

Cummins Surveillance Panel
ISB (ASTM D7484)
ISM (ASTM D7468)
04/09/2025

Prepared By: Joshua Ward, S.P. Chairman



Agenda

- ISB New Hardware Analysis
- ISM Sludge Analysis
- ISM Old Hardware Status
- ISB Old Hardware Status
- ISBVIS Transfer to Cummins SP
- CALTERM Parameters
- AOB

ISB New Hardware Batch Review

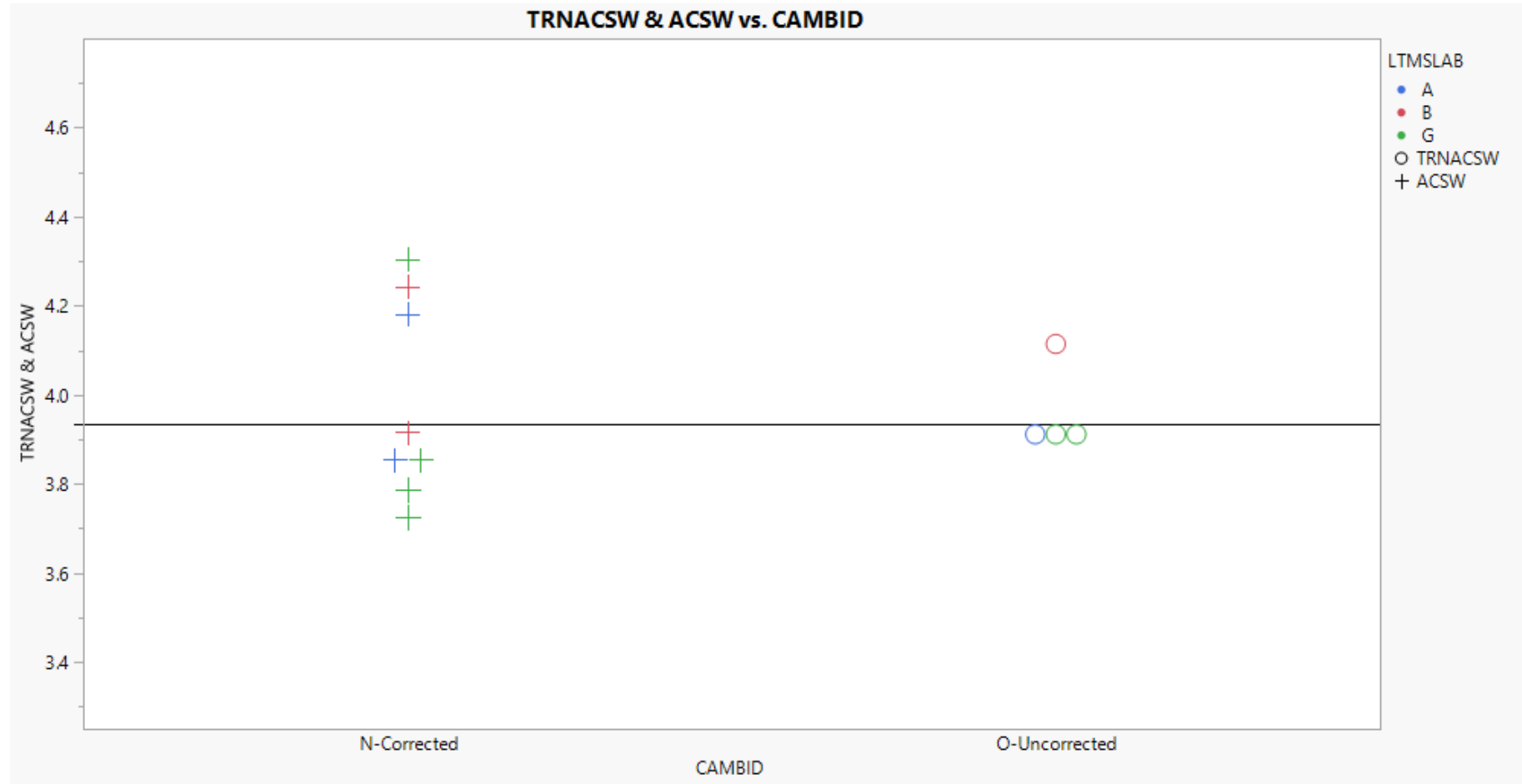
Statistics Group

April 9, 2025

Statistics Group

- Amanda Stone, New Market
- Dylan Beck, TMC
- Jo Martinez, Chevron Oronite
- Martin Chadwick, Intertek
- Phil Scinto, Lubrizol
- Sean Moyer, TMC
- Todd Dvorak, Infineum
- Travis Kostan, SwRI

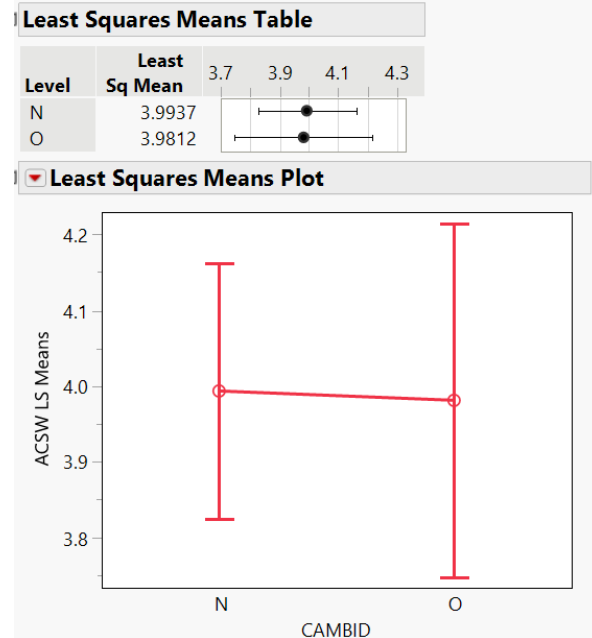
LnACSW for oil 835



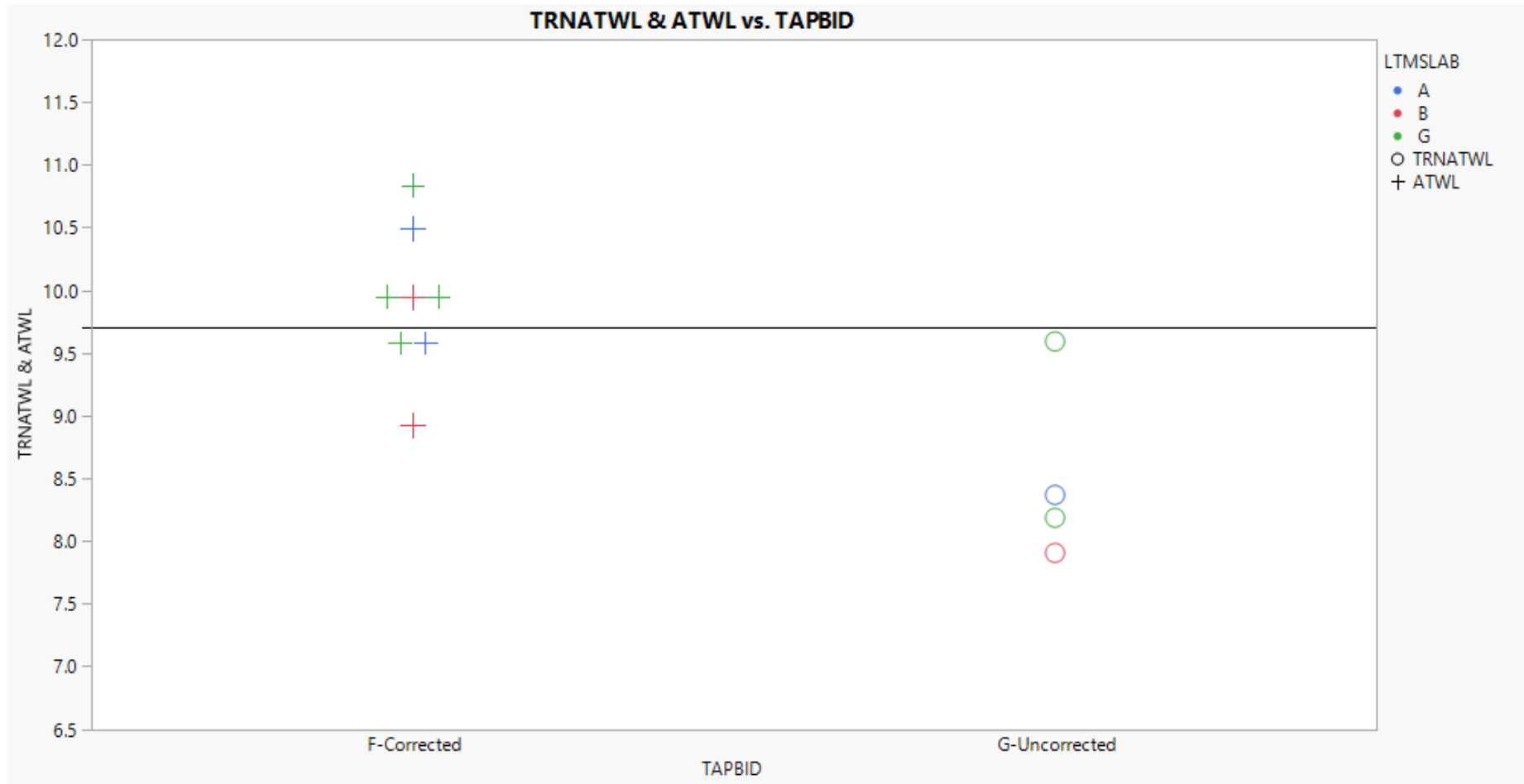
LnACSW

- No significant difference between corrected N and uncorrected O Cam batches
- Predicted LnACSW for CAMID O = 3.9812
- 835 Target = 3.9338
- Difference = -0.0474
- ICF = None

Response ACSW					
Whole Model					
Summary of Fit					
RSquare			0.138007		
RSquare Adj			-0.18524		
Root Mean Square Error			0.199613		
Mean of Response			3.9703		
Observations (or Sum Wgts)			12		
Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Ratio	
Model	3	0.05103501	0.017012	0.4269	
Error	8	0.31876439	0.039846		Prob > F
C. Total	11	0.36979940		0.7392	
Parameter Estimates					
Term	Estimate	Std Error	t Ratio	Prob> t	
Intercept	3.9874535	0.064066	62.24	<.0001*	
LTMSLAB[A]	-0.003822	0.090093	-0.04	0.9672	
LTMSLAB[B]	0.0807111	0.090093	0.90	0.3965	
CAMBID[N]	0.0062062	0.061119	0.10	0.9216	
Effect Tests					
Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
LTMSLAB	2	2	0.05062416	0.6353	0.5546
CAMBID	1	1	0.00041085	0.0103	0.9216



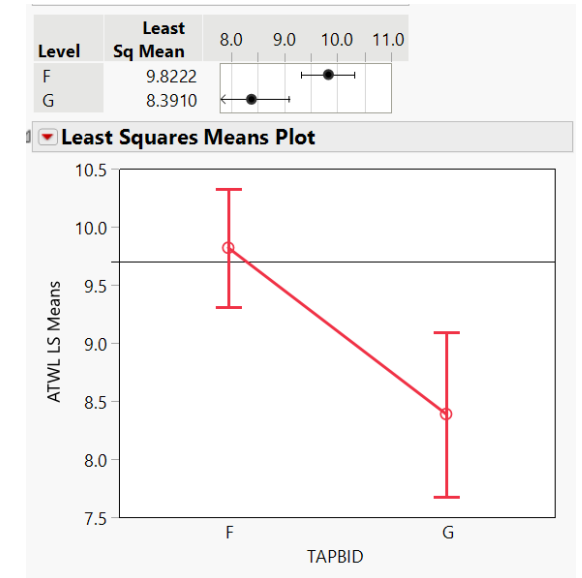
SqrtATWL for oil 835



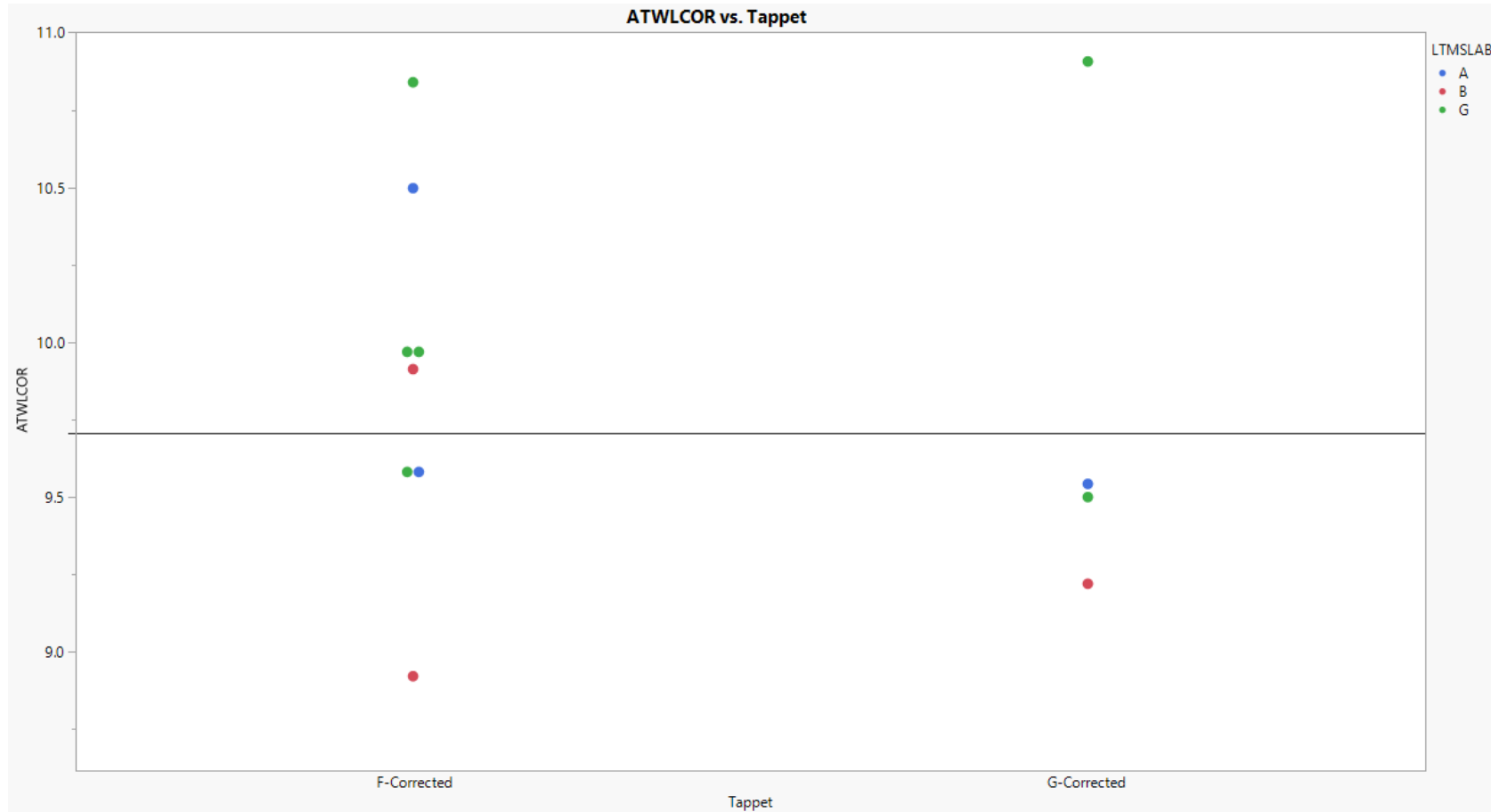
SqrtATWL

- Significant difference between corrected F and uncorrected G Tappet batches
- Predicted SqrtATWL for TAPBID
G = 8.3910
- 835 Target = 9.7057
- Difference = +1.3147
- **ICF = +1.3147**

Response ATWL					
Whole Model					
Summary of Fit					
RSquare		0.696211			
RSquare Adj		0.582289			
Root Mean Square Error		0.60337			
Mean of Response		9.431858			
Observations (or Sum Wgts)		12			
Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Ratio	
Model	3	6.6745972	2.22487	6.1113	
Error	8	2.9124415	0.36406		Prob > F
C. Total	11	9.5870387			0.0182*
Parameter Estimates					
Term	Estimate	Std Error	t Ratio	Prob> t	
Intercept	9.1065993	0.193652	47.03	<.0001*	
LTMSLAB[A]	0.0847278	0.272322	0.31	0.7637	
LTMSLAB[B]	-0.431606	0.272322	-1.58	0.1516	
TAPBID[F]	0.7156188	0.184744	3.87	0.0047*	
Effect Tests					
Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
LTMSLAB	2	2	1.2120885	1.6647	0.2486
TAPBID	1	1	5.4625088	15.0046	0.0047*



SqrtATWL with ICF for oil 835



Recommendations

- No ICF for ACSW Camshaft O
- Apply ICF = +1.3147 on SqrtATWL Tappet G
- Attempt to gather more data sooner

ISM Sludge Analysis

- Feedback on candidate sludge variability
- See separate presentation

Hardware Status

- ISM Old Hardware
- ISB Old Hardware

ISBVIS

- Adding ISBVIS to the Cummins SP Scope

CALTERM

- Calterm parameters need to be compiled to give to Cummins

Concluding Remarks

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