ASTM New Engine Oil Gelation Test (EOGT) WK86363 Update

EOFT and EOWTT Surveillance Panel Meeting

January 8, 2024

Yong-Li McFarland, Chair

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EOFT and EOWTT Surveillance Panel Membership

20 members

Beth Schwab, Afton Chemical
Michael Kunselman, Center for Quality Assurance
Robert Stockwell, Chevron Oronite
Dennis Gaal, Exxonmobil
Michael Deegan, Ford
Ron Shah, Infineum
Joe Franklin, Intertek
Karina Gil, Intertek
Michael Johnscher, ISP
Litchi Xie, Lubrizol Additive (Zhuhai) Co., Ltd.
Victoria Fein, Lubrizol
Jason Bowden, OH Technologies Inc
Greg Miiller, Savant Group
Maggie Smerdon, Savant Labs
Sean Alston, SGS North America
Jared Cavaliere, SwRI
Becky Grinfield, SwRI
Yong-Li McFarland*, SwRI
John Loop, TMC
Amy Ross, Valvoline

*Chair

New EOGT WK86363, ILS# 1854

- Ford request for a new Engine Oil Gelation Test (EOGT): request to add a new test filterability test to better screen oils for field issues
- Current status
  - Method: 2 drafts (large volume (600g) and small volume (200 g)) uploaded on ASTM Collaboration Area, email Jared with procedure questions
  - Oils: **11** potential reference oils offered; 17 oils received at TMC
  - Screening Tests, Pilot Study, and ILS: Screening Test completed, start additional Proposal testing
  - Timing: Pilot Study tests run by February, ILS tests to be run by June, and final method ballot in Sept or Oct 2024

Testing Status – updated Nov 16

EOGT report form Rev 6

Test Phase	Description	Status	Comments
1. Screening Tests	-4 tests; 2 oils: low performance oil in duplicate, high performance oil in duplicate; 6 labs -Run LV method -Intent: check labs can run test as set up	All 6 labs submitted data	Run SOT & 14 day EOT only. **-REVIEW data**
2. Pilot Study	-? Tests; ? Oils; 4 labs -Run SV and LV methods, all intervals -Intent: determine samples, method, and intervals for procedure and ILS	Waiting to determine samples: -Plan to include either 6 or 10 oils including 2 performance oils, and then each of the other oil participants select 1 or 2 “borderline” oil for total of 6 or 10 oils to run. “Borderline” is something that would fall in-between the 2 performance oils (less Ca than Oil F?) -Pros/cons: 6 oils – shorter to run, but may not find a borderline reference and may need another Pilot run; 10 oils-longer to run, but more likely to find a borderline reference	**Group to decide as we move forward**
3. Interlaboratory Study (ILS)	-? Tests; ? Oils; 6 labs -Run _ method -Intent: generate repeatability and reproducibility data on samples, determine at least 2 reference oils	Waiting to determine samples	

Proposal Experiments – updated Jan 4

Proposal Experiments	Lab(s)	Status	Next Step
1. Sediment-only Filterability	Afton	Completed	GROUP to make comments on if this is helpful – no feedback to use
2. Include 0 Hr filterability	ISP	Completed	No need to include 0 Hr filterability currently
3. Run EOGT on Ref Oil 79 and 77-3	ISP and Afton	ISP: Completed Afton: Complete – TO SHARE	
4. Run EOGT with 8% water	Savant and Intertek	Savant: Completed Intertek: Completed	No need to use 8% water
5. Characterize gel	Savant and Valvoline	Savant: Completed IR – ran on ATR Valvoline: completed IR, microscopy did not work - TO SHARE	Group to review data, Savant and Valvoline to add any data related to 870 wavelength, Ford to give feedback on how useful IR maybe in EOGT, ISP to possibly to for previous EOT samples for IR analysis
6. Centrifuge sample before filterability	SwRI	Completed	
7. No homogenizing before filterability	Intertek	Completed	GROUP to make comments on if this is helpful- no feedback to use
8. Run EOGT with 4 hr CO2 bubbling and	SwRI	Completed	Additional CO2 not necessary

3. Run EOGT on Ref Oil 79 and 77-3

- ISP Results, video

Sample	Filter Change Rate (%) Run 1	Filter Change Rate (%) Run 2	Filter Change Rate (%) Avg.
182063+064+065 (Ref Oil 77-3)	-13.33	-10.34	-11.84
182083+084+08 (Ref Oil 79 on EOFT avg is +36%)	-10.34	-6.90	-8.62

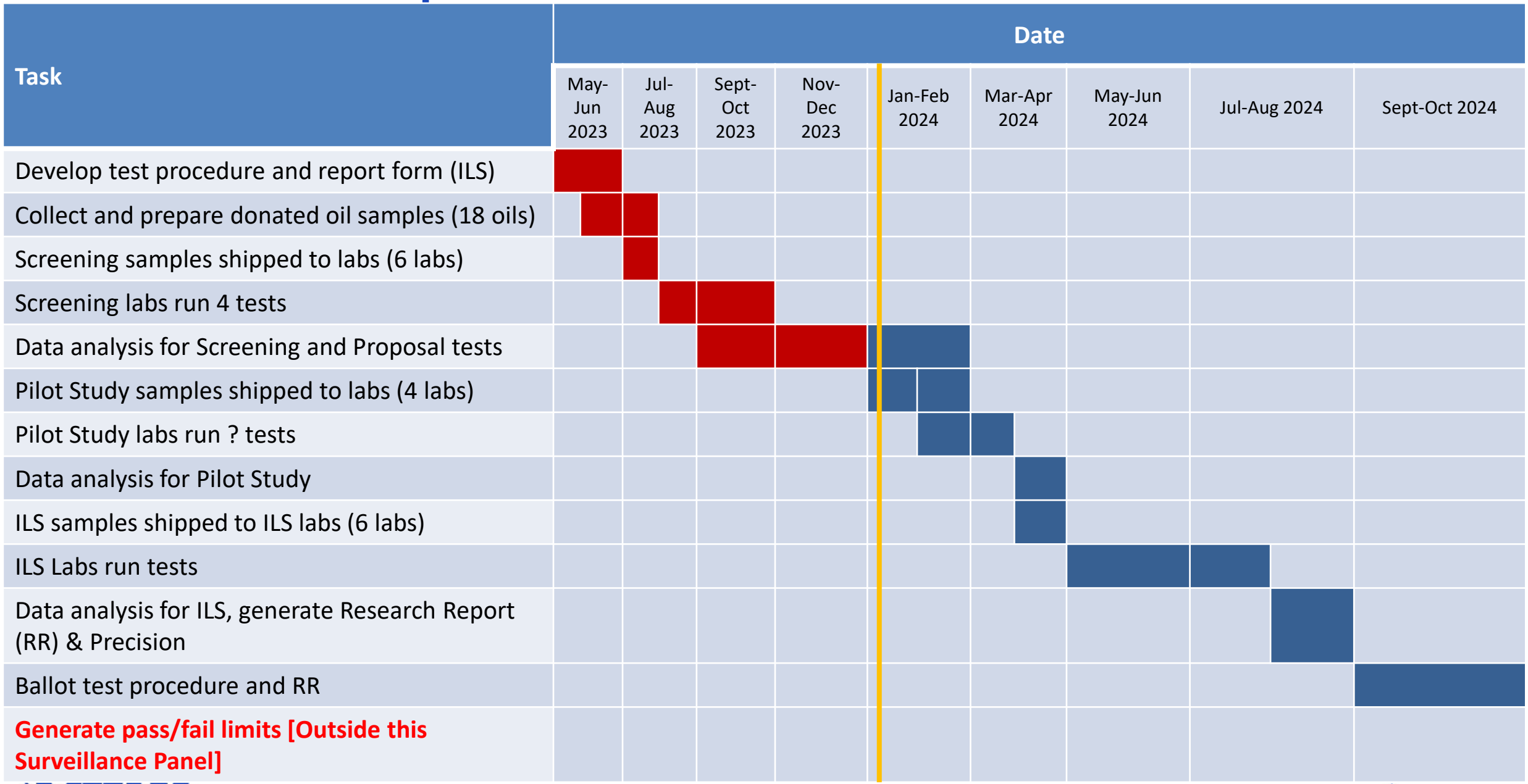
- Afton Results

Sample	New Oil KV40 (cSt)	0 Hr KV40 (cSt)	336 Hr EOT Ca (ppm)	336 Hr EOT Mg (ppm)	336 Hr EOT KV40 (cSt)	Filter Change Rate (%) Run 1
184243+184244 (Oil 77-3)	107.6	112.2	3028	282	113	-3.92
184245 + 184246 (Oil 79)	82.36	---	1908	3		7.87

Other updates Jan 4

- Blending Equipment update- add photo of regulator compared to filter set and distance of tubing from labs, send info by January to John Loop
- ISP Video: Blending mixer/homogenizing/shearing blade used is different from waring blender in method with higher shearing; will need to standardize mixing setup likely part numbers; group to update method with more details on blender in EOGT;
- Additional testing: 1) request for Afton to run with 1 CO2 tubes, plastic jars for storage and using dispersing tool on Change in filtering rate results on 2 oils, request oil from TMC with IR on fresh oil, top layer, sediment layer, and mixed EOT spectra – Expected to complete Feb 9
- 2) Request for ISP to run with 2 CO2 tubes, plastic jars for storage, and using waring blender setup on Change in filtering rate results on 2 oils, request oil from TMC with IR on fresh oil, top layer, sediment layer, and mixed EOT spectra- Expected to complete Feb 9
- Afton to help write an IR detection method for calcite, if any other methods to detect calcite, please let group know. – Currently working on procedure and will share when ready, possibly by Feb 9
- Status of EOGT fluids, fluids sent out in Dec. If need more fluids, let John Loop know. Used about 50-60% of performance oils, may need additional fluids from suppliers.
- Review of labs' blending and filtration equipment – Labs to send info to John Loop before next meeting

Draft Timeline – updated Jan 4



Next Steps

- Labs to run additional Proposal Experiments and group to review results
- Check on labs and TMC that need additional EOGT fluids
- What is the direction for next steps – Copy ISP equipment, look at other report metrics, proceed with Pilot Study, something else? Provide Yongli feedback

- On Hold-Determine Pilot Study samples (# and which samples, and # repeats), and method (LV, SV, all intervals)
- On Hold- Send out Pilot Study samples to Pilot Study labs
- On Hold- Labs run Pilot Study

Action Items and Next Meeting

- All to review Proposal Experiment results and make any comments on method improvements
- Afton and ISP Labs to run additional proposal tests
- All labs to update blending and filtering info to John Loop by Jan 22
- Labs to update Screening tests with Mo and B data by email to John Loop ASAP
- If any other methods to detect calcite, please let group know.
- All to let Yongli know on direction for next steps

- Next Meeting: Monday January 29 at 8:30AM CDT and every ? weeks

Thank you for your support!

Participants		
Method Development (11)	Oil Donations (9)	Testing Labs (7)
Afton ExxonMobil Ford Infineum Intertek ISP Lubrizol Oronite Savant SwRI TMC	Afton Ford Infineum Lubrizol OH Technologies (donate filters only) Oronite Subaru TMC (collection, shipping only) Toyota	Afton (Screening, Pilot, and ILS) Intertek (Screening, Pilot, and ILS) ISP (Screening, Pilot, and ILS) Savant (Screening and ILS) SwRI (Screening, Pilot, and ILS) TMC (monitoring system only) Valvoline (Screening and ILS)