

Notes
DOE/EPRI meeting on Phase II Mercury Field Test Needs
Washington DC
June 5, 2002

Attendees (phone/e-mail at end of notes)

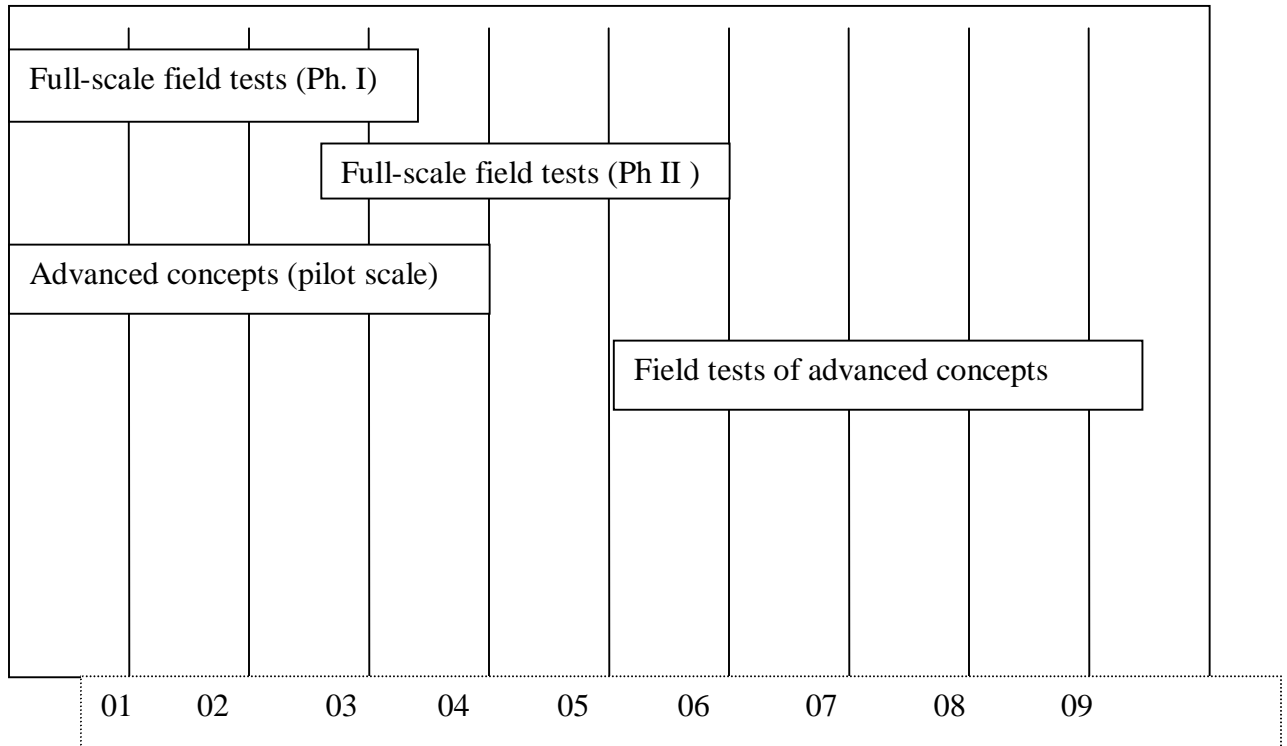
| | |
|-----------------------|-------------------------|
| AEP - Gary Spitznogle | EPRI - Stu Dalton |
| DOE - Scott Renninger | EPRI - George Offen |
| DOE - Tom Feeley | GRE - Mark Strohfus |
| Duke - Tim Shawver | Southern - Larry Monroe |
| EPA - Jim Kilgroe | TVA - Tom Burnett |
| | TXU - David Lamb |

DOE and EPRI jointly convened this meeting to obtain feedback from deeply involved industry members on the needs, scope, schedule, etc. for a second phase of full-scale, longer-term field tests of mercury controls on power plants. The program objectives would be to determine performance and costs of the major near-term control approaches with the hope of using this information both to inform the regulatory (MACT) and legislative (Clear Skies Initiative, CSI) processes as well as industry selections of controls to meet any near-term compliance requirements. The meeting was jointly sponsored because the two organizations have a history of effective collaboration, especially in the area of mercury emissions and controls. Both DOE and EPRI stated their assessment that some 10-20 full-scale, longer-term field tests are needed to meet these objectives.

Jim Kilgroe noted that EPA has to propose and promulgate MACT standards (by 12/03 and 12/04, respectively) and that from his perspective, as the lead technical expert within the Agency for mercury controls, many questions remain on performance and cost of the different options. Important information gaps he noted are: cost, basic chemistry (needed so they can extrapolate from tests on a few units/coins to the total boiler population), controls for PRB and lignite, and net capture rates by wet FGD. The MACT schedule requires that staff decisions be finalized by March-June 2003 for the proposed regulations. Information received after those dates might be useful as the Agency reviews the comments it receives on the proposed regulations before promulgating them in 2004.

Tom Feeley noted that DOE's goals are to have technology capable of 50-70% Hg reduction by 2005 and 90% Δ Hg at 50% the current cost by 2010. DOE has established the timeline on the next page to meet these goals.

Tom believes the probability is high to obtain about \$15M (DOE portion) spread equally over three years for the Phase II field tests. Industry would be required to provide 1/3rd cost-sharing (hence total program \geq \$22.5M). He is less certain about the advanced concept field tests because he hasn't yet discussed that with DOE management and the Hill. It was noted that the current ADA program is costing an average of \$1.5M/site, so the proposed funding could accommodate about 15 sites.



Scott noted that DOE is funding the following six advanced concept projects:

- Low temperature sorbent injection (Consol)
- ElectroCatalytic Oxidation 50 MW pilot (Powerspan with FirstEnergy & AEP)
- Calcium-silica-based sorbents for both S, Hg control, incl. applications in a circulating dry scrubber (SoRI)
- Novel sorbents, mostly carbonaceous (Apogee with EPRI co-funding and IP)
- Advanced Hybrid Particulate Collector with ACI (UND EERC)
- Oxidation catalysts + wet FGD on lignite and PRB (URS with EPRI co-funding and IP)

The group suggested to DOE that they (1) provide a mechanism for accepting proposals for full-scale field tests of advanced concepts about 6-12 months after the solicitation for control processes that are now ready to be tested at full-scale, and (2) allow proposals for any advanced concepts in the planned 2005-2009 program. Tom asked the attendees to send Scott their thoughts on how to structure a solicitation to provide this flexibility.

Tom noted that some firms may propose commercial-scale mercury control demonstration programs under the current CCPI solicitation (proposals due 8/1/02). He asked the group how they differentiated between the two programs and how would they justify participation in the field tests to their management given the availability of the CCPI program. He asked that group members send their thoughts on this to Scott.

Scott asked whether DOE should specify how companies should structure their responses, especially composition of the teams and number of sites each should propose. The group recommended that DOE identify the fuel/air pollution control/mercury control combinations they wanted tested, but let the market decide how to respond to this desired matrix. It was agreed that boiler type was not significant, except maybe CFB vs PC/cyclone.

The group decided that the program should include:

1. A matrix (about 15) of long-term tests of activated carbon on full-scale units, per the table at the end of these notes. This matrix includes representative sites for each major category of fuel and air pollution control (particulate, SO₂, and post-combustion NO_x). In addition to providing data on a number of different fuels and air pollution controls, these tests should also be run long enough to resolve the variability issue (a key question raised by Jim Kilgroe)
2. As noted above, starting about one year later, 2-4 long-term, full-scale tests on advanced technologies expected to reach the end of their development cycle by that time. These should be conducted on the smallest size unit that is representative of all sizes (e.g., 50-150 MW).
3. Parametric tests on a wide range of units with SCR to gain a more comprehensive understanding of its impact on mercury emissions and controllability by downstream particulate and/or SO₂ controls. The group suggested that tests should be conducted at up to 30 sites representing different fuels, catalyst types, and catalyst sizes (space velocities) for 1-2 weeks each, and that several be repeated one year later to assess deactivation rates for the mercury oxidation reaction.
4. Parametric tests on a number of wet FGD units to quantify the re-release of mercury captured by the FGD. The matrix of plant types should include different fly ash chemistries, ESP efficiencies (particulate loadings in the scrubber), and reagents (e.g., limestone, lime, magnesium-lime), and oxidation modes

The group also agreed with Jim Kilgroe's suggestion that additional fundamental R&D to enhance our understanding of the basic chemistry so that power producers and their pollution control suppliers can extrapolate the results from the above 10-15 field tests to the broader boiler population. This work would be funded and managed outside the field test program under discussion here, albeit coordinated with that program.

One member of the group suggested that funding for this field test program be allocated approximately as follows:

| | |
|----------------------------------|-----|
| Carbon injection | 50% |
| Advanced concepts | 10% |
| Hg ⁰ oxidation by SCR | 20% |
| Re-emissions fro FGD | 20% |

The group suggested the following test durations:

| | |
|------------------------------|--|
| ACI into ESP | 30 days |
| ACI into FF | 1 year (conventional baghouse or COHPAC) |
| SCR and wet FGD re-emissions | 1-2 weeks |

The group generally felt that the semi-continuous emission monitors (S-CEMS) would become acceptable R&D tools by mid-03, so they could be the mainstay of this program, with Ontario Hydro calibrations at the beginning and end of each test campaign (plus maybe 1-2 times during a year-long test). However, the group also would like to see this field program used to evaluate the long-term performance of a number of S-CEMS. There was some discussion about reducing costs by using EPRI's Quick SEM™ (carbon trap) to reduce costs further. EPRI believes this device will be demonstrated by 3Q02, so a decision can be made at that time.

Given limited resources, the field tests should focus on performance and costs. This means determining balance-of-plant (BOP) impacts such as ESP performance, baghouse performance and bag life, corrosion, parasitic load, etc. Tests of by-products should be limited to characterization tests (foaming index, etc.), collection of enough samples for other programs to conduct more detailed or extensive tests, and measurement of Hg in all streams (including water) to seek closure on mercury balance.

The following matrix identifies the combinations of fuel and air pollution control that the group considered and the ones for which it recommended that sorbent injection tests be conducted (in addition to the ongoing program). Late in the discussion, it was recognized that the matrix did not include any blends, which should be tested (especially PRB/E Bit.)

| | ESPC (Small) | ESPC (Med) | FF | SD/FF | TOXECON | ESPC/FGD | ESP/SCR FGD |
|----------------|--------------|------------|-----|-------|---------------|---------------------|---------------------|
| East Bit Hi S | YY | ? | X | X | Y but N/A | Y | X |
| East Bit Low S | YY | ? | X | X | Y (long-term) | Y | X |
| Sub Bit | X | YY | Y # | Y* | Y but N/A | Y ## | |
| ND Lig | X | ? | X | Y* | Y but NA | Y | N/A |
| TX Lig | X | X | X | Y* | Y | Y ## | |
| W Bit | X | X | Y # | ? | Y but N/A | Included in Sub Bit | Included in Sub Bit |

Y = yes (i.e., conduct field test). * = low Cl. # = either fuel; ## = either configuration

YY = possible multiple tests needed

? = maybe (e.g., how many plants on E. Bit with just ESPC)

E = existing test

Small: SCA < 200 ft²/kacfm; Medium: SCA = 200-350 ft²/kacfm

N/A = not available; X = not critical need – low interest or N/A

By e-mail, Dave Michaud (WE Energies) recommended that the matrix focus on air pollution control configurations expected to be most common when the mercury limitations will take effect. Thus, for E. Bit, he suggested focusing on SCR/ESPC/FGD combinations. He was less sure what to recommend for western fuels.

DOE would like to hold a larger stakeholder meeting to obtain broader feedback on this program. Given time and staff constraints, this is not likely to happen before August. An aggressive goal would be to develop and distribute the rough concepts of a solicitation by mid-July and hold the meeting in August. While it would be convenient for some to dovetail this meeting with the an EPA Hg MACT WG meeting, that should be less of a concern than holding it at the earliest possible date that DOE could support.

DOE and EPRI, as co-organizers, thank the 6 power company participants for sharing their thoughts with us.

Attendees Information

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|-----------------|---------------------|--------------|--|
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