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Date 25 January 2013
Re Natural gas extraction in Groningen

Dear Madam President,

I am writing to inform you about new insights into the effects of natural gas extraction from the Groningen field and its relationship to earthquakes in the Province of Groningen. I will discuss the possible consequences of these insights for the people living in the area and for Dutch society as a whole. I will also outline the measures I intend to take in connection with this issue.

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1. Background

On 16 August 2012 an earthquake occurred in the village of Huizinge in the Municipality of Loppersum in the Province of Groningen. This earthquake, measuring 3.4 on the Richter scale, was of longer duration and had a greater energy intensity than previous tremors. This was indeed also how the inhabitants of Huizinge and surroundings experienced it. The Royal Dutch Meteorological Institute (KNMI) concluded in its analysis that this was the strongest tremor resulting from gas extraction so far. The number of reports of damage was also greater than previously. So far the Nederlands Aardolie Maatschappij (NAM), the company operating the field, has received more than 2500 damage claims.

The earthquake on 16 August 2012 prompted the State Supervision of Mines (SodM) to further investigate the phenomenon of tremors resulting from gas extraction in the Groningen field. Subsequently both the KNMI and the NAM carried out studies. Because of the complex nature of the matter, close consultation has taken place in recent months between the SodM, the KNMI and the NAM to share and assess the information available.

2. Findings of the studies

The studies resulted in reports from the KNMI and the SodM, a letter from the NAM to the SodM suggesting appropriate measures, and recommendations to me from the SodM based on the NAM letter. These documents are enclosed. The studies and findings relate solely to the Groningen field and not to other gas fields in the Netherlands.

Each party that carried out the studies has its own particular role and responsibilities. As supervising authority for mining activities like gas production, the SodM is responsible for ensuring the safety of humans and the environment. If necessary, the SodM can carry out investigations, impose administrative penalties or advise me on measures to be taken. The KNMI is the authority concerned with

seismology and earthquakes and associated research, irrespective of how these tremors are caused, whether naturally, from gas extraction or otherwise. The NAM, as producer at the Groningen field, is required to produce gas in compliance with the law and in line with rules laid down in the extraction licence and accompanying extraction plan. As Minister of Economic Affairs I am responsible for policy and regulation on gas extraction and am also the authority responsible for issuing licences for mining activities, including gas extraction.

The main findings of the studies were as follows:

- Since 2000 annual production from the Groningen field has gradually increased from 20-30 billion m³ to 45-50 billion m³. Production was increased to compensate for reduced production in the smaller fields from 50 billion m³ to 25-to 30 billion m³ during the same period. Over the past decade the number of tremors per year, and also the number of strong earthquakes in the Groningen field has increased in proportion to increased production.
- It was already known that a relationship existed between gas extraction and the earthquakes. The KNMI assumed, on the basis of statistical study of all the Dutch gas fields, that the maximum magnitude of earthquakes resulting from gas extraction would be 3.9 on the Richter scale. The KNMI has now indicated that as far as the Groningen field is concerned it is not possible to estimate the maximum magnitude on the basis of historical data. The magnitude could therefore be greater.
- On the basis of earthquake reports from gas fields in other parts of the World, the KNMI anticipates that the maximum magnitude could well be somewhere between 4 and 5 on the Richter scale. Geomechanical and seismological study of the Groningen field could reveal the precise maximum magnitude that should be taken into account.
- If we assume a maximum magnitude of 5 on the Richter scale, there is an estimated 7 per cent risk of an earthquake of 3.9 or higher in the next twelve months, according to SodM. In other words, there is a one in fourteen chance that a tremor of this magnitude will occur in that period.

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3. Measures for the Groningen field

I believe these new SodM insights are significant and take them seriously. It has been clear for several decades that gas extraction in the Groningen field is accompanied by earthquakes, but the fact that we now have to take account of the effects of tremors with a magnitude greater than 3.9 on the Richter scale is new.

I am well aware that these new insights could cause uncertainty for people living in the vicinity of the Groningen field and especially in the Municipality of Loppersum, where the strongest earthquakes have occurred in recent years. Two types of measures have therefore been considered:

- Measures aimed at preventing and reducing damage as far as possible.
- Measures to reduce the magnitude of the tremors.

3.1 Prevention and reduction of damage

People living in the vicinity of the Groningen field are aware that earthquakes can occur as a result of gas extraction¹. However, the fact that earthquakes of a greater magnitude than expected can occur is new. It is of vital importance that the effects of any stronger tremors for the people living in the vicinity are prevented or reduced as much as possible. Nevertheless, if damage occurs they must be confident that they will receive compensation.

The NAM has indicated in a letter to SodM that it will take the following measures:

- The Nam, in collaboration with TNO and others, will assist residents and home owners in Groningen to assess the vulnerability of buildings to earthquakes of a greater magnitude.
- If the safety of buildings becomes a matter of debate, the NAM will make specialist knowledge available and contribute to any preventative repairs or reinforcement necessary. This will take place on the basis of what is reasonable and on further criteria to be developed.
- The NAM will also cooperate with other parties, including the Safety Region, to provide information on how to act in the event of an earthquake.

The purpose of these measures is to identify and reinforce weak constructions as preventative measure, and so reduce the damaging effects of earthquakes and increase the safety of the people living in the area. In addition, residents will be better informed so that they are better prepared in the event of an earthquake. I endorse these measures and have found that SodM has already indicated that it will supervise the execution of this task.

In consultation with me the NAM has already earmarked a sum of EUR 100 million for preventative measures for buildings, to prevent or reduce earthquake damage. This is in addition to NAM's existing earthquake compensation scheme.

3.2 Reducing earthquake strength

The SodM has made recommendations on how to reduce the number of earthquakes, including strong earthquakes. Specifically, the SodM has advised me to urge the NAM "to reduce gas extraction in the Groningen field as quickly and as much as is feasibly possible". Before coming to a decision on this advice I will need to take careful consideration of the various interests and ensure it is based on all the information available.

The availability of gas from the Groningen field is of great importance for both Dutch and foreign customers. In the Netherlands this gas is used in almost all households, institutions and businesses. But besides the Netherlands, Germany Belgium and France use gas from Groningen. Last year 47 billion m³ of gas was extracted from the Groningen field, approximately half of which was sold in the Netherlands and the rest abroad. An added complication is that gas from the

¹ See map attached showing earthquakes in the area around the Groningen field in the 1996-2012 period..

Groningen field is low-calorific gas, in contrast to the gas from the small fields in our country and the gas from Norway and Russia. Central heating boilers and cookers suitable for low-calorific gas cannot be used for high-calorific gas and vice versa. The facilities presently available to convert high-calorific gas to low-calorific gas, by adding nitrogen, are limited. The Groningen field therefore holds a unique position in gas provision for north-western Europe. Groningen gas production cannot be replaced by gas imports or other measures in the foreseeable future. Reduced availability of Groningen gas would have serious consequences for Dutch society and those of our neighbouring countries.

The sale of Groningen gas also has consequences for the National Budget. A reduction in annual production of 10 billion m³ (approximately 20 per cent) at the current gas price would result in a shortfall in the National Budget of EUR 2.2 billion a year, including corporation tax.

Also, as I explained in section 2, we do not have a full understanding of the potential magnitude of future earthquakes in the Groningen field. This all makes it difficult to justify a decision to reduce production without more information. The maximum earthquake magnitude we should be factoring in for the Groningen field will have to be determined from geomechanical and seismological studies. The NAM has already started these studies and will now accelerate the process. Independent experts will follow the execution of the studies closely. The results will also be assessed by independent experts. For the purposes of the studies the existing monitoring network will be expanded, making more precise data available. The study results will be used to draw up a revised extraction plan, which the NAM will submit on 1 December 2013 for assessment by SodM.

The period until 1 December 2013 can also be used to study the possibility of limiting the number and magnitude of earthquakes by using alternative extraction techniques to achieve the same rate of production. The NAM has also initiated this research and will now accelerate the process.

I will ask SodM to advise me on a revised extraction plan based on the study's outcome after which I will consider whether further measures regarding production are necessary.

4. Conclusion

The SodM, Nam and KNMI studies have all made it clear that we can no longer maintain the assumption that the maximum magnitude of earthquakes from gas extraction in the Groningen field would be 3.9 on the Richter scale. Tremors greater than 3.9 are possible. The studies will determine the level of magnitude which should now be taken into account. Appropriate measures will be taken to reduce the effects of stronger earthquakes on the inhabitants of the area. Further research will be carried out to enable us to reach an informed decision on any further measures necessary to reduce the possibility of such earthquakes.

I will ensure that the NAM takes the measures outlined above and carries out or commissions the research. The results of this research should clarify whether extra measures are necessary and if so what they should be. I will keep the House informed of the progress made. In this context I would suggest I arrange to have a technical briefing organised in the near future, at which staff of the Ministry of Economic Affairs, the SodM, the NAM and the KNMI will be present to answer questions.

Yours sincerely,

Henk Kamp
Minister of Economic Affairs

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