**Reactor 25 | Oct 2022 - Jan 2023 Summary**

**\*\* The project lead is responsible for double checking all laboratory normalizations and applying any additional corrections, as needed.**

**Session information:**

## Responsible for QC and corrections to final lab data: Kirsten Andrews [March 2023]

Add any significant updates in a different color or link to a new summary file: here.

## Description of session: Reactor 25 lasted 2 months from the end of October to the middle of January. Reactor 25 started because Reactor 24 had gone through over 200 water injections and started showing high d33 err and d17O err values. When Reactor 25 started, the high d33 and d17O err values continued, and it was discovered that the scroll pump backing the Mass Spec turbo pump was showing oscillating values on the Pirani gauge of 100to 10-1 mbar when usually this value is at 10-3 - a background pressure that was 10-100x higher than normal. The tip seals for the scroll pump on the carbonate line were changed and then a swap between the scroll pump on the carbonate line and the scroll pump on the Mass Spec was made.The green o-ring on the scroll pump that was backing the mass spec had a large tear in it, which might have been the cause for the oscillating pressure values. After this, Reactor 25 ran smoothly, with a Fe catalyst change on 12/1/22. Reactor 25 ended on 1/17/23 after 97 water injections, 54 primes, and 60 carbonates had gone through the reactor.

## Decisions about correction of data (breaks, linear vs basic correction etc):

Reactor 25 was reduced using a linear correction with no segment breaks. From the beginning to the end of the reactor we see a decrease in SLAP and SMOW values where SLAP values at the beginning of the reactor were -2 to 8 per meg and SMOW values were between -2 to 5 per meg. At the end of the reactor however SLAP values ranged from -11 to 0 per meg and SMOW values ranged from -5 to 5 per meg. However, overall, both SLAP and SMOW values stayed relatively consistent around 0 per meg. The SMOWs, SLAPs, and USGS45 waters run on Reactor 25 matched well with the overall average for these standards. USGS47 was higher than the overall average and USGS45 and USGS48 were lower than the overall average. Carbonate standard IAEA-C1 values of Reactor 25 were consistent with values throughout the reactors, while 102-GC-AZ01 values were higher than normal. Neither IAEA-C1 nor 102-GC-AZ01 had been run on Triple since Reactor 21, and carbonate standard IAEA-603 has yet to be run since Reactor 19. See stdSummary\_box.pdf output figure in the [”basic figures” folders](https://drive.google.com/open?id=1Zss03V6wx0g9sQGKERhFx62DsQ-CnNhr&authuser=nelevin%40umich.edu&usp=drive_fs) for an overview or standards.

Changes to script or file structure/formatting

* if made changes summarize them and reference the script file name where they were made
* if no changes were made list “NONE”

## Notable Events:

* 10/25/22: Kirsten and Naomi changed Edwards RV5 pump oil on mass spec
* 10/31/22: Sarah purged gas ballasts
* 10/31/22: Sarah changed ref gas
* 11/7/22: High d33 and D17O errors - O2 peak scans and yields looked normal but “d33 err” and “cap17O err” values were higher than normal. Some runs would look normal and then some runs would have high values. This was seen at the end of R24 and the start of R25.
* 11/8/22: To see if this was a mass spec issue a couple zero enrichments were run (with ref gas going into the mass spec from the reference and sample bellows) but these runs were also returning higher d33 and D17O error values.
* 11/8/22: Sarah and Kirsten changed the tuning (named it O2 tuning 11-8-22 test). This tuning was the same as the previous (named O2 tuning 9-6-21) except that in the Quad 1 tab -170v was changed to -160v.
* 11/922: Figured out that the scroll pump that backs the MS turbo was not working optimally. The pirani gauge was oscillating between 100 and 10-1 mbar (when usually at 10-3 mbar)
* 11/9/22: Changed the tip seals on the scroll pump that backs the carbonate line then swapped this scroll pump with the one of the mass spec
* 11/11/22: Changed the tip seals on the scroll pump that was on the mass spec - noted a tear in the green o-ring - this may have been why the pump was failing to reach background pressure
* 11/11/22: Sarah and Kirsten loaded ref gas and ran more zero enrichments - data looked good
* 11/11/22: Changed tuning back to the original tuning (named O2 tuning 9-6-21) since the magnet scans were not the issues it was the scroll pump
* 11/11/22: Kirsten changed the tip seals on the scroll pump that backs the autoline - noticed 2 of the fan blades were broken so this scroll pump was swapped with the scroll pump that was on the carbonate line (and was first on the mass spec line). - ordered and replaced the fan in January
* 11/15/22: Kirsten septum changed
* 11/16/22: Kirsten added ref gas
* 11/18/22: Kirsten switched He tanks
* 11/28/22: Kirsten updated computers, refilled ref gas (1 aliquot @ 20nA - 86.9%)
* 11/29/22: Started carbonate runs
* 12/1/22: Ben and Kirsten changed Fe Catalyst
* 12/2/22: Gregory Henkes added ref gas
* 12/8/22: Gregory Henkes added ref gas
* 12/19/22: Kirsten purged ballasts
* 12/23/22: Kirsten added ref gas - 1 aliquot @ 20nA - 87%
* 1/5/23: Kirsten purged ballast and added ref gas - 1 aliquot @ 20nA - 81.8%
* 1/9/23: Kirsten reprogrammed robot
* 1/16/23: Kirsten added ref gas - 1 aliquot @ 20nA - 84.9%
* 1/17/23: Reactor 25 end
* 1/23/23: Kirsten updated computers and purged ballasts