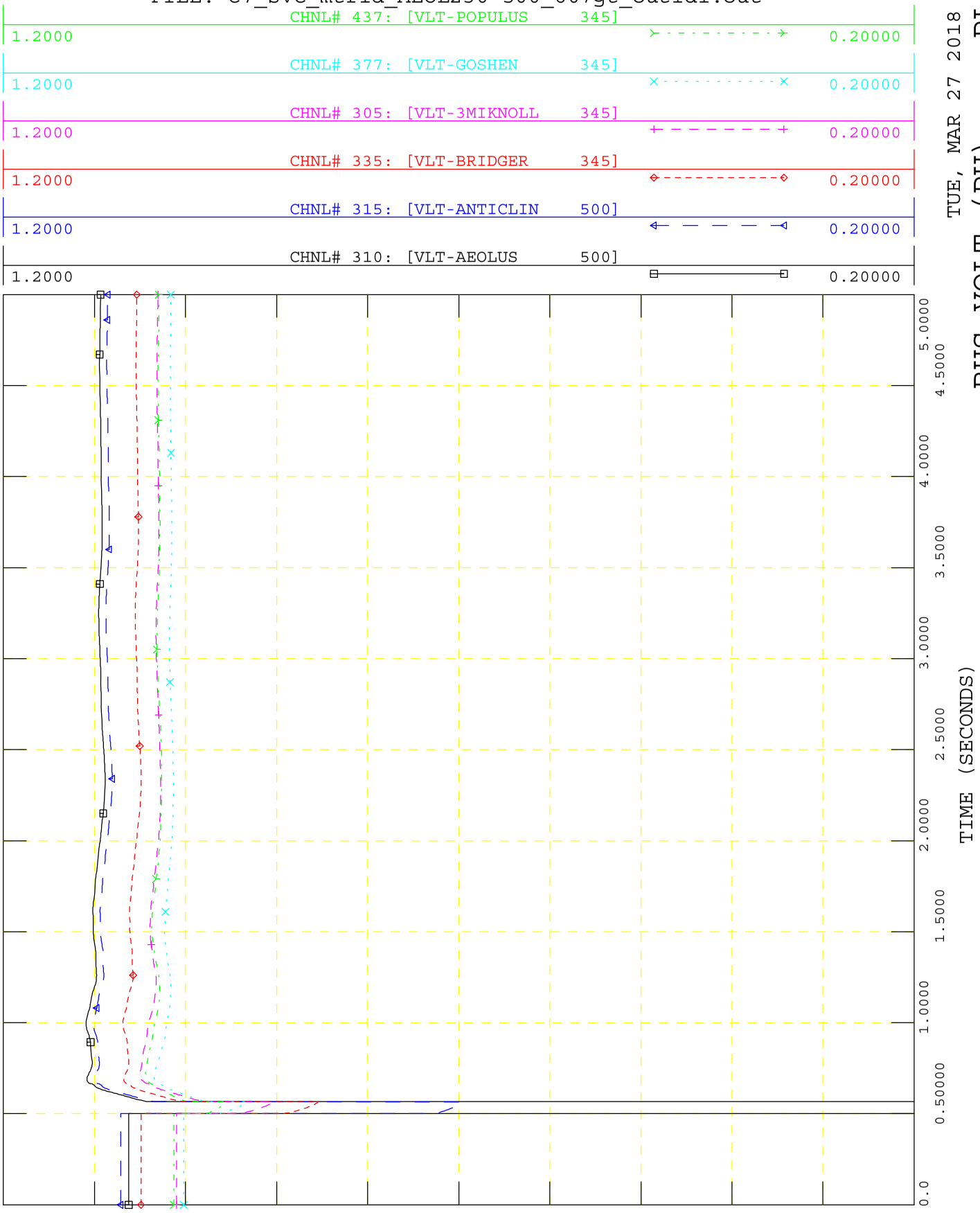

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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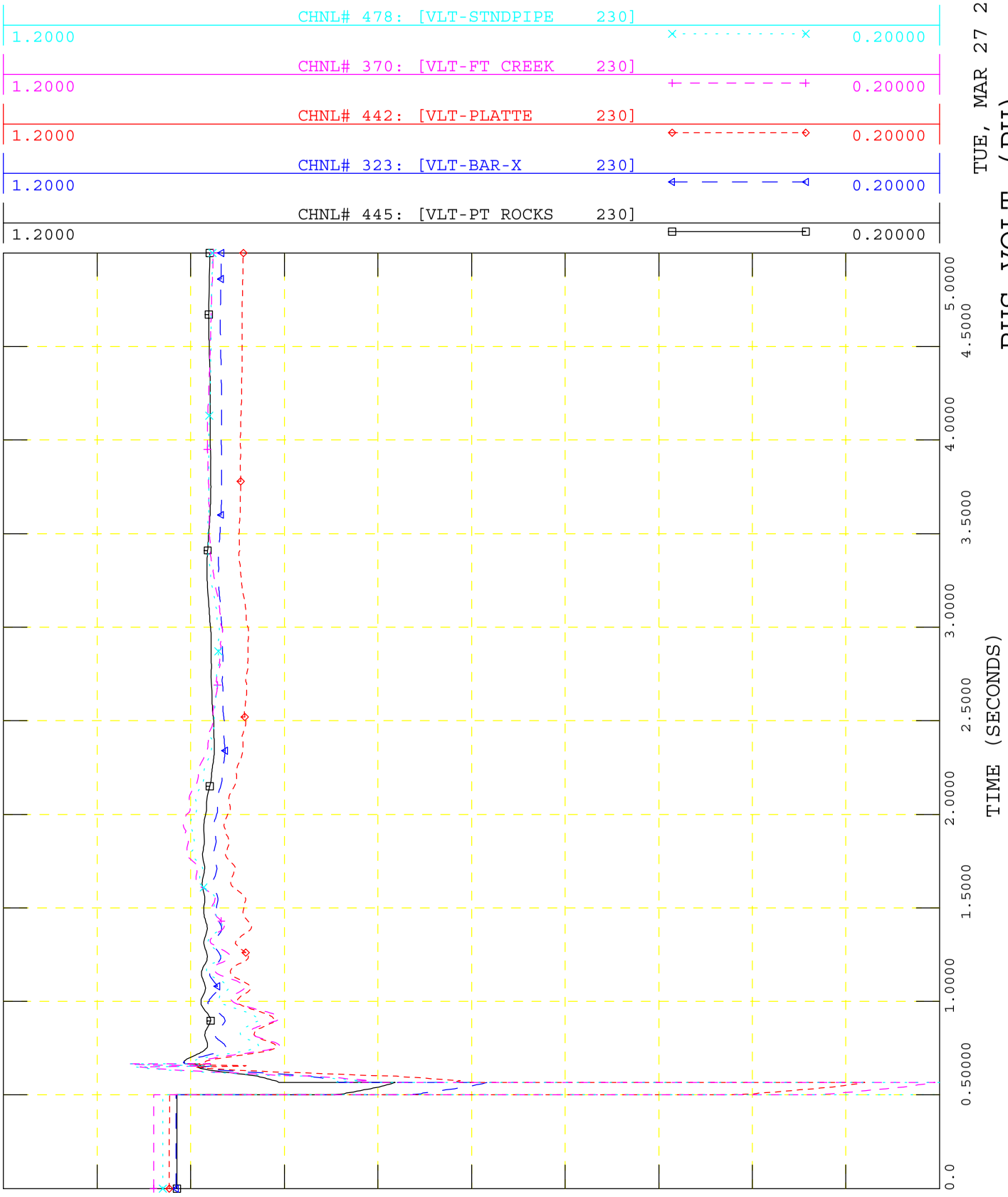

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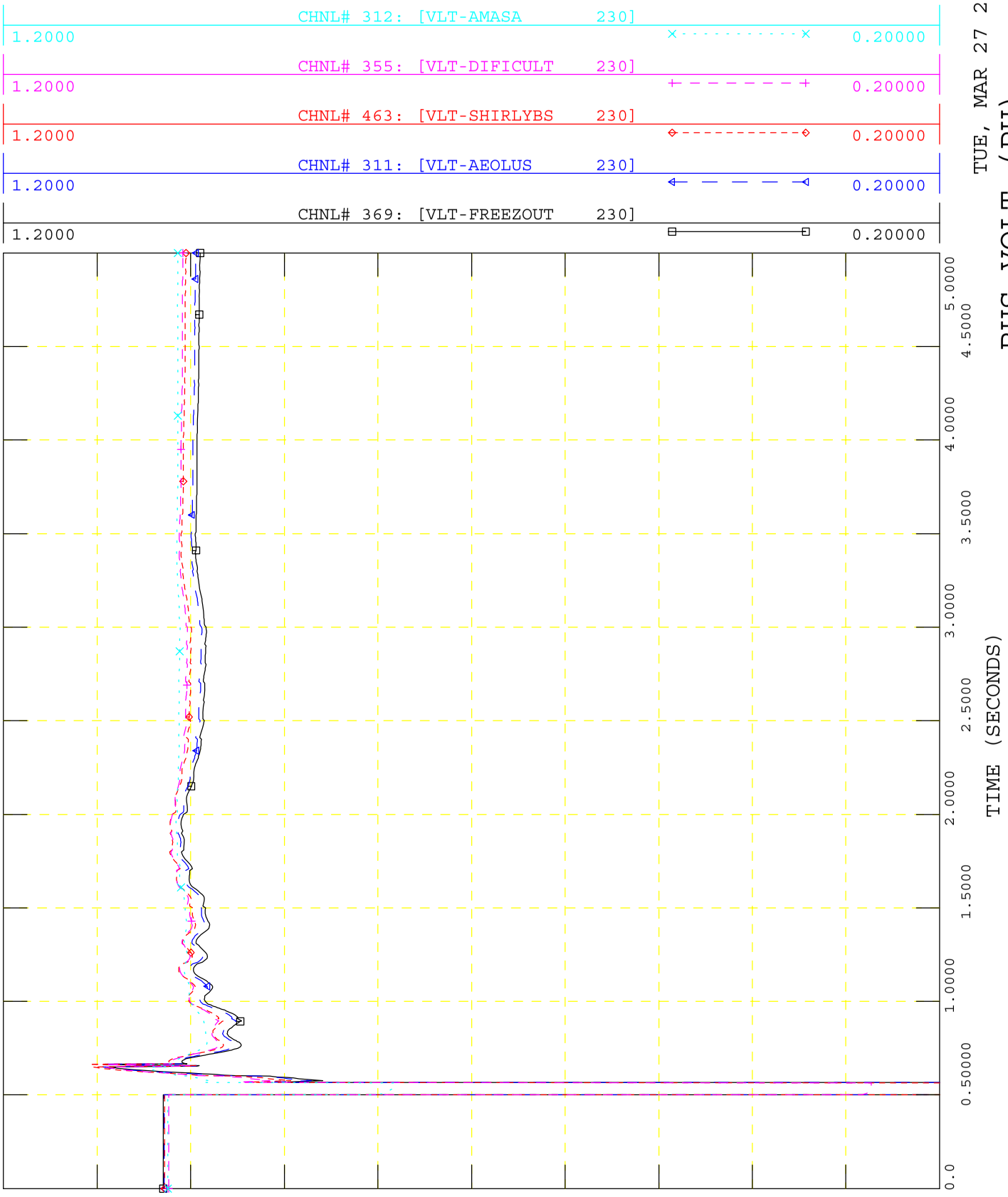

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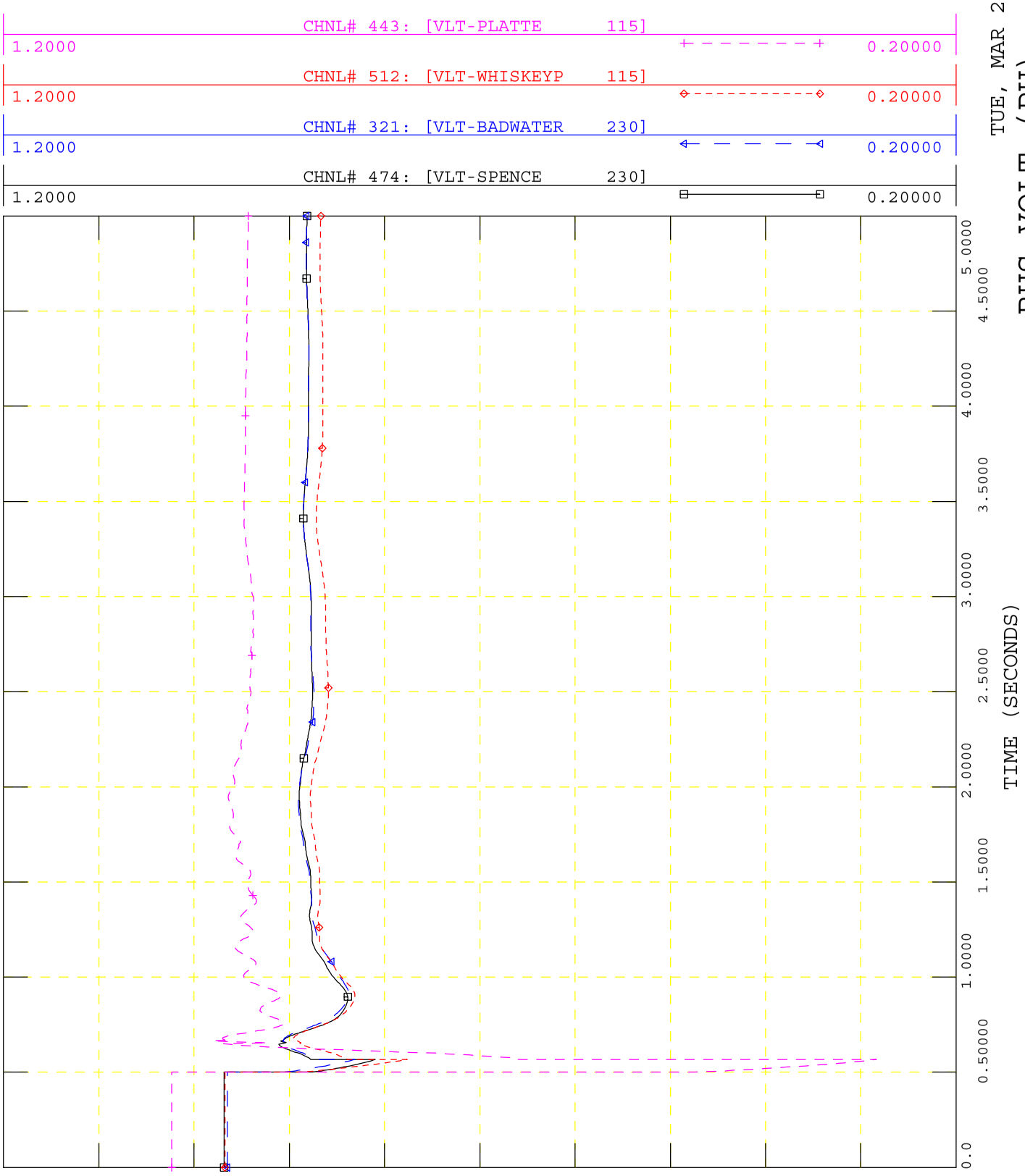

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30CY-3PHS AEOLUS 230 FLT. 34CY-CLR FLT & OPEN AEOL 230/500
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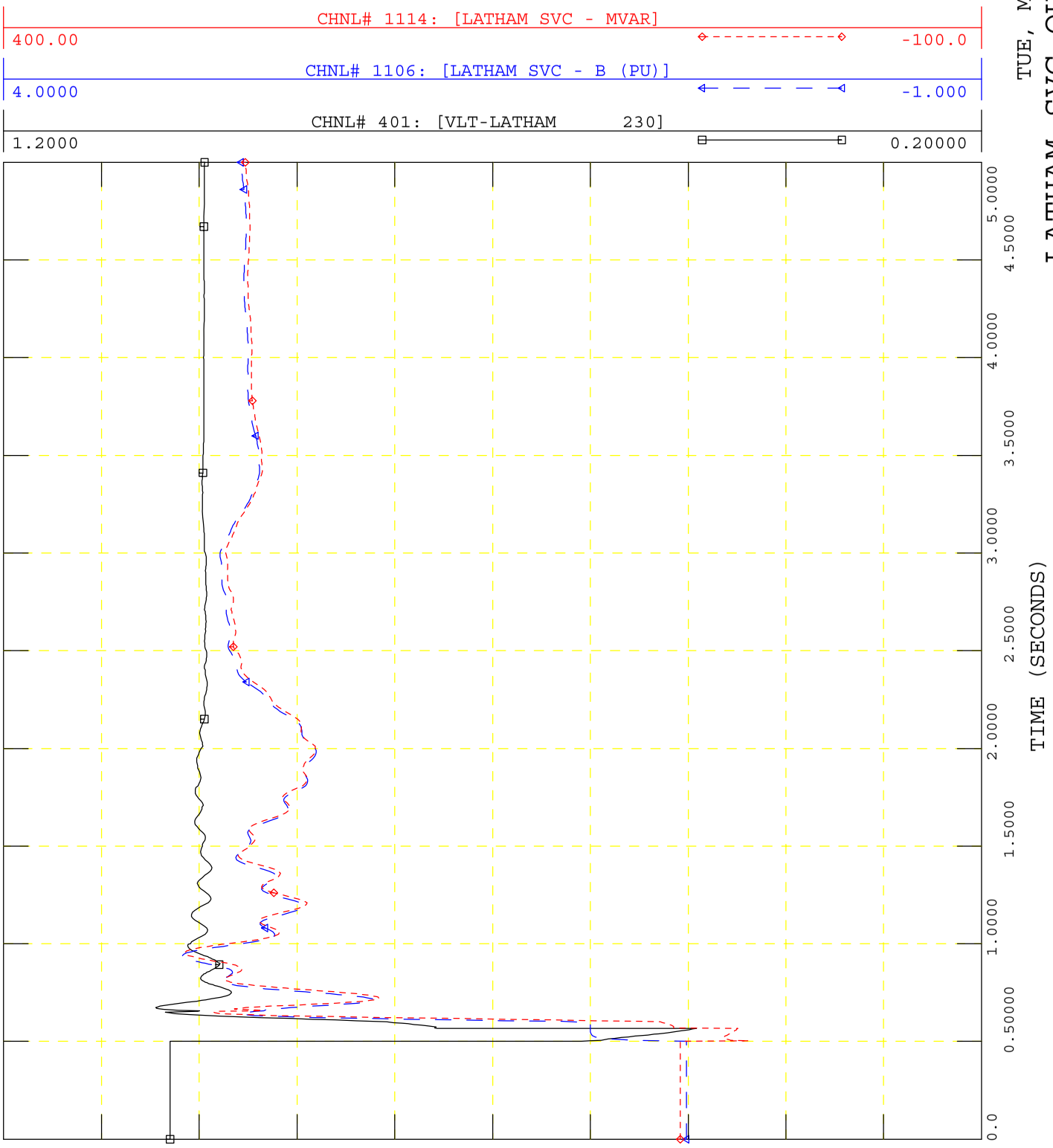
FILE: c7_svc_mtrld_AEOL230-500_607gt_out1d1.out

TUE, MAR 27 2018 21:27 PLT 6

LATHAM SVC OUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS AEOLUS 230 FLT. 34CY-CLR FLT & OPEN AEOL 230/500
XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1D1
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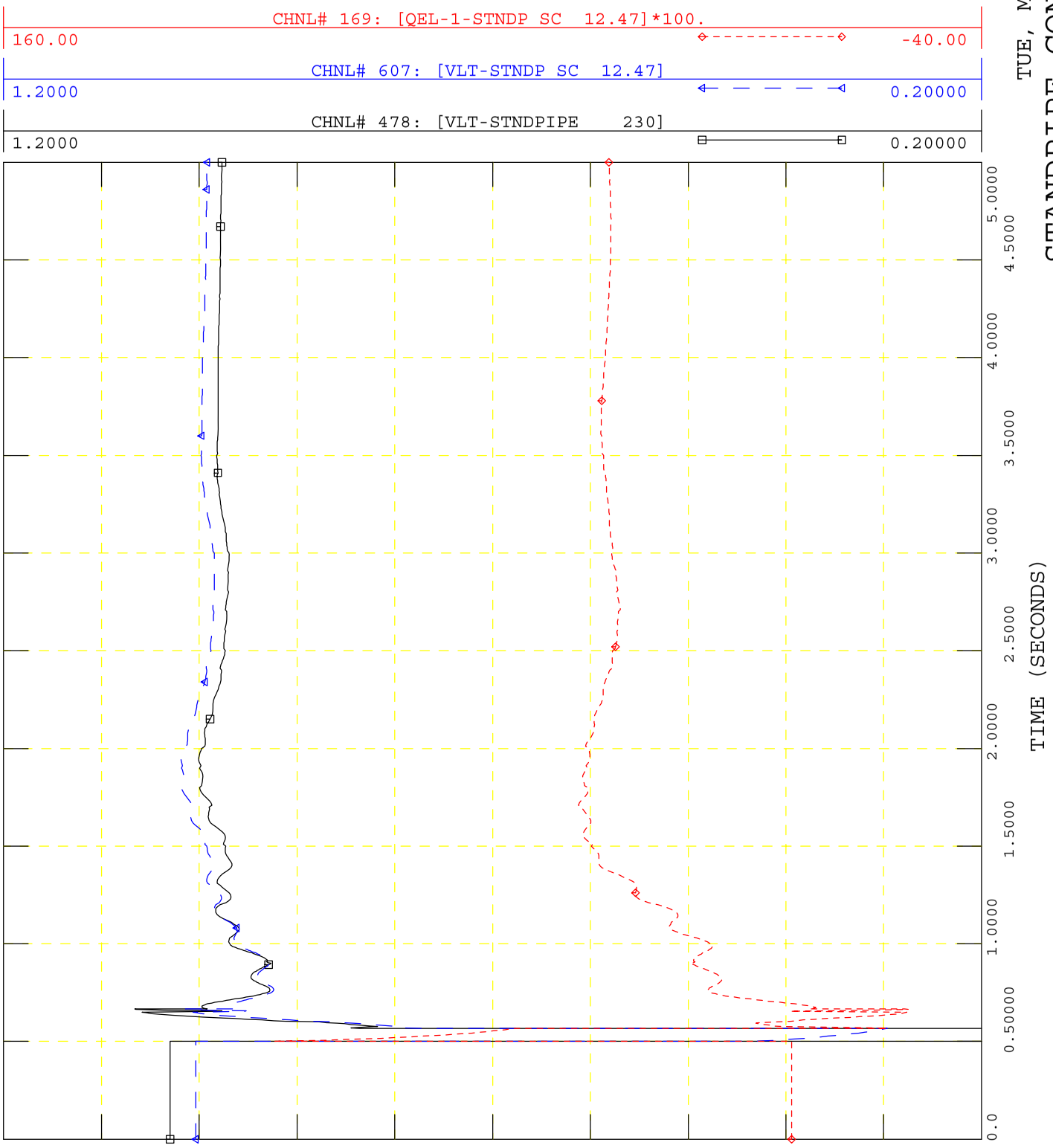
TUE, MAR 27 2018 21:27

STANDPIPE CONDNSR PLT 7



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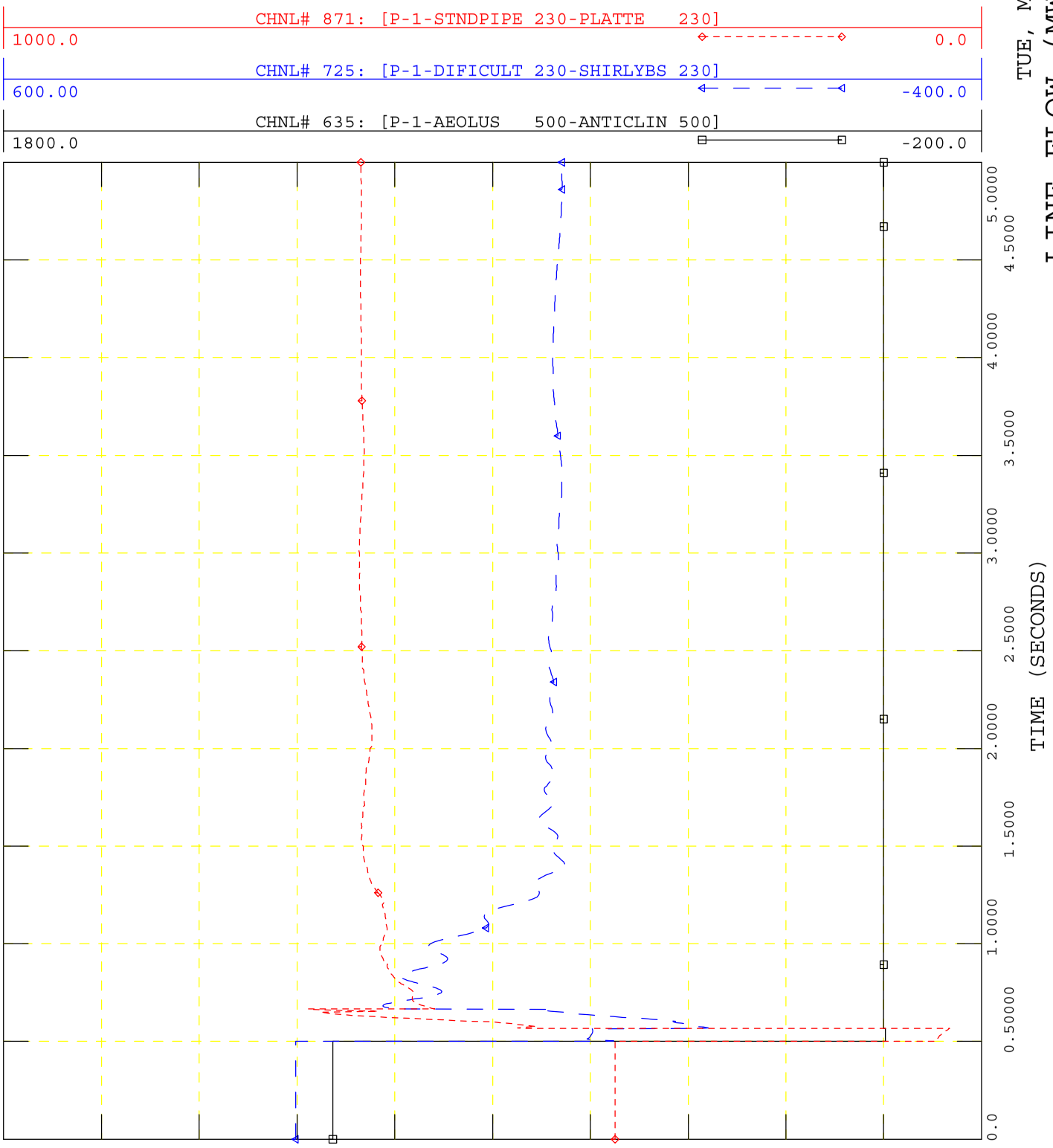
TUE, MAR 27 2018 21:27 PLT 8

LINE FLOW (MW)



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TUE, MAR 27 2018 21:27 PLT 9

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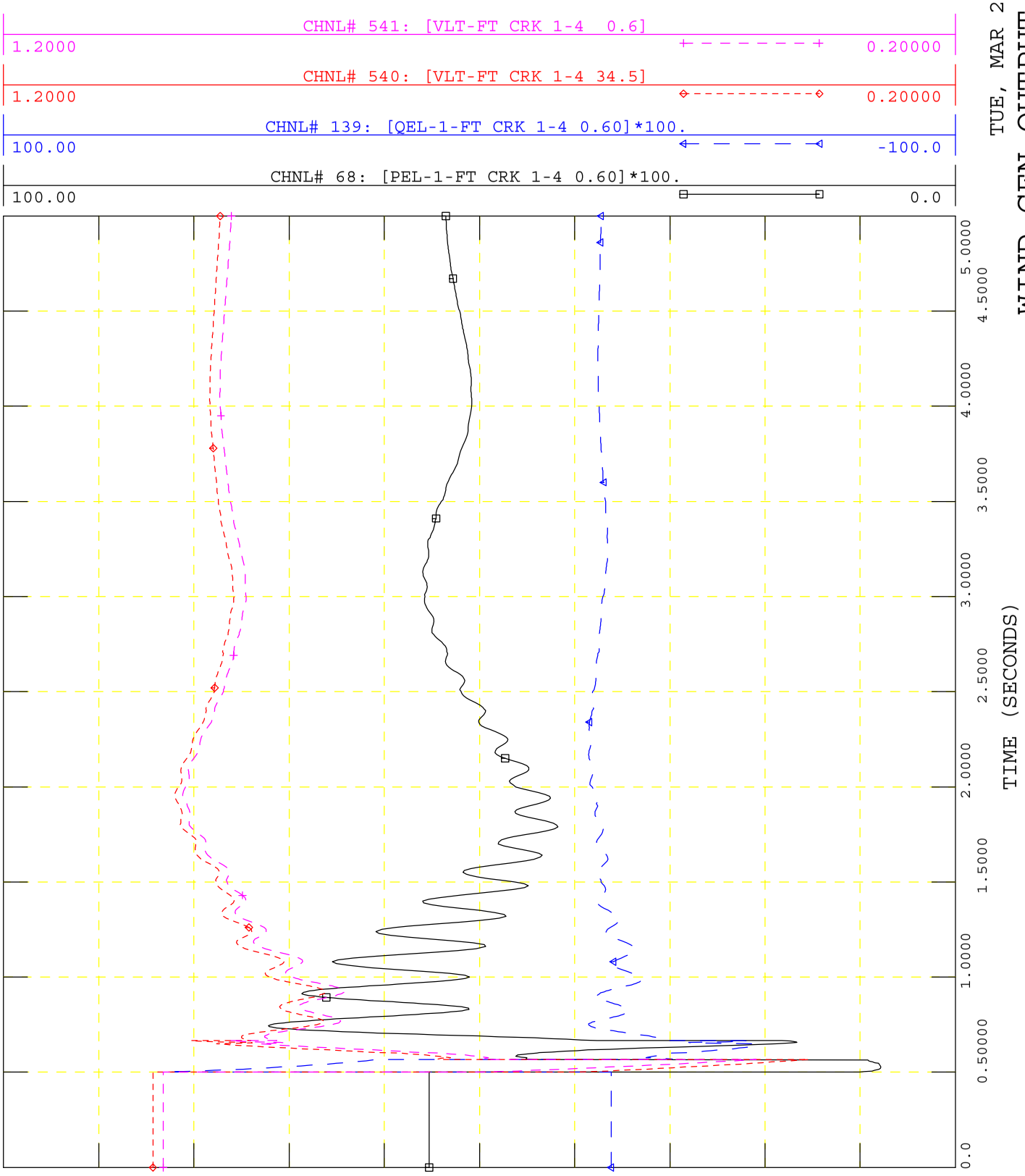

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TUE, MAR 27 2018 21:27 PLT 10

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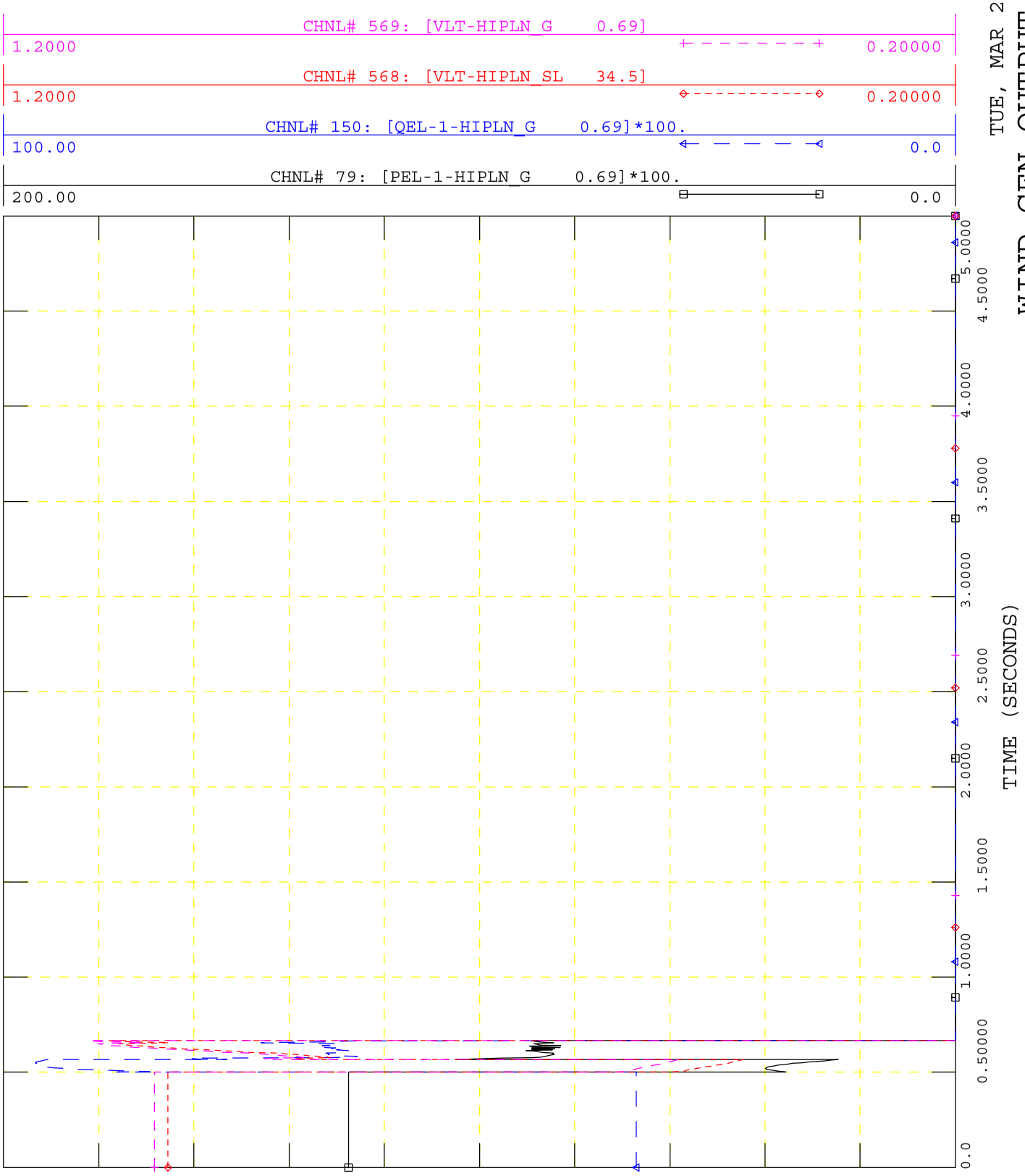

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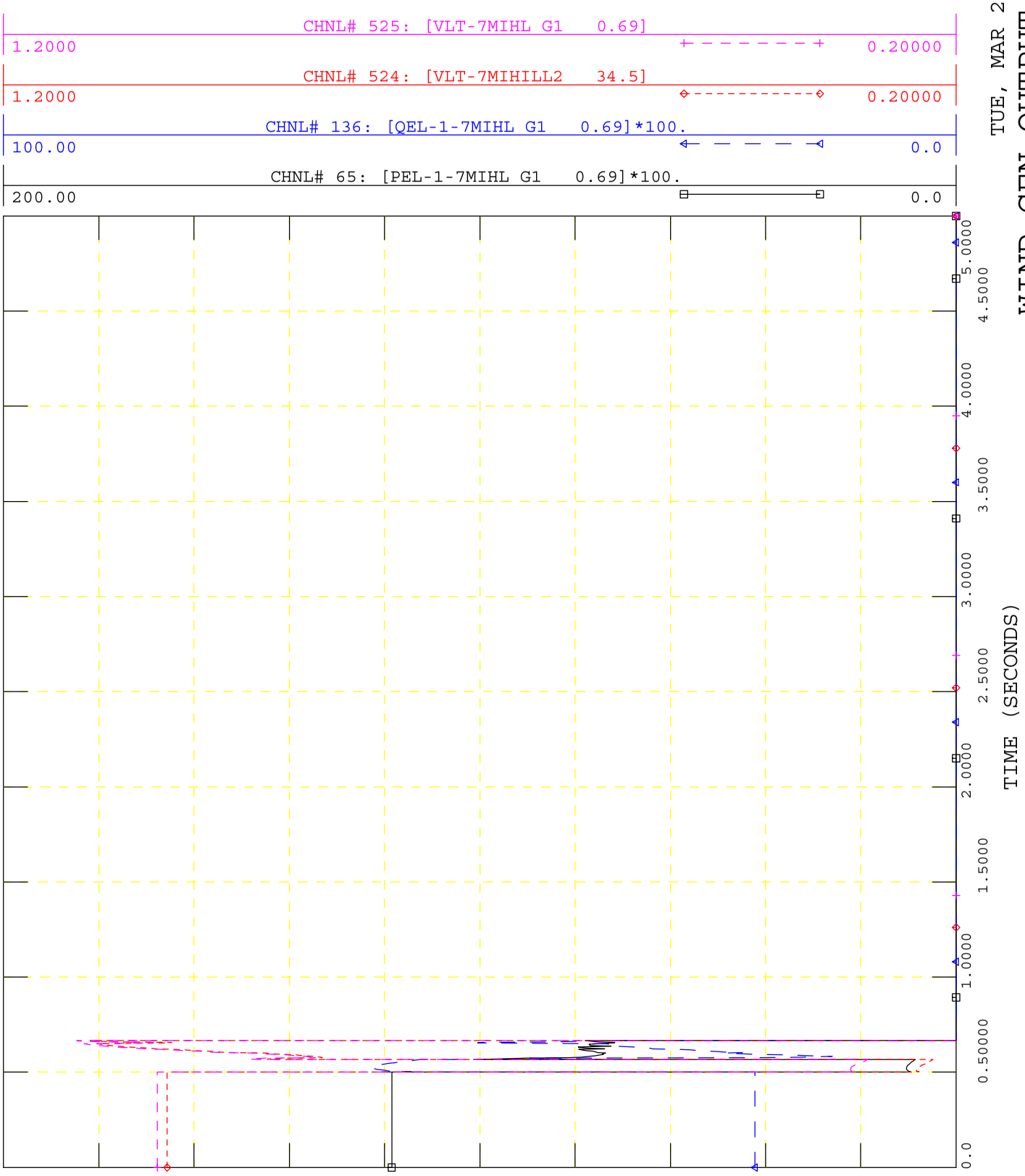
TUE, MAR 27 2018 21:27

WIND GEN OUTPUT PLT 11



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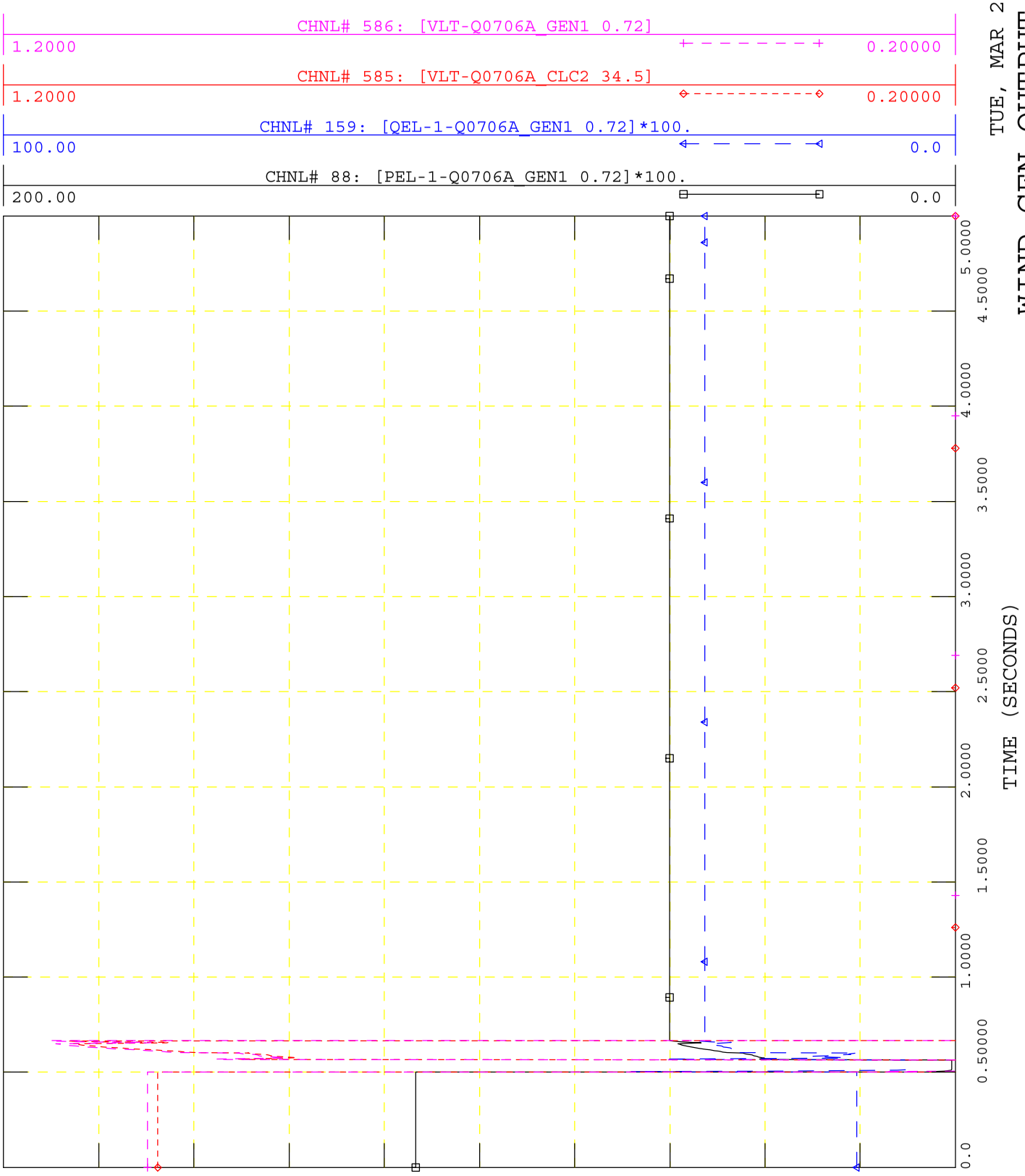

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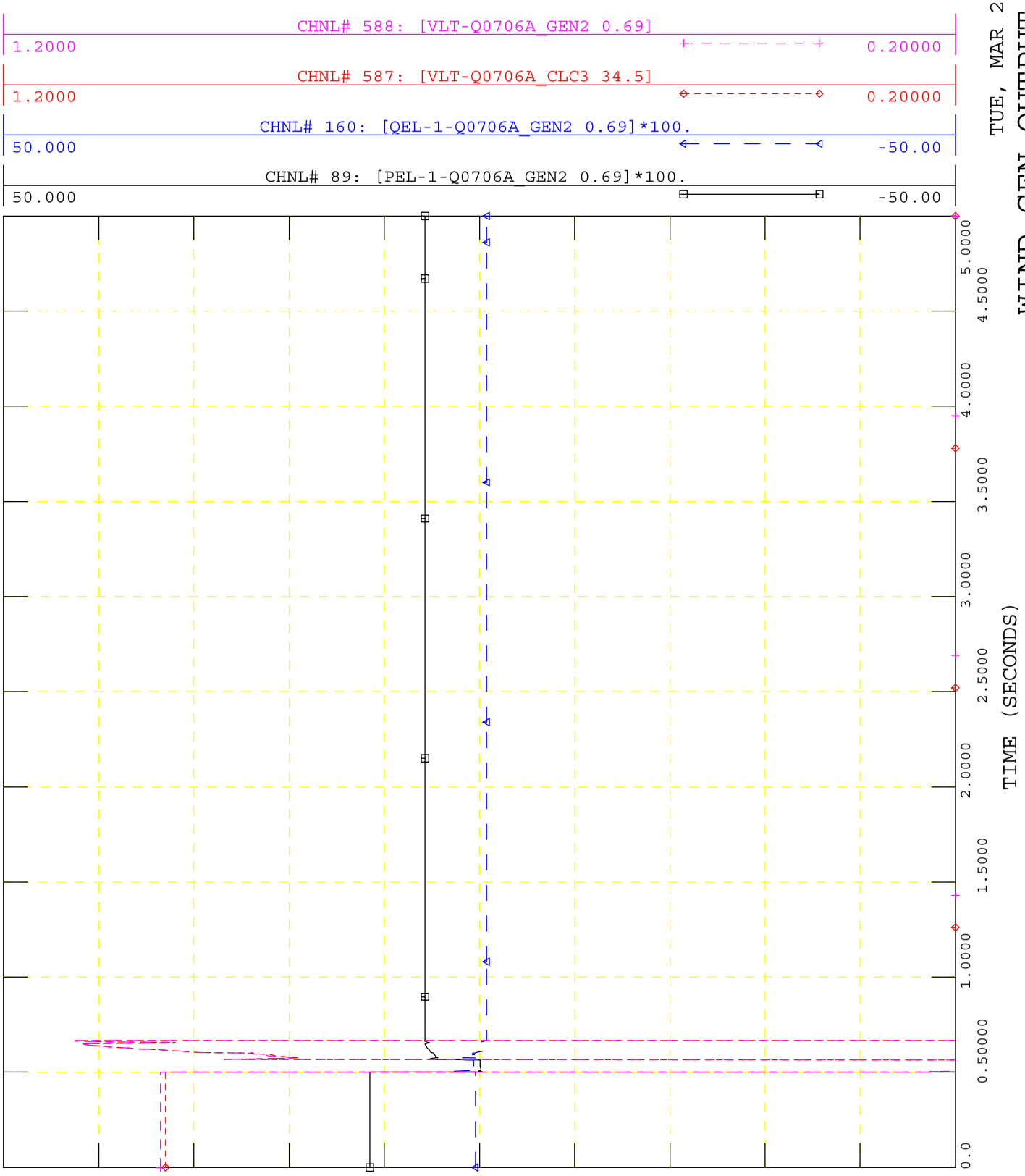
TUE, MAR 27 2018 21:27 PLT 13

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:27 PLT 14

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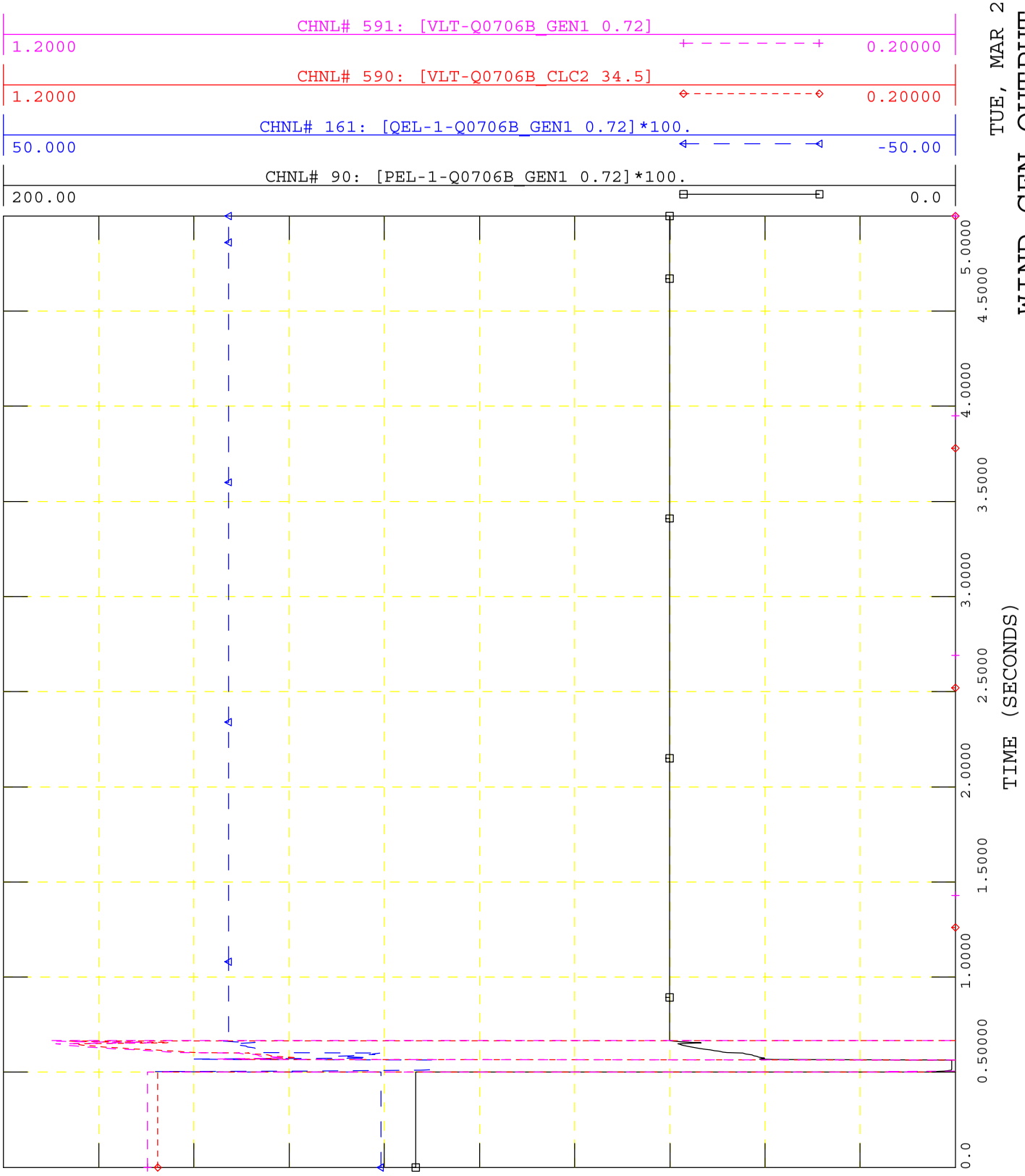

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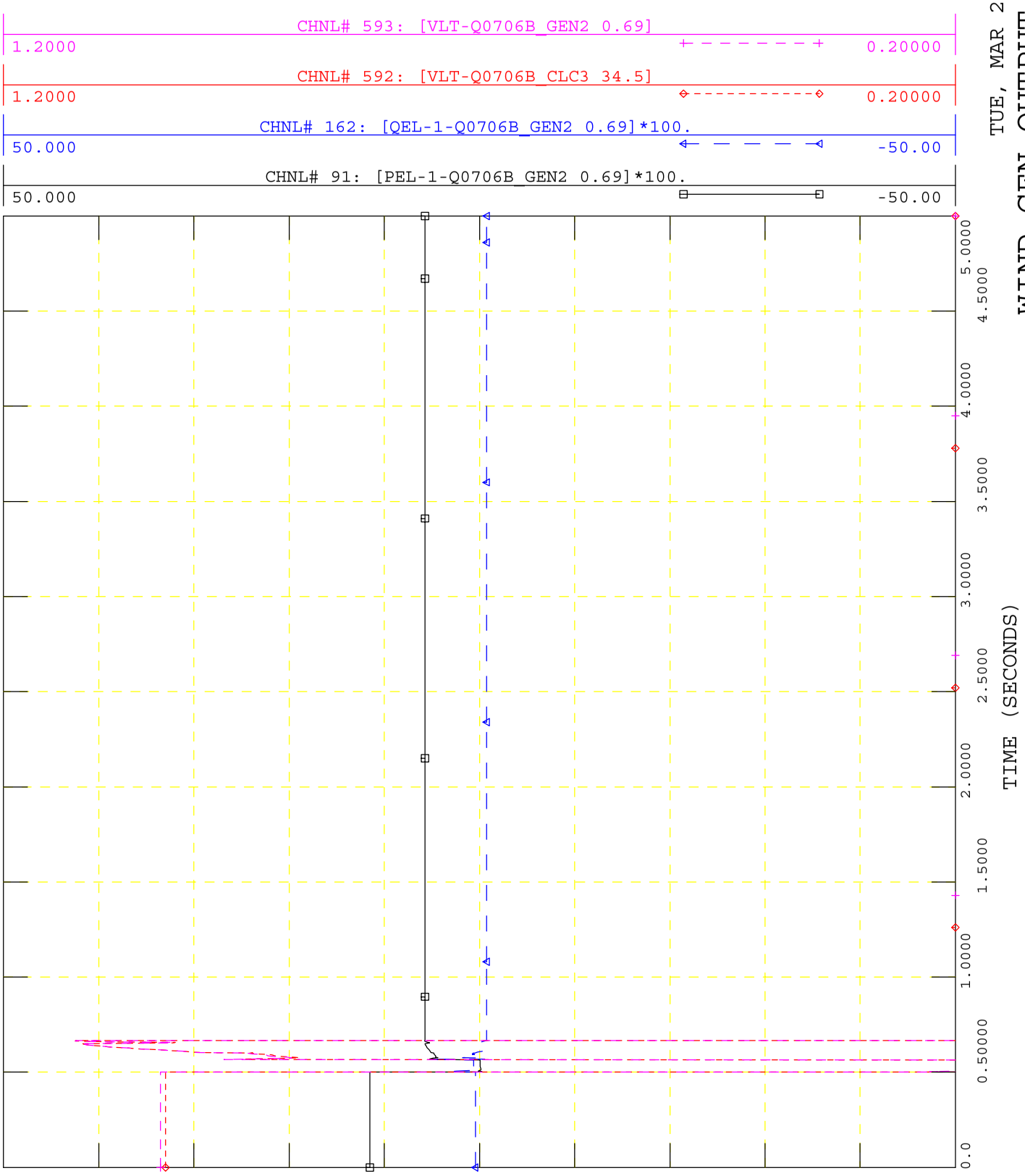

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TUE, MAR 27 2018 21:27 PLT 16

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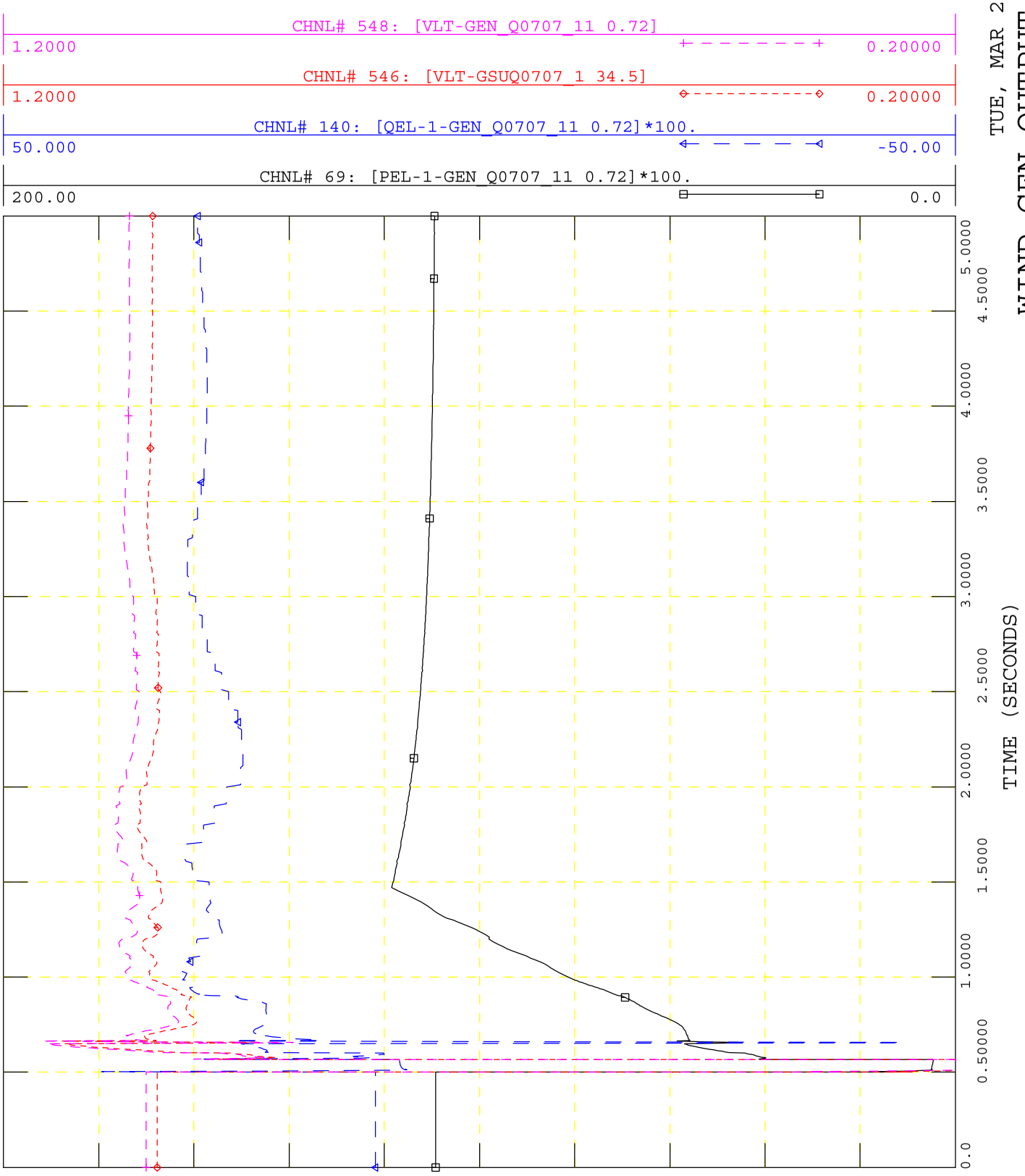

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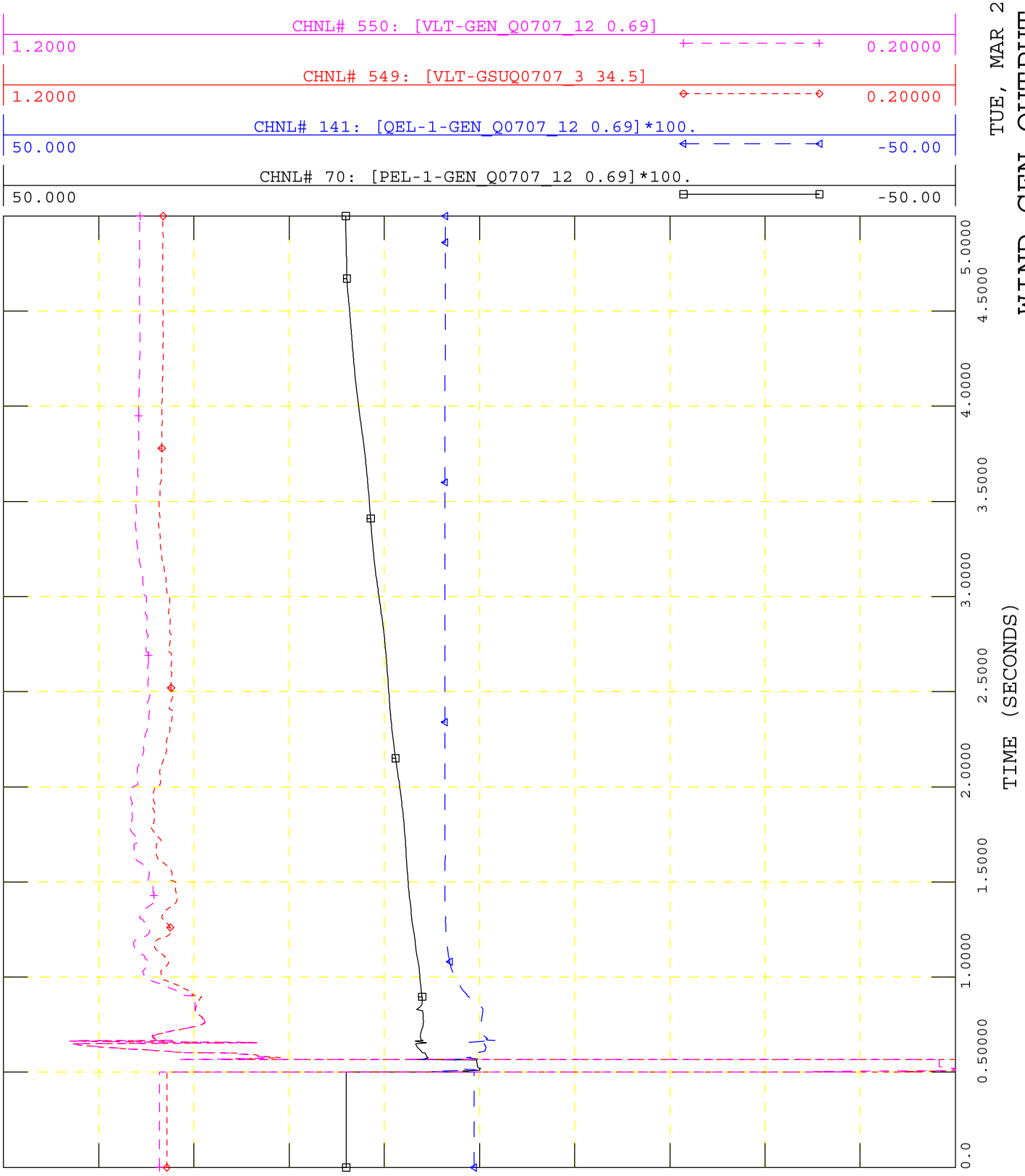
TUE, MAR 27 2018 21:27 PLT 17

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:27 PLT 18

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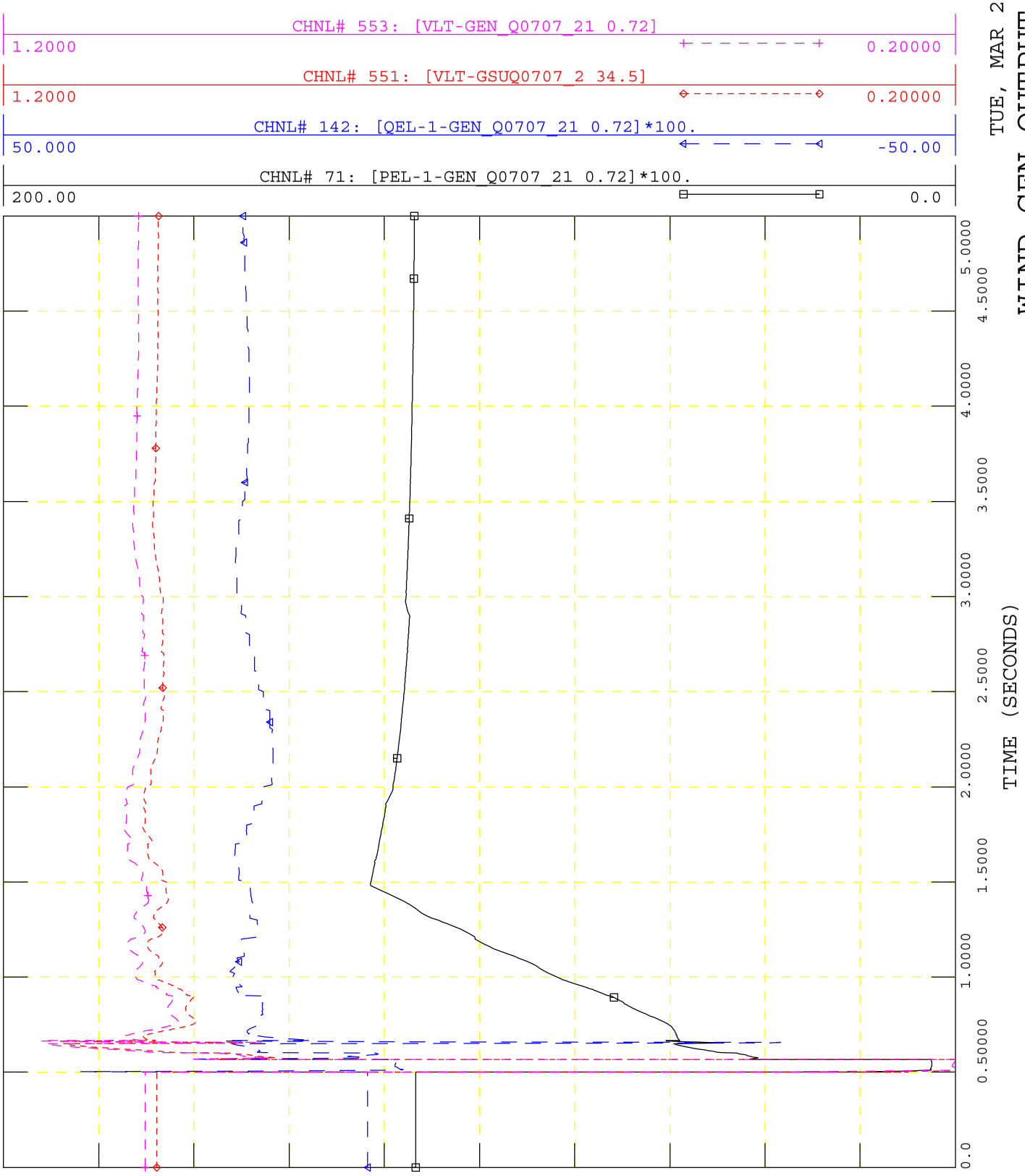

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TUE, MAR 27 2018 21:27 PLT 19

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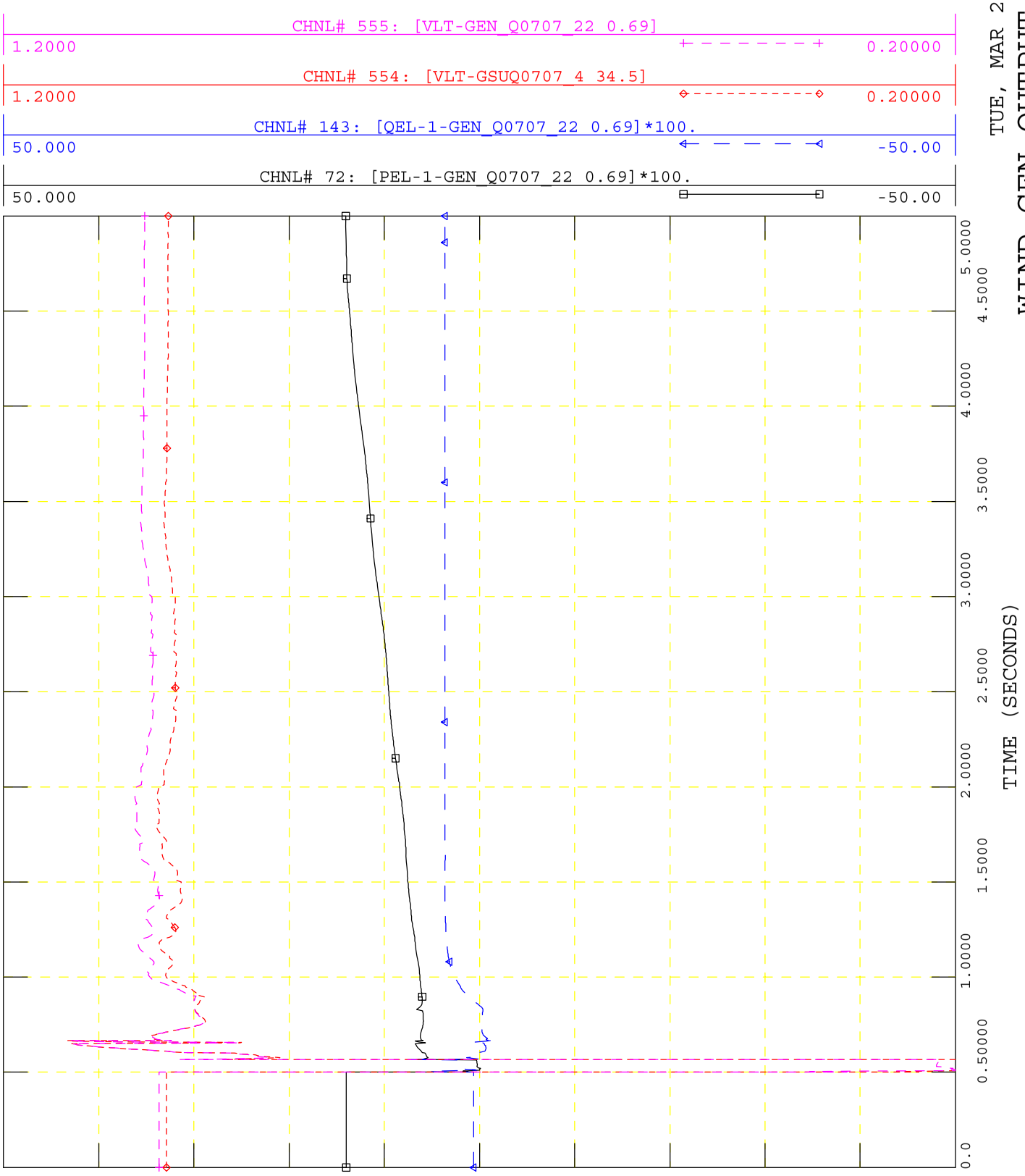

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TUE, MAR 27 2018 21:27 PLT 20

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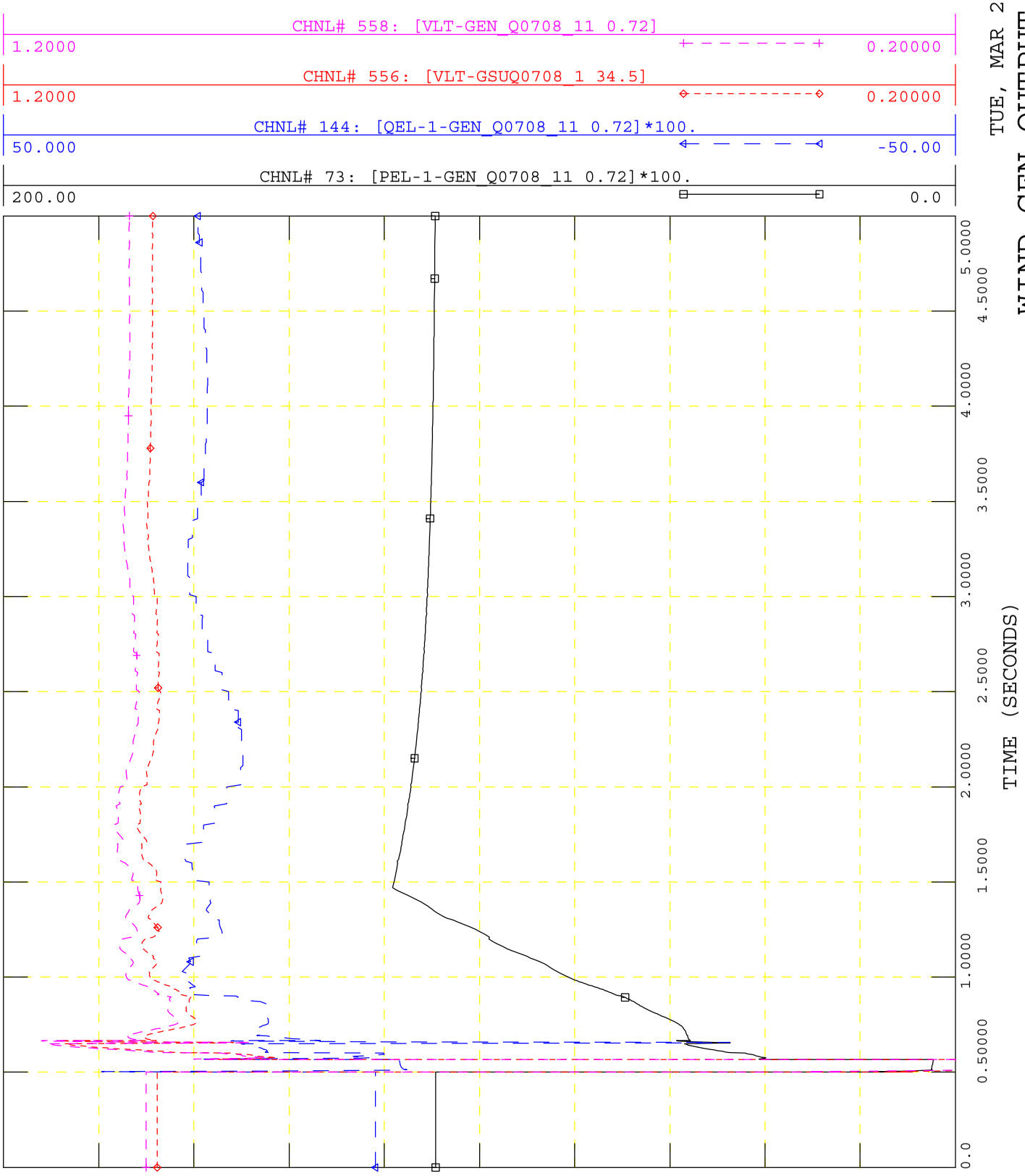

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TUE, MAR 27 2018 21:27 PLT 21

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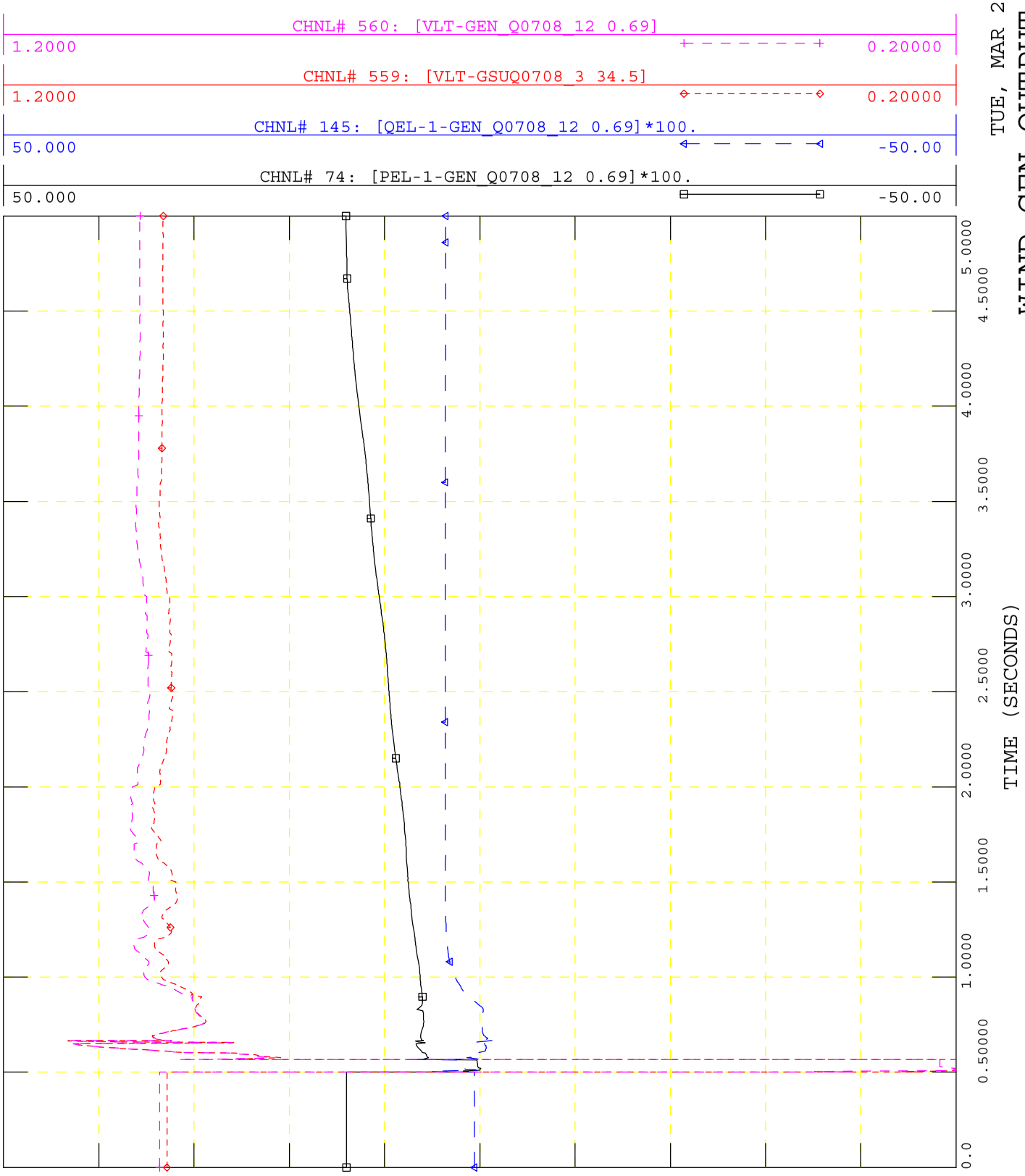

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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TUE, MAR 27 2018 21:27 PLT 22

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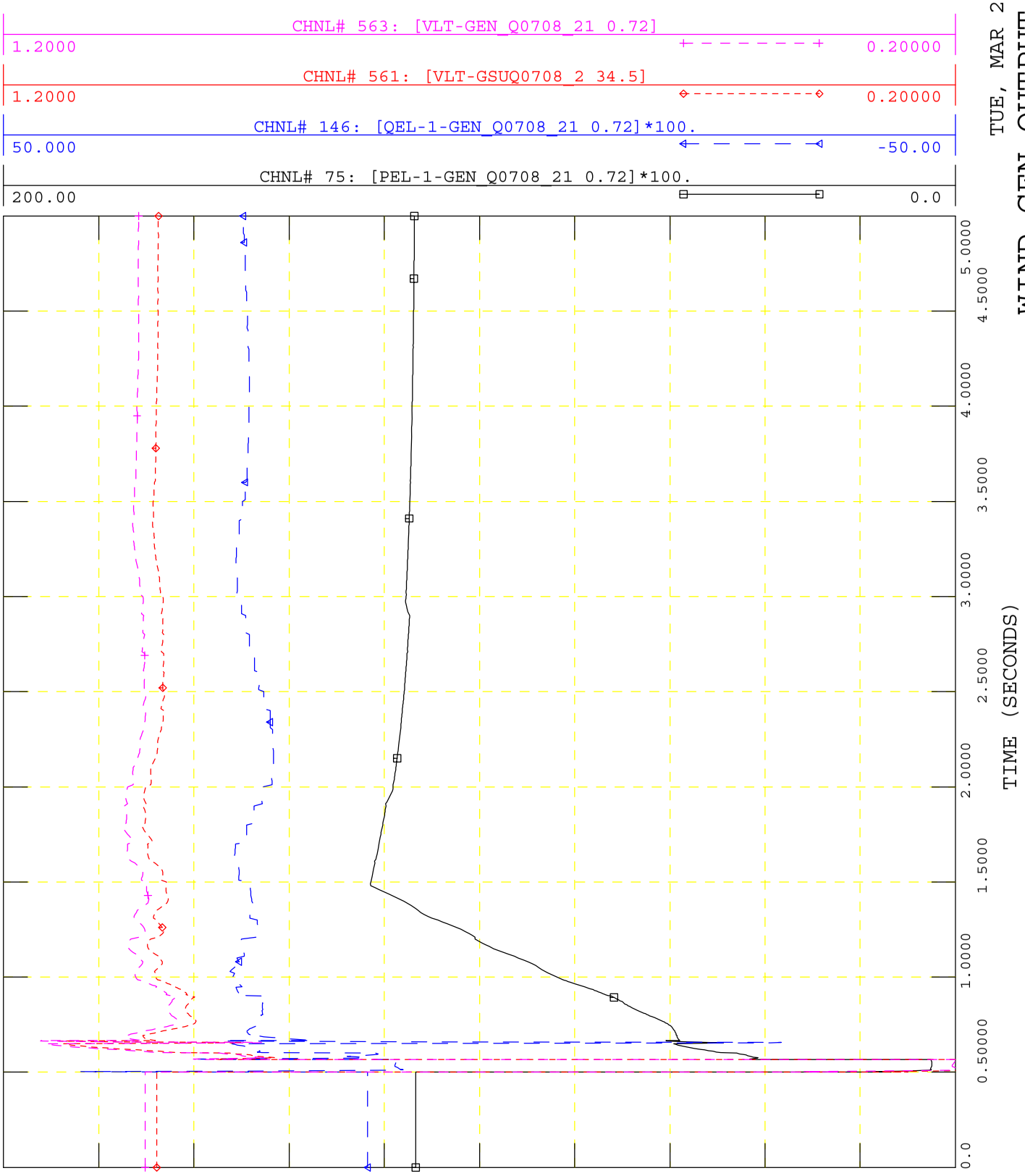

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TUE, MAR 27 2018 21:27 PLT 23

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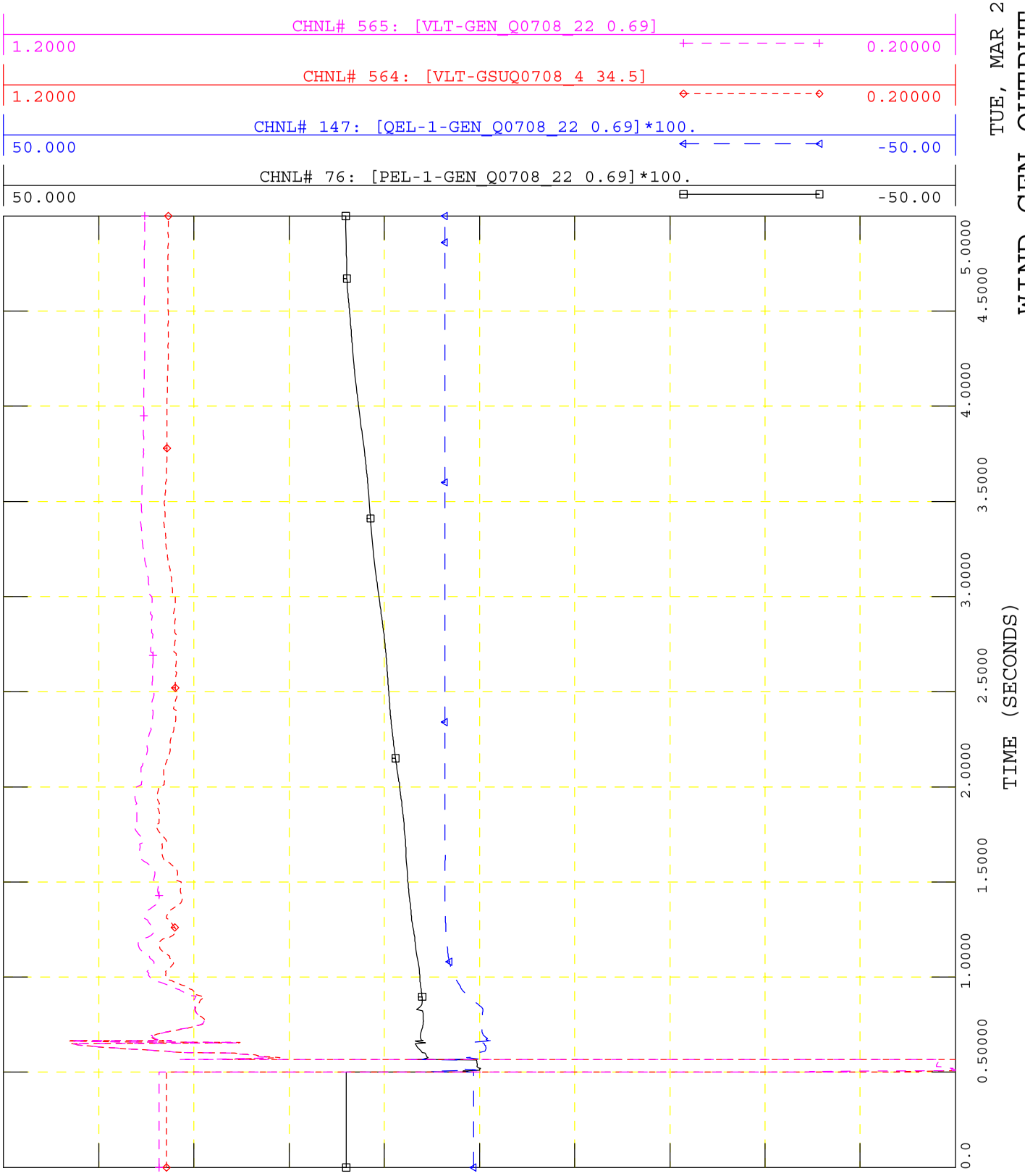

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TUE, MAR 27 2018 21:27 PLT 24

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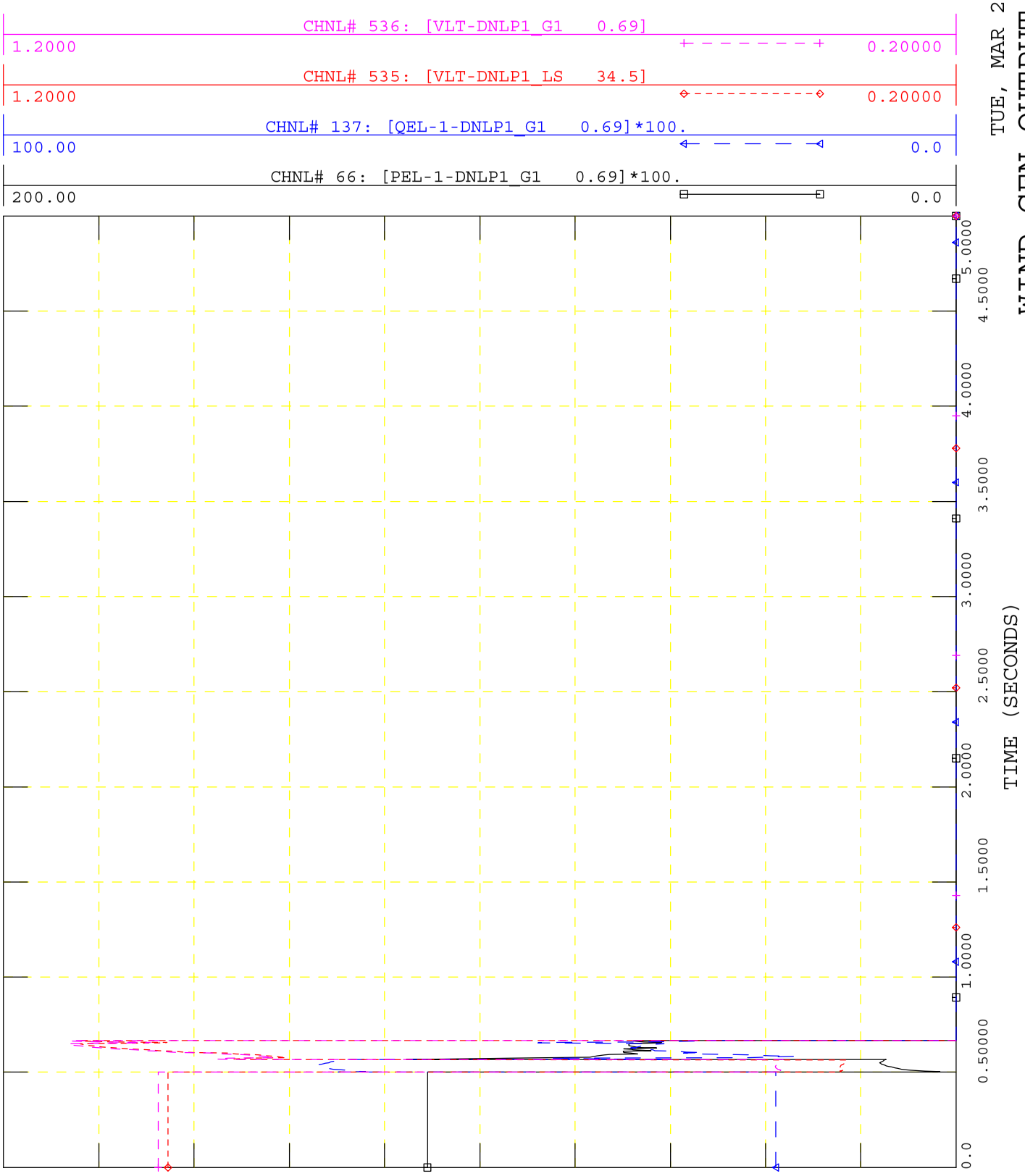

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TUE, MAR 27 2018 21:27 PLT 25

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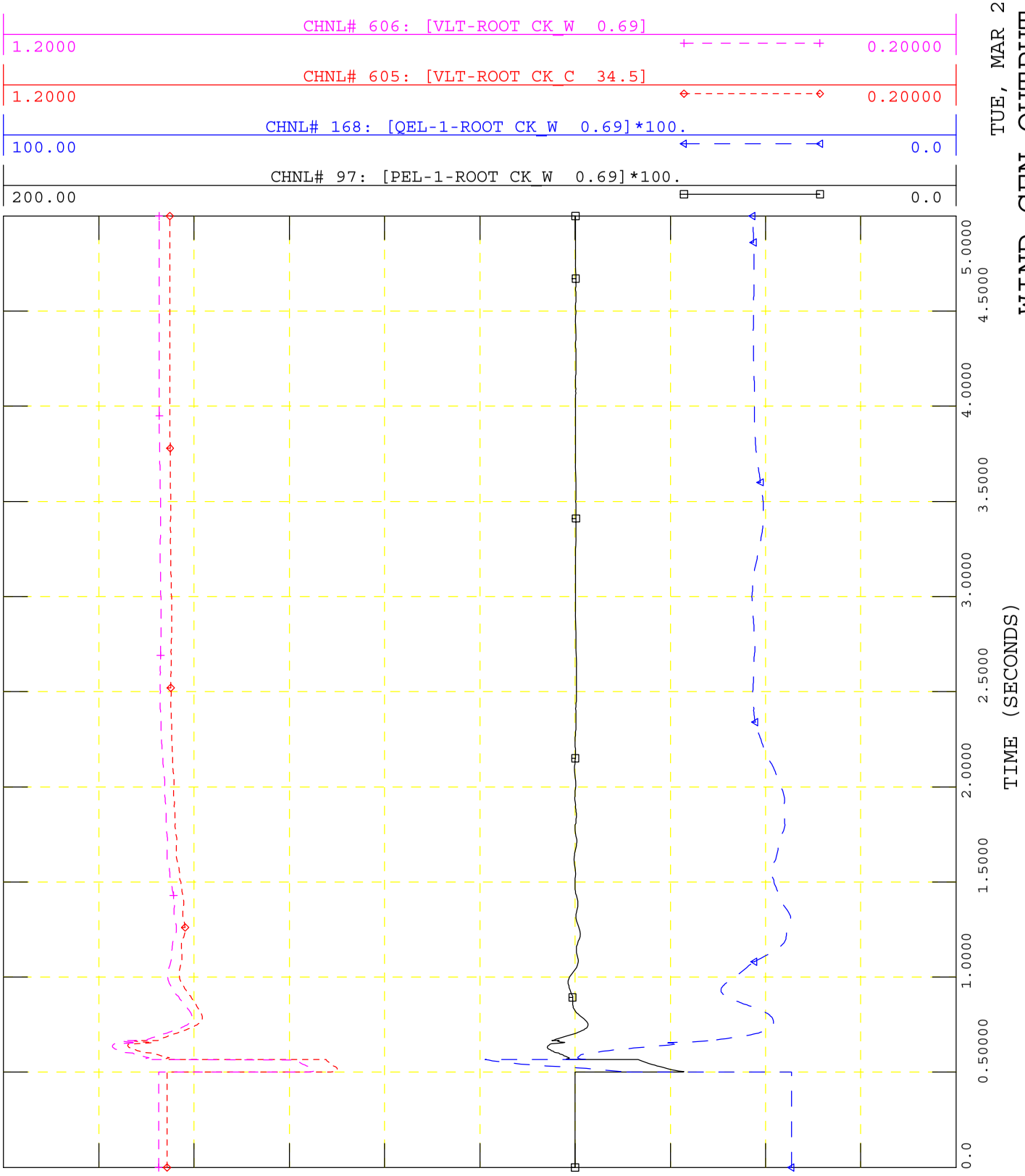

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TUE, MAR 27 2018 21:27 PLT 26

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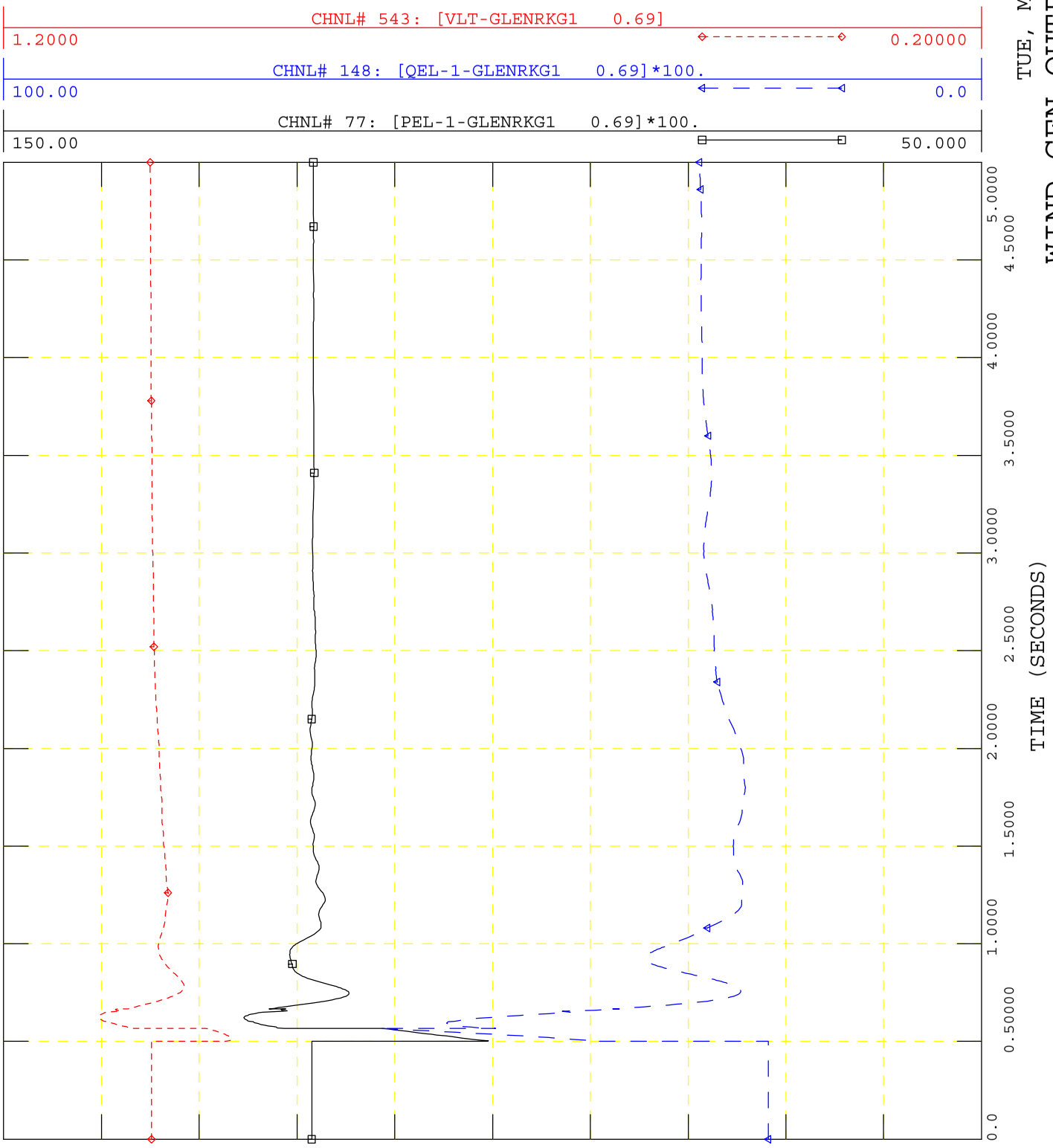

Dynamic Simulation

Case 1d2 – Loss of Aeolus 230/500 kV transformer with 628 MW generator tripping

30 cycles	**3 phase Aeolus 230 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Aeolus 230/500 kV transformer, trip 200 MVAR shunt capacitors at Aeolus and Anticline 500 kV subs**
36 cycles	**Remove SVC MVAR limiter**
40 cycles	**Trip High Plains wind generation (127.5 MW)** **Trip Q0706 A&B (Ekola Flats) wind generation (249.8 MW)** **Trip Q0707 1&2 (TB Flats 1) wind generation (250.6 MW)**
5 sec.	**Terminate simulation**

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XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 628 MW WND GEN. OUTAGE 1D2
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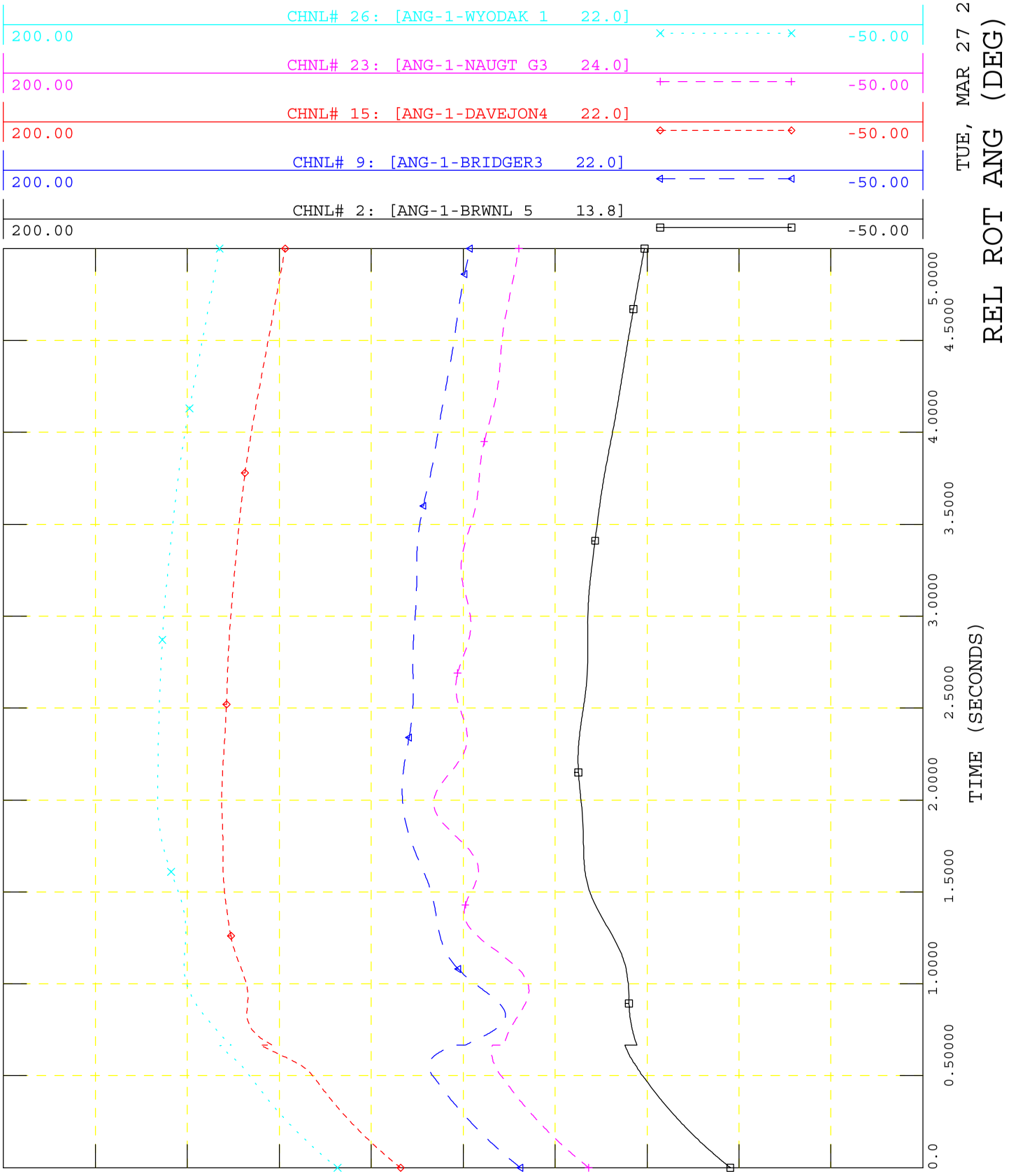

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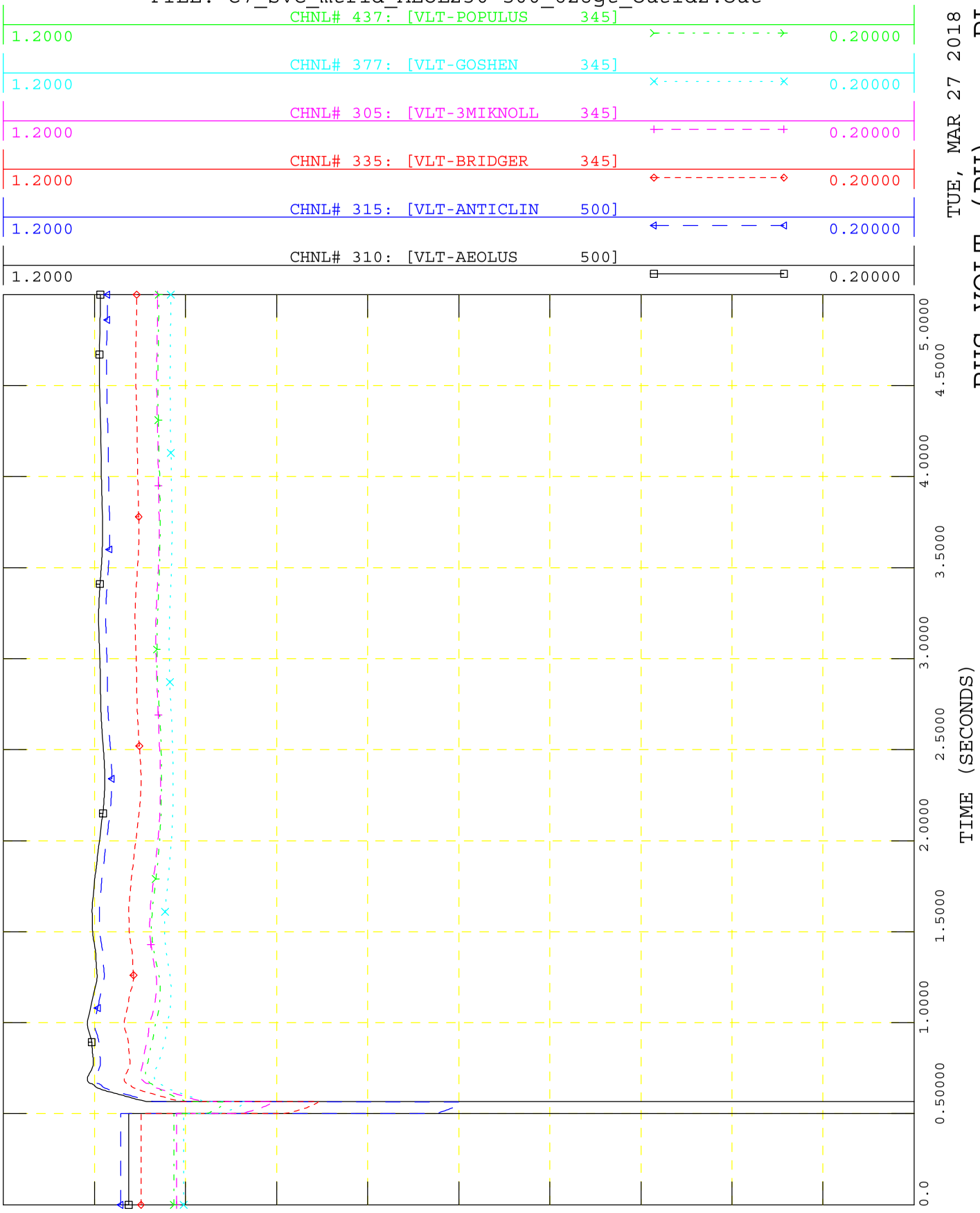

BUS VOLT (PU)

TUE, MAR 27 2018 21:27

PLT 2

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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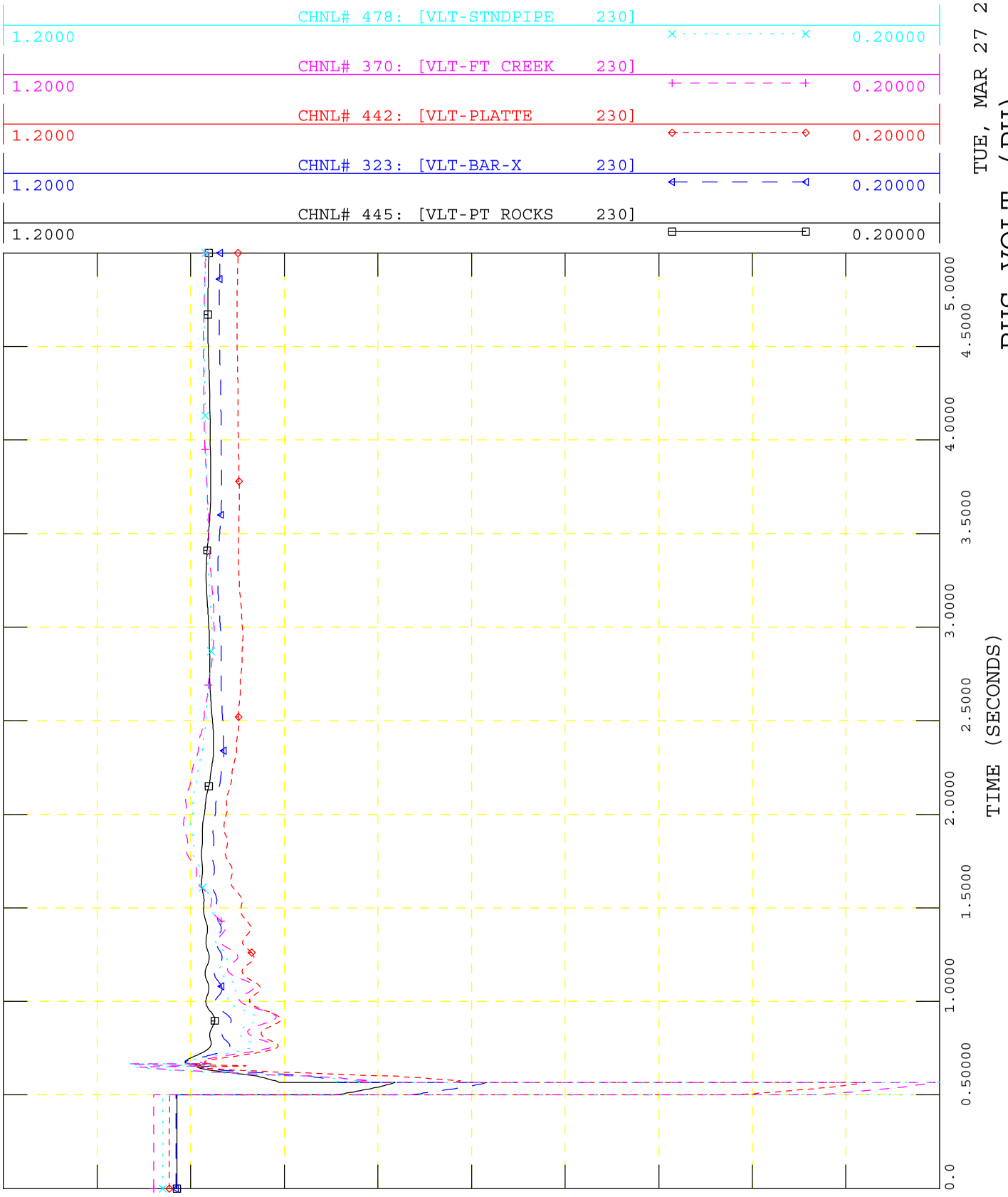
TUE, MAR 27 2018 21:27 PLT 3



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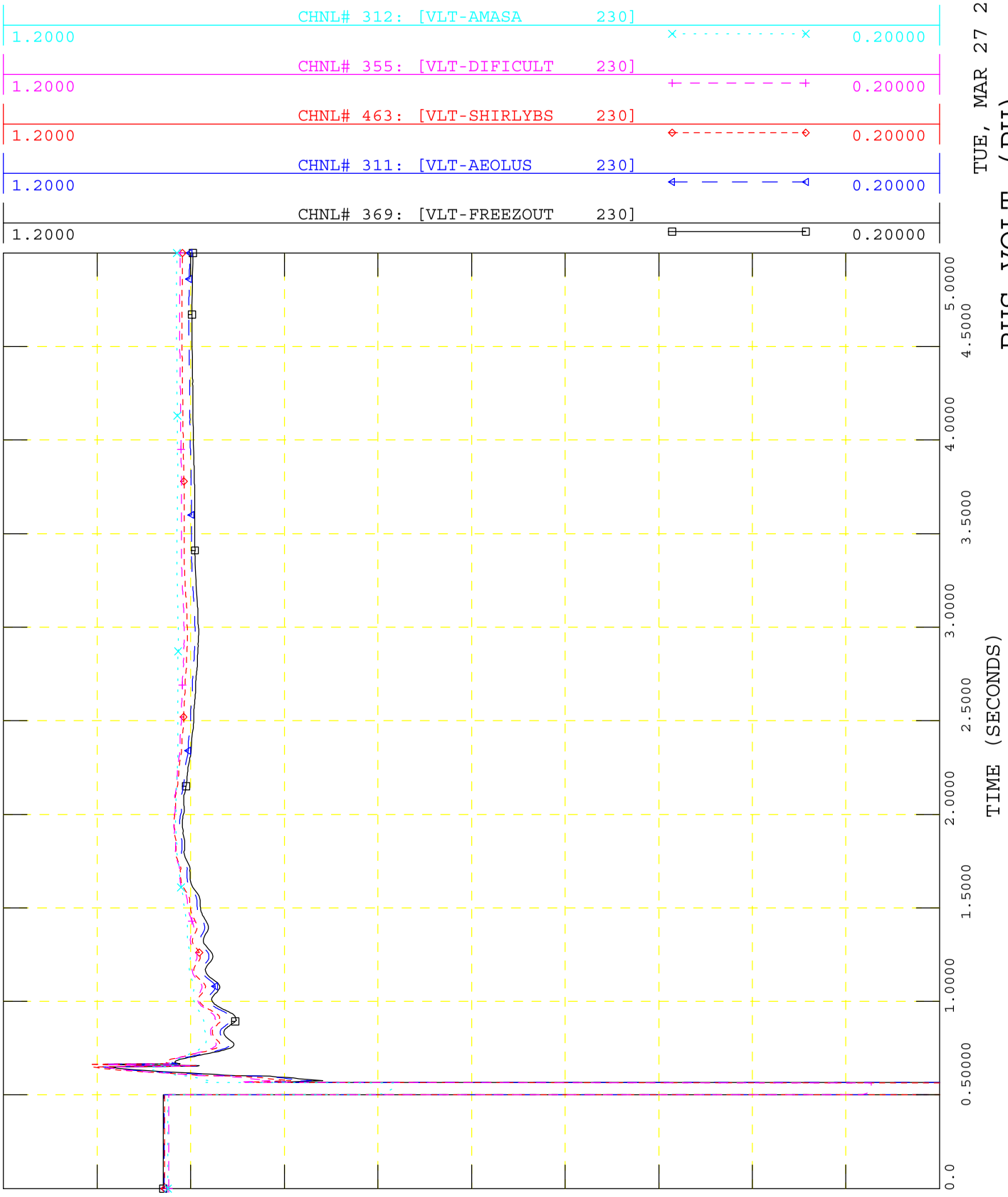
TUE, MAR 27 2018 21:27 PLT 4



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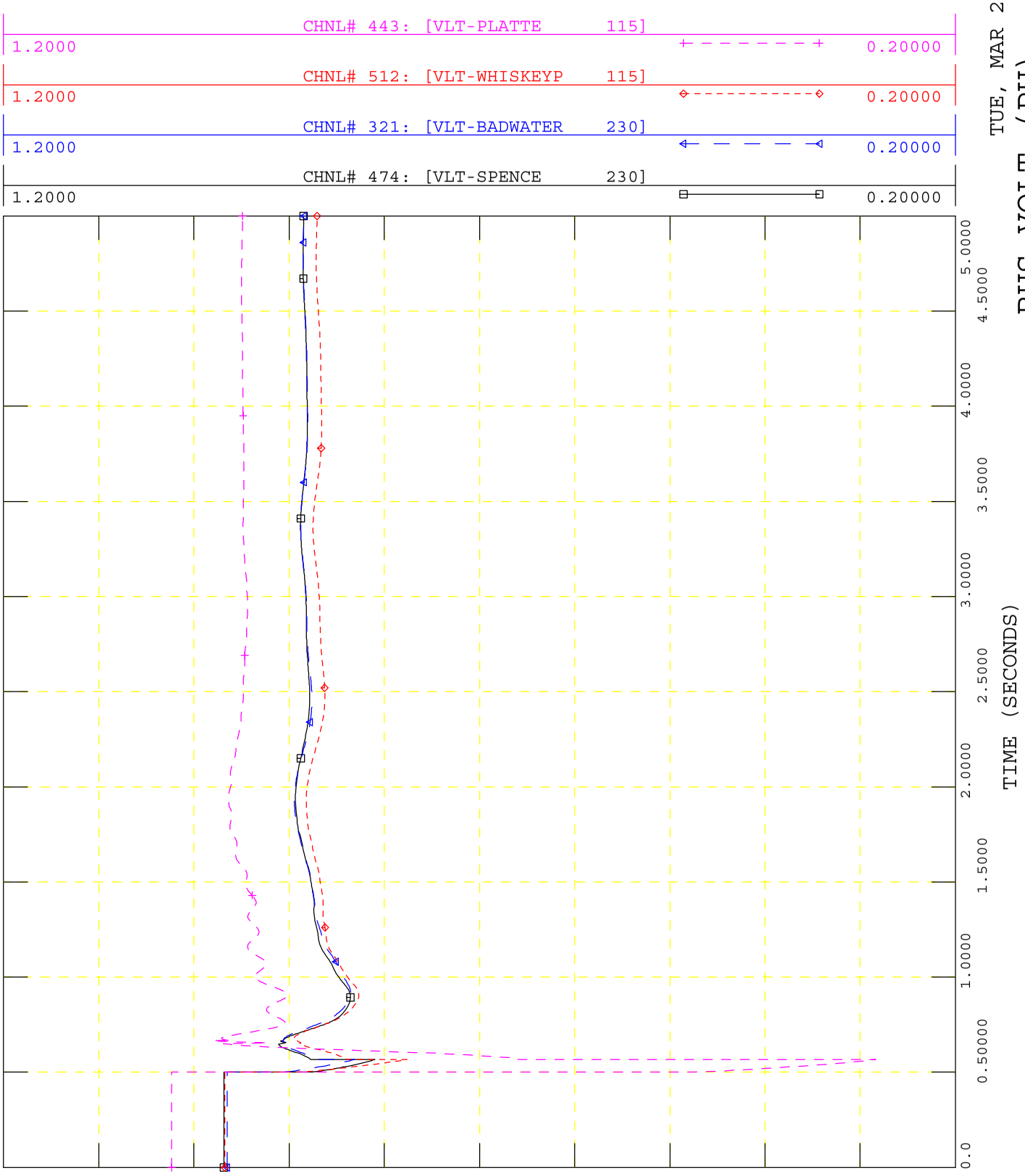
TUE, MAR 27 2018 21:27 PLT 5



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS AEOLUS 230 FLT. 34CY-CLR FLT & OPEN AEOL 230/500
XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 628 MW WND GEN. OUTAGE 1D2
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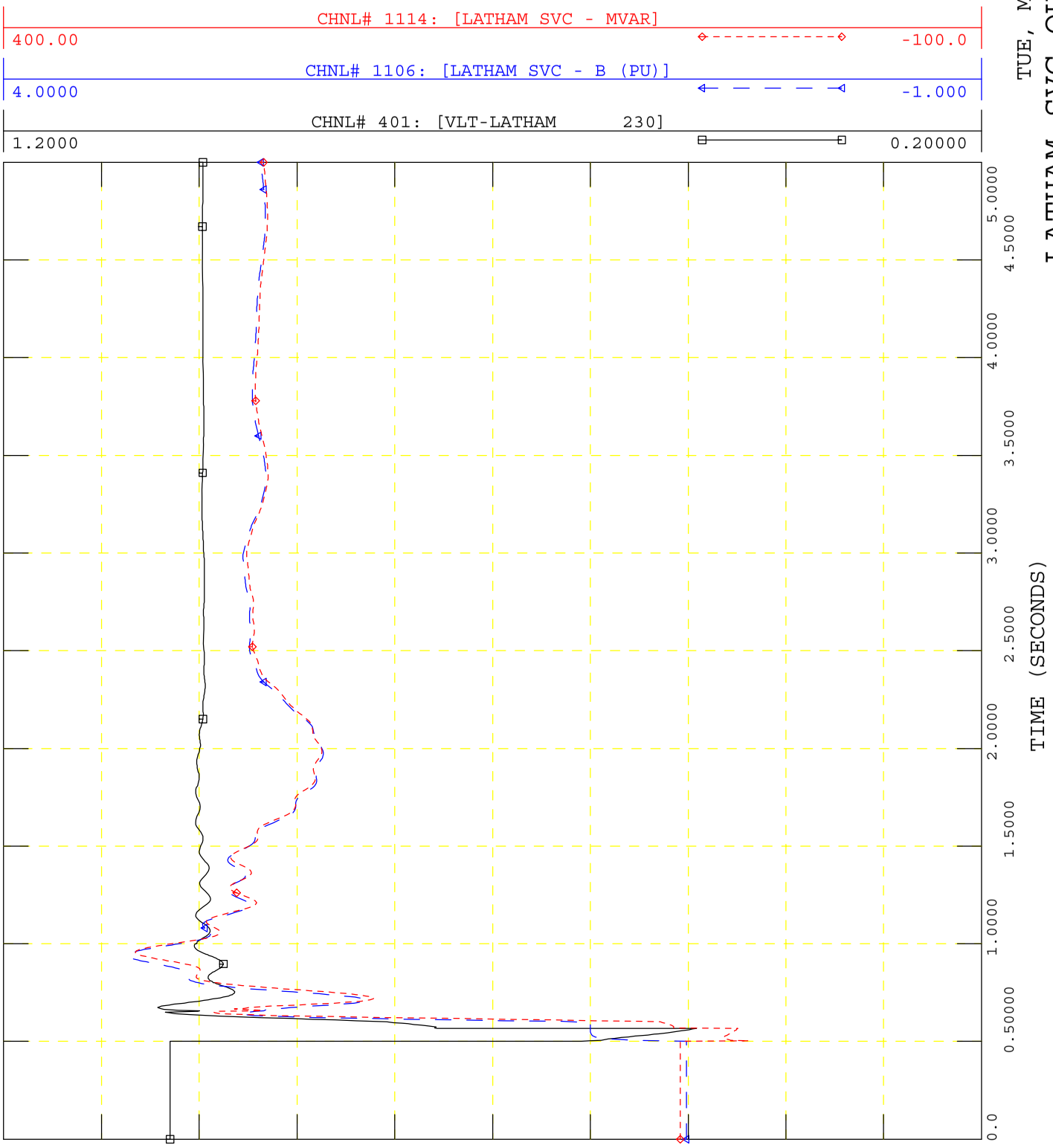
TUE, MAR 27 2018 21:27 PLT 6

LATHAM SVC OUT



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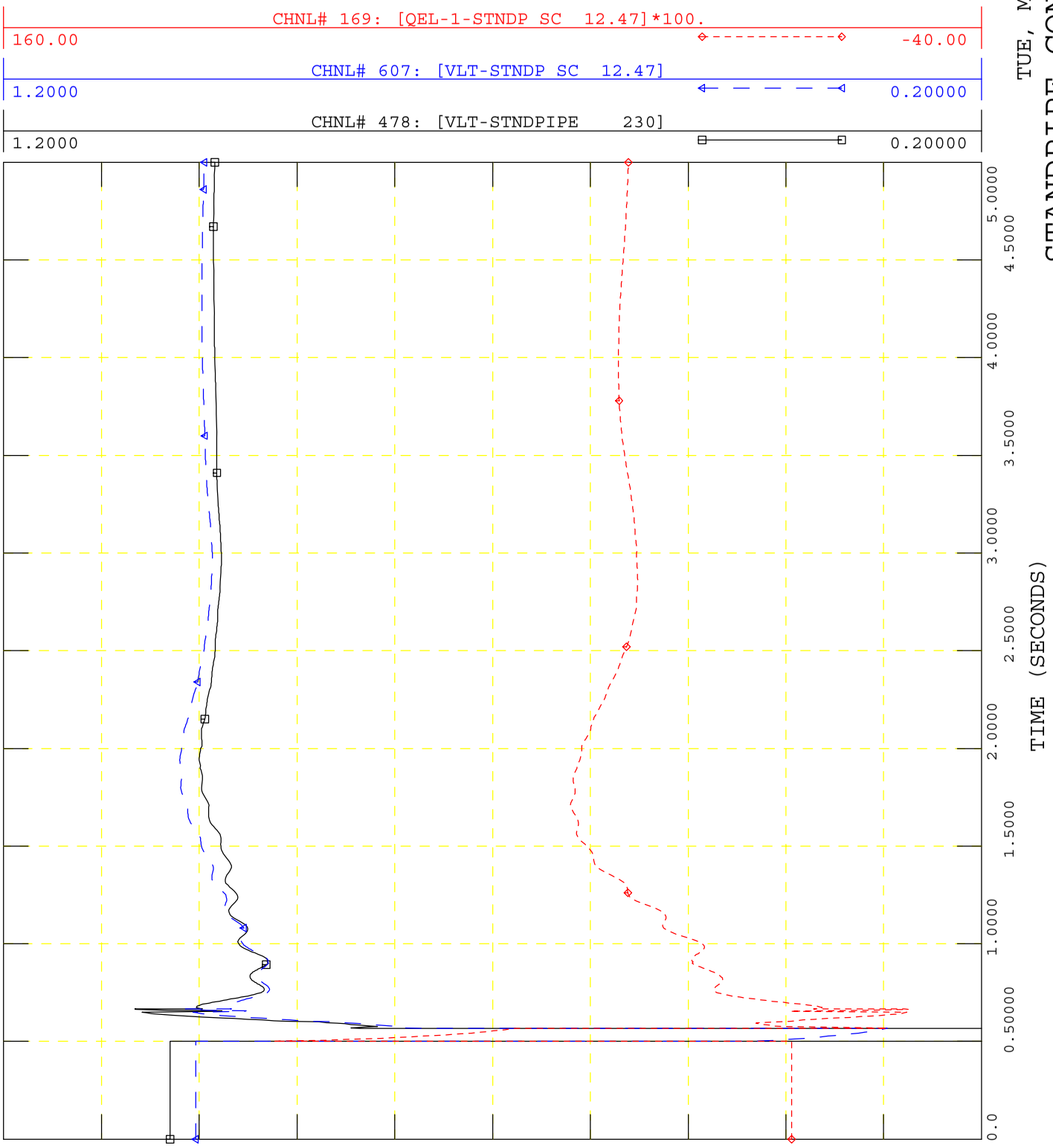
TUE, MAR 27 2018 21:27

STANDPIPE CONDNSR PLT 7



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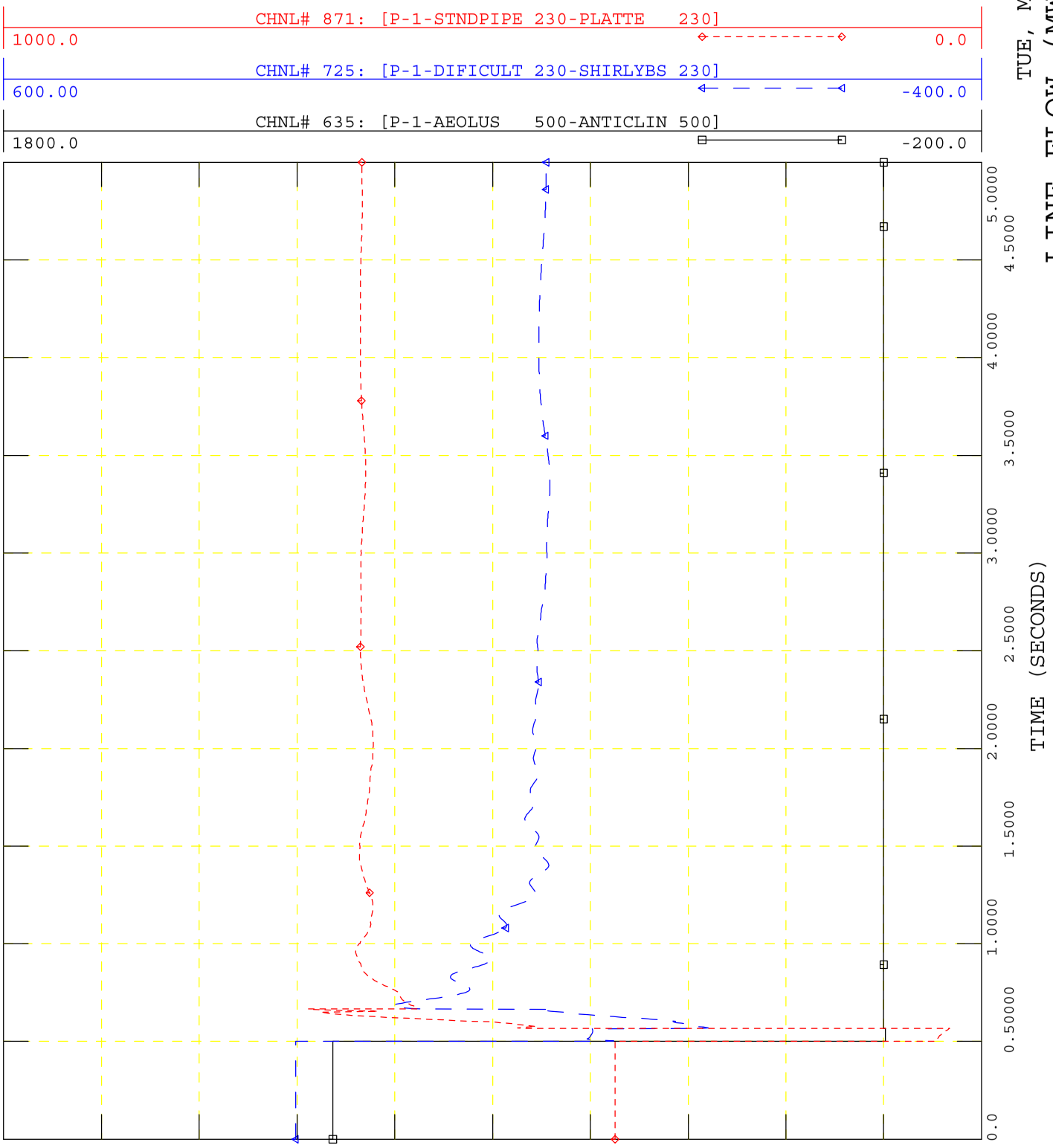
TUE, MAR 27 2018 21:27 PLT 8



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XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 628 MW WND GEN. OUTAGE 1D2
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TUE, MAR 27 2018 21:28 PLT 9

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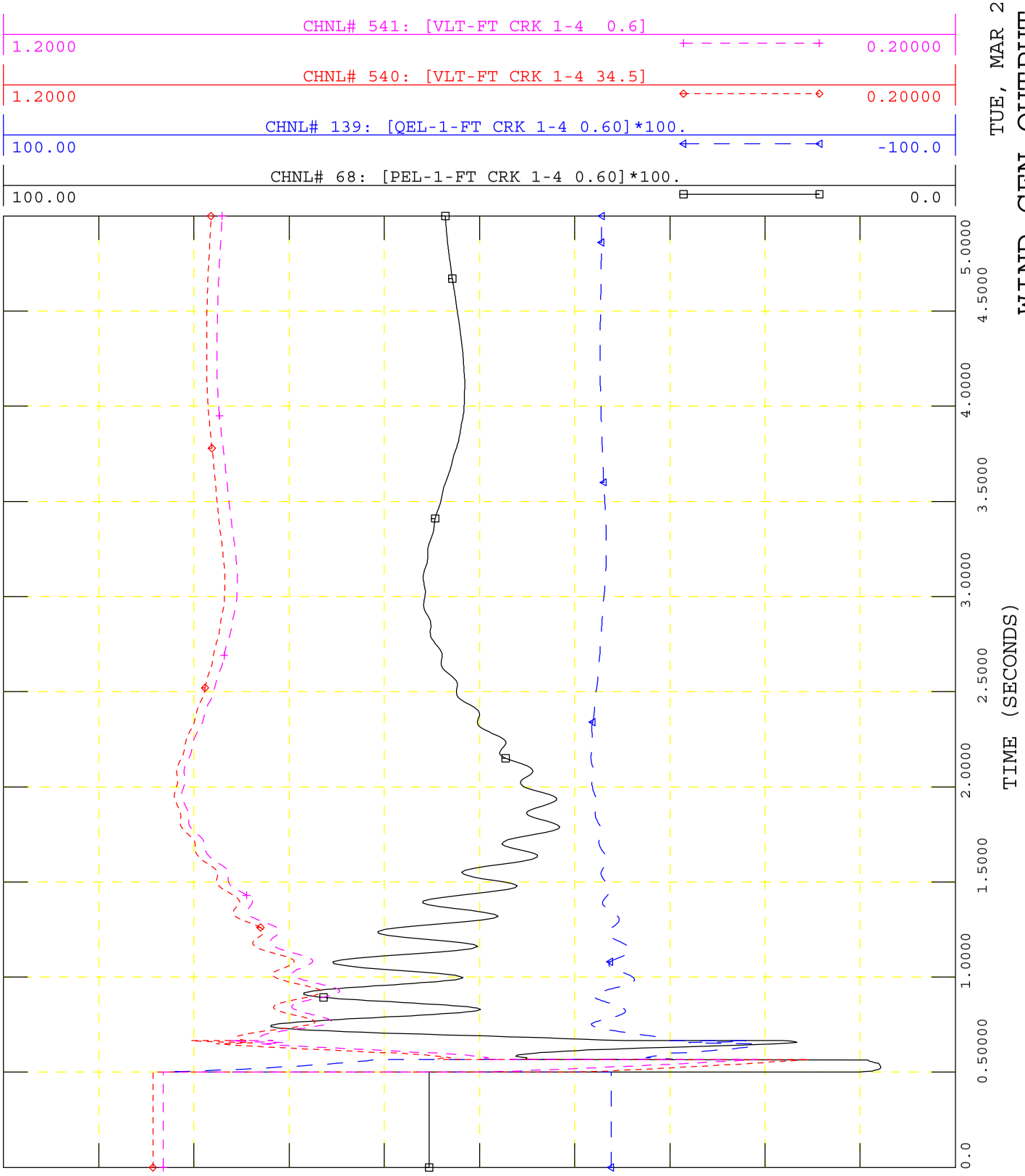

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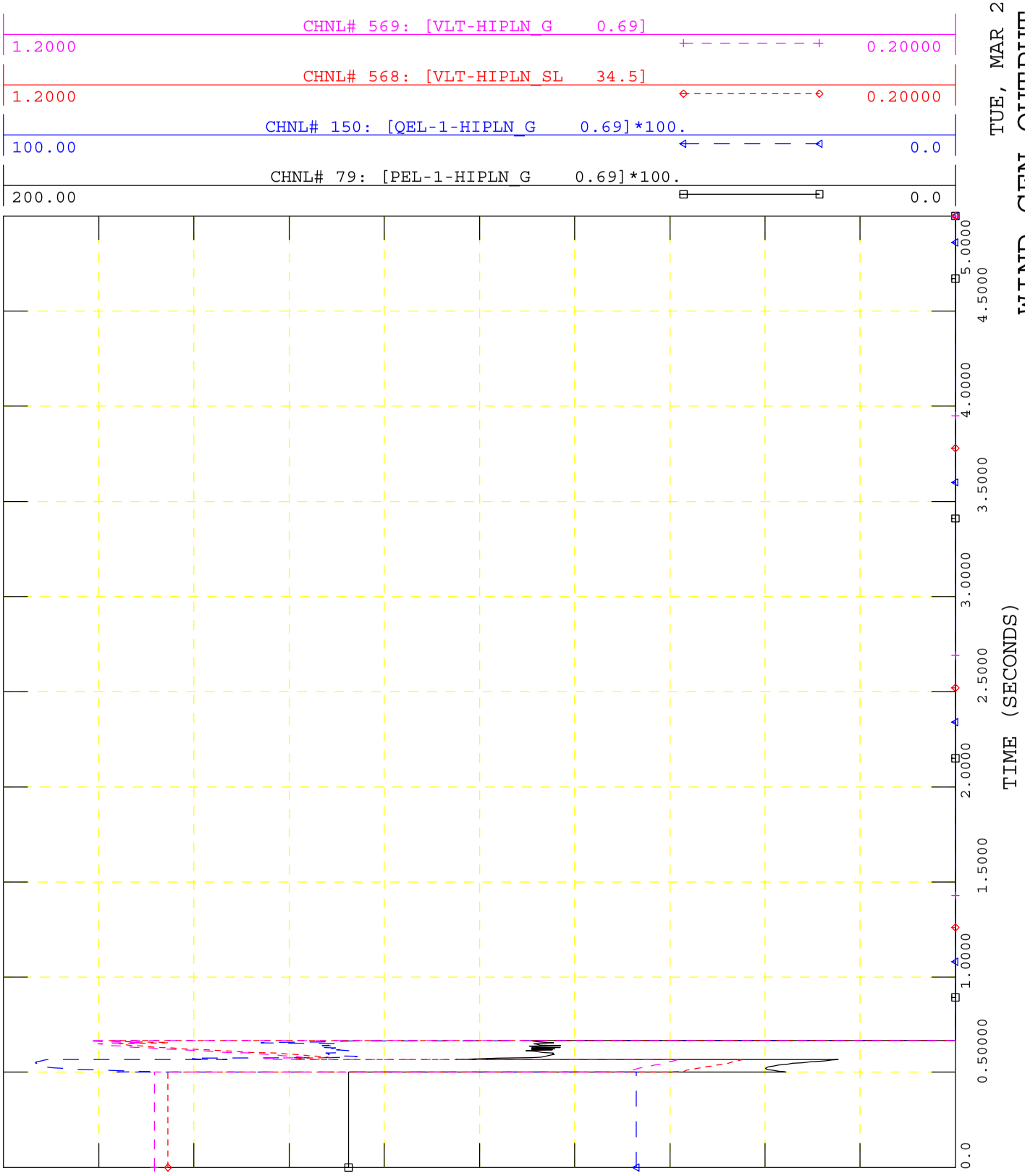

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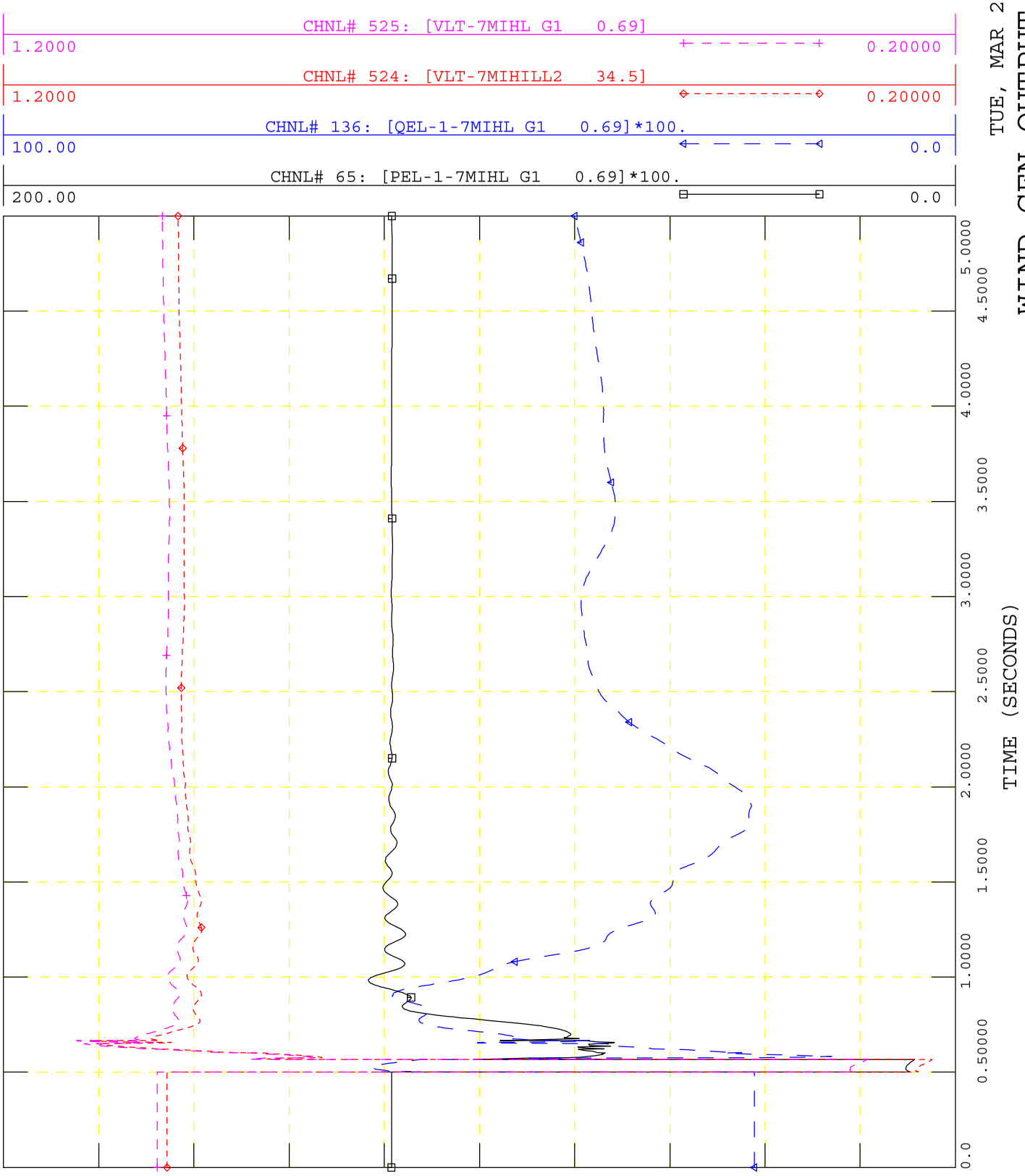

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XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 628 MW WND GEN. OUTAGE 1D2
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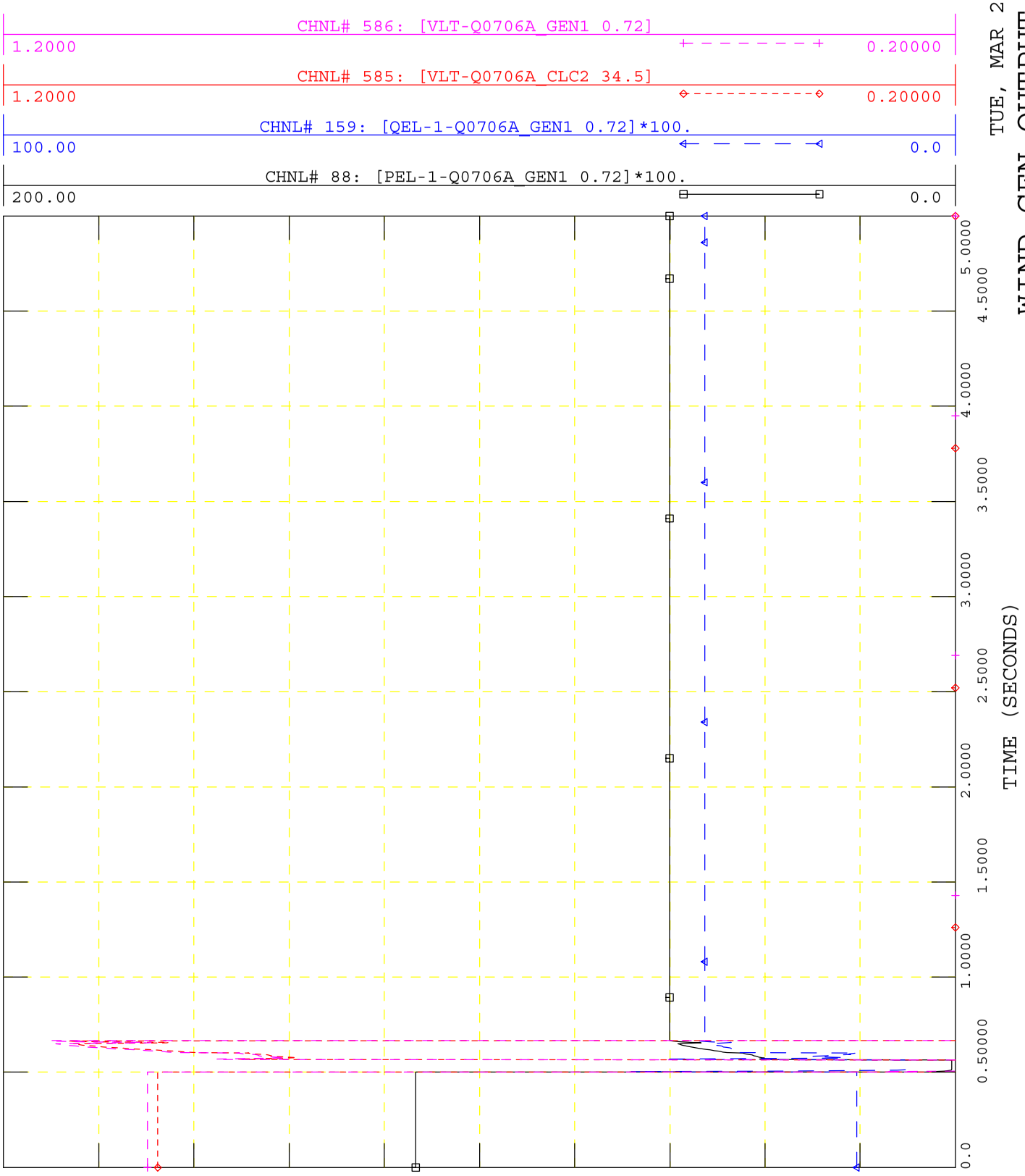

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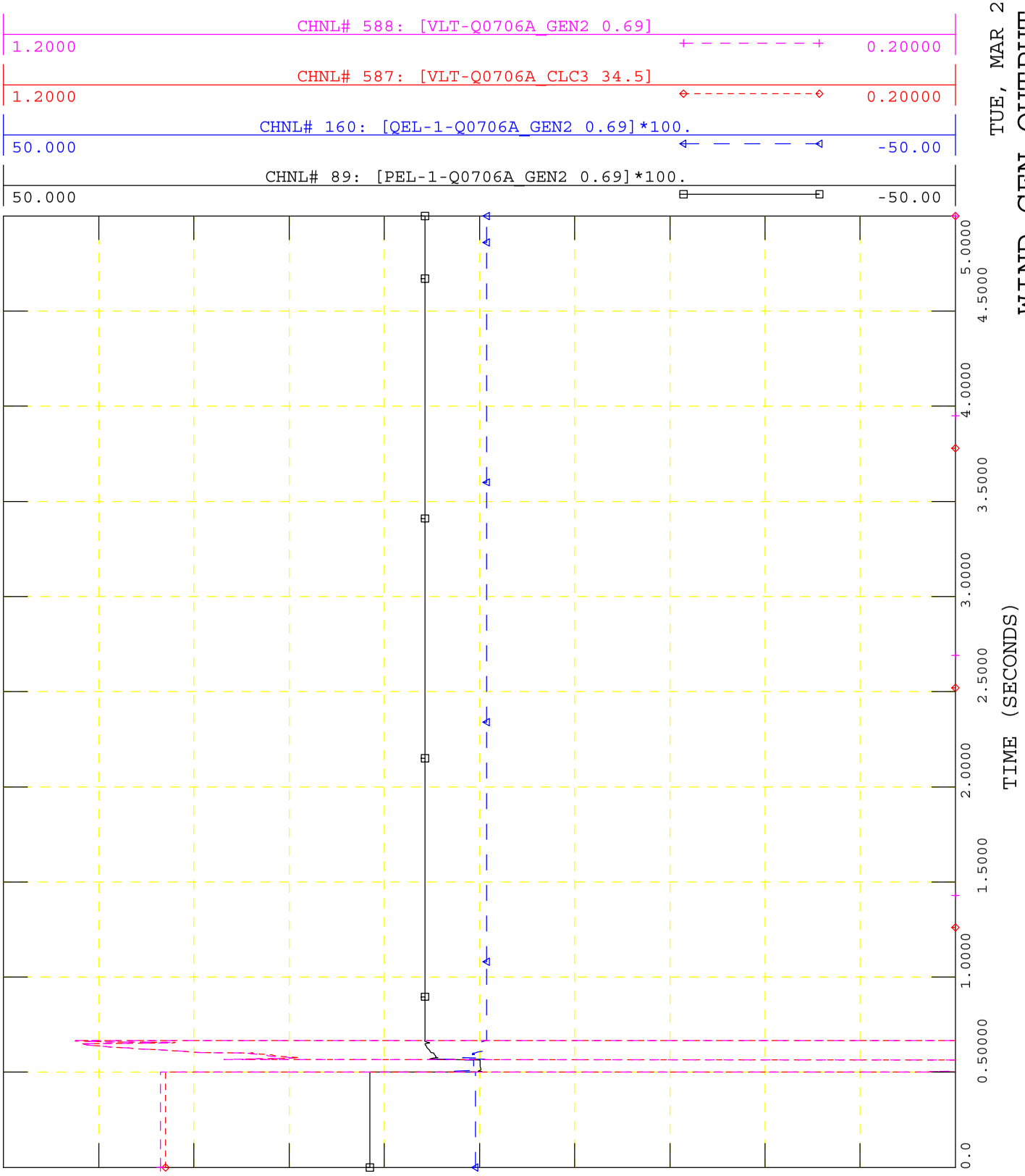

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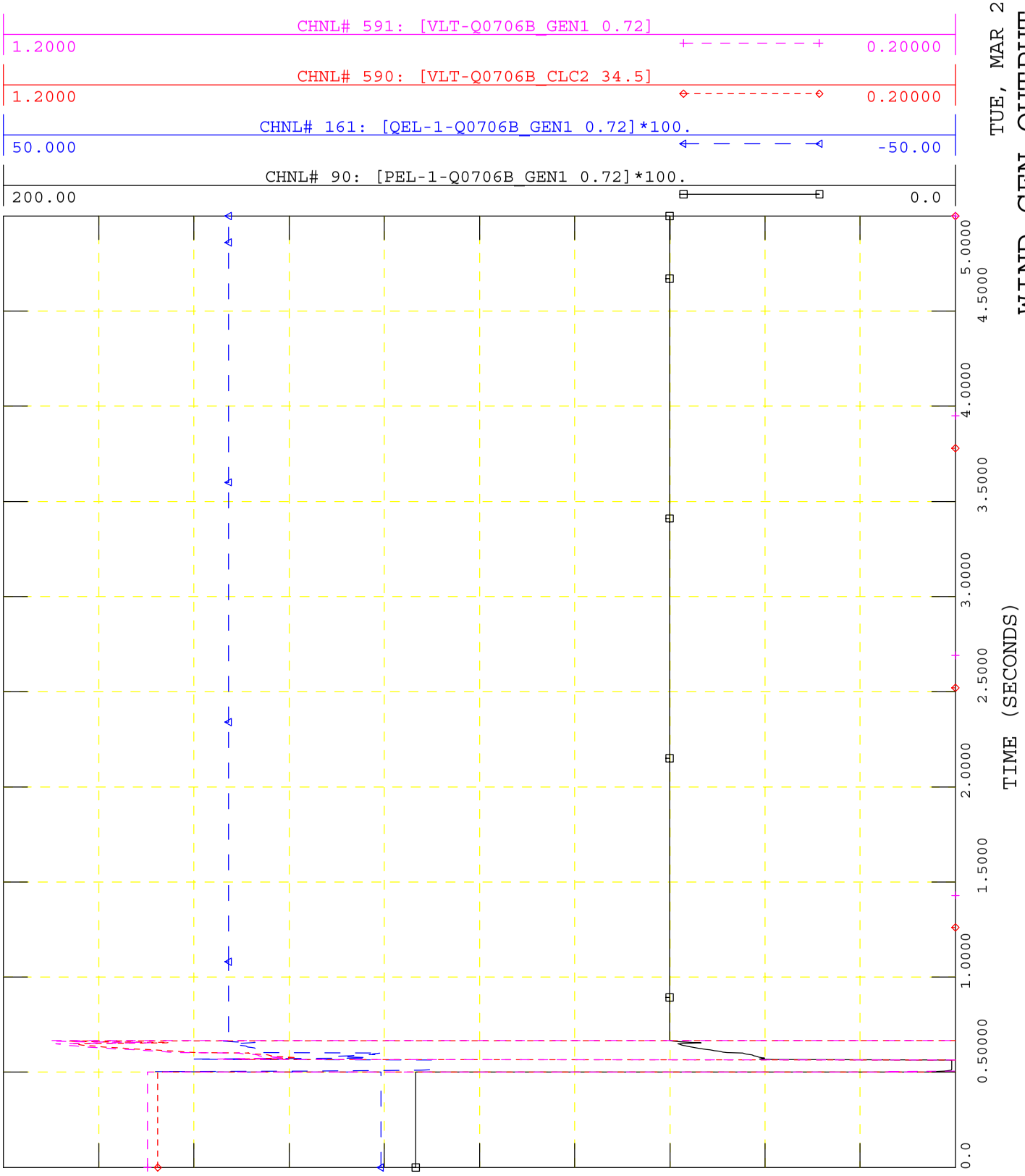

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XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 628 MW WND GEN. OUTAGE 1D2
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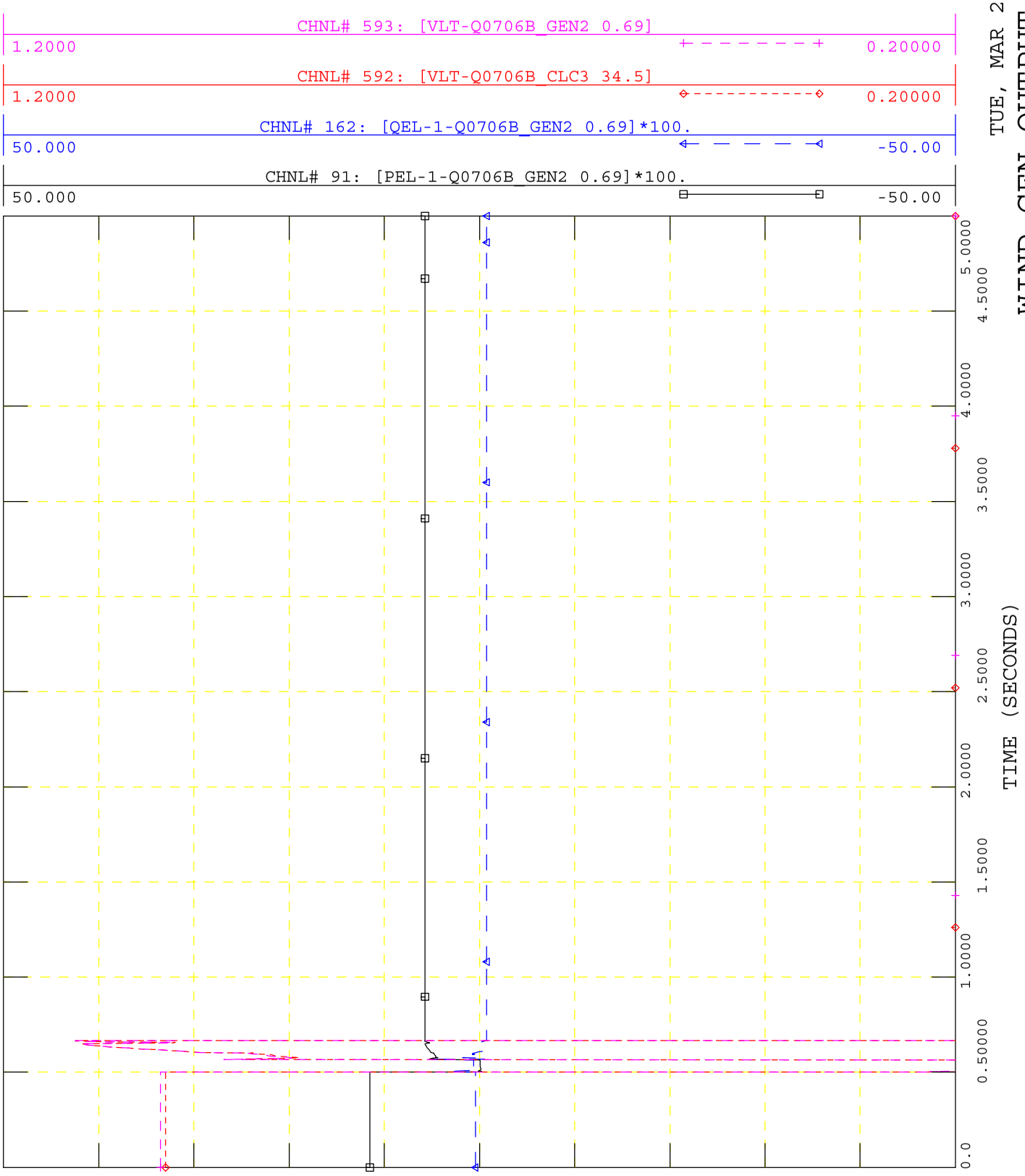

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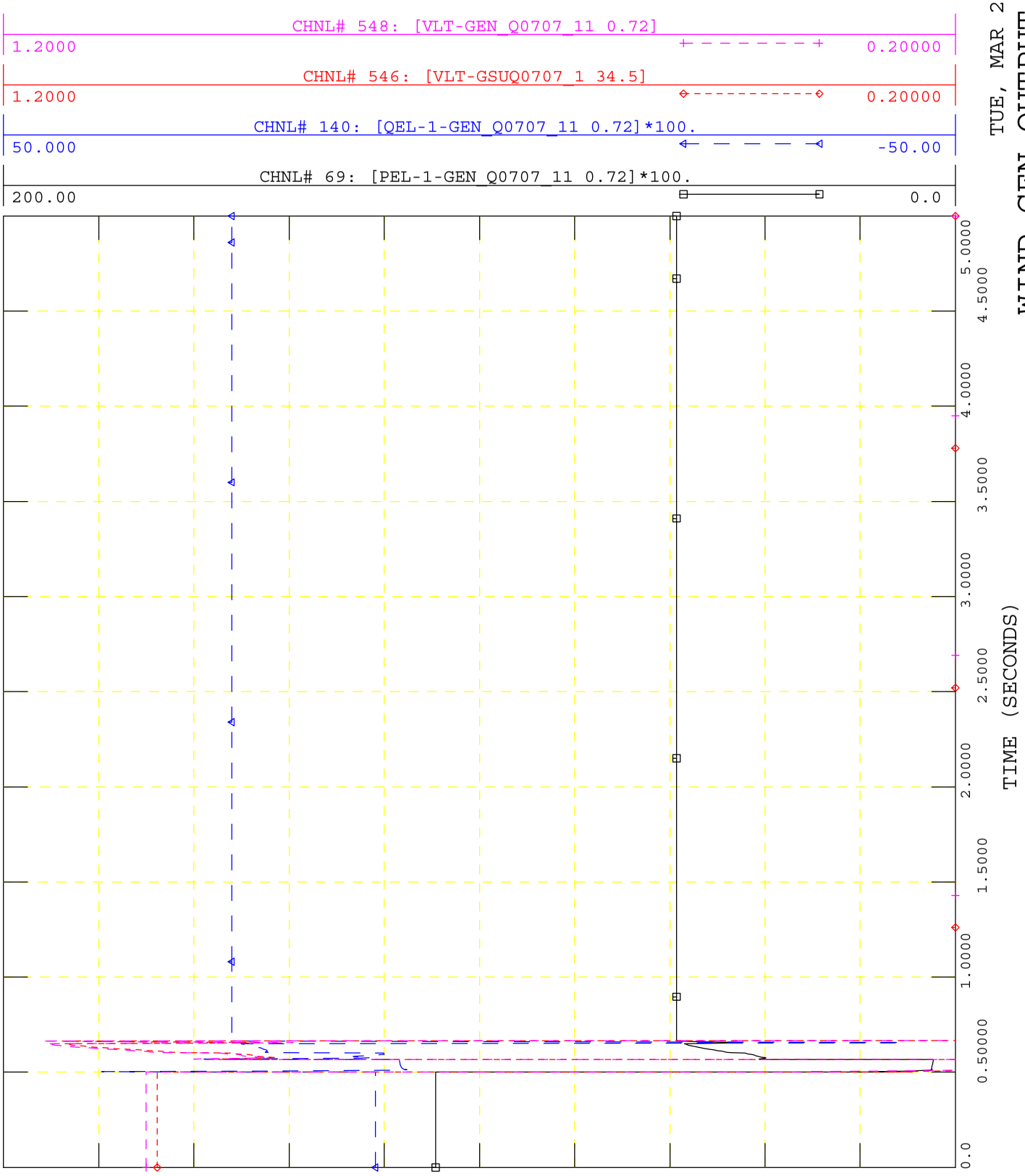

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TUE, MAR 27 2018 21:28 PLT 17

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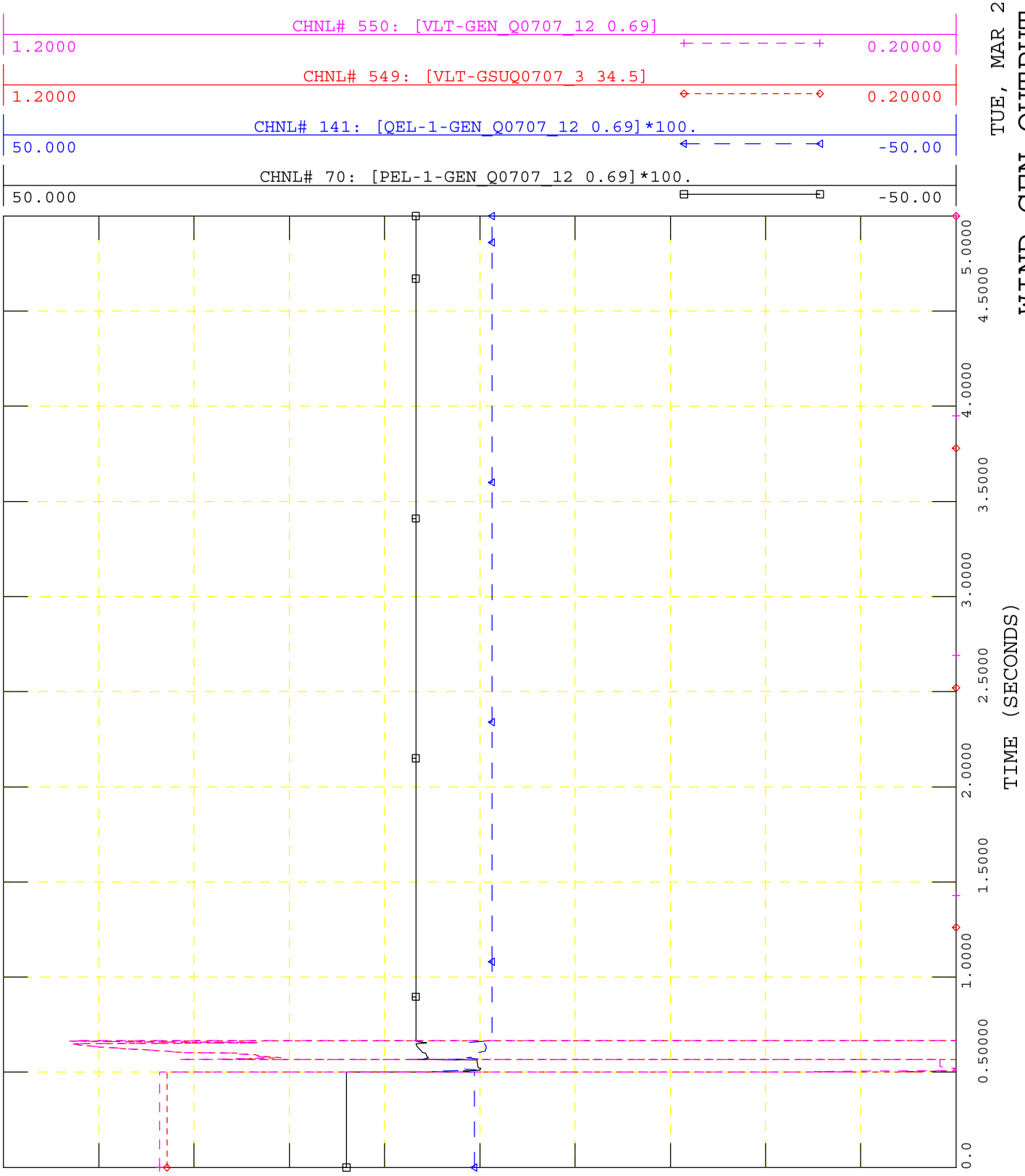

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XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 628 MW WND GEN. OUTAGE 1D2
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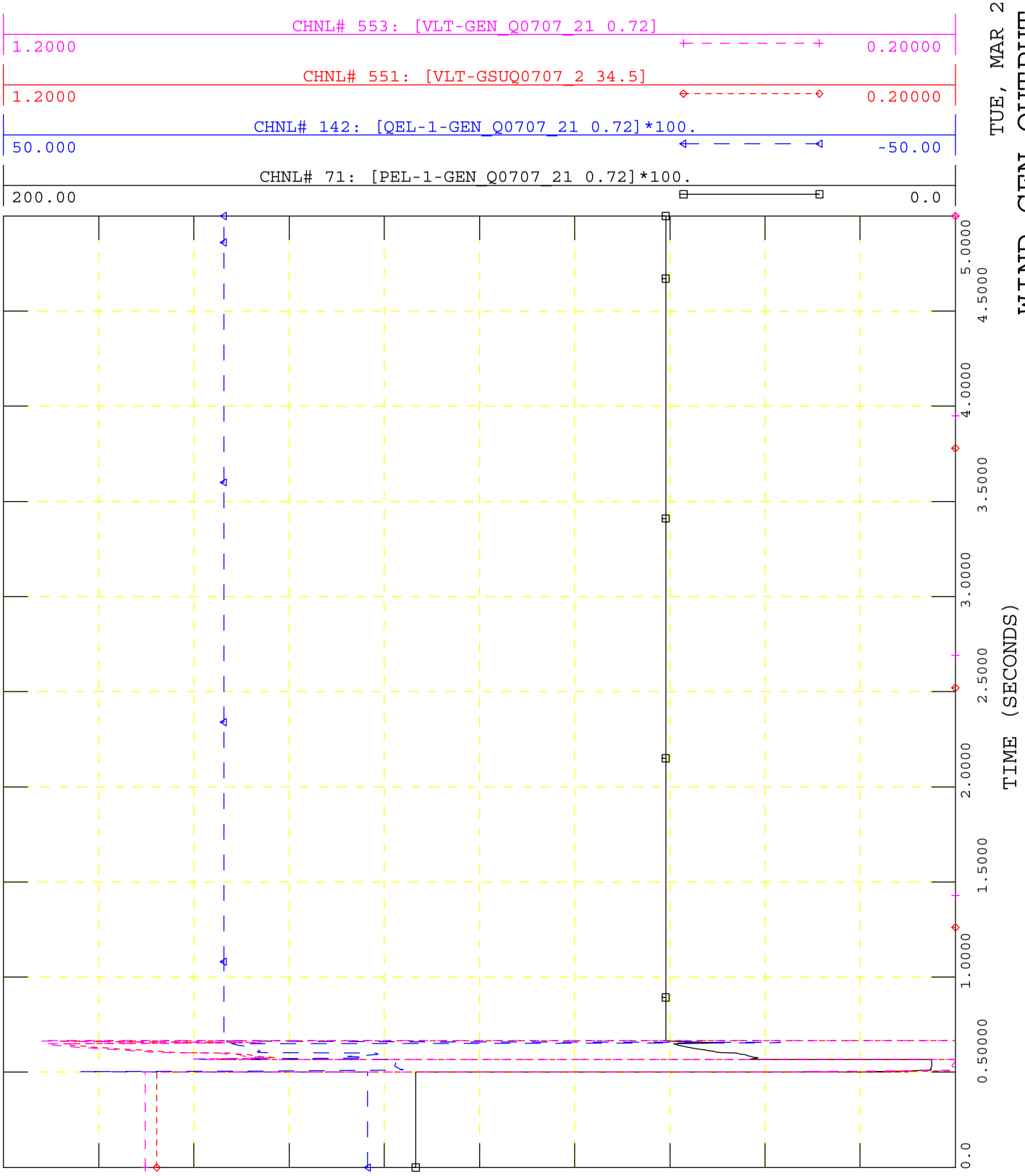

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TUE, MAR 27 2018 21:28 PLT 19

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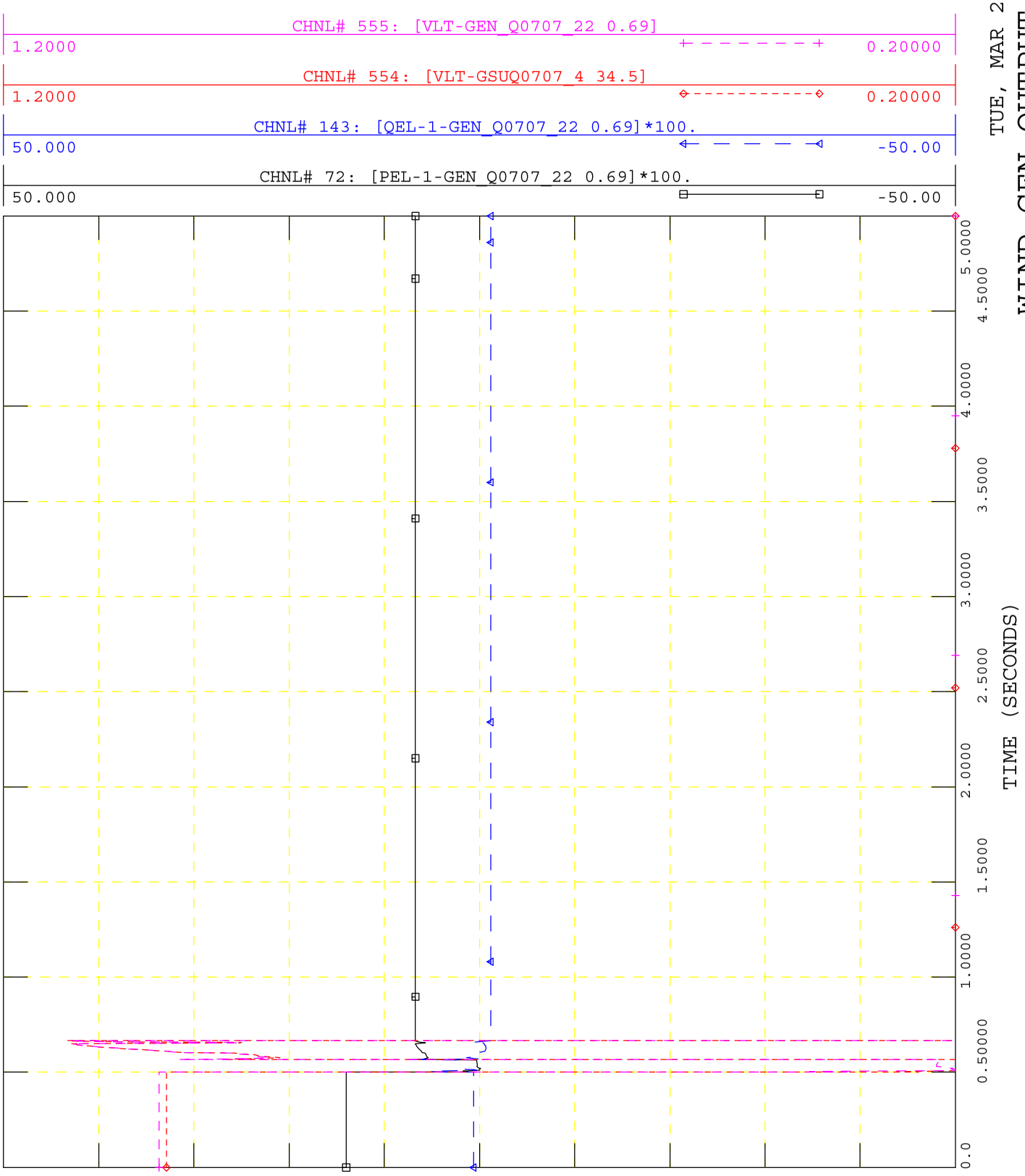

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 628 MW WND GEN. OUTAGE 1D2
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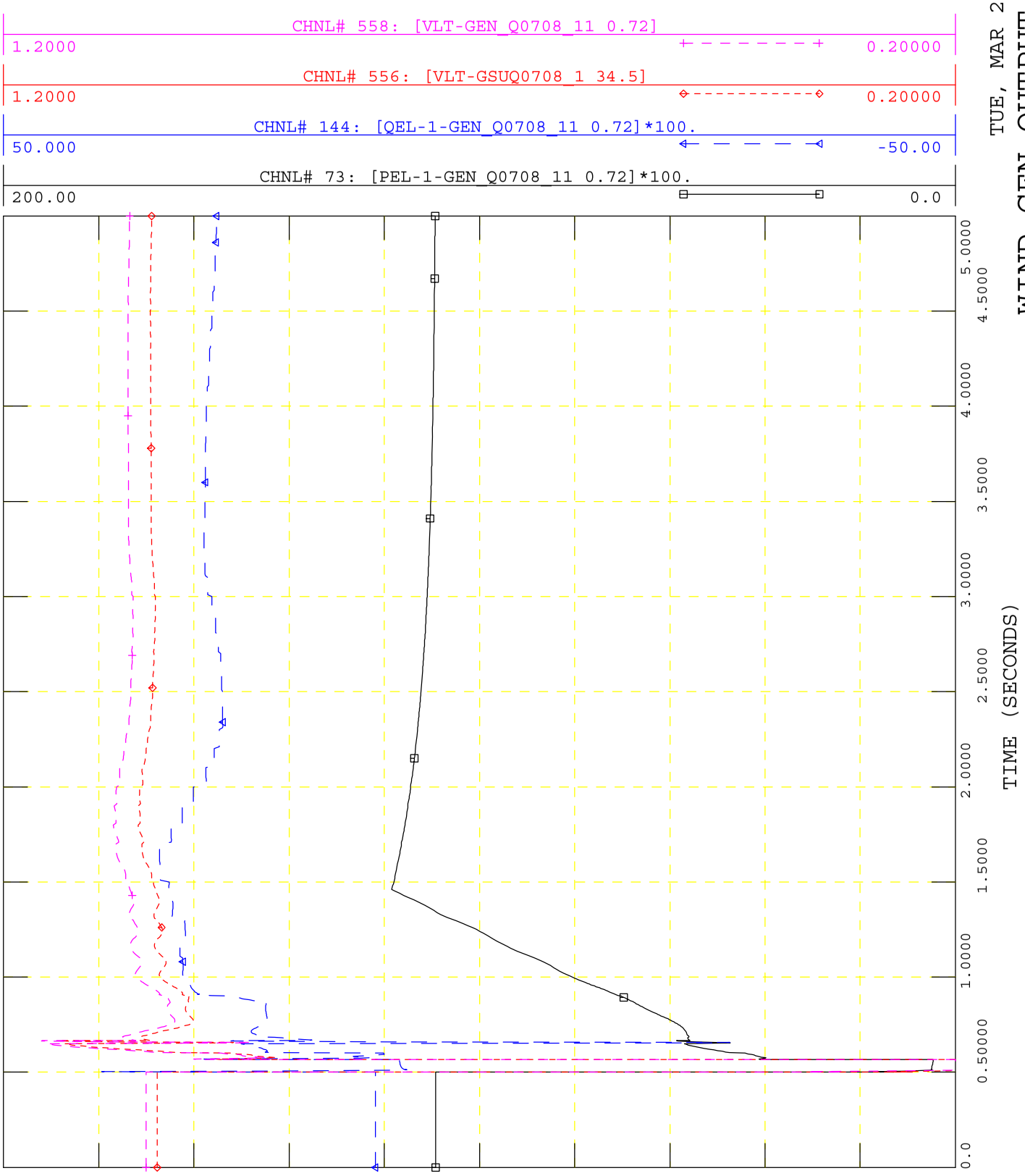

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XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 628 MW WND GEN. OUTAGE 1D2
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TUE, MAR 27 2018 21:28 PLT 21

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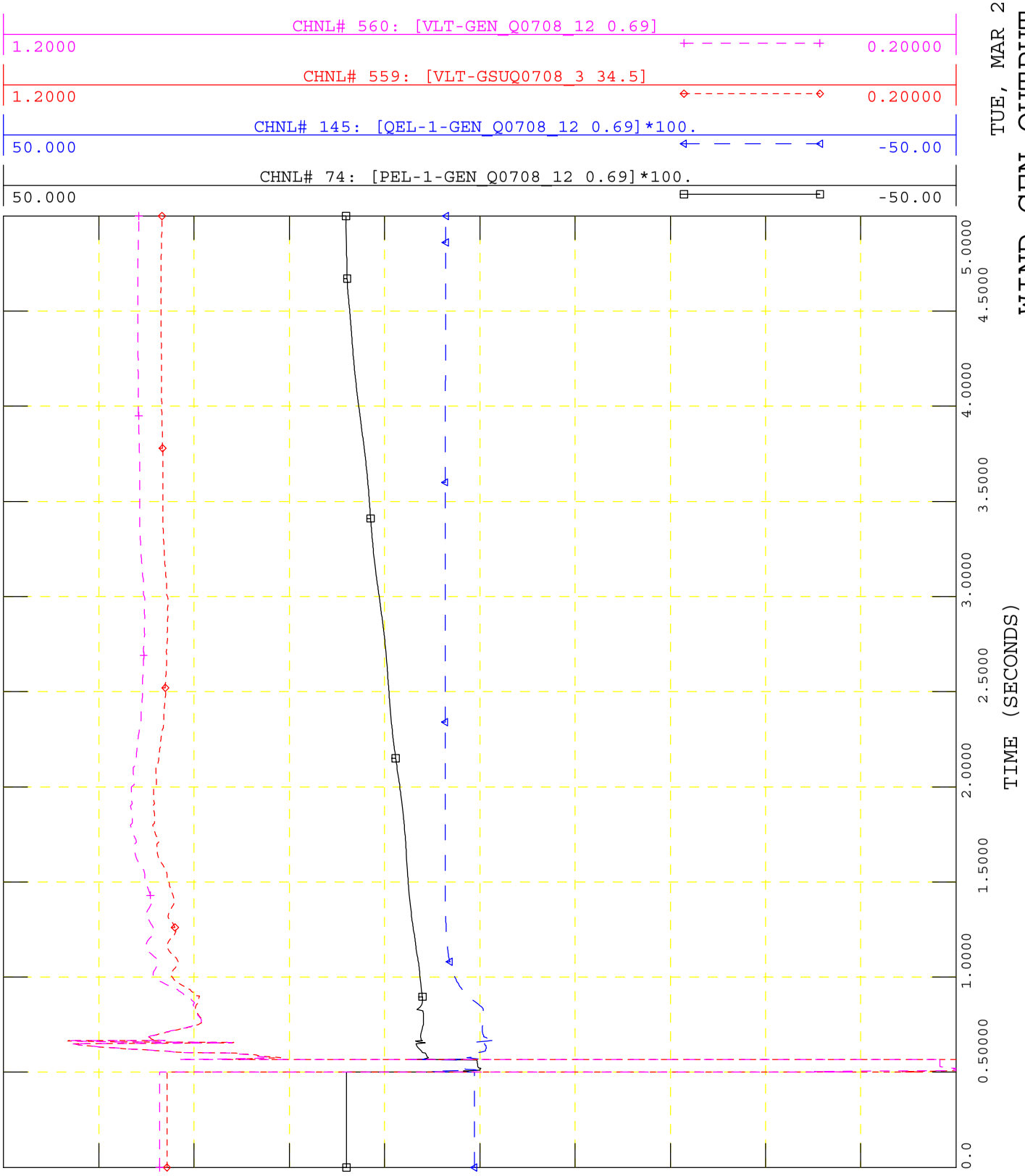

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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TUE, MAR 27 2018 21:28 PLT 22

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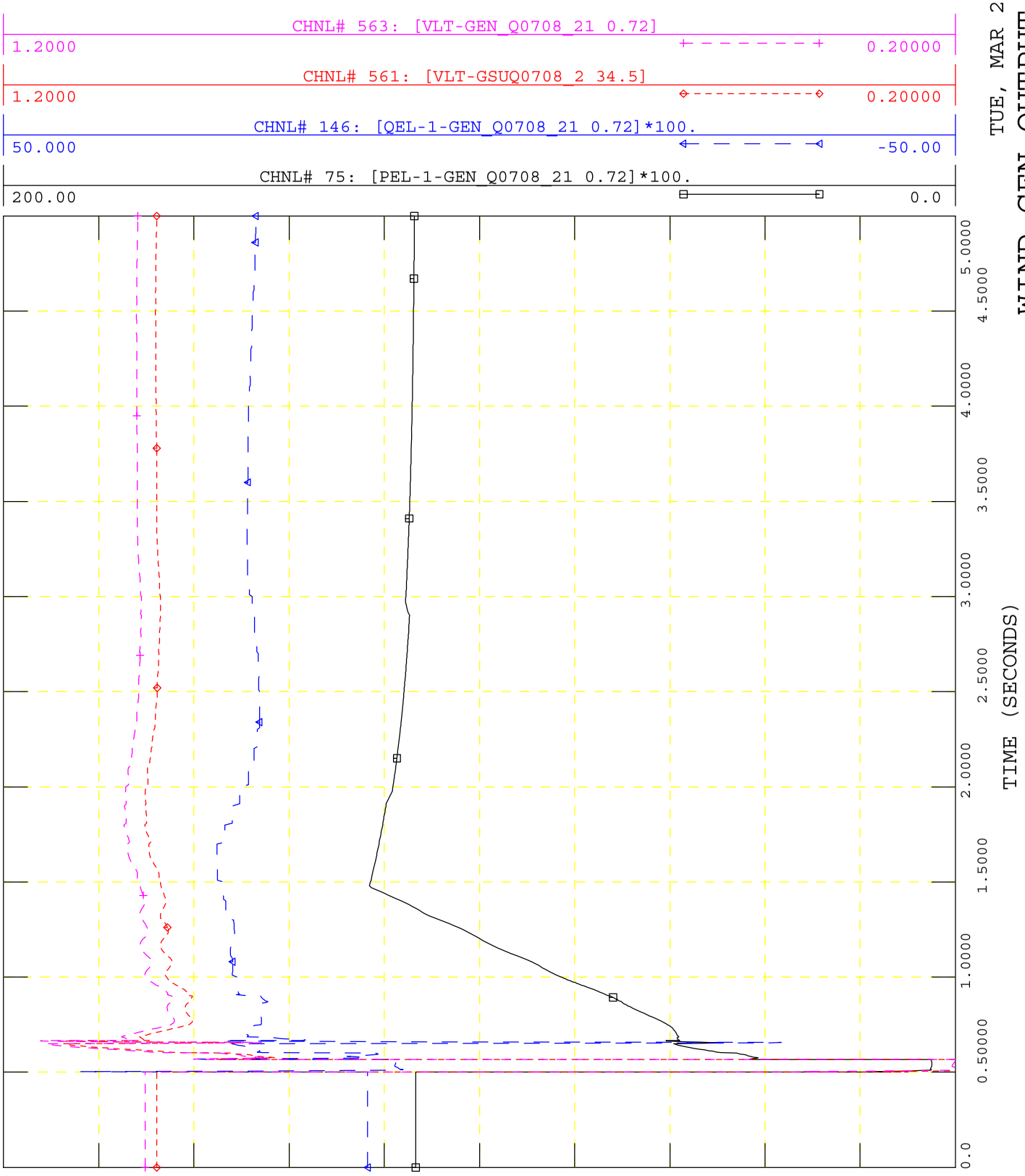

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XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 628 MW WND GEN. OUTAGE 1D2
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TUE, MAR 27 2018 21:28 PLT 23

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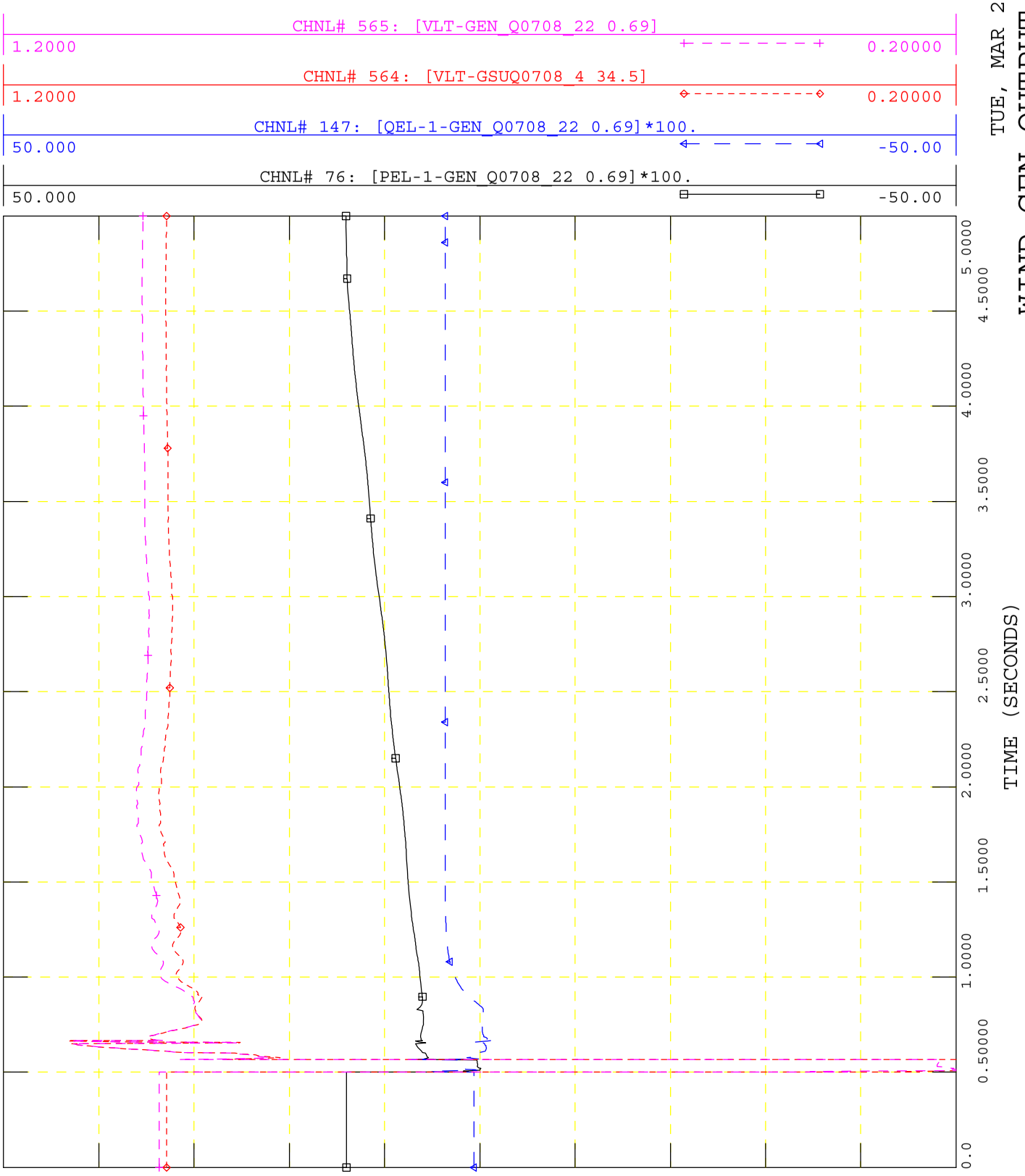

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TUE, MAR 27 2018 21:28 PLT 24

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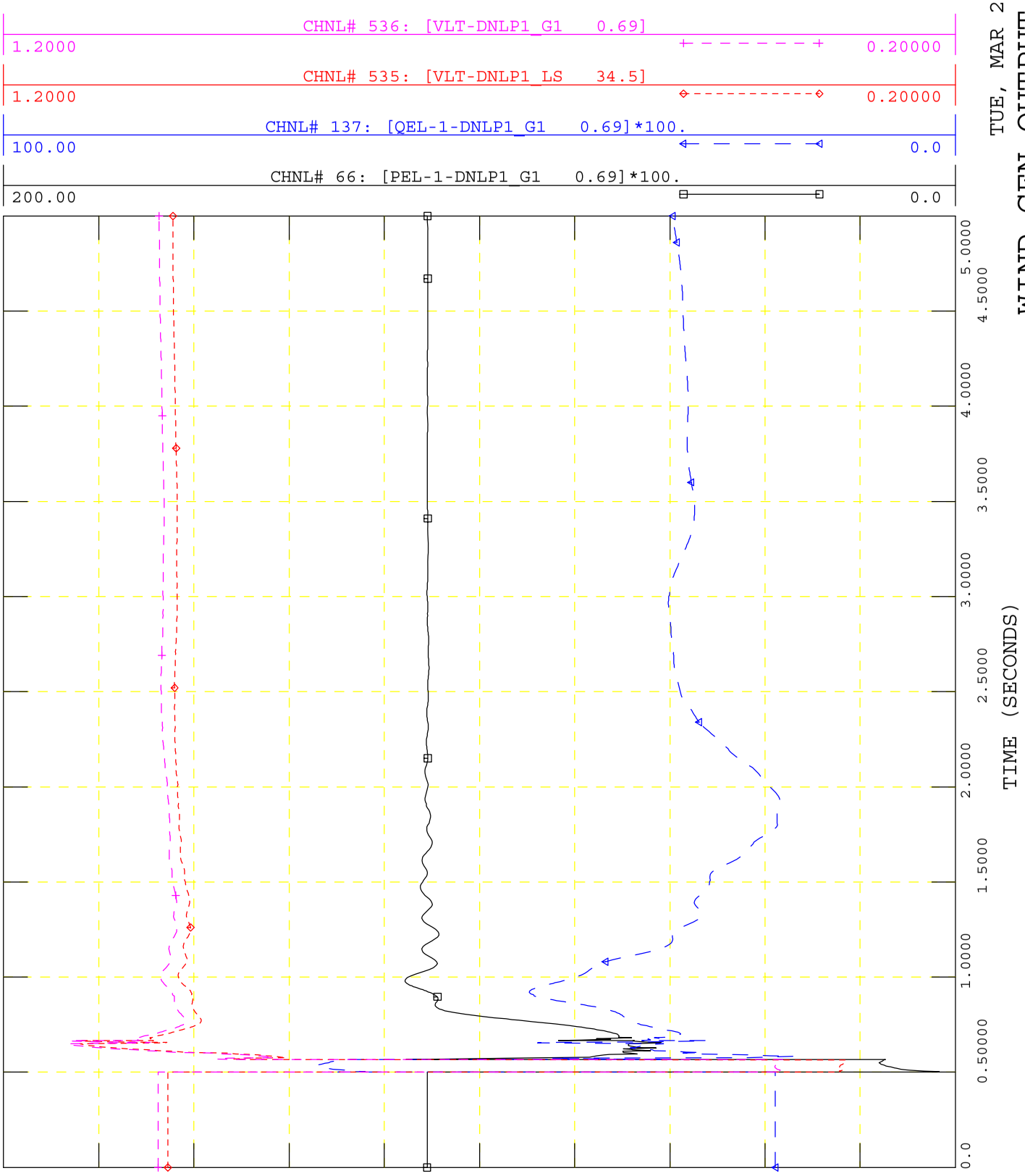

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XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 628 MW WND GEN. OUTAGE 1D2
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TUE, MAR 27 2018 21:28 PLT 25

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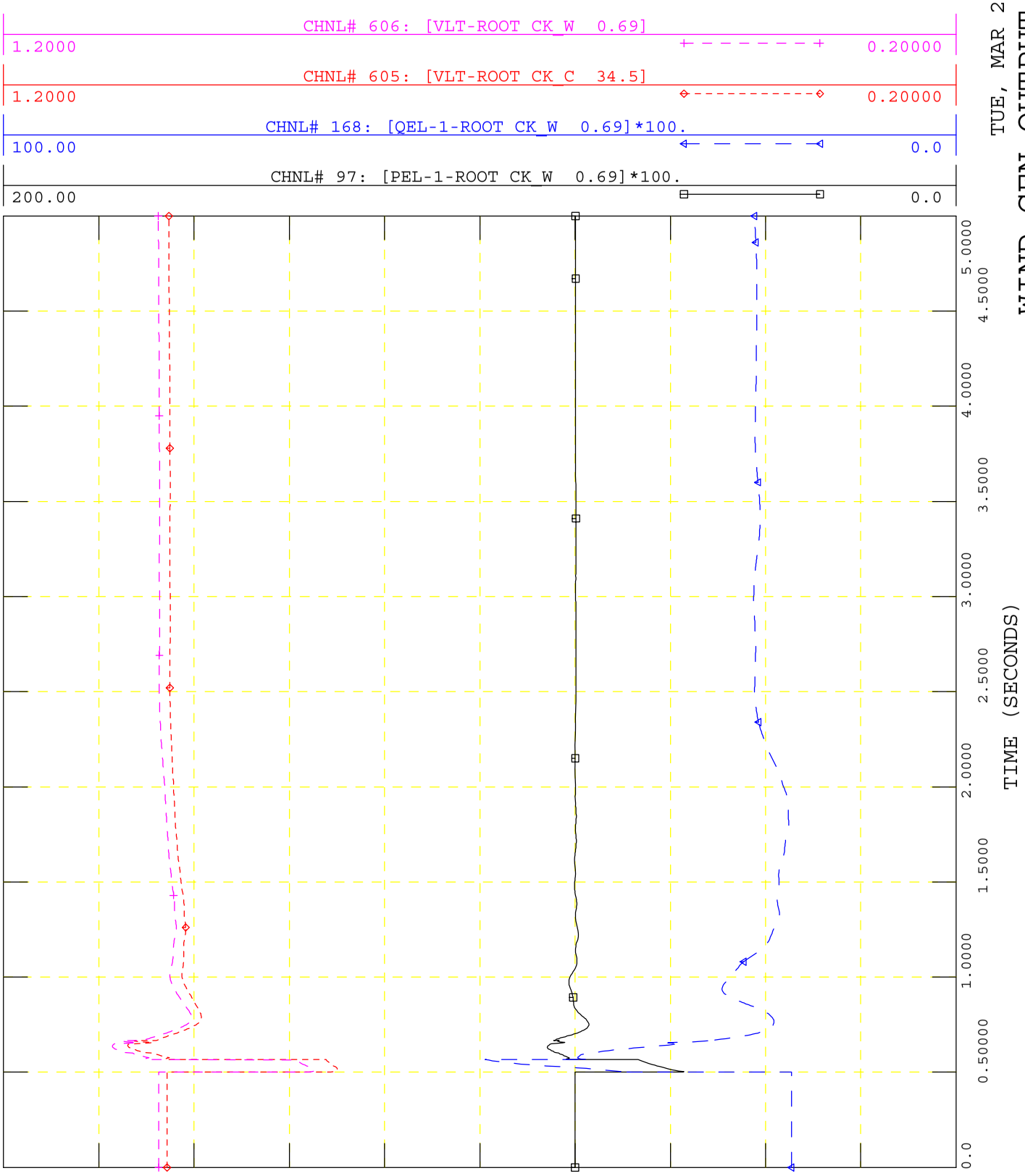

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XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 628 MW WND GEN. OUTAGE 1D2
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TUE, MAR 27 2018 21:28 PLT 26

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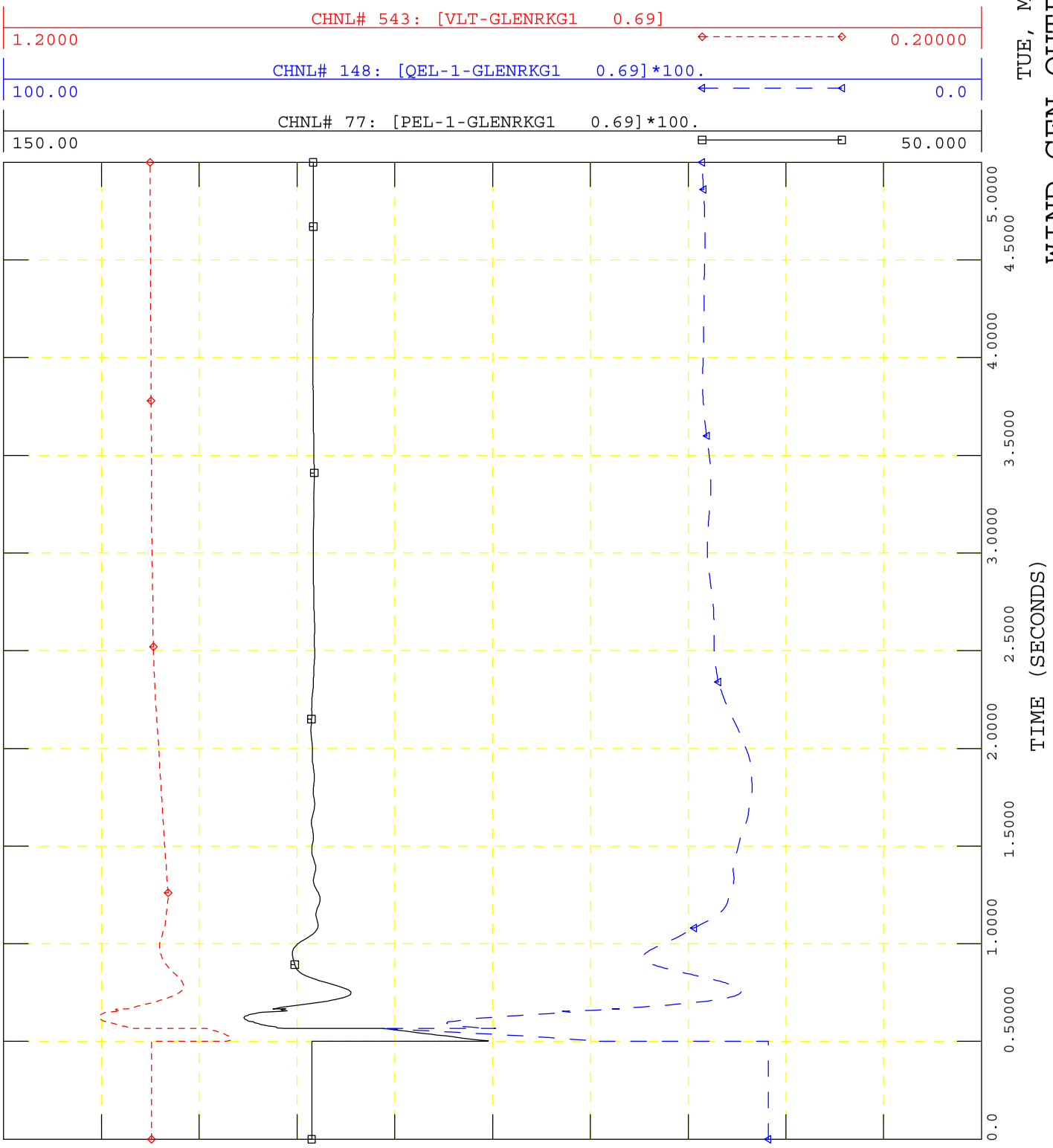

Dynamic Simulation

Case 1e – Loss of Anticline 345/500 kV transformer with 607 MW generator tripping

30 cycles	**3 phase Anticline 345 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Anticline 345/500 kV transformer, trip 200 MVAR shunt capacitors at Anticline and Aeolus 500 kV subs**
36 cycles	**Remove SVC MVAR limiter**
40 cycles	**Trip High Plains wind generation (127.5 MW)** **Trip 7 Mile Hill wind generation (118.5)** **Trip Q0706 A&B (Ekola Flats) wind generation (249.8 MW)** **Dunlap wind generation (111.0 MW)**
5 sec.	**Terminate simulation**

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS ANTICLINE 345 FLT. 34CY-CLR FLT & OPEN ANTI345/500
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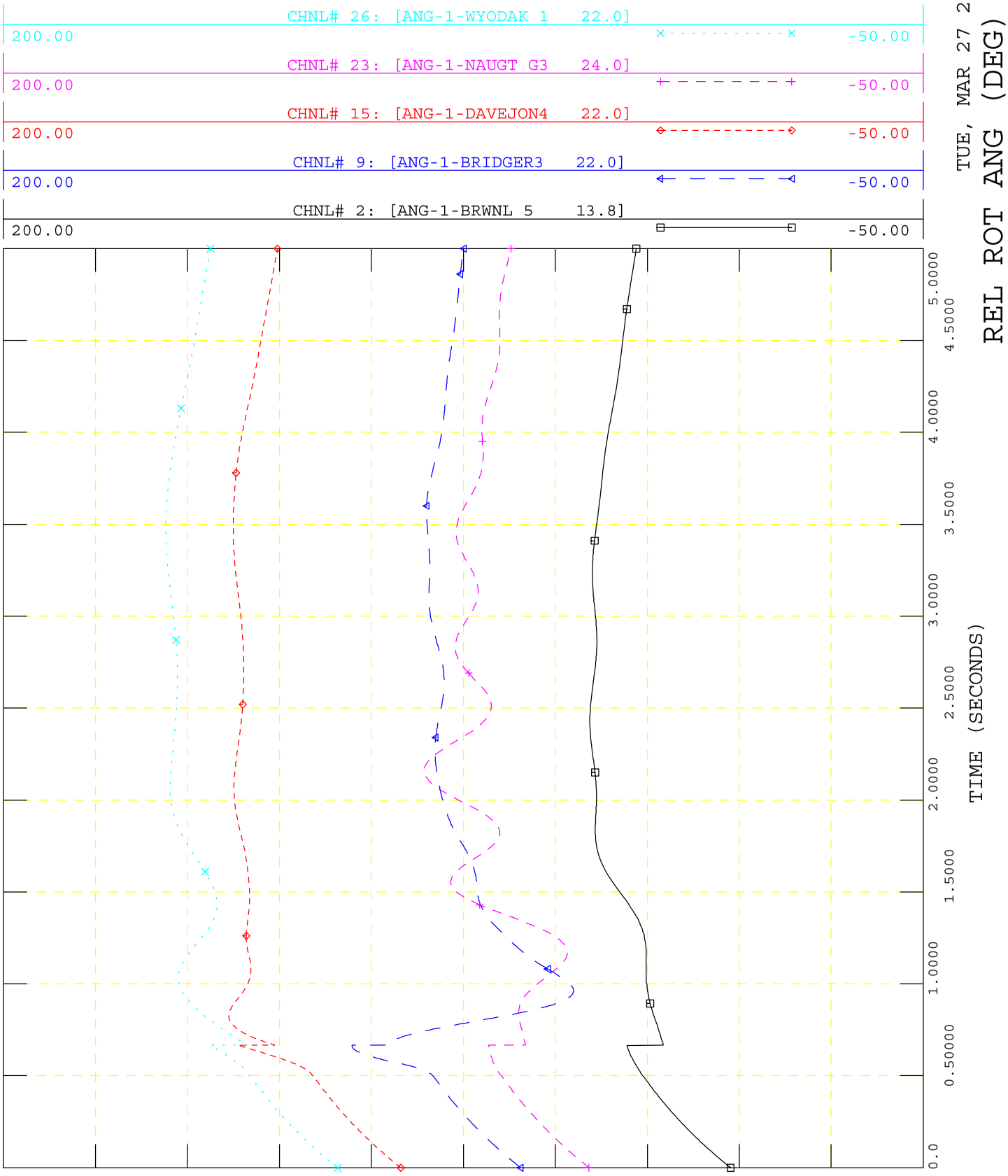

TUE, MAR 27 2018 21:28
REL ROT ANG (DEG) PLT 1

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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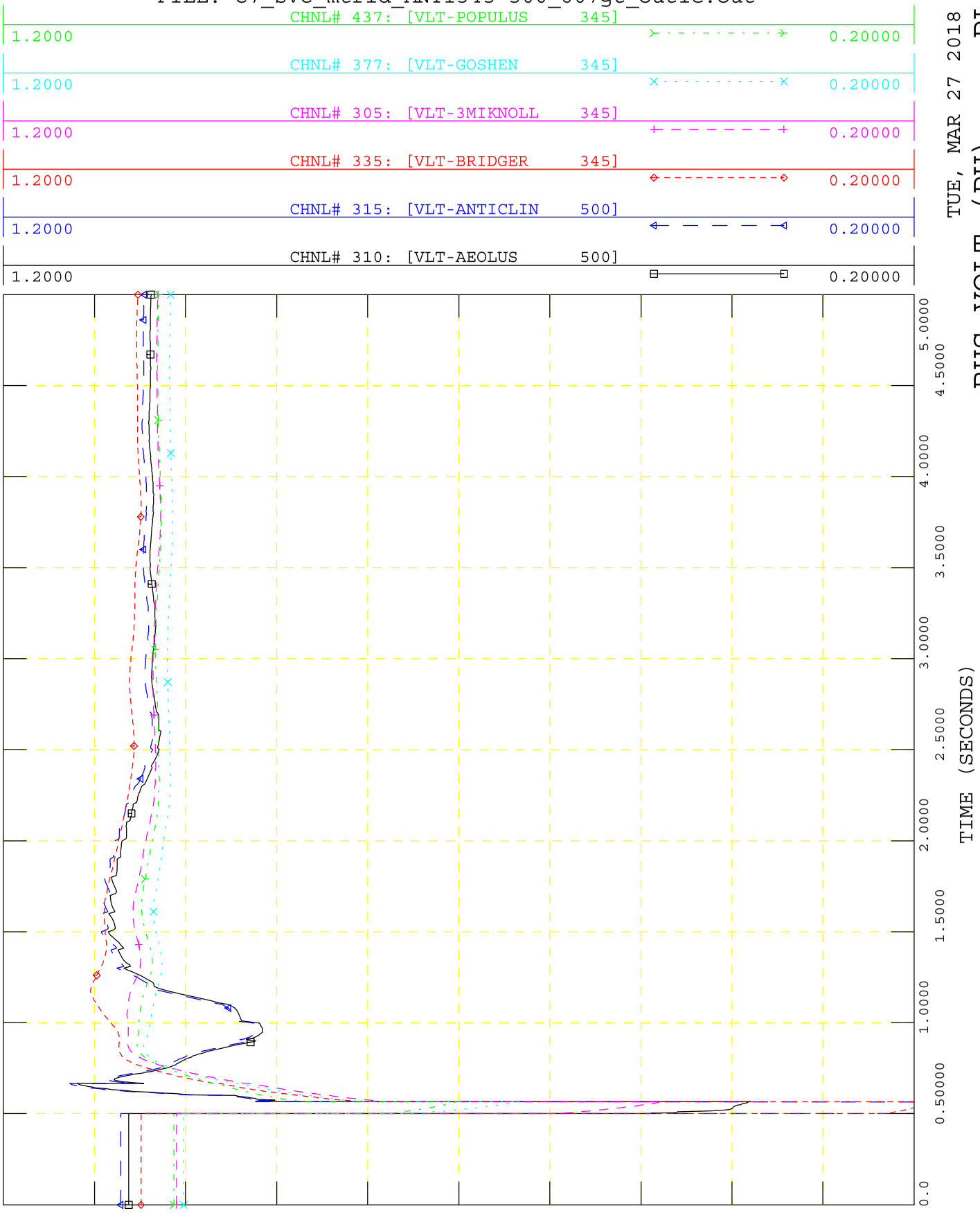
TUE, MAR 27 2018 21:28 PLT 2



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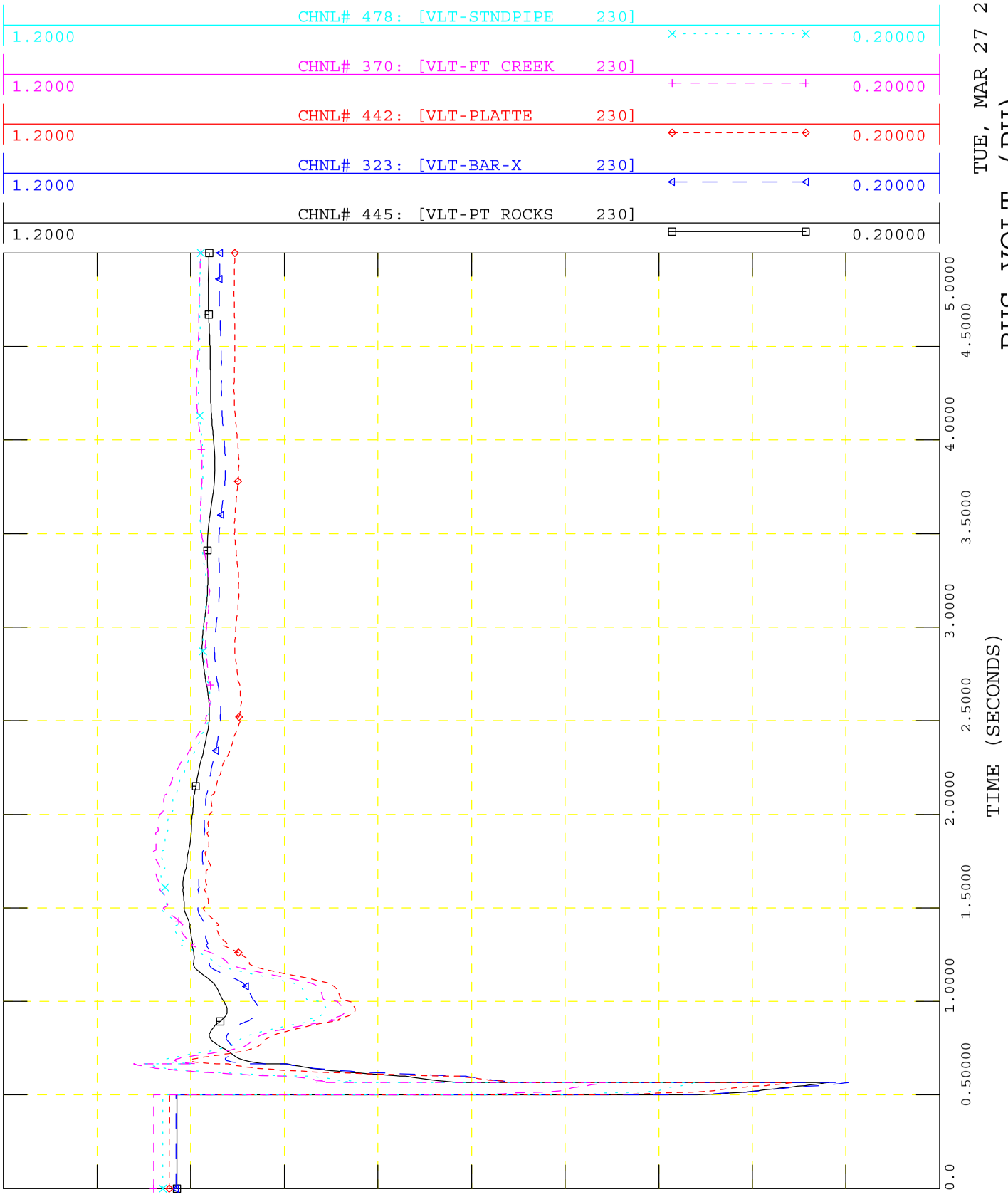
TUE, MAR 27 2018 21:28 PLT 3



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XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1E
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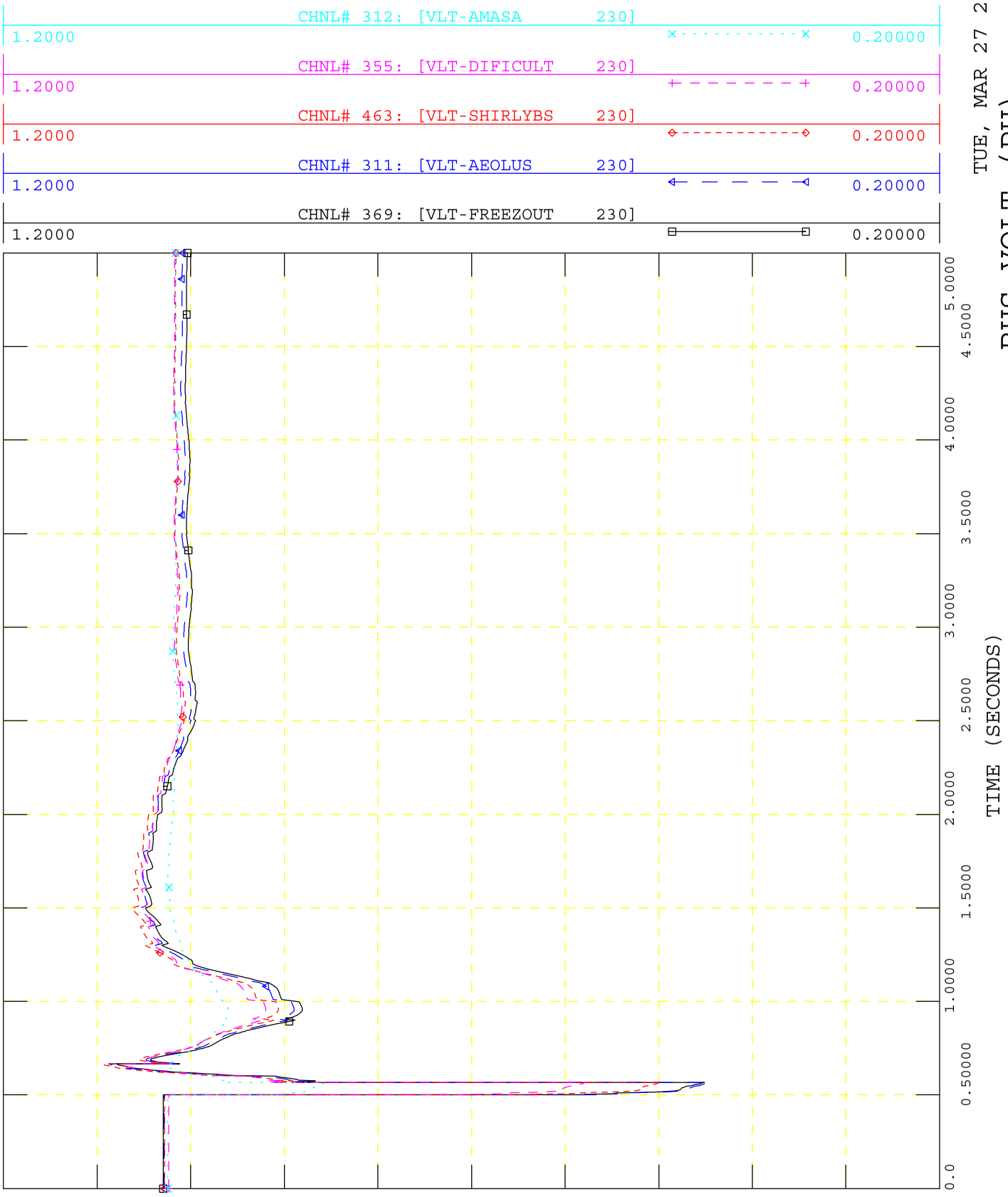
TUE, MAR 27 2018 21:28 PLT 4



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1E
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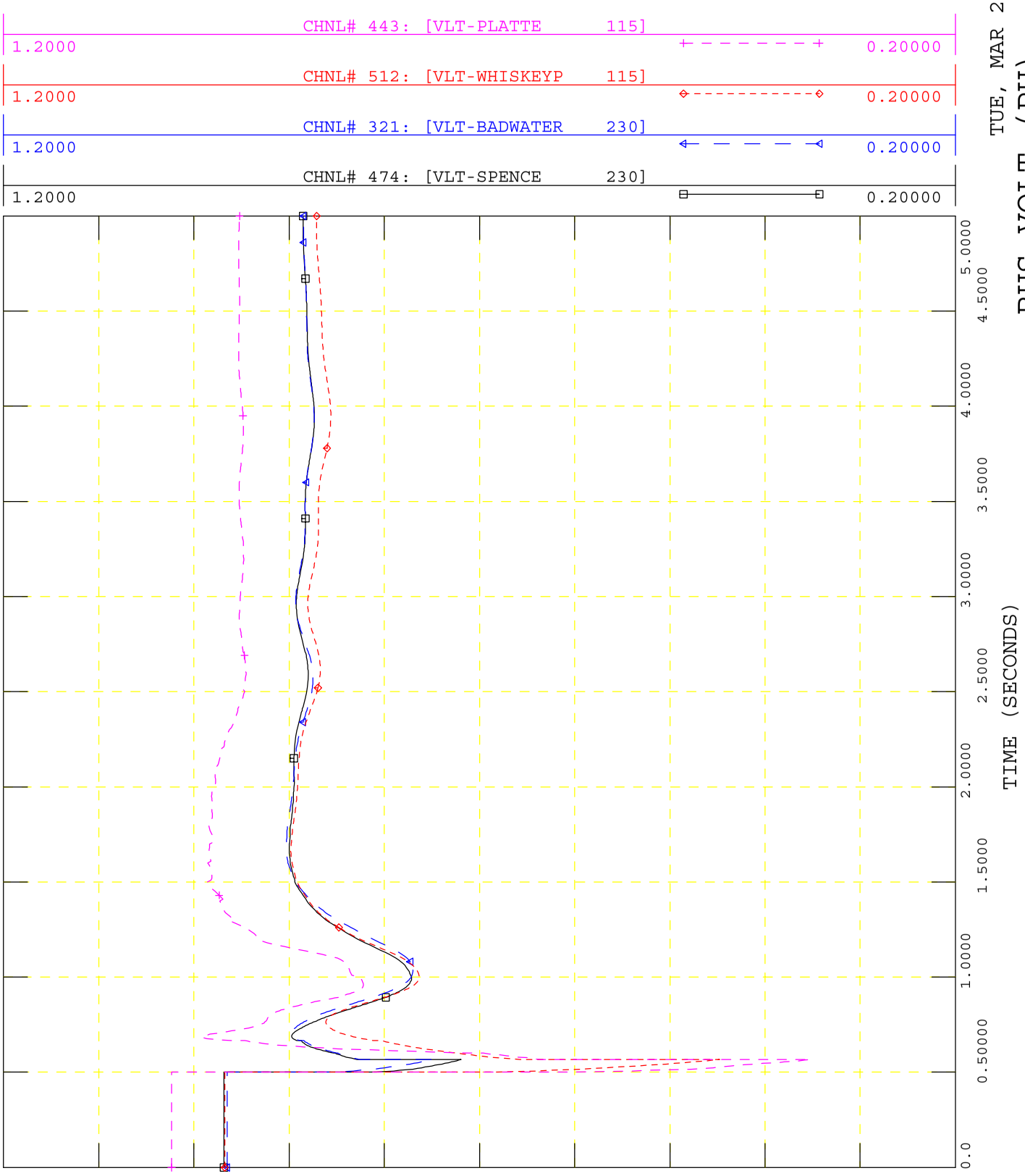

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TUE, MAR 27 2018 21:28 PLT 6

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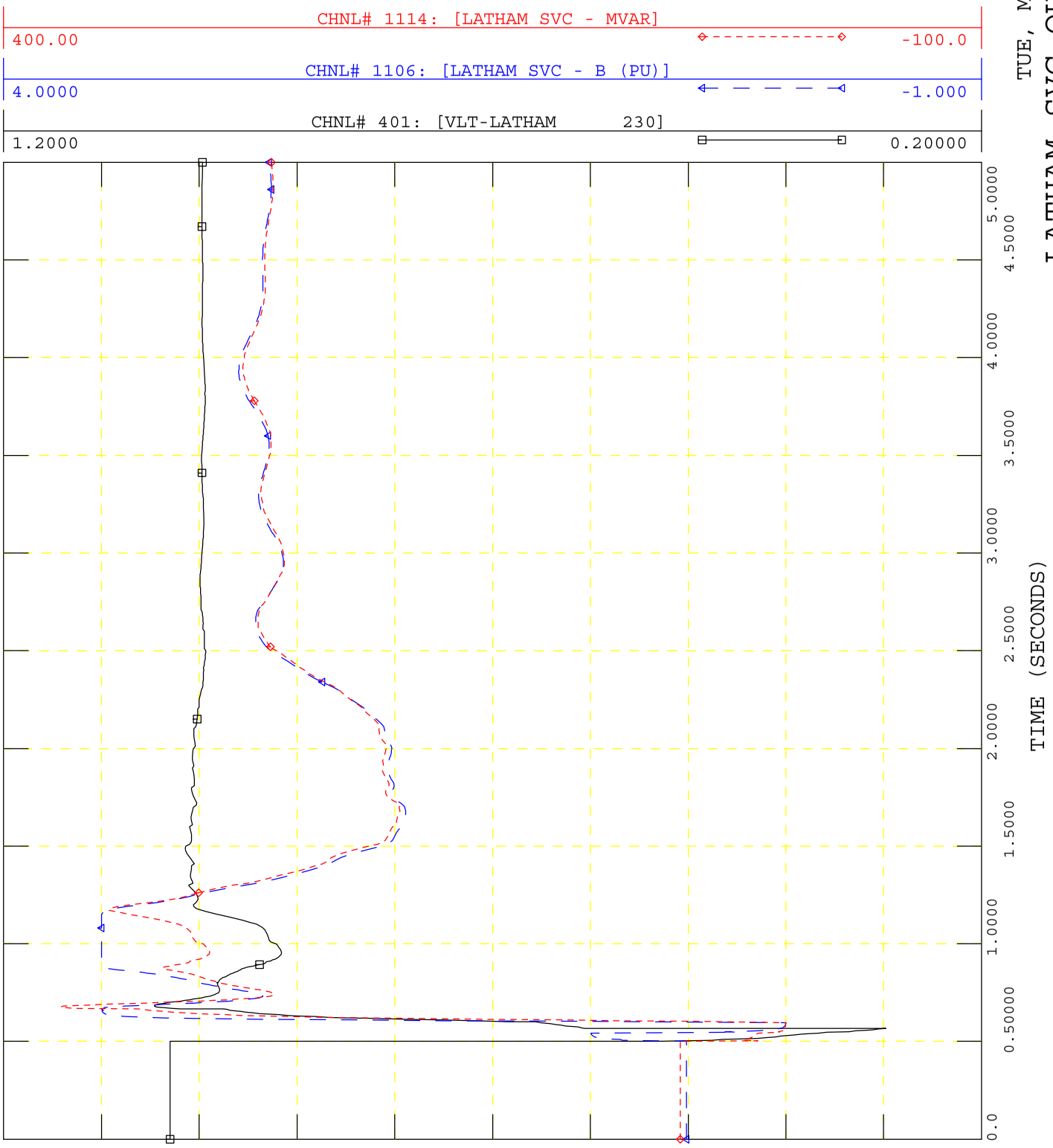

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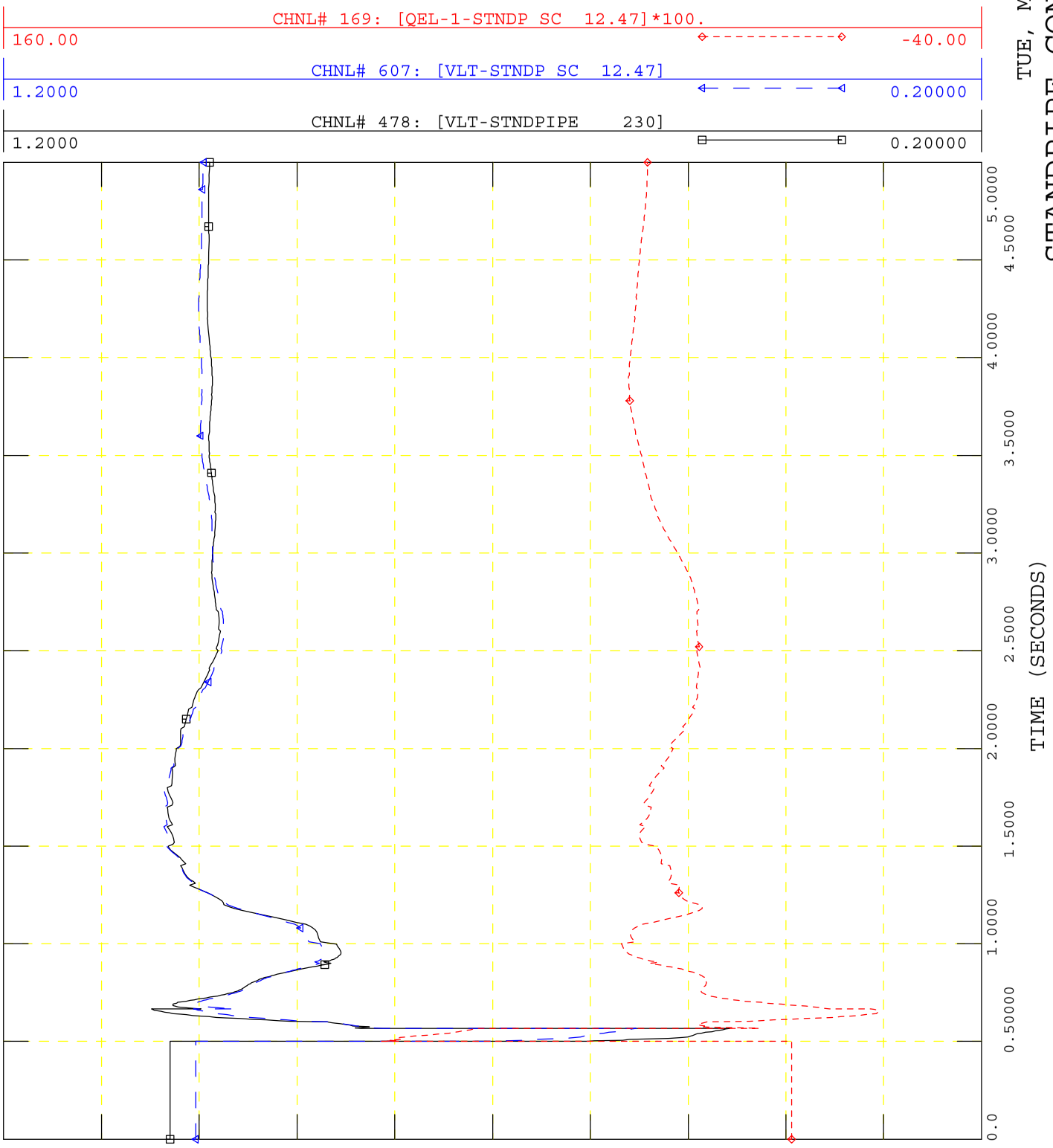
TUE, MAR 27 2018 21:28

STANDPIPE CONDNSR PLT 7



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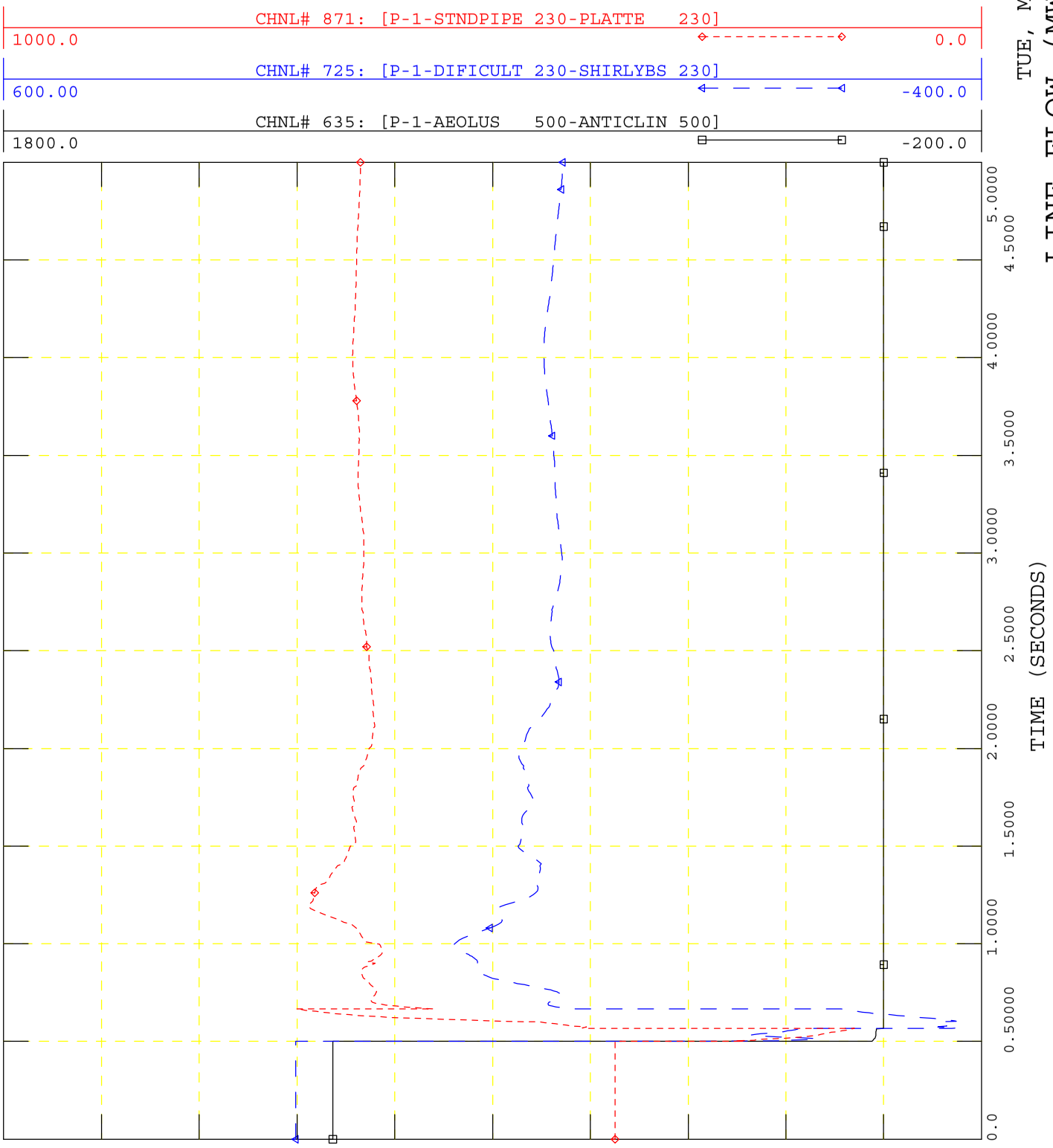
TUE, MAR 27 2018 21:28 PLT 8



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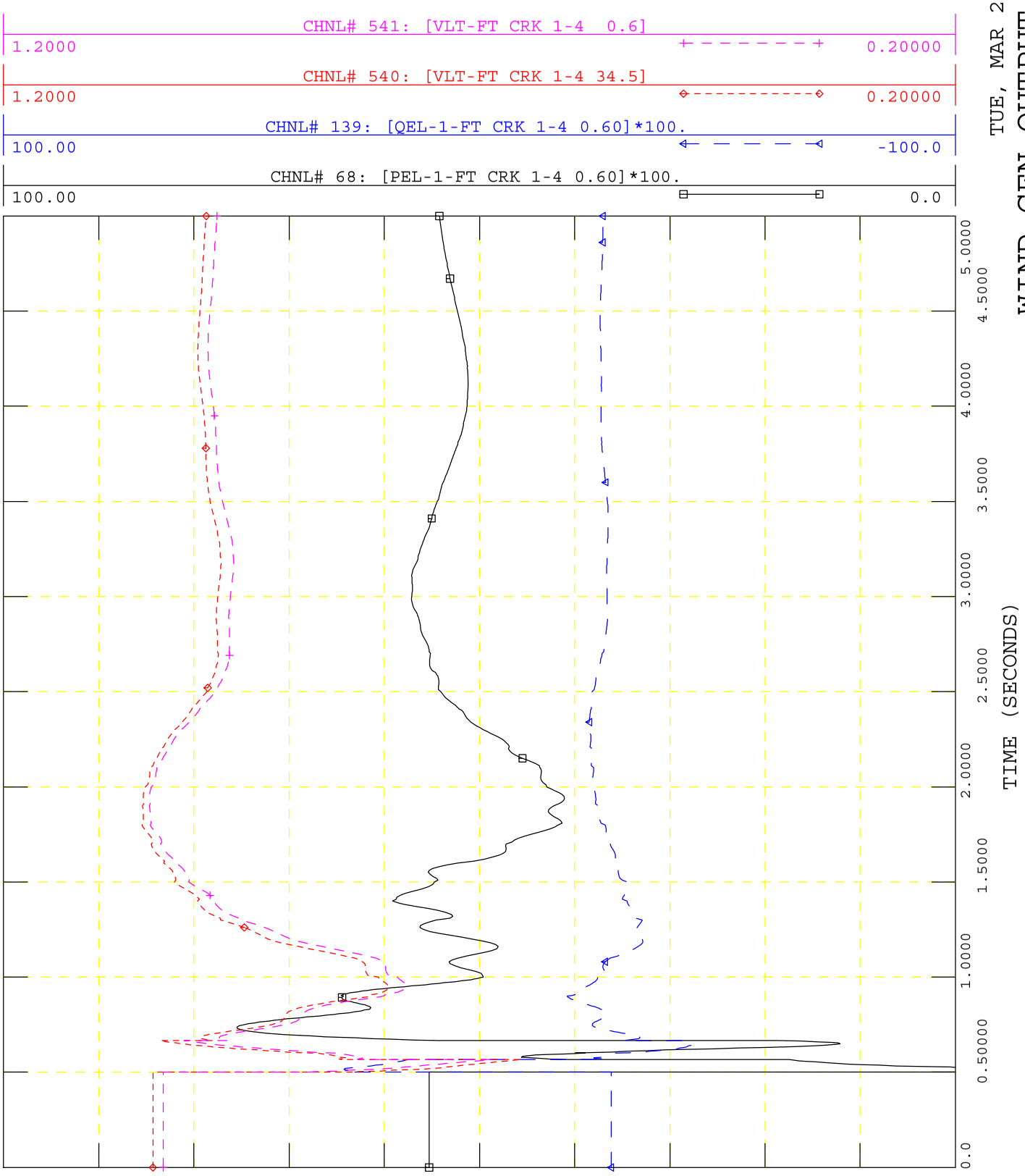

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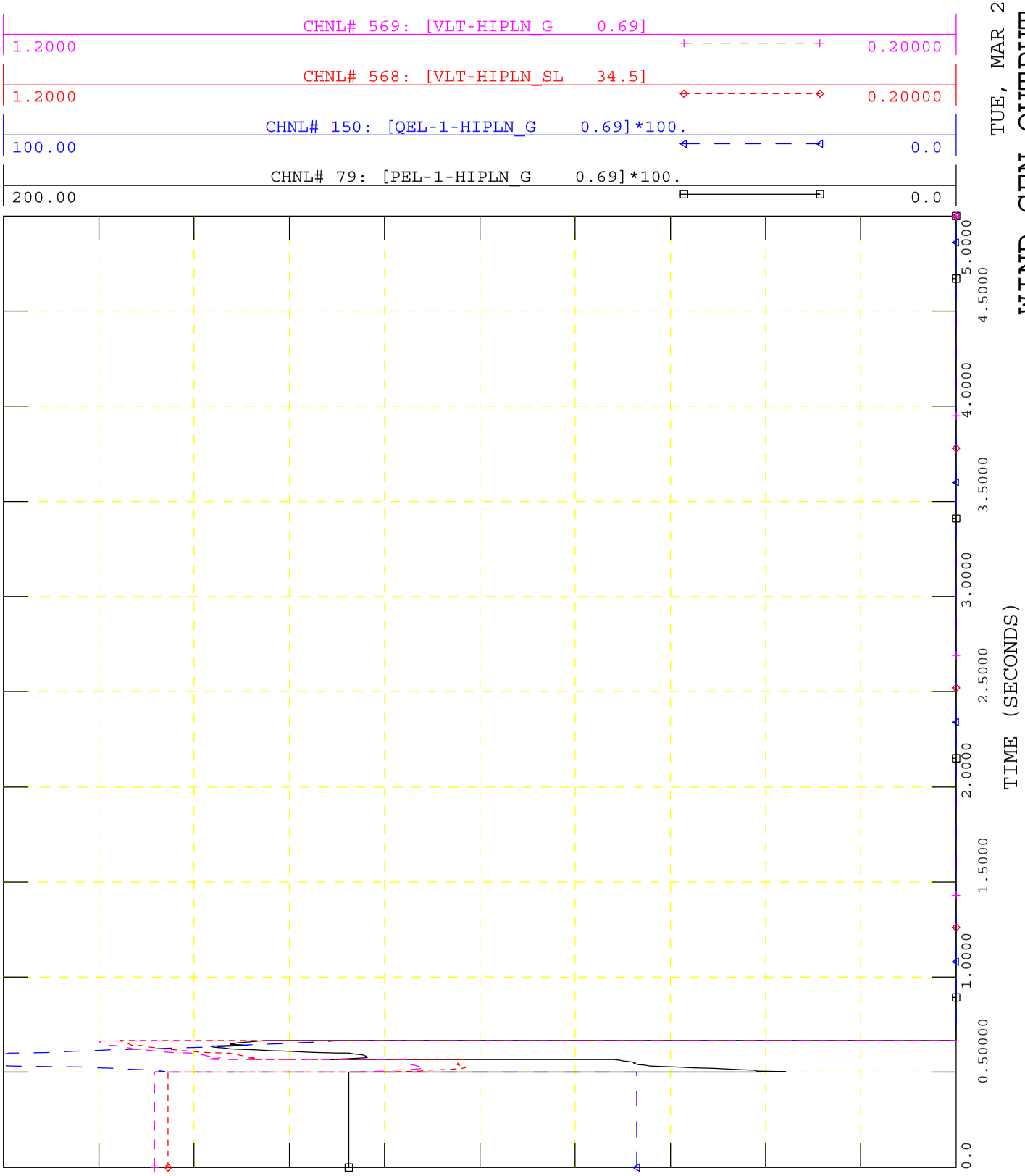

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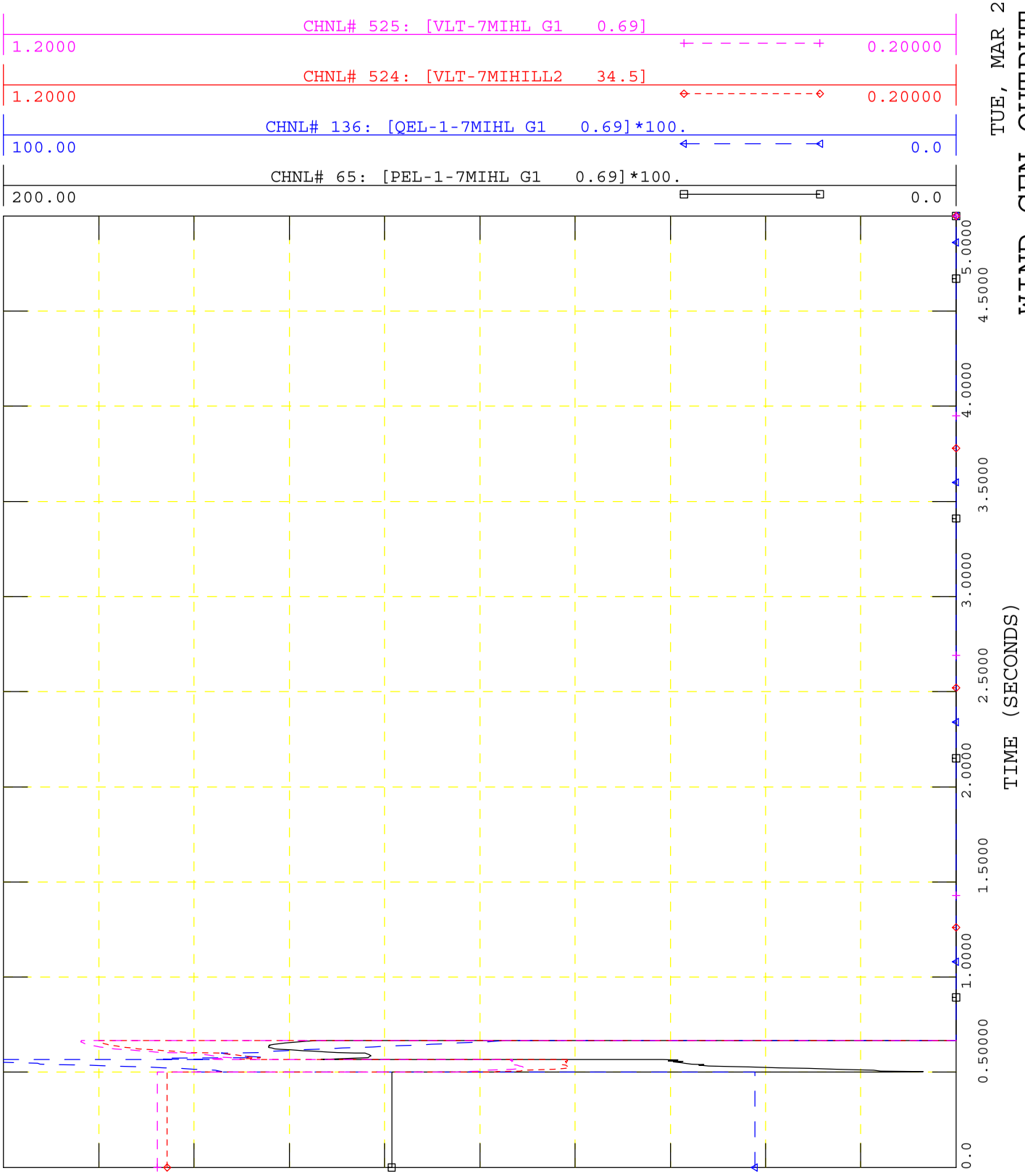

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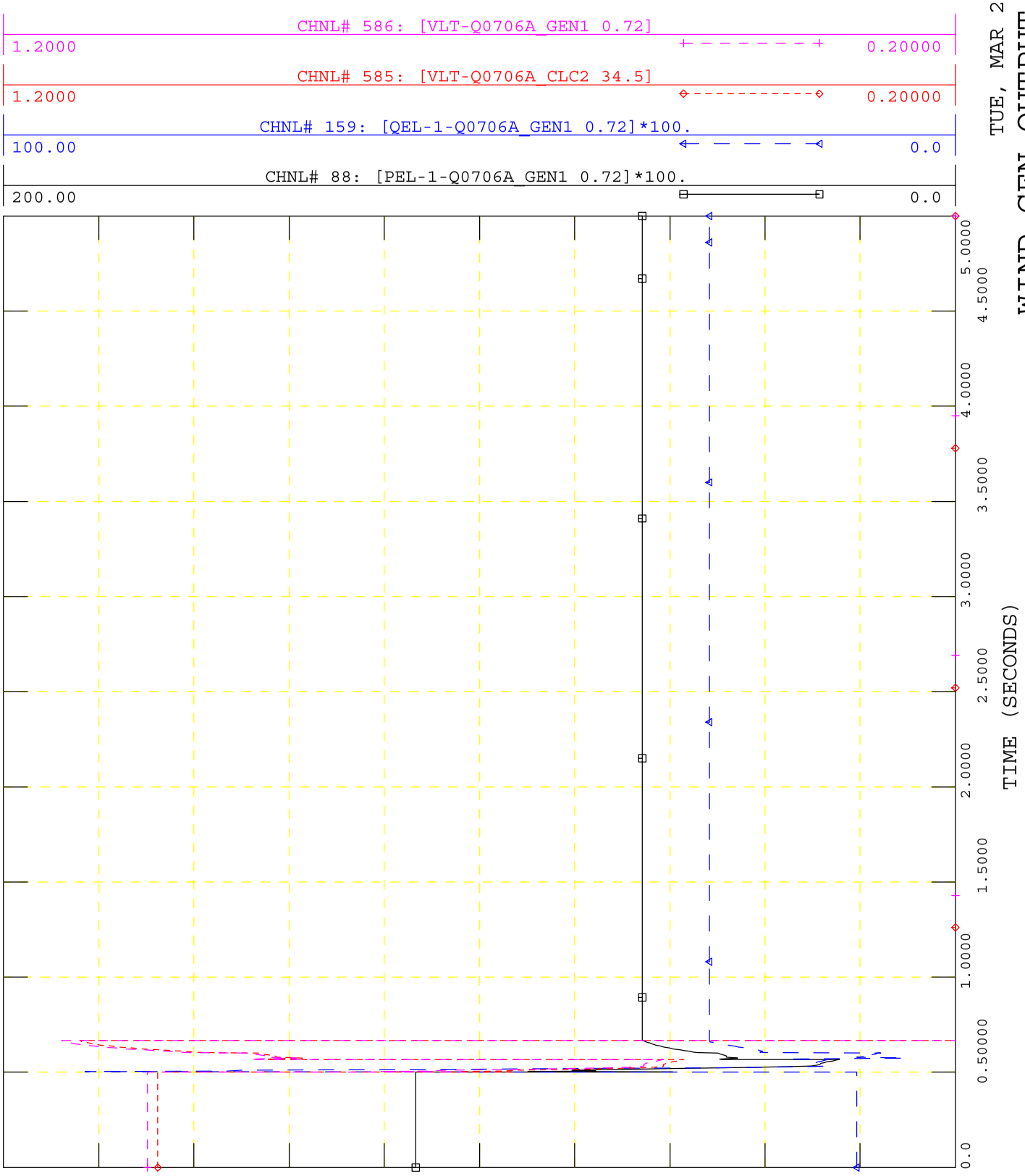

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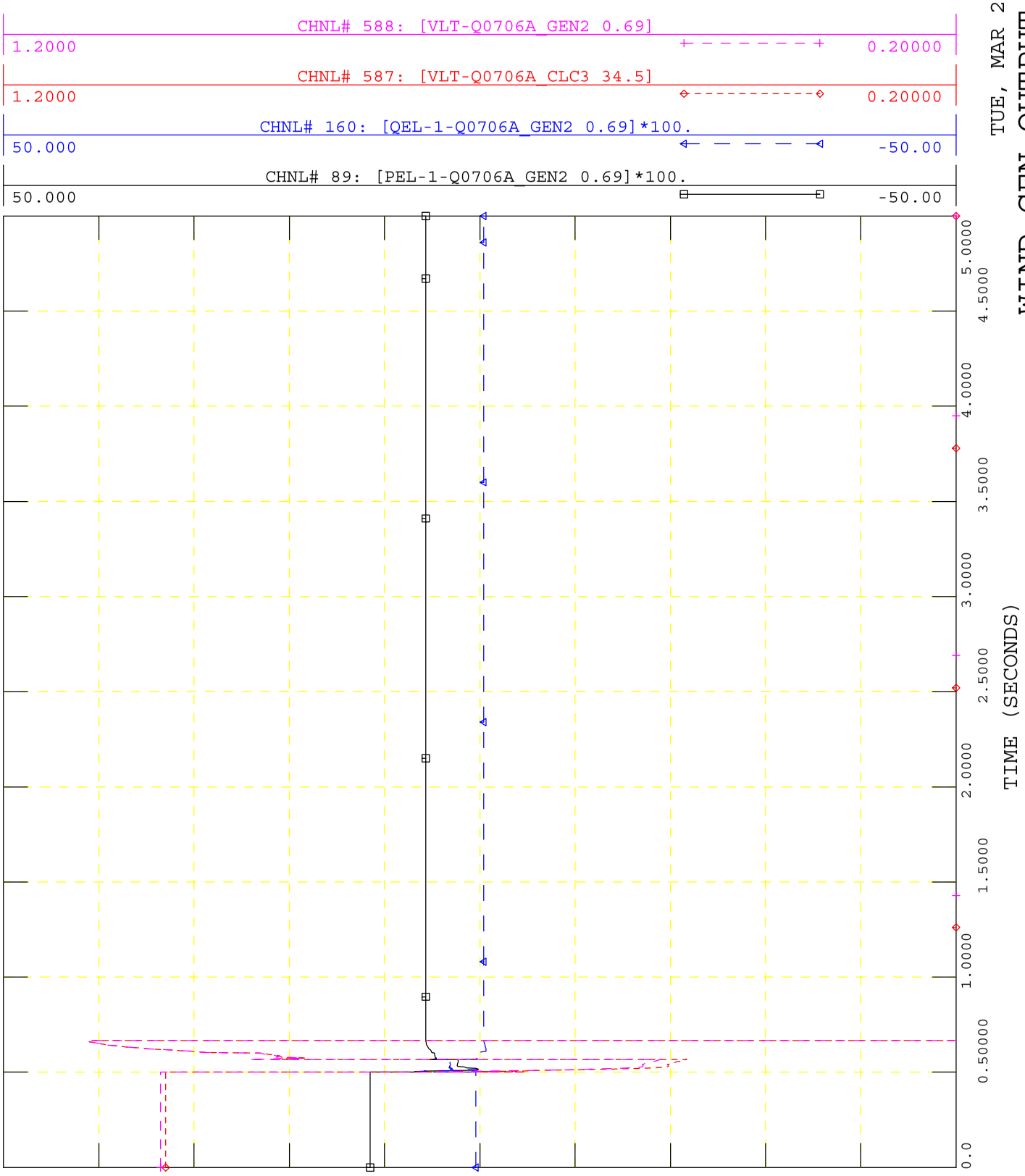

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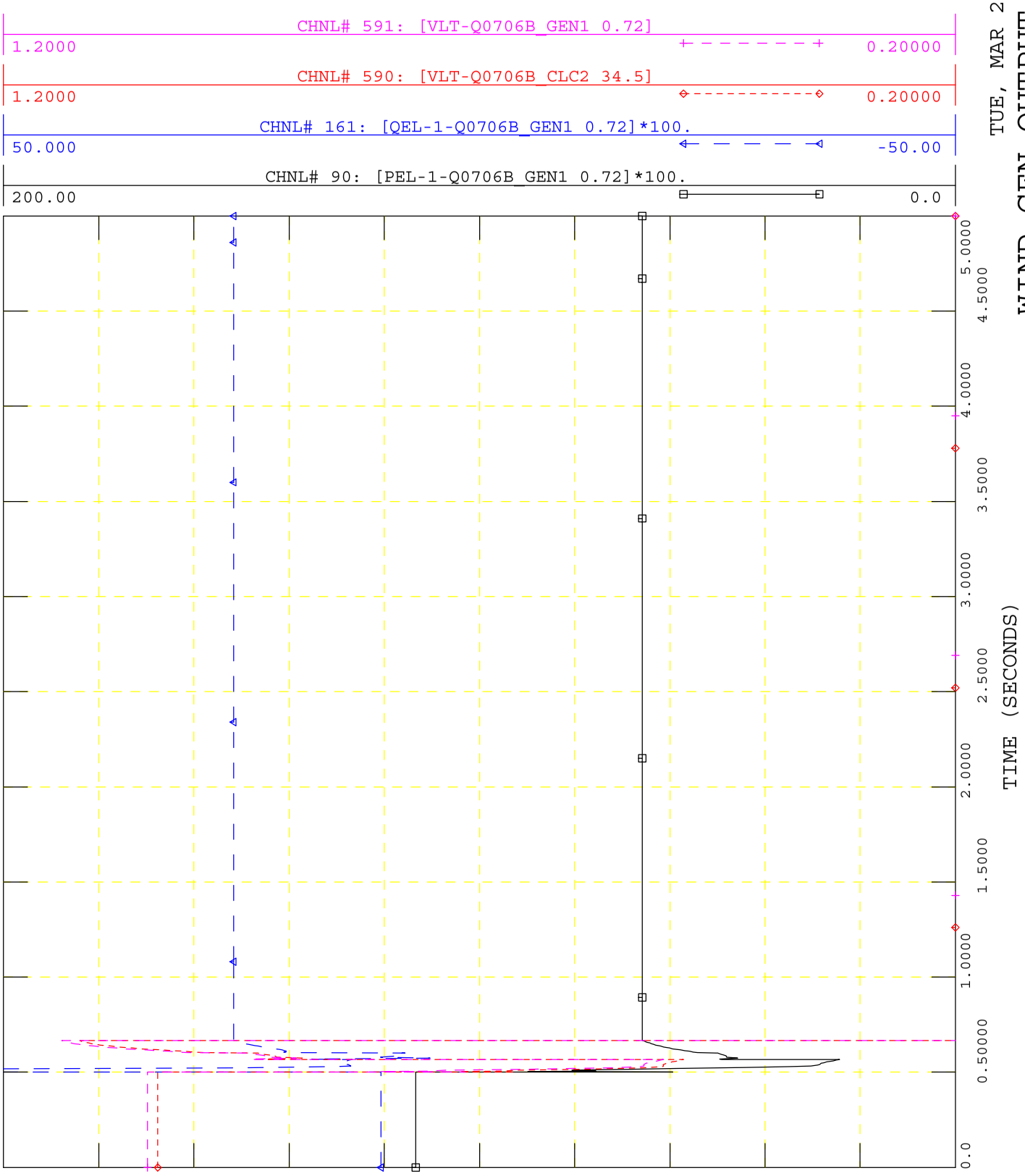

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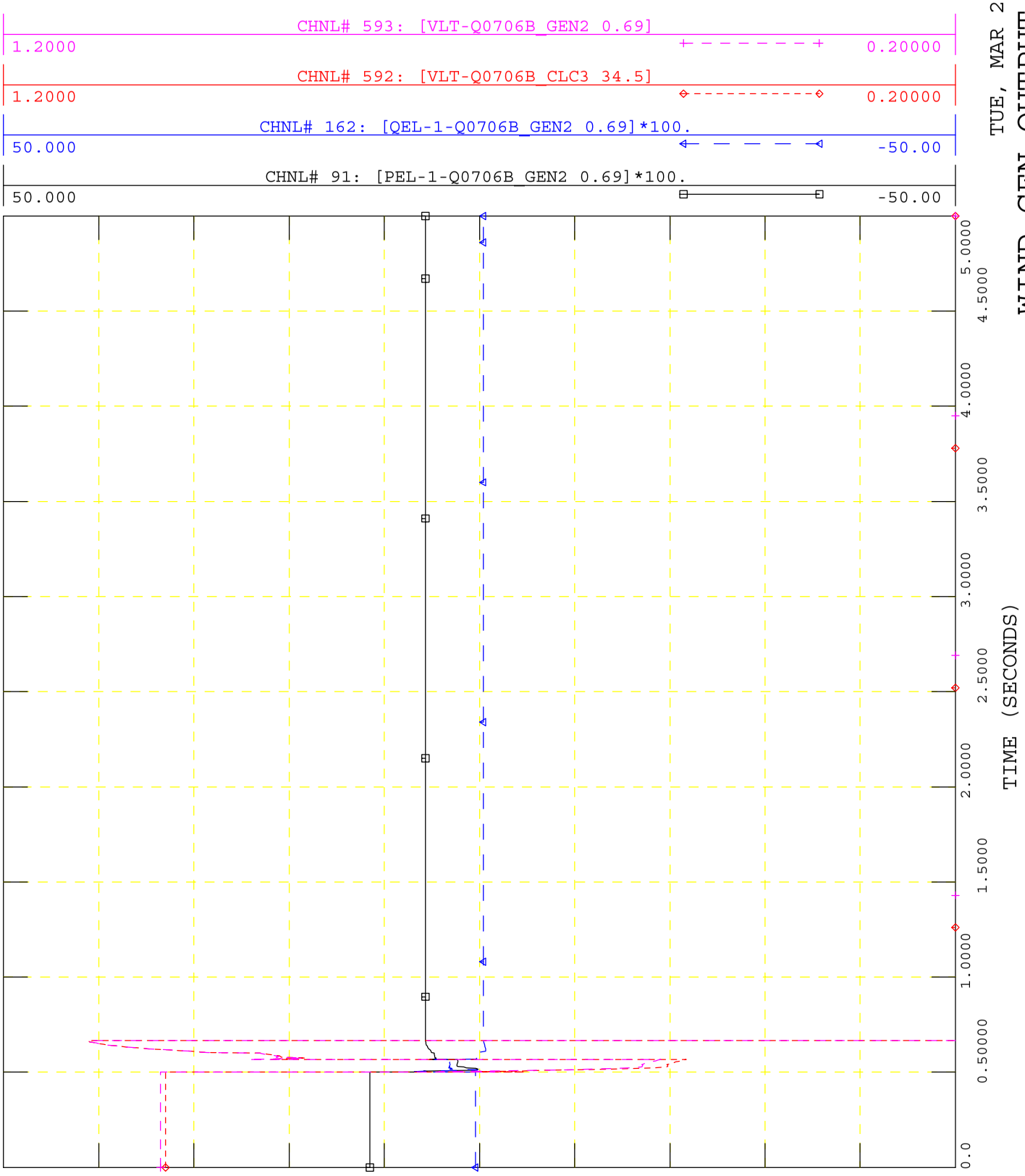

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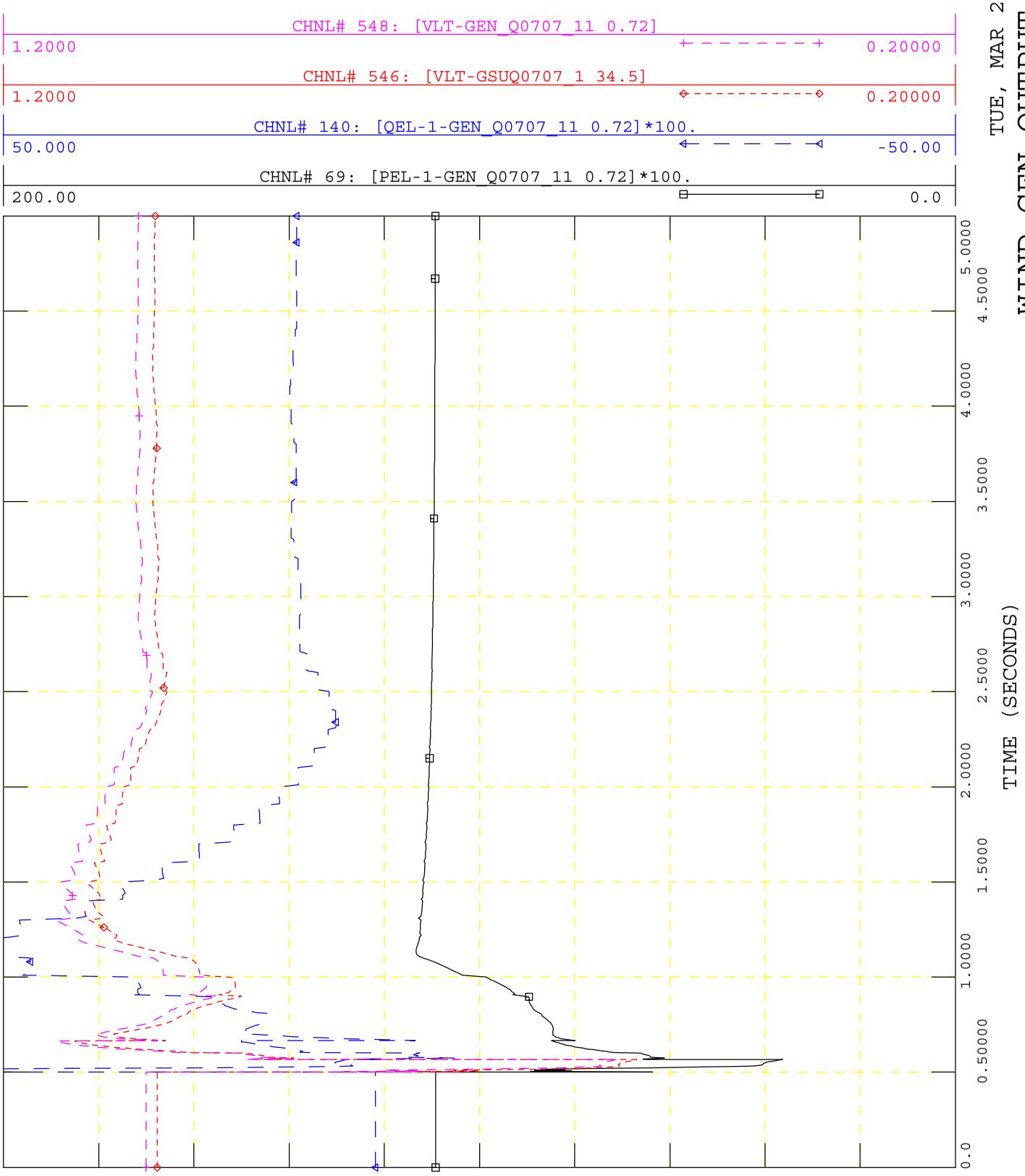

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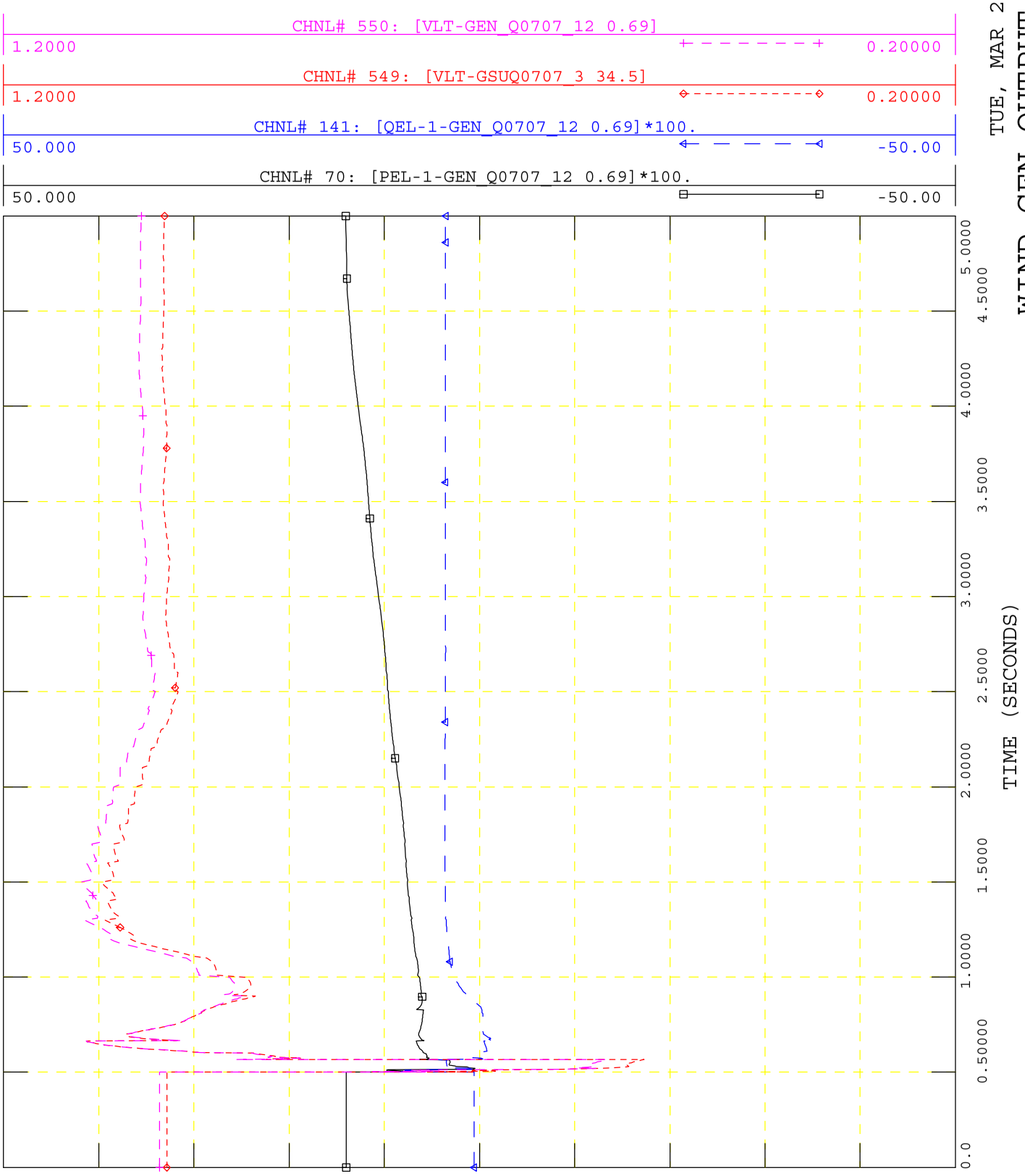

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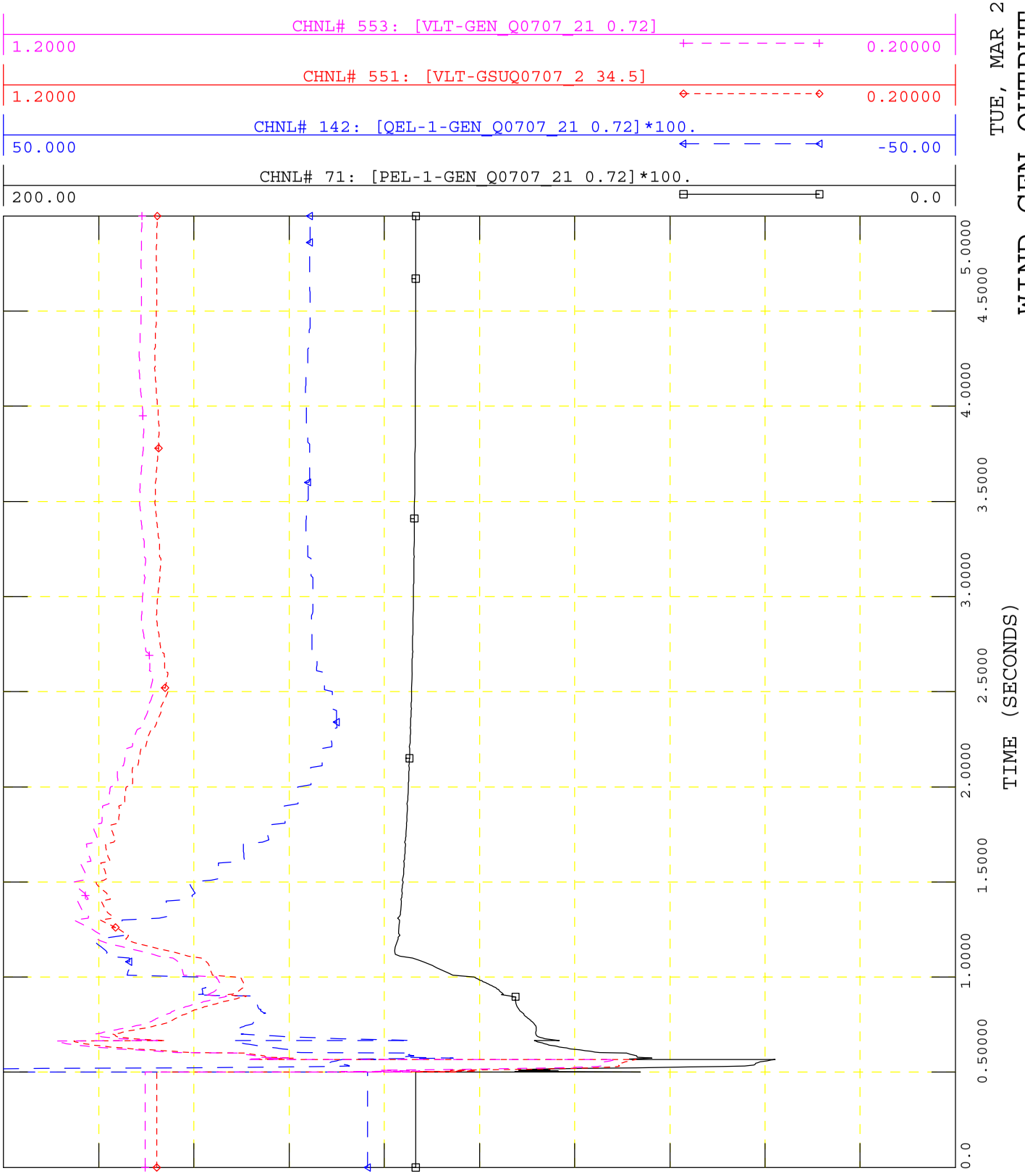

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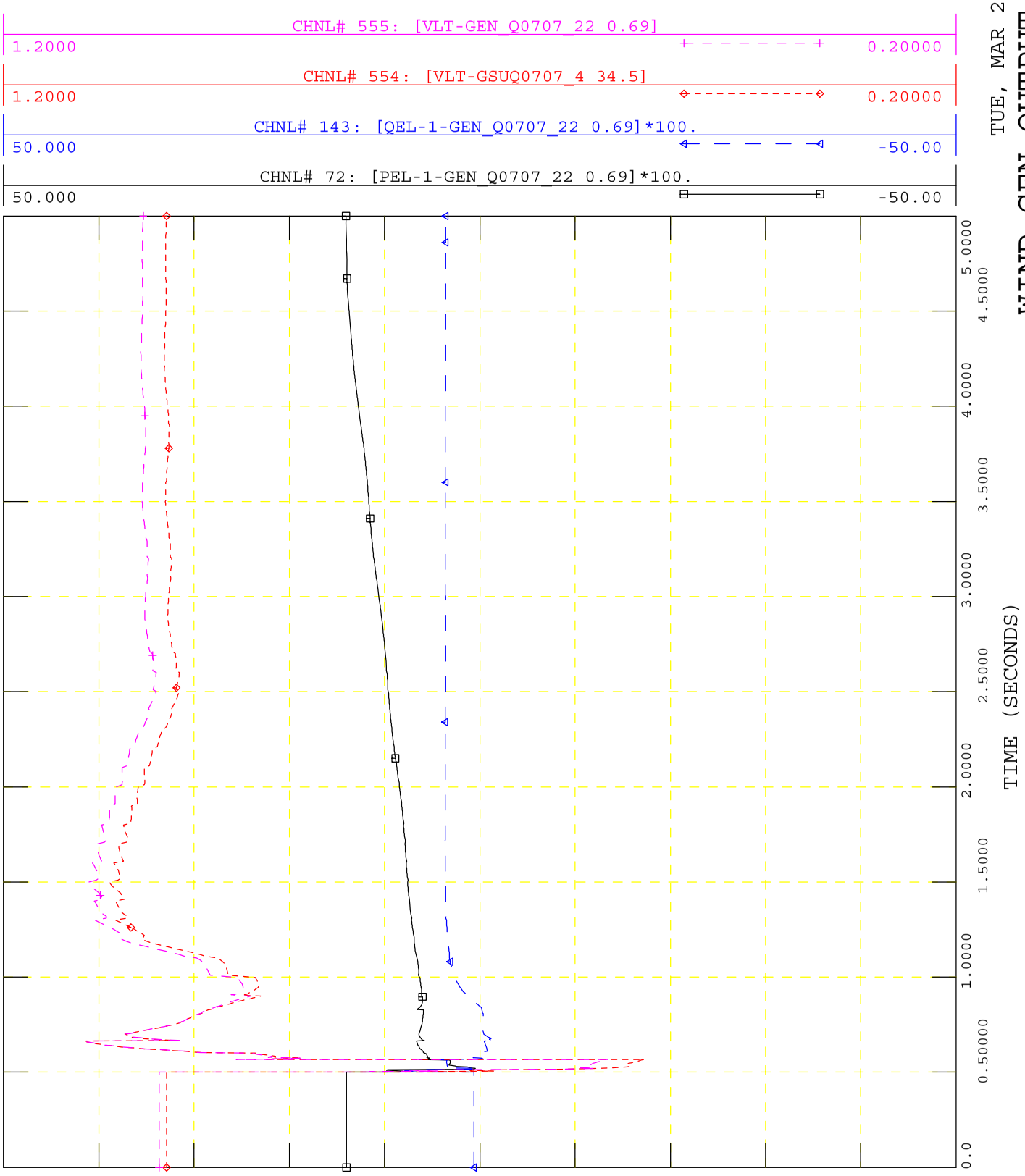

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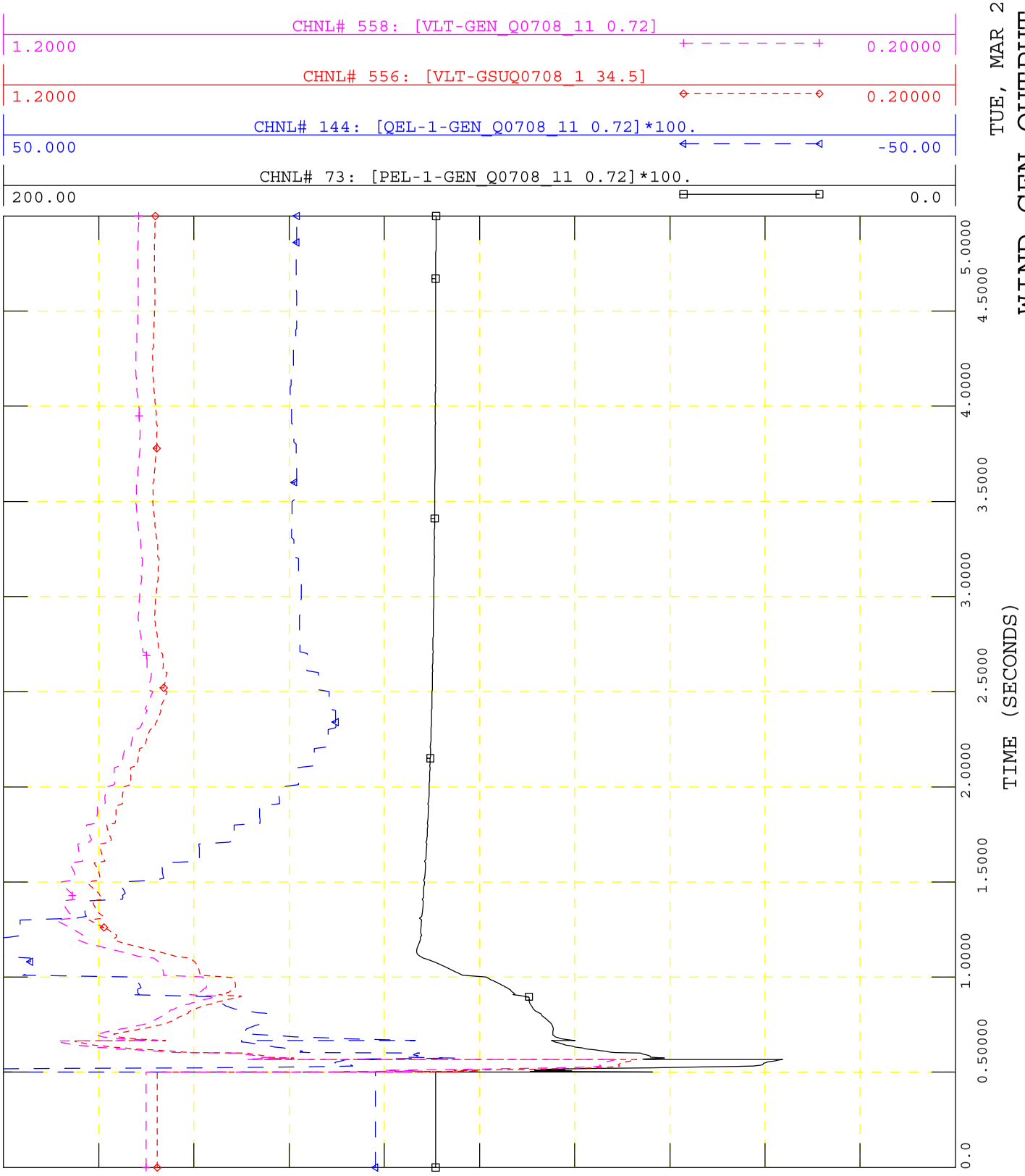

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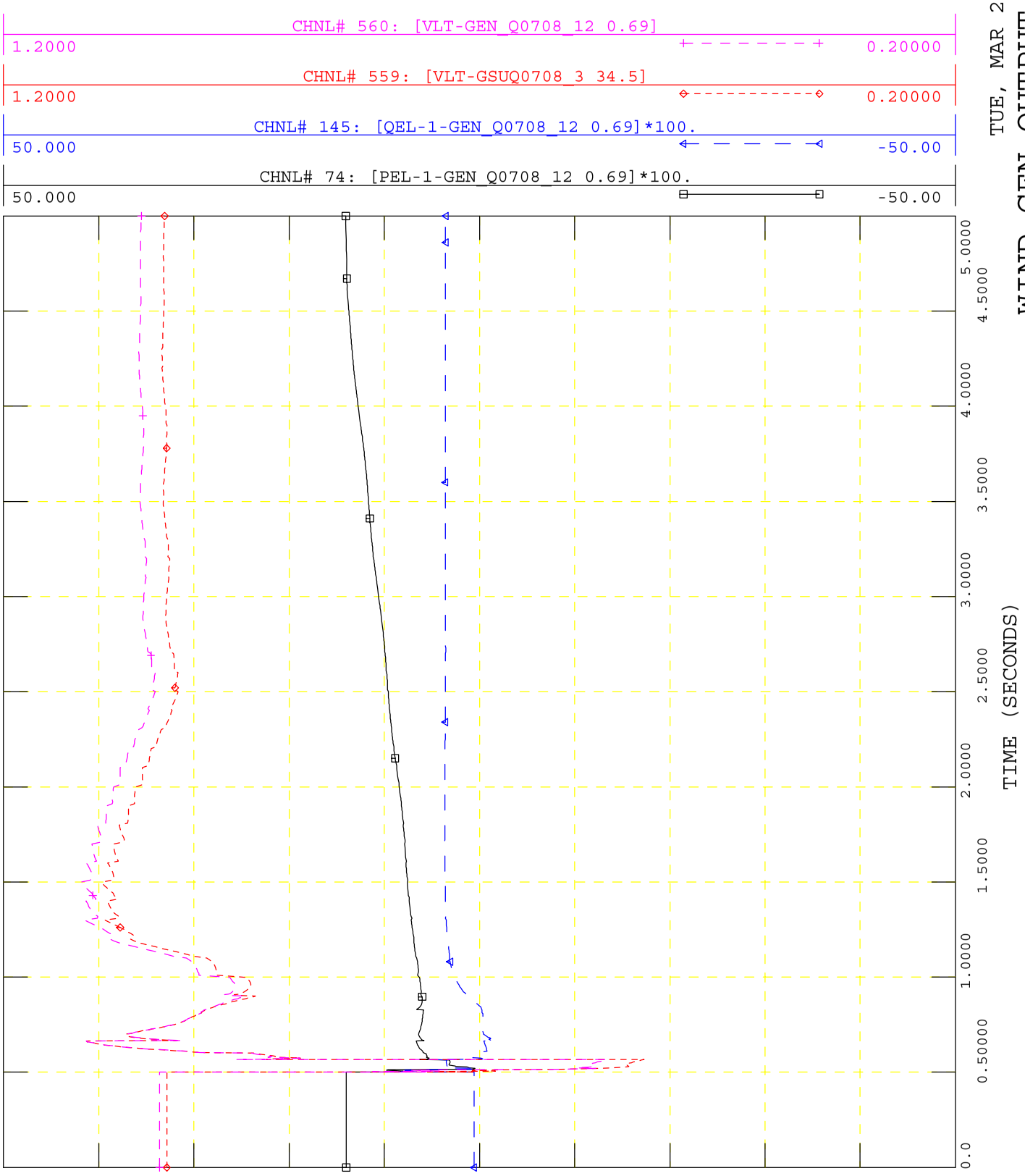

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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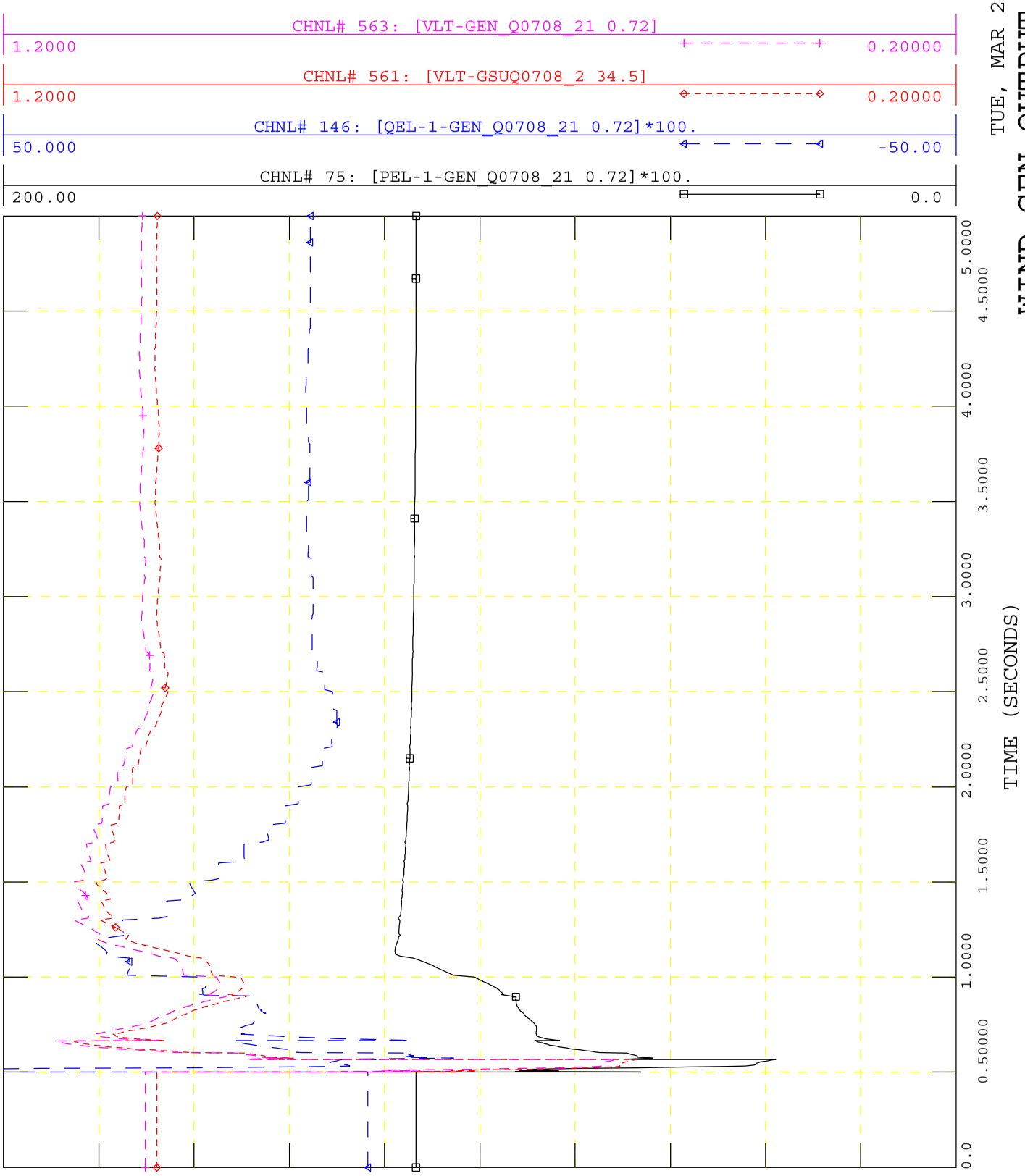

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TUE, MAR 27 2018 21:28 PLT 23

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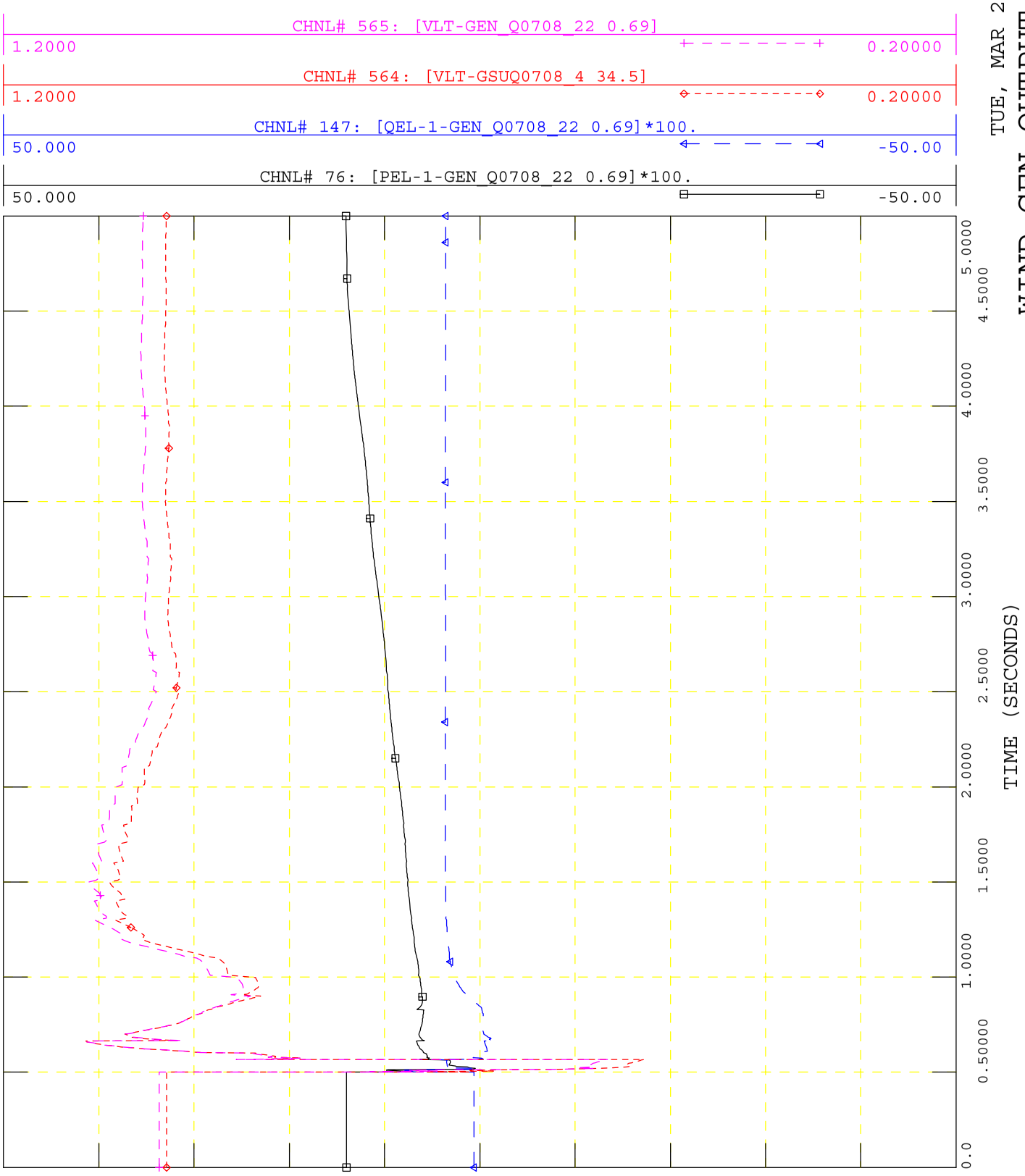

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TUE, MAR 27 2018 21:28 PLT 24

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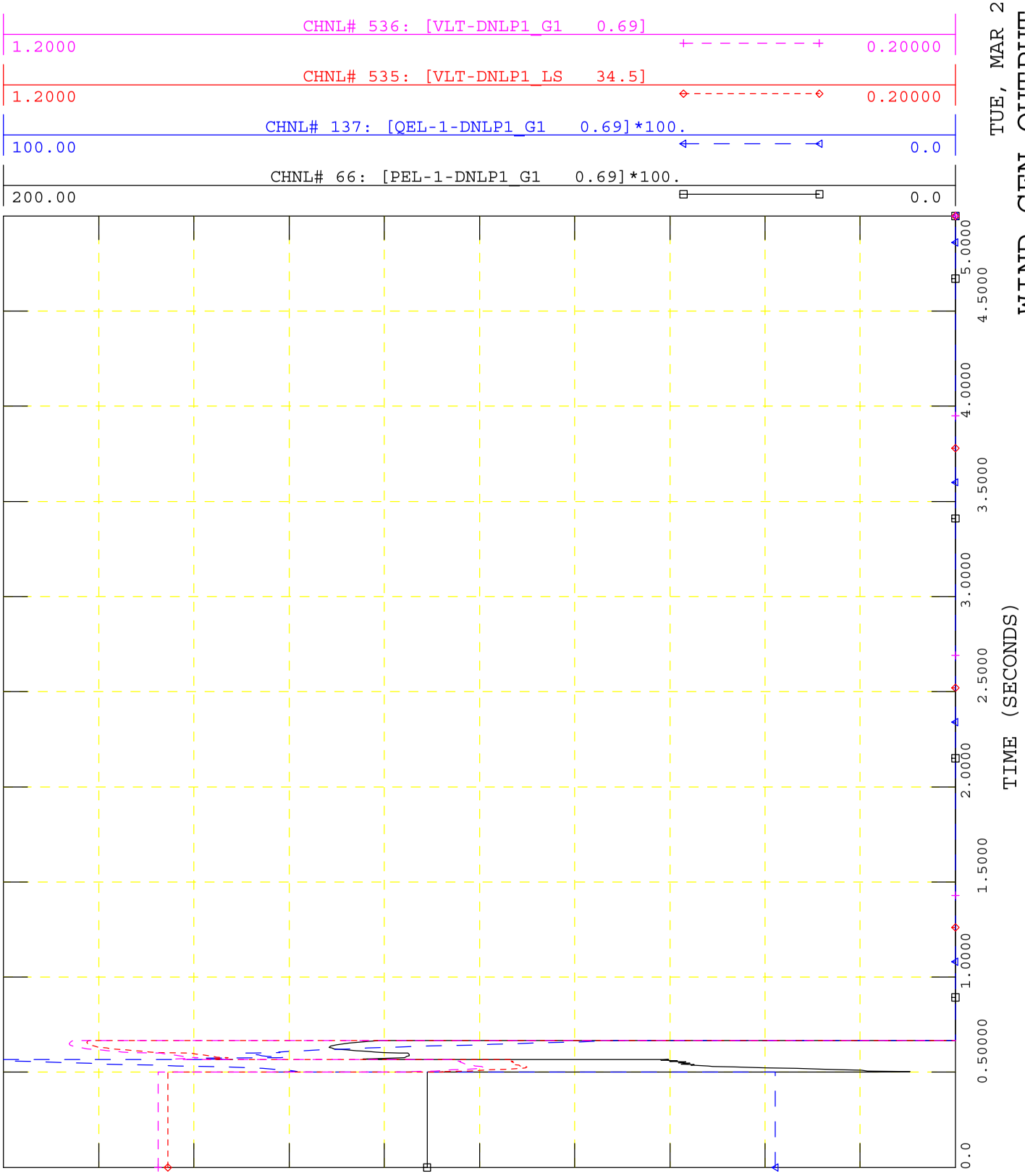

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XFMR. 36CY-UNBLOCK SVC. 40CY-TRP 607 MW WND GEN. OUTAGE 1E
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TUE, MAR 27 2018 21:28 PLT 25

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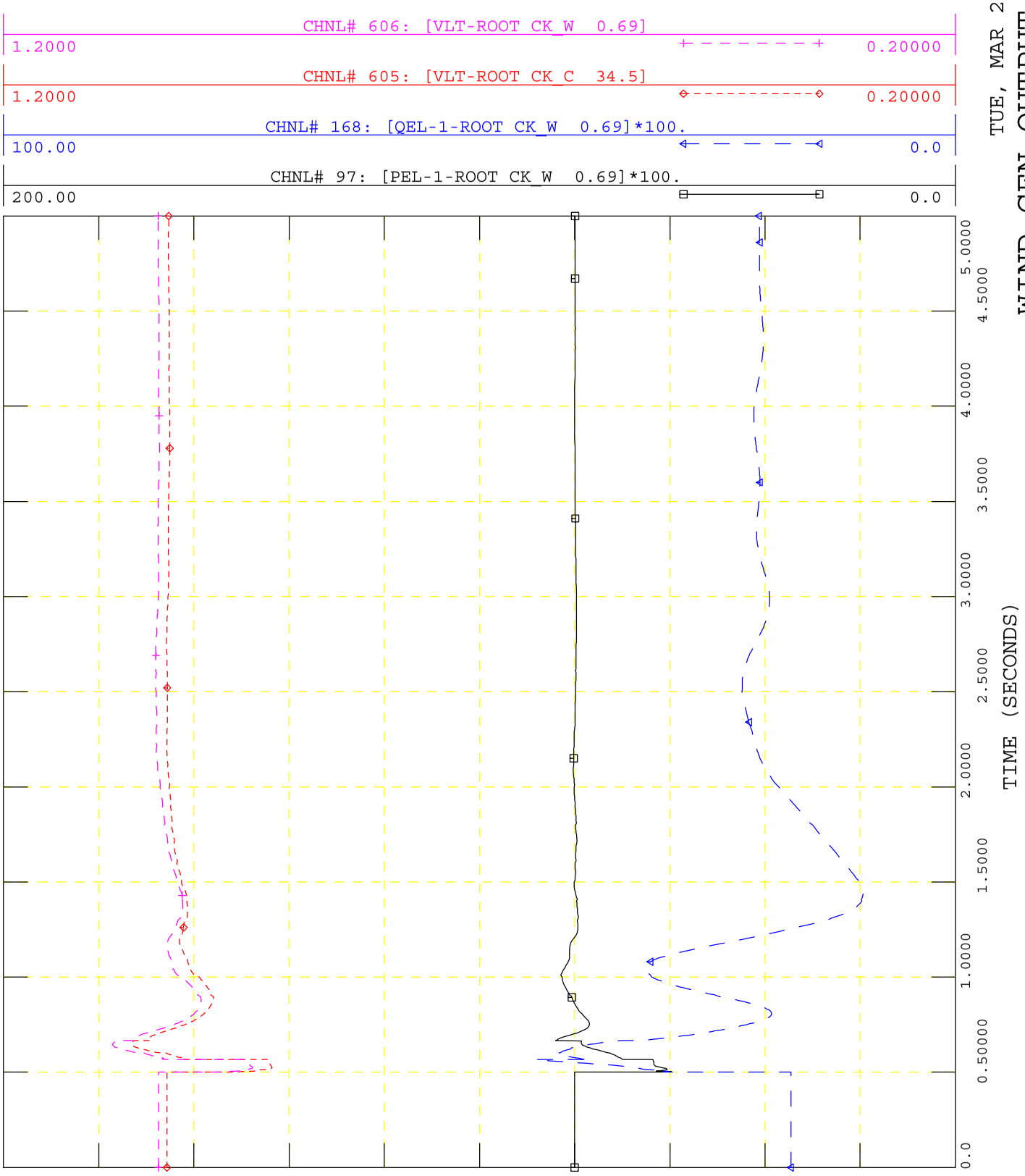

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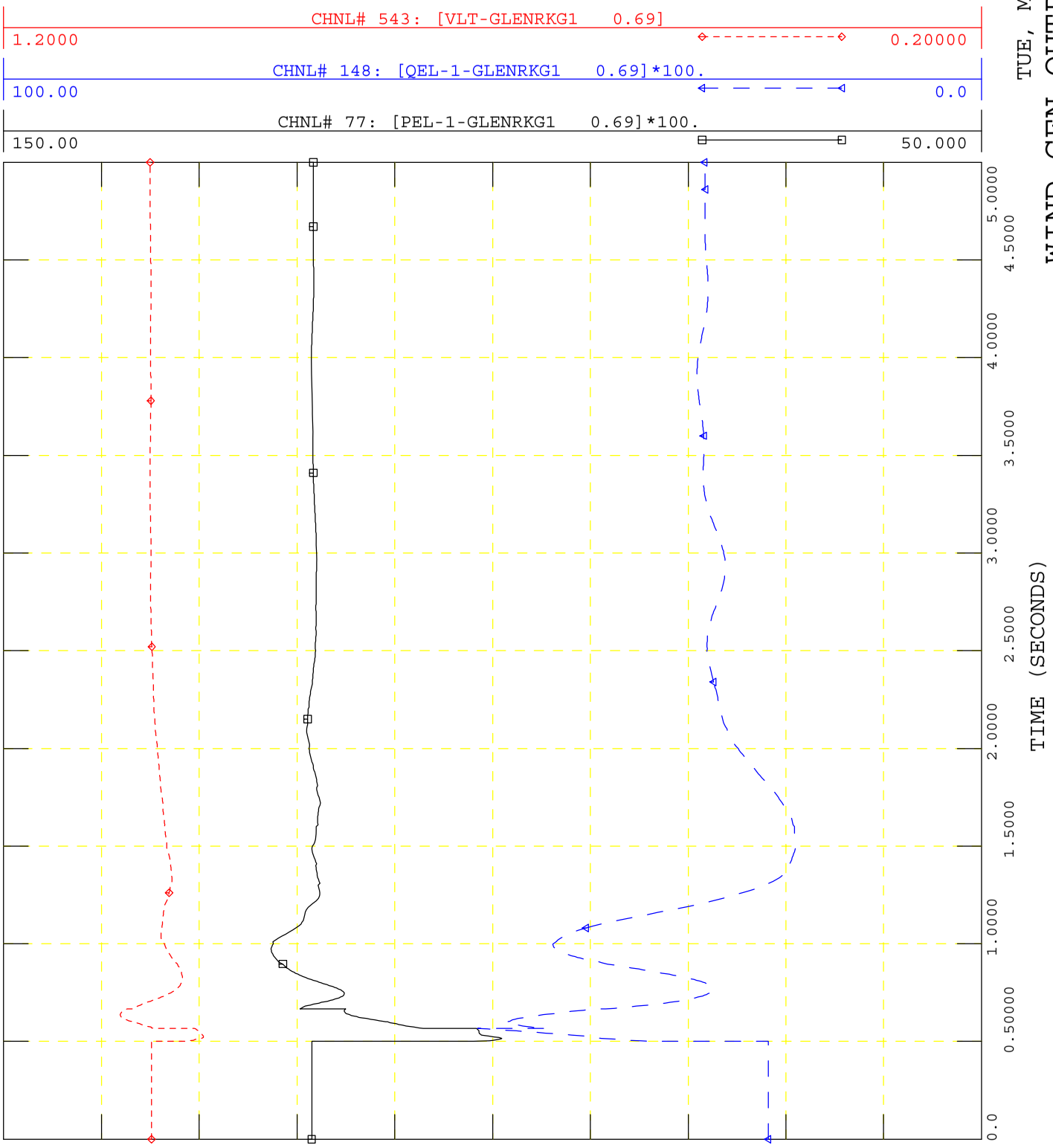
WIND GEN OUTPUT PLT 26



Dynamic Simulation

Case 1f1 – Loss of Bridger-Anticline 345 kV line with 607 MW generator tripping

30 cycles	**3 phase Bridger 345 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Bridger-Anticline 345 kV line, trip 200 MVAR shunt capacitors at Anticline and Aeolus 500 kV subs**
36 cycles	**Remove SVC MVAR limiter**
40 cycles	**Trip High Plains wind generation (127.5 MW)** **Trip 7 Mile Hill wind generation (118.5)** **Trip Q0706 A&B (Ekola Flats) wind generation (249.8 MW)** **Dunlap wind generation (111.0 MW)**
5 sec.	**Terminate simulation**

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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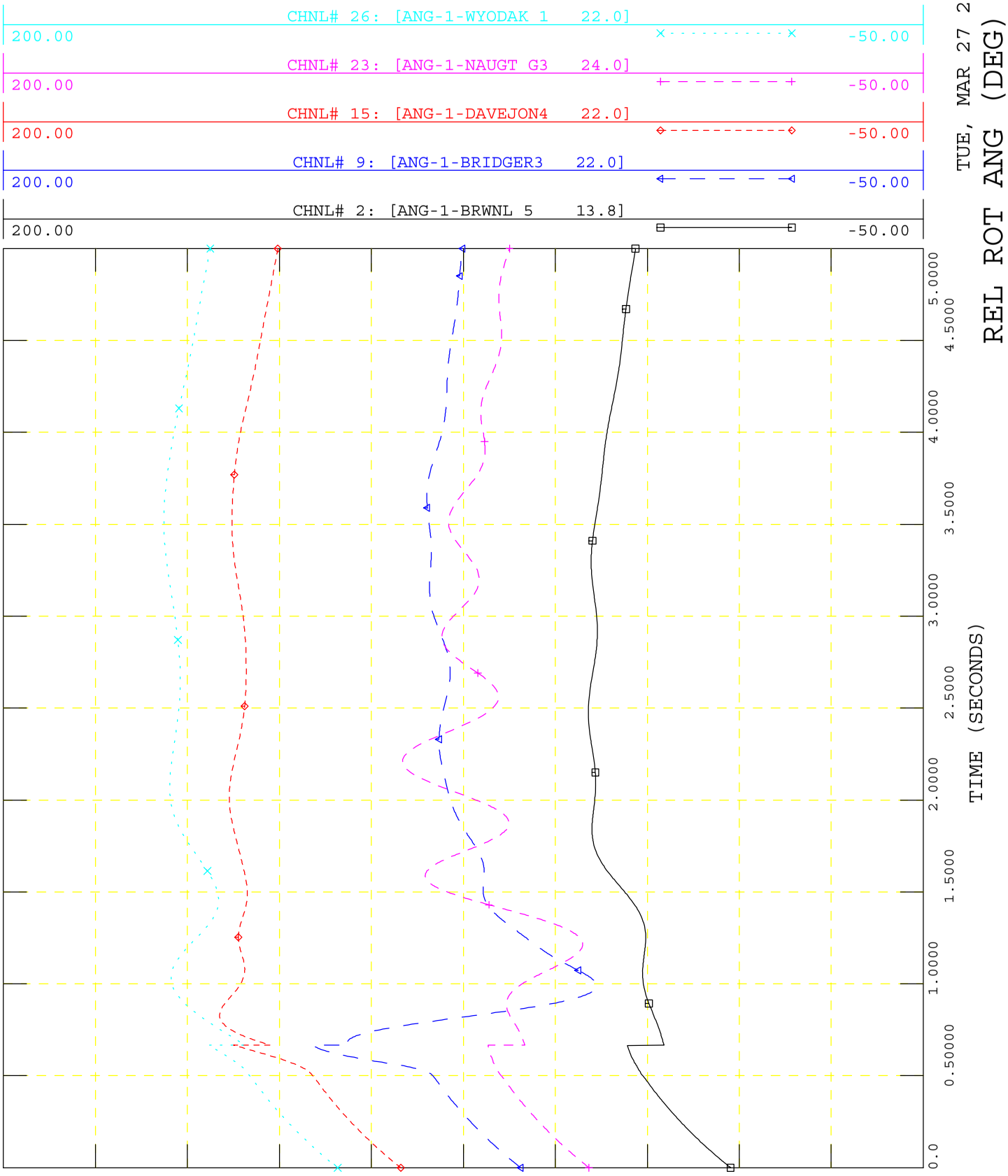

TUE, MAR 27 2018 21:28
REL ROT ANG (DEG) PLT 1

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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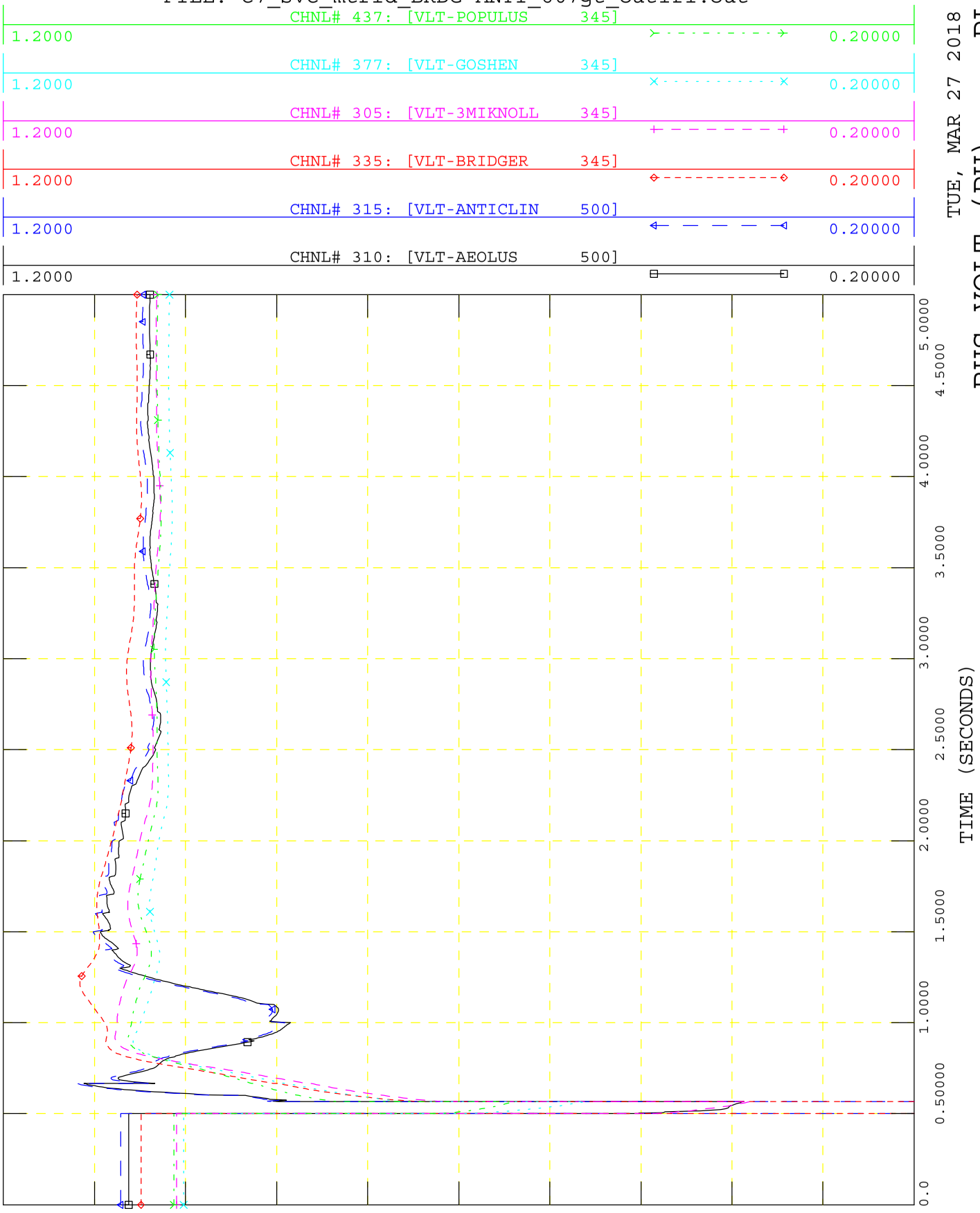

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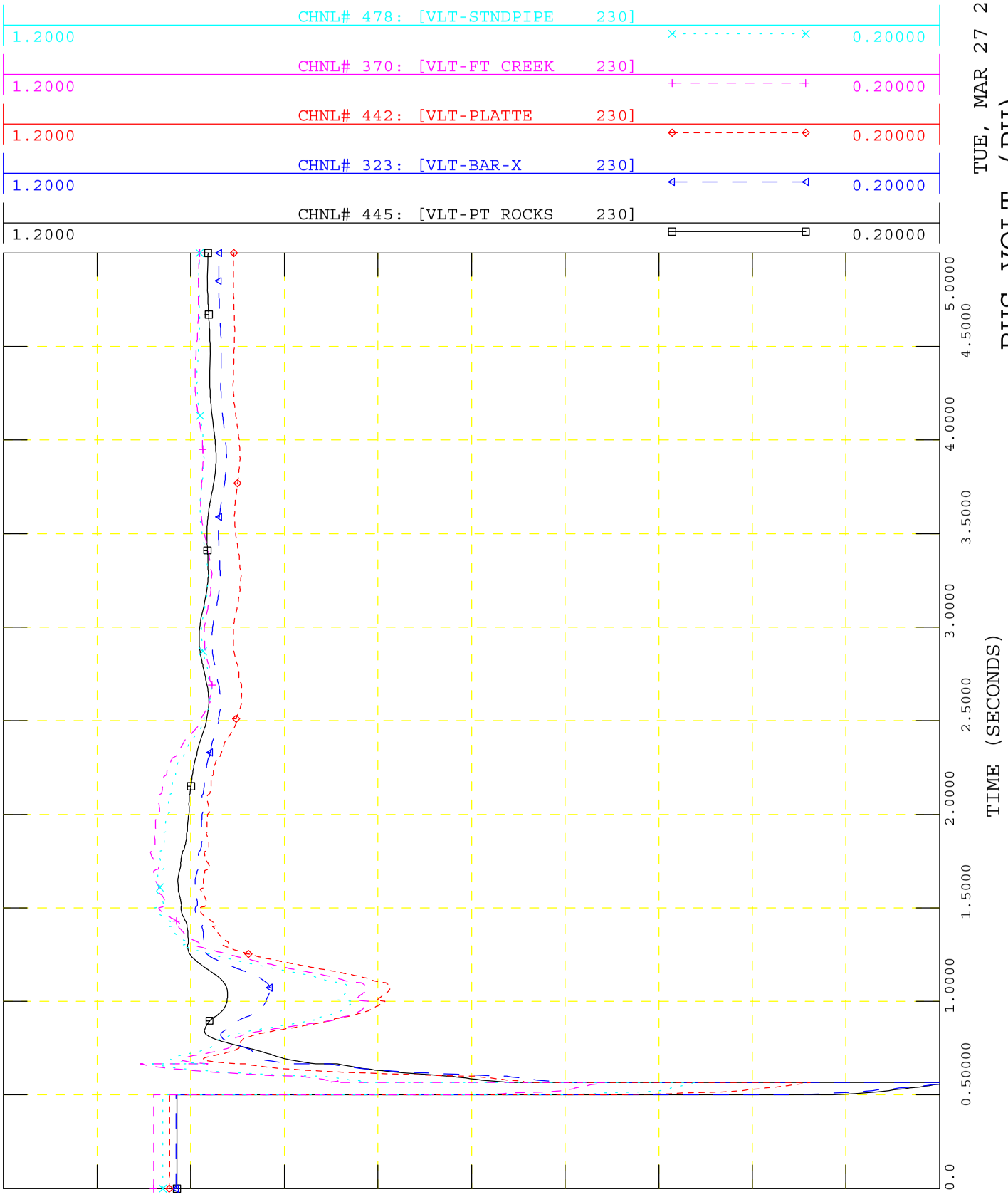
TUE, MAR 27 2018 21:28 PLT 3



SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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345 LN. 36CY-UNBLOCK SVC. 40CY-TRP 607 WND GEN. OUTAGE 1F1
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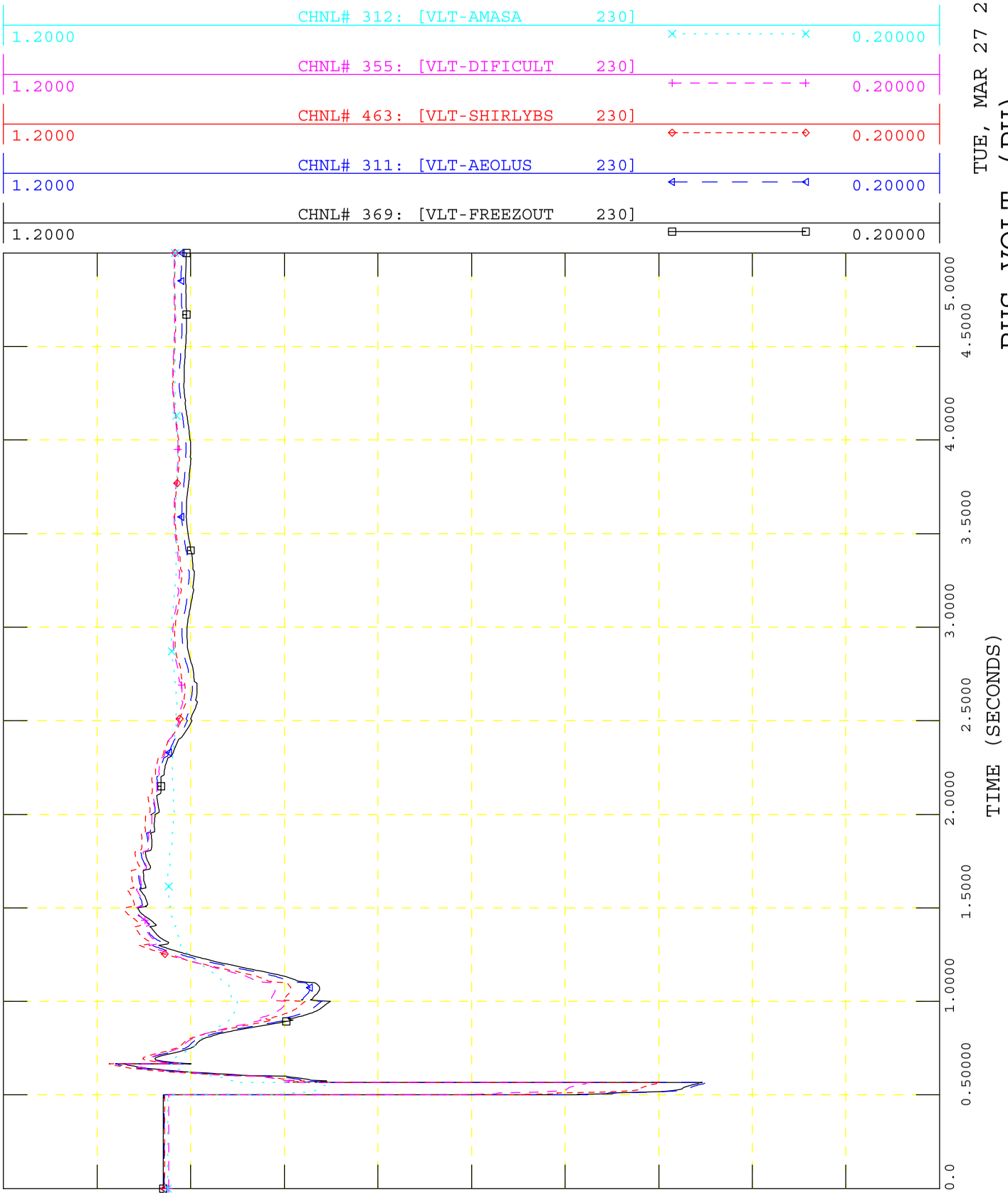

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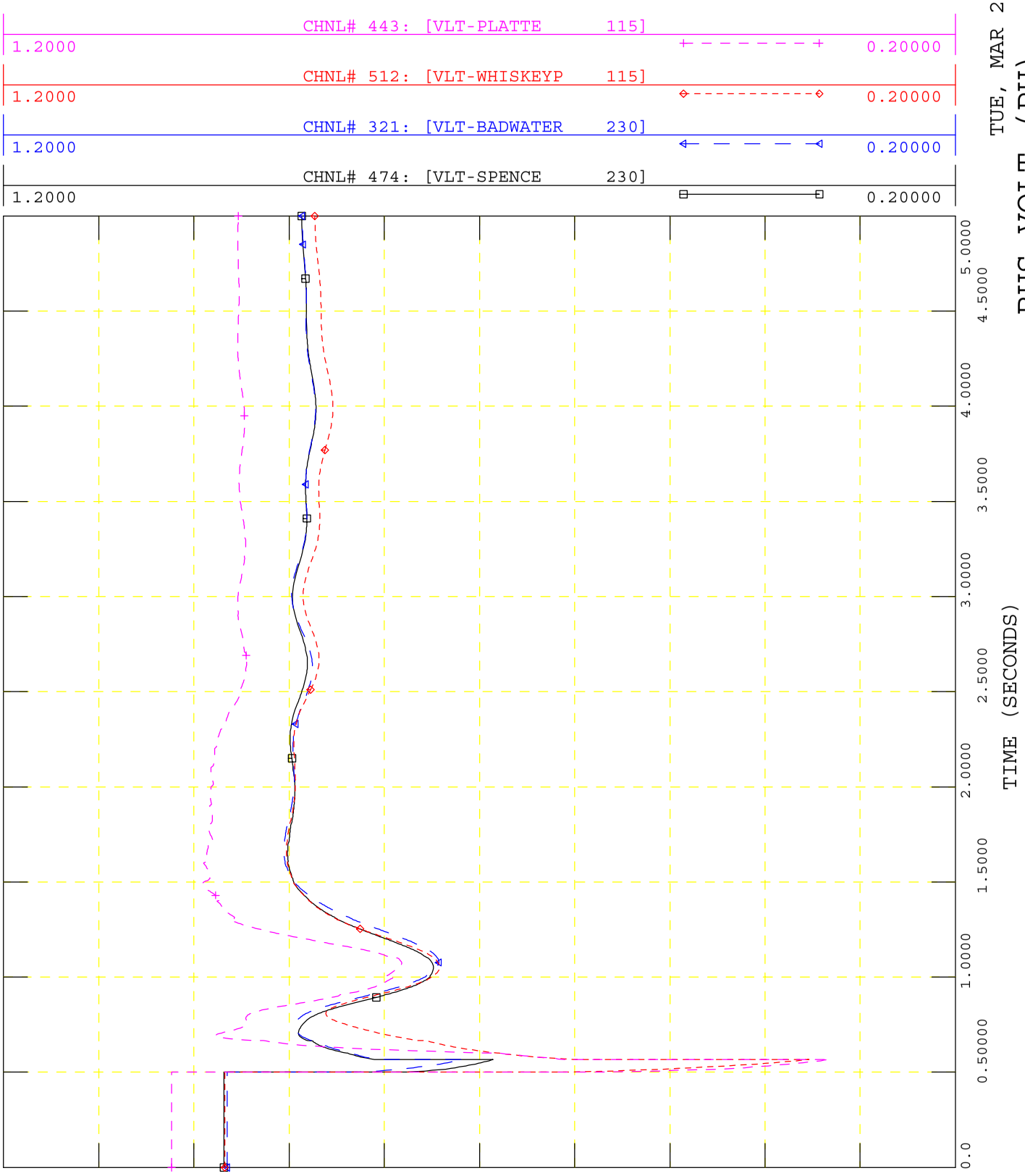

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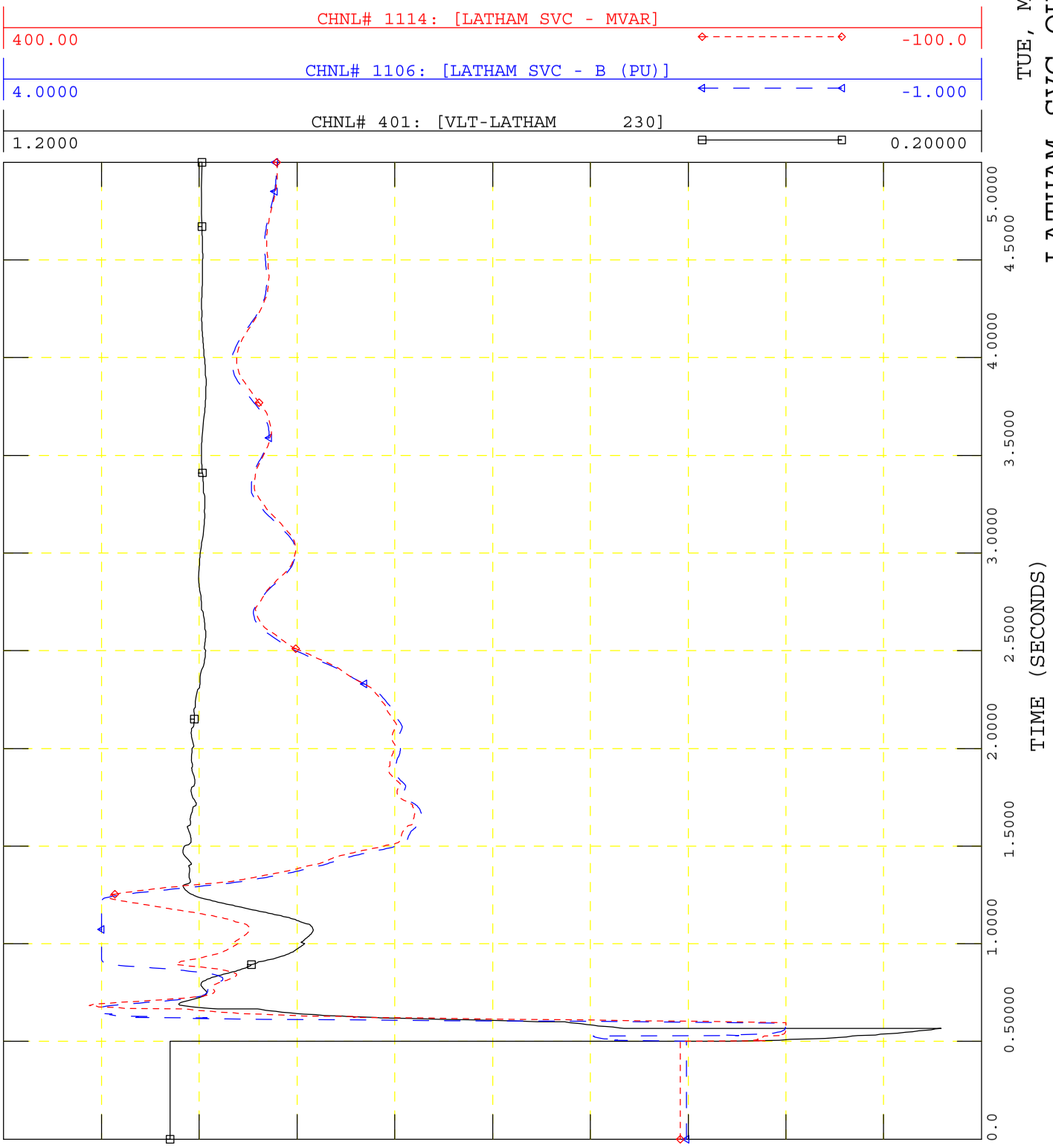

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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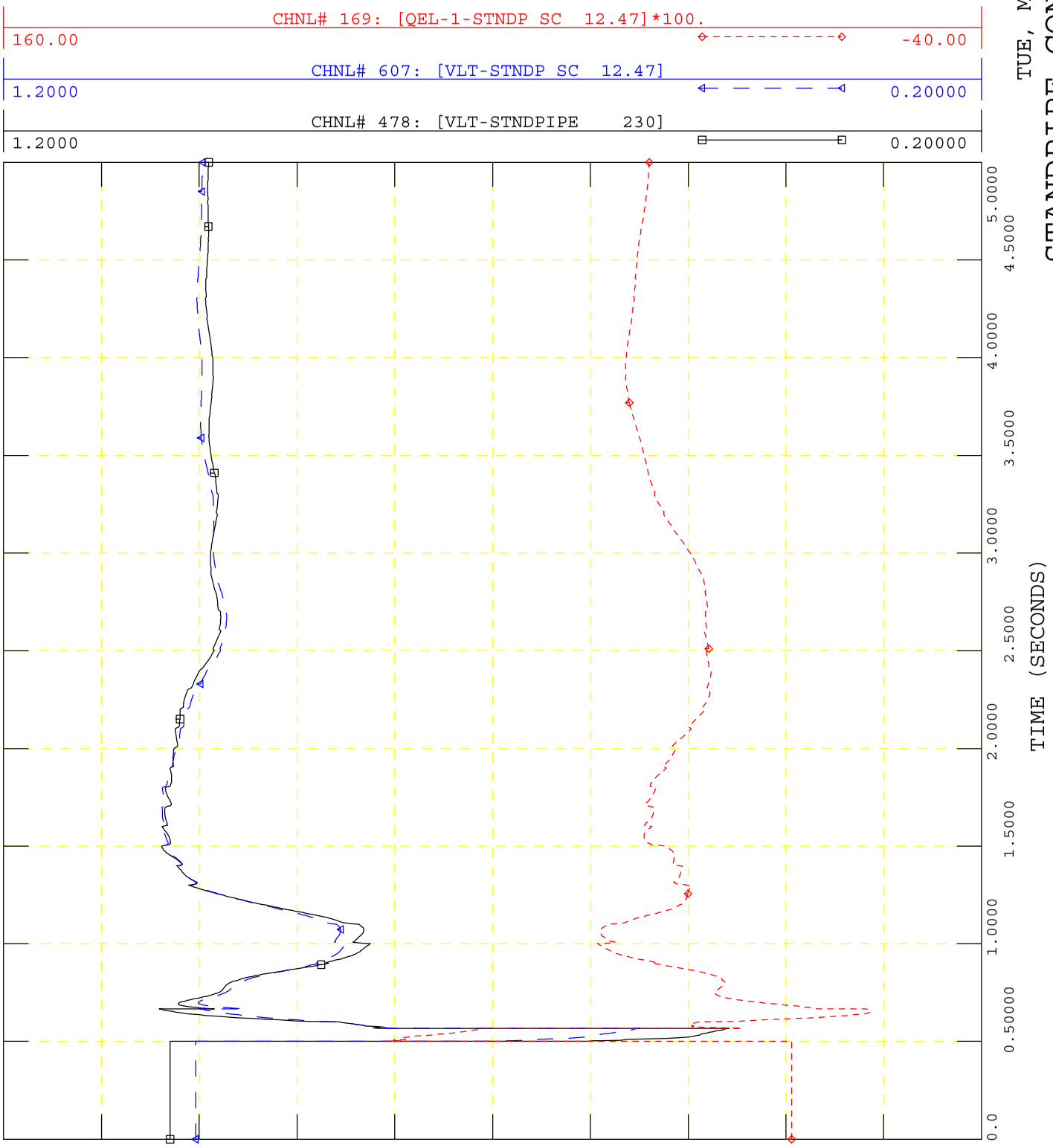
TUE, MAR 27 2018 21:28

STANDPIPE CONDNSR PLT 7



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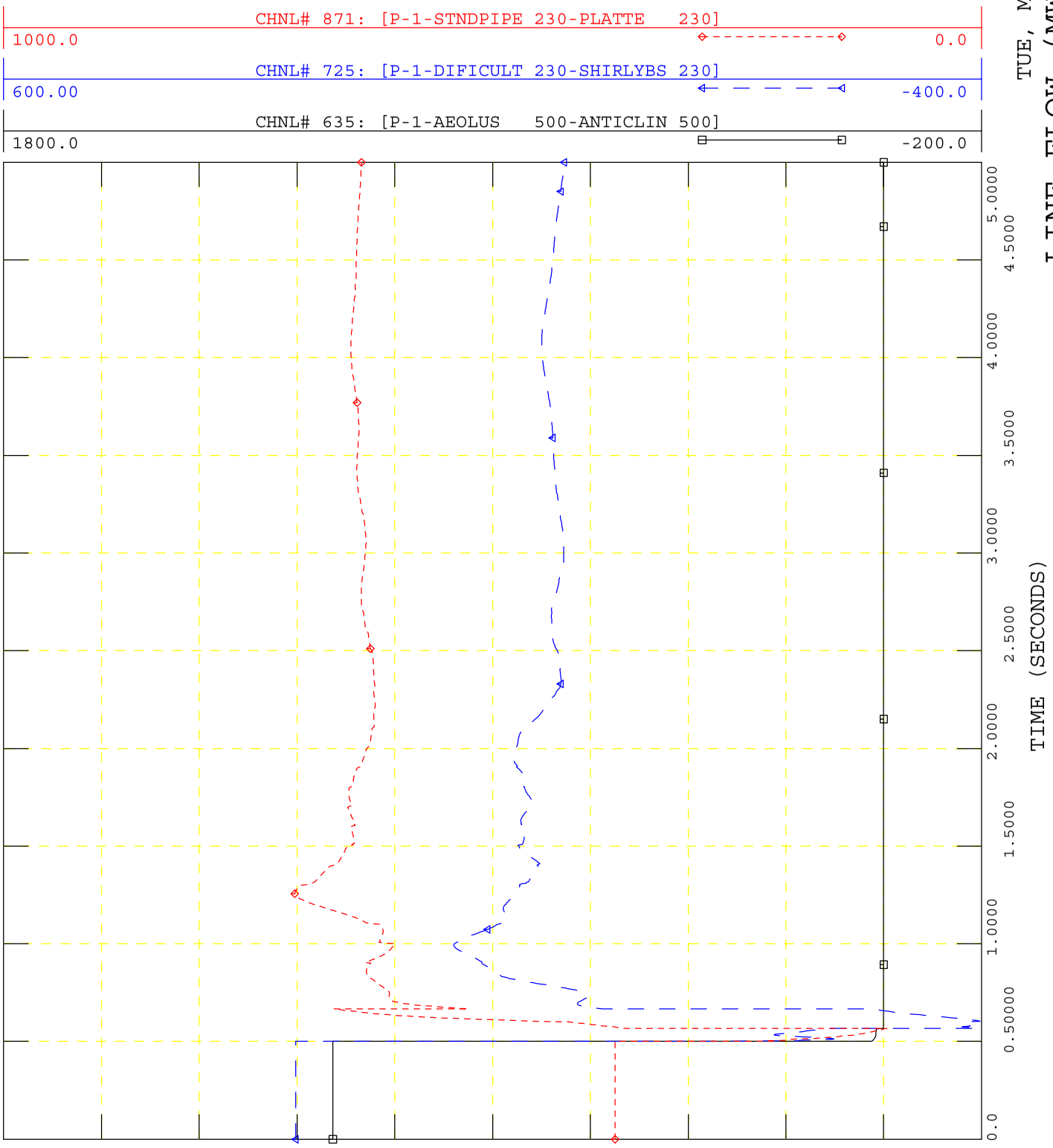
TUE, MAR 27 2018 21:28 PLT 8



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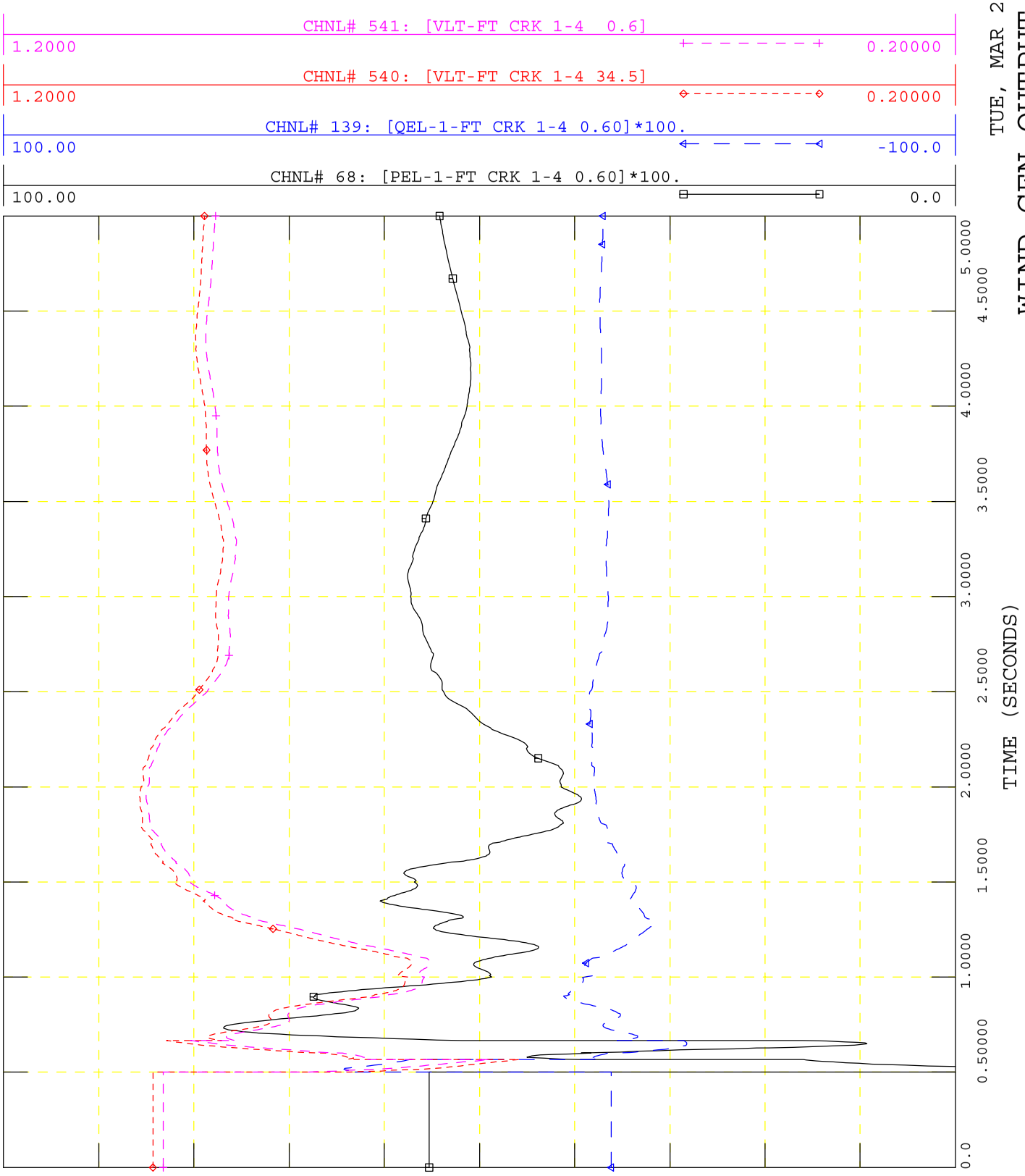

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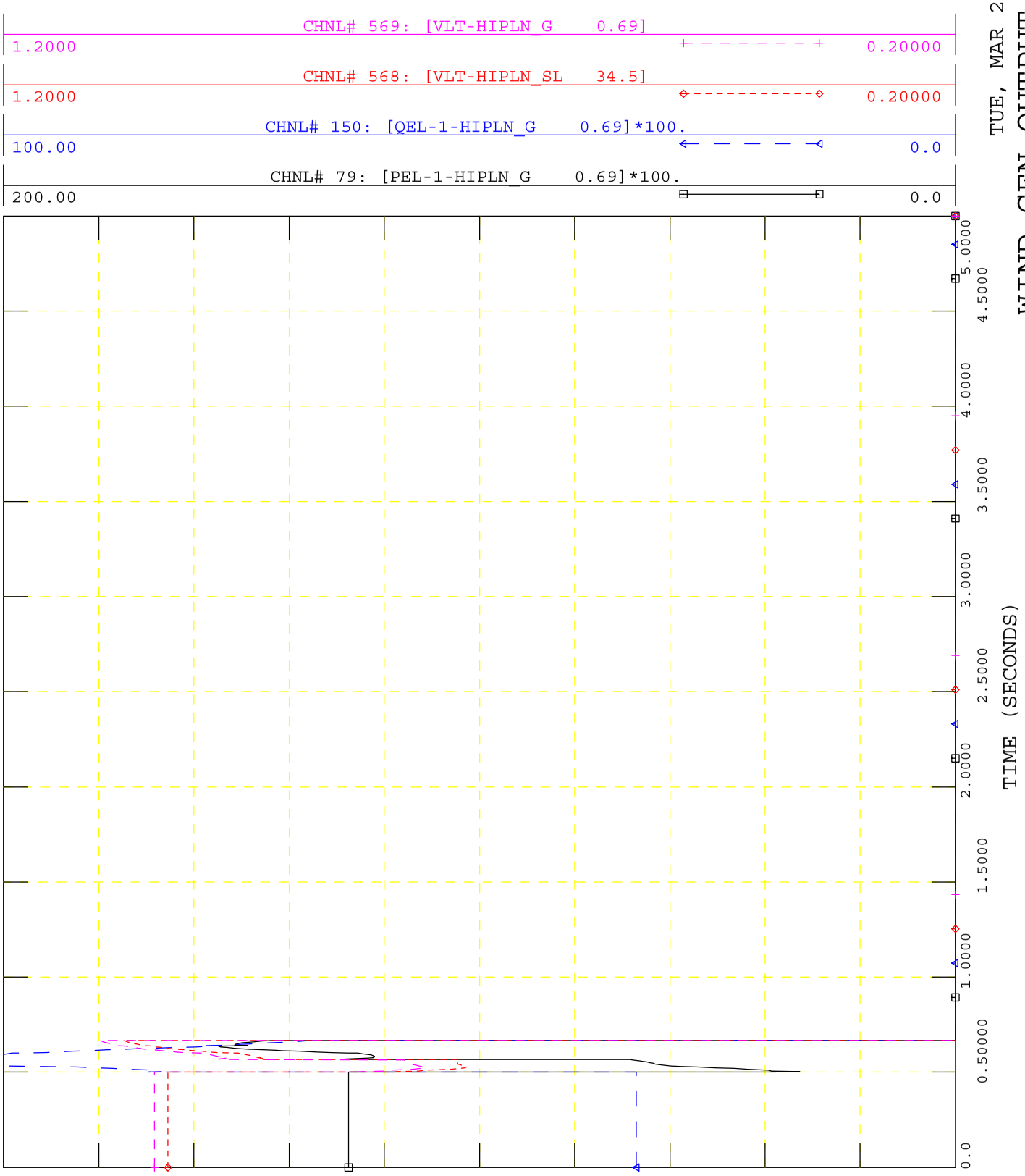

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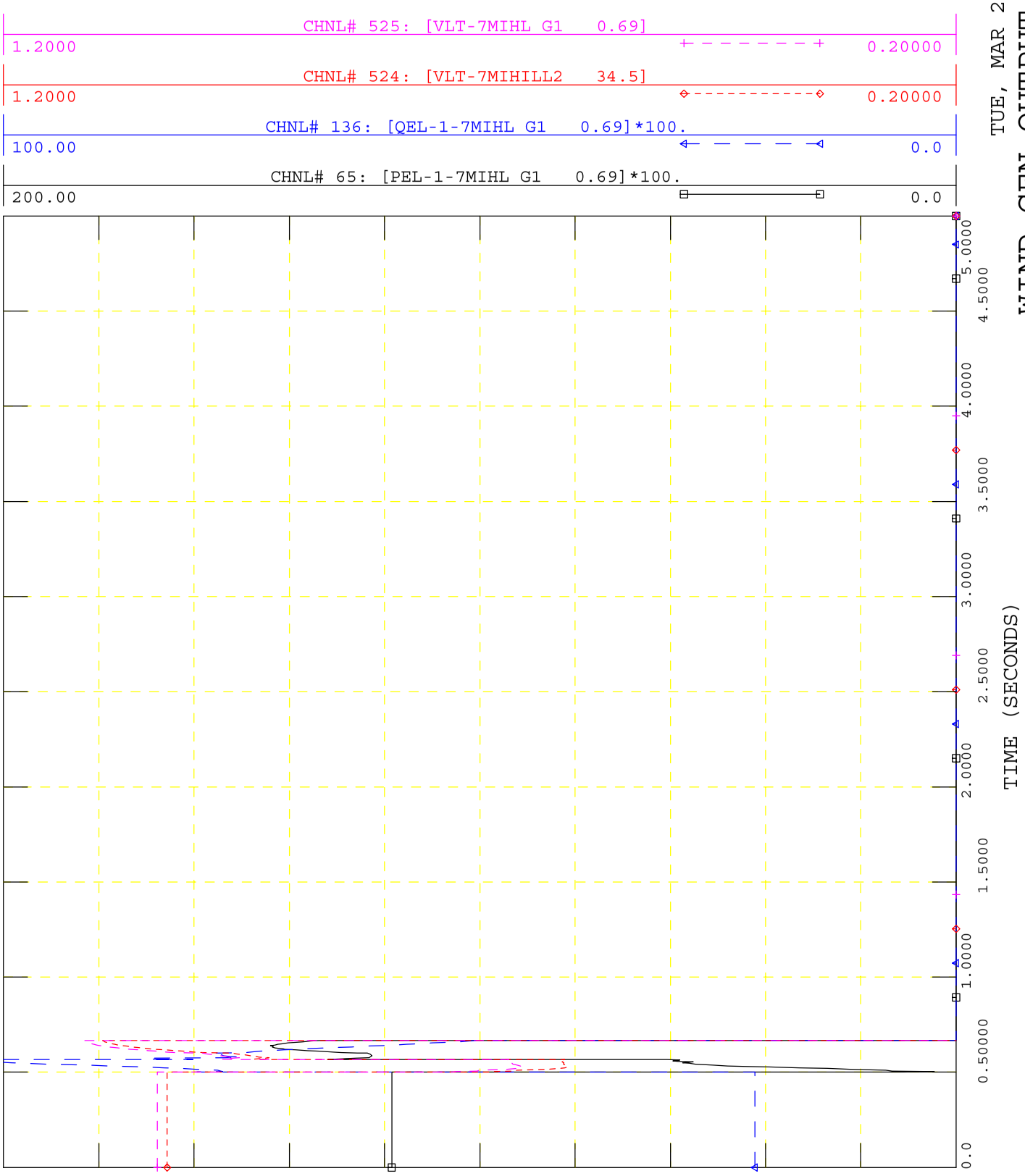

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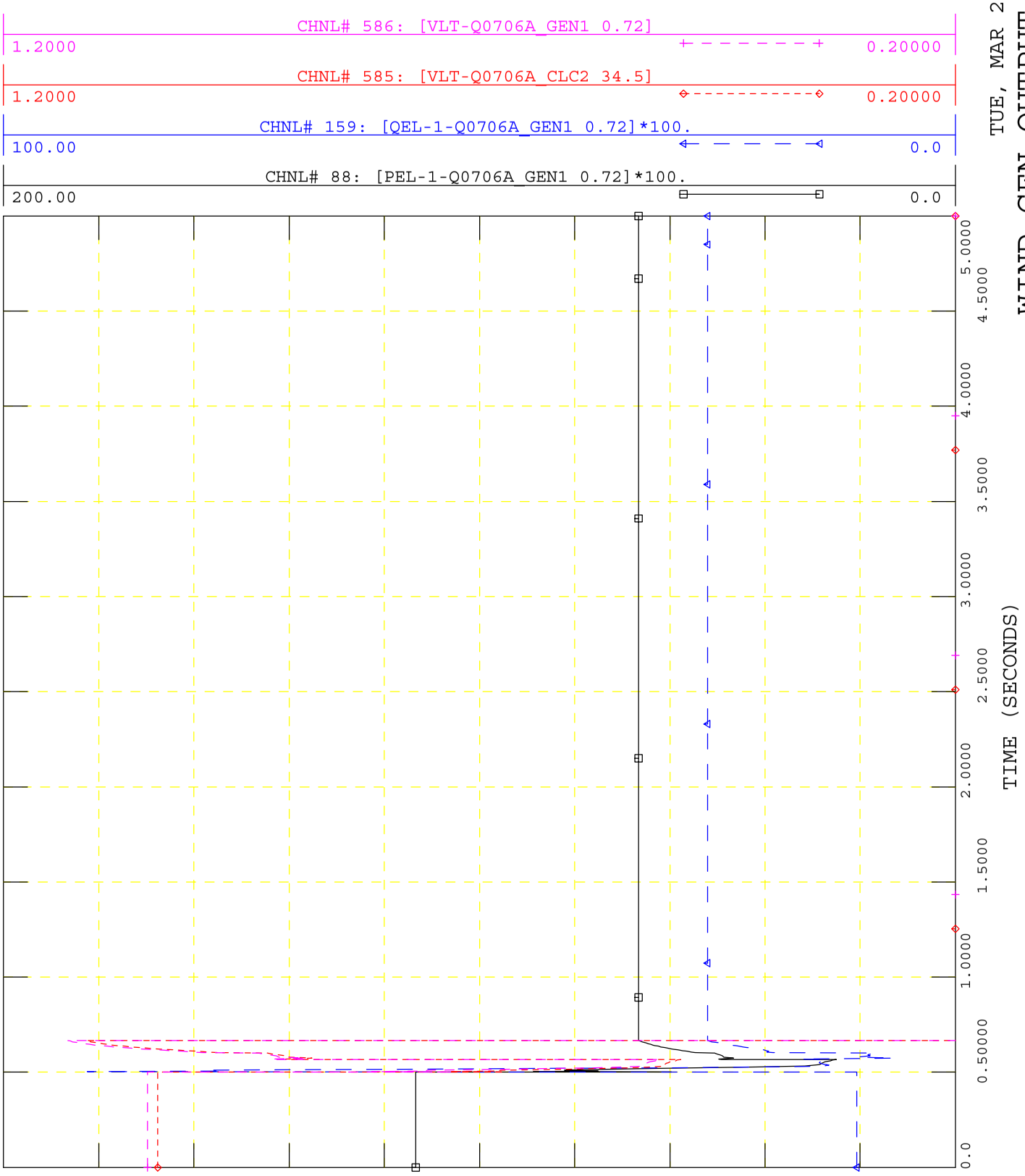

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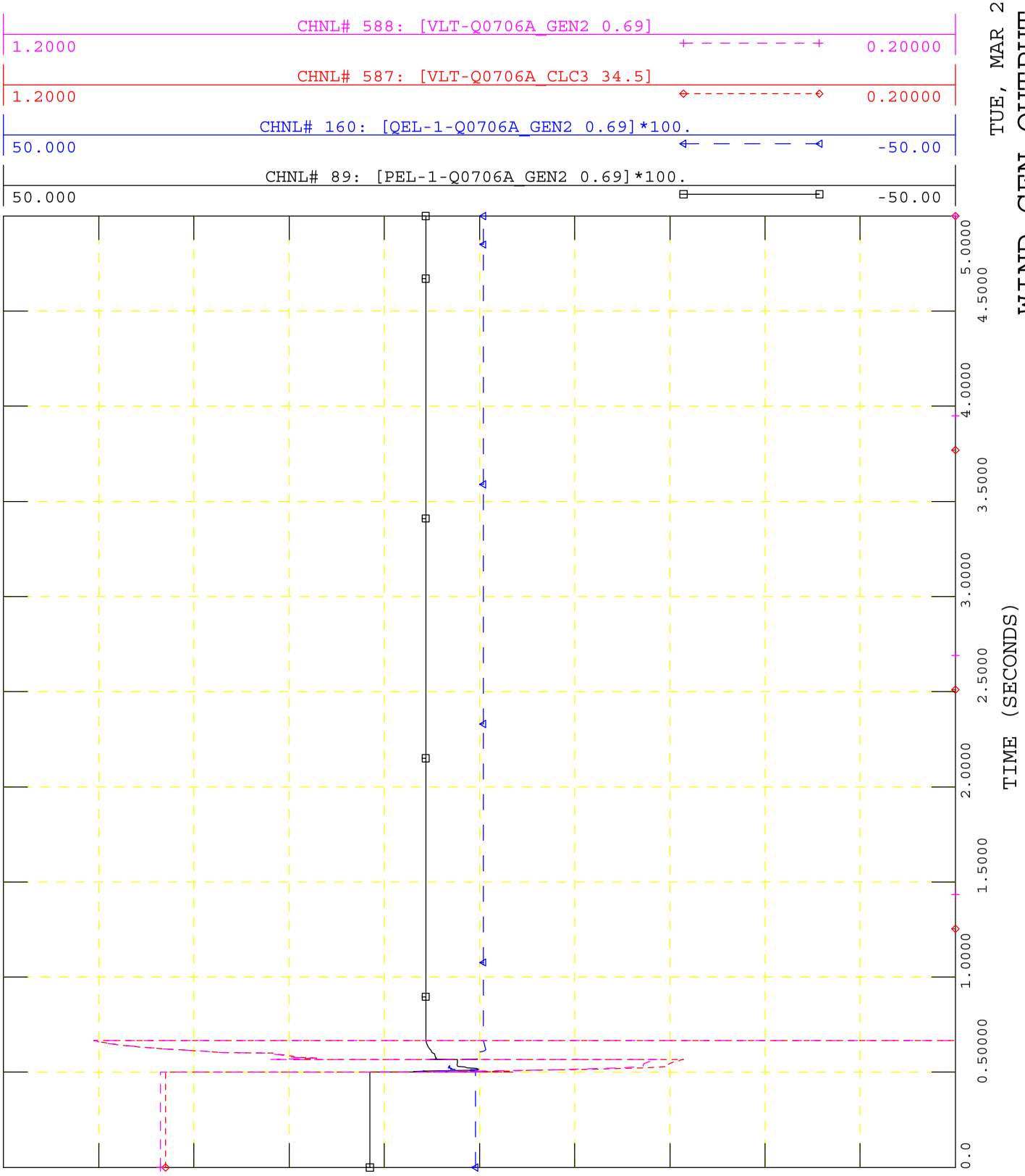

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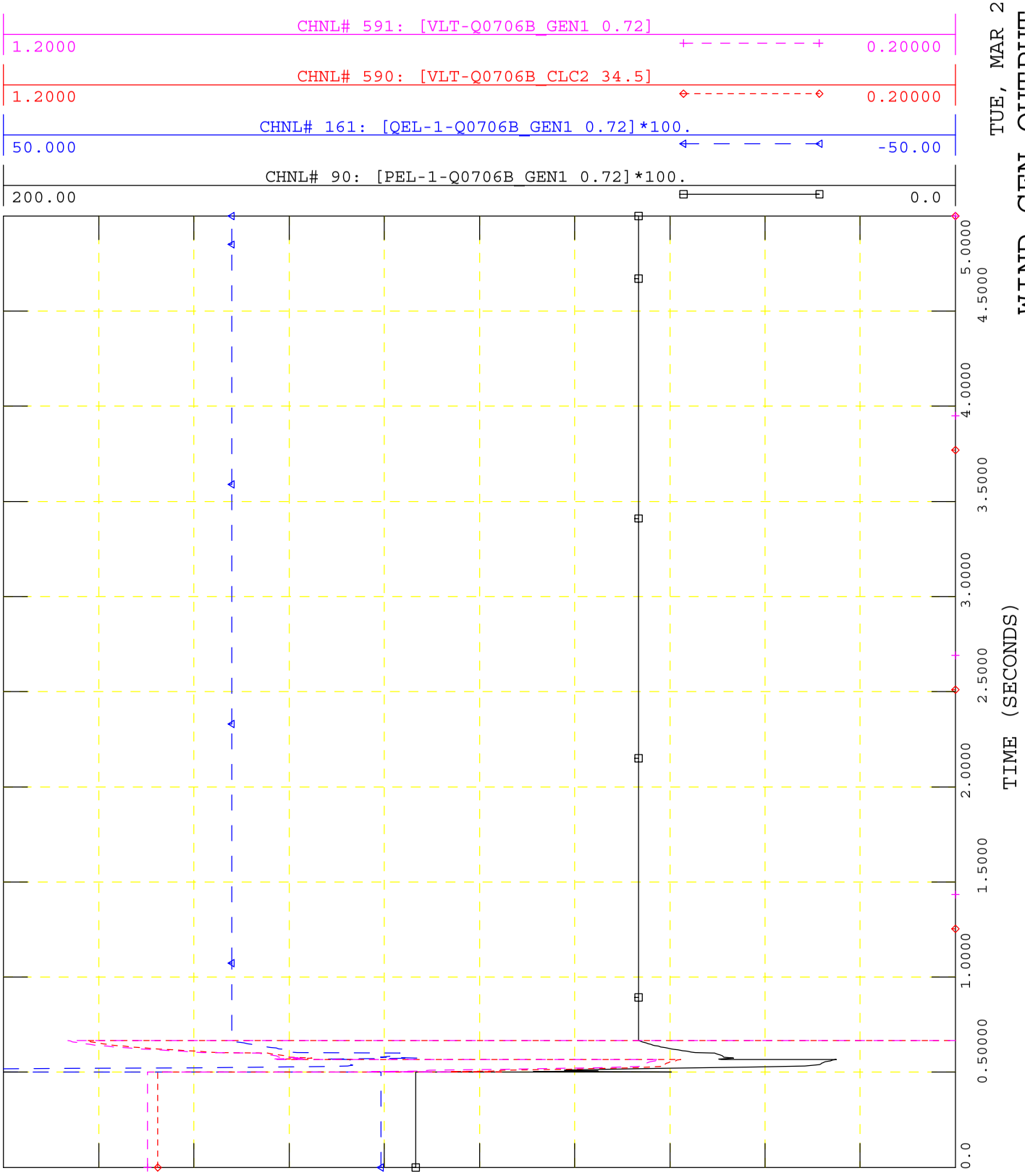

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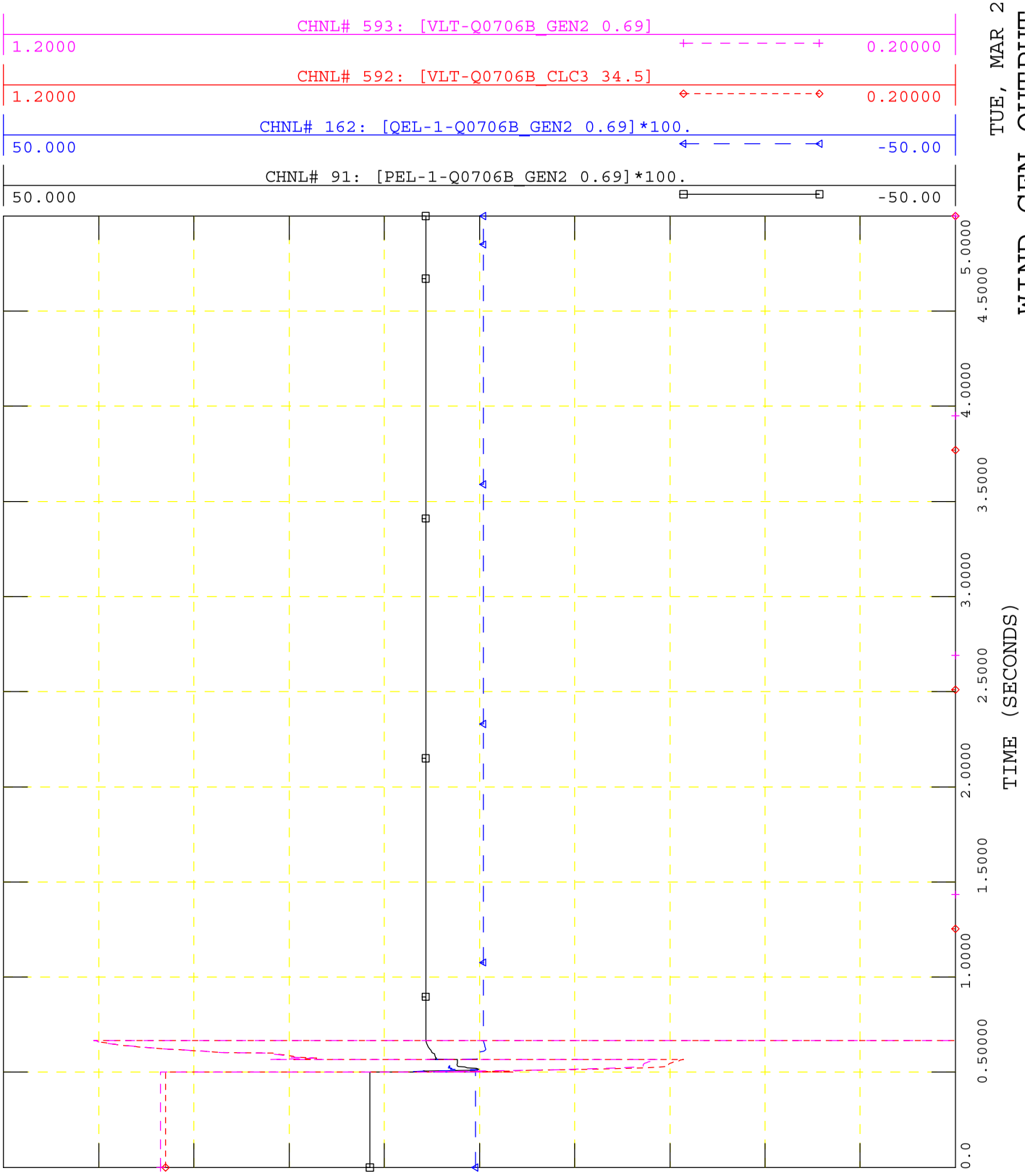

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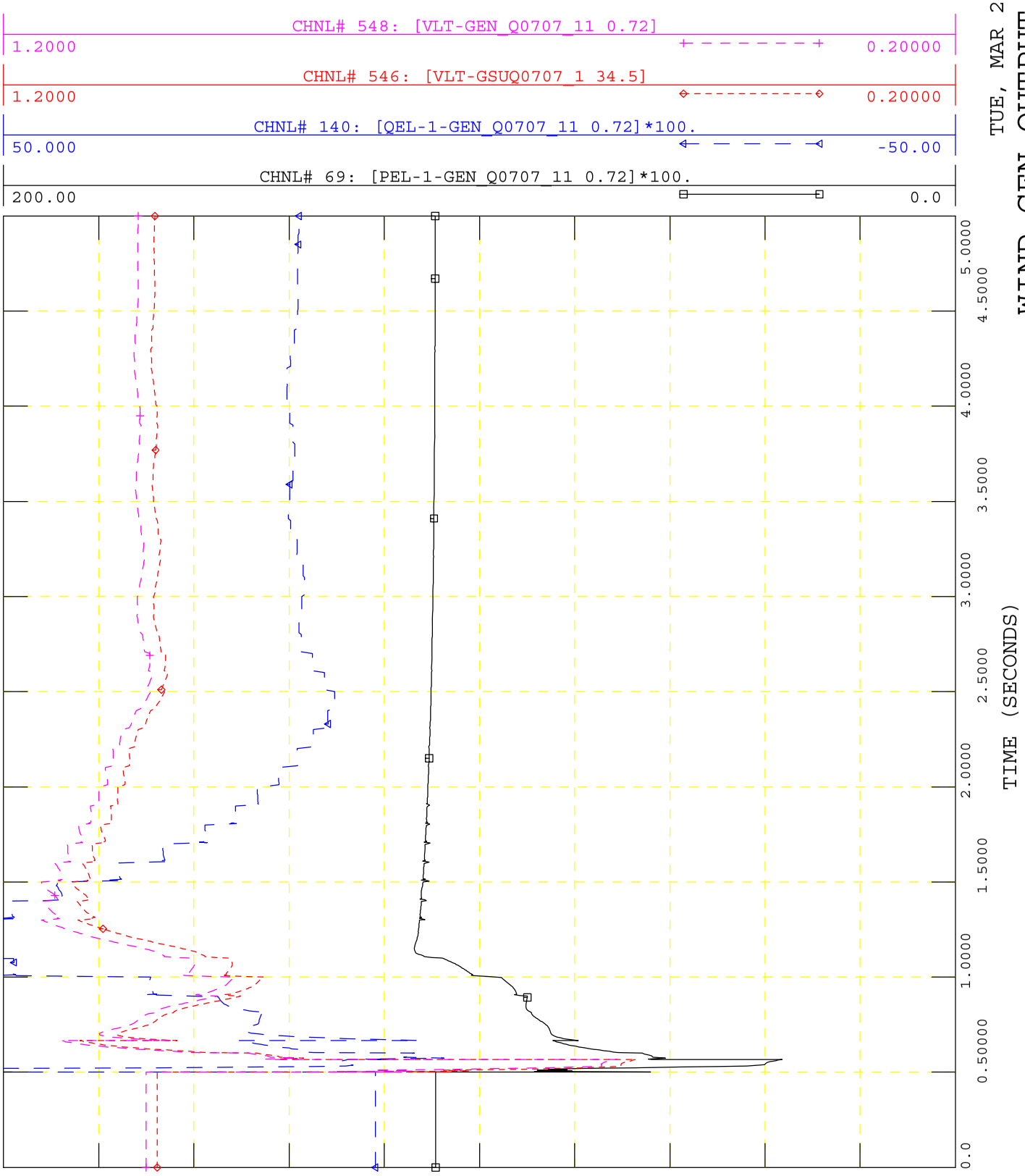

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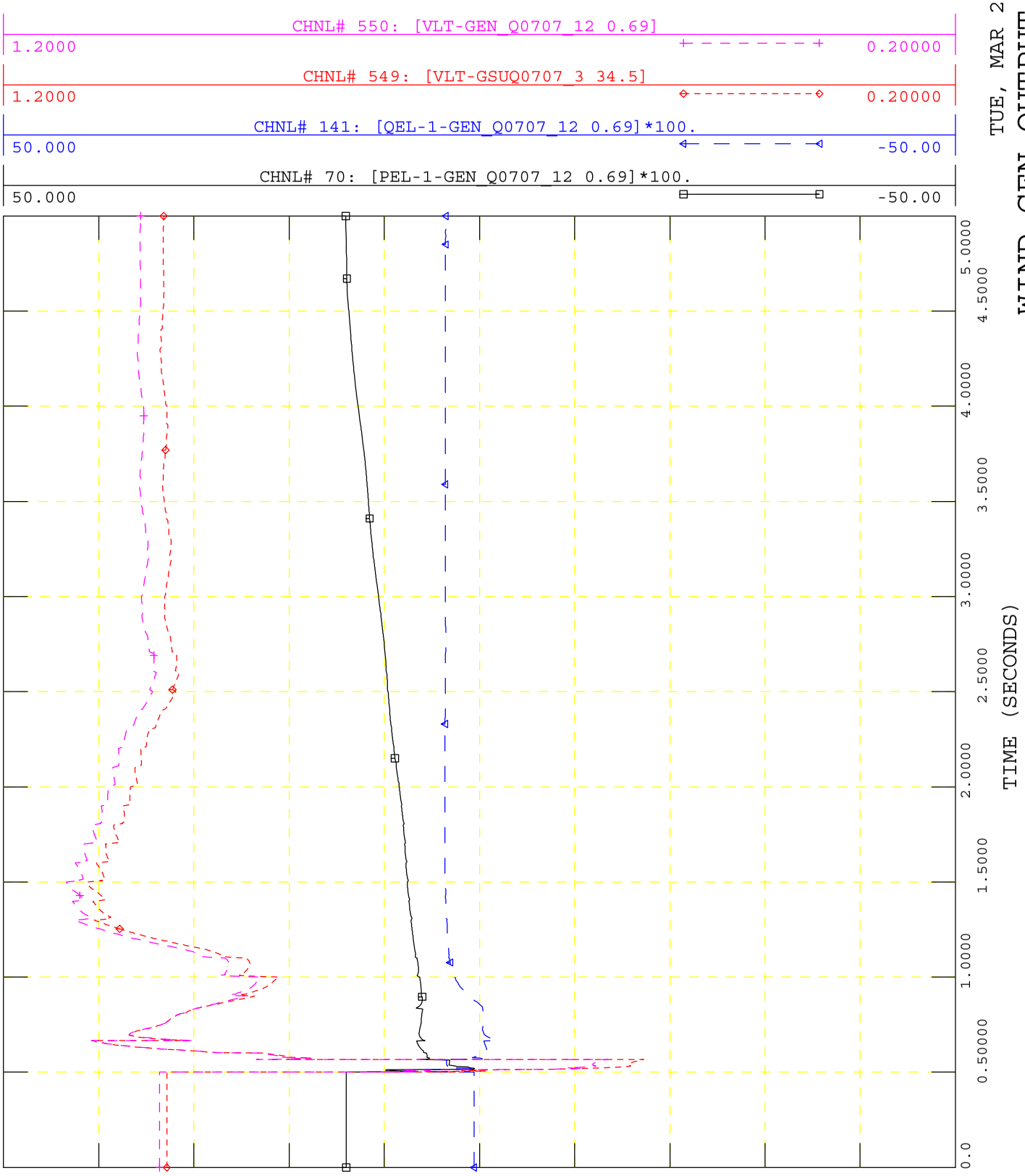

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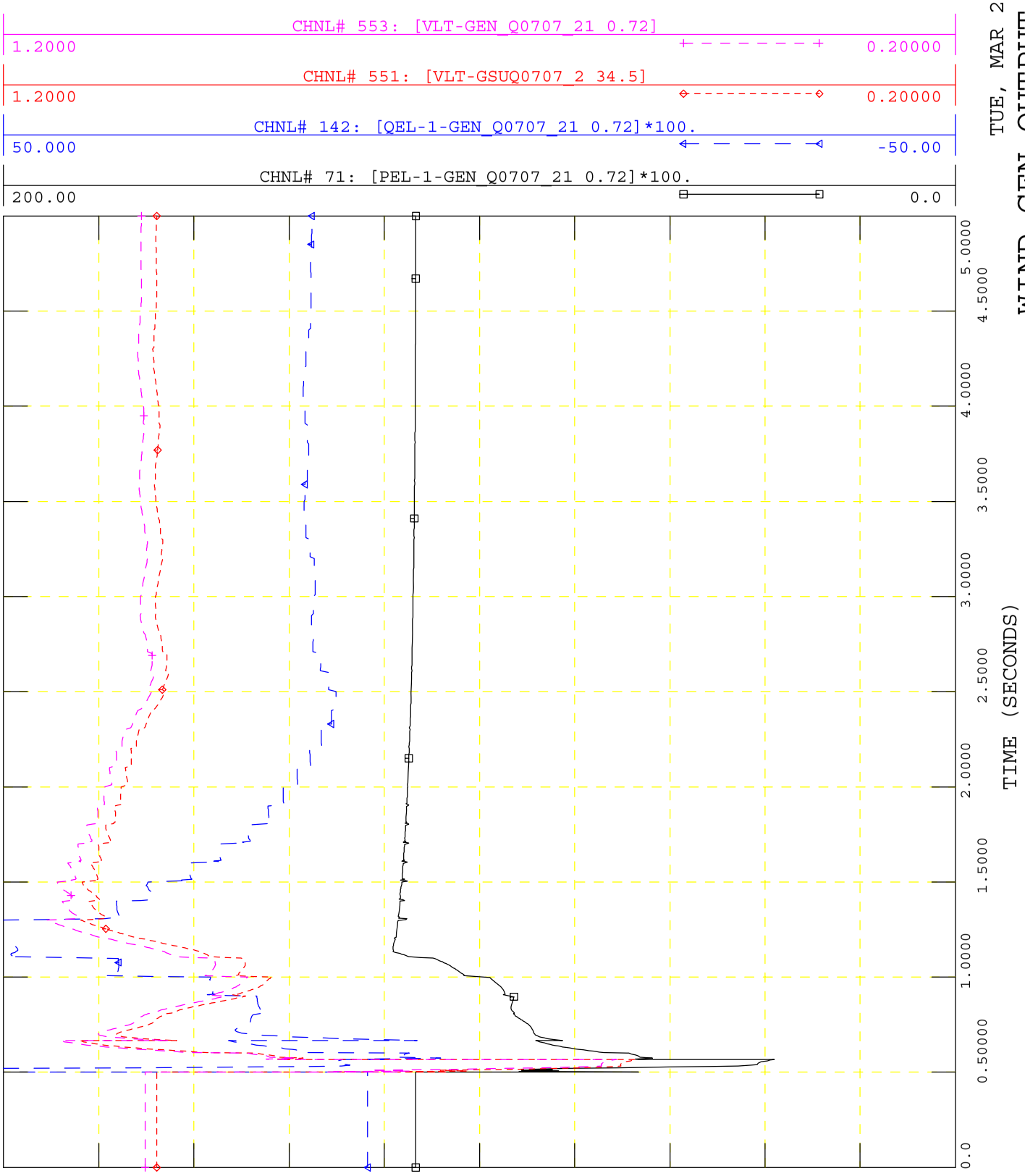

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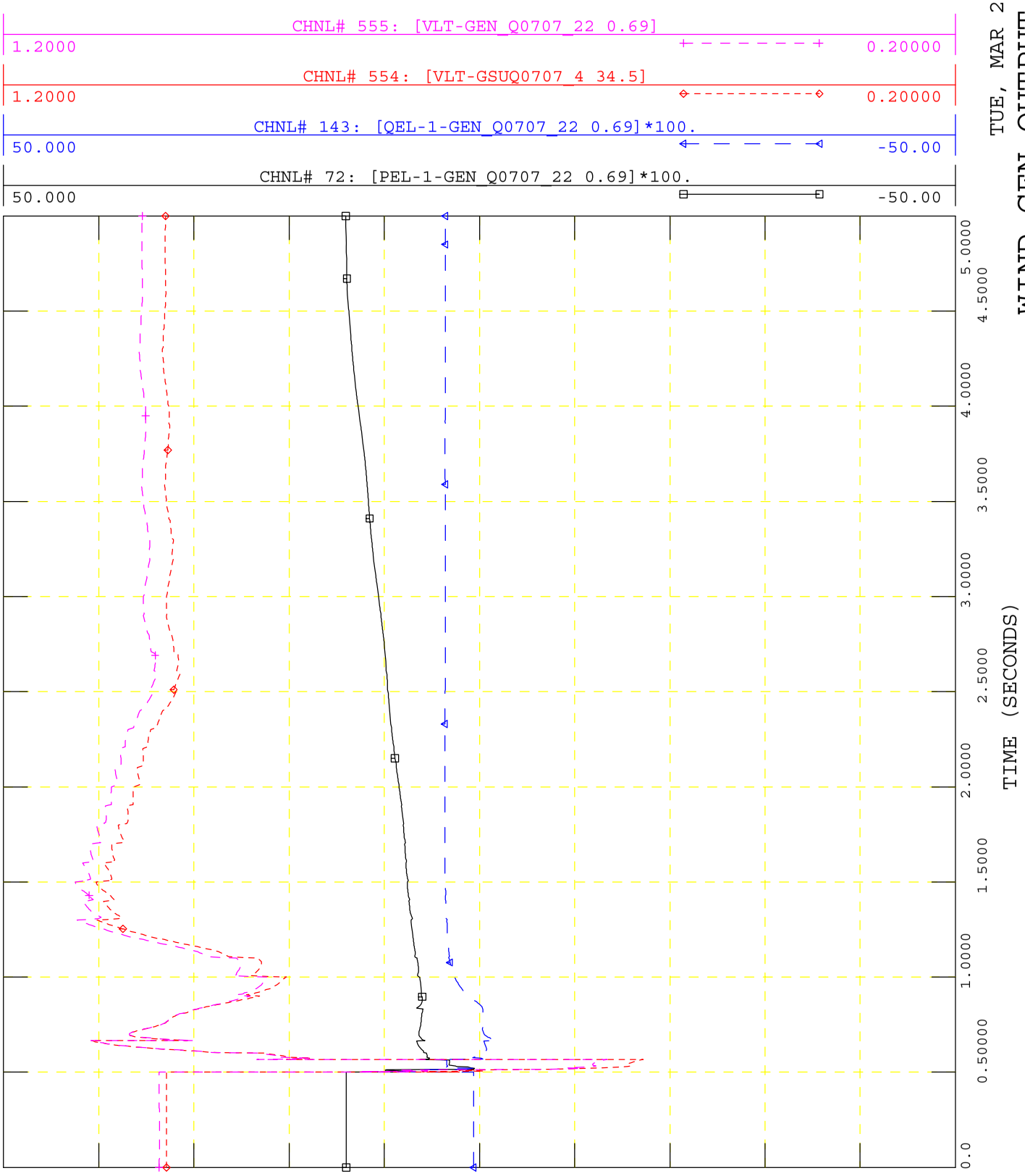

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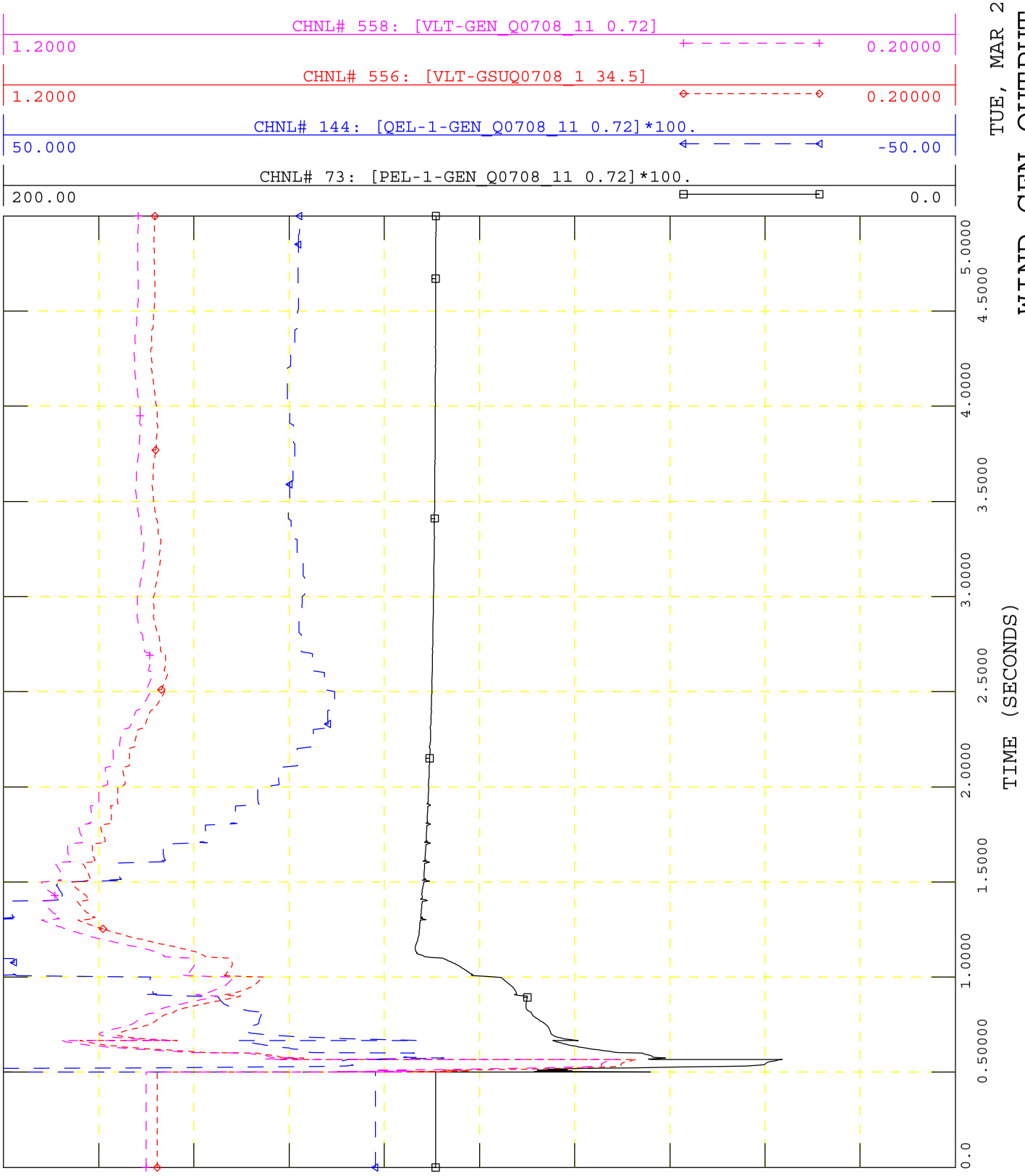

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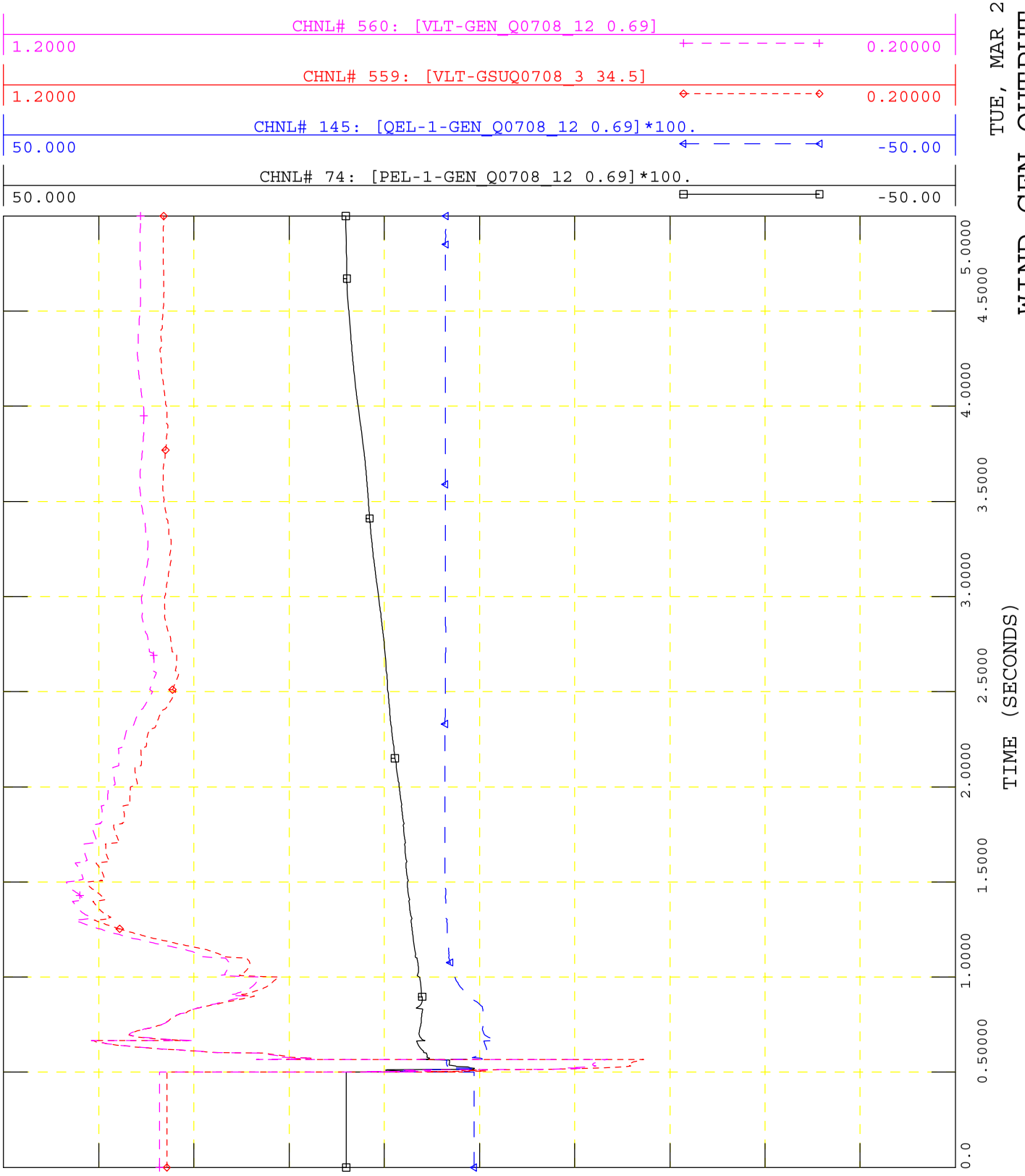

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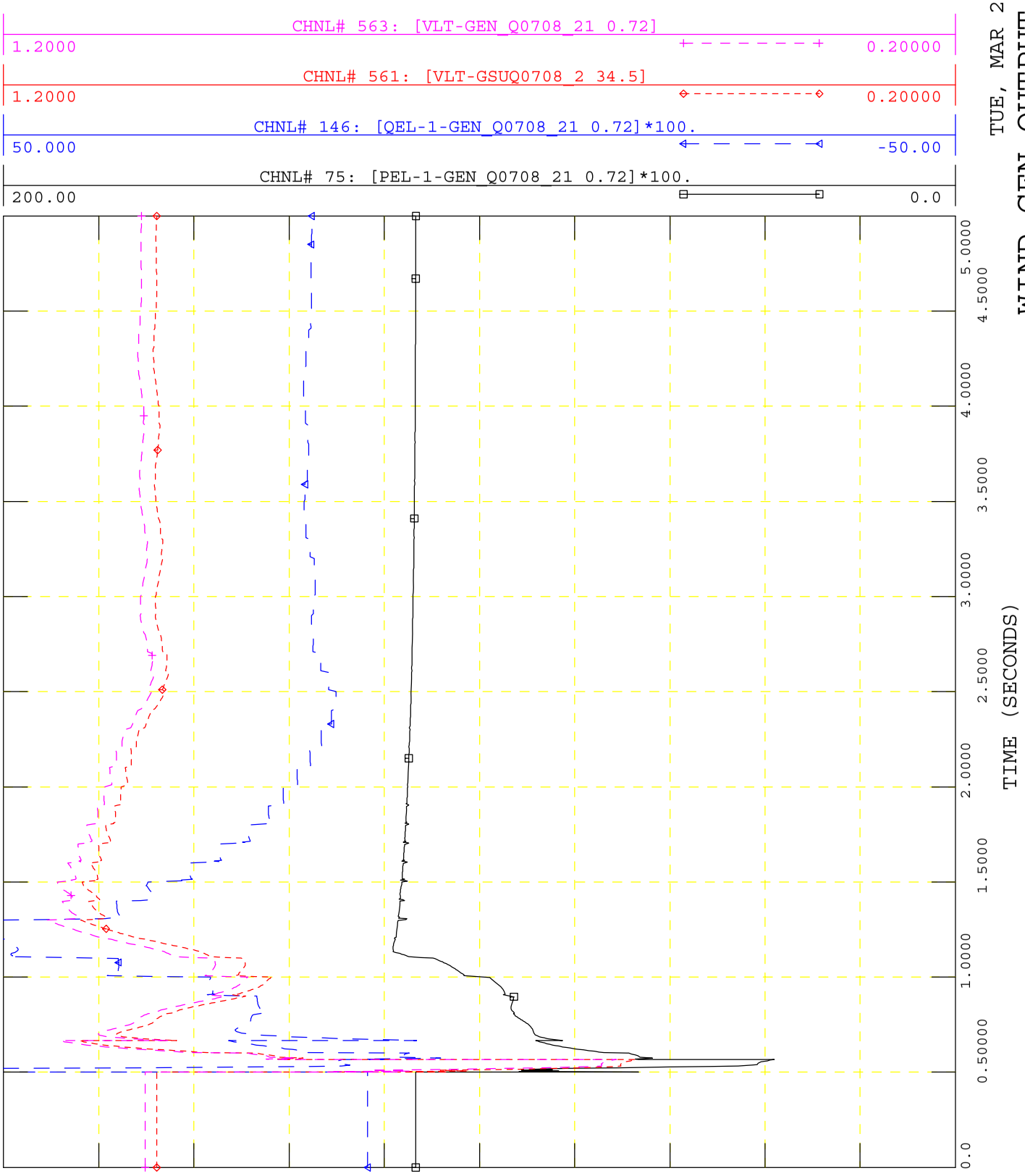

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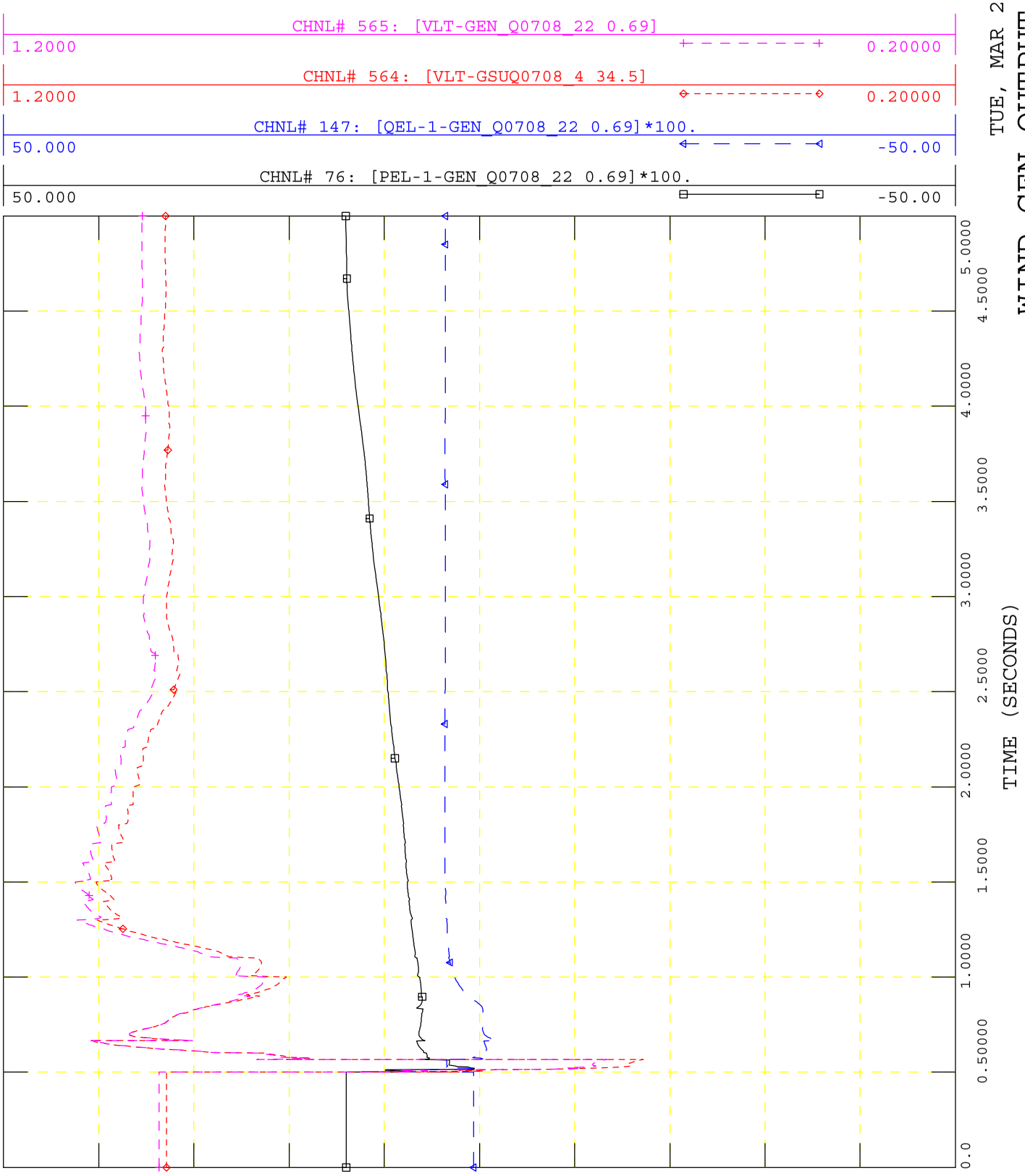

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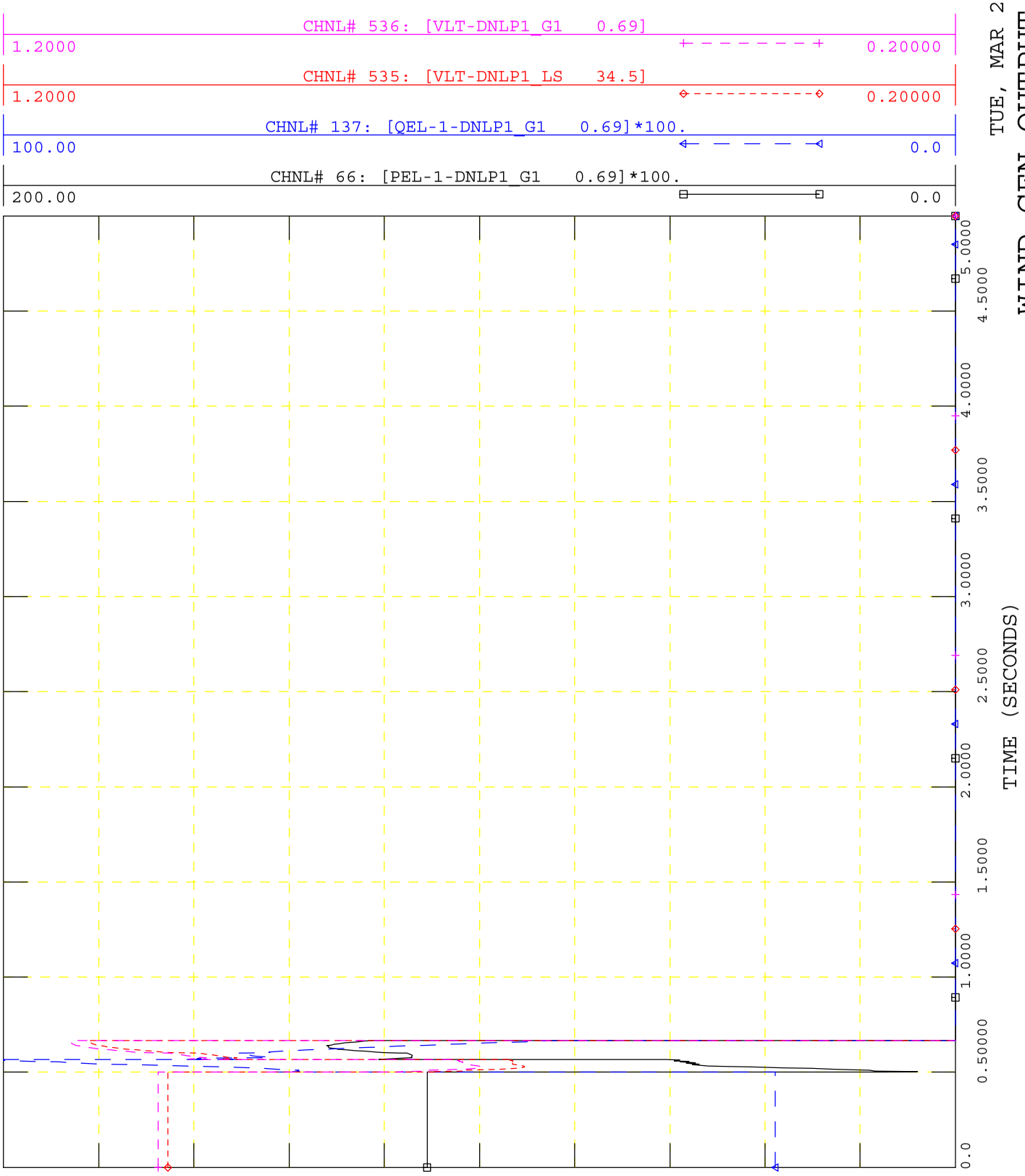

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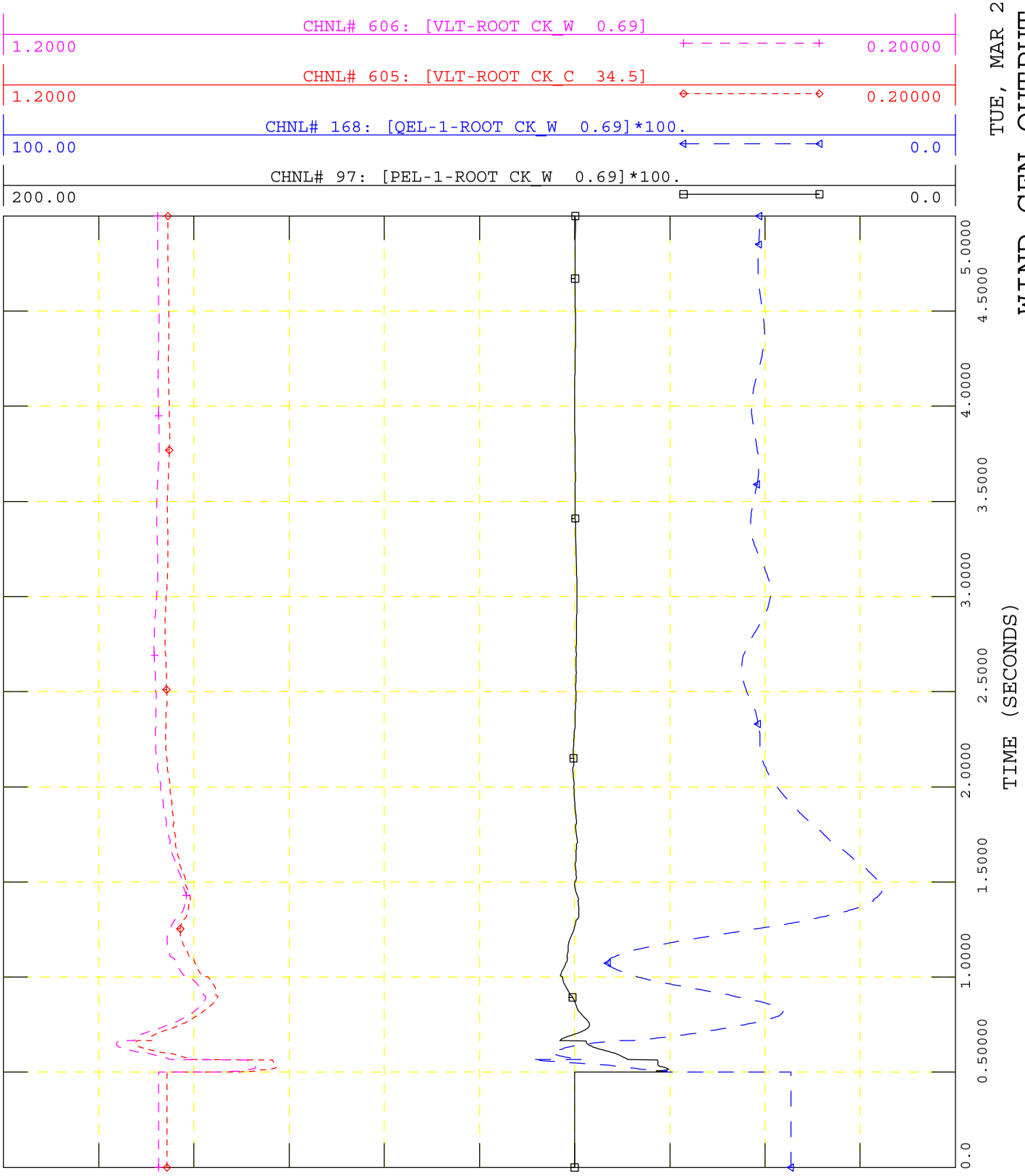

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TUE, MAR 27 2018 21:28 PLT 26

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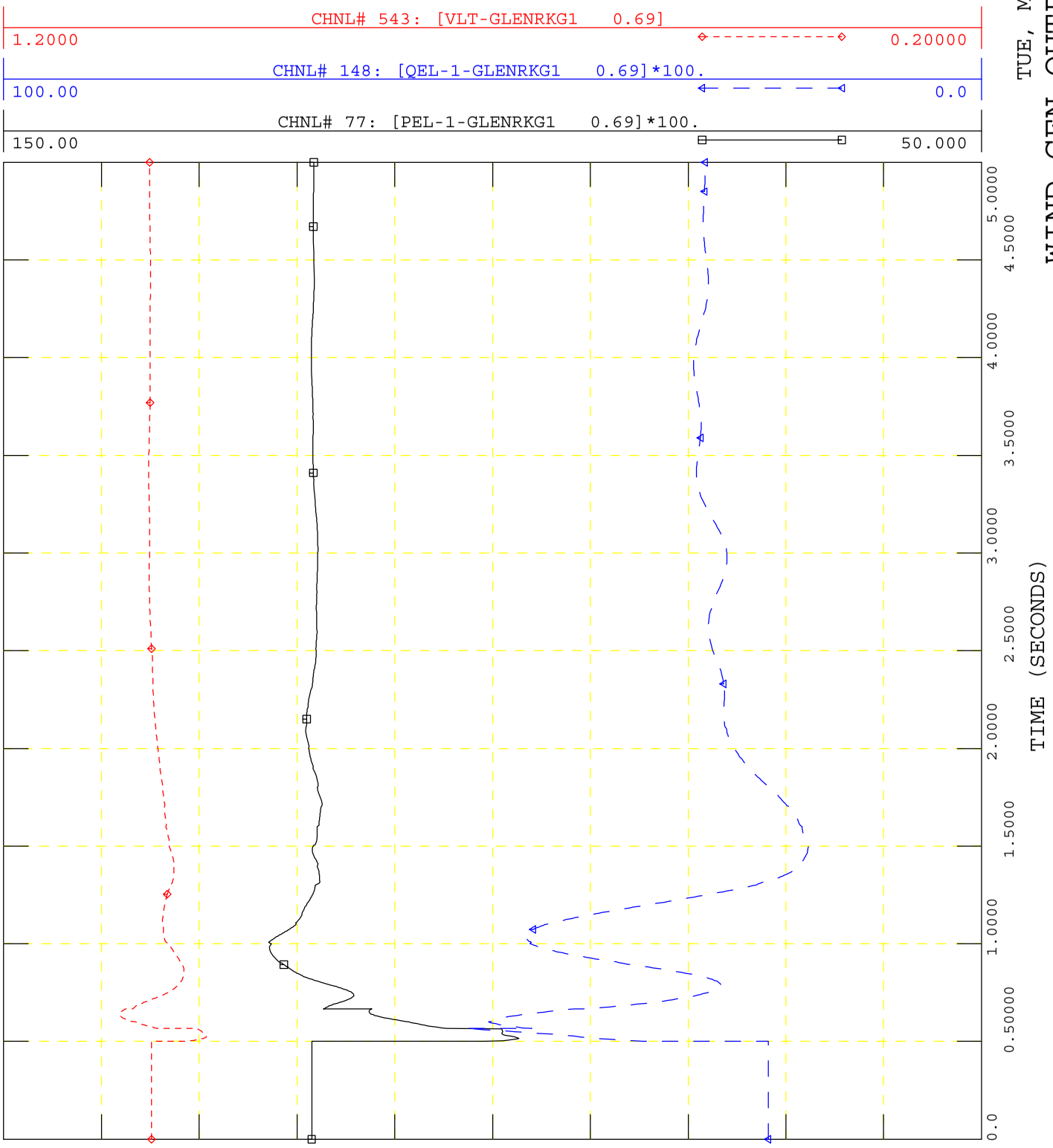

Dynamic Simulation

Case 1f2 – Loss of Bridger-Anticline 345 kV line with 628 MW generator tripping

30 cycles	**3 phase Bridger 345 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Bridger-Anticline 345 kV line, trip 200 MVAR shunt capacitors at Anticline and Aeolus 500 kV subs**
36 cycles	**Remove SVC MVAR limiter**
40 cycles	**Trip High Plains wind generation (127.5 MW)** **Trip Q0706 A&B (Ekola Flats) wind generation (249.8 MW)** **Trip Q0707 1&2 (TB Flats 1) wind generation (250.6 MW)**
5 sec.	**Terminate simulation**

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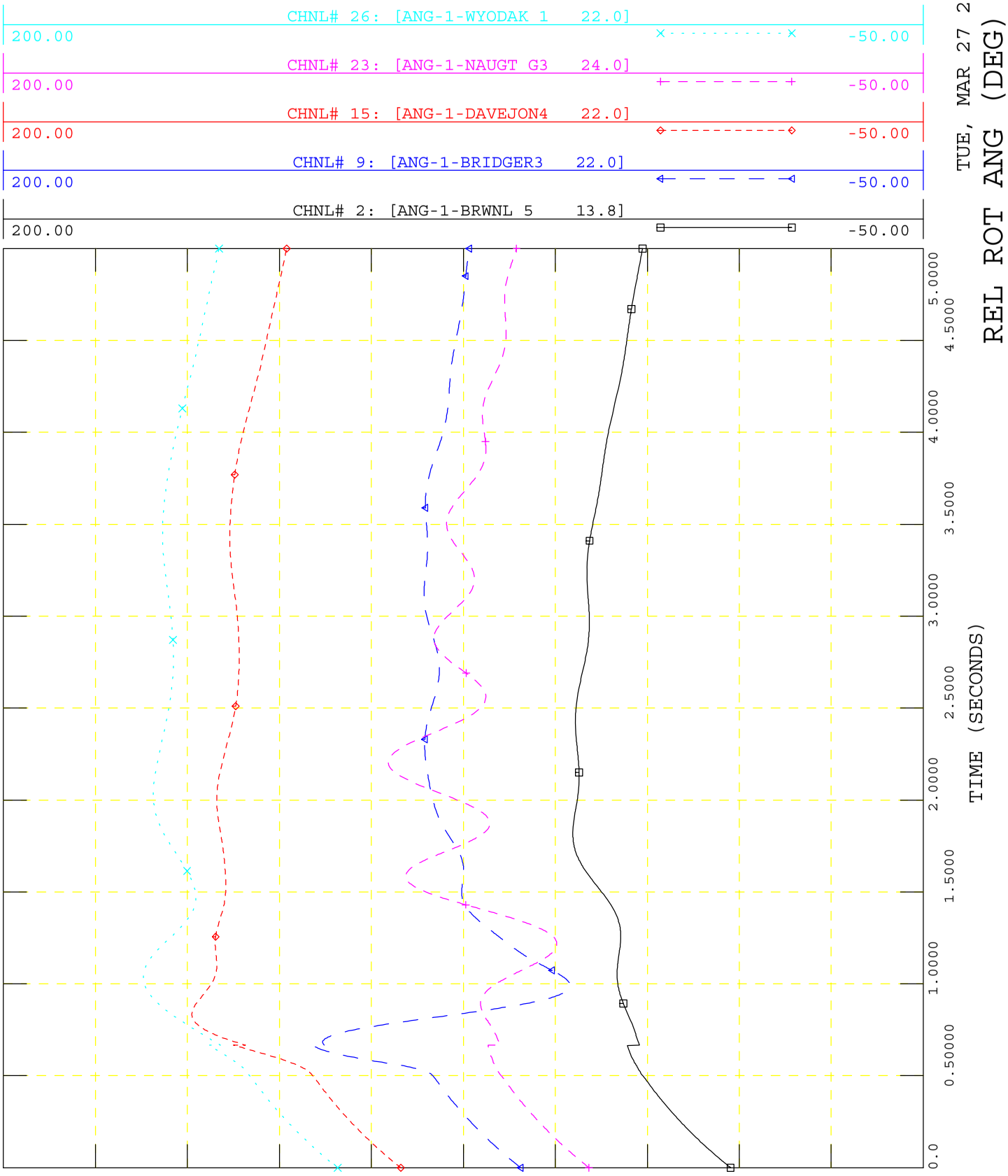

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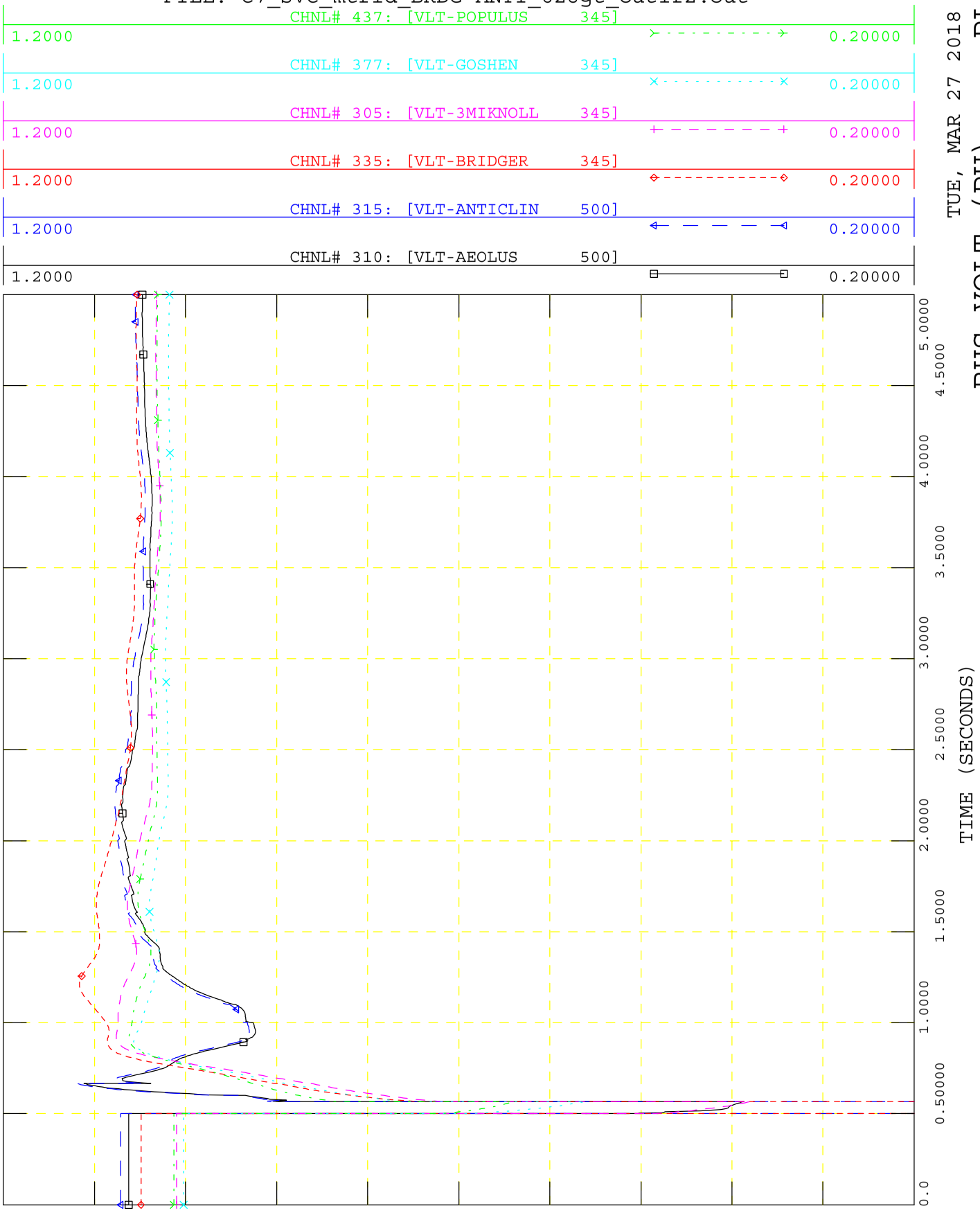
TUE, MAR 27 2018 21:28 PLT 2



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
345 LN. 36CY-UNBLOCK SVC. 40CY-TRP 628 WND GEN. OUTAGE 1F2
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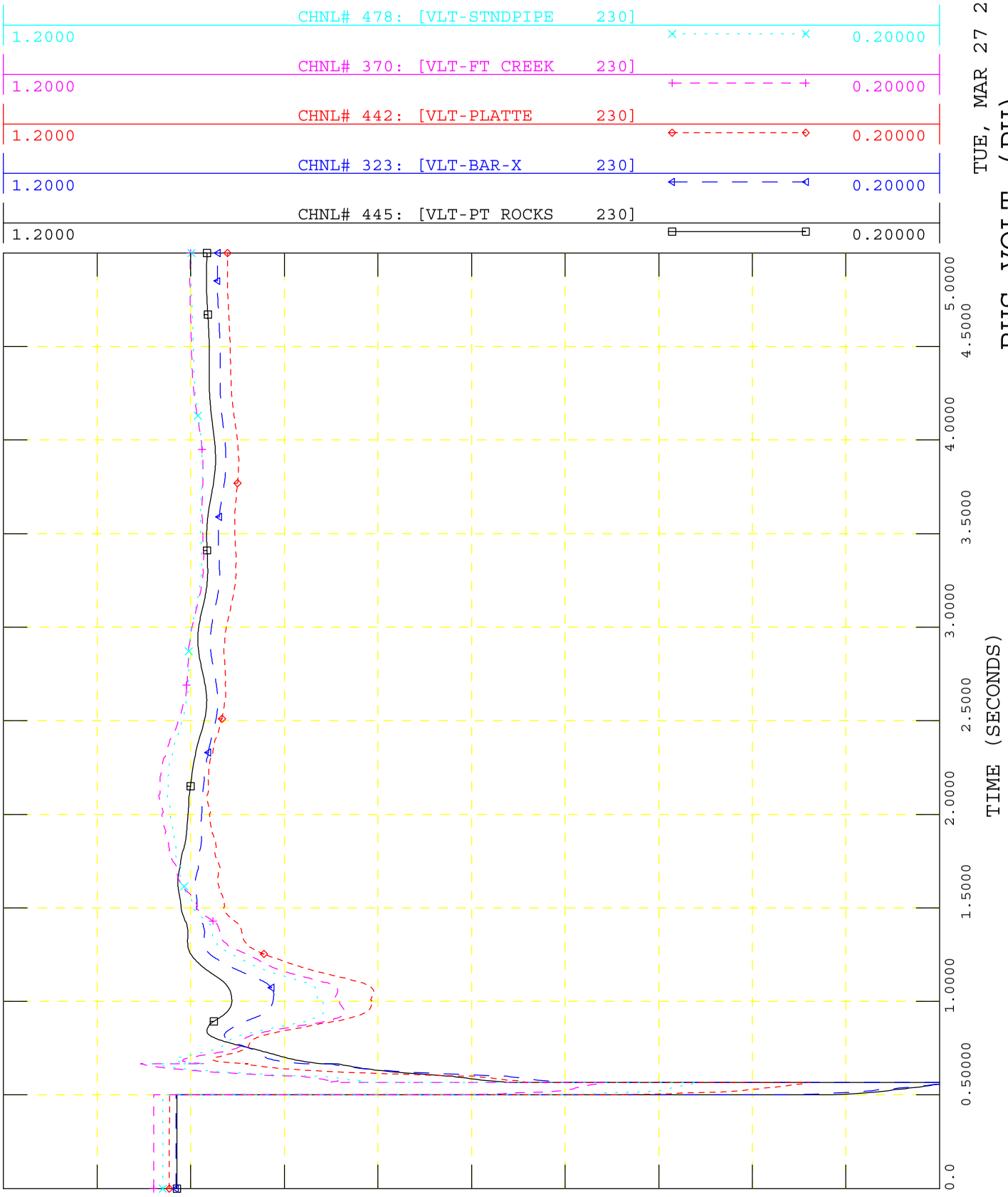
TUE, MAR 27 2018 21:28 PLT 3



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
345 LN. 36CY-UNBLOCK SVC. 40CY-TRP 628 WND GEN. OUTAGE 1F2
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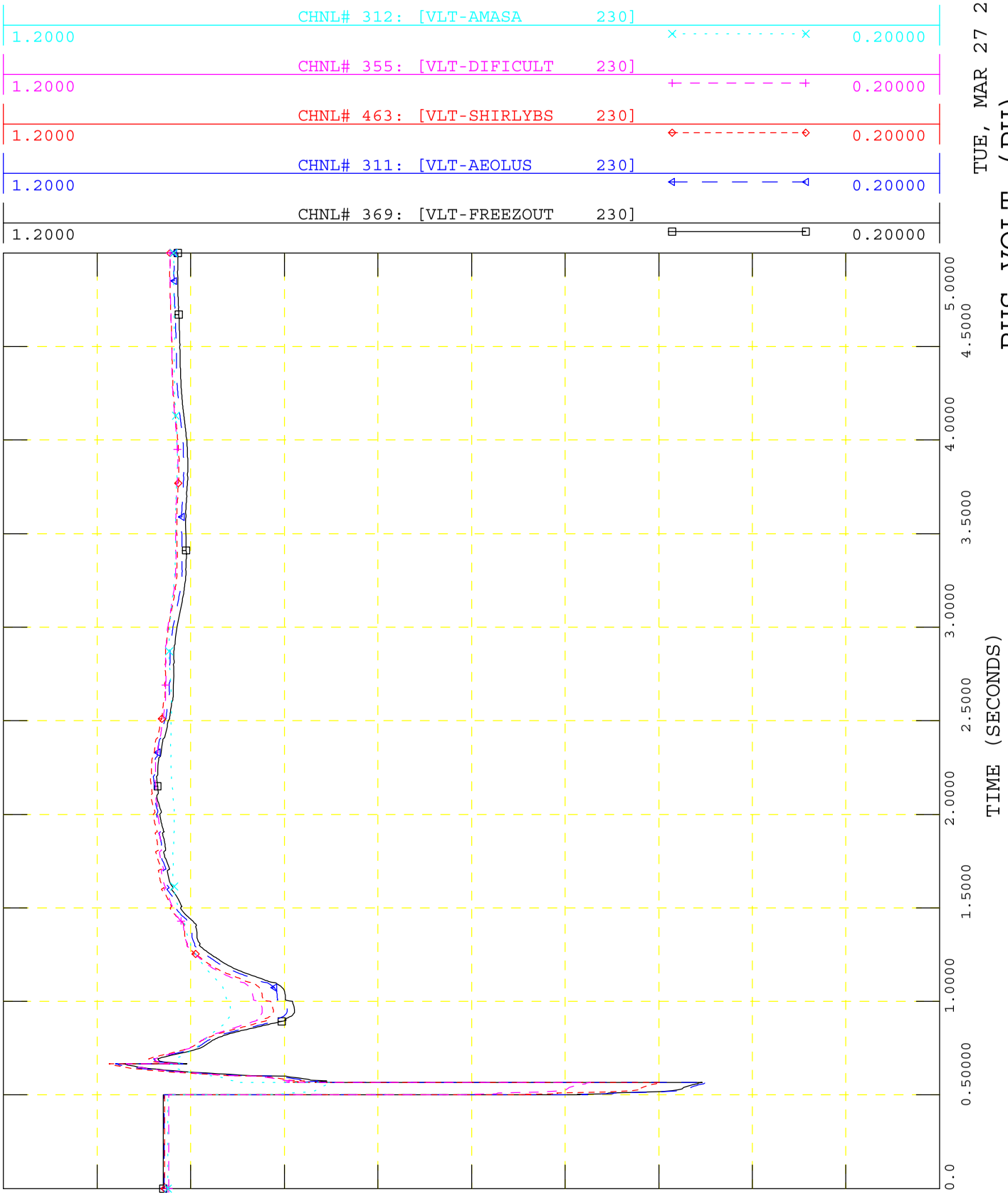
TUE, MAR 27 2018 21:28 PLT 4



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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
345 LN. 36CY-UNBLOCK SVC. 40CY-TRP 628 WND GEN. OUTAGE 1F2
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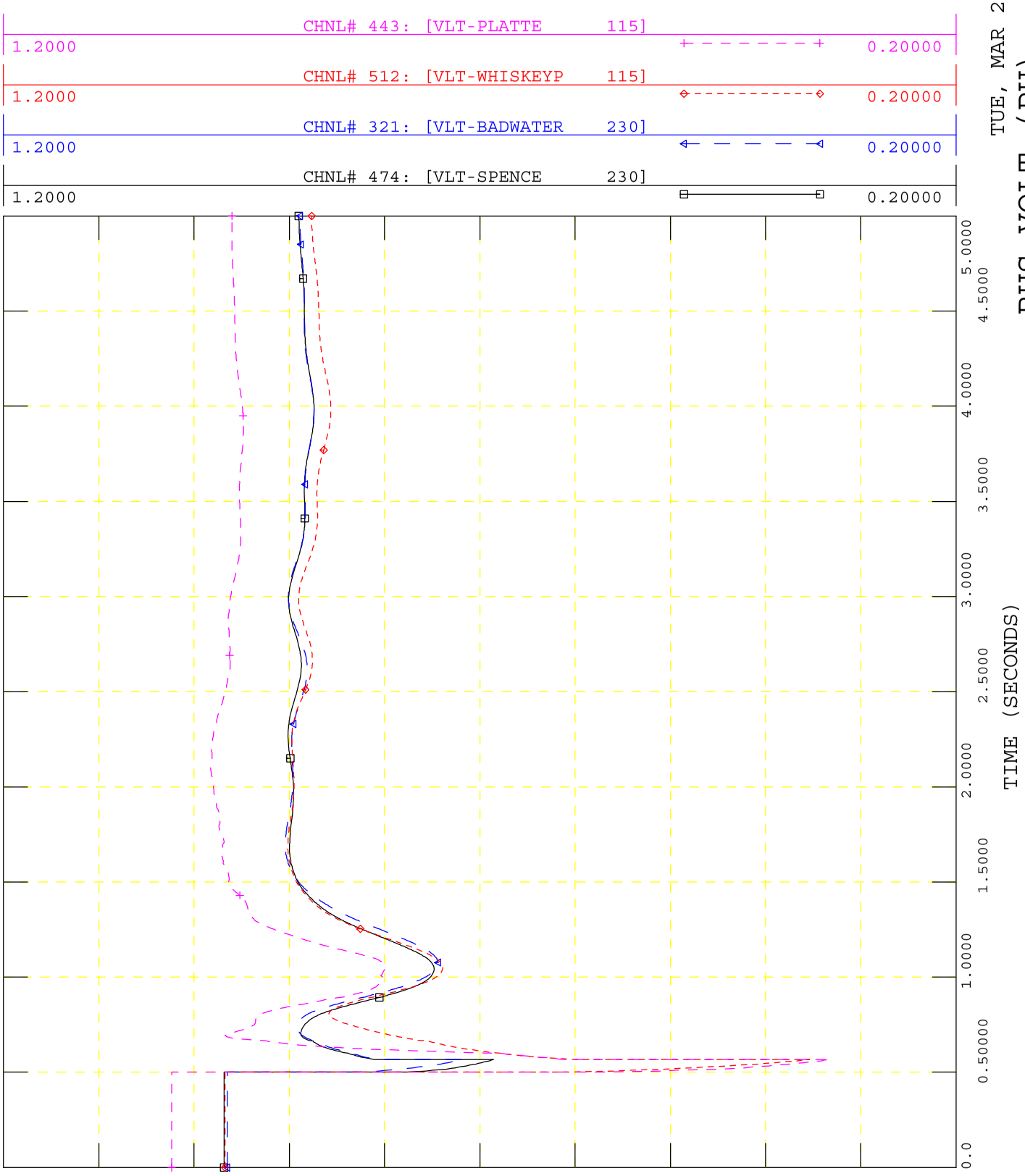
TUE, MAR 27 2018 21:28 PLT 5



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
345 LN. 36CY-UNBLOCK SVC. 40CY-TRP 628 WND GEN. OUTAGE 1F2
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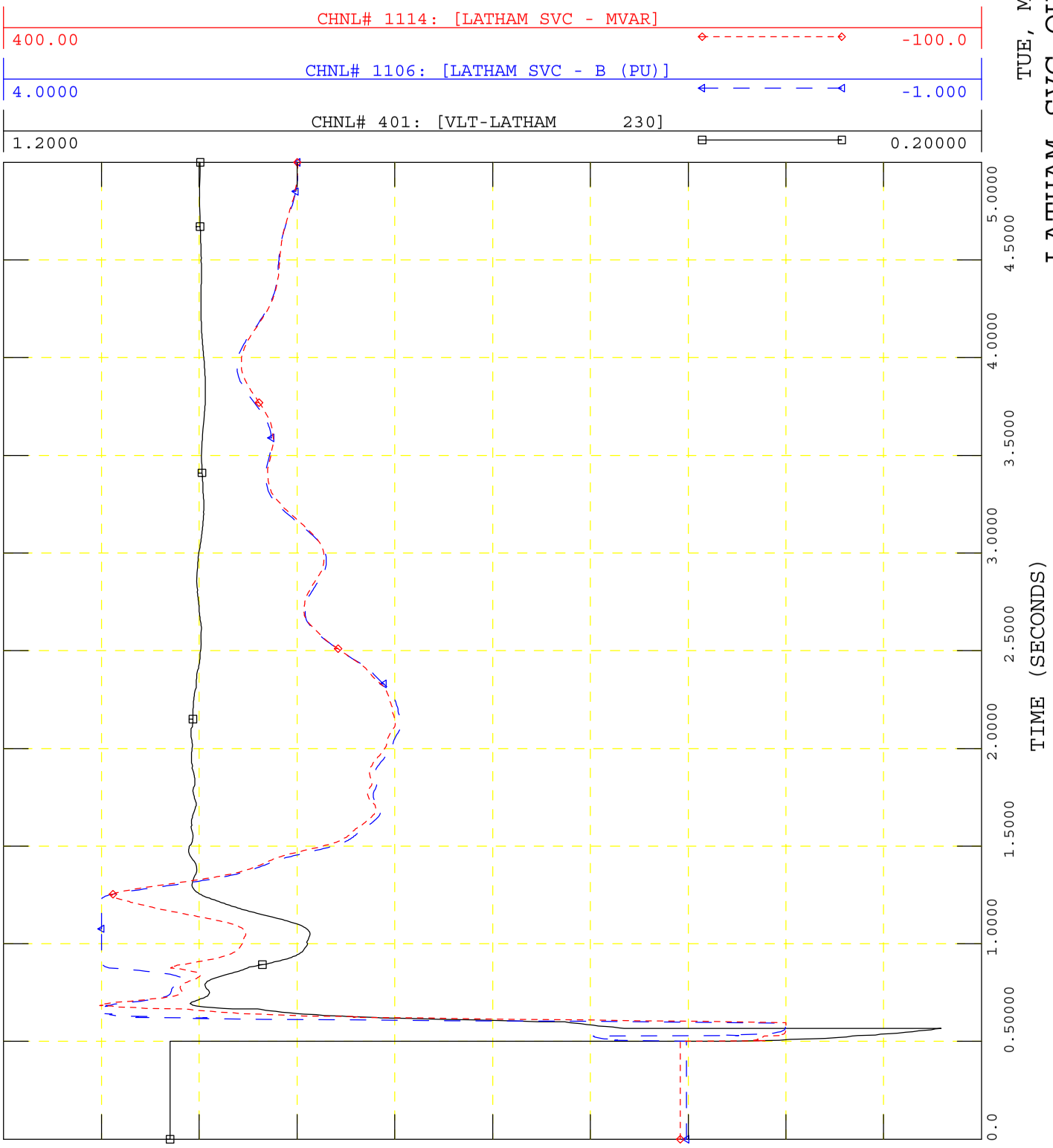
TUE, MAR 27 2018 21:28 PLT 6

LATHAM SVC OUT



SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
345 LN. 36CY-UNBLOCK SVC. 40CY-TRP 628 WND GEN. OUTAGE 1F2
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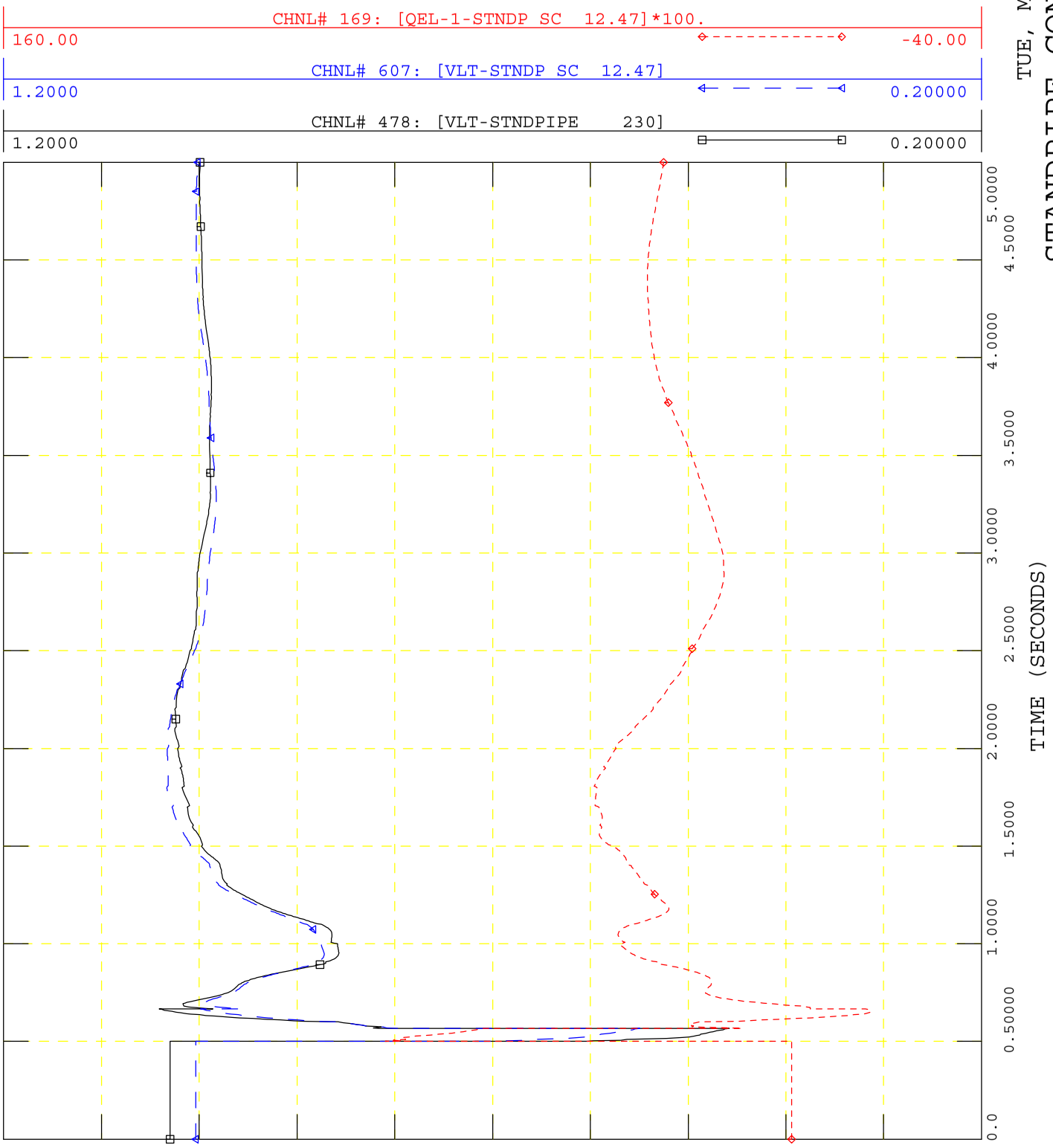
TUE, MAR 27 2018 21:28

STANDPIPE CONDNSR PLT 7



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
345 LN. 36CY-UNBLOCK SVC. 40CY-TRP 628 WND GEN. OUTAGE 1F2
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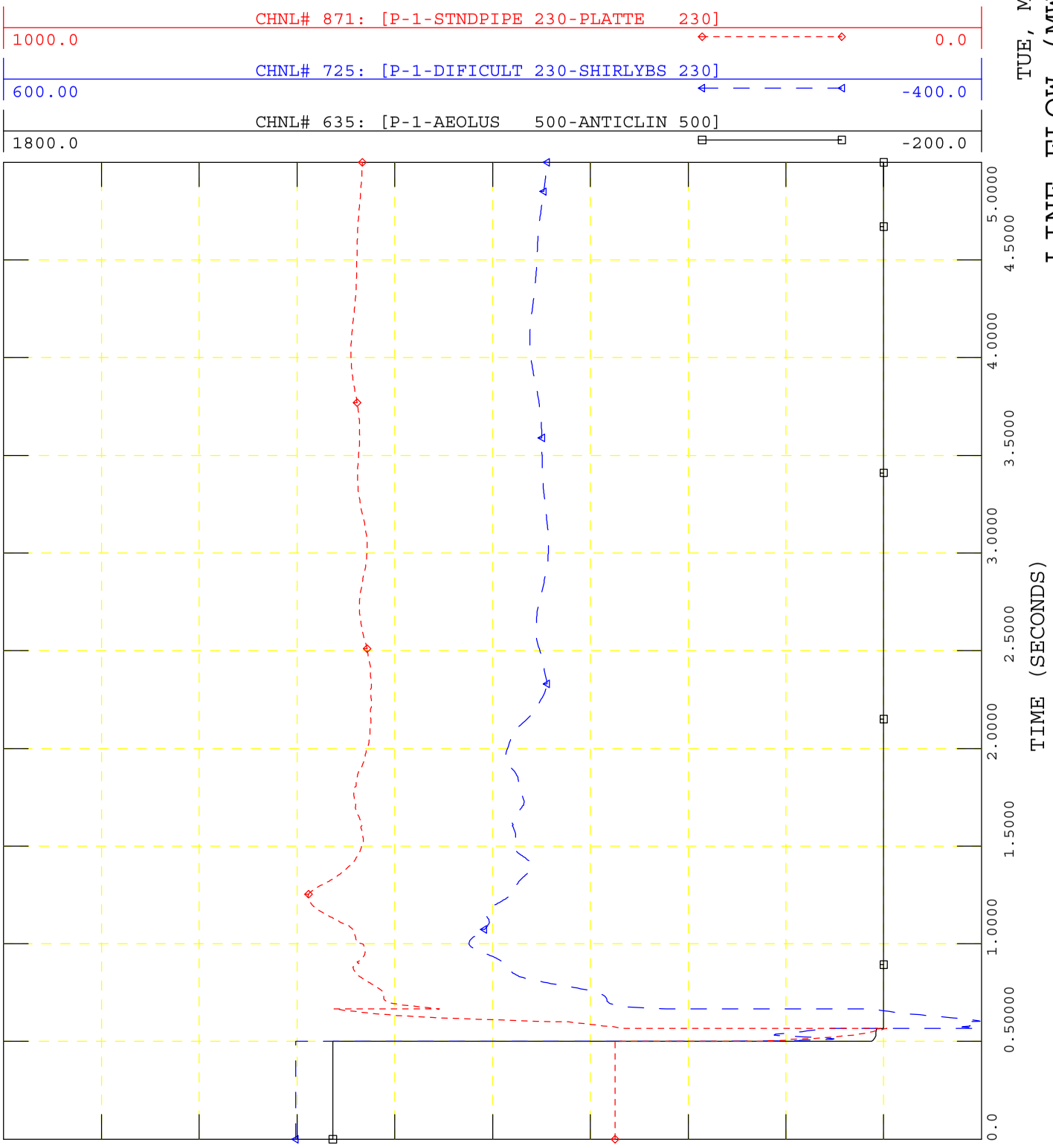
TUE, MAR 27 2018 21:28 PLT 8



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
345 LN. 36CY-UNBLOCK SVC. 40CY-TRP 628 WND GEN. OUTAGE 1F2
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TUE, MAR 27 2018 21:28 PLT 9

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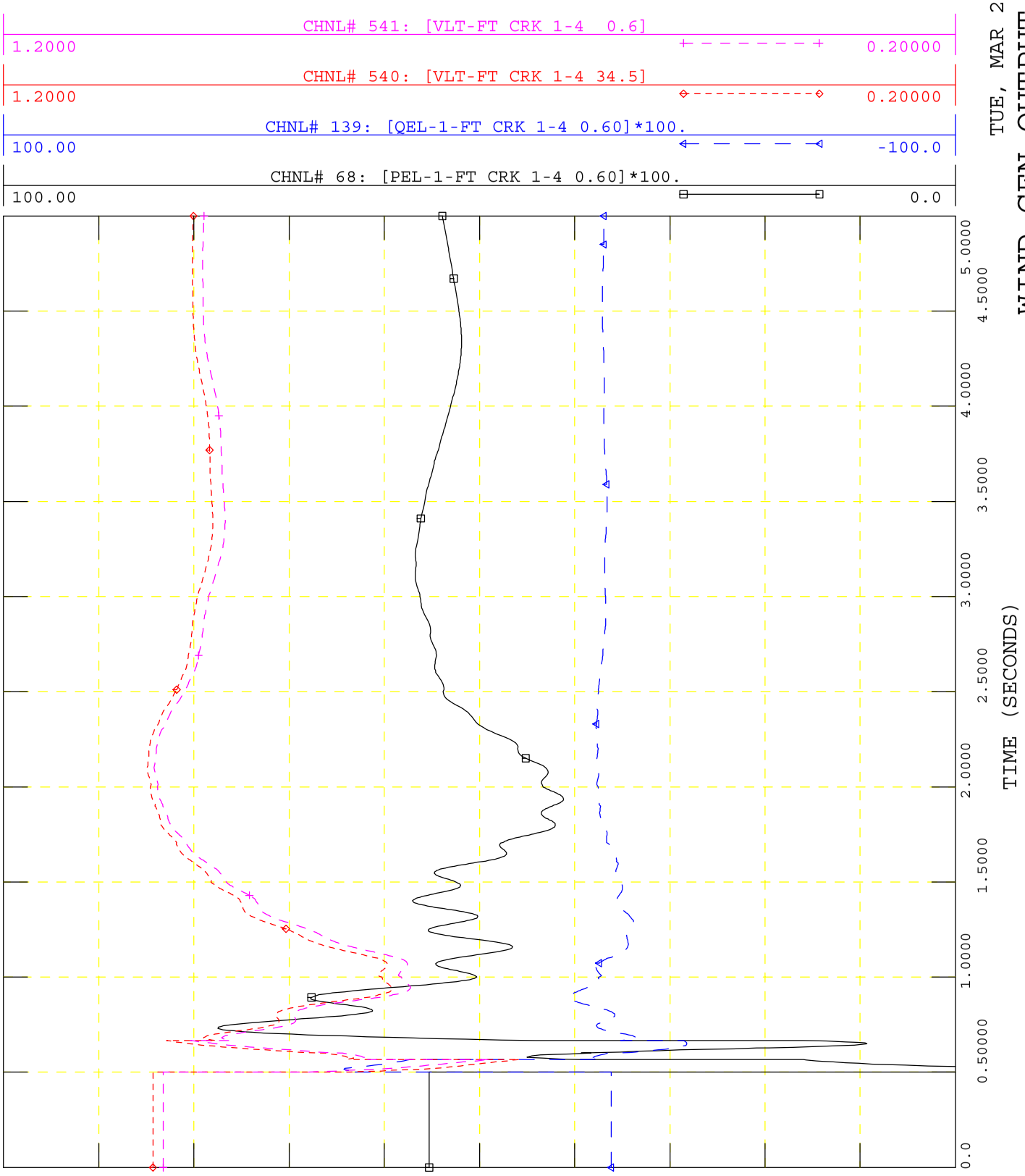

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
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TUE, MAR 27 2018 21:28 PLT 10

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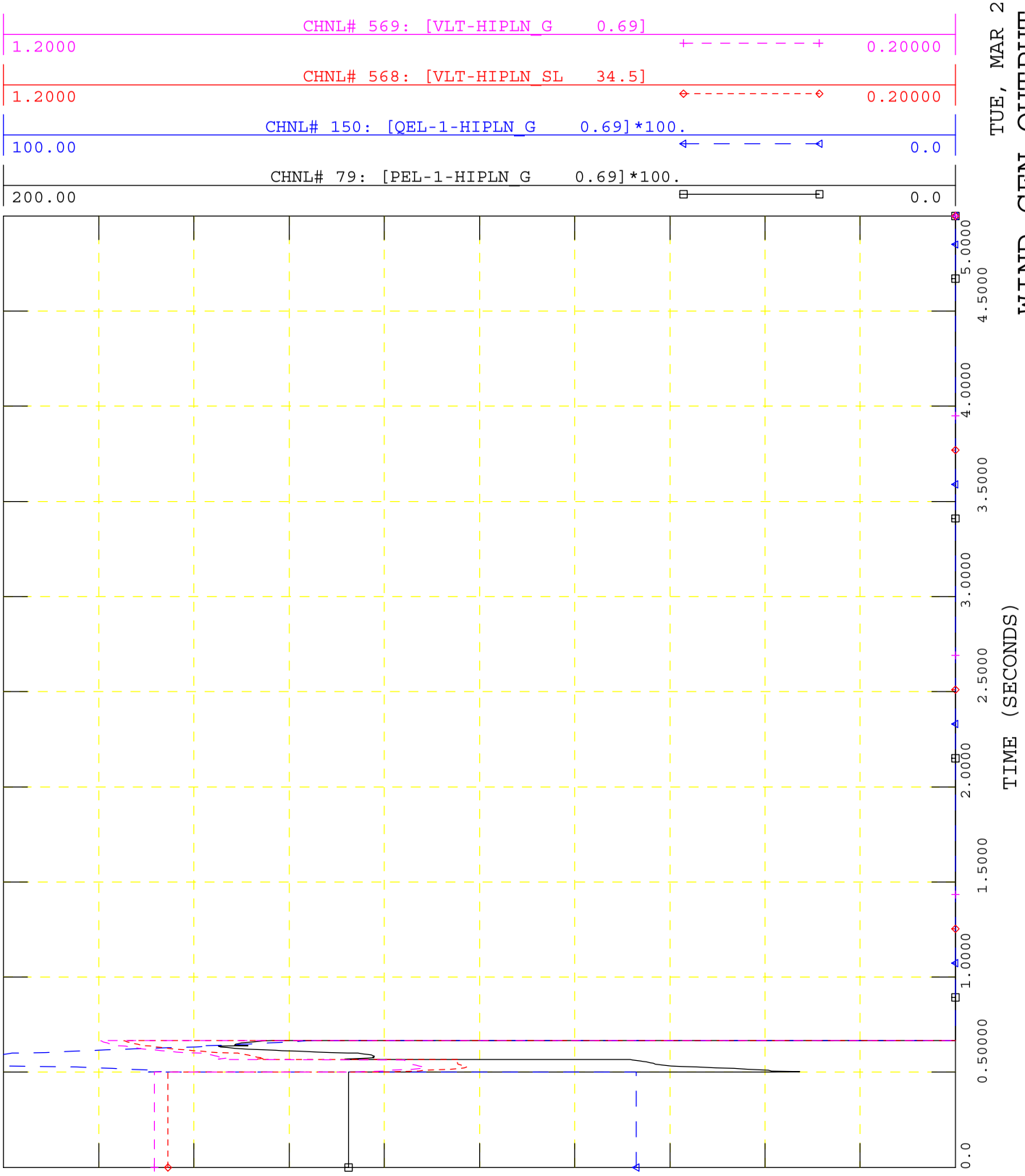

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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
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TUE, MAR 27 2018 21:28 PLT 11

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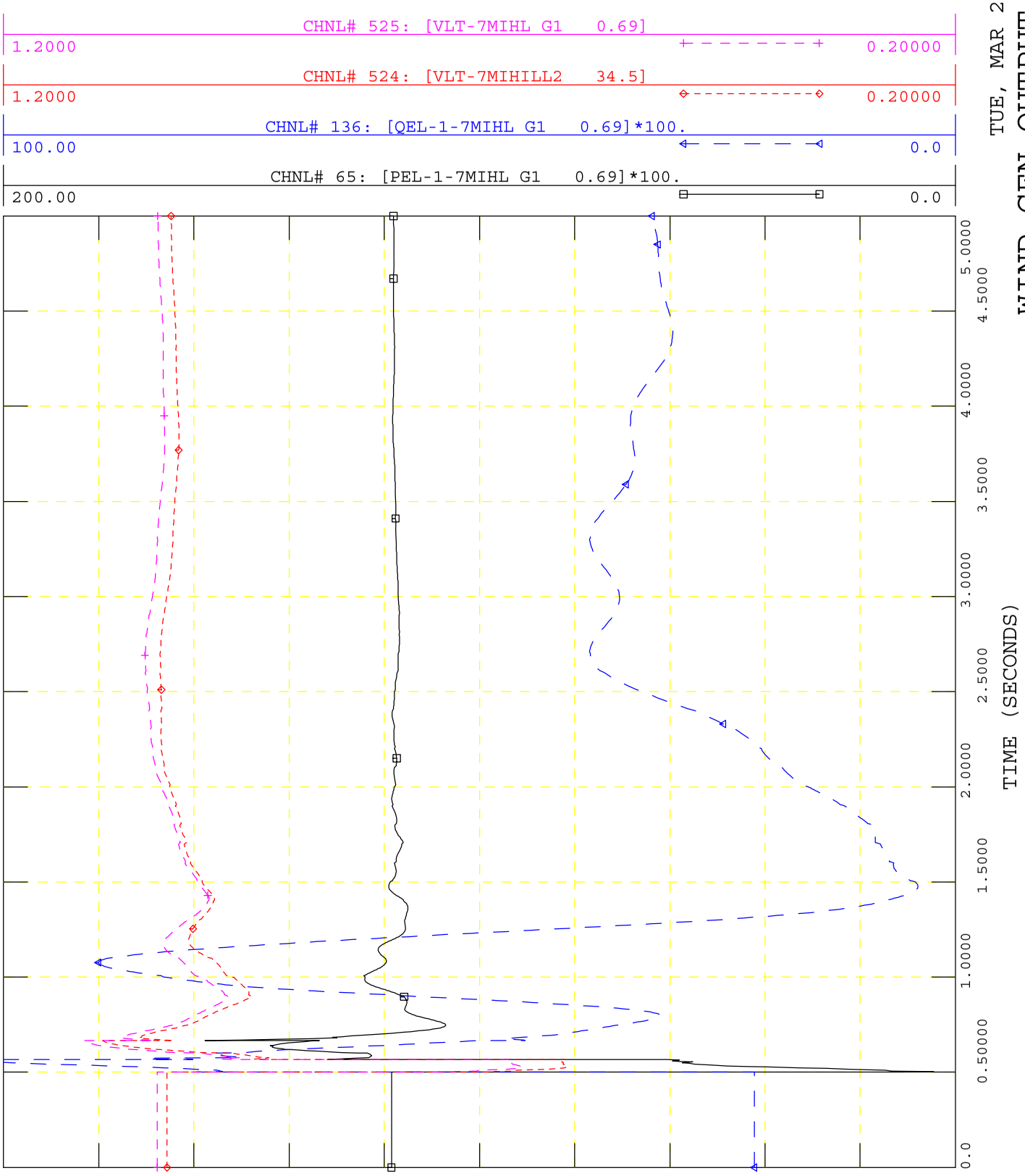

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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
345 LN. 36CY-UNBLOCK SVC. 40CY-TRP 628 WND GEN. OUTAGE 1F2
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TUE, MAR 27 2018 21:28 PLT 12

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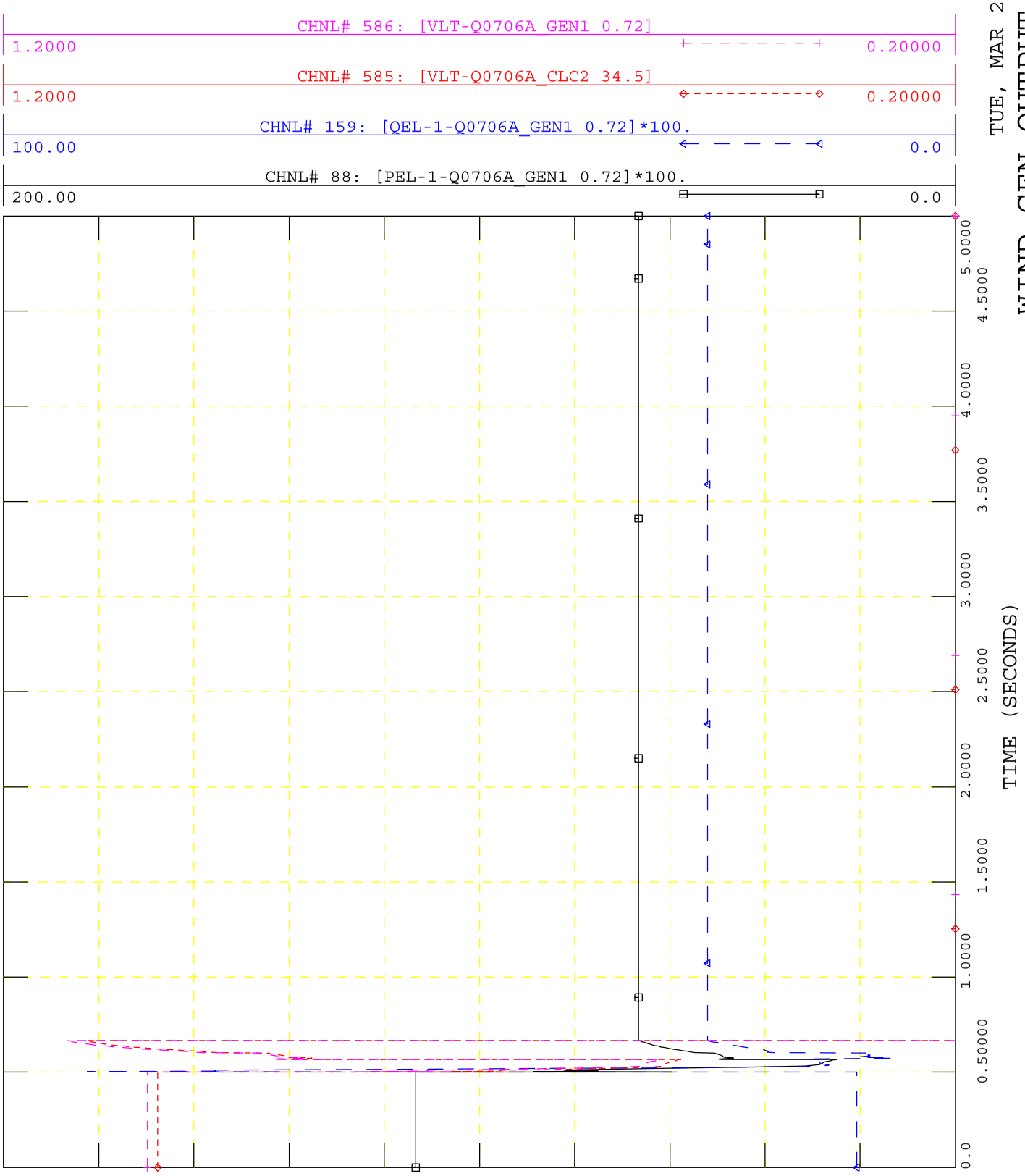

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
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TUE, MAR 27 2018 21:28 PLT 13

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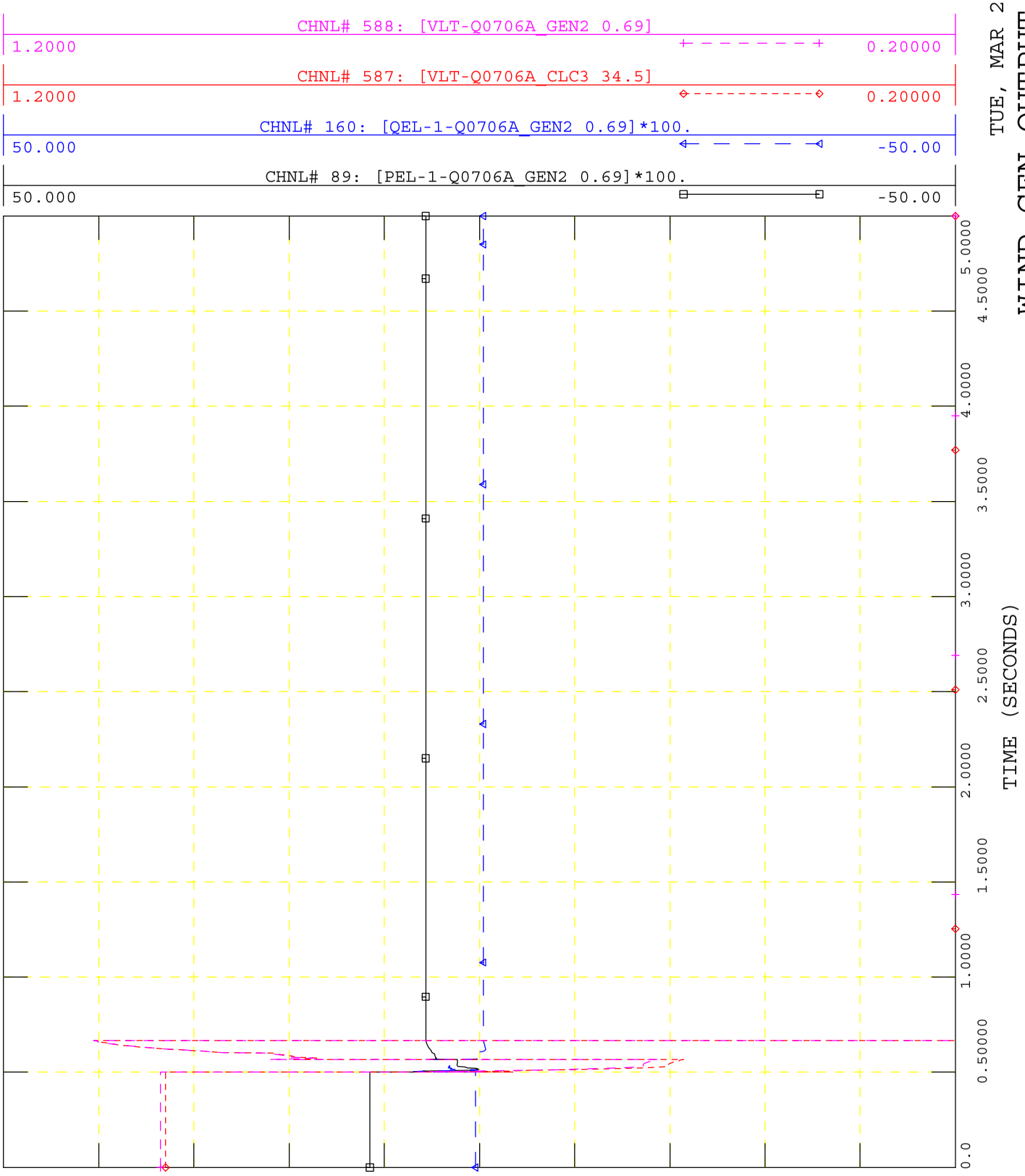

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TUE, MAR 27 2018 21:28 PLT 14

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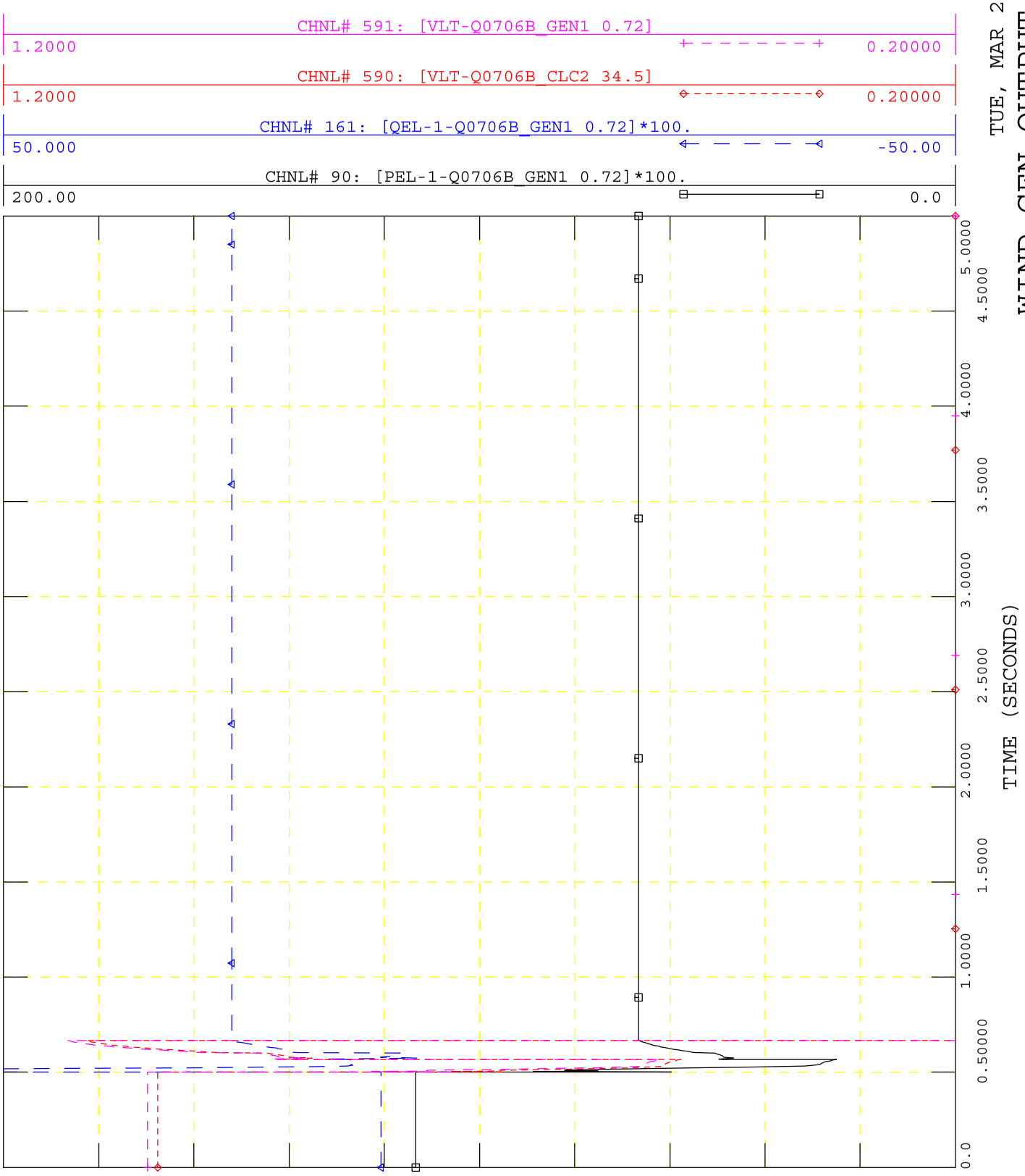

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TUE, MAR 27 2018 21:28 PLT 15

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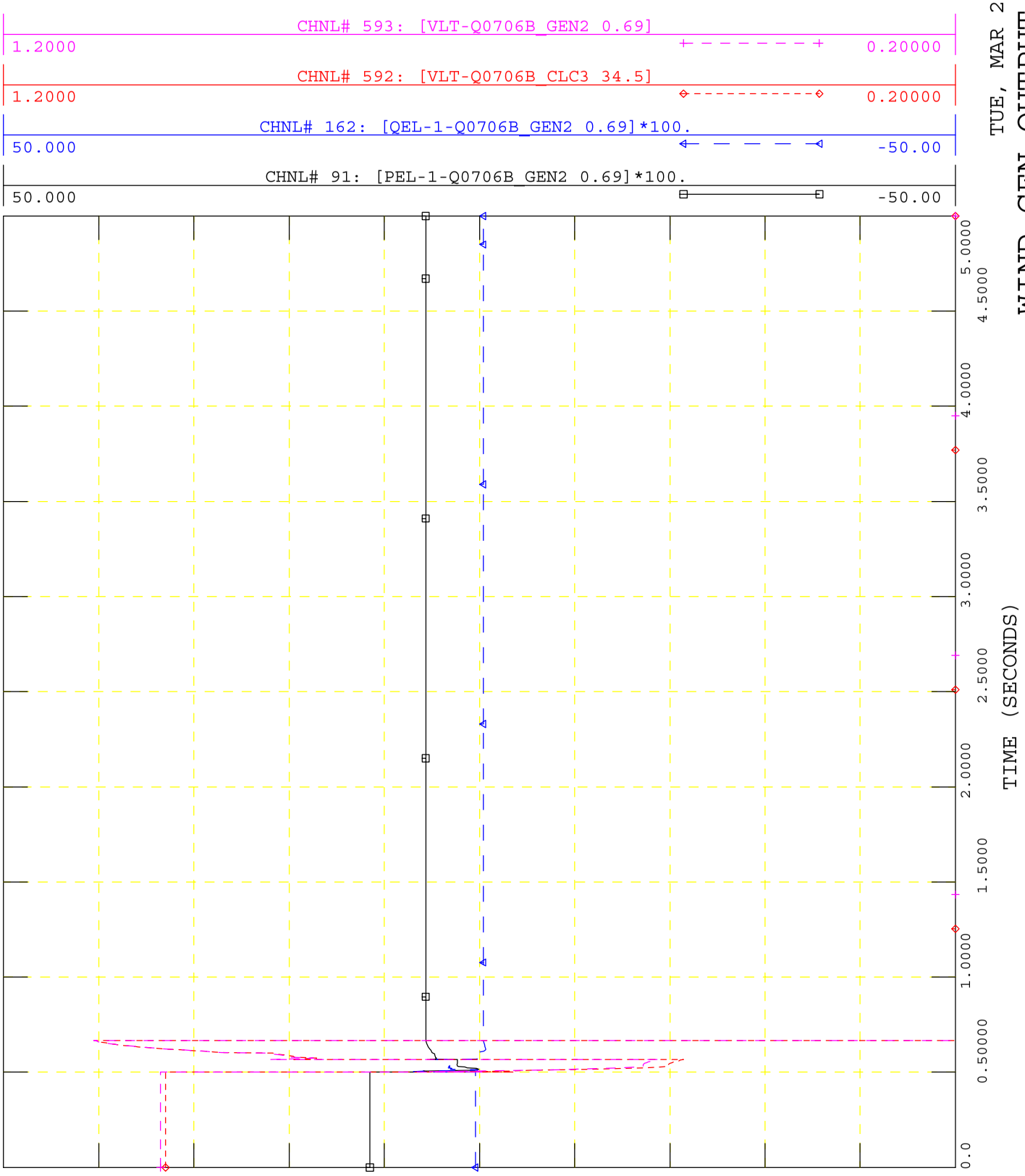

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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
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TUE, MAR 27 2018 21:28 PLT 16

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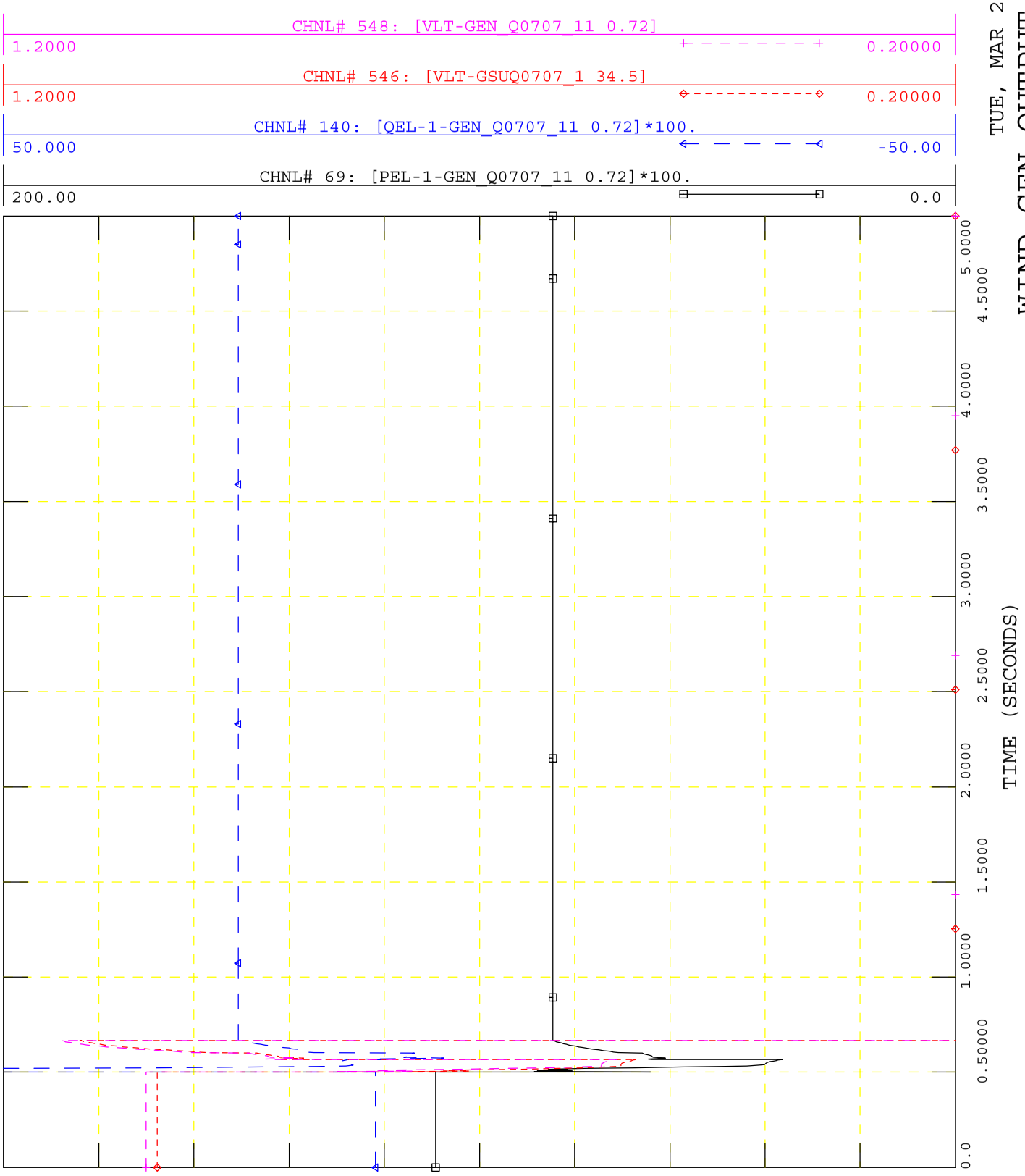

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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
345 LN. 36CY-UNBLOCK SVC. 40CY-TRP 628 WND GEN. OUTAGE 1F2
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TUE, MAR 27 2018 21:28 PLT 17

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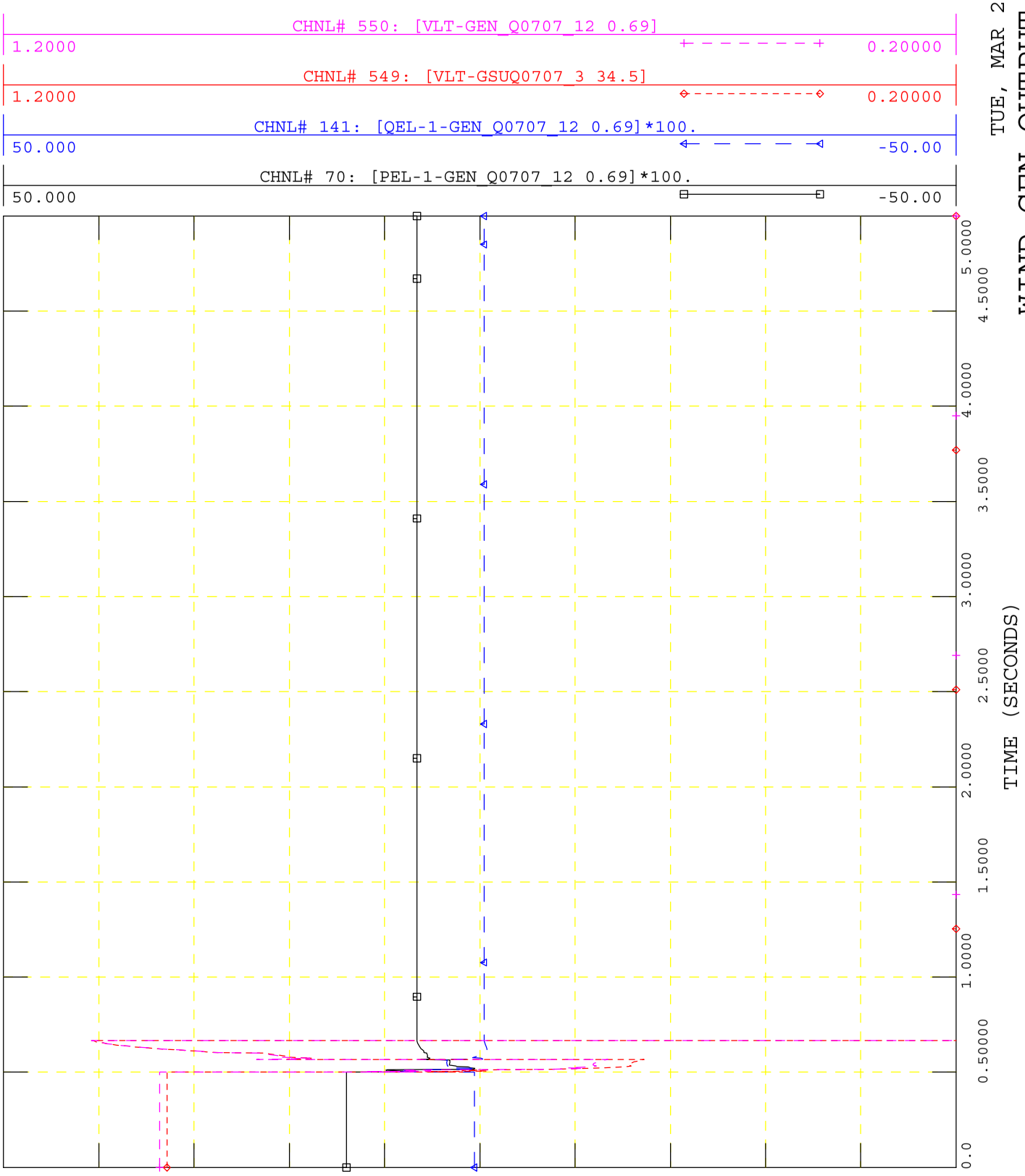

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TUE, MAR 27 2018 21:28 PLT 18

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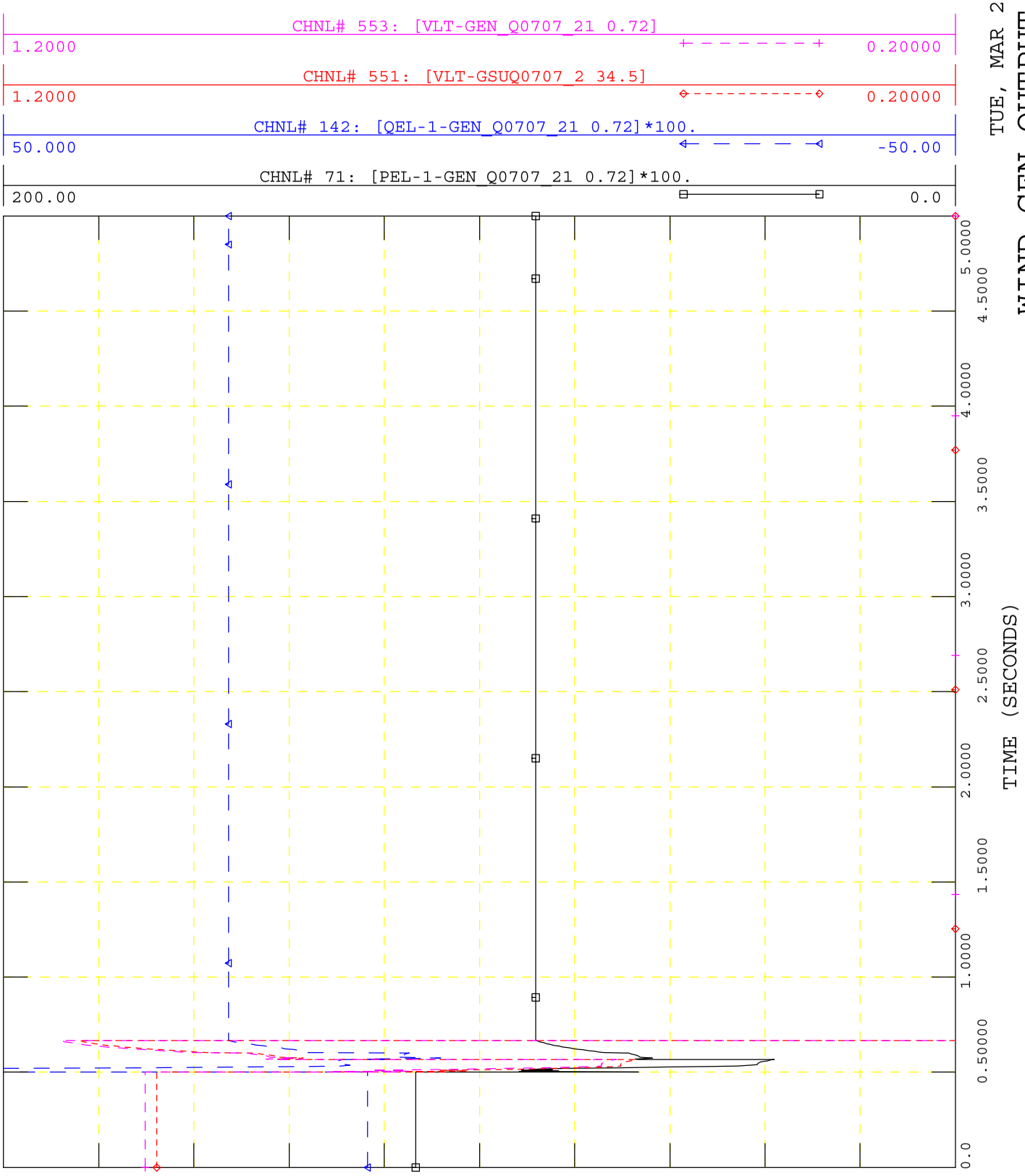

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TUE, MAR 27 2018 21:28 PLT 19

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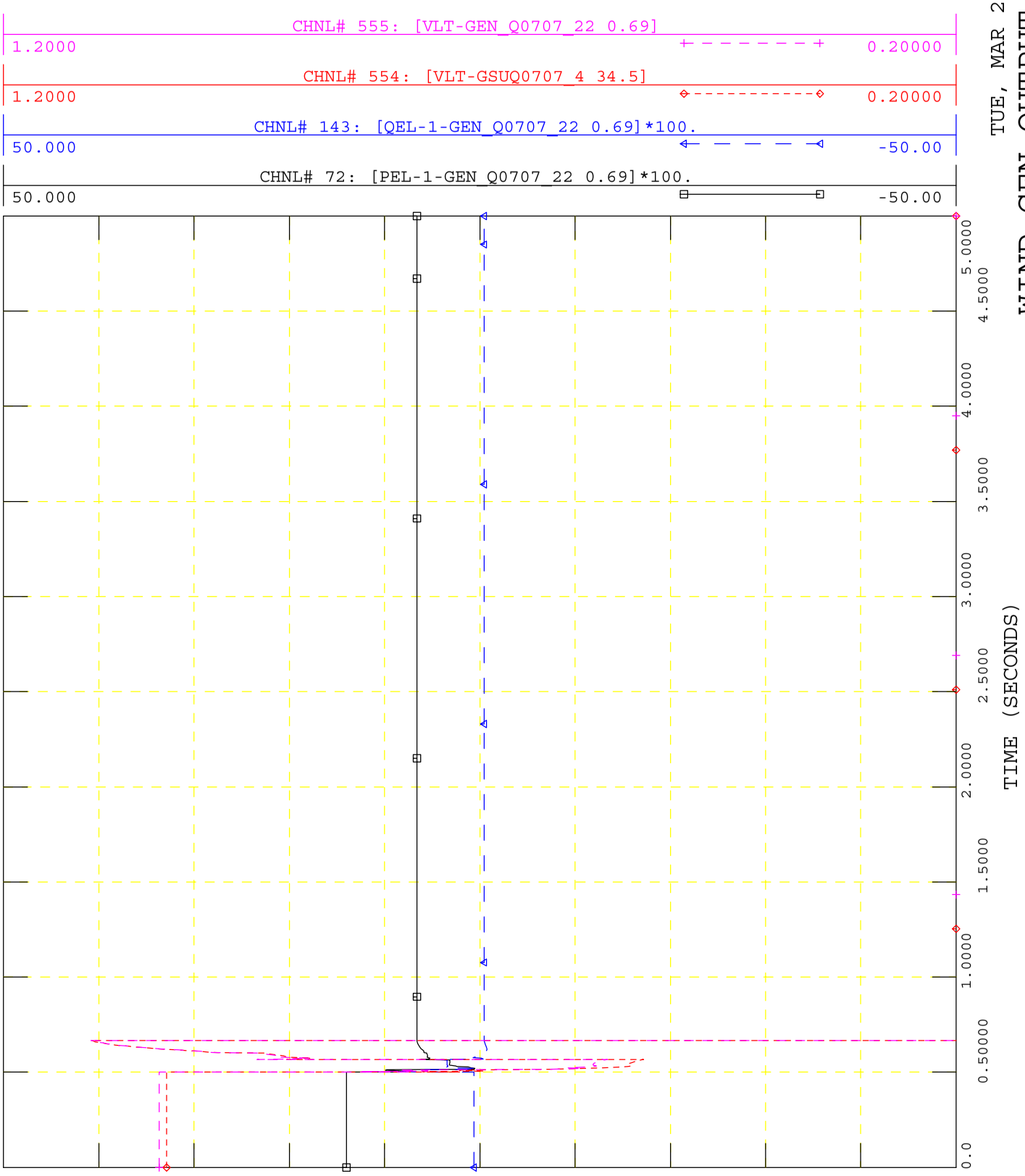

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TUE, MAR 27 2018 21:28 PLT 20

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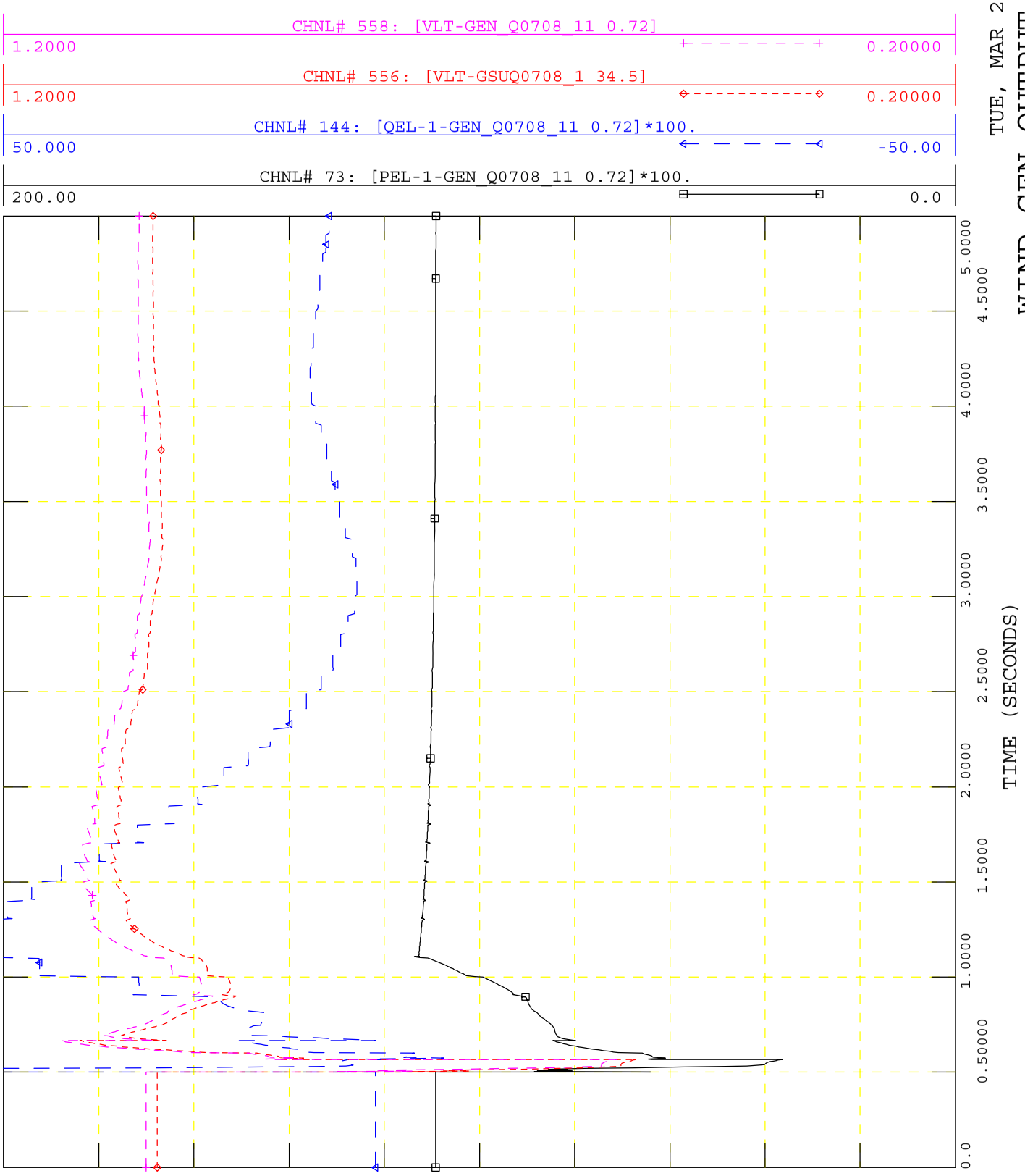

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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
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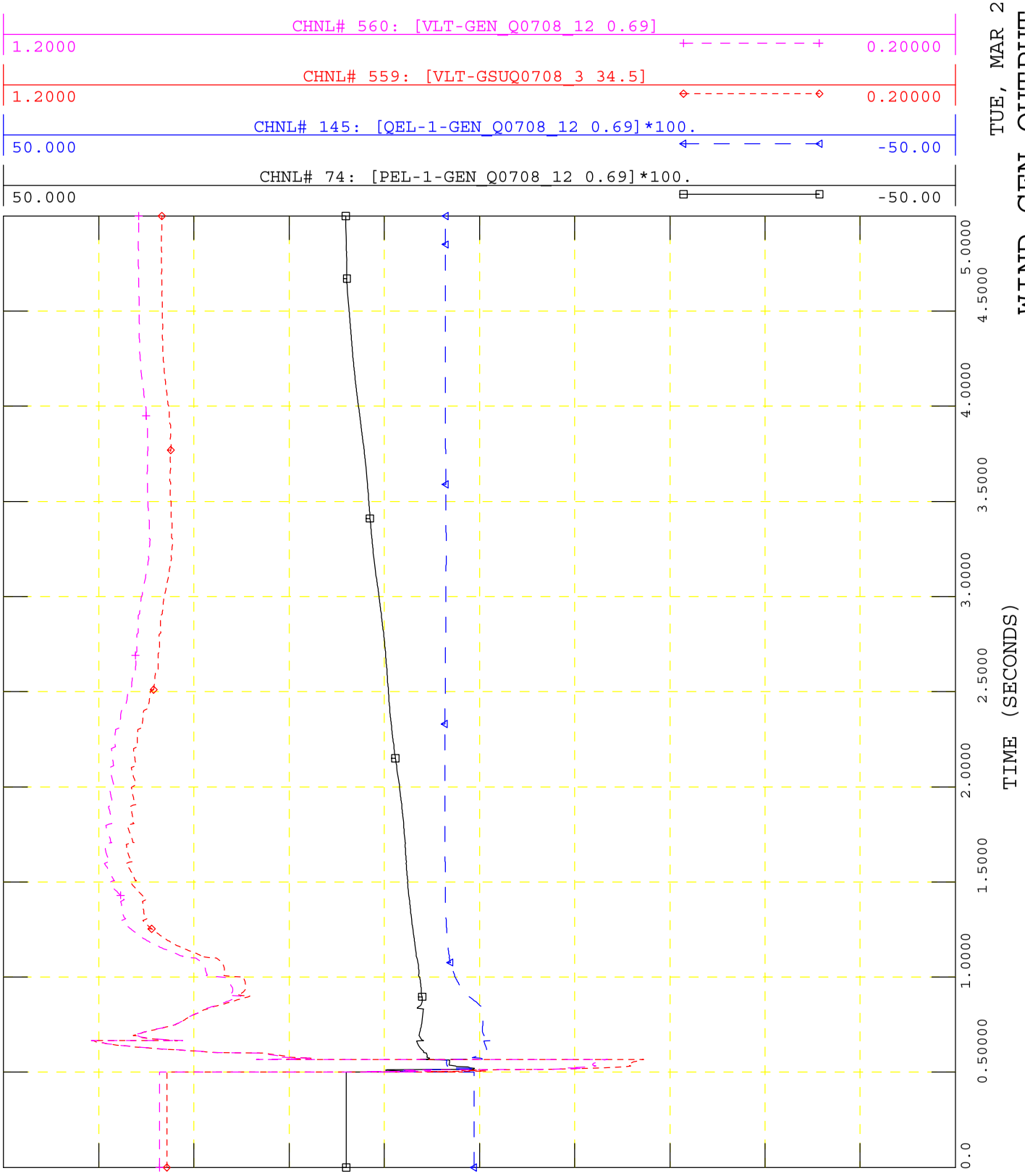
TUE, MAR 27 2018 21:28 PLT 21

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
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TUE, MAR 27 2018 21:28 PLT 22

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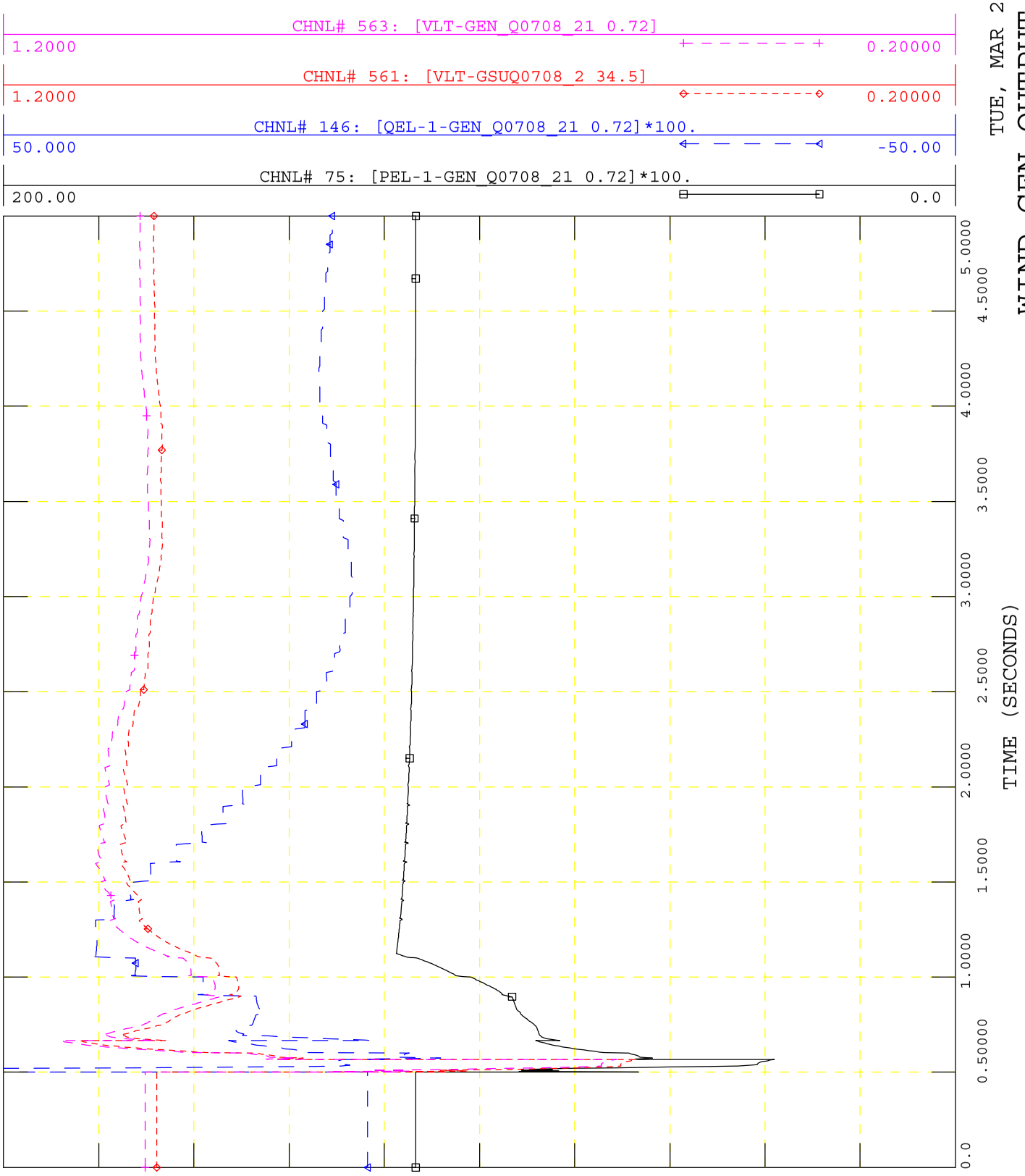

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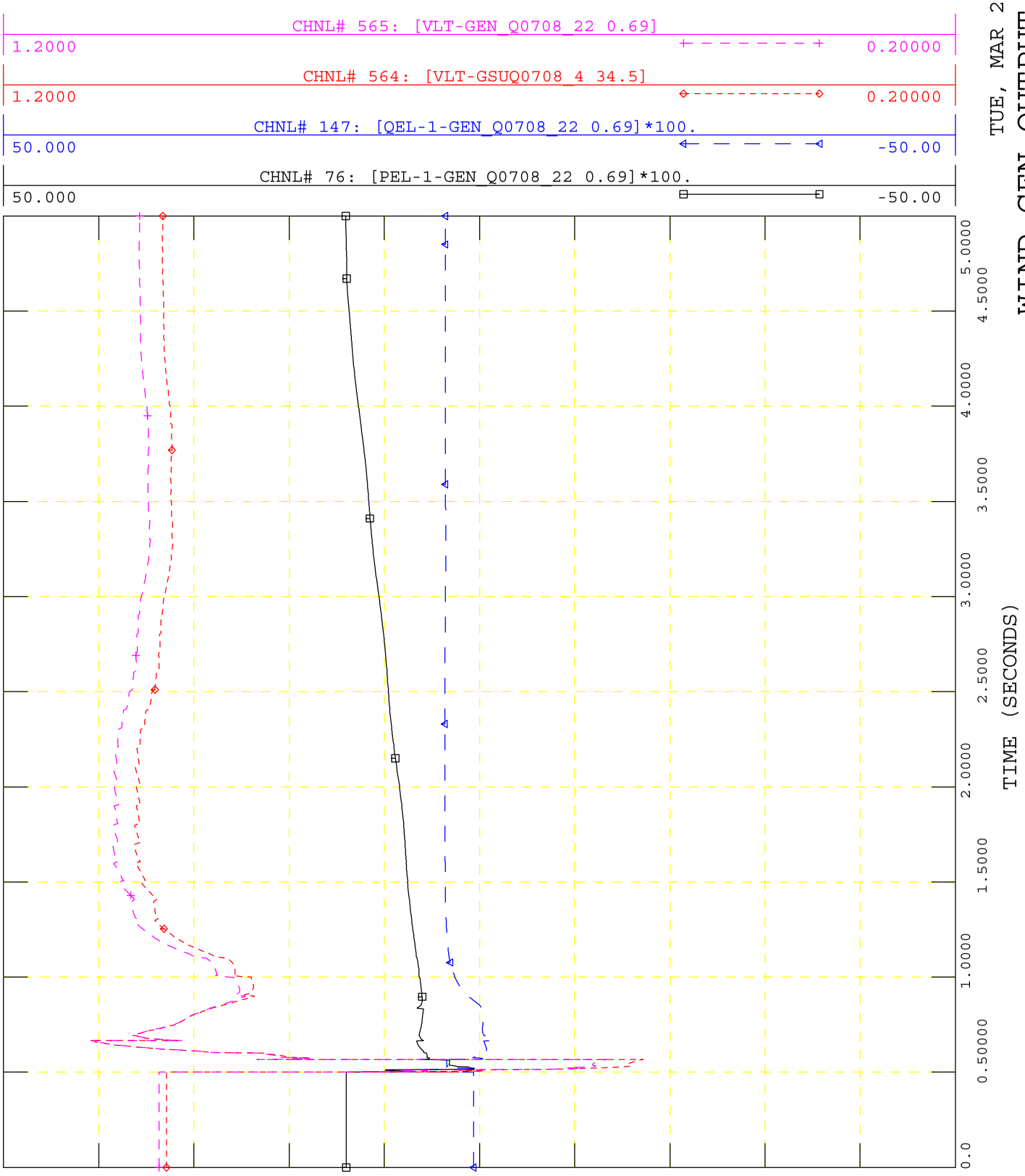
TUE, MAR 27 2018 21:28 PLT 23

WIND GEN OUTPUT



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30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
345 LN. 36CY-UNBLOCK SVC. 40CY-TRP 628 WND GEN. OUTAGE 1F2
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TUE, MAR 27 2018 21:28 PLT 24

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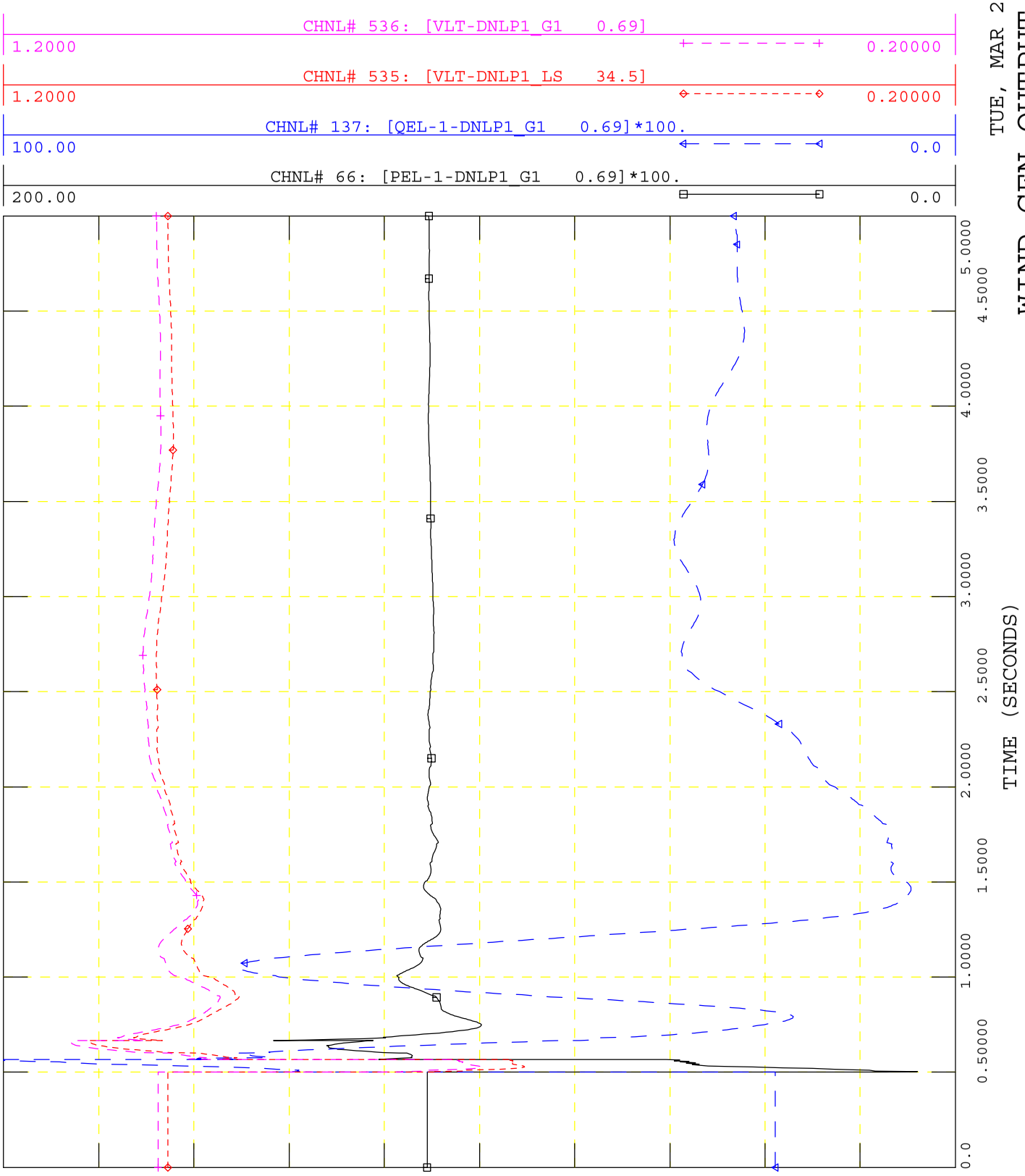

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
345 LN. 36CY-UNBLOCK SVC. 40CY-TRP 628 WND GEN. OUTAGE 1F2
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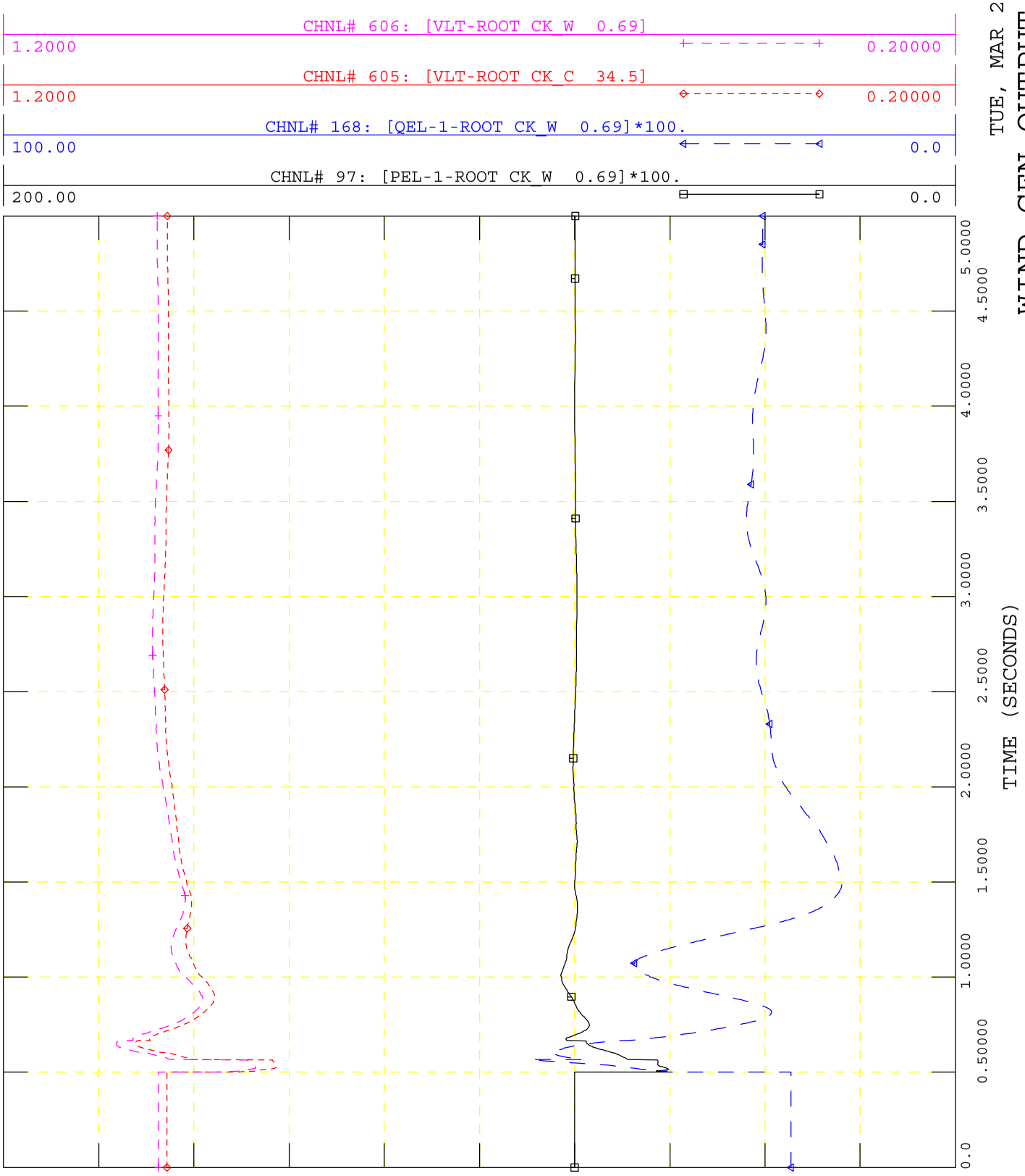
TUE, MAR 27 2018 21:28 PLT 25

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS BRIDGER 345 KV FLT. 34CY-CLR FLT & OPEN BRID-ANTI
345 LN. 36CY-UNBLOCK SVC. 40CY-TRP 628 WND GEN. OUTAGE 1F2
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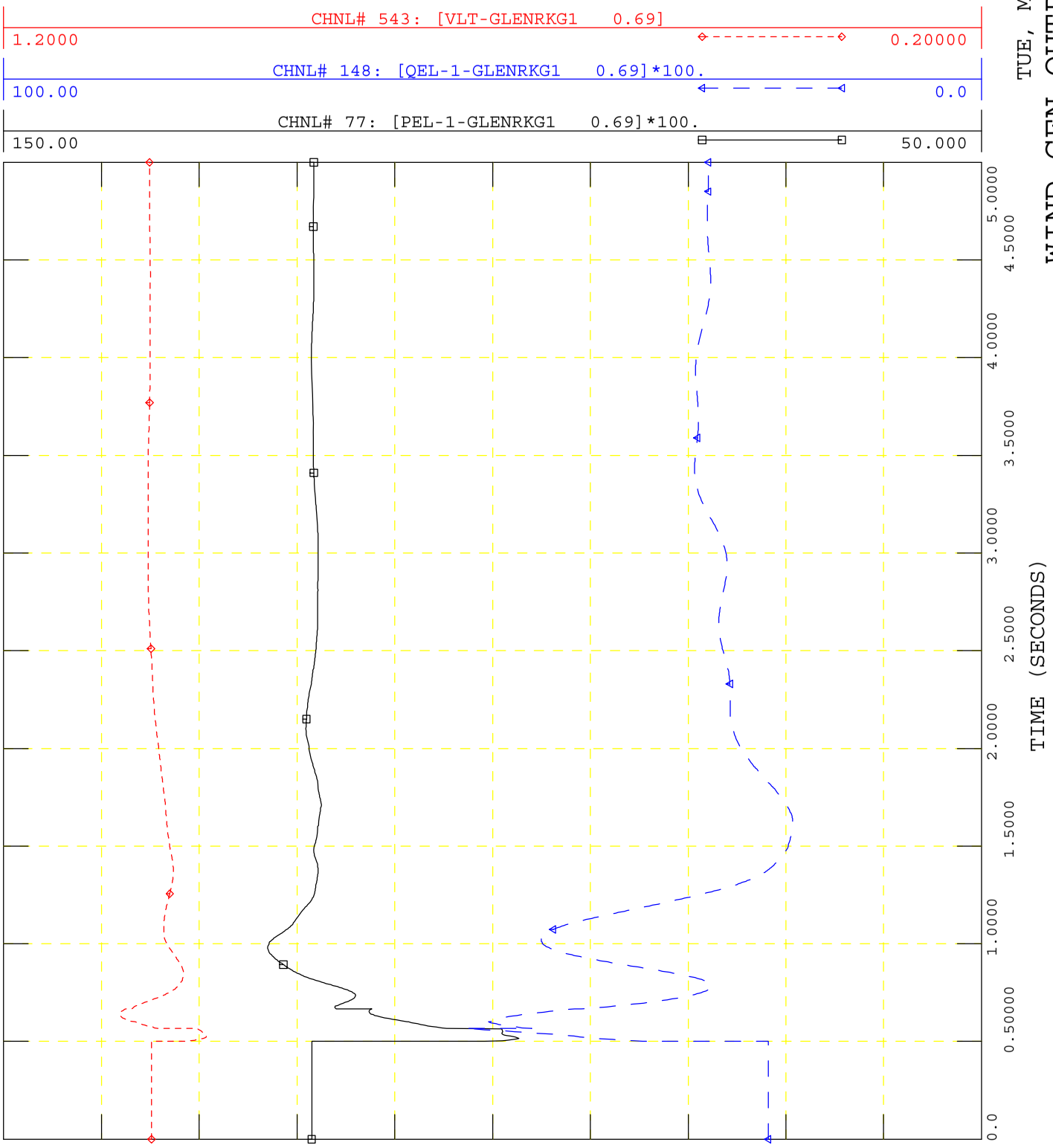
TUE, MAR 27 2018 21:28

WIND GEN OUTPUT PLT 26



Dynamic Simulation

Case 2 – Loss of Bridger-Point of Rocks-Rock Springs 230 kV line

30 cycles	**3 phase Bridger 230 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Bridger-Point of Rocks-Rock Springs 230 kV line**
36 cycles	**Remove SVC MVAR limiter**
5 sec.	**Terminate simulation**

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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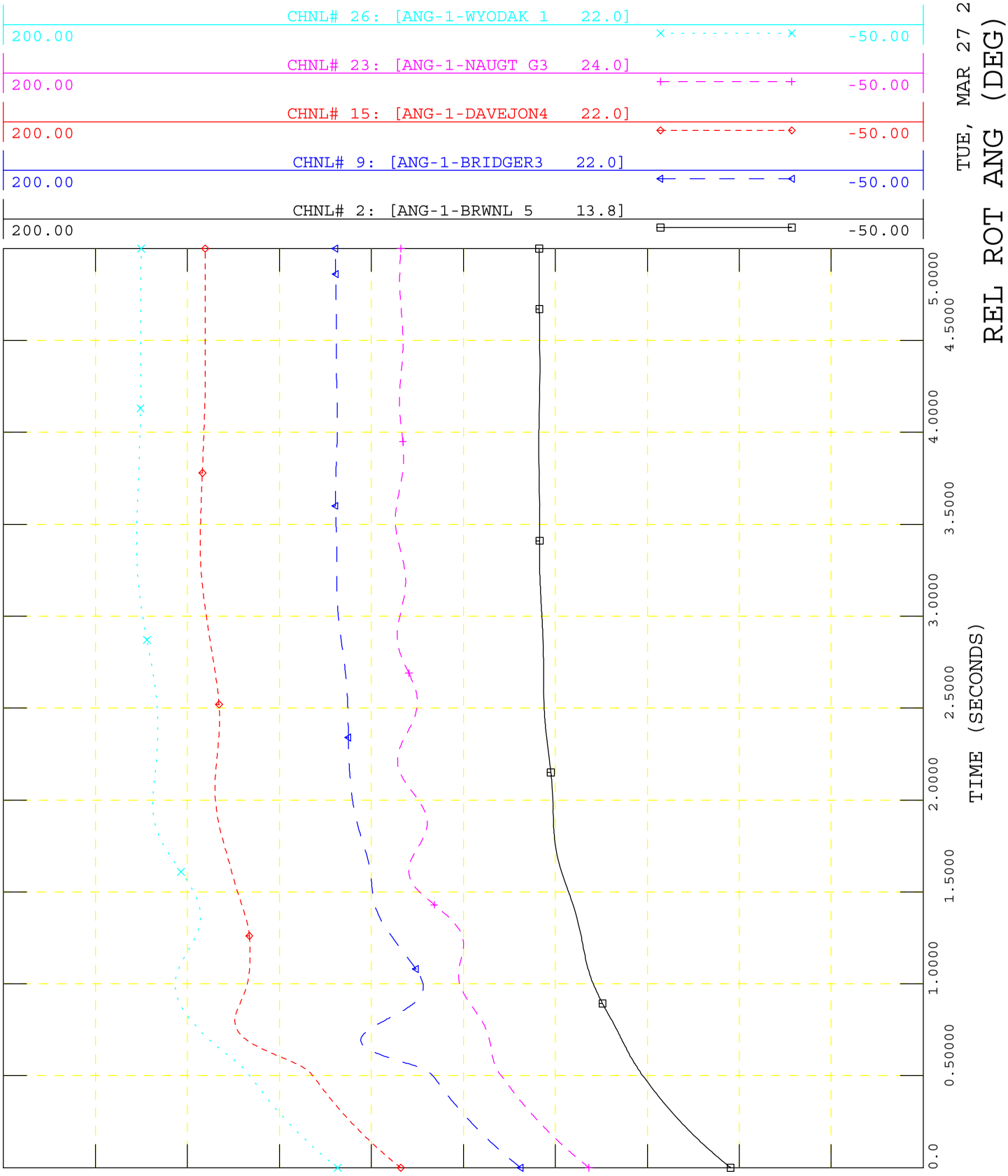
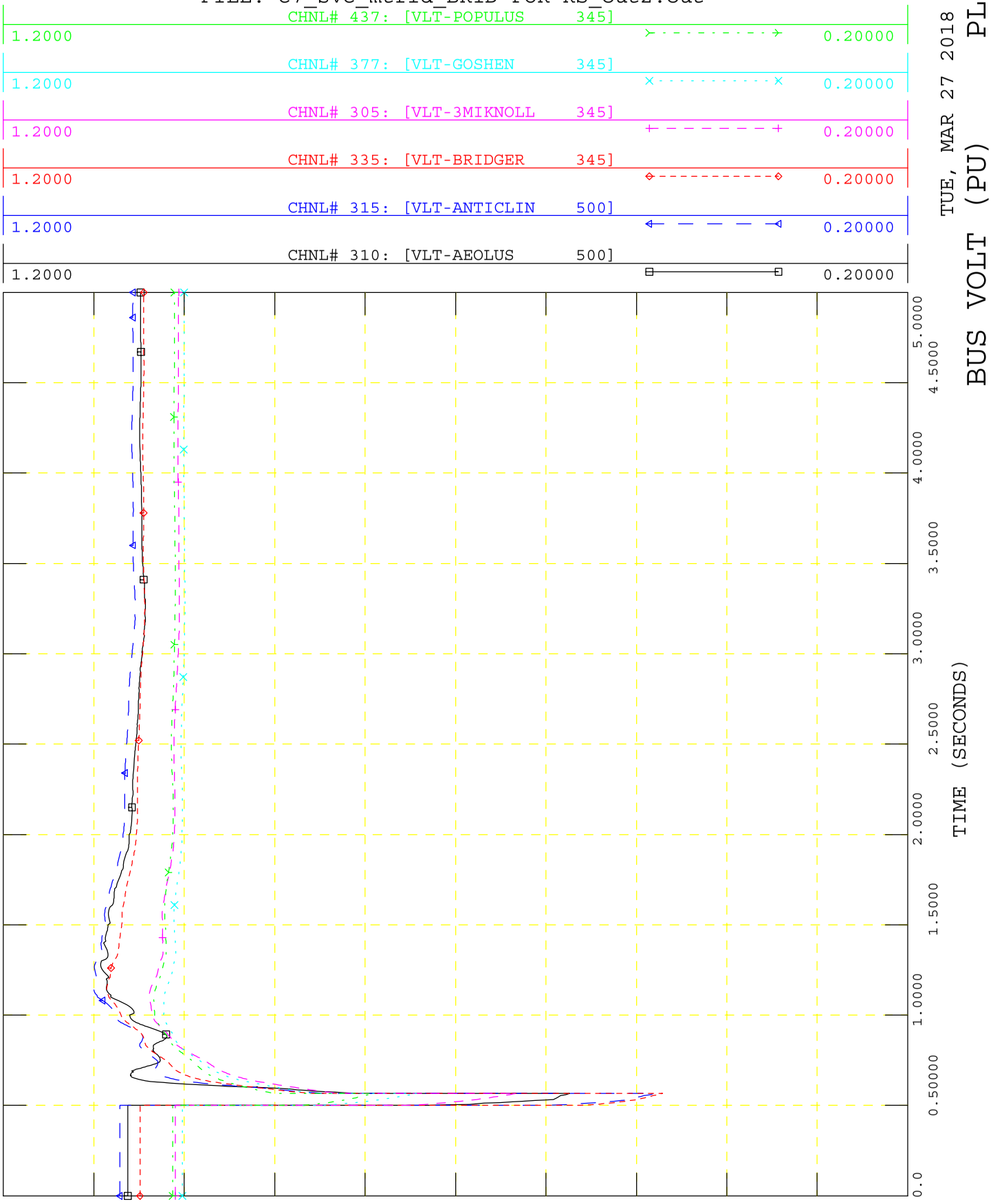


TUE, MAR 27 2018 21:28
REL ROT ANG (DEG) PLT 1

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS BRIDGER 230 KV FLT. 34CY-CLR FLT & OPEN BRIDGER-
POINT ROCKS-ROCK SPGS 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 2
FILE: c7_svc_mtrld_BRID-POR-RS_out2.out



TUE, MAR 27 2018 21:28 PLT 2

BUS VOLT (PU)

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS BRIDGER 230 KV FLT. 34CY-CLR FLT & OPEN BRIDGER-
POINT ROCKS-ROCK SPGS 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 2
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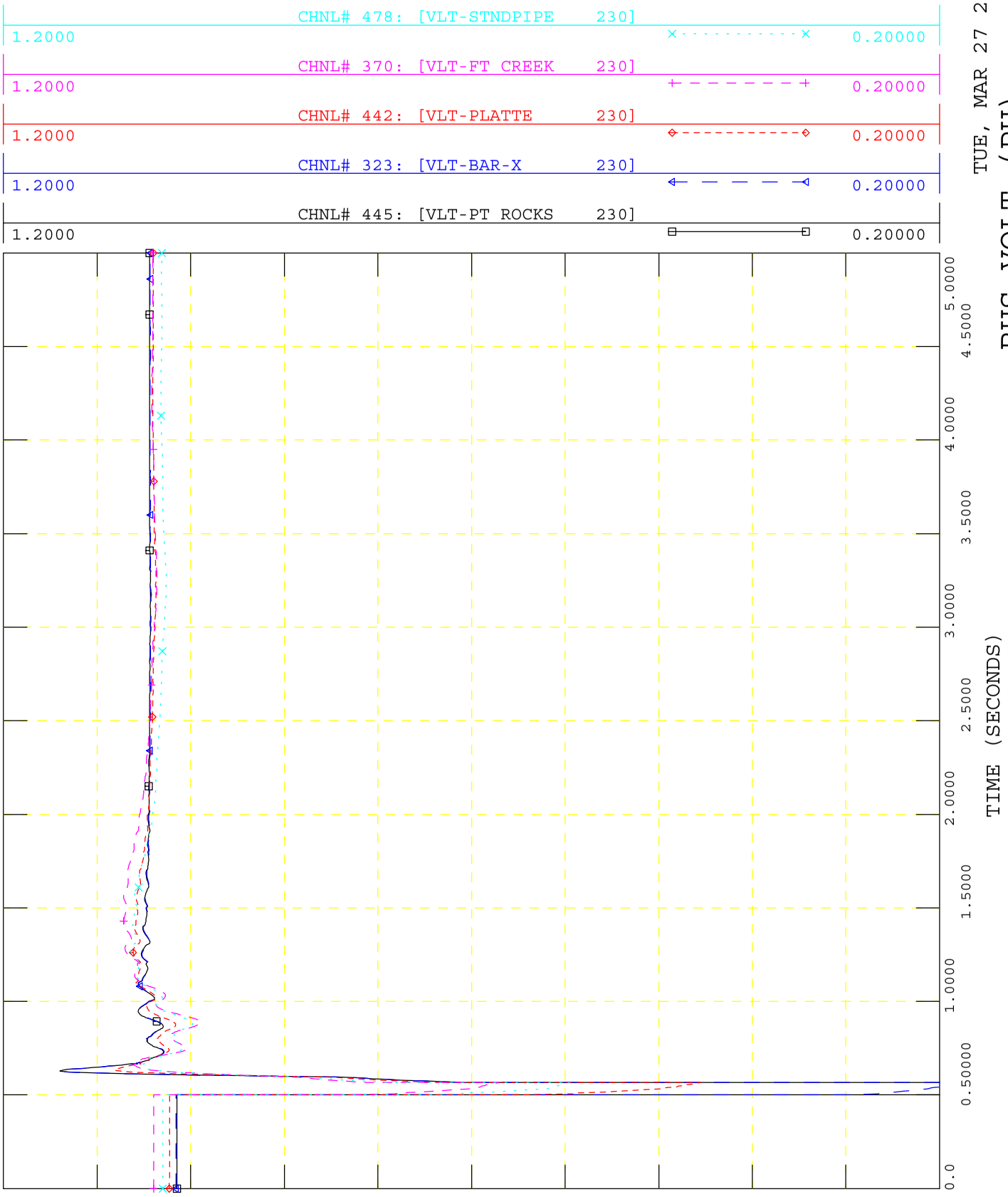
TUE, MAR 27 2018 21:28 PLT 3



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS BRIDGER 230 KV FLT. 34CY-CLR FLT & OPEN BRIDGER-
POINT ROCKS-ROCK SPGS 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 2
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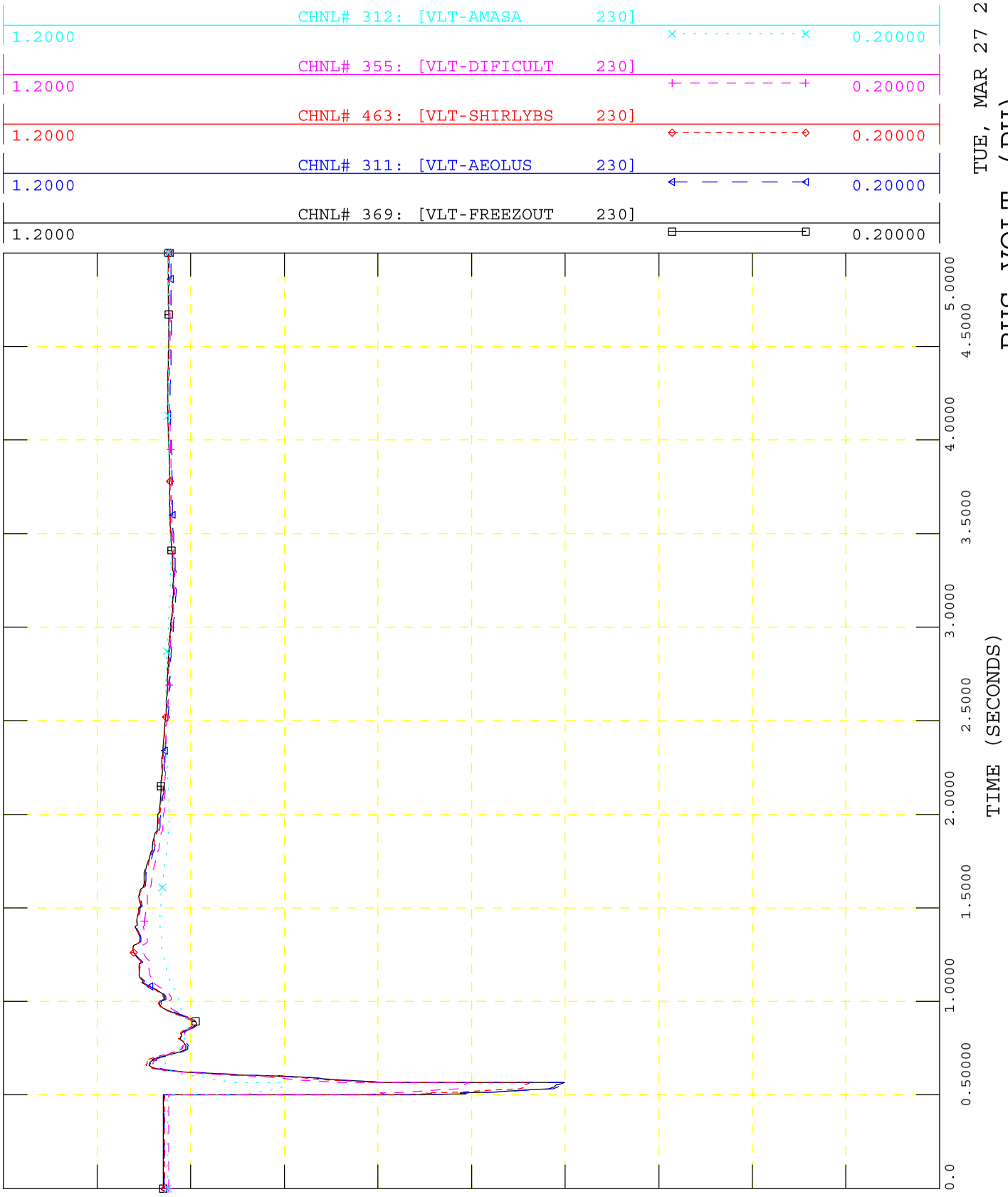
TUE, MAR 27 2018 21:28 PLT 4



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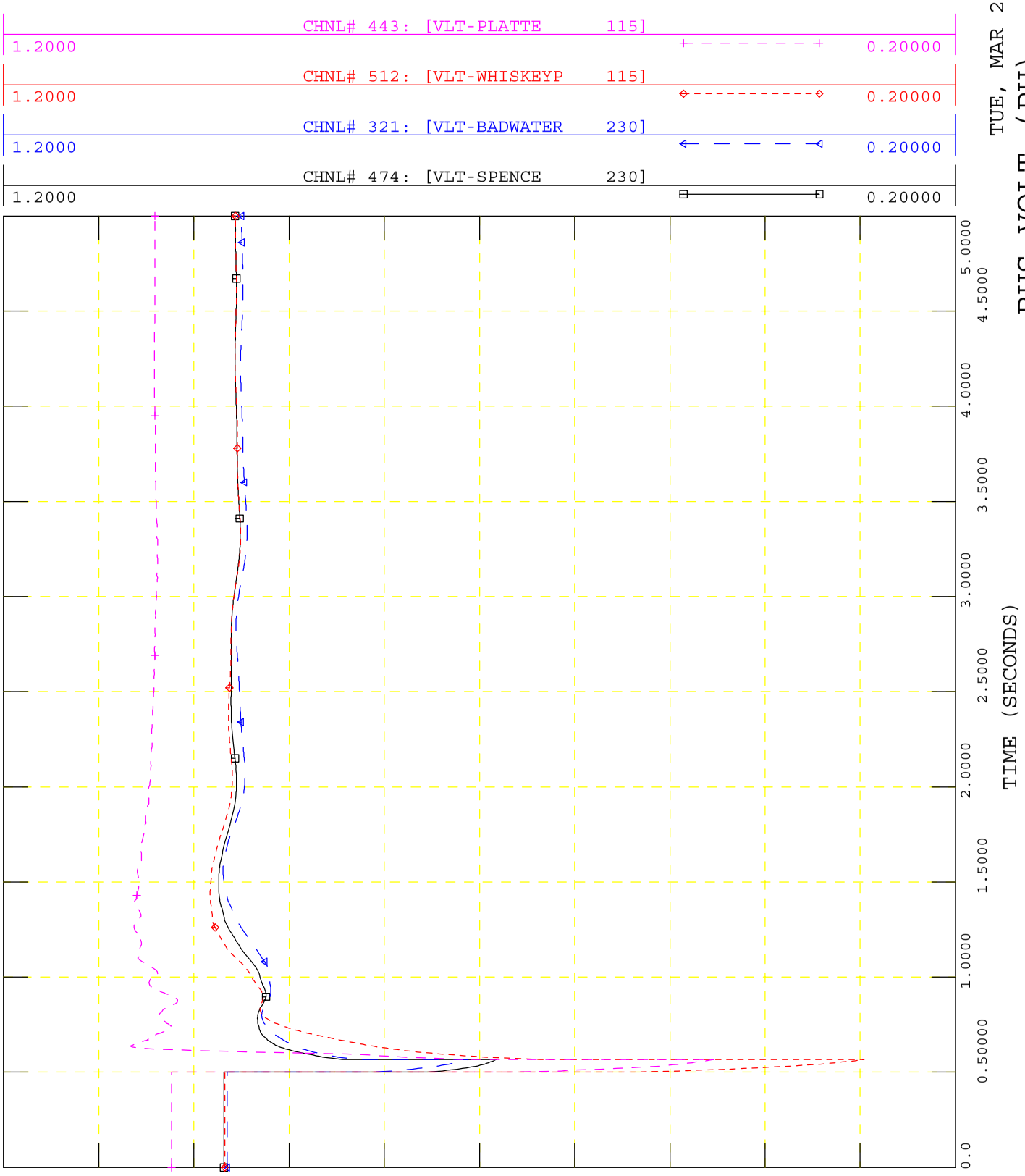
TUE, MAR 27 2018 21:28 PLT 5



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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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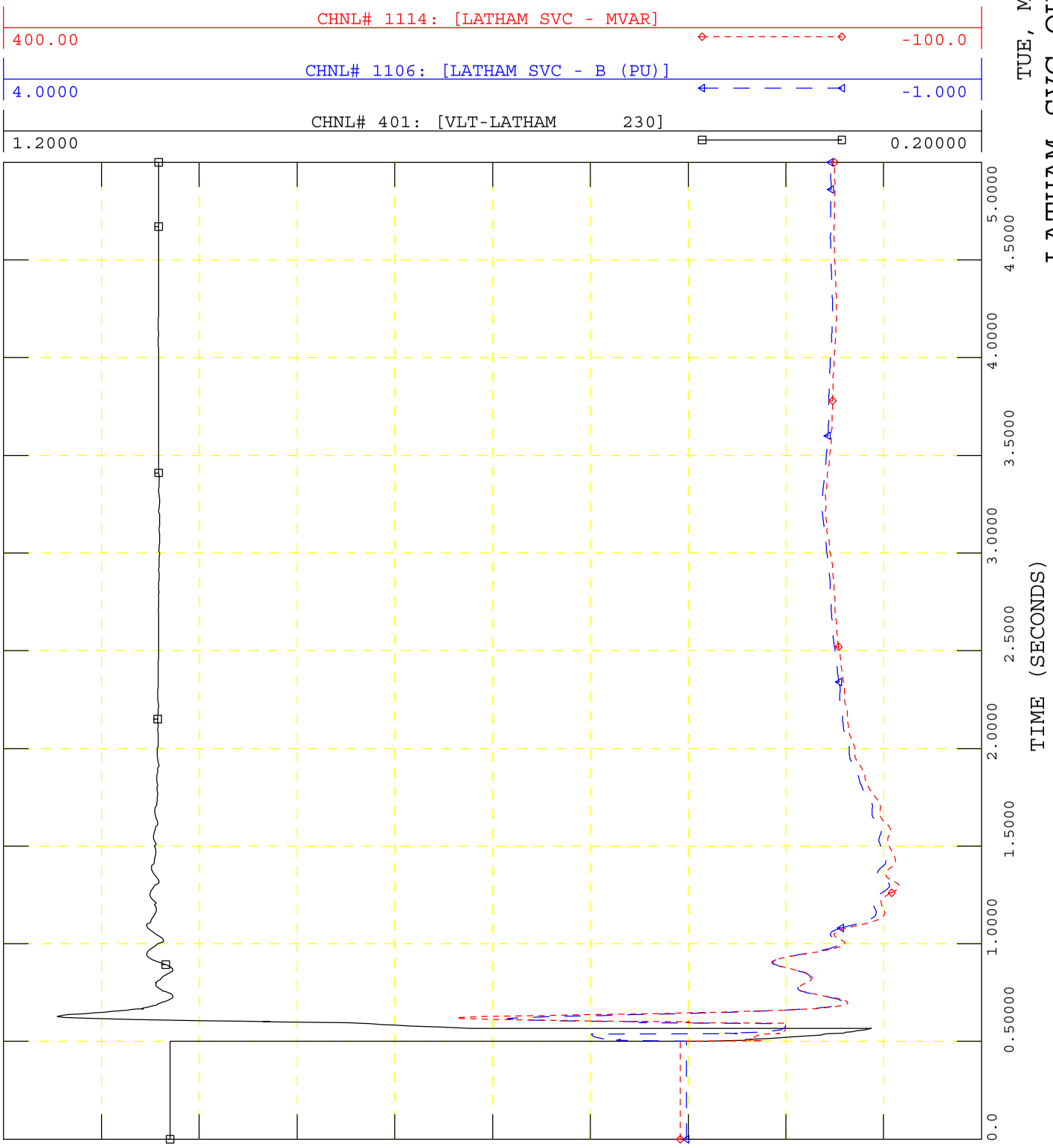
FILE: c7_svc_mtrld_BRID-POR-RS_out2.out

TUE, MAR 27 2018 21:28 PLT 6

LATHAM SVC OUT



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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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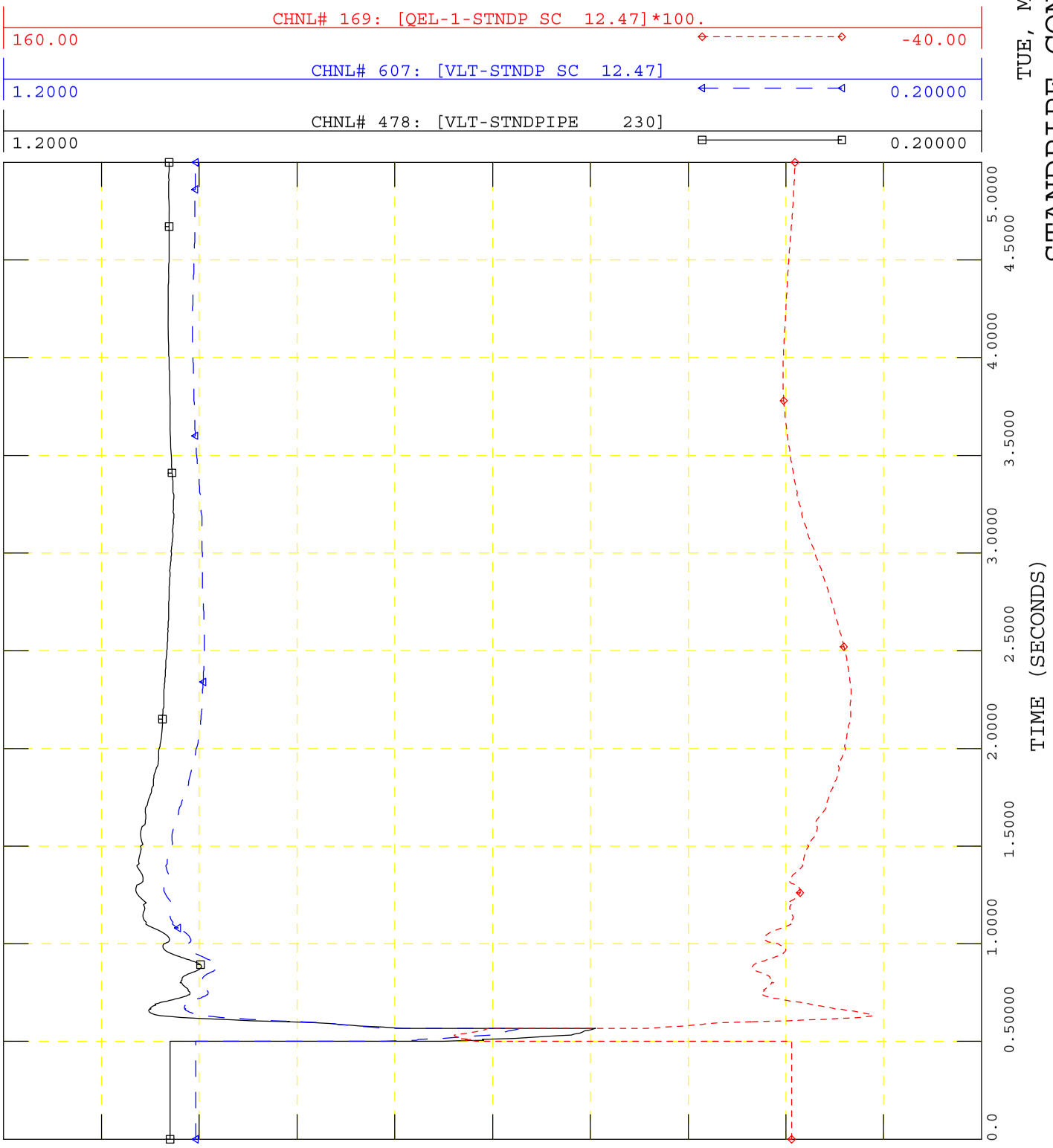
TUE, MAR 27 2018 21:28

STANDPIPE CONDNSR PLT 7



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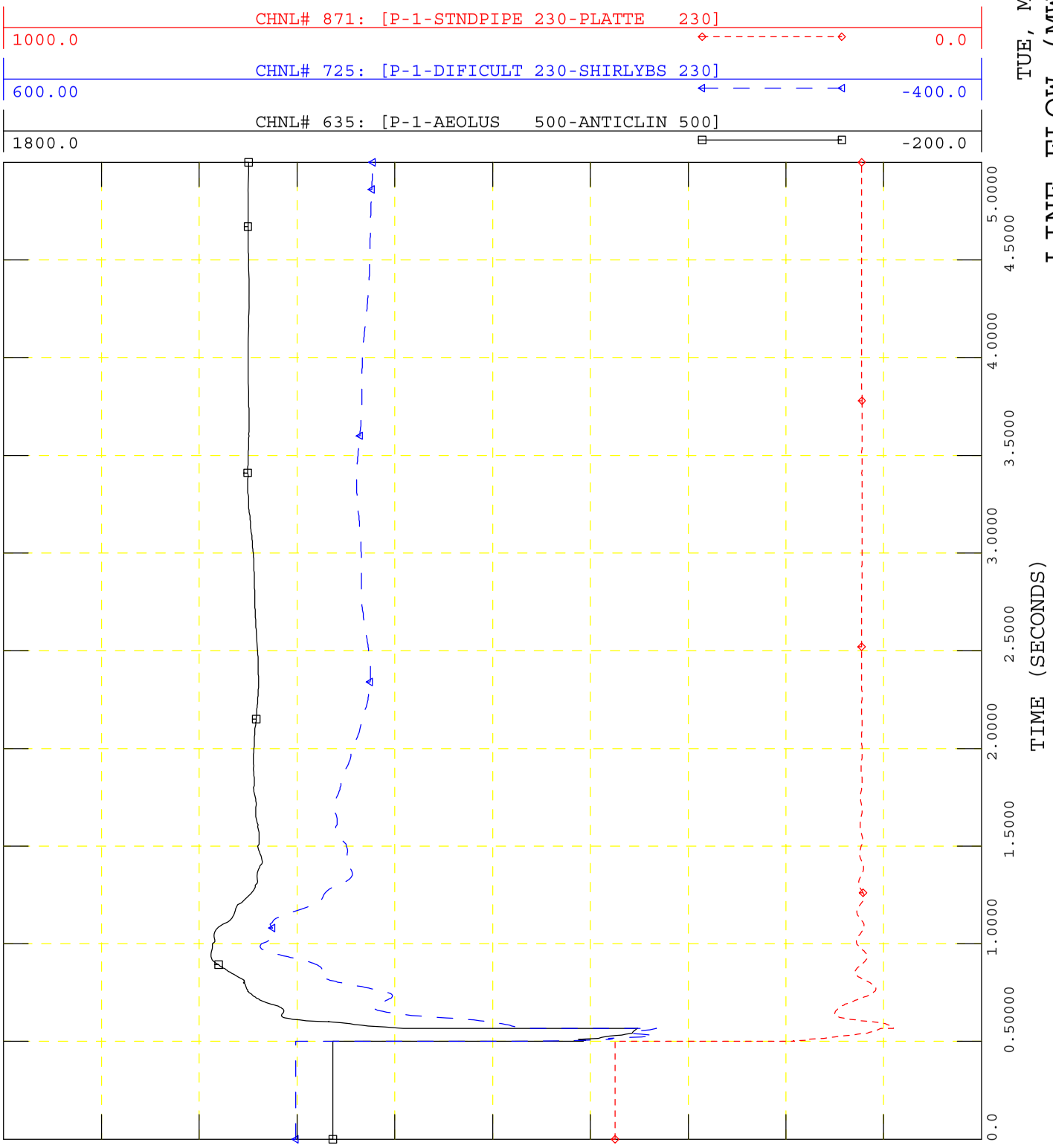
TUE, MAR 27 2018 21:28 PLT 8

LINE FLOW (MW)



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FILE: c7_svc_mtrld_BRID-POR-RS_out2.out

TUE, MAR 27 2018 21:28 PLT 9

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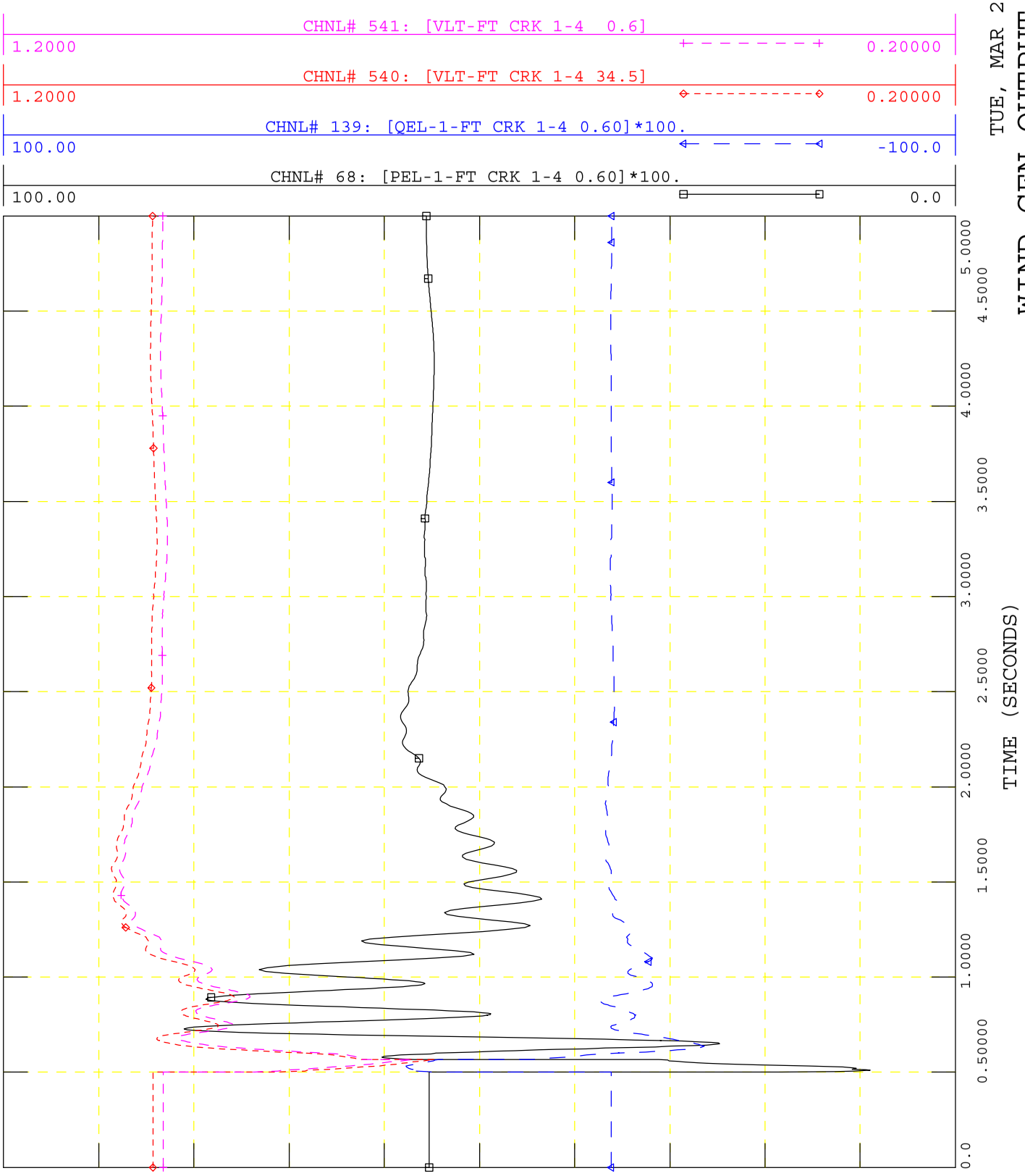

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TUE, MAR 27 2018 21:28 PLT 10

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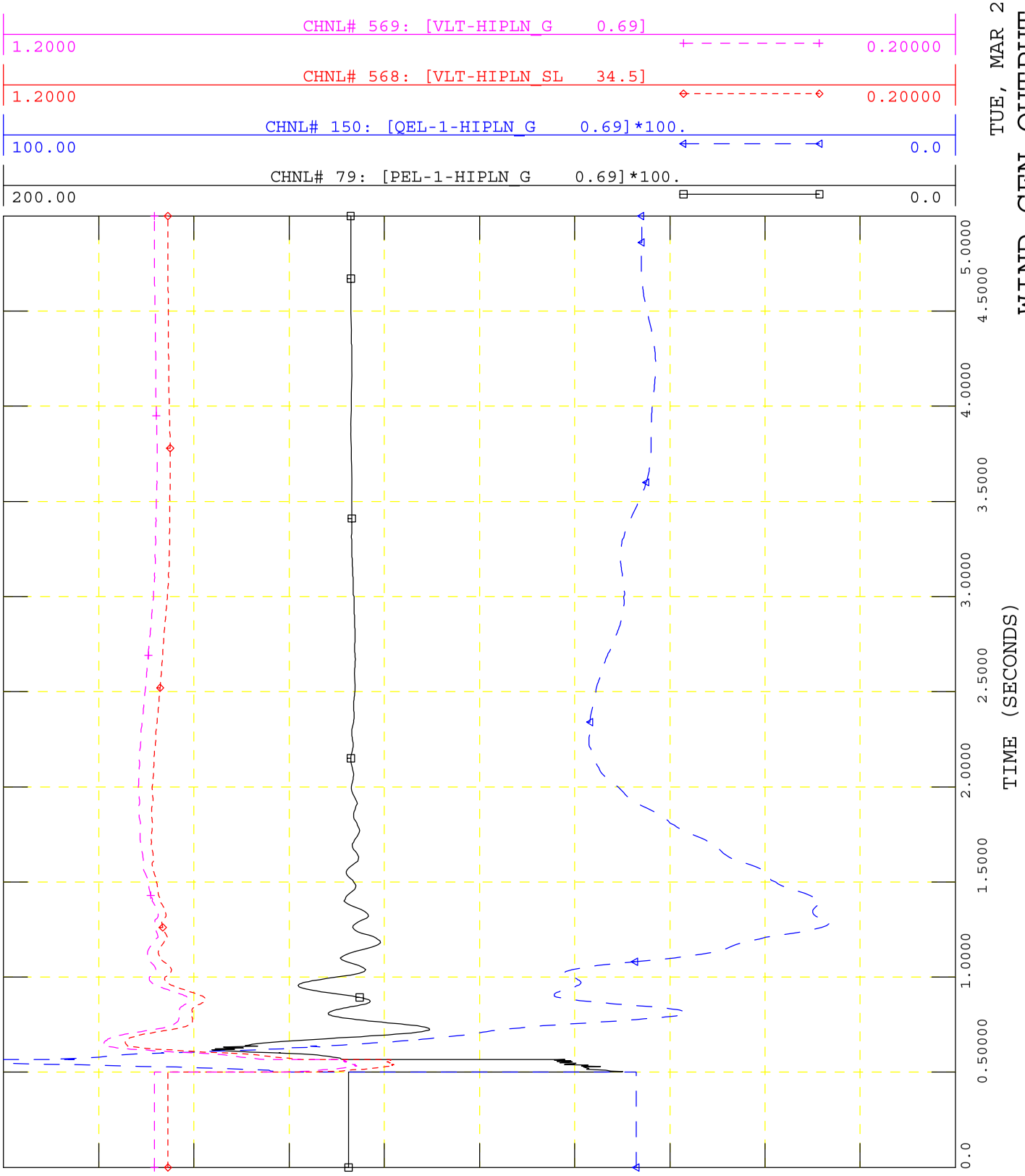

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TUE, MAR 27 2018 21:28 PLT 11

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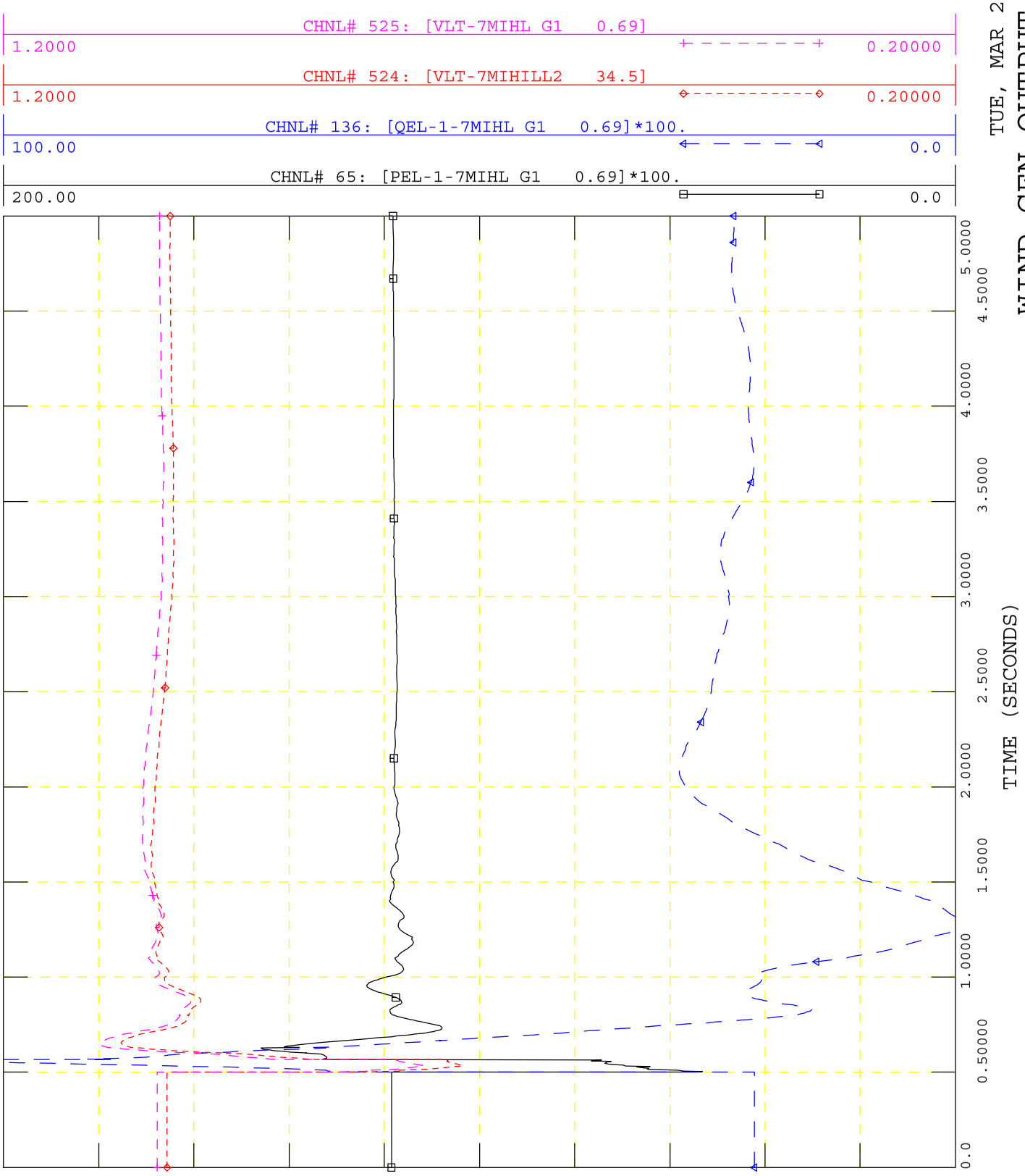

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TUE, MAR 27 2018 21:28 PLT 12

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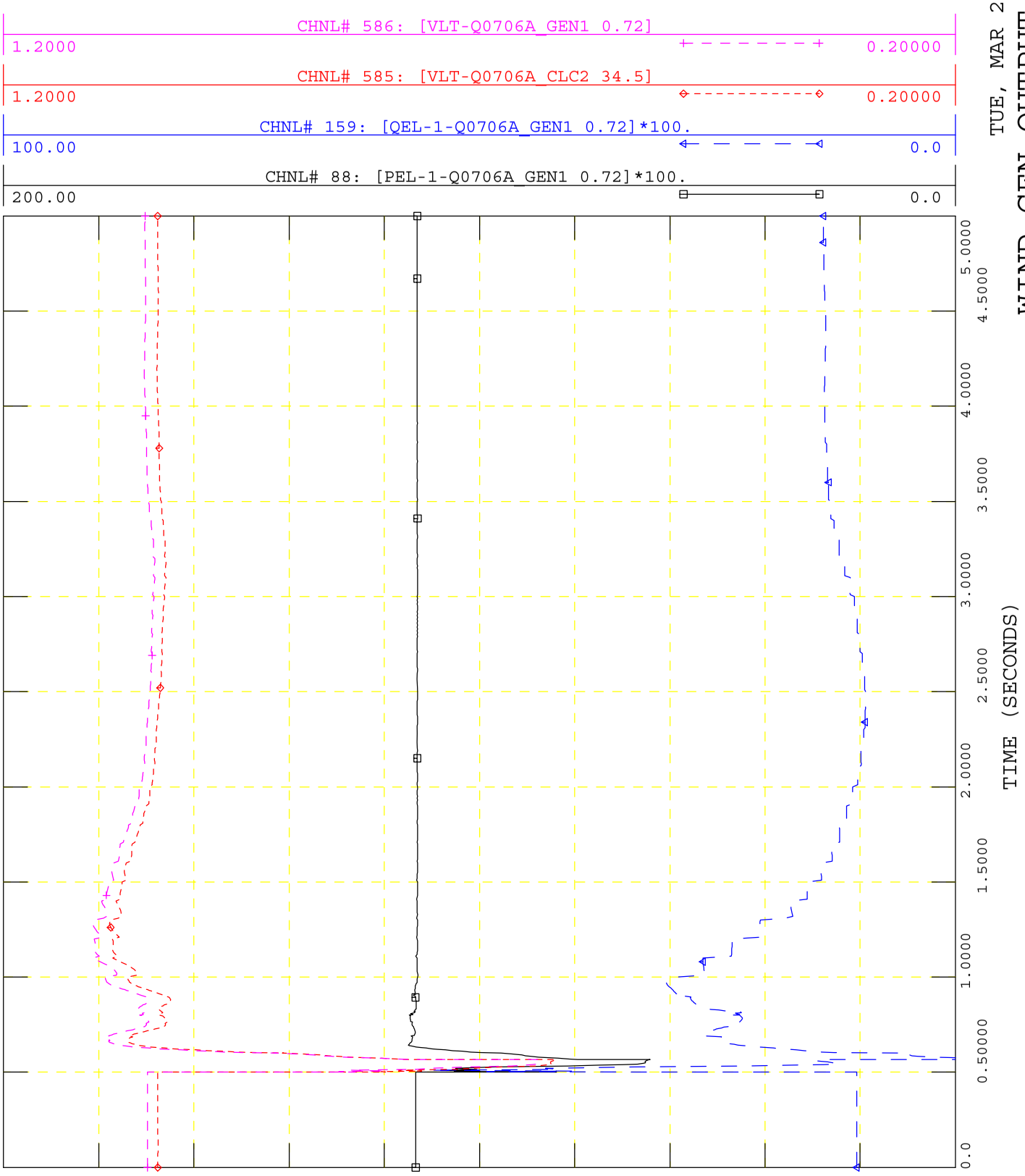

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TUE, MAR 27 2018 21:28 PLT 13

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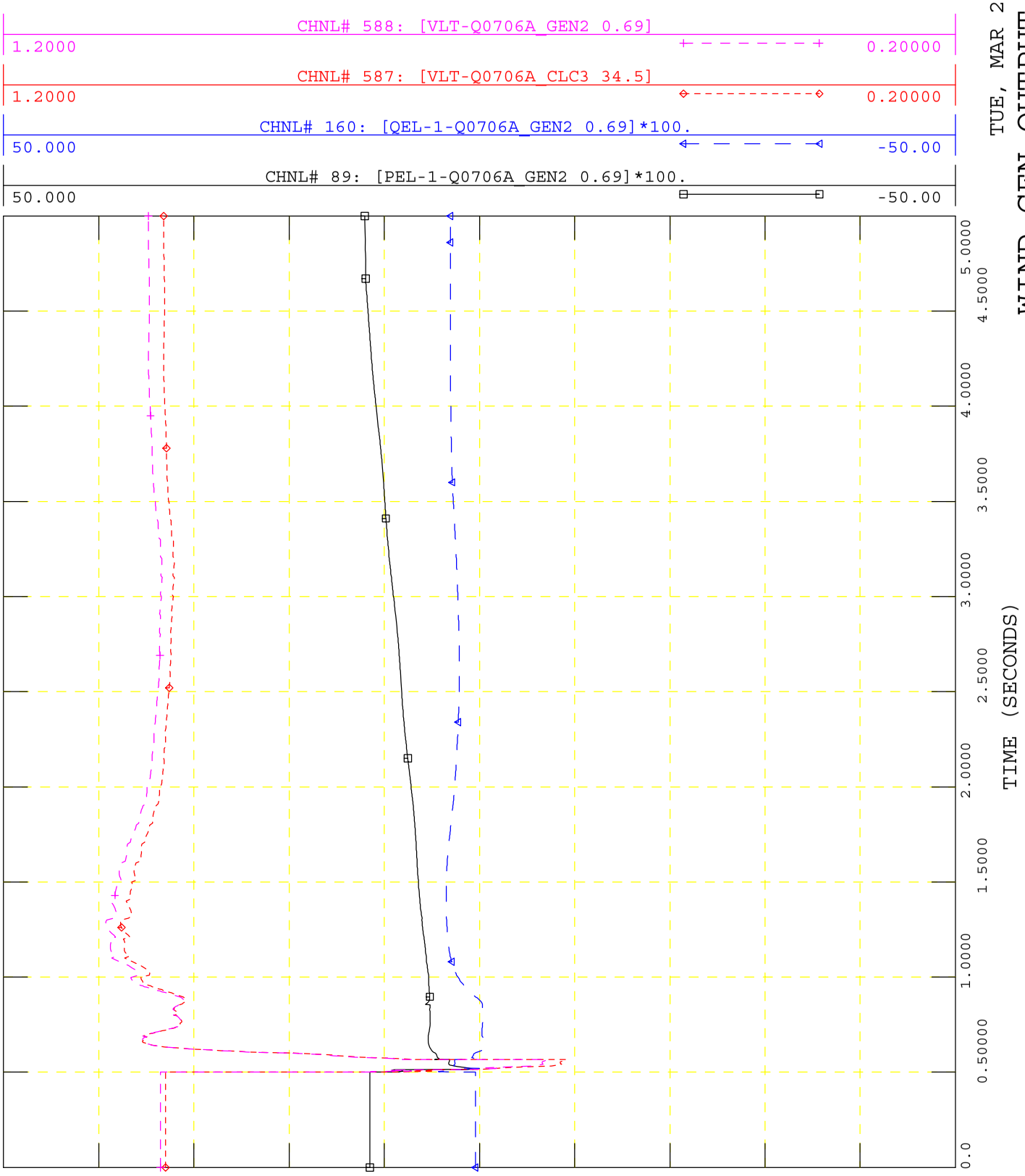

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TUE, MAR 27 2018 21:28 PLT 14

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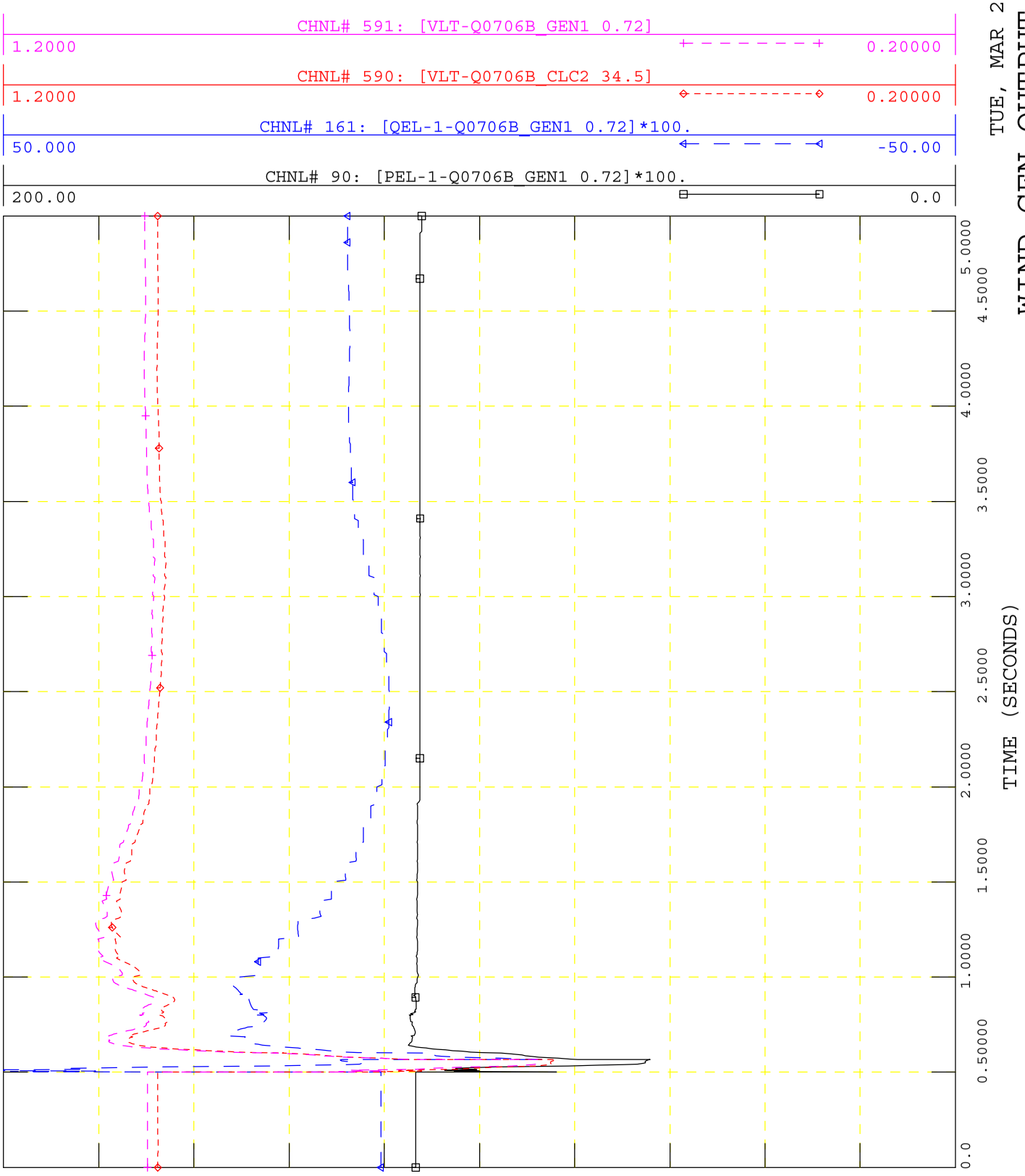

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TUE, MAR 27 2018 21:28 PLT 15

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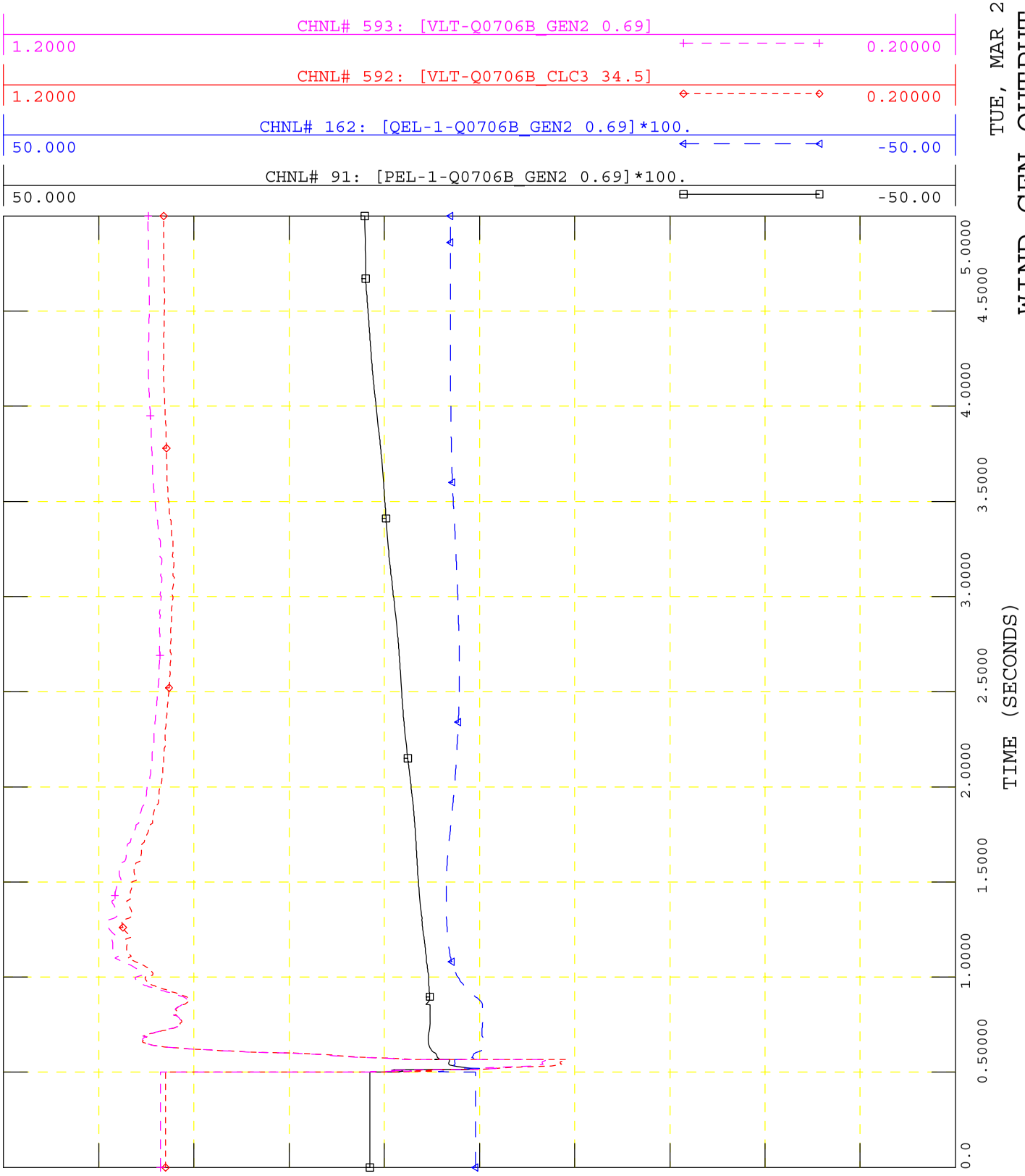

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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TUE, MAR 27 2018 21:28 PLT 16

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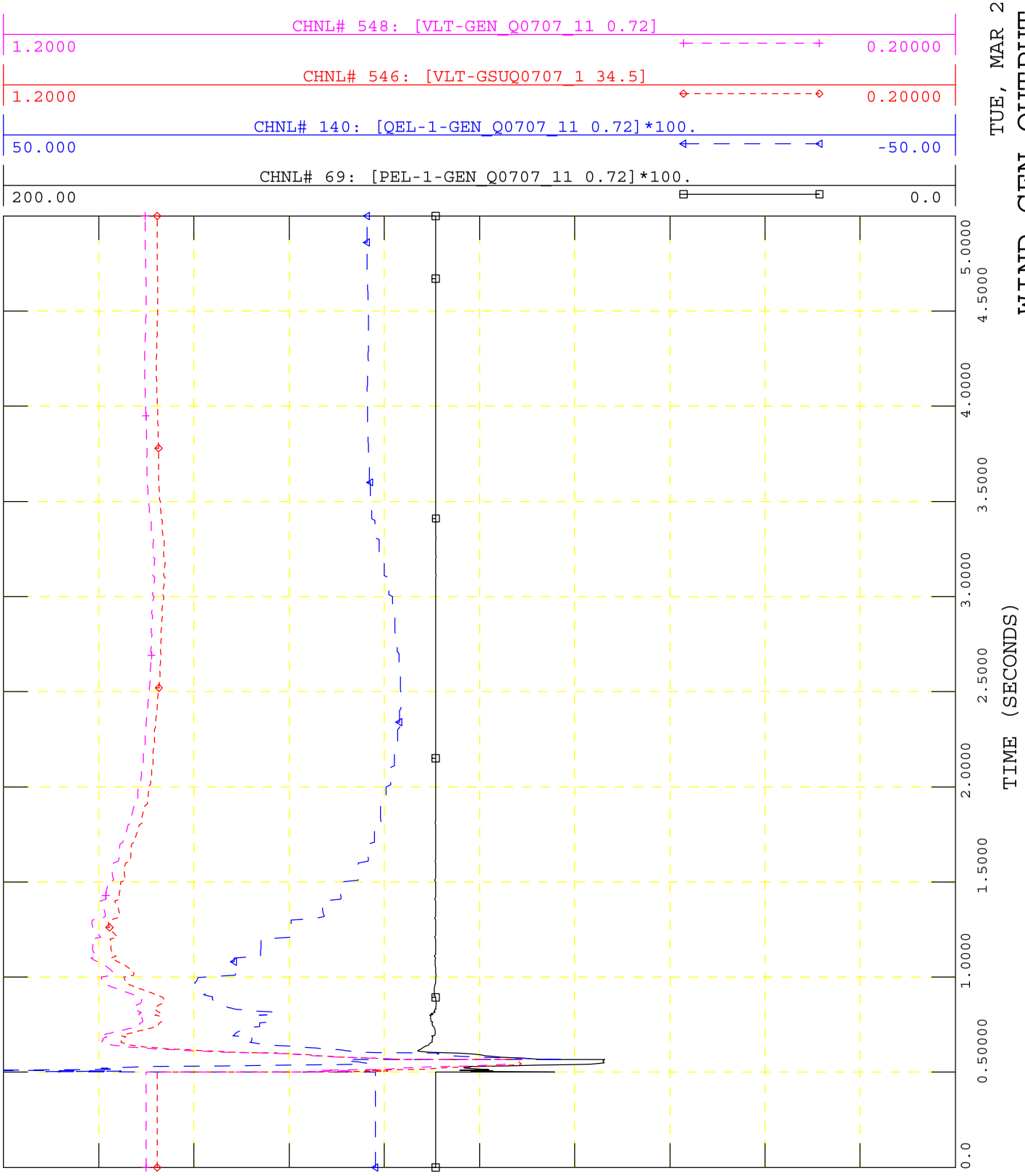

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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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TUE, MAR 27 2018 21:28 PLT 17

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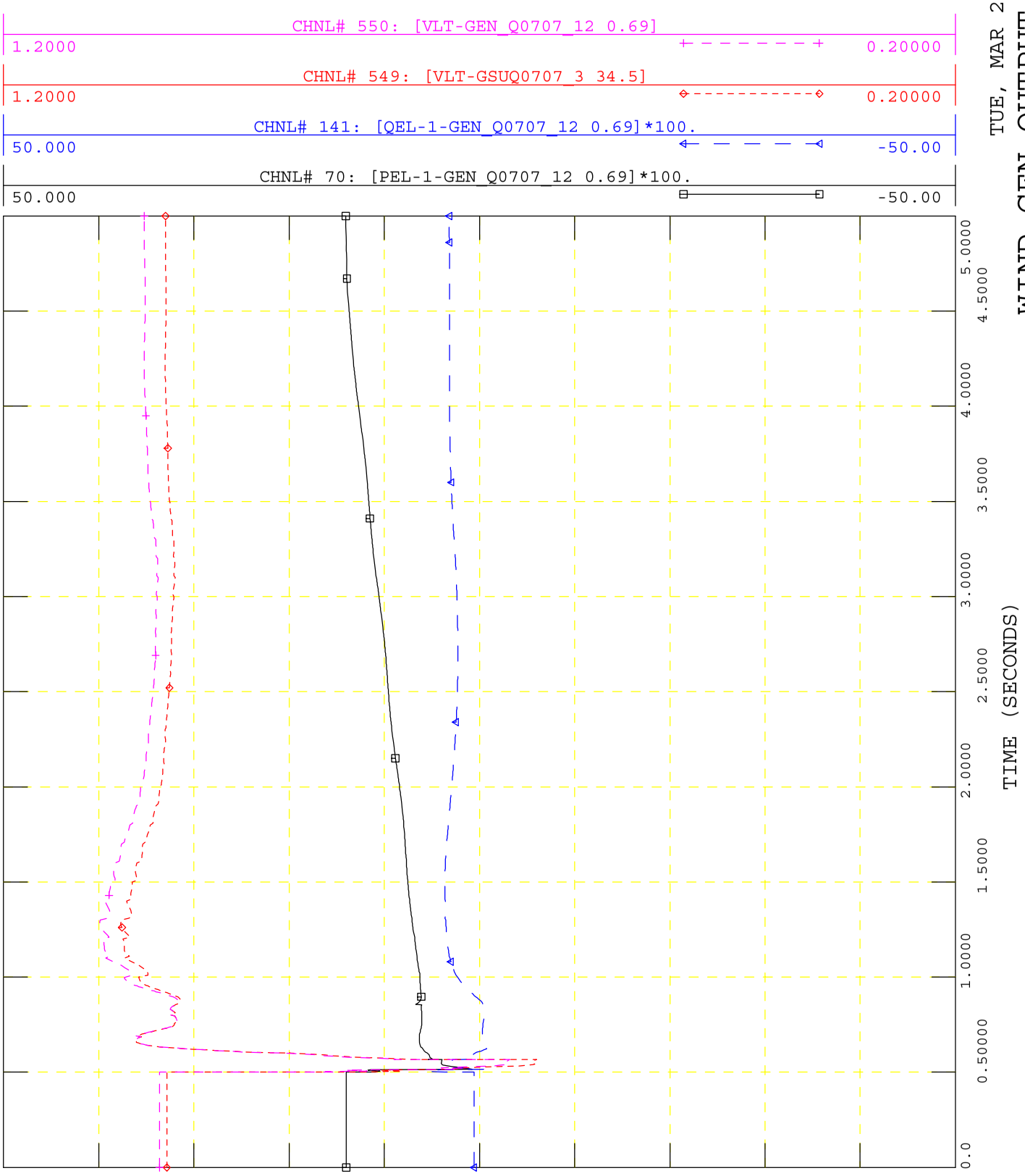

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TUE, MAR 27 2018 21:28 PLT 18

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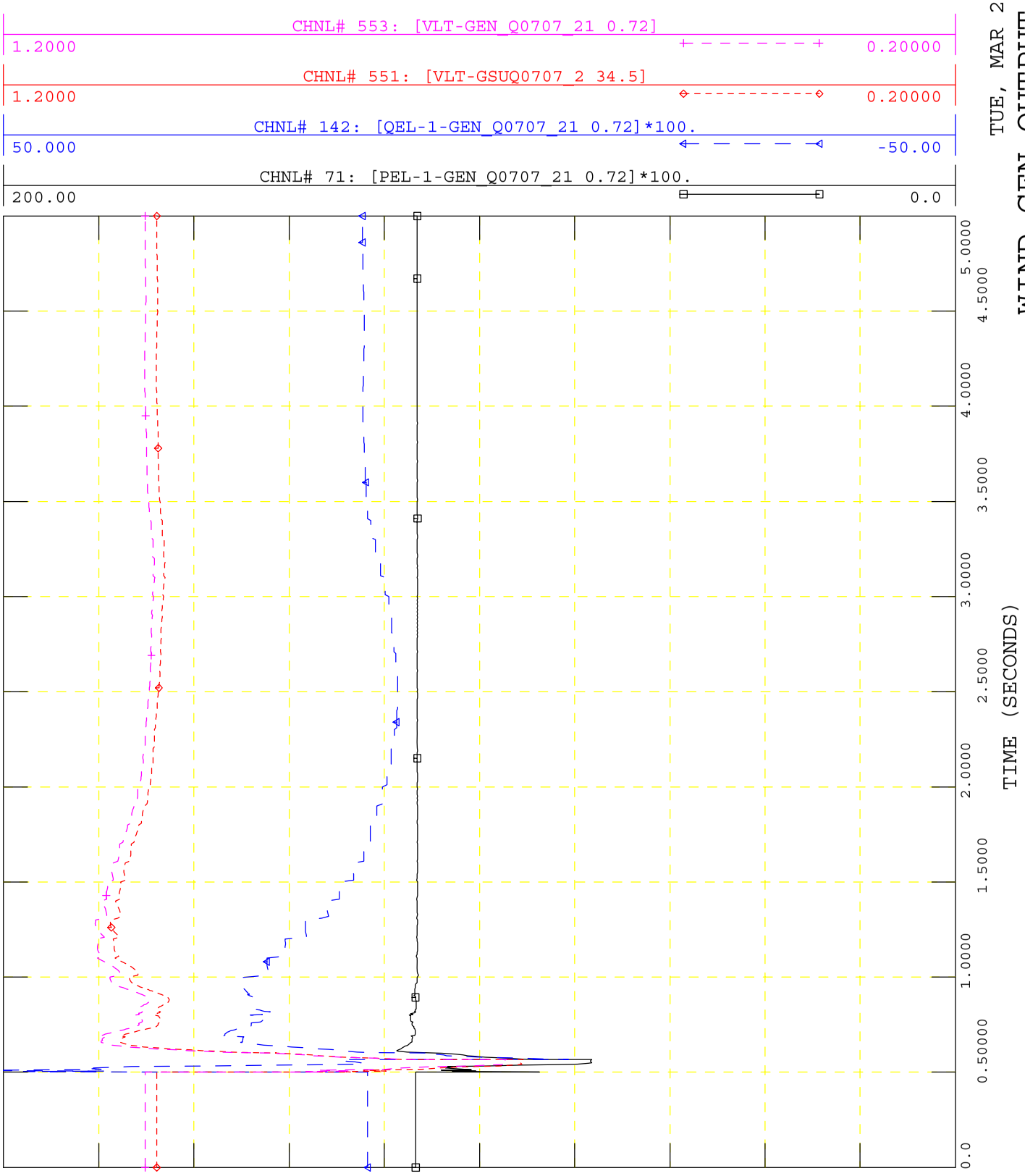

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FILE: c7_svc_mtrld_BRID-POR-RS_out2.out

TUE, MAR 27 2018 21:28 PLT 19

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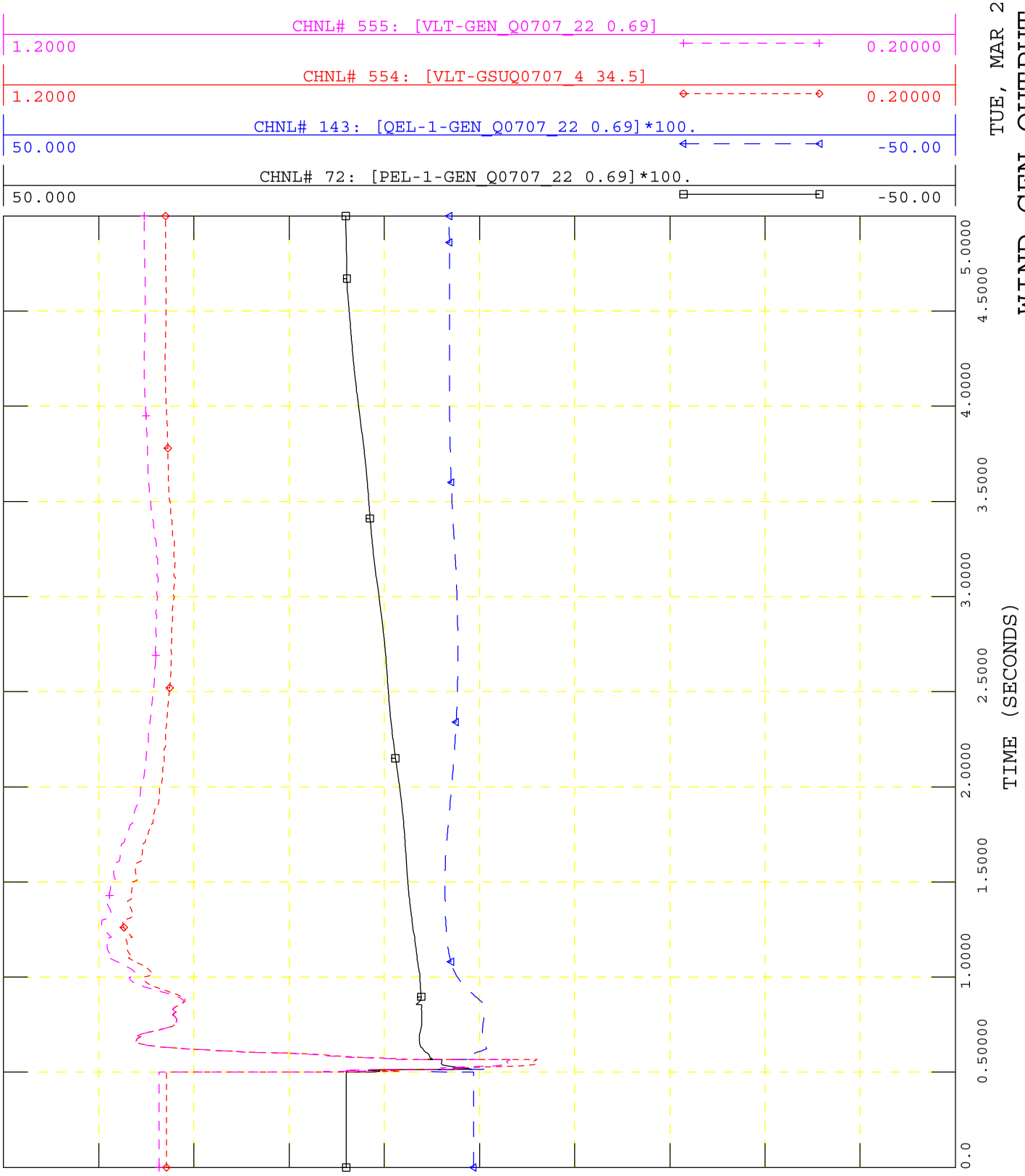

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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TUE, MAR 27 2018 21:28 PLT 20

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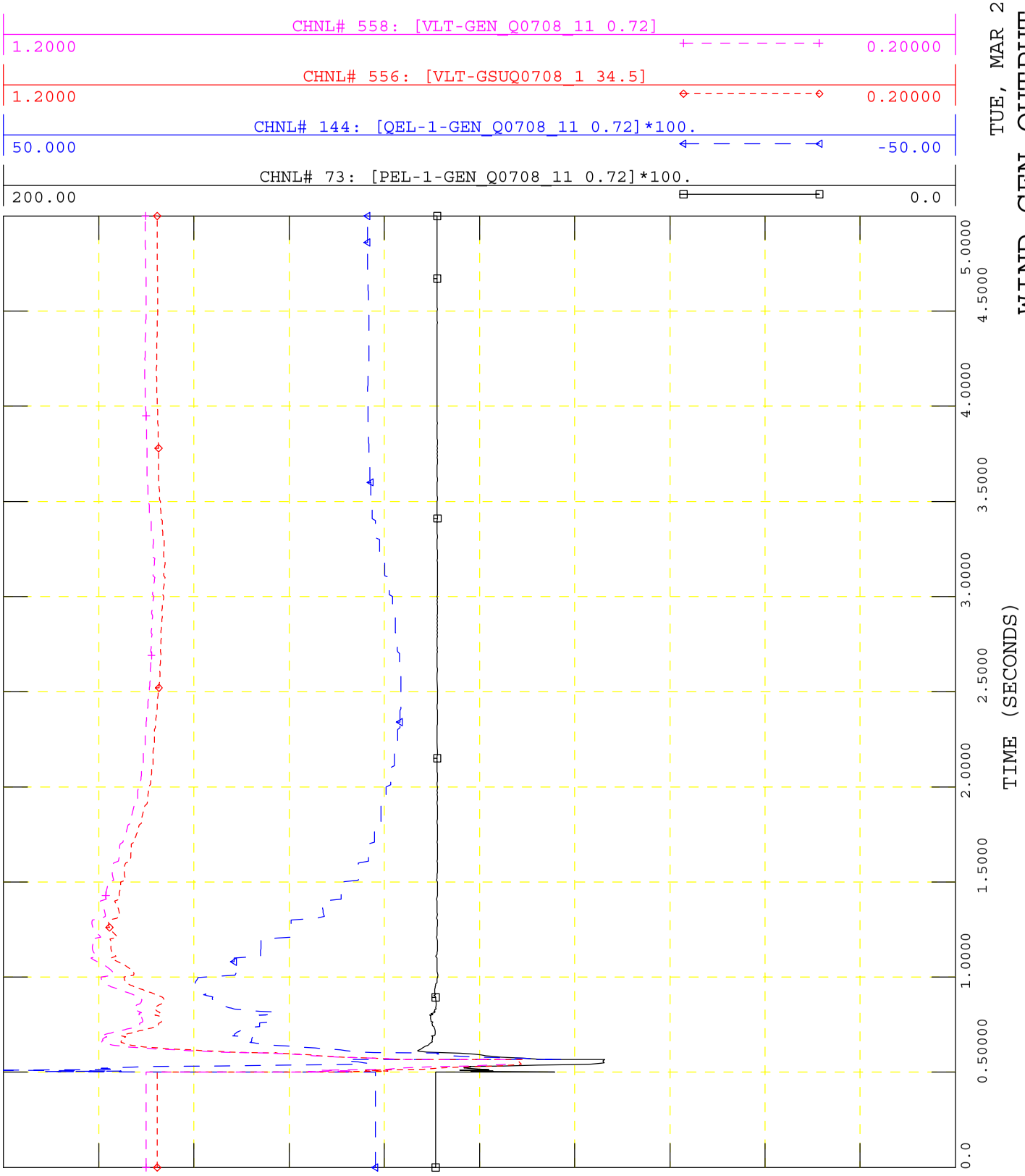

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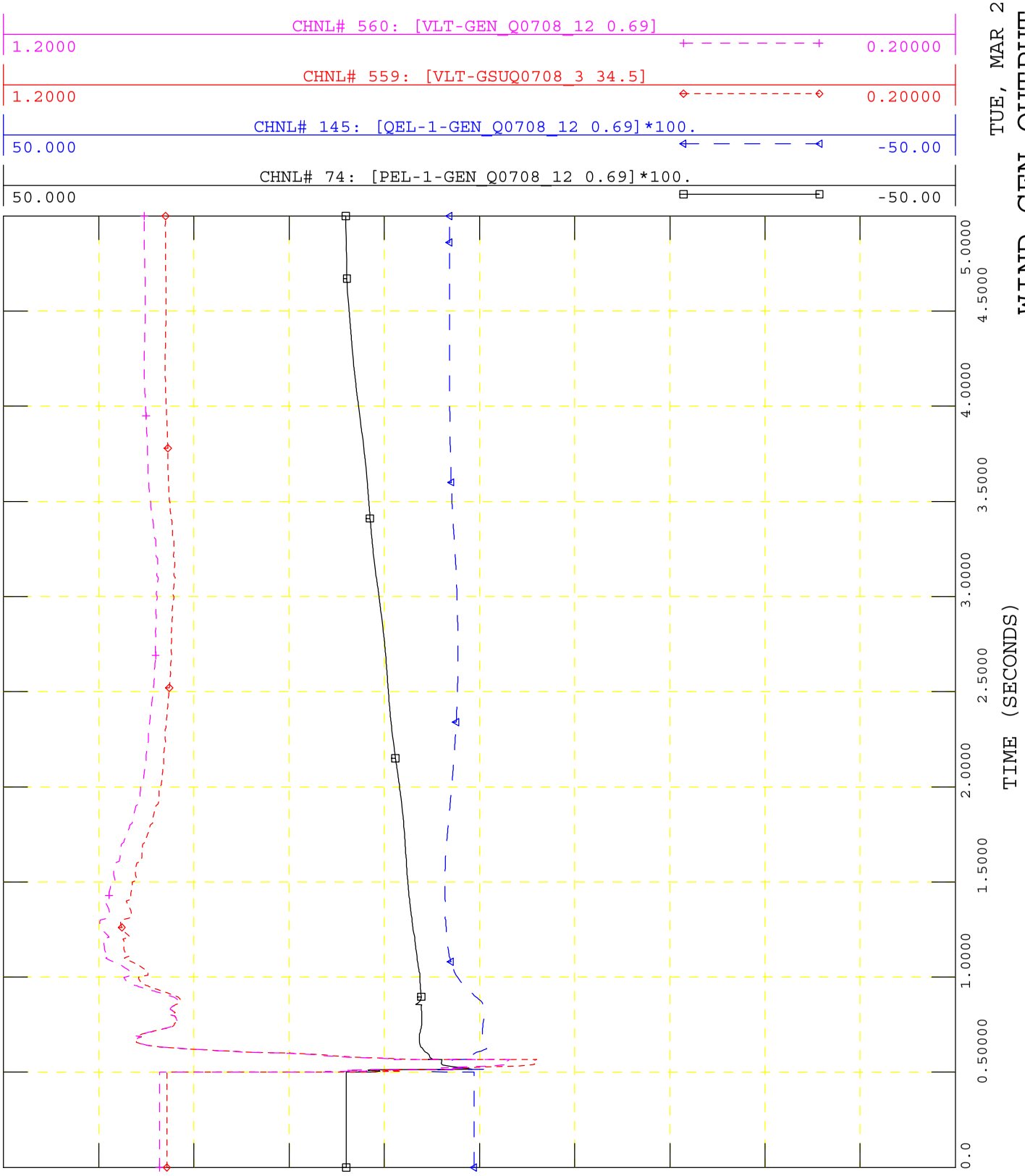
TUE, MAR 27 2018 21:28 PLT 21

WIND GEN OUTPUT



SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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TUE, MAR 27 2018 21:28 PLT 22

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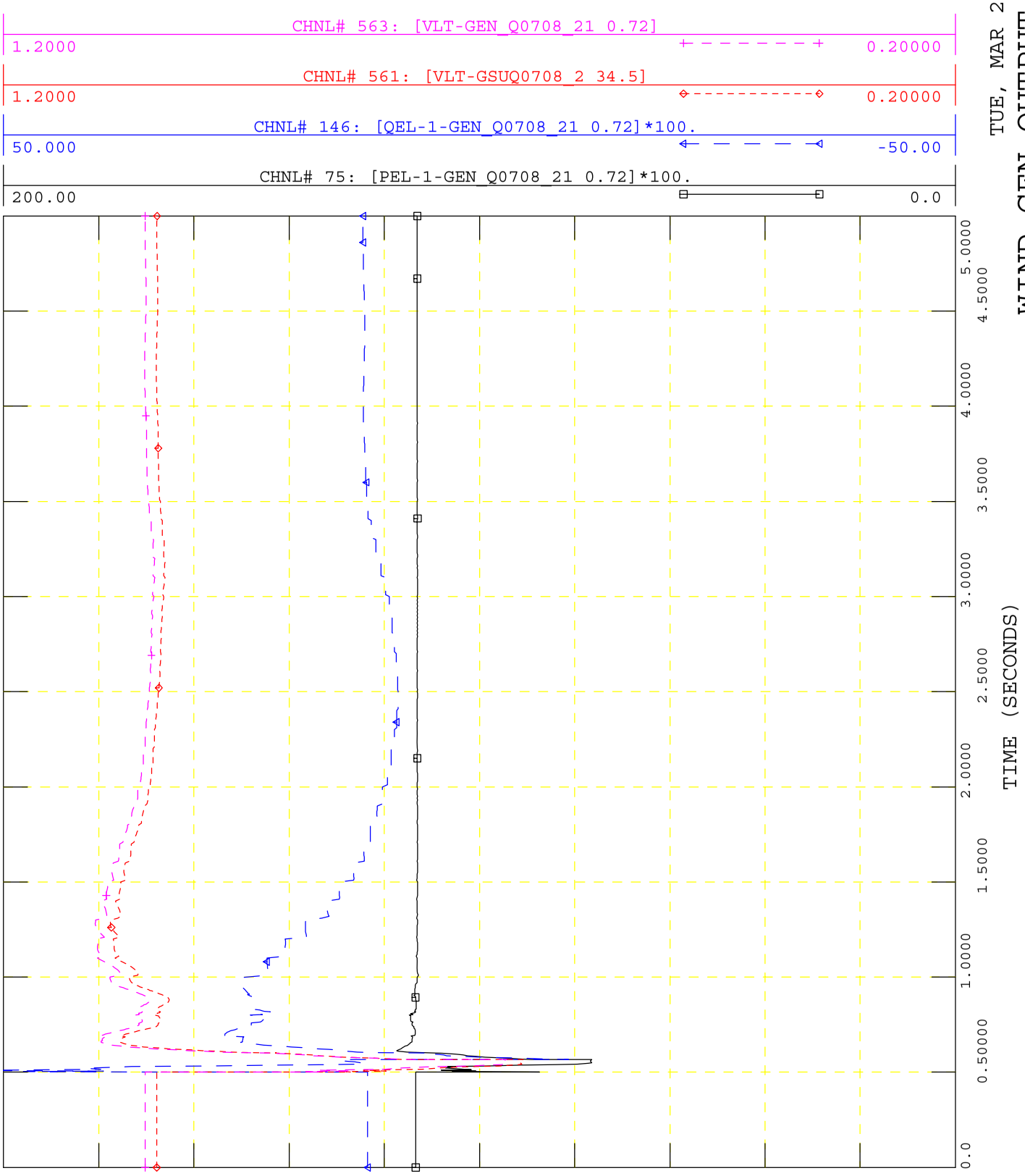

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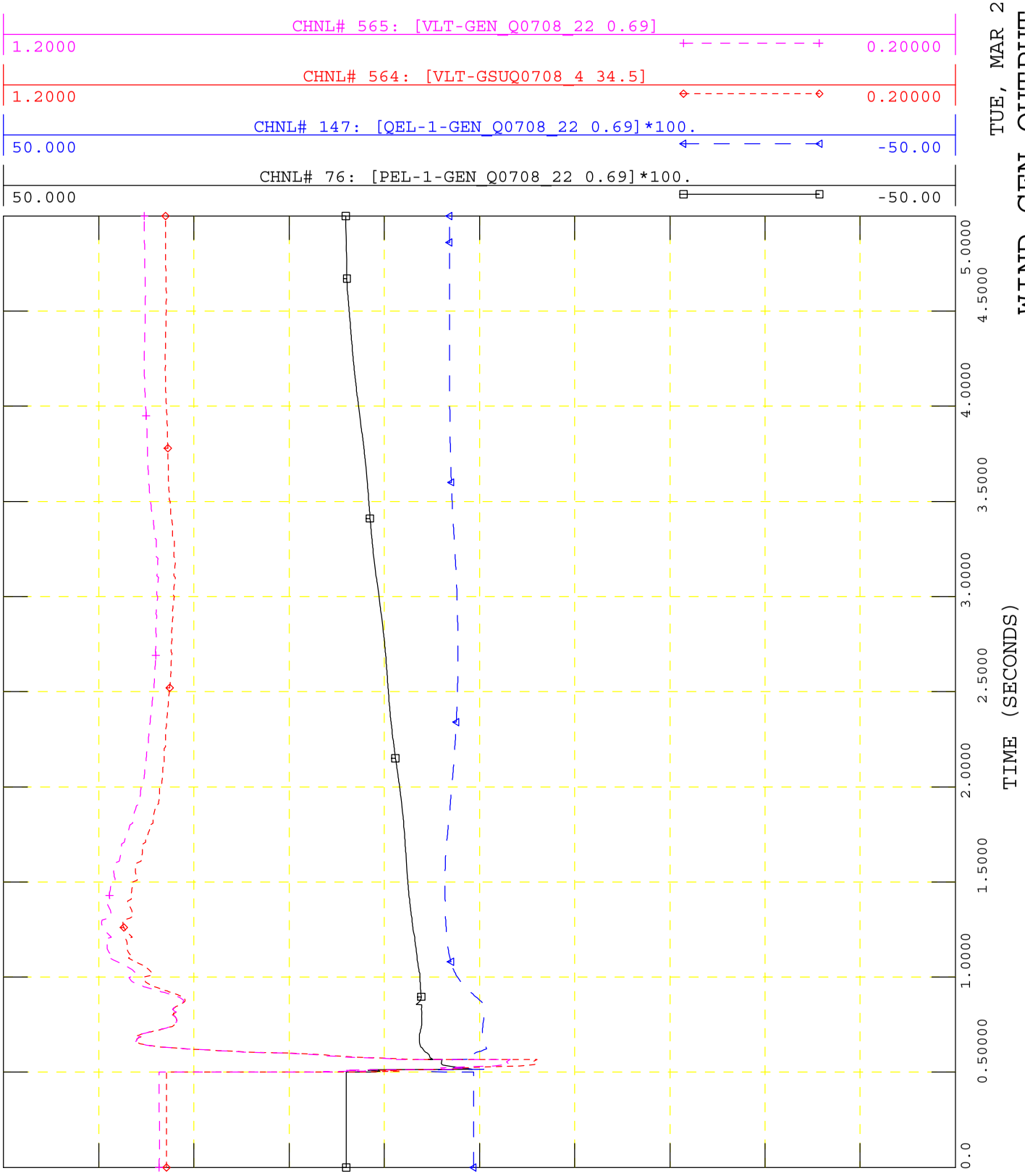
TUE, MAR 27 2018 21:28 PLT 23

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:28 PLT 24

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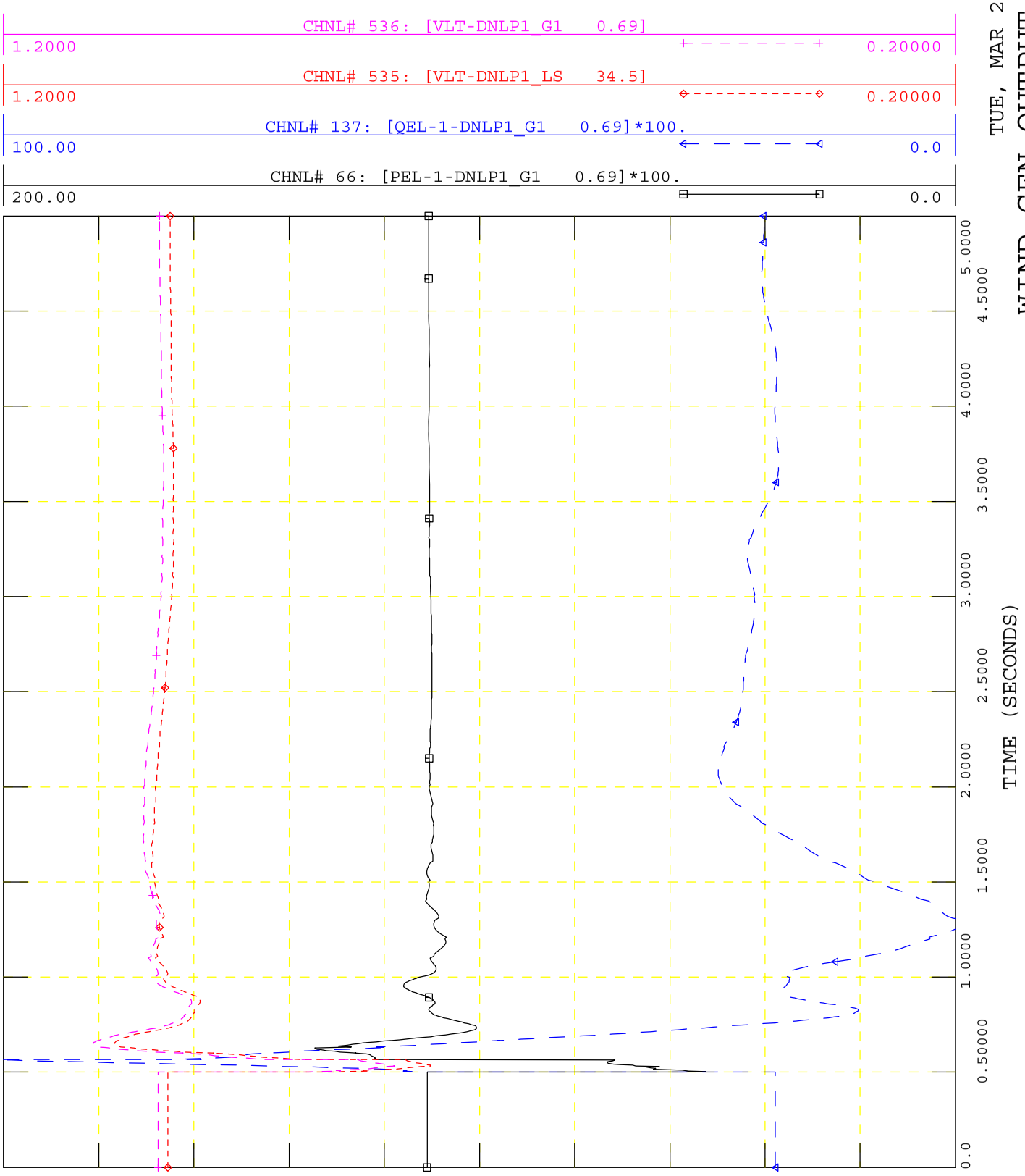

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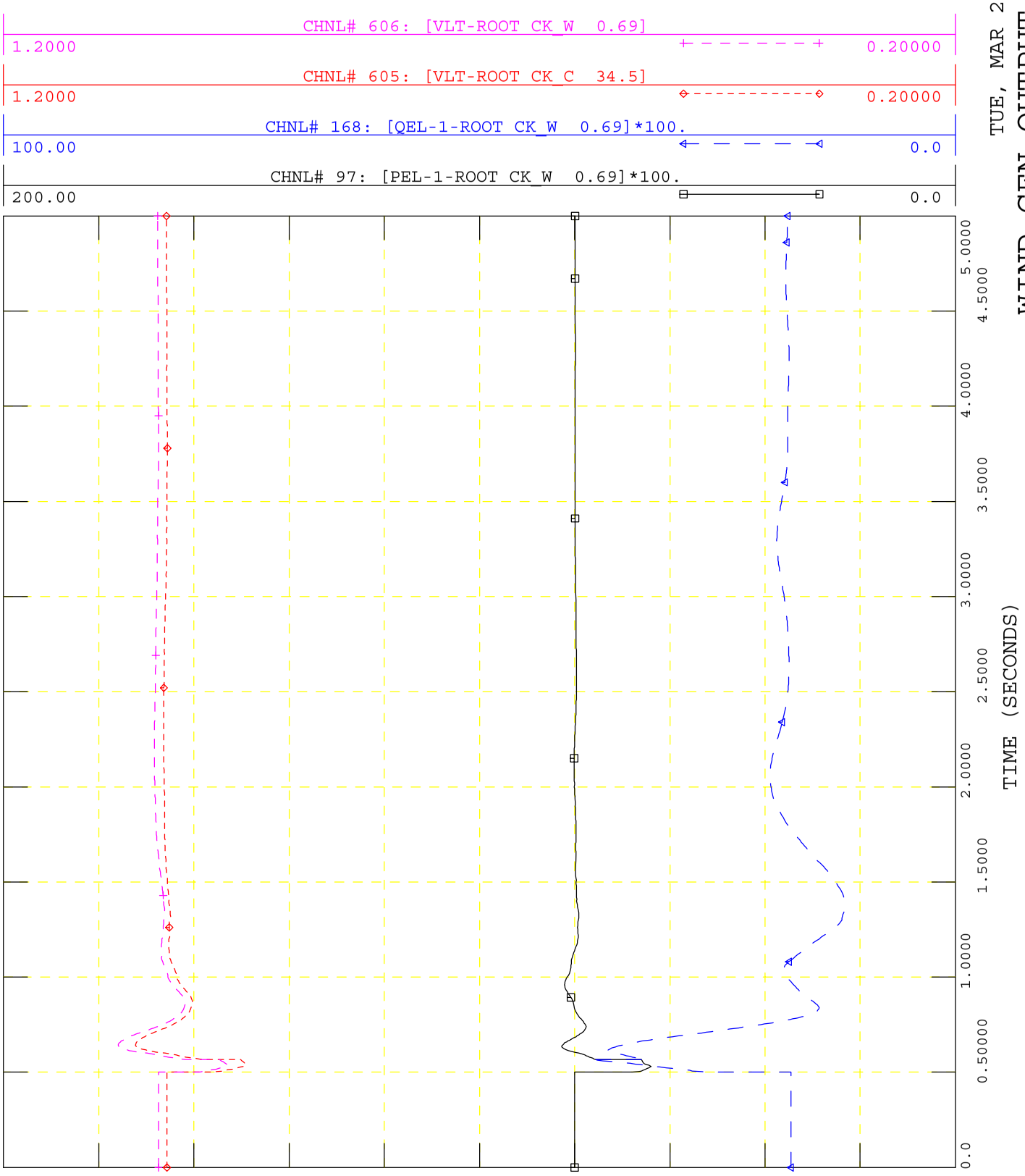
FILE: c7_svc_mtrld_BRID-POR-RS_out2.out

TUE, MAR 27 2018 21:28 PLT 25

WIND GEN OUTPUT



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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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FILE: c7_svc_mtrld_BRID-POR-RS_out2.out

TUE, MAR 27 2018 21:28 PLT 26

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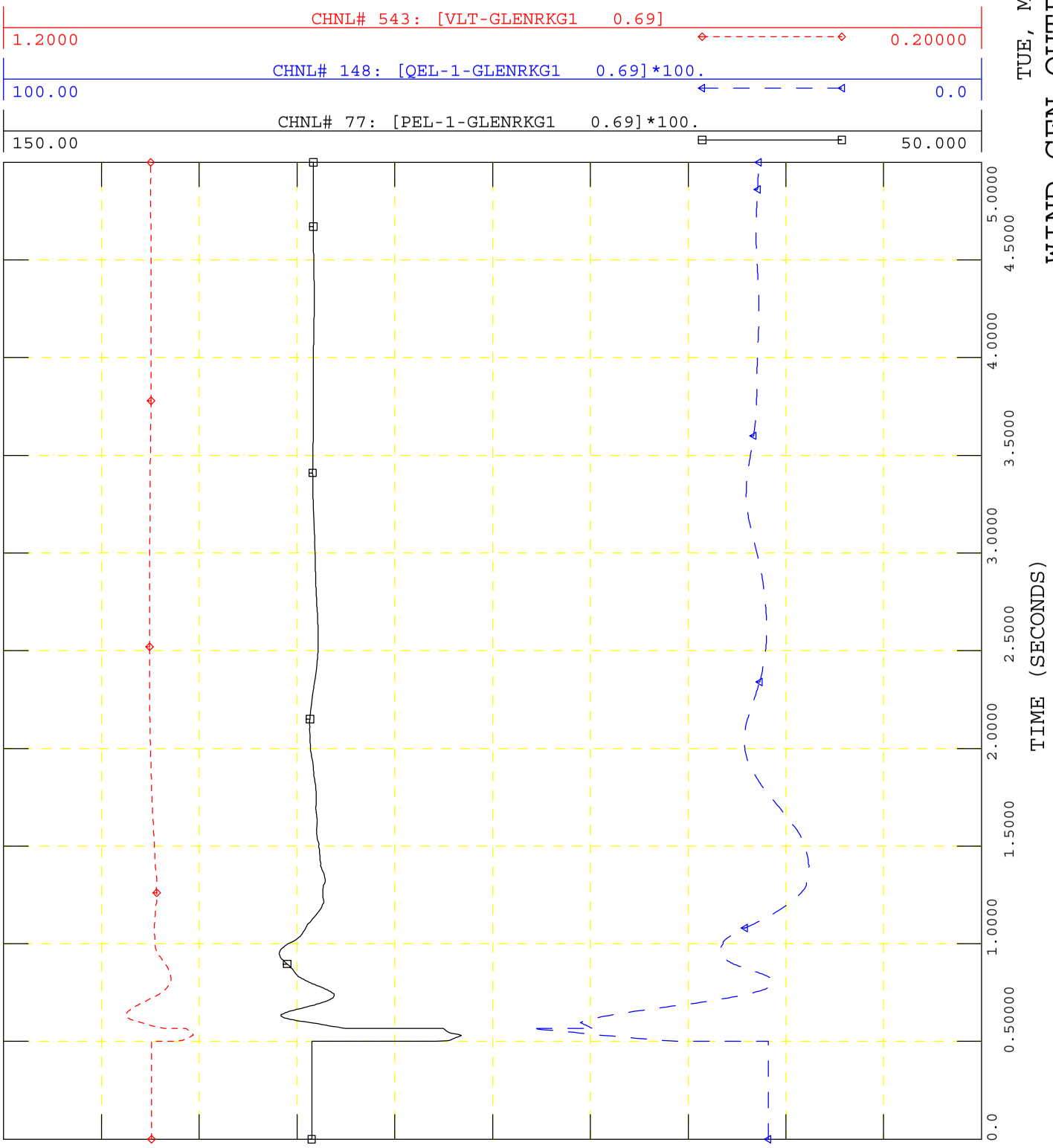

Dynamic Simulation

Case 3 – Loss of Point of Rocks-Latham 230 kV line

30 cycles	**3 phase Point of Rocks 230 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Point of Rocks-Latham 230 kV line**
36 cycles	**Remove SVC MVAR limiter**
5 sec.	**Terminate simulation**

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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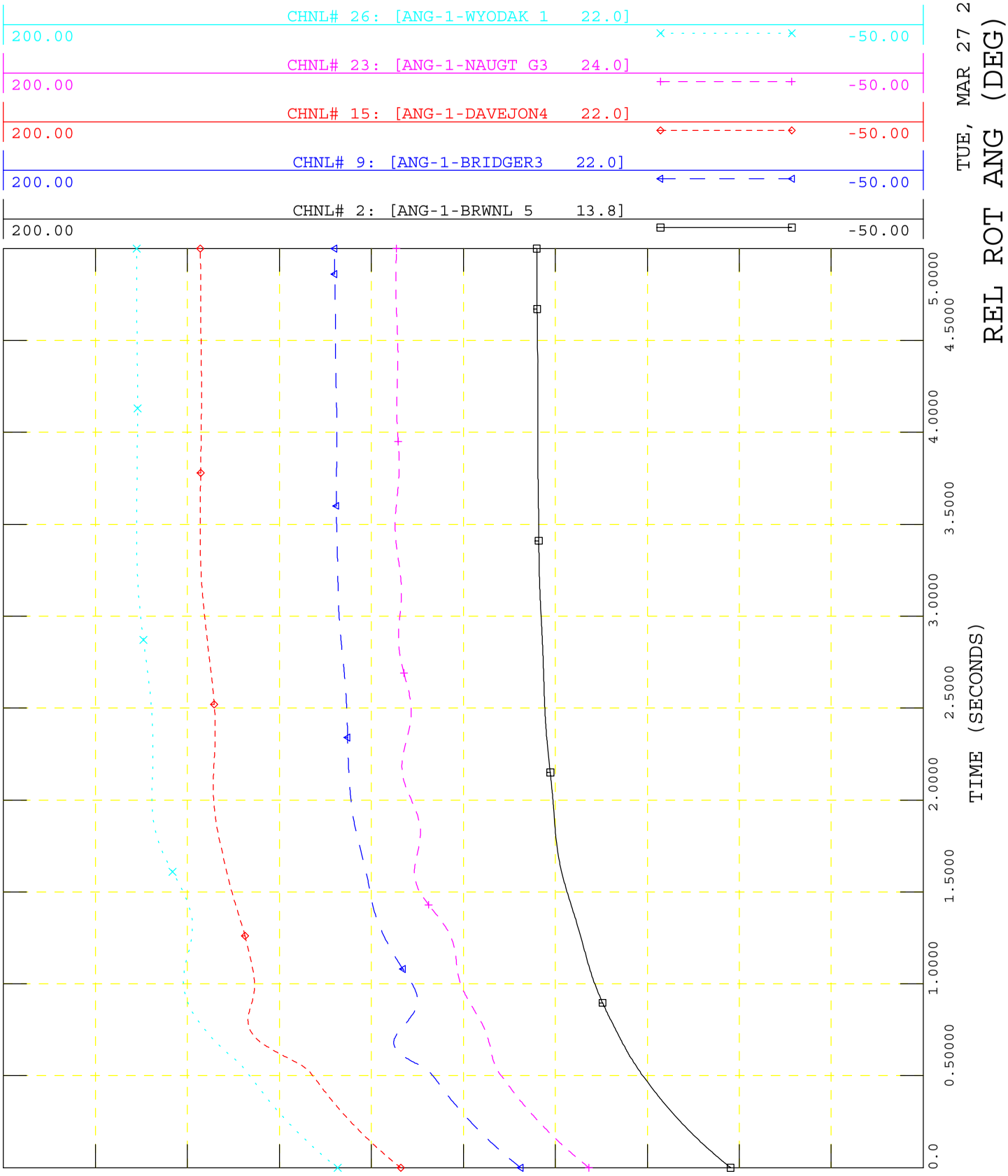
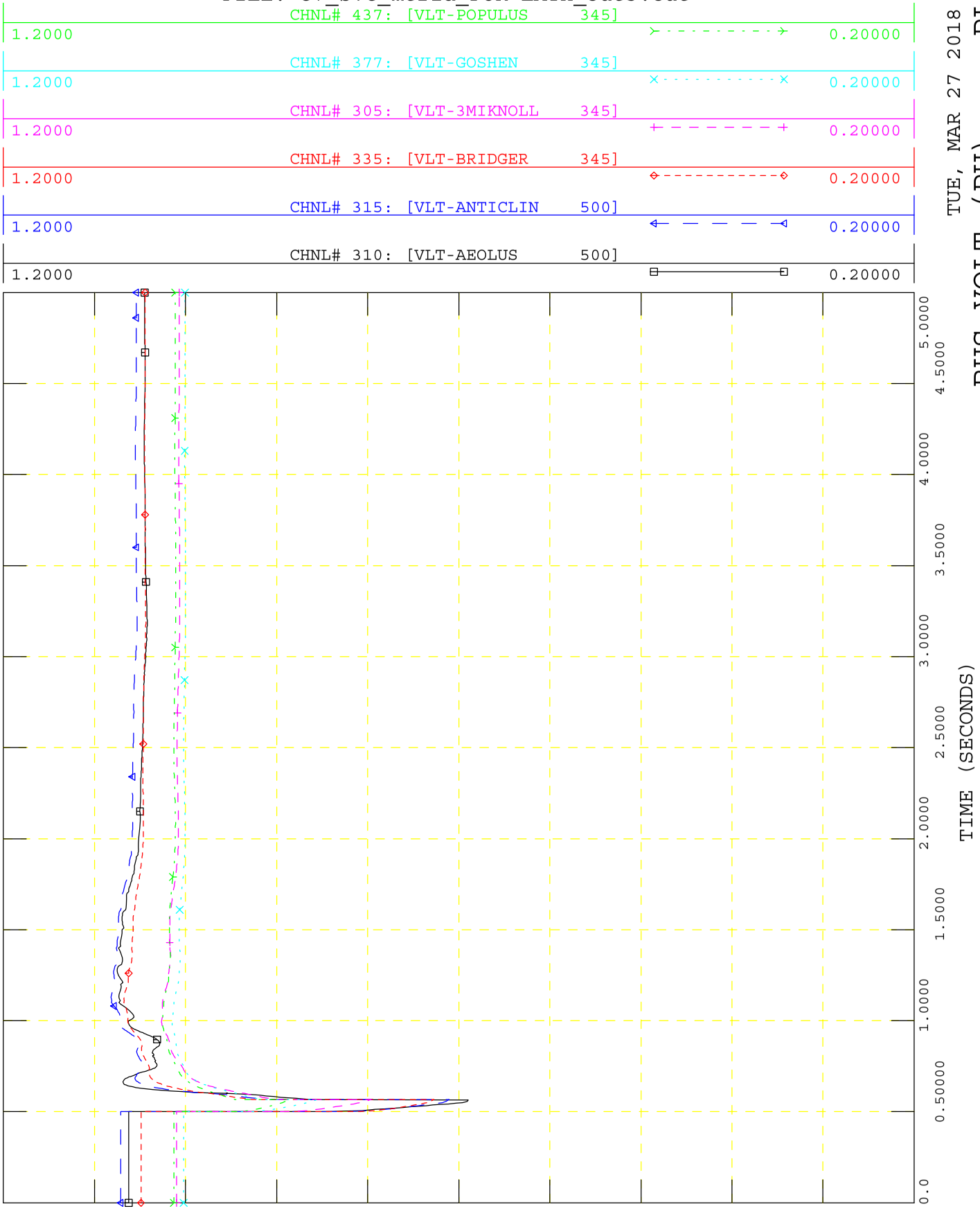
30CY-3PHS POINT OF ROCKS 230 KV FLT. 34CY-CLR FLT & OPEN
POINT OF ROCKS-LATHAM 230 LN. 36CY-UNBLOCK SVC. OUTAGE 3
FILE: c7_svc_mtrld_POR-LATH_out3.out



TUE, MAR 27 2018 21:28
REL ROT ANG (DEG) PLT 1

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS POINT OF ROCKS 230 KV FLT. 34CY-CLR FLT & OPEN
POINT OF ROCKS-LATHAM 230 LN. 36CY-UNBLOCK SVC. OUTAGE 3
FILE: c7_svc_mtrld_POR-LATH_out3.out

TUE, MAR 27 2018 21:28 PLT 2



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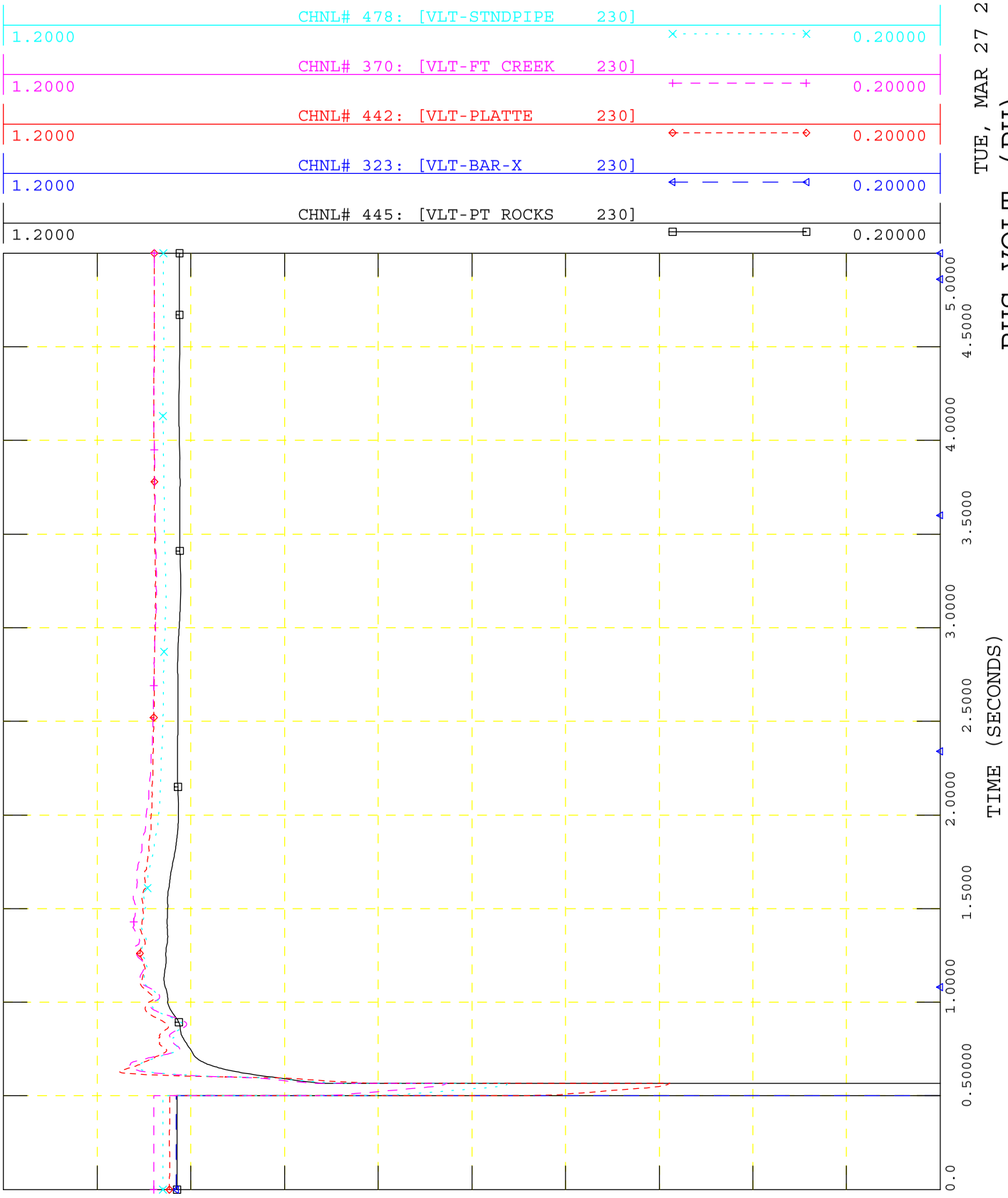
TUE, MAR 27 2018 21:28 PLT 3



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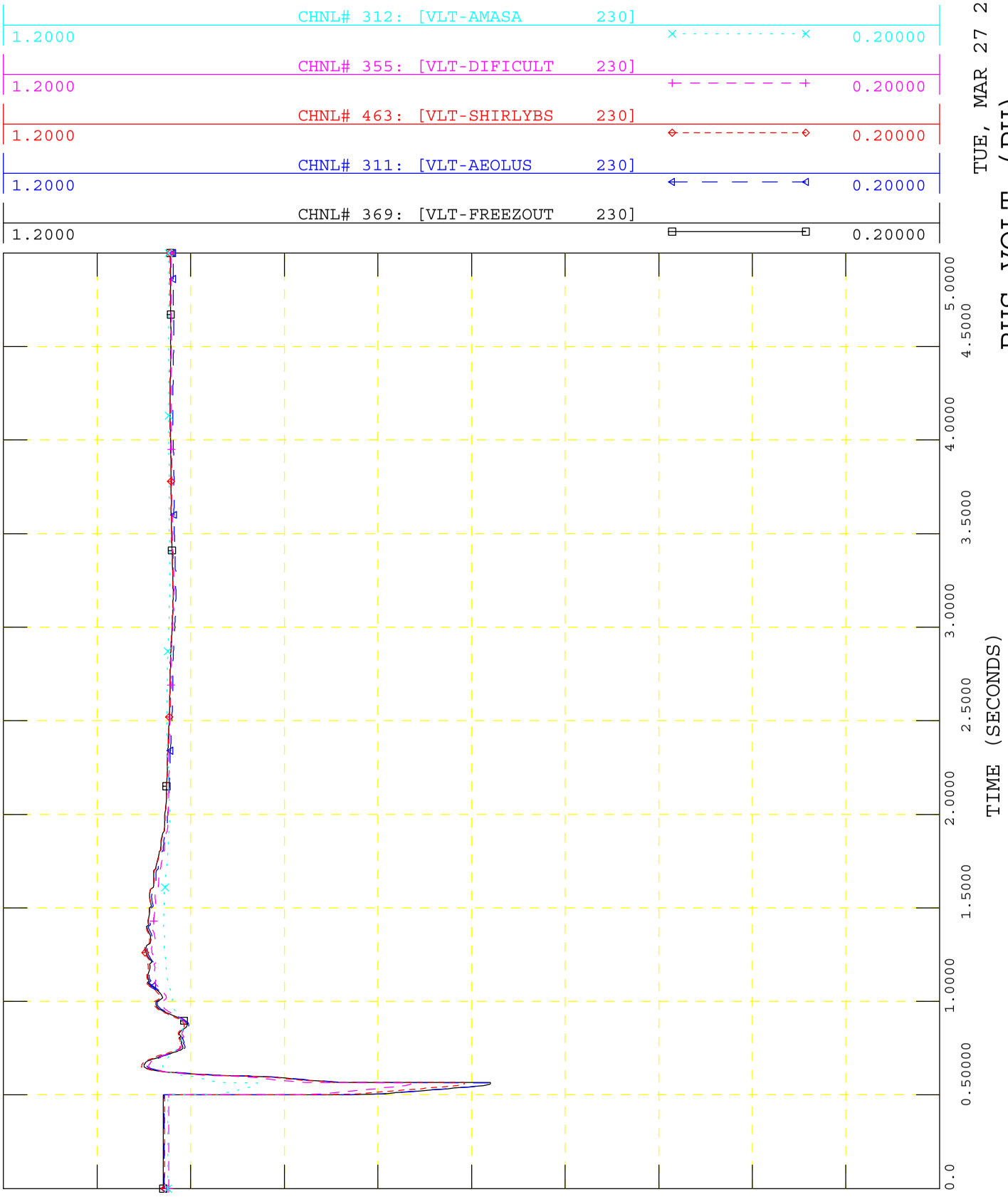
TUE, MAR 27 2018 21:28 PLT 4



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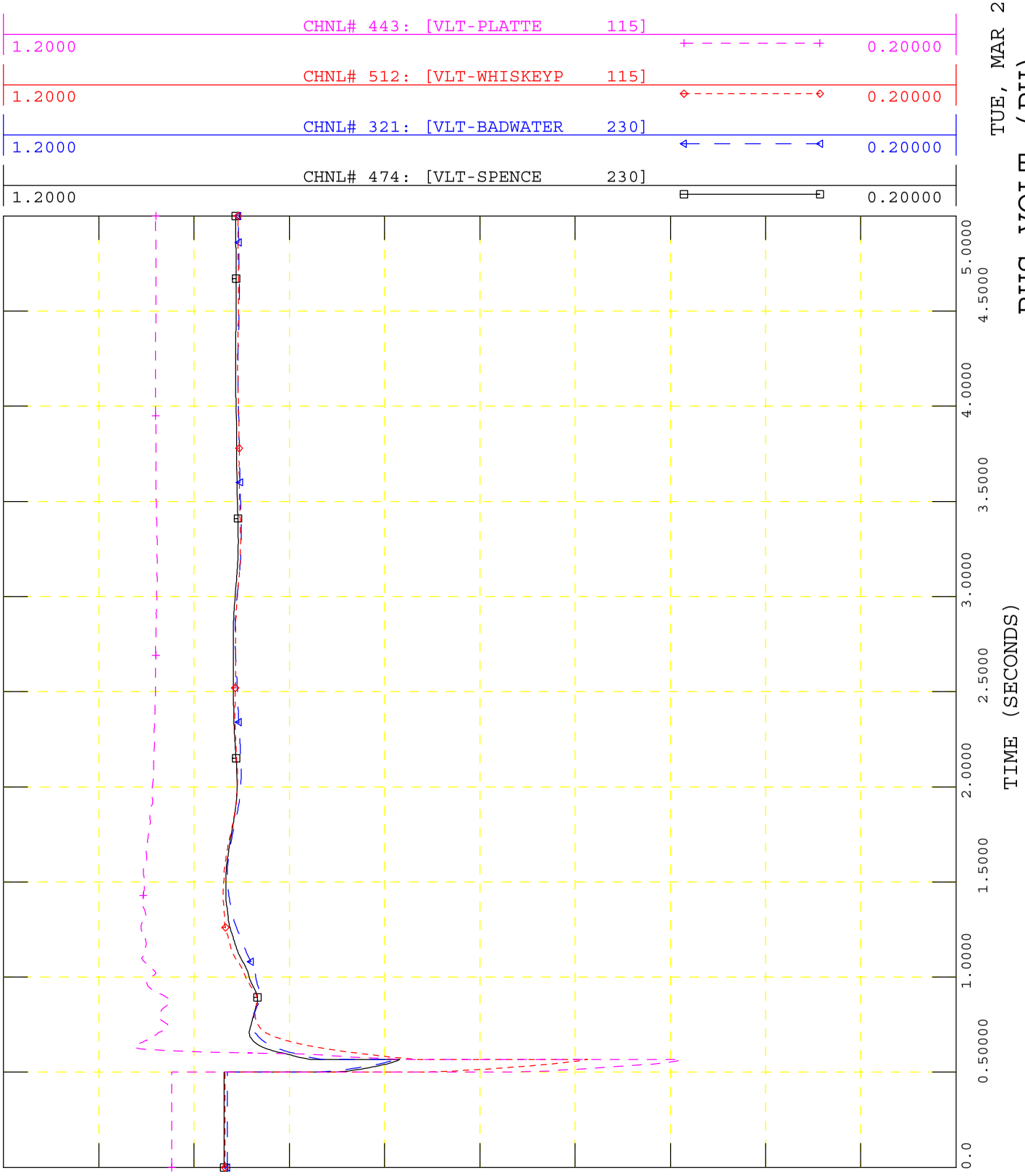
TUE, MAR 27 2018 21:28 PLT 5



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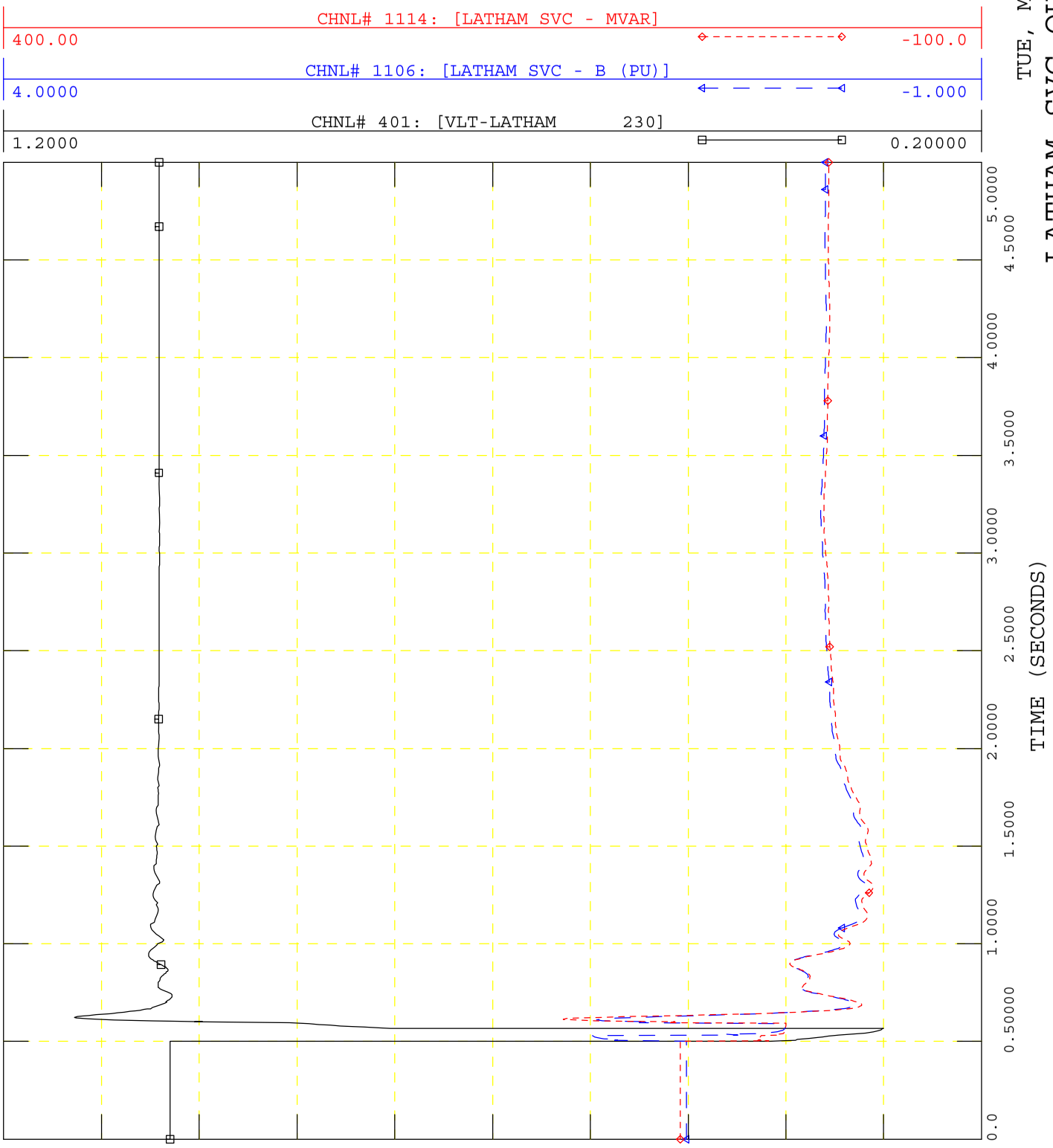
FILE: c7_svc_mtrld_POR-LATH_out3.out

TUE, MAR 27 2018 21:28 PLT 6

LATHAM SVC OUT



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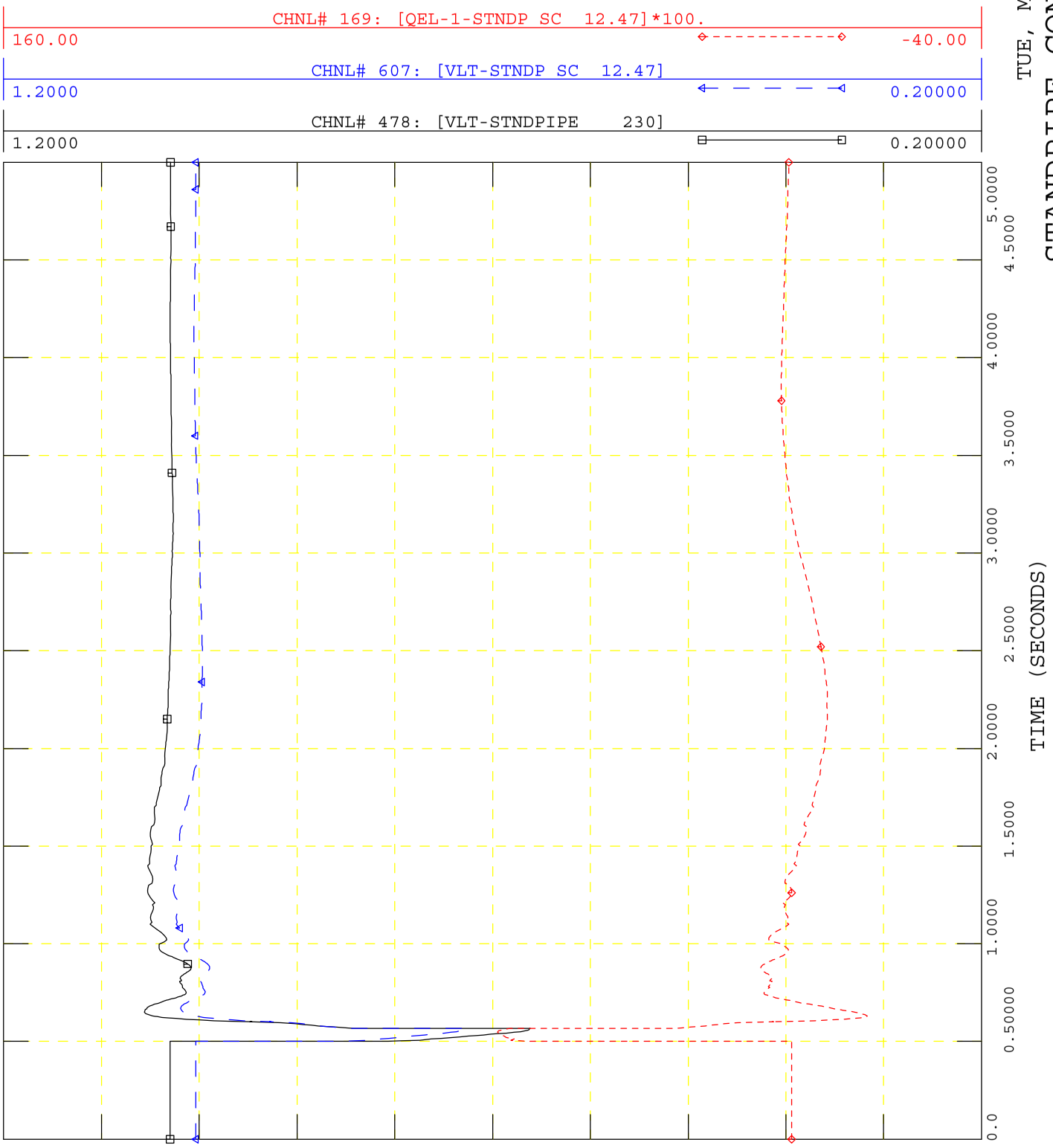
TUE, MAR 27 2018 21:28

STANDPIPE CONDNSR PLT 7



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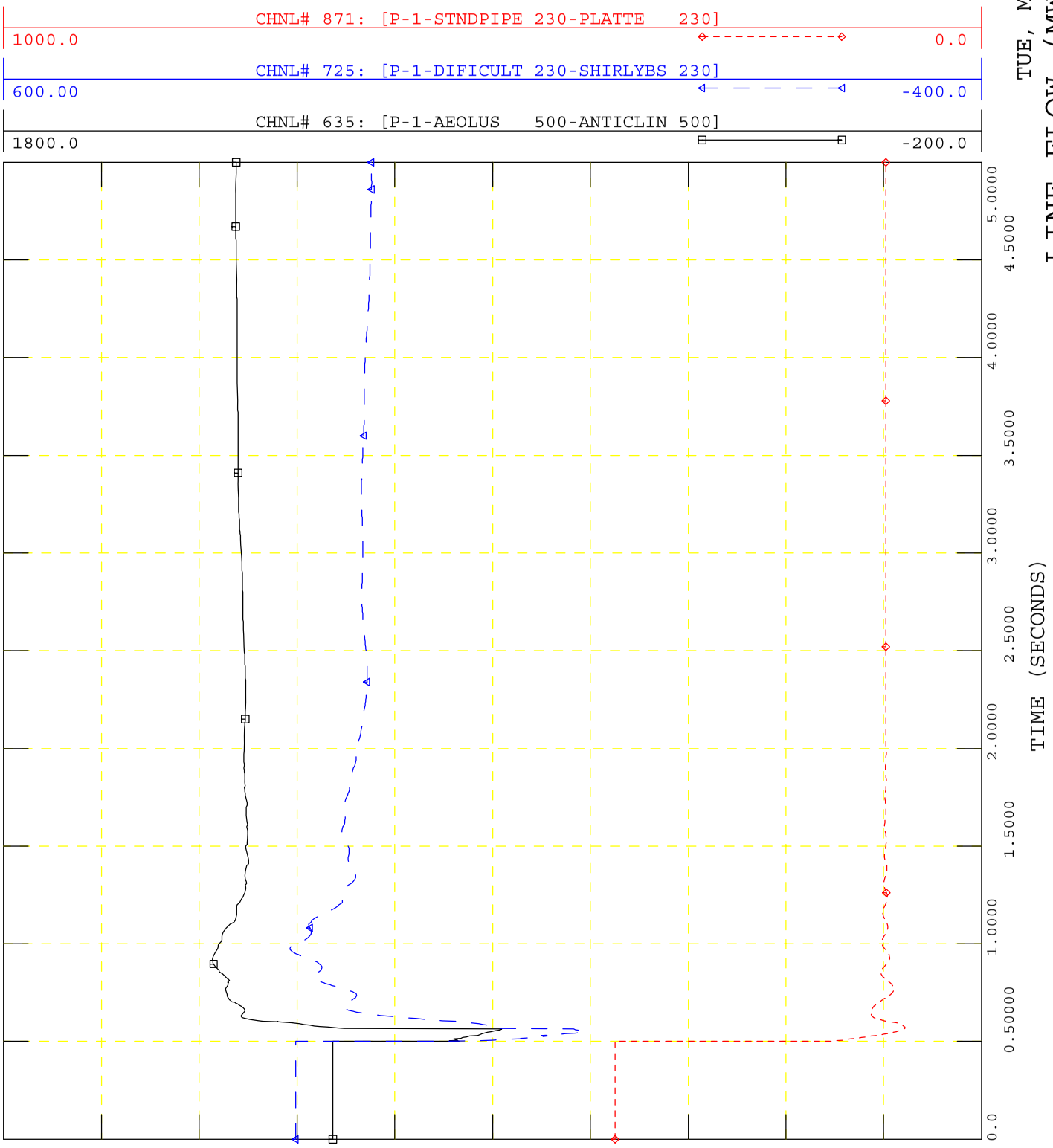
TUE, MAR 27 2018 21:28 PLT 8



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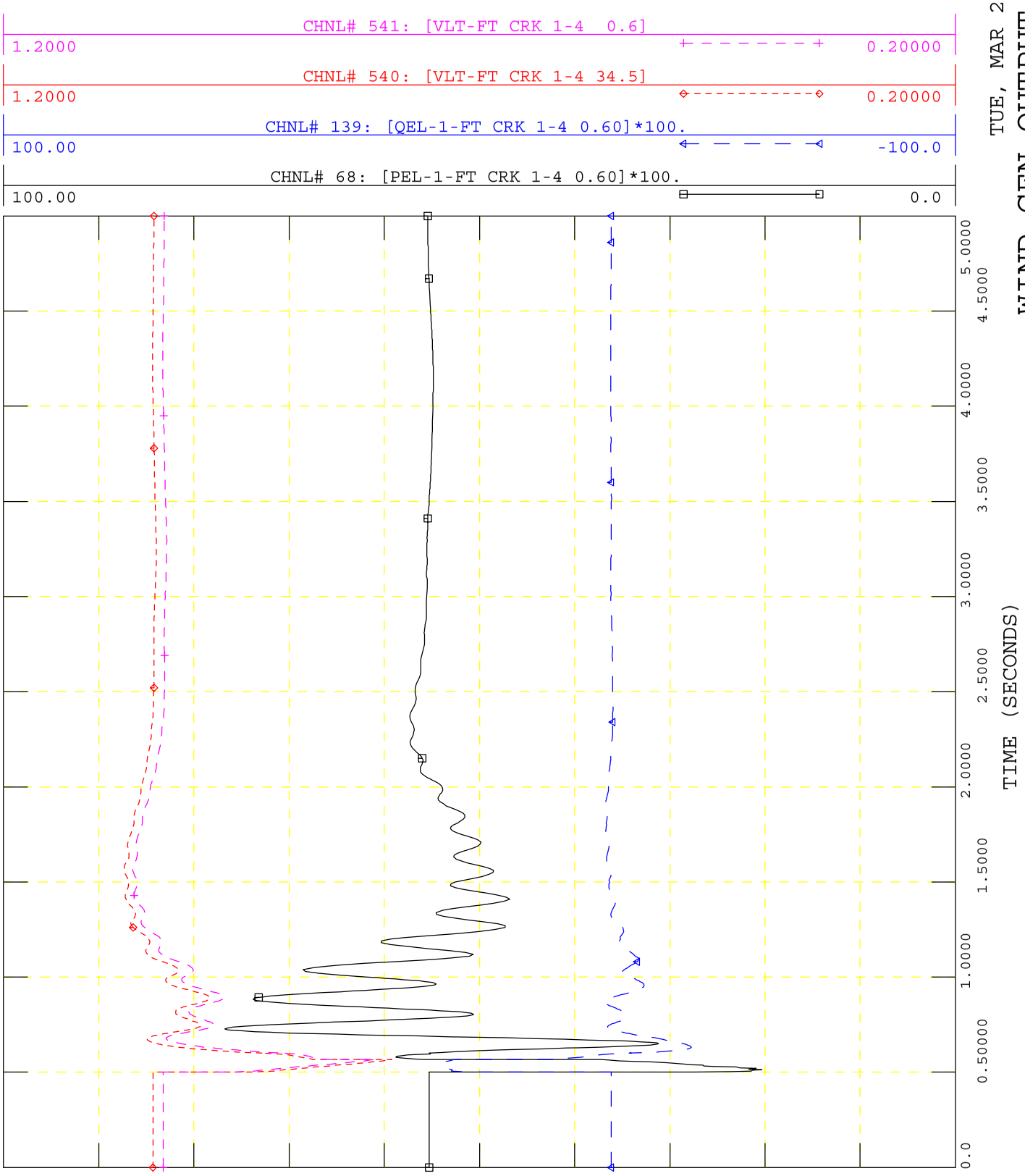
TUE, MAR 27 2018 21:28 PLT 9

WIND GEN OUTPUT



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2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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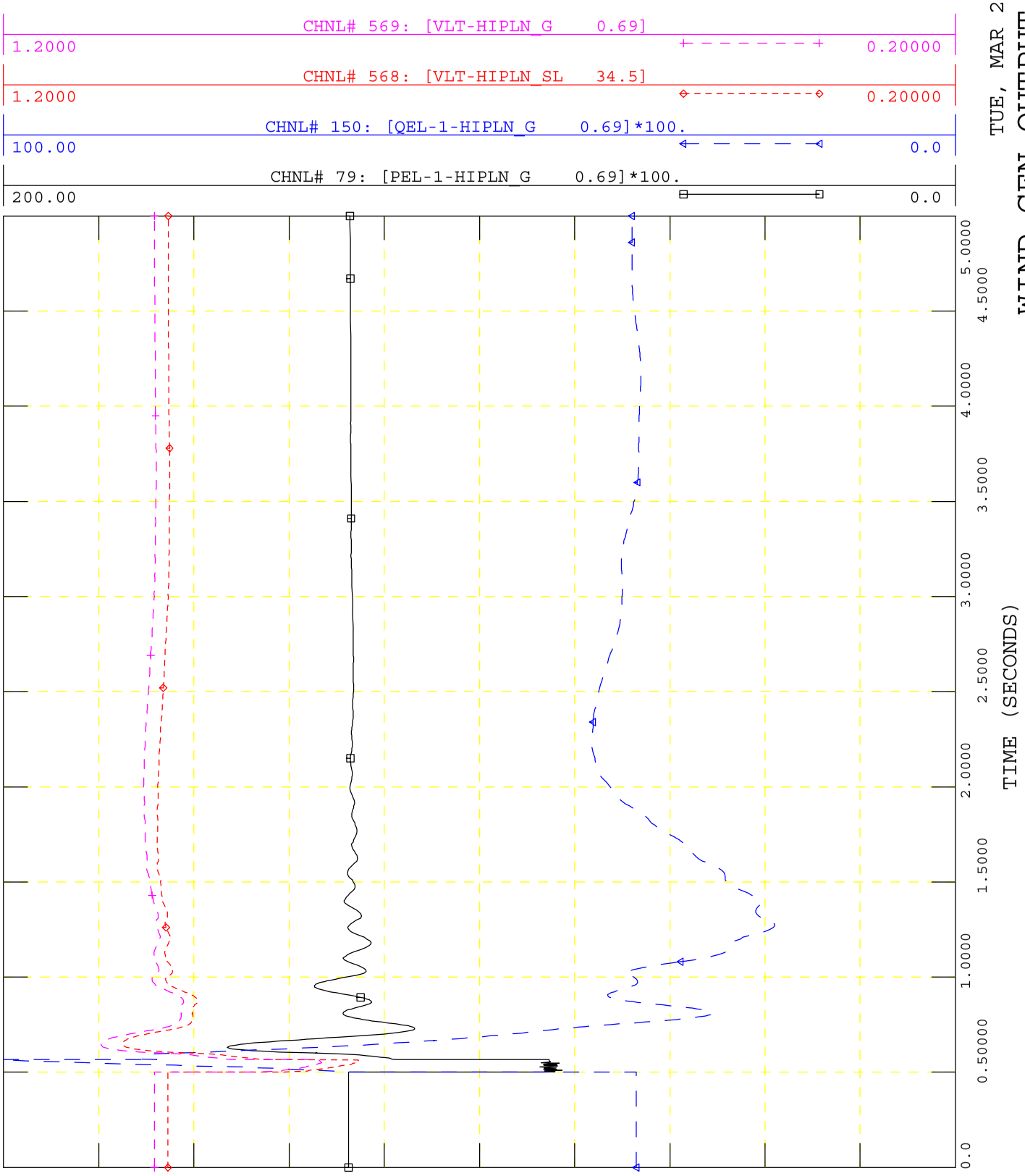
TUE, MAR 27 2018 21:28 PLT 10

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:28 PLT 11

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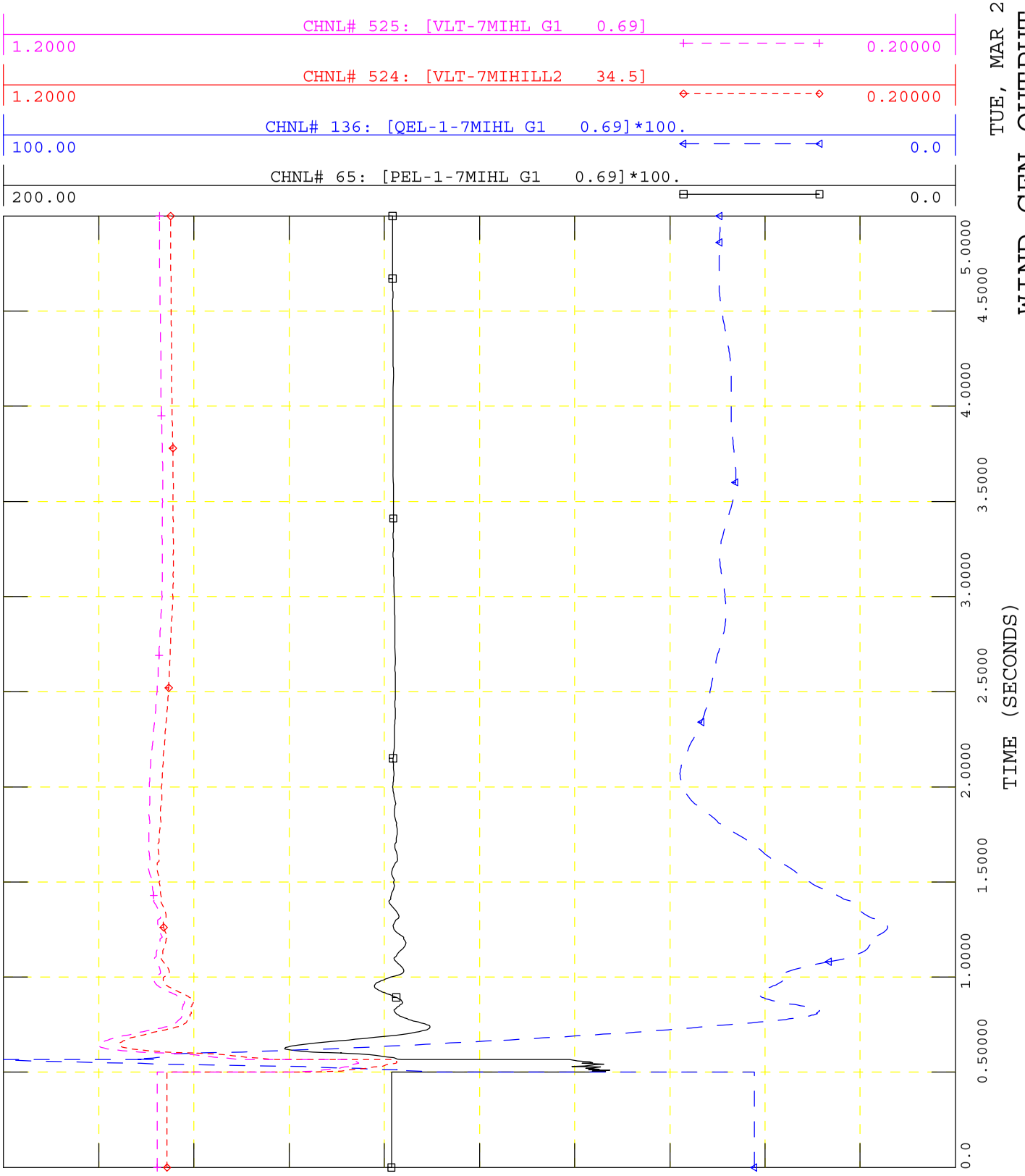

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TUE, MAR 27 2018 21:28 PLT 12

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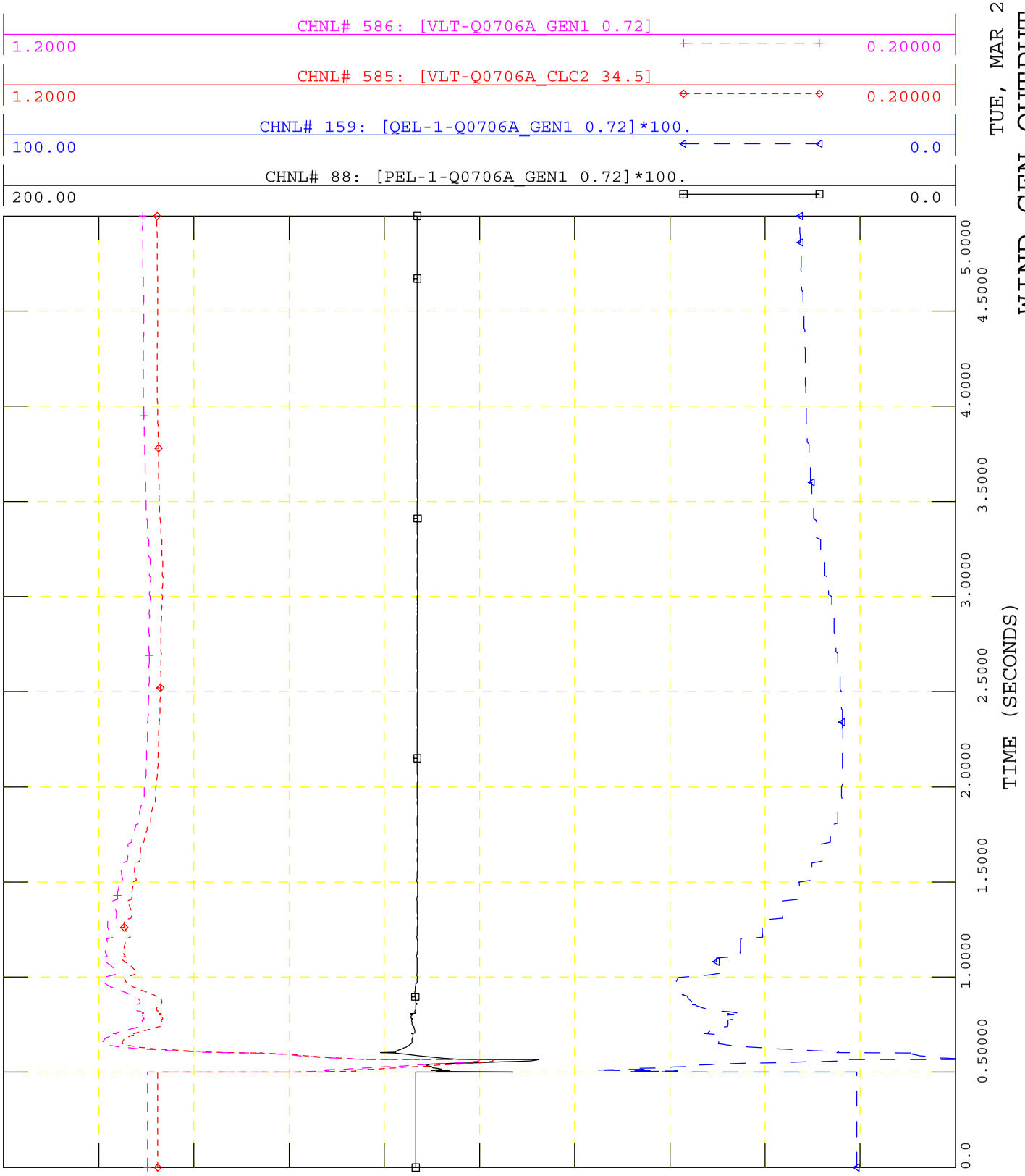

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TUE, MAR 27 2018 21:28 PLT 13

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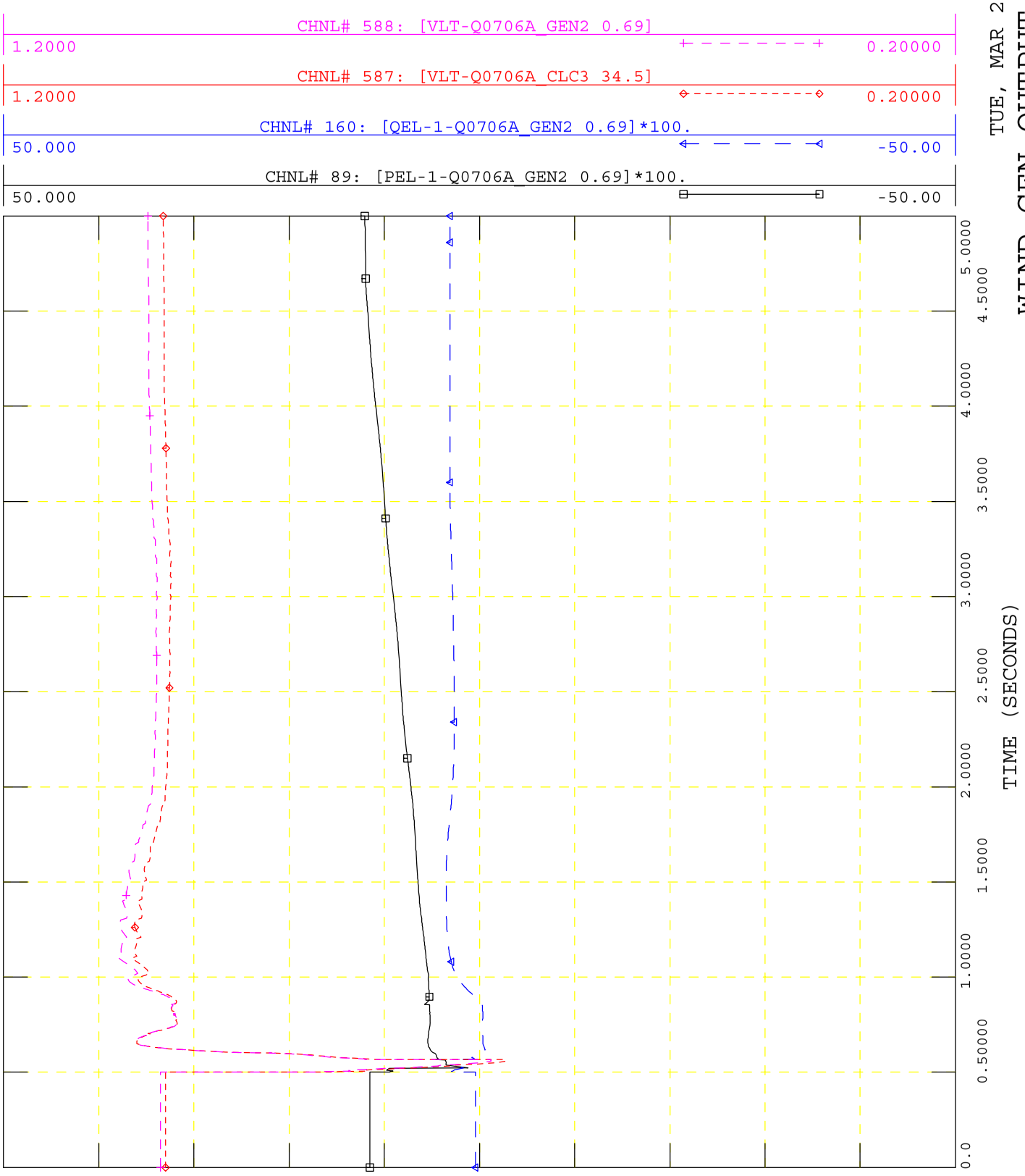

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TUE, MAR 27 2018 21:28 PLT 14

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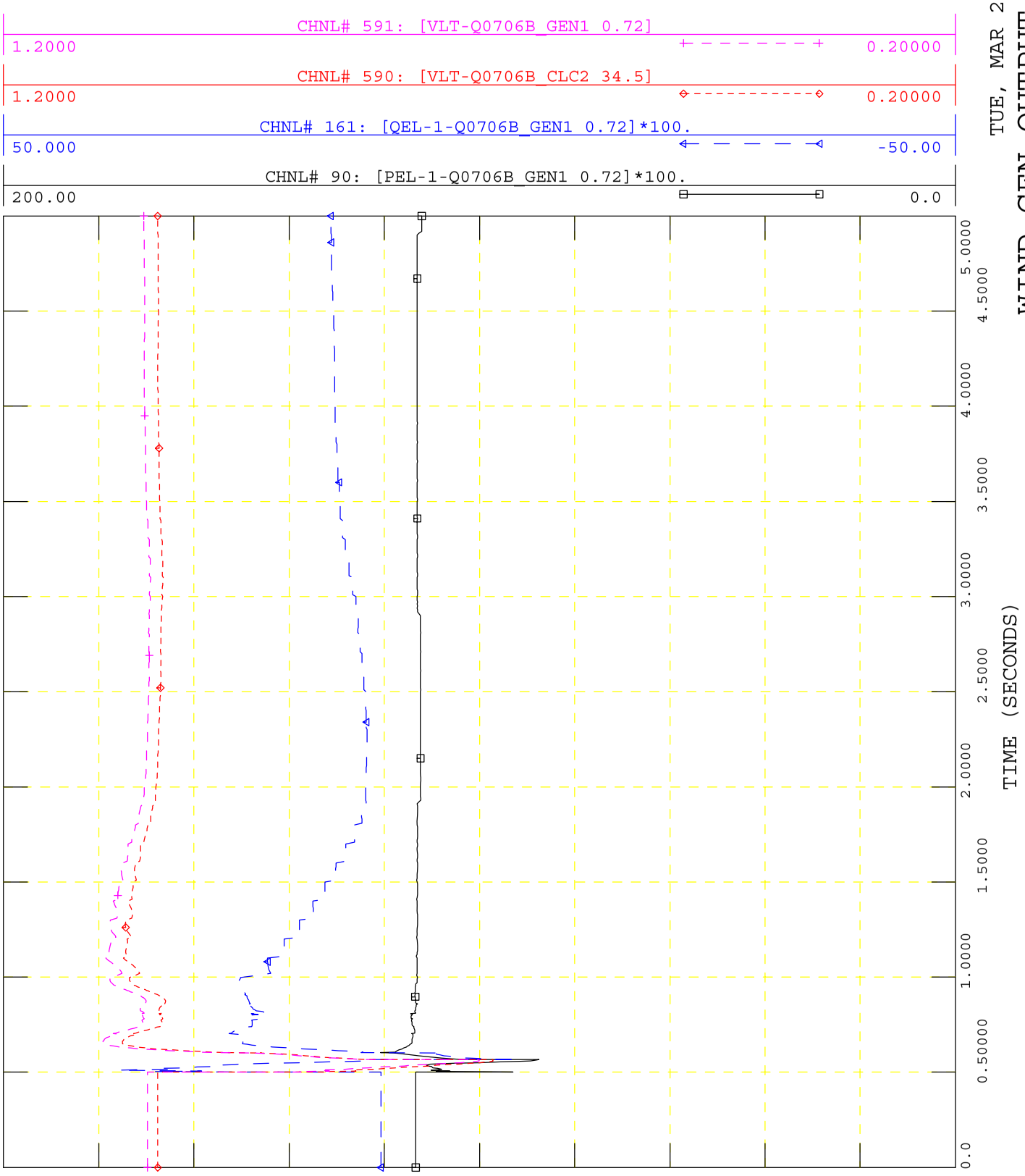

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TUE, MAR 27 2018 21:28 PLT 15

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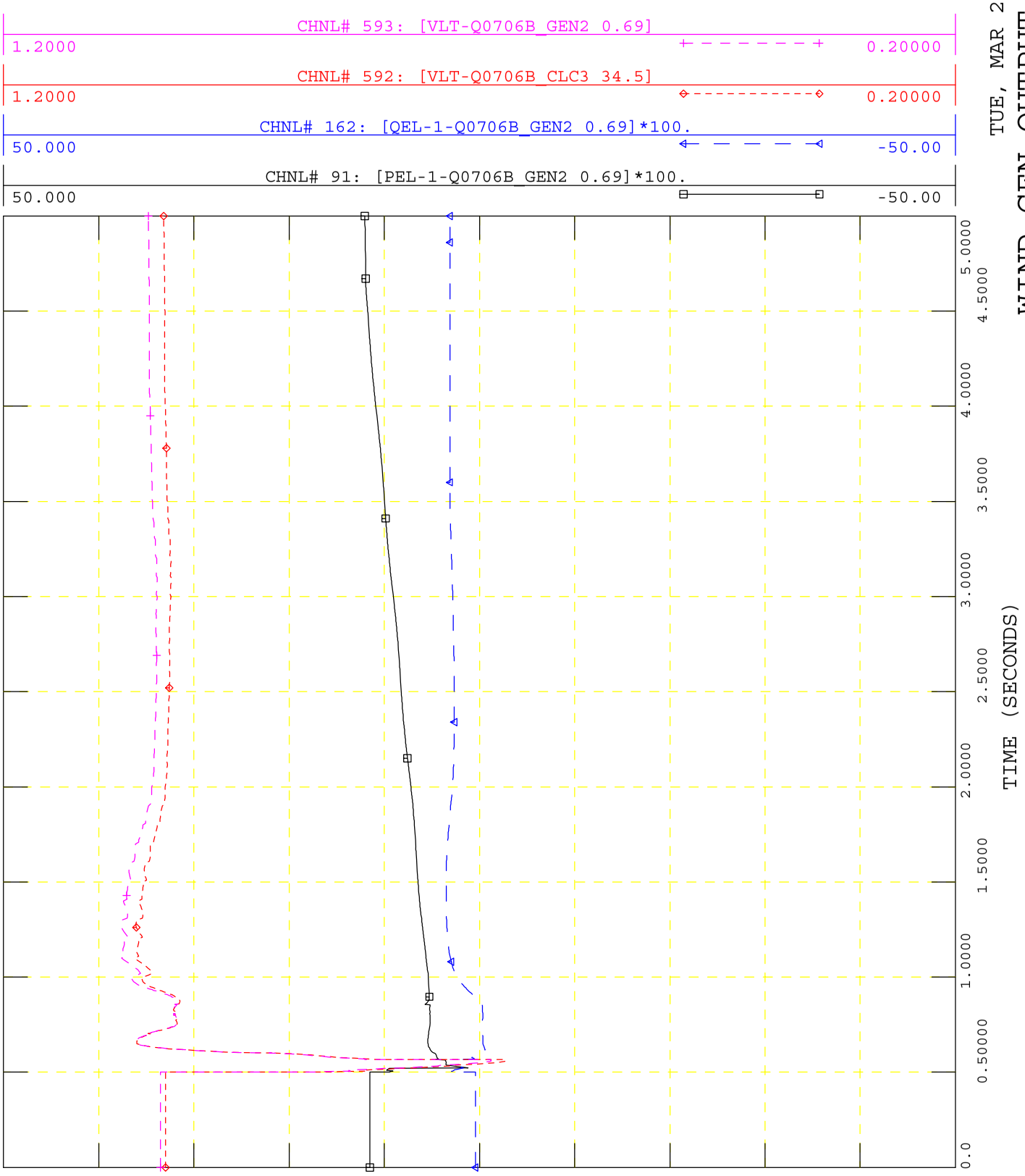

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TUE, MAR 27 2018 21:28 PLT 16

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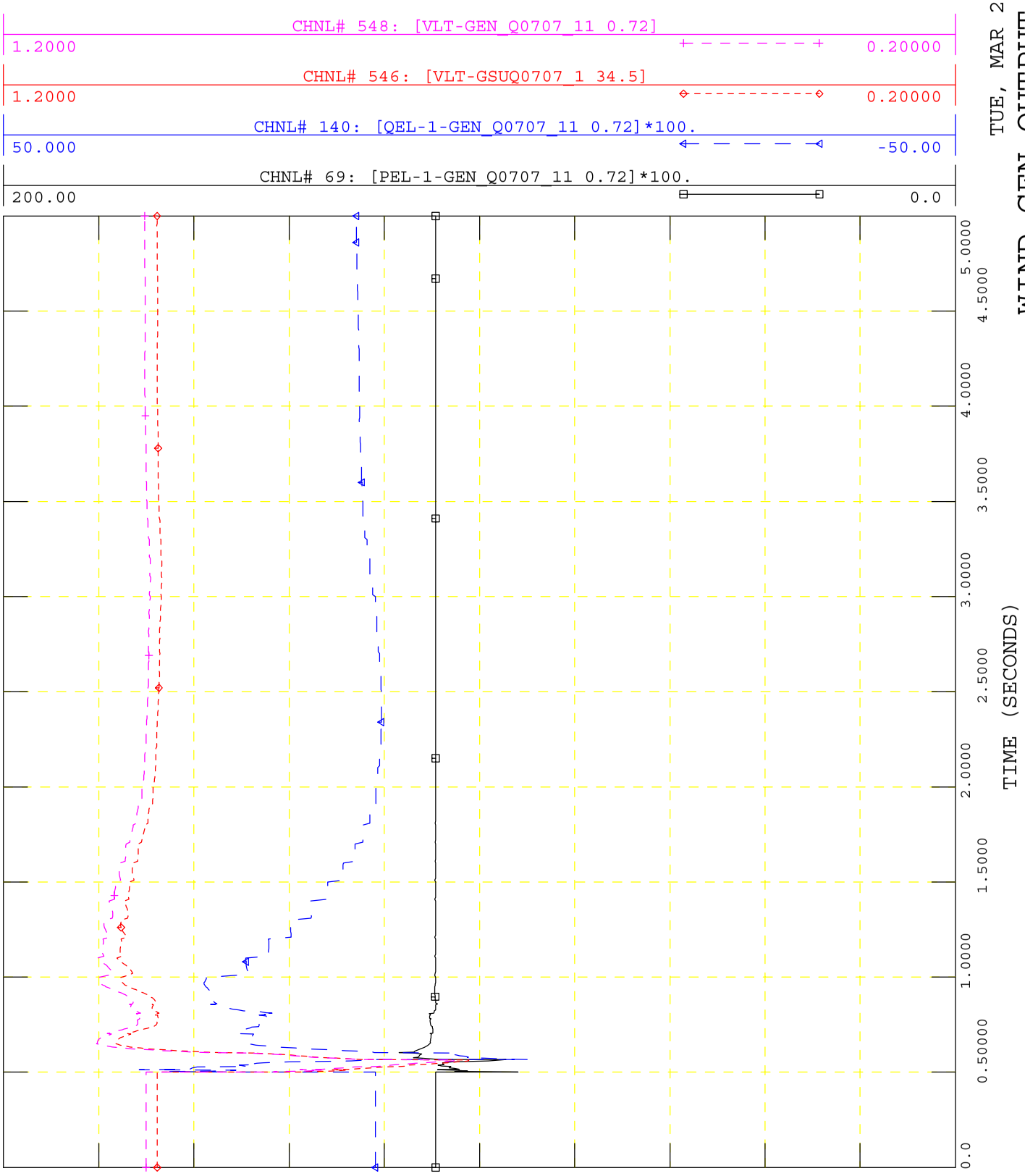

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TUE, MAR 27 2018 21:28 PLT 17

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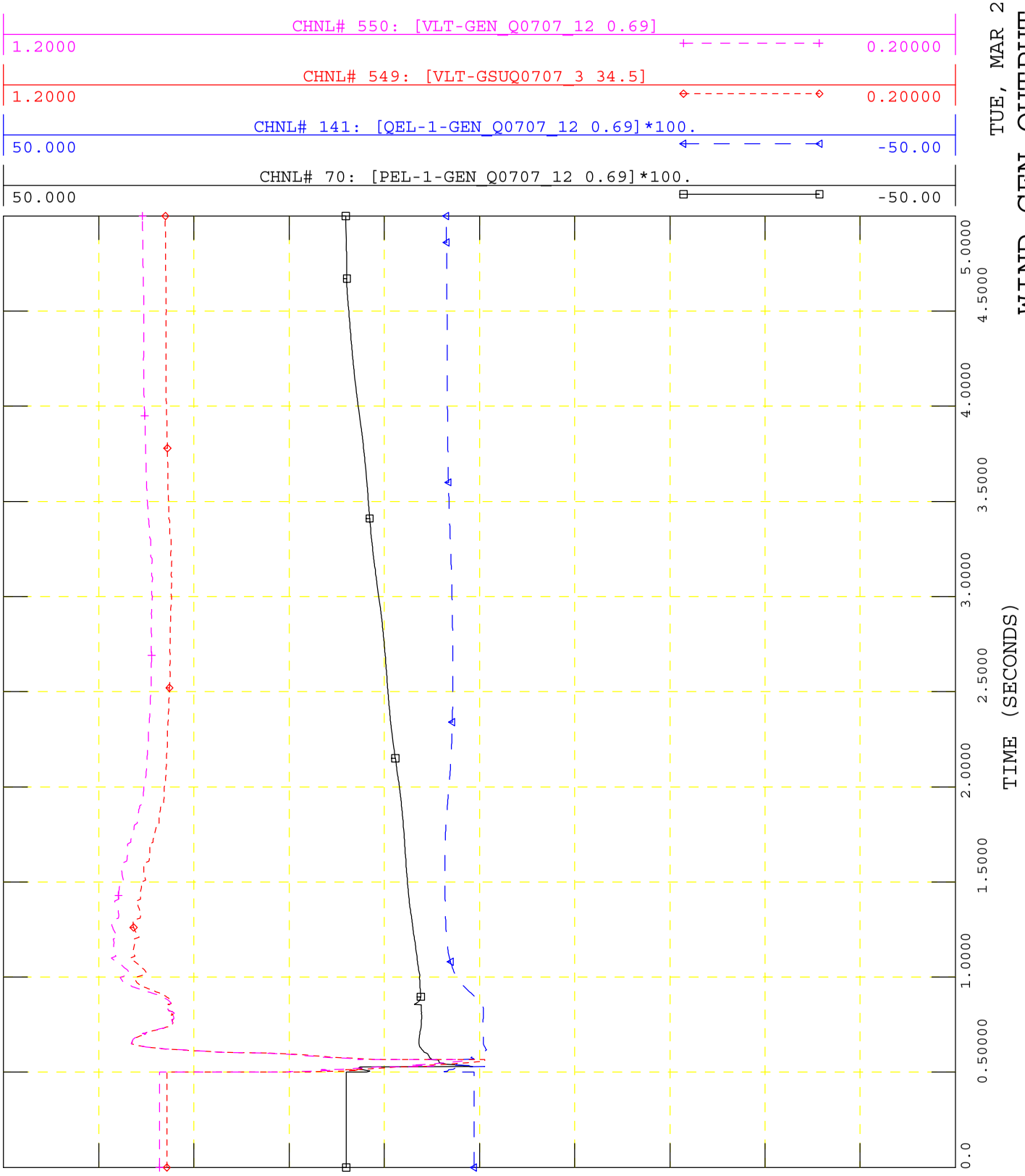

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TUE, MAR 27 2018 21:28 PLT 18

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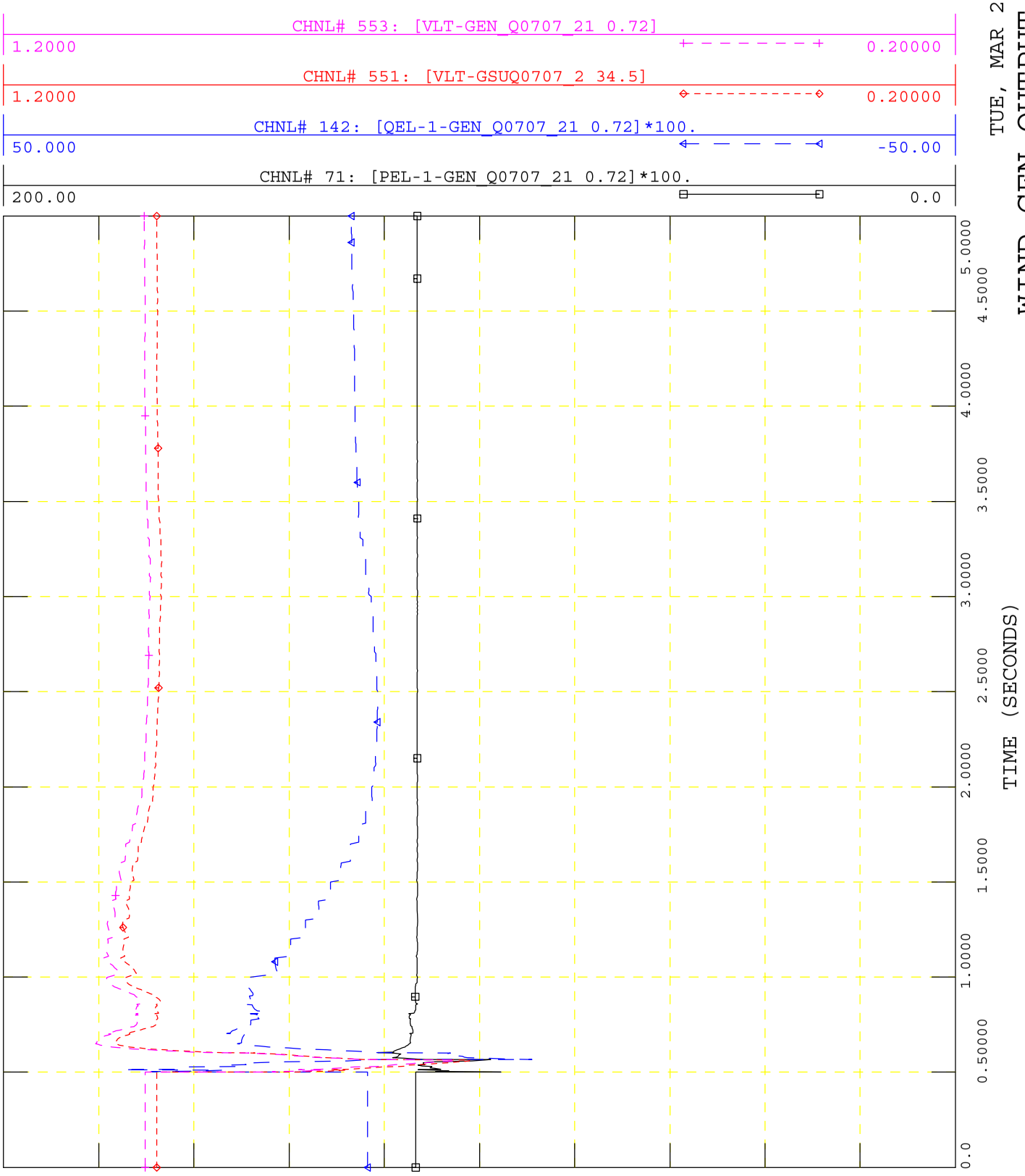

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TUE, MAR 27 2018 21:28 PLT 19

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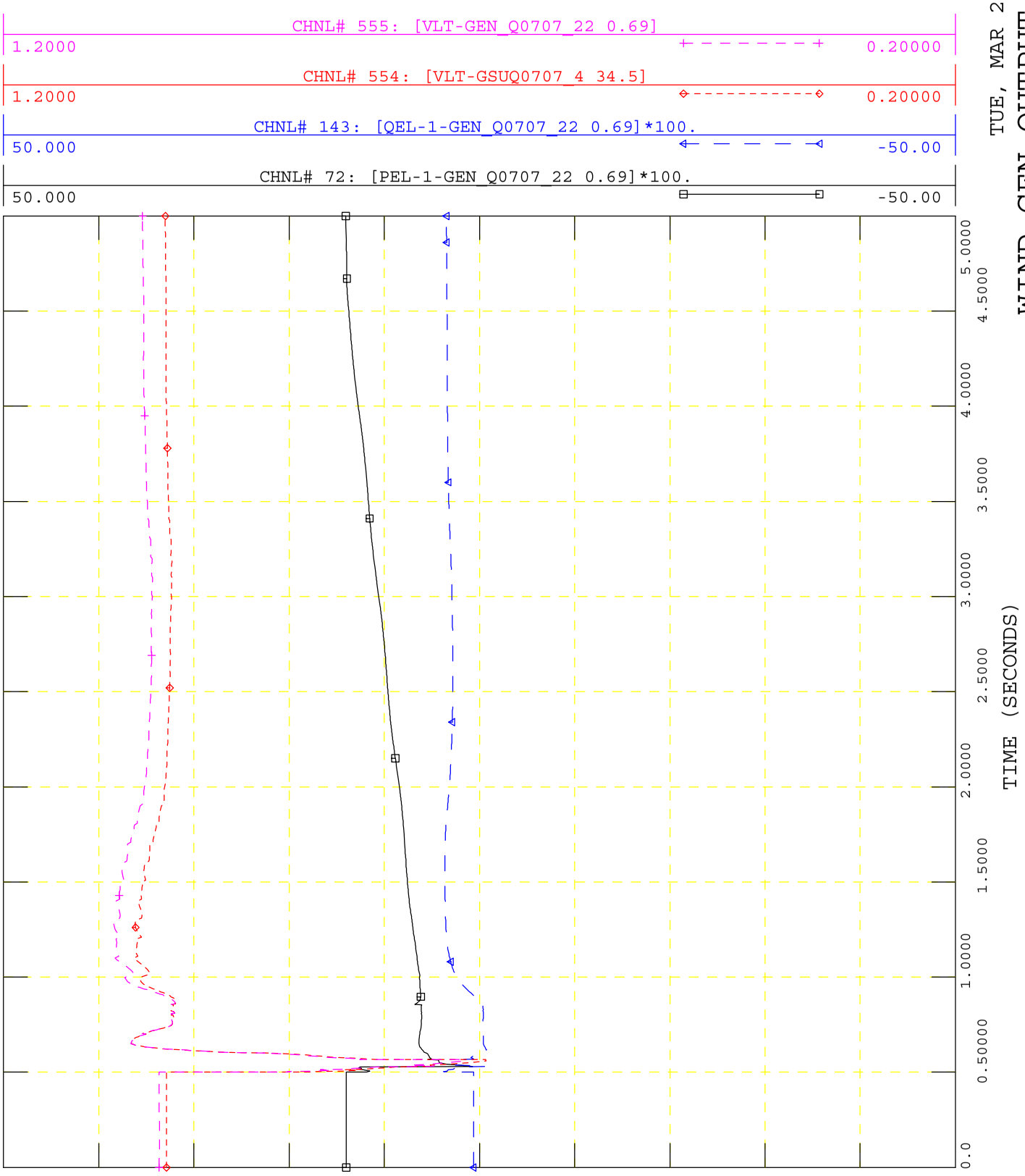

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TUE, MAR 27 2018 21:28 PLT 20

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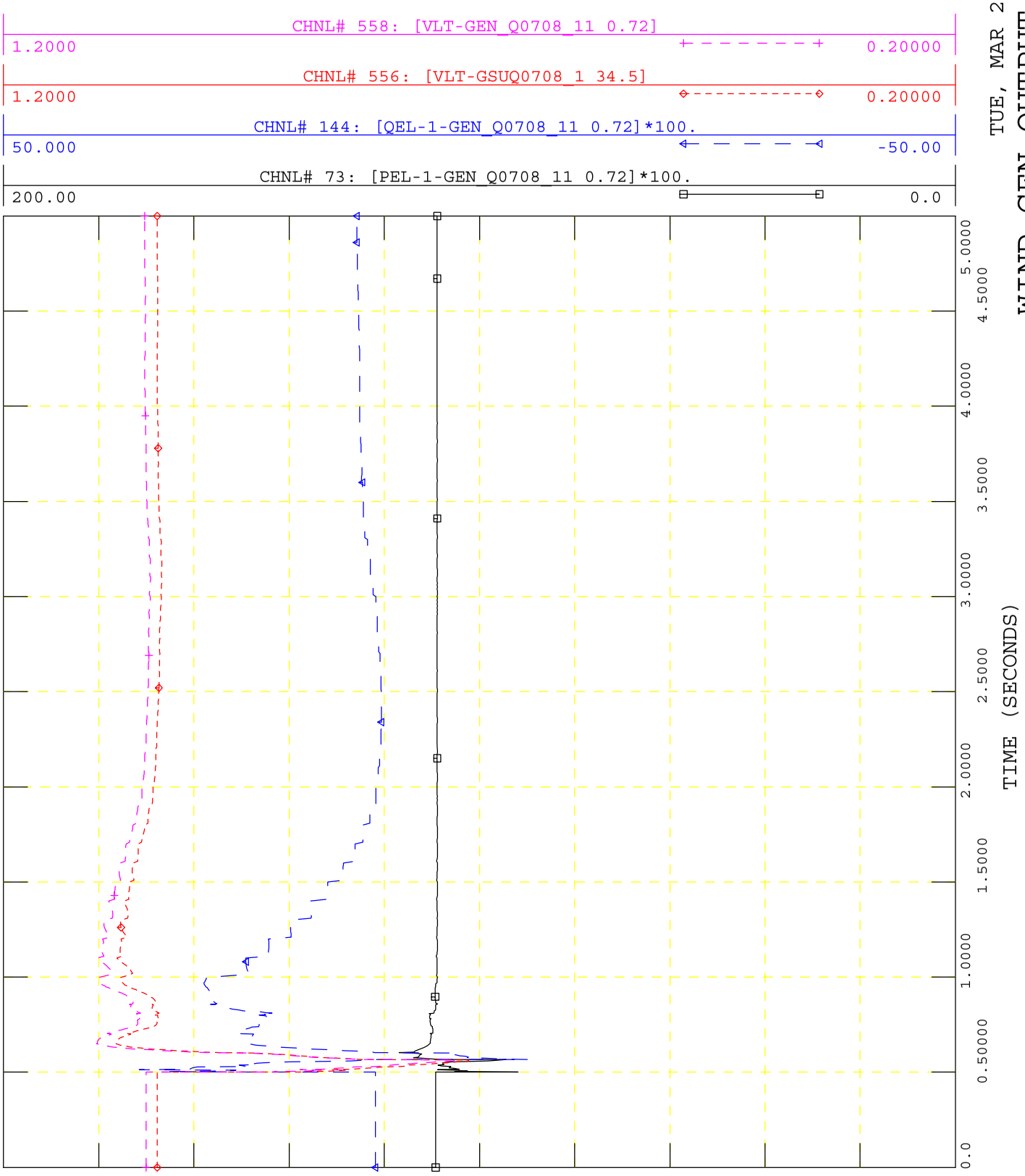

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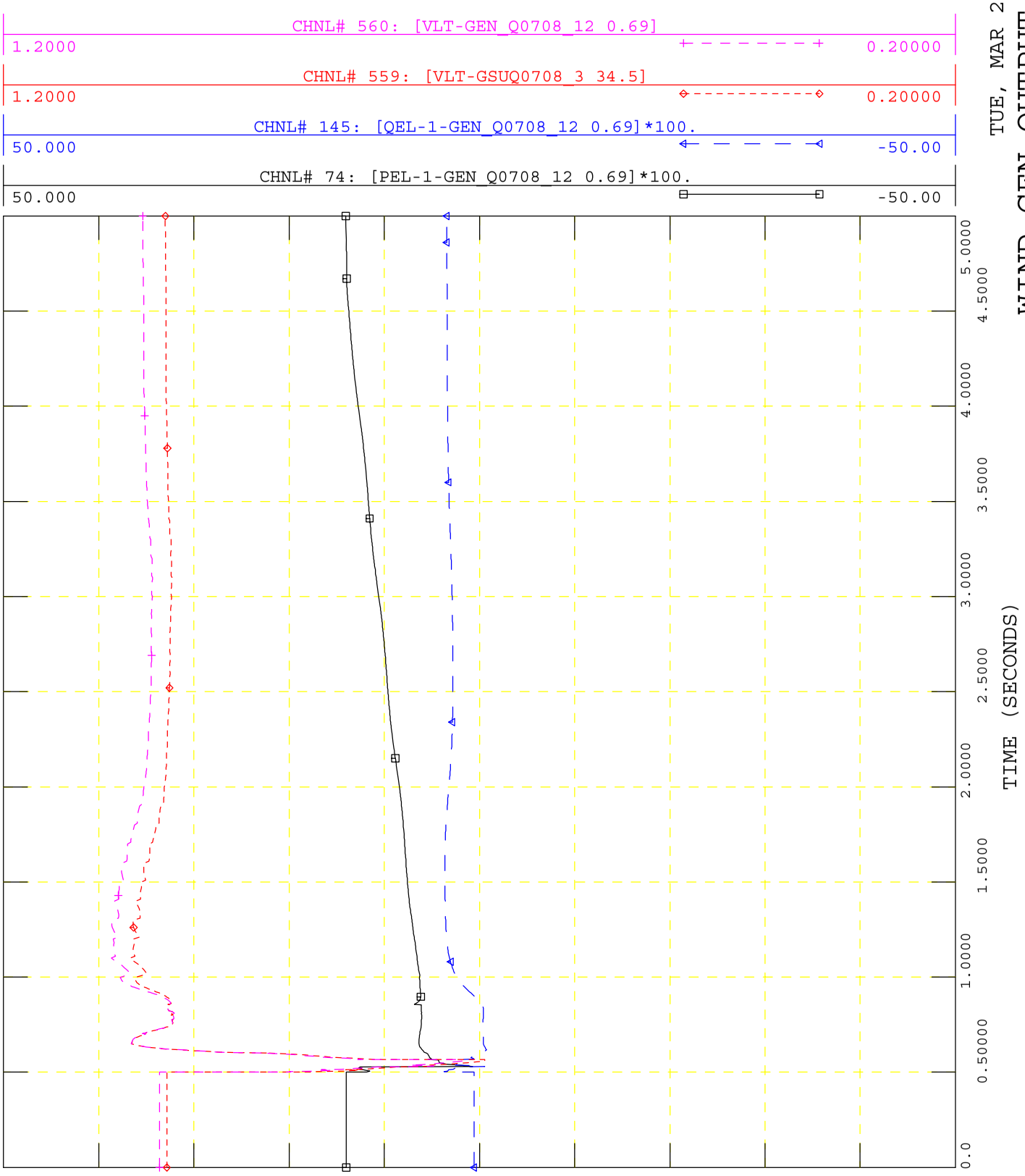
TUE, MAR 27 2018 21:28 PLT 21

WIND GEN OUTPUT



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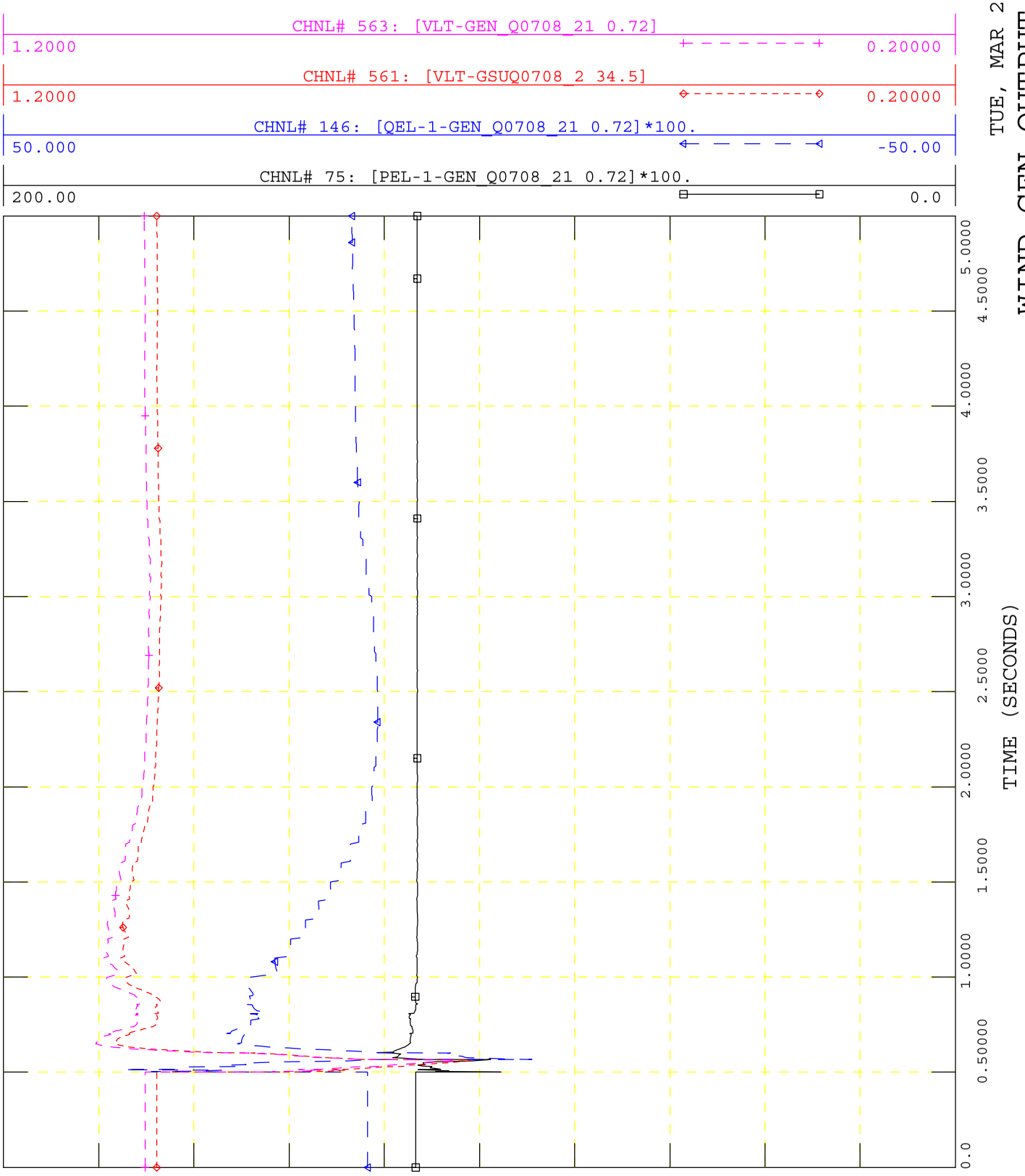
TUE, MAR 27 2018 21:28 PLT 22

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:28 PLT 23

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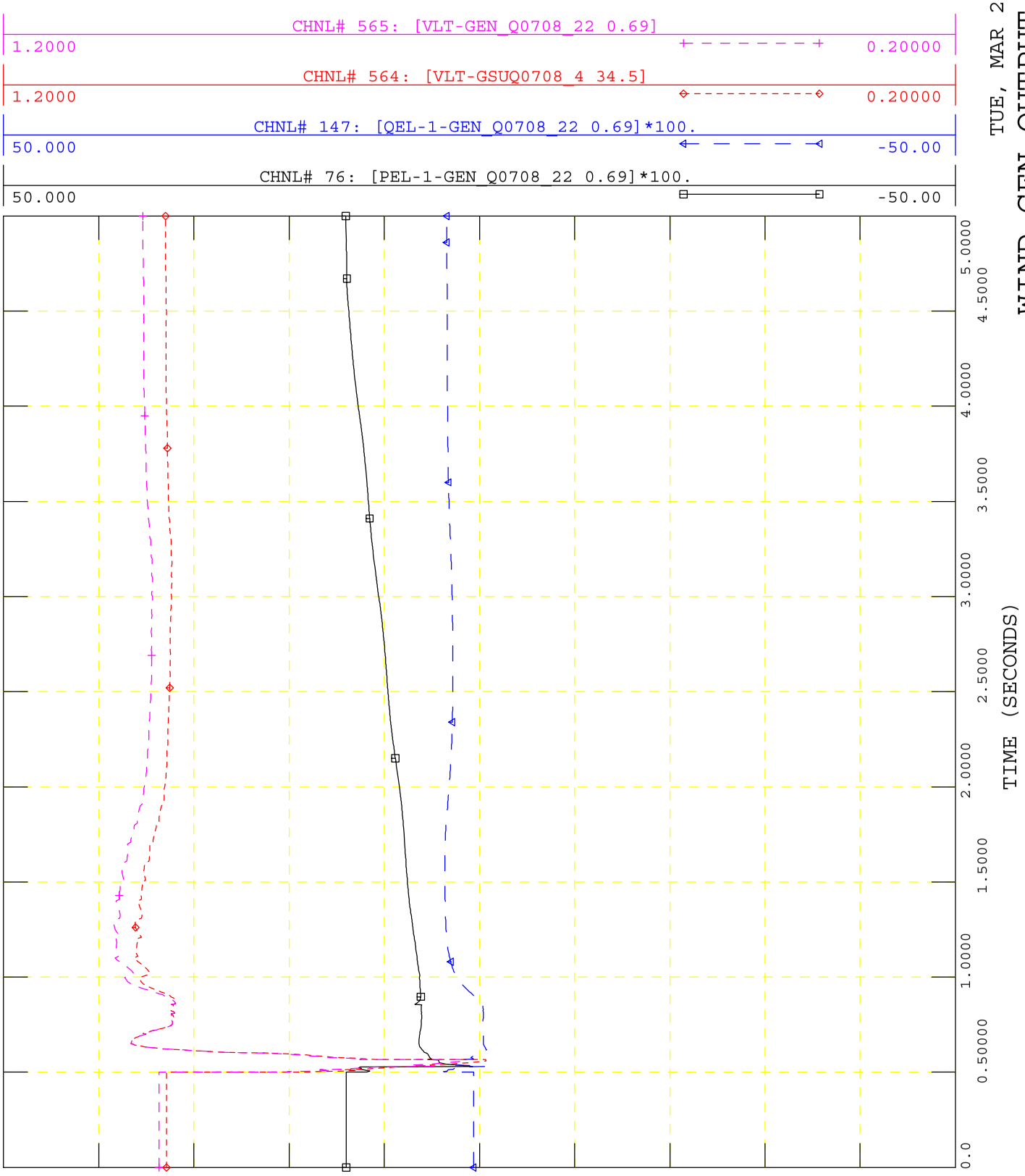

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TUE, MAR 27 2018 21:28 PLT 24

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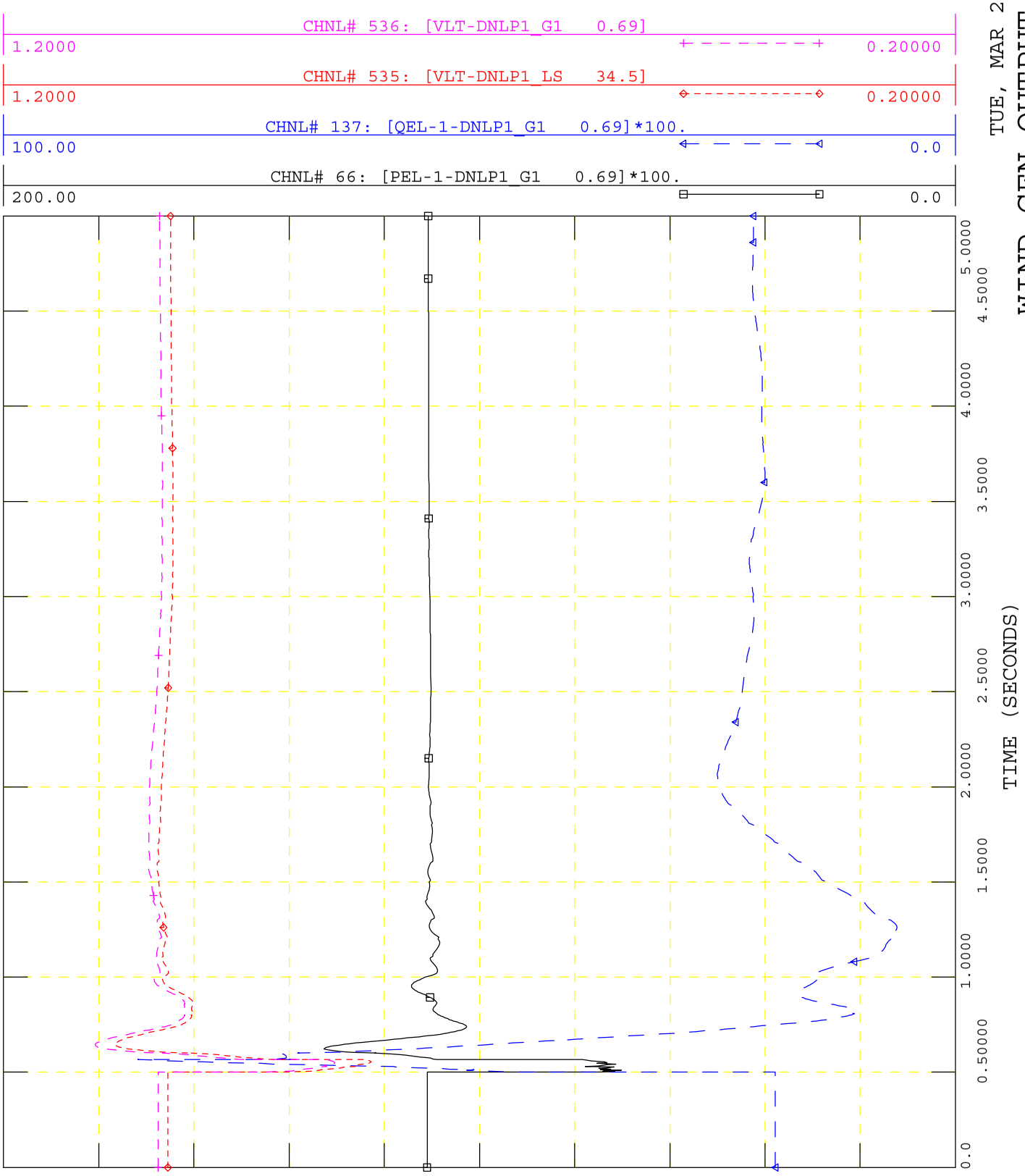

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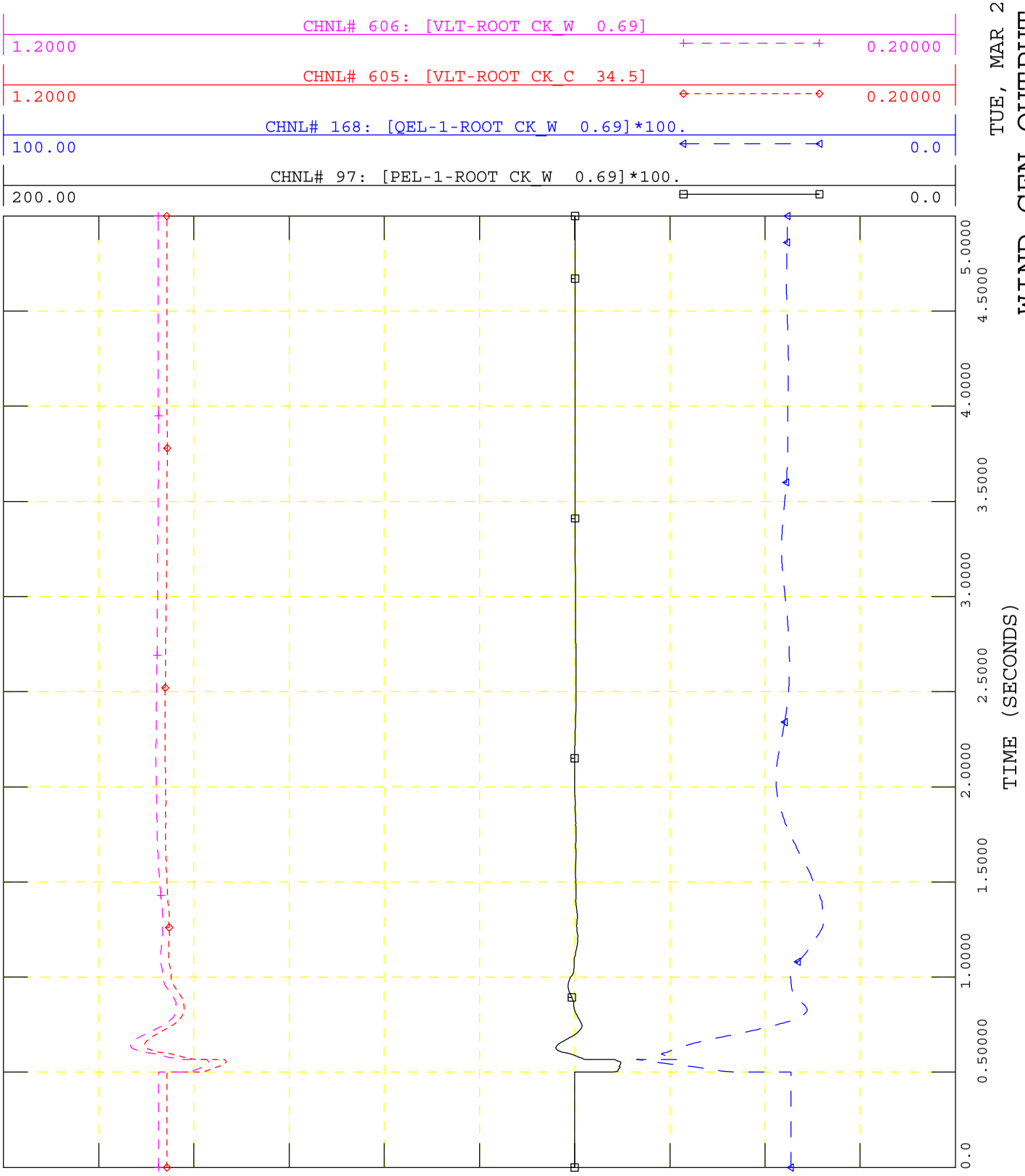
TUE, MAR 27 2018 21:28 PLT 25

WIND GEN OUTPUT



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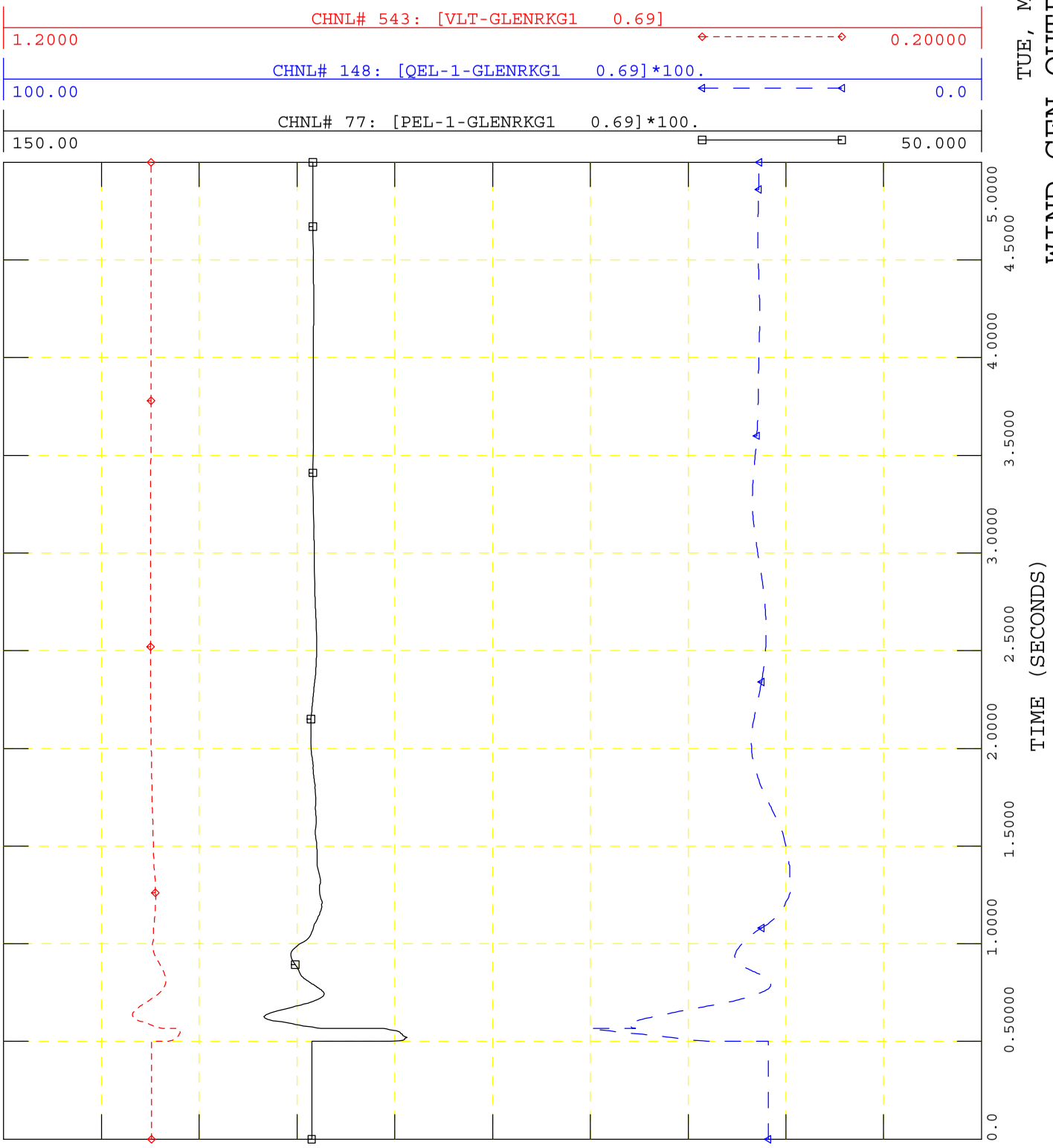
TUE, MAR 27 2018 21:28 PLT 26

WIND GEN OUTPUT



Dynamic Simulation

Case 4 – Loss of Latham-Platte 230 kV line

30 cycles	**3 phase Latham 230 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Latham-Platte 230 kV line**
36 cycles	**Remove SVC MVAR limiter**
5 sec.	**Terminate simulation**

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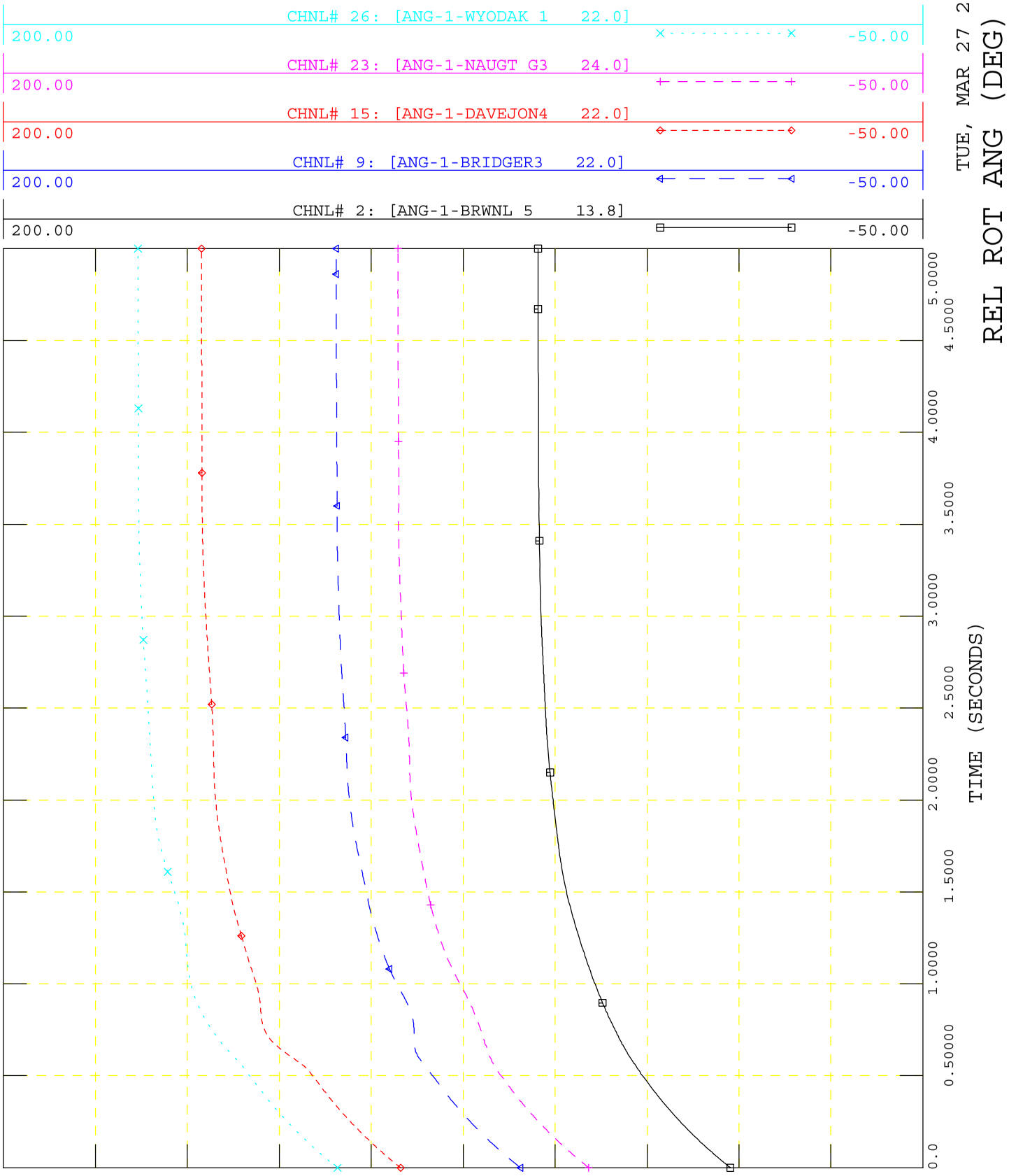
LATHAM-PLATTE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 4
FILE: c7_svc_mtrld_LATH-PLAT_out4.out



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REL ROT ANG (DEG) PLT 1

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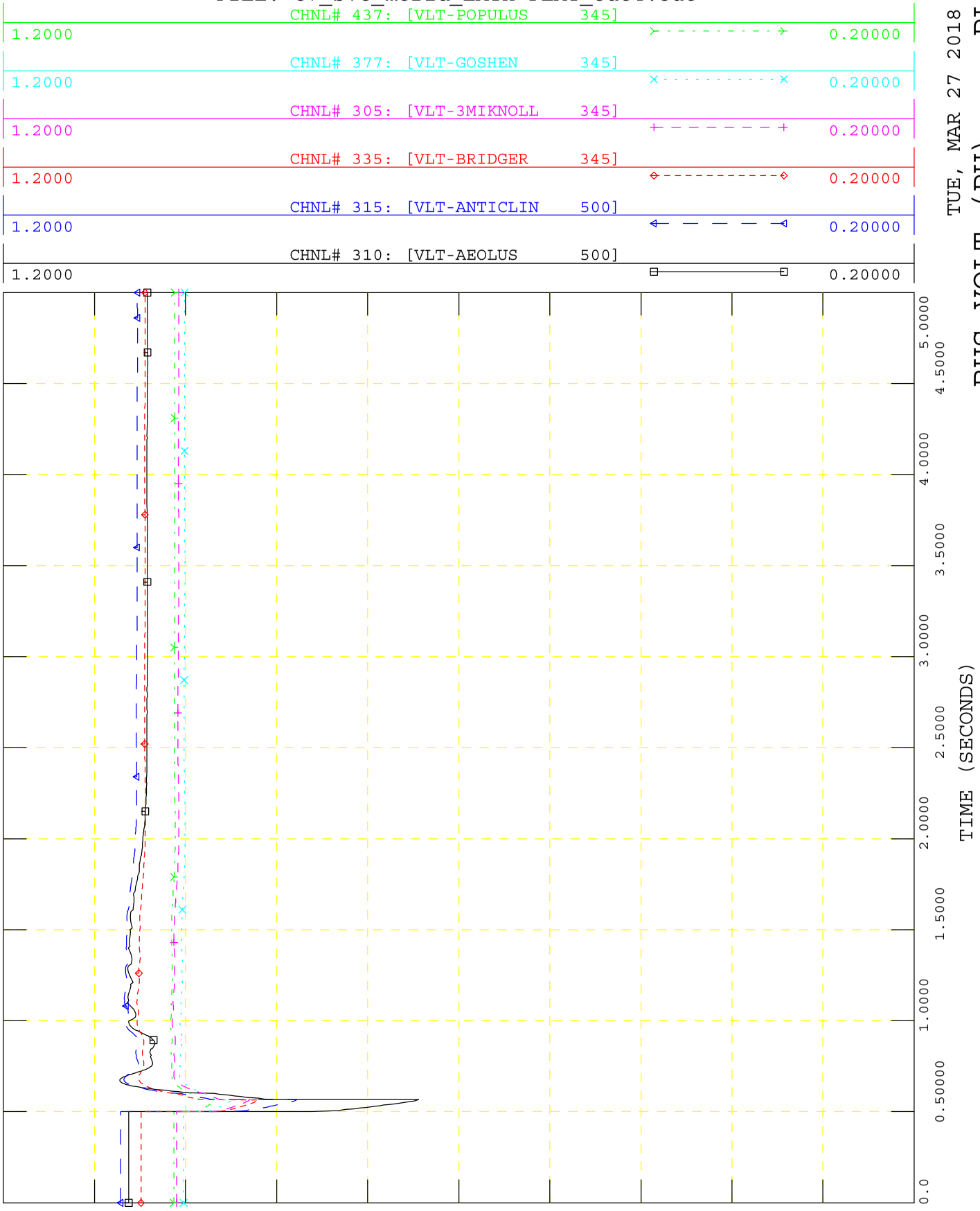
LATHAM-PLATTE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 4
FILE: c7_svc_mtrld_LATH-PLAT_out4.out

TUE, MAR 27 2018 21:28 PLT 2



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS LATHAM 230 KV FLT. 34CY-CLR FLT & OPEN
LATHAM-PLATTE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 4
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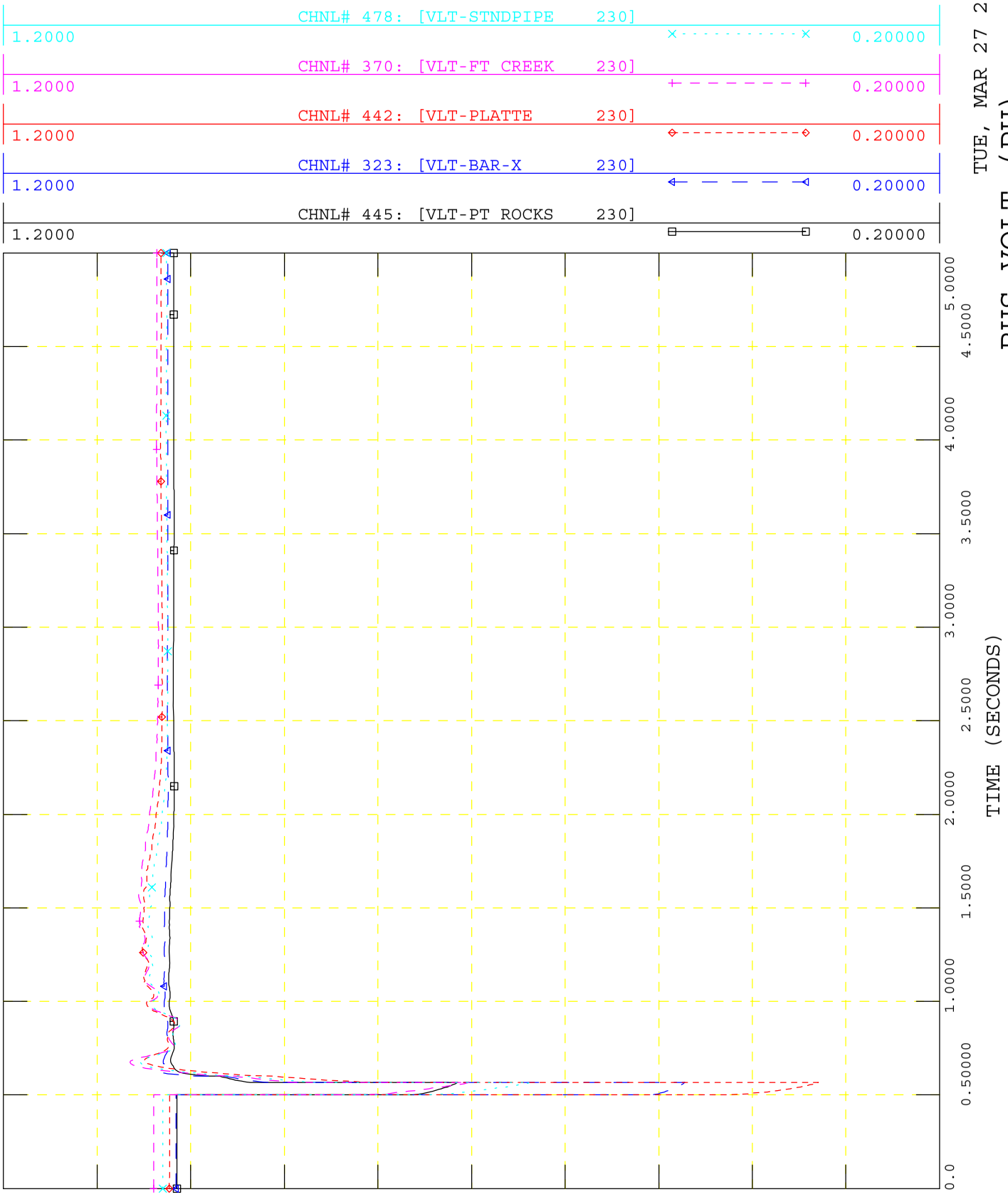
TUE, MAR 27 2018 21:28 PLT 3



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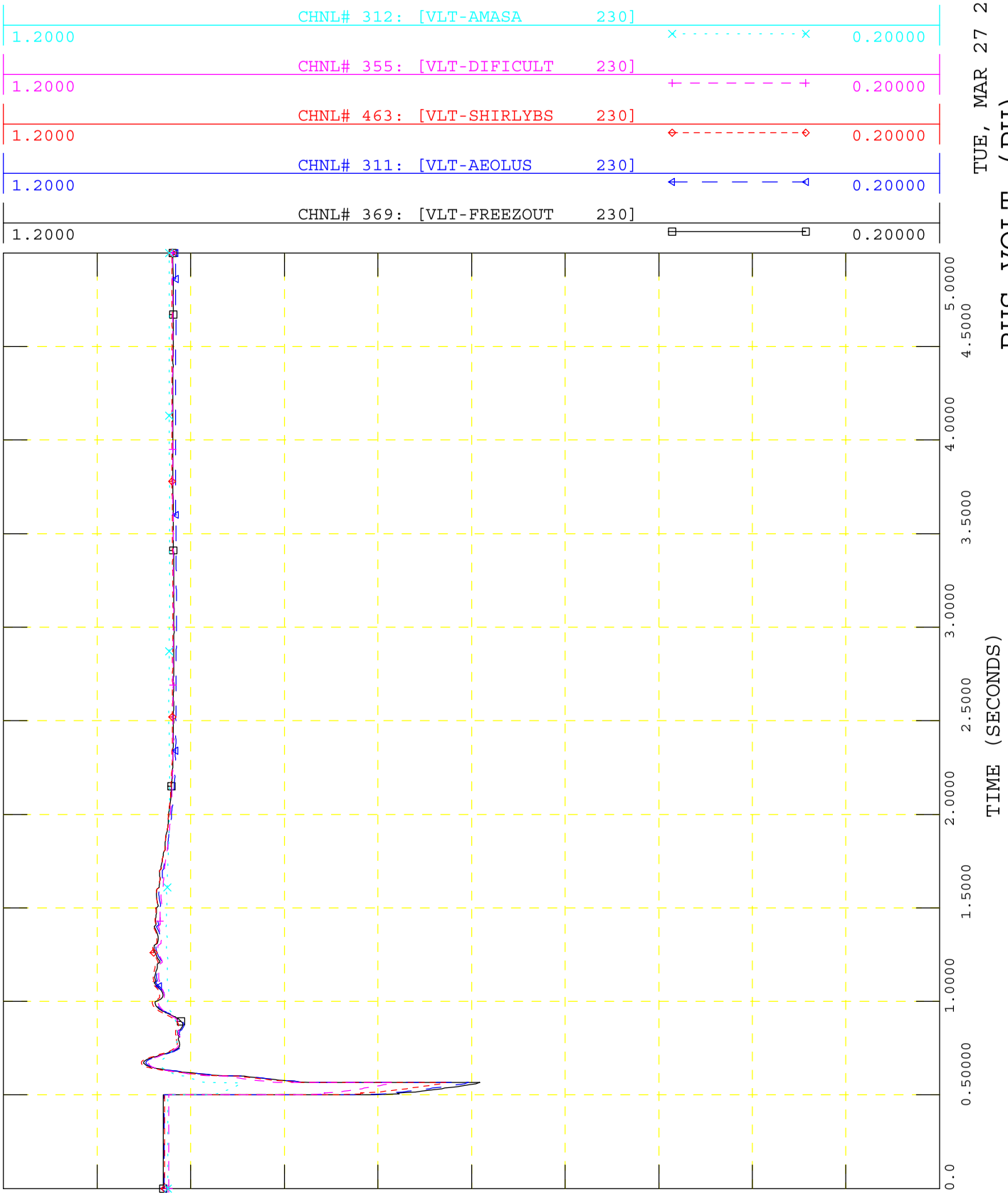
TUE, MAR 27 2018 21:28 PLT 4



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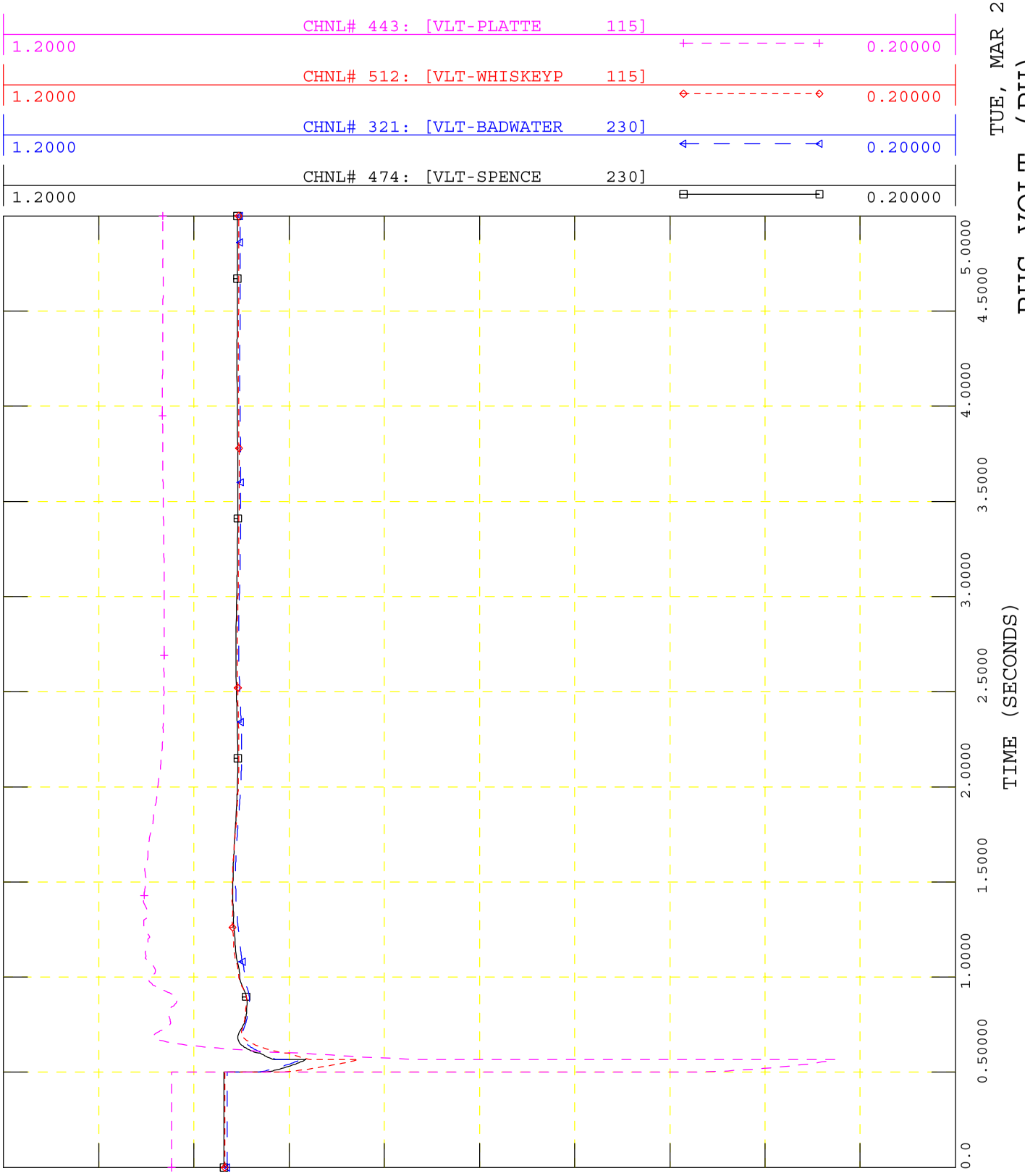
TUE, MAR 27 2018 21:28 PLT 5



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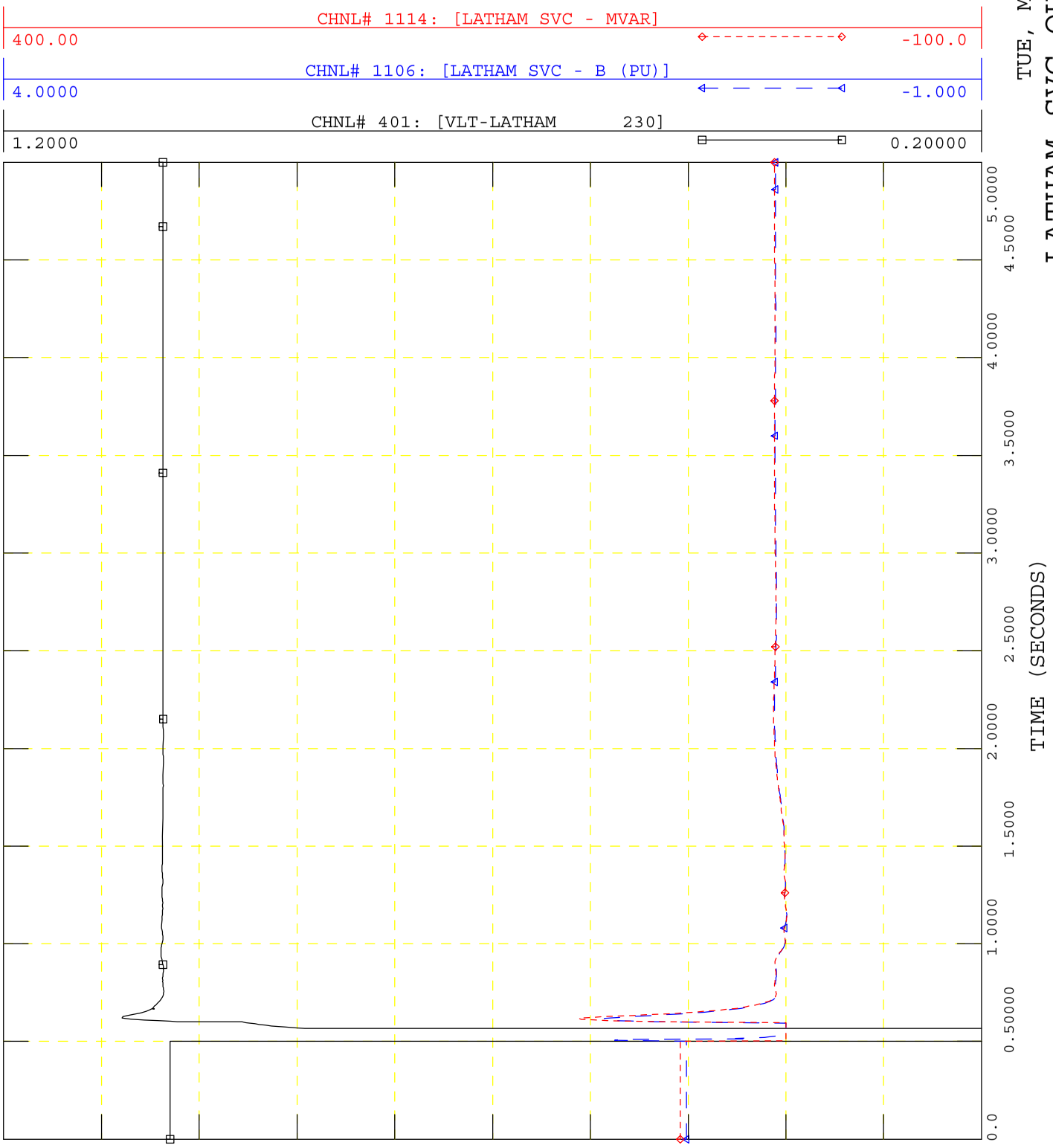
LATHAM-PLATTE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 4
FILE: c7_svc_mtrld_LATH-PLAT_out4.out

TUE, MAR 27 2018 21:28 PLT 6

LATHAM SVC OUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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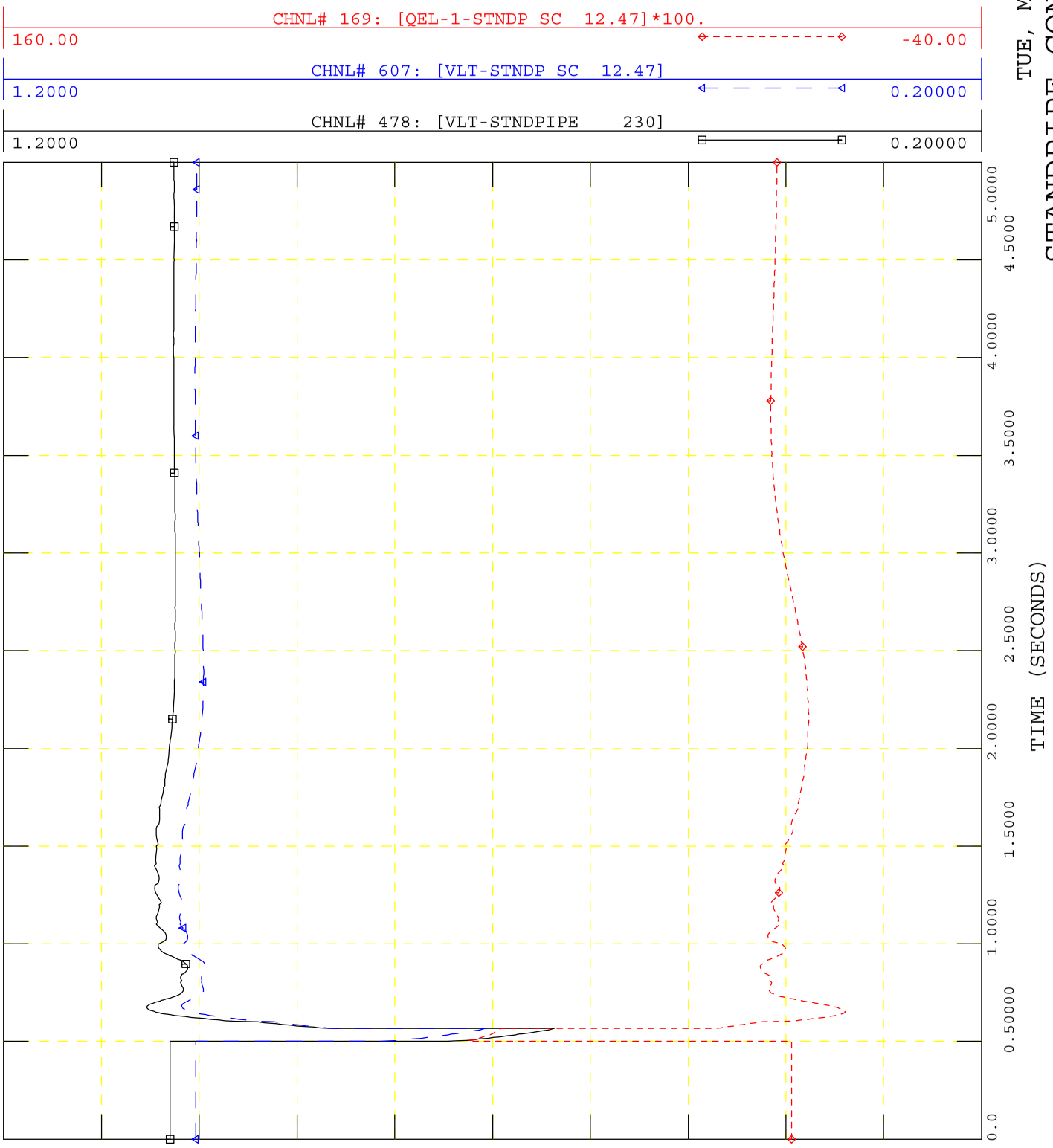
TUE, MAR 27 2018 21:28

STANDPIPE CONDNSR PLT 7



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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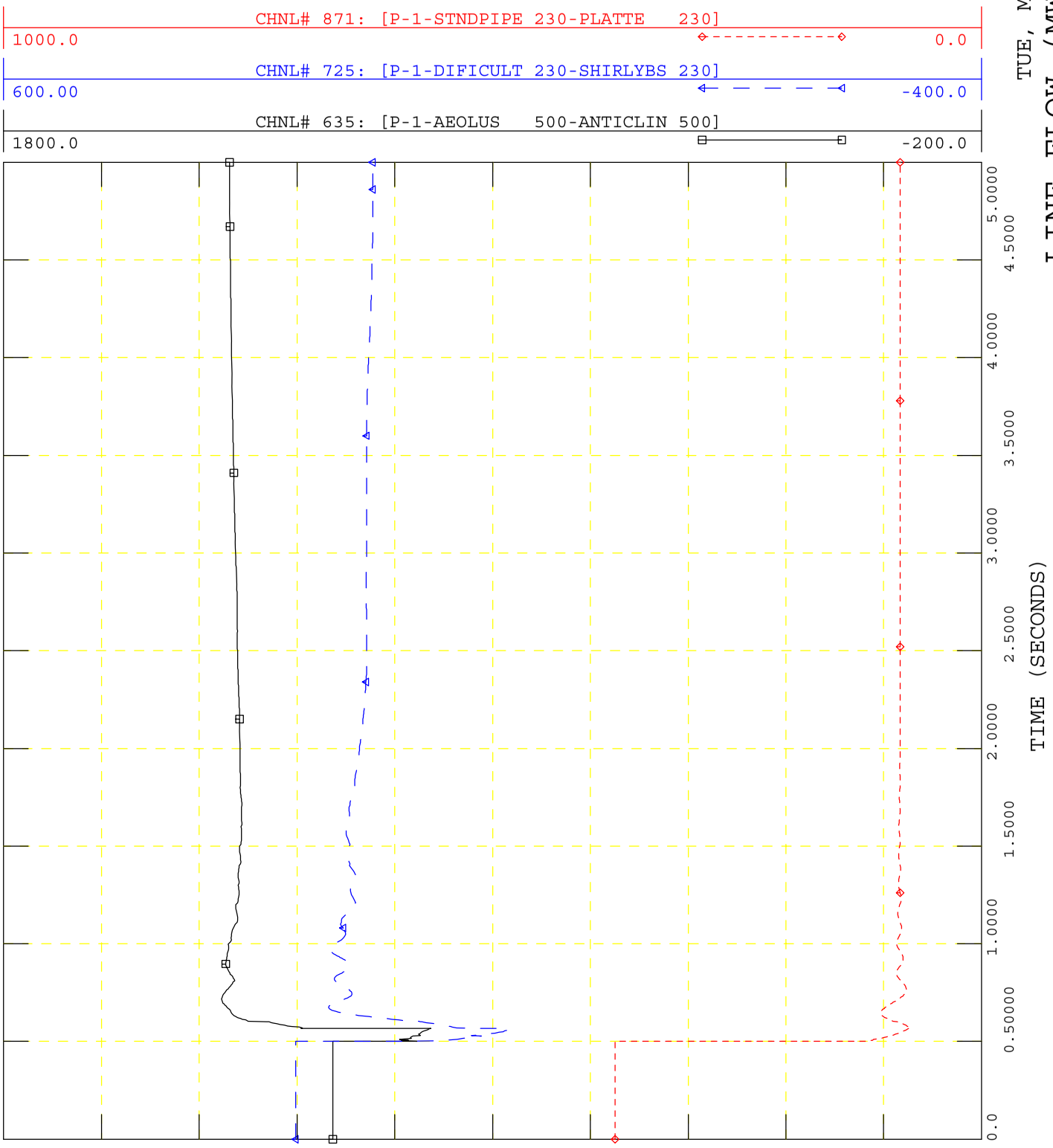
TUE, MAR 27 2018 21:28 PLT 8



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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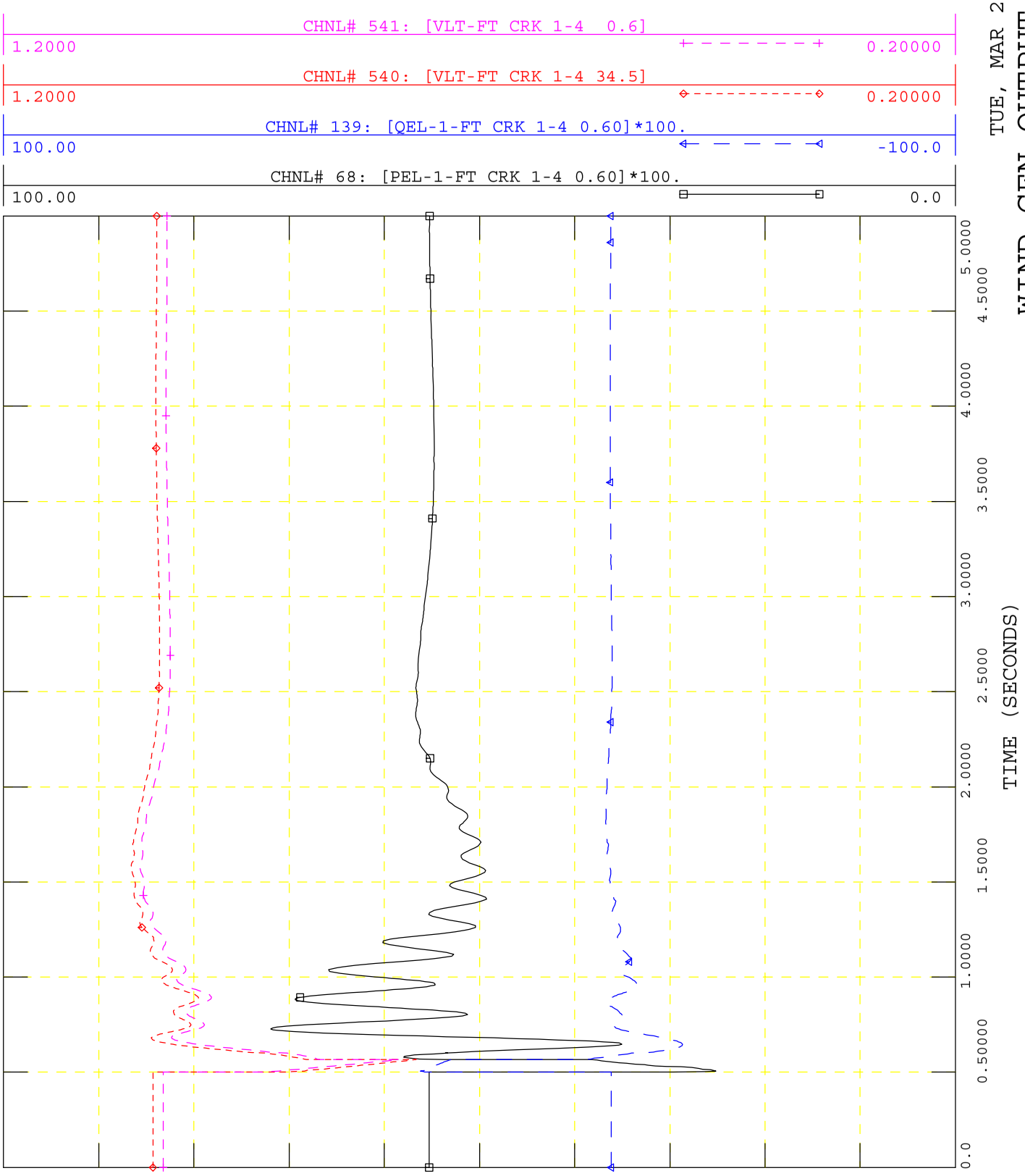
TUE, MAR 27 2018 21:28 PLT 9

WIND GEN OUTPUT



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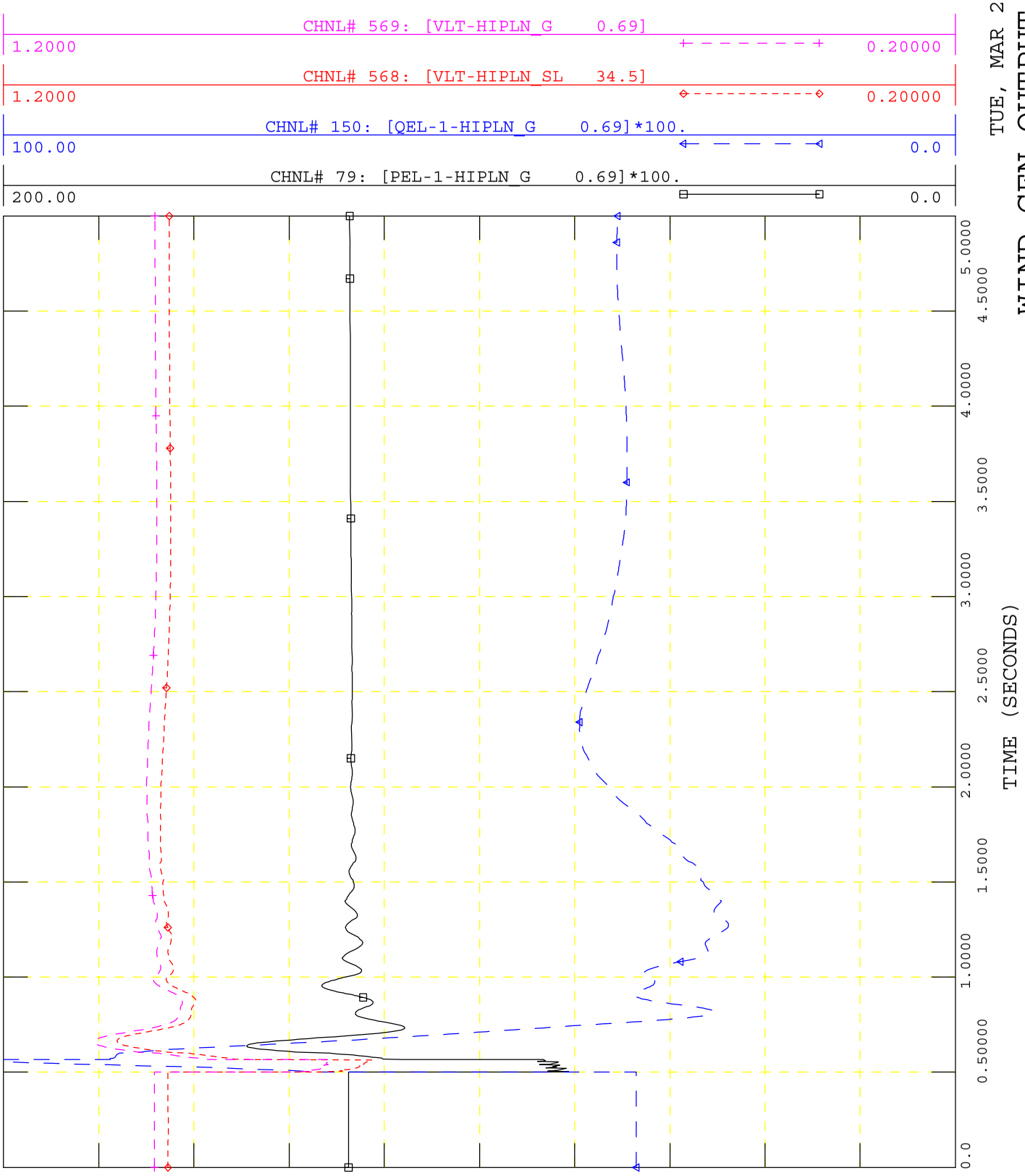
TUE, MAR 27 2018 21:28 PLT 10

WIND GEN OUTPUT



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LATHAM-PLATTE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 4
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TUE, MAR 27 2018 21:28 PLT 11

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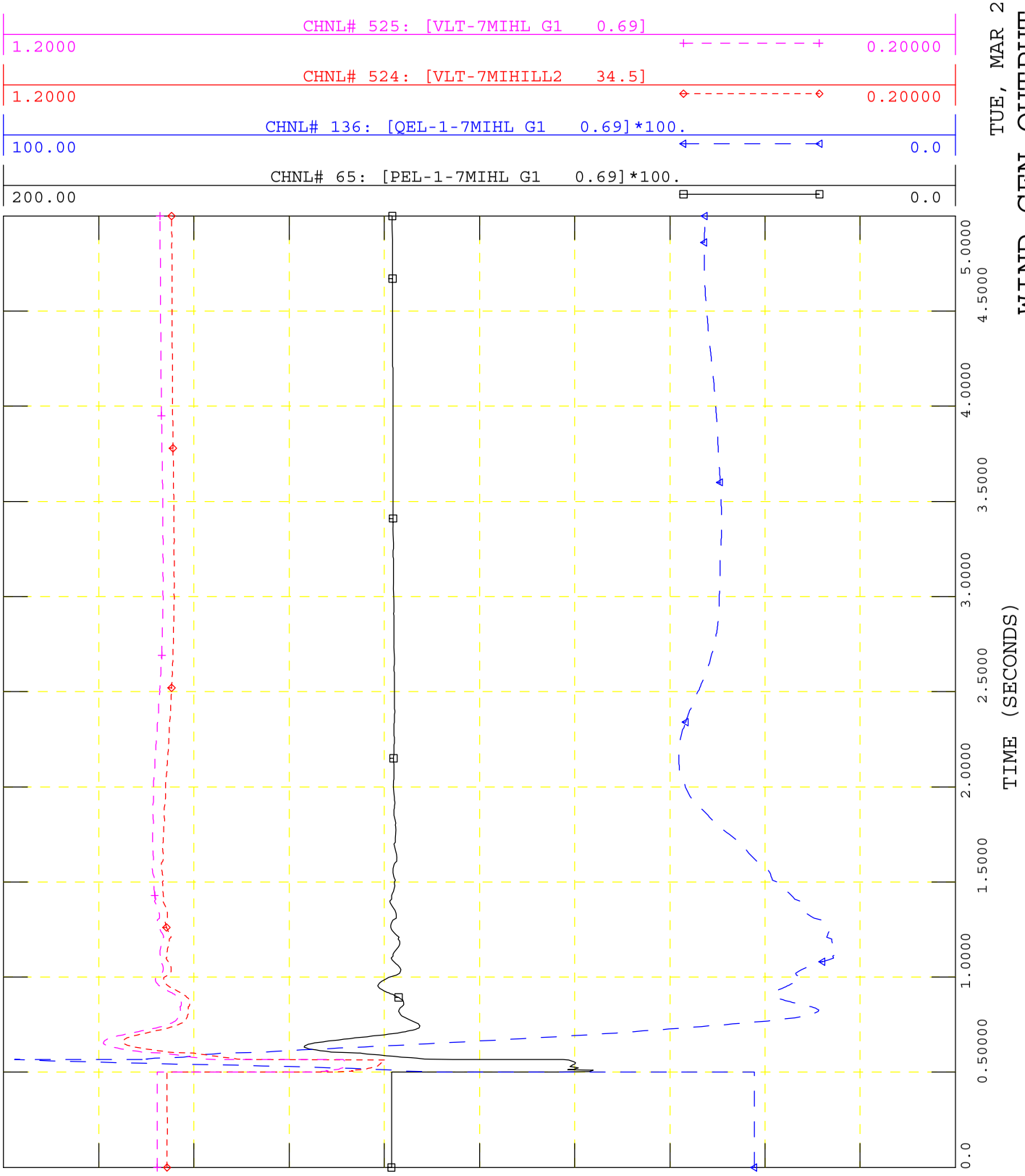

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TUE, MAR 27 2018 21:28 PLT 12

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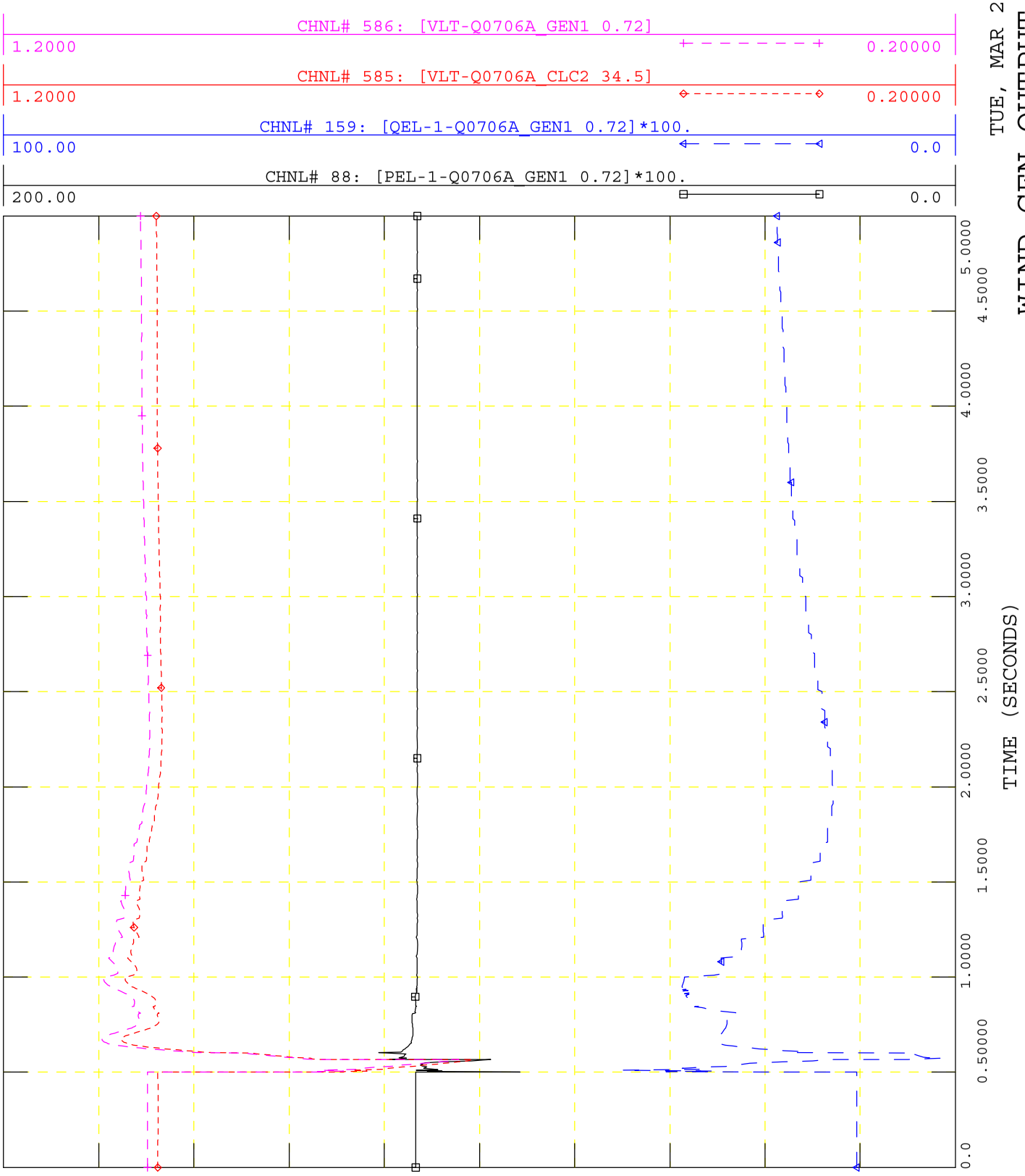

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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TUE, MAR 27 2018 21:28 PLT 13

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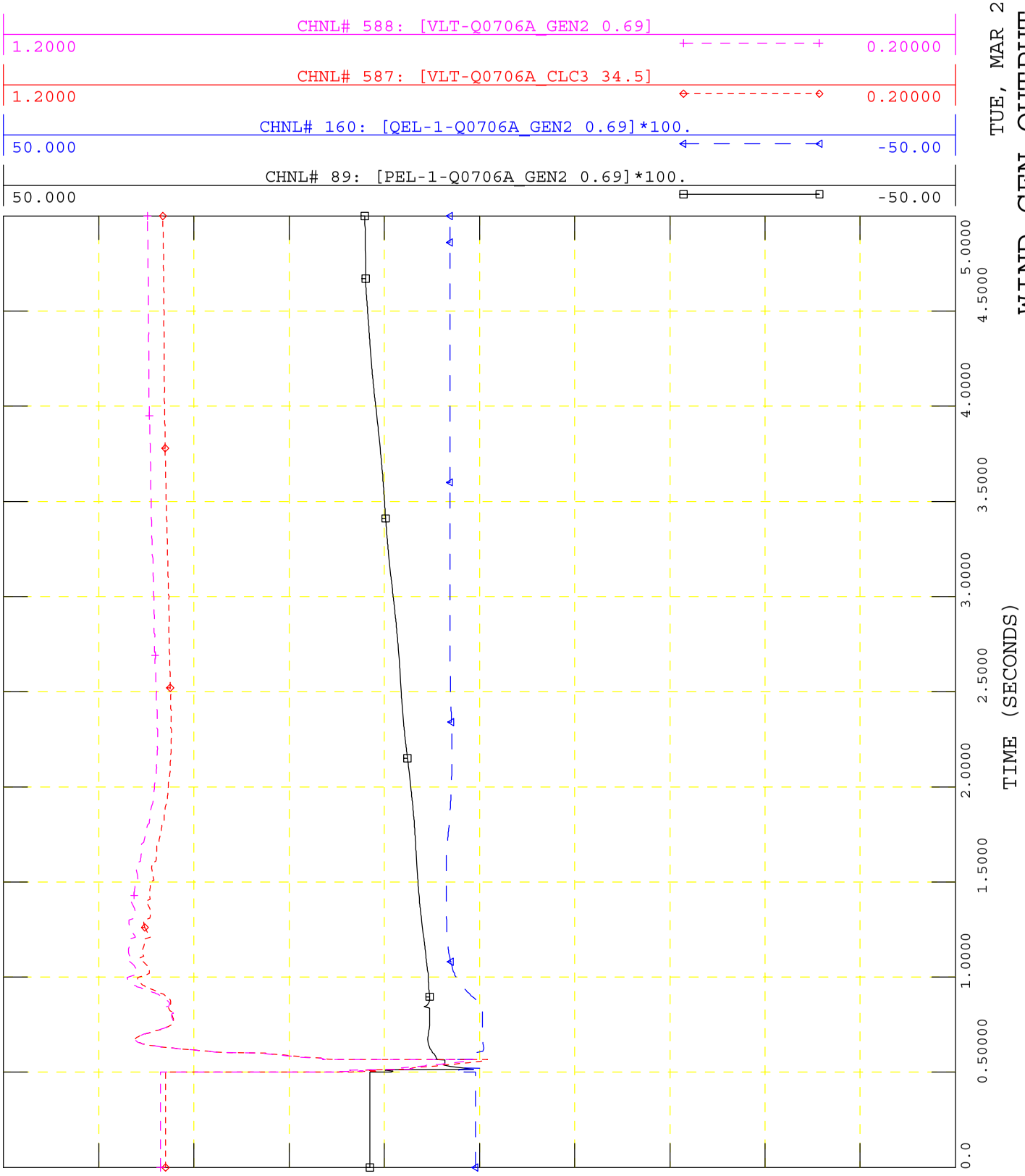

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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TUE, MAR 27 2018 21:28 PLT 14

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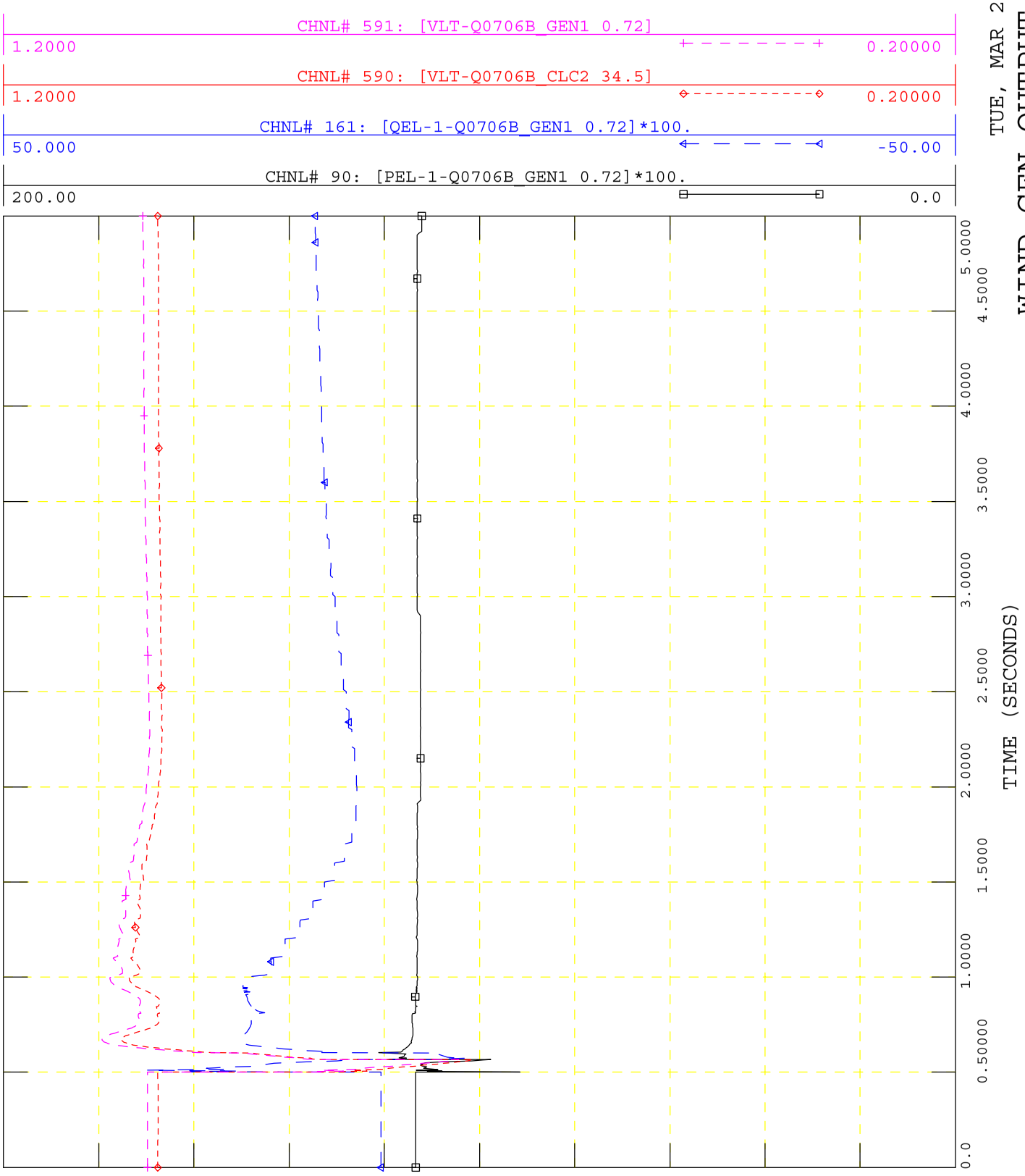

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TUE, MAR 27 2018 21:28 PLT 15

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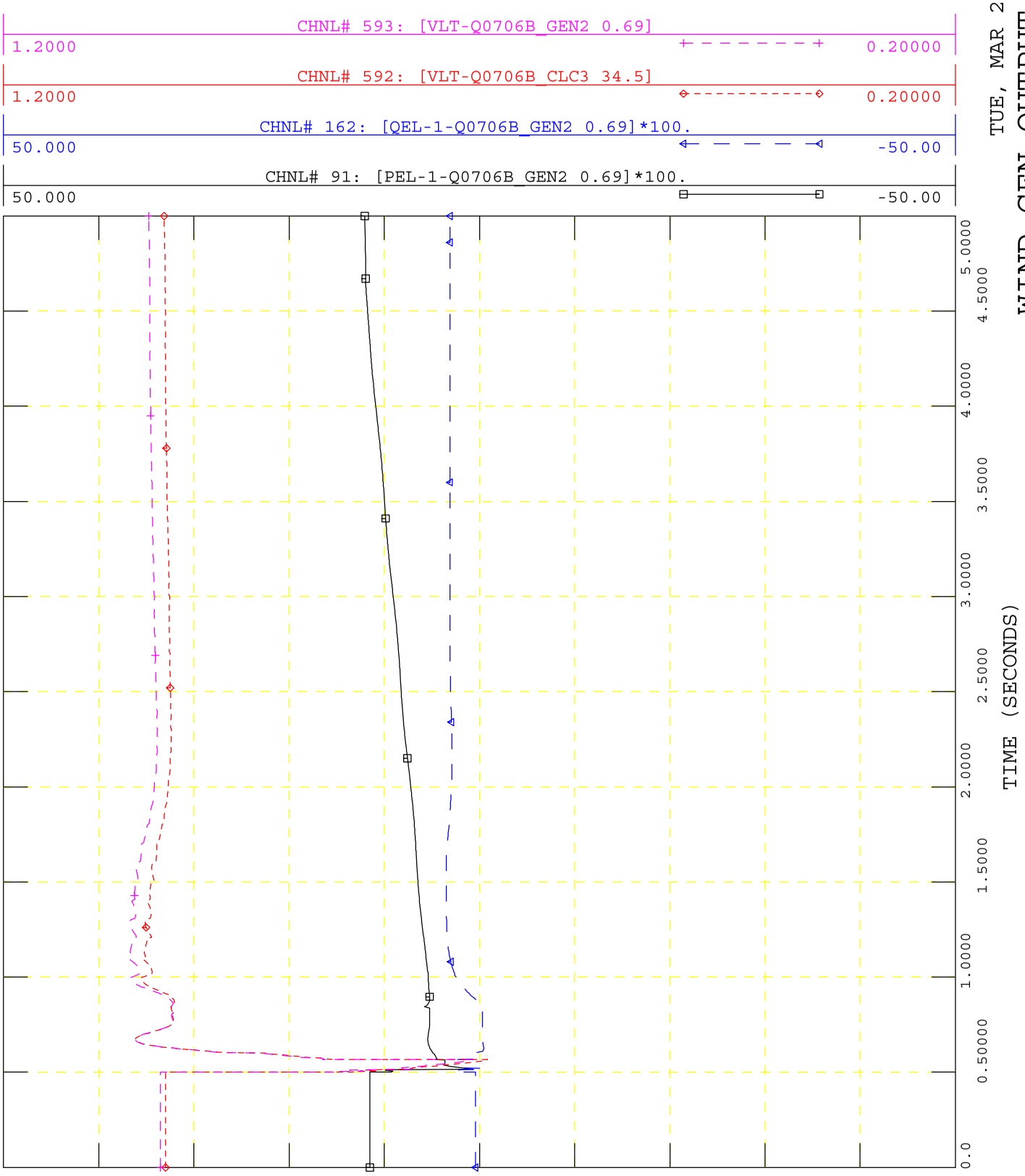

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TUE, MAR 27 2018 21:28 PLT 16

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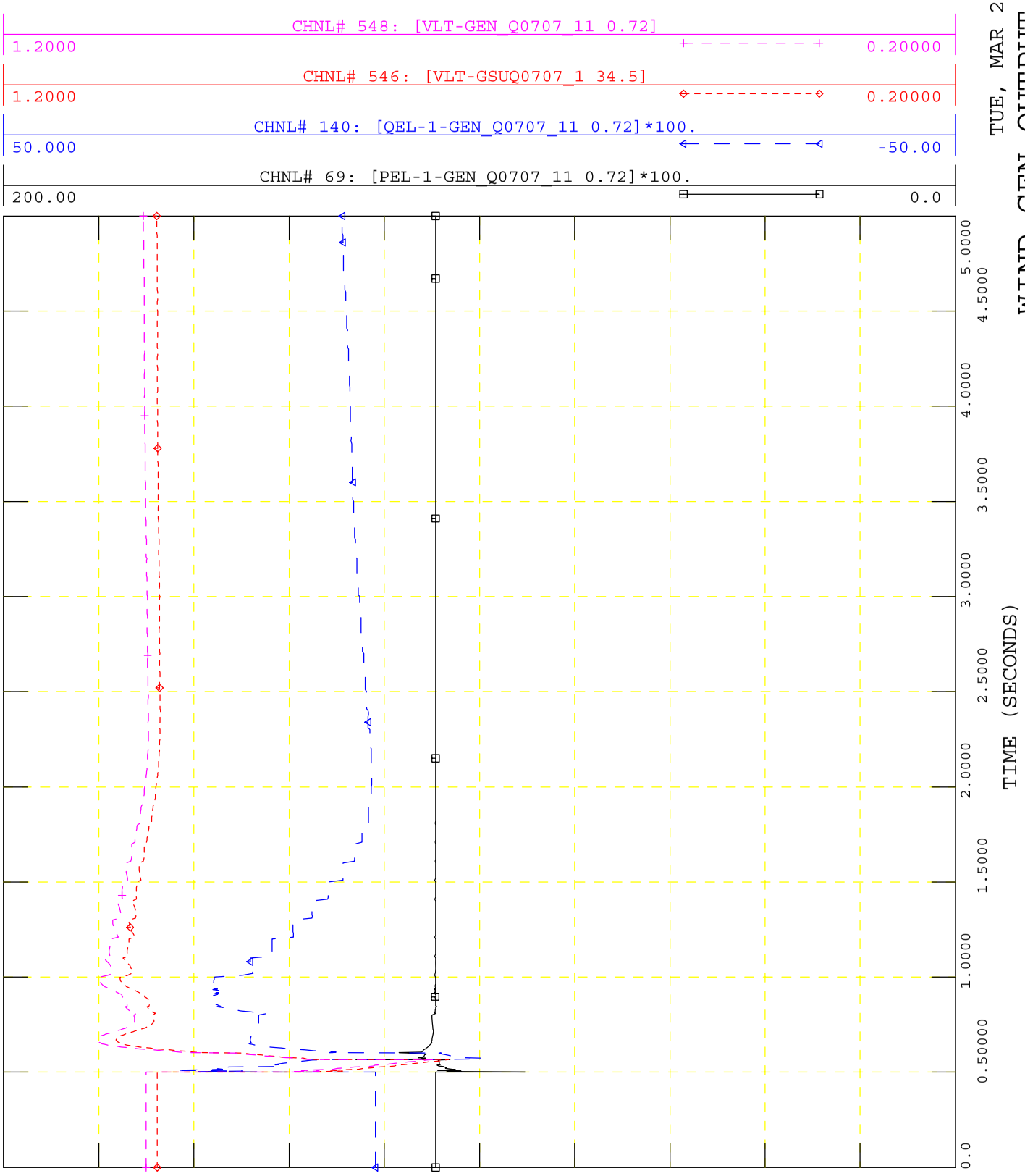

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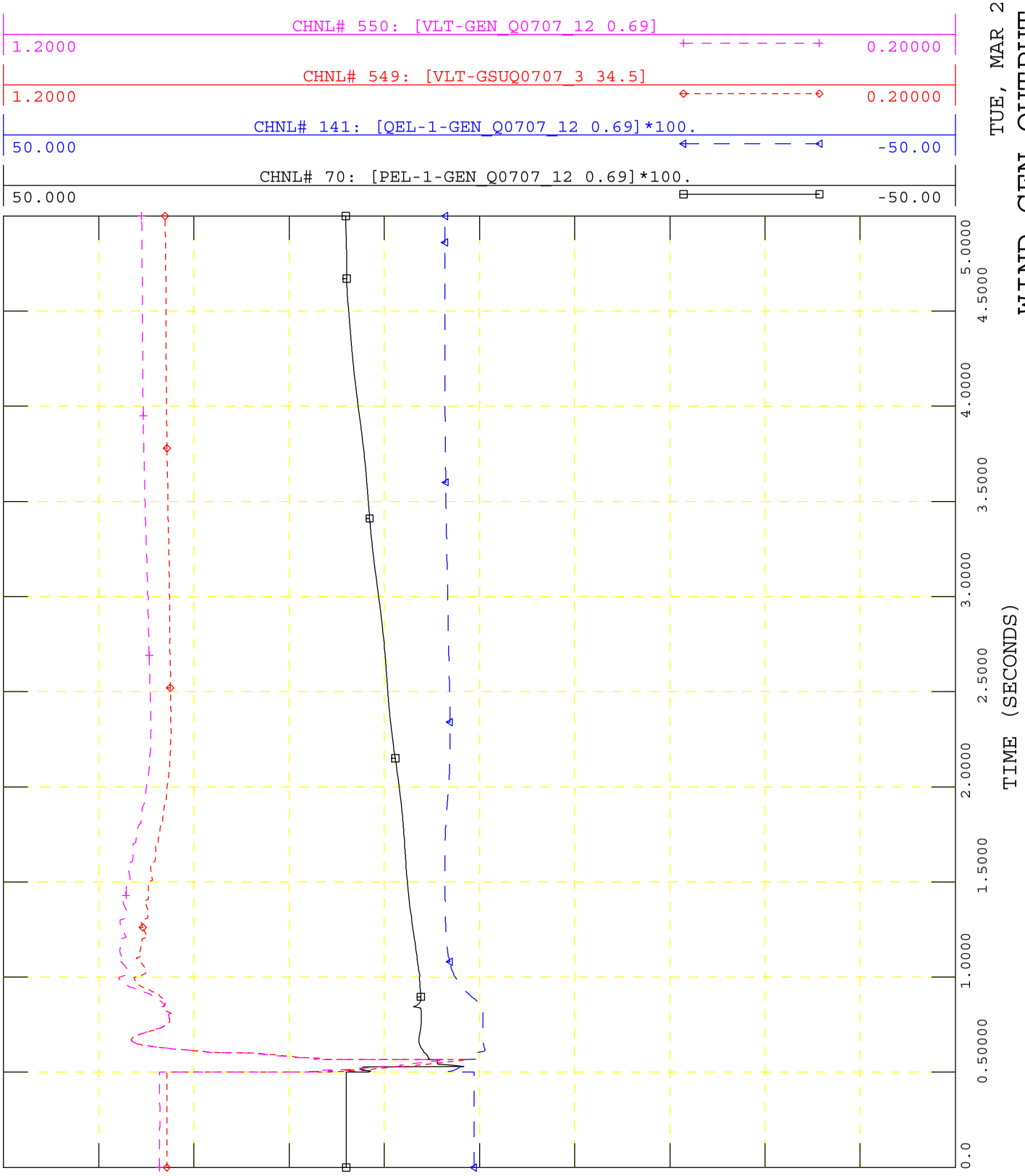
TUE, MAR 27 2018 21:28 PLT 17

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:28 PLT 18

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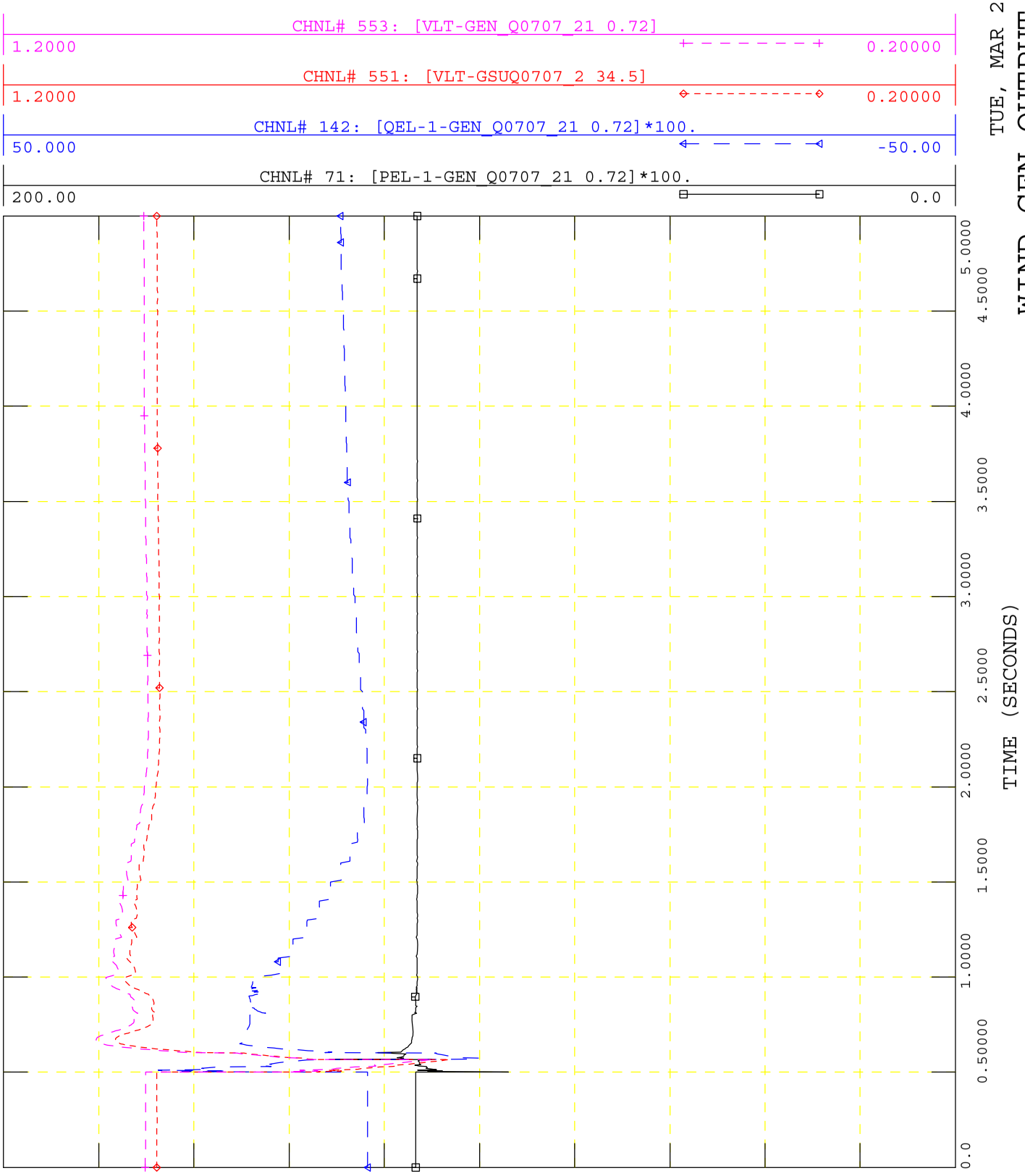

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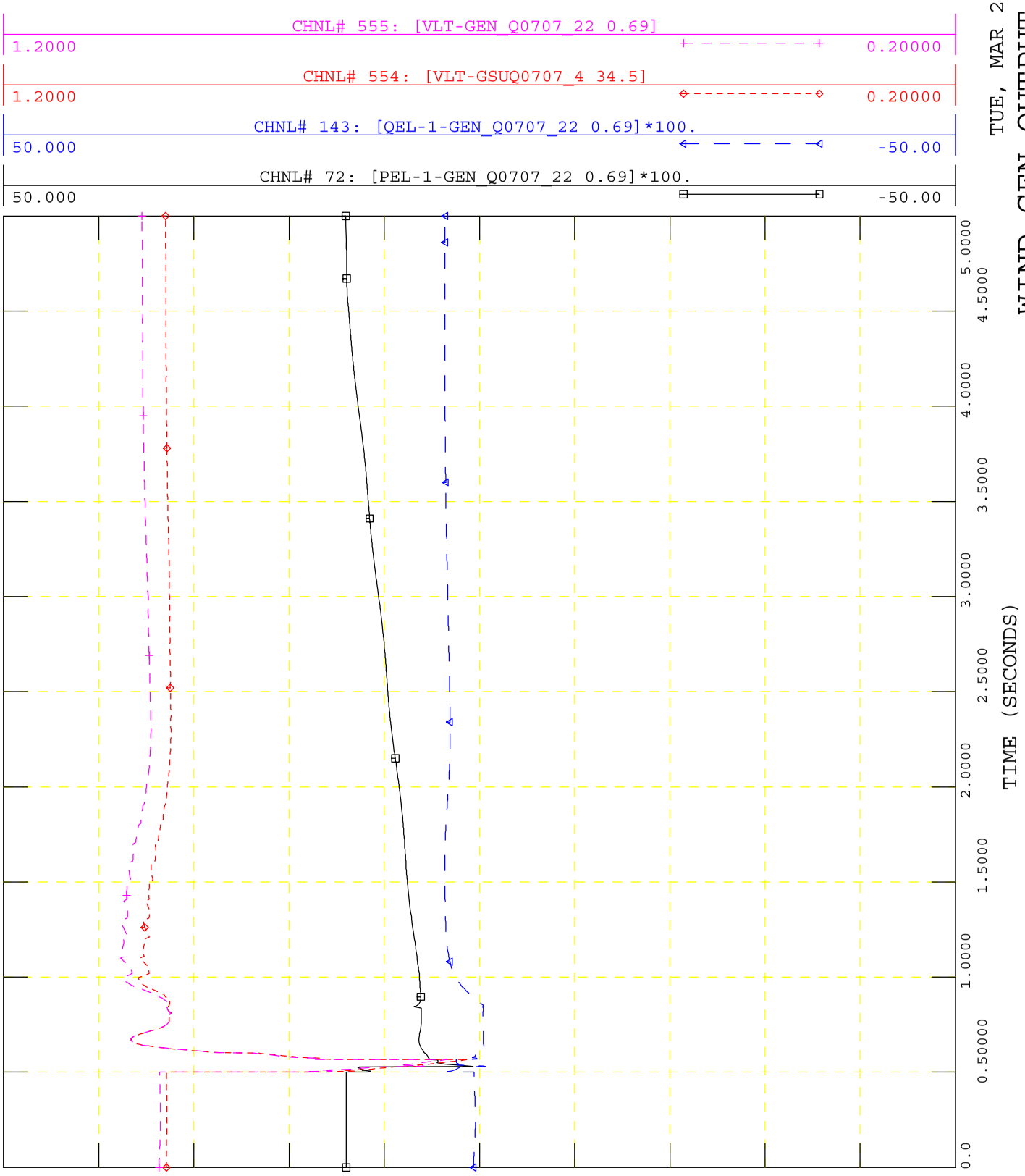
TUE, MAR 27 2018 21:28 PLT 19

WIND GEN OUTPUT



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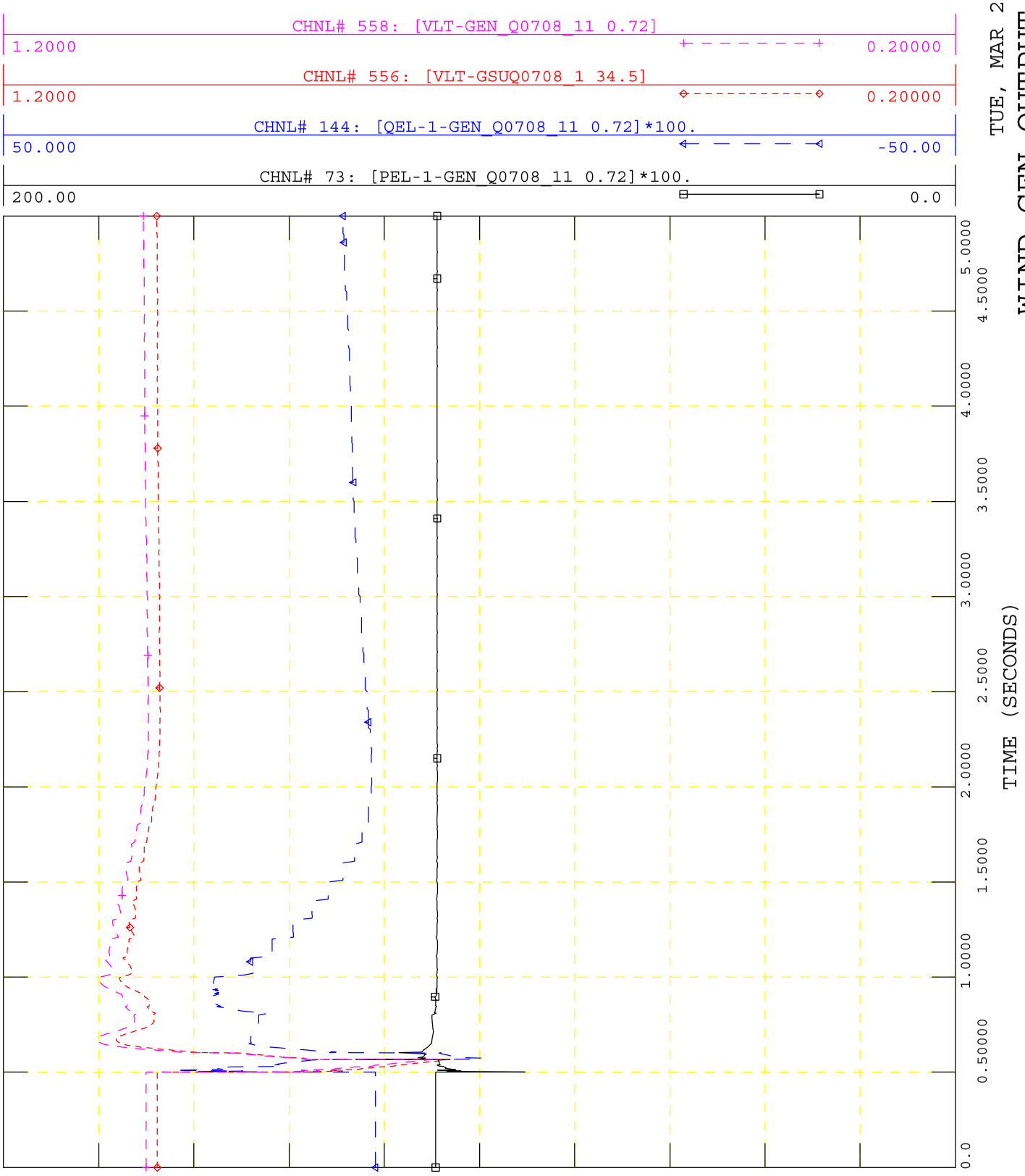
TUE, MAR 27 2018 21:28 PLT 20

WIND GEN OUTPUT



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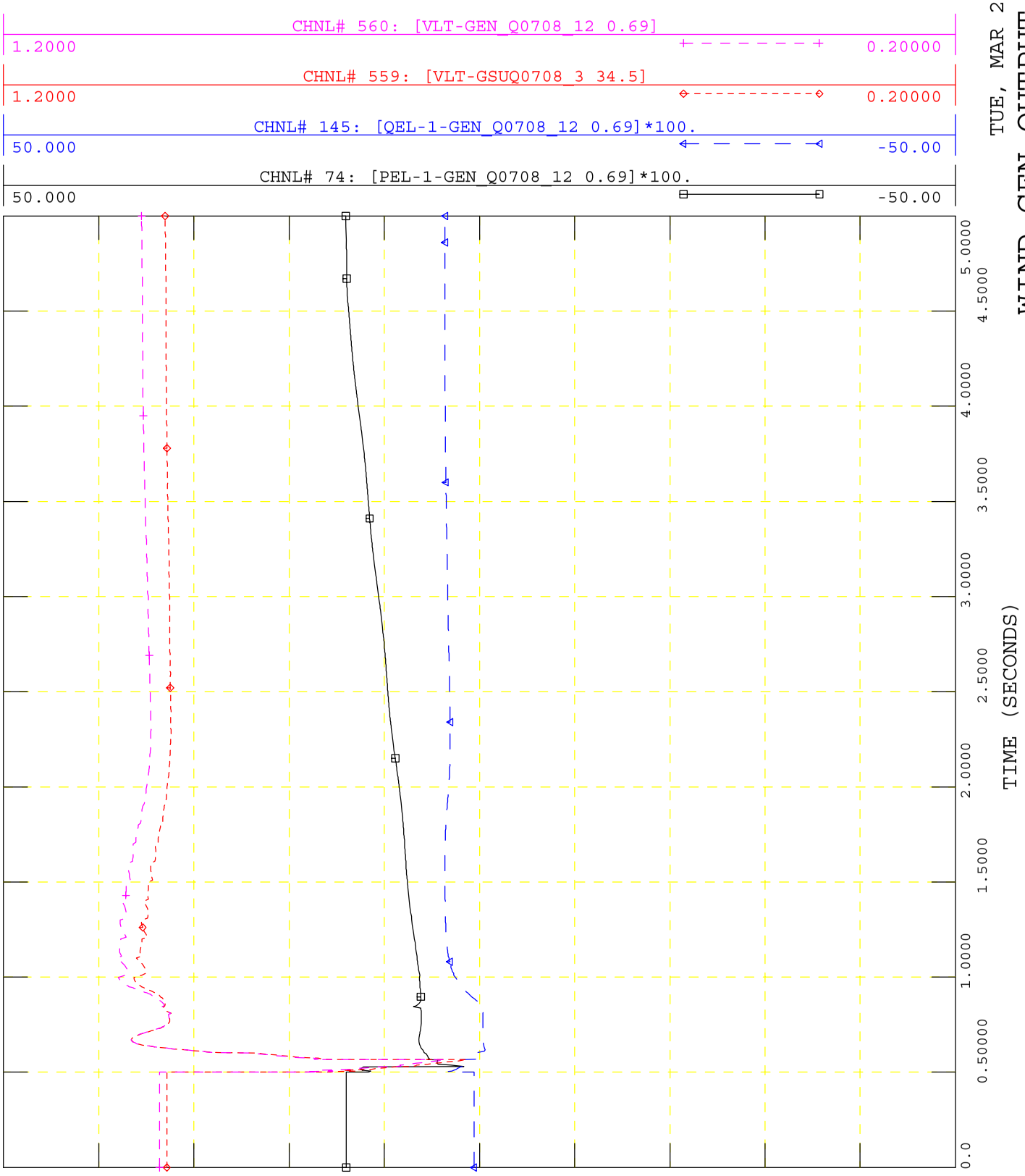
TUE, MAR 27 2018 21:28 PLT 21

WIND GEN OUTPUT



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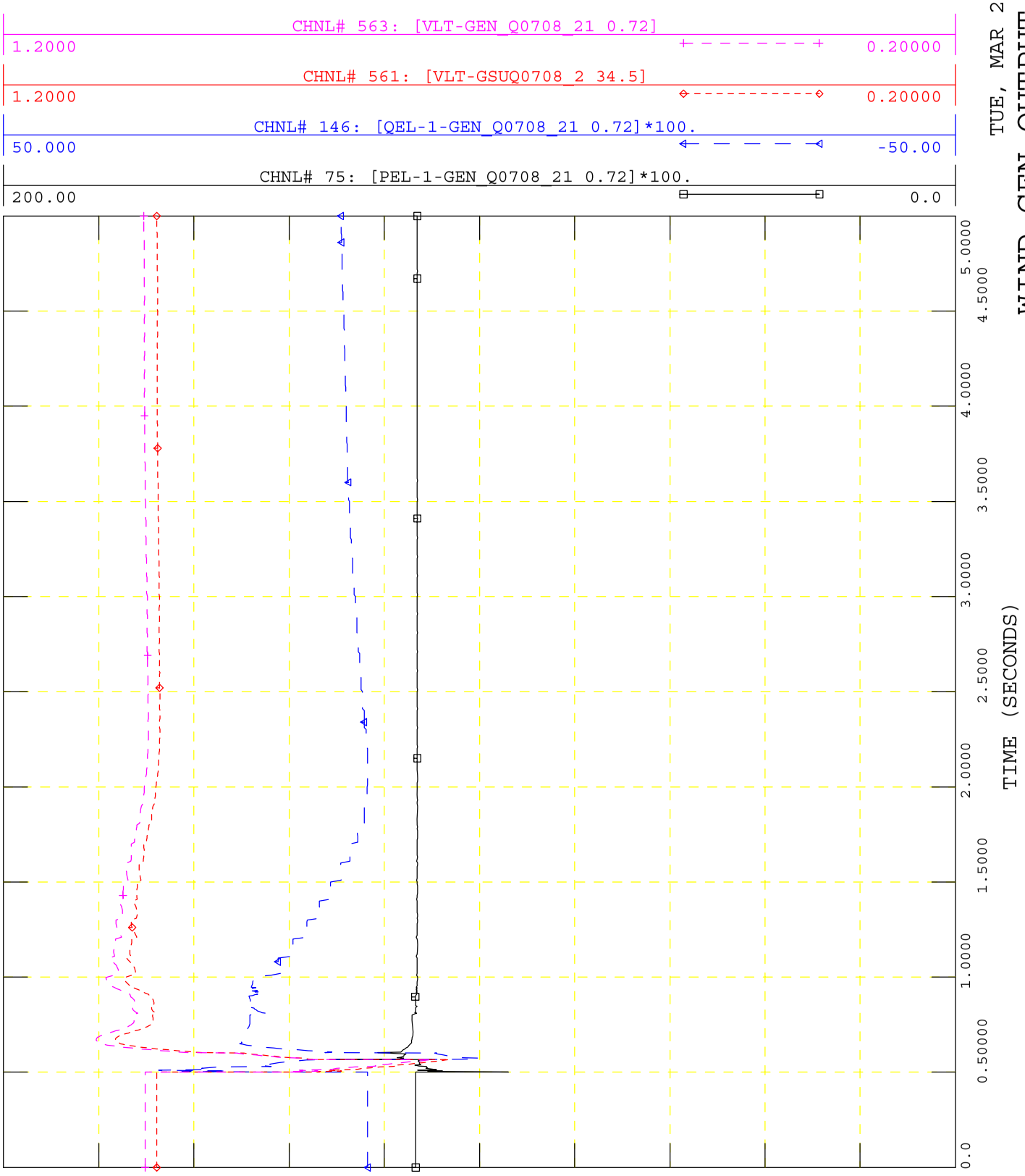
TUE, MAR 27 2018 21:28 PLT 22

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:28 PLT 23

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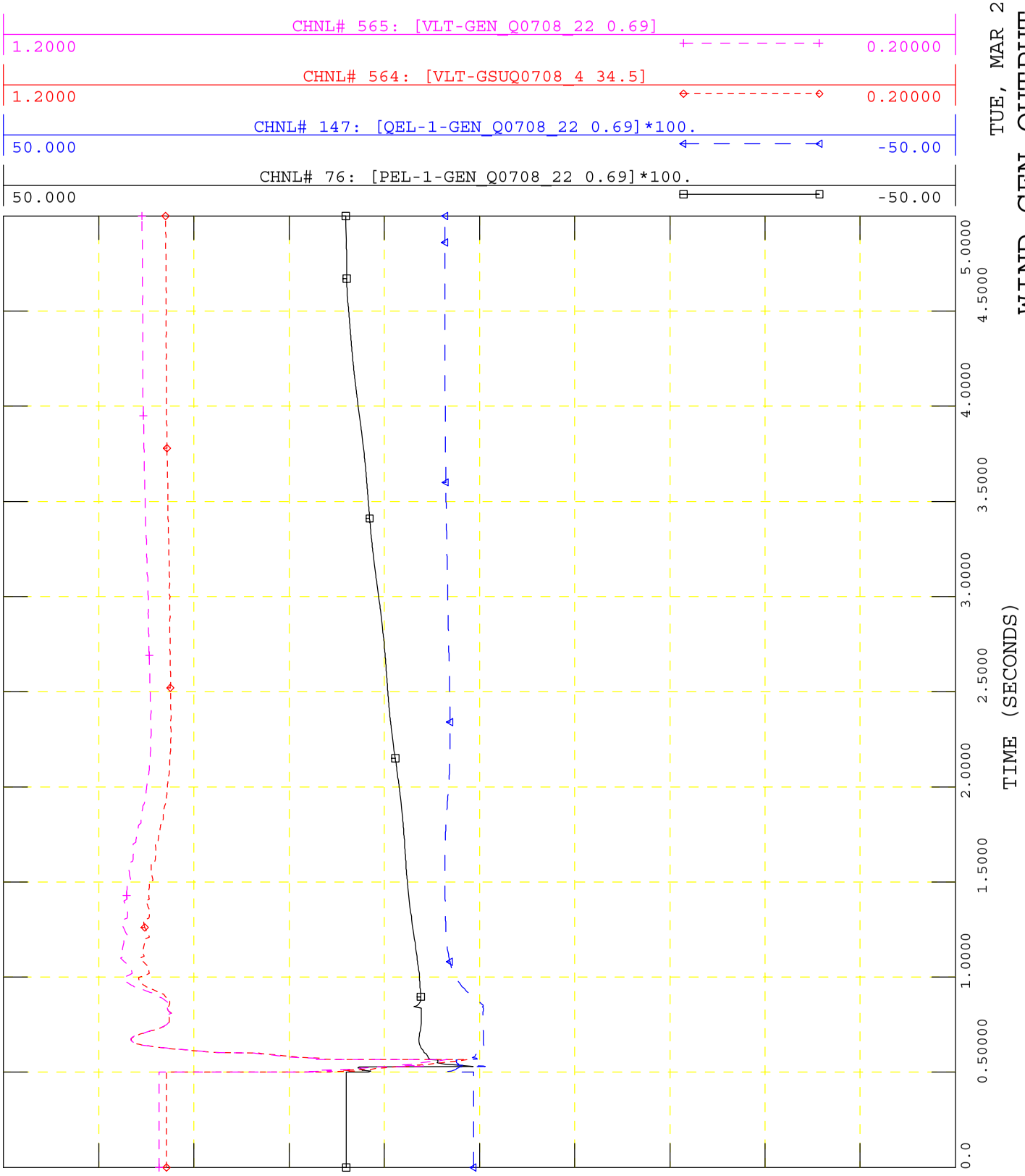

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LATHAM-PLATTE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 4
FILE: c7_svc_mtrld_LATH-PLAT_out4.out

TUE, MAR 27 2018 21:28 PLT 24

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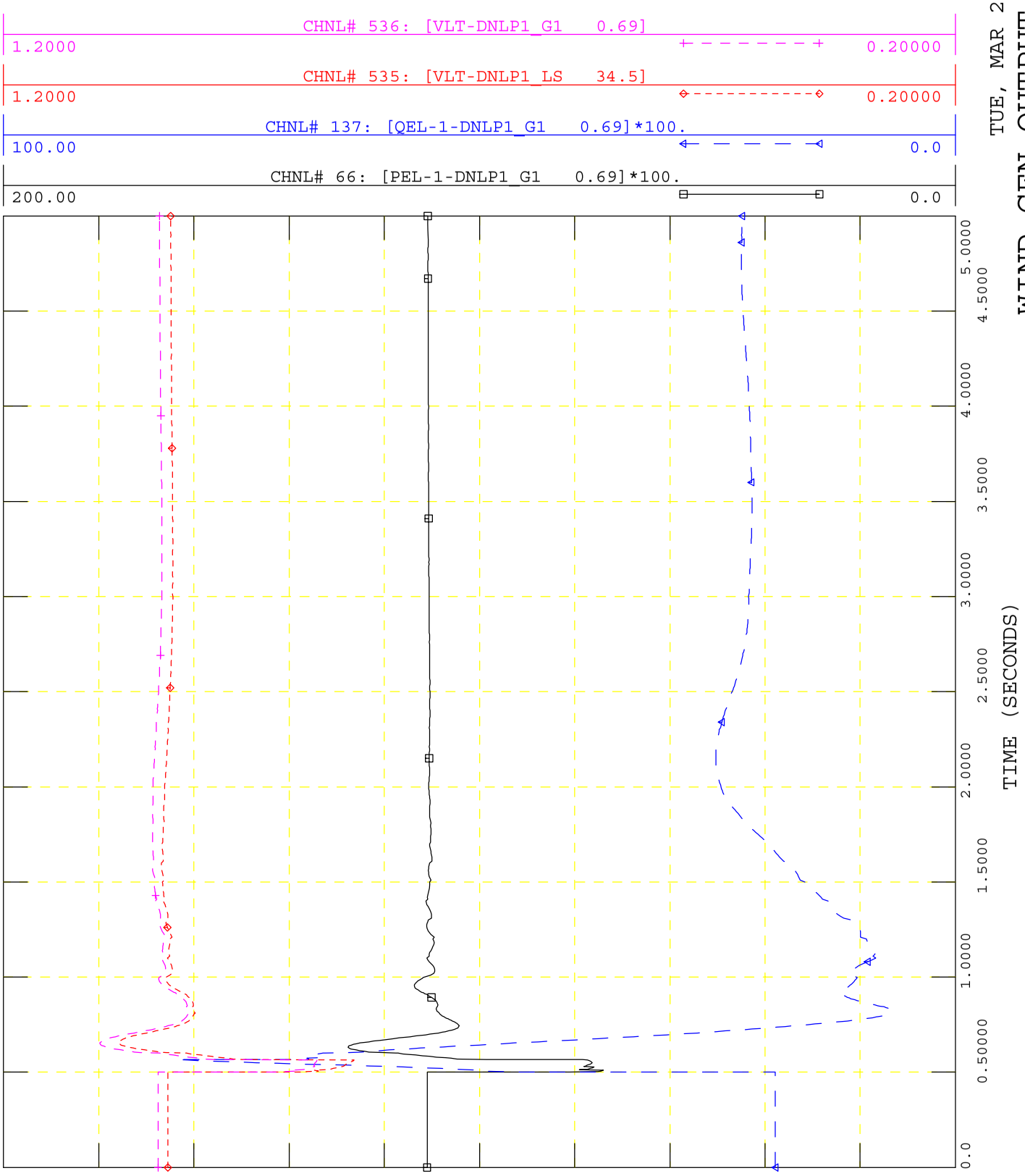

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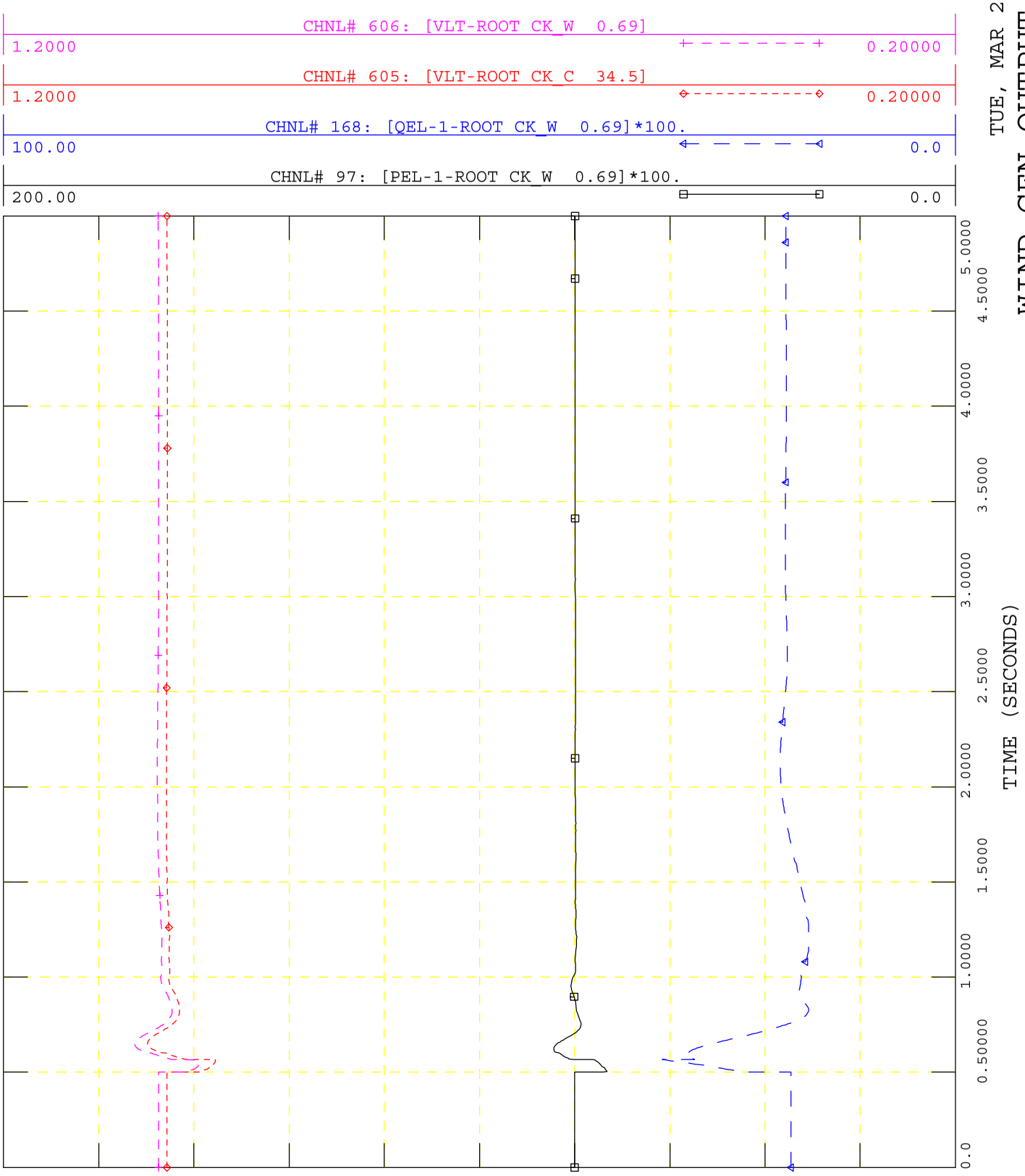
FILE: c7_svc_mtrld_LATH-PLAT_out4.out

TUE, MAR 27 2018 21:28 PLT 25

WIND GEN OUTPUT



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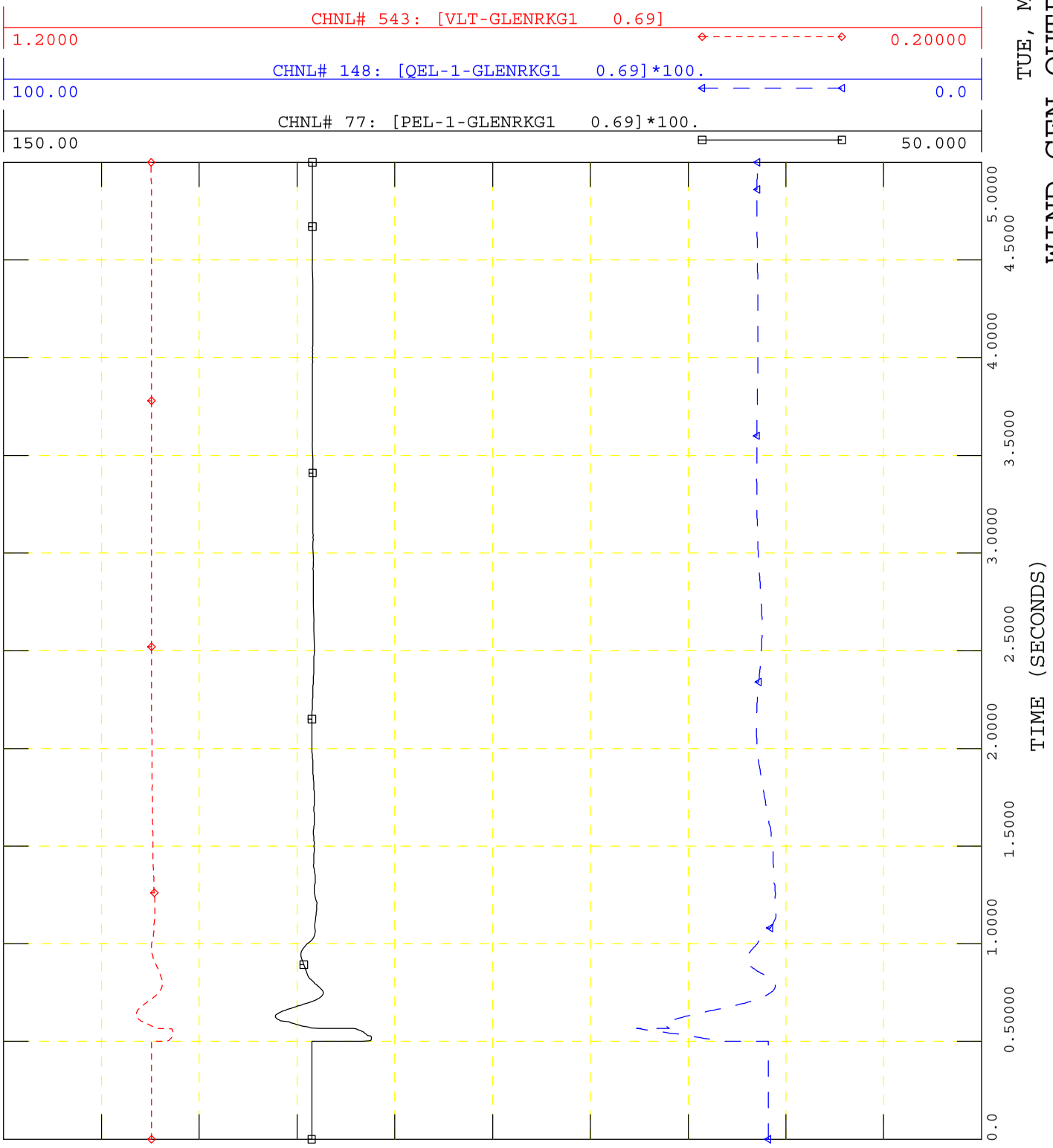
LATHAM-PLATTE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 4
FILE: c7_svc_mtrld_LATH-PLAT_out4.out

TUE, MAR 27 2018 21:28 PLT 26



WIND GEN OUTPUT

Dynamic Simulation

Case 5 – Loss of Standpipe-Platte 230 kV line

30 cycles	**3 phase Standpipe 230 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Standpipe-Platte 230 kV line**
36 cycles	**Remove SVC MVAR limiter**
5 sec.	**Terminate simulation**

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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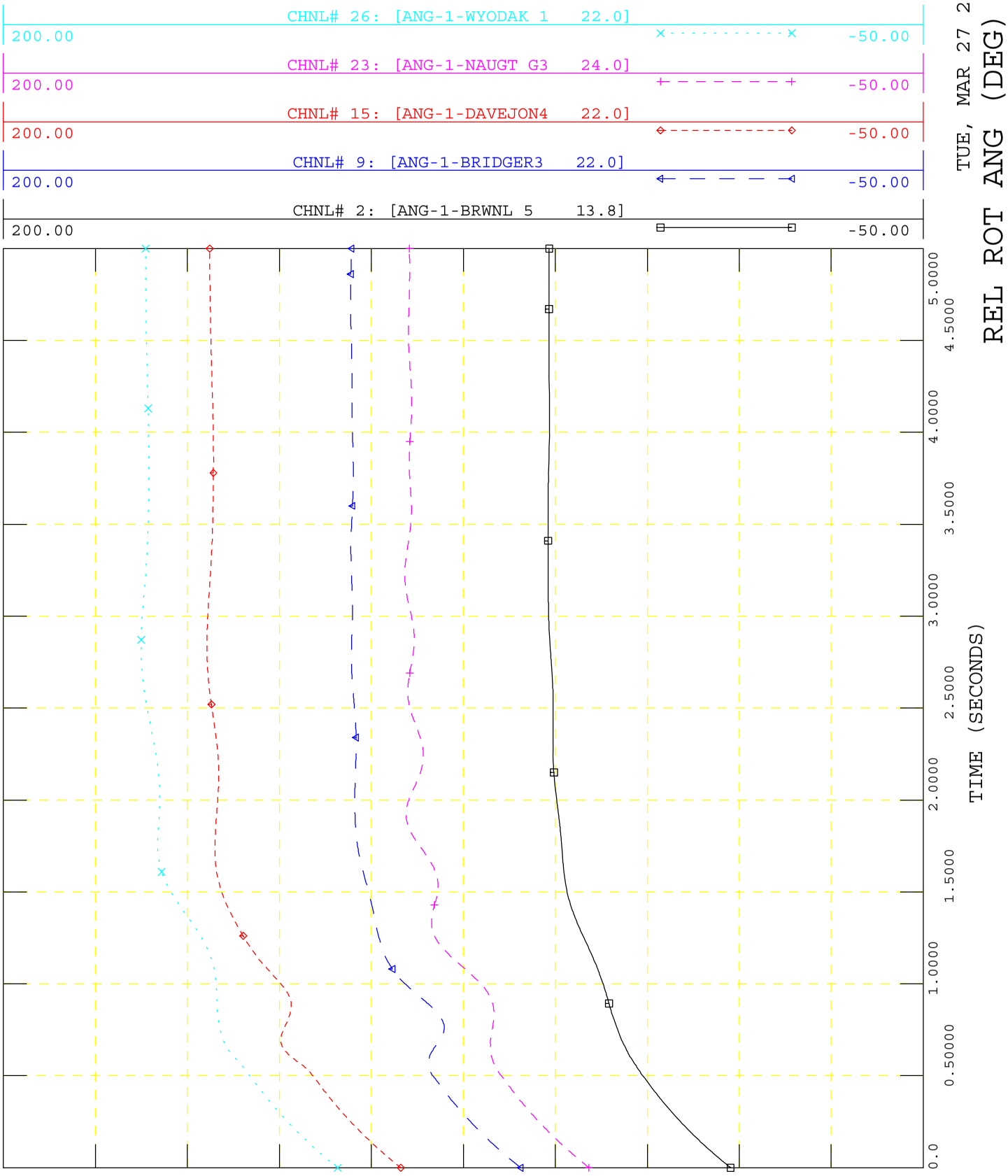
30CY-3PHS STANDPIPE 230 KV FLT. 34CY-CLR FLT & OPEN
STANDPIPE-PLATTE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 5
FILE: c7_svc_mtrld_STND-PLAT_out5.out



TUE, MAR 27 2018 21:28
REL ROT ANG (DEG) PLT 1

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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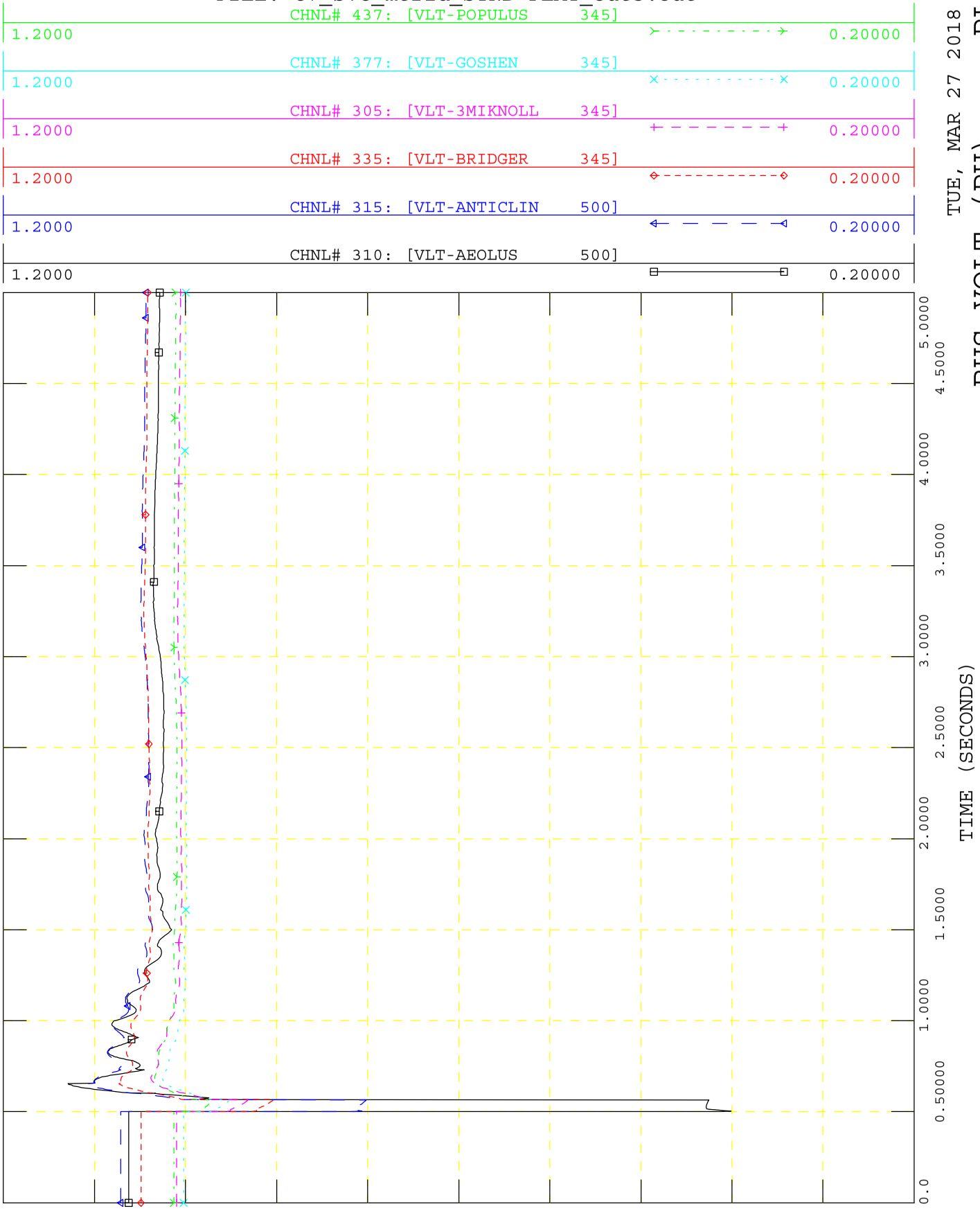
STANDPIPE-PLATTE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 5
FILE: c7_svc_mtrld_STND-PLAT_out5.out

TUE, MAR 27 2018 21:28 PLT 2



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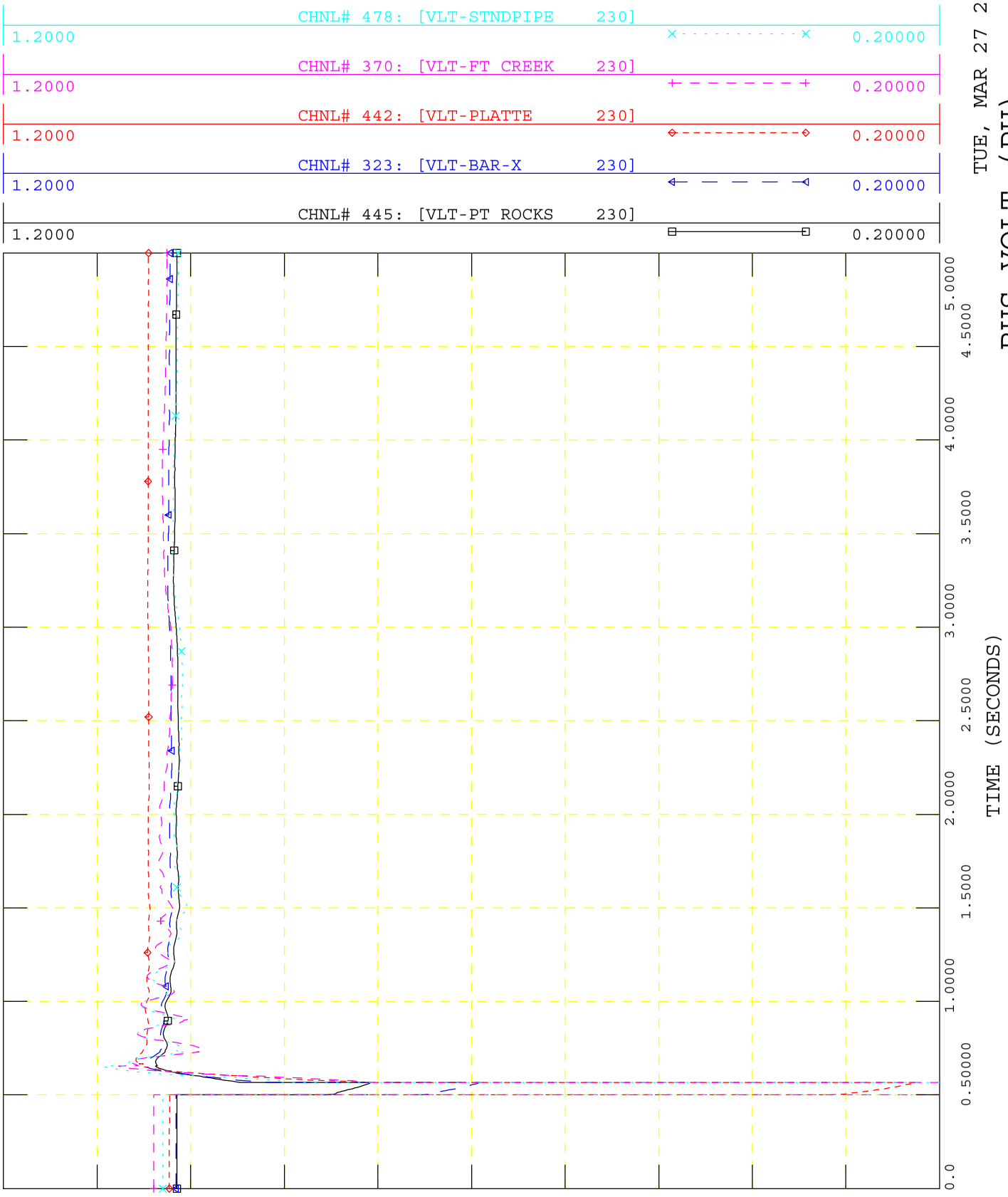
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS STANDPIPE 230 KV FLT. 34CY-CLR FLT & OPEN
STANDPIPE-PLATTE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 5
FILE: c7_svc_mtrld_STND-PLAT_out5.out

TUE, MAR 27 2018 21:28 PLT 3



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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STANDPIPE-PLATTE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 5
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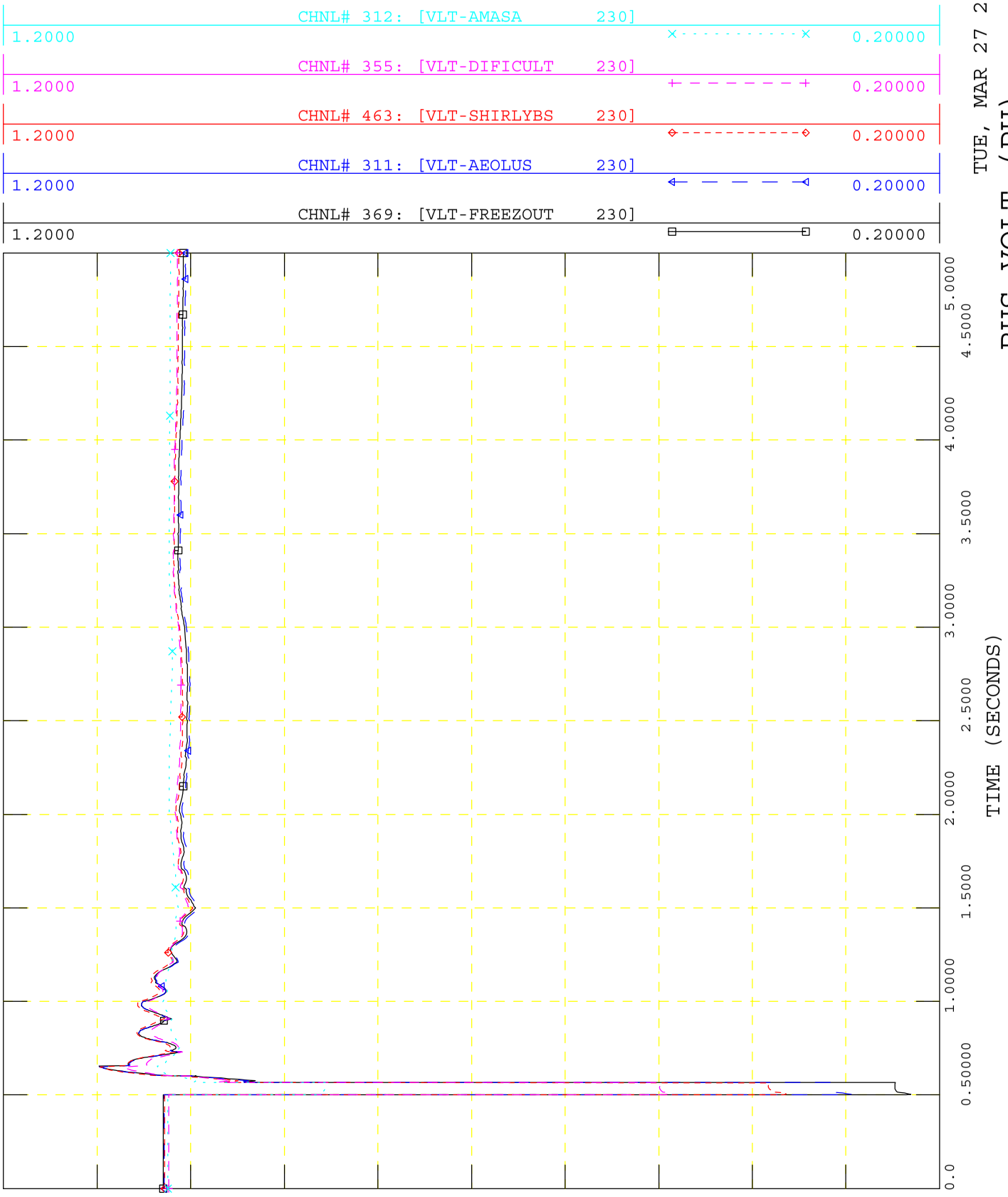
TUE, MAR 27 2018 21:28 PLT 4



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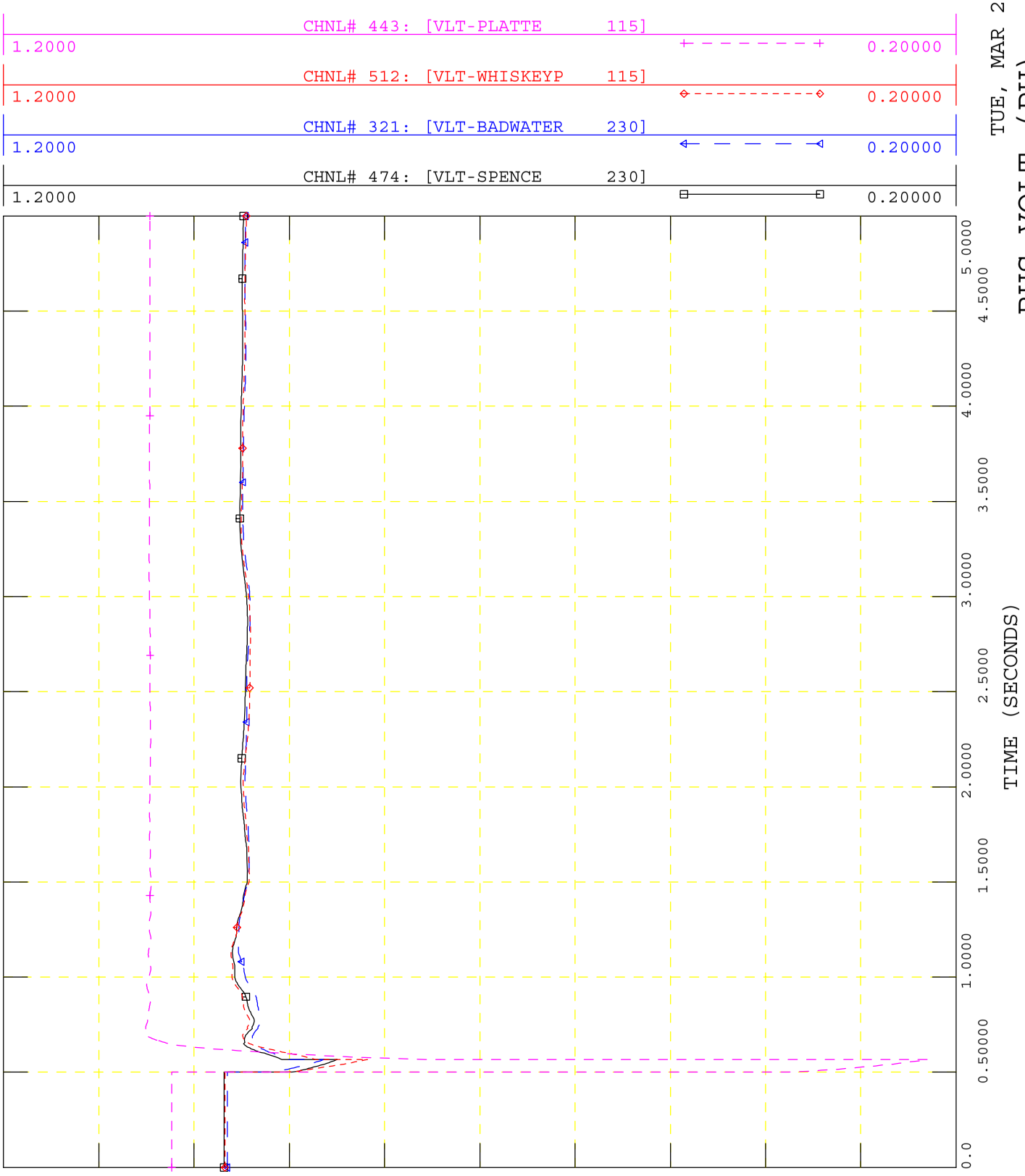
TUE, MAR 27 2018 21:28 PLT 5



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STANDPIPE-PLATTE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 5
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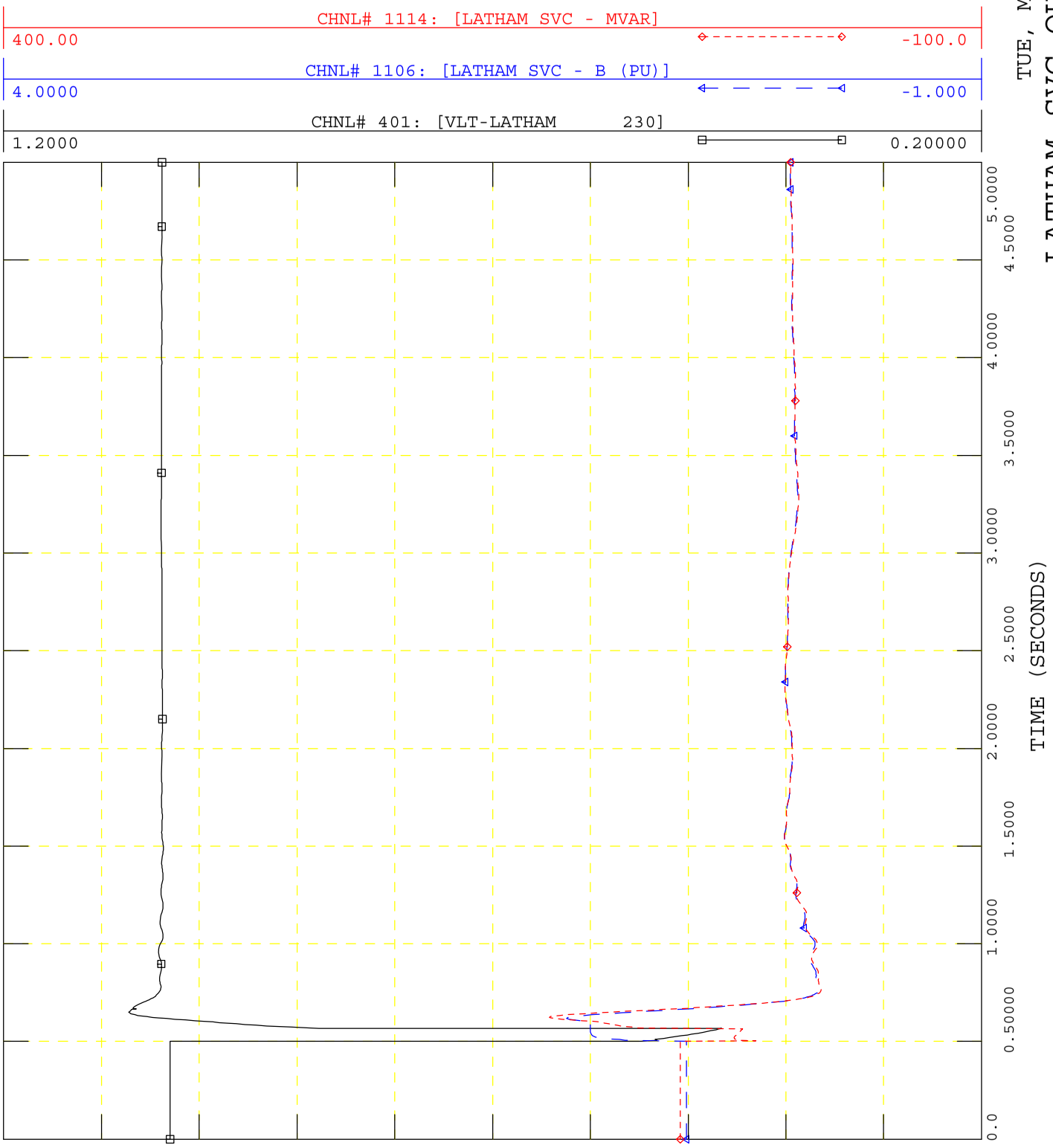
TUE, MAR 27 2018 21:28 PLT 6

LATHAM SVC OUT



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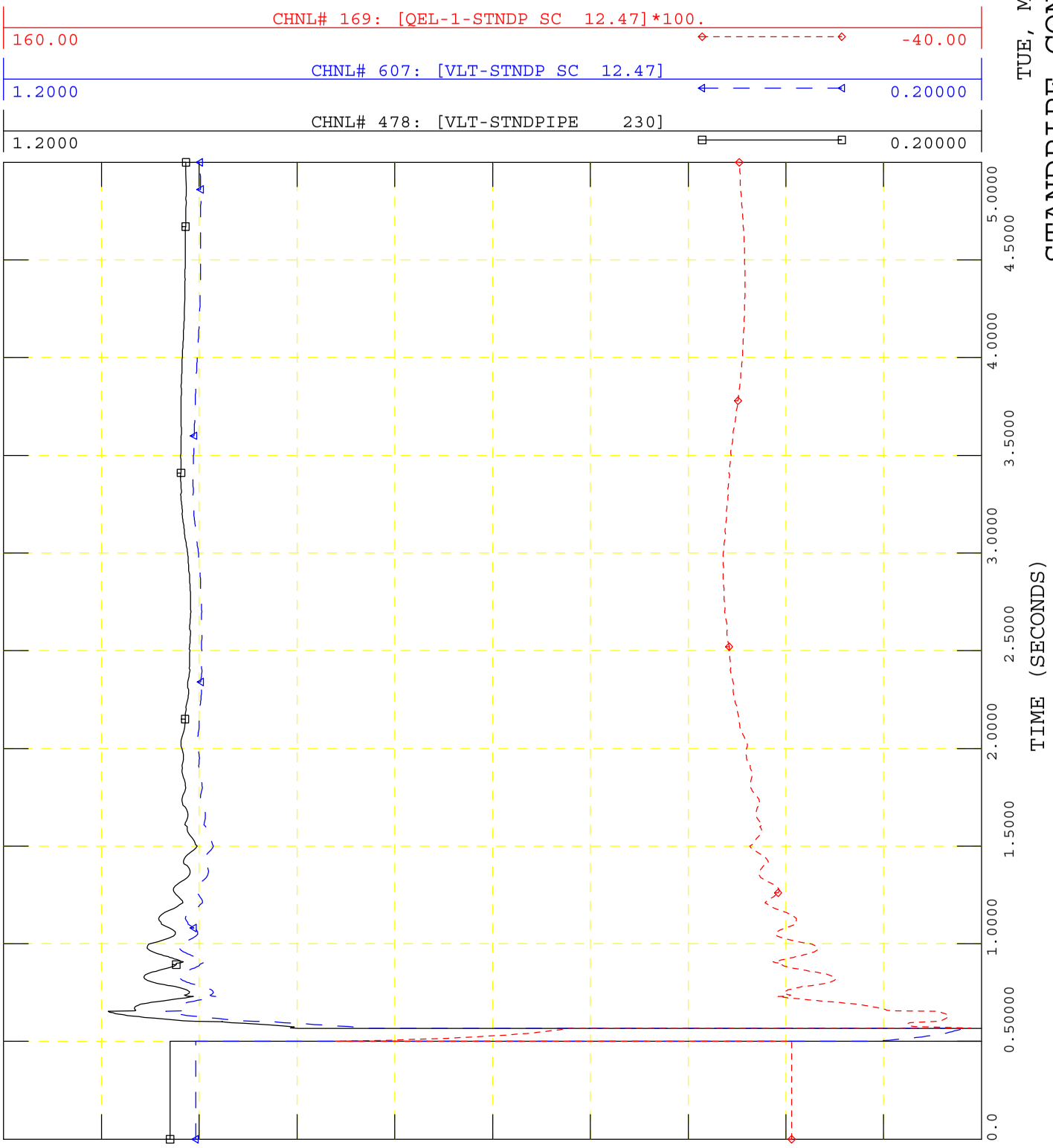
TUE, MAR 27 2018 21:28

STANDPIPE CONDNSR PLT 7



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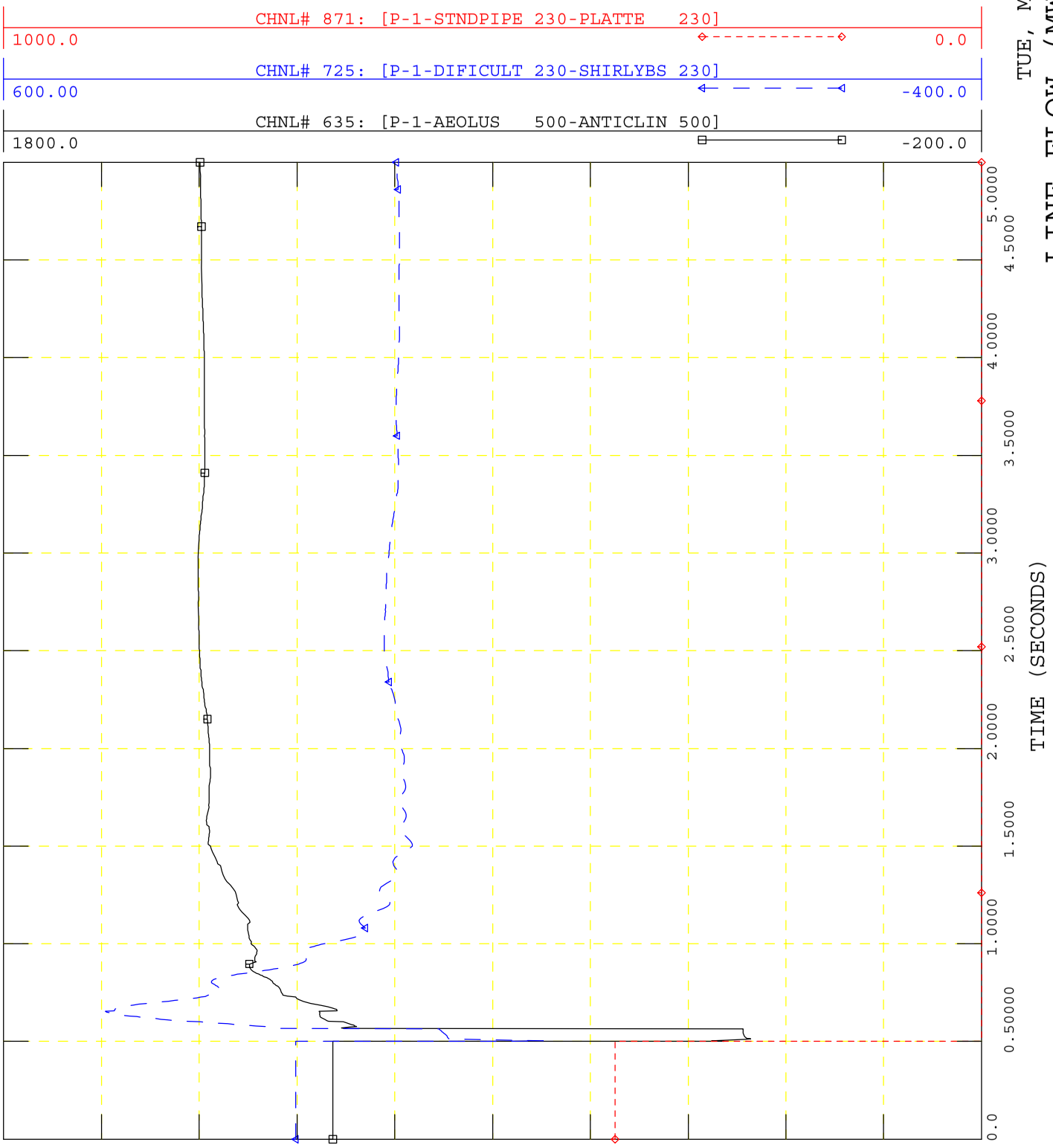
TUE, MAR 27 2018 21:28 PLT 8



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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TUE, MAR 27 2018 21:28 PLT 9

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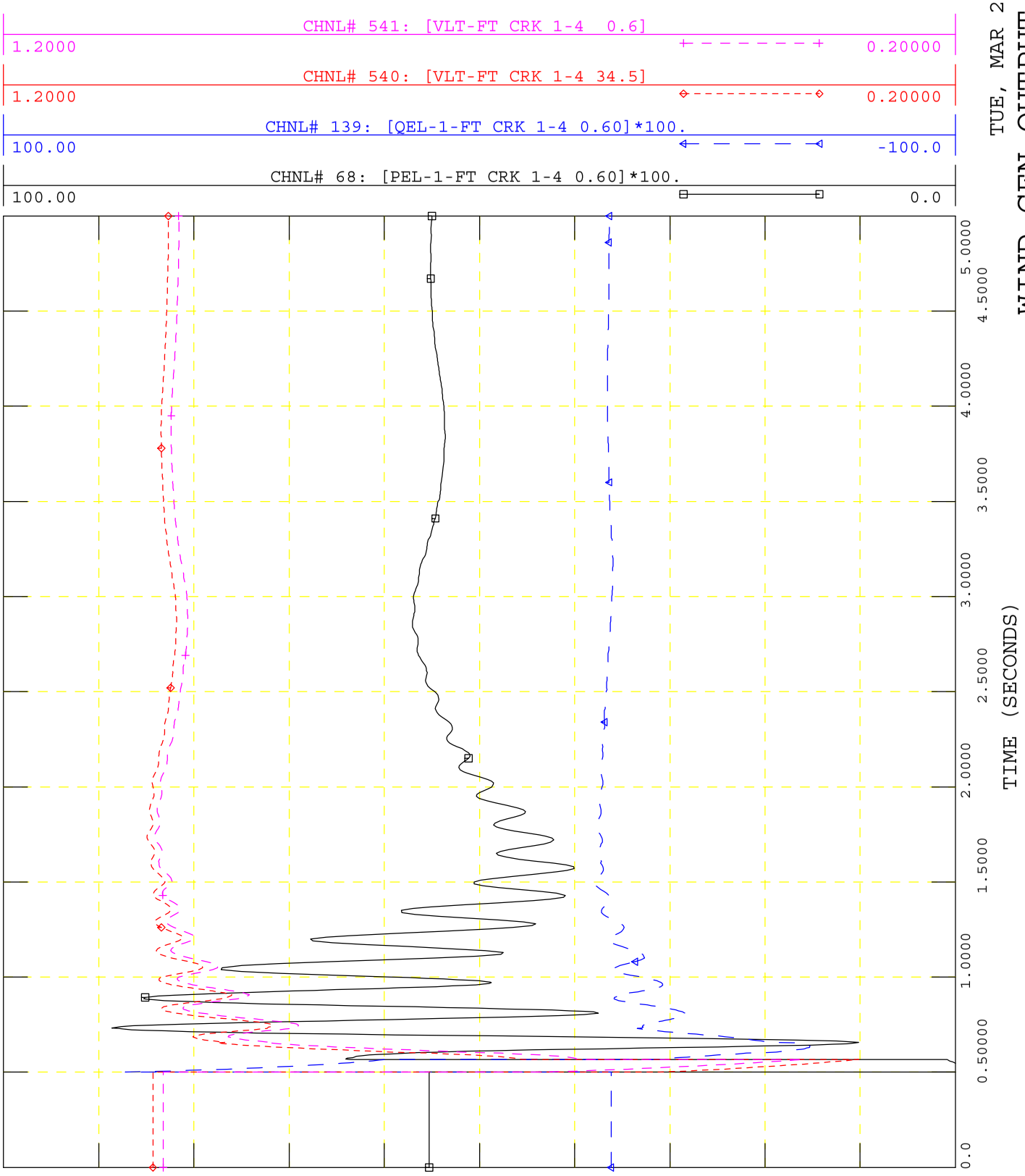

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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TUE, MAR 27 2018 21:28 PLT 10

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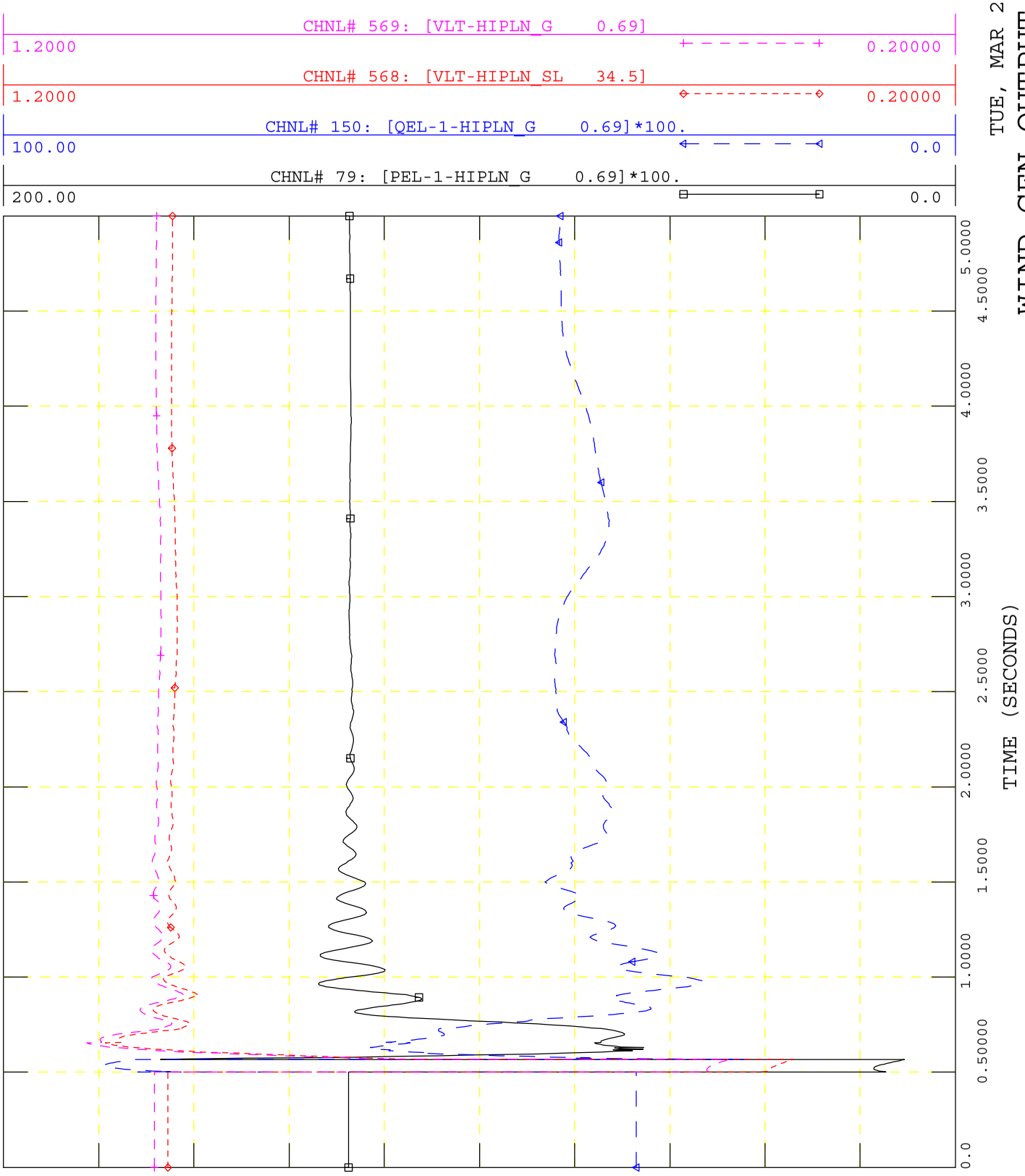

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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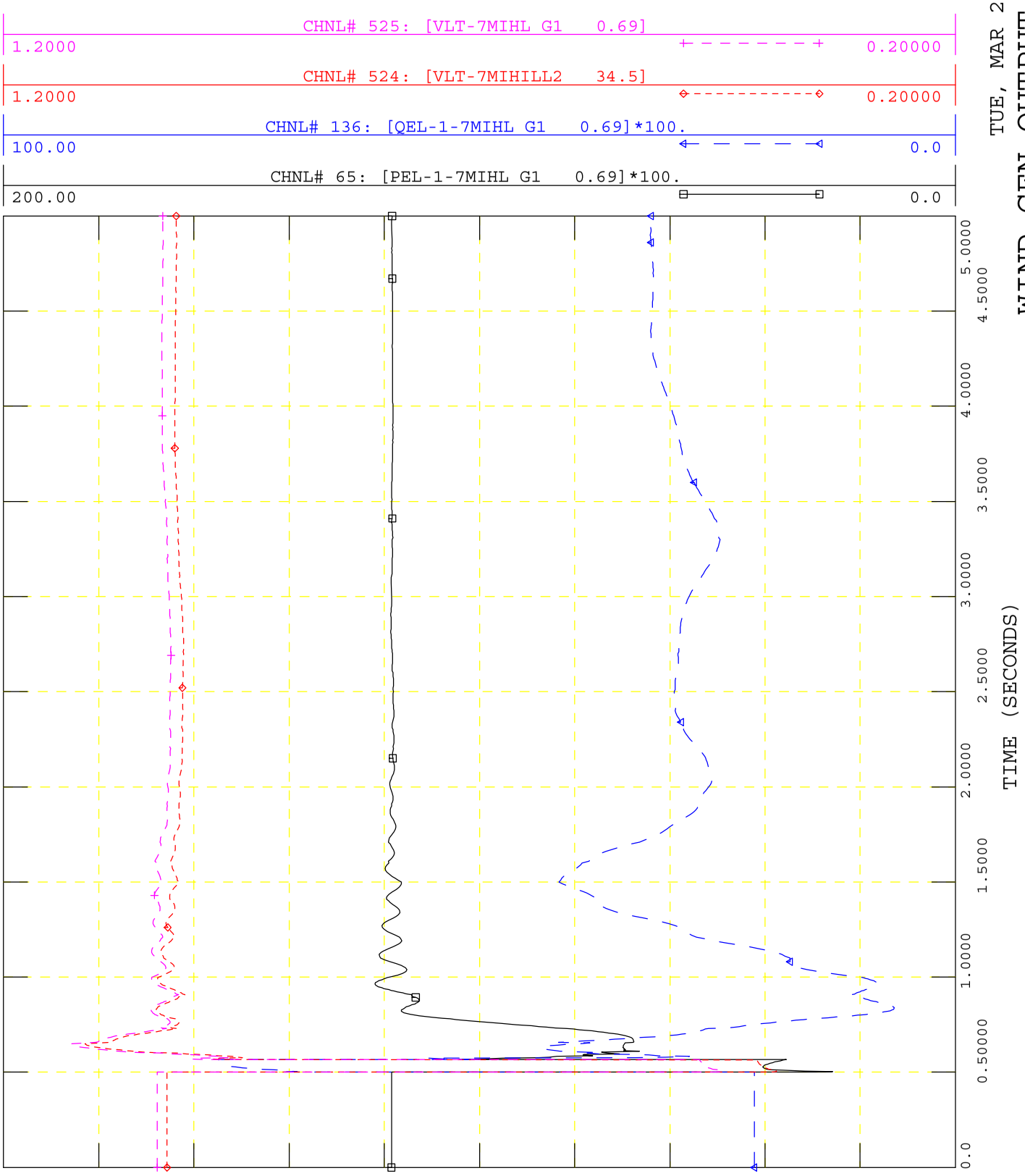

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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TUE, MAR 27 2018 21:28 PLT 12

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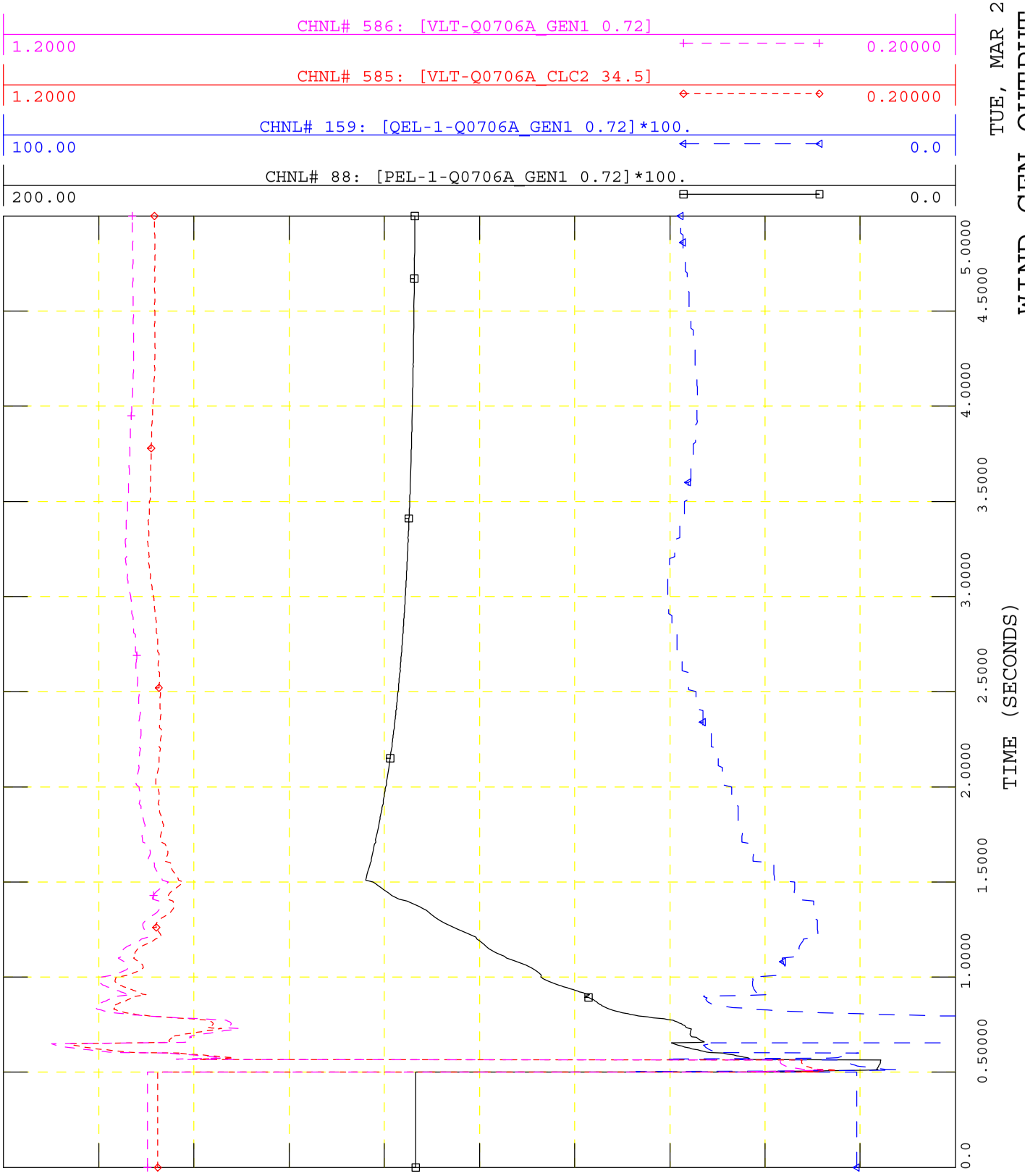

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TUE, MAR 27 2018 21:28 PLT 13

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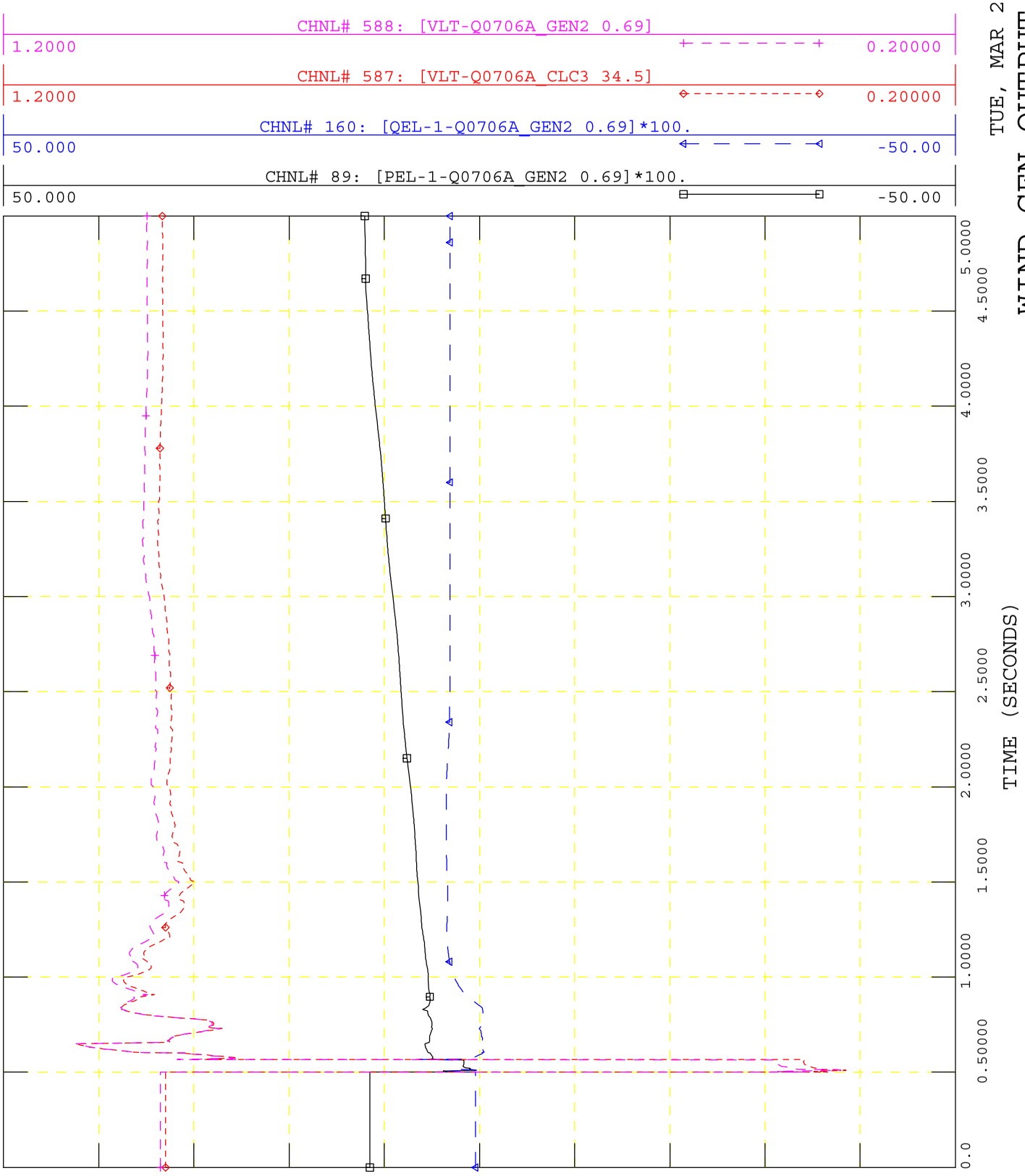

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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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TUE, MAR 27 2018 21:28 PLT 14

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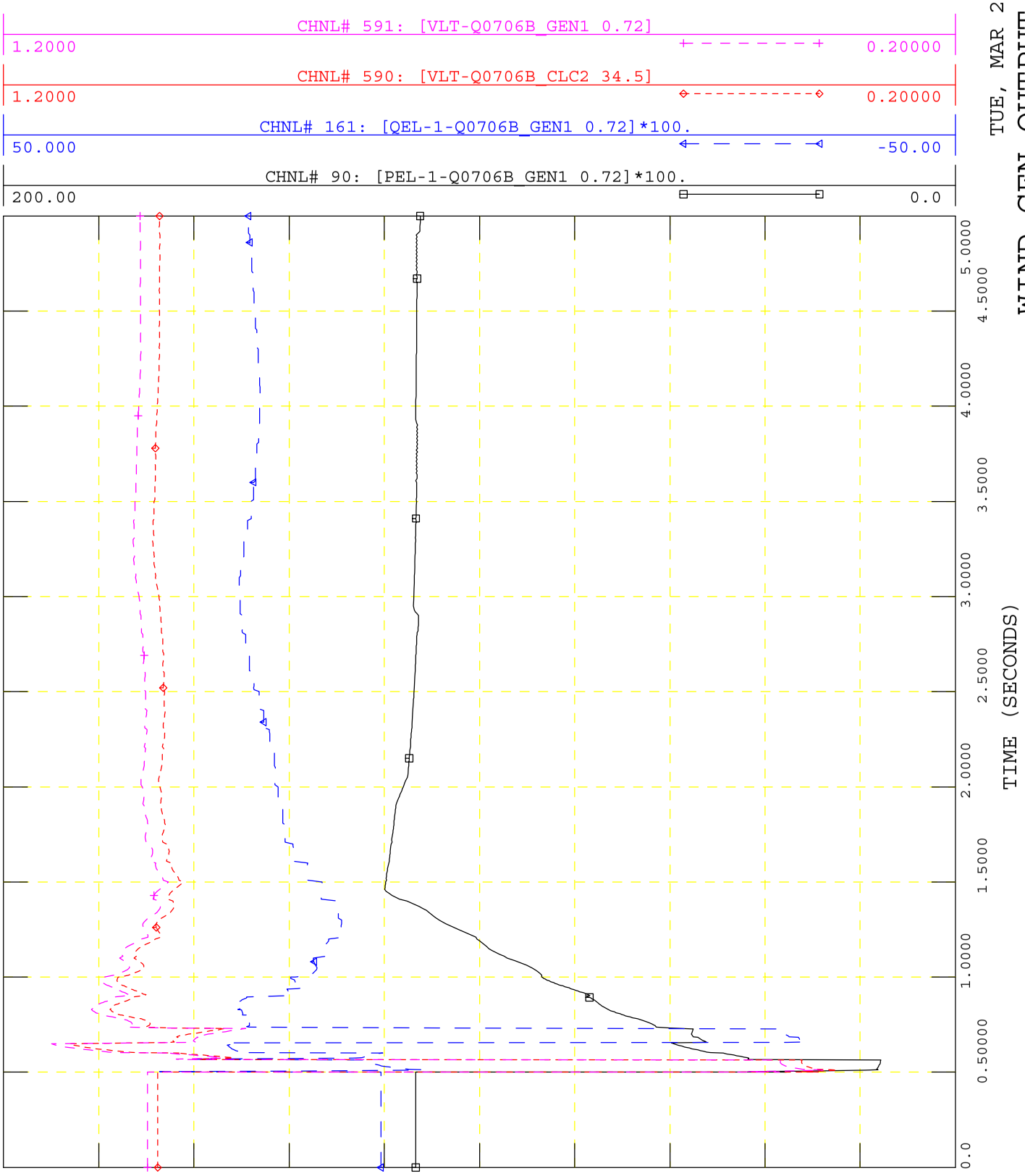

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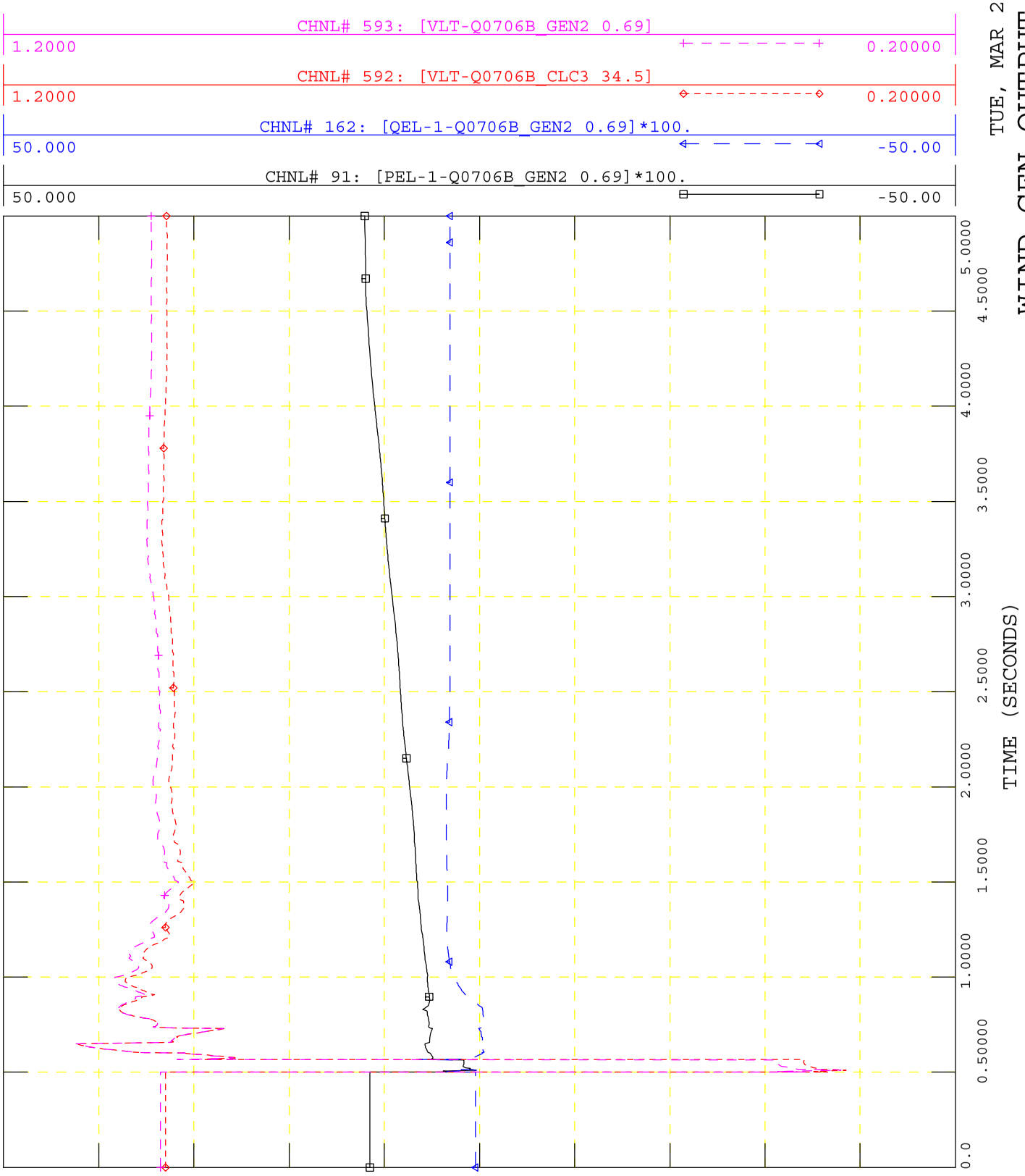
TUE, MAR 27 2018 21:28 PLT 15

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:28 PLT 16

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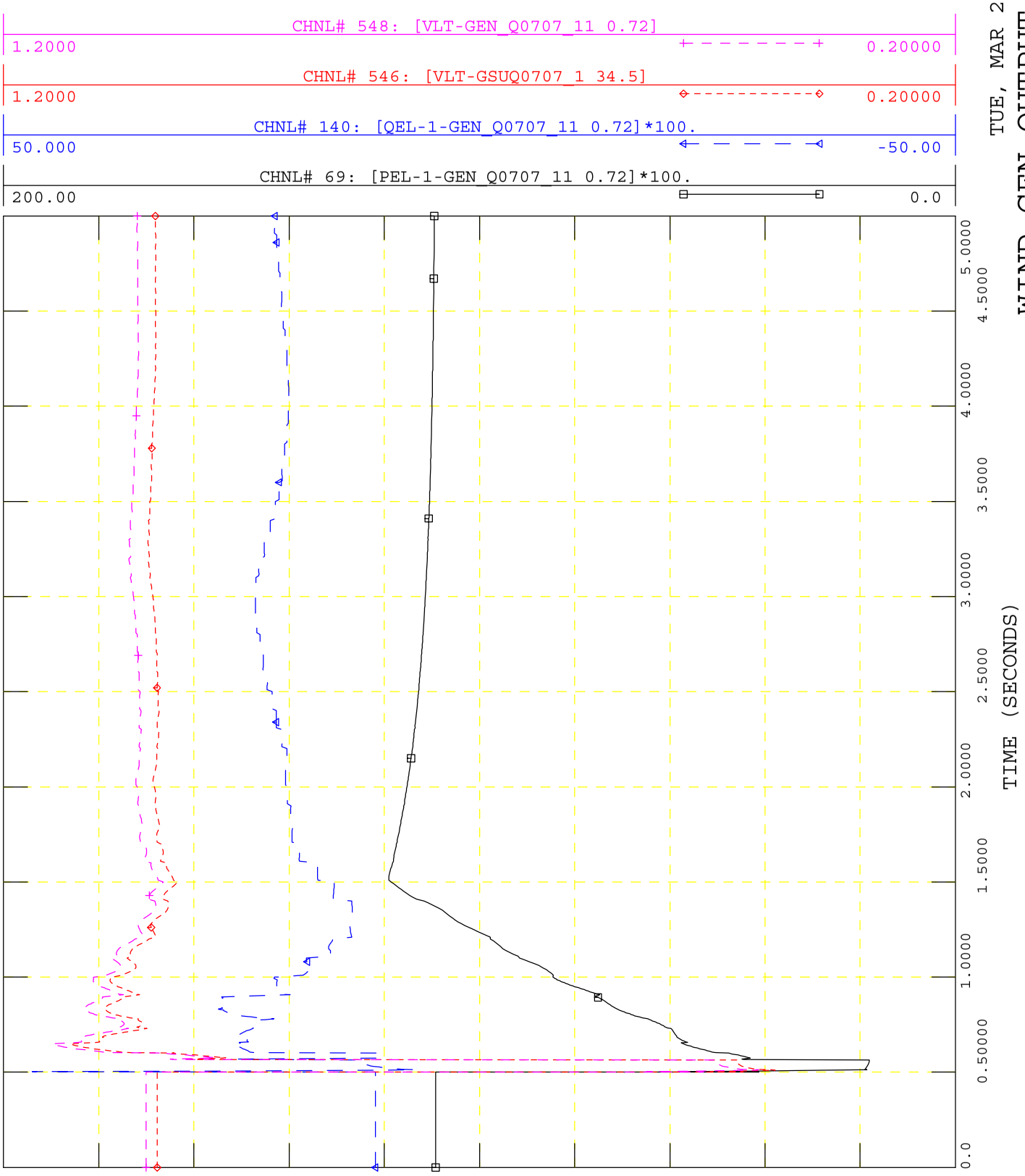

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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STANDPIPE-PLATTE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 5
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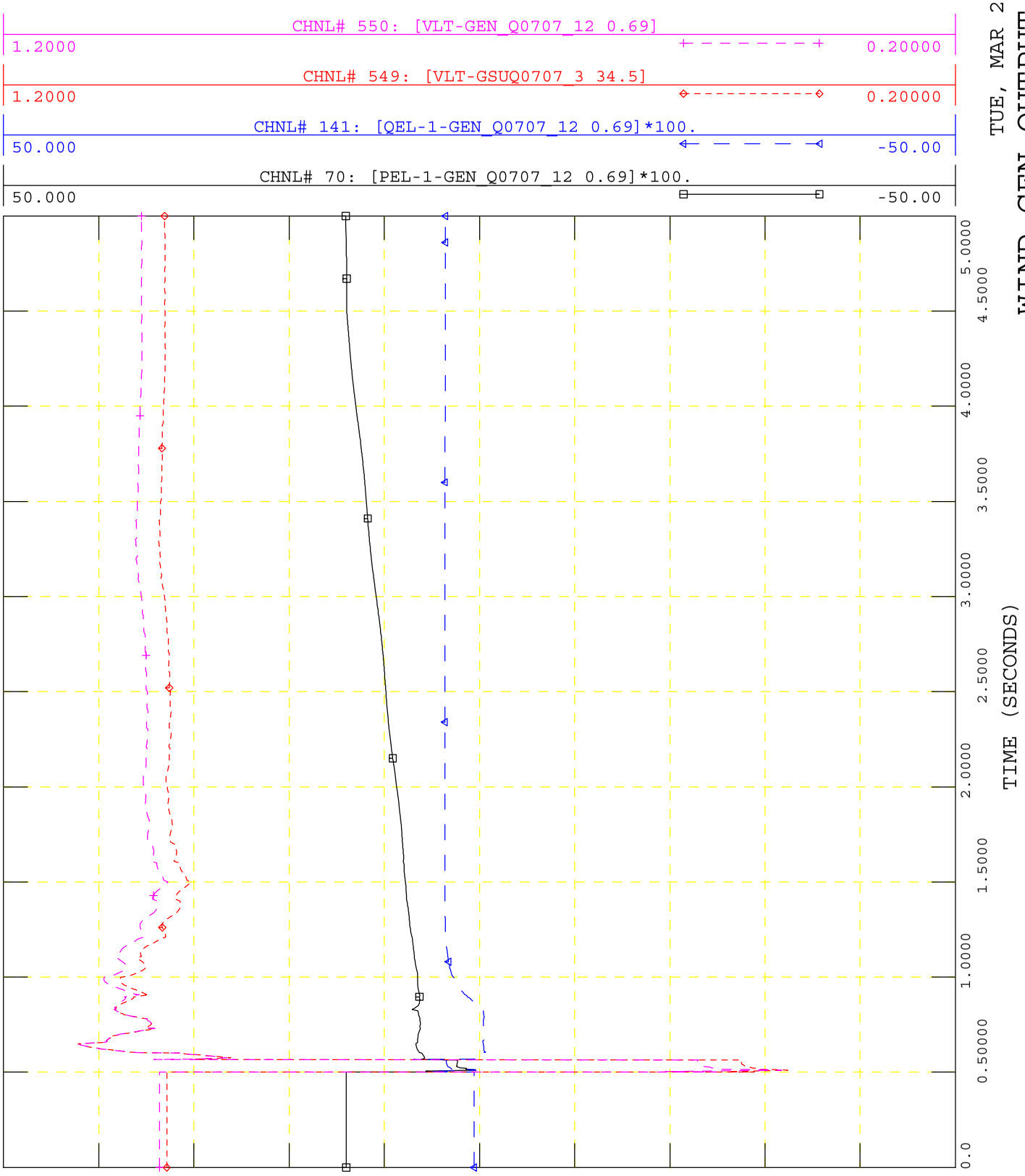
TUE, MAR 27 2018 21:28 PLT 17

WIND GEN OUTPUT



SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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TUE, MAR 27 2018 21:28 PLT 18

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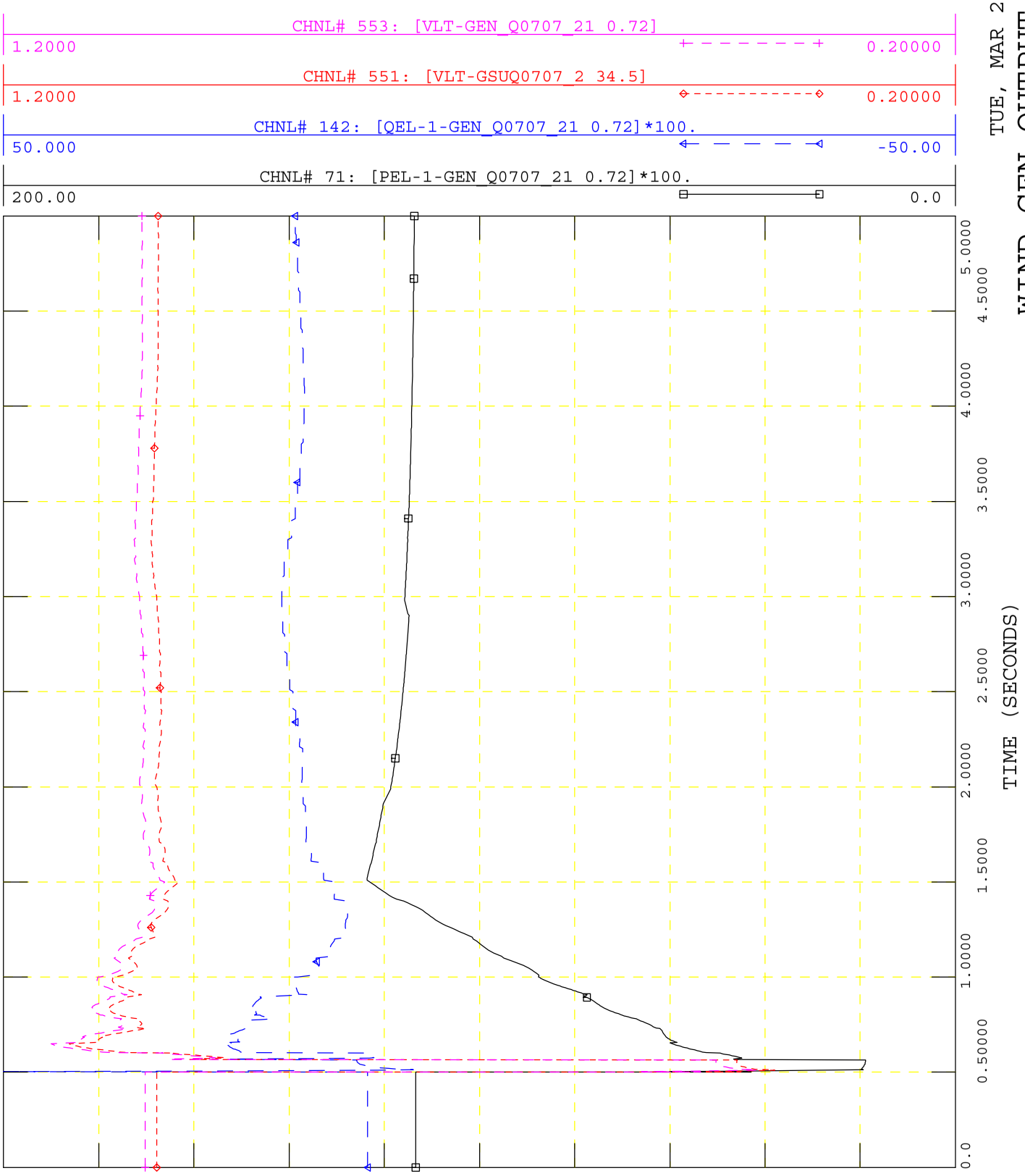

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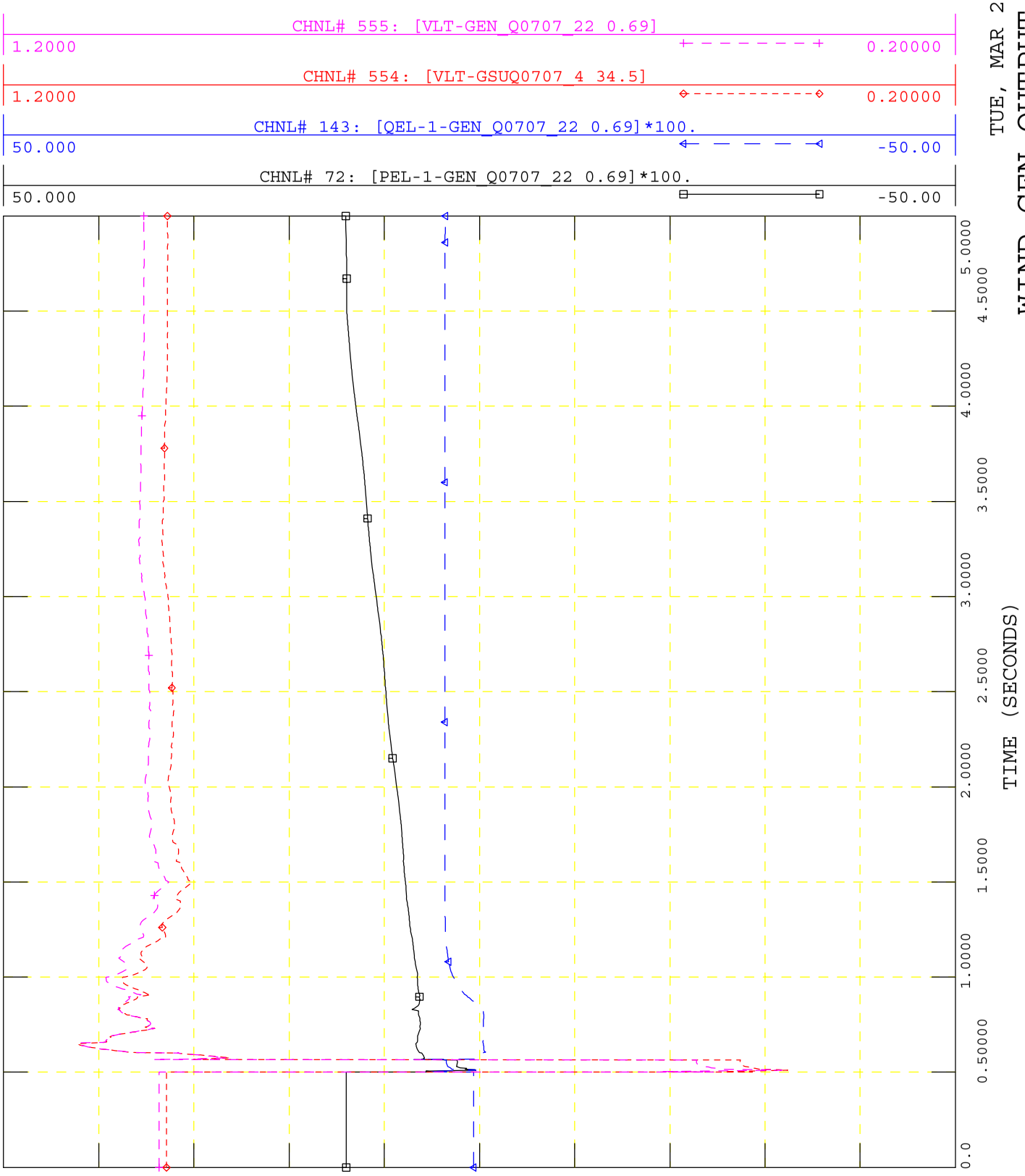
TUE, MAR 27 2018 21:28 PLT 19

WIND GEN OUTPUT



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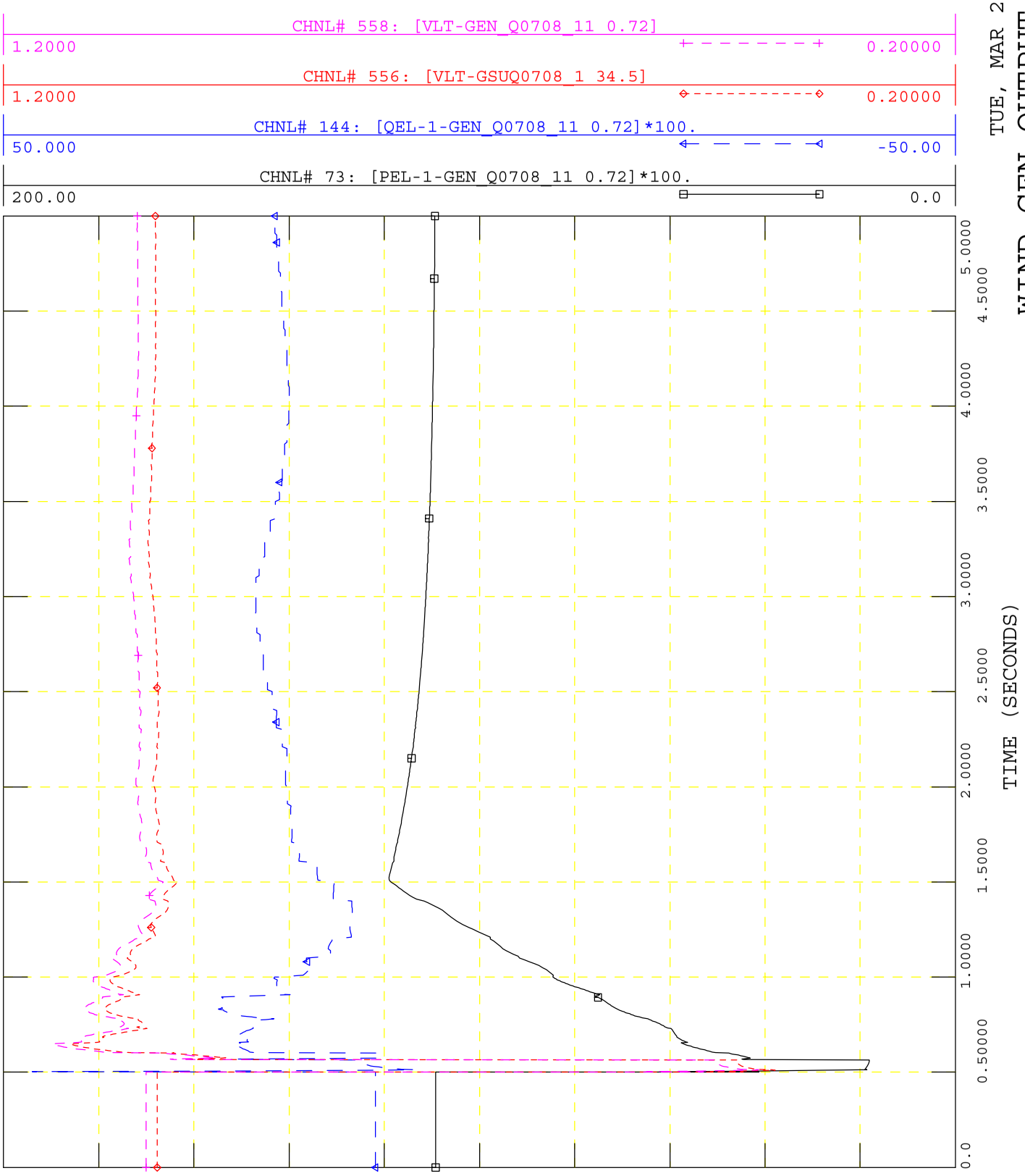
TUE, MAR 27 2018 21:28 PLT 20

WIND GEN OUTPUT



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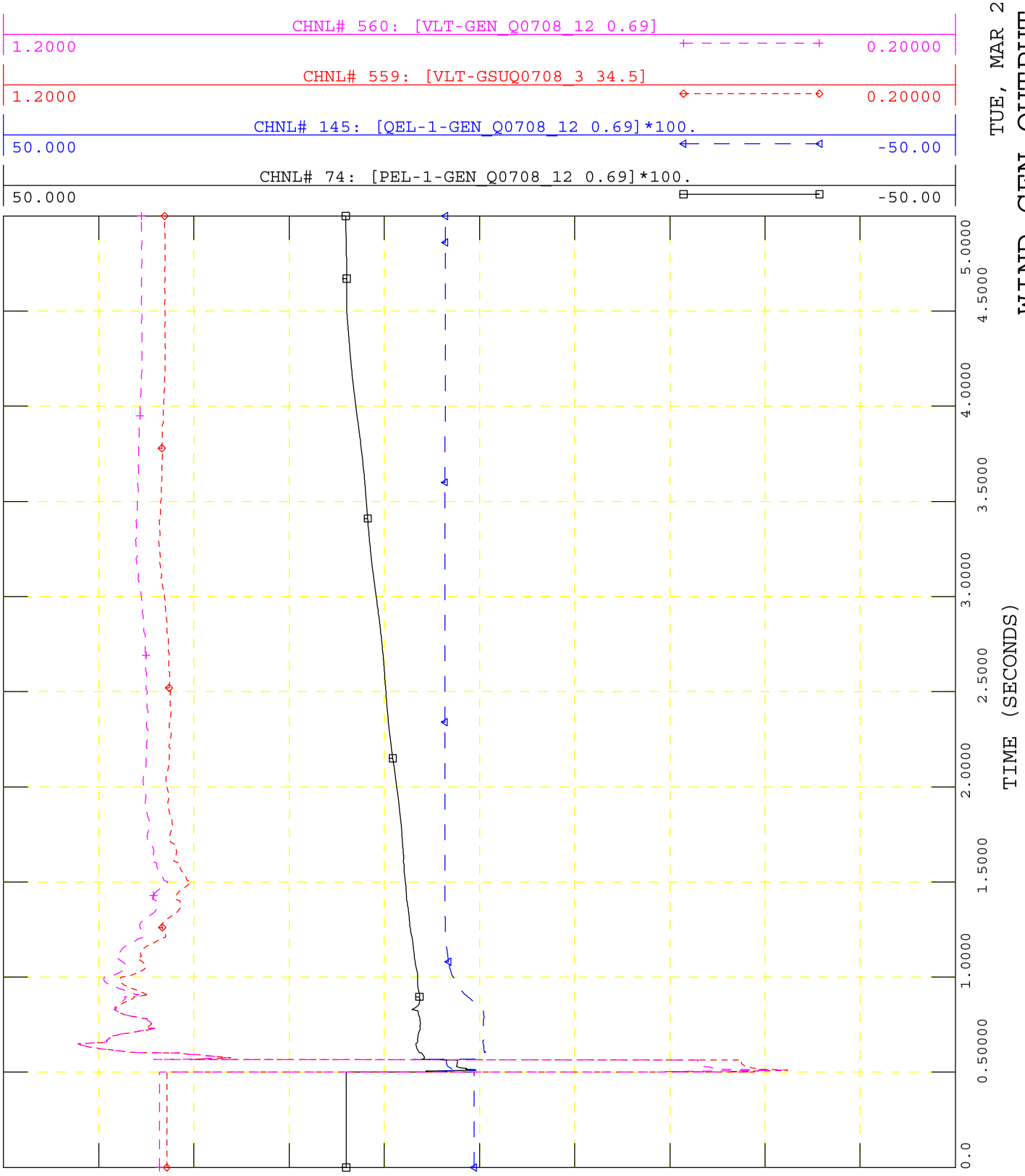
TUE, MAR 27 2018 21:28 PLT 21

WIND GEN OUTPUT



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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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TUE, MAR 27 2018 21:28 PLT 22

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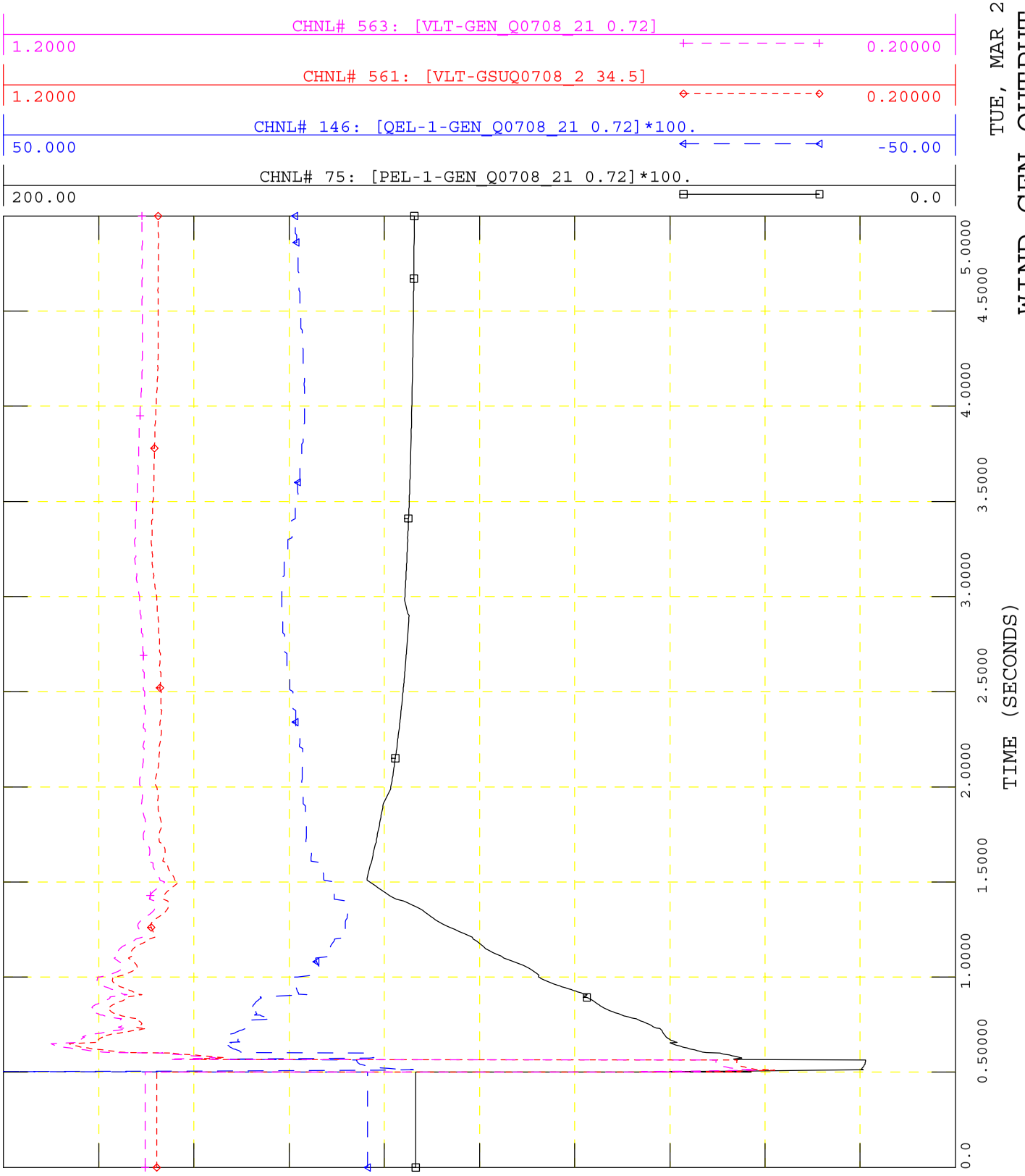

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TUE, MAR 27 2018 21:28 PLT 23

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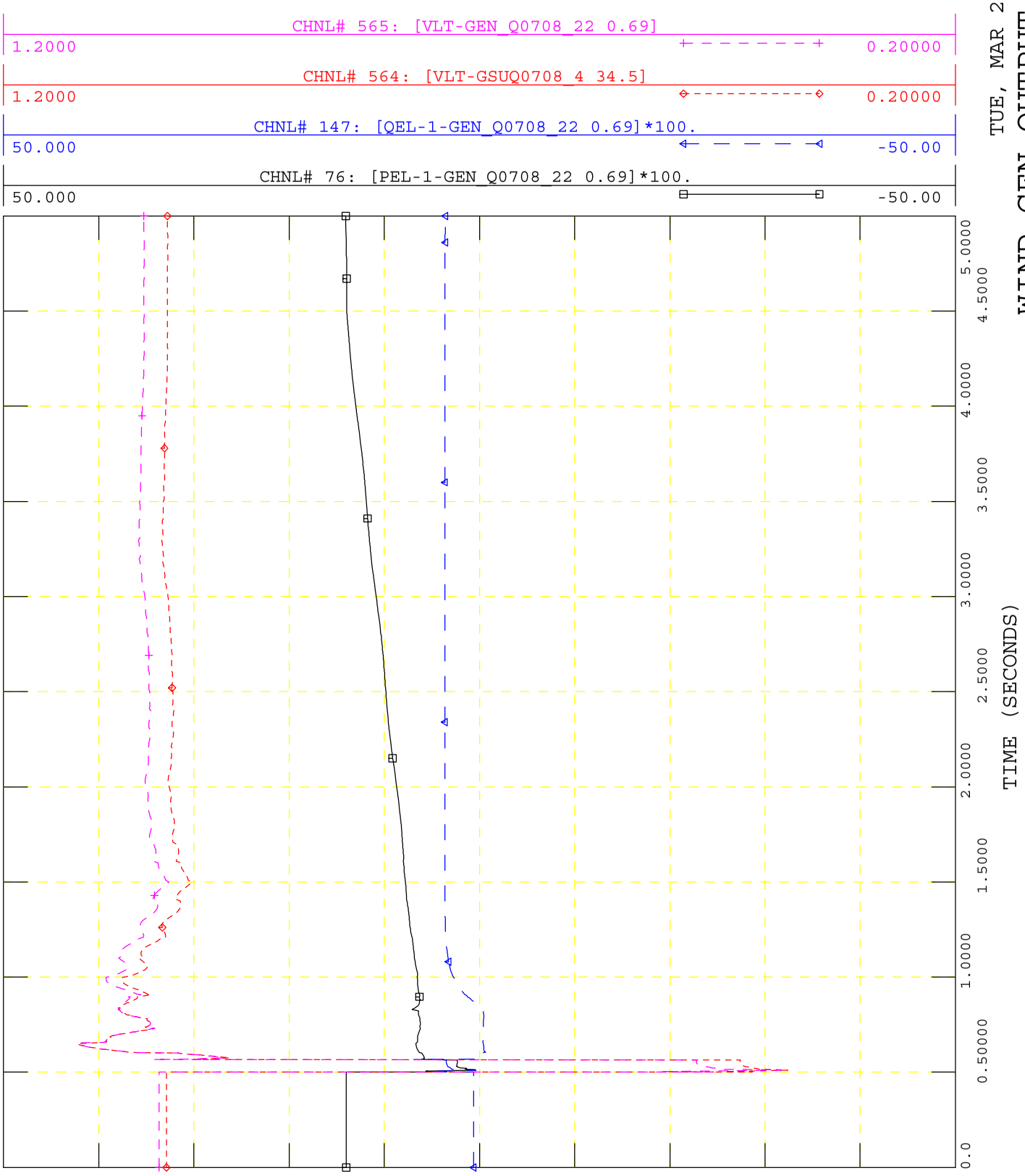

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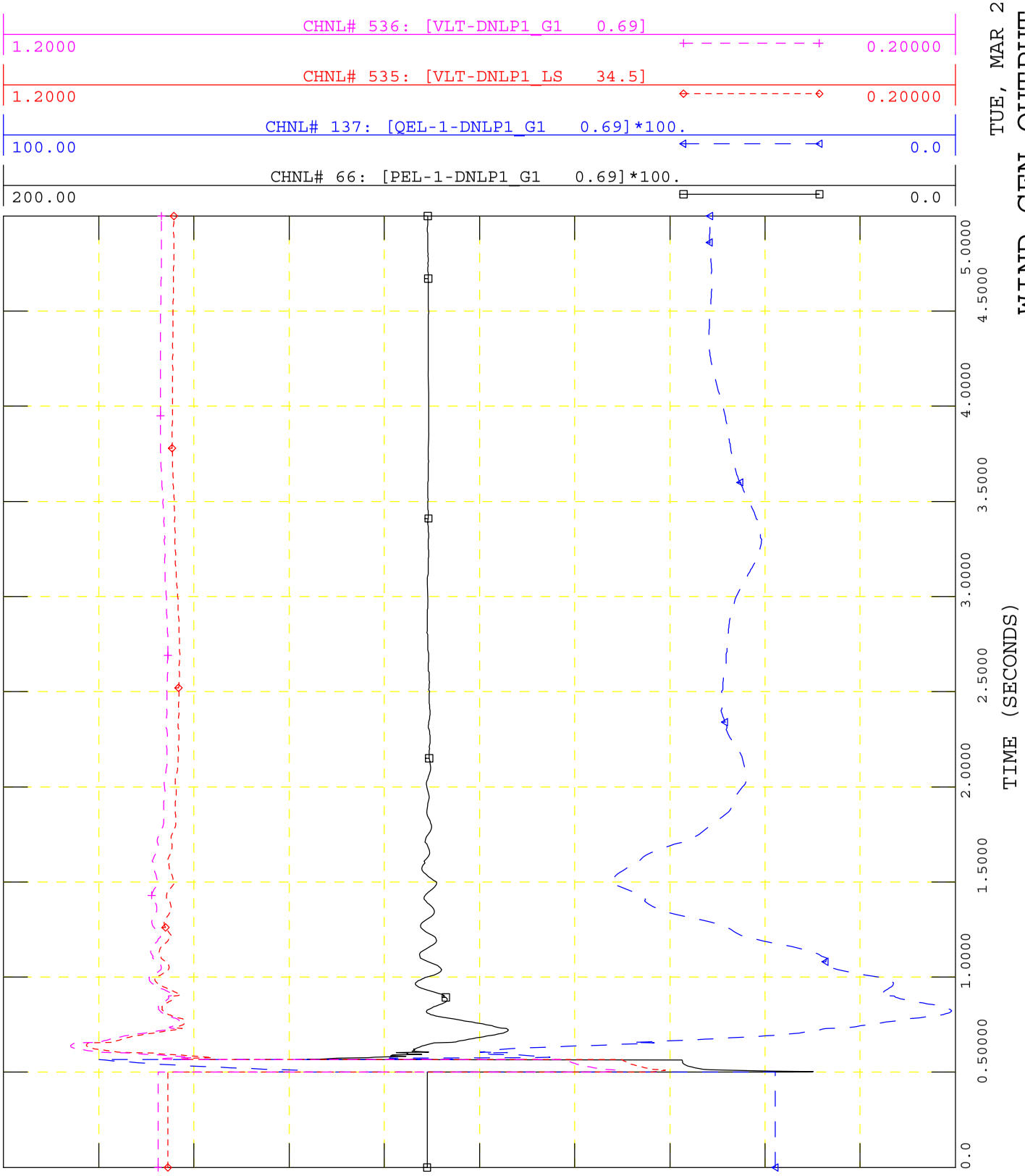
TUE, MAR 27 2018 21:28 PLT 24

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:28 PLT 25

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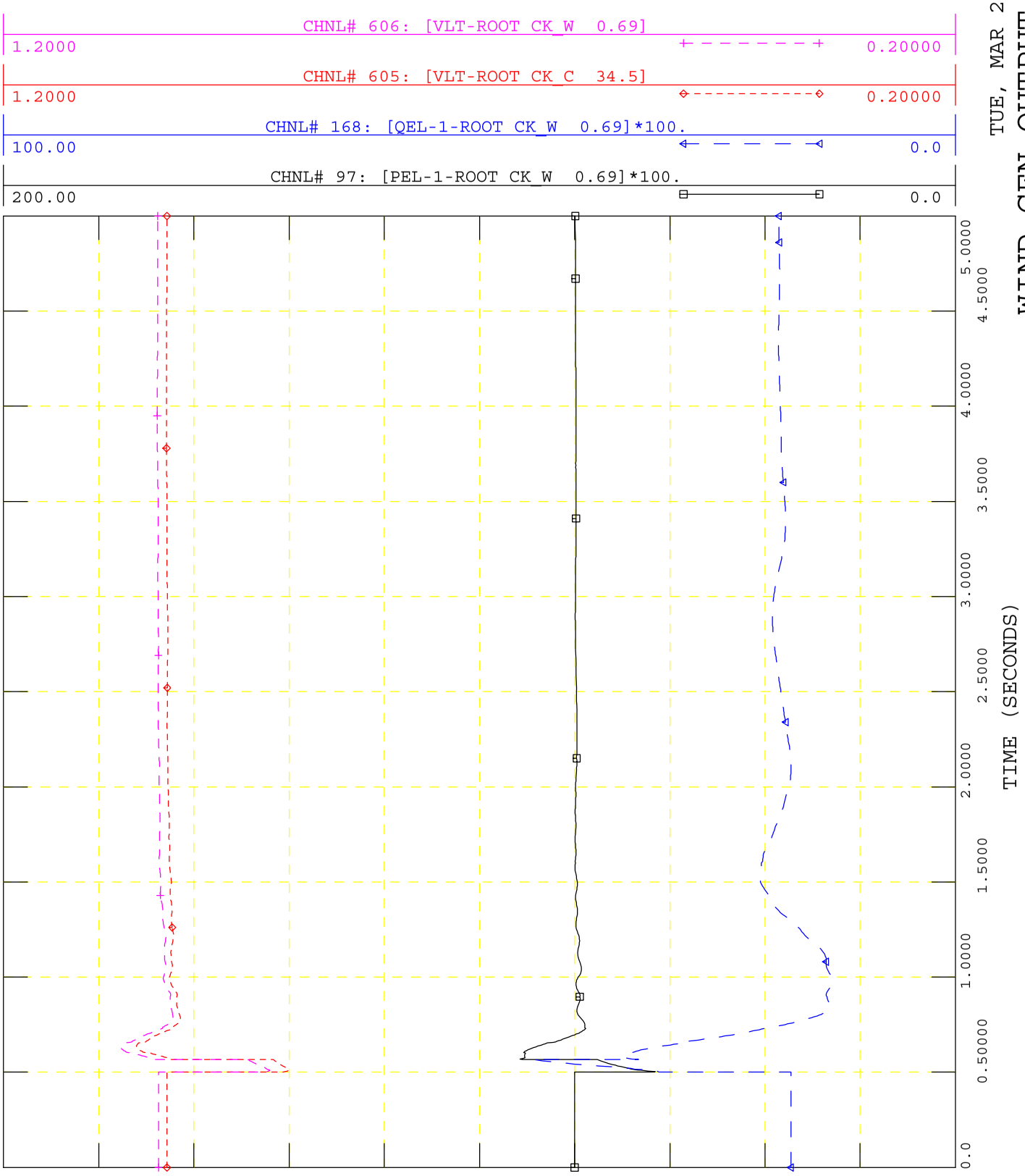

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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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TUE, MAR 27 2018 21:28 PLT 26

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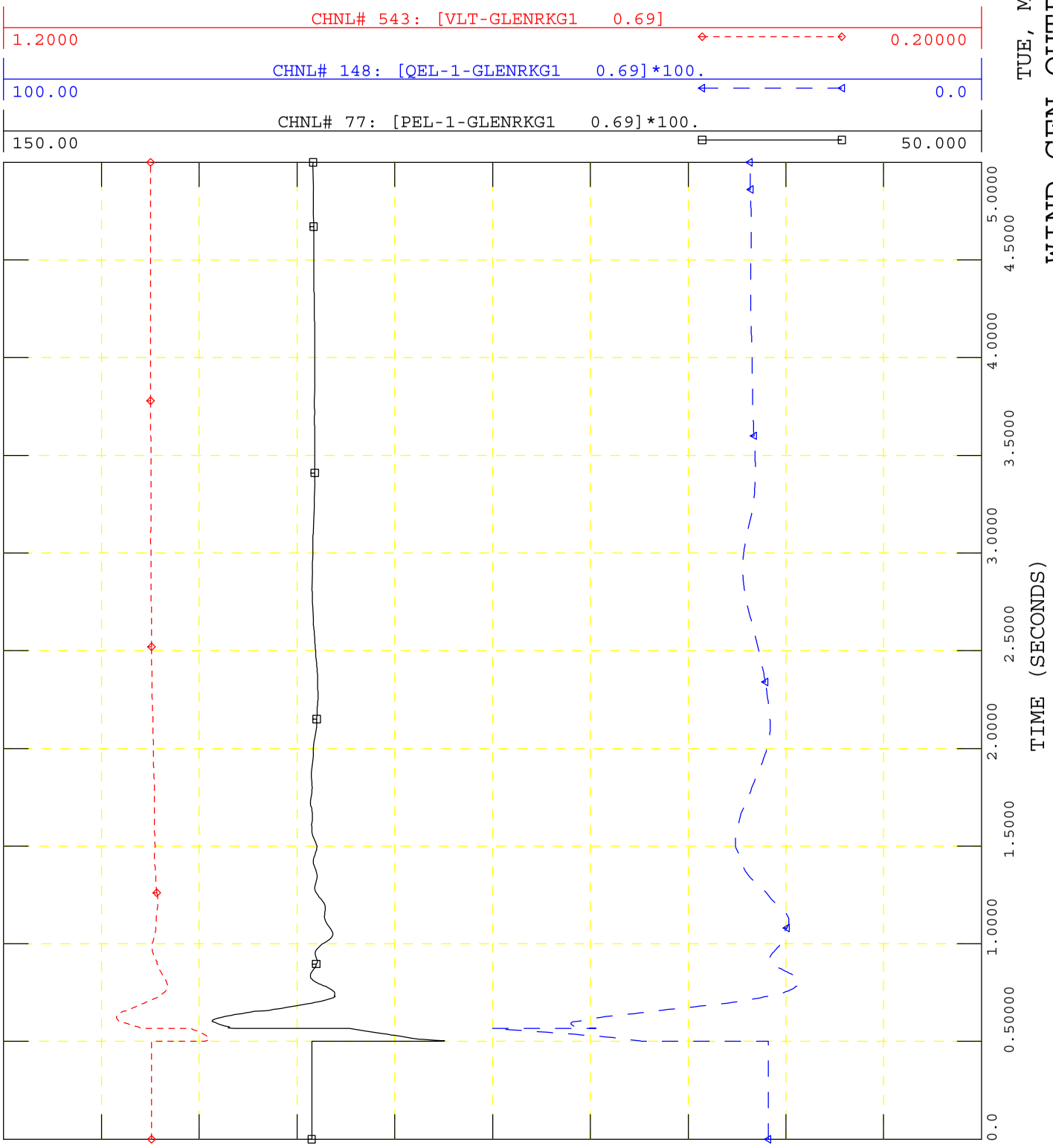
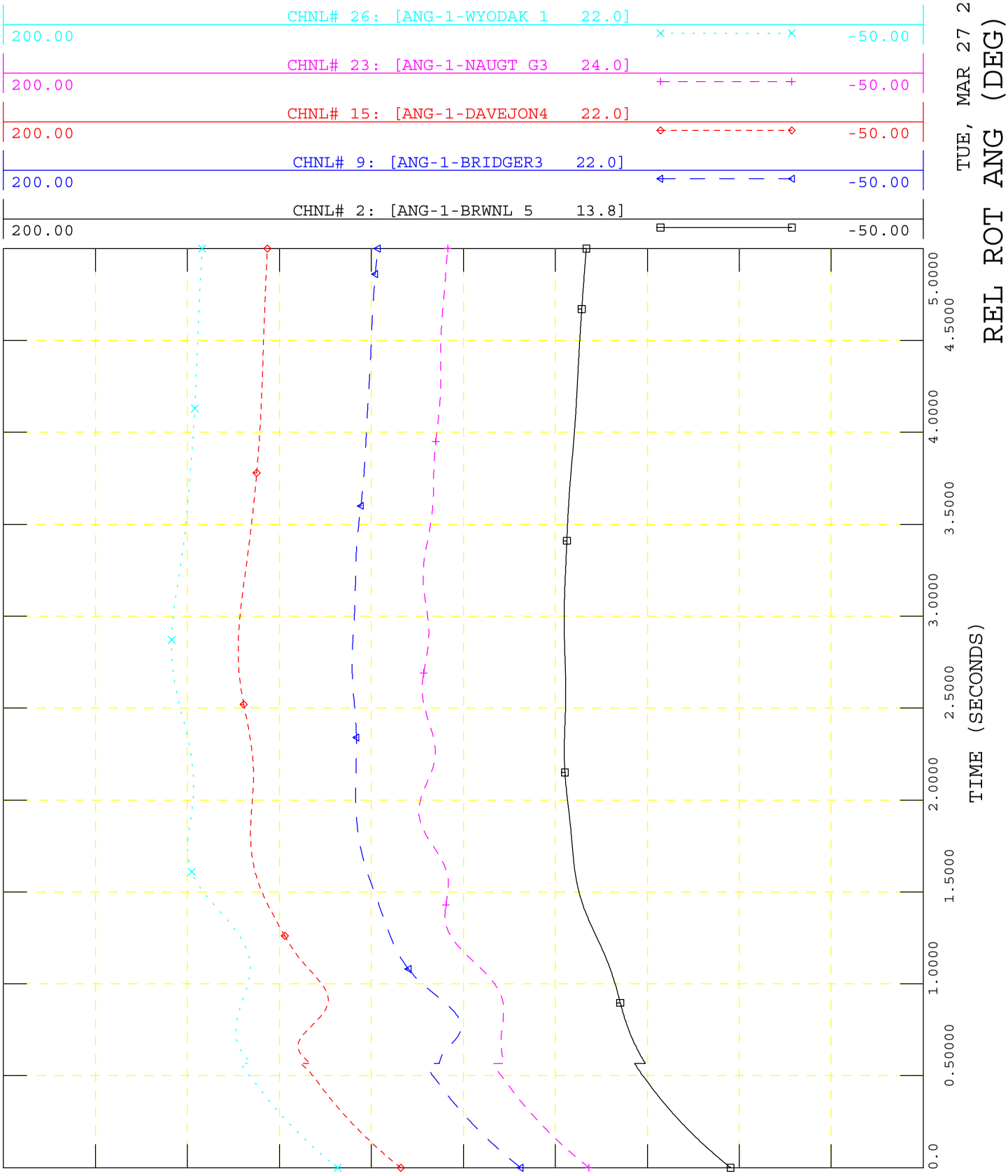


Dynamic Simulation

Case 6 – Loss of Standpipe-Foote Creek 230 kV line (loss of 262 MW generation)

30 cycles	**3 phase Standpipe 230 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Standpipe-Foote Creek 230 kV line**
36 cycles	**Remove SVC MVAR limiter**
5 sec.	**Terminate simulation**

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS STANDPIPE 230 FLT. 34CY-CLR FLT & OPEN STNDPP-FT
CREEK 230 LN (262 MW GEN LOSS). 36CY-UNBLOCK SVC. OUTAGE 6
FILE: c7_svc_mtrld_STND-FTCK_out6.out



TUE, MAR 27 2018 21:28
REL ROT ANG (DEG) PLT 1

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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CREEK 230 LN (262 MW GEN LOSS). 36CY-UNBLOCK SVC. OUTAGE 6
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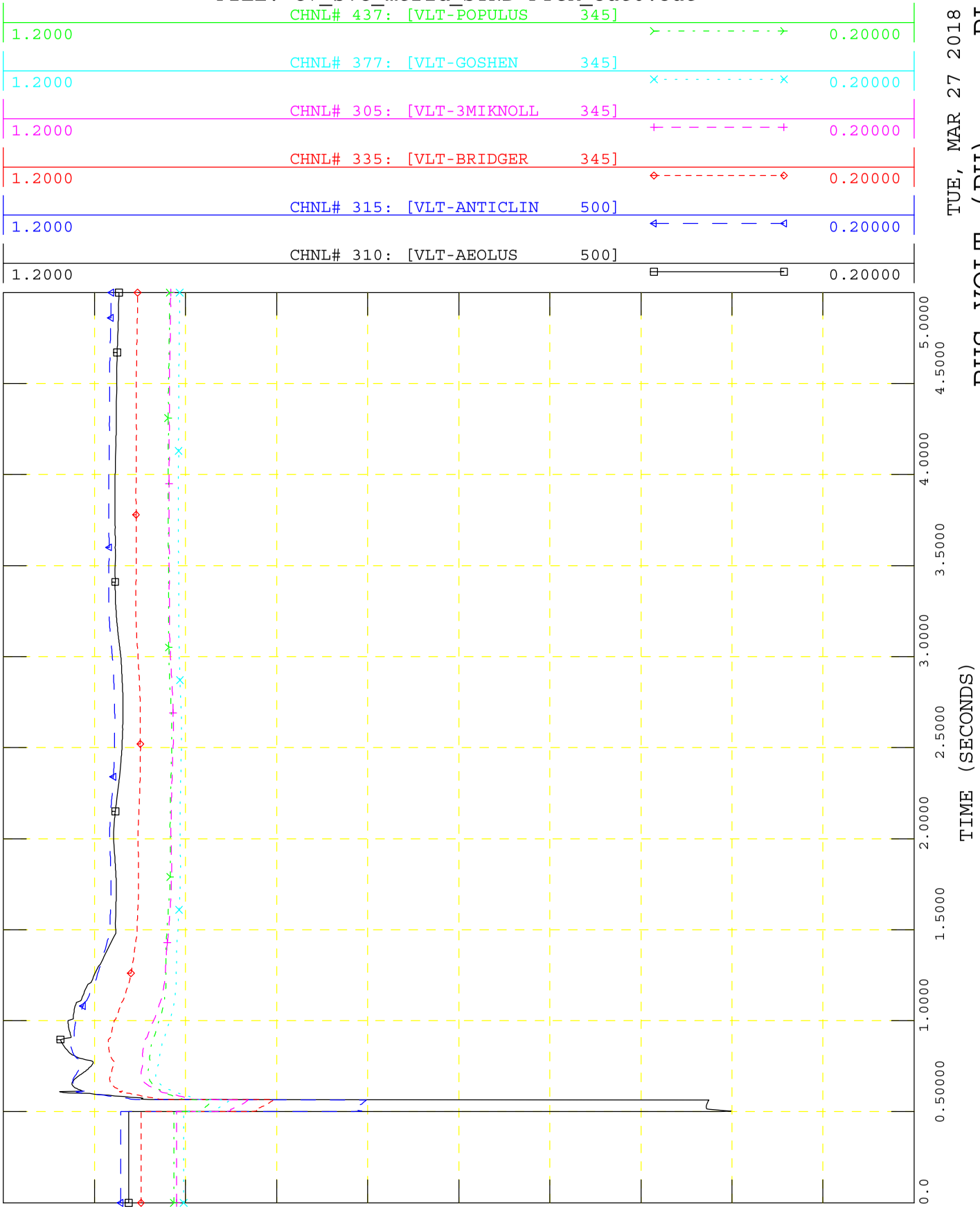
TUE, MAR 27 2018 21:28 PLT 2



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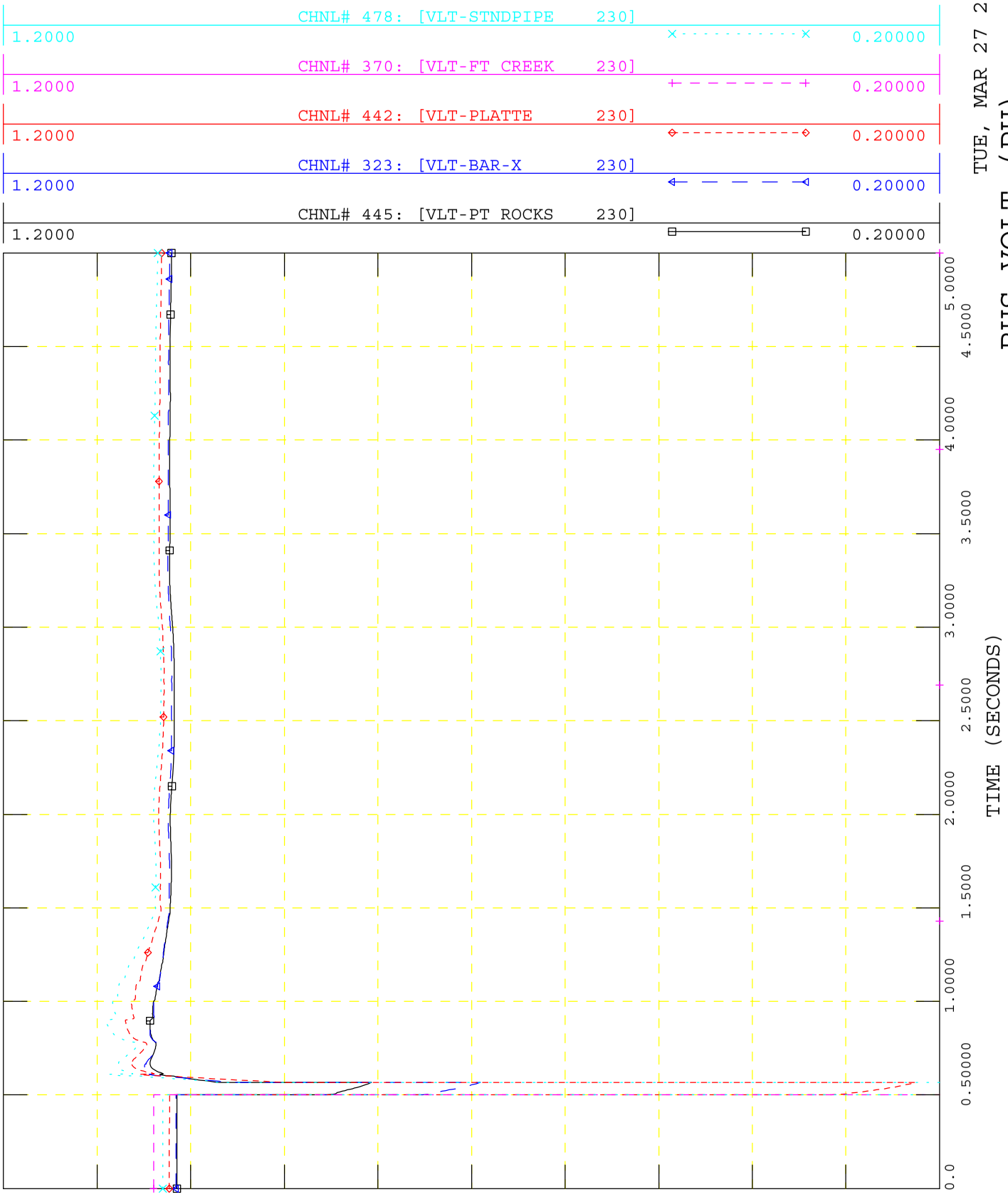
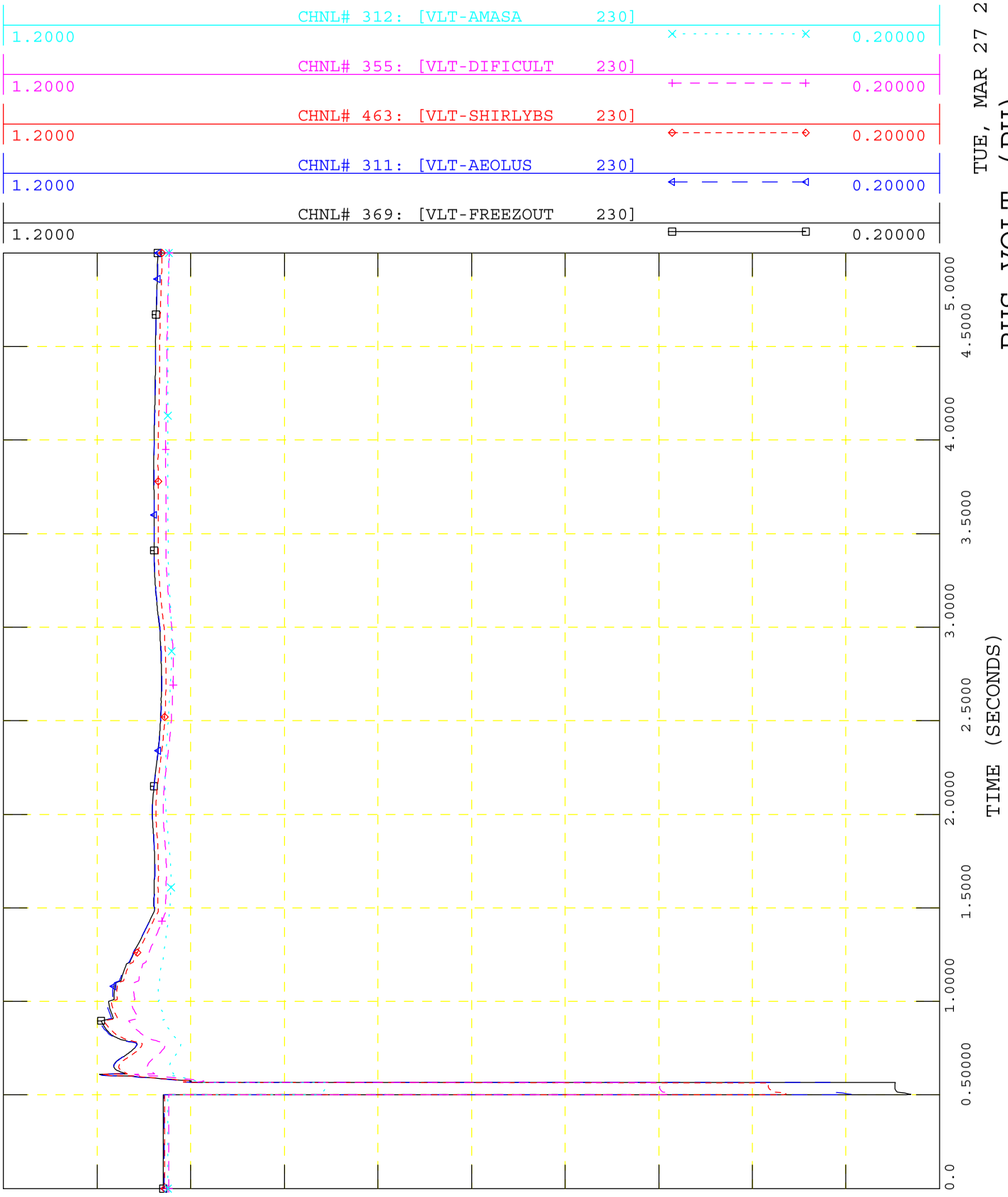
FILE: c7_svc_mtrld_STND-FTCK_out6.out

TUE, MAR 27 2018 21:28 PLT 3



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS STANDPIPE 230 FLT. 34CY-CLR FLT & OPEN STNDPP-FT
CREEK 230 LN (262 MW GEN LOSS). 36CY-UNBLOCK SVC. OUTAGE 6
FILE: c7_svc_mtrld_STND-FTCK_out6.out

TUE, MAR 27 2018 21:28 PLT 4



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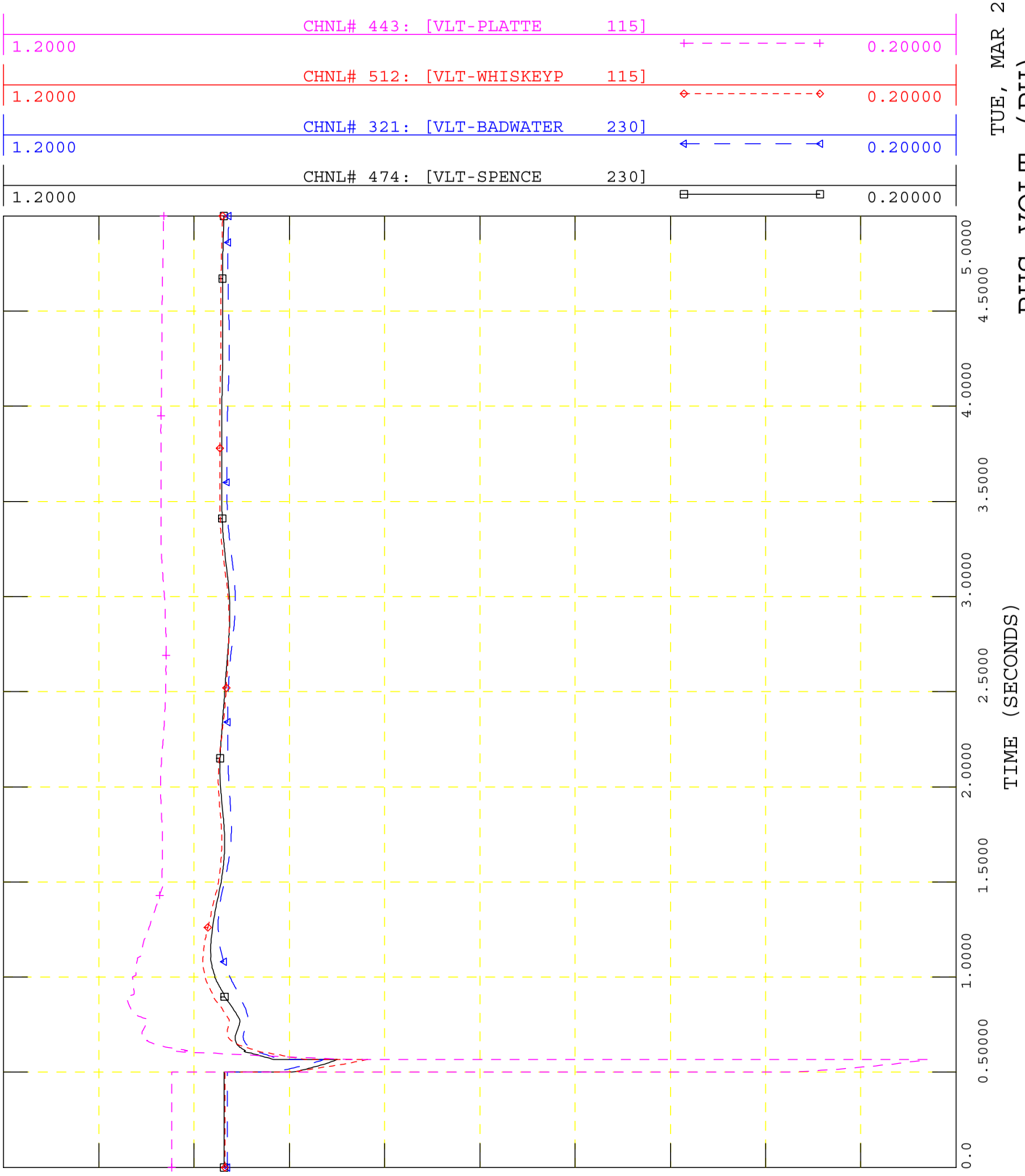
CREEK 230 LN (262 MW GEN LOSS). 36CY-UNBLOCK SVC. OUTAGE 6
FILE: c7_svc_mtrld_STND-FTCK_out6.out

TUE, MAR 27 2018 21:28 PLT 5



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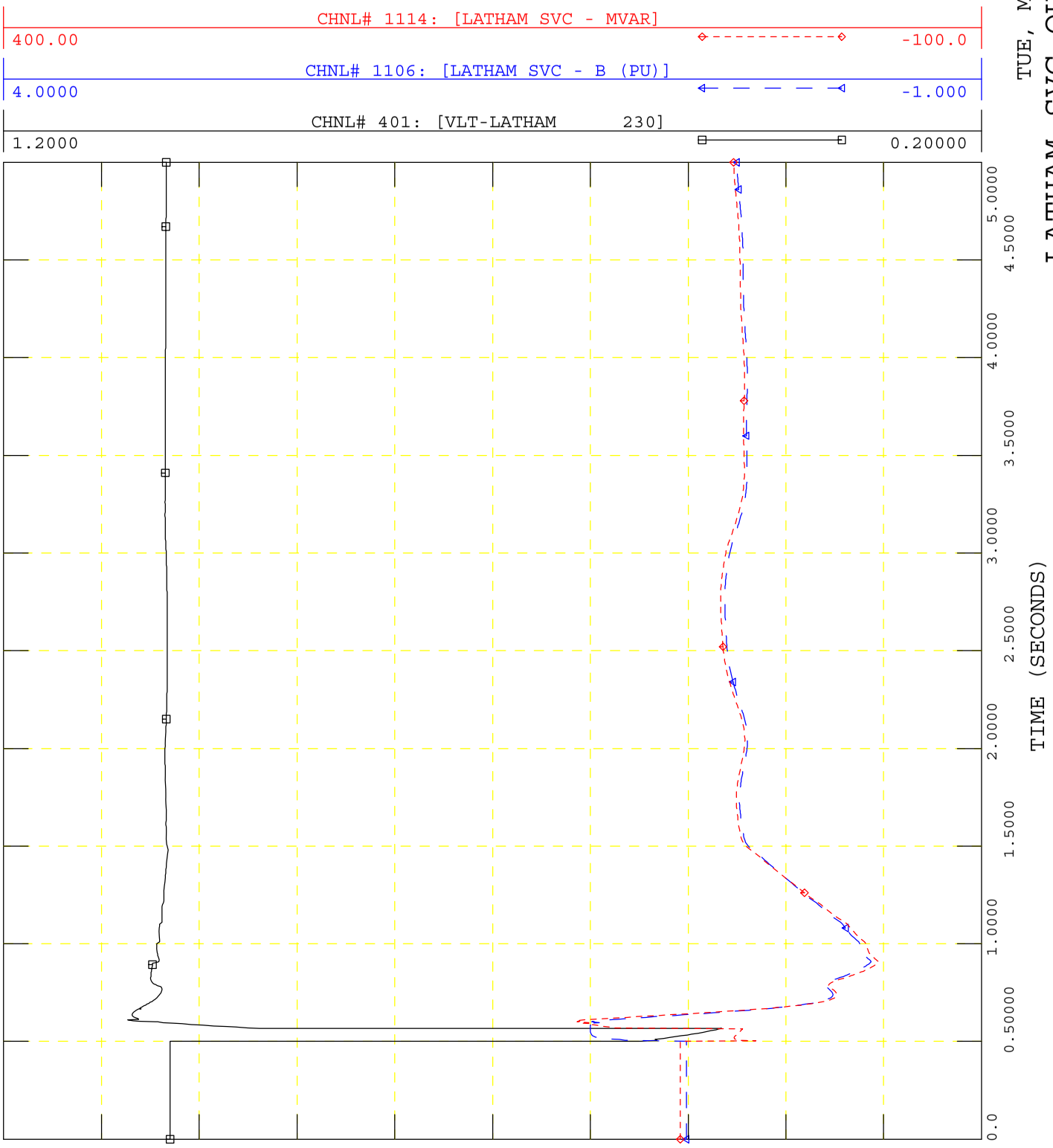
TUE, MAR 27 2018 21:28 PLT 6

LATHAM SVC OUT



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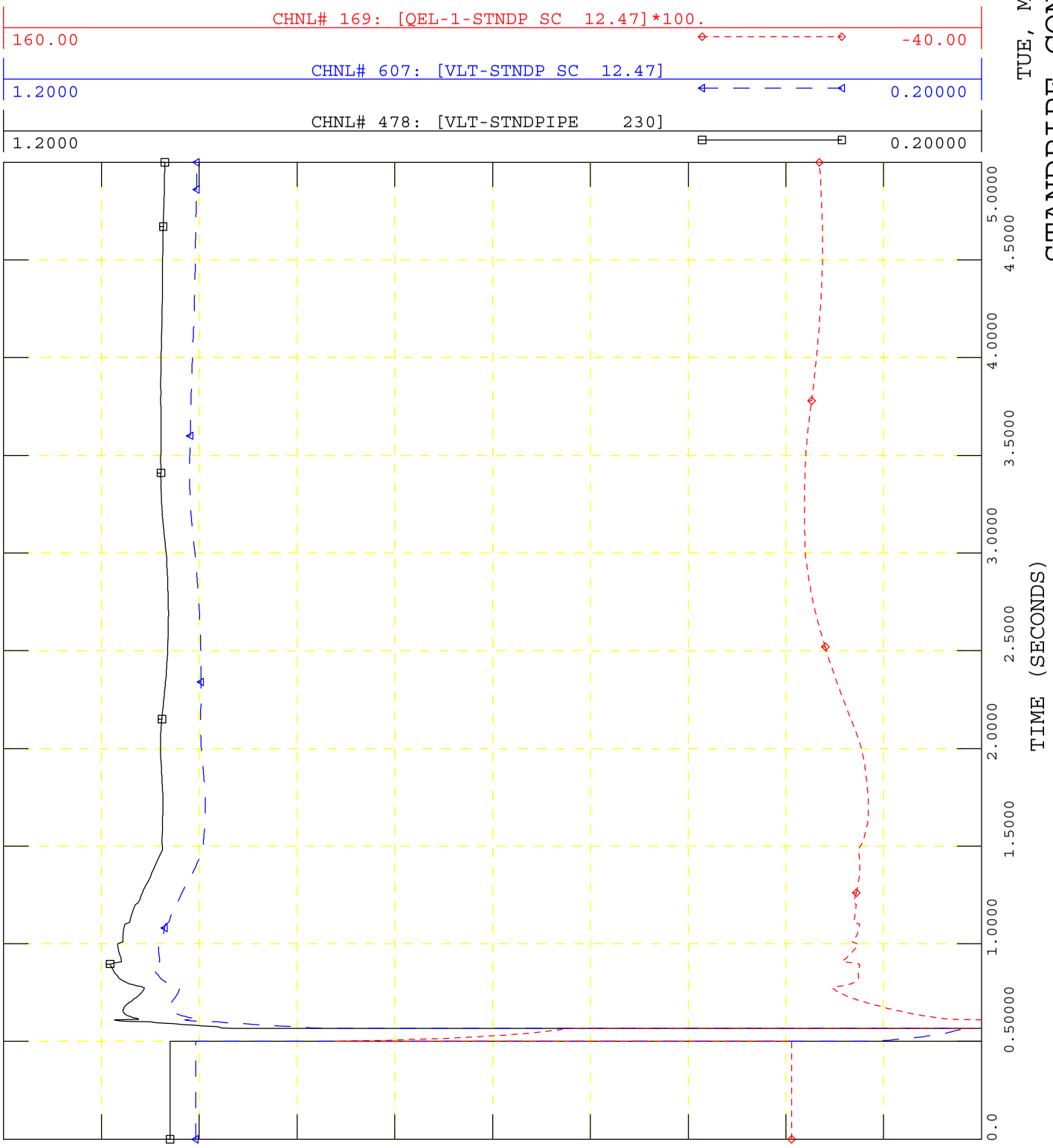
TUE, MAR 27 2018 21:28

STANDPIPE CONDNSR PLT 7



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CREEK 230 LN (262 MW GEN LOSS). 36CY-UNBLOCK SVC. OUTAGE 6
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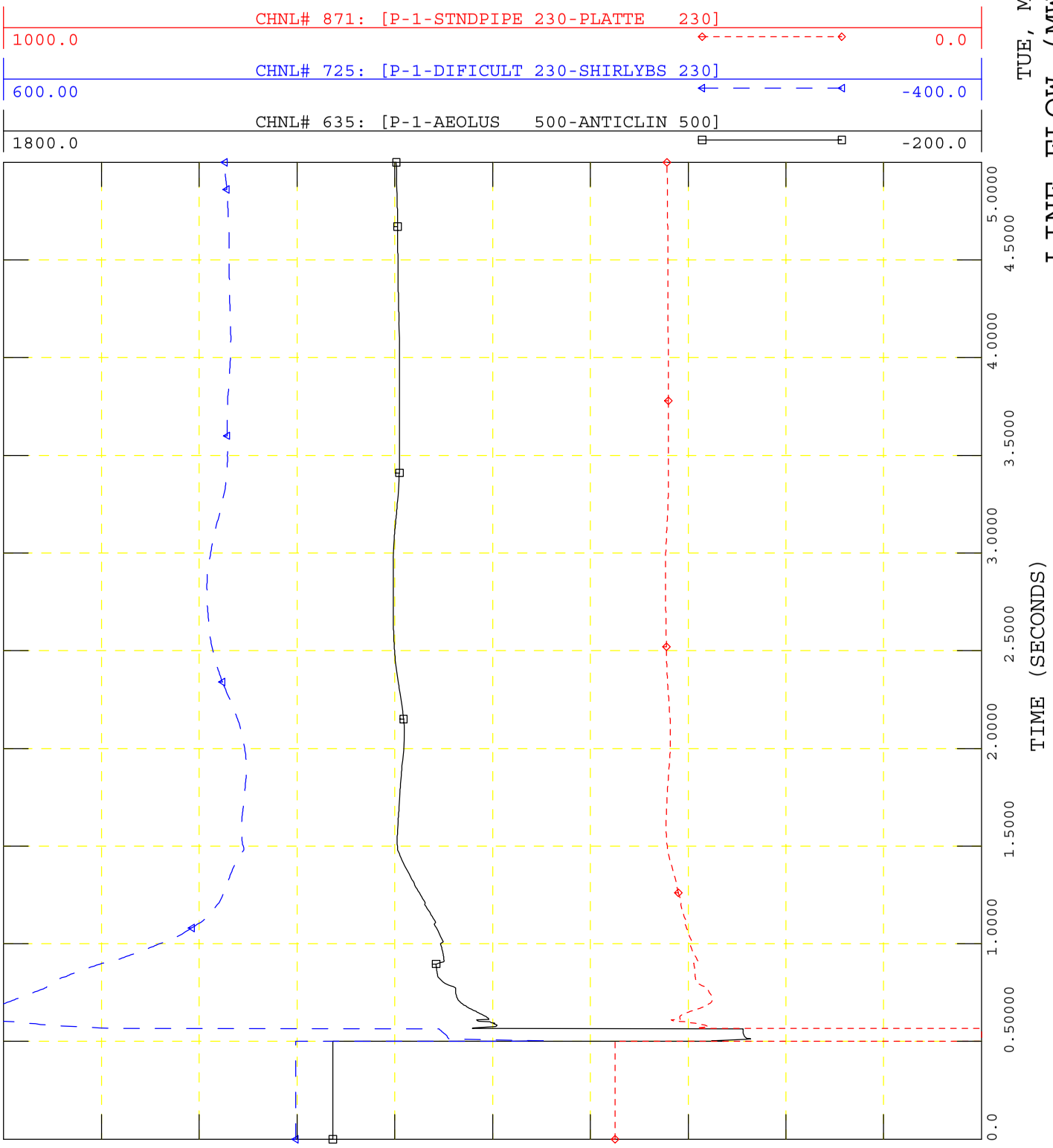
TUE, MAR 27 2018 21:29 PLT 8



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TUE, MAR 27 2018 21:29 PLT 9

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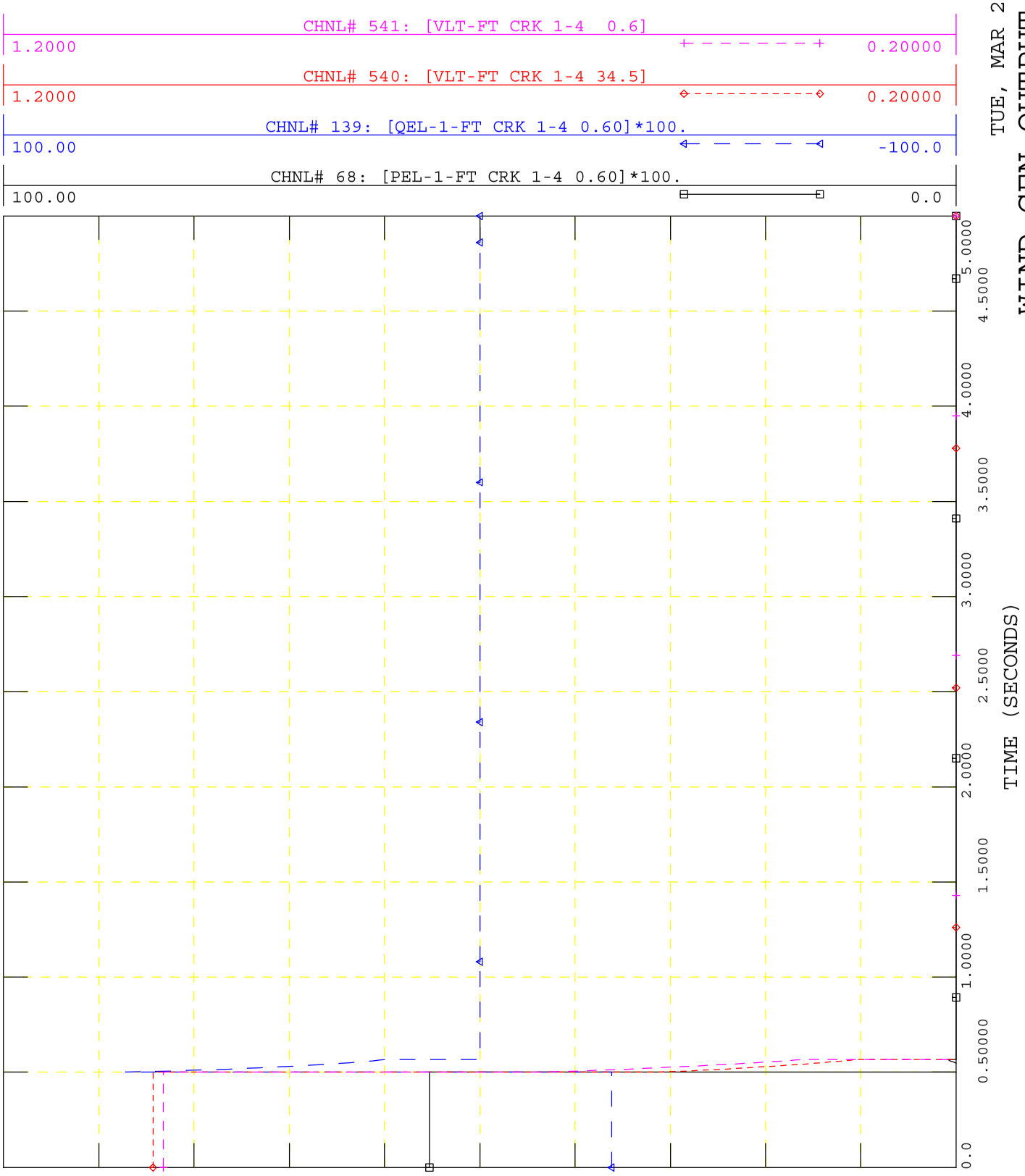

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TUE, MAR 27 2018 21:29 PLT 10

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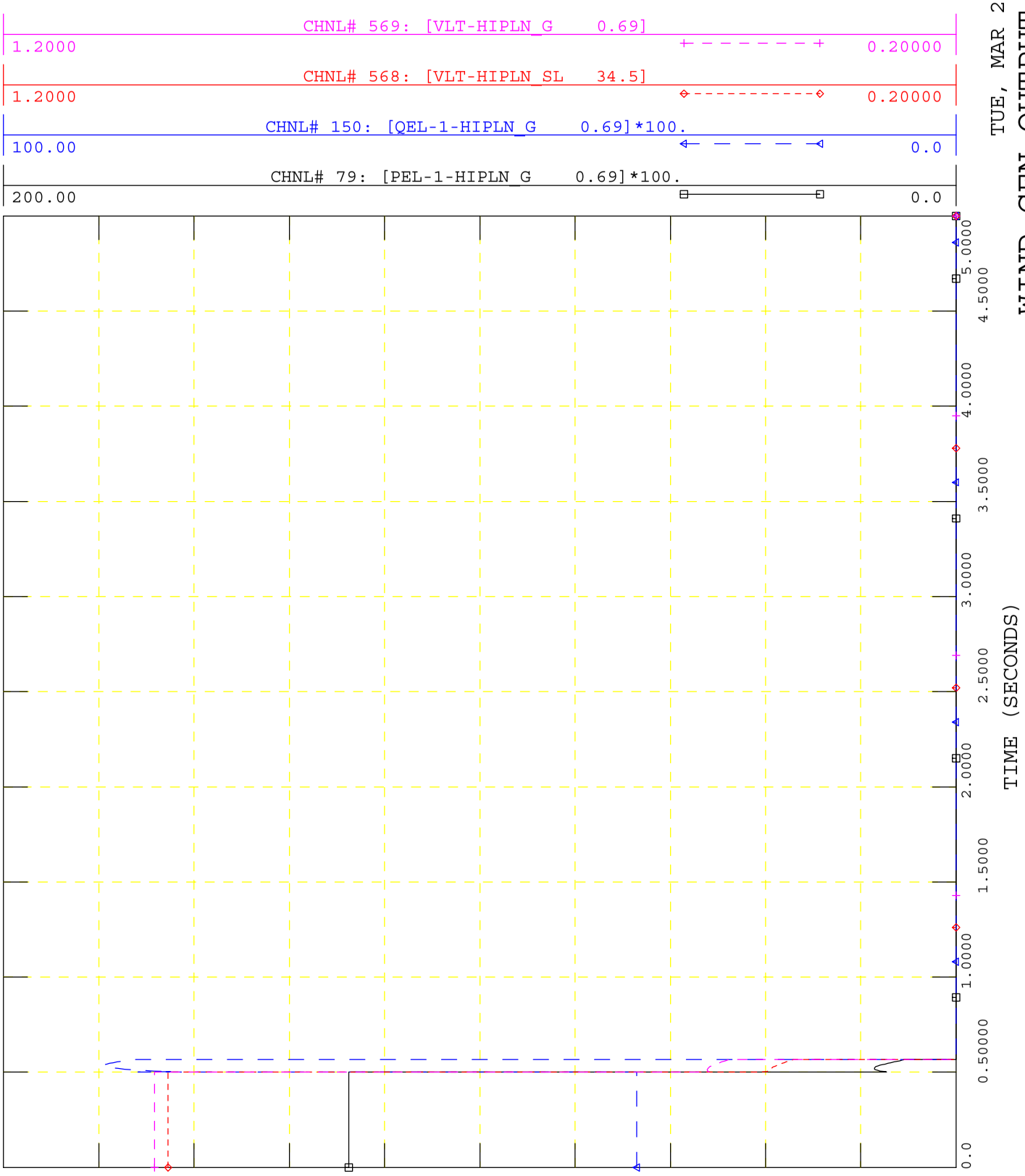

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CREEK 230 LN (262 MW GEN LOSS). 36CY-UNBLOCK SVC. OUTAGE 6
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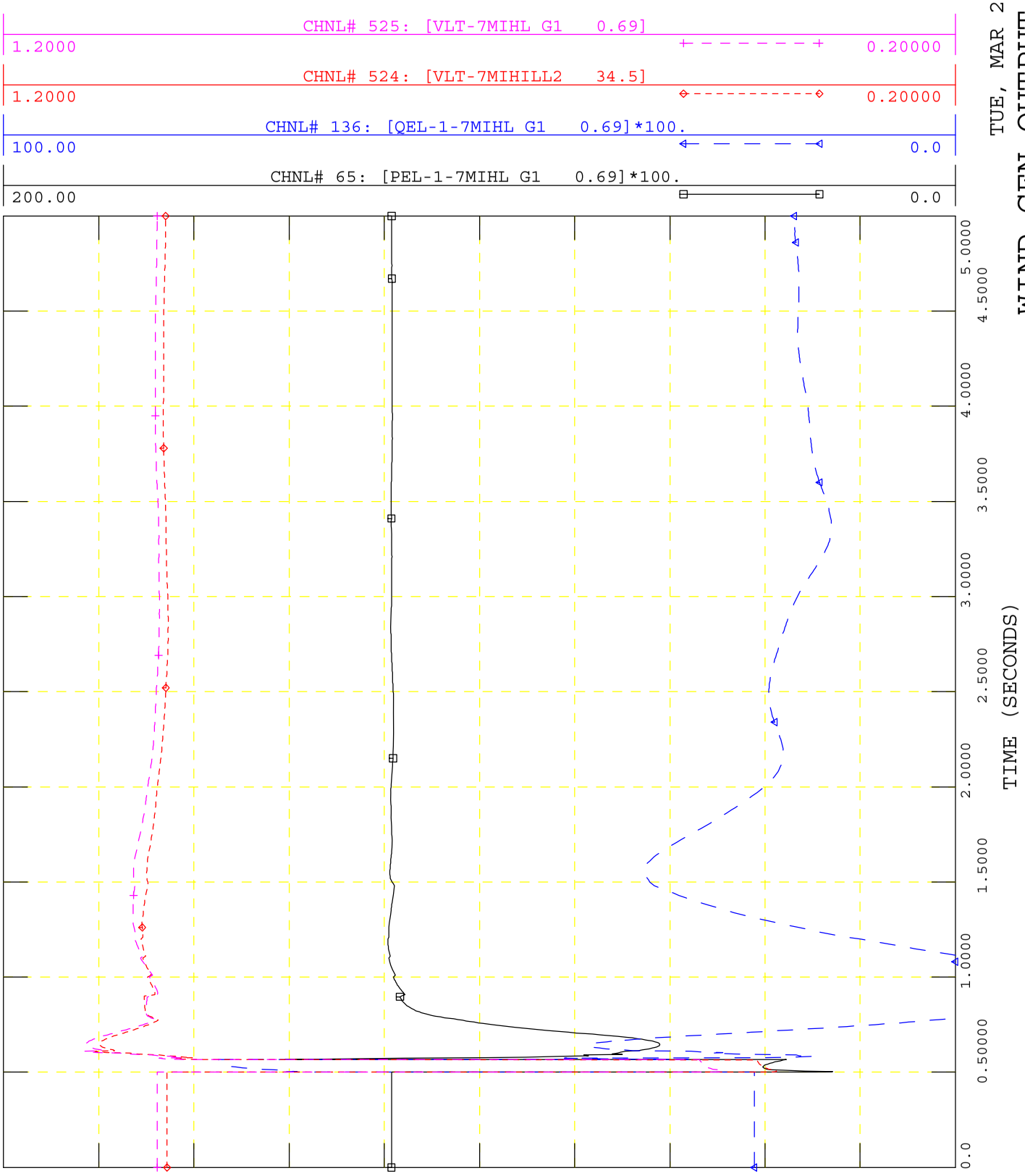
TUE, MAR 27 2018 21:29 PLT 11

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:29 PLT 12

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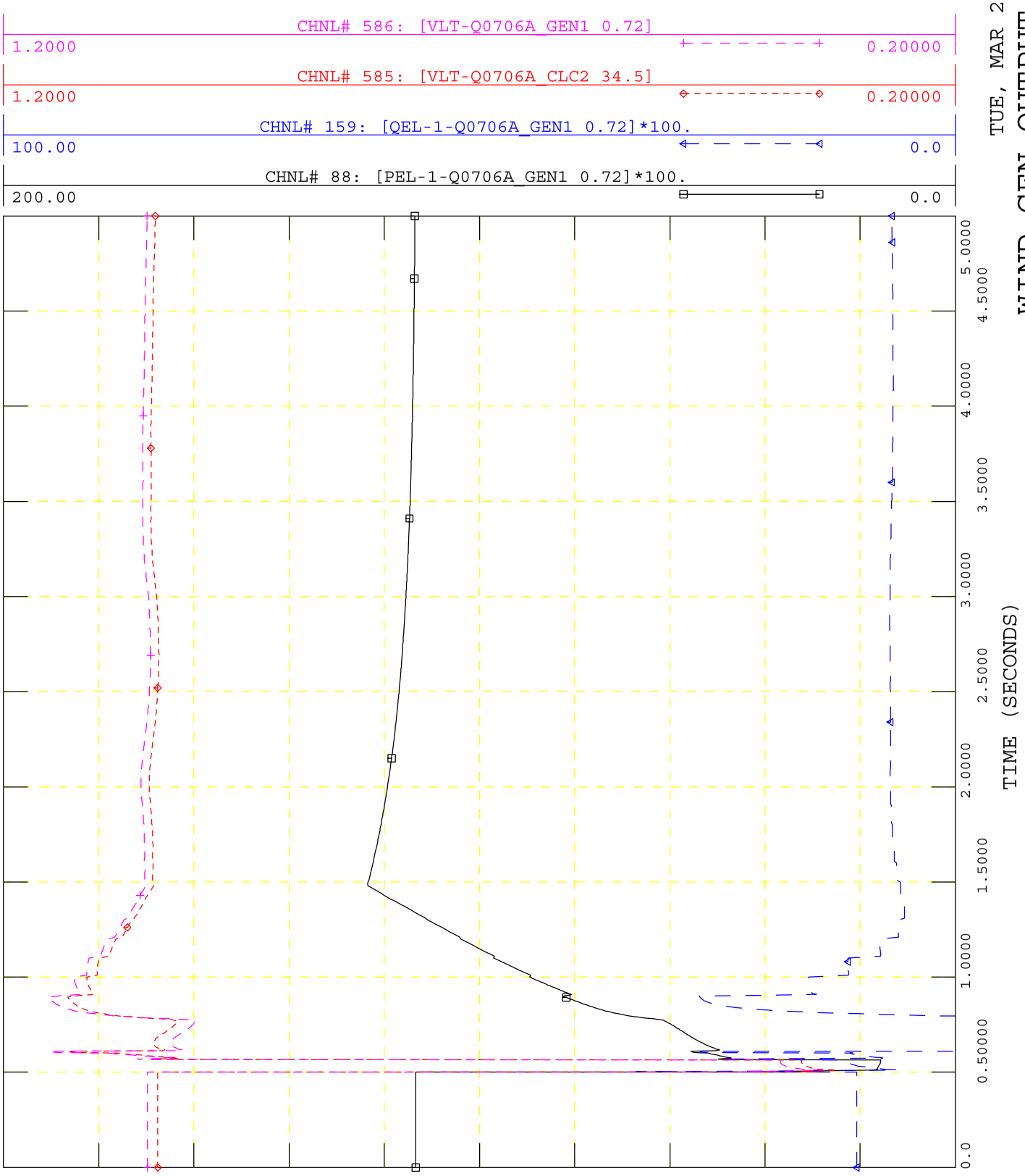

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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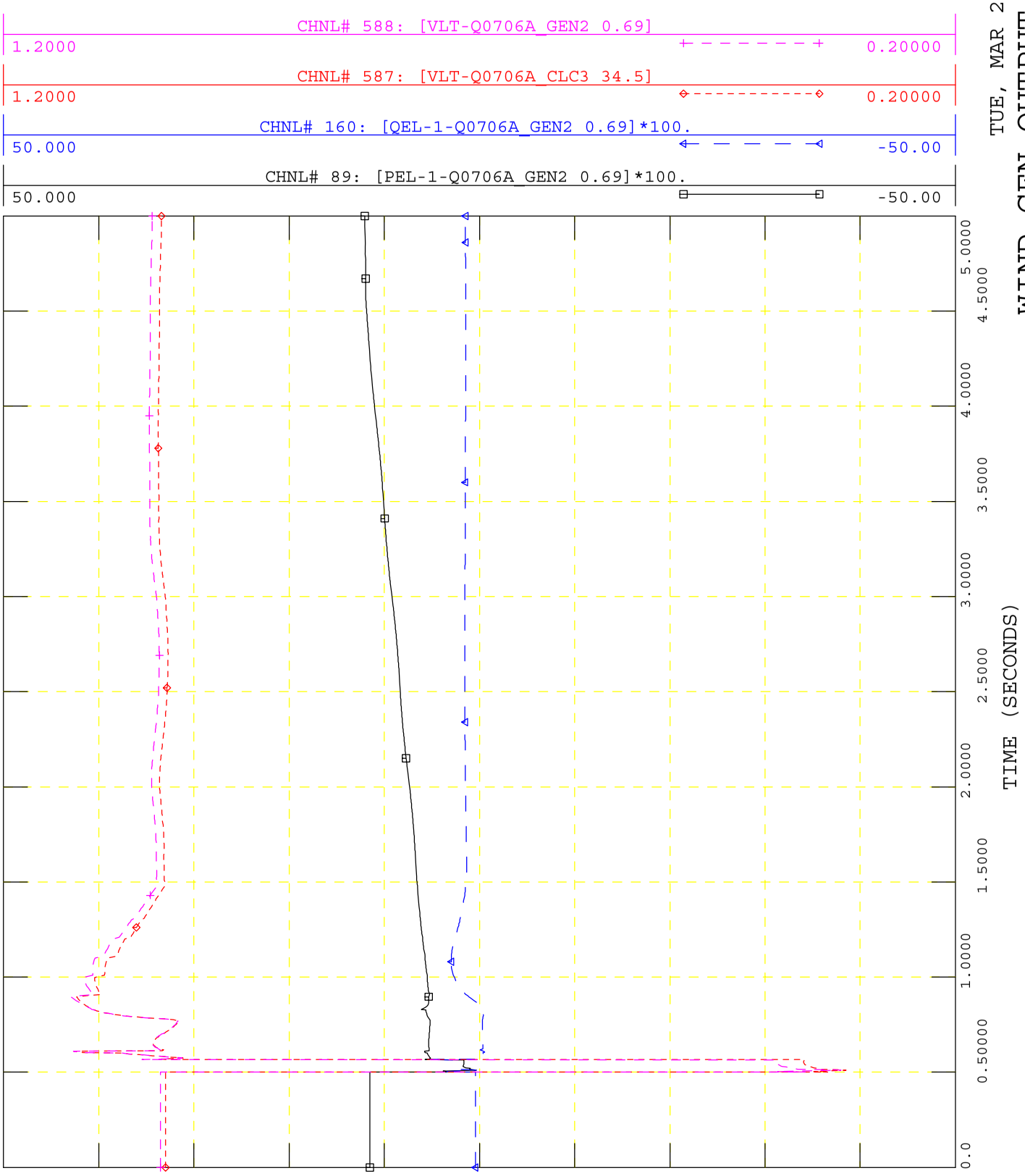
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 13



SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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TUE, MAR 27 2018 21:29 PLT 14

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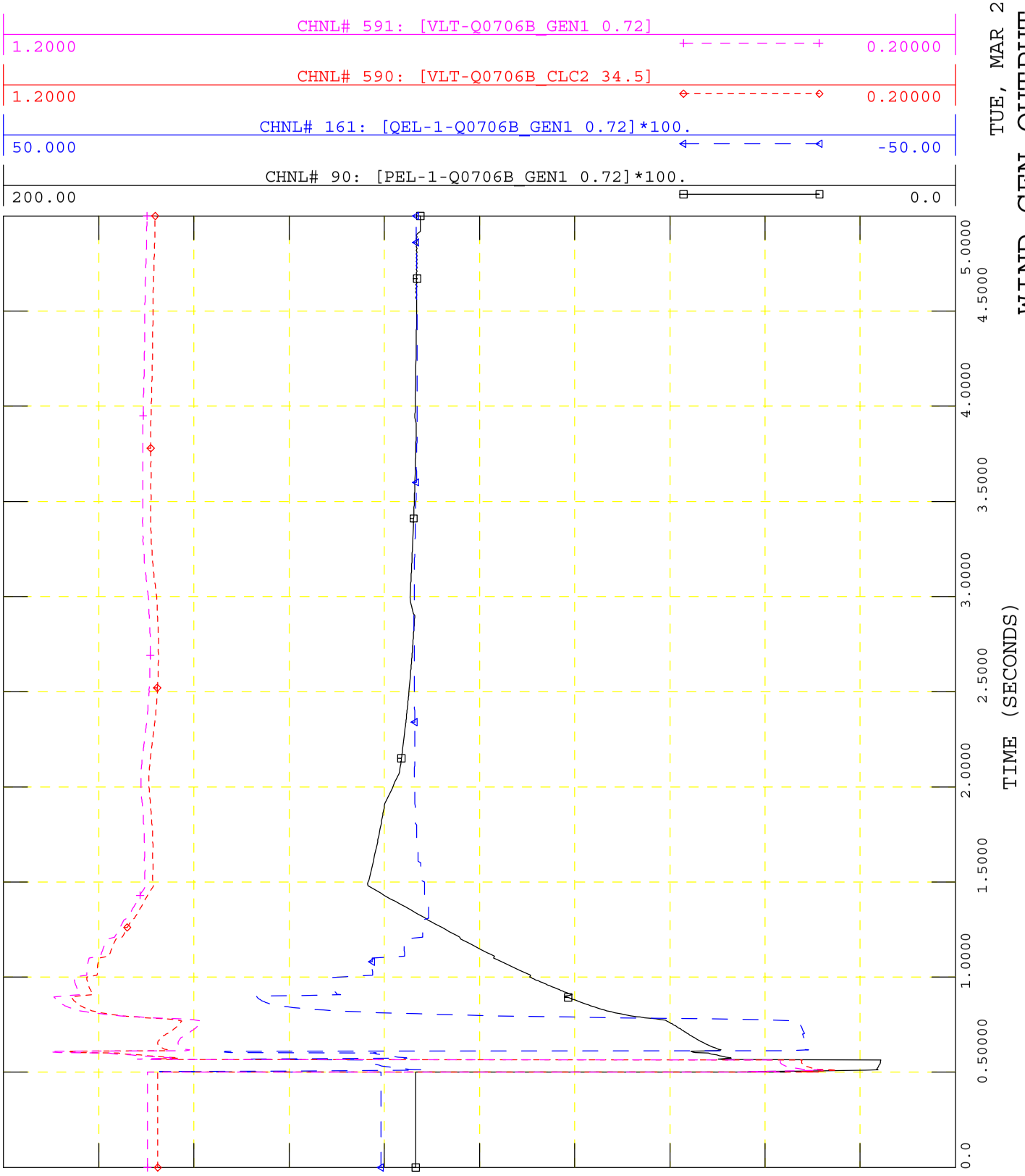

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TUE, MAR 27 2018 21:29 PLT 15

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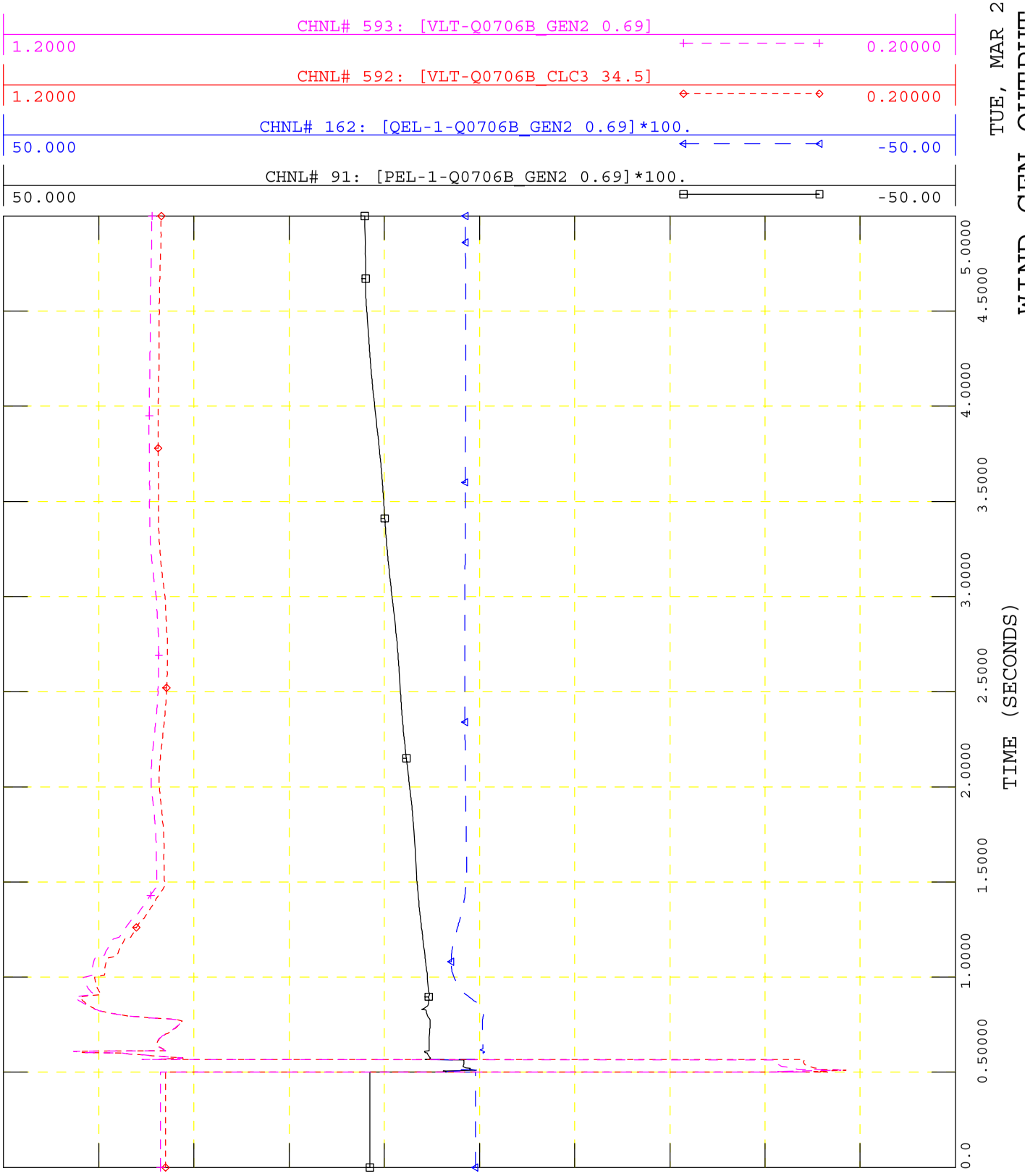

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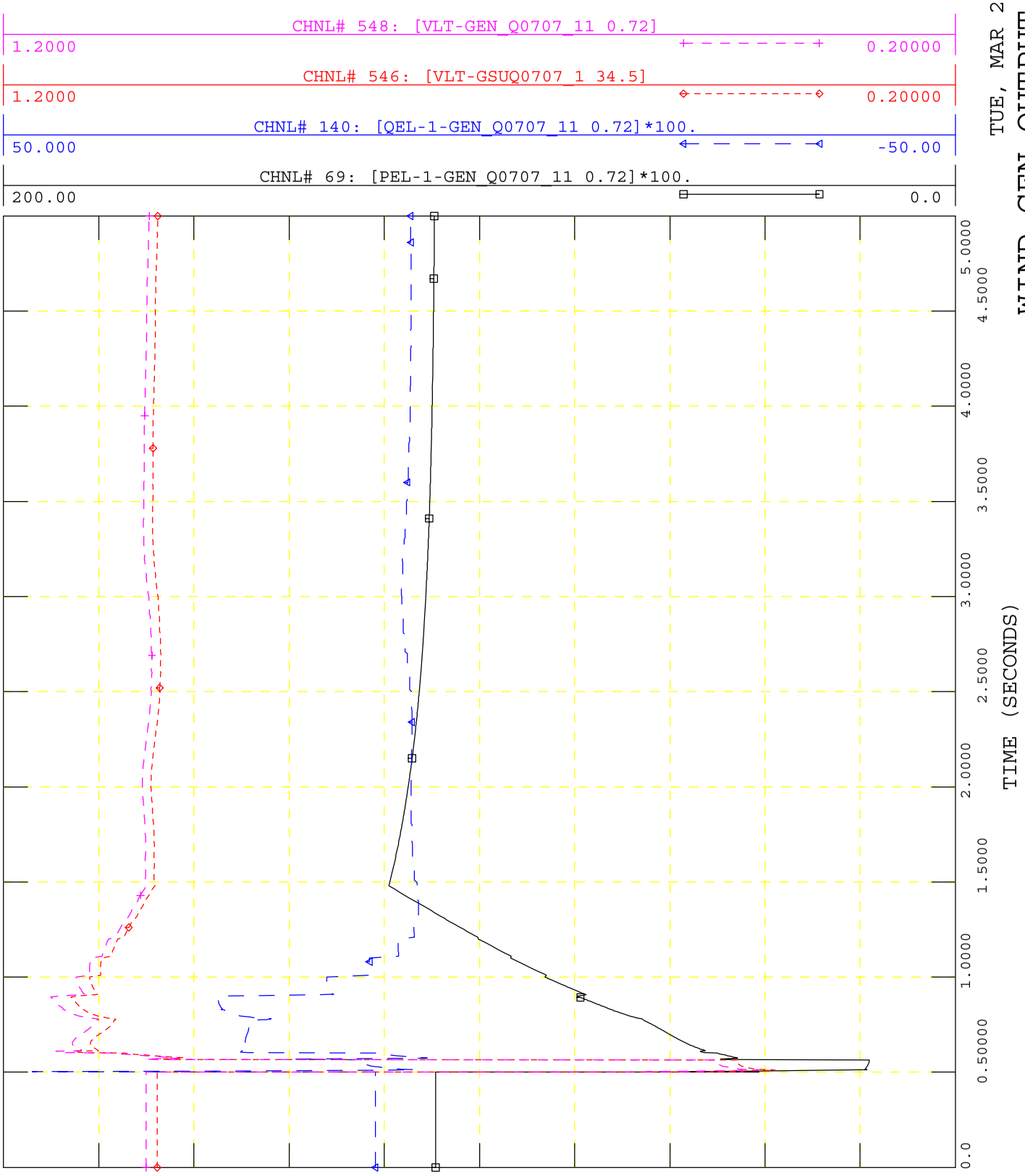
TUE, MAR 27 2018 21:29 PLT 16

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:29 PLT 17

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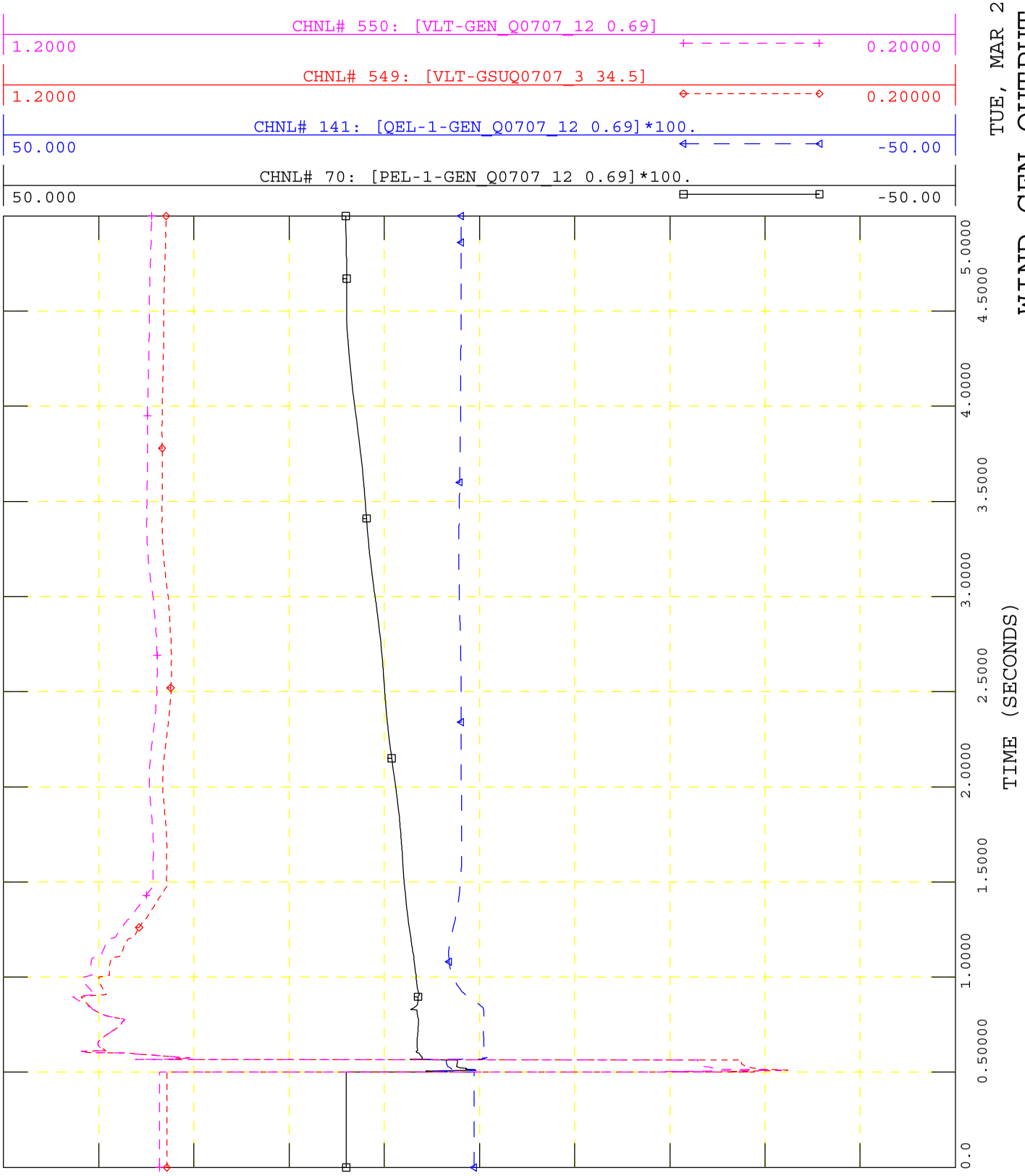

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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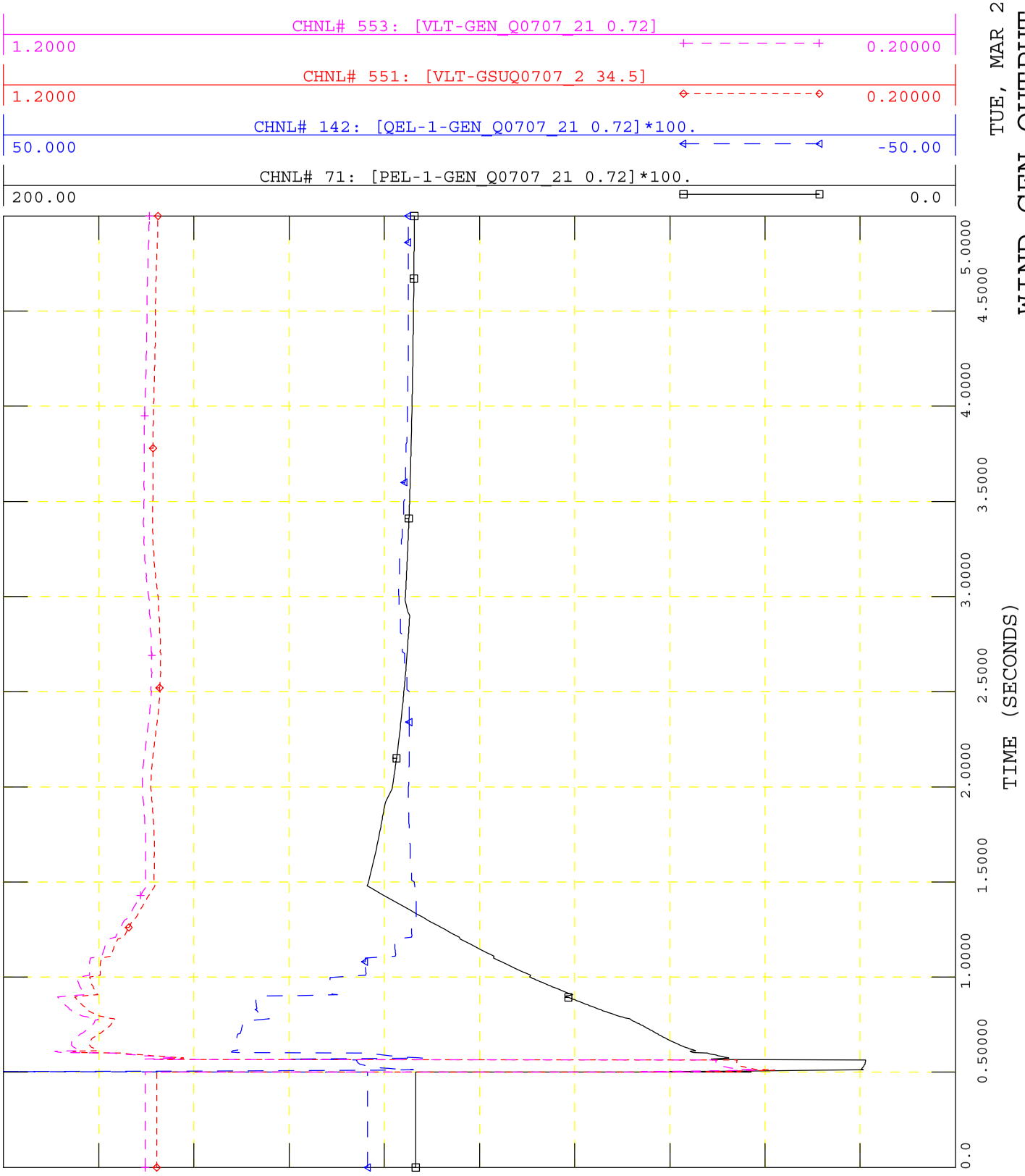

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TUE, MAR 27 2018 21:29 PLT 19

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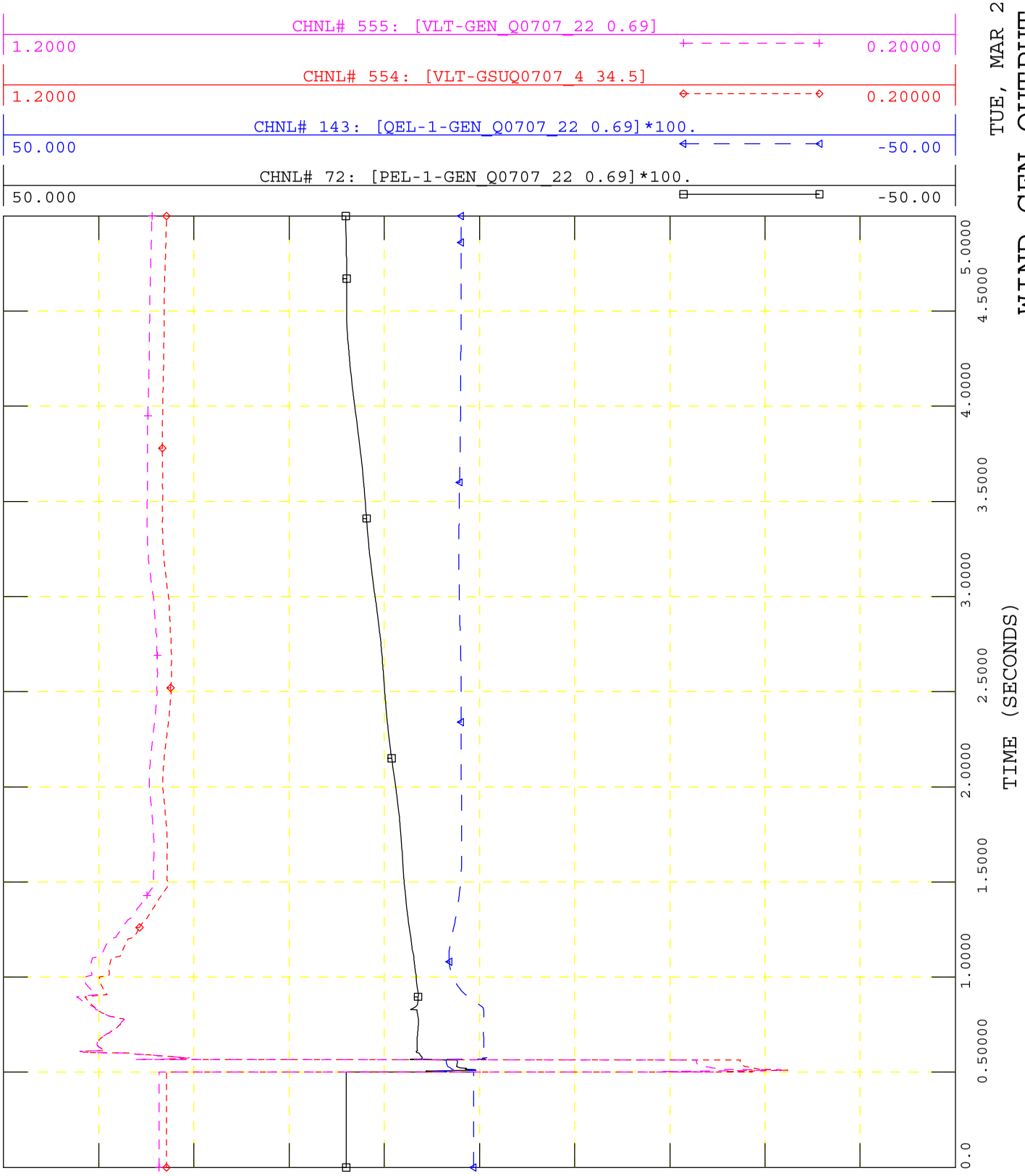

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TUE, MAR 27 2018 21:29 PLT 20

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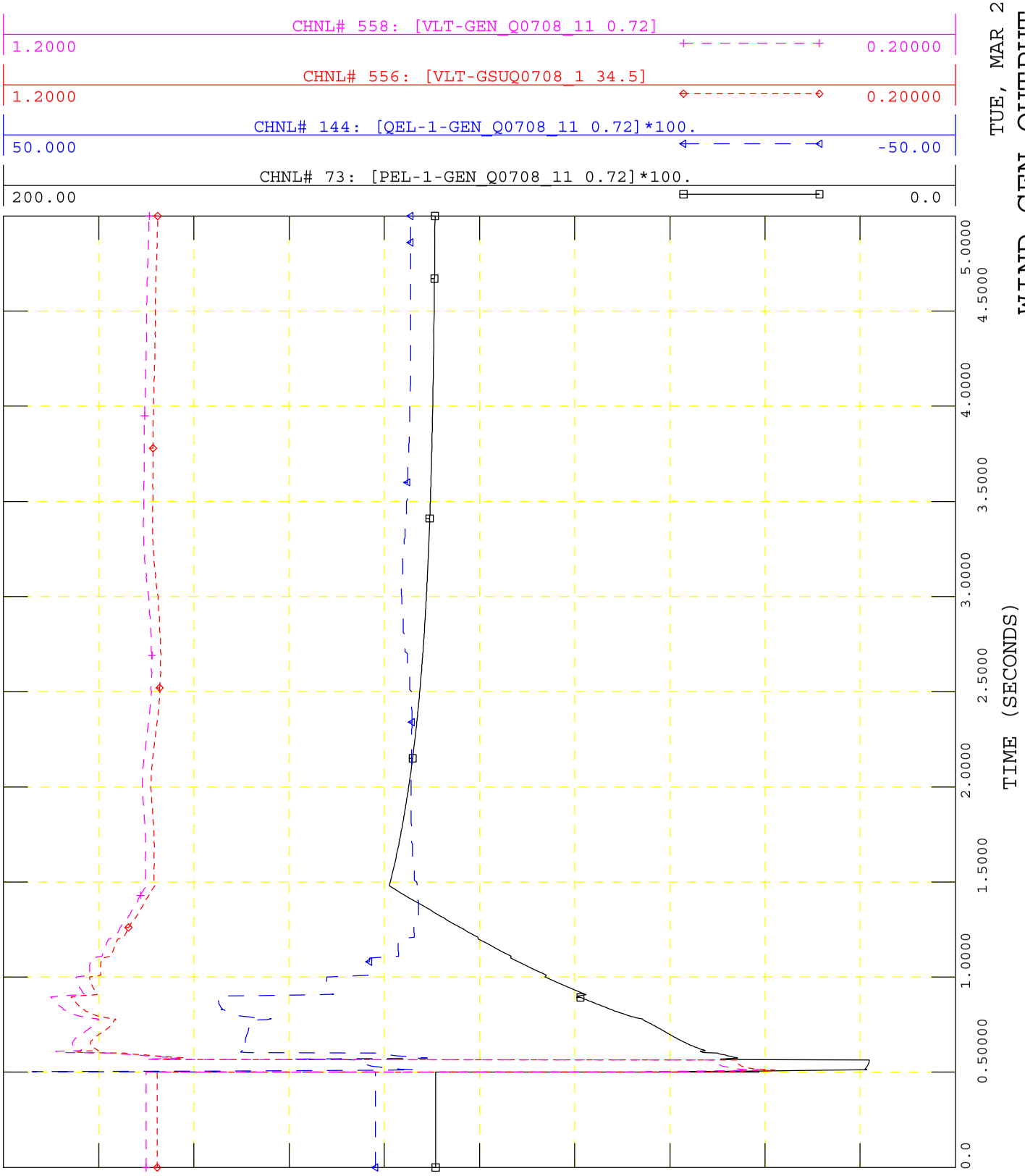

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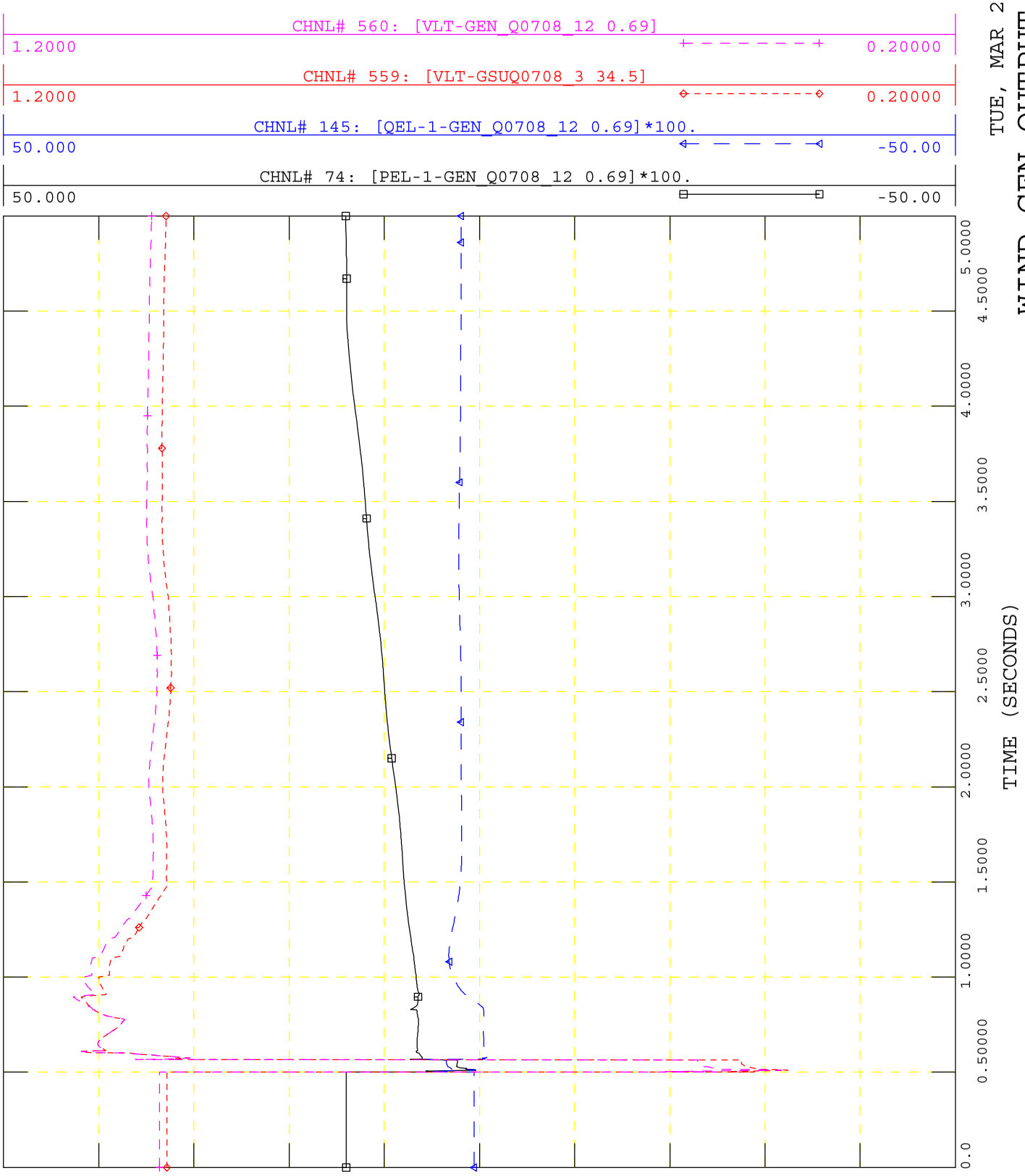
TUE, MAR 27 2018 21:29 PLT 21

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:29 PLT 22

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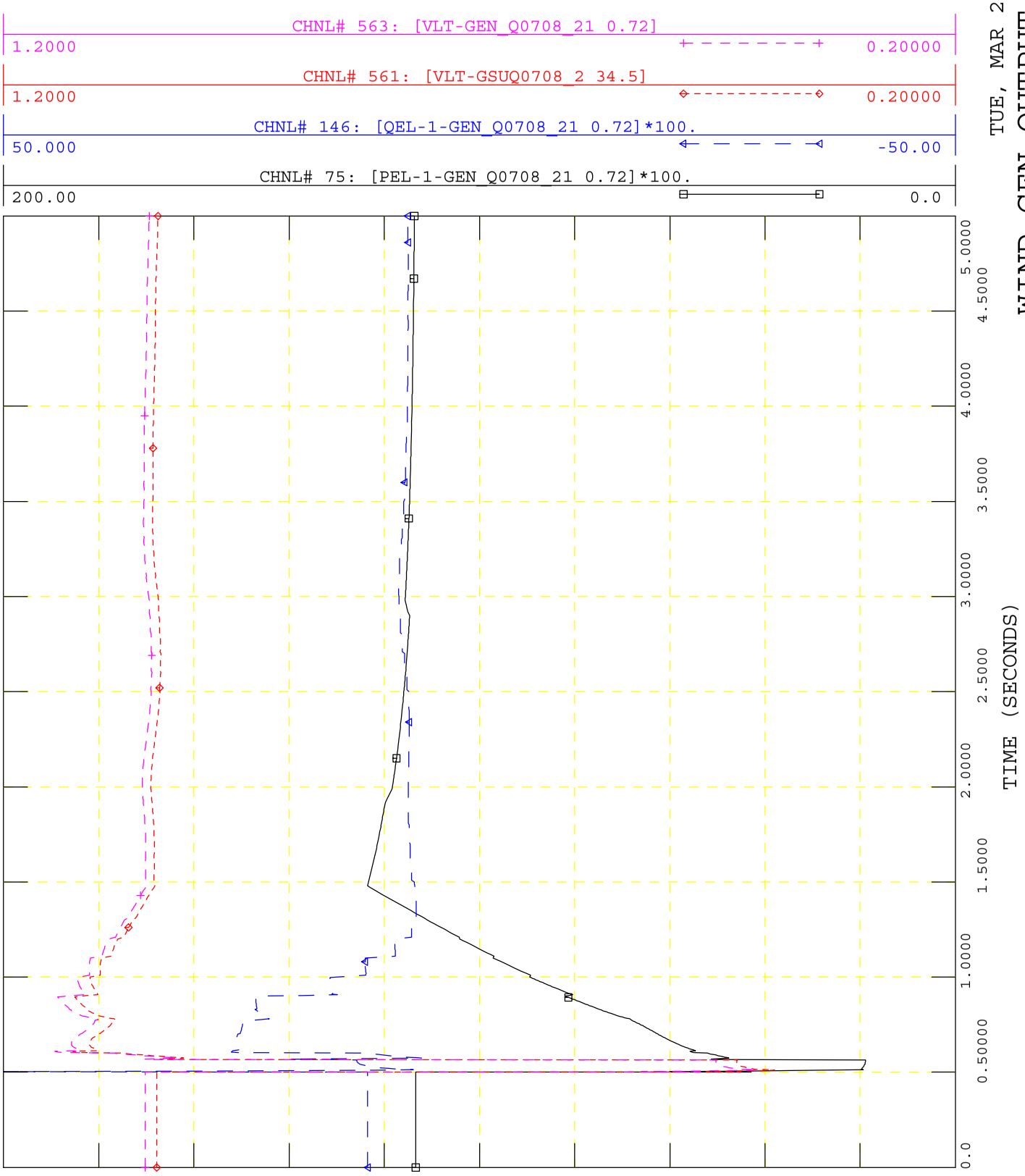

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TUE, MAR 27 2018 21:29 PLT 23

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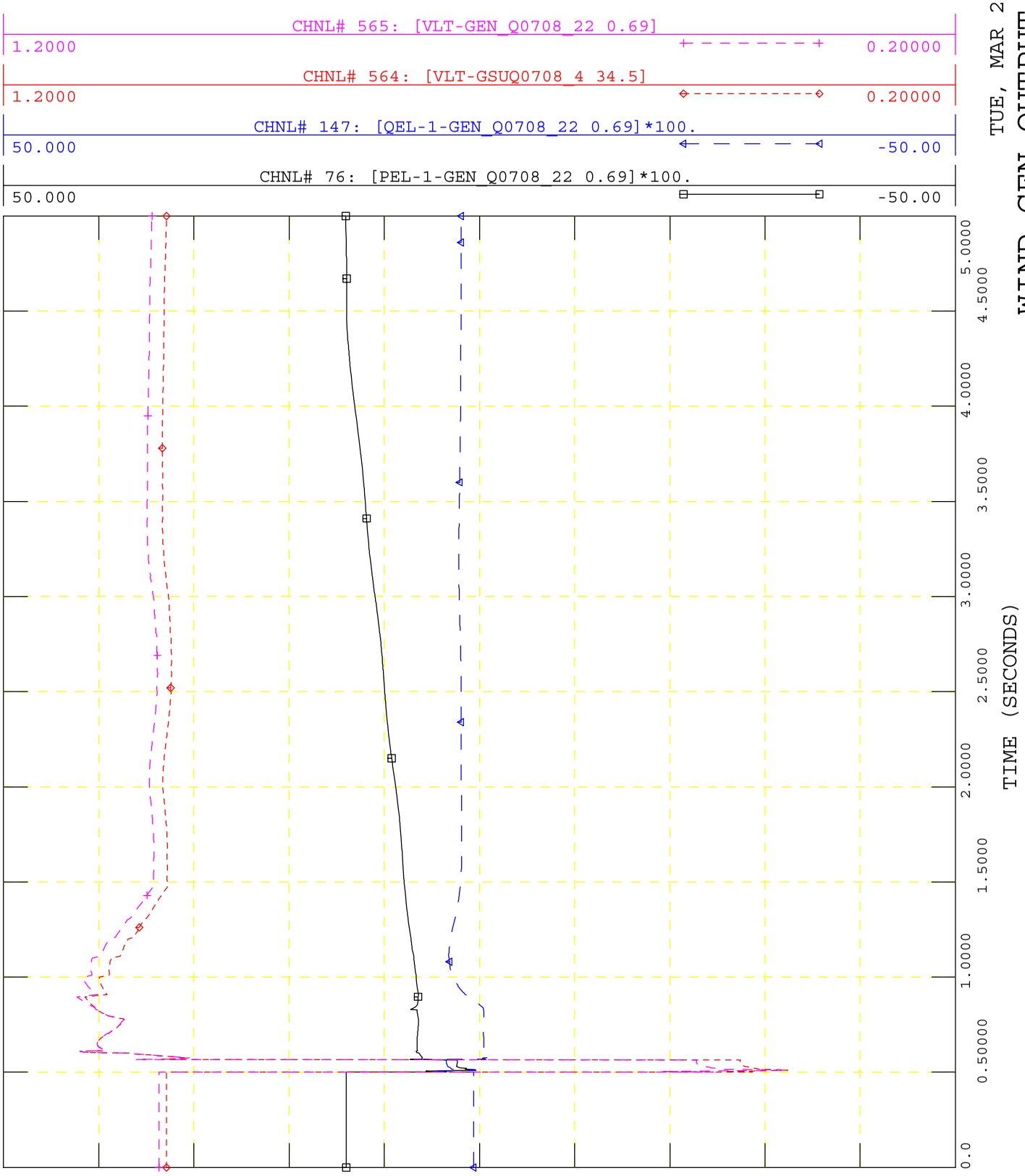

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TUE, MAR 27 2018 21:29 PLT 24

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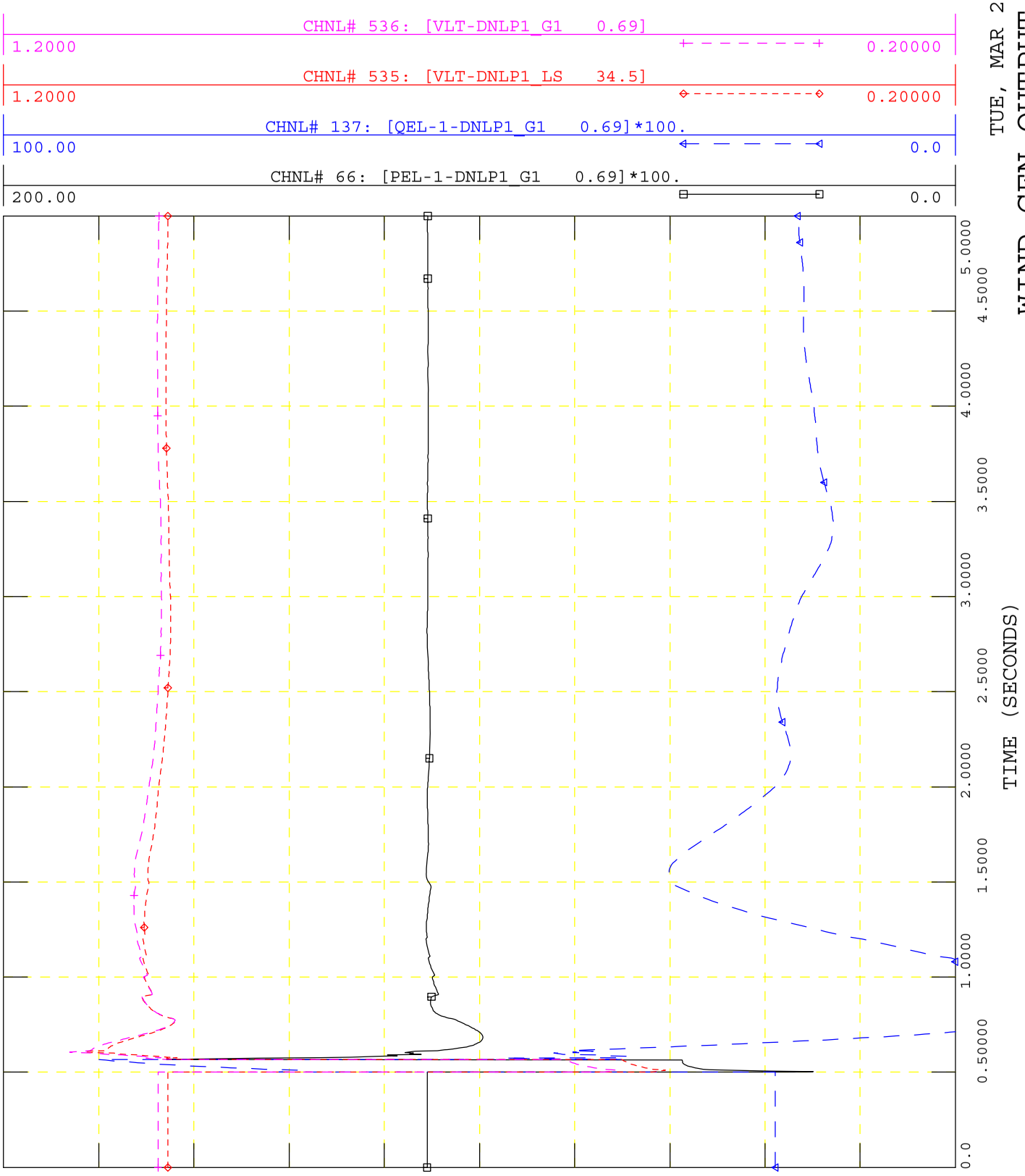

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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CREEK 230 LN (262 MW GEN LOSS). 36CY-UNBLOCK SVC. OUTAGE 6
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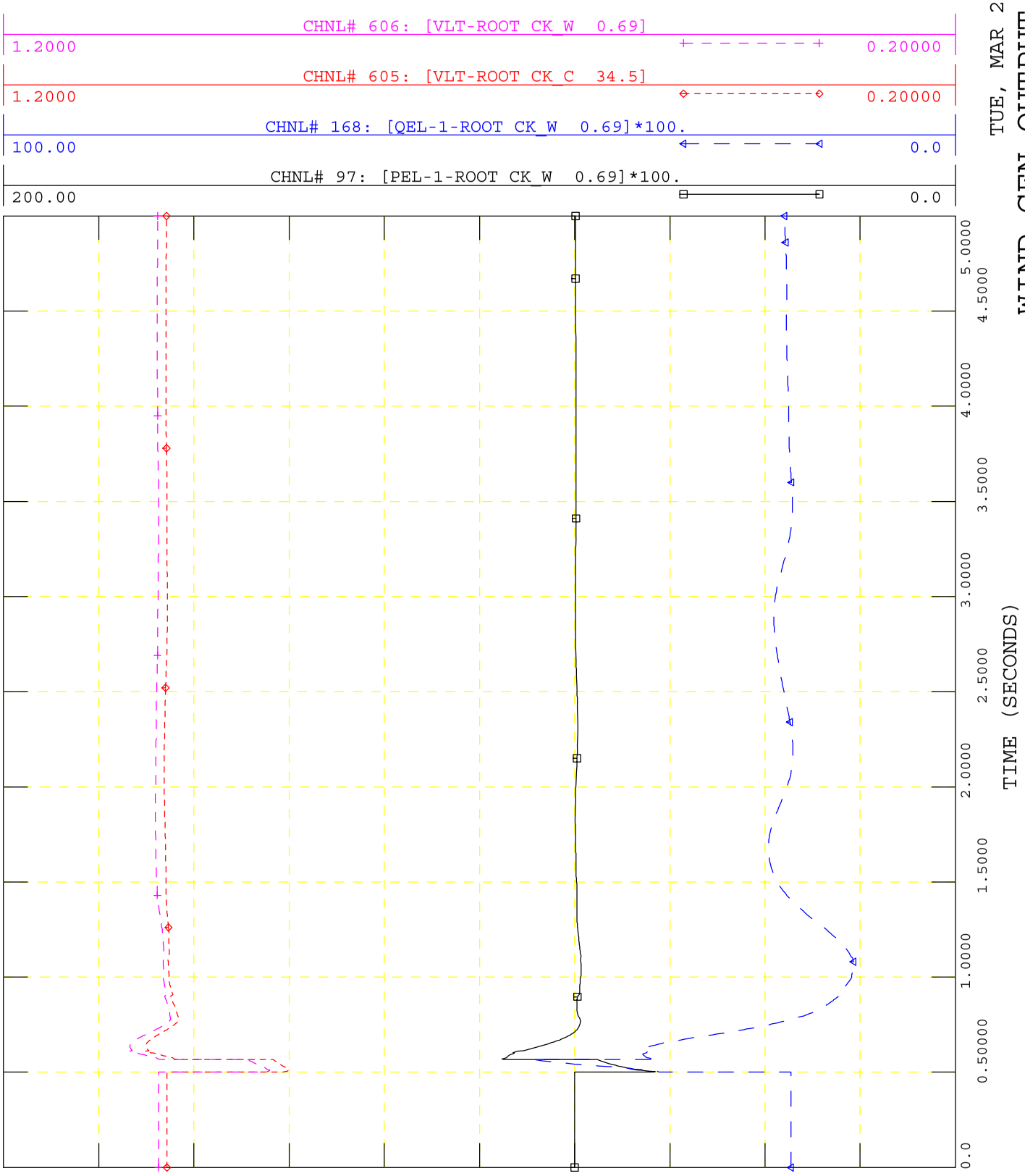
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 25



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CREEK 230 LN (262 MW GEN LOSS). 36CY-UNBLOCK SVC. OUTAGE 6
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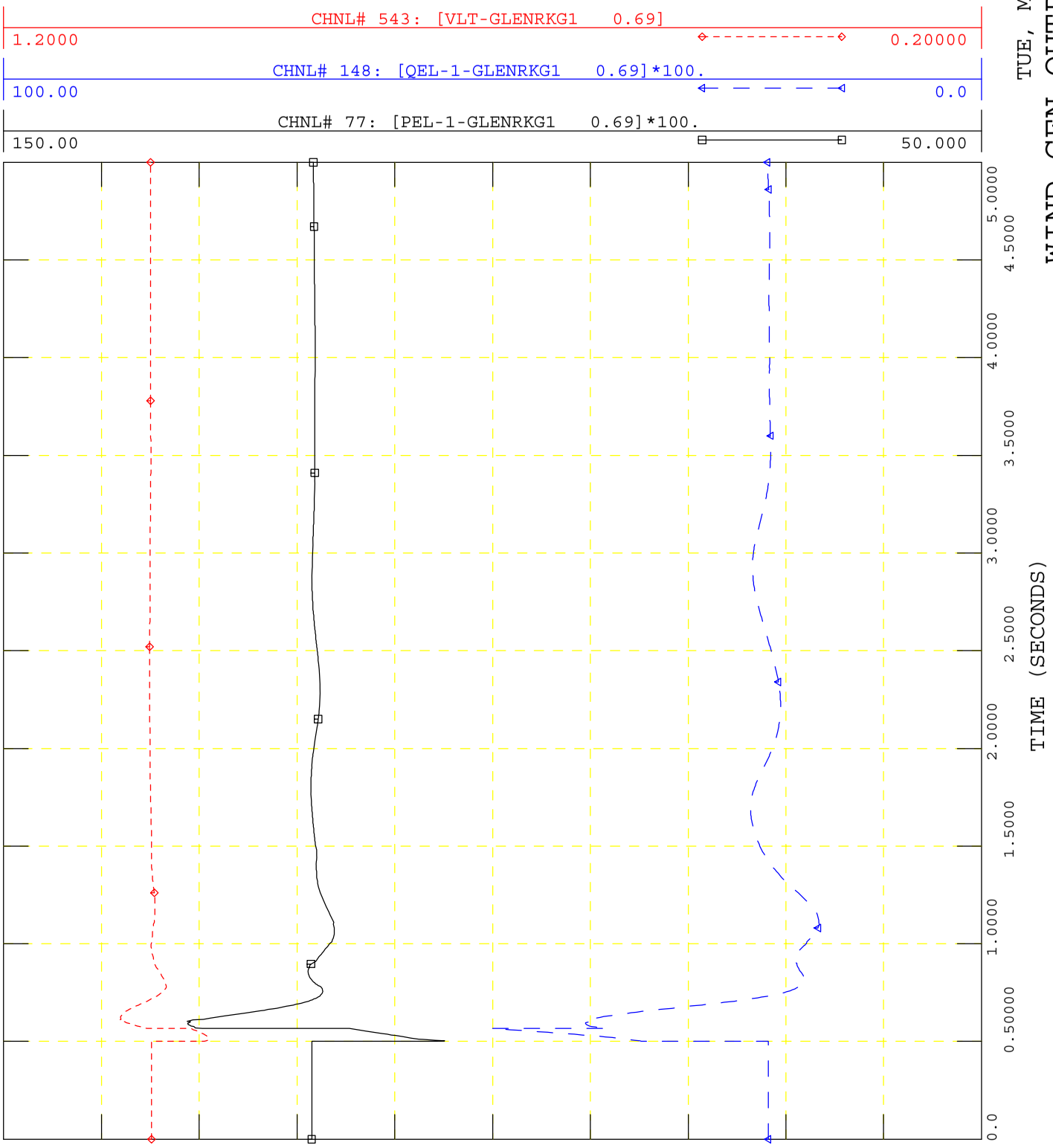
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 26



Dynamic Simulation

Case 7 – Loss of Standpipe-Freezeout 230 kV line

30 cycles	**3 phase Standpipe 230 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Standpipe-Freezeout 230 kV line**
36 cycles	**Remove SVC MVAR limiter**
5 sec.	**Terminate simulation**

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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STANDPIPE-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 7
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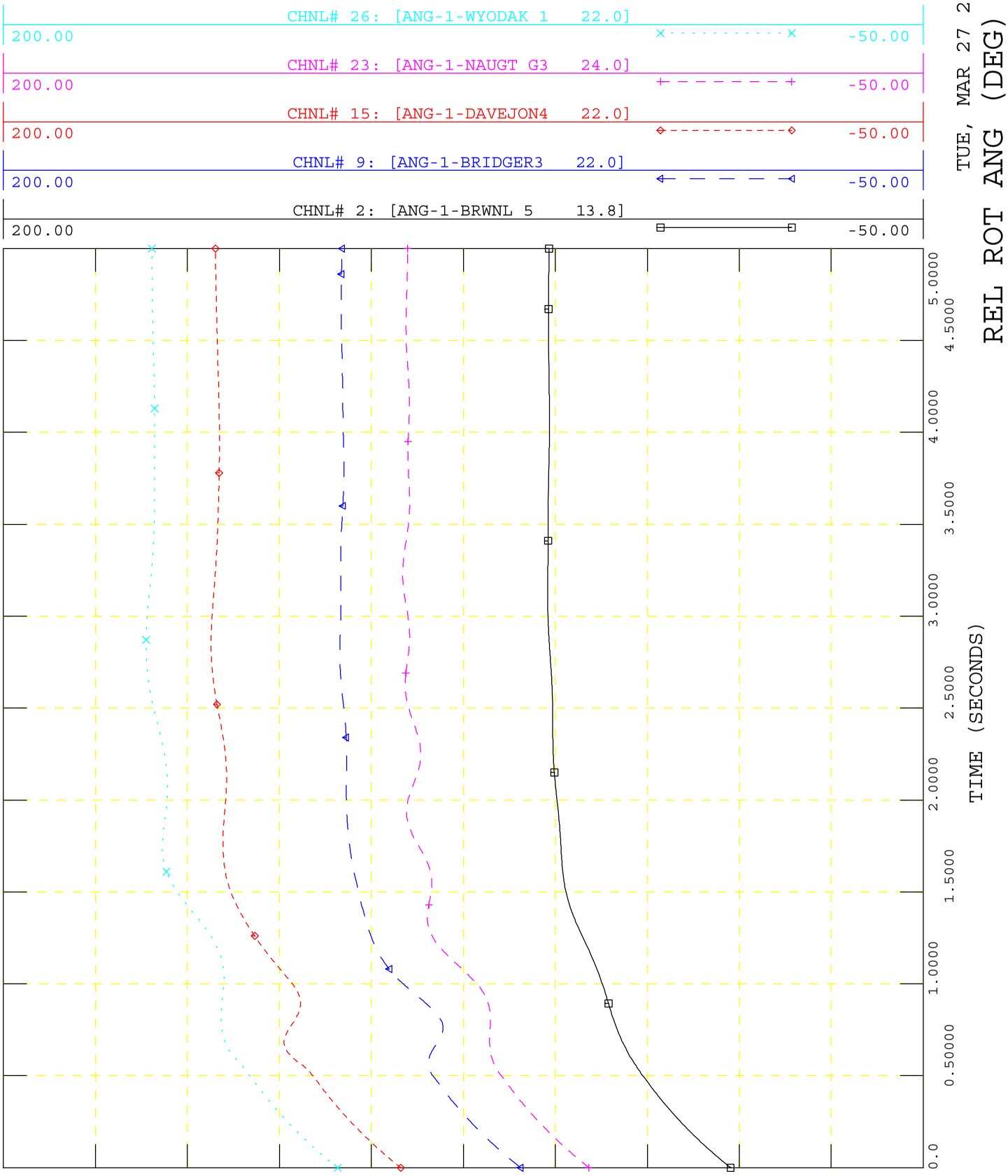

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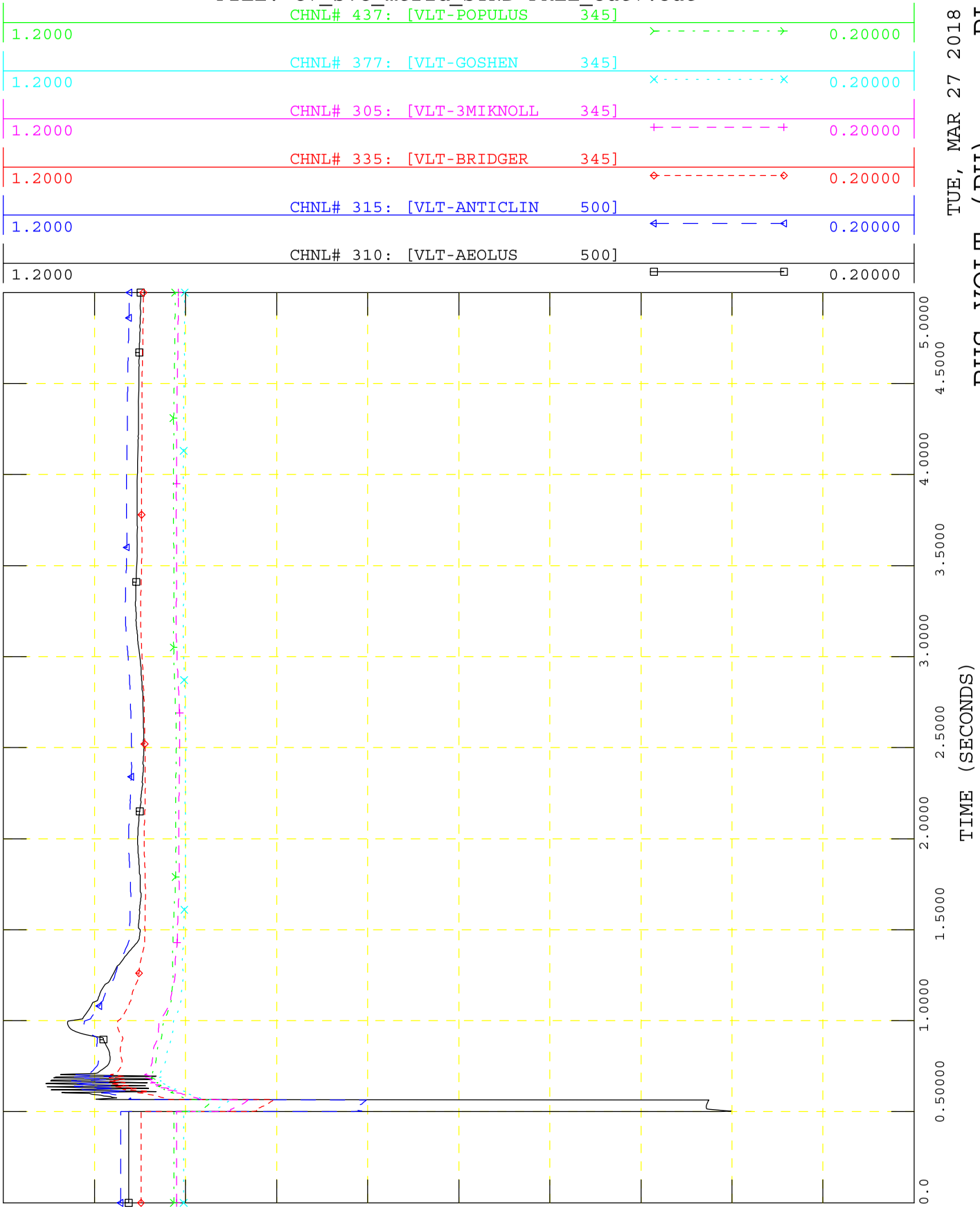
FILE: c7_svc_mtrld_STND-FREE_out7.out

TUE, MAR 27 2018 21:29 PLT 2



SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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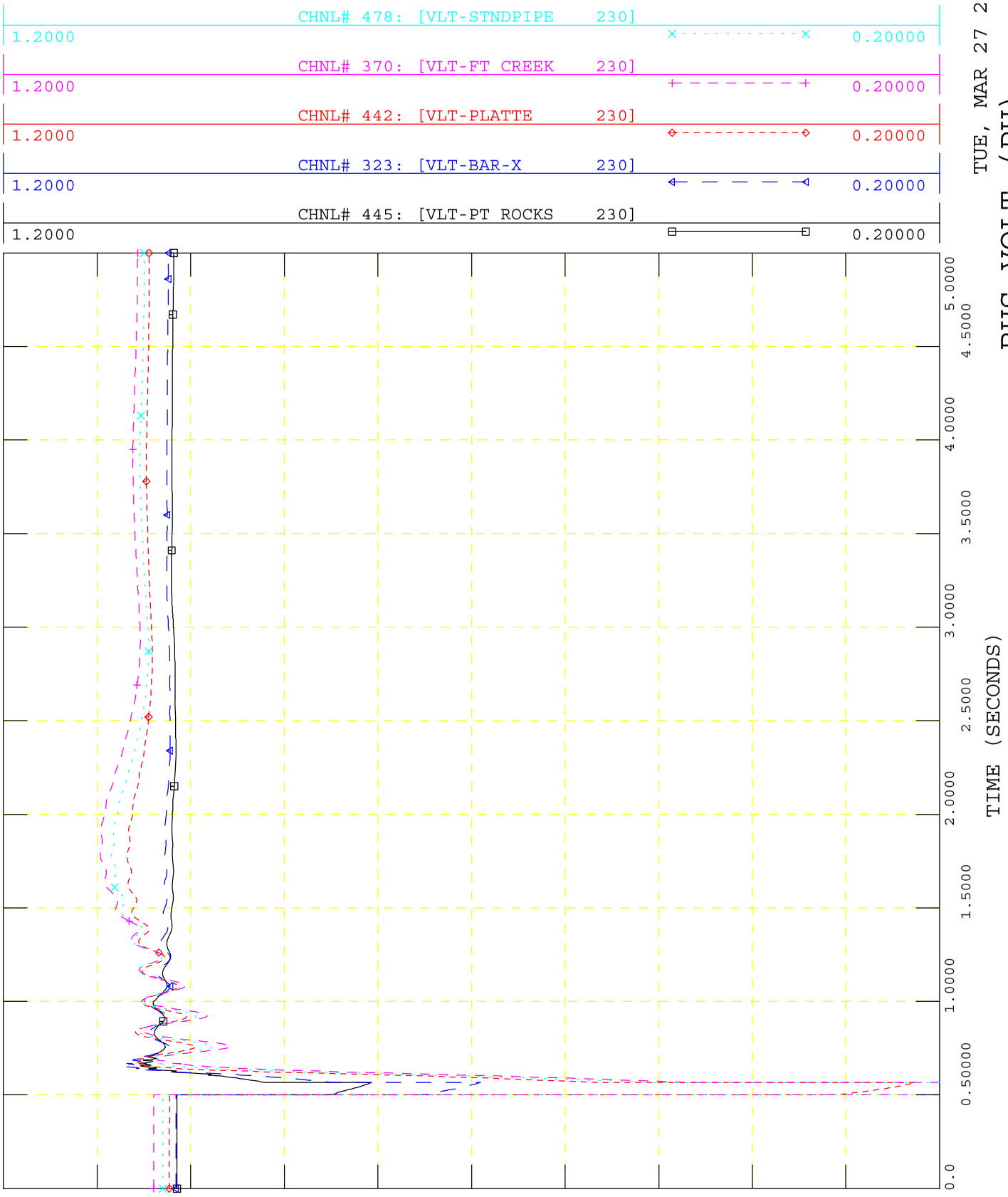
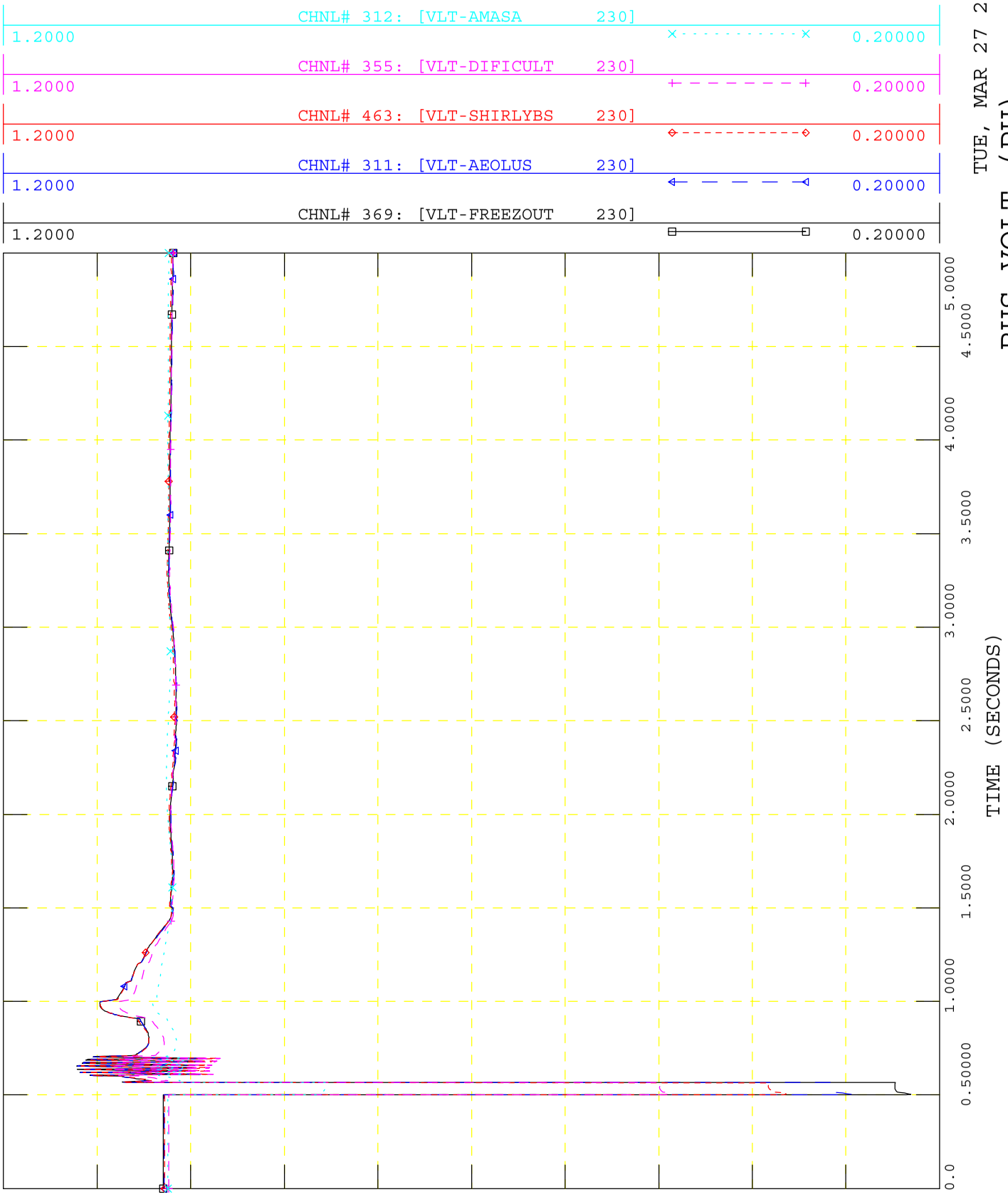
TUE, MAR 27 2018 21:29 PLT 3



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS STANDPIPE KV 230 FLT. 34CY-CLR FLT & OPEN
STANDPIPE-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 7
FILE: c7_svc_mtrld_STND-FREE_out7.out

TUE, MAR 27 2018 21:29 PLT 4



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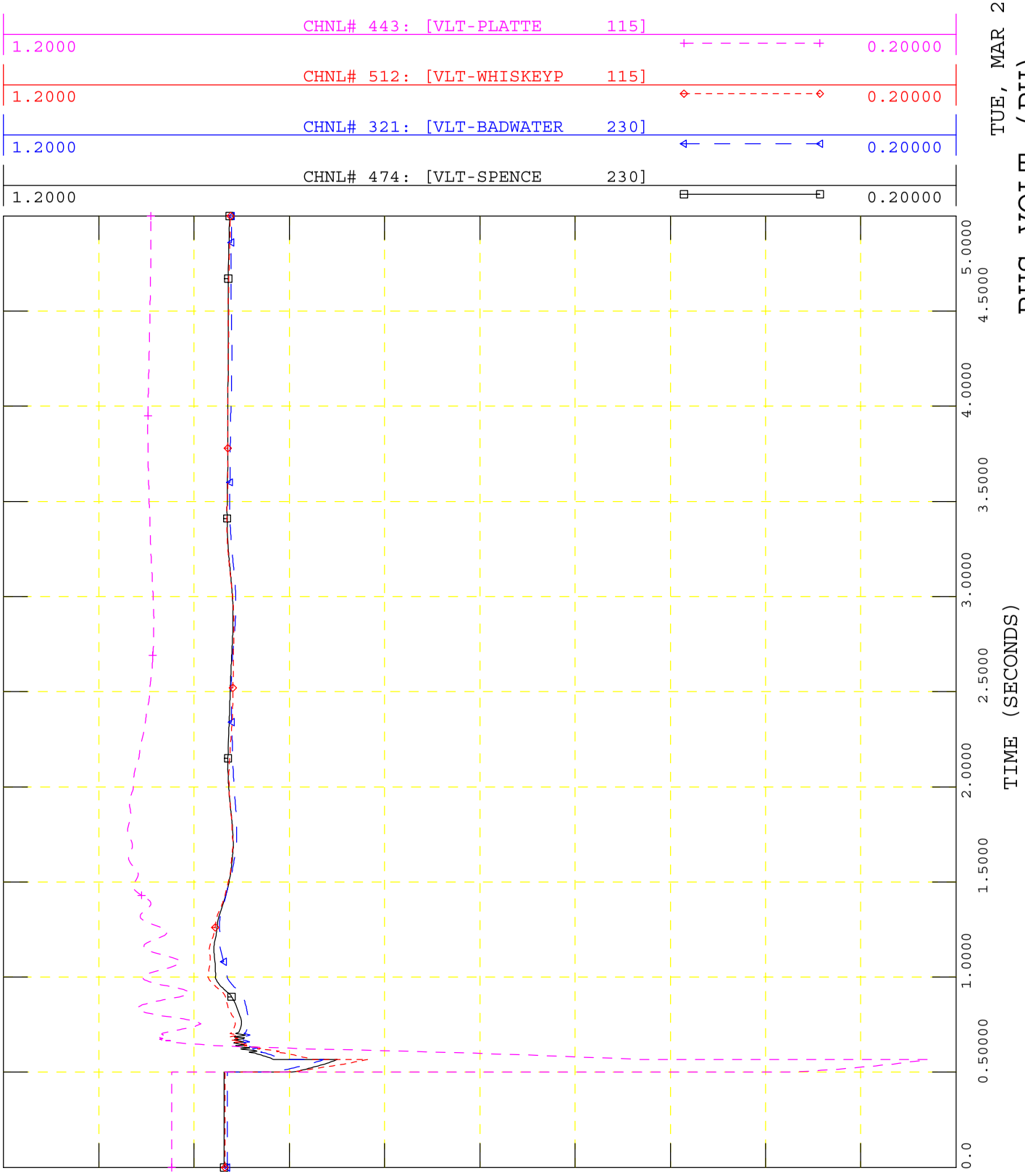
TUE, MAR 27 2018 21:29 PLT 5



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STANDPIPE-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 7
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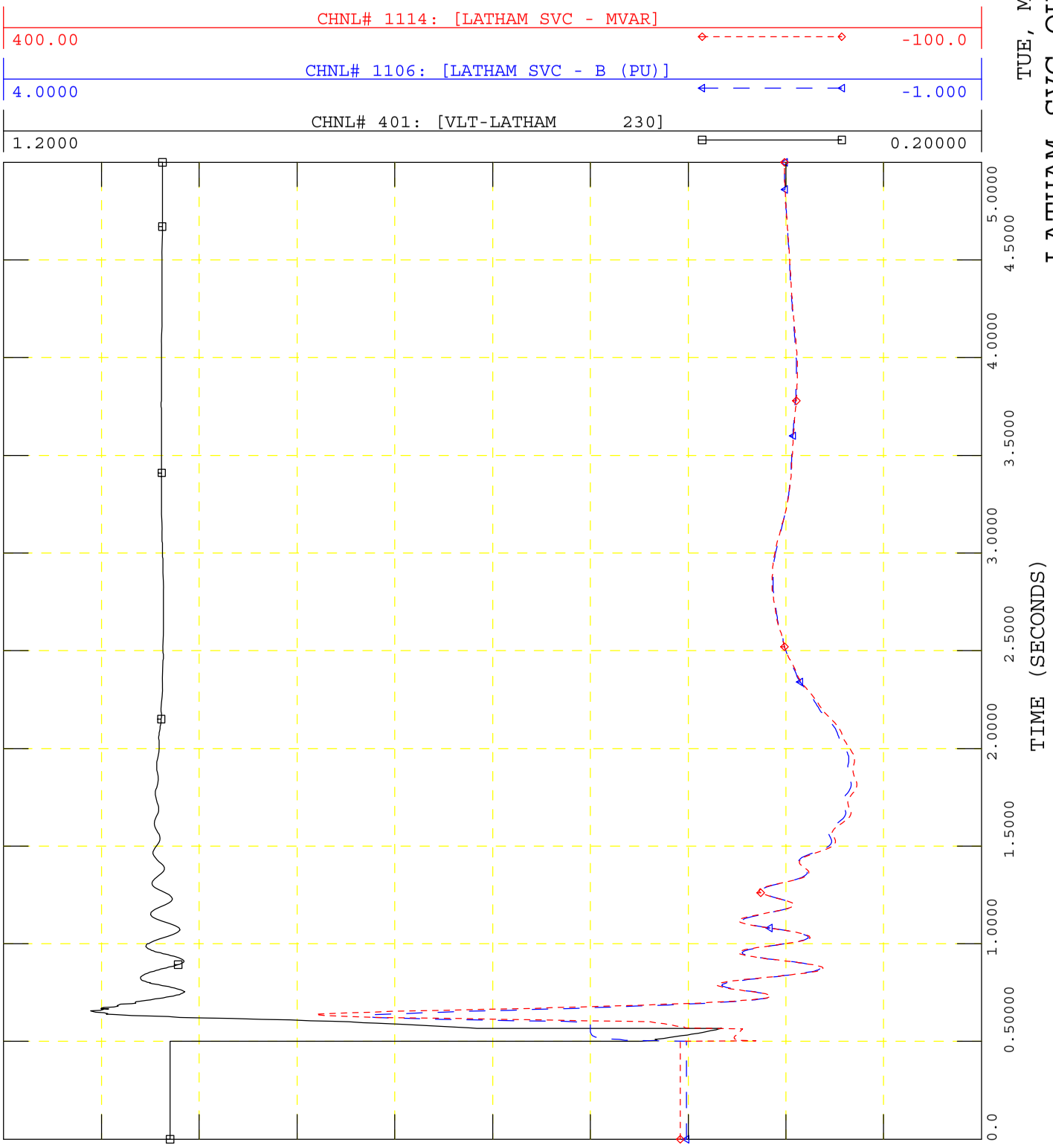
TUE, MAR 27 2018 21:29 PLT 6

LATHAM SVC OUT



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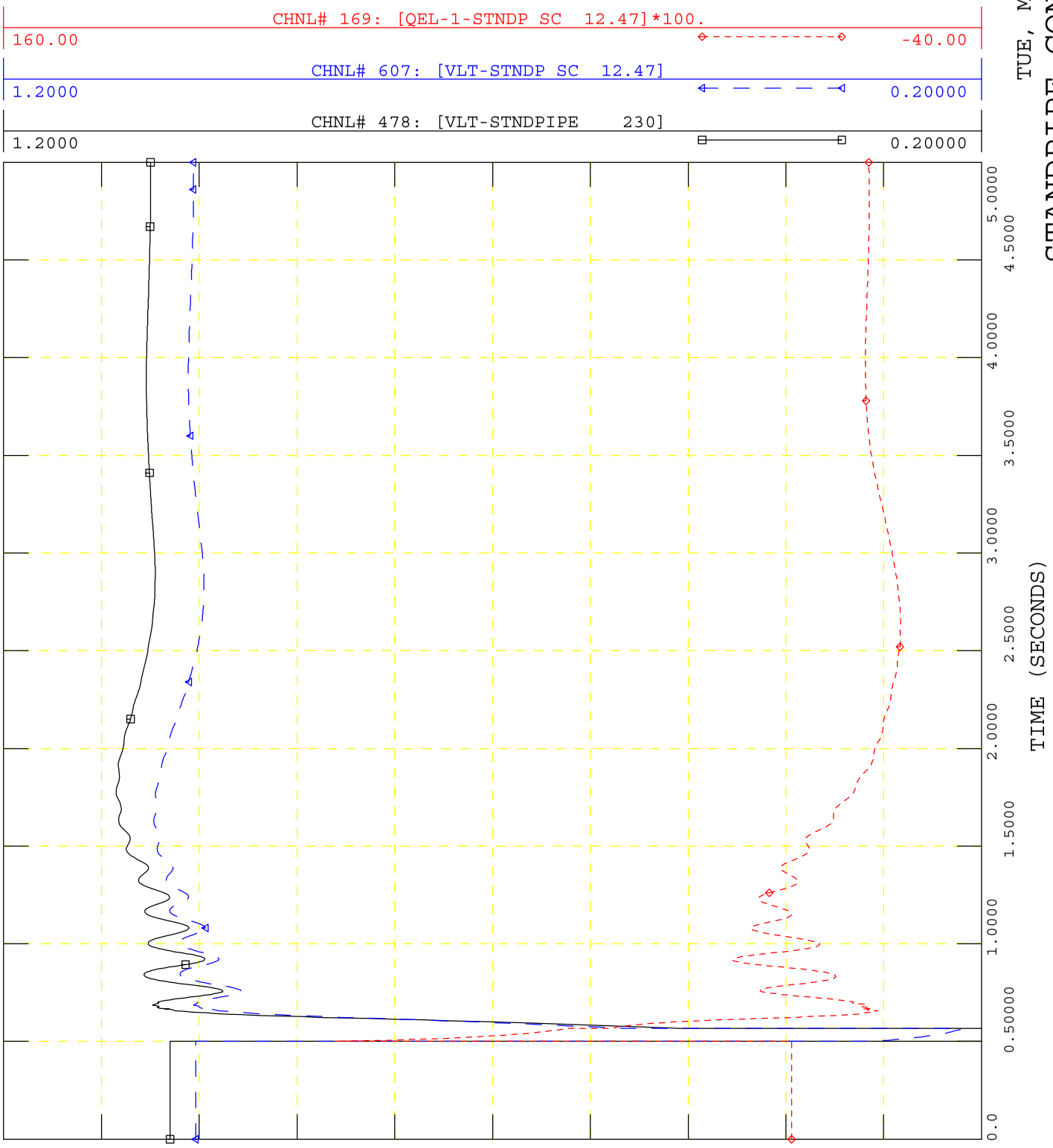
FILE: c7_svc_mtrld_STND-FREE_out7.out

TUE, MAR 27 2018 21:29

STANDPIPE CONDNSR PLT 7



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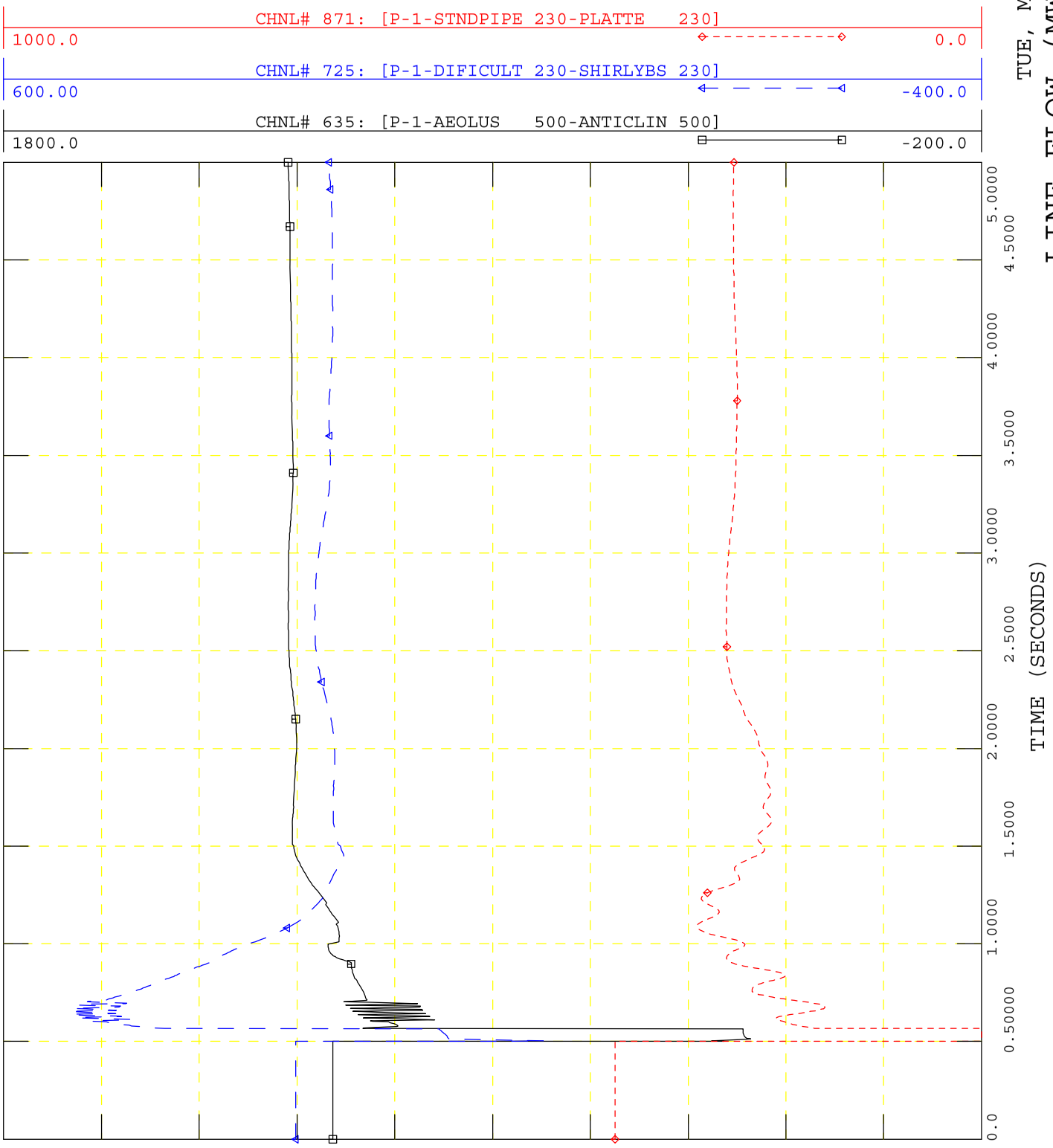
TUE, MAR 27 2018 21:29 PLT 8



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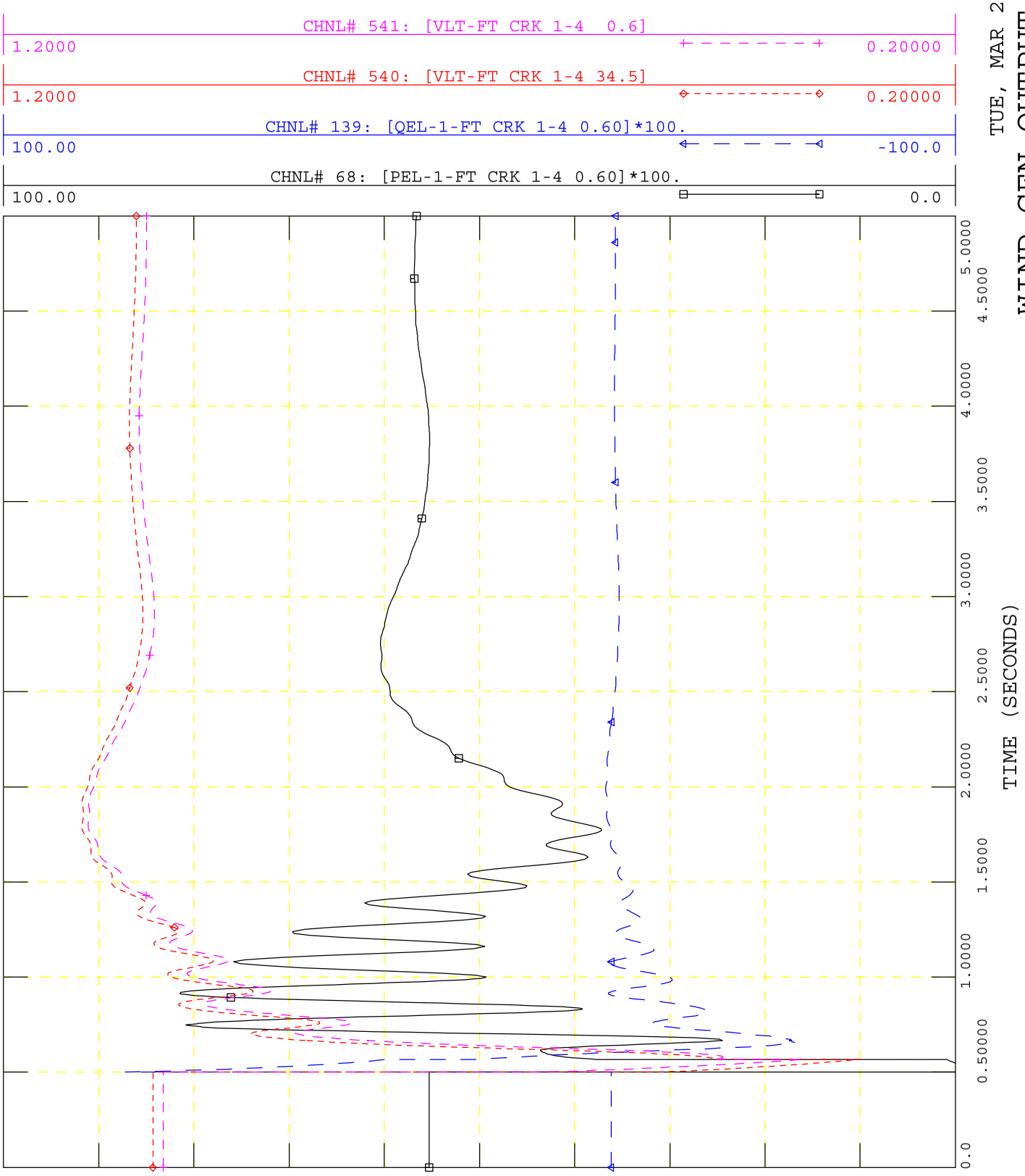
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 9



SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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STANDPIPE-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 7
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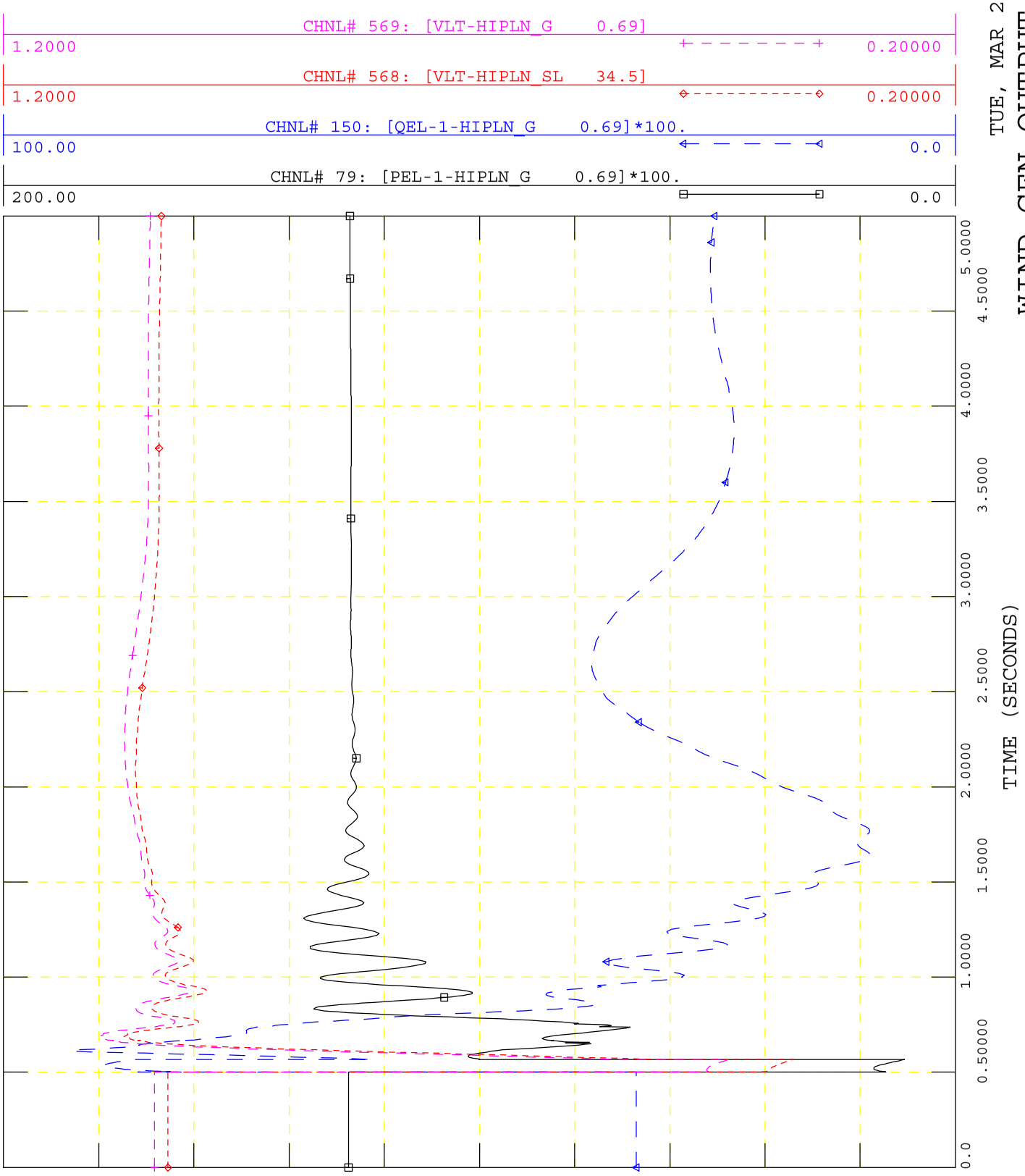
TUE, MAR 27 2018 21:29 PLT 10

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:29 PLT 11

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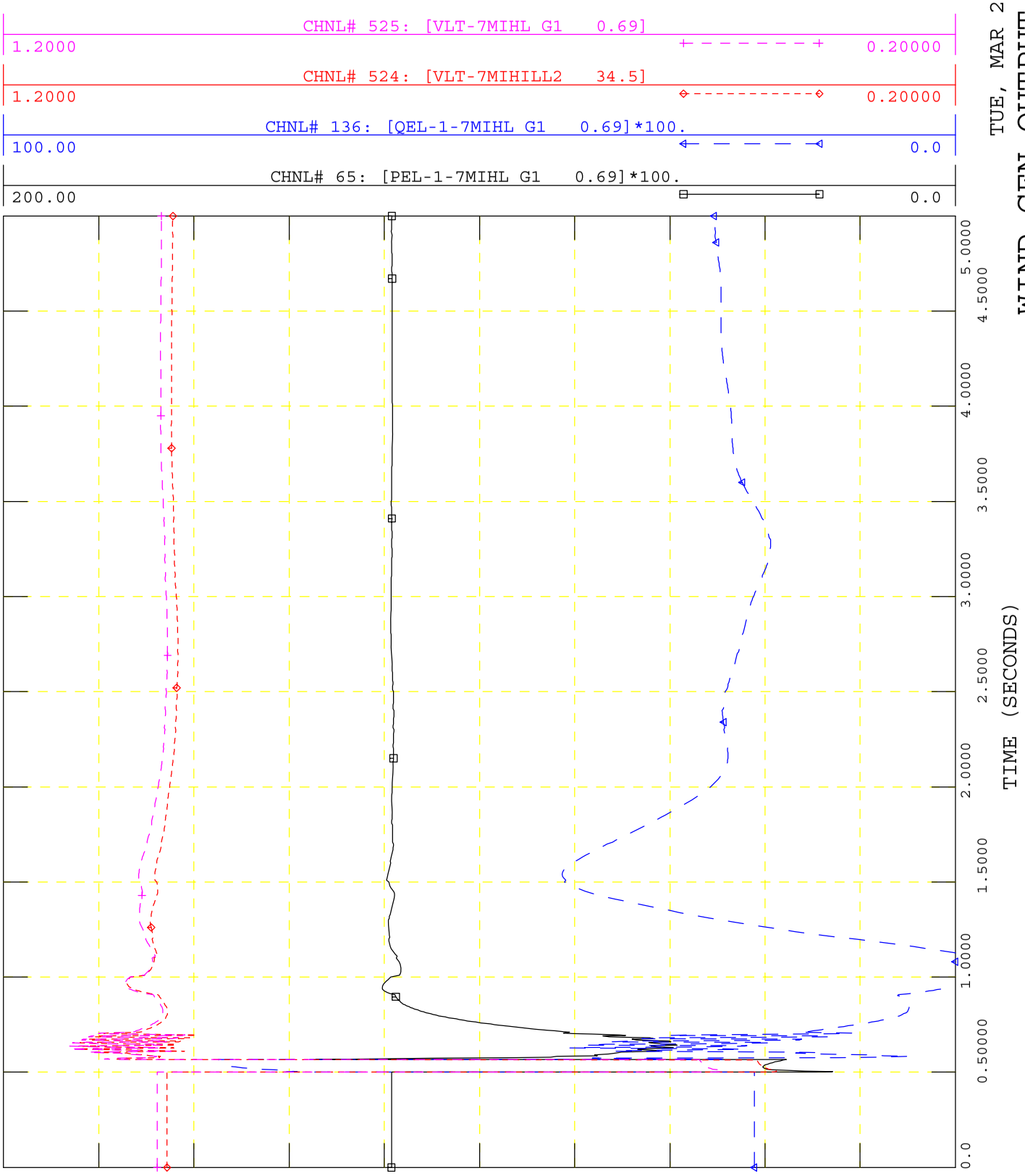

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TUE, MAR 27 2018 21:29 PLT 12

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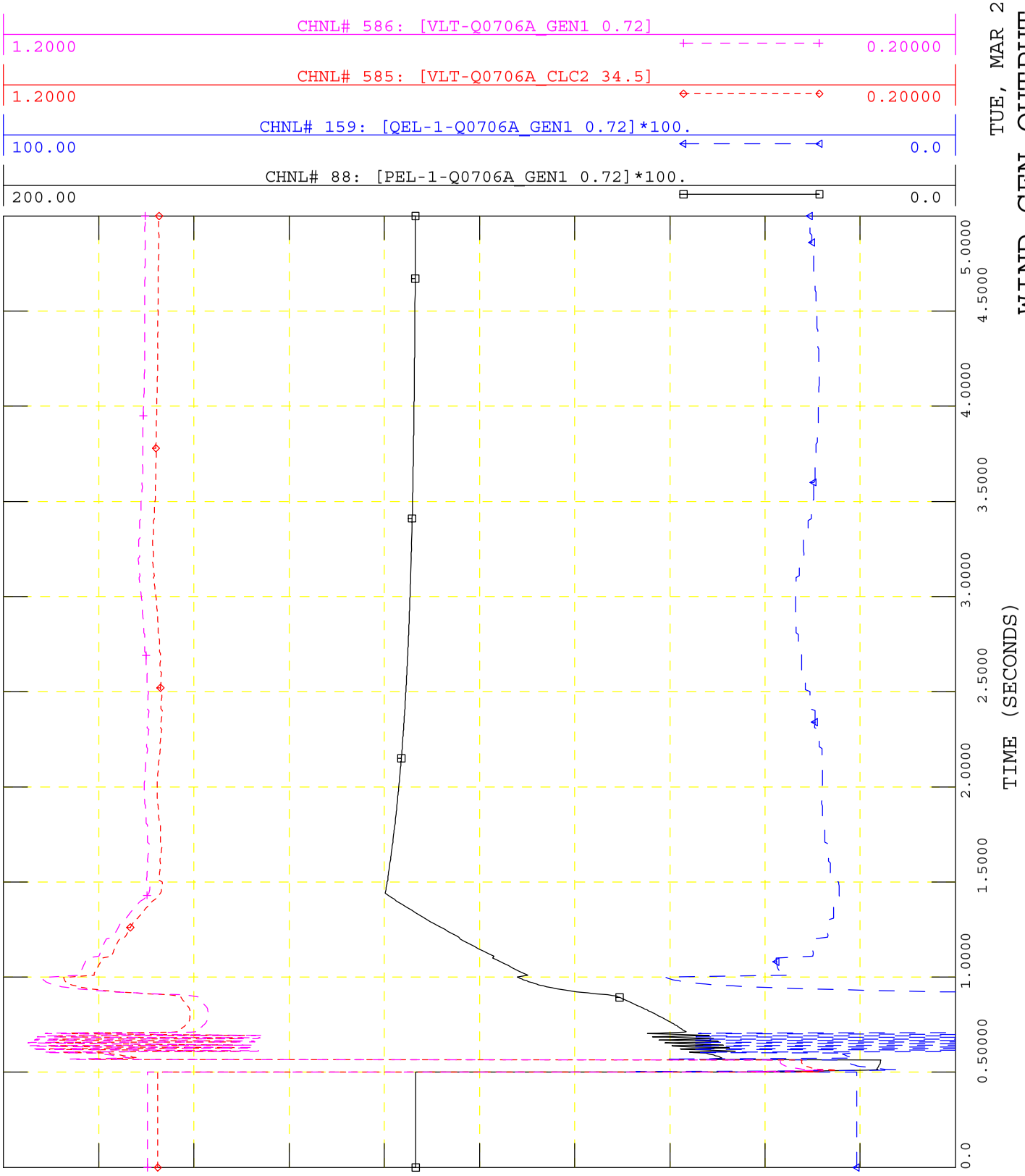

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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TUE, MAR 27 2018 21:29 PLT 13

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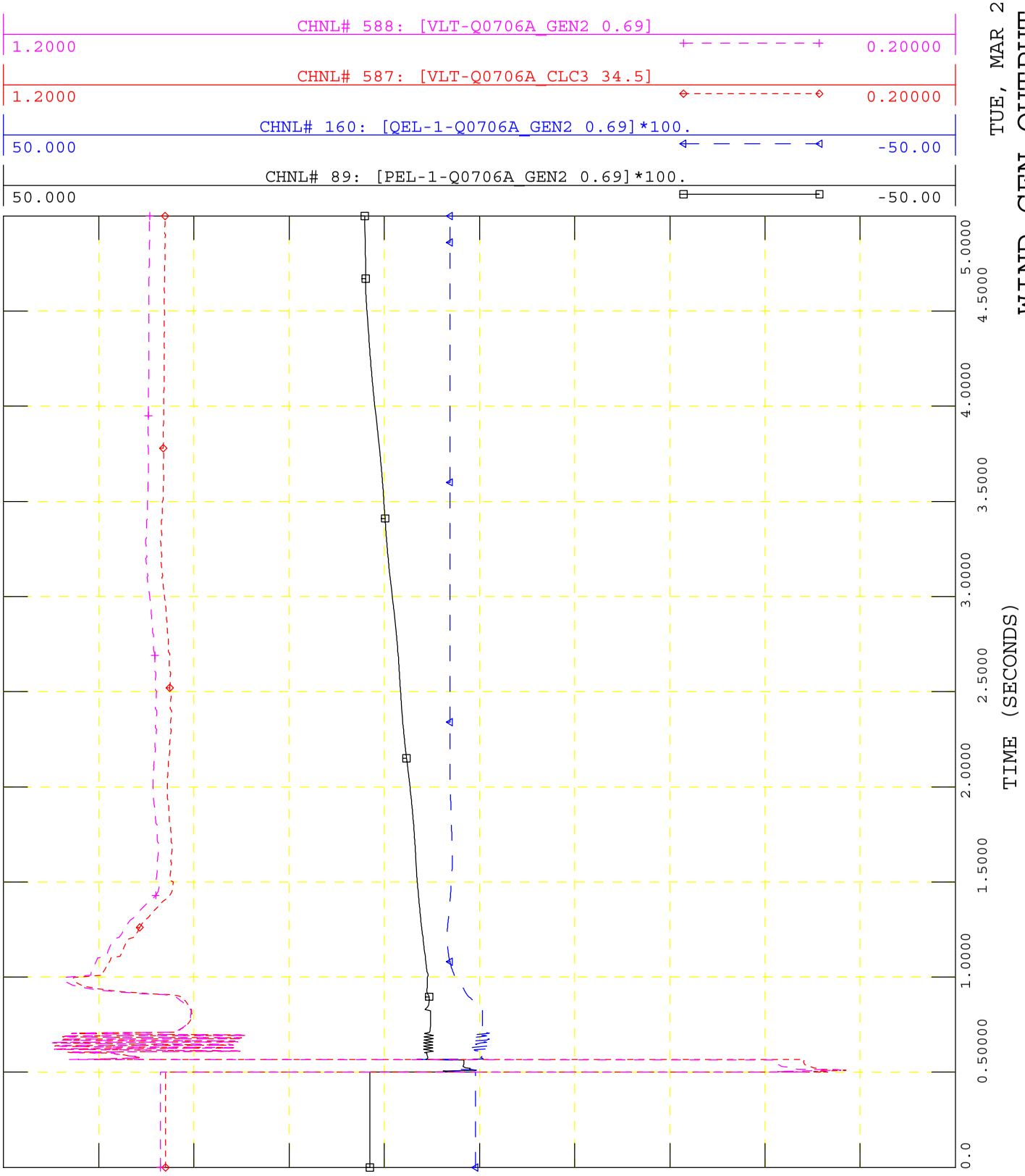

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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TUE, MAR 27 2018 21:29 PLT 14

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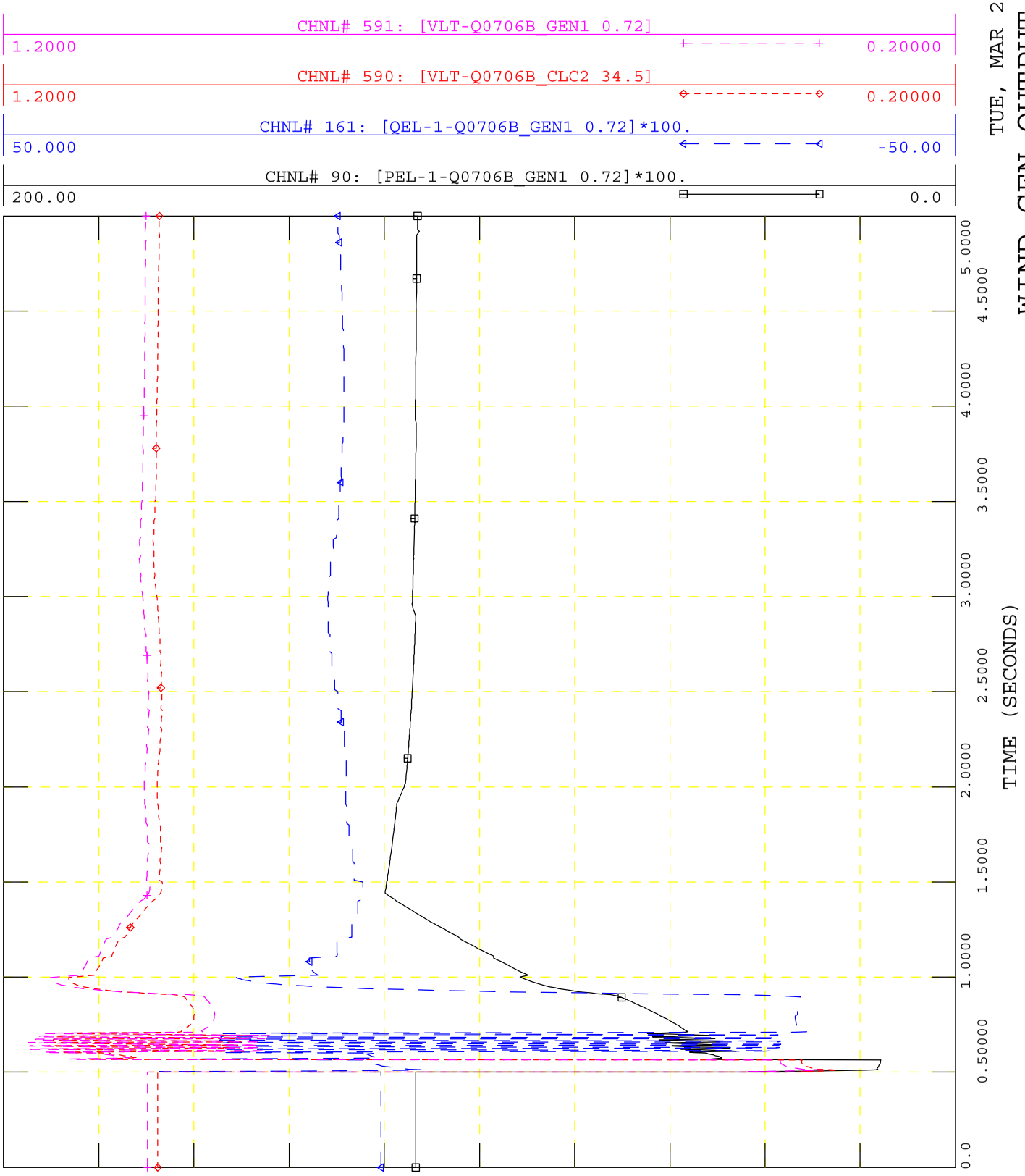

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TUE, MAR 27 2018 21:29 PLT 15

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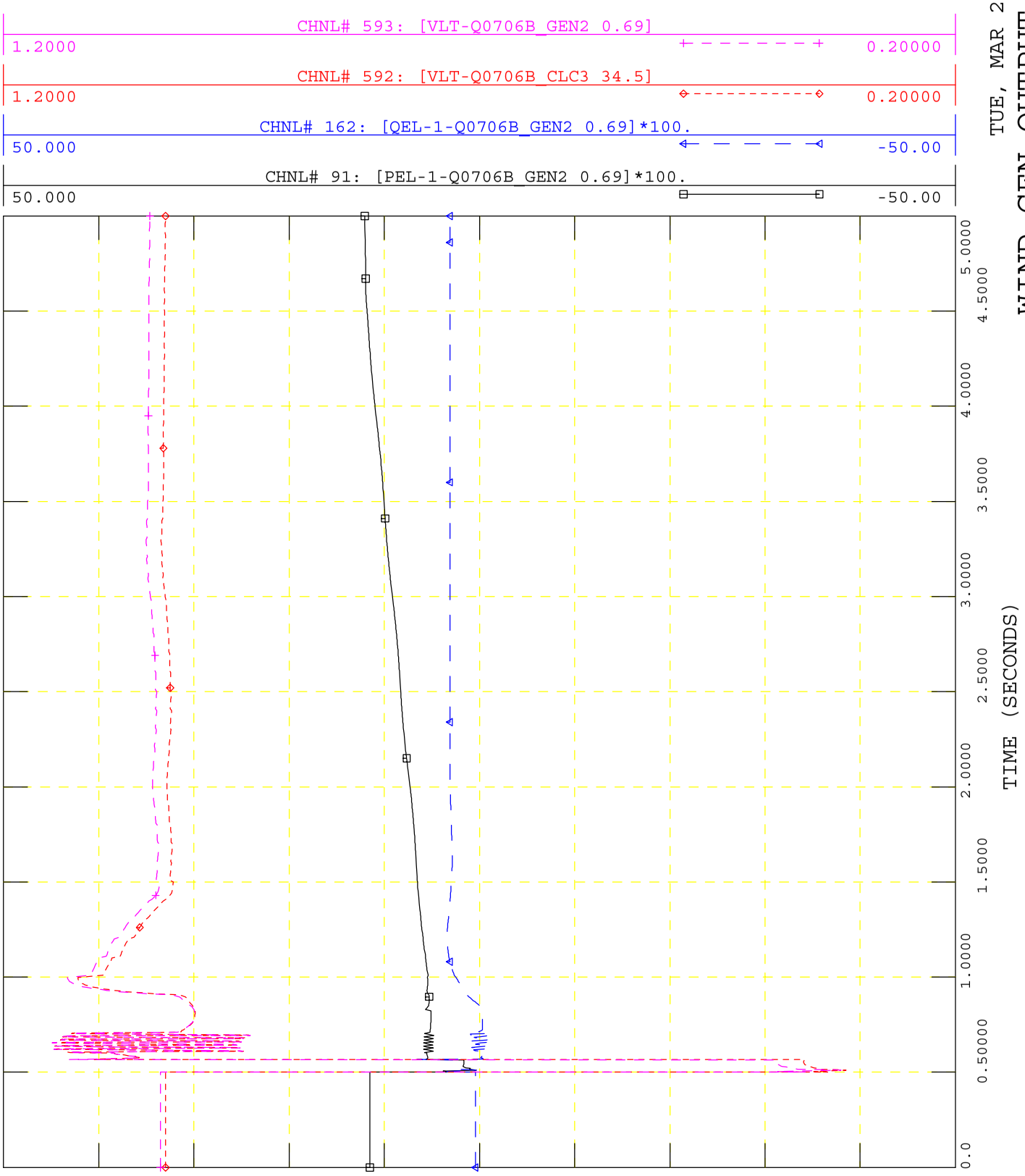

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TUE, MAR 27 2018 21:29 PLT 16

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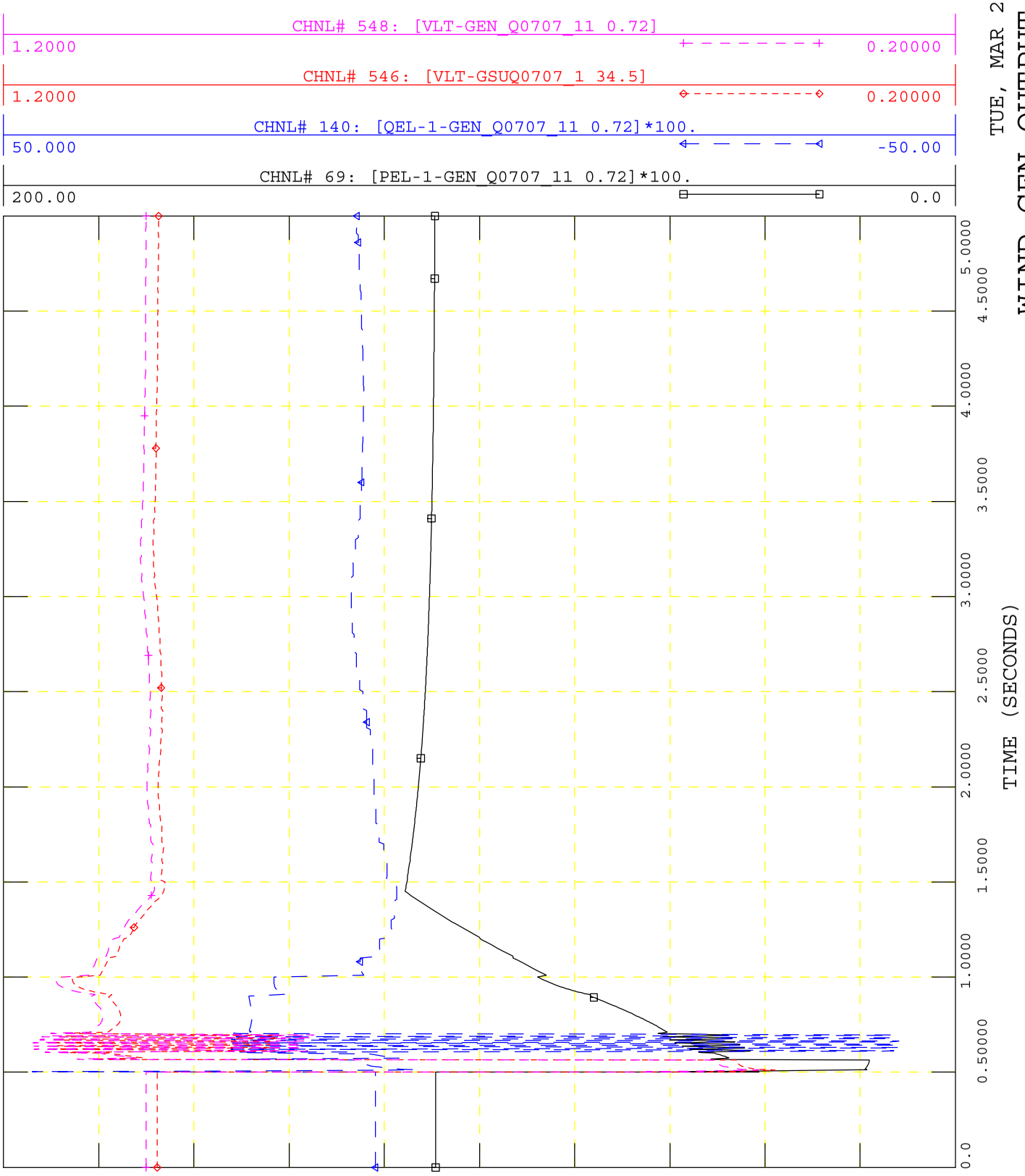

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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TUE, MAR 27 2018 21:29 PLT 17

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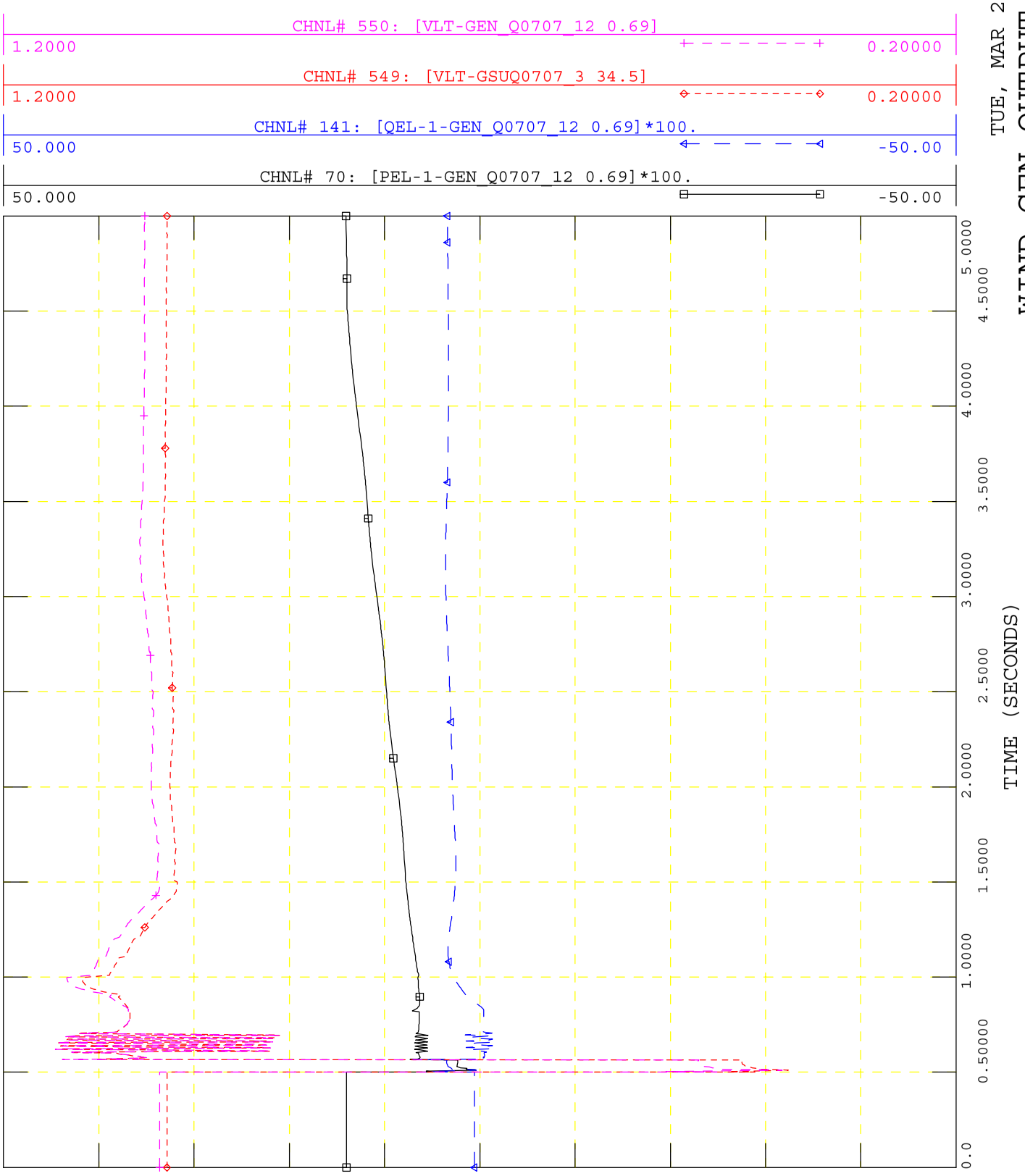

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TUE, MAR 27 2018 21:29 PLT 18

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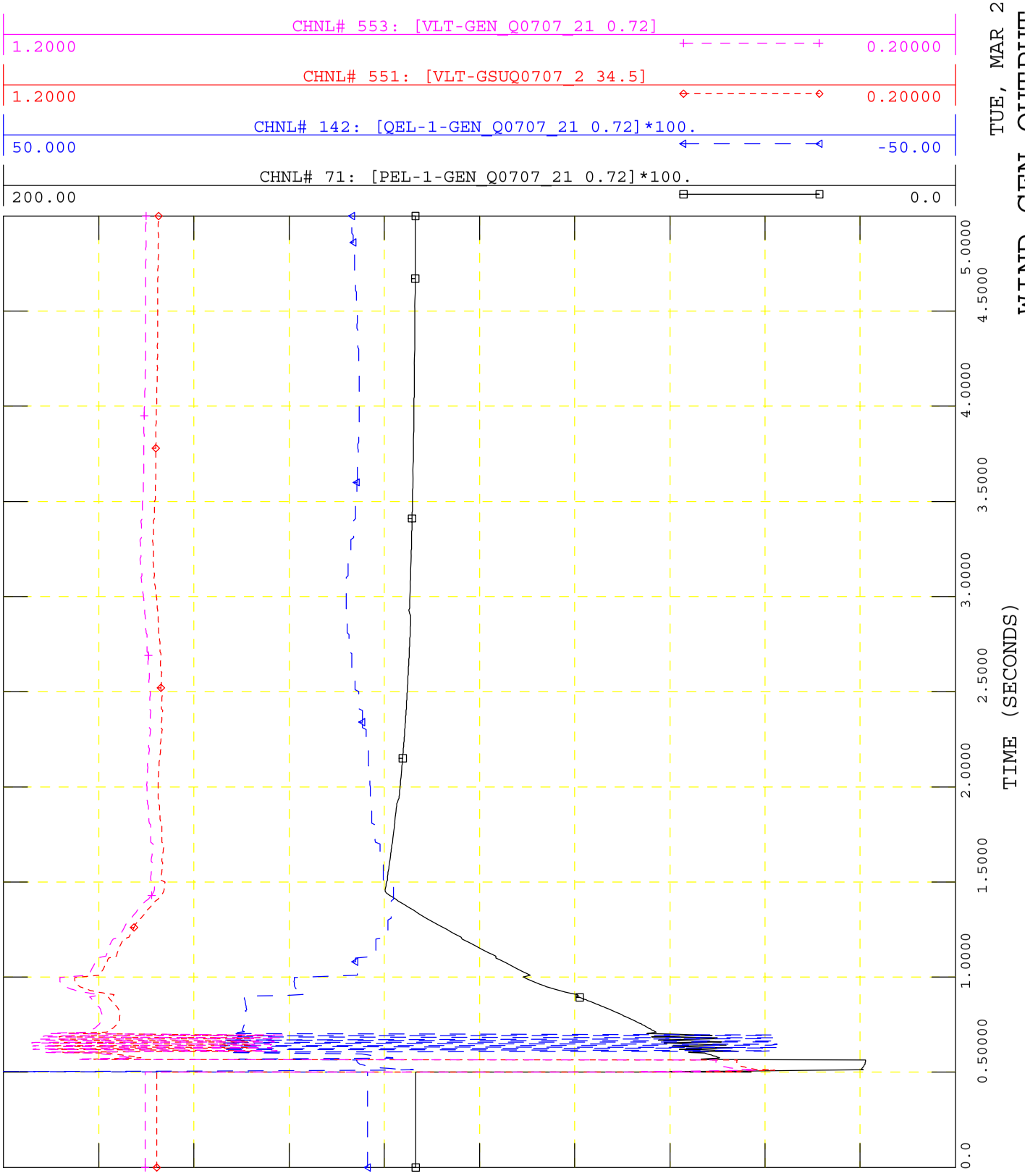

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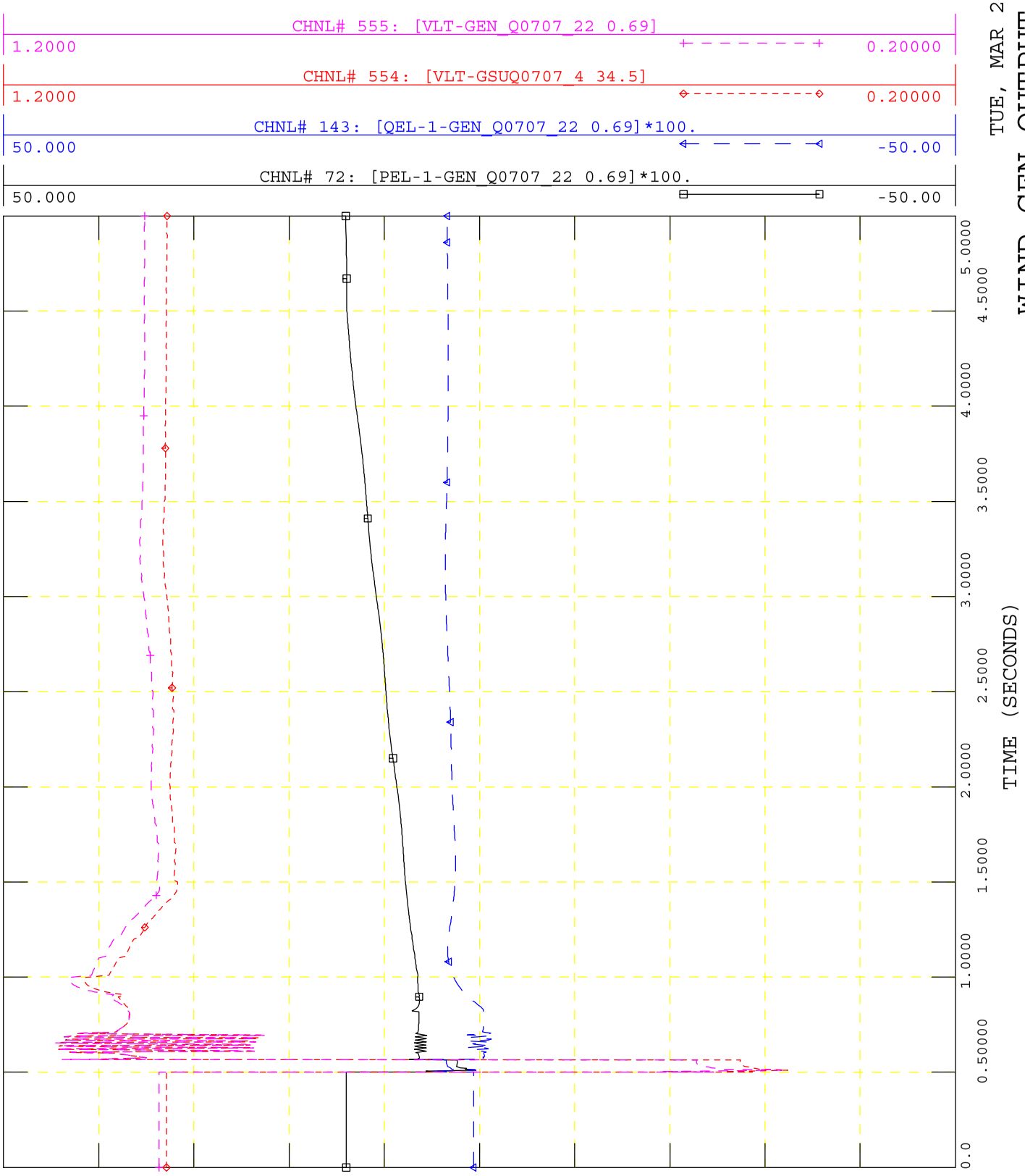
TUE, MAR 27 2018 21:29 PLT 19

WIND GEN OUTPUT



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STANDPIPE-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 7
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TUE, MAR 27 2018 21:29 PLT 20

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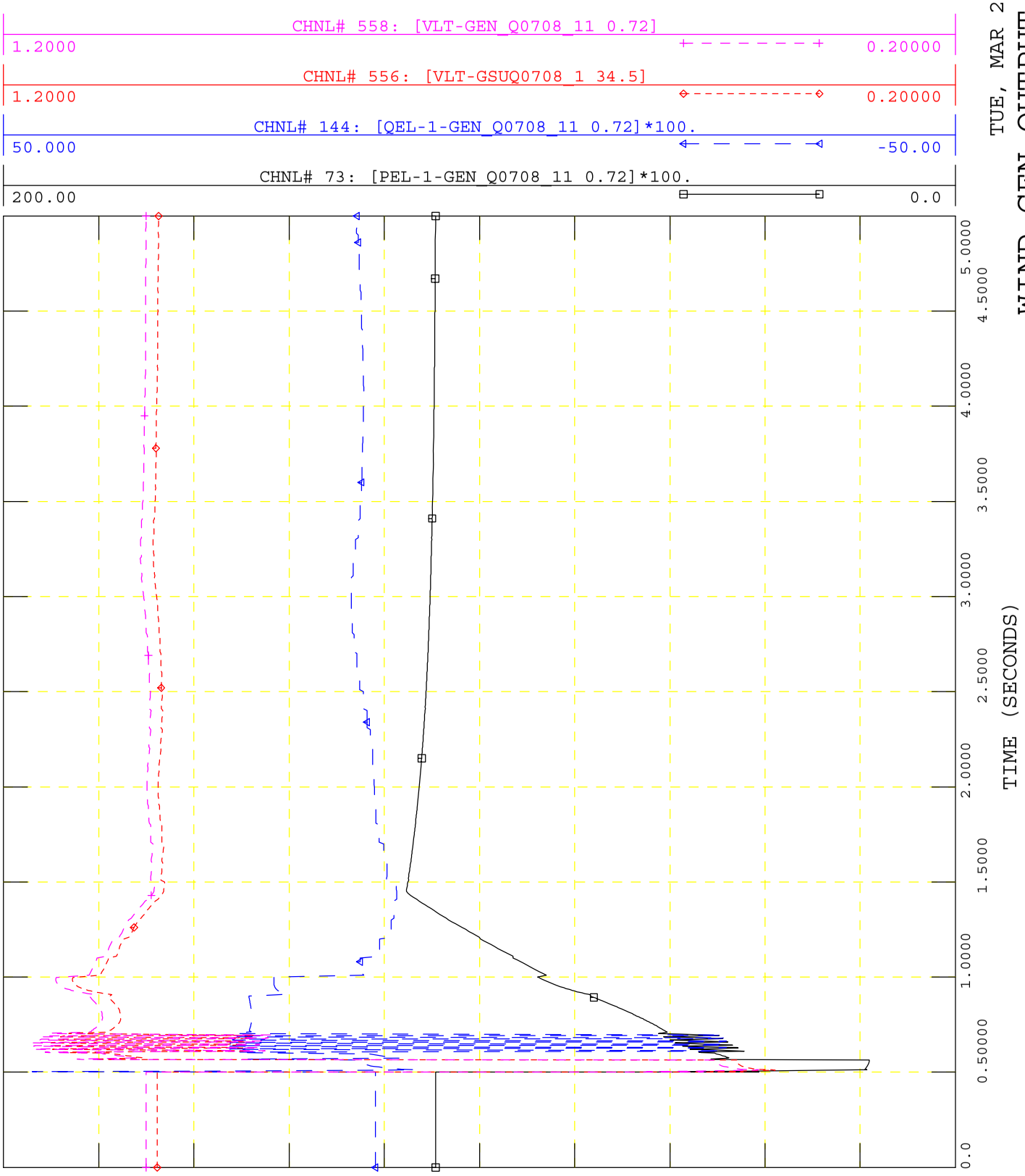

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TUE, MAR 27 2018 21:29 PLT 21

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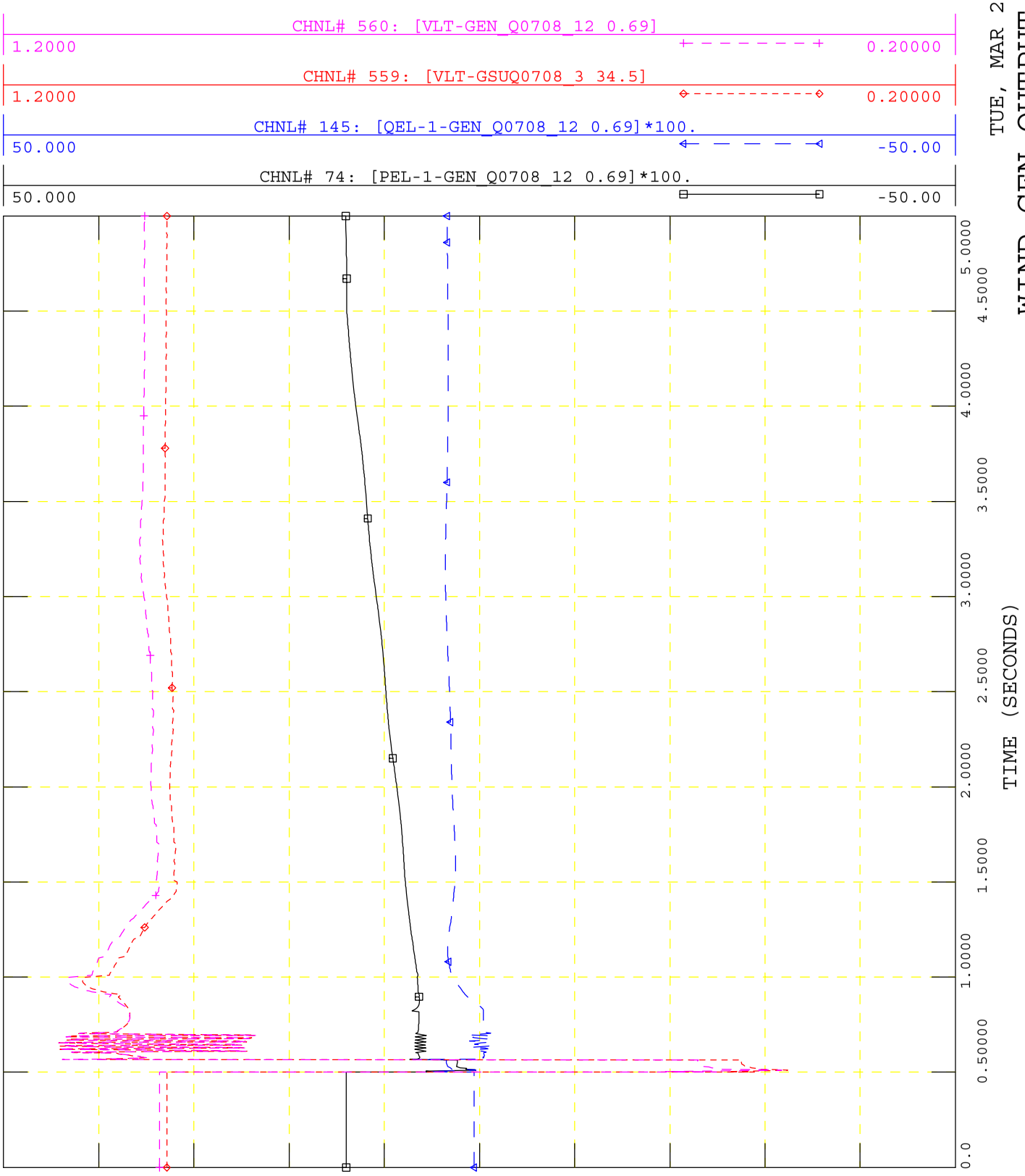

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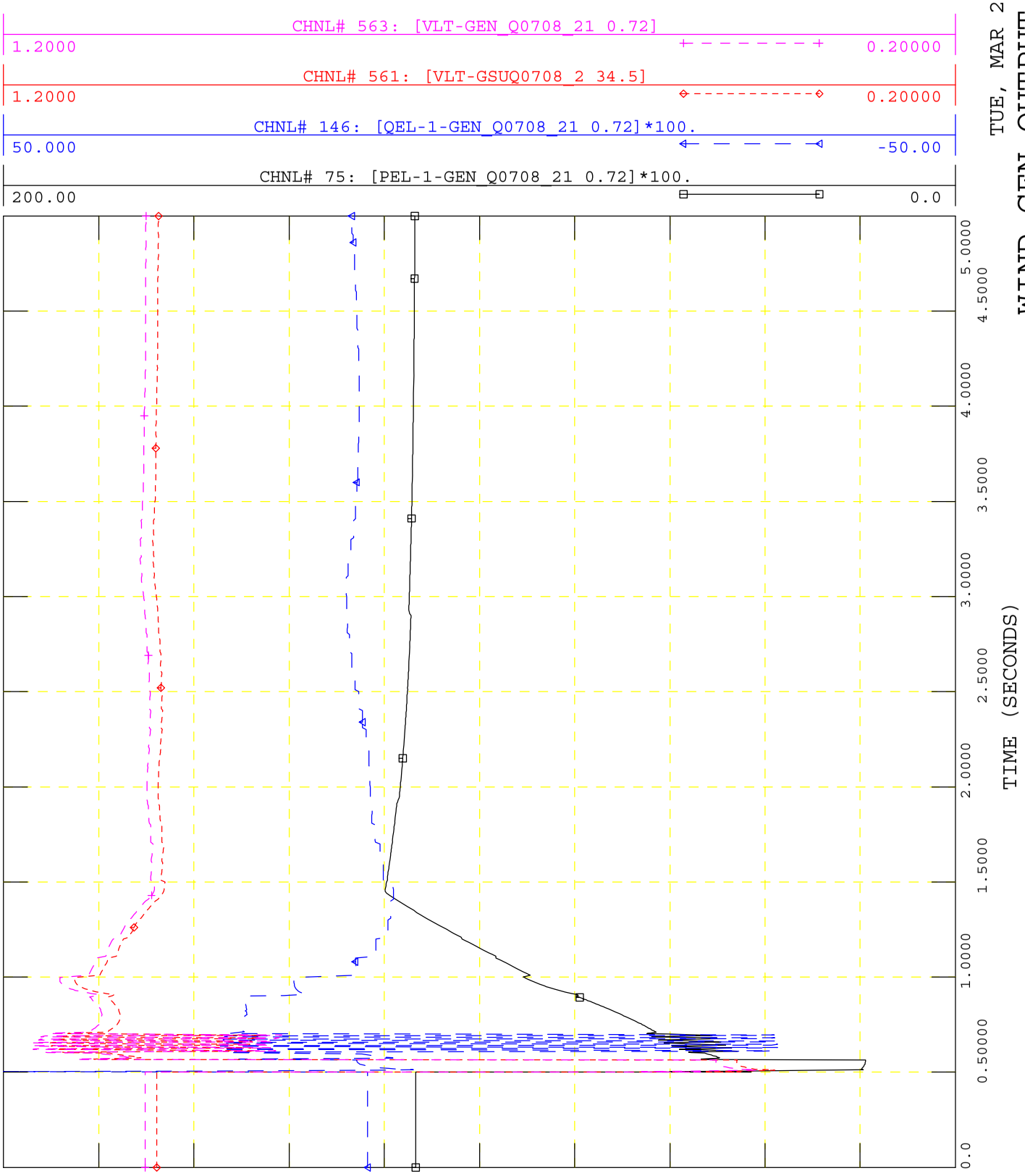
TUE, MAR 27 2018 21:29 PLT 22

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:29 PLT 23

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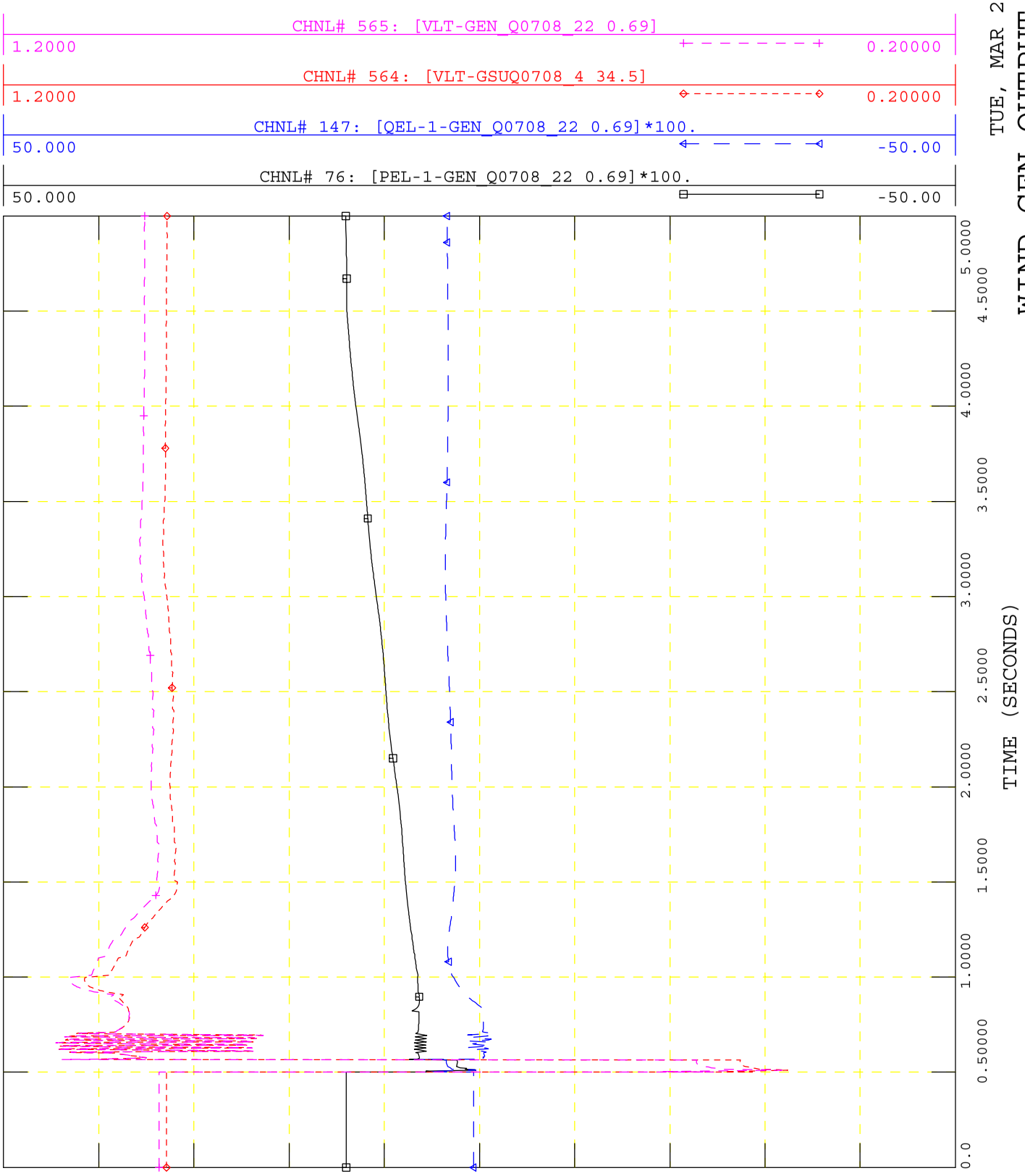

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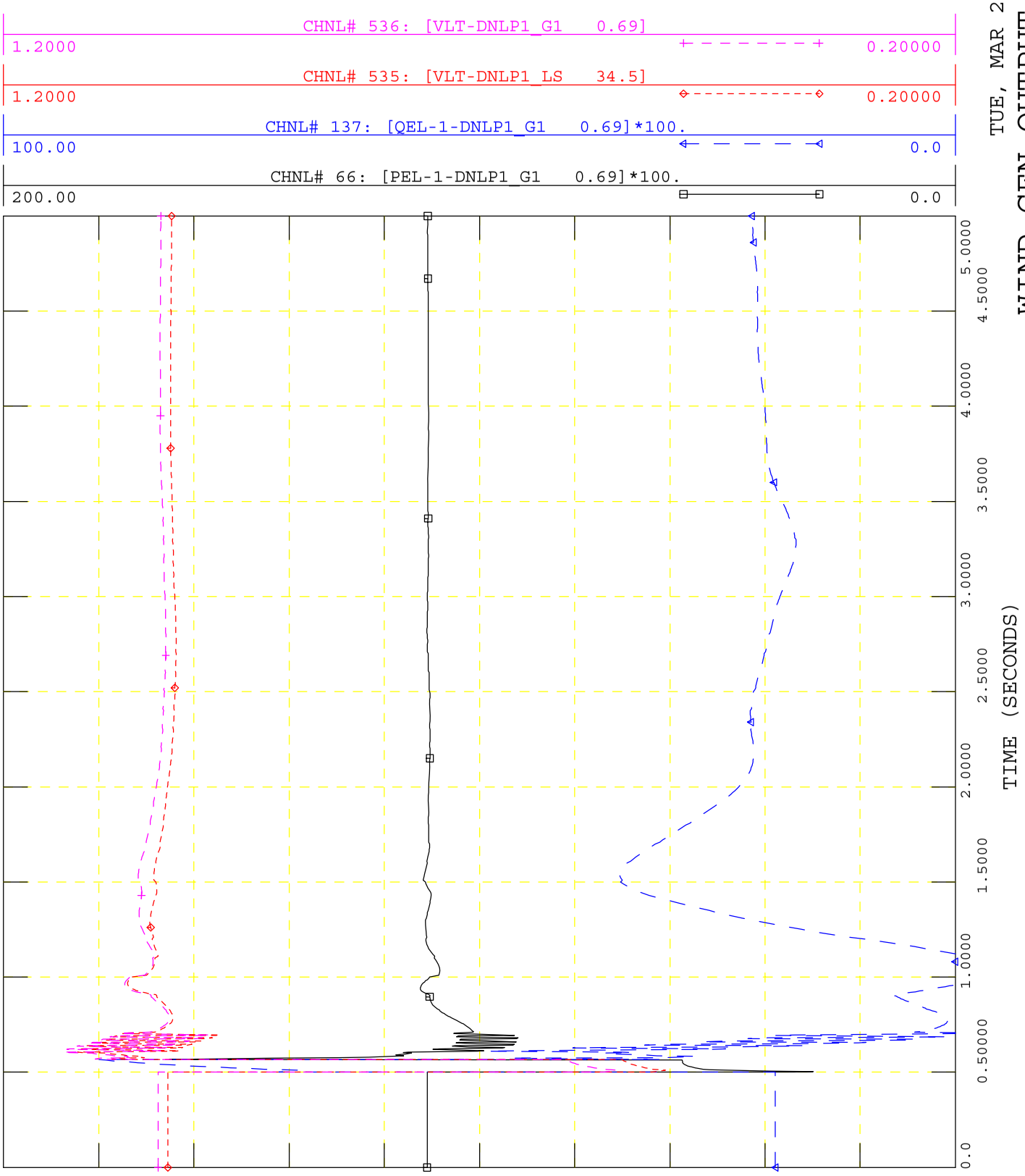
TUE, MAR 27 2018 21:29 PLT 24

WIND GEN OUTPUT



SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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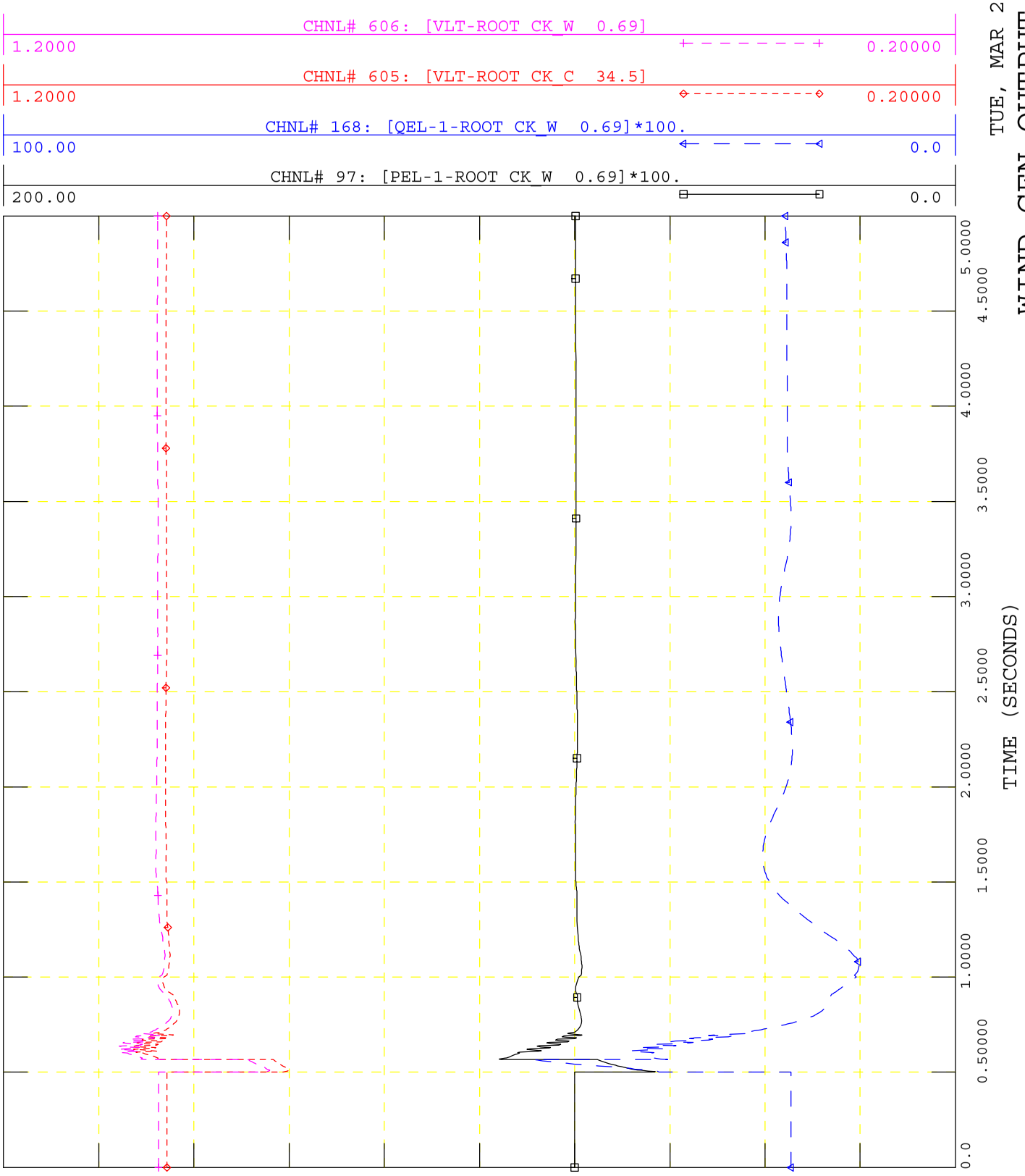
TUE, MAR 27 2018 21:29 PLT 25

WIND GEN OUTPUT



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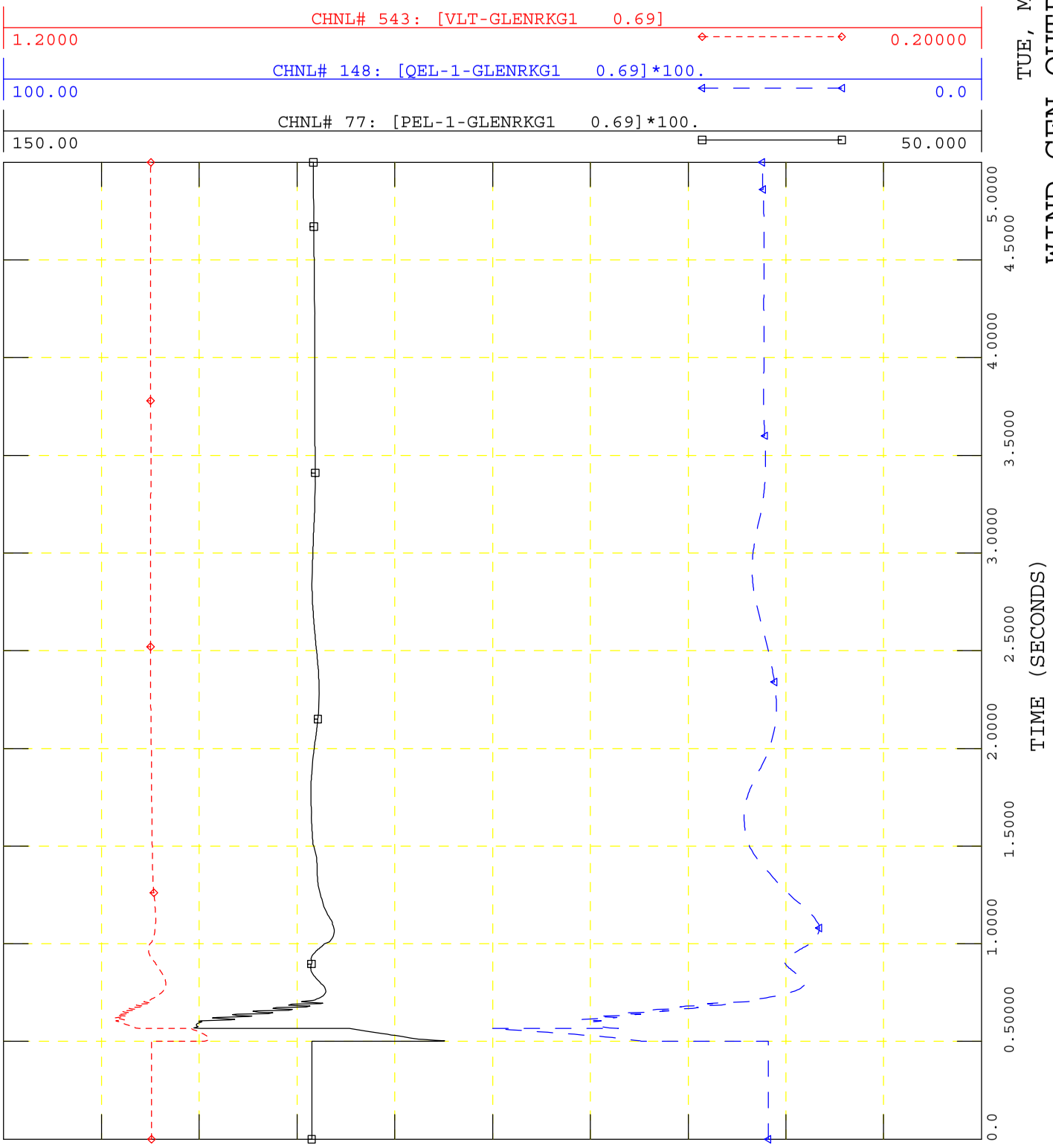
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 26



Dynamic Simulation

Case 8 – Loss of Aeolus-Freezeout 230 kV line

30 cycles	**3 phase Aeolus 230 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Aeolus-Freezeout 230 kV line**
36 cycles	**Remove SVC MVAR limiter**
5 sec.	**Terminate simulation**

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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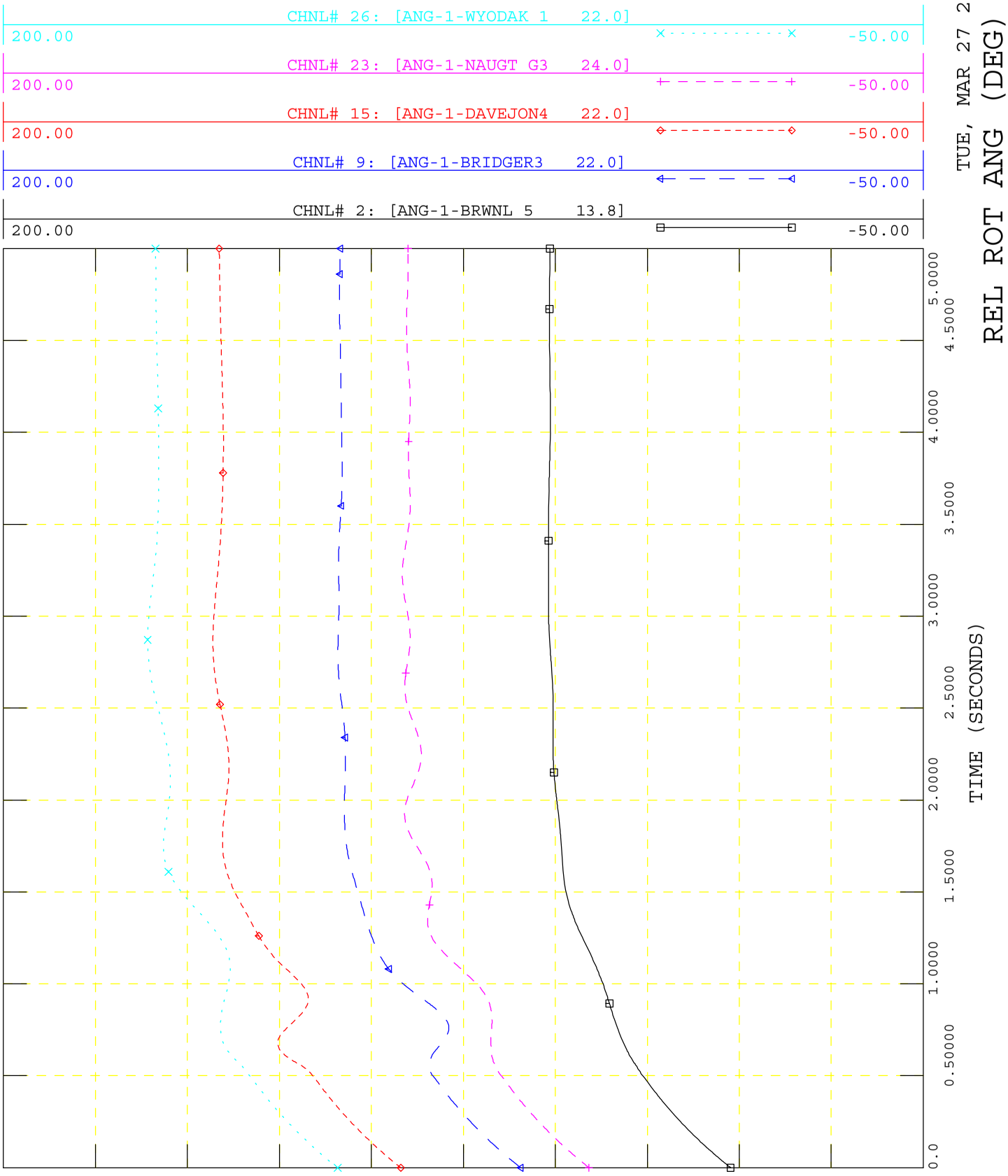
AEOLUS-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 8
FILE: c7_svc_mtrld_AEOL-FREE_out8.out



TUE, MAR 27 2018 21:29
REL ROT ANG (DEG) PLT 1

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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AEOLUS-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 8
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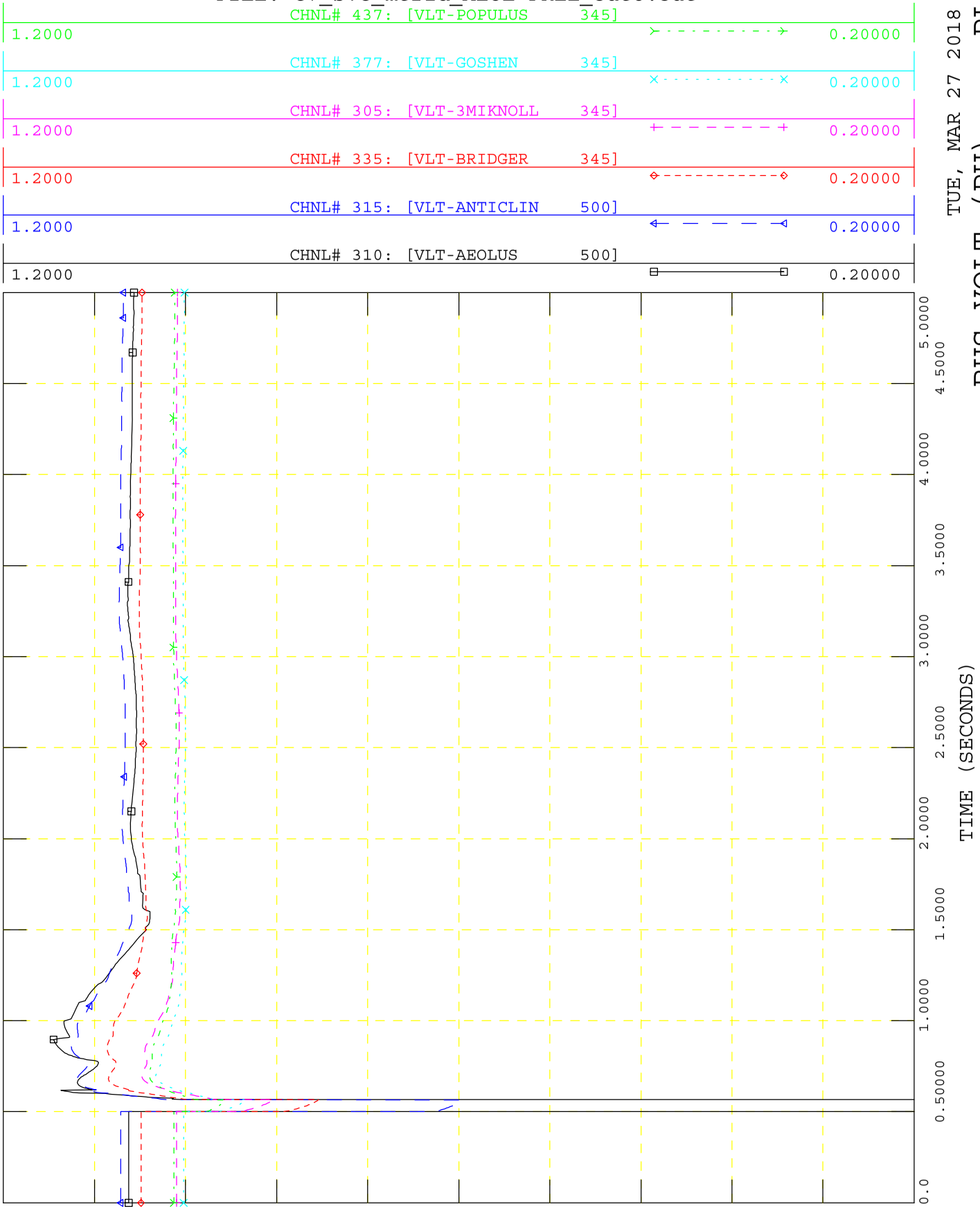
TUE, MAR 27 2018 21:29 PLT 2



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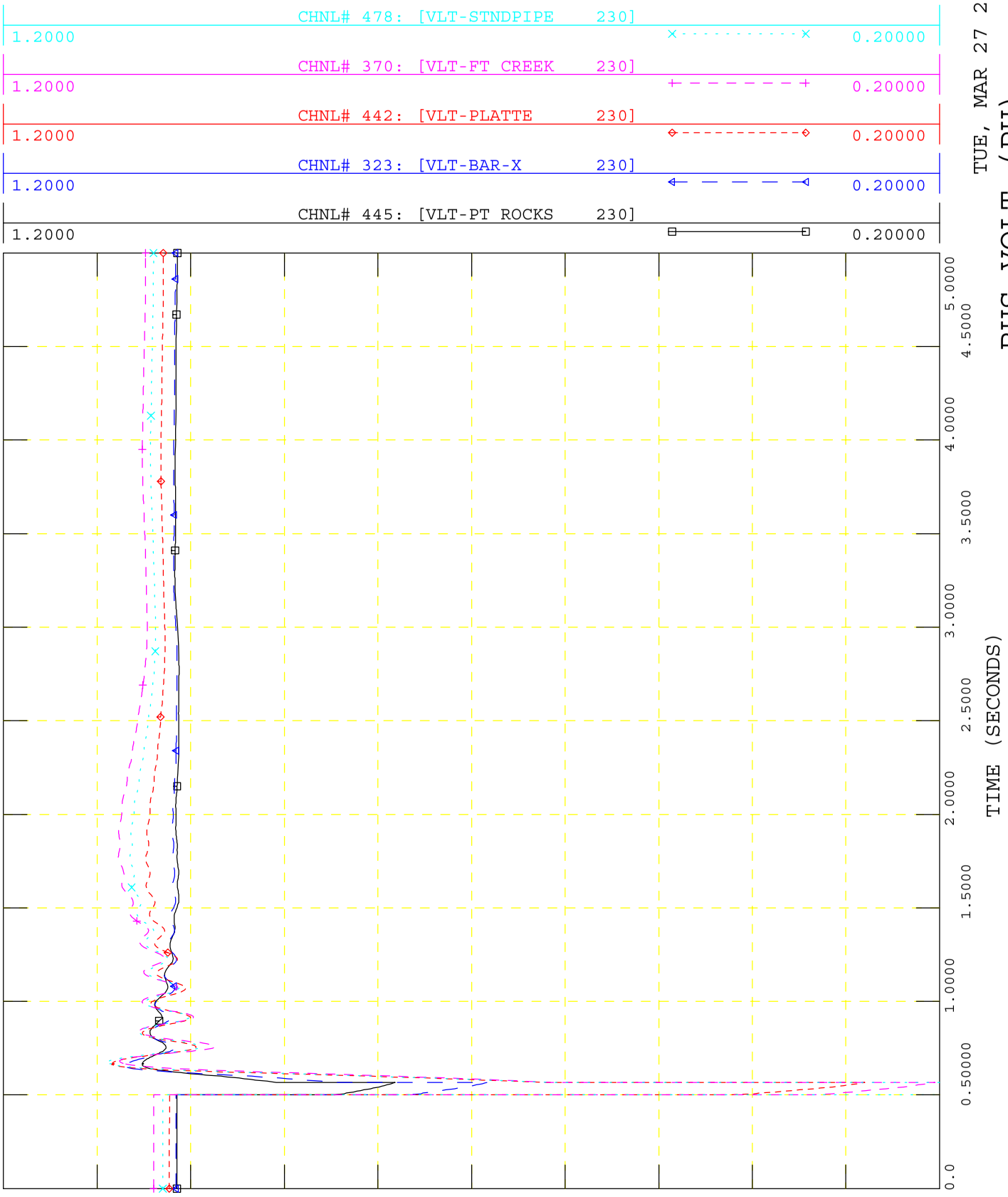
TUE, MAR 27 2018 21:29 PLT 3



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS AEOLUS KV 230 FLT. 34CY-CLR FLT & OPEN
AEOLUS-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 8
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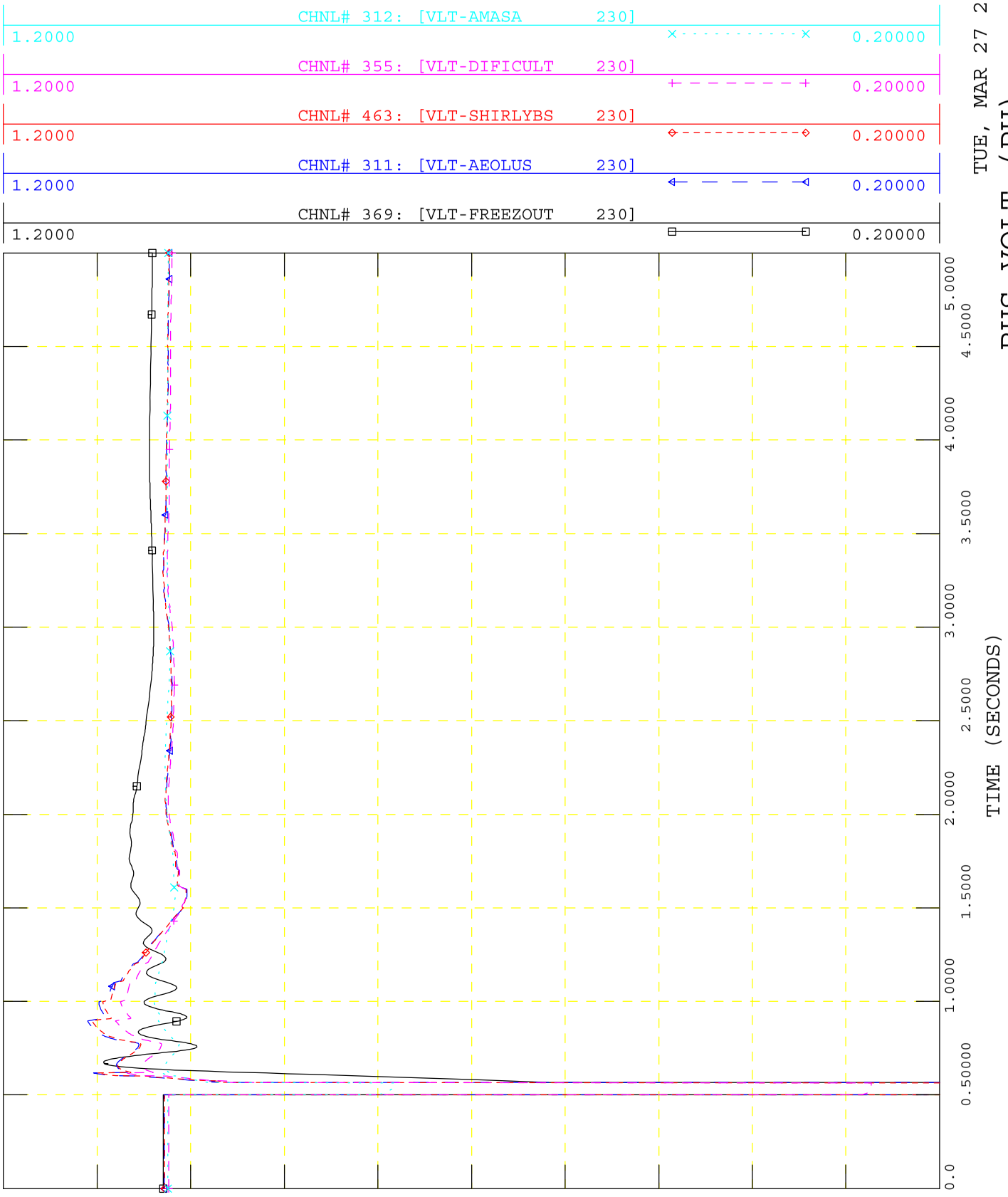
TUE, MAR 27 2018 21:29 PLT 4



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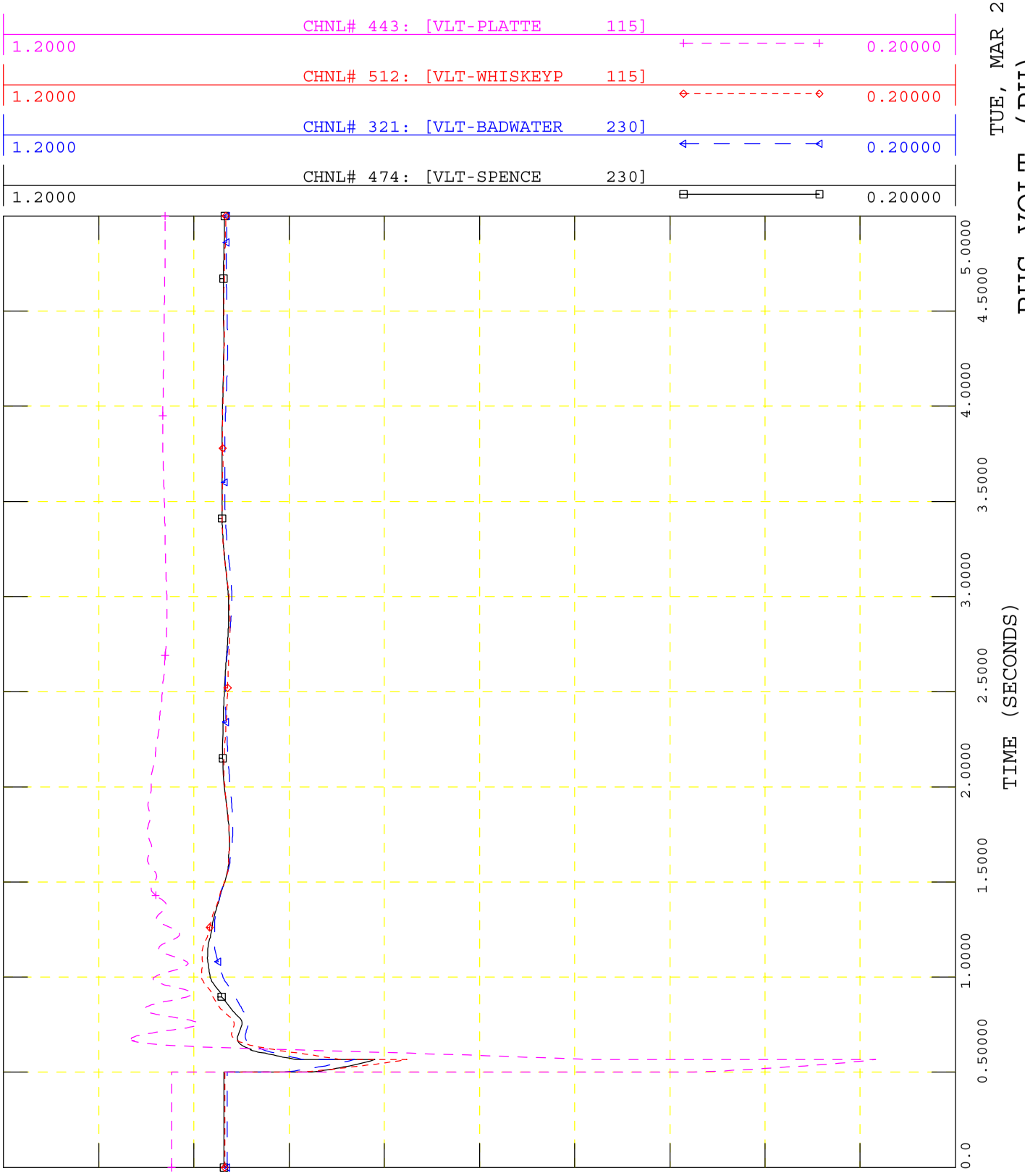
TUE, MAR 27 2018 21:29 PLT 5



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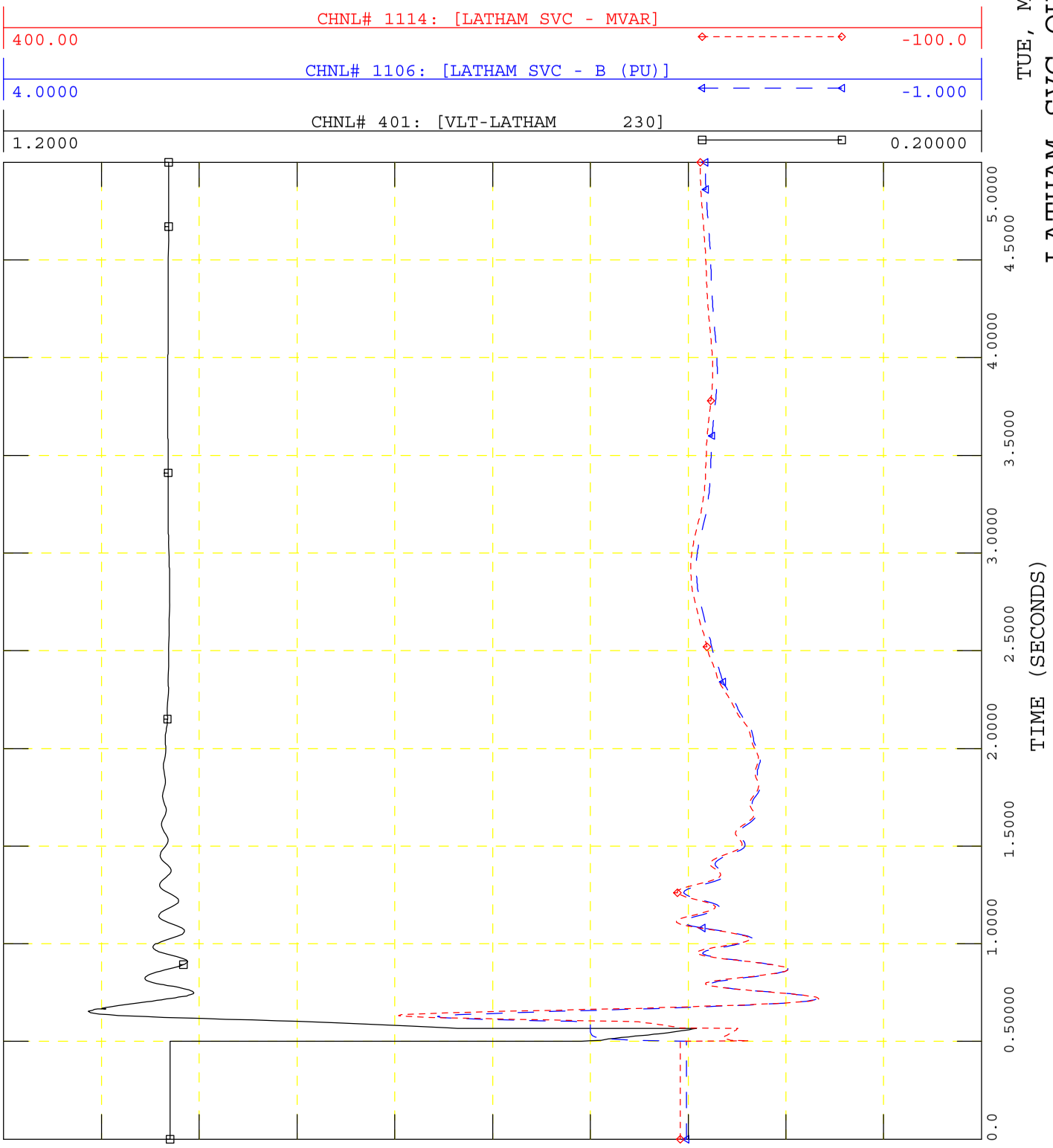
TUE, MAR 27 2018 21:29 PLT 6

LATHAM SVC OUT



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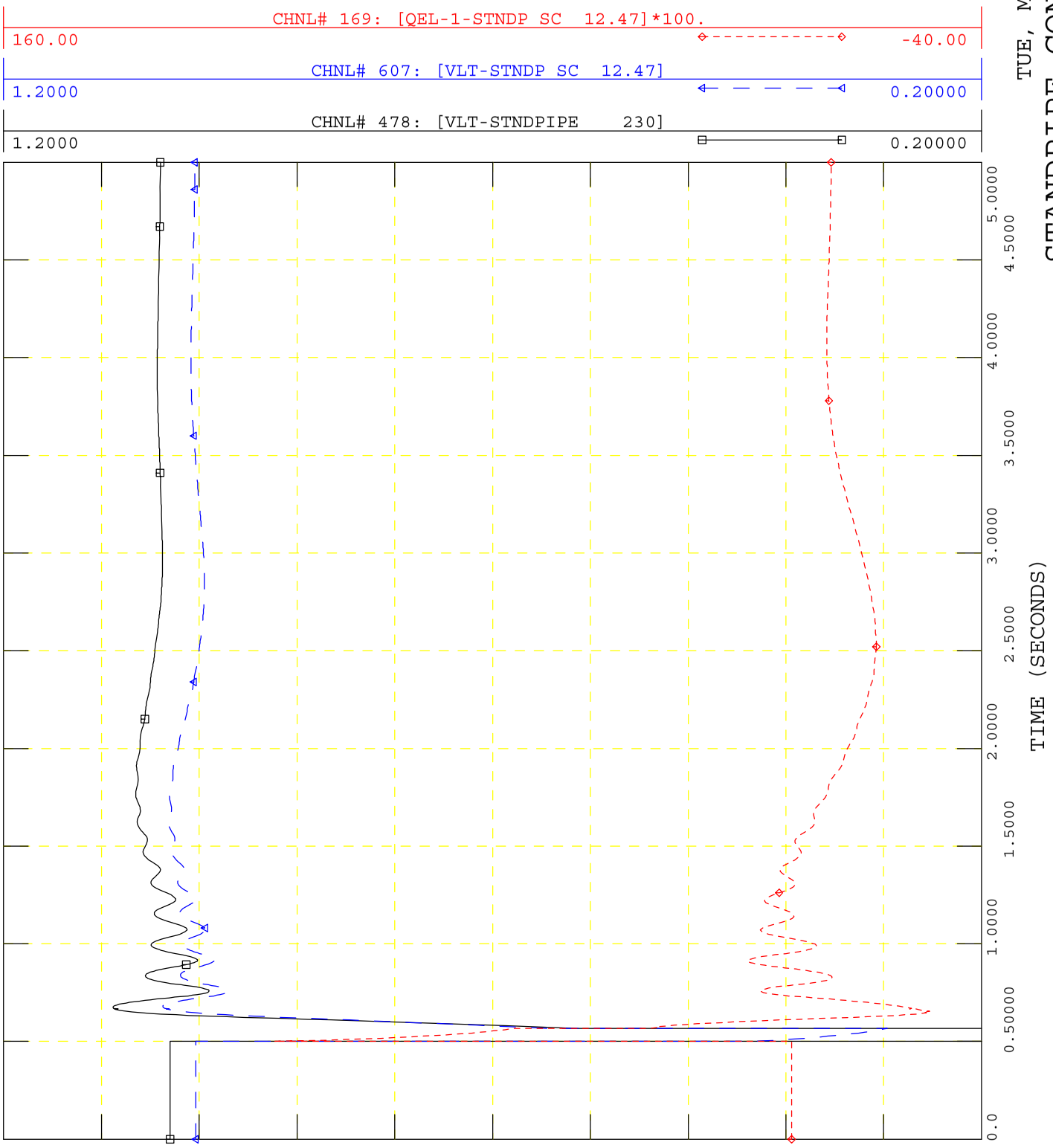
TUE, MAR 27 2018 21:29

STANDPIPE CONDNSR PLT 7



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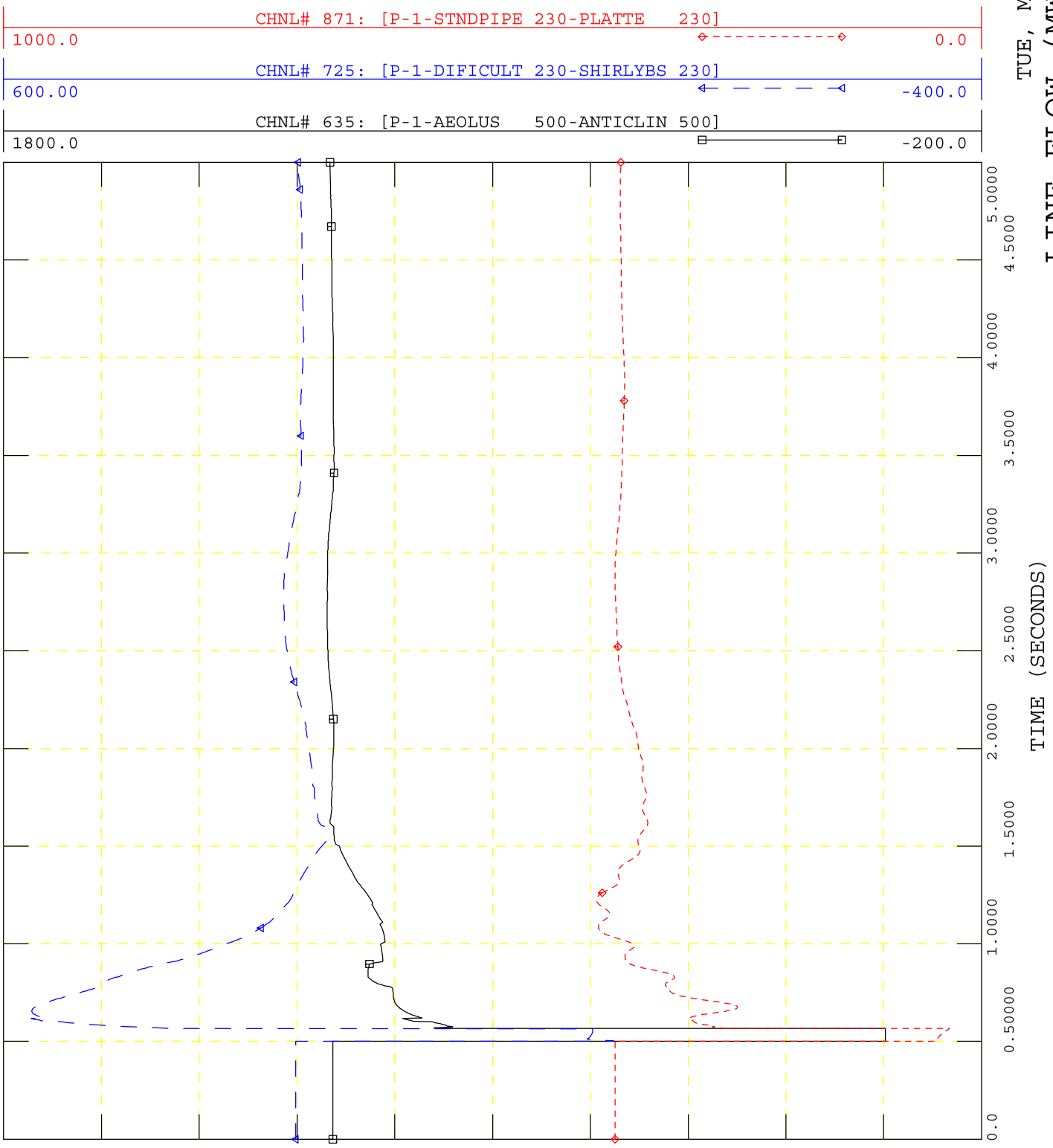
TUE, MAR 27 2018 21:29 PLT 8



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AEOLUS-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 8
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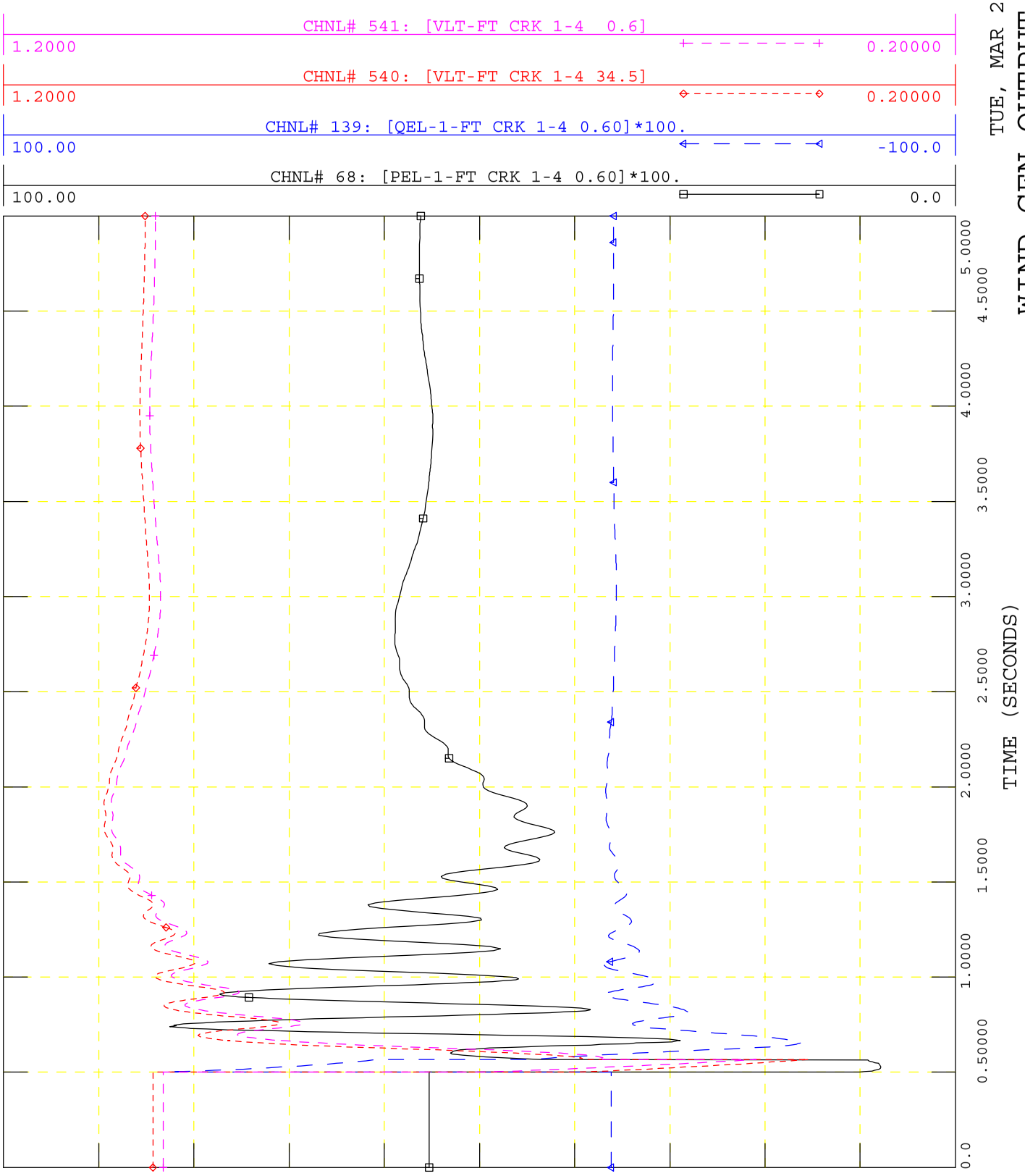
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 9



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TUE, MAR 27 2018 21:29 PLT 10

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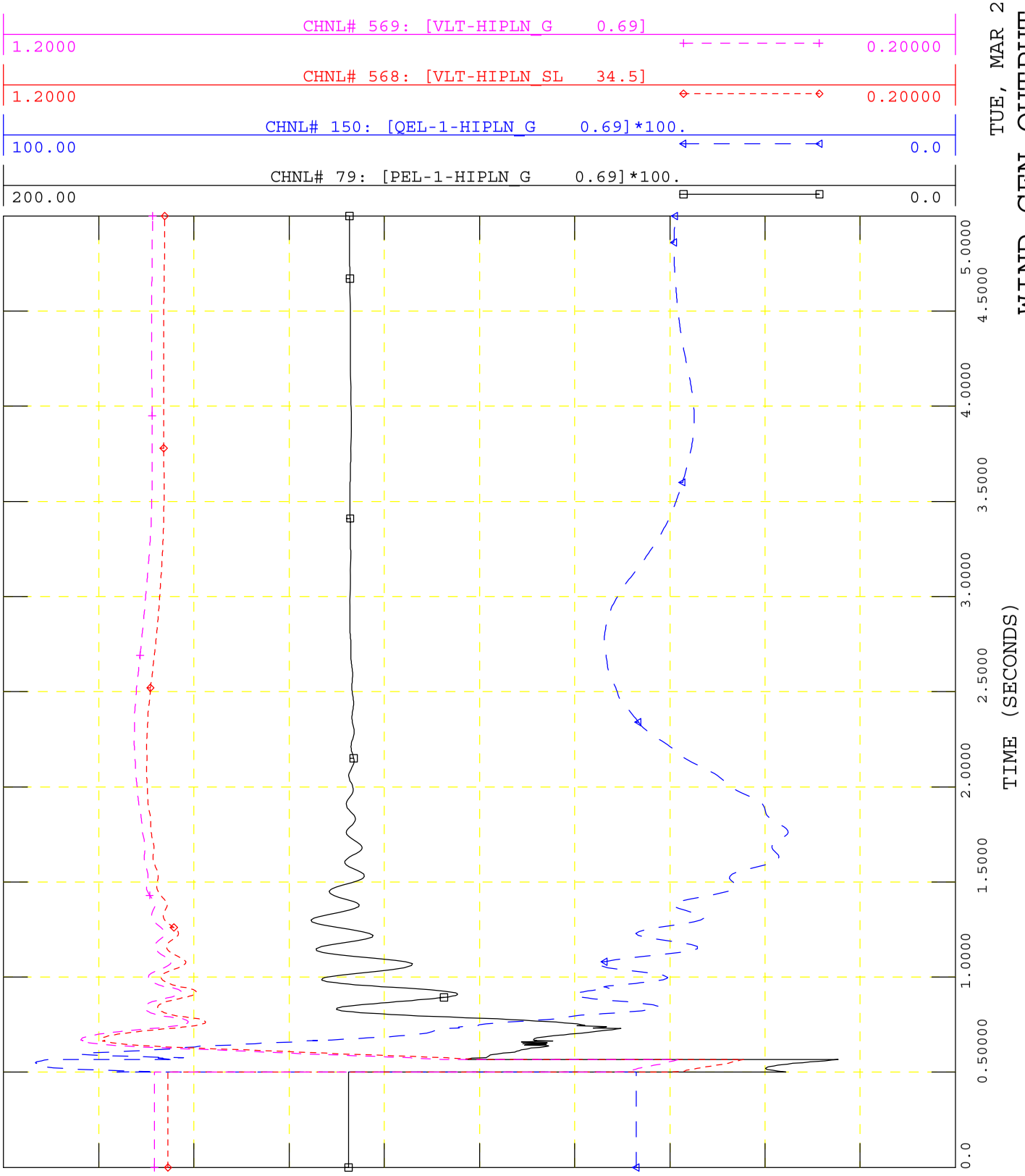

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AEOLUS-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 8
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TUE, MAR 27 2018 21:29 PLT 11

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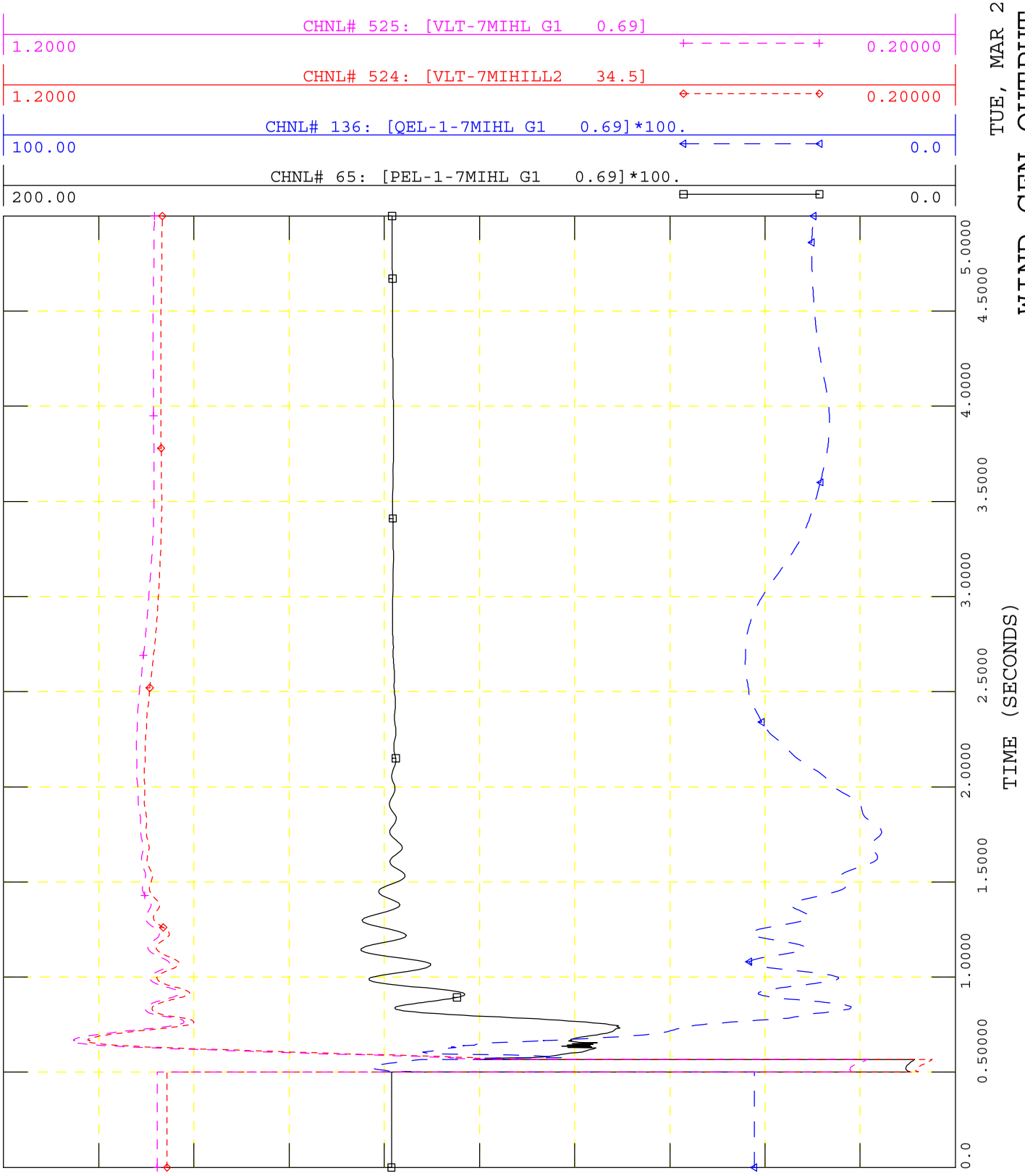

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TUE, MAR 27 2018 21:29 PLT 12

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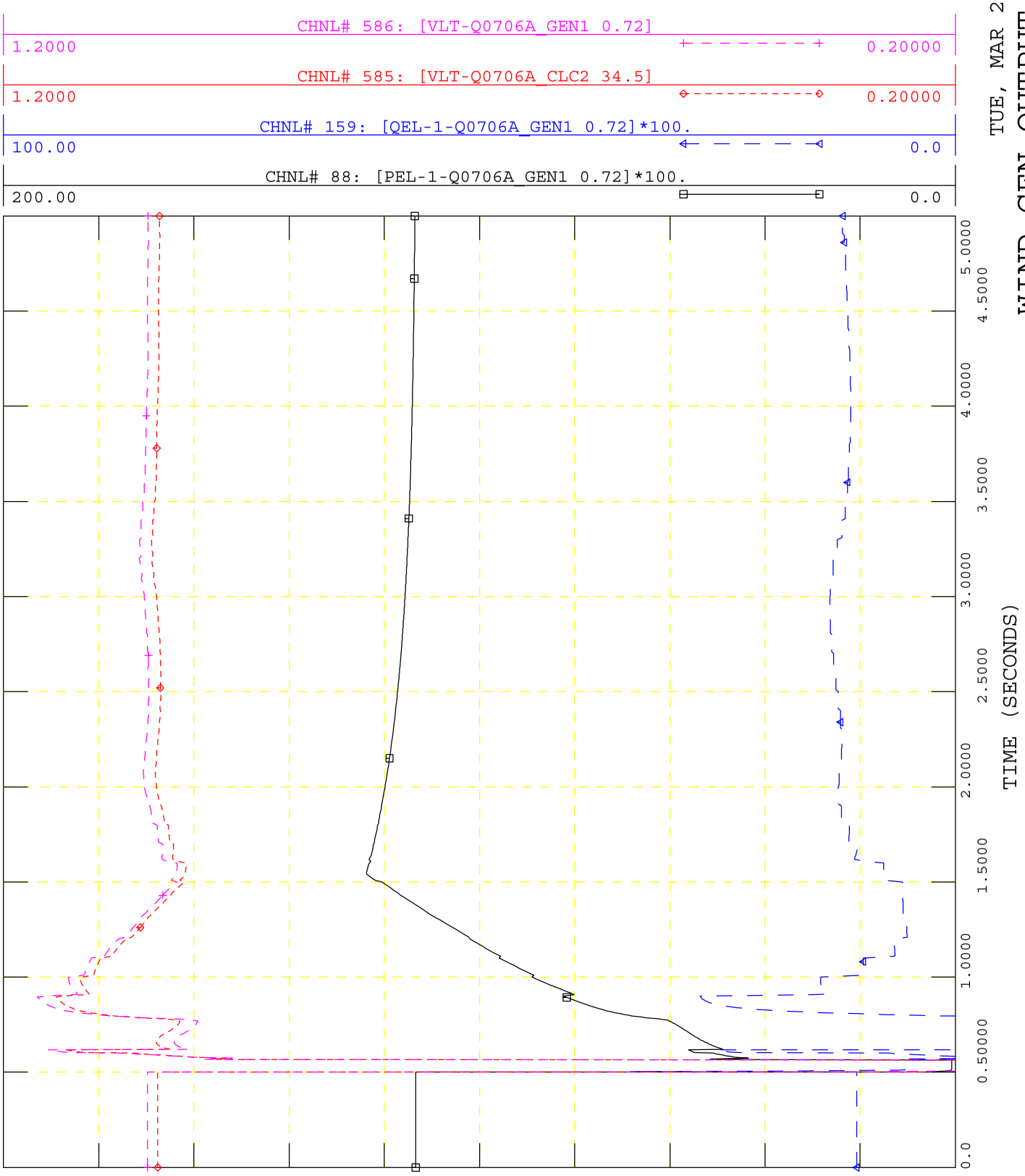

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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AEOLUS-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 8
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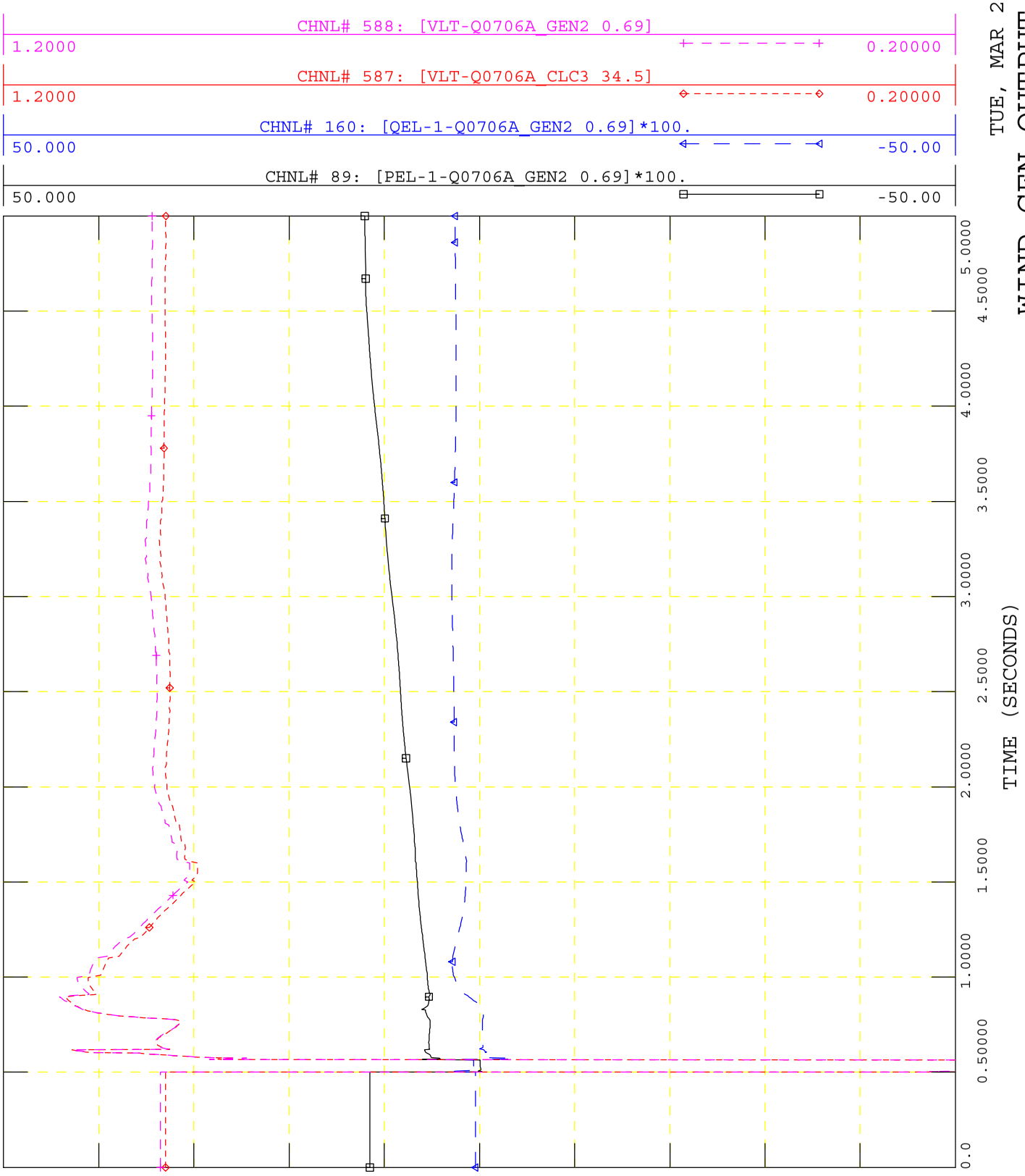
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 13



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AEOLUS-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 8
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TUE, MAR 27 2018 21:29 PLT 14

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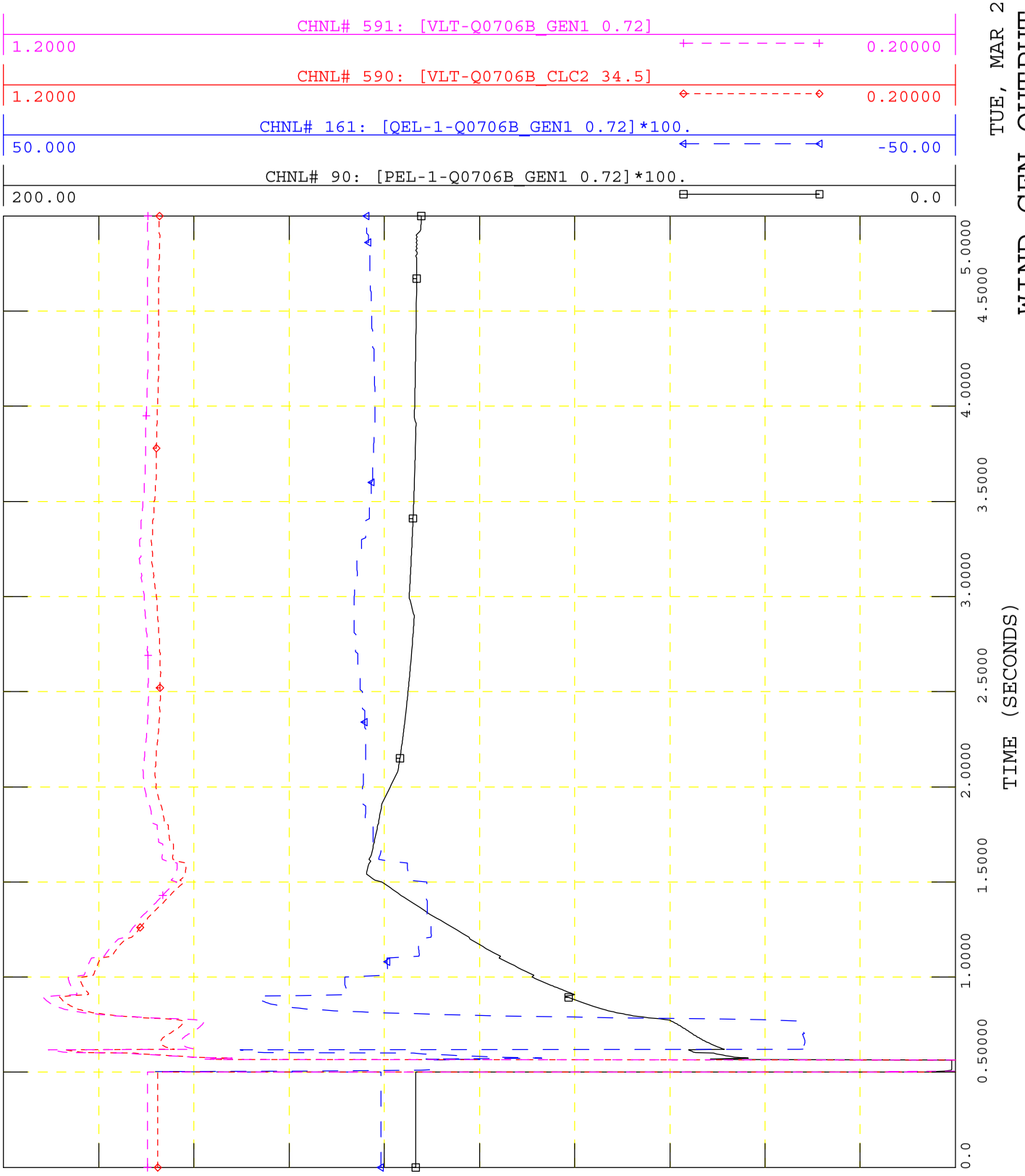

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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AEOLUS-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 8
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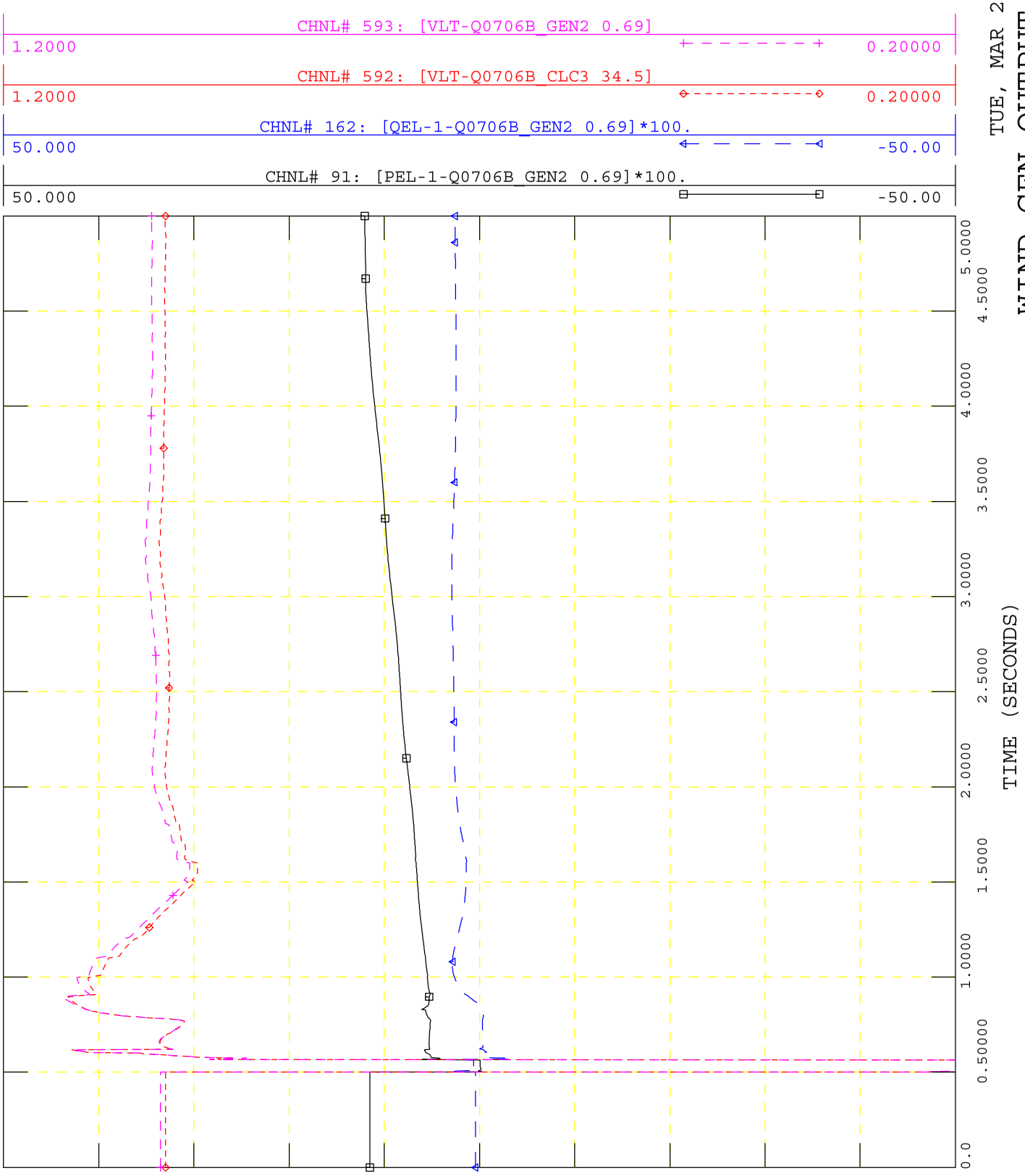
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 15



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AEOLUS-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 8
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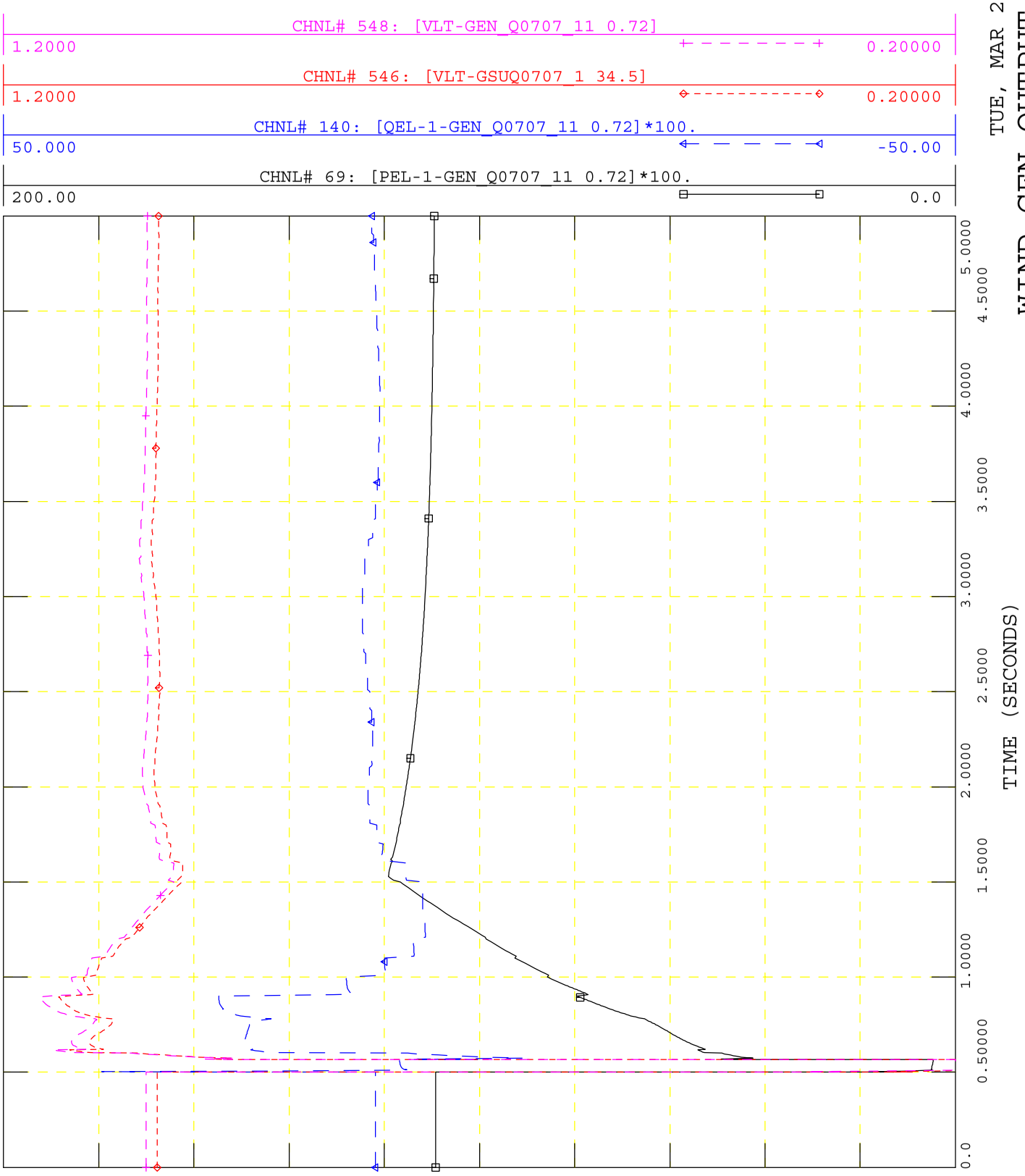
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 16



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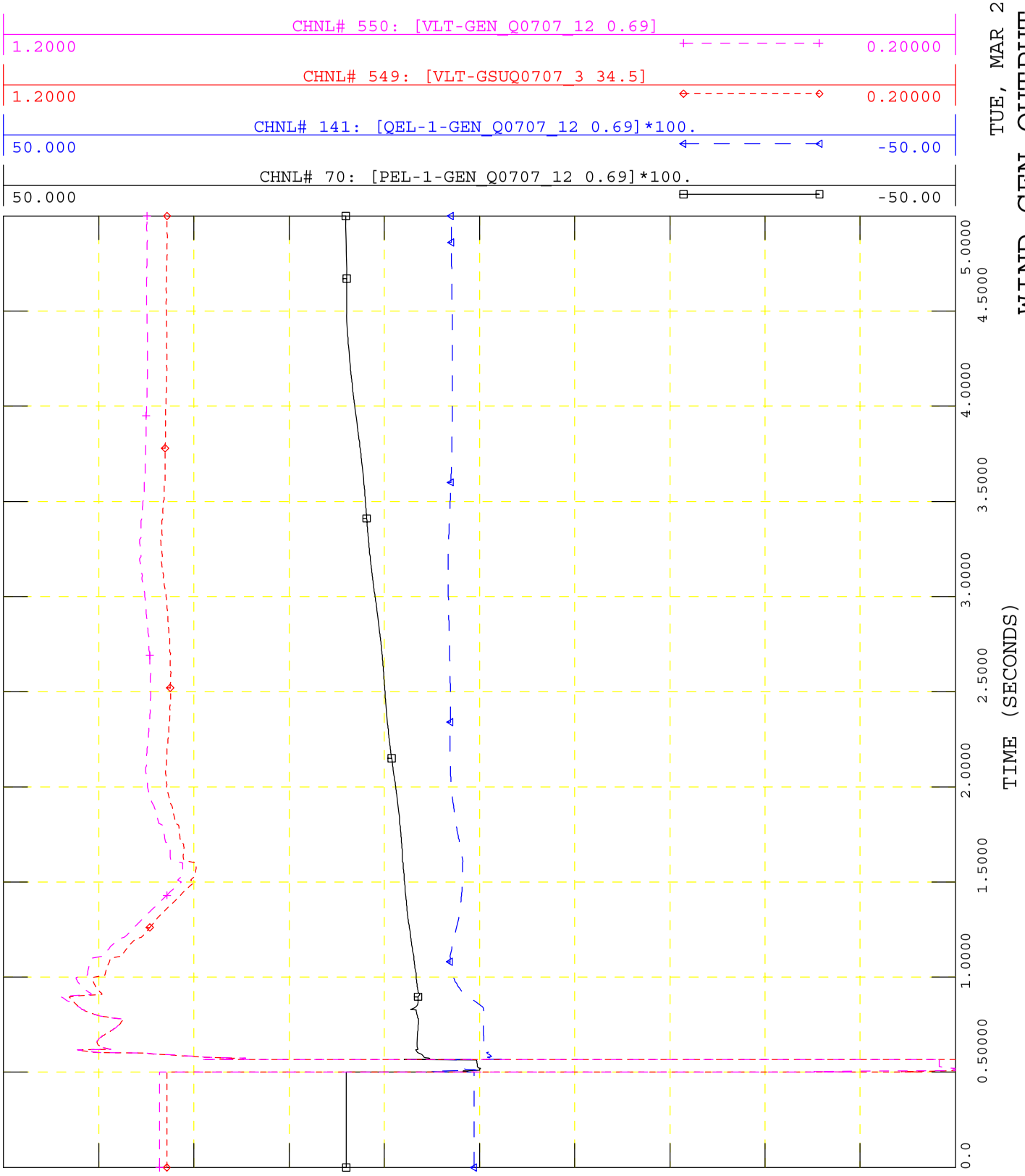
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 17



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AEOLUS-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 8
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TUE, MAR 27 2018 21:29 PLT 18

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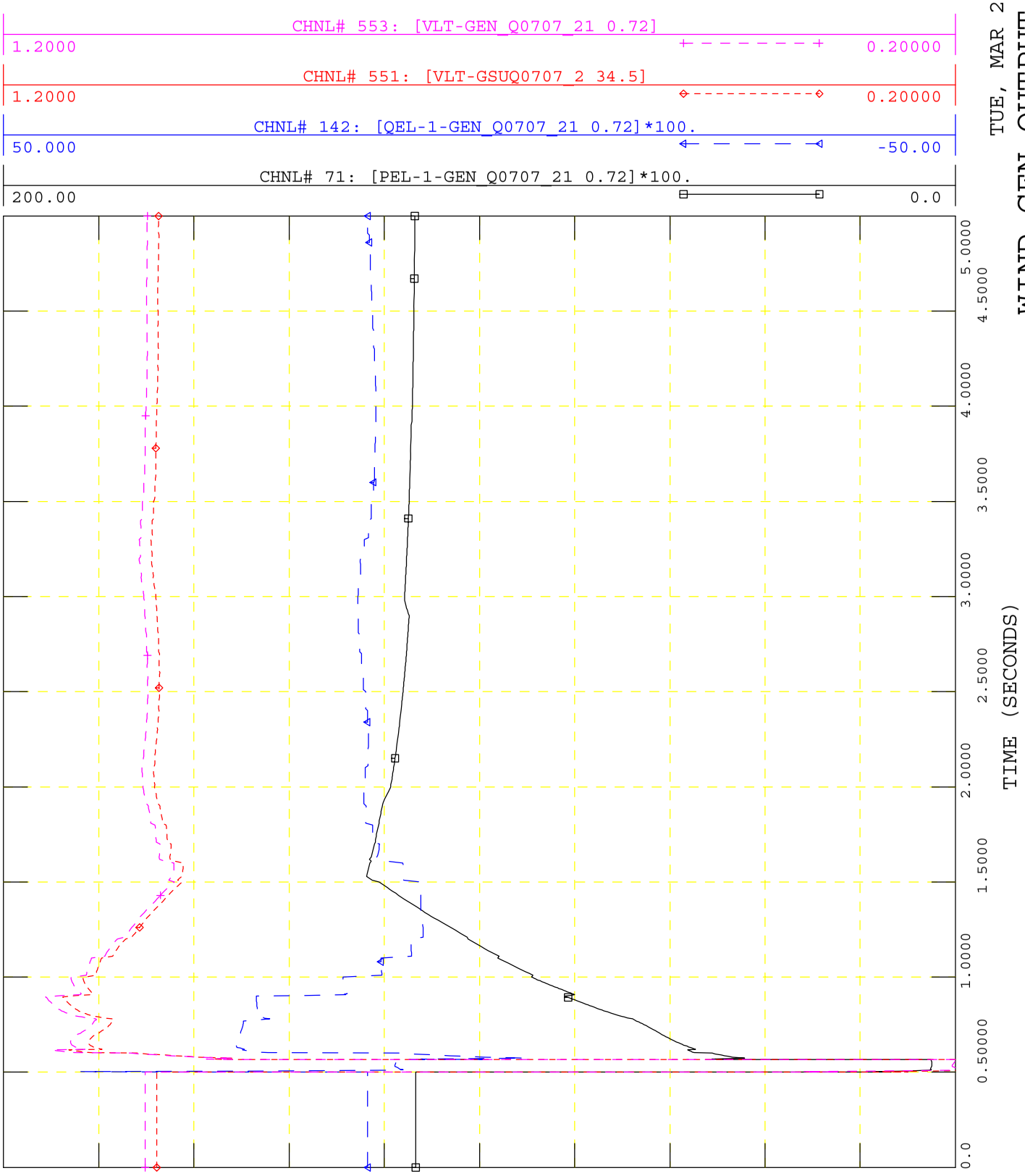

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TUE, MAR 27 2018 21:29 PLT 19

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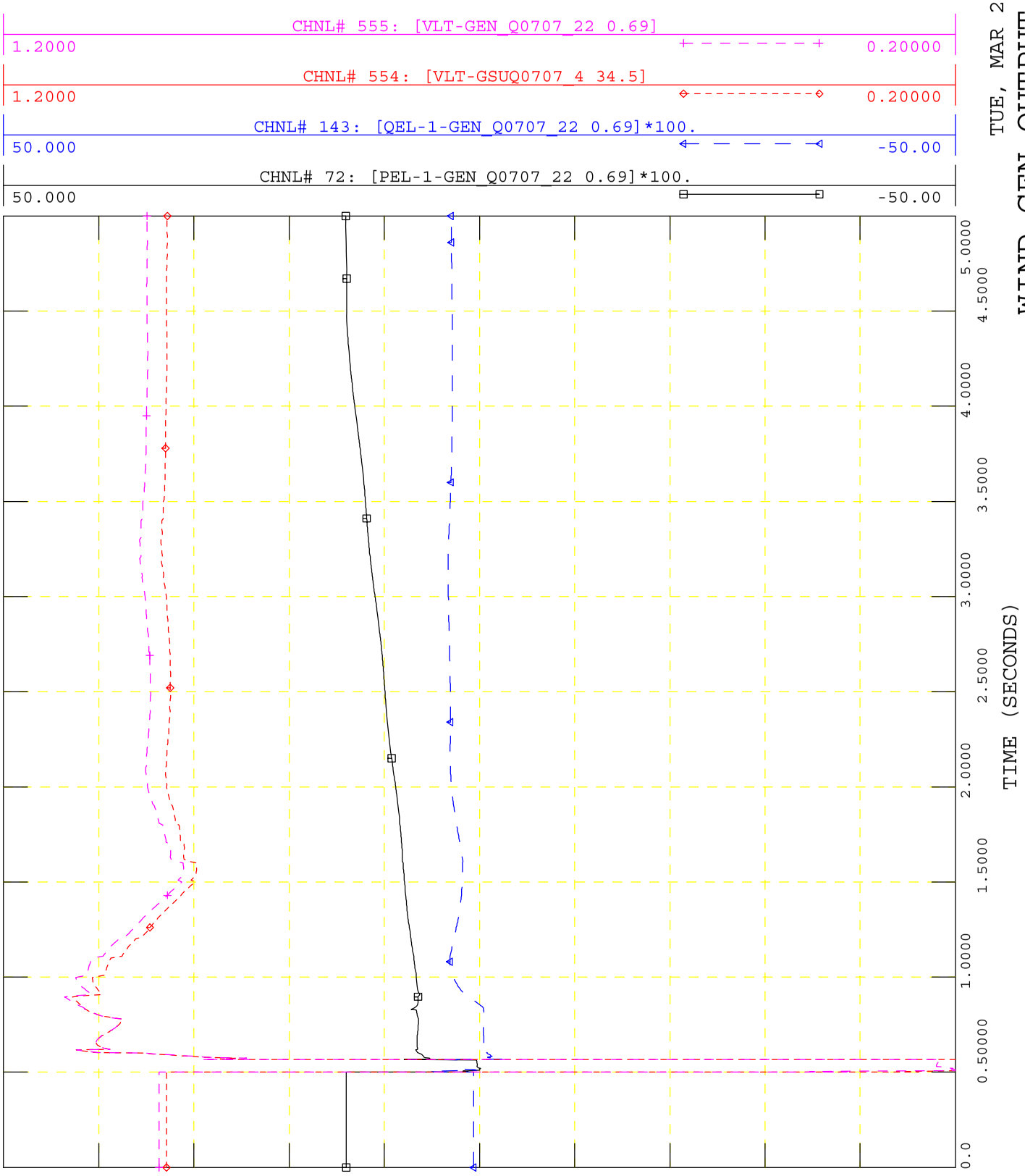

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AEOLUS-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 8
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TUE, MAR 27 2018 21:29 PLT 20

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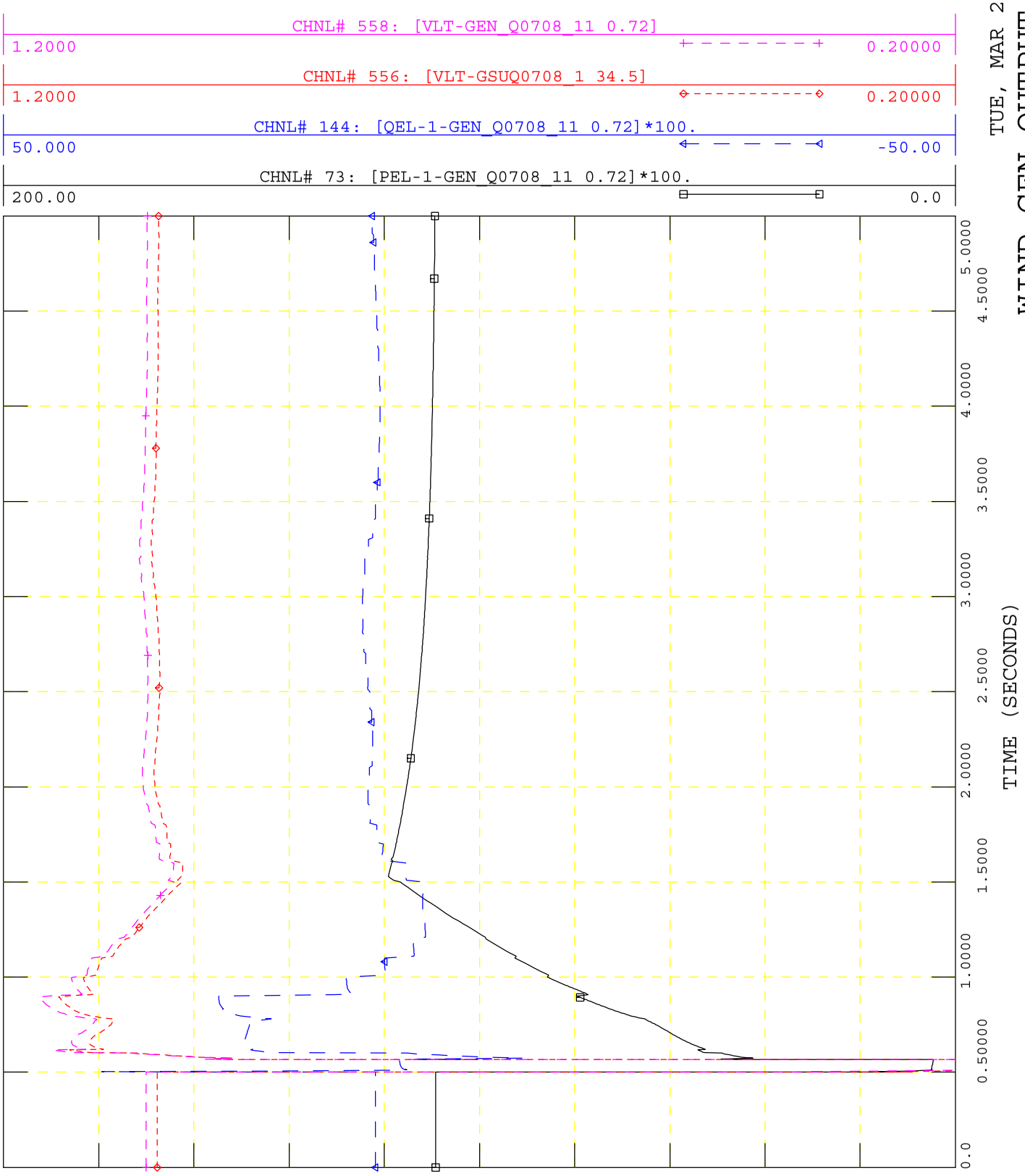

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TUE, MAR 27 2018 21:29 PLT 21

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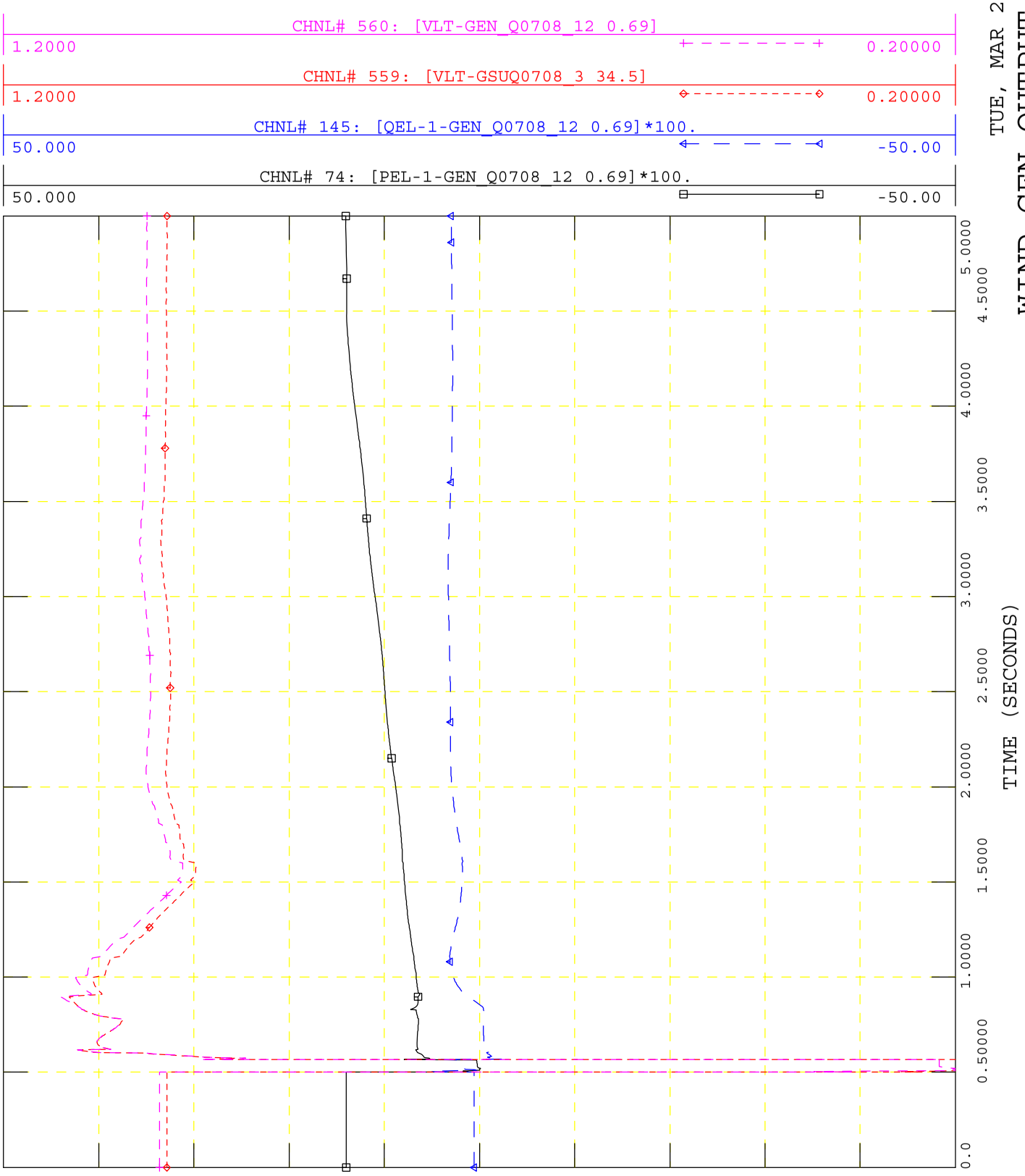

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TUE, MAR 27 2018 21:29 PLT 22

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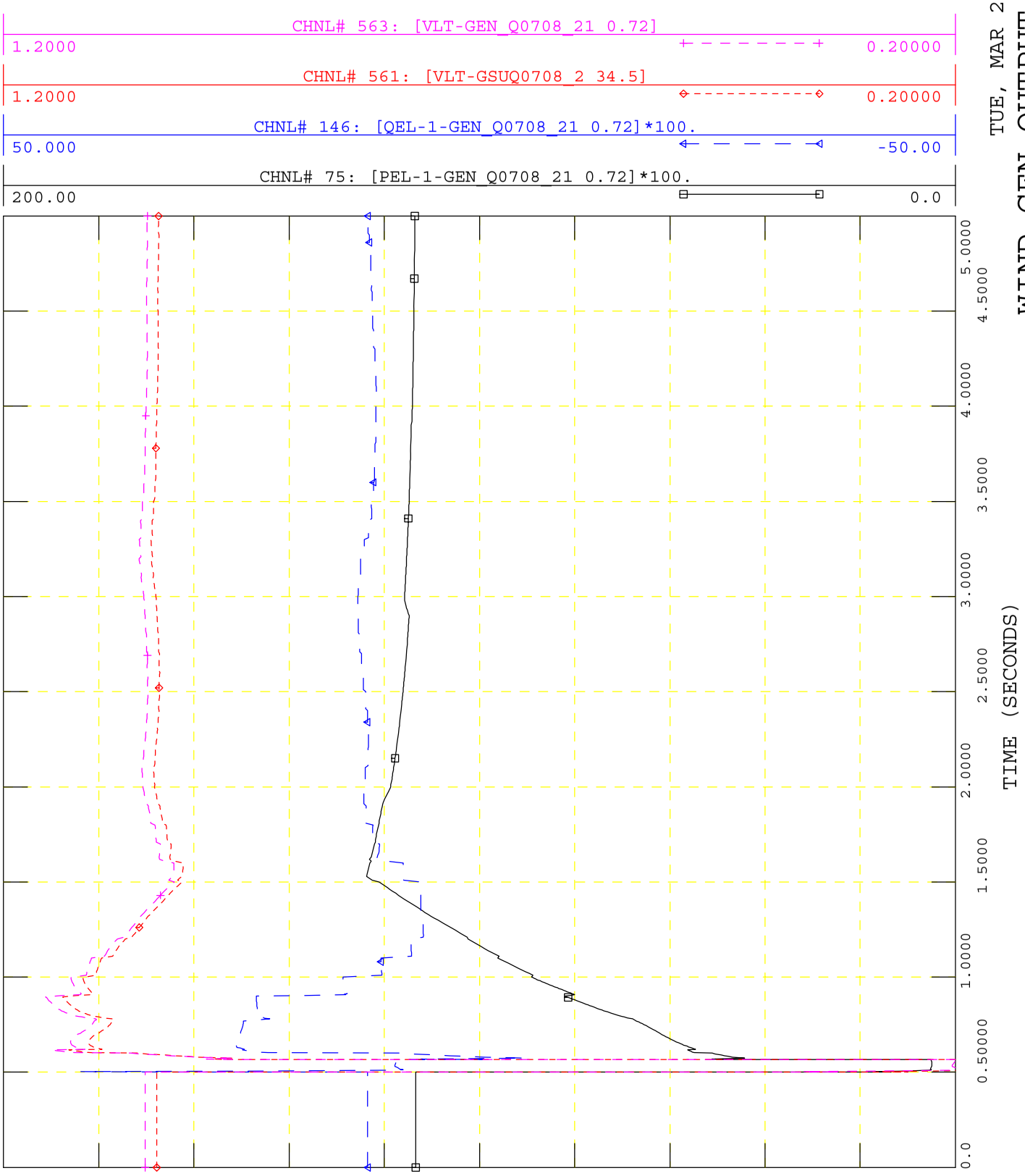

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AEOLUS-FREEZEOUT 230 LN. 36CY-UNBLOCK SVC. OUTAGE 8
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TUE, MAR 27 2018 21:29 PLT 23

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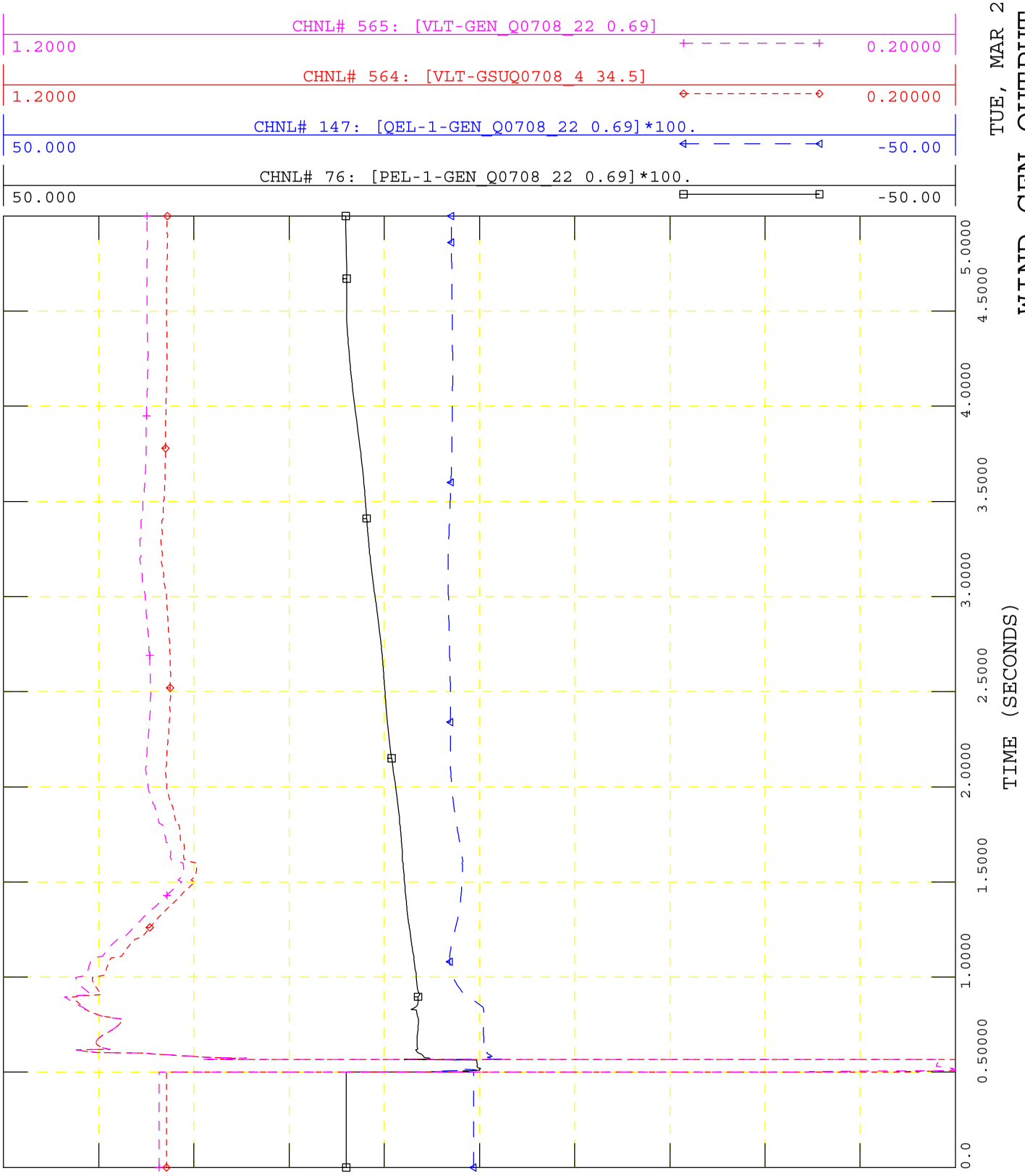

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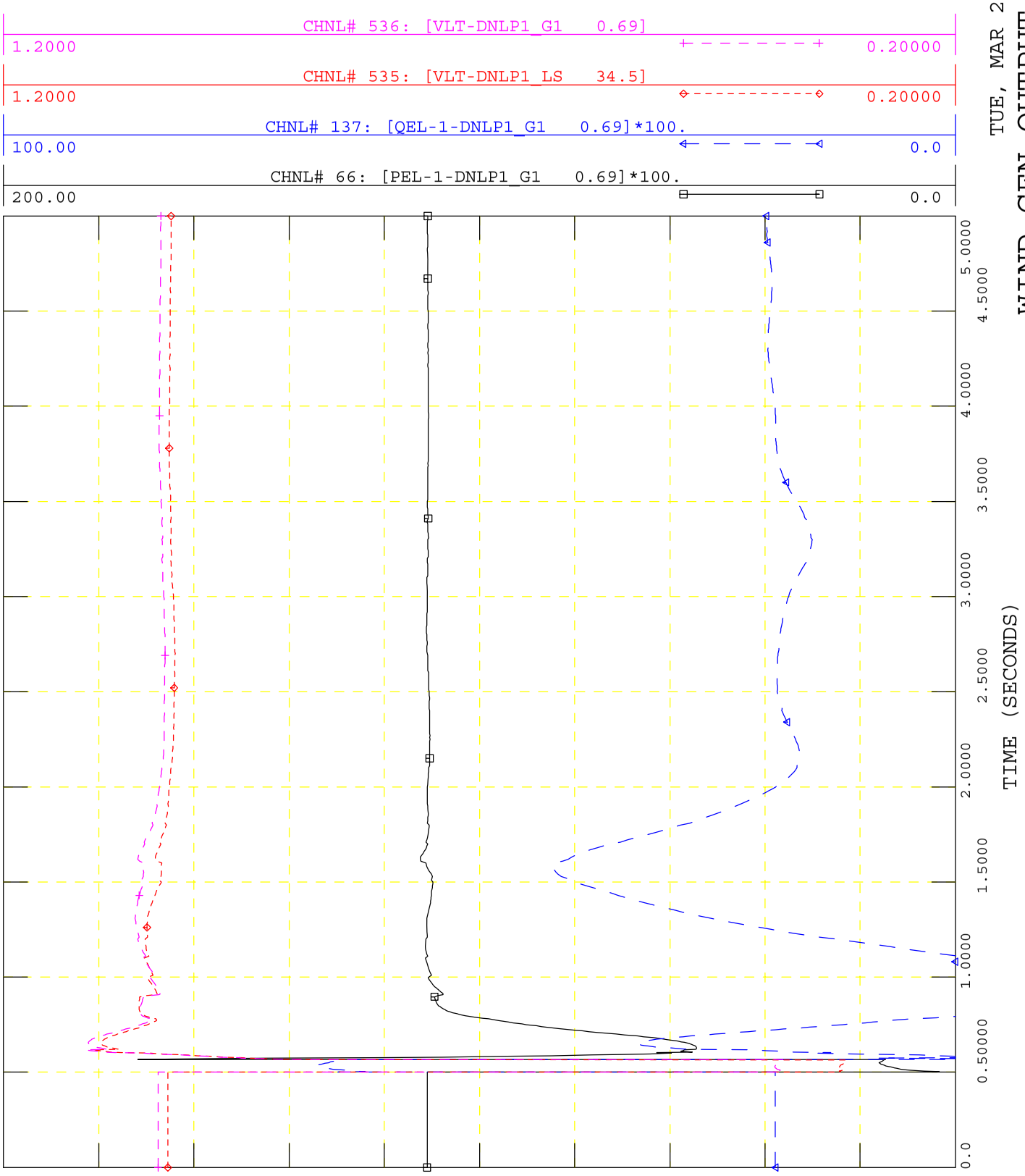
TUE, MAR 27 2018 21:29 PLT 24

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:29 PLT 25

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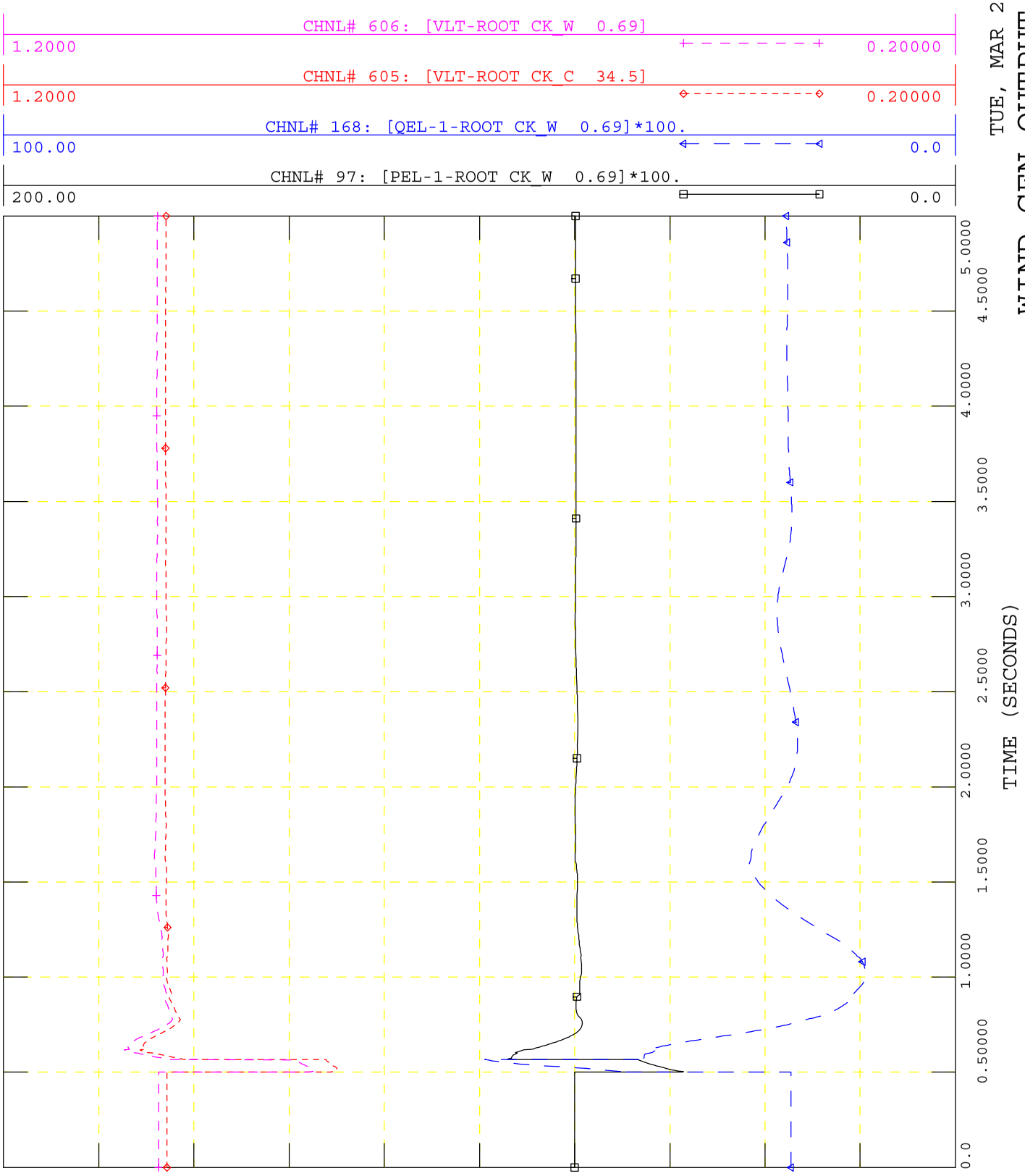

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TUE, MAR 27 2018 21:29 PLT 26

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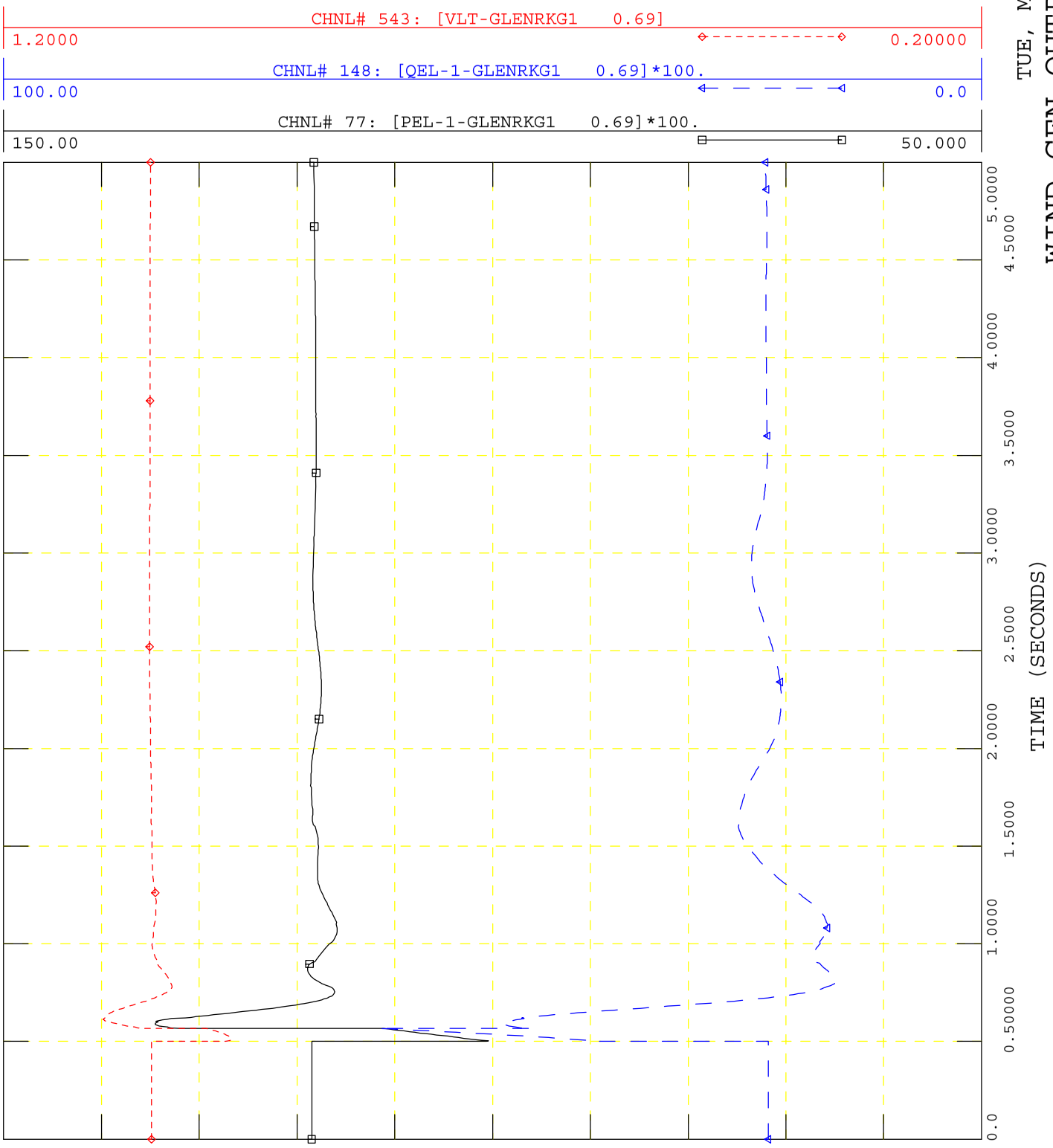

Dynamic Simulation

Case 9 – Loss of Aeolus-Shirley Basin #2 230 kV line

30 cycles	**3 phase Aeolus 230 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Aeolus-Shirley Basin #2 230 kV line**
36 cycles	**Remove SVC MVAR limiter**
5 sec.	**Terminate simulation**

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

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SHIRLEY BASIN #2 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 9
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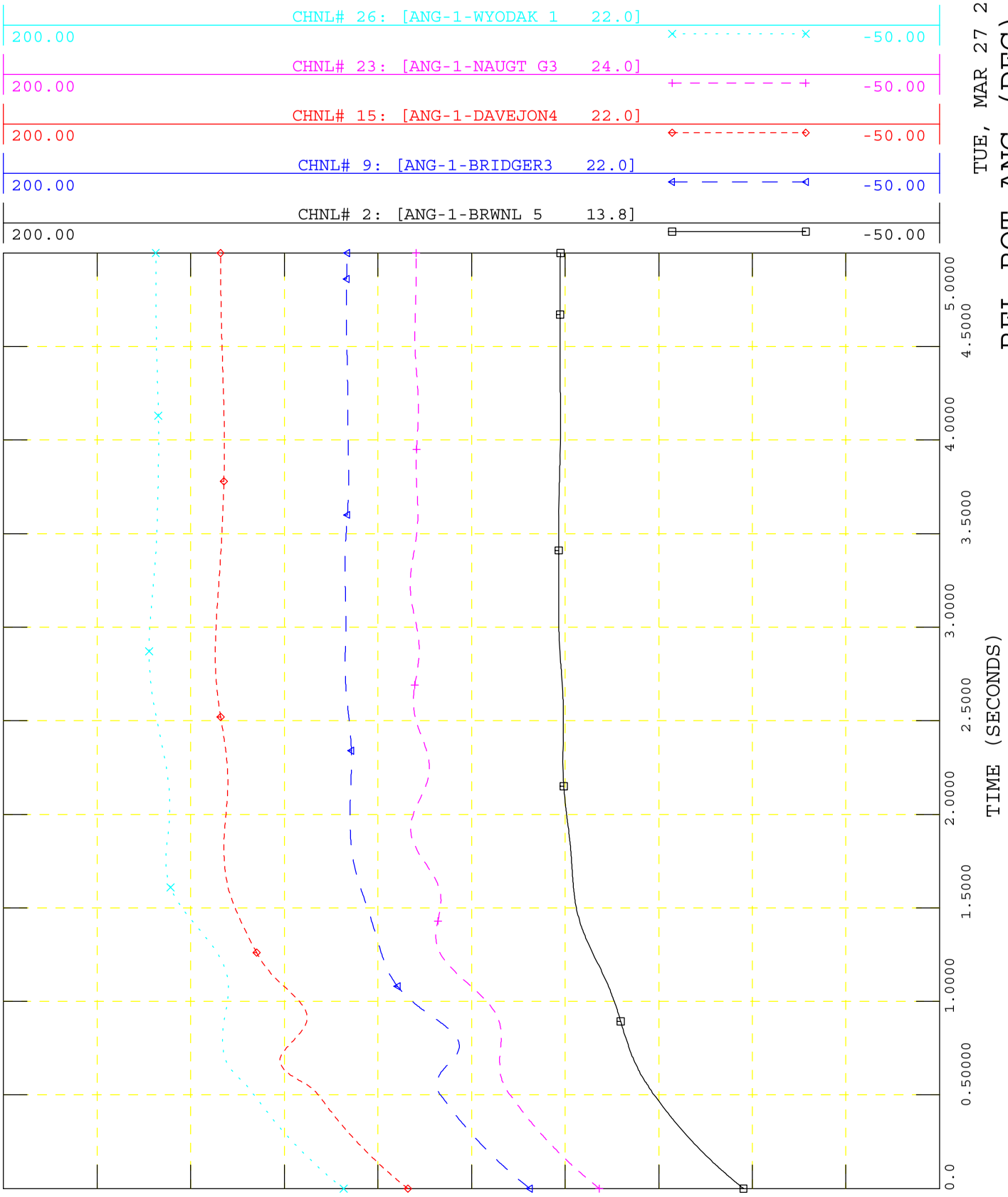
TUE, MAR 27 2018 21:29

REL ROT ANG (DEG) PLT 1



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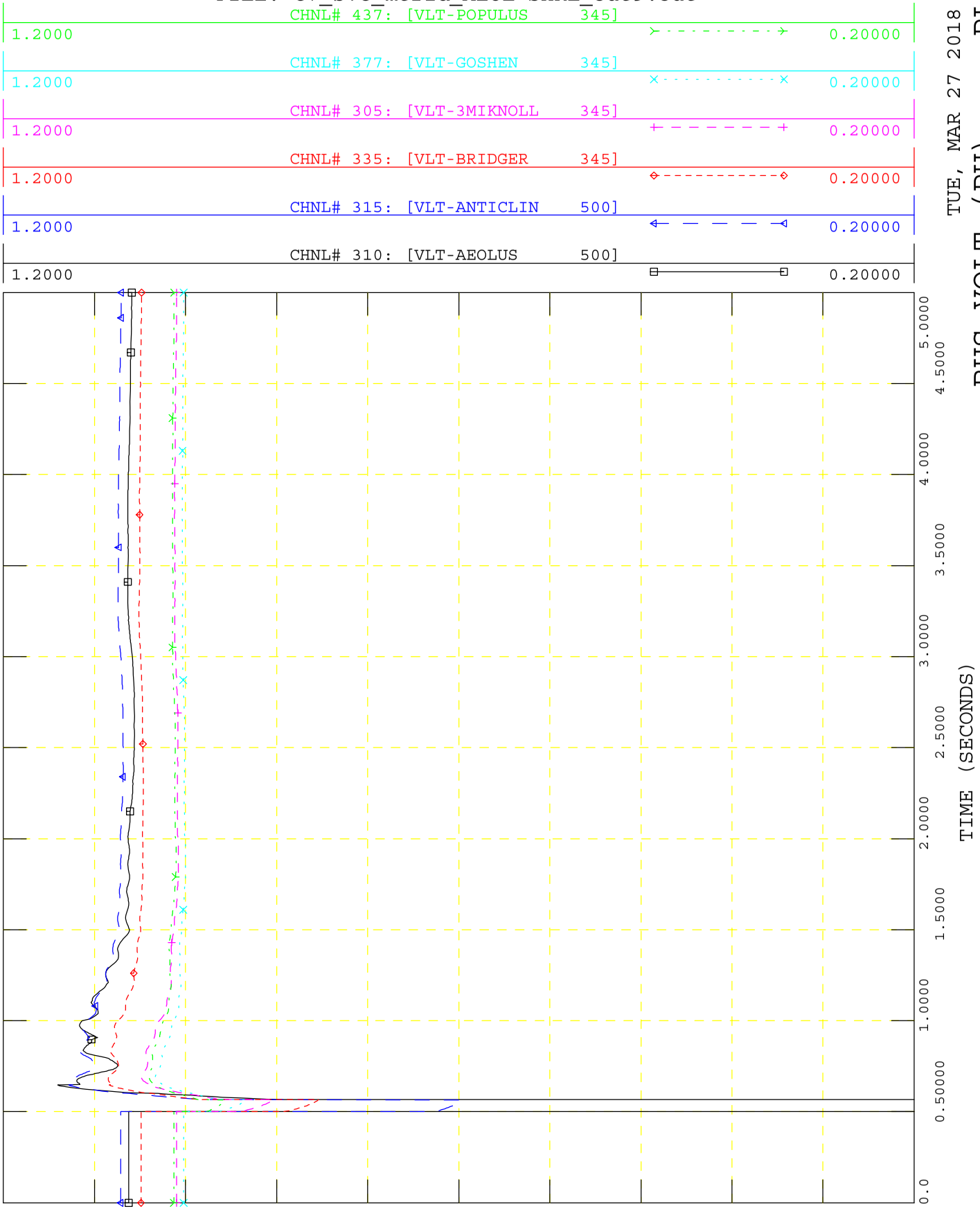

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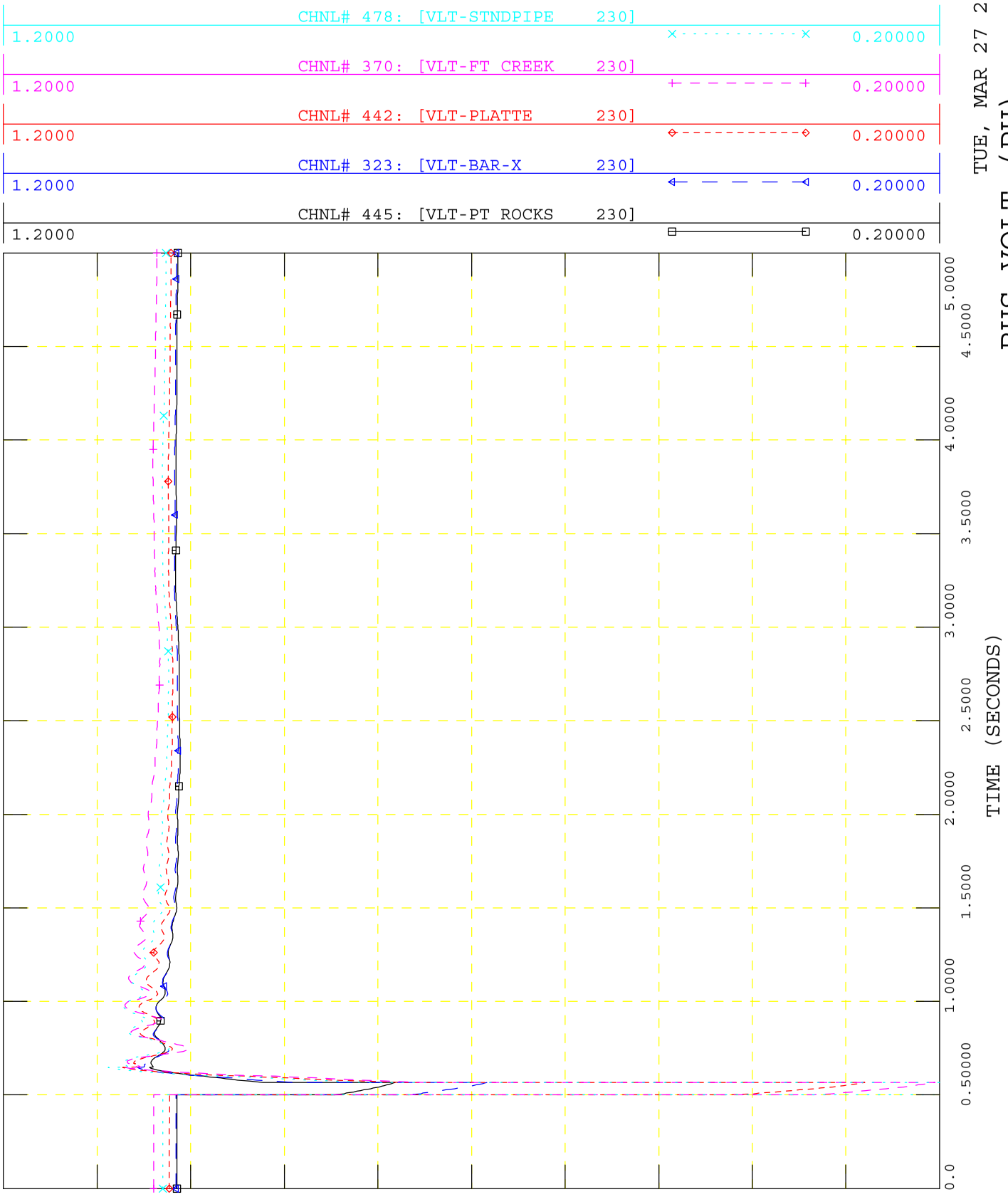
TUE, MAR 27 2018 21:29 PLT 3



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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS AEOLUS KV 230 FLT. 34CY-CLR FLT & OPEN AEOLUS-
SHIRLEY BASIN #2 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 9
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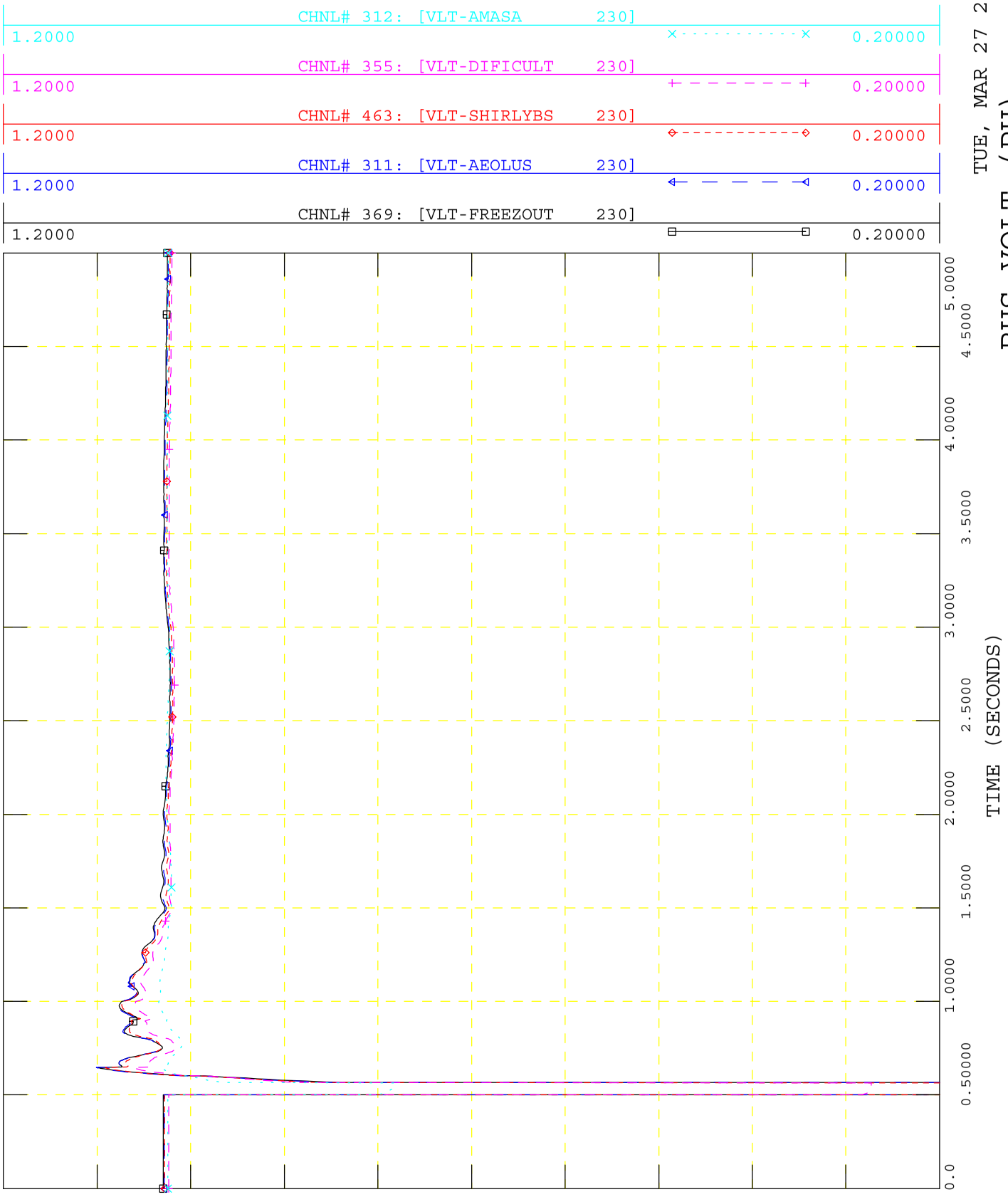
TUE, MAR 27 2018 21:29 PLT 4



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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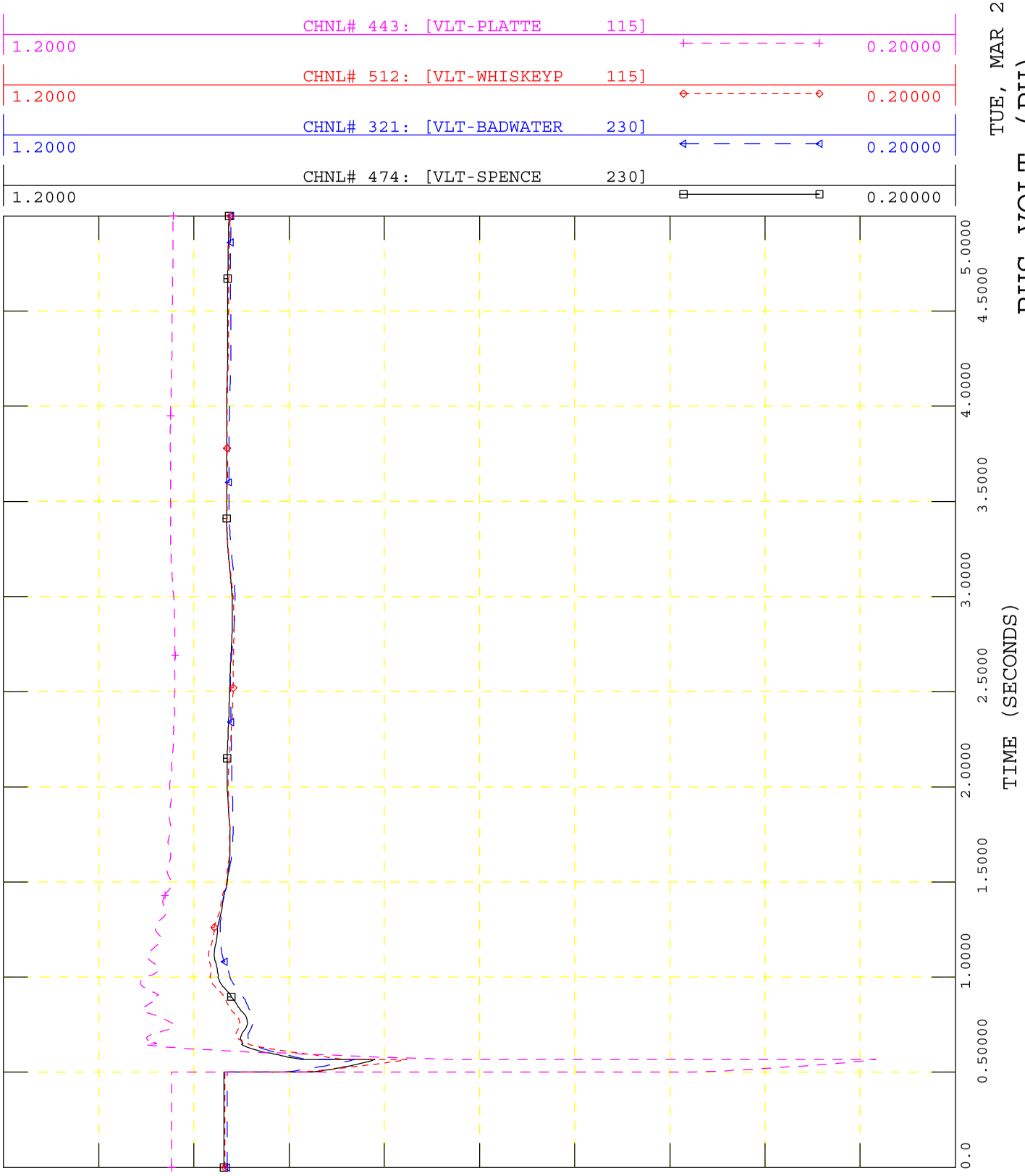
TUE, MAR 27 2018 21:29 PLT 5



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SHIRLEY BASIN #2 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 9
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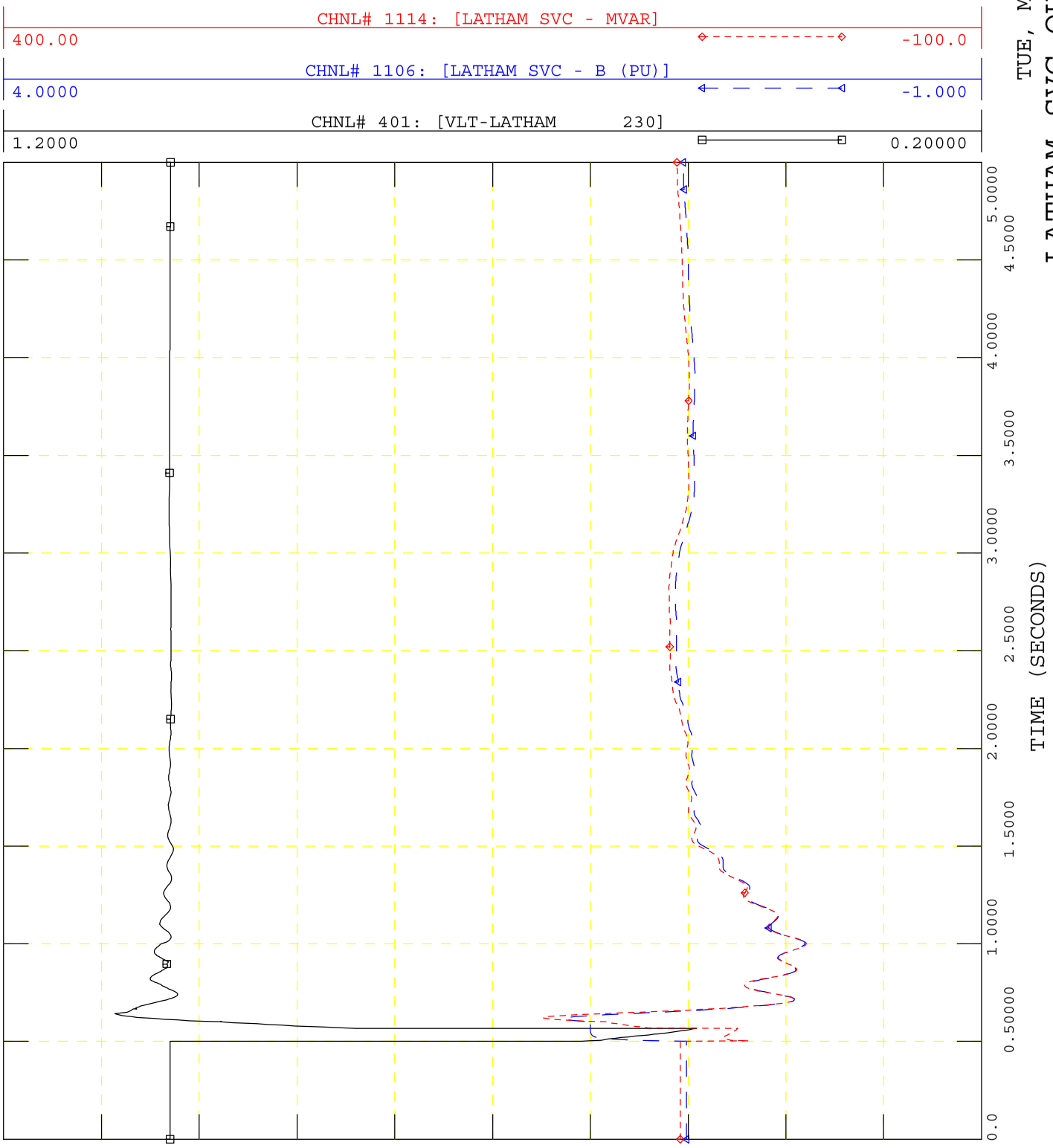
TUE, MAR 27 2018 21:29 PLT 6

LATHAM SVC OUT



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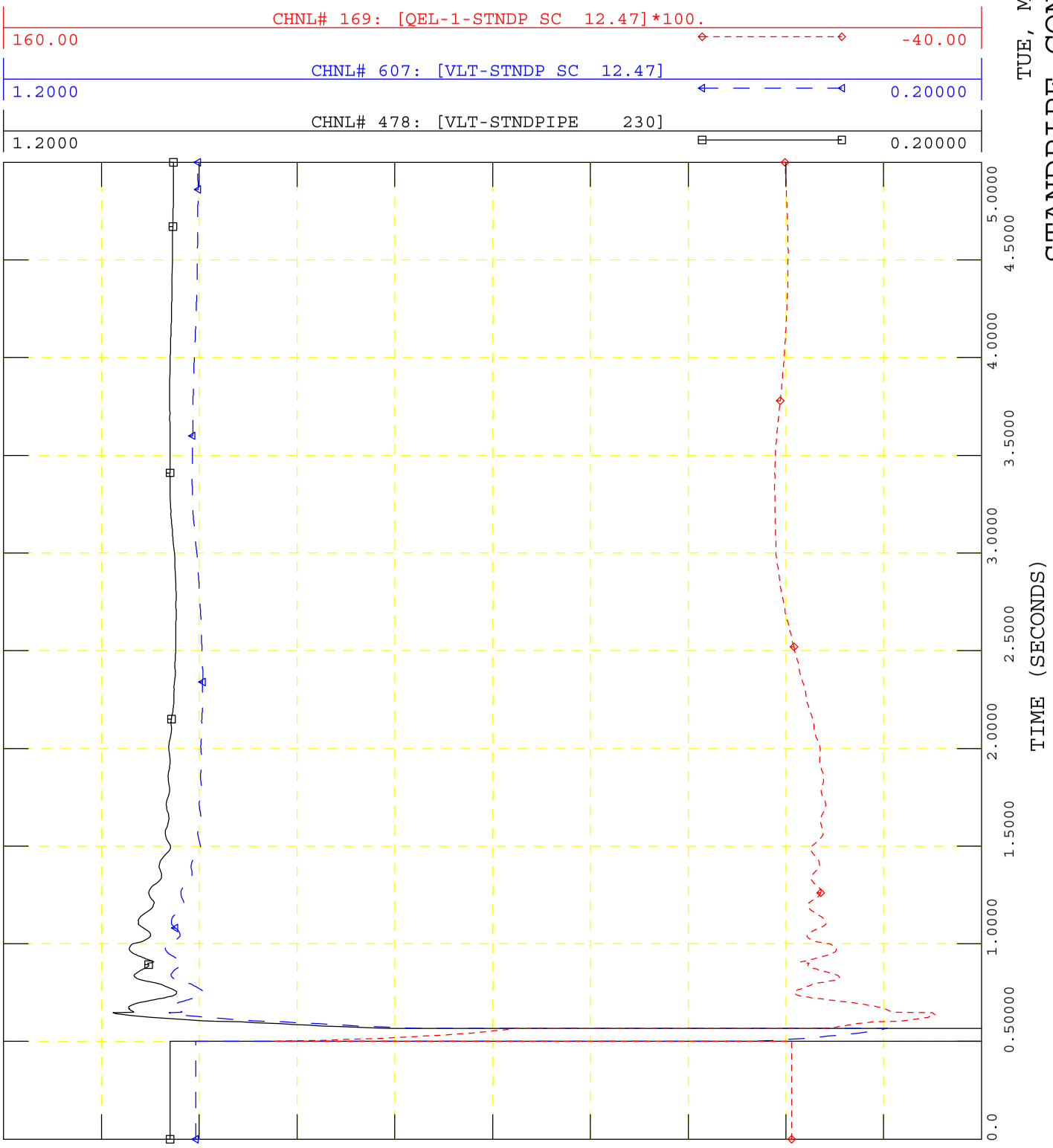
TUE, MAR 27 2018 21:29

STANDPIPE CONDNSR PLT 7



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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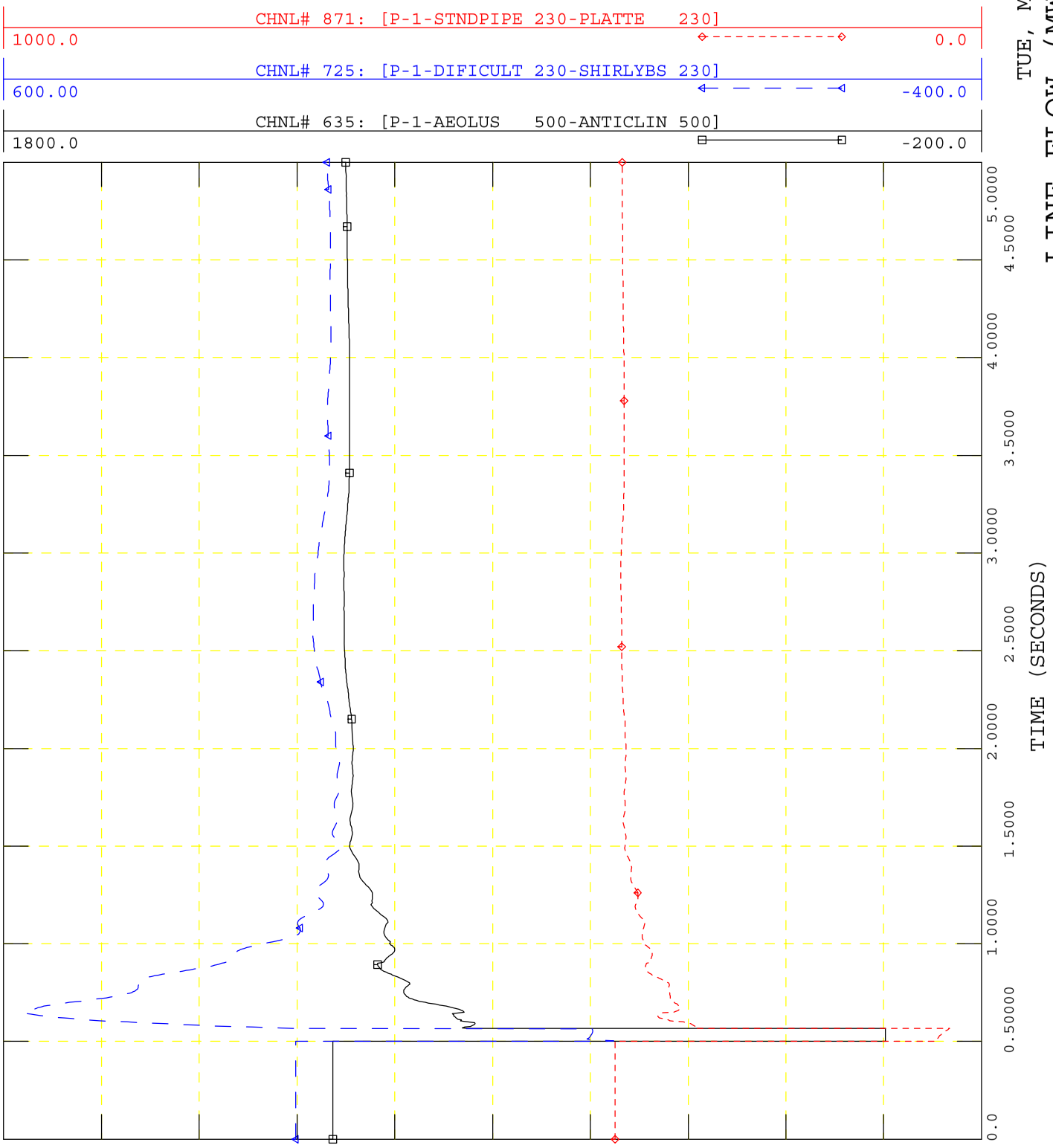
TUE, MAR 27 2018 21:29 PLT 8



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TUE, MAR 27 2018 21:29 PLT 9

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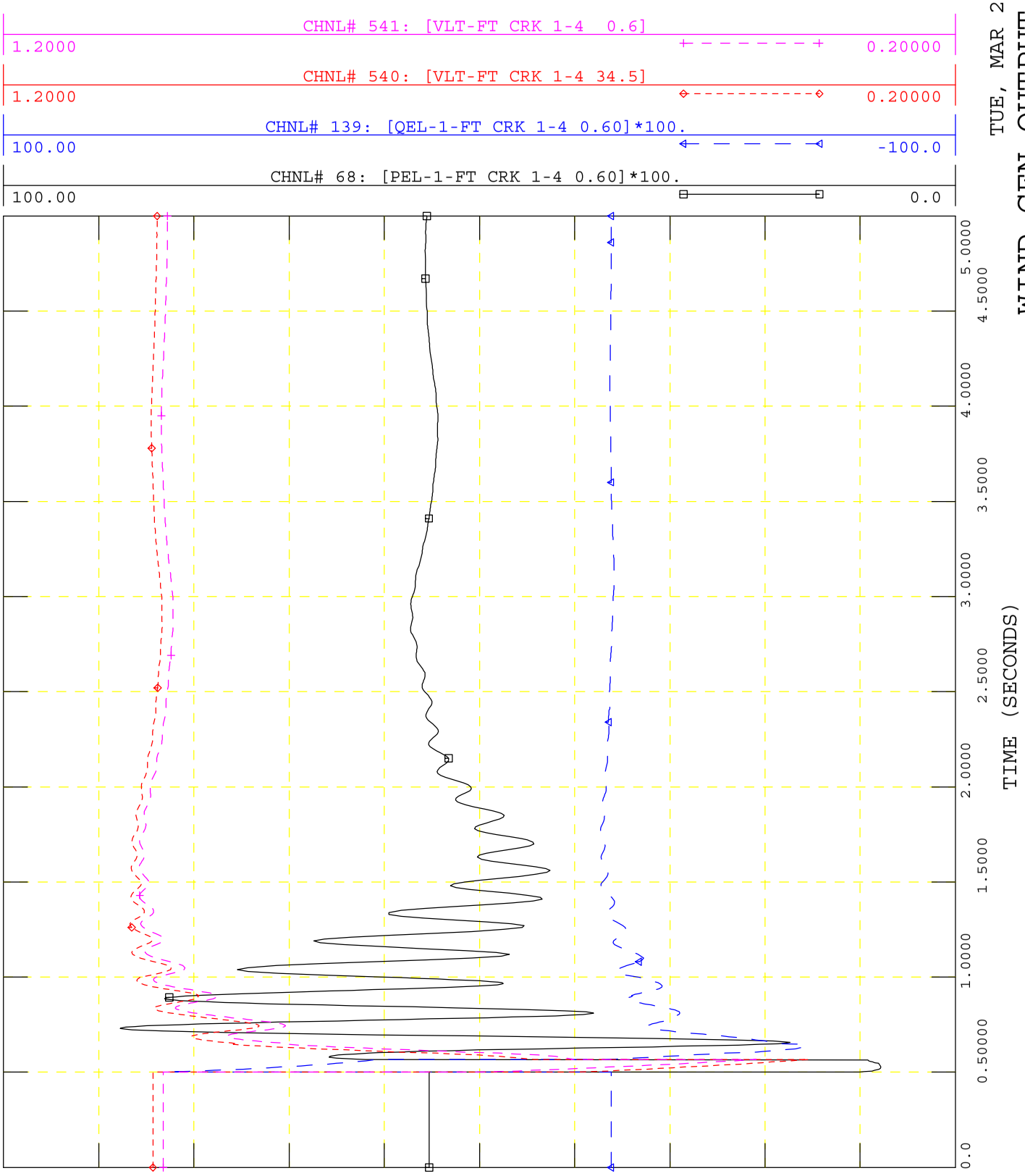

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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TUE, MAR 27 2018 21:29 PLT 10

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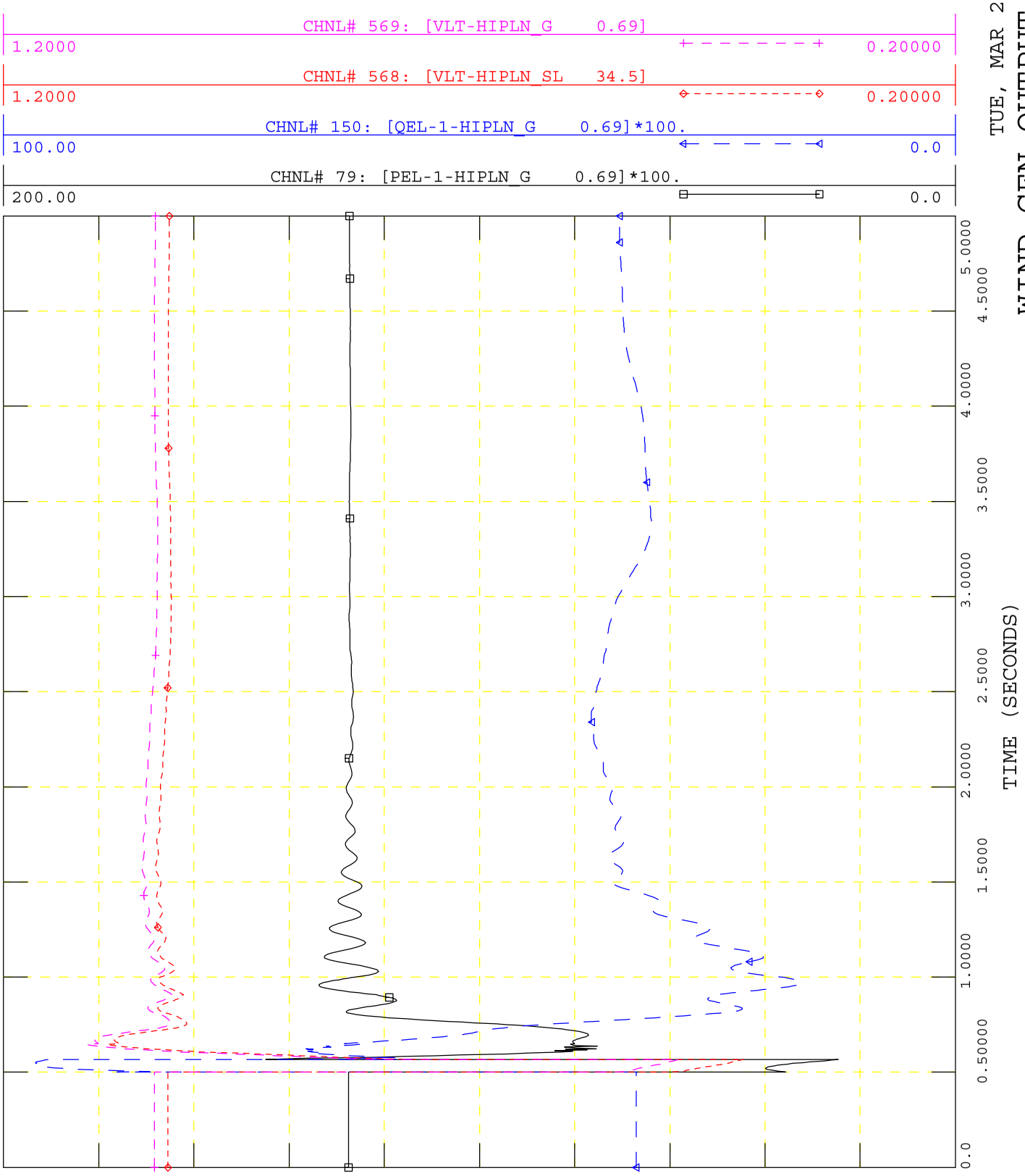

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TUE, MAR 27 2018 21:29 PLT 11

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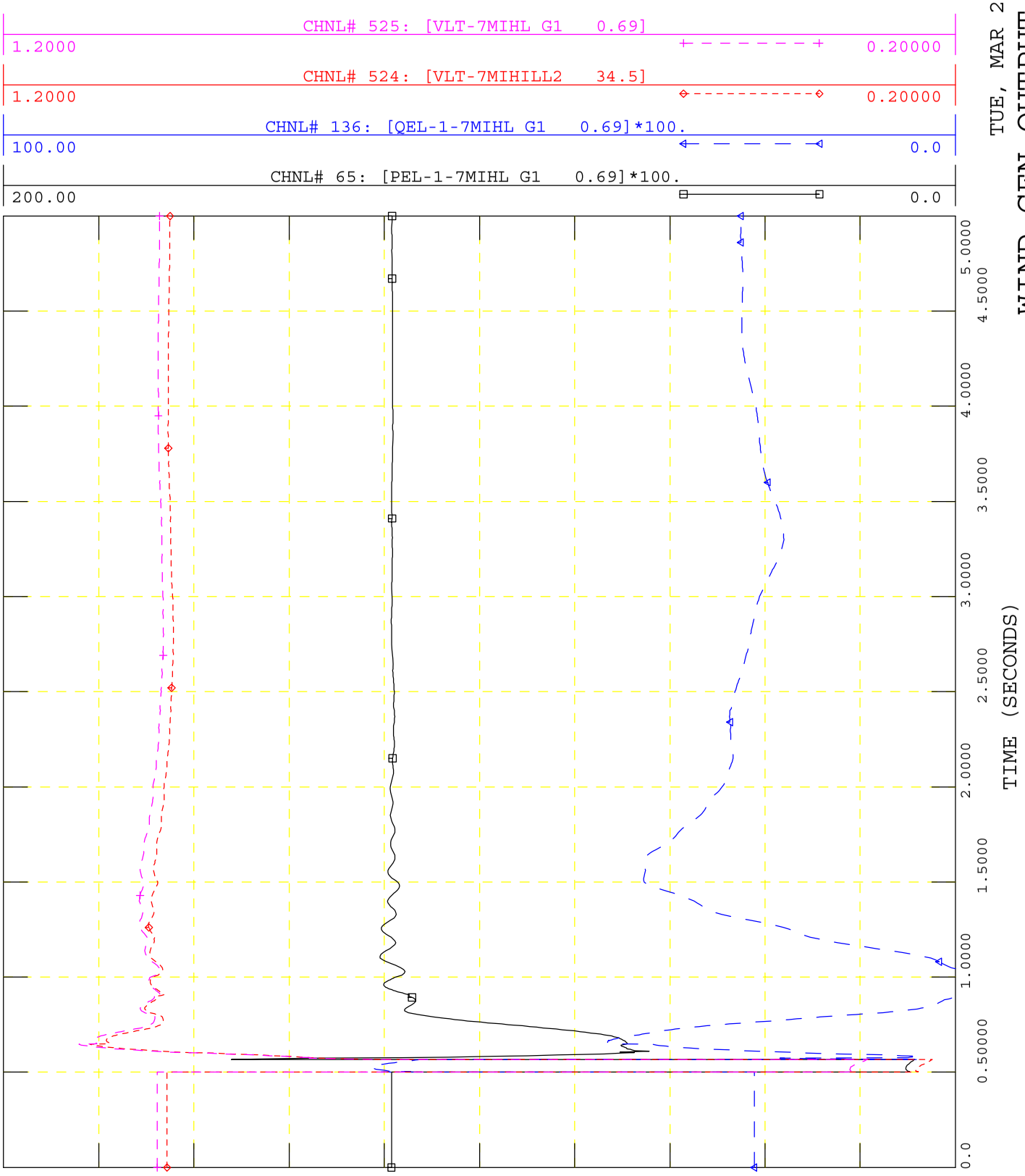

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TUE, MAR 27 2018 21:29 PLT 12

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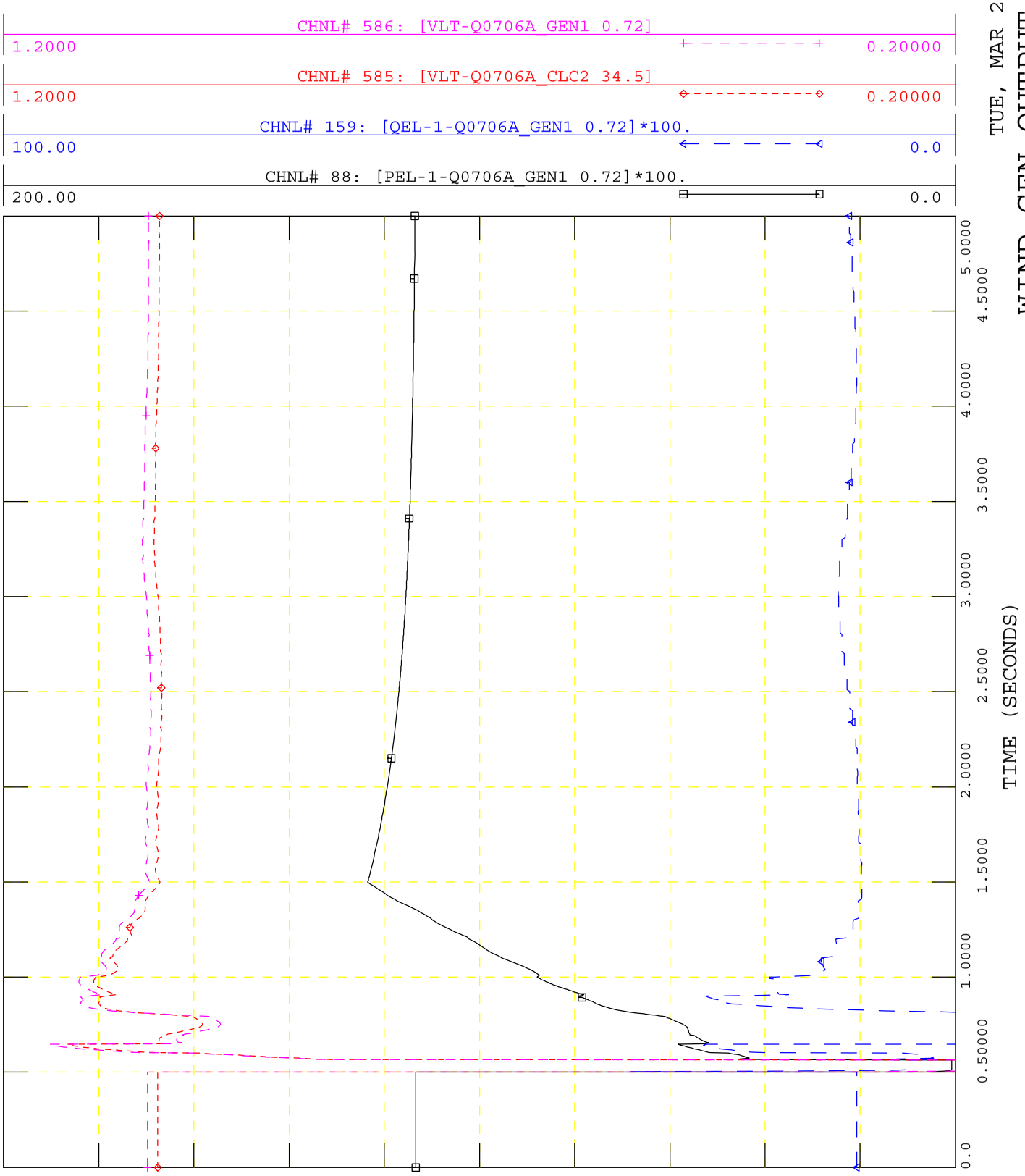

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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TUE, MAR 27 2018 21:29 PLT 13

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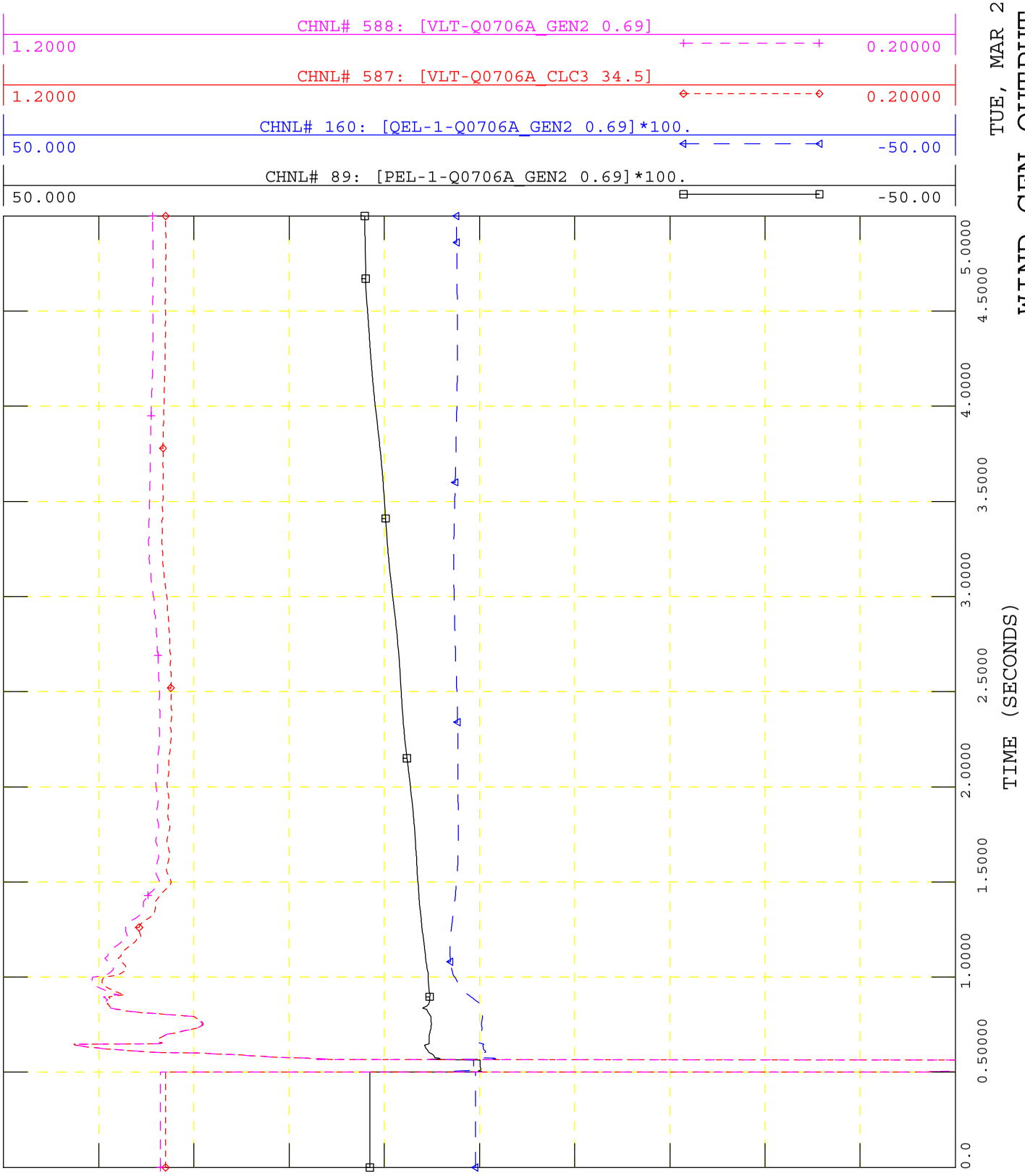

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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TUE, MAR 27 2018 21:29 PLT 14

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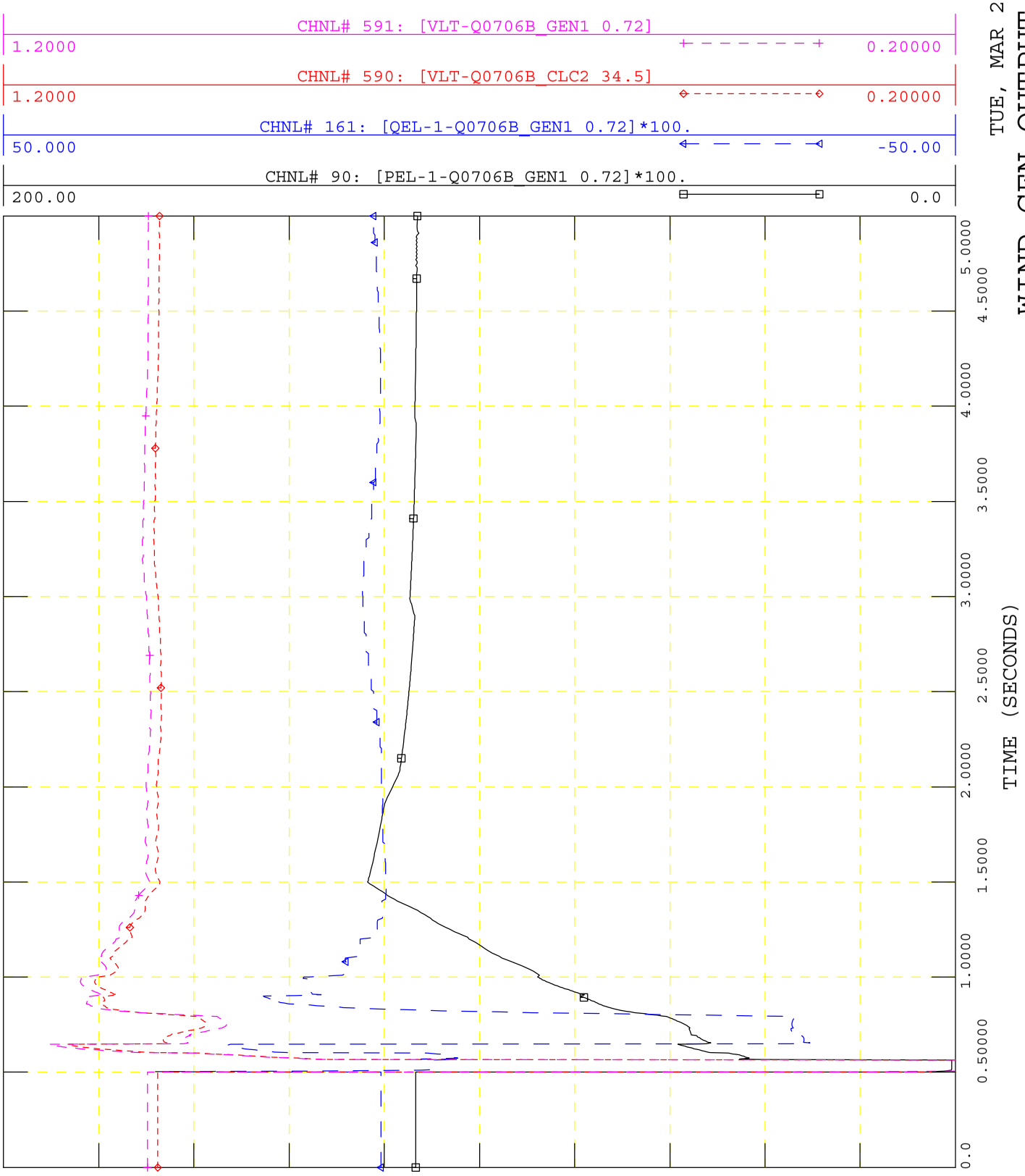

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TUE, MAR 27 2018 21:29 PLT 15

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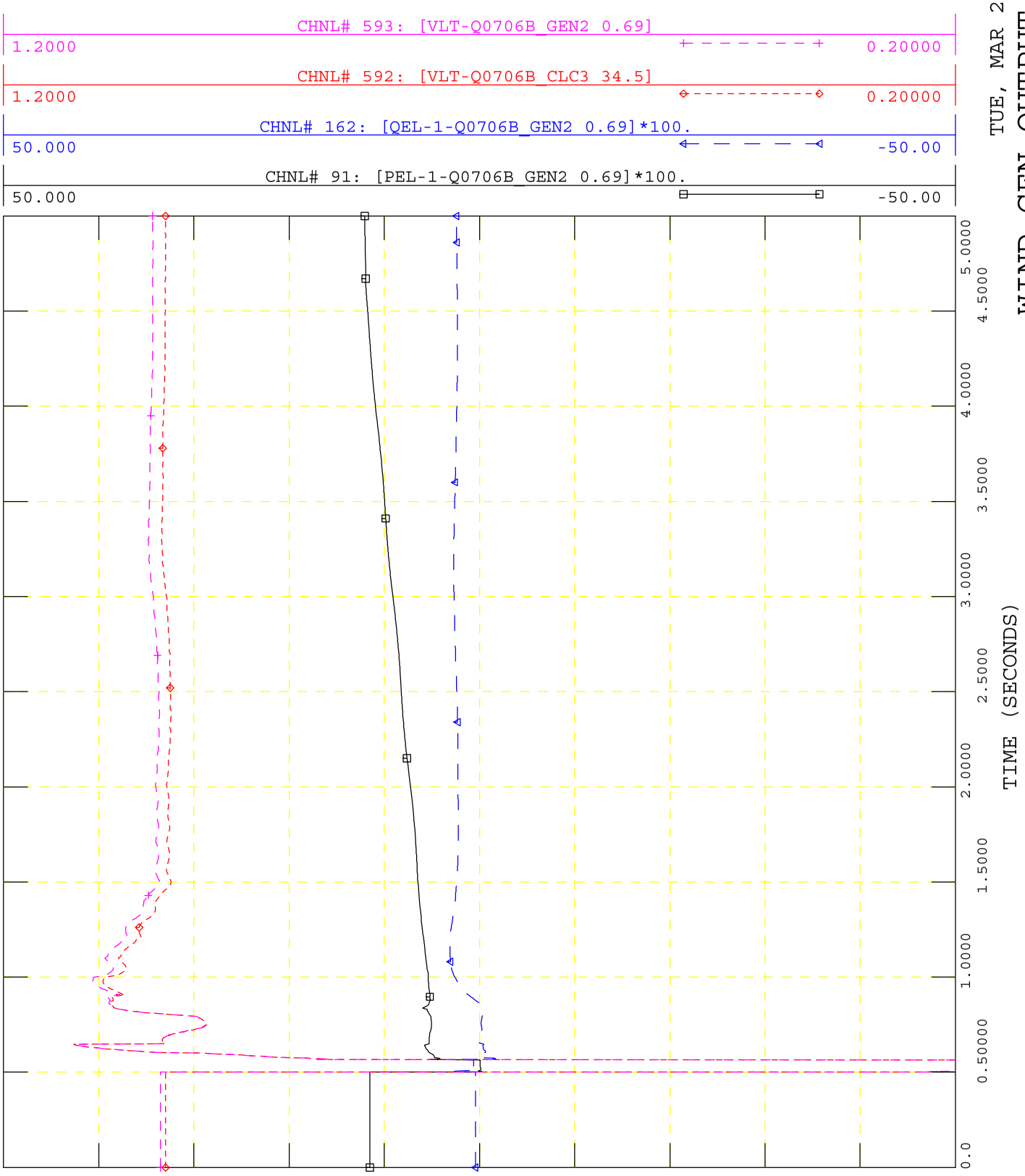

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TUE, MAR 27 2018 21:29 PLT 16

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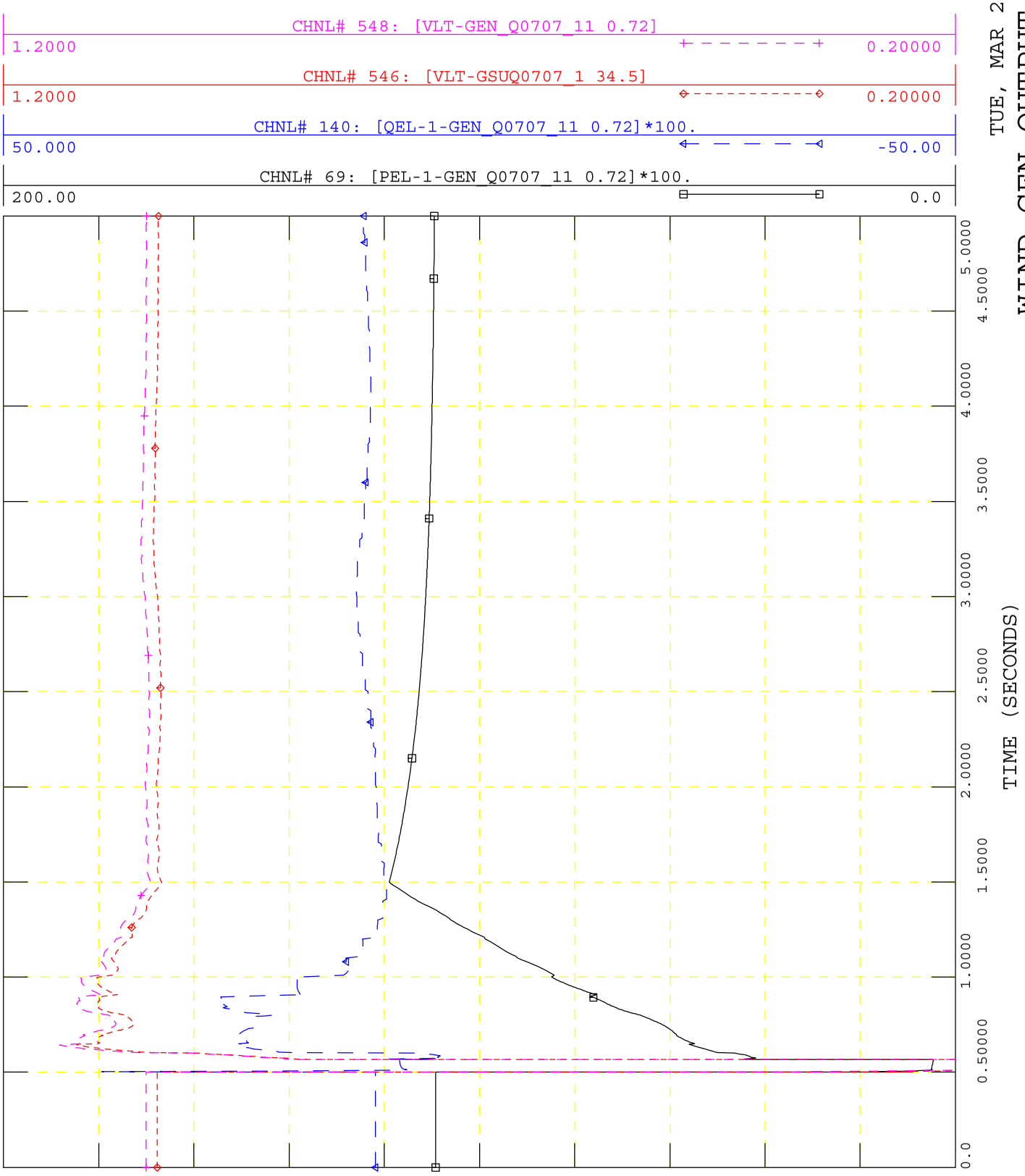

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TUE, MAR 27 2018 21:29 PLT 17

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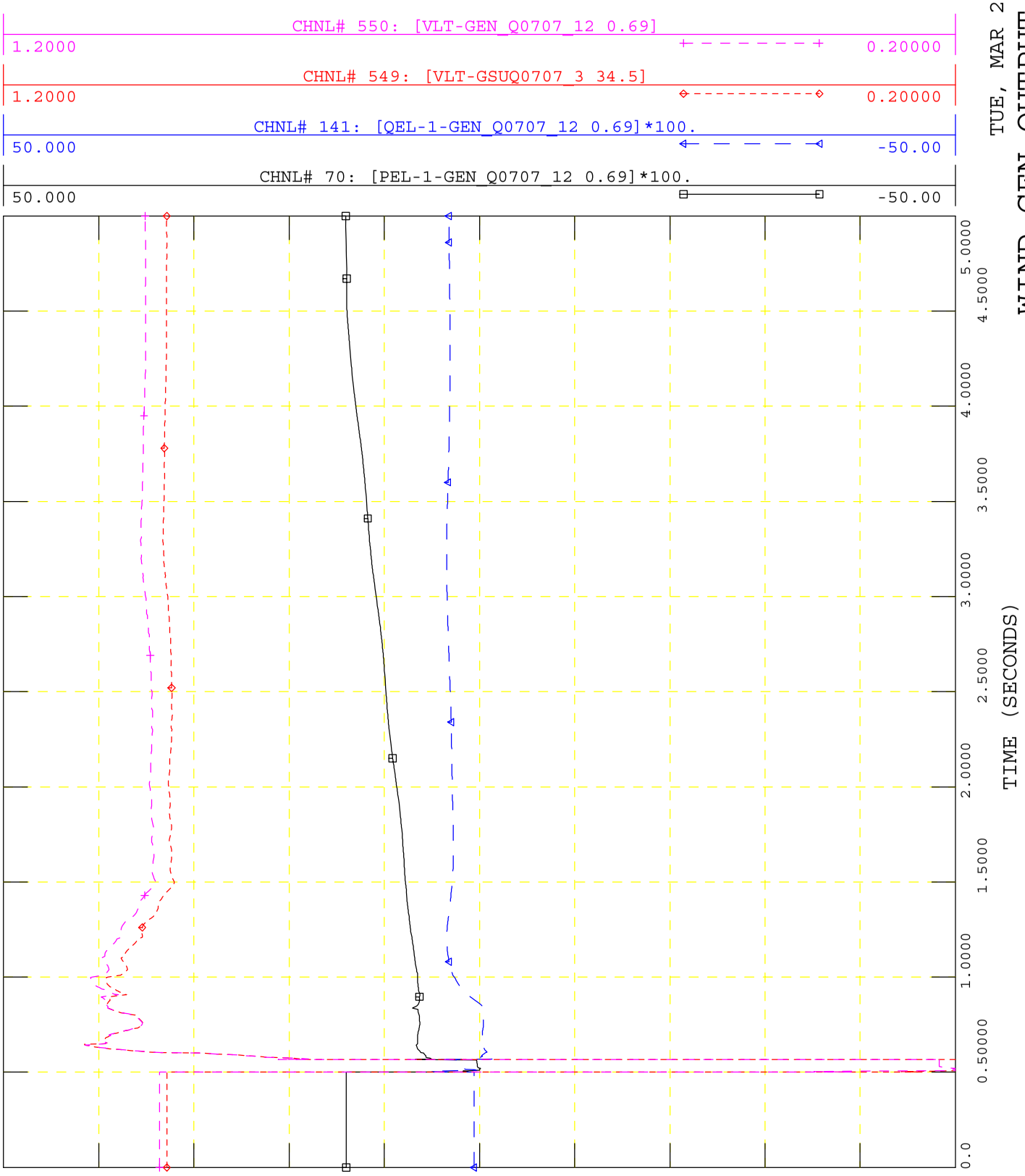

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TUE, MAR 27 2018 21:29 PLT 18

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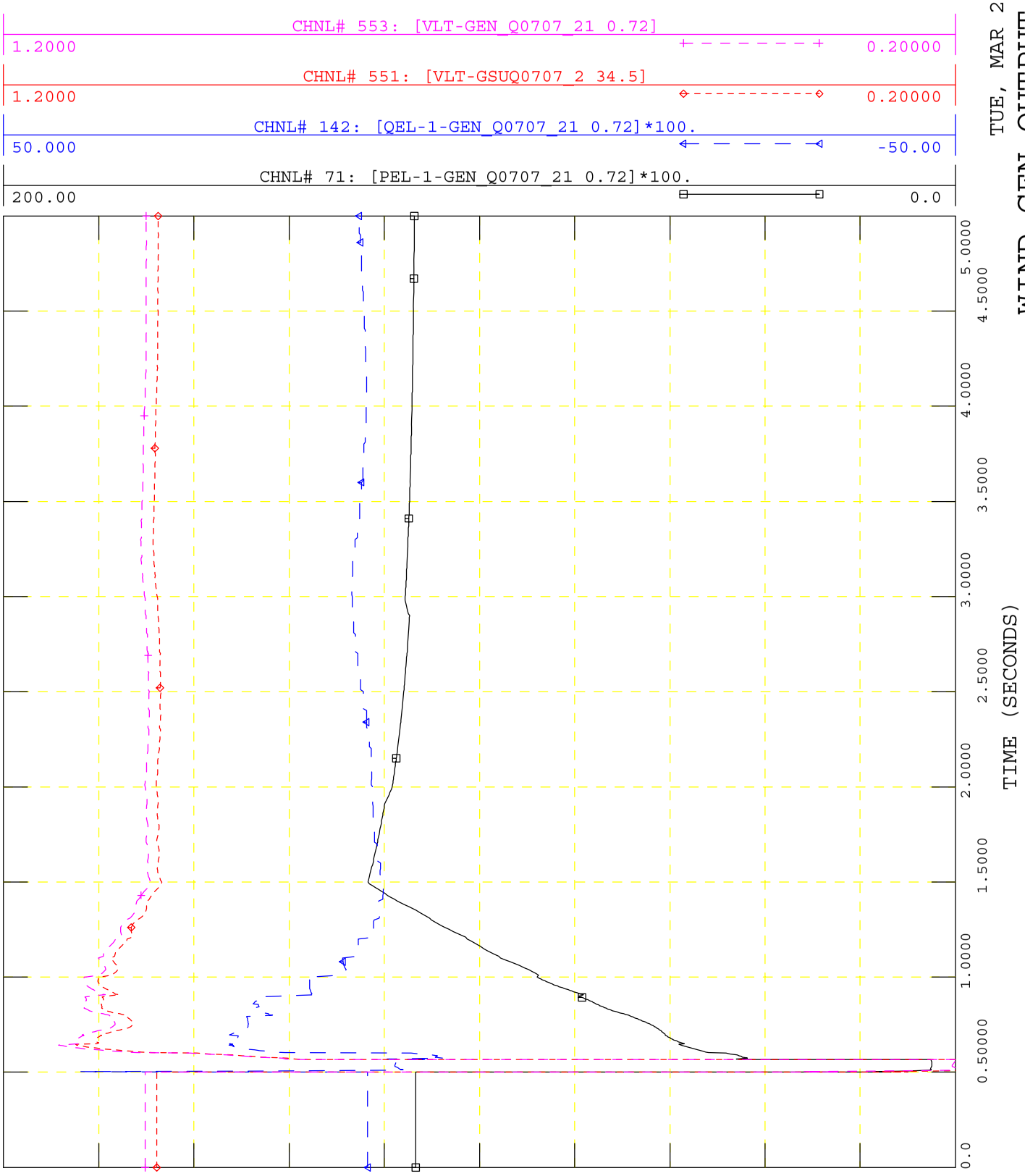

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TUE, MAR 27 2018 21:29 PLT 19

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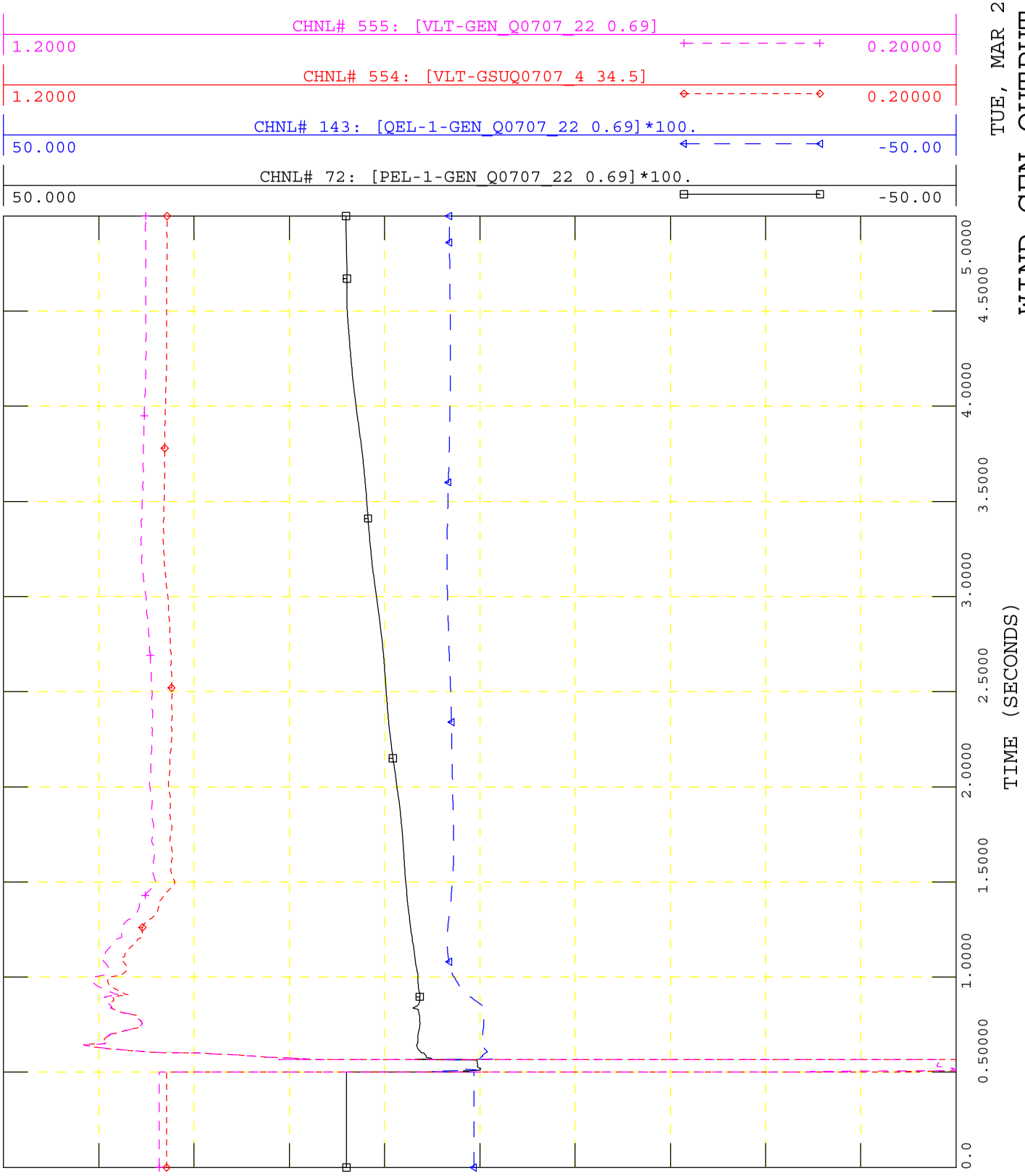

SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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TUE, MAR 27 2018 21:29 PLT 20

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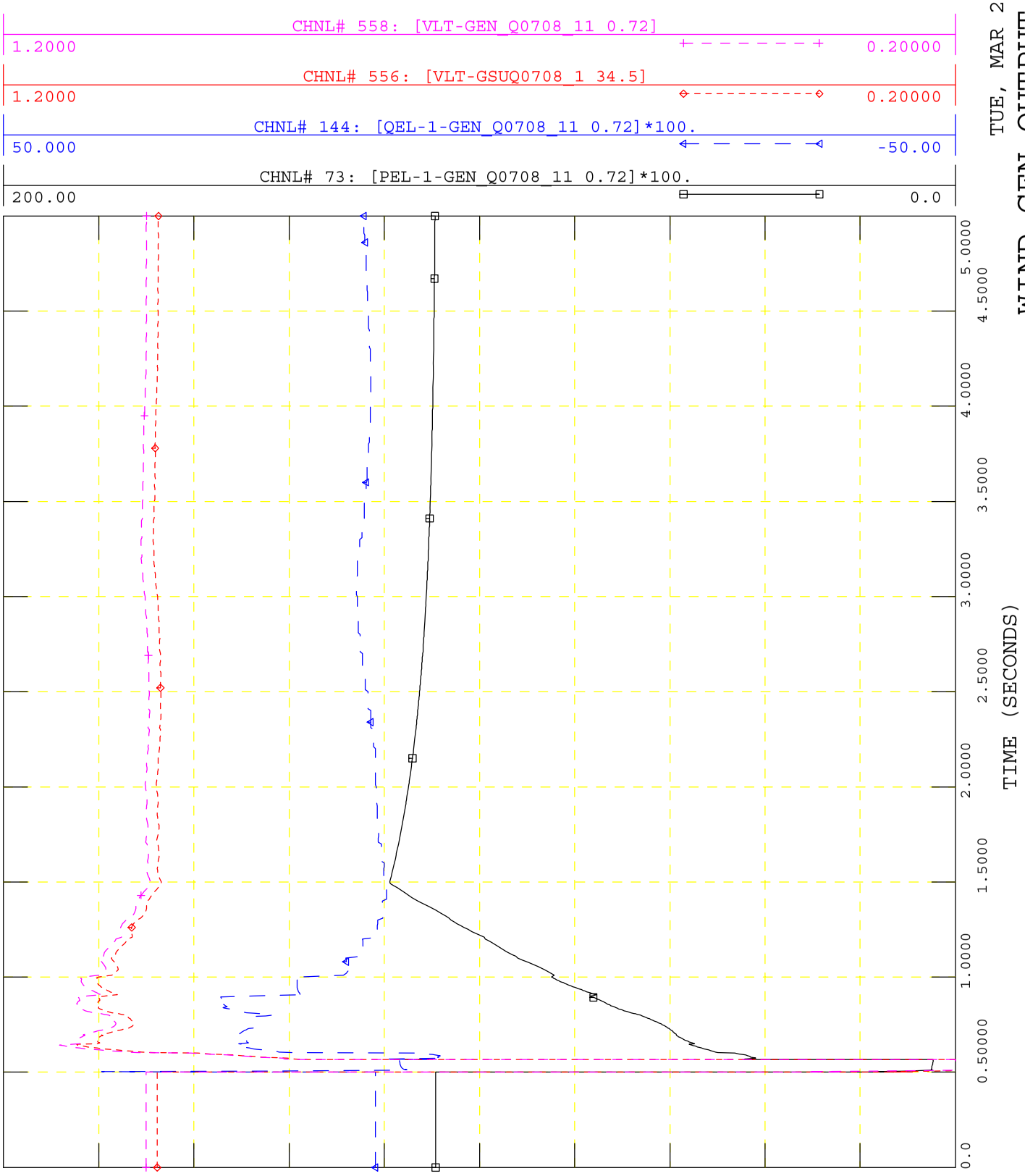

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TUE, MAR 27 2018 21:29 PLT 21

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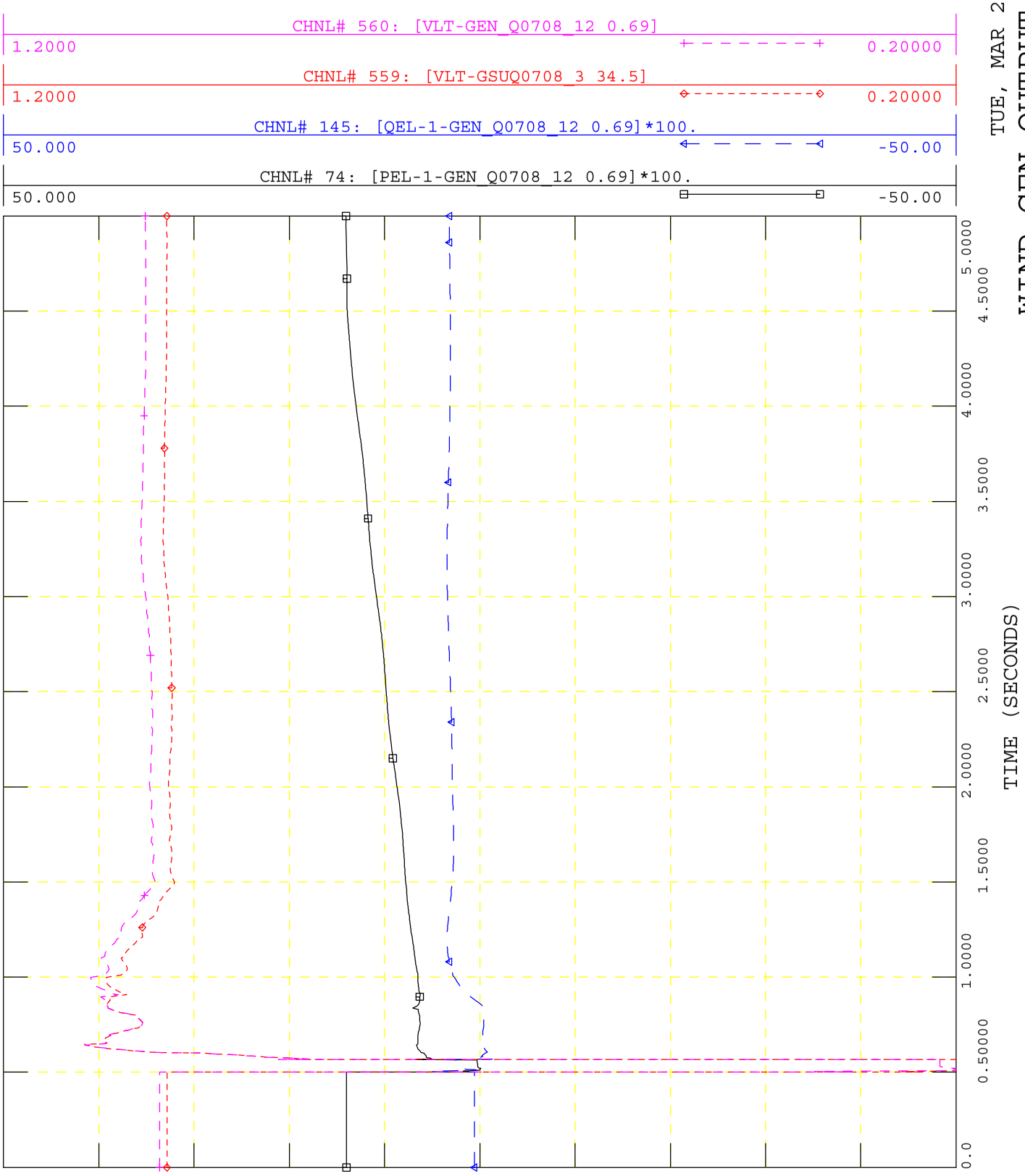

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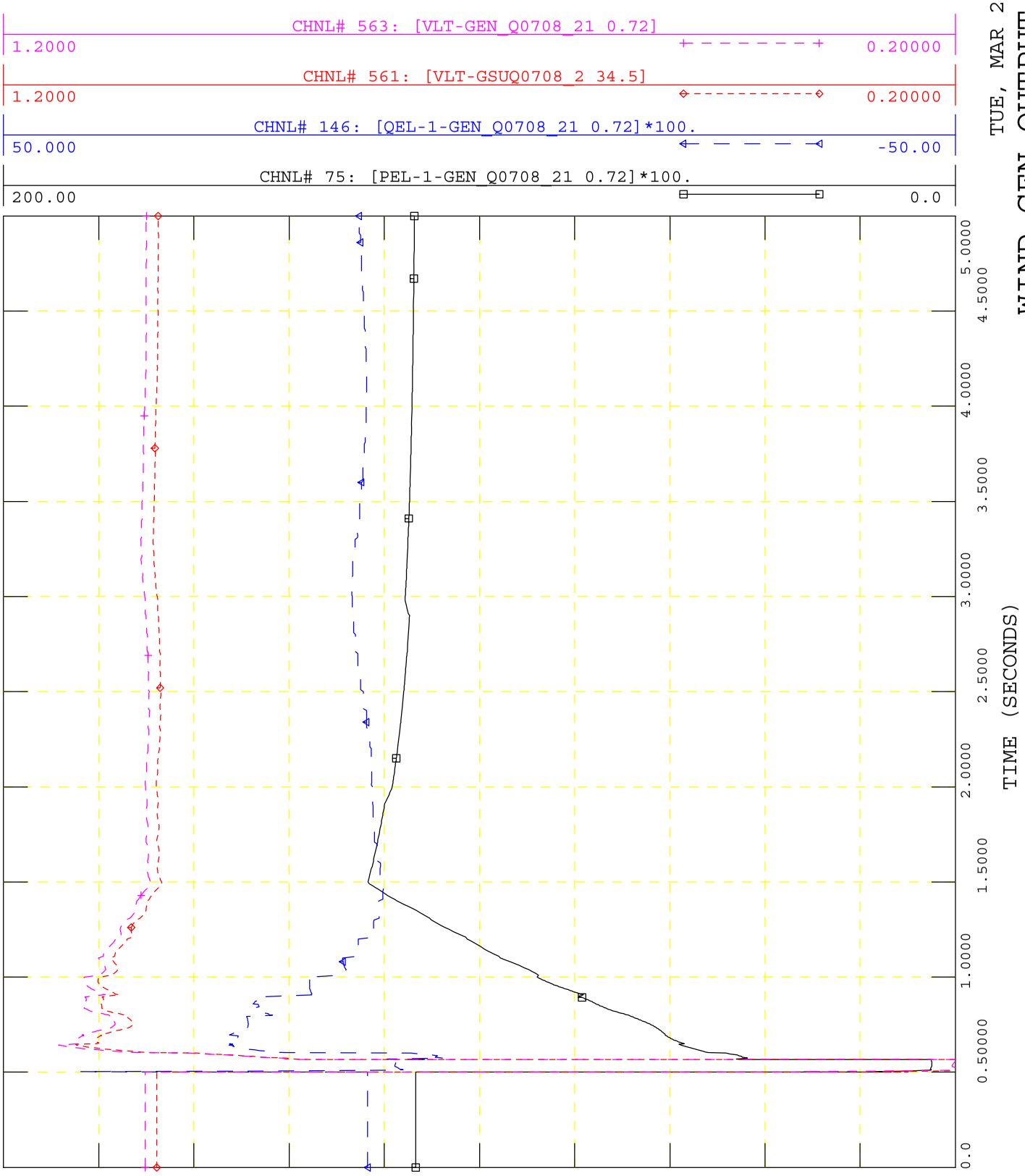
TUE, MAR 27 2018 21:29 PLT 22

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:29 PLT 23

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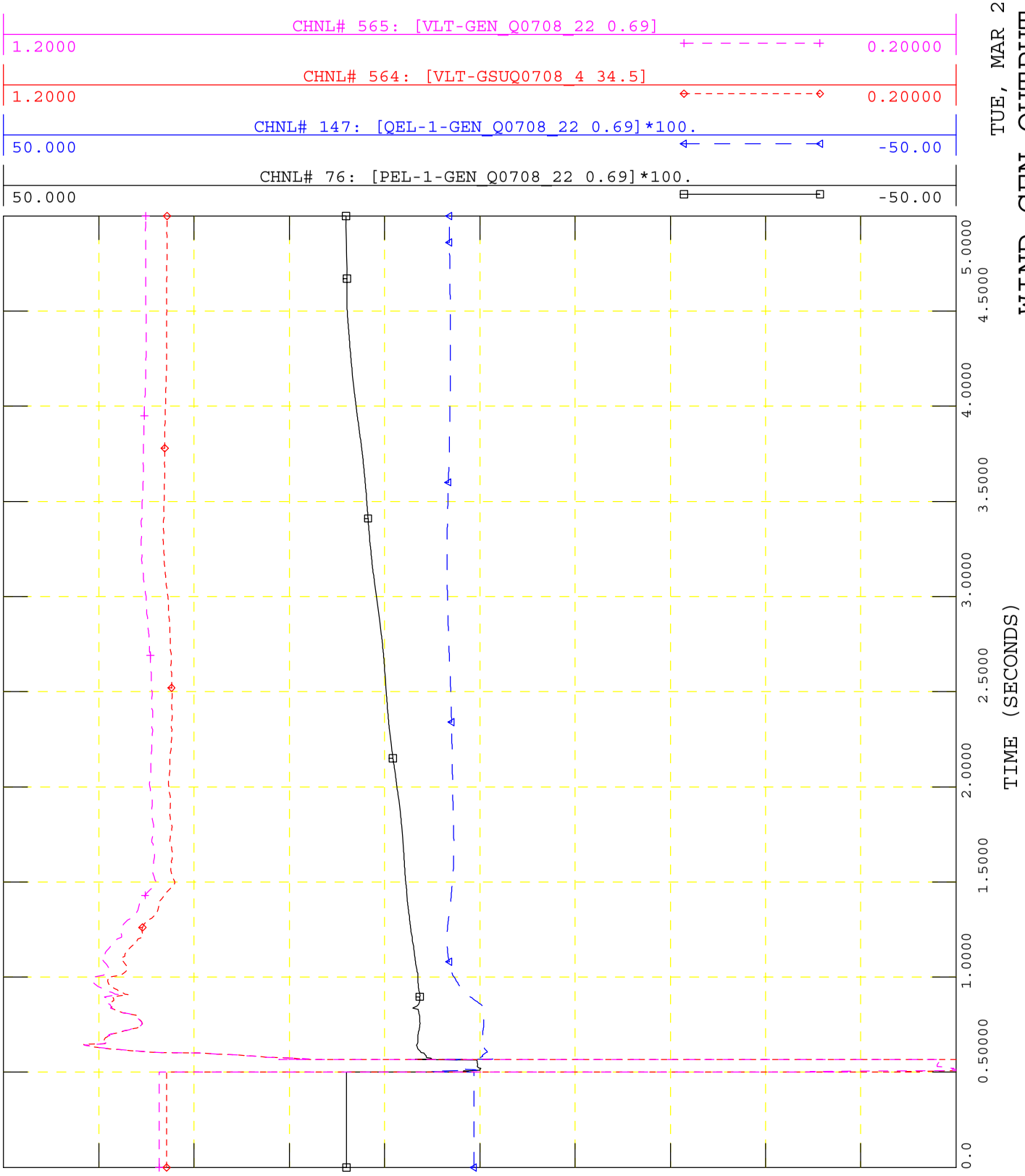

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SHIRLEY BASIN #2 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 9
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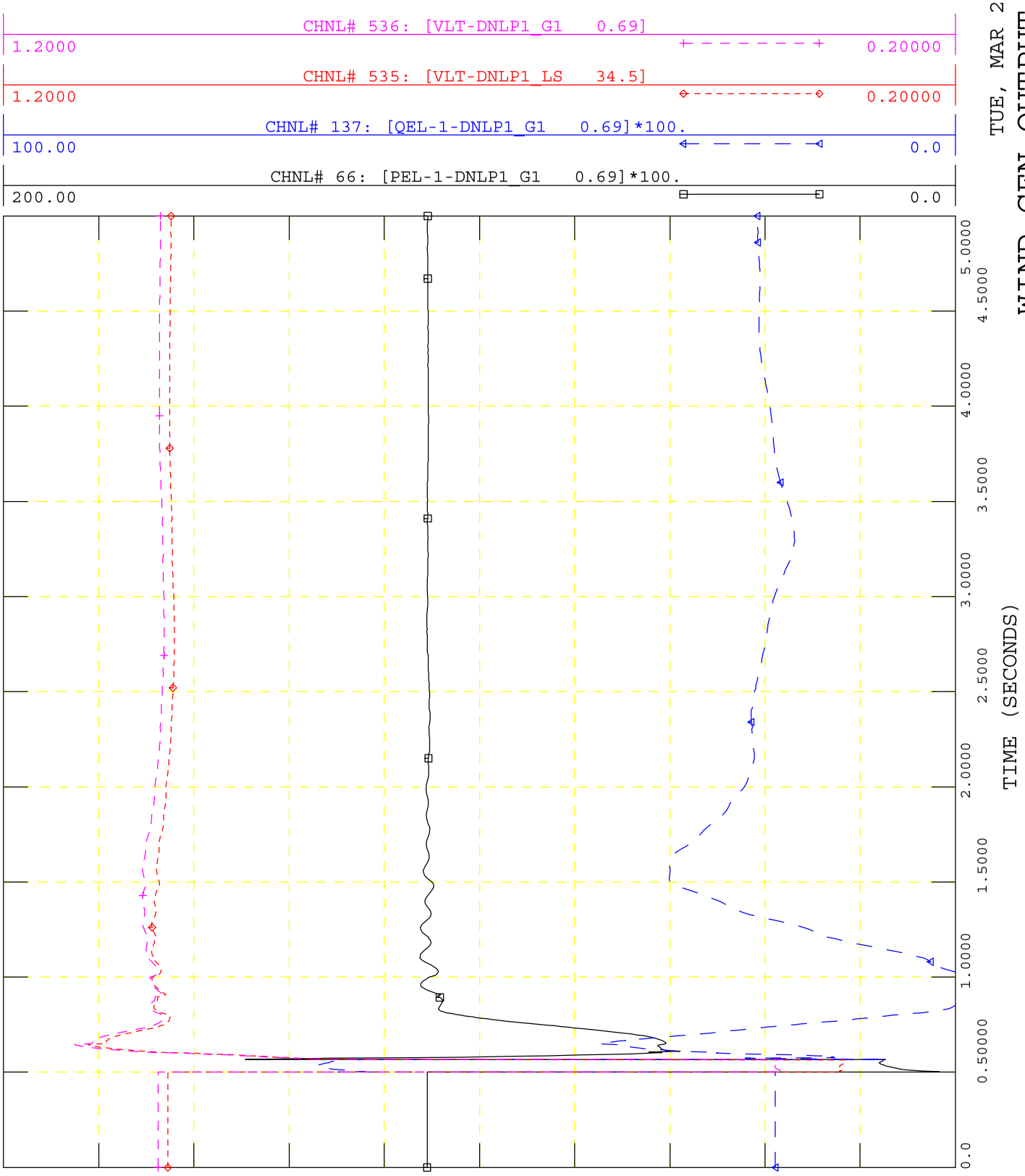
TUE, MAR 27 2018 21:29 PLT 24

WIND GEN OUTPUT



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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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SHIRLEY BASIN #2 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 9
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TUE, MAR 27 2018 21:29 PLT 25

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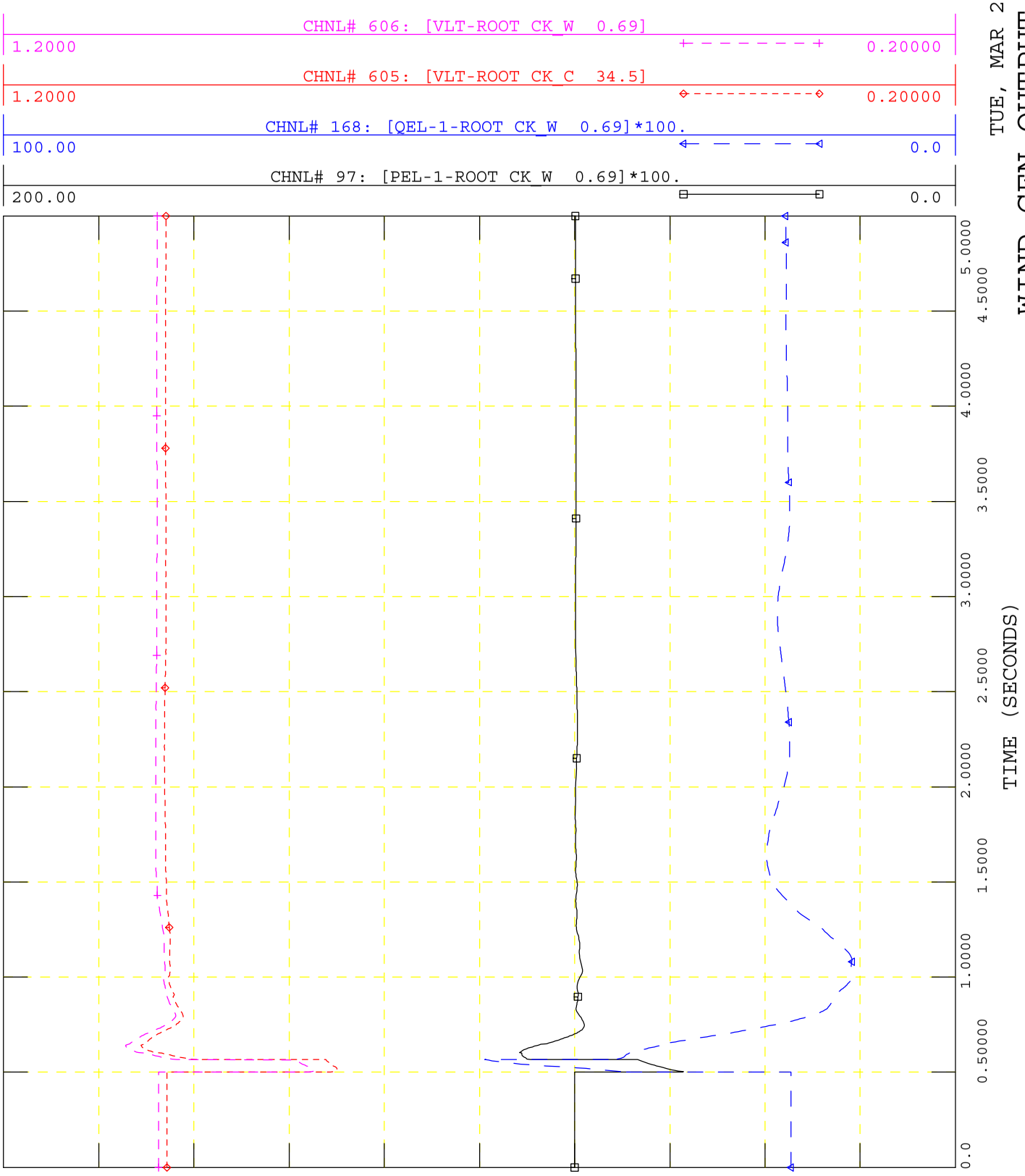

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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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SHIRLEY BASIN #2 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 9
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TUE, MAR 27 2018 21:29 PLT 26

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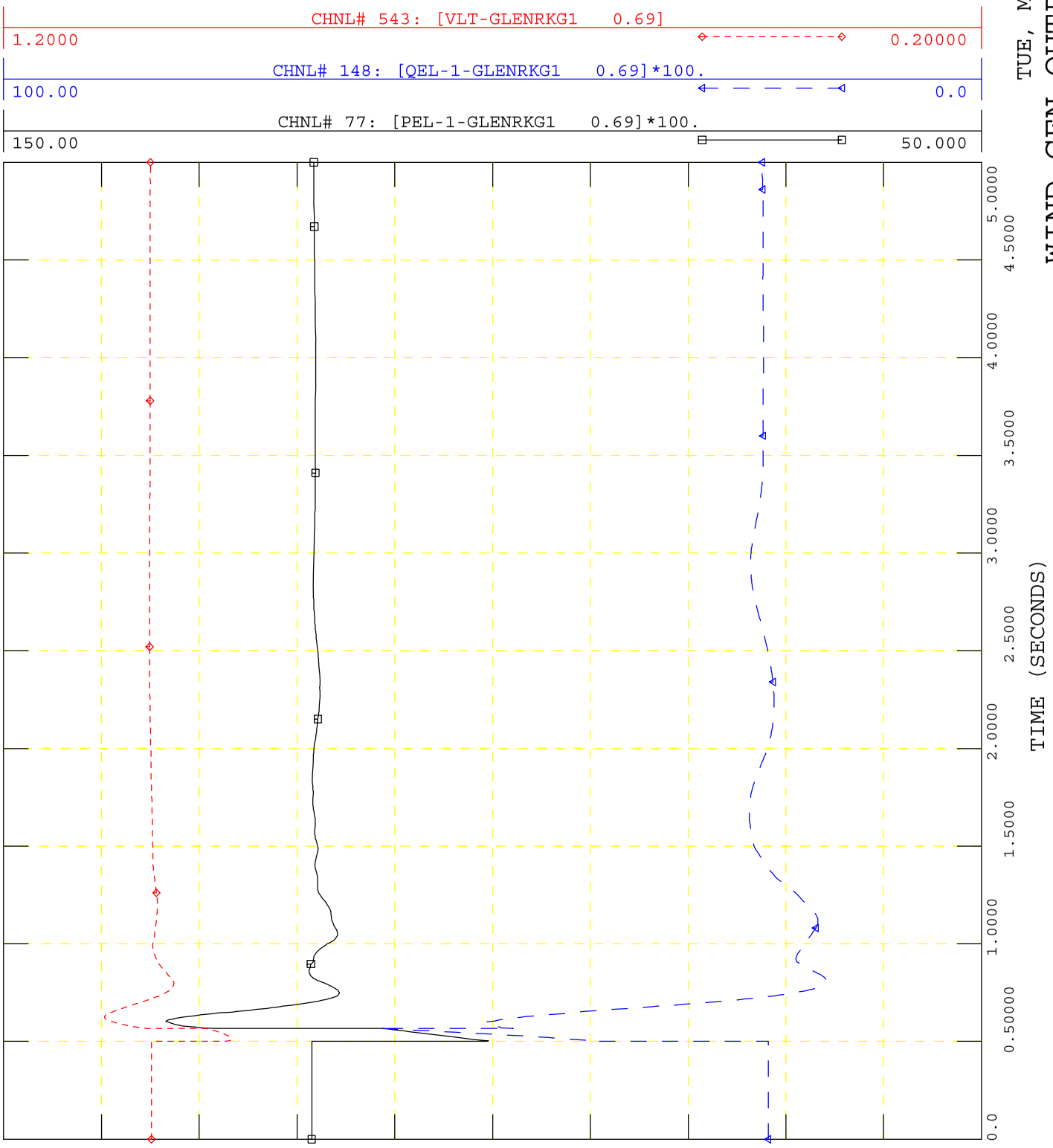

Dynamic Simulation

Case 10 – Loss of Shirley Basin-Q707 (TB Flats 1) 230 kV line (loss of 251 MW generation)

30 cycles	**3 phase Shirley Basin kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Shirley Basin-Q707 230 kV line**
36 cycles	**Remove SVC MVAR limiter**
5 sec.	**Terminate simulation**

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS SHIRLEY BSN 230 FLT. 34CY-CLR FLT & OPEN SHRLYBN-
Q707 230 LN (251 MW GEN LOSS). 36CY-UNBLOCK SVC. OUTAGE 10
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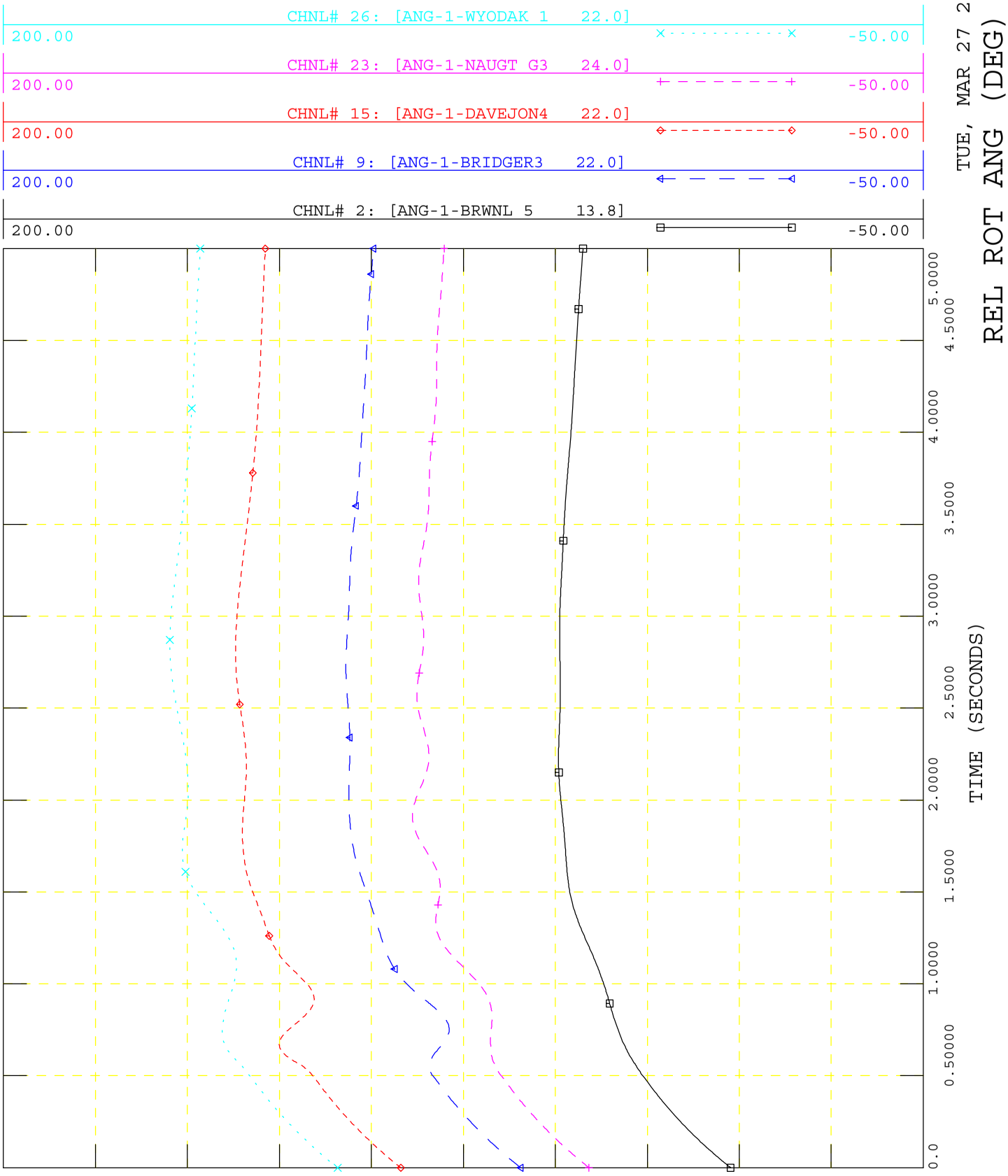

TUE, MAR 27 2018 21:29
REL ROT ANG (DEG) PLT 1

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS SHIRLEY BSN 230 FLT. 34CY-CLR FLT & OPEN SHRLYBN-
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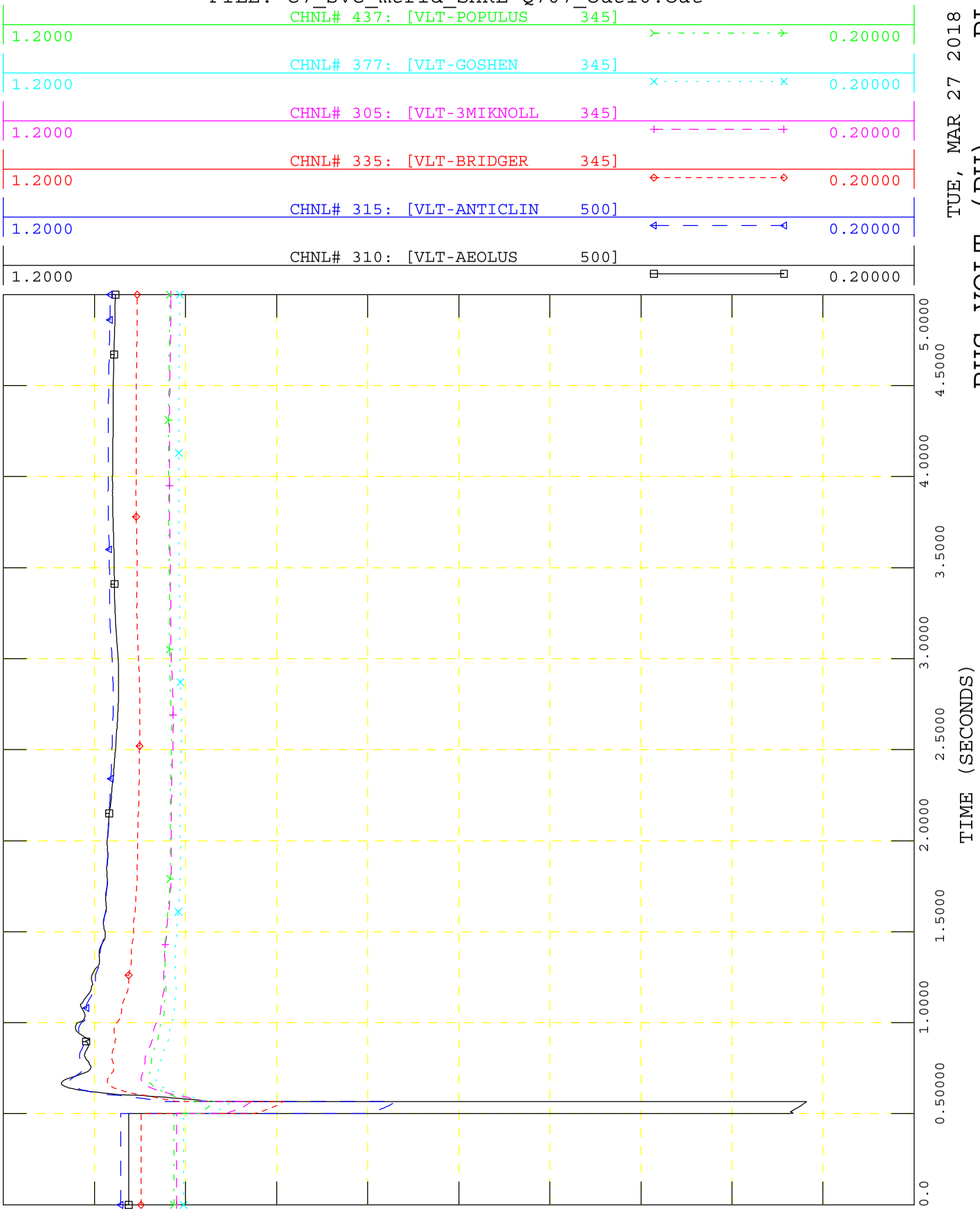
TUE, MAR 27 2018 21:29 PLT 2



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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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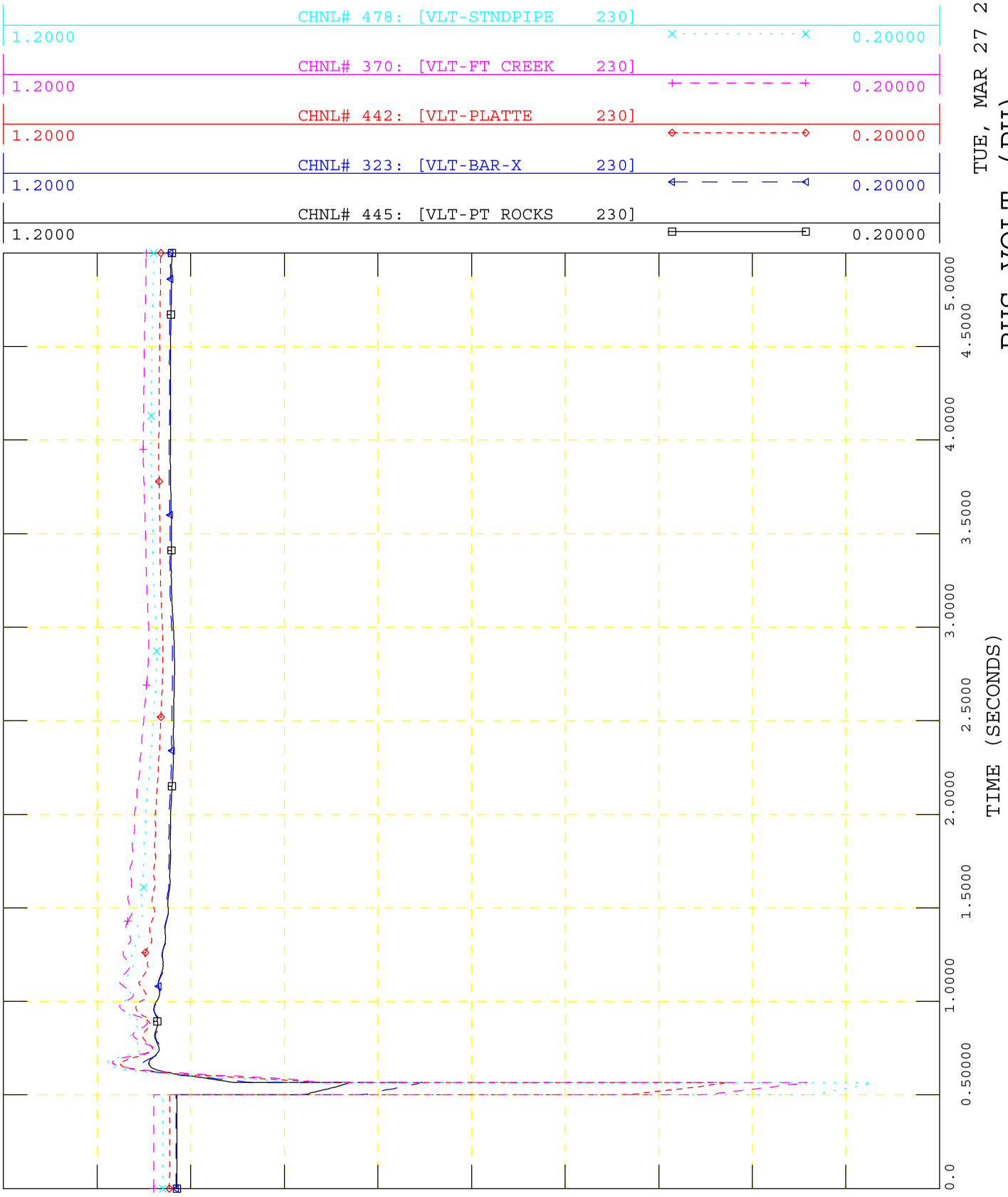
TUE, MAR 27 2018 21:29 PLT 3



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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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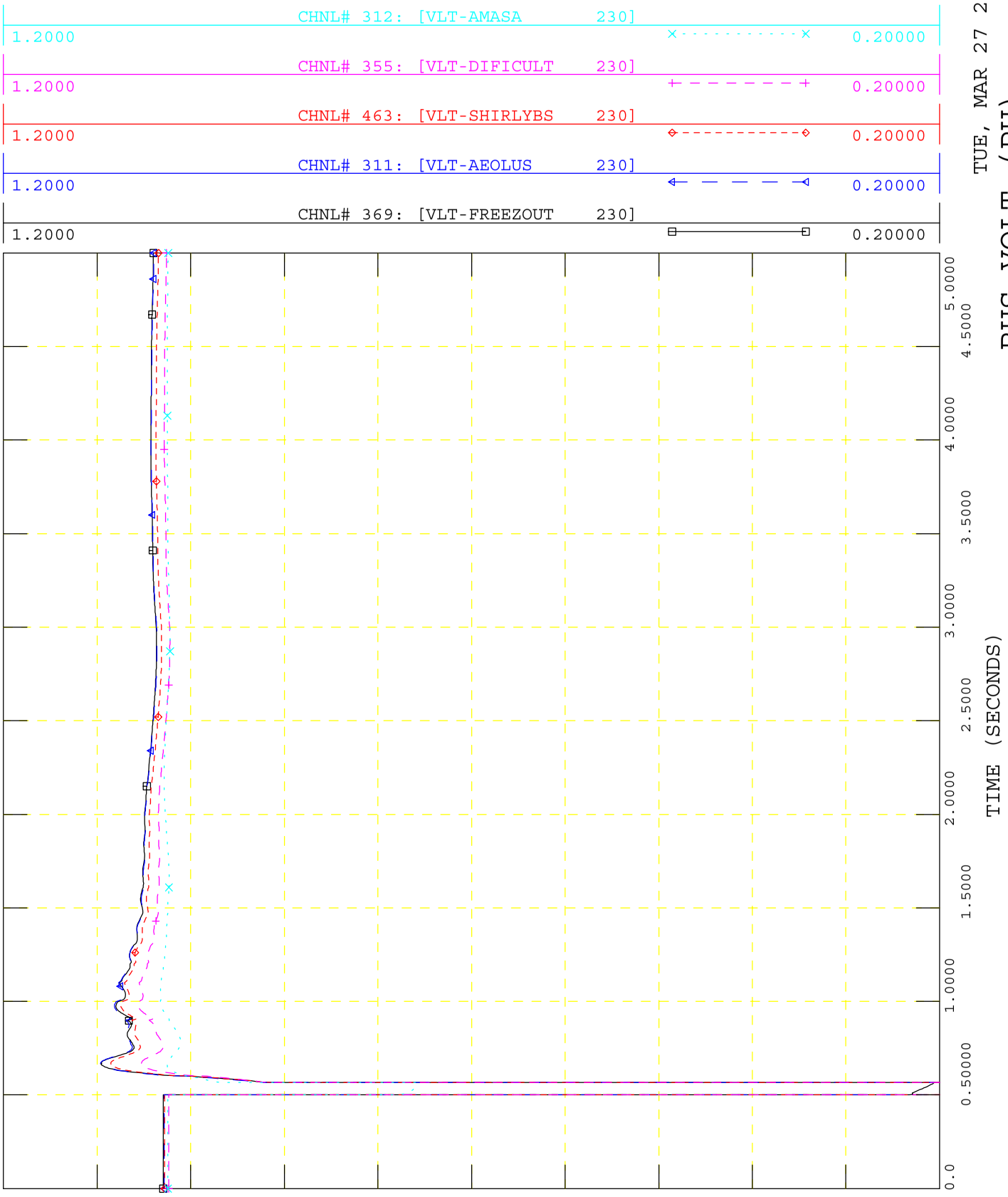
TUE, MAR 27 2018 21:29 PLT 4



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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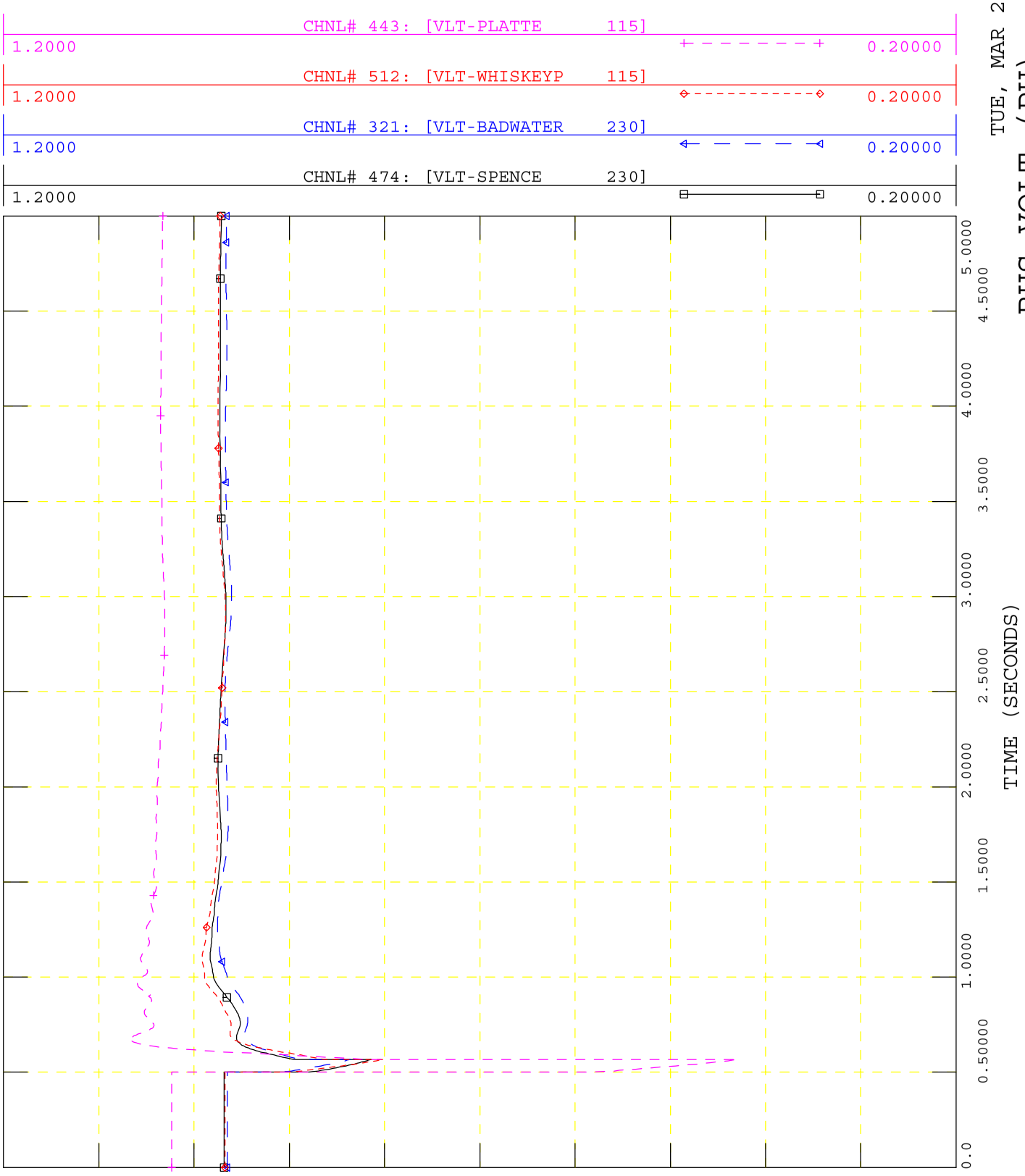
Q707 230 LN (251 MW GEN LOSS). 36CY-UNBLOCK SVC. OUTAGE 10
FILE: c7_svc_mtrld_SHRL-Q707_out10.out

TUE, MAR 27 2018 21:29 PLT 5



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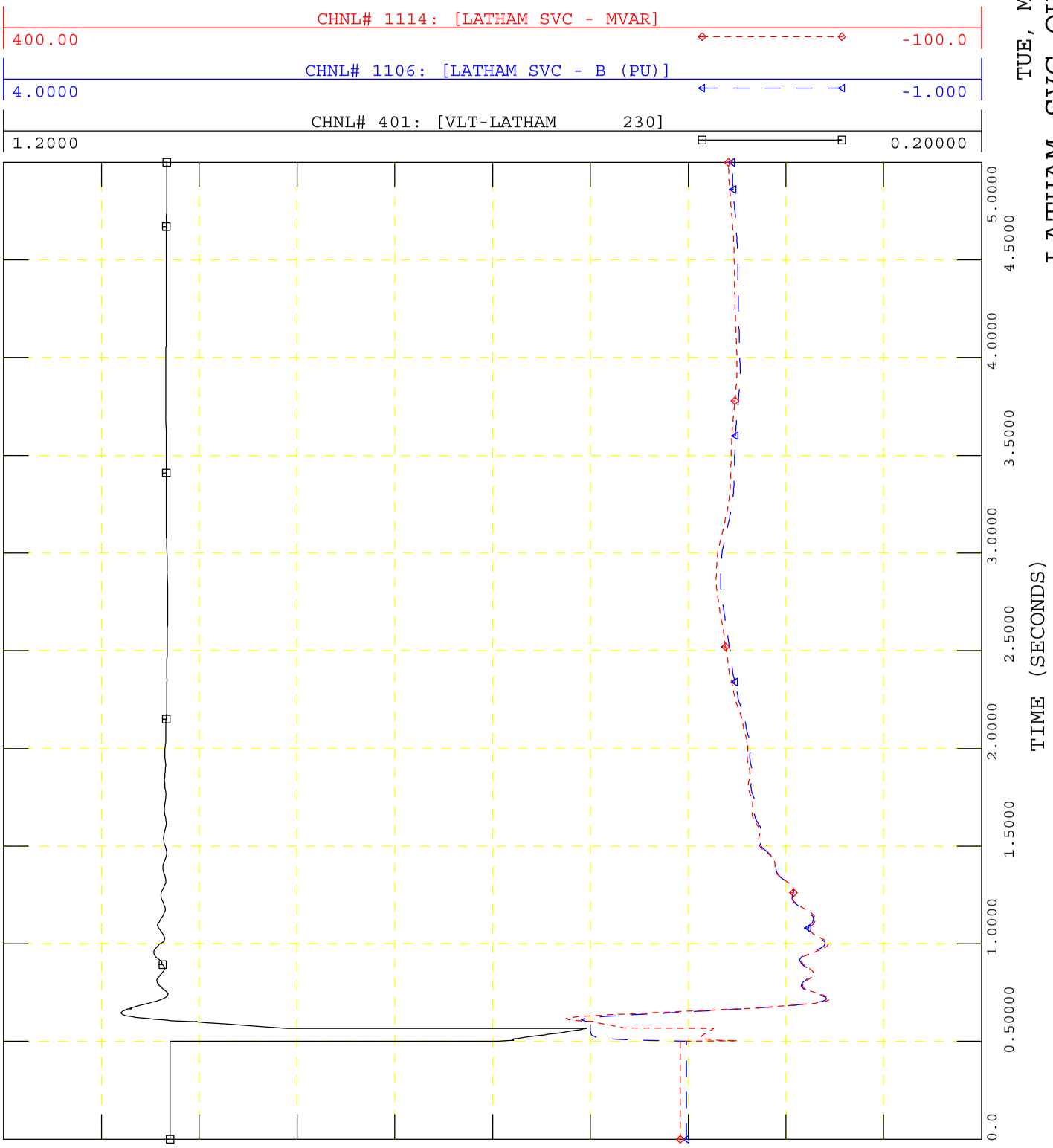
TUE, MAR 27 2018 21:29 PLT 6

LATHAM SVC OUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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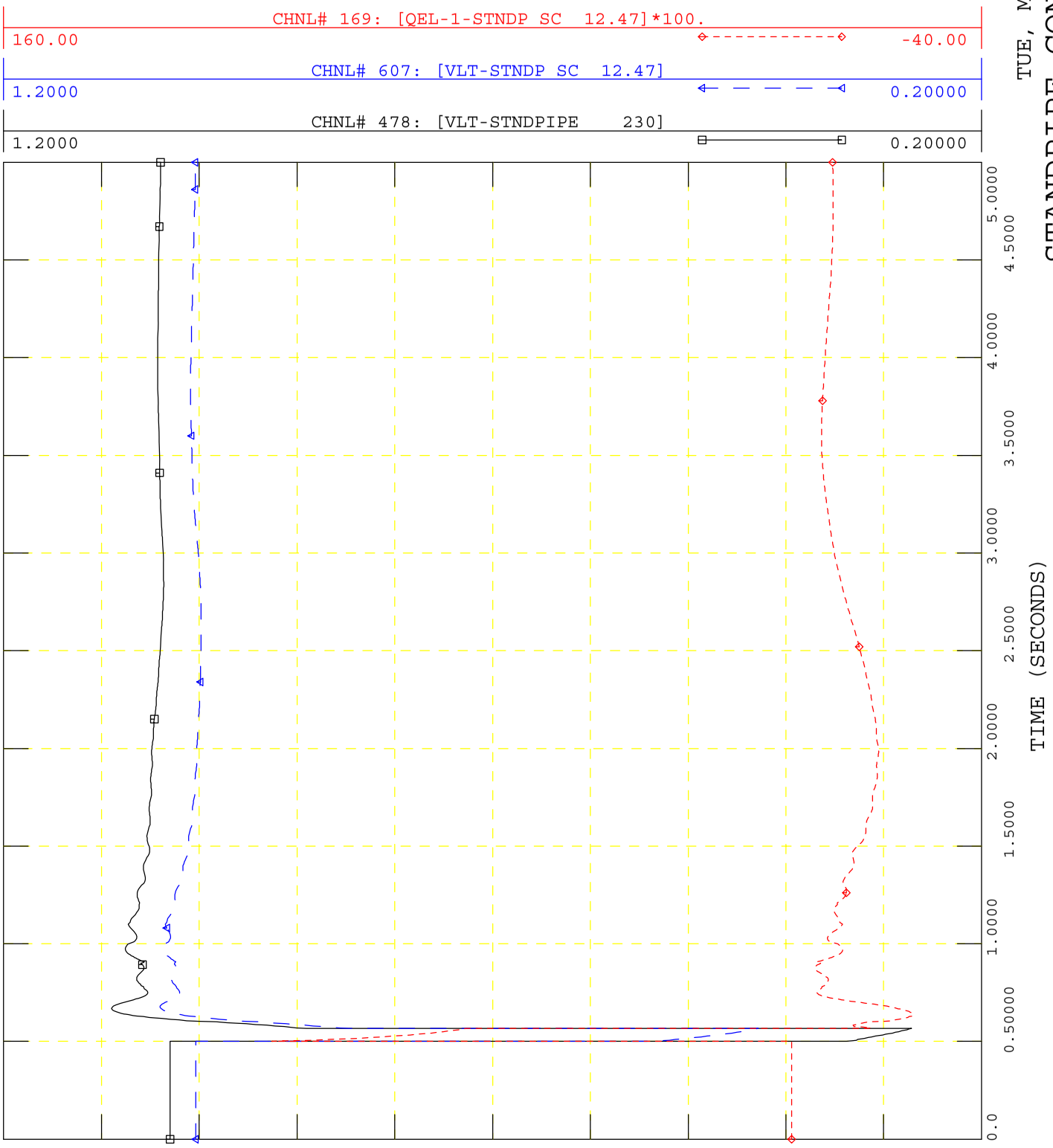
TUE, MAR 27 2018 21:29

STANDPIPE CONDNSR PLT 7



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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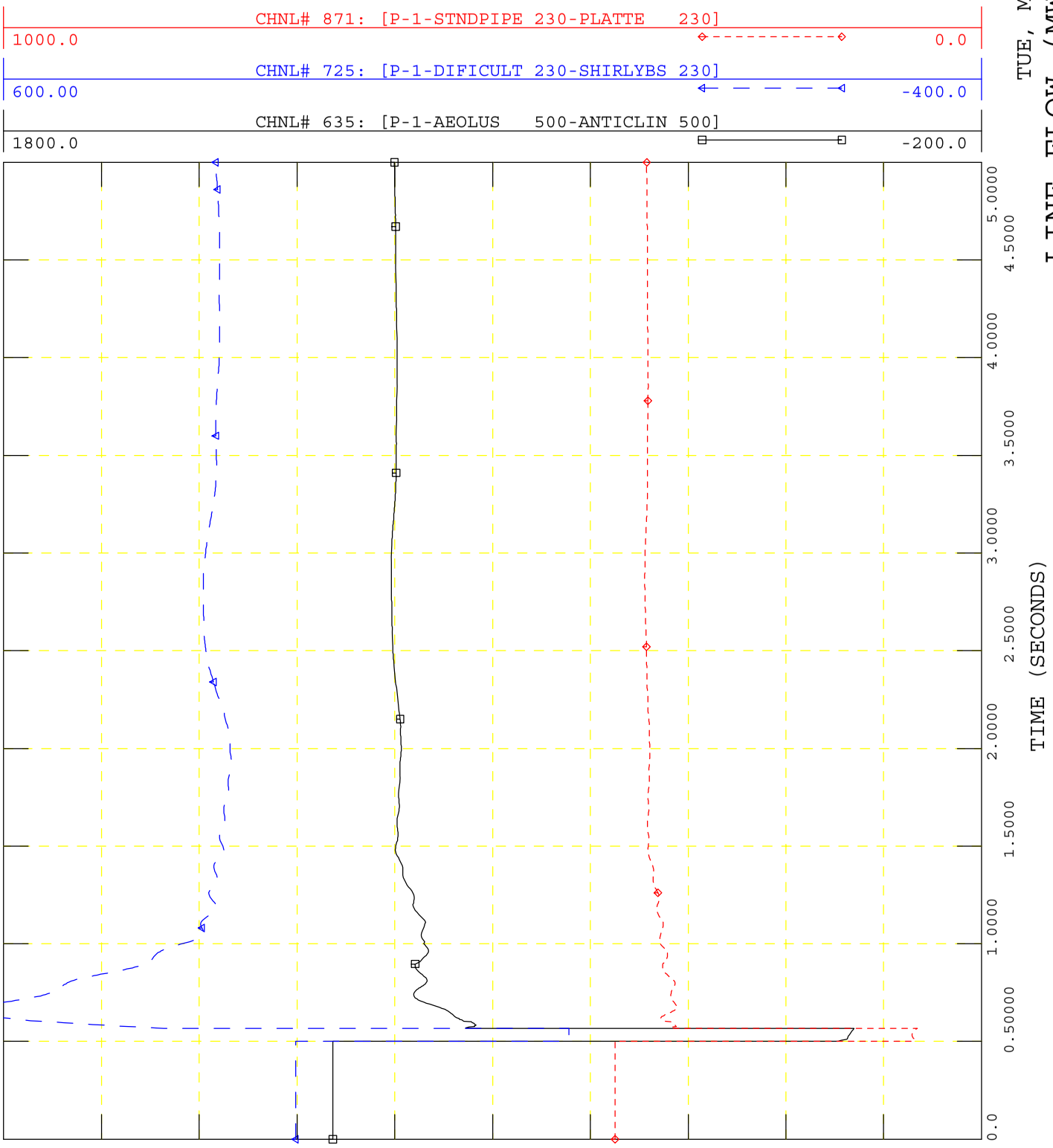
TUE, MAR 27 2018 21:29 PLT 8



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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Q707 230 LN (251 MW GEN LOSS). 36CY-UNBLOCK SVC. OUTAGE 10
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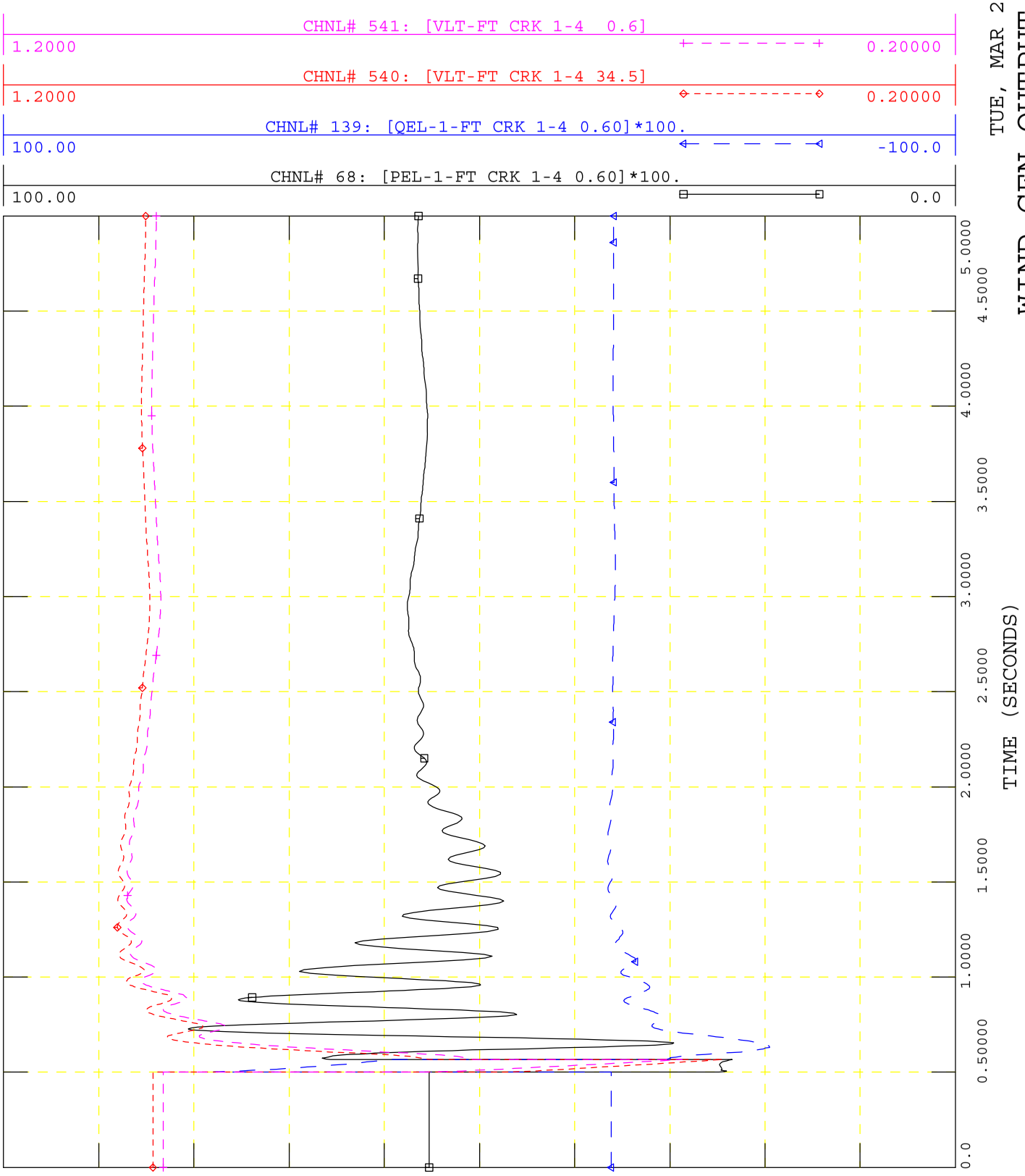
TUE, MAR 27 2018 21:29 PLT 9

WIND GEN OUTPUT



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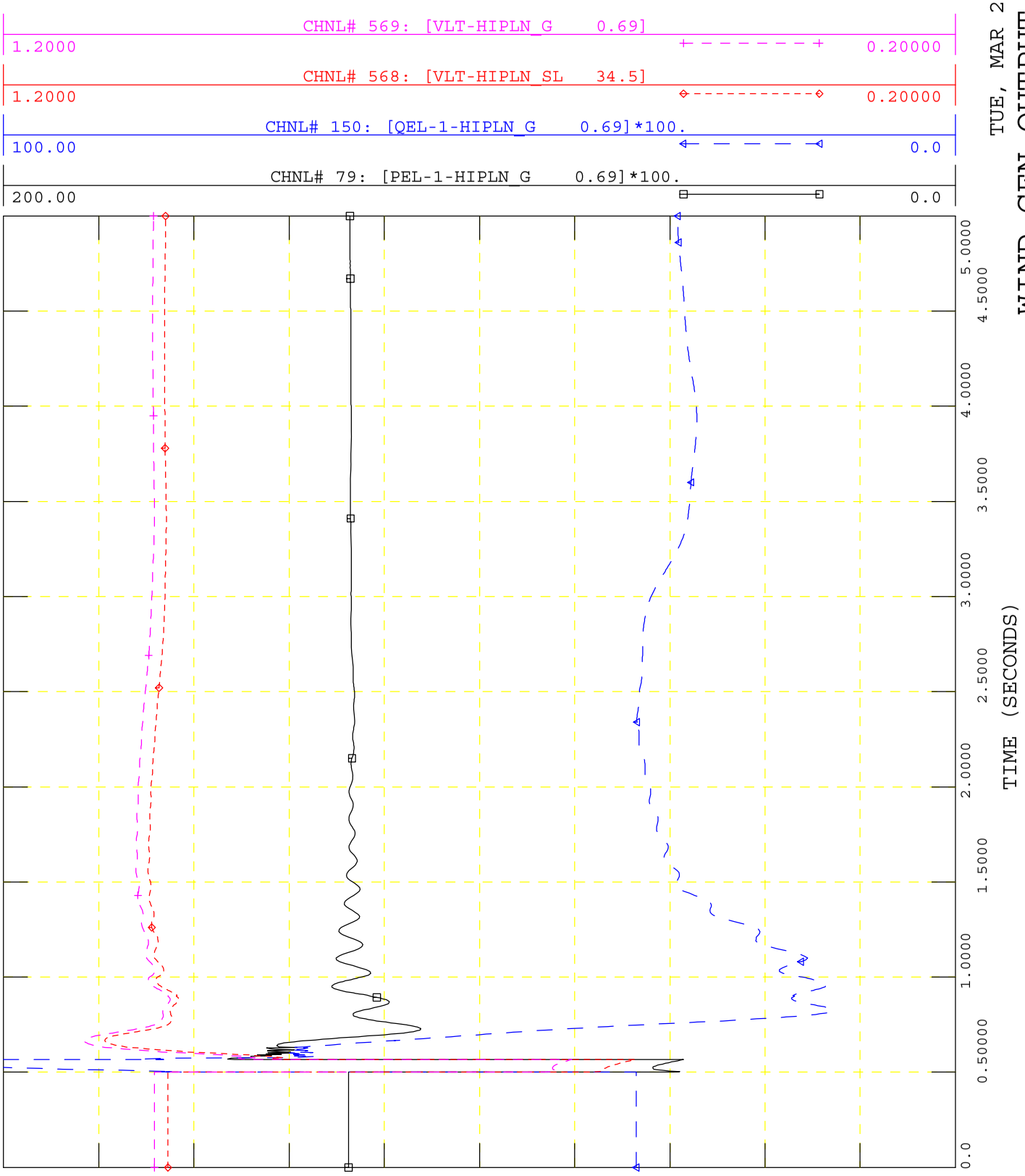
TUE, MAR 27 2018 21:29 PLT 10

WIND GEN OUTPUT



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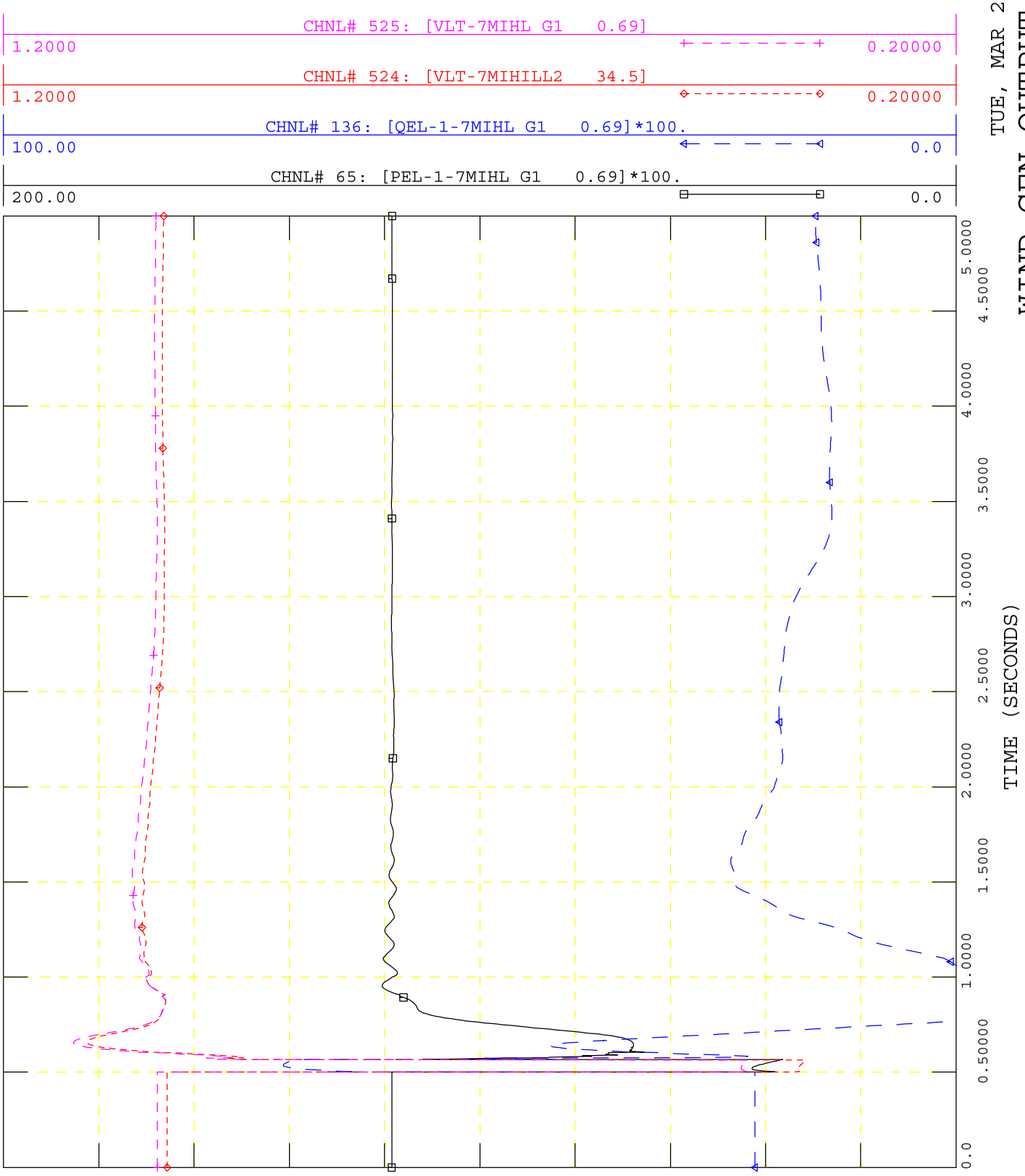
SIEMENS POWER TECHNOLOGIES INTERNATIONAL

TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 11



SIEMENS POWER TECHNOLOGIES INTERNATIONAL

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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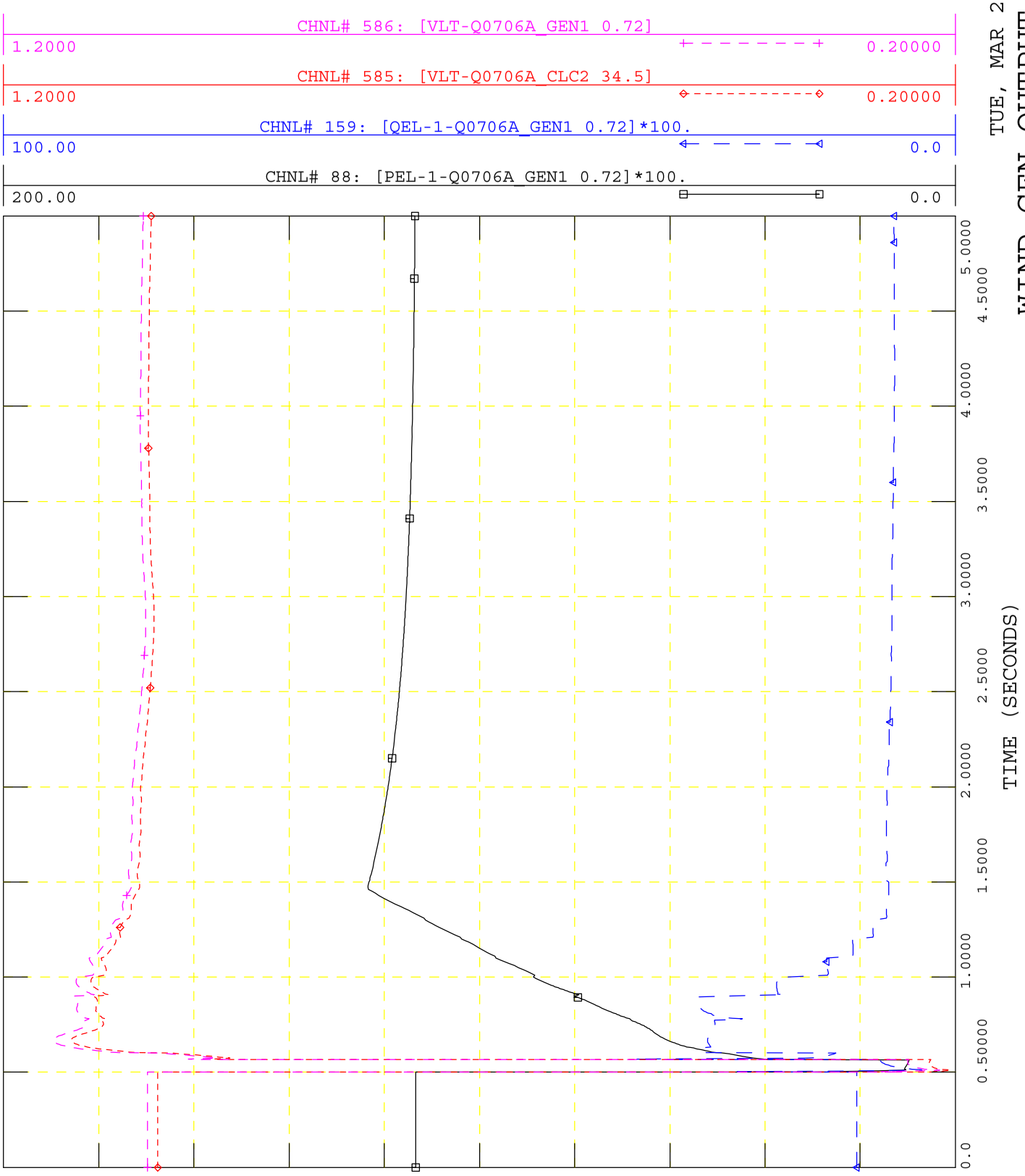

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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Q707 230 LN (251 MW GEN LOSS). 36CY-UNBLOCK SVC. OUTAGE 10
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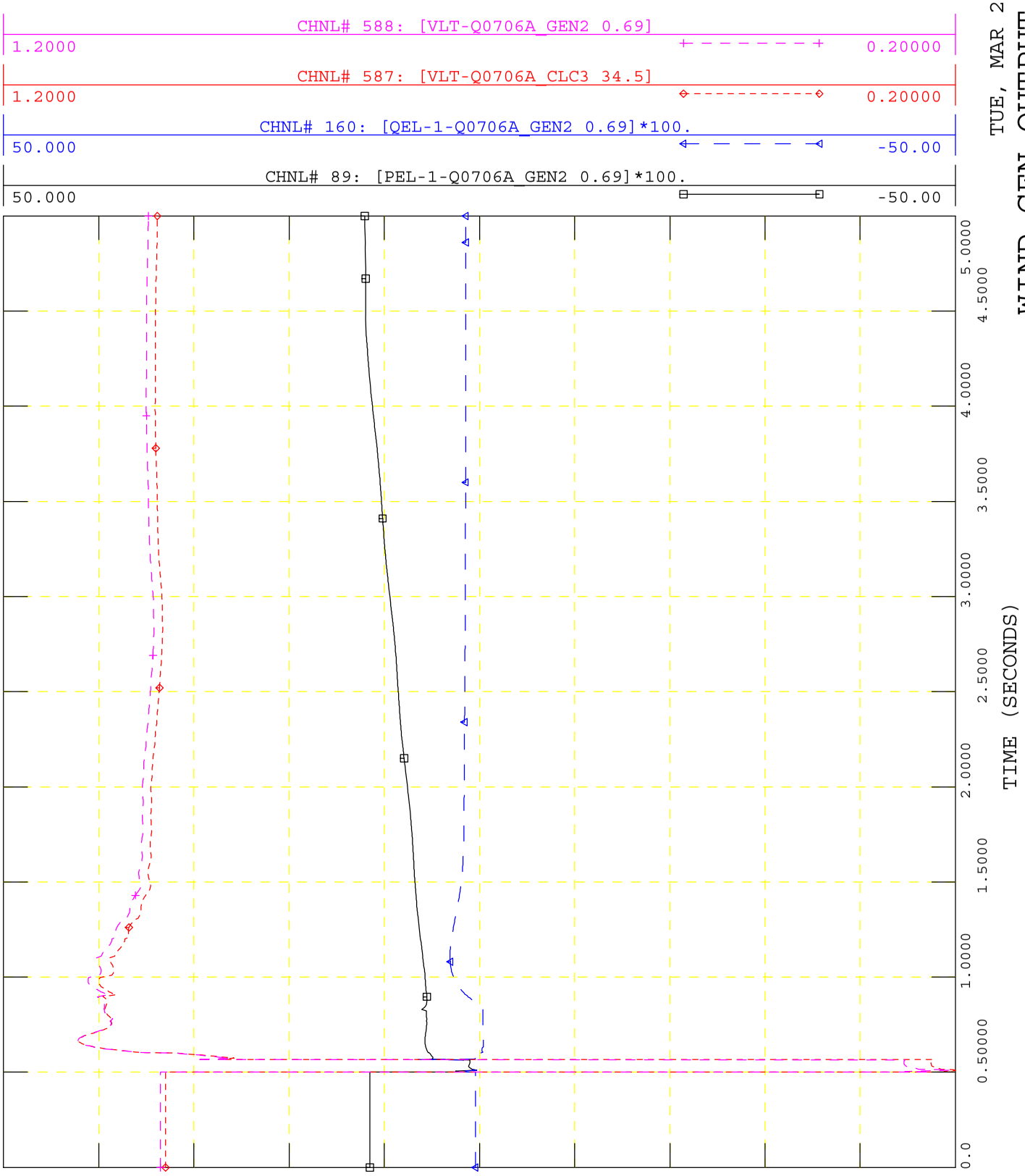
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 13



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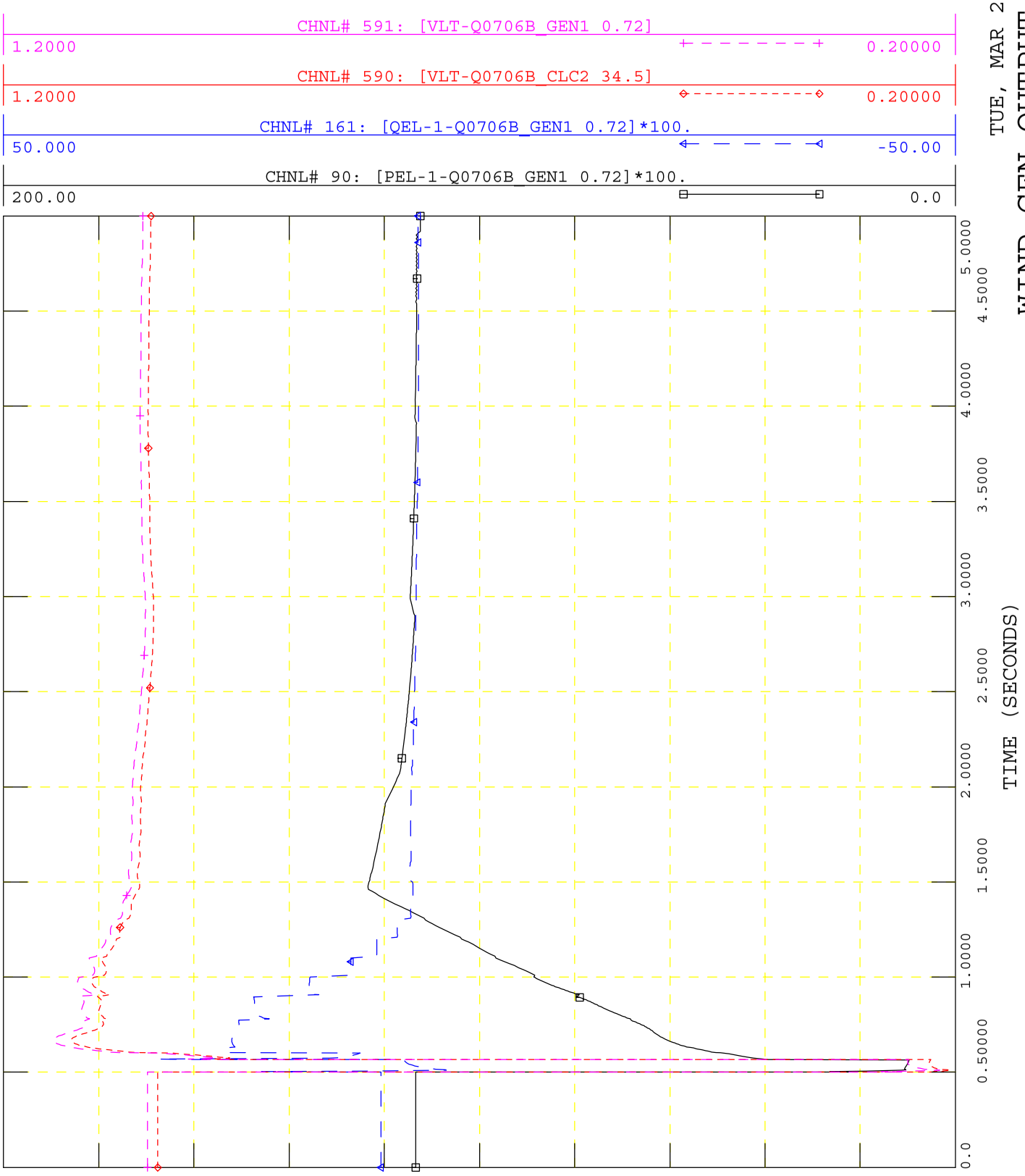
TUE, MAR 27 2018 21:29 PLT 14

WIND GEN OUTPUT



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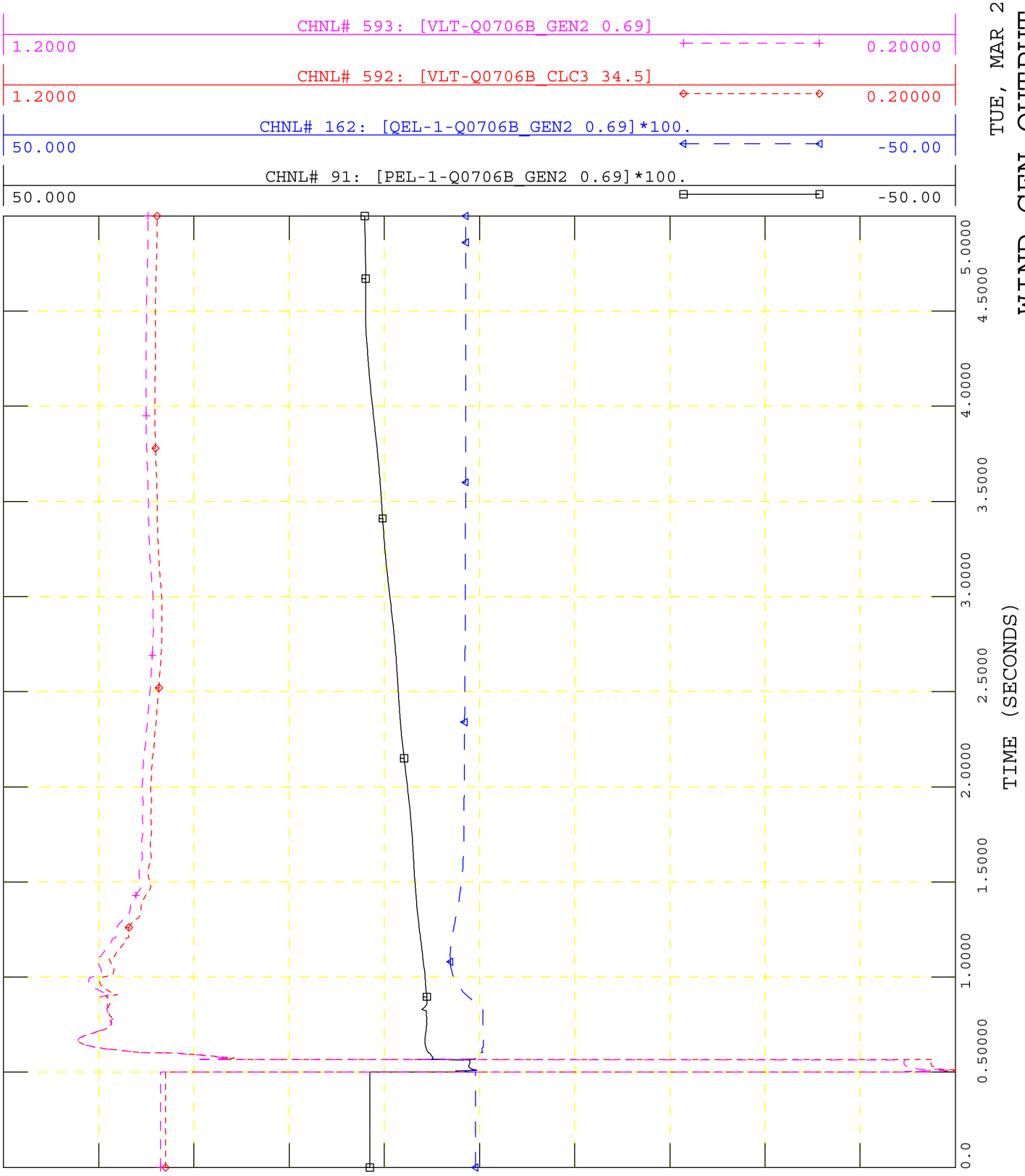
TUE, MAR 27 2018 21:29 PLT 15

WIND GEN OUTPUT



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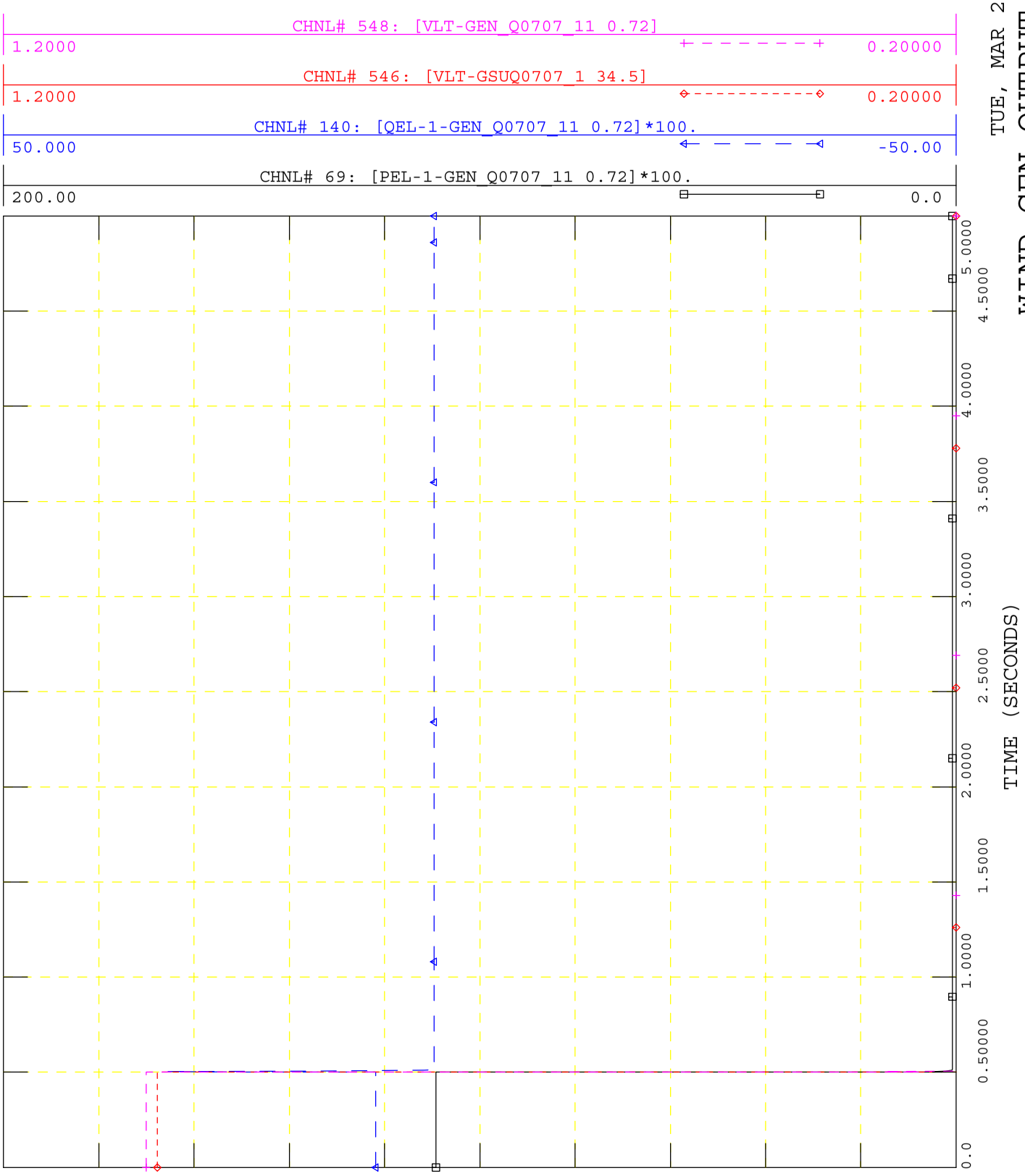
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 16



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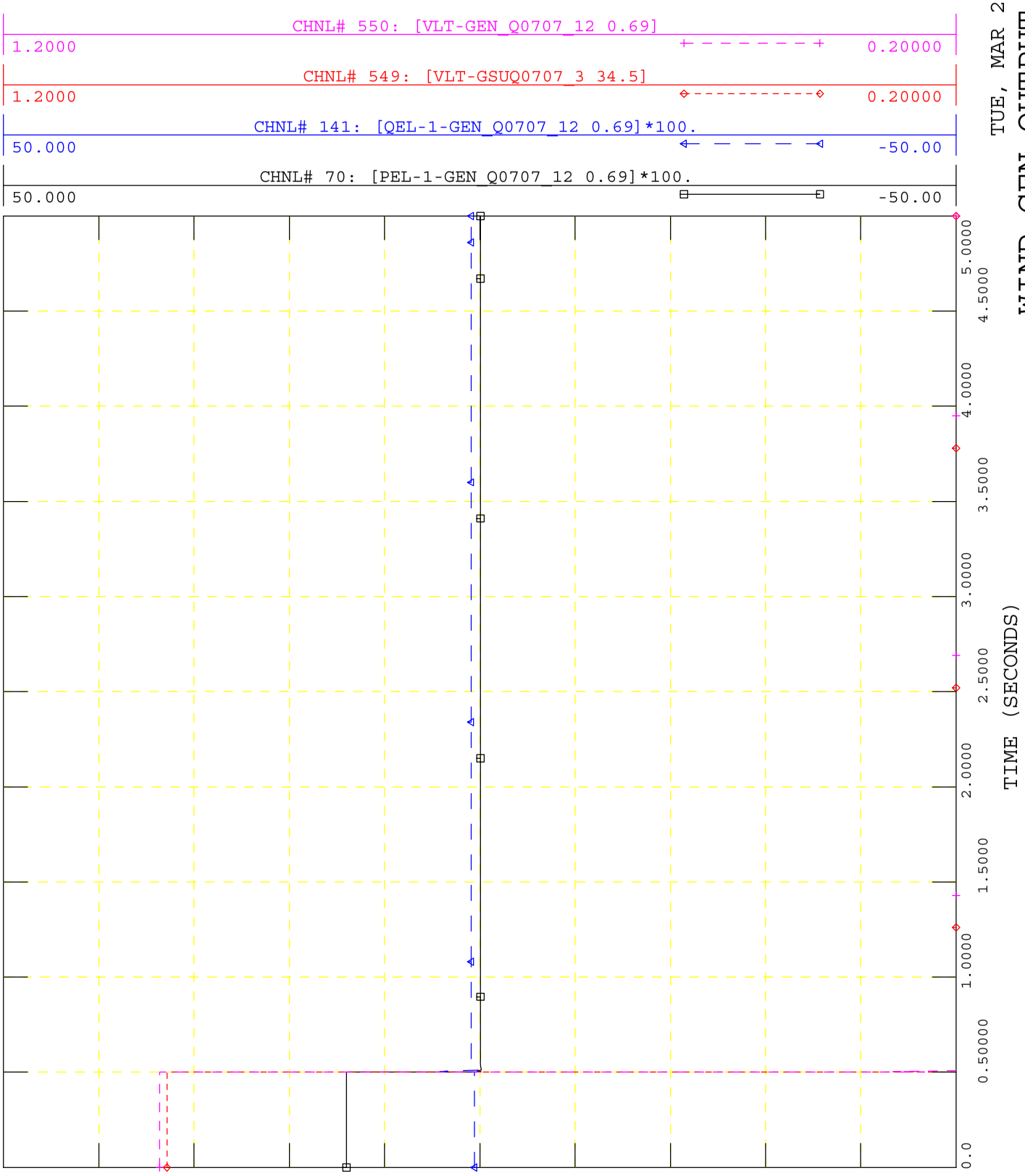
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 17



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TUE, MAR 27 2018 21:29 PLT 18

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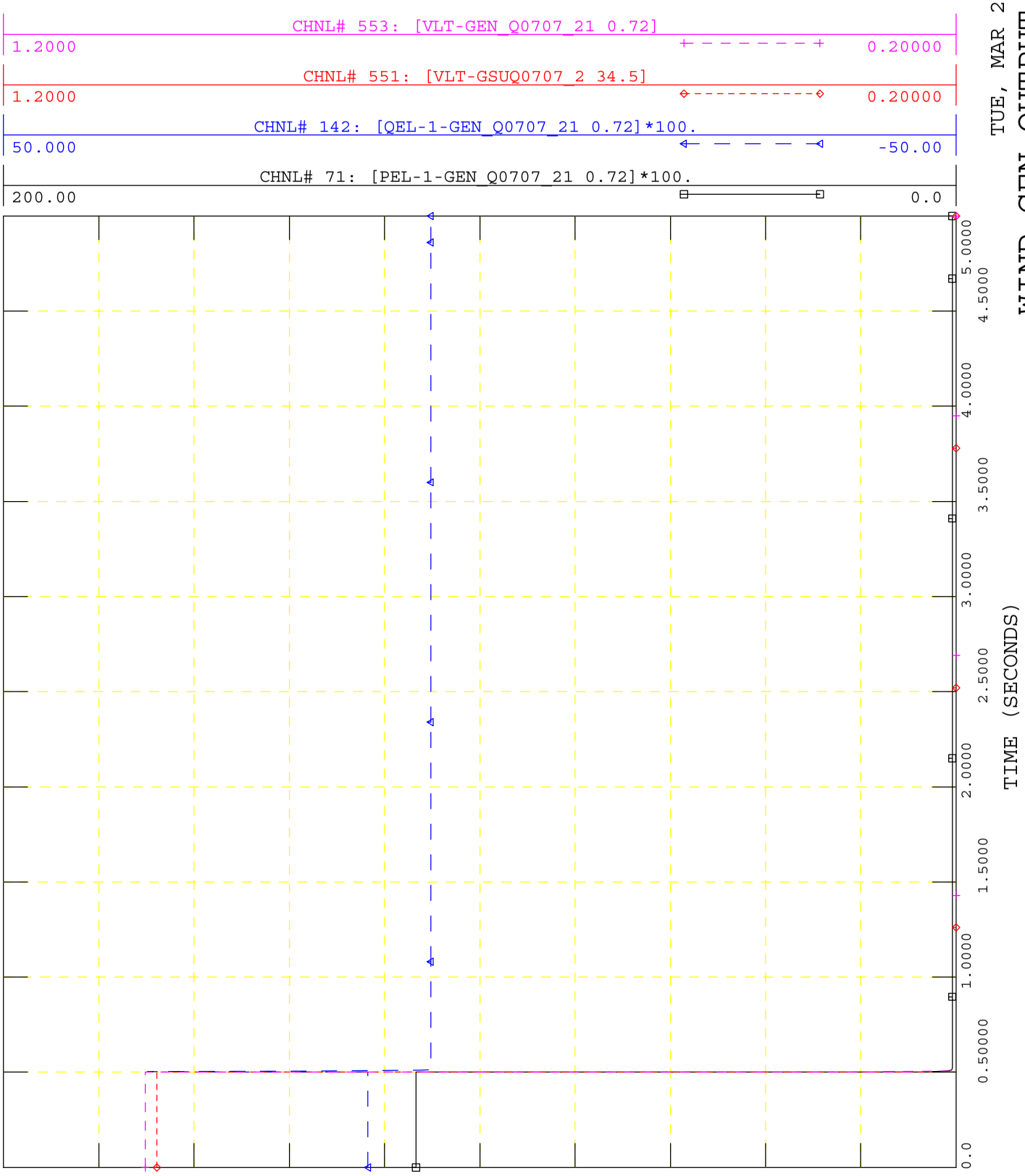

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TUE, MAR 27 2018 21:29 PLT 19

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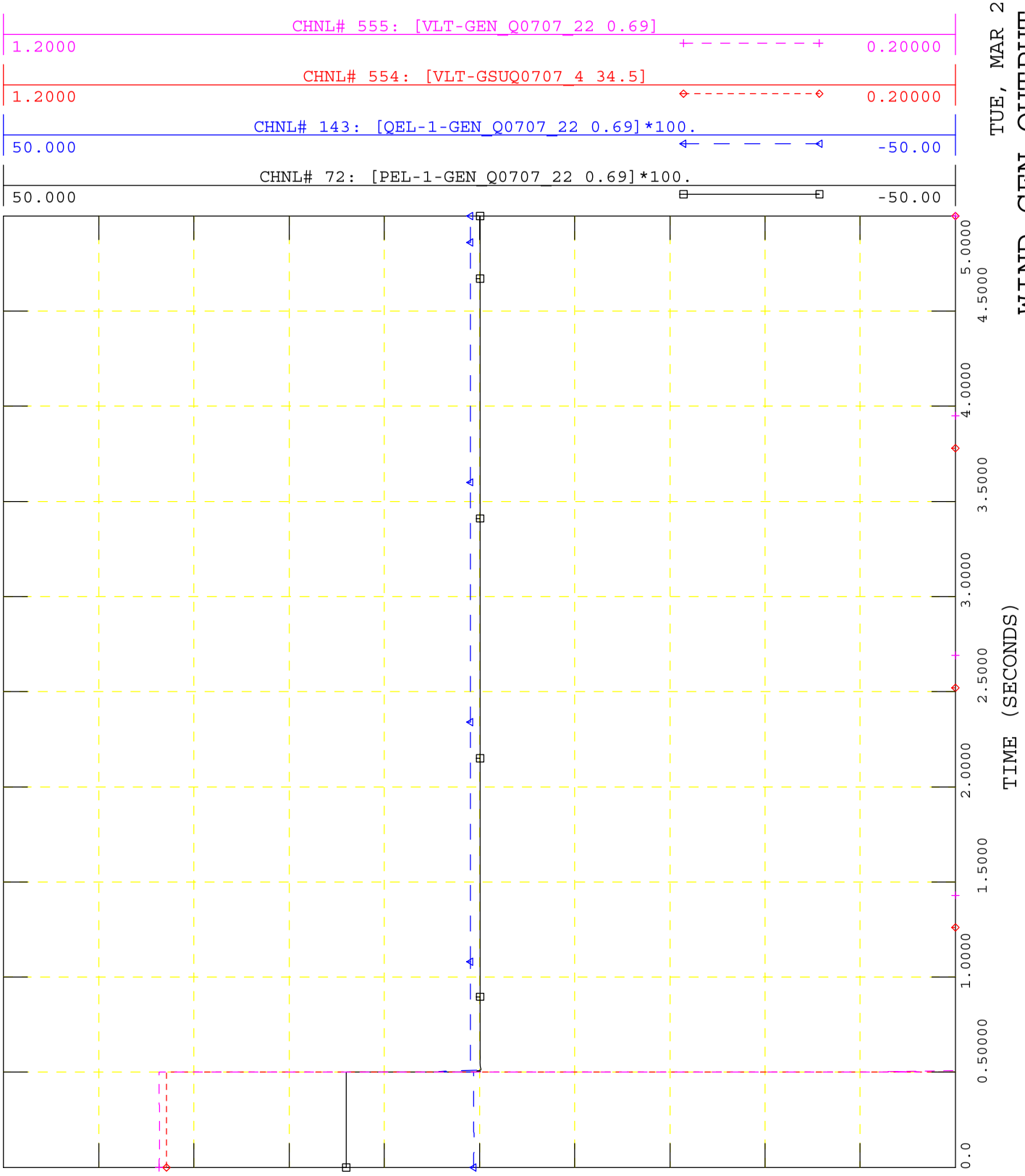

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TUE, MAR 27 2018 21:29 PLT 20

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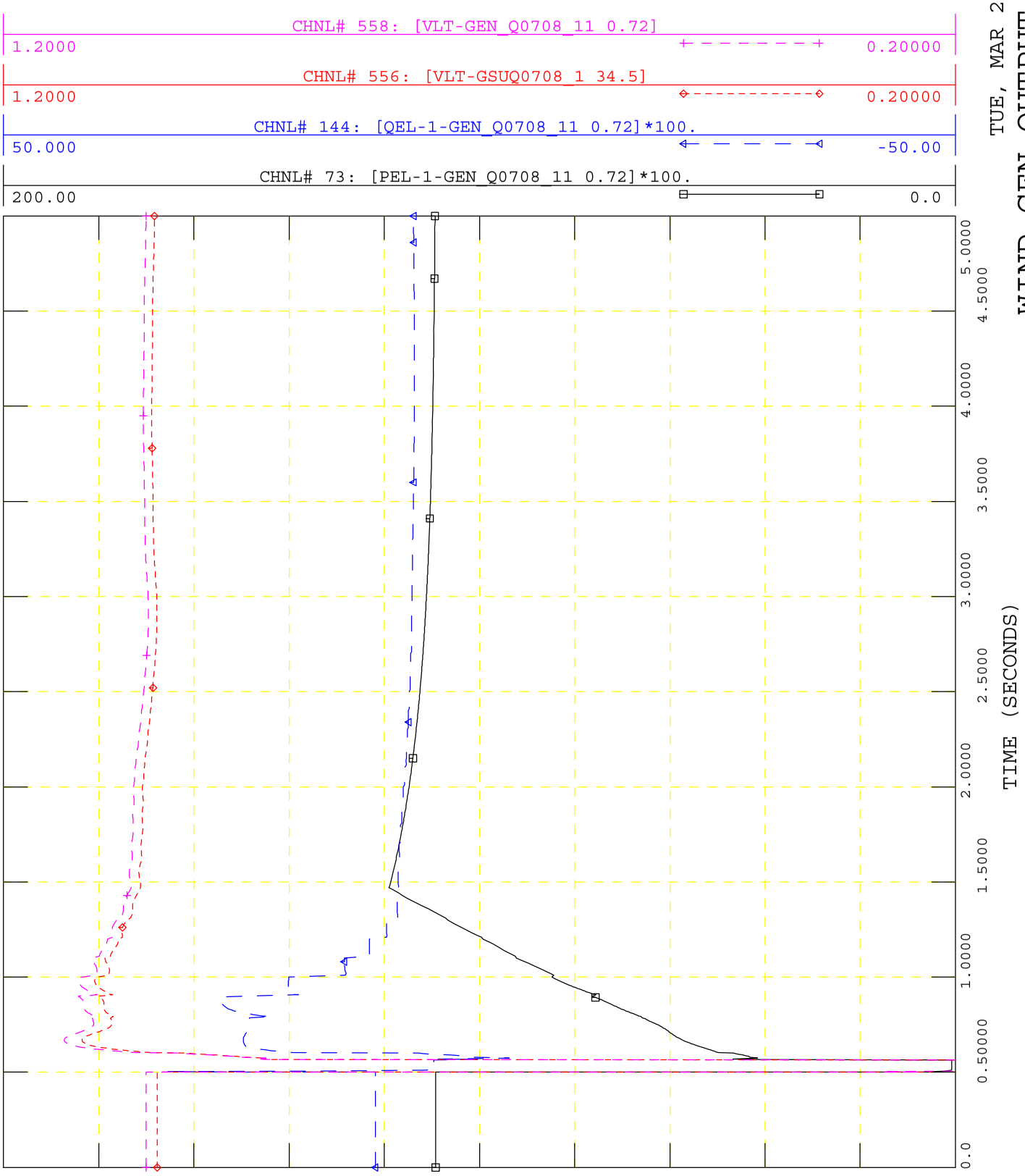

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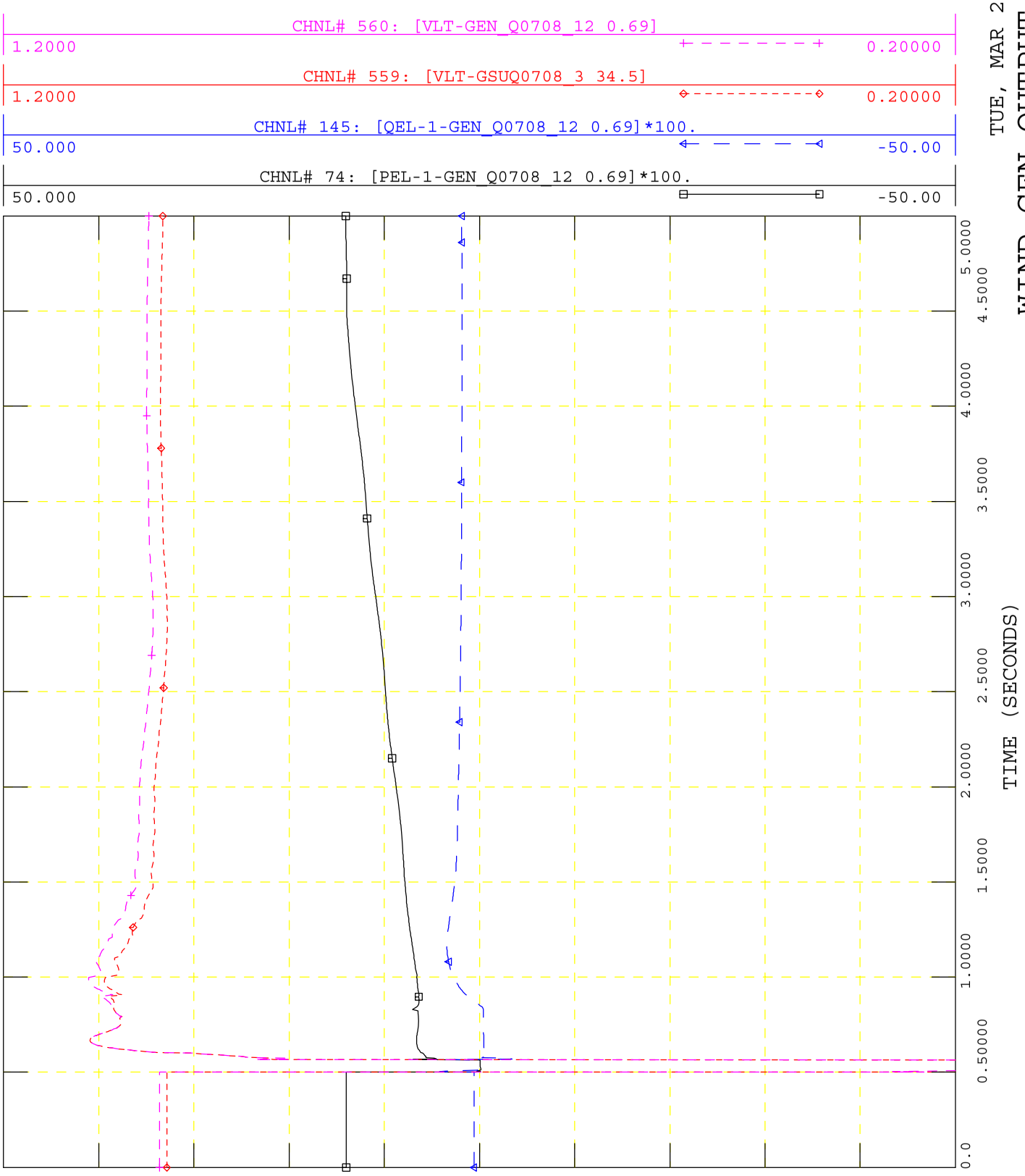
TUE, MAR 27 2018 21:29 PLT 21

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:29 PLT 22

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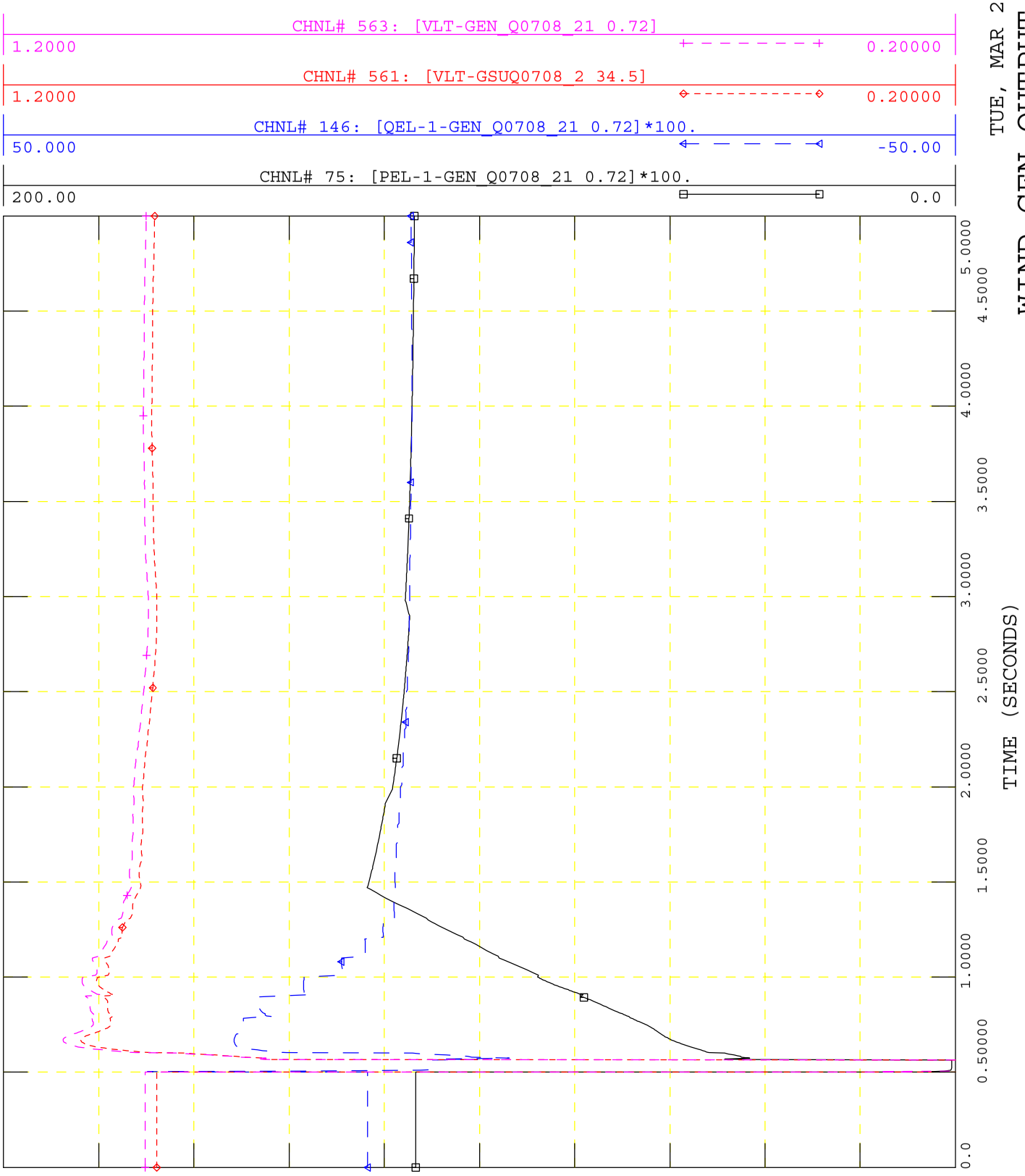

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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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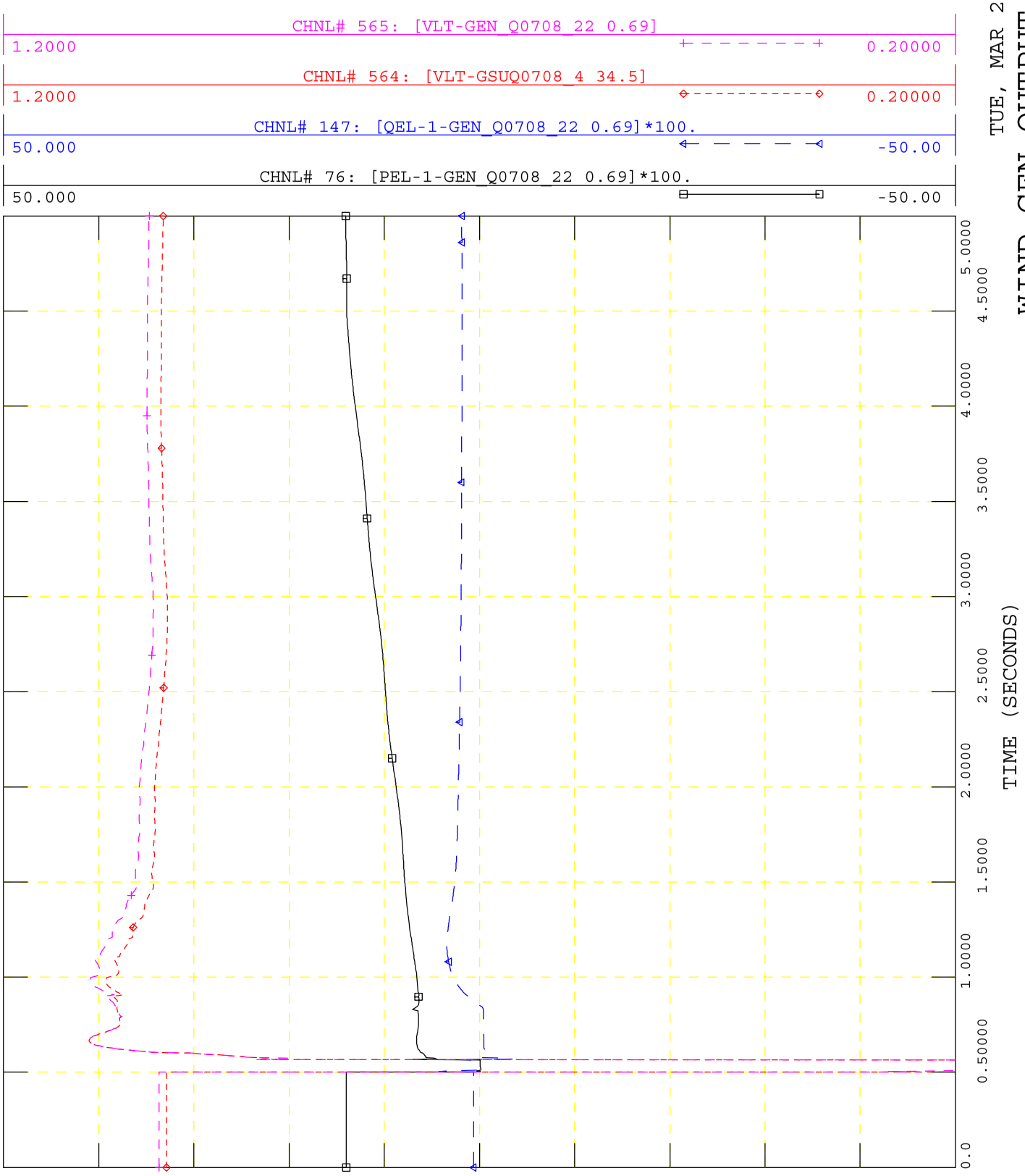
TUE, MAR 27 2018 21:29 PLT 23

WIND GEN OUTPUT



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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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Q707 230 LN (251 MW GEN LOSS). 36CY-UNBLOCK SVC. OUTAGE 10
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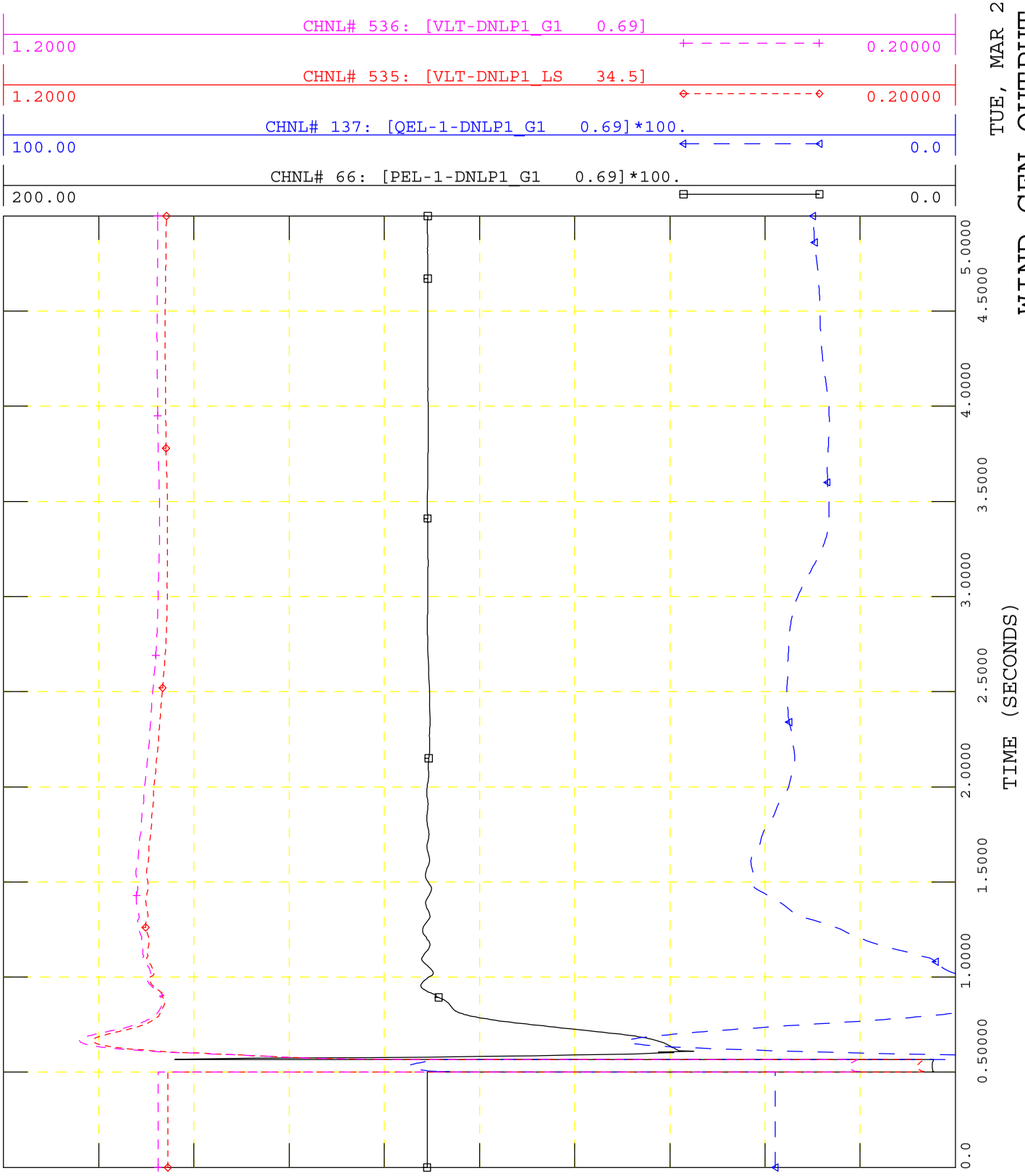
TUE, MAR 27 2018 21:29 PLT 24

WIND GEN OUTPUT



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TUE, MAR 27 2018 21:29 PLT 25

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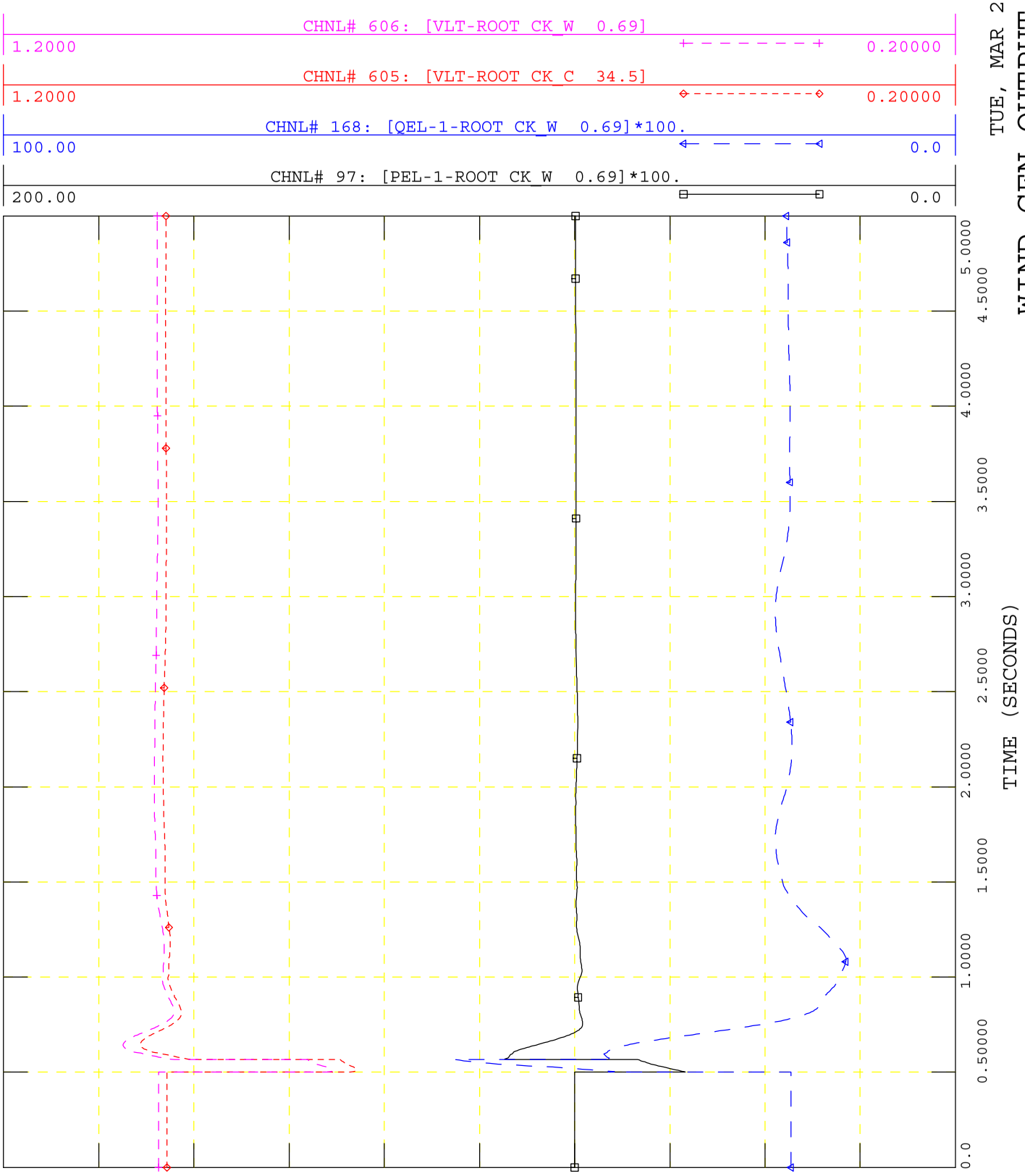

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Q707 230 LN (251 MW GEN LOSS). 36CY-UNBLOCK SVC. OUTAGE 10
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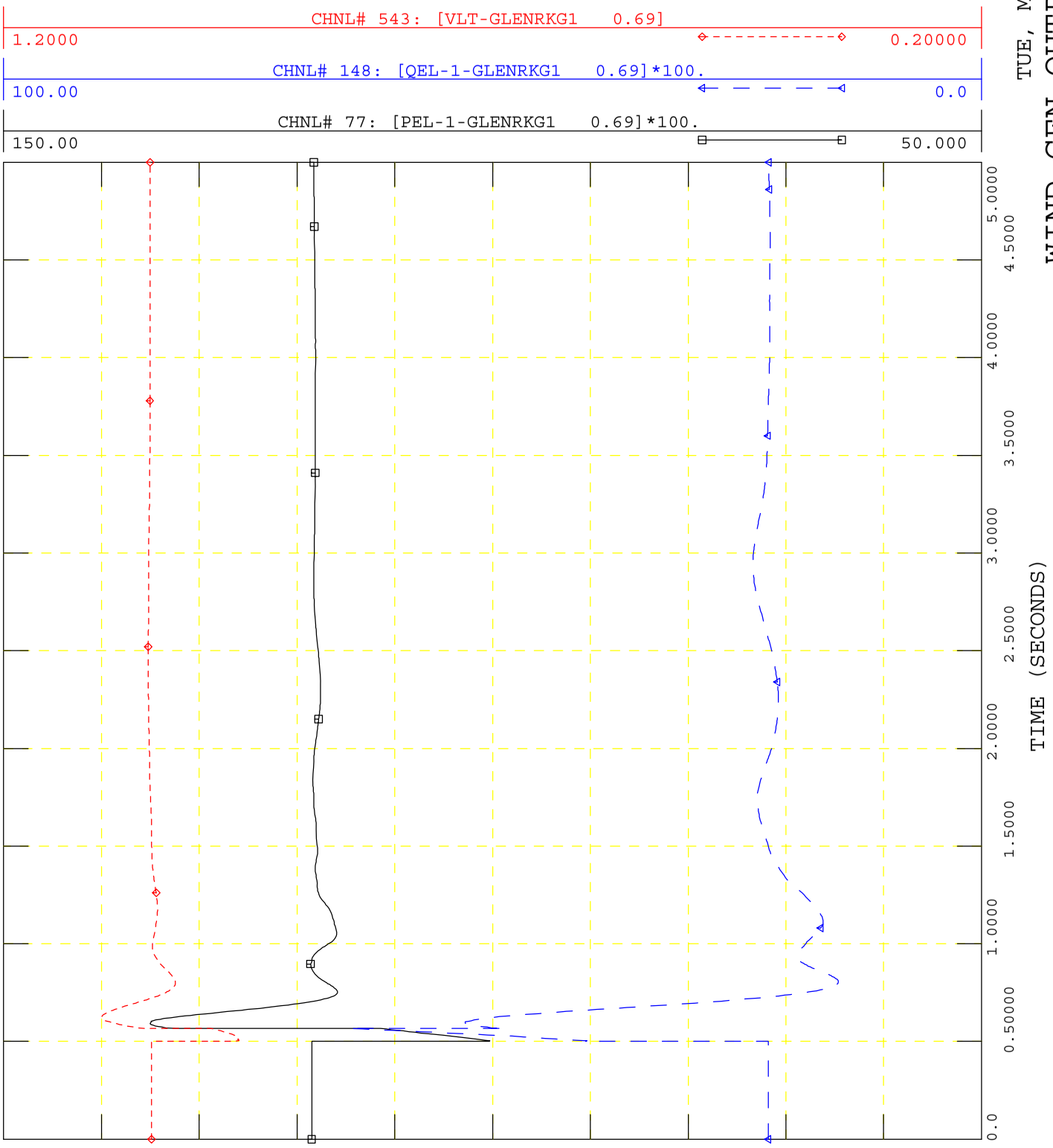
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 26



Dynamic Simulation

Case 11 – Loss of Shirley Basin-Difficulty 230 kV line

30 cycles	**3 phase Shirley Basin 230 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Shirley Basin-Difficulty 230 kV line**
36 cycles	**Remove SVC MVAR limiter**
5 sec.	**Terminate simulation**

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS SHIRLEY BASIN 230 FLT. 34CY-CLR FLT & OPEN SHIRLEY
BASIN-DIFFICULTY 230 KV LINE. 36CY-UNBLOCK SVC. OUTAGE 11
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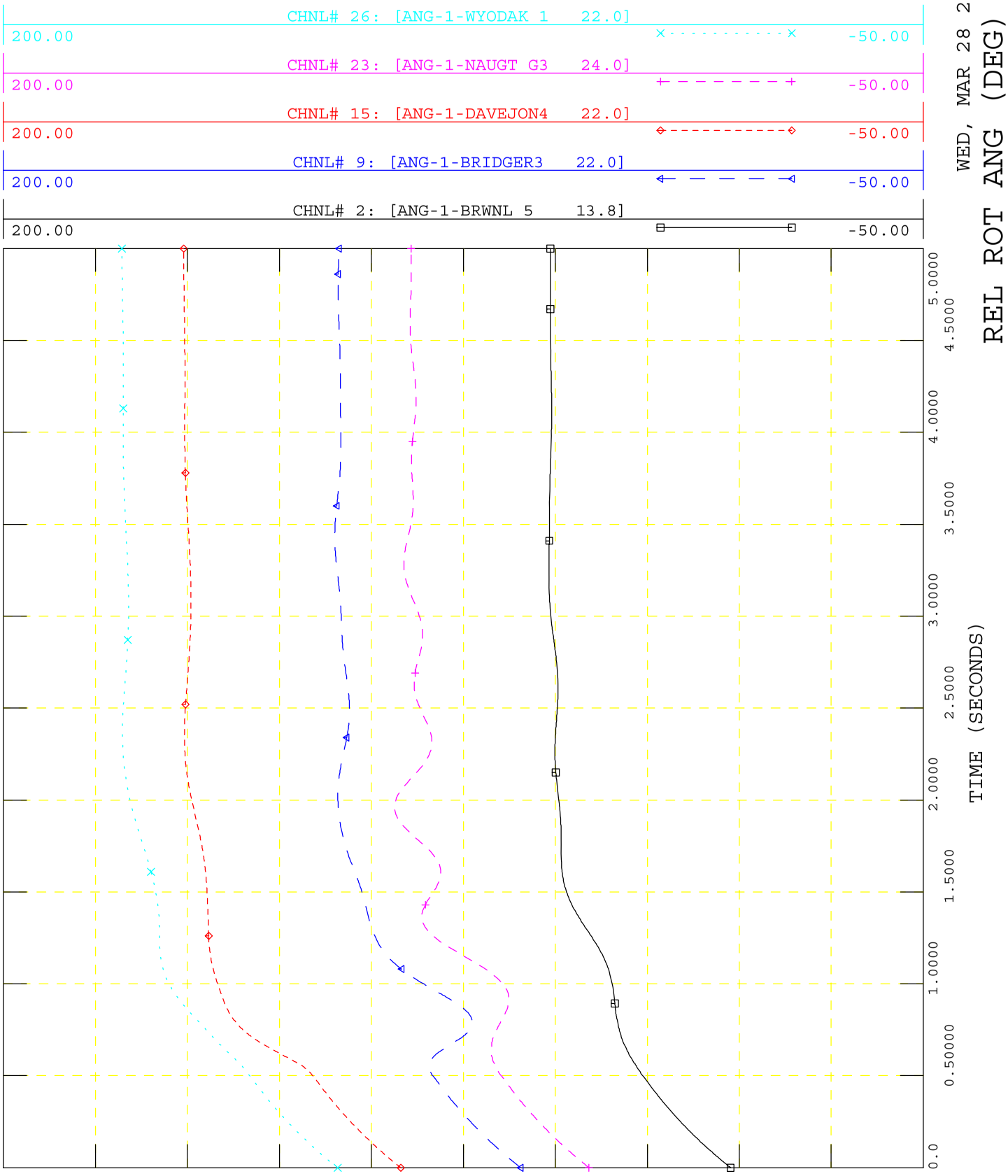
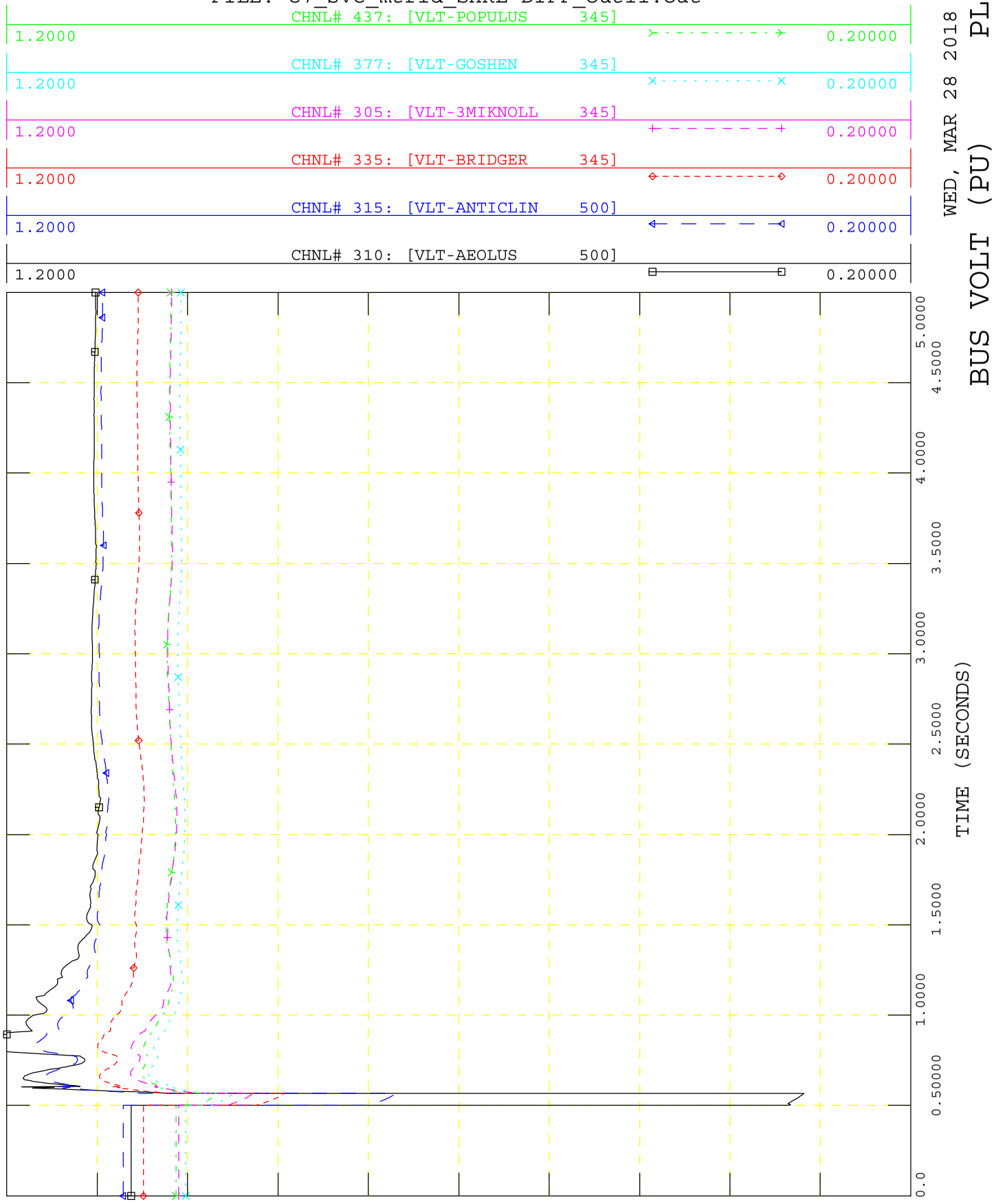


WED, MAR 28 2018 11:45
REL ROT ANG (DEG) PLT 1

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS SHIRLEY BASIN 230 FLT. 34CY-CLR FLT & OPEN SHIRLEY
BASIN-DIFFICULTY 230 KV LINE. 36CY-UNBLOCK SVC. OUTAGE 11

FILE: c7_svc_mtrld_SHRL-DIFF_out11.out



WED, MAR 28 2018 11:45

PLT 2

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30CY-3PHS SHIRLEY BASIN 230 FLT. 34CY-CLR FLT & OPEN SHIRLEY
BASIN-DIFFICULTY 230 KV LINE. 36CY-UNBLOCK SVC. OUTAGE 11
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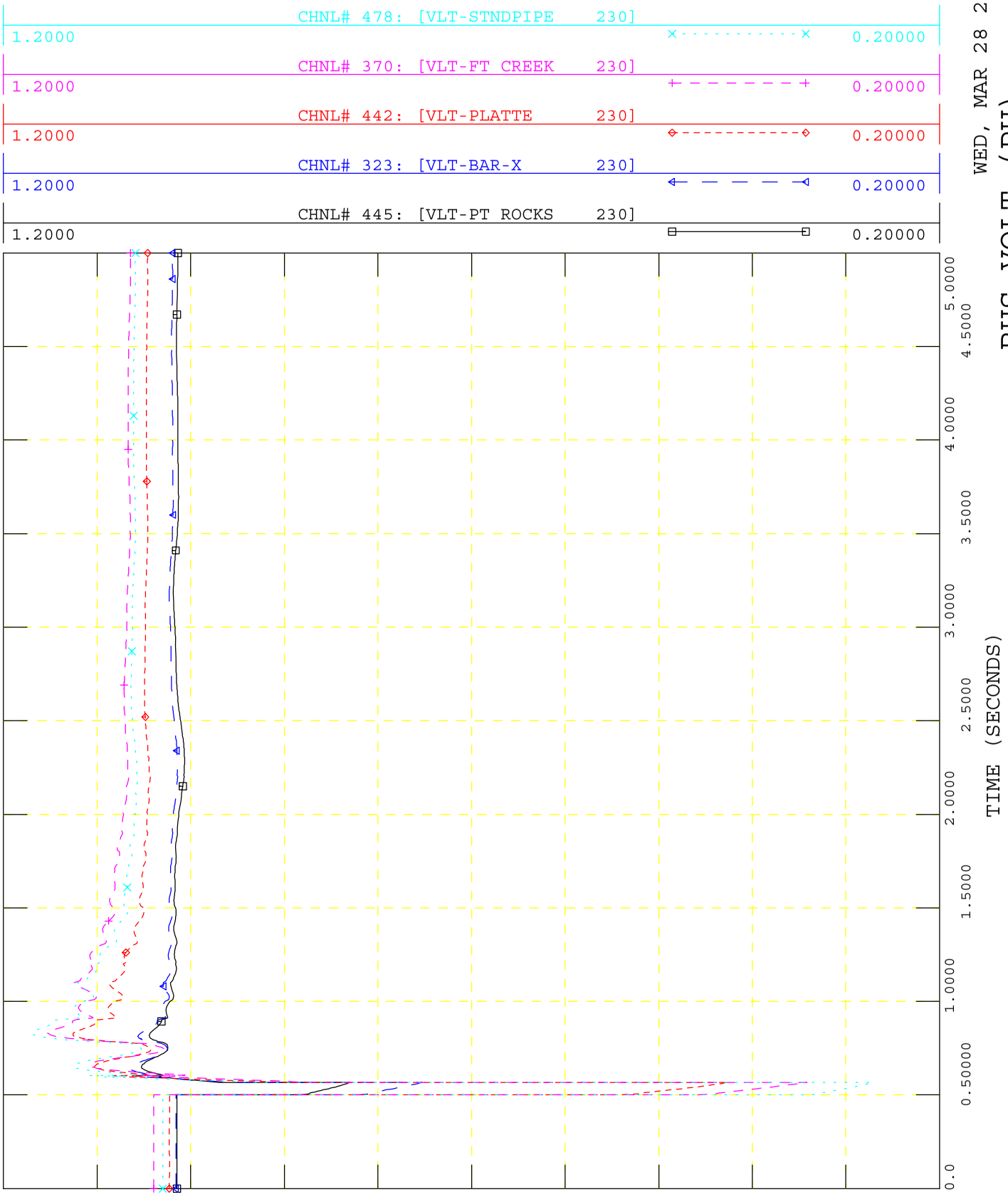
WED, MAR 28 2018 11:45 PLT 3



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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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BASIN-DIFFICULTY 230 KV LINE. 36CY-UNBLOCK SVC. OUTAGE 11
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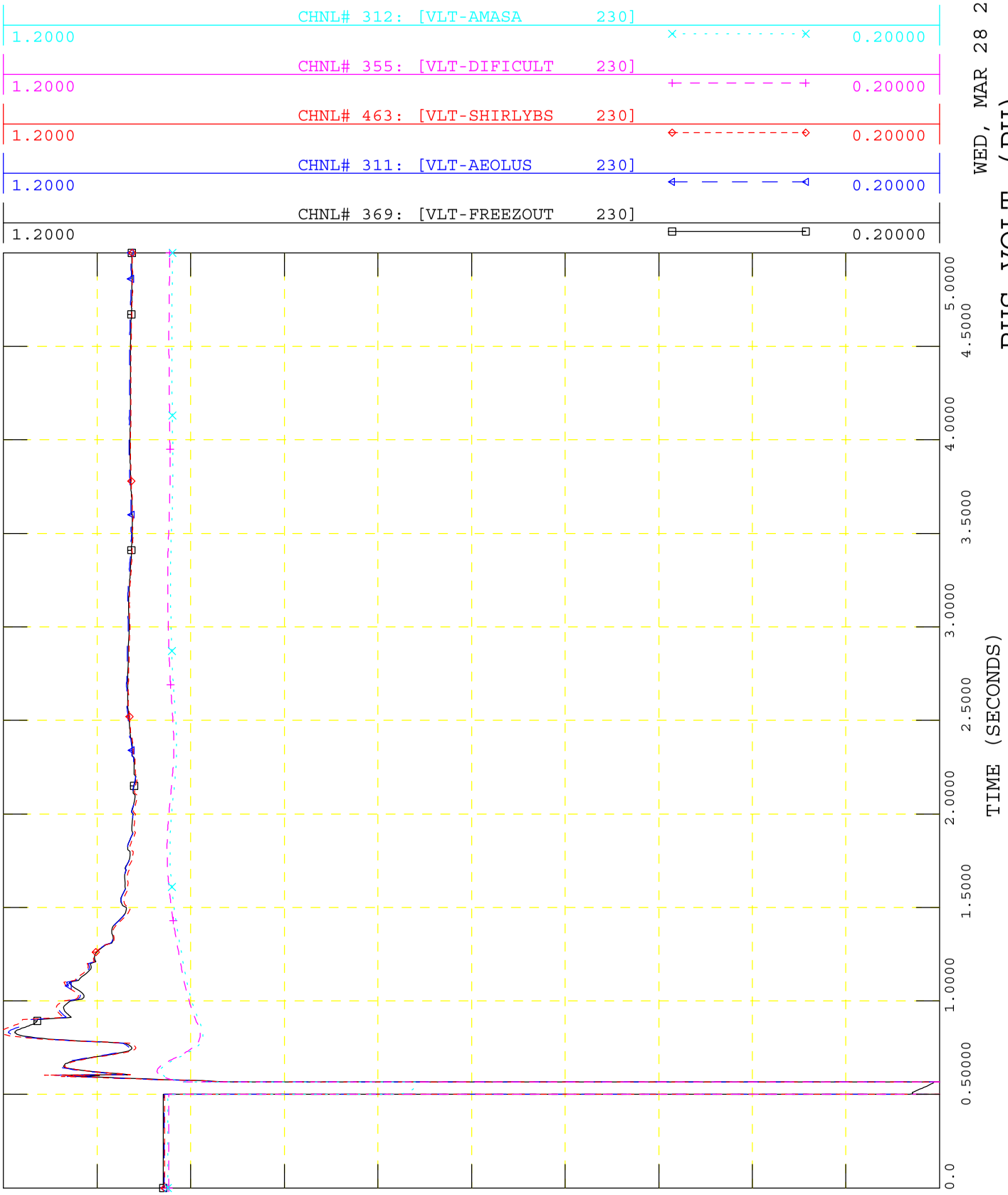
WED, MAR 28 2018 11:45 PLT 4



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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BASIN-DIFFICULTY 230 KV LINE. 36CY-UNBLOCK SVC. OUTAGE 11
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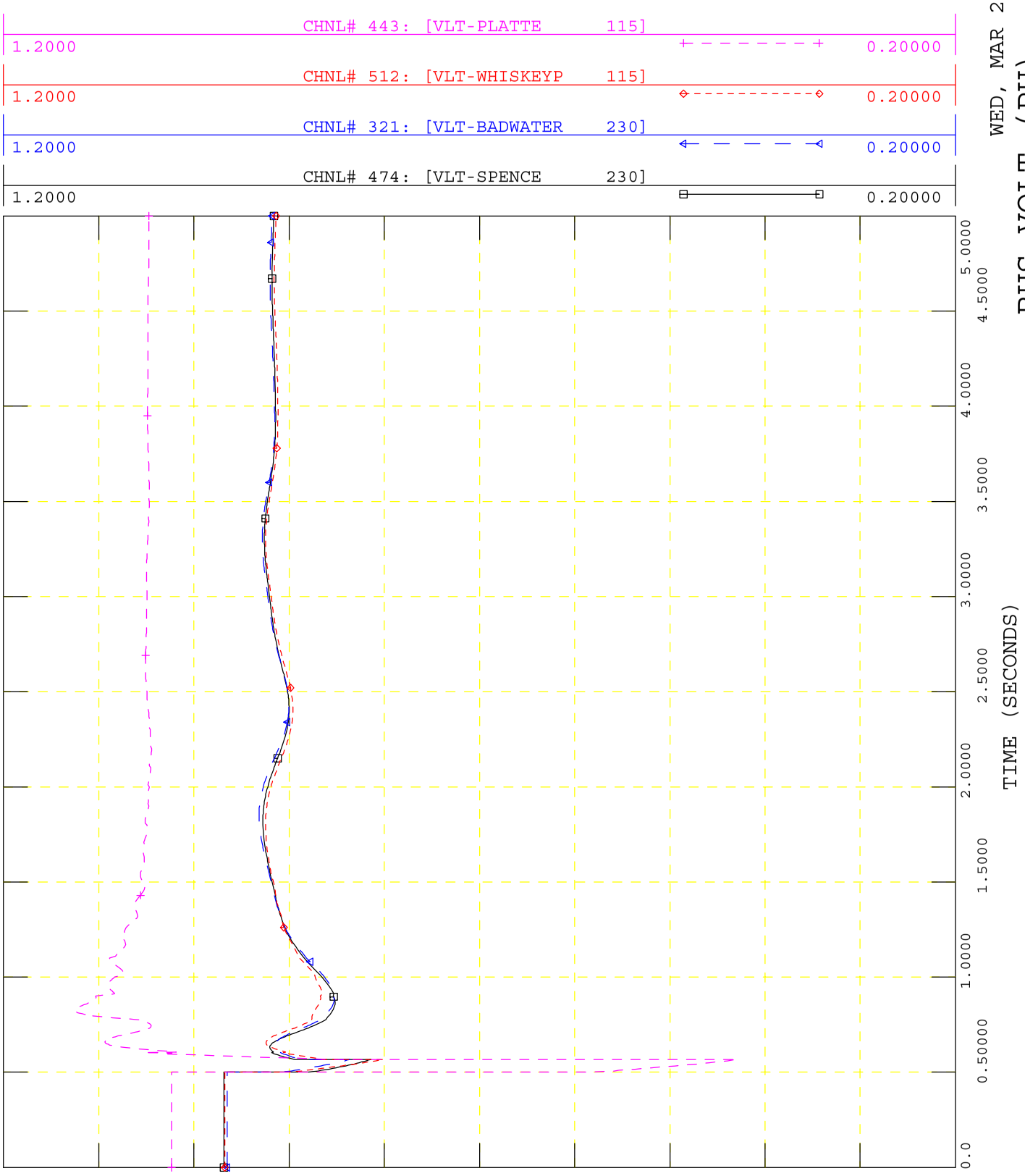
WED, MAR 28 2018 11:45 PLT 5



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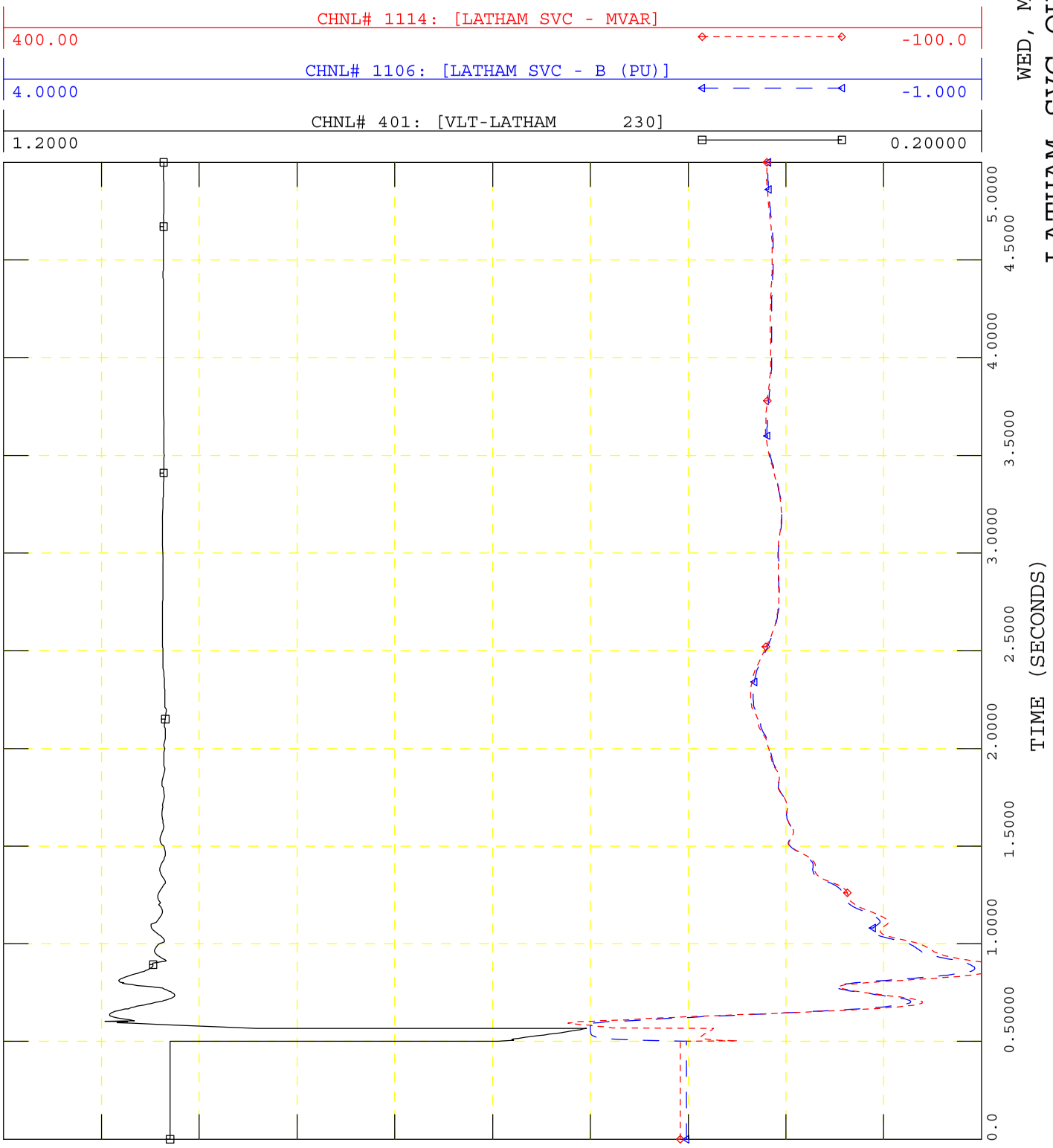
WED, MAR 28 2018 11:45 PLT 6

LATHAM SVC OUT



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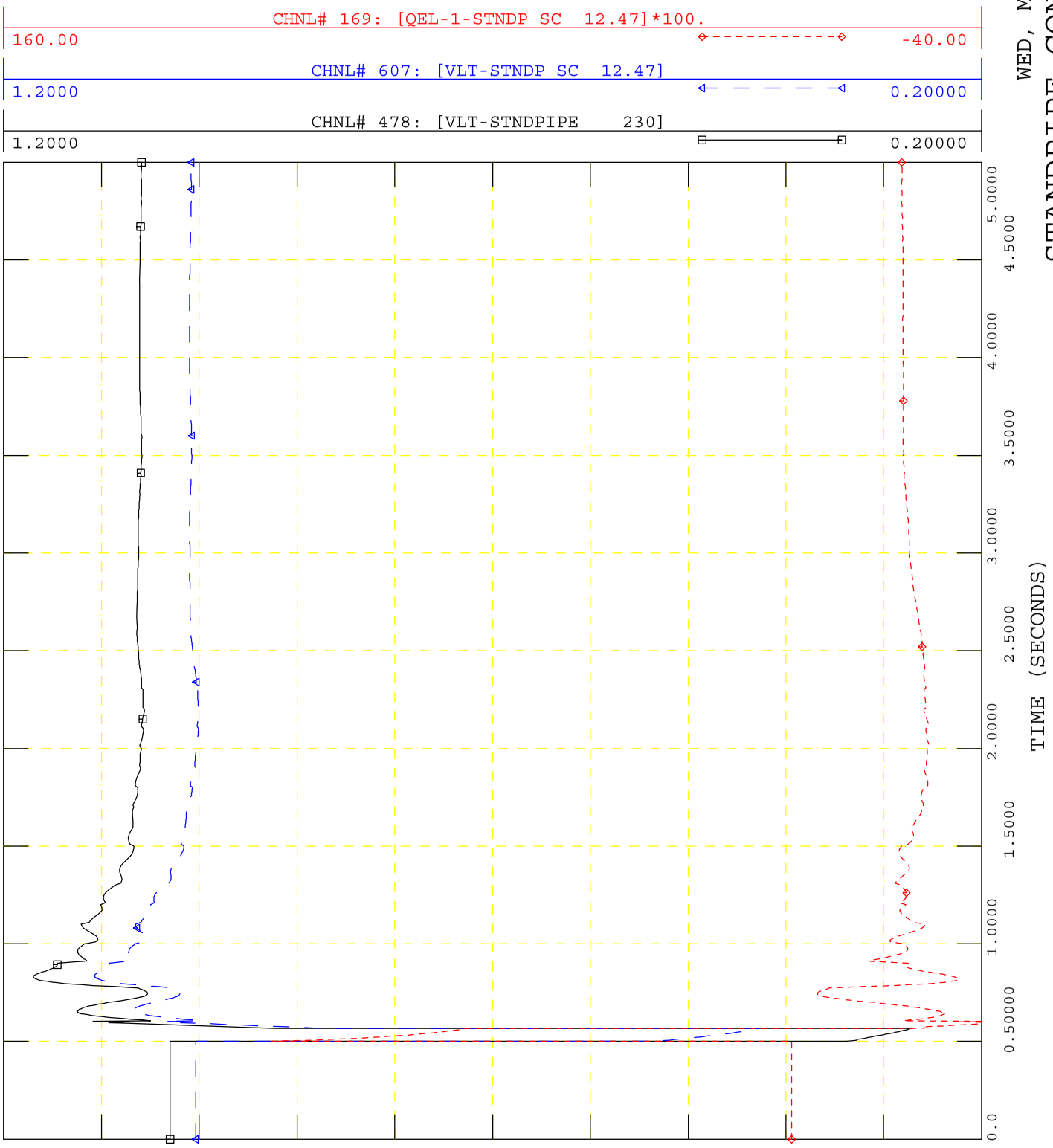
STANDPIPE CONDNSR PLT 7



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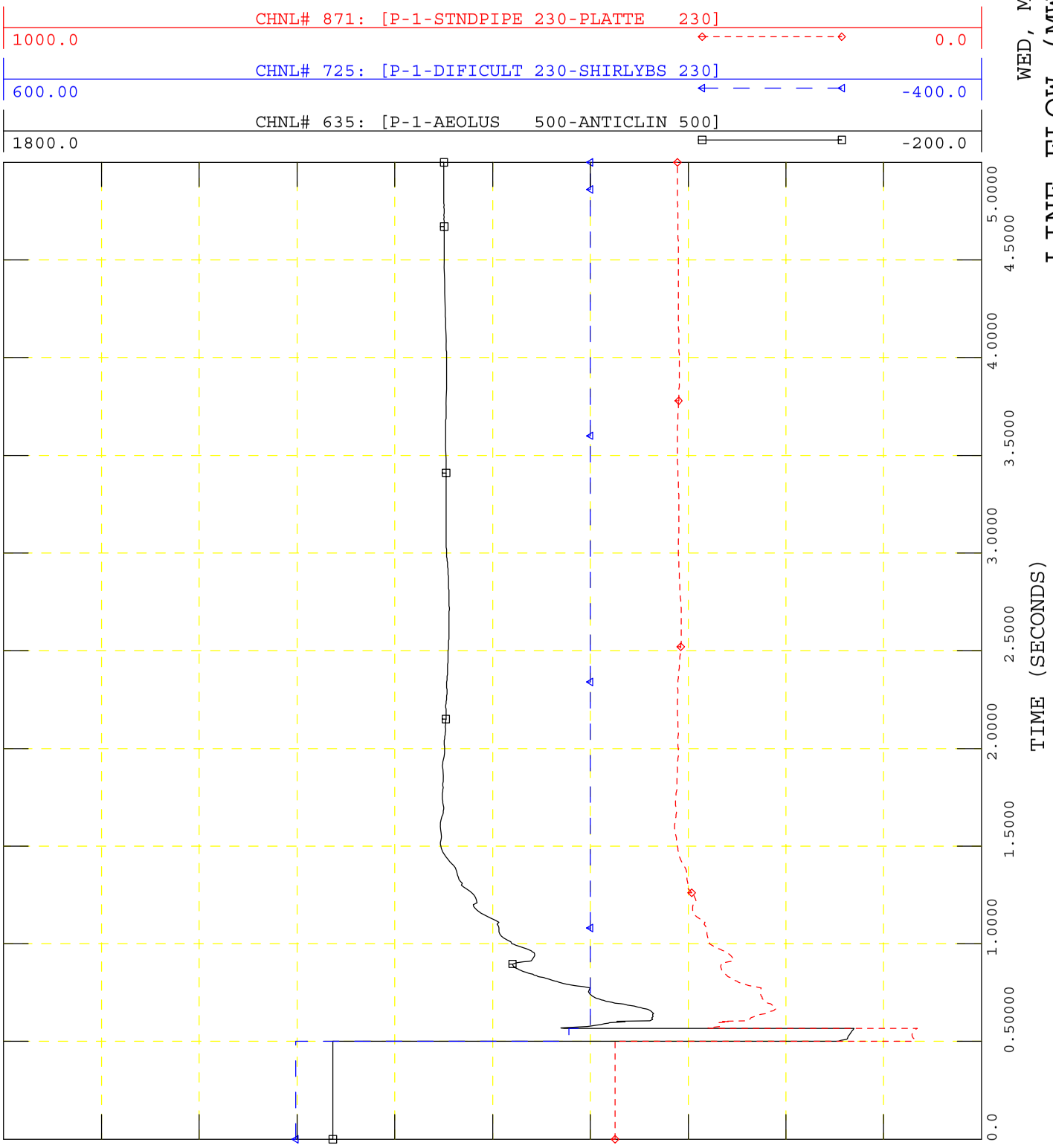

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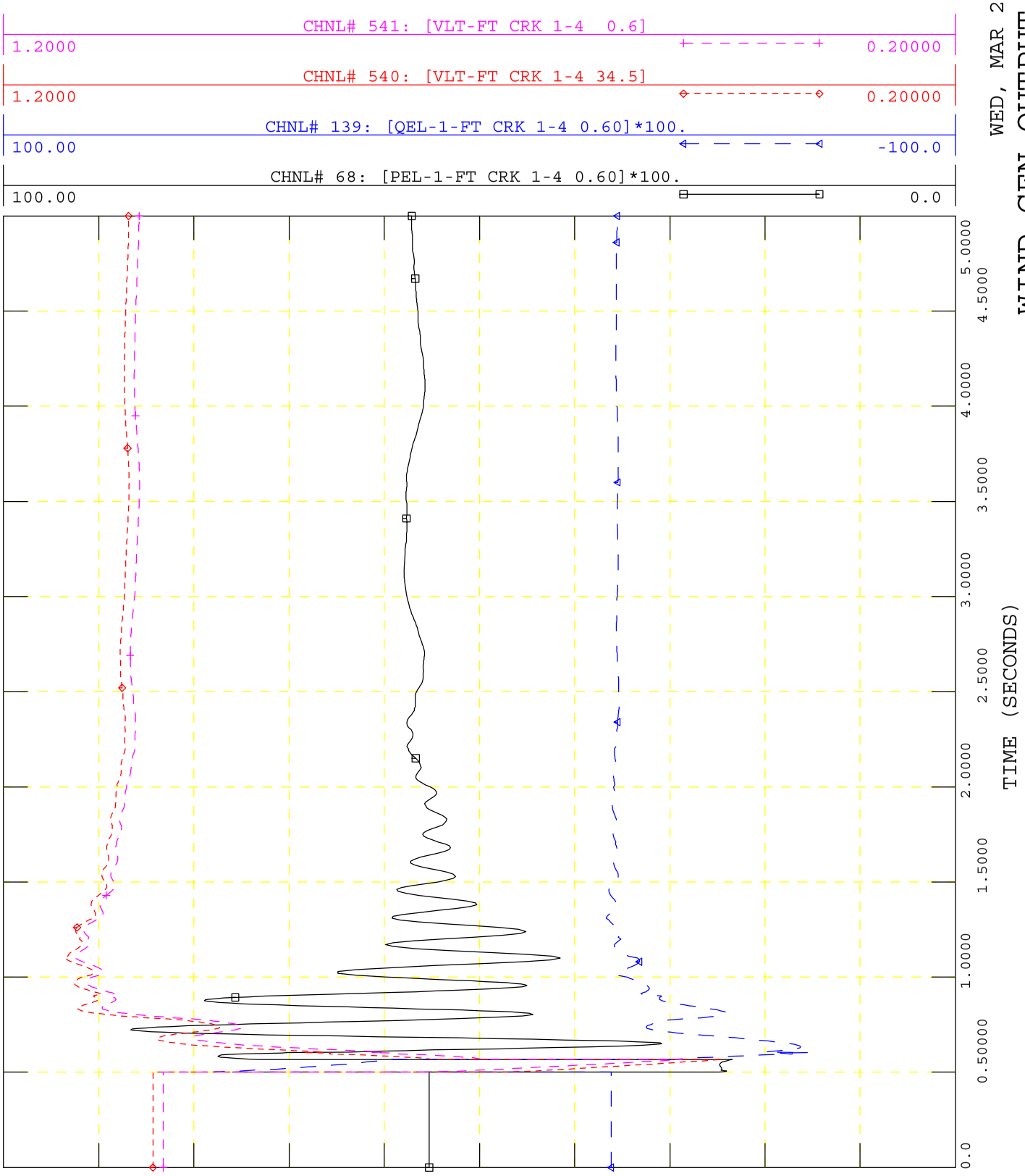

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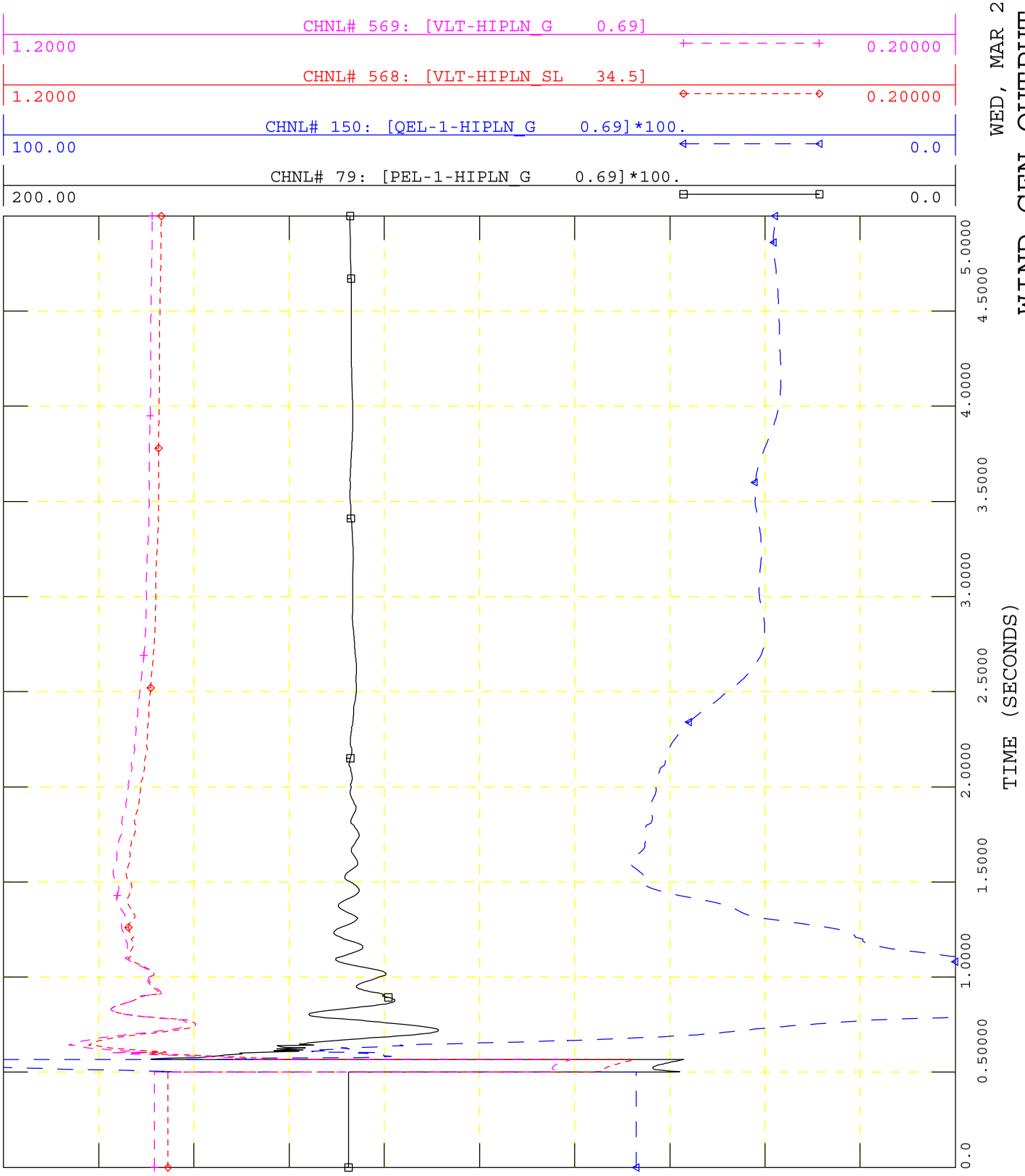

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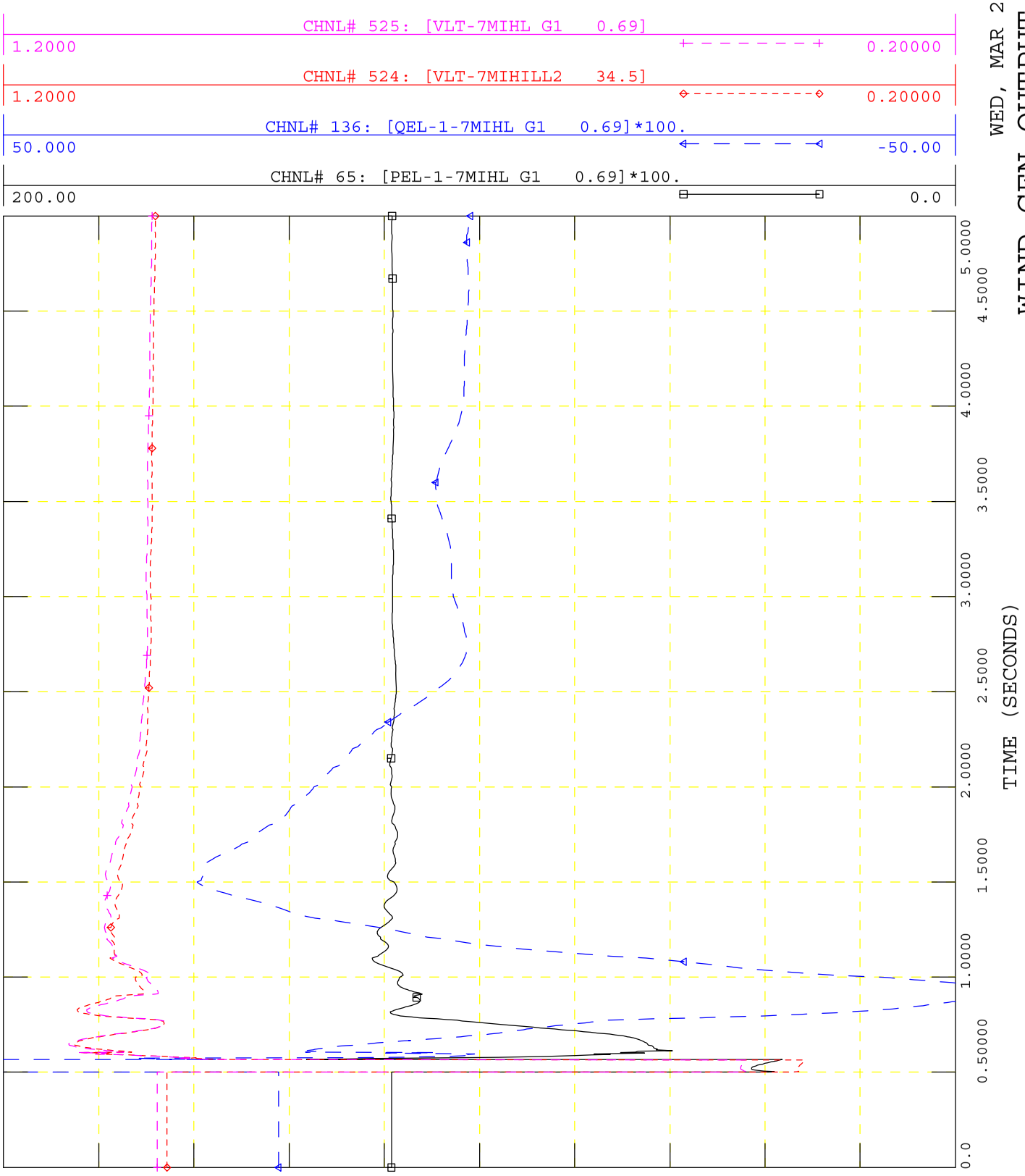

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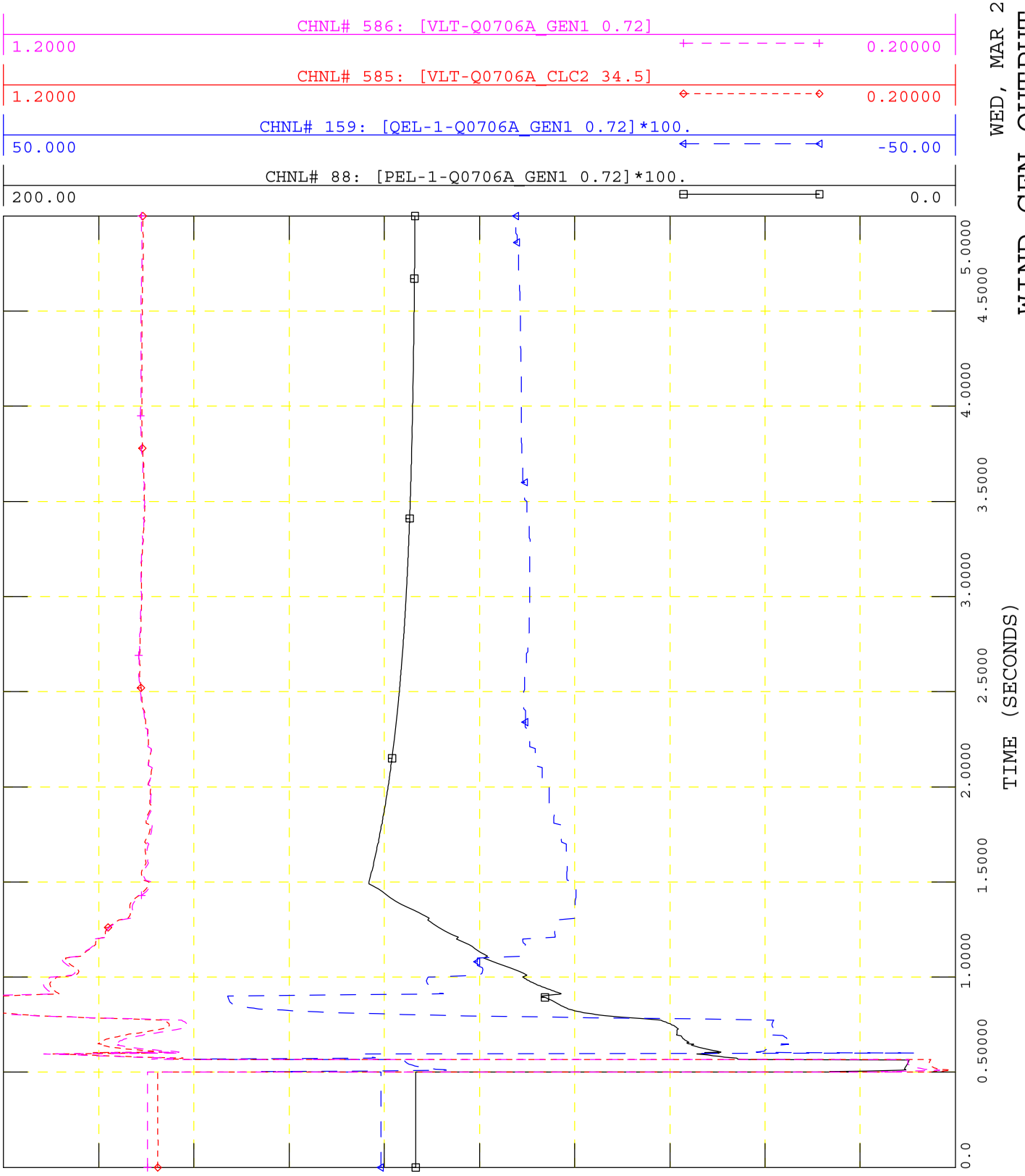

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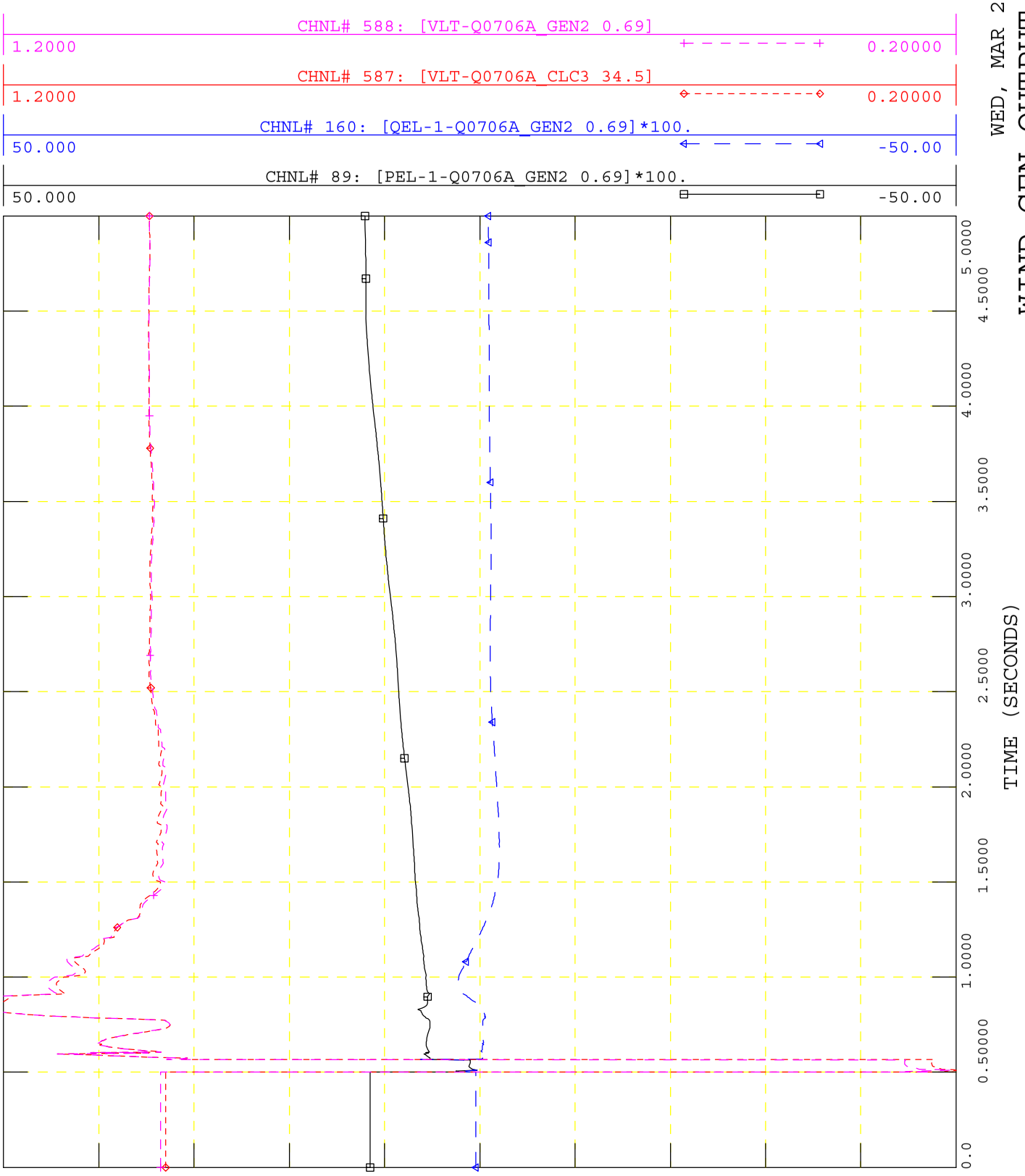

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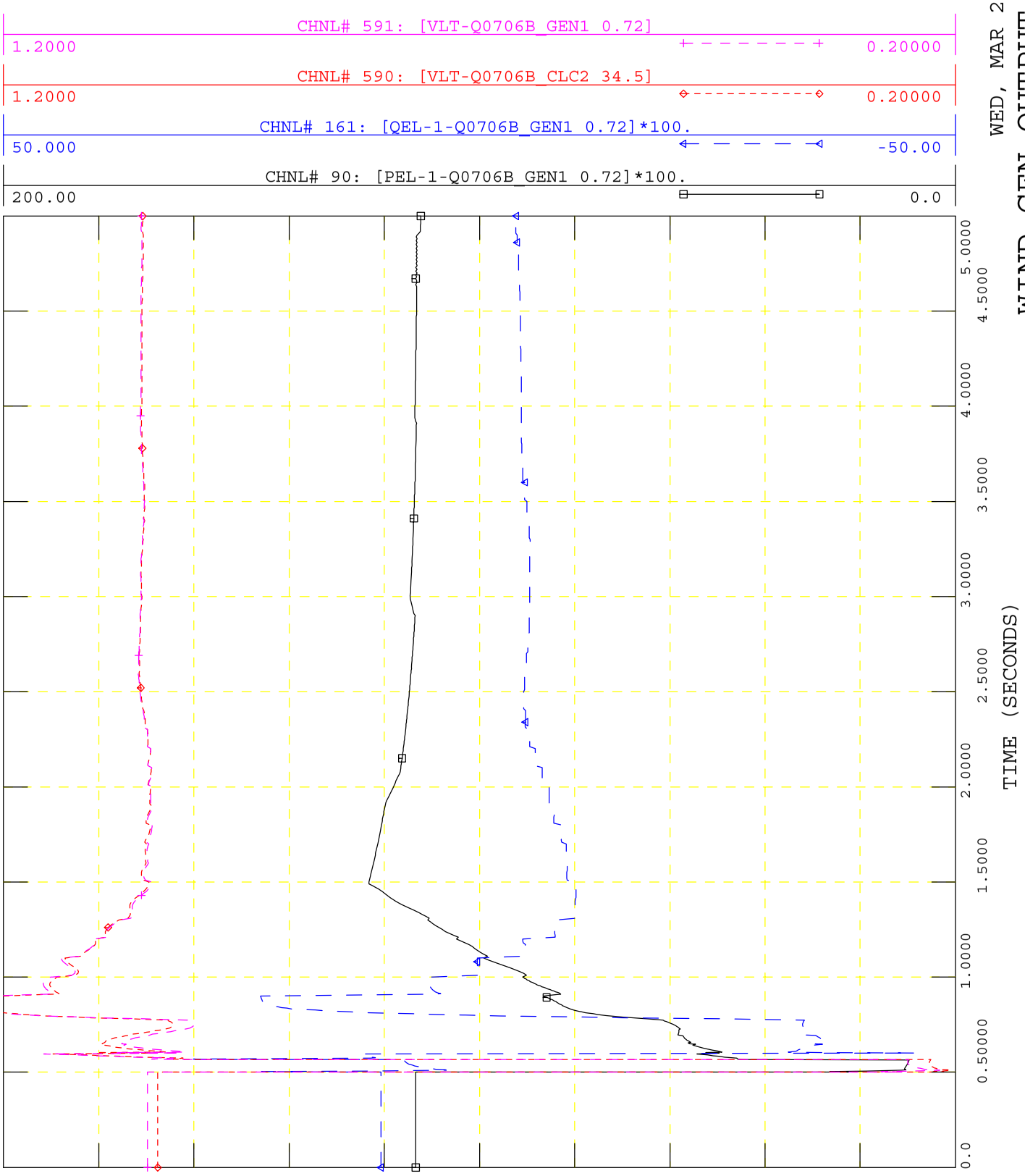

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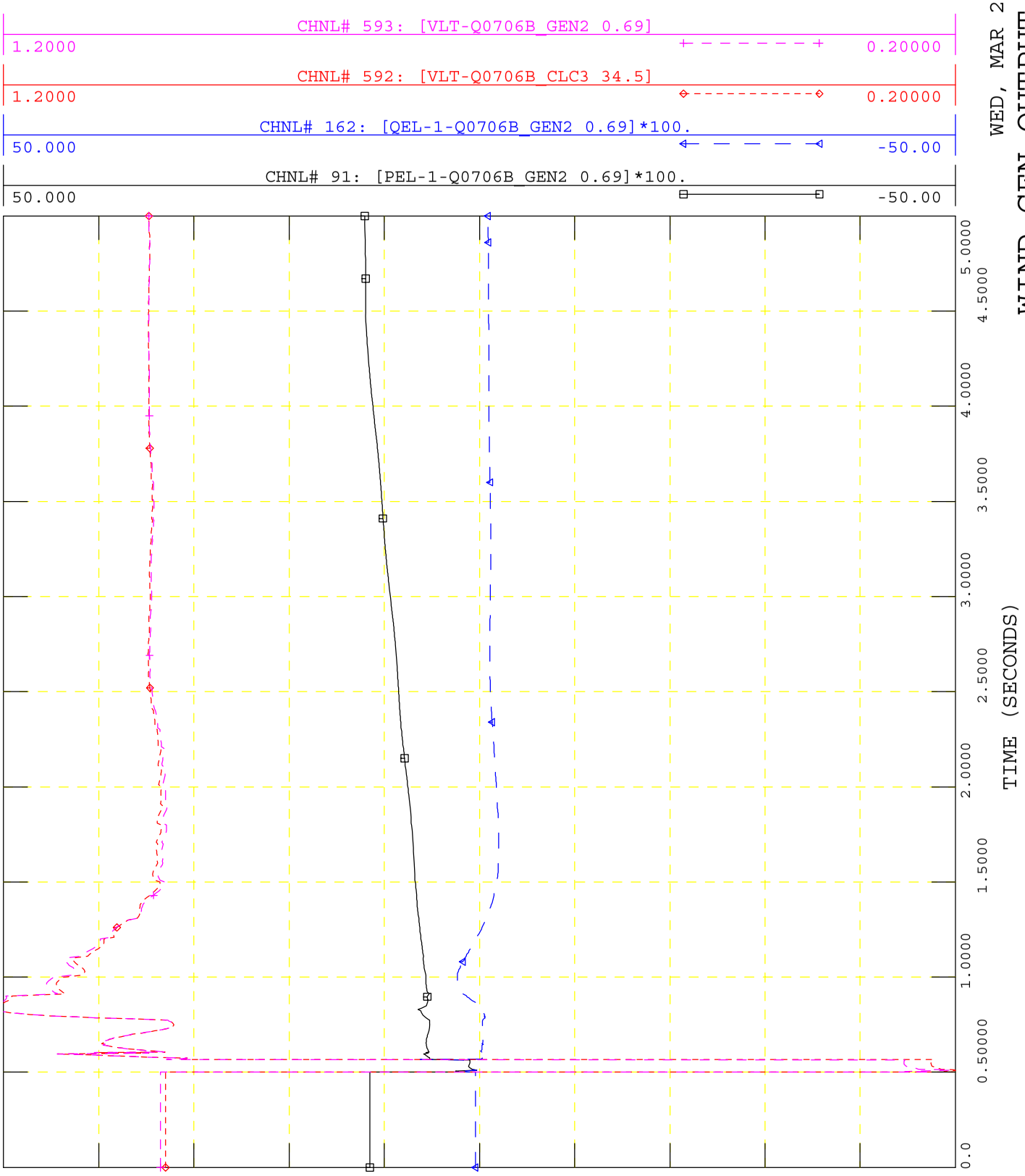

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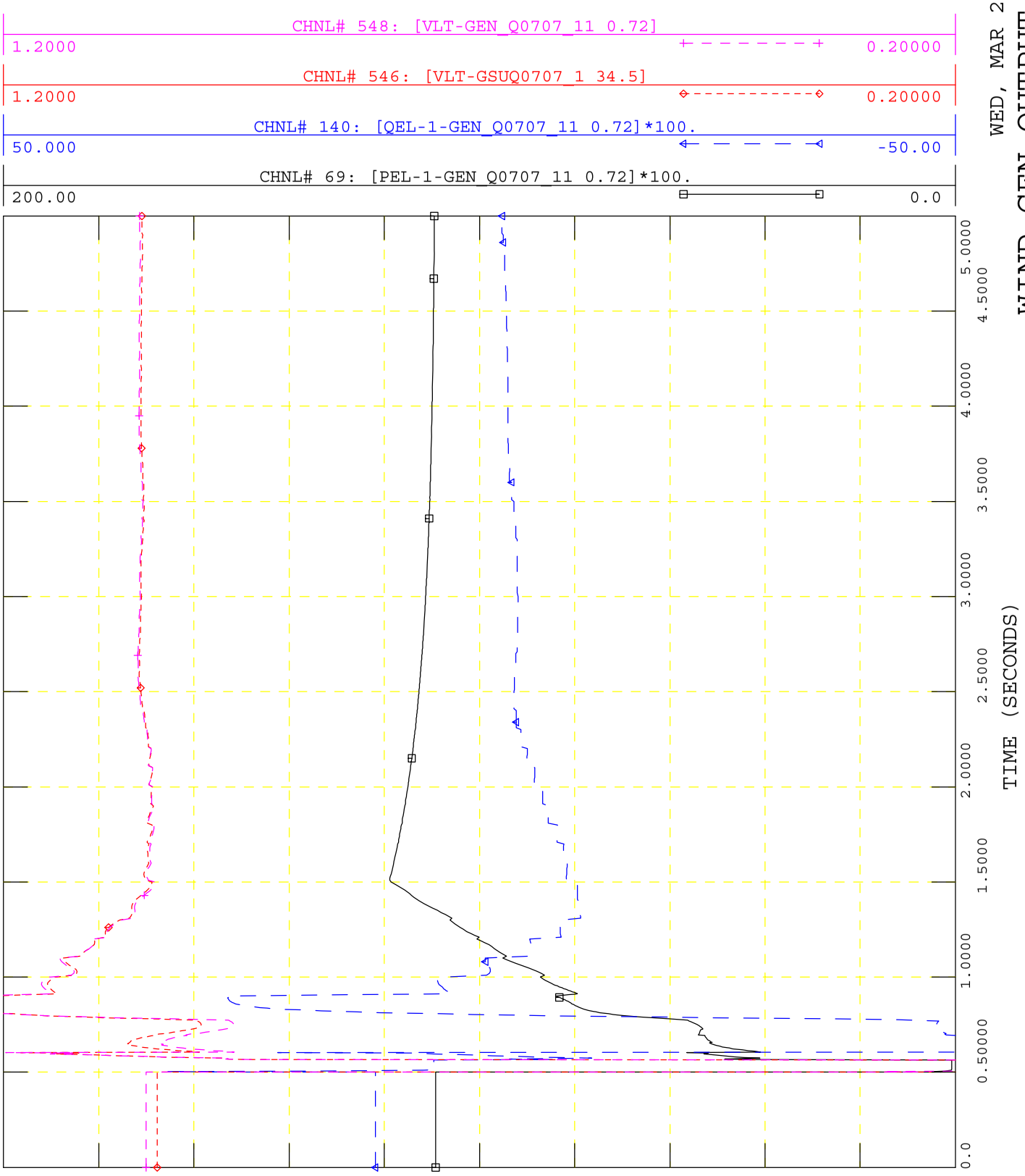

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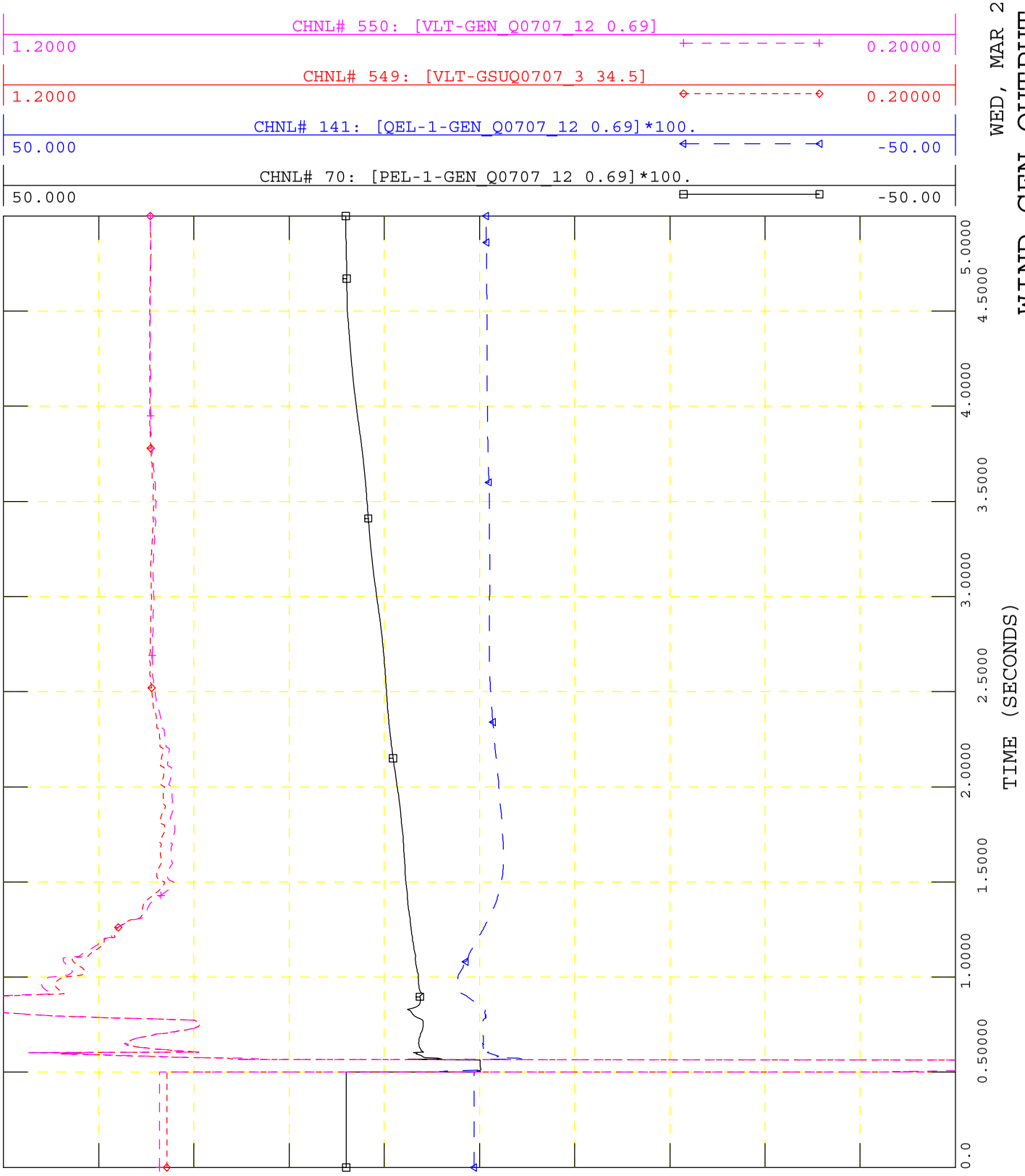

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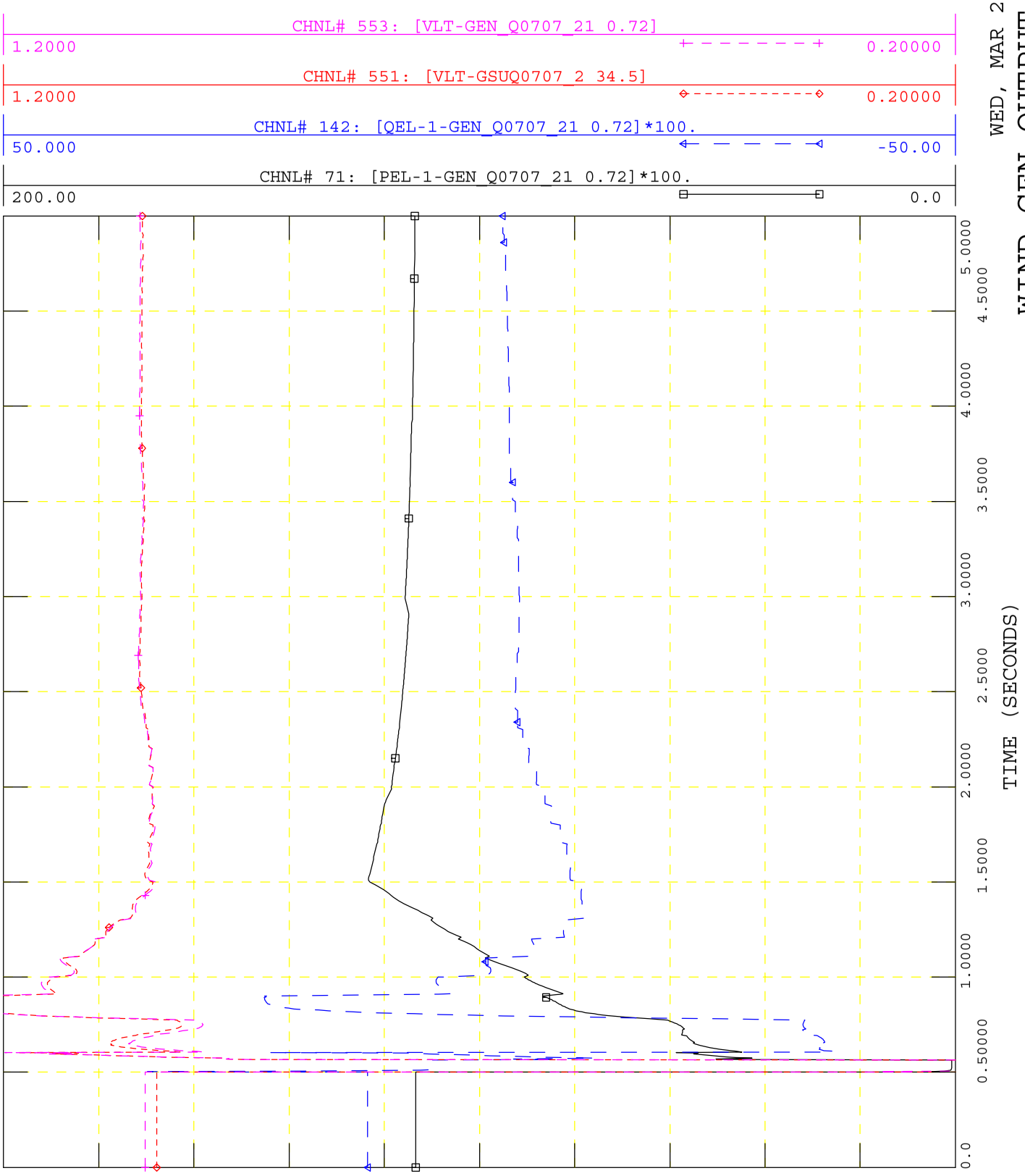

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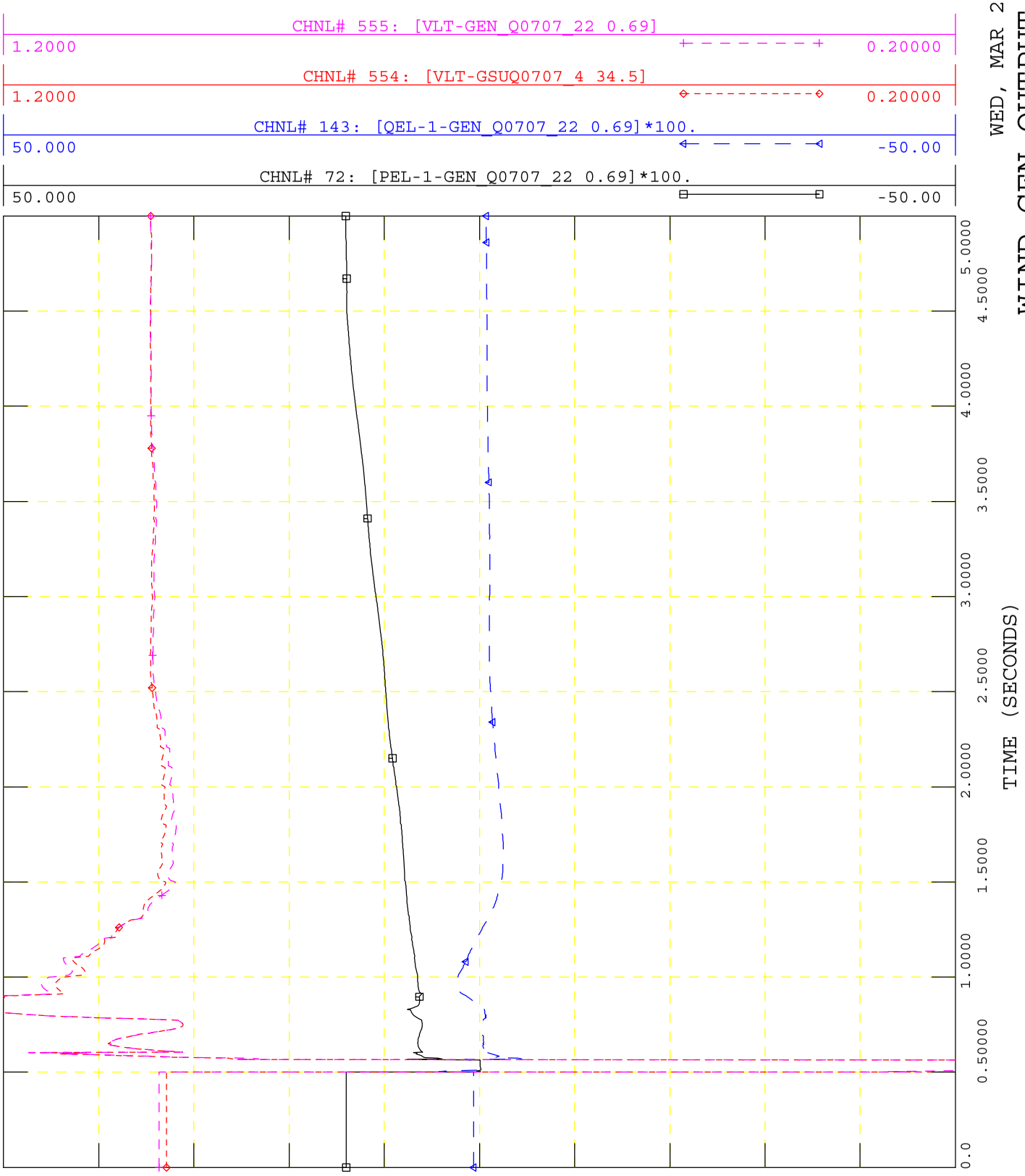

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WED, MAR 28 2018 11:46 PLT 20

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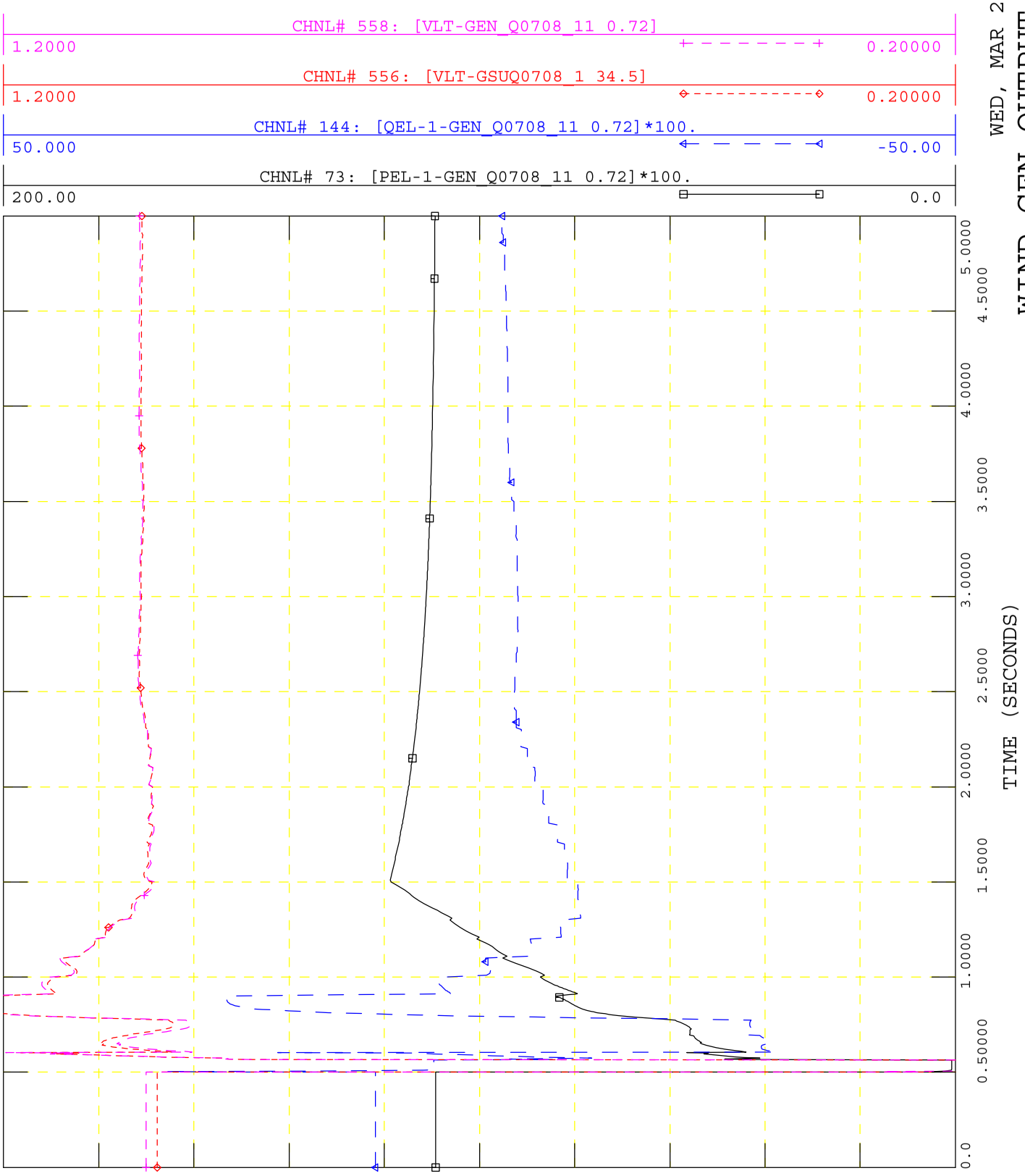

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WED, MAR 28 2018 11:46 PLT 21

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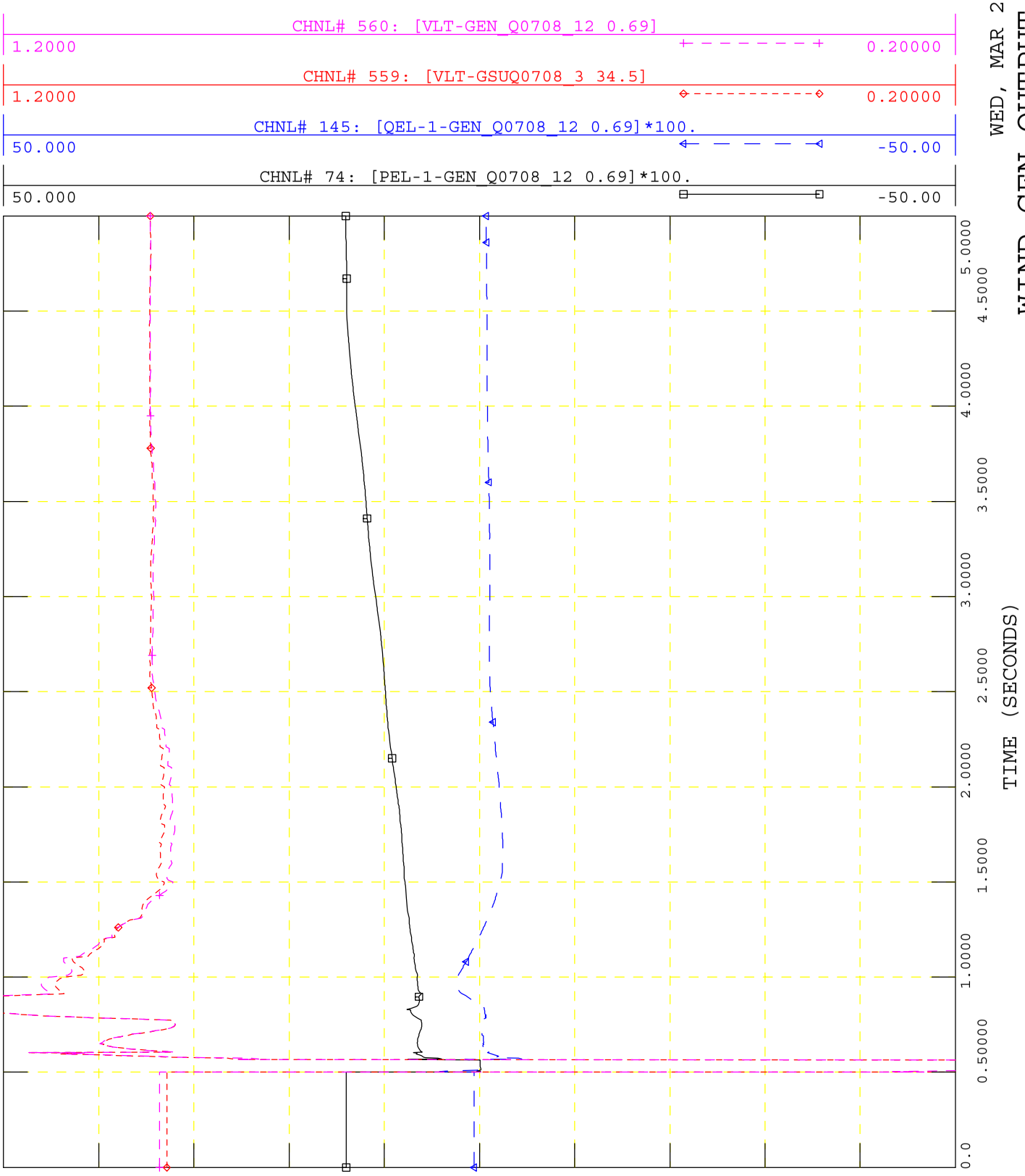

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WED, MAR 28 2018 11:46 PLT 22

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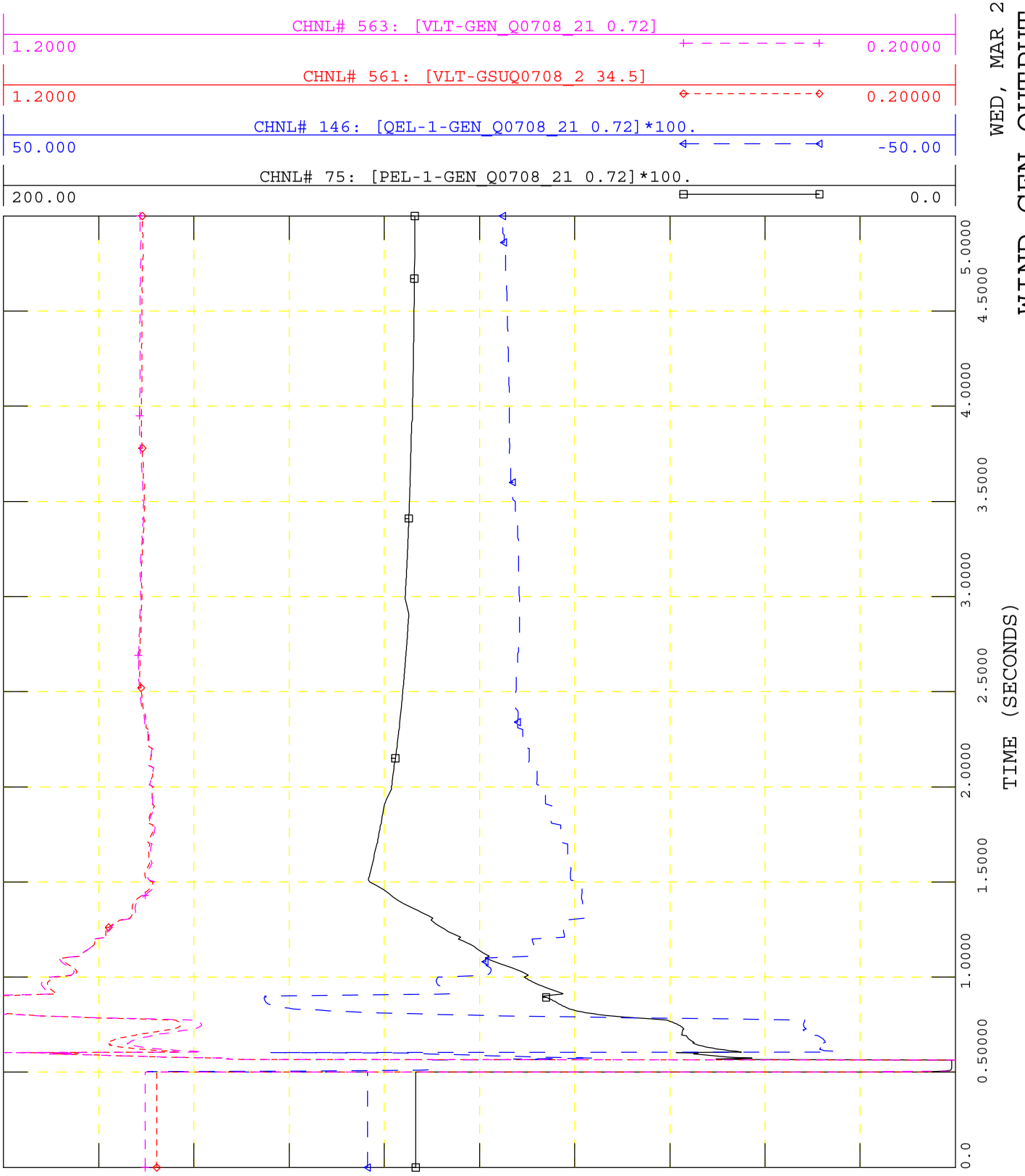

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WED, MAR 28 2018 11:46 PLT 23

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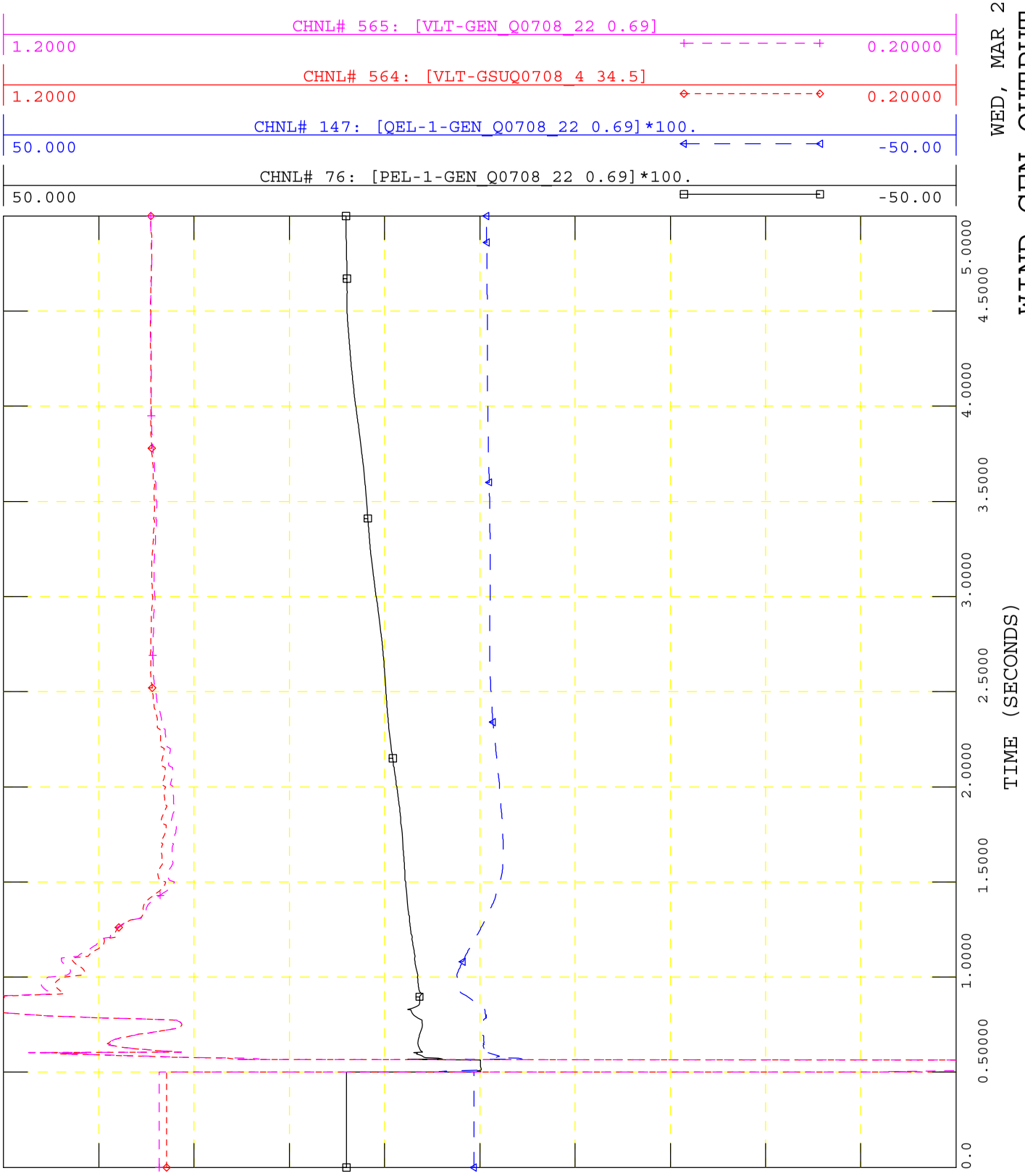

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WED, MAR 28 2018 11:46 PLT 24

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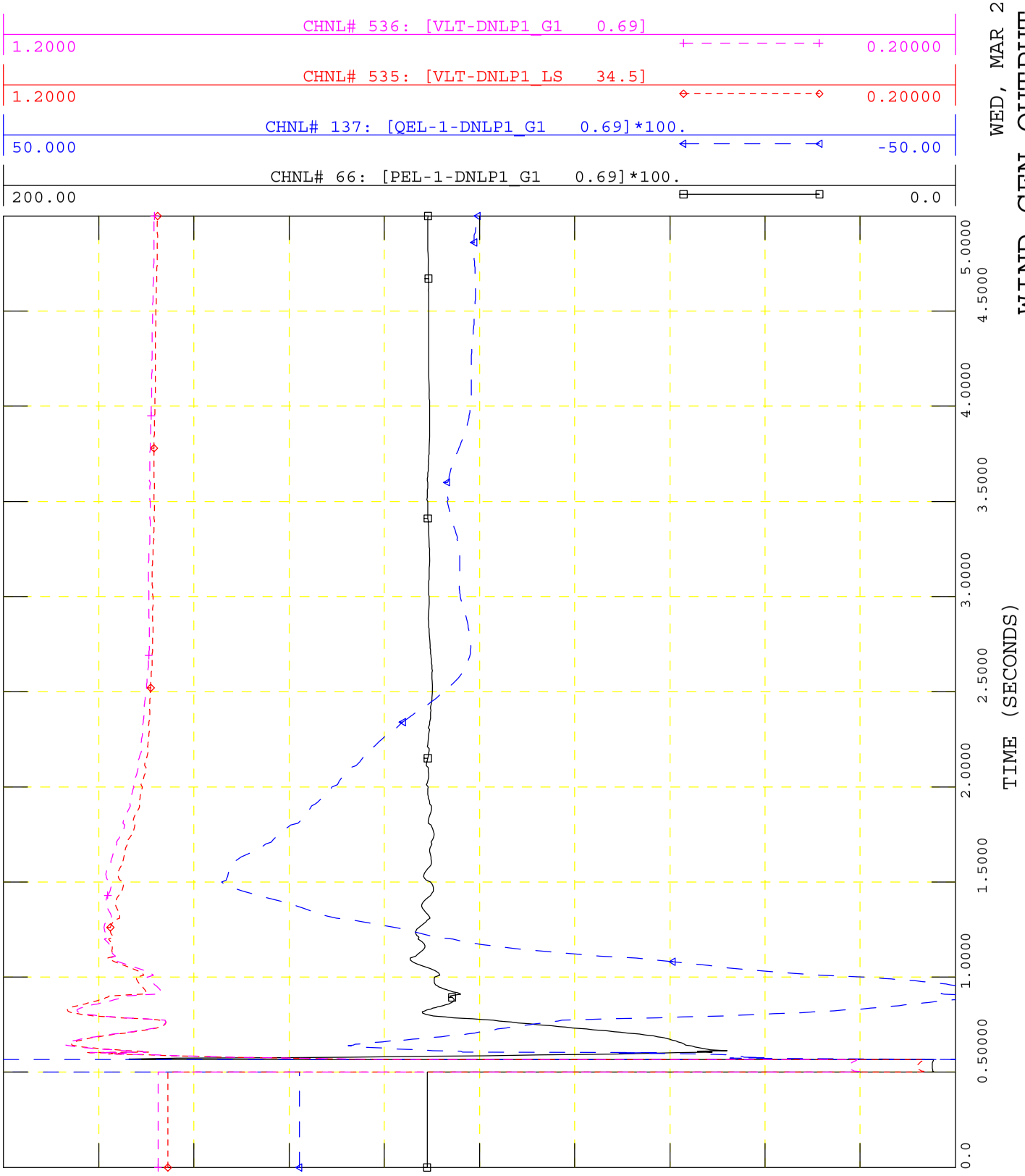

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WED, MAR 28 2018 11:46 PLT 25

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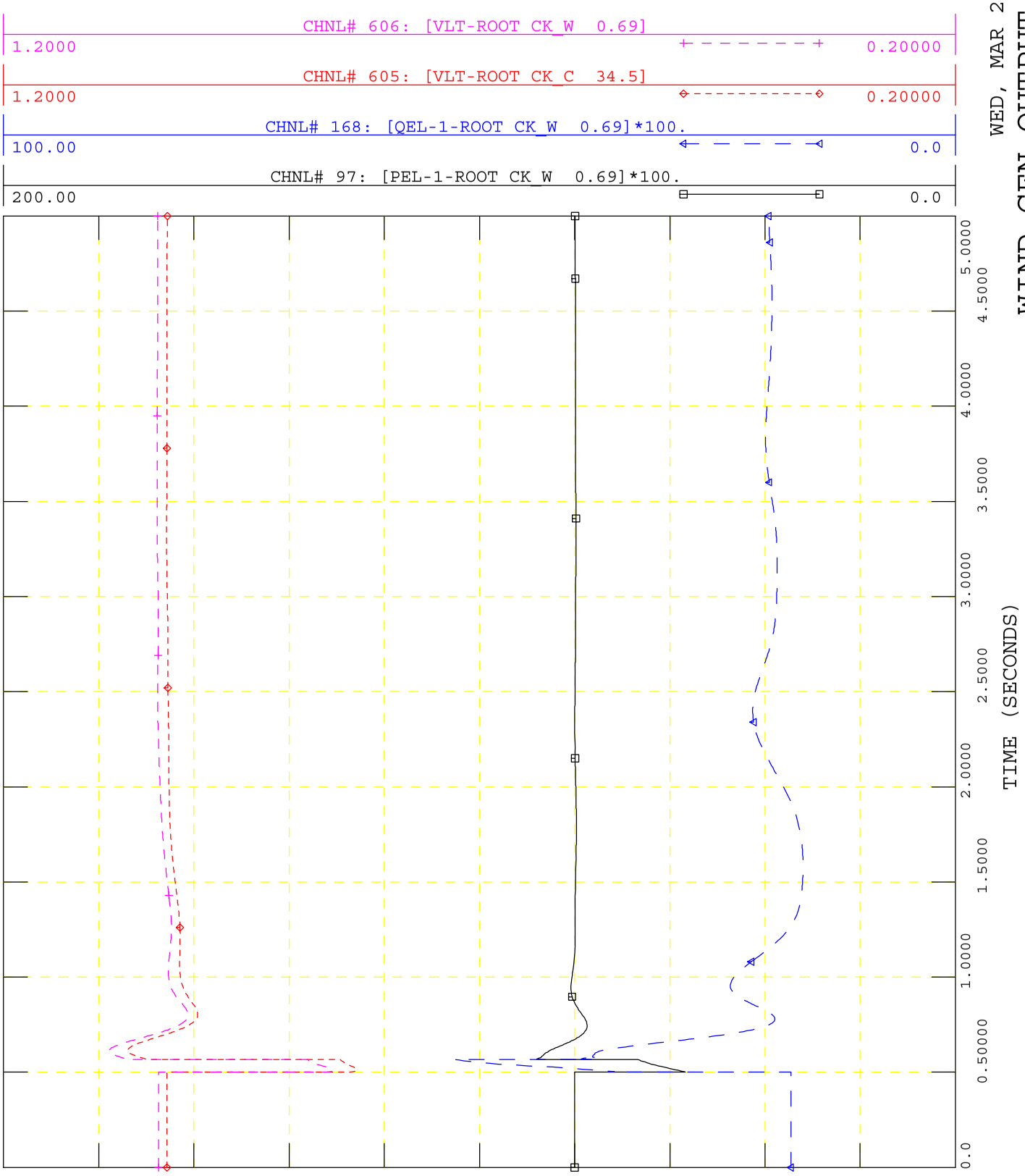

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WED, MAR 28 2018 11:46 PLT 26

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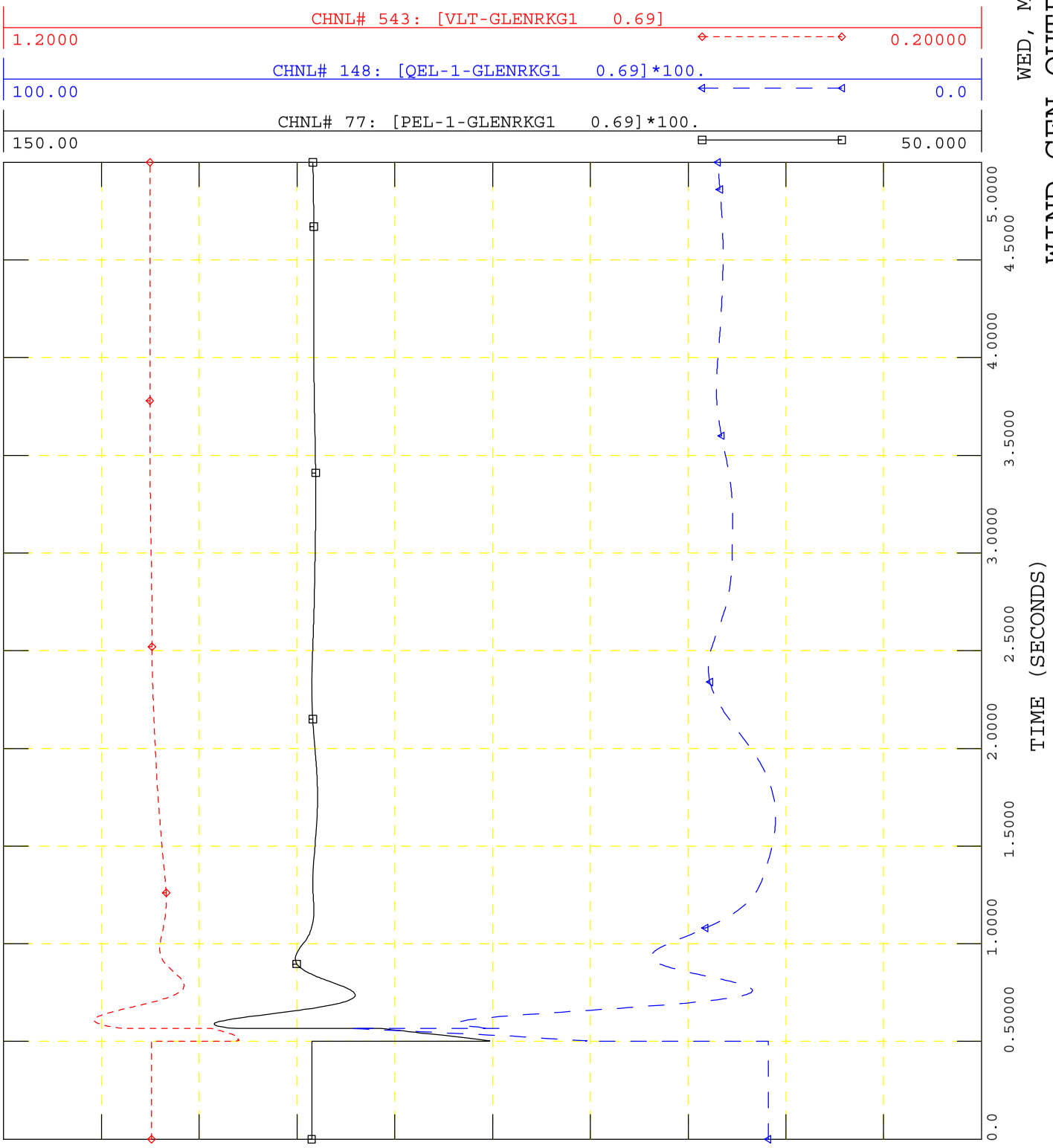

Dynamic Simulation

Case 12 – Loss of Dave Johnston-Amasa 230 kV line

30 cycles	**3 phase Dave Johnston 230 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Dave Johnston-Amasa 230 kV line**
36 cycles	**Remove SVC MVAR limiter**
5 sec.	**Terminate simulation**

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30CY-3PHS DAVE JOHNSTON 230 KV FLT. 34CY-CLR FLT & OPEN
DAVE JOHNSTON-AMASA 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 12
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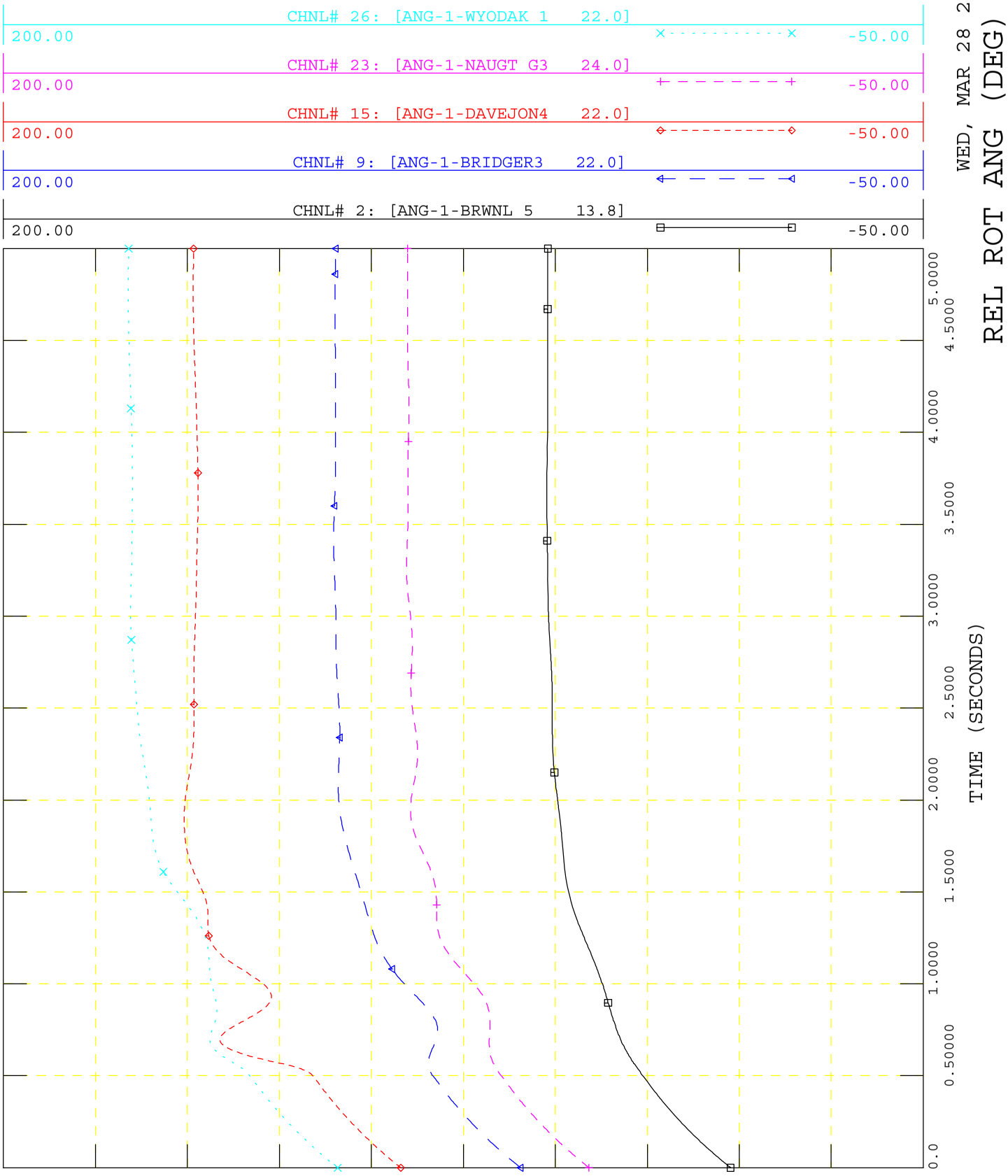

WED, MAR 28 2018 11:46
REL ROT ANG (DEG) PLT 1

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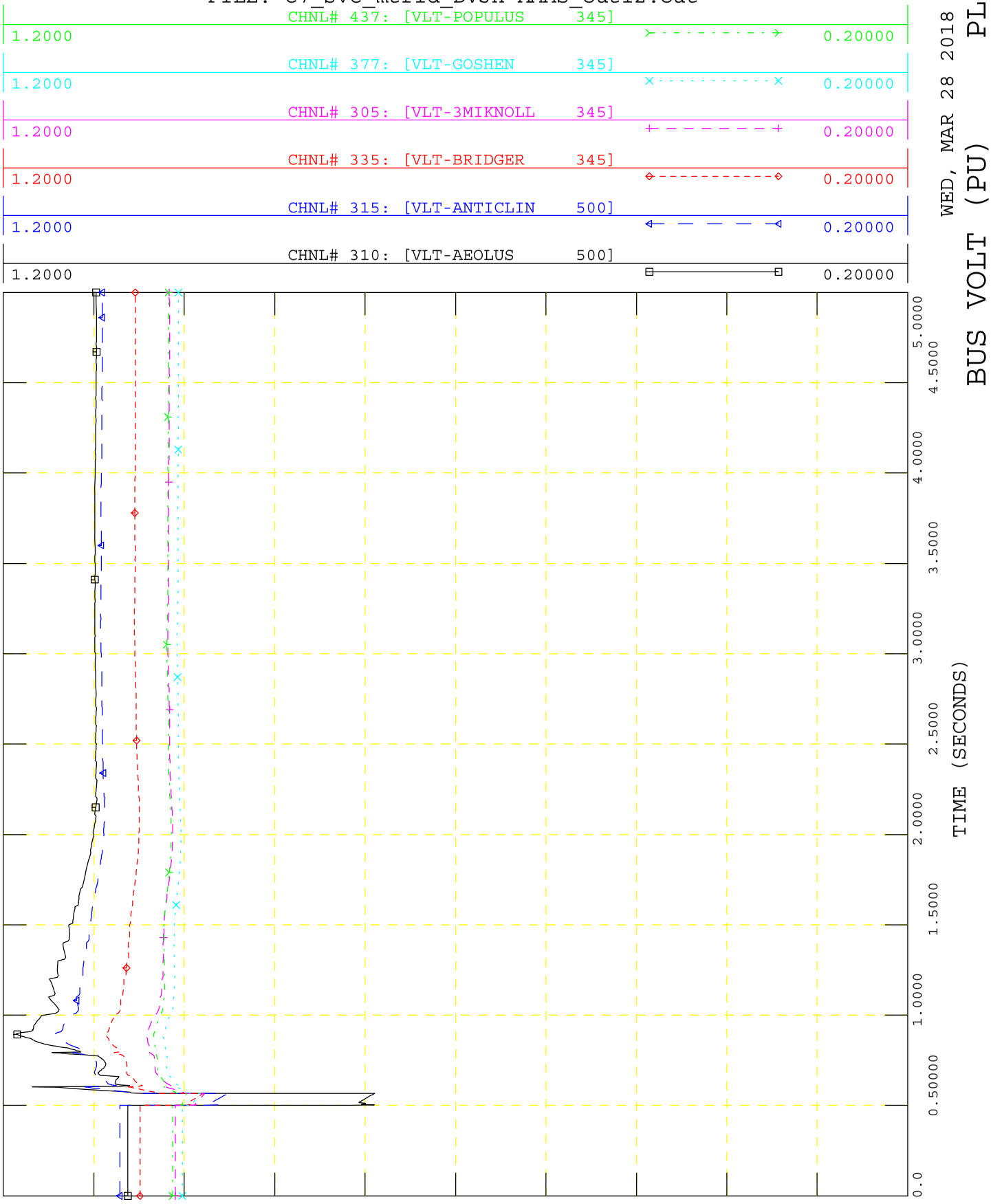
FILE: c7_svc_mtrld_DVJH-AMAS_out12.out



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PLT 2

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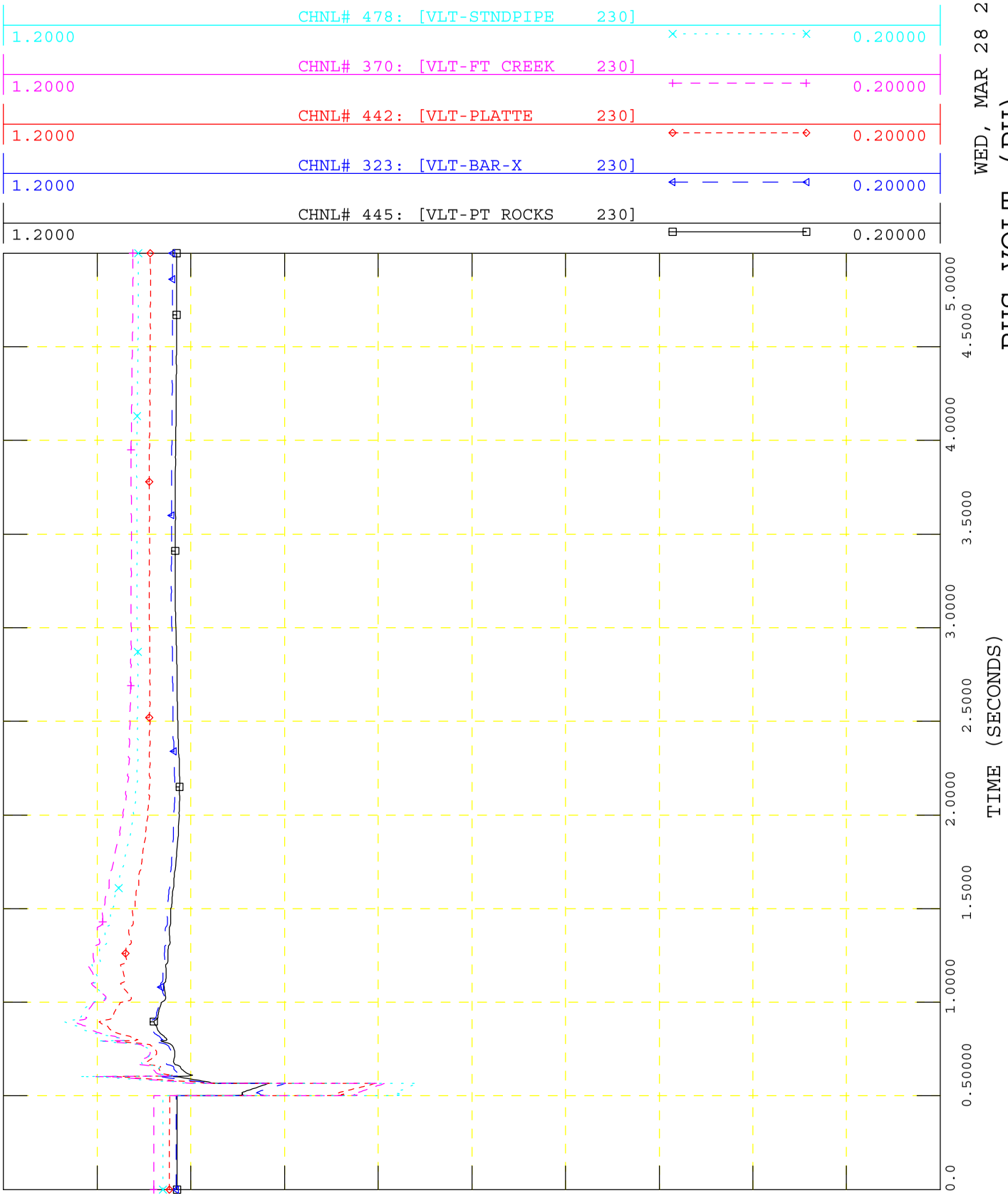
WED, MAR 28 2018 11:46 PLT 3



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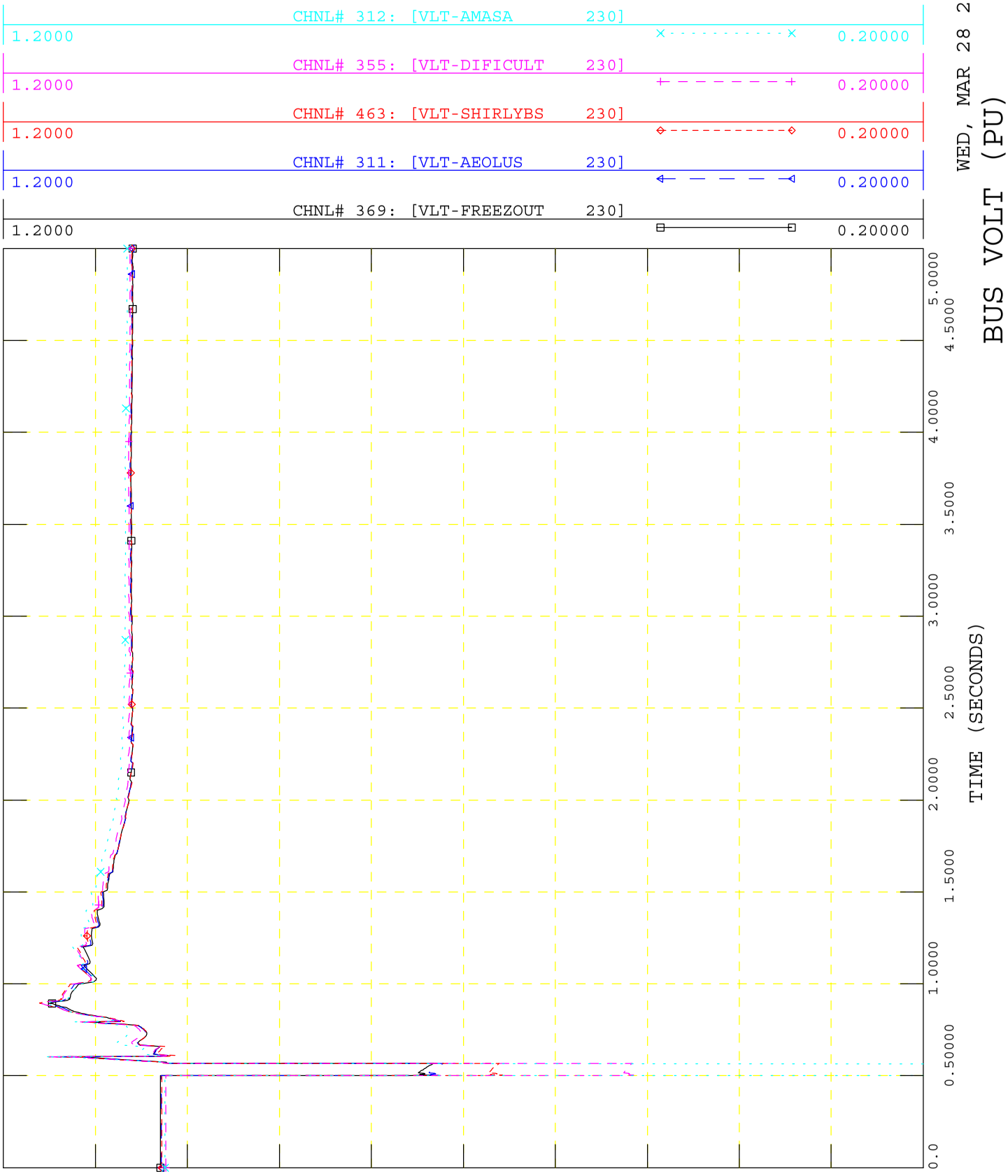
DAVE JOHNSTON-AMASA 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 12
FILE: c7_svc_mtrld_DVJH-AMAS_out12.out



WED, MAR 28 2018 11:46
PLT 4

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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DAVE JOHNSTON-AMASA 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 12
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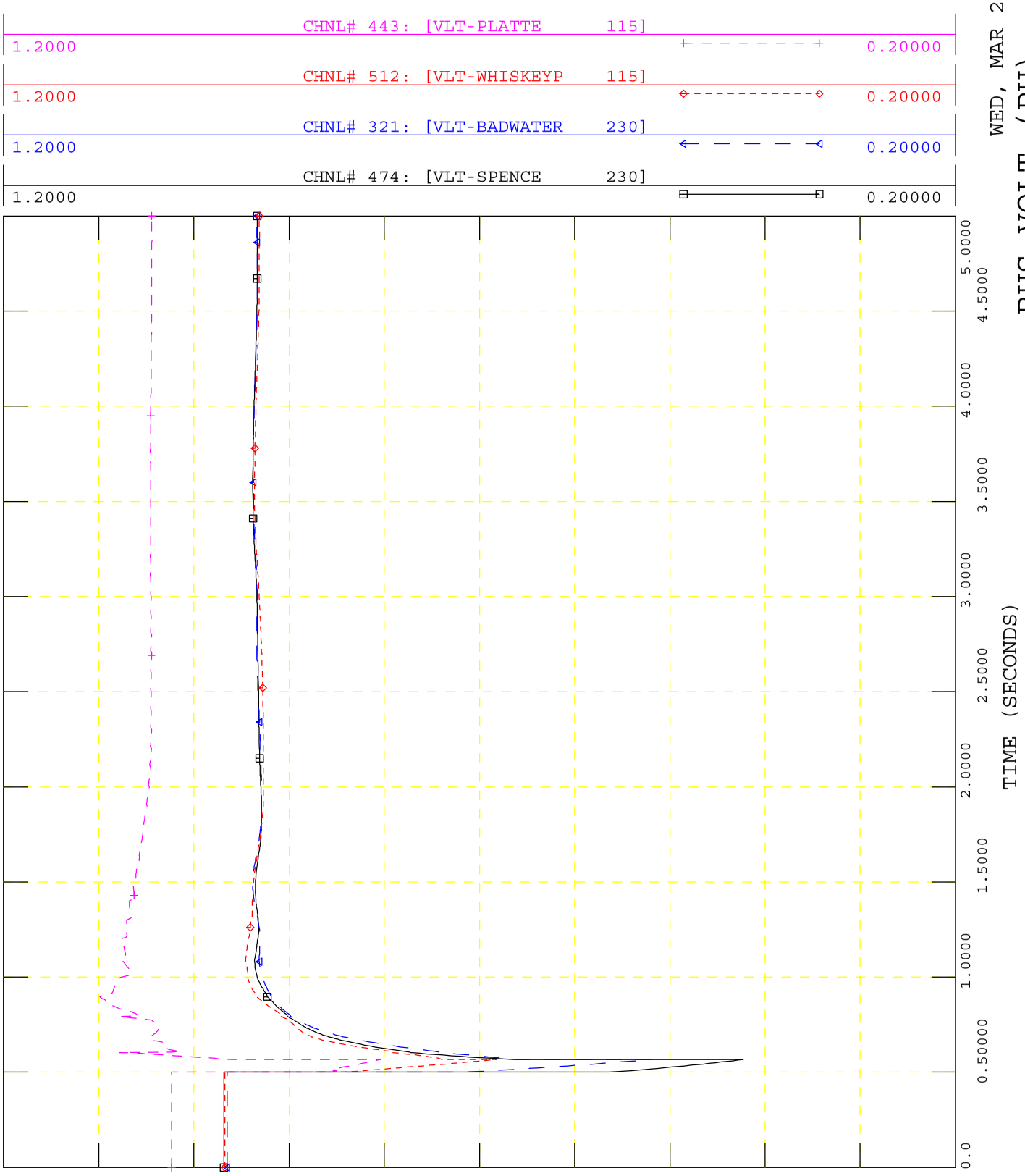
WED, MAR 28 2018 11:46 PLT 5



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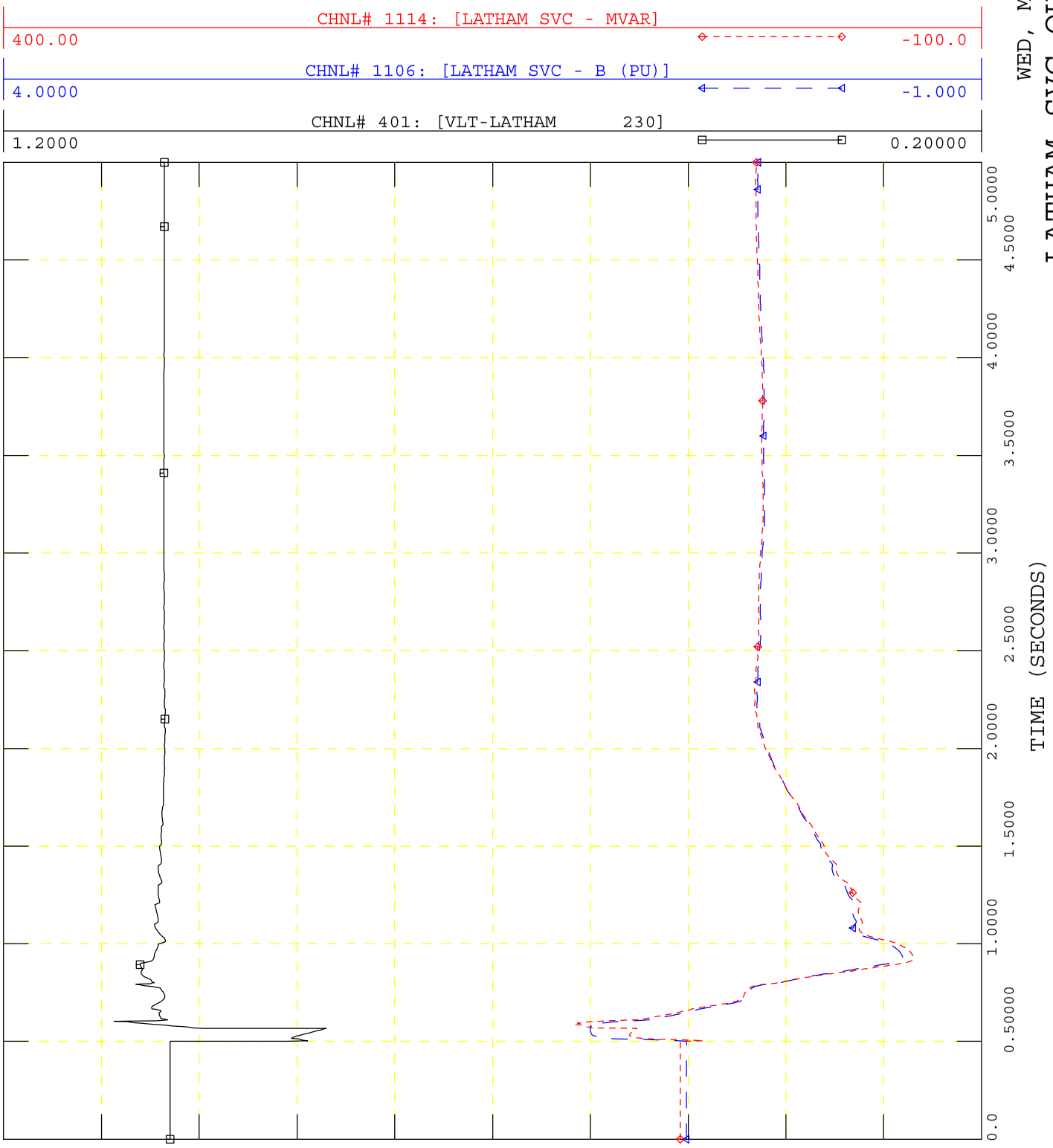
WED, MAR 28 2018 11:46 PLT 6

LATHAM SVC OUT



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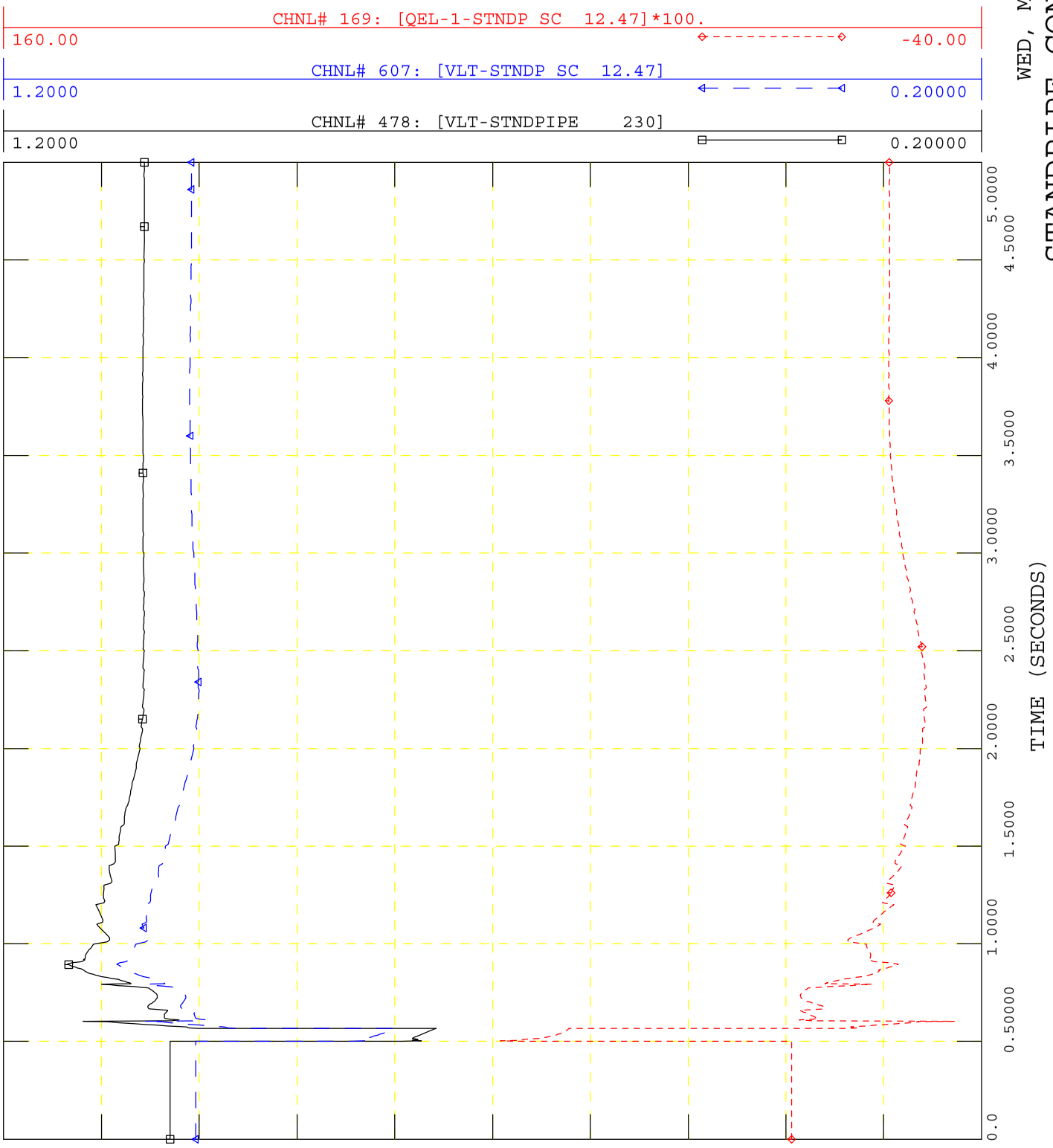
STANDPIPE CONDNSR PLT 7



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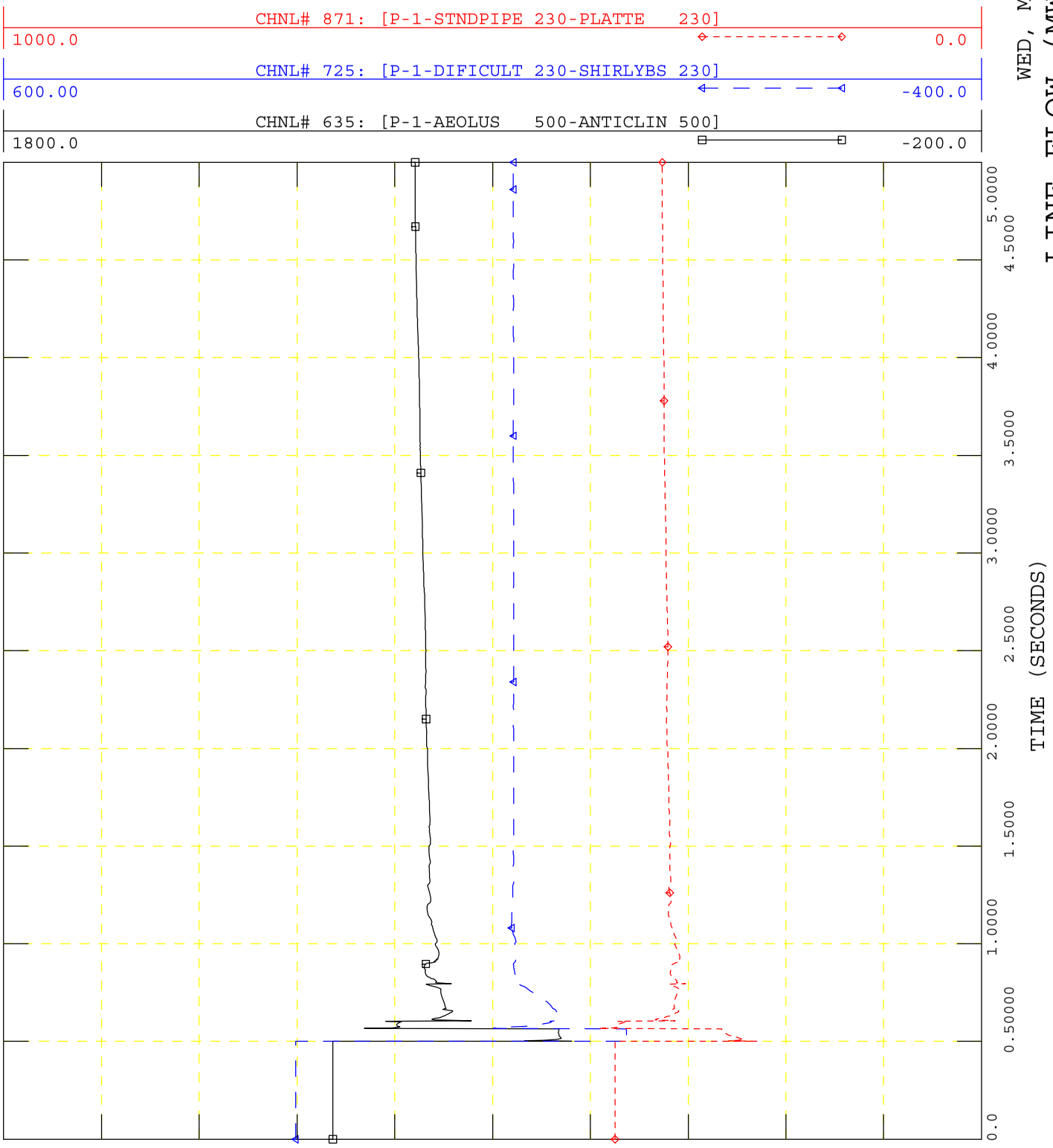
WED, MAR 28 2018 11:46 PLT 8

LINE FLOW (MW)



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WED, MAR 28 2018 11:46 PLT 9

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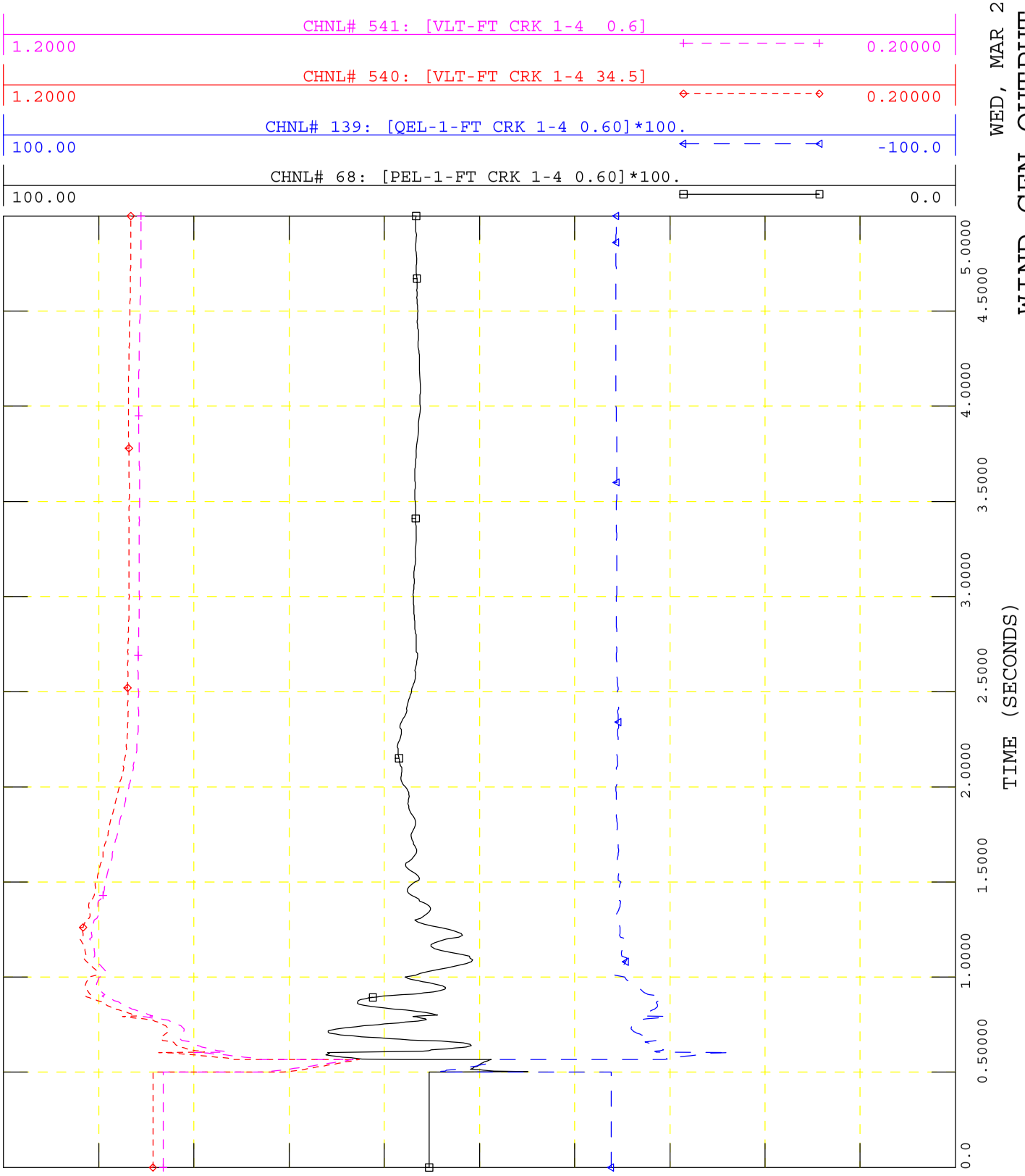

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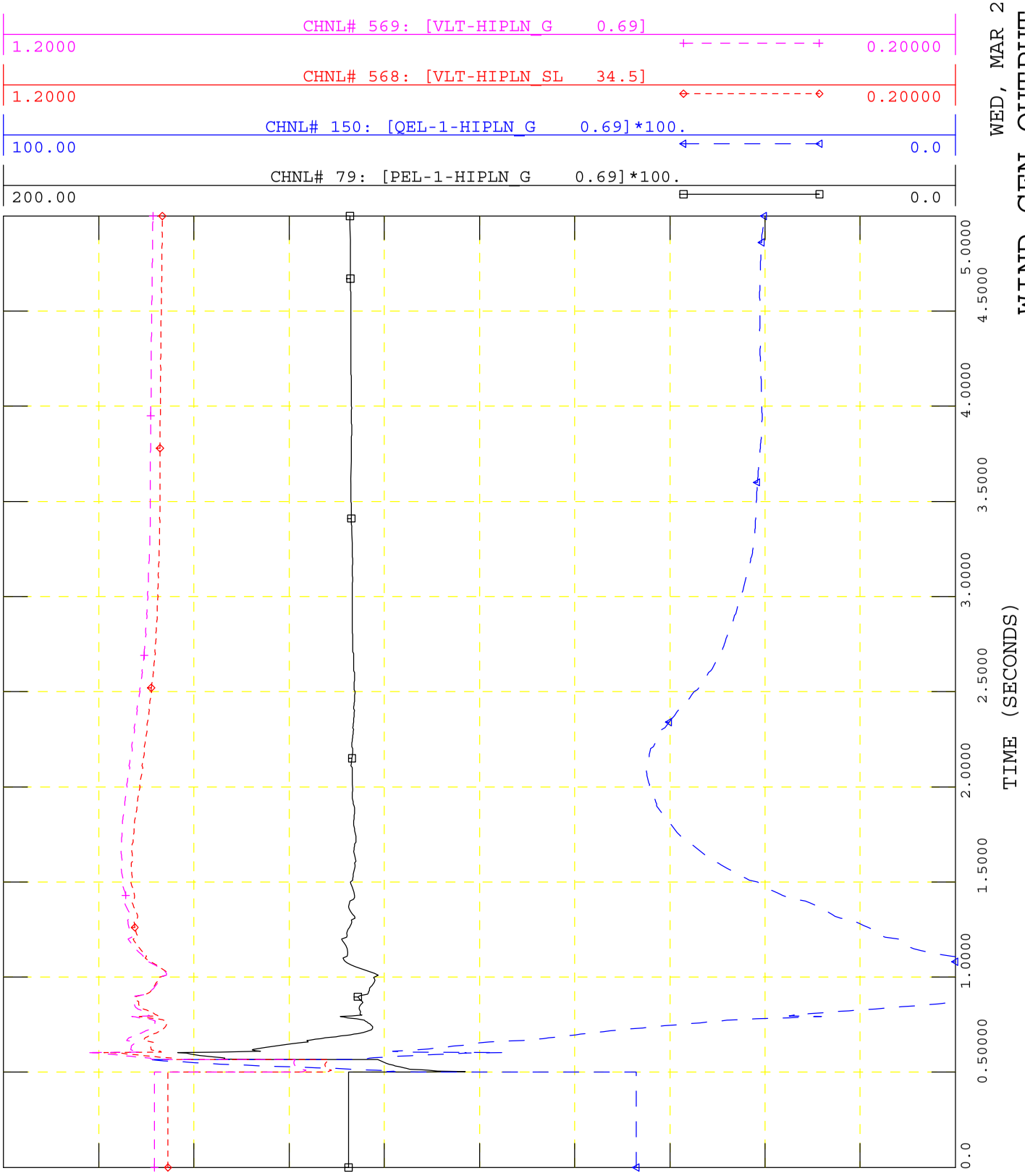

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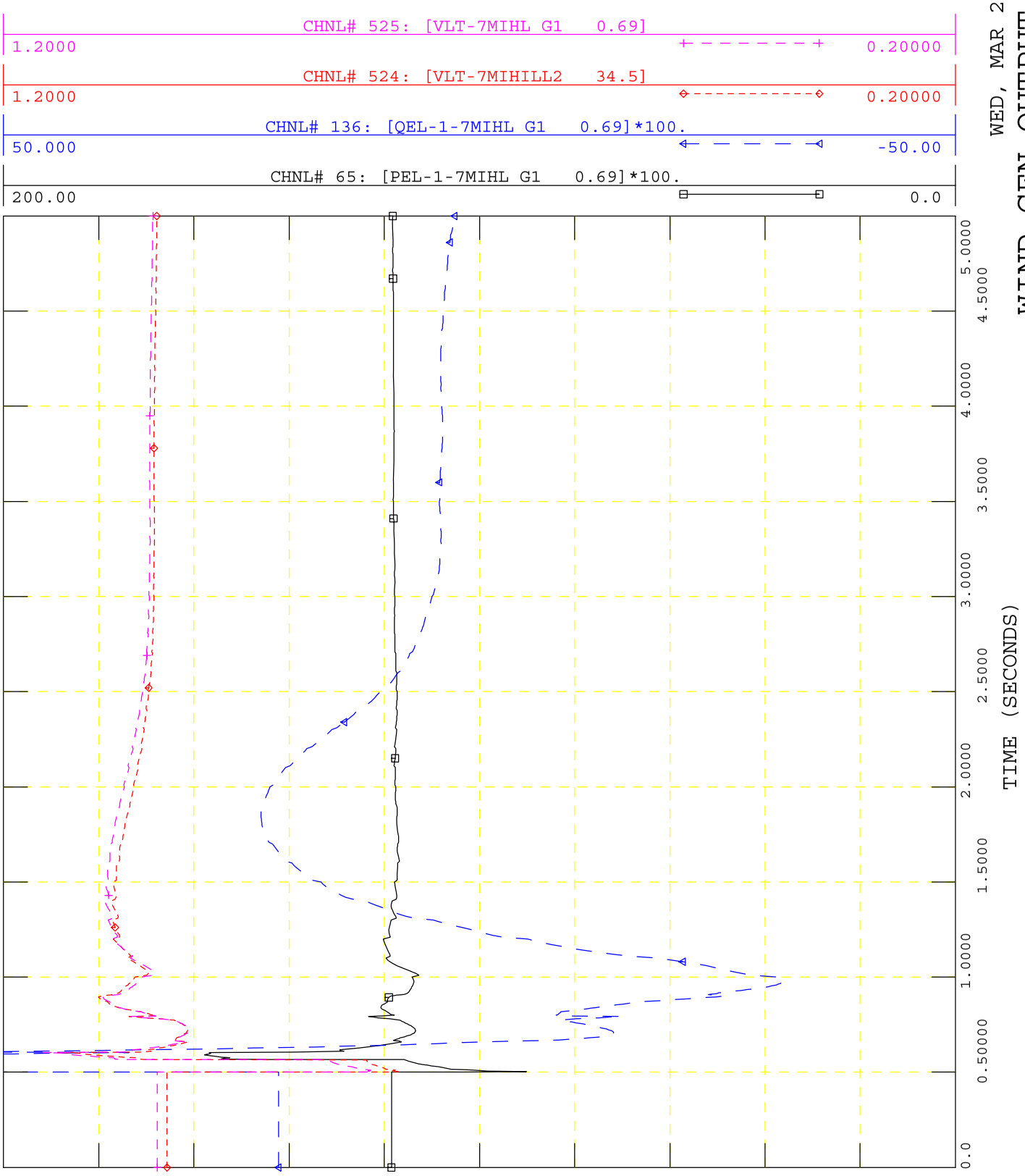

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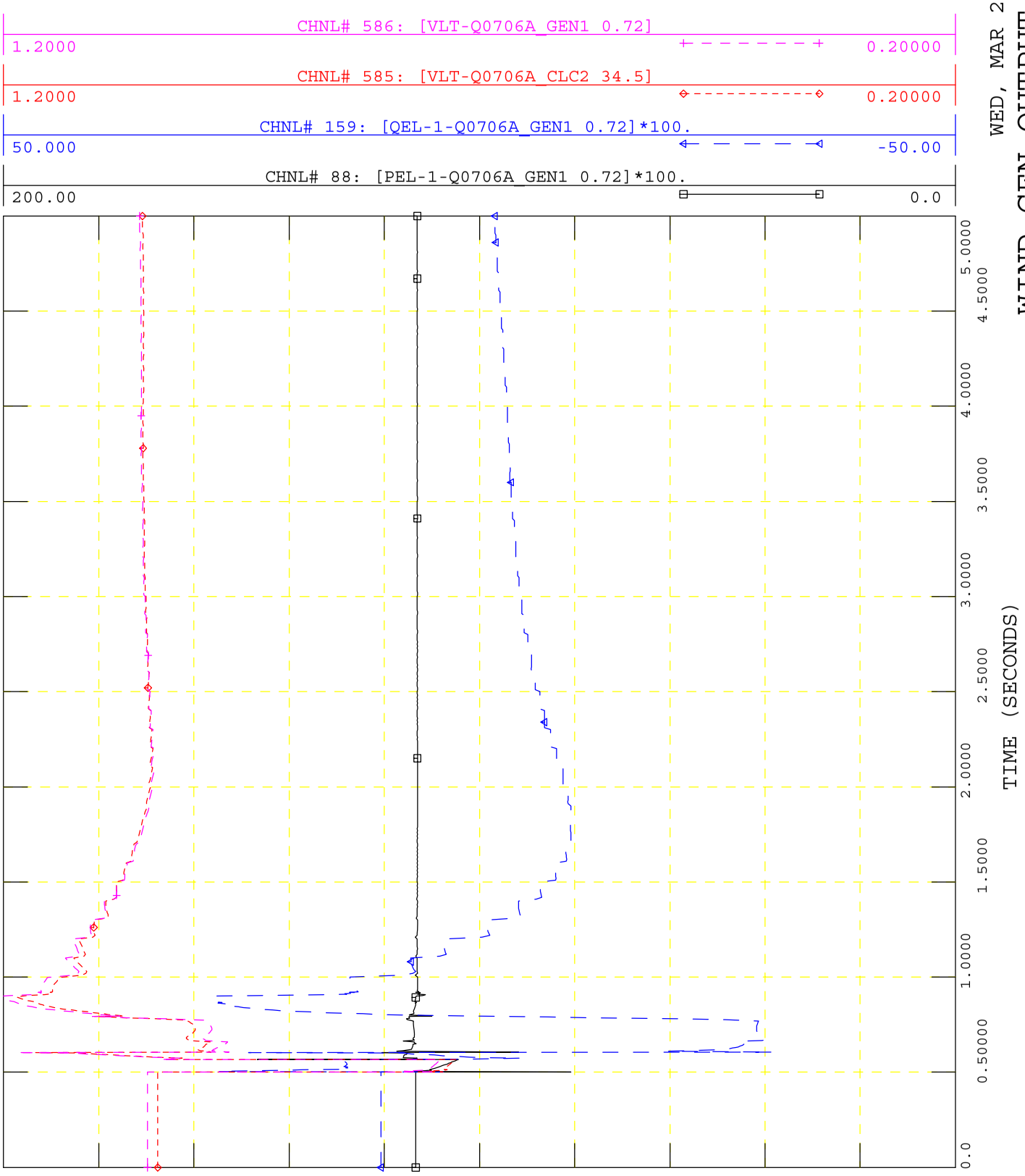

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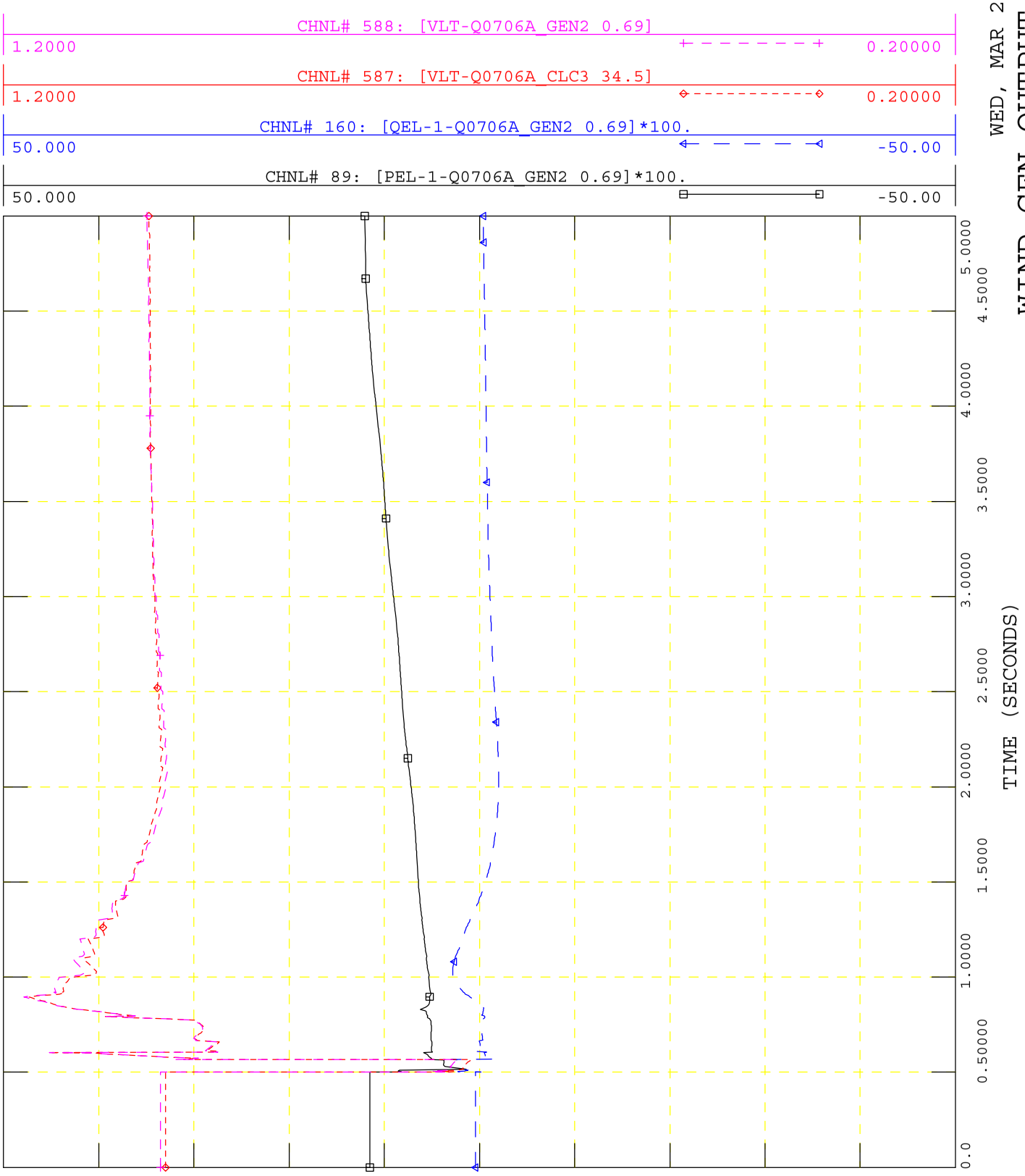

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WED, MAR 28 2018 11:46 PLT 14

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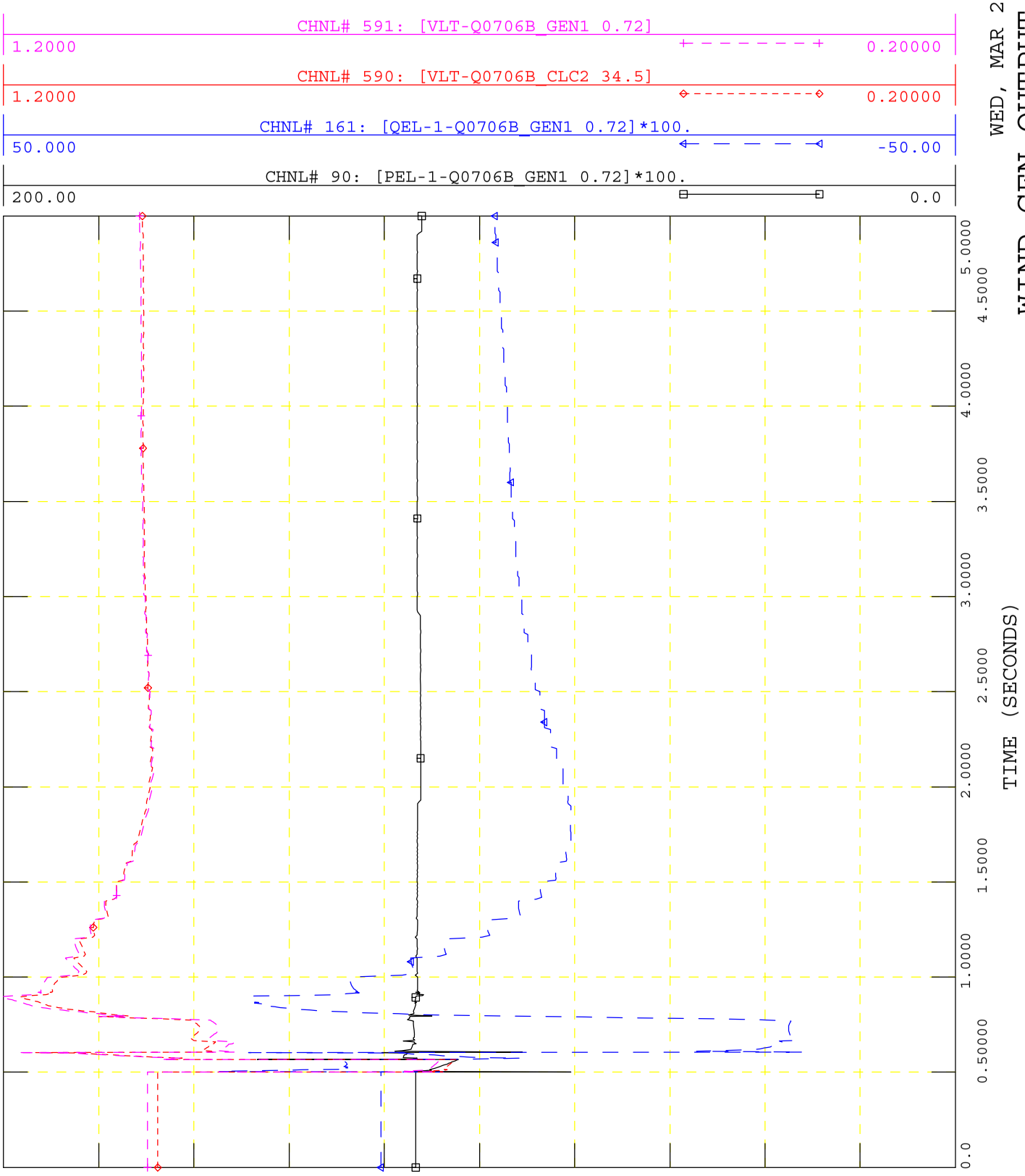

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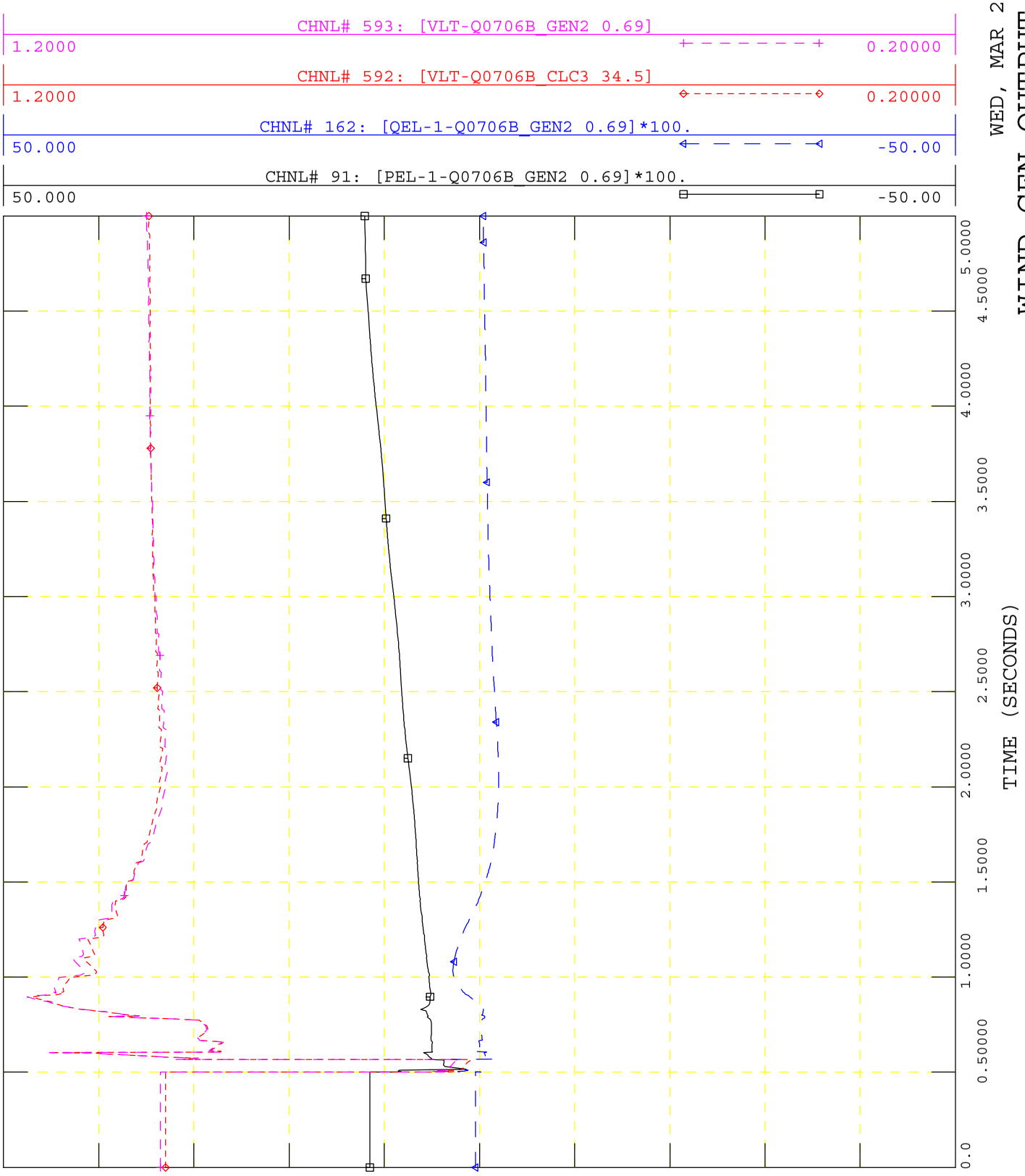

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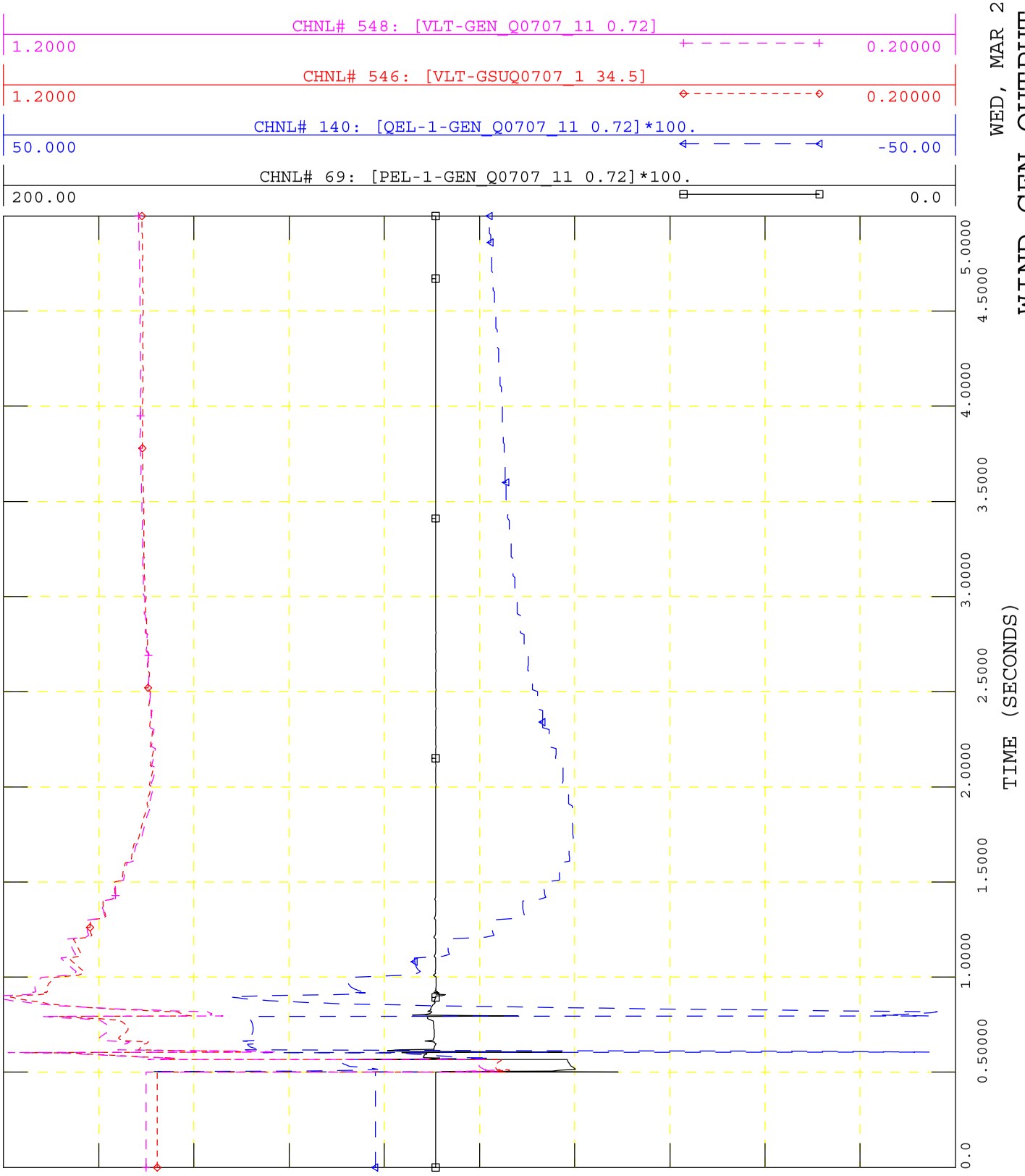

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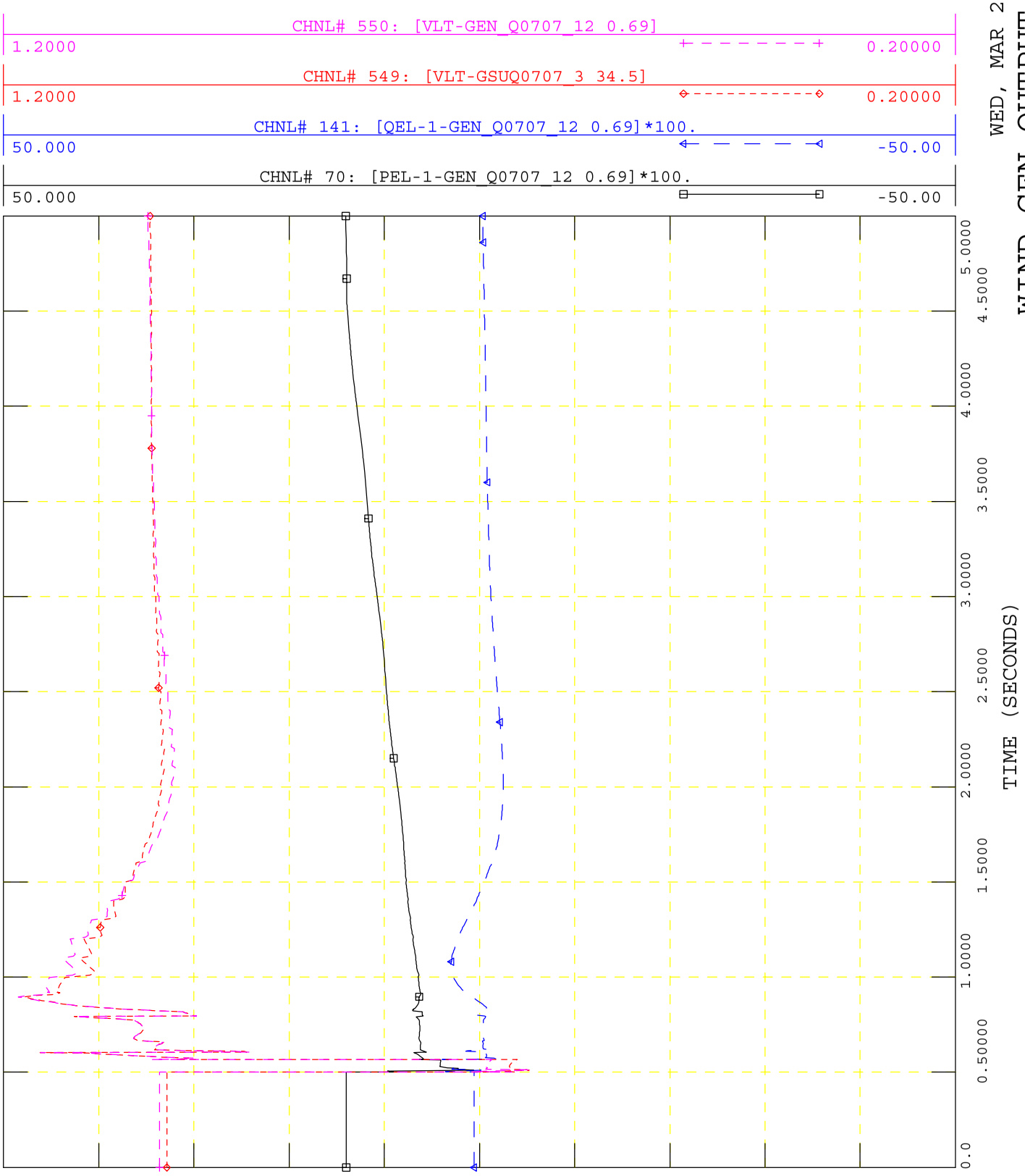

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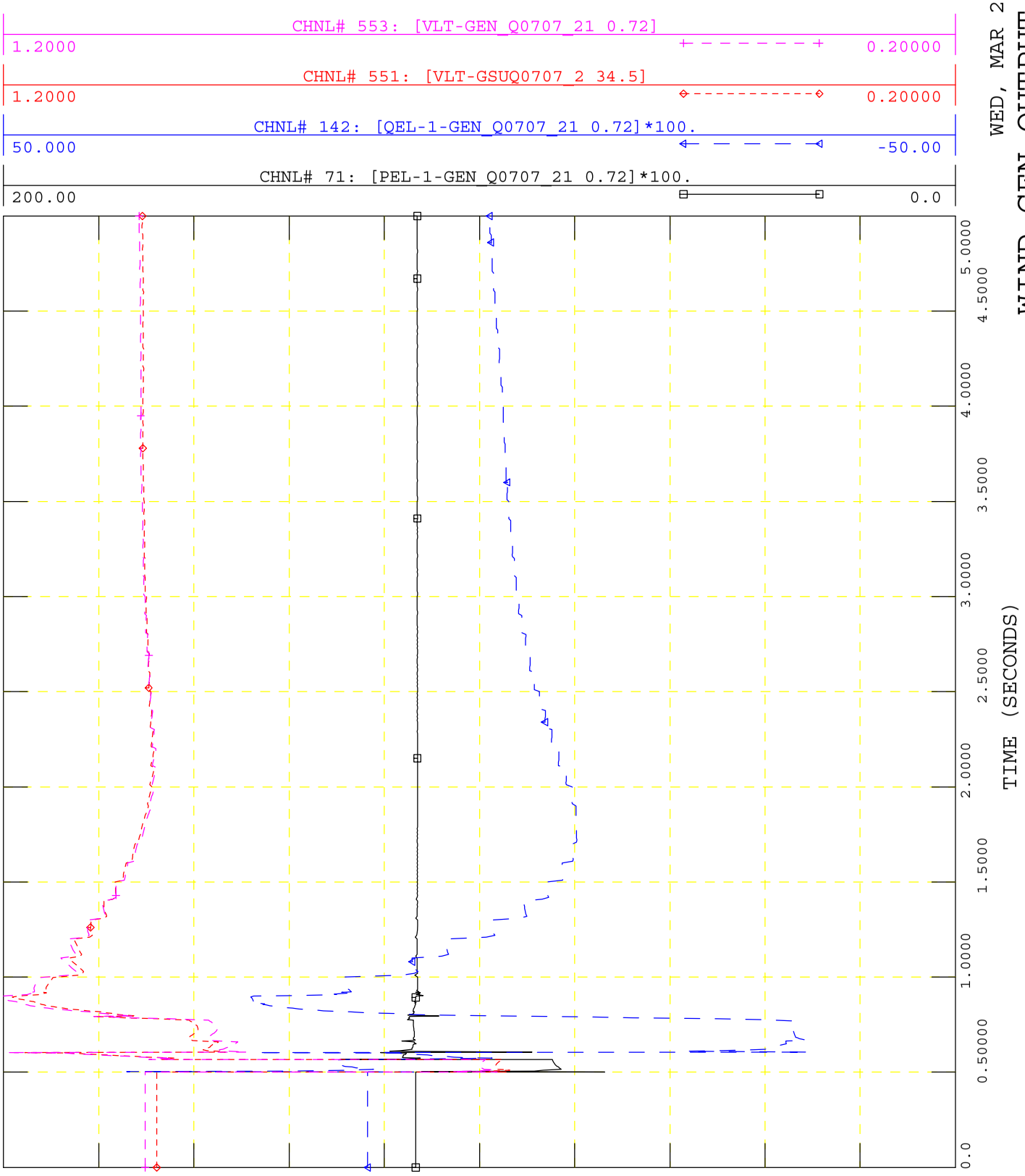

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WED, MAR 28 2018 11:46 PLT 19

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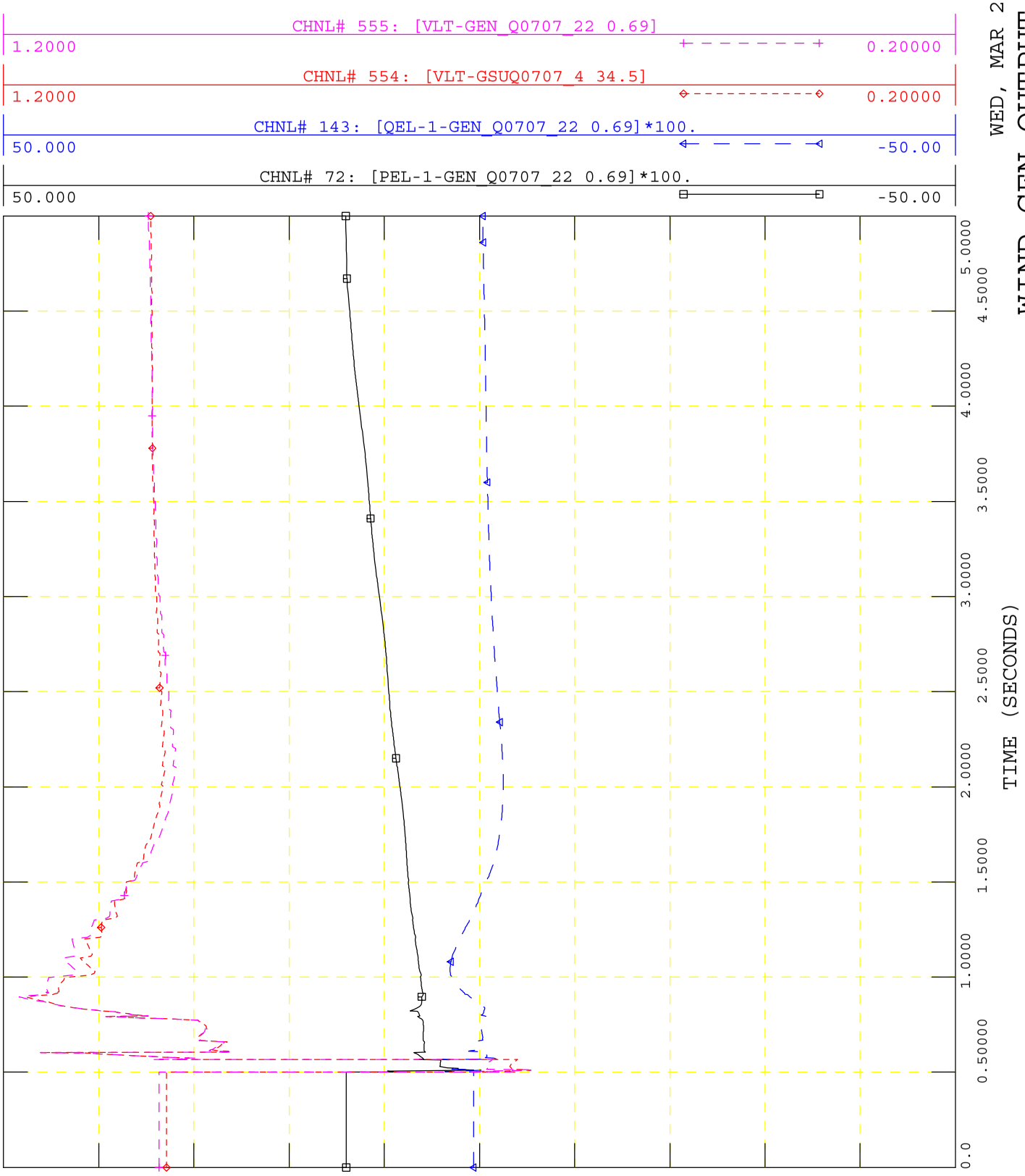

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WED, MAR 28 2018 11:46 PLT 20

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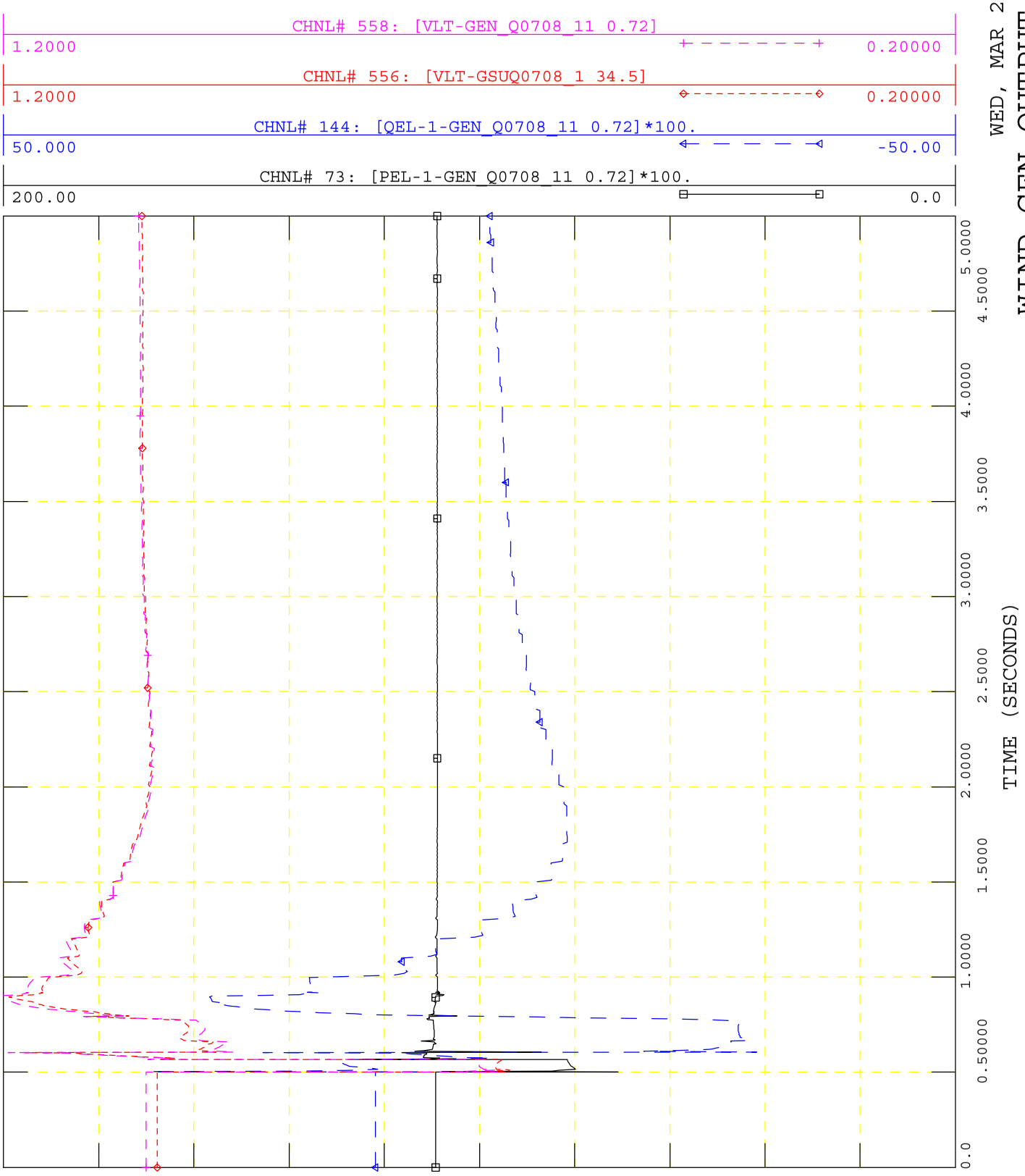

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WED, MAR 28 2018 11:46 PLT 21

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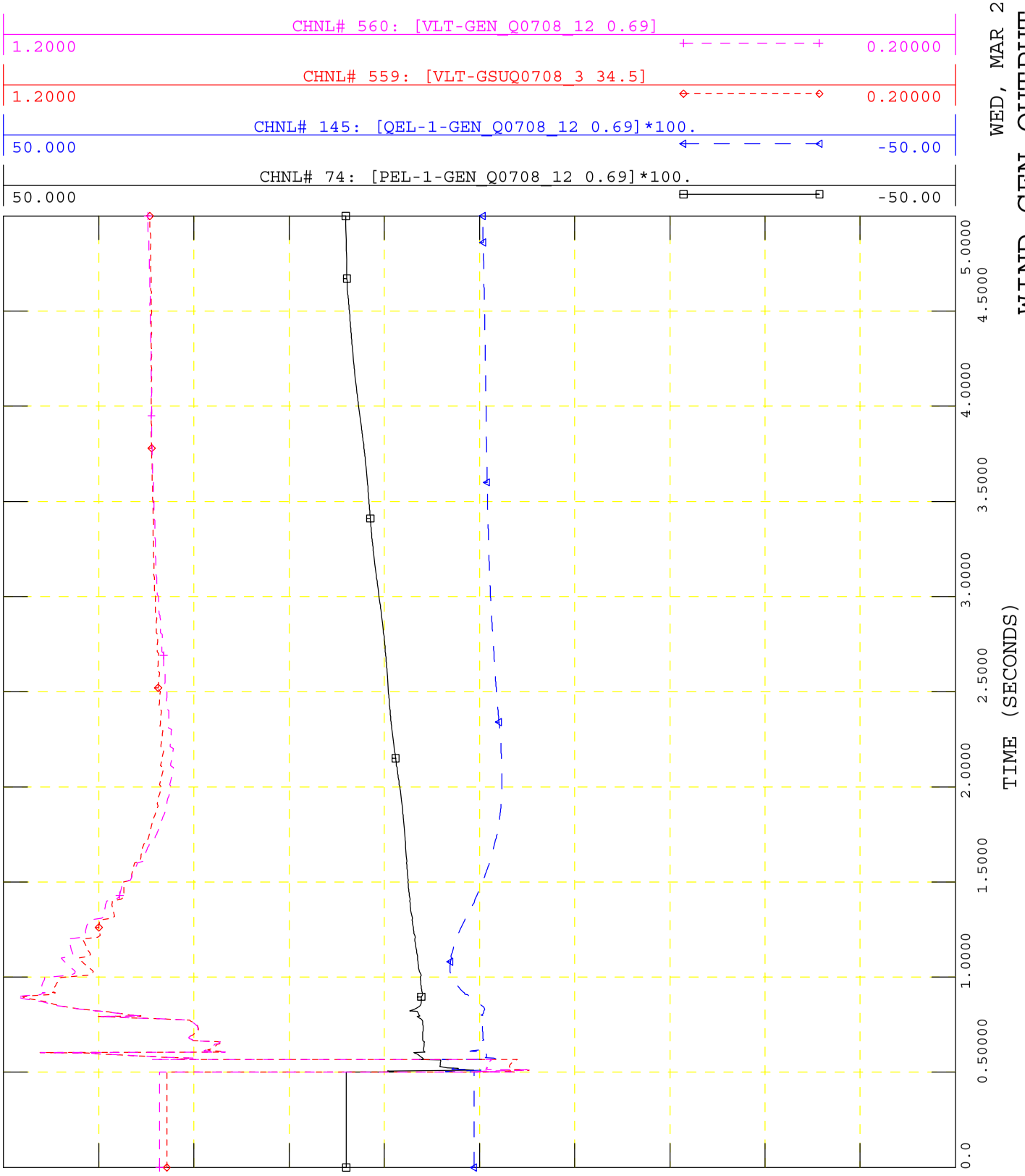

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WED, MAR 28 2018 11:46 PLT 22

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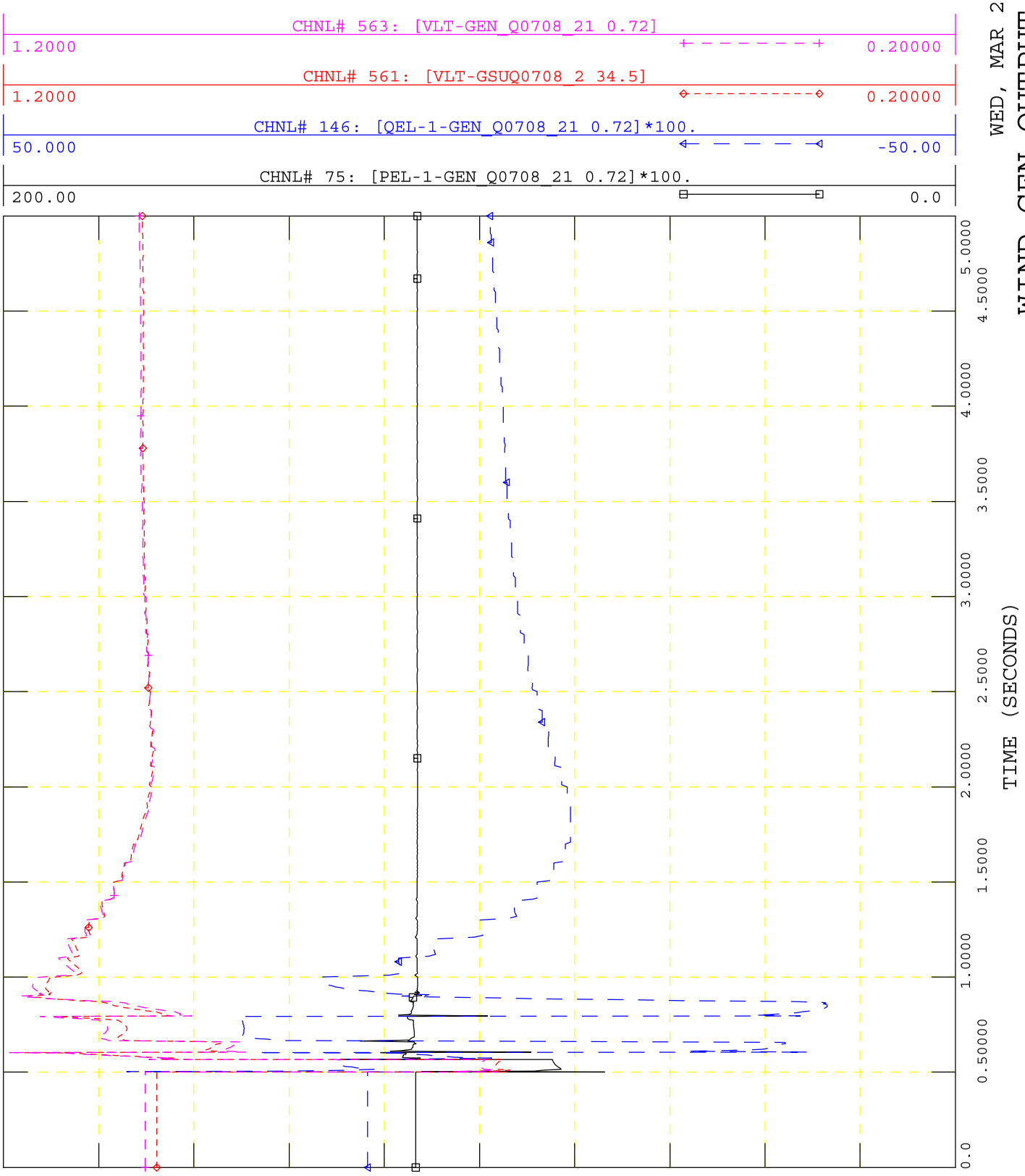

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WED, MAR 28 2018 11:46 PLT 23

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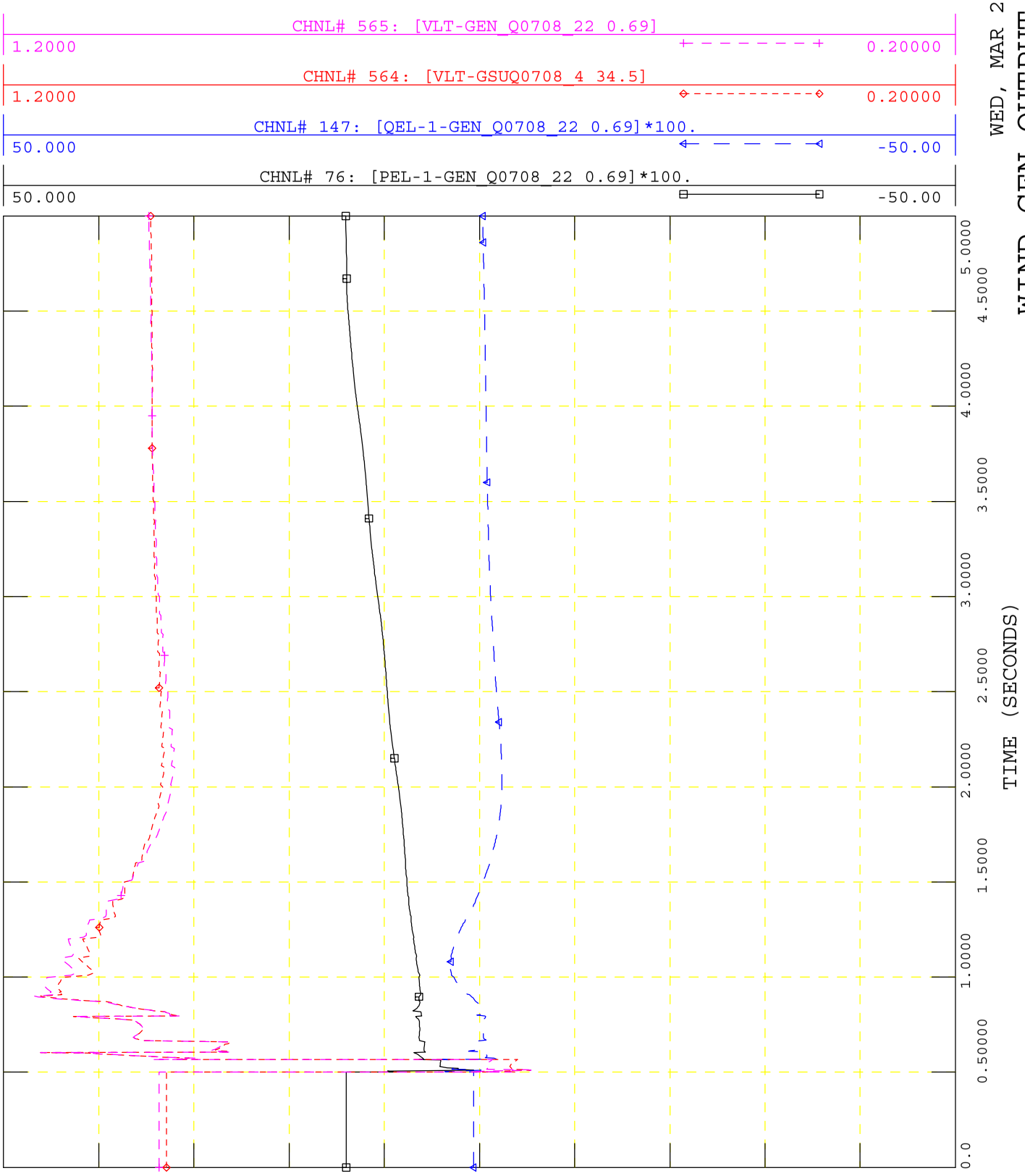

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WED, MAR 28 2018 11:46 PLT 24

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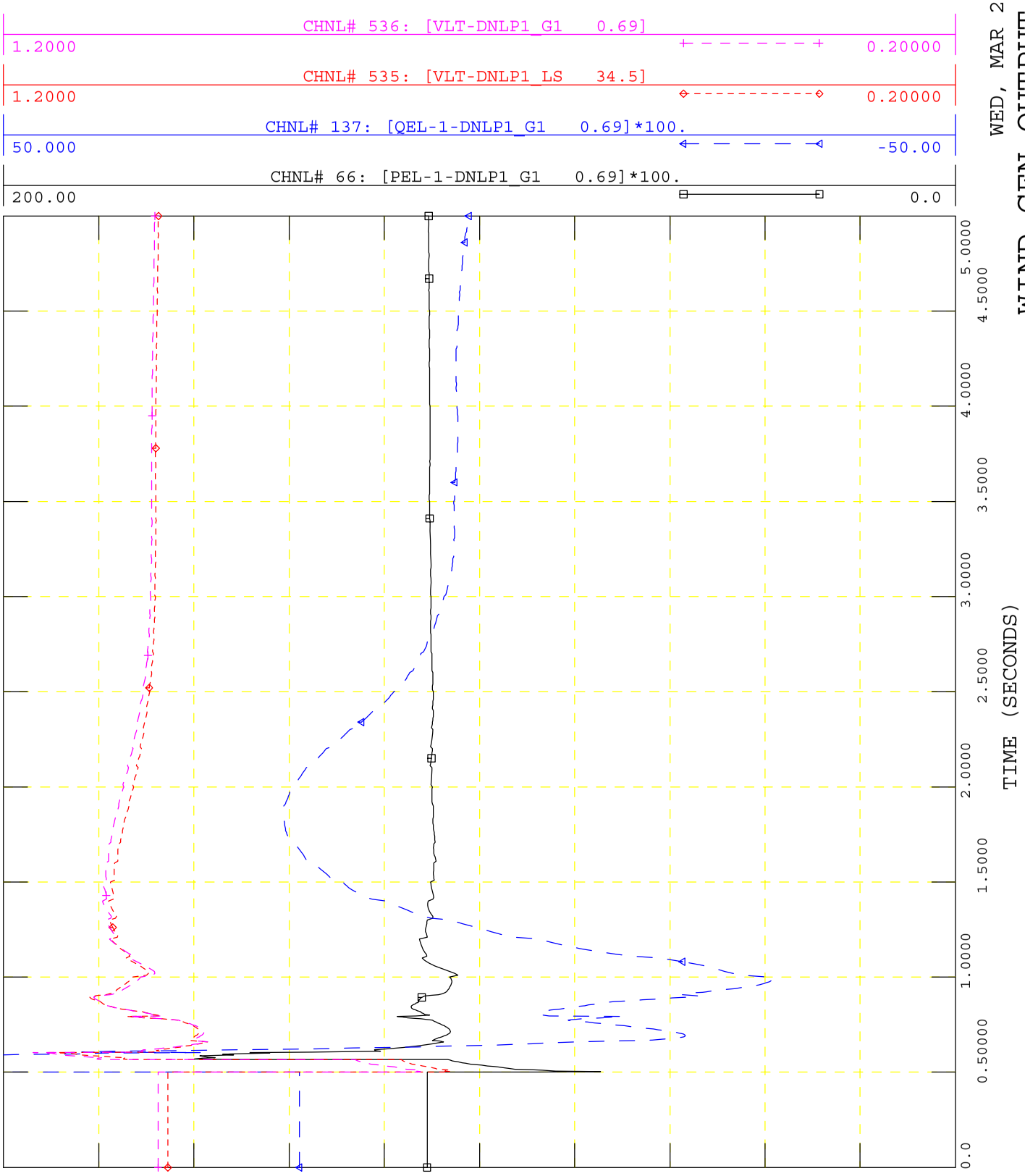

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WED, MAR 28 2018 11:46 PLT 25

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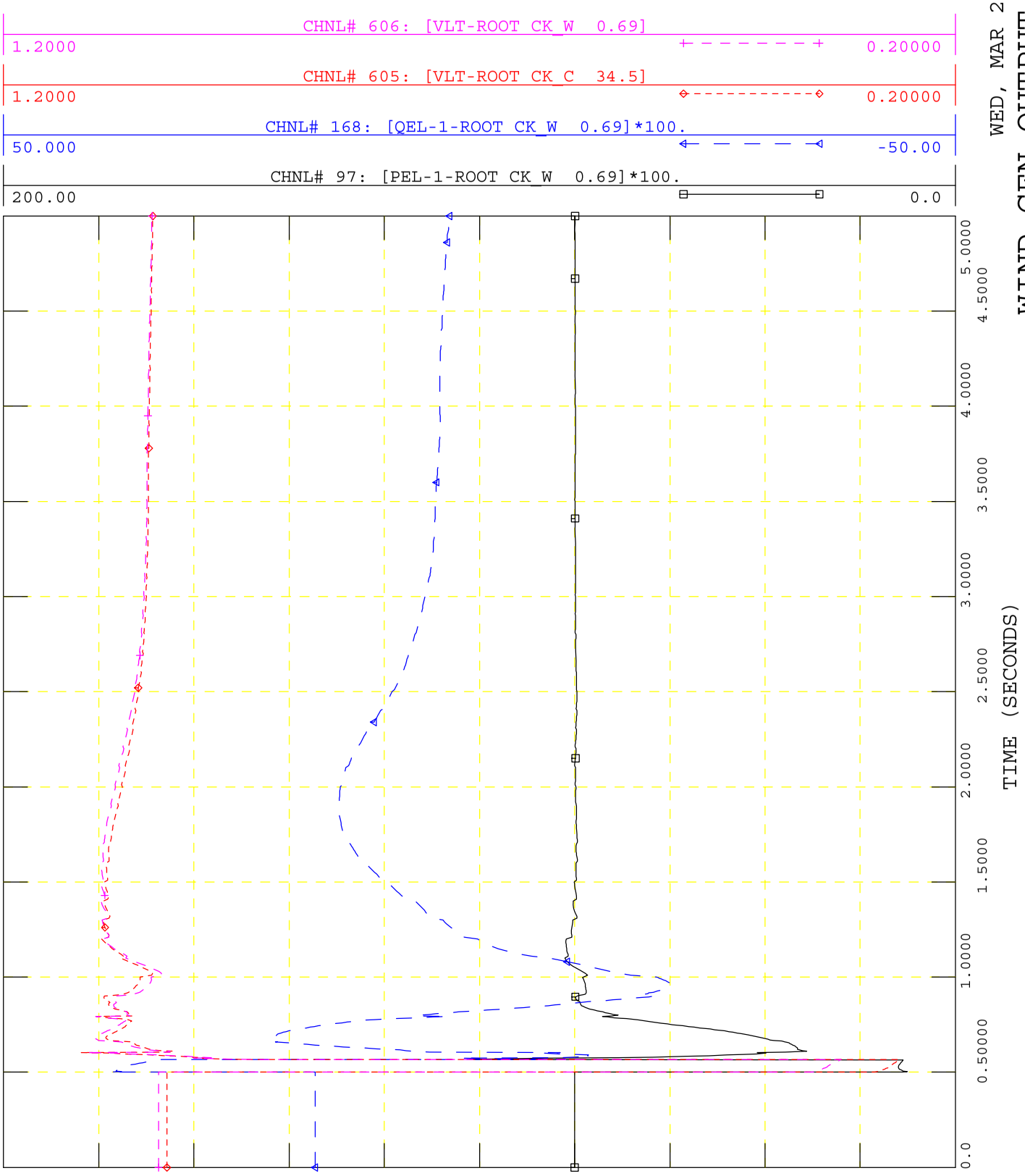

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FILE: c7_svc_mtrld_DVJH-AMAS_out12.out

WED, MAR 28 2018 11:46 PLT 26

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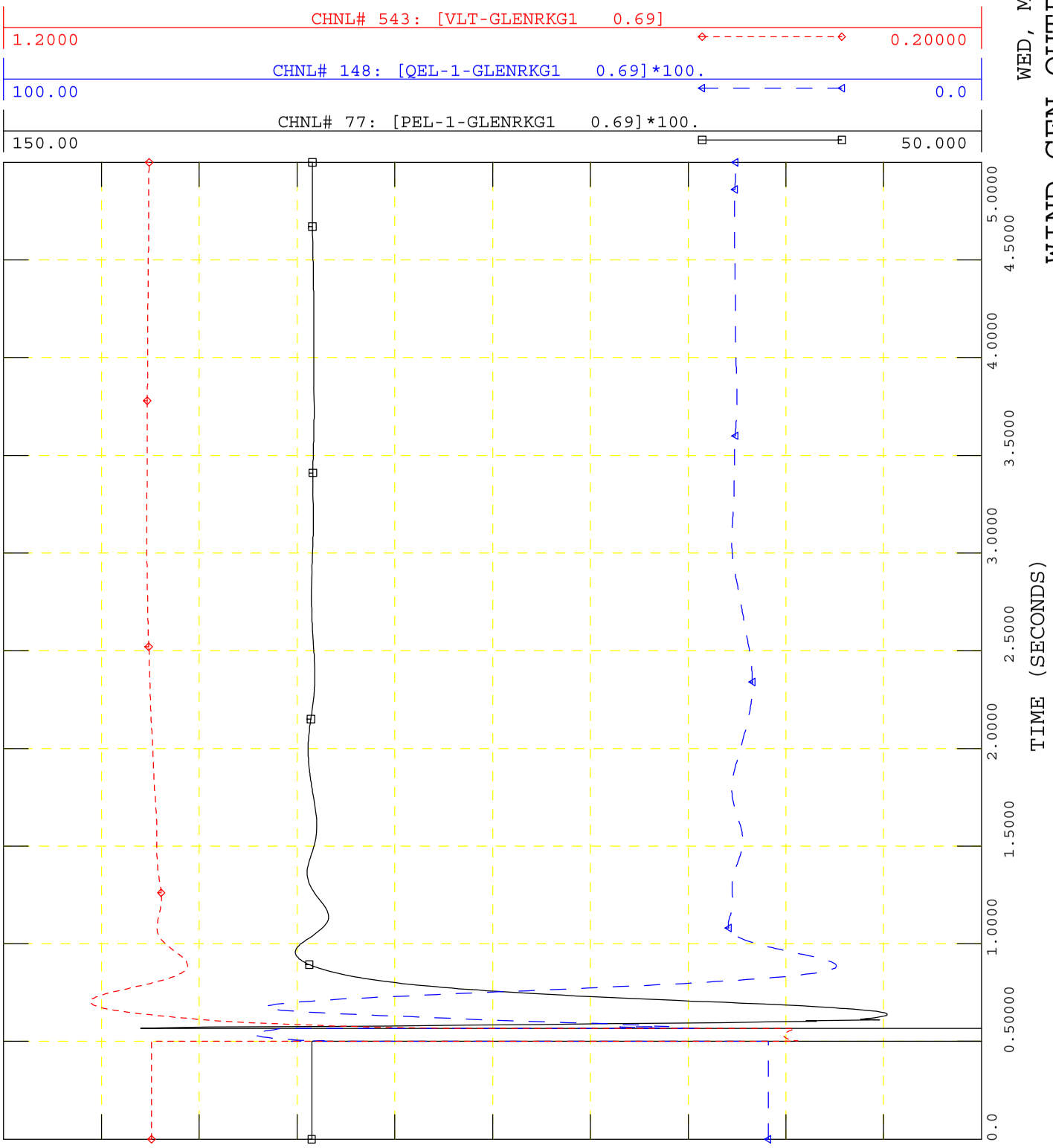

Dynamic Simulation

Case 13 – Loss of Casper PP-Spence 230 kV line

30cycles	**3 phase Casper PP 230 kV fault, limit SVC to 100 MVAR**
34 cycles	**Clear fault and open Casper PP-Spence 230 kV line**
36 cycles	**Remove SVC MVAR limiter**
5 sec.	**Terminate simulation**

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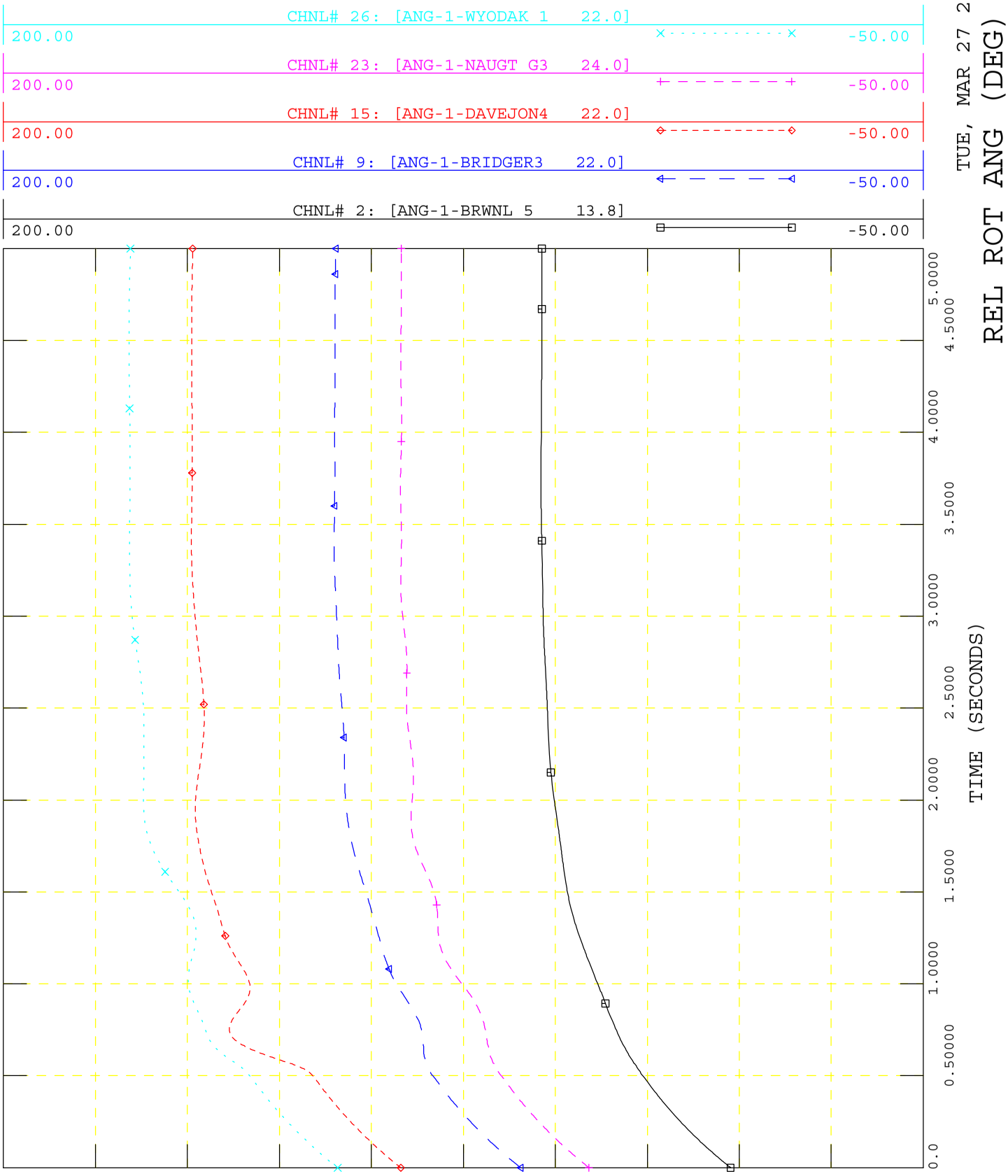
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
FILE: c7_svc_mtrld_CSPR-SPEN_out13.out



TUE, MAR 27 2018 21:29
REL ROT ANG (DEG) PLT 1

2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
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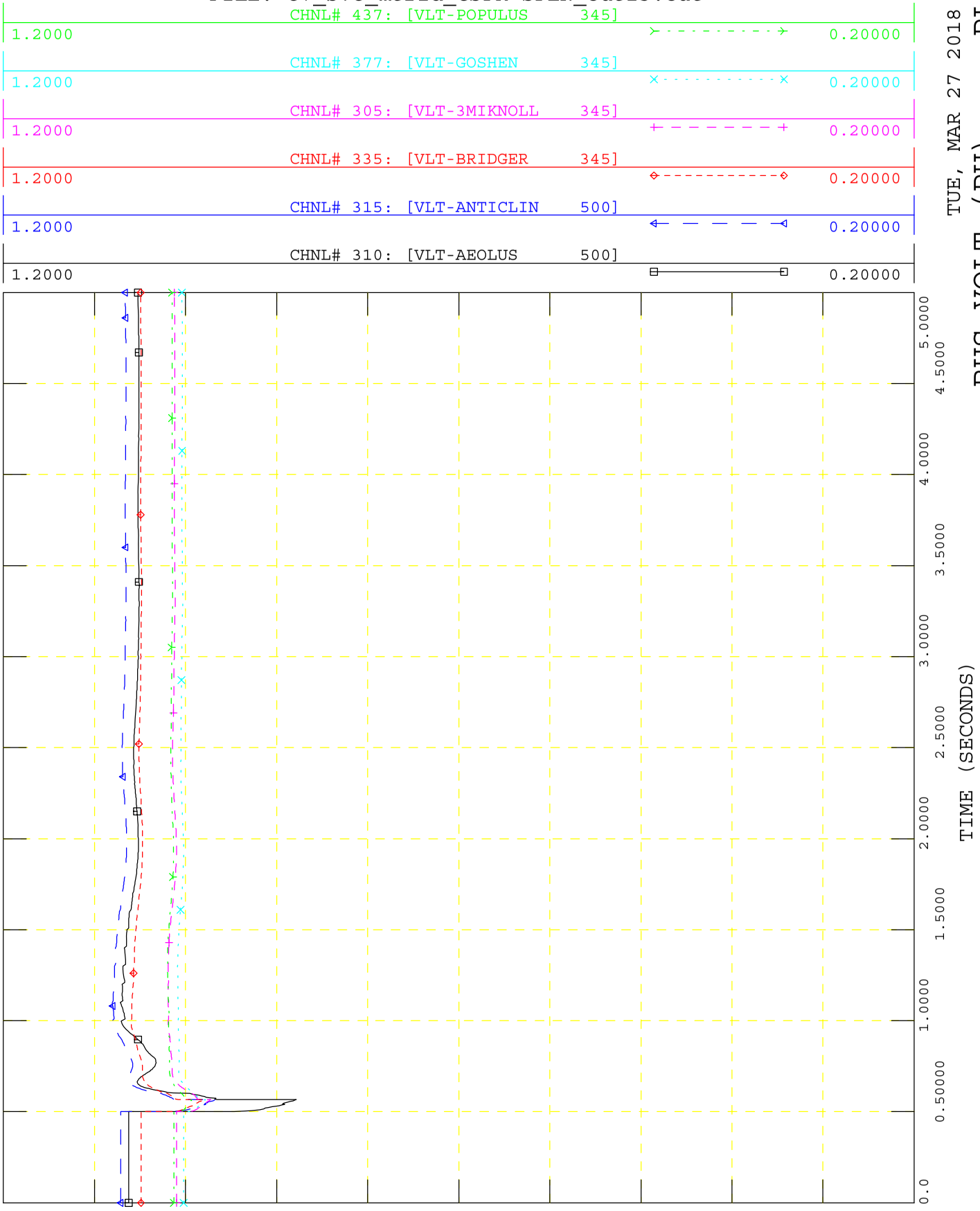
TUE, MAR 27 2018 21:29 PLT 2



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CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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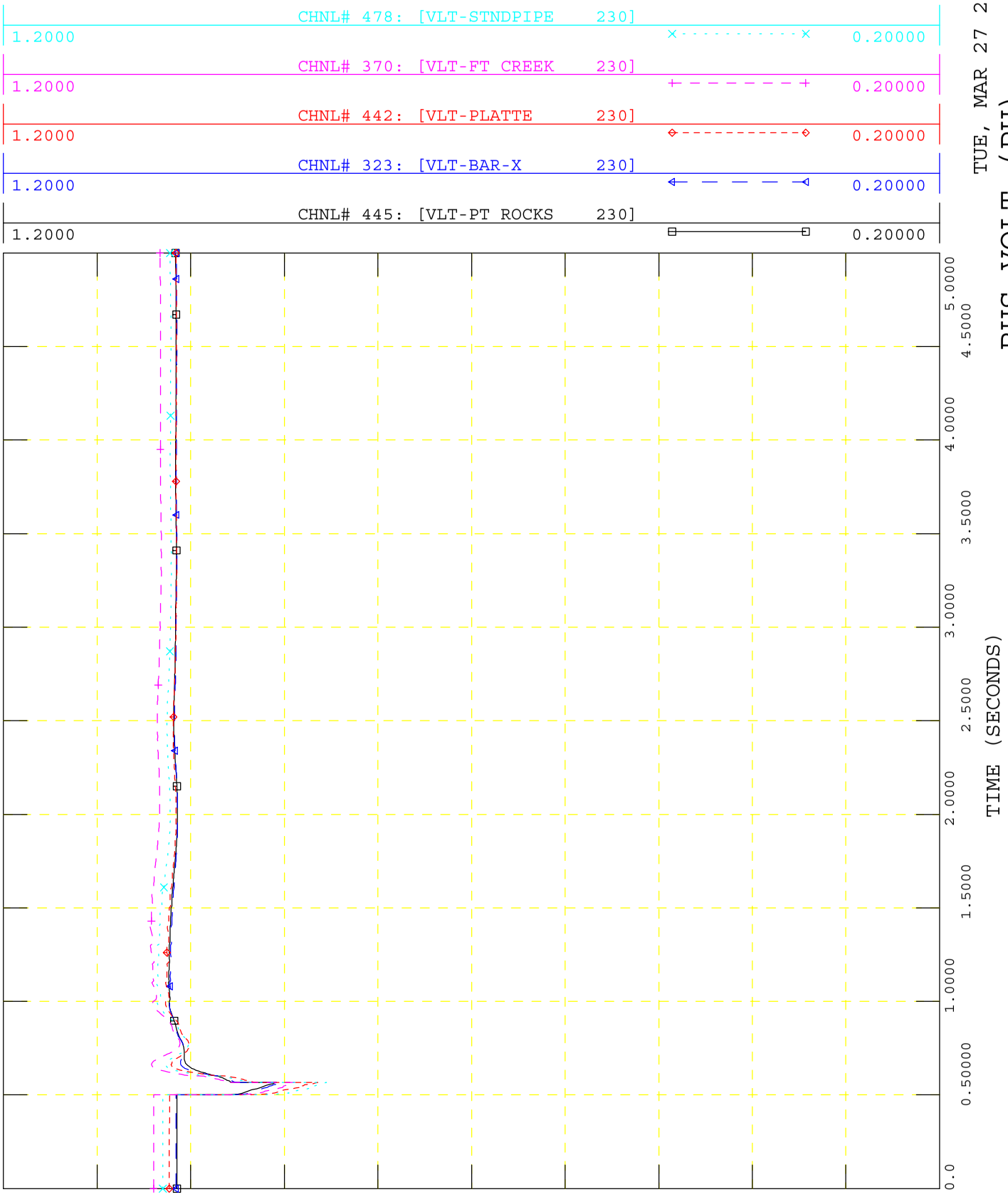
TUE, MAR 27 2018 21:29 PLT 3



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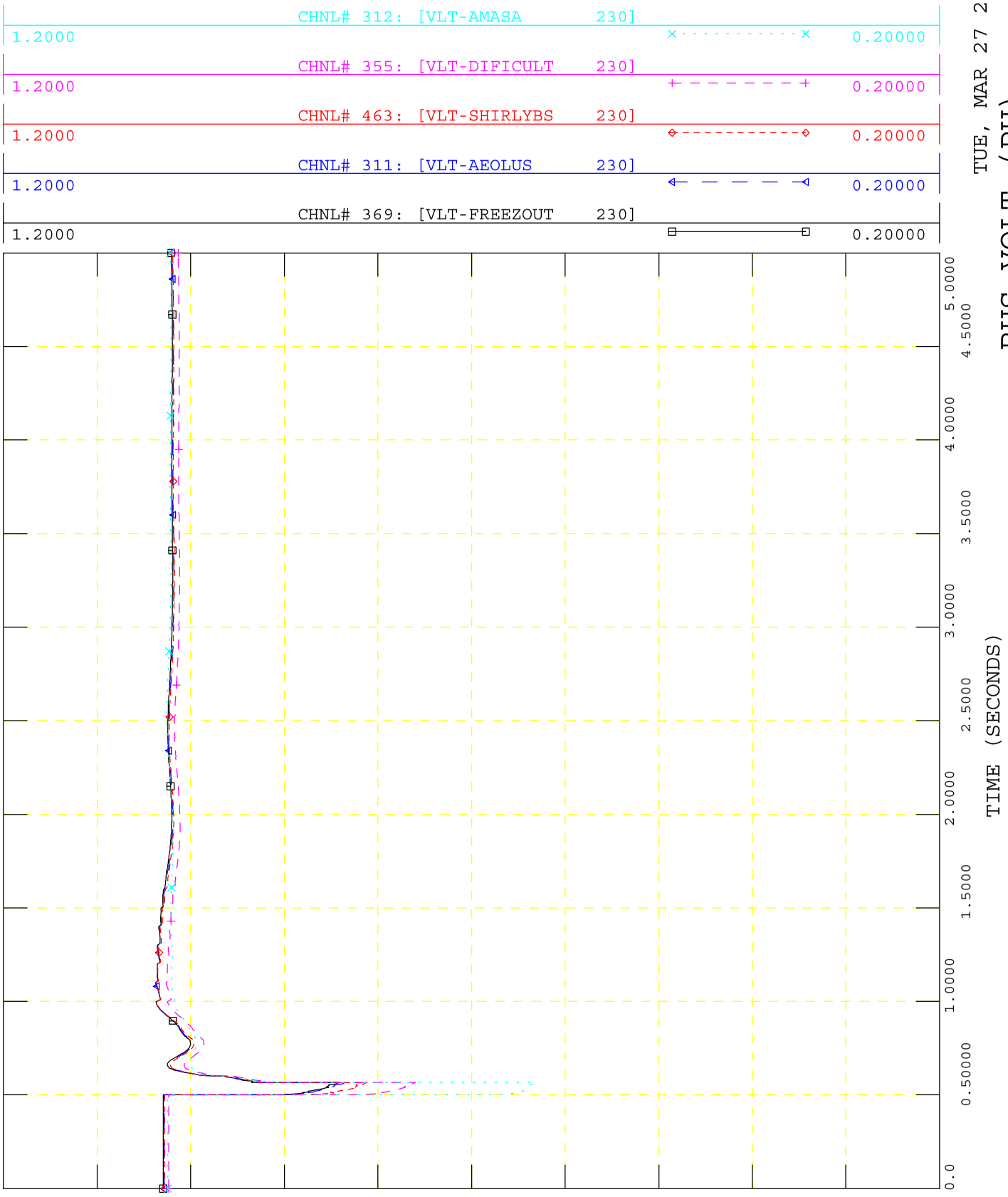
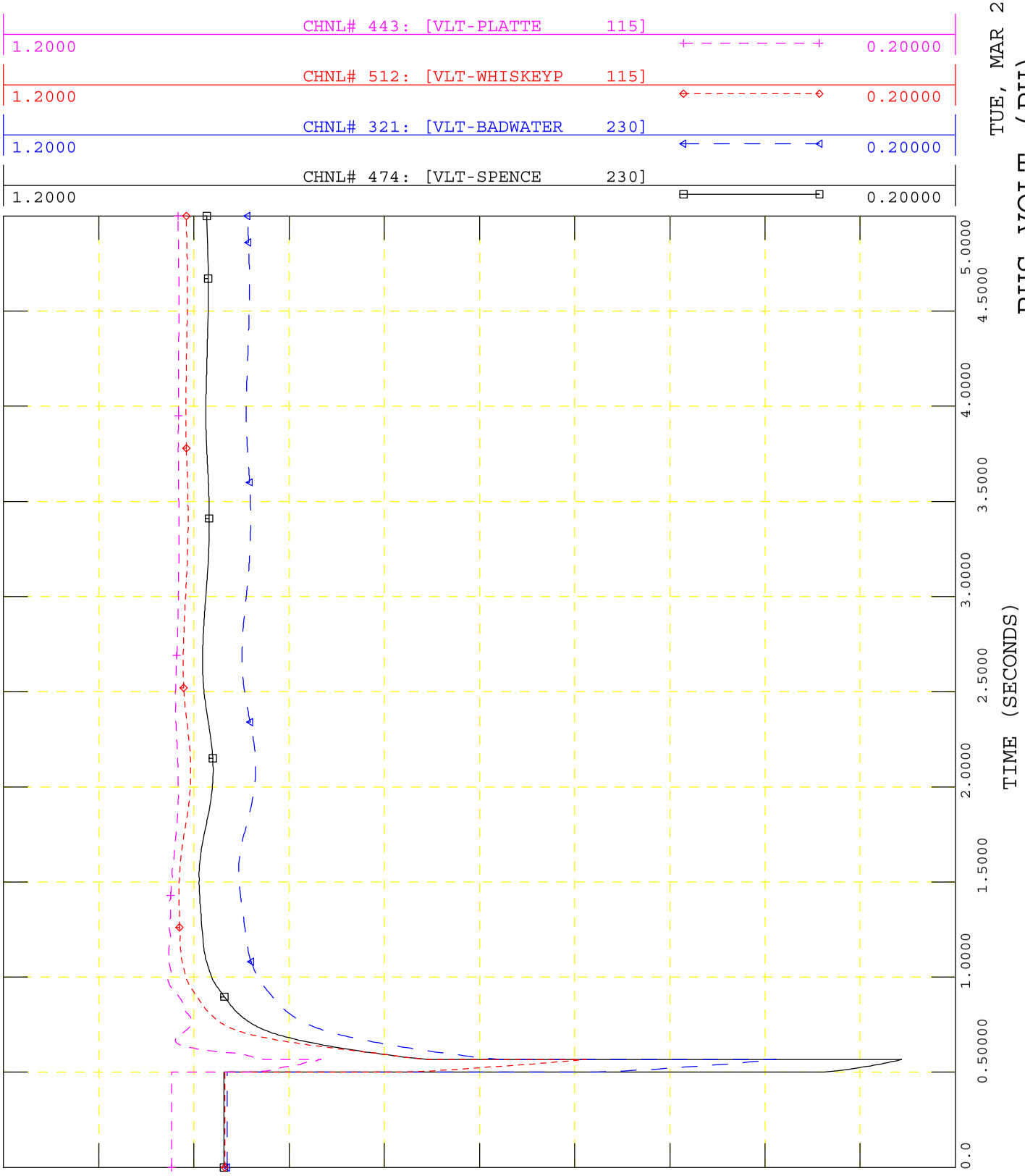
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
FILE: c7_svc_mtrld_CSPR-SPEN_out13.out

TUE, MAR 27 2018 21:29 PLT 4



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
FILE: c7_svc_mtrld_CSPR-SPEN_out13.out

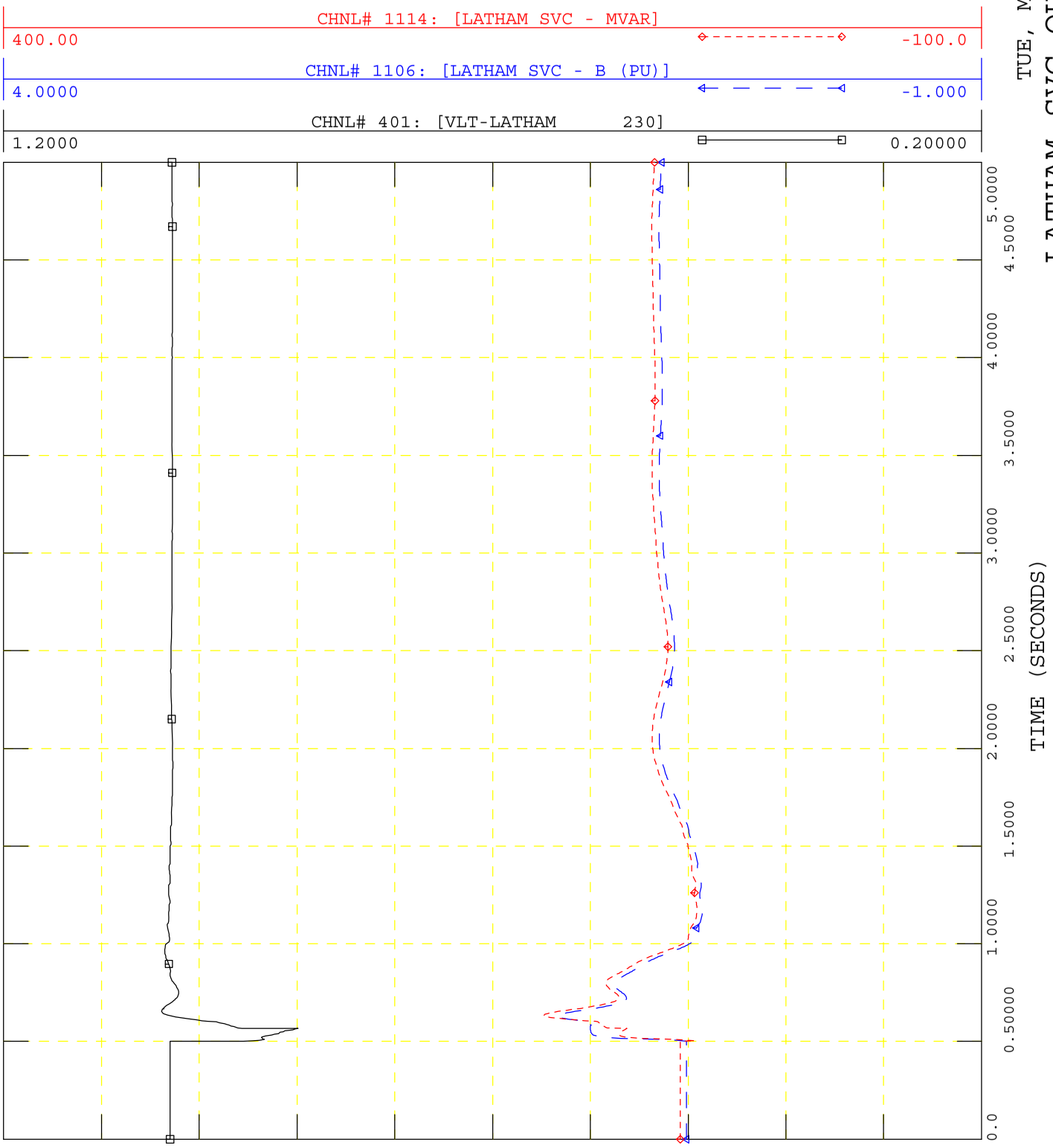
TUE, MAR 27 2018 21:29 PLT 5



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
FILE: c7_svc_mtrld_CSPR-SPEN_out13.out

TUE, MAR 27 2018 21:29 PLT 6

LATHAM SVC OUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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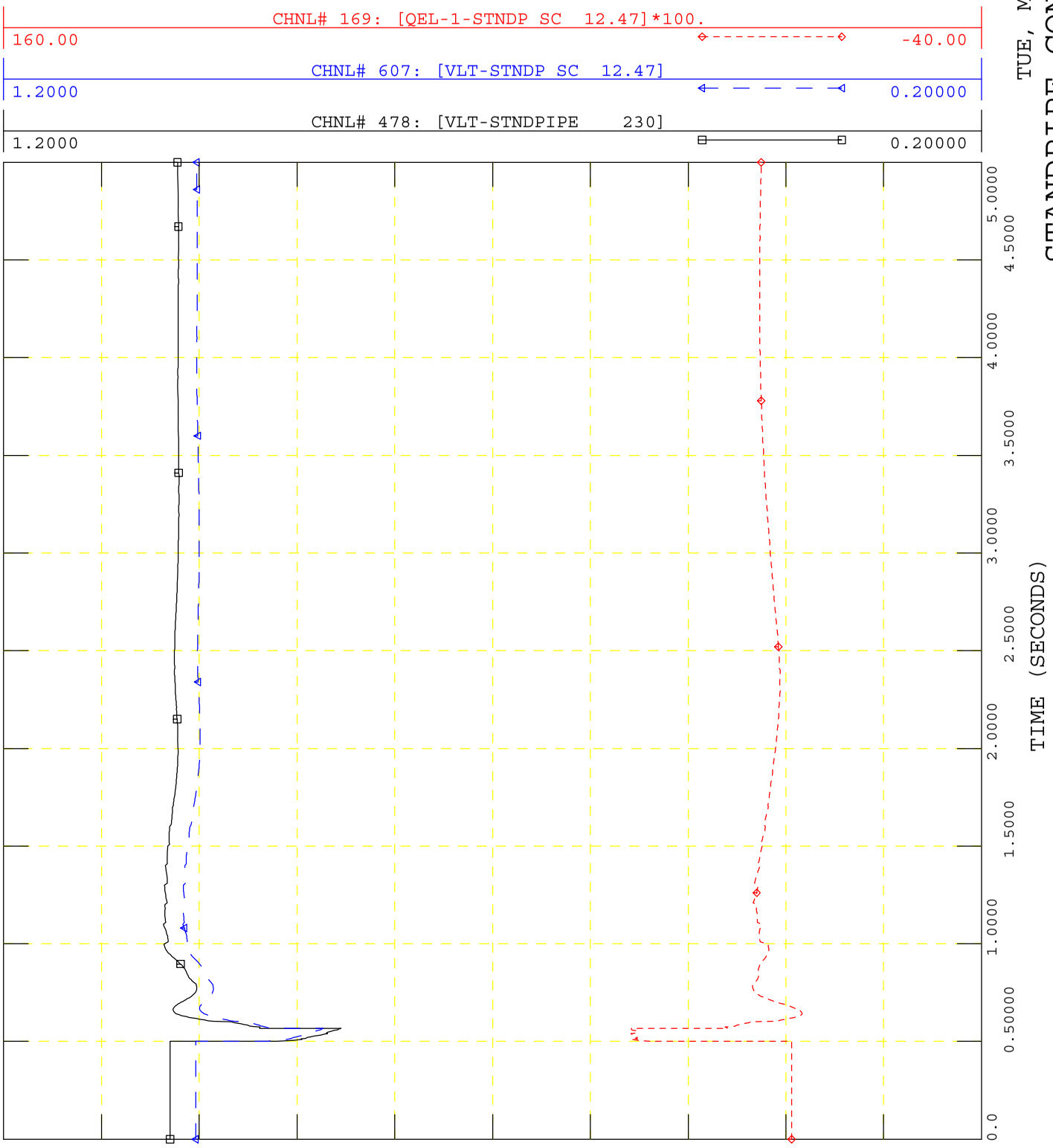
30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
FILE: c7_svc_mtrld_CSPR-SPEN_out13.out

TUE, MAR 27 2018 21:29

STANDPIPE CONDNSR PLT 7



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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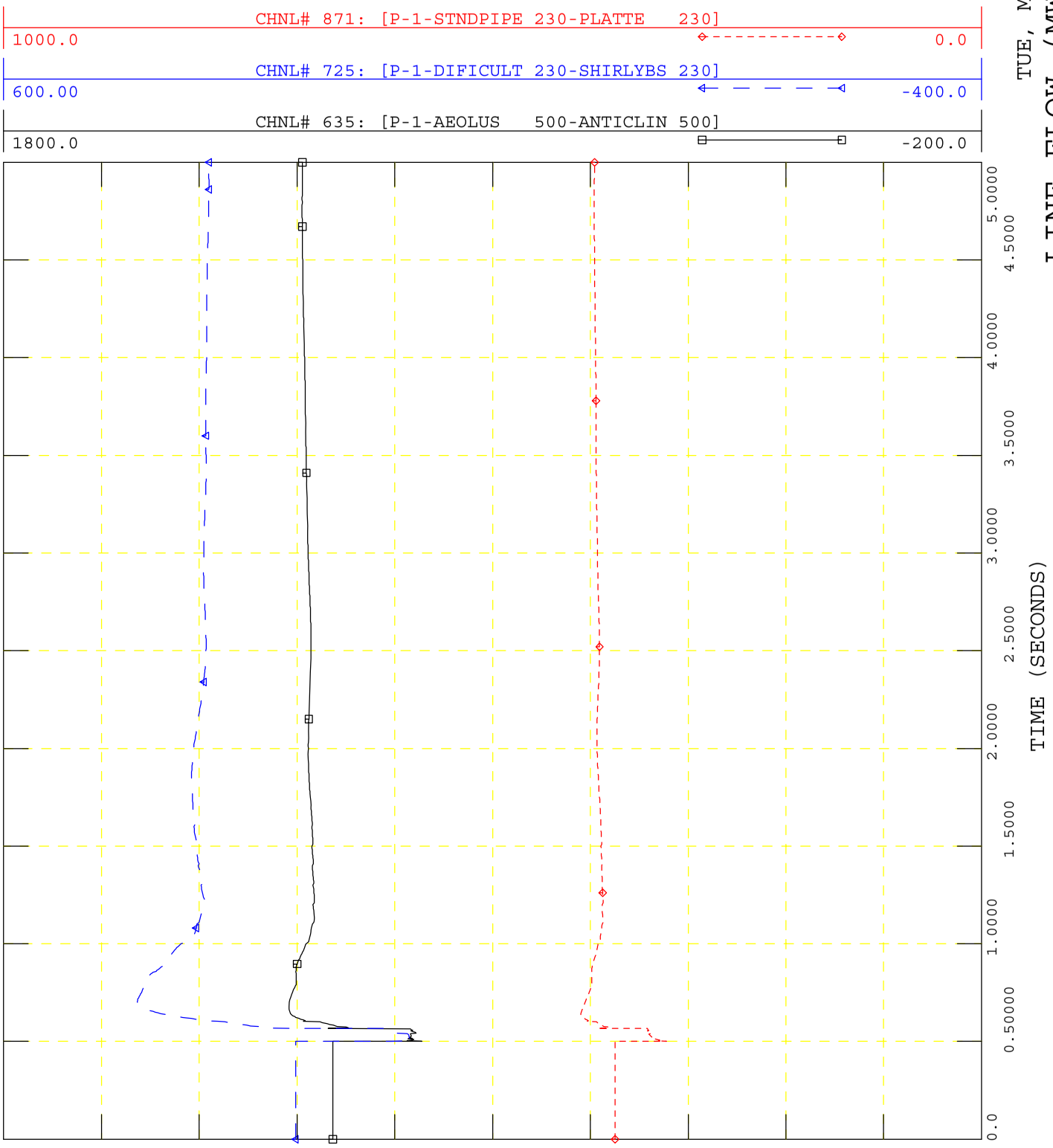
TUE, MAR 27 2018 21:29 PLT 8



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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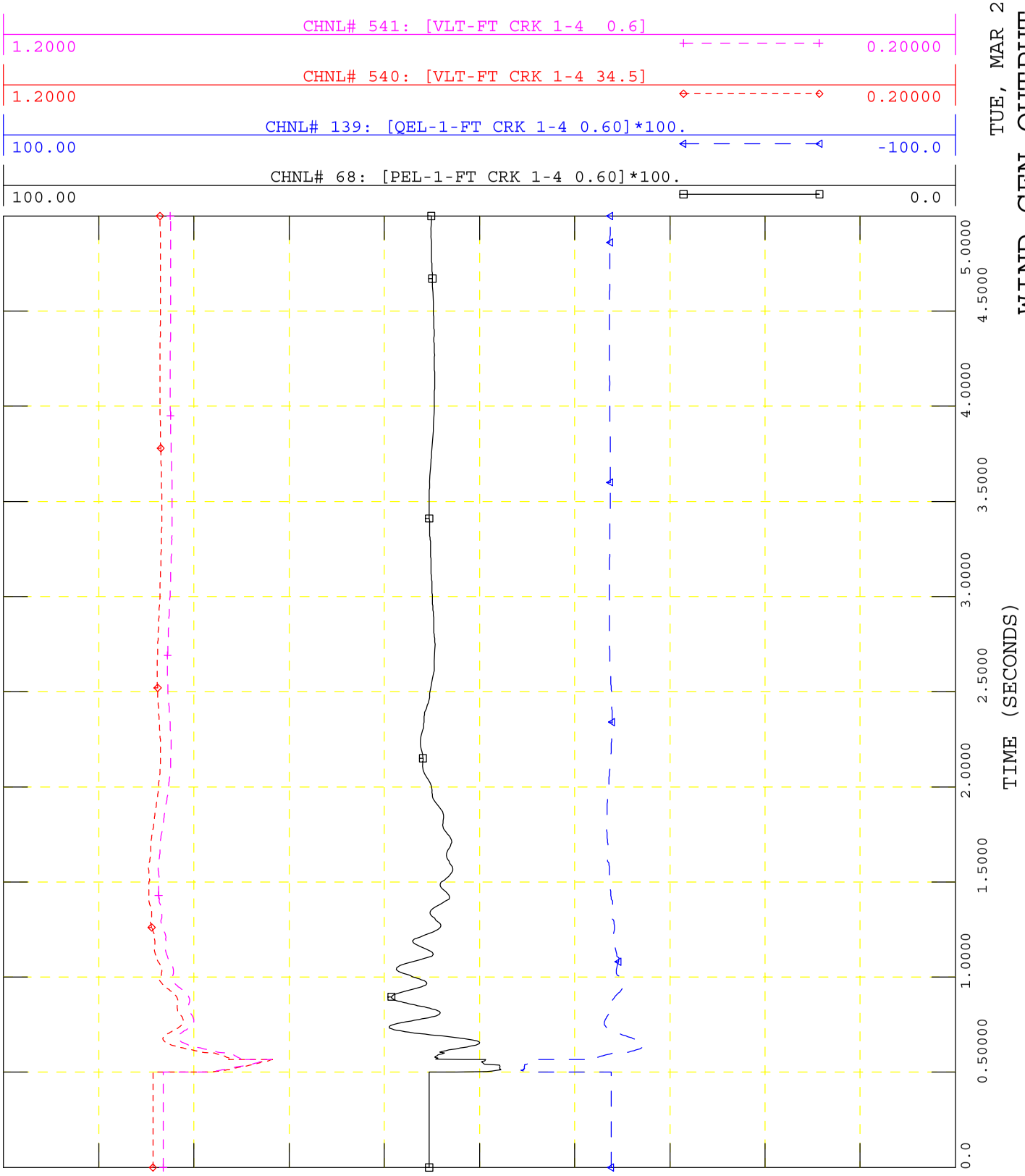
TUE, MAR 27 2018 21:29

WIND GEN OUTPUT PLT 9



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30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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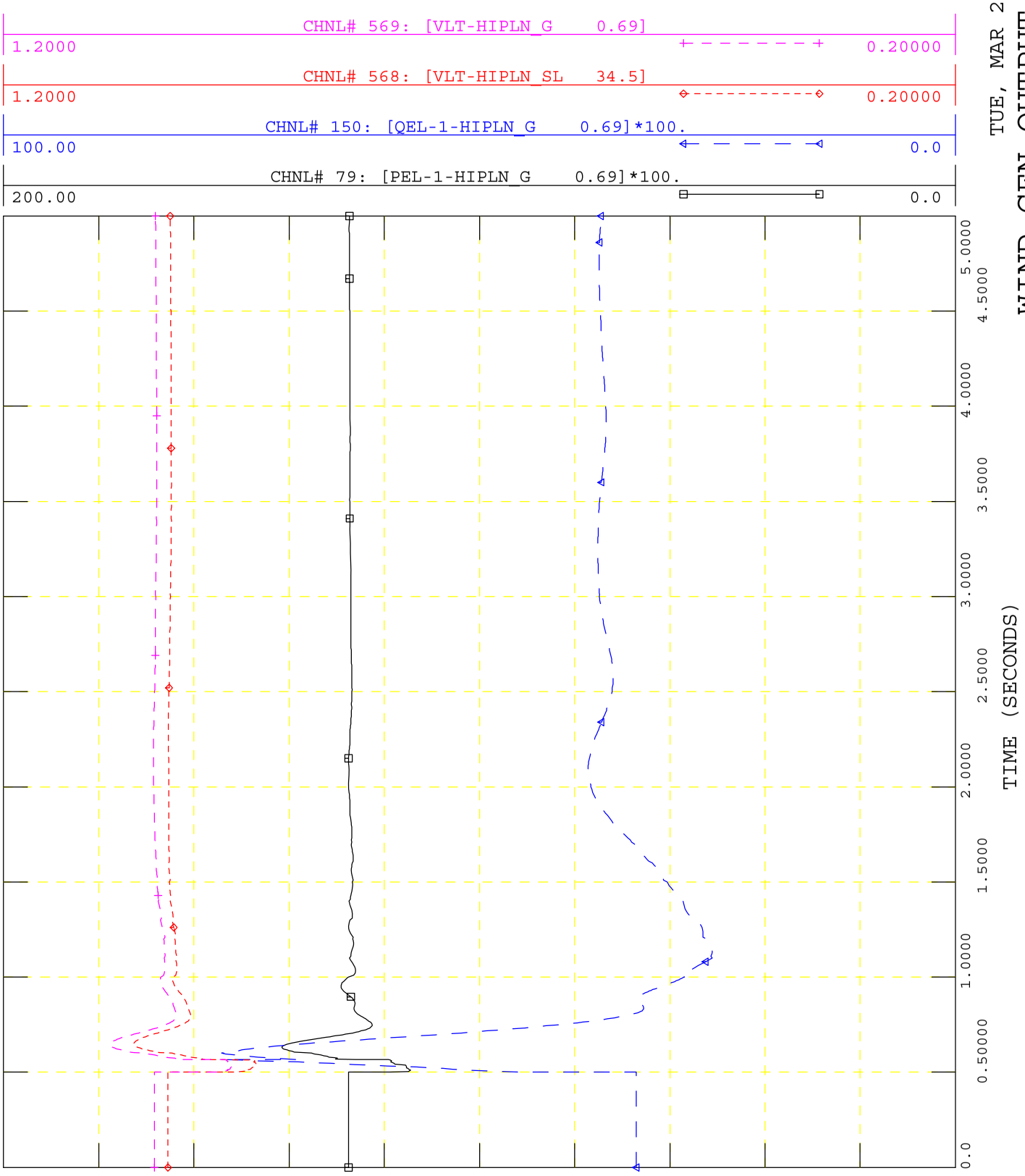
TUE, MAR 27 2018 21:29 PLT 10

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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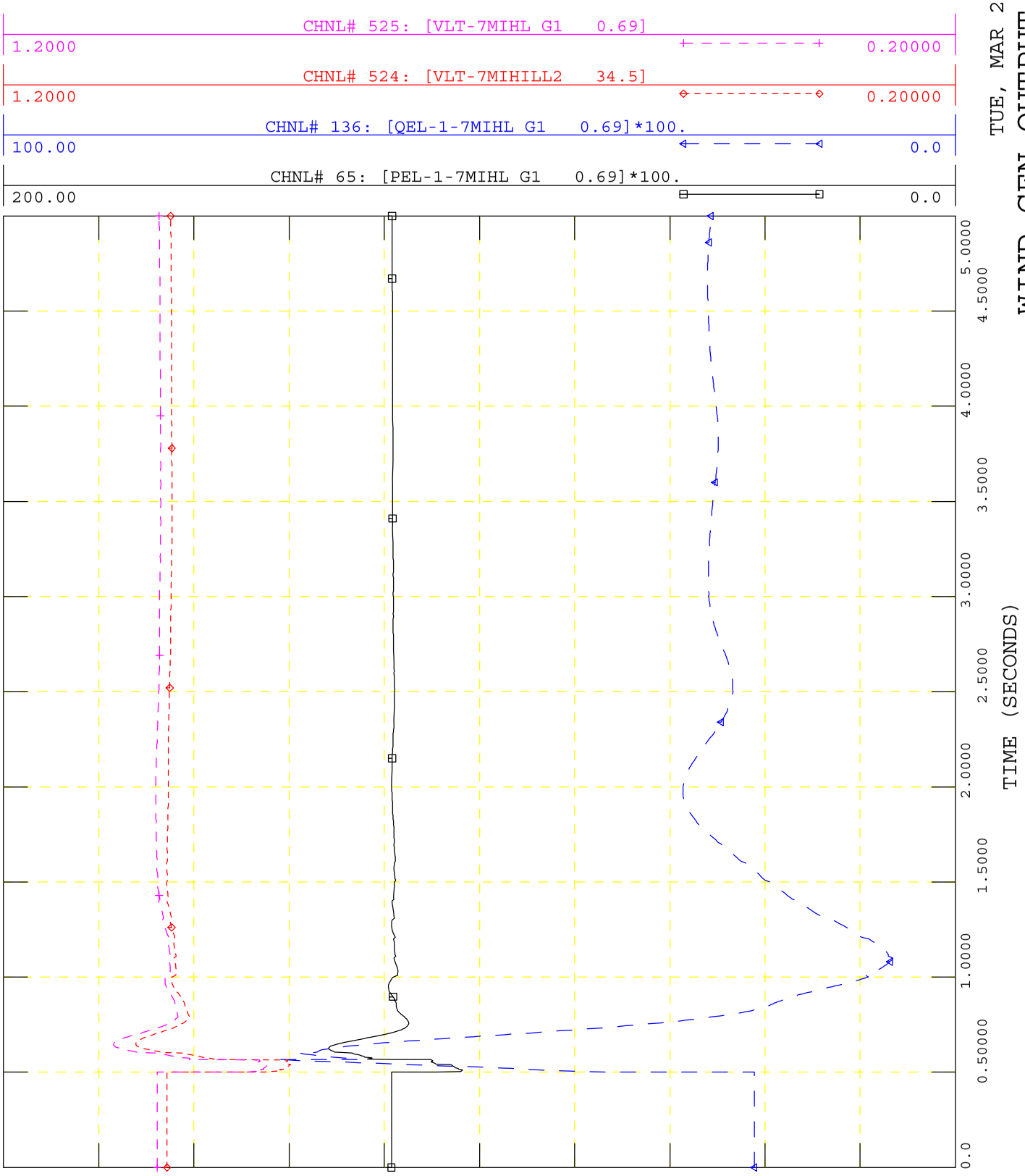
TUE, MAR 27 2018 21:29 PLT 11

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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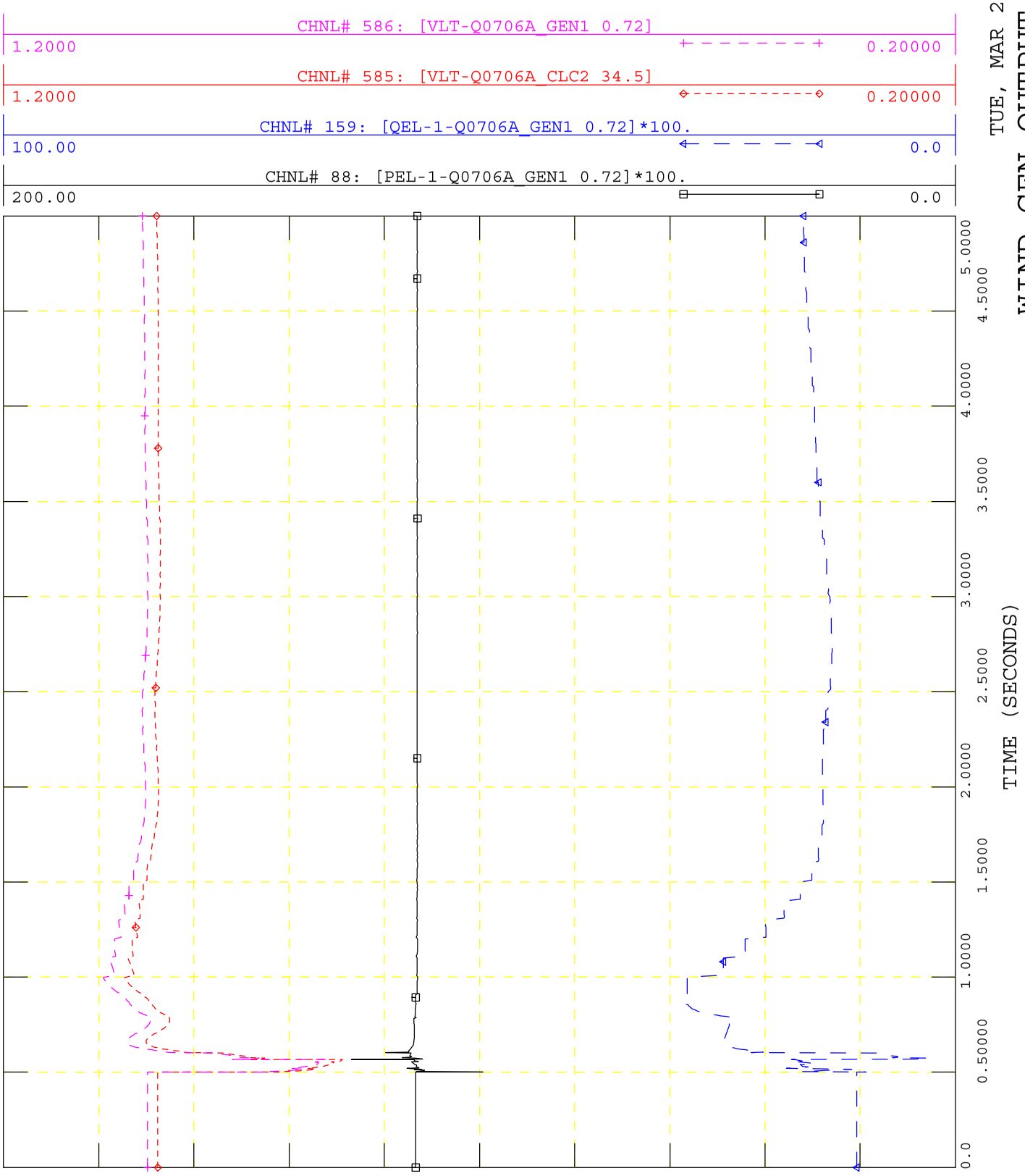
TUE, MAR 27 2018 21:29 PLT 12

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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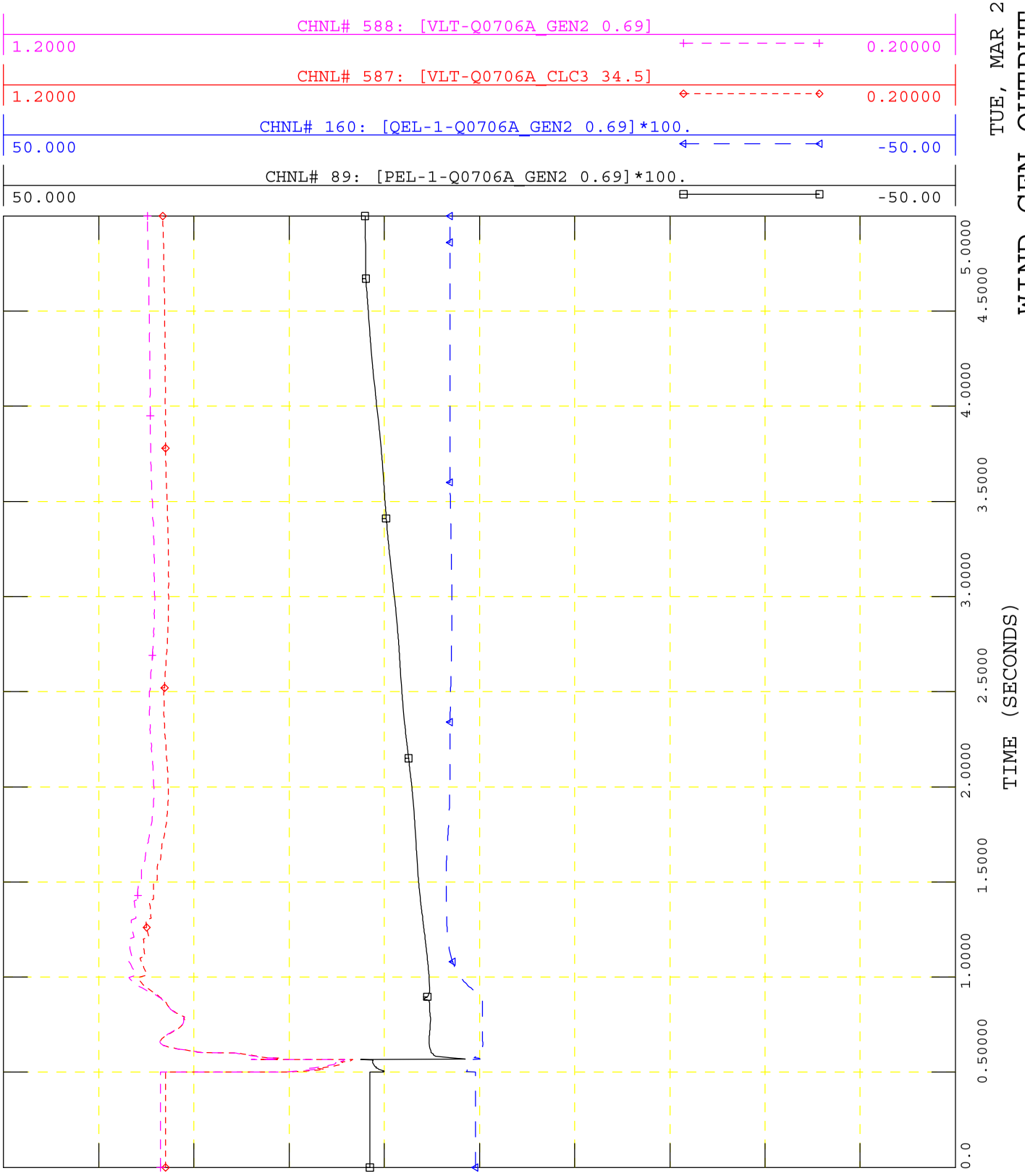
TUE, MAR 27 2018 21:29 PLT 13

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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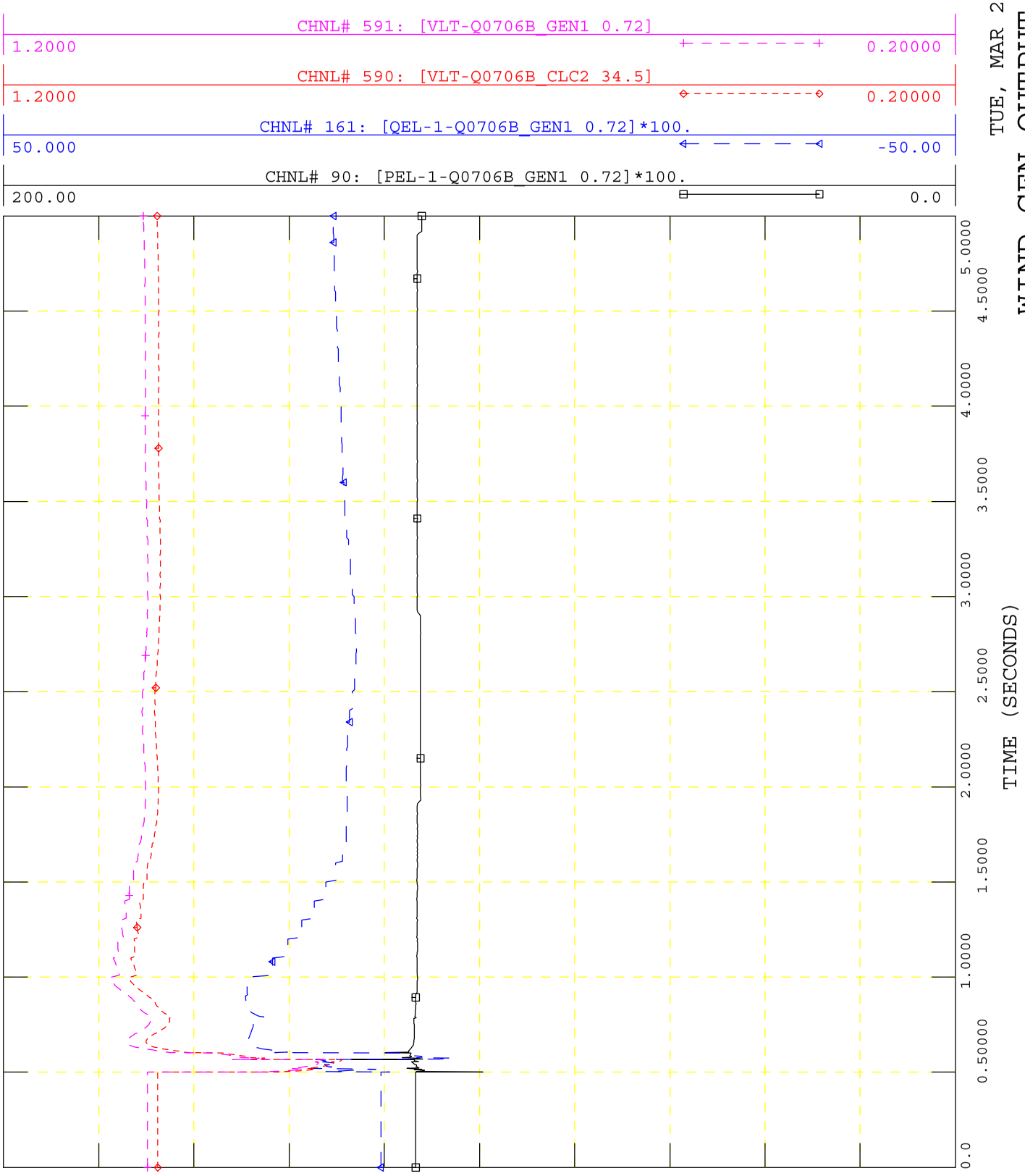
TUE, MAR 27 2018 21:29 PLT 14

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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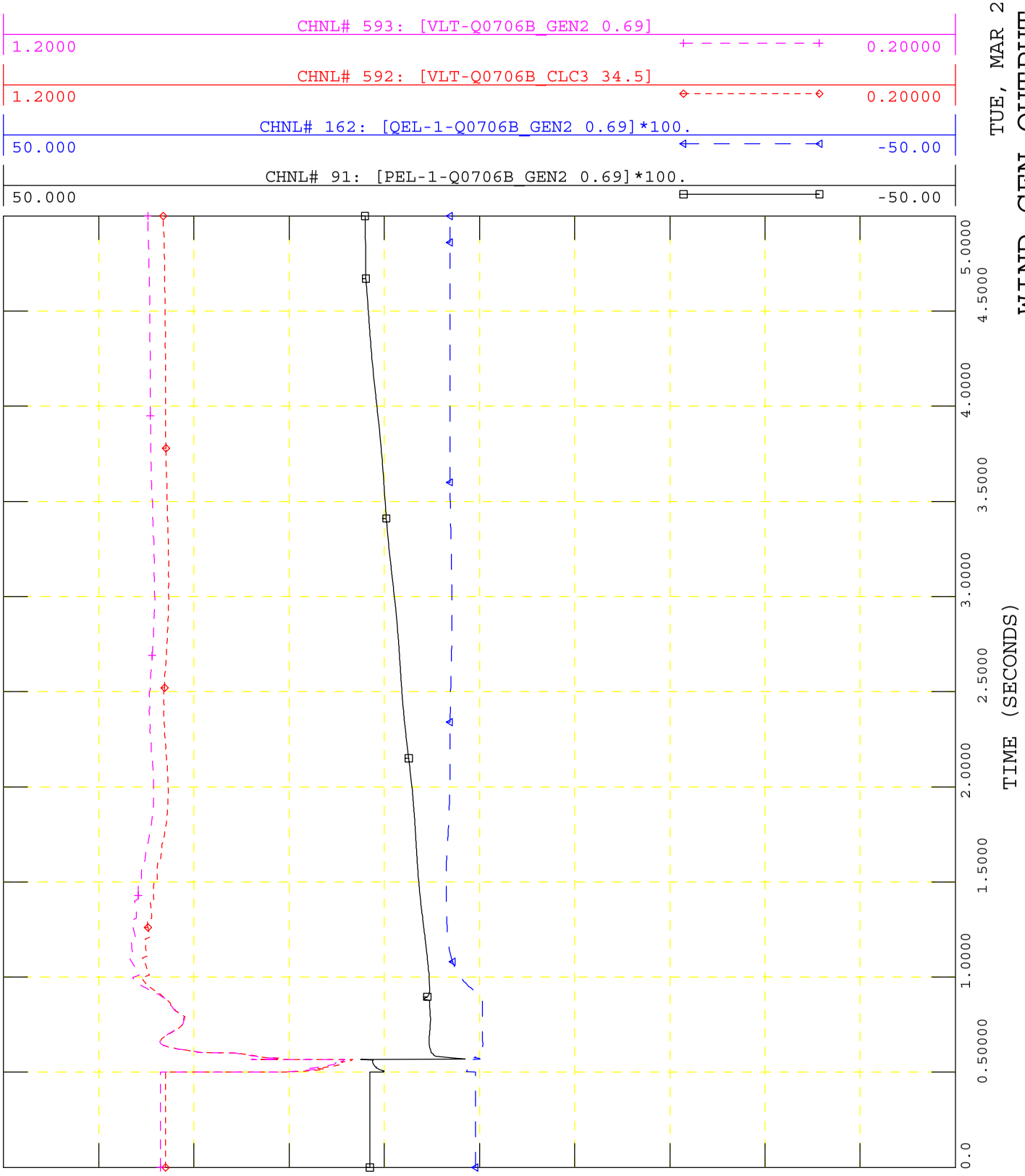
TUE, MAR 27 2018 21:29 PLT 15

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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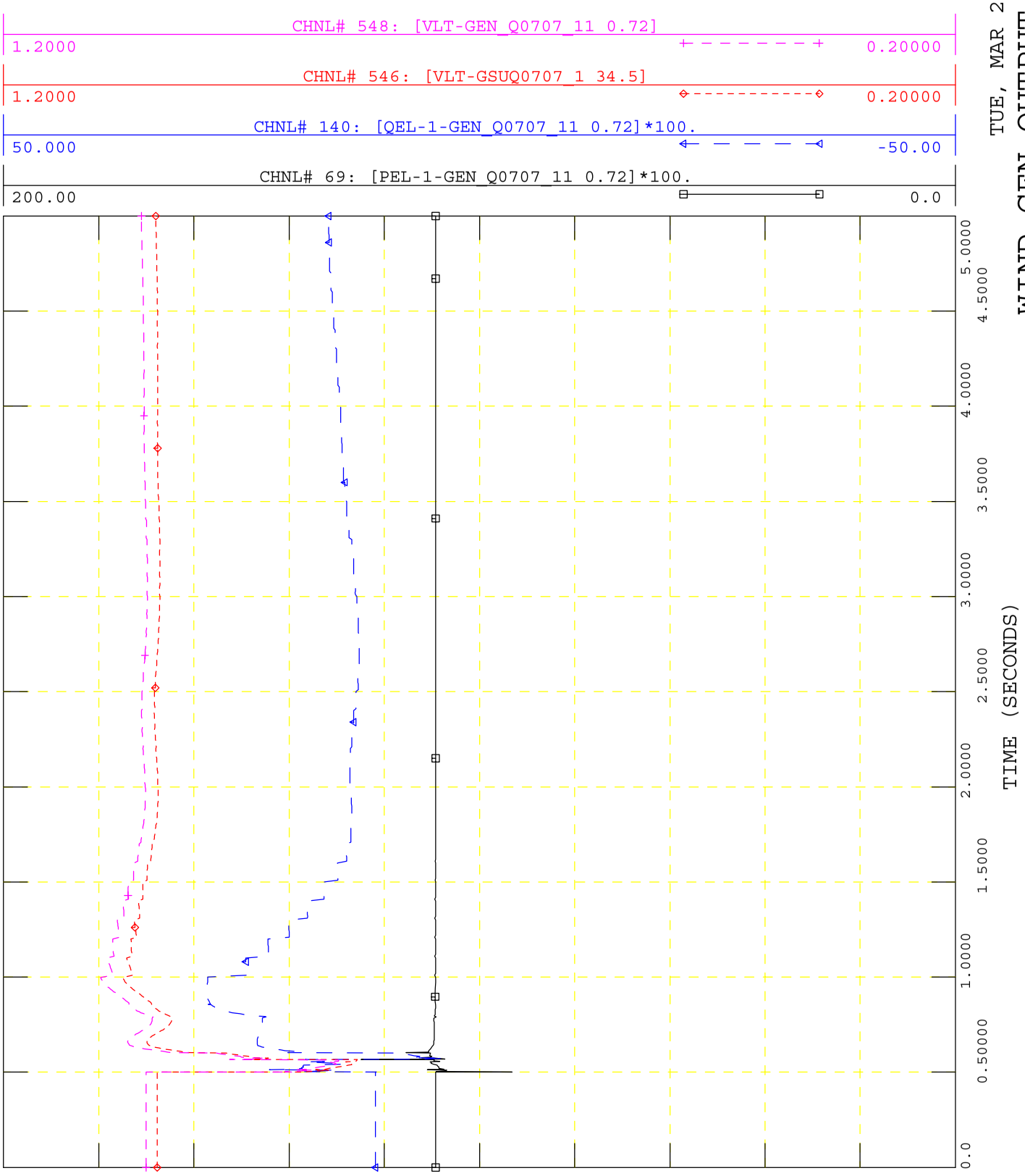
TUE, MAR 27 2018 21:29 PLT 16

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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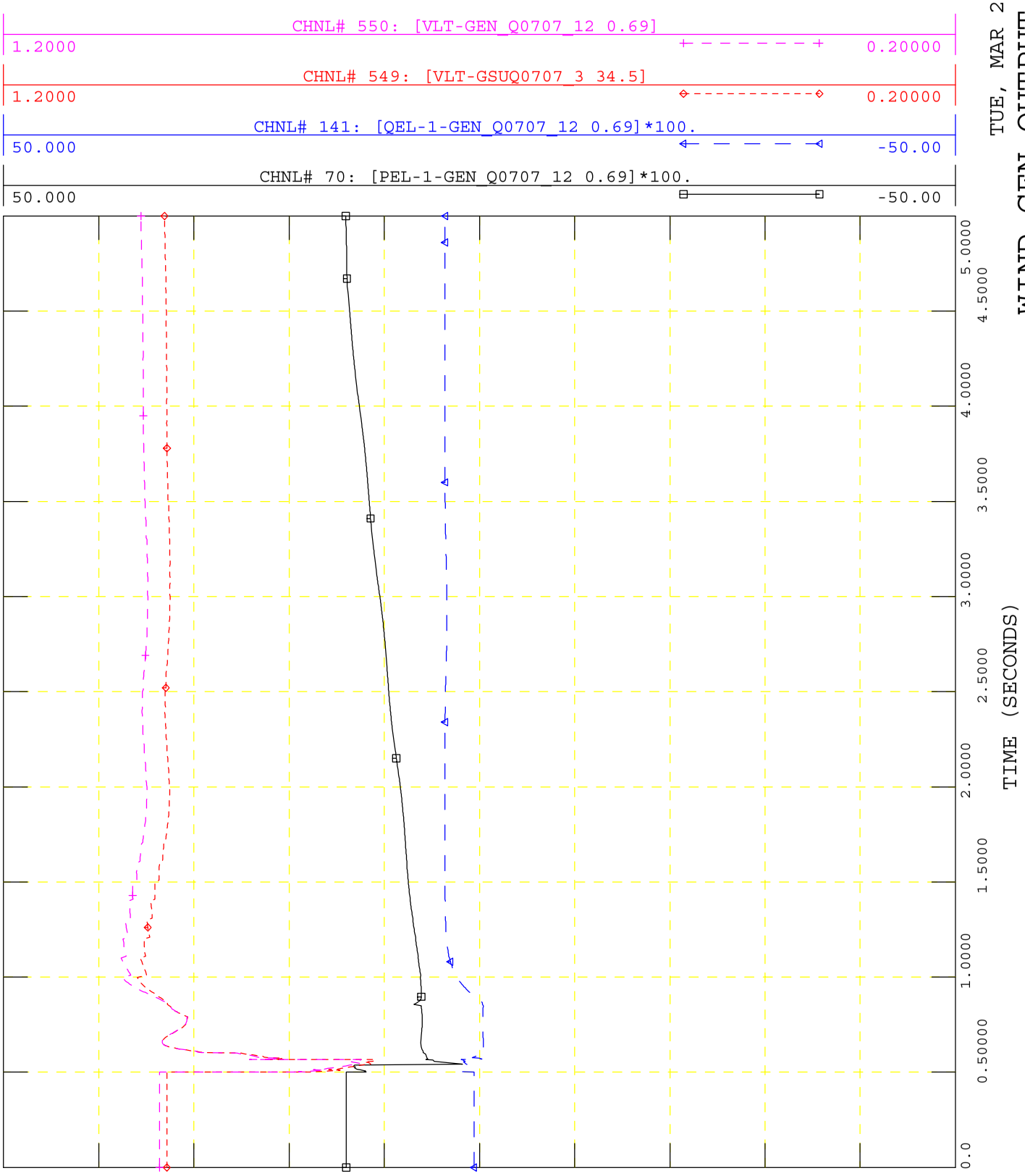
TUE, MAR 27 2018 21:29 PLT 17

WIND GEN OUTPUT



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C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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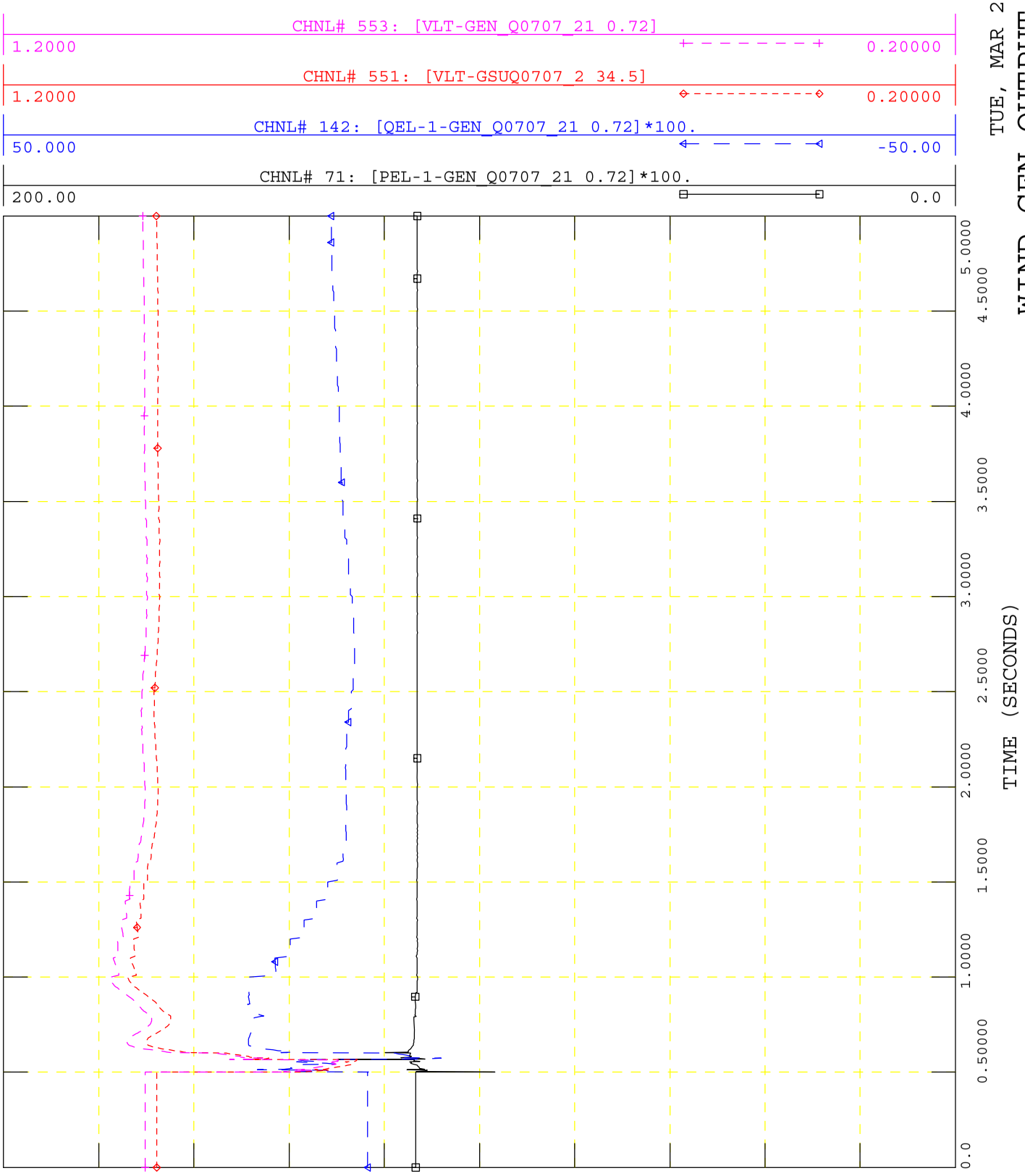
TUE, MAR 27 2018 21:29 PLT 18

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
C7_22HW2AP-4B-100P (REVISED VESTAS DYANMICS DATA) 3/27/2018
30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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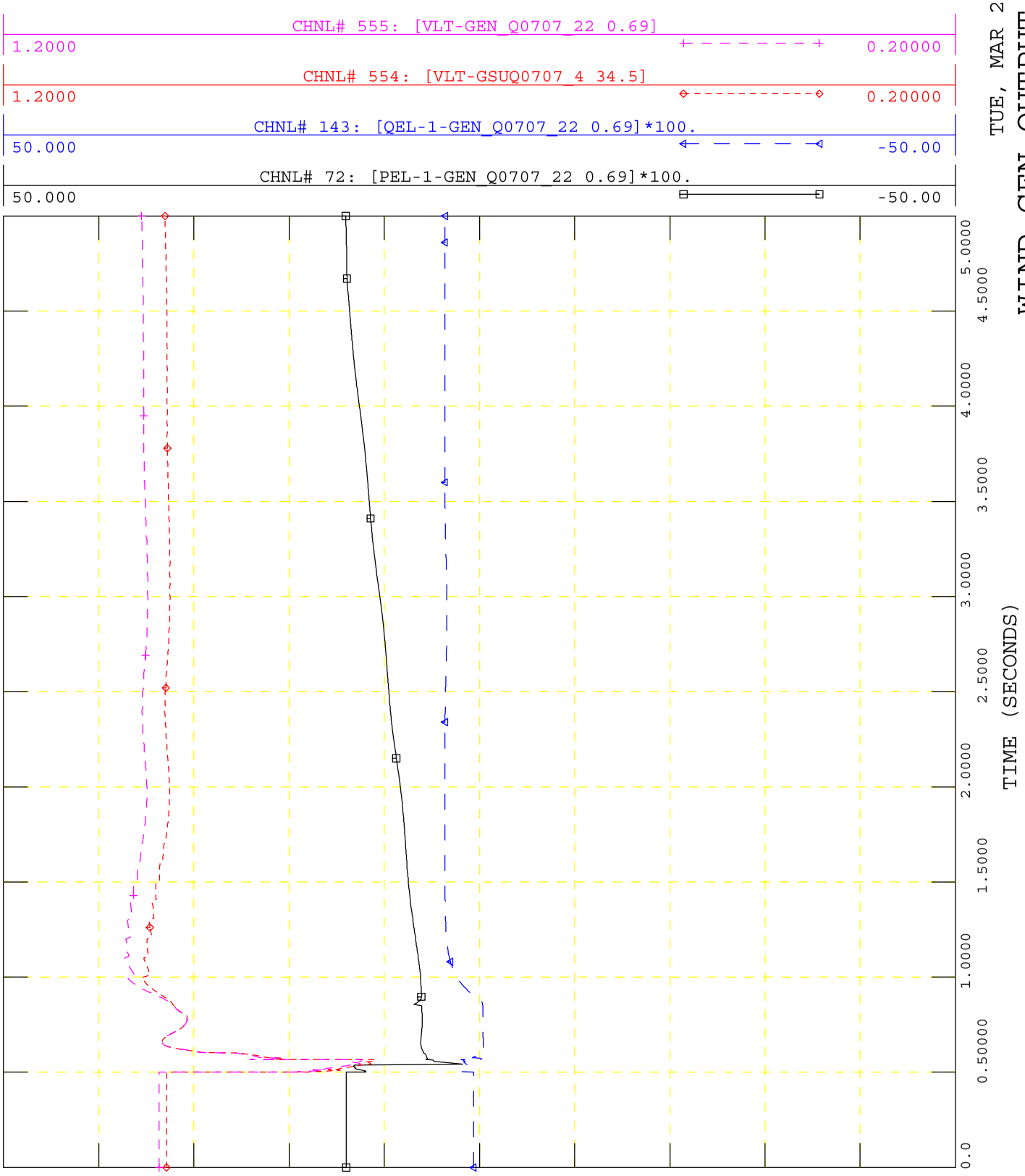
TUE, MAR 27 2018 21:29 PLT 19

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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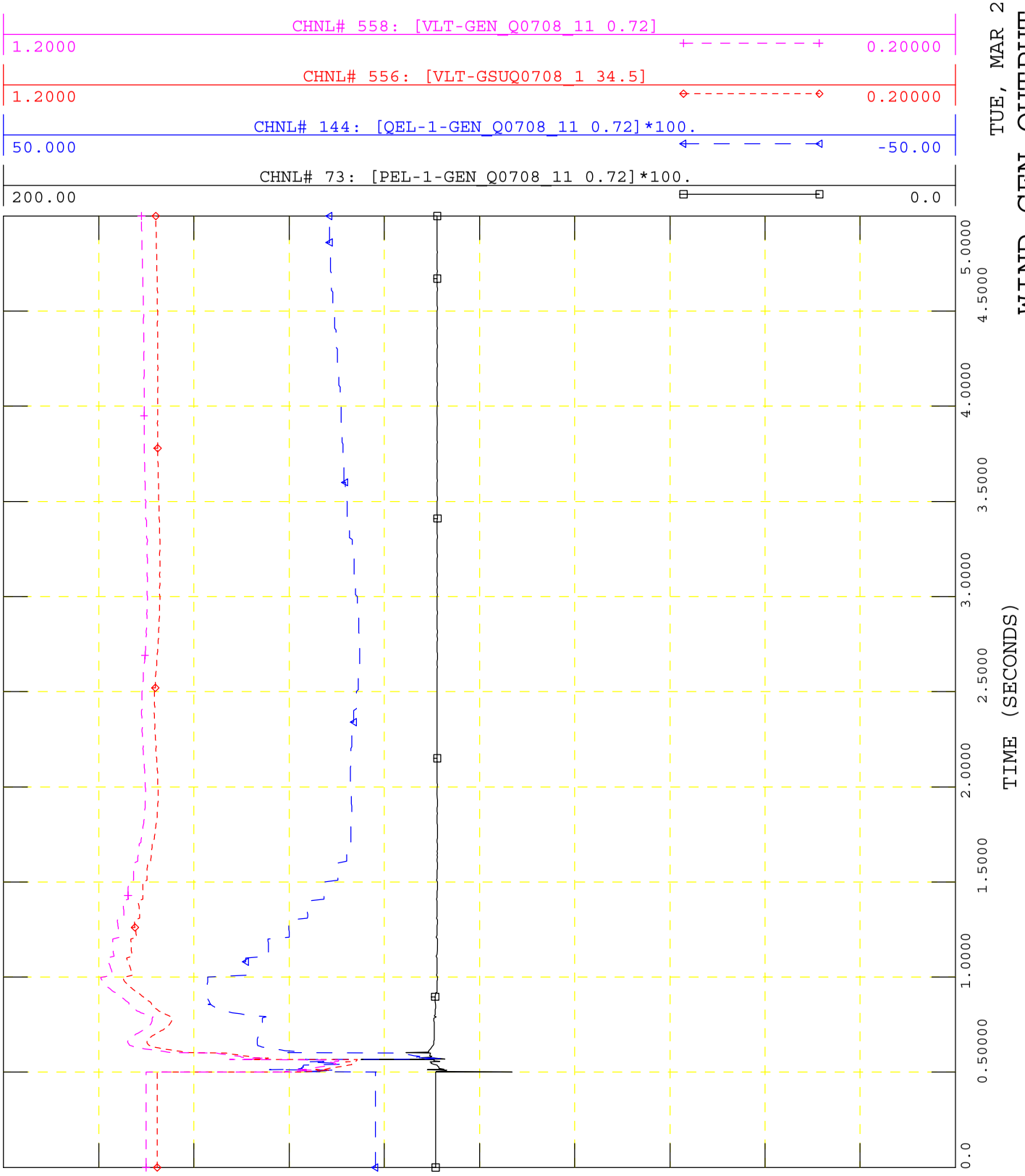
TUE, MAR 27 2018 21:29 PLT 20

WIND GEN OUTPUT



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30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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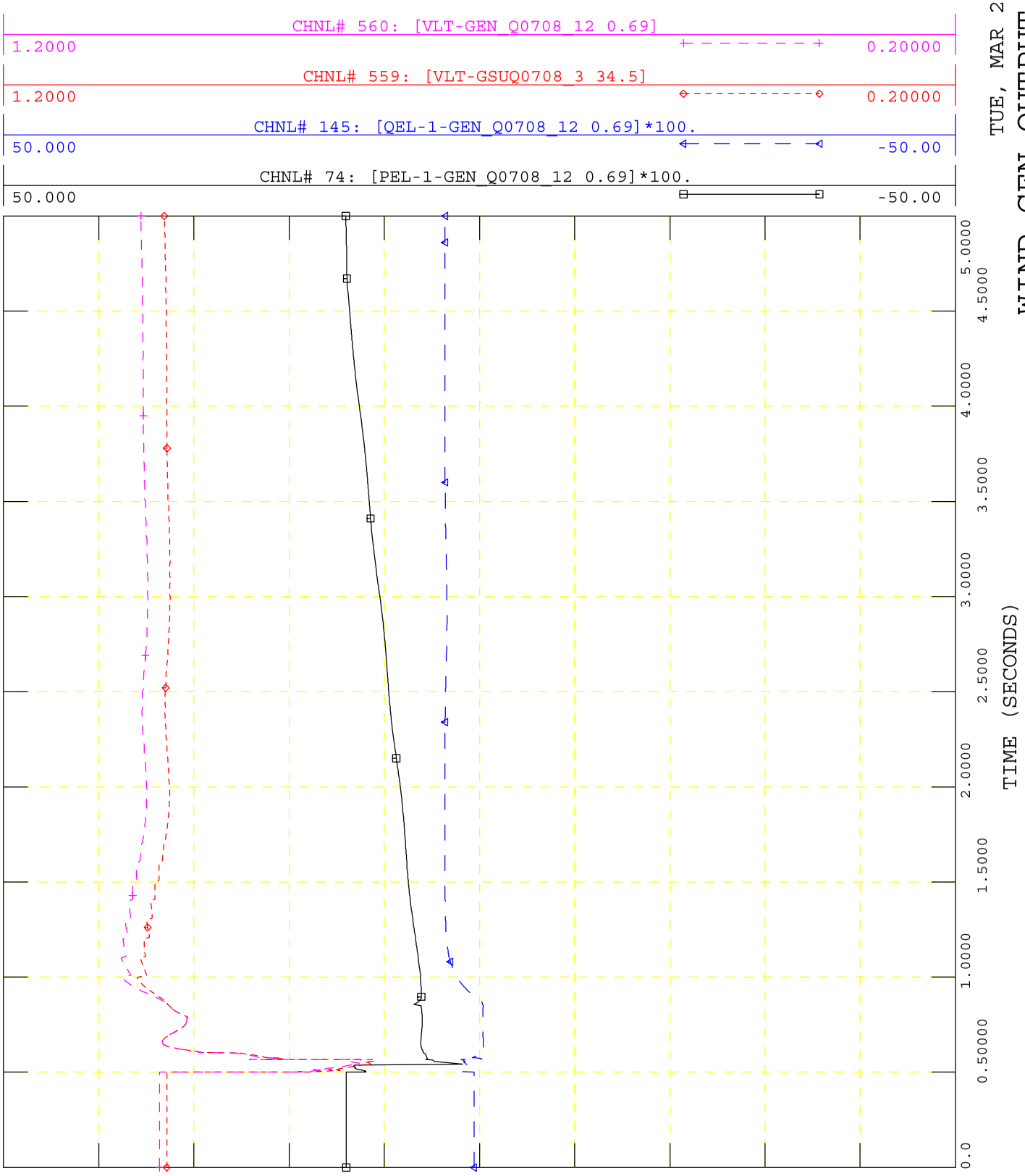
TUE, MAR 27 2018 21:29 PLT 21

WIND GEN OUTPUT



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30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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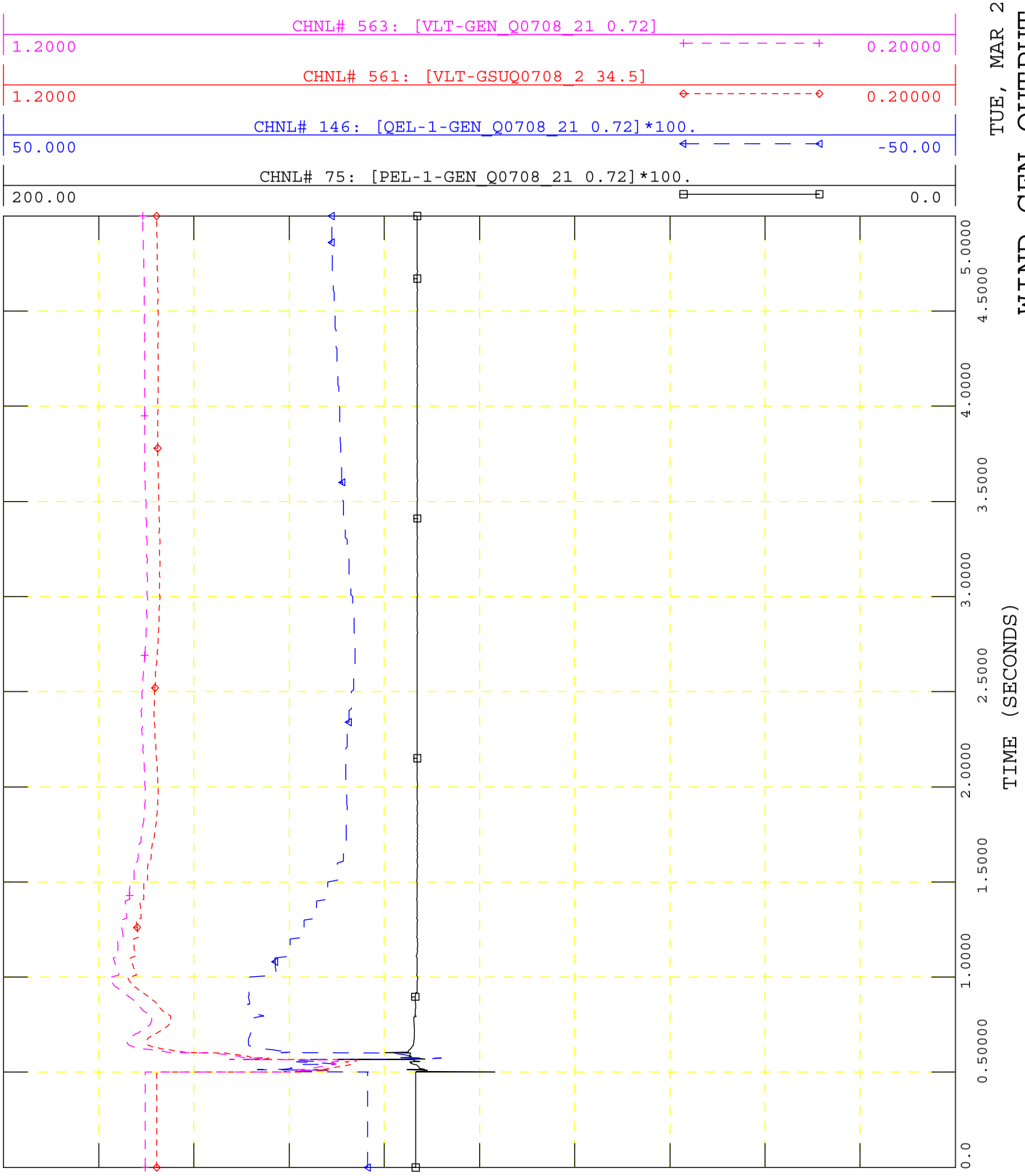
TUE, MAR 27 2018 21:29 PLT 22

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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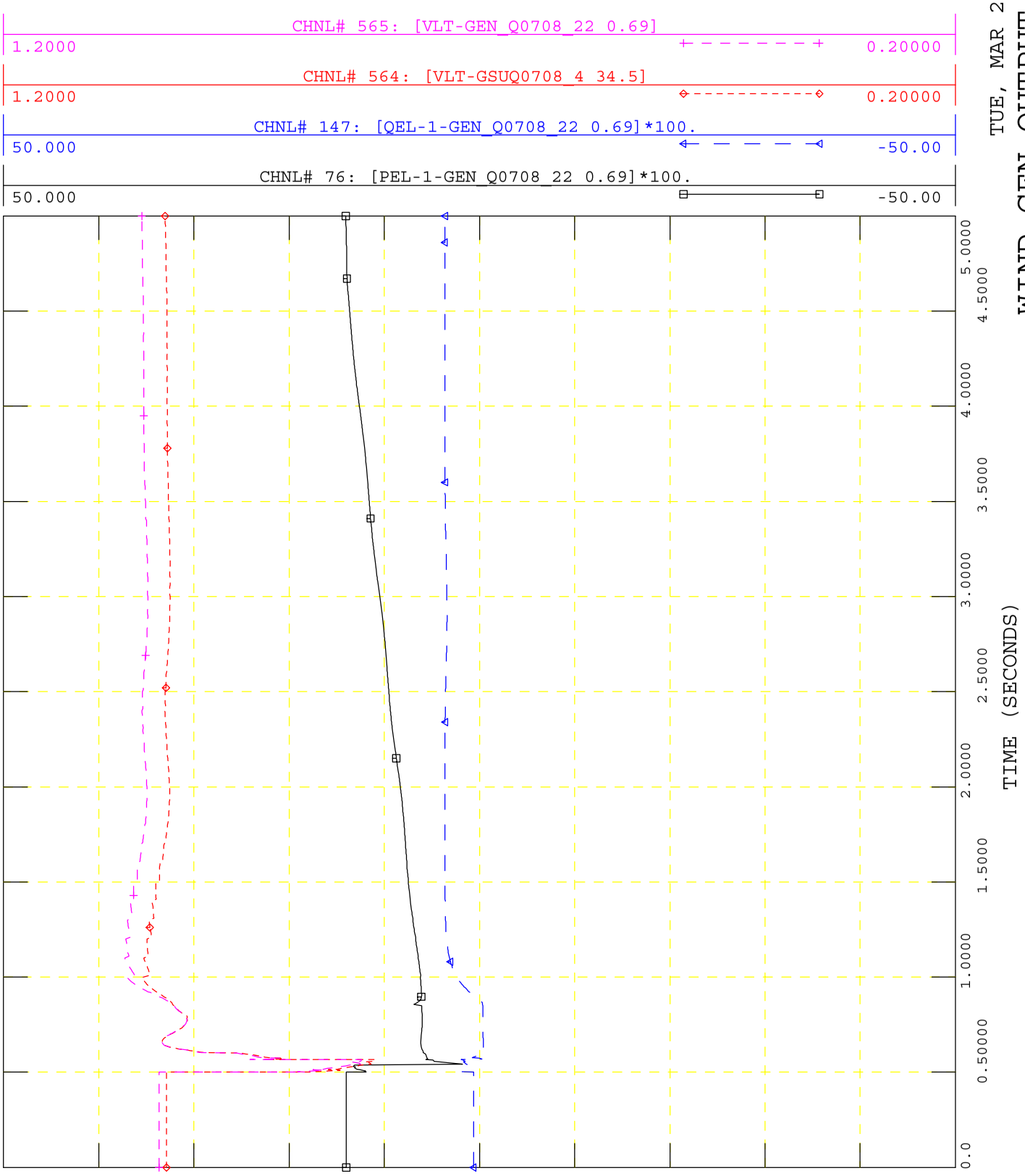
TUE, MAR 27 2018 21:29 PLT 23

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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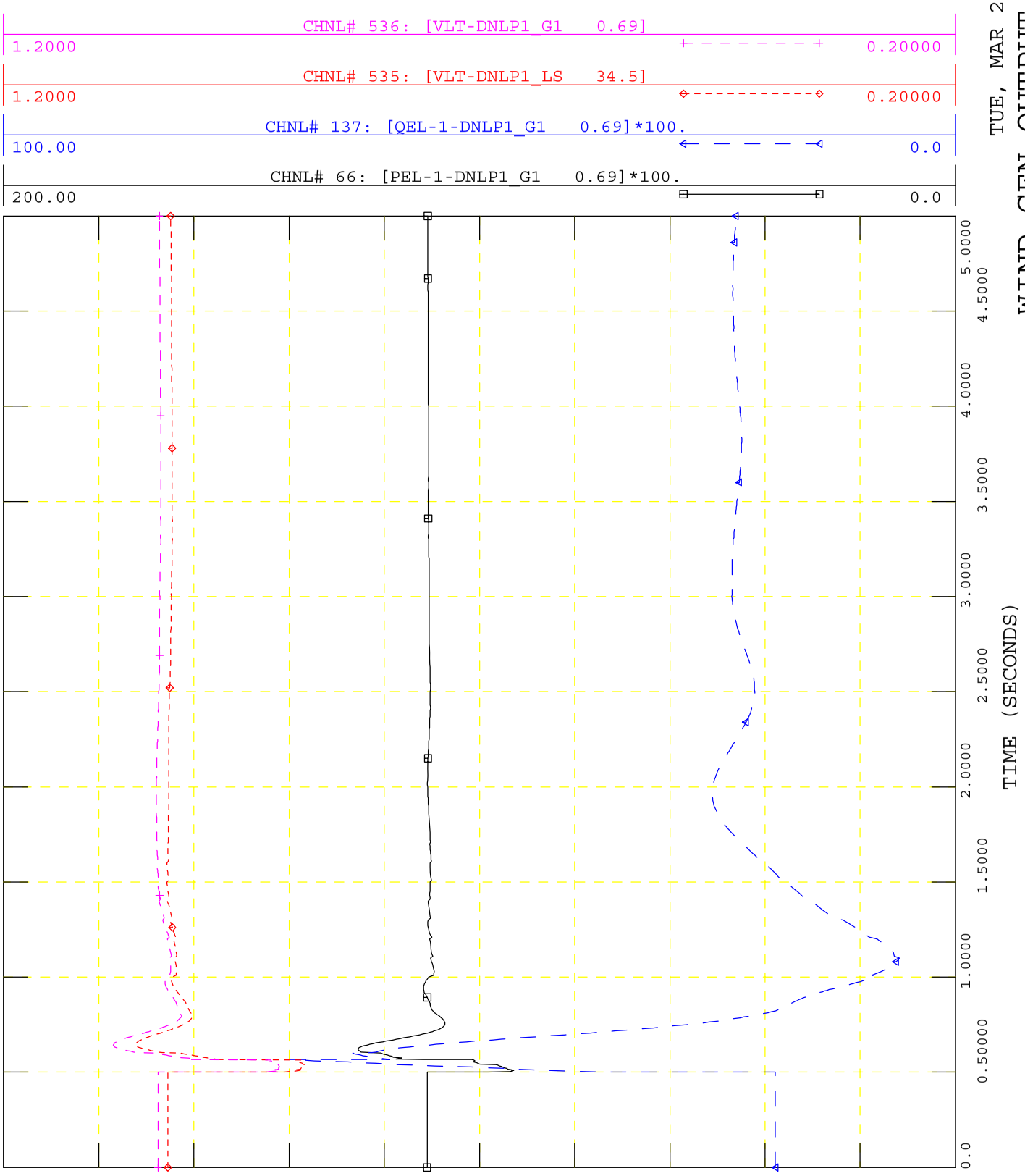
TUE, MAR 27 2018 21:29 PLT 24

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
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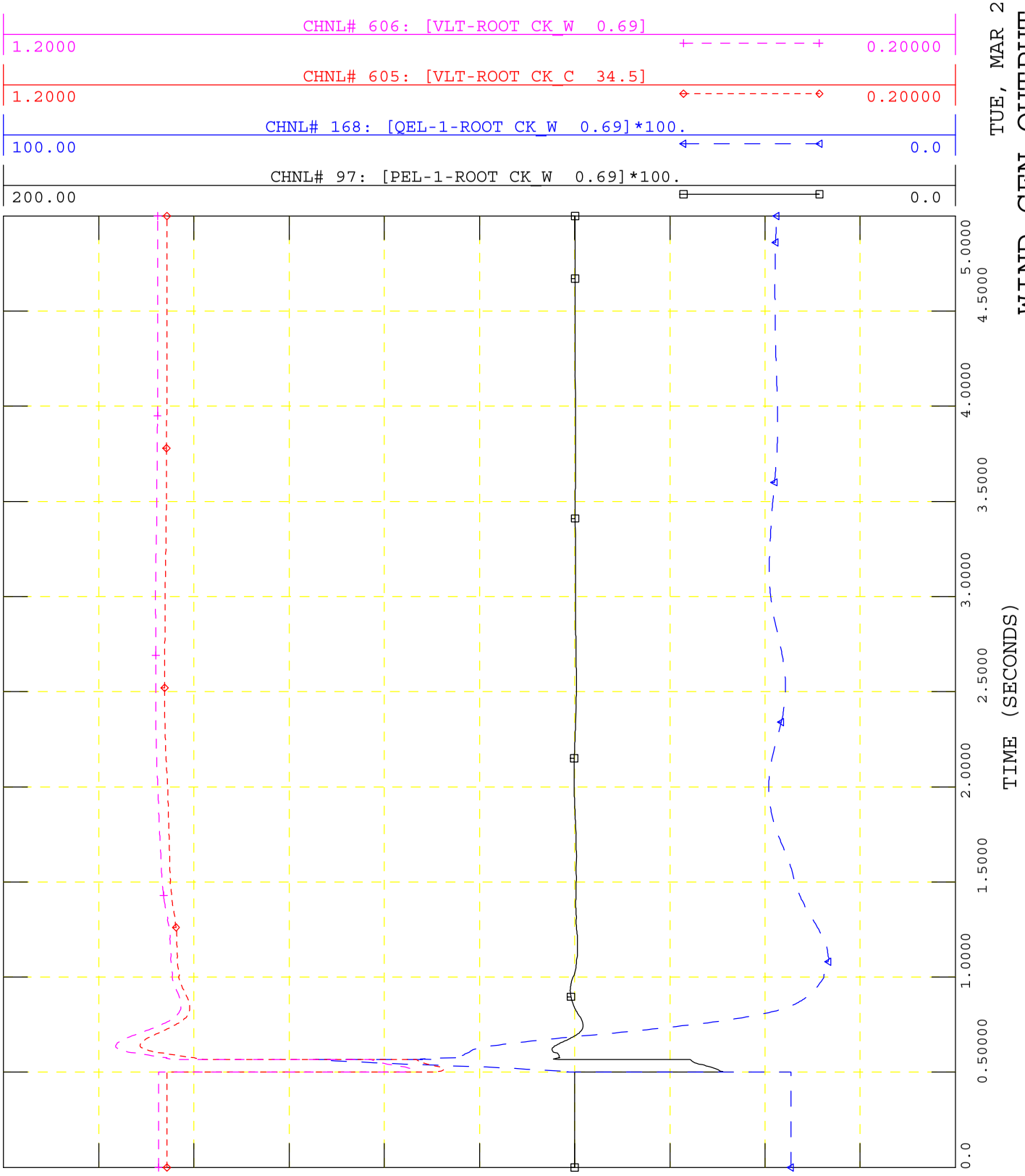
TUE, MAR 27 2018 21:29 PLT 25

WIND GEN OUTPUT



2021-22 HW2B W/GATEWAY D.2. ADD NEW Q706,707 & 708 MODELING
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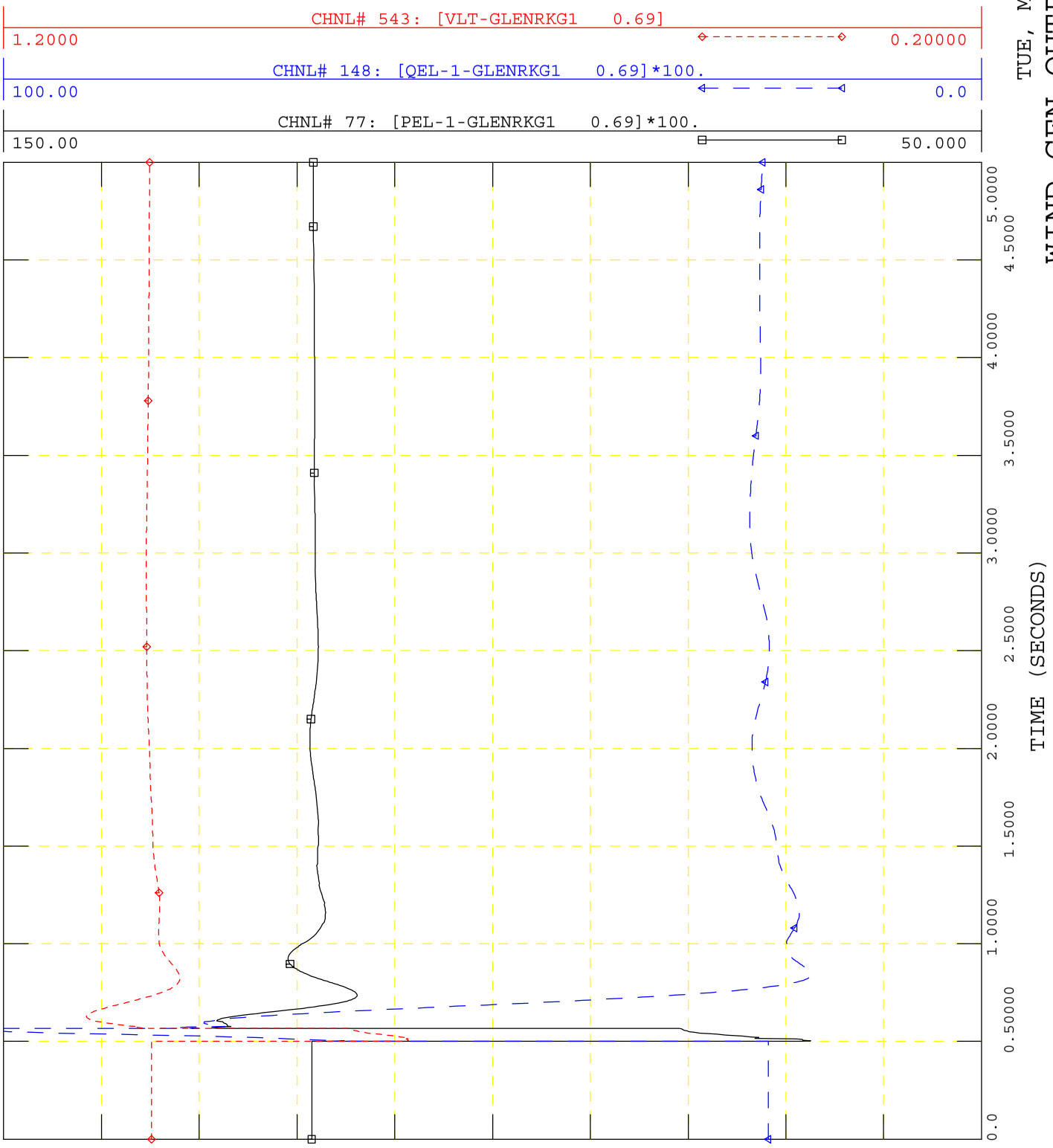
30CY-3PHS CASPER PP 230 KV FLT. 34CY-CLR FLT & OPEN
CASPER PP-SPENCE 230 KV LN. 36CY-UNBLOCK SVC. OUTAGE 13
FILE: c7_svc_mtrld_CSPR-SPEN_out13.out

TUE, MAR 27 2018 21:29

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