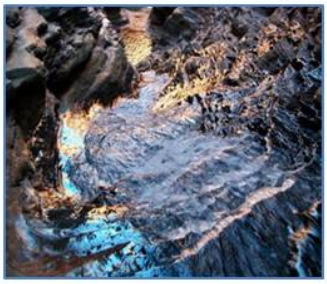

Cassini Resources Limited

West Musgrave Project

Exploration Management Plan

FINAL REPORT

V1.0

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Cassini Resources Ltd Exploration Management Plan

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1. BACKGROUND AND LOCATION

Cassini Resources Limited (Cassini) is an Australian listed exploration company with tenements in Western Australia's West Musgrave Region. These tenements are located approximately 26 kilometres (km) south-south-east of Jameson (Mantamaru Aboriginal Community), 114 km due east of Warburton and 128 km due west of the Western Australian – South Australian border in the West Musgrave region (**Figure 1**). The tenements lay within the Aboriginal Reserve 17614, which is classified as an Environmentally Sensitive Area (ESA).

The West Musgrave Project is situated on lands that are leased to the Ngaanyatjarra Land Council on behalf of the Traditional Owners of the land. The leases held by the Ngaanyatiarra Land Council cover an area of 159,948 km2 and form the boundaries of the Shire of Ngaanyatjarraku. The Jameson Community is one of ten communities in the Shire and is situated approximately 25 km to the North of the Project. The Ngaanyatjarra Land Council represents the Traditional Owners who have lodged a claimant application for a Native Title Determination, part of which covers the whole of the land comprising the Exploration Area (Coffey, 2012)

Cassini proposes to conduct an expanded resource definition drilling programme for the Babel and Nebo Deposits and Succoth Prospect in 2014/2015 and multiple other exploration activities and programme at the West Musgrave numerous tenements (**Table 1**) in 2014 and beyond.

The West Musgrave area has only been accessible to modern exploration since the mid 1990's and the initial discovery by BHP Billiton (BHP) of the Nebo and Babel nickel-copper-PGE sulphide deposits occurred in 2000. Subsequently there has been a number of nickel (Ni), copper (Cu) and gold (Au) discoveries in the last 10 years. In April 2014, Cassini acquired 100% of BHP's West Musgrave Project (the Project) which includes the Nebo and Babel (Nebo-Babel) deposits (Cassini 2014).

1.1. Nebo-Babel

Nebo-Babel was the first major discovery in the West Musgrave region. It has an Inferred resource of 446 million tonnes (Mt) @ 0.33% Ni, 0.35% Cu (0.2% Ni cut-off) for a total of 1.47 Mt of contained nickel metal and 1.56 Mt of contained copper metal. This mineralised system is the largest nickel sulphide discovery since the discovery of Voisey's Bay in Canada in 1993. The Nebo-Babel deposit is amenable to open pit mining.

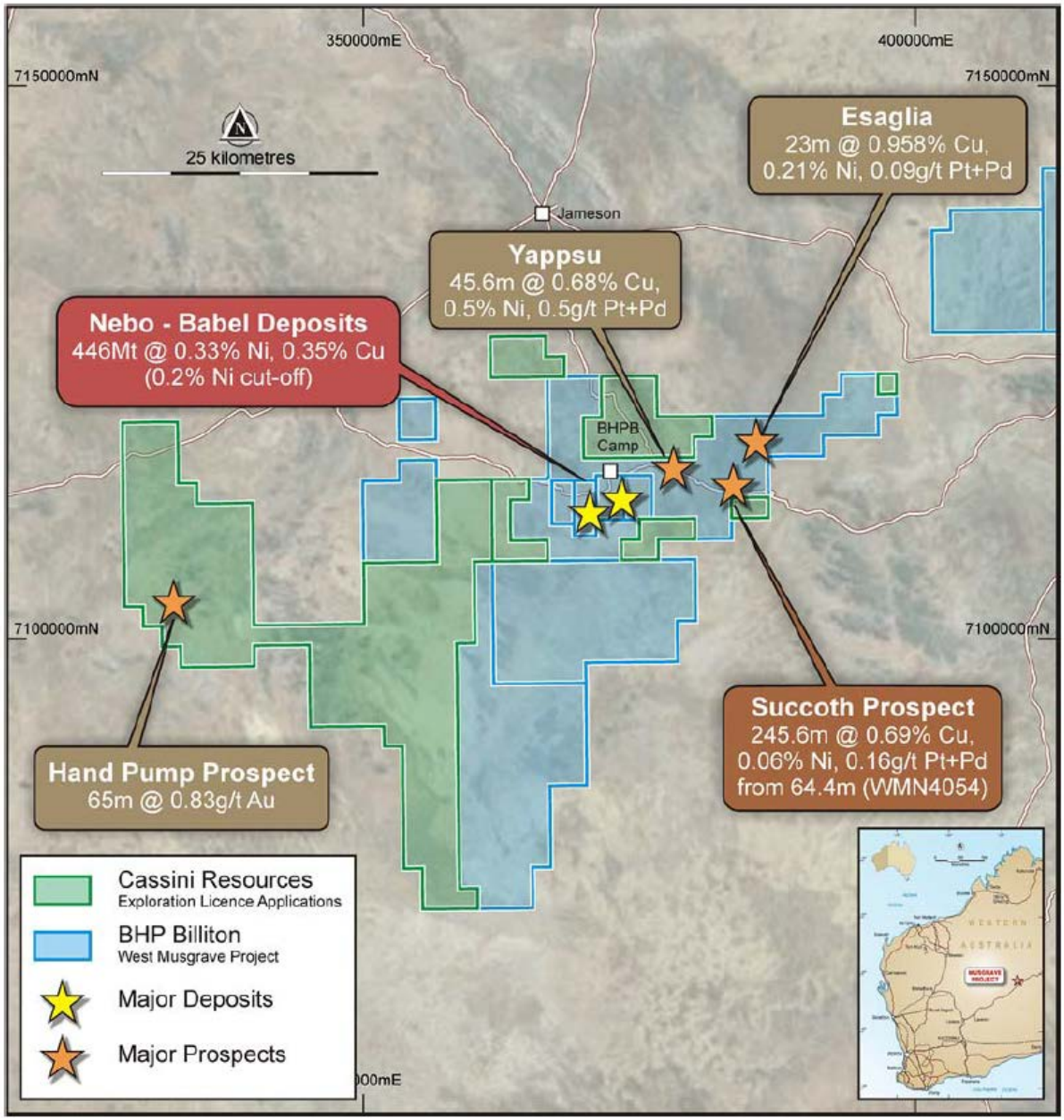


Figure 1: The West Musgrave Project

1.2. Succoth

The Succoth Copper Project (discovered by BHP in 2009) is located 13 km north east of Nebo-Babel; the proximity presenting Cassini with a co-development opportunity. Succoth is a shallow lying ore body with Cu-PGE mineralisation from ~20 m depth, still open, spanning over a 3 km strike length.

The proposed drilling programmes and other exploration activities will be undertaken over the next five years within the tenements listed in **Table 1**.

Table 1: Cassini Resources Tenement List - West Musgrave

Tenement ID	Holder	Type	Tenement Area	Expiry Date	Date of Grant
E69/3163	Wirraway Metals and Mining PTY LTD	Exploration	41 BL	-	Pending
E69/3166	Wirraway Metals and Mining PTY LTD	Exploration	1 BL	-	Pending
E69/3167	Wirraway Metals and Mining PTY LTD	Exploration	11 BL	-	Pending
E69/3169	Wirraway Metals and Mining PTY LTD	Exploration	1 BL	-	Pending
E69/3256	Wirraway Metals and Mining PTY LTD	Exploration	103 BL	-	Pending
E69/3264	Wirraway Metals and Mining PTY LTD	Exploration	164 BL	-	Pending
E69/1530	Wirraway Metals and Mining PTY LTD	Exploration	70 BL	7/09/2014	8/09/2000
E69/2338	Wirraway Metals and Mining PTY LTD	Exploration	5 BL	24/09/2017	25/09/2007
M69/72	Wirraway Metals and Mining PTY LTD	Mining	790 ha	29/11/2022	30/11/2001
M69/73	Wirraway Metals and Mining PTY LTD	Mining	1000 ha	29/11/2022	30/11/2001
M69/74	Wirraway Metals and Mining PTY LTD	Mining	1000 ha	29/11/2022	30/11/2001
M69/75	Wirraway Metals and Mining PTY LTD	Mining	1000 ha	29/11/2022	30/11/2001
E69/2313	Wirraway Metals and Mining PTY LTD	Exploration	22 BL	12/12/2017	13/12/2007
E69/2201	Wirraway Metals and Mining PTY LTD	Exploration	76 BL	12/04/2017	13/04/2007
E69/1505	Wirraway Metals and Mining PTY LTD	Exploration	58 BL	19/04/2014	20/04/2000
E69/2069	Wirraway Metals and Mining PTY LTD	Exploration	35 BL	11/05/2015	12/05/2006
E69/2070	Wirraway Metals and Mining PTY LTD	Exploration	35 BL	11/05/2015	12/05/2006
E69/2911	Wirraway Metals and Mining PTY LTD	Exploration	6 BL	18/06/2017	19/06/2012
E69/3091	Wirraway Metals and Mining PTY LTD	Exploration	89 BL	1/08/2018	2/08/2013
E69/3137	Wirraway Metals and Mining PTY LTD	Exploration	3 BL	10/11/2018	11/11/2013
E69/3145	Wirraway Metals and Mining PTY LTD	Exploration	69 BL	10/11/2018	11/11/2013
E69/2909	Wirraway Metals and Mining PTY LTD	Exploration	131 BL	15/12/2016	16/12/2011
E69/3164	Wirraway Metals and Mining PTY LTD	Exploration	5 BL	13/05/2019	14/05/2014

Tenement ID	Holder	Type	Tenement Area	Expiry Date	Date of Grant
E69/3165	Wirraway Metals and Mining PTY LTD	Exploration	2 BL	13/05/2019	14/05/2014
E69/3168	Wirraway Metals and Mining PTY LTD	Exploration	1 BL	13/05/2019	14/05/2014
E69/2907	Wirraway Metals and Mining PTY LTD	Exploration	169 BL	18/06/2017	19/06/2012
E69/2917	Wirraway Metals and Mining PTY LTD	Exploration	200 BL	18/06/2017	19/06/2012
E69/2918	Wirraway Metals and Mining PTY LTD	Exploration	133 BL	18/06/2017	19/06/2012

2. PURPOSE

This Exploration Management Plan (EMP) has been developed by Cassini Resources to set out the required standards in environmental management during its proposed exploration programmes at the West Musgrave Project, and particularly whilst operating in Aboriginal Reserve 17614, an Environmental Sensitive Area (ESA).

The EMP sets out the existing environment of the main exploration areas, environmental aspects of key exploration activities and the means to manage any environmental impacts that may be associated with these activities.

The key objectives of this EMP and Cassini's operations in the ESA will be:

- undertake all activities in an environmentally responsible manner so that any identified potential impacts from exploration are reduced and where possible avoided; and
- to meet all legal obligations detailed in tenement conditions..

This EMP will be used to support Cassini's all future applications for a Programme of Works (PoW) and Clearing Permit applications as required. This EMP has been written to comply with the DMP's *Guideline for Mineral Exploration / Rehabilitation Activities, August 2007.*

3. RELEVANT LEGISLATION AND STANDARDS

The following Commonwealth Acts are relevant to the management of the environment while carrying out exploration activities:

- *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *Commonwealth Native Title Act 1993*; and
- *Australian Heritage Council Act 2003.*

A number of Western Australian State Acts and their Regulations that are (or may be) relevant to the management of the environment while carrying out exploration activities include:

- *Aboriginal Heritage Act 1972;*
- *Bush Fires Act 1954;*
- *Conservation and Land Management Act 1984;*
- *Contaminated Sites Act 2003*
- *Dangerous Goods Safety Act 2004 (DG Act);*
- *Dangerous Good (Transport) Act 1998;*
- *Environmental Protection Act 1986 (EP Act);*
- *Environmental Protection Regulations 1987*
- *Environmental Protection (Noise) Regulations 1997;*
- *Environmental Protection (Rural Landfill) Regulations 2002;*

- *Environmental Protection (Clearing of Native Vegetation) Regulations 2004;*
- *Environmental Protection (Unauthorised Discharges) 2004;*
- *Explosives and Dangerous Goods Act 1961;*
- *Health Act 1911;*
- *Heritage of Western Australia Act 1990;*
- *Land Administration (Amendments) Act 1995;*
- *Local Government Act 1995;*
- *Mining Act 1978;*
- *Mines Safety and Inspection Act 1994 (MSI Act);*
- *Occupational Safety and Health Act 1984 (OSH Act)*
- *Pollution of Waters by Oil and Noxious Substances Act 1987;*
- *Rights in Water and Irrigation Act 1914;*
- *Waterways Conservation Act 1976;*
- *Water and Rivers Commission Act 1995; and*
- *Wildlife Conservation Act 1950*

4. EXISTING ENVIRONMENT

4.1. Regional Environment

The West Musgrave Project lies in the Central Ranges (CR1) Interim Biogeographic Regionalisation of Australia (IBRA) region (Graham & Cowan 2001). This region extends from Western Australia into the Northern Territory and incorporates the Gibson Desert. The landscape is characterised by high proportion of ranges interspersed with sand plains. The climate is considered arid with a mean rainfall of 200 mm.

The dominant land use in this region is for Aboriginal Reserves (94.33 %) with unallocated Crown land and Crown reserves (4.28 %) and grazing (1.39 %) making up the remaining land uses. Graham and Cowan (2011) discuss that there are no identified ecosystems at risk in the CR1 region but state that in general altered fire regimes and the potential for intense wildfires pose the greatest risk to the ecosystems of the region. Introduced animals are considered the next greatest risk to flora and fauna in the region, with the introduction of weeds and water courses also posing a threat.

4.2. Flora and fauna

The regional flora and fauna is considered rich and diverse with wide ranging species that likely occur in at least one other gaining subregion (Graham & Cowan 2001).

4.2.1. Native Flora

The vegetation of the Babel and Nebo Deposits within the Project has been assessed by Western Botanical in 2014 and they defined six vegetation associations, which they considered well represented in a local and regional sense:

- Mulga woodlands and groves on hardpan plains;
- Mulga and grasses on Calcrete rises;
- Mulga over Wanderrie Grasses on shallow sand sheet;
- Sandplains with Spinifex;
- Sandplains with Mallee, Mulga and Spinifex; and
- Sand dunes with Grevillea and Acacia.

Western Botanical (2014) found no Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) were known in the region. There were a total of 172 native vascular flora species identified from previous reports completed by Western Botanical in the area, with the majority of the species within the Project Areas considered widespread in Western Australia. There were no species of conservation significance (Declared Rare or Priority species) that were known from previous studies on the tenements.

Database searches revealed seven Priority species that are known to occur within a 50 km radius of the two Prospects. In addition to the data base searches, Western Botanical is aware of eight Priority 1 species, one Priority 2 species, seven Priority 3 species and two priority 4 species. A further seven species collected in the region are poorly known in Western Australia and may, on review by Department of Parks and Wildlife (DPaW) , attract Priority Flora listing as they fulfil the requirements for such. A further two species collected in the region by Western Botanical remain enigmatic and require recollection and taxonomic review before their status can be determined (Western Botanical, 2014).

Five of the 27 species noted, *Calotis latiuscula* P3, *Chrysocephalum apiculatum* subsp. *glandulosum* ms (poorly known), *Euphorbia parvicaruncula* P1, *Goodenia* sp. aff. *Quasilibera* (RJP Davies & L Ransom 868) (poorly known), and *Stackhousia clementii* P3 are considered to have a high chance of occurring within the Babel and Nebo Prospects. A further two species, *Goodenia gibbosa* P1and *Goodenia hirsuta* P1 are considered to have a moderate likelihood of occurrence while 12 species are considered to have a low likelihood of occurrence. A further eight species were not able to be assessed. Of these, *Calotis latiuscula* P3, *Euphorbia parvicaruncula* P1, *Stackhousia clementii* P3 and *Goodenia* sp. aff. *quasilibera* (RJP Davies & L Ransom 868) (poorly known), are considered highly likely to be present given the known populations nearby to, and favourable habitat being present within, the Babel and Nebo Prospects (Western Botanical, 2014).

4.2.2. Introduced Flora

No weed species have been identified on the Babel or Nebo tenements but it would be expected that these common regional species may occur close to or on the tenements:

- Ruby Dock (*Acetosa vesicaria*);
- Buffel Grass(*Cenchrus ciliaris*); and
- Caltrop (*Tribulus terrestris*).

It is important that site personnel are able to identify and report sightings of these species during all land clearing and drilling activities. In order to reduce the risk of introducing weed and invasive species or encouraging existing populations to spread, all machinery should be clean and washed prior to undertaking any activities within the tenements, this procedure can be found in **Appendix G**.

4.2.3. Vegetation Condition

Vegetation condition has been assessed in the various field surveys by Western Botanical from 2005 to 2008. Vegetation has been assessed as Pristine to very Good to Excellent condition, based on the Keighery 1994 scale. No weeds and limited grazing pressure has been evident in the sites assessed.

4.2.4. Fauna

Targeted surveys have been completed on the tenements for burrows of Bilby (*Macrotis lagotis*), Mulgara (*Dasycercus cristicauda* and *D.blythi*), and the Great Desert Skink (*Liopholis kintorei*) on tenements E69/2067 and E69/2201, respectively. No evidence of the Bilby was reported during these surveys, and while it was suggested Mulgara and the Great Desert Skink may occur, there was no conclusive evidence. A species of Mulgara was identified, but it was thought to be *D. blythi* rather than *D. cristicauda*.

Opportunistic sightings of introduced animals (dogs and camels) have been made in the Project and numerous bird species are considered to frequent the water sources in the area.

4.3. Environmentally Sensitive Areas

ESAs are defined under the *Environmental Protection* (Clearing of Native Vegetation) *Regulations* 2004 and include, for example, declared World Heritage properties, defined wetlands and the areas within 50 m of the wetlands, the areas covered by vegetation within 50 m of declared rare flora (DRF) and the areas covered by TECs.

4.4. Aboriginal Heritage

The Project is within the Ngaanyatjarra Lands and all work must be done in consultation with the local community representatives. Access tracks must not be created that enter Heritage Exclusion Zones unless permission has been granted by the Ngaanyatjarra Land Council to create a track in that exact location.

Tenement conditions on all tenements associated with the Project carry this condition or a similar variant:

> *Consent to mine on Use and Benefit of Aboriginal Reserve 17614 given on 27 January 2004 subject to the Entry Permit issued by the Minister for Indigenous Affairs and valid from 1 January 2004.*

Appendix H has a Cultural and Heritage Procedure to refer to for the identification or commencement of an exploration program for known or unknown cultural or significant sites within the Cassini tenements.

5. EXPLORATION ACTIVITIES

There are several exploration method and several different methods of drilling that will be implemented at the West Musgrave Project, and these individual types may influence the environmental impacts of the drilling programme in different ways. Drilling pads should only be made as large as required to operate equipment safely. Excessive clearing should be avoided. Sumps should be constructed within the drill pads to contain water encountered during the drilling process.

General staging of exploration activities is as follows:

- non-invasive work (e.g. surface geophysics, geological mapping)
- geochemical sampling / shallow drilling on a regional scale (~1 km line spacing)
- broad geophysical surveys (500 m to 1,000 m line spacing)
- potential for further infill geophysics / mapping / interpretation
- moderately spaced deep drilling (~300 m spacing) over promising targets
- resource style drill-out (25 m or 50 m spacing) in success cases

5.1. Field Reconnaissance and Surface Mapping

Light vehicles (4WDs) will be used to access the work areas using existing tracks. Where tracks cease to exist the work will be continued on foot. The work will involve walking around prospective areas recording geological information. If warranted, rock-chip samples will be collected from outcrops using a geological hammer. The samples will generally be less than 1 kg in weight. The number of samples will vary greatly by site but is never likely to exceed more than 200 for a specific trip.

5.2. Surface Geochemistry

5.2.1. Handheld XRF Survey

Involves a team of two to three people working on foot. No physical sample is taken, but a small pit approximately 10 cm x 10 cm x 5 cm is cleared before analysis. Sample pattern can be as close as 50 m x 50 m grid. Approx. 1 in 20 samples sites will also be used for a soil sample which is described below.

5.2.2. LAG Sampling

This work involves collection of bulk surface samples up to 10 kg in weight, which will be sieved to retain the size fraction 3 mm to 20 mm, with the rest discarded at the sampling site. Sampling density

can vary from regional scale (1 sample/km^2 or less) to tight infill on 50 m x 50 m grid (440 samples / km^2).

5.2.3. Magnetic LAG (MagLag) Sampling

The work involves collection of magnetic rock fragments. Sample size is generally less than 1 kg, but this can vary to a large degree depending on the terrain. Samples are collected by use of a magnetic sampler which is either carried or pulled along as part of a small wheeled trolley.

5.2.4. Soil Geochem Sampling

Personnel will collect 1 - 2kg of soil material in calico bags for geochemical analysis.

5.3. Surface Geophysics

5.3.1. Gradient Array Induced Polarisation

Gradient Array IP utilises two transmitter pits located approximately 3 km apart. Transmitter pits are generally dug 3 m x 3 m and approx. 50 cm deep into which large aluminium plates (electrodes) are placed. The pits are then filled with water enabling a contact with the ground. Due to the amounts of water required, vehicle access to the transmitter pits is preferred. Upon completion of the survey, the electrodes are removed and the pits filled in.

High ground resistance necessitates high voltage transmitters to attain just a few amps of current flow. A single large motor generator is required to produce the transmitted signal. Long wires are used to take the current to the transmitter pits.

Measurements are taken using two receiver electrodes spaced 25 m apart. These electrodes, roughly the size of a coffee cup, are placed in a small hole filled with water. Once the measurement is taken, the receiver is removed and the hole filled in.

Survey lines are typically 1 km long with readings taken every 25 m. Survey lines are typically 100 m apart with 11 lines in each survey to form a 1 km x 1 km survey area.

5.3.2. Electromagnetic Surveys

A light vehicle is used to travel to, from and around the tenement area. A trailer is used to carry survey equipment such as cable and an electrical generator. If the vegetation and landscape allow, the cable is laid out from the tailgate of a moving vehicle. If vegetation is very dense, field staff may need to clear vegetation. If the landscape prohibits access by vehicles, the cable is laid by field operators on foot. Traverses are made in a grid pattern. Vegetation clearing will rarely be undertaken. After the grid has been arranged, the cable is connected to the generator and a high voltage is passed through it. A magnetometer is then used, in conjunction with the grid to obtain geological data about the underlying rock strata. This is considered to have minimal impact on the environment.

5.3.3. Moving Loop Electromagnetics (MLEM)

This method uses a transmitter loop and an electromagnetic receiver. The receiver takes a measurement or series of measurements inside the loop and then the loop is moved and the process repeated. This type of survey generally requires grid lines to provide access for a light vehicle.

Historical grid lines can be used, in some cases new grid lines or extensions are required for effective coverage. If clearing is required a qualified operator will use a backhoe with a raised blade once the area is cleared by a qualified botanist. The width of the lines will generally only be a single blade width (approximately 2.5 m).

5.3.4. Fixed Loop Electromagnetic (FLEM)

This method involves laying out a large transmitter loop and recording the electromagnetic response along grid lines both inside and outside the loop. This type of survey generally requires grid lines to provide access for a light vehicle. As above, historical grid lines can be used, in some cases new grid lines or extensions are required for effective coverage. If clearing is required a qualified operator will use a backhoe with a raised blade once cleared by a qualified botanist. The width of the lines will generally only be a single blade width (approximately 2.5 m).

5.3.5. Audio Magneto-Telluric (AMT) Survey

The AMT (Audio Magneto-Telluric) survey technique measures variations in the Earth's natural electromagnetic field. Each site uses a combination of magnetometers and porous pot electrodes. Porous Pot electrodes are buried approximately 100 m apart at a depth of 15-20 cm with wires connecting each pot to the central acquisition unit. Three magnetometers, each 1.4 m long, are buried in an orthogonal configuration. The two horizontal magnetometers are buried in trenches 15-20 cm deep. The vertical magnetometer requires a 1.5 m post hole. Ideally this is dug using a hydraulic digger mounted on the survey vehicle but can be dug with a hand auger. Upon completion of each station, the shallow holes are infilled.

An AMT survey does not require cleared lines however vehicle access to each station is preferable, although not essential, due to the equipment required at each site. Vegetation clearance is not required and ground disturbance minimal.

5.3.6. Ground Gravity Survey

A light vehicle is used to travel to, from and around the tenement area. A trailer may be used to carry survey equipment. A field operator traverses the survey area on foot, whilst taking data readings with a gravity meter. The survey is non-intrusive.

5.4. Rotary Air Blast Drilling

Rotary Air Blast (RAB) drilling is used for relatively shallow depths of up to 100 m. The only drilling fluid used in generally compressed air, although foam is sometimes used to provide more lift for the cuttings. There is the potential to produce moderate volumes of ground water to be encountered with this method.

Samples from this drilling method generally exit the rig through a side mounted cyclone and are collected in a bucket before being laid out in rows along the margin of the drill pad. Wet or potentially fibrous samples will be placed in plastic bags prior to being laid out. The drilling pads required for RAB rigs are generally relatively small, with clearing required to be approximately 15 m by 15 m.

5.5. Reverse Circulation Drilling

Reverse Circulation (RC) drilling involves a larger rig than RAB and is used for drilling depths of around 500 metres. RC is a slower drilling method, but it achieves better penetration than RAB drilling. Like RAB, RC also uses compressed air as the main drilling fluid, and also uses foam where required. Water is often injected into the drilling to reduce dust, lubricate the drill bit and improve the removal of cuttings from the hole. There is the potential for large volumes of groundwater to be produced during RC drilling.

Drill cuttings are collected and laid out as per the process for RAB drillings, with wet and fibrous materials collected in plastic bags. Drillings pads will be 20 m by 20 to 30 m to accommodate the larger rig, which is general truck mounted. Sumps should also be constructed to contain groundwater and for the disposal of excess cuttings.

5.6. Diamond Drilling

Diamond drilling produces a continuous rock core and can achieve depths of greater than 1000 metres. Drilling requires the use of specialised fluids, generally a bentonite based mud with moderately high potassium chloride salt content. Diamond drilling has the potential to produce low to moderate amounts of groundwater, which becomes mixed with the circulated drilling fluid. Drill cores will be collected and are generally removed from site for further analysis. Some rock cuttings will be produced, and these are likely to settle out on the bottom of the drill mud sumps.

The drill pad required should be no bigger than 20 m by 30 m and should include multiple sumps for the containment of drilling fluids and disposal of excess cuttings. Sumps for diamond drilling will be lined with heavy duty PVC if required.

6. DRILL PAD AND ROAD PREPARATION

Previous drill holes should be located and made safe prior to any exploration activities. Fencing may need to be reinstated wherever required to prevent stock, fauna or people inadvertently entering the area.

Any areas that have priority flora or significant fauna habitats will be avoided and demarcated to ensure that these species are unaffected.

6.1. Clearing

All clearing should only be undertaken where absolutely necessary. Clearing areas should be demarcated at regular intervals to ensure clearing remains within defined boundaries. All clearing activities should be undertaken once the appropriate internal and external approvals are in place. These may include:

- Programmes of Works;
- Clearing Permits
- Ground Disturbance Permits; and

- Heritage Clearance.

Clearing of surface vegetation should be carried out with a raised blade approximately 150 mm above ground level to reduce mixing of vegetation with topsoil. A minimum of 100 mm of topsoil is to be removed and stockpiled away from potential contaminants, including areas exposed to contaminated water runoff and high traffic areas.

6.1.1. Clearing Access Roads and Tracks

All clearing of tracks should be undertaken as per *Cassini Exploration Department Standard Operating Procedure– Track Management*. New roads and access tracks should only be cleared where there are no existing tracks available, or where existing access tracks are inaccessible or unsafe.

Track width should not exceed 3 m and all reasonable steps must be taken to ensure that appropriate turning room and removal of potential hazards (e.g. overhanging vegetation) has been considered. Once created, all vehicular traffic should be constrained to the track and venturing off the track into adjacent undisturbed areas is to be avoided.

6.1.2. Clearing Drill Pads

Clearing of drill pads should be undertaken by following *Cassini Exploration Department Standard Operating Procedure– Clearing Drill Sites*. The drill site perimeter and orientation of sumps needs to be delineated for earthmoving operators as follows:

a. Locate the designed collar position with a differential or hand-held GPS.
b. Mark the collar position with a 1.2 m long survey peg that clearly states the coordinates and designed hole ID (or drill pad identifier if no hole ID is available). Attach a length of flagging tape to the top of the peg.
c. Using similar wooden pegs but without flagging tape, mark a 20 x 20m perimeter around the collar peg, suitably orientated for the direction of drilling and anticipated position of drilling equipment.
d. Mark the location of drill sump(s) in line with the contractor's desired orientation. The total sump area should be no larger than 10 x 4.5m and sits adjacent (additional) to the 20 x 20m drill pad.

Ensure that the proposed clearing falls within the scope of approved Clearing Permits and PoWs. Give instruction and appropriate explanation to earthmoving operators to clear the site and dig sumps as necessary.

Once the site has been cleared, ensure the collar peg remains appropriately located and upright, and that the written identifier is clearly written on the peg. Ensure all puncture hazards have been removed from the drill site where practicable. Drill sumps should be demarcated as necessary so as to highlight fall hazards to personnel and equipment.

6.2. Stockpiling of Vegetation and Topsoil

Vegetation and topsoil should be collected and stored separately. Topsoil stockpiles should be heaped at the side of the drill pad where it is available to be pulled back over the pad during rehabilitation. It should be separate from the sumps and any other processes that may contaminate the soil.

7. DRILL PAD SET UP

Drill pads should be set up to allow drilling operators to work safely around drill rigs, whilst keeping clearing to a minimum and to ensure that all potential environmental contaminants are contained within the pad.

7.1. Sumps

Sumps should be developed within the drill pad and capture all outputs from the drilling process, except for the actual drill samples. Sumps also provide a water source for the rig whilst drilling. If sumps are losing water through seepage, they can be lined with plastic to contain water. Sumps should be designed to accommodate the volume of water that is expected to be encountered when drilling. In the absence of sumps, tanks should be used to collected water.

One side of the constructed sumps should be left open to allow fauna egress. An angle of around 10 degrees should be left on the open side to facilitate this. Material excavated from the sump should be left adjacent to the sump to cover the sump back over during rehabilitation. The sumps should be marked with flagging tape as a safety precaution.

Where possible, sumps should be constructed away from significant vegetation such as large trees or strands of dense scrub to minimise disturbance to roots and to prevent horizontal transmission of potentially hostile material coming into contact with vegetation.

7.2. Drill Pads

Clearing of drill pads can create a bunding effect around the edge of the drill pad to act as a bund and prevent potential chemical of hypersaline spills.

The drill pad should have hydrocarbon matting placed under the rig to capture hydrocarbon spills. All hydrocarbons should be kept in spill protected areas and spill response kits should be available in all areas of operation.

Figure 2 has a preferred design of set up for drilling onsite, this is dependent on vegetation and availability of space due to restrictions that may occur such as but not limited to priority vegetation communities, larger vegetation locations such as trees or water ways and creeks.

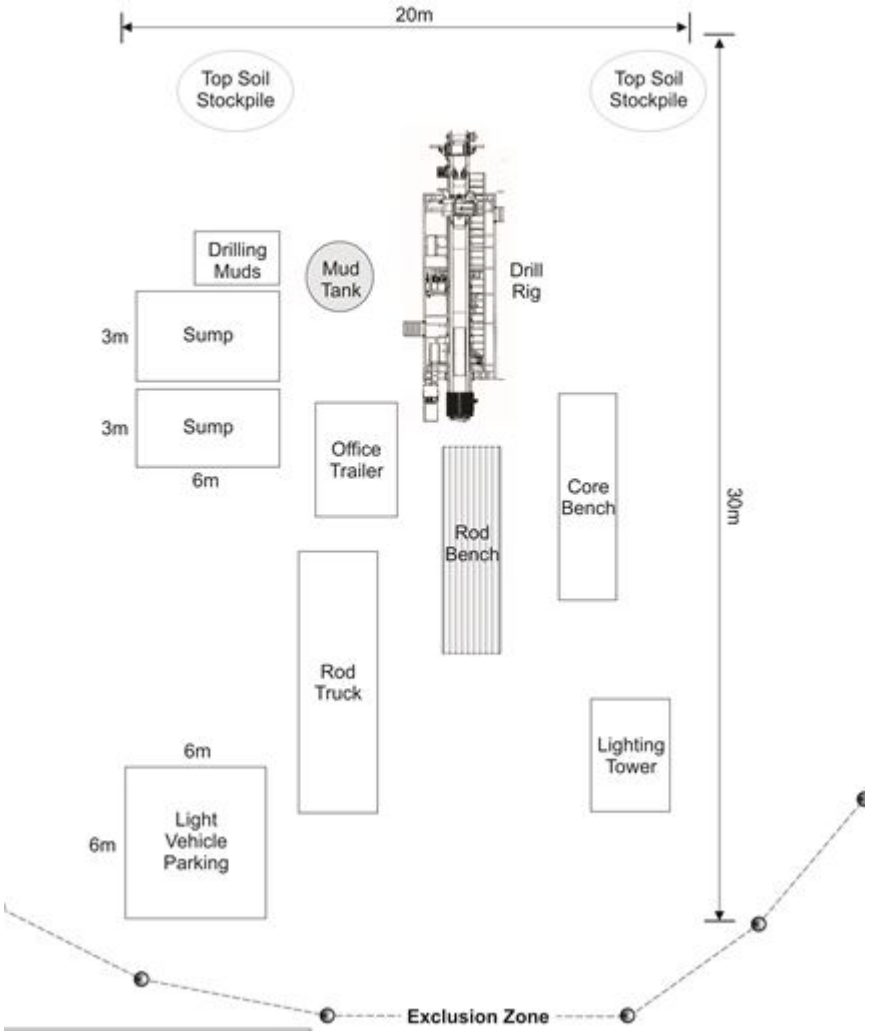


Figure 2 Drill Pad set up

8. REHABILITATION

All rehabilitation activities should be undertaken by following *Cassini Exploration Department Standard Operating Procedure– Rehabilitation*. Steps should be taken to secure the site and do basic rehabilitation steps at the cessation of drilling. This includes temporary capping of drill holes and removal of waste. It is usually standard that within six months of the drilling programme, site rehabilitation activities should be complete, however if the site requires further time to stay un-rehabilitated, approval should be sought from the DMP. This includes all rubbish collected and disposed of appropriately offsite – no rubbish is to be buried onsite: removal of all plastic sample bags; calico bags; survey pegs; flagging tape and all other drilling rubbish is required.

8.1. Drill holes

Individual drill holes should be capped immediately after drilling that hole finishes. Temporary caps should be put in place to stop fauna entering the drill holes. Ensure that the caps themselves do not collect water (i.e. ensure they are a type that sit over the drill hole collar rather than in it).

Within six months, all drills holes should be appropriately rehabilitated. In the case of diamond and RC drilling:

- PVC collar casing is to be cut 400 mm below the surface and the hole plugged at the top of casing. Plugging is preferably with conical concrete plug;
- tamp plug to ensure it fits securing into collar;
- backfill drill hole to the surface, with low permeability material eg. clay or oxide drill cuttings; and
- mound over the backfilled hole to facilitate water shedding away from the drill hole with low permeability material (approximately 20 cm high by 80 cm wide) and then cover with topsoil.

A diagram of a rehabilitated drill hole is included in **Appendix A**.

Drill cuttings with a high sulphide content need to be moved to an appropriate potential acid forming (PAF) disposal area. All remaining drill cuttings are to be buried in sumps before being covered over with original sump fill. Plastic bags need to be removed and disposed of offsite. Topsoil should be spread over the backfilled sumps.

8.2. Sumps

Once sumps are dry they should be filled in with drill spoils, drill samples and fill to return surface to natural land level, then covered with the stockpiled topsoil and the area should be scarified. If any of the spill material contains potentially hostile materials they must be buried at an appropriate depth below the surface to ensure they do not disperse into the environment. All rubbish should be removed from site rather than buried in sumps.

All sumps to be filled in within six months or written permission received from the DMP to keep them open. Where necessary, local native seeds should be spread on rehabilitated areas to encourage re-establishment of flora.

8.3. Tracks

Rehabilitated drill sites and tracks should be scarified to loosen compacted soil and aid vegetation re-establishment. Dead tree branches and stumps should be placed on the rehabilitated land to prevent vehicles re-entering the area, and grid lines need to be closed off at the completion of the programme to prevent them being used by vehicles for access.

8.4. Performance Criteria and Assessment

The development of performance criteria helps measure the success of rehabilitation activities and ensures a standard in rehabilitation is maintained. Pre and post mining photos should be taken at each site. Key performance indicators for successful rehabilitation will be assessed on an annual basis for two years following completion of the programme. These include:

- the return of native fauna and flora populations;
- access to non-retained tracks closed and hidden;
- no introduced flora or fauna present;
- no waste is left in the area;
- all tracks that are being rehabilitated have been ripped to an appropriate depth to remove compaction and minimise topsoil loss; and
- the original surface contour has been restored.

9. INSPECTIONS AND ASSESSMENTS

Once rehabilitation has been completed the DMP checklist provided in **Appendix B** should be filled out, photographs should be taken as supporting evidence and both parts should be submitted to the DMP for review. These inspections must be completed at each site and should also ensure that the performance criteria set out in Section 7.4 have been achieved.

10. RISK ASSESSMENT

The exploration programme at the Project was assessed for environmental risks using the Australian Standard AS/NZS 4360:2004 and industry best practices to determine risk rankings for each event identified in **Table 2** through **Table 5**.

The methodology used in the risk assessment rated the likelihood (A to E) and consequence on a scale of 1 to 5, where a letter was given to the likelihood or probability of an event occurring, and a number was assigned to the consequence should the event occur. In the evaluation process, the participants of the risk assessment workshop considered the ‘most credible scenario’ and aimed to maintain a balance between the assessed likelihood and consequences. Risks were then prioritised using the risk matrix.

The risk assessment undertaken for the exploration programme is detailed in **Appendix C**.

Table 2: Qualitative measure of likelihood

LIKELIHOOD	DESCRIPTION
A – Almost Certain	Is expected in most circumstances (>1 per day)
B – Likely	Will probably occur in most circumstances (> once per month but < once per day)
C – Possible	Should occur at some time (> once per year but < once per month)
D – Unlikely	Could occur at some time (< once per year)
E – Rare	May occur only in exceptional circumstances (very unlikely to ever occur)

Table 3: Qualitative measure of consequences

	1 - Low	2 - Minor	3 - Moderate	4 - Major	5 - Catastrophic
Environmental / Heritage	No permanent environmental damage	Minimal environmental damage, localised impact	Minor effect on biota and/or environment or disturbance of heritage features	Medium term impact to environment or damage to heritage feature	Long term impairment of ecosystem functions or destruction of heritage features

Table 4: Qualitative risk analysis matrix

	1 - Low	2 - Minor	3 - Moderate	4 - Major	5 - Catastrophic
A Almost Certain	**11 (H)**	**16 (H)**	**20 (E)**	**23 (E)**	**25 (E)**
B Likely	**7 (M)**	**12 (H)**	**17 (H)**	**21 (E)**	**24 (E)**
C Possible	**4 (L)**	**8 (M)**	**13 (H)**	**18 (E)**	**22 (E)**
D Unlikely	**2 (L)**	**5 (L)**	**9 (M)**	**14 (H)**	**19 (E)**
E Rare	**1 (L)**	**3 (L)**	**6 (M)**	**10 (H)**	**15 (H)**

Table 5: Risk definitions

RISK	RANKING	INCIDENT NOTIFICATION / INVESTIGATION
Extreme	**18 - 25**	Notify Exploration Manager Immediately In the event of an incident a Serious Incident Report is required as well as a Incident Report Form Nominal Investigation timeframe is 7 days
High	**11 - 17**	Notify Department Manager Immediately In the event of an incident a Serious Incident Report is required as well as a Incident Report Form Nominal Investigation timeframe is 5 days
Moderate	**6 - 10**	Notify Department Manager Immediately In the event of an incident conduct the standard Incident Report Form Nominal Investigation timeframe is 3 days
Low	**1 - 5**	Notify Department Manager Immediately In the event of an incident conduct the standard Incident Report Form Nominal Investigation timeframe is 2 days

10.1. Potential Environmental Impacts

10.1.1. Clearing of Native Vegetation / Ground Disturbance

Clearing of native vegetation (using hand tools and mechanical equipment) and ground disturbance as a result of the proposed exploration-activities have the potential to result in the following:

- loss of native vegetation, including conservation significant and geographically restricted species, through direct clearing;
- loss, degradation and fragmentation of fauna habitat, especially habitat essential to the survival of threatened species;
- increase access for feral animals into the area;
- spread of weed material from unwashed vehicles and footwear;
- increases in sedimentation of natural drainage lines;
- impacts to sites of cultural heritage;
- inappropriate discharge of groundwater and drill muds into surrounding vegetation;
- unscheduled hydrocarbon discharges leading to ground contamination; and
- alterations of natural fire regimes due to increase in fire risk that may alter the structure of the native vegetation.

10.1.2. Fauna and Short Range Endemic Species (SRE)

The proposed exploration activities may result in the following impacts to local fauna, this may be a result of limited surveys undertaken of flora and SRE within the programme area:

- death and injury of individual species, including conservation significant and geographically restricted species, from vehicle collisions, interactions during clearing and drilling activities;
- increase occurrence of feral animals due to inappropriate waste disposal;
- changes to fire regimes resulting in loss of food resources and habitat areas; and
- loss and fragmentation of fauna populations due to clearing of habitat areas.

10.1.3. Soil and Rehabilitation Success

Exploration activities have the potential to impact on the soils and rehabilitation success of disturbed areas though the following:

- increase the occurrence of soil erosion due to clearing of native vegetation, vehicle movements, and drilling and excavation activities;
- compaction and dissection of soils due to vehicle movement and construction of drill pads;
- contamination of soils from minor hydrocarbon spills from vehicles, drill rigs and refuelling activities;
- failure of disturbed areas to retain nutrients and water during rehabilitation attempts;
- failure of disturbed areas to regenerate successfully and to re-establish stable vegetation structures similar to surrounding areas;
- disturbance or damage to the conservation values of the ESA; and

- increase occurrence of weeds within disturbed areas resulting in the failure of native vegetation to compete for survival and reduced biodiversity.

10.1.4. Emissions to Atmosphere

The proposed exploration activities have the potential to impact on air quality through the generation of dust emissions related to:

- elevated particulate matter in the atmosphere affecting surrounding flora and fauna; and
- elevated levels of noise, vibrations and lighting from drilling activities and vehicle movement impacting on surrounding fauna.

Potential fugitive and point-source of particulate generation have been identified as:

- areas disturbed by land clearing;
- dust generated from drilling activities;
- exhaust emissions from machinery and vehicles; and
- noise and vibration emissions from drill rigs.

10.1.5. Fire

The proposed exploration activities have the potential to increase the occurrence of fire within the project area. The increased occurrence of fires within the region could result in the following:

- immediate death, displacement or disruption of threatened flora and fauna individuals, populations, habitats or communities;
- loss or alteration of critical habitat and effects on species reliant on long-term unburnt vegetation or require a mosaic style burning;
- loss of breeding habitat;
- increase of the occurrence of weeds; and
- altered vegetation structure.
- Loss of camp and community facilities

10.1.6. Surface Water and Groundwater

The proposed exploration activities may result in the following impacts on surface water and groundwater:

- modifications to natural drainage lines and surface water flows through the clearing of native vegetation and compaction of soils;
- contamination of surface water and groundwater through discharge of contaminants, inappropriate waste disposal and inappropriate discharge of groundwater and drill muds;
- cross flow contamination of groundwater between aquifers containing inferior-quality water to aquifers containing useable-quality water or to leakage zones via drill holes.

- uncontrolled flow and wastage of groundwater through drill holes, either to aquifers of different quality water or to the surface, resulting in the death of vegetation, changes to surface water flow volumes and natural drainage lines and changes to soil chemistry (increase in soil salinity); and
- dewatering and contaminated groundwater may impact on the habitat and diversity of subterranean flora and fauna and groundwater dependant ecosystems.

10.2. Environmental Risk Assessment Outcomes

The environmental risks associated with each activity/aspect as identified in the risk assessment have been prioritised using the risk matrix (extreme, high, moderate, low). With current controls in place, only one extreme risks was identified, this was the aquifers within the area.

Due to the limited amount of information known about the underground aquifers of the project area, any potential drilling may cause contamination or mixing of aquifers which may have long term effects on water supply or the loss of subterranean fauna if it does exist due to lowering of the water table or changes to humidity from exploration related activities.

There is a high potential that stygofauna and troglofauna communities maybe present in the groundwater system. It is recommended that a desktop survey is completed to determine the potential impact on these ecological communities.

The risk assessment suggests that the key environmental factors that need to be considered in environmental management are:

- Review current aquifers within the proposed exploration and mining areas
- Undertake desktop surveys on potential habitats for stygofauna and troglofauna
- management of flora and fauna habitat during clearing operations and mobilisation;
- management of threatened and vulnerable fauna and habitat during clearing operations, operational practices and mobilisation;
- management of fire risk;
- management of sites of cultural significance;
- management of hydrocarbon and hydrocarbons waste; and
- rehabilitation success

11. ENVIRONMENTAL MANAGEMENT

To ensure the current environmental values of the Project are maintained during the exploration programme, and any potential impacts are mitigated, the following environmental management actions should be implemented.

11.1. Fire

Fire is considered one of the greatest threats to the Project area as fire can disrupt the age mosaics of vegetation and cause habitat degradation. Fire management activities at the Project will include:

- restrict vehicles to cleared access tracks and roads;
- restrict any hot work, welding or field servicing that has potential to cause sparks;
- equip all vehicles with fire extinguishers; and
- all cigarette butts to be placed into a fireproof unit.
- reduce potential ignition sources.

11.2. Weeds

The Project area is considered to be relatively free of weeds. Clearing and the use of earthmoving equipment from other areas has the potential to introduce weeds to the Project. The following steps should be undertaken to minimise the possibility of weeds being introduced or spread by exploration personnel:

- all vehicles should be cleaned down before entering the Project areas and prior to leaving the area to ensure they are not carrying any soil or seeds that may contain weed species;
- personnel should be educated about weed species that are present in the Project area; and
- personnel should identity weed species during clearing activities and ensure weed hygiene measures, such as infield clean downs of equipment, are undertake to limit the potential for weeds to spread.

11.3. Feral animals

Feral animals can threaten both native fauna and flora and efforts should be taken to stop their introduction and spread within the Project area:

- ensure food waste is secured and not available for scavenging animals;
- ensure no cats or dogs are brought to site with personnel; and
- personnel to report sightings of feral animals to Project Manager, who may pass sightings on to pastoralists or regulators where appropriate.

11.4. Hydrocarbons

Hydrocarbons can contaminate soil and water and lead to flora and fauna deaths. There will be various hydrocarbons required onsite for the drilling programme, particularly fuels and oils. To mitigate risks of hydrocarbons to the environment the following precautions should be taken:

- spill response equipment should be kept in all vehicles;
- drip trays and hydrocarbon absorption mats should be used whenever refuelling equipment;
- all hydrocarbon waste should be disposed of offsite;

- all hydrocarbons should be stored in a lined bund or some other form of secondary containment that will help protect against hydrocarbon spills; and
- all hydrocarbon containers should have lids or seals, with all taps and valves left closed when not in use. Leaks should be reported and addressed immediately.

11.5. Waste

It is important that all materials bought into the Project and also taken once the programme has finished:

- all waste material should be collected and disposed of offsite; and
- drill sample bags and sump liners must be included in this waste and removed from site.

12. REFERENCES

Cassini 2014 West Musgrave Accessed on 25/07/2014 at http://www.cassiniresources.com.au/projects/western-australia/west-musgrave

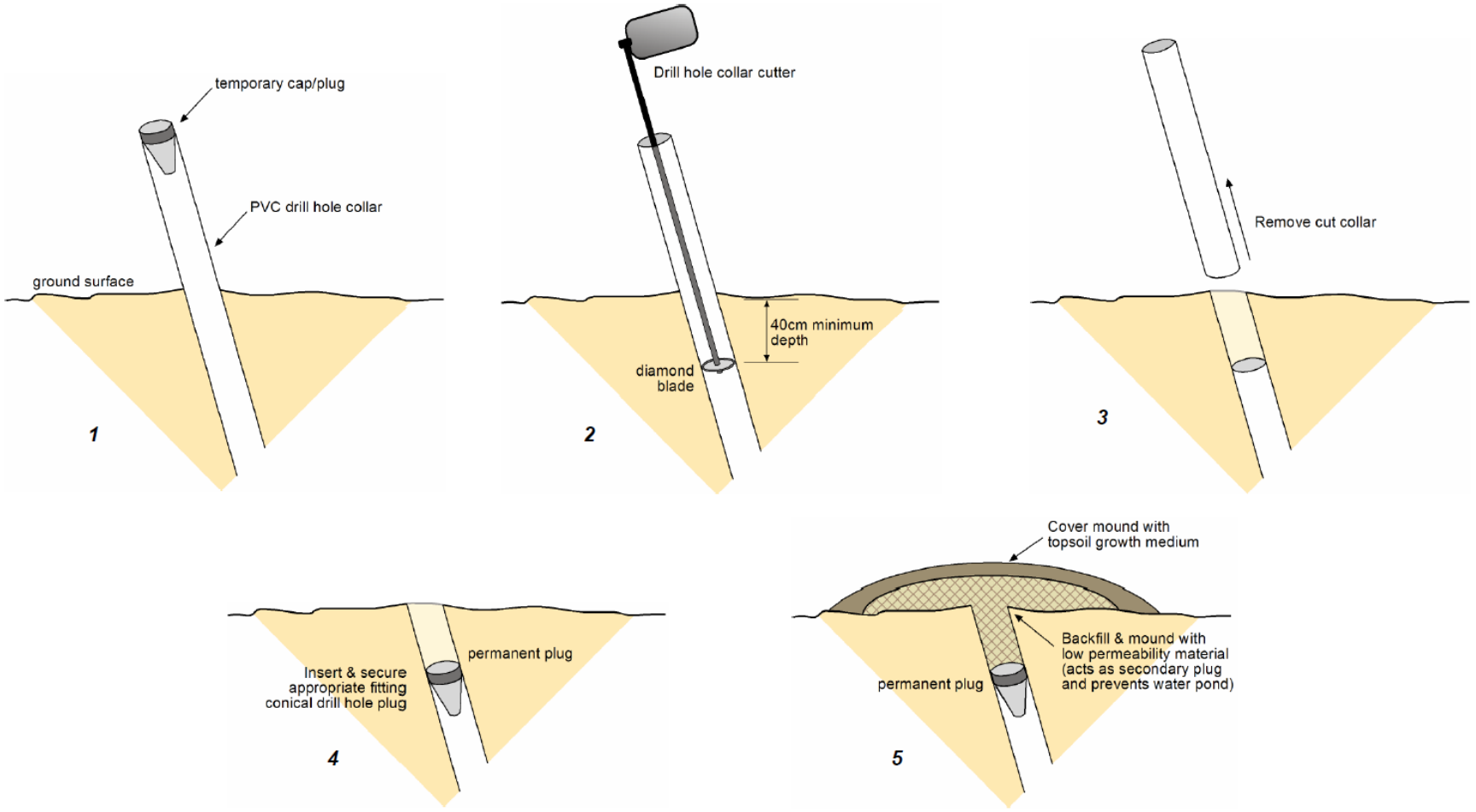
Coffey Environments (2012) BHP Closure Requirements Report – Minerals Exploration West Musgrave Project. Prepared for BHP Billiton. Perth Western Australia

Graham & Cowan (2001) Central Ranges 1 (CR1 – Mann-Musgrave Block Subregion)

Western Botanical (2014). Desktop Assessment of Flora and Vegetation Babel and Nebo Tenements, West Musgraves Region. Prepared for Cassini Resources, Perth Western Australia.

APPENDIX A

Figure of the drill hole rehabilitation process


temporary cap/plug
PVC drill hole collar
ground surface
1
Drill hole collar cutter
40cm minimum depth
diamond blade
2
Remove cut collar
3
Insert & secure appropriate fitting conical drill hole plug
permanent plug
4
Cover mound with topsoil growth medium
Backfill & mound with low permeability material (acts as secondary plug and prevents water pond)
permanent plug
5

APPENDIX B

DMP Exploration Rehabilitation Checklist

EXPLORATION REHABILITATION REPORT

(Complete upon completion of rehabilitation of the exploration programme and return to the relevant Perth or Kalgoorlie Environmental Inspectorate)

TENEMENT DETAILS

Programme of Works (POW) No. _____ Company: _____

Tenement Nos. and Types: _____

Date Programme Commenced: _____ Date Programme Completed: _____

Exploration Activity		Y/N or NA	Comments
Drill Holes	Immediate Capping		
	Plugged below ground level		
Drill Pads	Minimal Clearing		
	Rehabilitated		
Sumps	Constructed		
	Topsoil stored separately		
	Ramped		
	Rehabilitated		
Sample Bags	Removed		
	Bag Farm removed		
	Hostile Material eg. acid forming material, heavy metals, naturally occurring radioactive material and asbestoform removed or appropriately buried		
	Rehabilitated		
Hydrocarbons	Spills removed		
	Remediated		
Access Tracks	Access Closed Off		
	Rehabilitated		
Gridlines	Rehabilitated		
Minimal Topsoil Disturbance			
Rubbish & Infrastructure Removed			
Campsite Removed and Rehabilitated			

GENERAL COMMENTS (include any variations to the approved POW or areas not yet rehabilitated)
All statements made and information given is true and correct.

Name: _____ Position: _____

Contact Ph: _____ Email: _____

Signature: _____ Date: _____

APPENDIX C
RISK ASSESSMENT

DESCRIPTION	ACTIVITY / ENVIRONMENTAL ASPECT	POTENTIAL ENVIRONMENTAL IMPACT	CURRENT CONTROLS	RESIDUAL RISK ASSESSMENT		
				LIKELIHOOD	CONSEQUENCE	RISK RANKING
Clearing - for the purpose of preparation of drill pads and tracks to site. Removal using either mechanical or hand tools	Flora and Fauna	removal of priority species or DRF resulting in breach of EP Act and Regulations	Flora surveys undertaken before ground works, maps showing Priority Flora and DRF locations, marking Priority flora exclusion zones, relevant flora information provided in site inductions and Environmental handbooks, internal procedures to be followed	Unlikely	Moderate	M
		Clearing of significant vegetation for fauna habitat	Relevant fauna information provided in site inductions and Environmental handbooks, training of field personnel to ID nests/mounds, ID books in vehicles, maps, internal procedures to be followed	Unlikely	Moderate	M
	Vibration	SRE species	no current procedures or baseline surveys	possible	Moderate	H
	Invasive Species such as Weeds and Feral animals	Introduction or Spread of invasive species and weeds	Information provided in site inductions and Environmental handbooks, Internal procedures to be followed, clean machinery prior to entering tenements	possible	minor	M
	Water Courses (if within location)	erosion and sedimentaiton of water courses	internal procedures for clearing to be followed, operator to utilise exisiting lay of the land	Unlikely	minor	L
	Aboriginal and Heritage Issues	disturbance of cultural significant sites	heritage surveys, Undertake DAA searches, relevant heritage information provided in site inductions and Environmental handbooks, POWs, avoidance of any known sites, internal procedures to be followed,	Unlikely	moderate	M

DESCRIPTION	ACTIVITY / ENVIRONMENTAL ASPECT	POTENTIAL ENVIRONMENTAL IMPACT	CURRENT CONTROLS	RESIDUAL RISK ASSESSMENT		
				LIKELIHOOD	CONSEQUENCE	RISK RANKING
	Driving and Parking of vehicles in work areas	Compaction of soil	Wheel mounted equipment to be used where possible, internal rehabilitation procedure to be followed,	possible	minor	M
		Increased air pollution and noise	dust control measures such as water carts. Ensuring equipment is operating to full capacity and serviced regularly	possible	minor	M
	Hydrocarbon and Chemical Use	hydrocarbon spills, leaks and contamination of soil and groundwater	internal proocedures, inductions and training modules, containment bunding and cleanup equipment available	possible	minor	M
Use of light vehicles	Invasive Species such as Weeds and Feral animals	Introduction or Spread of invasive species and weeds	Information provided in site inductions and Environmental handbooks, Internal procedures to be followed, clean machinery prior to entering tenements	possible	minor	M
		increased sightings of Feral Animals	good hygeine and disposal procedures, inductions and procedures, do not feed animals, bins and disposal points around the site	Unlikely	minor	L
	Air Emissions	Increased air pollution and noise	driving to conditions, slower driving speeds, avoiding sandy areas	likely	minor	H
	Hydrocarbon and Chemical Use	hydrocarbon spills, leaks and contamination of soil and groundwater	internal proocedures, inductions and training modules, containment bunding and cleanup equipment available	possible	minor	M
	Driving and Parking of vehicles in work areas	Compaction of soil	minimise vehicle use where possible and avoid parking in same areas all the time	possible	minor	M
		disturbance footprint increases due to people driving off approved areas	POW, maps and desgnated tracks marked out, inductions and internal awareness, maps of significant sites including indigenous, flora and fauna	Unlikely	minor	M

DESCRIPTION	ACTIVITY / ENVIRONMENTAL ASPECT	POTENTIAL ENVIRONMENTAL IMPACT	CURRENT CONTROLS	RESIDUAL RISK ASSESSMENT		
				LIKELIHOOD	CONSEQUENCE	RISK RANKING
		bushfires caused from exhausts	avoid areas of thick dry vegetation if possible, cars equipped with fire equipment, induction process,	Unlikely	moderate	M
		collision with fauna	drive to conditions, avoid dusk and night time driving, inductions and internal driving procedures	possible	minor	M
Preparation of Drill sites	Preparation of sumps and drill hole locations	vegetation and tree death	set up of drill pad procedures, ensure placement of sumps is not within the vicinity of tree roots or other significant vegetaiton	Unlikely	low	L
		erosion and sedimentaiton of water courses	internal procedures for clearing to be followed, operator to utilise exisiting lay of the land, maps and locations of water courses	Unlikely	minor	L
Drilling (including RAB, RC & Diamond)	Use of chemicals and hydrocarbons, causing hydrocarbon spills, leaks	contamination of soil and groundwater from spills or leaks	internal proocedures, inductions and training modules, containment bunding and cleanup equipment available	possible	minor	M
	Air Emissions	Increased air pollution and noise	dust control measures such as water carts or dust collectors on drill rigs. Ensuring equipment is operating to full capacity and serviced regularly	Unlikely	low	L
		fauna or flora death	internal procedures to be followed, good housekeeping, reducing dust emissions, avoiding machinery and vehicles outside disturbed area	Unlikely	low	L

DESCRIPTION	ACTIVITY / ENVIRONMENTAL ASPECT	POTENTIAL ENVIRONMENTAL IMPACT	CURRENT CONTROLS	RESIDUAL RISK ASSESSMENT		
				LIKELIHOOD	CONSEQUENCE	RISK RANKING
	Sumps	contamination of soil and vegetation due to sumps being too full	freeboard on sumps, sumps capacity meets the volume of water required through drilling, or additional sumps preparared and used. Collection tanks also used	possible	minor	M
		fauna death	incline at sumps, sumps fenced if required, animals not encouraged to enter area due to poor housekeeping practices	Unlikely	low	L
	Fibrous materials	Release of fibrous materials	Production of dust - negative public perception	Unlikely	low	L
		Incorrect disposal of fibrous materials	Negative public perception	Unlikely	low	L
	Breaching of Aquifers	Mixing of multiple aquifers	maps of possible known aquifers, vegetation maps, type of geology available	possible	Major	E
		Contamination of aquifers		possible	Major	E
		Impact to stygofauna		possible	Major	E
Maintenance of Equipment	Hydrocarbon and Chemical Use	contamination soil and groundwater from spills and leaks	inductions and spill training, maintenance to be completed on bunded areas, spill clean up equipment and procedures available , inductions	possible	minor	M
	Waste Management	contamination of vegetation habitats	good hygeine and disposal procedures, inductions and procedures bins and disposal points	rare	low	L
	Flora and Fauna	Disturbance to Priority Flora and significant fauna	Flora surveys undertaken before ground works, maps showing Priority Flora and DRF locations, marking Priority flora exclusion zones, ID books in vehicles, relevant flora and fauna information provided in site inductions, internal procedures to be followed	Unlikely	minor	L

DESCRIPTION	ACTIVITY / ENVIRONMENTAL ASPECT	POTENTIAL ENVIRONMENTAL IMPACT	CURRENT CONTROLS	RESIDUAL RISK ASSESSMENT		
				LIKELIHOOD	CONSEQUENCE	RISK RANKING
Rehabilitation	Plugging of drill holes	Failure to plug drill holes causing fauna to enter and potentially get stuck and die	Rehabilitation procedures to be followed, contractor management, rehabilitation database to be maintained	rare	low	L
	sump backfilling	Leaving non biodegradable matter covered by topsoil on tenement	removal of all rubbish and material from site, Rehabilitation procedures to be followed, contractor management, rehabilitation database to be maintained,	rare	low	L
	Ripping	rehabilitation not successful	removal of all rubbish and material from site, Rehabilitation procedures to be followed, contractor management, rehabilitation database to be maintained, addition of local seeds and plants if required	Unlikely	minor	L
		water logging and pooling	Rehabilitation procedures to be followed, contractor management, rehabilitation database to be maintained, photos of sites and monitoring	Unlikely	minor	L
		Introduction or Spread of invasive species and weeds	clean machinery procedures prior to entering to site, rehabilitation procedures followed, ensure seed mix is weed free	Unlikely	Moderate	M
		Vibration	Direct loss of SRE / invertebrate species	possible	Moderate	H
Camp	Waste Management	contamination of vegetation habitats	good hygeine and disposal procedures, inductions and procedures bins and disposal points	possible	minor	M
		increased rubbish not been dispoed of properly	bins around camp area, covered bins, landfill area to dispose of rubbish, procedures, inductions and awareness sessions	possible	minor	M

DESCRIPTION	ACTIVITY / ENVIRONMENTAL ASPECT	POTENTIAL ENVIRONMENTAL IMPACT	CURRENT CONTROLS	RESIDUAL RISK ASSESSMENT		
				LIKELIHOOD	CONSEQUENCE	RISK RANKING
		Introduction or Spread of invasive species and weeds	Information provided in site inductions and Environmental handbooks, Internal procedures to be followed, clean machinery prior to entering tenements	possible	minor	M
		hydrocarbon spills, leaks and contamination of soil and groundwater	bunded areas to hold containers, inspections, spill kits	Unlikely	minor	L
	Septic Tanks - Sewage	contamination of groundwater and soil	above ground tanks to monitor, procedures, inspections	Unlikely	minor	L
	Leach Drain	contamination of groundwater and soil	inspections, licences and approvals from local council, built to specs	Unlikely	Moderate	M
	Hydrocarbon and Chemical Use	hydrocarbon spills, leaks and contamination of soil and groundwater	internal proocedures, inductions and training modules, containment bunding and cleanup equipment available	possible	minor	M
		refuelling at camp				
	Feral Animals	Increased numbers of feral animals	covering or burying of waste, fencing?	likely	Moderate	H
Local Communities - Jamieson and Blackstone	Groundwater	Contamination of local groundwater sources	Bore locations known, desktop review of water locations and resources, water locations. Monitoring during drilling of potential areas of known drinking water sources	Unlikely	Moderate	M
		use of water source from local community	monitoring of water usage, agreements in place to use water bores, flow meters and monthly tracking, licensing of water usage	rare	Major	H

DESCRIPTION	ACTIVITY / ENVIRONMENTAL ASPECT	POTENTIAL ENVIRONMENTAL IMPACT	CURRENT CONTROLS	RESIDUAL RISK ASSESSMENT		
				LIKELIHOOD	CONSEQUENCE	RISK RANKING
	Fire	disturbance of cultural significant sites	fire fighting equipment, fire extinguishers at camp and in vehicles, fire breaks around camp, not driving cars around dry vegetation, smoking in desinagted areas and cigarette butt bins and potential ignition sources to a minimum, education and awareness	Unlikely	Major	H
		loss of vegetation and fauna habitat		Unlikely	Major	H
		loss of buildings at camp or communities		Unlikely	Major	H
	Weeds	Introduction, increase or Spread of invasive species and weeds	Information provided in site inductions and Environmental handbooks, Internal procedures to be followed, clean machinery prior to entering tenements	possible	minor	M

APPENDIX D
EXP-SOP CLEARING DRILL SITES

CASSINI RESOURCES LIMITED ABN 50 149 789 337	Exploration Department Standard Operating Procedure
	Clearing and Preparing Drill Sites

Scope

This procedure outlines the method to be employed for safe and standardised preparation of drill sites.

Prerequisites

All statutory approvals for ground disturbance, including Programmes of Work and Clearing Permits, must be obtained prior to undertaking any ground disturbance.

Clearing should be conducted in line with the Drilling Contractor's desired layout provided the footprint is in line with Companies procedures and permits.

Related Documents

EXP-SOP Track Management
EXP-SOP Drill Site Schematic

Method and Safety Controls

Instructions are written in black.
Hazards and safety controls are written in red.

1. Access to the drill site should be obtained along gazetted roads and/or existing tracks. Where pre-existing access is not available, refer to EXP-SOP-002 for instruction related to clearing access tracks.

2. The drill site perimeter and orientation of sumps needs to be delineated for earthmoving operators as follows:

    a. Locate the designed collar position with a differential or hand-held GPS.
    b. Mark the collar position with a 1.2m-long survey peg that clearly states the coordinates and designed hole ID (or drill pad identifier if no hole ID is available). Attach a length of flagging tape to the top of the peg.

c. Using similar wooden pegs but without flagging tape, mark a 20x20m perimeter around the collar peg, suitably orientated for the direction of drilling and anticipated position of drilling equipment.
d. Mark the location of drill sump(s) in line with the contractor's desired orientation. The total sump area should be no larger than 10x4.5m and sits adjacent (additional) to the 20x20m drill pad.

3. Ensure that the proposed clearing falls within the scope of approved Clearing Permits and Programs of Work (POW).

4. Give instruction and appropriate explanation to earthmoving operators to clear the site and dig sumps as necessary.
   Exercise caution around earthmoving equipment and obtain positive acknowledgement from operator before approaching equipment.

5. Once the site has been cleared, ensure the collar peg remains appropriately located and upright, and that the written identifier is clearly written on the peg. Ensure all puncture hazards have been removed from the drill site where practicable.
   Drill sumps should be demarcated as necessary so as to highlight fall hazards to personnel and equipment.

End of procedure.

APPENDIX E
EXP-SOP TRACK MANAGEMENT

CASSINI RESOURCES LIMITED ABN 50 149 789 337	Exploration Department Standard Operating Procedure
	Track Management

Scope

This procedure outlines the method to be employed for safe and standardised clearing of access tracks in line with all permitting requirements.

Related Documents

EXP-SOP Clearing Drill Sites

EXP-SOP Rehabilitation

Method and Safety Controls

Instructions are written in black.

Hazards and safety controls are written in red.

1. Clearing of new access ways should only be undertaken where existing access either does not exist or is deemed unsafe. Permission must be given by the site manager to clear new access tracks.

2. Access tracks must not be created that enter Heritage Exclusion Zones unless permission has been granted by the Ngaanyatjarra Land Council to create a track in that exact location.

3. Clearing is to be completed only by qualified equipment operators to ensure unnecessary environmental damage is avoided.

4. Track width is not to exceed 3m and all reasonable steps must be taken to ensure appropriate turn radii and removal of potential hazards (e.g. overhanging vegetation).

5. Once created, all vehicular traffic should be constrained to the track and venturing off the track into adjacent undisturbed areas is to be avoided.

End of procedure.

APPENDIX F
EXP-SOP REHABILITATION

CASSINI RESOURCES LIMITED ABN 50 149 789 337	Exploration Department Standard Operating Procedure
	Rehabilitation

Scope

This procedure outlines the timeframes and methods to be employed for safe and standardised rehabilitation of access tracks and drill pads in line with legislative requirements.

Related Documents

EXP-SOP Clearing Drill Sites

EXP-SOP Track Management

Method and Safety Controls

Instructions are written in black.

Hazards and safety controls are written in red.

1. Legislative requirements necessitate the rehabilitation of drill sites within 6 months of the completion of works or as otherwise stated in the submitted Program of Works (POW). Cassini Resources Ltd aims to rehabilitate disturbance as soon as possible after all work has been completed and no further exploration work is deemed likely to occur at a particular site.

2. All rubbish is to be collected and disposed of appropriately prior to the rehabilitation process. This includes removal of all plastic RC bags, calicos, survey pegs, flagging tape and various other drilling rubbish.

3. In the case of diamond and RC drilling, collar casing is to be cut 400mm below the surface and the hole plugged at the top of casing. This is to be covered over with topsoil to return the ground surface to its natural level, allowing for the settling of soil over time.

4. Drill cuttings with a high sulphide content need to be moved to an appropriate Potential Acid Forming (PAF) disposal area.

5. All remaining drill cuttings are to be buried in sumps before being covered over with original sump fill. Topsoil should be spread over the backfilled sumps.

6. Rehabilitated drill sites and tracks should be scarified to loosen compacted soil and aid the catchment of seeds carried on the wind. Dead tree branches and stumps should be placed on the rehabilitated land to prevent vehicles re-entering the area.

End of procedure.

APPENDIX G

EXP-SOP WASH DOWN AND HYGIENE

CASSINI RESOURCES LIMITED ABN 50 149 789 337	Exploration Department Standard Operating Procedure
	Wash down and Hygiene Procedure

Scope

This procedure outlines the timeframes and methods to be employed for the minimisation of weed infestations into the Cassini tenements.

Related Documents

EXP-SOP Clearing Drill Sites
EXP-SOP Track Management
EXP-SOP Rehabilitation

Method

Vehicle And Mobile Equipment Weed Hygiene Site Entry to Cassini Resources Tenements

Prior to entering site all vehicles must be washed down and inspected for weeds and seeds. A weed inspection checklist is attached to this procedure as Appendix A. Upon entering site the weed inspection checklist is to be given to the Cassini Resources Contact.

Vehicles and equipment will have a final inspection by Cassini Resources using the Vehicle and Mobile Equipment Weed Inspection Form. A copy of both inspections shall remain within the program file for reference when the program is completed.

A vehicle or item of mobile plant or equipment is only free to move within the site (with the exception of weed risk areas) once it has been demonstrated to be clean on entry. Records of site access permits, weed inspections shall be maintained for reporting purposes.

Known weed risk areas will be identified on Weed Maps and Ground Disturbance Permits with the location of either Declared Plants and Priority Environmental Weeds.

The project has an existing wash-down facility at the camp area.

Inspection Checklist

Earthmoving machinery, equipment, road trains and light vehicles entering and leaving Cassini Resources tenements have the potential to contribute to the transfer of materials containing weeds and seeds. Weed seeds present in accumulated sediment may be deposited across other sites and transport corridors potentially causing weed infestation.

All mobile equipment arriving at Cassini Resources tenements must be clean and free of built up mud, rock, soil, seeds, propagules and vegetation. An inspection checklist must be completed prior to entry at Cassini Resources.

Table 1: Inspection Checklist

	PASS	FAIL	N/A
The following areas are provided as an initial guide:			
1. Tyres and rims – inspect all parts of the tyres and rims, including inner side of rim for soil or other contaminates			
• Between dual wheels (if fitted) • Check for wheel mounted counter – weights • Gaps in split tyre rims • Gashes or cuts in tyres			
2. Dozers and Excavators			
• Examine tracks carefully • Check idler wheels (these support the tracks) • Check removable track adjusted guards • Arms / booms – pivot points are usually only area of concern			
3. Chassis and machinery body			
• Inspect mud guards and wheel flares for hollows and crevices • Check for void spaces in rear brake assemblies • Check if any sections or channels are hollow and determine if there is a possible entry point for contamination, check if plates are covering a compartment or space that may have collected soil etc.			
4. Inspect underside of machinery, especially			
• Wheel arches, wheel trims • Axels and diffs • Any spare tyres			
5. Buckets / Blades / Scoops / (if applicable)			
• Between teeth of adaptors • Wear plates • Inspect hollow section arms and blades for hollows that may contain soil etc • Check cutter points / wear blades			

Equipment Owner: _____

Equipment Type: _____ Equipment ID: _____

Inspection completed by: _____ Sign: _____

Date: _____

APPENDIX H
EXP-SOP CULTURAL & HERITAGE PROCEDURE

CASSINI RESOURCES LIMITED ABN 50 149 789 337	Exploration Department Standard Operating Procedure
	Heritage and Cultural Procedure

Scope

This procedure outlines the methods to be employed for safe and standardised access to any known cultural or heritage sites between Company and Ngaanyatjarra Council (representing Traditional Owners).

Related Documents

EXP-SOP Clearing Drill Sites

EXP-SOP Track Management

Method

Prior to the commencement of any exploration programme, the area must be approved to enter by the Exploration Manager, after checks of the proposed works location, a map of known cultural and heritage sites should be provided to all personnel involved with the works to ensure no sites are entered or damaged unintentionally.

In areas which have not previously undergone Heritage surveys, a work programme clearance is required. The clearance work program method requires the Company to supply a work programme containing details of all proposed works and the location of these works to the Ngaanyatjarra Council. Ngaanyatjarra Council will then organise a clearance team which will undertake a clearance of the proposed works locations. The clearance team will include male and female traditional owners, as well as one male and one female anthropologist. Senior Company representatives will also be present.

The task of the clearance team is to determine at each proposed works location whether the proposed works are likely to damage or interfere with any areas of cultural and/or historical significance. The clearance will be undertaken with the input of men and women, unless there is an indication by past reports/knowledge of any particularly sacred men's or women's sites within the proposed work areas. The work will mostly be carried out on the ground using four wheel drives, with some of the clearance being conducted off road and on foot. The Anthropologist's will compile a report summarising results of the survey along with maps and any Heritage Exclusion areas. These areas will be added to the Company corporate database. Any Heritage sites that are found, will also be excluded from the work area.

In areas which have been previously cleared, Company representatives will provide Traditional Owners and Ngaanyatjarra Council with the details of the proposed work programme. In most cases Heritage survey will not be required, however, Traditional owners may visit those areas with the Company representatives as part Company's efforts to keep the Traditional owners informed of its activities.

Once the exploration programme is completed all rubbish and items bought in to undertake the program must be removed and disposed of in the Jamieson landfill.

If there is any interaction with a heritage or cultural site, work must cease immediately and the Exploration Manager notified. If required an incident investigation will occur.