

AB679 Diesel Fuel Comparison Study Meeting – March 13, 2009

Panel Members Present: Paul Wuebben/SCAQMD, Thomas Durbin/UCR CE-CERT, Ken Kimura/WSPA, Michael Tunnell/ATA, Dean Simeroth/CARB; **Teleconference:** Roger Gault/EMA, Charles Schleyer/ExxonMobil, Fred Cornforth/ ConocoPhillips (Cornforth joined by phone with the meeting in progress, after the fuel discussions had occurred)

Air Resources Board (ARB) Staff Present: Jim Guthrie, Floyd Vergara, Dean Simeroth, Aubrey Sideco, Alexander Mitchell

Public Present: Mark Sperling/Interstate Oil, Kim Waggoner/AIAM; **Teleconference:** Dave Hacin, Gary Grimes/Paramount Petroleum, Dominick DiCicco/Ford

Handout

- Diesel Fuel Comparison Study Advisory Panel Meeting Presentation – March 13, 2009

Meeting and Presentation

Vergara called the meeting to order at 10:09 AM. A quorum was present.

Emergency meeting called and deemed necessary in order to prevent serious delays and averse affects to the test program. Emergency meeting definition and guidelines read by Vergara. Emergency meeting finding was made with unanimous vote by the Panel.

The Panel discussed the potential CARB test and the Federal average test fuel as presented by Guthrie. The Panel approved the property ranges for the CA and Federal fuels in December 2008 and January 2009. The Panel also approved fall-back property ranges in December 2008.

Guthrie led the meeting and started the presentation with an update of actions taken in finding potential average test fuels. He contacted refineries where he thought properties would fall in average ranges. Guthrie recently found potential CA and Federal test fuels that may work. The two fuels work well together.

Guthrie continued to discuss the proposed CA test fuel (Slide 2). He introduced the estimated properties of the proposed CA fuel in comparison to the average property ranges for average CARB ULSD fuel. Guthrie commented on the properties of the proposed fuel: API is low, aromatics content is high, cetane is about right, and sulfur is out of range. He doesn't see sulfur affecting emissions greatly. Guthrie stated that there is a narrow window of opportunity for obtaining this fuel. Approximately 3,000 gallons is needed. The fuel also needs to be drummed and stored. If the fuel is approved, we will get the fuel by early next week, Tuesday. He is talking with the refinery to see if can be stored. It would provide more time to get the fuel drummed.

Gault stated that sulfur seems higher than expected and higher than what is seen in surveys. Guthrie said that common carrier people raised sulfur content (from 8 to 10 ppmw). The Panel discussed sulfur content further. Is this an indicator of future trends?

The attendees continued to discuss average fuel. Typically cannot find “average” fuel.

Wuebben asked if high sulfur could reflect some seasonality. Guthrie answered that it would be something refineries would have to answer. The pipeline company Kinder Morgan knows at 10ppm, they can deliver fuel on spec. Kimura agreed. No seasonality associated with sulfur. Schleyer agreed with Kimura. DiCicco asked why raising sulfur by 2ppm. Kimura stated that the surveys from end users are meeting specifications. Kimura noted that WSPA asked for them to review and raise sulfur for increased flexibility.

The Panel briefly discussed aromatics. Members were generally surprised that the aromatics were 19.2 vol %. Guthrie described that the aromatics include 10% fuel and that it is difficult to find “average” fuel. They would need something from the lower end. Some fuels in CA are higher than 19. Jim noted that the volume weighted average compared closely to retail stations. That’s why the panel approved the range. 19 vol % is on the high side.

The Panel continued to discuss API gravity of the proposed CA test fuel. The fuel is a slightly higher emitting fuel. More NOx would be expected.

Guthrie continued the presentation and discussed the proposed Federal test fuel (Slide 3). Guthrie led the discussion and introduced the estimated properties of the proposed “average” Federal ULSD fuel compared to the approved ranges. Guthrie noted that the two fuels might work because the API for the proposed Federal fuel is also low; it is directional for both NOx and PM. Both fuels are also higher emitting. For aromatics, he wouldn’t say it’s on the low end because it is based on ASTM D5186 instead of ASTM D1319. Cetane number is right there. Sulfur is high.

Tunnell asked about aromatics and what the percent difference between test methods would be. Phone attendee stated that the average is on the order of 2%. Others agreed. The proposed fuel is most likely mid to high end.

Mike asked if the proposed CA fuel is a blended fuel. Guthrie answered no. The proposed Federal fuel properties are the average of three batches. He stated that there is not a lot of variability in numbers (most variability in T90). Two batches are within range. Cetane number is within range. Natural cetane number is low (about 38). This fuel was additized with cetane improver. Jim can’t say for sure if they will be able to get this fuel. Especially when compared to CA fuel proposed fuel, this fuel looks pretty good.

Attendees then discussed aromatics. Phone participant stated that from January meeting, the Alliance Survey results (28.6 for ASTM D1319 and 25.7 for ASTM D5186) would mean that 27 would be closer to 30.

Guthrie reasoned that the two proposed fuels would work better together. He stated that the natural cetane number is low. Schleyer expressed concern that aromatics not high and cetane low and that this can definitely have an affect on emissions. Just adding cetane improver won't help. Simeroth asked if natural cetane of refineries running CA crude is low. Schleyer answered yes. Grimes added that natural cetane for crude is 33-34 and conventional is around 45-46. Hacin expressed that the refiner might be using light cycle oil. Kimura stated that it is common practice outside of California.

The Panel continued discussion with the last slide of the presentation (Slide 4). Participants discussed the approved property ranges for the "fall-back" Federal ULSD test fuel selection (Federal A). The fall-back ranges were defined and approved in December 2008.

Guthrie stated that if fuels cannot be found, an alternative would be to blend an average. It might not be that hard. They would need to blend into tank, take back fuel, and drum. Simeroth stated that the Panel would have to accept whatever is blended. What you blend is what you get.

Going back to the CARB ULSD proposed test fuel, Simeroth states that the proposed test fuel does not look unreasonable. Based on previous surveys, there's lower sulfur. Simeroth asked the Panel if the proposed test fuel is something the panel would consider (staying away from blending). Kimura agreed and suggested to the Panel to consider. He said that there are different problems with blending (storing, blending, funds). Tunnell proposed to consider both the CA and Federal fuels simultaneously. Simeroth stated that approval of each fuel, separately, would be acceptable in order to move forward and progress quickly. Guthrie agreed with Dean and reminded the Panel that they have a narrow window of opportunity for the CARB fuel. They have more time with the Federal fuel.

Gault noted that for the test program, all three fuels would need to be available at the time of testing. Durbin deemed statement correct. Phone participant asked the Panel if they should lock in CA fuel even though they would still need the other fuels for testing. Simeroth stated that they can move forward with CA fuel and then discuss Federal fuel later because there is not a lot of time.

Motion (Gault): Motion to accept proposed CA fuel based on estimated properties. Seconded (Tunnell).

Vergara clarified the motion. He stated that the Panel would be voting on acceptance of the specific proposed CA fuel and not on the estimated fuel properties. Durbin asked for the ranges the ARB would suggest. Simeroth notes that he doesn't think it would

help so much. If something is off, they will go back to the Panel. Durbin asked if the Panel should move forward in getting the fuel and target estimated properties. Wuebben expressed that he is uncomfortable looking at the two fuels separately. He feels that spread is important. The two fuels move in same directions. He further states that the spread is important for credibility and viability of the study. Wuebben would be satisfied approving as a pair. Schleyer expressed that he was comfortable until he saw that the Federal cetane was so low (natural cetane of 38). Gault has same concern. Cetane improver is used to get up from 38 to 46. He is not comfortable with that. Wuebben asked how much cetane enhancer was added. Guthrie said around 1000 to 1200 ppm typically. Guthrie noted that most fuels don't have cetane improver.

Tunnell brought the discussion back to the original question, asking the Panel if they should consider the fuels separately. Guthrie stated that there are limited refineries in CA for Federal fuel. Simeroth asked if fuel can be brought from outside CA for more refineries. Simeroth asked Schleyer if ARB can get fuel from out of state. Schleyer suggested the Gulf Coast and the Pacific Northwest for potential Federal test fuels. He said that is it difficult for them to get fuel. Dean doesn't disagree with the Federal fuel having a fair amount of cetane improver. They will try getting fuel from the Pacific Northwest or out of state. Tunnell asked how this will affect getting the CA fuel. Dean responded saying that if they can preserve the spread, it would generally be accepted. There are advantages finding the CA fuel and then finding the Federal fuel that can preserve the spread. Tunnell stated that he generally agrees but the goal would be preserving the spread.

Guthrie expressed that his major concern for the CA proposed fuel is the low API gravity. Durbin said that for the Federal fuel, the API gravity is still on the low side. Guthrie reiterated that it is still on low side for natural cetane.

Tunnell took back prior statement and focused more on the fall-back ranges. Simeroth suggested locking down the CA fuel and to focus on preserving the spread. They would try to find a Federal fuel not influenced by additives. Wuebben asked if natural cetane tracks fuel quality. Schleyer answered saying that it is a function of the crude and that it would depend on processing.

Simeroth suggested for the Panel to return to the proposal on the table. Wuebben stated that he supports the motion as amended. Durbin clarified that the focus would be on the target properties. Gault amended the motion.

Amended Motion (Gault): Amend motion to request the ARB to proceed based on the estimated properties of the proposed CARB ULSD test fuel as described in the chart, recognizing tolerance to property values, and that the ultimate properties of the CA fuel will be used to define the Federal fuel. Seconded (Durbin). Voted 7-0. Motion carried.

Simeroth asked the position of the Panel to decide Federal fuel. Panel member recommended them to consider expanding some of the ranges so that it would be easier for staff to find fuel without having the Panel reconvene. Guthrie agreed. Kimura

reminded the Panel of fall-back ranges and that guidelines are in place already. Simeroth further clarified fall-back ranges were previously approved.

Phone participant directed discussion to T50 and T90 values. Temperatures are slightly out of range. For both CA and Federal fuel, T90 tends to high side and T50 the low side. Gault suggested giving staff discretion to go out of range for T50 and T90. Wuebben seconded. Schleyer agreed to not worry about that if reach other four properties. Simeroth stated that they will use they're recommendation as guidance when choosing fuels.

Guthrie noted that for sulfur, there is a 5 ppm difference with fall-back of 0 – 4 ppm maximum. Guthrie suggested more leeway for sulfur. Simeroth deemed current range of sulfur acceptable.

The discussion ensues with Federal Fuel B. Participant asked where they're at in terms of the other Federal fuel, Federal B. Guthrie requested feedback and any ideas.

Wuebben stated that he would have concern if the Federal fuel did not meet CA sulfur level. Simeroth agreed that 13 ppm sulfur is unusual for Federal and CA. He continued saying that for the third fuel, they can be more flexible than main fuel.

Simeroth asked all if they are aware of the diesel fuels supplied in Salt Lake City area. From the first survey, Simeroth asked if they know what regions the fuel came from, path and location. Phone participant said that the locations are where the samples are taken from and not where fuels are sourced from. They need to actually source other Federal fuel before the start of the test.

Discussion of testing logistics and schedule continued. Attendees discuss with Durbin window of opportunity, early May. Roughly a month, they would miss window and won't open until July. They discussed how to expand out to find right fuels. Phone participant mentioned survey data, Portland Oregon. Simeroth stated that they will push what is coming from the Pacific Northwest. They might want to go the Gulf Coast. The Panel discussed aromatics and expressed an interest in higher aromatics. Participants noted 30+ aromatics (Portland refineries). Simeroth said that they will talk with refineries and Pacific Northwest. It wouldn't be unreasonable to truck it down that distance. Guthrie asked Sperling if this is something his company can do and Sperling said yes.

Durbin started a short discussion on testing issues. He explained that the cruise cycle has an issue with the engine map, causing a 4 percent change in NOx for some fuel and engines on some runs. Two emission levels are created at the same, single point. They may need to consider a different test cycle or somehow address the issue. New testing protocols may increase the number of tests that can be done per day. Durbin suggested increasing number of tests in a day. There would be a time benefit. Durbin mentioned working with Larry Larsen, ARB for statistical validity. Durbin stated that he is comfortable with cycles but there are issues with 50 mph cruise cycle. He is not sure if the test plan was changed from 40mph to 50mph. He will look over. Guthrie asked if

it would be reasonable to take couple seconds off. Durbin stated that it would complicate things. Gault noted that it would cause NOx to shift. Durbin said that it occurs more with CARB diesel (compared to biodiesel). Durbin expressed that he just wanted to bring this up to Panel's attention. Schleyer added that removing seconds would not be good. Simeroth stated that he does not think they can alter the test program. Guthrie said that they don't know if the trend is caused by the fuel. Durbin said responded saying that it does appear to be fuel related. Simeroth stated that they just need to be aware of it and hopefully only shows in biodiesel versus conventional diesel. A short memo describing the phenomenon was requested (**Action Item**). Panel agreed.

Gault asked Durbin about the length of the program if they were able to meet the first window of opportunity in April or May. Durbin explained the timeframe and that it will allow having 2010 engine (late fall timeframe). Simeroth noted that 2010 technology would be very valuable to have some tests on.

The meeting concluded with a short discussion on the biodiesel study and test schedule.

Meeting adjourned at 11:36 AM.