**Technical description (offer) of proposed supplies according PD Annex 2 requirements.**

This description is prepared based on manufacturer’s document “Picarro Response to GSE 272890” and documents with additional specifications, as mentioned in text below.

**The analyzer complies with the following technical criteria:**

1. The offered analyzer **Picarro L2130-i** enables simultaneous high-precision measurements of both δ18O and δ2H from liquid water samples (document “Picarro L2130-i Analyzer Datasheet”).

2. The analyzer uses the laser absorption spectroscopy (LAS) technology called “Cavity Ringdown Spectroscopy” for isotopic analysis.

3. Guaranteed precision (1σ) of the analyzer for liquid water samples is 0.025 ‰ for δ18O and 0.1‰ for δ2H. This precision can be achieved in both Standard and Express mode. Typical performance is roughly 2 times better than the guaranteed performance.

4. The analyzer enables measurements of samples with high total dissolved solids (TDS) of ≥40 g/kg. The Picarro L2130-i (and L2140-i) is the only analyzer that can handle dissolved solids over 40 g/kg. With our Salt Liner we can handle samples of up to 200 g/kg of dissolved solids. The analyzer can run for 24 hours without intervention. The Standard Mode is recommended in this case to minimize the amount of liquid to be injected into the vaporizer and stretch the cleaning intervals. The **A0211 High Precision Vaporizer** with the **A0340 Autosampler** and **C0354 Salt Liner** for High Precision Vaporizer are included in proposed configuration (documents “Picarro A0211 and A0340 Datasheet” and “Picarro AN039 Salt Liner”).

5. The analyzer is able analyze at least 20 samples or more in 24 hours with a guaranteed precision (1σ) as stated in point 3. Picarro is the only analyzer currently on the market that can process 20 or more samples per 24-hours at the above-mentioned guaranteed precision.

For one sample 6 injections of each 9 minutes are needed, which means 54 minutes per sample, or 27 samples per 24-hours. 7 Samples can therefore be used as standards. In the Express mode the throughput will practically be ~2 times higher, and still within the requested specifications.

The only competing instrument on the market needs 20 times 4 injections (80 injections) to achieve the 'High-precision' values on their datasheet. With 800 injections per 24-hours, they will only manage to do 10 samples per 24-hours, and standards still need to be measured. See attached method comparison (document “Picarro vs LGR Summary”) and “LWIA Post Analysis User Manual” page 117 ( please see link: <https://search.abb.com/library/Download.aspx?DocumentID=3KXG164020R4601&LanguageCode=en&DocumentPartId=&Action=Launch> )

6. Auto-injection system is added to the analyzer for automated liquid sample injections for isotopic water analysis.

7. Vaporization/evaporation module (vaporizer) for liquid water analysis that works in combination with the automatic injection system is included. The separate Vaporizer allows for much better controlled evaporation and an analysis plateau for much better precision and faster analysis. A0211 High Precision Vaporizer with the A0340 Autosampler.

8. Software for controlling analyzer operation, data analysis, normalization of measurements, calibration and identification/flagging for possible sample contamination will be provided together with access to applicable software updates**. S3099 EXPRESS AND SURVEY** software included.

9. The analyzer is compatible with the “Laboratory Information Management System (LIMS) for Lasers” software for data processing.

10. A monitor “**LG 24BK550Y-I”** for working with the analyzer is included, also the keyboard and mouse included (document “LG SPEC SHEET 24BK550Y”).

11. A kit for processing 1000 samples “**C0329 Isotopic Water Kit - 1000 samples**” included with necessary number (4x10 uL) of syringes, glass vials (1000x2mL) with caps and 20x injection port septa, together with the user manual describing their replacement.

12. A vaporizer cleaning kit “**C0211 Vaporizer Cleaning Kit”**. included with a manual for carrying out the cleaning procedure of a separate vaporization module.

13. The package includes 3 laboratory water calibration standards in 4-5 mL ampoules. **“C0356 Secondary Water Isotopes Standard Kit”** (Three water standards (USGS46, USGS47, and USGS48))

14. It is possible to operate and monitor the analyzer remotely (through remote login, e.g. teamviewer), which includes operations such as start/stop the analysis run, change performance mode, manage job queue etc.

15. The analyzer accepts both zero (dry) air and N2 as carrying-gases. Additionally room air can be dried, due to the low flow rate of the analyzer. This makes the analyzer field suitable as well. In configuration included “**C0360 Drierite™ Desiccant Drier Kit”** (Drierite™ canister and tubing for proper analyzer shutdown and for use with analyzers when sample drying is required and dry nitrogen or zero air gas cylinders are unavailable).

16. The analyzer works with an alternating voltage of 230V and a frequency of 50 Hz and does not require additional cooling for operation. It has added accessories that allow the instrument to continue working even in the event of a short-term power failure – UPS **“Riello Sentinel Pro SEP 700”** (700 VA/630W) included in configuration (document “UPS specs sheet”)

17. The dimensions of the analyzer taken separately (i.e., without the accessories described in points 6, 7 and 11) are 19.1 x 43.2 x 43.2 cm (height x width x depth) and the weight is 20.4 kg. Analyzer can be installed into a building in a remote location, and it is transportable from one room to another using manpower of one (1) person.

18. 12-month (after delivery date) extended warranty for any repairs/replacement of defective parts, maintenance or calibration is included.

19. Cost of the tender includes:

19.1 delivery of the analyzer and its accessories to the final location;

19.2 installation of the analyzer and its accessories at the final location and on-site training, after which the contracting authority will be able to independently perform isotopic analyses. The training program includes, among other things, hands-on tasks/instruction in routine analyzer maintenance, troubleshooting, sample preparation and handling, calibration, isotopic data post-processing, and quality assurance/quality control (QA/QC).