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EPA is providing the draft of this document, the drafts of the CPP Model Rules, and the drafts of other associated technical support materials for informational purposes only. EPA withdrew the Model Rules and accompanying documents from OMB review before the review was completed. The Administrator has not signed the Model Rules. With respect to the Model Rules, EPA has not completed several of the steps necessary to conclude a rulemaking action under CAA section 307. The agency has not completed the responses to comments and has not completed the docketing process for supporting materials at this time as would be required under CAA section 307(d)(6) for a final rule. The docket will remain open, with the potential for finalizing the Model Rules at a later date. These materials are not being published in the *Federal Register* or the *Code of Federal Regulations* and are not subject to judicial review. *See* CAA section 307(b)(1).

While this is a deliberative document that EPA is not required to release, for the reasons discussed in the Cover Memorandum accompanying the Draft Model Trading Rule Preamble and Regulatory Text, the agency is providing the public with its work to date on these topics. This is in keeping with the agency's general ability to share deliberative material with the public at its discretion in appropriate circumstances.

Clean Power Plan Tracking Systems

Draft White Paper

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List of Acronyms and Abbreviations

AMPD	Air Markets Program Data
ARP	Acid Rain Program
ATCS	EPA Allowance Tracking and Compliance System
CAIR	Clean Air Interstate Rule
CBS	Clean Air Markets Division Business System
CITSS	Compliance Instrument Tracking System Service
CO_2	carbon dioxide
COATS	CO_2 Allowance Tracking System
CPP	Clean Power Plan
CSAPR	Cross-State Air Pollution Rule
ECMPS	Emissions Collection and Monitoring Plan System
EGU	electric generating unit
EPA	U.S. Environmental Protection Agency
ERC	emission rate credit
ERC TCS	ERC Tracking and Compliance System
EU ETS	European Union Emission Trading Scheme
IT	information technology
M&V	monitoring and verification
MWh	megawatt-hour
NASEO	National Association of State Energy Officials
NEER	National Energy Efficiency Registry
NO_X	nitrogen oxides
REC	renewable energy certificate
RGGI	Regional Greenhouse Gas Initiative

1 Introduction

A tracking system is the accounting system for an emission trading program; it tracks compliance instruments (i.e., CO_2 allowances or emission rate credits [ERCs]) from their initial issuance to final surrender to meet compliance obligations, and maintains a record of ownership of all compliance instruments. By doing so, it facilitates the administration, operation, and auditing of an emission trading program. The Clean Power Plan (CPP) discusses mechanisms to facilitate the use of emission trading programs in state plans.[1,2]

The purpose of this white paper is to educate states and stakeholders about tracking systems. To have a meaningful discussion about tracking system support, it is important to establish a basic understanding of a tracking system's role in the implementation of an emission trading program, including the effort involved in establishing and administering a tracking system and its use by a state or its agent acting on behalf of the state to oversee an emission trading program. This white paper is directed at state agencies, and market participants to inform them about the role of tracking systems.

2 Background

The CPP provides states with flexibility to develop state plans that meet the requirements of the EPA's emission guidelines,[3] including the use of emission trading programs. The CPP outlines two possible types of emission trading programs – mass-based and rate-based – that a state may select from and use in a state plan under the CPP.[4]

A state adopting a mass-based program would establish an emission budget that is equal to the state mass-based CO_2 goal for affected electric generating units (EGUs) established in the CPP. The state would then allocate CO_2 allowances to program participants (e.g., affected EGUs, market participants) in an amount up to the established emission budget. Each CO_2 allowance represents a limited authorization to emit one short ton of CO_2 from an affected EGU. The CO_2 allowances may be bought and sold, or banked for use in later years. At the end of each compliance period, affected EGUs use CO_2 allowances to demonstrate compliance with an emission standard. An affected EGU must surrender CO_2 allowances in a number equal to reported CO_2 emissions during the compliance period.

[1] On February 9, 2016, the Supreme Court stayed the CPP while the courts are reviewing it. On September 27, 2016, oral arguments were heard before the U.S. Court of Appeals for the D.C. Circuit. The EPA firmly believes the CPP will be upheld when the merits are considered because the rule rests on strong scientific and legal foundations. Right now, states and stakeholders do not have to comply with the CPP while the stay is in effect. The Court, however, did not tell EPA to stop all work related to the CPP, and, in fact, many stakeholders have asked the agency to continue providing assistance so that they can move forward on a voluntary basis. Even for states that are choosing not to act during the period of the stay, these tools will assist their decisions regarding options for plan development when the stay is lifted.

[2] This document is provided solely as general information regarding design and operation of tracking systems. While this document discusses certain requirements in the CPP and other regulatory programs, in the event of any discrepancy between this document and those requirements, the latter shall apply.

[3] 40 CFR § 60.5740

[4] For a discussion about mass- and rate-based emission trading programs in the CPP, respectively, see 80 FR 64887-64894 and 64894-64911 (October 23, 2015).

Alternatively, a state adopting a rate-based emission trading program would assign a rate-based CO_2 emission standard(s) expressed in pounds of CO_2 per megawatt-hour (lb/MWh) to affected EGUs. If an affected EGU emits above its assigned rate standard, the owner or operator must acquire enough ERCs, each representing a MWh with zero deemed associated CO_2 emissions for compliance purposes, to bring its adjusted CO_2 emission rate into compliance. ERCs may be issued to affected EGUs or other entities (called "eligible resources") that supply zero- or low-emitting electricity generation or savings to the grid through a state approval and issuance process. ERCs may be bought and sold or banked for use in later years.

To ensure the environmental and market integrity of an emission trading program, it is essential to keep an accurate accounting of the ownership and transaction history of all valid compliance instruments. The CPP requires that a state plan using a mass-based or rate-based emission trading program must include an electronic tracking system that meets specified requirements.[5]

3 Emission trading program tracking systems

This section provides an overview of tracking systems in the context of an emission trading program. It first addresses the core functions of a tracking system and why emission trading programs need these systems; it then identifies key principles for tracking system software and concludes with a brief discussion of tracking system technical and programmatic elements.

3.1 What are tracking systems and why are they necessary?

A tracking system for an emission trading program is simply a tool that is used to track the ownership of compliance instruments and facilitate the efficient, safe, and secure transfer of compliance instruments between accounts for the purpose of issuance or allocation of compliance instruments, holding of compliance instruments, transfer of compliance instruments between participant accounts, and surrender and retirement of compliance instruments to meet compliance obligations.[6] This information is essential to enable trading, compliance determination, and program oversight. A tracking system also reduces the administrative burden associated with operating an emission trading program.

Some tracking systems already exist in the United States to support emission trading programs. The longest-running is the EPA's Allowance Tracking and Compliance System (ATCS). The ATCS is part of the Clean Air Markets Division Business System (CBS) that supports the Acid Rain Program (ARP) and Cross-State Air Pollution Rule (CSAPR) emission trading programs. In addition, the Northeast and Mid-Atlantic states that participate in the Regional Greenhouse Gas Initiative (RGGI) have developed the CO_2 Allowance Tracking System (COATS) and California and Quebec have developed the Compliance Instrument Tracking System Service (CITSS). Several states have also implemented renewable energy certificate (REC) tracking systems that may include some of the necessary elements for a tracking system under the CPP. An initiative by National Association of State Energy Officials (NASEO) and the Climate Registry is underway to develop a National Energy Efficiency Registry (NEER) that may also offer some of the necessary elements for a tracking system under the CPP.

[5] 40 CFR § 60.5810 and § 60.5820

[6] As discussed below, the CPP includes additional documentation, public access, and report-generation requirements for ERC tracking systems for rate-based emission trading programs, see 40 CFR § 60.5810(a)(2).

3.2 Important design principles for a tracking system

Similar to other financial or asset transaction tracking systems, tracking systems to support emission trading programs must be easy to use, secure, reliable, and transparent.

- **Usability.** Good design and usability are basic to any software. In addition, the tracking system administrator should provide responsive and robust technical support for the use of the tracking system by account holders. In addition, the system should comply with accessibility standards for people with disabilities.[7]

- **Security.** Security concerns have increased with greater connectivity and implementation of newer information technology (IT) resources. A tracking system must include measures that ensure only authorized and authenticated users have access to the system. The integrity of an emission trading program relies on the validity of compliance instruments. Therefore, a tracking system must ensure that each compliance instrument is properly originated or issued,[8] held in one and only one account, and retired after an affected EGU has used it for compliance. Confidence about the integrity of an emission trading program and its compliance instruments enhances market liquidity, decreases uncertainty, and lowers transaction costs.

- **Reliability.** Tracking system software must work properly and promptly at all times, whether the demand for the system is high or low. When problems in a system are discovered, they must be corrected in a timely manner to ensure the reliability and availability of the system.

- **Transparency.** Publicly available data facilitate public oversight and help create confidence in emission trading programs. Access to program data also allows brokerage firms, financial organizations, market monitors, academic institutions, and other third parties to participate in a program and/or analyze an emission trading program's performance and progress toward meeting environmental goals.

3.3 Administering a tracking system

The CPP requires that state plans that use a mass-based or rate-base emission trading program include a tracking system to maintain a record of accounts and compliance instrument holdings and transactions.[9] Developing, testing, deploying, operating, and maintaining tracking systems can require significant investment in resources, including infrastructure, personnel, and security. This section outlines some of the important technical and program elements of administering a tracking system.

[7] For example, Section 508 of the Rehabilitation Act as amended (29 U.S.C. § 794d) mandates that electronic and information technology that is developed, procured, maintained, or used by federal agencies be accessible to people with disabilities.

[8] The term *origination* refers to the creation of an allowance and the term *issuance* refers to the creation of an ERC.

[9] 40 CFR § 60.5810 and § 60.5820.

3.3.1 Technical elements of tracking system development and administration

The technical elements of a tracking system range from the initial system design, development, and testing through ongoing security assurance, software hosting, system maintenance, and user support.

- **System design, development, and testing.** One of the first steps in creating a tracking system is to identify the requirements for the system, including the functions the system needs to support, the data that need to be collected, and any technical requirements that must be met (e.g., response times, required technologies). The tracking system design principles discussed in section 3.2 of this white paper are integral to the design of an effective and efficient tracking system. It is also important to remember that tracking system design, development, and testing may be a continuous process as new features and technologies are integrated into the tracking system.

- **Security planning.** The tracking system maintains the official record of compliance instrument holdings and transactions. Therefore, security planning is critical to ensure the integrity of the tracking system and its data. A security plan should identify the potential risks to the system and the measures that are taken to address those risks. Like tracking system design, development, and testing, security planning is a continuous process, and plans should be regularly reviewed and updated.

- **Software hosting and system monitoring.** In today's networked environment, data and software are typically hosted on internet-connected platforms that provide for easy access using web browsers on a computer or mobile device. The tracking system administrator should provide reliable and secure hosting environments, and monitor the tracking system to identify security, performance, and availability problems. When necessary, the tracking system administrator should address any such problems to ensure system integrity and adequate performance.

- **System maintenance.** As new tracking system features are added or existing problems are corrected, the tracking system administrator will need to update the tracking system software and/or hosting platforms.

- **User support.** Providing support to account owners is an essential service of the tracking system administrator. This may include setting up new users (e.g., authentication and credentials) in the tracking system; resetting passwords; providing user help documentation, user manuals, tutorials, and frequently asked questions; and establishing a support helpline to assist with user requests and inquiries.

- **Data backups and disaster recovery.** It is important to identify the procedures needed to back up data and restore services to ensure mission-critical functions are not interrupted if problems arise.

3.3.2 General tracking system programmatic functions

A tracking system can significantly reduce the administrative burden of operating an emission trading program by performing or facilitating the performance of many of the programmatic functions

necessary to implement an emission trading program. Some of the general program activities implemented through a tracking system include account management, origination of compliance instruments (i.e., creation of allowances or issuance of ERCs), compliance demonstration, and provision of public access to tracking system data.

3.3.2.1 Accounts and authorized account representatives

Tracking systems are used to manage a variety of accounts and the authorized users for those accounts. Entities that have accounts in a tracking system include the owners or operators of affected EGUs (compliance and general accounts), other market participants (general accounts), and implementing state agencies (holding, reserve, and retirement accounts). Different types of accounts have different functions and features. The EPA ATCS, for example, includes the following types of accounts:

- **Compliance accounts.** Each of these accounts is associated with affected EGUs at a facility and are the accounts from which compliance instruments are deducted to meet compliance obligations. The authorized account representative(s)[10] of a compliance account can manage the compliance instruments in the account and transfer the compliance instruments to other compliance, general, or retirement accounts.

- **General accounts.** These are compliance instrument holding accounts held by the owners or operators of affected EGUs and other market participants (e.g., brokers, financial institutions, NGOs). Typically, any person or organization can open a general account. The authorized account representatives of a general account can manage the compliance instruments in the account and transfer the compliance instruments to other general, compliance, or retirement accounts.

- **Holding accounts.** These are compliance instrument holding accounts managed by a state. The state can transfer the compliance instruments in the account to other holding accounts, as well as compliance, general, or retirement accounts. Holding accounts are often established for a specific purpose (e.g., auction set aside, new source allocation set aside, renewable energy project set aside).

- **Origination (reserve) accounts.** These are program- and state-specific accounts in which compliance instruments are created (originated) and from which compliance instruments are transferred to compliance, general, and holding accounts.

- **Retirement (surrender) accounts.** Compliance instruments are transferred to retirement accounts to demonstrate compliance (as part of the compliance reconciliation process). Once a compliance instrument is transferred to a retirement account, it is no longer available for transfer or use by another affected EGU.

Account authorization and verification requirements and procedures are critical to ensure the security and integrity of an emission trading program, as it is an access point into the tracking system that can be exploited to perform fraudulent transactions. The tracking system should provide the necessary functions for a tracking system administrator to review account applications and create, manage, and

[10] In the EPA ATCS, the authorized account representative(s) for a compliance account is also known as the designated representative (or alternate designated representative).

close accounts, and for account owners to manage their accounts and related information (e.g., authorized account representatives, list of the parties with an ownership interest in the compliance instruments held in the account).

3.3.2.2 Creation and transfer of compliance instruments

Compliance instruments are created and initially distributed to market participants differently in mass- and rate-based emission trading programs.

In mass-based emission trading programs, the state establishes an emission budget – the total number of allowances created for a program – and transfers serialized, uniquely identified allowances into the accounts of trading program participants and other accounts, as specified by the state's allocation approach.[11] The allocation approach may include transfers to compliance accounts, general accounts, and holding accounts. States may also choose to use an allowance auction as a method for allocating allowances.[12] At the completion of the auction, allowances are transferred from the auction account (e.g., a holding account that contains the allowances offered at auction) to the general accounts or compliance accounts of the auction winners.

Rate-based emission trading programs under the CPP use ERCs as the compliance instrument. Unlike allowances, ERCs are issued for certain eligible, documented activities that either generate zero- or low-emitting electricity or save electricity. ERCs may be issued to affected EGUs and other entities, referred to as eligible resources. In addition, ERCs are not created and distributed on a regular schedule, as is typically the case with allowances. Instead, entities must demonstrate that they are eligible to be issued ERCs and also must submit periodic documentation of electricity generation or savings. Based on demonstration of eligibility and documentation of electricity generation or savings, the state then determines whether ERCs may be issued and the amount of ERCs to be issued. ERCs may be issued to account holders at any time for specific documented activities or projects that are approved by the state in accordance with program rules.

After the allocation of allowances or issuance of ERCs, an authorized account representative can transfer compliance instruments by identifying the transferring and receiving accounts, and the specific compliance instruments she/he wishes to transfer. It is important that the tracking system provide the ability for authorized account representatives to specify the compliance instruments they wish to transfer.[13]

3.3.2.3 Compliance demonstration

Under a mass-based emission trading program, each affected EGU must have a sufficient number of CO_2 allowances in its compliance account by the compliance deadline to match the total amount of reported CO_2 emissions by the affected EGU during the compliance period.[14] Under a rate-based emission trading

[11] The term *allocation* is typically used in mass-based emission trading programs to refer to specified methods for distributing allowances.
[12] 80 FR 64755 (October 23, 2015)
[13] Each instrument may be treated differently for financial accounting purposes by the parties that have an ownership interest in the compliance instruments in the account, and the transfer of compliance instruments may have accounting and tax implications for such parties.
[14] 40 CFR § 60.5825(a)

program, as defined in the CPP, each affected EGU must have sufficient ERCs in its compliance account to achieve an adjusted CO_2 emission rate (inclusive of surrendered ERCs) that is at or below its rate-based CO_2 emission standard.[15]

To facilitate compliance, a tracking system should provide the owner or operator of an affected EGU with information about the affected EGU's compliance obligation (i.e., the number of compliance instruments the affected EGU must hold in its compliance account to comply with its emission standard), so it can acquire any necessary compliance instruments before the compliance deadline.

After the compliance deadline passes, a tracking system should calculate the compliance obligation for each affected EGU and then compare each affected EGU's compliance obligation against the quantity of valid compliance instruments held in the affected EGU's compliance account (or already retired by the owner or operator of the affected EGU). If the affected EGU holds enough valid compliance instruments, the program administrator would use the tracking system to deduct the necessary compliance instruments from the affected EGU's compliance account. If, however, the affected EGU does not hold sufficient compliance instruments in its compliance account, the tracking system should provide information to the state indicating that the affected EGU does not hold sufficient compliance instruments to meet its compliance obligation.

3.3.2.4 Data access

Tracking systems need the capability to provide data access to program administrators, oversight organizations (e.g., market monitors), market participants, and the general public. Easy access to data via the internet enhances program oversight and public acceptance. Depending on program rules, available data reports may include holdings in various accounts (at an aggregate or individual level), transfers between accounts, allowance allocation or ERC issuance, and compliance information.

3.3.3 Additional program-specific tracking system functions

Tracking systems may also support program-specific rules and/or functions. For example, the tracking system may provide capabilities to support allowance auctions, management of allowances in allowance set asides, approval of ERC-eligible resources and ERC issuance, trading restrictions, and linked trading programs. Several of these capabilities are discussed in this section.

3.3.3.1 Allowance set-asides

Allowance set asides are a portion of the total emission budget that is reserved for a specific function or policy goal. Allowance set-asides may also be used to address short-term market liquidity or system reliability issues, by releasing allowances for auction or sale under certain market conditions. Allowance allocation strategies, including set-asides, can also be used to meet the CPP requirement to address potential leakage to new fossil fuel-fired EGUs not subject to the mass-based emission trading program.[16] Allowance allocation can be used to provide incentives to alternatives to new fossil fuel-fired

[15] 40 CFR § 60.5790(c)(1)

[16] The CPP includes a discussion of the nature of potential leakage (80 FR 64822-64823) and the ways states can address potential leakage under the CPP, including allowance allocation-based approaches (80 FR 64887-64890).

EGUs, such as existing affected fossil fuel-fired EGUs, zero-emitting generation, and energy efficiency measures.[17]

3.3.3.2 ERC eligible resource tracking

Under the CPP, a rate-based emission trading program requires that the tracking system provide electronic public access to relevant documentation that supports the issuance of ERCs to an eligible resource.[18] In other words, each ERC in the ERC tracking and compliance system (ERC TCS) must be traceable back to the documentation that supported its issuance. In a rate-based program, this requirement may be met by a document management and approval system that is linked to the ERC TCS. The document management and approval system maintains the documentation necessary to support the issuance of ERCs and provides an electronic link for the ERC TCS to provide access to the information.

The document management and approval system should provide a repository for all submittals by an eligible resource that seeks the issuance of ERCs (eligibility application, monitoring and verification (M&V) reports, and independent verifier reports), and records all decisions made by the state or its designee related to the qualification of an eligible resource and issuance of ERCs, including eligibility application approvals and ERC issuance decisions. Figure 1 provides a simplified illustration of the role of the different software systems in the qualification of eligible resources; review of monitoring and verification reports; and the issuance, transfer, and retirement of ERCs for demonstrating compliance with a rate-based emission standard.

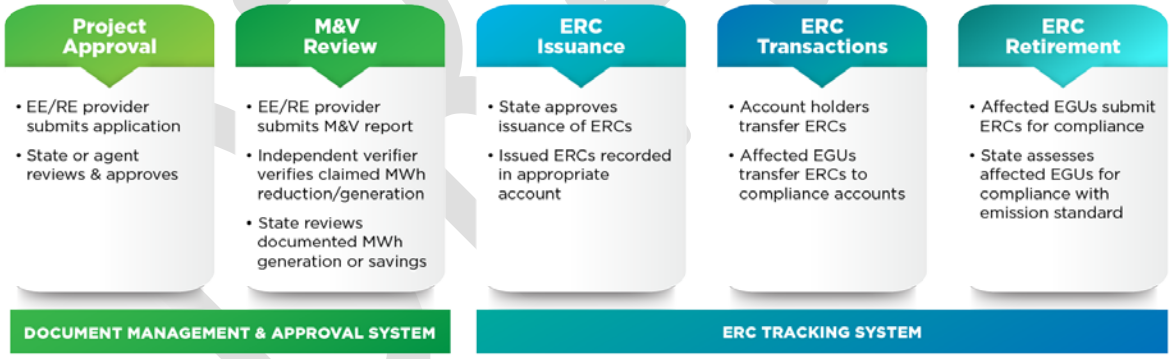

Figure 1: Document management and approval, and ERC tracking systems for a rate-based emission trading program

The ERC TCS for a rate-based emission trading program tracks the ERC from the point when the state approves and issues the ERC, beginning with the recordation of the issued ERC in an appropriate account, through each transfer among accounts, to final ERC surrender for compliance purposes. The instrument tracking system also has the capability for allowing an ERC to be cancelled in the case of any errors or misstatements that result in ERC issuance.

[17] For more information about the CPP requirement to address potential leakage, see the document, "Leakage Requirement for State Plans Using Mass-Based Emission Budget Trading Programs".

[18] The necessary submittals for ERC issuance and related documentation requirements are described in the CPP (40 CFR § 60.5805).

3.3.3.3 Trading restrictions between compliance instruments

Under the CPP, mass- and rate-based emission trading programs are distinct and separate programs. State emission trading programs under the CPP cannot allow the use of different types of compliance instruments (CO_2 allowances or ERCs) to be used interchangeably to demonstrate compliance with a mass- or rate-based program (i.e., trading is not permitted between mass- and rate-based emission trading programs).[19] Although the same software platform may be used for the tracking systems for mass- and rate-based emission trading programs, the tracking systems for each type of program must be completely separate to ensure that CO_2 allowances and ERCs are not comingled.

3.3.3.4 Linkages to other trading programs

Under the CPP, a state plan may include a mass- or rate-based emission trading program that is linked to other mass- or rate-based programs, respectively. Under such program linkages, a state program recognizes as usable for compliance a compliance instrument issued by another state(s).[20] Use of a shared tracking system for the linked programs enhances efficiency and consistency while reducing security risks associated with interoperable tracking systems.

3.4 CO_2 emissions and energy generation reporting

CO_2 emissions and energy data are necessary to support compliance. Affected EGUs subject to state plans under the CPP will use the emissions and energy measurement and quality assurance requirements under 40 CFR Part 75.[21] The EPA provides affected EGUs with software – the Emissions Collection and Monitoring Plan System (ECMPS) client tool – to quality assure and submit monitoring plans; quality assurance test information; and hourly emissions, electricity generation, and other operating data to EPA for a variety of emission control programs. The EPA provides efficient and timely data access to the CO_2 emissions, energy, and other relevant data for tracking system administrators, industry, and the public. These data enable program administrators to assess the compliance obligations for each affected EGU.

4 Tracking system interoperability

Tracking system interoperability refers to the seamless exchange of information across different electronic tracking system software platforms without any additional effort by the person initiating the exchange. Interoperability can expand a trading market outside of the emission trading programs served by a single tracking system because market participants in different state programs that use different tracking systems can trade with one another. In addition, interoperability provides a state with the flexibility to choose a tracking system that best fits its program's needs while also providing for links to a program(s) that may use another tracking system.

Tracking system interoperability is not required by the CPP. However, states may elect to make their tracking systems interoperable if they wish to provide linkages with state or regional emission trading

[19] 80 FR 64839 (October 23, 2015)
[20] Mass: 80 FR 64892-64894 (October 23, 2015); Rate: 80 FR 64910-64911 (October 23, 2015)
[21] In addition to electricity generation, some affected EGUs may have to report useful thermal output (UTO), see 40 CFR § 60.5860.

programs that do not use their chosen tracking system. If a state specifies in its state plan that compliance instruments issued by other states that do not use the same tracking system may be used for compliance in the state's program, then those tracking systems would need to be interoperable with the state's tracking system for the EPA to approve the state plan.[22]

While interoperability offers advantages in terms of market access, it also has risks. Tracking system interoperability presents significant risks to security, market integrity, and reliability (e.g. delays in transaction processing caused by system outages or communication problems). Ensuring the integrity of multiple interoperable tracking systems requires additional institutions and technical infrastructure compared to a single tracking system. These include a central transaction log or clearinghouse to validate the transactions between tracking systems, in addition to well-defined standards for data structures, communication protocols, and system security. These are explored in more detail below.

4.1 Central transaction log

A central transaction log (see Figure 2) is necessary to process and validate transactions among interoperable tracking systems. In the case of state emission trading programs that use linked, interoperable tracking systems, a central transaction log automatically checks, records, and validates all transfers of compliance instruments between accounts in the interoperable tracking systems. In addition, the central transaction log should record all intra-tracking system transactions (e.g., ERC issuance, allowance allocations, transfers, retirements) to facilitate the validation of inter-tracking system transfers (e.g., to verify that a compliance instrument transferred from one interoperable tracking system to another is held in the transferring account and has not already been submitted for compliance). For a rate-based emission trading program, a central transaction log must also maintain a directory that provides the capability to directly trace each ERC back to all related documentation that supported the ERC's issuance. A central transaction log is critical to guaranteeing accurate accounting of compliance instrument transfers between separate interoperable tracking systems and thus program integrity. A central transaction log, like the interoperable tracking systems themselves, contains all of the information related to the issuance, transfer, and cancellation of compliance instruments in each of the interoperable tracking systems.

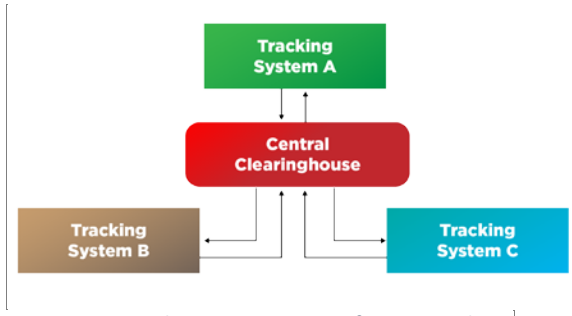

Figure 2: Central Transaction Log Information Flow

4.2 Interoperability standards and coordination

Data formatting and messaging standards are necessary to ensure compatibility among interoperable tracking systems. For example, interoperable tracking systems will need to use the same established standard for the serialization of compliance instruments. This standard will ensure that a compliance instrument that is created in any one tracking system is uniquely identified within all the interoperable tracking systems. Another important standard will be the message formats that are used to communicate between the interoperable tracking systems and the central transaction log. Standard

[22] 80 FR 64839 (October 23, 2015)

message formats will help ensure that the central transaction log can efficiently validate and process transactions and communicate outcomes to the interoperable systems.

A governance process may need to be established to create and maintain these standards as use of the interoperable tracking systems evolves. A governance process would need to establish procedures to evaluate proposed changes to standards and coordinate the implementation of changes among all interoperable tracking systems. It is imperative that a governance organization have the appropriate authority and resources to fulfill its mission. Otherwise, the interoperability of the tracking systems and, correspondingly, the integrity of the emission trading programs could be compromised.

4.3 Risks to security, reliability, and performance

Creating interoperable tracking systems introduces a number of risks to each tracking system's security, reliability, and performance. With interoperable tracking systems, these risks become more complicated to mitigate because of differences in the technologies and business practices employed by program administrators. The entire network of interoperable tracking systems is only as secure, reliable, and high-performing as its weakest link.

- **Security.** Multiple tracking systems provide multiple access points for unauthorized entry to all connected systems, posing a security threat to the integrity of the emission trading program. A tracking system security plan must consider how the interoperable systems verify user identities and enforce access restrictions.

  The European Union Emission Trading Scheme (EU ETS) experienced a number of cyber security incidents from 2008 to 2011, when there were 30 separate linked national tracking systems.[23] The wide range of account authorization and validation practices among the tracking systems contributed to these security issues, and the EU ETS has transitioned to one single tracking system. Incidents related to account-holder authorization and validation highlight the importance of account/user authorization from a security standpoint. In addition to validating transactions between accounts within the tracking system, linked interoperable tracking systems must also authenticate communication between tracking systems.

- **Reliability.** The procedures for system-to-system communication and data synchronization will need to account for scenarios where one tracking system is attempting to send or extract data to or from another tracking system while the other system is down or not responding.

- **Performance.** A tracking system's performance under various load conditions will need to be thoroughly tested. The load on an interoperable tracking system will include not only the number of active users and transactions taking place, but also the system-to-system communication and data synchronization processes.

4.4 Costs of interoperability

Beyond the costs of designing, developing, operating, and maintaining the infrastructure to facilitate interoperability (e.g., central transaction log, standards, governance processes), developing multiple

[23] *Special Report: The Integrity and Implementation of the EU ETS*, European Court of Auditors, 2015.

tracking systems that are interoperable creates additional development and administrative costs compared to a single platform. Interoperable tracking systems may also increase the administrative burden for owners or operators with affected EGUs that are subject to multiple state emission trading programs if they must use multiple tracking systems to manage compliance for their fleet of affected EGUs and are subject to duplicative administrative procedures in each tracking system.

5 The EPA's experience operating tracking systems

The EPA has operated an ATCS for more than 20 years. The system has evolved, since the first generation of ATCS, as IT advanced and the internet expanded. The following section outlines some of the EPA experience using ATCS to perform programmatic functions for the federal ARP, the NO_X Budget Trading Program, Clean Air Interstate Rule (CAIR), and CSAPR. Additional detail for some of these programmatic functions that are processed in a tracking system is provided below. These are the type of functions a state or its designee would have to perform under the CPP. A state may wish to divide some of these functions among a tracking systems administrator responsible for the software and infrastructure and a tracking system operator or program administrator responsible for programmatic functions.

5.1 Account creation and management

The EPA conducts the following programmatic support functions related to the establishment and management of accounts in the tracking system:

- **Maintaining compliance account and designated representative information.** Any allowances used for compliance must be held in the affected EGU's compliance account. In the ATCS, the EPA creates a facility compliance account for affected EGUs upon receipt of a Certificate of Representation form that identifies the designated representative – a person chosen by the owners and operator of the affected EGUs at the facility to act on their behalf to provide required submissions under the emission trading program. The EPA also maintains the information and provides the functionality necessary for designated representatives to update information about the accounts and the corresponding affected EGUs (e.g., ORIS [plant] code, unit ID, nameplate capacity, commence commercial operation date, operating status, owners and operators). The EPA also tracks retirements of affected EGUs (through a Retired Unit Exemption form submitted to the EPA by the designated representative).

- **Maintaining general account information.** Any person, company, or organization may open a general account for the purpose of holding and transferring allowances. The ATCS allows registered users to use their credentials to establish general accounts. New users without current credentials that want to open a general account(s) must submit a General Account form to the EPA in order to establish a general account(s). As with compliance accounts, account representative information is entered and updated along with account ownership information.

- **Manage agents for account representatives.** An agent is someone authorized to make electronic submissions on behalf of a representative. The ATCS provides the capability for representatives to add, edit, and remove agents.

- **Establish origination (reserve) accounts.** Origination (reserve) accounts are established for a specific state program (e.g., a state's NO_X annual emission trading program), and they are used to initially create the allowances that are then distributed to compliance, general, or holding accounts.

- **Establish holding accounts.** The ATCS holding accounts are established for specific purposes (e.g., allowance set asides). As required by the Clean Air Act (or at the state's direction), the EPA creates holding accounts within the ATCS. An EPA or state program official is responsible for managing the allowances held in the account(s). For example, a state may choose to reserve a portion of the state's total emission budget in the holding account for allocations to newly affected EGUs. Then the state official would transfer those allowances to other compliance, general, holding, or retirement accounts according to procedures established by the state.

5.2 Origination and transfer of compliance instruments

The EPA ATCS is also used to create and distribute allowances:

- **Distribute allowances per allocation plan.** The EPA creates the appropriate number of allowances in the ATCS as permitted by the program or state budget. In the programs that the EPA operates on behalf of the states, the states have the option to submit an allocation plan to the EPA. The EPA uses the allocation plan to record (distribute) the allowances in the appropriate compliance, general, or holding accounts.

- **Transfer allowances.** Authorized account representatives and their agents can submit allowance transfers within the ATCS. Upon completion of the transfer, the account representatives for both the transferring and receiving accounts are notified via email that the transaction was processed.

5.3 Compliance demonstration

Under emission trading programs like CSAPR, affected EGUs must hold allowances equal to or greater than the total reported emissions for the compliance period in the facility-level compliance account as of the allowance transfer deadline. The EPA ATCS provides the following support functions related to compliance:

- **Provide preliminary compliance information.** The ATCS allows the designated representative (or agent) to view a facility's preliminary compliance information at any time after emissions data have been successfully reported for the full compliance period. This helps the designated representative of the affected EGU(s) plan for compliance and reduce the risk of noncompliance due to accounting errors.

- **Notify representatives of insufficient allowance holdings for compliance**. EPA reviews compliance information before the allowance transfer deadline and notifies the representative for any compliance account that does not hold sufficient allowances. This notification provides the representative advanced notice to obtain the necessary allowances before the compliance deadline (and potential non-compliance penalties).

- **Deduct allowances**. Following the allowance transfer deadline, the ATCS provides the designated representative the option to deduct allowances by transferring them from the compliance account to a retirement (surrender) account.[24] If the representative does not retire a sufficient number of allowances, the EPA then deducts the appropriate number of allowances from compliance accounts at a specified time after the transfer deadline (typically about 60 days later). After allowances are deducted from the compliance account, a detailed report is e-mailed to the designated representative summarizing emissions and deductions.

5.4 Data access

Data collected and contained in the ATCS is made available to the public through the EPA's Air Markets Program Data (AMPD) website. AMPD provides easy access to both current and historical data collected as part of the EPA trading programs through interactive maps, charts, reports, and pre-packaged datasets.

5.5 Other

In addition to the functions outlined above, EPA provides other capabilities that help with the operation of the emission trading programs. These are practices that EPA has developed over its more than 20 years of operating emission trading program tracking systems.

- **Communicate actions to relevant parties.** The ATCS provides email notifications to relevant parties (e.g., authorized account representatives, agents, state officials) when actions are taken and/or submissions are made in the tracking system. Examples include changes to a representative's contact information, reset of a user's password, creation of a compliance or general account, completion of an allowance transaction, and deduction of allowances.

- **Provide program forms and information.** The EPA maintains forms (e.g., electronic signature agreement form), guidance, and information required by program participants on the Clean Air Markets website.[25]

- **Provide technical assistance to representatives and account holders.** The EPA provides technical assistance to account holders in the ATCS including everything from password resets to transferring allowances.

- **Collect and quality assure CO_2 emission data from affected EGUs.** The EPA collects emission and energy data using the ECMPS reporting tool and provides technical assistance (i.e., a help desk) to support the data submission process.

[24] Designated representatives may wish to specify the deduction of specific allowances (e.g., those of a certain vintage or within a specific serial identifier range), as specific allowances may have different financial accounting treatment and tax implications for the account owners.

[25] For example, see the program participant website for the EPA trading programs: https://www.epa.gov/airmarkets/participants.

6 Conclusion

Tracking systems are an important component of an emission trading program. For state program administrators, tracking systems can decrease the burden of establishing and operating an emission trading program, including ensuring the affected EGUs are meeting their compliance obligation. For the affected EGUs and other market participants, they provide a secure and efficient means to manage holdings within the trading program. For all of the parties involved, tracking systems can increase the confidence that the program is run in an effective and efficient manner by providing access to program data.

When choosing a tracking system for a state plan under the CPP, states should consider the following questions:

- What are my organization's technical capabilities for developing, implementing, hosting, and securing a tracking system?
- Does it make sense to build a system from scratch or use a third-party system?
- Does my trading program allow for linking to other states? If so, what tracking systems are used by the other partners?
- If choosing a third-party system:
    - Does the tracking system support all of the features of my emission trading program?
    - What are the options for hosting the system?
    - What are the technical and programmatic functions that my organization will perform versus the functions that could be outsourced to the third-party?