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PC-10 Tipping Toward an October Debut

By David McFall

NORFOLK, Va. – PC-10, the new diesel engine oil category under intensive technical discussion (and now officially designated as CJ-4 by the American Petroleum Institute) has reached the approval tipping point. All indicators point to a finalization of the technical issues, including test limits, by the end of January – which would allow first API licensing by the end of October. This assumes that API will agree to shorten the normal 12-month interval between approval and first licensing to nine months, as recommended by the American Chemistry Council.

ASTM's Heavy Duty Engine Oil Classification Panel, the inter-industry body where all technical matters are resolved and test limits set, is scheduled to meet Jan. 10 in San Antonio to address remaining concerns and attempt a final ballot. The group's chairman, Jim McGeehan of Chevron, also has scheduled a fall-back meeting Jan. 26 in Chicago, in case a final ballot is not completed on the 10th.

The October date proposed by ACC is two months sooner than the first-licensing date which had been projected just a month ago, and is only a couple of weeks beyond the deadline that heavy-duty engine builders have been insisting on for several years. In the face of persistent large obstacles, it highlights what McGeehan has been proclaiming from the start: "PC-10 will be delivered on time."

At the Classification Panel's Dec. 7 session, during ASTM's Committee D-2 meeting here, McGeehan reported that progress was "the result of intensive and significant behind-the-scenes work by members of the Classification Panel, the Surveillance Panels and many other people, particularly from ACC and Engine Manufacturers Association member companies."

In all, McGeehan noted, the PC-10/CJ-4 test battery has a total of 10 engine tests, including three which measure valvetrain wear (the Cummins ISM and ISB and the General Motors Roller-Follower Wear Test) and three others which measure piston deposits (Caterpillar's 1N, 1P and C-13 tests). The Classification Panel has approved each of these tests for inclusion in the PC-10 test battery, reasoning that each measures a different aspect of the major parameter.

Selecting limits for PC-10's battery of tests, of course, is the raison d'etre for the work of the Classification Panel. To date, successful ballots have been completed to apply the test limits of the Mack T-10

engine sequence test to the T-6 and T-9, and from the Cummins ISM to the new Cummins M11-EGR.

McGeehan observed that the sulfated-ash limit in PC-10's "chemical box" had been changed from critical to non-critical at 1.0 percent, meaning that the effective tolerances had been somewhat expanded. In addition, the Caterpillar 1P engine test had been added to the category, as had the primarily gasoline engine oil test (either the Sequence IIIF at API CI-4 limits, or Sequence IIIG with limits to be defined).

Three new engine tests were run in the recently completed precision testing matrix, but none had yet reached full approval by the Panel. The Mack T-12 and the Cummins ISB had significant negative comments in earlier screening (called exit) ballots; the ISB, in fact, had more negative comments than approvals. During the discussions, many of the concerns expressed in the written negative comments got close to resolution with a consensus developing that intensive discussion followed swiftly by another exit ballot would be a productive course. Since the meeting, significant agreement has been reached on major items, sources told Lube Report.

As it has from the beginning, Caterpillar's new C-13 engine test, which measures oil consumption and piston deposits, continued to be the central concern. Following the 26 test runs of the precision matrix, it was pointed out that one test measurement – titled the 2RTC, which stands for the second-ring carbon rating – had not been rated consistently. Raters are skilled specialists who evaluate engine parts after each test run and give numeric ratings ("demerits") to the deposits, corrosion and wear they observe. However, it turns out the C-13 raters had not been trained in how and/or what part of the ring to measure. As a result, the demerits given to the same ring by different raters were, as Infineum's Pat Fetterman pointed out, "all over the place, from 9 up to 50."

A few weeks earlier, the C-13 Surveillance Panel had agreed that all of the C-13's parameters – such as oil consumption, top land and groove carbon – were appropriate and useful, and test results produced valid measurements. The Panel, however, had reservations on the 2RTC measurement and Caterpillar was asked for certain follow-up information.

Now, however, this single, uncertain measurement has cast a pall over the entire test. Fetterman noted, "We have very legitimate concerns over the 2RTC parameter. It is a scary parameter because we do not know how the existing database was generated or what it means."

McGeehan added, "This parameter was never properly rated in the matrix and we have wasted the $2.2 million testing costs. Raters had not been properly trained and their measurements were inconsistent across several parts of the ring and across the participating labs."

The old saw "For want of a nail the battle was lost" illustrates why

there is great concern over the uncertainty of this one, single parameter. ACC member companies shoulder almost all candidate oil test costs. The C-13, at about $125,000 per test, is the most expensive test in this or any other category. Tests, or separate parameters in individual tests, with outcomes that are not consistent over time – that is, "all over the place" – will result in unreliable test outcomes; if even a single parameter fails in a test, the entire test must be rerun.

This results in two problems: substantially increased testing costs, and delays in licensing candidate oils. The latter issue is particularly troubling since the 500-hour-long C-13 test takes nearly one full month to run, rate, rebuild and set up for the next test run.

Abdul Cassim of Caterpillar noted that "a crash course, in early January, has been scheduled in San Antonio for the raters from all the labs, to insure future rating consistency."

Another concern heard in the meeting was the piecemeal setting of test limits. Pointing out that trade-offs in performance between tests may exist, Chevron Oronite's Wim van Dam said, "We really need to see all the proposed test limits as a group before voting on individual test limits, so that we can evaluate individual limits across the whole test battery." That concern was reinforced by Lubrizol's Lew Williams and other ACC member company representatives.

Williams reported that in the five months from July to November 2005, ACC member companies had invested close to $10 million in preliminary PC-10 testing, including 153 registered test runs for just five tests – the Mack T-11 and T-12, Cummins ISM and ISB, and the Caterpillar C-13. "ACC really showed its commitment to PC-10 by running the preliminary test before parameters, limits and final test development are completed," he said. "We saw this as crucial to helping complete PC-10 on time and making first-licensing possible for all oil marketers in the agreed-upon time frame. Industry now needs to reach final agreement on the test parameters and limits to help us keep PC-10 moving forward."

ExxonMobil's Steve Kennedy highlighted another issue, saying, "The potential lack of comprehensive C-13 read-across has been a major industry-wide concern." He noted that API's Lubricants Committee Base Oil Interchange and Viscosity Grade Read-Across Task Force had worked to develop a "progressive BOI and VGR-A for the C-13. Specifically, BOI would be defined around properties of the base oil mixture; not strictly around traditional API base oil groups I through V." It was also suggested that the blend's viscosity index would be used as a property in addition to the customary saturates and sulfur, with the option to read from a single test or define a range based on two tests. The viscosity grade read-across proposal for the C-13 is similar to the CAT 1R single-cylinder test and covers a limited number of viscosity grades, SAE 15W-40, 10W-30 and 10W-40.

Kennedy noted that a ballot to finalize the proposed interchange and read-across guidelines was issued on Dec. 5; returns were due Dec.

16. This accelerated balloting process was a testimonial to API's commitment to assist in moving PC-10 forward to meet EMA's requested first-licensing date, he said.

Finally, at the close of the meeting, Caterpillar's Cassim surprised the Panel by announcing that his company was planning to introduce two new proprietary specifications, with the same finalization date as PC-10. For a look at Cat's new ECF-2 and ECF-3 specifications, see last week's issue of Lube Report.

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