

EXPLORATION FOR NATURALLY OCCURRING HYDROGEN LEGISLATED IN WESTERN AUSTRALIA

Constellation Resources Limited (the "Company" or "Constellation") is pleased to announce that the Western Australian parliament has passed the *Petroleum Legislation Amendment Bill 2023*^{5,6} which establishes the framework for both the exploration for, and subsequent inclusion into existing gas pipelines, of naturally occurring hydrogen in Western Australia.

Constellation was recently advised that it had been conditionally accepted as the preferred applicant for six Special Prospecting Authorities with an Acreage Option ("SPA-AO") applications over the Edmund-Collier and Yerrida Basin areas (Figure 1), a cumulative area of 56,192km². Constellation considers that it has selected two of the most prospective large-scale basin opportunities for hydrogen, helium and associated gases that will give it a first mover advantage in the search for natural hydrogen in Western Australia.

HIGHLIGHTS

- Company's previously announced SPA-AO applications now considered to be prospective for hydrogen, helium and associated gases.
- Global hydrogen demand is expected to grow fivefold by 2050.¹ Current hydrogen consumption is mainly sourced from grey Hydrogen (produced by natural gas) and the search for and uses of a zero-carbon source of hydrogen is gathering momentum worldwide.
- Natural hydrogen is a colourless, odourless, tasteless and non-toxic energy source, with only a water vapour by-product, making it a zero-carbon fuel, with no water requirements needed for production.
- Natural hydrogen is sourced underground and offers the potential for significantly lower cost of production and carbon emissions compared to other hydrogen production (including subsidies).²
- The world's only known natural hydrogen producing field is Bourakebougou in Mali, Africa which has been generating carbon free electricity utilising natural hydrogen since 2012.^{2,3} The Company considers its Edmund Collier Project to have the potential to be a larger scale analogue of Bourakebougou.
- The Yerrida Basin Project applications are bookended by reported gas outbursts from nearby underground mining operations hosted in Archean rocks and capture the strike extension of major, deep seated lithospheric structures and Archean stratigraphy.
- The proximity of both the Edmund Collier and Yerrida Basin projects to the Dampier to Perth and Goldfields gas pipelines offers a potential solution to market should a discovery occur.⁴

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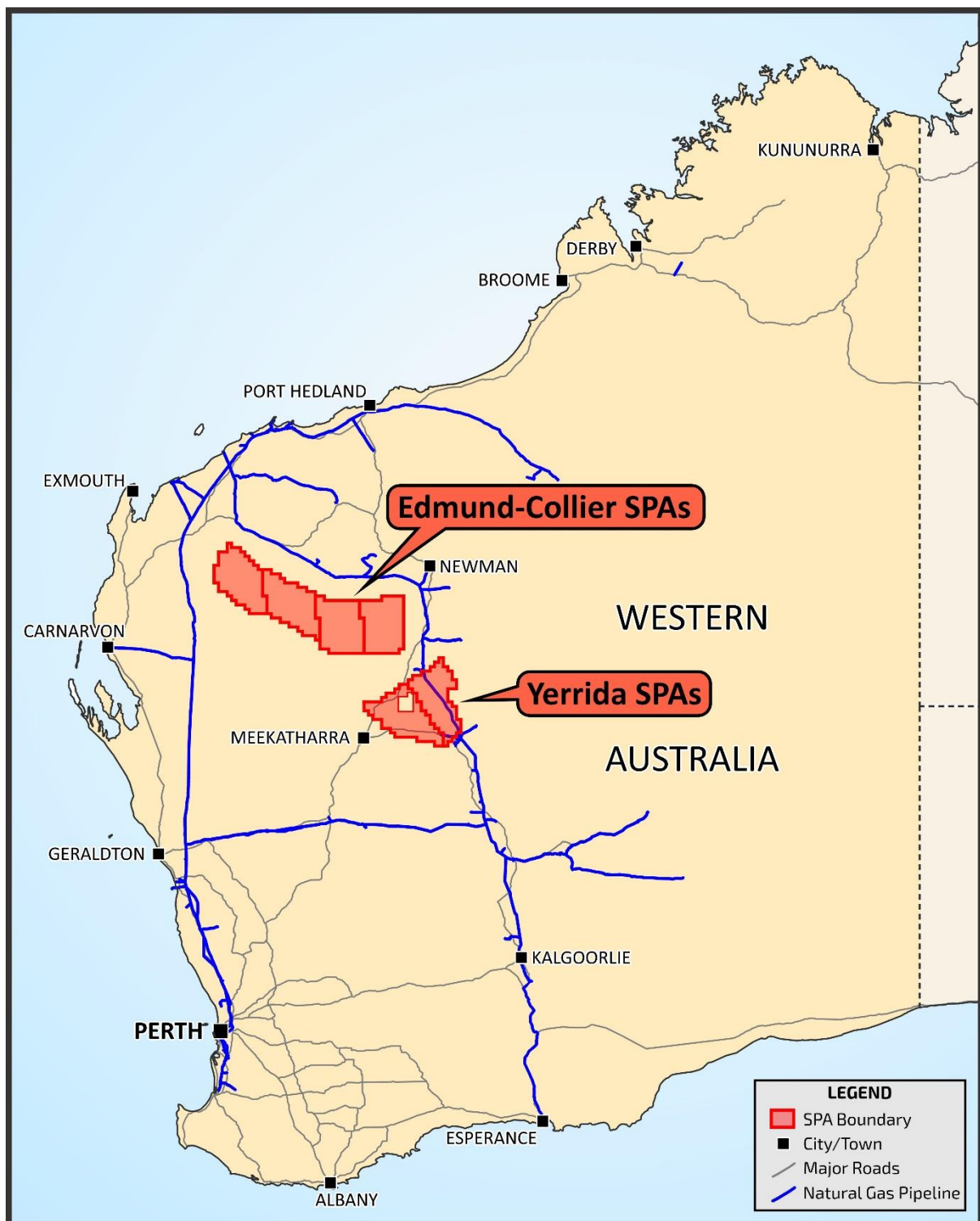


Figure 1: Edmund-Collier and Yerrida Basin Projects SPA-AO Application Locations.

INTRODUCTION

The Western Australian parliament has recently passed the *Petroleum Legislation Amendment Bill 2023*^{5,6} ("Bill") which establishes the framework for both the exploration for, and subsequent inclusion into existing gas pipelines, of naturally occurring hydrogen in Western Australia. The Bill enables exploration for naturally occurring hydrogen through the concept of a regulated substance which is an element that occurs naturally within a natural geological formation. Hydrogen offers a potentially zero-emission option to assist Western Australia in decarbonising its energy production. The Bill amends the *Petroleum and Geothermal Energy Resources Act 1967*, *Petroleum Pipelines Act 1969* and *Petroleum (Submerged Lands) Act 1982*.

As previously announced, the Company's 100% owned subsidiary CR1 Energy Pty Ltd ("CR1 Energy") has been advised that it is the preferred applicant for six SPA-AOs (STP-SPA-0116-21) in the Edmund Collier Basin and Yerrida Basin areas of Western Australia (Figure 1). The six SPA-AOs are a preliminary but not guaranteed offer to progress to a granted licence in accordance with the requirements and timelines as outlined under "*SPA-AO Applications and Timeline*" in the Company's announcement dated 6 March 2024.

The Company completed a detailed technical appraisal of the SPA-AOs areas and identified all the critical elements needed for a prospective hydrogen, helium gas system, of a scale that has the potential to generate large targets. The applications for the SPA-AOs are seen as a conceptual, early-stage, cost-effective, complimentary opportunity which was generated by organic growth within the Company.

Once a granted SPA-AO is received, the proposed exploration work programs in the application areas draw on the ideologies behind 'first-mover advantage' — where the largest discoveries in an unexplored field for either metals or petroleum are usually shallow and found early with simple and low-cost exploration techniques in the field's history.

The Company's underlying technical assumption is that the largest and most viable hydrogen and helium gas accumulations will likely leak at the surface. Thus, the identification of anomalous gas seeps or 'invisible gossans' can be achieved utilising low-cost and simple but sophisticated detection techniques to assess the prospectivity of the Edmund–Collier and Yerrida Basins. The Company is currently working on land access identification and notification programs prior to planned soil gas surveys as outlined in the Company's announcement dated 6 March 2024 titled "*SPA-AO Applications Accepted for Helium and Associated Gases in Western Australia*".

EDMUND-COLLIER

The Edmund-Collier Project is located in the Gascoyne Province of Western Australia. The four contiguous SPA-AOs (477 graticular blocks covering 37,288km²) span an east west strike length of approximately 380km and are bordered to the north, east and west by gas transmission pipelines (Figure 2).

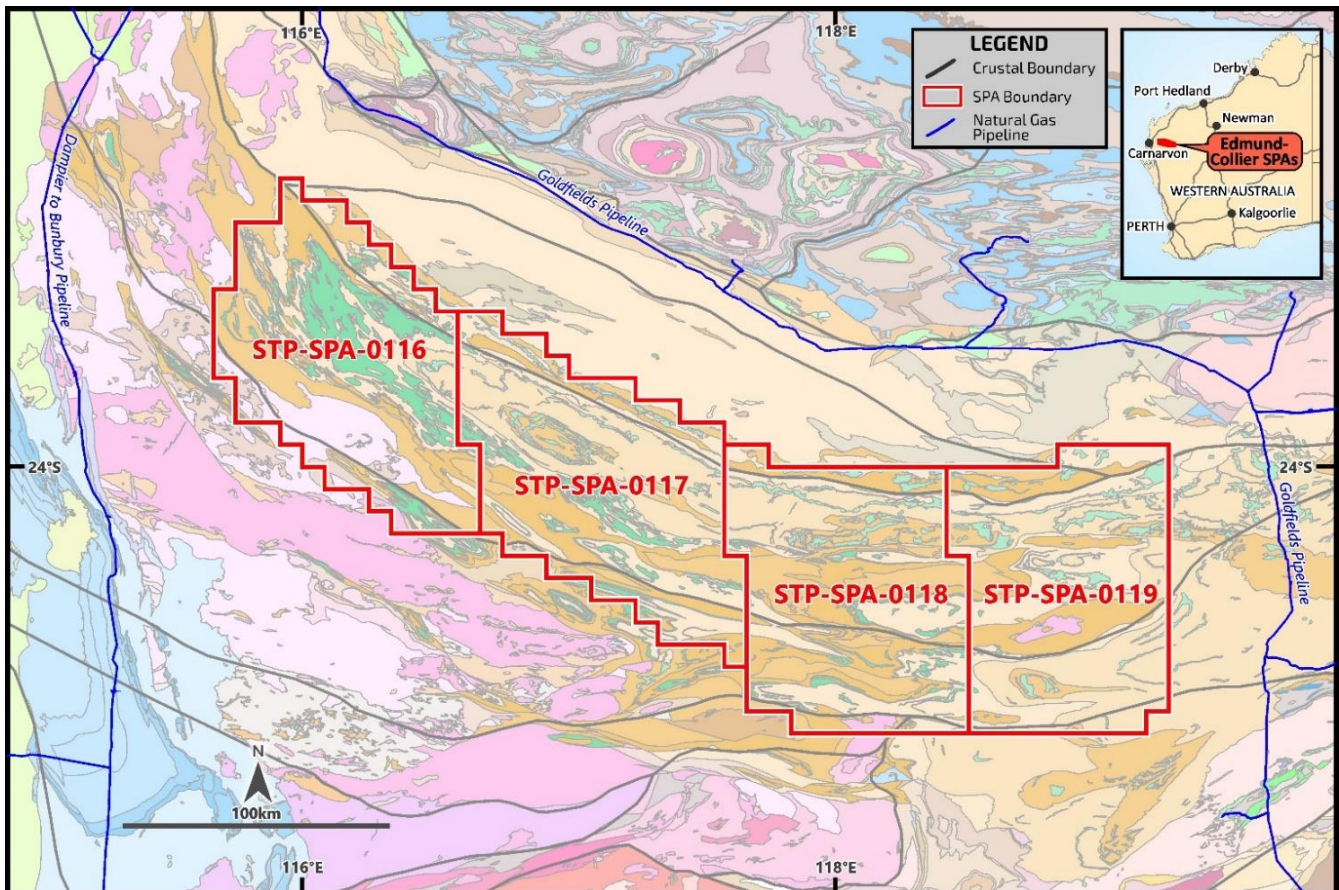


Figure 2: Edmund-Collier Basin STP- SPA-0116-19 Application Locations.

Geology

The Edmund Fold Belt which covers most of the four SPA-AOs is largely outcropping and contains a well-documented folded succession of up to 5km thick Proterozoic clastics, carbonates and dolerite sills, with associated deeply penetrating fault systems that cap the radiogenic Proterozoic basement.

High heat-producing radiogenic Paleoproterozoic granites of the Gascoyne Province are prospective source-rocks for both hydrogen and helium generation. Hydrogen generation is likely from hydrolysis of groundwater and also from primordial degassing. Helium generation is most likely from the extremely long-lived radiogenic decay of uranium and thorium in granites of the Durlacher and Moorarie Supersuites and potentially also from some sedimentary rocks. Refer conceptual cross section below (Figure 3).

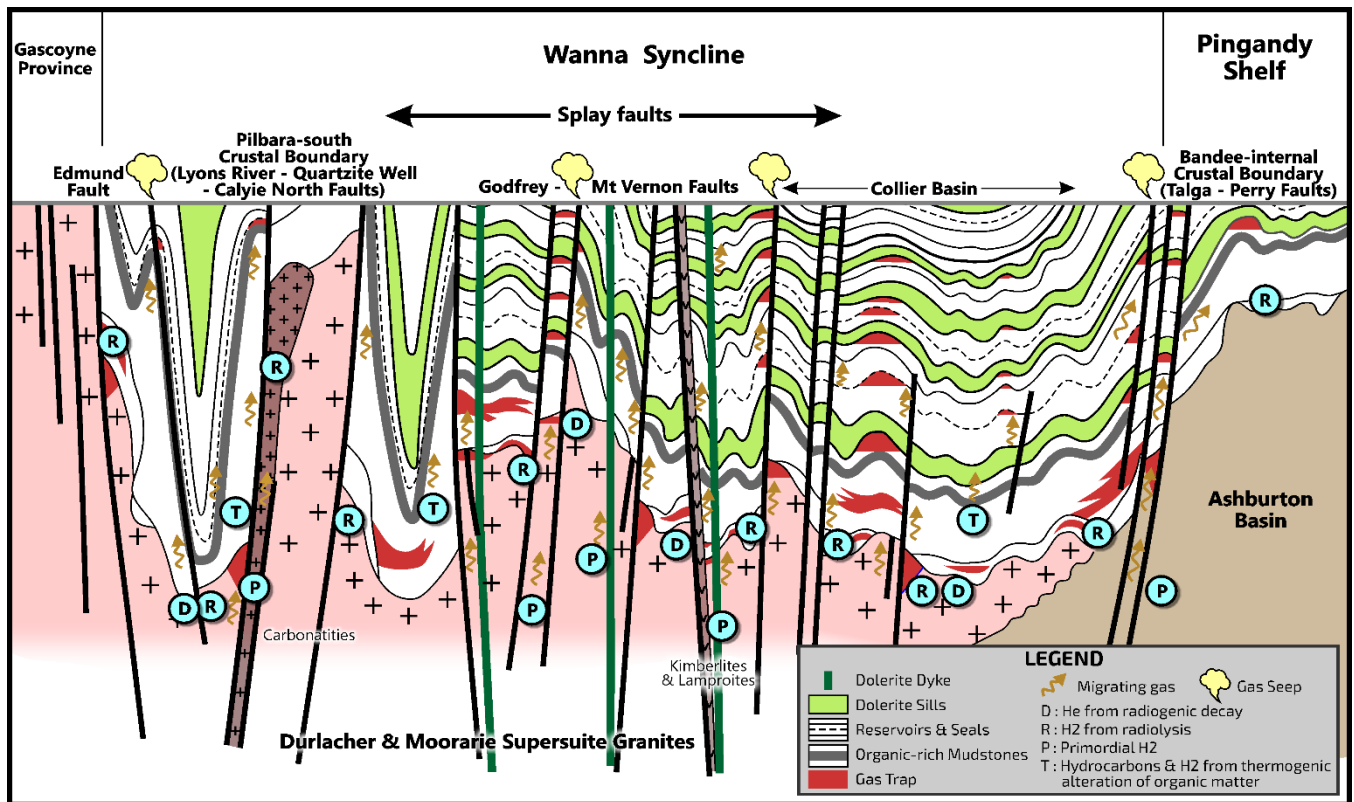


Figure 3: Conceptual Edmund Collier Basin Hydrogen - Helium System.

Migration pathways include significant structures along lithospheric-scale crustal boundaries and their splay faults and via sedimentary aquifers. These fault zones parallel the present-day maximum horizontal-stress direction and are in extensional orientation conducive for gas migration into nearby traps during contemporary earthquake activity. This may also lead to surface gas leaks that are amenable for direct detection techniques.

A significant opportunity in the Edmund–Collier is the development of multiple and long-lived traps for gas accumulations, including anticlinal and structural traps, stratigraphic depositional pinch outs and diagenetic traps, and density driven hydrologic traps. Importantly, prospective fold-closures at surface can be extrapolated in the subsurface in various geophysical interpretations. Numerous tectonic events and geological process are recognized that were potential drivers for gas generation and migration and for driving and rapidly focussing gas into traps.

Importantly, widespread anticline development since c. 1171 Ma and voluminous dolerite intrusions have provided traps for the potential accumulation of ongoing hydrogen and helium gases for at least one billion years.

YERRIDA

The Yerrida Basin Project is located north west of Wiluna in Western Australia. The two contiguous SPA-AOs (235 graticular blocks covering 18,904km²) cover the majority of Yerrida Basin outcrop and the Goldfields gas transmission pipeline passes through the eastern side (Figure 5).

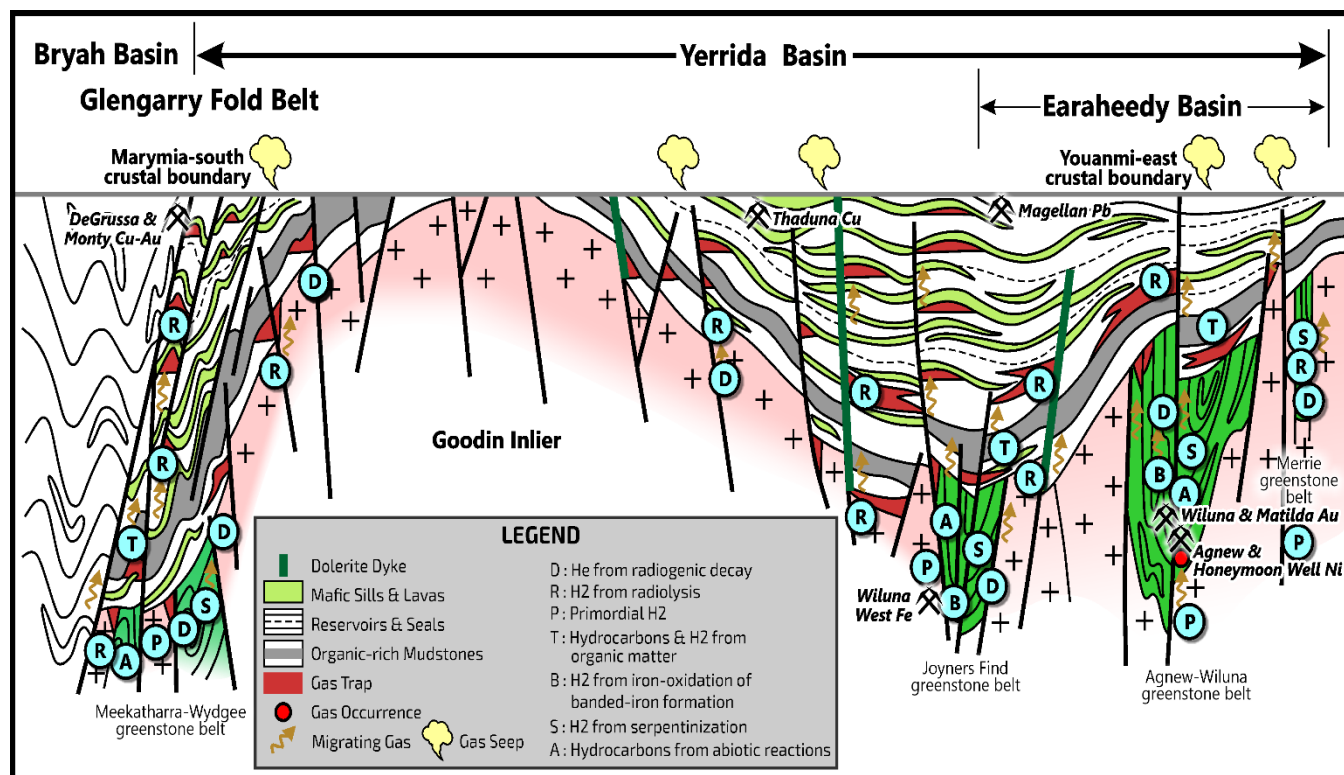


Figure 4: Conceptual Yerrida Basin Hydrogen - Helium System.

Geology

The Yerrida Basin succession is largely outcropping and contains a mildly to highly folded succession of clastic and carbonate sedimentary rocks and mafic intrusive and extrusive igneous rocks up to 5-6km thick.

Beneath the Yerrida Basin are heat-producing Archean granites and greenstone belts of the northern Yilgarn Craton which are the prospective source-rocks for hydrogen and helium gas generation. Helium generation is potentially predicted from extremely long-lived radiogenic decay of uranium and thorium in granites beneath the Yerrida Basin, and potentially also from some sedimentary rocks. Hydrogen could be generated from: 1) radiolysis of groundwater by high heat-producing granites; 2) serpentinization of ultramafic rocks within greenstone belts; 3) Degassing from primordial mantle-core sources through deep-seated structures; 4) oxidation of banded iron-formations in greenstone belts; and 5) thermogenic alteration of organic-rich rocks within the Yerrida Basin. Refer conceptual cross section above (Figure 4).

Encouragingly, the Yerrida Basin prospectivity is underpinned by reported methane (CH₄) and hydrogen gas outbursts from several Archean-hosted underground mines immediately north and south of application area (as reported under Section 78(3e) of the Mines Safety and Inspection Act 1994; obtained in freedom of information request by the Company). These gas occurrences are aligned with a crustal-scale fault zone that cross-cuts the overlying Paleoproterozoic Yerrida Basin and supports the fertility of the Yerrida SPA-AO. Importantly, the Yerrida Basin contains long-lived traps analogous to Bourakebougou in Mali — the world's only known natural hydrogen producing field³.

Migration pathways in the Yerrida Basin include mapped basin-wide structures and lithospheric-scale crustal boundaries, and clastic and carbonate aquifers. It is likely that mine-gas intersections reported in Archean greenstone belts adjoining the Yerrida Basin are closely associated with such deep-seated structures. Many fault zones within the basin have paralleled the maximum horizontal-stress direction (dilatational orientation) during the Late Phanerozoic and consequently were potentially conducive for He and H₂ migration during seismic activity. Migration through these zones may also have led to surface gas leaks, which may be amenable for direct detection techniques.

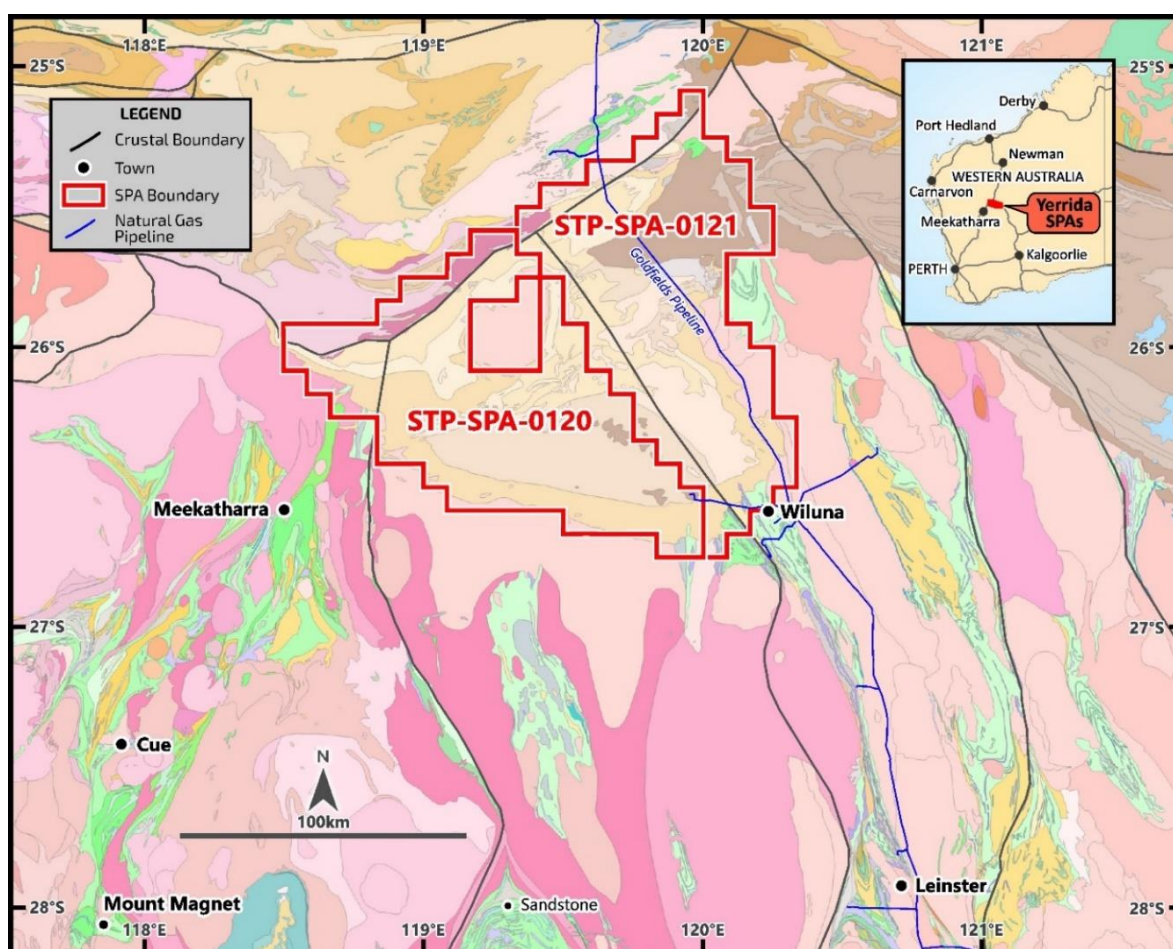


Figure 5: Yerrida Basin STP- SPA-0120-21 Application Location.

FORWARD LOOKING STATEMENTS

Statements regarding plans with respect to Constellation's projects are forward-looking statements. There can be no assurance that the Company's plans for development of its projects will proceed as currently expected. These forward-looking statements are based on the Company's expectations and beliefs concerning future events. Forward looking statements are necessarily subject to risks, uncertainties and other factors, many of which are outside the control of the Company, which could cause actual results to differ materially from such statements. The Company makes no undertaking to subsequently update or revise the forward-looking statements made in this announcement, to reflect the circumstances or events after the date of that announcement.

This ASX Announcement has been approved in accordance with the Company's published continuous disclosure policy and authorised for release by the Company's Managing Director, Peter Woodman.

References:

¹ "Global Energy Perspective 2023 – McKinsey" - <https://www.mckinsey.com/industries/oil-gas/our-insights/global-energy-perspective-2023-hydrogen-outlook>

² "Natural Hydrogen: A New Source of Carbon-Free and Renewable Energy That Can Compete with Hydrocarbons" - <https://www.earthdoc.org/content/journals/10.3997/1365-2397.fb2022087>

³ "Characterization of the spontaneously recharging natural hydrogen reservoirs of Bourakebougou in Mali" - <https://www.nature.com/articles/s41598-023-38977-y>

⁴ "Study proves feasibility of gas to hydrogen pipeline conversion" - <https://www.wa.gov.au/government/media-statements/McGowan-Labor-Government/Study-proves-feasibility-of-gas-to-hydrogen-pipeline-conversion-20230519>

⁵ <https://www.parliament.wa.gov.au/parliament/bills.nsf/BillProgressPopup?openForm&ParentUNID=73CC60C376933B0848258A7500359AA0>

⁶ [https://www.parliament.wa.gov.au/parliament/bills.nsf/73CC60C376933B0848258A7500359AA0/\\$File/Bill%2B142-1.pdf](https://www.parliament.wa.gov.au/parliament/bills.nsf/73CC60C376933B0848258A7500359AA0/$File/Bill%2B142-1.pdf)

⁷ <https://www.wa.gov.au/government/media-statements/Cook-Labor-Government/Carbon-capture-and-storage-Bill-passes-WA-Parliament-20240508>

