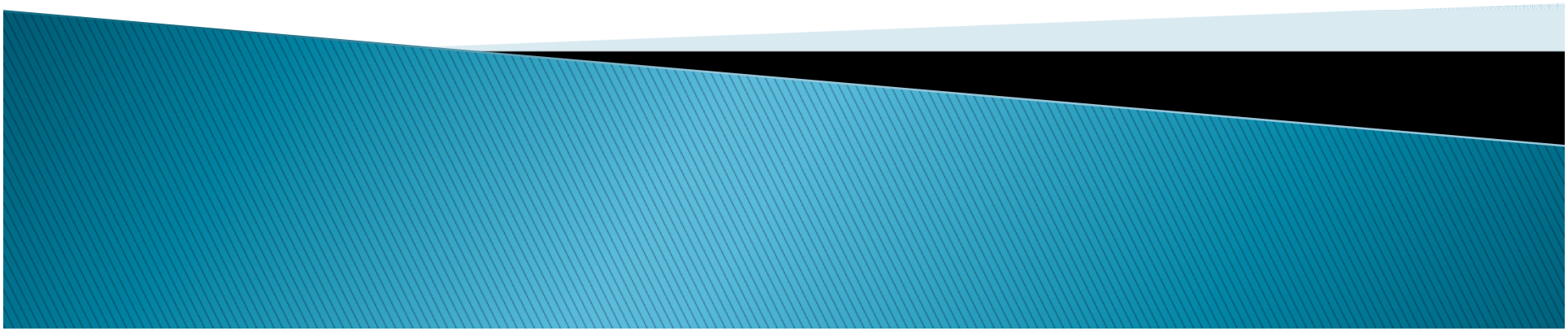
IIIH PM Op Data Review

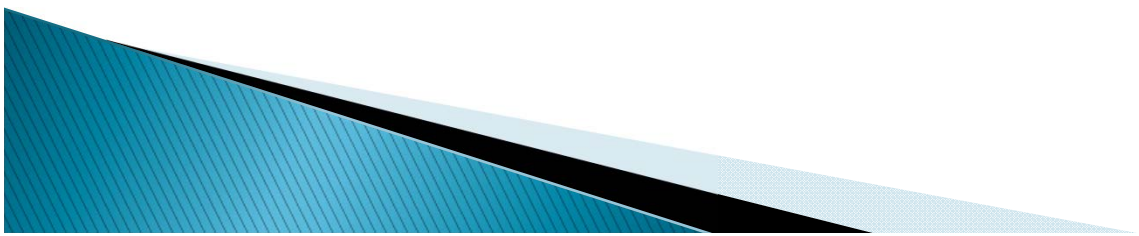
Fourth Round of IIIH PM Tests



Overview

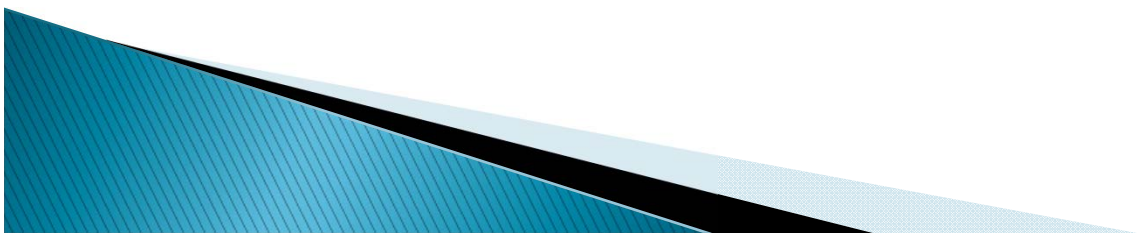
- The IIIH Task Force has Performed a Preliminary Review of the Following:
  - Controlled Parameters
  - QI's
  - Non-controlled Parameters

- Parameters and QI's Identified as Having Anomalies were Addressed by the Industry Test Labs.

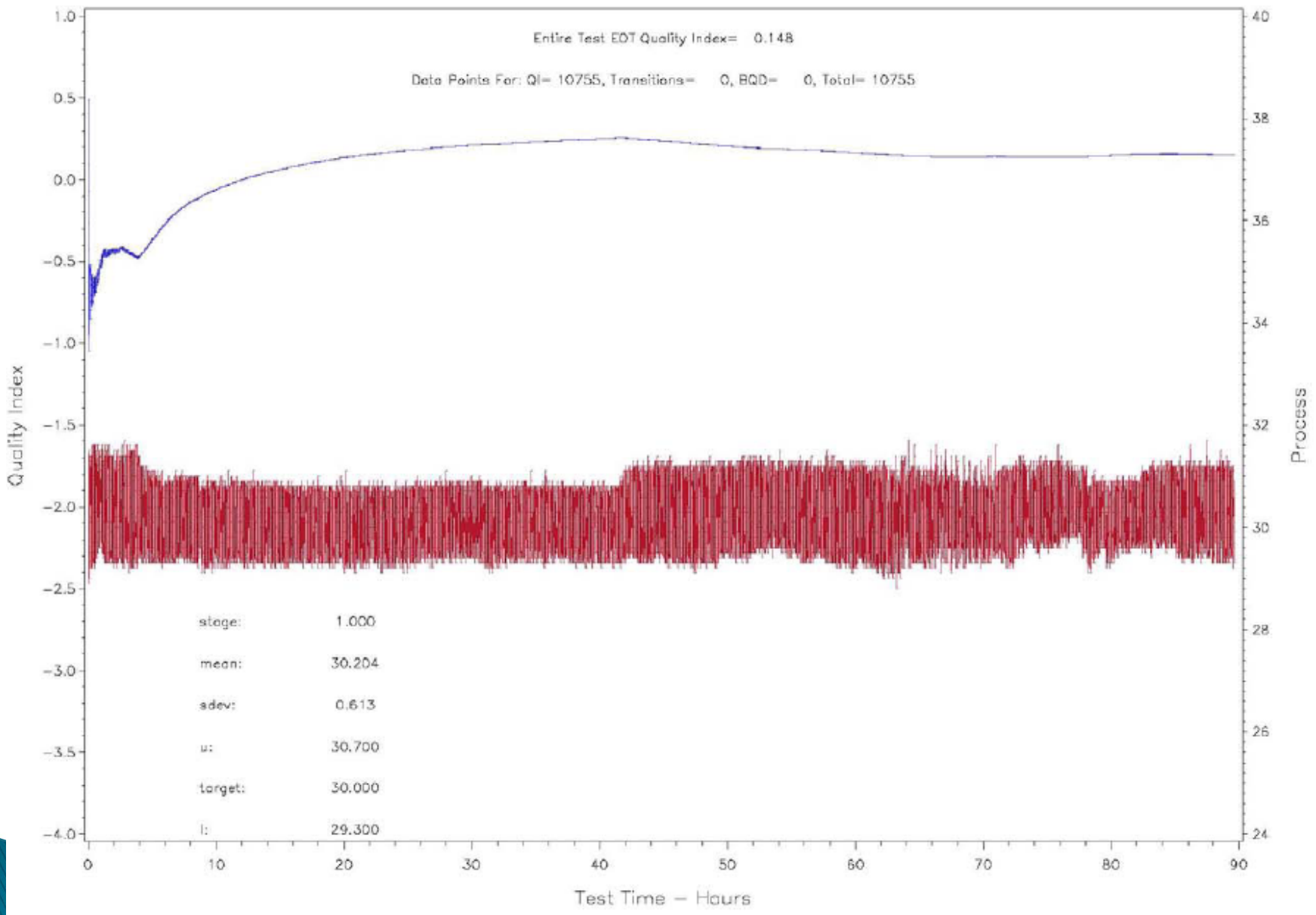


Controlled Parameters

- **Controlled Parameters Identified:**
  - Fuel Temperature – CMIR-106791
  - Fuel Temperature – CMIR-106776
  - Left Exhaust Back Pressure – CMIR-106781

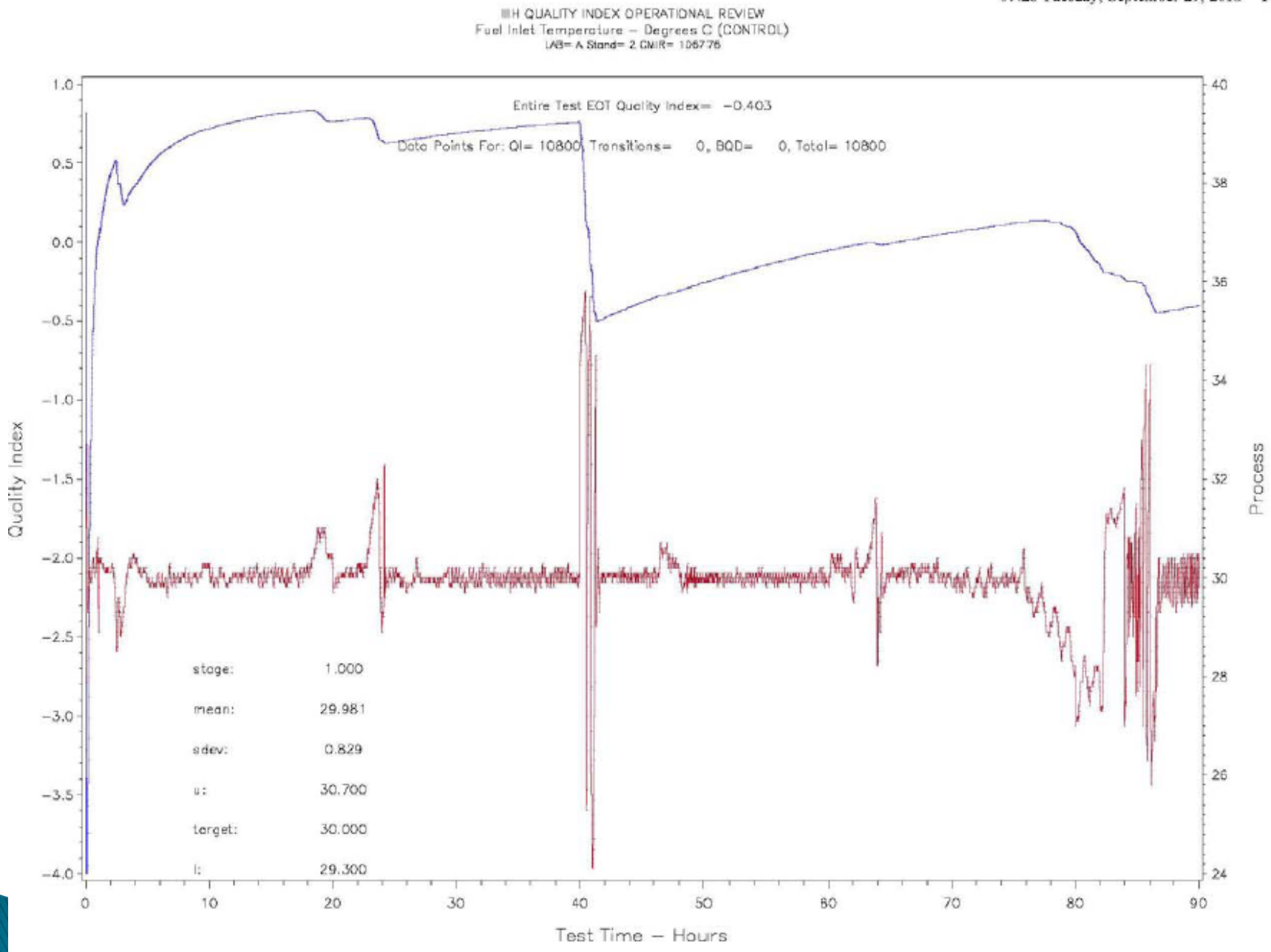


IIIH QUALITY INDEX OPERATIONAL REVIEW
Fuel Inlet Temperature – Degrees C (CONTROL)
LAB= D Stand= CB106 CNIR= 106791



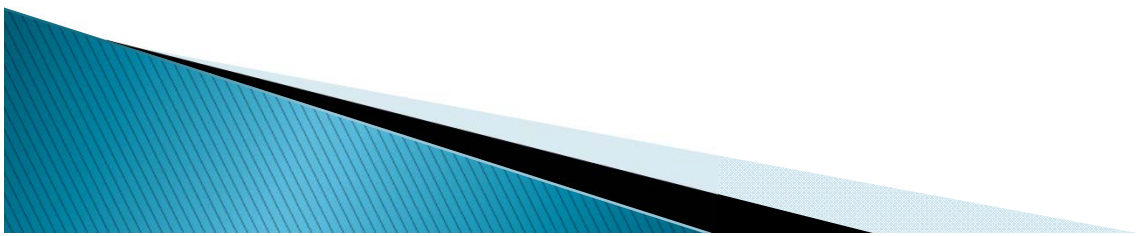
CMIR 106791

- Fuel Temperature QI
  - The control loop is at the limit of control and highly dependent on ambient effects due to the return-less fuel system.

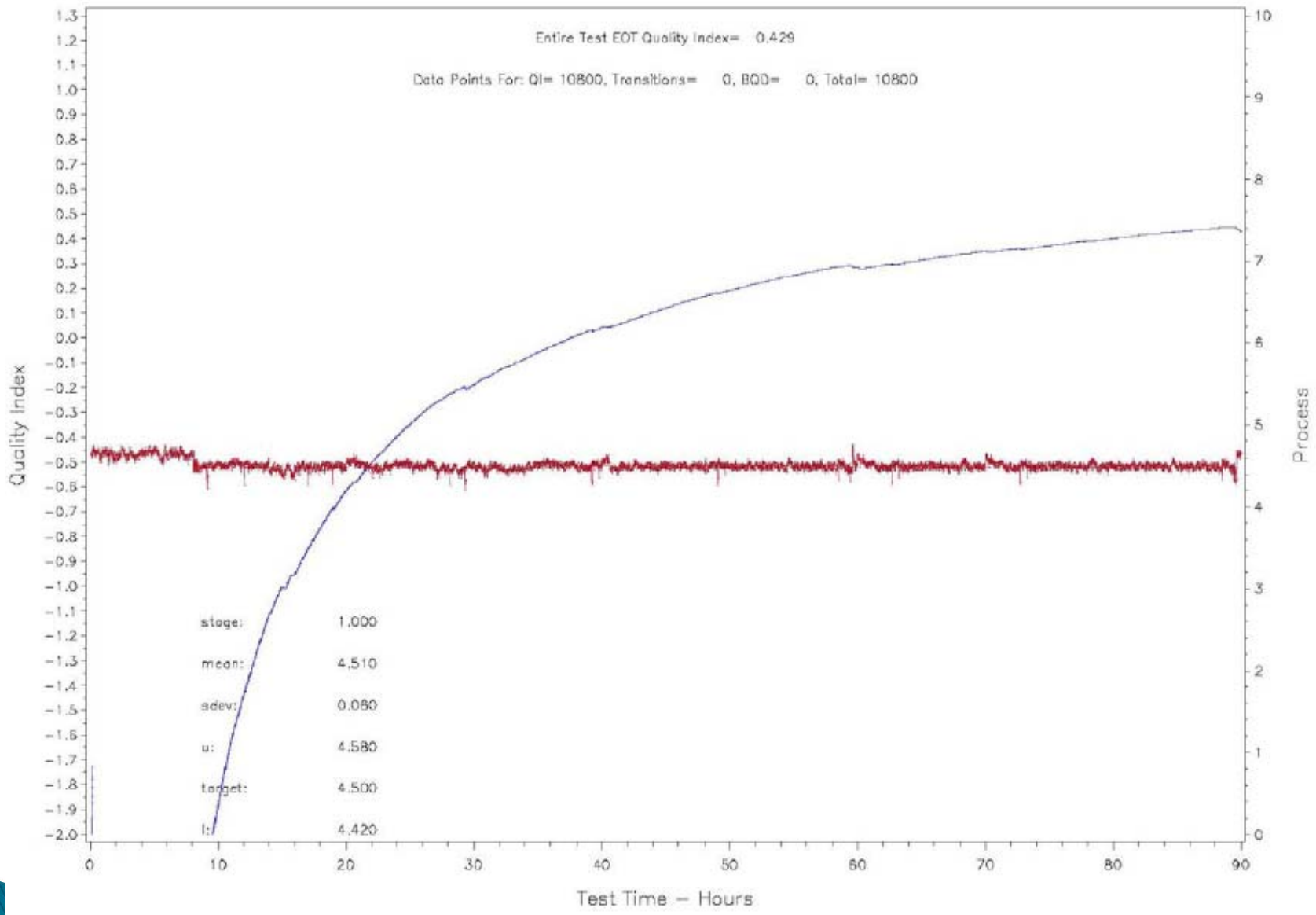

H QUALITY INDEX OPERATIONAL REVIEW
Fuel Inlet Temperature – Degrees C (CONTROL)
LAB= A Stand= 2 CMR= 106776
Entire Test EOT Quality Index= -0.403
Data Points For: QI= 10800, Transitions= 0, BQD= 0, Total= 10800
stage: 1.000
mean: 29.981
sdev: 0.829
u: 30.700
target: 30.000
l: 29.300
Quality Index
Process
Test Time – Hours

CMIR 106776

- Fuel Temperature QI
  - Control issues were experienced due to ambient temperature effects.



IIIH QUALITY INDEX OPERATIONAL REVIEW
Exhaust Back Pressure Left – kPa (CONTROL)
LAB= E Stand= 3 CMR= 105761

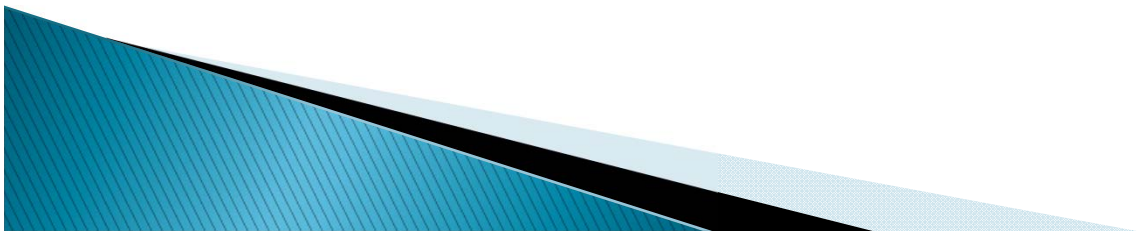


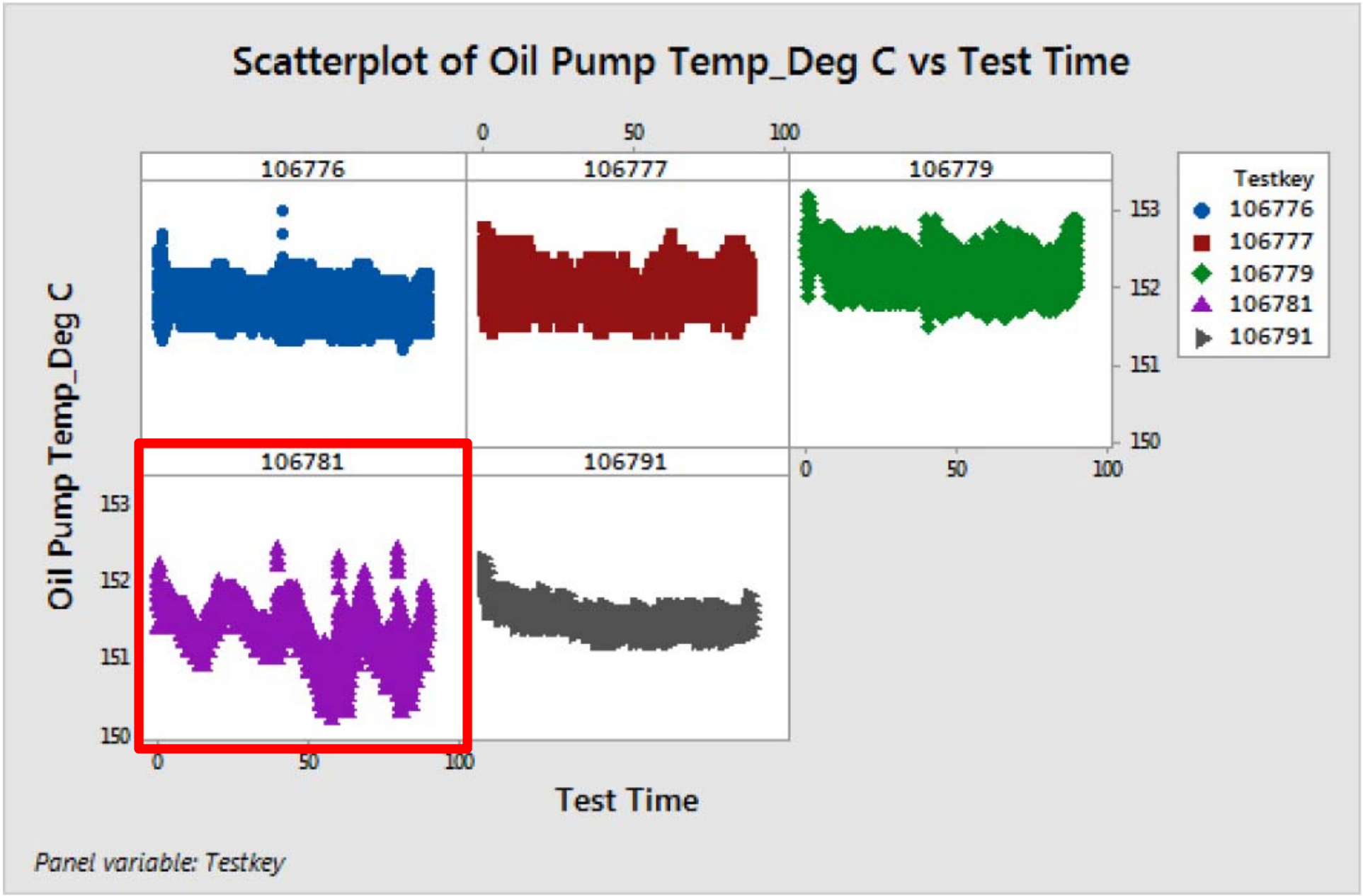
CMIR 106781

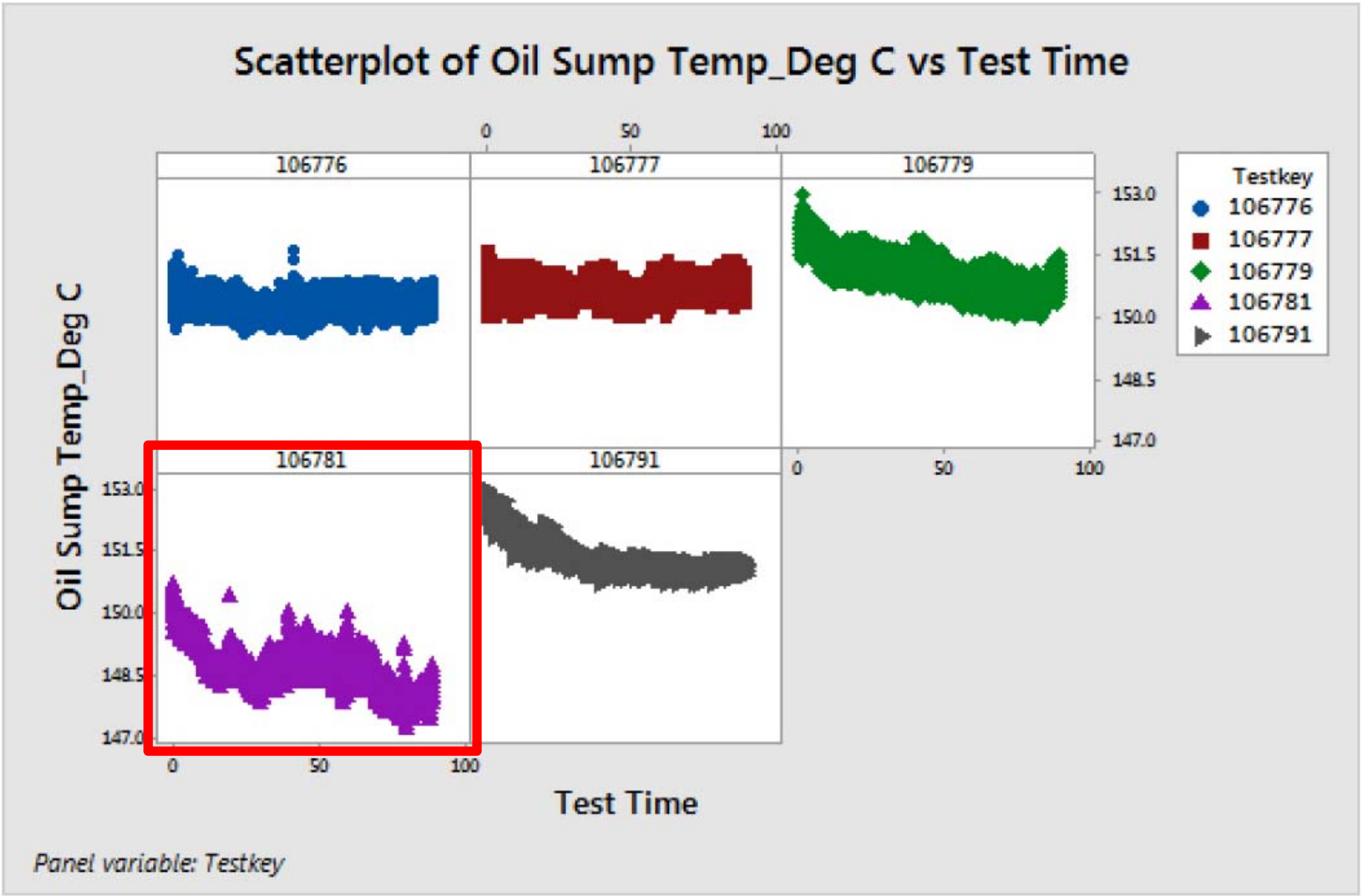
- Left Exhaust Back Pressure QI
  - Exhaust back-pressure valve actuator lower limit was spanned Incorrectly which prevented it from opening fully to lower the exhaust back pressure. It was corrected at test hour 5 by test Engineer. This test did end with a positive QI (0.429).

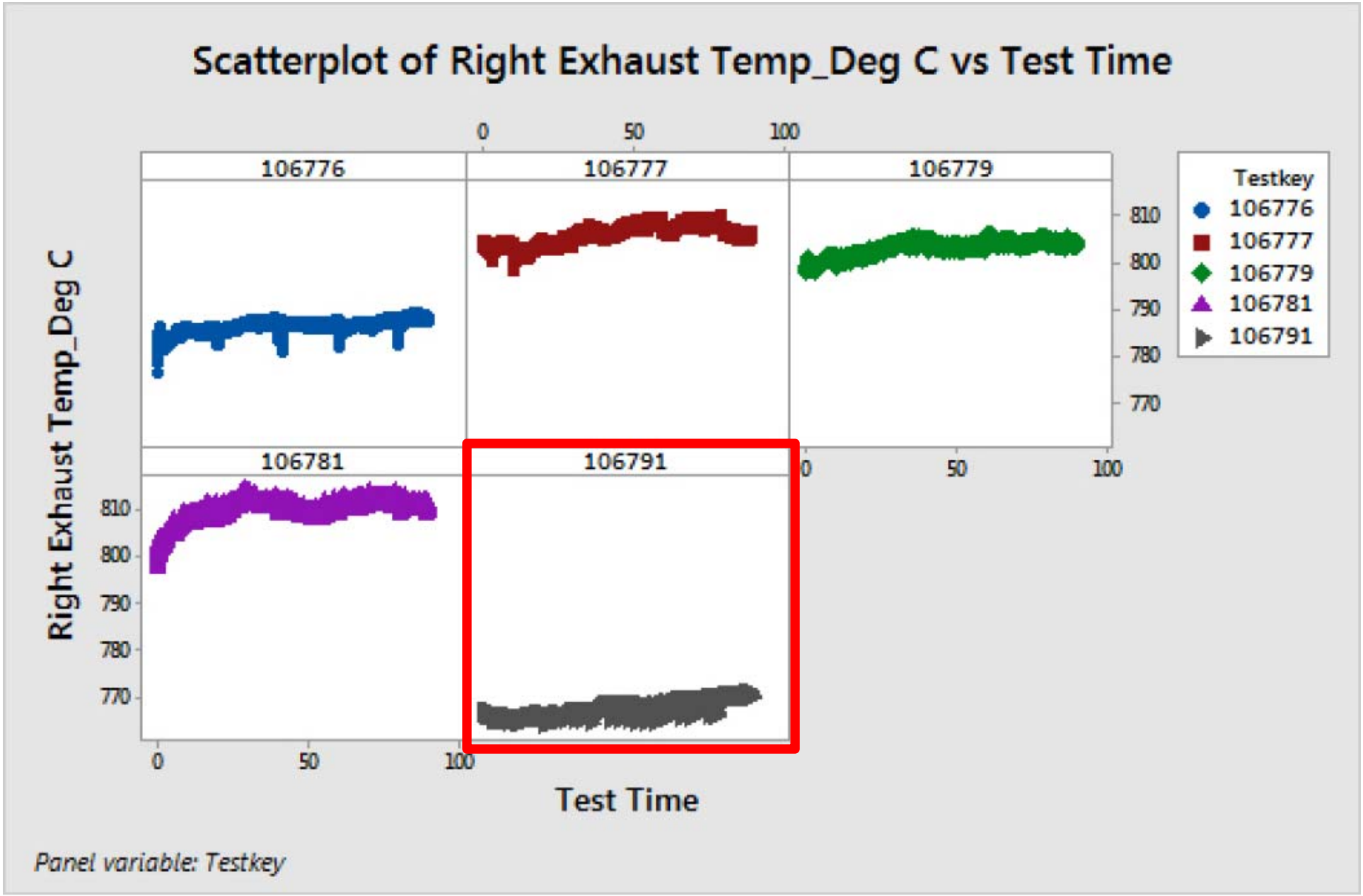
Non-controlled Parameters

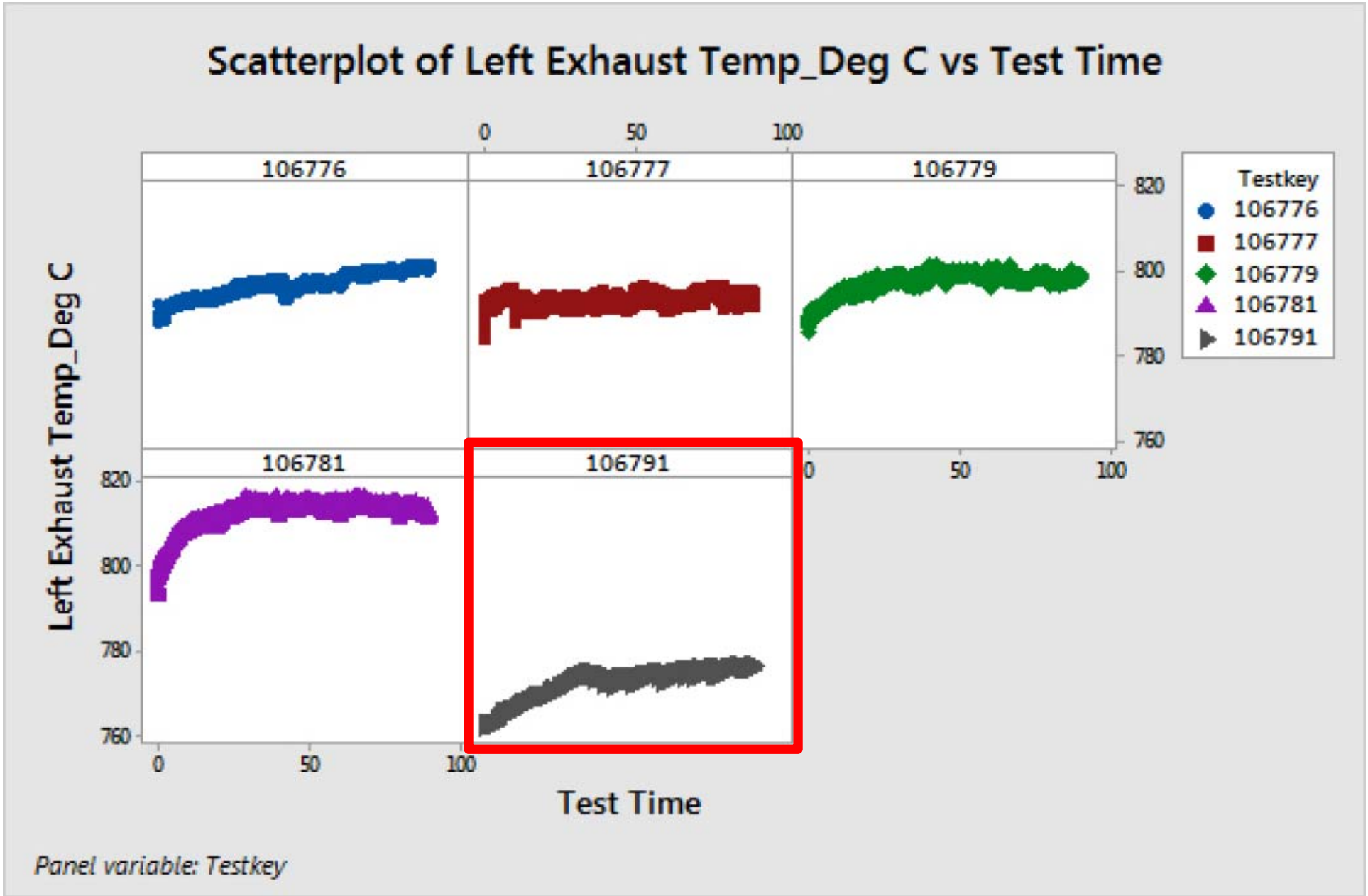
- **Non-Controlled Parameters Identified:**
  - Oil Pump Temperature – CMIR 106781
  - Oil Sump Temperature – CMIR 106781
  - Left and Right Exhaust Temperature – CMIR 106791
  - Left and Right NOx – CMIR 106777
  - Left and Right NOx – CMIR 106779

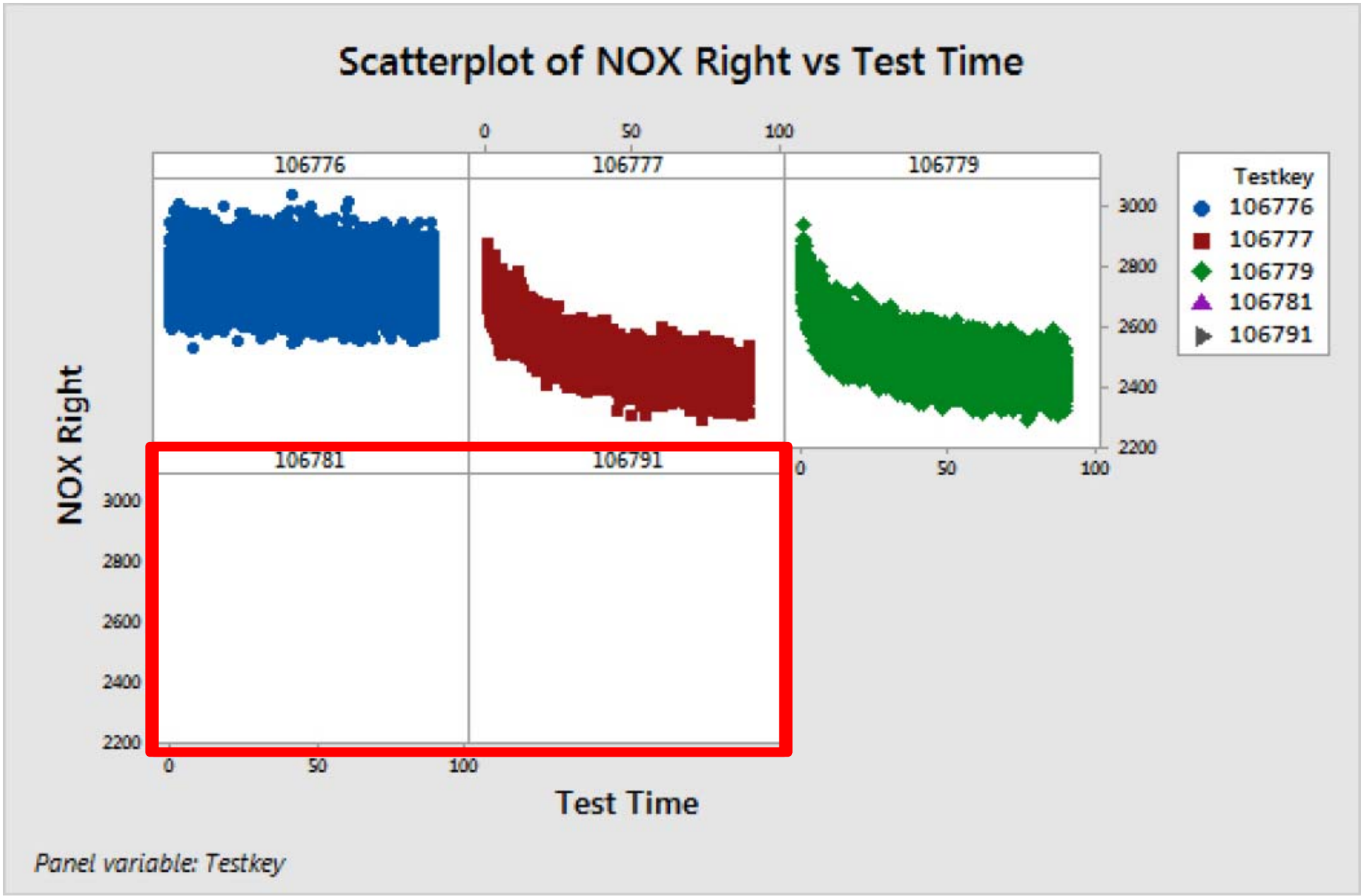


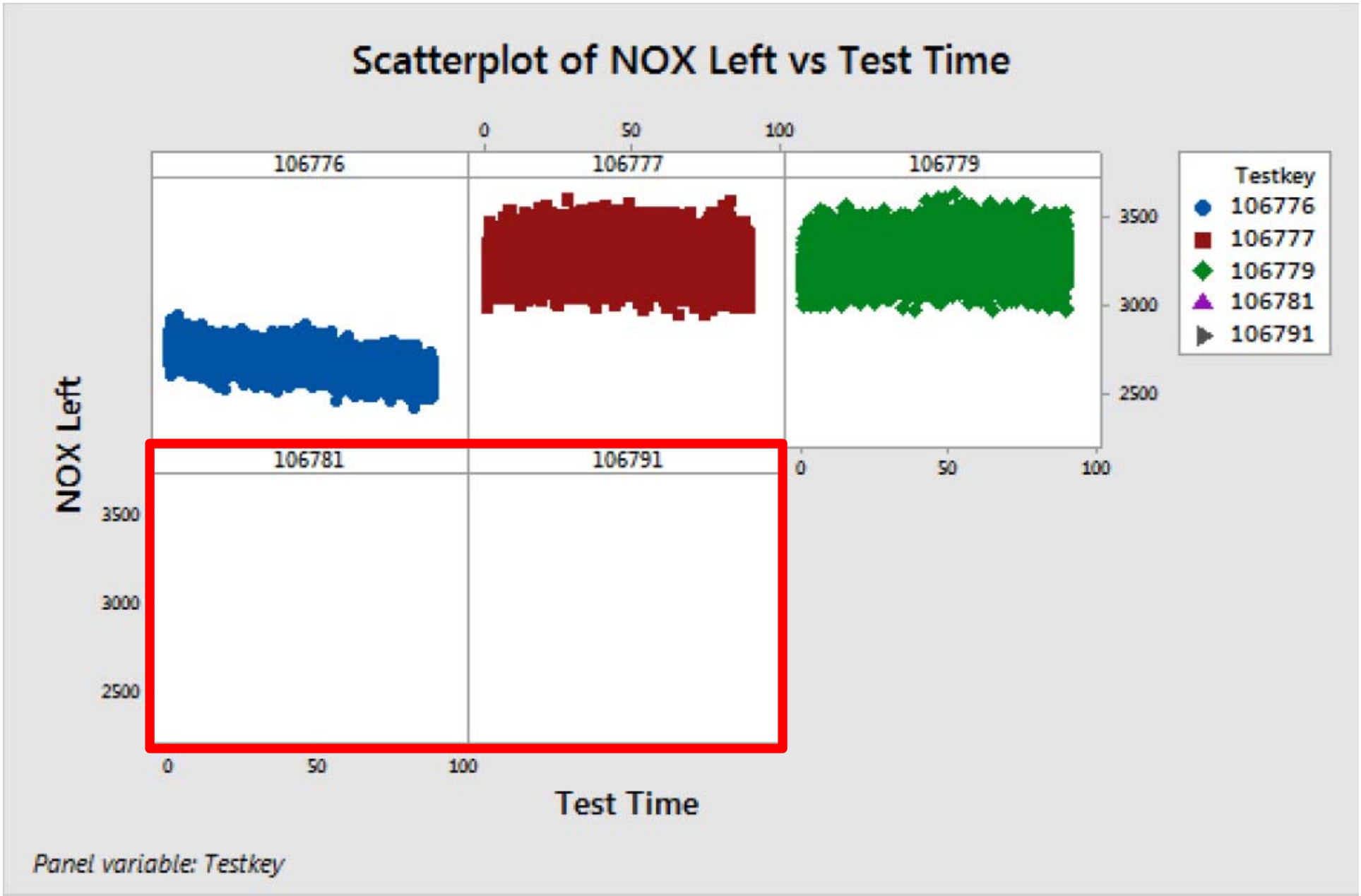

Scatterplot of Oil Pump Temp_Deg C vs Test Time
106776
106777
106779
106781
106791
Oil Pump Temp_Deg C
Test Time
Testkey
106776
106777
106779
106781
106791
Panel variable: Testkey


Scatterplot of Oil Sump Temp_Deg C vs Test Time
106776
106777
106779
106781
106791
Oil Sump Temp_Deg C
Test Time
Testkey
106776
106777
106779
106781
106791
Panel variable: Testkey


Scatterplot of Right Exhaust Temp_Deg C vs Test Time
106776
106777
106779
106781
106791
Right Exhaust Temp_Deg C
Test Time
Testkey
106776
106777
106779
106781
106791
Panel variable: Testkey


Scatterplot of Left Exhaust Temp_Deg C vs Test Time
106776
106777
106779
106781
106791
Left Exhaust Temp_Deg C
Test Time
Testkey
106776
106777
106779
106781
106791
Panel variable: Testkey


Scatterplot of NOX Right vs Test Time
106776
106777
106779
106781
106791
NOX Right
Test Time
Testkey
106776
106777
106779
106781
106791
Panel variable: Testkey

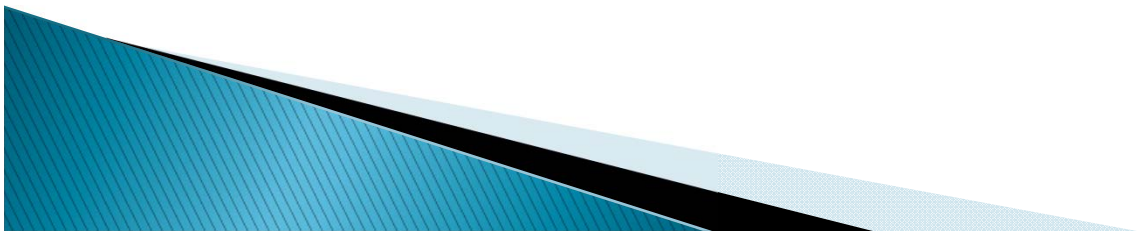

Scatterplot of NOX Left vs Test Time
106776
106777
106779
106781
106791
NOX Left
Test Time
Testkey
106776
106777
106779
106781
106791
Panel variable: Testkey

CMIR 106781

- Oil Pump Temperature
  - Found -1.3°C offset relative to T-block control temp. Large ambient temp. swings were also observed (75F to 57F for 1st 2 days and 80 F to 47 F for last 2 days) believed to be cause of undulations observed.
- Oil Sump Temperature
  - Found -1.3°C offset relative to T-block control temp. This thermocouple might have been in the wrong drain plug hole (on the side of pan instead of under-bottom of the pan). These exceptions believed to have been the cause of Oil Sump Temp. showing lower than others.
- NOx Left and Right
  - NOx gas analysis was performed manually and not with a real time NOx sensor.

CMIR 106791

- Right and Left Exhaust Temperature
  - Fans are utilized per procedure to cool the exhaust turndown pipes. This parameter is also highly dependent on thermocouple insertion depth.
- NOx Left and Right
  - NOx gas analysis was performed manually and not with a real time NOx sensor.



Questions?