

West Coast Diesel Emissions Reduction Collaborative

Diesel Emulsions for Locomotive Applications

Working with leaders from government, the private sector, and environmental groups the West Coast Diesel Emissions Reduction Collaborative (Collaborative) brings attention to the need for additional funding for diesel emissions reduction on the West Coast and encourages voluntary and incentive based projects that reduce diesel emissions. The Collaborative is focused on projects that are regional in scope, leverage funds from a variety of sources, result in real measurable reductions/results, and create momentum for future diesel emissions reductions. This document describes an important potential diesel emissions reduction project possibly in the San Joaquin Valley Unified Air District (or other California Air District such as Placer County): Diesel Emulsions for Locomotive Applications

Project at a Glance

- Two year project
- Estimated 20 switcher locomotives
- Estimated 1,000,000 gallons consumed per year on 20 switcher locomotives
- Estimated 57 ton of NOx reduction
- Estimated 27 ton of PM reduction

Problem Statement

Switcher locomotive terminals are typically located in close proximity to residential neighborhoods. These switcher locomotives are typically older high emission producing engines. In addition, these locomotives are often operated long hours due to the nature of this business. Considering this information we feel this is an ideal target fleet to reduce emissions on and gain significant benefits for neighboring communities.

Proposed Actions

The concept with this project is to target an application that operates close to residential areas and that consumes large amounts of diesel fuel which equates to significantly larger emission reductions for these densely populated neighborhoods. In addition, we are targeting switcher operations that are relatively close to our current emulsion fuel providers to keep delivery costs to a minimum. Our current California emulsion fuel providers are located in Sacramento, Los Angeles and Fresno regions. The emulsion technology of choice is PuriNOx™ technology developed by The Lubrizol Corporation which is registered and verified by US EPA and CARB. The following items are a rough sketch of how the project would unfold.

- Identify railroad company partner.
- Assemble project team consisting of personnel from the railroad, regulatory group, and technology provider.
- Jointly prepare a more detailed RFP given the fleets equipment, location and goals. Ensure we have EPA, CARB and the local air district on board so all agency's can gain from this project.
- With the Collaborative's assistance solicit and contract appropriate funds to cover the cost of this project.
- Prepare contracts with involved parties. Ideally one of the local air districts can take a leadership role in this area.
- Have a media announcement for all to participate in.
- If emission testing is desired, baseline emission testing will need to be conducted before conversion to PuriNOx fuel.

- Conversion to PuriNOx emulsion fuel ensuring that Lubrizol's operation guidelines for this technology are followed.
- Follow-up emission testing would be conducted shortly after conversion to PuriNOx fuel (again only if emission testing was part of this project).
- If emission testing was conducted a formal report of findings would be produced shortly after conclusion of testing (within ~1 month of final testing).
- The fleet partner would monitor operability and overall economics of the project with the project teams input.
- Quarterly reports would be submitted regarding status of the project.
- A final report would summarize the overall findings at the end of the project.

The intent of this project would be to determine the effectiveness of using low emission diesel fuel in the switcher locomotive application. Key parameters that would be evaluated to identify a successful project would be as follows.

- Performance of the locomotive such that it can still perform its needed tasks effectively.
- The technologies overall economic value as compared to other technologies with similar emission reductions.
- Overall emission reductions (only if it was decided not to use current verified numbers).

Anticipated Benefits

Assuming the project consumes ~2MM gallons of PuriNOx emulsion fuel it is estimated that a reduction of 57 tons of NOx and 27 tons of PM would be reduced from the atmosphere. This would provide the local air districts significant reductions into their community. Such an outcome would serve as a positive media and public relations tool to facilitate steps toward meeting local, state and national goals for less pollution. In addition, this technology does a tremendous job reducing the visible black carbon that is typically emitted from the stack exhaust. By reducing these opacity levels (typically in the order of 75 to 100%) a positive impact is achieved both at the terminal facility and with the surrounding community.

Estimated Costs

Estimations below are based on an estimated 1MM gallon per year project to be run for two years.

- Estimated funding needed for this fuel is ~\$0.25/gallon (~\$500,000)
- Possible preparation needed for fuel conversion such as fuel tank cleaning, storage tank recirculation, etc. (~\$20,000)
- Potential estimated emission test cost (TBD)
- Estimated administrative costs (\$5,000)
- Estimated media and public relations cost (\$2,000)

Based on the estimated numbers above the total project cost would be ~\$527,000 which would be \$26,350 per locomotive over two years or \$13,175 per locomotive for one year.

Collaborative Partners

It would be suggested that the following partners be involved in this type of project:

- Local Air Quality Management District (i.e. SJVAQMD, SCAQMD, Placer, etc.)
 - Appoint someone from this group to take the lead for the project.
 - Handle administrative duties.
 - Appoint someone from their locomotive sector to provide input so results can be used for future AQMD activity with respect to this application.
 - Assist with raising the needed funds for this project.
 - Assist with media relations.
- EPA Region 9
 - Appoint someone from their locomotive sector to provide input so results can be used for future EPA activity with respect to this application.
 - Assist with raising the needed funds for this project.
 - Assist with media relations.
- California Air Resource Board
 - Appoint someone from their locomotive sector to provide input so results can be used for future CARB activity with respect to this application.
 - Assist with raising the needed funds for this project.
 - Assist with media relations.
- The Lubrizol Corporation
 - Provide appropriate information required regarding their technology.
 - Provide assistance with conversion from conventional diesel fuel to PuriNOx technology.
 - Provide emission testing if so desired for an agreed upon fee to be covered by the project funds. Note, much data has already been generated on this technology regarding emission reduction quantity, therefore, it would be suggested that this project focus on operability and economics. The verified emission reductions could be used to calculate cost per ton numbers.
- Locomotive Company (i.e. BNSF, UP, etc.)
 - Provide equipment (i.e. switcher locomotives) for project.
 - Provide key individual to be a point person to assist with conversion and management of day-to-day evaluation.
 - Assist with media relations.
 - Provide company goals or needs with respect to emission reductions.

More Information on the Collaborative and Contacts

The West Coast Diesel Emissions Reduction Collaborative is made up of federal government agencies from the U.S., Canada and Mexico, and state and local governments and non-profit and private sector partners from California, Oregon, Washington, Alaska and British Columbia. The Collaborative's purpose is to bring attention to the need for additional funding for diesel emissions on the West Coast, support voluntary diesel emissions reductions, create a forum for information sharing among diesel emissions reductions advocates, and leverage significant new resources to expand voluntary diesel emissions reductions efforts.

The goal of the Collaborative is to leverage over \$100 million in new federal funds for diesel emissions reductions projects per year for 5 years to reduce emissions from the most polluting diesel sources in the most impacted communities and significantly improve air quality and public health. By targeting the higher polluting engines with the most cost effective strategies, we estimate that the benefits of this investment will significantly outweigh the costs.

For more information on the Diesel Emulsions for Locomotive Applications project, contact:

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For more information on the Collaborative in general, go to www.epa.gov/air/westcoastdiesel or contact Peter Murchie, murchie.peter@epa.gov or Michelle Roos, roos.michelle@epa.gov.