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Edmund G. Brown Jr.
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TO: Mary D. Nichols
Chairman

Honorable Board Members

FROM: James N. Goldstene
Executive Officer

DATE: August 16, 2012

SUBJECT: STATUS OF MARKET INFRASTRUCTURE DEVELOPMENT FOR THE
CAP-AND-TRADE PROGRAM

At the June 28, 2012 public hearing to consider amendments to the Cap-and-Trade Regulation, the Board asked for a report on the status of the program's market infrastructure and had questions about systems' testing. Enclosed is a briefing paper regarding the status and testing of the Compliance Instrument Tracking System Service and auction administration, including financial services administration and market monitoring. The briefing paper describes major types of testing—by the application developers, by Air Resources Board (ARB) staff, and stakeholders—that have or will occur before the systems are deployed. The briefing paper also describes what ARB staff is doing to support implementation of the Cap-and-Trade Program.

Currently, registration is taking place under the program and we are preparing for the practice auction, which will take place on August 30, 2012. We are continuing to work with our contractors and stakeholders to fully test the system and are on track for the November auction.

We plan to provide updates on implementation at each Board meeting through the end of this year to keep the Board and the public fully apprised. If you have questions, please contact me at (916) 445-4383 or via email at jgoldstene@arb.ca.gov, or Richard W. Corey, Deputy Executive Officer, at (916) 322-7077 or via email at rcorey@arb.ca.gov.

Enclosure

cc: Richard W. Corey
Deputy Executive Officer

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Website: <http://www.arb.ca.gov>.

California Environmental Protection Agency

Enclosure

August 2012 Status of Market Infrastructure Development for the Cap-and-Trade Program

The Cap-and-Trade Regulation became effective on January 1, 2012, with the compliance obligation for covered entities beginning on January 1, 2013. This memorandum outlines the status of implementation readiness for the program's market infrastructure including the primary systems and resources that support the Cap-and-Trade Program. These include:

- Compliance Instrument Tracking System Service (CITSS) application development
- Auction platform application development
- Financial Services Administrative Services
- Market Monitoring Services
- Air Resources Board (ARB) Staff Readiness

METRICS FOR SUCCESS:

In order to assess the readiness to implement the Cap-and-Trade Program, ARB staff has defined successful implementation as:

- The CITSS development is complete and tested with essential functionality for stakeholder use.
- The CITSS is hosted and secure to go-live for user registration at least 10 weeks prior to the release of the first auction notice (60 days prior to the auction).
- All auction operation and related services are tested and operational no later than 60 days prior to the first auction.
- All auction operation and related services are secure.
- Training materials are available to CITSS users and auction participants.
- CITSS users and auction participants are served by an effective Help Desk and additional outreach materials.
- CITSS user registration and account application is complete and Know-Your-Customer (KYC) measures are conducted on all registered CITSS users to ensure there is no barrier to apply to participate in an auction.
- Internal ARB policies and procedures are developed to handle confidential materials.
- Market monitoring efforts are in place to validate auction results and monitor market activity.

COMPLIANCE INSTRUMENT TRACKING SYSTEM SERVICE (CITSS)

The CITSS is a market tracking system that will record compliance instrument (allowance and offset) transfers; provide the mechanism to submit allowances and offsets to comply

with the regulation; and support market oversight through the collection of Cap-and-Trade Program information. SRA International, Inc. (SRA) is developing the CITSS application. ARB is collaborating with other WCI partner jurisdictions and WCI, Inc. in the design and deployment of the CITSS.

The CITSS is being released in phases. On July 9, 2012, ARB released the first phase of the CITSS which allows Cap-and-Trade Program participants to register as users and complete applications for compliance instrument accounts. In September 2012, we plan to update the CITSS to allow ARB to create and issue allowances, and allow all program participants to transfer allowances and offsets.

CITSS Testing for Release 1:

The Release 1 functions that were provided on July 9, 2012, to California program participants include:

- User Registration for all individuals who will be designated as account representatives on compliance instrument accounts and all ARB staff who will fill required functions in the administration of California's program.
- Account application for Cap-and-Trade Program participant accounts and ARB administered accounts.

Testing of the CITSS Release 1 was conducted from November 2011 through the July 2012 release date. Testing included SRA, internal ARB staff, other Western Climate Initiative (WCI) Partner Jurisdiction staff, as well as stakeholder testing, and testing by an independent third party contractor. The following are the types of testing completed prior to release of the CITSS Release 1.

- **Unit testing** was conducted by SRA to ensure each new piece of code did what it was designed to do.
- **Integration testing** was conducted by SRA to test multiple modules of the application together to ensure no system errors or defects were introduced.
- **Functional testing** was conducted to test the functionality of the entire application end to end against ARB's design requirements to ensure that no system errors or defects were introduced to existing system features when new code was added. This was done for each component of Release 1 including: user registration, user management, account application, account management, live email notification, and all of the jurisdiction user administrative functions associated with the processes. Testing included both scripted tests, as well as unstructured testing to identify unexpected errors.
 - Functional testing was conducted by SRA, ARB staff, WCI Partner jurisdiction staff, and an independent third party contractor.
 - The contractor conducted over 9 weeks of functional testing of the CITSS. During this time they completed over 30 hours of unscripted testing.
 - All test runs were completed with 98 percent pass rate at initial testing. Any areas which did not meet expected criteria were tracked

and sent back through the development cycle of development, quality assurance, and then for user acceptance testing (UAT).

- **User acceptance testing (UAT)** was conducted by ARB staff, WCI Partner jurisdiction staff, and stakeholders to ensure the application operated as expected and is acceptable for use by the user (as opposed to the developers. **Stakeholder testing** was conducted to ensure the complete set of functions for the system was operating as expected on April 24th and 25th, with 34 individuals participating representing 27 covered entities and industry associations.
- **Regression testing** was conducted throughout application development to ensure that all CITSS functions continue to work properly as new features are introduced.
- **Security testing** was conducted by ARB staff as well as third-party internet security firms for both the application and the WCI, Inc. contractor providing the environment in which the application is hosted.
- **Smoke testing** was conducted in the pre-production and production environments prior to final release of the CITSS to the public to confirm readiness of the application for user registration. A smoke test, or go-live test, is the final test done to ensure that the deployment to the production environment is successful before a system is released to the public.

ARB completed testing on the CITSS Release 1 functionality in the Summer of 2012. In the final testing, no critical defects were found in the application and the functionality required to meet the initial user registration of Cap-and-Trade Program participants was tested and verified. Since its release, registration under CITSS has been going smoothly.

CITSS Testing for Release 2:

The CITSS Release 2 is anticipated to go-live with essential functionality for stakeholder use related to compliance instrument issuance and transfer in late September 2012, approximately 45 days prior to the first auction. The functions anticipated to be provided in Release 2 in September 2012 include:

- Compliance instrument creation and issuance
- Compliance instrument transfers
- Integration of auction administration and market monitoring

The unit, integration, functional, UAT, regression, security, and smoke testing described above for Release 1 features will also be conducted for Release 2. Stakeholder testing prior to the CITSS Release 2 is planned for early September. Security testing including testing by third-party internet security firms for both the application and the environment for which the application is hosted will be completed again prior to Release 2 of the CITSS.

Release 2 testing will also include the integration of the CITSS and auction administration. It will test how the CITSS registration data is transmitted from the tracking system to the auction platform. It will also test how auction data is processed to transfer allowances into the CITSS accounts of successful bidders.

AUCTION ADMINISTRATION

Auction administration and related services include Financial Services Administration and Market Monitoring. ARB has contracted with Markit North America, Inc. (Markit) as the Auction Administrator for the California's Cap-and-Trade Program. The Auction Administrator will administer auction and reserve sale services for the quarterly greenhouse gases (GHG) allowance auctions and reserve sales.

Markit has developed an auction platform that allows participants to apply for, post bids to, and review results for the auctions and reserve sales held by California. The auction platform provides the following:

- A centralized, secure platform and workflow solution for regulators, administrative authorities, and contractors.
- A paperless application system.
- Efficient platform generated communication system between parties.
- Market monitoring tools for authorities, with the ability to flag bids in real time.
- Access to information and educational tools to effectively allow the bidding community to make more informed decisions including a Frequently Asked Questions (FAQs) document and on-line presentations and demonstrations.
- Access to help desk support through the Auction Administrator's current regional services.

Auction Platform Testing:

The Auction Administrator will conduct the following tests prior to the release of the Auction Platform:

- **Unit testing** on the development of the auction platform by the contractor.
- **Integration testing** by the contractor to ensure multiple modules of the application perform as expected.
- **Functional testing** for quality assurance of the auction platform, including load testing and security testing, by the contractor.
- **Regression testing** each time there is a new application build that could affect existing functionality, by the contractor.
- **Performance and load testing** is undertaken to ensure that the system performs adequately in terms of the expected level of users within acceptable response times for the expected usage pattern, by the contractor.
- **User Acceptance Testing** including testing by the Auction Administrator, ARB staff, Financial Services Administrator, and Market Monitor to test different functional use cases mimicking what the actual users would do and see. A set of scripted scenarios are being used and tested. Any defects identified in UAT are tracked and sent back through the development cycle, quality assurance, and then UAT.
- **Security testing** including testing by third-party internet security firms.

- **Go-live testing** to ensure that the deployment to the production environment is successful, by the contractor.

Each function of the auction platform will also undergo multiple cycles of end-to-end integration testing prior to the public release of the auction platform. The features of the auction platform being tested by the Auction Administrator, ARB staff, Financial Services Administrator, and the Market Monitor include:

- Auction application – transmitting data from the CITSS to the auction platform, email notification, auction application process, and communicating with the Financial Services Administrator for required Know Your Customer checks.
- Bidding – opening and closing of the bidding window, bid submittal (manual and bid schedule upload), bid processing, bid monitoring flagging, settlement price determination, and auction results generation.
- Auction results distribution – ARB and Market Monitor obtain details of the auction process, ARB auction certification, distribution of individual participant results, and settlement instructions to winning bidders from the Financial Services Administrator.

The Auction Administrator will provide test completion results to ARB. The auction platform test results will state the level of test completion for each function and additional high-level testing results statistics, as applicable. The ARB staff will provide updates on systems testing results to the Board through the end of this year.

PRACTICE AUCTION

ARB will hold a practice auction of GHG practice allowances on Thursday, August 30, 2012. The practice auction is designed to allow entities registered under the California Cap-and-Trade Regulation to interface with the auction and financial services process in preparation for the November 2012 auction. The practice auction is open to all covered entities and voluntary entities which registered in January 2012; ARB sent invitations to participate in the practice auction in early August. The practice auction will mimic most of the steps of a real auction, and will provide ARB staff, regulated entities, and the contractors with an opportunity to test the auction platform and its associated processes and procedures. We plan to provide the Board with a summary of the practice auction at the September Board meeting.

FINANCIAL SERVICES ADMINISTRATION

ARB has contracted with Deutsche Bank National Trust Company as the Financial Services Administrator for the California Cap-and-Trade Program. The Financial Services Administrator will administer financial and transaction services for the quarterly GHG allowance auctions and reserve sales.

The Financial Services Administrator will perform the following activities prior to the release of the auction platform:

- Work closely with the Auction Administrator to ensure the financial services for the Cap-and-Trade Program integrate with the auction platform.
- Participate in UAT in collaboration with ARB, the Auction Administrator, and Market Monitor.
 - Test bid guarantee, account opening, and settlement invoice functions and processes.
- Test internal information and system security infrastructure, ensuring optimization of performance, quality, security, and contingency planning.
- Complete system security planning and disaster recovery planning for financial services platform.
- Integrate all financial services activities in auction processes and procedures.

MARKET MONITORING

ARB has contracted with Monitoring Analytics, LLC. as the Market Monitor for the California's Cap-and-Trade Program. The Market Monitor along with ARB staff will monitor market participants and the secondary market to identify any indicators of anti-competitive behavior, as well as understand activities and trades.

The Market Monitor will perform the following activities prior to the release of the Auction Platform:

- Work closely with the Auction Administrator to ensure the market monitoring services for the Cap-and-Trade Program integrate with the Auction Platform.
- Develop the plan for monitoring the structure, conduct, and performance of the auction including activities before, during, and after the auction.
- Participate in UAT in collaboration with ARB, the Auction Administrator, and Financial Services Administrator.

ARB STAFF READINESS

There are several areas of focus for ARB readiness for implementation. The first area of focus is ensuring that CITSS users are served by an effective Help Desk service and training materials to assist in the CITSS registration process. The second area of focus is the completion of CITSS user registration and Know Your Customer (KYC) measures on all registered users to ensure there is no barrier to apply to participate in an auction. The third focus area is stakeholder engagement to ensure stakeholders are informed.

ARB has established a CITSS Help Desk with trained staff and provided training materials:

- Responding to Help Desk questions - between the July 9, 2012, Release 1 of the CITSS and August 1, 2012, ARB staff responded to over 200 requests to the Help Desk related to user registration and account application.
- Providing training materials – ARB posted a CITSS User Registration and Account Application User's Guide on the ARB Cap-and-Trade Program webpage.

- Providing training – ARB conducted two 3-hour training webinars for stakeholders to demonstrate user registration and account application in the CITSS.

ARB has also established policies and procedures to complete the KYC measures required for user registration and account application. Between the July 9, 2012, Release 1 of the CITSS and August 1, 2012, there were over 350 individuals who initiated the user registration process. Over 150 KYC hard copy documentation packages have been received for review.

In addition, since the user registration and account application processes require the submittal of hard copy documentation that includes confidential and personal information about individuals and entities, ARB has established a number policies and procedures to ensure the security of all confidential and personal information submitted in document form. These security features include:

- Limited number of staff are approved to handle confidential and personal information.
- ARB staff with permission to take action in the CITSS are required to complete KYC provisions and sign incompatible activities statements.
- All CITSS files and documentation follow strong chain-of-custody procedures within ARB.
- All registration materials are stored in a secured room including reinforced ceiling, key card access, and limited staff access.

Additional information about ARB's privacy policies is provided in the attached fact sheet, which is also available on the ARB's website at:

http://www.arb.ca.gov/cc/capandtrade/markettrackingsystem/security_statement.pdf.

Stakeholder engagement has been a long standing practice of ARB. Prior to the July 2012 CITSS Release 1, ARB staff conducted outreach to describe the design and development activities being completed, provide stakeholders with a schedule of program activities, and involve stakeholders in the CITSS testing process.

To support the successful launch of the second phase of the CITSS and the auction, we plan additional outreach efforts focusing on describing the security of all systems, informing stakeholders of the resources available to support CITSS user registration and account application, and advising stakeholders of the necessary timeframes in which they must complete these activities to ensure their ability to participate in a November Auction. We are continuing to participate in regular stakeholder meetings, and updating the webpage to address frequently asked questions. Over the coming months, we will continue to conduct outreach to stakeholders on the CITSS Release 2 and to share information on auction systems testing and results.