

LEGISLATIVE ASSEMBLY OF THE NORTHERN TERRITORY

WRITTEN QUESTION

Mr Guyula to the Minister for Environment; and Water Security:

**Groundwater salinity records**

Newly released groundwater monitoring data from the Santos Tanumbirini exploratory frack site reveals apparent sharp increases in groundwater salinity recorded by electrical conductivity (EC) sensors in September 2019.

If the EC sensor readings for this site are accurate, then the possibility of cross-contamination from a deeper, non-potable aquifer is raised and must be investigated. If the EC sensor readings are not accurate, and were the result of faulty equipment, then there are equally serious questions about: the calibre of monitoring equipment approved for use by the NT Government; about the delay in checking and replacing the sensors following the anomalous data; and about the NT Government's approach to ensuring quality control in the groundwater monitoring system.

- 1. Following the sharp increases in groundwater salinity recorded by electrical conductivity (EC) sensors at the Santos Tanumbirini exploratory frack site in September 2019, why were the EC loggers not checked and, if found to be faulty, replaced immediately following the anomalous results?**

The *Code of Practice: Onshore Petroleum in the Northern Territory* (the Code of Practice) requires all equipment used for monitoring to be suitably maintained, laboratory checked and calibrated. All interest holders must comply with the Code of Practice.

The Department of Environment, Parks and Water Security (DEPWS) was formally advised of technical issues associated with the electrical conductivity loggers in registered bores RN040936 and RN040930 on 28 October 2019. The interest holder had observed a drift in the logger data and was proactively investigating the efficacy of the logger data as per the *Preliminary Guideline: Groundwater Monitoring Bores for Exploration Petroleum Wells in the Beetaloo Sub basin* (the Groundwater Guideline).

Where a change in groundwater logger data is detected, further investigation is required. In this instance, further investigation showed there was no actual change in electrical conductivity. This was confirmed by samples that were taken and tested in quality controlled laboratory

conditions. The drift in the logger data was the result accumulation of materials on the sensor (fouling).

In this instance the logger was not replaced as there were both field measurements and laboratory based analyses which demonstrated electrical conductivity was within the expected range.

A Regulatory Statement has been published on the DEPWS web page. The statement provides a comprehensive overview of the technical aspects and challenges associated with the use of loggers for continuous groundwater monitoring in the Beetaloo Sub-basin. Fouling of water loggers is not an uncommon occurrence.

**2. What are the applicable standards for this type of sensor in a best practice groundwater monitoring programme, and did Santos' loggers meet these standards? If so, why did they fail?**

The Code of Practice requires groundwater sampling to be undertaken in accordance with the Groundwater Guideline. The Groundwater Guideline does not prescribe equipment to be used. In this instance the "In-Situ Aqua TROLL 200 Data Logger" was used.

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**3. What steps does the NT Government take to maintain quality assurance with respect to the groundwater monitoring equipment used by gas companies to meet their reporting obligations? For example, how frequently does the NT Government independently verify the reported EC data, and/or require companies to check their sensors are functioning appropriately?**

Where a change in groundwater logger data is detected, further investigation is required. In this instance, further investigation by the interest holder showed there was no actual change in electrical conductivity. This was confirmed by samples that were taken and tested both in the field and in quality controlled laboratory conditions. The drift in the logger data was the result of fouling of the loggers.

No enforcement action has been taken in relation to this matter as the quality controlled laboratory analysis of the samples taken show there is no

significant variation in electrical conductivity outside of natural variation in those bores.

Compliance officers in DEPWS continue to monitor the situation and will continue to investigate any results or trends seen in the data that suggest groundwater is being impacted.

- 4. When was the Minister made aware of the rapid increase in the electrical conductivity (EC) sensor readings in the EC sensors in the bore RN040936, also known as the Impact Monitoring Bore at Tanumbirini?**

DEPWS was advised of technical issues associated with the electrical conductivity loggers in registered bores RN040936 and RN040930 on 28 October 2019. The interest holder had observed a drift in the logger data and was proactively investigating the efficacy of the logger data as per the Groundwater Guideline.

- 5. When was the Minister made aware of the rapid increase in the electrical conductivity (EC) sensor readings in the bore RN040930, also known as the Control Monitoring Bore at Tanumbirini?**

See response to Q 4.

- 6. What actions has the Minister undertaken in response to this recorded change in measurements from EC sensors?**

Where a change in groundwater logger data is detected, further investigation is required. In this instance, further investigation showed there was no actual change in electrical conductivity. This was confirmed by samples that were taken and tested both in the field and in quality controlled laboratory conditions. The drift in the logger data was the result of fouling of the loggers.

No enforcement action has been taken in relation to this matter as the field measurements and the quality controlled laboratory analysis of the samples taken show there is no significant variation in electrical conductivity outside of natural variation in those bores.

Compliance officers in DEPWS continue to monitor the situation and will continue to investigate any results or trends seen in the data that suggest groundwater is being impacted.

7. **Has the Minister received any evidence from Santos as to the accuracy of the readings, and if so, when? If the Government considers that the readings are erroneous then why were the sensors not replaced for 12 months?**

All interest holders must comply with the Code of Practice. The Code of Practice requires groundwater monitoring of control and impact monitoring bores in accordance with the Groundwater Guideline.

The logger readings were shown to be inaccurate based on both field measurements of electrical conductivity by the interest holder, as well as quality controlled laboratory analyses of electrical conductivity. Both of these monitoring methods showed no change to electrical conductivity at the same time that the loggers were providing inaccurate readings. Verified data was provided in accordance with required timeframes. The logger was not replaced.

See also response to Q 4.

A Regulatory Statement has been published on the DEPWS web page. The statement provides a comprehensive overview of the technical aspects and challenges associated with the use of loggers for continuous groundwater monitoring in the Beetaloo Sub-basin. Fouling of water loggers is not an uncommon occurrence.

8. **Who approved the monitoring regime in these bores and the use of single sensors instead of multilevel arrays as specified in Pepper recommendation 7.11, and what make and model of sensors are being used?**

The required monitoring regime is established in the Groundwater Guideline. The groundwater monitoring program conducted by the interest holder complied with the requirements of the Groundwater Guideline. During development of the Groundwater Guideline it was acknowledged that placing electrical conductivity sensors at each of the screened levels of a groundwater bore (top, middle and bottom of the aquifer) was not likely to consistently provide meaningful results, because the very slow rates of flow of groundwater in the Beetaloo Sub-basin would mean the loggers are measuring stagnant water in the bore casing – not the quality of water in the aquifer. The stagnant water in the bore column is also the primary cause of fouling of sensors. The preferred method for obtaining a representative sample of water quality in the aquifer in low groundwater flow environments, and therefore provide certainty as to any change to electrical conductivity, is to pump groundwater from the bore to create flow

across the screens. The Groundwater Guideline therefore requires this sampling approach.

A Regulatory Statement has been published on the DEPWS web page. The statement provides a comprehensive overview of the technical aspects and challenges associated with the use of loggers for continuous groundwater monitoring in the Beetaloo Sub-basin. Fouling of water loggers is not an uncommon occurrence.

**9. Did the Minister take this data into consideration when approving the Santos EMP in 2021?**

The quality controlled laboratory analysis of the samples taken show there is no significant variation in electrical conductivity outside of natural variation in those bores.

All information required by the Petroleum (Environment) Regulations 2016 was considered when making recommendations and decisions on environment management plans.

**10. Where is the data from the other monitoring bores in the region as required by recommendation 7.11?**

Recommendation 7.11 does not contain such a requirement.

**11. Why was data from this event in August 2019 denied to the community until Jan 2022?**

The Petroleum Onshore Information NT (POINT) portal was established in March 2021. Since then, there has been an ongoing program of uploading historical data, as well as new data and reports.

Verified groundwater monitoring data from the referenced bores is published on the DEPWS website as it becomes available, consistent with recommendation 7.11.

**12. Did the EPA take this data into account when it said in correspondence to you there was no evidence of risk to stygofauna?**

See response to Q 9.