

# Tulu Moyo Geothermal Development Project - Phase I: Environmental and Social Impact Assesement

**ESIA Report: Part III of III (ESMP)**

Version 02 – Nov. 2017

Report no. 17005-01

Page left intentionally blank.

## CONTENT

<b>20</b>	<b>Environmental and Social Management Plan</b>	<b>8</b>
20.1	Introduction	8
20.2	Roles and responsibilities	8
20.2.1	<i>RG top management</i>	8
20.2.2	<i>Project Manager</i>	8
20.2.3	<i>EHS team /unit</i>	8
20.2.4	<i>Project EHS Manager</i>	9
20.2.5	<i>E&amp;S, H&amp;S, CLO Officers</i>	9
20.2.6	<i>Project contractors</i>	9
20.3	RPF /RAP and SEP	9
20.3.1	<i>Resettlement Action Plan</i>	9
20.3.2	<i>Stakeholder Engagement Plan</i>	10
20.4	Required policies of contractors	10
20.4.1	<i>EHS Policy &amp; system</i>	10
20.4.2	<i>Recruitment policy</i>	10
20.4.3	<i>HIV /Aids policy /engagement plan</i>	11
20.5	Studies to be carried out prior to operation	13
20.5.1	<i>Survey of socially significant places</i>	13
20.5.2	<i>Survey to verify biodiversity</i>	13
20.5.3	<i>Study into hydrology and water resources</i>	14
20.5.4	<i>Soil mapping and land-use studies</i>	14
20.6	Site specific ESMPs	16
20.6.1	<i>Noise Management Plan</i>	16
20.6.2	<i>Soil Erosion and Sediment Control Management Plan</i>	18
20.6.3	<i>Water Resources Management Plan</i>	20
20.6.4	<i>Spill Prevention Control and Countermeasures Plan</i>	22
20.6.5	<i>Biodiversity Management Plan</i>	25
20.6.6	<i>Socioeconomic, Health and Cultural Management Plans</i>	28
20.6.7	<i>Cultural Heritage Management Plan</i>	32
20.6.8	<i>Transportation and Traffic Management Plan</i>	34
20.6.9	<i>Waste Management Plan</i>	35
20.6.10	<i>Drill Mud and Cuttings Management Plan</i>	38
20.6.11	<i>H<sub>2</sub>S Management Plan</i>	39
20.6.12	<i>Decommissioning and Restoration Management Plan</i>	42
<b>21</b>	<b>EHS Management Plan</b>	<b>44</b>
21.1	Purpose	44
21.2	Scope	44

21.3	EHS Requirements	44
21.3.1	<i>Contractor's EHS plan</i>	44
21.4	EHS Plan Components /Structure	45
21.4.1	<i>Scope of Work</i>	45
21.4.2	<i>Policy statement and objectives</i>	45
21.4.3	<i>Compliance with regulations and guidelines</i>	45
21.4.4	<i>Organization, resources and competence</i>	45
21.4.5	<i>Evaluation and risk management</i>	47
21.4.6	<i>Planning and procedures</i>	49
21.4.7	<i>Emergency Response Plan - ERP</i>	51
21.4.8	<i>Implementation and monitoring</i>	55
21.4.9	<i>External audits and reviews</i>	56
21.4.10	<i>Note</i>	56
21.5	Social Accountability /Responsibility	56
21.5.1	<i>Wildlife</i>	56
21.5.2	<i>Forest cutting</i>	57
21.5.3	<i>Discrimination</i>	57
21.5.4	<i>Workers' organization</i>	57
21.5.5	<i>Child labour, forced labour</i>	57
21.5.6	<i>Working hours and remuneration</i>	57
21.5.7	<i>Social commitment</i>	57
21.5.8	<i>Horseplay</i>	57
21.5.9	<i>Illegal drugs and firearms</i>	57
21.5.10	<i>Alcohol</i>	57
21.5.11	<i>Legal drugs, prescription drugs, traditional medicines</i>	58
21.5.12	<i>Violations</i>	58
21.6	Basic facilities at drilling rig	59
21.6.1	<i>Medical facility</i>	59
21.6.2	<i>Safety equipment</i>	59
21.7	Hazard analysis of geothermal work	61
<b>22</b>	<b>E&amp;S Monitoring Plan</b>	<b>69</b>
<b>23</b>	<b>Policies of Reykjavik Geothermal</b>	<b>73</b>
23.1	Business & Quality Policy of Reykjavik Geothermal	73
23.1.1	<i>Vision statement</i>	73
23.1.2	<i>Mission statement</i>	73
23.1.3	<i>Values</i>	73
23.1.4	<i>Corporate Business Statement</i>	73
23.1.5	<i>Corporate Business Objectives</i>	74

---

23.2	Social Responsibility Policy of Reykjavik Geothermal	75
23.2.1	<i>RG is guided by its commitment to corporate social responsibility</i>	75
23.2.2	<i>RG is guided by its principles of social accountability</i>	76
23.3	Health, Safety and Environment Policy of Reykjavik Geothermal	76
23.3.1	<i>RG is guided by basic principles - to:</i>	76
23.4	Reykjavik Geothermal Code of Conduct	77
23.4.1	<i>Article 1: Applicability &amp; purpose</i>	77
23.4.2	<i>Article 2: Ethical conduct</i>	77
23.4.3	<i>Article 3: Company reputation</i>	77
23.4.4	<i>Article 4: Stakeholders</i>	77
23.4.5	<i>Article 5: Law &amp; regulations</i>	78
23.4.6	<i>Article 6: Transparency</i>	78
23.4.7	<i>Article 7: The work place</i>	78
23.4.8	<i>Article 8: Commitment to values</i>	78
23.4.9	<i>Article 9: Confidentiality</i>	78
23.4.10	<i>Article 10: Entry into force</i>	78

### Acronyms and glossary

AD	Anno Domini
AFI	Acute Febrile Illness
AfDB	African Development Bank
ADLI	Agricultural Development Led Industrialization
Aol	Area of Influence
Asl	Above Sea Level
ARCCH	Authority for Research and Conservation of Cultural Heritage
ARDO	Agriculture and Rural Development Office
BSG	Bushed Scrubbed Grass Land
CEDAW	Convention on the Elimination of All forms of Discrimination Against Women
CH <sub>4</sub>	Methane
CIA	Cumulative Impact Assessment
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLO	Community Liaison Officer
CMS	Conservation of Migratory Species of wild animals
CO <sub>2</sub>	Carbon dioxide
CRC	Convention on the Rights of the Child
CSE	Conservation Strategy of Ethiopia
dB	Decibel
dBA	Decibels Acoustic
DEM	Digital Elevation Model
DHO	District Health Office
EA	Environmental Assessment
EAR	East African Rift
EBI	Ethiopian Biodiversity Institute
EC	Electrical Conductivity
EEA	Ethiopian Energy Authority
EEP	Ethiopian Electric Power
EEPCo	Ethiopian Electric Power Corporation
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EPA	Environmental Protection Authority
EPC	Environmental Protection Council
EPLAUA	Environmental Protection, Land Administration and Use Authority
EPSE	Environmental Policy and Strategy of Ethiopia
ERA	Ethiopian Roads Authority
ERP	Emergency Response Plan

E&S	Environmental and Social
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
EWCA	Ethiopian Wildlife Development and Conservation Authority
F	Fluoride
FAO	Food and Agricultural Organization
FDRE	Federal Democratic Republic of Ethiopia
FGD	Focus Group Discussions
g	Gram
GDP	Gross Domestic Production
GIS	Geographical Information System
GTP	Growth and Transformation Plan
H <sub>2</sub> S	Hydrogen Sulphide
H&S	Health and Safety
IBA	Important Bird Areas
ICS	Interconnected System
IFC	International Finance Corporation
ILO	International Labour Organisation
IUCN	International Union for Conservation of Nature
KPI	Key Performance Indicator
LA	A-weighted sound level
LA <sub>eq</sub>	Equivalent sound level
M a.s.l.	Meter Above Sea Level
mcm	Million Cub. Meter
MDGs	Millenium Development Goals
MER	Main Ethiopian Rift
mg/l	Milligram Per Liter
MoEF	Ministry of Environment and Forestry
MoWIE	Ministry of Water, Irrigation and Energy
MoM	Ministry of Mines
MWe	Megawatt Electrical
MW	Megawatt
NCG	Non-Condensable Gases
NGO	Non-Governmental Organization
NMSA	National Meteorological Services Agency
NMT	Non-Motorised Transport
OFWE	Oromia Forest and Wildlife Enterprise
OG	Open Grass Land

OMC	Optimum Moisture Content
ONRS	Oromia National Regional State
ORA	Oromia Roads Authority
OW	Open Wood Land
PAP	Project Affected People
PLC	Private Limited Company
POPs	Persistent Organic Pollutants
PPB	Parts Per Billion
PPM	Parts Per Million
RAP	Resettlement Action Plan
RFP	Request for Proposal
RPF	Resettlement Policy Framework
SEP	Stakeholder Engagement Plan
SNNPR	Southern Nations, Nationalities & Peoples' Region
TBD	To be decided
TDS	Total Dissolved Solid
t/hh	tonnes per household
UNFCCC	United Nations Framework Convention on Climate Change
URTIs	Upper Respiratory Tract Infections
VECs	Valued Environmental and Social Components
VES	Vertical Electrical Sounding
VIP	Ventilated Improved Pit
WBG	World Bank Group
WFB	Wonji Fault Belt
WHO	World Health Organization
WRMP	Water Resource Management Policy
UEPA	Universal Electricity Access Program
UNU	United Nations University
USC	Unified Soil Classification



## 20 Environmental and Social Management Plan

### 20.1 Introduction

The purpose of this Environmental and Social Management Plan (ESMP) is to transfer the results of the ESIA to the implementation phase for the Project. The ESMP is a critical component of ESIA because it takes the project-specific environmental safeguards that are identified by the ESIA and integrates them with the Project.

The role of the ESMP is to ensure that implementation of this Project complies with both Ethiopian legislation and regulations and International Finance Corporation (IFC) requirements. Reykjavik Geothermal has implemented and conforms to ISO 9001, ISO 14001, OHSAS 18001, also to ISO 26000 (including SA 8000) and follow policies on quality, environment, health and safety and social responsibility, respectively.

#### **Environmental Aspects and Impacts**

The ESIA report summarizes the predicted overall impact of the Project, the impact significance and recommended mitigation measures.

#### **Summary of environmental impact and mitigation measures**

The following plans and tables show predicted impacts for each Project activity and they provide an overview of recommended mitigation and enhancement measures.

Appropriate Project and site specific mitigation measures have been defined.

### 20.2 Roles and responsibilities

This section describes resources and responsibilities that will be important for successful implementation of ESMPs.

#### 20.2.1 *RG top management*

Decisions on an organisation's policy and approach are driven by top management. The Project proponent /owner, Reykjavik Geothermal (RG), will be responsible for monitoring the overall effectiveness of the monitoring measures detailed in each resource management plan and will have within its staff environmental-, social-, health and safety manager(s) and coordinators to oversee implementation of the monitoring plans.

#### 20.2.2 *Project Manager*

Overall responsibility for Environmental (and Social), Health, & Safety (EHS) performance of the Project lies with the RG Management and the RG Project Manager. The ESMPs will be integrated and developed into an action list, Environmental and Social Action Plan (ESAP), used by RG or overseen by the Project Manager to ensure:

- Ownership of the plans from the highest level of the company
- Appropriate resource allocation for implementation of the plans
- Efficient and effective execution of the plans

#### 20.2.3 *EHS team /unit*

At the Project execution level, responsibility for implementation monitoring, control, and follow-up measures, including contractor EHS management, lies with the Project Environmental and Social, Health & Safety (EHS) team or unit within RG.

Specific responsibilities for delivering the commitments in the management plans related to contractor actions will be assigned as relevant to the Project EHS Manager, Project staff, and contractors, but the Project overall EHS team /unit will provide oversight and have ultimate responsibility.

#### 20.2.4 **Project EHS Manager**

The Project EHS manager has the following responsibilities:

- Have overall responsibility for the implementation of the ESMPs.
- Provide guidance to Project staff on appropriate protection of the environment.
- Work with company procurement to ensure use of quality contractors and vendors.
- Carry out audits and recommend correction actions when necessary.
- Review and update the ESMPs as required.

#### 20.2.5 **E&S, H&S, CLO Officers**

The EHS Manager may employ E&S, H&S staff who will regularly monitor the RG and the Drilling contractor's performance. These may involve:

- Environmental and Social Officer /Manager
- Community Liaison Officer(s) in the communities
- Also, H&S Health & Safety Officer during operation

#### 20.2.6 **Project contractors**

Reykjavik Geothermal is responsible for Project execution. However, most monitoring measures in the construction phase will be implemented by the Drilling Contractor.

The Drilling Contractor (contracted directly by RG) has the following responsibilities:

- Undertake these and other management plans designed for the construction and operation of the Project and to ensure that Project monitoring measures and standards are met.
- Develop their own monitoring plans and inspection procedures consistent with the requirements described in this ESMP before starting work. These management plans and procedures should be reviewed and approved by RG for consistency.

All monitoring measures for which construction contractors will be responsible will be outlined in the service contracts between RG and the contracting companies. Each contractor company will appoint at least one staff member charged with overseeing the implementation of the mitigation measures, as well as monitoring their implementation and effectiveness where relevant.

#### 20.3 **RPF /RAP and SEP**

Following plans are referred to in this ESIA report and annexed as separate documents. RAP and SEP should be in place and implemented prior to any operation.

##### 20.3.1 **Resettlement Action Plan**

Resettlement Policy Framework has been created and should /will be updated to Resettlement Action Plan for physical displacement if /as necessary prior to operation. Included in RAP should /will be livelihood restoration strategies to compensate for economic displacement.

Receptor	Impact	Mitigation measures	Responsible	Timing	Monitoring /auditing
Physical resettlement	Land expropriated. Loss of crop. People may lose their whole source of income and food.	Resettlement Action Plan Livelihood restoration strategies /plan.	RG Project Manager & EHS Manager	Planning phase and prior to disruption of land and any operation	Weekly, monthly and annual E&S Performance report.  Resettlement completion report.

		Policy for site selection			Number and type of grievances regarding physical resettlement
Economic resettlement	Crops lost due to site clearance  Land pieces lost due to widening of roads, enhancement	Compensation for lost crops and other livelihood restoration methods	RG Project Manager & EHS Manager	Planning phase and prior to disruption of land and any operation	Income levels before and after displacement and performance of livelihood restoration strategies.  Number and type of grievances, regarding economic displacement

### 20.3.2 Stakeholder Engagement Plan

Stakeholder Engagement Plan has been composed and the process is ongoing.

A number of stakeholder groups have been identified that will be consulted throughout the live cycle of the Project according to SEP.

### 20.4 Required policies of contractors

EHS, Recruitment, HIV /AIDS and procurement policies should be established.

#### 20.4.1 EHS Policy & system

Drilling contractor should be required to have Environment, Health & Safety Policy /-ies and comply with the international standards ISO 9001, ISO 14001 and OHSAS 18001 on quality, environmental and occupational health and safety management, respectively.

In conformance with the Prevention of Industrial Pollution Council of Ministries Regulation No.159 /2008, the Project /Drilling contractor must have /put in place an Emergency Response Plan (ERP) - for the construction and operation phases of the Project, both to ensure the safety of workers and the public and to ensure protection of the environment.

EHS policy and system should involve [but not limited to] issues such as stated in Ch. 21.

#### 20.4.2 Recruitment policy

For the preconstruction-, construction-, operation- and decommissioning phases recruitment policy should be implemented with focus on local employment.

Receptor	Impact	Mitigation measures	Responsible	Timing	Monitoring /auditing
Locals	Influx of non-local workers leads to socio-cultural conflict.	Disclosure of recruitment policy. Inform workers of local religion.	RG Project Manager & EHS Manager	Planning, construction, operation and decommissioning phase	Recruitment records of contractors.
	Non-local workers will be hired at the cost of individuals	Disclosure of Recruitment Policy.	RG Project Manager &	Planning, construction, operation	Recruitment records of contractors.

	in vulnerable groups, i.e. women will not be employed.	Avoid gender bias if possible.	EHS Manager	and decommissioning phase	
Following construction  Locals	When construction complete, large work force will not be required, rather skilled workers	Develop retrenchment strategies /plans	RG Project Manager & EHS Manager	2025 +/-	TBD

This policy may involve issues [but not limited to], such as:

- [Company] is committed to providing high quality services to our clients and community we work in. To support the achievement of this objective we recognise the importance of employing the most suitable applicants for all vacant positions.
- [Company] will ensure it has the best opportunity to attract the best available staff by broadly advertising locally (as deemed possible) all vacant remunerated positions and vacancies.
- [Company] will take all reasonable steps and provide training to ensure that applicants may be safely entrusted with the duties of their position.
- [Company] will internally advertise all vacant positions to current staff to encourage career advancement and increase participation.
- [Company] is committed to providing a work environment that is free from any kind of harassment and discrimination.
- [Company] is committed to zero tolerance for child labour or forced labour.
- All recruitment and selection procedures and decisions will reflect [Company] commitment to providing equal opportunity by assessing all potential candidates according to their skills, knowledge, qualifications and capabilities. No regard will be given to factors such as age, gender, marital status, race, religion, physical impairment, union membership or political opinions.
- Upon beginning a working relationship, [Company] will provide candidates with clear and understandable information regarding their rights under national labour and employment law including rights related to hours of work, wages, overtime, compensation, and benefits. Any agreement will be respect where the candidate is party to a collective bargaining agreement with a worker's organization.

### 20.4.3 HIV /Aids policy /engagement plan

For the preconstruction-, construction-, operation- and decommissioning phases HIV /AIDS policy should be advocated.

Receptor	Impact	Mitigation measures	Responsible	Timing	Monitoring /auditing
Local people and impacted communities	Influx of non-local workers increases risk of sexually transmitted diseases	HIV /AIDS Policy and Engagement Plan.	RG Project Manager & EHS Manager	Throughout civil works and construction phases	Medical statistics.  Review with local Admins.

This policy may involve issues [but not limited to], such as:

- Workers living with HIV /AIDS will be respected in accordance with their fundamental human rights and dignity, they will not be discriminated against because of their HIV /AIDS status, therefore they will enjoy all applicable rights and privileges in service.

- There will be no HIV /AIDS screening for the purpose of exclusion from employment /work processes and HIV /AIDS status will not be required of a job applicant.
- A worker living with HIV /AIDS will not be terminated or declared redundant unless otherwise. Relationship with an HIV /AIDS infected persons would be treated same as patients with chronic illness and likewise.
- All effort will be made through HIV /AIDS education to ensure a healthy and safe environment in order to prevent the transmission of HIV /AIDS.
- HIV /AIDS workers will not be required to disclose their status to management or co-workers. Workers and peer educators are not required to disclose such information about a positive worker to anybody. Worker's personal data relating to HIV /AIDS will be bound by rules of confidentiality.
- Gender dimensions of HIV /AIDS will be recognized. Special effort will be made to empower women in order to reduce their risk of being infected with HIV /AIDS.
- HIV /AIDS and OHS committee will make all effort to provide opportunities for workers to be educated on the modes of transmission, prevention and treatment etc.
- Condoms shall be made available by peer educators at random in support of HIV /AIDS education and awareness creation.

#### **20.4.4 Procurement policy /management**

For the preconstruction-, construction-, operation- and decommissioning phases Procurement policy /plan should be implemented. This policy may involve issues [but not limited to], such as:

- Value for money -
  - avoid unnecessary costs and delays, value quality as well as price
  - aim at best available outcome when all costs and benefits over the procurement cycle are considered
  - ensure continuous improvement
- Open and effective competition –
  - procurement process should be transparent, open and accessible
  - make use of tendering procedures, ensure effective competition
- Effective and fair dealing –
  - deal with each other on basis of mutual trust and respect
  - conduct business in a fair, reasonable manner with integrity
  - other things being equal, select environmentally sound products
- Accountability and reporting –
  - ensure that individuals and units are answerable for their plans, actions and outcomes
  - apply zero tolerance for products where there is risk of child labour, forced labour or use of natural and /or critical habitats in the supply chain
- Equity –
  - advance small, medium and micro enterprises and the disadvantaged
  - promote women, young people and physically handicapped people
  - create new local jobs
  - promote businesses from local enterprises, regional and local provinces, and especially the local rural areas
  - support local products

## 20.5 Studies to be carried out prior to operation

Prior to any operation, it is requested that studies into: location of socially significant places, biodiversity in and around the Gnaro lava field and hydrology and water sources for drilling (and community) be conducted by experts, reported and documented. Furthermore, that necessary mitigation measures should be developed and implemented.

### 20.5.1 Survey of socially significant places

This survey of socially significant places should focus on location of cemeteries, mosques /churches, steam baths, water kiosks and health posts. Results should be considered prior to final design of roads, water works, drill pads and power plan.

Receptor	Impact	Mitigation measures	Responsible	Timing	Monitoring/auditing
Local people and impacted communities	Construction work, drilling, well testing and power plant may disturb socially significant places	Take into consideration during site selection, based on survey results.  Implementation of sound barriers	RG Project Manager & EHS Manager	Planning phase and prior to operation	Report on location of socially significant places
	Emission of gases from wells can lead to odor and impact people visiting historical or cultural sites.	Site selection. Gas emission monitoring.	RG Project Manager & EHS Manager	Planning phase and prior to operation	Constant monitoring

### 20.5.2 Survey to verify biodiversity

Rapid survey on biodiversity should be carried out to verify and complement results of the original baseline study in and around the Gnaro lava field. The study should focus on the wet-season (June to end of September) to cover species possibly not found in the original baseline study on biological environment.

For the purposes of this assessment, definition of rare species should be based on, but not limited to, the Red List of the International Union for the Conservation of Nature (IUCN). These species are listed as Near Threatened (NT), Vulnerable (VU), Endangered (EN), or Critically Endangered (CR) (IUCN 2016). Other national and international references for protected, endemic and range-restricted species should also be consulted and employed.

The IFC Performance Standard 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources should be considered and consulted.

Receptor	Impact	Mitigation measures	Responsible	Timing	Monitoring/auditing
<b>Birds</b>	Structures and steam from cooling towers cause disruption of bird flyways	Cooperate with bird experts, relevant authorities and locals when doing survey.	EHS Manager  Local experts	Planning phase	Report on biodiversity in drilling area

<b>Reptiles &amp; amphibians</b>	Disruption of land can result in killing sessile species	Hire experts and NGOs to relocate reptiles and amphibians.	EHS Manager Local experts	Planning phase	Report on findings and relocation
<b>Wildlife</b>	Emission of combustion related pollutants can have effect on air quality for wildlife, including increased noise levels during drilling	Site selection with respect to habitat of endangered and vulnerable species. Flush out wildlife, relocate species	EHS Manager Local experts	Planning phase	Follow-up report on biodiversity in drilling area
<b>Vegetation</b>	Disruption of land can result in removal of endemic plants	Hire experts and NGOs to relocate endemic plants and rare vegetation.	EHS Manager Local experts	Planning phase	Report on findings and relocation

### 20.5.3 **Study into hydrology and water resources**

Water is instrumental for the operation, and in fact to the areas (particularly to Tero Moye, but also to Anole and Tero Desta) where there is serious water shortage. Thorough work needs to be done on groundwater hydrology and water levels. Impact needs to be evaluated of water take on water potential of the communities who today get their water from water trucks provided by the government as the Gonde springs are yielding less and less water and drying up.

Reykjavik Geothermal has been working on the water issue and report is expected, followed by exploration shallow well drilling. Hitosa Woreda water works has also been working on location of groundwater and are preparing to drill exploration wells. Resolution should be found benefitting both the company and the people.

### 20.5.4 **Soil mapping and land-use studies**

The petrology in the Tulu Moye geothermal concession is characterized by rocks ranging from basalt to rhyolite in composition. The defined Drilling area in the eruptive plateau of Gnaro is partially vegetated rhyolitic obsidian lava field, without any agriculture practise. Potential for erosion and respirable dust seems limited considering mitigation in ESMP.

However, certain constructions /operations outside the Drilling area and closer to human habitation may /will require study on soil mapping. At the lava border and surrounding the area, there is presence of soils of agricultural potential and erosion potential.

Given the reliance of the population on subsistence agriculture, soils may /will require mapping according to their agricultural potential and erodibility. Based on this; distribution, roads, separation station, and other infrastructure, as well as more site-specific mitigation measures, should be planned timely and accordingly.

Timing of soil mapping is suggested as follows:

- The access road design will require a separate, brief ESIA submitted with application to Oromia Roads Authority prior to being granted license for roads work. This work should include soil and land-use evaluation and specific mitigation measures.
- When planning for water works system, separation station, collection and intake pipes, further impact evaluation should be conducted, incl. soil and land-use assessment and specific mitigation measures to be included in ESMP /ESAP.



- Other project components.



## 20.6 Site specific ESMPs

### 20.6.1 Noise Management Plan

#### Objectives

The Noise Management Plan is designed to control and minimize potential sources of noise during Phase I of the Project. This Plan describes proposed measures and best management procedures to be implemented to protect environmental and social receptors from potential adverse impacts associated with the increase of airborne noise. The generation of noise levels is expected with any geothermal project construction and with the implementation of this plan will help control and minimize the noise disturbance.

This management plan defines the potential sources of noise, and establishes how they would be managed and monitored throughout the duration of Phase I of the Project. This Plan also provides guidelines that will help the RG, its contractors and the environmental authorities of Ethiopia determine the effectiveness of proposed mitigations.

The general objective of this Plan is to define framework and actions to implement the proposed mitigation to control and minimize potential sources of noise. The following objectives are also part of this Management Plan:

- Comply with applicable local and international noise requirements;
- Identify the potential sources of noise impacts during Phase I;
- Define construction and operation procedures for noise management;
- Align with international best practices;
- Define the procedures and mitigation measures to be applied to construction and operation activities associated with Phase I that have the potential to produce noise;
- Define training and communication commitments; and
- Define the monitoring, reporting, and adaptive management procedures for the Plan.

#### Noise Management

Receptor	Impact	Mitigation Measures	Responsibility	Timing	Monitoring, KPI
Human use and residences	Potential increase in daytime and nighttime airborne noise during Project exploratory drilling.	Project's staff will have /receive appropriate required PPE and training in their use.  Install safety signs where noise levels are above 85 dBA to prevent exposure of staff without appropriate required PPE (hearing protection).	Civil works & drilling contractors  RG Project Manager /EHS Manager	Throughout operation /construction	Daily site inspection and audit reports.  Monthly (or on complaint) noise monitoring at the closest human receptors.
	Potential increase in daytime and nighttime airborne noise during Project steam blow testing.	Install acoustic barriers/screens or use site objects or topography to block direct line of site between high noise level generating activities and potentially impacted noise receptors.  Barriers should be located as close as possible to the source or to the receptor location to be effective.			Grievance Mechanism
		Shorten well testing period down to 2 weeks.			

		<p>Design: rocks in sound muffler, insulation and dock around.</p> <p>Relocate farmers within well pad(s) boundaries or provide temporary housing elsewhere for the entire duration of exploratory activities.</p> <p>Select equipment with lower sound power levels than those assumed for the noise analysis in this ESIA.</p> <p>All engine exhausts and compressor components will be maintained regularly. Equipment that meets industry good practice will be selected.</p> <p>Maintain noise suppression devices (e.g. rock muffler) on construction vehicles and equipment.</p> <p>Keep the public informed about Project activities and efforts to minimize noise, and establish procedures for prompt response and corrective action with regard to noise complaints (i.e., grievance mechanism).</p>			
Animals and wildlife	Potential increase in daytime and nighttime airborne noise during Project drilling and blow testing	<p>Install acoustic barriers/screens or use site objects or topography to block direct line of sight between noise level generating activities and impacted noise receptors.</p> <p>Barriers should be located close to the source or to the receptor location to be effective.</p> <p>Shorten well testing period down to 2 weeks.</p> <p>Most species will move away from noise or adapt to it. Get expert opinion on species of concern and ideas on mitigation.</p> <p>Relocate (sessile) species. Consider special sanctuaries.</p>	RG Project Manager /EHS Manager	Throughout construction	TBD with experts

## 20.6.2 Soil Erosion and Sediment Control Management Plan

### Objectives

The Soil Erosion and Sediment Control Management Plan is designed to ensure the reduction of potential impacts on soils and protect water resources within the Project Aol. The Plan includes methods that will guide RG and the Drilling Contractor to manage, mitigate, and avoid adverse effects on soils. The general objectives of this plan include:

- Comply with applicable local and international requirements;
- Prevent soils erosion and contamination;
- Align with international best practices;
- Define the procedures and mitigation measures to be applied to construction and operation activities associated with Phase I that have the potential to impact soils;
- Define management procedures for all soils-related functions including roles and responsibilities; and
- Define the monitoring.

### Soil Erosion and Sediment Control Management

Receptor	Impact	Mitigation Measures	Responsibility	Timing	Monitoring, KPI
Soils	Soil erosion and landslides	<p>Develop and implement soil erosion /sediment control plans, including control measures such as the use of silt fences, installation of temporary and permanent drainage systems to manage water runoff from the construction areas, and use of sediment basins.</p> <p>Use appropriate best management practices during clearance activities (to the extent practicable), schedule as possible construction activities during the dry season, especially on steeply sloped areas; limit clearing and disturbance to the approved work zone area only; minimize the area of bare soil at any one time within the approved work zone as much as possible; and progressively stabilize and revegetate disturbed areas).</p> <p>Revegetate disturbed soils with fast-growing species that are common in the Project area.</p> <p>Improve feeder roads with adequate drainage ways.</p> <p>Reuse excavated material for slope stabilization of the drilling and injection pads.</p>	<p>Civil works contractor</p> <p>RG Project Manager /EHS Manager</p>	Throughout operation /construction	Daily site inspection

	<p>Soil contamination</p>	<p>Develop and implement a Spill Prevention Control and Countermeasures (SPCC) Plan to minimize the risk of spills and to ensure an appropriate response in the event of a spill.</p> <p>Reinject geothermal fluids into (re)injection wells.</p> <p>Provide appropriate facilities /containers for segregation and temporary storage of general wastes on site.</p> <p>Establish site-specific processes for material, handling (receipt, unloading), storage, transportation and disposal (including recycling /reuse options).</p>			
--	---------------------------	---	--	--	--

### 20.6.3 Water Resources Management Plan

#### Objectives

The Water Resources Management Plan is designed to ensure the protection of water resources within the Project Aol. The Plan includes methods that will guide RG and the Drilling Contractor to manage, mitigate, and avoid adverse effects on water resources during Phase I. The general objectives of this Plan include:

- Protect surface and groundwater quantity and quality for local users and the environment;
- Define management procedures for all water-related functions including roles and responsibilities and training requirements;
- Comply with applicable Ethiopian regulatory requirements and recommended international guidelines (i.e., WHO, IFC, NOAA);
- Align with international best practices;
- Define and implement monitoring and reporting procedures; and
- Define responsible parties for the implementation of the management plan.

#### Water Resources Management

Receptor	Impact	Mitigation Measures	Responsibility	Timing	Monitoring, KPI
Ground water	Water quality	<p>Wells: Lining, casing and grouting the drilling wells.</p> <p>Use water-based drilling fluids and muds. Reuse drilling fluid (if feasible). Recycle drilling muds.</p> <p>Groundwater sampling, analysis and quality monitoring.</p> <p>Provide baseline of current springs to ensure any potential new springs created by excavation can be identified.</p> <p>Properly store and use of fuel and hazard materials.</p> <p>Avoid discharge of untreated wastewater into rivers/streams.</p> <p>Construct diversion drains and bunds in low lying land around wells to divert clean runoff away from construction areas and prevent contaminated water entering local water sources.</p>	<p>RG Project Manager /EHS Manager</p> <p>Drilling Contractor</p>	<p>Mitigation throughout construction.</p> <p>Monitoring after well blow out /overflow events.</p> <p>Daily inspections by RG of contractor, observations of non-compliance reported.</p> <p>At least two formal audits of contractor by RG during contract scope.</p>	<p>Collection of groundwater samples and analysis by accredited laboratory.</p> <p>Where applicable, drinking water guidelines established by WHOc should be used as KPI.</p> <p>No spills affecting groundwater quality.</p> <p>RG will audit contractor storage areas against mitigation requirements (i.e., availability of spill kits and adequate banded storage for chemicals and fuels).</p> <p>Site visit to identify location of springs, their flow rate and /or water levels</p>

Water	Quantity	<p>Use ponds to store water for drilling.</p> <p>Recycle muds, apply closed systems for drilling activity/use of geothermal fluid (if applicable) or treated water from ponds to minimize need for new water.</p> <p>Truck water in or store water in tanks and ponds during dry season if necessary.</p> <p>Ground water level monitoring</p>	<p>RG Project Manager /EHS Manager</p> <p>Drilling Contractor</p>	Same as above	<p>Regular monitoring</p> <p>No complaints from water using public</p>
Effluent water	Geothermal effluent water may cause ground-water pollution and other problems	<p>Route effluent fluids to lining settling drilling water ponds /storage ponds.</p> <p>Regularly check for rips and tears.</p> <p>Monitor and periodically remove accumulated silt from any sediment control ponds.</p> <p>Reinjection of waste water to avoid discharge to surfacewater.</p> <p>If necessary, consider that bedrock layers filtrate substances from effluent before reaching groundwater if deep enough (below 100 m +/-) based on experience from Iceland.</p>	RG/Contractor	Same as above	Regular monitoring
If surface water	Water extraction	<p>Do biodiversity study of aquatic species of water /lake /stream.</p> <p>Impacts and mitigation measures for water pipeline</p> <p>Choose extraction flow rate and timing to minimize impacts on water course and to ensure minimum flow /level is maintained.</p>	<p>RG Project Manager /EHS Manager</p> <p>Drilling Contractor</p> <p>Regional Bureau of Water and Energy has to authorize and regulate water extractions</p>	<p>Prior to extraction and throughout construction.</p> <p>Monitoring throughout construction.</p>	<p>Record quantity of water abstracted and timing of abstraction.</p> <p>Lake /river flow monitoring, e.g. water levels.</p> <p>No complaints from water using public or fishermen.</p>

#### 20.6.4 Spill Prevention Control and Countermeasures Plan Objectives

The Spill Prevention Control and Countermeasures (SPCC) Plan is designed to establish a framework for the proper handling of fuels, lubricants, and similar types of substances (chemicals) used during construction and operation activities associated with Phase I of the Project. The SPCC Plan includes strategies that will guide RG and the Drilling Contractor to manage, mitigate, and avoid adverse effects to environmental and social receptors within the Project Aol during Phase I. Finally, the SPCC Plan includes performance indicators aimed at measuring the effectiveness of the Project's environmental management and at encouraging constant improvements throughout Phase I. This Plan also includes the following objectives:

- List of measures necessary to mitigate any impacts resulting from accidental spills;
- Identify mechanisms to prevent, address, and report a spill (i.e., appropriate storage, transfer and use of chemicals and fuel on site);
- Identify responsibilities and equipment required to deal with a spill; and
- Establish indicators to support management and encourage ongoing.

#### SPCC Management

Receptor	Impact	Mitigation Measures	Responsibility	Timing	Monitoring, KPI
Soils and water	Soil and water contamination	<p><u>Execute measures before event:</u> Project's staff will receive appropriate required training related to spills (i.e., causes, risks, management methods and use of emergency kits).</p> <p>Chemical substances, fuels and hydrocarbons should be properly stored, transported and managed according to NFPA guidelines.</p> <p>Investigation, remediation and validation procedures will be developed and used to establish the site as 'clean' in the event of a spill.</p> <p>Construct appropriate spill containment facilities for all chemicals and fuel storage areas. Any potentially hazardous materials on site will be kept in a secure and banded area. Bunds will be designed to enable containment of 110% of the largest container volume, or 25% of the total storage capacity (whichever is greater).</p> <p>Any storage facility must:</p> <ul style="list-style-type: none"> <li>• Have a written procedure that explains each of the steps to be followed in case of a spill or leak.</li> </ul>	<p>RG Project Manager/EHS Manager</p> <p>Drilling Contractor</p> <p>Emergency Response Team (ERT)</p>	Throughout construction	<p>Daily site inspection and Audit reports</p> <p>Monthly water quality monitoring – no deterioration in pre-project river water quality</p>

		<ul style="list-style-type: none"> <li>• Have a spill kit based on the volume of chemicals stored. Spill kits may include oleophilic blankets and cloths; retardant foams; sand, and any other item that prevents a spill from spreading (i.e., shovel, absorbent paper, plastic bags).</li> <li>• Have a specific Emergency Plan with local contact of regional authority to inform.</li> </ul> <p>Use water based drilling muds rather than oil based.</p> <p>Material Safety Data Sheets (MSDS) for all stored substances will be held at each storage site.</p> <p>Locate hazardous material stores away from surface waters.</p> <p>Hazardous wastes must be collected in designated containers including classification and labelling as hazardous waste.</p> <p>Hazardous waste storage areas must be lined and capable of containing any potential spills.</p> <p>Stormwater runoff will be diverted away from hazardous materials stores.</p>			
		<p><u>Execute measures during event:</u> Inform immediately to the Emergency Response Team (ERT).</p> <p>Control spill by using Spill kits. The appropriate PPE should be used during control and cleaning spill activities.</p> <p>If necessary, soil or wood-made barriers will be built to control the expansion of the spill.</p> <p>In case that a watercourse is contaminated, the following activities should be conducted:</p> <ul style="list-style-type: none"> <li>• Build soil-made barriers to limit the spill. A sedimentation basin will be built adjacent to the spilled zone to capture all the spilled soil and mud;</li> <li>• The spill course will be redirected to stop its contact with waterbodies;</li> </ul>	<p>RG Project Manager/EHS Manager</p> <p>Drilling Contractor</p> <p>Emergency Response Team (ERT)</p>	Throughout construction	Documented response and correction incl. eliminating root cause.



		<ul style="list-style-type: none"> <li>Inform communities located downstream of the waterbody about the occurrence of the spill.</li> </ul>			
		<p><u>Execute measures after event:</u> All the spilled liquids or solids will be properly removed and disposed.</p> <p>Investigations should be conducted to determine root-causes of the spill including the magnitude of damages (health, environmental and property) to implement new prevention measures.</p> <p>Prepare a report describing all causes of the spill, and clean-up activities.</p> <p>Develop and maintain a report of contaminated soils. This report should list all known and suspected areas of land contamination at sites associated with the Project.</p>	<p>RG Project Manager/EHS Manager</p> <p>Drilling Contractor</p> <p>Emergency Response Team (ERT)</p>	Throughout construction	Documented response and correction incl. eliminating root cause.

## 20.6.5 Biodiversity Management Plan

### Objectives

This Biodiversity Management Plan establishes a framework for minimizing impacts of the Project on terrestrial and potential freshwater aquatic biodiversity to be applied during Phase I of the Project. This Plan defines the actions that will enable RG and the Drilling Contractor to avoid, minimize, and avoid adverse effects to biodiversity receptors within the Project Aol during the Project's Phase I activities.

The key objectives of this Plan are:

- Establish RG's responsibilities towards avoiding, minimizing, and mitigating impacts on terrestrial and freshwater aquatic biodiversity in the Project Aol.
- Define and describe the embedded controls (and mitigation measures to be applied to the Phase 1 activities that relate to management of biodiversity impacts.
- Define the roles and responsibilities for implementing the Plan.
- Define the monitoring and Key Performance Indicators (KPIs) that will be used to assess the effectiveness and success of the Plan at managing biodiversity impacts.

### Biodiversity Management

Receptor	Impact	Mitigation Measures	Responsibility	Timing	Monitoring, KPI
All biodiversity receptors	Biodiversity loss and disturbance	Provide training to Project field staff on the biodiversity features of the Project area, particularly any rare and endemic species potentially present in the area, and the procedures defined in this Biodiversity Management Plan	RG Project Manager /EHS Manager  Civil Works Contractors	During worker induction or prior to site preparation activities	Documentation of training provided to staff and provision of written training materials.  KPI: Training received by 100% of site workers.
All biodiversity receptors	Biodiversity loss and disturbance	Develop an environmental /biodiversity monitor prior to site preparation activities to ensure proper implementation of the measures defined herein. Identify potential unforeseen impacts to terrestrial biodiversity, and apply adaptive management where needed to minimize impacts on vegetation and wildlife, particularly rare species.	RG Project Manager /EHS Manager	During site preparation activities	Daily reporting documented at toolbox meetings of day's activities and findings.
Terrestrial vegetation and rare and endemic species	Direct loss, disturbance and degradation of habitat and vegetation	Minimize the footprint of activities and related ground and vegetation disturbance.  Time road improvements and site preparation activities in the wet or transition seasons to the extent practicable or implement dust control procedures (e.g. watering) when needed to control dust	RG Project Manager /EHS Manager  Civil Works Contractors	During road improvement and site preparation activities	Documentation of Project footprint through monitoring.  KPI: Vegetation disturbance is limited to exploration and injection pad sites and road improvement locations.
Terrestrial vegetation and rare and	Direct loss of possibly rare and endemic plant species	Salvage and translocate rare and endemic flora in cooperation with local experts and consistent with	RG Project Manager /EHS Manager	During site preparation activities	Collection and translocation records to be prepared for all

endemic species		Government of Ethiopia requirements.  Authorization should be obtained from relevant Bureau in close collaboration /consultation with Oromia EPA.	Biodiveristy Expert		plant collections and translocations.  KPI: Successful translocation of rare and locally endemic plant species from the pad sites prior to site preparation
Terrestrial wildlife and rare and endemic species	Direct loss or injury of wildlife species	Conduct pre-clearing surveys prior to site preparation activities to flush wildlife and remove sessile wildlife, particularly rare and endemic species, from the well pad sites	RG Project Manager /EHS Manager  Biodiversity Monitor	During site preparation activities	Survey and collection records to be prepared for all pad sites.  KPI: Pre-construction surveys completed on all pad sites prior to site preparation.
Terrestrial wildlife and rare and endemic species	Direct loss of rare and endemic wildlife species	Salvage and translocate rare and locally endemic wildlife (with focus on sessile species that cannot move away from site activities on their own) in cooperation with local experts and consistent with Government of Ethiopia requirements.  Authorization should be obtained from relevant Bureau in close collaboration /consultation with Oromia EPA.	RG Project Manager /EHS Manager  Biodiversity Monitor	During site preparation activities	Collection and translocation records to be prepared for all animal collections and translocations.  KPI: Successful translocation of rare and endemic species from the pad sites prior to site preparation.
Terrestrial wildlife and rare and endemic species	Traffic-related mortality	Implement the Traffic Management Plan including strict enforcement of speed limits and limit nighttime driving	RG Project Manager /EHS Manager  Drilling Contractor	Throughout Phase 1 activities	Maintain records of traffic-related wildlife interactions  KPI: No injury or mortality of wildlife due to Project-related traffic.
Terrestrial wildlife and rare and endemic species	Noise-related habitat degradation and wildlife disturbance	Implement the noise reduction procedures identified in the Noise Management Plan  Possibly schedule initiation of drilling and steam blow testing prior to or following breeding season of rare, endemic, vulnerable, endangered species (if any) - to the extent possible	RG Project Manager /EHS Manager  Drilling Contractor	Throughout Phase 1 activities but particularly during drilling and testing	Breeding census and monitoring of selected species activity in and around the AoI, particularly during breeding season  KPI: Regular noise monitoring
Terrestrial wildlife and rare and endemic species	Light-related habitat degradation and wildlife disturbance	Minimize the amount of lighting used at the pad sites and use directional (downward facing) lighting	RG Project Manager /EHS Manager  Drilling Contractor	Throughout Phase 1 activities	Not applicable
Terrestrial wildlife and rare and	Hunting of wildlife by Project workers	Implement and enforce strict no hunting policy for Project workers	RG Project Manager /EHS Manager	Throughout Phase 1 activities	Document communication of no hunting policy,

endemic species		Include education on illegal wildlife trade and protected species law in Project employee induction and related environmental training			e.g. keep as part of training record that will be audited /inspected  KPI: No hunting infraction by staff
Terrestrial wildlife and rare and endemic species	Release of geothermal gases can cause risk to wildlife. Especially H <sub>2</sub> S.	Concentration of H <sub>2</sub> S and other relevant gases should be monitored around the power plant. Implement a contingency plan if H <sub>2</sub> S levels rise	RG Project Manager /EHS Manager	Construction phase	Monitoring schedule for H <sub>2</sub> S  KPI: No incident of high levels of H <sub>2</sub> S outside drill pads
Terrestrial vegetation and wildlife	Spreading of invasive plants due to vegetation cover removal	Soil and material with invasive plant residues should be treated to the extent practicable.  Only native species used when re-vegetating.	RG /Contractor	Planning phase and throughout construction phase.	Not applicable
Terrestrial vegetation and wildlife	Scalding of vegetation with impact on fauna due to steam and geothermal fluid from wells	Controlled well testing time.  Fluids directed to infiltration ponds.	RG /Contractors	Construct-ion phase	Documented at toolbox meetings of day's activities  KPI: Records of environmental incidents
Birds	High rising structures and steam may cause disruption of bird flyways	Consider as design input for structures. Possibly, collision deferring equipment placed on high rise structures	RG planning /design team	Construct-ion phase	Final design  KPI: N/A
If surface water					
Freshwater aquatic habitat and species	Aquatic biodiversity	Prepare and carry out further baseline studies, particularly into biodiversity, also into people who rely on income from the lake e.g. from fishing	RG EHS Manager	When locating water source for the Project	Additional biodiversity report, incl. impacts and mitigation measures
Freshwater aquatic habitat and species	Aquatic habitat loss and disruption	Minimize water withdrawals during low flow periods	RG Project Manager /EHS Manager  Drilling Contractor	During drilling and testing	Monitoring of water abstraction and lake /river flows to ensure surface flow is maintained
Freshwater aquatic habitat and species	Entrainment or impingement of aquatic biota	If design involves surface water, then minimize the intake velocity for the water abstraction	RG Project Manager /EHS Manager  Drilling Contractor	During drilling and testing	Monitoring of water intake velocity
Freshwater aquatic habitat and species	Entrainment or impingement of aquatic biota	Install wedgewire screens to exclude larval aquatic organisms from the water intake	RG Project Manager /EHS Manager  Water Works Contractor	Prior to water abstraction	Confirmation that wedgewire screens have been installed and are functional

## 20.6.6 Socioeconomic, Health and Cultural Management Plans Objectives

This Plan summarizes methods that will guide RG and the Drilling Contractor to manage, mitigate, and avoid adverse effects on social receptors during Phase I; additional managing activities that have effects on social receptors are also described in other management plans, where they indirectly affect social receptors through other receptors.

The general objective of this Plan is to define a framework and actions to implement the proposed mitigations. The following objectives are also part of this Plan:

- Comply with applicable local and international requirements;
- Align with international best practices;
- Define mitigation measures to ensure the management of risks to social receptors;
- Define management procedures for social-related functions including roles and responsibilities; and
- Define the monitoring, reporting, and adaptive management procedures for the Plan.

### Socioeconomic, Health and Cultural Management

Receptor	Impact	Mitigation Measures	Responsibility	Timing	Monitoring, KPI
Residents and farmers near to exploration drill pads and injection pads	Physical displacement	Resettlement Action Plan (RAP) developed from RPF to include resettlement location for primary project affected person (PAP)  Community Grievance Redress Mechanism /process	RG: E&S Manager	All activity phases	Disclose RAP, incl. cut-off dates, rates, and methods for compensation  Disclose grievance mechanism  Ensure stakeholders' feedback on drafts of SEP, RAP, ESMP impacts and mitigation measures,  Summarized quarterly reports on consultations with and grievances received from stakeholders.  Following resettlement, completion audit by independent auditor to assess Project efforts to restore the living standards of PAP. Completion s have been properly executed.
	Economic displacement	Resettlement Action Plan (RAP) developed from RPF to include Livelihood Restoration	RG: E&S Manager	All activity phases	See monitoring for RAP above  Conduct formal quarterly

		Community Grievance Mechanism			engagement with local farmers impacted by economic displacement to compare income levels before and after displacement and performance of livelihood restoration strategies
	Stress on local infrastructure (housing, businesses)	Community Grievance Mechanism Local Employment and Supplier Development Plan	RG: E&S Manager Community Liaison Officer	During drill rig installation, drilling and exploratory blow testing phases	Audit /track local hiring and purchasing trends
Existing potential workforce in Project-affected communities	Economic benefits	Include requirements to prioritize local employment, taking into account available skills.  Ensure drilling contractor adheres to a local employment and supplier development plan in Recruitment Policy	RG & Drilling Contractor	During access improvements and transportation; drill rig installation and drilling	Audit /track local hiring and purchasing trends
Existing businesses in the towns	Economic benefits	See Economic Benefits Mitigation Measure above	RG & Drilling Contractor	During access improvements and transportation, drill rig installation and drilling	Audit /track local hiring and purchasing trends
Local and foreign tourists	Recreational and Tourism	Ensure Traffic Management Plan includes continued daytime access to tourist attractions (i.e. Anole Memorial).	Drilling contractor	During access improvements and transportation, drill rig installation and drilling	Track number of grievances received from stakeholders related to loss of recreational amenity and respond with further engagement and mitigation
Residents and farmers near to exploration drill pads and injection pads	Noise	Provide day farmers with noise protection if needed and /or consider (temporary) relocation	RG Community Liaison Officer  Drilling Contractor EHS Manager	During drill rig installation, drilling and exploratory blow testing phases	Track and evaluate monthly grievances related to noise
	Traffic	Implement Traffic Management Plan /Journey Management Plan  Ensure that movement of outsize or large /long vehicles, or convoys, will be timed, where practicable, to avoid busy traffic	Civil Works and Drilling Contractors	During access improvements and transportation and	Track and evaluate monthly grievances related to traffic  Liaise monthly with local health officials and police

		<p>periods and will be restricted to the agreed access routes and the construction corridor</p> <p>Implementation of safe driving protocols</p>		<p>decommission phases</p>	<p>stations to track and evaluate any traffic-related injuries and health concerns as a result of Project traffic</p> <p>Document consultation with community members on traffic and road safety</p>
	<p>Increase in crime, prostitution, and conflict as a result of influx</p>	<p>Implement Community Grievance Mechanism</p> <p>Security Management Plan (including security guards, fencing, roving police patrols)</p> <p>Code of Conduct for all Project employees and contracted staff including zero-tolerance policy for drug use, sale or purchase</p> <p>Project /contractors should issue a policy statement regarding sexually transmitted infections (STIs) including HIV/AIDS, and this policy should be communicated internally to staff, and externally to Contractors.</p> <p>Provide training to local communities on grievance mechanism use and workforce policies on interaction with community members</p>	<p>RG E&amp;S Manager</p> <p>Community Liaison Officer</p>	<p>Throughout Project</p>	<p>Include plans in induction seminar to Project workers</p> <p>Document number of consultations and trainings with local communities on grievance process</p> <p>Engage monthly with local NGOs, civil society leaders and /or religious leadership on local perceptions related to influx</p> <p>Track and evaluate monthly grievances related to crime, prostitution, and conflict</p> <p>Liaise monthly with local health officials and police stations to track and evaluate any increase in crime and /or prostitution within the Project area</p>
<p>Populations in the nearest settlements to the Project area</p>	<p>Noise</p>	<p>See Noise Mitigation Measures above</p>	<p>Drilling Contractor</p> <p>Community Liaison Officer</p>	<p>During drill rig installation and drilling; and exploratory blow testing phases</p>	<p>See Noise Monitoring above</p>
	<p>Traffic</p>	<p>See Traffic Mitigation Measures above</p>	<p>Drilling Contractor</p> <p>Community Liaison Officer</p>	<p>Throughout Phase I</p>	<p>See Traffic Monitoring above</p>
	<p>Increase in crime, prostitution, and</p>	<p>See Influx Mitigation Measures above</p>	<p>RG E&amp;S Manager</p>	<p>Throughout Phase I</p>	<p>See Influx Monitoring above</p>

	conflict as a result of influx		Community Liaison Officer		
Populations residing and working along Highway to Project area	Traffic	See Traffic Mitigation Measures above	Drilling Contractor  Community Liaison Officer	Throughout Phase I	See Traffic Monitoring above  Track and evaluate monthly grievances related to traffic from this receptor community
Archeological remains and sites	Disruption of known archaeological remains or site of historical value due to site clearing	Site selection, signage and cordoning archeological remains off if known  Chance Finds Procedure	RG	Planning phase	See Chance Finds Procedure in Cultural Heritage Management
Locals and tourists	Building of structures will change landscape character and visual aesthetics	Site selection and design of structures that aim to blend in with the landscape.	RG	Planning phase	Design
Geological formations	Disturbance of sensitive or valuable geological formations such as surface manifestations/h of springs	Site selection to avoid disturbance  Should drilling result in steam bath(s) loosing water and steam, geothermal waste water can be used to form new baths /lagoons for bathing as compensation.	RG	Planning phase	Design



## 20.6.7 Cultural Heritage Management Plan

### Objectives

IFC Performance Standard 8 defines cultural heritage as: *(i) tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values; (ii) unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls; and (iii) certain instances of intangible forms of culture that are proposed to be used for commercial purposes, such as cultural knowledge, innovations, and practices of communities embodying traditional lifestyles.*

This plan outlines the proposed Chance Finds Procedure. Chance finds are defined as potential cultural heritage objects, features, or sites that are identified outside of or after a formal site reconnaissance, normally because of construction monitoring. Chance finds may be made by anyone on the Project including archaeologists, architectural historians, non-cultural heritage site workers, and visitors or guests. Cultural heritage resources may be associated with prehistoric or historic periods and may include:

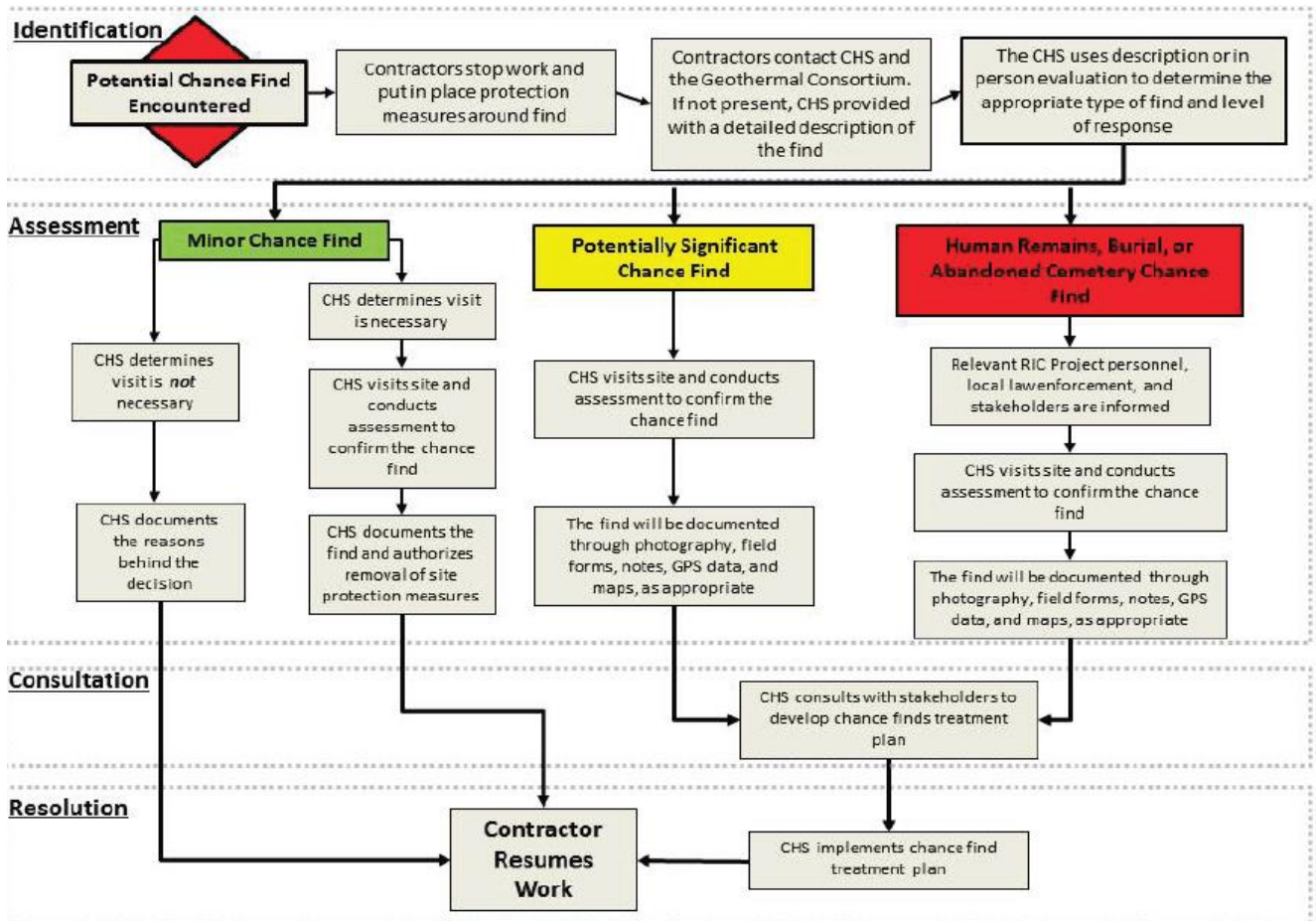
- Artifacts, whole or partial, such as ceramic sherds, ground and chipped stone artifacts, glass fragments, bone, shell, metal, textiles, and plant and animal remains;
- Features associated with human occupation, such as trash dumps, middens, hearths, and structural remains including temples, fortifications, habitations, walls, and monuments;
- Prehistoric or historic human remains found in formal graves, cemeteries, or as isolated occurrences;
- Underwater cultural heritage, including shipwrecks, dockyards, piers, wharves, ports, navigational markers, fishing weirs, breakwaters, human remains or burials, and inundated prehistoric or historic terrestrial archaeological site;
- Architecture, landscape, and other built heritage features; and
- Paleontological resources, including fossilized plant or animal remains or their impressions.

Central to the procedure is a local Cultural Heritage Specialist (CHS) that can be available with short notice. It is suggested, that he /she be appointed by the relevant Oromia Bureau responsible for Ethiopian cultural heritage in Oromia.

### Three-tiered Chance Finds Hierarchy

Receptor	Impact	Mitigation Measures
Minor Chance Finds	Modern objects or features. Isolated historic or prehistoric artifacts that are out of context or lack research potential or value.	Construction work stopped in the area of the find. If CHS not present, potential find reported to CHS. CHS will determine if find site visit is necessary. If CHS is present or determines site visit is necessary, find will be documented and collected /resolved in the field by CHS without stakeholder consultation. Construction activities resumed in the area.
Potentially Significant Chance Finds	Potentially significant prehistoric or historic artifacts, features, cultural heritage sites, or cultural heritage site clusters.	Construction work stopped in the area of the find. If CHS not present, potential find reported to CHS. CHS will visit find site and document find. If find is determined to represent a potentially significant chance find, CHS will initiate consultation with stakeholders to develop treatment plan. Construction works will resume in the area upon completion of treatment plan.
Human Remains, Burials, Abandoned Cemeteries Chance Finds	Prehistoric, historic, or modern human remains, burials, or associated artifacts or features.	Construction work stopped in the area of the find. If CHS not present, potential find reported to CHS. CHS will report find to stakeholders, including local, regional, or national law enforcement agencies. CHS will initiate consultation with stakeholders to develop treatment plan. Construction works will resume in the area upon completion of treatment plan.

### Chance Finds Procedure Flow Chart



## 20.6.8 Transportation and Traffic Management Plan Objectives

The key transportation issues surrounding the Project are transportation safety concerns associated with the movement of Project components and construction equipment. Possible route may involve port, e.g. in Djibuti (if shipped from outside of Africa), then through Ethiopia probably via Highway #1, connecting to Highway #9 leading to the town of Iteya and off to the gravel road to the Gnaro lava.

The Table below provides a list of the actions and monitoring activities required to avoid or mitigate potential negative Project impacts to acceptable levels, particularly along Highway #9 and especially along the gravel road to the Gnaro lava field.

### Transportation and Traffic Management

Receptor	Impact	Mitigation Measures	Responsibility	Timing	Monitoring, KPI
Pedestrians and cyclists	Increased safety risk due to the presence of large Project related vehicles	Preparation of and adherence to journey management planning, including (but not limited to): <ul style="list-style-type: none"> <li>• Use of escort vehicles;</li> <li>• Proper training and licensing of all Project drivers; and</li> <li>• Regular inspection and maintenance of Project vehicles</li> </ul>	RG	Prior to civil works	Presence of a master trip schedule and journey management planning for every Project-related trip.
		Regular, scheduled communication with community stakeholders, to ensure maximum awareness of Project-related vehicle movements.	RG E&S Manager  Community Liaison Officer	Prior to civil works	Document consultation with community members on traffic and road safety
All road users	Degradation of road infrastructure	Preparation of and adherence to a journey management plan, including (but not limited to) a requirement to transport tracked vehicles via trailer, rather than driving directly on public roads.  Repair any damage to roads or other structures caused by the Project.	RG  Transport Contractor	Prior to civil works	Presence of a master trip schedule
All road users	Accidents and injuries	Adhere to speed limits.  All driving licenses up to date.  Ensure that movement of outside or large /long vehicles, or convoys, will be timed, where practicable, to avoid busy traffic periods and will be restricted to the agreed access routes and the construction corridor  Implementation of safe driving protocols	RG  Hitosa Woreda Administration	Prior to civil works	Evaluate regularly grievances related to traffic  Liaise with local health officials and police stations to track and evaluate any traffic-related injuries and health concerns as a result of Project traffic

### 20.6.9 Waste Management Plan

Receptor	Impact	Mitigation measures	Responsibility	Timing	Monitoring, KPI
<b>Workers</b>	Disease distribution from hygiene facilities waste.	Sewage may have to be treated according to standards as not to create risk of pollution.	Contractor(s)	Through construction phase and operation	Regular inspection
	Hazardous waste	Mark clearly disposal of waste and hazardous waste. Dispose of in approved manner.	Contractor(s)	Through construction phase and operation	Regular inspection
	Health	Good housekeeping at camps.	Contractor(s)	Throughout	Regular inspection
<b>Environment</b>	Recyclable	Recyclable waste like used batteries, used oil, ink cartridges, scrap iron and steel, etc. can be transferred to recycling facilities in nearby town, i.e. Nazareth (Adama City) or Assela.	Contractor	Through construction phase and operation	Contractor provide proof of disposal of hazardous waste to accredited facility.
	Electronics	For other like medical waste, obsolete electronics etc. incinerator can be used which TS Environment can provide.	Contractor	Through construction phase and operation	Contractor provide proof of disposal of hazardous waste to accredited facility.
	Hazardous chemicals	Deal with hazardous chemicals through contractor, e.g. TS Environment.	Contractor	Through construction phase and operation	Contractor provide proof of disposal of hazardous waste to accredited facility.
	Sewage waste	Sewage waste can be handled by Nazareth /Adama municipality. Assela that is closer might have such facility.	Contractor	Through construction phase and operation	Contractor provide proof of disposal of hazardous waste to accredited facility.
	Visual impact of drilling mud and cuttings	Directed to infiltration ponds. Sediment is disposed of in an approved landfill	Contractor(s)	Through construction phase and operation	Regular inspection
<b>Locals and tourists</b>	Dust generation and visual impact from concrete mix, excavation etc.	Wash water directed to infiltration ponds.  Concrete solids reused and /or disposed of in landfills.	Civil Works and Drilling Contractors	Through construction phase and operation	Regular inspection
	Visual impact from scrap metal. Risk of accidents.	Segregate for recycling. Reuse if possible.	Contractor(s)	Through construction phase and operation	Regular inspection
	Visual impact from timber and wood based waste.	Segregate for recycling. Reuse if possible.	Contractor(s)	Through construction phase and operation	Regular inspection
	Visual impact from paper and cardboard.	Segregate for recycling. Closed containers.	Contractor(s)	Through construction phase and operation	Regular inspection

	Waste is easily blown away.				
	Visual impact, odor and pest problems from household waste.	Collected in closed containers and transported to appropriate disposal site.	Contractor(s)	Through construction phase and operation	Regular inspection
	Visual impact of silica deposits generating from well testing.	Directed to infiltration ponds which will be covered with earth after use	Contractor(s)	Through construction phase and operation	Regular inspection
	Risk of accidents from scrap metal.	Segregate for recycling.	Contractor(s)	Through construction phase and operation	Regular inspection
<b>Wildlife</b>	Hazardous waste	Mark clearly disposal of waste and hazardous waste. Deal with hazardous chemicals through contractor.	Contractor	Through construction phase and operation	Contractor provide proof of disposal of hazardous waste to accredited facility.
	Pollution from facilities waste /sewage	Sewage may have to be treated according to standards as not to create risk of pollution. Sewage can be handled by Adama /Nazareth municipality. Or town closer, e.g. Assela.	Contractor(s)	Through construction phase and operation	Regular inspection
<b>Soil and water</b>	Contamination from hazardous waste (oils, lubricants, batteries, chemicals, tyres)	Segregated as appropriate and stored in closed containers. Collected by licenced party to dispose of in a safe manner.	Contractor(s)	Through construction phase and operation	Regular inspection
	Groundwater and soil contamination generating from well testing.	Directed to infiltration ponds which will be covered with earth after use	Contractor(s)	Through construction phase and operation	Regular inspection

Decommissioning phase

Receptor	Impact	Mitigation measures	Responsibility	Timing	Monitoring, KPI
<b>Surface water</b>	Disposal of waste water or chemical spillage to surface pollutes surface water	Good site management plan.	Contractor	Throughout decommissioning	Daily inspections
<b>Environment</b>	Contamination and visual impact from various waste generating from	A specific waste management plan for decommissioning would have to be put in place, ensuring that among other, hazardous waste is identified and disposed of in a proper manner. Emphases should	RG /Contractor	Throughout decommissioning	Daily inspections

	decommissioning	be placed on recovering, reusing and recycling of waste.			
<b>Wildlife</b>	Demolition can cause trapping or accidents for animals.	Accidental deaths of wildlife will be minimized by undertaking detailed surveys before the commencement of the demolition.  Demolition will be planned so it will be continuous and surface finish will not leave hazards of abandoned structures for wildlife.	RG /Contractor	Throughout decommissioning	Daily inspections
	Noise from machineries and demolition can affect animals during breeding	Noise from machineries and demolition can affect animals and scare them which could have impact on results from breeding season. One way to mitigate impacts is to plan demolition outside breeding season.	RG /Contractor	Seasonal	N/A

## 20.6.10 Drill Mud and Cuttings Management Plan

### Objectives

The Drill Mud and Cuttings Management Plan is designed to establish a framework for the proper handling of drill cuttings and drill muds generated during Phase I of the Project. This Plan includes strategies that will guide RG and the drilling contractor to manage, mitigate, and avoid adverse effects to environmental and social receptors located within the Project Aol during Phase I. The objectives of this Plan are:

- Provide appropriate storage, handling, testing, transport and reuse of drilling mud or cutting onsite or disposal;
- List of measures necessary to mitigate any impacts on water resources (surface and groundwater) and aquatic habitat and species resulting from managing Drill Mud and Cuttings;
- Identify responsibilities and equipment required to deal with drill mud and cuttings used during Phase I; and
- Establish indicators to support management and encourage ongoing improvement regarding the handling of drill mud and cuttings on site.

### Drill Mud and Cuttings Management

Receptor	Impact	Mitigation Measures	Responsibility	Timing	Monitoring, KPI
Soil and water	Soil and water contamination	<p>Project's staff will have /receive appropriate required training related to manage drill mud and cuttings onsite and offsite.</p> <p>Construct an impervious lined mud pond to collect drill cuttings and recycle drill muds to minimize project water demand.</p> <p>Use non-toxic water-based drill fluids as possible in accordance with accepted practice.</p> <p>Dispose cuttings in accordance with national regulations. Water-based cuttings typically can be reused for construction fill if testing shows they are not toxic.</p> <p>Disposal of water-based drilling fluids into the bore hole following toxicity assessment.</p> <p>Include cuttings description in the Daily Geological Reports (DGR)</p>	<p>Drilling Contractor</p> <p>RG Project Manager /EHS Manager</p>	Throughout drilling operation /construction	<p>Daily site inspection and Audit reports</p> <p>Toolbox meeting: Daily Drilling Report (DDR) &amp; Daily Geology Reports (DGR)</p> <p>Monthly surface water quality monitoring upstream and downstream of the Project sites – no deterioration in pre-project lake /ground water quality</p>



### 20.6.11 H<sub>2</sub>S Management Plan

The health effects related to concentration of H<sub>2</sub>S is described in following table.

Conc (ppm)	Health effects
0.008-0.2	Smell detection.
20	Smell detection disappeared. No known health damage even though person stay in these concentration for some hours.
20-50	Irritating in eye.
50	If people stay in this concentration for long time, this can lead to pharyngitis and bronchitis.
60	If people stay in this concentration for long time, this can lead to conjunctivitis and pain in eyes.
150+	Irritation in upper part of the respiratory tract. Olfactory paralysis occurs.
400+	Respiratory distress.
1000	Unconsciousness.
2000+	Unconsciousness and likelihood of instant dead.

(Amoore, 1983; Baxter, 2000; Faivre-Pierret and Le Guern, 1983 and references therein; NIOSH, 1981; Sax and Lewis, 1989; Snyder et al., 1999)

The no-observed adverse-effect level (NOAEL) is 10 ppm (14 mg /m<sup>3</sup>) (Concise International Chemical Assessment Document 53, Hydrogen sulphide, human health aspects, World Health Organization Geneva, 2003).

The lowest-observed-adverse-effect level (LOAEL) is 2 ppm (2.8 mg /m<sup>3</sup>) in asthmatic individuals for respiratory and neurological effects (Concise International Chemical Assessment Document 53, Hydrogen sulphide, human health aspects, World Health Organization Geneva, 2003).

The conversion factors for hydrogen sulphide in air (20 °C, 101.3 kPa) are as follows:

\* 1 mg /m<sup>3</sup> = 0.71 ppm

\* 1 ppm = 1.4 mg /m<sup>3</sup>

#### H<sub>2</sub>S monitoring

- Identifying and understanding the hazards of working with dangerous atmospheres and mitigate exposure to H<sub>2</sub>S;
- Understand the H<sub>2</sub>S hazards (if any) found in the workplace;
- Maintaining and ensuring availability of H<sub>2</sub>S Safety Data Sheets (SDS);
- Understand emergency response procedures in case of H<sub>2</sub>S release; and
- Be able to apply the use of an H<sub>2</sub>S SDS, material's inventory, and labelling systems into routine procedures.



**Hydrogen sulphide is a deadly gas if people are exposed to a high concentration. It is also corrosive.**

- No smell when H<sub>2</sub>S concentrations are hazardous.
- Flammable and toxic – Short term TLV: 10 PPM.
- Use respiratory protection.
- ALWAYS use a H<sub>2</sub>S or O<sub>2</sub> meter near boreholes, vaults, in power plant buildings, in low areas, or in areas where there is danger of H<sub>2</sub>S accumulating!
- NEVER work alone in such locations!
- Ventilate worksite as much as possible.
- Move immediately to fresh air if the alarm system sounds and notify the shift warden /colleagues.
- H<sub>2</sub>S is highly flammable and explosive in high concentration in mixture of air or oxygen!

**H<sub>2</sub>S Emergency response plan**

- Ensure safety at the site.
- Call for help!
- Only personnel with full rescue unit (minimum 30 minutes breathing apparatus) can rescue unconscious people.
- Put respirators over the head of unconscious persons.
- Apply first aid.
- Take affected people to fresh air and let them rest, preferable in a sitting position.
- Give oxygen if possible. Administer breathing assistance if possible.
- Keep patient relaxed and warm; provide emotional support.
- Rinse eyes with water if they get in contact with H<sub>2</sub>S.

**Power plant**

- Although power plants use an advanced ventilation system, have sophisticated alarm systems and trained staff it is not possible to rule out accidents.
- Vigilance should be exercised when stopping and starting turbines. Also, weather conditions can cause gas emissions to collect in the surrounding areas.
- H<sub>2</sub>S alarm systems should be placed in machinery house which sounds at defined danger limit 10 ppm.
- If the system sounds employees should leave the premises immediately, ventilate well and allow adequate time for H<sub>2</sub>S to return to a safe level.
- Upon first opportunity, the cause of the alarm shall be investigated.
- It is required that two or more employees investigate the leakage area being equipped with a gas monitor.
- They should leave immediately if the level of H<sub>2</sub>S exceeds 10 ppm or use proper respiratory equipment.
- If the level does not drop below the defined danger limit after some time, then the investigators should report the incident to the divisional manager and await further instruction.

### **For set-ups without cleaning procedure**

- The strength of the gas becomes very high when it is separated from the steam in the turbines steam cylinders of a geothermal power plant.
- Gas pumps and pipelines transport the gas to the chimney where it is mixed with the plants emissions and dispersed.
- The most dangerous situation is if a leakage occurs on the pressure side of the gas pump.
- Double pipelines should be installed and a H2S alarm system monitors all the relevant rooms.

### **Boreholes**

- It is required that no less than two employees visit borehole housing area.
- At least one of them should be equipped with a gas monitor.
- When boreholes are closed, or vented under pressure, gases can collect in the top of them.
- If a section of the borehole is not properly sealed, then gases can collect in the borehole's cellar.
- If the monitor sounds they should leave the premises immediately.
- To remove the gaseous build-up, it should be enough to open up the borehole.

### **First aid**

- If a person loses consciousness because of H2S inhalation, then the rescue party must firstly ensure that they are equipped with the proper respiratory masks (fresh air mask).
- The victim should be immediately taken to fresh air allowed adequate recovery time (preferably in a sitting position) and then given oxygen.
- Mouth to mouth resuscitation should be used if necessary.
- The patient should relax to avoid adverse effects of exertion on the lungs.
- The patient should be kept warm.
- If gas has come into contact with the eyes rinse thoroughly with water.
- After First aid, contact a doctor or emergency services.

### **Fire**

- Stop the leakage!
- Extinguish the fire with powder or CO2 extinguisher.

## 20.6.12 Decommissioning and Restoration Management Plan

### Objectives

This Plan presents specific guidance on prevention and control of community health and safety impacts that may occur at the end of the Project (Phase I) if it is found not feasible. Decommissioning activities may be conducted in case the results obtained from testing indicate that the exploration wells and pads are not suitable for production in Phase II. The equipment and material used in the Project (Phase I) will need to be decommissioned according to this Management Plan.

This Plan will guide RG and the Drilling Contractor to manage, mitigate, and avoid adverse effects environmental and social receptors during Phase I due to decommissioning activities.

The general objective of this Plan is to ensure that risks for adverse environmental and social impacts due to decommissioning activities are minimized. This Plan also includes the following objectives:

- List of measures necessary to mitigate any impacts resulting from decommissioning activities;
- Comply with applicable corporative, national, and/or international recommended guidelines;
- Align with international best practices;
- Define and implement monitoring and reporting procedures; and
- Define responsible parties for the implementation of the management plan and training requirements.

### Decommissioning and Restoration Management

Receptor	Impact	Mitigation Measures	Responsibility	Timing	Monitoring, KPI	
Human settlements	Remove all structures, materials, equipment	Implement Best Management Practices listed in the construction ESMP's.	RG Project Manager/EHS Manager	Throughout decommissioning and for at least three months afterwards to confirm adequate revegetation	Daily site inspection and audit reports.	
Farmland	Fill mud ponds.	Follow Environmental, Health, and Safety (EHS) Guidelines: Construction and Decommissioning, International Finance Corporation (IFC).	Drilling Contractor		Vegetation monitoring to document restoration.	
Water Resources (surface and groundwater)						
Biodiversity	Cement wells and close, incl. injection wells	Remove all the infrastructure (e.g., structures, materials, equipment) and either export from Tulu Moye or dispose of properly				Survey and collection records to be prepared for all decommissioned areas.
	Remediate any soil or other contamination.	Fill all excavated areas and adequately level the disturbed areas and re-spread the original topsoil or provide a suitable media for plant growth.				
	Stabilize and restore site with native landscaping.	Collect and remove any contaminated soil and remediate any other contamination.				
		Abandon wells in a stable and safe condition. The abandoned				

		well should be plugged and filled according to Ethiopia's regulations and /or by following other accepted guidelines to prevent fluid migration. The method should be designed to ensure that aquifers are isolated and the long term risk of aquifer or surface contamination is minimized. The hole should be sealed to the ground surface with cement plugs and the surface casing should be cut and capped below plow depth. If no law exists, the casing should be cut off at approximately 0.6 m below ground surface and filled with grout from the bottom to the casing cut-off; then the excavation should be filled with native material.			
Locals and tourists	An abandoned and derelict plant has adverse impacts on visual amenities	Demolition will be planned so it will be continuous.  Lava field surface will be affected but otherwise finish will not leave signs of abandoned power plant.  Surface will be levelled and revegetated as applicable.	RG	Decommissioning	Planning ahead.

## 21 EHS Management Plan

This chapter describes EHS Management Plan that has been used by Reykjavík Geothermal and should /will be used as requirement of contractors (and subcontractors) in tenders for civil work, drilling and construction, and audited accordingly.

The following EHS Management Plan is based on requirements of OHSAS 18001, ISO 14001 and SA 8000 on occupational hazards, the environment and social accountability, respectively, also on hazard analysis of geothermal work outlined in the last section of this chapter.

### 21.1 Purpose

EHS contractor requirements and the contractor's EHS program /plan shall aim to:

- eliminate of personal injuries and damage to property
- minimize the effects of accidents on both the individuals and on the project
- comply with RG Health, Safety and Environmental policy and procedures
- comply with all national and local statutory requirements and standards
- prevent fatalities and accidents
- prevent lost time resulting from accidents
- prevent penalties
- and lead to safe working practices

### 21.2 Scope

These requirements, which may vary depending on specific contractor work scope, apply to all contractors carrying out any work on any RG facility /location. These requirements shall be submitted to contractors as an appendix to the call for tender, for construction /service contracts for work within existing plants /facilities and /or new projects.

Workers /sub-contractors engaged by Contractor are required to have appropriate ESMS system. Following EHS /ESMS requirements also apply to such third-party employees.

### 21.3 EHS Requirements

The health, safety and welfare of RG and contractors' employees are of prime importance to RG and, together with protecting the environment, are essential to its operations and undertakings.

The following rules and conditions have been prepared to ensure the safety of RG and contractors' employees. Contractors shall ensure that their employees and sub-contractors are conversant with these rules and that they comply with them. These rules do not exempt contractors from their statutory duties on EHS issues, but are intended to assist them in attaining a high standard of compliance with those duties.

#### 21.3.1 Contractor's EHS plan

Preparation for contracts, large or small, must include the same systematic processes of hazard identification, assessment, control and recovery, together with the evidence that a system is in place to manage these hazards.

In a major project, this EHS plan will be a comprehensive document. At the other extreme, e.g., for a one-man contract for a simple repetitive task, indication that this person recognizes and understands associated hazards is likely to be adequate.

For small or short-duration contracts, EHS planning must not be ignored or treated superficially. In such cases, the work is likely to include the use of basic practices (e.g.,

scaffolding, welding, excavating, etc.). The contractor should be able to demonstrate good general EHS management in each of these practices.

In addition, the contractor should understand and be able to carry out hazard assessment when these practices are put together in different combinations; particularly in association with the hazards of the workplace (e.g., working in confined spaces, in energized equipment, when isolating electrical systems).

The EHS plan shall also have provisions for all precautions necessary to preventing injury to the public or damage to the property of others.

#### **21.4 EHS Plan Components /Structure**

The EHS plan components or structure shall be as follows:

1. Scope of Work
2. Policy statement and objectives
3. Compliance with regulations and guidelines
4. Organization, resources and competence
5. Evaluation and risk management
6. Planning and procedures
7. Emergency Response Plan - ERP
8. Implementation and monitoring
9. External audits and reviews

##### **21.4.1 Scope of Work**

Brief description of the project Scope of Work is required.

##### **21.4.2 Policy statement and objectives**

Contractor shall issue and make available to RG his EHS policy statement including objectives. As leadership commitment and involvement, this statement shall be dated and signed by the contractor's most senior representative.

The contractor shall bring this policy statement to the attention of all his personnel.

##### **21.4.3 Compliance with regulations and guidelines**

The contractor shall carry out his work in accordance and compliance with all pertinent international, national and local laws, rules, regulations, guidelines and standards including those issued for occupational safety and health, environment, and social accountability and social responsibility.

The contractor shall develop a comprehensive listing of EHS (basic) rules, standards, procedures and legislations applicable to the project. He shall issue and make available EHS material as necessary.

The contractor shall ensure that all personnel under his control are aware of and follow EHS rules and conditions. Copies of relevant rules, guidelines and regulations should be posted in the field offices and other employee gathering sites.

If high risk is identified in primary supply chain of significant safety issues, cases of child labour or forced labour, the Contractor will take appropriate steps to remedy them. If not, RG will take steps to shift the the supply chain to compliant suppliers and contractors.

##### **21.4.4 Organization, resources and competence**

The contractor shall define the formal structure of his organization, allocating resources, defining communications and responsibilities on EHS issues between RG, consultant (if

relevant) and contractor, setting minimum competence levels and training requirements in EHS expected on the project for his personnel, and specifying documentation control.

The following headings should be considered as basic requirements:

- EHS organization and responsibilities
- EHS communications
- EHS meeting program
- Employee orientation program
- EHS awareness and training
- Competence requirements
- EHS induction process

### **EHS responsibilities**

The contractor, as a minimum, shall:

- Be directly responsible for the implementation and administration of his EHS program /plan and that of his subcontractors.
- Document specific responsible authorities and the interrelation of all personnel who implement the EHS activities.
- Appoint a EHS Coordinator /Engineer, who shall have defined authority and responsibility for ensuring that EHS requirements in the contract and any additional instructions issued by the project management team are implemented and maintained.
- Submit for RG approval a resume of the qualifications and work experience of the contractor EHS Coordinator /Engineer proposed for assignment to the project.
- Take all necessary action to ensure that his subcontractors and others employed by them comply with the contractor's approved EHS program.

### **EHS communications and meetings**

The contractor shall provide RG with a plan showing the frequency of EHS meetings at projects site. He shall invite the RG to attend. The main contractor's senior representative on site or his immediate substitute shall attend and actively participate in the EHS meetings.

Representatives from all contractors and /or teams shall meet for brief Tool-box /Safety Meetings every morning and go through issues from previous 24 hours, assess what operations lie ahead in the next 24 hours, including potential EHS risks. Meeting Minutes and all reports should be retained as records.

### **Orientation, awareness and training**

Contractor EHS Coordinator shall ensure that:

- All personnel are qualified in the particular job that they are performing and undergo further training to meet the needs of the working environment, if required.
- All personnel under his control, regardless of position, are given specific job oriented EHS training prior to start-up of work and as necessary thereafter.
- All personnel are also trained in both:
  - General awareness of environmental issues.
  - Specific procedures aimed at the avoidance of environmental damage.

### **Competence requirement**

The contractor will provide documented evidence of all qualifications, EHS training and instruction given to personnel under his control to the RG - if requested.

### **EHS induction**

New staff /contractors /visitors must acknowledge their visit in a timely manner before visiting a work site, have basic induction training /course, and follow safety procedures as others. Health and safety procedures apply to all routine and non-routine activities, involving staff, suppliers and subcontractors.

#### **21.4.5 Evaluation and risk management**

The contractor shall describe how hazards and effects are to be identified, assessed and controlled, and how recovery in the event of loss of control will be carried out.

The following headings should be considered as basic requirements:

- Risk identification, assessment and control.
- Methods for effective management:
- Permit to Work.
- Check in /Check out.
- Lock-out /tag-out clearance.
- Fires /open flame.
- Rules for assessment of hazard exposure.
- Safety Data Sheets for safe handling of chemicals.
- Hazardous materials.
- Methods and procedures for waste management.

### **Risk assessment and control**

The contractor shall have effective management system to identify, assess /evaluate and control for job risks continuously and as necessary.

He shall provide documented evidence of these hazard methods and procedures.

### **Effective management – Permit to Work**

Contractor shall have a system for selecting professionals or skilled workers to do dangerous jobs. This may involve:

- Working at heights.
- Confined space entry.
- Welding and/or cutting.
- Hazardous substances.
- Cranes and lifting equipment.
- Electricity maintenance and/or repairs.
- Excavation, explosive, pressure systems.

Permit to Work or PTW system is required for this sort of dangerous jobs at the site.

When working on or within an existing RG facility, the contractor shall ensure that all personnel who are required to work under the PTW system, where such permits are applicable, understand how to comply with the permit, prior to commencing work.



### **Effective management – Check in /out**

The contractor shall be responsible for Check in /Check out board. All employees check in when arriving at the work site by moving a tag to On-site, and check out by replacing the tag to Off-site.

Check-in and check-out tag system for staff working on and around the rig is important for head count in case of emergency.

### **Effective management - Lock-out /tag-out clearance**

Repairs shall not be made on machinery until power is positively locked and tagged out at the electrical disconnect. Prime movers, machinery or equipment capable of movement, must be effectively blocked or secured while repairs are being made.

Only qualified employees designated by Contractor EHS Coordinator are allowed to work on electrical lines and equipment. Lock-out /tag-out procedures must be implemented prior to starting work on electrical lines and equipment.

### **Effective management - Fires /open flames**

Neither open flames nor welding is permissible within thirty (30) meters of a drilling site without specific authorization from the supervisor in charge of the project.

Smoking is prohibited on and within thirty (30) meters of drilling site except in areas specifically posted or designated for smokers.

### **Assessment of exposure**

All personnel shall have the right to remove themselves from imminent serious danger without seeking permission from the contractor.

All employees shall be required to report observations of potential /suspected safety and environmental hazard at the work site on check-lists available around the work site.

Stopping of work and prohibition of unsafe practices and environmentally damaging acts. RG shall have the right to suspend work being performed by the contractor at any time, if RG deems that the contractor has or is about to violate statutory or RG health, safety or environmental rules and regulations. The cost of such stoppages of work will be borne by the contractor.

### **Safety Data Sheets**

(Material) Safety Data Sheets (MSDS or SDS) are necessary for all chemical and substances used, accessible and available at the work site.

### **Hazardous materials**

All hazardous materials shall be clearly marked as hazardous and contractor must inform all employees of proper storage, handling and transporting procedures.

Contractor shall have formal clean-up and disposal procedures for all hazardous materials. This includes special instructions on cases such as oil spill prevention and response and hydrogen sulphide (H<sub>2</sub>S) response plan.

At no time shall hazardous materials of any kind be put into streams or lakes.

### **Environmental protection and waste disposal**

The contractor shall pay due regard to the environment by preserving air, water, soil, animal and plant life from adverse effects of the contractor's activities and shall provide the RG /consultant representative(s) with detailed procedures for protecting and monitoring the environment (e.g., oil and chemical spill contingency measures, site restoration, etc.) and the disposal of waste, prior to starting work on site.

#### 21.4.6 **Planning and procedures**

The contractor shall describe how controls for hazard and effect management are to be implemented, and describe emergency response procedures.

The basic topics to be considered are:

- EHS equipment and its inspection, including check lists.
- PPE.
- First aid.
- Occupational health.
- Waste management.
- Site entry control.
- Basecamp conditions.
- Housekeeping.
- Road transport.
- Managing sub-contractors.
- Environment.

#### **Certification of equipment and monitoring**

The contractor shall ensure that all lifting tackle, lifting appliances, mobile work platforms and hoists under his control are in possession of current up-to-date certification according to legal requirements.

Contractor shall implement equipment inspection and monitoring of transportation, field personnel, fuel, and so forth, and environmental parameters (air quality, water quality, noise, and weather parameters).

Drivers should check vehicle safety following a standard procedure before each trip and Contractor EHS Coordinator should review vehicles with drivers on a monthly basis or when a new (different) vehicle is used. Contractor should check sub-contracted drivers' records /licenses.

#### **Personal Protective Equipment - PPE**

The contractor shall provide, free of charge, personal protective clothing and other equipment to all personnel under his control, as required in connection with the safe performance of work.

This PPE shall be maintained in good condition or replaced. It should be used as necessary, and is required at all times during certain periods of work such as drilling.

As a minimum, the contractor shall ensure that:

- Safety helmets and safety shoes shall be worn by all personnel while in the vicinity of any construction activity.
- Safety goggles or face shields shall be worn by all personnel performing grinding/ chipping, cutting, welding or similar work that may produce dust, sparks, gases and/or flying particles, and by those in the affected vicinity.
- Dust goggles shall be used when working in areas subject to blowing dust or sand.
- Protective gloves shall be provided and used by personnel working with sharp materials.
- All employees shall be required to wear appropriate work pants or overalls for skin protection.

- All personnel protective devices shall be inspected regularly and maintained in good working condition.

### **Fire, medical, gas release emergency equipment**

Necessary equipment for responding to an emergency shall be available and maintained in the appropriate locations. This includes the following as a minimum:

- First Aid box.
- Portable fire extinguishers.
- Breathing apparatus.

### **Occupational health and hygiene**

The contractor shall ensure that all necessary arrangements are made to identify any hazardous exposure that may endanger the health of his employees, and that precautionary measures have been taken to protect personnel and the workplace.

Medical examinations for employees shall be provided by the contractor at periods specified in accordance with the Country's health laws and regulations.

### **Waste management**

Contractor shall implement formal procedures to ensure the proper removal, disposal and recycling (when possible) of all waste /litter and refuse associated with the contract work.

Disposal of cuttings, water, mud and materials from mud pond shall be done according to local laws and regulations in cooperation with authorities.

### **Site entry control**

Drilling /rig site shall be adequately secured by fencing and a robust security control shall be in place to prevent unauthorized entry to well site.

### **Basecamp conditions**

The contractor shall ensure that any camp facilities provided for personnel are clean, safe, and meet the basic needs of the personnel. Camp facilities provided for use of all personnel, shall have access to clean W.C. facilities, potable water, and, where applicable, hygienic facilities for food storage.

### **Housekeeping**

Good housekeeping is an aid to safety. All employees will keep tools, equipment and work areas clean and orderly.

### **Road transport**

The contractor shall consider to:

- Prohibit roads for unauthorized persons especially children and animals to avoid possible risks.
- Restrict traffic speeds and if needed apply water on dusty roads to prevent high dust emission and air pollution.
- Observe operating hours of transport activities that produce noise and nuisance.
- Keep construction machines well maintained to minimize excessive emission of gases as a result of incomplete combustion of fuels.

### **Managing sub-contractors**

Sub-contractors are expected to abide by the laws and regulations that apply to health, safety and environment at the workplaces as well as acts of law and regulations that apply to construction and development in workplaces. Moreover, they are expected to abide by all the rules stated in this document, including reporting accidents, near misses and observations etc.

### **Environment**

The contractor should consider procedure is to analyse and monitor environmental aspects in his operation. Furthermore, to assess the importance of environmental effects under normal and abnormal operating conditions as well as during emergencies.

Input and output issues to take into account that may matter:

- Energy use
- Materials (purchasing)
- Materials (use and storage)
- Emissions
- Water consumption
- Rubbish and waste
- Release into water and soil
- Localised environmental and social issues, including flora and fauna
- Noise pollution
- Landscaping and mechanical disturbance of ground
- Other issues

#### **21.4.7 Emergency Response Plan - ERP**

EHS organization shall be defined prior to mobilization, including Emergency Response Plan (ERP) that involves incidents and emergency management, call out and mobilization, line of responsibilities and roles, interfaces with external organizations and institutions, contingency plans for specific scenarios and communications directory.

The contractor shall have a written ERP as part of his EHS program /plan including, but not limited to, action in the following cases:

- Injuries to employees.
- Injuries to the general public on or adjacent to the work site.
- Property damage with particular emphasis on utilities.
- Fire.
- Environmental damage.
- Natural disasters such as earthquakes.
- Other exposures or potential hazards that may occur at the work site.
- Roles and responsibilities.
- Communications and contact numbers.

The contractor's emergency procedures shall be compatible with the procedures of the Country's police, fire and other related authorities.

Emergency procedures shall ensure that the contractor's Project Manager or most senior supervisor present takes charge and directs the handling of the emergency.

### **Emergency Response Team (ERT)**

Emergency Response Team (ERT) shall be appointed and include RG /Company EHS Coordinator, and Contractor EHS Coordinator as the ERT Coordinator. Others included can involve Project Manager, Constructor Manager and Site Manager. ERT shall be directly responsible to manage Emergency.

### **Emergency Response Team ERT Coordinator**

The Emergency Response Team Coordinator shall be in command. He shall take responsibility for the overall organization and strategy of the emergency response, coordinate logistical efforts and has the authority for the final decision in any emergency action. He shall be responsible for effective evacuation of personnel, organizing response, mobilizing resources and initiating actions to stop the emergency and /or prevent escalation of the emergency till assistance arrives.

His specific responsibilities shall include but not be limited to the following:

- Assume control of an Emergency Control Center (ECC) /security room.
- Implement the Emergency Response Plan and plan against escalation of emergency.
- Receive updates on control measures taken by the field ERT members.
- Communicate with the Project Managers and mutually agreed aid partners.
- Take final decision on evacuating potentially affected mass population.
- Approach the on site and off site populated areas for insisting mass evacuation.
- Declare the emergency "under control" and authorize the "all clear" signal.
- On receiving information about emergency, relocates himself with the emergency vehicles and the available security personnel.
- In case of emergency requiring medical help, direct the ambulance & coordinate with male nurse to arrive at the site of emergency.
- Assess the emergency and initiate the response (e.g. medical assistance, search & rescue, fire fighting, spill containment, evacuation etc) with the security personnel and available resources.
- On assessment if more help is required contact the control room to arrange for the Emergency Response Team, with clear instructions on where to arrive.
- Arrange for special resources if required.
- Brief the ERT on the situation and direct them as appropriate.
- Constantly communicate and provide updated information to Company EHS Coordinator.
- If assessment reveals that emergency is out of control, consult with ERT to arrange for civil defense /other mutual aid /help.
- Assist and provide available resources / information to the Civil Defense /mutual aid's personnel to control the emergency.
- Approach residential areas and populated areas of on & off site to initiate mass evacuation and provide adequate assistance to civil defense / other agencies in mass evacuation.
- Initiate post emergency operations in coordination with the ERT.

### **Emergency Response Team members**

Emergency Response Team members shall work on the direction of the ERT Coordinator and shall be responsible to stop the emergency and /or prevent escalation of the emergency till help arrives.

The duties and responsibilities of the filed ERT members during Emergency shall include but not limited to the following:

- They shall allocate and control the resources by which a coordinated, effective company response may be mounted to meet the requirements of managing any emergency or disaster.
- ERT members on receiving the information from the EEC / ERT Coordinator shall suspend all their duties and proceed to location as directed.
- They report to the ERT Coordinator at the site of the emergency to receive further instructions.
- Work with the other ERT members /Civil Defense /mutual aid /help under the direction of the ERT Coordinator.
- They shall not leave the site of emergency unless permitted by the ERT Coordinator.
- They follow the instruction of ERT Coordinator & approach the populated areas (if necessary & instructed) to assist mass evacuation and provide assistance to Civil Defense /other mutual aid organizations.

### **Gas detection and alarms**

Continuous monitoring type H<sub>2</sub>S detectors, capable of sensing a minimum of 10 PPM H<sub>2</sub>S in air shall be placed at the following locations:

- Driller's console.
- Shale shakers.
- Mud tanks / pond, and any other location of the rig and associated system to be vulnerable of leakage and releasing H<sub>2</sub>S.
- All H<sub>2</sub>S detectors will be monitored at a central monitoring point located in the dog house.

H<sub>2</sub>S Alarms (both visual and audible) shall be located at:

- Rig floor.
- Service rooms.

The controlled premises will be covered adequately by toxic /hazardous gas detection system and alarm.

### **Fire detection system**

The premises shall be fitted with fire detector(s), manual call points & warning systems (sound & light). The detection system shall be controlled through a centralized monitoring system and eventually at the contractor's control room, which shall be manned 24 hours.

On detection of fire or on the breaking of the manual call point the alarm system shall activate and give alert /warning alarm with the indication at the control room about the area. It is expected that within 2 minutes from the alert alarm the designated person from the ERT shall take over the area and perform the requisite limitation actions. Otherwise the alarm automatically converts to the evacuation mode indicating immediate evacuation requirement from the effected site location.

### **Communication system**

Emergency information in general shall be communicated through the existing telephone network, or using manual call points within the premises.

Civil Defense, mutual agreed aid members can be contacted using company telephone or mobile phones.

### **Assembly points**

Minimum of two areas shall be designated as assembly point. The primary assembly point area shall be 100 meters in the upwind direction from the well. A secondary assembly point shall be located also 100 meters from the well in 180 degree opposite from the primary assembly point. Each assembly point shall have a wind sock /flag mounted.

### **Wind direction indicators**

Wind socks /flags shall be positioned in a location, where it can be seen from any part of the well site. As a minimum wind socks will be at the rig office, mud tank, cement unit, the assembly points.

### **Warning signs**

H2S warning signs shall be posted in the areas designated for H2S hazard. A sign shall be posted in the main entrance of the particular well site.

### **Standard safety equipment**

The inventory of the safety equipment including H2S and SO2 detectors, explosion meters etc. shall be maintained. The minimum required equipment is as follows (subject to manpower of drilling contractor on site):

- Self Contained Air unit (as per contract) – 1 unit.
- SCBA 30 minutes.
- Breathing air compressor.
- Air analysis kit.
- Compressed breathing air cylinders.
- Hand held colorimetric stain tube detectors with H2S, SO2, CO2 tubes.
- Wind sock.
- First Aid kit.
- Personal portable electronic gas monitors: O2, H2S, CO, CH4.
- Hood type 10 minute escape SCBA.
- Personal H2S electronic monitor.

Additional safety equipment:

- Rig Rat system with H2S.
- Low pressure hose (for run to rig in case of blow out).
- High pressure hose.

### **H2S, gas and fire detection system**

Site alarm system shall be divided into few major supervisory zones with detectors of different types (H2S and other hazardous gas, heat & fire etc) in addition to the manual call points. The detector's shall be producing different kind of alarm pitch for gas and fire emergency.

### **Emergency information**

- Assembly point locations & layout shall be developed and defined
- Search and rescue routines shall be developed and defined.

- Contact numbers of EHS personnel shall be circulated.
- Contact numbers of necessary parties and responsible persons during “Off Duty” hours shall be circulated.
- Emergency contact numbers of RG, Program Management, Civil Defense, police, hospitals and mutual aid members etc. shall be circulated.
- The necessary information’s shall be given to the third party agencies /mutual aids expected to perform in emergency scenario regarding the toxicity information, air modeling and information charts of vulnerable areas and available resources to control the emergency.
- Training should be conducted for the employees to be responsible to act in emergency.

### **Rig safety layout**

Contractor shall prepare well site /rig safety layout plan or hazard map of hazard /emergency response locations markings, including exit routes.

### **Medical**

Preferrably a paramedic shall be responsible to provide necessary medical first response during emergency if called for by the emergency rescue team for medical assistance. Their duties and responsibilities shall include but not be limited to the following:

- On receiving information from the ECC /ERT Coordinator about the emergency they shall remain in a state of alert until the emergency is declared over.
- For emergency requiring medical assistance, they shall provide the necessary emergency medical kit and proceed to the emergency area with the ambulance as per available real time information.
- Medic shall perform initial diagnosis and if necessary direct the ambulance to proceed to the appropriate medical facility outside project.

### **ER vehicle - OPTIONAL**

It is recommended that one Emergency Response vehicle to respond an emergency in preliminary stages shall be available and ready.

#### **21.4.8 Implementation and monitoring**

The contractor shall define how EHS performance is to be monitored, the criteria for EHS performance to be applied, and how the corrective action is to be taken.

The main issues to be considered are:

- EHS performance – general
- Incident and near miss investigation and reporting
- EHS inspections and internal audits

### **EHS performance**

Contractor will be expected to keep track of Key Performance Indicators and report to RG.

### **Incident investigating and reporting**

All safety incidents including injuries whether major or minor, significant near misses and property damage must be reported to the employee's immediate supervisor immediately



or at the next available opportunity depending on seriousness. Further immediate corrective action by the supervisor may be required.

All spills of brine, mud, gas, oil or any other chemical must be reported immediately to supervisors or the designated person in charge.

Immediately inform Contractor EHS Coordinator.

Verbal, and eventually written, report should include:

- When – Date, Time
- Where – Project # and exact location
- Who – Injured Name, Nationality, Job and Witnesses
- What – Injury /injuries
- Why – Accident description – sequence of events
- How – Reason accident happened

Forward the report to RG /Company EHS Coordinator within twelve (12) hours.

Contractor shall record environmental and safety incidents, that includes identifying the root cause to environmental and safety incidents, promptly implement corrective and preventive action, and allocate adequate resources appropriate to the nature and severity of any identified non-conformance.

#### **Audits, monitoring and inspection**

The contractor shall carry out regular inspections at specific intervals covering his work sites. Copies of inspection reports shall be submitted to the RG. The contractor shall also carry out planned audits to review safety and environmental management and procedural aspects of his operation.

The contractor shall develop an annual EHS audit and inspection plan /schedule and shall ensure an effective system is in place for monitoring the follow-up and implementation of inspection and audit actions.

RG shall have the right at any time to audit /inspect the contractor's facilities, procedures and safety management systems. The contractor shall fully co-operate in such reviews and shall implement recommendations at his own cost where RG or statutory rules and regulations are contravened.

#### **21.4.9 External audits and reviews**

RG /Company audits will be carried out at basecamps and work sites according to RG Operations Manual check-lists for various construction and operational phases.

The Contractor shall participate in the RG /Company's monitoring activities and audits as requested on environment, health and safety, and social accountability /responsibility.

#### **21.4.10 Note**

Any form(s) used by contractors relating to EHS are to be attached to the EHS plan.

### **21.5 Social Accountability /Responsibility**

#### **21.5.1 Wildlife**

No hunting, trapping or unnecessary disturbance of wildlife shall be permitted during contract work unless specifically required for reasons of safety. Keeping of pets and sale of wildlife is prohibited. All such actions shall be immediately reported to Company's Representative /Company EHS Coordinator.

**21.5.2 Forest cutting**

Unless specifically requested by Company's Representative, no cutting clearance of forest under-growth shall be done except to make permitted passage safe. At all times, including preparation of campsites or survey sites, forest cutting shall be kept to a minimum and shall comply with applicable permit.

**21.5.3 Discrimination**

The Contractor shall not engage in or support discrimination in hiring, remuneration, access to training, promotion, termination, or retirement based on race, national or social origin, caste, birth, religion, disability, gender, sexual orientation, family responsibilities, marital status, union membership, political opinions, age, or any other condition that could give rise to discrimination.

**21.5.4 Workers' organization**

The Contractor shall not discourage workers from electing worker representative, forming or joining workers organizations of their choosing, or from bargaining collectively.

**21.5.5 Child labour, forced labour**

The Contractor shall not engage in or support the use of child labour.

The Contractor shall ensure that forced labour is not used in any work or project.

**21.5.6 Working hours and remuneration**

The Contractor shall comply with applicable laws and industry standards on working hours and public holidays. The Contractor shall respect the right of personnel to a living wage and ensure that wages paid for a normal work week shall always meet at least legal or industry minimum standards and shall be sufficient to meet the basic needs of personnel and to provide some discretionary income.

**21.5.7 Social commitment**

The Contractor may be requested to a written commitment required to: (i) Conform to all requirements of the SA 8000 standard on Social Accountability; (ii) Promptly implement remedial and corrective action to address any non-conformance identified against the requirements of this standard; (iii) Promptly and completely inform the company of any and all relevant business relationship(s) with other suppliers /subcontractors and sub-suppliers.

**21.5.8 Horseplay**

Horseplay or practical jokes will not be permitted.

**21.5.9 Illegal drugs and firearms**

Illegal drugs, explosives, and unauthorized firearms, or persons under the influence of illegal drugs, are not permitted on Company premises. If any person is reasonably suspected of being under the influence of illegal drugs or in the possession of explosives or firearms that individual's vehicle, luggage, personal effects, lockers, or quarters on the premises shall be subject to investigation.

**21.5.10 Alcohol**

Alcohol or persons under the influence of alcohol are not permitted in Company's area of work. If any person is reasonably suspected of being under the influence of alcohol or in the possession of alcohol, within or outside the designated area, that individual's vehicle, luggage, personal effects, lockers, or quarters on the premises shall be subject to investigation.

**21.5.11     *Legal drugs, prescription drugs, traditional medicines***

Employees taking any prescription drug, traditional medication or other medication whether for an illness or for health maintenance must receive prior approval by Company's Representative before beginning work.

**21.5.12     *Violations***

Employees who violate these Health, Safety and Environmental Rules or other regulations as may be issued by the Company Authorities will be subject to disciplinary action up to and including termination or exclusion from work done under this Contract.

**21.6 Basic facilities at drilling rig**

**21.6.1 Medical facility**

One unit with complete emergency medical supplies, oxygen, stretchers, blankets, splints and other emergency equipment required to treat first aid cases and prepare patients for emergency evacuation in case of serious injury.

Make	
Unit size	
Description of Unit and Facilities	
Air Conditioned	

**21.6.2 Safety equipment**

**General**

Complete set of Fire Extinguishers to meet API, IADC Standard plus 2 units' wheel type

First Aid kits and supplies

One to two (1-2) stretcher(s)

One (1) Derrickman escape seat and escape line if necessary

Safety hats, safety boots, gloves, safety glasses and coveralls (to be worn at all times by rig personnel)

First Aid Supplies: List stock held and location	
First Aid Kits: List typical content, No. of kits and location	
Stretchers: Make / Type and location	
Derrickman Escape Line: Make / Type	
Eye-wash Facilities: Make / Type	
Confirm Safety Hats, Coveralls, Eye Protection Safety Boots provided to all Contractor personnel	

### H2S Safety Equipment

One (1) each Fixed Point Electronic H2S Detection System, with capabilities of monitoring four (4) areas at the location.

One (1) Hydrogen Sulphide Testing (or Calibration) Equipment

One horn /siren warning system

Six (6) positive pressure self-contained breathing apparatus (SCBA Scott) complete with 45 cu ft, 30 minute rated duration air cylinders (no Steel cylinders).

Six (6) emergency life support apparatus (Elsa pack).

One (1) set H2S danger/warning signs in English.

Portable electronic Hydrogen Sulphide / Carbon Dioxide monitors as necessary

One (1) electronic megaphone

Two (2) Windsocks on poles

Optional: Yellow and Red flashing light for entrance

Optional: One (1) powered Oxygen resuscitators c/w demand valve and one spare cylinder

	Contractor's Description
Four Channel Fixed Point Monitor C/W Sensors: Make / Type	
H2S Testing (Calibration) Equipment: Make / Type	
Alarm Light and Horn / Siren: Make / Type	
SCBA: Make, Capacity, Quantity	
ELSA: Make, Capacity, Quantity	
Danger Warning: List	
Resuscitator: Make / Type	
Portable Electronic H2S / CO2 monitors: Make Type, Quantity	
Electronic Megaphone	
Windssocks - quantity	

## 21.7 Hazard analysis of geothermal work

Overview of hazards and measures related to preconstruction. The table does not replace a thorough risk assessment.

Receptor	Impact	Mitigation measures	Responsibility	Timing	Monitoring, KPI
Locals	Increased noise level due to earth works and construction	Offer ear plugs /muffs with regard to condition of machineries.	RG	Planning phase	Daily inspection
	Increased noise level from cooling towers	Site selection.	RG	Planning phase	
Workers	Increased noise level due to earth works and construction	Use appropriate PPE with regard to condition of machineries.	RG	Planning phase	Daily inspection
Workers	Loss of consciousness, fatality due to work in confined spaces	Identify confined spaces, measure oxygen level, work procedures Emergency Response Plan	Contractor	Preconstruct-ion phase	Daily inspection

Overview of hazards and measures related to construction work. The table does not replace a thorough risk assessment.

Receptor	Impact	Mitigation measures	Responsibility	Timing	Monitoring, KPI
Locals	Water extraction for construction leads to households getting less water	Water supply from other sources than in local use. Water monitoring and management, setting of targets for water use according to IFC EHS guidelines 1.4	RG	Planning stage	Regular measurements
Workers	Risk of accidents during construction time	Training program for staff and preventative safety measures in place	RG/Contractors	Construction phase	Daily inspection
		Health and safety program	RG/Contractors	Construction phase	Daily inspection
Locals	Risk of accidents during construction time	Preventative safety measures in place for residents and visitors such as fencing and signage	RG/Contractors	Construction phase	Daily inspection
Locals	Risk of burning from	Signage, informing locals, fencing	RG/Contractors	Construction phase	Daily inspection

	steam during well testing				
Workers	Dust rising from truck beds and road affects air quality for workers	Work procedures plan for minimizing dust creation. Provide workers with personal protective equipment.	Contractors	Construction phase	
Locals, workers	Release of geothermal gases can cause risk to locals and workers. Especially H <sub>2</sub> S.	Concentration of H <sub>2</sub> S and other relevant gases will be monitored around the power plant. Emergency Response Plan section on high levels of H <sub>2</sub> S will be implemented.	RG	Construction phase	Constant monitoring throughout construction
Workers	Risk of hearing loss due to noise from drilling or other machineries	Personal protection equipment and health and safety plan	Contractor	Construction phase	Daily inspection
Workers	Nuisance and possible health effects due to vibration	Adhere to exposure limits	Contractor	Construction phase	Daily inspection
Locals	Increased noise level due to earth works and construction	Implement sound barriers.	RG/Contractor	Construction phase	
Workers	Risk of hearing loss due to earth works and construction	Personal protection equipment and health and safety plan	RG/Contractor	Construction phase	Daily inspection
Workers	Injury or death from being trapped, entangled or struck by rotating and moving machinery	Eliminate hazard by design. Installation of EHS management plan	RG/Contractors	Construction phase	Daily inspection
Workers and locals	Injury or death from electrocution	Signage, information, inspection of electrical devices	Contractors	Construction phase	Daily inspection
Workers	Solid particles or liquid chemical strike worker in eye, causing injury or blindness	Use machine guards, splash shields, safety goggles. Installation of EHS management plan	Contractors	Construction phase	Daily inspection

Workers	Bright and intense light that can injure workers' eyesight due to welding or hot work	Provide proper eye protection. Standard operating procedures.	Contractor	Construction phase	Daily inspection
Workers and locals	Risk of accidents due to poor skills or vehicular and pedestrian traffic	Training and licencing. Define traffic routes, rights of way and other rules at site.	Contractor	Construction phase	Daily inspection
Workers	Exposure to hot or cold conditions can result in temperature stress related injury	Monitor conditions and put in place a contingency plan	Contractor	Construction phase	Daily inspection
Workers	Injury or death due to fall from heights or a falling object from heights	Fall prevention equipment and measures for work over 2 m	Contractor	Construction phase	Daily inspection
Workers	Potential illness or injury due to exposure of chemical hazards	Replace hazardous substances with less hazardous ones. Provide material safety data sheets and PPE, information and training. Emergency Response Plan	Contractor	Construction phase	Daily inspection
Workers	Respiratory irritation, discomfort, illness due to poor air quality	Implement work practices to minimize air pollution. Provide ventilation and PPE	Contractor	Construction phase	Daily inspection
Workers and property	Loss of property, injury or fatalities of project workers due to fire and explosion	Proper storage of flammables. Work procedures. Emergency Response Plan	Contractor	Construction phase	Daily inspection
Workers	Loss of consciousness, fatality due to work in confined spaces	Identify confined spaces, measure oxygen level, work procedures.	Contractor	Construction phase	Daily inspection
Workers	Impact on health or	Gas monitoring and warning system, contingency plan, ventilation.	Contractor	Construction phase	Constant monitoring



	fatality due to H <sub>2</sub> S release.	Emergency Response Plan			
Workers	Potential blowout accidents, burn injuries or fatalities when maintaining hot pipes, wells. Heat related stress.	Reduce time required for work in hot environments, shield surfaces, PPE, safety procedures. Provide plenty drinking water.	Contractor	Construction phase	Daily inspection

Overview of hazards and measures related to power plant operation. The table does not replace a thorough risk assessment.

Receptor	Impact	Mitigation measures	Responsibility	Timing	Monitoring, KPIs
Locals, workers and wildlife	Release of geothermal gases can cause risk to locals, workers and fauna. Especially H <sub>2</sub> S.	Concentration of H <sub>2</sub> S and other relevant gases will be monitored around the power plant. Emergency Response Plan section on high levels of H <sub>2</sub> S will be implemented.	RG	Operation phase	Constant monitoring throughout operation
Power plant employees	Risk of accidents or work related health issues	Staff training and health and safety plan	RG	Operation phase	Regular inspections
	Risk of hearing loss due to noise from cooling towers	Personal protection equipment and health and safety plan	RG	Operation phase	Regular inspections
Locals	Increased noise level due to cooling towers	Sound barriers between source of noise and settlement	RG	Operation phase	Regular noise monitoring
Power plant employees	Injury or death from being trapped, entangled or struck by rotating and moving machinery	Eliminate hazard by design. Installation of EHS management plan	RG/Contractors	Operation phase	Regular inspection
Power plant employees	Nuisance and possible health effects due to vibration	Adhere to exposure limits	RG	Operation phase	Regular inspection
Power plant employees and locals	Injury or death from electrocution	Signage, information, inspection of electrical devices	RG	Operation phase	Regular inspection

Power plant employees	Solid particles or liquid chemical strike worker in eye, causing injury or blindness	Use machine guards, splash shields, safety goggles. Emergency Response Plan (directory for emergencies)	RG	Operation phase	Regular inspection
Power plant employees	Bright and intense light that can injure workers eyesight due to welding or hot work	Provide proper eye protection. Standard operating procedures.	RG	Operation phase	Regular inspection
Power plant employees	Exposure to hot or cold conditions can result in temperature stress related injury	Monitor conditions and put in place a contingency plan	RG	Operation phase	Regular inspection
Power plant employees	Injury or death due to fall from heights or a falling object from heights	Fall prevention equipment and measures for work over 2 m	RG	Operation phase	Regular inspection
Power plant employees	Potential illness or injury due to exposure of chemical hazards	Replace hazardous substances with less hazardous ones. Provide material safety data sheets and PPE, information and training. Emergency Response Plan	RG	Operation	Regular inspection
Power plant employees	Respiratory irritation, discomfort, illness due to poor air quality	Implement work practices to minimize air pollution. Provide ventilation and PPE	RG	Operation	Regular inspection
Power plant employees and property	Loss of property, injury or fatalities of project workers due to fire and explosion	EHS management plan, proper storage of flammables. Work procedures. Emergency Response Plan	RG	Operation	Regular inspection
Power plant employees	Loss of consciousness, fatality due to work in confined spaces	Identify confined spaces, measure oxygen level, work procedures, contingency plan.	RG	Prior to commencing of operation	Regular inspection
Power plant employees	Impact on health or	Gas monitoring and warning system, ventilation.	RG	Operation	Constant monitoring

	fatality due to H <sub>2</sub> S release.	Emergency Response Plan			
Power plant employees	Potential blowout accidents, burn injuries or fatalities when maintaining hot pipes, wells. Heat related stress.	Reduce time required for work in hot environments, shield surfaces, PPE, safety procedures. Provide plenty drinking water. Emergency Response Plan	RG	Operation	Regular inspection

Overview of hazards and measures related to decommissioning. The table does not replace a thorough risk assessment.

Receptor	Impact	Mitigation measures	Responsibility	Timing	Monitoring, KPIs
Workers and locals	Risk of accidents due to land restorations	Information campaign, health and safety plan, fencing, signage	Contractor	Decommissioning	Daily inspection
Workers and locals	Dust creation from building material being demolished affects air quality.	Plan for preventing dust arising from harmful building material. Personal protective equipment for workers.		Decommissioning	Daily inspection
Locals	Increased noise level due to earth works and demolition	Implement policy with regard to condition of machineries. Sound barriers.	RG	Prior to demolition	Daily inspection
Workers	Risk of hearing loss for workers	Implement policy with regard to condition of machineries. Personal protection equipment and health and safety plan	RG/Contractor	Prior to demolition and throughout decommissioning	Daily inspection
Workers	Injury or death from being trapped, entangled or struck by rotating and moving machinery	Eliminate hazard by design. Emergency Response Plan	RG/Contractors	Decommissioning	Daily inspection
Workers and locals	Injury or death from electrocution	Signage, information, inspection of electrical devices	Contractors	Decommissioning	Daily inspection
Workers	Solid particles or liquid chemical strike worker in eye, causing	Use machine guards, splash shields, safety goggles. Emergency Response Plan	Contractors	Decommissioning	Daily inspection

	injury or blindness				
Workers	Bright and intense light that can injure workers eyesight due to welding or hot work	Provide proper eye protection. Follow operating procedures. Emergency Response Plan.	Contractor	Decommissioning	Daily inspection
Workers and locals	Risk of accidents due to poor skills or vehicular and pedestrian traffic	Training and licencing. Define traffic routes, rights of way and other rules at site.	Contractor	Decommissioning phase	Daily inspection
Workers	Exposure to hot or cold conditions can result in temperature stress related injury	Monitor conditions. Emergency Response Plan	Contractor	Decommissioning	Daily inspection
Workers	Injury or death due to fall from heights or a falling object from heights	Fall prevention equipment and measures for work over 2 m Emergency Response Plan	Contractor	Decommissioning	Daily inspection
Workers	Potential illness or injury due to exposure of chemical hazards	Replace hazardous substances with less hazardous ones. Provide material safety data sheets and PPE, information and training. Emergency Response Plan	Contractor	Decommissioning	Daily inspection
Workers	Respiratory irritation, discomfort, illness due to poor air quality	Implement work practices to minimize air pollution. Provide ventilation and PPE	Contractor	Decommissioning phase	Daily inspection
Workers and property	Loss of property, injury or fatalities of project workers due to fire and explosion	Follow work procedures and proper storage of flammables. Emergency Response Plan.	Contractor	Decommissioning phase	Daily inspection
Workers	Loss of consciousness, fatality due to work in confined spaces	Identify confined spaces, measure oxygen level, work procedures. Emergency Response Plan.	Contractor	Prior to decommissioning	Daily inspection

Workers	Impact on health or fatality due to H <sub>2</sub> S release.	Gas monitoring and warning system, ventilation. Emergency Response Plan.	Contractor	Decommissioning	Constant monitoring
Workers	Potential blowout accidents, burn injuries or fatalities when maintaining hot pipes, wells. Heat related stress.	Reduce time required for work in hot environments, shield surfaces, PPE, follow safety procedures. Provide plenty drinking water. Emergency Response Plan.	Contractor	Decommissioning	Daily inspection

---

## 22 E&S Monitoring Plan

This chapter provides a summary of the first version of monitoring, control, and follow-up measures identified in the Environmental and Social Impact Assessment (ESIA) and in individual management plans.

The general objective of this Environmental and Social (E&S) Monitoring Plan is to inspect /monitor and evaluate the efficiency of the impacts, embedded controls, and proposed mitigation measures that will be implemented during Project's lifecycle.

This monitoring plan also identifies the responsible parties, roles, and procedures for implementing the various monitoring programs, including monitoring methodologies, monitoring frequency, and the location and number of the monitoring sites.

Environmental and Social Components	Parameters	KPI	Location or Number of Monitoring Sites	Monitoring Frequency	Sampling Technique	Report Type and Frequency	Reporting Responsibilities	Submitted
Air Quality	H2S	ACGIH Guidelines	At each site and the closest down gradient residence	Continuous (real-time)	Electrochemical sensor in a monitoring instrument	Monthly E&S Performance Report	RG Project Manager/EHS Manager  Drilling Contractor	RG
Noise	Leq dBA	IFC standards	Closest noise sensitive receptors (e.g., residence), one location in nearby wildlife habitat and another in nearest community	Initial one week monitoring when drilling is at full operation and when steam flow testing is at full operation.	Calibrated sound level	Monthly E&S Performance Report	RG Project Manager/EHS Manager  Drilling Contractor	<b>RG</b>
Soil	Soil Erosion and Contamination	No visible evidence of sediment leaving the Project site  Number and volume of spills	Within construction area	Daily site inspection and audit reports	Inspection	Monthly E&S Performance Report	RG Project Manager/EHS Manager  Drilling Contractor	RG
Wastes (drill mud and cuttings)	Volume of wastes spilled or improperly managed	Volume of drill mud spilled	Waste tracking and reporting on all waste amounts	Daily site inspections  Audit reports	Daily site inspection and audit reports	Monthly E&S Performance Report	RG Project Manager/EHS Manager  Drilling Contractor	RG
Water resources	Surfacewater quality - pH, turbidity, conductivity, TDS, TSS, the principal elements found in the geothermal	No deterioration in water quality from present drinking water resources.  WHO drinking water guidelines	Sampling from each water source used for community drinking water	Sample before starting construction activities to establish baseline.  Monthly throughout construction.	Hand dipped sample	Monthly E&S Performance Report	RG Project Manager/EHS Manager  Drilling Contractor	RG

	fluids, sulfate, and coliforms							
	Surfacewater quantity	Maintain minimum environmental flow required by Government	Regular or continuous water level recordings at existing water resources	Continuous or daily before and throughout construction	Water level recorder	Monthly E&S Performance Report	RG Project Manager/EHS Manager Drilling Contractor	RG
	Groundwater quality	WHO drinking water guidelines	Closest downgradient well or borehole drilled for Project water consumption	Before construction to establish baseline and in response to any groundwater related complaints	Monitoring wells	Monthly E&S Performance Report	RG Project Manager/EHS Manager Drilling Contractor	RG
Biodiversity	Terrestrial flora and fauna	100% Survival of translocated plants. Same for animals where feasible to monitor translocated individuals.	Translocation sites (to be determined based on species and habitat requirements)	Monthly for three months following translocation	Qualified biodiversity specialist	Monthly E&S Performance Report	RG Project Manager/EHS Manager Civil works contractors Drilling contractor	RG Forestry Department /Ministry
	Red Listed bird breeds	No nest abandonment	Forest surrounding the pad sites	Monthly during breeding season	Qualified biodiversity specialist	Monthly E&S Performance Report	RG Project Manager/EHS Manager	RG Forestry Department /Ministry
	If surface water, then include Aquatic flora and fauna	No entrainment of aquatic organisms	Water intake	Monthly during water extraction	Visual inspection	Monthly E&S Performance Report	RG Project Manager/EHS Manager Civil works Contractor	RG
Displacement	Physical resettlement	Number and type of grievances regarding physical resettlement	NA	Ongoing throughout resettlement process	Monthly meetings with physically resettled people	Monthly Environmental and Social Performance Report  Annual summary report on the RAP progress	RG E&S Manager and Community Liaison Officer	RG



						Resettlement completion report		
	Economic displacement	Income levels before and after displacement and performance of livelihood restoration strategies  Number and type of grievances , regarding economic displacement	N/A	Formal quarterly engagement with and survey of local farmers impacted by economic displacement	Meetings /interviews with local farmers  Submissions to the grievance mechanism	See monitoring for physical displacement above  Quarterly report based on analysis of engagement with local farmers	RG E&S Manager and Community Liaison Officer	RG
Socioeconomics	Economic benefits	Number of local full time equivalent hires	N/A	Monthly	Track in payroll	Monthly Environmental and Social Performance Report	RG EHS Manager  Drilling Contractor	RG
	Recreational	Number and type of grievances received from recreational users or guides	To be determined during stakeholder engagement process	Monthly	Grievance Reports and CLO coordination with communities	Monthly Environmental and Social Performance Report	RG E&S Manager and Community Liaison Officer	RG

## 23 Policies of Reykjavik Geothermal

### 23.1 Business & Quality Policy of Reykjavik Geothermal

#### 23.1.1 Vision statement

Reykjavik Geothermal works with local partners to harness natural resources and develop utility-scale geothermal power plants, providing an inexpensive, clean and indigenous energy source for the benefit of local economies, while providing attractive returns for investors.

Our vision is to become a global geothermal energy company respected for its partnership and performance.

#### 23.1.2 Mission statement

Reykjavik Geothermal mission is to drive values to all our stakeholders by being a leader in geothermal energy project solutions with recognizable world class performance. The project management including project management consulting will enable our clients to achieve a competitive advantage through the effective utilization of project planning and control techniques.

#### 23.1.3 Values

- Passion. Our employees strive to be energetic and enthusiastic, we are used to making fast and flexible decisions; we perform and deliver on time and on budget.
- Responsibility. We take responsibility, for our work and our actions, both as individuals and as teams. We take our corporate social responsibility very seriously. Teamwork is the foundation for our success.
- Integrity. Reykjavik Geothermal stands for honesty and trust-based relationships with all stakeholders. We believe that the full potential of RG can be reached only through mutual respect and cooperation of all stakeholders.
- Quality. Our commitment to quality includes executive oversight on every engagement and unparalleled attentiveness to the relationship we forge with each of our clients.
- HSE. Integrated part of our Company culture is an absolute commitment to the safety and health of all our staff and others who may be affected, and optimal protection of the environment in which we operate.

#### 23.1.4 Corporate Business Statement

Reykjavik Geothermal is a geothermal exploration and developmental company. The nature of our business and our expertise spans the whole value chain; including resource exploration and reservoir assessment, exploration drilling, design and development, production drilling, construction and operations of geothermal power plants.

Successful project realization will result from our commitment to our values, emphasizing passion, responsibility, integrity, and quality, and our contribution to sustainable development. This includes the areas of health and safety, and environmental protection.

RG is specialized in the development of global geothermal energy projects. We do this by collaborating with other companies and stakeholders in compliance with all applicable

legislations and operating conditions. We are therefore granted access to a full spectrum of outstanding development prospects.

The stakeholders are the economic fundament of our company and the focus of our activities. At RG, our mission is to drive values to all our stakeholders by being the world-leader in energy project solutions with recognizable world-class performance. Environmental matters have strong influence on stakeholders' interests; therefore, Reykjavik Geothermal is determined to be in the forefront of environmental protection. For that purpose, we use our knowledge, creativity, the passion of our staff, and the spirit of the teamwork to provide our collaborators with first class work and results.

An integrated part of our culture is an absolute commitment to safety and health of all our employees and others who may be affected. The management of RG is committed to implement a health and safety system as an essential part of every employee's work. No employee will commit, condone, or knowingly be party to an unsafe act or violation of our health and safety policies.

Our focus is on providing energy that is clean, renewable, and increasingly more economical by developing utility-scale geothermal power plants. Believing there is an opportunity to create a safer and cleaner environmental future for ourselves and our children by developing geothermal assets, we do not only provide a better solution for our energy needs, we also contribute towards a stronger and more stable economy for our communities. RG creates a significant value for its shareholders by growing its portfolio of generation assets through new development.

Our corporate philosophy will secure the future of RG as a growing and prosperous company with dynamic and motivated organization that provides values to its stakeholders including economic benefits to local communities.

### **23.1.5 Corporate Business Objectives**

The corporate business statement will be communicated and understood within the organization and reviewed for continuing suitability.

RG will create a significant value for its shareholders by growing its portfolio of generation assets through new developments. We will do our best to constantly satisfy market demands and expand into new markets and territories.

RG will fulfil stakeholders' interests, by:

- Providing attractive returns to investors.
- Providing cheaper and sufficient energy to customers.
- Reducing reliance on imported, thus increasing energy sovereignty.
- Producing clean, renewable energy to local communities.

RG is a reliable and responsible company that meets customer satisfaction, by:

- Offering customers professional and flexible service that fulfils their expectation.
- Keeping and exceeding operational plans regarding time (delivery dates) and cost.
- Matching as possible our assessment of reserves with actual output regarding production and temperature.

RG realizes the importance of protecting natural resources and we will ensure their sustainable utilization.

RG will make sure that employees are content, well trained, effective and productive.

RG will respect, meet and exceed legal requirements anywhere we operate, and fulfil other standards that apply to our business, especially standards and requirements regarding health and safety, the environment, and corporate social responsibility.

RG is committed to comply with ISO 9001 requirements, and continually improve and further develop the effectiveness of the operational system.

## 23.2 **Social Responsibility Policy of Reykjavik Geothermal**

Reykjavik Geothermal (RG) will manage and conduct its affairs in an honourable and morally sound manner.

The Company will observe and comply with national, international and other applicable laws, regulations, treaties, directives, declarations, as well as our own policies, and other requirements.

Reykjavik Geothermal will ensure that this policy is reviewed periodically, communicated, and made accessible to all personnel, including directors, executives, management, supervisors, and staff, whether directly employed, contracted or otherwise representing the company, and is publicly available upon request.

### 23.2.1 ***RG is guided by its commitment to corporate social responsibility***

Reykjavik Geothermal places great emphasis on improving people's lives and developing a constructive and prosperous relationship with the communities in which it operates. We will:

- Create jobs, hire local workers and choose national partners when feasible to work on our projects during all phases of utilizing the natural resource and developing utility geothermal power plants.
- Provide technical training and pass expertise to local entities, a transition that includes training and education of local experts and cooperation with regional institutions and local contractors and consultants.
- Increase educational opportunities around geothermal projects; RG is dedicated to introduce the UNU geothermal program to developing countries where RG has operations, and to utilize other educational and training programs to increase the competence of employees and partners.
- Recognize the duty as a corporate citizen to undertake and promote philanthropic activities to support, health care, education, environmental awareness, and increase wellbeing and living standards both at global level, and locally in the communities and regions where we operate, as possible and prudently.
- Promote sustainable development; continually endeavour to meet the needs of the present without compromising the ability of future generations to meet their own needs.
- Produce clean, renewable energy to local communities; thus creating a safer and cleaner environmental future for ourselves and our children through the developing of geothermal assets.

- Reduce reliance on imported energy, and thereby increase energy sovereignty and contribute to a stronger and more stable economy for the communities and regions where we operate.
- Recognize stakeholders (including landowners and indigenous peoples) and their concerns and strive to continually improve the ways in which we promote, communicate and manage social responsibility with employees, customers, suppliers, and the community at large.

RG will disclose as appropriate its internal structures, policies, rules, safeguards, decision making processes, responsibilities and other information that are reasonably acceptable to stakeholders.

### **23.2.2** *RG is guided by its principles of social accountability*

Reykjavik Geothermal will conform to all requirements of SA 8000. We will:

- Comply with local age laws and requirements, and do not employ child labour.
- Ensure that forced labour is not used in our projects, including prison or debt bondage labour; no holding of deposits or identity papers by employers or outside recruiters.
- Provide a safe and healthy work environment at all sites and facilities; take steps to prevent injuries through risk assessment; run regular health and safety worker training programs; and maintain a system to detect threats to health and safety.
- Respect the right to form and join trade unions and bargain collectively; where law prohibits these freedoms, facilitate parallel means of association and bargaining.
- Prohibit discrimination based on race, caste, origin, religion, disability, gender, sexual orientation, union or political affiliation, or age; no sexual harassment will be tolerated.
- Prohibit physical abuse, harassment, mental or physical coercion or verbal abuse.
- Comply with applicable laws, and do not require employees to work more than the maximum hours of daily labour; comply with overtime pay requirements; and limit overtime to avoid exceeding 12 hours per week on a regular basis.
- Compensate workers with wages and benefits that meet or exceed the legally required minimum, including no disciplinary deductions.

RG will continue to encourage all suppliers and contractors to comply with the same standards that we have set for ourselves regarding social accountability.

## **23.3 Health, Safety and Environment Policy of Reykjavik Geothermal**

It is the objective of Reykjavik Geothermal (RG) to take a proactive and progressive role in the protection of the environment. RG is committed to conduct its business in a manner that protects the health and safety of its employees, and other persons affected by activities of the company and to the protection of the environment.

### **23.3.1** *RG is guided by basic principles - to:*

- Comply with all applicable national and international laws, regulations, accepted local rules and standards governing occupational health, safety and the environment.

- Provide a healthful, safe and environmentally secure workplace for employees and other persons affected by our activities.
- Provide employee training in healthful, safe work practices and environmental protection.
- Motivate employees to take personal responsibility for their safety and the safety of their co-workers. No one is required to work at a job that he or she may have reason to believe is not safe, healthful or environmentally sound.
- Manage safety like any other key aspect of the business by establishing goals and objectives for continuous improvement, measure and report performance.
- Take environmental matters into account in all operations, thus promoting improvements to the environment.
- Ensure that each natural resource is utilized with as little environmental impact as possible.
- Work in close co-operation with customers and suppliers to ensure that they meet RG's health, safety and environmental objectives.
- Consider life cycle perspective as possible in all environmental aspects of RG activities, products and services.
- RG is committed to comply with ISO 14001 and OHSAS 18001 requirements, and to continually improve the effectiveness of the Business management system.

## **23.4 Reykjavik Geothermal Code of Conduct**

### **23.4.1 Article 1: Applicability & purpose**

The Code of Conduct applies to Board of Directors and all employees of Reykjavik Geothermal, hereafter referred to as RG staff.

The Code of Conduct is designed to assist staff in carrying out responsibilities effectively and without compromising ethics and good behaviour.

### **23.4.2 Article 2: Ethical conduct**

Staff shall maintain the highest standards of ethical conduct, emphasising professional expertise and accountability in all their work, whether this concerns fellow employees or stakeholders' relationships.

RG staff shall manage and conduct all Company affairs in an honourable and morally sound manner.

### **23.4.3 Article 3: Company reputation**

Staff shall execute their duties with integrity, conscientiously and faithfully, and honour the Company's possessions and valuables.

In all their decisions and actions they shall strive to enhance the Company's credibility and reputation and make sure that it will be respected and valued as a good constituent of society.

### **23.4.4 Article 4: Stakeholders**

Staff shall take great care to respect the interests of the Company's stakeholders and to treat all stakeholders' affairs with confidentiality where it applies.

Staff shall be aware of the importance of Reykjavik Geothermal in the countries and societies where the Company operates. They shall ensure that decisions and projects have positive, socio-economic impact on communities and the environment.

**23.4.5 Article 5: Law & regulations**

Staff shall ensure that decisions and transactions comply with the appropriate laws and regulations and optimal ethical standards. This includes compliance with national, international and other applicable laws, regulations, treaties, directives, declarations, and the Company own policies and other requirements.

**23.4.6 Article 6: Transparency**

Staff shall follow defined work procedures to ensure conformity, quality, and traceability.

Staff shall disclose as appropriate its internal structures, policies, rules, safeguards, decision making processes, responsibilities and other information that are reasonably acceptable to stakeholders.

**23.4.7 Article 7: The work place**

Staff shall perform the work with which they have been entrusted with diligence and vigilance. They will do nothing to damage the reputation of the Company.

Staff shall be obliging and polite in their conduct to colleagues and honour their feelings and private life when such matters inevitably enter the working place.

They shall honour their colleagues' spare time with their families and friends.

They shall ensure occupational health and safety and assist colleagues, co-workers and general citizens in emergencies and hazards should such instances occur.

**23.4.8 Article 8: Commitment to values**

Staff shall strive to perform and deliver on time and on budget.

They shall take responsibility for their work and actions, both as individuals and as teams.

They shall strive to build honesty and trust-based relationships with all stakeholders through mutual respect and cooperation.

They shall commit themselves to quality, occupational health and safety and optimal protection of the environment in which the Company operates.

**23.4.9 Article 9: Confidentiality**

Staff must treat as confidential all information they receive in the course of their duties relating to the Company' business affairs, except when obliged by law to provide information. The obligation of confidentiality shall remain even after employment ceases.

Any person acquiring information as referred to above, whether by accident or indirectly as shared information, is subject to the same obligations of confidentiality. The party providing the information shall point out the confidentiality of the material to the recipient.

**23.4.10 Article 10: Entry into force**

RG will encourage all suppliers and contractors to comply with the same standards that staff of the Company have set for themselves regarding Code of Conduct.

The Code of Conduct shall be made available to all Company management and employees, the Board of Directors and alternates.