GUIDE TO WEB SERVICES

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Important Notice

AEMO has prepared this Guide to Web Services (Guide) to provide guidance on the use of the Web Services Client Software under the National Gas or Electricity Rules (Rules), as at the date of publication.

No reliance or warranty

This Guide does not constitute legal or business advice, and should not be relied on as a substitute for obtaining detailed advice about the National Gas or Electricity Law, the Rules or any other applicable laws, procedures or policies. While AEMO has made every effort to ensure the quality of the information in this Guide, neither AEMO, nor any of its employees, agents and consultants make any representation or warranty as to the accuracy, reliability, completeness, currency or suitability for particular purposes of that information.

Limitation of liability

To the maximum extent permitted by law, AEMO and its advisers, consultants and other contributors to this Guide (or their respective associated companies, businesses, partners, directors, officers or employees) are not liable (whether by reason of negligence or otherwise) for any errors, omissions, defects or misrepresentations in this document, or for any loss or damage suffered by persons who use or rely on the information in it.

Copyright

Copyright 2013 Australian Energy Market Operator Limited. The material in this publication may be used in accordance with the copyright permissions on AEMO's website.

Trademark notices

Microsoft is a trademark of Microsoft Corporation in the United States and/or other countries.
Oracle and Java are registered trademarks of Sun Microsystems, Inc. in the U.S. and other countries.

Documents made obsolete

The release of this document changes any version of the Web Services User Guide and earlier versions of Guide to Web Services

Distribution

Available to the public.

Prepared by

IMT Documentation Team
Last update: 21/06/2013 2:43 PM

Notes

Updated for Constraints Plain English Web Service.

Further information

For further information, please visit www.aemo.com.au or contact:
AEMO Information and Support Hub
Phone: 1300 AEMO 00 (1300 236 600) and follow the prompts.
Email: supporthub@aemo.com.au

Contents

Tables

Glossary

These abbreviations, symbols, and special terms assist the reader's understanding of the terms used in this document. For definitions of these terms, the reader should always refer to the applicable market Rules.

A

AEMC
Australian Energy Market Commission

API
Application Programming Interface

aseXML
A Standard for Energy Transactions in XML. The eXtensible mark-up language standard used by energy companies.

C

CSV
Comma-separated values; a file format for exchanging data.

E

EMMS
Electricity Market Management System; software, hardware, network and related processes to implement the wholesale National Electricity Market (NEM).

energy market systems web portal
Single web portal interface to access AEMO's IT systems.

H

HTTP
Hypertext Transfer Protocol

HTTPS
Hypertext Transfer Protocol Secure. A combination of the Hypertext Transfer Protocol (HTTP) with SSL/TLS protocol to provide encrypted communication and secure identification.

J

JRE
Java Runtime Environment

JSON
JavaScript Object Notation

M

MarketNet
AEMO's secure private data network connection.

MSATS
Market Settlements And Transfer Solution; software, hardware, network and related processes to implement the retail national electricity market (NEM).

N

NEM
National Electricity Market

NER
National Electricity Rules

NGR
National Gas Rules

R

REST
Representational State Transfer

RESTful
Web services designed using the Representational State Transfer (REST) paradigm.

Rules
National electricity or gas rules.

S

SOAP
Simple Object Access Protocol

T

TLS/SSL

Transport Layer Security (TLS) and its predecessor, Secure Sockets Layer (SSL), are protocols providing communication security over the Internet.

U

URI

Unified Resource Identifier

URM

User Rights Management for AEMO's participant systems.

W

WSDL

Web Services Description Language

X

XML

Extensible Mark-up Language

Z

ZIP

Files containing business data with the filename extensions .zip are compressed. They usually contain the XML coded message data.

1 Introduction

In this chapter:

1.1 Purpose

This guide explains AEMO's available web services and the parameters required to access them.

1.2 Audience

This document is intended for participants' technical and software development staff, responsible for implementing AEMO's systems.

1.3 How to use this guide

This guide assumes you have knowledge of:

- The Java™ Platform version 7 and above or the Microsoft.NET. Framework 4® environments.
- The operating system you are using.
- AEMO's systems and how they operate from an external perspective.
- The extensible mark-up language (XML).

1.4 What's in this guide

This guide describes the:

- Context and standards of AEMO's Web Services.
- Available AEMO Web Services.
- How to ask AEMO for IT assistance.

1.5 Related resources

As well as the resources listed in "References" on page 60 the following resources may be useful:

- Technical Guide to Web Services Client Software.
- RESTful Web Services: The basics.
- Guide to Transition of aseXML

Text in this format indicates a direct hyperlink with details of the resource listed in "References" on page 60.

2 Context

In this chapter:

2.1 Web services interface

In addition to AEMO's web portals, and batch or file interface options for system-to-system interaction, AEMO's Web Services offers a new layer of interaction. It takes advantage of existing architecture and is extensible into a larger set of web services, applying to both wholesale and retail systems. The approach, built on top of aseXML, provides for comprehensive coverage of AEMO's systems into the future.

AEMO's Web Services use existing messaging standards such as aseXML and CSV, maintaining maximum flexibility and consistency for participants who are free to specify data formats or payloads that suit the target system.

The market systems standard is the transfer of aseXML documents between participant gateways and the market systems. As the full MSATS interface is based on existing aseXML standard documents, the addition of a web service only requires the transfer of such documents. As an extension, the web services are enhanced with some URI parameterised requests to help in the development of gateway interfaces.

2.2 RESTful architecture

AEMO chose RESTful (REST) for its web services architecture because of its lightweight nature and ability to transmit data directly over HTTP—REST is an alternative to SOAP and WSDL.

The REST architecture makes it possible to start small, developing what is required with available resources, and scaling up as the number of services increase. The REST approach uses the features of HTTP to make requests and follows these design principles:

- Services are provided using HTTPS over MarketNet.
- HTTP requests are stateless.
- Directory structure-like URIs, for example, https://<web service host>/<system>/<business_function>.
- Transfer of XML or JavaScript Object Notation (JSON), or both.

Resources are addressed by mapping to a location within a hierarchy of URIs. For example, the root of the hierarchy might represent the web service application and provide a listing of the resources available. Drilling down one level then provides specific information about a particular resource, and further levels provide data from specific resource records. For participants, the operations performed on resources are mapped to HTTP methods:

HTTP Method	Operation
GET	Retrieve data
POST	Update data, retrieve data

AEMO's goal in implementing a RESTful web services approach is to achieve the following:

- Performance: quality of responsiveness.
- Scalability: many users can simultaneously use the systems.
- Generality: solve a wide variety of problems.
- Simplicity: no complex interactions, easy to prove the system is doing as it is supposed to.
- Modifiability: extensible in the face of new requirements and technologies.

2.3 What AEMO's Web Services are for

AEMO's Web Services offers a new layer of interaction with AEMO's systems. It is an additional option to AEMO's web portals, and batch or file interfaces for system-to-system interaction with AEMO's systems.

2.4 How do you use AEMO's Web Services

AEMO's Web Services provides supported and secure web services to participants' systems using their secure MarketNet connection.

The web service is provided by AEMO's web services server responding to a HTTPS request. The request is stateless, or self-contained, having no dependency on any prior or future request. It contains all data required to both define the request and authenticate the requestor. The response is a block of data sent to the participant's machine making the request. The response is not required to be readable by a person.

Errors are flagged using HTTP response codes, not textual descriptions of the error. A response code of 200 indicates the request was processed successfully. All other response codes indicate the server was unable to process the request, see "Response Codes" on page 55 .

Response codes are listed in the Technical Guide to Web Services Client Software.

Figure 1: web services infrastructure
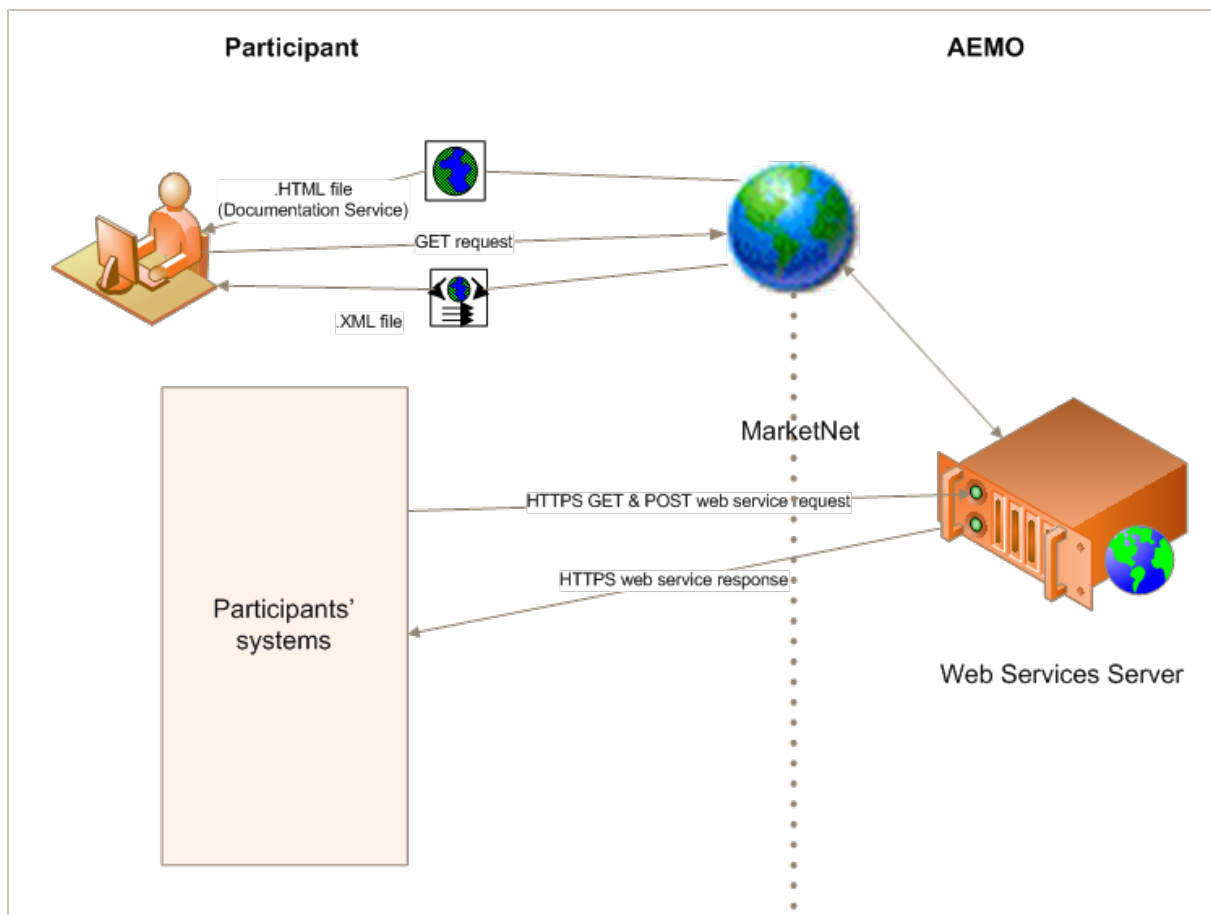
2.5 Who can use AEMO's Web Services

- Web Services and its software is for use by participants' technical and software development staff, responsible for implementing AEMO's systems.

2.6 System requirements

- The supported Internet browser is Microsoft Internet Explorer version 7 or later, although the recommended version is Microsoft Internet Explorer 8.

- AEMO's Web Services are accessed using your MarketNet connection.

- A user ID and password, provided by your system administrator, set up with access to AEMO's Web Services is required.

  For participant user access to web services, participant administrators select the appropriate entity in the **Maintain Rights** menu. User accounts and user administration is done in the energy market systems web portal, see the Guide to User Rights Management.

- The Web Services Client Software runs on either the Java ^{TM} Platform, Standard Edition 6 (developer version 1.6.0), or the Microsoft .NET Framework 4$^{®}$.

3 Standards

In this chapter:

3.1 aseXML

For MSATS transactions, the architecture supports the aseXML format. aseXML defines an XML format for data exchange specific to the electricity and gas industries in Australia and is already in use, and well known to participants and AEMO. For more information about aseXML, see aseXML Standards.

3.2 aseXML version

Most MSATS requests produce an aseXML response and clients often require a specific schema version. An optional `aseXML_version` parameter in the `Accept` header meets this requirement. If the requested aseXML version is not supported, a `406` HTTP response code returns.

If the `aseXML_version` is not provided, the participant's aseXML schema for the current or superseded schema is used. To see your participant schema version, sign in to the MSATS web portal, select Participants and then Participant Schema. For help see the *Guide to MSATS Web Portal* on the MSATS Participant User Interface Guides web page.

When participants update their aseXML schema version in the MSATS web portal, the change is reflected after 4:00 AM the next day (the schema change for batch services is immediate).

Figure 2: schema version parameter example

```
GET·
https://msats.prod.nemnet.net.au/msats/ws/NMIDetail/NEMMCO?transactionId=TX123&nmi=123456789
0&checksum=0· HTTP/1.0¶
Host:·127.0.0.1¶
Authorization:· Basic·dXNlcmlkOnBhc3N3b3Jk¶
Accept:·application/zip;· aseXML_version=r25¶
```

3.3 Security and authentication

To provide encrypted communication and secure identification, interactions between participant systems and AEMO's MarketNet are secured using HTTPS.

3.4 User access

For access to web services, participant administrators select the relevant entity in the "Maintain Rights" menu and assigns the right to their participant users. For help, see Guide to User Rights Management.

3.5 HTTPS requests

All HTTPS requests contain a method, a URL, headers, and optional file attachments. The method is either GET or POST. The HTTP response code 405 returns if the requested method is not supported.

- GET requests require all parameters in the URL, see § 3.5.1 "URL".
- POST requests allow the parameters to exist in an attached file. The file format is either an .XML or a .ZIP file. Posted files have a size limit of 1 MB. If the limit is exceeded, a response code of 413 is returned.
- URL parameters are case sensitive.
- Request character sets are UTF-8 encoded.
- The .XML file must only contain one request.

3.5.1 URL

GET Requests conform to the following URL pattern:

<protocol>//<server>/<application>/ws/<serviceName>/<participantId>?<parameters>

Figure 3: URL example

```
https://127.0.0.1/msats/ws/NMIDiscovery/NEMMCO?jurisdictionCode=NSW&transactionId=TX123&deliveryPointIdentifier=12345
```

Note: URL parameters are case sensitive.

Table 1: URL parameters

URL Parameter	Description
\<protocol\>	HTTPS
\<server\>	Names the server hosting the service or an external proxy. See AEMO's "Interfaces" in Technical Guide to Electricity IT Systems.
\<application\>	The AEMO system providing the service (for example MSATS or EMMS).
\<serviceName\>	Names the required web service.
\<participantId\>	The participant requesting the service. If no \<participantId\> is provided then HTTP response code 400 returns.
\<parameters\>	A list of "name=value" pairs, separated by "&".

3.5.2 Headers

Table 2: Headers

Header	Description
Authorization	userid:password encoded by the Base64 algorithm. If this header is not provided then HTTP response code 401 returns with the header: WWW-Authenticate: Basic realm="*\<applicationId\>*". If the header is provided but the user credentials cannot be decoded and authenticated, then HTTP response code 403 returns.
Host: \<web service host\>	URL of the server hosting the service.
Accept: application/zip;	`application/zip` requests the ase:XML response compressed and returned as a .ZIP file.
Accept: text/xml;	`text/xml` requests the ase:XML response returned as an XML file.
Accept: application/zip; aseXML_version=r25	Adding `aseXML_version=r25` indicates the client is requesting the response as r25 XML schema. If no schema is specified, the participant's schema version is sent. If the version specified is not supported, then HTTP response code 406 is returned.
Content-Length: nnn	The length of the attached request file.
Content-Type: text/xml	The format of the attached request file (application/zip or text/xml).

3.5.3 File size limits

- Files are limited to a size of 1 MB.

3.5.4 Performing a GET request from Internet Explorer

For testing purposes, as well as using the web services client software, GET requests can be made from Internet Explorer, by entering the parameters in the URL. The following is an example of an MSATS NMI Discovery, search by meter serial, GET request to the MSATS pre-production web services server.

1. Enter the URL including the NMI Discovery parameters in the address bar. Substituting your participant ID for PARTICIPANTID, and the correct parameters for jurisdictionCode, transactionId, and meterSerialNumber. For example: https://msats.-preprod.nemnet.NET.au/msats/ws/NMIDiscovery/PARTICIPANTID?jurisdictionCode= NSW&trransactionId=TX123&meterSerialNumber=12345

2. If the authentication dialog box displays, enter your MSATS user ID and password.
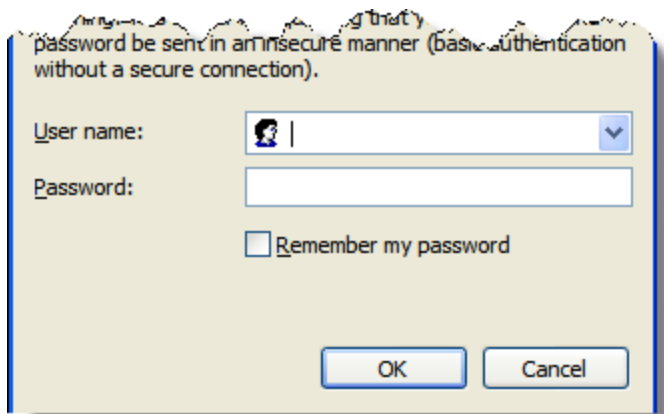
3. If you have entered the GET parameters correctly the **File Download** dialog box displays, where you can **Open** or **Save** the file.

   Otherwise, the **MSATS Web Services** web page displays a description of the web service along with the parameter information.
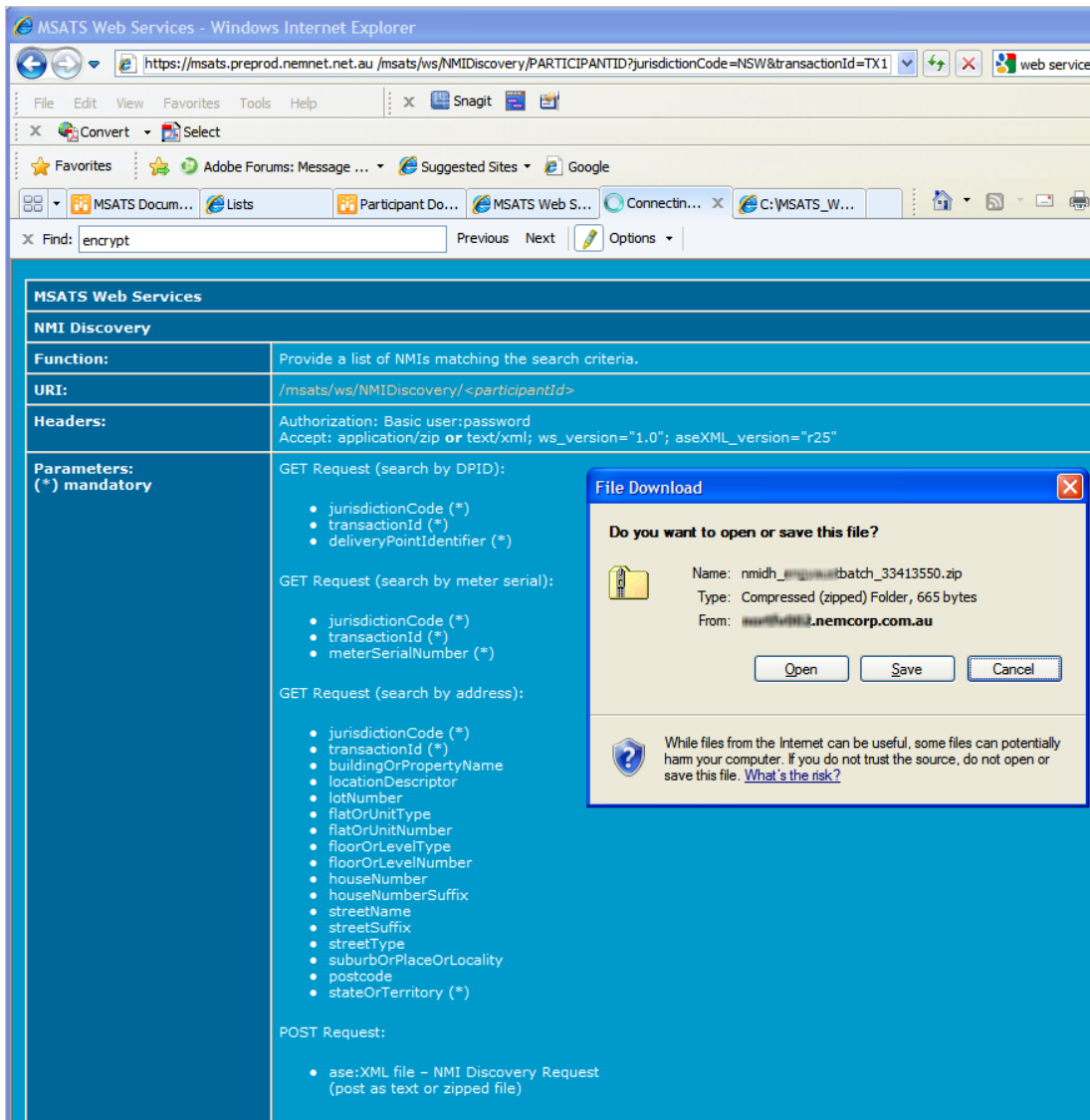
3.6 HTTPS responses

A successful request to the web services server, indicated by the HTTP response code 200, returns an .XML file to the client. All other codes indicate a failure, see "Response Codes" on page 55.

The response character set is UTF-8 encoded. The following headers are always returned.

Table 3: Response headers

Response Header	Description
HTTP/1.1 and response code	Indicates the HTTP response code (see "Response Codes")
Date:	Current date and time

Response Header	Description
Server	Web services server
Content-Length:	length of response
Cache-Control: no-cache	Response is not cached
Expires:	Response completion date and time
Content-Disposition	Response type and filename
Connection: close	Indicates connection to web services server closed.
Content-Type:	Mime type of response
WWW-Authenticate: Basic realm="*<applicationId>*"	Returned if the authorization header is not supplied

Figure 4: Response header example

```
HTTP/1.1 200 OK¶
Date: Fri, 05 Aug 2011 05:20:53 GMT¶
Server: Oracle-Application-Server-10g/10.1.2.0.0 Oracle-HTTP-Server¶
Content-Length: 5570¶
Cache-Control: no-cache¶
Expires: Fri, 05 Aug 2011 05:20:55 GMT¶
Content-Disposition: attachment;filename=nmidh_userid_33433417.xml¶
Connection: close¶
Content-Type: text/xml; charset=UTF-8¶
```

4 AEMO's Web Services

In this chapter:

AEMO provides the following web services:

Web Service	Description	Page
C4 NMI Master	Provides the full standing data for a single NMI, which is currently available in a C4 – NMI Master Report.	15
Constraints Plain English	The Constraints Plain English Web Service allows participants to retrieve constraint information using a Get request.	22
MSATS Limits	Provides details or your MSATS Limits status	30
NMI Detail	Provides details of a specified NMI to authorised users. It is the same criteria as NMI Discovery type 2.	34
NMI Discovery	Provides a list of NMIs matching the search criteria.	41
NMI Discovery Type 3	Assists in identifying the current or most recent previous retailer for a NMI.	49
Participant System Status	Provides feedback to participants about the status of their processing by MSATS systems	52

4.1 MSATS Documentation Service

AEMO's Web Services provides a web-based documentation service that describes each web service and its required parameters.

- When a specific service is not nominated, for example:
  https://msats.preprod.nemnet.NET.au/msats/ws/ — a list of available web services displays. Click the web service link to see individual web service information.

MSATS Web Services	
C4 – Single NMI Master Report	/msats/ws/C4/<participantId>
MSATS Limits	/msats/ws/MSATSLimits/<participantId>
NMI Discovery	/msats/ws/NMIDiscovery/<participantId>
NMI Detail	/msats/ws/NMIDetail/<participantId>

- When a specific service with no parameters is made, for example: https://msats.preprod.nemnet.NET.au/msats/ws/NMIDetail/ — a description of the requested service and the required parameters displays.

MSATS Web Services	
NMI Detail	
Function:	Provide details of a specified NMI.
URI:	/msats/ws/NMIDetail/*<participantId>*
Headers:	Authorization: Basic user:password Accept: application/zip **or** text/xml; aseXML_version="r25"

Parameters:
(*) mandatory
	GET Request:
	
	    • transactionId (*)
	    • nmi (*)
	    • checksum (*)
	
	POST Request:
	
	    • ase:XML file – NMI Standing Data Request
	      (post as text or zipped file)

The documentation service is in XHTML format as it has the advantage of being readable by a web browser or XML parser, facilitating the extraction of data by client programs.

5 C4 NMI Master Report

In this chapter:

5.1 About the C4 NMI Master report

The C4 NMI Master Report web service provides the full standing data for a single NMI, which is currently available in a C4 – NMI Master Report. The output is like a C4 attachment to a COM change request notification.

Data	Schema Version	URM Maintain Rights Entity
aseXML	Current or superseded	C4 NMI Master Report (using right type "batch").

Figure 5: C4 NMI Master Report parameter example

MSATS Web Services	
C4	
Function:	Provide Single NMI Master (C4) report.
URI:	/msats/ws/C4/*<participantId>*
Headers:	Authorization: Basic user:password Accept: application/zip or text/xml; aseXML_version="r25"
Parameters: (*) mandatory	GET Request: • transactionId (*) • NMI(*) • fromDate (*) • toDate (*) • asatDate (*) • participantId • roleId • inittransId POST Request: • ase:XML file – Report Request (post as text or zipped file)

5.2 C4 Get request example

Figure 6: C4 Get request example

```
Get
https://msats.pro-
d.nemnet.NET.au/msats/ws/C4/PARTICIPANTID?transactionId=TX04_
01&NMI=1234567890&fromDate=2011-11-12&toDate=2011-11-18&asatDate=2011-11-
18&participantId=PARTICIPANTID&roleId=FRMP&inittransid=ZM4QHAKCQG
HTTP/1.
Host: msats.prod.nemnet.NET.au
Authorization: Basic YourEncrypted[UserId:Password]
Accept: text/xml; aseXML_version=rxx
```

The C4 web service request does not allow filtering of the standing data for a specified Participant ID and Role ID combination, therefore, these two parameters are irrelevant to the output produced but remain to keep the aseXML schema valid.

5.3 C4 Post request example

Figure 7: C4 Post request example

```
POST https://msats.prod.nemnet.NET.au/msats/ws/C4/PARTICIPANTID HTTP/1.0
Host: msats.prod.nemnet.NET.au
Authorization: Basic YourEncrypted[UserId:Password
Accept: text/xml; aseXML_version=rxx
Content-Type: text/xml
```

5.4 C4 Post aseXML file example

XML files have a size limit of 1 MB and can only contain one request.

Figure 8: C4 Post aseXML file example

```
<?xml version="1.0" ?>
- <ase:aseXML xmlns:ase="urn:aseXML:r25" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="urn:aseXML:r25
    http://www.nemmco.com.au/aseXML/schemas/r25/aseXML_r25.xsd">
  - <Header>
      <From>PARTICIPANTID</From>
      <To>NEMMCO</To>
      <MessageID>MSG04_02</MessageID>
      <MessageDate>2011-12-28T15:28:39</MessageDate>
      <TransactionGroup>CATS</TransactionGroup>
      <Priority>Medium</Priority>
      <SecurityContext>PARTICIPANTUSER</SecurityContext>
      <Market>NEM</Market>
    </Header>
  - <Transactions>
    - <Transaction transactionID="TX04_02" transactionDate="2011-12-28T15:28:39" initiatingTransactionID="ZM4QHAKCQG">
      - <ReportRequest version="r10">
        - <ReportParameters xsi:type="ase:CATSMasterReportParameters">
            <ReportName>Master</ReportName>
            <FromDate>2011-11-12</FromDate>
            <ToDate>2011-11-18</ToDate>
            <AsAtDate>2011-11-18</AsAtDate>
            <LastSequenceNumber>0</LastSequenceNumber>
            <NMI>1234567890</NMI>
            <Participant>PARTICIPANTID</Participant>
            <Role>FRMP</Role>
            <ReportType>Detailed</ReportType>
          </ReportParameters>
        </ReportRequest>
      </Transaction>
    </Transactions>
  </ase:aseXML>
```

The parameters, LastSequenceNumber, Participant ID, Role ID, and ReportType, are required for the post request to be aseXML schema valid. However, for the C4 - NMI Master Report web service, they are ignored because it always produces the full NMI Standing Data

as produced on existing completed change request notifications. No notifications are sent out as a result of a C4 - NMI Master Report web service request.

5.5 C4 response example

The output of the C4 web service request is an aseXML file containing the FULL standing data for the following parameters:

- NMI
- fromDate
- toDate
- asatDate

The C4 web service request does not allow filtering of the standing data for a specified Participant ID and Role ID combination, therefore, these two parameters are irrelevant to the output produced but remain to keep the aseXML schema valid.

Figure 9: C4 response example

```xml
<ase:aseXML xmlns:ase="urn:aseXML:r25" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocatio
    http://www.nemmco.com.au/aseXML/schemas/r25/aseXML_r25.xsd">
  <Header>
    <From description="Australian Energy Market Operator Limited">PARTICIPANTID1</From>
    <To description="Australian Energy Market Operator Limited">NEMMCO</To>
    <MessageID>NEMMCO-MSG-33425158</MessageID>
    <MessageDate>2011-11-25T14:17:51+10:00</MessageDate>
    <TransactionGroup>CATS</TransactionGroup>
    <Priority>High</Priority>
    <SecurityContext>PARTICIPANT1USER</SecurityContext>
    <Market>NEM</Market>
  </Header>
  <Transactions>
    <Transaction transactionID="CATS-33425158" transactionDate="2011-11-25T14:17:51+10:00" initiatingTransactionID="1
      <ReportResponse version="r10">
        <ReportParameters xsi:type="ase:CATSMasterReportParameters">
          <ReportName>Master</ReportName>
          <FromDate>2011-11-11</FromDate>
          <ToDate>2011-11-18</ToDate>
          <AsAtDate>2011-11-18</AsAtDate>
          <LastSequenceNumber>0</LastSequenceNumber>
          <NMI>1234567890</NMI>
          <ExcludeParticipant>No</ExcludeParticipant>
          <Participant>PARTICIPANTID</Participant>
          <ExcludeRole>No</ExcludeRole>
          <Role>FRMP</Role>
          <ReportType>Detailed</ReportType>
        </ReportParameters>
        <ReportResults xsi:type="ase:ReplicationReportFormat">
          <ReplicationBlock tableName="ElectricityNMIMaster">
            <Row xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ase:ElectricityNMIMasterRow">
              <SequenceNumber>25659109</SequenceNumber>
              <CreationDate>2007-03-21T01:35:37+10:00</CreationDate>
              <MaintenanceDate>9999-12-31T00:00:00+10:00</MaintenanceDate>
              <RowStatus>A</RowStatus>
              <FromDate>2007-03-20T00:00:00+10:00</FromDate>
              <ToDate>9999-12-31T00:00:00+10:00</ToDate>
              <NMI>1234567890</NMI>
              <JurisdictionCode>VIC</JurisdictionCode>
              <NMIClassificationCode>SMALL</NMIClassificationCode>
              <TransmissionNodeIdentifier>VRT2</TransmissionNodeIdentifier>
              <DistributionLossFactorCode>ELVE</DistributionLossFactorCode>
              <Address>
                <StructuredAddress>
                  <FloorOrLevel>
                    <FloorOrLevelType>L</FloorOrLevelType>
                    <FloorOrLevelNumber>3</FloorOrLevelNumber>
                  </FloorOrLevel>
                  <BuildingOrPropertyName>TEST</BuildingOrPropertyName>
                  <LocationDescriptor>PART LEVEL 3</LocationDescriptor>
                  <House>
                    <HouseNumber>12</HouseNumber>
                  </House>
                  <Street>
                    <StreetName>KINGSSBRIDGE</StreetName>
                    <StreetType>ST</StreetType>
                  </Street>
                </StructuredAddress>
```

```xml
            <SuburbOrPlaceOrLocality>SOUTH MELBOURNE</SuburbOrPlaceOrLocality>
            <StateOrTerritory>VIC</StateOrTerritory>
            <PostCode>3205</PostCode>
          </Address>
          <Aggregate>Yes</Aggregate>
          <Status>A</Status>
        </Row>
      </ReplicationBlock>
    - <ReplicationBlock tableName="ElectricityNMIRoles">
      - <Row xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ase:ElectricityNMIRoleRow">
          <SequenceNumber>56213228</SequenceNumber>
          <CreationDate>2003-09-02T01:08:48+10:00</CreationDate>
          <MaintenanceDate>9999-12-31T00:00:00+10:00</MaintenanceDate>
          <RowStatus>A</RowStatus>
          <FromDate>2003-08-01T00:00:00+10:00</FromDate>
          <ToDate>9999-12-31T00:00:00+10:00</ToDate>
          <NMI>1234567890</NMI>
          <Party>PARTICIPANTID2</Party>
          <Role>LNSP</Role>
        </Row>
      - <Row xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ase:ElectricityNMIRoleRow">
          <SequenceNumber>56213229</SequenceNumber>
          <CreationDate>2003-09-02T01:08:48+10:00</CreationDate>
          <MaintenanceDate>9999-12-31T00:00:00+10:00</MaintenanceDate>
          <RowStatus>A</RowStatus>
          <FromDate>2003-08-01T00:00:00+10:00</FromDate>
          <ToDate>9999-12-31T00:00:00+10:00</ToDate>
          <NMI>1234567890</NMI>
          <Party>PARTICIPANTID3</Party>
          <Role>LR</Role>
        </Row>
      - <Row xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ase:ElectricityNMIRoleRow">
          <SequenceNumber>56213232</SequenceNumber>
          <CreationDate>2003-09-02T01:08:48+10:00</CreationDate>
          <MaintenanceDate>9999-12-31T00:00:00+10:00</MaintenanceDate>
          <RowStatus>A</RowStatus>
          <FromDate>2003-08-01T00:00:00+10:00</FromDate>
          <ToDate>9999-12-31T00:00:00+10:00</ToDate>
          <NMI>1234567890</NMI>
          <Party>PARTICIPANTID</Party>
          <Role>MPC</Role>
        </Row>
      - <Row xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ase:ElectricityNMIRoleRow">
          <SequenceNumber>56213233</SequenceNumber>
          <CreationDate>2003-09-02T01:08:48+10:00</CreationDate>
          <MaintenanceDate>9999-12-31T00:00:00+10:00</MaintenanceDate>
          <RowStatus>A</RowStatus>
          <FromDate>2003-08-01T00:00:00+10:00</FromDate>
          <ToDate>9999-12-31T00:00:00+10:00</ToDate>
          <NMI>1234567890</NMI>
          <Party>PARTICIPANTID3</Party>
          <Role>ROLR</Role>
        </Row>
      - <Row xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ase:ElectricityNMIRoleRow">
          <SequenceNumber>68059286</SequenceNumber>
          <CreationDate>2005-01-05T01:21:25+10:00</CreationDate>
          <MaintenanceDate>9999-12-31T00:00:00+10:00</MaintenanceDate>
          <RowStatus>A</RowStatus>
          <FromDate>2005-01-01T00:00:00+10:00</FromDate>
          <ToDate>9999-12-31T00:00:00+10:00</ToDate>
          <NMI>1234567890</NMI>
          <Party>PARTICIPANTID5</Party>
          <Role>MPB</Role>
        </Row>
      - <Row xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ase:ElectricityNMIRoleRow">
          <SequenceNumber>68059288</SequenceNumber>
          <CreationDate>2005-01-05T01:21:25+10:00</CreationDate>
          <MaintenanceDate>9999-12-31T00:00:00+10:00</MaintenanceDate>
          <RowStatus>A</RowStatus>
          <FromDate>2005-01-01T00:00:00+10:00</FromDate>
          <ToDate>9999-12-31T00:00:00+10:00</ToDate>
          <NMI>1234567890</NMI>
          <Party>PARTICIPANTID6</Party>
          <Role>RP</Role>
        </Row>
      - <Row xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ase:ElectricityNMIRoleRow">
          <SequenceNumber>79526673</SequenceNumber>
          <CreationDate>2006-12-12T00:14:16+10:00</CreationDate>
          <MaintenanceDate>9999-12-31T00:00:00+10:00</MaintenanceDate>
          <RowStatus>A</RowStatus>
          <FromDate>2006-08-28T00:00:00+10:00</FromDate>
          <ToDate>9999-12-31T00:00:00+10:00</ToDate>
          <NMI>1234567890</NMI>
          <Party>PARTICIPANTID1</Party>
          <Role>FRMP</Role>
        </Row>
      - <Row xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ase:ElectricityNMIRoleRow">
          <SequenceNumber>79526674</SequenceNumber>
          <CreationDate>2006-12-12T00:14:16+10:00</CreationDate>
          <MaintenanceDate>9999-12-31T00:00:00+10:00</MaintenanceDate>
          <RowStatus>A</RowStatus>
          <FromDate>2006-08-28T00:00:00+10:00</FromDate>
          <ToDate>9999-12-31T00:00:00+10:00</ToDate>
          <NMI>1234567890</NMI>
          <Party>PARTICIPANTID</Party>
          <Role>MDP</Role>
        </Row>
      </ReplicationBlock>
    - <ReplicationBlock tableName="ElectricityNMIDataStreams">
```

```xml
          – <Row xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ase:ElectricityNMIDataStreamRow">
               <SequenceNumber>32440195</SequenceNumber>
               <CreationDate>2007-02-20T00:50:44+10:00</CreationDate>
               <MaintenanceDate>9999-12-31T00:00:00+10:00</MaintenanceDate>
               <RowStatus>A</RowStatus>
               <FromDate>2006-08-28T00:00:00+10:00</FromDate>
               <ToDate>9999-12-31T00:00:00+10:00</ToDate>
               <NMI>1234567890</NMI>
               <Suffix>N1</Suffix>
               <ProfileName>NOPROF</ProfileName>
               <AveragedDailyLoad>560</AveragedDailyLoad>
               <DataStreamType>Interval</DataStreamType>
               <Status>A</Status>
            </Row>
         </ReplicationBlock>
      – <ReplicationBlock tableName="ElectricityNMIMeters">
          – <Row xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ase:ElectricityNMIMeterRow">
               <SequenceNumber>20809352</SequenceNumber>
               <CreationDate>2005-01-04T00:24:29+10:00</CreationDate>
               <MaintenanceDate>9999-12-31T00:00:00+10:00</MaintenanceDate>
               <RowStatus>A</RowStatus>
               <FromDate>2004-07-01T00:00:00+10:00</FromDate>
               <ToDate>9999-12-31T00:00:00+10:00</ToDate>
               <NMI>1234567890</NMI>
               <SerialNumber>1234567</SerialNumber>
               <InstallationTypeCode>COMMS4</InstallationTypeCode>
               <ReadTypeCode>C4</ReadTypeCode>
               <Status>C</Status>
            </Row>
         </ReplicationBlock>
      – <ReplicationBlock tableName="ElectricityNMIRegisterConfiguration">
          – <Row xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ase:ElectricityNMIMeterRegisterRow">
               <SequenceNumber>23287330</SequenceNumber>
               <CreationDate>2006-02-08T00:46:04+10:00</CreationDate>
               <MaintenanceDate>9999-12-31T00:00:00+10:00</MaintenanceDate>
               <RowStatus>A</RowStatus>
               <FromDate>2005-07-22T00:00:00+10:00</FromDate>
               <ToDate>9999-12-31T00:00:00+10:00</ToDate>
               <NMI>1234567890</NMI>
               <SerialNumber>1234567</SerialNumber>
               <RegisterID>E1</RegisterID>
               <NetworkTariffCode>C1G</NetworkTariffCode>
               <UnitOfMeasure>KWH</UnitOfMeasure>
               <TimeOfDay>INTERVAL</TimeOfDay>
               <Multiplier>1</Multiplier>
               <DialFormat>5</DialFormat>
               <ControlledLoad>N</ControlledLoad>
               <ConsumptionType>Actual</ConsumptionType>
               <Status>C</Status>
            </Row>
          – <Row xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:type="ase:ElectricityNMIMeterRegisterRow">
               <SequenceNumber>23287332</SequenceNumber>
               <CreationDate>2006-02-08T00:46:04+10:00</CreationDate>
               <MaintenanceDate>9999-12-31T00:00:00+10:00</MaintenanceDate>
               <RowStatus>A</RowStatus>
               <FromDate>2005-07-22T00:00:00+10:00</FromDate>
               <ToDate>9999-12-31T00:00:00+10:00</ToDate>
               <NMI>1234567890</NMI>
               <SerialNumber>1234567</SerialNumber>
               <RegisterID>Q1</RegisterID>
               <NetworkTariffCode>C1G</NetworkTariffCode>
               <UnitOfMeasure>KVA</UnitOfMeasure>
               <TimeOfDay>MAX</TimeOfDay>
               <Multiplier>1</Multiplier>
               <DialFormat>5</DialFormat>
               <Suffix>N1</Suffix>
               <ControlledLoad>N</ControlledLoad>
               <ConsumptionType>Actual</ConsumptionType>
               <Status>C</Status>
            </Row>
         </ReplicationBlock>
      </ReportResults>
   – <Event severity="Information">
         <Code>0</Code>
         <Explanation>Success</Explanation>
      </Event>
   </ReportResponse>
 </Transaction>
</Transactions>
</ase:aseXML>
```

6 Constraints Plain English

In this chapter:

6.1 About Constraints Plain English

The Constraints Plain English Web Service allows participants to retrieve the following constraint information using a Get request:

- A list of the current binding constraints, see 6.5 "GetBindingList" on page 24.
- A list of the currently invoked constraint sets, see 6.6 "GetInvokedSetList" on page 25.
- A list of equations for the supplied constraint set identifier, see 6.7 "GetEquationsForSet" on page 26.
- A plain English equation, see 6.8 "GetTranslatedEquation" on page 28.

6.2 User Access

For user access to the Constraints Plain English Web Service, participant administrators select the **EMMS - Market Info - View Constraints** entity in the Administration->Maintain Rights menu, and assign **Read** rights.

6.3 Parameters

Participants with access can view the Constraints Plain English Web Service parameters using the following URLs:

- Pre-production: https://mms.preprod.nemnet.net.au/ws/constraints
- Production: https://mms.prod.nemnet.net.au/ws/constraints

Participants must use the https communications protocol for secure access to AEMO's web services.

Figure 10: Constraints Plain English parameters

6.4 Formats

Participants can request the Constraints Plain English Web Service in either of the below formats:

- JSON
- XML

For examples of each format and its request header see the following sections.

6.5 GetBindingList

Obtain a list of the current binding constraints:

https://mms.preprod.nemnet.net.au/ws/constraints/GetBindingList

6.5.1 GetBindingList JSON request

Figure 11: GetBindingList JSON request header example

```
GET https://mms.preprod.nemnet.NET.au/ws/constraints/GetBindingList
Host: mms.preprod.nemnet.NET.au
Authorization: Basic YourEncrypted[UserId:Password]
Accept: application/JSON;
```

6.5.2 GetBindingList JSON response

Figure 12: GetBindingList JSON response

```
[
    {
        "Id": "F_I+ML_L5_0400"
    },
    {
        "Id": "F_I+ML_L60_0400"
    },
    {
        "Id": "F_I+ML_L6_0400"
    },
    {
        "Id": "F_I+NIL_DYN_LREG"
    },
    {
        "Id": "F_I+NIL_DYN_RREG"
    }
]
```

6.5.3 GetBindingList XML request

Figure 13: GetBindingList XML request header example

```
GET https://mms.preprod.nemnet.NET.au/ws/constraints/GetBindingList
Host: mms.preprod.nemnet.NET.au
Authorization: Basic YourEncrypted[UserId:Password]
Accept: application/XML;
```

6.5.4 GetBindingList XML response

Figure 14: GetBindingList XML response

```xml
<ArrayOfBindingEquation
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema">
    <BindingEquation>
        <Id>F_I+ML_L5_0400</Id>
    </BindingEquation>
    <BindingEquation>
        <Id>F_I+ML_L60_0400</Id>
    </BindingEquation>
    <BindingEquation>
        <Id>F_I+ML_L6_0400</Id>
    </BindingEquation>
    <BindingEquation>
        <Id>F_I+NIL_DYN_LREG</Id>
    </BindingEquation>
</ArrayOfBindingEquation>
```

6.6 GetInvokedSetList

Obtain a list of the currently invoked constraint sets:

https://mms.preprod.nemnet.net.au/ws/constraints/GetInvokedSetList

6.6.1 GetInvokedSetList JSON request

Figure 15: GetInvokedSetList JSON request header example

```
GET https://mms.preprod.nemnet.NET.au/ws/constraints/GetInvokedSetList
Host: mms.preprod.nemnet.NET.au
Authorization: Basic YourEncrypted[UserId:Password]
Accept: application/JSON;
```

6.6.2 GetInvokedSetList JSON response

Figure 16: GetInvokedSetList JSON response example

```json
[
  {
    "Id": "N-LTUT_64_15M",
    "Description": "Out= Lower to UpperTumut (64), 15/30_min ratings for 65, 66 lines auto-switch on prior loading"
  }
]
```

6.6.3 GetInvokedSetList XML request

Figure 17: GetInvokedSetList XML request header example

```
GET https://mms.preprod.nemnet.NET.au/ws/constraints/GetInvokedSetList
Host: mms.preprod.nemnet.NET.au
Authorization: Basic YourEncrypted[UserId:Password]
Accept: application/XML;
```

6.6.4 GetInvokedSetList XML response

Figure 18: GetInvokedSetList XML response example

```xml
<ArrayOfInvokedSet
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema">
    <InvokedSet>
        <Id>N-LTUT_64_15M</Id>
        <Description>Out= Lower to UpperTumut (64), 15/30_min ratings for 65, 66 lines auto-switch on prior loading</Description>
    </InvokedSet>
</ArrayOfInvokedSet>
```

6.7 GetEquationsForSet

Obtain a list of equations for the supplied constraint set identifier:

GetEquationsForSet/{id} (where id = the Constraint Set Identifier), for example:

https://mms.preprod.nemnet.net.au/ws/constraints/GetEquationsForSet/N-LTYS_03

6.7.1 GetEquationsForSet JSON request

Figure 19: GetEquationsForSet JSON request header example

```
GET https://mms.preprod.nemnet.NET.au/ws/constraints/GetEquationsForSet
Host: mms.preprod.nemnet.NET.au
Authorization: Basic YourEncrypted[UserId:Password]
Accept: application/JSON;
```

6.7.2 GetEquationsForSet JSON response

Figure 20: GetEquationsForSet JSONresponse example

```json
[
    {
        "SetId": "N-LTYS_03",
        "EffectiveDate": "2011-09-13T00:00:00",
        "VersionNo": "1",
        "Id": "N>>N-LTYS_A",
        "Description": "Out= Lower Tumut - Yass (3)"
    },
    {
        "SetId": "N-LTYS_03",
        "EffectiveDate": "2011-09-13T00:00:00",
        "VersionNo": "1",
        "Id": "N>>N-LTYS_B",
        "Description": "Out= Lower Tumut - Yass (3)"
    }
]
```

6.7.3 GetEquationsForSet XML request

Figure 21: GetEquationsForSet XML request header example

```
GET https://mms.preprod.nemnet.NET.au/ws/constraints/GetEquationsForSet
Host: mms.preprod.nemnet.NET.au
Authorization: Basic YourEncrypted[UserId:Password]
Accept: application/XML;
```

6.7.4 GetEquationsForSet XML response

Figure 22: GetEquationsForSet XML response example

```
<ArrayOfEquation
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema">
    <Equation>
        <SetId>N-LTYS_03</SetId>
        <EffectiveDate>2011-09-13T00:00:00</EffectiveDate>
        <VersionNo>1</VersionNo>
        <Id>N&gt;&gt;N-LTYS_A</Id>
        <Description>Out= Lower Tumut - Yass (3)</Description>
    </Equation>
    <Equation>
        <SetId>N-LTYS_03</SetId>
        <EffectiveDate>2011-09-13T00:00:00</EffectiveDate>
        <VersionNo>1</VersionNo>
        <Id>N&gt;&gt;N-LTYS_B</Id>
        <Description>Out= Lower Tumut - Yass (3)</Description>
    </Equation>
</ArrayOfEquation>
```

6.8 GetTranslatedEquation

Obtain a plain English equation:

GetTranslatedEquation/{id}?version={version}&equationEffectiveDateTime={equationEffectiveDatetime}&functionEffectiveDateTime={functionEffectiveDateTime}

Where the parameters are:

- id = equation identifier
- version = version number of the equation (optional parameter)
- equationEffectiveDateTime = effective date/time of the equation (optional parameter)
- functionEffectiveDateTime = effective date/time of the function (optional parameter)

For example:

https://mms.preprod.nemnet.net.au/ws/constraints/GetTranslatedEquation/F_MAIN+ML_L60_0400

6.8.1 GetTranslatedEquation JSON request

Figure 23: GetTranslatedEquation JSON request header example

```
GET https://mms.preprod.nemnet.NET.au/ws/constraints/GetTranslatedEquation
Host: mms.preprod.nemnet.NET.au
Authorization: Basic YourEncrypted[UserId:Password]
Accept: application/JSON;
```

6.8.2 GetTranslatedEquation JSON response

Figure 24: GetTranslatedEquation JSON response example

<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"> \r\n<html><head><title>Constraint Description</title>\r\n<meta http-equiv=\"Content-Type\" content=\"text/html; charset=us-ascii\">\r\n<style type=\"text/css\">body { font-family: Verdana Geneva, Arial, Helvetica, sans-serif}\r\n</style>\r\n</head>\r\n<body>\r\n\r\n<h2>Constraint: F_MAIN+ML_L60_0400</h2>\r\nConstraint type: LHS>=RHS
\r\nEffective date: 01/07/2008
\r\nAuthor: BENB
\r\nVersion No: 1
\r\n\r\nWeight: 4
\r\nConstraint active in: Dispatch and DS PASA, Predispatch and PD PASA
\r\n5 Min Predispatch RHS: Dispatch

\r\nConstraint description: Out = Nil, Lower 60 sec requirement for a Mainland Load Event, ML = 400, Basslink unable transfer FCAS
\r\nImpact: Other
\r\nSource: NEMMCO
\r\nLimit type: FCAS
\r\nReason: Mainland Load Event
\r\nModifications: Modifications for Snowy region abolition
\r\nAdditional Notes: SOPP Constraints Guide - FCAS\r\n\r\n<h3>LHS= </h3>\r\nLOWER60SEC NSW region
 + LOWER60SEC Queensland region
 + LOWER60SEC South Australia region
 + LOWER60SEC Victoria region
\r\n\r\n<h3>RHS</h3>\r\nDefault RHS value= 260
\r\n
\r\n\r\nDispatch RHS= \r\n\r\n400 {CONSTANT_MLOAD}
\r\n+ <i>Generic Equation: </i>X_MAIN_LOAD_RELIEF
\r\n+ <i>Generic Equation: </i>X_BL_MAIN_MINAVL_OFF
\r\n
\r\n\r\nPredispatch RHS= \r\n\r\n400 {CONSTANT_MLOAD}
\r\n+ <i>Generic Equation: </i>X_MAIN_LOAD_RELIEF
\r\n+ <i>Generic Equation: </i>X_BL_MINAVL_OFF_PD
\r\n\r\n<h2>Equation: X_BL_MAIN_MINAVL_OFF</h2><font color = \"000000\">if<font color = \"000000\">
\r\n <font color = \"ff0000\">if<font color = \"000000\">
\r\n   MW flow north on the Basslink DC Interconnector
\r\n   - <font color = \"0000ff\">if<font color = \"000000\">
\r\n   MW flow north on the Basslink DC Interconnector<font color = \"0000ff\"> <= 0<font color = \"000000\">
\r\n   <font color = \"0000ff\">then<font color = \"000000\">
\r\n   -1 x [Maximum bid availability from VIC1 to TAS1 Basslink DC Interconnector (MNSP)]
\r\n   <font color = \"0000ff\">else<font color = \"000000\">
\r\n   50 {NoGoUpper}
\r\n   - 0.5 <font color = \"000000\"> <= 0<font color = \"000000\">
\r\n <font color = \"ff0000\">then<font color = \"000000\">
\r\n   0
\r\n <font color = \"ff0000\">else<font color = \"000000\">
\r\n   1
\r\n + <font color = \"ff0000\">if<font color = \"000000\">
\r\n   -50 {PrevDI_Threshold}
\r\n   + Absolute<font color = \"000000\">(<font color = \"000000\">Basslink previous dispatch interval target (MW)<font color = \"000000\">)<font color = \"000000\"><font color = \"ff0000\"> <= 0<font color = \"000000\">
\r\n <font color = \"ff0000\">then<font color = \"000000\">
\r\n   0
\r\n <font color = \"ff0000\">else<font color = \"000000\">
\r\n   1
\r\n + <font color = \"ff0000\">if<font color = \"000000\">
\r\n   50 {CurrentFlow_Threshold}
\r\n   + Absolute<font color = \"000000\">(<font color = \"000000\">MW flow north on the Basslink DC Interconnector<font color = \"000000\">)<font color = \"000000\"><font color = \"ff0000\"> <= 0<font color = \"000000\">
\r\n <font color = \"ff0000\">then<font color = \"000000\">
\r\n   0
\r\n <font color = \"ff0000\">else<font color = \"000000\">
\r\n   1
\r\n + BassLink NEMDE Switch - taken from same SPD_ID for SPD_Type 'S'
\r\n + <font color = \"ff0000\">if<font color = \"000000\">
\r\n   1
\r\n   - Basslink frequency controller set to 50Hz on Tasmanian side<font color = \"ff0000\"> <= 0<font color = \"000000\">
\r\n <font color = \"ff0000\">then<font color = \"000000\">
\r\n   0
\r\n <font color = \"ff0000\">else<font color = \"000000\">
\r\n   1
\r\n - 4 <font color = \"000000\"> <= 0<font color = \"000000\">
\r\n<font color = \"000000\">then<font color = \"000000\">
\r\n 0.0001 {DontSwamp}
\r\n<font color = \"000000\">else<font color = \"000000\">
\r\n -10000 {Swamp}
\r\n\r\n<h2>Equation: X_BL_MINAVL_OFF_PD</h2><font color = \"000000\">if<font color = \"000000\">
\r\n <font color = \"ff0000\">if<font color = \"000000\">
\r\n   MW flow north on the Basslink DC Interconnector
\r\n   + Maximum bid availability from VIC1 to TAS1 Basslink DC Interconnector (MNSP)
\r\n   - 0.5 <font color = \"ff0000\"> <= 0<font color = \"000000\">
\r\n <font color = \"ff0000\">then<font color = \"000000\">
\r\n   0
\r\n <font color = \"ff0000\">else<font color = \"000000\">
\r\n   1
\r\n + <font color = \"ff0000\">if<font color = \"000000\">
\r\n   -5 {PrevDI_Threshold}
\r\n   + Absolute<font color = \"000000\">(<font color = \"000000\">MW flow north on the Basslink DC Interconnector<font color = \"000000\">)<font color = \"000000\"><font color = \"ff0000\"> <= 0<font color = \"000000\">
\r\n <font color = \"ff0000\">then<font color = \"000000\">
\r\n   0
\r\n <font color = \"ff0000\">else<font color = \"000000\">
\r\n   1
\r\n - 1 <font color = \"000000\"> <= 0<font color = \"000000\">
\r\n<font color = \"000000\">then<font color = \"000000\">
\r\n 0.0001 {DontSwamp}
\r\n<font color = \"000000\">else<font color = \"000000\">
\r\n -10000 {Swamp}
\r\n\r\n<h2>Equation: X_MAIN_LOAD_RELIEF</h2>-0.015 x [NSW region demand]
\r\n- 0.015 x [Queensland region demand]
\r\n- 0.015 x [Victoria region demand]
\r\n- 0.015 x [South Australia region demand]</body></html>

6.8.3 GetTranslatedEquation XML request

Figure 25: GetTranslatedEquation XML request header example

```
GET https://mms.preprod.nemnet.NET.au/ws/constraints/GetTranslatedEquation
Host: mms.preprod.nemnet.NET.au
Authorization: Basic YourEncrypted[UserId:Password]
Accept: application/XML;
```

7 MSATS Limits

In this chapter:

7.1 About MSATS Limits

The MSATS Limits web service provides details or your MSATS Limits status. If the participant is a member of a group then the limits are the group limits, otherwise they are the participant limits.

Data	Schema Version	URM Maintain Rights Entity
aseXML	current or r28	Web Service MSATS Limits

Figure 26: MSATS Limits parameter example

7.2 MSATS Limits Get request example

Figure 27: MSATS Limits Get request example

```
Get
https://msats.pro-
d.nemnet.NET.au/msats/ws/MSATSLimits/NEMMCO?transactionId=TX123 HTTP/1.0
Host: msats.prod.nemnet.NET.au
Authorization: Basic dXNlcmlkOnBhc3N3b3Jk
Accept: text/xml; aseXML_version=r28
```

7.3 MSATS Limits Post request example

Post https://msats.prod.nemnet.NET.au/msats/ws/MSATSLimits/NEMMCO HTTP/1.0
Host: msats.prod.nemnet.NET.au
Authorization: Basic dXNlcmlkOnBhc3N3b3Jk
Accept: text/xml; aseXML_version=r28
Content-Type: text/xml

XML files have a size limit of 1 MB and can only contain one request.

Figure 28: MSATS Limits Post request example

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<ase:aseXML xmlns:ase="urn:aseXML:r28" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:aseXML:r28
    http://www.nemmco.com.au/aseXML/schemas/r28/aseXML_r28.xsd">
    <Header>
        <From>PARTID</From>
        <To description="AUSTRALIAN ENERGY MARKET OPERATOR">AEMO</To>
        <MessageID>tx03_02_test</MessageID>
        <MessageDate>2011-06-28T12:00:00.000+10:00</MessageDate>
        <TransactionGroup>CATS</TransactionGroup>
        <Priority>Medium</Priority>
        <SecurityContext>userid</SecurityContext>
        <Market>NEM</Market>
    </Header>
    <Transactions>
        <Transaction transactionID="tx03_02_test" transactionDate="2011-06-28T12:00:00.000+10:00">
            <ReportRequest version="r10">
                <ReportParameters xsi:type="ase:CATSMsatsLimitsReportParameters">
                    <ReportName>MsatsLimits</ReportName>
                </ReportParameters>
            </ReportRequest>
        </Transaction>
    </Transactions>
</ase:aseXML>
```

7.4 MSATS Limits response example

Figure 29: MSATS Limits response header example

```
HTTP/1.1 200 OK
Date: Thu, 04 Aug 2011 04:51:16 GMT
Server: Oracle Containers for J2EE
Content-Length: 3300
Connection: close
Content-Type: text/xml; charset=UTF-8
Cache-Control: no-cache
Expires: Thu, 04 Aug 2011 04:51:18 GMT
Content-Disposition: attachment;filename=catsm_userid_33433401.xml
```

Figure 30: MSATS Limits response example

```xml
<?xml version="1.0" ?>
<ase:aseXML xmlns:ase="urn:aseXML:r28" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:aseXML:r28
    http://www.nemmco.com.au/aseXML/schemas/r28/aseXML_r28.xsd">
    <Header>
        <From description="Australian Energy Market Operator Limited">AEMO</From>
        <To description="MyParticipantID">PARTID</To>
        <MessageID>NEMMCO-MSG-33433401</MessageID>
        <MessageDate>2011-08-04T14:50:56+10:00</MessageDate>
        <TransactionGroup>CATS</TransactionGroup>
        <Priority>Medium</Priority>
        <SecurityContext>userid</SecurityContext>
        <Market>NEM</Market>
    </Header>
    <Transactions>
        <Transaction transactionID="CATS-33433401" transactionDate="2011-08-04T14:50:56+10:00"
            initiatingTransactionID="ABC">
            <ReportResponse version="r10">
                <ReportParameters xsi:type="ase:CATSMsatsLimitsReportParameters">
                    <ReportName>MSATSLimits</ReportName>
                </ReportParameters>
                <ReportResults xsi:type="ase:CATSMsatsLimitsReportFormat">
                    <MsatsLimits>
                        <Participant>PARTID</Participant>
                        <Group>NEMMCOG</Group>
                        <GroupMembers>
                            <GroupMember>NEMMCO</GroupMember>
                            <GroupMember>AEMO</GroupMember>
                        </GroupMembers>
                        <Cr>
                            <DefaultLimit>13000</DefaultLimit>
                            <UpperLimit>13000</UpperLimit>
                            <ParticipantActual>0</ParticipantActual>
                            <GroupActual>4</GroupActual>
                            <StopFlag>N</StopFlag>
                        </Cr>
                        <CrNotification>
                            <DefaultLimit>60000</DefaultLimit>
                            <UpperLimit>60000</UpperLimit>
                            <ParticipantActual>0</ParticipantActual>
                            <GroupActual>24</GroupActual>
                            <StopFlag>N</StopFlag>
                        </CrNotification>
                        <NsrdNotification>
                            <LowerLimit>160000</LowerLimit>
                            <UpperLimit>200000</UpperLimit>
                            <ParticipantActual>0</ParticipantActual>
                            <GroupActual>0</GroupActual>
                            <StopFlag>N</StopFlag>
                        </NsrdNotification>
                        <NsrdResponse>
                            <LowerLimit>260000</LowerLimit>
                            <UpperLimit>300000</UpperLimit>
                            <ParticipantActual>0</ParticipantActual>
                            <GroupActual>0</GroupActual>
                            <StopFlag>N</StopFlag>
                        </NsrdResponse>
                        <OutboxFile>
                            <LowerLimit>32000</LowerLimit>
                            <UpperLimit>40000</UpperLimit>
                            <ParticipantActual>44</ParticipantActual>
                            <GroupActual>215</GroupActual>
                            <StopFlag>N</StopFlag>
                        </OutboxFile>
                        <Report>
                            <LowerLimit>2000</LowerLimit>
                            <UpperLimit>2500</UpperLimit>
                            <ParticipantActual>0</ParticipantActual>
                            <GroupActual>0</GroupActual>
                            <StopFlag>N</StopFlag>
                        </Report>
                    </MsatsLimits>
                </ReportResults>
                <Event severity="Information">
                    <Code>0</Code>
                    <Explanation>Success</Explanation>
                </Event>
            </ReportResponse>
        </Transaction>
    </Transactions>
</ase:aseXML>
```

8 NMI Detail

In this chapter:

8.1 About NMI Detail

The NMI Detail web service provides details of a specified NMI to authorised users. It is the same criteria as NMI Discovery type 2. For more detail about NMI Detail search criteria, see MSATS NMI Discovery Questions and Answers.

Data	Schema Version	URM Maintain Rights Entity
aseXML	current or superseded	NMI Discovery This is the same entity required for access to NMI Discovery using the MSATS Web Portal.

Figure 31: NMI Detail parameter example

8.2 NMI Detail Get request example

Figure 32: NMI Detail Get request example

```
Get
https://msats.pro-
d.ne-
mnet.NET.au/msats/ws/NMIDetail/NEMMCO?transactionId=TX123&nmi=1234567890&
checksum=0 HTTP/1.0
Host: 127.0.0.1
Authorization: Basic dXNlcmlkOnBhc3N3b3Jk
Accept: application/zip; aseXML_version=rxx
```

8.3 NMI Detail Post request example

Figure 33: NMI Detail Post request header example

```
Post https://msats.prod.nemnet.NET.au/msats/ws/NMIDetail/NEMMCO HTTP/1.0
Host: msats.prod.nemnet.NET.au
Authorization: Basic dXNlcmlkOnBhc3N3b3Jk
Accept: text/xml; aseXML_version=rxx
Content-Type: text/xml
Content-Length: 123
```

XML files have a size limit of 1 MB and can only contain one request.

Figure 34: NMI Detail Post request example

```xml
<?xml version="1.0" ?>
<ase:aseXML xmlns:ase="urn:aseXML:r25" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:aseXML:r25
    http://www.nemmco.com.au/aseXML/schemas/r25/aseXML_r25.xsd">
    <Header>
        <From>PARTID</From>
        <To>AEMO</To>
        <MessageID>TX123</MessageID>
        <MessageDate>2011-04-01T11:12:13.000+10:00</MessageDate>
        <TransactionGroup>NMID</TransactionGroup>
        <Priority>High</Priority>
        <SecurityContext>userid</SecurityContext>
        <Market>NEM</Market>
    </Header>
    <Transactions>
        <Transaction transactionID="TX123" transactionDate="2011-04-01T11:12:13.000+10:00">
            <NMIStandingDataRequest version="r4">
                <NMI checksum="5">1234567890</NMI>
            </NMIStandingDataRequest>
        </Transaction>
    </Transactions>
</ase:aseXML>
```

8.4 NMI Detail response example

Figure 35: NMI Detail response header example

```
HTTP/1.1 200 OK
Date: Fri, 05 Aug 2011 05:20:53 GMT
Server: Oracle-Application-Server-10g/10.1.2.0.0 Oracle-HTTP-Server
Content-Length: 5570
Cache-Control: no-cache
Expires: Fri, 05 Aug 2011 05:20:55 GMT
Content-Disposition: attachment;filename=nmidh_userid_33433417.xml
Connection: close
Content-Type: text/xml; charset=UTF-8
```

Figure 36: NMI Detail response example

```xml
<?xml version="1.0" ?>
<ase:aseXML xmlns:ase="urn:aseXML:r25" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:aseXML:r25
    http://www.nemmco.com.au/aseXML/schemas/r25/aseXML_r25.xsd">
    <Header>
        <From description="Australian Energy Market Operator Limited">AEMO</From>
        <To description="ABC Energy Pty Ltd">ABCENGY</To>
        <MessageID>NEMMCO-MSG-33413543</MessageID>
        <MessageDate>2011-07-21T17:14:08+10:00</MessageDate>
        <TransactionGroup>NMID</TransactionGroup>
        <Priority>High</Priority>
        <SecurityContext>AEMOBATCH</SecurityContext>
        <Market>NEM</Market>
    </Header>
    <Transactions>
        <Transaction transactionID="NMID-33413543" transactionDate="2011-07-21T17:14:08+10:00"
            initiatingTransactionID="TX02_01">
            <NMIStandingDataResponse version="r4">
                <NMIStandingData xsi:type="ase:ElectricityStandingData" version="r25">
                    <NMI>4102026436</NMI>
                    <MasterData>
                        <JurisdictionCode>NSW</JurisdictionCode>
                        <NMIClassificationCode>SMALL</NMIClassificationCode>
                        <TransmissionNodeIdentifier>NSYS</TransmissionNodeIdentifier>
                        <DistributionLossFactorCode>JLSL</DistributionLossFactorCode>
                        <Address>
                            <StructuredAddress>
                                <House>
                                    <HouseNumber>195</HouseNumber>
                                </House>
                                <Street>
                                    <StreetName>SYDNEY</StreetName>
                                    <StreetType>AVE</StreetType>
                                </Street>
                            </StructuredAddress>
                            <SuburbOrPlaceOrLocality>SUBURBHEIGHTS</SuburbOrPlaceOrLocality>
                            <StateOrTerritory>NSW</StateOrTerritory>
                            <PostCode>2111</PostCode>
                        </Address>
                        <Status>A</Status>
                    </MasterData>
                    <RoleAssignments>
                        <RoleAssignment>
                            <Party>ENERGY1</Party>
                            <Role>LNSP</Role>
                        </RoleAssignment>
                        <RoleAssignment>
                            <Party>ENERGY2</Party>
                            <Role>MDP</Role>
                        </RoleAssignment>
                        <RoleAssignment>
                            <Party>ENERGY3</Party>
                            <Role>MPB</Role>
                        </RoleAssignment>
                        <RoleAssignment>
                            <Party>ENERGY4</Party>
                            <Role>MPC</Role>
                        </RoleAssignment>
                    </RoleAssignments>
                    <DataStreams>
                        <DataStream>
                            <Suffix>11</Suffix>
                            <ProfileName>NSLP</ProfileName>
                            <AveragedDailyLoad>15</AveragedDailyLoad>
                            <DataStreamType>Consumption</DataStreamType>
                            <Status>I</Status>
                        </DataStream>
                        <DataStream>
                            <Suffix>12</Suffix>
                            <ProfileName>NSLP</ProfileName>
                            <AveragedDailyLoad>18</AveragedDailyLoad>
                            <DataStreamType>Consumption</DataStreamType>
                            <Status>I</Status>
                        </DataStream>
```

```xml
- <Meter>
    <SerialNumber>290718</SerialNumber>
  - <RegisterConfiguration>
    - <Register>
        <RegisterID>1</RegisterID>
        <NetworkTariffCode>EA270</NetworkTariffCode>
        <UnitOfMeasure>KWH</UnitOfMeasure>
        <TimeOfDay>ALLDAY</TimeOfDay>
        <Multiplier>1</Multiplier>
        <DialFormat>5</DialFormat>
        <ControlledLoad>No</ControlledLoad>
        <Status>C</Status>
      </Register>
    </RegisterConfiguration>
  </Meter>
- <Meter>
    <SerialNumber>290719</SerialNumber>
  - <RegisterConfiguration>
    - <Register>
        <RegisterID>1</RegisterID>
        <NetworkTariffCode>EA270</NetworkTariffCode>
        <UnitOfMeasure>KWH</UnitOfMeasure>
        <TimeOfDay>ALLDAY</TimeOfDay>
        <Multiplier>1</Multiplier>
        <DialFormat>5</DialFormat>
        <ControlledLoad>No</ControlledLoad>
        <Status>C</Status>
      </Register>
    </RegisterConfiguration>
  </Meter>
- <Meter>
    <SerialNumber>290720</SerialNumber>
  - <RegisterConfiguration>
    - <Register>
        <RegisterID>1</RegisterID>
        <NetworkTariffCode>EA270</NetworkTariffCode>
        <UnitOfMeasure>KWH</UnitOfMeasure>
        <TimeOfDay>ALLDAY</TimeOfDay>
        <Multiplier>1</Multiplier>
        <DialFormat>5</DialFormat>
        <ControlledLoad>No</ControlledLoad>
        <Status>C</Status>
      </Register>
    </RegisterConfiguration>
  </Meter>
- <Meter>
    <SerialNumber>290722</SerialNumber>
  - <RegisterConfiguration>
    - <Register>
        <RegisterID>1</RegisterID>
        <NetworkTariffCode>EA270</NetworkTariffCode>
        <UnitOfMeasure>KWH</UnitOfMeasure>
        <TimeOfDay>PS</TimeOfDay>
        <Multiplier>1</Multiplier>
        <DialFormat>5</DialFormat>
        <ControlledLoad>No</ControlledLoad>
        <Status>C</Status>
      </Register>
    </RegisterConfiguration>
  </Meter>
- <Meter>
    <SerialNumber>311126</SerialNumber>
  - <RegisterConfiguration>
    - <Register>
        <RegisterID>1</RegisterID>
        <NetworkTariffCode>EA270</NetworkTariffCode>
        <UnitOfMeasure>KWH</UnitOfMeasure>
        <TimeOfDay>PS</TimeOfDay>
        <Multiplier>1</Multiplier>
        <DialFormat>5</DialFormat>
        <ControlledLoad>No</ControlledLoad>
        <Status>C</Status>
      </Register>
    </RegisterConfiguration>
  </Meter>
```

```xml
        - <Meter>
            <SerialNumber>311128</SerialNumber>
          - <RegisterConfiguration>
            - <Register>
                <RegisterID>1</RegisterID>
                <NetworkTariffCode>EA270</NetworkTariffCode>
                <UnitOfMeasure>KWH</UnitOfMeasure>
                <TimeOfDay>PS</TimeOfDay>
                <Multiplier>1</Multiplier>
                <DialFormat>5</DialFormat>
                <ControlledLoad>No</ControlledLoad>
                <Status>C</Status>
              </Register>
            </RegisterConfiguration>
          </Meter>
        </MeterRegister>
      </NMIStandingData>
    - <Event severity="Information">
        <Code>0</Code>
      </Event>
    </NMIStandingDataResponse>
  </Transaction>
  </Transactions>
</ase:aseXML>
```

```
- <DataStream>
    <Suffix>13</Suffix>
    <ProfileName>NSLP</ProfileName>
    <AveragedDailyLoad>6</AveragedDailyLoad>
    <DataStreamType>Consumption</DataStreamType>
    <Status>I</Status>
  </DataStream>
- <DataStream>
    <Suffix>14</Suffix>
    <ProfileName>NSLP</ProfileName>
    <AveragedDailyLoad>0</AveragedDailyLoad>
    <DataStreamType>Consumption</DataStreamType>
    <Status>I</Status>
  </DataStream>
- <DataStream>
    <Suffix>15</Suffix>
    <ProfileName>NSLP</ProfileName>
    <AveragedDailyLoad>0</AveragedDailyLoad>
    <DataStreamType>Consumption</DataStreamType>
    <Status>I</Status>
  </DataStream>
- <DataStream>
    <Suffix>16</Suffix>
    <ProfileName>NSLP</ProfileName>
    <AveragedDailyLoad>0</AveragedDailyLoad>
    <DataStreamType>Consumption</DataStreamType>
    <Status>I</Status>
  </DataStream>
</DataStreams>
- <MeterRegister>
- <Meter>
    <SerialNumber>290718</SerialNumber>
    <NextScheduledReadDate>2007-10-31</NextScheduledReadDate>
    <InstallationTypeCode>BASIC</InstallationTypeCode>
    <Status>C</Status>
  </Meter>
- <Meter>
    <SerialNumber>290719</SerialNumber>
    <NextScheduledReadDate>2007-10-31</NextScheduledReadDate>
    <InstallationTypeCode>BASIC</InstallationTypeCode>
    <Status>C</Status>
  </Meter>
- <Meter>
    <SerialNumber>290720</SerialNumber>
    <NextScheduledReadDate>2007-10-31</NextScheduledReadDate>
    <InstallationTypeCode>BASIC</InstallationTypeCode>
    <Status>C</Status>
  </Meter>
- <Meter>
    <SerialNumber>290722</SerialNumber>
    <NextScheduledReadDate>2007-10-31</NextScheduledReadDate>
    <InstallationTypeCode>BASIC</InstallationTypeCode>
    <Status>C</Status>
  </Meter>
- <Meter>
    <SerialNumber>311126</SerialNumber>
    <NextScheduledReadDate>2007-10-31</NextScheduledReadDate>
    <InstallationTypeCode>BASIC</InstallationTypeCode>
    <Status>C</Status>
  </Meter>
- <Meter>
    <SerialNumber>311128</SerialNumber>
    <NextScheduledReadDate>2007-10-31</NextScheduledReadDate>
    <InstallationTypeCode>BASIC</InstallationTypeCode>
    <Status>C</Status>
  </Meter>
```

9 NMI Discovery

In this chapter:

9.1 About NMI Discovery

The NMI Discovery web service provides a list of NMIs matching the search criteria to authorised users. For example, discover a customer's NMI and checksum if the customer cannot provide it. There are three different types of NMI Discovery search:

- Delivery point identifier (DPID), see § 9.2 "NMI Discovery by DPID".
- Meter serial, see § 9.3 "NMI Discovery by meter serial".
- Address, see § 9.4 "NMI Discovery by address".

For more detail about NMI Discovery and search criteria, see MSATS NMI Discovery Questions and Answers.

Data	Schema Version	URM Maintain Rights Entity
aseXML	Current or superseded	NMI Discovery This is the same entity required for access to NMI Discovery using the MSATS Web Portal.

Figure 37: NMI Discovery parameter example

MSATS Web Services	
NMI Discovery	
Function:	Provide a list of NMIs matching the search criteria.
URI:	/msats/ws/NMIDiscovery/*<participantId>*
Headers:	Authorization: Basic user:password Accept: application/zip **or** text/xml; aseXML_version="r25"
Parameters: **(*) mandatory**	GET Request (search by DPID): • jurisdictionCode (*) • transactionId (*) • deliveryPointIdentifier (*) GET Request (search by meter serial): • jurisdictionCode (*) • transactionId (*) • meterSerialNumber (*) GET Request (search by address): • jurisdictionCode (*) • transactionId (*) • buildingOrPropertyName • locationDescriptor • lotNumber • flatOrUnitType • flatOrUnitNumber • floorOrLevelType • floorOrLevelNumber • houseNumber • houseNumberSuffix • streetName • streetSuffix • streetType • suburbOrPlaceOrLocality • postcode • stateOrTerritory (*) POST Request: • ase:XML file – NMI Discovery Request (post as text or zipped file)

9.2 NMI Discovery by DPID

9.2.1 NMI Discovery by DPID Get request example

Figure 38: NMI Discovery by DPID Get request example

```
Get
https://msats.pro-
d.ne-
mnet.NET.au/msats/ws/NMIDiscovery/NEMMCO?jurisdictionCode=NSW&transactionId=
TX123&deliveryPointIdentifier=12345 HTTP/1.0
Host: msats.prod.nemnet.NET.au
Authorization: Basic dXNlcmlkOnBhc3N3b3Jk
Accept: text/xml; aseXML_version=rxx
```

9.2.2 NMI Discovery by DPID Post request example

Figure 39: NMI Discovery by DPID Post request header example

```
Post https://msats.prod.nemnet.NET.au/msats/ws/NMIDiscovery/NEMMCO HTTP/1.0
Host: msats.prod.nemnet.NET.au
Authorization: Basic dXNlcmlkOnBhc3N3b3Jk
Accept: text/xml; aseXML_version=rxx
Content-Type: text/xml
```

XML files have a size limit of 1 MB and can only contain one request.

Figure 40: NMI Discovery by DPID Post request example

```xml
<?xml version="1.0" ?>
<ase:aseXML xmlns:ase="urn:aseXML:r25" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:aseXML:r25
    http://www.nemmco.com.au/aseXML/schemas/r25/aseXML_r25.xsd">
    <Header>
        <From>PARTID</From>
        <To>AEMO</To>
        <MessageID>TX123</MessageID>
        <MessageDate>2011-04-01T11:12:13.000+10:00</MessageDate>
        <TransactionGroup>NMID</TransactionGroup>
        <Priority>High</Priority>
        <SecurityContext>userid</SecurityContext>
        <Market>NEM</Market>
    </Header>
    <Transactions>
        <Transaction transactionID="TX123" transactionDate="2011-04-01T11:12:13.000+10:00">
            <NMIDiscoveryRequest version="r17">
                <JurisdictionCode>NSW</JurisdictionCode>
                <DeliveryPointIdentifier>12345</DeliveryPointIdentifier>
            </NMIDiscoveryRequest>
        </Transaction>
    </Transactions>
</ase:aseXML>
```

9.2.3 NMI Discovery by DPID response example

Figure 41: NMI Discovery by DPID response header example

```
HTTP/1.1 200 OK
Date: Fri, 05 Aug 2011 04:38:46 GMT
Server: Oracle-Application-Server-10g/10.1.2.0.0 Oracle-HTTP-Server
Content-Length: 13349
Cache-Control: no-cache
Expires: Fri, 05 Aug 2011 04:38:53 GMT
Content-Disposition: attachment;filename=nmidh_userid_33433413.xml
Connection: close
Content-Type: text/xml; charset=UTF-8
```

Figure 42: NMI Discovery by DPID response example

```xml
<?xml version="1.0" ?>
<ase:aseXML xmlns:ase="urn:aseXML:r25" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:aseXML:r25
    http://www.nemmco.com.au/aseXML/schemas/r25/aseXML_r25.xsd">
  <Header>
    <From description="Australian Energy Market Operator Limited">AEMO</From>
    <To description="myParticipantID">PARTID</To>
    <MessageID>NEMMCO-MSG-33433413</MessageID>
    <MessageDate>2011-08-05T14:38:53+10:00</MessageDate>
    <TransactionGroup>NMID</TransactionGroup>
    <Priority>High</Priority>
    <SecurityContext>userid</SecurityContext>
    <Market>NEM</Market>
  </Header>
  <Transactions>
    <Transaction transactionID="NMID-33433413" transactionDate="2011-08-05T14:38:53+10:00"
        initiatingTransactionID="X1">
      <NMIDiscoveryResponse version="r17">
        <NMIStandingData xsi:type="ase:ElectricityStandingData" version="r25">
          <NMI checksum="0">1234567890</NMI>
          <MasterData>
            <Address>
              <StructuredAddress>
                <House>
                  <HouseNumber>32</HouseNumber>
                </House>
                <Street>
                  <StreetName>WALERT</StreetName>
                  <StreetType>ST</StreetType>
                </Street>
              </StructuredAddress>
              <SuburbOrPlaceOrLocality>DOUGAL</SuburbOrPlaceOrLocality>
              <StateOrTerritory>NSW</StateOrTerritory>
              <PostCode>2123</PostCode>
            </Address>
            <FeederClass>ERGUD</FeederClass>
          </MasterData>
          <RoleAssignments>
            <RoleAssignment>
              <Party>NEMMCO</Party>
              <Role>LNSP</Role>
            </RoleAssignment>
          </RoleAssignments>
        </NMIStandingData>
        <Event severity="Information">
          <Code>0</Code>
        </Event>
      </NMIDiscoveryResponse>
    </Transaction>
  </Transactions>
</ase:aseXML>
```

9.3 NMI Discovery by meter serial

9.3.1 NMI Discovery by meter serial Get request example

Figure 43: NMI Discovery by meter serial Get request example

```
Get
https://msats.pro-
d.ne-
mnet.NET.au/msats/ws/NMIDiscovery/NEMMCO?jurisdictionCode=NSW&transactionId=
TX123&meterSerialNumber=12345 HTTP/1.0
Host: msats.prod.nemnet.NET.au
Authorization: Basic dXNlcmlkOnBhc3N3b3Jk
Accept: text/xml; aseXML_version=rxx
```

9.3.2 NMI Discovery by meter serial Post request example

Figure 44: NMI Discovery by meter serial Post request header example

```
Post https://msats.prod.nemnet.NET.au/msats/ws/NMIDiscovery/NEMMCO HTTP/1.0
Host: msats.prod.nemnet.NET.au
Authorization: Basic dXNlcmlkOnBhc3N3b3Jk
Accept: text/xml; aseXML_version=rxx
Content-Type: text/xml
```

XML files have a size limit of 1 MB and can only contain one request.

Figure 45: NMI Discovery by meter serial Post request example

```xml
<?xml version="1.0" ?>
<ase:aseXML xmlns:ase="urn:aseXML:r25" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:aseXML:r25
    http://www.nemmco.com.au/aseXML/schemas/r25/aseXML_r25.xsd">
    <Header>
        <From>PARTID</From>
        <To>AEMO</To>
        <MessageID>TX123</MessageID>
        <MessageDate>2011-04-01T11:12:13.000+10:00</MessageDate>
        <TransactionGroup>NMID</TransactionGroup>
        <Priority>High</Priority>
        <SecurityContext>userid</SecurityContext>
        <Market>NEM</Market>
    </Header>
    <Transactions>
        <Transaction transactionID="TX123" transactionDate="2011-04-01T11:12:13.000+10:00">
            <NMIDiscoveryRequest version="r17">
                <JurisdictionCode>NSW</JurisdictionCode>
                <MeterSerialNumber>12345</MeterSerialNumber>
            </NMIDiscoveryRequest>
        </Transaction>
    </Transactions>
</ase:aseXML>
```

9.3.3 NMI Discovery by meter serial response example

All NMI Discovery responses are similar to the "NMI Discovery" on page 41 .

9.4 NMI Discovery by address

9.4.1 NMI Discovery by address Get request example

Figure 46: NMI Discovery by address Get request example

```
Get
https://msats.pro-
d.ne-
mnet.NET.au/msats/ws/NMIDiscovery/NEMMCO?jurisdictionCode=NSW&transactionId=
TX123&streetName=GEORGE&postcode=2000&stateOrTerritory=NSW HTTP/1.0
Host: msats.prod.nemnet.NET.au
Authorization: Basic dXNlcmlkOnBhc3N3b3Jk
Accept: text/xml; aseXML_version=r25
```

9.4.2 NMI Discovery by address Post request example

Post https://msats.prod.nemnet.NET.au/msats/ws/NMIDiscovery/NEMMCO HTTP/1.0
Host: msats.prod.nemnet.NET.au
Authorization: Basic dXNlcmlkOnBhc3N3b3Jk
Accept: text/xml; aseXML_version=rxx
Content-Type: text/xml
Content-Length: 123

XML files have a size limit of 1 MB and can only contain one request.

Figure 47: NMI Discovery by address Post request example

```xml
<?xml version="1.0" ?>
- <ase:aseXML xmlns:ase="urn:aseXML:r25" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:aseXML:r25
    http://www.nemmco.com.au/aseXML/schemas/r25/aseXML_r25.xsd">
  - <Header>
      <From>PARTID</From>
      <To>AEMO</To>
      <MessageID>TX123</MessageID>
      <MessageDate>2011-04-01T11:12:13.000+10:00</MessageDate>
      <TransactionGroup>NMID</TransactionGroup>
      <Priority>High</Priority>
      <SecurityContext>userid</SecurityContext>
      <Market>NEM</Market>
  </Header>
  - <Transactions>
    - <Transaction transactionID="TX123" transactionDate="2011-04-01T11:12:13.000+10:00">
      - <NMIDiscoveryRequest version="r17">
          <JurisdictionCode>NSW</JurisdictionCode>
        - <Address>
          - <StructuredAddress>
            - <Street>
                <StreetName>George</StreetName>
              </Street>
            </StructuredAddress>
            <StateOrTerritory>NSW</StateOrTerritory>
            <PostCode>2000</PostCode>
          </Address>
        </NMIDiscoveryRequest>
      </Transaction>
    </Transactions>
  </ase:aseXML>
```

9.4.3 NMI Discovery by address response example

All NMI Discovery responses are similar to the "NMI Discovery" on page 41 .

10 NMI Discovery Type 3

In this chapter:

10.1 About NMI Discovery Type 3

The NMI Discovery Type 3 (obtain role data) web service allows retailers to perform retailer enquiries directly in MSATS. The transaction assists in identifying the current or most recent previous retailer for a NMI. It is the same web service as NMI Detail with two extra fields: type and reason.

The NMI Discovery Type 3 web service uses aseXML schema r31, if r25 is used, the request is transformed into a NMI Detail (see "NMI Detail" on page 34) request. For more details about transforms, see "B2B Transforms" in the MSATS B2B User interface Guide.

For more details about NMI Detail search criteria, see MSATS NMI Discovery Questions and Answers.

Data	Schema Version	URM Maintain Rights Entity
aseXML	**r31**	NMI Discovery This is the same entity required for access to NMI Discovery using the MSATS Web Portal.

Figure 48: NMI Discovery Type 3 parameter example

MSATS Web Services	
NMI Detail	
Function:	Provide details of a specified NMI. Based on input parameters returns NMI Detail or Role Data.
URI:	/msats/ws/NMIDetail/*<participantId>*
Headers:	Authorization: Basic user:password Accept: application/zip **or**text/xml; aseXML_version="r25"**or**"r31"
Parameters: (*) mandatory	GET Request: • transactionId (*) • nmi (*) • checksum (*) • type • reason POST Request: • ase:XML file – NMI Standing Data Request (post as text or zipped file)

10.2 NMI Discovery Type 3 Get request example

Figure 49: NMI Discovery Type 3 Get request example

```
Get
https://msats.pro-
d.ne-
mnet.NET.au/msats/ws/NMIRoleData/PARTICIPANT?transactionId=X1&nmi=4001021157
&checksum=6&type=ROLE_REQUEST&reason=SAB& HTTP/1.0
Host: msats.prod.nemnet.net.au
Authorization: Basic RU5HWUFFVU1RCQVRDSDpOZW1tY28wMQ==
Accept: text/xml; aseXML_version=r31
```

10.3 NMI Discovery Type 3 Post request example

Figure 50: NMI Discovery Type 3 Post request header example

```
Post https://msats.prod.nemnet.NET.au/msats/ws/NMIRoleData/NEMMCO HTTP/1.0
Host: msats.prod.nemnet.NET.au
Authorization: Basic dXNlcmlkOnBhc3N3b3Jk
Accept: text/xml; aseXML_version=rxx
Content-Type: text/xml
Content-Length: 123
```

XML files have a size limit of 1 MB and can only contain one request.

Figure 51: NMI Discovery Type 3 Post request example

```
<?xml version="1.0"?>
<ase:aseXML xmlns:ase="urn:aseXML:r31" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="urn:aseXML:r31 http://www.nemmco.com.au/aseXML/schemas/r31/aseXML_r31.xsd">
        <Header>
                <From description="Participant Retail Pty Ltd">PARTICIPANT</From>
                <To description="National Electricity Market Management Company">NEMMCO</To>
                <MessageID>PARTICIPANT-MSG-11234569</MessageID>
                <MessageDate>2001-10-31T13:20:10.000+10:00</MessageDate>
                <TransactionGroup>NMID</TransactionGroup>
                <Priority>High</Priority>
                <SecurityContext>zz023</SecurityContext>
                <Market>NEM</Market>
        </Header>
        <Transactions>
            <Transaction transactionID="PARTICIPANT-TNS-12348990" transactionDate="2001-10-31T13:20:09.900+10:00">
                <NMIStandingDataRequest version="r31">
                   <NMI checksum="5">1234567890</NMI>
                  <Type>ROLE_REQUEST</Type>
                  <Reason>TRI</Reason>
                </NMIStandingDataRequest>
            </Transaction>
        </Transactions>
</ase:aseXML>
```

10.4 NMI Discovery Type 3 response example

Figure 52: NMI Discovery Type 3, reason code SAB-Site Abolishment example

```
<?xml version="1.0" ?>
<ase:aseXML xmlns:ase="urn:aseXML:r31" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="urn:aseXML:r31 http://www.nemmco.com.au/aseXML/schemas/r31/aseXML_r31.xsd">
 .............
  <Transactions>
   <Transaction transactionID="NMID-816" transactionDate="2012-10-29T11:02:17+10:00" initiatingTransactionID="TX123">
<NMIStandingDataResponse version="r4">
<NMIStandingData xsi:type="ase:ElectricityStandingData" version="r31">
<NMI>NEMMT12513</NMI><RoleAssignments>
 <RoleAssignment>
  <Party>POOLTST</Party>
  <Role>FRMP</Role>
 </RoleAssignment>
 </RoleAssignments>
</NMIStandingData>
  <Event severity="Information">
        <Code>0</Code>
      </Event>
</NMIStandingDataResponse>
   </Transaction>
  </Transactions>
</ase:aseXML>
```

11 Participant System Status

In this chapter:

11.1 About Participant System Status

The Participant System Status web service provides feedback to participants about the status of their processing by MSATS systems (such as batch handlers), and about any changes to the status of their processing by MSATS systems. The available statuses are: Running, Skipped, Stopped, and Down.

Data	Schema Version	URM Maintain Rights Entity
aseXML	r32	Web Service Participant System Status.

Figure 53: Participant System Status parameter example

MSATS Web Services	
Participant System Status	
Function:	Provide the current participant system status.
URI:	/msats/ws/ParticipantSystemStatus/*<participantId>*
Headers:	Authorization: Basic user:password Accept: application/zip **or** text/xml; aseXML_version="rxx"

Parameters:
(*) mandatory
	GET Request:
	
	    • transactionId (*)
	
	POST Request:
	
	    • ase:XML file – Report Request
	      (post as text or zipped file)

11.2 Participant System Status Get request example

Figure 54: Participant System Status Get request example

```
Get
https://msats.pro-
d.nemnet.NET.au/msats/ws/ParticipantSystemStatus/NEMMCO?transactionId=TX123
HTTP/1.0
Host: msats.prod.nemnet.NET.au
Authorization: Basic dXNlcmlkOnBhc3N3b3Jk
Accept: text/xml; aseXML_version=r32
```

11.3 Participant System Status Post request example

Figure 55: Participant System Status Post request header example

```
Post https://msats.prod.nemnet.NET.au/msats/ws/ParticipantSystemStatus/NEMMCO
HTTP/1.0
Host: msats.prod.nemnet.NET.au
Authorization: Basic dXNlcmlkOnBhc3N3b3Jk
Accept: text/xml; aseXML_version=r32
Content-Type: text/xml
```

XML files have a size limit of 1 MB and can only contain one request.

Figure 56: Participant System Status Post request example

```xml
<?xml version="1.0" encoding="ISO-8859-1" ?>
<ase:aseXML xmlns:ase="urn:aseXML:r32" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:aseXML:r32
    http://www.nemmco.com.au/asexml/schemas/r32/aseXML_r32.xsd">
    <Header>
        <From>XYZ</From>
        <To>NEMMCO</To>
        <MessageID>XYZ-MSG-123456789</MessageID>
        <MessageDate>2012-12-12T09:00:00.0+10:00</MessageDate>
        <TransactionGroup>CATS</TransactionGroup>
        <Priority>Medium</Priority>
        <SecurityContext>XYZ</SecurityContext>
        <Market>NEM</Market>
    </Header>
    <Transactions>
        <Transaction transactionID="XYZ-TNS-12348990" transactionDate="2012-12-12T09:00:00.0+10:00">
            <ReportRequest version="r10">
                <ReportParameters xsi:type="ase:GenericReportParameters">
                    <ReportName>ParticipantSystemStatus</ReportName>
                </ReportParameters>
            </ReportRequest>
        </Transaction>
    </Transactions>
</ase:aseXML>
```

11.4 Participant System Status Response example

Figure 57: Participant System Status Response example

```xml
<?xml version="1.0" encoding="ISO-8859-1"?>
<ase:aseXML xmlns:ase="urn:aseXML:r32"
xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance xsi:schemaLocation="urn:aseXML:r32
http://www.nemmco.com.au/asexml/schemas/r32/aseXML_r32.xsd">
<Header>
  <From>NEMMCO</From>
  <To>XYZ</To>
  <MessageID>NEMMCO-MSG-123456789</MessageID>
  <MessageDate>2012-12-12T09:00:00.0+10:00</MessageDate>
  <TransactionGroup>CATS</TransactionGroup>
  <Priority>Medium</Priority>
  <SecurityContext>XYZ</SecurityContext>
  <Market>NEM</Market>
</Header>
<Transactions>
  <Transaction transactionID="CATS-123456789" transactionDate="2012-12-12T09:00:00.0+10:00"
initiatingTransactionID="XYZ-TNS-12348990">
    <ReportResponse version="r10">
      <ReportParameters xsi:type="ase:GenericReportParameters">
        <ReportName>ParticipantSystemStatus</ReportName>
      </ReportParameters>
      <ReportResults xsi:type="ase:CATSParticipantSystemStatusReportFormat">
        <ParticipantSystemsStatus>
          <ParticipantSystemStatus>
  <System>Batch</System>
            <ModeType>MSATS</ModeType>
            <TransactionGroups>
    <TransactionGroup>CATS</TransactionGroup>
            </TransactionGroups>
            <Box>Inbox</Box>
            <Status>Skipped</Status>
            <Description>No MSATS .zip files being processed in participant inbox.</Description>
            <Reason>Current number of MSATS .zip files in participant inbox that have
corresponding
MSATS .ack file in participant outbox is greater than the limit of 20.</Reason>
    <Resolution>Please remove MSATS .zip files from participant inbox that have corresponding
MSATS .ack file in participant outbox.</Resolution>
    <StartTime>2012-12-11T16:19:47.0+10:00</StartTime>
    <HeartbeatTime>2012-12-11T16:25:00.0+10:00</HeartbeatTime>
          </ParticipantSystemStatus>
        </ParticipantSystemsStatus>
      </ReportResults>
      <Event>
        <Code>0</Code>
      </Event>
      </ReportResponse>
    </Transaction>
</Transactions>
</ase:aseXML>
```

12 Response Codes

In this chapter:

12.1 Contents

- 12.2 Console and log file responses
- 12.3 Java software response codes
- 12 Response Codes

12.2 Console and log file responses

All response codes are listed in the log file and on the console, for example:

Figure 58: console response example

Figure 59: log file response example

16/08/2011 16:14:20, ERROR, – Web request exception. The remote server returned an error: (403) Forbidden.
16/08/2011 16:14:20, ERROR, – - Req Headers Authorization=Basic bWlrZW11aXI6QmxvbmRpZTAy
16/08/2011 16:14:20, ERROR, – - Req Headers Accept=text/xml
16/08/2011 16:14:20, ERROR, – - Req Headers Host=002.test.nemnet.NET.au
16/08/2011 16:14:20, ERROR, – - Req Headers Connection=Keep-Alive
16/08/2011 16:14:20, ERROR, – - Response <HTML><HEAD><TITLE>403 Forbidden</TITLE></HEAD>
<BODY><H1>403 Forbidden</H1>Invalid Authorization header
 </BODY></HTML>
16/08/2011 16:14:20, ERROR, – Fatal error, abnormal exit
System.NET.WebException: The remote server returned an error: (403) Forbidden.
   at System.NET.HttpWebRequest.GetResponse()
   at Aemo.Web.Client.WebClient.GetResponse(HttpWebRequest httpWebRequest) in
C:\nem\DotNet2\Samples\Other\WebServices\WebClient\WebClient.cs:line 338
   at Aemo.Web.Client.WebClient.DoGet(Dictionary`2 parameters) in
C:\nem\DotNet2\Samples\Other\WebServices\WebClient\WebClient.cs:line 209
   at Aemo.Web.Client.WebClient.DoNmiDetail(String transactionId, String nmi, String checksum) in
C:\nem\DotNet2\Samples\Other\WebServices\WebClient\WebClientGet.cs:line 75
   at WebServicesGet.GetOperations.TryTheVariousCalls() in
C:\nem\DotNet2\Samples\Other\WebServices\WebServicesGet\GetOperations.cs:line 74
   at WebServicesGet.Program.Main() in
C:\nem\DotNet2\Samples\Other\WebServices\WebServicesGet\Program.cs:line 68

12.3 Java software response codes

This table lists some of the response codes displayed in the log file or on the console.

Table 4: Java software response codes

Code	Description
200	Indicates a successful request.
400	No <participantId> provided in the request.
401	The WWW-Authenticate: Basic realm="*<applicationId>*" header is not provided.
403	The user credentials cannot be decoded and authenticated.
404	The webpage cannot be found.
405	The requested method is not supported.

Code	Description
406	The version specified in the header is not supported.
413	The posted file has exceeded its limit of 1 MB.
500	AEMO Internal Server Error
503	The configured limit for concurrent requests or request rate is exceeded.

12 Needing help?

In this chapter:

12.4 AEMO's Information and Support Hub

12.4.1 Contacting AEMO's Information and Support Hub

IT assistance is requested through AEMO's Information and Support Hub using one of the following methods:

- Phone: 1300 AEMO 00 (1300 226 600) and follow the prompts.

  For non-urgent issues, normal coverage is 8:00 AM to 6:00 PM on weekdays, Eastern Standard Time (EST).

- Email: supporthub@aemo.com.au
- The Customer Portal, http://helpdesk.preprod.nemnet.net.au/nemhelplite/ allows you to log your own requests for assistance. For access credentials, see your company's IT security contact or PA.

AEMO recommends participants call AEMO's Information and Support Hub for all urgent issues, whether or not you have logged a call in the Customer Portal.

12.4.2 What can I check before requesting IT assistance from AEMO?

- Check the status of your organisation's IT systems with your internal IT department.
- Check the status of AEMO's production market systems. Call 1300 AEMO 00 (1300 236 600) and following the prompts to listen to the recording.
- Check the "Needing Help" section of AEMO's user guides. To obtain guides, see Using Energy Market Information Systems.
- Check the IT Assistance topics on AEMO's website.

12.4.3 Information to provide AEMO

Please provide the following information when requesting IT assistance from AEMO:

- Your name
- Organisation name
- Participant ID
- System or application name
- Environment: production or pre-production
- Problem description
- Steps that caused the problem
- Screenshots

For AEMO software-related issues please also provide:

- Version of software
- Properties or log files

12 References

The resources listed in this section contain additional related information that may assist you.

In this chapter:

12.5 Rules, Law, and Government Bodies

- "Australian Energy Market Commission" (AEMC), electricity and gas rules
  http://www.aemc.gov.au/index.html. Viewed 06 February 2013.

- "Australian Energy Regulator (AER)", www.aer.gov.au. Viewed 06 February 2013.

12.6 Oracle

- "Oracle Downloads", SE 7 JRE and JDK downloads:
  http://www.oracle.com/technetwork/java/javase/downloads/index.html. Viewed 10 April 2013.

12.7 AEMO's website

You can find the following resources on AEMO's website:

- "aseXML Standards", help with aseXML, including guidelines, schemas, change process, sample files and white papers, http://www.aemo.com.au/About-the-Industry/Information-Systems/aseXML-Standards (Home>About the Industry>Information Systems>aseXML Standards). Viewed 30 January 2013.

- "Guide to Transition of aseXML", http://www.aemo.com.au/About-the-Industry/Information-Systems/Using-Energy-Market-Information-Systems(Home > About the Industry > Information Systems > Using Energy Market Information Systems). Viewed 04 February 2013.

Note: AEMO can change the version of aseXML for output, but the timing does not always suit data recipients. To assist data recipients with making the transition, AEMO supports the delivery of both the new and immediately superseded versions of aseXML data. Each participant receives data conforming to one of the versions at any one time.

- *Guide to User Rights Management,* http://www.aemo.com.au/About-the-Industry/Information-Systems/Using-Energy-Market-Information-Systems (Home > About the Industry > Information Systems). Viewed 15 February 2013.

- "IT Assistance", information to assist participants with IT related issues: http://www.aemo.com.au/About-the-Industry/Information-Systems/IT-Assistance (Home > About the Industry > Information Systems > IT Assistance). Viewed 15 February 2013.

- "MSATS B2B User Interface Guide", http://www.aemo.com.au/Electricity/Policies-and-Procedures/Market-Settlement-and-Transfer-Solutions/MSATS-Participant-User-Interface-Guides (Home > Electricity > Policies & Procedures > MSATS > MSATS Participant User Interface Guides). Viewed 11 February 2013.

- *MSATS NMI Discovery Questions and Answers*, contains answers compiled in response to questions from participants asking how to get the best results from the MSATS NMI Discovery features. Its purpose is to assist participants' staff who are actively involved in discovering NMIs through MSATS. See http://www.aemo.com.au/Electricity/Policies-and-Procedures/Market-Settlement-and-Transfer-Solutions/NMI-Discovery-Questions-and-Answers (Home>Electricity>Policies & Procedures>MSATS>NMI Discovery Questions and Answers). Viewed 15 February 2013.

- "MSATS Participant User Interface Guides", http://www.aemo.com.au/Electricity/Policies-and-Procedures/Market-Settlement-and-Transfer-Solutions/MSATS-Participant-User-Interface-Guides (Home > Electricity > Policies & Procedures > MSATS > MSATS Participant User Interface Guides). Viewed 21 March 2013.

- "RESTful Web Services: *The basics",* http://www.ibm.com/developerworks/webservices/library/ws-restful/. Viewed 06 February 2013.

- *Technical Guide to Electricity IT Systems*, information about AEMO's CSV Data Format Standard, AEMO's IP Addresses for Participants, AEMO's file servers for EMMS and MSATS, Security and Passwords. http://aemo.com.au/About-the-Industry/Information-Systems/Using-Energy-Market-Information-Systems (http://aemo.com.au/About-the-Industry/Information-Systems/Using-Energy-Market-Information-Systems). Viewed 6 May 2013.

- *Technical Guide to Web Services Client Software*, http://aemo.com.au/About-the-Industry/Information-Systems/Using-Energy-Market-Information-Systems (Home > About the Industry > Information Systems > Using Energy Market Information Systems). Viewed 06 February 2013.

- "Using Energy Market Information Systems", IT systems documentation and software: http://www.aemo.com.au/About-the-Industry/Information-Systems/Using-Energy-Market-Information-Systems (Home > About the Industry > Information Systems > Using Energy Market Information Systems). Viewed 15 February 2013.

12.8 Feedback

To suggest corrections to this document, please contact AEMO's Information and Support Hub.

12 Index