



# CALIFORNIA ISO

Charge Type 4534  
Market Usage  
Ancillary Services

Updated  
June 23, 2005

### 1.1.1. Version 0.2: CT 4534 GMC Market Usage Ancillary Services

#### 1.1.2. Description

Market Usage contains the activities associated with processing Supplemental Energy and Ancillary Services, determining the Real-Time Market Clearing Price, maintaining and controlling the OASIS, monitoring market performance, and ensuring generator compliance with market protocols. In the future, activities associated with forward energy markets will be included here.

Currently, the costs of Market Usage will be recovered from those SCs that use the Forward or Real-Time markets in a charge based on usage of these markets. The billing determinant for Market Usage Ancillary Services will be the purchases and sales of Ancillary Services.

The Market Usage Charge for each Scheduling Coordinator is calculated using the absolute value of each Scheduling Coordinator's Market purchases and sales of Ancillary Services.

Charges are calculated monthly using hourly and Hourly data. Estimated charges are output daily for information of market participants.

#### 1.1.3. Configuration History

The following table sets out changes in the configuration of this charge type from when it was first created until it is retired.

Version number is expressed as a sequentially increasing number for each configuration change. A new version is established for each production release after successful testing and is shown as an integer increase (0.1, 0.2, 0.3). Changes under development will be indicated by an incremental version number (that is, 1.1, 1.2, 1.3) until the production release.

The Effective Start and End dates reflect the actual trades for which the configuration applies. Update Date is the actual calendar date of configuration guide edits.

Version #	Effective Start	Effective End	Author	Update Date	Description of Changes
0.1	Stage 1	Stage 2	M. McGuffin & E. Siegel	5/30/04	Original version
0.2	Stage 1	Stage 2	E. Siegel	01/30/05	Assigned Charge Type number. . MID4 received a BAID in 01/2005 and needed to be added to exemption table.

#### 1.1.4. ISO Charge Type Formula

The ISO formula for **Market Usage Ancillary Services GMC** for each Scheduling Coordinator is as follows:

$$\text{GMC Market Usage Settlement Amount}_{smd} = \text{Total GMC Market Usage Ancillary Service Quantity}_{smd} * \text{GMC Market Usage Rate}_m$$

Where

**Total GMC Market Usage Ancillary Service Quantity**  $s_{md}$  = **Ancillary Service Quantity**  $s_{md}$  = **Ancillary Service Purchase Quantity**  $s_{md}$  + **Ancillary Service Sale Quantity**  $s_{md}$

**NOTE**

Capacity quantities for PIR resources under CT 114, which have been deferred for daily settlement, must be included in the calculation of the Ancillary Service Quantity.

Where

**Ancillary Service Purchase Quantity**  $s_{md}$  =

$$\sum_{rQ} \sum_R \sum_Z \sum_d \sum_h \left( \text{Day Ahead Spin Capacity}_{srQtxARZmdh} + \text{Day Ahead Non Spin Capacity}_{srQtxARZmdh} + \text{Day Ahead Replacement Reserve Capacity}_{srQtxARZmdh} + \text{Day Ahead Regulation Up Capacity}_{srQtxARZmdh} + \text{Day Ahead Regulation Down Capacity}_{srQtxARZmdh} + \max(0, \text{Hour Ahead Spin Incremental Quantity}_{srQtxARZmdh}) + \max(0, \text{Hour Ahead Non Spin Incremental Quantity}_{srQtxARZmdh}) + \max(0, \text{Hour Ahead Replacement Reserve Incremental Quantity}_{srQtxARZmdh}) + \max(0, \text{Hour Ahead Regulation Up Incremental Quantity}_{srQtxARZmdh}) + \max(0, \text{Hour Ahead Regulation Down Incremental Quantity}_{srQtxARZmdh}) \right) + \sum_R \sum_d \sum_h \left( | \min(0, \text{Spin Allocation Quantity}_{sRmdh}) | + | \min(0, \text{Non Spin Allocation Quantity}_{sRmdh}) | + | \min(0, \text{Replacement Reserve Allocation Quantity}_{sRmdh}) | + | \min(0, \text{Regulation Up Allocation Quantity}_{sRmdh}) | + | \min(0, \text{Regulation Down Allocation Quantity}_{sRmdh}) | \right) - \sum_{rQ} \sum_R \sum_Z \sum_d \sum_h \left( \text{Replacement Reserve Bid-In Withhold Quantity}_{srQtxARZmdh} + \text{Replacement Reserve Self-Provided Withhold Quantity}_{srQtxARZmdh} \right)$$

And

**Ancillary Service Sales Quantity**  $s_{md}$  =

$$\sum_R \sum_d \sum_h \left( \max(0, \text{Spin Allocation Quantity}_{sRmdh}) + \max(0, \text{Non Spin Allocation Quantity}_{sRmdh}) + \max(0, \text{Replacement Reserve Allocation Quantity}_{sRmdh}) + \max(0, \text{Regulation Up Allocation Quantity}_{sRmdh}) + \max(0, \text{Regulation Down Allocation Quantity}_{sRmdh}) \right) + \sum_{rQ} \sum_R \sum_Z \sum_d \sum_h \left( | \min(0, \text{Hour Ahead Spin Incremental Quantity}_{srQtxARZmdh}) | + | \min(0, \text{Hour Ahead Non Spin Incremental Quantity}_{srQtxARZmdh}) | + | \min(0, \text{Hour Ahead Replacement Reserve Incremental Quantity}_{srQtxARZmdh}) | + | \min(0, \text{Hour Ahead Regulation Up Incremental Quantity}_{srQtxARZmdh}) | + | \min(0, \text{Hour Ahead Regulation Down Incremental Quantity}_{srQtxARZmdh}) | \right)$$

**Reserve Incremental Quantity  $srQt_{xARZmdh}$  | + | min (0, Hour Ahead Regulation Up Incremental Quantity  $srQt_{xARZmdh}$  | + | min (0, Hour Ahead Regulation Down Incremental Quantity  $srQt_{xARZmdh}$  | )**

**Where**

**Market Type (x) and/or Schedule Component ID (A) for the variables identified below are as follows:**

**Day Ahead Spin Capacity: (x) = Day Ahead, (A) = Spin Reserve**

**Day Ahead Non Spin Capacity: (x) = Day Ahead, (A) = Non-Spin Reserve**

**Day Ahead Replacement Reserve Capacity: (x) = Day Ahead, (A) = Replacement Reserve**

**Day Ahead Regulation Up Capacity: (x) = Day Ahead, (A) = Regulation Up**

**Day Ahead Regulation Down Capacity: (x) = Day Ahead, (A) = Regulation Down**

**Hour Ahead Spin Incremental Quantity: (x) = Hour Ahead, (A) = Spin Reserve**

**Hour Ahead Non Spin Incremental Quantity: (x) = Hour Ahead, (A) = Non-Spin Reserve**

**Hour Ahead Replacement Reserve Incremental Quantity: (x) = Hour Ahead, (A) = Replacement Reserve**

**Hour Ahead Regulation Up Incremental Quantity: (x) = Hour Ahead, (A) = Regulation Up**

**Hour Ahead Regulation Down Incremental Quantity: (x) = Hour Ahead, (A) = Regulation Down**

**Replacement Reserve Bid-In Withhold Quantity: (A) = Replacement Reserve**

**Replacement Reserve Self-Provided Withhold Quantity: (A) = Replacement Reserve**

**Where**

**GMC Market Usage Ancillary Services Exceptions <> True**

**And**

**GMC Market Usage Ancillary Services Rate  $m$  is the current FERC approved rate for the CAISO Control Area**

**Where**

***s = Business Associate ID***

***r = Location ID***

***Q = Interchange ID***

***t = Location Type***

***x = Market Type***

***A = Schedule Component ID***

***R = Region ID***

***Z = Congestion Zone***

***m = Trade Month***

***d = Trade Day***

***h = Trade Hour***

<b>Equation Name</b>	<b>Description</b>
Daily GMC Market Usage Ancillary Services Settlement Amount	The total amount charged to a Scheduling Coordinator for GMC Market Usage for all Trade Hours in a Trade Day
GMC Market Usage Ancillary Services Settlement Amount	The total amount charged to a Scheduling Coordinator for GMC Market Usage by Trade Hour
Total GMC Market Usage Ancillary Services Quantity	The sum of the Ancillary Services Quantity for a Scheduling Coordinator in a Trade Hour.
GMC Market Usage Ancillary Services Rate	The current FERC approved rate for the CAISO Control Area
Ancillary Service Purchase Quantity	All purchases of Ancillary service capacity in the forward markets
Day Ahead Spin Capacity	The Day Ahead awarded Spin capacity by location or location/interchange combination for a given hour.
Day Ahead Non Spin Capacity	The Day Ahead awarded Non-Spin capacity by location or location/interchange combination for a given hour.
Day Ahead Replacement Reserve Capacity	The Day Ahead awarded Replacement Reserve capacity by location or location/interchange combination for a given hour.
Day Ahead Regulation Up Capacity	The Day Ahead awarded Regulation Up capacity by location or location/interchange combination for a given hour.
Day Ahead Regulation Down Capacity	The Day Ahead awarded Regulation Down capacity by location or location/interchange combination for a given hour.
Hour Ahead Spin Incremental Quantity	The additional amount of Spin capacity awarded or bought back in the Hour Ahead market
Hour Ahead Non Spin Incremental Quantity	The additional amount of Non-Spin capacity awarded or bought back in the Hour Ahead market

Equation Name	Description
Hour Ahead Replacement Reserve Incremental Quantity	The additional amount of Replacement Reserve capacity awarded or bought back in the Hour Ahead market
Hour Ahead Regulation Up Incremental Quantity	The additional amount of Regulation Up capacity awarded or bought back in the Hour Ahead market
Hour Ahead Regulation Down Incremental Quantity	The additional amount of Regulation Down capacity awarded or bought back in the Hour Ahead market
Spin Allocation Quantity	Allocated SC billable quantity for Spinning Reserve
Non Spin Allocation Quantity	Allocated SC billable quantity for Non-Spinning Reserve
Replacement Reserve Allocation Quantity	Allocated SC billable quantity for Replacement Reserve
Regulation Up Allocation Quantity	Allocated SC billable quantity for Regulation Up
Regulation Down Allocation Quantity	Allocated SC billable quantity for Regulation Down
Replacement Reserve Bid-In Withhold Quantity	The withheld capacity amount for a resource in a trade hour due to dispatch of bid-in Replacement Reserve capacity in MW.
Replacement Reserve Self-Provided Withhold Quantity	The withheld capacity amount for a resource in a trade hour due to dispatch of self-provided Replacement Reserve capacity in MW.
GMC Market Usage Ancillary Services Exception	Scheduling Coordinators, Locations, or Location/Interchange combinations that are exempt from GMC Market Usage charges.
Ancillary Service Sales Quantity	All ancillary service sales including capacity buybacks and obligations.

### 1.1.5. Calculation Exceptions

Exceptions for Ancillary Service Sales Quantity and Ancillary Service Purchase Quantities are described below:

BA ID #	Scheduling Coordinator Name (Short Name)	Location ID	Interchange ID (if applicable)	Exception / Treatment	Quantity	Variable Name	Effective Start Date	Effective End Date	Comments
3933	COTP	NA	NA	Exempt from Market Usage Charge	Ancillary Service Sales Quantity and Ancillary Service Purchase Quantity	<a href="#">Configuration Special?</a>	1/1/04	Open	COTP Litigation
2970	Internal ISO ID used in Energy Exchange Transactions	All	All	Exclude ISO SC from All GMC charges	All	<a href="#">Configuration Special?</a>	4/6/2001	Open	
5819	MID4	All	All	Exempt from Market Usage Charge	All	<a href="#">Configuration Special?</a>	1/1/2004	Open	Charge for MID4 handled in a separate charge type
1268	SCE2	NA	NA	Exempt from charge	All		1/1/2004	Open	

### 1.1.6. Charge Type Bill Determinants

The following table sets out the bill determinants used by a sample charge type including details of source system, and required attributes.

Input Name	Type	Interval	Sign	Description	Source	Variable Name	Alias	Rounding	Actual Attributes	Derived Attributes
DA Spin Capacity <i>Where</i>	S	H	+	DA Spin Awarded Capacity for Generator or Load	SS_SCHEDULE			9	Schedule Component ID, Location ID, BA ID, Trade Date, Trade Hour, Market Type,	Scheduling Component ID = '2' for Spin; Market Type = 'D'

Input Name	Type	Interval	Sign	Description	Source	Variable Name	Alias	Rounding	Actual Attributes	Derived Attributes
Location Type = "G"				Resources.					Location Type, Zone ID, Region ID	for Day Ahead;
DA Spin Capacity Where Location Type = "C"	S	H	+	DA Spin Awarded Capacity for System Resources/Interchange ID combinations.	SS_GROSS_IN TERTIE_SCHEDULES			9	BA_ID, Location ID, Trade Date, Trade Hour, Market Type, Scheduling Component ID, Region ID, Interchange ID, Zone ID, Location Type	Scheduling Component ID = '2' for Spin; Market Type = 'D' for Day Ahead
DA Non-Spin Capacity Where Location Type = "G"	S	H	+	DA Non-Spin Awarded Capacity for Generator or Load Resources.	SS_SCHEDULE			9	Schedule Component ID, Location ID, BA ID, Trade Date, Trade Hour, Market Type, Location Type, Zone ID, Region ID	Scheduling Component ID = '3' for Non-Spin; Market Type = 'D' for Day Ahead;
DA Non-Spin Capacity Where Location Type = "C"	S	H	+	DA Non-Spin Awarded Capacity for System Resources/Interchange ID combinations.	SS_GROSS_IN TERTIE_SCHEDULES			9	BA_ID, Location ID, Trade Date, Trade Hour, Market Type, Scheduling Component ID, Region ID, Interchange ID, Zone ID, Location Type	Scheduling Component ID = '3' for Non-Spin; Market Type = 'D' for Day Ahead
DA Replacement Reserve Capacity Where Location Type = "G"	S	H	+	DA Replacement Reserve Awarded Capacity for Generator or Load Resources.	SS_SCHEDULE			9	Schedule Component ID, Location ID, BA ID, Trade Date, Trade Hour, Market Type, Location Type, Zone ID, Region ID	Scheduling Component ID = '5' for Replacement Reserve; Market Type = 'D' for Day Ahead;
DA Replacement Reserve Capacity Where Location Type = "C"	S	H	+	DA Replacement Reserve Awarded Capacity for System Resources/Interchange ID combinations.	SS_GROSS_IN TERTIE_SCHEDULES			9	BA_ID, Location ID, Trade Date, Trade Hour, Market Type, Scheduling Component ID, Region ID, Interchange ID, Zone ID, Location Type	Scheduling Component ID = '5' for Replacement Reserve; Market Type = 'D' for Day Ahead
DA	S	H	+	DA Regulation Up	SS_SCHEDULE			9	Schedule Component	Scheduling

Input Name	Type	Interval	Sign	Description	Source	Variable Name	Alias	Rounding	Actual Attributes	Derived Attributes
Regulation Up Capacity <i>Where Location Type = "G"</i>				Awarded Capacity for Generator or Load Resources.					ID, Location ID, BA ID, Trade Date, Trade Hour, Market Type, Location Type, Zone ID, Region ID	Component ID = '9' for Regulation Up; Market Type = 'D' for Day Ahead;
DA Regulation Up Capacity <i>Where Location Type = "C"</i>	S	H	+	DA Regulation Up Awarded Capacity for System Resources/Interchange ID combinations.	SS_GROSS_IN TERTIE_SCHEDULES			9	BA_ID, Location ID, Trade Date, Trade Hour, Market Type, Scheduling Component ID, Region ID, Interchange ID, Zone ID, Location Type	Scheduling Component ID = '9' for Regulation Up; Market Type = 'D' for Day Ahead
DA Regulation Down Capacity <i>Where Location Type = "G"</i>	S	H	+	DA Regulation Down Awarded Capacity for Generator or Load Resources.	SS_SCHEDULE			9	Schedule Component ID, Location ID, BA ID, Trade Date, Trade Hour, Market Type, Location Type, Zone ID, Region ID	Scheduling Component ID = '10' for Regulation Down; Market Type = 'D' for Day Ahead;
DA Regulation Down Capacity <i>Where Location Type = "C"</i>	S	H	+	DA Regulation Down Awarded Capacity for System Resources/Interchange ID combinations.	SS_GROSS_IN TERTIE_SCHEDULES			9	BA_ID, Location ID, Trade Date, Trade Hour, Market Type, Scheduling Component ID, Region ID, Interchange ID, Zone ID, Location Type	Scheduling Component ID = '10' for Regulation Down; Market Type = 'D' for Day Ahead
HA Spin Incremental Quantity	S	Hourly	+/-		STLMTS – CT 51: HA Spin Capacity Settlement Calculation	<a href="#">Configuration Specialist</a>		9	BA_ID, Location ID, Trade Date, Trade Hour, Market Type, Scheduling Component ID, Region ID, Interchange ID, Zone ID, Location Type	Scheduling Component ID = '2' for Spin; Market Type = 'H' for Hour Ahead
HA Non Spin Capacity	S	Hourly	+/-		STLMTS – CT 52: HA Non Spin Capacity Settlement	<a href="#">Configuration Specialist</a>		9	BA_ID, Location ID, Trade Date, Trade Hour, Market Type, Scheduling Component	Scheduling Component ID = '3' for Non Spin; Market Type = 'H'

Input Name	Type	Interval	Sign	Description	Source	Variable Name	Alias	Rounding	Actual Attributes	Derived Attributes
Quantity					Calculation				ID, Region ID, Interchange ID, Zone ID, Location Type	for Hour Ahead
HA Replacement Reserve Incremental Capacity Quantity	S	Hourly	+/-		STLMTS – CT 54: HA Replacement Reserve Capacity Settlement Calculation	<a href="#">Configuration Specialist</a>		9	BA_ID, Location ID, Trade Date, Trade Hour, Market Type, Scheduling Component ID, Region ID, Interchange ID, Zone ID, Location Type	Scheduling Component ID = '5' for Replacement Reserve; Market Type = 'H' for Hour Ahead
HA Regulation Up Incremental Capacity Quantity	S	Hourly	+/-		STLMTS – CT 55: HA Regulation Up Capacity Settlement Calculation	<a href="#">Configuration Specialist</a>		9	BA_ID, Location ID, Trade Date, Trade Hour, Market Type, Scheduling Component ID, Region ID, Interchange ID, Zone ID, Location Type	Scheduling Component ID = '9' for Regulation Up; Market Type = 'H' for Hour Ahead
HA Regulation Down Capacity Quantity	S	Hourly	+/-		STLMTS – CT 56: HA Regulation Down Capacity Settlement Calculation	<a href="#">Configuration Specialist</a>		9	BA_ID, Location ID, Trade Date, Trade Hour, Market Type, Scheduling Component ID, Region ID, Interchange ID, Zone ID, Location Type	Scheduling Component ID = '10' for Regulation Down; Market Type = 'H' for Hour Ahead
Spin Allocation Quantity	S	Hourly	+/-		STLMTS – CT 111: Spin Obligation Settlement Calculation	<a href="#">Configuration Specialist</a>		9	BA_ID, Region ID, Trade Date, Trade Hour	
Non-Spin Capacity Allocation Quantity	S	Hourly	+/-		STLMTS - CT 112: Non Spin Obligation Settlement Calculation	<a href="#">Configuration Specialist</a>		9	BA_ID, Region ID, Trade Date, Trade Hour	
Replacement Reserve Allocation Quantity	S	Hourly	+/-		STLMTS - CT 114: Replacement Reserve	<a href="#">Configuration Specialist</a>		9	BA_ID, Region ID, Trade Date, Trade Hour	

Input Name	Type	Interval	Sign	Description	Source	Variable Name	Alias	Rounding	Actual Attributes	Derived Attributes
					Obligation Settlement Calculation					
Regulation Up Allocation Quantity	S	Hourly	+/-		STLMTS - CT 115: Regulation Up Allocation Settlement Calculation	<i>Configuration Specialist</i>		9	BA_ID, Region ID, Trade Date, Trade Hour	
Regulation Down Allocation Quantity	S	Hourly	+/-		STLMTS - CT 116: Regulation Down Allocation Settlement Calculation	<i>Configuration Specialist</i>		9	BA_ID, Region ID, Trade Date, Trade Hour	
Replacement Reserve Bid-In Withhold Quantity	S	Hourly	+/-		STLMTS - CT 24: Replacement Reserve Bid-In Withhold Settlement Calculation)	<i>Configuration Specialist</i>		9	BA_ID, Location ID, Interchange ID, Location Type, Schedule Component ID, Region ID, Zone ID, Trade Date, Trade Hour	Scheduling Component ID = '5' for Replacement Reserve
Replacement Reserve Self-Provided Withhold Quantity	S	Hourly	+/-		STLMTS - CT 124: Replacement Reserve Self-Provided Withhold Settlement Calculation)	<i>Configuration Specialist</i>		9	BA_ID, Location ID, Interchange ID, Location Type, Schedule Component ID, Region ID, Zone ID, Trade Date, Trade Hour	Scheduling Component ID = '5' for Replacement Reserve

**In reviewing this table:**

- Type indicates whether the Bill determinant is provided by an external system (S) or calculated as an intermediate value by another process (I).
- Interval is the interval of the incoming record
- Source for the moment is the expected supplying system. This will be replaced with actual system names in the “as built” version of the configuration guide.
- Actual attributes are parameters used in the calculation that are expected to be supplied with the source data.
-

Specific Master File data used by this charge type is as follows:

Master file Data	Description	Type	Variable Name	Detail	Actual Attributes	Derived Attributes
Location	Valid Location ID	Primary record			Location_ID	
BA_ID	Valid Business Associate	Primary record			BA_ID	

**In reviewing this table:**

- Type indicates whether the Master file is one of the following:
  - A primary record (such as SC, or resource)
  - An association (which is a connection between any two primary records, such as ownership)
  - An attribute (such as a flag or equivalent specific to a primary record that can be used for billing, for example resource type)
  - A roll up group where a primary record is within a further hierarchy (such as region, zone etc, noting that locations, etc are primary records in their own right)
- Details are the actual flag or association.

These are summarized in total for settlements in Volume 3, Interface Configuration

Specific Standing data used by this calculation are as follows:

Input Name	Type	Interval	Unit of Measure	Description	Source	Variable Name	Alias	Rounding	Actual Attributes	Derived Attributes
Market Usage Ancillary Services Rate	T	Annual	\$/MWh	Monthly rate for Market Usage Ancillary Services based	STLMTS			9	Rate, Effective Start Date, Effective End Date	
Market Usage Ancillary Services Exception by BA	EF	Periodic	NA	Exception by SC	STLMTS				Flag, BA_ID, Effective Start Date, Effective End Date	

**In reviewing this table:**

- Type indicates whether the Bill determinant is standing data for a Tariff Rate (T), a rate calculated as an intermediate value by another process (CR), or and Exception Flag (EF).
- Interval indicates the frequency with which the input is updated.

- Source for the moment is the expected supplying system. This will be replaced with actual system names in the “as built” version of the configuration guide.



### 1.1.7. Calculation Attributes

Billable quantity and charge type indices and summary levels must be indicated as attributes. All quantity and pricing inputs must satisfy these attributes for charges to be calculated. Attributes must be common to the Charge Group that the Charge type belongs to. An attribute table must be completed for each calculation.

Attribute Name	Order	USE	Sum	Key Value	Notes
Market Type		Y			Standard attribute, use TBD
Major group		Y			Standard attribute, use TBD
Charge Group		Y			Standard attribute, use TBD
Trade Date		Y			
Trade Hour		Y	Y		Sum to Hourly
Settlement Interval		Y			
BA ID		Y	Y		Used to sum by customer
Location ID		Y			
Interchange ID		Y			
Location Type		Y			
Market Type		Y		"D" for Day Ahead, "H" for Hour Ahead	
Schedule Component ID		Y		"2" for Spin; "3" for Non-Spin; "5" for Replacement Reserve; "9" for Regulation Up; "10" for Regulation Down	
Region ID		Y	Y		Sum for all Regions
Zone ID		Y	Y		Sum for all Zones



Calculation Details	Value	Notes
Calculation Frequency	Houlyr	
Number of Intervals	25	
Pre-requisite CTs	CT 1: Day Ahead Spinning Reserve Settlement	
	CT 2: Day Ahead Non-Spinning Reserve Settlement	
	CT 4: Day Replacement Reserve Settlement	
	CT 5: Day Regulation Up Settlement	
	CT 6: Day Regulation Down Settlement	
	CT 51: Hour Ahead Spinning Reserve Settlement	
	CT 52: Hour Ahead Non-Spinning Reserve Settlement	
	CT 54: Hour Ahead Replacement Reserve Settlement	
	CT 55: Hour Ahead Regulation Up Settlement	
	CT 56: Hour Ahead Regulation Down Settlement	
	CT 111: Spinning Reserve Allocation Settlement	
	CT 112: Non-Spinning Reserve Allocation Settlement	
	CT 114: Replacement Reserve Allocation Settlement	
	CT 115: Regulation Up Allocation Settlement	
	CT 116: Regulation Down Allocation Settlement	
	CT 24: Replacement Reserve Bid-In Withhold Settlement	
	CT 124: Replacement Reserve Bid-In Withhold Settlement	
Successor Charge Types	N/A	

### 1.1.8. Calculation Flowcharts

The high-level Market Usage Ancillary Services GMC is shown below. The flow chart will have ?? levels:

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### 1.1.9. Output Requirements and Definitions

Output requirements include details of which charge type outputs are to be reported to participants in the detailed Quantity, Price, and Charge detail format. The specific participant outputs are defined, together with any intermediate outputs needed to validate charges prior to publishing results, or used as inputs in other charge calculations

Output type	Level	Expected quantities	Unique Output	Rounding	Output	Variable Name
Detailed BQ output	Ancillary Services Purchase Quantity	25 * # of SCs	Yes	9		
Detailed BQ output	Ancillary Services Sales Quantity	25 * # of SCs	Yes	9		
Detailed BQ output	Total GMC Market Usage Ancillary Services Quantity	25 * # of SCs	Yes	9		
Detailed BQ output	GMC Market Usage Ancillary Services Rate	1 (same price for all SCs)	Yes	9		
Detailed BQ output	Daily GMC Market Usage Ancillary Services Settlement Amount by SC by Day	# of SCs	Yes	9		
Daily settlement statement	GMC Market Usage Settlement Amount	# of SCs * 25				
Invoice	SC by bill period	# of SCs				

### 1.1.10. Adjustments and Rounding

#### 1.1.10.1. Adjustments

Automatic recalculation adjustments to this charge type will occur in the event of revised data input from any source system, predecessor calculation (as listed below), revised GMC Market Usage Ancillary Services Rate, Pass through Bill adjustment, or operator override, by performing a recalculation on the prior run.

- CT 1: Day Ahead Spinning Reserve Settlement
- CT 2: Day Ahead Non-Spinning Reserve Settlement
- CT 4: Day Replacement Reserve Settlement
- CT 5: Day Regulation Up Settlement

- CT 6: Day Regulation Down Settlement
- CT 51: Hour Ahead Spinning Reserve Settlement
- CT 52: Hour Ahead Non-Spinning Reserve Settlement
- CT 54: Hour Ahead Replacement Reserve Settlement
- CT 55: Hour Ahead Regulation Up Settlement
- CT 56: Hour Ahead Regulation Down Settlement
- CT 111: Spinning Reserve Allocation Settlement
- CT 112: Non-Spinning Reserve Allocation Settlement
- CT 114: Replacement Reserve Allocation Settlement
- CT 115: Regulation Up Allocation Settlement
- CT 116: Regulation Down Allocation Settlement
- CT 24: Replacement Reserve Bid-In Withhold Settlement
- CT 124: Replacement Reserve Bid-In Withhold Settlement

### 1.1.10.2. Rounding Adjustments

As this product type is a charge calculation only, no rounding adjustment is required.

## 1.1.11. Validation and Testing

### 1.1.11.1. Validation

The table below sets out the validation checks that must occur:

Validation	Timing	Description	Applicable to
Exceptions are accurately reflected.	After	Calculation error produced when this condition is not met.	Initial and recalculation run types
Ancillary service quantity	After	Calculation error if incorrect base quantity is used.	Initial and recalculation run types
GMC Market Usage Ancillary Services Settlement Amount $\geq 0$	After	Calculation error if this condition is not met. Initial settlement of GMC Market Usage must be a positive value (that is, a charge to Scheduling Coordinators).	Initial run types
Sign convention for GMC Market Usage Ancillary Services Settlement Amount	After	Calculation error. Incremental runs of GMC Market Usage Ancillary Services must maintain the proper sign convention for the Settlement amount if Ancillary Service quantities or Market Usage Ancillary Services rate updates impact the direction of the charge. Payments to SCs must be negative settlement amounts, and additional charges to SCs must be positive settlement amounts	Recalculation run types

### 1.1.11.2. Testing

The following conditions must be tested prior to release of any configuration to production:

#### Standard Testing

Detail standard tests that need to be conducted for this charge type.

Test Condition	Description	Applicable to
Charge calculation correct at hourly	Correct base calculation	Initial and recalculation run types

Test Condition	Description	Applicable to
level		
Charge sum correct at SC level	Correct SC sum	Initial and recalculation run types
Zero price with non zero billable quantity	Warning produced for this in post validation	Initial and recalculation run types
True up for altered price is correct	Correct price true up	Recalculation run types
True up for altered inputs	Correct quantity true up	Recalculation run types

### Charge Type Specific Testing

Test Condition	Description	Applicable to
Exceptions	Ensure resource receives multiple charges for that interval and correct prices are used	Initial and recalculation run types
Rate Changes	Ensure rate changes have correct effective dates. Charge types will not change as rates change	Initial and recalculation run types

### Successor Charge Type Specific Tests

Test Condition	Description	Applicable to
N/A		

### Revision Table

Date	Description
March 18, 2005	Original
June 23, 2005	Added BAID 1268 to Exceptions