



**SHEER WP3 Report, 04.11.2015  
for the Progress / PTM Meeting in ...  
(WP Leader S. Lasocki IGF PAS, representative GFZ, RSK, AMRA, KNMI, KeU)**

**Short summary of the progresses of the period**

Please provide a concise overview of the progress of the work in line with the structure of Annex I to the Grant Agreement (DoA)

- List of the staff actively involved in the WP

IGF PAS: Prof. Stanislaw Lasocki (WP leader, Task 3.1 leader), Prof. Janusz Jaroslowski (Task 3.4 leader), Dr. Eng. Janusz Mirek, Dr. Jan Wiszniowski, Eng. Wojciech Bialon, Eng. Szymon Cielesta, Eng. Mateusz Lasak, Mr. Krzysztof Otto MBA.

GFZ: Prof. Torsten Dahm (Task 3.2 leader), Dr. Simone Cesca, Dr. Jose Angel Lopez Comino, Postdoc contracted within the SHEER project since 1.10.2015, Mr. Ralf Bautz, Technician

RSK: Mr. Andrew Gunning, Partner RSK Ltd. (Task 3.3 leader), Dr. Catherine Isherwood, Senior Hygrologist

UGL: Prof. Paul Younger, Dr. Nelly Montcoudiol, Dr. Neil Burnside

AMRA: Prof. Paolo Capuano, Prof. Roberto Scarpa

- Objectives expected after 6 Month

- 1.1. Development of a monitoring execution plan agreed with the Operator (PGNiG).
- 1.2. Obtaining regulatory permits, carry out feasibility study, initial planning and risk assessments.
- 1.3. Preparation of drill sites, purchase of equipment and drilling and complete up to four boreholes up to 150mbgl
- 1.4. Preparation of sites and installing seismic equipment that is planned to be implemented with a distributed network of eight broadband stations, three small-scale arrays each composed of eight three-component sensors and shallow borehole installations.
- 1.5. Installation of long term hydrogeological sampling equipment in the drilled wells.
- 1.6. The setup and launch of the mobile air pollution station
- 1.7. Defining a SHEER data server on the Andromeda cluster of IGF PAS for storing the field data and ensuring their availability for all consortium members.
- 1.8. Testing of specific seismic network setups in the Netherlands
- 1.9. Monitoring the background seismicity of the site with on-line transmission of the waveforms to the data server.
- 1.10. Monitoring the baseline of groundwater condition
- 1.11. Monitoring the baseline of air pollution

- A summary of progress towards objectives and details for each task in the first six months;

Ad. #1.1. Done. Deliverable D3.1 submitted. (IGF PAS, GFZ, RSK, AMRA)

Ad. #1.2. Done. Essential difficulties with land rent overcame (IGF PAS). Regulatory permits for drilling obtained. (Subcontractor)

Ad. #1.3. In process. At the day of writing the drilling is carried on by the subcontracted company, selected in public tender. (IGF PAS, RSK, Subcontractor)

Ad. #1.4. Done. Essential difficulties with land rent overcome (IGF PAS). At the date of writing, the surface network has been fully installed (IGF PAS, GFZ). It comprises of 6 BB stations (GFZ), 16 SP stations for two miniarrays (IGF PAS), 9 SP stations for the third mini-array (GFZ).

Ad. #1.5. Not done. In preparation. Equipment shipped to the site. (RSK)

Ad. #1.6. Continuous measurements of selected air quality parameters (except hydrocarbons) have started soon after installation of air pollution monitoring station in July 10th, 2015. Monthly data sets are available since August 2015. Complete set of air quality parameters including hydrocarbons is available since October 2015. Actually measurements are performed in accordance with the monitoring plan. (IGF PAS)

Ad. #1.7. Done. The Consortium Members are asked by the server administrator to designate representatives approved to register on the server. (IGF PAS)

Ad. #1.8. Not done (GFZ, KNMI).

Ad. #1.9. Partially carried on. Surface monitoring is carried on, however the GFZ stations do not support on-line transmission. The first datasets after 4 months were recently downloaded from GFZ stations (GFZ, IGF PAS) and will be uploaded to the SHEER data server soon (IGF PAS). Boreholes for seismometers not ready yet. (AMRA, IGF PAS) However, the definition of the drilling characteristics for the borehole seismometers (BS) installation, the site selection for BS installation, the BS testing and calibration, the arrangement and shipment of equipment to Warsaw, the numerical simulation of the code for signals detection even in case of signal's amplitude close to noise level have been carried out (AMRA).

Ad. #1.10. Not carried on. Hydrogeological boreholes not ready yet. (RSK)

Ad. #1.11. Carried on. The data are semi on-line transmitted to the SHEER data server. (IGF PAS)

Other\_1. Optimization and assessment of the array geometry: estimation of the array response function for different configurations and its application to optimize the array configuration, given a limited number of usable sites (GFZ).

Other\_2. GFZ stations maintenance (October 2015) prior to planned fracturing activity (GFZ)

- Highlight clearly significant results;

- 2.1. Installation of surface seismic monitoring network completed in August 2015 (6BB and 25SP stations) and operational. On-line data transmission from 16SP IGF PAS stations at 500sps since June - August, 2014 (IGF PAS). Data download from 6BB and 9SP off-line GFZ stations done in October 2015 (GFZ, IGF PAS).
- 2.2. Beginning of drilling of boreholes for water quality and seismic monitoring (Subcontractor, RSK, IGF PAS).
- 2.3. Air monitoring station installed and operational. Semi on-line data transmission. Fast (in the 3rd month of the Project duration) start of measurements, well ahead of the planned hydrofracturing activities, allows the collection of data in amount representative for the assessment of background summer and autumn air quality conditions in the vicinity of the drilling area. Preliminary data analysis confirms the correctness of the choice of station's location (IGF PAS)

- If applicable, explain the reasons for major deviations from Annex I and their impact on other tasks;

- 3.1. In spite of earlier written promises PGNiG has not made available yet needed geological information about the site.
- 3.2. PGNiG changed its earlier plan to do the horizontal fracturing in Spring 2016 and intends to complete the fracturing in late November.
- 3.3. Boreholes cannot be shared by water monitoring and seismic equipment. It was decided to drill separate three boreholes for seismic equipment.
- 3.4. The difficulties with land rent for boreholes, the need of public tender for drilling subcontracting and the longer period to achieve regulatory permits resulted in a considerably delay of borehole seismic and water quality monitoring.

- If applicable, explain the reasons for failing to achieve critical objectives and/or not being on schedule and explain the impact on other tasks as well as on available resources and planning;

- 4.1. #3.1 makes difficult and can delay analyses in WP4 and in particular in WP5.

- 4.2. If #3.2 happens then it will significantly shorten the seismicity, water quality and air quality monitoring before the hydrofracturing,
- 4.3. #3.3 compels to drill separate boreholes. In connection with the budget for drilling these boreholes will be shallower than assumed. This weakens the seismicity monitoring potential.
- 4.4. #3.4 in connection with the possible earlier hydrofracturing operations (#3.2) can make it impossible to record the water quality baseline which should be done before fracking.

- If applicable, propose corrective actions.

Ad. #3.1. Efforts to obtain relevant materials from PGNiG are continued.

Ad. #3.2. This problem cannot be remedied by SHEER consortium. However present information signalize that the horizontal fracturing will not be done in 2015.

Ad. #3.3. There will be four hydrological boreholes down to 75m each and three seismic boreholes down to 40m each. When the hydrological boreholes reach the aquifer at shallower depths the seismic boreholes will be drilled deeper.

- Publications and papers in print

None.

**This section should not exceed two pages.**

## Deliverables due at the date

Please complete this table if deliverables are due for the reporting period

<b>Table 1. Deliverables due at the date</b>											
<b>Del. no.</b>	<b>Deliverable name</b>	<b>Version</b>	<b>WP no.</b>	<b>Lead beneficiary</b>	<b>Nature</b>	<b>Dissemination level<sup>1</sup></b>	<b>Delivery date from Annex I (proj month)</b>	<b>Actual / Forecast delivery date Dd/mm/yyyy</b>	<b>Status No submitted/ Submitted</b>	<b>Contractual Yes/No</b>	<b>Comments</b>
D3.1	A plan of monitoring campaign agreed with the Operator (PGNiG)		WP3	IGF PAS	Report	CO	30/06/2015	13/07/2015	Submitted		

<sup>1</sup>PU

Public

PP

Restricted to other programme participants (including the Commission Services)

RE

Restricted to a group specified by the consortium (including the Commission Services)

CO

Confidential, only for members of the consortium (including the Commission Services)

