Our ref: MER-2020/0172
2023_023

Government of South Australia
Department for Energy and Mining

4 April 2023

Environmental Impact Classification – Pursuant to Section 98 of the *Petroleum and Geothermal Energy Act 2000* – Exploration Drillhole Logging, Monitoring, Maintenance, Rehabilitation and Decommissioning – Statement of Environmental Objectives, Geothermal Resources, February 2023.

Pursuant to Section 98 of the *Petroleum and Geothermal Energy Act 2000* (the Act) the Minister must classify the regulated activities covered by a prepared Environmental Impact Report (EIR) as either of low, medium or high environmental impact.

The classification must be made on the basis of:

- The prepared EIR;
- Criteria established for classifying the level of environmental impact of regulated activities, a copy of which is found on the Department for Energy and Mining - Energy Resource Divisions (DEM-ERD) web page:

  http://www.energymining.sa.gov.au/petroleum/legislation_and_compliance/environmental_register; and
- Comment received from relevant Government departments in accordance with established administrative arrangements between these departments and DEM-ERD.

This document summarises the classification made by DEM-ERD on the *Exploration Drillhole Logging, Monitoring, Maintenance, Rehabilitation and Decommissioning – Statement of Environmental Objectives, Geothermal Resources, February 2023.* This classification is based on information provided in the EIR prepared by Geothermal Resources Pty Ltd.

ACTIVITY CLASSIFICATION SUMMARY

1. From an analysis of the potential environmental significance of the events and potential impacts associated with the proposed activities against the classification criteria referred to above (assessment provided as Attachment 1), these regulated activities have been classified as **low impact**.

2. Of 37 potential environmental events assessed, 37 were deemed to be of low potential environmental significance, no medium potential environmental significance and no high potential environmental significance. This is due to the fact that appropriate management measures will be implemented by Geothermal Resources to avoid or mitigate any potential environmental consequences.

CONSULTATION

1. For a low impact classification, DEM-ERD consults with the Department of Environment, Water (DEW) and the Environment Protection Authority (EPA) on the impact classification level in accordance with relevant administrative arrangement's dated 11 November 2005 and 25 June 2012 respectively.

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2. Concurrence received from both EPA and DEW on 11 July 2022, agreed with the classification of **low impact.**

3. In accordance with Section 101 of the Act, activities classified as low impact require DEM-ERD to undertake consultation with relevant government agencies. This consultation period was for at least 20 business days. Consultation was initiated on 11 July 2022 and closed on 12 August 2022.

4. Comments received from this consultation are provided in Appendix 3 of the EIR whereby all reasonable comments within scope need to be adequately addressed. DEM-ERD is satisfied that all comments raised during consultation have been adequately addressed.

   *The Environmental Register can be accessed via the webpage at - http://www.petroleum.statedevelopment.sa.gov.au/legislation_and_compliance/environmental_register#SEO

Pursuant to delegated powers, I classify this regulated activity as **low impact.**

Nick Panagopoulos
A/Executive Director
Energy Resources Division
Department for Energy and Mining
Delegate of the Minister for Energy and Mining

PROJECT: Geothermal Exploration Drillhole Logging, Monitoring, Maintenance, Rehabilitation and Decommissioning
COMPANY: GEOTHERMAL RESOURCES

Date: July 2022

ABBREVIATIONS:
H = High certainty;
L = Low certainty

REF	TYPE OF IMPACT	EVENTS	POTENTIAL CONSEQUENCES	PREDICTABILITY						MANAGEABILITY							COMMENTS	ENVIRONMENTAL SIGNIFICANCE
				SIZE	SCOPE	DURATION	FREQUENCY	STAKEHOLDERS	SIGNIFICANCE	AVOIDANCE	PROBABILITY	DURATION	SIZE AND SCOPE	CUMULATIVE EFFECTS	STAKEHOLDERS	SIGNIFICANCE		
	Natural Environment Impacts																	
	Soil Impacts																The area is marked by a thin veneer of wind blown sand and hardpan comprised of ferruginous and gypsum cemented sandy to gravelly material. Variable thicknesses of Cenozoic sands and clays (eg Namba Formation) up to 90 metres thick rest unconformably on either Cambrian or Neoproterozoic gently dipping shelf sediments of the Arrowie Basin. This sequence rests unconformably on either Mesoproterozoic granitic rocks or Palaeoproterozoic metasediments and granitic gneisses.	
3.1, 3.2, 4.2.1, Table 7		Movement of vehicles to, from and within well site locations	Soil erosion and compaction	H	H	H	H	H	1	No	Low	--	--	--	--	1	The wells were carefully sited along existing well maintained station tracks. This avoided the need for construction of new tracks and any cross-country travel that could have resulted in unnecessary damage to vegetation and the surface environment. This logging is likely to involve only relatively light vehicles rather than heavy trucks. Any surface disturbance caused by use of logging vehicles will be rehabilitated at the time. Vehicles to travel at reduced speeds to minimise rutting - Travel to be prohibited during wet weather events - Personnel to use only existing pastoral tracks - Ripping and rehabilitation to be undertaken if compaction occurs	**LOW**
		Storage and handling of fuels and chemicals	Contamination of surface soils	H	H	H	H	H	1	No	Low	--	--	--	--	1	All vehicle refuelling to be undertaken offsite - Spill kits to be available at each site - Emergency response plan in place	**LOW**
		Subsurface Well Decommissioning	Collapse and subsidence of hole collar	H	H	H	H	H	1	No	Low	--	--	--	--	1	Decommissioning of wells undertaken in accordance with Mineral Exploration Drillholes guideline M21 -Decommissioning program developed and approved by DEM through Activity Notification process	**LOW**
	Surface Water and Groundwater Impacts																Groundwater in the region is almost exclusively sub-artesian and occurs in Cenozoic Eyre Formation palaeochannel sands and gravels (eg Goulds Dam palaeochannel). It is of high-salinity and is not suitable for stock (mostly >10,000 TDS). Hence almost all stock water in the region is derived from natural surface catchments in dams rather than bores. These observations are supported by data from the Waterconnect SA database, which for a very large area of almost 20,000 km2 surrounding GEL 181, records only two water bores in the region that are equipped with pumps or windmills (Figure 3). This area was selected because of the similarity of the surface topography and underlying geology to GEL 181 (unlike areas to the west nearer the Flinders Ranges, where the geology is different and the topography more undulating). Local ephemeral water holes and clay pans are rare within the GEL area. Lake Frome lies to the north of the Frome project area and is the largest drainage feature in the region. The lake is fed by a large catchment, including the Flinders Ranges to the west, the Olary Ranges to the south, and the Barrier Ranges to the east.	
4.3, 4.4, Table 7		Movement of vehicles to, from and within well site locations	Alteration of surface water drainage	H	H	H	H	H	1	No	Low	--	--	--	--	1	Drainage lines to be avoided when driving to and from sites - Travel to be prohibited during wet weather events -Unavoidable damage to be repaired as soon as practicable	**LOW**
		Storage and handling of fuels and chemicals	Impact on groundwater and surface water	H	H	H	H	H	1	No	Low	--	--	--	--	1	All vehicle refuelling to be undertaken offsite - Spill kits to be available at each site - Emergency response plan in place	**LOW**
		Waste storage, handling and disposal	Impact on groundwater and surface water	H	H	H	H	H	1	No	Low					1	All litter and waste will be removed from site post operations - Litter and waste will be contained during operations	**LOW**
		Subsurface well decommissioning	Cross flow of groundwater	H	H	L	H	H	1	No	Low	--	--	--	--	1	Decommissioning of wells undertaken in accordance with Mineral Exploration Drillholes guideline M21 -Decommissioning program developed and approved by DEM through Activity Notification process	**LOW**
	Vegetation Impacts																The Frome Downs project area is mostly flat open country vegetated with species of saltbush, bluebush and small shrubby trees (predominately Acacia species) and occasional groves of larger trees such as black oak and mulga. There are wide flood plains occupying the low areas that may become temporarily inundated after extreme rain storms. Well defined water courses are generally lacking. Interspersed sand sheets that form slightly higher ridges are mostly covered with thicker low scrubby vegetation. Reviews of DEW and EPBC databases, including Nature Maps and BDBSA searches found no records of threatened plants or animals near the decommissioning sites or within GEL 181. Although this area has not been intensely surveyed, there have been no long-term observations of rare or endangered species indicating there is little likelihood of encountering such.	
4.2.1, 4.2.2, Table 7		Movement of vehicles to, from and within well site locations	Damage to native vegetation and fauna habitat	H	H	H	H	H	1	No	Low	--	--	--	--	1	Confinement of all vehicles to existing station tracks and selection of open sparsely vegetated areas for the drilling sites means that the likelihood of the drilling work having impacted any unrecognised threatened species was exceptionally low. Likewise, the likelihood of impacting any of these species as a result of the well logging, monitoring or decommissioning work will be extremely low.	**LOW**
			Introduction/spread of pest plant species	H	H	L	H	H	1	No	Low	--	--	--	--	1	Vehicles to be washed down prior to entering work area - Inspections of vehicles to be undertaken prior to entering work area	**LOW**
			Clearance of vegetation	H	H	H	H	H	1	No	Low	--	--	--	--	1	Confinement of all vehicles to existing station tracks and selection of open sparsely vegetated areas for the drilling sites means that the likelihood of the drilling work having impacted any unrecognised threatened species was exceptionally low. Likewise, the likelihood of impacting any of these species as a result of the well logging, monitoring or decommissioning work will be extremely low.	**LOW**
		Fire (resulting from any site activities)	Damage to vegetation and habitat	H	L	L	H	L	2	No	Low	--	--	--	--	1	Firefighting equipment will be available in all vehicles - Fire safety induction for all personnel - Fire danger season restrictions applied when operating - Driving over dry vegetation litter and foliage prohibited	**LOW**
		Storage and handling of fuel and oil	Spill/leak resulting in damage to vegetation and habitat	H	H	H	H	L	1	No	Low	--	--	--	--	1	All vehicle refuelling to be undertaken offsite - Spill kits to be available at each site - Impacted soil to be immediately contained and removed - Any affected areas will be fenced off to exclude native fauna	**LOW**
	Fauna Impacts																Reviews of DEW and EPBC databases, including Nature Maps and BDBSA searches found no records of threatened plants or animals near the decommissioning sites or within GEL 181. Although this area has not been intensely surveyed, there have been no long-term observations of rare or endangered species indicating there is little likelihood of encountering such.	
4.2.2, Table 7		Movement of vehicles to, from and within well site locations	Disturbance to rare, endangered species and loss due to collision	H	H	H	L	H	1	No	Low	--	--	--	--	1	Confinement of all vehicles to existing station tracks and selection of open sparsely vegetated areas for the drilling sites means that the likelihood of the drilling work having impacted any unrecognised threatened species was exceptionally low. Likewise, the likelihood of impacting any of these species as a result of the well logging, monitoring or decommissioning work will be extremely low.	**LOW**
		Fire (resulting from any siteactivities)	Damage to habitat, loss of native fauna	H	L	H	H	H	1	No	Low	--	--	--	--	1	Firefighting equipment will be available in all vehicles - Fire safety induction for all personnel - Fire danger season restrictions applied when operating - Driving over dry vegetation litter and foliage prohibited	**LOW**

REF	TYPE OF IMPACT	EVENTS	POTENTIAL CONSEQUENCES	PREDICTABILITY						MANAGEABILITY							COMMENTS	ENVIRONMENTAL SIGNIFICANCE
				SIZE	SCOPE	DURATION	FREQUENCY	STAKEHOLDERS	SIGNIFICANCE	AVOIDANCE	PROBABILITY	DURATION	SIZE AND SCOPE	CUMULATIVE EFFECTS	STAKEHOLDERS	SIGNIFICANCE		
		Storage and handling of fuel and oil	Spill/leak resulting in damage habitat, loss of native fauna	H	H	H	H	H	1	No	Low	--	--	--	--	1	All vehicle refuelling to be undertaken offsite - Spill kits to be available at each site - Impacted soil to be immediately contained and removed - Any affected areas will be fenced off to exclude native fauna	LOW
		Storage and transport of waste	Scavenging of native species	H	H	H	H	H	1	No	Low	--	--	--	--	1	All litter and waste will be removed from site post operations - Litter and waste will be contained during operations	LOW
	Air Impacts																The project area lies within the pastoral leases of Curnamona, Kalabity and Frome Downs that have been used for sheep grazing for over 100 years. There are no other land uses. The country is flat and mostly featureless with rainfall unpredictable and drought periods common. The nearest settlement is Yunta, approximately 120 km to the south, which lies on the main Barrier Highway. The Frome Downs project area is generally arid with an annual average rainfall of approximately 200mm and a temperature variation of between 0°C and 45°C. Rainfall is extremely variable, with drought seasons common. Surface runoff may occur after heavy rainstorms and is relied upon to fill local station dams for stock watering.	
4.1, 4.7, Table 7		Movement of vehicles to, from and within well site locations	Generation of dust resulting in reduction in local air quality	H	H	H	H	H	1	No	Low	--	--	--	--	1	Vehicles to travel at reduced speeds to avoid generating excess dust - Vehicles to further reduce speed when in close proximity to infrastructure	LOW
		Fire (resulting from any siteactivities)	Reduction in air quality	H	H	H	H	H	1	No	Low	--	--	--	--	1	Firefighting equipment will be available in all vehicles - Fire safety induction for all personnel - Fire danger season restrictions applied when operating - Emergency response plan in place - Activities not to take place in any communities or near dwellings	LOW
	Social Environment																	
	Community Resource Impacts																The project area lies within the pastoral leases of Curnamona, Kalabity and Frome Downs that have been used for sheep grazing for over 100 years. There are no other land uses. The country is flat and mostly featureless with rainfall unpredictable and drought periods common. The nearest settlement is Yunta, approximately 120 km to the south, which lies on the main Barrier Highway.	
4.7, Table 7		Movement of vehicles to, from and within well site locations	Generation of dust resulting in reduction in local air quality	H	H	H	H	L	1	No	Low	--	--	--	--	1	Vehicles to travel at reduced speeds to avoid generating excess dust - Vehicles to further reduce speed when in close proximity to infrastructure	LOW
			Damage to stakeholder infrastructure or stock	H	H	H	H	H	1	No	Low	--	--	--	--	1	Vehicles to travel at reduced speeds to minimise chances of collision -Personnel to use only existing tracks - Station managers to be contacted prior to any work being undertaken	LOW
			Introduction/spread of pest plant species	H	H	H	H	H	1	No	Low	--	--	--	--	1	Vehicles to be washed down prior to entering work area - Inspections of vehicles to be undertaken prior to entering work area	LOW
		Fire (resulting from any siteactivities)	Damage to vegetation and habitat	H	L	H	H	H	1	No	Low	--	--	--	--	1	Firefighting equipment will be available in all vehicles - Fire safety induction for all personnel - Fire danger season restrictions applied when operating - Driving over dry vegetation litter and foliage prohibited	LOW
			Damage to stakeholder infrastructure or stock	H	H	H	H	H	1	No	Low	--	--	--	--	1	Firefighting equipment will be available in all vehicles - Fire safety induction for all personnel - Fire danger season restrictions applied when operating - Driving over dry vegetation litter and foliage prohibited - Activities not to take place in close proximity to infrastructure	LOW
			Reduction in air quality	H	H	H	H	H	1	No	Low	--	--	--	--	1	Firefighting equipment will be available in all vehicles - Fire safety induction for all personnel - Fire danger season restrictions applied when operating - Emergency response plan in place - Activities not to take place in any communities or near dwellings	LOW
		Storage and handling of fuel and oil	Spill/leak resulting in impacts on stock	H	H	H	H	H	1	No	Low	--	--	--	--	1	All vehicle refuelling to be undertaken offsite - Spill kits to be available at each site - Impacted soil to be immediately contained and removed - Any affected areas will be fenced off to exclude stock	LOW
		Storage and transport of waste	Litter and reduced visual amenity	H	H	H	L	H	1	No	Low	--	--	--	--	1	All litter and waste will be removed from site post operations	LOW
	Cultural & Heritage Impacts																The Frome Downs project area lies within two Native Title determined areas, those being; the Adnyamathanha People No. 1 (Stage 1) determination to the north, and Adnyamathanha No.1 (Stage 2) determination in the south. On 10 and 11 August 2006, prior to drilling, a heritage survey was conducted by four senior Adnyamathanha people who were familiar with the area. They were taken to each of the proposed drilling sites and in each case did not identify any culturally significant features as recorded in a signed statement clearing the sites for drilling activities. The proposed well logging, monitoring and decommissioning activities will be completely confined to the areas subject to this previous heritage survey thereby mitigating the risk of disturbance to any cultural sites, objects or remains.	
4.5, Table 7		Movement of vehicles to, from and within well site locations	Disturbance or damage to sites of cultural heritage significance	H	H	H	H	L	1	No	Low	--	--	--	--	1	Drill sites have already been cleared by heritage survey. - Personnel to use only existing tracks - Personnel to be trained to identify areas or objects of significance	LOW
	Community Health & Safety																The project area lies within the pastoral leases of Curnamona, Kalabity and Frome Downs that have been used for sheep grazing for over 100 years. There are no other land uses. The country is flat and mostly featureless with rainfall unpredictable and drought periods common. The nearest settlement is Yunta, approximately 120 km to the south, which lies on the main Barrier Highway.	
4.7, Table 7		Movement of vehicles to, from and within well site locations	Vehicle collision	H	H	H	H	H	1	No	Low	--	--	--	--	1	Vehicles to travel at reduced speeds to minimise chances of collision -Personnel to use only existing tracks	LOW
		Fire (resulting from any siteactivities	Impacts to public safety and reduction in air quality	H	H	H	H	H	1	No	Low	--	--	--	--	1	Firefighting equipment will be available in all vehicles - Fire safety induction for all personnel - Fire danger season restrictions applied when operating - Emergency response plan in place - Activities not to take place in any communities or near dwellings	LOW
		Storage and handling of fuel and oil	Spill/leak resulting in impacts to public safety	H	H	H	H	H	1	No	Low	--	--	--	--	1	All vehicle refuelling to be undertaken offsite - Spill kits to be available at each site - Emergency response plan in place	LOW

REF	TYPE OF IMPACT	EVENTS	POTENTIAL CONSEQUENCES	PREDICTABILITY						MANAGEABILITY							COMMENTS	ENVIRONMENTAL SIGNIFICANCE
				SIZE	SCOPE	DURATION	FREQUENCY	STAKEHOLDERS	SIGNIFICANCE	AVOIDANCE	PROBABILITY	DURATION	SIZE AND SCOPE	CUMULATIVE EFFECTS	STAKEHOLDERS	SIGNIFICANCE		
		Subsurface well decommissioning	Collapse and subsidence of hole collar	H	L	H	H	H	1	No	Low	--	--	--	--	1	Decommissioning of wells undertaken in accordance with Mineral Exploration Drillholes guideline M21 -Decommissioning program developed and approved by DEM through Activity Notification process	LOW
	Economic Environment																	
	Existing Land Use Impacts																The project area lies within the pastoral leases of Curnamona, Kalabity and Frome Downs that have been used for sheep grazing for over 100 years. There are no other land uses. The country is flat and mostly featureless with rainfall unpredictable and drought periods common. The nearest settlement is Yunta, approximately 120 km to the south, which lies on the main Barrier Highway. In places extensive man-made drains channel surface water into dams, but none of the geothermal holes lie near such channels so there is no possibility of contamination from saline groundwater nor surface water draining into the holes.	
4.4, 4.7, Table 7		Movement of vehicles to, from and within well site locations	Damage to stakeholder infrastructure or stock	H	H	H	H	H	1	No	Low	--	--	--	--	1	Vehicles to travel at reduced speeds to minimise chances of collision -Personnel to use only existing tracks - Station managers to be contacted prior to any work being undertaken	LOW
			Introduction/spread of pest plant species	H	H	L	H	L	1	No	Low	--	--	--	--	1	Vehicles to be washed down prior to entering work area - Inspections of vehicles to be undertaken prior to entering work area	LOW
		Fire (resulting from any siteactivities)	Damage to stakeholder infrastructure or stock	H	H	L	H	L	1	No	Low	--	--	--	--	1	Firefighting equipment will be available in all vehicles - Fire safety induction for all personnel - Fire danger season restrictions applied when operating - Driving over dry vegetation litter and foliage prohibited - Activities not to take place in close proximity to infrastructure	LOW
		Storage and handling of fuel and oil	Spill/leak resulting in impacts on stock	H	H	H	H	H	1	No	Low	--	--	--	--	1	All vehicle refuelling to be undertaken offsite - Spill kits to be available at each site - Impacted soil to be immediately contained and removed - Any affected areas will be fenced off to exclude stock	LOW
		Storage and transport of waste	Litter and reduced visual amenity	H	H	H	H	H	1	No	Low	--	--	--	--	1	All litter and waste will be removed from site post operations	LOW
		Subsurface well decommissioning	Collapse and subsidence of hole collar	H	H	H	H	H	1	No	Low	--	--	--	--	1	Decommissioning of wells undertaken in accordance with Mineral Exploration Drillholes guideline M21 -Decommissioning program developed and approved by DEM through Activity Notification process	LOW