



Memorandum

To: ISO Operations Committee
From: Steve Berberich, Chief Information Officer & Vice President Information Services
CC: ISO Board of Governors, ISO Officers
Date: December 9, 2005
Re: *Technology Status Report (Report covers period 10/13/05 through 12/09/05)*

This is a status report only. No Board action is required at this time.

EXECUTIVE SUMMARY

This memorandum provides an initial review of a new organizational focus as well as an overall update on certain key technology and capital projects.

Organizational Focus

Four key elements of IT excellence have been identified and will be pursued. Those areas include running IT with: 1) business discipline; 2) delivery excellence; 3) innovation; and 4) delivery of the technology vision. Initiatives will be undertaken in each one of the following areas to improve IT functions.

- Instituting a focus on running IT as a business (“Business of IT”)
 - A sharpened focus on cost management
 - Process excellence across IT operations
- Delivery Excellence
 - Delivery against project budget and schedules through implementation of best practice techniques and separation of support and project functions
 - Implementing an effective project management capability
- Innovation
 - Implementing a “quick hit” capability to achieve small but incrementally valuable results across the business units
 - Aligning resources to the business units to provide analytical and system planning resources
- Achieving the technology vision
 - Engaging IT in developing the three-year business plan and developing a vision for the future state of technology

Project Status

Projects are grouped by the following focus areas:

- Ensure Reliability of the Grid
- Technologies and Activities Supporting Market Redesign and **Technology Upgrade Program (MRTU)**
- Improve Operational Efficiencies
- Enhance Business Effectiveness
- Strengthen and be Responsive to External Relationships

Management has grouped the projects by focus area so that the Board and stakeholders can appreciate and understand how these projects relate to both the ISO's corporate goals as well as issues raised by stakeholders.

Ensure Reliability of the Grid

- **Energy Management System (EMS) 2004 Upgrade Project:** The Energy Management System (EMS) is a group of systems/subsystems and hardware that monitors, evaluates, and controls the power system lines, loads, and generators in the ISO Control Area. The EMS is the fundamental system that the ISO utilizes to operate the grid safely and reliably in real-time. In an effort to ensure that the EMS will meet future requirements and functionality, Management undertook a review of the existing EMS and identified the need for implementing the ISO's existing vendor's technology upgrade - ABB's EMS Network Manager 2004 release. Key functionalities associated with the upgrade include:
 - Performance improvements: There is a 10 second update for real-time EMS screens in the EMS User Interface. The Network Manager 2004 update would provide a minimum 2 second update.
 - SAS 70: The current EMS does not accommodate for the level of auditing and access controls currently being mandated. Security requirements would be addressed within the new release inclusive of auditing, authorization controls, and access controls.
 - Security requirements: This upgrade would provide single user sign on, audit records of user's actions, and administration of security update patches.
 - Alarm enhancements: In response to August 14, 2003 Eastern Blackout, NERC and WECC requirements include the usability of alarm systems, navigation, and usability of EMS systems. The business requirement is to have a system that would allow operators the ability to view what is pertinent and not overload them with lower priority views. This update would address the enhancements necessary to accommodate mandates.
 - Workstation expansion: The update would allow for an easy expansion of additional workstations. Moreover, the update would remove the necessity for an intermediate display server resulting in a simpler architecture.
 - New web interface: All on-line diagrams of the EMS system would be available for Operations Engineers via a new web interface. This would expand the Grid Operations views of our system to a much wider engineering user community.

Status: Project behind schedule. Funding approval for the EMS 2004 Upgrade project was received at the September 15, 2004 ISO Board of Governors meeting. The original target date and cutover activities were moved to later in the year due to issues related to summer preparedness and changes at ABB as well as at the ISO. There have been several schedule impacts due to personnel changes, challenges with the vendor's resources, and working

through variances regarding our onsite testing in EMS Quality Assurance Systems. The target date was also impacted due to the amount of testing required and issues in EMS displays that did not surface until the Site Acceptance Testing started in November. The amount and depth of the data changes have been significant. Original target date: May 15, 2005. Revised target date: December 12, 2005.

- **Transmission Register Redesign:** The ISO's current Transmission Register (TR) application provides information on transmission equipment, specifically, the ratings of equipment. It is frequently used by Grid Operations and Planning to determine the most limiting element(s) on a transmission line. The initial TR application met these business requirements but has quickly become deficient in being able to meet the evolving business requirements of external PTO administration and more robust reporting. Due to performance and usability issues, many users are no longer accessing this application. The administration of transmission equipment is problematic for PTO administrators due to limited functionality. Some PTO administrators have resorted to updating their organization's equipment details in a process that, at times, bypasses the front end of the TR application. This process, along with other "workarounds" to prevent security violations, costs the ISO in both Operations Engineering and Information Systems employee resources. The deficiencies that negatively affect the business today will become even more exasperated with the deployment of the Market Redesign & Technology Upgrade program in which the TR becomes even more critical to day-to-day operations. In 2004, the ISO performed a business analysis, gathering information from the primary PTOs such as SDGE, SCE, and PG&E. The result of that effort was presented to the participating PTOs and they were very pleased.

The primary benefits to be achieved include:

- A satisfied user community. Performance issues will no longer prevent PTOs from accessing the system.
- A system that provides accurate transmission equipment information to those who need it at the time they need it. Users will no longer have to rely on potentially outdated printed reports to determine ratings. Providing the most up to date and accurate transmission data will reduce the potential for grid reliability events.
- An open system that conforms to ISO application standards. This will lower maintenance costs and make it easier to expand its functionality, as business needs change. The TR can easily and openly share information with other ISO applications with minimal integration efforts.
- A more flexible system that allows the TR administrators to support business changes without requiring new development.
- A secure system.

Status: Project on target. The ISO Project Steering Committee approved funding for this project during their April 21, 2005 meeting. Business requirements are complete, the team is currently working on the application design and development, and test planning is currently underway. Target date: June 30, 2006.

Technologies and Activities Supporting Market Redesign and *Technology Upgrade Program* (MRTU)

- **Computer Infrastructure (System) Provisioning:** The current process for the installation, configuration, and maintenance of computer systems, databases, and applications is mostly a manual and decentralized effort as well as a labor and time intensive process due to the lack of automated provisioning tools. Until recently, the few tools available in the market were point solutions for a few computer infrastructure components and for specific technologies. However, mature enterprise-wide provisioning tools are now available in the market, which address previous shortcomings. The primary objective of this project is to deploy an automated provision tool to accomplish the following: a) reduce labor and time required for the deployment and upkeep of computer systems; b) ensure consistent computer infrastructure deployments across all technologies; c) track computer systems' configuration from a central location as well as automate detection of non-compliant configurations; d) centralize the auditing of computer systems through the automated recording of all configuration changes applied on any managed system; and e) increase the leveraging of ISO's computer assets for multiple projects through rapid redeployment of those assets. Initially, this tool will manage all new systems being introduced by the MRTU program as well as other existing critical systems impacted by MRTU.

Status: Project on hold. The ISO Project Steering Committee authorized the initiation of the planning phase for this project. Due to critical summer readiness projects and the organizational restructuring, this project was placed on hold. Provisioning capabilities have been included within the outsourcing contract currently under negotiation. Original target date: December 31, 2005. Revised target date: September 30, 2006.

Improve Operational Efficiencies

- **Enterprise Lightweight Directory "Access" Protocol (LDAP) Infrastructure Upgrade:** The ISO's current LDAP infrastructure was initially created to support the existing public-key infrastructure required to secure access for many of our external-facing market systems. Today, there is a need for several new systems to also utilize LDAP, including the Vitria upgrade; the Portal; and the new Identify, Policy, and Access Management (IPAM) Project. Analysis has shown that the current LDAP infrastructure cannot support the additional availability and load requirements of these new systems. The purpose of this project is to create a single new enterprise infrastructure for application and system security that will accommodate all current and foreseeable future business requirements. This eliminates the need for current and future systems to provide separate servers to host individual LDAPs, centralizing access control and decreasing the maintenance required to manage multiple infrastructures.

Status: Project pending. The ISO Project Steering Committee approved funding for this project during their August 5, 2004 meeting. All hardware and software have been installed and configured in production, ready for use. New web applications are utilizing the new infrastructure as they come online. Legacy web applications can make use of the new LDAP infrastructure after they are all decommissioned from the existing ISO Internet network infrastructure and migrated to the Internet segment of the Next Generation Network (reference Internet Application Tree Network Project). The project team is currently testing migrations of

existing web applications. Original target date: January 2005. Revised target date: January 3, 2006.

- **Database Server Replacement Project:** The database server infrastructure that currently supports several ISO mission critical applications (ADS, SLIC, BITS, SRS, and GRMMA) must be upgraded to support upcoming applications such as SIBR, Vitria, Portal, and others. The Information Services department has, over the last two years, redefined its systems availability architecture and server consolidation strategy. This architecture seeks to group like-applications with identical availability requirements onto a common set of infrastructure that can be leveraged for all projects in a cost-effective and reliable manner.

Status: Project on hold (Scheduled restart-January 6, 2006). The ISO Project Steering Committee approved funding for the Ultra-High Availability Database (UHDB) project on September 2, 2004. A change request to extend the project through June 2005 to utilize Oracle's latest database solutions, which will provide a savings of \$263,400.00 or approximately 30% of the approved budget, was approved in December 2004. The savings were used to upgrade the ultra-high availability database servers to support future databases such as SIBR, Vitria, Portal, and MasterFile – providing additional room for future growth. The ultra-high available production environment has been setup and configured. However, due to the risk associated with replacing the existing SLIC, ADS, BITS, and SRS database servers prior to summer operations, a decision was made to postpone the upgrade project until after the summer. The project has approximately two months of activity remaining, as defined within the original project plan. An updated plan will be developed. Original target date: December 31, 2004. Revised target date: March 31, 2006.

Enhance Business Effectiveness

- **Internet Application Tree (IAT) Network Project:** The Internet Application Tree (IAT) Network supports all ISO Internet web and application services such as Open Access Same-Time Information System (OASIS), Automated Dispatch System (ADS), Secondary Registration System (SRS), Scheduling and Logging for ISO in California (SLIC), and others. The IAT network is currently separated from the Next Generation Network (NGN) through security and network infrastructure. This separation results in increased operational complexity, increased hardware and software costs, and does not support future MRTU Portal requirements. The IAT decommission project presents an opportunity to: a) increase system reliability by reducing operational complexity; b) reduce hardware and software costs through better utilization of computer assets; and c) enables integration of existing Internet applications into the ISO Portal solution.

Status: Project behind schedule. The ISO Project Steering Committee approved funding for this project on June 15, 2004. A collaborative design effort between Network Services and Information Security was completed on July 15, 2004. Procurement of the security equipment was completed on August 31, 2004. Infrastructure installation, configuration, and testing were completed on October 29, 2004. Application migrations began on February 1, 2005 and will continue through the duration of the project. Ninety percent of IAT application migrations have completed. Resource constraints experienced during the organizational realignment slowed progress. The IAT Network Project has seen significant schedule extensions due to a number of higher priority projects taking precedence over the resources needed to complete this project on time and on schedule. After detailed review of the work remaining to migrate the

Business-to-Business connections, coupled with limited staff available to complete the required firewall modifications, original completion date is being revised. Original target date: May 31, 2005. Revised target date: January 1, 2006.

- **Oracle Employee Timecard Exception Report:** As a result of the settlement of the wage/hour case, Shift Workers at the California ISO are now classified as Non-Exempt employees, eligible for overtime earnings. Since November 2004, ISO Shift Workers have entered hours into an interim online system. All processing thereafter is manual, adding 60-70 person hours to every payroll. The manual process is prone to error and is acknowledged to be a corporate risk of high order. The existing Exception Report cannot feasibly be modified to meet the complex Shift Worker timekeeping requirements, except at prohibitive development and support costs, while adding even more risk to this critical corporate process. At the same time, Exempt and Non-Shift Non-Exempt employees use old and inadequate software that has long outlived its ability to adapt to our evolving business and needs to be replaced. We have an ideal opportunity to do that. This project is to replace all employee timekeeping and exception reporting with the Employee Self-Service (ESS) framework already familiar to ISO employees. There will be no new software or hardware costs; our approach is rather to extend the functionality and utility of the software and hardware we already use to support our corporate accounting and HR processes. If we do not undertake this project, Payroll and IS Payroll Support will continue to process payrolls with high risk for errors and working long hours against inflexible deadlines. If one or more steps of the manual processes are overlooked or are conducted inaccurately, the legal exposure and financial liability to the organization could be substantial.

Status: Project on target. The ISO Project Steering Committee approved funding for this project during their April 21, 2005 meeting. Factory Acceptance Testing (FAT) was completed in August 2005. User Acceptance Testing was completed in November. Training will be scheduled for all employees in December. The new timecard, which HR now refers to as ATM (Automated Time Manager), will be the ISO's first implementation of electronic approvals in the "Oracle E-Business Suite" software used for Accounting and HR. Target date: December 26, 2005.

- **Enterprise (End-to-End) Testing Project:** In the demanding energy market, ISO must respond rapidly to change. Over the years, these changes have led to increasingly more complex software systems used to manage the grid. Validating changes to these software systems to ensure continued grid reliability has also become much more complex. The existing test environments, processes, and procedures do not scale adequately to support the large number of changes and interdependencies of software systems and scripts that have evolved. In addition, the management, support, and coordination of the current ISO testing processes and test environments are decentralized with a number of different groups maintaining their own processes, system configurations, and sets of documentation. In the past, system changes had minimal or no impact on other systems, allowing for less sophisticated testing tactics. However, with today's integrated systems, even small changes can have adverse impact on other systems' functionality and performance. Today's systems require a much more rigorous testing approach to ensure continued reliability.

In recognition of the current situation, ISO embarked on a three-phase approach to improvements. The initial phase, referred to as the Stabilization Phase, was completed in late August 2005. During this phase, ISO defined a testing coordinator, identified enterprise-wide

roles and responsibilities within the current organization, and streamlined the testing processes. While this effort provided immediate results, long-term opportunities were identified and scoped out in two additional phases. Phase 2, the Finalization Phase, will provide adequate development and test environment infrastructure. In addition, Phase 2 will create a comprehensive test repository, define test data sets, and standardize the test execution processes, and transition roles and responsibilities to a centralized testing team. Phase 3, the Optimization Phase, will create a "production-like" staging environment and ensure future sustainability at a reasonable staffing level.

Status: Project on target. Funding approval for the Enterprise (End-to-End) Testing project was received at the September 8, 2005 ISO Board of Governors meeting. Phase 2 of the project was fully initialized on September 30, 2005. The hardware has arrived and is in the process of being installed. Interim testing processes have been deployed to address current testing efforts (such as Long Day and C1 Model Testing) while the longer-term processes are being defined. Centralized test team needs and transition plan have been identified and are being analyzed. A test management tool has been designed and is being configured to support the newly defined processes. A test data repository has been designed and is in the process of being implemented. Target date: April 8, 2006.

Strengthen and be Responsive to External Relationships

- **Website Redesign Project:** The ISO Internet Website is the organization's principle tool for communicating and disseminating information externally to market participants, stakeholders, regulatory and governmental entities, the media, and consumers. Website users have voiced concerns about the volume of stale data on our website and the difficulty they encounter retrieving current and relevant information, including difficulties navigating the site and determining where to look for information. In 2004, several incremental improvements were made to the current site, and more specific information was gathered regarding the concerns identified above. In 2005, the ISO concentrated on a redesign and deployment of a new website that addresses the most important stakeholder needs and the ISO's business requirements.

Status: Project complete. The new ISO Website was deployed into production on schedule -- October 31, 2005. Target date: October 31, 2005.

Technology Status Report Summary			
Project Name	Original Target Date	Revised Target Date	Status
Energy Management System (EMS) 2004 Upgrade Project	05/15/05	12/12/05	RED
Transmission Register Redesign Project	06/30/06		GREEN
Computer Infrastructure (System) Provisioning Project	12/31/05	09/30/06	YELLOW
Enterprise Lightweight Directory "Access" Protocol (LDAP) Infrastructure Upgrade Project	01/2005	01/03/06	YELLOW
Database Server Replacement Project	12/31/04	03/31/06	YELLOW
Internet Application Tree (IAT) Network Project	05/31/05	01/01/06	RED
Oracle Employee Timecard Exception Report Project	12/26/05		GREEN
Enterprise (End-to-End) Testing Project	04/08/06		GREEN
Website Redesign Project	10/31/05		BLUE

Status Legend:

- Red = Behind Schedule*
- Yellow = In Jeopardy – pending/on hold*
- Green = On Target*
- Blue = Completed*