

**RESPONSE TO THE SANTOS NARRABRI GAS PROJECT
ENVIRONMENTAL IMPACT STATEMENT
BY SIDING SPRING OBSERVATORY, COONABARABRAN**

1. BACKGROUND

Siding Spring Observatory (SSO) is Australia's national facility for optical astronomy. Situated on a high ridge in the Warrumbungle Mountains, it hosts a suite of more than 20 telescopes operated by the Australian National University (ANU) and other agencies, including significant international collaborations. Among the facilities are the two telescopes of the Australian Astronomical Observatory (AAO), a division of the Commonwealth Department of Industry, Innovation and Science. One of these (the 3.9-metre Anglo-Australian Telescope) is the largest optical telescope in Australia, and is expected to remain so for at least the next two decades. The total infrastructure investment at Siding Spring is in excess of \$100 million at today's costs.

The Santos Narrabri Gas Project is sufficiently close to the Observatory to raise concerns about the incremental effects of light pollution from infrastructure lighting and gas flaring. Upward sky-glow from unshielded light sources is the major threat to a pristine night sky, with the deleterious effect depending on the number, intensity and distance of the sources. In the case of the Narrabri Gas Project, the southernmost point of the project area is 78km from Siding Spring, while the two principal locations for infrastructure lighting and flaring are respectively 90km (Biblewindi) and 100km (Leewood) from the observatory. In addition, up to six pilot flares will be in operation during the installation phase of the project, and they may be located anywhere within the project area.

The preservation of a night sky unpolluted by artificial light is imperative to the future operation of Siding Spring, which continues to attract infrastructure investment from domestic and international scientific institutions. It is the protection of the night sky under NSW planning legislation that is one of the main reasons for Australia's success in attracting these ventures to the site. The legislation consists of the *Environmental Planning and Assessment Amendment (Siding Spring Observatory) Regulation 2016* and its subsidiary documentation, in particular the associated *Dark Sky Planning Guideline*. These mandate the implementation of the provisions of the *Guideline* in State Significant developments on land within 200 kilometres of the observatory.

This submission is a response to the exhibition of the Santos Narrabri Gas Project's Environmental Impact Statement (EIS) made by the Siding Spring Dark Sky Committee on behalf of the Australian Astronomical Observatory, the Australian National University and other stakeholders on the Siding Spring site.

2. CONCERNS FROM THE EIS

We acknowledge the cooperation of Santos and their willingness to engage with the Siding Spring Dark Sky Committee in order to understand and mitigate the damaging effects of light sources associated with the project. The company has been at pains to have an open discussion with the Committee, which we value greatly.

In this section, we highlight our concerns relating to specific issues in the EIS.

50-metre flare stacks. The elevation of the two permanent flare stacks at Bibblewindi and Leewood to a height of 50 metres above ground level is our foremost concern. We appreciate that these are principally safety flares for non-routine conditions, but we should like to ask to what extent they will be used during commissioning, and the likely frequency of their operation in emergencies. What other situations might be considered non-routine? In the extreme circumstance of enough gas being vented to produce a 30-metre flare, we believe that this would not only have line-of-sight visibility from the observatory, but would also impact on the night sky background. We request an estimate of the luminance of the flaring gas, from which we can calculate the expected luminous flux in lumens.

Pilot flares. We are also concerned that the pilot flares could contribute to the upward light-spill of the project as a whole, particularly if the maximum of six are in operation at any one time. With blue flames of an expected height of four metres, as stated in the EIS, there is a risk of significant light pollution, since blue light is the most damaging to the environment due to its high scattering properties. Once again, it would be helpful to have an estimate of the luminance of the flaring gas.

Construction lighting from drill rigs. While there is clearly potential for light pollution during the installation of the well pads, this can be mitigated by the use of full cut-off light fittings throughout. The environmental impact can be further reduced by the use of low colour-temperature lamps, in which the damaging blue component of white light is minimised. Santos is aware of these requirements, and we are confident that they will be implemented; we would, however, like to have confirmation of the details.

Construction and operational site lighting at Leewood, Bibblewindi and Westport workers' accommodation. Once again, the effects of light pollution from these facilities can be mitigated by the use of full cut-off light fittings and low colour-temperature lamps, and we request confirmation of these details.

Light scattering from raised dust. The emission of particulate matter such as dust is unlikely to have a direct effect on the sky transparency at Siding Spring. However, in any construction and drilling activities undertaken outside daylight hours, there is a risk that raised dust will enhance the scattering of stray light and contribute to unwanted sky-glow. We request that dust-mitigation procedures are followed during night-time construction and drilling operations.

Cumulative impacts. Finally, we stress that the detrimental effects of light pollution on an observatory represent a 'death by a thousand cuts'. Any light emissions from the Narrabri Gas Project would add to the existing emissions from other resource extraction projects, neighbouring communities and regional cities, pushing the night sky background inexorably towards the critical threshold quoted in Section 3.3 of the *Dark Sky Planning Guideline*.

3. CONSIDERATION OF SHIELDING

Given that our principal concerns centre around the likely impact of gas flares, we request that Santos explore the possibility of shielding the flares. We note that enclosed flares are briefly described in the NSW Environmental Protection Authority's Gas Flaring Fact Sheet at:

<http://www.epa.nsw.gov.au/resources/epa/2564-gas-flaring-fact-sheet.pdf>

If it is possible to fully shield a gas flare to prevent light escaping in any direction, this would eliminate the issue of light-pollution from the flares altogether. It would be especially valuable for the permanent flares at Bibblewindi and Leewood, but would also be advantageous in the case of the pilot flares.

4. THE WAY FORWARD

The Siding Spring Dark Sky Committee recognises that the current realities of energy production in Australia dictate that ventures such as the Santos Narrabri Gas Project are necessary. The challenge is to carry out these activities while preserving the pristine environment of Siding Spring so it can continue as a major contributor to the nation's scientific well-being. That being so, we are keen to continue working with Santos to minimise any detrimental impact on the observatory from the project, and will make resources available to achieve that.

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