Date: February 14, 2014

Order 745 implemenation detail and conforming business rules for manuals

Formatted: Font: 14 pt

CBL Certification Process

The CBL Certification process will identify variable load customers. All customers must use a CBL with an error (RRMSE) no greater than 20% unless otherwise approved by PJM.

- If a customer's CBL error is greater than 20% then the customer is considered to be a variable load customer and another CBL must be used.
- If an alternate CBL with an error less than 20% (unless otherwise approved by PJM) cannot be found then the registration will be terminated by PJM.
- All new Economic DR registrations require CBL Certification.
- Registration extensions will not require CBL Certification. Note: All registrations will be terminated as part of the implementation plan and therefore need a new registration which will go through the CBL certification process. Once the registration goes through the CBL certification once, subsequent Registration extensions will not be required to go through the CBL certification process.

  Exception

  - CSPs shall inform PJM of any significant operational changes that affect the load which in turn require an evaluation of the existing CBL..
  - Registrations with significant operation changes require CBL Certification.
  - PJM may review and request accuracy of registration CBL on a periodic basis

CBL Certification Process

CBL Certification is performed prior to submitting the registration. This process eliminates current alternative CBL process and focus on getting CBL correct on registration.

1) Create Registration & save registration (New status)
2) Input Load Data
3) CSP should run RRMSE
   a. Standard CBL with SAA must be run
   b. CSP may run other alternative CBLs
4) CSP can select any CBL from drop down on registration if CBL has RRMSE in successful status

Order 745 implemenation detail and conforming business rules for manuals

Formatted: Font: 14 pt

a. if registration has “successful” RRMSE <=20% for CBL selected on registration with 30 CBL test days AND RRMSE is lower than Standard CBL THEN CSP may submit and PJM does not need to approve.

    i. Load Data used must be contiguous where most current date of load data is <= current date minus 60.

b. Otherwise, CSP can initiate a “CBL Review Task” for PJM to review CBL exception for one of the following reasons and then be able to submit the registration for approval:

    i. RRMSE >20%

    ii. Alternative CBL RRMSE > Default RRMSE

    iii. Insufficient load data (not able to get 30 CBL Test Days)

    iv. Outdated load data (most current load data is older than 60 days from current date)

    v. Use of Manual CBL.

c. Once CSP submits CBL Review Task or submits registration the CSP cannot change the CBL on the registration.

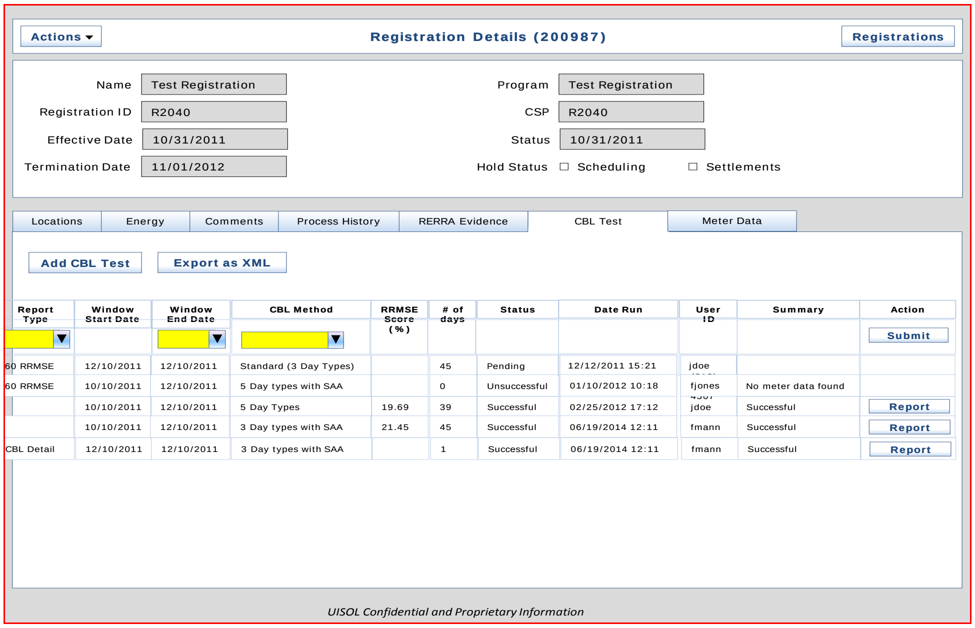
d. PJM CBL Review Task will use same logic and timeline today embedded in alternative CBL process (including settlement hold process).

e. Registration goes through normal Registration approval process

New CBL Test tab with display of how user can initiate and view RRMSE results

Order 745 implemenation detail and conforming business rules for manuals

Formatted: Font: 14 pt


Actions ▾
Registration Details (200987)
Registrations

Name: Test Registration
Registration ID: R2040
Effective Date: 10/31/2011
Termination Date: 11/01/2012
Program: Test Registration
CSP: R2040
Status: 10/31/2011
Hold Status: ☐ Scheduling ☐ Settlements

Locations
Energy
Comments
Process History
RERRA Evidence
CBL Test
Meter Data
Add CBL Test
Export as XML

Report Type	Window Start Date	Window End Date	CBL Method	RRMSE Score (%)	# of days	Status	Date Run	User ID	Summary	Action
▼		▼	▼							Submit
60 RRMSE	12/10/2011	12/10/2011	Standard (3 Day Types)		45	Pending	12/12/2011 15:21	jdoe		
60 RRMSE	10/10/2011	12/10/2011	5 Day types with SAA		0	Unsuccessful	01/10/2012 10:18	fjones	No meter data found	
	10/10/2011	12/10/2011	5 Day Types	19.69	39	Successful	02/25/2012 17:12	jdoe	Successful	Report
	10/10/2011	12/10/2011	3 Day types with SAA	21.45	45	Successful	06/19/2014 12:11	fmann	Successful	Report
CBL Detail	12/10/2011	12/10/2011	3 Day types with SAA		1	Successful	06/19/2014 12:11	fmann	Successful	Report

UISOL Confidential and Proprietary Information

Order 745 implemenation detail and conforming business rules for manuals

Formatted: Font: 14 pt

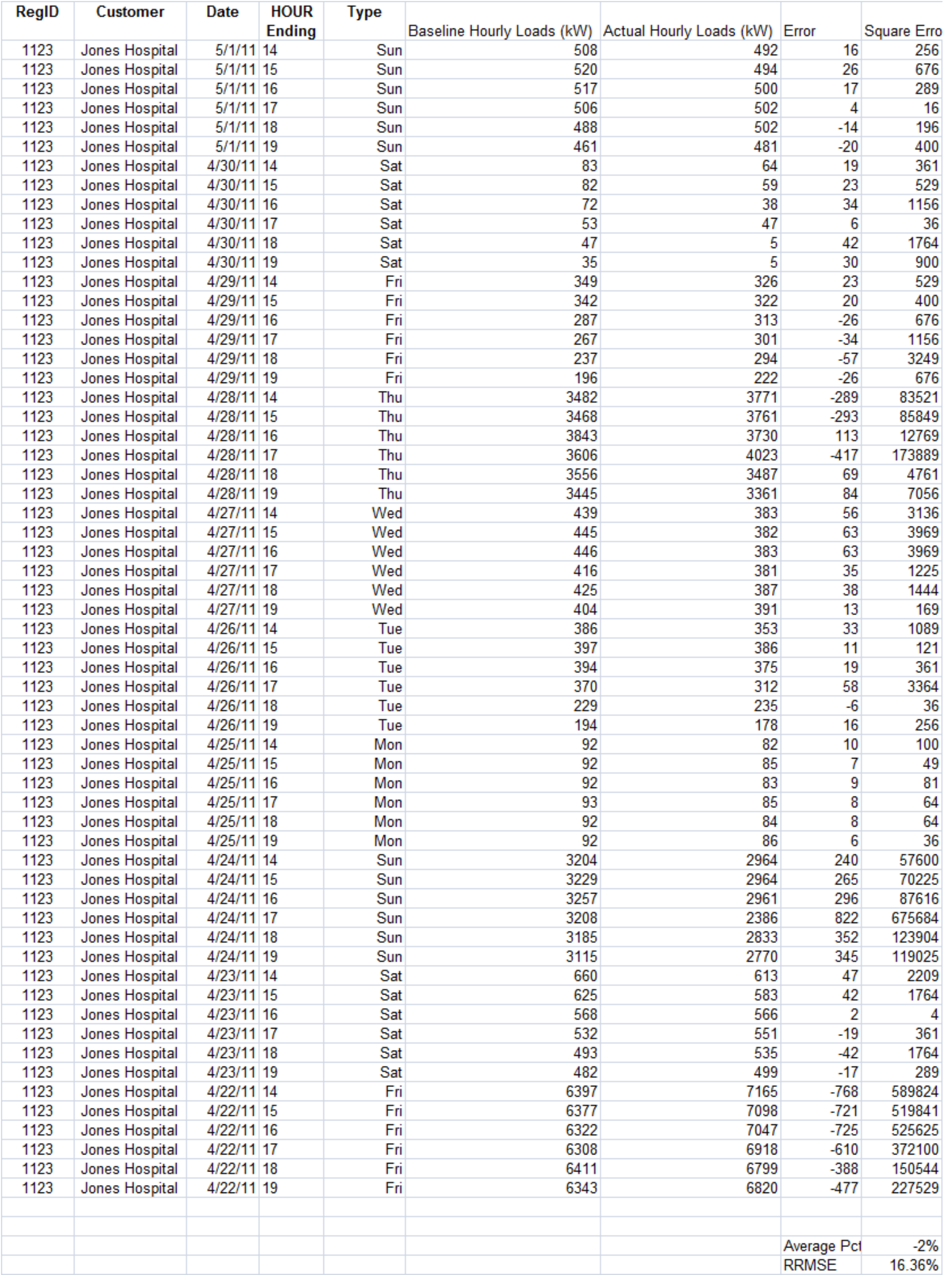
CBL detailed report

User will be able to select 1 day at a time and view a CBL detailed report (same type of report that is available today for settlements

Order 745 implemenation detail and conforming business rules for manuals

Formatted: Font: 14 pt

Example of RRMSE detailed report that will be available



RegID	Customer	Date	HOUR Ending	Type	Baseline Hourly Loads (kW)	Actual Hourly Loads (kW)	Error	Square Erro
1123	Jones Hospital	5/1/11	14	Sun	508	492	16	256
1123	Jones Hospital	5/1/11	15	Sun	520	494	26	676
1123	Jones Hospital	5/1/11	16	Sun	517	500	17	289
1123	Jones Hospital	5/1/11	17	Sun	506	502	4	16
1123	Jones Hospital	5/1/11	18	Sun	488	502	-14	196
1123	Jones Hospital	5/1/11	19	Sun	461	481	-20	400
1123	Jones Hospital	4/30/11	14	Sat	83	64	19	361
1123	Jones Hospital	4/30/11	15	Sat	82	59	23	529
1123	Jones Hospital	4/30/11	16	Sat	72	38	34	1156
1123	Jones Hospital	4/30/11	17	Sat	53	47	6	36
1123	Jones Hospital	4/30/11	18	Sat	47	5	42	1764
1123	Jones Hospital	4/30/11	19	Sat	35	5	30	900
1123	Jones Hospital	4/29/11	14	Fri	349	326	23	529
1123	Jones Hospital	4/29/11	15	Fri	342	322	20	400
1123	Jones Hospital	4/29/11	16	Fri	287	313	-26	676
1123	Jones Hospital	4/29/11	17	Fri	267	301	-34	1156
1123	Jones Hospital	4/29/11	18	Fri	237	294	-57	3249
1123	Jones Hospital	4/29/11	19	Fri	196	222	-26	676
1123	Jones Hospital	4/28/11	14	Thu	3482	3771	-289	83521
1123	Jones Hospital	4/28/11	15	Thu	3468	3761	-293	85849
1123	Jones Hospital	4/28/11	16	Thu	3843	3730	113	12769
1123	Jones Hospital	4/28/11	17	Thu	3606	4023	-417	173889
1123	Jones Hospital	4/28/11	18	Thu	3556	3487	69	4761
1123	Jones Hospital	4/28/11	19	Thu	3445	3361	84	7056
1123	Jones Hospital	4/27/11	14	Wed	439	383	56	3136
1123	Jones Hospital	4/27/11	15	Wed	445	382	63	3969
1123	Jones Hospital	4/27/11	16	Wed	446	383	63	3969
1123	Jones Hospital	4/27/11	17	Wed	416	381	35	1225
1123	Jones Hospital	4/27/11	18	Wed	425	387	38	1444
1123	Jones Hospital	4/27/11	19	Wed	404	391	13	169
1123	Jones Hospital	4/26/11	14	Tue	386	353	33	1089
1123	Jones Hospital	4/26/11	15	Tue	397	386	11	121
1123	Jones Hospital	4/26/11	16	Tue	394	375	19	361
1123	Jones Hospital	4/26/11	17	Tue	370	312	58	3364
1123	Jones Hospital	4/26/11	18	Tue	229	235	-6	36
1123	Jones Hospital	4/26/11	19	Tue	194	178	16	256
1123	Jones Hospital	4/25/11	14	Mon	92	82	10	100
1123	Jones Hospital	4/25/11	15	Mon	92	85	7	49
1123	Jones Hospital	4/25/11	16	Mon	92	83	9	81
1123	Jones Hospital	4/25/11	17	Mon	93	85	8	64
1123	Jones Hospital	4/25/11	18	Mon	92	84	8	64
1123	Jones Hospital	4/25/11	19	Mon	92	86	6	36
1123	Jones Hospital	4/24/11	14	Sun	3204	2964	240	57600
1123	Jones Hospital	4/24/11	15	Sun	3229	2964	265	70225
1123	Jones Hospital	4/24/11	16	Sun	3257	2961	296	87616
1123	Jones Hospital	4/24/11	17	Sun	3208	2386	822	675684
1123	Jones Hospital	4/24/11	18	Sun	3185	2833	352	123904
1123	Jones Hospital	4/24/11	19	Sun	3115	2770	345	119025
1123	Jones Hospital	4/23/11	14	Sat	660	613	47	2209
1123	Jones Hospital	4/23/11	15	Sat	625	583	42	1764
1123	Jones Hospital	4/23/11	16	Sat	568	566	2	4
1123	Jones Hospital	4/23/11	17	Sat	532	551	-19	361
1123	Jones Hospital	4/23/11	18	Sat	493	535	-42	1764
1123	Jones Hospital	4/23/11	19	Sat	482	499	-17	289
1123	Jones Hospital	4/22/11	14	Fri	6397	7165	-768	589824
1123	Jones Hospital	4/22/11	15	Fri	6377	7098	-721	519841
1123	Jones Hospital	4/22/11	16	Fri	6322	7047	-725	525625
1123	Jones Hospital	4/22/11	17	Fri	6308	6918	-610	372100
1123	Jones Hospital	4/22/11	18	Fri	6411	6799	-388	150544
1123	Jones Hospital	4/22/11	19	Fri	6343	6820	-477	227529
							Average Pct	-2%
							RRMSE	16.36%

Formatted: Font: 14 pt

Maximum Base Load CBL (MBL)

The MBL CBL for weekdays shall be the average of the daily minimum hourly loads during the event hours over the 5 most recent weekdays preceding the load reduction event within the 45 calendar day period preceding the load reduction event. It is expected that this alternative CBL may be used for variable loads where other CBLs are not accurate.

The daily minimum load calculation must be based on a minimum of three hours. If the number of event hours is less than three, then the daily minimum load calculation will use the following hours:

1. The hour prior to the first hour of the event
2. The hour(s) of the event
3. The hour after the event

For the purpose of calculating the MBL CBL for weekdays, weekdays shall not include:

1. NERC holidays
2. Weekend days
3. Event Days defined as previous submitted non-denied submitted settlements.
4. Any weekday where the average daily event period usage is less than 25% of the average event period for the five days.

If a 45-day period does not include 5 weekdays, provided that there are 4 weekdays within the 45-day period, the MBL CBL shall be based on the average of the daily minimum loads using hours defined above.

If a 45-day period does not include 4 weekdays, the most recent prior event days will be used as necessary to meet the 4 day requirement to calculate the MBL CBL.

The MBL CBL for Saturdays and Sundays/NERC holidays shall be the average of the daily minimum loads during the event hours over the 3 most recent Saturdays or Sundays/NERC holidays within the 45 calendar period preceding the load reduction event

The daily minimum load calculation must be based on a minimum of three hours. If the number of event hours is less than three, then the daily minimum load calculation will use the following hours:

1. The hour prior to the first hour of the event
2. The hour(s) of the event
3. The hour after the event

For the purpose of calculating the MBL CBL for a Saturday or Sunday/NERC holiday, the following days shall not be used to calculate a Saturday or Sunday/NERC holiday MBL CBL:

Order 745 implemenation detail and conforming business rules for manuals

Formatted: Font: 14 pt

1. Weekend event days defined as previous submitted non-denied submitted settlements.
2. Any Saturday or Sunday/NERC holiday where the average daily event period usage is less than 25% of the average event period usage level for the three days.
3. Any Saturday or Sunday/NERC holiday where that corresponds to the beginning of end of daylight savings.

If a 45-day period does not include 3 Saturdays or Sundays/NERC holidays, provided that there are 2 Saturdays or Sundays/NERC holidays within the 45-day period, the MBL CBL shall be based on the average of the daily minimum loads of those 2 Saturdays or 2 Sundays/NERC holidays.

If a 45-day period does not include 2 Saturdays or Sundays/NERC holidays, the most recent prior event days will be used as necessary to meet the 2 day requirement to calculate the MBL CBL.

Formatted: Font: 14 pt

Relative Root Mean Squared ERROR (RRMSE)

1) To perform the RRMSE calculation, daily CBL calculations are first performed for each CBL method using hours ending 14 through hours ending 19 as the simulated event hours for each of the 60 non-event days according to each CBL method rules.

2) Actual Hourly errors are calculated by subtracting the CBL hourly load from the actual hourly load for each of the simulated event hours of the non-event day.

3) The Mean Squared Error (MSE) is calculated by summing the squared actual hourly errors and dividing by the number of simulated event hours.

4) The Average Actual Hourly Load is the average of the actual hourly load for each of the simulated event hours.

5) The Relative Root Mean Squared Error (RRMSE) is calculated by taking the square root of the quantity (MSE/Average Actual Load).

Example of RRMSE calculated over 10 day period

1) Daily CBL calculations are first performed for each CBL method using hours ending 14 through hours ending 19 as the simulated event hours for each of the 60 non-event days according to each CBL method rules.

		Baseline Hourly Loads (kW)						Actual Hourly Loads (kW)					
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
customer	**Date**	**1-2PM**	**2-3PM**	**3-4PM**	**4-5PM**	**5-6PM**	**6-7PM**	**1-2PM**	**2-3PM**	**3-4PM**	**4-5PM**	**5-6PM**	**6-7PM**
R2001	18-Aug-11	508	520	517	506	488	461	492	494	500	502	502	481
R2001	19-Aug-11	83	82	72	53	47	35	64	59	38	47	5	5
R2001	20-Aug-11	349	342	287	267	237	196	326	322	313	301	294	222
R2001	21-Aug-11	3,482	3,468	3,843	3,606	3,556	3,445	3,771	3,761	3,730	4,023	3,487	3,361
R2001	22-Aug-11	439	445	446	416	425	404	383	382	383	381	387	391
R2001	23-Aug-11	386	397	394	370	229	194	353	386	375	312	235	178
R2001	24-Aug-11	92	92	92	93	92	92	82	85	83	85	84	86
R2001	25-Aug-11	3,204	3,229	3,257	3,208	3,185	3,115	2,964	2,964	2,961	2,386	2,833	2,770
R2001	26-Aug-11	660	625	568	532	493	482	613	583	566	551	535	499
R2001	27-Aug-11	6,397	6,377	6,322	6,308	6,411	6,343	7,165	7,098	7,047	6,918	6,799	6,820

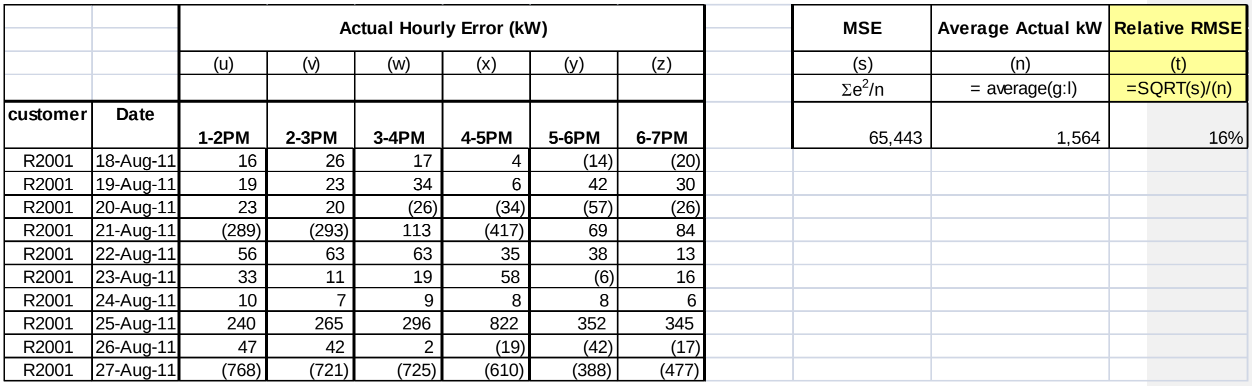
2) Actual Hourly errors are calculated by subtracting the CBL hourly load from the actual hourly load for each of the simulated event hours of the non-event day.

3) The Mean Squared Error (MSE) is calculated by summing the squared actual hourly errors and dividing by the number of simulated event hours.

4) The Average Actual Hourly Load is the average of the actual hourly load for each of the simulated event hours.

Formatted: Font: 14 pt

5) The Relative Root Mean Squared Error (RRMSE) is calculated by taking the square root of the MSE/Average Actual Load.



		Actual Hourly Error (kW)						MSE	Average Actual kW	Relative RMSE
		(u)	(v)	(w)	(x)	(y)	(z)	(s)	(n)	(t)
								$\Sigma e^2/n$	= average(g:l)	=SQRT(s)/(n)
customer	**Date**	**1-2PM**	**2-3PM**	**3-4PM**	**4-5PM**	**5-6PM**	**6-7PM**	65,443	1,564	16%
R2001	18-Aug-11	16	26	17	4	(14)	(20)			
R2001	19-Aug-11	19	23	34	6	42	30			
R2001	20-Aug-11	23	20	(26)	(34)	(57)	(26)			
R2001	21-Aug-11	(289)	(293)	113	(417)	69	84			
R2001	22-Aug-11	56	63	63	35	38	13			
R2001	23-Aug-11	33	11	19	58	(6)	16			
R2001	24-Aug-11	10	7	9	8	8	6			
R2001	25-Aug-11	240	265	296	822	352	345			
R2001	26-Aug-11	47	42	2	(19)	(42)	(17)			
R2001	27-Aug-11	(768)	(721)	(725)	(610)	(388)	(477)			

Formatted: Font: 14 pt

CBL Pre-certification process FAQ:

Formatted: Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Indent at: 0.5"

1) Do I need to run RRMSE if I would like to use gen output data to determine the load reduction? No but PJM must approve the use of gen output data to determine the load reduction. Gen output data may only be used if the gen unit does not normally run. For example, a cogen operation must use load data and cbl to determine load reduction since the gen unit normally runs.

2) Do I need to run RRMSE and have accurate score if I will only participate in SR or Regulation market? No - but CSP will need to guarantee PJM that the registration will not bid in the energy market since PJM currently does not have a mechanism to preclude energy market participation. The process will be for CSP to select MBL, request PJM exception in eLRS and put in comment that Resource will not participate in energy market and will only participate in SR or Regulation. During the transition process, once the new registration is approved the CSP will request SR or Regulation and PJM will approve if previously certified.

Dispatch Implementation

- All Economic Load Response participation is defined as:
  1) Clearing in the Day-Ahead Market
  2) Dispatched by PJM in the Real-Time Market
- All registrations and Dispatch Groups will be eligible to set LMP
- Self Scheduling will be eliminated with the PJM implementation of FERC Order 745
- Consolidation of eMKT screens – cut the number of tabs in half to make much easier to manage bids, schedules and associated market results. This is expected to go live on 1/26 and will not change fields or web services – this will simply make it easier for CSP to administer if doing through the User Interface. Training material has been published and webex session will be conducted.
- Economic Min and Max MW on the DSR Hourly Updates can be changed up to 3 hours before the operating hour.
- DR bids for each Market Type will be handled as follows:
    a. Day-Ahead Market – If hour clears in DA market then DR should respond with associated MWs. PJM will not dispatch in RT for hours that clear in DA market.
    b. Balancing Market – DR should follow RT dispatch signal
    c. Both
        i. If hour clears in DA market then DR should respond with associated MWs. PJM will not dispatch in RT for hours that clear in DA market.

Formatted: Font: 14 pt

ii. If hour does not clear then hour is eligible to be dispatched in RT.

Formatted: Font: 14 pt

Dispatch Groups

Dispatch Groups can be created in eLRS for Economic participation in eMKT.

The Dispatch Groups allows the CSP to create a single offer for a group of registrations for economic participation.

- Day-Ahead Market
- Balancing Market
- Both

Rules for creating Dispatch Groups in eLRS:

1. Same CSP, Zone and Pricing Point.
2. Registrations participating in Ancillary Services (SR, DASR, Regulation) will not be permitted in Dispatch Group.
3. Registration cannot be in a Dispatch Group and as a standalone registration. This will ensure that each registration is only available to bid once in the market and avoid duplications.
4. PJM will create LSE negative DEC bids for DR that clears in DA market for Dispatch Group based on registration DR load reduction capability.
5. Registrations must be confirmed before they may be added to a Dispatch Group.
6. Registrations may not be added to a Dispatch Group if they have an open OPR CBL Review task.
7. Registration that clears in DA market is not allowed to be assigned to Dispatch Group on same day it cleared in DA market. If CSP does try to assign to Dispatch Group on such day then PJM will remove (because this may create conflict between single registration that cleared in DA market and DG that may be dispatched in RT for same Operating Day)

Dispatch Groups are bridged from eLRS to eMKT

1. Dispatch Groups must still be assigned to Portfolios
2. Use a single Schedule and all associated Schedule parameters to represent the Dispatch Group
3. DSR Schedules cannot be changed when the Market is closed **(Same as today)**
4. Use a single DSR Hourly Updates and all associated DSR Detail to represent the Dispatch Group
5. The CSP is responsible for ensuring that at least 1 registration is in a Dispatch Group when they bid in eMKT.

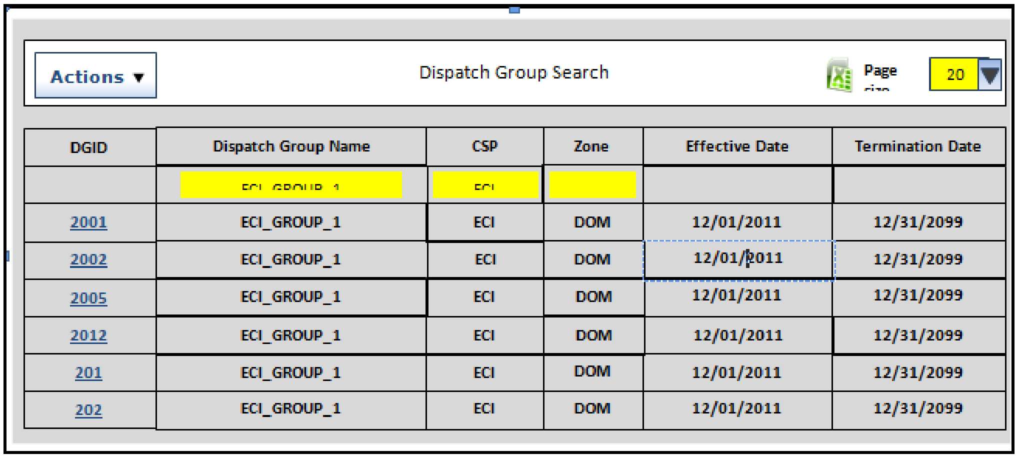
Formatted: Font: Not Bold

Formatted: Font: Not Bold

Dispatch Group Notification when Dispatched by PJM

1. The CSP will be notified of a Dispatch Group's dispatch by PJM at the Dispatch Group level. The registrations that comprise the Dispatch Group will not be part of the notification.

Dispatch Group Search Screen. Click Action to create new Dispatch Group. Click DGID to see Dispatch Group information



DGID	Dispatch Group Name	CSP	Zone	Effective Date	Termination Date
2001	ECI_GROUP_1	ECI	DOM	12/01/2011	12/31/2099
2002	ECI_GROUP_1	ECI	DOM	12/01/2011	12/31/2099
2005	ECI_GROUP_1	ECI	DOM	12/01/2011	12/31/2099
2012	ECI_GROUP_1	ECI	DOM	12/01/2011	12/31/2099
201	ECI_GROUP_1	ECI	DOM	12/01/2011	12/31/2099
202	ECI_GROUP_1	ECI	DOM	12/01/2011	12/31/2099

Create/add registration to Dispatch Group Clicking Add Registration displays a list of registrations that meet the requirements for the Dispatch Group (zone, pricing point, etc.)

Formatted: Font: 14 pt

Formatted: No bullets or numbering

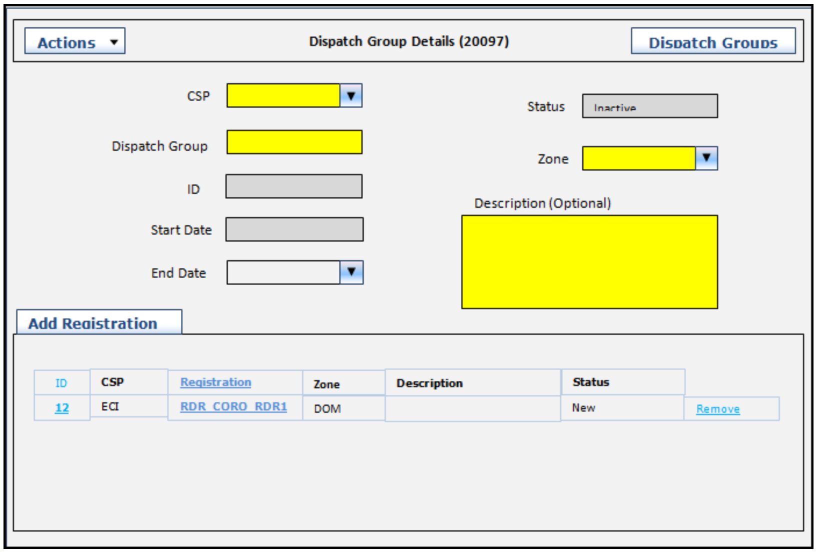
Formatted: Font: Not Bold

Formatted: Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.75" + Indent at: 1"

Formatted: Font: Not Bold

Formatted: Font: Not Bold

Formatted: Font: 14 pt


Actions
Dispatch Group Details (20097)
Dispatch Groups
CSP
Dispatch Group
ID
Start Date
End Date
Zone
Description (Optional)
Add Registration
Remove

Status: Inactive

ID	CSP	Registration	Zone	Description	Status	
12	ECI	RDR_CORO_RDR1	DOM		New	Remove

Formatted: Font: 14 pt

Electronic Notifications

The PJM Real-Time Dispatch of Registrations and Dispatch Groups will use an Electronic Notification. Electronic notification of Emergency events will not be included in the initial release.

1. Notifications are based on Web Services (WS) Pull sent to PJM by the CSP. This notification system is an extension of the existing web services functionality. Existing Web Services security will be used. A new service has been created to allow the CSP to perform regular periodic polling. CSP can continue to use existing Get Event service to pull down historical event information. The new regular periodic polling service is:
    - dispatchNotification (Noun)
        - Get (Verb)
            - Used to poll PJM each minute for new events
        - Update (Verb)
            - ~~1.~~ Used to acknowledge receipt of new events by Event ID

Formatted

Formatted

Formatted

Formatted

Formatted

2. The ~~A~~ new dispatchNotification web service will ~~be created to~~ include the following fields ~~two additional fields~~ relevant to the dispatch:
    - Event ID
    - Event type (RT dispatch or SR (when turned on by PJM) only; no emergency events)
    - Event date
    - Notify Time (time that the CSP receives dispatch instructions; previously known as StartTime)
    - Start time (actual time reductions are to begin; new field)
    - End time (time resource is released by PJM)
    - ~~2.~~
    - Min Down time (new field)
    - ~~Deployment time~~
    - Target MW
    - Status
    - ShortLead
    - LongLead
    - Registration ID

Formatted

Formatted: Font: 14 pt

- Customer
- Type
- Program
- CSP
- EDC
- LSE

3. Web service design specification are described in the PJM LRS External Web Services Design Specification document linked here:

   http://www.pjm.com/markets-and-operations/etools/elrs/~/media/etools/elrs/lrs-external-web-services-specifications-pdf.ashx

   Note that the specification will be updated to reflect the new fields.

4. The PJM eLRS Web Services Guide which is linked here:

   http://www.pjm.com/markets-and-operations/etools/elrs/~/media/etools/elrs/elrs-web-services-guide.ashx

5. The Dispatch instructions will include all relevant data. Below are draft XML request and responses for dispatches (the additional fields noted above will be added):

dispatchNotification Request:

```
<soapenv:Envelope
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:mes="http://www.pjm.com/schema/drbiznet/2009/message">
  <soapenv:Header/>
  <soapenv:Body>
    <mes:InformationRequest>
      <mes:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>dispatchNotification</mes:Noun>
        <mes:Revision>001</mes:Revision>
        <mes:Source>PJM</mes:Source>
        <mes:UserID>rmick</mes:UserID>
      </mes:Header>
      <mes:Request/>
    </mes:InformationRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

dispatchNotification Response:

Formatted: Font: 14 pt

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <ResponseMessage
xmlns="http://www.pjm.com/schema/drbiznet/2009/message"
xmlns:ns2="http://www.pjm.com/schema/drbiznet/2009/model">
      <Header>
        <Verb>reply</Verb>
        <Noun>dispatchNotification</Noun>
        <Revision>1.0</Revision>
        <Source>PJM</Source>
        <UserID>rmick</UserID>
        <MessageID>1322591929149-ECI</MessageID>
      </Header>
      <Reply>
        <ReplyCode>ok</ReplyCode>
      </Reply>
      <Payload>
        <ns2:Events
xmlns:ns3="http://www.pjm.com/schema/drbiznet/2009/message">
          <ns2:Event>
            <ns2:id>2060</ns2:id>
            <ns2:summaryInfo>
              <ns2:eventDate>2011-11-10-05:00</ns2:eventDate>
              <ns2:eventType>Real-Time Dispatch</ns2:eventType>
              <ns2:startTime>2011-11-10T05:00:00.000-05:00</ns2:startTime>
              <ns2:endTime>2011-11-10T07:00:00.000-05:00</ns2:endTime>
              <ns2:shortLead>false</ns2:shortLead>
              <ns2:longLead>false</ns2:longLead>
              <ns2:target>5000.0</ns2:target>
              <ns2:status>Confirmed</ns2:status>
            </ns2:summaryInfo>
            <ns2:registrationInfo>
              <ns2:registrationId>2011</ns2:registrationId>
              <ns2:reference>R2011</ns2:reference>
              <ns2:name>Cust 1</ns2:name>
              <ns2:type>Economic</ns2:type>
              <ns2:program>Economic</ns2:program>
              <ns2:CSP>
                <ns2:name>ECI</ns2:name>
              </ns2:CSP>
              <ns2:EDC>
                <ns2:name>AEP</ns2:name>
              </ns2:EDC>
              <ns2:LSE>
                <ns2:name>APS</ns2:name>
              </ns2:LSE>
              <ns2:zone>AEP</ns2:zone>
            </ns2:registrationInfo>
          </ns2:Event>
```

Formatted: Font: 14 pt

```
                  <ns2:Event>
            <ns2:id>2061</ns2:id>
            <ns2:summaryInfo>
              <ns2:eventDate>2011-11-12-05:00</ns2:eventDate>
              <ns2:eventType> Real-Time Dispatch</ns2:eventType>
              <ns2:startTime>2011-11-12T05:00:00.000-05:00</ns2:startTime>
              <ns2:endTime>2011-11-12T07:00:00.000-05:00</ns2:endTime>
              <ns2:shortLead>false</ns2:shortLead>
              <ns2:longLead>false</ns2:longLead>
              <ns2:target>2000.0</ns2:target>
              <ns2:status>Scheduled</ns2:status>
            </ns2:summaryInfo>
            <ns2:registrationInfo>
              <ns2:registrationId>2015</ns2:registrationId>
              <ns2:reference>R2015</ns2:reference>
              <ns2:name>Cust 1</ns2:name>
              <ns2:type>Economic</ns2:type>
              <ns2:program>Economic</ns2:program>
              <ns2:CSP>
                <ns2:name>ECI</ns2:name>
              </ns2:CSP>
              <ns2:EDC>
                <ns2:name>AEP</ns2:name>
              </ns2:EDC>
              <ns2:LSE>
                <ns2:name>APS</ns2:name>
              </ns2:LSE>
              <ns2:zone>AEP</ns2:zone>
            </ns2:registrationInfo>
</ns2:Event>

        </ns2:Events>
      </Payload>
    </ResponseMessage>
  </soap:Body>
</soap:Envelope>
```

<u>Empty dispatchNotification Reponse (i.e. no events):</u>

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Body>
    <ResponseMessage
xmlns="http://www.pjm.com/schema/drbiznet/2009/message"
xmlns:ns2="http://www.pjm.com/schema/drbiznet/2009/model">
      <Header>
        <Verb>reply</Verb>
        <Noun>dispatchNotification</Noun>
        <Revision>1.0</Revision>
```

Formatted: Font: 14 pt

```
          <Source>PJM</Source>
          <UserID>rmick</UserID>
          <MessageID>1322591929149</MessageID>
        </Header>
        <Reply>
          <ReplyCode>ok</ReplyCode>
        </Reply>
        <Payload>
          <ns2:Events/>
        </Payload>
      </ResponseMessage>
    </soap:Body>
  </soap:Envelope>
```

dispatchNotification Acknowledgement (via Update):

```
<soapenv:Envelope
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:mes="http://www.pjm.com/schema/drbiznet/2009/message">
  <soapenv:Header/>
  <soapenv:Body>
    <mes:InformationRequest>
      <mes:Header>
        <mes:Verb>update</mes:Verb>
        <mes:Noun>dispatchNotification</mes:Noun>
        <mes:Revision>001</mes:Revision>
        <mes:Source>PJM</mes:Source>
        <mes:UserID>rmick</mes:UserID>
      </mes:Header>
 <mes:Request>
                <mes:Id>2060,2061</mes:Date>
      <mes:Request/>
    </mes:InformationRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

6. The following gives the timeline for event notification and heartbeat:

    - Every minute, CSP will send a WS Get dispatchNotification request ~~to ask~~ for all unacknowledged events. ~~current or into the future that have not been acknowledged already. CSP will receive all non-acknowledged events that are either presently in progress or have a future start time.~~
    - PJM will reply with ~~list of~~ all events (~~emergency or economic~~RT dispatch or SR) and ~~list of all~~ the registration~~s~~ and/or dispatch group~~(s)~~ involved in each~~the~~ event. ~~(PJM does not expect to implement the list of registrations segment for Emergency Load Management events in 2012.)~~

Order 745 implemenation detail and conforming business rules for manuals

Formatted: Font: 14 pt

- CSP will reply with an Update dispatchNotification ~~acknowledgement~~ message. There should be a log entry recording that an Event was acknowledged~~ pull was made~~. There can be multiple events in each response.

- This one minute polling will act as the heartbeat. The heartbeat indicates that the end-to-end communication path is healthy.

7. CSP must create and be able to support their infrastructure to periodically (once per minute) pull event information from PJM. CSPs should use the eLRS Web Services Guide as the reference for creating the pulling services.

    - As an aid, a simple generic non-supported polling application (such as Java for Windows 7) will be available to CSPs to enable them to submit the dispatchNotification WS request~~s~~ in the appropriate format and convert the reply message to CSV for storage on a local drive. It is the CSPs responsibility to maintain and manage their own webservice Client – PJM will not be responsible for this infrastructure of configuration at the CSP location.

~~8. The event message sent by PJM will include list of registrations if applicable (PJM does not expect to implement for Emergency Load Management events in 2012)).~~

~~9. Each CSP will be able to query for its own messages/events. In addition to the automatic pulling of event data, the CSP will be able to pull historic events by setting the time period and event type.~~

~~10. Once a notification has been acknowledged it should not be part of the next poll.~~

~~11.~~8. If heartbeat is not heard or if there are un-acknowledged messages for a length of time an alarm escalation process will initiate as follows:

    - STEP 1 (CSP alarm 1): We can send an alarm email to the CSP (users with Any Dispatch and above User Interest) if there is no heartbeat check for over 10 minutes or if there is no pull from the CSP when there are unacknowledged events with a start time more than 3 minutes old.

    - STEP 2 (CSP alarm 2): If after an additional 15 minutes to each time in STEP 1 there is either no heartbeat or there are still un-acknowledged events then a second alarm email should be sent to the CSP (users with Any Dispatch and above User Interest).

    - STEP 3 (PJM alarm): If after an additional 30 minutes to each time in STEP 2 there is either no heartbeat or there are still un-acknowledged events then an alarm email should be sent to PJM's DSR Ops and ITOC including the CSP name and time of last successful heartbeat or acknowledged event.

Order 745 implemenation detail and conforming business rules for manuals

Formatted: Font: 14 pt

Settlements

Settlement Revenue

CSPs are eligible to be paid full LMP for the Registration's or Dispatch Group's reductions, provided that the LMP at the pricing point is at or above the Net Benefits Price.

1. All Registrations or Dispatch Groups must either clear in the Day-Ahead Market or be Dispatch by PJM in order to be eligible for settlement revenue.
2. All Registrations or Dispatch Groups are eligible for Make Whole payments.
3. All Registrations or Dispatch Groups are subject to Balancing Operating Reserve (BOR) charges for deviations greater than 20% from the PJM Day-Ahead or Real-Time Dispatch instructions.
4. Registrations that are cleared or dispatched will be evaluated at the registration level when evaluating BOR
5. DR resources may submit bids that are less than the Net Benefits price.
    - If the DR resource clears in the Day-Ahead Market or is dispatched in the Real-Time Market and the corresponding hourly LMP is less than the Net Benefits Price, then the DR resource will receive no settlement credits and no make-whole credits. The DR resource will still receive BOR Charges for under or over reductions.
6. All settlements that are not submitted within 60 days of the economic event will be sent to Market Settlements by PJM with 0 kW hourly reductions. BOR will be assessed based on the deviations of the stand alone settlement or Dispatch Group settlement..
7. All settlements that are still pending, denied or withdrawn after 75 days from the economic event will be sent to Market Settlements. These settlements will be assessed 0 kW hourly reductions. BOR will be assessed based on the deviations of the stand alone settlement or Dispatch Group settlement.

Dispatch Group Settlements

To calculate the reductions achieved by the Dispatch Group after an economic event, individual settlements need to be created in eLRS.

1. The CBL needs to be calculated in order to calculate the reductions for the individual registrations.
2. The Dispatch Group event will be entered as an Event in eLRS. Once a Dispatch Group is created successfully, the status will be 'Confirmed'. Note: a single registration's event status is 'Settled'.

Order 745 implemenation detail and conforming business rules for manuals

Formatted: Font: 14 pt

~~1.~~3. The Dispatch Group event will be de-aggregated to the registration level and registration events will be created. The registration events will be based on the registrations in the Dispatch Group when the event is bridged into eLRS – approximately 3:00 AM.

~~2.~~4. ~~The Dispatch Groups are de-aggregated and i~~Individual settlements are created in eLRS based on the registration level events. The individual settlements are submitted by the CSP and the meter data and loss factors are verified by the EDC and retail rate is reviewed by LSE similar to current settlement review process.

3. The total reduction for the Dispatch Group is calculated once a day as the sum of all the reductions of the settlements. Once all of the settlements in the Dispatch Group reach their final state, the Dispatch Group Reduction is bridged to Market Settlements for billing.
    a. The final State for a Dispatch Group Economic Settlement is achieved when all of the individual settlements within the Dispatch Group achieve the following status:
        i. All settlements in Dispatch Group are confirmed.
        ii. Prior to the 60th day after the event, the CSP may mark the Dispatch Group ready for settlement. No further updates to any settlements may be done in the Dispatch Group.
        iii. On the 61st day after the event and all settlements are either confirmed, withdrawn or expired.
        iv. The 75th day after the event has been reached, the Dispatch Group settlement will be sent to settlements regardless of the individual status of any settlements in the group
4. Dispatch Groups that are cleared or dispatched will be evaluated at the Dispatch Group level when evaluating BOR. Deviations and BOR will be assessed based on the reduction of the Dispatch Group.
5. Market Settlements will only provide settlement report based on Dispatch Group(s) and not by registrations.

Settlement Compensation (see worksheet for detailed examples)

1. If resource bids in DA market is less than NBT and bid clears at DA LMP less than NBT then all energy delivered will be settled at LMP – G&T compensation structure for both DA and RT markets (if there is an imbalance).
2. If resource bids in DA market is greater than or equal to NBT then all energy delivered will be settled at full LMP compensation structure.

Formatted: Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Indent at: 0.5"

Order 745 implemenation detail and conforming business rules for manuals

Formatted: Font: 14 pt

Note: DA make whole is based on bid price or bid price less G&T where appropriate. DA make whole is not a function of amount of deviation. BOR changes will be applicable for all deviations.

Formatted: Indent: Left: 0.25"

3. If resources does not bid in DA market but has RT dispatch price less than NBT and is dispatched by PJM in RT then all hours where LMP is less than NBT will be compensated at LMP-G&T and all hour equal or greater than NBT will be compensated at full LMP.

Formatted: Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.25" + Indent at: 0.5"

    a. Make Whole is hourly and based on lesser or bid volume and actual volume delivered

        i. Make whole is only eligible for hour if load reductions is within +/- 20% of dispatch amount

        Formatted

        ii. Make whole compensation is based on bid if bid => NBT otherwise bid - G&T

        iii. Shutdown cost will not be paid if any hour in segment is outside 20% volume deviation

        iv. Shutdown cost is paid once for all contiguous hours

        v. Segment make whole is sum of hourly make whole (ie: negative make whole will offset positive make whole)

    b. BOR charge applied to all deviations outside +/-20%

Formatted: Numbered + Level: 2 + Numbering Style: a, b, c, … + Start at: 1 + Alignment: Left + Aligned at: 0.75" + Indent at: 1"

Settlement Cost Allocation

The cost of Economic Demand Response settlements will be allocated to all of the Market participants with real-time exports from PJM and LSE's within a zone that has an LMP greater than the Net Benefits Price.

1. Market Participant with real-time exports
    - ratio-share basis based on their real-time exports (where PJM LMP >= NBT)
2. LSEs
    - ratio-share basis based on their real-time loads in the zone.

Settlement Reports (from MSRS)

1) Load Response Summary Report

    a. The Load Response Summary report will still be used to view data for dates from prior to FERC 745 go live For data from activity days after FERC 745 go live, there will be a new Load Response Credit Report. This new report will support the following line items; DA Load Response Credit (2240), DA Operating

Formatted: Font: 14 pt

Reserves for Load Response Credit (2371), RT Load Response Credit (2241) and Emergency Load response Credit (2245)

2) Economic Load Response Zonal Charge Allocations Report
    a. This report will support the new line items DA Load Response Charge Allocation (1242) and RT Load Response Charge Allocation (1243)
3) Operating Reserve for Load Response Credit Report – Pre FERC 745
    a. No change for Pre FERC 745
4) Operating Reserve for Load Response Credit Report – Post FERC 745
    a. This report has been updated to remove the DA Operating Reserves for Load Response Credit (2371). Column Segment ID has been added. Column RT Shutdown Cost Multiplier has been removed.
5) Balancing Operating Reserve for Load Response Deviation Charge
    a. This report will be used by CSPs to view their DA and RT only deviations
6) Operating Reserves for Load Response Charge Allocations
    a. This report will be used by LSEs to view the negative operating reserve charges