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Matthew Stewart
09-8-5

September 25, 2009
Ms. Mary D Nichols
Chair
California Air Resources Board
1101 I St.
Sacramento CA 95814

Dear Ms Nichols

ACTI has reviewed the ARB document, "Technical Options to Achieve Additional Emissions and Risk Reductions from California Locomotives and Railyards", henceforth called the "Paper", and dated August 2009. Considering that ACTI was not consulted on the technical and financial information within this document, and that this may become a blueprint for public funding, ACTI has some concerns regarding the accuracy of some of the statements made. This memorandum addresses our concerns

Source Emissions

Considering that all railyards are different, ALECS will be deployed in the most cost effective manner possible for each specific application. ALECS should only be applied to locations within the yard where locomotives are generally running in one place, i.e. the service and maintenance areas. Generally there would be a single treatment system that would be sized for the specific application such that it would be running at peak efficiency nearly all of the time. The treatment system can also automatically scale back energy usage during reduced demand, and therefore retains its cost effectiveness during the low periods. This is important, because operating costs (e.g. energy usage) effects cost effectiveness more than capital costs. All of the service and maintenance locations in the yard can likely be accommodated. For example, ACTI has plans for dock (vessel) applications that call for nearly a mile of ducting along the dock connected to a single ETS. This would certainly apply to Roseville, where both sides of the maintenance shop, the Modsearch building, Ready tracks, and Service track could all be accommodated with a single ETS.

As more hoods are added to an ETS, the cost effectiveness actually increases. This is because capital cost per locomotive decreases, since the capital cost of the single ETS remains approximately the same and there is only a relatively small incremental cost due to each additional hood.

In the Paper, the staff assumed 1 ton per year of PM emissions per year based on the Roseville study. The assumption was that only the west side of the maintenance shop would be addressed. However, since nearly all of the service operations can be accommodated with a single treatment system, most of the 6 tpy referenced in the Roseville study for the service and testing area could be captured.

The Paper states that "load testing is now performed at a variety of locations through the railyard, rather than being concentrated near the maintenance shop." We have not been able to verify this. UP and BSNF have the opportunity to reduce emissions by simply modifying their procedures. This is one of the most cost-effective ways to reduce pollution because there is no additional capital cost and little effect of the operating costs. The ALECS system is actually beneficial to operations because load testing on the locomotives does not have to be done remotely (away from residences, especially at night) because the ALECS system significantly reduces the noise levels.

We understand that practically all locomotives will be Tier 2 by the time ALECS is installed. We have therefore used the emissions from Tier 2 locomotives with a mix of idle, TN5, and TN8 throttle notch settings in our latest calculations of emissions and cost effectiveness. This is more stringent than what was used in the TIAX report. However, it is more representative of the actual emissions that will be seen during the life of the ALECS system.

It is sometimes not appropriate to express cost effectiveness in a range, as was done in the TIAX report. For example, one end of the range is for all locomotives idling only (no higher throttle notches). This would only be valid if this were the case for the entire year. Cost effectiveness has to address the *average* expected usage, not an instantaneous occurrence. Therefore, many of these ranges do not make practical sense.

In addition, the Roseville report based its emissions calculations on published emissions factors that may be lower than actual emissions. Note that testing in Roseville indicated much higher emissions (more than double) than the EPA factors, even after accounting for deterioration factors. This may be because PM is highly dependent on tuning. The EPA factors assume a new and properly tuned engine, which is normally not the case in real-world operations (engines are serviced for a reason). Therefore, over 12 tpy PM reduction may be achievable in the Roseville yard, which would more than half the cost effectiveness.

Operating Costs

Energy consumption is lower now with the introduction of low-temperature catalyst. In addition, higher efficiency spraying systems are planned to be in place before installation. This will reduce the electrical and natural gas requirements of the system compared to when the Roseville tests were made.

ALECS has variable flow capability and adapts to both the number of locomotives connected and their various throttle settings. Therefore the amount of energy consumption is proportional to the amount of gas treated. ALECS always runs at optimum cost effectiveness. All throttle settings between idle and TN8 can be accommodated, especially considering the averaging effect of many locomotives attached to a single processing system.

Benefits from Rapid Deployment

The Paper states that other technologies can be implemented sooner. ALECS could be deployed at selected rail yards (Roseville, Barstow, Colton) within 18 months and result in significant reduction in emissions.

Cost Effectiveness

The cost effectiveness has been re-evaluated in light of the previous discussion. A system designed for Roseville is analyzed in this example which has five areas (Maintenance west & east, ready tracks, service tracks, and the Modsearch building) with a total of 26 locomotive stations. Emissions are only from Tier 2 locomotives. It is estimated that only 50% of the hoods are utilized at any given time, on average, and that the system reliability is 96%. The resulting cost effectiveness is $14,022/ton or about $7/lb.

ALECS

EST. OPERATING COSTS		Annual		Monthly
Personnel	$	306,600	$	25,550
Maintenance	$	104,092	$	8,674
Insurance	$	39,875	$	3,323
Consumables & Disposal	$	376,839	$	31,403
ACTI OPERATING FEE:	**$**	**827,407**	**$**	**68,951**
Utilities	$	728,331	$	60,694
OPERATING COSTS:	**$**	**1,555,737**	**$**	**129,645**

CAPITAL COSTS		
Emissions Treatment System (ETS)	$	8,581,401
Exhaust Capture System (ECS)	$	5,970,156
EQUIPMENT PRICE:	**$**	**14,551,557**

ESTIMATED INSTALLATION COSTS		
ETS Installation Costs	$	954,525
ECS Installation Costs	$	1,947,231
INSTALLATION COSTS:	**$**	**2,901,756**
TOTAL CAPITAL COSTS:	**$**	**17,453,313**
Interest Rate		8%
Term (Years)		10
AMORTIZED CAPITAL COSTS:	**$**	**211,757**

Date: 9/24/2009 18:02

Years:	**20**	**Rate:**	**3.8%**
		Interest Rate:	8.00%
		Inflation:	4.00%
		Carl Moyer PM x	20

TOTAL MONTHLY COST:	**$**	**341,402**
PV of Operating Costs:		**22,258,337**
Total cost / Life:		**39,711,651**
Emissions Tons / Life:		**2,832**
Cost Effectiveness ($/ton):	**$**	**14,022**
Cost Effectiveness ($/lb):	**$**	**7.01**

Conclusions

The most important aspect that affects the cost effectiveness of the ALECS system is that a single treatment system is able to capture emissions from the entire service and maintenance area. Also, the system is able to automatically match its energy consumption to demand which maintains its cost effectiveness continuously. The cost effectiveness of ALECS has been evaluated using Tier 2 locomotives to be about $14,000/ton ($7/lb) instead of the $23/lb as stated in the Paper. ALECS can be cost-effectively deployed quickly to accelerate further emissions reductions before Tier 4 locomotives are implemented.

The ARB staff cm contact us at 310-763-1423 or mstewart@actird.com

Sincerely,

Matthew F Stewart
Executive Vice President

Cc ARB Board Members
Cc James Goldstene