
Market Implementation

Commercial Operation System: XML Interfaces Reference

Revision 39

Last Updated: May 23, 2018

Revision History

Revision	Date	Description
29	03/24/2006	<u>DAY AHEAD, REAL TIME AND SUMMARY STATEMENT CHANGES</u> - Related to Schedule 24 Processing: - Added the following charge type to the Day Ahead Statement: - DA_SCHD_24_ALC (Schedule 24 BA Cost Allocation to Asset Owner) - Added the following bill determinant to the Day Ahead Statement: - SCHD_24_ALC_RATE (Schedule 24 Allocation Rate) - Added the following charge types to the Real Time Statement: - RT_SCHD_24_ALC (Schedule 24 BA Cost Allocation to Asset Owner) - RT_SCHD_24_DIST (Schedule 24 Collection Distribution to BA's designated AO / MP) - Added the following bill determinants to the Real Time Statement: - BA_SCHED_24_DIST_MN_OP_CST (Schedule 24 Distribution Monthly Operating Cost) - MISO_RT_SCHD_24_DIST (MISO Total Schedule 24 Allocation Dollars) - MISO_SCHED_24_DIST_MN_OP_CST (MISO Total Schedule Distribution Monthly Operating Cost) - SCHD_24_ALC_RATE (Schedule 24 Allocation Rate) - Added the following charge types to the Summary Statement: - DA_SCHD_24_ALC (Schedule 24 BA Cost Allocation to Asset Owner) - RT_SCHD_24_ALC (Schedule 24 BA Cost Allocation to Asset Owner) - RT_SCHD_24_DIST (Schedule 24 Collection Distribution to BA's designated AO / MP) - Related to Changes To Provide More Granular RT_RSG_MWP Bill Determinants: - Added the following bill determinants to the Day Ahead Statement: - DA_RSG_MIT_NL (Day Ahead Mitigated RSG No Load Amount) - DA_RSG_MIT_SU (Day Ahead Mitigated RSG Start Up Amount) - DA_RSG_MIT_IE (Day Ahead Mitigated RSG Incremental Energy Amount) - DA_RSG_IE (Day Ahead RSG Incremental Energy Amount) - DA_RSG_NL (Day Ahead RSG No Load

		Amount) ▪ DA_RSG_SU (Day Ahead RSG Start Up Amount) ○ Added the following bill determinants to the Real Time Statement: ▪ RT_RSG_MIT_IE (Real Time Mitigated RSG Incremental Energy Amount) ▪ RT_RSG_MIT_NL (Real Time Mitigated RSG No Load Amount) ▪ RT_RSG_MIT_SU (Real Time Mitigated RSG Start Up Amount) ▪ RT_RSG_IE (Real Time RSG Incremental Energy Amount) ▪ RT_RSG_NL (Real Time RSG No Load Amount) ▪ RT_RSG_SU (Real Time RSG Start Up Amount)
30	10/09/2006	<u>DAY AHEAD AND REAL TIME STATEMENT CHANGES</u> ○ Related to FERC RSG Carve-out Order ○ DAY AHEAD STATEMENT: Added the following attribute to the ASSET_NM tag associated with each CP Node: ▪ DA_RSG_DIST_EXEMPT ○ REAL TIME STATEMENT: Added the following attributes to the ASSET_NM tag associated with each CP Node: ▪ LRS_EXEMPT ▪ DEV_EXEMPT ○ Related to Price Volatility Make Whole Payment Change ○ REAL TIME STATEMENT: ▪ Added the following charge type tag: • RT_PV_MWP ▪ Added the following bill determinants: • PV_BO • PV_COFD • PV_ELIG • PV_POCR
31	04/12/2007	<u>METER DATA REQUIREMENTS AND VALIDATION CHANGES</u> ○ DST_PARTICIPANT: Now a required tag; value must be 'N' or meter file will be rejected. ○ STATUS: Remains an optional tag; value, if present, must be ' ' (space) or 'E' or meter file will be rejected. <u>NEW ATTRIBUTE ON RT ASSET OWNER STATEMENTS</u> <u>"RSG_AWE"</u> ○ Related to March 15, 2007 FERC Order. ○ Participants that pay RT_RSG_DIST1 are those participants who have "Actually Withdraw Energy" in the RT.
32	08/21/2007	Updates to FTR Statements for application of monthly net auction net revenue and LTTR full funding changes (statement impact effective Dec 11, 2007 calculations effective January 1, 2008) ○ Added 3 new charge types ○ Added 9 new bill determinants ○ Added bill dets and charge type in the appropriate places in sample xml

33	03/05/2008	Updates to FTR Statements related to addition of Auction Revenue Rights (ARR) functionality effect June 1, 2008. ○ Added 4 new charge types ○ Added 15 new bill determinants ○ Replaced sample xml with ones including the new bill determinants and charge types
34	04/07/2008	<u>METER DATA VALIDATION CHANGES</u> • Changed all dates from 'type=xs:string' to 'type=xs:dateTimeFormat' such that badly formatted dates do not get past schema validation. • Specified enumeration validations at the schema level for UOM and SPI values to only allow values of 44 and 3600 for these nodes, respectively.
35	09/12/2008	Synchronize Bill Determinant and Charge Type names with Market Settlements BPM Attachment A
36	9/12/2008	Added 5 Minute Interval Data File Information
37	3/6/2009	Additional data points added to the 5 Minute Interval Data File: DISPATCHABLE, DISP_BAND_ON, MIN_LIMIT_BIND, MAX_LIMIT_BIND and MIN_UDS_RR.
38	1/20/2017	<u>METER DATA VALIDATION CHANGES</u> Added Elemental Pricing Node information to support internal pseudo-tie cost allocation Removed Rejection Data Reports section; no longer applicable Updated public website reference links throughout
39	6/1/2018	<u>METER DATA 5 AND 15 MINUTE CHANGES</u> Added information to support 5 and 15 minute meter data upload ability Added information on error messages related to 5 and 15 minute changes. Updated the example XML files to include a 5 and 15 minute file example. Added example URLs for meter data upload and settlement statement download in Appendix G. Added Appendix H – API Upload Considerations

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Commercial Operation System Interfaces: XML

1 Introduction

1.1 Purpose

The purpose of this document is to describe the XML-based interfaces to the MISO Commercial Operations System (COS) – Market Settlements, Customer Service, and Portal. Although this document reflects the latest thinking, this version is not considered “final” and is subject to change. This document will be modified and made available through normal communications when updates occur.

1.2 Document Description

This document provides a translation of the XML based Market Participant interfaces for the Commercial Operations System (COS). The following pages will give an overall description of each file, their structures, and provide a working example.

1.3 Document Definitions

Definitions of common terminology use throughout this document:

- Nodal pricing (\$/MWh) - Represents the Locational Marginal Price (LMP) and its Marginal Components at given Commercial Pricing Node (CPNode).
- Volumes (MWh) - Represents the Day-Ahead and Real-Time Schedules sent from either Market Operations or Financial Scheduling (FinSched). Financial Transmission Right (FTR) volumes, sent from the FTR system, represent mega-watt ownership of FTR's by a Market Participant. Additional volumes are represented as Meter Actual Data submitted by Meter Data Management Agents.
- Quantity – Same as Volume.
- Trade date - The daily 24-hour period beginning at midnight for which transactions on the MMI Interchange Energy Market are scheduled.
- Operating date - Same as the Trade date.
- Execution date - The day Market Settlements are run for a group of trade dates.
- Settlement date – Same as the Execution date.

2 COS XML Interface Files

The COS XML Interface Files described in this document are:

[MMI Day-Ahead Settlement Statement](#)
[MMI Real-Time Settlement Statement](#)
[MMI Financial Transmission Rights Settlement Statement](#)
[MMI Market Summary Statement](#)
[Meter Actuals](#)
[Rejection Data Reports](#)

All files listed within this document are either produced by COS or accepted as input to COS. This document is arranged in four sections used to describe the files. These sections are:

- **File Description** - The “File Description” sections will briefly explain the functionality of each file.
- **Schema Description** - The “Schema Description” tables define the data element names, their data descriptions, their data types, and whether the fields are required.
- **Schema Definition** - The “Schema Definition” section shows the schema that the COS System uses to validate the XML files for each particular functional area. A schema is used as a template to describe the structure of the data that the system is expecting as well as the relationships between that data.
- **Sample File** - The “Sample File” represents a sample of the XML file populated with sample data.

3 MMI Day-Ahead Settlement Statement

3.1 File Description

COS Market Settlements creates one Settlement Statement for each of the Day Ahead, Real Time and Financial Transmission Rights Markets for each Asset Owner and for each Operating Day which was settled on a given Settlement Execution Day. Included in the Statements are all the line items and adjustments to charge types generated for the Operating Day on the current settlement run and all previous runs. In support of this charge type data, Statements also include all recently updated raw hourly interval bill determinant data required to verify the charges and credits. Settlement calculations performed on the bill determinants total to the sum of all line items and adjustments for each charge type. Bill determinant data also includes an update flag to indicate where values have changed since the previous settlement run of this Operating Day.

Bill Determinants that appear on the Day-Ahead Market MMI Settlement Statement are:

Bill Determinant Code (DET_TYP_ID)	Name Posted in the XML Statement	Additional Information
ADMIN_TXN_CNT	Transaction Count	Daily, count
ADMIN_TXN_RATE	Transaction Administration Rate	Hourly, \$/txn
DA_ASOF_MWP	Day Ahead As Offered Make-Whole Payment	Hourly, \$/MWh
DA_FIN	Day Ahead Financial Bilateral Transaction Volume	Hourly, MWh
DA_GFAOB	Day Ahead Valid Option B Grandfathered Agreement Transaction Volume	Hourly, MWh
DA_GFACO	Day Ahead Carve-out Grandfathered Agreement Transaction Volume	Hourly, MWh
DA_IMM_MWP	Day Ahead IMM Make-Whole Payment	Hourly, \$/MWh
DA_LMP_EN	Day Ahead Locational Marginal Price	Hourly, \$/MWh
DA_LMP_CG	Day Ahead Congestion Component of Locational Marginal Price	Hourly, \$/MWh
DA_LMP_LS	Day Ahead Loss Component of Locational Marginal Price	Hourly, \$/MWh
DA_ADMIN_VOL	Day Ahead Market Administration Volume	Hourly, MWh
DA_MAP_FL	Day-Ahead Margin Assurance Payment Flag	Daily, Y/N
DA_PHYS	Day Ahead Physical Bilateral Transaction Volume	Hourly, MWh
DA_REG_MCP	Day-Ahead Regulation Market Clearing Price	Hourly, \$/MWh
DA_REG_VOL	Day-Ahead Cleared Regulation Volume	Hourly, MWh
DA_RSG_ELIGIBILITY	Day Ahead Revenue Sufficiency Guarantee Eligibility	Hourly, Y/N
DA_RSG_DIST_FCT	Day Ahead Revenue Sufficiency Guarantee Distribution Factor	Hourly, MWh
DA_RSG_DIST_VOL	Day Ahead Revenue Sufficiency Guarantee Distribution Volume	Hourly, MWh
DA_RSG_DIST_XMPT	Day-Ahead Revenue Sufficiency Guarantee Distribution Exemption	Hourly, Y/N
DA_RSG_IE	Day Ahead RSG Incremental Energy Amount	Hourly, \$
DA_RSG_MIT_IE	Day Ahead Mitigated RSG Incremental Energy Amount	Hourly, \$
DA_RSG_MIT_NL	Day Ahead Mitigated RSG No Load Amount	Hourly, \$
DA_RSG_MIT_PC	Day Ahead Mitigated RSG Production Cost Amount	Hourly, \$
DA_RSG_MIT_SU	Day Ahead Mitigated RSG Start Up Amount	Hourly, \$
DA_RSG_NL	Day Ahead RSG No Load Amount	Hourly, \$
DA_RSG_PC	Day Ahead RSG Production Cost Amount	Hourly, \$

DA_RSG_SU	Day Ahead RSG Start Up Amount	Hourly, \$
DA_SPIN_MCP	Day Ahead Spinning Reserve Market Clearing Price	Hourly, \$/MWh
DA_SPIN_VOL	Day Ahead Cleared Spinning Reserve Volume	Hourly, MWh
DA_SUPP_MCP	Day Ahead Supplemental Reserve Market Clearing Price	Hourly, \$/MWh
DA_SUPP_VOL	Day Ahead Cleared Supplemental Reserve Volume	Hourly, MWh
DA_SCHD	Day Ahead Asset Schedule Volume	Hourly, MWh
DA_VSCHD	Day Ahead Net Virtual Schedule	Hourly, MWh
ENERGY_MKT_RATE	Energy Markets Administration Rate	Hourly, \$/MWh
GFA_AVG_LOSS_PCT	Grandfathered Agreement Average Loss Rate Percentage	Hourly, Percentage
IMM(DA)_RSG_MITIGATION	Day-Ahead IMM RSG Mitigation flag	Daily, Y/N
IMM_MIT_MWP_TOL_AMT	IMM Mitigated Make Whole Payment Tolerance Amount	Daily, \$
IMM_MIT_MWP_TOL_PCT	IMM Mitigated Make Whole Payment Tolerance Percentage	Daily, Percentage
MISO_DA_RSG_MWP	MISO Day Ahead RSG Make Whole Payment Amount	Hourly, \$
MISO_DA_RSG_DIST_VOL	MISO Total Day Ahead Revenue Sufficiency Guarantee Distribution Volume	Hourly, MWh
PRE_888_REG	Regulation Pre-Order 888 Flag	Daily, Y/N
PRE_888_SPIN	Spinning Pre-Order 888 Flag	Daily, Y/N
PRE_888_SUPP	Supplemental Pre-Order 888 Flag	Daily, Y/N
SCHD_24_ALC_RATE	Schedule 24 Allocation Rate	Hourly, \$/MWh

Note: The Bill Determinant name posted in the XML Statement is not completely static. The names are built by a combination of a static portion and a dynamic portion. The static portion is provided in the above table. The dynamic portion will provide additional information about the determinant. The following is an example of a determinant name for a Day-Ahead Spot Schedule:

```
<DET_TYP_NM>Day Ahead Asset Schedule Volume at Node: Node32</DET_TYP_NM>
<ND_ID>Node32</ND_ID>
```

The static portion is “Day Ahead Spot Schedule Volume” and the dynamic portion is “ at node: Node32” which is generated based on the node information (in this case Node32 as presented in the following XML tag)

Charge Types that appear on the Day-Ahead Market Market MMI Settlement Statement are:

CHG_TYP_ID	Name Posted in the XML Statement	Additional Information
DA_ADMIN	Day Ahead Market Administration Amount	Hourly, \$
DA_ASM_REG	Day-Ahead Regulation Amount	Daily, \$
DA_ASM_SPIN	Day-Ahead Spinning Reserve Amount	Daily, \$
DA_ASM_SUPP	Day-Ahead Supplemental Reserve Amount	Daily, \$
DA_ASSET_EN	Day Ahead Asset Energy Amount	Hourly, \$
DA_FIN_LS	Day Ahead Financial Bilateral Transaction Loss Amount	Hourly, \$
DA_FIN_CG	Day Ahead Financial Bilateral Transaction Congestion Amount	Hourly, \$
DA_NASSET_EN	Day Ahead Non-Asset Energy Amount	Hourly, \$
DA_GFACO_RBT_CG	Day Ahead Congestion Rebate on Carve-Out Grandfathered Agrmnts	Hourly, \$
DA_GFACO_RBT_LS	Day Ahead Loss Rebate on Carve-Out Grandfathered Agrmnts	Hourly, \$
DA_GFAOB_RBT_CG	Day Ahead Congestion Rebate on Option B Grandfathered	Hourly, \$

	Agrmnts	
DA_GFAOB_RBT_LS	Day Ahead Loss Rebate on Option B Grandfathered Agrmnts	Hourly, \$
DA_RSG_DIST	Day Ahead Revenue Sufficiency Guarantee Distribution Amount	Hourly, \$
DA_RSG_MWP	Day Ahead Revenue Sufficiency Guarantee Make Whole Payment Amount	Hourly, \$
DA_SCHD_24_ALC	Day Ahead Schedule 24 Allocation Amount	Hourly, \$
DA_VIRT_EN	Day Ahead Virtual Energy Amount	Hourly, \$

An xml declaration with version and encoding attributes must always be added to the first line of an XML document otherwise there will be unpredictable results: <?xml version="1.0" encoding="UTF-8"?>

3.2 Schema Description

Note: Bolded element indicates Parent elements having Child elements. Elements may contain text, other elements, or are empty.

Schema Element Name	Schema Element Description	Data Type	Required
DA_STLMT	Day-Ahead Settlement Statement parent element having elements: ASSET_OWNER_NAME, ASSET_OWNER_ID, TIMESTAMP, SCHEDULED_DATE, OPERATING_DATE, SETTLEMENT_CODE, STATEMENT_ID, LINE_ITEMS, MKT_DET_TYP, ASSET_OWNER		Y
ASSET_OWNER_NAME	Name of the Asset Owner set up in the COS Customer Service System.	VARCHAR2(64)	Y
ASSET_OWNER_ID	ID of the Asset Owner set up in the COS Customer Service System.	VARCHAR2(64)	Y
TIMESTAMP	Date the Settlement Statement was generated.	DATE	Y
SCHEDULED_DATE	Scheduled Execution date of the Settlement.	DATE	Y
OPERATING_DATE	Operating Date being settled.	DATE	Y
SETTLEMENT_CODE	Type of the Settlement being S7, S14, S55, S105 or any Resettlement (represented as Rx where x is the number of calendar days after the operating day when the resettlement was executed)	VARCHAR2(64)	Y
STATEMENT_ID	Unique combination of the StatementType, Asset Owner Name, MMDDYYYY Scheduled Date, MMDDYYYY Operating Date and Settlement Type used to identify the settlement: [Statement Type]_[Asset Owner Name]_[Scheduled Date]_[Operating Date]-[Settlement Type] Example: "DA_POWER1_04012004_03252004-S7"	VARCHAR2(64)	Y
LINE_ITEMS	The Line Items tag contains all charges associated to the Asset Owner. This is a parent element having child element CHG_TYP.		Y
CHG_TYP	Each CHG_TYP element contains information about each of the charges assessed to the Asset Owner.		Y

	This is a parent element having elements CHG_TYP_ID, CHG_TYP_NM, STLMT_TYP, TOTAL.		
CHG_TYP_ID	Charge Type Identification Code	VARCHAR2(64)	Y
CHG_TYP_NM	String name of the Charge Type (listed in the Summary Statement section).	VARCHAR2(64)	Y
STLMT_TYP	A STLMT_TYP element contains charge information for all settlements performed for the same operating day including the current one. This is a parent element having child elements STLMT_TYP_CD and AMT.		Y
STLMT_TYP_CD	Type of the Settlement being S7, S14, S55, S105 or any Resettlement (represented as Rx where x is the number of calendar days after the operating day when the resettlement was executed).	VARCHAR2(64)	Y
AMT	Incremental Dollar Amount of this Day-Ahead Settlement Charge Type for the associated STLMT_TYP_CD.	NUMBER(12,2)	Y
TOTAL	Represents the sum total of actual charges for the current settlement. This is a parent element having the child element AMT.		Y
AMT	Total Dollar Amount of the Day-Ahead Settlement Charge Type actual charges for the Operating Day.	NUMBER(12,2)	Y
MKT_DET_TYP	Each one of these tags contains a Market Wide Billing Determinant. This parent element has elements DET_TYP_ID, DET_TYP_NM, INT, VAL, ND_ID, and attribute INTD_UPDT_FL		Y
ASSET_OWNER	This section contains all the Asset Owner Bill Determinants. This parent element has the following elements: ASSET_OWNER_NAME, DET_TYP, ASSET		Y
ASSET	Day-Ahead Settlement determinants for the Asset. Asset parent element has child elements ASSET_NM, ASSET_TYP, DET_TYP.		N (May or may not be present depending on assets owned)
ASSET_NM	Name of the Asset as specified in the Customer Care system. Only assets with a registered node id of "FXD" can have the following attribute and value: COMBINED_CYCLE_AGG ="Y" Schedule 17 admin fee exemption will be indicated with the following attribute: SCHEDULE_17_ASSET="EXEMPT" IMM Revenue Sufficiency Guarantee Mitigation eligibility will be indicated with the following attribute: IMM_RSG_MITIGATION=("Y" or "N") Only assets which are DA RSG-exempt	VARCHAR2(64)	Y

	will see the following attribute: DA_RSG_DIST_EXEMPT="Y"		
COMBINED_CYCLE_AGG	Attribute of the ASSET_NM tag. Determines if this is a combined cycle Generation Resource. Values: "Y" This is the aggregate combined cycle unit. "[NAME]" = The current unit is a child combined cycle unit and the name in this attribute represents the Name of the aggregate parent unit. Attribute not present = Not a combined cycle Generation Resource (or not a Generation Resource at all)		N
ASSET_TYP	Type of Asset. Values: "GENRES" – Generation Resource "LOAD" – Load "DRR" – Demand Response Resource	VARCHAR2(64)	Y
DET_TYP	Depending on the location of this element, this tag could contain the following data: Inside MKT_DET_TYP: Represents a Market Wide Bill Determinant. Inside MP: Represents an Asset Owner Bill Determinant not tied to an Asset Inside ASSET: Represents an Asset Owner Bill Determinant tied to an Asset All possible elements are: DET_TYP_ID, DET_TYP_NM, VAL, SRC_ND_ID, DEL_ND_ID, SNK_ND_ID, ND_ID, TRANSACTION_ID, INT, PRE_888_CG, PRE_888_LS, and attribute INTD_UPDT_FL		Y
INTD_UPDT_FL	Attribute of the MKT_DET_TYP and DET_TYP elements. This indicates if the Billing Determinant changed since the last time that a settlement statement was generated for the same operating day. Values: "Y" – Bill determinant is different from the one used in the previous settlements for the same operating day "N" – Bill determinant has not changed from the previous time settlements was executed		Y
DET_TYP_ID	Determinant Type Identifier. List of codes is provided in a table within the File Description sub section	VARCHAR2(64)	Y
DET_TYP_NM	Name of the Day-Ahead Bill Determinant.	VARCHAR2(64)	Y
SRC_ND_ID	Name of the Source Node for the current determinant	VARCHAR2(64)	N
ND_TYP	Attribute of SRC_ND_ID Node		N
DEL_ND_ID	Name of the Delivery Point Node for the current determinant	VARCHAR2(64)	N
SNK_ND_ID	Name of the Sink Node for the current determinant	VARCHAR2(64)	N
ND_TYP	Attribute of SNK_ND_ID Node		N
ND_ID	Name of the Node for the current determinant,	VARCHAR2(64)	N

	(schedule or price).		
INT	Hourly Interval parent element having element INT_NUM and VAL.		Y
INT_NUM	Holds value representing each hour of the 24-hour Interval.	VARCHAR2(64)	Y
VAL	Holds an Hourly value of Price (\$/MW or %/MW) or Volume (MWH), depending for the Bill Determinant.	NUMBER(10,2)	Y
PRE_888_CG	Financial Schedules containing a PRE_888_CG flag set to "Y" will be excluded from congestion charges in the settlement calculations. Flags set to: "G" represent GFAs; "O" for GFA Carveouts.	VARCHAR2(64)	N
PRE_888_LS	Financial Schedules containing a PRE_888_LS flag set to "Y" will be excluded from loss charges in the settlement calculations. Flags set to: "G" represent GFAs; "O" for GFA Carveouts.	VARCHAR2(64)	N
TRANSACTION_ID	Transaction unique Identifier. This tag also has attribute TXN_TYP.	VARCHAR2(64)	N
TXN_TYP	The transaction type.	VARCHAR2(64)	N

Note: Bolded element indicates Parent elements having Child elements. Elements may contain text, other elements, or are empty.

3.3 Schema Definition

Supporting technical documentation, such as schema files and XML specifications, can be found on the MISO public website (www.misoenergy.org). Navigate to [Markets and Operations > Technical Documents > Market Portal](#).

4 MMI Real-Time Settlement Statement

4.1 File Description

COS Market Settlements creates one Settlement Statement for each of the Day Ahead, Real Time and Financial Transmission Rights Markets for each Asset Owner and for each Operating Day which was settled on a given Settlement Execution Day. Included in the Statements are all the line items and adjustments to charge types generated for the Operating Day on the current settlement run and all previous runs. In support of this charge type data, Statements also include all of the most recently updated raw hourly interval bill determinant data required to verify the charges and credits. Settlement calculations performed on the bill determinants total to the sum of all line items and adjustments for each charge type. Bill determinant data also includes an update flag to indicate where values have changed since the previous settlement run of this Operating Day.

Bill Determinants that appear on the Real-Time Market MMI Settlement Statement are:

Bill Determinant (DET_TYP_ID)	Name Posted in the XML Statement	Additional Information
AO_RT_RSG_DIST2	Asset Owner Real Time RSG 2 nd Pass Distribution Amount	Hourly, \$
AO_RT_GFAOB_DIST	Asset Owner RT Option B GFA Congestion Rbt Dist Amt	Hourly, \$
AO_RT_GFACO_DIST	Asset Owner Carve-Out GFA Congestion Rbt Dist Amt	Hourly, \$
ASM_REG_DIST_RATE	Hourly Regulation Reserve Distribution Rate for a Reserve Zone	Hourly, \$/MWh
ASM_REG_DIST_VOL	Hourly Regulation Reserve Distribution Volume for a CPNode	Hourly, MWh
ASM_REG_GFA_DIST_RATE	Hourly Regulation Reserve GFA Distribution Rate for a Reserve Zone	Hourly, \$/MWh
ASM_SPIN_DIST_RATE	Hourly Spinning Reserve Distribution Rate for a Reserve Zone	Hourly, \$/MWh
ASM_SPIN_DIST_VOL	Hourly Spinning Reserve Distribution Volume for an AO in a Reserve Zone	Hourly, MWh
ASM_SPIN_GFA_DIST_RATE	Hourly Spinning Reserve GFA Distribution Rate for a Reserve Zone	Hourly, \$/MWh
ASM_SUPP_DIST_RATE	Hourly Supplemental Reserve Distribution Rate for a Reserve Zone	Hourly, \$/MWh
ASM_SUPP_DIST_VOL	Hourly Supplemental Reserve Distribution Volume for an AO in a Reserve Zone	Hourly, MWh
ASM_SUPP_GFA_DIST_RATE	Hourly Supplemental Reserve GFA Distribution Rate for a Reserve Zone	Hourly, \$/MWh
BA_SCHED_24_DIST_MN_OP_CST	Schedule 24 Distribution Monthly Operating Cost	Daily, \$
CA_LOSS	Modeled BA Losses Volume	Hourly, MWh
CRD_SHORT	Hourly Contingency Reserve Deployment Shortfall	Hourly, \$
DAMAP_EN_CON	Day-Ahead Margin Assurance Payment Energy Contribution	Hourly, \$
DAMAP_REG_CON	Day-Ahead Margin Assurance Payment Regulating Reserve Contribution	Hourly, \$
DAMAP_SPIN_CON	Day-Ahead Margin Assurance Payment Spinning Reserve Contribution	Hourly, \$
DAMAP_SUPP_CON	Day-Ahead Margin Assurance Payment Supplemental Reserve Contribution	Hourly, \$
DA_PHYS	Day Ahead Physical Bilateral Transaction Volume	Hourly, MWh
DA_SCHD	Day Ahead Asset Schedule Volume	Hourly, MWh
DA_VSCHD	Day Ahead Net Virtual Schedule Volume	Hourly, MWh
DEV_EXEMPT	Real-Time Nodal Deviation Exemption	Y/N
DFE	Deficient Energy Volume	
D1_NI_PBK	Day One Net Inadvertent Payback	Hourly, MWh

EEEF	Excessive Energy Exemption Flag; at a Commercial Pricing Node	Hourly, Y/N
ENERGY_MKT_RATE	Energy Markets Administration Rate	Hourly, \$/MWh
EXE	Excessive Resource Energy Volume	Hourly, MWh
FFDF	Failure to Follow Dispatch Flag	Hourly, Y/N
GEN_PERF	Generation Performance Volume	Hourly, MWh
GEN_SP	Generation Set Point Volume	Hourly, MWh
IMM(RT)_RSG_MITIGATION	Real-Time IMM RSG Mitigation flag	Daily, Y/N
IMM_MIT_MWP_TOL_AMT	IMM Mitigated Make Whole Payment Tolerance Amount	Daily, \$
IMM_MIT_MWP_TOL_PCT	IMM Mitigated Make Whole Payment Tolerance Percentage	Daily, Percentage (0 to 100)
JOA_AO_UPLIFT	Asset Owner Total JOA Uplift Amount	Hourly, \$
JOA_MISO_UPLIFT	MISO Total JOA Uplift Amount	Hourly, \$
LP_FCT	Loss Pool to MISO Losses Distribution Factor	Hourly, Factor (0 to 1)
LP_LRS_FCT	Real-Time Distribution Factor for an Asset in a Loss Pool	Hourly, Factor (0 to 1)
MISO_ASM_EXE_DFE_DEP_RT	Real Time Excessive/Deficient Charge Rate	Daily \$/MWh
MISO_CRDFC_UPLIFT	Real-Time Contingency Response Deployment Failure Uplift Amount	Hourly, \$
MISO_LOSS_SURPLUS	MISO LOSS Surplus Amount	Hourly, \$
MISO_LRS_FCT	Asset Owner to MISO Load Ratio Share Factor	Hourly, Factor (0 to 1)
MISO_NI	MISO Net Inadvertent Amount	Daily, \$
MISO_PV_MWP_UPLIFT	Real-Time Price Volatility Make-Whole Payment Uplift Amount	Hourly, \$
MISO_RT_GFAOB_DIST	Real Time Option B Grandfathered Agrmnt Congestion Rbt Amt	Hourly, \$
MISO_RT_GFACO_DIST	Real Time Carve-out Grandfathered Agrmnt Congestion Rbt Amt	Hourly, \$
MISO_GFACO_LS_RBT	Midwest ISO Total of Loss Rebates on Carved-Out GFAs	Hourly, \$
MISO_GFAOB_LS_RBT	Hourly Midwest ISO total Day-Ahead Losses Rebate on GFAOB FBTs	Hourly, \$
MISO_RT_RNA	MISO Real Time Revenue Neutrality Amount	Hourly, \$
MISO_RT_RSG_DIST_RATE	MISO Real Time RSG First Pass Distribution Rate	Hourly, Factor (0 to 1)
MISO_RT_RSG_DIST_VOL	MISO Real Time RSG First Pass Distribution Volume	Hourly, MWh
MISO_RT_RSG_DIST2	MISO Real Time RSG Second Pass Distribution Amount	Hourly, \$
MISO_RT_RSG_ELIGIBILITY	MISO Real Time RSG Commitment Volume	Hourly, MWh
MISO_RT_RSG_MWP	MISO Real Time RSG Make Whole Payment Total Amount	Hourly, \$
MISO_RT_SCHD_24_DIST	MISO Total Schedule 24 Allocation Dollars	Hourly, \$
MISO_SCHED_24_DIST_MN_OP_CST	MISO Total Schedule Distribution Monthly Operating Cost	Daily, \$
NAI	Net Actual Interchange (NAI) Volume	Hourly, MWh
NI_DIST_FCT	Net Inadvertent Distribution Factor	Daily, Factor (0 to 1)
NRGA	Net Regulation Generation Adjustment	Hourly, \$
PCT_CPN_IN_ZN	Percent CPNode in Reserve Zone	Daily, Percentage (0 to 100)
PRE_888_REG	Regulation Pre-Order 888 Flag	Daily, Y/N
PRE_888_SPIN	Spinning Pre-Order 888 Flag	Daily, Y/N
PRE_888_SUPP	Supplemental Pre-Order 888 Flag	Daily, Y/N
PV_BO	Price Volatility Base Output	Hourly, MWh
PV_COFD	Price Volatility Cost of Following Dispatch	Hourly, \$/MWh
PV_ELIG	Price Volatility Eligibility	Hourly, Y/N
PV_POCR	Price Volatility Pay Output Commitment Ratio	Hourly, Factor (0 to 1)
REG_DN	Generation Regulation Down Volume	Hourly, MWh
REG_UP	Generation Regulation Up Volume	Hourly, MWh
RI_AO_UPLIFT	Asset Owner Revenue Inadequacy Uplift	Hourly, \$

RT_ACT_MTR	Real Time Metered Actual Volume	Hourly, MWh
RT_ADJ_MTR	Real Time Metered Adjustment Volume	Hourly, MWh
RT_ADMIN_VOL	Real Time Market Administration Volume	Hourly, MWh
RT_ALT_MTR	Real Time Metered Alternate Volume	Hourly, MWh
RT_ASM_REG_GFA_SELLER_DIST_VOL	Regulation Reserve GFA Distribution Volume for an AO in a Reserve Zone	Hourly, MWh
RT_ASM_SPIN_GFA_SELLER_DIST_VOL	Spinning Reserve GFA Distribution Volume for an AO in a Reserve Zone	Hourly, MWh
RT_ASM_SUPP_GFA_SELLER_DIST_VOL	Supplemental Reserve GFA Distribution Volume for an AO in a Reserve Zone	Hourly, MWh
RT_ASOF_MWP	Real Time As Offered Make-Whole Payment	Hourly, \$/MWh
RT_BLL_MTR	Real Time Metered Billable Volume	Hourly, MWh
RT_ELIG_MWH	Real-Time Eligible Megawatt-Hour (MWh) for a Resource	Hourly, MWh
RT_FIN	Real Time Financial Bilateral Transaction Volume	Hourly, MWh
RT_IMM_MWP	Real Time IMM Make-Whole Payment	Hourly, \$/MWh
RT_GFACO	Real Time Carve Out Grandfathered Agrmnt Transaction Volume	Hourly, MWh
RT_LMP_CG	Real Time Congestion Component of Locational Marginal Price	Hourly, \$/MWh
RT_LMP_EN	Real Time Locational Marginal Price	Hourly, \$/MWh
RT_LMP_LS	Real Time Loss Component of Locational Marginal Price	Hourly, \$/MWh
RT_MAX_DSP	Real Time Maximum Dispatchable Volume	Hourly, MW
RT_MIN_DSP	Real Time Minimum Dispatchable Volume	Hourly, MW
RT_ORSGP_FL	Real-Time Offer Revenue Sufficiency Guarantee Flag	Hourly, Y/N
RT_ORSGP_IE	Real-Time ORSGP Incremental Energy Cost for a Resource	Hourly, \$
RT_PHYS	Real Time Physical Bilateral Transaction Volume	Hourly, MWh
RT_REG_AC	Real Time Regulating Reserve Availability Cost	Hourly, \$
RT_REG_MCP	Real Time Regulating Reserve Market Clearing Price	\$/MWh
RT_REG_MIT_AC	Real Time Regulation Reserve Mitigated Availability Cost	Hourly, \$
RT_REG_REV	Real-Time Hourly Regulation Reserve Revenue	Hourly, \$
RT_RSG_DIST_VOL	Real Time RSG First Pass Distribution Volume	Hourly, MWh
RT_RSG_ELIGIBILITY	Real Time Revenue Sufficiency Guarantee Eligibility	Hourly, Y/N
RT_RSG_IE	Real Time RSG Incremental Energy Amount	Hourly, \$
RT_RSG_MIT_IE	Real Time Mitigated RSG Incremental Energy Amount	Hourly, \$
RT_RSG_MIT_NL	Real Time Mitigated RSG No Load Amount	Hourly, \$
RT_RSG_MIT_PC	Real Time Mitigated RSG Production Cost Amount	Hourly, \$
RT_RSG_MIT_SU	Real Time Mitigated RSG Start Up Amount	Hourly, \$
RT_RSG_NL	Real Time RSG No Load Amount	Hourly, \$
RT_RSG_PC	Real Time RSG Production Cost Amount	Hourly, \$
RT_RSG_SU	Real Time RSG Start Up Amount	Hourly, \$
RT_SPIN_AC	Real Time Spinning Reserve Availability Cost	Hourly, \$
RT_SPIN_MCP	Real Time Spinning Reserve Market Clearing Price	\$/MWh
RT_SPIN_MIT_AC	Real Time Spinning Reserve Mitigated Availability Cost	Hourly, \$
RT_SPIN_REV	Real-Time Hourly Spinning Reserve Revenue	Hourly, \$
RT_SUPP_AC	Real Time Supplemental Reserve Availability Cost	Hourly, \$
RT_SUPP_MCP	Real Time Supplemental Reserve Market Clearing Price	\$/MWh
RT_SUPP_MIT_AC	Real Time Supplemental Reserve Mitigated Availability Cost	Hourly, \$
RT_SUPP_REV	Real-Time Hourly Supplemental Reserve Revenue	Hourly, \$
RTORSGP_REG_AC	Real-Time Additional Regulation Reserve Cost	\$

RTORSGP_SPIN_AC	Real-Time Additional Spinning Reserve Cost	\$
RTORSGP_SUPP_AC	Real-Time Additional Supplemental Reserve Cost	\$
RTN_REG_VOL	Net Real-Time Cleared Regulation Volume	Hourly
RTN_SPIN_VOL	Real Time Net Cleared Spinning Volume at a Commercial Pricing Node	Hourly,
RTN_SUPP_VOL	Real Time Net Cleared Supplemental Reserve Volume	Hourly,
RI_UPLIFT	MISO Revenue Inadequacy Uplift	Hourly, \$
SCHD_24_ALC_RATE	Schedule 24 Allocation Rate	Hourly, \$/MWh
UD_AO_UPLIFT	Asset Owner Total Uninstructed Deviation Uplift Amount	Hourly, \$
UD_MISO	MISO Total Uninstructed Deviation Amount	Hourly, \$
UD_PRC_CP	Uninstructed Deviation Maximum Charge LMP Percent	Hourly, Percent (0 to 100)
UD_PRC_DN	Uninstructed Deviation Down Charge LMP Percent	Hourly, Percent (0 to 100)
UD_PRC_UP	Uninstructed Deviation Up Charge LMP Percent	Hourly, Percent (0 to 100)
UD_TOL_DN	Generation Deviation Down Tolerance Volume	Hourly, MWh
UD_TOL_DN_MAX_MW	Generation Deviation Down Tolerance Maximum Megawatt Volume	Hourly, MWh
UD_TOL_DN_MIN_MW	Generation Deviation Down Tolerance Minimum Megawatt Volume	Hourly, MWh
UD_TOL_DN_PCT	Generation Deviation Down Tolerance Percent	Hourly, Percent (0 to 100)
UD_TOL_UP	Generation Deviation Up Tolerance Volume	Hourly, MWh
UD_TOL_UP_MAX_MW	Generation Deviation Up Tolerance Maximum Megawatt Volume	Hourly, MWh
UD_TOL_UP_MIN_MW	Generation Deviation Up Tolerance Minimum Megawatt Volume	Hourly, MWh
UD_TOL_UP_PCT	Generation Deviation Up Tolerance Percent	Hourly, Percent (0 to 100)
UD_XMPT	Uninstructed Deviation Exemption Flag	Hourly, Y/N

Charge Types that appear on the Real-Time Market MMI Settlement Statement are:

Charge Type (CHG_TYP_ID)	Name Posted in the XML Statement	Additional Information
RT_ASSET_EN	Real Time Asset Energy Amount	Hourly, \$
RT_FIN_CG	Real Time Financial Bilateral Transaction Congestion Amount	Hourly, \$
RT_FIN_LS	Real Time Financial Bilateral Transaction Loss Amount	Hourly, \$
RT_ADMIN	Real Time Market Administration Amount	Hourly, \$
RT_GFACO_RBT_CG	Real Time Congestion Rebate on Carve-Out Grandfathered Agrmnts	Hourly, \$
RT_GFACO_RBT_LS	Real Time Loss Rebate on Carve-Out Grandfathered Agrmnts	Hourly, \$
RT_MISC	Real Time Miscellaneous Amount	Daily, \$
RT_NI_DIST	Real Time Net Inadvertent Distribution Amount	Daily, \$
RT_NASSET_EN	Real Time Non-Asset Energy Amount	Hourly, \$
RT_PV_MWP	Real Time Price Volatility Make Whole Payment Amount	Hourly, \$
RT_RNU	Real Time Revenue Neutrality Distribution Amount	Hourly, \$
RT_RSG_DIST1	Real Time Revenue Sufficiency Guarantee First Pass Dist Amount	Hourly, \$
RT_RSG_MWP	Real Time Revenue Sufficiency Guarantee Make Whole Payment Amt	Hourly, \$
RT_VIRT_EN	Real Time Virtual Energy Amount	Hourly, \$
RT_SCHD_24_ALC	Real Time Schedule 24 Allocation Amount	Hourly, \$
RT_SCHD_24_DIST	Real Time Schedule 24 Distribution Amount	Hourly, \$
RT_UD	Real Time Uninstructed Deviation Amount	Hourly, \$

RT_LOSS_DIST	Real Time Distribution of Losses Amount	Hourly, \$
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An xml declaration with version and encoding attributes must always be added to the first line of an XML document otherwise there will be unpredictable results: <?xml version="1.0" encoding="UTF-8"?>

4.2 Schema Description

Note: Bolded element indicates Parent elements having Child elements. Elements may contain text, other elements, or are empty.

Schema Element Name	Schema Element Description	Data Type	Required
RT_STLMT	Real-Time Settlement Statement Name parent element having child elements: ASSET_OWNER_NAME, ASSET_OWNER_ID, TIMESTAMP, SCHEDULED_DATE, OPERATING_DATE, SETTLEMENT_CODE, STATEMENT_ID, LINE_ITEMS, MKT_DET_TYP, ASSET_OWNER, RT_MISC_RECORD		Y
ASSET_OWNER_NAME	Name of the Asset Owner set up in the COS Customer Service System.	VARCHAR2(64)	Y
ASSET_OWNER_ID	ID of the Asset Owner set up in the COS Customer Service System.	VARCHAR2(64)	Y
TIMESTAMP	Date the Settlement Statement was generated.	DATE	Y
SCHEDULED_DATE	Scheduled Execution date of the Settlement.	DATE	Y
OPERATING_DATE	Operating Date being settled.	DATE	Y
SETTLEMENT_CODE	Type of the Settlement being S7, S14, S55, S105 or any Resettlement (represented as Rx where x is the number of calendar days after the operating day when the resettlement was executed)	VARCHAR2(64)	Y
STATEMENT_ID	Unique combination of the Statement Type, Asset Owner Name, MMDDYYYY Scheduled Date, MMDDYYYY Operating Date and Settlement Type used to identify the settlement: [Statement Type]_[Asset Owner Name]_ [Scheduled Date]_[Operating Date]- [Settlement Type] Example: "RT_POWER1_04012004_03252004-S7"	VARCHAR2(64)	Y
LINE_ITEMS	The Line Items tag contains all charges associated to the Asset Owner. This is a parent element having child element CHG_TYP.		Y
CHG_TYP	Each CHG_TYP element contains information about each of the charges assessed to the Asset Owner. This is a parent element having elements CHG_TYP_ID, CHG_TYP_NM, STLMT_TYP, TOTAL.		Y
CHG_TYP_ID	Charge Type Identification Code	VARCHAR2(64)	Y
CHG_TYP_NM	String name of the Charge Type (listed in the Summary Statement section).	VARCHAR2(64)	Y
STLMT_TYP	A STLMT_TYP element contains charge information for all settlements performed for		Y

	the same operating day including the current one. This is a parent element having child elements STLMT_TYP_CD and AMT.		
STLMT_TYP_CD	Type of the Settlement being S7, S14, S55, S105 or any Resettlement (represented as Rx where x is the number of calendar days after the operating day when the resettlement was executed).	VARCHAR2(64)	Y
AMT	Incremental Dollar Amount of this Real-Time Settlement Charge Type for the associated STLMT_TYP_CD.	NUMBER(12,2)	Y
TOTAL	Represents the sum total of actual charges for the current settlement. This is a parent element having the child element AMT.		Y
AMT	Total Dollar Amount of the Real-Time Settlement Charge Type actual charges for the Operating Day.	NUMBER(12,2)	Y
MKT_DET_TYP	Each one of these tags contains a Market Wide Billing Determinant. This parent element has elements DET_TYP_ID, DET_TYP_NM, INT, N_ID, VAL, and attribute INTD_UPDT_FL		Y
ASSET_OWNER	This section contains all the Asset Owner Bill Determinants. This parent element has the following elements: ASSET_OWNER_NAME, DET_TYP, ASSET. RSG_AWE (RSG Actually Withdrawing Energy) attribute will indicate when the Asset Owner is subject to RT RST DIST1 charges for the operating day: RSG_AWE = "Y" indicates AO is subject to RT_RSG_DIST1 charges. RSG_AWE = "N" indicates AO is NOT subject to RT_RSG_DIST1 charges.		

ASSET	Real-Time Settlement determinants for the Asset. Asset parent element having ASSET_NM, ASSET_TYP, DET_TYP.		N (May or may not be present depending on assets owned)
ASSET_NM	Name of the Asset as specified in the Customer Care system. Only assets with a registered node id of "FXD" can have the following attribute: COMBINED_CYCLE_AGG Schedule 17 admin fee exemption will be indicated with the following attribute: SCHEDULE_17_ASSET="EXEMPT" IMM Revenue Sufficiency Guarantee Mitigation eligibility will be indicated with the following attribute: IMM_RSG_MITIGATION=("Y" or "N") Only assets which are RT RSG DIST-exempt will see the following attribute: DEV_EXEMPT="Y" Only assets which are exempt from RT RNU charges and RT LOSS DIST credits will see the following attribute: LRS_EXEMPT="Y"	VARCHAR2(64)	Y
COMBINED_CYCLE_AGG	Attribute of the ASSET_NM tag. Determines if this is a combined cycle Generation Resource. Values: "Y" This is the aggregate combined cycle unit. "[NAME]" = The current unit is a child combined cycle unit and the name in this attribute represents the Name of the aggregate parent unit. Attribute not present = Not a combined cycle Generation Resource (or not a Generation Resource at all)		N

ASSET_TYP	Type of Asset. Values: “GENRES” – Generation Resource “LOAD” – Load “DRR” – Demand Response Resource	VARCHAR2(64)	Y
DET_TYP	Depending on the location of this element, this tag could contain the following data: Inside MKT_DET_TYP: Represents a Market Wide Bill Determinant. Inside ASSET_OWNER: Represents an Asset Owner Bill Determinant not tied to an Asset Inside ASSET: Represents an Asset Owner Bill Determinant tied to an Asset All possible elements are: DET_TYP_ID, DET_TYP_NM, VAL, SRC_ND_ID, DEL_ND_ID, SNK_ND_ID, ND_ID, TRANSACTION_ID, INT, PRE_888_CG, PRE_888_LS, and attribute INTD_UPDT_FL		Y
INTD_UPDT_FL	Attribute of the MKT_DET_TYP and DET_TYP elements. This indicates if the Billing Determinant changed since the last time that a settlement statement was generated for the same operating day. Values: “Y” – Bill determinant is different from the one used in the previous settlements for the same operating day “N” – Bill determinant has not changed from the previous time settlements was executed		Y
DET_TYP_ID	Determinant Type Identifier. List of codes is provided in a table within the File Description sub section	VARCHAR2(64)	Y
DET_TYP_NM	Name of the Day-Ahead Bill Determinant.	VARCHAR2(64)	Y
SRC_ND_ID	Name of the Source Node for the current determinant	VARCHAR2(64)	N
ND_TYP	Attribute of SRC_ND_ID Node		N
DEL_ND_ID	Name of the Delivery Point Node for the current determinant	VARCHAR2(64)	N
SNK_ND_ID	Name of the Sink Node for the current determinant	VARCHAR2(64)	N
ND_TYP	Attribute of SRC_ND_ID Node		N
ND_ID	Name of the Node for the current determinant, (schedule or price).	VARCHAR2(64)	N
INT	Hourly Interval parent element having element INT_NUM and VAL.		Y

INT_NUM	Holds value representing each hour of the 24-hour Interval.	VARCHAR2(64)	Y
VAL	Holds an Hourly value of Price (\$/MW or %/MW) or Volume (MWH), depending for the Bill Determinant.	NUMBER(10,2)	Y
PRE_888_CG	Financial Schedules containing a PRE_888_CG flag set to "Y" will be excluded from congestion charges in the settlement calculations. Flags set to: "G" represent GFAs; "O" for GFA Carveouts.	VARCHAR2(64)	N
PRE_888_LS	Financial Schedules containing a PRE_888_LS flag set to "Y" will be excluded from loss charges in the settlement calculations. Flags set to: "G" represent GFAs; "O" for GFA Carveouts.	VARCHAR2(64)	N
TRANSACTION_ID	Transaction unique identifier. This tag has the attributes TXN_TYP and SCHD_TYP.	VARCHAR2(64)	N
TXN_TYP	The transaction type attribute.	VARCHAR2(64)	N
SCHD_TYP	The schedule type attribute.	VARCHAR2(64)	N
RT_MISC_RECORD	Parent element holding the following child elements: RT_MISC_RECORD_ID, RT_MISC_RECORD_DESC, and RT_MISC_RECORD_AMOUNT		N
RT_MISC_RECORD_ID	Identifier of the miscellaneous charge detail record	NUMBER(10)	N
RT_MISC_RECORD_DESC	Description of the miscellaneous charge detail record	VARCHAR2(254)	N
RT_MISC_RECORD_AMOUNT	Amount of the miscellaneous charge detail record	NUMBER(10,2)	N

Note: Bolded element indicates Parent elements having Child elements. Elements may contain text, other elements, or are empty.

4.3 Schema Definition

Supporting technical documentation, such as schema files and XML specifications, can be found on the MISO public website (www.misoenergy.org). Navigate to [Markets and Operations > Technical Documents > Market Portal](#).

5 MMI Financial Transmission Rights Settlement Statement

5.1 File Description

COS Market Settlements creates one Settlement Statement for each of the Day Ahead, Real Time and Financial Transmission Rights Markets for each Market Participant and for each Operating Day which was settled on a given Settlement Execution Day. Included in the Statements are all the line items and adjustments to charge types generated for the Operating Day on the current settlement run and all previous runs. In support of this charge type data, Statements also include all of the most recently updated raw hourly interval bill determinant data required to verify the charges and credits. Settlement calculations performed on the bill determinants total to the sum of all line items and adjustments for each charge type. Bill determinant data also includes an update flag to indicate where values have changed since the previous settlement run of this Operating Day.

Bill Determinants that appear on the FTR Market MMI Settlement Statement are:

Determinant (DET_TYP_ID)	Name Posted in the XML statement	Additional Information
AO_FTR_GUL_M_PVS	Asset Owner Previous Monthly Guarantee Uplift Amount	Monthly, \$
AO_FTR_GUL_Y_PVS	Asset Owner Previous Yearly Guarantee Uplift Amount	Yearly, \$
AO_FTR_M_TARG_CR	Asset Owner FTR Monthly Target Credit Allocation Amount	Monthly, \$
AO_FTR_Y_TARG_CR	Asset Owner FTR Yearly Target Credit Allocation Amount	Yearly, \$
AO_FTR_MN_ALC	Financial Transmission Rights Asset Owner Monthly Allocation	Monthly, \$
AO_FTR_MN_SHORTFALL	Asset Owner Total FTR Shortfall Amount for (MONTH)	Monthly, \$
AO_FTR_PRF	Asset Owner Financial Transmission Rights Profile Volume	Hourly, MWh
AO_FTR_YR_SHORTFALL	Asset Owner Total FTR Shortfall Amount for (YEAR)	Year to Date, \$
ARR_TXN	Allocated ARR Transaction ID: (ARR ID)	Transactional, \$
ARR_TXN_ADJ	Allocated ARR Transaction Shift Adjustments: (ARR ID)	Transactional, MWh
AO_ARR_STG2_DET	Asset Owner ARR Stage 2 Distribution Determinants for Zone: (ZN ID)	Transactional, \$
AO_ARR_STG2_DET_ADJ	Asset Owner ARR Stage 2 Distribution Determinant Shift Adjustments for Zone: (ZN ID)	Transactional, MWh
DA_LMP_CG	Day Ahead Congestion Component of Locational Marginal Price	Hourly, \$/MWh
DA_LMP_EN	Day Ahead Energy Component of Locational Marginal Price	Hourly, \$/MWh
DA_GFAOB	Day Ahead Valid Option B Grandfathered Agrmnt Transaction Volume	Hourly, MWh
FTR_ADMIN_RATE	Financial Transmission Rights Market Administration Rate	Hourly, \$/MWh
FTR_ADMIN_VOL	Financial Transmission Rights Market Administration Volume	Hourly, MWh

FTR_HR_ALC_FCT	Financial Transmission Rights Hourly Allocation Factor	Hourly, Factor (0 to 1)
FTR_MN_ALC_FL	Monthly FTR Allocation of Excess Congestion Fund Occurred	Daily, Y/N
FTR_YR_ALC_FL	Excess Congestion Distributed Through Yearly Allocation	Daily, Y/N
FTR_YR_ALC_FCT	Yearly Midwest ISO FTR Allocation Factor	Yearly, Factor (0 to 1)
FTR_TXN_RECORD	Financial Transmission Rights Transaction Record	Transactional, \$
GEN_OUTAGE	Generation Scheduled Outage Flag	Hourly, Y/N
MISO_ARR_FTR_PK_SEAS_TXN_DLS	MISO Total FTR Peak Seasonal Auction Transaction Amount for (MONTH):	Monthly, \$
MISO_ARR_FTR_SEAS_TXN_DLS	MISO Total FTR Off-Peak Seasonal Auction Transaction Amount (MONTH):	Monthly, \$
MISO_ARR_FEAS_PK_TARG_DLS	MISO Total Feasible ARR Peak Target Settlement Amount for (MONTH):	Monthly, \$
MISO_ARR_FEAS_TARG_DLS	MISO Total Feasible ARR Off-Peak Target Settlement Amount for (MONTH):	Monthly, \$
MISO_ARR_PK_STG1A_VOL	MISO Total ARR Peak Stage 1A Volume for (MONTH):	Monthly, MWh
MISO_ARR_STG1A_VOL	MISO Total ARR Off-Peak Stage 1A Volume for (MONTH):	Monthly, MWh
MISO_ARR_PK_INFEAS_DLS	MISO Total ARR Peak Infeasible Settlement Amount for (MONTH):	Monthly, \$
MISO_ARR_INFEAS_DLS	MISO Total ARR Off-Peak Infeasible Settlement Amount for(MONTH):	Monthly, \$
MISO_ARR_PK_STG2_ALLOC_DENOM_VOL	MISO Total ARR Peak Stage 2 Allocation Denominator for (MONTH):	Monthly, MWh
MISO_ARR_STG2_ALLOC_DENOM_VOL	MISO Total ARR Off-Peak Stage 2 Allocation Denominator for (MONTH):	Monthly, MWh
MISO_FTR_M_TARG_CR	MISO Monthly FTR Credit Target Allocation Amount	Monthly, \$
MISO_FTR_Y_TARG_CR	MISO Yearly FTR Credit Target Allocation Amount	Yearly, \$
MISO_FTR_FFG_M	MISO Monthly Full Funding Guarantee Amount	Monthly, \$
MISO_FTR_FFG_Y	MISO Yearly Full Funding Guarantee Amount	Monthly, \$
MISO_FTR_MN_SHORTFALL	MISO Total FTR Shortfall Amount for (MONTH):	Monthly, \$
MISO_FTR_YR_SHORTFALL	MISO Total FTR Shortfall Amount for (YEAR):	Year to Date, \$
MISO_MN_CG_FND	MISO Accumulated Excess Congestion for (MONTH) :	Daily, \$
MISO_YR_CG_FND	MISO Accumulated Excess Congestion for (YEAR):	Daily, \$
MO_FTR_TXN	Monthly FTR Transaction Record purchase or sale	Monthly, \$
SEAS_FTR_TXN	Seasonal FTR Transaction ID: (TXN ID) Transaction Date: (MM/DD/CCYY) FTR ID: (FTR_ID)	Seasonal, \$

Charge Types that appear on the FTR Market MMI Settlement Statement are:

Charge Type (CHG_TYP_ID)	Name Posted in the XML Statement	Additional Information
FTR_ADMIN	Financial Transmission Rights Market Administration Amount	Hourly, \$
FTR_ARR_ARR_TXN	Auction Revenue Rights Transaction Amount	Transactional, \$
FTR_ARR_FTR_TXN	Financial Transmission Rights Annual Transaction Amount	Transactional, \$
FTR_ARR_INF_UPL	Auction Revenue Rights Infeasible Uplift Amount	Transactional, \$
FTR_ARR_STG2_DIST	Auction Revenue Rights Stage 2 Distribution Amount	Transactional, \$
FTR_FFG	Financial Transmission Rights Full Funding Guarantee Amount	Monthly, \$
FTR_GUL	Financial Transmission Guarantee Uplift Amount	Monthly, \$
FTR_HR_ALC	Financial Transmission Rights Hourly Allocation Amount	Hourly, \$
FTR_MN_ALC	Financial Transmission Rights Monthly Allocation Amount	Daily, \$
FTR_MO_TXN	Financial Transmission Rights Monthly Transaction Amount	Daily, \$
FTR_TXN	Financial Transmission Rights Transaction Amount	Daily, \$
FTR_YR_ALC	Financial Transmission Rights Yearly Allocation Amount	Daily, \$

An xml declaration with version and encoding attributes must always be added to the first line of an XML document otherwise there will be unpredictable results: <?xml version="1.0" encoding="UTF-8"?>

5.2 Schema Description

Note: Bolded element indicates Parent elements having Child elements. Elements may contain text, other elements, or are empty.

Schema Element Name	Schema Element Description	Data Type	Required
FTR_STLMT	Statement Name parent element having child elements: ASSET_OWNER_NAME, ASSET_OWNER_ID, TIMESTAMP, SCHEDULED_DATE, OPERATING_DATE, SETTLEMENT_CODE, STATEMENT_ID, LINE_ITEMS, MKT_DET_TYP, ASSET_OWNER, FTR_TXN		Y
ASSET_OWNER_ID	ID of the Asset Owner set up in the COS Customer Service System.	VARCHAR2(64)	Y
ASSET_OWNER_NAME	Name of the Asset Owner set up in the COS Customer Service System.	VARCHAR2(64)	Y
TIMESTAMP	Date the Settlement Statement was generated.	DATE	Y
SCHEDULED_DATE	Scheduled Execution date of the Settlement.	DATE	Y
OPERATING_DATE	Operating Date being settled.	DATE	Y
SETTLEMENT_CODE	Settlement Type Code	VARCHAR2(64)	Y
STATEMENT_ID	Unique combination of the Statement Type, Asset Owner Name, MMDDYYYY Scheduled Date, MMDDYYYY Operating Date and Settlement Type used to identify the settlement. [Statement Type]_[Asset Owner Name]_[Scheduled Date]_[Operating Date]-[Settlement Type] Example: "FTR_POWER1_04012004_03252004-S7"	VARCHAR2(64)	Y

LINE_ITEMS	Settlement Line Item parent element having child element CHG_TYP. Name and total dollar amount of the Charge Type for the FTR Settlement.		Y
ASSET_OWNER	Asset Owner parent element having elements ASSET_OWNER_NAME, DET_TYP Financial Transaction Rights Settlement determinants for a Market Participant.		Y
CHG_TYP	Charge Type parent element having elements CHG_TYP_ID, CHG_TYP_NM, STLMT_TYP, TOTAL Name and total dollar amount of the Charge Type for the FTR Settlement.		Y
CHG_TYP_ID	Charge Type Identification Code	VARCHAR2(64)	Y
CHG_TYP_NM	Name of the FTR Charge Type (listed in the Summary Statement section).	VARCHAR2(64))	Y
STLMT_TYP	A STLMT_TYP element contains charge information for all settlements performed for the same operating day including the current one. This is a parent element having child elements STLMT_TYP_CD and AMT.		Y
STLMT_TYP_CD	Type of the Settlement being S7, S14, S55, S105 or any Resettlement (represented as Rx where x is the number of calendar days after the operating day when the resettlement was executed).	VARCHAR2(64))	Y
AMT	Incremental Dollar Amount of this FTR Settlement Charge Type for the associated STLMT_TYP_CD.	NUMBER(12,2)	Y
TOTAL	Represents the sum total of actual charges for the current settlement. This is a parent element having the child element AMT.		Y
AMT	Total Dollar Amount of the FTR Settlement Charge Type actual charges for the Operating Day.	NUMBER(12,2)	Y
MKT_DET_TYP	Market Wide Bill Determinant Type parent element having elements DET_TYP_ID, DET_TYP_NM, INT, ND_ID, TRANSACTION_ID, VAL and attribute INTD_UPDT_FL		Y
DET_TYP	Bill Determinant Type parent element having elements DEL_ND_ID, DET_TYP_ID, DET_TYP_NM, STARTTIME, STOPTIME, SRC_ND_ID, SNK_ND_ID, ND_ID, FTR_ID, INT, TRANSACTION_ID, and attribute INTD_UPDT_FL		Y
INTD_UPDT_FL	Attribute of the MKT_DET_TYP and DET_TYP elements. This indicates if the Billing Determinant changed since the last time a settlement statement was generated for the same operating day. Values: "Y" – Bill determinant is different from the one used in the previous settlements for the same operating day "N" – Bill determinant has not changed from the previous time settlements was executed		Y

DET_TYP_ID	Determinant Type Identifier. List of codes is provided in a table within the File Description sub section	VARCHAR2(64)	Y
DET_TYP_NM	Name of the Bill Determinant. For FTR Profile bill determinants, it can have the following attributes: FTR_TYPE_FL, PEAK_FL, OPT_FL, CFTR_FL	VARCHAR2(64))	Y
FTR_TYPE_FL	Attribute of the DET_TYP_NM element. Indicates the FTR Type. Values: "FGR" = Flowgate FTR "PTP" = Point to Point FTR		Y
PEAK_FL	Attribute of the DET_TYP_NM element. Indicates if the FTR is for Peak or off Peak hours. Values: "Y" = On Peak "N" = Off Peak		Y
OPT_FL	Attribute of the DET_TYP_NM element. Indicates the FTR Option flag. Only for Point to Point FTRs. Values: "Y" = PTP Option FTR "N" = PTP Obligation FTR		Y
CFTR_FL	Attribute of the DET_TYP_NM element. Indicates a Counter Flow FTR. This flag is only present for PTP FTRs. Values: "Y" = Counterflow FTR "N" = Not a counterflow FTR		N
STARTTIME	Seasonal FTR or ARR transaction starttime	DATE	N
STOPTIME	Seasonal FTR or ARR transaction stoptime	DATE	N
SRC_ND_ID	PTP FTR Source Node ID	VARCHAR2(64)	N
SNK_ND_ID	PTP FTR Sink Node ID	VARCHAR2(64)	N
ND_TYP	Attribute of the SRC_ND_ID and SNK_ND_ID elements.		
ND_ID	Flowgate FTR Node ID	VARCHAR2(64)	N
FTR_ID	FTR Unique Identifier	VARCHAR2(64))	Y
INT	Hourly Interval parent element having child elements INT_NUM and VAL. INT_NUM indicates which hour of the day (1-24) the hourly value is for. VAL holds hourly values of Price (\$/MW) or Volume (MWH) depending for the Bill Determinant.		Y
INT_NUM	Holds a value of 1 through 24 indicating which hour of day the associated value represents.	VARCHAR2(64))	Y
VAL	Holds an Hourly value of Price (\$/MW or %/MW) or Volume (MWH), depending for the Bill Determinant.	NUMBER(12,2)	Y
SCHD_TYP	Attribute of the TRANSACTION_ID Element		
FTR_TXN	FTR Parent Transaction Information. It contains the elements DET_TYP_ID, TXN, and TXN_AMOUNT		N
TXN	Transaction information containing Transaction ID, Transaction Type, Transaction Date, and FTR ID of the FTR that was sold/bought through	VARCHAR2	Y

	the FTR monthly auction or Secondary Market		
TXN_AMOUNT	FTR Transaction Amount as determined in the FTR auctions or Secondary Market	NUMBER(12,2)	Y
TRANSACTION_ID	Transaction unique identifier	VARCHAR2(64)	Y
ARR_DETS	Asset Owner parent element for ARR determinants for a Market Participant, containing element ARR_DET_TYP.		
ARR_DET_TYP	AO ARR Transaction and Stage 2 Distribution Determinants, containing elements ARR_DET_TYP_ID, ARR_DET_TYP_NM, ARR_ID, SRC_ND, SNK_ND, ZONE, STARTTIME, STOPTIME, PRC, VOL,SHIFT_NOM, NON_SHIFT_NOM, SHIFT_ALLOC, NON_SHIFT_ALLOC	VARCHAR2(64)	N
ARR_DET_TYP_ID	ARR_TXN, ARR_TXN_ADJ, AO_ARR_STG2_DET or AO_ARR_STG2_DET_ADJ	VARCHAR2(64)	N
ARR_DET_TYP_NM	Description for ARR_DET_TYP_ID	VARCHAR2(64)	N
ARR_ID	Unique identifier for ARR Transaction	VARCHAR2(64)	N
SRC_ND	ARR Source Node	VARCHAR2(64)	N
SNK_ND	ARR Sink Node	VARCHAR2(64)	N
ZONE	ARR Zone	VARCHAR2(64)	N
STARTTIME	Seasonal FTR or ARR transaction starttime	DATE	N
STOPTIME	Seasonal FTR or ARR transaction stoptime	DATE	N
PRC	ARR Transaction price / MWh	NUMBER(10,2)	N
VOL	ARR Transaction or Shift Adjustment volume (MWh)	NUMBER(10,3)	N
SHIFT_NOM	ARR nomination volume which has shifted	NUMBER(10,3)	N
NON_SHIFT_NOM	ARR nomination volume which has not shifted	NUMBER(10,3)	N
SHIFT_ALLOC	ARR allocation volume which has shifted	NUMBER(10,3)	N
NON_SHIFT_ALLOC	ARR allocation volume which has not shifted	NUMBER(10,3)	N

Note: Bolded element indicates Parent elements having Child elements. Elements may contain text, other elements, or are empty.

5.3 Schema Definition

Supporting technical documentation, such as schema files and XML specifications, can be found on the MISO public website (www.misoenergy.org). Navigate to [Markets and Operations > Technical Documents > Market Portal](#).

6 MMI Market Summary Statement

6.1 File Description

COS Market Settlements creates one Settlement Summary for each Asset Owner and one for each Market Participant on each Settlement Execution Day. The Asset Owner Summary captures every line item and adjustment data from all markets representing the current settlement run on the Settlement Execution Day for all Assets owned by the Asset Owner. Likewise, the Market Participant Summary Statement does the same for all Assets owned by all its Asset Owners. Each type Summary Statement includes no raw hourly interval bill determinant data. Settlement Summaries can be thought of as the daily contribution of market activity to an invoice.

Charge Types that appear on the MMI Market Summary Statement are:

Charge Type	Name Posted in the XML Statement	Unit
DA_ADMIN	Day Ahead Market Administration Amount	Daily, \$
DA_ASSET_EN	Day Ahead Asset Energy Amount	Daily, \$
DA_FIN_CG	Day Ahead Financial Bilateral Transaction Congestion Amount	Daily, \$
DA_FIN_LS	Day Ahead Financial Bilateral Transaction Loss Amount	Daily, \$
DA_GFACO_RBT_CG	Day Ahead Congestion Rebate on Carve-Out Grandfathered Agrmnts	Daily, \$
DA_GFACO_RBT_LS	Day Ahead Loss Rebate on Carve-Out Grandfathered Agrmnts	Daily, \$
DA_GFAOB_RBT_CG	Day Ahead Congestion Rebate on Option B Grandfathered Agrmnts	Daily, \$
DA_GFAOB_RBT_LS	Day Ahead Loss Rebate on Option B Grandfathered Agrmnts	Daily, \$
DA_NASSET_EN	Day Ahead Non-Asset Energy Amount	Daily, \$
DA_RSG_DIST	Day Ahead Revenue Sufficiency Guarantee Distribution Amount	Daily, \$
DA_RSG_MWP	Day Ahead Revenue Sufficiency Guarantee Make Whole Payment Amount	Daily, \$
DA_SCHD_24_ALC	Day Ahead Schedule 24 Allocation Amount	Daily, \$
DA_VIRT_EN	Day Ahead Virtual Energy Amount	Daily, \$
FTR_ADMIN	Financial Transmission Rights Market Administration Amount	Daily, \$
FTR_HR_ALC	Financial Transmission Rights Hourly Allocation Amount	Daily, \$
FTR_MN_ALC	Financial Transmission Rights Monthly Allocation Amount	Daily, \$
FTR_TXN	Financial Transmission Rights Transaction Amount	Daily, \$
FTR_YR_ALC	Financial Transmission Rights Yearly Allocation Amount	Daily, \$
RT_ADMIN	Real Time Market Administration Amount	Daily, \$
RT_ASSET_EN	Real Time Asset Energy Amount	Daily, \$
RT_FIN_CG	Real Time Financial Bilateral Transaction Congestion Amount	Daily, \$
RT_FIN_LS	Real Time Financial Bilateral Transaction Loss Amount	Daily, \$
RT_GFACO_RBT_CG	Real Time Congestion Rebate on Carve-Out Grandfathered Agrmnts	Daily, \$
RT_GFACO_RBT_LS	Real Time Loss Rebate on Carve-Out Grandfathered Agrmnts	Daily, \$
RT_LOSS_DIST	Real Time Distribution of Losses Amount	Daily, \$
RT_MISC	Real Time Miscellaneous Amount	Daily, \$
RT_NASSET_EN	Real Time Non-Asset Energy Amount	Daily, \$
RT_NI_DIST	Real Time Net Inadvertent Distribution Amount	Daily, \$
RT_RNU_DIST	Real Time Revenue Neutrality Distribution Amount	Daily, \$
RT_RSG_DIST1	Real Time Revenue Sufficiency Guarantee First Pass Dist Amount	Daily, \$
RT_RSG_MWP	Real Time Revenue Sufficiency Guarantee Make Whole Payment Amt	Daily, \$

RT_SCHD_24_ALC	Real Time Schedule 24 Allocation Amount	Daily, \$
RT_SCHD_24_DIST	Real Time Schedule 24 Distribution Amount	Daily, \$
RT_UD	Real Time Uninstructed Deviation Amount	Daily, \$
RT_VIRT_EN	Real Time Virtual Energy Amount	Daily, \$

An xml declaration with version and encoding attributes must always be added to the first line of an XML document otherwise there will be unpredictable results: <?xml version="1.0" encoding="UTF-8"?>

6.2 Schema Description

Note: Bolded element indicates Parent elements having Child elements. Elements may contain text, other elements, or are empty.

Schema Element Name	Schema Element Description	Data Type	Required
SUMMARY	Market Participant or Asset Owner Summary parent element having child elements: NAME, ID, TIMESTAMP, SCHEDULED_DATE, STATEMENT_ID, LINE_ITEMS.		Y
NAME	Name of the Market Participant or Asset Owner set up in the COS Customer Care System.	VARCHAR2(64)	Y
ID	ID of the Market Participant or Asset Owner set up in the COS Customer Care System.	VARCHAR2(64)	Y
TIMESTAMP	Date the Summary Statement was generated.	DATE	Y
SCHEDULED_DATE	Scheduled Execution Date of the Summary.	DATE	Y
STATEMENT_ID	Unique combination of the Statement Type (either "AO-SUMM" or "MP-SUMM"), Asset Owner or MP Name and MMDDYYYY Scheduled Date used to identify the summary settlement statement: [Statement Type]_[Asset Owner Name]_[Scheduled Date] Example: "AO-SUMM_ABCD123_04012004"	VARCHAR2(64)	Y
LINE_ITEMS	Settlement Line Item parent element having child element CHG_TYP. Name and total dollar amount of the Charge Type for the Settlement Summary.		Y
CHG_TYP	Charge Type parent element having elements CHG_TYP_NM, STLMNT_TYP and INV_TOTAL. Name and total dollar amount of the Charge Type for the Settlement Summary.		Y
CHG_TYP_ID	Charge Type Identification Code	VARCHAR2(64)	Y
CHG_TYP_NM	Name of the Charge Type (listed above).	VARCHAR2(64)	Y

INV_TOTAL	Total parent element having element AMT. Total dollar amount of the Summary Charge Type.		Y
AMT	Dollar Amount of the total Settlement Charge Type.	NUMBER(12,2)	Y
STLMT_TYP	A STLMT_TYP element contains charge information for all settlements performed for the same operating day including the current one. This is a parent element having child elements STLMT_TYP_CD, OPERATING_DAY and AMT.		
STLMT_TYP_CD	Type of the Settlement being S7, S14, S55, S105, or any Resettlement (Sx where x indicates the number of calendar days after the operating date when the resettlement occurred)	VARCHAR2(64)	Y
INVOICE	Attribute of the STLMT_TYP_CD element. Record describing if the current settlement type is included in the Invoice Total, or purely informational. Values: "Y" = Invoice "N" = Not Invoiced Yet		N
OPERATING_DATE	Date being settled.	DATE	Y
AMT	Incremental Dollar Amount of this Settlement Charge Type for the associated STLMT_TYP_CD.		

Note: Bolded element indicates Parent elements having Child elements. Elements may contain text, other elements, or are empty.

6.3 Schema Definition

Supporting technical documentation, such as schema files and XML specifications, can be found on the MISO public website (www.misoenergy.org). Navigate to [Markets and Operations > Technical Documents > Market Portal](#).

7 Meter Actuals

7.1 File Description

Meter Data Management Agents are responsible for uploading meter data files to the MISO Market Portal or through the Programmatic Interface. The meter data could be Meter Actuals or estimate values if no actuals can be provided. Meter data can be provided for:

- Generation – represented by the Commercial Pricing Node at that Generation Resource.
- Load – represented by the Commercial Pricing Node at that Load Resource.
- DRR – represented by the Commercial Pricing Node at that Demand Response Resource.

Meter Actual data will be submitted to the MISO Market Portal or through the Programmatic Interface in Lodestar Standard XML format. Each Meter Actual XML file is the Meter Actual readings for:

- One Asset and
- One Operating Day or Multiple Consecutive Operating Days.

Beginning July 1, 2018, meter data can be submitted in hourly, 15-minute, and 5-minute intervals. For one Operating Day, a file must contain the appropriate number of megawatt hour values for the interval range they are reporting for (see table below).

Time Interval	Seconds Per Interval (SPI)	# Intervals
Hourly	3600	24
15-Minute	900	96
5-Minute	300	288

For Market Participants with Internal Commercially Pseudo-Tied load EPNodes, the XML data can include the Asset and Elemental Pricing Node (EPNode) relationship.

All dates provided in the meter data files need to be on Eastern Standard Time (EST).

Meter data for a single Asset with multiple consecutive Operating Days should contain all interval values for each Operating Day and in the correct sequence.

The Start time of the Meter Actual XML is the start of the first Operating Day being metered represented as **hour beginning 00:00:00**. The Stop time of the Meter Actual XML is the end of the last Operating Day being metered represented as **hour ending 23:59:59**. The total number of intervals provided in a meter file should correspond to the number of intervals times the number of consecutive Operating Days provided in the file.

If meter data needs to be submitted for days that are not consecutive, then separate meter files should be sent. Example:

It is February 1st, and the MDMA has meter data available for the entire month of January except for January 18th. The MDMA needs to submit the following two separate meter upload requests:

1. A meter upload with:
 - Start Time = 2004-01-01 00:00:00
 - Stop Time = 2004-01-17 23:59:59
2. A meter upload with:
 - Start Time = 2004-01-19 00:00:00
 - Stop Time = 2004-01-31 23:59:59

A Meter file cannot be submitted if it starts at an hour other than 00:00:00 or if it finishes at an hour other than 23:59:59. The following is an example of a badly formatted meter file. Even though the following

example will contain 24 consecutive hourly values, it is invalid because it starts at hour 4 and ends at hour 3 of the next day instead of starting at hour 0 and ending at hour 23:

1. Start Time 2004-01-01 04:00:00 - Bad
2. Stop Time 2004-01-02 03:59:59 - Bad

The intervals within each meter file need to be provided in sequential order. The first interval should correspond to the first time interval of the day; the second interval should correspond to the second time interval, and so on. Even though there is a tag that can be attached to each interval indicating the specific time interval of the day (the START tag), it is only meant to aid a user to quickly match the values with the time intervals when looking at the data. The START tag is not used by Market Settlements in the process of saving the intervals, but as it was mentioned before, the sequential order of the intervals is what will determine the corresponding time period for each interval.

The meter data cannot be submitted for days in the future or it will be rejected.

If there was no activity at a particular Generation Resource or Load Zone, the MDMA is expected to submit 0 values for that entity; otherwise the entity will show up as missing meter data and alternate meter data for that entity for that settlement interval will be used in lieu of the missing actuals.

An MDMA can only submit meter data where his / her effective dates bracket the trade date of the Asset data being submitted. If a Market Participant switches MDMAs at any point in time, the old MDMA will only be able to submit meter data for that Asset for trade dates prior to his / her termination date. Also, the old MDMA will only be able to continue to do this at the pleasure of the Asset-owning Market Participant. Should this Market Participant choose to not have the old MDMA continue to submit meter data for trade dates prior to his / her termination, the Market Participant has the option of revoking his / her certificate. Conversely, the new MDMA will only be able to submit meter data for the given Asset with a trade date which is not less than his / her start date.

An xml declaration with version and encoding attributes must always be added to the first line of an XML document otherwise there will be unpredictable results: `<?xml version="1.0" encoding="UTF-8"?>`

7.2 Meter Data Validation

MISO will perform meter data validation checks on every file that is uploaded. Validations will be performed at the MISO Market Portal (or by Programmatic Interface) during the upload process. The validations include portal user security, XML structure validation, and the contents of the meter data file.

The Portal user will receive an instantaneous message indicating whether each file was successfully uploaded or rejected. The Programmatic Interface will send an XML response message indicating the success or reason for failure to upload the file. The following validations are performed during the upload process:

Validations resulting in an instantaneous 'Reject' level error message:

- Valid XML Schema – well formed xml with consistent xml schema definition for meter file submissions
- Nonrepeating <CUT> element – meter files must not contain more than one cut element
- Meter File Name does not contain special characters – the only characters allowed in a meter file name are letters, numbers, underscores (_), periods(.) and dashes (-)
- Operating date is not greater that current date – submission of meter data for future operating days will not be allowed
- Valid Market Participant-Asset Relationship – MP in the digital certificate should own the Asset at the CPNode given in the meter file
- Valid MDMA-Asset Relationship - MDMA in the digital certificate may only submit meter data for CPNodes of currently assigned Assets

- Valid Asset-Elemental Pricing Node Relationship – CPNode has valid relationship to EPNode given in the meter file
- Asset is not an Individual Unit of a Combined Cycle unit – for combined cycle units meter data can only be submitted for the aggregate unit
- DST PARTICIPANT = 'N'
- SPI (seconds per interval) tag corresponds to the intervals being submitted (see table in section 7.1). This value is checked for validity by an xml schema validation.
- Unit of measure (UOM) = 44 (Megawatt hour). This value is checked for validity by an xml schema validation.
- STARTTIME format is correct and the time portion has to be 00:00:00
- STOPTIME format is correct and the time portion has to be 23:59:59
- Special characters not allowed in the RECORDER tag. The following special characters are not allowed in this tag: \$, #, @, !, &, *, ~, ^, %, +
- The number of VALUE tags must match the number of time intervals in the date range of STARTTIME and STOPTIME
- The STATUS tags, if present, must contain either a space or 'E'
- The VALUE tags must contain a numeric value
- VALUE tags must not contain leading or trailing spaces
- STARTTIME AND STOPTIME tags must not contain leading or trailing spaces
- In addition to the validations listed above, STARTTIME, STOPTIME, TIMESTAMP and the START subnode of the RECORDING tag are all checked for validity by xml schema validation which will insure that dates like '03/00/08', '02/29/07' and '04/31/06' (i.e. invalid day of month specified) are not entered.

Validations resulting in instantaneous Warning level message (file is accepted but a warning is given):

- Meter data for historical Operating Day – for an operating day older than or equal to 105 days a warning message will be shown indicating the meter data will be uploaded but may not be used in market settlements unless a resettlement is scheduled beyond the Settlement 105

Validation Portal Messages:

The following is a list of messages that the user should expect to see from validation. In this example File1 had no problems, File2 was submitted for an Operating Day older than 105 days, File3 had an invalid XML structure, File4 had a CPNode of a different MDMA, File5 had a CPNode of a different MP, File6 had an Operating Day in the future, File7 was an individual unit of a combined cycle unit, File8!@# contained invalid characters, File 9 had SPI = 1, File10 had UOM = 16, File11 had a starttime with the time portion at 12:00:00, File12 had a stoptime with a time portion at 00:00:00, File13 had a recorder tag with special characters, File 14 had multiple cut elements, File 15 had an unequal number of VALUE tags to hours in the date range, File 16 had a non-numeric value in one of the VALUE tags, File 17 had leading and/or trailing spaces in the VALUE tags, File 18 had leading and/or trailing spaces in the STARTTIME tag, File 19 had leading and/or trailing spaces in the STOPTIME tag. File 20 had invalid Asset-Elemental Pricing Node relationship.

Here are the results:

The following file(s) were loaded successfully:

File Name:	Message:
File1.xml	No Message
File2.xml	A meter file is being submitted beyond last scheduled settlement and may not be used unless there is another settlement performed

The following file(s) were invalid:

File Name:	Error:
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File3.xml	Invalid Data: Error validating xml against the schema: cvc-complex-type.2.4.a: Invalid content starting with element 'OTHER_TAG'. One of '{":START}' is expected.
File4.xml	Invalid Data: Invalid Metering Agent-Asset Relationship
File5.xml	Invalid Data: Invalid Market Participant-Asset Relationship
File6.xml	Invalid Data: The date is outside of the range for Meter Data submittal.
File7.xml	Invalid Data: Asset is an Individual Unit
File8!@#!.xml	Invalid Data: The meter file name contains special characters. Only letters, numbers, underscores, and dashes are allowed in the name.
File10.xml	Invalid Data: The Unit of Measure (UOM) has to be 44
File11.xml	Invalid Data: Incorrect STARTTIME. The format has to be YYYY-MM-DDTHH:mm:ss and the time portion has to always be equal to 00:00:00
File12.xml	Invalid Data: Incorrect STOPTIME. The format has to be YYYY-MM-DDTHH:mm:ss and the time portion has to always be equal to 23:59:59
File13.xml	There are illegal characters used in the RECORDER tag value
File14.xml	Error validating xml against the schema: cvc-complex-type 2.4.d: Invalid content starting with element 'CUT'. No child element is expected at this point.
File15.xml	Incorrect number of VALUE tags. The number of hours in the date range is: 144 The number of VALUE elements in the Meter Data file is: 145
File16.xml	VALUE tag contains a non-number value: NULL
File17.xml	Invalid Data: Value tag cannot have leading or trailing white space: [-97.8].
File18.xml	StartTime tag cannot have leading or trailing white space: [2005-01-25T00:00:00].
File19.xml	StopTime tag cannot have leading or trailing white space: [2005-01-25T23:59:59].
File 20.xml	Invalid CpNode EpNode Relationship
File21.xml	Incorrect number of VALUE tags. The number of intervals in the date range is: 300 The number of VALUE elements in the Meter Data file is: 250

7.3 Viewing Uploaded Meter Data

Whenever a Market Participant or MDMA uploads meter files to MISO, they can check the status of the meter file by accessing the “View Metering Data” screen within the MISO Market Portal. Only the files that successfully passed validation will be available for display.

Meter File Renaming:

Please note that once uploaded, the meter files will be renamed by the system by keeping the first fifty characters of the original filename and then appending a unique identifier to it. If the filename contains less than 50 characters, then the ID will be simply appended to the end of the name.

The following example illustrates the meter file renaming process:

Example 1: Participant submits file named:

04-05-2004_ASSET-2_UNIT-X_CPNODE-Y_OTHERID-Z_QUALIFIER-A_QUALIFIER-B.xml

The first 50 characters are kept and then a unique ID is appended to it, becoming:

04-05-2004_ASSET-2_UNIT-X_CPNODE-Y_OTHERID-Z_QUALIT1083073858838.xml

Example 2: Participant submits file named:

04-05-2004_ASSET-2_UNIT-X.xml

The file is renamed to:

04-05-2004_ASSET-2_UNIT-XT1083073859388.xml

Since the original filename will be truncated at the first 50 characters, the MISO strongly recommends that the MDMA's use meaningful codes or names to identify their meter files in the first 50 characters of the filenames.

Meter Data Directory Structure:

The “View Metering Data” screen will display a directory tree containing all the folders and meter files relevant to the Market Participant. The root folder is that of the Market Participant that is associated to the portal user. The subfolders contained within the root folder are the Asset Owner folders for which the portal user has viewing permissions. Within each Asset Owner there will be MDMA subfolders, but only the MDMA folders for which the portal user has permissions will be displayed. Within each MDMA folder are four subfolders: “Pending”, “In Progress”, “Complete”, and “Rejected”.

Files in the “Pending” folder are those that have recently been submitted by the MDMA and that have passed the Portal validation. These files have not yet been transferred to the Market Settlements system for processing. The MDMA's have the ability to remove the files from the “Pending” folder as if they were never submitted. This is accomplished by selecting the checkbox button next to files and then clicking on the button marked for deletion.

Every day at noon, all the files in the “Pending” folder will be transferred to the Market Settlements Application. At this moment all the files in the “Pending” folder are moved into the “In Progress” folder. The MDMA's no longer have the ability to remove their meter files once they have been placed in the “In Progress” folder.

Every day at 5:00 pm, all the files that were in the “In Progress” folder will be moved into the “Complete” folder. All meter files moved from the “In Progress” folder to the “Complete” folder will be placed into a single zip file for each Asset Owner serviced by the MDMA in question. This zip file name will be configured as follows:

ao name followed by '_' followed by mdma name followed by '_' followed by YYYYMMDD format system date (EST)

where:

ao name is the Asset Owner entity short name and
mdma name is the MDMA entity short name and
YYYYMMDD format system date (EST) is the system date in EST on which the transfer took place

7.4 Meter Upload Performance

The MISO strongly recommends adhering to the following guidelines to achieve the highest levels of performance during the meter data upload:

Meter Upload through the Portal:

The MISO recommends the use of Zip files to upload multiple files simultaneously. The upload process will be much faster than performing the upload of individual files.

Meter Upload through the Programmatic Interface:

The MISO also recommends submitting meter files through the Programmatic Interface in a single connection request. Opening and closing connections to the MISO Market Portal can be time consuming. The overhead associated to the validation process is also considerable, and it is associated to each connection regardless of how many meter files are provided within the connection. Having mentioned this, Market Participants should expect a considerably faster upload times if they choose to upload meter files in a single connection rather than opening and closing a connecting to the MISO Market Portal for every meter file.

7.5 Schema Description

Note: Bolded element indicates Parent elements having Child elements. Elements may contain text, other elements, or are empty.

Schema Element Name	Schema Element Description	Data Type	Required
INTERVAL_DATA	Interval Data parent element. Parent to: INTERVAL_DATA_FORMAT, VERSION, CUT		Y
INTERVAL_DATA_FORMAT	Lodestar Interval Data Format. Not required but reserved for possible future use	VARCHAR2(64)	N
VERSION	XML Version. Not required but reserved for possible future use		N
CUT	Cut, parent element. Parent to RECORDER, CHANNEL, STARTTIME, STOPTIME, DST_PARTICIPANT, VALIDATION_REQUIRED, PULSE_MULTIPLIER, PULSE_OFFSET, SPII, UOM, TIMEZONE, TIME_ZONE_STANDARD_NAME, ORIGIN, INTERVAL. Must not be repeated within INTERVAL_DATA parent element.		Y
RECORDER	Name Identification of the Commercial Node where the metering is performed.	VARCHAR2(64)	Y
EPNODE	Name of EPNode which is tied to CP Node.	VARCHAR2(64)	N

	EPNode/CPNode relationship will be validated. This tag should not be included when not submitting EPNode meter values.		
CHANNEL	Channel of data. Not required but reserved for possible future use	NUMBER(5)	Y
STARTTIME	Day and Start time of Meter data. Has to be in Eastern Standard Time (EST). Format as YYYY-MM-DDT00:00:00, start of the Operating Day being metered. This date cannot be a future date.	DATE	Y
STOPTIME	Day and Stop time of Meter data. Has to be in Eastern Standard Time (EST). Format as YYYY-MM-DDT23:59:59, end of the Operating Day being metered. This date cannot be a future date.	DATE	Y
DST_PARTICIPANT	Day Light Savings Participant flag. The value for this tag must always be specified as 'N', indicating no Daylight Savings Participation.	VARCHAR2(64)	Y
VALIDATION_REQUIRED	Validation Required Flag. Not required. Reserved for possible future use	CHAR(1)	N
PULSE_MULTIPLIER	Not required. Reserved for possible future use	FLOAT(52)	N
PULSE_OFFSET	Not required. Reserved for possible future use	FLOAT(52)	N
SPI	Seconds per interval defined by the Market Rules. SPI must correspond to the number of interval values submitted.	FLOAT(52)	Y
UOM	Unit of Measure always set to 44 for Mega Watt.		Y
TIMEZONE	Not required. Reserved for possible future use. Currently, the Midwest ISO will always set this value to 10, indicating EST	VARCHAR2(64)	N
TIME_ZONE_STANDARD_NAME	Not Required. Reserved for possible future use	VARCHAR2(64)	N
TIMESTAMP	Not required. Reserved for possible future use	DATE	N
ORIGIN	Not required. Reserved for possible future use.	CHAR(1)	N
INTERVAL	Interval, parent element. Parent to: RECORDING.		Y
RECORDING	Recording, parent element. Parent to: VALUE, STATUS, START.		Y
VALUE	Meter Actual MW volume for the interval hour. Decimal values accepted up to the KW (provided values will be truncated to three decimal places)	FLOAT(10,3)	Y
STATUS	Status of the Interval. If this tag is present, one of the following values must be specified: - A space (empty field) indicates Actual Meter Data recording value for this interval. 'E' indicates an estimated recording value for this interval. Any value other than these will be rejected.	VARCHAR2(64)	N

START	Date and Time of the Interval Start. Has to be in Eastern Standard Time (EST) Format as YYYY-MM-DDTHH24:00:00 Examples: 2002-02-01T00:00:00 (For the first hour) 2002-02-01T23:00:00 (For the last hour) This tag is not required and is for the user's own viewing purposes. This value will not be used to match the interval value with the hour provided when loading the meter values. The sequential order of the intervals will determine the hour that corresponds to each interval.	DATE	N
DESCRIPTOR	Reserved space for internal use.	VARCHAR2(64)	N

Note: Bolded element indicates Parent elements having Child elements. Elements may contain text, other elements, or are empty.

7.6 Schema Definition

Supporting technical documentation, such as schema files and XML specifications, can be found on the MISO public website (www.misoenergy.org). Navigate to [Markets and Operations > Technical Documents > Market Portal](#).

8 5Minute Interval Data File

8.1 File Description

COS Market Settlements creates a file containing 5-minute Billing Determinants for the Real Time Energy and Operating Reserve Market. A single file will be created for each Asset Owner for each Operating Day for each Settlement Execution Date. These files will be included in the Settlement Execution Day zip file that is created and provided on a daily basis to Market Participants.

8.2 Schema Description

Note: Bolded element indicates Parent elements having Child elements. Elements may contain text, other elements, or are empty.

Schema Element Name	Schema Element Description	Data Type	Required
INT_DATA	Interval Data parent element. Parent to: ASSET_OWNER, TIMESTAMP, SCHEDULED_DATE, OPERATING_DATE, SETTLEMENT_CODE, STATEMENT_ID, LINE_ITEMS		Y
ASSET_OWNER_NAME	Name of Asset Owner set up in the COS Customer Service System	VARCHAR2(64)	Y
TIMESTAMP	Date file was generated	DATE	Y
SCHEDULED_DATE	Scheduled Execution date of the Settlement	DATE	Y
OPERATING_DATE	Operating Date being settled.	DATE	Y
SETTLEMENT_CODE	Type of the Settlement being S7, S14, S55, S105 or any Resettlement (represented as Rx where x is the number of calendar days after the operating day when the resettlement was executed)	VARCHAR2(64)	Y
STATEMENT_ID	Unique combination of the Asset Owner Name, MMDDYYYY Scheduled Date, MMDDYYYY Operating Date and Settlement Type used to identify the settlement: [INT]_[Asset Owner Name]_[Scheduled Date]_[Operating Date]-[Settlement Type] Example: "INT_AO1_01302008_01232008-S7"	VARCHAR2(64)	Y
LINE_ITEMS	The Line Items tag contains all Billing Determinants associated to the Asset Owner. This is a parent element having child element INT.		Y
INT	Interval parent element having elements CPN_NAME, MKT_INT_BEG_EST, REG_DEPL, REG_MCP, REG_MW, RES_LP_VOL, AVG_BP, SPIN_MCP, SPIN_MW, SUPP_MCP, SUPP_MW, TEL_VOL, EEEF		Y
CPN_NAME	Commercial Pricing Node Name	VARCHAR2(64)	Y
MKT_INT_BEG_EST	Market Interval Begin in Eastern Standard Time	DATE	Y
REG_DEPL	Average Regulation Deployment, resources	NUMBER(10, 3)	Y

	cleared for regulation deployment at a commercial node(<i>see Market Settlements BPM Attachment D for more information</i>)		
REG_MCP	Regulating Reserve Marginal Clearing Price, real time clearing price for regulation reserve at a commercial node(<i>see Market Settlements BPM Attachment D for more information</i>)	NUMBER(10, 2)	Y
REG_MW	Regulating Reserve Megawatt(s) value	NUMBER(8, 1)	Y
RES_LP_VOL	Resource Load Profiled Volume, represents the resource dispatch interval adjusted for hourly real time actual meter(<i>see Market Settlements BPM Attachment D for more information</i>)	NUMBER(10, 3)	Y
AVG_BP	Average Basepoint, median for positive or negative regulation deployment(<i>see Market Settlements BPM Attachment D for more information</i>)	NUMBER(10, 3)	Y
SPIN_MCP	Spinning Reserve Marginal Clearing Price, clearing price for spinning reserve at a commercial node(<i>see Market Settlements BPM Attachment D for more information</i>)	NUMBER(10, 2)	Y
SPIN_MW	Spinning Reserve Megawatt(s) value	NUMBER(8, 1)	Y
SUPP_MCP	Supplemental Reserve Marginal Clearing Price, quantity weighted hourly clearing price at commercial node(<i>see Market Settlements BPM Attachment D for more information</i>)	NUMBER(10, 2)	Y
SUPP_MW	Supplemental Reserve Megawatt(s) value	NUMBER(8, 1)	Y
TEL_VOL	Telemetry Value, dispatch interval telemetry volume(<i>see Market Settlements BPM Attachment D for more information</i>)	NUMBER(10, 3)	Y
EEEE	Excessive Energy Exemption Flag	NUMBER(1)	Y
BP	Basepoint or Dispatch Target for Energy	NUMBER(10,3)	Y
DISPATCHABLE	Dispatchable Flag, 0/1 flag representing whether or not a Resource can be dispatched by the UDS	NUMBER(1)	Y
DISP_BAND_ON	Dispatch Band enabled and non-zero flag	NUMBER(1)	Y
MIN_LIMIT_BIND	Minimum UDS Limit Bind Flag	NUMBER(1)	Y
MAX_LIMIT_BIND	Maximum UDS Limit Bind Flag	NUMBER(1)	Y
MIN_UDS_RR	Minimum UDS Ramp Rate	NUMBER(8,1)	Y

Note: Bolded element indicates Parent elements having Child elements. Elements may contain text, other elements, or are empty.

8.3 Sample 5 minute Interval Data Settlement Statement

```

<INT_DATA>
  <ASSET_OWNER_NAME>EXAMP</ASSET_OWNER_NAME>
  <TIMESTAMP>08/21/2008</TIMESTAMP>
  <SCHEDULED_DATE>08/22/2008</SCHEDULED_DATE>
  <OPERATING_DATE>08/15/2008</OPERATING_DATE>
  <SETTLEMENT_CODE>S7</SETTLEMENT_CODE>
  <STATEMENT_ID>INT_EXAMP_08222008_08152008-S7</STATEMENT_ID>
  <LINE_ITEMS>
    <INT>
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      <REG_DEPL>0</REG_DEPL>
    
```

```

    <REG_MCP>4.68</REG_MCP>
    <REG_MW>0</REG_MW>
    <RES_LP_VOL>-545.455</RES_LP_VOL>
    <AVG_BP>544.55</AVG_BP>
    <SPIN_MCP>.07</SPIN_MCP>
    <SPIN_MW>0</SPIN_MW>
    <SUPP_MCP>.01</SUPP_MCP>
    <SUPP_MW>0</SUPP_MW>
    <TEL_VOL>544.365</TEL_VOL>
    <EEEEF>0</EEEEF>
    <BP>544.5</BP>
    <DISPATCHABLE>1</DISPATCHABLE>
    <DISP_BAND_ON>0</DISP_BAND_ON>
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    <MAX_LIMIT_BIND>0</MAX_LIMIT_BIND>
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  </INT>
  <INT>
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  </INT>
</LINE_ITEMS>
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```

NOTE: For the purposes of this example, only the first and last INT interval entry are displayed. An actual file would contain an INT entry for every 5-minute interval in the Operating Day.

9 Appendices

9.1 Appendix A – Sample Day-Ahead Settlement Statement XML File

Please Note: In an effort to keep the document to a manageable size, portions of repeating intervals have been removed from the following sample file. Unabridged statement examples can be downloaded from the MISO public website (<http://www.misoenergy.org>). Navigate to [Markets and Operations > Market Settlements > Technical Documents](#) link.

```
<?xml-stylesheet type="text/xsl" href="http://markets.midwestiso.org/vss/SettlementStatement-DA.xsl"?>
<DA_STLMT>
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  <ASSET_OWNER_ID>1-SKVB</ASSET_OWNER_ID>
  <TIMESTAMP>09/26/2006</TIMESTAMP>
  <SCHEDULED_DATE>03/24/2003</SCHEDULED_DATE>
  <OPERATING_DATE>03/10/2003</OPERATING_DATE>
  <SETTLEMENT_CODE>S14</SETTLEMENT_CODE>
  <STATEMENT_ID>DA_GENCO1_03242003_03102003-S14</STATEMENT_ID>
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9.2 Appendix B – Sample Real-Time Settlement Statement XML Files

Please Note: In an effort to keep the document to a manageable size, portions of repeating intervals have been removed from the following sample file. Unabridged statement examples can be downloaded from the MISO public website (<http://www.misoenergy.org>). Navigate to [Markets and Operations > Market Settlements > Technical Documents](#) link.

Example 1:

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Example 2:

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Example 3:

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9.3 Appendix C – Sample FTR Settlement Statement XML File

Please Note: In an effort to keep the document to a manageable size, portions of repeating intervals have been removed from the following sample file. Unabridged statement examples can be downloaded from the MISO public website (<http://www.misoenergy.org>). Navigate to [Markets and Operations > Market Settlements > Technical Documents](#) link.

Sample Statement # 1:

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9.4 Appendix D – Sample Settlement Summary XML File

Please Note: In an effort to keep the document to a manageable size, portions of repeating intervals have been removed from the following sample file. Unabridged statement examples can be downloaded from the MISO public website (<http://www.misoenergy.org>). Navigate to [Markets and Operations > Market Settlements > Technical Documents](#) link.

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</CHG_TYP>
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  <CHG_TYP_ID>RT_RNU</CHG_TYP_ID>
  <CHG_TYP_NM>Real Time Revenue Neutrality Uplift Amount</CHG_TYP_NM>
  <STLMT_TYP>
    <STLMT_TYP_CD INVOICE="N">S7</STLMT_TYP_CD>
    <OPERATING_DATE>03/01/2003</OPERATING_DATE>
    <AMT>-8161.82</AMT>
  </STLMT_TYP>
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    <AMT>0.00</AMT>
  </INV_TOTAL>
</CHG_TYP>
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  <CHG_TYP_ID>RT_RSG_DIST1</CHG_TYP_ID>
  <CHG_TYP_NM>Real Time Revenue Sufficiency Guarantee First Pass Dist Amount</CHG_TYP_NM>
  <STLMT_TYP>
    <STLMT_TYP_CD INVOICE="N">S7</STLMT_TYP_CD>
    <OPERATING_DATE>03/01/2003</OPERATING_DATE>
    <AMT>0.00</AMT>
  </STLMT_TYP>
  <INV_TOTAL>
    <AMT>0.00</AMT>
  </INV_TOTAL>
</CHG_TYP>
<CHG_TYP>
  <CHG_TYP_ID>RT_RSG_MWP</CHG_TYP_ID>
  <CHG_TYP_NM>Real Time Revenue Sufficiency Guarantee Make Whole Payment Amt</CHG_TYP_NM>
  <STLMT_TYP>
    <STLMT_TYP_CD INVOICE="N">S7</STLMT_TYP_CD>
    <OPERATING_DATE>03/01/2003</OPERATING_DATE>
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  </STLMT_TYP>
  <INV_TOTAL>
    <AMT>0.00</AMT>
  </INV_TOTAL>
</CHG_TYP>
<CHG_TYP>
  <CHG_TYP_ID>RT_SCHD_24_ALC</CHG_TYP_ID>
  <CHG_TYP_NM>Real Time Schedule 24 Allocation Amount</CHG_TYP_NM>
  <STLMT_TYP>
    <STLMT_TYP_CD INVOICE="N">S7</STLMT_TYP_CD>
    <OPERATING_DATE>03/01/2003</OPERATING_DATE>
    <AMT>42.91</AMT>
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  <CHG_TYP_NM>Real Time Schedule 24 Distribution Amount</CHG_TYP_NM>
  <STLMT_TYP>
    <STLMT_TYP_CD INVOICE="N">S7</STLMT_TYP_CD>
    <OPERATING_DATE>03/01/2003</OPERATING_DATE>
    <AMT>-934.61</AMT>

```

```
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<CHG_TYP>
  <CHG_TYP_ID>RT_UD</CHG_TYP_ID>
  <CHG_TYP_NM>Real Time Uninstructed Deviation Amount</CHG_TYP_NM>
  <STLMT_TYP>
    <STLMT_TYP_CD INVOICE="N">S7</STLMT_TYP_CD>
    <OPERATING_DATE>03/01/2003</OPERATING_DATE>
    <AMT>0.00</AMT>
  </STLMT_TYP>
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  </INV_TOTAL>
</CHG_TYP>
<CHG_TYP>
  <CHG_TYP_ID>RT_VIRT_EN</CHG_TYP_ID>
  <CHG_TYP_NM>Real Time Virtual Energy Amount</CHG_TYP_NM>
  <STLMT_TYP>
    <STLMT_TYP_CD INVOICE="N">S7</STLMT_TYP_CD>
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    <AMT>-53400.60</AMT>
  </STLMT_TYP>
  <INV_TOTAL>
    <AMT>0.00</AMT>
  </INV_TOTAL>
</CHG_TYP>
</LINE_ITEMS>
</SUMMARY>
```



```

</RECORDING>
<RECORDING>
  <VALUE>6676.667</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>732.222</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>787.778</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>843.333</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>888.889</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>954.444</VALUE>
</RECORDING>
</INTERVAL>
</CUT>
</INTERVAL_DATA>

```

The next example is a meter file with more than one operating day (has to be for the same asset)

```
<?xml version="1.0" encoding="UTF-8"?>  
<INTERVAL_DATA>  
  <CUT>  
    <RECORDER>CNODE2</RECORDER>  
    <STARTTIME>2003-10-01T00:00:00</STARTTIME>  
    <STOPTIME>2003-10-02T23:59:59</STOPTIME>  
    <DST_PARTICIPANT>N</DST_PARTICIPANT>  
    <SPI>3600</SPI>  
    <UOM>44</UOM>  
    <INTERVAL>  
      <RECORDING>  
        <VALUE>-220</VALUE>  
        <STATUS></STATUS>  
      </RECORDING>  
      <RECORDING>  
        <VALUE>-220</VALUE>  
        <STATUS></STATUS>  
      </RECORDING>  
      <RECORDING>  
        <VALUE>-220</VALUE>  
        <STATUS></STATUS>  
      </RECORDING>  
      <RECORDING>  
        <VALUE>-220</VALUE>  
        <STATUS></STATUS>  
      </RECORDING>  
      <RECORDING>  
        <VALUE>-220</VALUE>  
        <STATUS></STATUS>  
      </RECORDING>  
      <RECORDING>  
        <VALUE>-220</VALUE>  
        <STATUS></STATUS>  
      </RECORDING>  
      <RECORDING>  
        <VALUE>-220</VALUE>  
        <STATUS></STATUS>  
      </RECORDING>  
      <RECORDING>  
        <VALUE>-220</VALUE>  
        <STATUS></STATUS>  
      </RECORDING>  
    </INTERVAL>  
  </CUT>  
</INTERVAL_DATA>
```

[illegible]

[illegible]

```

    <RECORDING>
      <VALUE>-220</VALUE>
      <STATUS></STATUS>
    </RECORDING>
    <RECORDING>
      <VALUE>-220</VALUE>
      <STATUS></STATUS>
    </RECORDING>
    <RECORDING>
      <VALUE>-220</VALUE>
      <STATUS></STATUS>
    </RECORDING>
    <RECORDING>
      <VALUE>-220</VALUE>
      <STATUS></STATUS>
    </RECORDING>
    <RECORDING>
      <VALUE>-220</VALUE>
      <STATUS></STATUS>
    </RECORDING>
    <RECORDING>
      <VALUE>-220</VALUE>
      <STATUS></STATUS>
    </RECORDING>
    <RECORDING>
      <VALUE>-220</VALUE>
      <STATUS></STATUS>
    </RECORDING>
  </INTERVAL>
</CUT>
</INTERVAL_DATA>

```

The next example is a meter file with 15 minute values

```

<?xml version="1.0" encoding="UTF-8"?>
<INTERVAL_DATA>
  <CUT>
    <RECORDER>CNODE1</RECORDER>
    <STARTTIME>2018-11-11T00:00:00</STARTTIME>
    <STOPTIME>2018-11-11T23:59:59</STOPTIME>
    <DST_PARTICIPANT>N</DST_PARTICIPANT>
    <SPI>900</SPI>
    <UOM>44</UOM>
    <INTERVAL>
      <RECORDING>
        <VALUE>501</VALUE>
      </RECORDING>
      <RECORDING>
        <VALUE>501</VALUE>
      </RECORDING>
      <RECORDING>
        <VALUE>500</VALUE>
      </RECORDING>
      <RECORDING>
        <VALUE>501</VALUE>
      </RECORDING>
      <RECORDING>
        <VALUE>500</VALUE>
      </RECORDING>
      <RECORDING>
        <VALUE>501</VALUE>
      </RECORDING>
      <RECORDING>
        <VALUE>500</VALUE>
      </RECORDING>
      <RECORDING>
        <VALUE>501</VALUE>
      </RECORDING>
      <RECORDING>
        <VALUE>500</VALUE>
      </RECORDING>
      <RECORDING>
        <VALUE>501</VALUE>
      </RECORDING>
      <RECORDING>
        <VALUE>500</VALUE>
      </RECORDING>
      <RECORDING>
        <VALUE>501</VALUE>
      </RECORDING>
    </INTERVAL>
  </CUT>
</INTERVAL_DATA>

```

```
</RECORDING>
<RECORDING>
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</RECORDING>
<RECORDING>
  <VALUE>501</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>501</VALUE>
</RECORDING>
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  <VALUE>501</VALUE>
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</RECORDING>
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  <VALUE>501</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>500</VALUE>
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<RECORDING>
  <VALUE>500</VALUE>
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  <VALUE>555.556</VALUE>
</RECORDING>
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  <VALUE>611.111</VALUE>
</RECORDING>
<RECORDING>
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</RECORDING>
<RECORDING>
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</RECORDING>
<RECORDING>
  <VALUE>787.778</VALUE>
</RECORDING>
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<RECORDING>
  <VALUE>954.496</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>673.371</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>954.444</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>418.181</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>872.489</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>954.444</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>954.444</VALUE>
</RECORDING>
<RECORDING>
```

[illegible]

[illegible]

[illegible]

The next example is a meter file with 5 minute values

```
<?xml version="1.0" encoding="UTF-8"?>
<INTERVAL_DATA>
  <CUT>
```

```
<RECORDER>CNODE1</RECORDER>
<STARTTIME>2018-11-11T00:00:00</STARTTIME>
<STOPTIME>2018-11-11T23:59:59</STOPTIME>
<DST_PARTICIPANT>N</DST_PARTICIPANT>
<SPI>300</SPI>
<UOM>44</UOM>
<INTERVAL>
  <RECORDING>
    <VALUE>501</VALUE>
  </RECORDING>
  <RECORDING>
    <VALUE>501</VALUE>
  </RECORDING>
  <RECORDING>
    <VALUE>500</VALUE>
  </RECORDING>
  <RECORDING>
    <VALUE>501</VALUE>
  </RECORDING>
  <RECORDING>
    <VALUE>500</VALUE>
  </RECORDING>
  <RECORDING>
    <VALUE>501</VALUE>
  </RECORDING>
  <RECORDING>
    <VALUE>500</VALUE>
  </RECORDING>
  <RECORDING>
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  </RECORDING>
  <RECORDING>
    <VALUE>500</VALUE>
  </RECORDING>
  <RECORDING>
    <VALUE>501</VALUE>
  </RECORDING>
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  <RECORDING>
    <VALUE>501</VALUE>
  </RECORDING>
  <RECORDING>
    <VALUE>500</VALUE>
  </RECORDING>
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  </RECORDING>
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    <VALUE>501</VALUE>
  </RECORDING>
  <RECORDING>
    <VALUE>500</VALUE>
  </RECORDING>
  <RECORDING>
    <VALUE>555.556</VALUE>
  </RECORDING>
  <RECORDING>
    <VALUE>611.111</VALUE>
  </RECORDING>
  <RECORDING>
    <VALUE>6676.667</VALUE>
  </RECORDING>
  <RECORDING>
    <VALUE>732.222</VALUE>
  </RECORDING>
  <RECORDING>
```

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

```
</RECORDING>
<RECORDING>
  <VALUE>501</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>501</VALUE>
</RECORDING>
<RECORDING>
  <VALUE>501</VALUE>
</RECORDING>
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</RECORDING>
<RECORDING>
  <VALUE>500</VALUE>
</RECORDING>
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</RECORDING>
<RECORDING>
  <VALUE>611.111</VALUE>
</RECORDING>
<RECORDING>
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</RECORDING>
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  <VALUE>843.333</VALUE>
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  <VALUE>954.444</VALUE>
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<RECORDING>
  <VALUE>954.496</VALUE>
</RECORDING>
<RECORDING>
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</RECORDING>
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<RECORDING>
  <VALUE>954.444</VALUE>
</RECORDING>
<RECORDING>
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</RECORDING>
```

[illegible]

[illegible]

[illegible]

9.6 Appendix F – Supplemental XML Files

Supplemental XML statement examples can be downloaded from the MISO public website (<http://www.misoenergy.org>). Navigate to [Markets and Operations > Market Settlements > Technical Documents](#) link.

These XML files will provide examples where optional elements and attributes are used, as necessitated by various business circumstances. The examples include Statements for 1) generation companies that do not own combined-cycle aggregate units, 2) load-serving entities that own DRR's, and 3) monthly FTR allocations.

9.7 Appendix G – Sample URLs for Meter Data Upload and Settlement Statement Download

Below are sample URLs for programmatic upload of meter data files as well as download of settlement statements.

9.7.1 Meter Data Upload:

CCE: <https://cce.midwestiso.org/PI/MeterDataUpload>

Prod: <https://markets.midwestiso.org/PI/MeterDataUpload>

Meter Data Upload is an HTTP POST containing a Soap Envelope with MeterData Loadstar XML or XML directly in the HTTP Post Body. There are no URL parameters that are passed.

9.7.2 Settlement Statement Download:

CCE:
<https://cce.midwestiso.org/PI/SettlementStatementDownload?entity=ENTITY&date=YYMMDD>

Prod:
<https://markets.midwestiso.org/PI/SettlementStatementDownload?entity=ENTITY&date=YYMMDD>

Settlement Statement download is an HTTP GET where the entity parameter is the Asset Owner name. Note that the user must be granted the "Settlements: Summaries (view)" role for this Asset Owner in order to get the statement.

9.8 Appendix H – API Upload Considerations

In order to guarantee reliable file uploads, follow these steps:

1. The first request may be an HTTP GET request or an HTTP POST request smaller than 1 MB.
2. Our appliance will return an MRHSession value in the HTTP Set-Cookie header as described in <https://support.f5.com/csp/article/K15387>.
3. The client must capture the MRHSession cookie and send it as an HTTP Cookie header on all subsequent requests.
4. If these steps are followed, files larger than 1 MB can be submitted on all subsequent requests that have the MRHSession cookie.