Simultaneous Feasibility Test (SFT) Process Overview - Page 1 VSAT determines the VSAT identified Breaker switching schedules Report network topology Report unsolved Convert the network Generic constraints of the Report error message to CLU Close forced closed breakers (TOPPER and via MSSNET csv files representation into the transfer limit on following form are created: violations, load limits and Register availability SFTCOB modes) Register availability predefined interfaces transfer limits are Register availability with bus-branch model that Additional Information $A_1 \times P_1 + A_2 \times P_2 + \dots \leq INT_n$ with the MDB to Reactive profiles (non-TOPPER modes) the MDB to receive a new with the MDB to VSAT recognises. based on defined reported VSAT constraints are receive a new case to Thermal branch limit calculation based on Latta Exports the state of the case to be studied receive a new case to scenarios. Where A₁, A₂,... are the branch flow reported in csv files be studied calculation and overall branch limit is the be studied solution coefficitients, P₁, P₂,... is the branch Register availability with minimum of the static and thermal limits (non-The same network toplogy flow and INT_{fl} is the interface flow limit the MDB to receive a TOPPER modes) as SFTCheck is used If applicable, quadratic offload curve coefficients as determined by VSAT new case to be studied calculated using specified offload time and conductor characteristics (non-TOPPER modes) End End End No Case setup for Create generic Converged? Run VSAT End Evaluate VSAT constraints SFT Start up and schedules and TOPPER mode? Initialisation overall static limit Simultaneous Feasibility Test (SFT) Yes Run AC power flow Valid mode? Run TOPPER No Yes **Future Implementation** Run AC VSAT mode? power flow **TOPPER** Yes solved? Case setup Run Optimal End Converged? Power Flow (OPF) MW Injection SFTCOB or SFTCheck mode? Setup End Yes End Goto Page 2 MDB assigns case Retrieve network model Report TOPPER MW injection (generation, Report unsolved status Determine voltage-var control Report voltage-var control MDB specifies mode for load and HVDC dispatch) and Register availability with recommendations Retrieve contingency data (if failure movements to alleviate/ SFT (TOPPER, SFTCOB, Register availability with Register reserves from SPD the MDB to receive a reduce voltage violations applicable) Additional Information SFTCheck, VSAT or OPF) Determine static branch limits availability with Expand unit limits if exceeded new case to be studied the MDB to receive a new based on specified summer/winter case to be studied the MDB to by SPD energy and reserve limits (non-TOPPER modes) receive a new AC decoupled power flow options case to be studied If Unit Reallocation option is set allocate the MW at station Retrieve DCP model (VSAT only) to minimum number of units Retrieve control model (OPF only)

Simultaneous Feasibility Test (SFT) Process Overview – Page 2 Create sensitivity factors for Constraint of the generic Record branch and Use fast decoupled Base case violations Produce csv file that contains created constraints algorithm reported in the SFT to be used in the next SPD iteration, unsolved or constraints specified by SPD voltage violation. Calculate offload time to Check solution file. Sensitivity factors indicate the partially solved contingencies and voltage Additional Information $K_1P_m + K_2P_c \leq c$ Displayed in the Market violations. change in the constraint manage constraint if Indication of AC or DC solve. output given a change in a K₁ and K₂ are constraint applicable. Operator Interface. If SFTCheck mode then csv file contains base generator output. coefficients; case and contingency violations, sensitivity Sensitivity used by the Block/ P_m and P_c are the pre-contingency factors for SPD monitored constraints, forced Station constraint processing power flow on the monitored and close breaker that are open voltage violations application in the MDB. contingent branches respectively; Register availability with the MDB to receive a c is the RHS of the constraint new case to be studied Calculate injection sensitivities for End SPD monitored Record base case constraints violations Near binding or binding offload SFTCheck mode? limit violation? Yes Yes SFTCheck mode? All potentially Create branch Record the branch Base case harmful Solve contingency violations? contingencies constraint violation power flow using processed? same method as base case Simultaneous Feasibility Test (SFT) Near binding or binding static limit violation? All included Contingency Solve base case AC power flow SFTCheck mode? contingencies power flow AC power flow solved? screened? solved? Yes No SFTCheck mode? constraint Record unsolved or partially solved Yes contingency From Nonlinear DC power flow Page 1 Solve using solved? No nonlinear DC method? Calculate offload Record the branch violation (if applicable) Screened contingency Yes violates limit? Initialise and solve base case using End nonlinear DC End Add contingency method to potentially harmful list Constraint of the generic form: Return solve failure Flat start voltage Return solve failure Screening based on single Record branch and iteration of decoupled power voltage violation. status Large tolerance on $K_1 P_m + K_2 P_c \le c$ Calculate offload time to Register availability the MVAr Register availability Additional Information with the MDB to convergence with the MDB to Angle difference across the manage constraint if K₁ and K₂ are constraint coefficients; branch is compared to an P_m and P_c are the pre-contingency receive a new case to No voltage receive a new case to applicable. be studied magnitude update be studied angle difference limit. power flow on the monitored and MVAr component of Angle difference limit based contingent branches respectively; branch flows are on active base case branch c is the RHS of the constraint zeroed after limit adjusted with a screening tolerance. convergence