January 10, 2003

The Honorable Magalie Roman Salas
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

[PUBLIC VERSION]

Re: California Independent System Operator Corporation, Docket No. ER02-1656-009, 010 and 011 and Investigation of Wholesale Rates of Public Utility Sellers of Energy and Ancillary, Services in the Western Systems Coordinating Council, Docket No. EL01-68-017

Dear Secretary Salas:

Enclosed for filing in the above-captioned dockets, please find the Status Report of the California Independent System Operator Corporation ("ISO") that will be released to the public.

Simultaneous with the instant filing, the ISO is submitting a version of the Status Report that contains confidential information. In the instant version of the Status Report, the confidential information, i.e., **Attachments D and E**, have been redacted. In all other respects, the version of the Status Report to be released publicly is identical to the version of the Status Report that contains confidential information.

Respectfully submitted,

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UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System Operator Corporation	)	Docket No. ER02-1656-000
	)	
	)	
Investigation of Wholesale Rates of Public Utility Sellers of Energy and Ancillary Services in the Western Systems Coordinating Council	)	Docket No. EL01-68-017
	)	
	)	

STATUS REPORT OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

The California Independent System Operator Corporation ("ISO")[1] respectfully submits this monthly progress report ("Report") in compliance with the Commission's November 27, 2002 "Order Clarifying The California Market Redesign Implementation Schedule" 101 FERC ¶ 61,266 (2002) ("November 27 Order"), issued in the above-referenced dockets.

The November 27 Order requires the ISO to file reports on the first Monday of each month, beginning in January 2003,[2] to update the Commission on the ISO's progress in designing and implementing the ISO's Market Redesign ("MD02"). Specifically, the November 27 Order required the report to include explanations of: (1) any alternative methods of developing MD02 elements;

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[1] Capitalized terms not otherwise defined herein are used in the sense given in the Master Definitions Supplement, Appendix A to the ISO Tariff.

[2] The ISO filed for an extension of time to file the initial report, otherwise due on Monday, January 6, to Friday, January 10, 2003.

(2) progress in developing MD02 elements; (3) action required to establish such elements; and (4) a detailed breakdown of the total start-up costs.[3]

On December 9, 2003, the Commission convened a Technical Conference (the "December 9th Conference") to review the ISO's proposed implementation schedule for MD02 and to obtain reports from the four working groups that had been formed to identify and attempt to achieve consensus resolution of significant issues associated with the design and development of the reconstituted California electricity market. At the December 9th Conference, Commission Staff directed the ISO also to include in the January status report: (1) a list of the critical issues that needed Commission resolution to ensure timely implementation of the revised market design and a proposal as to the process by which the ISO would obtain the necessary Commission direction; (2) an explanation of how the ISO would continue to involve stakeholders in the development of MD02; (3) a discussion of the possible implementation of the New England ISO's ("NEISO") market design software in California; (4) a report on ISO collaboration with representatives of the California Department of Water Resources State Water Project to address market design issues involving the use of the State dedicated-purpose hydro resources, and (5) discussion of ISO efforts to collaborate with the Department of Energy regarding issues arising from the implementation of the full network model and the state estimator.

To provide the information requested by the Commission from both the November 27 Order and the December 9th Conference, this Status Report is organized as follows:

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[3] November 27, 0rder at P 9.

Section I - contains a general background discussion;

Section II - contains a discussion of the ISO's proposed procedural approach to balancing timely implementation of the elements of market redesign with the necessary regulatory process;

Section III - contains a report on the progress of MD02, including: the MD02 project implementation plan; the MD02 project budget; and market redesign alternatives considered by the ISO, including consideration of the adoption of the NEISO software;

Section IV - contains the ISO's proposed approach to further stakeholder participation into the MD02 process; and

Section V - reports on the collaborative efforts with the California Department of Water Resources State Water Project and the Department of Energy.

The ISO expects that Section III will provide a template for the monthly updates to be provided to the Commission. In the Instant Report additional data presented will serve as a baseline for measuring the progress of MD02's implementation in future monthly updates.

I. BACKGROUND

On May 1, 2002, the ISO submitted: (1) a comprehensive description of the MD02 redesign proposal ("Comprehensive Market Design Proposal") and

(2) proposed Tariff language for the market redesign Phase I elements,[4] including Automated Mitigation Procedures ("AMP") reforms to real-time dispatch and penalties for uninstructed deviations ("Amendment No. 44 Filing"). On June 17, 2002, the ISO submitted detailed proposed Tariff language for the implementation of an integrated forward Day-Ahead Energy Market ("MD02 Phase II elements") as well as locational marginal pricing ("LMP") and new Firm Transmission Rights/Congestion Revenue Rights ("MD02 Phase III elements").

On July 17, 2002, the Commission issued an order[5] accepting in part and rejecting in part the Phase I elements. In particular, the Commission accepted the proposed AMP, use of a single Energy bid curve, clearing the price overlap through the use of real-time economic dispatch, and the application of uninstructed deviation penalties, but rejected certain other proposed elements, including the Interim Residual Unit Commitment ("RUC"). The July 17 Order did not rule on the MD02 Phase II and Phase III elements as proposed in the May 1 and June 17 ISO filings, except to authorize the ISO to expend funds to begin developing its full network model and locational marginal pricing software and to direct Commission staff to convene a technical conference to address the Phase II and Phase III MD02 elements.

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[4] The ISO proposed that the Phase I elements be effective upon expiration of the then-existing, Commission-approved west-wide mitigation. Such mitigation measures were scheduled for expiration on September 30, 2002 and subsequently were extended through October 31, 2002.

[5] Order on the California Comprehensive Market Redesign Proposal, 100 FERC ¶61,060 (July 17, 2002) ("July 17 Order").

The ISO staff, Commission staff and Market Participants held a technical conference in San Francisco on August 13- 15, 2002, to discuss the MD02 effort. Four Working Groups were established as a result of this conference:

1. the Transitional Issues Working Group;
2. the Integrated Forward Markets Working Group;
3. the Resource Adequacy Working Group; and
4. the LMP/CRR Working Group.

On August 16 and 21, 2002, respectively, as required by the July 17 Order, the ISO requested rehearing of certain aspects of that order and filed Tariff language in compliance with such order. On August 27, 2002, the ISO filed comments on the August 13-15 technical conference. In those comments, the ISO indicated it might be able to implement a rudimentary forward energy market (the so-called "Phase II Lite") by relaxing the balanced schedule requirement and the market separation rule by January 31, 2003, though the ISO indicated it did not support doing so.

On October 11, 2002 the Commission issued its order[6] on rehearing of the July 17 Order. In its October 11 Order, the Commission, *inter alia,* directed the ISO to implement Phase II Lite by January 31, 2003. On November 11, 2002, the ISO filed a request for rehearing of the October 11 Order, indicating that, contrary to its prior statements, it could not implement the Phase II Lite market by January 31, 2003. On November 27, 2003, the Commission issued the November 27 Order in which it directed the ISO not to proceed with Phase II Lite

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[6] Order on Rehearing and Compliance Filing, 101 FERC 61,061 (2002) ("October 11 Order").

and directed the ISO to submit monthly reports as described above, of which this Status Report is the first. Because this is the initial report, it contains significantly more information than will be provided in subsequent reports.

On October 29, 2002, the ISO filed a request to hold a technical conference to discuss implementation of the MD02 proposal. On November 8, 2002, the Commission set a December 9, 2002 date for that conference. The ISO staff and consultants presented the MD02 project plan at the December 9, 2002 technical conference. In addition, representatives from the four working groups reported on the progress that had been made in identifying and resolving critical issues.

II. PROPOSED PROCEDURAL APPROACH

As explained in this section, the ISO proposes to follow the practice of other regional transmission providers in seeking the Commission's conceptual approval of critical market design features before proceeding with detailed implementation work and tariff preparation.[7] Accordingly, the ISO proposes to file within approximately a month's time an amendment to its Amendment No. 44 filing that would update the Comprehensive Market Design Proposal originally filed in May 2002 and explain the ISO's position on the critical issues the ISO needs to have resolved before it can retain a primary software vendor. The revised design proposal also would reflect the changes the ISO has agreed to make as a result of the discussions with stakeholders following the Amendment

[7] See e.g., *Carolina Power and Light Co., et al.*, 94 FERC ¶ 61,273 (2001) (Grid South), *GridFlorida, L.L.C., et al.*, 94 FERC ¶ 61,363 (2001), *Avista Corporation, et al.*, 100 FERC ¶

No. 44 Filing.[8] The ISO would need Commission approval of this revised design proposal within 60 days of the filing in order to maintain the implementation timeline presented at the December 9, 2002 Technical Conference. The ISO would also proceed on parallel tracks to resolve, with stakeholder input, the many design issues that are not time critical for the vendor contract, and to begin drafting tariff language to reflect the new market design. The ISO would continue to inform the Commission of the results of these stakeholder activities in future status reports.

There are several reasons for the proposed procedural approach. First, as experience over the past year has shown, the ISO's market redesign process is a dynamic process, which must proceed in stages and on parallel tracks to balance the competing objectives of expediency and sound development practices (including stakeholder participation), thereby maximizing the likelihood of success of the project and minimizing the need for successive major design changes. A strictly linear approach, i.e., an approach in which the ISO would first resolve all design issues, then draft and file tariff language, then receive Commission approval, and then release a Request for Proposal (RFP") for a primary vendor, would result in extensive delays in implementation of the necessary market reforms. Accordingly, the ISO is using the collaborative design changes that have resulted from the extensive stakeholder activities that have taken place since the May 1 and June 17 filings in finalizing the RFP for a primary software vendor for MD02 that the ISO intends to release within the next

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61,274 (2002) (RTO West), *Arizona Public Service Company, et al.*, 101 FERC ¶ 61,033 (2002) (WestConnect RTO), *Cleco Power, L.L.C., et al.* 101 FERC ¶ 61,008 (2002) (SeTrans RTO).

month[9]. However, the ISO understands that it is imperative to have conceptual approval from the Commission of the core market design features to be described in the revised design proposal before the ISO incurs significant costs by contracting with a vendor.

Second, the ISO notes that MD02 implementation provides a unique opportunity, by virtue of the extent of the required changes, to improve the structure of the ISO Tariff in a meaningful manner. For the past five years, the ISO has applied one patch or modification on top of another to a tariff that, from the beginning, was extremely complex. The concept of "Tariff simplification" has long been a goal at the ISO, but given the pace of crisis and change in the California markets, the concept has remained a distant ideal. In preparing revised tariff language for MD02 the ISO would also strive to make its tariff more consistent with those of other independent system operators (*e.g.*, ISO New England's Market Rule 1).

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[8] These changes are discussed in greater detail below.

[9] The ISO is finalizing a RFP for software vendors to provide Integrated Forward Energy market ("IFM") functionality. The IFM optimizes energy clearing, congestion management, ancillary services procurement and unit commitment, includes a RUC process and uses a Full Network Model ("FNM") to derive Locational Marginal Prices ("LMP") at each network node. Because the proposed IFM with LMP conforms to standard industry practices and the majority of the design elements are consistent with the Commission's proposed SMD, the ISO believes it is appropriate to proceed with the RFP. While the basic elements of the IFM, RUC, FNM and LMP reflect industry standards and would, for the most part, be expected components of a standard offer from a qualified vendor, there are certain elements of market functionality that the ISO needs to address specifically in an RFP to account for several unique aspects of the proposed ISO market design and market conditions in California and the West. These as well as the more standard features would all be submitted to the Commission in the revised design proposal. The ISO notes that if any of the underlying MD02 assumptions or proposed resolution of these elements are changed by the Commission after issuance of the RFP, the RFP would then need to be amended or reissued. The additional time would need to be given to vendors to prepare responses. The resulting delay to the software implementation schedule can not be specifically quantified in advance of a specific instance of Commission modification or required change to the RFP. However, for the ISO to have any chance of implementing the principal redesign elements before the summer of 2004, the ISO must commence the RFP process early in 2003, even at the risk of potentially having to amend the RFP.

Clearly an effort towards tariff simplification and standardization is an activity that can be done in due course without delaying implementation of the new market. For the next few months, however, it is more important for the ISO, market participants, and the Commission to focus their attention and resources on a limited number of core issues needed to get the primary vendor in place. This will be the goal of the upcoming filing to revise the Phases II and III elements contained in the Amendment No. 44 Filing.

The following is a summary of the main elements the Commission can expect to see included in the Revised MD02 Design Proposal.

1. **Forward Congestion Management Based on LMP**. The ISO proposes to use a fully accurate model of the ISO transmission grid to adjust submitted preferred schedules to mitigate transmission overloads, ensure local reliability and, in the process, produce congestion prices equal to the difference between locational marginal energy prices at each node of the grid. With this change the ISO will eliminate the distinction between inter-zonal and intra-zonal congestion, eliminate the "Market Separation Rule," and conduct a forward spot energy market integrated with congestion management.

2. **Integrated Forward Markets for Energy, Ancillary Services and Unit Commitment.** Even without explicitly creating a new spot energy market, the proposed LMP congestion management approach would require energy trading among participants in order to clear congestion on a network consisting of thousands of nodes.. The ISO proposes to use a Transmission Constrained Unit Commitment ("TCUC") algorithm to run integrated energy and congestion management markets, procure ancillary services and perform unit commitment, based on multi-part bids (start-up cost, minimum load cost, incremental energy curve, and capacity reservation bid for Ancillary Services). The proposed design will allow Scheduling Coordinators ("SCs") to self-schedule supply resources and loads, and will allow commercial energy trading at a few key "trading hubs." The Ancillary Services ("A/S") markets will be used to procure Operating Reserves (Spin and Non-spin) and Regulation (separate Reg Up and Reg Down as today).

3. **Congestion Revenue Rights ("CRRs").** These new, primarily financial instruments will allow participants to hedge the risk of congestion charges in a manner consistent with the LMP congestion management design. The ISO proposes to allocate CRR Options to converted ETC rights holders, allocate CRR obligations to load-serving entities, and release CRRs for any remaining transmission capacity in an auction process. The proposed limited physical scheduling priority property of CRRs would allow a balanced schedule with corresponding CRRs to receive higher priority against day-ahead curtailment than non-CRR schedules.

4. **Residual Unit Commitment ("RUC").** Because the outcome of the integrated forward market processes is based completely on SC schedules and bids, it may result in a total scheduled quantity of energy that is substantially below the ISO's forecast. The RUC proposal, which is featured in the designs of the Eastern independent system operators, would evaluate whether final forward schedules include enough on-line resources to meet the demand forecast for the operating day or hour, and if not, would enable the ISO to commit enough additional units to ensure that on-line capacity can meet the forecast.

5. **Changes to Structure and Timing of Hour Ahead Market.** The ISO proposes to retain both the Day Ahead and Hour Ahead markets that exist under the current market design. In the Amendment No. 44 Filing, the ISO indicated that it would move the close of the Hour Ahead market up to T-60 (60 minutes before the start of the operating hour). At the time the ISO thought there was near universal support for this change and that it was not controversial. In the course of the Stakeholder Working Groups, several parties voiced a concern that this change would eliminate the opportunity for SCs to submit new real-time energy bids after receiving and reviewing their final Hour Ahead schedules. At this time, stakeholder consensus seems to be swinging back toward preservation of the "re-bid period" and, if necessary, leave the Hour Ahead time line approximately where it was originally (T-120).

6. **Real-time Economic Dispatch Using Full Network Model.** The Commission has already approved real-time economic dispatch which likely will be implemented in June 2003 based on the ISO's existing zonal network model ("MD02 Phase 1B"). With the incorporation of the full network model, this approach will meet the ISO's real-time operating needs accurately and efficiently by fully taking into account all transmission constraints, local reliability needs, generator operating constraints, and system imbalance

energy needs. This approach will produce nodal real-time energy prices, which will be paid to supply resources but could be aggregated to larger geographic areas for settling imbalance energy purchases by load serving entities.

7. **Bid Mitigation for Local** Reliability Needs. The MD02 Proposal includes Local Market Power Mitigation in both the forward and the real-time markets and is based on the design currently being used by PJM. The forward market mitigation of incremental bids that are needed out of economic merit order for local reliability needs follows the same logic and principles regardless of the underlying network model used (i.e., nodal or zonal). With respect to local market power in the decremental bid market, nodal pricing should provide a natural mitigation in the first settlement market (i.e., the day ahead). However, absent activity rules (such as precluding bidders from submitting arbitrary decremental bids after the close of the day ahead market), local market power in the supply of decremental bids can emerge in the subsequent markets, again regardless of the granularity of the underlying network model. With or without a forward energy market, bid mitigation for local reliability is still a needed feature of the real time market. In the alternative the ISO could apply AMP at the local level as is the practice in NYISO and currently performed by the ISO in real-time.

8. **Damage Control Price Cap on ISO Markets.** To mitigate against excessive market power abuse, the ISO proposes a Damage Control Bid Cap ("DCBC") that will specify the maximum and minimum bids allowed in the ISO's energy and ancillary service capacity markets.

9. **Bid Screens and Mitigation.** As ordered by the Commission, in October 2002 the ISO implemented individual resource bid screens and mitigation procedures in the real time market; i.e., AMP. In subsequent phases of MD02 the AMP procedure would also be applied to the forward energy markets and the RUC procedure.

10. **Scheduling and Settlement of Loads.** A crucial feature of the LMP market design is the geographic granularity used for scheduling and settling loads. In the Comprehensive Market Design Proposal filed on May 1, 2002, the ISO recognized the equity concerns regarding potentially large LMP cost impacts on loads in constrained areas, and proposed a mechanism whereby loads may schedule and settle at aggregation points, with prices averaged over all the nodes within specified geographic areas of the grid. In subsequent stakeholder discussions, the ISO expanded its original proposal to allow load aggregation at the level of the

participating transmission owner service territory. The ISO also proposes to allow SCs to create custom load aggregations for scheduling and settlement, using the actual nodes at which they serve load, provided there is appropriate revenue quality metering to enable the ISO to verify the accuracy of the custom aggregation. Individual loads with adequate metering and metered subsystems may also elect locational pricing that coincides with their actual locations.

III. STATUS REPORT

In this, this first Status Report, the ISO is attempting to provide a format for the future updates. The ISO does not intend to provide the breadth of introductory and general comments in subsequent reports Instead, the ISO would expect that subsequent reports will focus on updating the scheduling and budget data presented in Section III and informing the Commission of monthly accomplishments and upcoming activities and milestones.[10]

A. MD02 Implementation Plan

1. Development Process

The ISO has retained IBM Business Consulting Services ("IBM") for external project management consulting with respect to MD02. IBM, in collaboration with ISO staff, developed the MD02 implementation schedule that was presented at the December 9th Conference.

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[10] Section III incorporates information that the ISO does not expect will be necessary to include in monthly updates but which is being provided as a baseline. For example, the ISO anticipates that future schedule sections may not include the Gantt chart contained in Attachment B, but will consist of a narrative form highlighting the main elements for that particular month. Similarly, the ISO anticipates that it will not be necessary to include the detailed breakdown of the development of costs in **Attachment E:** Baseline Cost Estimates on a regular basis, only Attachment D: Budget Status and Tracking Report with a narrative as needed. Moreover, it is anticipated that on a going forward basis there will be less of a need to report on alternatives considered as there is less design flexibility further along in the process. Instead the ISO will report on key issues, including alternative design elements and items that will require

The development of the implementation schedule followed accepted business practices for project development. Standard formats and templates were used by the Phase II and III Managers and each of the nine Project Managers to facilitate orderly tracking of projects and identification of synergies and interdependencies among and between projects, and to link development milestones to completion dates. The first step for the ISO in preparing the MD02 schedule required each of the nine Project Managers to develop their proposed schedules. The schedules were then aggregated into an initial master program plan. When the individual project plans were arrayed against one another, the ISO discovered many projects were dependent upon other project(s) in either Phase II or Phase III or a combination of both Phases.

Accordingly, the Phase Managers, who have the responsibility for overall coordination of the projects in each Phase, and all Project Managers worked to identify and coordinate the interdependencies of the projects, including those with linkages across the phases. In one case a single project was determined to be dependent on as many as six other projects.

Subsequently, the Project Managers submitted revised schedules and a revised master program plan was prepared. The IBM consultants assisted the Project Managers with staging of testing plans to assure that any non-concurrent testing among the various projects would be incorporated into the master program plan. Following a number of iterations, the MD02 master program plan was finalized and presented at the Commission technical conference on

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timely resolution by the Commission to meet project schedule and key issue resolution with stakeholders.

December 9, 2002. The master program plan will continue to be updated as elements are completed or change.

Attachment A, MD02 Program Plan – High Level, is a summary schedule of the MD02 Program Plan. Attachment B, MD02 Program Plan – Major Tasks and Milestones contains a more detailed MD02 Program Plan with Phase tasks and milestones. Attachment C, MD02 Program Plan – Training Schedule, contains the MD02 Program Plan training schedule as requested by the Commission.

2. Interpreting the MD02 Implementation Schedule

The MD02 Implementation project schedule is a Gantt chart capturing collectively all projects within each Phase and underlying deliverables grouped by similar tasks within each of the distinct projects. The timelines shown for particular tasks in the master project plan generally were developed based on typical timelines for software system development. These timelines are subject to adjustments based on the specifics associated with completion of preceding tasks and as a result of other inputs. The schedule being provided herein is a baseline and is linked closely to the higher level bar graph provided by the ISO at the December 9, 2002 technical conference.

In the ISO's opinion, the anticipated timelines are aggressive but achievable. The ISO would rather manage a project under this aggressive schedule, even if unexpected delays occur, rather than include additional time up front which could become a self-fulfilling expectation.

While the same process was used to develop all facets of the schedule, the training elements are being provided in their own attachment, which is directly extracted from the master project plan. This is intended to make it easier for the reader to understand how training is incorporated into the overall plan, how the actual training deliverables are developed, and when training will be available to the different users of MD02 elements. These elements of the master project plan will continue to be monitored and updated as the program training coordinator works through the deliverables required to deliver timely and sufficient training.

3. Key Dependencies of Phase II and Phase III

As noted, many of the projects in both Phase II and Phase III are interdependent. There are key elements within the phases that, without successful implementation, would cause a failure of the Integrated Forward Market ("IFM") and/or Locational Marginal Pricing ("LMP") using the Full Network Model ("FNM"). The three key elements that are interdependent and essential for the successful implementation of the IFM in Phase II are Master File Redesign, Market Transaction System, and Settlement Modifications. While these key elements are not part of the core software being procured through the IFM and LMP RFP, they are necessary components to the inputs of the market participants and the processing of market data to the ultimate financial settlement of the market. If one of these elements is not implemented as scheduled, IFM will be delayed until such time as the dependent project is successfully completed.

There are four key elements for implementation of Phase III LMP with FNM: Congestion Revenue Rights; Master File Redesign; Settlement Modifications; and Transmission and Contract Optimization System. One additional overall dependency for Phase III is the successful implementation of Phase II. Without the successful implementation of IFM there cannot be a transition to LMP using the FNM.

4. Current Schedule

The current program schedule and its implementation dates are based upon industry-accepted practices for systems implementation. The scope of all projects has been determined and early milestones of the project plan have been met. Most Phase II and III projects have substantially completed vision documents and are currently working through the business process design.

The following significant accomplishments have been achieved:

1. Creation of comprehensive project schedule for all phases including analysis, design, construction, training, testing, remediation and implementation;
2. All elements of Phase 1A are in production;
3. Completion of design details with the incumbent vendor for the real-time security constrained economic dispatch ("SCED") in Phase1B;
4. Analysis and scoping of forward energy markets including simultaneous optimization with ancillary services and congestion management;

5. Creation and release of RFP for Congestion Revenue Rights;
6. Performed initial LMP studies to validate design options and determine business rules for LMP implementation;
7. Analysis and scoping of LMP using the Full Network Model; and
8. Resolution of a number of issues for the Phase II and Phase III IFM/LMP RFP requirements through extensive stakeholder engagement in Working Groups and JAD sessions. These issues are depicted in Attachment F: MD02 Topics Discussed in Working Group and JAD Sessions.

In addition, the ISO projects that deliverables for Phase II and Phase III IFM/LMP RFP are 60% complete.

The final schedule represents the ISO's and IBM's current, informed best estimate of the time required for completion of each design element within each project for Phase II and Phase III. The project schedule remains dynamic until there are specific time commitments from vendors for any outsourced elements, most notably the core IFM/LMP software. If the vendor(s) do not complete the work as set forth in the timeline agreed to by the successful bidder, and/or the ISO or the Commission deny or otherwise modify the revised MD02 design, the current schedule likely will change.

At the December 9th Conference, certain market participants expressed concern regarding the proposed schedule for market testing prior to proceeding

with full implementation of the new market design. The ISO is very sensitive to the concern that market participants must have sufficient time and training to adjust to the significant changes to systems and procedures. The ISO will continue to evaluate the testing schedule to determine if adjustments are warranted and will include updates in subsequent Status Reports as warranted.

B. MD02 Budget

In response to the Commission's request for data regarding MD02 implementation costs, the ISO is providing confidential budget information in two formats: (1) the "Baseline Cost Estimates" and (2) the "Budget Status and Tracking Report." Both these documents are being provided on a confidential basis because it would be commercially imprudent to reveal estimates of vendor costs prior to negotiation and contracting with successful bidders.

Attachment D, the Budget Status and Tracking Report shows how money is actually being spent compared to forecast. It shows the budgeted amounts, the amounts authorized by the Board of Governors, the amounts that have been approved through the internal ISO accounting process, and actual expenditures to date. Attachment E, the Baseline Cost Estimates, shows each phase cost breakdown by individual project element. Because the ISO has not yet contracted with vendors for all of these elements, these budget numbers, particularly for Phases II and III, are very preliminary.

C. Market Design Alternatives Considered

1. Alternatives Considered in the Working Groups and JAD Sessions

In the November 27 Order, the Commission asked the ISO to explain "alternative methods of developing the MD02 elements." November 27 Order at P 9. In its Statement of Position filed in this proceeding on December 2, 2002, the ISO discussed alternatives it considered in the course of the Stakeholder Working Groups and its reasons for proposing either modifications to the initial MD02 proposals or continuing with the original market design. Since that filing, some of these issues have been discussed further in Joint Application Development ("JAD") sessions with stakeholders that were conducted during December. The discussion below reflects any relevant modifications that have been made to the positions enunciated in the ISO's December 2 Statement of Position.

a. Proposed MD02 Modifications

As a result of discussions with stakeholders and based upon further consideration of alternatives, the ISO is in the process of finalizing the following modifications to the MD02 elements originally proposed in the Comprehensive Market Design Proposal filed on May 1, 2002:

1. Load aggregation: In its Comprehensive Market Design Proposal and June 17 Tariff filing, the ISO initially proposed to schedule and settle loads at the Demand Zone level and, when technically feasible, at the Load Group level. The ISO contemplated that there would be approximately 20 Demand Zones in the ISO Control Area and over 40 Load Groups. Certain parties expressed anxiety that LMP pricing will have a significant negative cost impact on them. The ISO has consistently recognized the equity concerns of these parties and is willing to accommodate such concerns.

Specifically, in response to these concerns, the ISO believes that it is appropriate to establish default load aggregation groups at a high level, at least for a transition period. This high level aggregation would have four distinct pricing areas for load settlement: the current NP15 and ZP26 zones (which comprise the Pacific Gas & Electric transmission service territory); and the Southern California Edison Company and San Diego Gas & Electric Company transmission service territories (which today comprise the SP15 zone). All Load Serving Entities ("LSEs") within these boundaries – including municipal utilities and non-utility retail service providers – would schedule loads at this level and would settle those loads at load-weighted average nodal prices for each of those four areas. This approach is consistent with the approach taken by PJM and the NYISO, both of which settle loads at a high level of aggregation. This approach would address the concerns of parties regarding LMP cost impacts on loads without sacrificing the primary benefits of LMP for the California market.

2. Penalties for Failure To Maintain Resource Adequacy: If it is determined that an ISO-established resource adequacy mechanism is necessary, and in order to move resolution of this issue forward, the ISO is prepared to support an alternative approach that it proposed in the Comprehensive Market Design Proposal. The ISO would propose that, instead of penalties based on a forward-market assessment of resource adequacy, the ISO would establish a forward-market priority curtailment list, to be utilized in real-time if necessary.

3. Timing of the Hour-Ahead Market: The ISO perceives this issue as a simple choice between moving the Hour-Ahead market closer to Real Time and eliminating the current re-bid period (i.e., the opportunity to re-submit real-time energy bids after final Hour-Ahead schedules are published), or retaining the re-bid period and keeping the Hour-Ahead market timeline roughly where it is today. Either option could be compatible with the comprehensive market design. The ISO originally proposed the first option in response to what it believed was universal support for this change. However, some parties have expressed a strong desire to retain the re-bid period, and no consensus was reached on this issue in the Working Group. Therefore, the ISO is revisiting its initial proposal and continuing to discuss this issue with stakeholders.

4. Virtual Bidding: The original MD02 proposal did not address the question of Virtual Bidding. In discussions in the Working Group, most (but not all) parties felt that Virtual Bidding should not be

permitted when MD02 is first implemented, but may have merit at a later date, once the new markets have demonstrated stable performance. One issue related to virtual bidding that was raised in the Working Group is whether the newly acquired software and systems to implement market redesign should accommodate "explicit virtual bidding". Because the Commission's Standard Market Design Notice of Proposed Rulemaking contemplates the accommodation of explicit virtual bids and Eastern independent system operators have implemented explicit virtual bidding successfully, the ISO believes it would be prudent for its new software and systems to accommodate the potential future implementation of explicit virtual bidding.

5. Bilateral Schedules: Although the Comprehensive Market Design Proposal explicitly recognized the need to accommodate bilateral schedules, at the time it was drafted, the ISO had not yet considered certain other aspects of the "bilateral scheduling" issue that have surfaced in the course of the IFM working group. Several participants have pointed out that it may be problematic to try to accomplish self-scheduling through the use of price-taker bids in the context of the ISO's mitigation measures, specifically the $250 bid cap and the AMP mechanism and requested the option to set a flag on their bids which would explicitly distinguish self-schedules from other bidding practices that could trigger mitigation. The ISO has accommodated this concern by allowing the Scheduling Coordinator the option not to submit bids with a preferred self-schedule (subject, of course, to any applicable must offer obligation), and to thereby be distinguished from Scheduling Coordinators who bid as price takers.

6. CRR Scheduling Priority: The ISO originally proposed to accord a Day-Ahead scheduling priority to point-to-point ("PTP") CRRs. PTP CRR schedules would have the second highest scheduling priority (after ETC schedules) and, in particular, would have a scheduling priority over other price takers in the Day-Ahead Market. The ISO did not propose to extend scheduling priority to Network Service ("NS") CRRs because it would lead, in the event of uneconomic curtailment, to potentially excessive curtailment of CRR schedules to maintain the correct distribution proportions across the multiple injection and take-out nodes that make up the NS-CRR. Stakeholders pointed out that the same problem can occur with PTP-CRRs when the take-out point is a load aggregation. The following options have been identified to resolve this problem: (1) limit the scheduling priority to PTP CRRs with sources and sinks that are single nodes (rather than Load Aggregation Points or trading hubs); (2) extend scheduling priority to all CRRs (including

Network Service Rights) but, in the event that pro rata adjustments are needed to clear congestion, do not attempt to keep the nodal distribution pattern fixed; or (3) not provide a scheduling priority for CRRs. This issue is still open, pending further discussion with stakeholders.

7. Rolling CRRs: In its Comprehensive Market Design Proposal, the ISO proposed to offer a portion of the available transmission capacity ("ATC") as long-term (three-year) CRRs once every three years. Some parties expressed concerns that, in the intervening years, this proposal would not allow them to procure CRRs for a three-year time horizon, and expressed a need to be able to procure such CRRs at any point in the cycle, not just once every three years. Other options include offering only a portion of the total allowable long-term CRRs annually, or offering the full amount of allowable long-term CRRs for the third year annually. Based on further discussions with the working groups, the ISO believes that the concept of rolling CRRs has merit and will continue to discuss this matter with stakeholders. With respect to certain parties' desire for even longer-term CRRs (*e.g.*, five-year CRRs), the ISO believes that it is prudent to limit CRR availability to the proposed three-year period, at least initially, until the ISO and market participants gain experience with LMP in California. The ISO is willing to revisit this issue in the future.

8. Local Market Power Mitigation: Options discussed by the Working Group with regard to local market power mitigation included: (1) the approach proposed by the ISO in the May 1 filing, which is similar to the methodology that the Commission approved for PJM, (2) the methodology in place in the NYISO, and (3) the methodology in place in ISO New England.[11] Throughout the working group process the ISO has been amenable to discussing alternative local market power mitigation measures with stakeholders. Thus far, however, parties have not presented strong concerns about the ISO's original proposal to use the PJM

[11] In PJM, the bids of Generators called to operate for local reliability purposes are capped at: (1) the average LMP during a recent comparable period when the Generator was in merit order dispatch or (2) a level based on cost plus a 10 percent adder. *Atlantic City Electric Company, et al.*, 86 FERC ¶ 61,248 at 61,899 (1999). In ISO New England, units running out of economic merit order are subject to a screen price ranging from five to fifty percent above the reference price. If the reference price, multiplied by the screening percentage is less than the current day or hour out-of-merit bid, and the market structure screen identifies fewer than three total competitors, mitigation pricing will apply. *See* Section 17.3.2.2 and Appendix 17-A of NEPOOL's Market Rules and Procedures. The NYISO sets In-City load pocket conduct and impact thresholds according to a formula[11] that is proportional to the number of congested hours experienced over the preceding 12-month period. The In-City bid will be mitigated if it exceeds the reference level by more than two percent.[11] *New York Independent System Operator, Inc.*, 99 FERC ¶ 61,246 at 62,046 (2002).

approach, nor presented any reasons why another approach would be superior.

b. Original Design Features the ISO Proposes to Retain

The ISO recommends that the original proposal should be retained and certain proposed alternatives should not be adopted with respect to the following market design elements:

1. RUC vs Continuation of the Must-Offer Waiver: The ISO continues to believe that its proposed RUC procedure is an integral element of the MD02 comprehensive market design, is fully consistent with the implementation of LMP by other independent system operators and is an absolute necessity for the ISO to perform its core, NERC-mandated function of reliable grid operation. Although the ISO's Must-Offer Waiver procedure, as adopted by the Commission, does take into account a Generating Unit's Minimum Down Time, including its Start-up Time, the Must-Offer procedure is not an effective substitute for a structured, objective and transparent unit commitment process.

2. Timing of Unit Commitment Decisions: The ISO proposed to follow PJM's approach and make its residual unit commitment decisions after the completion of the Day-Ahead market and to carry over any minimum load energy resulting from RUC to a subsequent market (*i.e.*, either to be scheduled by the Scheduling Coordinator against load in the Hour-Ahead market or to be viewed by the ISO as a pre-dispatch of Real Time Energy). Some parties have raised the issue whether the ISO's unit commitment decisions should be included in the Day-Ahead market. Participants have suggested two variations of this concept. The first variation entails running RUC after the Day-Ahead market as originally proposed in the Comprehensive Market Design Proposal, but then incorporating the minimum load Energy associated with RUC-committed units into the final Day-Ahead Schedule. The NYISO follows this approach. The second variation would be to incorporate the RUC procedure into a complete re-run of the Day Ahead market by having the ISO bid load in an amount equal to the shortfall between the ISO's load forecast and the final Day Ahead schedule that resulted from Market Participants' bids and schedules. With respect to the latter proposal, the ISO believes that it is inappropriate to have the ISO bid load into a re-run of the Day Ahead market. The Day-Ahead market outcome should reflect the bids and schedules submitted by

market participants.[12] With respect to the two options for treating the minimum-load energy of RUC-committed resources, the ISO continues to prefer the PJM approach because it completely insulates Day-Ahead market prices from any impacts of ISO RUC decisions.

3. Ancillary Services Capacity Bids - whether the ISO should permit one capacity bid or four capacity bids: In its the Comprehensive Market Design Proposal, the ISO advocated a design which would utilize four capacity bids, one for each type of Ancillary Service. The ISO continues to believe that four capacity bids are appropriate. Regulation, Spin and Non-Spin impose different operational requirements on a unit and, therefore, should be bid separately. Because Reg-Up and Reg-Down are procured and priced separately, they should also be bid differently. Finally, because Ancillary Services capacity bids include only two figures, MW and $/MW, submitting a separate bid for each service is not a burden on the ISO.

4. Whether There Should Be Bid Limitations Between Sequential Markets (Day-Ahead to Hour-Ahead to Real-Time): Under the ISO's proposal, the portion of the energy bid curve associated with capacity selected in the day-ahead market and the RUC process cannot be increased in a subsequent market. The ISO's proposal is consistent with the bidding limitations in place in the Eastern independent system operators and is necessary to prevent bidders from exercising market power.[13] The Commission has recognized in the SMD NOPR that bidding limits may be imposed to mitigate market power. SMD NOPR at ¶ 273.

5. Should Locational Marginal Prices Be Used for Settlement With Supply Resources: Although some participants question the use of nodal prices to settle supply resources, the ISO believes that settlement of supply resources at nodal prices is so fundamental to an effective market design that such element cannot be relinquished without compromising the effectiveness of the entire redesign effort.

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[12] If the ISO were to bid load into this market, it would totally defeat the ability of market participants to limit their purchases in Day-Ahead and would force them to purchase Day-Ahead energy up to whatever amount the ISO's purchasing procedures dictate. Moreover, it would mean that ISO energy purchasing procedures – rather than participants' economic decisions – become the ultimate determinant of Day-Ahead prices.

[13] For example, absent this provision, a supplier could submit a low energy bid curve in order to have its unit committed in the ISO's residual unit commitment process and then once selected, modify its energy bids upwards for dispatch in the real-time market.

6. What Power Flow Model Should the ISO Use: The ISO proposes that the Integrated Forward Market optimization and the Real-Time dispatch will be based on the results of an AC Optimal Power Flow ("OPF") that will minimize the Real-Time cost of imbalance Energy, determined from Energy bids submitted by participating resources, subject to transmission interface, nomogram, and resource capability constraints, while accounting for transmission losses. In general either a DC model or an AC OPF model can be used. The DC models are widely used and are generally easier to operate. They are also more robust and can provide repeatable solutions. However, the DC models do not incorporate accurate calculations of losses and do not model factors such as voltage constraints, reactive power limits, and other dynamic features of the transmission network. Although an AC OPF is more complex than a DC OPF, it has numerous benefits that outweigh the complexity.[14]

7. Options vs. Obligations: The ISO proposes allocating Obligation CRRs to LSEs and to offer Option CRRs only to ETC rights holders who convert. Parties have raised the following alternatives to the ISO's proposal: (1) allocate only Options to LSEs; (2) permit LSEs to request their mix of Options and Obligations; and (3) not grant Options to any entity including ETC conversions. The ISO is willing to offer Options CRRs to LSEs in the future once the ISO determines that it is technically feasible to do so on such a large scale. This is consistent with the position the Commission has taken in the SMD NOPR. The ISO proposed to allocate Options CRRs only to converting ETC holders, if desired. Although this complicates the release of CRRs by requiring a distinct allocation procedure and creating different "flavors" of CRRs, and may decrease the total amount of transmission capacity available to the market, the ISO recognizes the value of encouraging ETC holders to convert to CRRs and has determined that it will be technically feasible to grant Options CRRs on this limited basis.

9. Allocation vs. Auction of CRRs: The ISO proposes to allocate CRRs to LSEs and converted ETC rights holders. Parties have suggested several alternatives pursuant to which CRRs would be allocated during some specified transition period only, after which all CRRs would be auctioned. The ISO submits that the proposal to require the auction of all CRRs exalts form over substance. Under a full auction scheme, entities that are entitled to an allocation of

[14] AC models can incorporate the "dynamic" features of the transmission system by observing voltage constraints and reactive power limits. An AC model calculates losses on a marginal loss rate, which tends to result in "over-collection" of loss costs. The loss characteristics of the AC-OPF increase the accuracy of dispatch of resources by calculating the effects of losses on congestion in the network.

> CRRs would instead be entitled to a share of CRR auction revenues. Thus, any LSE that desires to maintain its rights could bid an arbitrarily high price for the CRRs and retain their full value because all of the revenues from the auction sale would return to that LSE, *i.e.* LSEs would essentially be paying themselves. Requiring the ISO to release all CRRs at auction would impose an additional and unnecessary administrative burden on the ISO and the parties entitled to CRRs. Moreover, under the Comprehensive Market Redesign Proposal, CRRs follow the load, not the LSEs. If a load should switch from its existing LSE to a new supplier, then the associated CRRs would be shifted to the new supplier. Moreover, the ISO proposes to allocate CRRs to LSEs only in the quantities necessary to serve their load, net of local generation, based on historical patterns of load and grid usage. Based on the ISO's proposed allocation rules, there should be additional transmission capacity available in the CRR Auctions.

As noted in the December 2nd Statement of Position, throughout the working group process and in developing the positions stated in this filing, the ISO has maintained a focus on the big picture, *i.e.*, on the internal consistency of the entire design and the inter-relationships of the various elements and issues. In light of previous Commission orders to avoid a piecemeal market design approach, the ISO has continually tried to assess the impacts of specific design proposals on the functioning of the whole system, and to develop its positions on the issues accordingly, while at the same time remaining open to making feasible changes in design to address the concerns and needs of market participants. Statement of Position at 6. The ISO submits that the need to ensure internal consistency must inform the Commission's determinations with respect to the California and Western market designs. Options cannot be examined in isolation but must function together in a workable market structure.

2. Additional Consideration of Alternatives

a. Use of ISO New England Software and Market Rules

With regard to alternative methods of developing the MD02 elements, the Commission Staff at the December 9th Technical Conference expressed particular interest in an offer from ISO New England regarding potential use by the ISO of their market design software. The ISO subsequently discussed this offer with ISO New England and began a detailed comparison of the ISO New England market design as embodied in its "Market Rule 1" against the MD02 design. The following discussion is intended to inform the Commission about the ISO's findings

Because the ISO anticipates that any vendor capable of providing the core elements that the ISO requires, either has this base functionality in production in other ISOs/RTOs or is poised to provide it in the very near future, the efficiencies that the Commission seeks to capture are, to a significant extent, already imbedded in the ISO implementation plan. Because the MD02 design closely follows that of existing markets and the Commission's proposed in the Standard Market Design, any vendor responding to the RFP being issued would incorporate any features or design efficiencies from these other operating markets in order to provide a competitive bid. The ISO never anticipated that a qualified vendor would build software from the ground up to meet its requirements, but instead would adapt existing software to meet any of the additional market enhancements set forth in the RFP issued by the ISO.

The following discussion is divided into two parts. First, the ISO discusses the ISO New England software and certain of the issues involved with its utilization by the ISO. Second, the ISO reviews ISO New England's market design as embodied in its Market Rule 1, and identifies similarities and differences to MD02.

(1). ISO New England Software

The ISO understands that in March 2001, ISO New England began a major market redesign effort. This project, which was based on the rules of PJM as modified by some of the "best practices" of New England's market management, will begin its third round of market trials in January 2003 and is expected to go live on March 1, 2003. The project is expected to cost approximately $70 million. ISO New England has licensed the PJM market rules and enhanced them: (1) to better accommodate hydro resource dispatching and (2) to include a loss component in locational marginal price. ISO New England refers to this modified set of PJM-based rules as "Market Rule 1." It is likely that Market Rule 1 would need further enhancement to be useful in a market such as California's that has significantly more hydro resources, heavy reliance on imports and a substantial number of existing transmission rights.

The market software implemented at ISO New England is based on ALSTOM ESCA Corporation ("ESCA") platform. The ISO understands that ISO New England's payments to ESCA for the SMD software have totaled to date approximately $12.5 million. In addition, Accenture built ISO New England's original settlements system, but this system has been almost entirely re-designed

for the enhanced market design using ISO New England resources. ISO New England has spent considerable time and effort developing business process definitions and training materials.

ISO New England appears willing to share the material it has developed. This would include the business process definitions and the training material. It may also include the settlements system. While the enhancements contained in Market Rule 1 are the work of ISO New England, the original package was developed by PJM. Thus, the ISO might have to license the original rule set from PJM. Pursuant to the license agreement, ISO New England may not give away the ESCA software. Therefore, the ISO would have to license the ESCA software separately. With this approach, there would be some difficulty in integrating an implementation of what, despite the efforts to move to standard interfaces, are highly customized integrations into existing legacy systems including the existing Energy Management System ("EMS"). Through the development of an RFP, the ISO sets forth the specifics of the required integration so that the vendor can evaluate the difficulty of integration into legacy systems. This is a much more efficient method of integration as opposed to first determining the required customizations of the NEISO implementation and then adapting them to the ISO requirements.

The value of utilizing the ISO New England program to California would depend greatly on the extent to which California's MD02 implementation mirrors ISO New England's market design. An analysis of the New England and California market designs is provided in the next section.

The highest value would be obtained if Market Rule 1 were to be adopted essentially intact. The ISO would then save the effort associated with business rule development, business process definition, development of training materials, and development or acquisition of a new settlements system. However, given the market design accommodations required for the ISO, substantial hydro resources, significant reliance on imports and existing transmission contracts, much of this value would be lost as discussed in further detail below.

(2). Comparison of Market Rule 1 with MD02

Subsequent to the December 9 Technical Conference, the ISO began a systematic comparison of MD02 with ISO New England's market design as embodied in Market Rule 1 (MR-1). As part of this comparison the ISO initiated discussions with ISO New England staff to understand in greater detail exactly how MR-1 is being implemented. The present section offers some preliminary observations. In a subsequent report the ISO will provide a more detailed discussion of the similarities and differences between MR-1 and MD02, and an assessment of the pros and cons of adopting MR-1, with suitable adaptations, as the basis of the ISO's market redesign.

At first glance MR-1 and MD02 are quite similar to each other and to the Commission's SMD NOPR. Both are based on Locational (i.e., nodal) Marginal Pricing (LMP) and an integrated forward market which simultaneously performs congestion management, clears the energy market and procures ancillary services. Both MR-1 and MD02 contain a reliability unit commitment procedure that runs after the Day-Ahead market to commit adequate capacity to meet the

next day's load forecast. Finally, both designs offer point-to-point transmission rights (FTRs or CRRs) that are of the obligations type.

Based on an initial review, the ISO understands that the following elements appear to be the main differences between MR-1 and MD02:

- MR-1 provides for the submission of limit prices for congestion costs associated with Day-Ahead "external transactions," which signals the forward market optimization to curtail such schedules in order to stay below the limit price.
- MR-1 allows for the submission of no-load bids, rather than requiring minimum load to be cost-based as in MD02.
- MR-1 requires Day-Ahead energy bid curves to be the same for all hours of the trading day, whereas MD02 allows different energy bids curves for each hour.

  MR-1 proposes to disaggregate LMPs into energy, congestion and loss components.
- MR-1 allows capacity bids only for regulation service, and prices operating reserves at the opportunity cost of energy in the same market in which they are procured.
- MR-1 does not provide for AS self provision to the extent the ISO proposes.

- MR-1 accommodates only symmetric regulation ranges; MD02 proposes to maintain separate regulation up and regulation down services.
- With respect to the reliability unit commitment, MR-1 minimizes only the commitment costs, whereas MD02 proposes to minimize the expected cost of energy dispatch from committed resources to meet the forecasted real time imbalance.
- MR-1 is a two-settlement system (Day-Ahead and real time), whereas MD02 has an Hour-Ahead settlement market as well.
- MR-1 does not provide penalties for uninstructed real time deviations by supply resources, whereas MD02 sees these as necessary to prevent physical withholding in real time.
- MD02 proposes to perform real time settlement for each 10-minute interval, as an additional incentive for supply resources to follow dispatch instructions; MR-1 proposes hourly real time settlement.
- MR-1's transmission rights ("FTRs") are purely financial, with no day ahead physical scheduling priority; MD02 provides Day-Ahead priority against curtailment for balanced schedules with corresponding CRRs.

b. SMD Proposal on Existing Contracts

Over the years the ISO and several market participants have in various filings with the Commission noted the inefficiencies and complexities created by the requirement that the ISO accommodate existing transmission contracts ("ETCs") in allocating transmission to grid users, the most notable inefficiency being "phantom congestion." Nevertheless, the ISO's May 1 Comprehensive Design Proposal continued to fully accommodate ETCs, based on the expectation that the Commission would maintain its existing policy. With the release of the SMD NOPR, however, the Commission has offered an alternative approach that has the potential to resolve many of the inefficiencies and complexities associated with ETCs that the ISO had expected to carry forward in implementing MD02. Although the ISO is still evaluating the pros and cons of the SMD approach, the ISO believes that because of this potential it would be premature at this time to exclude it from further consideration.

IV. ONGOING STAKEHOLDER PARTICIPATION

A. Background On Stakeholder Participation in Development of MD02

The ISO has provided for stakeholder comments and design input consistently, dating from the early stages of development of MD02. On January 9, 2002, the ISO posted to its website a draft comprehensive Design Proposal used for discussion purposes with stakeholders on January 14-17, 2002. This marked the beginning of the ISO's development of a program of market design changes that would address current problems in a systematic

fashion and create a framework for a sustainable, workably competitive electric industry that benefits California consumers and is compatible with the rest of the western region. Through a stakeholder process the ISO completed its Comprehensive Market Design proposal on April 19, 2002. This is the comprehensive proposed market design that was filed on May 1 and June 17, 2002.

The ISO has proposed to implement the MD02 proposal in three phases. Since the May 1st filing, Phase IA was implemented on October 30, 2002, which included market power mitigation measures. Phase IB is targeted for full implementation in June 2003.

B. Current Stakeholder Activities

The ISO now is transitioning from the conceptual design phase to the implementation phase. Even though many of the design-related issues are being resolved, this does not mean the ISO no longer needs stakeholder input. Rather, the ISO fully intends to continue utilizing its stakeholder process through the Joint Application Design[15] ("JAD") sessions that have been very successful. The well-received JAD sessions began with Phase IB and have continued with the development of design details for Phase II and Phase III.

As a part of the on-going stakeholder process, the ISO has offered multiple educational papers, seminars and discussions on basic aspects of market design. Early recognition of the need for a common, fundamental

[15] JAD sessions are a commonly used method in standard software development projects to resolve technical design issues and to establish a common set of business requirements. The ISO has engaged a small group of market participants with business and technical expertise that represents a broad cross-section of stakeholders to work with ISO staff to resolve design details.

understanding of market issues and a common vocabulary for discussing such issues led the ISO to work with stakeholders to identify topics and concepts of concern. The ISO then attempted to inform all interested Market Participants in the basic elements of such market design topics and concepts.

The ISO recently completed three weeks of JAD sessions on December 18, 2002 for Phase II and Phase III. The JAD stakeholders identified a total of 55 issues for both phases, many of which are the same as those raised in the stakeholder work groups. These are listed in the matrix provided as Attachment F. After the column describing the issue, the "Status" column indicates whether the issue has been resolved. The third column, "Resolution," describes either the final solution for the issue or the solution(s) under consideration. There still remain elements within Phase II and Phase III that will require further discussion with stakeholders. Therefore, the ISO proposes to continue using JAD sessions either via conference call or meetings for focused design-related issues that surface throughout the implementation process.

In the November 27, 2002 Order the Commission directed the ISO to update its implementation plan on a monthly basis, indicating its progress and upcoming steps. The ISO now proposes to hold monthly stakeholder meetings on the first Tuesday of each month following its first Monday of each month progress report that the ISO will file with the Commission. The focus of the monthly stakeholder meeting will be twofold: (1) to provide a status update of each MD02 Phase, highlighting the key issues that have been resolved over the past month and answering any stakeholder questions about the previous day's

filing, and (2) to develop an agenda and work plan for issues that must be resolved over the coming month and, as time may permit, begin working to frame and clarify each such issue. The ISO proposal for these regular stakeholder meetings and issue identification will allow all parties to determine the level and type of effort that will be needed and accordingly to commit adequate resources.

As the ISO transitions to the implementation phase, the ISO recognizes the importance of establishing a Technical Locational Marginal Pricing Working Group ("LMP-WG"), similar to the Technical Standards Working Group that has provided an ongoing technical forum for stakeholders for the past several years. It is envisioned that this working group would evaluate prices runs and studies during the testing stage of LMP implementation to determine the accuracy of pricing results. In addition they would help to develop business practices as they relate to scheduling protocols and other changes required in the LMP environment. It should be emphasized that the LMP-WG must be small, to ensure that as implementation issues arise, resolution is made in a timely manner so as not to slow down the ISO's proposed timelines for Phase II and Phase III. The entities selected for this group should have a technical background, and should be willing to commit to continuing participation in all working group activities. The ISO proposes the working group have the following representation: WestConnect, RTO West, the California municipal utilities, the generators, Direct Access customers, the three IOUs and the State of California, for a total of nine non-ISO members.

C. Resource Adequacy

On May 1, 2002, as part of its MD02 proposal, the ISO filed to establish an Available Capacity ("ACAP") obligation on load-serving entities in California. The ACAP obligation was intended as an integral element of the proposed new market design necessary to support the ISO's core function, *i.e.*, providing non-discriminatory and reliable transmission service to all customers. In addition, the ACAP proposal was intended to create a viable platform for long-term forward contracting, thus promoting investment in new supply (and demand) resources. In many respects, the ISO's proposal is aligned with many aspects of the resource adequacy proposal put forth by the Commission in its SMD NOPR. Concurrent with the development of the ISO's MD02 proposal, a number of California state agencies initiated rulemakings related to resource adequacy. The ISO previously submitted information regarding these initiatives to the Commission in its Statement of Position, filed December 2, 2002 (See Appendix A to the ISO's Statement of Position). As noted in the ISO's filing, the progress of the State's efforts regarding resource adequacy has been significant.

In its July 17 Order, the Commission directed the ISO and stakeholders to develop, through the "technical conference" process established therein, a long-term resource adequacy proposal. Subsequent to the July 17th Order and the Commission-sponsored technical conference that occurred shortly thereafter, the ISO and stakeholders formed the "Resource Adequacy Working Group" or "RAWG". As noted in previous ISO submissions to the Commission, California State agencies, represented by the State's "Inter-Agency Working Group" or

"IAWG", were chosen to facilitate the RAWG discussions. To date, and as previously articulated to the Commission, the RAWG discussions have focused on three subject areas:

1. **Allowable Resources** – whose purpose is to develop principles for determining the eligibility of various types of resources to provide capacity that could be procured by LSEs to satisfy a resource adequacy requirement.
2. **Nature and Level of Obligation** – whose purpose is to develop principles on the nature of the resource adequacy obligation and the appropriate level of reserves.
3. **Jurisdiction/penalties** - whose purpose is to develop principles on the appropriate delineation of responsibilities regarding which entity oversees and monitors compliance with an established resource adequacy requirement and whether and how penalties/incentives for non-compliance/compliance should be applied.

At this time, as previously outlined to the Commission, and in recognition of the primary role and significant progress of the State of California's own efforts at developing a policy framework for resource adequacy within California, the ISO supports further development of those State efforts before defining what, in the end, may be required with respect to a limited and appropriate resource adequacy requirement for users of the ISO Controlled Grid. Thus, as it pertains to the process for resolving resource adequacy related issues going forward, the

ISO thinks that the State activities should be the primary forum for addressing certain fundamental resource adequacy-related issues. To support those efforts, the ISO Board, at its November meeting, passed a resolution that directed management to file at the Commission a request to defer action on the ISO's ACAP proposal and for management to reassess the need for such a requirement upon conclusion of the State efforts currently underway, but no later than November 1, 2003. Shortly, the ISO will file a motion requesting that the Commission defer action on the ACAP proposal.

Notwithstanding the State efforts, the ISO supports continuation of the RAWG discussions. To date, there has been broad participation in the RAWG discussions, with participation by the state's investor-owned utilities, direct access providers, municipal utility systems, generators, State agencies and, of course, the ISO. The RAWG's broad-based discussion forum has been effective in vetting and fully understanding the implications for various entities' participation in the ISO's markets.

Subsequent to the November ISO Governing Board meeting, the RAWG discussed the going-forward process for addressing these issues. It is the ISO's understanding that most participants in the RAWG process support continuing those discussions. To that end, and to ensure that the views of RAWG participants are shared with other participants in the State proceedings, certain of the State agencies agreed to hold workshops to discuss further resource adequacy related issues and their interrelationship with the ISO's MD02 effort. Specifically, in what is likely to be the first of a series of State-sponsored

workshops regarding this matter, the California Consumer Power and Conservation Financing Authority ("CPA") is sponsoring, on January 8, 2003, an open workshop to discuss reserve margin requirements and other matters related to resource adequacy. It is the ISO's understanding that the California Public Utilities Commission ("CPUC") and the California Energy Commission ("CEC") also intend to hold open workshops regarding matters pertinent to the CPUC's procurement rulemaking and the CEC's development of a state-wide integrated plan. The ISO fully supports those efforts and intends to engage in those discussions.

Finally, the ISO also supports continuation of RAWG discussions focused specifically on the ISO's MD02 proposal. A number of issues related to resource adequacy will have a direct impact on the resolution of Phase II and III implementation issues and vice versa. For example, the manner and extent to which resources are compensated and qualify (i.e., are rated) for resource adequacy purposes will have a direct bearing on the "availability" requirements placed on those resources in the ISO's markets. As outlined in the ISO's original MD02 filing, on a long-term basis the ISO envisions that whatever resource adequacy mechanism or framework is in place will supplant aspects of the existing Must Offer Obligation. While that view is not universally shared, the interrelationship between these elements is, the ISO contends, self-evident. In addition, the resolution of issues related to the final form and structure of the integrated forward markets – specifically the optimization program – will have a direct impact on how resource adequacy subscribed resources are used in the

ISO's markets and reliability programs. Once again, this could influence both the compensation to and the availability requirements of these resources. For example, a key issue for resolution with respect to the ISO's proposed integrated forward markets is the use, by the ISO, of energy or use-limited resources in the context of the IFM's optimization program and the Residual Unit Commitment process. As stated repeatedly by the ISO, resolution of these issues cannot be done in a piecemeal or sequential manner. Thus, if MD02 implementation is to proceed and successfully result in an integrated design, all parties need to address these issues expeditiously. RAWG discussion should continue so as to ensure an integrated comprehensive market design package. The ISO does not suggest, however, that this should in any way diminish the State's legitimate and primary role in developing a resource adequacy policy framework and mechanism(s) for California.

V. OTHER ISO COLLABORATION EFFORTS

A. California Department of Water Resources State Water Project Issues

As the result of comments made by representatives of the California Department of Water Resources' State Water Project ("SWP") on the ISO's market redesign filings and at the December 9, 2002 Technical Conference, Commission staff directed the ISO to work with SWP and try to determine how SWP's special-purpose hydroelectric resources could better participate in the ISO's proposed markets. On January 9, 2003, ISO technical staff and SWP technical staff met to discuss a list of approximately twelve issues SWP staff

identified as important to enhancing SWP's participation in the current and future ISO markets. The discussions resolved several of the issues and initiated further ISO/SWP efforts to resolve the other issues. The ISO and SWP will jointly prepare a paper detailing the resolution or status of all these issues which the ISO will report on in future monthly Status Report.

B. U.S. Department Of Energy

Also as a result of Commission Staff comments expressed at the Technical Conference on December 9, 2002, the ISO was directed to initiate communications with the U.S. Department of Energy to assist the ISO in determining the adequacy of meter data as an input to the full network model and state estimator. The ISO has yet to establish the appropriate contact at the DOE to further this discussion. It should be noted that the ISO has recently been successful in deriving a convergent State Estimation solution with data made available by the incumbent Transmission Owners.

VI. CONCLUSION

In Section III of this Report, the ISO has responded to the Commission's request for specific information on progress, critical issues, budget and alternative methods for the MD02 effort. This Section III will be the format the ISO will employ in subsequent Status Reports. Inasmuch as this is the first such monthly report, and in response to certain additional requests for information from Commission Staff, the ISO has included, as a one-time-only filing, additional information on budget, the MD02 planning processes and ISO outreach efforts with Market Participants and other entities. The ISO hopes that the inclusion of this additional information will help this Status Report serve as a reference report for future use and as a background review for all interested parties. The ISO thanks the Commission for the opportunity to comment and report on the progress being made in MD02.

Respectfully submitted,

Anthony Ivancovich /JMV

Charles F. Robinson
Anthony Ivancovich

Counsel for the California Independent
Operator Corporation

Dated: January 10, 2003

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon the Public Utilities Commission of the State of California, upon all parties of the official service lists maintained by the Secretary for Docket Nos. ER02-1656-000 and EL01-68-017.

Dated at Folsom, California, this 10th day of January, 2003.

Anthony Ivancovich /dmm

Anthony Ivancovich
The California Independent System
Operator Corporation
151 Blue Ravine Road
Folsom, California 95630

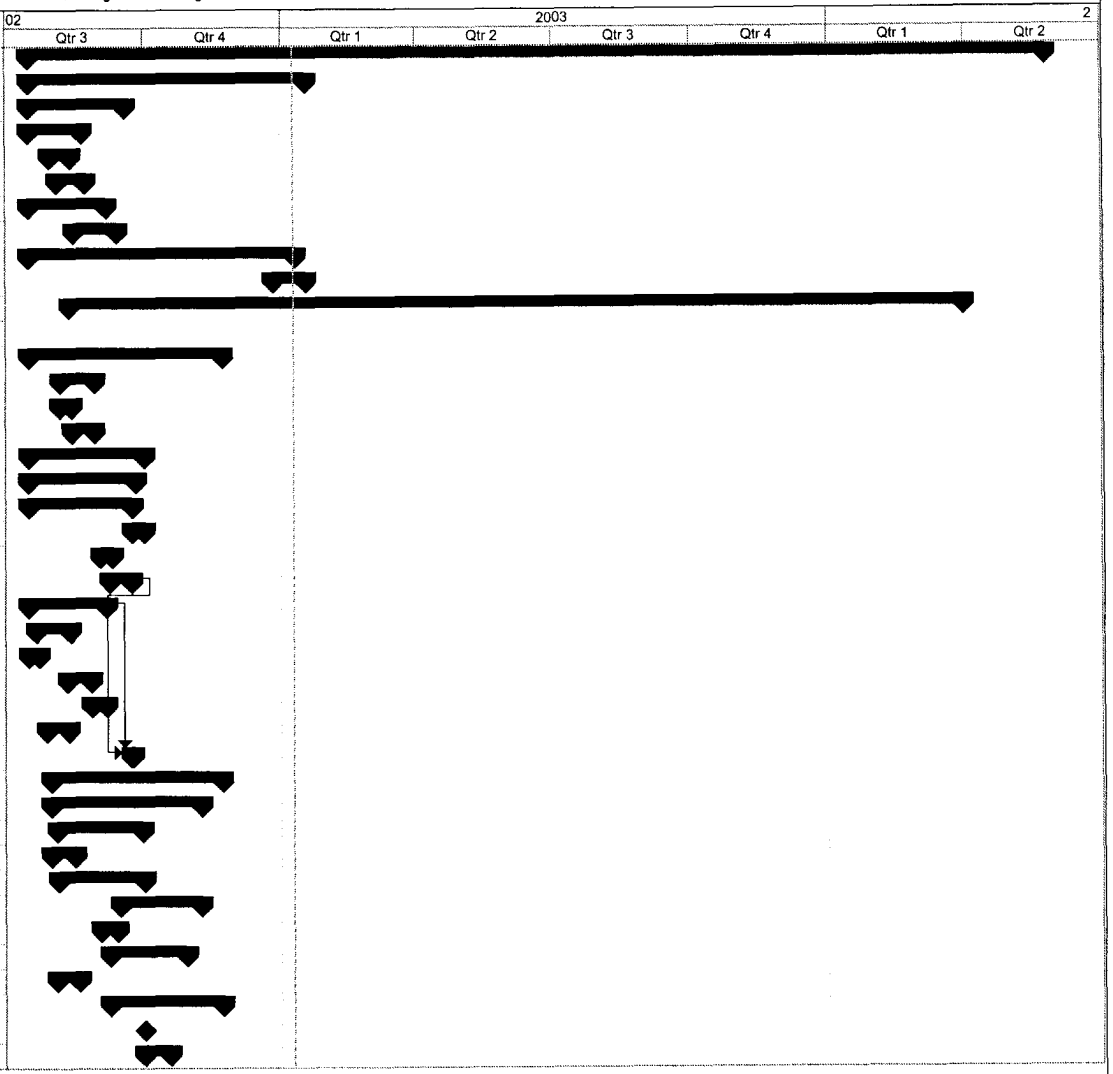
ATTACHMENT A

Attachment A - MD02 Program Plan - High Level

CAISO MD02 Program Plan - High Level

Thu 1/9/03

ID	Task Name	Predecessors
1	**MD02 Program**	
2	**Program Initiation**	
3	**PMO Initiation (Inception)**	
54	**Define Communications Strategy**	
68	**Define Regulatory communication strategy**	
71	**Define Vendor Management Strategy**	
78	**Develop MD02 IT Strategy**	
109	**Develop Overall MD02 Testing Strategy and Approach**	
116	**Training Strategy**	
147	**TRAINING DESIGN--PHASE INDEPENDENT**	
156	**Policy Issues (Non Phase Specific)**	
189		
190	**Phase 1A**	
191	**Initiation (Inception) Stage**	
192	**Create project team(s)**	
195	**Complete Formal Approval for Phase 1A**	
198	**Planning (Elaboration) Stage**	
199	**Define business requirements**	
236	**Define IT Environment Requirements**	
276	**Create Phase-level rollup SOW**	
281	**Finalize scope**	
284	**Update Market Rules (Tariff)**	
288	**Business Process Analysis**	
289	**Describe the Elementary and Common Processes**	
297	**Develop Business Model (Phase level)**	
301	**Define Business/Use Cases (Project Level)**	
311	**Define high level conceptual data model**	
315	**Install/Test Development Infrastructure**	
322	**Conduct QA Review**	**284,288**
325	**Execution/Control (Construction) Stage**	
326	**Projects**	
327	**AMP**	
406	**DMA Reporting - Weekly reporting of 12 month market index**	
415	**RLC**	
494	**Procedural Market Modifications**	
519	**Install/Test Testing Infrastructure**	
527	**Training**	
563	**Install/Test Production Infrastructure**	
570	**Implementation**	
593	**Phase 1a Operational**	**577**
594	**Phase 1a Closeout (Transition) Stage**	

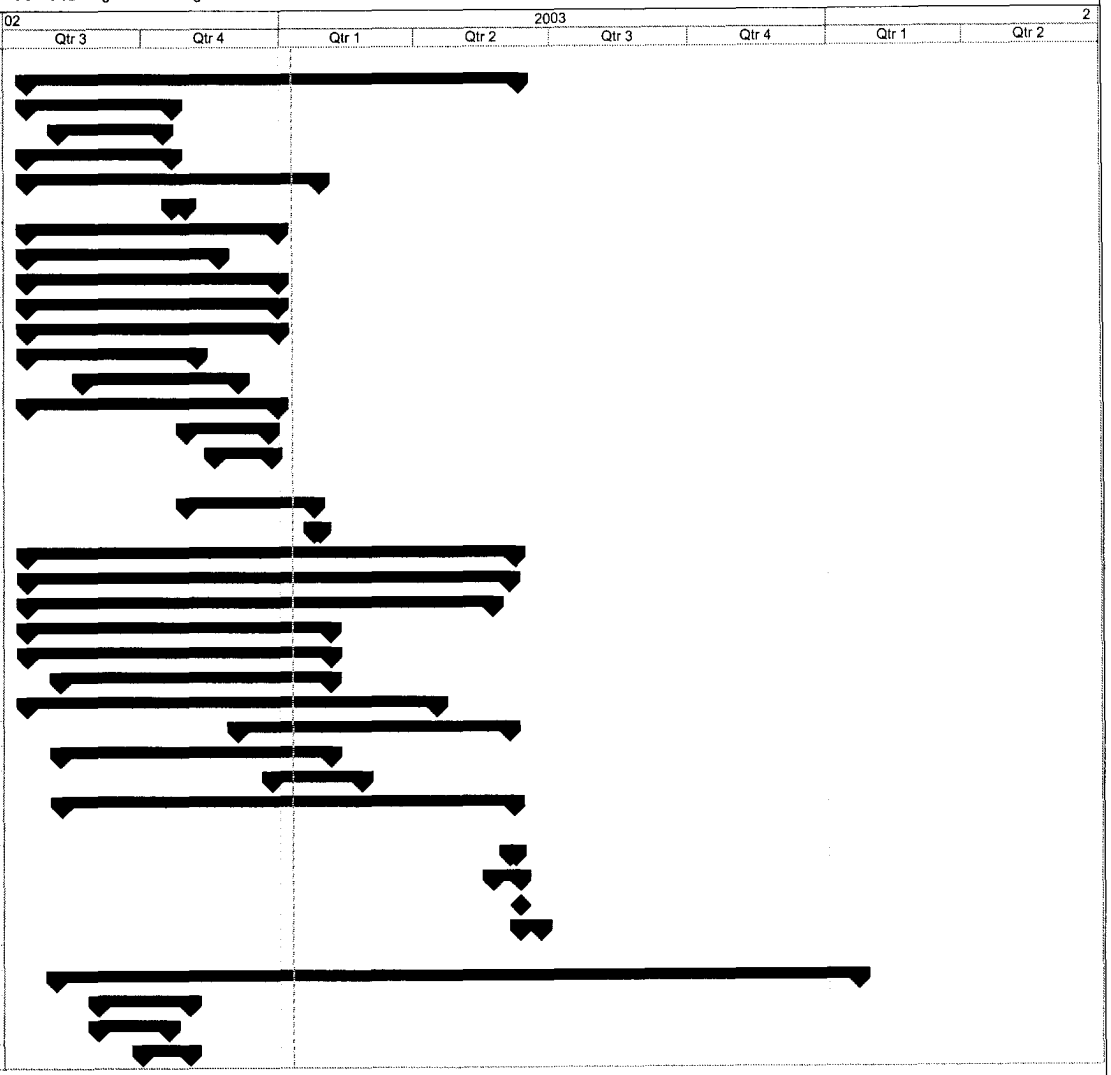


Attachment A - MD02 Program Plan - High Level

CAISO MD02 Program Plan - High Level

Thu 1/9/03

ID	Task Name	Predecessors
602		
603	**Phase 1b**	
604	**Initiation (Inception) Stage**	
605	**Create project team(s)**	
627	**Complete Formal Approval**	
649	**Planning (Elaboration) Stage**	
650	**Finalize scope for Phase 1b**	
653	**Business Process Analysis**	
654	**Security Constrained Economic Dispatch (SCED)**	
721	**Modifications to SLIC**	
788	**Modifications to Master-File**	
853	**Modifications to ADS, REDS**	
918	**Compliance Systems - UID Penalties/No Pay**	
997	**Settlements Mods (RT Energy Settlements/UID Penalty/No Pay Mods)**	
1062	**SI-Workspace**	
1127	**Create Phase-level rollup SOW**	
1137	**Define IT Environment Requirements (pre-installation)**	
1165	**Install/Test Development Infrastructure**	
1194	**Update Market Rules**	
1202	**Conduct QA Review**	
1205	**Execution/Control (Construction) Stage**	
1206	**Projects**	
1207	**Security Constrained Economic Dispatch (SCED)**	
1287	**Modifications to SLIC**	
1367	**Modifications to Master-File**	
1447	**Modifications to ADS**	
1527	**Compliance Systems - UID Penalties/No Pay**	
1608	**Settlements Mods (RT Energy Settlements/UID Penalty/No Pay Mods)**	
1689	**SI-Workspace**	
1769	**Install/Test Testing Infrastructure**	
1798	**Training**	
1889	**Install/Test Production Infrastructure**	
1918	**QA Review**	
1925	**Implementation**	
1989	**Phase 1b Operational**	1934,1970,1975
1990	**Phase 1b Closeout (Transition) Stage**	
1999		
2000	**Phase 2**	
2001	**Initiation (Inception) Stage**	
2002	**Create project team(s)**	
2015	**Complete Formal Approval**	

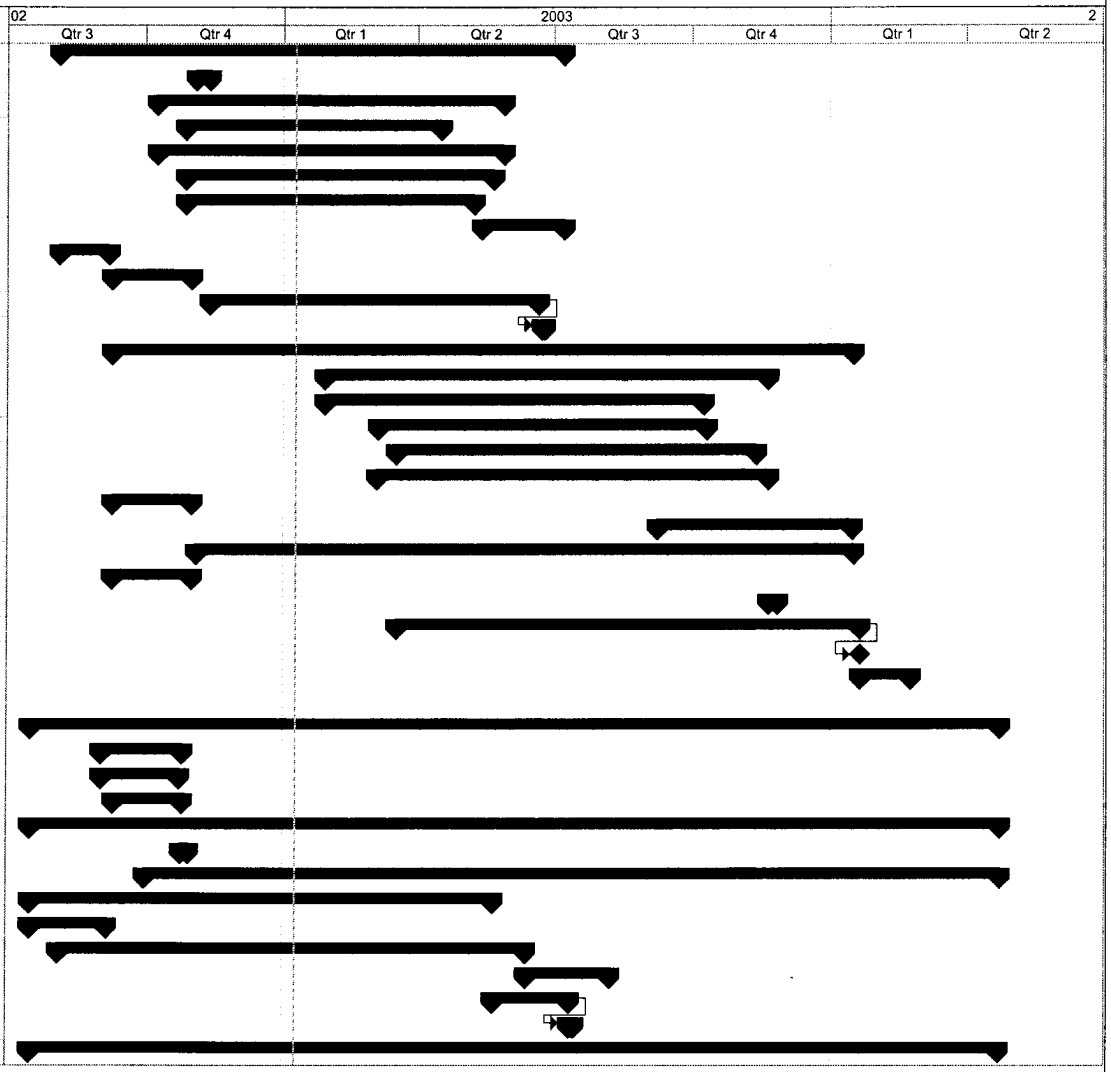


Attachment A - MD02 Program Plan - High Level

CAISO MD02 Program Plan - High Level

Thu 1/9/03

ID	Task Name	Predecessors
2028	Planning (Elaboration) Stage	
2029	Finalize scope for Phase 2	
2032	Business Process Analysis	
2033	Integrated Forward Markets (IFM)	
2118	Masterfile Mods (MFRD-2)	
2199	Market Transactions System (MTS)	
2279	Settlements	
2362	Create Phase-level rollup SOW	
2372	Define IT Environment Requirements (pre-installation)	
2411	Install/Test Development Infrastructure	
2440	Update Market Rules	
2447	Conduct QA Review	2440
2450	Execution/Control (Construction) Stage	
2451	Projects	
2452	Integrated Forward Markets (IFM)	
2498	MFRD	
2544	Market Transactions System (MTS)	
2590	Settlements Mods-2	
2637	Install/Test Testing Infrastructure	
2666	Integrated Testing	
2708	Training	
2799	Install/Test Production Infrastructure	
2828	QA Review	
2835	Implementation	
2878	Phase 2 Operational	2835
2879	Phase 2 Closeout (Transition) Stage	
2888		
2889	Phase 3	
2890	Initiation (Inception) Stage	
2891	Create project team(s)	
2910	Complete Formal Approval	
2929	Planning (Elaboration) Stage	
2930	Finalize scope for phase 3	
2933	LMP Phase III Studies	
2952	Business Process Analysis	
3739	Create Phase-level rollup SOW	
3749	Define IT Environment Requirements (pre-installation)	
3788	Install/Test Development Infrastructure	
3817	Update Market Rules	
3824	Conduct QA Review	3817
3827	Execution/Control (Construction) Stage	

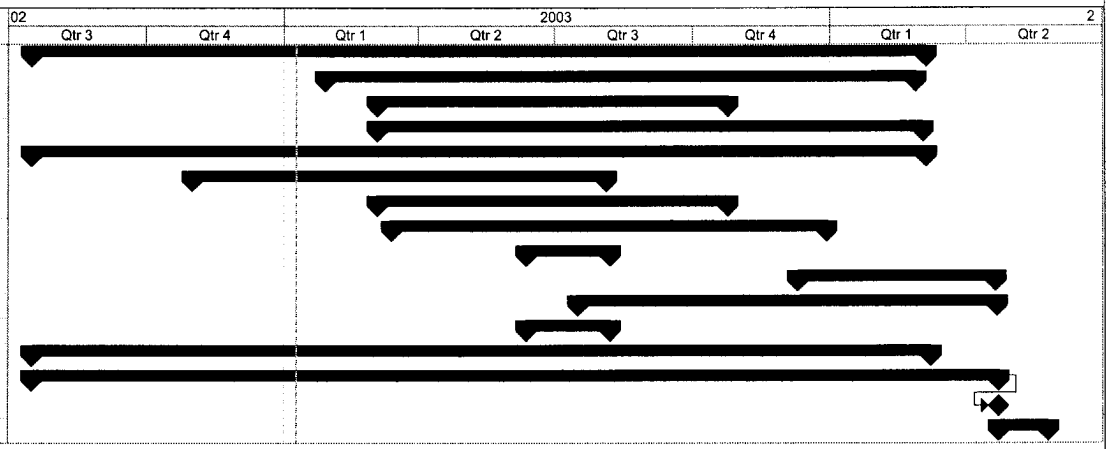


Attachment A - MD02 Program Plan - High Level

CAISO MD02 Program Plan - High Level

Thu 1/9/03

ID	Task Name	Predecessors
3828	**Projects**	
3829	**Locational Marginal Pricing (LMP) using Full Network Model (FNM)**	
3890	**DMA Mods (upgrad tools for LMP)**	
3936	**Settlements Mods-3**	
3983	**Transmission and Contract Optimization System (TCOS)**	
4278	**Congestion Revenue Rights (CRR/FTR)**	
4324	**Scheduling Inteface Graphical User Interface (SI-GUI)**	
4370	**Master File Re-Design (MFRD-3)**	
4416	**Install/Test Testing Infrastructure**	
4445	**Integrated Testing**	
4489	**Training**	
4570	**Install/Test Production Infrastructure**	
4599	**QA Review**	
4606	**Implementation**	
4681	**Phase 3 Operational**	**4606**
4682	**Phase 3 Closeout (Transition) Stage**	



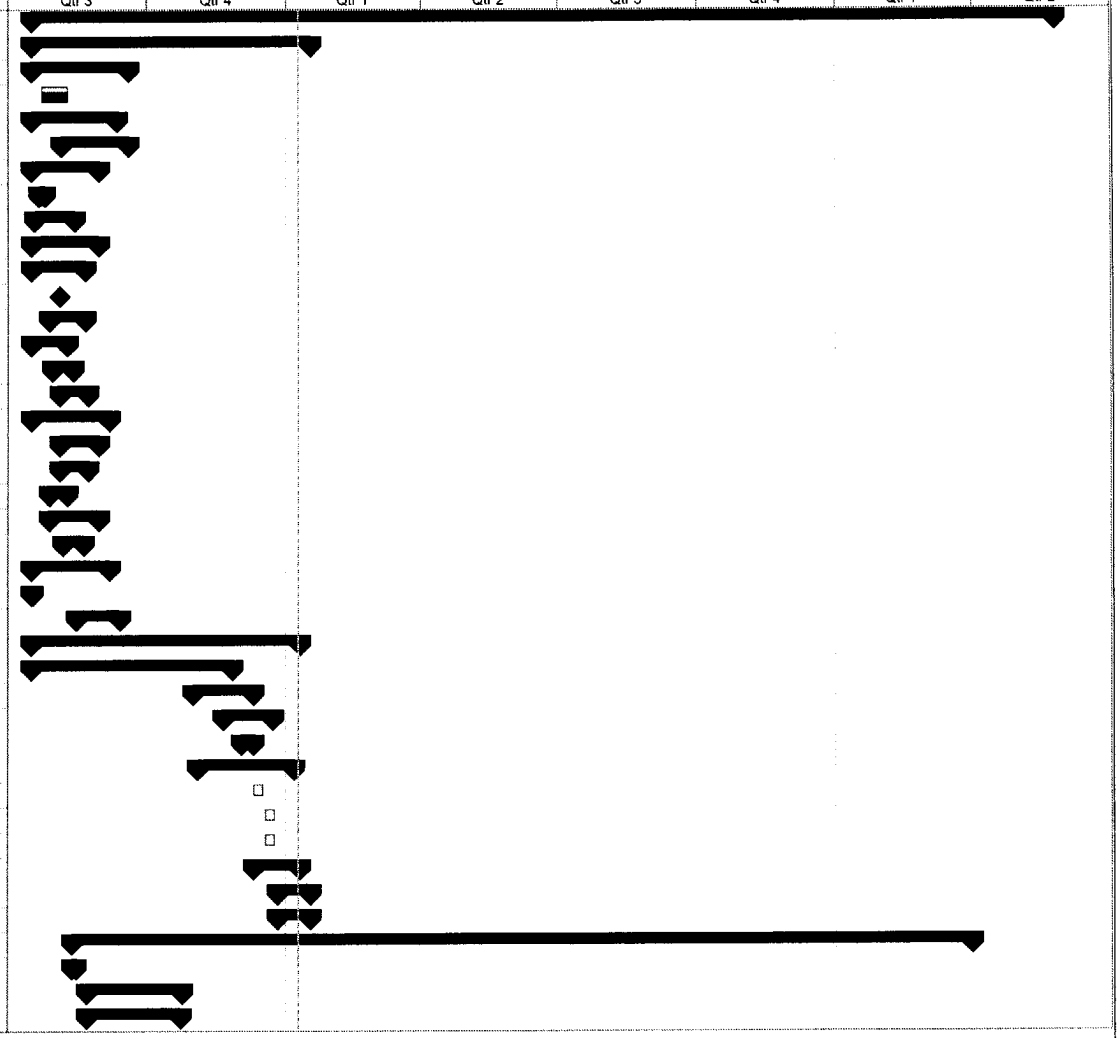
ATTACHMENT B

Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

Thu 1/9/03

ID	Task Name	Predecessors
1	**MD02 Program**	
2	**Program Initiation**	
3	**PMO Initiation (Inception)**	
4	Create Project Charter	
5	**Define Conceptual Scope (MD02 Implementation Strategy)**	
14	**Complete Formal Approval**	
17	**Create PMO**	
18	**Define roles and responsibilities**	
21	**Define PMO scope and control mechanisms**	
46	**Identify and mobilize staff**	
54	**Define Communications Strategy**	
55	Hold MD02 Team Kickoff Meeting	
56	**Create communication framework**	
62	**Define Market Participant communication strategy**	
68	**Define Regulatory communication strategy**	
71	**Define Vendor Management Strategy**	
78	**Develop MD02 IT Strategy**	
79	**Implement IT control process**	
82	**Conform MD02 to IT Standards**	
91	**Specify application architecture (Preferred)**	
94	**Identify Integration System Issues, Strengths, Weaknesses, and Threats**	
97	**Define IT Testing Strategy**	
102	**Develop IT Infrastructure Transition Strategy**	
107	**Develop MD02 Grid Operations Strategy**	
109	**Develop Overall MD02 Testing Strategy and Approach**	
116	**Training Strategy**	
117	**DEFINE BUSINESS ENVIRONMENT**	
120	**DEFINE AUDIENCE & TRAINING NEEDS**	
127	**ASSESS TRAINING AND FACILITIES INFRASTRUCTURE**	
134	**DETERMINE TRAINING DATABASE STRATEGY**	
136	**ASSESS EPSS/LMS CAPABILITIES**	
139	DETERMINE SCHEDULING STRATEGY	
140	DETERMINE GO-LIVE SUPPORT STRATEGY	
141	DETERMINE POST-IMPLEMENTATION STRATEGY	
142	**FINALIZE LEARNING STRATEGY**	
147	**TRAINING DESIGN--PHASE INDEPENDENT**	
148	**DEVELOP STANDARDS & TEMPLATES**	
156	**Policy Issues (Non Phase Specific)**	
157	**Complete FERC Technical Conferences**	
159	**Working Groups**	158
160	**Resource Adequacy Working Group (RAWG)**	

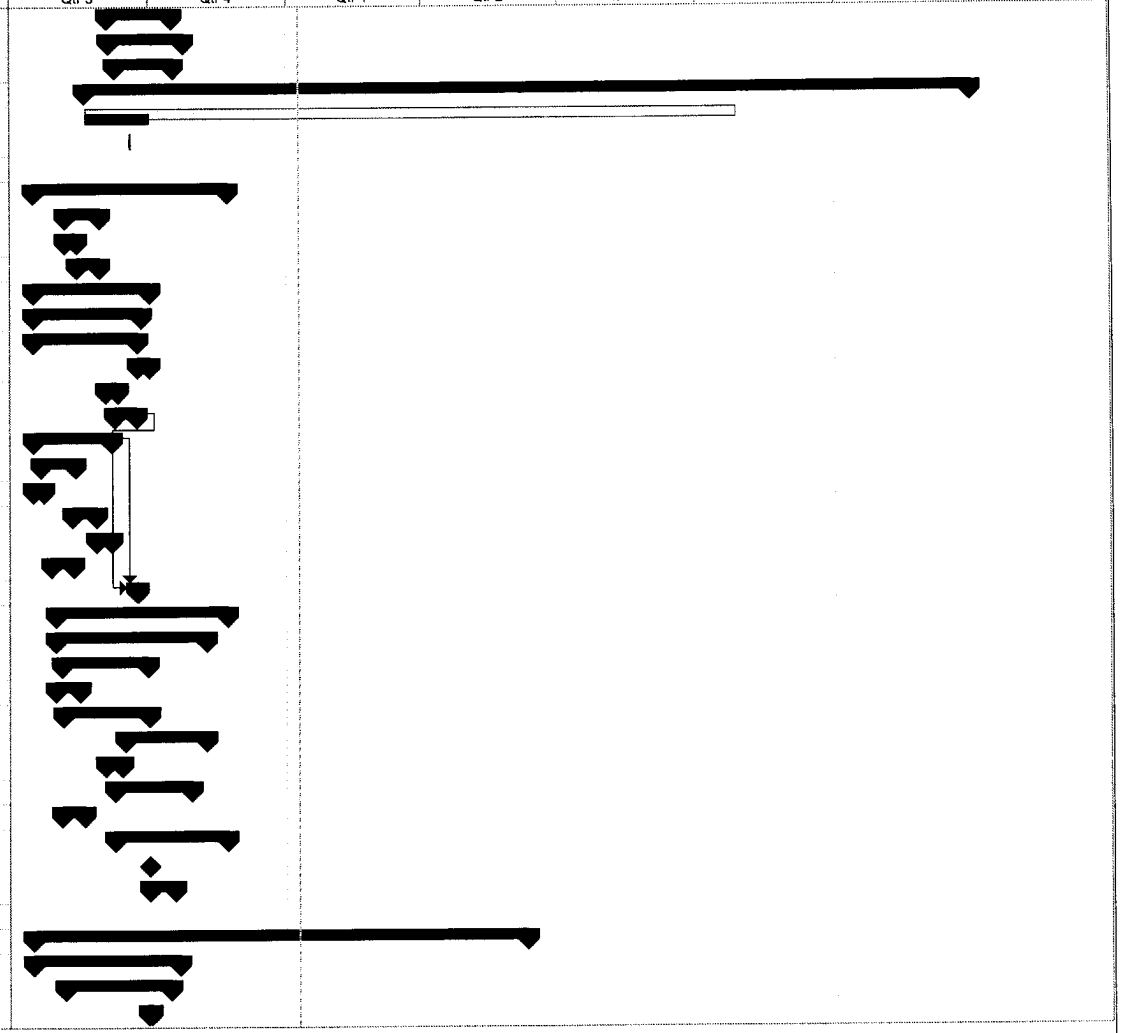


Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

Thu 1/9/03

ID	Task Name	Predecessors
166	**Integrated Markets Working Group**	
171	**LMP & FTR's Working Group**	
176	**Interim Markets Working Group**	
181	**Complete Regulatory Filings**	
187	Stakeholder Interventions - On going	182
188	Board Approvals	
189		
190	**Phase 1A**	
191	**Initiation (Inception) Stage**	
192	**Create project team(s)**	
195	**Complete Formal Approval for Phase 1A**	
198	**Planning (Elaboration) Stage**	
199	**Define business requirements**	
236	**Define IT Environment Requirements**	
276	**Create Phase-level rollup SOW**	
281	**Finalize scope**	
284	**Update Market Rules (Tariff)**	
288	**Business Process Analysis**	
289	**Describe the Elementary and Common Processes**	
297	**Develop Business Model (Phase level)**	
301	**Define Business/Use Cases (Project Level)**	
311	**Define high level conceptual data model**	
315	**Install/Test Development Infrastructure**	
322	**Conduct QA Review**	**284,288**
325	**Execution/Control (Construction) Stage**	
326	**Projects**	
327	**AMP**	
406	**DMA Reporting - Weekly reporting of 12 month market index**	
415	**RLC**	
494	**Procedural Market Modifications**	
519	**Install/Test Testing Infrastructure**	
527	**Training**	
563	**Install/Test Production Infrastructure**	
570	**Implementation**	
593	**Phase 1a Operational**	**577**
594	**Phase 1a Closeout (Transition) Stage**	
602		
603	**Phase 1b**	
604	**Initiation (Inception) Stage**	
605	**Create project team(s)**	
606	**Security Constrained Economic Dispatch (SCED)**	



Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

Thu 1/9/03

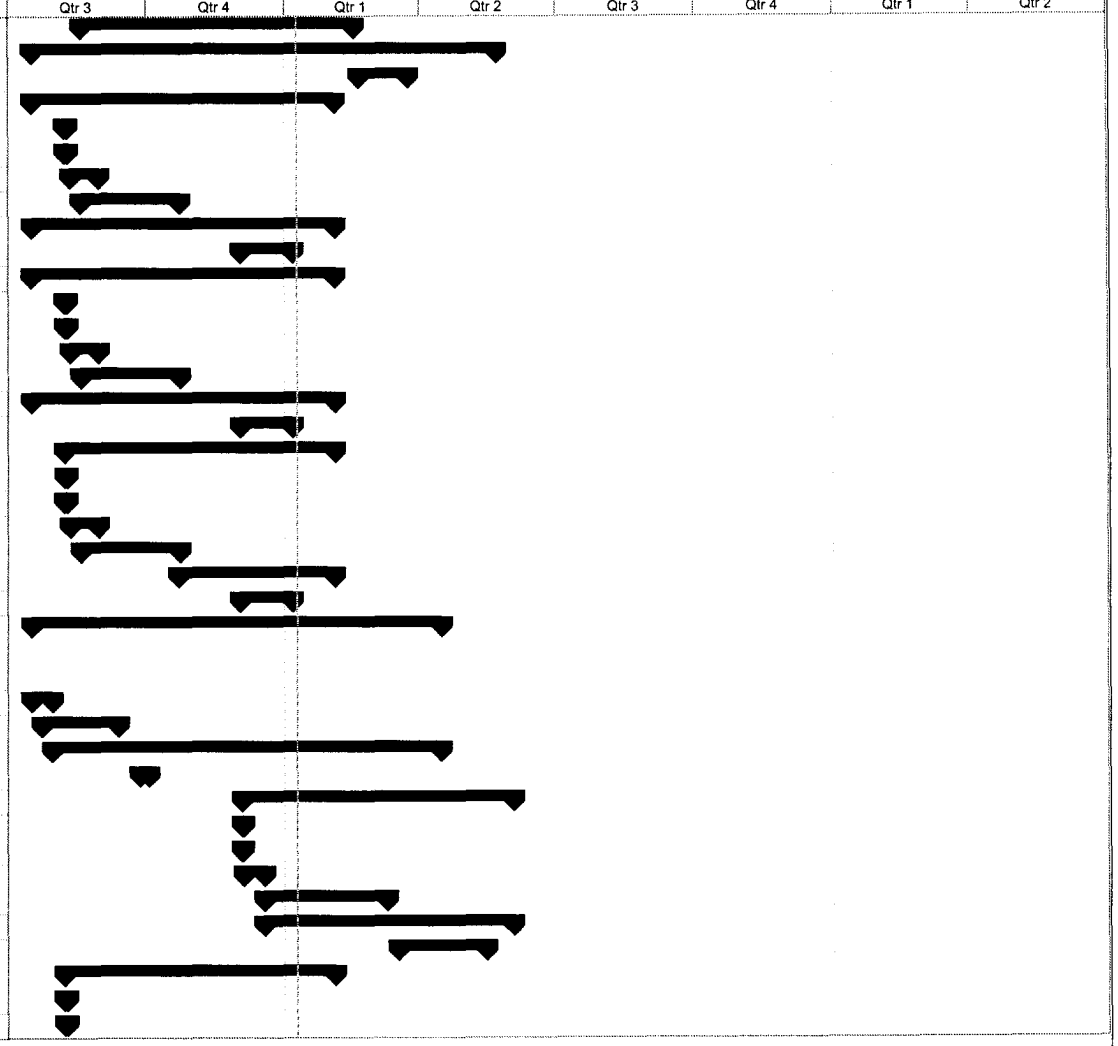
ID	Task Name	Predecessors
609	**Modifications to SLIC**	
612	**Modifications to Master-File**	
615	**Modifications to ADS, REDS**	
618	**Compliance Systems - UID Penalties/No Pay**	
621	**Settlements Mods (RT Energy Settlements/UID Penalty/No Pay Mods)**	
624	**SI-Workspace**	
627	**Complete Formal Approval**	
628	**Security Constrained Economic Dispatch (SCED)**	
631	**Modifications to SLIC**	
634	**Modifications to Master-File**	
637	**Modifications to ADS, REDS**	
640	**Compliance Systems - UID Penalties/No Pay**	
643	**Settlements Mods (RT Energy Settlements/UID Penalty/No Pay Mods)**	
646	**SI-Workspace**	
649	**Planning (Elaboration) Stage**	
650	**Finalize scope for Phase 1b**	
653	**Business Process Analysis**	
654	**Security Constrained Economic Dispatch (SCED)**	
721	**Modifications to SLIC**	
788	**Modifications to Master-File**	
853	**Modifications to ADS, REDS**	
918	**Compliance Systems - UID Penalties/No Pay**	
997	**Settlements Mods (RT Energy Settlements/UID Penalty/No Pay Mods)**	
1062	**SI-Workspace**	
1127	**Create Phase-level rollup SOW**	
1137	**Define IT Environment Requirements (pre-installation)**	
1138	Identify resources	1051
1139	Determine tool requirements (Phase Specific)	1138
1140	**Complete IT system engineering**	
1145	**Complete network engineering**	
1150	**Complete integration engineering**	
1160	**Complete Security Engineering**	
1165	**Install/Test Development Infrastructure**	
1194	**Update Market Rules**	
1202	**Conduct QA Review**	
1205	**Execution/Control (Construction) Stage**	
1206	**Projects**	
1207	**Security Constrained Economic Dispatch (SCED)**	
1208	**Vendor / IT**	
1209	**Define Vendor checkpoint reviews**	
1212	**Complete Detailed Design**	

Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

Thu 1/9/03

ID	Task Name	Predecessors
1215	Develop Application	
1223	Testing	
1274	Create Technical Documentation	
1287	Modifications to SLIC	
1288	Vendor / IT	
1289	Define Vendor checkpoint reviews	
1292	Complete Detailed Design	
1295	Develop Application	
1303	Testing	
1354	Create Technical Documentation	
1367	Modifications to Master-File	
1368	Vendor / IT	
1369	Define Vendor checkpoint reviews	
1372	Complete Detailed Design	
1375	Develop Application	
1383	Testing	
1434	Create Technical Documentation	
1447	Modifications to ADS	
1448	Vendor / IT	
1449	Define Vendor checkpoint reviews	
1452	Complete Detailed Design	
1455	Develop Application	
1463	Testing	
1514	Create Technical Documentation	
1527	Compliance Systems - UID Penalties/No Pay	
1528	Vendor / IT	
1529	Define Vendor checkpoint reviews	
1532	Complete Detailed Design	
1535	Develop Application	
1544	Testing	
1595	Create Technical Documentation	
1608	Settlements Mods (RT Energy Settlements/UID Penalty/No Pay Mods)	
1609	Vendor / IT	
1610	Define Vendor checkpoint reviews	
1613	Complete Detailed Design	
1616	Develop Application	
1625	Testing	
1676	Create Technical Documentation	
1689	SI-Workspace	
1690	Vendor / IT	
1691	Define Vendor checkpoint reviews	

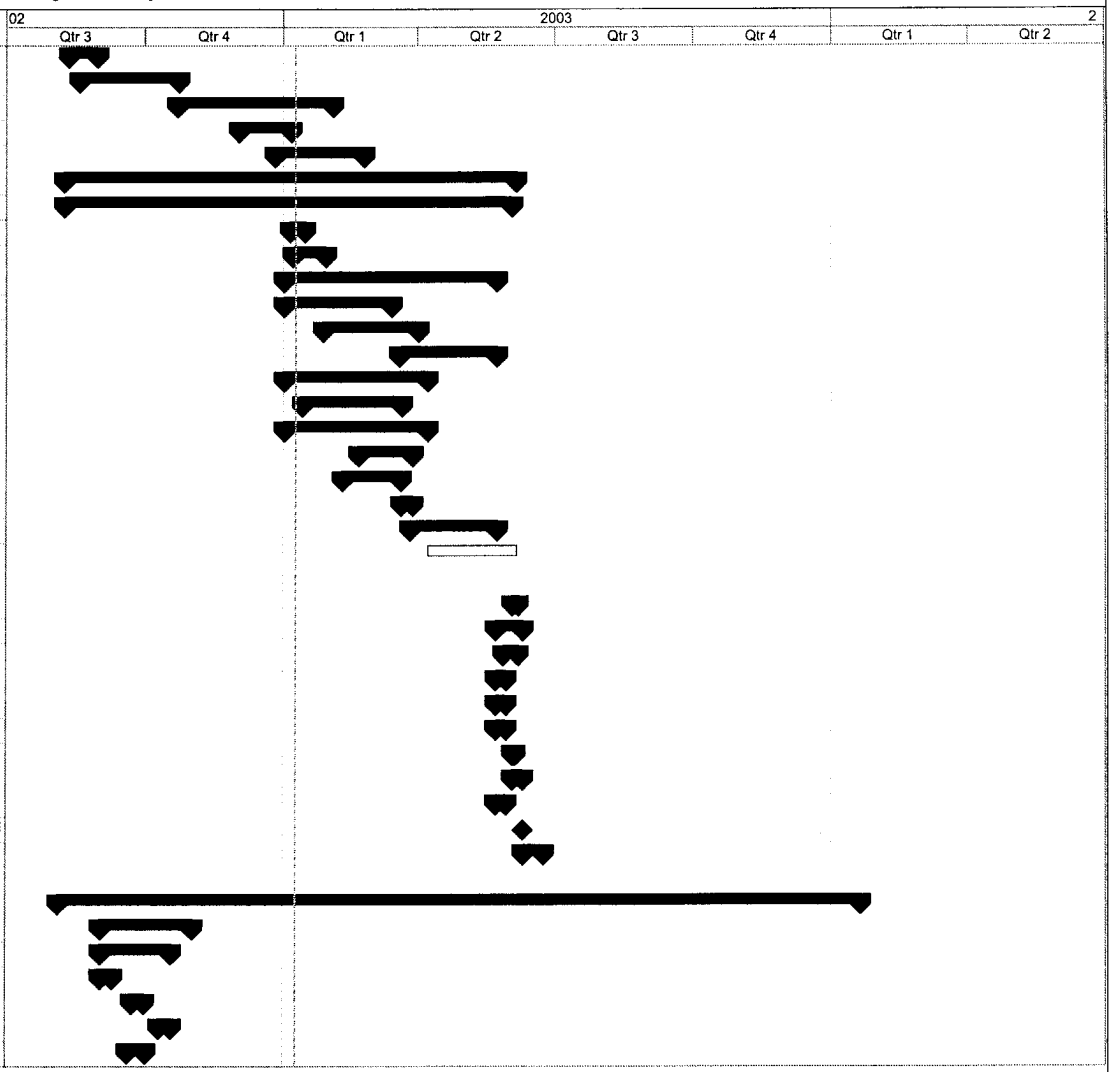


Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

Thu 1/9/03

ID	Task Name	Predecessors
1694	**Complete Detailed Design**	
1697	**Develop Application**	
1705	**Testing**	
1756	**Create Technical Documentation**	
1769	**Install/Test Testing Infrastructure**	
1798	**Training**	
1799	**Phase 1B PROJECT Construction Stage**	
1802	**TRAINING STRATEGY-PHASE 1B**	
1806	**TRAINING DESIGN -PHASE 1B**	
1821	**TRAINING DEVELOPMENT - PHASE 1B**	
1822	**KICKOFF TRAINING FOR DEVELOPMENT**	
1836	**CBT DEVELOPMENT**	
1845	**EPSS DEVELOPMENT**	
1849	**REGISTRATION PREPARATION**	
1850	**Scheduling**	
1860	**Facilities & Equipment Preparation**	
1866	**TRAINING CLIENT DATABASE**	
1874	**TRAIN-THE-TRAINER**	
1880	**PILOT TRAINING**	
1883	**REVIEW & FINALIZE MATERIALS**	
1888	Phase 1B Training Delivery (overlaps with Summer Seminars)	
1889	**Install/Test Production Infrastructure**	
1918	**QA Review**	
1925	**Implementation**	
1926	**Security Constrained Economic Dispatch (SCED)**	
1935	**Modifications to SLIC**	
1944	**Modifications to Master-File**	
1953	**Modifications to ADS, REDS**	
1962	**Compliance Systems - UID Penalties/No Pay**	
1971	**Settlements Mods (RT Energy Settlements/UID Penalty/No Pay Mods)**	
1980	**SI-Workspace**	
1989	**Phase 1b Operational**	1934,1970,197
1990	**Phase 1b Closeout (Transition) Stage**	
1999		
2000	**Phase 2**	
2001	**Initiation (Inception) Stage**	
2002	**Create project team(s)**	
2003	**Integrated Forward Markets (IFM)**	
2006	**MFRD Phase 2 Roles**	
2009	**Market Transactions System (MTS)**	
2012	**Settlements Mods**	

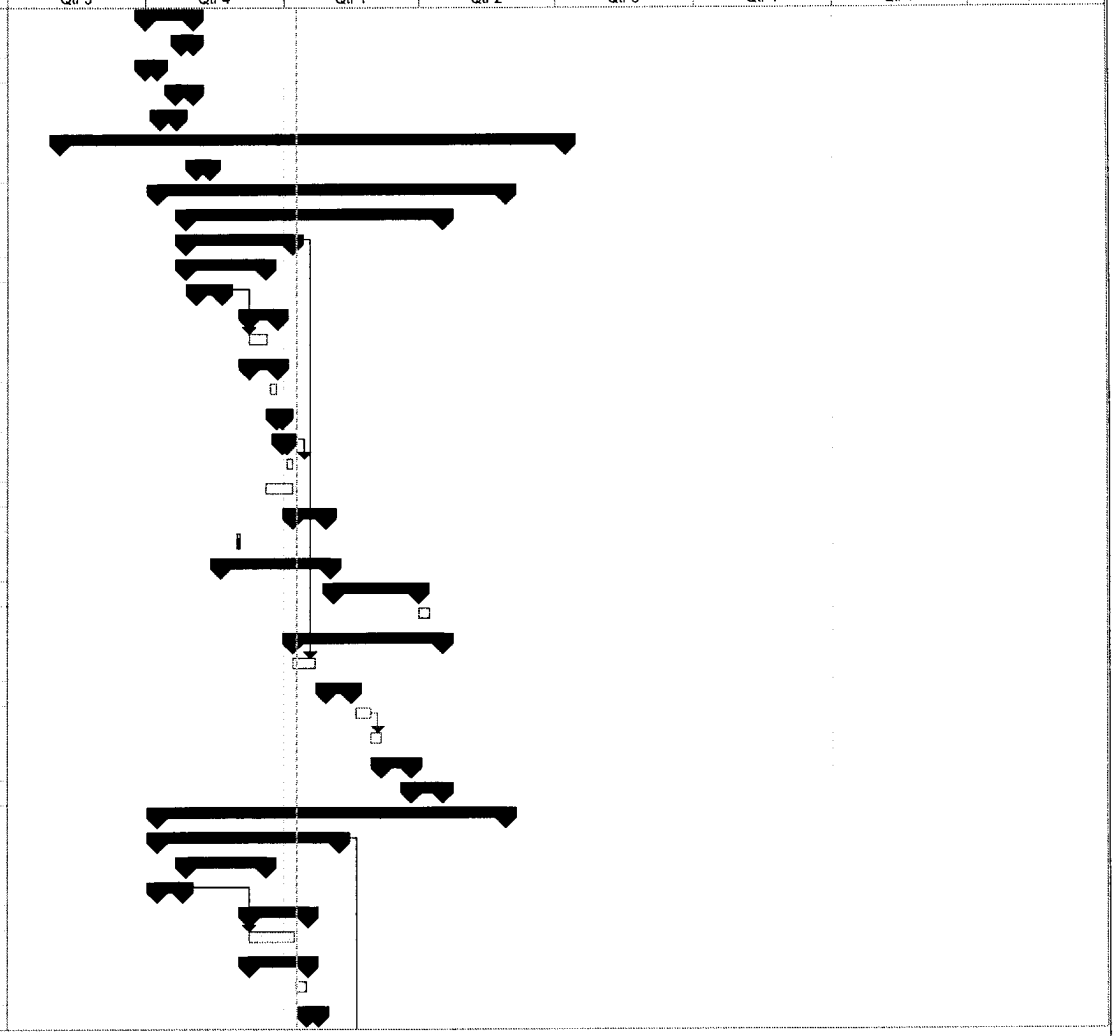


Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

Thu 1/9/03

ID	Task Name	Predecessors
2015	**Complete Formal Approval**	
2016	**Integrated Forward Markets (IFM)**	
2019	**MFRD**	
2022	**Market Transactions System (MTS)**	
2025	**Settlements Mods**	
2028	**Planning (Elaboration) Stage**	
2029	**Finalize scope for Phase 2**	
2032	**Business Process Analysis**	
2033	**Integrated Forward Markets (IFM)**	
2034	**Develop DSOW Inputs**	
2035	**Complete External Stakeholder Process**	
2041	**Create Vision Document**	
2050	**Business Process Design**	
2051	Conduct design sessions	2041
2052	**Collect, analyze, and document findings**	
2063	Prepare Use Case Diagrams	2054
2064	**Prepare Process Descriptions**	
2067	**Prepare Supplementary Business Specification Document**	
2074	Create Conceptual Data Model	2067
2075	FERC 205 Filing to FERC for Jad Session Changes	2040
2076	**Finalize DSOW**	
2081	Determine Sourcing Strategy	2080FF
2082	**Develop RFP (Joint IFM/LMP)**	
2087	**Vendor Selection**	
2094	Define testing exit criteria (test to production)	2093
2095	**Design Requirements**	
2096	Prepare Job Profiles	2034
2097	**Functional Requirements**	
2100	Develop State Transition Diagrams	2099
2101	Software/System Requirements Specification	2100
2102	**Define data models**	
2107	**Define Data Conversion Requirements**	
2118	**Masterfile Mods (MFRD-2)**	
2119	**Develop DSOW Inputs**	
2120	**Complete External Stakeholder Process**	
2126	**Create Vision Document**	
2135	**Business Process Design**	
2136	Conduct design sessions	2126
2137	**Collect, analyze, and document findings**	
2146	Prepare Use Case Diagrams	2139
2147	**Prepare Process Descriptions**	

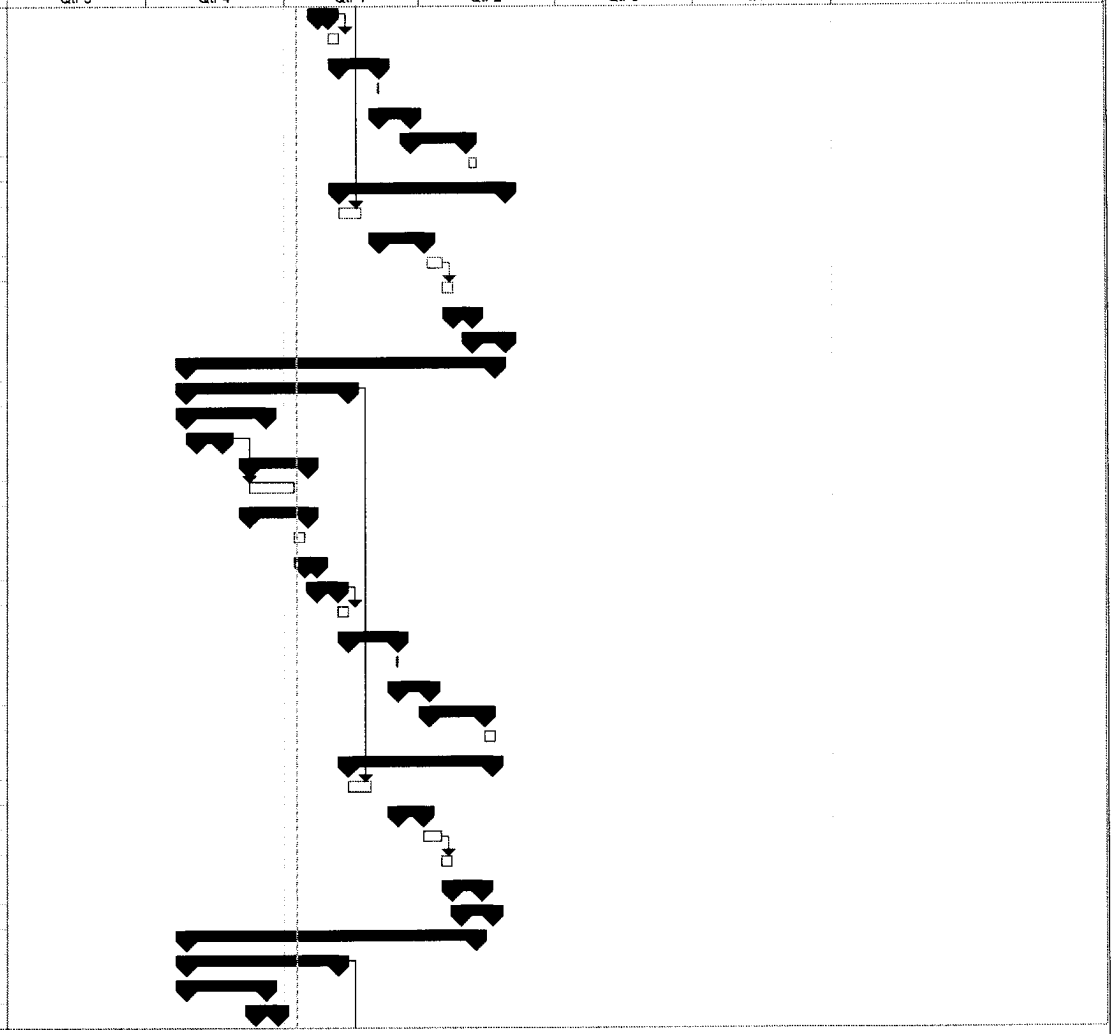


Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

Thu 1/9/03

ID	Task Name	Predecessors
2150	**Prepare Supplementary Business Specification Document**	
2157	Create Conceptual Data Model	2150
2158	**Finalize DSOW**	
2163	Determine Sourcing Strategy	2162FF
2164	**Develop RFP**	
2169	**Vendor Selection**	
2175	Define testing exit criteria (test to production)	2174
2176	**Design Requirements**	
2177	Prepare Job Profiles	2119
2178	**Functional Requirements**	
2181	Develop State Transition Diagrams	2180
2182	Software/System Requirements Specification	2181
2183	**Define data models**	
2188	**Define Data Conversion Requirements**	
2199	**Market Transactions System (MTS)**	
2200	**Develop DSOW Inputs**	
2201	**Complete External Stakeholder Process**	
2207	**Create Vision Document**	
2216	**Business Process Design**	
2217	Conduct design sessions	2207
2218	**Collect, analyze, and document findings**	
2226	Prepare Use Case Diagrams	2220
2227	**Prepare Process Descriptions**	
2230	**Prepare Supplementary Business Specification Document**	
2237	Create Conceptual Data Model	2230
2238	**Finalize DSOW**	
2243	Determine Sourcing Strategy	2242FF
2244	**Develop RFP**	
2249	**Vendor Selection**	
2255	Define testing exit criteria (test to production)	2254
2256	**Design Requirements**	
2257	Prepare Job Profiles	2200
2258	**Functional Requirements**	
2261	Develop State Transition Diagrams	2260
2262	Software/System Requirements Specification	2261
2263	**Define data models**	
2268	**Define Data Conversion Requirements**	
2279	**Settlements**	
2280	**Develop DSOW Inputs**	
2281	**Complete External Stakeholder Process**	
2287	**Create Vision Document**	



Attachment B - MD02 Program Plan - Major Tasks and Milestones

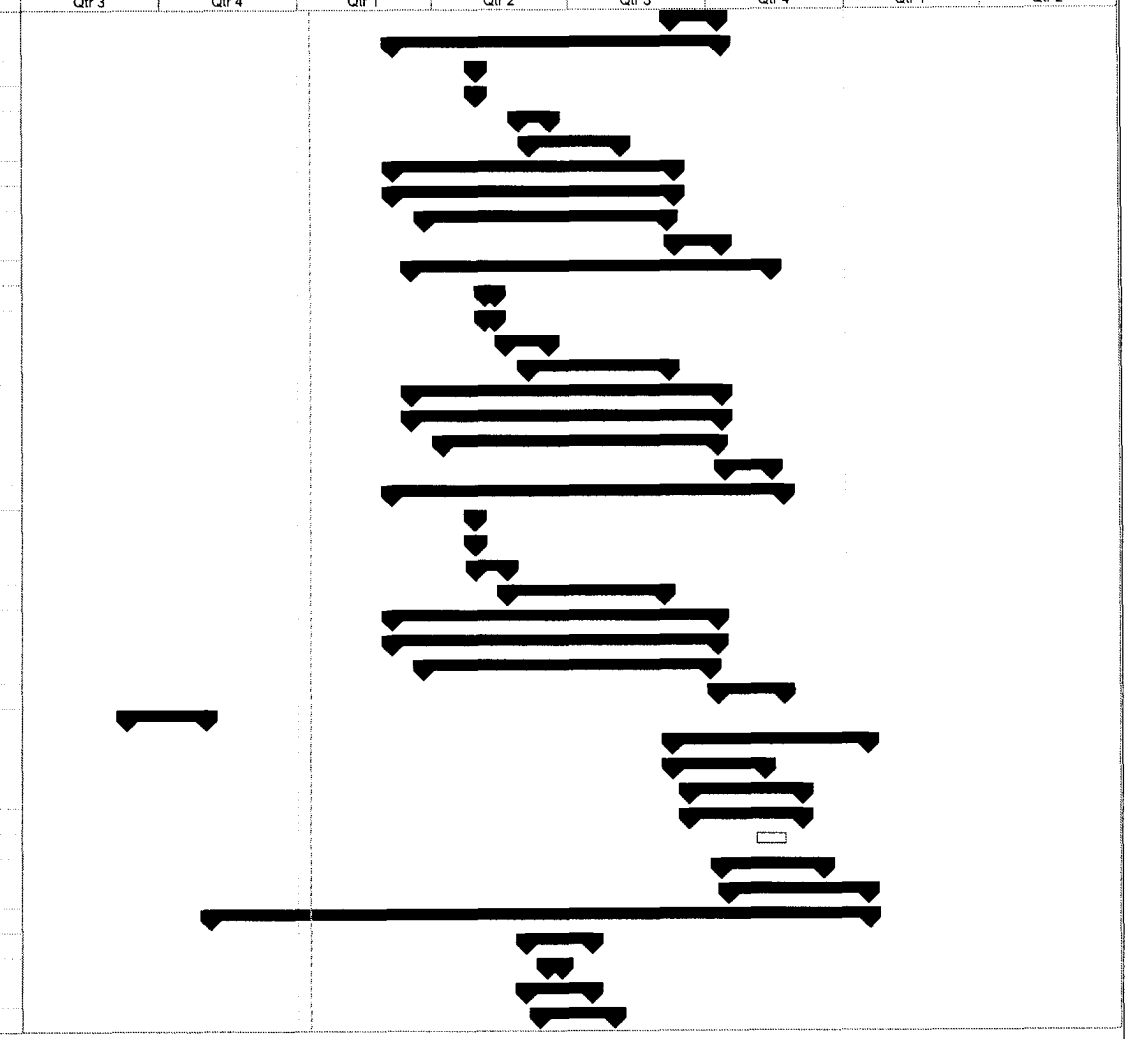
CAISO MD02 Program Plan - Major Tasks and Milestones

Thu 1/9/03

ID	Task Name	Predecessors
2296	**Business Process Design**	
2297	Conduct design sessions	
2298	**Collect, analyze, and document findings**	
2309	Prepare Use Case Diagrams	2300
2310	**Prepare Process Descriptions**	
2313	**Prepare Supplementary Business Specification Document**	
2320	Create Conceptual Data Model	2313
2321	**Finalize DSOW**	
2326	Determine Sourcing Strategy	2325FF
2327	**Develop RFP**	
2332	**Vendor Selection**	
2338	Define testing exit criteria (test to production)	2337
2339	**Design Requirements**	
2340	Prepare Job Profiles	2280
2341	**Functional Requirements**	
2344	Develop State Transition Diagrams	2343
2345	Software/System Requirements Specification	2344
2346	**Define data models**	
2351	**Define Data Conversion Requirements**	
2362	**Create Phase-level rollup SOW**	
2372	**Define IT Environment Requirements (pre-installation)**	
2373	Identify resources	
2374	Determine tool requirements (Phase Specific)	2373
2375	**Complete IT system engineering**	
2380	**Complete network engineering**	
2385	**Complete Integration engineering**	
2395	**Complete Security Engineering**	
2400	**Define Data Conversion Requirements**	
2411	**Install/Test Development Infrastructure**	
2440	**Update Market Rules**	
2447	**Conduct QA Review**	**2440**
2450	**Execution/Control (Construction) Stage**	
2451	**Projects**	
2452	**Integrated Forward Markets (IFM)**	
2453	**Vendor / IT**	
2454	**Define Vendor checkpoint reviews**	
2457	**Complete Detailed Design**	
2460	**Develop Application**	
2468	**Testing**	
2469	**System Test**	
2477	**Load and Performance Test**	

Attachment B - MD02 Program Plan - Major Tasks and Milestones

ID	Task Name	Predecessors
2485	**Create Technical Documentation**	
2498	**MFRD**	
2499	**Vendor / IT**	
2500	**Define Vendor checkpoint reviews**	
2503	**Complete Detailed Design**	
2506	**Develop Application**	
2514	**Testing**	
2515	**System Test**	
2523	**Load and Performance Test**	
2531	**Create Technical Documentation**	
2544	**Market Transactions System (MTS)**	
2545	**Vendor / IT**	
2546	**Define Vendor checkpoint reviews**	
2549	**Complete Detailed Design**	
2552	**Develop Application**	
2560	**Testing**	
2561	**System Test**	
2569	**Load and Performance Test**	
2577	**Create Technical Documentation**	
2590	**Settlements Mods-2**	
2591	**Vendor / IT**	
2592	**Define Vendor checkpoint reviews**	
2595	**Complete Detailed Design**	
2598	**Develop Application**	
2607	**Testing**	
2608	**System Test**	
2616	**Load and Performance Test**	
2624	**Create Technical Documentation**	
2637	**Install/Test Testing Infrastructure**	
2666	**Integrated Testing**	
2667	**Integration Testing**	
2675	**End-to-End Testing**	
2683	**Load and Performance Test**	
2691	Perform Operations Acceptance Testing (Systems/Network/Security)	2689FF
2692	**User Acceptance Testing**	
2700	**Market Testing**	
2708	**Training**	
2709	**TRAINING STRATEGY-PHASE 2**	
2710	**DETERMINE TRAINING DATABASE STRATEGY**	
2713	**CONTINUOUS IMPROVEMENT**	
2717	**TRAINING DESIGN -PHASE 2**	

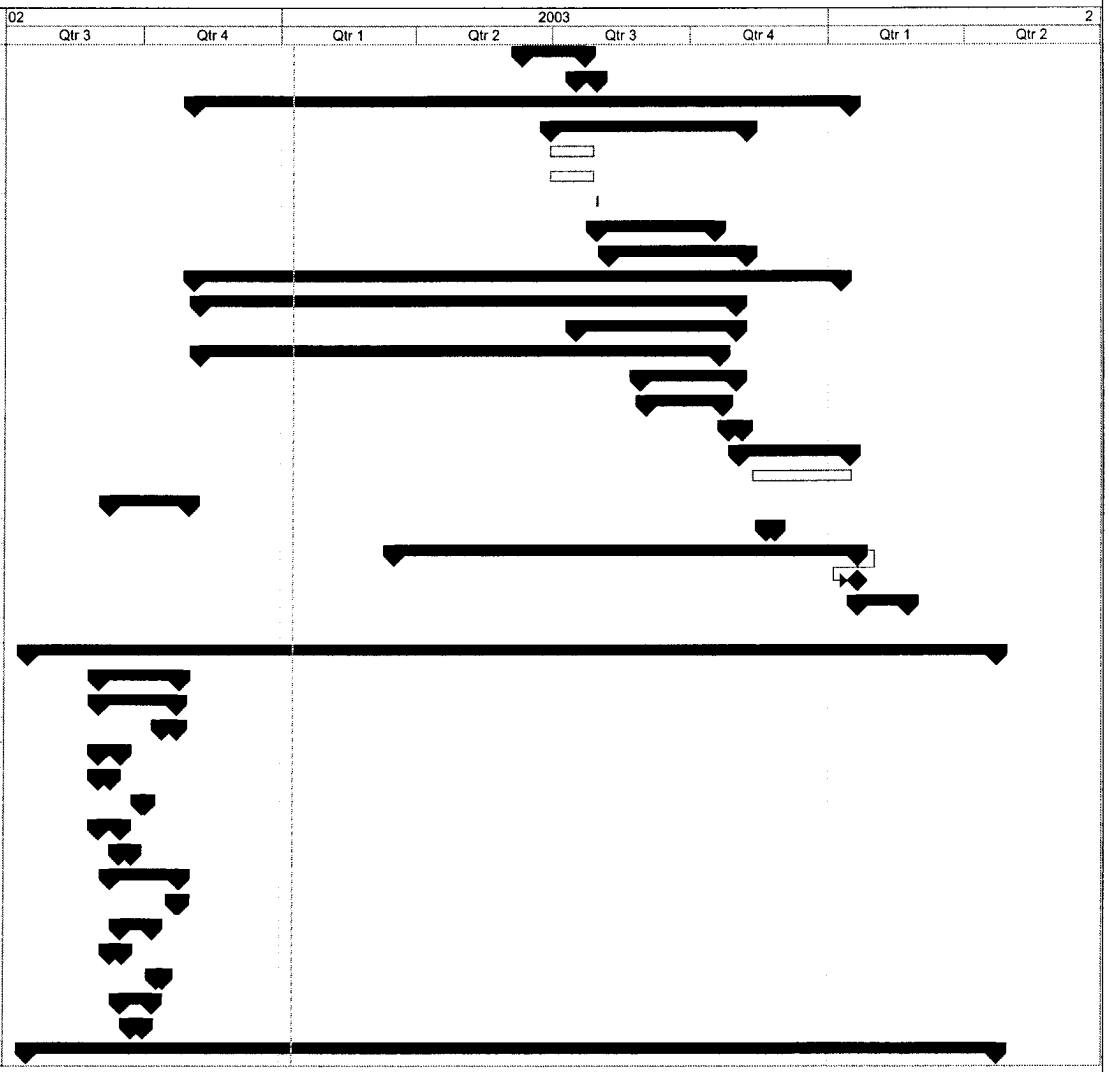


Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

Thu 1/9/03

ID	Task Name	Predecessors
2718	**DESIGN CURRICULUM-PHASE 2**	
2727	**REVISE WORK PLAN, LOE FOR DEVELOPMENT- PHASE 2**	
2732	**TRAINING DEVELOPMENT- PHASE 2**	
2733	**KICKOFF TRAINING FOR DEVELOPMENT**	
2734	Plan kickoff event	
2735	Revise template and documentation training	
2736	Conduct kickoff	
2737	**DOCUMENTATION DEVELOPMENT**	
2747	**CBT DEVELOPMENT**	
2756	**EPSS DEVELOPMENT**	
2760	**REGISTRATION PREPARATION**	
2761	**Scheduling**	
2771	**Facilities & Equipment Preparation**	
2777	**TRAINING CLIENT DATABASE**	
2784	**TRAIN-THE-TRAINER**	
2790	**PILOT TRAINING**	
2793	**REVIEW & FINALIZE MATERIALS**	
2798	Phase 2 Training Delivery	
2799	**Install/Test Production Infrastructure**	
2828	**QA Review**	
2835	**Implementation**	
2878	**Phase 2 Operational**	**2835**
2879	**Phase 2 Closeout (Transition) Stage**	
2888		
2889	**Phase 3**	
2890	**Initiation (Inception) Stage**	
2891	**Create project team(s)**	
2892	**Locational Marginal Pricing (LMP) using Full Network Model (FNM)**	
2895	**DMA Mods (upgrad tools for LMP)**	
2898	**Transmission and Contract Optimization System (TCOS)**	
2901	**Congestion Revenue Rights (CRR)**	
2904	**Scheduling Inteface Graphical User Interface (SI-GUI)**	
2907	**Master File Re-Design (MFRD-3)**	
2910	**Complete Formal Approval**	
2911	**Locational Marginal Pricing (LMP) using Full Network Model (FNM)**	
2914	**DMA Mods (upgrad tools for LMP)**	
2917	**Transmission and Contract Optimization System (TCOS)**	
2920	**Congestion Revenue Rights (CRR)**	
2923	**Scheduling Inteface Graphical User Interface (SI-GUI)**	
2926	**Master File Re-Design (MFRD-3)**	
2929	**Planning (Elaboration) Stage**	

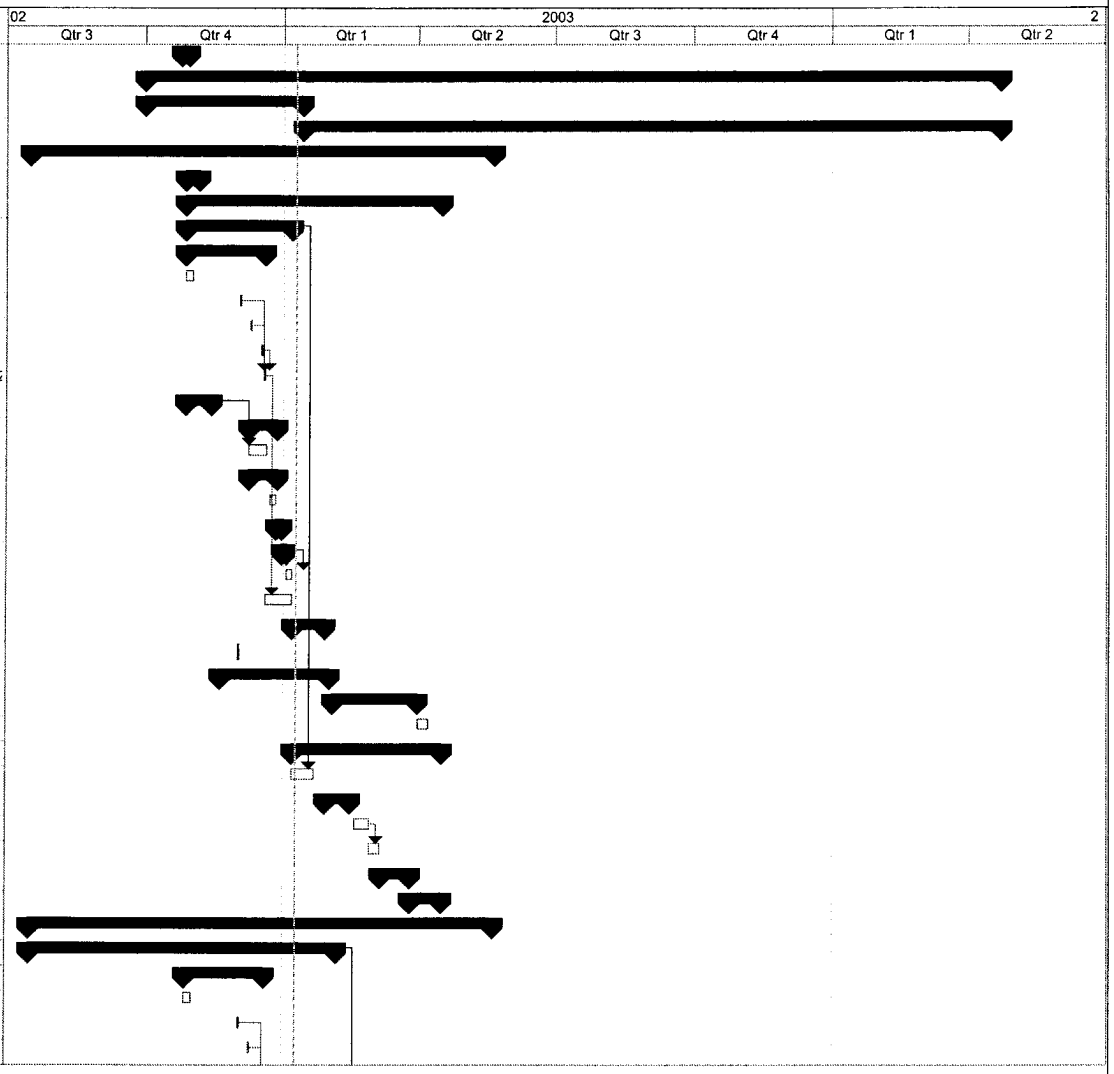


Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

Thu 1/9/03

ID	Task Name	Predecessors
2930	**Finalize scope for phase 3**	
2933	**LMP Phase III Studies**	
2934	**Study 2**	
2945	**Other Studies**	**2944**
2952	**Business Process Analysis**	
2953	**Finalize scope for LMP Implementation in Phase 3**	
2956	**LMP Implementation Business Process Analysis and Design**	
2957	**Develop DSOW Inputs**	
2958	**Complete External Stakeholder Process**	
2959	IFM Design White Paper Internal Review	
2960	JAD Session 1	
2961	JAD Session 2	
2962	JAD Session 3	
2963	JAD issues resolved (MDSC approval)	2960,2961,2962
2964	**Create Vision Document**	
2973	**Business Process Design**	
2974	Conduct design sessions	2964
2975	**Collect, analyze, and document findings**	
2986	Prepare Use Case Diagrams	2977
2987	**Prepare Process Descriptions**	
2990	**Prepare Supplementary Business Specification Document**	
2997	Create Conceptual Data Model	2990
2998	FERC 205 Filing to FERC for Jad Session Changes	2963
2999	**Finalize DSOW**	
3004	Determine Sourcing Strategy	
3005	**Develop RFP (Joint IFM/LMP)**	
3010	**Vendor Selection**	
3017	Define testing exit criteria (test to production)	3016
3018	**Design Requirements**	
3019	Prepare Job Profiles	2957
3020	**Functional Requirements**	
3023	Develop State Transition Diagrams	3022
3024	Software/System Requirements Specification	3023
3025	**Define data models**	
3030	**Define Data Conversion Requirements**	
3041	**DMA Mods (upgrad tools for LMP)**	
3042	**Develop DSOW Inputs**	
3043	**Complete External Stakeholder Process**	
3044	IFM Design White Paper Internal Review	
3045	JAD Session 1	
3046	JAD Session 2	

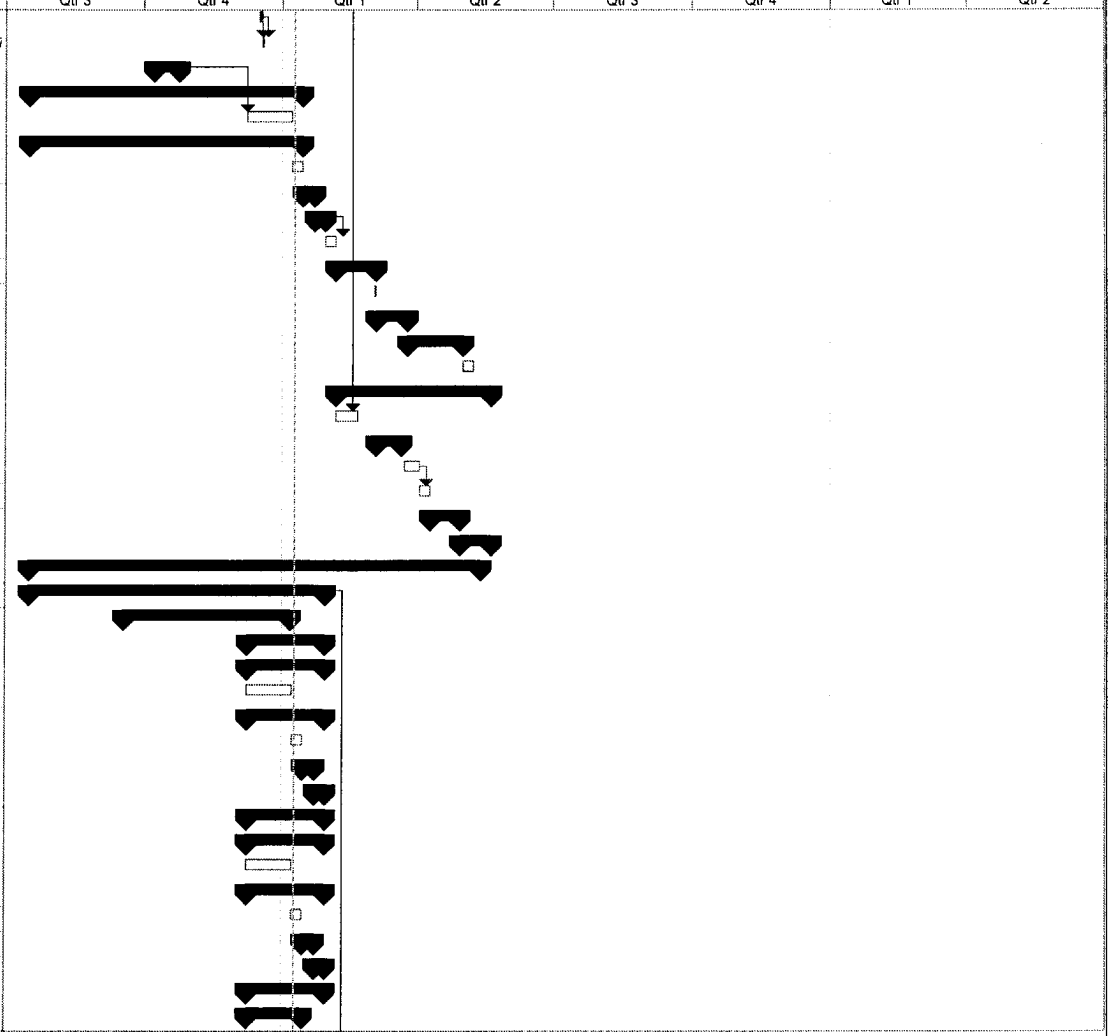


Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

Thu 1/9/03

ID	Task Name	Predecessors
3047	JAD Session 3	
3048	JAD issues resolved (MDSC approval)	3045,3046,3047
3049	**Create Vision Document**	
3058	**Business Process Design**	
3059	Conduct design sessions	3049
3060	**Collect, analyze, and document findings**	
3071	Prepare Use Case Diagrams	3062
3072	**Prepare Process Descriptions**	
3075	**Prepare Supplementary Business Specification Document**	
3082	Create Conceptual Data Model	3075
3083	**Finalize DSOW**	
3088	Determine Sourcing Strategy	3087FF
3089	**Develop RFP**	
3094	**Vendor Selection**	
3100	Define testing exit criteria (test to production)	3099
3101	**Design Requirements**	
3102	Prepare Job Profiles	3042
3103	**Functional Requirements**	
3106	Develop State Transition Diagrams	3105
3107	Software/System Requirements Specification	3106
3108	**Define data models**	
3113	**Define Data Conversion Requirements**	
3124	**Transmission and Contract Optimization System (TCOS)**	
3125	**Develop DSOW Inputs**	
3126	**Create Vision Document**	
3137	**Process Analysis - Outage Coordination**	
3138	**Business Process Design**	
3139	Conduct design sessions	
3140	**Collect, analyze, and document findings**	
3146	Prepare Use Case Diagrams	3142
3147	**Prepare Process Descriptions**	
3150	**Prepare Supplementary Business Specification Document**	
3157	**Process Analysis - PreScheduling**	
3158	**Business Process Design**	
3159	Conduct design sessions	
3160	**Collect, analyze, and document findings**	
3166	Prepare Use Case Diagrams	3162
3167	**Prepare Process Descriptions**	
3170	**Prepare Supplementary Business Specification Document**	
3177	**Process Analysis - Market Ops DA**	
3178	**Business Process Design**	

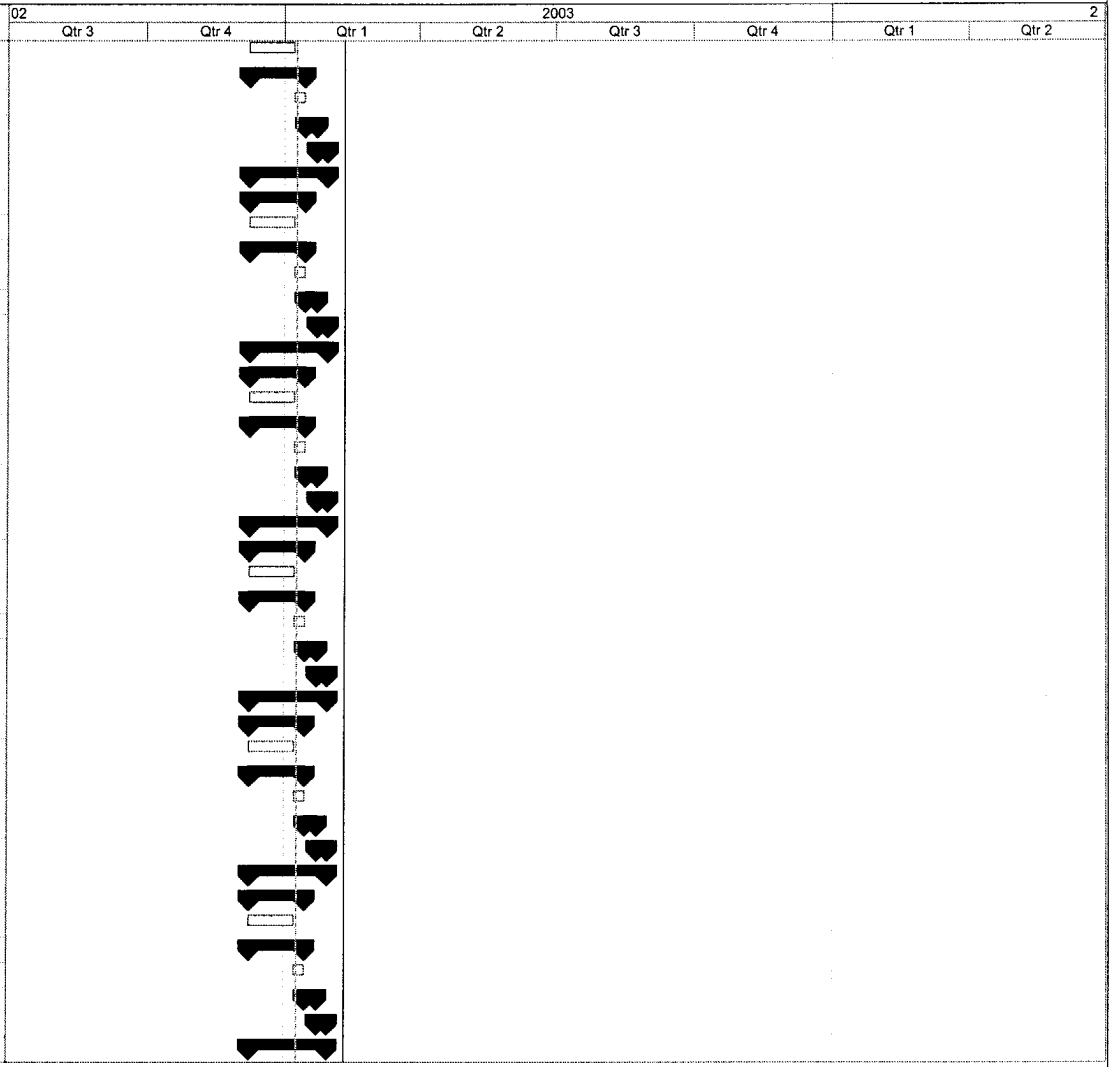


Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

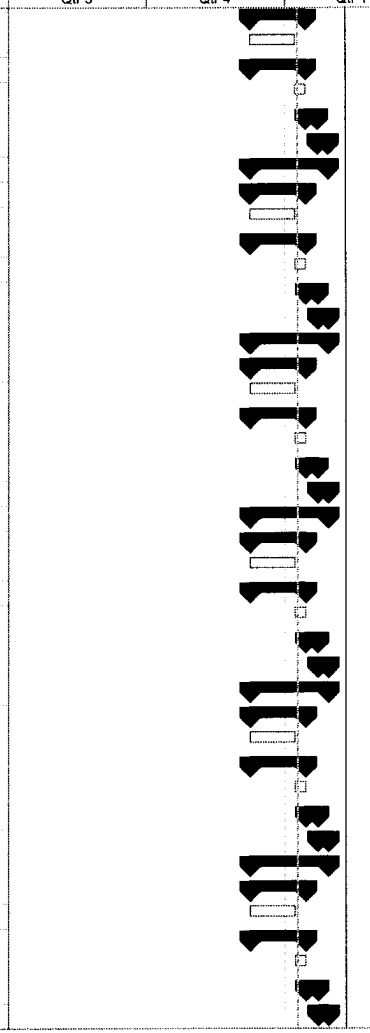
Thu 1/9/03

ID	Task Name	Predecessors
3179	Conduct design sessions	
3180	**Collect, analyze, and document findings**	
3186	Prepare Use Case Diagrams	3182
3187	**Prepare Process Descriptions**	
3190	**Prepare Supplementary Business Specification Document**	
3197	**Process Analysis - Market Ops HA**	
3198	**Business Process Design**	
3199	Conduct design sessions	
3200	**Collect, analyze, and document findings**	
3206	Prepare Use Case Diagrams	3202
3207	**Prepare Process Descriptions**	
3210	**Prepare Supplementary Business Specification Document**	
3217	**Process Analysis - Transmission Dispatcher**	
3218	**Business Process Design**	
3219	Conduct design sessions	
3220	**Collect, analyze, and document findings**	
3226	Prepare Use Case Diagrams	3222
3227	**Prepare Process Descriptions**	
3230	**Prepare Supplementary Business Specification Document**	
3237	**Process Analysis - RT Schedulers**	
3238	**Business Process Design**	
3239	Conduct design sessions	
3240	**Collect, analyze, and document findings**	
3246	Prepare Use Case Diagrams	3242
3247	**Prepare Process Descriptions**	
3250	**Prepare Supplementary Business Specification Document**	
3257	**Process Analysis - Market Quality**	
3258	**Business Process Design**	
3259	Conduct design sessions	
3260	**Collect, analyze, and document findings**	
3266	Prepare Use Case Diagrams	3262
3267	**Prepare Process Descriptions**	
3270	**Prepare Supplementary Business Specification Document**	
3277	**Process Analysis - EMS**	
3278	**Business Process Design**	
3279	Conduct design sessions	
3280	**Collect, analyze, and document findings**	
3286	Prepare Use Case Diagrams	3282
3287	**Prepare Process Descriptions**	
3290	**Prepare Supplementary Business Specification Document**	
3297	**Process Analysis - Settlements**	



Attachment B - MD02 Program Plan - Major Tasks and Milestones

ID	Task Name	Predecessors
3298	**Business Process Design**	
3299	Conduct design sessions	
3300	**Collect, analyze, and document findings**	
3306	Prepare Use Case Diagrams	3302
3307	**Prepare Process Descriptions**	
3310	**Prepare Supplementary Business Specification Document**	
3317	**Process Analysis - OASIS**	
3318	**Business Process Design**	
3319	Conduct design sessions	
3320	**Collect, analyze, and document findings**	
3326	Prepare Use Case Diagrams	3322
3327	**Prepare Process Descriptions**	
3330	**Prepare Supplementary Business Specification Document**	
3337	**Process Analysis - SLIC Integration**	
3338	**Business Process Design**	
3339	Conduct design sessions	
3340	**Collect, analyze, and document findings**	
3346	Prepare Use Case Diagrams	3342
3347	**Prepare Process Descriptions**	
3350	**Prepare Supplementary Business Specification Document**	
3357	**Process Analysis - PI Integration**	
3358	**Business Process Design**	
3359	Conduct design sessions	
3360	**Collect, analyze, and document findings**	
3366	Prepare Use Case Diagrams	3362
3367	**Prepare Process Descriptions**	
3370	**Prepare Supplementary Business Specification Document**	
3377	**Process Analysis - MasterFile Integration**	
3378	**Business Process Design**	
3379	Conduct design sessions	
3380	**Collect, analyze, and document findings**	
3386	Prepare Use Case Diagrams	3382
3387	**Prepare Process Descriptions**	
3390	**Prepare Supplementary Business Specification Document**	
3397	**Process Analysis - Nomagram Integration**	
3398	**Business Process Design**	
3399	Conduct design sessions	
3400	**Collect, analyze, and document findings**	
3406	Prepare Use Case Diagrams	3402
3407	**Prepare Process Descriptions**	
3410	**Prepare Supplementary Business Specification Document**	

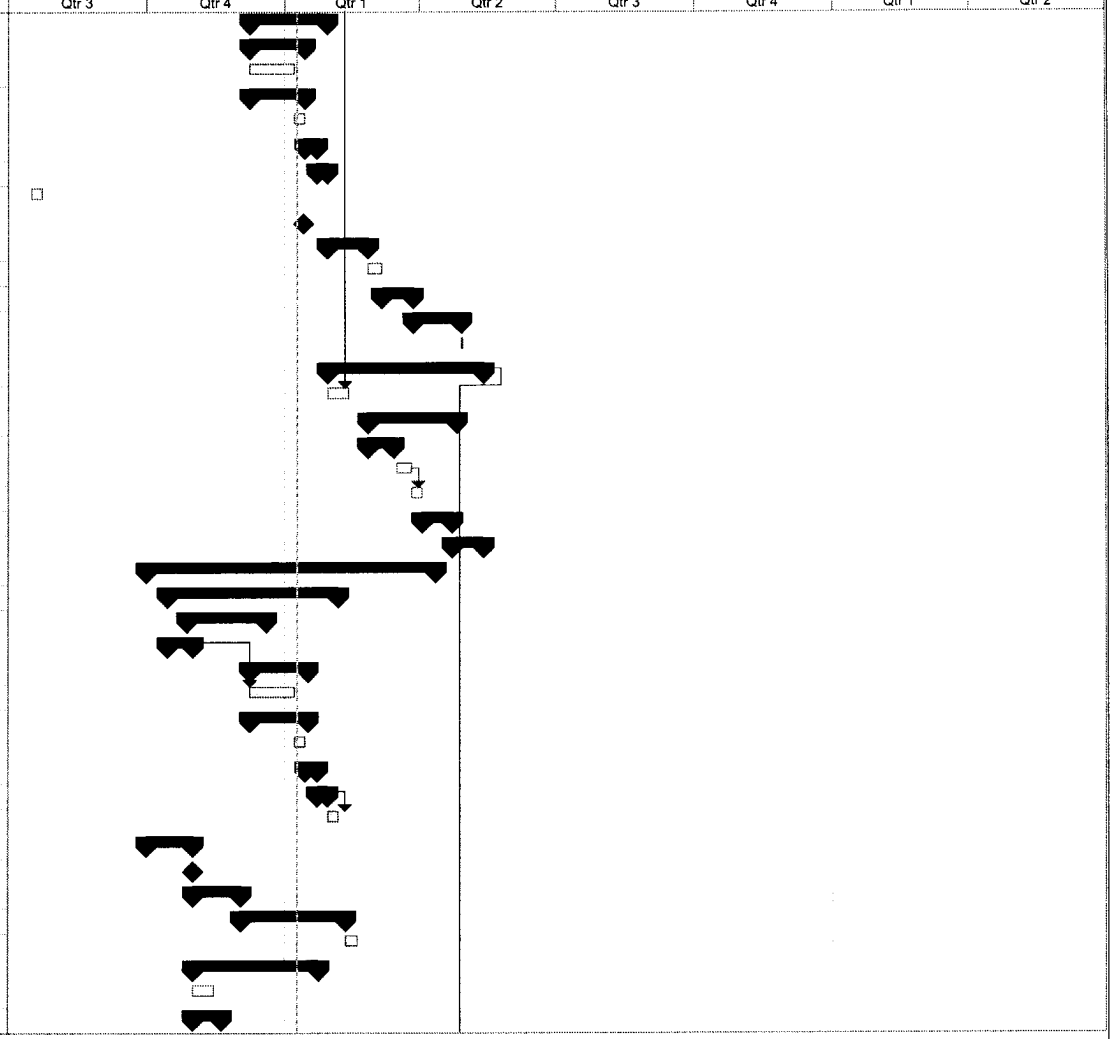


Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

Thu 1/9/03

ID	Task Name	Predecessors
3417	**Process Analysis - Interface to SI**	
3418	**Business Process Design**	
3419	Conduct design sessions	
3420	**Collect, analyze, and document findings**	
3426	Prepare Use Case Diagrams	3422
3427	**Prepare Process Descriptions**	
3430	**Prepare Supplementary Business Specification Document**	
3437	Create Conceptual Data Model	
3438	**Define Input/Output Descriptions for other Projects**	
3441	**Finalize DSOW**	
3446	Determine Sourcing Strategy	3445
3447	**Develop RFP**	
3452	**Vendor Selection**	
3458	Define testing exit criteria (test to production)	3457
3459	**Design Requirements**	
3460	Prepare Job Profiles	3125
3461	**Prescheduling ETC Calculation Design**	
3468	**Functional Requirements**	
3471	Develop State Transition Diagrams	3470
3472	Software/System Requirements Specification	3471
3473	**Define data models**	
3478	**Define Data Conversion Requirements**	
3489	**Congestion Revenue Rights (CRR/FTR)**	
3490	**Develop DSOW Inputs**	
3491	**Complete External Stakeholder Process**	
3497	**Create Vision Document**	
3506	**Business Process Design**	
3507	Conduct design sessions	3497
3508	**Collect, analyze, and document findings**	
3516	Prepare Use Case Diagrams	3510
3517	**Prepare Process Descriptions**	
3520	**Prepare Supplementary Business Specification Document**	
3527	Create Conceptual Data Model	3520
3528	**Finalize DSOW**	
3534	Determine Sourcing Strategy	
3535	**Develop RFP**	
3540	**Vendor Selection**	
3546	Define testing exit criteria (test to production)	3545
3547	**Design Requirements**	
3548	Prepare Job Profiles	3550SS
3549	**Functional Requirements**	

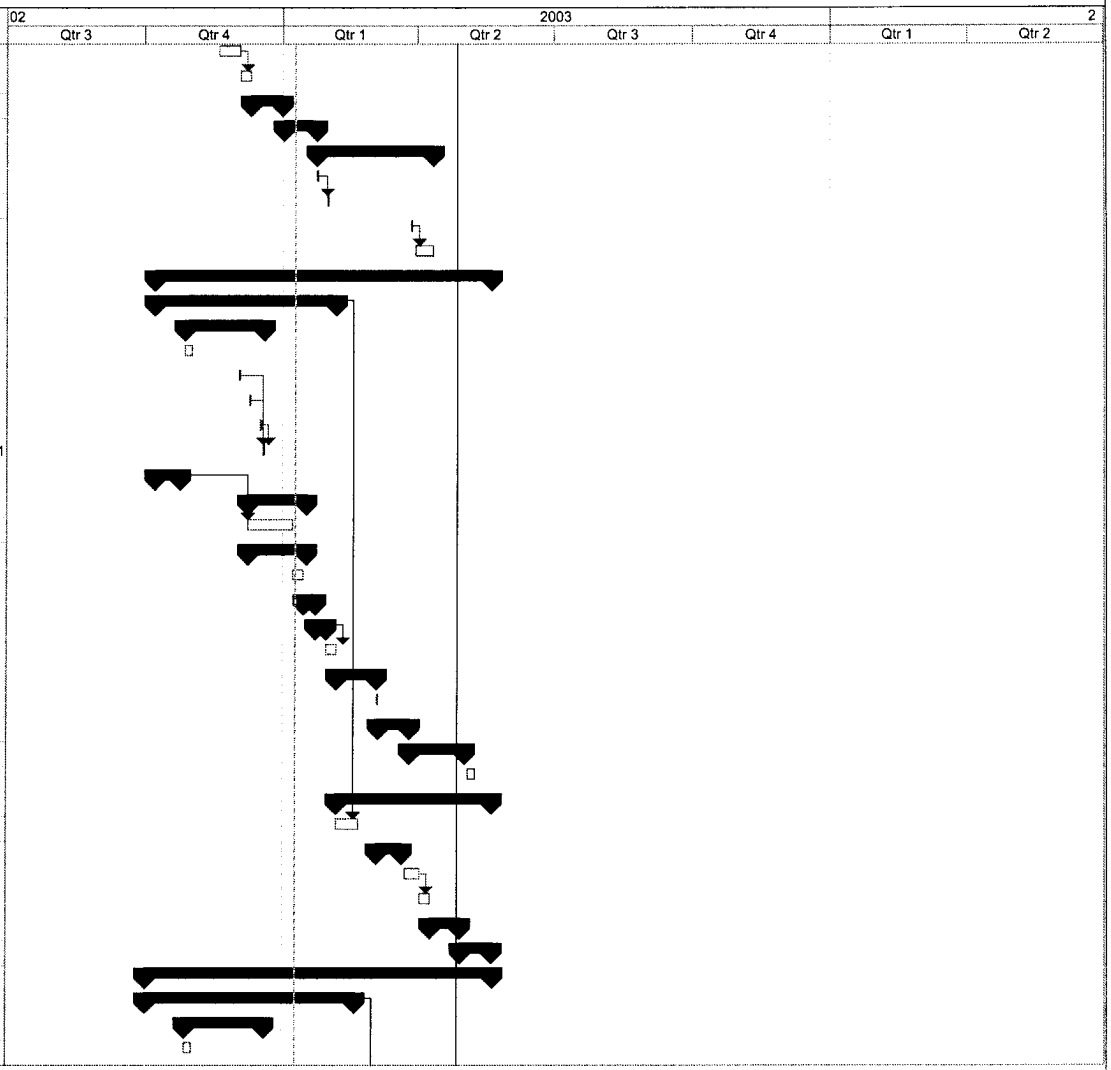


Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

Thu 1/9/03

ID	Task Name	Predecessors
3552	Develop State Transition Diagrams	3551
3553	Software/System Requirements Specification	3552
3554	**Define data models**	
3559	**Define Data Conversion Requirements**	
3570	**Complete External Stakeholder Process**	
3571	CRR Materials for JADs	
3572	JAD Session 1	3571
3573	JAD Session 2	
3574	MDSC process to resolve JAD issues	3573
3575	**Scheduling Inteface Graphical User Interface (SI-GUI)**	
3576	**Develop DSOW Inputs**	
3577	**Complete External Stakeholder Process**	
3578	IFM Design White Paper Internal Review	
3579	JAD Session 1	
3580	JAD Session 2	
3581	JAD Session 3	
3582	JAD issues resolved (MDSC approval)	3579,3580,3581
3583	**Create Vision Document**	
3592	**Business Process Design**	
3593	Conduct design sessions	3583
3594	**Collect, analyze, and document findings**	
3605	Prepare Use Case Diagrams	3596
3606	**Prepare Process Descriptions**	
3609	**Prepare Supplementary Business Specification Document**	
3616	Create Conceptual Data Model	3609
3617	**Finalize DSOW**	
3622	Determine Sourcing Strategy	3621
3623	**Develop RFP**	
3628	**Vendor Selection**	
3634	Define testing exit criteria (test to production)	3633
3635	**Design Requirements**	
3636	Prepare Job Profiles	3576
3637	**Functional Requirements**	
3640	Develop State Transition Diagrams	3639
3641	Software/System Requirements Specification	3640
3642	**Define data models**	
3647	**Define Data Conversion Requirements**	
3658	**Master File Re-Design (MFRD-3)**	
3659	**Develop DSOW Inputs**	
3660	**Complete External Stakeholder Process**	
3661	IFM Design White Paper Internal Review	



Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

Thu 1/9/03

ID	Task Name	Predecessors
3662	JAD Session 1	
3663	JAD Session 2	
3664	JAD Session 3	
3665	JAD issues resolved (MDSC approval)	3662,3663,3664
3666	**Create Vision Document**	
3675	**Business Process Design**	
3676	Conduct design sessions	3666
3677	**Collect, analyze, and document findings**	
3686	Prepare Use Case Diagrams	3679
3687	**Prepare Process Descriptions**	
3690	**Prepare Supplementary Business Specification Document**	
3697	Create Conceptual Data Model	3690
3698	**Define Data Conversion Requirements**	
3709	**Finalize DSOW**	
3714	Determine Sourcing Strategy	3713
3715	**Develop RFP**	
3720	**Vendor Selection**	
3726	Define testing exit criteria (test to production)	3725
3727	**Design Requirements**	
3728	Prepare Job Profiles	3659
3729	**Functional Requirements**	
3732	Develop State Transition Diagrams	3731
3733	Software/System Requirements Specification	3732
3734	**Define data models**	
3739	**Create Phase-level rollup SOW**	
3749	**Define IT Environment Requirements (pre-installation)**	
3750	Identify resources	
3751	Determine tool requirements (Phase Specific)	3750
3752	**Complete IT system engineering**	
3757	**Complete network engineering**	
3762	**Complete integration engineering**	
3772	**Complete Security Engineering**	
3777	**Define Data Conversion Requirements**	
3788	**Install/Test Development Infrastructure**	
3817	**Update Market Rules**	
3824	**Conduct QA Review**	3817
3827	**Execution/Control (Construction) Stage**	
3828	**Projects**	
3829	**Locational Marginal Pricing (LMP) using Full Network Model (FNM)**	
3830	**Vendor / IT**	
3831	**Define Vendor checkpoint reviews**	

Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

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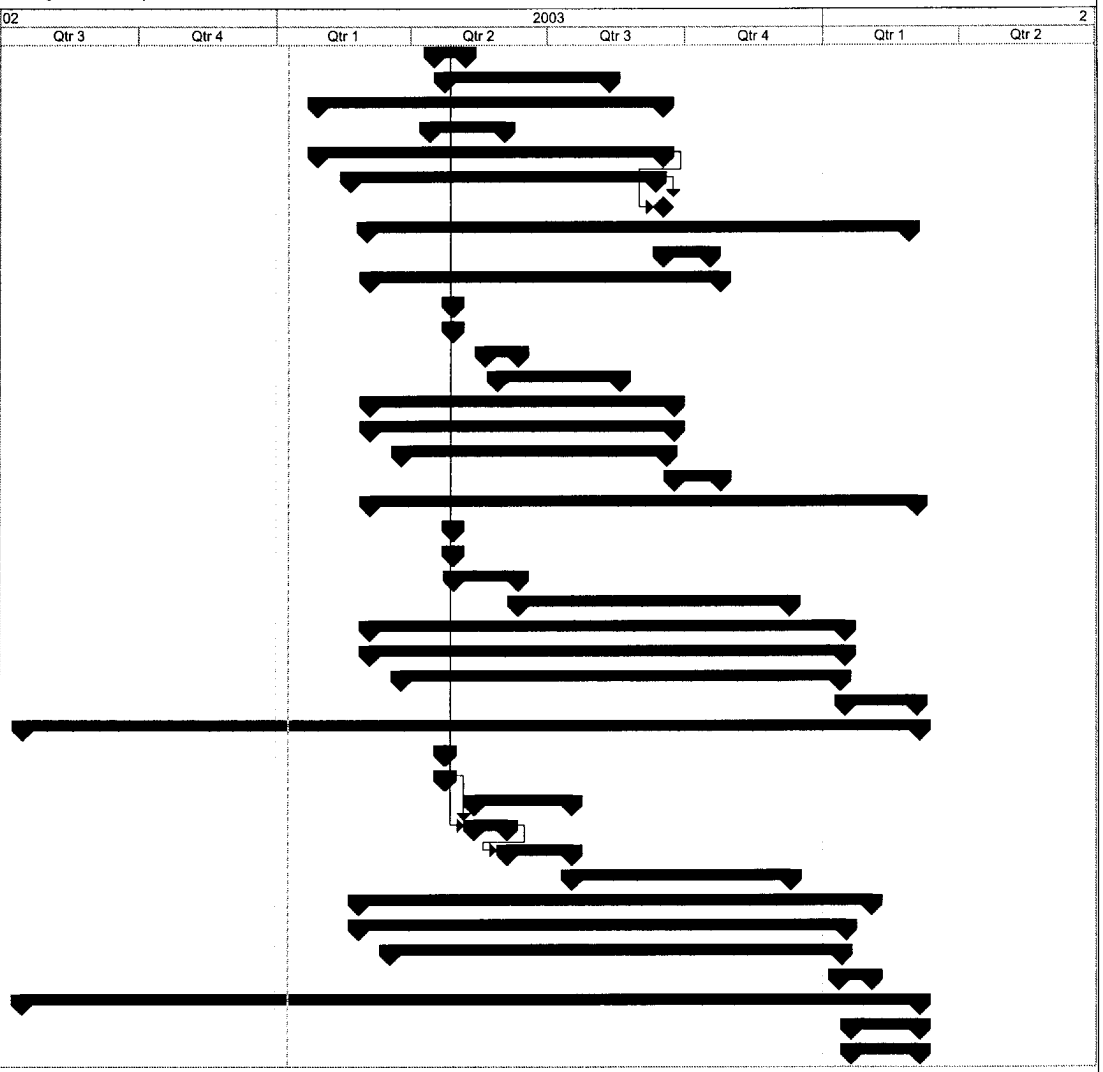
ID	Task Name	Predecessors
3834	**Complete Detailed Design**	
3837	**Develop Application**	
3845	**Testing**	
3846	**State Estimator Solution Quality**	
3850	**System Test**	
3858	**Load and Performance Test**	
3866	Ready for Integration Testing	3850,3858
3867	**LMP Parallel Market Test**	
3877	**Create Technical Documentation**	
3890	**DMA Mods (upgrad tools for LMP)**	
3891	**Vendor / IT**	
3892	**Define Vendor checkpoint reviews**	
3895	**Complete Detailed Design**	
3898	**Develop Application**	
3906	**Testing**	
3907	**System Test**	
3915	**Load and Performance Test**	
3923	**Create Technical Documentation**	
3936	**Settlements Mods-3**	
3937	**Vendor / IT**	
3938	**Define Vendor checkpoint reviews**	
3941	**Complete Detailed Design**	
3944	**Develop Application**	
3953	**Testing**	
3954	**System Test**	
3962	**Load and Performance Test**	
3970	**Create Technical Documentation**	
3983	**Transmission and Contract Optimization System (TCOS)**	
3984	**Vendor / IT**	
3985	**Define Vendor checkpoint reviews**	
3988	**Complete Detailed Design**	
3989	**System Archetectual Documents**	3985,3459
4007	**Develop first drafts of user documentation**	3989
4025	**Develop Application**	
4081	**Testing**	
4082	**System Test**	
4090	**Load and Performance Test**	
4098	**Fault Tolerance Test**	
4108	**Create Technical Documentation**	
4109	**Create Technical Documentation - Outage Coordination**	
4123	**Create Technical Documentation - PreScheduling**	



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ID	Task Name	Predecessors
4137	**Create Technical Documentation - Market Ops DA**	
4151	**Create Technical Documentation - Market Ops HA**	
4165	**Create Technical Documentation - Transmission Dispatchers**	
4179	**Create Technical Documentation - RT Schedulers**	
4193	**Create Technical Documentation - Market Quality**	
4207	**Create Technical Documentation - EMS**	
4221	**Create Technical Documentation - Settlements**	
4235	**Create Technical Documentation - OASIS**	
4249	**Create Technical Documentation - SLIC Integration**	
4263	**Create Technical Documentation - Nomagram Integration**	
4277	Create User Documentation - MF Integration	
4278	**Congestion Revenue Rights (CRR/FTR)**	
4279	**Vendor / IT**	
4280	**Define Vendor checkpoint reviews**	
4283	**Complete Detailed Design**	
4286	**Develop Application**	
4294	**Testing**	
4295	**System Test**	
4303	**Load and Performance Test**	
4311	**Create Technical Documentation**	
4324	**Scheduling Inteface Graphical User Interface (SI-GUI)**	
4325	**Vendor / IT**	
4326	**Define Vendor checkpoint reviews**	
4329	**Complete Detailed Design**	
4332	**Develop Application**	
4340	**Testing**	
4341	**System Test**	
4349	**Load and Performance Test**	
4357	**Create Technical Documentation**	
4370	**Master File Re-Design (MFRD-3)**	
4371	**Vendor / IT**	
4372	**Define Vendor checkpoint reviews**	
4375	**Complete Detailed Design**	
4378	**Develop Application**	
4386	**Testing**	
4387	**System Test**	
4395	**Load and Performance Test**	
4403	**Create Technical Documentation**	
4416	**Install/Test Testing Infrastructure**	
4445	**Integrated Testing**	
4446	**Integration Testing**	

Attachment B - MD02 Program Plan - Major Tasks and Milestones

CAISO MD02 Program Plan - Major Tasks and Milestones

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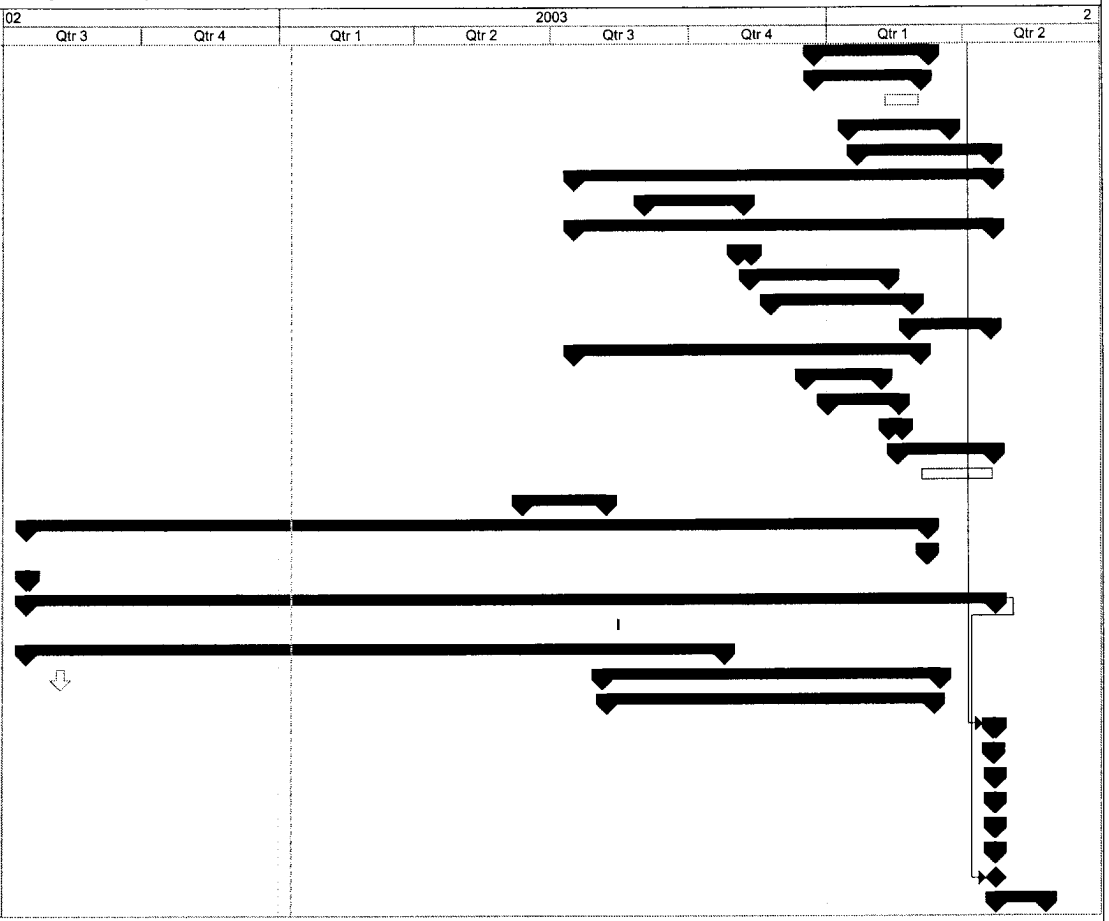
ID	Task Name	Predecessors
4456	**End-to-End Testing**	
4464	**Load and Performance Test**	
4472	Perform Operations Acceptance Testing (Systems/Network/Security)	4470FF
4473	**User Acceptance Testing**	
4481	**Market Testing**	
4489	**Training**	
4490	**TRAINING DESIGN -PHASE 3**	
4505	**TRAINING DEVELOPMENT- PHASE 3**	
4506	**KICKOFF TRAINING FOR DEVELOPMENT**	
4509	**DOCUMENTATION DEVELOPMENT**	
4519	**CBT DEVELOPMENT**	
4528	**EPSS DEVELOPMENT**	
4532	**REGISTRATION PREPARATION**	
4549	**TRAINING CLIENT DATABASE**	
4555	**TRAIN-THE-TRAINER**	
4561	**PILOT TRAINING**	
4564	**REVIEW & FINALIZE MATERIALS**	
4569	Phase 3 Training Delivery	
4570	**Install/Test Production Infrastructure**	
4599	**QA Review**	
4600	**Confirm the Completeness of Construction**	
4603	**Review Issues**	
4606	**Implementation**	
4607	Hold first new FTR auction	
4608	**CRR**	
4615	**Create implementation plans**	
4624	**Prepare live processing checklist**	
4632	**Validate the live processing tasks**	**4445**
4641	**Obtain CHASE approval**	
4649	**Perform Data Cleanup and Initialization**	
4657	**Complete reconciliation of the old and new systems**	
4665	**Close the old systems**	
4673	**Conduct system transfer according to installation change control procedures**	
4681	**Phase 3 Operational**	**4606**
4682	**Phase 3 Closeout (Transition) Stage**	



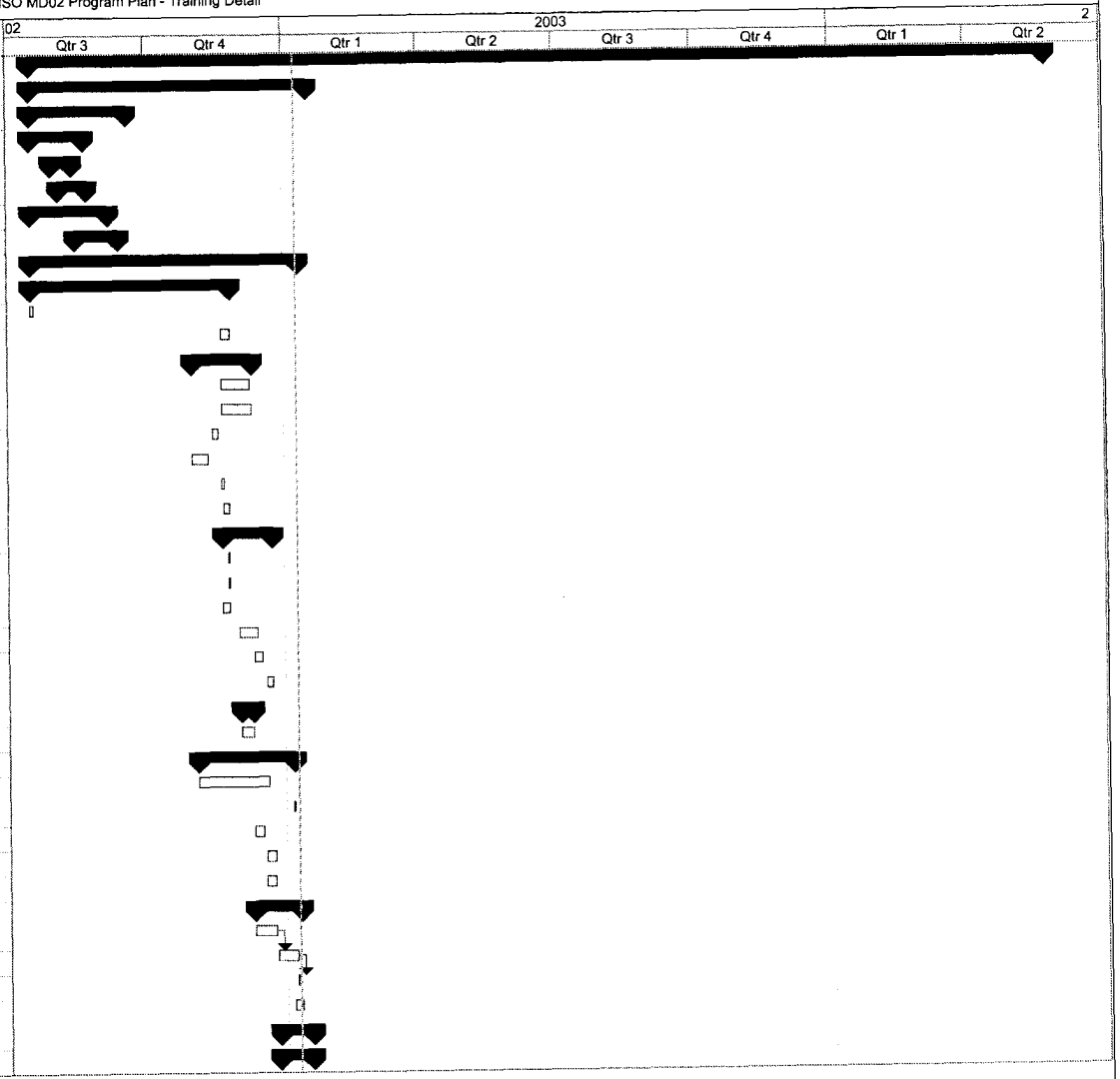
ATTACHMENT C

Attachment C - MD02 Program Plan - Training Schedule

CAISO MD02 Program Plan - Training Detail

Thu 1/9/03

ID	Task Name	Predecessors
1	**MD02 Program**	
2	**Program Initiation**	
3	**PMO Initiation (Inception)**	
54	**Define Communications Strategy**	
68	**Define Regulatory communication strategy**	
71	**Define Vendor Management Strategy**	
78	**Develop MD02 IT Strategy**	
109	**Develop Overall MD02 Testing Strategy and Approach**	
116	**Training Strategy**	
117	**DEFINE BUSINESS ENVIRONMENT**	
118	Document project scope and components	
119	Review technical environment	
120	**DEFINE AUDIENCE & TRAINING NEEDS**	
121	Identify end user audience and environment	
122	Review audience skill profile	
123	Analyze training environment	
124	Review other environmental issues and culture	
125	Define critical success factors and performance measurements	
126	Assess and prioritize training requirements	
127	**ASSESS TRAINING AND FACILITIES INFRASTRUCTURE**	
128	Determine interconnectivity needs with MIS	
129	Identify workstation infrastructure requirements by location	
130	Identify available training facilities and infrastructure by location	
131	Identify (high-level) trainers / developers	
132	Identify basic software needs for training work stations (high level)	
133	Identify resource requirements (high level)	
134	**DETERMINE TRAINING DATABASE STRATEGY**	
135	Determine database requirements	
136	**ASSESS EPSS/LMS CAPABILITIES**	
137	Determine system capabilities	
138	Determine needed complexity of EPSS system	
139	DETERMINE SCHEDULING STRATEGY	
140	DETERMINE GO-LIVE SUPPORT STRATEGY	
141	DETERMINE POST-IMPLEMENTATION STRATEGY	
142	**FINALIZE LEARNING STRATEGY**	
143	Finalize Learning Strategy Report	
144	Review Learning Strategy	143
145	Revise Learning Strategy	144
146	Final Approval on Learning Strategy	
147	**TRAINING DESIGN–PHASE INDEPENDENT**	
148	**DEVELOP STANDARDS & TEMPLATES**	

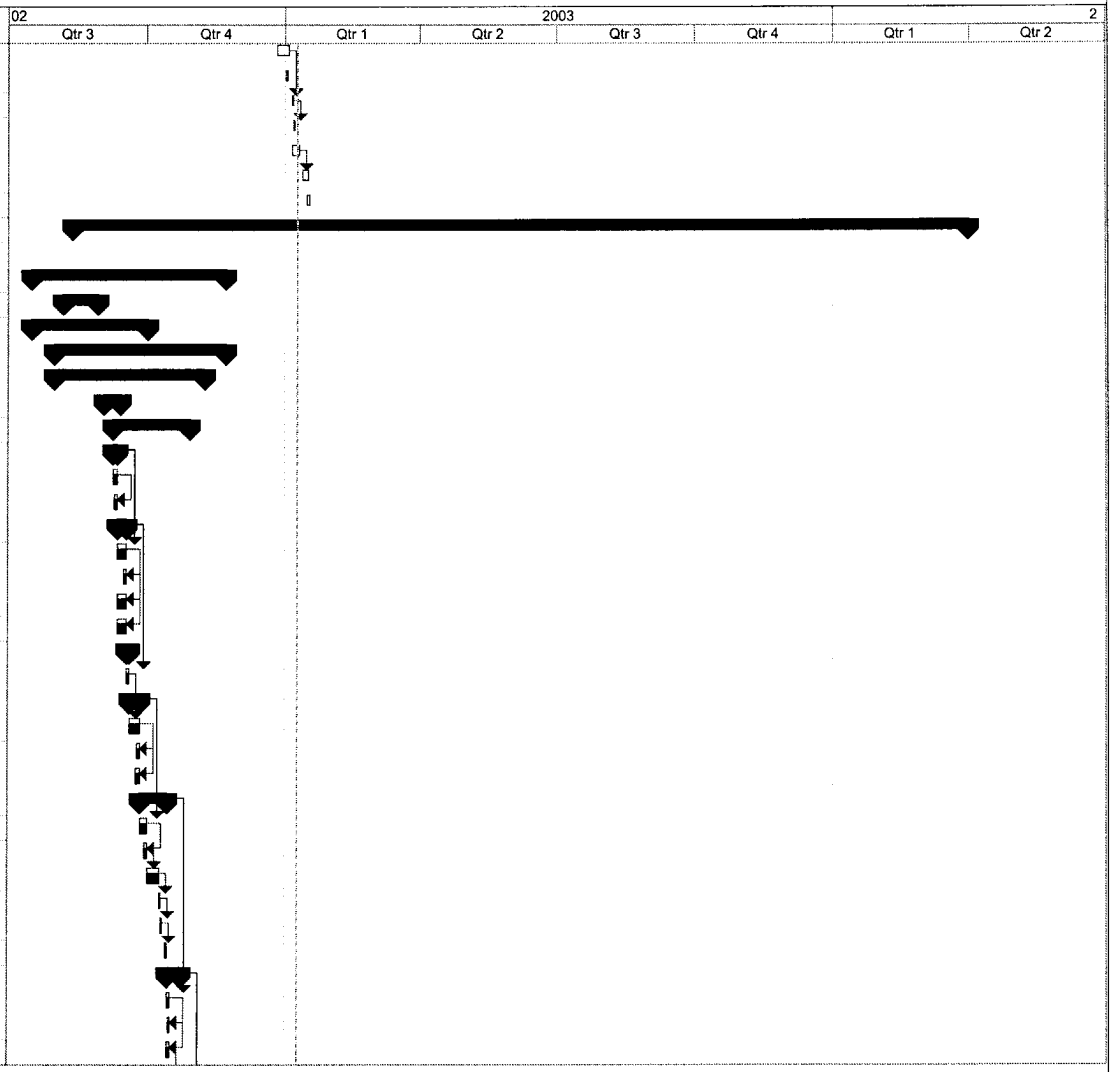


Attachment C - MD02 Program Plan - Training Schedule

CAISO MD02 Program Plan - Training Detail

Thu 1/9/03

ID	Task Name	Predecessors
149	Create documentation prototypes	
150	Review documentation prototypes	
151	Revise prototypes/create templates	149
152	Approve documentation prototypes	151
153	Create Document Standards	
154	Review Document Standard	153
155	Revise Document Standards Document	
156	**Policy Issues (Non Phase Specific)**	
189		
190	**Phase 1A**	
191	**Initiation (Inception) Stage**	
198	**Planning (Elaboration) Stage**	
325	**Execution/Control (Construction) Stage**	
326	**Projects**	
519	**Install/Test Testing Infrastructure**	
527	**Training**	
528	**Needs Assesment**	
529	Confirm and agree with management on personnel to be trained, both internal and e	205
530	Identify training needs of each Business Line	529FF
531	**Task Analysis**	
532	Analyze Learners (I.e., number to be trained, location, experience level, attitude tow	528
533	Identify job functions which will change due to activities in the given Phase	532FF
534	Identify tasks within the changed function	532FF
535	Identify the knowledge needed	532FF
536	**Define Learning Objectives**	
537	Develop a course outline	531
538	**Training Design**	
539	Detemine Sequence of skills to be learned (I.e., Step-by-step, Simple to Complex, G	537
540	Select Training Strategies (Training Methods: On-the-job training, classroom instruct	539FF
541	Resources Required (Trainers, tools, equipment, environmental requirements)	539FF
542	**Course Development**	
543	Identify Content Type (I.e., Concept, Fact, Procedure, Process, Principle)	538
544	Identifying the Level of Performance (I.e., remember level, use level)	543FF
545	Develop course content	544
546	Verify if content related directly to the objectives	545
547	Practice teach	546
548	Make necessary revisions	547
549	**Training Implementation**	
550	Identify Qualified Instructor	542
551	Schedule training facilities	550FF
552	Schedule personnel to attend training sessions	551FF

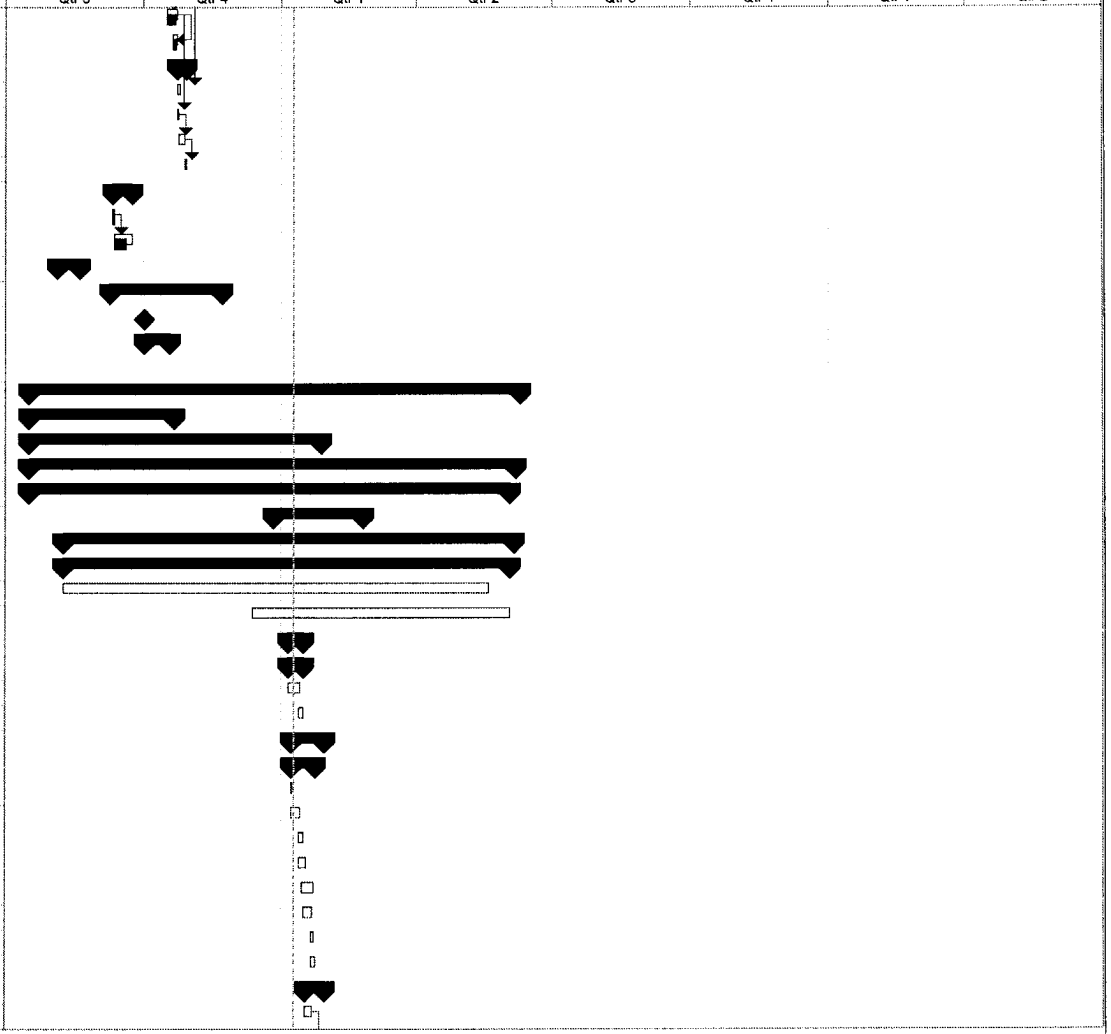


Attachment C - MD02 Program Plan - Training Schedule

CAISO MD02 Program Plan - Training Detail

Thu 1/9/03

ID	Task Name	Predecessors
553	Conduct training sessions (Help Center, Business Lines, Infrastructure/Systems Per	552
554	Track training in the LMS	553FF
555	**Training Evaluation**	
556	Develop training assesment strategy (How many levels of training evaluation will be	549
557	Trainee satisfaction survey after each class	553
558	Analyze of evaluation surveys	557
559	Identify opportunities for improvement	558
560	**On-line Training**	
561	Set up on-line training	281
562	Culmination of on-line training	561
563	**Install/Test Production Infrastructure**	
570	**Implementation**	
593	**Phase 1a Operational**	577
594	**Phase 1a Closeout (Transition) Stage**	
602		
603	**Phase 1b**	
604	**Initiation (Inception) Stage**	
649	**Planning (Elaboration) Stage**	
1205	**Execution/Control (Construction) Stage**	
1206	**Projects**	
1769	**Install/Test Testing Infrastructure**	
1798	**Training**	
1799	**Phase 1B PROJECT Construction Stage**	
1800	User Acceptance testing (combined for phase)	
1801	Market Test (combined for phase)	
1802	**TRAINING STRATEGY-PHASE 1B**	
1803	**DETERMINE TRAINING DATABASE STRATEGY**	
1804	Determine database requirements	
1805	Determine client refresh schedule	
1806	**TRAINING DESIGN -PHASE 1B**	
1807	**DESIGN CURRICULUM-PHASE 1B**	
1808	Design kickoff	
1809	Review technical documentation	
1810	Specify learning/performance objectives	
1811	Specify course modules, objectives, content, length	
1812	Review detailed curriculum with functional teams	
1813	Revise detailed curriculum	
1814	Identify course linkages/prerequisites and develop map	
1815	Obtain approval for curriculum	
1816	**REVISE WORK PLAN, LOE FOR DEVELOPMENT- PHASE 1B**	
1817	Refine work plan	



Attachment C - MD02 Program Plan - Training Schedule

CAISO MD02 Program Plan - Training Detail

Thu 1/9/03

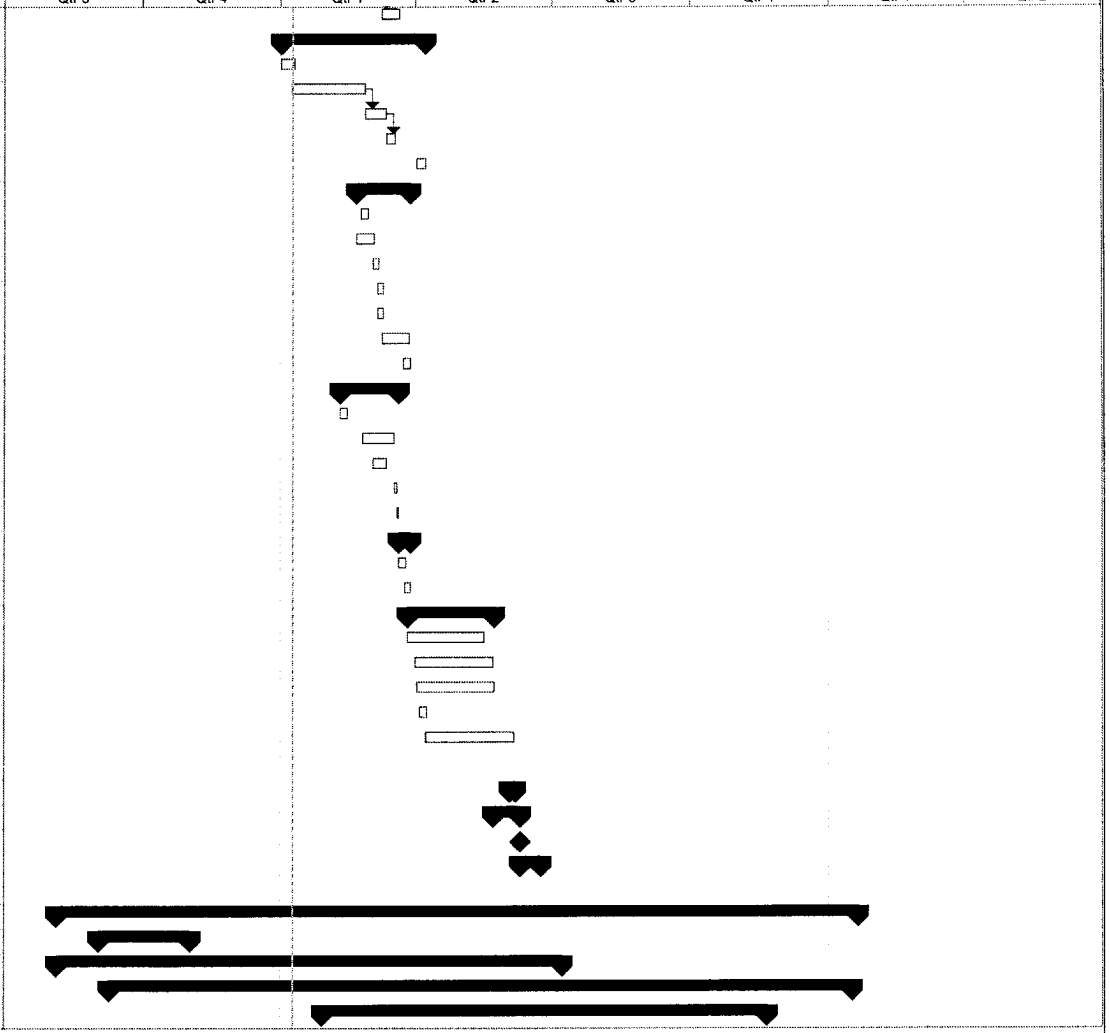
ID	Task Name	Predecessors
1818	Reevaluate cost estimates	1817
1819	Review plan	1818
1820	Incorporate comments & finalize	
1821	**TRAINING DEVELOPMENT - PHASE 1B**	
1822	**KICKOFF TRAINING FOR DEVELOPMENT**	
1823	Plan kickoff event	
1824	Develop documentation training	
1825	Conduct development kickoff	
1826	**DOCUMENTATION DEVELOPMENT**	
1827	Orient developers	
1828	Develop work instructions	
1829	Develop concept slides	
1830	Develop exercises	
1831	Develop Quick Reference Cards	
1832	Review full course material	
1833	Revise course materials	
1834	Develop Train the Trainer course	
1835	Finalize material for publication (TTT & Pilot)	
1836	**CBT DEVELOPMENT**	
1837	Develop storyboards (content)	
1838	Review CBT content	
1839	Revise CBT content	
1840	Develop CBTs (Technical)	
1841	Review CBTs	
1842	Revise CBTs	
1843	Approve CBTs	
1844	Deploy/Launch CBTs	
1845	**EPSS DEVELOPMENT**	
1846	Create structure for course materials	
1847	Upload content	
1848	Test & Verify	
1849	**REGISTRATION PREPARATION**	
1850	**Scheduling**	
1851	Match students to courses	
1852	Determine class schedule	1851
1853	Determine registration policy	
1854	Determine instructor schedule	1852
1855	Validate instructor schedule with instructors	
1856	Revise instructor schedule	
1857	Validate class lists with managers	
1858	Revise class lists	

Attachment C - MD02 Program Plan - Training Schedule

CAISO MD02 Program Plan - Training Detail

Thu 1/9/03

ID	Task Name	Predecessors
1859	Register participants	1858
1860	**Facilities & Equipment Preparation**	
1861	Reserve rooms for TTT, Pilot, and Training	
1862	Order needed equipment for training & process delivery	
1863	Set up any equipment for training	1862
1864	Test all equipment for TTT & Pilot training	1863
1865	Test all equipment for end-user training	
1866	**TRAINING CLIENT DATABASE**	
1867	Review database requirements	
1868	Create database	
1869	Determine client refresh schedule	
1870	Input 1 set of data	
1871	Test data	
1872	Populate database	
1873	Test data	
1874	**TRAIN-THE-TRAINER**	
1875	Identify participants	
1876	Schedule TTT logistics	
1877	Register participants	
1878	Prepare for TtT	
1879	Conduct TtT training	
1880	**PILOT TRAINING**	
1881	Prepare for pilot course	
1882	Pilot courses	
1883	**REVIEW & FINALIZE MATERIALS**	
1884	Incorporate pilot comments	
1885	Finalize materials	
1886	Mass Produce Materials (?)	
1887	Refresh training clients	
1888	Phase 1B Training Delivery (overlaps with Summer Seminars)	
1889	**Install/Test Production Infrastructure**	
1918	**QA Review**	
1925	**Implementation**	
1989	**Phase 1b Operational**	1934,1970,197
1990	**Phase 1b Closeout (Transition) Stage**	
1999		
2000	**Phase 2**	
2001	**Initiation (Inception) Stage**	
2028	**Planning (Elaboration) Stage**	
2450	**Execution/Control (Construction) Stage**	
2451	**Projects**	

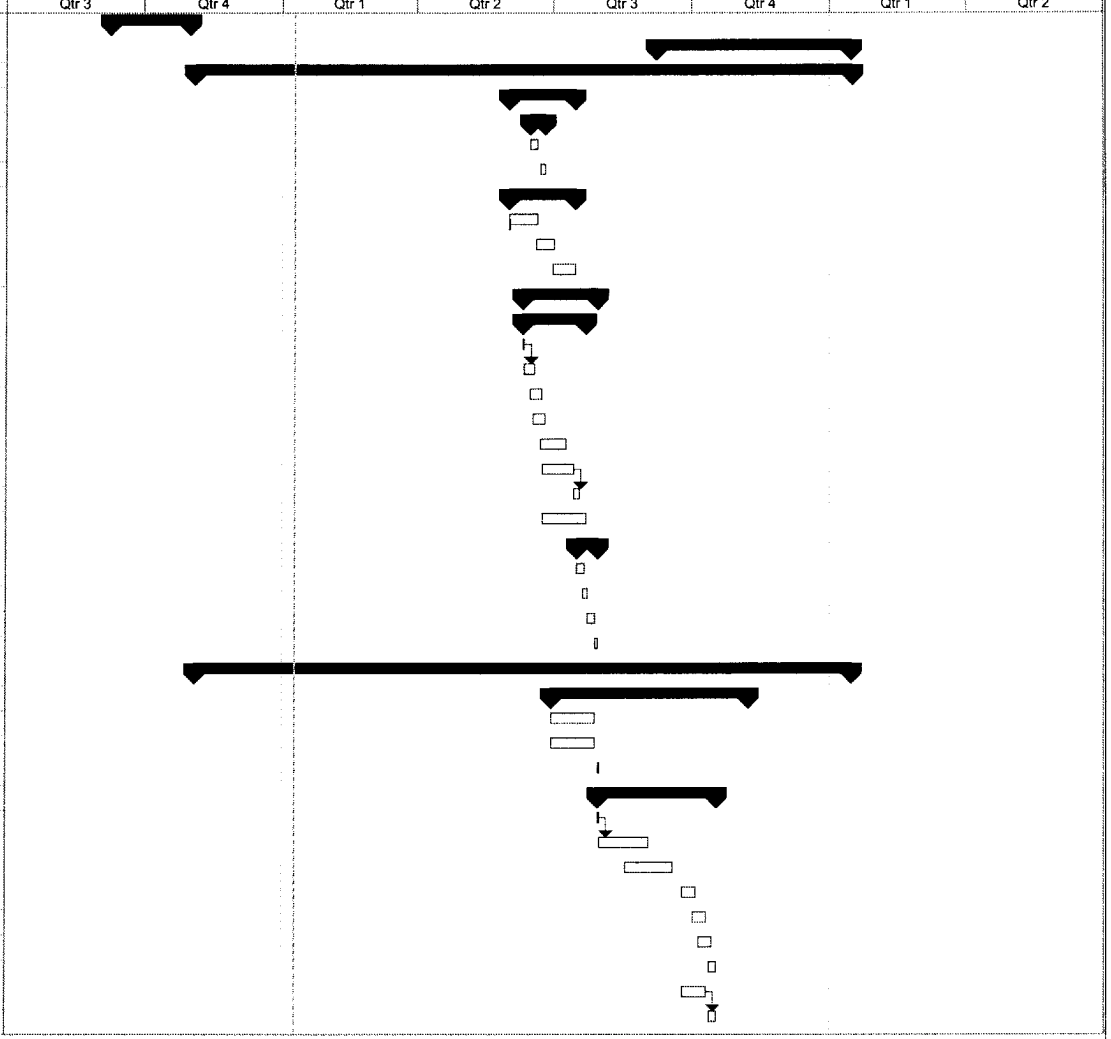


Attachment C - MD02 Program Plan - Training Schedule

CAISO MD02 Program Plan - Training Detail

Thu 1/9/03

ID	Task Name	Predecessors
2637	**Install/Test Testing Infrastructure**	
2666	**Integrated Testing**	
2708	**Training**	
2709	**TRAINING STRATEGY-PHASE 2**	
2710	**DETERMINE TRAINING DATABASE STRATEGY**	
2711	Determine high-level database requirements	
2712	Determine client refresh schedule	
2713	**CONTINUOUS IMPROVEMENT**	
2714	Evaluate Phase 1B training strategy effectiveness	
2715	Revise training strategy for Phase 2 as needed & appropriate	
2716	Review & revise maintenance strategy	
2717	**TRAINING DESIGN -PHASE 2**	
2718	**DESIGN CURRICULUM-PHASE 2**	
2719	Design kick-off	
2720	Specify learning/performance objectives	2719
2721	Identify subject areas within tmg	
2722	Specify course modules, objectives, content, length	
2723	Review curriculum with functional teams	
2724	Revise curriculum	
2725	Identify course linkages/prerequisites and develop map	2724
2726	Obtain approval for curriculum	
2727	**REVISE WORK PLAN, LOE FOR DEVELOPMENT- PHASE 2**	
2728	Refine work plan	
2729	Reevaluate cost estimates	
2730	Review plan	
2731	Incorporate comments & finalize	
2732	**TRAINING DEVELOPMENT- PHASE 2**	
2733	**KICKOFF TRAINING FOR DEVELOPMENT**	
2734	Plan kickoff event	
2735	Revise template and documentation training	
2736	Conduct kickoff	
2737	**DOCUMENTATION DEVELOPMENT**	
2738	Orient developers	
2739	Develop work instructions	2738
2740	Develop concept slides	
2741	Develop exercises	
2742	Develop Quick Reference Cards	
2743	Review full course material	
2744	Revise course materials	
2745	Revise Train the Trainer course	
2746	Finalize material for publication (TTT & Pilot)	2745

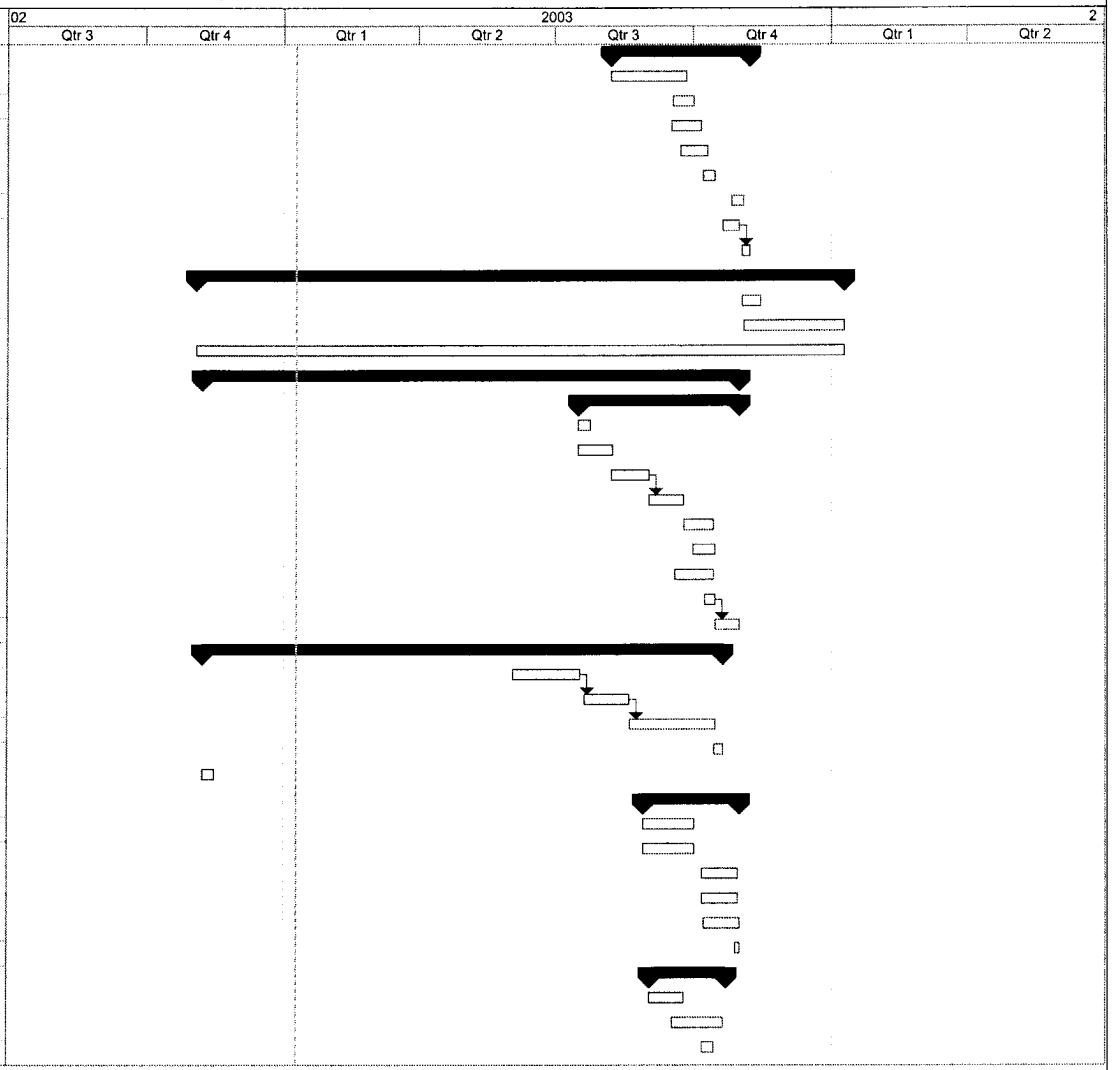


Attachment C - MD02 Program Plan - Training Schedule

CAISO MD02 Program Plan - Training Detail

Thu 1/9/03

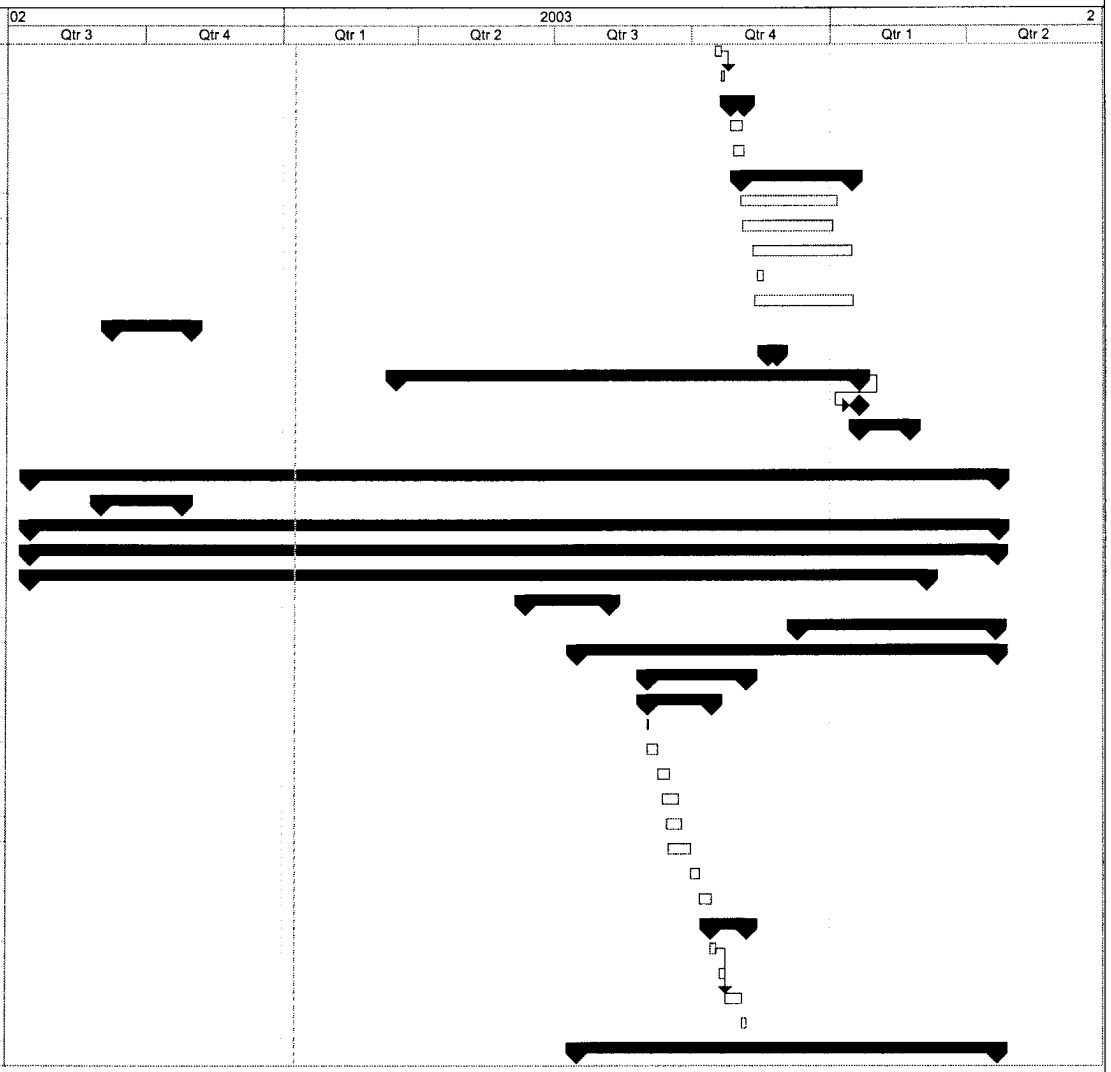
ID	Task Name	Predecessors
2747	**CBT DEVELOPMENT**	
2748	Develop storyboards (content)	
2749	Review CBT content	
2750	Revise CBT content	
2751	Develop CBTs (Technical)	
2752	Review CBTs	
2753	Revise CBTs	
2754	Approve CBTs	
2755	Deploy/Launch CBTs	2754
2756	**EPSS DEVELOPMENT**	
2757	Create structure for course materials	
2758	Upload content	
2759	Test & Verify	
2760	**REGISTRATION PREPARATION**	
2761	**Scheduling**	
2762	Confirm registration policy	
2763	Match students to courses	
2764	Determine class schedule	
2765	Determine instructor schedule	2764
2766	Validate instructor schedule with instructors	
2767	Revise instructor schedule	
2768	Validate class lists with managers	
2769	Revise class lists	
2770	Register participants	2769
2771	**Facilities & Equipment Preparation**	
2772	Reserve rooms for TTT, Pilot, and Training	
2773	Order needed equipment for training	2772
2774	Set up any equipment for training	2773
2775	Test all equipment for TTT & Pilot training	
2776	Test all equipment for end-user training	
2777	**TRAINING CLIENT DATABASE**	
2778	Create database	
2779	Determine client refresh schedule	
2780	Input 1 set of data	
2781	Test data	
2782	Populate database	
2783	Test data	
2784	**TRAIN-THE-TRAINER**	
2785	Identify participants	
2786	Schedule TTT logistics	
2787	Register participants	



Attachment C - MD02 Program Plan - Training Schedule

CAISO MD02 Program Plan - Training Detail — Thu 1/9/03

ID	Task Name	Predecessors
2788	Prepare for TtT	
2789	Conduct TtT training	2788
2790	**PILOT TRAINING**	
2791	Prepare for pilot course	
2792	Pilot courses	
2793	**REVIEW & FINALIZE MATERIALS**	
2794	Incorporate pilot comments	
2795	Finalize materials	
2796	Mass Produce Materials (?)	
2797	Refresh training clients	
2798	Phase 2 Training Delivery	
2799	**Install/Test Production Infrastructure**	
2828	**QA Review**	
2835	**Implementation**	
2878	**Phase 2 Operational**	**2835**
2879	**Phase 2 Closeout (Transition) Stage**	
2888		
2889	**Phase 3**	
2890	**Initiation (Inception) Stage**	
2929	**Planning (Elaboration) Stage**	
3827	**Execution/Control (Construction) Stage**	
3828	**Projects**	
4416	**Install/Test Testing Infrastructure**	
4445	**Integrated Testing**	
4489	**Training**	
4490	**TRAINING DESIGN -PHASE 3**	
4491	**DESIGN CURRICULUM-PHASE 3**	
4492	Design kick-off	
4493	Specify learning/performance objectives	
4494	Identify subject areas within trng	
4495	Specify course modules, objectives, content, length	
4496	Review curriculum with functional teams	
4497	Revise curriculum	
4498	Identify course linkages/prerequisites and develop map	
4499	Obtain approval for curriculum	
4500	**REVISE WORK PLAN, LOE FOR DEVELOPMENT- PHASE 3**	
4501	Refine work plan	
4502	Reevaluate cost estimates	
4503	Review plan	4501
4504	Incorporate comments & finalize	
4505	**TRAINING DEVELOPMENT- PHASE 3**	

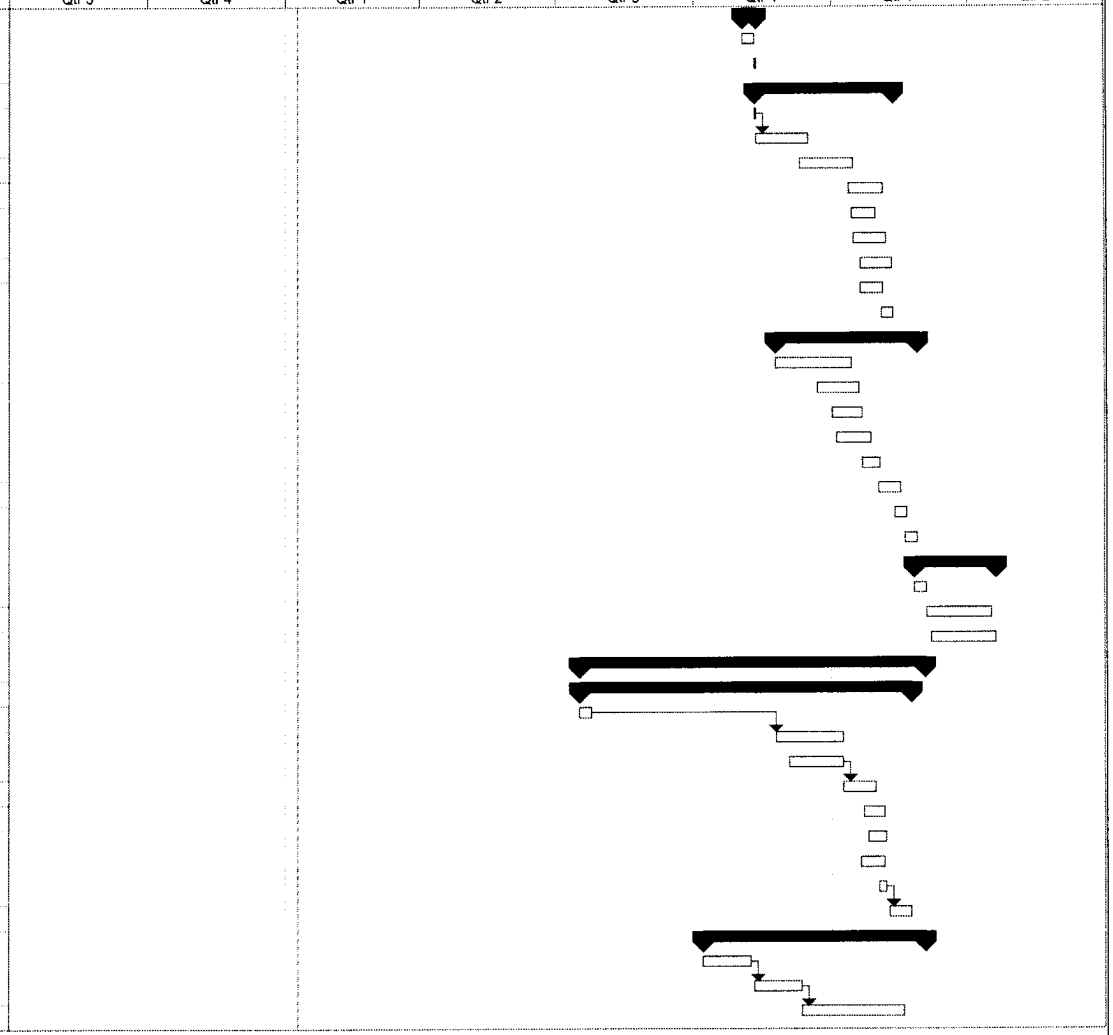


Attachment C - MD02 Program Plan - Training Schedule

CAISO MD02 Program Plan - Training Detail

Thu 1/9/03

ID	Task Name	Predecessors
4506	**KICKOFF TRAINING FOR DEVELOPMENT**	
4507	Plan kickoff event	
4508	Conduct kickoff	
4509	**DOCUMENTATION DEVELOPMENT**	
4510	Orient developers	
4511	Develop work instructions	4510
4512	Develop concept slides	
4513	Develop exercises	
4514	Develop Quick Reference Cards	
4515	Review full course material	
4516	Revise course materials	
4517	Revise Train the Trainer course	
4518	Finalize material for publication (TTT & Pilot)	
4519	**CBT DEVELOPMENT**	
4520	Develop storyboards (content)	
4521	Review CBT content	
4522	Revise CBT content	
4523	Develop CBTs (Technical)	
4524	Review CBTs	
4525	Revise CBTs	
4526	Approve CBTs	
4527	Deploy/Launch CBTs	
4528	**EPSS DEVELOPMENT**	
4529	Create structure for course materials	
4530	Upload content	
4531	Test & Verify	
4532	**REGISTRATION PREPARATION**	
4533	**Scheduling**	
4534	Confirm registration policy	
4535	Match students to courses	4534
4536	Determine class schedule	
4537	Determine instructor schedule	4536
4538	Validate instructor schedule with instructors	
4539	Revise instructor schedule	
4540	Validate class lists with managers	
4541	Revise class lists	
4542	Register participants	4541
4543	**Facilities & Equipment Preparation**	
4544	Reserve rooms for TTT, Pilot, and Training	
4545	Order needed equipment for training	4544
4546	Set up any equipment for training	4545

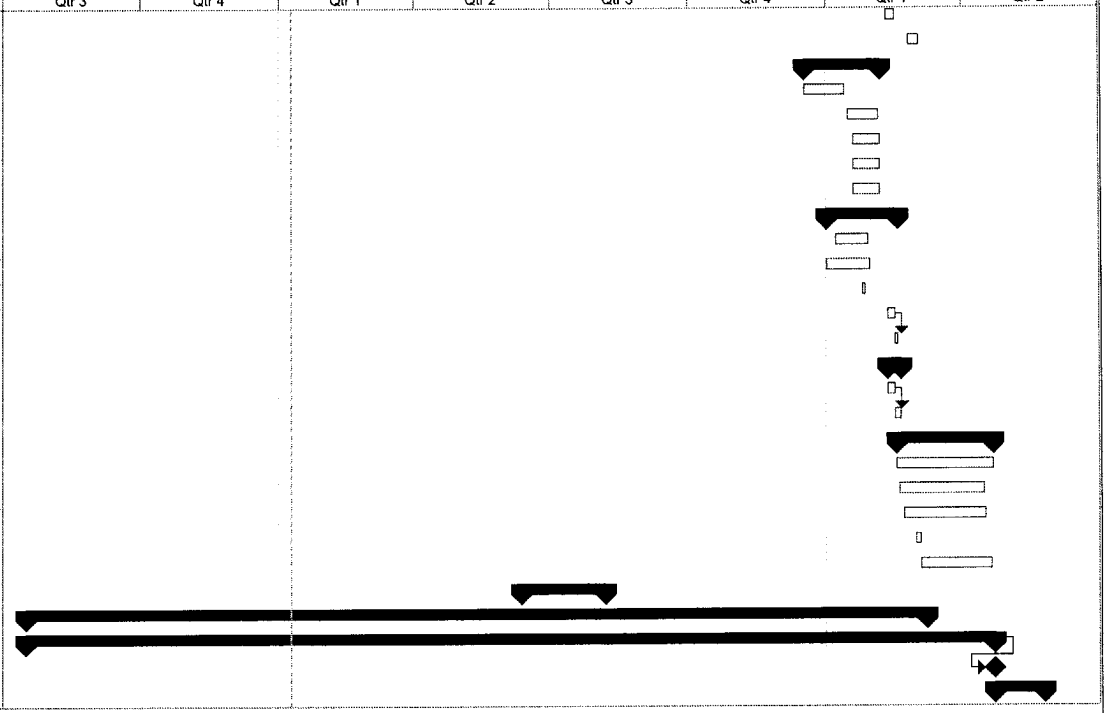


Attachment C - MD02 Program Plan - Training Schedule

CAISO MD02 Program Plan - Training Detail

Thu 1/9/03

ID	Task Name	Predecessors
4547	Test all equipment for TTT & Pilot training	
4548	Test all equipment for end-user training	
4549	**TRAINING CLIENT DATABASE**	
4550	Create database	
4551	Input 1 set of data	
4552	Test data	
4553	Populate database	
4554	Test data	
4555	**TRAIN-THE-TRAINER**	
4556	Identify participants	
4557	Schedule TTT logistics	
4558	Register participants	
4559	Prepare for TtT	
4560	Conduct TtT training	4559
4561	**PILOT TRAINING**	
4562	Prepare for pilot course	
4563	Pilot courses	4562
4564	**REVIEW & FINALIZE MATERIALS**	
4565	Incorporate pilot comments	
4566	Finalize materials	
4567	Mass Produce Materials	
4568	Refresh training clients	
4569	Phase 3 Training Delivery	
4570	**Install/Test Production Infrastructure**	
4599	**QA Review**	
4606	**Implementation**	
4681	**Phase 3 Operational**	**4606**
4682	**Phase 3 Closeout (Transition) Stage**	



ATTACHMENT D

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ATTACHMENT E

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ATTACHMENT F

Attachment F: MD02 Topics Discussed in Working Group and JAD Sessions

MD02 Topics Discussed in Working Groups and JAD Sessions			
Design Elements			
No.	**Issue**	**Status**	**Resolution**
1	Identify the specific types of nomogram constraints the ISO wants the optimization software to enforce (Internal Constraints and Boundary Constraints) Phase 3 Issue (Also Issue #13)	Closed	The optimization software (covered by the RFP) must include the capability to enforce various types of nomogram constraints, but the ISO does not need to specify all the nomograms prior to releasing the RFP and developing the software. Indeed, nomograms change over time as transmission facilities are upgraded and new generation is brought on-line. The modeling of specific nomogram constraints in the OPF will be an ongoing activity, not required for RFP, discussed further at Issue #13.
2	Can a SC use both custom and standard aggregations for scheduling and settling load? Phase 3 Issue	Closed	Yes, the capability will be provided for SCs to use both. A custom aggregation must meet certain requirements, however, including the requirement to have ISO revenue metering.
3	Can a SC using custom aggregation override the pre-specified LDFs by submitting nodal schedules? Phase 3 Issue	Closed	Yes, the SC will be able schedule load under a custom aggregation using updated load dispersion information. This could be achieved by scheduling load at each node in the aggregation, or submitting revised LDFs to reflect the updated dispersion.
4	Can a SC using custom aggregation submit different bid curves for loads at each of the nodes in the aggregation? Phase 3 Issue	Closed	No, the SC must submit a single bid curve for the load under a custom aggregation. SCs who wish to submit a distinct bid curve for any node must elect nodal scheduling & settlement for that node.

MD02 Topics Discussed in Working Groups and JAD Sessions			
Design Elements			
No.	**Issue**	**Status**	**Resolution**
5	In MD02, will a resource be able to bid and self provide for the same ancillary service? Phase 2 Issue	Closed	Yes, a resource will be able to self-provide using a portion of its capacity and bid for the same service using the remaining portion of its capacity. For must-offer units, any capacity associated with "over" self-provision will be available for optimization in the energy market. For non-must offer units that over self provide AS, the ISO will offer a flag for the SC to indicate what, if any, left over capacity should be optimized in the energy market. The ISO will include this in the RFP.
6	The 6/17/02 filed MD02 tariff stipulates that balanced schedules associated with Point-to-Point CRRs have DA scheduling priority, and will be kept balanced during uneconomic adjustments when economic bids are exhausted to mitigate congestion. If the sink of the PTP CRR is a load zone, the pre-specified LDFs will be maintained during the uneconomic adjustment, with the result that the aggregated load may be curtailed at nodes that do not contribute to the congestion. The same problem was the reason why the filed tariff does NOT provide DA scheduling priority for Network Service CRRs. Phase 3 Issue	Pending	Based on stakeholder opinions expressed at the JAD, the ISO proposed two options to be discussed with stakeholders. The options are (1) eliminate CRR scheduling priority altogether; or (2) retain DA scheduling priority only to establish curtailment priority, but once uneconomic adjustment is necessary, do not maintain LDFs nor try to keep CRR schedules balanced. Option (2) allows DA scheduling priority to apply to Network Service CRRs as well as PTP-CRRs.

MD02 Topics Discussed in Working Groups and JAD Sessions			
Design Elements			
No.	**Issue**	**Status**	**Resolution**
7	Does the ISO interpret the FERC Must Offer order to apply to the Forward Markets as well as to Real Time? Phase 2 Issue (Also Issue #50)	Closed	The RFP will include the functionality to apply the Must Offer Obligation and insert proxy bids if necessary, in the forward energy markets and the RUC procedure, as well as in the real time energy market. (For the ISO's rationale for including must offer provisions in forward market see Informational Issue #50.)
8	Can SCs substitute units awarded ancillary services after the Day Ahead Market? Phase 2 Issue	Closed	No, the ISO does not support explicit substitution of one AS unit for another. The SC who wishes to substitute for a unit that sells AS in DA will be able to buy back that AS in the HA Market and offer AS from another unit at the same time, as is allowed today.
9	A rule regarding RUC capacity determination needs to be established. Phase 2 Issue (Also Issue #15)	Closed	There are two aspects of this issue. The first is RFP Critical. The RFP must include the optimization engine for performing the RUC procedure, and must specify calculations that will be needed in determining how much capacity RUC should procure (such as the amount of unloaded capacity available from self-scheduled must offer units). The second - the actual procedure the ISO will follow in determining the quantity of RUC procurement - is not RFP nor Contract Critical, but is Configurable.

MD02 Topics Discussed in Working Groups and JAD Sessions			
Design Elements			
No.	**Issue**	**Status**	**Resolution**
10	Timing of HA Market and opportunity for re-bid of Imbalance Energy after publication of final HA schedules. Phase 2 Issue	Pending	The issue is whether to move the close of HA as close as possible to RT, and in so doing give up the ability of SCs to submit revised RT bids after seeing final HA schedules, or to preserve the "re-bid" capability and close the HA further ahead of RT.
11	Need for a flag to indicate balanced self-schedules. Self-schedules submitted with no bids will receive higher scheduling priority than schedules with bids, but balanced self-schedules may be unbalanced by the ISO if uneconomic curtailment is needed, unless flagged to preserve balance. Phase 2 Issue	Pending	The ISO has proposed not to have a flag. The option not to submit bids with a preferred self-schedule can be used for unbalanced as well as balanced self-schedules; e.g., in self-scheduling an energy-limited resource for which the SC want to specify the exact operating level without relying on bids. This option can also be used to submit HA balanced reductions in load and generation when the SC wishes to reduce the output of its generating unit to reflect a reduced load forecast. The ISO believes that an additional flag is not necessary.

MD02 Topics Discussed in Working Groups and JAD Sessions			
Configurable Elements			
No.	**Issue**	**Status**	**Resolution**
12	Information was requested regarding Proxy Bids: 1. When will a generator be exposed to a proxy bid? 2. What does a proxy bid consist of for a non-gas generator? Phase 2 Issue	Closed	Refer to Tariff sections 5.12.5.1.4. Question (1) If a Must Offer resource does not submit a bit or if its bid does not include the full capacity of the unit, a proxy bid will be inserted. The Must Offer obligation will apply in the forward energy markets and RUC as well as in real time. Question (2) The ISO will accept an energy cost curve from a non-gas generator. For non-gas fueled must offer units, according to the tariff as filed, the unit should submit an Average Cost Curve instead of Average Heat Rate, and start-up cost instead of start-up fuel consumption.
13	Identify the specific nomograms the OPF will enforce Internal Constraints and Boundary Constraints. Phase 3 Issue	Closed	The optimization software (covered by the RFP) will include the capability to enforce various types of nomogram constraints, but the ISO does not need to specify all nomograms prior to releasing the RFP and developing the software. Indeed, nomograms change over time as transmission facilities are upgraded and new generation is brought on-line. The modeling of specific nomogram constraints in the OPF will be an ongoing activity.
14	LSE-customer and LSE-SC relationships may change mid year. How often will LDFs for default and custom aggregations change? Phase 3 Issue	Pending	This topic will be a subject for further discussion in subsequent sessions.

MD02 Topics Discussed in Working Groups and JAD Sessions			
Configurable Elements			
No.	**Issue**	**Status**	**Proposed Resolution**
15	A rule regarding RUC capacity determination needs to be established, including the amount of discretion that the ISO has. How will the ISO evaluate reliability concerns in estimating the amount of capacity of must offer units that will be available in Hour Ahead and Real Time without receiving ISO commitment instructions? Phase 2 Issue (Also Issue #9)	Closed	The formulation of the actual procedure the ISO will follow in determining the quantity of RUC procurement, including considerations such as reliability that go into this determination, will be the subject of further discussion in subsequent sessions.
16	The ISO needs to clarify the metering standards and requirements for custom aggregation. Phase 3 Issue	Open	The ISO plans to address this in future discussions with the Market Participants.
17	The ISO needs to reconsider whether to implement Phase 2 (IFM) and Phase 3 (LMP) separately. What is the impact on CRR implementation? Phase 2 & 3 Issue	Open	The ISO believes a phased approach is the most practical for the deployment of IFM and LMP. The ISO is attempting to allow adequate time to properly consider good process in the development and implementation of the P2 and P3 projects, including allowing Markets Participants ample opportunity to put in place and test the required processes to participate in the new market environment. Clearly the new CRR model must be implemented simultaneously with LMP in Phase 3, regardless of whether or not IFM and LMP are implemented in phases.

MD02 Topics Discussed in Working Groups and JAD Sessions			
Configurable Elements			
No.	**Issue**	**Status**	**Resolution**
18	Are auxiliary power costs part of the allowable costs included in start-up costs? Phase 2 Issue	Closed	Refer to Tariff section 31.2.3.2.3.3.1.1. Start-up costs do include auxiliary power. JAD participants agreed on the formula: Start-up cost = Start-up Fuel*GPI + Start-up Energy*EPI, where GPI/EPI = Gas/Energy Price Index. There still needs to be continued discussion and policy resolution on how to calculate the EPI. JAD participants had concerns regarding the calculation of EPI using 90 days.
19	What information from the Unit Commitment results will be provided to SCs? Will the ISO provide more than final energy results back to the SCs (I.e., long lead time unit commitment results)? Phase 2 Issue	Pending	Although the DA unit commitment looks 5 days out and the HA process looks 5 hours out, the ISO will not provide to SCs the commitment status beyond the trade period (next day in DA, or next hour in HA) unless the unit's minimum up time (MUT) requires the unit to be committed beyond the trade period. Even in this case, the ISO will only provide the commitment status beyond the trade-period to the extend that the MUT is satisfied. Commitment beyond the trade period and the MUT is used by the ISO for advisory purposes only and is treated as a different commitment period for settlements. Each such commitment period is settled based on the cost curves that were used to make the commitment decision. JAD participants requested further discussion regarding the information that is going to be provided. JAD participants felt that the information would be very useful to a generation owner, for example, in making decisions about procuring fuel, even though the 5-day out UC is advisory only.

Attachment F: MD02 Topics Discussed in Working Group and JAD Sessions

MD02 Topics Discussed in Working Groups and JAD Sessions			
Informational Issues			
No.	**Issue**	**Status**	**Resolution**
20	Unrecovered cost calculation/eligibility. The ISO should provide examples to show how hours are disqualified for payment of unrecovered start-up and minimum load costs. The ISO should also consider not netting the revenue surplus during hours when a resource incurs uninstructed deviation (UID) penalties or a No Pay. The filed policy of disqualifying hours for cost recovery when a resource has an HA ancillary service schedule within the ISO commitment period disincents participation in those markets. Phase 2 Issue	Pending	Numerical examples have been provided and are posted on the ISO Home Page. The determination of disqualified hours due to ancillary service awards is a policy decision that is consistent with ISO's interpretation of FERC's Must Offer orders. This policy will be reviewed internally.
21	Will the new systems accommodate Application Program Interfaces (API) so that third party applications can get all the functions. Phase 3 Issue	Closed	The ISO intends to accommodate, as much as possible, functionality that the Market Participants may need. To the extent there are additional needs, the ISO may support the provision of API for third party applications. The open architecture requirement is part of the project objectives, which include: non-proprietary, industry standard programs, standard data exchange and thorough documentation. Any APIs allowed must be consistent with the ISO's security standards.
22	Can the ISO reduce Internet/Wenet Access hurdles that SCs have to go through to get access to Wenet that other ISOs do not require, and that require special computer set-up and have cost implications for SCs? Phase 3 Issue	Closed	It remains the responsibility of the ISO to determine what the requirements for interface must be. The ISO strives to balance system security needs against the potential costs imposed on Market Participants who wish to interface with the CAISO. The CAISO always endeavors, whenever possible, to minimize costs to Market Participants.

MD02 Topics Discussed in Working Groups and JAD Sessions			
Informational Issues			
No.	**Issue**	**Status**	**Resolution**
23	Will the Unit Commitment Cost be allocated on a zonal/regional basis? How does this impact MSS? Phase 2 Issue	Closed	Refer to Tariff Sections 5.12.8.2.1, 5.12.8.2.1.1, 5.12.8.3, 5.12.8.3.1 and 31.2.3.4.4.4.2. Allocation will be system wide. For the RUC Unrecovered Commitment costs, we are reviewing the MSS contracts to assess the applicable allocation.
24	Is the Minimum load fuel cost based on a monthly or a daily gas price? Phase 2 Issue	Closed	The ISO will use the same calculation methodology as is used for today's RT proxy cost calculation , i.e., monthly.
25	(1) How are unbalanced self schedules going to be handled in the forward markets? (2) Can SCs submit forward self-schedules that will settle in the real time market? Phase 2 Issue	Closed	(1) Unbalanced self schedules without bids are treated like price takers in the forward market, and are curtailed for congestion only after schedules with bids are exhausted. (2) This will not be possible in the initial implementation. However it may be achievable through Virtual Bidding if that feature is enabled at a later time. There are numerous policy and design issues to be addressed, however, in determining the appropriate design of a Virtual Bidding function in the ISO markets.
26	What is the rule for ancillary service procurement requirements and how does the ISO determine the deferral amount to the Hour Ahead Market? Phase 2 Issue	Closed	The ISO procures AS in accordance with WECC and NERC reliability standards. Operating Procedure M-402, Sections 1.1 and 2.1.4 (posted on the ISO Website) describe how the ISO determines the deferral to HA today.
27	To what extent will the new systems be scalable; i.e., to what extent and how easily will the systems be able to include additional information from outside the ISO control area (e.g., the external model)? Phase 3 Issue	Closed	The ISO intends to put in place a scalable system. When and if additional information becomes available the ISO should be able to accommodate this additional input.

MD02 Topics Discussed in Working Groups and JAD Sessions			
Informational Issues			
No.	**Issue**	**Status**	**Resolution**
28	Will the Phase 3 system be able to accommodate West-wide flowgate solutions? Phase 3 Issue	Closed	The Phase 3 system will be designed to accommodate and enforce flowgate constraints as needed to manage congestion into the ISO control area. The larger question of more complete coordination between the ISO's markets and flowgate-based markets of other western RTOs is a matter for the SSG-WI working group process, in which the ISO is a participant.
29	Will Market Participants have access to the ISO's network model and receive information on the status of the system? Phase 3 Issue	Closed	The detailed Network Model maintained and used by EMS and other ISO systems is proprietary. The ISO does not envision providing this at this time. As far as the status of topology within the model, the ISO intends to post on OASIS the same items that are currently posted.

MD02 Topics Discussed in Working Groups and JAD Sessions			
Informational Issues			
No.	**Issue**	**Status**	**Resolution**
30	Why aren't Generators allowed to aggregate across nodes for scheduling and settlement purposes? Phase 3 Issue	Closed	(1) One purpose of allowing aggregate pricing for loads is the recognition that loads have a limited ability to curtail when prices are high. There is currently inadequate infrastructure and/or facilities in place to support the dynamic response of load. Thus loads are subject to the bids provided by supply, potentially unreasonably so. Generators already enjoy the ability to maximize profits (unlike the loads who have no corresponding ability to minimize costs) and will not be candidates for aggregation. (2) Load is forecastable with fairly high accuracy, whereas generator behavior is under the suppliers' control. Therefore nodal pricing is especially important as an incentive for generators to perform in accordance with ISO operating needs. (3) Nodal pricing for generators is consistent with today's approach of paying for re-dispatch for intra-zonal congestion - which essentially pays "nodal" prices to generators.
31	The ISO should implement a policy to mandate LSEs to offer their CRRs at auction. Phase 3 Issue	Closed	The MD02 filing allows LSEs the option of offering their allocated CRRs at auction, but does not require them to do so. The ISO believes this is an appropriate policy, at least initially, to minimize the risks for customers and the complexity for LSEs, until all parties become familiar with LMP and the associated CRRs. The current scope of the CRR engine will handle the auctioning of CRRs offered for auction by LSEs, and therefore would be able to accommodate the proposed policy change in the future if adopted.

Attachment F: MD02 Topics Discussed in Working Group and JAD Sessions

MD02 Topics Discussed in Working Groups and JAD Sessions			
Informational Issues			
No.	**Issue**	**Status**	**Resolution**
32	The functionality of the CRR engine should support simultaneous auction of obligations and options. Phase 3 Issue	Closed	The current design of the CRR auction engine can accommodate both options and obligations, but cannot simultaneously auction both types in a single auction. Consistent with the ISO's MD02 Tariff filing, the ISO will initially allocate options only to converted ETCs. As the algorithms to perform a simultaneous options and obligations auction are developed, tested and utilized in practice, the ISO will consider moving to such a design.
33	Example needed of TO & SC debit process. Phase 3 Issue	Closed	The ISO provided a presentation on the mechanics of TO and SC debit for discussion at the JAD sessions. A revised presentation is being completed and will be posted shortly.
34	SCs that utilize default aggregations would like either the output of the nodal LDF matrix or their final Schedules by node, to validate their settlement statements. Phase 3 Issue	Closed	The ISO has agreed to provide, in some manner, adequate data and/or a methodology to allow SCs to validate settlements at their respective nodes.
35	What information do generators send and what information does the ISO use for proxy bids? Phase 2 Issue	Closed	The ISO will send back to SCs the start-up costs, minimum load costs and incremental cost curves that were used for optimization and settlement back to the market participants. Examples were presented at the JAD session and are posted to the ISO Website.

MD02 Topics Discussed in Working Groups and JAD Sessions			
Informational Issues			
No.	**Issue**	**Status**	**Resolution**
36	For a Must Offer unit that has an Option Contract to provide capacity that has not been exercised in time for scheduling in a forward market, how is this option represented in the Must Offer provisions in both the IFM and RUC markets? Phase 2 Issue	Closed	Such an Option Contract is a financial contract that is outside the ISO. A Must Offer unit that fails to offer all its capacity to the IFM and RUC markets in order to reserve that capacity for an Option Contract does not satisfy the unit's Must Offer obligation to provide its capacity to the ISO. Therefore MD02 does not provide a way to represent such a contract, and the unit's capacity may be dispatched in the IFM or RUC process. However, commitment in RUC does not prevent the unit from performing if its option is exercised later.
37	How will the SLIC log be coordinated with the hour ahead schedule regarding derates and outages? Phase 2 Issue	Closed	As Market Participants notify the ISO of Generator Status changes, the ISO Operators update SLIC. SA scans SLIC approximately every 4 seconds for updated information. When the HA Market closes it incorporates all updated information submitted up to that time.
38	Can the Load Forecast be posted 5 days out? Phase 2 Issue	Closed	Yes
39	Can numerical examples be provided for RUC proxy bids, including partial bids? Phase 2 Issue	Closed	For Must Offer units, if any of the three bid elements (start-up costs, minimum load costs, and incremental energy curve) are missing from a bid, the ISO will use the cost based proxy numbers. The proxy bid elements are submitted to the ISO's masterfile prior to participation in the ISO markets. If such data is not submitted to the ISO, the ISO will assume data based on similar resources. Examples were provided in JAD Session 3 and have been to the ISO Website.

MD02 Topics Discussed in Working Groups and JAD Sessions			
Informational Issues			
No.	**Issue**	**Status**	**Resolution**
40	What bids will ISO use to settle for commitment costs of resources where the commitment period crosses a daily boundary? Note that the resource has the ability to submit new bids the following day, as long as they are no greater than its start-up and minimum load costs in the master file. Phase 2 Issue	Closed	Market Participants will be compensated consistent with the bids used for the optimization decision.
41	If the SCUC optimization must adjust resources to resolve congestion, and all economic bids are exhausted, are uneconomic adjustments required, and are they priced at the applicable bid cap (bid ceiling or floor)? Why? Phase 2 Issue	Closed	Once all economic bids are exhausted without fully clearing congestion, adjustments will be made to resources that did not submit bid curves. These resources will be price takers for settlement. Thus, when these resources must be adjusted, the adjustment price is the maximum or minimum price the system allows (bid floor and ceiling).
42	In the current market design, there are scenarios that result in an SC not receiving full credit for its AS self-provision schedules. This seems to occur when there is Rational Buyer substitution. Will this occur in the MD02 design? Phase 2 Issue	Closed	Under MD02, accepted self-provision capacity will be determined during the IFM optimization so the ISO will ensure that the accepted self-provision is settled appropriately.
43	JAD Participants requested examples of heat rate curves. Phase 2 Issue	Closed	Examples were presented and are posted on the ISO Website.

MD02 Topics Discussed in Working Groups and JAD Sessions			
Informational Issues			
No.	**Issue**	**Status**	**Resolution**
44	Will the ISO post to OASIS a total estimated cost (non-settlement quality) prior to settlements, representing the uplift to be charged to load for generator commitment costs not recovered through market revenues? Phase 2 Issue	Closed	This type of cost is difficult to estimate prior to Settlements. The ISO does not currently try to estimate such costs for posting and does not plan to do so in the future.
45	Will the ISO de-commit units in the HA Market? Phase 2 Issue	Closed	Tariff 2.3.1.2.1. The ISO may de-commit units in HA if they are determined no longer to be needed, but will observe all physical constraints of units that were previously committed (such as minimum run time). A unit cannot de-commit itself unless it is out of service.
46	What Volume of energy will ISO use for GMC (self schedule net vs. gross)? Phase 2 Issue	Closed	Possible options include: (a) ASREO Charge based on DA/HA energy volumes as well as RT energy; (b) A new charge based on RUC Capacity volume and/or Energy if dispatched. Ultimate policy will be handled via the 2004 GMC Rate Design.
47	If DA RUC-purchase of energy is not used in real time, how is it charged to participants (i.e. hour ahead schedules or load forecast error)? Phase 2 Issue	Closed	Refer to Tariff sections 5.12.8.2.1, 5.12.8.2.1.1, 5.12.8.3, and 5.12.8.3.1. The first allocation tier is to positive real-time deviations of load from DA schedules. This is because the ISO must make these commitment decisions in the DA timeframe, even though some load may clear in the HA, due to the start-up time required for the resources.

MD02 Topics Discussed in Working Groups and JAD Sessions			
Informational Issues			
No.	**Issue**	**Status**	**Resolution**
48	(1) Will default load aggregations include any combination of load nodes the ISO chooses? (2) Will scheduling at the default level accommodate identification of the load in an MSS aggregation? Phase 3 Issue	Closed	(1) Default load aggregations will not be arbitrary. They will include all nodes within the geographic/electrical definition of the aggregation (i.e., PGE3, PGE4, SCE, SDGE). (2) Like any other SC, a MSS can elect default or custom aggregation for scheduling and settling its load. However, any custom aggregation must be wholly contained within one of the four default aggregations identified in (1).
49	In the CRR auction optimization, is maximizing Market Participant value the same as maximizing auction revenues? Phase 3 Issue	Closed	It can be demonstrated mathematically that the objective of maximizing auction revenues is the same and achieves the same goal as maximizing Market Participant value; in linear programming terms, one problem is the "dual" of the other. An example that illustrates this linear programming property is given in Section VII of "Transmission Access and Pricing with Multiple Separate Energy Forward Markets" by Paul Gribik et. al. published on IEEE Transaction on Power Systems, Vol 14, No. 3, August 1999.
50	On what basis does the ISO interpret the FERC Must Offer order to apply to the Forward Markets, rather than only to Real Time? Phase 2 Issue (Also Issue #7)	Closed	The only market run by the ISO at the time the Must Offer Order was made was the Real Time market, thus this was the only means by which the ISO could implement this economic withholding preventative measure. The ISO believes the Order can naturally be extrapolated to the Forward Markets proposed in MD02.

MD02 Topics Discussed in Working Groups and JAD Sessions			
Informational Issues			
No.	**Issue**	**Status**	**Resolution**
51	How will the ISO perform Contingency Analysis on the Full Network Model? Phase 3 Issue	Closed	Contingency analysis may be performed in two steps: (1) Contingency Screening and (2) Contingency Evaluation. Contingency Screening is commonly done using a linear model that could be a global linear model, i.e., the DC model, or a local linearization of the AC model at an operating point. The contingencies that are not screened out in the first step are evaluated further in Contingency Evaluation using a more accurate model that could be an AC power flow. Exactly how contingencies will be treated in the SCUC will depend however on the vender's technology and approach. The fact that the CAISO has proposed using an AC-OPF to determine the nodal prices does not necessarily limit the choice of algorithms for the performance of contingency analysis.
52	Participants requested more information on LDFs, how aggregation with custom and standard LDFs will work, and some examples of the impact of aggregation on settlements. Phase 3 Issue	Closed	The ISO provided several presentations and these are posted on the ISO website.
53	Participants requested examples for changes to various charge types (CTs). Phase 2 Issue	Closed	Examples were presented and are posted on the ISO Website.
54	Will the RFP for the IFM & LMP software be made public? Phase 2 Issue	Closed	The full RFP will not be made available to the public. However, the ISO will determine if specific documents associated with the RFP should be made public.

Attachment F: MD02 Topics Discussed in Working Group and JAD Sessions

MD02 Topics Discussed in Working Groups and JAD Sessions			
Informational Issues			
No.	**Issue**	**Status**	**Resolution**
55	Participants requested continuing updates on the progress of Phase 2 and Phase 3, and a forum for discussing implementation issues. Phase 2 and 3 Issue	Open	Per the FERC Order of November 27, 2002, the ISO will be filing MD02 progress reports on the first Monday of every month. The first of these progress reports, to be filed in January 2003, will offer a proposal for continuing discussions with stakeholders.