High Level Description of Security Constraint Creation Process with SFT Constraint Builder (SFTCOB) (see page 2 for additional detail)

Additional Information
- Workflow module in the MDB determines the next application to run in the schedule.
- All constraints used by SPD displayed in the Market Operator Interface (MOI).
- Branch security constraints within 85% of their limit are published to the market (Production schedules only).

Additional Information
- Yes if SFTCOB enabled for the schedule AND Convergence criteria not satisfied AND Maximum iterations between SPD and SFTCOB not reached.
- Injection MW from SPD.
- Network model (offered grid as used by SPD), reactive profile from network database.
- Contingencies from contingency database.

SFT - Constraint Builder (SFTCOB)
- Solve SPD
- Run SFTCOB
- Initialise SFTCOB
- Calculate branch limits
- Solve base case powerflow
- All included contingencies processed?
- If yes, go to next SPD iteration.
- If no, solve contingency powerflow.
- Calculate offload limits
- Near binding or binding offload limit violation?
- If yes, create (offload) branch security constraint using pre and post contingency flow and offload characteristics.
- If no, calculate static and thermal branch limits.
- Offload limits are calculated based on the pre-contingency loading, conductor characteristics and the specified offload time.
- Constraint of the generic form:
  \[ K_1 P_m + K_2 P_c \leq c \]
  Where \( K_1 \) and \( K_2 \) are constraint coefficients; \( P_m \) and \( P_c \) are the pre-contingency power flow on the monitored and contingent branches respectively; \( c \) is the RHS of the constraint.

Additional Information
- Produce constraint file that is to be used in the next SPD iteration for the same trading period.
- Go to the next SPD iteration for the same trading period.

Additional Information
- Binding violations are violations of 100% of the limit. The threshold value \( X \) is specified in the database.
- Near binding or binding static limit violation?
- If yes, create (static) branch security constraint using pre and post contingency flow.
- If no, go to the next SPD iteration for the same trading period.
Detailed Description of Security Constraint Creation Process with SFT Constraint Builder (SFTCOB)

- Workflows module in the MDB determines the next application to run in the schedule.
- All constraints used by SPD are displayed in the Market Operator Interface (MOI).
- Branch security constraints within 85% of their limit are published to the market.
- Additional information.

**SFT - Constraint Builder (SFTCOB)**

1. To MDB
2. Solve SPD
3. Run SFTCOB
4. SFTCOB
5. Decide if SFTCOB enabled:
   - Yes if SFTCOB enabled for the schedule AND
   - Convergence criteria not satisfied AND
   - Maximum iterations between SPD and SFTCOB not reached.
   - Else NO
6. Injection MW from SPD.
7. Network model (offered grid as used by SPD), reactive profile from network database.
8. Contingencies from contingency database.
9. Nonlinear DC power flow is based on decoupled power flow algorithm but with the convergence on the MVAr problem relaxed and with no voltage magnitude update.
10. Offload limits are calculated using the quadratic offload curve and the pre-contingency loading.
11. Constraint of the generic form:
    \[ K_1 P_m + K_2 P_c \leq c \]
    
    where:
    - \( K_1 \) and \( K_2 \) are constraint coefficients;
    - \( P_m \) and \( P_c \) are the pre-contingency power flow on the monitored and contingent branches respectively.
    - \( c \) is the RHS of the constraint.

Additional Information:
- Constraint of the generic form:
  \[ K_1 P_m + K_2 P_c \leq c \]
  
  where:
  - \( K_1 \) and \( K_2 \) are constraint coefficients;
  - \( P_m \) and \( P_c \) are the pre-contingency power flow on the monitored and contingent branches respectively.
  - \( c \) is the RHS of the constraint.