EOEC(PC-9/10 Seals) Presentation To the HDEOCP, Value of TMC Monitoring

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Test Design - Background

- **Current Process:**
  - **Each candidate set run with TMC Service Fluid 105(1006)**
    - **Acquired in bulk from TMC.**
  - **Candidate limits calculated based on reference run data.**
  - **Calculations include direct reference data as well as industry calculated standard deviations for inter-lab and intra-lab.**
  - **Data is reported with reference data to the test requestor.**
  - **Reference data is reported to the TMC for inclusion in the SD calculations.**

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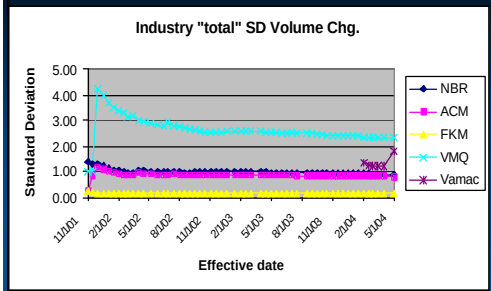
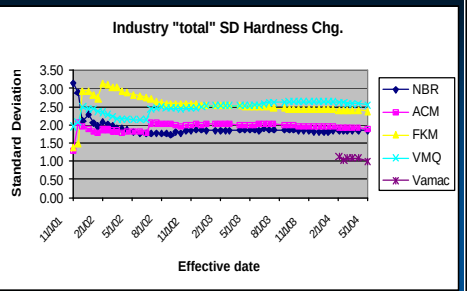
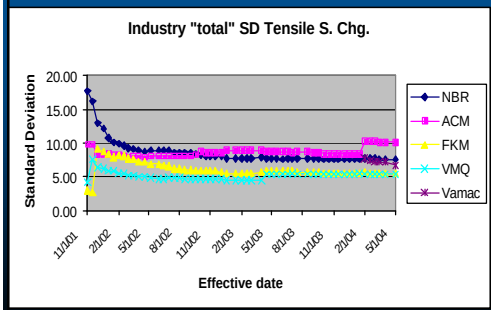
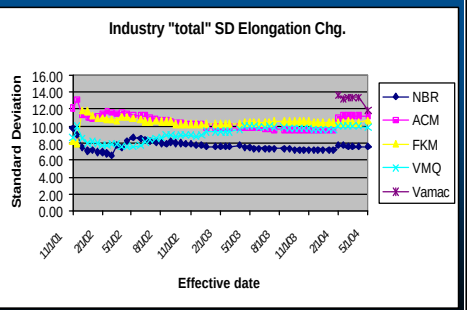
Test Precision History

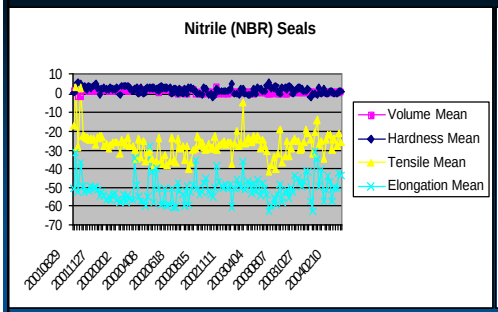


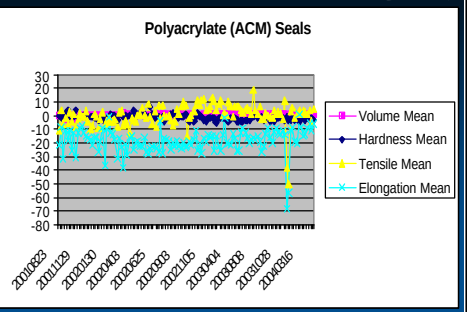


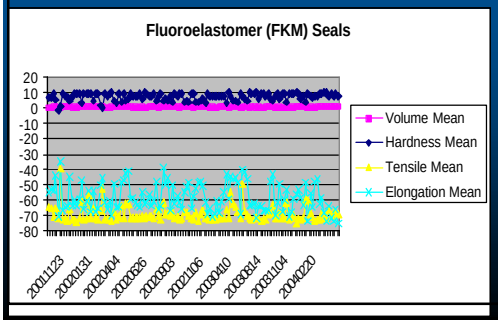


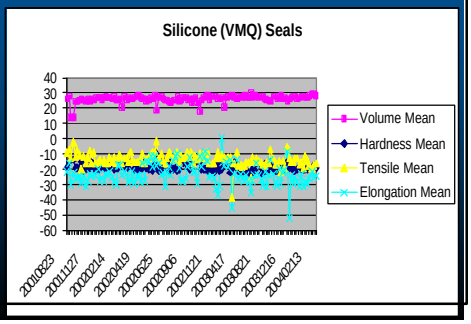


Test Result History









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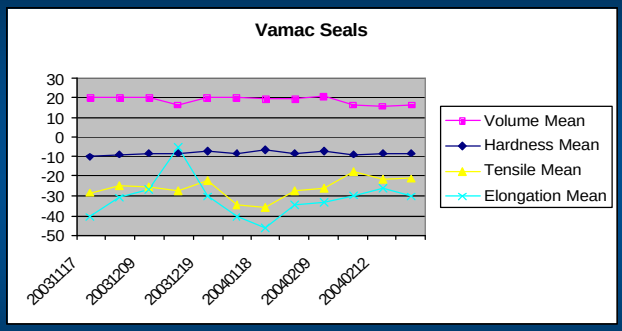
Test History (continued)



Details of Pass/Fail calculations

	Volume Chg.		Hardness Chg.		Tensile S. Chg.		Elongation Chg.	
Type	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
NBR	(-3)	(+5)	(-5)	(+7)	Ref.	(+10)	Ref.	(+10)
VMQ	(-3)	Ref.	Ref.	(+5)	(-45)	(+10)	(-30)	(+20)
ACM	(-3)	(+5)	(-5)	(+8)	(-15)	(+18)	(-35)	(+10)
FKM	(-2)	(+5)	(-7)	(+7)	Ref.	(+10)	Ref.	(+10)

Typical values for Ref. oil TMC SF 105 (1006) (Specific values are generated w/ Candidate)

NBR	0.6	0.2	-25	-52
VMQ	26	-15	-12	-22
ACM	1.1	-1.7	0.9	-20
FKM	0.8	5	-66	-48
Vamac	19	-8	-26	31

*Values in ( ) are non-critical and adjusted by a factor of the industry "total" SD. (= + or - [s /Ö6]*2)*

*Ref. values are also non-critical and adjusted by a factor of the industry "within Lab" SD .(= + or - [s /Ö6]*2)*

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Proposed Changes based on December 03 Request

- *TMC modified Data Dictionary(done).*
- *Establish Limit data for the current reference oil.*
  - *Choice needed about how much data to use.*
  - *Choice needed about use of LTMS or Acceptance bands*
  - *Choice needed about how to account for material batch changes.*
  - *Choice needed for format of the new data set at TMC.*
- *Bottle Reference oil in small quantities.*
  - *Each bottle will contain only enough fluid for 1 run of 1 elastomer type.*
- *Assign CMIR's to each bottle.*
  - *5 CMIR's will be assigned to the lab for each set of reference elastomer tests (5 materials)*
- *Distribute to participating labs.*
- *Discontinue acceptance of data from bulk reference oils already at the participating labs.*

General Statements

- **TMC makes sure that tests have adequate precision.**
  - **Test precision is generally getting better or leveling off over time.**
- **TMC makes sure that data which is not normally distributed about the mean is not validated.**
  - **Test mean values are generally normally distributed despite batch changes in the elastomers.**
- **TMC maintains control of the tests it monitors.**
  - **Test is in control.**
- **TMC takes action to control variation between labs and across material/hardware batches.**
  - **Test is designed to account for lab and material variation when determining pass / fail. The limits are also set up in a "no harm" scenario.**

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Conclusions

- **Adding a full TMC monitoring system would not likely advance the usefulness of the test data.**
- **The Features of a proposed monitoring system would serve to further complicate the scheduling and operation of the test.**
- **The fees to the laboratories combined with the additional complication would increase the cost of the test without increasing the value of the data.**

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