

# Exhibit A

## FERC Submittal Work Item Definition and Status

ID	Work Item	Description	Staging Plan #3 Item No. and prior target release date	Priority	Sub System	Target Release Date
1	SC's Testing for SI/SA	No Detailed Statement of Work (DSOW) needed; on-going testing. Maintain status to indicate resource requirements.		1	SI	1/1/99
2	HIM Server	<p>An archival database is to be created for permanent historical storage of bidding, price and schedule data.</p> <p>HIM is defined in section 3.2.5 of the SI DSOW:</p> <p>Archival Database</p> <p>The purpose of the archival database is to provide long term historical storage for the ISO Scheduling data. Data are stored to support:</p> <ul style="list-style-type: none"> <li>• Statistic analysis of market data; and</li> <li>• Audit function.</li> </ul> <p>The Archival Database will be distinct and separate from the main system database. SC's will not be able to access data in the archival database directly. On-line storage must be provided for 5 years of data.</p>	Item 9 7/1/98	1	SI	Revised; 8/7/98
3	Operator entry for RMR unit info.	<p>The SI/SA and EMS Systems will be modified to provide the following functionality to automate the scheduling of A/S capacity and energy from RMR generation units:</p> <p>After the close of the Day Ahead Market the ISO must evaluate if the market has provided enough ancillary services. If the market did not provide enough energy ancillary services to ensure reliability then the ISO will select Reliability Must Run (RMR) units to provide the balance of reliability requirements. Once ISO staff has determined the RMR units, the ISO will have a simple mechanism to schedule and settle RMR in the Day Ahead Market.</p>		1	SI	12/25/98
4	SI/BBS modification	<p>The ISO SI System will be modified to provide the ability to bulk load scheduling and price data that may have been lost or obtained manually under market emergencies (i.e. Day Ahead, Hour-Ahead or BEEP fails). For instance, this data will be populated in the SI Operational Database (ODB) prior to running Settlements.</p> <p>With the current design for the SI/Settlement interface, each transfer always includes a complete set of schedules and price data for an operating date. When data errors in the schedules or prices are identified after the SI data are processed by Settlement, the</p>		1	SI	10/19/98

# Exhibit A

## FERC Submittal Work Item Definition and Status

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		source data can be corrected in SI ODB but SI cannot send the corrected data without resending the whole set of data again. Resending the whole set of data causes quite a few problems. It leads to unnecessary processing overhead, fills up the settlement database rapidly and makes the audit history useless due to the large number of redundant records. SI will be modified support an incremental push of changed data to the Settlement System.				
5	SI allowing feedback from EMS	Currently the ISO SI/SA and EMS Systems are designed to allow only one way communication from SI to EMS. This work item will allow information such as real time intertie schedule changes to move back into SI/SA from EMS.		1	SI	8/7/98
6	Enhance SI validation rules	<p>The ISO SI System will be modified to provide enhanced validation capabilities. These capabilities include the following.</p> <ol style="list-style-type: none"> <li>1. Existing Contract Validation -- SI will perform validation for generation, load, interchange and inter-SC schedules with existing contracts.</li> <li>2. Inter SC Trades -- SI will provide ISO operator with a mechanism to prevent Phase II validation cascading failures due to Inter-SC trading. For example, SI Phase II validation will provide warning messages to ISO operator when out-of-balance failures are caused by Inter-SC trading mismatches. Also, SI Phase II validation will notify ISO operator when an SC is rejected from market due to unbalance and which of its Inter-SC trading partners are affected.</li> <li>3. GMM/Tie MM's -- The ISO will be able to populate the SI database and workspace with global Generator and Tie Meter Multiplier values for use in Phase II validation via a user initiated script. Forecasted GMM's and Tie MM's are generated by SA and stored in the SI ODB. These values are used to create the corresponding WEB pages for Day Ahead (8-day) Public Market Information publishing. The ISO user will be able to have an option to select the SA generated forecasted GMM's and Tie MM's or use the user-entered, global GMM and Tie Meter Multiplier values for Phase II validation.</li> <li>4. Enhanced A/S Validation – Additional validation on Ancillary Services schedule</li> </ol>		1	SI	10/30/98

# Exhibit A

## FERC Submittal Work Item Definition and Status

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		<p>data will be provided.</p> <p>5. Master File Table Modifications -- Modifications will be made to the ISO Master File database tables to provide further validation and cross-referencing for various SI/SA functionality.</p>				
7	Portfolio bidding, 10-bus model	Functionality definition awaiting Joint Application Development (JAD) Session with Market Participants.		1	SI	
28	Inter-SC trade adjust bids	Functionality awaiting definition from JAD session with Market Participants.		1	SI	
26	Improved ISO load forecast capability	<p>The ISO Similar Day Load Forecast (SDLF) program will be modified to provide enhanced forecasting capability. Over twenty items were identified as future enhancements. The following are the most critical.</p> <ol style="list-style-type: none"> <li>1. SDLF data structure, programs, and forms should be modified to handle at least 30 parameters for each forecast area. ISO also needs the ability to transfer into SDLF the actual weather data it has been accumulating since the start of operation</li> <li>2. The SDLF templates for weather forecast data and actual weather data must be modified to minimize the number of keystrokes needed for data entry. An interface for loading weather forecast and actual weather data from other applications should be provided</li> <li>3. The ISO operator should be able to select multiple historical load curves for comparison. Load profiles of the selected curves must be presented graphically on the same display.</li> <li>4. The SDLF historical database must be adjusted to resolve Day Light savings shifts.</li> <li>5. It should be possible to use multiple day-of-week selections as query criteria for curve selection. For example, the user should be able to query against Monday, Tuesday, and Friday curves together.</li> <li>6. Forecast data must be saved. For each day, next day, the following day, and one additional forecast day. The saved forecast data include weather forecast, date of the similar day load curve used, scaling factor, and forecasted load values.</li> </ol>		1	SI	8/8/98

# Exhibit A

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		7. Provide a SDLF template for forecast and actual data comparison. The template should have the ability to show load forecast vs. actual load for all areas and weather forecast vs. actual weather. The template should also be used for actual data entry. 8. The ISO operators should also have the ability to manually overwrite values directly on the load forecast template.				
29	Add. Public Market Information (PMI) for Load Forecast (LF), A/S requirements, Generic message mechanism	This work item will modify SI PMI displays to provide Market Participants additional data to make market decisions. Additional data includes congestion path usage, updated TTC or ATC and actual ISO load. Furthermore, SI will be modified to provide an ISO Messaging System via the WeNet. The messaging system will enable the ISO operator to send out either pre-structured or free form messages to the Scheduling Coordinators.	Item 19 10/1/98	1	SI	11/14/98
8	Beep Modifications	The ISO SI/SA System will be modified to accommodate the following Balancing Energy and Ex-Post Pricing (BEEP) functions: <ol style="list-style-type: none"> <li>1. Change the balancing energy computation and ensure that this computation is based on actual generation output. Ensure that BEEP is looking forward in calculating the requirement.</li> <li>2. Modify the computation of instructions of generation to ensure that only the unit(s) that were instructed via phone call or AGC are paid.</li> <li>3. Publish incremental and decremental zonal prices every interval. The publication must contain all 24 hrs – 10 min incremental and decremental prices and average hourly price. The ISO needs to know the 10 minute decrement and incremental prices along with the ex-post price calculated by BEEP. Additionally, publish the 10 minute interval prices calculated by BEEP. Finally, retain the 10 minute ex-post zonal prices in the SI ODB for 90 days and then move to long term storage.</li> <li>4. Ensure that BEEP instructions do not contradict ACE movement.</li> <li>5. Ensure that BEEP is taking into account RMR dispatch.</li> <li>6. Ensure that BEEP is not depleting the Operating Reserve requirement.</li> <li>7. Integrate BEEP and SDLF, so BEEP is using 10 min load forecast data for the</li> </ol>	Item 1 1/1/99	1	SA	12/10/98

# Exhibit A

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		calculation of the 10 min requirement, use actual and forecast load from SDLF. 8. Integrate EMS generation and interchange data into BEEP.				
9	SI Event Manager changes when SA not run	<p>The SI Event Manager will be modified to provide several functions needed when SA applications are not run due to SA system errors or market emergencies. These functions include the following:</p> <ol style="list-style-type: none"> <li>1. Add messaging in the Event Manager highlighting actual internal errors in SA when SA functions are not able to run properly.</li> <li>2. Provide diagnostic tools in ISO user interface to help ISO staff identify the reasons why there are SA function execution errors.</li> <li>3. Provide ISO Operator the ability to make Preferred or Revised Preferred energy schedules and/or ancillary service self-provided schedules Final Schedules without any processing by SA.</li> <li>4. Provide ISO operator the ability to make Adjusted energy schedules and/or ancillary service schedules Final Schedules without receiving Revised Preferred schedules from SCs or performing any SA applications.</li> <li>5. If Day-Ahead market is not run, provide the ability to create Hour-Ahead Default Schedules for the same trading day from the latest set of Final Day-Ahead schedules.</li> <li>6. If Hour-Ahead market is not run, provide ISO operator the ability to make Day-Ahead final schedules the Hour-Ahead final schedules without any processing from the SA. Subsequently, these Hour-Ahead final schedules will be published to the SCs.</li> </ol> <p>Furthermore, SA should be able to recover after the above changes occur without further data manipulation.</p>		1	SA	11/30/98
9.1	Reserve calculation to reflect EMS manual replacement and BEEP data	The ISO EMS System will be modified to use data from SA in its spinning and operating reserve calculation. This will ensure that only the capacity designated for reserve is included in real-time reserve calculation. Furthermore, the ISO EMS System will be able to display an individual unit's current (real-time) contribution to spinning and non-spinning reserves in addition to total system reserves.		1	EMS	7/24/98
34	A/S import/export	The ISO SI/SA System will be modified to accept import bids and self-provided	Item 12	1	SA	7/31/98

# Exhibit A

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		interchange schedules for spinning, non-spinning and replacement reserve for the day ahead and hour ahead markets. These bids and/or schedules may or may not be associated with existing transmission contracts.	6/1/98			
10	Operating reserve validation	The ISO EMS System will be modified so its Operating Reserve calculation will include upward available capacity, including capacity within regulatory range for units on AGC control. The validation is needed to provide the most accurate calculation of operating reserves for the most effective procurement and allocation.		1	EMS	8/3/98
11	Real time schedule feedback (including BEEP/EMS interface)	This work item will establish data links between EMS, SI/SA and BBS to process and save schedule changes made in real time within EMS.		1	EMS	11/13/98
12	Control area checkouts/Integration of BITS and EMS	A new ISO system will be developed to provide the ISO and its Adjacent Control Areas (ACAs) with the capability to automatically extract intertie totals. Also, the system will provide functionality to break down totals to their lowest common denominator. Separate screens will be developed to display totaled intertie data that are viewable by both the ISO and the ACAs.  Additionally, the ISO EMS System will be modified to provide the capability to automatically export net schedules developed in Bill's Interchange Transaction Scheduler (BITS) to the EMS for use by AGC and distribution to Adjacent Control Centers.		1	EMS	11/13/98
12.1	EMS manual replacement functionality	ISO EMS System will be modified to provide manual replacement (manrep) functionality [excluding over-ride from any other sources] to allow the data acquisition flag to be set to "Yes". This will be available system wide for areas such as generator minimum operating limits, generator maximum operating limits, and generator AGC ramp rates. The manrep value will be denoted via color or flag as manrep on EMS operator displays. All manrep values will be summarized in a single display showing all manually replaced values, plus any point manually removed from scan until they are manually returned to normal.		1	EMS	8/3/98
12.2	Improved data retrieval and trending from SPIDER and HIM	ISO EMS System will be modified to provide the capability to easily retrieve and trend data from the system databases without degradation of EMS performance. This capability should provide a more efficient means of gathering data for engineering		1	EMS	8/22/98

# Exhibit A

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		analysis of system operations				
40	Centralized Generation Monitoring and Control (GMAC)	A centralized, single level control scheme will be provided on the ISO EMS System. Individual units will be controlled directly by the ISO via Remote Terminal Unit (RTU) or through an Area Control Center via setpoint. This application will also provide for multi-area control ability.	Item 6 1/1/99	1	EMS	9/15/98
41	Firm Transmission Rights Billing/TO debit/HA inter-zonal CONG/ETC	Firm Transmission Rights (FTR) are rights across an interface, in one specific direction, between two congestion zones. ISO SI/SA and BBS System will be modified to implement a mechanism to track FTR holders so as to properly allocate Usage Charge revenues. The current software refunds usage charges to Transmission Owners (TOs) but does not allow for hour to hour changes in allocation or allocations that differ by flow direction.  In addition, the TO debit will be revised for cases when congestion in the Hour Ahead market is a result of a decrease in Available Transmission Capacity.  NOTE: The Firm Transmission Rights requirement analysis is still pending.		1	SI/SA/ BBS	12/22/98
13	Settlement for GMC	The Settlement System was designed to use the hour ahead net exports in the calculation of Grid Management Charges (GMC). Since GMC should be assessed using real time gross exports, the GMC calculation is currently performed outside the Settlement System using a semi-manual process. The Settlement System needs to be enhanced to perform the appropriate GMC calculation.  According to the GMC Agreement between ISO and the market participants, certain load schedules and export schedules may receive a 50% or 100% waiver on GMC. This calculation is currently performed outside the Settlement System since it was not designed to handle the waivers. The system needs to be enhanced to include this requirement.		1	BBS	12/25/98
14	Settlement for Wheeling	The Settlement System was designed to use the hourahead net exports in the calculation of wheeling charges. Since wheeling charges should be assessed using real time gross exports, the charge calculation is currently performed outside the Settlement System using a semi-manual process. The Settlement System needs to be		1	BBS	12/25/98

# Exhibit A

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		<p>enhanced to include this requirement.</p> <p>Exports scheduled under existing transmission contracts are exempted from wheeling charges. These exemptions are currently handled outside the Settlement System since it was not designed to handle such exemptions. The system needs to be enhanced to include this requirement.</p> <p>Wheeling charge is also assessed for energy leaving the ISO grid at locations within the ISO control area. This charge calculation is also handled outside the Settlement System. The system needs to be enhanced to include this requirement.</p>				
15	Per Unit charge Calculation and Neutrality Adjustments	<p>The automated neutrality adjustment mechanism, which is based on Per Unit Charge method, shall take into consideration any Manual Line Items and preserve the overall revenue neutrality for the imbalance energy group.</p> <p>To allow the Settlement Analysts to review the latest neutrality condition, the Neutrality Report shall be revised to incorporate the effect of the latest adjustments entered into the Settlement System.</p>		1	BBS	12/25/98
16	Settlement file expansion	<p>The settlement statement files should be expanded to show the detail breakdown of various charges. The following requirements should be met:</p> <ul style="list-style-type: none"> <li>• For charges related to the imbalance energy group, the files should provide information for the individual intertie schedules including any real-time adjustments and contract exemptions.</li> <li>• Wheeling charges should be posted daily with appropriate breakdowns.</li> <li>• Grid Management Charges should be posted with daily breakdown of the charge components.</li> </ul>		1	BBS	12/25/98



# Exhibit A

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16.1	Allocation of A/S to SC's	Functionality definition awaiting Joint Application Development (JAD) session with Market Participants		1	BBS	12/22/98
17	Meter data authentication	MDAS must preclude SC submissions of meter data which an SC is not authorized to submit into the database. It is possible with current MDAS functionality, for a SC to request Settlement Ready meter data from MDAS, alter the data and resubmit to MDAS. This SC resubmitted data would then become the most current version in the MDAS database. Currently, if such a situation occurs, it is not readily detectable by a MDAS operator. Before a SC submission is accepted, it needs to be tested to assure the SC is authorized to submit for that particular resource.		1	MDAS	8/10/98
18	Meter data submission deadline/data queues	At present, SCs can submit meter data information as late as the final statements publishing date. They also have the ability to turn in this data multiple times within that timeframe. Thus the ISO does not know until the 61t day if the data being submitted is the final version. An enhancement is needed to restrict SCs from submitting data beyond the meter data due date (T+41 days where T = Trade day) directly into the MDAS database. Data submitted beyond T+41 days will be placed in queue rather than going into the database. Acceptance of these changes into the database requires different levels of authorization depending upon the age of the change request. The application must assure that changes waiting in queue are passed to the database only if approved by someone with proper authority.		1	MDAS	8/10/98
18.1	Business Associate (BA) Master File interface for MDAS	MDAS must automatically stay in synch with the BA master file. When changes to the BA Master File become public (00:01 each day) a snapshot of the Master File must be available for MDAS use. This snapshot is used to assure that the BA may only report resources he is contractually allowed to report. The enhancement will also automate the process of MDAS being aware of which SC is related to which resource. MDAS must preclude SC submissions of meter data which an SC is not authorized to submit into the database. It is possible with current MDAS functionality, for a SC to request Settlement Ready meter data from MDAS, alter the		1	MDAS	9/11/98

# Exhibit A

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		data and resubmit to MDAS. This SC resubmitted data would then become the most current version in the MDAS database. Although this is a very difficult task involving the breach of SC authorized use of access to MDAS and the infiltration of the password protected system, it is not impossible for such an intrusion to take place. Currently, if such a situation occurs, it is not readily detectable by a MDAS operator. Before a SC submission is accepted, it needs to be tested to assure the SC is authorized to submit for that particular resource.				
18.2	CEC Data reporting requirements	There is a legal requirement to create and maintain a database (which will exist separately from all other ISO systems and not interact with them) which record energy generation and fuel consumption of all generation sources. This database will be used for various reporting purposes. Exact requirements of how this database is to be created and maintained are yet to be determined.		1	MDAS	12/1/98
19	Enterprise Integration Test Environ.	Current plan is to utilize existing 2100 SI/SA/BBS platforms in Alhambra as test platforms for system testing prior to rollover into production. MDAS and EMS interfaces are to be simulated. Future enhancements include shadow testing of systems utilizing real-time data interfaces for testing and to include EMS and MDAS into integrated testing.		1	IT Support	10/22/98
20	25 Hr. DST Testing	Systems have been tested for 23 hour DST, however, 25 hour DST testing has not been completed by the vendors.		1	IT Support	7/27/98
21	ID and resolve critical single points of failure in ISO system	Perform a single point of failure analysis of all ISO systems and develop plan for resolving issues critical to ISO reliability. Analysis for SI is near completion and planning is underway for other systems.		1	IT Support	7/27/98
22	Resolve security issues	Improve security process; ABB will work with all developers.		1	IT Support	7/27/98
23	Deploy secure remote access	Deploy security servers and security token authentication platforms across production systems. Secure tunneling server to access OA, DMZ and Production servers to allow confidential communications through public telecommunications systems.		1	IT Support	7/27/98
24	Market Surveillance System	Market Surveillance has recently acquired a DEC Alpha 4100 Server. This system is installed and operational; however, some support may be required from ABB, E&Y, and UTS to develop data transfers from the SI, SA, BBS, and MDAS systems.		1	IT Support	7/27/98

# Exhibit A

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25	BBS Backup Server	Install necessary hardware and software to provide backup BBS system in a warm stand-by configuration. Supports Business Continuity Planning		1	IT Support	7/27/98
78	Modifications to Manual Line-Item Entry to Allow Changes After Preliminary Statement	<p>Before this software change was made, the settlements software allowed the user to enter manual line item adjustments to statements with a specified effective data that is within 90 days of the current calendar date. If the effective date is prior to the current processing date, the software would process the adjustment on the next preliminary statement. This caused problems when disputes required adjustments to be effective on final statements (as opposed to be reflected on a preliminary statement for an unrelated date).</p> <p>Modifications made to the software under this project allow the user to specify adjustments apply to either a future preliminary statement or a final statement for which a preliminary has already been processed. As a result, an adjustment that results from the dispute process can be properly applied between preliminary and final statement issuance dates.</p>		1	BBS	6/12/98
79	Copy/Reverse Existing Manual Line-Item Entries	This is an additional enhancement to Item 78. The enhancement will provide additional functionality to either copy or reverse an existing line item adjustment entry. The copy feature of this enhancement will allow the user to specify an existing entry, modify it, and easily enter a new adjustment without re-keying all of the information. The reverse feature will copy a selected record and negate the charge by multiplying the entry by negative one. The system will automatically update the Client statement.		1	BBS	8/7/98
80	CONG Default Usage Charges (DUC)	Implement DUC calculation in SA software.		1	SA	12/25/98.
52	Y2000 Certification	<ul style="list-style-type: none"> <li>Per Software Warranty Section of the Contract, the software suppliers will submit to ISO the Year 2000 test plan and test scripts and certify that each licensed software developed for ISO as Year 2000 compliant with demonstrated test result on or before July 1, 1998.</li> </ul>		1	IT Support	7/1/98

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		<ul style="list-style-type: none"> <li>Testing, assessment, and contingency planning to be completed by 12/15/98</li> </ul>				
27	Inter SC trades for A/S	ISO SI/SA System will be modified to provide market participants means to trade ancillary services. This will allow one scheduler coordinator to self-provide ancillary services that are actually provided by a second scheduler coordinator under a bilateral contract between the two. This is required, for example, for scheduler coordinators that have load in the control area but have no internal generation resources with unused capacity and do not wish to buy ancillary services from the auction since they have long term arrangements on the side.		2	SI	9/15/98
30	OASIS Modifications	ISO SI/SA System will be modified to provide OASIS functionality in compliance with FERC 888/889.		2	SI	1/20/99
31	On-demand obligations	ISO SI/SA System will be modified to provide functionality to allow SCs to self-provide or purchase from ISO the operating reserves required for their interruptible imports and on-demand obligations.	Item 13 6/1/98	2	SA	3/15/99
32	Correct support for Hoover-Mead	ISO SI/SA System will be modified to automate the current work-around to modify Hoover schedules associated with acquiring regulation from outside the area (for an existing arrangement).		2	SA	9/28/98
33	A/S CONG Interface	ISO SA System will be modified to provide the ability for the Ancillary Service Management (ASM) subsystem to consider final schedules rather than preferred schedules. This is needed to avoid accounting for Ancillary Services that cannot be provided due to physical limits of a unit in a congestion situation.		2	SA	8/29/98
35	Network parameter update	ISO SA System will be enhanced to update the network model used for Congestion Management (CONG) and to provide engineering tools for manipulating the network model.		2	SA	3/8/99
36	A/S self provisioning	ISO SI/SA System will be modified so SCs can self-provide and bid the same A/S commodity from the same resource. This capability provides the flexibility to self-provide and bid into the market with a single unit resulting in more A/S capacity for the control area.	Item 14 1/1/99	2	SA	1/22/99
37	Single database model SA-PMS	Currently, there is a separate network model database for SA and EMS. The two databases will be combined into one. This will create a consistent network model for		2	EMS	3/4/99

# Exhibit A

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		Real Time and Day Ahead decision making. Additionally, a single database allows for easier and more reliable data maintenance.				
38	<b>Deleted</b> (was BEEP/EMS interface)					
39	RTU protocols, additional SCADA features	RTU capabilities will be augmented to incorporate data exchange with new and expanding market entities. This will allow ISO systems to interface with other entities for data interchange and future direct generation control.		2	EMS	9/15/98
42	GMC unbundling	<p>Pending the outcome of the GMC unbundling studies, the Grid Management Charge may be broken down into components to be allocated in various ways in the settlement statement being passed to the Scheduling Coordinators. Each component may require a different allocation mechanism.</p> <p>NOTE: The Grid Management Charge Unbundling requirement analysis is still pending.</p>		2	BBS	1/31/99
43	Allocation of replace reserve cost	<p>Currently, the cost for the dispatched portion of the Replacement Reserve capacity is allocated according to the SCs' deviations from their schedules that are depleting system reserve. The cost for the undispached portion is allocated according the SCs' Hour Ahead reserve requirements.</p> <p>The ISO Settlement subsystem will be enhanced to allocate dispatched Replacement Reserve cost based on deviations between SCs' scheduled and actual demand. Additionally, the ISO's Settlement subsystem will be enhanced to allocate undispached Replacement Reserve costs pro rata to all Scheduling Coordinators based on actual demand.</p> <p>Additionally, a fix to the situation when the ISO has procured Replacement Reserves in the Day Ahead market and the Hour Ahead requirements drop to zero will be developed. This happens when the SCs revise their Hour Ahead load schedules so that their total load is no longer less than the ISO load forecast. Since ISO allocates Replacement Reserve capacity costs according to the SCs' Hour Ahead requirements which are now zero, the Replacement Reserve costs cannot be recovered.</p>	Item 3 10/1/98	2	BBS	1/27/99

# Exhibit A

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44	Trial settlement run	The normal settlement cycle allows only one day for ISO staff to verify settlement charges for a given date. A batch run conducted shortly after the day of operation allows the settlements staff to check the forward market charges (day-ahead and hour-ahead market) and immediately recognize any major problems right away (instead of waiting 47 days for a preliminary statement). Also, the ability to run early trial statements will allow ISO to publish ancillary service reserve prices only calculated in the settlement system.		2	BBS	1/27/99
45	Manual Adjustments Settlement Data Upload.	Currently, settlement statement adjustments are handled via line item entered refunds or charges. The format of adjustments does not conform with the format of the original charge, and the supporting documentation (detailed records) can not be provided within the ISO settlement statement file.  Manual Adjustments Settlement Data Upload allows information to be copied from spreadsheet directly into the Settlements System. This uploaded information should appear in the Settlements System as Manual Line Item entries. To perform this function, an option needs to appear on the Manual Line Item screen allowing the importation of the spreadsheet.		2	BBS	1-27-99
46	Imbalance energy settlement period	Real-time imbalance energy charges are to be calculated on 5-minute interval based on energy bids for A/S and supplemental energy according to the ISO staging plan. Currently, settlements are on a hourly basis. If the ISO is to proceed with the settlement of energy transaction on a fraction of an hour, changes to the scheduling, settlements and metering systems will be required. NOTE: Requirement analysis is still pending.		2	BBS	
47	<b>Deleted</b> (was Record vs. file rejection)					
48	Acknowledgement for meter data submission	A change is needed to provide the functionality that supports appropriate acknowledgement response to SCs submitting MDEF files to MDAS. Currently, MDAS does not provide such an acknowledgement response to SCs that submit meter data via MDEF files.		2	MDAS	8/10/98
49	Web browser interface	At present, SCs have to issue a request to get data from MDAS. A capability that will		2	MDAS	10/22/98

# Exhibit A

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		allow SCs to extract data from MDAS via a WEB Browser should be developed.				
50	<b>Deleted</b> (was Profiled meter data)		Item 5 10/1/98			
51	Authentication of data requests	At present, only certain SCs have access to MDAS information. All third parties that want access to this information have to request it from the entities that have that access. The Master File needs to be changed to allow authorized third parties access to MDAS information directly.	Item 4 10/1/98	2	MDAS	10/22/98
53	OASIS/SI Interface Enhancements	In late 1997, the Cal-ISO developed an internet web site to meet FERC's requirements to provide a steady stream of public information called for in the ISO tariffs. The main priorities focused on meeting tariff requirements for startup, providing basic OASIS Public Market Information (PMI), and posting a heavy volume of documents in as timely a manner as possible. Since the implementation of the Web site, some problems have been encountered with the reliability of the interface between SI and the Internet Oasis Site that do not allow PMI to be published consistently in an efficient and accurate manner. The ISO will work with ABB to improve this interface.		2	SI Support	9/15/98
54	Implement development network	Design and implement a communications network for Development systems. Current network design does not separate out these functions. As a result, real-time production systems performance can potentially be impacted by development activities.		2	IT Support	9/15/98
55	Standing schedules	ISO SI/SA System will be modified to provide SCs the ability to create standing schedules. The SCs will be able to click on the standing schedule and add it to their set of Preferred or Revised Preferred schedules. NOTE: This item has already been approved..	Item 10 10/1/98	3	SI	1/27/99
56	<b>Deleted</b> (was Generic message mechanism for SC's)					
57	Acquisition of voltage support services	Currently, the ISO meets its voltage support requirements using the mandatory power factor range requirements of all Generators and will call on the Reliability Must-Run Units if additional voltage support is required. This new functionality will allow the ISO to procure additional voltage support capability through contracts.	Item 16 1/1/99	3	SI	3/8/99

# Exhibit A

## FERC Submittal Work Item Definition and Status

ID	Work Item	Description	Staging Plan #3 Item No. and prior target release date	Priority	Sub System	Target Release Date
58	Non-spinning replacement sync time	SI/SA System will be modified to adjust the relationship between capacity bid and ramp rates and provide the ability to acquire A/S in the real time market to replenish reserve.	Item 17 1/1/99	3	SI	3/8/99
59	Acquisition of black start services	SI/SA System will be modified so ISO can procure Black Start competitively. This is needed to meet ISO's requirement to procure Black Start competitively. Currently ISO maintains Black Start capability via long term contracts.	Item 15 1/1/99	3	SI	3/8/99
60	Intra-zonal CONG	SI/SA System will be augmented so that in the event of intra-zonal congestion, generation resources within the zone will be adjusted to alleviate the constraint. The ISO will use an optimization algorithm which will calculate the amount of balancing energy bought from or sold to each zonal resource to remove all constraint violations within the zone based on the increment and decremental prices available within the zone.	Item 8 1/1/99	3	SA	12/31/98
61	Avail Transfer Capability (ATC)	The SA System will be augmented to provide ISO the ability to calculate in real time, available transfer capability on all paths (FERC 888/889 requirement) and monitor the quantity in use.	Item 7 1/1/99	3	SA	12/31/98
62	Voltage Stability & Collapse	An SA Subsystem will be provided to monitor voltage levels and stability across the grid. This Subsystem is defined in section 10.6 of the SA DSOW:  "A voltage collapse monitoring program will be used by the ISO to assess voltage collapse margins and identify potential reactive power deficiency. Voltage Collapse Monitoring and Evaluation may be used to assess whether Preferred Schedules submitted by SC's are feasible with regard to voltage and reactive limits both in normal and contingency conditions. It may also be used to update local operating instructions and nomograms."	Item 7 1/1/99	3	SA	12/31/99
63	Refine market activity rules	The SA System will be modified such that ISO selects either the Preferred or Revised Schedules based on which schedule provides the lower total Usage charge revenues to the ISO. Presently the ISO will use the Revised Schedules even if the resulting solution is more expensive. This enhancement will increase efficiency in the market and avoid high cost solutions.	Item 18 10/1/98	3	SA	3/8/99



# Exhibit A

## FERC Submittal Work Item Definition and Status

ID	Work Item	Description	Staging Plan #3 Item No. and prior target release date	Priority	Sub System	Target Release Date
		Additionally, SI/SA will be modified to publish results of comparative congestion costs. (Comparative congestion costs are the CONG prices calculated when relieving the constraint that ensures congestion adjustments are made such that SCs' schedules are balanced.)				
64	Bid evaluation and pricing algorithm	ISO SA System will be modified so the A/S bid evaluation and pricing takes into account applicable usage charges. CONG and ASM will interface to allocate transmission for a variety of A/S.	Item 11 1/1/99	3	SA	11/8/99
65	Transient stability	A Transient Stability Analysis (TSA) Subsystem will be provided in SA. TSA is defined in section 10.7 of the SA DSOW:  "The Transient Stability Analysis (TSA) function will be provided to study the impact of symmetrical and asymmetrical disturbances. Analysis will be in the time domain, extending to about 25 seconds (user-adjustable). TSA will be initialized from Power Flow or OPF (phase I) using and off-line network model and PMS SE (phase II) save cases and will be executed periodically or on user demand. The TSA function will be able to execute a 25-second study within 20 minutes."	Item 7 1/1/99	3	SA	12/31/98
66	Calculation of GMM	ISO SA will be augmented to calculate ex-post GMM's derived from actual metered quantities. Currently, ISO Settlements subsystem is using only forecasted values. Using actual (ex-post) GMM's instead of forecasted will allow the ISO to calculate settlement charges more accurately after the fact.	Item 2 10/1/98	3	SA	2/8/99
67	<b>Deleted</b> (was HA inter-zonal congestion refund)					
68	Operator training Simulator	An Operator Training Simulator (OTS) will be developed. OTS consists of software and hardware, used to simulate a power system, including all control functions, AGC, and Dispatcher Power Flow studies. OTS can be a stand alone system, or have direct links to the existing EMS system. Much like a flight simulator, OTS is a highly effective training tool, which when used in conjunction with a formal training program, i.e. classroom studies. OTS availability can be used to increase an operator's skill level, evaluate his or her performance and/or evaluate the		3	EMS	12/1/99

# Exhibit A

## FERC Submittal Work Item Definition and Status

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		effectiveness of training methods and curriculum.				
69	Direct load tripping	A direct load tripping schema will be provided. As a part of managing system separation events, a Load-Tripping plan (LTP) is proposed for the WSCC southern Island. This LTP will reduce the impact of such events on the southern island by reducing the magnitude of voltage and frequency dips and swings, thus reducing the potential of generator tripping in the already generation-deficient southern island. The LTP will help assure that system performance after the disturbance meets certain minimum standards, which will facilitate rapid restoration of customer load. This is accomplished by tripping load at higher frequency levels than the standard under-frequency load shedding plan, or by direct signal to loads in the generation-deficient island.		3	EMS	12/22/99
70	Network Application State Estimator	A Network Application State Estimator will be provided with ISO EMS. The State Estimator (SE) will provide an estimation of non-observed points for a complete and reliable base case containing information for use by other Transmission Security Assessment functions and for display. The SE will take advantage of available ISO area measurements and WSCC data external to the ISO area. This data will be augmented with pseudo measurements to allow the SE to get a solution for the unobservable areas of the network model. Additionally, when SE is available, a second set of MWh estimates will be obtained by integrating the appropriate line flow values from the State Estimator solution.	Item 7 1/1/99	3	EMS	2/15/99
71	Dispatcher Powerflow/Zero impedance branch	A Dispatcher Power Flow (DPF) will be provided with ISO EMS. DPF is capable of modeling zero impedance branch for line and series device as are all other network applications. As the conventional power flow approach is unable to handle branches with such characteristics, the following approach is used. First zero impedance pockets which include all the adjacent buses connected by zero impedance branches are identified. Each zero impedance pocket is collapsed into a super bus with all the injection of the pocket. The incident branches of the super bus are those connecting the pocket with other buses not belonging to this pocket. The power system network following the collapsing has no zero impedance branch and is solved by the power flow solution process. The branch flow of the zero impedance branch within the		3	EMS	2/15/99

# Exhibit A

## FERC Submittal Work Item Definition and Status

ID	Work Item	Description	Staging Plan #3 Item No. and prior target release date	Priority	Sub System	Target Release Date
		pocket is calculated as a linear combination of the injections and flows of incident branches of the super bus. Branch flows of branches with non-zero impedance but connecting two buses within the same pocket are presumed zero.				
72	Network app. OPF, PF, CA, TLF, SSV	<p>The following network applications will be provided with ISO EMS:</p> <p><u>Optimal Power Flow</u> In addition to the standard power flow which solves the power flow equation without regard to load bus voltage magnitude limits and branch power flow limits, a power flow will be provided that optimizes a user selected function.</p> <p><u>Power Flow</u> An interactive Power Flow will compute active and reactive power flows and bus voltage magnitudes and angles for the ISO Network Model. The user will be able to execute a power flow analysis only, or as an option, continue with an optimization analysis where users could specify the applicable objective functions. The PF will provide display-based input/output and will include a load and generation scheduler.</p> <p><u>Contingency Analysis</u> The CA function will use the State Estimator or PF/OPF results as a base case and check specified contingency cases to determine if potential overloads or voltage problems exist. After screening all of the contingency cases, full ac studies will be performed on a user-chosen number of the most severe cases (up to 100). For each element in violation, the output will identify its name, the value of the parameter and its associated limit, and the value of the parameter in the base case.</p> <p><u>Transmission Loss Factors</u> The Transmission Loss Factors (TLF) function will be provided to calculate transmission loss factors for use by other Power Management System functions. The loss factors for each user-designated bus and user-designated group of buses (e.g., load zone) in the ISO network will represent the sensitivity of ISO losses to changes in power injection at the buses or load zones</p> <p><u>Security/Stability Validation</u></p>	Item 7 1/1/99	3	EMS	2/15/99

# Exhibit A

## FERC Submittal Work Item Definition and Status

ID	Work Item	Description	Staging Plan #3 Item No. and prior target release date	Priority	Sub System	Target Release Date
		The Security/Stability Validation (SSV) function will be provided to monitor ISO network conditions with respect to ISO Operating Procedures (IOPs) and to provide easy access to applicable IOPs. ISO will prepare the IOPs in a rule-based format and store these procedures in the Power Management System where they can be accessed by the SSV function				
72.1	Network Application Monitor	<p>The Network Application Monitor will be provided in the ISO EMS. The Network Application Monitor program provides for the control of the execution of the network analysis programs. The program provides for the execution of two distinct types of sequences of network analysis programs: the real-time sequence and the study sequence.</p> <p>The real time sequence consists of a configurable set of network applications using real time telemetry as input data. This sequence provides an updated solution of the network state due to real-time events to the network and due to periodic updates to the network state via manual requests by the operator.</p> <p>The study sequences consists of a configurable set of network applications using input initialized from the real time solution, from a save case and from data entered by the operator. This sequence will respond to operator manual requests to provide a solution of the network under study.</p>		3	EMS	2/15/99
72.2	Security Analysis	<p>The Security Analysis subsystem will be developed on the ISO EMS and has the following major functional components:</p> <ul style="list-style-type: none"> <li>• <u>Contingency Definition</u> – The Contingency Definition provides the capabilities for the user to maintain, to update, and to expand the contingency cases.</li> <li>• <u>Contingency Selection</u> – The Contingency Selection function selects, from the large list of contingencies, a reduced list of contingencies, which are to be processed by the Contingency Analysis function. This function is executed in both real-time and the Study modes.</li> <li>• <u>Contingency Analysis</u> – The Contingency Analysis function analyzes the list of contingencies selected by the Contingency Selection Function and the must-run contingencies from the Contingency Definition. This function is executed in both the real-time and the Study modes</li> </ul>		3	EMS	2/15/99

# Exhibit A

## FERC Submittal Work Item Definition and Status

ID	Work Item	Description	Staging Plan #3 Item No. and prior target release date	Priority	Sub System	Target Release Date
72.3	Network Sensitivity	The Network Sensitivity (NS) Program will calculate the loss sensitivities and associated penalty factors for generation interchange within the ISO system. This will enhance ISO EMS system..		3	EMS	2/15/99
73	Data Registry	Majority of the data changes from the ACCs or the Utilities SCADA Centers (USCs) related to the transmission systems will have to be coordinated back to the Power Management System. A data registry will be provided to facilitate this process. The data registry will use the relational database and will use the standard SQL interface. Coordination between the ACCs/USCs and the Energy Management System is required to keep the data exchanged over the ICCP/WSCC link up to date. The ACCs/USCs will initiate data change by putting relevant information into the registry. ISO's Database Administrator will make corresponding database changes by consulting the information in the data registry. This process will be automated so that the USC's information to be exchanged over the ICCP/WSCC link can be maintained and updated automatically in the Energy Management System. The Data Registry will maintain data entered by the USCs. The information will be formatted and output from the Data Registry in a form that can be input to the batch processing function of the database generator and the ICCP/WSCC data exchange function.		3	EMS	12/22/99
74	Graphical data engineering Tool (IDES)	For Phase 2, a graphical data engineering tool (IDES) will be provided to maintain the source database from the system one-line diagram. This tool will also support the development of the system one-line diagram when the database has been imported. In the latter case, the user gives a command to read the elements from the database and to check internally whether there are new elements for which display objects are required in IDES. Those are put on the ToDo list in the usual hierarchical fashion. The user may then pick such objects from the ToDo list and create the elements which are represented by areas (stations, busbar systems, feeder bays) by dragging a frame. For elements represented by symbols (breakers, measurands, transformers) the standard symbol is created and connected to the cursor, (as in the "paste" mode). The data to be specified for the object is then automatically taken from the selected object. In contrast to the paste mode, the name of the object does not adjust to the		3	EMS	12/22/99

# Exhibit A

## FERC Submittal Work Item Definition and Status

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		environment (context), but the system will refuse to position an element into the wrong context. Connecting elements like lines or bay connectors have to be created manually and can then be identified to an imported object on the ToDo list.				
74.1	Network Status Processor	<p>For Phase 2, the open/closed status of network switching devices, such as breakers and disconnects, will be analyzed in order to define the configuration of the ISO transmission network for video display. The Network Status Processor must recognize the relationship between an open/close telemetered breaker(s) and it's associated non-telemetered disconnects. The energization of lines, transformers, reactors/capacitors, and generating units will be determined so that the overview displays may correctly show the status of these power system elements. The configuration will be re-evaluated and updated whenever a change-of-state of a switching device is detected.</p> <p>It is expected that telemetry will be available for 80% of the network model described in Appendix D of the EMS DSOW. The Network Status Processor will be able to accommodate all status changes in the network model. There will be no limitation on the number or configuration of network switching devices required to define the energization status of lines, transformers, and generating units.</p> <p>The Network Status Processor will use the same input data used by the network model builder provided as part of the Transmission Security Assessment function, Section 2.12. Use of Boolean equations for the energization and service status of devices analyzed by the Network Status Processor is unacceptable.</p>		3	EMS	12/22/99
74.2	Set of CIM compliant tools	<p>ISO is interested in the use of both the Common Information Model (CIM) and the Common Data Access Method (CDA) aspects of the Guidelines.</p> <p>ABB will ensure that its system supports the EPRI CCAPI guidelines within two years of each guideline being finalized. The CCAPI compliant releases to be ready within the following year will be made available to the PMS at no charge if the PMS is under a SW maintenance contract. Since these guidelines are still in development, and are not expected to be completed in time for Phase 2, ABB will implement, by the end of Phase 2, a set of CIM compliant tools allowing power applications to extract information such as the static power system model and the current state of the</p>		3	EMS	12/22/99

# Exhibit A

## FERC Submittal Work Item Definition and Status

ID	Work Item	Description	Staging Plan #3 Item No. and prior target release date	Priority	Sub System	Target Release Date
		power system (State Estimator solution) from the PMS. These tools will progressively evolve to follow CDA (CIM) and MBI (MIM) guidelines as they become available.				
75	BBS HIM Server	<p>A HIM server will allow settlement data to be stored in a permanent historical storage system.</p> <p>The purpose of the archival database is to provide long term historical storage for the ISO Scheduling data. Data are stored to support:</p> <ul style="list-style-type: none"> <li>• Statistic analysis of market data; and</li> <li>• Audit function.</li> <li>• Settlement Re-run capability</li> </ul> <p>The Archival Database will be distinct and separate from the main system database. SC's will not be able to access data in the archival database directly.</p>		3	BBS	2/22/99
76	Misc. window changes	<p>Enhancements will be made to the following screens:</p> <ul style="list-style-type: none"> <li>• Schedule and Measurement Windows</li> <li>• Display of Records with Zero Values in View Deviation Window</li> <li>• Wheeling Tariff Window</li> <li>• Window Architecture Changes</li> </ul>		3	BBS	2/22/99
77	Transmission access charge mod	Per the tariff, the ISO will look into alternate methods of charging and allocating transmission access charges. These charges are currently assessed by IOUs, and new functionality will be required to collect, process and settle for access charge		3	BBS	12/15/99