ASTM New Engine Oil Gelation Test (EOGT) WK86363 Update

EOFT and EOWTT Surveillance Panel Meeting

October 23, 2023

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: Wait on 1 lab Screening Test results, start additional Proposal testing
  - Timing: Pilot Study tests run by February, ILS tests to be run by June, and final method ballot in July or August 2024

Oil Matrix

Participants	Potential Reference Oils Offered	Oil Sample Received at TMC	Comments
Ford	2 oils (low and high known performance oils) - eligible to be reference oils	2 oil samples received	
Toyota	2 oils - not eligible to be reference oil	2 oil samples received	Offer 2 field samples for later testing; Awaiting some Physical and Chemical data
Afton	4 oils– eligible to be reference oils	4 oil samples received	
Lubrizol	4 oils – eligible to be reference oils	4 oil samples received	
Infineum	1 oil – eligible to be reference oil	1 oil sample received	
Oronite	3 oils –not eligible to be reference oils	3 oil samples received	Awaiting Physical and Chemical data
Subaru	1 oil – not eligible to be reference oil	1 oil sample received	Offer 1 field sample for later testing
Total Oils	**11 potential reference oils confirmed**	**17 oils received**	

John Loop to manage Sample Information

Testing Status – updated Oct 6

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	-Valvoline: complete tests by end Sept, send data by end Sept	Run SOT & 14 day EOT only. **-REVIEW data and start Proposal tests**
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	

Labs Only Meeting (Oct 2) comments continued

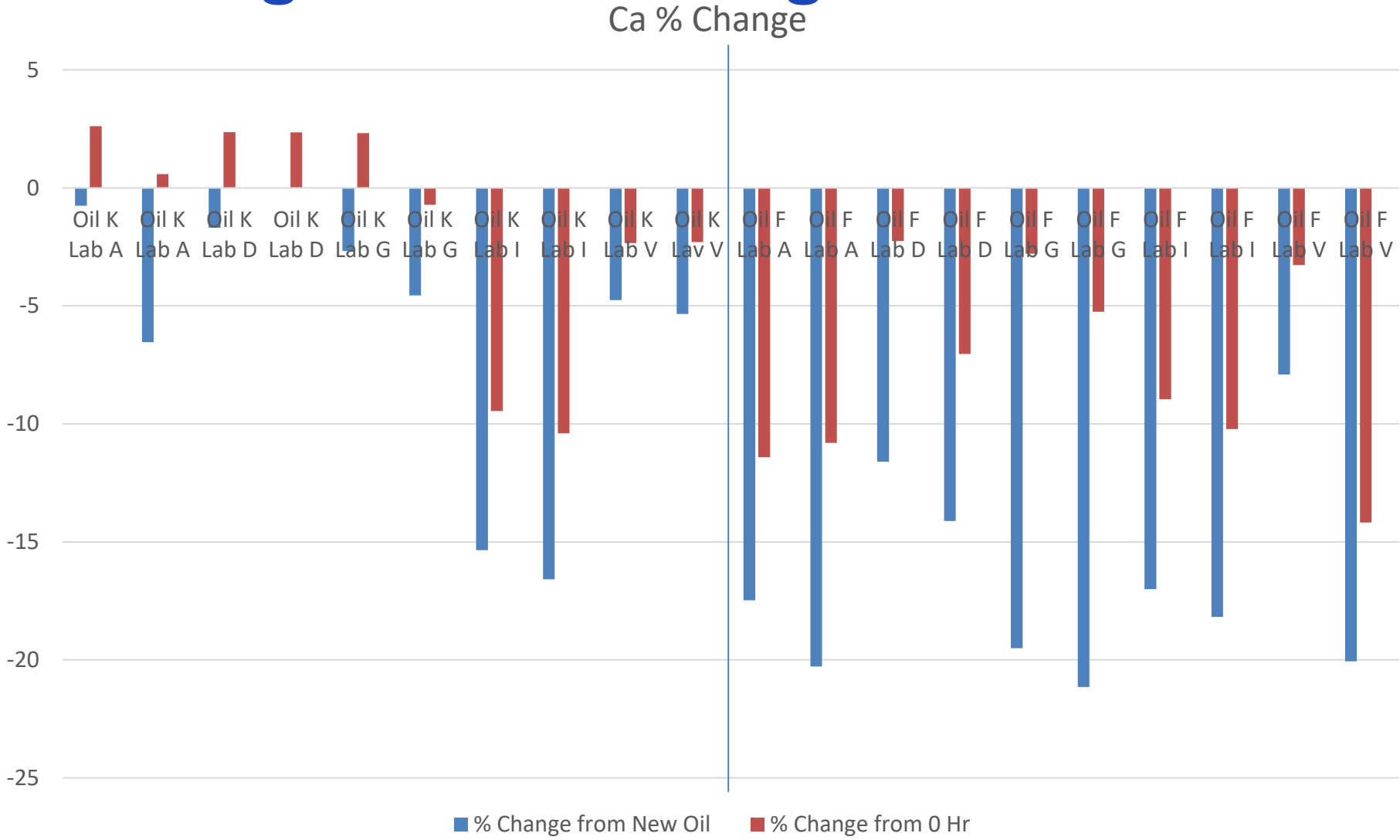
- Proposals: (all complete data report form) – All 8 proposals approved by group on Oct 9.
- 1. Filterability of just the bottom sediment layer: need procedure (2 oils) – Afton; how to make sure there's enough sample if sediment amount changes, and make sure all labs can duplicate-Estimated Timing: 3 day test completed and filter rate changed for both oils-Task Completed
- 2. Include 0 hr filterability: ISP on existing samples (2 oils) – homogenized water into new oil, no heating or CO2-COMPLETED- consider to add to method
- 3. Run Reference oil 79 (EOWT(3%):-2 to 18, EOFT: 27 to 45) or 77-3 (EOWT(3%): -5 to -15) in EOGT: ISP (to include glass jars with plastic containers) and Afton to run oils 79 and 77-3- shakedown runs from TMC- Estimated Timing: ISP complete by end Nov, TMC will ship 2 oils to Afton;
- 4. Running with higher water %: Savant and Intertek to run 8% water pending ISP previous data info (2 oils) – Is this overly severe and not field-relevant?- Estimated Timing: Savant to complete Oct 25, Intertek to complete Nov 6
- 5. Characterize gel: Savant, Valvoline -COF (coefficient of friction), FTIR of separate layers, microscope; viscosity (cone & plate); particle size; limited sample of gel, may need order of which property to perform first – Estimated Timing: Savant will run on 8% water samples, and complete Oct 27, Valvoline?
- 6. Centrifuge stored sample before running filterability: SwRI to check, would centrifuge help or hurt gel formation?, centrifuge for ICP and KV and then homogenize before filterability- Estimated Timing: SWRI to complete Nov 9
- 7. Run EOGT without homogenizing EOT sample before filterability- Tricky to repeat; Intertek running on 2 oils- Estimated Timing: Intertek to complete Nov 6
- 8. Increase CO2 bubbling time to 4 hrs: SwRI – Estimated Timing: SwRI to complete Nov 9

Updates

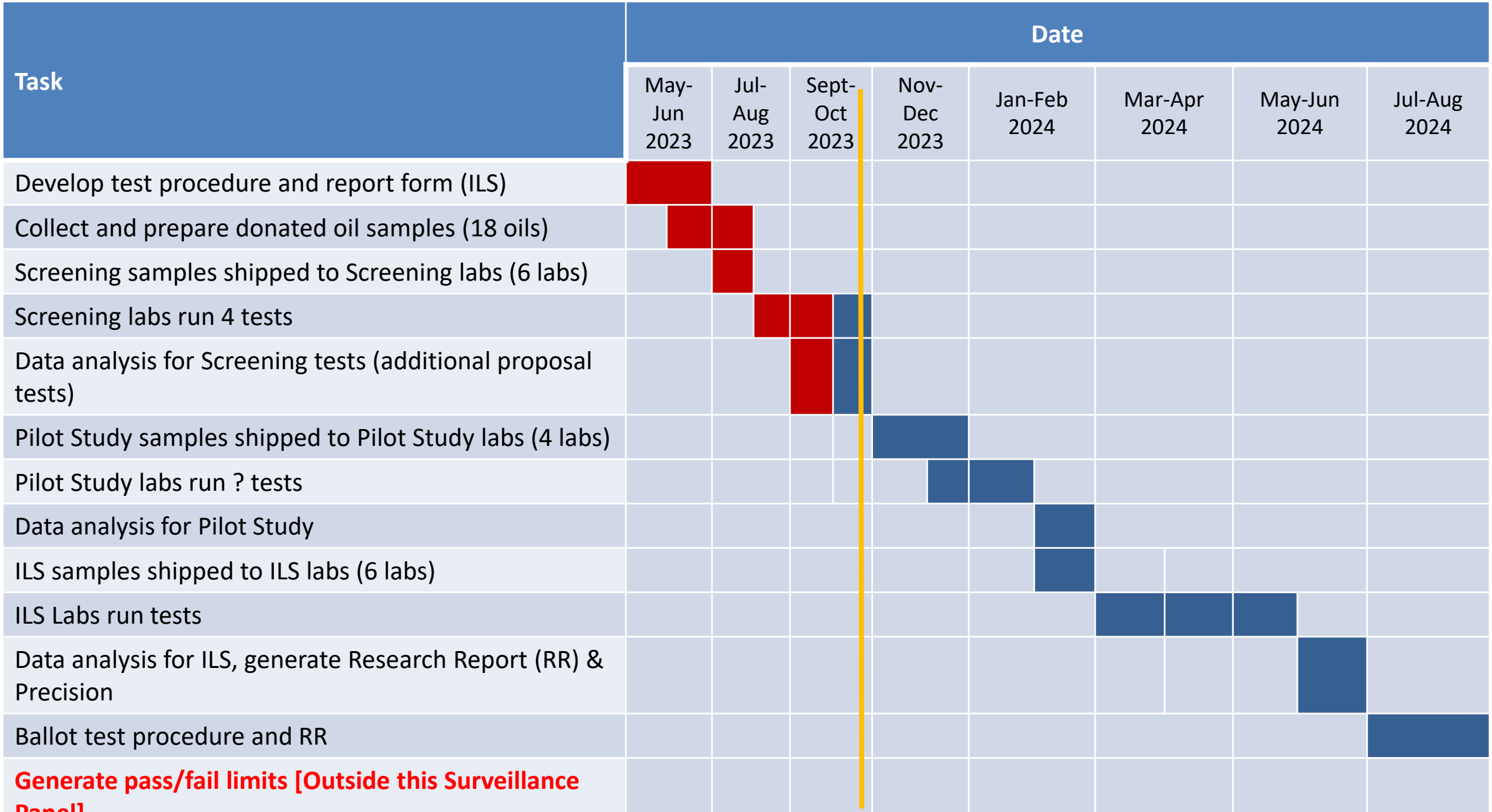
- ISP provided additional description of heating and CO2 bubbling steps: noted uses 2 air flow tubes at 9 L/Hr to reach total 18 L/Hr flow; SwRI may try this method with Proposal tests
- Oil Participants responded yes to allowing labs to report Mo and B on oils. Labs, please update your Screening tests with ICP data, if available, and email by Oct 26 to John Loop.
- Additional info on gel sent out to group
- EOGT summary for AOAP meeting: Mike D will provide update at AOAP
  - EOGT (Engine Oil Gelation Test): The group has conducted Screening Tests on 2 oils with previously known good and poor performance but the data between labs do not show discrimination between the 2 oils at 5 of the 6 labs. Currently the group is working to refine the procedure to show such discrimination before additional Pilot and ILS tests can be run. The estimated timing to complete the ILS and have the ASTM test method complete is July or August 2024.
- Any thing else? ISP to provide video of heating and CO2 bubbling to send out by Nov 3 to labs. ISP to check on if video can be provided on filtering part of test as well (likely be end of Nov before provided).

Calcium % Change from Screening Tests

Group saw more discrimination in the % change from New Oil between the 2 oils. Yongli to add to report form this calculation.



Draft Timeline – updated 9-25-23



Next Steps

- Remaining lab run Screening tests (LV tests on high and low performance oils).
- Group to review updated Screening Test data and for labs to run additional Proposal Tests
- 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

- Remaining lab to run Screening Tests and send Excel Report TMC (John Loop) ASAP.
- All labs to review and update submitted Data Report Form to John Loop with additional fields and any missing or clarifying information. Please submit missing info and photos. Please follow Lab A in providing as much detail as possible.
- Labs to run proposal tests
- Labs to update Screening tests with Mo and B data by email to John Loop before Oct 26
- TMC will ship 2 oils (Oil 77-3 and 79) to Afton
- Yongli to update report form with Mo, B, and %Ca change from new oil.

- Next Meeting: Monday Nov 6 at 8:30AM CDT and every 2 weeks

Thank you for your support!

Participants		
Method Development	Oil Donations	Testing Labs
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)