Use Case 1: Import Operational Model to Planning

1   Summary:

Import a state estimator or load flow case from the Energy Management System into the planning environment to establish a planning base case for additional study or for developing a current plannng model.

2   Actor(s):

Describe the primary and secondary actors involved in the use case. This might include all the people (their job), systems, databases, organizations, and devices involved in or affected by the role performed (e.g. operators, system administrators, customer, end users, service personnel, executives, meter, real-time database, ISO, power system). Actors listed for this use case should be copied from the global actors list to ensure consistency across all use cases.

Actor Name	Actor Type (person, system, device, etc.)	Role description for this use case
Network Planning Engineer	Person	Develop a base planning model to examine an operations event or to establish a new planning base case for future planning.
EMS Operator	Person	Attends the EMS and is familiar with its capabilities to export network models
EMS- Energy Management System	System	System for monitoring/controlling the real-time system and includes a bus-breaker network operations model for real-time network calculations and includes switches/breakers in the model (bus-breaker model). Includes a State Estimator and usually a load flow solution package
Planning Software	System	Software for detailed study of network performance, usually representing a larger geographical territory than the network model in the EMS. Generally based on a bus-branch model (no switches/breakers). Planning software includes power flow, short-circuit, dynamics, etc.
CIM XML	Method	A protocol defined by a NERC profile that establishes the content, naming, relationships, etc. of network data and the file format for a file exchange from one EMS to another such that sufficient data is exchanged to perform a similar load flow solution on the receiving EMS system
Topology Processor	Analysis	A software analysis used to remove switches/breakers from an operations model (bus-breaker model) to a planning model (bus-branch model). Uses the switch positions (open/closed) in the operations model to connect/disconnect equipment terminals together in the planning model. The bus-breaker model can be developed from base EMS data or from an actual operations mode.
Base Case	Network planning model from which network alternatives are studied	A data set that represents the network at a specific point in time either as a past point in time or a significant point in time in the future (e.g. 2008 Summer heavy case). The Network Planning Engineer builds alternatives on this case for transmission expansion scenarios or "what-ifs" if the case is a case representing a historical operating point

3   Assumptions / Design Considerations:

The urgency of the export/import is a function of the planning activities that use the model. If the planning model is to be used in an environment to study near-term voltage/rating violations or stability, rapid export/import (on the order of minutes) is required. When developing an operating event base case for further study, time may not be as critical (on the order of hours).

4 Pre-conditions:

The network model exists on the EMS, and for the case of exporting information to emulate an operating event, the SCADA data is available for export such that switch positions and generation and load values are provided in the exported data.

5 Normal Sequence:

Use Case Step	Event/ Input to this step	Actor activity and tools used	Description Of Processing	Information Producer	Information Receiver	Output Information to be Exchanged	Notes or Comments
#	*Event that triggers this step and/or inputs*	*Name of actor(s), activity description, and tools/ applications used*	*Describe the processing that takes place in this step.*	*Actors/tools responsible for producing information.*	*Actors responsible for receiving information*	*Description of information produced in this step to be exchanged with Information Receiver*	
1	Request from planning for an EMS network model	Network Planning Engineer specifies what case is needed: base/normal model (from base EMS model) point-in-time model (from state estimator or load flow model)	Network Planning Engineer must specify the type of case needed for their purposes and, if it is for a specified time, the time of the model needed	EMS system	A file	The file can be in any number of forms depending on the tools available to the network planning engineer, but it is generally a data file for one of the more popular network planning software packages, or in IEEE format (2A) Alternatively the file can be: Operations model CIM XML file (includes switches) (2B) Raw data files (2C)	Popular planning formats include: PSS™E PSLF IEEE See alternate Steps 2A – 2C for

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2A	Planning data file in a popular planning software format	Network Planning Engineer imports data file directly into planning software application	Generally a "Read," "Open," or "Import" activity in the receiving applications software; or, perhaps a custom data conversion software application	Application software or data conversion software	Network Planning Engineer	Base Case for Network Planning Engineer use	**Process Complete**
2B	Operations model in CIM XML	Network Planning Engineer runs CIM XML import, topology processor and data format converter	A CIM XML interpreter must be run and a topology process performed to convert the operations model to a planning model, this model must then be converted to the target planning applications software format	Converter software	Network Planning Engineer	Base Case for Network Planning Engineer use	**Process Complete**
2C	Operations model in EMS specific format	Network Planning engineer runs format converter/ importer, topology processor and data format converter	An EMS raw data interpreter must be run and a topology process performed to convert the operations model to a planning model, this model must then be converted to the target planning applications software format	Converter software	Network Planning Engineer	Base Case for Network Planning Engineer use	**Process Complete**

6   Exceptions / Alternate Sequences:

Describe any alternative actions that may be required that deviate from the normal course of activities. Should the alternate sequence require detailed descriptions, consider creating a new Use Case.

When the Network Planning Engineer has the data in it's network planning form, they may choose to extend this base model by attaching a larger external planning representation to the model. This implies removing any equivalent model at the external portion of the original EMS model and merging the resulting model with the external planning model.

7   Post Conditions

Describe conditions that must exist at the conclusion of the use case.

Complete and error-free transfer.

8   Activity Diagrams

Typically an activity diagram with swim lanes for each participating system or actor to graphically describe the step-by-step interactions between actors/systems and the messages exchanged between them. Additionally, sequence diagrams may be developed to help describe complex event flows.

9   References:

Use Cases referenced by this use case, or other documentation that clarifies the requirements or activities described. Also any prior work (intellectual property of companies or individuals) used in the preparation of this use case.

10 Issues:

List of outstanding issues that must be addressed to complete the use case.

ID	Description	Status

11 Revision History:

No	Date	Author	Description
0	11/06/2006	S F Mauser	Initial version

12 Use Case Diagram

Step 1 – Request File from EMS

System Planner

EMS Export

Step 2 – Export System Model

EMS Network Model File in EMS Raw Data Form

EMS Network Model File in CIM XML Form

EMS Network Model File in Either Planning Application or IEEE Format

Convert Raw Data, Topology Process, Export to Planning Application File

Convert CIM XML Data, Topology Process, Export to Planning Application File

Applications Software Package