Column Headings:

A **Original Number** - The number originally assigned the seam issue. Used to track each issue as it was categorized and re-categorized.

B **Category** - Seam issues are grouped into one of 8 categories:

1. Congestion Management
2. Market Design
3. Market Monitoring / Compliance
4. Market Standards
5. Planning
6. System Reliability
7. Transaction Scheduling
8. Transmission Service

C **1st Sub-Category** - The seam issues categories are further delineated into 1st sub-categories.

D **2nd Sub-Category** - The seam issue 1st sub-categories are even further delineated into 2nd sub-categories.

E **Description Of Seam Issue** - Brief description of the seams issue.

F **Comments** - Additional comments providing background or further definition of the seam issue.

***** **Association / Notes** - Identification of associated seam issues based on their Original Number. (Ed. Note: this column was eliminated once seams issues were categorized).

***** **Seam Interface Type** - Each seam interface has 2 acting parties. Here the market status relationship between the 2 acting parties are identified, e.g., RTO Market to RTO Market, RTO Market to Non-RTO Market, Non-RTO Market to Non-RTO Market. (Ed. Note: this column was eliminated once seams issues were categorized).

G **Resp Org Cobb** - Recommended assignment by Steven Cobb, Salt River Project.

H **Resp Org IRC** - Recommendd assignment by Karl Tammar, NYISO, as representative of the IRC.

I **Resp Org Mueller** - Recommeded assignment by Ken Brown and Jeff Mueller, PSEG.

J **Issue Type** - Categorization of seams issue as either "national" or "regional" in scope.

K **Responsible Organization** - The recommended organization to be assigned a seam issue by the NERC / NAESB / IRC Joint Interface Committee (JIC).

L **Region 1** - The RTO, ISO, or Non-RTO Market Region that is the 1st acting party to the seam issue is identified here.

M **Region 2** - The RTO, ISO, or Non-RTO Market Region that is the 2nd acting party to the seam issue is identified here.

N **Priority** - The organization assigned a seam by the NERC / NAESB / IRC Joint Interface Committee (JIC) will use this column to prioritize their efforts.

O **Seam Impediment Type** - Identification of what causes the seam issue, e.g., market rule, business practice, physical barrier.

P **Currently Being Addressed** - Identification of another body that is currently working on the seam issue.

Q **Submitter** - The name of the person and organization providing the matrix information.

R **Reference Papers** - If reference papers are provided to support the information, a letter is assigned to the document. The index of reference papers appears at the end of the matrix.

Seams Issues Matrix

(Note: columns J and K not yet adopted by NAESB EC)

Orig #	Category	1ST Sub-Category	2ND Sub-Category	Description of Seam Issue	Comments	Issue Type	Resp Org	Reference Papers
1	Market Standards	Market Standard Operating Time		Non Standard Time Zone	The lack of a standard Time Zone causes Market Inefficiencies	National	NAESB	No
3	Market Standards	Energy Market Standard Product Definitions		Definition & treatment of Firm/nonfirm Power	Annual Plan Item 4ci moved from MOS	National	NAESB	No
4	Transmission Service	Transmission Market Standard Product Definitions and Priorities		Definition & treatment of Firm/nonfirm Transmission	Annual Plan Item 4cii moved from MOS	National	NAESB	No
5	System Reliability	Operating Reserves/Resource Adequacy	Energy and Reactive Capacity Reserve Requirements	Provision of reserves across multiple control areas	Annual Plan Item 4cii moved from MOS	National	NERC	L
6	Transmission Service	Transmission Service Procurement	Common Western Interconnection Wide OASIS	Transmission Access	No transmission market one stop shopping available for the Western Interconnection - entities can't find needed information to efficiently conduct business on a preschedule or real-time basis. Solution: Common OASIS Site needed.	Regional	Multiple	No
7	Market Standards	Market Standard Communication Protocols and Transparency		Market Price Information	Market pricing methodology not comprehensive, consistent or dependable. Solution: Standardized Indices, Independently Managed.	Regional	Western Interconnect	No
8	Transaction Scheduling	Interchange Scheduling Standardized Protocols		Scheduling	Inconsistent procedures among entities. Solution: Western Interconnection Standardized Interchange Scheduling Protocols.	Regional	Multiple	No
9	Congestion Management	Standardize and Coordinate ATC Calculations and Postings		Transmission Calculations	Transmission calculations are not consistent. Solution: Standardized ATC Calculations.	National	NAESB	No
10	Market Standards	Energy Market Standard Product Definitions		Energy Products	Entities have disagreements concerning the definitions of various energy products. Solution: Standardized Energy Products.	National	NAESB	No
11	Market Monitoring/ Compliance	Market Monitoring Entity Requirements		Market Oversight	New and mature markets need oversight to ensure that existing rules are complied with and new rules are adequate in meeting the scenarios they were designed to govern. Solution: Independent Market Auditor or Monitor.	Regional	Multiple	No
12	Transaction Scheduling	Interchange Scheduling Standardized Protocols	Develop Electronic Scheduling	Interchange/Intrachange Scheduling Data Exchange	Current E-Tagging process is inadequate for exchanging reliability and market data within the Western Interconnection. Solution: Electronic Scheduling	National	NAESB	No
13	Market Design	Unscheduled/Parallel Path Flow Management	Compensation for Unscheduled/Parallel Path Flow	Compensation for Unscheduled Flows of Electricity	Lack of compensation lessens incentives for operators to solve problems and for accountants to spend money on metering.	National	NAESB	A - C
14	Market Standards	Physical and/or Financial Resolution of Inadvertent Interchange		Compensation for Inadvertent Interchange	Lack of compensation lessens incentives for operators to solve problems. Explicit compensation for inadvertent interchange is necessary for appropriate definition of other products, in that such compensation ensures that the defined product is delivered.	National	NAESB	A - C
15	Market Design	Unscheduled/Parallel Path Flow Management	Compensation for Unscheduled/Parallel Path Flow	Compensation for Loop Flow	Lack of compensation lessens incentives for operators to solve problems and for accountants to spend money on metering.	National	NAESB	A - C
16	Market Design	Transmission Ancillary Service Market Design and Coordination	Reactive Power Compensation	Compensation for Reactive Power	Lack of compensation lessens incentives for operators to solve problems and for accountants to spend money on metering.	National	NAESB	A - C

Seams Issues Matrix

(Note: columns J and K not yet adopted by NAESB EC)

Orig #	Category	1ST Sub-Category	2ND Sub-Category	Description of Seam Issue	Comments	Issue Type	Resp Org	Reference Papers
17	Congestion Management	Standardize and Coordinate ATC Calculations and Postings	Reconcile ATC Calculations Between Physical and Financial Transmission Markets	TTC-ATC calculation/posting	Interface between a financial market (no physical transmission arrangements) and physical transmission regions (selling transmission capacity through OASIS reservations): Problems of TTC-ATC calculations coordination. Counterparties include IMO, NYISO, and ISO-NE.	Regional	HQ TransÉnergie/NYISO/ISO-NE	No
20	Congestion Management	Standardize TCC Calculations Across Interfaces		TTC coordination	Disagreement between two operators on the physical capability of an interconnection (line 7040 and Phase II). Counterparties are NYiso and ISO-NE.	National	NERC	No
22	Transmission Service	Transmission Service Pricing	Market Interface Transmission Service Pancaking	Rate pancaking elimination	Being reviewed by PJM/MISO.	Regional	PJM/MISO	No
23	System Reliability	Unscheduled/Parallel Path Flow Management	Parallel Path/ Unscheduled Flow Monitoring and Operation	How different congestion management methodologies will interact to ensure parallel flows and impacts are recognized and controlled to ensure system reliability.	Being reviewed by PJM/MISO.	Regional	PJM/MISO	No
24	System Reliability	Voltage Control		Voltage Operating Procedures	Being reviewed by PJM/MISO. See PJM presentation "Status Report to FERC on July 31, 2002 Alliance Order" dated Jan 2003, page 6 as posted under NAESB WEQ Seams subcommittee July 8 date	National	NERC	D
25	Market Standards	Energy Market Standard Product Definitions		Need for common physical market and products - regional variations permitted		National	NAESB	No
26	Planning	Transmission Expansion and Generator Interconnection Coordination	Transmission Expansion Cost and Construction Responsibilities	Transmission expansion planning - coordination between systems and determine who is obligated to build and pay for improvements	Being reviewed by PJM/MISO.	Regional	Multiple	No
27	System Reliability	Inter-Market and Intra-Market Facility Outage and Maintenance Coordination		Outage Maintenance Coordination	Being reviewed by PJM/MISO. See PJM presentation "Status Report to FERC on July 31, 2002 Alliance Order" dated Jan 2003, page 6 as posted under NAESB WEQ Seams subcommittee July 8 date	National	NERC	D
28	Transmission Service	Transmission Service Settlement	Consolidate Multiple Market Transmission Service Settlement Statements	Multiple transmission service charge invoicing	Being reviewed by PJM/MISO.	National	NAESB	No
29	Market Design	Unscheduled/Parallel Path Flow Management	Compensation for Unscheduled/Parallel Path Flow	Allocation of transmission capacity on reciprocal flow gates amounts to transmission service without compensation. Legitimizes "parallel loop flow".		National	NAESB	E
30	System Reliability	Operate Markets Within Transmission Limits		Market allocations over flow gates are approved without regard to flow gate capacity resulting in over subscription of flow gates.		National	NERC	E
32	Transmission Service	Transmission Market Design	Transmission Service Product Type Priority	MISO- PJM market allocation will give preference to the market as Network over PTP even though the Market allocation my be a non paying transmission customer.		Regional	PJM/MISO	E
33	Transmission Service	Transmission Service Procurement	Intra-Hour Transmission Service Procurement	Standard for Purchasing of Inter-Hour Transmission	The ability to purchase transmission after the top of the hour when the transmission service is predetermined as available in prior hour.	National	NAESB	No
34	Market Standards	Energy Market Standard Product Definitions		Clarification of Product Definitions	Complete/Standard definitions for Liquidated Damages (LD), "Into", etc.	National	NAESB	No

Seams Issues Matrix

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Orig #	Category	1ST Sub-Category	2ND Sub-Category	Description of Seam Issue	Comments	Issue Type	Resp Org	Reference Papers
35	Congestion Management	Congestion Management Market Coordination	Standardize Prices at Market Interfaces	LMP prices at borders of RTOs with markets (Price cap included)		National	NAESB	No
36	Congestion Management	Congestion Management Market Coordination	Coordinate Hedging Instruments at Market Interfaces	Coordination of market based congestion hedging instruments, such as FTRs, between adjacent RTOs with markets, especially for out and thru' transactions		National	NAESB	No
38	Transmission Service	Transmission Service Pricing	Market Interface Transmission Service Pancaking	Rate Pancaking	Charges to Market Participants who conduct business over more than one RTO. Reciprocal agreements needed to eliminate these charges. NYISO and ISO-NE	Regional	NYISO/ISO-NE	No
39	Transaction Scheduling	Controllable Line Scheduling		Controllable Line Scheduling	Concept of operations for general methodology to schedule controllable lines between RTOs. Being reviewed by NYISO	Regional	NYISO/ISO-NE/PJM	No
40	Transmission Service	Transmission Market Standard Product Definitions and Priorities	Multiple Proxy Bus Development	Multiple Proxy Buses for Free Flowing Interfaces	Development of multiple proxy buses between RTOs for scheduling and pricing.	Regional	NYISO/ISO-NE/PJM	No
41	Transaction Scheduling	Interchange Scheduling Standardized Protocols	Inter-Market Ramping Requirements Standardization	Scheduling Coordination (including Ramp Rates)	RTOs have different ramp rates and scheduling requirements that require Market Participants to complete multiple submissions for the same transaction.	National	NAESB	No
42	Market Standards	Market Standard Communication Protocols and Transparency		Data Visibility	Inability to view neighboring markets information through a common software such that this sometimes hinders Market Participants ability to complete business in a timely fashion.	National	NAESB	No
43	Congestion Management	Standardize and Coordinate ATC Calculations	Contract Tie Capacity Sharing	Allow Sharing Contract Tie Capacity between Entities across Seams	Lack of Coordination and Sharing of Tie Capacity is an artificial market barrier	National	NAESB	No
44	Congestion Management	Standardize and Coordinate ATC Calculations	Standardize TRM and CBM Calculations	Calculation and Values of TRM and CBM consistent	Underutilization of Transmission Capacity	National	NAESB	F
45	System Reliability	Inter-Market and Intra-Market Facility Outage and Maintenance Coordination		Coordination of Transmission and Generation Outages	Both forced and planned outages	National	NERC	No
46	Planning	Transmission Expansion and Generator Interconnection Coordination	Generator Interconnection - Affected Systems	Generation Interconnection Studies	Generation Interconnections close to seam affects both areas	National	NAESB	No
47	Congestion Management	System Market Modeling Coordination		Operational Model Updates	Areas must have up to date models for operational use of other areas across the seam	National	NERC	No
48	System Reliability	Emergency Operations	Computer Failures	Communication of Computer Failures	Needed for reliable operations and emergency operations	National	NERC	No
49	System Reliability	Emergency Operations	Emergency Operating Procedures for Market Interfaces	Emergency Procedures	Emergency procedures require operations across seams	National	NERC	No
50	System Reliability	Generation-Load Balance	Interchange Schedule Ramping Requirements	Schedule Ramp Management	Ramping standard differences across the seams hinder business	National	NAESB	No
51	System Reliability	Generation-Load Balance	Inter-Market Resource Requirements	Resource Adequacy	Parties in one area rely on resources in other areas. Validation of their reliance on the other area must be coordinated.	National	NERC	No
52	Market Standards	Market Standard Communication Protocols and Transparency		Confidentiality of Data and Information Shared	Standards of Confidentiality would enhance the capability to resolve data sharing and information posting	National	NAESB	No

Seams Issues Matrix

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Orig #	Category	1ST Sub-Category	2ND Sub-Category	Description of Seam Issue	Comments	Issue Type	Resp Org	Reference Papers
53	Congestion Management	Transmission Market Design	Transmission Service Product Type Priority	CAISO ETC rights scheduling - Contract Reference Number	CAISO uses Contract Numbers to track ETC rights. This causes Phantom Congestion and does not allow ETC rights holders to sell and schedule their transmission	Regional	Western Interconnect SSG-WI	No
54	Transmission Service	Transmission Service Pricing	Discounting of Market Interface Transmission ATC	Transmission service charge discounting	Ability for TOs to discount TSC rates on external interfaces to selectively reduce export charges and encourage use of ties. The software exists, however, there does not appear to be any business incentives to exercise discounts.	Regional	NYISO/ ISO-NE	G
55	Congestion Management	Standardize and Coordinate ATC Calculations and Postings		Improved TTC/ATC posting	Monthly and yearly posting of TTC/ATC values to support transaction pre-scheduling. Clarify how the ATC values calculated by each ISO should be used to ascertain the ability of the interface to support transactions.	Regional	NYISO/ISO-NE	G
56	Transmission Service	Transmission Service Settlement	Consolidate Multiple Market Transmission Service Settlement Statements	Multiple transmission service charge invoicing	Companies that conduct business across Control Area borders are faced with receiving a TSC bill from each TO. A single charge should be provided to each transaction to the appropriate parties and revenues allocated to the TOs according to the appropriate usage formulas.	Regional	NYISO/ISO-NE	G
57	Planning	Transmission Expansion and Generator Interconnection Coordination	Generator Interconnection Transmission Requirements	Transmission interconnection procedures	Need consistent approach to treating merchant generation interconnection procedures with transmission	Regional	Multiple	G
58	Transaction Scheduling	Controllable Line Scheduling		Controllable line scheduling	Concept of Operations for general methodology to schedule controllable lines has been drafted. A multi-ISO stakeholder group (similar to JCAG) needs to be formed to review the draft Concept of Operations to provide stakeholder input.	Regional	NYISO/ISO-NE	G
59	Congestion Management	Standardize and Coordinate ATC Calculations	Coordinate Hedging Instruments at Market Interfaces	Inter-control area congestion management / parallel flow management	Develop congestion hedges across control area boundaries.	Regional	NYISO/ISO-NE	G
60	Transaction Scheduling	Controllable Line Scheduling		Cross-border price convergence	The lack of price convergence at the control area boundaries may inhibit the desire of market participants to arbitrage between neighboring markets. This issue is being referred to the individual ISO Market Committees for further definition on the business issue that needs resolution.	Regional	NYISO/ISO-NE	G
61	Congestion Management	Standardize and Coordinate ATC Calculations and Postings	Reconcile ATC Calculations Between Physical and Financial Transmission Markets	Market Design - Prior to Day Ahead. Congestion Revenue Rights (CRRs) [Firm Transmission Rights (FTRs) in MD02, FTOs in RTO West]	Are all transmission rights both physical and financial required to be identical to mitigate the seams problems? (Issue #I.a.2)	Regional	Western Interconect SSG-WI	No
62	Congestion Management	Congestion Management Market Coordination		Market Design - Prior to Day Ahead. Financial or Physical	Must the offerings be identical? How can congestion management discontinuities be mitigated? (Issue I.a.3)	Regional	Western Interconect SSG-WI	No
63	Congestion Management	Congestion Management Market Coordination		Market Design - Prior to Day Ahead. Option or Obligation	Do different CM models create barriers to trade, and if so, how can these differences be mitigated? (Issue I.a.4)	Regional	Western Interconect SSG-WI	No

Seams Issues Matrix

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Orig #	Category	1ST Sub-Category	2ND Sub-Category	Description of Seam Issue	Comments	Issue Type	Resp Org	Reference Papers
64	Congestion Management	Congestion Management Market Coordination		Market Design - Prior to Day Ahead. Revenue Stream/ or Offset CM Cost	Must the term of congestion offerings be identical? How can congestion management discontinuities be mitigated? (Issue I.a.5)	Regional	Western Interconect SSG-WI	No
65	Transmission Service	Transmission Service Procurement	Long-Term Transmission Service for New Construction	Market Design - Prior to Day Ahead. Duration	To the extent that longer term transmission rights are needed for new construction, can agreement be reached to issue long term rights? (Issue I.a.6)	Regional	Western Interconect SSG-WI	No
66	Market Design	Unscheduled/Parallel Path Flow Management	Compensation for Unscheduled/Parallel Path Flow	Market Design - Prior to Day Ahead. Duration	How will rights for loop flows (non-contract flows) in other RTOs be allocated/acquired? (Issue I.a.7)	Regional	Western Interconect SSG-WI	No
67	Transmission Service	Transmission Service Procurement	Secondary Transmission Service Market Standardization	Market Design - Prior to Day Ahead. Primary Release Mechanism	There seems to be agreement here that a secondary market would be outside the RTO. If the resulting secondary market is not westwide, will coordination be needed? (Issue I.a.8)	Regional	Multiple	No
68	Congestion Management	Congestion Management Market Coordination	Standardize Prices at Market Interfaces	Market Design - Prior to Day Ahead. Secondary Market	To the extent that at a minimum congestion redispatch occurs in an RTO (i.e. a limited energy market), can a method be developed to produce consistent prices at the boundaries? If not, can price discontinuities be tolerated or managed? (Issue I.b.1)	Regional	Western Interconect SSG-WI	No
69	Congestion Management	System Market Modeling Coordination	Standardize Prices at Market Interfaces	Market Design - Day Ahead. Energy Spot Market	In order to achieve a uniform set of redispatch prices, if that is necessary, do the network models have to be identical, with the exact system? Each time each one is used does it have to be synchronized with the other RTOs or is a single process required? In addition do the programs that use the models have to be identical in order to get the uniform set of redispatch prices? (Issue I.b.2)	Regional	Western Interconect SSG-WI	No
70	Congestion Management	Congestion Management Market Coordination	Standardize Prices at Market Interfaces	Market Design - Day Ahead. Congestion Management Market	If models with identical levels of detail for the West are not used by all three RTOs, do the various simplifications for areas outside any given RTO create problems in achieving a uniform set of redispatch prices? (Issue I.b.3)	Regional	Western Interconect SSG-WI	No
71	Market Standards	Market Standard Communication Protocols and Transparency		Market Design - Day Ahead. Model spatial granularity	To what extent do RTOs need to see other RTOs' scheduling information? (Issue I.b.4)	Regional	Western Interconect SSG-WI	No
72	Congestion Management	Congestion Management Market Coordination	Standardize Prices at Market Interfaces	Market Design - Day Ahead. Model spatial granularity	To the extent that at a minimum congestion redispatch occurs in an RTO (i.e. a limited energy market), can a method be developed to produce consistent day ahead prices at the boundaries? (Issue I.b.5)	Regional	Western Interconect SSG-WI	No
73	Congestion Management	Operate Markets Within Transmission Limits		Market Design - Day Ahead. Model objective function	Who coordinates the scheduling constraints (i.e., security constrained dispatch) on paths that cross RTO boundaries to ensure that inter-RTO schedules do not exceed reliability standards? (Issue I.b.6)	Regional	Western Interconect SSG-WI	No
74	Market Design	Transmission Ancillary Service Market Design and Coordination		Market Design - Day Ahead. Model objective function	What is the effect of linking energy and ancillary service markets in the optimizations on model coordination issues? (Issue I.b.7)	Regional	Western Interconect SSG-WI	No

Seams Issues Matrix

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Orig #	Category	1ST Sub-Category	2ND Sub-Category	Description of Seam Issue	Comments	Issue Type	Resp Org	Reference Papers
75	Congestion Management	System Market Modeling Coordination		Market Design - Day Ahead. Model objective function	Does the use of both AC and DC OPFs introduce compatibility problems? (Issue I.b.8)	Regional	Western Interconect SSG-WI	No
76	Transaction Scheduling	Interchange Scheduling Standardized Protocols		Market Design - Day Ahead. Model objective function	Do differences in the scheduling requirements (e.g., requirements for balanced schedules) between RTOs create seams problems for inter-RTO schedules? If so, can these problems be mitigated? (Issue I.b.9)	Regional	Western Interconect SSG-WI	No
77	Market Monitoring/ Compliance	Anti-Gaming Coordination		Market Design - Day Ahead. Schedule Components	Will different RTO congestion management systems enhance opportunities for gaming or affect generation dispatch efficiency? (Issue I.b.10)	Regional	Western Interconect SSG-WI	No
78	Transaction Scheduling	Interchange Scheduling Standardized Protocols	Tools and Procedures to Accommodate Inter-Market Interchange Scheduling Requirements	Market Design - Day Ahead. Schedule Components	Can tools be developed for scheduling submission that assist the user in meeting any differences in protocols between RTOs? (Issue I.b.11)	National	NAESB	No
79	Transaction Scheduling	Interchange Scheduling Standardized Protocols	Standardize Inter-Market Scheduling Timelines	Market Design - Day Ahead. Other Scheduling Requirements	Should the time intervals and submission times be synchronized to mitigate obstacles to inter-RTO trade? (Issue I.b.12)	National	NAESB	No
80	Congestion Management	Congestion Management Market Coordination	Standardize Prices at Market Interfaces	Market Design - Day Ahead. Other Scheduling Requirements	To the extent that at a minimum congestion redispatch occurs in an RTO (i.e. a limited energy market), can a method be developed to produce consistent prices at the boundaries that send the same signal to the market? If not, can price discontinuities be tolerated or managed? (Issue I.b.13)	Regional	Western Interconect SSG-WI	No
81	Market Design	Transmission Ancillary Service Market Design and Coordination	Ancillary Service Prices at Market Interfaces	Market Design - Day Ahead. Congestion Prices.	Can a “best practice” model for definition and acquisition of ancillary services products be developed to produce consistent prices at the RTO boundaries? (Issue I.b.14)	Regional	Western Interconect SSG-WI	No
82	System Reliability	Operating Reserves/Resource Adequacy	Reliability Aspects of Inter-Market Scheduling of Ancillary Services	Market Design - Day Ahead. Ancillary Service Market	How does bidding of ancillary services between or among RTOs affect the scheduling and dispatch obligations within the RTOs? Can this kind of trade between RTOs be accommodated? Does trade of these services between RTOs have implications for either the “exporting” or “importing” RTO’s ability to meet reliability criteria? (Issue I.b.15)	Regional	Western Interconect SSG-WI	No
83	Market Design	Transmission Ancillary Service Market Design and Coordination		Market Design - Day Ahead. Ancillary Service Market	When ancillary services are provided from within one RTO for another RTO, does the providing RTO recognize them as obligations within the seller’s RTO? (Issue I.b.16)	Regional	Western Interconect SSG-WI	No
84	Market Design	Transmission Ancillary Service Market Design and Coordination		Market Design - Day Ahead. Ancillary Service Market	How can AS bids be coordinated across three markets to avoid both double counting and inefficient limitations on bids? (Issue I.b.17)	Regional	Western Interconect SSG-WI	No
85	Market Design	Transmission Ancillary Service Market Design and Coordination	Transmission Service Requirements for Ancillary Service Delivery	Market Design - Day Ahead. Ancillary Service Market	Does the RTO of the A/S seller recognize the transmission capacity reservation required to enable the reserves to respond for outages in the RTO of the buyer? (Issue I.b.18)	Regional	Western Interconect SSG-WI	No

Seams Issues Matrix

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Orig #	Category	1ST Sub-Category	2ND Sub-Category	Description of Seam Issue	Comments	Issue Type	Resp Org	Reference Papers
86	Market Design	Transmission Ancillary Service Market Design and Coordination	Ancillary Service Auction Coordination	Market Design - Day Ahead. Ancillary Service Market	All three propose auctions: Do the auctions have be identical? Is it possible to use price exchange (say as imputed bids) in connection with interactive calculation to minimize the spread between the A/S auctions? (Issue I.b.19)	Regional	Western Interconect SSG-WI	No
87	Market Design	Unit Commitment Procedure Standardization		Market Design - Day Ahead. Acquisition Mechanism	Does unit commitment need to be standardized? Is this an area where each RTO can have its own method, which matches its resource mix and system responsiveness? (Rapid response of hydro gen. versus lead time requirements for thermal gen.) (Issue I.b.20)	Regional	Western Interconect SSG-WI	No
88	Congestion Management	Transmission Market Design	Transmission Service Product Type Priority	Market Design - Day Ahead. Centralized Unit Commitment.	Does a recallable physical right conflict with a redispatch set in a day-ahead clearing process? (Issue I.b.21)	Regional	Western Interconect SSG-WI	No
89	Transmission Service	Transmission Service Procurement	Hour Ahead Transmission Service Market Standardization	Market Design - Day Ahead. Release of Unused Transmission Capacity after Close of DA Markets	How are boundary prices to be synchronized between RTO's if only one RTO has a hour ahead process? Is it necessary to align hour ahead markets? (Issue I.c.1)	Regional	Western Interconect SSG-WI	No
90	Market Design	Energy Market Design and Coordination	Hour Ahead & Real-Time Energy Market Coordination Across Market Interfaces	Market Design - Hour Ahead. Timing	How does hour-ahead market integrate with neighbors who do not have hour-ahead process? (Issue I.c.2)	Regional	Western Interconect SSG-WI	No
91	Market Design	Energy Market Design and Coordination	Hour Ahead & Real-Time Energy Market Coordination Across Market Interfaces	Market Design - Hour Ahead. Energy Market, Congestion Management Market, and Ancillary Services Market	Is it necessary to align real time markets? If so, can a method be developed to produce consistent real-time prices at the boundaries? (avoid an price discontinuity due to separate calculation of prices with different information.) (Issue I.d.1)	Regional	Western Interconect SSG-WI	No
92	Congestion Management	Congestion Management Market Coordination	Standardize Prices at Market Interfaces	Market Design - Real Time. Model objective function	How much would a common dispatch interval mitigate against price discontinuities at boundaries? (Issue I.d.2)	Regional	Western Interconect SSG-WI	No
93	Market Design	Energy Market Design and Coordination	Hour Ahead & Real-Time Energy Market Coordination Across Market Interfaces	Market Design - Real Time. Dispatch interval	Can a method be developed to produce consistent real-time prices at the boundaries? (avoid an price discontinuity due to separate calculation of prices with different information.) If not, can discontinuities be tolerated or managed? [This may be more of a settlements issue than a consistency issue.] (Issue I.d.3)	Regional	Western Interconect SSG-WI	No
94	Market Monitoring/ Compliance	Penalty/Sanction Coordination		Market Design - Real Time. Imbalance Price	Do penalties need to be the same in each RTO? (Issue I.d.4)	Regional	Western Interconect SSG-WI	No
95	Market Monitoring/ Compliance	Penalty/Sanction Coordination		Market Design - Real Time. Penalties	Will inconsistent imbalance penalty practices hamper non-dispatchable resource sales across RTO boundaries? (Issue I.d.5)	Regional	Western Interconect SSG-WI	No
96	Market Design	Market Settlement Systems	Energy Market Settlement Process at Market Interfaces	Market Design - Real Time. Penalties	Do settlement systems have to be common as long as price discontinuities at the boundaries are managed? (Issue I.e.1)	Regional	Western Interconect SSG-WI	No
97	Market Design	Market Settlement Systems	Energy Market Settlement Process at Market Interfaces	Market Design - Post Real Time. Settlement stages	How are inter-RTO settlements managed? (Includes the revenue adequacy issues related to achieving consistent prices.) (Issue I.e.2)	Regional	Western Interconect SSG-WI	No

Seams Issues Matrix

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Orig #	Category	1ST Sub-Category	2ND Sub-Category	Description of Seam Issue	Comments	Issue Type	Resp Org	Reference Papers
98	Market Design	Energy Market Design and Coordination	Demand Side Energy Market Coordination	Market Design - Post Real Time. Settlement stages	How does bidding or demand-side response between or among RTO's affect the scheduling and dispatch of obligations within the RTO's? Can these kinds of trades between RTOs be accommodated? Does trade of these services between RTOs have implications for either the exporting or importing RTOs ability to meet reliability criteria? (Title to power needs to be established) (Issue II).	Regional	Western Interconect SSG-WI	No
99	System Reliability	Operating Reserves/Resource Adequacy	Energy and Reactive Capacity Reserve Requirements	Demand Response Participation.	If there is an RTO capacity requirement for all RTOs, how will double-counting across RTOs be avoided? Note: RTO West and WestConnect are not currently proposing a resource adequacy requirement independent of the requirement for balanced schedules. (Issue X.1).	Regional	Western Interconect SSG-WI	No
100	System Reliability	Operating Reserves/Resource Adequacy	Energy and Reactive Capacity Reserve Requirements	Resource Adequacy. Resource Adequacy Assessment.	If there is an RTO capacity requirement for all RTOs, do different resource adequacy approaches result in different penalty structures and if so, does this create problems, e.g., opportunities for arbitrage? Note: RTO West and WestConnect are not currently proposing a resource adequacy requirement independent of the requirement for balanced schedules. (Issue X.2).	Regional	Western Interconect SSG-WI	No
103	Transmission Service	Transmission Market Standard Product Definitions and Priorities		Transmission Service - Market participants require consistent treatment of transmission products across multiple control areas to reduce perceived market risk, scheduling confusion and uncertainty.		National	NAESB	H
104	Transaction Scheduling	Interchange Scheduling Standardized Protocols		Transmission Checkout Failure - Operators curtail transactions due to mismatched tag data, different MW volumes, etc. The curtailment of transactions due to data incompatibility is disruptive to both the marketplace and the reliable operation of the grid.		National	NAESB	H
105	Transmission Service	Transmission Service Pricing	Market Interface Transmission Service Pancaking	Export Charges (Pancaking) - Control-area specific export charges remove incentives to transact business when transaction margins are of the same magnitude or less than the prevailing export charges. Such charges include transmission and ancillary service components.		Regional	PJM/ NYISO/ ISO-NE	H
106	Transaction Scheduling	Interchange Scheduling Standardized Protocols		Transaction Scheduling - Inconsistent information and market timing rules lead to uncertainty and risk that discourage the scheduling of some inter-regional transactions.		National	NAESB	H

Seams Issues Matrix

(Note: columns J and K not yet adopted by NAESB EC)

Orig #	Category	1ST Sub-Category	2ND Sub-Category	Description of Seam Issue	Comments	Issue Type	Resp Org	Reference Papers
107	System Reliability	Transaction Curtailments	Market Impacts of Transaction Curtailments for Reliability Reasons	Transaction Curtailment - Transaction curtailments for security may extend beyond the reliability need due to differences in market timing. Extended curtailments are disruptive to both the marketplace and the reliable operation of the grid.		Regional	PJM/ NYISO/ ISO-NE	H
108	System Reliability	Generation-Load Balance	Interchange Schedule Ramping Requirements	Failure of Transactions due to Ramping of Control Area Interchange - Desirable transactions between control areas may be "blocked" from access to the grid due to insufficient dispatch capacity to absorb large schedule changes while maintaining energy/load balance within the control area.		Regional	PJM/ NYISO/ ISO-NE	H
109	Congestion Management	Standardize and Coordinate ATC Calculations and Postings		ATC Differences - Individual control areas determine ATC for jointly operated transmission interfaces. Differences in ATC calculations can confuse the marketplace, which may react by avoiding transactions that would otherwise be economic due to the uncertainty and perceived risk.		Regional	PJM/ NYISO/ ISO-NE	H
110	Congestion Management	Transmission Market Design	Transmission Market Manipulation	ATC Manipulation - Market participants schedule transactions day-ahead and beyond with no intent to deliver energy. Cancellation in real-time by a market participant results in unused ATC, ramp capability that cannot be used by other market participants. Valuable capability is left unused.		Regional	PJM/ NYISO/ ISO-NE	H
111	Market Standards	Transmission Ancillary Service Market Design and Coordination	ICAP Market Standardization	Capacity Market - Differences in ICAP definitions, requirements, deliverability, and recall procedures have hampered the ability of suppliers to sell ICAP between Northeast ISOs (include regional resource adequacy model, external 30-minute reserves participation, harmonize demand response programs)		Regional	PJM/ NYISO/ ISO-NE	H
112	Transmission Service	Transmission Service Procurement	Transmission Service for ICAP Market	Long-term Transmission Service Availability to Support ICAP Transactions - Firm transmission reservation requirements to establish "Deliverability" as a requirement to buy external ICAP results in an economic advantage for internal suppliers and a barrier to market entry for external suppliers.		Regional	PJM/ NYISO/ ISO-NE	H
113	Market Design	Green Power Market		Green power attributes trading		National	NAESB	No
114	Planning	Transmission Expansion and Generator Interconnection Coordination	Interregional Transmission Planning Procedures	Coordination of interregional planning including transmission facilities and generator interconnection procedures		National	NAESB	H

Seams Issues Matrix

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Orig #	Category	1ST Sub-Category	2ND Sub-Category	Description of Seam Issue	Comments	Issue Type	Resp Org	Reference Papers
115	Congestion Management	Congestion Management Market Coordination	Standardize Congestion Management Market Data Exchange	Congestion Management Procedures including reciprocal coordination agreement, exchange of data for real-time and projected operations, SCADA, EMS, Operations Planning and Planning information and models; better granularity, avoid double counting, use of state estimator and LMP to enable RTOs to accurately and consistently quantify flows/impacts outside of NERC IDC to enable RTO to RTO and market to market congestion management to achieve greater efficiencies without calling TLRs; MISO and PJM and expansions to use same methods.	Definition of AFC coordination process between RTOs.	Regional	PJM/MISO	I
116	Congestion Management	Standardize and Coordinate ATC Calculations and Postings		ATC/AFC Coordination - MISO and PJM to coordinate with any external parties wishing to do so, respecting all significant flowgates external to their respective boundaries; availability and levels of service and curtailments for firm and non-firm, network and point to point.		Regional	PJM/MISO	No
117	Transmission Service	Transmission Service Procurement	Common Reservation System for Market Interface Transmission ATC	Contract Tie Capacity - One Stop Shopping		Regional	NAESB	No
118	System Reliability	Emergency Operations	System Restoration Procedures	Emergency and Restoration Plans - operating procedures for Voltage Collapse and Stability		National	NERC	I
119	System Reliability	Operating Reserves/Resource Adequacy	Energy and Reactive Capacity Reserve Requirements	NERC Regional Criteria and Reserve Sharing - define operating policy changes, waivers, or certifications that are needed to permit security-constrained dispatch over multiple existing control areas to allow flows not to be tagged; Joint Reliability Coordination - NERC Policies 5 and 9		National	NERC	J
120	System Reliability	Inter-Market and Intra-Market Facility Outage and Maintenance Coordination		Facilities in close electrical proximity under different RTOs - outage maintenance coordination, access and expansion planning		Regional	PJM/MISO	J
121	Congestion Management	System Market Modeling Coordination		Market flow data - reflect ISN and SDX data	Standardize inputs to estimation of power flows (i.e., GLDFs, outages, etc…).	Regional	PJM/MISO	J
122	System Reliability	Functional Model		Control area - control zone responsibilities vs. market operator		National	NERC	J

Seams Issues Matrix

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Orig #	Category	1ST Sub-Category	2ND Sub-Category	Description of Seam Issue	Comments	Issue Type	Resp Org	Reference Papers
123	Congestion Management	System Market Modeling Coordination		GDLF calculation	Standardized methodology for determining distribution factors - standard OPF model for each interconnection?	Regional	PJM/MISO	J
124	Transmission Service	Transmission Market Standard Product Definitions and Priorities		Wide area dispatch and network resources to network loads - resource deliverability if not a firm network load		Regional	PJM/MISO	J
125	Congestion Management	Determining Control Area Boundaries		Retention of former CAs in the model	When expanding Control Area boundaries (i.e., merging Control Areas) is it necessary to retain "Historic" boundaries for use in NNL estimation or other reasons?	Regional	PJM/MISO	J
126	System Reliability	Unscheduled/Parallel Path Flow Management	Interchange Distribution Calculator Requirements	Definition of coordination between market entity (PJM or MISO) and the IDC; define necessary changes to IDC; updates of base cases and book of flowgates		Regional	PJM/MISO	J
127	System Reliability	Unscheduled/Parallel Path Flow Management	Interchange Distribution Calculator Requirements	Industry oversight and reporting of PJM and MISO impact calculations - IDC cost, cost allocation to reimburse NERC		Regional	PJM/MISO	J
128	System Reliability	Emergency Operations	System Monitoring and Contingency Plans	Contingency plans; critical path analysis		National	NERC	J
129	Congestion Management	Congestion Management Market Coordination		Selection process for market/TLR coordinated flowgates; inclusion of flowgates in PJM FTR/ARR auctions; flowgates with and without effective control by markets; updates to flowgate list, phase-in; dispute resolution; let RTO calculate flows outside of IDC and TLR; audit rights; confidentiality of data; consideration of flowgates outside PJM and MISO	Standardized rules for determining flowgates impacted by an RTO.	Regional	PJM/MISO	J
130	Congestion Management	Operate Markets Within Transmission Limits		What happens when MISO and PJM and outside PJM/MISO firm and CBM exceed TTC - day ahead mechanism to reduce oversubscribed conditions		Regional	PJM/MISO	J
131	Market Design	Energy Market Design and Coordination		Express sunset provisions for implementation of Day 2 markets		Regional	PJM/MISO	J
132	Congestion Management	Congestion Management Market Coordination	Joint Re-Dispatch Agreements	Interaction with American Transmission Company; possible joint redispatch agreement among ATC-PJM-Generators on ATC's system		Regional	PJM/MISO	K

Seams Issues Matrix

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Orig #	Category	1ST Sub-Category	2ND Sub-Category	Description of Seam Issue	Comments	Issue Type	Resp Org	Reference Papers
133	Congestion Management	Transmission Market Design	Redispatch of Generation	Define "RTO area wide dispatch"	AJR - This refers to centralized dispatch across a RTO Footprint, rather than within a CA Boundary.	Regional	PJM/MISO	J
134	Market Design	Unscheduled/Parallel Path Flow Management	Compensation for Unscheduled/Parallel Path Flow	Compensation for parallel flows		National	NAESB	J
135	Congestion Management	System Market Modeling Coordination		Historic NNL values should not be reflected indefinitely in the future, and an appropriate mechanism to rationalize the historic flows to recognize eventual market conditions should be developed		Regional	PJM/MISO	J
136	Market Standards	Market Standard Operating Time		Inconsistent Market Event Timelines	There is a disconnect between the timing of bids and offers in the Ontario market and the releasing of firm transmission in MISO for which schedules have not been submitted for use as non-firm transmission.	Regional	NPCC/ ECAR	No
137	Market Standards	Market Standard Operating Time		Inconsistent Market Event Timelines	Timing issues between bid based markets (one example only - not knowing whether your bid has been accepted in "sink" market before having to commit in the "source" market).	Regional	IMO/NYISO	No
138	Congestion Management	Congestion Management Market Coordination		Coordination of congestion	Several regional efforts are underway. Coordinate practices and methods between areas with different market approaches.	National	NAESB	No
139	Market Standards	Energy Market Standard Product Definitions		Standard definition of energy products	Energy products and services have common attributes in all markets. Standards definitions will improve efficiencies in communicating and operating between areas with various market designs	National	NAESB	No
140	Market Standards	Market Standard Communication Protocols and Transparency		Standard messaging protocols for market notifications	Market participants will benefit from common messaging protocols.	National	NAESB	No
141	Transmission Service	Transmission Market Standard Product Definitions and Priorities		Replacement of contract path with flow-based transmission service		Regional	Multiple	No
142	Market Design	Unscheduled/Parallel Path Flow Management	Compensation for Unscheduled/Parallel Path Flow	Pricing for native load loop flow impacts		Regional	Multiple	No

#	Reference Paper or Supporting Document Provided
A	“Profit-Enhancing Seam Management: A White Paper on Pricing The Unscheduled Flows of Electricity Across the Seams Between Utilities Using A Geographically Differentiated Auction of Inadvertent Interchange”, released 2001 March 25 (Mark Lively - Lively Utility).
B	"WOLF: Wide Open Load Following," A presentation to the NERC Market Interface Committee, 2002 September 4-5, Houston, Texas (Mark Lively - Lively Utility).
C	E-Mail by Mark Lively to NAESB WEQ Seams Subcommittee of 9/4/2003 8:28:10 PM Eastern Standard Time (Mark Lively - Lively Utility).
D	See the PJM/MISO JOA dated 8/5/03 (Linda Horn - WE Energies).
E	MISO - PJM Managing Congestion to Address Seam Paper, April 28, 2003 (Dave Nick - DTE Energy) (Ed. note: white paper updated Aug. 4, 2003).
F	*Intentionally left blank.*
G	Northeast ISOs Seams Resolution Report: History of Seam Issues Resolution (Jan. 15, 2003); and Ongoing Northeast ISOs "Seams" Projects, 2003-2004 (Jan. 14, 2003) (Joe Rossignoli - National Grid).
H	In Northeast Power Markets Seams Action Plan - October 9, 2002 and July 14, 2003, and July 3, 2003 timeline update (Jeff Mueller - PSEG).
I	Attachement A of MISO and PJM Reliability Plans (Jeff Mueller - PSEG).
J	MISO compliance filings in FERC Docket No. EL03-35-004 and in Whitepaper "Managing Congestion to Address Seams" PJM and MISO May 16, 2003 (Jeff Mueller - PSEG).
K	ATC's Attachment K (Jeff Mueller - PSEG).
L	M. Lively, Forcing Reserves to Compete with a Physical Market (2002) (Lou Oberski -- Dominion Energy).