



Business Requirements Specification

ADS Replacement Project

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1. Introduction

1.1 Purpose

Since 2014, some market advances have not completely made their way to ADS and the product is being enhanced in this project to catch up with several of the market advances. Also, technology-based upgrades are being made to enhance application security, improve operational efficiencies and establish a technology infrastructure that will support evolving market requirements.

In addition, functional improvements are included that assist both Market Participants and CAISO operations in more effectively managing the dispatch and operation of resources operating in the CAISO market. These improvements involve automation of current manual/verbal processes and enhanced displays of data and instructions provided through ADS.

1.2 References

All references represent external requirements documents or stakeholder requests developed and submitted by the Business Units.

Information for this initiative can be found under the Fall 2019 Release on the following CAISO web page at:

<http://www.aiso.com/informed/Pages/ReleasePlanning/Default.aspx>

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2. Intellectual Property Ownership

Intellectual property covers a broad array of information and materials, including written works, computer programs, software, business manuals, processes, symbols, logos, and other work products. Determining ownership of intellectual property is very important in preserving rights of the California ISO and helps to avoid intellectual property infringement issues. In considering the business requirements or service requirements to be performed, the business owner of the project must determine intellectual property Ownership.

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2.1 Guidelines

Intellectual property ownership must be considered by all applicable stakeholders before the services are performed. The level of analysis is two-fold. One, the business owner must determine if the intellectual property necessary to perform the services is owned by the California ISO or whether it must be obtained from a third party. Once it has been determined that the California ISO has secured the proper intellectual property rights to perform the services (i.e., the intellectual property is owned by the California ISO or we have licensed it from a third party), then the second step in the analysis is to consider whether new intellectual property will be created as a result of the business requirements or service requirements to be performed and how that intellectual property will be owned and protected by the California ISO. In order to assist the business owner in the analysis previously described, refer to the California Intellectual Property Policy available at <http://www.caiso.com/rules/Pages/LegalPoliciesNotices/Default.aspx>, which provides a brief tutorial on what Intellectual Property is and how the California ISO can go about protecting its intellectual property. Please contact the Legal Department if you have any questions regarding intellectual property.

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2.2 Checklist

There are no impacts to intellectual property based on the requirements stated in this document.

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3. Appendix: Acronym Definition

Acronym	Definition
ADS	Automated Dispatch System
AIM	Access Identify Management System
A/S	Ancillary Services
CUI	Common User Interface
DOT	Dispatch Operating Target
ED	Exceptional Dispatch
FMM	Fifteen Minute Market
FRD	Flex Ramp Down
FRU	Flex Ramp Up
SUPP	Supplemental Dispatch

4. Details of Business Need/Problem

4.1 Description

The ADS Replacement Project addresses the following three (3) main topics:

- **ADS User Interface (UI) Replacement:**
 - The current ADS UI is a legacy system that has not been brought up to current ISO technology standard
 - The new UI will provide improved operational efficiencies for Market Participants in accessing ADS
 - Existing functionality and user interface capabilities will be retained except as noted

- **Market-related enhancements:**
 - Automation of unannounced A/S testing
 - Economic dispatch of resources for Non-Spin A/S
 - Deferred Flex Product enhancements for FRU and FRD awards

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- **Operational Data and Displays:**
 - Improved information available for Exceptional Dispatches (EDs) instructions
 - Additional columns for DOT and SUPP values for enhanced operational efficiencies
 - Improved access to historical ADS messages
 - Revised retention period of ADS data to thirty (30) days
 - Resizing of text fonts for improved visibility to ADS Pop Up messages

The CAISO continues to seek Market Participant feedback on proposed enhancements.

5. Business Process Impacts

5.1 Business Practice Manual (BPM)

BPM	Description of Impact(s)
Managing Full Network Model	N/A
Congestion Revenue Rights	N/A
Market Instruments	Yes - TBD
Outage Management	N/A
Reliability Requirement	N/A
Market Operations	Yes - TBD
Compliance Monitoring	N/A
Metering	N/A
Scheduling Coordinator Certification & Termination	N/A
Rules of Conduct Administration	N/A
BPM Change Management	N/A
Definitions & Acronyms	N/A
Settlements & Billing	N/A
Credit Management	N/A
Candidate CRR Holder	N/A
Transmission Planning Process	N/A
Direct Telemetry	N/A
Distributed Generation for Deliverability	N/A
Energy Imbalance Market (EIM)	N/A
Generator Interconnection Procedure (GIP)	N/A

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BPM	Description of Impact(s)
Generator Interconnection and Deliverability Allocation Procedures	N/A
Generator Management	N/A
Managing Full Network Model	N/A

5.2 Other

Impact:	Description: (optional)
Market Simulation	Yes
Market Participant Impact	Yes
Internal Training	Yes
External Training	Yes
Policy Initiative	No
Vendor	Yes
Architectural Framework and Roadmap	Yes

6. Business Requirements

The sections below describe the Business Processes and the associated Business Requirements involved in the project. These may represent high level functional, non-functional, reporting, and/or infrastructure requirements. These business requirements directly relate to the high level scope items determined for the project.

6.1 Business Process: Manage ADS UI Replacement

The current ADS User Interface (UI) technology platform will be replaced with a new technology platform that meets CAISO's standard.

This replacement process will focus on identifying and maintaining existing capabilities currently in ADS.

6.1.1 Business Requirements

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ADS-BRQ001	<i>Port the ADS User Interface from the current Delphi-based platform to the WebSDK platform</i>	Core	ADS

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ADS-BRQ002	<p><i>Maintain functionality currently available in ADS in the new platform except for the following:</i></p> <ul style="list-style-type: none"> • <i>Ability to export to custom XML format. Current "Save As" function save the query report data as <APIDispatchResponse> XML.</i> • <i>Ability to create custom display tabs</i> • <i>Ability for dynamic arrangements of data grids and charts to fit within the available spaces of the application. Display layouts will be static and predefined.</i> • <i>Ability to use context help (right mouse click) to copy chart or data for copy/paste</i> 	Core	ADS
ADS-BRQ003	<p><i>Maintain existing user interface capabilities currently available in ADS using the new Common User Interface (CUI) except for the following:</i></p> <ul style="list-style-type: none"> • <i>Ability to "Drag a column here to group by that column" for grouping.</i> 	Core	ADS

6.2 Business Process: Manage Flex Ramp Modifications

Flex Ramp Up and Flex Ramp Down awards will be made available in ADS and visible via the ADS UI.

6.2.1 Business Requirements



ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ADS-BRQ010	<p>The ADS client user-interface shall be updated to display the following for generator and TG resources to users: CAISO System Operators; SC Gen Operators; SC Gen Dispatchers</p> <ul style="list-style-type: none"> RTD binding FRU and FRD ramping awards (separately) <p>FRU/FRD awards shall be presented in the same manner as all other market commodity types.</p>	Core	ADS
ADS-BRQ011	<p>The ADS client user-interface shall be updated to display the following for intertie resources to users (CAISO System Operators; SC Gen Operators; SC Gen Dispatchers):</p> <ul style="list-style-type: none"> FMM binding Energy Dispatches (schedules) and bid type <p>FMM Energy Schedules shall be presented in the 15-minute display(s).</p>	Core	ADS
ADS-BRQ012	<p>The ADS client user-interface shall be updated to display the following for generator and TG resources to users (CAISO System Operators; SC Gen Operators; SC Gen Dispatchers):</p> <ul style="list-style-type: none"> FMM binding FRU and FRD ramping awards (separately) <p>FRU/FRD awards shall be presented in the same manner as all other market commodity types..</p>	Core	ADS



ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ADS-BRQ013	<p><i>RTM (RTPD and RTD, separately) shall broadcast the following information to system and generation dispatch operators (both CAISO and Market Participant):</i></p> <ul style="list-style-type: none"> • <i>Binding FMM Energy Dispatches</i> • <i>Bid type for Intertie Resources</i> • <i>Binding FMM FRU and FRD awards for Generator and Tie-Generator resources</i> • <i>Binding RTD FRU and FRD awards for Generator and Tie-Generator resources</i> <p><i>Note: Updated web services will be used to support this requirement. Market to send information.</i></p>	Core	ADS
ADS-BRQ014	<p><i>RTM (RTPD and RTD, separately) shall broadcast the following information to system and generation dispatch operators (both CAISO and Market Participant):</i></p> <ul style="list-style-type: none"> • <i>Binding FMM Energy Dispatches</i> • <i>Bid type for Intertie Resources</i> • <i>Binding FMM FRU and FRD awards for Generator and Tie-Generator resources</i> • <i>Binding RTD FRU and FRD awards for Generator and Tie-Generator resources</i> <p><i>Note: Updated web services will be used to support this requirement. Market to send information.</i></p>	Core	ADS

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ADS-BRQ015	<p><i>ADS API web services shall be extended to provide the following:</i></p> <ul style="list-style-type: none"> • <i>RTD binding FRU and FRD ramping awards (separately)</i> <p><i>FMM binding energy schedules and bid type, FRU and FRD ramping awards (separately)</i></p> <p><i>Note: Updated web services will be used to support this requirement. Market to send information.</i></p>	Core	ADS
ADS-BRQ016	<p><i>The system shall add an alarm in the 15-minute market (FMM) for Energy dispatches. Alarms to be similar to existing alarms and in current Alarm window.</i></p>	Core	ADS

6.3 Business Process: Manage NSPIN Economic Dispatch

Economic optimization will refine unit commitment decisions for non-spinning reserve during Real-Time Contingency Dispatch (RTCD), rather than the current practice to commit all offline resources with Non-Spin Awards to their minimum output (Pmin).

Specifically, this shall only apply to resources with contingent Non-Spin awards when the “Include Off-line NSPIN” resource option is active.

6.3.1 Business Requirements



ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ADS-BRQ200	<p>Activation of “Include Off-line NSPIN” flag shall optimize offline NSPIN unit commitment.</p> <p>When the “Include Off-line NSPIN” flag is activated, the system shall apply economic optimization to the unit commitment decisions for off-line resources with awarded NSPIN.</p> <p>System shall only consider off-line resources with Non-Spin awards and are native to the CAISO BAA for unit commitment. Resources that are NSPIN-certified (i.e. Fast Starts) without NSPIN awards will not be considered.</p> <p>Additionally, economic dispatch for resource capacity included in their entire energy bid (beyond just the NSPIN MW awards) shall be included in system optimization when this method is activated.</p>	Core	Market System
ADS-BRQ210	Solution shall not decommit or shutdown resources.	Core	Market System
ADS-BRQ215	Solution shall not allow MSG resources to transition between configurations due to timing constraints.	Core	Market System
ADS-BRQ220	<p>Unit commitment optimization shall consider the following economic criteria in the optimized solution:</p> <ul style="list-style-type: none"> • Start-Up Costs • Minimum Load Cost <p>Shutdown costs shall not apply due to ADS-BRQ210.</p> <p>Transition costs shall not apply as MSG Transition decisions would not happen due to ADS-BRQ0215.</p>	Core	Market System
ADS-BRQ230a	<p>Unit commitment optimization shall consider the following temporal criteria in the optimized solution:</p> <ul style="list-style-type: none"> • Minimum Up/Down Times • Maximum Daily Starts 	Core	Market System

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ADS-BRQ230b	<p>System shall ensure that resources committed through optimization shall honor all temporal constraint currently honored by RTPD except for the MUT in subsequent Real-Time market runs.</p> <p><i>Specifically, committed units shall have their minimum up times honored in those RTPD and RTD market run intervals subsequent to the RTCD run.</i></p>	Core	Market System
ADS-BRQ241a	<p>RTM shall immediately broadcast startup instructions for resources committed (there shall be no delay to RTPD).</p> <p>Startup time must reflect the exact timestamp when the unit is expected to be online (currently only at the 15-min boundary - now will be at any time).</p> <p>This will allow start-up instructions to be immediately broadcast to ADS.</p>	Existing Functionality	ADS, RTM
ADS-BRQ241b	<p>ADS shall be able to receive start-up instructions. Start-up times may not align with the existing 15-minute boundary currently expected (i.e., can be any time).</p>	Core	ADS
ADS-BRQ241c	<p>ADS shall be able to process start-up instruction and incorporate them in applicable ADS displays.</p> <p>Start-up times may not align with the existing 15-minute boundary currently expected (i.e. can be any time).</p>	Core	ADS
ADS-BRQ242a	<p>RTM shall broadcast to downstream systems information that will allow them to align the correct commitment period for the RTCD run's resulting commitment costs.</p>	Core	Market System
ADS-BRQ243	<p>System shall pro-rate the minimum load cost for the first RTPD commitment period(s) for the purpose of determining the commitment cost under the following rules of precedence:</p> <ul style="list-style-type: none"> • If commitment conflicts with prior RTM data for that interval, commitment shall always take precedence • As the commitment is de-composed to RTPD intervals, the existing rules of precedence between RTM and DA/RUC markets shall still apply 	Core	Market System

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ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
<i>ADS-BRQ244</i>	System shall perform commitment cost allocation calculations under its currently existing rules as performed for RTPD, with the following exceptions: <ul style="list-style-type: none"> • System to receive startup instructions from RTCD as well as RTPD. • System to accept start-up time down to the second (currently on a 15-minute boundary), from the same Start-Up instruction defined in ADS-BRQ241a • System calculation engine to calculate commitment periods down to the second • System calculation engine shall prorate the first 5-minute interval of the commitment period commensurate with the actual startup time 	Core	Market System
<i>ADS-BRQ271</i>	Systems shall provide Settlements with cost data for committed resources for RTM BCR Settlement as consistent with RTPD-committed resources	Existing Functionality	Market System Settlements
<i>ADS-BRQ280</i>	Committed resources shall be considered for RTM BCR Settlement the same as with RTPD-committed resources.	Existing Functionality	Settlements

6.4 Process: Manage Unannounced A/S Test Instructions

Operations to have the ability to automate unannounced A/S Test Instructions. Requirement is intended to mimic real contingency dispatch for a single resource. The resource shall behave as if it is dispatched.

6.4.1 Business Requirements



ID	Business Feature	Requirement type	Potential Applications impacted
ADS-BRQ410	<p>Select designated resources for unannounced A/S testing</p> <p>Only resources with A/S Spin and Non-Spin awards can be selected for unannounced A/S testing</p>	Core	RTM, ED, ED UI
ADS-BRQ420	<p>Initiate the unannounced A/S test for the designated resources as simulated contingency dispatch</p> <ol style="list-style-type: none"> The unannounced A/S testing can be issued to a resource in conjunction with other existing ED; and will automatically supersede any conflicting ED instructions during the test period. System shall automatically set up a single ASTEST instruction time period of no less than 40 minutes and shall include: <ul style="list-style-type: none"> Initial 10-minute ramp-up period (“ramp-up period”) that simulates contingency dispatch at the resource level, and 30-minute test evaluation period (“test period”) immediately following the ramp-up period to ensure AS performance is sustainable. Always extend the test period’s end time to the end of the final RTD or RTCD interval when the 40-minute period finishes. <p>The A/S testing dispatch shall be allowed for all resources that with A/S awards in the market, including, but not limited to: VER, pump-gen, dynamic, battery, storage, DER (PDR, NGR).</p>	Core	RTM, ED, ED UI
ADS-BRQ425	<p>Market system shall ensure unannounced A/S testing not affect EIM, not activate RTCD</p> <ul style="list-style-type: none"> The A/S testing dispatch and ADS do not affect any EIM transfer. ETSR will not be fixed. The A/S testing dispatch and ADS does not activate the “CAISO RTCD” alert/warning in the market. 	Core	RTM, ED, ADS



<p>ADS-BRQ430</p>	<p>Publish the unannounced A/S testing dispatch instruction for the designated resource</p> <ul style="list-style-type: none"> System shall display dispatch instructions for the designated resources of unannounced A/S testing The dispatch instruction for designated resource shall become valid and shall be incorporated into sequential market runs System shall publish dispatch instructions for the designated resource with an instruction type as "ASTEST" This broadcast is separate from other dispatch instructions that publish in alignment with standard clock market intervals. The unannounced A/S testing dispatch instruction shall only be received by the SC with a designated resource through ADS <p>Recipient SCs with designated resources shall additionally continue to receive DOT dispatch instructions aligned with the same standard clock market intervals for those resources not receiving ASTEST instructions.</p> <p>A new alarm/pop up for unannounced ASTEST instruction with individual SC enable/disable control will be added.</p>	<p>Core</p>	<p>RTM, ED ADS</p>
<p>ADS-BRQ440</p>	<p>Alert resource SC on the unannounced A/S testing for designated resource</p> <ul style="list-style-type: none"> Ensure resource SC (via ADS) receive the dispatch instruction for the designated resource and the instruction type as "ASTEST". ADS screen to be modified so that the designated resource instruction shall be noticeable to the resource SC. ADS to add a new column which will be populated with "Unannounced A/S Testing" flag at resource level. <p>Resource SC shall follow the unannounced A/S testing dispatch instruction in the same manner as in RTCD. Resource SC shall discard any pending Dispatch Instruction before the unannounced A/S testing dispatch is activated</p>	<p>Core</p>	<p>RTM, ED ADS, ADS UI</p>



<p>ADS-BRQ445</p>	<p>The system shall continue run clock interval RTPD and RTED</p> <ul style="list-style-type: none"> The system shall continue to execute and broadcast standard run clock interval RTPD and RTED interval dispatches. The designated resource shall be treated as minimum go to dispatch in the clock interval run after the unannounced A/S testing dispatch is broadcasted. <p><i>For example, the operator designates a ASTEST instruction for RESOURCE A to start at 1144 Hrs., and its default end time is set to 1225 Hrs. (ASTEST start time + 40 minutes + round up to the end of interval).</i></p> <p><i>RESOURCE A is offline and has 10 MW of awarded AS Non-Spin at the time of the unannounced AS test. Ramp Rate = 1 MW/min.</i></p> <p><i>Therefore, the SC of RESOURCE A receives its initial UASTEST start dispatch instruction from the system at 1144. Subsequently, it receives the following sequence of "Minimum Go To MW" DOT instructions:</i></p> <p>11:44:00 (ASTEST Ramp-Up Start, DOT = 0 MW)</p> <p>11:47:30 (5-minute DOT = 3.5 MW)</p> <p>11:52:30 (5-minute DOT = 8.5 MW)</p> <p>11:54:00 (ASTEST Ramp-Up End, DOT = 10 MW)</p> <p>11:57:30 (5-minute DOT = 10 MW)</p> <p>...</p> <p>12:17:30 (5-minute DOT (for 12:25-12:30) economic)</p> <p>12:22:30 (5-minute DOT (for 12:30-12:35) economic)</p> <p>12:25:00 (ASTEST Test End, DOT = 10 MW)</p> <p>12:27:30 (5-minute DOT (for 12:35-12:40) Economic)</p> <p>12:32:30 (Reverts to RTD/RTPD dispatches)</p>	<p>Core</p>	<p>RTM, ADS</p>
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	<ul style="list-style-type: none"> Resources that are not the designated resources for unannounced a/s testing shall not be impacted and continue to receive standard RTPD/RTD dispatch instructions at standard clock market intervals. <p>Clock intervals for RTPD and RTED shall continue to generate LMP for settlement, and any ASTEST designated resources shall be the price taker for energy produced within these time intervals.</p>		
ADS-BRQ460	Calculate expected energy for designated resource for unannounced A/S test <ul style="list-style-type: none"> Calculate expected energy for designated resource 40 minute plus extension to the end of the RTD or RTCD interval for unannounced A/S testing dispatch Publish the expected energy with the instruction type as ASTEST 	<i>Core</i>	Market System
ADS-BRQ461	Receive the expected energy with the instruction type as ASTEST and publish for market participants (SC)	<i>Core</i>	<i>CMRI</i>
ADS-BRQ462	Receive the expected energy with the instruction type as ASTEST and consume for Settlements in same manner as done for ASTEST	<i>Core</i>	<i>Settlements</i>

6.5 Business Process: Manage Exceptional Dispatch (ED) Instructions

The ADS display to be changed to provide more accurate information related to Exceptional Dispatches (EDs).

Changes to instruction display to include the following:

- When an ED has changed, the display must show the latest current ED instruction
- When ED instruction has expired, the ED instruction should remain on the display as long as the DOT applicable to the end time of ED remains on display

6.5.1 Business Requirements

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ADS-BRQ520	System shall change when an ED is changed, such that only the currently valid ED instruction is displayed	Core Enhancement	ADS
ADS-BRQ521	System shall perform when the ED is ended such that the ED: <ul style="list-style-type: none"> no longer appears and shall remain on display DOT applicable at the end time 	Core Enhancement	ADS
ADS-BRQ522	System shall remove duplicate ED entries in the 'Instructions' tab	Core Enhancement	ADS

6.6 Business Process: Manage DOT and SUPP Values

Additional information to be made available and visible to enhance the efficiency in managing resources that have received SUPP values along with the DOT. Additional columns in ADS displays to be added.

6.6.1 Business requirements

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ADS-BRQ530	System shall change display to add new column: <ul style="list-style-type: none"> Previous SUPP To be similar to RT Prev. DOT Will show last binding Supp.	Core Enhancement	ADS
ADS-BRQ531	System shall change display to add new column: <ul style="list-style-type: none"> RT SUPP Delta To be similar to RT DOT Delta Will show difference between RT SUPP Energy and Previous SUPP	Core Enhancement	ADS

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6.7 Business Process: Manage DOT Value Acceptance/Variation

Additional information to be available and visible to enhance the efficiency in managing resources for which there was a request to accept a partial DOT value. Additional column in ADS displays to be added.

Example scenario: A resource received a HASP award of 10MW, and at T-50 the SC called the Interchange Scheduler to have them partial their award to 5MW in ADS.

In the next HASP run the "Prev Accept DOT" column would show 5MW value.

6.7.1 Business requirements

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
<i>ADS-BRQ540</i>	System shall change display to add new column: <ul style="list-style-type: none"> • Previous Accepted DOT • Column to have Hourly indicator. NOTE: No changes to existing columns	Core Enhancement	ADS

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6.8 Business Process: Manage ADS Messages

Enhanced capabilities to view ADS messages and retrieve ADS dispatch data to be provided.

Generation dispatchers to have better visibility of ADS messages through larger text formats.

6.8.1 Business requirements

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
ADS-BRQ550	Operators shall view messages that are stored in the system for thirty (30) days UI shall allow user to filter and download the data	Core Enhancement	ADS
ADS-BRQ551	System shall allow operator to load a query tool template. The query tool template will allow operator to view the following data: <ol style="list-style-type: none"> 1. Time interval 2. Resource name 3. Configuration name 4. DOT instruction 5. Commitment instruction (startups/shutdowns/transition) 6. AS awards 	Core Enhancement	ADS
ADS-BRQ552	System shall enhance visibility of ADS Pop-Up messages: <ul style="list-style-type: none"> • Screen displays to increase size of text for Pop-Up messages • Font size to be two times (2x) the size of current Pop-Up messages 	Core Enhancement	ADS

 California ISO	Technology	Template Version:	4.2
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6.9 Business Process: Manage Access to ADS Data

Data retention requirements for ADS data and access by the Query Tool will be reduced for enhanced technology-based operational efficiencies. Query Tool capabilities will not change.

6.9.1 Business requirements

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
<i>ADS-BRQ560</i>	System to maintain access to ADS data for on-line retrieval and reports up to thirty (30) days.	Core	ADS

6.10 Business Process: Manage Enhanced Access Controls

CAISO's Access Identity Management (AIM) system will be used to enable more efficient operations in managing access to CAISO applications.

AIM will provide enhanced self-provisioning capabilities for external entities requiring access to CAISO applications.

6.10.1 Business requirements

ID#	Business Feature	Requirement Type	Potential Application(s) Impacted
<i>ADS-BRQ602</i>	Administration of access controls to CAISO applications will be managed through the AIM system	Core	ADS