Appendix H

Transient Stability Switching Sequences

Switching Sequence 1 - Three-phase fault on Pala 69 kV bus cleared after 6 cycles (no system elements removed post clearing).

```
*
*  3-phase 6 cycle fault at Pala 69 kV
*
*  CC cards for post-transient only
*
CC  DRP 0
*
*  Apply bus fault at Pala 69 kV
*
FB   60.0  "PALA    "  69.0
*
*  Clear bus fault at Pala 69 kV
*
CFB  66.0  "PALA    "  69.0
*
```

Switching Sequence 2 - Three-phase fault on Pala 69 kV bus cleared after 6 cycles by opening Pala - Lilac 69 kV TL6932.

```
*
*  3-phase 6 cycle fault at Pala 69 kV
*  followed by loss of Pala - Lilac 69 kV TL6932
*
*  CC cards for post-transient only
*
CC  DRP 0
*
*  Apply bus fault at Pala 69 kV
*
FB   60.0  "PALA    "  69.0
*
*  Clear bus fault at Pala 69 kV
*
CFB  66.0  "PALA    "  69.0
*
*  Trip Pala - Lilac 69 kV TL6932
*
DL   66.0  "PALA    "  69.0  "LILAC   "  69.0    "1 "
*
```

Switching Sequence 3 - Three-phase fault on Pala 69 kV bus cleared after 6 cycles by opening Avocado - Monserate - Pala 69 kV TL698.

```
*
*  3-phase 6 cycle fault at Pala 69 kV
*  followed by loss of Avocado - Monserate - Pala 69 kV TL698
*
*  CC cards for post-transient only
*
CC  DRP 0
*
*  Apply bus fault at Pala 69 kV
*
FB   60.0  "PALA    "  69.0
*
*  Clear bus fault at Pala 69 kV
*
CFB  66.0  "PALA    "  69.0
*
*  Trip Avocado - Monserate - Pala 69 kV TL698
*
DL   66.0  "AVOCADO "  69.0  "MNSRATTP"  69.0    "1 "
DL   66.0  "MNSRATTP"  69.0  "MONSRATE"  69.0    "1 "
DL   66.0  "MNSRATTP"  69.0  "PALA    "  69.0    "1 "
*
```

Switching Sequence 4 - Three-phase fault on San Onofre 230 kV bus cleared after 6 cycles by tripping San Onofre units 2 and 3.

```
*
*  3 phase 6 cycle fault at San Onofre 230 kV
*  followed by loss of SONGS units #2 and #3
*
*  CC cards for post-transient only
*
CC DRP 2150
*
*  Apply bus fault at S.ONOFRE 230 kV
*
FB   60.0  "S.ONOFRE" 230.
*
*  Clear bus fault at S.ONOFRE 230 kV
*
CFB  66.0  "S.ONOFRE" 230.
*
*  Trip SONGS units #2 and #3
*
TG   66.0 "S.ONOFR2 "  22. "**"
TG   66.0 "S.ONOFR3 "  22. "**"
*
```

Switching Sequence 5 - Three-phase fault on Palomar Energy 230 kV bus cleared after 6 cycles by tripping Palomar Energy units 1, 2, and 3.

```
*
*  3-phase 6 cycle fault at Palomar 230 kV
*  followed by loss of PEN units 1, 2 and 3
*
*  CC cards for post-transient only
*
CC  DRP 520
*
*  Apply bus fault at Palomar 230 kV
*
FB   60.0  "PEN     " 230.
*
*  Clear bus fault at Palomar 230kV
*
CFB  66.0  "PEN     " 230.
*
*  Trip PEN units 1, 2 and 3
*
TG   66.0  "PEN_CT1 "  18. "**"
TG   66.0  "PEN_CT2 "  18. "**"
TG   66.0  "PEN_ST  "  18. "**"
*
```

Switching Sequence 6 without SPS - Three-phase fault on Imperial Valley/Windfarm 500 kV bus cleared after 4 cycles by opening Imperial Valley/Windfarm-Miguel 500 kV transmission line. (without SPS)

```
*
*  3-phase 4 cycle fault at Imperial Valley 500 kV/Windfarm 500 kV
*  followed by loss of Imperial Valley/Windfarm - Miguel 500 kV TL50001;
*
*  CC cards for post-transient only
*
CC  DRP 0
*
*  Apply bus fault at Imperial Valley 500 kV/Windfarm 500 kV
*
FB   60.0  "WNDFARMS" 500.
*
*  Flash SWPL capacitors
*
FC   60.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 2
*FC   60.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*FC   60.0  "IMPRLVLY" 500. "WNDFARMS" 500. "1 " 1
*
*  Clear bus fault at Imperial Valley 500 kV/Windfarm 500 kV
*
CFB  64.0  "WNDFARMS" 500.
*
*  Trip Imperial Valley/Windfarm - Miguel TL50001
*
DL   64.0  "WNDFARMS" 500. "MIGUEL  " 500. "1 "
*
*  Reinsert remaining SWPL capacitors
*
RC   64.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 2
*RC   64.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*RC   64.0  "IMPRLVLY" 500. "WNDFARMS" 500. "1 " 1
*
```

Switching Sequence 6 with SPS 6.1 - Three-phase fault on Imperial Valley/Windfarm 500 kV bus cleared after 4 cycles by opening Imperial Valley/Windfarm-Miguel 500 kV transmission line. (with SPS 6.1)

```
*
*  3-phase 4 cycle fault at Imperial Valley 500 kV/Windfarm 500 kV
*  followed by loss of Imperial Valley/Windfarm - Miguel 500 kV TL50001;
*  followed by automatic SPS 6.1 to open IV Generation
*
*  CC cards for post-transient only
*
CC  DRP 952
*
*  Apply bus fault at Imperial Valley 500 kV/Windfarm 500 kV
*
FB   60.0  "WNDFARMS" 500.
*
*  Flash SWPL capacitors
*
FC   60.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 2
*FC   60.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*FC   60.0  "IMPRLVLY" 500. "WNDFARMS" 500. "1 " 1
*
*  Clear bus fault at Imperial Valley 500 kV/Windfarm 500 kV
*
CFB  64.0  "WNDFARMS" 500.
*
*  Trip Imperial Valley/Windfarm - Miguel TL50001
*
DL   64.0  "WNDFARMS" 500. "MIGUEL  " 500. "1 "
*
*  Reinsert remaining SWPL capacitors
*
RC   64.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 2
*RC   64.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*RC   64.0  "IMPRLVLY" 500. "WNDFARMS" 500. "1 " 1
*
*  SDG&E SPS TMC1505 6.1 SPS B
*  (assume redundant scheme in CFE operates in 2 sec)
*  Trip IV Generation
*
TG   64.0  "INTBCT  "  16.  "**"
TG   64.0  "INTBST  "  18.  "**"
TG   64.0  "IV GEN1 "  21.  "**"
TG   64.0  "IV GEN2 "  18.  "**"
TG   64.0  "IV GEN3 "  18.  "**"
*
*  Add in LRP1 unit if connected for export to U.S.
*
```

Switching Sequence 6 with SPS 6.2 - Three-phase fault on Imperial Valley/Windfarm 500 kV bus cleared after 4 cycles by opening Imperial Valley/Windfarm-Miguel 500 kV transmission line. (with SPS 6.2)

```
*
*  3-phase 4 cycle fault at Imperial Valley 500 kV/Windfarm 500 kV
*  followed by loss of Imperial Valley/Windfarm - Miguel 500 kV TL50001;
*  followed by automatic SPS 6.1 to open IV Generation
*  followed by automatic SPS 6.2 to open ML - TJI 230 kV TL23040 Heavy Summer
*  followed by automatic SPS 6.2 to open IV-ROA 230 kV Light Winter
*
*  CC cards for post-transient only
*
CC  DRP 952
*
*  Apply bus fault at Imperial Valley 500 kV/Windfarm 500 kV
*
FB   60.0  "WNDFARMS" 500.
*
*  Flash SWPL capacitors
FC   60.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 2
*FC   60.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*FC   60.0  "IMPRLVLY" 500. "WNDFARMS" 500. "1 " 1
*
*  Clear bus fault at Imperial Valley 500 kV/Windfarm 500 kV
CFB  64.0  "WNDFARMS" 500.
*
*  Trip Imperial Valley/Windfarm - Miguel TL50001
DL   64.0  "WNDFARMS" 500. "MIGUEL  " 500. "1 "
*
*  Reinsert remaining SWPL capacitors
RC   64.0  "HASSYAMP" 500. "N.GILA  " 500. "1 " 2
*RC   64.0  "N.GILA  " 500. "IMPRLVLY" 500. "1 " 2
*RC   64.0  "IMPRLVLY" 500. "WNDFARMS" 500. "1 " 1
*
*  SDG&E SPS TMC1505 6.1 SPS B
*  (assume redundant scheme in CFE operates in 2 sec)
*  Trip IV Generation
TG   64.0  "INTBCT  "  16.  "**"
TG   64.0  "INTBST  "  18.  "**"
TG   64.0  "IV GEN1 "  21.  "**"
TG   64.0  "IV GEN2 "  18.  "**"
TG   64.0  "IV GEN3 "  18.  "**"
*
*  SDG&E SPS TMC1505 6.2
*  (assumes ROA-HRD or ROA-RUM over 388 MVA operates in 2 sec)
*  Trip ML - TJI 230 kV TL23040 Heavy Summer
*  Trip IV-ROA 230 kV Light Winter
*
DL   184.  "MIGUEL  " 230. "TJI-230 " 230. "1"
DL   184.  "IMPRLVLY" 230. "ROA-230 " 230. "1"
*
```