

406 FIRM LOAD RESPONSIBILITY

1. Purpose

This OPP outlines the process and calculations to be used by the ISO for determining firm load responsibility (FLR) used in the contingency reserve calculations.

2. Background

As a participating member of Northwest Power Pool, the ISO is required to carry contingency reserve that is at least the sum of five percent of the FLR served by hydro and wind generation, and seven percent of the FLR served by thermal generation in the AIES. FLR varies with AIES demand and a real-time calculation is required.

The ISO has no obligation to provide contingency reserve for non-firm Alberta internal load (AIL). These are loads that are not secured through a DTS contract with the ISO. A correction factor (COR) will be applied to determine the FLR. Examples are set out in [Appendix A](#).

Several new generators are part of industrial sites that have significant local loads that are either partially or not at all secured through DTS contracts with the ISO. A COR is used in each case to account for the non-firm load. An explanation of the COR calculation is provided in [Appendix B](#). (Note that COR is either a negative number or 0.)

3. Policy

3.1 Definition of firm load responsibility (FLR)

FLR is defined as:

- the AIES firm load demand served under demand transmission service (DTS)
- *plus* AIES losses
- *plus* firm export transaction
- *minus* firm import transaction
- *minus* firm load under the ISO's DTS which is under contract to provide operating reserves.

3.2 Calculation methodology

- The first two components in the FLR definition, the AIES firm load demand served under DTS and the AIES losses, represent the AIES **internal** firm load and can be calculated by:
 - a. summing all total net generation (TNG) in the AIES
 - b. *plus* the total COR. A list of all COR sites and the calculation for each site is provided in [Appendix C](#)

Reserve Management
OPP 406 Firm Load Responsibility

- c. *minus* total load under demand opportunity service (DOS) contracts. However, since these loads are not telemetered to the ISO and they are small volume in total, this factor is ignored.
- d. *plus* actual MW value of imports on the Saskatchewan and BC interconnections
- e. *minus* actual MW value of exports on the Saskatchewan and BC interconnections.
- The third component in the FLR definition, firm export transaction, is the total export schedule on the Saskatchewan and BC interconnections.
- The fourth component in the FLR definition, firm import transaction, is the total import schedule on the Saskatchewan and BC interconnections.
- The last component in the FLR definition, Firm load under the ISO's DTS which is under contract to provide operating reserves, is the total load dispatched for supplemental reserves (i.e., SUPL).
- Therefore, the FLR calculation formula is:
$$\text{FLR} = \text{TNG} + \text{COR} + \text{actual import} - \text{actual export} + \text{scheduled export} - \text{scheduled import} - \text{SUPL}$$

4. Responsibilities

4.1 ISO

The ISO will:

- Periodically review the calculation process described in this OPP and update it as required; for example, add or delete a site.
- Periodically review the sites to which the calculation is applied and verify that the data values used are the correct ones; for example, when new DTS or DOS contracts are signed.
- Update [Appendix C](#) whenever the DTS levels of the sites in Appendix C change.
- Update the COR calculations with respect to the specific sites to which it is applied and the data values used when [Appendix C](#) has been updated.

System Controller

The SC will use the results of the calculation described in this OPP to determine the amount of contingency reserve required.

5. System Controller Procedures

None specified.

Appendix A. Non-firm load calculation

The following example illustrates the principles of measuring non-firm load. The example is based on a facility with two 400 MW generators. The generators at full load consume 25 MW of unit service power. The facility has 450 MW of load that includes any station service load. The facility has also contracted for 200 MW of firm service with the ISO.

Example 1

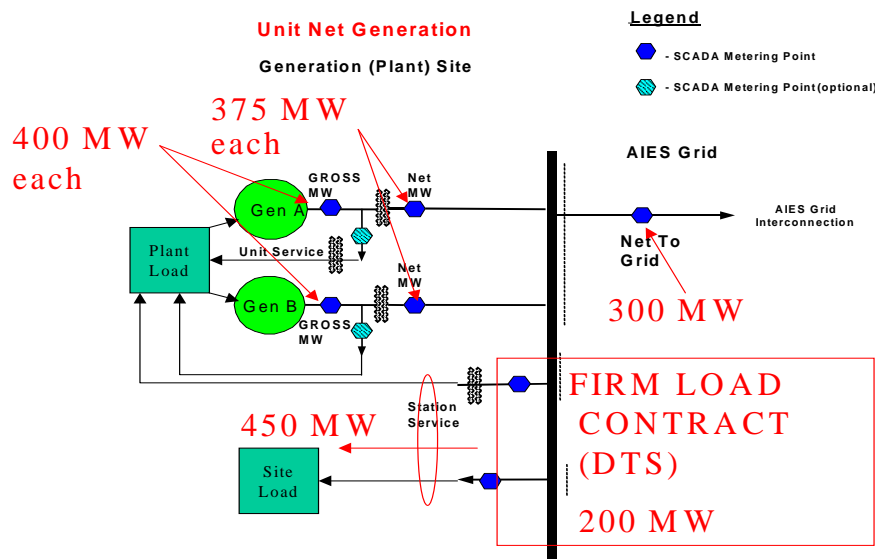
Gross generation is 800 MW and net generation is 750 MW. The facility is 300 MW net to grid. The facility load is determined as net generation less net to grid or 450 MW as shown in Figure 1.

The facility has a contract where the first 200 MW are firm. The non-firm load at this facility is determined as 250 MW. The Correction (COR) is -250 MW.

Figure 1

Non-firm load

$$\begin{aligned} \text{Non-Firm Load} &= \max([\text{Total Net Gen} - \text{Net to Grid} - \text{DTS}], 0) \\ &= \max([750 - 300 - 200], 0) \\ &= 250 \text{ MW} \end{aligned}$$



Example 2

Gross generation is 800 MW and net generation is 750 MW. The facility is 550 MW net to grid. The facility load is determined as net generation less net to grid or 200 MW as shown in Figure 2.

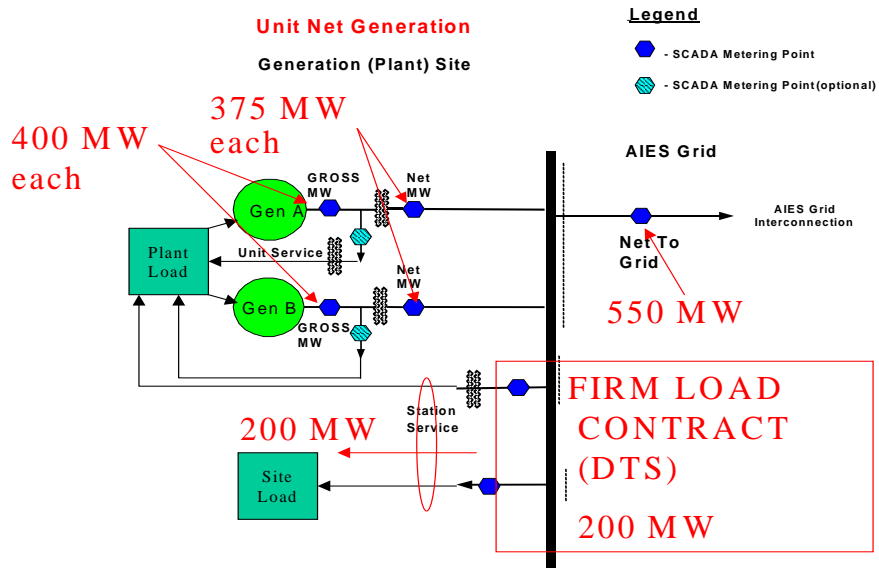
The facility has a contract where the first 200 MW are firm. The non-firm load at this facility is determined as 0 MW. The COR is 0 MW.

Reserve Management
OPP 406 Firm Load Responsibility

Figure 2

Non-firm load example 2

$$\begin{aligned} \text{Non-Firm Load} &= \max([\text{Total Net Gen} - \text{Net to Grid} - \text{DTS}], 0) \\ &= \max([750 - 550 - 200], 0) \\ &= 0 \text{ MW} \end{aligned}$$



Example 3

Gross generation is 260 MW and net generation is 250 MW. The facility is -200 MW net to grid. The facility load is determined as net generation less net to grid or 450 MW as shown in Figure 3.

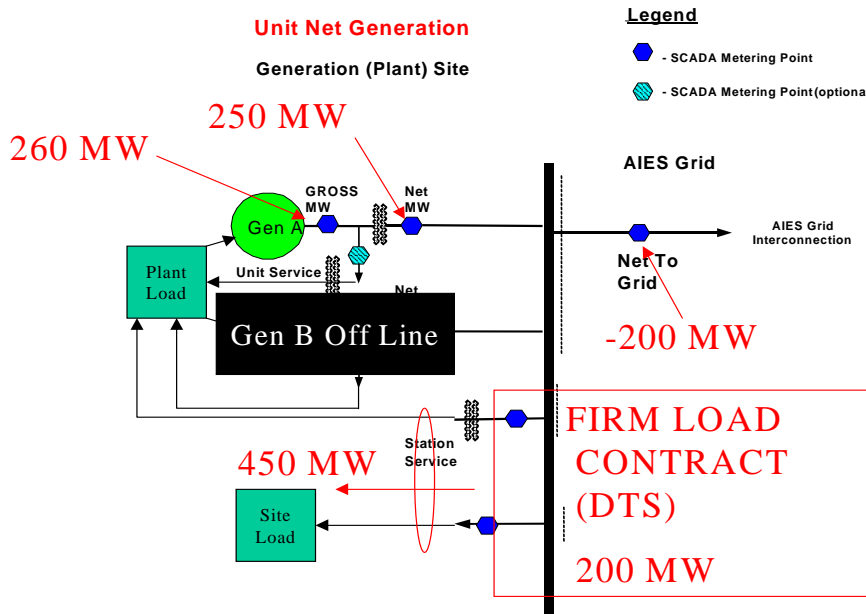
The facility has a contract where the first 200 MW are firm. The non-firm load at this facility is determined as 250 MW. The COR is -250 MW.

Reserve Management
OPP 406 Firm Load Responsibility

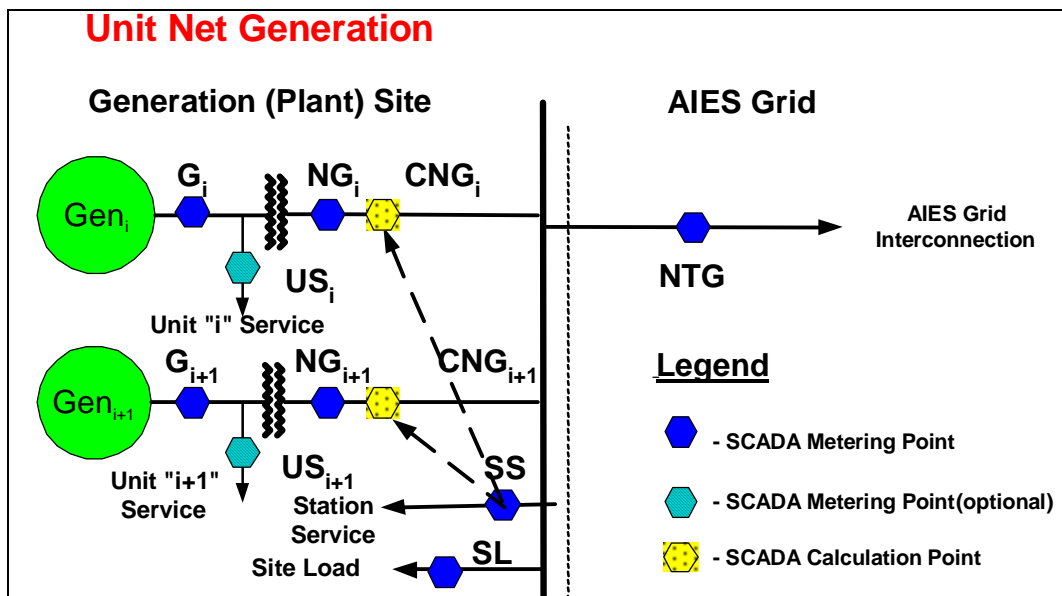
Figure 3

Non-firm load example 3

$$\begin{aligned} \text{Non-Firm Load} &= \max([\text{Total Net Gen} - \text{Net to Grid} - \text{DTS}], 0) \\ &= \max([250 - (-200) - 200], 0) \\ &= 250 \text{ MW} \end{aligned}$$



Appendix B. Correction factor (COR) calculation



“*ith*” Unit Gross Generation = G_i “*ith*” Unit Service Load = US_i
 Site Load = SL Station Service = SS

Reserve Management
OPP 406 Firm Load Responsibility

“*ith*” Unit Net Generation “*ith*” = $G_i - US_i$ - Unit Transformer Losses

$$\text{“}i\text{th” Unit Calculated Net Generation} = \text{CNG}_i = \text{NG}_i - \frac{\text{SS} \times G_i}{\sum_{i=1}^n G_i}$$

$$\text{Plant Net to Grid} = \text{NTG} = \sum_{i=1}^n \text{CNG}_i - \text{SL}$$

- The sites for which this correction is calculated are chosen on the basis of being industrial sites for which telemetry exists and where significant industrial load exists that does not have DTS contracts. The calculation requires the quantity of the DTS MW contract held by the customer at the site.
 - The formula for the calculation of the individual COR at each selected site is based on the generic configuration shown above, with the variable names located on the diagram.
 - The value of COR is calculated as the minimum of either (NTG + DTS – CNG) or zero
 - NTG is positive when flowing **into** the AIES and **out of** the site.
 - COR is either 0 or a negative number. It can never be a positive number.
 - The specific values of CNG and NTG vary from site to site depending on the local topology, number of lines, number of generators, etc. The specific values for these parameters are given in [Appendix C](#).
- The calculation of net generation (NG) or net to grid (NTG) is based on the availability of the following telemetered values:
- telemetry of NG (generation net of unit service load) or gross MW from all of the generators at each affected site (whichever is available)
 - telemetry either directly indicating, or sufficient to permit the calculation of, the NTG real power flow from the facility into the AIES

If the telemetry fails, the last good value is to be used until the telemetry is restored.

Appendix C. List of sites with correction factors (CORs)

This information is confidential.

To view the Appendix, click the link below and then provide the password.

[View Appendix C.](#)

Reserve Management
OPP 406 Firm Load Responsibility

6. Revision History

Issued	Description
2007-12-03	Supersedes 2007-06-14 (confidential Appendix only)
2007-06-14	Supersedes 2004-10-14
2004-10-14	Supersedes interim OPP effective 2004-09-02
2004-08-27	Approved for interim implementation, effective 2004-09-02
2003-07-28	Revised to ISO Operating Policies and Procedures