2/8/21 – 6:14 AM with delayed delivery till 7:30 AM

All,

On February 5th, John Frost and I performed the following function tests on the Romulus automation system:

* Annulus Pressure – Well 1 & 2
  + LL, L, H, HH
* Annulus Differential Pressure – Well 1 & 2
  + LL, L, H, HH
* Injection Pressure – Well 1 & 2
  + H, HH

See Notes below for reference. I have also attached screenshots showing the alarm triggers as well as the ending setpoints with timestamps on the equipment.

NOTE: Timestamps show a date of February 7th, not February 5th. This is due to my computer randomly shutting down over the weekend.

Let me know if you have any questions or concerns. I am working on some forms that we can use for this process in the future.

2/5/21 – Romulus Functionality Testing.

Note: High High and Low Low triggers shutdown of both well 1 and well 2.

* Well 1
  + Annulus Differential (pressure starting – 270 psi)
    - H – set at 260, received alarm(turned yellow)
    - L – set @ 280, received alarm(turned yellow)
    - LL – set @ 280, received alarm(turned red), turned the pump off @ 1:11 PM
      * Both Wells Turned off
    - HH – set @ 300, received alarm(turned red), turned the pump off @ 1:59 PM
  + Annulus(pressure starting – 965 psi)
    - H – set at 960 psi, received alarm(turned yellow)
    - L - set at 1000 psi, received alarm(turned yellow)
    - LL – set @ 1000, received alarm(turned red), turned the pump off @ 1:24 PM
      * Both Wells Turned off
    - HH – set @ 900, received alarm(turned red), turned the pump off @ 2:06 PM
  + Injection Pressure(pressure starting – 667 psi)
    - H – set at 500 psi, received alarm(turned yellow)
    - HH – set at 500 psi, received alarm(turned red), turned the pump off @ 1:49 PM
      * Both Wells Turned off
* Well 2
  + Annulus Differential (pressure starting – 596 psi)
    - H – set at 500, received alarm(turned yellow)
    - L – set @ 600, received alarm(turned yellow)
    - LL – set @ 600, received alarm(turned red), turned the pump off @ 1:30 PM
      * Both Wells Turned off
    - HH – set @ 500, received alarm(turned red), turned the pump off @ 2:11 PM
  + Annulus(pressure starting – 1156 psi)
    - H – set at 1100 psi, received alarm(turned yellow)
    - L - set at 1300 psi, received alarm(turned yellow)
    - LL – set @ 1300, received alarm(turned red), turned the pump off @ 1:42 PM
      * Both Wells Turned off
    - HH – set @ 500, received alarm(turned red), turned the pump off @ 2:13 PM
  + Injection Pressure(pressure starting – 685 psi)
    - H – set at 500 psi, received alarm(turned yellow)
    - HH – set at 500 psi, received alarm(turned red), turned the pump off @ 1:55 PM
      * Both Wells Turned off

Regards,

**Jason Rubin**

Well Engineering Manager

10613 W. Sam Houston Parkway N. Suite 300

Houston, TX 77064

e  [JRubin@republicservices.com](mailto:JRubin@republicservices.com)

o  832-399-4586  c  346-260-7837

w  [www.RepublicServices.com](http://www.republicservices.com/)



2/5/21 – Shuts off both wells

* Well 1
  + Annulus Differential (pressure starting – 270 psi)
    - H – set at 260, received alarm(turned yellow)
    - L – set @ 280, received alarm(turned yellow)
    - LL – set @ 280, received alarm(turned red), turned the pump off @ 1:11 PM
      * Both Wells Turned off
    - HH – set @ 300, received alarm(turned red), turned the pump off @ 1:59 PM
  + Annulus(pressure starting – 965 psi)
    - H – set at 960 psi, received alarm(turned yellow)
    - L - set at 1000 psi, received alarm(turned yellow)
    - LL – set @ 1000, received alarm(turned red), turned the pump off @ 1:24 PM
      * Both Wells Turned off
    - HH – set @ 900, received alarm(turned red), turned the pump off @ 2:06 PM
  + Injection Pressure(pressure starting – 667 psi)
    - H – set at 500 psi, received alarm(turned yellow)
    - HH – set at 500 psi, received alarm(turned red), turned the pump off @ 1:49 PM
      * Both Wells Turned off
* Well 2
  + Annulus Differential (pressure starting – 596 psi)
    - H – set at 500, received alarm(turned yellow)
    - L – set @ 600, received alarm(turned yellow)
    - LL – set @ 600, received alarm(turned red), turned the pump off @ 1:30 PM
      * Both Wells Turned off
    - HH – set @ 500, received alarm(turned red), turned the pump off @ 2:11 PM
  + Annulus(pressure starting – 1156 psi)
    - H – set at 1100 psi, received alarm(turned yellow)
    - L - set at 1300 psi, received alarm(turned yellow)
    - LL – set @ 1300, received alarm(turned red), turned the pump off @ 1:42 PM
      * Both Wells Turned off
    - HH – set @ 500, received alarm(turned red), turned the pump off @ 2:13 PM
  + Injection Pressure(pressure starting – 685 psi)
    - H – set at 500 psi, received alarm(turned yellow)
    - HH – set at 500 psi, received alarm(turned red), turned the pump off @ 1:55 PM
      * Both Wells Turned off

**From:** Rubin, Jason <JRubin@republicservices.com>   
**Sent:** Friday, January 29, 2021 11:05 AM  
**To:** Luke Schedler <lschedler@txautosys.com>; James Parks <jparks@txautosys.com>; wbaker@txautosys.com; Brad Byrum <bbyrum@txautosys.com>  
**Cc:** Rodriquez, Tom <TRodriquez@republicservices.com>; Frost, John <JFrost@republicservices.com>; Forman, James <JForman@republicservices.com>  
**Subject:** WELL 2 COMPLIANCE TESTING CHANGES  
**Importance:** High

All,

We performed a test on the Well 2 Annulus, Annulus Differential and Injection pressure system. We will do well 1 when we get back operational but need the same changes made as well.. We need to make the following changes in order to be in compliance. See notes for reference of testing performed. NEED THIS CORRECTED ASAP.

CHANGES:

* WELL 2 Annulus Differential
  + HH - Need to shut off Injection pump 1,2,3 if designated to pump on Well 2 or Well 1
  + LL - Need to shut off Injection pump 1,2,3 if designated to pump on Well 2 or Well 1
* WELL 2 Annulus
  + HH - Need to shut off Injection pump 1,2,3 if designated to pump on Well 2 or Well 1
  + LL - Need to shut off Injection pump 1,2,3 if designated to pump on Well 2 or Well 1
* WELL 2 Injection Pressure
  + HH - Need to shut off Injection pump 1,2,3 if designated to pump on Well 2 or Well 1
  + LL - Need to shut off Injection pump 1,2,3 if designated to pump on Well 2 or Well 1

NOTES:

* Well 2 Annulus differential(pressure @ 495 psi starting)
  + HH – changed to 475 psi – Flashed red(11:24 AM) did not shut down the pump. But showed on the alarm page
    - Using injection pump 3
    - PUMP DID NOT TURN OFF
  + H – changed to 450  psi – turned yellow(11:23 AM), showed on alarm page
  + L - changed to 550  psi – turned yellow(11:34 AM), showed on alarm page
  + LL - changed to 550  psi – turned red(11:37 AM), showed on alarm page
    - PUMP DID NOT TURN OFF
* Well 2 Annulus(pressure @ 1316 psi starting)
  + HH - changed to 1200  psi turned red(11:43 AM), showed on alarm page
    - Did not turn off the pump
  + H - changed to 1200  psi turned yellow(11:40 AM), showed on alarm page
  + L - changed to 1400  psi turned yellow(11:42 AM), showed on alarm page
  + LL - changed to 1400  psi turned red(11:45 AM), showed on alarm page
    - DID NOT TURN OFF PUMP
* Well 2 Injection Pressure(original status)
  + HH – setpoint at 930
  + H  - setpoint at 900
  + L -setpoint at 0. Changed to 50
  + LL – setpoint at 0
    - ALL DISABLED
* Well 2 Injection Pressure(pressure @ 820 psi)
  + HH – changed to 750 psi turned red(11:53 AM), showed on alarm page
    - DID NOT TURN OFF THE PUMP
  + H  - changed to 750 psi turned yellow(11:49 AM), showed on alarm page
  + L - changed to 900 psi turned yellow(11:52 AM), showed on alarm page
  + LL – changed to 900 psi turned yellow(11:55 AM), showed on alarm page
    - Did not shut off the pump
  + ENABLED Well 2 Injection Pressure setpoints as follows:
  + HH – setpoint at 930
  + H  - setpoint at 900
  + L -setpoint at 50
  + LL – setpoint at 0

**Jason Rubin**

Well Engineering Manager

10613 W. Sam Houston Parkway N. Suite 300

Houston, TX 77064

e  [JRubin@republicservices.com](mailto:JRubin@republicservices.com)

o  832-399-4586  c  346-260-7837

w  [www.RepublicServices.com](http://www.republicservices.com/)

