An archaeological survey of the Moon 1 to Kerna 2 Pipeline Route, SW Queensland

Permit Number SW08/EIS/2001

Tickalara 1:250 000 Topographic Map

A report to Santos Ltd
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Cover photo: Wangkumarra heritage advisors Mr Peter Ebsworth and Mr Robert Smith at the South Australian - Queensland border, the point at which the survey concluded.

Executive summary

Santos Ltd proposes to build a 5.6km pipeline to connect the Moon 1 gas well in south west Queensland with the Kerna gas field in north eastern South Australia. The pipeline route passes through crosses the Queensland – South Australian border approximately 4.13km from Moon 1. This report documents the methodology and findings of the site investigation of the Queensland portion of the pipeline route and makes recommendations for the mitigation of impacts to cultural heritage items during pipeline construction.

The Queensland portion of the pipeline route was checked on the 13th June 2002 by representatives of the Wangkumarra Aboriginal community: Mr Peter Ebsworth and Mr Robert Smith accompanied by a surveyor, Mr Joe D'Aloia, and archaeologist Allan Lance under the authorisation of EPA permit SW08/EIS/2001. The pipeline route was followed on foot giving detailed survey coverage within a 50m wide corridor.

Two locations containing evidence of prior Aboriginal visitation were identified along the Queensland segment of the pipeline route. These were a single flake located on the sandy surface of a low sand dune, and a low density scatter of artefacts on the baked clay surface at the junction of a low sand dune and an ephemeral claypan. The later of these two locations, neither of which met the criteria for classification as sites, contained a small number of artefacts found at a density of 1/5m^2.

No non-indigenous heritage sites were detected during the field survey.

Construction impacts will be localised and will not adversely affect the region's cultural heritage values. The most effective way of minimising impact to undetected sites and isolated artefacts will be to confine construction activities to the right-of-way.

- Aboriginal heritage monitors will supervise ground clearing and trenching during construction of the pipeline. Any cultural material found during these operations will be reported to the EPA and mitigation measures formulated.

- Work will be restricted to the cleared right-of-way. Where extra work space is required, it will first be necessary for these areas to be examined by the Aboriginal monitors.

- Should items of heritage significance be revealed during construction, it will be necessary for appropriate remediation measures to be instituted. These measures may include collection of the cultural material, minor pipeline relocation or application for consent to damage the material sought from the Minister. The preferred measures will be formulated by the traditional owners in consultation

with the EPA and heritage advisors.

While the recommendations made in this report provide a guide as to the most appropriate measures for the protection of the Aboriginal cultural material along the proposed pipeline, these are not binding. The EPA may recommend additional measures deemed necessary to protect the cultural heritage along the pipeline route.

If the recommendations listed above are implemented, there can be no objection, on Aboriginal or cultural heritage grounds, to construction of the proposed Moon 1 to Kerna 2 gas pipeline.

1. Introduction

Santos Ltd proposes to build a 5.6km pipeline to connect the Moon 1 gas well in south west Queensland with the Kerna gas field in north eastern South Australia. The pipeline route passes through spinifex covered dunes, crossing the Queensland – South Australian border approximately 4.13km from Moon 1. Maps showing the location of the Queensland portion of the pipeline route are presented in Figures 1-2.

The Queensland portion of the pipeline route was checked by representatives of the Wangkumarra Aboriginal community: Mr Peter Ebsworth and Mr Robert Smith, to ensure that any evidence of prior Aboriginal occupation was identified, recorded and avoided in accordance with the Indigenous Land Use Agreement (ILUA) the Wangkumarra have with Santos for construction activities in this region. Mr Ebsworth is currently employed as a Santos Cultural Heritage officer.

Fieldwork was carried out on the 13th June 2002. The Aboriginal community representatives were accompanied by a surveyor, Mr Joe D'Aloia, who was on hand to record route changes if these were required. The findings of the site survey were documented in the field by Heritage Consulting Australia Pty Ltd archaeologist Allan Lance under the authorisation of EPA permit SW08/EIS/2001.

This report documents the methodology and findings of the site investigation of the Queensland portion of the pipeline route and makes recommendations for the mitigation of impacts to cultural heritage items during pipeline construction.

1.1 Project description

The pipeline connecting Moon 1 and Kerna 2 will entail the laying of a 15cm welded and coated pipeline. This will be buried at a depth of between 1 and 2 metres beneath the ground surface. The pipeline will be laid in a cleared right-of-way 15m wide, in which most construction activities associated with the pipeline will take place. A construction camps, and pipe and machinery lay-down areas may also be required during the period of construction. The right-of-way will be prepared by skimming vegetation from the surface. Deeper grading may be required to provide a level surface on which the trenching machinery will operate, particularly where the pipeline route crosses mobile sand dunes.

1.2 Heritage legislation

In Queensland all heritage items are protected by provisions of the *Cultural Records (Landscapes Queensland and Queensland Estate) Act 1987*, and are deemed under that Act to be the property of the Crown. This Act states (Section 56, subsection 2) that: "a person shall not take, destroy, damage, deface, excavate, expose, conceal or interfere with an

Figure 1. Location of the study area.

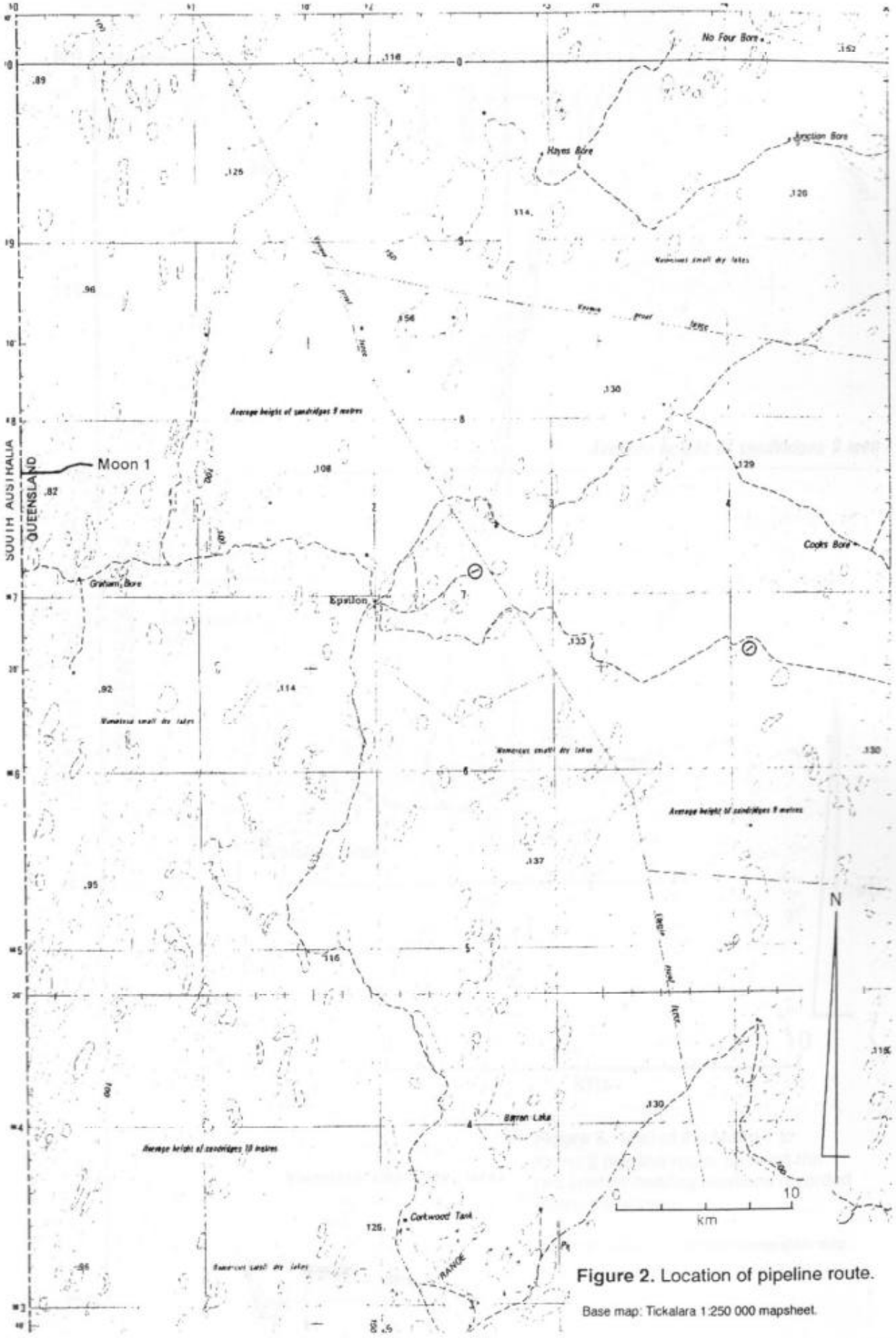

Figure 2. Location of pipeline route.

Base map: Tickalara 1:250 000 mapsheet.

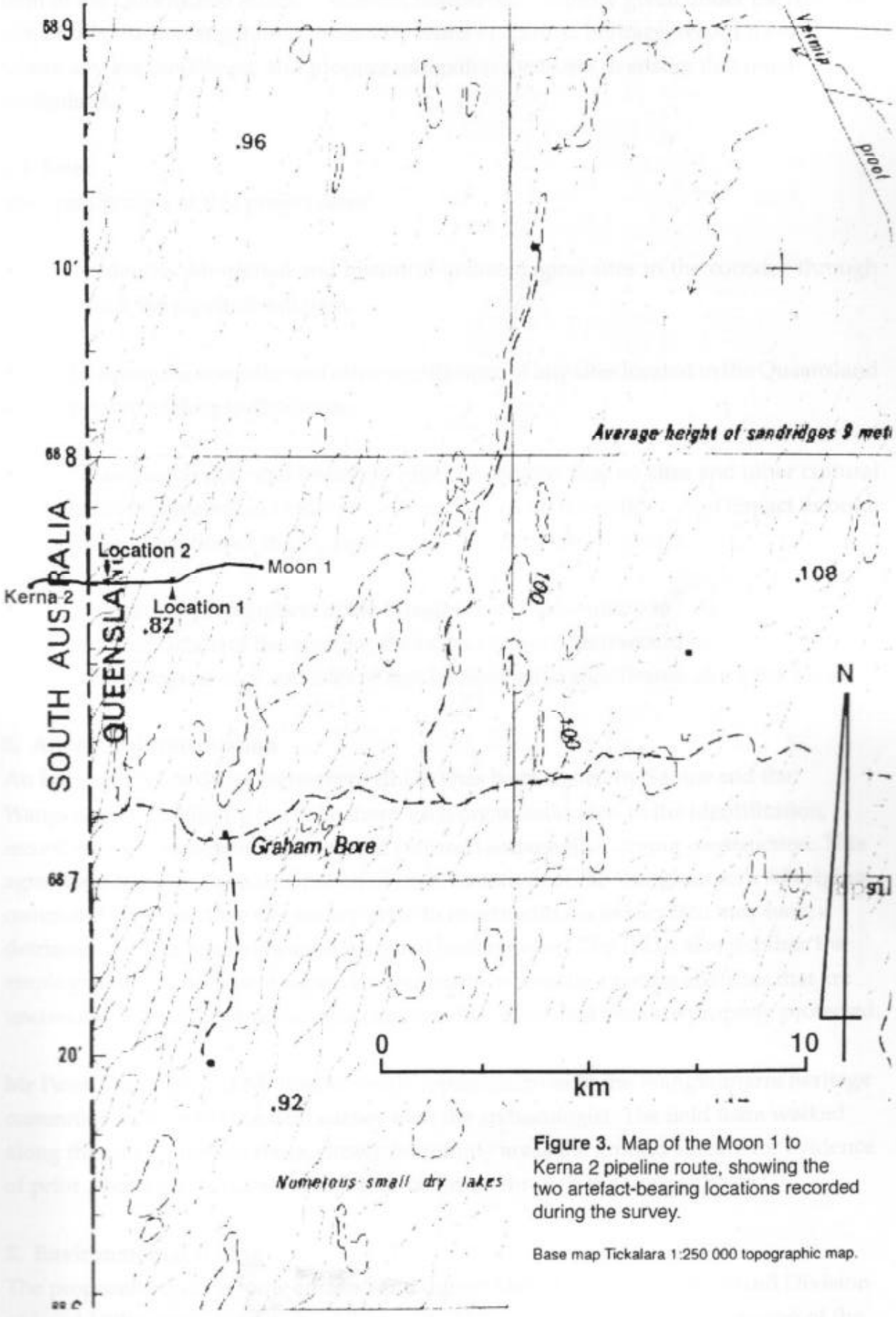

Figure 3. Map of the Moon 1 to Kerna 2 pipeline route, showing the two artefact-bearing locations recorded during the survey.

Base map Tickalara 1:250 000 topographic map.

item of the Queensland estate..." without ministerial authority given under the Act. The aim of this site investigation is to identify items of cultural heritage, record them and where any are threatened, and propose mitigation measures to ensure that impacts are minimised.

1.3 Brief

The specific aims of this project were:

- To identify Aboriginal and historical archaeological sites in the corridor through which the pipeline will pass.
- To assess the scientific and other significance of any sites located in the Queensland portion of the pipeline route.
- To assess the potential impact of pipeline construction on sites and other cultural heritage material and make recommendations for the mitigation of impact through minor deviation of the pipeline or other appropriate measures.
- To consult with members of the Wangkumarra community to ascertain their views on construction of the pipeline, the impact construction would have on Aboriginal archaeological sites and sites of special Aboriginal significance along the route.

2. Aboriginal consultation

An Indigenous Land Use Agreement (ILUA) has been signed by Santos and the Wangkumarra, outlining the obligations each organisation has in the identification, recording and protection of Aboriginal cultural heritage sites during construction. This agreement requires the participation of representatives of the Wangkumarra Aboriginal community in a heritage site survey prior to construction activities that may have a detrimental effect on significant Aboriginal heritage sites. The ILUA also requires the employment of monitors to supervise construction activities, noting any sites that are uncovered during construction and ensuring that identified sites are properly protected.

Mr Peter Ebsworth and Mr Robert Smith, representatives of the Wangkumarra heritage committee, conducted the field survey with the archaeologist. The field team walked along the entire pipeline route, closely examining areas the ground surface for evidence of prior Aboriginal occupation that is so common through the Cooper Basin.

3. Environmental setting

The proposed pipeline route crosses sand dunes, identified in the Queensland Division of Land Utilisation's *Western Arid Region Land Use Study* (1974) as a combination of the

Santos and *Poongamulla* dune land systems. These land systems are characterised by red sand dunes ranging from 4-12m in height, with red earths and clays on the dune flanks. Pleistocene aged dune cores are typically cemented with carbonate, which is often mistaken for broken bone. The claypans in the interdune corridors have deep grey clay soils, with texture contrast soils on the cemented aprons surrounding claypans. Vegetation is predominantly spinifex hummock grassland. Mulga open shrubland is also found on the dunes. Bluebush, lignum or needlebush (*Hakea* sp.) low open shrubland and occasionally coolibah (*Eucalyptus coolibah*) open woodland are found in the interdune corridors associated with claypans which hold water following local rain.

Plate 1. View towards the west from the Moon 1 well site.

4. Aboriginal and non-Aboriginal historical background

This pipeline route traverses a region which has seen at least 10 millennia of human occupation. Aboriginal people occupied the land exclusively for the vast majority of this period. Some evidence of their activities in the form of scatters of stone artefacts, or campsites, shell middens, and scarred trees occurs widely. The nature and frequency of this evidence varies according to the distribution of resources, particularly water and stone suitable for stone tool manufacture. A comprehensive summary of the region's recent Aboriginal history can be found in Lance (1998).

From 1845, when Charles Sturt first ventured into the region on his expedition to explore the interior of the continent, evidence of European activities has also been accumulating. This evidence includes a diverse range of sites dating from the past 150 years. Sites associated with the various phases of European settlement and expansion have been identified during past studies in the region. These phases of European use include: exploration, Aboriginal relations, pastoralism, and infrastructure development. A detailed account of the region's historical context can also be found in Lance (1998).

5. Archaeological background

Previous archaeological studies in Central Australia have revealed Aboriginal occupation of the interior of the continent at the height of the last glaciation, at least 22,000 years ago (Smith 1989). Studies carried out in areas nearer that investigated during this study, reveal that occupation of the Cooper Basin was also taking place during the Pleistocene, at least 14,000 - 15,000 years ago (Hughes and Lampert 1980, Lampert and Hughes 1988, Williams 1988). One site, comprising a number of hearths containing mussel shell, was found eroding from a sand dune in the Strzelecki Desert, to the west of the area under investigation. Radiocarbon dating revealed that this site was occupied at least 14,000 years before present (Wasson 1983b:102, Smith *et al.* 1991). This site is exceptional, as other studied sites in the dunefields of the region have only revealed occupation deposits dating from the late Holocene period, more recent than 4-5,000 years ago (Williams 1988, Lampert and Hughes 1988). Further studies are likely to reveal additional late Pleistocene sites.

Studies of sites in the Strzelecki Desert have revealed that Aboriginal occupation in isolated corners of the dunefield first occurred in the late Pleistocene. These sites were periodically revisited, suggesting that at this time the region was being systematically exploited by mobile groups moving through the desert following periods of local rainfall or flooding of major watercourses (Smith *et al.* 1991:177). Freshwater mussel shell fragments in hearths reveal that Aboriginal people were travelling from the watercourses carrying mussels, which provided a long-lasting food source. These Aboriginal people maximised the use of resources by visiting areas which were normally dry, following localised summer rainfall in the desert (Allen 1974, Peterson and Long 1986).

Sand dune land systems have been shown from previous studies (e.g. Lance 1984, 1990a and b, 1992a-c, Lance and Moffitt 2001, Lance 2002) to have a generally high site density with a correspondingly high density of stone artefacts forming the background scatter. Site and stone artefact densities are particularly high near major watercourses or near large claypans.

A survey carried out along the route of the Stokes to Mettika pipeline (Lance 1996) revealed two stone artefact scatters 9km to the south of the present pipeline route. Artefacts in these sites, found in the crest of a dune and around the edges of a claypan, include numerous flake tools, small cores, a chert tula adze slug and a small anvil/mortar.

A site clearance was carried out by Lance and Moffitt (2001) along the route of the

Chiron to Brumby pipeline route last year. This pipeline is located 20km to the south of the present pipeline route and crosses the same sand dune Land Systems crossed by the present line. Four sites and six low-density background scatter occurrences were found in the dunes. These sites were exposed on blowouts in the crests of dunes and around the dune flanks adjacent to claypans. Artefacts found in these sites and in the background scatter included flakes and flaked pieces, Tula adze slugs, grinding stones and pirri points. In addition to these artefacts were found deflating hearths comprising scattered silcrete heat-retaining stones. Artefact densities were relatively low, ranging from $10/m^2$ in the sites, to less than $3/m^2$ in the scalds.

The survey of another pipeline in this region was recently conducted (Lance 2001). This pipeline route (Quasar 1 to Stokes) is situated approximately 13-18km to the south of the present line. The pipeline route also traverses sand dune land systems. No evidence of prior Aboriginal occupation was detected during this earlier survey.

Another recent study of a pipeline route in the sand dune country on the eastern side of the Queensland – South Australian border was recently undertaken (Lance 2002a). This short pipeline, from Tellus 1 to Tellus South 1, is located near the Quasar to Stokes pipeline and similarly, no sites were found in the well-vegetated mobile sand dunes along this pipeline route.

A study of the heritage sites was recently carried out along the route of the Thoar 1 to Wolgolla 2 pipeline, which traversed a number of land systems through the region between the Cooper Creek floodplain and the Strzelecki Desert dunefields 30-75km to the east of the Moon to Kerna pipeline route. The main evidence of prior Aboriginal visitation in this area comprised small numbers of stone artefacts scattered on dune surfaces and around the edges of claypans. Twenty six locations were identified with Aboriginal cultural material, of which four were classified as sites. Sites including scatters of stone artefacts and deflated hearths were found around the edges of a large claypan, 50km to the east of the present pipeline route.

6. Study methodology

The Queensland portion of the pipeline route was examined for evidence of historical and prehistoric sites, to determine the potential impact of pipeline construction. The route had been surveyed and pegged recently and the vehicle tracks and wooden pickets allowed the line to be followed easily.

The pipeline route was followed on foot with two support vehicles driven in front and behind. The survey covered a 50m wide corridor in which the line would be built. Conditions affecting the detection of sites such as ground cover vegetation (mainly

spinifex) and mobile sand on the dunes, were noted, however, in all areas there was adequate ground surface visibility to be assured that stone artefacts in the area would have been found.

In a region such as this, were there is abundant evidence of past Aboriginal occupation, the identification and delineation of archaeological *sites* depends both on the presence of suitable areas of exposure and the application of criteria to distinguish the sites from the low density background scatter of artefacts. In previous studies carried out in the Cooper Basin *sites* comprising scatters of chipped stone artefacts, were defined on the basis of their containing noticeably higher densities than in the surrounding background scatter.

Sites were defined on the basis of their meeting a number of criteria:

1. More than 5 artefacts.
2. $5m^2$ or more in area.
3. Average artefact density is greater than 5x the average density of the background scatter.
4. Average density of $\geq 5/m^2$.
5. Contain exotic raw materials or implements.

Site boundaries are commonly identified as corresponding with the boundaries of exposures, although in most cases undisturbed deposits are certain to continue beneath adjacent but uneroded sediments. The presence of potentially artefact bearing deposits at these sites was noted.

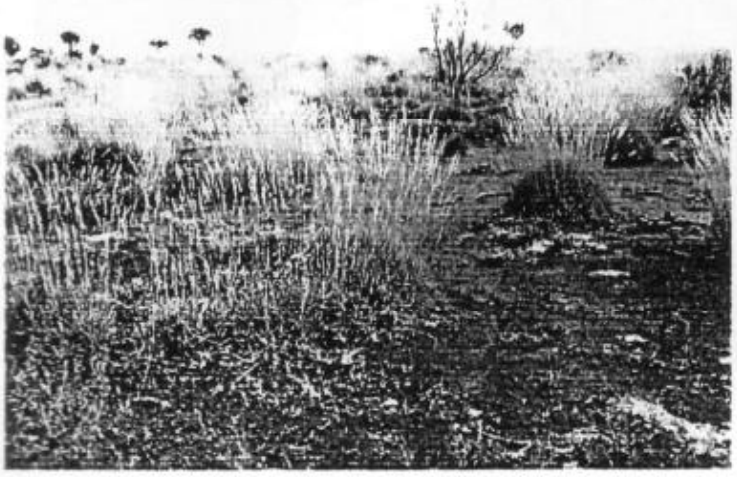

Plate 2. View across sand dune on which Location 1 artefact was found. Note clear sandy ground between spinifex tussocks.

7. Results

Two locations containing evidence of prior Aboriginal visitation were identified along the Queensland segment of the pipeline route. These were a single flake located on the sandy surface of a low sand dune, and a low density scatter of artefacts on the baked clay surface at the junction of a low sand dune and an ephemeral claypan. The later of these two locations, neither of which met the criteria for classification as sites, contained a small number of artefacts found at a density of 1/5m².

Location	Easting	Northing	Comments
1	502012	6877068	Isolated silcrete flake found on a low sand dune to the north of the proposed pipeline route
2	500481	6877015	Low density scatter of stone artefacts found on the edge of a low sand dune crossed by the pipeline route. Artefact density in this location is approximately 1/5m² and artefacts comprise silcrete flakes and flaked pieces some of which have use-wear.

Table 1. Details of the two artefact bearing locations found during the field survey.

No non-indigenous heritage sites were detected during the field survey.

Plate 3. Silcrete flake found at Location 1. Note coarse grain. Scale in millimetres.

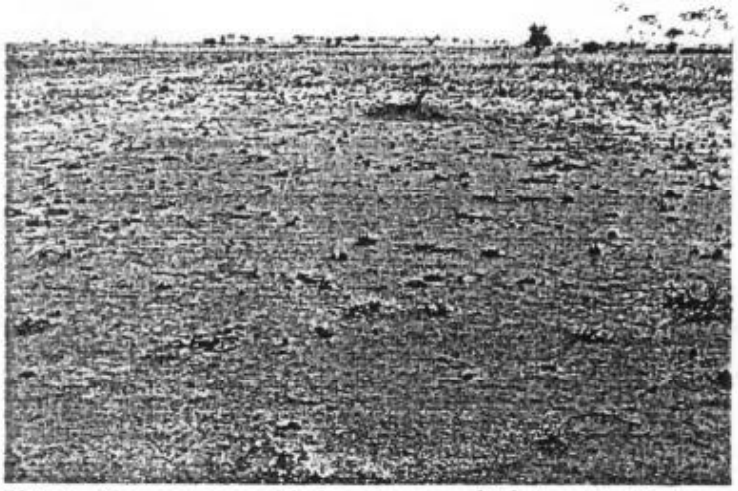

Plate 4. View across scalded surface on which Location 2 artefacts were found.

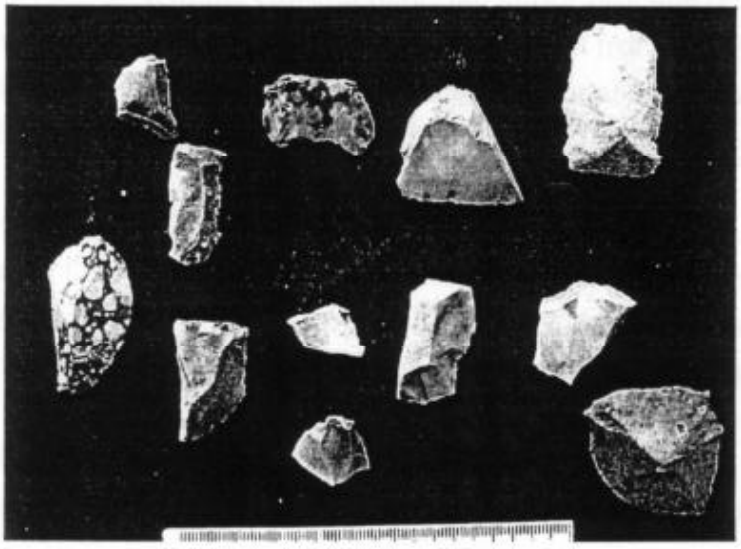

Plate 5. Selection of stone artefacts from Location 2. Scale in millimetres.

8. Potential impact and recommendations

The absence of substantial water sources along the pipeline route led to only limited Aboriginal visitation of this portion of dunefield, and consequently few stone artefacts, the main evidence of prior Aboriginal visitation, were discarded. Pipeline construction will therefore have no substantial impact to the region's archaeological record. At worst several stone artefacts on the ground surface at location 2 will be threatened, however, these are usually removed from the vicinity of the pipeline right-of-way by the Wangkumarra Traditional Owner monitors prior to the commencement of pipeline construction.

Construction impacts will be localised and will not adversely affect the region's cultural heritage values. The most effective way of minimising impact to undetected sites and

isolated artefacts will be to confine construction activities to the right-of-way.

- In keeping with the requirements of the Indigenous Land Use Agreement (ILUA), Aboriginal heritage monitors will supervise ground clearing and trenching during construction of the pipeline. Any cultural material found during these operations will be reported to the EPA and mitigation measures formulated.

- Work will be restricted to the cleared right-of-way. Where extra work space is required, it will first be necessary for these areas to be examined by the Aboriginal monitors.

- Should items of heritage significance be revealed during construction, it will be necessary for appropriate remediation measures to be instituted. These measures may include collection of the cultural material, minor pipeline relocation or application for consent to damage the material sought from the Minister. The preferred measures will be formulated by the traditional owners in consultation with the EPA and heritage advisors.

While the recommendations made in this report provide a guide as to the most appropriate measures for the protection of the Aboriginal cultural material along the proposed pipeline, these are not binding. The EPA may recommend additional measures deemed necessary to protect the cultural heritage along the pipeline route.

If the recommendations listed above are implemented, there can be no objection, on Aboriginal or cultural heritage grounds, to construction of the proposed Moon 1 to Kerna 2 gas pipeline.

Plate 6. View of sand dune country to the west of Location 2.

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Plate 7. Undulating dune country near the SA - Qld border.