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INNOVATIVE SOLUTIONS FOR THE DEREGULATED ENERGY INDUSTRY

## **NORTH AMERICAN ELECTRIC RELIABILITY COUNCIL CHANGE ORDER: 163**

**ORIGINATOR'S NAME:** IDCWG / DFWG  
**ORIGINATION DATE:** SEPTEMBER, 2004  
**SPONSOR:** IDCWG

**MARK-UP BY:**  
**MARK-UP DATE:**  
**REVISION: 1**

**CHANGE REQUEST SUMMARY:** **IMPLEMENT GRANULARITY INTO IDC – WHITE PAPER ON THE  
FUTURE OF CONGESTION MANAGEMENT, OPTION 1**

### **CHANGE REQUEST DETAIL:**

The detailed description of the IDC granularity to be implemented can be found on the White Paper on the Future of Congestion Management – Option 1, Version 2.1, June 2004.

### **EVALUATOR'S SECTION:**

EVALUATOR'S NAME: Open Access Technology International, Inc.

DATE: 11/14/2004

### PROPOSED CHANGE DESCRIPTION:

The IDC will be modified with the implementation of the IDC granularity as described in Option 1 of Version 2.1 of the White Paper on the Future of Congestion Management (Granularity). A description of the changes to the IDC is described below. Further details of the software and hardware changes to the IDC will be provided in revisions of this change order following discussions with the IDCWG and other NERC committees and working groups, as needed.

#### **1. Existing IDC Model**

##### **1.1. Service Point and TDF Model**

The IDC currently computes generation and load Transfer Distribution Factors (TDF) for Service Points. The Service Points are currently comprised of the set of generation and load buses within the control areas defined in the base network model. The TDFs of the Service Points are computed as the weighted sum of the Service Points' Generator Shift Factors (GSF) and Load Bus Shift Factors (LBSF). For market entities, in addition to the control areas in the base network model, the IDC computes the import and export market footprint TDFs by way of a

weighted sum of the Service Points' TDFs for the Service Points within the market footprint. As such, the IDC TDF calculation module can be described as the weighted sum of generators and load bus shift factors.

The Service Points weighting factors are defined in the base network model (MBase) and may be modified via the SDX by changing the generation statuses (in-service, out-of-service or de-rated), and via the market interface used in exchanging information between the IDC and the markets (generator mobility factors and marginal zone weighting factors).

### **1.2. Tag Model**

E-tags are currently sent by the control areas' Tag Authority service provider to the IDC at the time the tags are approved for scheduling and implementation. The IDC models an e-tag as a point-to-point (PTP) transaction between a source and a sink Service Point. In general, the source and sink Service Points are identified through a direct map between the e-tag source control area (GCA) and an IDC Service Point, and between the e-tag sink control area (LCA) and an IDC Service Point. There are, however, a few exceptions where an e-tag GCA or LCA is not directly mapped to an IDC Service Point, such as controlled interfaces (DC ties and/or phase shifters). In such cases the IDC performs additional checks in an e-tag to identify the source and/or sink Service Point, which can be identified by the Source and/or Sink Points or the POR/POD on an e-tag.

### **1.3. NNL Model**

The current IDC NNL calculation module computes the Generation-to-Load Distribution Factors (GLDF) for each generator in a Service Point as the difference between the generator's GSF and the aggregate load TDF (also called Load Shifter Factor, or LSF) of the Service Point. The NNL impact is calculated by multiplying the output of the generator used in providing native load by the generator's GLDF. The output of a generator is computed by distributing the control areas' load to its generators. The generators' distribution factors are modeled by the generators' MW capability (P-Max) defined in the base network model.

### **1.4. TLR Calculations**

The IDC TLR calculations will not be modified unless, of course, the NERC Policy 9 (TLR Procedures) is modified. The IDC will identify all the tags that impact the flowgate in TLR by at least 5% of their schedule. The impact of a tag is calculated as the different between the TDF of the source Service Point and the TDF of the sink Service Point, where the source and sink Service Points are defined as described in the Section 1.2 above.

TLR levels 5A and 5B requires the IDC to calculate the NNL contribution and the total control area NNL relief responsibility, and the NNL MW contribution depends on the GLDFs and on the MW output of the generators.

## **2. IDC Modeling Requirements Under Granularity**

### **2.1. Service Point and TDF Model**

The Service Point TDF modeling requirements to implement the Granularity does not change the way the IDC performs its calculations; that is, TDFs will be calculated for the Service Points as the weighted sum of the GSFs and LBSFs in a Service Point. The Service Points, however, may no longer be defined as the control areas in the base network model. Instead, the Service Points may be defined as the control areas and/or zones in the base network model, or through

some sort of registry that will contain the Service Point name and the list of generator and load in the Service Point. The IDC may also be modified to enable the IDC users or the DFWG to model Service Points and their generators and loads directly through the IDC user interface. Although the Granularity requirements limits the generators to belong to a single zone, and a zone to belong entirely in a control area, the IDC Service Point model is not technically limited by zone and control area boundaries, and a Service Point may contain one or multiple generators and buses, that can belong to different zones or control areas.

## **2.2. Tag Model**

The tag model for the Granularity requires the IDC to check the Source and Sink Points to identify the source and sink Service Points. NERC will provide a map between all registered Source and Sink Points to the IDC Service Points. In the event that a Source or Sink Point in an e-tag is not mapped to an IDC Service Point, the IDC will assume that the e-tag source and/or sink Service Points are the host control areas of the Source and Sink Points of the e-tag.

## **2.3. NNL Model**

In current hour calculations (TLR 5B), the control areas' generator outputs will be determined from real-time generator output data, via ICCP. The zones' native load amounts will also be received via ICCP. For next hour calculations (TLR 5A), the control areas' native load will be distributed to the control areas' generators based on the current real-time generator output data enhanced with block loading merit order data provided via SDX. The next hour's native load of each zone data will be provided via SDX.

In the event that ICCP data is unavailable the IDC will default native load values from those provided in the SDX, with the generation output allocated via block loading merit order. In the rare event that both ICCP and SDX data becomes unavailable the IDC will use the last available data, or default to the base case network model values.

## **2.4. TLR Calculations**

Although the NNL MW contribution calculation methodology does not change under the Granularity, the method for allocating the native load to the generators will be changed based on the merit order scheme described in Section 2.3 above.

## **3. Summary of the IDC Changes**

The following describes the changes to the IDC and responsibilities to support the Granularity:

### **NERC/DFWG:**

- Provide the IDC with a zone-based base case network model. The IDC will setup Service Points for every zone and control area defined in the base network model.
- Provide the IDC with a map between the NERC Master Registry Source-Sink Points and the IDC base case zones and/or control areas in the network model. In addition the NERC Master Registry Control Areas must also be mapped to an IDC base case zone or control area. Source-Sink Points not properly mapped to an IDC base case zone will, by default, be set to the host control area map.
- Facilitate providing the IDC with generator block loading merit order for each zone in the IDC via SDX. This data is to be provided once per day, or more often. However, this data will not be provided more often than once per hour.

- Support providing the IDC with data from ICCP – generator outputs and zone loads.
- Provide the IDC with a map between the generators and zones ICCP ID to the base case generators and zones.

***IDC:***

- Support the creation of Service Points from base case zones and control areas
- Support the maintenance of the mapping between IDC base case zones and control areas, and NERC Master Registry Control Areas and Source-Sink Points on-line in the IDC via a user interface
- Map the generators and zones ICCP IDs to the base case network model generators and zones
- Modify the SDX import application to support receiving the generator block loading merit order information
- Setup an ICCP node, and the subsequent use of generator outputs and zone loads
- Modify the tag processing to assign a tag to a Service Point dynamically, as the map between a Source-Sink Point and a Service Point can be changed dynamically
- Modify the IDC TLR 5A and 5B process to allocate generation based on ICCP and merit order information
- Provide user interface to display the real time data received from the ICCP
- Modify the TLR processes to account for the tags dynamic Service Points
- Modify the Whole Transaction List to account for the tags dynamic Service Points
- Modify the all tag displays to account show the dynamic Service Points
- Modify the GLDFs to account for changes to generator output based on the generator block loading merit order
- Data archival

IMPACT OF REQUESTED CHANGE:

PROJECT SCHEDULE:

The following is a simplified schedule based on an “go live” date of 06/01/2005:

- Change order approval for implementation: 01/01/2005
- Software development, hardware procurement: Begins on 01/01/2005
- Provide a sample of all data IDC will receive: 02/15/2005
- Testing with the IDCWG: 04/01/2005 – 04/30/2005
- Implementation on the IDC training system: 05/01/2005
- Implementation on the IDC production system: 06/01/2005

HARDWARE AND THIRD PARTY SOFTWARE:

Hardware for this project is required to support additional data to be archived and additional data transfers. OATI is currently negotiating with NERC on the IDC contract extension which will include the hardware needed to support this change order. In the event that the hardware to support this change order is not included as part of the IDC contract extension, OATI will evaluate the hardware needs based on the hardware that will be available at the time of the IDC contract extension.

PROJECT MANAGEMENT: As per SSD.

ACCEPTANCE TESTING: As per SSD.

DOCUMENTATION: None

TRAINING: OATI will provide two one-day training sessions at the OATI Data Center in Minneapolis, Minnesota, during the month of May, 2005. Additional training sessions at the OATI Data Center or at other sites may be provided as well at the rate indicated below.

HELP DESK: As per Exhibit C in the IDC Operation Services Extension Agreement

INTELLECTUAL PROPERTY: The design and implementation of "Implement Granularity into the IDC" was developed exclusively by OATI using public domain ideas and expressions. OATI claims exclusive ownership of and retains all intellectual property rights in this design, implementation and software. OATI agrees to waive only its "Implement Granularity into the IDC" software license fee with respect to NERC during the term of the IDC Operation Services Agreement, excluding any software license fee for other OATI supporting software required for this Change Order.

<b>Date</b>	<b>Revision</b>	<b>Changes</b>
11/14/2004	1	Initial Request