

Best Practices for Managing CCR Transportation

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KEYWORDS: Best management procedures, Safety, Transportation, Fleet, Recruiting, Hiring, Training, Retention, Customer, Maintenance, Logistics, Disposal.

ABSTRACT

For shorter-term projects such as ash basin excavations, safe transportation is a crucial component in the removal of Coal Combustion Residuals (CCR) to an off-site location. WM has leveraged our broader company experience with fleet management and logistics operations to develop best practices in project-based CCR transportation.

In this presentation we will explore a range of best practices, highlighting how each contributes to operational excellence in transporting CCR off-site for disposal. We will provide proven methodology for recruiting, hiring, and retaining drivers; teaching and implementing safety standards; and maintaining a timeline that is beneficial to the customer as well as to the project budget. The intended result of this presentation is to share knowledge and insight from past projects that will benefit similar future endeavors.

Best Practices for Managing CCR Transportation

As regulations increasingly drive electric utilities to clean close CCR basins and surface impoundments, off-site disposal of CCR becomes a factor in site closure projects. Many contractors are equipped to excavate, condition, and handle CCR on-site using temporary facility roads, but additional challenges arise when disposal occurs at an off-site facility and requires transportation on public roads and highways. To meet the needs of one of our first CCR closure projects, WM leveraged our extensive transportation management experience from our core business operations to build an over-the-road trucking operation specifically designed to support off-site disposal of CCR.

Problem Statement

When WM was awarded the opportunity to excavate an impoundment and ash fill area containing over 1,360,000 tons (1,500,000 short tons) of CCR and dispose of the material off-site, a cost-effective and reliable transportation component was essential. Based on WM's experience with trucking fleets associated with our core business, WM elected to self-perform over-the-road truck transport to an off-site disposal facility approximately 110 kilometers (68 miles) from the project site for the duration of the three year project. Following that decision, a fully-developed trucking operation was established to include the following components:

- Safety
- Personnel
- Fleet
- Facility
- Operations
- Maintenance
- Compliance
- Future Operations

Each element of the trucking operation presented unique challenges, and the shorter-term project need exacerbated those challenges. We will explore each of these elements and present best practices for reducing risk to the project and maintaining a cost-effective operation.

Safety

WM's commitment to its employees carries a fundamental commitment to safety. Safety is considered a core value with no compromise and is embraced by both leadership and employees. WM recognizes that hazards in over-the-road transportation are often influenced by external factors and the best protection for our drivers is empowering them to do the right thing, the right way.

Each newly hired driver completes a two- to three-week training program. The initial week of training is conducted in the classroom, followed by a ride along period, and

culminating in observation and mentoring by a veteran driver. Figure A outlines the classroom portion of the driver training program.

Figure A: Driver Training Program

 Day 1	 Day 2	 Day 3	 Day 4	 Day 5
Check-In Code of Conduct Personal Protective Equipment Safety Rules Book	Safety Rules Book Safe Driving Practices	Safe Driving Practices Life Critical Rule Training	Life Critical Rule Training Performance Management DOT Entry Level Driver Vehicle Inspection Reports	Driver Vehicle Inspection Reports Hazardous Energy Control Program Lock-Out/Tag-Out Demos Tour of Station & Driving Course

Additional site-specific training covers truck routes, emergency response procedures, truck driver's safety precautions, and equipment familiarization. The truck routes are established with safety in mind, considering a number of factors that can contribute to incidents:

- Distance, including number of towns passed through and schools passed by
- Road construction or closures, evaluated monthly through Department of Transportation (DOT) improvement plans and communication with local counties
- Intersections, including signaled and not signaled
- Turns, left or right, signaled with permissive vs. protected movement

Each truck in our fleet is equipped with safety equipment (i.e., fire extinguisher, spill kit, first aid kit, window breakers) that may be needed. Drivers are provided with written copies of the various truck routes for the project, including on-site traffic patterns as well as primary inbound and outbound routes, to help mitigate incidents. Recognizing that over-the-road truck transport is unpredictable, WM also provides drivers with a flow chart to follow in the event of an off-site incident which includes the Safety Data Sheet (SDS) for CCR in case the incident results in a release.

When establishing safety for a project that includes over-the-road transportation, safety is not limited to employees. The safety program must consider the community and instill confidence in the increase in truck traffic on their roads. Table 1 outlines the safety features integrated into WM's fleet of trucks that are intended to instill confidence in the safety of our trucking operations.

Table 1: Fleet Safety Features

Feature	Description
Dash Cameras	WM has installed dash camera systems on all of our trucks. This system features a forward and cab facing wide angle camera that is triggered by unsafe driving events such as hard braking, bumps etc. When an occurrence triggers the camera, a video is uploaded to a third-party for review to determine if it is worthy to send on to WM. Additionally, there is a manual button on the camera that will start a recording event if the driver desires.
Fleetmatics GPS	The GPS system is hardwired to our trucks and the web-based software interprets this data and reports it in 60 second intervals directly to the website. Alerts for braking, hard driving, speeding, and route geography violations are relayed to WM.
1 (800) How's My Driving	This program is a safety tool utilizing a 4" x 12" sticker on the back of all WM trucks that provides a method for concerned persons to have an avenue to report unsafe driving. All calls are routed to a call-center that is answered 24/7 and immediately relayed to WM.

All WM drivers receive monthly refresher training which underscores safety as a core value. Topics include coaching based on the prior month's dash camera and GPS reports. The Trucking Foreman will also conduct ride along observations with each driver at least annually, with additional observations for drivers involved in reported safety incidents.

Since 2013, the United States has averaged 6.5 million police-reported motor vehicle traffic incidents each year over an estimated 5.15 million kilometers (3.2 million miles)¹. That translates to more than 1 motor vehicle incident per kilometer driven. Obviously, most of these crashes are not severe (i.e., no fatality or injury), and many drivers will traverse thousands of kilometers without a crash. WM's record of driving over 80M total kilometer (50M total miles) with very few incidents illustrates the benefits of our robust safety programs.

Personnel

Availability of drivers with Class A Commercial Drivers Licenses (CDL) is a key challenge faced by the entire trucking industry today. With over 20,000 trucks on the road daily in our core business, WM has a long history of driver recruitment. WM's approach to driver hiring and retention covers initial advertising, hiring, compensation, and benefits.

¹ Traffic Safety Facts: A Compilation of Motor Vehicle Crash Data <https://cdan.dot.gov/tsftables/tsfar.htm#>

Recruiting begins with advertising the available positions to candidates in the local area. WM has engaged a media company that assists with buying advertising spots and creating content. Successful advertising campaigns reach the intended audience where they are located – in this case we are looking for local, experienced, professional drivers. By narrowing down the operations area, we are able to purchase billboard space along major trucking routes serving national and local destinations as well as radio advertisements for the most popular local music, talk, and sports radio stations. Through this strategy, we are recruiting from the field.

Additionally, WM communicates with local employees from other areas of our business to gauge interest in the new opportunity. Offering a referral bonus to any employee who refers a successful candidate is also a helpful recruiting technique. We leverage our extensive operational reach and driver network to identify local candidates. Happy employees are often the best advocates in recruiting!

As WM progresses to the hiring process, one stop hiring events make it easy for candidates to apply. A comfortable venue with ample parking, meeting facilities, and private interview areas is selected. Community centers, hotel conference rooms, and existing company facilities may provide the necessary space for a hiring event. Each candidate is given a chance to fill out an employment application as well as meet with company interviewers and human resource representatives. To maximize opportunities, WM has also had third parties onsite conducting DOT pre-employment drug testing. By combining all these activities into a single day and place, WM makes it easy for candidates to complete the necessary pre-employment steps and streamlines the hiring process. Following the event, formal written offers are made detailing employment terms and start dates.

One of the key challenges in a shorter-term operation is identifying employees willing to take temporary employment. By planning ahead, you can add increased compensation, slightly higher than salaries in the market area, into the project budget. For employment terms of three years or less, consider a retention bonus awarded for drivers who make it to the end of the project. Additionally, highlight the benefits specific to the project or the employer. This opportunity might be attractive to over-the-road drivers looking for a daily drive schedule that allows them to be home each night, or your company might offer cross-training and advancement opportunities to drivers that will assist in transitioning a driver's career away from the truck. As a large organization, WM has the ability to offer a full suite of benefits to every employee, and this assists greatly in hiring and retention.

Fleet

With drivers established, the trucking operation needs to establish a reliable fleet. Procuring and maintaining a large fleet of trucks and tractors is a resource-heavy and capital intensive proposition. At the height of operations, WM operated 125 tractors and trailers with 2 support trucks. Figure B shows a portion of the fleet established.

Figure B: WM Fleet for CCR Transportation



WM began the procurement process early, recognizing that establishing a fleet to support our first CCR project would take time. During the proposal period, an evaluation of material transport needs (i.e., daily, weekly, and monthly production) and public road capacity dictated trailer size specifications. With a preference to reduce potential environmental impacts, side dump trailers were selected for their superior containment as conditioned CCR still contains some amount of moisture that has a tendency to settle out during transport. Integrated tarps were also incorporated to prevent dust releases. Figure C highlights the selected trucks and trailers for CCR transport.

Figure C: Truck and Trailer Selected



In determining total equipment needs, 90% fleet availability was assumed to account for maintenance and repairs. This fleet sizing and truck and trailer specification was used by WM for initial sourcing and price evaluation. Once a client commitment was received, WM completed the purchase of the initial 50 trucks with trailers. As the initial fleet was established and new projects were being evaluated, the key focus shifted to balancing project production with additional procurements. An evaluation of equipment needs and truck and trailer specifications was undertaken so a decision could be made regarding

sourcing new equipment versus repurposing from another project. In an effort to work multiple projects simultaneously during procurement of additional trucks and trailers, WM was able to work with the client to temporarily shift resources from the established project fleet to the new project until dedicated trucks and trailers were available.

In addition to equipment sourcing, capital funding and maintenance costs must be worked out internally and verified to the client to ensure contract performance. Supplier solvency is also a consideration for future asset replacement or parts acquisition. By deciding to purchase a single model of new equipment, WM was able to standardize maintenance schedules, parts, and mechanical knowledge. An electronic system tracks fleet assets and usage, including mileage, operational days, and type of service. Preventative maintenance is based on logged miles or days of service and drivers perform daily checks to identify issues between scheduled service. In addition to routine maintenance and detailed repairs, WM operates two service trucks for field repairs.

Facility

At the heart of any local trucking operation is a place to call home. With more than 80 employees as well as 80 trucks and trailers for a single project, the facility must cover the basic needs for both personnel and equipment. Depending on project scope and schedule, permanent or temporary facilities may be appropriate. Table 2 outlines the factors to consider in establishing a functional facility.

Table 2: Facility Considerations

	Considerations
Drivers	<ul style="list-style-type: none"> • Locker rooms with restrooms for drivers • Support staff offices • Meeting space / break room • Kitchenette with microwave ovens, vending machines, and refrigerators • Personal vehicle parking
Equipment	<ul style="list-style-type: none"> • Maintenance shop with at least three bays • Office space and restrooms for maintenance personnel • Parts and tool storage • Truck parking

To best support site operations and CCR transportation, the key strategic decision for the facility is location. Ideally, a facility will be located near one destination to maximize time spent hauling material. Although each truck undergoes routine maintenance and inspections, they are subject to issues, most commonly in the loading and unloading processes. Having the maintenance shop near a loading or unloading facility also reduces the response time for field repairs.

For projects with longer haul distances, facility locations can be an important factor in meeting production requirements for the project. WM conducted staggered truck launches from three truck yards to prevent traffic backups during on-site loading operations. Staggered launches also helped drivers to complete necessary turns without exceeding work hours. A well placed facility can also help in establishing a slip seat operation, where trucks can keep moving with new drivers after the first driver has reached their daily limit.

Operations

Once the transportation center is fully built and staffed, the operations team keeps the CCR moving from project site to disposal facility. A project manager oversees the day-to-day operations and coordinates with the project site and disposal facility. Route managers each work with a team of drivers daily to ensure start and end of shift tasks are completed and changing conditions throughout the day are communicated to all drivers. The route managers assign driver loads each day to make sure that CCR transportation volume is meeting production requirements in the contract.

With a focus on safety, WM's driving operations integrate daily checks and feedback for both drivers and equipment. Each driver conducts pre-and post-trip equipment inspections (i.e., tire pressure, lights, air brakes, general condition), which are documented so that issues can be addressed in a timely manner. Driver meetings at the beginning and end of the day review current road conditions, daily weather forecast, known construction or road closures, unexpected traffic upsets, and local events that might affect traffic (i.e., festivals, parades, Presidential motorcade).

Route management is critical for the trucking operation. With known route endpoints, a primary route can be planned to optimize efficiency with alternate routes selected for contingency planning. Road characteristics including underpass height or overpass load ratings factor into route selection as well as community features such as residential neighborhoods and school zones. With respect to the CCR project site, managing truck traffic flow is key to safe, efficient operations. Ideally, the truck route is dedicated for on-road vehicles and has a single traffic pattern that navigates staging, loading, cleaning, and weighing without requiring complicated turns or reversing. Figure D highlights the on-site traffic pattern for one of WM's projects.

Figure D: Loading Loop



At the disposal facility, a similar traffic pattern for weighing, dumping, and cleaning should be established by the disposal facility. For a large project with a consistent flow of trucks to the landfill, the Contractor should work with the disposal facility to ensure unloading operations support the project needs.

Operations is also responsible for anticipating schedule upsets and providing contingency plans. While a driver schedule is planned out to accommodate DOT Federal Motor Carrier Safety Administration (FMCSA) service hour limitations, unexpected illness, vacations, or weather can interfere. The Project Manager and Route Managers balance truck, driver, and road availability to maximize loads in adverse conditions. In many cases, limitations at the project site will drive recovery pace, including space available to stockpile additional material. Significant schedule upsets can take several days to resolve.

The final operations consideration is general project site administration. WM has dedicated administrative staff to manage employee schedules, corporate communications, recruiting & interview scheduling, and filing & recordkeeping. The administrative assistant bridges the field facility with the larger corporate WM organization so that the Project Manager and Route Managers can focus on safe and efficient project execution. Having a readily available resource to facilitate company communication (e.g., insurance and benefits inquiries) also assists with employee satisfaction and retention.

Maintenance

To complement the operations, a maintenance team is assembled and established at the primary trucking facility. The maintenance team’s directive is to ensure that every truck leaving the facility each day is safe to operate. With a Fleet Manager, Operation Support Specialist, and several Technicians, the maintenance team verifies equipment status to schedule preventative maintenance (PM) as well as working with Operations on issues that crop up unexpectedly. As previously stated, WM has a goal of 90% truck availability planned into Operations, which provides 10% availability for preventive maintenance focusing on safety and reliability.

The maintenance team primarily functions at the repair shop. Multiple bays allow for Technicians to perform simultaneous repairs and balance short-term and longer duration tasks. WM also splits maintenance into two shifts to increase operational flexibility and meet availability goals. The day shift operates while trucks are on the road and performs larger repair and PM projects as well as operates the service trucks for call-outs. During the second shift, minor issues reported by the drivers are repaired for use the following day.

As with drivers, recruiting and retaining qualified mechanics pose challenges for shorter-term projects. WM requires mechanics to supply personal tools and their own storage box, which is a standard practice in the industry. To support both safety and employee retention, WM provides a quarterly reimbursement for personal tool purchases. Large tools including jacks, lifts, and supplied air are provided and maintained by WM.

Compliance

Launching a transportation operation requires special licenses, approvals, and registrations. Table 3 outlines the various programs that must be considered in order to comply with federal regulations.

Table 3: Transportation Programs

Program	Description
DOT Registration	This number is a unique identifier and is displayed on all trucks. With this number, anyone can access information about the company and safety ratings through the following website: http://www.fmcsa.dot.gov/
Motor Carrier Authority	This is evidence of a carrier’s authority to engage in transportation by motor vehicle in interstate commerce.
Uniform Carrier Registration (UCR) and Apportioned Registration	The UCR is a system for paying registration dues for truck and trailers in the jurisdiction where they will be operated. For example, if the tractor/trailer is owned and operated by a Texas-based company, but all the mileage is in Tennessee and Mississippi, the registration fees will be

Program	Description
	prorated between the states where the trucks were operational.
International Fuel Tax Agreement License	Carriers pay fuel taxes prorated between the member jurisdictions rather than just the location where the fuel was purchased. For example, if 100% of the fuel is purchased in Tennessee but 20% of the mileage is in Mississippi, then 20% of the fuel taxes paid to Tennessee would be credited to Mississippi.
Heavy Vehicle Usage Tax	The Internal Revenue Service requires pre-payment of a Heavy Vehicle Usage Tax yearly on all on-road tractors/trailers. This too can be verified by USDOT # through the same website.

In establishing the trucking operation, consideration also needs to be given to the DOT FMCSA hours of service regulation for drivers. The restrictions provided in Title 49 of the Code of Federal Regulations (CFR) §395.3 factor into decisions regarding:

- Number of trucks and drivers required to meet production
- Placement of truck yards in relation to project and disposal location
- Selection of disposal location

With a desire to achieve as many turns per day as possible and disposal facilities with extended hours (i.e., 11 hours), it is possible to approach the 14-hour work period and 10-hour drive time restriction rather easily. In addition to the shift limitations, there are restrictions on the total work hours in a 7-day consecutive period. As most CCR closure projects operate 5 to 6 days per week and 10 hours or more per day, a single crew of drivers may not be sufficient to support the project while maintaining compliance with federal regulations.

Future Operations

As projects progress and near completion, the trucking operation slows to coincide with slower production from excavation. The number of loads will decrease, drivers and trucks can be transitioned off the project and reassigned to other pursuits. With a home base facility near the disposal site, it is possible that similar scope opportunities exist for hauling material to the landfill that can absorb some of the resources. If not, the drivers and mechanics would be paid the stated retention bonus upon their release. As part of the people first philosophy, WM also provides referrals to other WM sites upon request for deserving employees. Similarly, equipment can be reassigned to out-of-area projects or equipment and facilities can be sold to recoup capital costs. With proper planning, site closure and demobilization will reduce the business risk of retaining under-utilized resources longer than necessary.