How to make the worksheet for the TRD Gas Refill

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Objective: This worksheet does all of the TRD Gas Refill calculations for you, as long as you give it the proper input parameters. The goal is to eliminate stupid mistakes that can happen when things are done by hand too quickly. Details of the calculations and how to open the programs can be found in the complete Gas Refill Guide.

Getting started…

- Go to the directory where the worksheet lives:

```
cd  ~trd/COMMANDING/TRDGAS/Gas_Refills/
```

- Make a new directory for the current refill and copy everything in the example directory to the new directory:

```
mkdir 2013_01_23
cp example_dir/* 2013_01_23/.
```

- Change to your new directory and open the worksheet in your favorite browser (emacs, for example)

```
cd 2013_01_23
emacs make_worksheet.py &
```

- make_worksheet.py has three sections,
  1. the input parameters (basic, Day1 and Day2—see next 2 pages)
  2. Day 1 calculations—produces the Day 1 worksheet
  3. Day 2 calculations—produces the Day 2 worksheet

You will need to modify ONLY parameters at top! DO NOT MODIFY THE REST!

Note that the code was initially written to take these parameters as inputs from the command line so there are many print statements which may be removed at some point.

Input parameters

There are three parts to the input parameters as well: basic things, day 1 things and day 2 things….

- Find the first four fields to fill in—the should be simple:
  - **refill** = refill number (an integer, ie 23)
  - **day** = day 1 or day 2
  - **who** = who are you: put your initials and the initials of those helping you so we know who to blame when it breaks ☺ k.a.
  - **Date**: use the format DD-Month-YYYY: 13-Mar-2013
- 7 more parameters you need to add for Day 1—do NOT modify them on Day 2:
  - target_xe → *How much Xe you want to add to the TRD: usually 10 bars*
  - target_co2 → *How much CO_2 you want to add to the TRD: usually 3 bars*
  - trd_pressure
  - trd_xe_pressure
  - trd_co2_pressure

    *From the TRD Pressure Monitor. **See pg 6** for a screenshot. Be sure to use the values for the actual day of the injection (at or just after the black dashed line)*
  - mix_pressure → *From the TRD Gas Monitor. **See pg 7** for a screenshot*
  - mix_percent_co2 → *From the previous refill. **See pg. 8** for more info.*

Extra input parameters if it's Day 2

If this is Day 2, you need to **change the day #** and fill in 3 more parameters **(do NOT modify the parameters from day 1!!!)**.

- add_pressure_xe_1
- add_pressure_co2_1

From pg 4 of the Day 1 worksheet. You calculate the partial pressure of gas in the mixing vessel like so:
*Original # + **# added** = total #.*
***# added** is what you want for these fields.*
*(**See page 8** of these notes for more info)*

- mix_pressure_2 →

*From the TRD Gas Monitor. **See pg 6** for a screenshot—use the new value here, after the 1st injection.*

Once you have all of your numbers

- Simply run the code like so:

  ```
  ./make_worksheet.py
  ```

- Then transform the .txt output to a pdf like so (where 23 is the refill # and Day 1 is which day of the refill you're on):

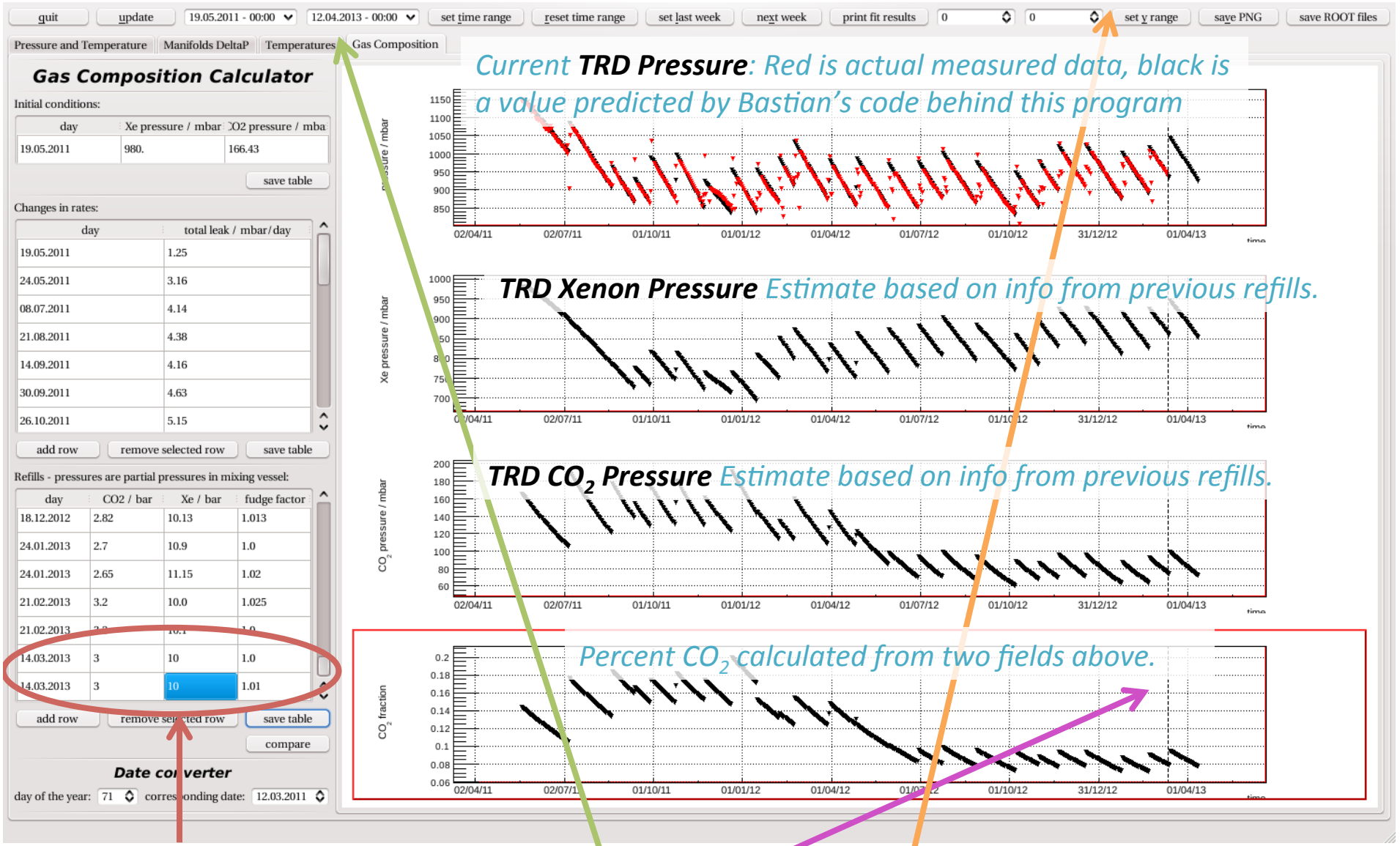
  ```
  ./refill2ps.csh 23_Day1
  ```

- And print like so:

  ```
  lpr trd_Refill_23_Day1.ps
  ```

- Voila! You have a worksheet!

TRD-Pressure Monitor (open from ~trd/RUN/)



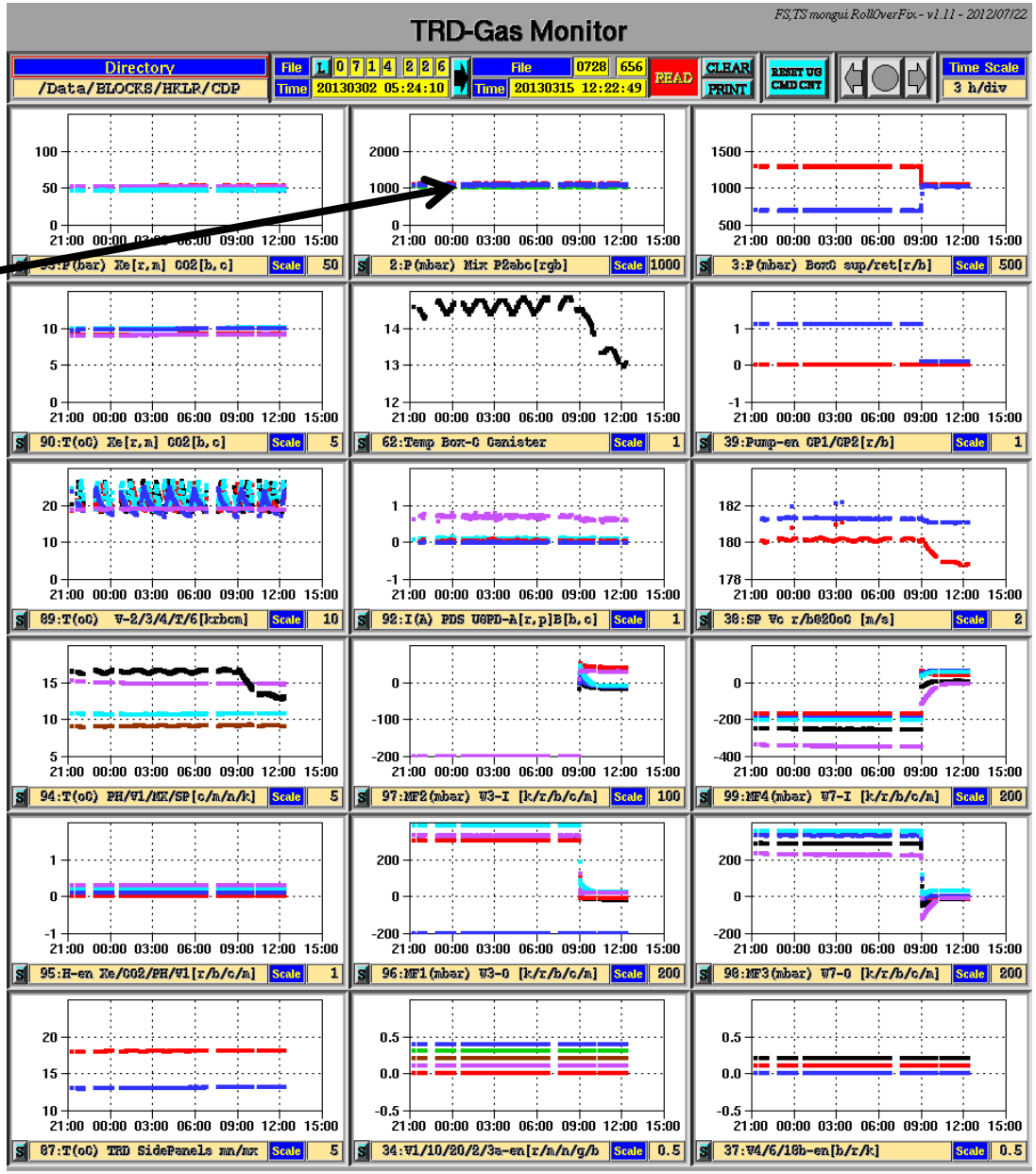
This is where you fill in your target Xe and target CO2 (see pg 3 of these notes for more details see the gas refill guide)

Dashed *line marks the current day: you will want to change the* ***dates*** *and the* ***axes*** *to zoom in here…*

TRD-GasMonitor

*This plot has your **mix_pressure** (from before you start the refi—usually 1100l) and **mix_pressure_2** (look again after you are finished with the first injection—usually 1000**)**.*

*Zoom in on it, and use the average of the **red** one, just for consistency.*



Getting Numbers from the "Previous Refill"

- On Day 1 and Day 2 you need to grab numbers from the previous refill (on Day 2 this means you should get your info. from Day 1)
- On a Day 1 worksheet this info is on page 4, while on a Day 2 worksheet this info is on page 3. The lines look like this:

```
Calculate the partial pressure of gas in the mixing vessel
    CO2      242 + 2600 = 2842 bar
    Xe       758 + 9500 = 10258 bar
```

- The **percent CO2 (see pg 3 of these notes)** is:
  2842 / (2842 + 10258) = 0.217 = 21.7 % (use the percent #)
- 2600 and 9500 are the **amount added** (see pg 4 of these notes)