

CCR Beneficial Use Data Capture and Reporting

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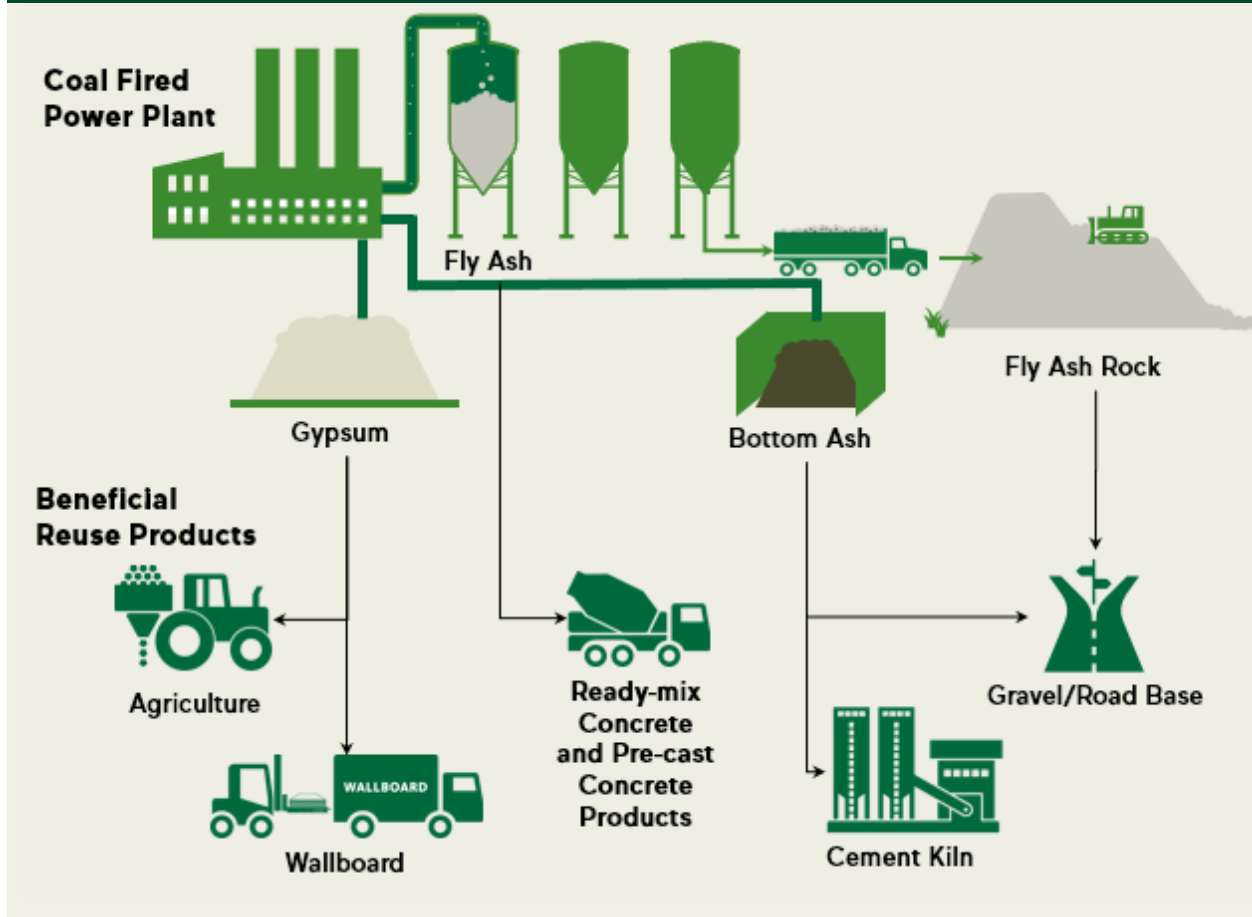
ABSTRACT

Waste Management (WM) developed custom software to capture valuable CCR data and is designed to improve efficiency in billing and customer data management. Current and historical information are databased allowing for trend and operational analysis. Topics presented include the road map design of the software solution, the efficiency and accuracy created, and the ability for the electric utilities to use the cloud-based system for tracking, reporting, and auditing purposes. We will explore customizations, where WM can modify the customer interface to provide a customized experience.

ASH MARKETING BASICS

Ash marketing is an environmentally friendly way to turn one industry's trash into another industry's treasure. By taking coal combustion residuals generated as waste from coal-burning power generation facilities, concrete companies and gypsum wallboard manufacturers re-purpose the materials as feedstock for their processes. CCR substitutions reduce consumption of mined materials and have been determined by the US EPA to have lower environmental releases than the native raw materials.

Typical Coal Combustion Byproducts and End Uses



While there are environmental and economic advantages to marketing the waste material for sale as feedstock, there are also costs, logistics, and infrastructure needs associated with the process. First, a dedicated space at the facility is needed for CCR temporary or long term storage, with the requisite transportation from the point of generation. Storage facilities vary based on type of CCR and handling needs (e.g., silos for fly ash versus storage building for FGD/synthetic gypsum) and the commensurate equipment needed for the size and scope of the operation (e.g., skid steer versus front end loader). Along with the facilities and equipment, the operation must be staffed by dedicated site personnel and supported onsite while remotely managed by

administrative and sales personnel. Finally, to successfully market CCRs, a laboratory or other analytical support is needed to understand the material's physical and chemical properties and match each CCR to an appropriate end user.

DATA NEEDS

As with any business and process, information goes hand-in-hand with physical products. In order to market ash, a process for handling data must run from the point of CCR generation through handling and sales and on to delivery and billing. Some information is needed by only one entity, while other information is used by a variety of people. Table 1 provides examples of the data used during ash marketing as well as each data initiator and end user.

Table 1. Data Needs for Ash Marketing

	Power Station Owner (Operations)	Power Station Owner (Environmental)	Ash Marketer (Site workers)	Ash Marketer (Administrative)	Ash Marketer (Sales)	Trucking Carrier	CCR Purchaser/ Customer
Ash data							
Chemical composition			✓	✓	✓		✓
Physical properties			✓	✓	✓		✓
Customer data							
Customer identification	✓		✓	✓	✓	✓	✓
Material acceptance specs	✓		✓	✓	✓		✓
Carrier data							
Carrier identification			✓	✓		✓	✓
Carrier certs/ DOT status			✓	✓		✓	✓
Truck weights	✓		✓	✓		✓	✓
Transaction data							
Transaction identifier	✓	✓		✓			✓
Quantity sold	✓	✓	✓	✓	✓		✓
Final material disposition	✓	✓		✓	✓		
Inventory data							
Amount available	✓	✓	✓	✓	✓		
Projected generation rate	✓	✓	✓	✓	✓		

Historically, this information was tracked through simple spreadsheets and paper Bills of Lading (BOLs). Information lagged at each step of the process, and each stakeholder had to find and manipulate the data into what they needed. The spreadsheets grew more complex, added more rows, and were accessed by more users. Paper BOLs were damaged or lost in transit, and the records weren't readily available to the customers who needed them. As each person wanted to put their own spin on the data, a new table was created, and the numbers were re-typed and re-calculated. As the business

grew, information sharing created a half dozen touch points for each data point, and data entry errors as expected were prevalent throughout the business.

Before and After: Electronic BOLs Reduce Errors

WM CCP Solutions, LLC. 4228 Airport Rd. Cincinnati, OH 45226 (513) 871-9733

Ticket No: 42344	Date: 4/30/2022 4:29:00 PM
Source: Your Plant	PO #:
Source Address: 4228 Airport Rd. Cincinnati, OH 45226	
Material: Fly Ash	Silo No: 1
Loaded By: JP	
Customer: Your Customer Customer Destination: Customer Home	
Carrier: Your Customer	Truck No: 1234
Driver Name: John Doe	Trailer No:

Title to product transfers to Customer upon loading of Carrier's vessel at shipping point. Terms and Conditions of Sale is attached

Gross: 75,000	Customer Plant Received By
Tare: 25,000	
Net: 50,000	
Tonnage: 25.00	

For ticket copies please call (513) 871-9733

WM CCP SOLUTIONS, LLC.
TERMS AND CONDITIONS OF SALE

BUYER takes PRODUCT subject to these Terms and Conditions of Sale incorporated into every sale of PRODUCT made to BUYER by WM CCP SOLUTIONS, LLC. a Waste Management Company.

1. POSSESSION AND TITLE TO PRODUCT SHALL COMPLETELY TRANSFER TO BUYER UPON TRANSFER TO CARRIER'S VESSEL AT SHIPPING POINT, AT WHICH TIME BUYER ASSUMES ALL RISK OF LOSS AND LIABILITY ASSOCIATED WITH DELIVERY AND SELLER SHALL NOT BE LIABLE TO BUYER FOR ANY LOSS OR DAMAGE TO PERSONS OR PROPERTY.
2. BUYER shall observe all applicable state and federal laws concerning the transportation, handling, storage and use of the PRODUCT.
3. CARRIER AND BUYER assumes all responsibility for assuring that shipments are within current DOT weight limits and shall under no circumstances allow a shipment to leave the property where loaded if overweight. SELLER assumes no liability or responsibility for any fines or tickets resulting from shipments which are overweight, unless SELLER's scale weights or the point of loading are proven to be in error.
4. SELLER DOES NOT MAKE ANY WARRANTY, EITHER EXPRESS OR IMPLIED AS TO THE MERCHANTABILITY OR FITNESS OF THE PRODUCT FOR ANY PURPOSE OR AS TO THE QUALITY OR QUANTITY OF THE PRODUCT PRODUCED.
5. BUYER acknowledges that PRODUCT is sold by SELLER "AS IS, WHERE IS AND AS PRODUCED" with all faults, and it is BUYER's responsibility to conduct proper testing, prior to use in any particular application, to ensure PRODUCT is suitable for BUYER's particular application.
6. SELLER SHALL NOT BE LIABLE, AND BUYER WAIVES ALL CLAIMS AGAINST SELLER, FOR ANY INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, WHETHER DUE TO OR ARISING OUT OF FAILURE OF PRODUCT TO PERSONS, BREACH OF CONTRACT, NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY OR ANY OTHER CAUSE OF ACTION OF SELLER. BUYER'S exclusive remedy for any cause of action hereunder shall be, at SELLER'S election, replacement of PRODUCT, or a claim for damages not to exceed the amount paid for the PRODUCT causing the claim.
7. BUYER shall indemnify, defend and hold SELLER, and SELLER's affiliates, and their respective officers, directors, employees, agents and representatives, harmless from and against any and all losses, claims, costs, expenses (including, without limitation, reasonable attorney's fees and expenses, liability, demands and causes of action of every kind and character, including but not limited to the amounts of judgments, penalties and interest, relating to or arising from bodily injuries to or death of any person, or damage to property (including any contamination of or diminution in value of property), arising from or relating to (i) the PRODUCT sold to BUYER hereunder; or (ii) the BUYER's performance hereof, negligence or willful misconduct or violation of law. This paragraph shall survive any termination hereof.
8. BUYER agrees to be bound by SELLER'S payment terms of net 15 days unless otherwise stated in writing.
9. This Agreement shall be governed and construed in accordance with the laws of the State of Ohio, and venue shall lie in Hamilton County, Ohio.
10. The failure of either party at any time to enforce any provision of this Agreement, to exercise its rights under any provision hereof, or to require a certain performance of any provision hereof, shall in no way be construed as a waiver of such provision, nor in any way affect the validity of this Agreement or the right of such party thereafter to enforce each and every provision hereof. No waiver shall ever occur unless first reduced to writing and signed by the party to be charged with the waiver.
11. All technical advice, lab data and/or recommendations of SELLER rendered to BUYER, if any, are intended for use by persons having the appropriate education and skill. SELLER shall not be liable for any use or non-use of such advice and/or recommendations.

CREATING AUTOMATION AND EFFICIENCY

Opportunities arose for WM CCP Solutions to take advantage of economies of scale. While administrative functions such as accounting and human resources had infrastructure and procedures in place for handling larger datasets and business growth, the manual, spreadsheet-based ash data tracking persisted and grew unmanageable. To realize the benefits associated with a more robust system, WM CCP Solutions understood the need to investigate options to streamline and automate data entry and information sharing.

Based on the range of stakeholders who create, enter, and retrieve data and the geographic distribution of facilities, a cloud-based platform was conceptualized to manage ash marketing information. WM CCP Solutions developed a framework for data entry, storage, and retrieval of the commonly used information.

Development goals included:

Automated data entry. WM uses a scale interface that weighs and records each truck leaving the facility. By tying the scale information to the data management software, a direct transfer is possible that eliminates the possibility of typos during data entry.

Single source data retrieval. Through a common data repository, each user draws from the same information, eliminating data errors propagated by repeated entry of the same data point in multiple systems.

Transparency and visibility. Data access can be granted to utility owners, WM operations and administrative personnel, CCR customers, and trucking operators. Within these categories, data visibility can be customized for a facility to simplify retrieval options.

Facility Dashboard View

WMCCPORTAL Main Menu ▼ Logout

New Bill of Lading | Landfilled | Silo & Unit Status | Export Silo Log | Export Landfill Log | Order Supplies | Help

Fayette ▼

Fayette Dashboard

From Date: 5/18/2022 📅

To Date: 5/18/2022 📅

Year to Date 📅 | Month to Date 📅

Silo/Unit Status			
Time	Silo/Unit	Status	Level
1:18 AM	1	DOO	0
1:18 AM	2	OL	584
1:18 AM	3A	STO	0
1:18 AM	3B	OL	1428

Landfilled Materials		
Silo/Unit	Type	Amount
No records to display.		

Sales Summary			
Product	Silo	Tons	Load Count
Ash Rock	N/A	0.00	0
Bottom Ash	N/A	27.59	1
Fly Ash	N/A	336.89	13
Gypsum	N/A	49.44	2
		413.92	16

Summary By: Material ▼

Not Ready To Bill |
 Show Deleted BOLs |
 Show Pending BOLs

|
 |

<input type="checkbox"/>	Plant	Ticket Date	Ticket	FADO #	Product	Silo	Customer	PO Num	Destination	Carrier	Truck	Gross (lbs)	Tare (lbs)	Net (lbs)	Net (Tons)	Billed
<input type="checkbox"/>	Fayette	5/18/2022	43749		Fly Ash (C)	3B	TEX MIX CONCRETE		Mustang Ridge	REDBIRD	2109	79,900	29,880	50,020	25.01	False

Record retention and availability. Based on a data repository model, records for each facility are maintained in full and available to the designated stakeholders. A cloud storage system greatly increases the availability by shifting to an on-demand platform rather than user-level spreadsheet access.

Consistency and scalability. Establishing a single data sharing system for all WM CCP Solutions facilities provides consistent information availability across operations. In areas that common transporters are used, it is possible to maintain all the records in one place under one company identity. For BOLs, facility and end customer identities are consistent to support material tracking.

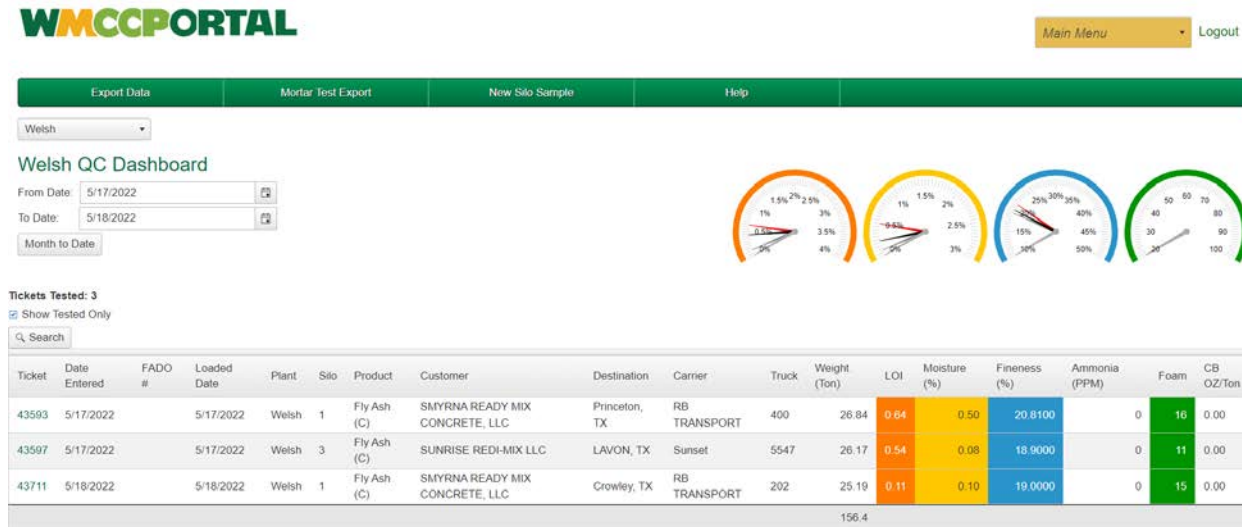
Data security. Establishing user permissions, each stakeholder is granted access to view or manipulate data only as necessary. This reduces the risk of inadvertent data changes or corruption.

Operational efficiency. Daily inventory verification paired with production and sales tracking, provides information assisting sales and operations personnel. Automated scales and weight calculations identify overweight loads to prevent permit exceedance. The built-in calculations increase accuracy and decrease data processing workloads.

Material quality monitoring. WM CCP Solutions performs periodic field analysis and laboratory analysis on managed ash. To efficiently communicate analysis results, an

ash quality dashboard was integrated into the software. This provides a reliable method for customers to verify the material meets specifications.

Product Quality Dashboard



Customization. Managing multiple facilities operated by multiple utility clients and selling to multiple customers, WM established customization options built within the base interface.

ADDITIONAL BENEFITS AND FUTURE ROADMAP

WM's efforts to improve operational efficiency provided benefits that exceeded the project goals. Providing better access to a wide range of ash marketing data, stakeholders are able to evaluate the data trends that matter for their operation.

Following system integration, data errors have been reduced from six percent to one-half percent. WM can rely on real time ash inventory and truck load data when engaging customers for sales, transport, and billing. The increased confidence and reliability is passed on to the utility through strengthened customer relationships.

Information transparency has provided the utilities with the ability to track ash from cradle to jobsite. As the manufacturer/generator of the material, the utility maintains environmental liability for marketed ash. By reporting the transporter and purchaser for each sale, the utility now has the confidence and can verify that ash is marketed commensurate with the ash marketing contract and environmental policies.

A common data repository enables ash quality trending and analysis. Because ash samples are identified for specific loads leaving a facility, and the time each load departs is known, quality issues can be tracked to the source. With that level of increased detail, additional material testing can be completed to determine corrective actions, and all customers can be notified if necessary.

Exploring ways to reduce data errors and support operations, WM CCP Solutions discovered customer benefits through enhanced information sharing. As part of our drive for sustainability, data analysis provides an increase in the service we provide to both the utilities and end users, WM continues to identify additional information that will boost future ash utilization. Plans are in place to expand the silo management module, enhance user customizations and access, and provide historical QC record lookups. Through our data-driven ash utilization process, WM continues to lead the way to a scalable, sustainable improvement in the coal ash industry.