DASA URANIUM MINE, NIGER

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT ADDENDUM

24 FEBRUARY 2023

SOMIDA
SOCIÉTÉ MINIÈRE DE DASA S.A.

GLOBALATOMIC

Executive summary

Introduction

Global Atomic Corporation (GAC), through its wholly owned subsidiary company, Global Atomic Fuels Corporation (GAFC), owns an 80% interest in Société Minière Dasa SA (SOMIDA), a Nigerien Company in which the Government of Niger owns a 20% interest. SOMIDA is building the Dasa underground uranium mine in the Agadez region of Niger (the Project). The Dasa Mine is scheduled to begin commercial production in early 2025.

An Environmental and Social Impact Assessment (ESIA) for the Project, carried out by Nigerien environmental consultancy; Groupe Art & Génie in 2020, has been approved by the Nigerien authorities. However, GAFC has committed to undertake its operations in line with the Equator Principles (EP4) and, following an internal evaluation of the approved Project ESIA against EP4, GAFC commissioned a new ESIA to accelerate the transition to EP4 compliance. The ESIA was prepared by Nigerien environmental consultancy; Firme d'Expertise en Environnement et Développement (FEED Consult in 2022.

This ESIA Addendum report is presented as a summary and update of both the approved regulatory ESIA and the recent FEED Consult ESIA. It includes information from the latest Feasibility Study (METC, 2023) and results from ongoing technical work. It summarizes the environmental and social management measures that will be put in place to ensure that the Project is undertaken in accordance with good international industry practice. This includes the International Finance Corporation Performance Standards on Environmental and Social Sustainability (the IFC PS), the IFC Environmental, Health and Safety (EHS) Guidelines, and the guidance of the International Atomic Energy Agency (IAEA), of which Niger is a member state.

The Project

The Dasa deposit is located in the rural commune of Tchirozérine, within Agadez Region in northern Niger. It lies 5 km east of the RN25 highway, which links the regional capital, Agadez, to the south, with the mining town of Arlit to the north. The French group ORANO has been mining uranium in the area since the 1970s, including at the Somaïr and Cominak mines near Arlit approximately 110 km north of Dasa. The Cominak mine closed in March 2021 after a 50-year life. SOMIDA has hired several members of the Cominak senior management team to run SOMIDA, along with experienced miners to work at Dasa.

The Dasa underground mine will be accessed via a single decline ramp developed from surface. Mining will proceed in blocks, working upwards from access drives from the decline ramp, with pillars left between blocks for stability. The mined out voids will then be backfilled, allowing these temporary pillars to be removed.

The mine ventilation system is a key aspect of the mine design due to the presence of radioactive elements in the air. The designed ventilation system is a once-through system (i.e., there is no recirculation of air) and will replace the volume of air in the mine on average every 15 minutes. Ventilation of those excavations within the orebody where the radiation risk is highest will be via an exhaust system which removes contaminated air from the workings immediately into the return airway system, thereby ensuring that risk relating to exposure to radiation is minimized at all times.

Processing will comprise acid leach (pugging) followed by solvent extraction of the uranium from solution. The selected pugging and curing process has been successfully applied at the Cominak and

Somaïr operations. The overall recovery rate is 94.15% for the processed uranium ore. The plant will have the capacity to treat 365,000 tonnes per annum (tpa) of ore, and annual production will be approximately 4.1 million pounds (Mlb) uranium oxide. The Project has a probable mineral reserve of 4.1 million tonnes of ore at 5,267 parts per million uranium oxide, for a total production of 47.2 Mlb of uranium oxide. A 23-month ramp-up stage will be followed by 12 years of steady-state mining and processing.

The tailings will be stored in a dry-stack tailings storage facility (DSTSF) at the surface. The facility will have a low-permeability liner and will be constructed in three compartments. On closure, the DSTSF will be capped with a low-permeability cover.

All mine staff will be housed in a purpose-built accommodation camp located approximately 4 km east of the site. Teams will work on a rotational basis, with 14 days at the camp followed by 14 days away.

The Project site will be fenced over an area of approximately 2 km^2. Outside the fenced area there will be an approximate 40 km^2 buffer area, which incorporates the Mine Permit Area and additional areas for possible future infrastructure development. Passage through and use of this area by local people will not be restricted, although longer-term occupation (e.g. establishing camps) will be discouraged by a continuing stakeholder consultation and awareness-raising process.

Mine safety

Stability analysis of the entire mine system has been undertaken. A risk assessment for the geotechnical analysis of the orebody and the geometrical design of the Project has also been performed.

Mine safety considerations that have been incorporated in the design include availability of fire detection, suppression, and protection equipment (particularly in areas where rubber-tired vehicles are present); a robust ventilation system coupled with flammable gas testing and warning; temperature monitoring and air conditioning in vehicles to protect against heat stress; and escape and rescue provisions.

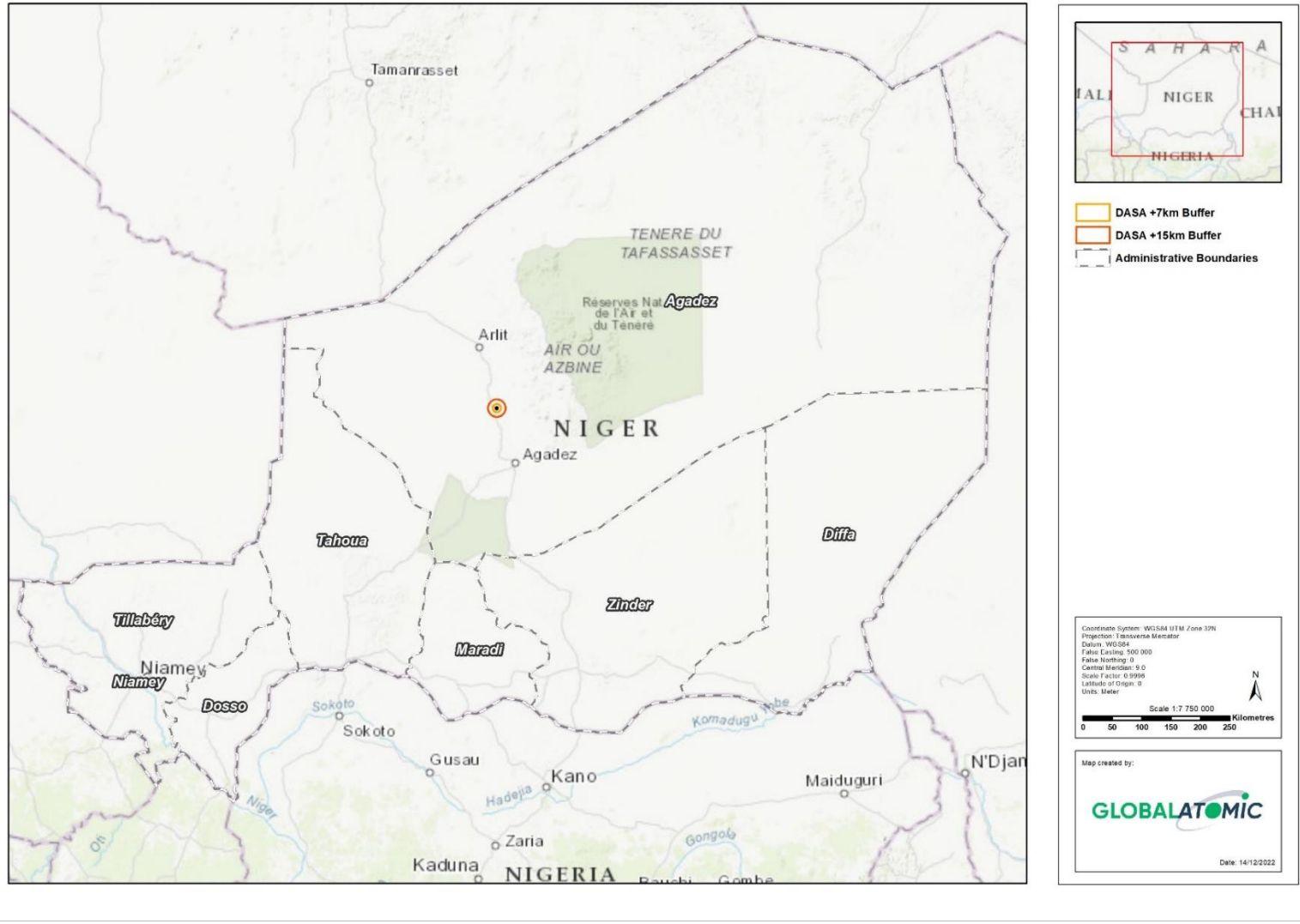
Radiation protection

The overall aim of SOMIDA's radiation protection procedures is to ensure that all equipment, processes, work methods and operations are designed so that individual and collective exposures are kept as low as reasonably achievable below regulatory limits. There are three general approaches used to minimize exposure to radiation: maximize the distance between the source and the worker; limit exposure times; and/or, place shielding between the worker and the source.

Exposure can occur via the inhalation of very fine ore or uranate dust (radioactive aerosols), particularly the short-lived alpha emitters radon-222 and radon-220, and long-lived alpha emitters from ore dust. Protection against these is effected by limiting the airborne content of the products (capture, water suppression) or by rapidly evacuating the particles in suspension (ventilation). The wearing of individual protection (masks, work clothes) completes the collective protection.

Workplaces will be regularly monitored for exposure dose rates, and short- and long-lived emitters. Reference guideline values will be set at various facility locations for radon, gamma radiation, ore dust, and uranate dust. If any measurement exceeds these values, work will be stopped until safe conditions resume.

Personnel considered to be at risk of high exposure will wear an integrated multi-risk dosimeter and will undergo regular medical surveillance.


Tamanrasset
TENERE DU TAFASSASSET
Réserves Nat de l'Air et du Ténéré
Agadez
Arlit
AÏR OU AZBINE
NIGER
Agadez
Tahoua
Diffa
Zinder
Tillabéry
Maradi
Niamey
Niamey
Dosso
Sokoto
Sokoto
Gusau
Kano
Maiduguri
N'Djam
Hadeja
Komadugu
Niger
Zaria
Kaduna
NIGERIA
Gongola
SAHARA
NIGER
NIGERIA
DASA +7km Buffer
DASA +15km Buffer
Administrative Boundaries
Coordinate System: WGS84 UTM Zone 32N
Projection: Transverse Mercator
Datum: WGS84
False Easting: 500 000
False Northing: 0
Central Meridian: 9 0
Scale Factor: 0.9996
Latitude of Origin: 0
Units: Meter
N
Scale 1:7 750 000
0 50 100 150 200 250
Kilometres
Map created by:
GLOBALATOMIC
Date: 14/12/2022

To minimize radiation exposure of the workforce, the air in the mine will be replaced every three to four minutes. This will be achieved by a ventilation system which will draw air into the mine at 400 m^3/s. The retention time of the air flowing through the mine will not exceed 15 minutes.

In addition to the mine site and occupational radiation monitoring, SOMIDA will undertake radiological monitoring of the air around the site to monitor potential impacts on the population and the environment. In addition, a program is being developed to monitor potential radiological impacts to groundwater, soil, and the food chain in the wider area.

Environmental and social baseline

The Project is located within the Sahel-Saharan desert climate zone, which is characterized by a six-month warm season (April to September) and a six-month cold season (October to March). Within the warm season there is a short rainy season lasting from June to September. In the warm season, the temperature varies between 31°C and 50°C; in the cold season it varies between 0°C and 20°C. Analysis of 20 years (2000 – 2019) of rainfall data from the Tchirozérine weather station indicated annual rainfall varying between 77.5 mm and 332.5 mm, with an annual average of 180.2 mm. During the dry season, the prevailing winds are from the north-east and north-northeast - these are the Harmattan winds. During the rainy season, there is a more significant component of winds from the south-west.

The ground surface in the Project area comprises sandy plains and rock outcrops in a desert landscape, traversed in places by koris (ephemeral watercourses). Few soils in the Project area have agropastoral potential, and these are located along the koris and their tributaries. The geomorphology and the nature of the soils are not conducive to large-scale crop farming or stockbreeding, but grazing areas may be seen in the koris and on the plains.

Field surveys and GIS analysis have confirmed that areas of perennial vegetation exist in association with koris and in lowland areas. The extent of vegetation cover is similar across both the dry and wet seasons. A total of 38 floral species have been identified in the area, including five woody species which are protected under Nigerien law.

Recent surveys recorded a total of 54 faunal species in the area. Large mammals included Fennec, Dorcas gazelle, Aoudad (barbary sheep), Patas monkey, African wildcat, and Golden jackal. Of these, Dorcas gazelle and Aoudad are listed as 'Vulnerable' on the International Union for the Conservation of Nature's (IUCN) Red List of Threatened Species. Of the seven reptiles recorded, one, the Spiny-tailed lizard, is listed as 'Near-Threatened' on the IUCN Red List.

Bird species observed during the surveys include Egyptian vulture and Lappet-faced vulture, both of which are listed as 'Endangered' by IUCN; and Tawny eagle, which is listed as 'Vulnerable'.

Based on GIS spatial assessment, desktop critical habitat screening, and historical and recent fieldwork, there is no 'critical habitat', per the definition of IFC PS6, in the Project's area of influence. The species of conservation concern that are present in the area are considered unlikely to trigger a critical habitat determination because they are all wide-ranging.

There are no permanent water courses in the Project area. However, the kori channels are characterized by short duration, high flow events in response to heavy rainfall. They remain dry for most of the year, but flash floods can occur as a result of local storm events.

Groundwater in the Project area is hosted by an alternating sequence of high- to moderate-permeability sandstones and low-permeability siltstones and mudstones. The shallow Tchirézrine

aquifers occur at less than 80 m depth and are important for local water supplies, whereas the deeper Teloua and Tarat units are considered regional aquifers.

The local Kel Tamashek (Tuareg) population is considered to be an 'indigenous people' in the context of IFC PS7. Since 2008, GAC has been consulting and seeking the informed participation of the local community. More recently, broad community support for the Project has been demonstrated at both the local village and regional administrative levels, through receipt of signed letters of support.

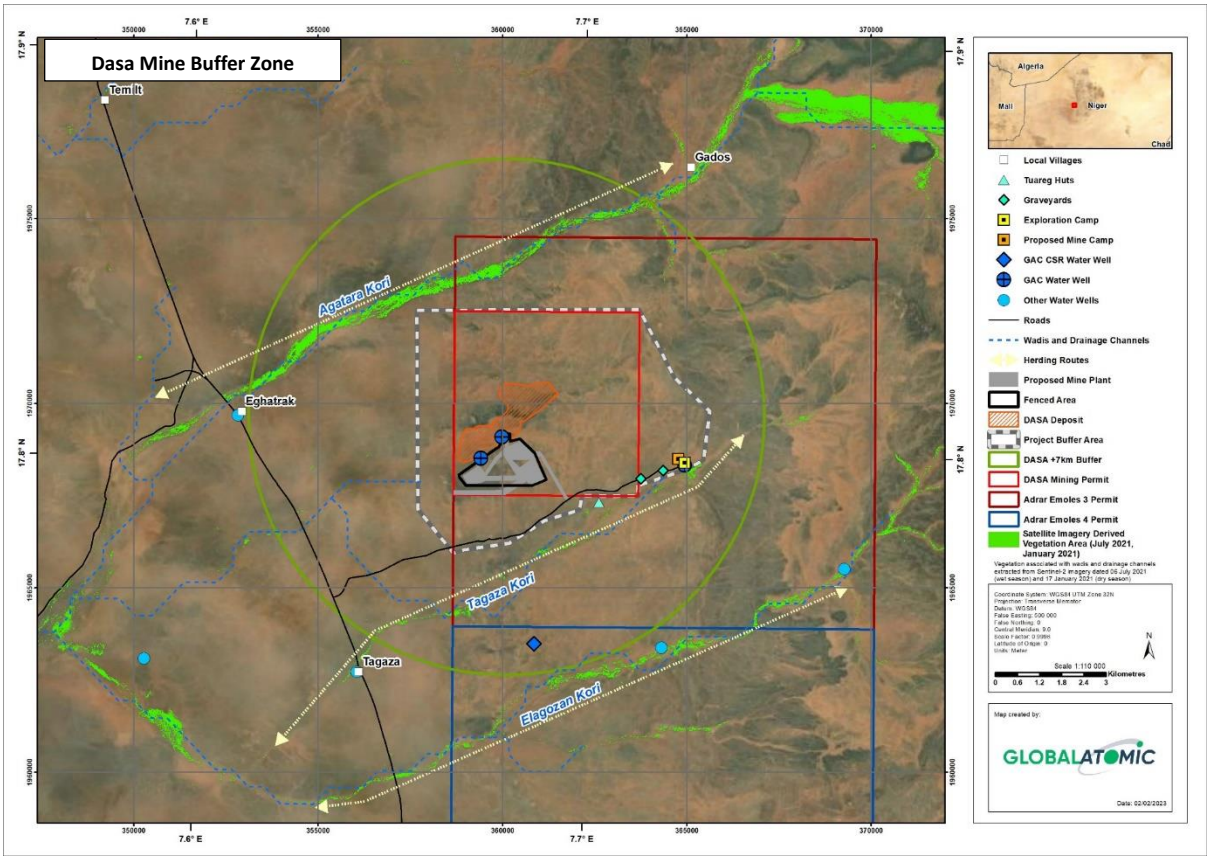
The Kel Tamashek (Tuareg) have historical connections with their natural environment and temporarily migrate between regions and between departments in search of pasture and seasonal jobs. With the decline in traditional livelihoods, young people in particular migrate to urban areas in search of alternative lifestyles.

Stockbreeding is the primary economic activity of the inhabitants of the region. It is carried out by all sectors of the population, irrespective of ethnic group, gender or social category. Except for some large-scale stock farmers, the herds are family capital managed on behalf of the family members by the head of household. Family stock farming involves several species of animals including goats, sheep, donkeys, and camels. In the Project area, it is understood that the east-northeast to west-southwest trending koris are used as transit or nomadic herding corridors on a limited basis, in connection with the "Cure Salee", a meeting of Kel Tamashek (Tuareg) from around the region which celebrates the end of the rainy season and is held at the Town of In-gal, located approximately 150 km south-west of Dasa.

Crop farming is an important activity that is carried out by a small number of men and women in the Project area. This activity is carried out in the main valleys, is irrigation-based and takes place practically all year round. The market gardens are laid out on both sides of the koris. The main crops are lettuce, bell peppers, cabbage, carrots, squashes, onions, potatoes and alfalfa. In the Project area, FEED Consult (2022) found approximately 7.3 ha under cultivation within an approximate 15 km radius around the Project site, the closest being the market gardens of Elagozan, approximately 5 km to the south.

In the Project vicinity, the vast majority of the population lives in villages, of which Eghatrak and Tagaza are nearest to the Project site, more than 5 km to the west. The area surrounding the mine site is sparsely populated, with small clusters of huts occupying land along the koris. Settlement within the koris is limited to families with small groups of animals on an approximate 200-300 m spacing. The inhabitants typical live within the kori during April to June and September to December. During the wet season from July to September and winter season from December to March, the inhabitants move to the edges of the koris where it is dryer and warmer respectively.

The nearest settlement to the Project site is a collection of three huts approximately 1.5 km to the east-southeast. There are not believed to be any permanent residents within the 40 km^2 buffer area around the site. Please see map below.



Impacts and mitigation

FEED Consult (2022) carried out its impact assessment for each of the construction, operation, and closure phases of the Project. This ESIA Addendum includes a summary of the impact assessment.

The following outlines, for the more significant potential impacts, the mitigation measures deemed necessary to reduce the significance of impact and to align the Project with good international industry practice.

SOMIDA has estimated its base-case operations-phase GHG emissions as 65,395 tonnes per annum (tpa) which includes 12,477 tpa scope 1 emissions and 52,919 tpa scope 2 emissions and assumes that the majority of the Project's electricity will be provided by coal-fired power via the Nigerien national grid, and that vehicles will be fueled by diesel.

There is an optimized plan to install solar photovoltaic (PV) panels linked to battery storage and back-up diesel, with the intent of providing approximately 20% of the Project's total requirement as renewable energy. This would reduce the total estimated GHG emissions to 52,871 tpa to include 21,275 tpa scope 1 emissions and 31,596 tpa scope 2 emissions. Furthermore, there is a conceptual plan to reduce the mine site power demand from 12 megawatts (MW) to 9 MW which, coupled with solar PV and battery storage, and back-up diesel, would target a reduction in GHG emissions to 43,000 tpa; a 34% reduction from the base case scenario to include 18,691 tpa scope 1 emissions and 24,422 tpa scope 2 emissions.

In line with IFC PS3, SOMIDA has an obligation to continuously seek and implement cost effective measures for improving efficiency in its consumption of energy, as well as water and other natural resources and material inputs.

By 2050 in Niger, climate change is predicted to result in temperatures increasing by between 2.0°C and 2.5°C, with rainfall either unchanging or increasing by up to 50%, and the number of heavy rainfall days, and number of rainy days per year, also either unchanging or increasing by up to 50%. These predictions suggest three main actions to be considered by SOMIDA in implementing the Dasa Project:

- Ensure that potential heat-related effects (thermal stresses) are addressed in occupational health and safety planning;
- Ensure that Project infrastructure is protected from potential surface water flooding; and,
- Support local initiatives for agricultural efficiency and food security for local people.

Soil and groundwater resources in the Project area will be protected by the implementation of good international industry practices for materials and waste handling, including the development of a Hazardous Materials Management Plan, a Spill Response Plan (part of the Emergency Preparedness and Response Plan), a Tailings Management Plan, and a Waste Management Plan.

Land areas disturbed and used for the Project will be reduced to the minimum necessary. These areas will be clearly delineated (by fencing or otherwise) and there will be no encroachment outside them (this applies particularly to off-road driving). Trees or areas of dense vegetation will be retained when possible (particularly species protected in Niger), and areas presenting potential hazards to fauna (e.g. deep excavations, ponds, chemical storage areas) will be made secure (e.g., by fencing).

Control of dust will be of critical importance during all Project phases. A dust management plan will be implemented (as part of the Air Quality and Greenhouse Gas Emissions Management Plan), based upon the strategies outlined in the IFC EHS Guidelines for Mining.

The Project will employ good international industry practices for the minimization of air emissions and noise, as exemplified by the IFC EHS General Guidelines.

Groundwater modelling has predicted that inflow of groundwater to the mine will be significantly greater than the total Project water demand, including for processing and domestic needs. This groundwater must be removed to allow mining to progress safely. This results in a risk of natural groundwater levels in the surrounding area being drawn down. Modelling suggests that by the end of the 12 year mine life, water levels in wells in Tagaza and Eghatrak may decline by around 2m as a result of mine dewatering, whereas at the market gardens of Elagozan (5 km south of the mine) the decline may be 10 m or more.

Any impact to local wells would be gradual, and detectable by appropriate monitoring, thus enabling the early planning of appropriate mitigation measures (e.g., provision of an alternative water supply, lowering the pump in the existing well, deepening the existing well, or installing a replacement deeper well).

As per IFC PS3, the Project has an obligation to use natural resources, including water, sustainably. SOMIDA is investigating strategies to reduce the inflow of groundwater to the mine, in order to reduce the requirement for dewatering and to minimize the requirement for water handling, storage and disposal. Such strategies should also lower the risk of significant drawdowns in local community wells. The strategies under consideration are a combination of targeted grouting to block water inflows, and dewatering via boreholes. There is also a proposal to extract water up-gradient of the mine and re-inject it down-gradient; this is currently under investigation.

As part of comprehensive occupational health and safety planning for the Project, a Radiation Management Plan has been developed in line with IAEA guidance. Although the Project site is relatively remote, there are health and safety risks to the local population when Project and

community interact, particularly accidents relating to movement of Project-related vehicles on public roads and through communities (including transportation of hazardous materials such as explosives, chemicals, and uranium product); reduced availability and/or contamination of water supplies; risk of physical harm to pastoralists or others present closer to the Project site; and risk of increased disease transmission from Project staff interacting with local communities.

SOMIDA plans to formulate a Community Health, Safety and Security Plan guided by the IFC EHS General Guidelines (IFC, 2007a) and the United Nations Environment Program's Awareness and Preparedness for Emergencies at Local Level (APELL) standard. The APELL process aims to improves community-level emergency preparedness efforts and supports government and community initiatives to minimize the occurrence and harmful effects of technological hazards and environmental emergencies. The Voluntary Principles on Security and Human Rights (VPSHR) will also be addressed.

As noted above, a fenced area of approximately 2 km^2 will be established around the Project. Outside this there will be an approximate 40 km^2 buffer area, through which access will not be restricted, although prolonged stays (e.g. setting up camps) will be discouraged. These arrangements are not considered to represent a significant adverse impact to the Kel Tamashek (Tuareg). There will be no relocation of permanent communities, and traditional herding routes through the koris will not be affected. Nevertheless, SOMIDA will continue to support pastoralists through the provision of livestock feed banks; providing training in agricultural techniques to maximize fodder crop yields and ways of harvesting and storing fodder; and refurbishing and maintaining watering points. SOMIDA will set up a system to monitor any impacts on pastoralists.

Although the Project is expected to bring significant benefits to the local area in terms of direct and indirect employment opportunities and incomes in general, stakeholder engagement raised concerns over local traditions and customs potentially being lost, as a result of an incoming workforce and a switch to mining-related livelihoods. This risk will be lowered by the Project having its own, self-contained accommodation camp located at distance from the local villages. SOMIDA will formulate a plan to raise awareness among staff and subcontractors about respecting the traditional practices and customs of the local population. A Code of Conduct will be drawn up to encourage respectful interaction with the local communities. Camp residents will be discouraged from entering local communities for recreational purposes.

SOMIDA intends that the Dasa Project will bring significant benefits to the local economy, via the provision of direct and indirect employment opportunities. SOMIDA will prioritize local labor in recruitment, prioritize local companies in subcontracting, and enhance local procurement opportunities for the providers of local goods and services.

Benefits to local communities will also accrue through education and training, and the enhancement of health care. These initiatives are in addition to the benefits that will accrue to the local and regional population from the payment by SOMIDA of mining royalties and tax revenue, a portion of which will be returned to local and regional authorities.

There is potential for significant impact on the local economy and livelihoods when the mine finally closes and employment and procurement activities cease. Therefore, the mine closure plan, which currently exists in conceptual form and will be developed as the Project progresses, will address social aspects of closure, in terms of direct workers, indirect livelihoods, and associated communities (those with a high proportion of workers or suppliers of goods and services). In particular, SOMIDA will devise a retrenchment program aimed at retraining workers in other occupations.

Cumulative impacts

The wider region around the Project is an established uranium mining center. Although the Cominak mine near Arlit (about 110 km north of Dasa) closed in March 2021, the Somair mine, also near Arlit, is currently operating and expected to do so until at least 2035. Also near Arlit is the Madouela project, for which a mining feasibility study was published in 2022. Approximately 50 km west of Dasa is the Imouraren deposit, for which an operating permit was awarded in 2009 but whose development has been on hold since 2015, pending an improvement in market conditions. The relatively large distances between the various existing and potential future developments are such that cumulative impacts on ambient environmental conditions are unlikely to add significantly to the impacts already identified for Dasa.

Should both the Imouraren and Madouela projects come on stream during the Dasa project's life, social impacts may become significant. These may include common pressures associated with influx of workers, including inflation of the local economy, overwhelming of local infrastructure and services, over-depletion of natural resources, and loss of traditional cultural heritage and ways of life.

Environmental and social management of the Project

The results of the FEED Consult ESIA (2022), together with the additional good international industry practice outlined in this Addendum, will be incorporated into the existing Environmental and Social Management Plan (ESMP) developed as part of the original, government approved ESIA (Groupe Art & Génie, 2020) and will be managed under an Environmental and Social Management System (ESMS).

In practice, the ESMP will comprise a suite of topic-specific documents. These plans have been developed - or will be developed - for the construction phase and will be updated and amended as necessary to carry the Project into the operational phase and through the closure phase.

The initial two years of underground development will be undertaken with the assistance of a mining contractor. The contractor will be required to adhere to all of the provisions of the SOMIDA ESMP.

While the component management plans of the Project ESMP address technical topics, the role of the ESMS is to provide the organizational framework necessary to ensure the successful implementation of the ESMP. The ESMS defines, amongst others, the company organizational structure, staff training provisions, communication networks, document control procedures, and systems for checking progress that are required for assured and demonstrable achievement of the Project's aims for sustainable development.

The ESMS will be modelled on the ISO 14001 Environmental Management Systems standard and its "Plan-Do-Check-Act" methodology that strives for continuous improvement. As required by IFC PS1, the ESMS will incorporate social and labor elements.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

°C	Degrees centigrade
ABA	Acid base accounting
ADB	African Development Bank
ADT	Articulated dump truck
AE3 / AE4	Adrar Emoles 3/4 Exploration Permit Area
AGC	Abell Geospatial Consulting Ltd
APELL	United Nations Environment Program's Awareness and Preparedness for Emergencies at Local Level
ARD	Acid rock drainage
ARSN	Nuclear Safety and Regulatory Authority
ASL	Above sea level
BEV	Battery electric vehicles
BNEE	National Environmental Assessment Office
Bq/L	Bequerel per liter
CEG	Middle school
CES	Secondary school
CH	Critical Habitat
CHA	Critical Habitat Assessment
CR	Critically Endangered
CSI	Integrated health center
CSR	Corporate social responsibility
DGDD	Directorate General of Sustainable Development
DSST	Directorate of Occupational Safety and Health
DSTSF	Dry Stack Tailings Storage Facility
EAAA	Ecologically Appropriate Area of Analysis
EAP	Potential alpha energy
EAVL	Long-lived alpha emitter
EHS	Environmental, Health and Safety
EITI	Extractive Industries Transparency Initiative
EN	Endangered
EP4	Equator Principles (4^{th} edition)
ESDD	Environmental and Social Due Diligence
ESG	Environmental, social and governance
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
eU_3O_8	Uranium oxide equivalent
FAR	Fresh-air raise
FEED Consult	Firme d'Expertise en Environnement et Développement Durable
FPIC	Free, prior and informed consent
GAC	Global Atomic Corporation
GAFC	Global Atomic Fuels Corporation
GBV	Gender-based violence
GHG	Greenhouse gases
HANEA	Niger Atomic Energy High Authority
HDPE	High-density polyethylene
IAEA	International Atomic Energy Agency
IBA	Important Bird Area
ICMM	International Council on Mining and Metals

ICRP	International Commission on Radiological Protection
IFC	International Finance Corporation
IFC PS	International Finance Corporation Performance Standards on Environmental and Social Sustainability
ITC	Integrated tool carrier
ITD	Indicative total dose
IUCN	International Union for the Conservation of Nature
KBA	Key Biodiversity Area
km	Kilometer(s)
km/h	Kilometers per hour
kV	Kilovolt
kVa	Kilovolt-ampere
kW	Kilowatt
L	Liter
LDAR	Leak detection and repair
LHD	Load-haul-dump
LHOS	Longhole open stoping
MAB	Man and Biosphere
m	Meter(s)
m^3/s	Cubic meters per second
mbgl	Meters below ground level
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
mg/Nm^3	Milligrams per normal cubic meter
Mlb	Million pounds
mm	Millimeter(s)
Mm^3	Million cubic meters
MRE	Mineral resource estimate
MSDS	Material Safety Data Sheet
mSv	Milli-Sievert(s)
Mt	Million tonnes
MW	Megawatt
MWp	Megawatt-peak
NAG	Net acid generating
NGO	Non-governmental organization
NO_2	Nitrogen dioxide
NORM	Naturally occurring radioactive material(s)
nSv	Nano-Sievert(s)
PDES	Economic and Social Development Plan
PEA	Preliminary economic assessment
PM	Particulate matter
PMN	National Mining Policy
PNAT	National Spatial Planning Policy
PNEDD	National Plan for the Environment and Sustainable Development
PNG	National Gender Policy
PPE	Personal protective equipment
ppm	Parts per million
PST	Pilot study test
PV	Photovoltaic
RAW	Return airway raise
ROM	Run of mine

SAG	Semi-autogenous grinding
SCSR	Self-contained self-rescuer
SO_2	Sulfur dioxide
SOMIDA	Société Minière Dasa SA
SOP	Standard operating procedure
Sv	Sievert
SX	Solvent extraction
t/a or tpa	Tonnes per annum
tpd	Tonnes per day
TEC	Treweek Environmental Consultants Ltd
TLD	Thermoluminescent detector
µSv/hr	Micro-Sieverts per hour
UNESCO	United Nations Educational, Scientific and Cultural Organization
VMA	Mining Vision for Africa
VU	Vulnerable
WBG	World Bank Group
WHO	World Health Organization
WRA	Whole rock analysis

1 Introduction

Global Atomic Corporation (GAC), through its wholly owned subsidiary company, Global Atomic Fuels Corporation (GAFC), owns an 80% interest in Société Minière Dasa SA (SOMIDA), a Nigerien Company in which the Government of Niger owns a 20% interest. SOMIDA is building the Dasa underground uranium mine in the Agadez region of Niger (the Project). The Dasa Mine is scheduled to begin commercial production in early 2025.

This Environmental and Social Impact Assessment (ESIA) Addendum Report summarizes the environmental and social management measures that will be put in place to ensure that the Project is undertaken in accordance with good international industry practice.

1.1 Background and history

GAFC has been investigating the uranium potential of six permit areas in the Agadez region of central Niger since 2007. The most significant discovery has been the Dasa deposit, discovered in 2010 within the Adrar Emoles 3 (AE3) Exploration Permit area.

In 2011, at the start of exploration on the Dasa Project, GAFC commissioned the Nigerien Company Groupe Art & Génie to complete an environmental characterization study to establish an environmental baseline (Groupe Art & Génie, 2011). Groupe Art & Génie went on to carry out hydrological and hydrogeological studies in the area of the deposit between 2012 and 2016.

Exploration and evaluation programs on the Dasa deposit resulted in a Preliminary Economic Assessment (PEA) reported in 2018 (and updated in 2020), and a Mineral Resource estimate (MRE) update in 2019. In 2021, a Feasibility Study and NI 43-101 Technical Report was issued by METC Engineering (Pty) Ltd [METC], in support of GAFC's proposal to process 4.254 million tonnes of uranium-bearing ore over a 12-year period. The Feasibility Study was updated in January 2023 (METC, 2023).

In parallel with the Feasibility Study, Groupe Art & Génie undertook an ESIA (Groupe Art & Génie, 2020), in compliance with Nigerien national legislation and in support of a mining permit application. The ESIA was subsequently submitted to, and approved by, the Nigerien authorities.

On December 23, 2020, the Republic of Niger Ministry of Mines granted a Mining Permit to GAFC. The Mining Permit has an initial term of 10 years and is renewable for successive 5-year terms, until the resource has been fully depleted.

In January 2021 GAFC received the Certificate of Environmental Conformity from the Ministry of Environment, Urban Health and Sustainable Development.

GAFC has received all permits and approvals required for the development and commercial production of the Dasa Project.

1.2 International environmental and social standards

GAFC has committed to undertake its operations in line with the Equator Principles (EP4), a financial industry benchmark for determining, assessing, and managing environmental and social risks. The Equator Principles incorporate both the International Finance Corporation Performance Standards on Environmental and Social Sustainability (the IFC PS) and the IFC Environmental, Health and Safety

(EHS) Guidelines. Together, these standards are widely considered to represent good international industry practice in project development.

Following an internal evaluation of the approved Project ESIA against the Equator Principles in 2021, GAFC decided to carry out a new ESIA to accelerate the transition to EP4 compliance. GAFC retained Firme d'Expertise en Environnement et Développement Durable (FEED Consult), a Nigerien company and area specialists, to conduct additional fieldwork, consultation, baseline studies and assessment, which were presented in a new ESIA report (FEED Consult, 2022).

This ESIA Addendum report is presented as a summary and update of both the approved regulatory ESIA (Groupe Art & Génie, 2020) and the recent ESIA (FEED Consult, 2022). It includes information from the latest Feasibility Study (METC, 2023) and results from ongoing technical work. It identifies explicitly the environmental and social measures that will be put in place to align the Project with the good international industry practice identified above, including an overview of the Environmental and Social Management Plan (ESMP) to be implemented during Project construction, operation and closure.

1.3 Project location

The Dasa deposit is located in the rural commune of Tchirozérine, within Agadez Region in northern Niger. It lies 5 km east of the RN25 highway, which links the regional capital, Agadez, to the south, with the mining town of Arlit to the north. The uranium deposits are hosted by Cretaceous sandstones of the 500,000 km^2 Tim Mersoï basin.

The French group ORANO has been mining uranium in the area since the 1970s, including at the Somaïr and Cominak mines near Arlit approximately 110 km north of Dasa. The Cominak mine closed in March 2021 after a 50-year life. SOMIDA has hired several members of the Cominak senior management team to run SOMIDA along with experienced miners to work at Dasa.

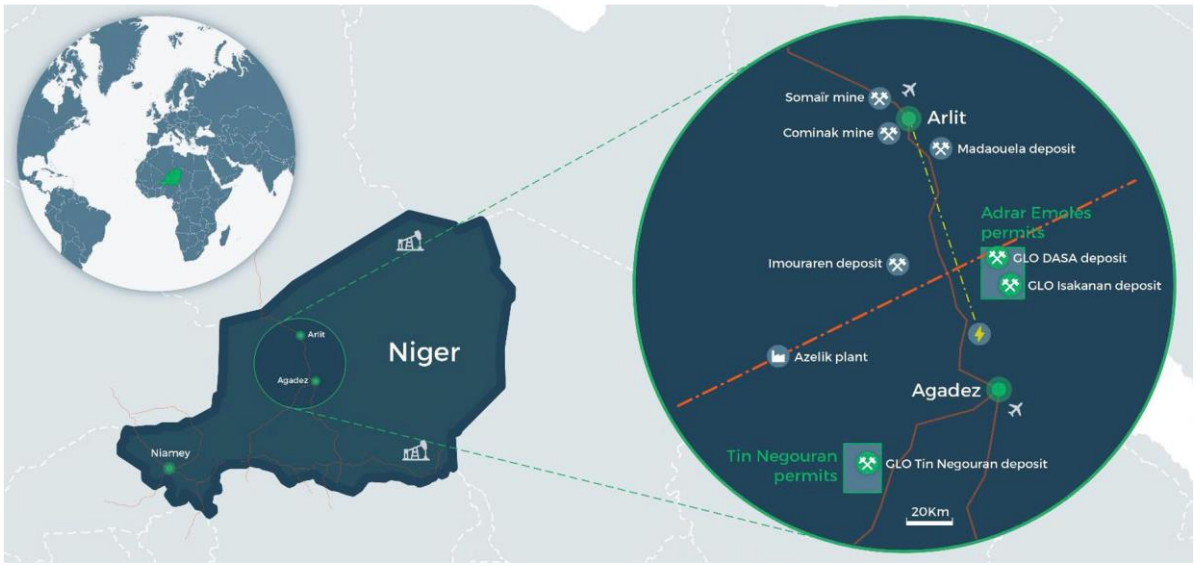


Figure 1-1: Project location

2 Regulatory Framework

This chapter presents the environmental and social regulatory framework under which the Project will operate. This includes mandatory requirements of Nigerien law, as well as international standards to which SOMIDA is committed. The chapter is based on the approved Project ESIA (Art & Génie, 2020), with amendments to reflect recent national legislation changes, and the addition of international standards.

2.1 National Policy

2.1.1 National Environmental Policy Framework

Environmental protection is enshrined in several national policy documents, including:

- The National Policy on the Environment and Sustainable Development, adopted by Decree No. 2016-522/PRN/ME/DD of 28 September 2016. The global objective of this policy is to create overall conditions that are conducive to economic, social and cultural development through the preservation and sustainable management of the environment and natural resources and the strengthening of measures to cope with the negative effects of climate change in order to ensure long-term food security for Nigeriens and improve their living conditions. It covers all key development areas relating to technical, institutional and organizational aspects, capacity-building and the mobilization of resources, in particular national ones. It focuses on four strategic intervention areas:
    - Governance of the environment and sustainable development, which is based on five guidelines, namely: implementing a communication program, strengthening the legal and institutional framework, capacity-building, gaining knowledge about the resources, and strengthening the environmental surveillance and monitoring system;
    - Sustainable land and water management, which will make it possible to slow or reverse the generalized process of land degradation with a view to preserving forests, grazing land, farmland and aquatic ecosystems through the rehabilitation and restoration of degraded land, securing of land resources, sustainable management of fisheries resources, development of natural forests, agro-forest parks and sylvopastoral areas, increased forest coverage and reinforcement of the woody forest and fisheries sectors;
    - Sustainable environmental management through capacity development in terms of adaptability and resilience, and the promotion of better living conditions, improved waste management, and the green economy.
    - Management of biological diversity along two axes, i.e., improvement of the management of protected areas, hunting areas and wetlands, and improvement of the management of genetic resources.
- The National Plan for the Environment and Sustainable Development (PNEDD), drawn up in 1998 serves as Agenda 21 for Niger. The PNEDD sets the objectives of the Nigerien policy on environmental protection and sustainable development. Its aim is to implement the three post-Rio Conventions by establishing conditions that are conducive to the long-term improvement of the living conditions of the population and the economic development of the country. It consists of six major plans, namely: (i) the national action plan for combating desertification and managing natural resources (PAN/LCD-GRN); (ii) the water and sustainable development plan; (iii) the energy and sustainable development plan; (iv) the biological

diversity management plan; (v) the action plan for urban environments and living conditions, and (vi) the climate change and variability plan.

- National Spatial Planning Policy (PNAT), adopted by Decree No. 2014-319/PRN/MPAT/DC of 2 May 2014. Its general objective is to promote balanced and sustainable spatial development that reduces inter-and intra-regional disparities based on the country's natural potential, the creation of regional development centers, the reduction of social deficits, the conservation of the environment and the dynamics of regional integration. The orientations and intervention areas of the PNAT are: (i) national and regional integration; (ii) territorial and institutional efficiency; (iii) social development; (iv) promotion of regional development centers and business areas; (v) sustainable management of natural resources; and (vi) disaster risk reduction.

2.1.2 National Policy Framework in Social Matters

The national policy framework in social matters is developed through:

- The Economic and Social Development Plan (PDES). The 2017-2021 PDES was founded on the Strategy for Sustainable Development and Inclusive Growth (SDDCI Niger 2035), which sets out the Nigerien government's vision for 2035. Through this vision, Niger affirms its firm resolve to transform at all levels and above all its commitment to eradicating poverty and social inequalities. It is also based on the guidelines of the "Renaissance Program Acte-2" (which was the subject of the Prime Minister's General Policy Statement of May 2016). This program aims to contribute to the country's development through the following eight priorities: (i) promote cultural renaissance, (ii) continue the consolidation of democratic institutions, (iii) ensure the safety of people and property, (iv) guarantee access to water for all, (v) ensure food and nutritional security through I3N (Initiative les Nigériens Nourrissent les Nigériens [Nigeriens Feeding Nigeriens Initiative]), (vi) develop communication and energy infrastructures, (vii) develop the social sectors: education and health, and (viii) promote youth employment. The PDES aims mainly to "contribute to building a peaceful and well-governed Niger with an emerging and sustainable economy and a society based on the values of equity and sharing the fruits of progress" over the 2017-2021 period. In order to meet the identified challenges and stakes of economic and social development, five strategic axes were selected. They are interrelated and reflect, as a whole, the primary dimensions of sustainable human development. This involves: (i) cultural rebirth; (ii) social development and demographic transition; (iii) improved economic growth; (iv) improved governance, peace and security, and (v) sustainable environmental management.
- The Strategy for Sustainable Development and Inclusive Growth (SDDCI Niger 2035) which sets out the basic principles for harmonious sustainable development for present and future generations of Nigeriens. The objective of this strategy is to build a modern, democratic and united country, well governed and peaceful, open to the world, as well as an emerging economy, based on a fair sharing of the fruits of progress. It is based on six strategic areas, namely security of the territory, development of a dynamic private sector, fertility control and reducing child mortality, revitalization and modernization of the rural world, development of human capital, and transformation of the administration.
- The National Policy on Occupational Health and Safety adopted by Decree No. 2017/540/MET/PS of 30 June 2017. This national occupational health and safety policy aims to make occupational health and safety services an instrument for the promotion of health in general, the preservation of the environment and the improvement of occupational

productivity, and consequently, the productivity of companies in all sectors of activity. Its purpose is to prevent accidents and health risks in the workplace or in the conditions under which work is performed. Thus, the general objective is to protect and ensure worker health and safety through the prevention of workplace accidents and occupational diseases in all sectors. The specific objectives are to train, inform and raise awareness of all stakeholders involved in the field of occupational health and safety; improve working conditions; improve the quality of the workplace and working environment; monitor employee health; improve work productivity; reduce health insurance costs in terms of compensation; combat and prevent the worst forms of child labor; promote active research in occupational health and safety; and develop a culture of prevention in companies and public services.

- The Politique Minière Nationale [National Mining Policy] (PMN 2020-2029) of 3 July 2020, which is based on international frameworks (SDGs), continental frameworks (Agenda 2063 of the AU, Vision Minière Africaine [Mining Vision for Africa (VMA)], regional and subregional frameworks (ECOWAS Vision 2020, ECOWAS Directive and Mining Policy, WAEMU Community Mining Policy) and national frameworks (Constitution of 2010, SDDCI Niger 2035, Déclaration de Politique Générale [General Policy Statement (DPG)] 2016-2021, PDES 2017-2021). It also takes into account the other commitments specific to the mining sector to which Niger has adhered (Global Reporting Initiatives, Extractive Industries Transparency Initiative (EITI), etc.), as well as the standards for good practice in the mining industry. The guiding principles of the national mining policy are:
    - The Nigerien people's ownership of the mineral resources in the soil and subsoil of Niger: the mineral resources contained in the soil and subsoil of Niger are the property of the people, their exploration and mining are carried out through mining permits or authorizations awarded by the State on behalf of the people;
    - Respect for the environment: mining activities must be carried out in such a way as to prevent and mitigate negative impacts on the environment and to ensure the rehabilitation and closure of mining sites in accordance with industry standards;
    - Sustainability: mining policy must be focused on achieving the UN Sustainable Development Goals. It must promote mining development that allows diversification of the mining production through the search for new deposits and the renewal of reserves of existing mining operations to extend their life cycle. Mining activities and the use of resources from the mining sector must be part of sustainable development, which ensures the wellbeing of current generations without compromising that of future generations;
    - An inclusive approach: all stakeholders in the sector, in particular the State at the central, regional and local levels, mining companies, civil society, and the general public must be involved in decisions concerning them through consultation and dialogue frameworks in order to achieve the mining policy objectives;
    - Non-discrimination of investors: in the granting of mining permit and authorizations, in the negotiation of mining agreements, in the monitoring and control of mining activities, the State will ensure that investors are treated on an equal footing;
    - Transparency and accountability: good governance of the sector implies compliance with international standards and principles of good governance (Kimberley Process, Global Reporting Initiative, EITI, Court of Auditors). Accountability implies empowerment and the obligation to report in order to ensure that the expected results are achieved and that the allocated resources are effectively and efficiently used;

  - The societal responsibility of mining companies who are voluntarily involved in the socio-economic development of the local communities through their activities, a guarantee of social acceptance;
  - Equitable sharing of the revenue generated by the sector: the revenue generated by mining activities must benefit all parties equitably: mining investors, national administration, local authorities, as well as all other stakeholders;
  - Gender equality: the stakeholders in the sector must ensure that women are encouraged to take part in decisions relating to mining activities at the national, local and company levels;
  - Respect for human rights: mining activities must be carried out with respect for human rights, in particular civic rights, workers' rights (including child and women's labor), hygiene, health and safety;
  - Respect for the rights of the local communities when conducting mining activities: the local communities must be involved in the management of the impacts of mining activities on their environment through frameworks that promote coordination, consultation and dialogue, as they are directly affected by these impacts; and,
  - Due diligence: it is important to establish a traceability system and provide customers with all the data obtained through the exercise of due diligence by ensuring that the ores are extracted and produced under conditions conducive to peace and development and not in support of conflicts, throughout the supply chain from the extraction site to the users of the end products.
- National Social Protection Policy. This policy was adopted in 2011 and defines the strategic priorities and priority areas of intervention for social protection in Niger. Its general objective is to "contribute to the mitigation of the vulnerability of underprivileged groups and help populations to deal with the most significant risks in life". This specifically involves contributing to the fight against food and nutritional insecurity; strengthening social security and promoting jobs and employment; reducing barriers relating to access to social services and basic social infrastructures; escalating specific actions in favor of vulnerable groups; and strengthening the consolidation of the legislative and regulatory framework.
- National Gender Policy. The overall objective of the Politique Nationale du Genre [National Gender Policy (PNG)] is to contribute to the creation of an environment that is conducive to the achievement of equity and equal chances and opportunities between men and women, girls and boys in Niger. Specifically, the PNG aims to establish an institutional, sociocultural, legal and economic environment that is conducive to the achievement of equity and equal chances and opportunities between men and women, girls and boys in Niger; and ensure the effective integration of gender as a variable in the analysis, planning, implementation, monitoring and assessment of development programs. It focuses on four strategic axes: improving the sociocultural environment in connection with demographics, peace and security for greater equity between men and women; strengthening the institutional and legal framework on the effective application of the rights of women and small girls, on combating gender-based violence and on the fair participation of men and women in power management; economic empowerment and inclusive growth in connection with sustainable management of the environment, management of natural disaster risks, and management of migration and humanitarian emergencies; and strengthening institutional mechanisms and organizational frameworks for coordination, monitoring and assessment and partnership. The effective implementation of this National Gender Policy will allow for better protection of the rights of women and men in relation to their opportunity to access quality training,

nondiscriminatory jobs, health benefits for all, drinking water everywhere and for all, peace, security and fair social protection.

- National Strategy for the Prevention of and Response to Gender-Based Violence (GBV). The national survey on the extent and determinants of GBV in Niger (UNFPA 2015) showed that the national prevalence of GBV, all types and sexes combined, was 28.4% in 2015. GBV is political, economic, socio-cultural, psychological, physical and sexual in nature and affects all categories of the population. Teenagers and women are the most exposed (60%). Faced with this problem, in 2017, Niger developed a National Strategy for the Prevention of and Response to Gender-Based Violence in which the strategic priorities are: (i) communication, (ii) capacity-building for GBV intervenors and survivors, (iii) an institutional and legal framework, (iv) resource mobilization, and (v) monitoring/assessment and research.

2.1.3 National Legal Framework

National legal provisions for environmental and social issues, particularly in respect of mining activities, are summarized in Table 2-1. The table has been extracted from the approved ESIA (Groupe Art & Génie, 2020), with the rows reordered so as to be grouped according to the subject area of the legislation.

Table 2-1: National legal framework of the Project

Title	Date adopted	Theme	Contextual references
Constitution of the 7th Republic	25 November 2010	Rights and duties of citizens	Article 35 specifies that "everyone has the right to a healthy environment. The State has an obligation to protect the environment under the conditions provided for by law in the interest of present and future generations. The State must also ensure the assessment and control of the impacts of any project and program on the environment". Article 37 specifies that "national and international companies are required to comply with the legislation on environmental protection in Niger".
Ordinance No. 2010 – 54 on the General Local Authorities Code of Niger	17 September 2010	Nigerien Regional and Local Authorities	Article 30 provides that "the municipal council deliberates in particular in the following areas: preservation and protection of the environment, management of natural resources" Article 105 stipulates "the regional council deliberates in particular the following areas: "...Conservation and protection of the environment, use and conservation of water resources, protection of forests and wildlife, conservation, defense and restoration of soils".
Ordinance No. 99-50 on the setting of rates for the disposal and occupancy of public land in the Republic of Niger	2 November 1999	Property	Article 1: Sets the basic disposal prices for urban land for housing (residential and traditional), industrial, artisanal or commercial use, that is within urban centers and agglomerations, subdivided or not, and rural land in the Republic of Niger.
Ordinance No. 93-015 of 2 March 1993 establishing the guiding principles of the Rural Code.	2 November 1999	Property	Article 5 provides that "the rights to natural resources benefit from equal protection, whether they result from custom or from written law. Consequently, land title is acquired by custom or by the means provided in written law". Article 9 provides that "customary ownership gives its holder full and effective ownership of the land, this text specifies that: The customary ownership results from: • The acquisition of rural land ownership by succession from time immemorial and confirmed by collective memory;

Title	Date adopted	Theme	Contextual references
			• The final allocation of land to a person by the competent customary authority; • Any other method of acquisition provided for by local customs. Article 10 specifies that "ownership according to written law results from the private acquisition of rural land ownership by one of the following acts: registration in the land register; authentic deed: certificate of registration in the Rural Record; private deed.
Law 2018-28 of 14 May 2018 setting out the fundamental principles of Environmental Review in Niger	14 May 2018	Environmental review	Article 10 lists the Environmental Review tools, which are: EES, ESIA and SEA. Article 14 specifies that "development activities or projects initiated by public authorities or private persons which, due to the magnitude of their dimensions or their impacts on biophysical and human environments, may harm the latter, are required to conduct an Environmental and Social Impact Assessment (ESIA).
Order No. 0099/MESU/DD/SG/BNEE/DL of 28 June 2019 organizing the National Office for Environmental Review (BNEE) and its National Directorates and setting out the responsibilities of their management	28 June 2019	Environmental review	Article 2 of this Order stipulates: "The BNEE is a decision-making body whose missions are to promote and implement Environmental Review in Niger. It has exclusive national jurisdiction over all policies, strategies, plans, programs, projects and all activities for which an Environmental Assessment is mandatory or necessary, in accordance with the provisions of Law 2018-28 of 14 May 2018".
Decree No. 2019-27/PRN/MESU/DD of 11 January 2019 implementing Law No. 2018-28 of 14 May 2018 on the fundamental principles of Environmental Review in Niger	11 January 2019	Environmental review	Article 13: Any project or activity that is likely to have environmental impacts classified in one of the following categories is subject to an Environmental and Social Impact Assessment (ESIA): • Category A: high-risk projects or activities likely to have highly negative, generally irreversible impacts, most often felt in a larger area than the sites hosting these projects. These projects are subject to a detailed ESIA; • Category B: projects or activities with a significant risk and whose negative impacts on the environment are less severe than those of category A projects. These are projects that may have easily identifiable and limited impacts and whose means of mitigating them are generally known. These projects are subject to a

Title	Date adopted	Theme	Contextual references
			Simplified ESIA called an "Environmental and Social Impact Statement"; • Category C: moderate-risk projects or activities with insignificant negative impacts on their biophysical and human environment. These projects are implemented without specific measures". Thus, the execution of any operation carried out as part of a mining project or activity listed in Category A is subject to an ESIA.
Act 98-56 on the Framework Law on Environmental Management	29 December 1998	Environmental management	Article 3 presents the fundamental principles of rational management of the environment and natural resources, in particular in paragraph c, "Polluter Pays Principle". Article 37 prohibits interfering with the quality of the air or causing any alteration of its characteristics that would be likely to harm public health or the preservation of goods, emitting into the air any polluting substance, in particular fumes, dust or toxic, corrosive or radioactive gases in excess of the limits set by the implementing texts of this law. Article 41 specifies that the Ministry of the Environment must ensure the application of international conventions relating to the protection of the atmosphere and the fight against global warming, in particular the United Nations Framework Convention on Climate Change. Article 53 provides that public authorities may, in compliance with the legislation in force, prohibit works detrimental to the soil, the subsoil or the ecological balance and may subject certain operations to prior authorization. Furthermore, this law prohibits the production, dumping or incineration of waste without any measure to protect the natural environment (wildlife, vegetation, landscape, soil, air and water), in particular in Articles 62, 66 and 67 with which the work to open and mine lateritic borrows must comply. Article 58 obliges mining or quarrying permits title holders to undertake activities relating to operated sites' reclamation. The holders of the said titles may, however, choose to pay for the financial cost of reclamation activities carried out by the appropriate authority.

Title	Date adopted	Theme	Contextual references
			Article 62 stipulates that any person who produces or stores waste under conditions likely to produce harmful effects on the soil, vegetation or wildlife, to damage landscapes, to pollute the air or water, to produce noise and odors and in general to affect human health and the environment, is required to ensure the disposal or recycling thereof or to have it ensured. Article 65 prohibits any person (physical or legal) from releasing wastewater into the environment without prior treatment. Consequently, every establishment must have a wastewater treatment plant that is appropriate and functional in accordance with the regulations in force. Effluents must meet the discharge standards defined by the regulations in force. Article 66 prohibits the outdoor incineration of combustible waste that may cause inconveniences. Article 76 specifies that the competent authorities develop the preventive rules for work-related and natural accident risks.
The Mining Code (Ordinance No. 93-16 of 2 March 1993 supplemented by Ordinance No. 99-48 of 5 November 1999, as amended by Law No. 2006-26 of 9 August 2006)	2 March 1993 5 November 1999 9 August 2006	Mining	Specifies that on the territory of the Republic of Niger, prospecting, exploration, operation, possession, holding, circulation, trade and transformation of mineral or fossil substances and the tax regime applicable to these activities are governed by the provisions of this ordinance.
Law No. 2006-26 amending Ordinance No. 93-16 of 2 March 1993 on the Mining Law Supplemented by Ordinance No. 99-48 of 5 November 1999	9 August 2006	Mining	Article 72 stipulates that "The permanent authorization to open and mine a quarry is issued by joint Order of the Minister of Mines and the Minister of Domains after approval from the relevant regional or communal authorities" Article 85 (new): The exploitation and collection of classified substances under the quarry plan are subject to the payment of a quarry tax at the rate of CFAF 250/m3 of excavated materials. The settlement of amounts due for the mining and collection of substances classified under the quarry plan falls under the jurisdiction of the relevant devolved departments of the Ministry of Mines, except for public quarries.

Title	Date adopted	Theme	Contextual references
			Collection of the amounts due for the extraction and collection of substances classified under the quarry plan is carried out by the territorial authorities concerned on their own behalf. Article 99 (new) provides that "mining or quarry operations must be conducted in such a way as to ensure the rational exploitation of national resources and protection of the environment in accordance with the laws and regulations in force. To this end, companies must carry out their work using confirmed mining industry techniques and take the necessary measures to preserve the environment, treat waste, and preserve forest lands and water resources. If the mining permit is for radioactive substances, the holder will also provide semi-annual and annual radiation protection reports."
Decree No. 2006-265/PRN/MME, enacting the conditions of application of the Mining Law	18 August 2006	Mining	Quarry exploitation must comply with the provisions governing the opening and operation of quarries. Article 79 stipulates: "Pursuant to Article 121, of the Mining Law, orders by the Minister of Mines set out: • The general health and safety provisions to which mining or quarrying operations are subject, as well as the outbuildings; • The provisions relating to exposure to ionizing radiation in mines and their outbuildings; • The provisions relating to silicosis risks in mines, quarries and their outbuildings; • The provisions relating to the transport, storage and use of explosives in mines or quarries"
Decree No. 70-3/MTP/T/M/U, enacting the administrative rules to which quarry operations are subject	8 January 1970	Quarrying	Any mine or quarry must have an administrative authorization from the minister in charge of mines.
Law No. 69-8 on reporting violations of the legislation relative to certain explosive substances	18 February 1969	Explosive substances	Offenses related to explosive substances are noted by the Director and sworn agents of the Ministry of Mines, as well as by the police.
Law 2018-21 of 27 April 2018 on the safety, security and peaceful use of atomic energy.	27 April 2018	Atomic energy	This law creates the Authority for Regulation, Nuclear Safety and Protection against the Dangers of Ionizing Radiation (ARSN). The main

Title	Date adopted	Theme	Contextual references
			provisions of the law include issuance of authorization to carry out a peaceful activity; unannounced or announced inspections; radiation protection principles, requirements and checks; management of radioactive sources; emergency preparedness and response; exploration, extraction and processing of uranium and thorium ores; transport of radioactive materials; radioactive waste and spent fuel; and nuclear security.
Law No. 2012-45 on the Labor Code in the Republic of Niger	25 September 2012	Labor	This law prohibits forced or compulsory labor, as well as any discrimination in employment and remuneration based in particular on race, sex and social origin. It establishes guidelines for the hiring of workers, the use of temporary employment agencies or private employment agencies, as well as for the suspension or termination of employment contracts. It specifies in its Article 8 that companies use their own workforce, or use external staff under temporary work provisions and second their employees to other companies. They can also hire piece workers. Article 9 specifies that subject to compliance with Articles 11, 13 and 48, employers directly recruit the employees they employ. They can also use the services of public or private recruitment agencies. Article 154 stipulates that, after consulting with the Technical Advisory Committee on Occupational Health and Safety, an employer must provide and supply with medications and accessories: • An infirmary for an average workforce of more than one hundred workers; • A treatment room for a workforce of twenty to one hundred workers; • A first aid kit for a workforce of fewer than twenty workers. Article 155 specifies that stress, smoking, alcoholism, drug addiction and HIV/AIDS are emerging health-related risks in the workplace. All employers are required to inform and raise awareness among their workers about emerging risks and to provide them with psychosocial assistance.
Decree No. 2017-682/PRN/MET/PS of 08/10/2017 on the regulatory role of the Labor Code	10 August 2017	Labor	Stipulates in Article 4 that any discrimination in employment and jobs is prohibited and specifies what is meant by discrimination.

Title	Date adopted	Theme	Contextual references
			Articles 25 to 30 regulate the performance of temporary work. Articles 39 to 47 regulate the wording of assignment contracts and secondment contracts. Articles 120 to 133 regulate the employment contract. Articles 134 to 155 regulate working conditions and remuneration.
Decree No. 2012-358 /PRN /MFPT setting the minimum salaries for each category of workers governed by the inter-professional collective agreement	17 August 2012	Labor	Article 1 of this decree sets the minimum salaries of workers governed by the Interprofessional Collective Agreement.
Decree No. 96-409/PRN /MFPT /E, on the terms of the hiring declaration	4 November 1996	Labor	Article 1 states that the hiring declaration provided for in the Labor Code is recorded in a register regularly kept by the Agence Nationale pour la Promotion de l'Emploi [National Employment Administration] (ANPE).
Decree No. 96-408 / PRN / MFPT /E on the methods for creating, organizing and running occupational health and safety committees	4 November 1996	Labor	Article 2 specifies that an Occupational Health and Safety Committee (OHSC) must be created in all companies or establishments subject to the Labor Code and employing at least 50 employees. The workforce to be taken into consideration is that of workers usually employed in the establishment, whether or not they are necessarily registered in the employer register.
Decree 2015-541/PRN/MET/PS of 15 December 2015 amending and supplementing Decree No. 65--117/PRN/MFP/T of 18 August1965 setting out the rules for managing the system of compensation and prevention of workplace accidents and occupational illnesses by the CNSSS	15 December 2015	Health and safety	Article 117 establishes the list of illnesses considered to be occupational as well as the time limits for coverage by the Caisse Nationale de Sécurité Sociale [Social Security Administration] (CNSS) and the indicative list of the main types of work likely to cause them in a 75-page appendix.
Order No. 12/MMH, enacting the safety and hygiene rules to which quarry and mining operations are subject	17 November 1975	Health and safety	Enacts the health and safety rules to which quarry and open-pit mining operations are subject, as well as their outbuildings,
Order No. 084/MM/SG/DGMC/DM of 08/05/2019 enacting the safety and hygiene rules to which the quarry and open-pit mine operations and their outbuildings are subject	8 May 2019	Health and safety	Enacts the health and safety rules to which quarry and open-pit mining operations are subject, as well as their outbuildings.

Title	Date adopted	Theme	Contextual references
Order No. 0003/MME/DM of 8 January 2001 on the protection against the dangers of ionizing radiation in the mining sector	8 January 2001	Ionizing radiation in the mining sector	Enacts safety rules against ionizing rays from mining operations, including occupational exposure limits.
Ordinance No. 93-13 establishing a Public Hygiene Code	2 March 1993	Public hygiene	Article 4 of the Public Hygiene Code prohibits any person from producing or storing waste under conditions likely to cause harmful effects on the soil, vegetation and wildlife, to degrade the landscapes, and in general, to harm the health of humans, domestic animals and the environment, and requires said person to ensure its disposal or recycling or have it ensured. This ordinance is in particular reinforced by Law No. 98-056 of 29 December 1998, on the framework law on the management of the environment in Niger, which provides for the prohibition of any form of inconvenience or pollution of living conditions. It also provides in its Article 80 that staff must wear adequate and specific protective equipment. Article 101 prohibits any discharge of used oils into the environment. The use of used oils as larvicide is subject to authorization from the health and sanitation departments. Lastly, Article 107 specifies that emissions from vehicles and other motorized equipment must comply with the regulations in force.
Law 2004-040, establishing the forestry regime in Niger	8 June 2004	Forestry	Article 2 provides that forest resources constitute natural resources and, as such, are an integral part of the country's public resources. Everyone is required to respect these natural resources and contribute to their conservation and regeneration. Article 33 provides that forest resources that are degraded or destroyed due to public utility work must be compensated under conditions set out by regulation. Article 34 provides that “Forest species requiring special protection are declared protected species by the implementing texts of this law. They cannot be uprooted or mutilated. In the event that their use is authorized, it is subject to the payment of a fee, the rate of which is set by regulation. The use of dead protected trees as firewood is free of charge if the products are intended for the personal or household use of the beneficiaries of customary usage rights”.

Title	Date adopted	Theme	Contextual references
Decree No. 2018-191/PRN/MEDD on the conditions for the application of Law No. 2004-040 of 8 June 2004	16 March 2018	Forestry	Article 11 of this decree determines the Forestry Domain in the Republic of Niger which consists of State-owned forest, forests owned by Territorial Authorities, and privately-owned forest. Article 59 sets out the action plan for the protection of forest species in Niger. Article 114 deals with the logging tax. Article 23 of this decree stipulates: "the management of urban and peri-urban forestry is considered to cover green spaces, agro-forestry areas, forested areas and other tree systems in urban or peri-urban zones, with a view to integrated and sustainable land management subject to the effects of urbanization. The State develops and implements a policy for the management of trees and forests in urban and peri-urban agglomerations, ensuring the protection of the environment and improving the social and economic life of the populations concerned. This policy will be devoted to a national strategy accompanied by an urban and peri-urban forestry action plan, which will serve as a coherent framework for the implementation of good practices and intervention in the sub-sector".
Law No. 98-07 of 29 April 1998 establishing the Hunting and Wildlife Protection Plan	29 April 1998	Wildlife	Article 2: Hunting is any act consisting of either searching for, pursuing, aiming at or sighting, trapping, capturing, injuring or killing a wild animal living in a state of freedom, or collecting or destroying eggs. Article 3: It is prohibited to hunt without a hunting license.
Ordinance No. 2010-09 on the Water Code	1 April 2010	Water resources	This ordinance recognizes every citizen's right to have access to water (Article 4), and its Article 6 stipulates that "water is an ecological, social and economic asset whose conservation is in the public interest and whose use in any form whatsoever requires each person to contribute to the efforts of the community and/or the State, in order to ensure its conservation and protection". Article 12 specifies that anyone who, through their activities, uses the water resource, must contribute to the funding of water management, according to their use, by virtue of the

Title	Date adopted	Theme	Contextual references
			user–payer principle, notwithstanding every citizen's right to water as set out in Article 4. Article 38 stipulates, in application of the "user-payer" principle set out in Article 12, that natural or legal persons who, through their activities, use water, may be subject to the payment of a financial contribution based on the volume of water collected, consumed or used. Article 39 specifies that in application of the "polluter-payer" principle set out in Article 13 of this ordinance, natural or legal persons whose activity is likely to cause or worsen the degradation of water resources may be subject to the payment of a financial contribution calculated on the basis of the volume of water collected, consumed or used. Articles 43 and 45 require the authorization, declaration or lease of water use by facilities, structures, works and activities carried out by any natural or legal person, public or private.
Decree No. 2011-405 establishing the terms and procedures for declaring, authorizing and granting water use	31 August 2011	Water resources	Article 19 specifies that "in the case of an operation subject to an environmental impact assessment, the request is sent to the Minister of the Environment, who examines it in accordance with the provisions of decree No. 2000-397/PRN/ME/LCD of 20 October 2000 on the administrative procedure for assessing and reviewing environmental impacts".
Order No. 00342/MSP/SG/DGSP/DHP/ES approving the potability standards of water for human consumption in Niger	29 March 2021	Water resources	Article 3: "To be considered drinkable, water: • Must not harm the health of the consumer; • Must have acceptable organoleptic properties; • Must comply with current standards." Article 6: "Drinking water must not contain any pathogenic germs transmissible to humans. It must be colorless, odorless and tasteless." Article 7 defines the microbiological quality standards that water for human consumption must meet. Article 10 defines physicochemical quality standards. (See section 2.4.3 below)
Law No. 97-002 on the protection, conservation and development of cultural heritage	30 June 1997	Cultural heritage	This law determines the fundamental principles of the legal regime by defining the applicable rules in terms of the protection of monuments,

Title	Date adopted	Theme	Contextual references
			cultural property, areas and sites, their identification, their classification, their use and reuse; archaeological digs and incidental discoveries; import, export and international transfer of cultural property.
Order No. 140/MSP/LCE/DGP/DS/DH of 27 September 2004 on the standards for the discharge of waste into the natural environment	27 September 2004	Waste	This order includes numerical criteria for the quality of effluent when discharged to the environment, and for allowable concentrations of silica-containing dust. Rules for the disposal of solid wastes are also included.
Order No. 140 /MSP /LCE /DGSP/DS/DH enacting the standards for discharging waste into the natural environment	26 August 1999	Waste and emissions	When the particle size is between 0.5 and 5 microns, the permissible dust concentrations are set as follows: a) Dust containing less than 6% silica: 5 mg/m3; b) Dust containing between 6% and 25% of silica: 2 mg/m3 for a period of eight (8) hours of work; c) Dust containing more than 25% silica: 1 mg/m3. Article 3 stipulates: “The operator is responsible for the application of the prescribed measures in terms of safety, health and medical surveillance of workers exposed to silicosis risks. As such, it must train and raise awareness among workers in order to allow them to become aware of the importance of the risks to which they are exposed”. Article 4 stipulates: “The operator is required to develop internal regulations meeting the specific requirements of its mining unit in order to allow compliance with the rules of good conduct necessary for the policy for the protection of workers against silicosis risks. It must draft safety instructions relating to silicosis risks, to be submitted for approval”.
Order No. 00343/MSP/SG/DGSP/DHP/ES setting the standards for waste discharge into the natural environment	30 March 2021	Waste	In Section I (Chapter II), the general characteristics of liquid effluent discharge standards are defined (see section 2.4.4 below). Article 5 (section II) states: "It is forbidden to discharge into the natural environment without prior treatment as defined by the regulations, wastewater from…industrial, craft or commercial enterprises…” Chapter IV deals with discharge standards and conditions for solid waste disposal.

Title	Date adopted	Theme	Contextual references
Law No. 2014-63 prohibiting the production, importation, marketing, use and storage of bags and packaging made from soft, low-density plastic.	5 November 2014	Plastic packaging	Article 1: It is forbidden to produce, import, market, use and store, throughout the territory of the Republic of Niger, bags and packaging made of soft, low-density plastic.
Decree No. 2015-321/PRN/MESU/DD enacting the terms of application of Law No. 2014-63 of 5 November 2014 prohibiting the production, importation, marketing, use and storage of bags and packaging made from soft, low-density plastic.	25 June 2015	Plastic packaging	The implementation of this decree will help ensure that our environment is free of plastic, which is a non-biodegradable material. Article 2 of this decree stipulates: "the natural or legal persons affected by the provisions of Article 1, paragraphs 1 and 2 of Law No. 2014-63 of 5 November 2014, are in particular: • Any industry that produces plastic bags and packaging; • Any company importing and marketing plastic bags and packaging; • Any holder of plastic bags and packaging whose main activity is the repackaging and marketing of these materials; • Any final holder of plastic bags and packaging that separates them from the product to be consumed or used and that holds the packaging". Article 3 defines the types of soft, low-density plastic bags and packaging that may be produced, imported, marketed, used or stored within the meaning of Article 1, paragraph 3 of Law No. 2014-63 of 5 November 2014
Ordinance 79-45 supplementing Law No. 66-033 relating to Unsafe, Unsanitary or Unsuitable Establishments of 24 May 1966	27 December 1979	Classified establishments	This ordinance amends Article 10 of Law No. 66-033. It specifies the penalties imposed on manufacturers who operate unsafe, unsanitary, or unsuitable establishments without authorization and/or declaring them.
Ordinance 76-21 supplementing Law No. 66-033 relating to Unsafe, Unsanitary or Unsuitable Establishments of 24 May 1966	31 July 1976	Classified establishments	Article 11 specifies that "In addition to the judicial police officers and agents of the Customs Department, sworn inspectors of classified establishments may also report violations of the legislation and regulations in unsafe, unsanitary or unsuitable establishments"
Law No. 66-033 on unsafe, unhealthy and unsuitable establishments supplemented by Ordinance No. 76-21 of 31 July 1976	24 May 1966	Classified establishments	Article 1: "Manufacturing, workshops, factories, shops, construction sites and all industrial or commercial establishments that present causes of danger or inconveniences, [...] are subject to the supervision of the administrative authority under the conditions determined by this law".

Title	**Date adopted**	**Theme**	**Contextual references**
Decree No. 76-129/PCMS/MMH enforcing the Unsafe, Unhealthy and Unsuitable Establishments Act	31 July 1976	Classified establishments	The text specifies the conditions of application of the law relating to unsafe, unsanitary and unsuitable establishments.
Order No. 0037/MMH regulating the inspection and monitoring of EDIIs	8 October 1979	Classified establishments	Defines the procedures for inspection and monitoring of EDIIs.
Order No. 14/MMH/MDR/MI/MTP/T/U/MAEI enacting the general requirements for EDIIs listed in the 3rd class.	1 November 1976	Classified establishments	Enacts the general requirements to which EDIIs listed in the 3rd class are subject.

2.1.4 National Institutional Framework

The institutions that are directly responsible for environmental and social issues related to mining exploration and operations are listed below.

Ministry of Environment and Desertification Control

According to Article 29 of Decree No. 2021-319/PRN of 11 May 2021, specifying the formal roles and responsibilities of the members of the Government, the Minister of Environment and the Fight against Desertification is responsible, in conjunction with the other Ministers concerned, for the design, development, implementation, monitoring and evaluation of the national policy on the environment and the fight against desertification, in accordance with the guidelines set by the Government. In this capacity, he/she performs, among others, the following functions:

- Definition and implementation of policies and strategies in the field of environmental restoration and preservation, the fight against desertification, climate change, biodiversity, biosafety, and the management of natural resources and wetlands;
- Definition and application of environmental and sustainable development standards; and,
- Validation of environmental assessment reports of development programs and projects, delivery of environmental compliance certificates, carrying out environmental and ecological monitoring and producing environmental audits and balance sheets.

To this end, and in accordance with the provisions of Decree No. 2021-351/PRN/ME/LCD of 27 May 2021, on the organization of the Ministry of Environment and Desertification Control (ME/LCD), the said Ministry has general and technical directorates and departments linked to the Ministry, including the National Environmental Assessment Office (BNEE), the structure responsible for ensuring compliance with the State environmental review procedure in Niger. The BNEE was created by Article 24 of Law No. 2018-28 of 14 May 2018 setting out the fundamental principles of environmental assessment in Niger, and according to Order No. 0099/MESUDD/SG/BNEE/DL of 28 June 2019 on the organization and operation of the BNEE, it is mandated, among others, to review and frame environmental assessment terms of reference, analyze environmental assessment reports admissibility and compliance, and monitor and control the implementation of environmental and social specifications to be met by developers.

Thus, BNEE is responsible for conducting environmental monitoring, control and capacity building activities during implementation of the Project.

Within the ME/LCD there is a Directorate General of Water and Forests (DGEF) which includes National Technical Directorates and ensures, among other things, compliance with forestry legislation through decentralized services. Consequently, the decentralized services (Regional and Departmental Directorates of Environment), intervene for the inventory and determination of felling tax rates as well as for the supervision and monitoring / evaluation of compensation plantations that may be applicable to the Project.

The Directorate General of Sustainable Development (DGDD) will also have involvement with Project implementation, particularly with regard to the management of waste that will be generated throughout the whole Project cycle.

Ministry of Employment, Labor and Social Protection

According to Article 30 of Decree No. 2021-319/PRN of 11 May 2021, specifying the formal roles and responsibilities of the members of the Government, the Minister of Employment, Labor and Social Protection is responsible, in conjunction with the other Ministries concerned, for the design, development, implementation, monitoring and evaluation of national policies and strategies in the area of employment and social protection, in accordance with the guidelines set by the Government. He/she ensures compliance with the legal provisions (legislative and regulatory) in these areas. In addition, he/she performs, among others, the following functions:

- Design, development, implementation, control, monitoring and evaluation of the social protection policy for civil servants and state workers;
- Management of relations with employers' and workers' organizations in the public and semi-public sectors; and,
- Contributing to the definition, implementation and management of the institutional and legal framework that should promote the management of labor relations, social dialogue and the collective agreement.

To this end, this Ministry has been structured into general and national technical directorates, including the Directorate General for Labor (DGT), which has within it the Directorate of Occupational Safety and Health (DSST). Consequently, the DSST, through the decentralized services and the National Social Security Fund (CNSS), will be the lead state body in the process of recruiting the labor force required for the project. The decentralized services must also keep an eye on employees working conditions. Finally, they must participate in the monitoring and control missions for the implementation of the ESMP to ensure compliance with occupational health and safety aspects.

Ministry of Public Health, Population and Social Affairs

According to Article 8 of Decree No. 2021-319/PRN of 11 May 2021, specifying the formal roles and responsibilities of the members of the Government, "the Ministry of Public Health, Population and Social Affairs is responsible, in relation to the Ministries concerned, for the design, development, implementation, monitoring and evaluation of national policies in the area of public health, particularly in terms of improving health coverage, prevention and the fight against endemic diseases in accordance with the guidelines defined by the Government." In this capacity, he/she performs, among others, the following functions:

- Design and implementation of public health programs and projects;
- Definition of standards and criteria in terms of public health and hygiene, as well as the control and inspection of health services throughout the national territory; and,
- Development, implementation, and monitoring the implementation, of laws and regulations governing the public health, population and social affairs sector.

Within the framework of the implementation of this project, this Ministry will intervene through its technical services concerned, in particular the National Directorate of Public Hygiene and Health Education (DNHPES) and the Regional Directorate of Public Health of Tahoua.

Ministry of Mines

The Minister of Mines is responsible, in conjunction with the other Ministers concerned, for the design, development, implementation, monitoring and evaluation of national mining policy in accordance with the guidelines laid down by the Government (Article 9 of Decree No. 2021-319/PRN of 11 May 2021, specifying the formal roles and responsibilities of the members of the Government).

In this capacity, he/she performs the following functions:

- Initiation of studies with a view to developing the rational exploitation of mining resources, including in particular carrying out fundamental geological surveys;
- Establishment of the national territory basic geoscience infrastructure in relation with the research institutions concerned;
- Control, monitoring and evaluation of exploration and mining activities; and,
- Effective implementation of guidelines on environmental protection and restoration in the mining sector.

In accordance with the provisions of Decree No. 2021-326/326/PRN/MM of 13 May 2021, this Ministry is organized into a central administration, deconcentrated and decentralized services, and public programs and projects. Thus, as part of the implementation of this project, the Directorate of Mines and Quarries and the Directorate of the Mine-Environment and Classified Establishments (DEMEC) will be involved in the environmental oversight and monitoring as regards the implementation of measures provided for in the ESMP.

Ministry of Water and Sanitation

According to the provisions of Article 3 (point 26) of Decree No. 2021-289/PRN of 4 May 2021 on the organization of the Government and setting out the responsibilities of Ministers of State, Ministers and Ministers Delegate, the Minister of Water and Sanitation is responsible, in conjunction with the other Ministers concerned, for the design, development, implementation, monitoring and evaluation of national water and sanitation policy, in accordance with the responsibilities defined by the Government.

In this capacity, he/she designs, develops, implements and evaluates strategies and development programs and projects in the areas of water, hygiene and sanitation.

Through the Directorate of Water Resources, this Ministry will be involved in environmental oversight and monitoring to assess the implementation of measures within its authority.

Ministry of Interior and Decentralization

According to Article 5 of Decree No. 2021-319/PRN of 11 May 2021, specifying the formal roles and responsibilities of the members of the Government, the Minister of Interior and Decentralization, in conjunction with the other Ministers concerned, is responsible for the design, development, implementation, monitoring and evaluation of national policies in the areas of territorial administration, public security, decentralization and deconcentration, in accordance with the guidelines laid down by the Government. In this capacity, he/she performs, among others, the following functions:

- In the area of territorial administration:
    - Organization and administration of administrative districts;
    - Management of national borders;
    - Development and application of regulations concerning the movement of people, public freedoms and the status of associations;
    - Organization of traditional chieftaincies and the management of their relations with the administration;
- In the area of decentralization and deconcentration:
    - General supervision and organization of support for local authorities;

    - Operationalization of the deconcentration-decentralization process mainly with regard to the transfer of powers and resources to local authorities;
- In the area of customary matters and religious affairs:
    - Organization of traditional chieftaincies and the management of their relations with the administration;
    - Promotion of local habits and customs; and,
    - Supervision and control of places and the exercise of worship.

This Ministry is responsible for supervising local authorities. Thus, created by the law No. 2008-42 supplemented by the ordinances No. 2010-54 of 17 September 2010 and the ordinance No. 2010-76 of 9 December 2010, municipalities enjoy the legal standing and financial autonomy. They have technical services for environment, agriculture, livestock, and a communal land commission, which are responsible for environmental and land issues (waste management, reforestation actions, environmental education and communication, etc.).

To this end, in accordance with Ordinance No. 2010-76 of 9 December 2010 amending and supplementing Ordinance No. 2010-54 of 17 September 2010, on the General Code of Local Authorities, the municipalities:

- Ensure the preservation and protection of the environment;
- Ensure the sustainable management of natural resources with the effective participation of all stakeholders;
- Develop, in accordance with development options, local plans and schemes for the environment and the management of natural resources;
- Give their opinion on any infrastructure project; and,
- Intervene as a member of expropriation commissions.

As part of this project, the municipalities concerned will be involved, with a view to playing their roles in accordance with the applicable law and regulations.

Niger Atomic Energy High Authority (HANEA)

According to Article 2 of Decree No. 2019-085/PRN of 1 February 2019, amending Decree No. 2013-490/PRN, on the creation, powers and duties, organization and operation of HANEA, "The main missions of the Niger Atomic Energy High Authority are: the supervision, coordination and promotion of all peaceful applications, including nuclear power and ionizing radiation, in conjunction with all ministries and other institutions concerned."

Within this framework, its mandate is to:

- Guide and/or manage the peaceful applications of nuclear science and technology;
- Initiate and/or participate in the development and implementation of policies and strategies for the peaceful application of science and technology, in accordance with national guidelines and priorities;
- Initiate and/or participate in the development of policies and strategies in the area of nuclear security; define and implement nuclear security plans, in accordance with national guidelines and priorities;
- Initiate and/or participate in the development of national policies and strategies for the development of nuclear energy resources;

- Initiate and/or participate in the development and implementation of policies and strategies for the development of human resources, research and capacity building in the field of peaceful applications of nuclear science and technology and ionizing radiation;
- Undertake, encourage and promote research and training activities in the peaceful applications of nuclear science and technology and ionizing radiation;
- Support research or training institutes and centers in the nuclear field;
- Develop and implement policies, strategies and communication plan for the promotion of peaceful applications of nuclear science and technology, as well as the culture of nuclear security;
- Coordinate, guide, monitor and harmonize nuclear security activities at the national level;
- Ensure, at the requestor's or recipient's expense:
    - The analysis and radiation survey of consumer products throughout the national territory;
    - The quality control of diagnostic X-ray and nuclear medicine equipment;
    - The radiation monitoring of the environment;
    - The dosimetric monitoring of staff and the environment of public and private organizations that use ionizing radiation; and,
- Decide on all matters referred to the Authority by the President of the Republic, the Government or the Authorities concerned.

During implementation of the Project HANEA will have roles to play in accordance with its missions defined above.

Nuclear Safety and Regulatory Authority (ARSN)

Created by Law No. 2016-45 of 06 December 2016, ARSN has competence in regulatory functions concerning radiological (nuclear) activity in order to guarantee safety, security and environmental protection against the effects of ionizing radiation throughout the national territory.

ARSN is responsible for regulating activities and practices related to the use of nuclear or radioactive substances and materials, as well as those related to sources of ionizing radiation.

In this capacity, it performs, among others, the following functions:

- To establish and publish radiation protection, safety, security and safeguards technical standards;
- To ensure compliance with regulations on nuclear safety and security and safeguards;
- To take coercive measures in the event of violation of laws and regulations or in the event of a dangerous or potentially dangerous situation at any location where authorized activities are carried out;
- To inform, educate and consult the public and all other stakeholders on the regulatory process and aspects of these practical activities related to safety, security, health and the environment, including incidents, accidents and abnormal events;
- To cooperate with all relevant structures to develop and maintain a plan for the preparation and conduct of emergency response involving nuclear or other radioactive materials in accordance with the national contingency plan; and,
- To participate in defining the reference threat for the application of security measures.

In accordance with its mission to regulate radiological (nuclear) activity throughout the country, this structure will play an important role in the implementation of the Project.

National Environment Council for Sustainable Development (CNEDD)

Created by Decree No. 96-004/PM of 9 January 1996, as amended and supplemented by Decree 2000-272/PRN/PM of 4 August 2000, the CNEDD is a deliberative body whose mission is to develop, implement, monitor and evaluate the implementation of the PNEDD [National Environmental Plan for Sustainable Development]. It is especially responsible for ensuring that the environmental dimension is taken into account in Niger's socio-economic development policies and programs. It is part of the Prime Minister's Office and the Chief of the Office of the Prime Minister is the Chairman. In order to ensure its role as a national coordinating body, the CNEDD has an Executive Secretariat, which is supported at the central level by sectoral technical commissions created by order of the Prime Minister and at the regional level by regional environmental councils for sustainable development.

Within the framework of a project, the CNEDD will be invited to evaluate its ESIA in order to ensure that the provisions of the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity and the Convention to Combat Desertification in countries severely affected by drought, particularly in Africa, are taken into account.

Extractive Industries Transparency Initiative (EITI) Niger

The EITI aims to promote transparency of payments and income from extractive industries, in particular through their verification and publication for the public at large. The EITI thus promotes a broad debate so that this wealth can contribute to economic growth and ensure sustainable development. The Government of Niger joined the EITI in 2005. In September 2007, Niger became a “candidate state” and in March 2011, it became “compliant state”.

The activities carried out by EITI Niger involve the annual production of reports on payments made by mining companies, income received by the State, independent audit of payments and income, the inclusion of civil society in the process and the strengthening of stakeholders' capacities. The responsibility for the operation of EITI Niger is entrusted to a Comité National de Concertation [National Dialogue Committee (CNC)] composed of representatives of the administrations, mining companies and civil society.

Following its suspension by the EITI Board of Directors at the latter's meeting in Manila, Philippines, on 26 October 2017 due to insufficient progress, the Government decided to withdraw Niger from the EITI Niger standard. On 22 January 2019, the Government announced that it would re-join the EITI and play its role in the governance of extractive industries. Niger was re-admitted as an EITI implementing country in February 2020. ITIE-Niger is administered by the Niger Multi-Stakeholder Group (MSG), also known as the Groupe multipartite de concertation. The MSG is chaired by the Director of the Prime Minister's Office.

Niger plans to use the EITI to monitor production and revenues in the burgeoning hydrocarbon sector, which is expected to generate substantial government revenues to develop the national economy. ITIE-Niger also aims to use extractives data to inform public debate. Formalisation of artisanal mining, following the gold rush on the Aïr mountains, is also a key priority of the government.

In accordance with the Petroleum Code (Article 146), 85% of oil and gas ad valorem royalties, fixed fees and surface royalties are allocated to the state budget, and 15% are allocated to regions and communes hosting extractive activities for the purpose of local development. Mining revenues are distributed in the same way and include proceeds from artisanal mining.

Focus and Advocacy Group on Extractive Industries (GREN)

GREN is a network of Nigerien civil society organizations. It operates in the field of extractive industries to promote good governance and environmental protection. It is also involved in informing and sensitizing stakeholders on the issue of extractive industries. Finally, it promotes and defends the rights of the sector throughout the national territory.

Niger Association of Environmental Impact Assessment Professionals (ANPEIE)

ANPEIE is authorized to operate in Niger by decree No.117/MI/AT/DAPJ/SA of 29 April 1999. ANPEIE is an apolitical, non-profit organization whose main objective is to promote the consideration of environmental concerns in development policies, plans, strategies, programs and projects. It is active in the field of training and awareness raising of staff for consultancy firms, projects, companies and of local people in the area of environmental impact assessment, as regards environmental oversight and monitoring in the implementation of plans to limit environmental impacts in development projects.

2.2 International Legal Framework

In accordance with Article 171 of the Constitution of the Republic of 25 November 2010, “regularly ratified treaties or agreements have, as soon as they are published, a higher authority than that of national laws, subject to the application of each agreement or treaty by the other party”. Relevant agreements and treaties are listed in Table 2-2.

Table 2-2: International and regional conventions and agreements

Title	Dates adopted / entered into force	Date of signature / ratification by Niger	Theme	Context reference
Treaty on the Non-proliferation of Nuclear Weapons (IAEA Standards): • Fundamental safety principles for the protection of persons and the environment (IAEA, 2006); • Fundamental international standards (IAEA, 2014); • Safety guidelines (IAEA, 2002).	1957	10 August 1969	Atomic Energy	Niger is a Member State of the International Atomic Energy Agency (IAEA) which establishes safety standards and measures for protection against ionizing radiation, including strategies and protocols relating to the location, design, construction, operation and closure of facilities, and measures to protect the workforce, the public and the environment against the impacts of radioactive waste generated by the mining and crushing of ore (including mine tailings, waste rock, mineralized waste rock, process water; leaching solutions, precipitates; storage infiltration, and uranium processing plant areas).
ECOWAS Directive C/DIR 3/05/09 dated 27 May 2009 on the harmonization of guiding principles and policies in the mining sector	27 May 2009	27 May 2009	Mining	Ensures the harmonization of guiding principles and policies in the mining sector of the Member States based on high-level standards of accountability for mining companies and governments in order to promote human rights, transparency and social equity and to ensure the protection of the local communities and the environment in the mining areas in the sub-region. Creates a mining environment conducive to sustainable macroeconomic development and which ensures a balance between the need to implement incentive measures to attract investors and that of protecting the basic income and resources of the Member States Improves transparency in the process of formulating and implementing mining policy in the sub-region, promotes participation and strengthens the capacities of the mining communities. Endows Member States with a harmonized mining policy and legal framework.

Title	Dates adopted / entered into force	Date of signature / ratification by Niger	Theme	Context reference
				Ensures that harmonization takes into account the different levels at which each Member State is situated in the mining sector and how policies and various strategies could be conducted to meet the specific needs of each Member State (Art. 2). The State is considered the owner of the mineral resources. The Directive provides for appropriate and rapid compensation which must be paid to the owner or legitimate occupant of any land acquired for the development of a mineral resource and sets out the methods for calculating the compensation. In addition, "States must classify certain areas as prohibited from mining activities, if these areas carry particular risks for the preservation of safety, including in areas with high environmental, social and cultural sensitivity" (Art. 4).
Convention No. 81 on the Labor Inspectorate of 1947 supplemented by the 1995 protocol on non-commercial services	June 1995	19 February 2009/effective 19 February 2009	Labor	Working conditions and the protection of workers in the exercise of their profession.
Convention No. 100 on Equal Pay of 1951	June 1951	19 February 2009, effective 19 February 2009	Labor	Principle of equal pay between the male workforce and the female workforce for work of equal value.
Convention No. 138 on the minimum age of admission to employment	Adopted in Geneva on 26 June 1973 and entered into force on 19 June 1976	Signed by Niger on 4 December 1978	Labor	Article 2 of the convention provides guidelines on the age of admission to employment to countries having ratified the convention (i.e. the minimum age must not be less than the age at which compulsory education ceases, or in any case no lower than fifteen years).
Convention No. 102 on minimum social security coverage	Enacting the convention on the	Signed by Niger on 4 December 1978	Labor	Its purpose is to promote social security at work. To this end, the convention sets out the provisions relating to social security, in particular: medical care, sickness, unemployment and retirement benefits, workplace

Title	Dates adopted / entered into force	Date of signature / ratification by Niger	Theme	Context reference
	standard adopted in Geneva on 28 June 1952 and effective on 27 April 155			accident and occupational illness benefits, family allowances, maternity benefits, disability benefits, survivor benefits and the equitable treatment of non-national residents.
Worst Forms of Child Labor Convention (No.182)	Adoption: Geneva, 87th ILC session (17 June 1999) / Entry into force: 19 Nov. 2000	23 October 2000/Entry into force on 23 October 2001	Labor	Article 3: "For the purposes of this Convention, the term the worst forms of child labor comprises: (a) all forms of slavery or practices similar to slavery, such as the sale and trafficking of children, debt bondage and serfdom and forced or compulsory labor, including forced or compulsory recruitment of children for use in armed conflict; (b) the use, procuring or offering of a child for prostitution, for the production of pornography or for pornographic performances; (c) the use, procuring or offering of a child for illicit activities, in particular for the production and trafficking of drugs as defined in the relevant international treaties; (d) work which, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children."
Convention No. 161 of 2009 on occupational health services	Signed on 25 January 1985 by the ILO	Signed and ratified by Niger on 17 February 1988 and December 2010, respectively	Occupational health & safety	Occupational health service to promote the physical and mental health of all workers by maintaining a safe, healthy and well-adapted workplace through a preventive service invested in essentially preventive functions.
Convention 155 on Occupational Health and Safety	Signed on 22 June 1981 by the ILO	Signed and ratified by Niger on 11 August 1983 and 19 February 2009, respectively	Occupational health & safety	Its purpose is to ensure a culture of safety for workers recruited for the implementation of the project.

Title	Dates adopted / entered into force	Date of signature / ratification by Niger	Theme	Context reference
Convention No. 187 on the Promotional Framework for Safety and Occupational Health	Signed on 15 January 2006 by the ILO	Ratified by Niger on February 19, 2009	Occupational health & safety	Its purpose is to promote a culture of prevention in occupational health and safety matters.
Convention No. 148 of 1977 on the workplace, (air pollution, noise and vibrations)	Adopted on 20 June 1977	Ratified by Niger on 21 June 1993	Occupational health & safety	Its purpose is to protect workers against occupational risks due to air pollution, noise and vibrations in the workplace.
United Nations Framework Convention on Climate Change	Signed on 11 June 1992 in Rio de Janeiro, entered into force on 21 March 1994	Signed by Niger on 23 December 1993	Climate change	Article 4, paragraph f: the signatory parties: "take into account, insofar as possible, considerations related to climate change in their social policies and actions, economic and environmental practices and use appropriate methods, for example impact assessments, formulated and defined at the national level, to minimize the harmful effects to the economy, to public health and the quality of the environment of the projects or measures they undertake to mitigate climate change or to adapt to it".
Kyoto Protocol on the Reduction of Greenhouse Gas (GHG) Emissions	Signed on 11 December 1997 and entered into force on 16 February 2005	Ratified by Niger on 30 September 2004	Climate change	Reduce emissions of the six Greenhouse Gases: carbon dioxide, methane, nitrous oxide, and three chlorofluorocarbon substitutes. As Niger is a signatory to this Protocol, it is necessary to avoid, as far as possible, practices that result in excessive gas emissions.
United Nations Convention on Biological Diversity	Signed on 11 June 1992 in Rio de Janeiro), entered into force 21 March 1994	Signed by Niger on 23 December 1993	Biodiversity	Article 14 ("Impact assessments and reduction of harmful effects") of this convention specifies that: "Each Contracting Party, insofar as possible and as appropriate, adopts procedures to require the assessment of the environmental impacts of the projects it has proposed and which are likely to significantly harm biological diversity, in order to avoid and minimize such effects, and, if applicable, allows the public to participate in these procedures."

Title	Dates adopted / entered into force	Date of signature / ratification by Niger	Theme	Context reference
International Convention on the fight against desertification in countries severely affected by drought and/or desertification, particularly in Africa	16 June 1994 in Paris and 19 January 1996	14 October 1994 and entered into force on 19 January 1996	Desertification	This convention recommends "the promotion of new livelihoods and environmental improvement", in its Article 10.4. This convention will be applicable to the clearing work in the vicinity of installations, with the destruction of woody species.
Convention on the Protection of World, Cultural and Natural Heritage	Adopted on 16 November 1972 in Paris and entered into force on 17 December 1975	23 December 1974	Heritage	Article 4 "Each State Party to this Convention recognizes that the duty of ensuring the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage [...], scientific and technical."
Stockholm Convention on Persistent Organic Pollutants (POPs)	Adopted on 22 May 2001 and entered into force on 17 May 2004	Signed and ratified by Niger in 2001 and 2005 respectively, entered into force in 2006	Pollutants	Article 1 stipulates that "Given the precautionary approach set out in Principle 15 of the Rio Declaration on the Environment and Development, the objective of this Convention is to protect human health and the environment from persistent organic pollutants". The measures intended to reduce or eliminate discharges resulting from intentional production and use are set out in Article 3 of this Convention.
Bamako Convention on "the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa".	Adopted on 30 January 1991 in Bamako and entered into force on 20 March 1996	30 June 1991 27 July 1996	Waste	The convention aims to improve and ensure the environmentally sound management of hazardous wastes, as well as the cooperation of the African states involved. Article 4 "General obligations" includes item 3, Hazardous Waste Import Ban; and item 4, Ban on Dumping of Hazardous Wastes at Sea and Internal Waters.
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	Adopted on 10/09/1998, entered into force on 24/02/2004	Accession of Niger on 16/02/2006	Hazardous materials	Promote shared responsibility and cooperation in addressing the international trade of certain hazardous chemicals, in order to protect human health and the environment from potential harm and to contribute to their use in an environmentally sound manner.

Title	Dates adopted / entered into force	Date of signature / ratification by Niger	Theme	Context reference
Rule No. 18/2003/CM/UEMOA of 23 December 2003 on the UEMOA Community Mining Code	Adopted on 23 December 2003	Tacit membership once effective	UEMOA Community Mining Code	This code covers operations relating to prospecting, exploration, mining, holding, circulation, processing, transportation, possession, transformation and marketing of mineral substances throughout the territory of the Union, with the exception of liquid or gaseous hydrocarbons. It sets out the following obligations for prospecting, exploration or mining of mineral substances in terms of environmental protection and the sustainable use of resources: • Performance of environmental impact assessments for the mining phase; • Compliance with environmental regulations; • Implementation of a surveillance plan as well as an environmental rehabilitation program.
Niger Basin Water Charter	Adopted in Niamey on 30 April 2008	Tacit membership once effective	Water resources	Article 2 of the Charter aims to promote cooperation based on solidarity and reciprocity for the sustainable, fair and coordinated use of the water resource of the Niger Hydrographic Watershed.

Table 2-3: Mine Safety Standards

Title	Dates adopted / entered into force	Date of signature / ratification by Niger	Theme	Context reference
United States of America, Department of Labor, Mine Safety and Health Administration, Code of Federal Regulations Title 30 (CFR 30), Mineral Resources	Updated July 1, 2021	N/A	Underground Mine Safety	**<u>The following Sections of CFR30 will be followed at the Dasa Mine</u>**: 57.3200 Correction of hazardous conditions. 57.3201 Location for performing scaling. 57.3202 Scaling tools. 57.3203 Rock fixtures. 57.3360 Ground support use. 57.3400 Secondary breakage. 57.3401 Examination of ground conditions. 57.3460 Maintenance between machinery or equipment and ribs. 57.3461 Rock bursts. 57.4011 Abandoned electric circuits. 57.4057 Underground trailing cables. 57.4100 Smoking and use of open flames. 57.4101 Warning signs. 57.4102 Spillage and leakage. 57.4103 Fueling internal combustion engines. 57.4104 Combustible waste. 57.4130 Surface electric substations and liquid storage facilities. 57.4131 Surface fan installations and mine openings. 57.4160 Underground electric substations and liquid storage facilities. 57.4161 Use of fire underground. 57.4200 General requirements. 57.4201 Inspection. 57.4202 Fire hydrants. 57.4203 Extinguisher recharging or replacement. 57.4230 Surface self-propelled equipment. 57.4260 Underground self-propelled equipment. 57.4261 Shaft-station waterlines.

Title	Dates adopted / entered into force	Date of signature / ratification by Niger	Theme	Context reference
				57.4262 Underground transformer stations, combustible liquid storage and dispensing. areas, pump rooms, compressor rooms, and hoist rooms. 57.4263 Underground belt conveyors. 57.4330 Surface firefighting, evacuation, and rescue procedures. 57.4331 Surface firefighting drills. 57.4360 Underground alarm systems. 57.4361 Underground evacuation drills. 57.4362 Underground rescue and firefighting operations. 57.4363 Underground evacuation instruction. 57.5001 Exposure limits for airborne contaminants. 57.5002 Exposure monitoring. 57.5005 Control of exposure to airborne contaminants. 57.5006 Restricted use of chemicals 57.5037 Radon daughter exposure monitoring. 57.5038 Annual exposure limits. 57.5039 Maximum permissible concentration. 57.5040 Exposure records. 57.5041 Smoking prohibition. 57.5042 Revised exposure levels. 57.5044 Respirators. 57.5045 Posting of inactive workings. 57.5046 Protection against radon gas. 57.5047 Gamma radiation surveys. 57.5060 Limit on exposure to diesel particulate matter. 57.5061 Compliance determinations. 57.5065 Fueling practices. 57.5066 Maintenance standards. 57.5067 Engines. 57.5070 Miner training. 57.5071 Exposure monitoring. 57.5075 Diesel particulate records.

Title	Dates adopted / entered into force	Date of signature / ratification by Niger	Theme	Context reference
				57.6100 Separation of stored explosive material. 57.6101 Areas around explosive material storage facilities. 57.6102 Explosive material storage practices. 57.6201 Separation of transported explosive material. 57.6202 Vehicles 57.6300 Control of blasting operations. 57.6301 Blasthole obstruction check. 57.6302 Separation of explosive material. 57.6303 Initiation preparation. 57.6304 Primer protection. 57.6305 Unused explosive material. 57.6306 Loading, blasting, and security. 57.6307 Drill stem loading. 57.6308 Initiation systems. 57.6309 Fuel oil requirements for ANFO. 57.6310 Misfire waiting period. 57.6311 Handling of misfires. 57.6312 Secondary blasting. 57.8520 Ventilation plan. 57.8525 Main fan maintenance. 57.8527 Oxygen-deficiency testing. 57.8528 Unventilated areas. 57.8529 Auxiliary fan systems. 57.8531 Construction and maintenance of ventilation doors. 57.8532 Opening and closing ventilation doors. 57.8534 Shutdown or failure of auxiliary fans. 57.9200 Transporting persons. 57.9201 Loading, hauling, and unloading of equipment or supplies. 57.9202 Loading and hauling large rocks. 57.9260 Supplies, materials, and tools on mantrips. 57.11050 Escapeways and refuges. 57.11051 Escape routes.

Title	Dates adopted / entered into force	Date of signature / ratification by Niger	Theme	Context reference
				57.11052 Refuge areas. 57.11053 Escape and evacuation plans. 57.11054 Communication with refuge chambers. 57.11055 Inclined escapeways. 57.11056 Emergency hoists. 57.11058 Check-in, check-out system. 57.15001 First aid materials. 57.15002 Hard hats. 57.15003 Protective footwear. 57.15004 Eye protection. 57.15005 Safety belts and lines. 57.15006 Protective equipment and clothing for hazards and irritants. 57.15007 Protective equipment or clothing for welding, cutting, or working with molten metal. 57.15014 Eye protection when operating grinding wheels. 57.18002 Examination of working places. 57.18006 New employees. 57.18009 Designation of person in charge. 57.18010 First aid. 57.18012 Emergency telephone numbers. 57.18013 Emergency communications system. 57.18014 Emergency medical assistance and transportation.

2.3 International Standards

2.3.1 The Equator Principles

GAFC has committed to implement the Dasa Project in line with the Equator Principles (EP). The EP are intended to serve as a common baseline and risk management framework for financial institutions to identify, assess and manage environmental and social risks when financing projects (https://equator-principles.com).

The latest version of the EP, version four (EP4), published in November 2019, incorporated new requirements including human rights impact assessment, climate change risk assessment, and, for projects with specific impacts on indigenous peoples, an evaluation of the whether the free, prior and informed consent (FPIC) of these peoples has been obtained.

There are 10 EPs, as outlined in Table 2-4.

Table 2-4: The Equator Principles and their implications for the Project

PRINCIPLE	OBJECTIVES	IMPLICATIONS FOR TO THE PROJECT
1: Review and Categorization	To categorize the Project (A, B, or C) based on the magnitude of potential environmental and social risks and impacts.	Nigerien legislation automatically categorizes mining projects as requiring full ESIA. Project categorization under Nigerien law effectively mirrors the EP classification.
2: Environmental and Social Assessment	To conduct an appropriate assessment process to address the relevant environmental and social risks and scale of impacts of the proposed project, and to propose measures to minimize, mitigate, and where residual impacts remain, to compensate/offset/remedy for risks and impacts to workers, affected communities, and the environment, in a manner relevant and appropriate to the nature and scale of the proposed project.	The ESIA undertaken for the Project by Groupe Art & Génie (2020) was approved by the Nigerien authorities. However, an internal comparison with the EP identified several gaps and GAFC commissioned additional work to bring the Project close to EP-compliance. This ESIA Addendum describes the process.
3: Applicable Environmental and Social Standards	To ensure the assessment process complies with relevant host country laws, regulations and permits; and with International Finance Corporation Performance Standards on Environmental and Social Sustainability (IFC PS) and the World Bank Group Environmental, Health and Safety Guidelines (the WBG EHS Guidelines).	The Project ESIA was undertaken in line with national standards and was approved by the regulatory authorities. This ESIA Addendum addresses compliance with the IFC PS and WBG EHS Guidelines.
4: Environmental and Social Management System (ESMS) and EP Action Plan (EPAP)	To develop and/or maintain an ESMS and an Environmental and Social Management Plan (ESMP) to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards. An EPAP may be required if applicable standards are not being met.	An ESMS is a requirement of Nigerien legislation. However, as with the ESIA there are gaps between the regulatory ESMS and EP requirements. The ESMS outline included as part of this ESIA Addendum aims to close the gaps.

PRINCIPLE	OBJECTIVES	IMPLICATIONS FOR TO THE PROJECT
5: Stakeholder Engagement	To demonstrate effective stakeholder engagement through an ongoing process in a structured and culturally appropriate manner, with affected communities, workers and, where relevant, other stakeholders.	Stakeholder consultation was carried out during the regulatory ESIA process and continued through the update of the ESIA. The Stakeholder Engagement Plan is appended to the FEED Consult (2022) ESIA.
6: Grievance Mechanism	To establish effective grievance mechanisms to receive and facilitate resolution of concerns and grievances about the project's environmental and social performance.	The grievance mechanism is included in the Stakeholder Engagement Plan appended to the FEED Consult (2022) ESIA.
7: Independent Review	To appoint an Independent Environmental and Social Consultant (IESC) to carry out an independent review of the assessment process including the ESMPs, the ESMS, and the stakeholder engagement process.	HCF International Advisors Limited (Hatch) was retained by the prospective Project lenders in 2022. Hatch has completed its Environmental and Social Due Diligence Review (ESDD) and issued a Draft ESDD Report.
8: Covenants	To ensure a project that is not in compliance with the EP is brought back into compliance through the establishment of covenants linked to compliance.	This is a financier action.
9: Independent Monitoring and Reporting	To ensure continuing EP compliance after financial closure, by independent monitoring and reporting by an IESC.	The appointment will be made by Project financier(s).
10: Reporting and Transparency	To ensure that a summary of the ESIA is accessible and available online and includes a summary of human rights and climate change risks and impacts when relevant; and to report annual greenhouse gas (GHG) emissions and biodiversity data.	To be implemented.

2.3.2 IFC Performance Standards on Environmental and Social Sustainability (IFC PS)

The IFC PS are directed towards IFC's clients, providing guidance on how to identify risks and impacts and avoid, mitigate, and manage such risks in order to do business in a sustainable manner. The PS are widely regarded as an international benchmark for environmental and social assessment and management. Compliance with the PS is an integral part of the EP (Principle 3).

There are eight PS, as outlined in Table 2-5. The table column, "Implications for the Project" summarizes the actions required to bring the approved regulatory Project ESIA into line with the PS.

Table 2-5: The IFC PS and their implications for the Project

PERFORMANCE STANDARD	OBJECTIVES	IMPLICATIONS FOR THE PROJECT
PS 1: Assessment and Management of Environmental and Social Risks and Impacts	- To identify and evaluate environmental and social risks and impacts of the project; - To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, affected communities, and the environment; - To promote improved environmental and social performance of clients through the effective use of management systems; - To ensure that grievances from affected communities and external communications from other stakeholders are responded to and managed appropriately; - To promote and provide means for adequate engagement with affected communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.	- SOMIDA environmental and social policies to be updated to reflect IFC PS. - ESIA Addendum to bring approved regulatory ESIA in line with IFC PS. - Cumulative impacts to be addressed. - Vulnerable social groups in affected communities to be engaged. - ESMS and ESMP to be updated in line with ESIA Addendum and IFC PS. - Emergency preparedness and response measures to be formulated. - Monitoring and review procedures to be developed. - Stakeholder Engagement Plan to be implemented, including Grievance Mechanism.
PS 2: Labor and Working Conditions	- To promote the fair treatment, non-discrimination, and equal opportunity of workers; - To establish, maintain, and improve the worker-management relationship; - To promote compliance with national employment and labor laws; - To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain; - To promote safe and healthy working conditions, and the health of workers; - To avoid the use of forced labor.	- SOMIDA to develop human resources policies in line with IFC PS. - Retrenchment planning to be addressed. - Policy on child labor to be enhanced. - Occupational health and safety planning to be reviewed against IFC PS. - Worker accommodation to incorporate IFC guidance. - Procurement policy to address standards applicable to sub-contractors. - Supply chain labor risks to be assessed.

PERFORMANCE STANDARD	OBJECTIVES	IMPLICATIONS FOR THE PROJECT
PS 3: Resource Efficiency and Pollution Prevention	- To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities; - To promote more sustainable use of resources, including energy and water; - To reduce project-related GHG emissions.	- GHG emissions to be estimated and requirements for monitoring and reporting determined. - Climate change risks to be considered. - Hazardous waste management plan to be developed.
PS 4: Community Health, Safety and Security	- To avoid or minimize risks to and impacts on the health and safety of the local community during the project life cycle from both routine and non-routine circumstances; - To ensure that the safeguarding of personnel and property is carried out in a legitimate manner that avoids or minimizes risks to the community's safety and security.	- Community Health, Safety and Security Plan to be developed, including emergency preparedness and response. - Project security arrangements to be aligned with the United Nations Voluntary Principles on Security and Human Rights (VPSHR). - There will be a particular focus on the roles and responsibilities, and rules of engagement of national security forces personnel.

PS 5: Land Acquisition and Involuntary Resettlement	- To avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs;
	- To avoid forced eviction;
	- To anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by:
	  ○ providing compensation for loss of assets at replacement cost;
	  ○ ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected;
	- To improve, or restore, the livelihoods and standards of living of displaced persons;
	- To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.
		- The Project will not result in the physical displacement of people.
		- Migratory herding routes may be minimally affected, and these potential impacts will be assessed and monitored.

PERFORMANCE STANDARD	OBJECTIVES	IMPLICATIONS FOR THE PROJECT
PS 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources	- To protect and conserve biodiversity; - To maintain the benefits from ecosystem services; - To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.	- Habitat characterization has been undertaken, including critical habitat screening assessment. - Boundaries of protected areas have been confirmed. - Ecosystem services have been evaluated and will be monitored.
PS 7: Indigenous Peoples	- To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples; - To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts; - To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner; - To establish and maintain an ongoing relationship based on informed consultation and participation with the Indigenous Peoples affected by a project throughout the project's life-cycle; - To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present; - To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.	- The status of Tuareg or Kel Tamashek people as Indigenous Peoples is recognized. - Consultation and informed participation of local predominantly Kel Tamashek communities has been taking place since 2008 for close to 15 years, and more recently, broad community support has been demonstrated through signed letters of support at both the local village and higher regional administrative levels. - As no adverse impacts, relocation, or impacts to or use of natural or critical cultural heritage will take place, the requirement for FPIC is not triggered.
PS 8: Cultural Heritage	- To protect cultural heritage from the adverse impacts of project activities and support its preservation; - To promote the equitable sharing of benefits from the use of cultural heritage.	- Enhanced archaeological and cultural heritage survey has been carried out.

2.3.3 World Bank Group Environmental, Health and Safety Guidelines (the WBG EHS Guidelines).

The WBG EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). They are referred to in the World Bank's Environmental and Social Framework and in the IFC PS, as well as the Equator Principles.

The WBG EHS Guidelines contain performance levels and measures that are generally considered to be achievable in new facilities at reasonable costs by existing technology. When host country regulations differ from the levels and measures presented in the Guidelines, it is usual for projects to commit to achieve whichever is more stringent.

The guidelines most applicable to this Project are the General EHS Guidelines (WBG, 2007a) and the sector-specific guidelines for mining (WBG, 2007b), and water and sanitation (WBG, 2007c). These guidelines are referenced as necessary throughout this document.

2.3.4 International Atomic Energy Agency (IAEA) and related standards

Niger is a member state of the IAEA, which establishes safety standards and measures for protection against ionizing radiation. The following references are applicable for strategies and protocols relating to location, design, construction, operation, and closure of facilities required to protect the workforce, general public and environment from the impacts of radioactive waste resulting from ore mining and crushing:

- Fundamental Safety Principles for Protecting People and the Environment (IAEA, 2006);
- Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards (IAEA, 2014);
- Occupational Radiation Protection (IAEA, 2018a);
- Radiation Protection of the Public and the Environment (IAEA, 2018b) ; and,
- Occupational Radiation Protection in the Uranium Mining and Processing Industry (IAEA, 2020).

In addition, IAEA (2018c) has established the Regulations for the Safe Transport of Radioactive Material, which includes the requirement to establish a radiation protection program for the safe transport of radioactive material to ensure safety and to protect people, property, and the environment from radiation effects.

SOMIDA also has cognizance of the International Commission on Radiological Protection (ICRP). ICRP is an independent, international organization that advances for the public benefit the science of radiological protection, in particular by providing recommendations and guidance on all aspects of protection against ionizing radiation.

ICRP consists of a community of more than 250 globally recognized experts in radiological protection science, policy, and practice from more than 30 countries. ICRP makes recommendations on the fundamental principles and quantitative bases upon which appropriate radiation protection measures can be established. ICRP offers its recommendations to regulatory and advisory agencies and provides advice the intended to be of help to management and professional staff with responsibilities for radiological protection. Legislation in most countries adheres closely to ICRP recommendations. The IAEA International Basic Safety Standards (IAEA, 2014) are based heavily on ICRP recommendations, and the International Labor Organization (ILO) Convention 115, Radiation Protection Convention,

General Observation 1992, refers specifically to the recommendations of ICRP. ICRP recommendations form the basis of radiological protection standards, legislation, programs, and practice worldwide.

The OECD / NEA document, Managing Environmental and Health Impacts of Uranium Mining (2014) is also used for reference.

2.4 Project Environmental Standards

This section summarizes the numerical standards for ambient environmental quality that are applicable to the Project, including both those mandated by Nigerien law, and international guidelines.

2.4.1 Air quality

Government of Niger Order no. 343/MSP/SG/DGSP/DHP/ES of 30 March 2021 provides ambient air quality standards. Selected standards are included in Table 2-5, along with the ambient air quality guidelines of the WBG/IFC (WBG/IFC, 2007a). (Note that the World Health Organization (WHO) guidance upon which WBG/IFC (2007a) was based were amended in 2021 (WHO, 2021). Table 2-6 includes the original and updated figures for reference.)

Table 2-6: Ambient air quality standards and guidelines

Parameter	**Concentration (µg/m^3)**			**Averaging Period**
	Niger Order no. 343 of 30 March 2021	**WBG/IFC (2007a)**	**WHO (2021)**	
Particulate Matter PM_{10}	80	20	15	Annual
	260	50	45	24-hour
Particulate Matter $PM_{2.5}$	-	10	5	Annual
	-	25	15	24-hour
Nitrogen dioxide NO_2	40	40	10	Annual
	-	-	25	24-hour
	200	200	200	1-hour
Sulfur dioxide O_2	50	-	-	Annual
	125	20	40	24-hour
	-	500	500	10-minute
Ozone O_3	120	100	100	8-hour daily maximum
	-	-	60	Peak season*
Carbon monoxide CO	30,000	-	4,000	24-hour
	-	-	10,000	8-hour
	-	-	35,000	1-hour
	-	-	100,000	15-minute

Note: see Article 40, Table 2 in Order no. 343/MSP/SG/DGSP/DHP/ES for a full list of substances
**Average of daily maximum 8-hour mean O_3 concentration in the six consecutive months with the highest six-month running-average O_3 concentration.*
Note: 24-hour figures are 99th percentile; i.e. 3-4 exceedance days per year are permitted.

The WBG/IFC General EHS guidelines (WBG/IFC, 2007a) provide air quality targets for exhaust gases and particulate matter associated with fossil fuel combustion (Table 2-7).

Table 2-7: Example small combustion facilities emissions guidelines

Combustion Technology/Fuel	**Particulate Matter (PM)**	**Sulfur Dioxide (SO_2)**	**Nitrogen Oxides (NO_x)**	**Dry Gas, Excess O_2 Content (%)**
Engine				
Gas	N/A[(a)]	N/A[(a)]	200 mg/Nm^3 (spark ignition) 400 mg/Nm^3 (dual fuel) 1,600 mg/Nm^3 (compression ignition)	15
Liquid	50 mg/Nm^3 or up to 100 mg/Nm^3 if justified by project specific considerations (e.g., economic feasibility of using lower ash content fuel, or adding secondary treatment to meet 50, and available environmental capacity of the site).	1.5 % sulfur or up to 3.0 % sulfur if justified by project specific considerations (e.g. economic feasibility of using lower S content fuel, or adding secondary treatment to meet level of using 1.5 % sulfur, and available environmental capacity of the site).	If bore size diameter < 400 mm use 1,460 mg/Nm^3 (or up to 1,600 mg/Nm^3 if justified to maintain high energy efficiency. If bore size diameter > or = 400 mm, use 1,850 mg/Nm^3	15
Turbine				
Natural Gas = 3 MWth[(b)] to <15 MWth	N/A[(a)]	N/A[(a)]	42 ppm (Electric generation) 100 ppm (Mechanical drive)	15
Natural Gas = 15 MWth to <50 MWth	N/A[(a)]	N/A[(a)]	25 ppm	15
Fuels other than Natural Gas = 3 MWth to <15 MWth	N/A[(a)]	0.5 % sulfur or lower percent sulfur (e.g., 0.2 % sulfur) if commercially available without significant excess fuel cost.	96 ppm (Electric generation) 150 ppm (Mechanical drive)	15
Fuels other than Natural Gas = 15 MWth to <50 MWth	N/A[(a)]	0.5% sulfur or lower % sulfur (0.2% sulfur) is commercially available without significant excess fuel cost.	74 ppm	15

Combustion Technology/Fuel	**Particulate Matter (PM)**	**Sulfur Dioxide (SO_2)**	**Nitrogen Oxides (NO_x)**	**Dry Gas, Excess O_2 Content (%)**
Boiler				
Gas	N/A[(a)]	N/A[(a)]	320 mg/Nm^3	3
Liquid	50 mg/Nm^3 or up to 150 mg/Nm^3 if justified by environmental assessment.	2,000 mg/Nm^3	460 mg/Nm^3	3
Solid[(c)]	50 mg/Nm^3 or up to 150 mg/Nm^3 if justified by environmental assessment.	2,000 mg/Nm^3	650 mg/Nm^3	6

Notes:
mg/Nm^3 is milligrams per normal cubic meter; Nm^3 is at one atmospheric pressure, 0°C
ppm is parts per million
(a) N/A – no emissions guideline; higher performance levels than these in the table should be applicable to facilities located in urban/industrial areas with degraded airsheds or close to ecologically sensitive areas where more stringent emissions controls may be needed.
(b) MWth (thermal megawatt) is heat input on higher heating value (HHV) basis. MWth category applies to the entire facility consisting of multiple units reasonably considered to be emitted from a common stack except for NOx and PM limits for turbines and boilers. Guideline values apply to facilities operating more than 500 hours per year with an annual capacity utilization factor of more than 30%.
(c) Solid fuels include biomass.

Order no. 343/MSP/SG/DGSP/DHP/ES of 30 March 2021 also provides process emission limits for various industries. Table 2-8 lists the standards from this Order that are deemed applicable to the Project. Where Nigerien standards are not available, or where international good practice standards are lower than the Nigerien standards, other guidelines have been adopted as shown.

Table 2-8: Stack emissions standards

Parameter	**Standard**	**Source**
Dust mg/m^3	50	Article 40, Table 4f of Niger Order no. 343 of 30 March 2021
Sulfur dioxide (SO_2) mg/m^3	450	Table 1 of WBG/IFC, 2007d
Sulfur dioxide (SO_2) kg/t	3	Article 40, Table 3.4 of Niger Order no. 343 of 30 March 2021
Sulfur trioxide (SO_3) mg/m^3	60	Table 1 of WBG/IFC, 2007d
Sulfur trioxide (SO_3) kg/t	0.15	Article 40, Table 3.4 of Niger Order no. 343 of 30 March 2021
Nitrogen oxides (NO_x) mg/m^3	300*	Table 1 of WBG/IFC, 2007d

** Lower than the 460 mg/m3 mandated by Order 343 of 30 March 2021 (Article 40 Table 4f)*

For waste incinerators, the standards in Annex VI of European Union Directive 2010/75/EU on industrial emissions will be referenced (Table 2-9).

Table 2-9: European standards for incinerator emissions

Parameter	**EU Directive 2010/75/EU emissions limit**
Total dust	10 mg/m^3
Total organic carbon (TOC)	10 mg/m^3
Carbon monoxide (CO)	50 mg/m^3
Sulfur dioxide (SO_2)	50 mg/m^3
Oxides of Nitrogen (NO_x) expressed as NO_2	200 mg/m^3
Hydrogen chloride (HCl)	10 mg/m^3
Hydrogen fluoride (HF)	1 mg/m^3
Cadmium (Cd)	0.05 mg/m^3
Mercury (Hg)	0.05 mg/m^3
Total metals	0.5 mg/m^3
Dioxins and furans	0.1 ng/m^3

Note: emission limits are daily averages except cadmium, mercury and total metals (sampling period minimum 30 minutes and maximum 8 hours); and dioxins and furans (sampling period minimum 6 hours and maximum 8 hours)

2.4.2 Noise

Table 2-10 lists WBG/IFC guidelines for ambient noise (WBG/IFC, 2007a).

Table 2-10: WBG/IFC Noise Level Guidelines

Receptor	**One hour L_{Aeq} (dBA)**		**Notes**
	Daytime (07:00 – 22:00)	**Night-time (22:00 – 07:00)**	
Residential, institutional and educational	55	45	Or a maximum increase in background levels of 3 dB at the nearest receptor off-site
Industrial and commercial	70	70	

For occupational noise, WBG/IFC (2007a) recommends:

- No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C);
- The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB(A); and,
- Although hearing protection is preferred for any period of noise exposure in excess of 85 dB(A), an equivalent level of protection can be obtained, but less easily managed, by limiting the duration of noise exposure. For every 3 dB(A) increase in sound levels, the 'allowed' exposure period or duration should be reduced by 50 percent.

2.4.3 Drinking Water

Order no. 342/MSP/SG/DGSP/DHP/ES of 29 March 2021 provides standards for drinking water quality. This Order states that drinking water must not contain any pathogenic germs; should be colorless, odorless and tasteless; and should comply with the limits listed in Table 2-11.

Table 2-11: Selected Niger drinking water quality regulations and WHO guidelines

Parameter	**Unit**	**Niger Order no. 342/MSP/SG/DGSP/ DHP/ES of 29 March 2021**	**World Health Organization (WHO) Guideline Value for Drinking Water (WHO, 2022)**
Fecal coliforms (water from springs, wells & boreholes)	Number per mL	0	-
Total coliforms (water from wells & boreholes)	Number per mL	0, in 98% of samples per year	-
pH	-	6.5 – 8.5	6.5 – 8.5
Turbidity	NTU	0.5	-
Total dissolved solids	mg/L	500	600

Parameter	**Unit**	**Niger Order no. 342/MSP/SG/DGSP/ DHP/ES of 29 March 2021**	**World Health Organization (WHO) Guideline Value for Drinking Water (WHO, 2022)**
Ammonium	mg/L	0.5	-
Antimony (Sb)	mg/L	0.001	0.02
Arsenic (As)	mg/L		0.01 (A, T)
Barium (Ba)	mg/L	0.01	1.3
Boron (B)	mg/L	0.3	2.4
Bromate	mg/L	-	0.01 [(a)] (A, T)
Cadmium (Cd)	mg/L	0.003	0.003
Calcium (Ca)	mg/L	75	-
Chlorine (Cl)	mg/L	250	5 (C) [(b)]
Chromium (CR)	mg/L	0.05	0.05
Copper (Cu)	mg/L	2	2
Cyanide	mg/L	0.05	-
Fluoride	mg/L	1.5	1.5
Iron (Fe)	mg/L	0.3 - 1.0	-
Lead (Pb)	mg/L	0.01	0.01 (A, T)
Magnesium (Mg)	mg/L	50	-
Manganese (Mn)	mg/L	0.4	80 (P)
Mercury (Hg)	mg/L	0.001	0.006
Nickel (Ni)	mg/L	-	0.07
Nitrate	mg/L	45	50
Nitrite	mg/L	3	3
Selenium (Se)	mg/L	0.01	0.04 (P)
Silver (Ag)	mg/L	0.001	-
Sulfates (SO_4)	mg/L	200	-
Mg sulfate	mg/L	500	-
Na sulfate	mg/L	1	
Uranium (U) [(c)]	mg/L	1.4	0.03 (P)
Zinc (Zn)	mg/L	3	-
Gross alpha radioactivity	Bq/L	0.1	0.5 [(d)]
Gross beta radioactivity	Bq/L	1.0	1.0 [(d)]
Uranium-238	Bq/L	10	10
Uranium-234	Bq/L	1	1
Thorium-230	Bq/L	1	1
Radium-226	Bq/L	1	1
Lead-210	Bq/L	0.1	0.1
Polonium-210	Bq/L	0.1	0.1

Notes:
A: provisional guideline value because calculated guideline value is below the achievable quantification level.

C: concentrations of the substance at or below the health-based guideline value may affect the appearance, taste or odor of the water, leading to consumer complaints.
P: provisional guideline value because of uncertainties in the health database.
T: provisional guideline value because calculated guideline value is below the level that can be achieved through practical treatment methods, source protection, etc.
(a) For substances that are considered to be carcinogenic, the guideline value is the concentration in drinking-water associated with an upper-bound excess lifetime cancer risk of 10^{-5} (one additional case of cancer per 100 000 of the population ingesting drinking-water containing the substance at the guideline value for 70 years). Concentrations associated with upper-bound estimated excess lifetime cancer risks of 10^{-4} and 10^{-6} can be calculated by multiplying and dividing, respectively, the guideline value by 10.
(b) For effective disinfection, there should be a residual concentration of free chlorine of ≥0.5 mg/l after at least 30 min contact time at pH <8.0. A chlorine residual should be maintained throughout the distribution system. At the point of delivery, the minimum residual concentration of free chlorine should be 0.2 mg/l.
(c) Guideline level based on chemical toxicity. For guideline values based on radioactivity, see further down table.
(d) Screening level – above this level, concentrations of individual radionuclides should be determined and compared with the guidance levels in WHO (2022).

2.4.4 Effluent Discharge

Table 2-12 lists Nigerien standards for effluent quality, with WBG/IFC guidelines shown for comparison.

Table 2-12: Nigerien and WBG/IFC standards for effluent discharge

Parameter	**Units**	**Effluents (Niger Order No. 343/MSP /SG/DGSP/DHP/ES)***	**Process effluent (WBG/IFC, 2007b)**	**Treated Sanitary Sewage Discharges (WBG/IFC, 2007a)**
Ammonium	mg/L	15	-	-
Arsenic	mg/L	0.05	0.1	-
BOD[(a)]	mg/L	50	50	30
Cadmium	mg/L	0.01	0.05	-
Chromium	mg/L	0.05	0.1	-
COD[(b)]	mg/L	100	150	125
Copper	mg/L	1	0.3	-
Cyanide Total	mg/L	0.1	1	-
Cyanide free	mg/L	-	0.1	-
Cyanide WAD	mg/L	-	0.5	-
Iron (total)	mg/L	-	2.0	-
Lead	mg/L	0.2	0.2	-
Mercury	mg/L	0.1	0.002	-
Nickel	mg/L	1	0.5	-
Oil and grease	mg/L	10	10	10
pH	pH	6 – 9	6-9	6-9
Phenols	mg/L	-	0.5	-
Selenium	mg/L	0.01	-	-
Temperature	°C	-	<3 degree differential	-

Parameter	**Units**	**Effluents (Niger Order No. 343/MSP /SG/DGSP/DHP/ES)***	**Process effluent (WBG/IFC, 2007b)**	**Treated Sanitary Sewage Discharges (WBG/IFC, 2007a)**
Total coliform bacteria	MPN[(c)] / 100 ml	-	-	400
Total nitrogen	mg/L	10	-	10
Total phosphorus	mg/L	-	-	2
Total suspended solids	mg/L	15	50	50
Uranium	mg/L	0.3	-	-
Zinc	mg/L	1	0.5	-

** The listed criteria are specifically for mines and metallurgical facilities, or, where these are not given, are for effluent that does not flow into a treatment plant. Note that this table only includes selected details from the Order, which must be complied with in full.*
[(a)] Biochemical Oxygen Demand [(b)] Chemical Oxygen Demand [(c)] most probable number per 100 milliliters

3 Project description

The following Project description is summarized from the Feasibility Study (METC, 2023), and includes the additional design work that has been undertaken since the approved regulatory ESIA (Groupe Art & Génie, 2020) was finalized.

3.1 Background and history

Uranium exploration commenced in Niger in the early 1950s, following up on indications from spotty surface mineralization. Exploration progressed in three phases dictated by the economics of the mineral at various times: from 1957 to 1981 regional exploration was carried out by the French Nuclear Energy Commission; between 1981 and 1990 the Power Reactor and Nuclear Fuel Development Corporation (PNC) and the Niger National Geological Survey (ONAREM) carried out further work, and a third phase commenced in 2007, during which the Adrar Emoles AE3 and AE4 Exploration Permits were granted to GAFC.

The presence of uranium mineralization at Dasa was confirmed by PNC in the 1980's (Dasa is actually an acronym for Dajy Area Surface Anomaly). In 2011, GAFC announced new uranium discoveries within the AE3 Exploration Permit. Later drilling confirmed that high-grade mineralization exists below feasible open-pit depths, including reported grades of 0.35% uranium oxide equivalent (eU_3O_8) over a 30 m length in one drillhole, and 0.21% eU_3O_8 over a 25 m length in another.

In June 2012, the Dajy exploration camp was opened which allowed easier access to the whole concession area and the drill sites.

In 2017 to April 2018, GAC drilled an additional 36 holes which targeted the southern flank zone of the graben. CSA Global completed a preliminary economic assessment of the Dasa Project in 2018, which concluded that the most attractive returns would be generated from a stand-alone, underground, high-grade mining scenario which would potentially operate for a period of 15 years and produce between 4 million pounds (Mlb) and 7 Mlb of U_3O_8 annually.

The Dasa Project will be implemented in an area which is familiar to uranium mining. The French group ORANO has been mining uranium since the 1970s, including at the Somaïr and Cominak mines near Arlit approximately 110 kms north of Dasa. The Cominak mine closed in March 2021 after a 50-year mine life. GAFC has hired several members of the Cominak senior management team to run the Dasa Project, along with experienced mine workers.

3.2 Geology

Uranium mineralization in Niger is located in sediments of the Tim Mersoï Basin and occurs in most of the thicker sandstone units, although not always in economic concentrations and tonnage.

Uranium is known in the Carboniferous Terada series, in the Carboniferous Tarat and Guezouman formations (Arlit mines), in the Permian Izegouande, the Jurassic Tchirézrine 2 Formation (Imouraren, Dasa, Azelik deposits) and the Cretaceous Dabla Series as well as in the Tegama Series.

The uranium in many of the deposits of the Tim Mersoï Basin is oxidized. Among the primary tetravalent minerals, coffinite is dominant and accompanied by pitchblende and silico titanates of uranium. Uranium hexavalent minerals such as uranophane and meta-tyuyamunite are present in the Imouraren deposit.

The gangue is composed of quartz, feldspar, analcime and often illite, kaolinite and chlorite, and with accessories such as some zircon, ilmenite, magnetite, tourmaline, garnet, anatase and leucoxene. The uranium minerals are frequently associated with copper minerals (native copper, chalcocite, chalcopyrite, malachite, chrysocolla) and also with iron minerals such as pyrite, hematite and goethite. Organic plant materials are generally plentiful in un-oxidized facies of greyish-greenish color.

The source of the uranium is very likely leaching of the frequent volcanic tuff and ash blankets and intercalations, now altered to analcimolite, within the Wagadi and Dabla sediment packages. This has occurred over time in the geological history of the area, and probably began as pre-uranium concentrations during the early sedimentation in favorable reducing environments such as organic matter-rich lower flow regimes and in favorable lithologies. The first stratiform mineralized bodies would have been formed during the early digenesis. Later, structural deformation and groundwater movement within coarser grained organic-rich sediments and aided by fluid movements and influenced by faults and tectonic activity, initiated redistribution of the uranium, thus giving the mineralized bodies their present shape.

The mineralization is contained in a graben environment with down-faulted blocks. The creation of the graben preserved the Tegama and Irhazer formations at depth, elsewhere found much farther to the west in the deeper areas of the Tim Mersoï Basin. It also preserved the rocks of the Tchirozérine 2 Formation which are extensively eroded on the sides of the graben. This vertical displacement has had a major impact in the continuation of potential host rock geometry and has also provided feeder faults and mineralization traps for mineralizing fluids, as evidenced by veining within the sandstones.

3.3 Project overview

The selected mining method for the Dasa orebody is an underground transverse longhole open stoping (LHOS) method with a cemented fill. The method is fully mechanized. The identified mining areas will be accessed by a single decline ramp developed from surface at a gradient of 8 degrees in the footwall of the orebody. Access to the stoping blocks will be at 22.5 meter (m) vertical intervals with a footwall drive developed along strike 20 m from the stopes. Stope access crosscuts will be developed at 16.5 m intervals off the footwall drive.

The mine ventilation system is a key aspect of the mine design due to the presence of radioactive elements in the air. The designed ventilation system is a once-through system (i.e., there is no recirculation of air) and will replace the volume of air in the mine on average every 15 minutes. Ventilation of those excavations within the orebody where the radiation risk is highest is by use of an exhaust system which removes contaminated air from the workings immediately into the return airway system, thereby ensuring that risk relating to exposure to radiation is minimized at all times.

The proposed processing solution for the Dasa Project is an acid leach (pugging) followed by solvent extraction of the uranium from solution. The selected pugging and curing process has been successfully applied at the Cominak and Somaïr operations in Arlit. It utilizes the addition of high strength lixiviant and oxidative chemicals (sulfuric acid and nitric acid) to create aggressive reaction conditions in a low moisture feed, which promotes the uranium leaching characteristics with limited dissolution of undesirable gangue elements like silica which would otherwise have negative downstream process implications. The plant recovery model allocates an overall recovery of 94.15% for the processed uranium ore. The plant has a capacity to treat 365,000 tonnes per annum (t/a) of run-of-mine (ROM) ore at a head grade of 5,267 parts per million (ppm) U_3O_8. Annual production will be approximately 4.1 Mlb eU_3O_8.

As of January 2023, the Dasa Project has a probable mineral reserve of 4.1 Mt ROM at 5,267 ppm eU_3O_8, for a total production of 47.2 Mlb of eU_3O_8.

The life of mine will include a 23-month ramp-up stage followed by 12 years of steady-state mining and processing.

The Dasa uranium product will be used for power generation. GAC has entered into two off-take agreements with North American utilities for a total of 650,000 pounds of uranium oxide to be delivered over five years, starting Q1 2025.

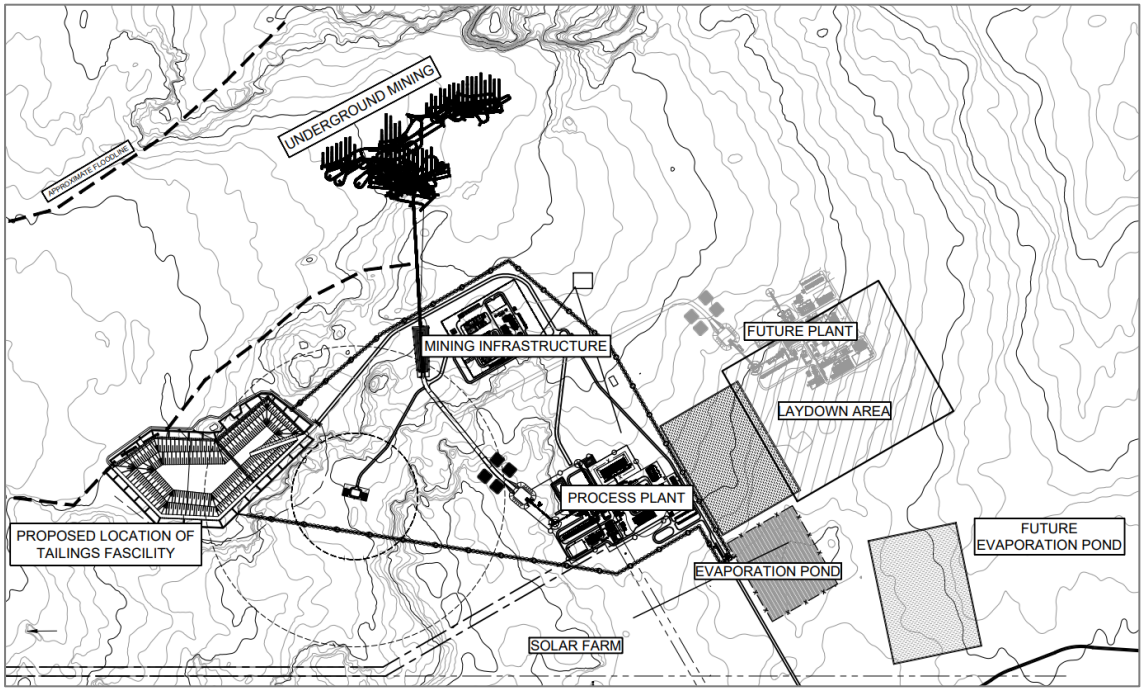


Figure 3-1: Proposed infrastructure

3.4 Mining method

Access to the underground workings will be via a single decline ramp developed from surface. The decline will serve as an intake airway and conduits for the transport of rock, personnel, and material. The decline will be developed at a nominal inclination of -8°, or 1:7, and will be sized to accommodate the selected mining equipment as well as the required intake ventilation at suitable airflow velocities. The decline system will be located in the footwall of the orebody.

As part of preliminary works, excavation of the underground ramp began in November 2022 (Figure 3-2).

In addition to the decline ramp access to the mine, two ventilation shafts will be excavated for the purposes of both ventilation and as a second means of egress from the mine in case of emergency.

Access to the orebody will be established at selected elevations by developing a level access from the decline towards the orebody, in a direction approximately perpendicular to the strike of the orebody. A footwall drive will be developed approximately 20 m from the orebody, along strike. The stope access crosscuts spaced at 16.5 m centers will be developed from the footwall drive across the orebody. The stoping method proposed for Dasa is Longhole Open Stoping (LHOS) with cemented backfill.

Figure 3-2: Opening blast ceremony, November 5, 2022; underground development begins

The level spacing is nominally 22.5 vertical meters. The general sequence of stoping will be bottom-up. Mining will commence on the lowest sublevel level in a mining block, progressing upwards towards a sill pillar, separating the mining block from the one above. Stopes will be filled with cemented fill. The use of the cemented backfill will allow the mining of the secondary stopes once the mining of the primary stopes is completed.

The mine has been divided into five zones formed by areas of higher grade, as targeted in the mine plan. The maximum depth of mining is approximately 630 m below surface.

The mine is designed to produce 1,000 tonnes per day (tpd) of ROM feed to the plant.

Ore will be trucked to surface using underground articulated dump trucks and tipped directly onto the ROM pad adjacent to the plant. Stockpiles will also be created adjacent to the ROM pad, which will assist in ore drying and ore blending. The waste rock produced from the development of the mine will either be used in the construction of the dry stack tailing storage facility (see below) or disposed of underground in the backfill. Waste rock will be deposited at one or other of these places and no permanent waste rock dump will be required.

Acid Base Accounting (ABA) and Net Acid Generation (NAG) testing undertaken on a bulk sample of ore in 2011 found that elemental iron, sulfide mineralization and sulfur are not present in significant amounts, and that sufficient neutralizing potential is present in the ore such that acid rock drainage (ARD) generation and associated metals leaching is highly unlikely to occur.

In 2022, five additional waste rock samples were subjected to ABA, NAG, whole rock analysis (WRA), and metal scan tests. The metals scan did not indicate significant concentrations of potentially toxic elements (e.g., mercury, silver, arsenic, cadmium, cobalt, chromium, copper, nickel, lead, and zinc), and suggests the rock is primarily aluminosilicate and silicate, with major concentrations of iron, aluminum, and alkali/alkali earth metals (i.e., calcium, potassium, magnesium, and sodium). The ABA/NAG testing concluded none of the samples will generate ARD. One of the five samples was determined to have the ability to neutralize infiltrating acid.

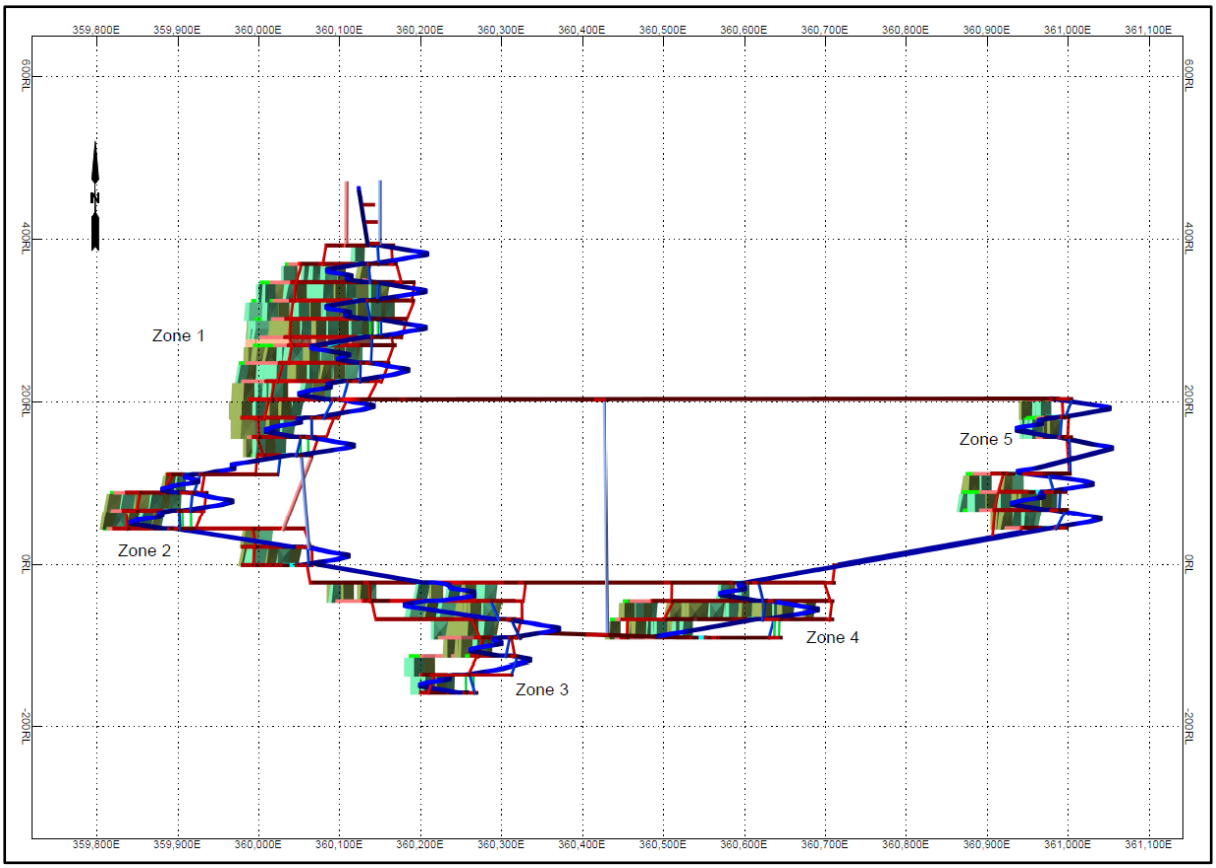


Figure 3-3: Schematic section of the underground mine looking North

3.5 Mining equipment

Standard mechanized underground mining equipment is proposed and will comprise electro-hydraulic long hole face drilling rigs and modern ground support drilling rigs (4 total). Proposed rock handling equipment will comprise diesel powered 14-tonne Load-Haul-Dump (LHD) units (4 no.) and 42-tonne articulated dump trucks (ADT) (5 no.).

Ancillary equipment will consist of diesel-powered charge-up vehicles, utility vehicles and other light vehicles such as Integrated Tool Carrier (ITC) units, man-carriers, mobile rock-breaker, maintenance utility vehicle, and crane.

Figure 3-4: Examples of underground mining equipment; LHD and ADT (epiroc.com)

3.6 Ventilation

Traditionally, the primary airflow quantity for mechanized mines is based on the amount of air required to dilute the exhaust gases released by all the diesel equipment to maximum accepted levels

in the atmosphere. However, uranium mines require enough ventilating air to ensure that all employees in the mine have minimum exposure to radiation levels.

A description of mine ventilation is included in Chapter 5 on Radiation Protection.

3.7 Dewatering

The mine dewatering system is a dirty water handling system and will serve to collect and transfer mine water from the production and development areas to the surface. The system has been designed to accommodate the service water load from the mining activities in addition to inflows from the backfill system and a constant groundwater inflow.

The primary dewatering system includes five dirty water pump stations, which transfer all water to the surface water treatment facility. In addition to the primary dewatering system, the design includes various secondary infrastructures and equipment to collect and transfer water to the primary dewatering system.

Due to the expectation that the groundwater inflows will be seasonal and predominately report to the decline, a specific dewatering design will be employed to reduce inflows at the decline development end. The design includes cover drilling for water ahead of the decline development and the use of mobile skid dams to collect and transfer water to the primary dewatering system.

For further consideration of water management, see section 3.11.

3.8 Ore processing

Ore from the underground mining operation may be tipped directly into the crusher feed bin from the haul trucks if the grade is suitable (Figure 3-5); otherwise it will be deposited onto stockpiles of differing grades and then transported to the crusher by front-end loader. Crushed ore is then delivered to a mill feed stockpile by conveyor belt.

Reclaim feeders under the stockpile will feed ore via a conveyor belt to the semi-autogenous grinding (SAG) mill, where the ore is dried and milled. The milling process includes screening and ore recirculating back to the SAG mill until a final product size of 0.6 mm is attained. Ore discharging from the milling process will report to a revolving pug drum where sulfuric acid and nitric acid are introduced to start the uranium extraction process. The retention time in the pugging drum is approximately 15 minutes before the ore discharges and reports via a feed conveyor to the curing conveyor belt.

The curing conveyor belt is a slow-moving wide conveyor that transports the ore over a total distance of 300 m (150 m on the outgoing leg and 150 m on the return leg). The ore cures for approximately 3 hours on the curing belt where the uranium recovery is further enhanced. Ore discharges from the curing belt and is fed to the leach section where it discharges into re-pulping tanks and is then pumped to the leach tanks where additional sulfuric acid is added to enhance the dissolution process.

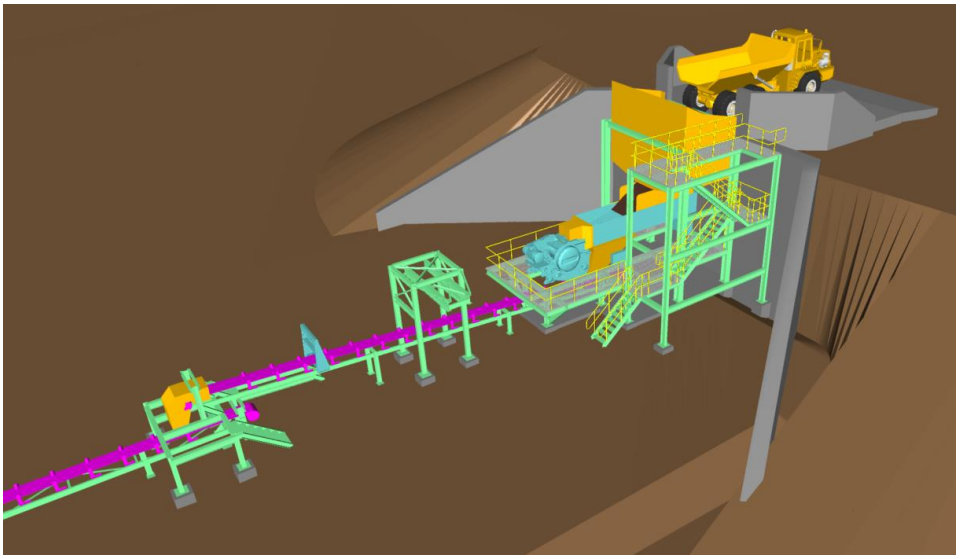


Figure 3-5: Crushing Circuit

The slurry solution in the leach circuits flows through a five-tank gravity cascade system and is pumped to the horizontal belt filters. The slurry is distributed across two horizontal belt filters where the solution containing the uranium is separated from the solids (tailings). The tailings discharge onto a conveyor belt that can distribute the solids to either the backfill plant (for underground placement) or the lined dry stack tailing storage facility. The backfill process will consume approximately 50% of the total tailings product in a batch process, and when the backfill plant does not require tailings, then the total tailings stream will report to the lined dry stack tailings storage facility.

The uranium-containing solution from the horizontal vacuum belt filter is pumped via the pregnant leach solution tanks to the solvent extraction plant. At the solvent extraction plant, the solution will report to the four-stage extraction section where kerosene and other reagents are used for the purification of the uranium. The next step in the solvent extraction plant is the scrubbing process (three-stage) that minimizes the transfer of organics to the stripping stage, where the remaining organics are removed using sodium carbonate in a three-stage process.

The uranium-bearing solution is then pumped to the precipitation section where the uranium is precipitated as sodium di-uranate. Precipitation of the uranium is achieved through a five-tank cascade process at elevated temperatures with the addition of caustic soda. The separation of the solids from the liquid fraction is then undertaken in a further horizontal vacuum belt filter with the uranium reporting as the solids. Discharge from the belt filter is then dried and packed into drums in an automatic drum filling process. Drums are loaded onto pallets and the pallets are loaded into containers for export.

Reagents used in the recovery process are delivered in a range of packaging types (dry powder to liquids) and, through several dedicated reagent make-up plants, are made up into useable and easy-to-dose concentrations for application at specific points in the recovery process (see section 3.10 below for further details on handling of hazardous materials).

3.9 Tailings Storage

3.9.1 Design and Construction

The Dry Stack Tailings Storage Facility (DSTSF) has been designed according to the following guidelines:

- South African National Standards (SANS);
- South African National Environmental Management: Waste Act (Act 59 of 2008);
- International Atomic Energy Agency (IAEA) technical reports on the disposal and management of radioactive waste;
- International Commission on Radiological Protection (ICRP) guidelines; and,
- The Global Industry Standard on Tailings Management (GISTM).

The total life of mine production of tailings will amount to 4.39 Mt over 12 years, of which only 50% will report to the DSTSF, equating to 2.20 Mt over 12 years. The remainder of the tailings produced will report to backfilling of underground stopes. The average rate of filter belt tailings reporting to the DSTSF is 500 dry tonnes per day.

The tailings are classified as a Type 3 waste according to South African legislation and require a Class C Landfill Liner (Figure 3-6).

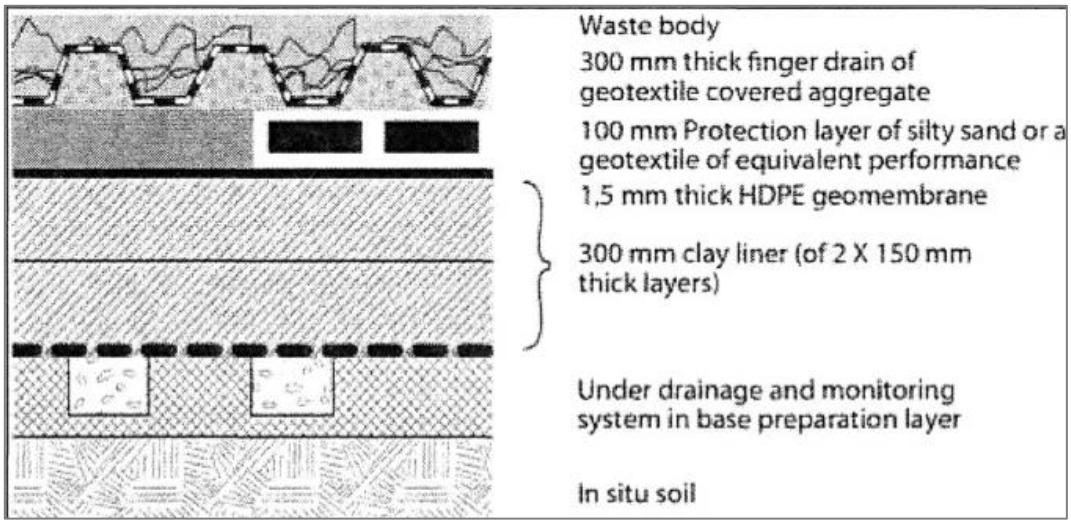


Figure 3-6: Engineering design requirements for a Class C Landfill (South African standards)

However, due to the 'dry' nature of the tailings product received at the facility, as well as the climatic conditions and geology of the area, it has been determined that a number of the Class C liner layers can be removed or adjusted as follows (from top to bottom):

- Finger drain of geotextile covered aggregate – toe drains have been placed at the toe of the lowest wall in each compartment, therefore this layer will not be required;
- Protection layer of silty sand or geotextile of equivalent performance –this layer will be required to protect the high-density polyethylene (HDPE) geomembrane from the mobile equipment operating the facility (hauling, placing, compacting, etc.) as well as exposure to ultraviolet light, which may cause decay; and,
- Under drainage and monitoring system in base preparation layer – since the tailings product will be 'dry' and be allowed to dry out before compaction, the underdrainage system will not be necessary. Any seepage within the tailings will flow to the toe drains and therefore no hydrostatic pressure head is expected to develop above the liner (which would cause seepage should there be a hole or defect in the liner). This layer has thus been excluded from the design.

Based on these adjustments, the basin and toe paddock liner system for the DSTSF will consist of the following:

- 300 mm layer of liner cushion/impermeable layer (material obtained from borrow areas around the site) compacted in layers of 150 mm thick to 98% Standard Proctor Density;
- 1.5 mm single textured HDPE geomembrane; and,
- 300 mm liner protective layer of sand (on the starter wall side slopes, the sand protective layer has been replaced by an A6 Bidim geotextile, or similar).

The DSTSF will be constructed as three phased compartments with two tiers each. The three compartments are individually constructed to the first tier over the entire footprint area of the facility. The infrastructure layout for the three compartments is shown in (Figure 3-7).

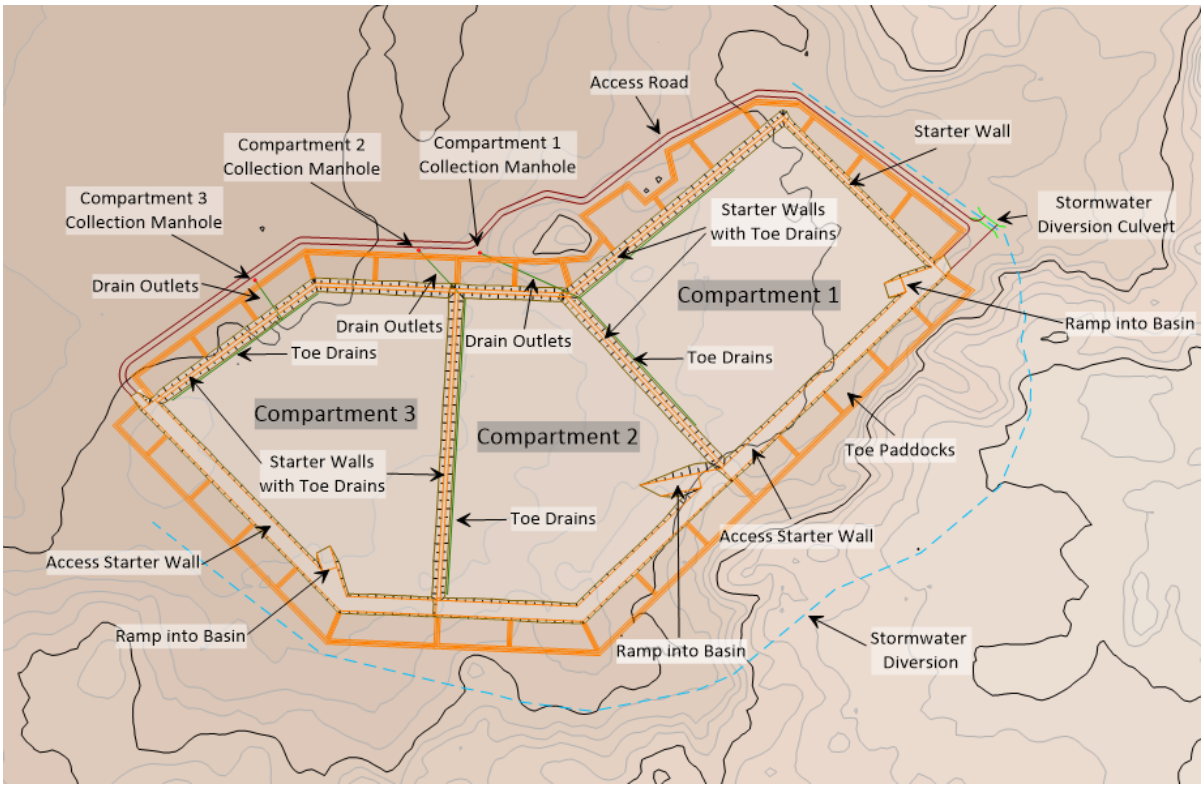
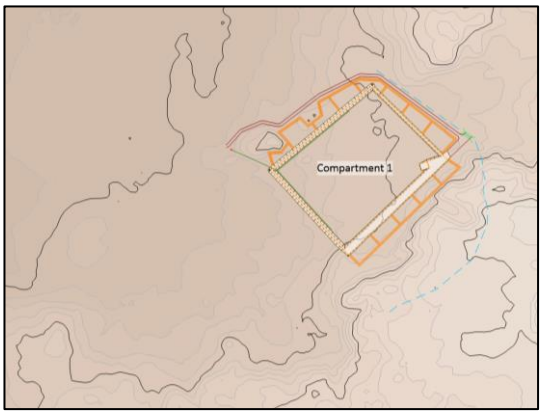


Figure 3-7: DSTSF

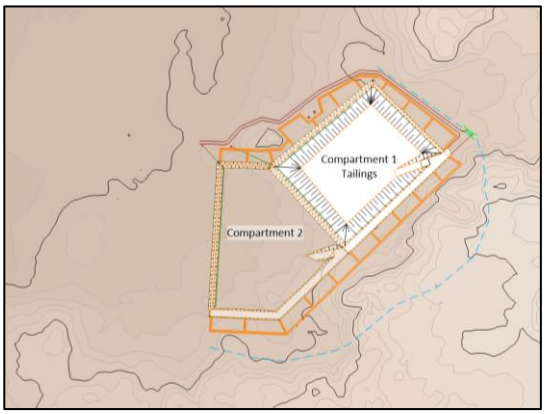
The second tier will involve the simultaneous lifting of all three compartments to the DSTSF's final elevation. The phasing of the DSTSF will require that each successive compartment be constructed and equipped to receive tailings upon termination of the storage capacity of the former compartment to Tier 1. The phased development and operation of the DSTSF is illustrated in Figure 3-8.

The delineation of the zone of influence and the safety classification of the DSTSF was carried out in accordance with the method specified by SANS 0286:1998. Based on the safety classification criteria detailed in the code of practice, the DSTSF has been classified as a Low Hazard facility.

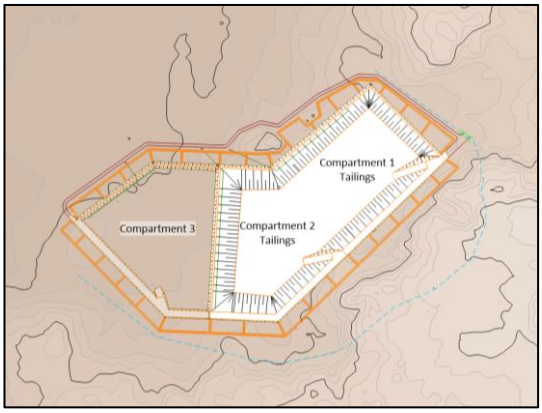
Seepage and slope stability analyses were conducted on the DSTSF using the in-situ soil parameters from the geotechnical site investigation and tailings values from test work conducted on a representative sample. Stability analyses were considered for the facility under operating conditions at the final height as well as post-closure conditions. The results show that the facility is stable, with a factor of safety well above 1.5 for both static and pseudo-static conditions.



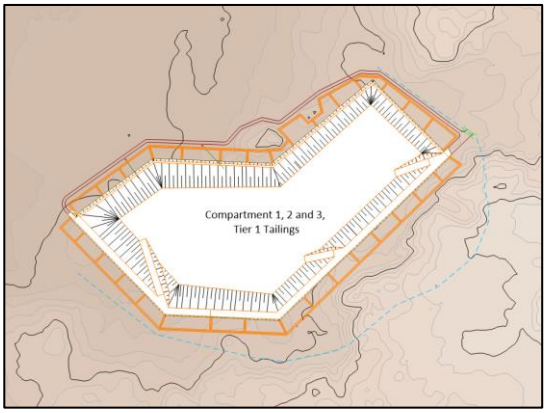
Compartment 1



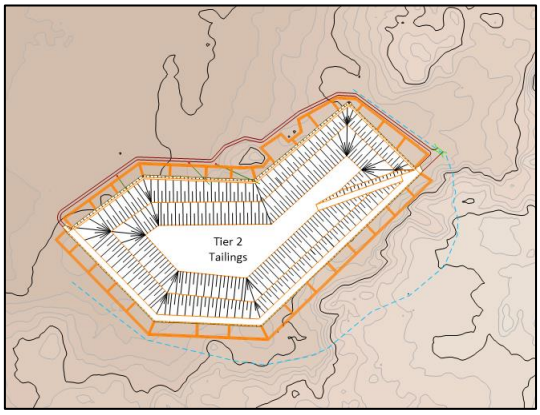
Compartment 2



Compartment 3



Compartment 1, 2 and 3 – Tier 1



Compartment 4 – Tier 2

Figure 3-8: Phasing of the DSTSF

In 2022, a sample of neutralized pilot study test (PST) tailings was subjected to WRA, ABA, NAG, trace element, and leachate testing. The results are summarized as follows:

- The analysis did not indicate significant concentrations of potentially toxic elements (e.g., mercury, silver, arsenic, cadmium, cobalt, chromium, copper, nickel, lead, and zinc), and

suggests the tailings are primarily aluminosilicate and silicate, with major concentrations of iron and alkali/alkali earth metals (i.e., calcium, potassium, magnesium, and sodium);
- Leachate test results did not suggest that the mobility of inorganic potential contaminants within the tailings is sufficient to generate hazardous leachate. However, it was noted that the concentration of uranium, at 7.93 mg/L, was close to the 10 mg/L reference standard (being the limit generally imposed in Canada); and,
- The risk of acid rock drainage generation was determined to be low, largely due to the low sulfide content of the tailings.

3.9.2 Operation

Dry tailings from the filter belt press will be stockpiled prior to transport, via haul trucks, to the DSTSF. The tailings will be tipped in the active compartment, and then spread and shaped using a dozer, before being compacted using a vibratory roller. Adjustments will be made as necessary to achieve the optimal moisture content for compaction: if the tailings are too wet, they will be spread out in thinner layers to allow further drying; if they are too dry, they will be watered using a bowser. Testing will confirm that specified densities have been achieved (95% Standard Proctor Density within 25 m of the outer slopes and 90% Standard proctor Density in the interior).

The tailings stream emanating from the filter belt press will be monitored regularly for its particle size distribution, moisture content, and bulk density.

Routine, daily inspections will be undertaken to monitor the operation, safety, and performance of the DSTSF, including:

- Presence of water ponding on the surface;
- Deformation, settlement, or cracking of placed tailings;
- Evidence of excessive erosion of the tailings surface or side slopes;
- Excessive dust generation;
- Condition of the perimeter toe drains, trenches, and access roads;
- Seepage flow rates in the seepage collection chambers; and,
- Any other unusual conditions.

3.9.3 Closure

Upon mine closure, the DSTSF will be capped to both control long-term radon emissions and provide stability to the structure. Detailed design of the cover is to be developed, but it is expected to comprise (from bottom to top):

- 1.5 mm single textured HDPE layer;
- 300 mm compacted low-permeability clay layer; and,
- 3 m rock cover.

The closure and capping of the DSTSF will occur in four stages over the facility's design life, to reflect the phasing illustrated in Figure 3-8. The first three capping stages will occur on the side slopes of each compartment as it reaches Tier 1. The final closure will occur at the cessation of the Tier 2 raise and will include installation of the closure cover layer and shaping to reduce erosion and direct run-off. The aridity of the environment suggests that the establishment of a vegetated cover is not likely to be viable. Waste rock will be placed on the outer slopes of the facility to provide protection against erosion during storm events.

There will be an aftercare and maintenance program for the DSTSF, to include inspection for signs of erosion damage, overall stability analysis, and monitoring for radon release and surface water / groundwater quality.

3.10 Hazardous materials

Table 3-1 identifies the hazardous materials that will be in use at the site, including the approximate quantities used per month.

Table 3-1: Hazardous materials handled on site

Material	**Quantity per month**	**Hazard***
Explosive gel (Magnum Buster 38X560)	40,000 kg	Explosive
Detonating cords	3500 m	Explosive
Fittings	10,000 pieces	Explosive
Detonators	13,100 pieces	Explosive
Diesel	400 m^3	Health / environment
Sodium Nitrate	105 t	Health / oxidizing
Sulfuric acid	2750 t	Corrosive
Kerosene	19 m^3	Health
Amine	3 m^3	Corrosive / health
Tridecanol	3 m^3	Health
Sodium Carbonate	39	Health
Hydrogen peroxide	47	Oxidizing / corrosive / health
Oils	To be confirmed	Health / environment

* European Chemicals Agency (https://echa.europa.eu

Bulk emulsion for underground blasting will be stored on site in iso-tainers provided by the explosives supplier. Provision has been made for a bunded concrete pad for placement of four iso-tainers, which will provide storage capacity of 120 tonnes of bulk emulsion. This equates to approximately two months' worth of supply.

Access to the explosive store will be strictly controlled. Transport of explosives and detonators will be effected on site in two clearly marked vehicles, under the supervision of the chief firefighter. Each blasting event will have a predefined plan including the drilling plan, a plan for loading the holes with cartridged emulsions, and a priming plan governing the connection of the various lines. Blasts will normally be done at the end of a shift. After appropriate sentries are put in place, the blast is triggered by the chief firefighter, positioned safely at the firing station. A delay of 15 minutes is imposed after the detonation before the chief firefighter and his deputy enter the exclusion zone to carry out their inspection and declare the area safe to enter.

3.11 Water supply and management

The total water demand for the Dasa Project (including the process plant, mine and camp) is estimated to be approximately 100 m^3/hr (28 L/s).

Groundwater modelling (CSA Global, 2022) predicts that mine inflows are likely to be significantly greater than the current site water demand, and that mine dewatering can therefore meet all site water demands. The groundwater modelling suggests that groundwater inflows to the mine will increase as mining progresses. Inflows will start at between 36 m^3/hr and 72 m^3/hr (10 L/s and 20 L/s)

as the decline ramp is developed, increasing to approximately 180 m^3/hr (50 L/s) over the next two years as mining proceeds in Zone 1. Total inflows are predicted to increase to approximately 360 m^3/hr (100 L/s) as the mine extends into Zone 2, to 540 m^3/hr (150 L/s) in Zone 3, and to approximately 792 m^3/hr (220 L/s) in Zones 4 and Zone 5.

A significant proportion of the inflows originates from where the mine workings intersect permeable sandstone units, particularly the deeper Teloua and Tarat aquifers. Evaluation of long-term, steady state predicted groundwater inflows, which occur late in the mine life, indicates that the predicted groundwater inflows in the Teloua aquifer are significantly reduced from their potential maximum, suggesting that the Teluoa aquifer is compartmentalized within the graben which hosts the mineralization; i.e., there is restricted hydraulic connection between the graben and the surrounding bedrock.

Because the quantity of water which must be pumped from the mine exceeds that required by the Project, strategies to reduce groundwater inflows to the mine are being formulated so as to minimize water management requirements. Mitigation efforts include grouting of mine drives where they intercept high-permeability aquifers to seal mine compartments from water ingress, and the drilling of horizontal and/or vertical boreholes in advance of mining, to intercept and divert water. Modelling suggests that a combination of these mitigation strategies could reduce end-of-life mine flows by about 20%, i.e. from approximately 792 m^3/hr (220 L/s) to 626 m^3/hr (174 L/s).

Raw water will be pumped to a water storage pond at the processing plant. The raw water pond has a 1,500 m^3 capacity to minimize the impact of short-term supply interruptions. Water will be pumped from the water storage pond to the plant process water tank.

The process plant is the main user of water on site. The process plant raw water consumption is approximately 41 m^3/h, equivalent to 0.82 m^3/t of ore processed. Some of this water would be in the form of demineralized water for use in solvent extraction (SX) and concentrate purification.

An additional 23.1 m^3/h of water is consumed by various services which include dust suppression, offices, acid plant and others.

Two water treatment plants will be constructed on site: one for process water and the other for water for domestic consumption (drinking, cooking, showering, etc.). These will include clarification through flocculant addition, sand filtration, carbon filtration and biocide dosing.

While rainfall in the Project area is extremely low, an effective surface water/storm water management system will still be required to ensure that extreme rainfall events (even if occurring in remote mountains) will not impact mine operations. Surface water management design will have the objective of intercepting and diverting non-contact water away from the mine area, and the collection and treatment of contact water from these areas.

A conceptual surface water management design has been developed to appropriately manage rainfall runoff in the vicinity of the mine surface infrastructure, including a drainage channel to the north of the site (red line in Figure 3-9) to capture/convey contact water from the process plant and DSTSF at a peak flow of 2.5 - 4 m^3/s; and a drainage channel to the south of the process plant and DSTSF (blue channel in Figure 3-9) to capture/convey non-contact water from the area to the south at a peak flow of 3 - 5 m^3/s. All contact water will routed to sedimentation ponds and allowed to evaporate.

A potential flood-plain area has been identified north of the mine infrastructure. While maximum flood levels are not predicted to impact the mine facilities, it has been recommended that flood

protection measures in these northern areas be considered to reduce the potential flood risk to the mine surface infrastructure.

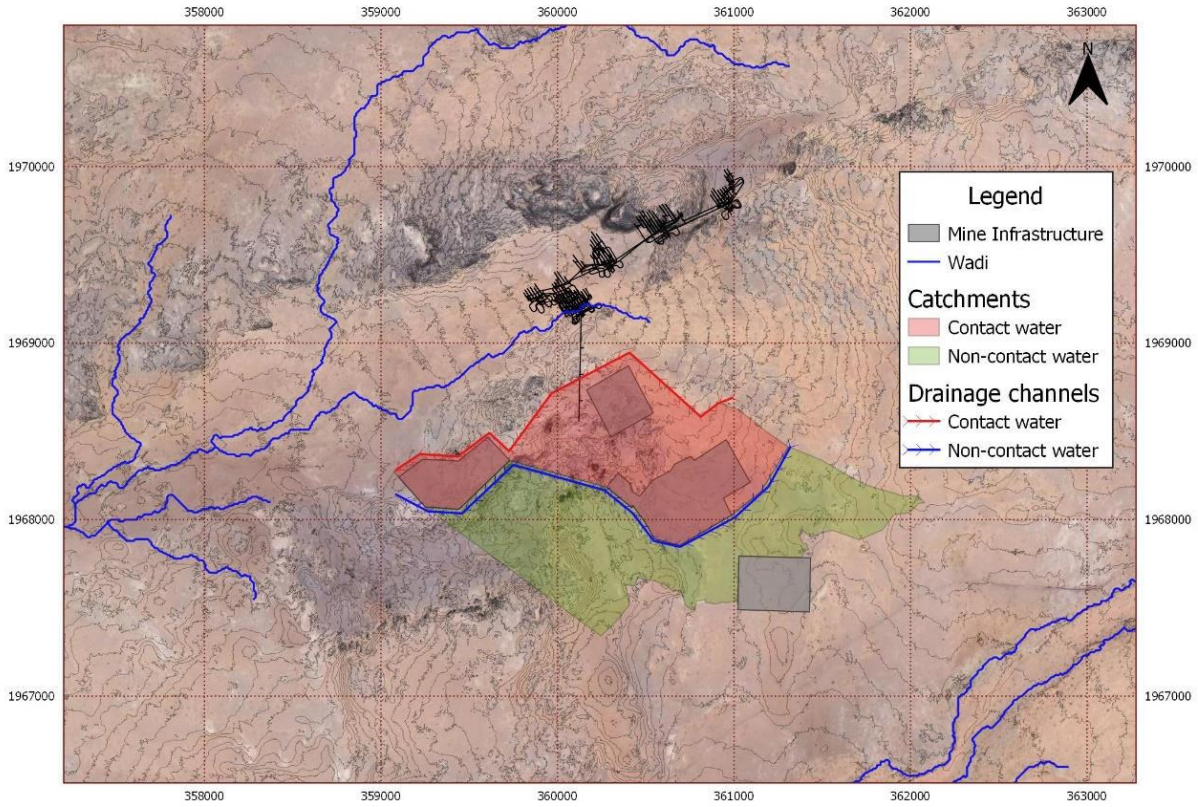


Figure 3-9: Surface water management

3.12 Power supply

A 132 kilovolt (kV) overhead electricity distribution line runs near the Dasa Project site alongside the RN25 road. The construction of a new 5.2 km overhead line will be required to connect the 132 kV line to the new incoming substation located at the proposed processing plant.

An allowance has been made for a 4.6 megawatt-peak (MWp) Solar photovoltaic (PV) plant to supplement the utility power supply during daylight hours. In addition, in case of interruption of power supply there will be two 1 MW diesel generators located at the process plant to supply selected process equipment that needs to remain energized, and two 800 kilowatt (kW) plus one 800 kilovolt-ampere (kVA) standby diesel generators at the accommodation camp.

3.13 Acid Plant

The on-site acid plant will produce sulfuric acid from native sulfur. The plant will utilize a double absorption process. Off-gases from the sulfuric acid plant will be treated by means of a caustic scrubber which will ensure that the effluent produced by the sulfuric acid plant conforms to the applicable environmental standards (see section 2.4.1).

The air heating and drying system feeding the SAG mill will use steam from the acid plant to preheat the air with diesel fed burners providing the final heating requirements.

3.14 Fuel and oil storage and distribution

Diesel fuel storage, dispensing and distribution facilities will be provided to supply fuel to light vehicles, surface mobile plant and equipment, processing plant equipment and the diesel backup generators. The diesel storage tanks selected are shipping-container sized and double-skinned or "self-bunded" and are commonly referred to as "tanktainers". They are fully equipped with transfer pumps as well as dispensing units for the different types of vehicles and equipment.

The facilities will include two 67,100 L diesel tanks and four 2,000 L tanks for hydraulic oil, engine oil, transmission oil, and engine coolant.

The diesel refueling and lubrication station is positioned to provide a logical route for the mining vehicles leaving the mining cluster to proceed underground. It is also positioned across from the tyre inflation station and wash bay.

All fuel required at the plant site will be delivered in tanker trucks by commercial suppliers. The fuel dispensing and vehicle park bay will be bunded to prevent spillage of fuel contaminating the site area.

3.15 Workshops

A vehicle workshop will be constructed at surface near the mining surface infrastructure area and will service, maintain, and overhaul light vehicles, surface mobile plant and the mechanized underground mining machinery. The workshop will be sized to handle the range of equipment envisaged on the Project and will be equipped with an inspection pit, lifting equipment, tools, spares stores, offices, tire storage and oils, paints, and lubricant stores. A sump pump will transfer dirty water to an oil/water separator.

Maintenance workshops will be constructed adjacent to the processing plant and in the mining surface infrastructure area and will be divided into separate sections to accommodate each engineering discipline (fitting, boiler making, rigging, electrical and control and instrumentation). Each section of the workshops will be equipped with a spares store, office and the machinery, tools, and equipment, including cranes and hoists (where required), necessary for the different engineering disciplines to perform maintenance in and around the mine and plant site.

3.16 Wash-bay facilities

Vehicle wash-bay facilities will be provided nearby the plant and mining workshops. They will comprise bunded concrete slabs sloping to settling sumps. The sumps will be equipped with oil/water separators.

Each wash-bay will be equipped with washing equipment specifically designed for the cleaning of the designated vehicles which will include light, heavy mobile and earthmoving vehicles.

3.17 Oil / water separator

The oil and water separation sump will be fed from the vehicle workshop and wash bay by means of drains and a trench arrangement. The oil / water separation process will be achieved by means of a rope mop skimmer unit. This machine will remove the floating oils from the polluted water collected and contained in the sump section, with the continuously running rope loop extracting oil by the skimmer. The dirty oil will then be transferred from the rope mop skimmer's separation tank into oil

drums. Provision has been made for a storage area for these oil drums. The oil / water separation sump is also equipped with a grit trap, walkway grating and handrailing for safe access, as well as a vertical spindle pump to pump the oil-free water to the dirty water storage tank.

3.18 Other buildings

Infrastructure buildings are classified as either architectural, control rooms or industrial. Architectural buildings include administration offices, ablution facilities, change houses, tea rooms, mosques, and accommodation camps. Control rooms include the underground mining and process plant control room and will be of the same type of construction as the architectural buildings. Industrial buildings include workshops, stores and buildings that house processing equipment.

As far as reasonably practicable, the architectural buildings will be prefabricated in nature. All architectural buildings will be equipped with airlock doors to prevent dust ingress and will be equipped with air conditioning units.

Industrial buildings will be constructed predominantly from structural steel and sheeting as these buildings require overhead cranes. Prefabricated buildings or converted containers will be used for sections such as the kitchens, stores, and offices.

The process plant buildings that contain processing equipment will be constructed of painted steel. The paint coating will be applicable to the corrosion protection required, taking into account both the macro and microenvironments where they are situated. These buildings will be designed to be suitable to accommodate any static and dynamic loads generated by the processing equipment. Similarly, acid proofing will be applied to concrete structures, such as sumps, where required. All buildings will include suitable stairways, walkways, and platforms to enable all operational and maintenance functions to be performed.

The mosque will be a stressed membrane structure and include the main prayer area and ablution facilities.

3.19 Accommodation camp

An accommodation camp will be constructed approximately 4 km from the mining operation and will consist of accommodation units with configurations to house three levels of seniority. There will be a single canteen with the requisite food storage, preparation, cooking, and housekeeping facilities servicing all staff. Recreation, security, access control, laundry and administration units will be provided at the camp. The camp will be constructed from prefabricated units, with a combination of standard structures and some specifically designed facilities and will be able to house 500 people. The facility will likely be operated by an independent service provider. National security personnel will be accommodated outside the camp, with company security personnel accommodated within.

The intention is to accommodate all staff in the accommodation camp on a rotation system, whereby they will be collected from their hometowns and then be accommodated on site for their work cycle, before being returned home for their rest period (see below). The accommodation camp will initially provide the majority of the requirements of the construction teams, and as the construction teams decrease in numbers, they will be replaced by operational readiness teams and ultimately the operational crews to run the mine.

3.20 Emissions, effluent and waste

Off-gases from the sulfuric acid plant will be treated by means of a caustic scrubber which will ensure that the effluent produced by the sulfuric acid plant conforms to the applicable environmental standards.

The dust extraction and baghouse facility at the milling area will be designed such that the dust caused by the processing equipment is kept to a minimum and any emissions from the baghouse plant conform to the applicable environmental standards. Similarly, the off-gas module which forms part of the product drying and packaging system will ensure that the effluent gases produced by the drying module conform to the applicable environmental standards.

Process effluent will be routed to sedimentation ponds before being recycled back through the processing plant. Surplus water will be evaporated; there is no plan to discharge water off site.

A change house on site will provide for workers to change in and out of their work clothes upon arrival at, or departure from, the mine site. Work clothes will not be allowed off site. Black and grey water from the change house, laundry and other site buildings will be sent to a central sewage treatment plant. This plant will also treat black and grey water from portable chemical toilets provided underground. Drums from these toilets will be collected and transported to surface manually.

An additional sewage treatment facility is included at the accommodation camp.

Waste such as hydrocarbons from equipment maintenance and chemical waste from the laboratory is expected to be collected and removed to the mines waste disposal facility, stored and regularly removed by an appointed contractor for responsible disposal at a facility in the town of Agadez.

Office waste, general waste and waste generated from the transportation and packaging of equipment and reagents etc. will be collected at the various sites and transported to the refuse disposal area where it will be sorted and prepared either for collection by an appointed contractor or incinerated. Waste materials that cannot be incinerated will be transported to and disposed of at the facility in Agadez.

3.21 Transport of materials to and from site

The proposed access road to the mine site is an existing sand track, approximately 5.2 km in length, which runs from the RN25 main sealed road that connects the towns of Arlit and Agadez. The existing sand track will be upgraded to an unsealed road suitable for frequent heavy load traffic and will be maintained by the mine site.

On site, a network of approximately 12 km of internal roads will connect the various infrastructure, buildings, accommodation camp, and mine entrances to the main access road. The construction of these roads will be of an unsealed, graded, and compact type with demarcation and drainage ditches.

There are no railways or usable waterways in Niger. All regional transportation is provided by trucks that use a relatively dense road network in the south, leading to the north and east of the country. Most of the capital equipment required for the Dasa Project, as well as consumables used once the mine is operational, will be imported from outside the West Africa region. These goods will arrive via the port of Cotonou in Benin and be transported by road from Cotonou through the border town of Gayaina-Faso. Abnormal and fragile cargo likely to be required for the construction phase of the

project will need to be carefully planned. The airports of Niamey and Agadez can receive large freight aircraft.

Materials to be transported to or from the mine and which are both hazardous and present risks in terms of security will be subject to special arrangements. These materials include explosives, detonators, uranium concentrate product, and radioactive wastes.

These sensitive materials will be transported by convoy. Each convoy will comprise:

- Up to 16 trucks transporting the sensitive material. These trucks will be loaded in accordance with Regulation No. 14/2005/CM/UEMOA on the harmonization of standards and procedures for controlling the size, weight and axle load of heavy goods transport vehicles in the member states of the West African Economic and Monetary Union (UEMOA);
- One civilian escort, whose objective is to guarantee the smooth running of the convoy, within stated time limits, and avoiding the stretching-out of the convoy. This escort is composed of:
    - One lead civilian 4x4 pick-up escort vehicle with the Deputy SOMIDA Convoy Leader on board;
    - One civilian 4x4 pick-up escort vehicle serving as a rear guard with the SOMIDA Convoy Leader on board;
    - One civilian 4x4 pick-up escort vehicle placed in the middle of the convoy with the SOMIDA Transport Protection Manager on board;
- One support vehicle equipped with breakdown and intervention equipment in the event of an incident or accident, with one mechanic on board;
- One empty emergency road tractor, placed behind the last truck of the convoy with a replacement driver on board; and,
- For transportation of explosives, detonators, and uranium concentrate only, a military escort, whose composition is established through agreement between SOMIDA and the State concerned. The military escort provides protection and security of the convoy, and facilitates its passage through checkpoints.

The length of a convoy, excluding military escort, is estimated at 3.7 km depending on the road section, with a maximum distance between vehicles of 150 m. The slowest trucks, or those having difficulties, will be placed at the head of the convoy during its formation to prevent the convoy from splitting. When passing through towns or villages, the SOMIDA Convoy Leader will tighten the convoy and apply a speed limit of 30 km/h.

Each journey will be carefully planned to include departure and arrival times at overnight stops and the final destination. Overnight stays will be at secure locations validated by the SOMIDA internal security department. The position of the convoy will be tracked using geolocation equipment. There are detailed procedures in place for the management of the convoy while en route, including communication between vehicles and dealing with breakdowns or emergency situations. Please see Traffic Management and Risk Procedures appended hereto as Appendix 1.

3.22 Human resources

The initial two years of underground development will be undertaken with the assistance of a mining contractor. The contractor will be responsible for managing, training and supervising all the underground operations personnel during the period of the contract.

After the initial two years of mine development, SOMIDA plans to assume operational control of the mine. At this point it is planned to structure the mine labor as discussed below.

It is proposed that two distinct shift cycles will be applied to personnel, one for production related personnel and a second for management, administration, and technical support personnel.

There is no significant town or village within 90 km of the project site, making it impossible for employees to travel to and from the mine on a daily basis. In addition, the local road conditions are poor, making travel time-consuming. It is therefore proposed that a camp system will be operated. Employees will travel to site to work for a planned period, while being accommodated at the camp before leaving on an extended period of rest.

The proposed shift cycle for the production personnel will be 14 days on and 14 days off. To allow for a continuous operation, there will be four teams, with two teams being on site and two resting off-site at any time. Shifts will be 12 hours in duration.

The shift cycle for the management and expatriate staff is based on a five-weeks on, three-weeks off cycle. These shifts will be eight hours in duration.

Based on these shift cycles, a total steady state labor complement of 450 persons is estimated.

SOMIDA has a non-discriminatory recruitment procedure in place (Service Note DG/2022.05). It also has a statement of employment conditions (Rules of Procedure) that, amongst others, guarantees the right of freedom of association, prohibits sexual harassment, and provides for employees to register complaints.

3.23 Security

Standard medium-security fencing will be established around Project facilities including the mine access, process plant, ponds, pumping facilities, DSTSF, the explosives magazine, and warehouses and storage areas. The fenced area will be approximately 2 km^2, as indicated in Figure 3-10 below.

Outside the fenced area there will be an approximate 40 km^2 buffer area, which incorporates the Mine Permit Area and additional areas for possible future infrastructure development. Passage through and use of this area by local people will not be restricted, although longer-term occupation (e.g. establishing camps) will be discouraged by a continuing stakeholder consultation and awareness-raising process.

As indicated in Figure 3-10, the boundary of the buffer area has been drawn to exclude the kori which runs from east-northeast to west-southwest to the south of the mine site.

GAFC and now SOMIDA retain a 60-man contingent of Guarde Nationale troops to provide outward facing security for the mine site and mine site personnel including escorted travel. Security is provided on a 24 hour 7 days/week basis and consists of periodic patrols of the surrounding area. SOMIDA's internal security staff will work with the Guarde Nationale to define roles and responsibilities and the rules of engagement, as far as possible. If feasible, troops will undertake basic training in the VPSHR, which will be repeated with each troop rotation. The troops largely live along the Agadez – Arlit axis and, like the local population, are majority Kel Tamashek (Tuareg). Accommodation and messing facilities for these troops will be provided outside the main camp if required.

All persons entering the Project site will be required to pass through the continuously manned boom gate adjacent to the administration building on the access road. For security reasons and due to the

handling of a potentially hazardous product, SOMIDA's own security guards located adjacent to the administration building will control all entry and exit of vehicles and personnel. Search and inspection of personnel, bags and items leaving the plant will be carried out at this facility by SOMIDA guards.

Access to hazardous and flammable process will be restricted to authorized persons and equipment, and these areas too will be separately fenced and controlled by the security team.

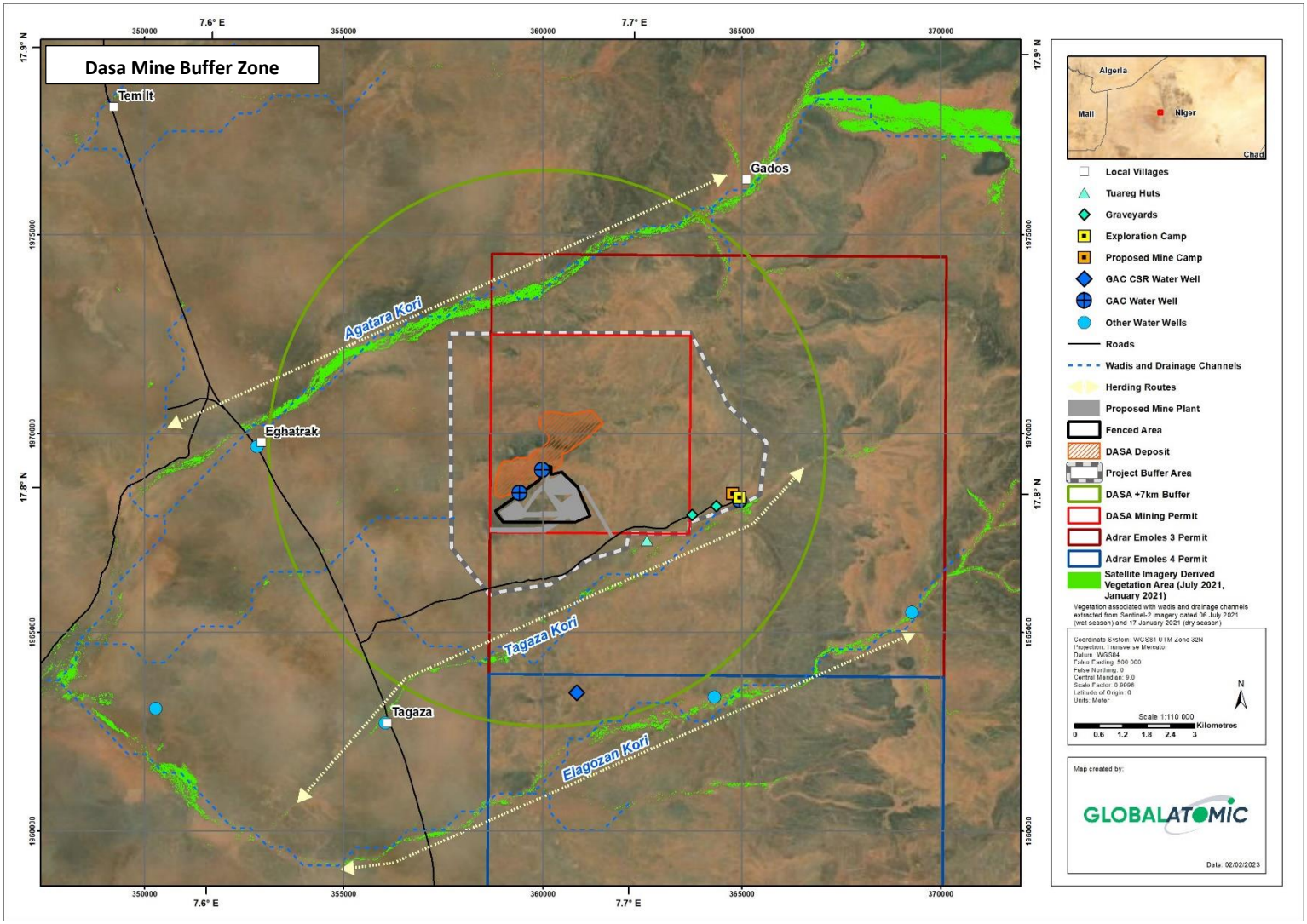


Figure 3-10: Dasa Mine Buffer Zone

3.24 Closure and rehabilitation

GAFC's agreements with the Ministry of Environment and Sustainable Development include provisions for the management of mine closure, to include the dismantling of buildings and demolition of facilities, recontouring the site and restoration of habitats and landscape.

The current Rehabilitation and Closure Strategy (the "Closure Plan") is fully costed and includes the removal and sale of mine site buildings, rehabilitation of the tailings management facility and other areas of site disturbance, and post-closure monitoring.

The Closure Plan will be further developed in line with international best practice, such as the International Council on Mining and Metals (ICMM) Mine Closure Toolkit, to meet the requirements of the environmental permit and include an updated closure budget.

The Closure Plan will address social implications and costs of closure as well as engineering and environmental aspects and will be regularly reviewed at completion of construction and at regular intervals during the life of mine. Extensions to mine life and the expansion of, or construction of, facilities will also trigger a review.

The Closure Plan will aim to present a vision for closure with clearly defined outcomes and closure criteria and will incorporate social and environmental considerations. Structures which will remain in place, such as evaporation ponds and the DSTSF, will be capped, revegetated (where viable) and designed to remain physically and chemically stable after mine closure.

4 Mine Safety

The following is summarized from the Feasibility Study (METC Engineering (Pty) Ltd., 2023).

Mine design was accomplished using a block model developed from the extensive exploration undertaken at site. Required geotechnical data was obtained from logging and laboratory strength testing of core from nine boreholes. Modelling derived required rock mass quality parameters including Rock Quality Designation, Rock Mass Rating, Rock Tunnel Quality Index, modified Rock Tunnelling Quality Index, and Mining Rock Mass Rating. Anticipated groundwater conditions and potential influx of water into the underground excavations resulted in further refinement of rock mass qualities.

Stope span designs were undertaken based on the critical hydraulic radius for various dip angles of the orebody as well as varied stope widths. The backfill free standing ability was determined empirically and was based on the maximum stope heights and maximum strike lengths. The dimensions of open stopes were estimated based on the relationship between rock mass quality and mining span. This method involves the calculation of a stability number (N') for each stope wall and relating this to a critical hydraulic radius. The stability number N' provides an indication of the geotechnical factors that may affect stability. The larger the N' value, the more stable the excavation. The hydraulic radius, HR, is a measure of the effect of size and shape of a stope surface and is proportional to the N'.

Crown pillar thickness was analyzed using numerical techniques. A safety factor of 1.8 – 2.0 was utilized to determine the required crown pillar thickness between surface and the underground workings. Sill pillar design was also undertaken.

The stability of the boxcut slopes was assessed using SLIDE slope stability software. The support design and support requirements for all major excavations and access developments were calculated based on empirical methods.

Support spacing, bolt length and secondary support requirements for all service and development excavations were determined based on empirical methods, standard industry design guidelines, and evidence from similar excavations on neighboring mines.

On completion of the mine layout design, an analysis of the stability of the entire mine system was undertaken. The mining layout was digitized into the MAP3D Software modelling program to analyze stress distributions and displacements as a result of mining. The layout was sequenced according to the excavation year spanning from year two up to year 14.

A Multiple Risk Assessment was conducted as part of the Feasibility Study. The objective of the risk assessment was to identify risks to the purpose and outcomes of the Feasibility Study. The risk assessment assumed that the proposed mine would be operated according to best practice principles and that the operations would generally follow the planning and methods proposed in the Feasibility Study. As such, operational issues were not considered as part of this risk assessment. However, at the commencement of mine development and operations, targeted risk assessments will address operational risks. Codes of Practice and Safe Work Procedures will be developed and maintained before activities take place.

The general procedure to compile the risk register was as follows:

- A risk matrix and rating system was developed for the Project;

- A risk register template was issued to the primary consultants who worked on the Project to pre-populate the register with possible risks;
- The responses from the various team members were combined into a consolidated document; and,
- A workshop was conducted where each of the identified risks was discussed, evaluated, and rated.

For each risk the assessment considered both consequence and likelihood of the risk manifesting itself and rated it according to Table 4-1.

Table 4-1: Risk ranking matrix

Consequence		**Likelihood**				
	Rating	Rare	Unlikely	Possible	Likely	Almost certain
		E	D	C	B	A
Catastrophic	5	15	19	22	24	25
Major	4	10	14	18	21	23
Moderate	3	6	9	13	17	20
Minor	2	3	5	8	12	16
Negligible	1	1	2	4	7	11

The following were the top risks identified:

- Exposure to high levels of radiation. Working in an underground mine with a high-concentration uranium orebody will pose significant health risks to personnel in terms of radiation exposure. To reduce the radiation exposure levels an adequate ventilation system has been designed, which will provide for a large volume of air and frequent air replacement through the underground mine. During the operations phase a specific Code of Practice will be drawn up and continuous personnel monitoring introduced to monitor and manage this risk (see Chapter 5).
- Larger than anticipated groundwater inflows entering the underground mine. With uncertainty in the hydrological information, there is a risk that more than anticipated groundwater will be entering the underground working areas. To reduce this risk, spare pumping capacity and equipment have been included in design.
- High groundwater inflows in the decline reporting to the development end, reducing decline advance rate. With uncertainty in the hydrological information, there is a risk that more than anticipated groundwater will be entering the decline and report to the development end. Cover drilling for water and dewatering ahead of decline development end has been proposed as a risk mitigation.

A risk assessment for the geotechnical analysis of the orebody and the geometrical design of Dasa was also performed. A standard hazard identification and risk assessment process was used, where hazards were identified and risks assessed using a matrix highlighting the impact of the hazards and required mitigation measures to reduce the risk where required.

A trade-off study was conducted which considered several alternative mining methods. The mining method selected is transverse LHOS with cemented backfill, as described in Chapter 3.

Mine safety considerations include the following:

- Fires: fires involving rubber-tired vehicles present a considerable risk to any underground mine. If a fire is not quickly suppressed and spreads to the tires, then it can only be extinguished with water. Dry powder is unable to extinguish a rubber tire fire as it does not remove sufficient heat to prevent re-ignition of the gases emanating from the hot rubber. If the fire is not quickly extinguished with water, then it is almost inevitable that the vehicle will be destroyed. Dense black smoke with high levels of carbon monoxide from burning rubber tires will quickly circulate through the mine, and for this reason body-worn self-contained self-rescuers (SCSR) will be provided, and refuge bays will be available (see below). All rubber-tired vehicles will be equipped with on-board fire suppression and a fire extinguisher to control any fire quickly. Vehicle maintenance plays a part in ensuring no issues which can cause fires are present.
- Flammable gas: a robust ventilation system coupled with flammable gas testing to a defined standard and a clear procedure for dealing with any gas intersection is the solution to preventing flammable gas explosions. Appropriate instruments to give warning and/or take measurements will be available.
- Heat: the possibility exists of heat stroke conditions (wet bulb temperature more than 27.5°C) occurring if the ventilation is not up to standard or some other abnormal circumstance occurs. Instruments to measure wet and dry bulb temperature, air velocity and air humidity will be deployed. Truck and LHD cabs will be equipped with air conditioning. As part of the mine heat management strategy, if any workplace temperature exceeds wet bulb 27.5°C or dry bulb 32.5°C, personnel will be withdrawn.
- Gases: immediate danger to persons can be caused due to (1) deficiency of oxygen in the general atmosphere, caused by displacement by other gases or fire; and (2) presence of high levels of carbon monoxide due to fire or inadequate air to dilute the diesel exhaust gases. Other harmful gases can occur in mines if there is insufficient air to dilute and remove them, including oxides of nitrogen from diesel engines, blasting fumes, welding fumes (welding/cutting of cadmium plated metal is particularly dangerous), and fumes from chemicals used in the mine.
- Occupational hygiene: the first defense against occupational exposure is a good ventilation system and, where appropriate, measures to suppress or allay dust (watering down). Groundwater inflow to the mine is expected to be sufficient to suppress dust (see section 3.11), but additional measures will be deployed if necessary.
- Escape and rescue: persons proceeding underground will be equipped with an SCSR. In addition, refuge bays with a source of breathable air will be made available and positioned so that any person underground can reach one within the duration of their SCSR. Portable refuge chambers will be positioned to ensure that persons remote from the escape way in the Fresh-air raise (FAR) have a safe refuge in an emergency; for example, one eight-man chamber situated on every operating level and positioned in the footwall drive. Because the FAR is being used as an escape way, the concrete wall sealing off the FAR will be equipped with a man-door airlock for easy access. The area behind the concrete wall can then be used as a fresh air base equipped with water and a communication device.

SOMIDA will incorporate the following global guidelines and standards into our activities:

1. The International Council on Mining and Metals (ICMM) Principles
2. The Canadian Mining Association's Towards Sustainable Mining (TSM) program
3. The Mine Safety and Health Administration (MSHA) Regulations, and,
4. The Voluntary Principles on Security and Human Rights (VPSHR).

5 Radiation Protection

5.1 Introduction

In nature, some elements that make up matter are not stable; i.e., they do not retain their original structure indefinitely. These unstable elements tend to return to a stable state by emitting alpha and beta radiation (in the form of particles) and gamma photons (in the form of electromagnetic rays similar to light). This phenomenon is called "radioactivity". Humans are exposed to low doses of radiation from the natural environment every day. However, at high doses, radiation can be harmful to health.

Uranium is radioactive; it naturally transforms 14 times to reach a stable state. These 14 transformations are accompanied by eight alpha and six beta emissions. For ten of the 14 transformations, there is also an emission of gamma photons.

An individual can be exposed to radioactive hazards in two ways:

- ***External*** exposure, when the body is penetrated by radiation from sources outside the body; and,
- ***Internal*** exposure when the source is inside the body, as a result of inhalation or ingestion of radioactive substances.

In uranium mines, and uranium ore processing plants, workers are exposed to:

- External irradiation due mainly to gamma radiation; and,
- Internal irradiation from inhalation of alpha emitters suspended in the working environment:
    - Radon and its progeny, short-lived alpha emitters;
    - Ore dust, long-lived alpha emitters; and,
    - Long-lived alpha emitting uranate dust.

The aim of radiation protection is to limit the dose equivalents that can be received by workers in such a way that effects due to high doses do not occur and the number of cases of effects due to low doses is reduced to an acceptable value.

5.2 Standards

As outlined in Chapter 2, Niger is a member state of the International Atomic Energy Agency (IAEA), which establishes safety standards and measures for protection against ionizing radiation. Niger's regulatory limits are set in accordance with the recommendations of both IAEA and the International Commission on Radiological Protection (ICRP).

The activity of a defined quantity of substance is characterized by the number of disintegrations (or transformations) per second. The unit of measurement is the Becquerel (Bq) which corresponds to 1 disintegration per second.

Radiation carries energy which it transfers to matter as it passes through it. The amount of energy transferred is called the absorbed dose. In a given time, for the same absorbed dose, the biological damage depends on the type of radiation. This influence is taken into account by introducing a factor called the radiation weighting factor. The product of the absorbed dose and this factor is called the dose equivalent, the unit of which is the Sievert "Sv".

Nigerian regulations (Decree 003/MME/DM of 8 January 2001) set the following annual limits for uranium mine workers for each occupational exposure risk:

- 50 mSv: External exposure due to gamma radiation;
- 42 mJ: for the Alpha Potential Energy (EAP) due to the short-lived progeny of radon-222;
- 5,400 Bq: for the long-lived alpha activity of inhaled ore dust; and,
- 27,000 Bq: for the long-lived alpha activity of inhaled uranate dust.

The Decree also provides a formula for calculating the cumulative Annual Total Exposure Rate, which has a limit of 1 over 12 consecutive months, and a target of 2 over 60 consecutive months.

SOMIDA has developed a suite of policies and procedures to cover radiological protection, including:

- P-RP-03 Environmental Radiation Monitoring Procedure;
- M-RP-07 Alpha and Gamma Dose Rate Monitoring Procedure;
- P-RP-09 Radiation Protection Procedure;
- M-RP-09 Dosimeter Testing Procedure; and,
- P-RP-10 Worker Dosimeter Monitoring Procedure.

The following sections summarize these procedures.

5.3 General protection principles

In uranium mining, external exposure is due to beta and gamma radiation coming from the ore body and stockpiles, circulating in the processing plant, and from the process products, uranium concentrate (uranate) and tailings.

In practice, in the mine as well as in the processing plant, the beta doses are very low because beta radiation has a very low penetrating power, therefore only gamma radiation is considered.

In order to limit radiation from gamma rays, three general approaches are used:

- Maximize the distance between the source and the worker;
- Limit exposure times; and/or,
- Place shielding between the worker and the source.

Internal exposure in the mine and processing plant results from the formation of very fine ore or uranate dust (radioactive aerosols) that are invisible to the naked eye and become airborne and are subsequently breathed in or ingested through contaminated food or through a wound. There are two types of radioactive aerosols:

- The short-lived alpha emitters radon-222 and radon-220 (this gas is released slowly from the rock and spreads throughout the mine and parts of the plant); and,
- Long-lived alpha emitters from ore dust.

The means of prevention to be implemented must make it possible to reduce the quantities inhaled or ingested, by limiting the airborne content of the products (capture, water suppression) or by rapidly evacuating the particles in suspension (ventilation).

The wearing of individual protection (masks, work clothes) completes the collective protection.

The overall aim of SOMIDA's radiation protection procedures is to ensure that all equipment, processes, work methods and operations are designed so that individual and collective exposures are

kept as low as reasonably achievable below regulatory limits considering economic and social factors. To this end, a technical and economic analysis of the various means of protection will be carried out before any new method of operation.

5.4 Regulated areas

Regulated areas in terms of radiological protection are based on assessment of risks of external and internal exposure. Nigerien legislation defines two types of regulated area:

- Controlled area – where the dose rate is greater than 7.5 µSv/hr. Underground mining operations, uranate handling areas, and slag heaps are automatically classified as controlled areas; and,
- Monitored area – where the dose rate is between 2.5 µSv/hr and 7.5 µSv/hr.

Personnel working in controlled areas are subject to monthly exposure assessment (see below).

Workplaces are regularly monitored for external exposure dose rates, potential alpha energy concentrations of short-lived radon-222 progeny, and alpha volume activities of radon-222 and long-lived aerosols. The frequency of monitoring is at least once a day for active underground workings, and weekly at the ore processing plant and the mine outbuildings (maintenance workshop).

Reference guideline values have been set at various facility locations for radon, gamma radiation, ore dust, and uranate dust. If any measurement exceeds these values, work is stopped and the Radiation Protection Officer is contacted for advice and action.

5.5 Worker health surveillance

In accordance with Nigerien law, for the purposes of dosimetric monitoring, exposed workers are classified at the beginning of each year in one of two categories:

- Category A: if their total annual exposure is greater than 6 mSv; or,
- Category B: if their total annual exposure dose is between 2 mSv and 6 mSv.

Persons working in concentrate handling facilities and solid waste disposal areas are automatically classified as Category A.

Personnel classified as Category A are subject to individual dosimetry for which the individual wearing of an integrated multi-risk dosimeter is mandatory. This dosimeter makes it possible to determine, after one month of sampling, the monthly exposure to potential alpha energy due to the short-lived descendants of the 222 and 220 isotopes of radon, to gamma radiation and to radioactive dust. The dose to each worker must not exceed 20 mSv over 12 consecutive months.

Personnel classified as Category B are subject to individual or functional (task) dosimetry based on the use of multi-hazard dosimeters by certain workers representative of the task. For example, if there are several electricians that are only intermittently exposed to radiation, then only one electrician needs to be monitored, and the results are considered representative for all electricians.

All workers likely to be classified as Category A or B undergo a medical examination for fitness before being employed, and once a year thereafter for Category B workers and twice a year for Category A workers.

The Company Doctor retains dosimetry records for each staff member. Medical files must be kept for the life of the person concerned and, in any case, at least 30 years after the end of exposure to the risk.

5.6 Mine ventilation

To minimize radiation exposure of the workforce, the decline system, all airways, and the footwall drives of the underground mine will be situated in the host rock outside the orebody, and only the production crosscuts and open stopes will be situated in the orebody. The excavations in the host rock can be ventilated with conventional force-ventilation methods and the excavations in the orebody will be ventilated by the exhaust overlap ventilation method.

In uranium mines, excavations in the orebody should not be ventilated in series, and in order to protect the workforce from radiation exposure from the orebody, the air needs to be replaced every three to four minutes. A rigid exhaust column with an exhaust quantity of 10-15 m^3/s will be used to ventilate a production crosscut situated in the orebody; this will replace the total volume of a completed crosscut in three to four minutes.

In addition to the requirement to replace air every three to four minutes in production areas, it is also planned that the retention time of the air flowing through the mine will not exceed 15 minutes. To achieve this, an additional intake airway will be required in parallel to the decline, as the decline cannot handle the required airflow and allow for sufficient air to be removed from the decline at the point where the air has been travelling for 15 minutes, and then replace the air with fresh air from the FAR. This point will be at the bottom of the Zone 2 mining area. The fresh air in the FAR travels at high velocity and does not exceed the 15-minute limit. The minimum airflow in the decline to achieve the required retention time will be 150 m^3/s.

To achieve the above airflows will require a total airflow of 400 m^3/s flowing via the decline and the FAR next to the decline to the operating levels, where the ventilating air will enter through the access crosscuts to the footwall drives. The air will then be drawn from the footwall drive along the length of the production crosscut to the end of the exhaust column situated in the crosscut. Air exhausting along the exhaust column in each production crosscut flows back to the footwall drive into a collector exhaust column which connects through a fan to the Return Airways Raises (RAW) on each end of the footwall drive. From these RAWs the air is exhausted through the main surface fans to the atmosphere on surface. The exhaust ports will be fenced off to prevent unauthorized access and monitored as part of the site perimeter air quality monitoring program.

In general, accidents or incidents of a radiological nature in underground mines are rare. There are a number of possible causes of internal irradiation, generally related to ventilation:

- Stoppages of main or secondary fans resulting in an increase in the potential alpha energy of the air;
- Rockfalls altering air flows in galleries that may result in increases in potential alpha energy;
- Accidental destruction of a wall or insulation barrier in the ventilation system;
- Fires; and,
- Prolonged accidental stay in areas with special access conditions.

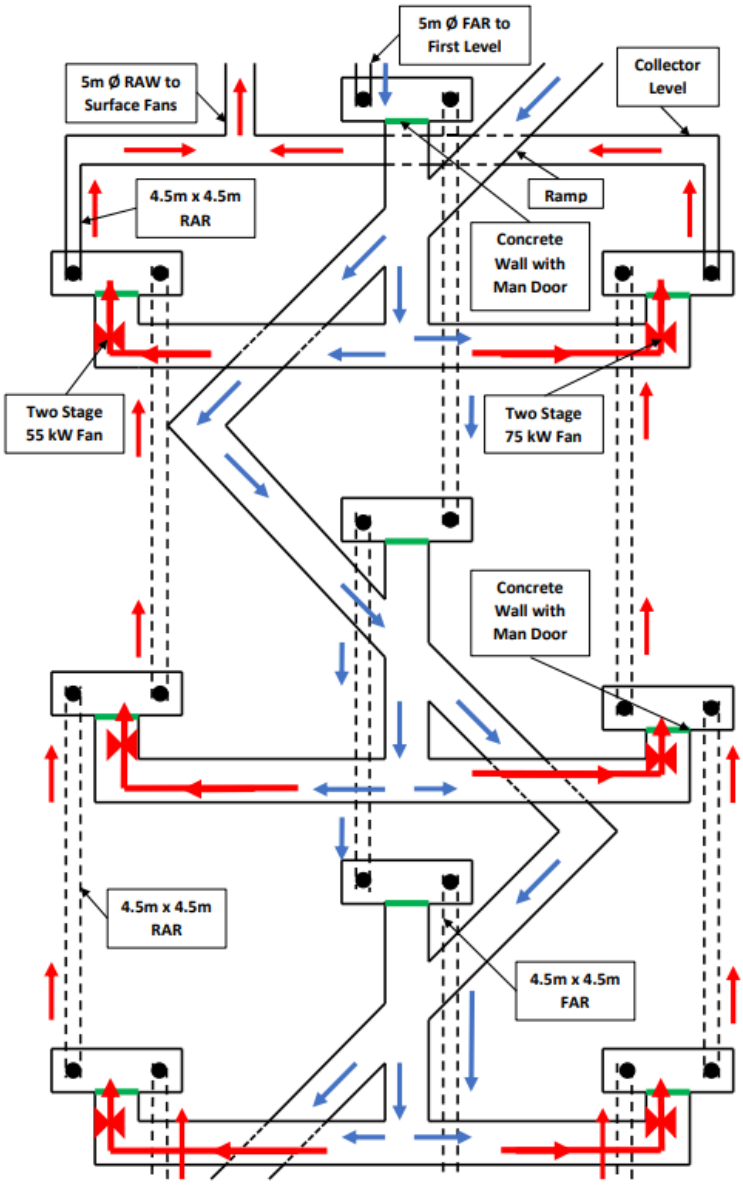


Figure 5-1: Schematic of primary airflow in mine

In these cases, the provisions of the ventilation instructions and the site Emergency Response Plan are applied and the person in charge of the operation must inform the Radiation Protection Officer as soon as possible, who will carry out radiological checks of the physical environment in the galleries and on the active work sites. Depending on the nature of the accident or incident and the results of the radiation survey, the Radiation Protection Officer will indicate if work can resume.

5.7 Other precautions and preventative measures against internal exposure

- Enclosed rooms and vessels used for work will be adequately ventilated. Necessary air flow rates will be determined according to the radon source, so that the residence time of the air in the workplaces is as low as possible;
- Meals will be taken in the places specially provided for this purpose. These places will be chosen so that the exposures likely to be received by workers are as low as possible. They will be kept clean and have running water nearby for hand washing;

- Following blasting, return to the site will only take place after explosive fumes, radon and dust have dissipated. Minimum return times are 5 minutes after the shot to restart the secondary ventilation; and 25 minutes after start of the secondary ventilation for other workers;
- Underground storage of ore is limited to what is necessary for the operation, and the storage areas must be placed in the air returns from the workings, to avoid radon and dust pollution of the air supplying the workings located downstream of the ventilation system;
- Water with a high dissolved radon content will be channeled away from the working area wherever possible. Boreholes carrying radon or water with a high radon content must be sealed;
- Dust-emitting activities will be investigated with a view to eliminating the source wherever possible, either by improving the working method or by capturing the source. Where it is not possible to eliminate sources, enclosures or traps will be installed on fixed installations, or means of suppressing dust by spraying or sprinkling will be implemented, in particular at crushers, following explosive blasts, and on roadways both in the underground mine and in the ore processing plant; and,
- In places where the risk of internal exposure is high, in the context of operations of an exceptional nature and of short duration, and if no means of prevention can be put in place, personal protection to limit the inhalation of airborne aerosols will be provided to the workers.

5.8 Other precautions and preventative measures against external exposure

- Shielding will be provided in administrative buildings and the accommodation camp;
- In the underground mine, the residence time in mineralized areas where the gamma dose rate is greater than 40 µSv/hr will be reduced to the strict minimum necessary for operations and subject to special instructions from the Radiation Protection Officer;
- At each location where sealed sources are used, these sources will be marked and a restricted area defined by the Radiation Protection Officer. For the transport of a sealed source in a vehicle, only the person(s) responsible for its transport may board the vehicle;
- At the end of each shift, a shower and change of work clothes for travel is compulsory for those assigned to controlled areas; and,
- Workers must change their work clothes at least once a week. A laundry room will be provided to allow the cleaning of clothes.

There will be rigorous rules for access and signage in place for controlled areas.

5.9 Environmental monitoring

In addition to the mine site and occupational radiation monitoring identified above, SOMIDA will undertake radiological monitoring of the environment to monitor as far as possible the radiological impact of its activities on the population and the environment.

SOMIDA will undertake sampling of ambient air to determine external exposure due to gamma radiation, and internal exposure due to potential alpha energy from radon-222 and radon-220 progeny and inhalation of long-lived alpha emitters in airborne dust. In addition, a monitoring plan will be developed for water, soil and food chain. All samples will be transported to the ALGADE laboratory in France, for analysis and calculation of annual effective doses.

Four monitoring stations for air monitoring have been established: at the mine site, at the Dajy exploration camp (to monitor the pastoralist population), and at Tagaza and Eghatrak villages.

Each site will be equipped with a thermoluminescent detector (TLD) to measure external exposure to gamma radiation, and a dosimeter to measure internal exposure due to the inhalation of short-lived radon progeny and long-lived alpha emitters present in airborne dust. The dosimeter heads are collected and sent for laboratory analysis each month, and the TLDs are sent for analysis each quarter.

Soil samples will be collected annually from 1 m depth at selected sites around the Project, designed to align with the prevailing wind direction and to allow determination of radiological element dispersion with distance from the mine. The samples will be sent for laboratory analysis of radiological parameters, including mass activity in radium-226, uranium-238, and lead-210.

Water samples will be collected each quarter from mine site and accommodation camp drinking water supplies, from evaporation ponds, and from selected water supply boreholes in the Project area. The samples will be sent for laboratory analysis, including radium-226, uranium, total alpha and beta indices, and an indicative total dose (ITD) will be determined for drinking water; this is based on measurements of the mass activities of the long-lived alpha emitters in the uranium chain: radium-226, radium-228, uranium-238, uranium-234, lead-210, and polonium-210.

A plan is being developed to monitor the food chain in the Project area, including locally grown produce and locally produced cheese. Samples will be analyzed for uranium-238, radium-226, thorium-230, lead-210, and polonium-210.

The results of all of the environmental monitoring will be analyzed to develop additive effective doses and to detect any changes from baseline conditions.

6 Environmental and Social Baseline

6.1 Introduction

GAFC's exploration operations are located in the north central part of the Republic of Niger, West Africa, approximately 95 km north of the city of Agadez. The country is bordered by Algeria and Libya to the north, Chad to the east, Nigeria and Benin to the south, and Burkina Faso and Mali to the west.

The Dasa Project is located in the southwest of the Adrar Emoles 3 (AE3) Exploration Permit area, which currently has a total area of 121.2 km^2. The center of the Dasa Project is positioned at longitude 7.8° east and latitude 17.8° north. The AE3 permit area is contiguous with the Adrar Emoles 4 (AE4) Exploration Permit, over which GAFC also has exploration rights (Figure 6-1).

The Dasa Project site is located in the Agadez Region, straddling the urban commune of Tchirozérine in the department of the same name, and the rural commune of Dannet in the department of Arlit. The mining town of Arlit is some 105 km north of the Project and Niamey (the capital of Niger) is some 1,000 km to the west.

There are two uranium mines near Arlit – the Somaïr open pit (discovered in 1967), and Cominak underground mine (discovered in 1974). The operator of both mines, Orano, reported production of 1,128 tonnes of uranium from Cominak and 1,783 tonnes of uranium from Somaïr during 2018. The Cominak mine closed in March 2021.

In 2009, construction started on what would have been the largest open-pit uranium mine in the world, at Imouraren, approximately 50 km west of the Project site. This project is currently on hold pending higher uranium prices.

The Project site is an approximately 100 km drive via paved (but degraded) Highway RN25 from Agadez (Niger's second-largest city) to the village of Tagaza, followed by a 10 km drive along an unpaved road. The RN25 is also known as the Route d'Uranium (Uranium Highway), as it is on this road that all the yellowcake from the Orano uranium mine near Arlit is transported by truck to the port of Cotonou in Benin, West Africa.

Groupe Art & Génie (2020) focused their environmental and social assessment work on two zones: firstly, a 7 km radius around the center of the mine site, which was considered to represent a reasonable safety perimeter and within which most direct impacts would be felt; and secondly a 15 km radius, within which the nearest populated areas are located. FEED Consult (2022) retained this focus, and the figures presented in this chapter show the two zones where appropriate.

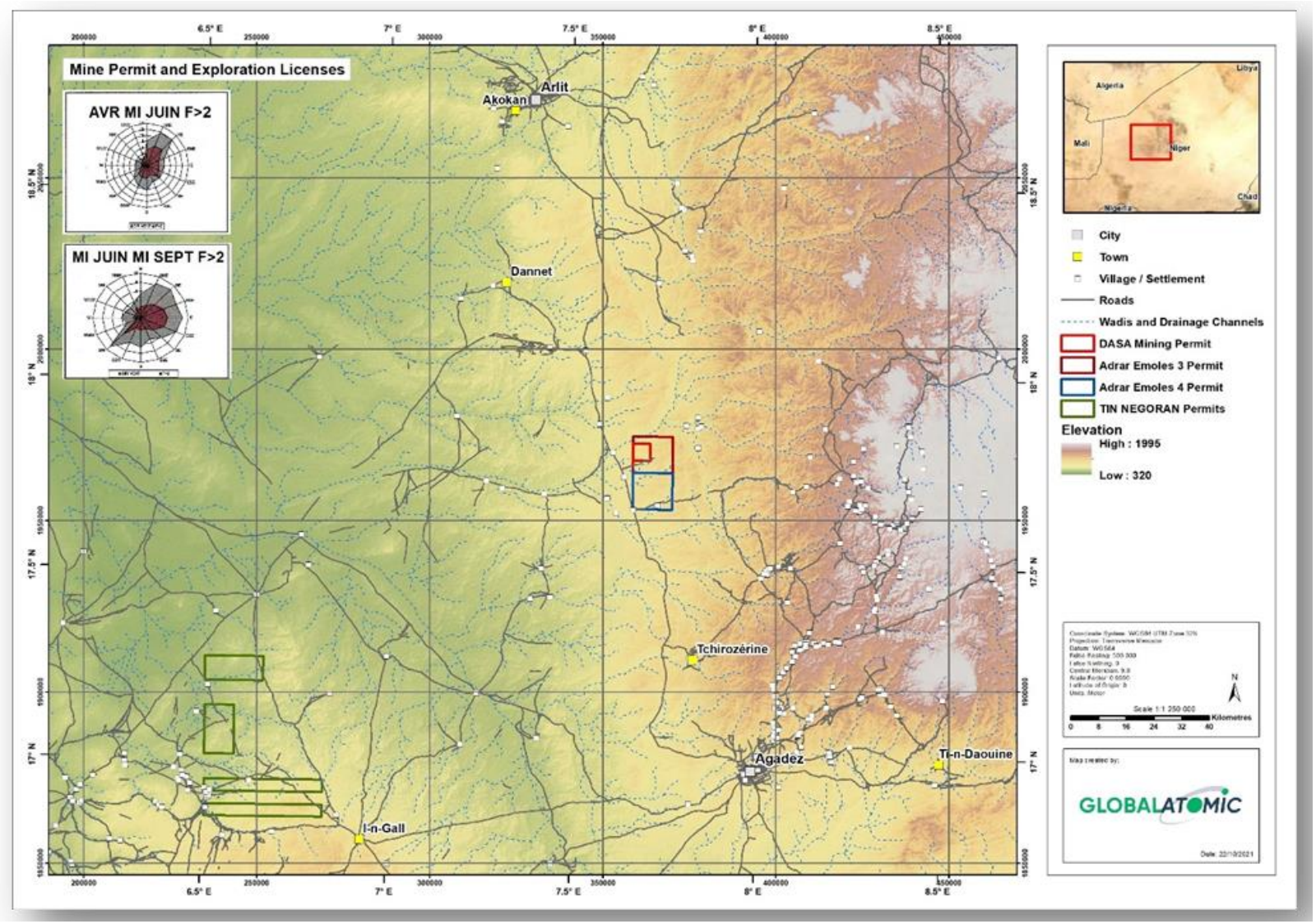


Figure 6-1: Location of Dasa Mining Permit, and AE3 and AE4 Exploration Permits

6.2 Climate

The following climate information is summarized from Groupe Art & Génie (2020) except where noted.

The Project is located within the Sahel-Saharan desert climate zone, which is characterized by a six-month warm season (April to September) and a six-month cold season (October to March). Within the warm season there is a short rainy season lasting from June to September.

In the warm season, the temperature varies between 31°C and 50°C; in the cold season it varies between 0°C and 20°C. The average annual temperature is 37°C, the average annual maximum temperature is 45°C and the average annual minimum temperature is 11.13°C.

Analysis of 20 years (2000 – 2019) of rainfall data from the Tchirozérine weather station indicated annual rainfall varying between 77.5 mm and 332.5 mm, with an annual average of 180.2 mm.

Analysis of wind patterns measured at the Imouraren project site, approximately 50 km away, showed that the Project site is located in an area with generally low wind speeds. During the dry season, the prevailing winds (approximately 24% of the total) are from the north-east and north-north-east - these are the Harmattan winds. During the rainy season, there is a more significant component of winds from the south-west. About 50% of the winds exceed 9 km/h, with a maximum of 35 km/h.

CSA Global (2021) compiled rainfall and evaporation data for the Project area, based on information from the In Gall weather station which is located 140 km to the south-west, at a comparable altitude, environment and distance from the sea as is the Dasa Project site. The rainfall record covers the period extending from 1954 to 2005. Several years' data are missing from the dataset, which reduces the data record to 42 years. Rainfall and evaporation values are presented in Tables 6-1 and 6-2 below.

Table 6-1: Monthly rainfall data (In Gall Weather Station)

(mm)	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
Avg.	1	0	0	0	0	0	1	6	13	54	98	29	193
Wet	1	0	0	0	0	0	1	6	13	68	121	29	238
Dry	0	0	0	0	0	0	0	0	4	36	77	8	125

Table 6-2: A-Pan monthly evaporation (calculated as recommended by the Food and Agriculture Organization)

(mm)	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Annual
A-Pan Evap.	332	323	279	274	322	396	420	432	394	359	315	310	4,155

6.3 Geology and Geotechnics

The following information is summarized from the Project Feasibility Study (METC, 2023).

The Project is located on the eastern edge of the Tim Mersoï Basin, west of the Aïr Mountains. The terrain is generally flat, sandy peneplain with an average elevation of some 500 m above sea level (ASL), with elevations decreasing to the west. The highest elevation is in the Azouza hills, 553 m ASL, whereas the Aïr Mountains located some 30 km to the east may reach over 1,800 m ASL.

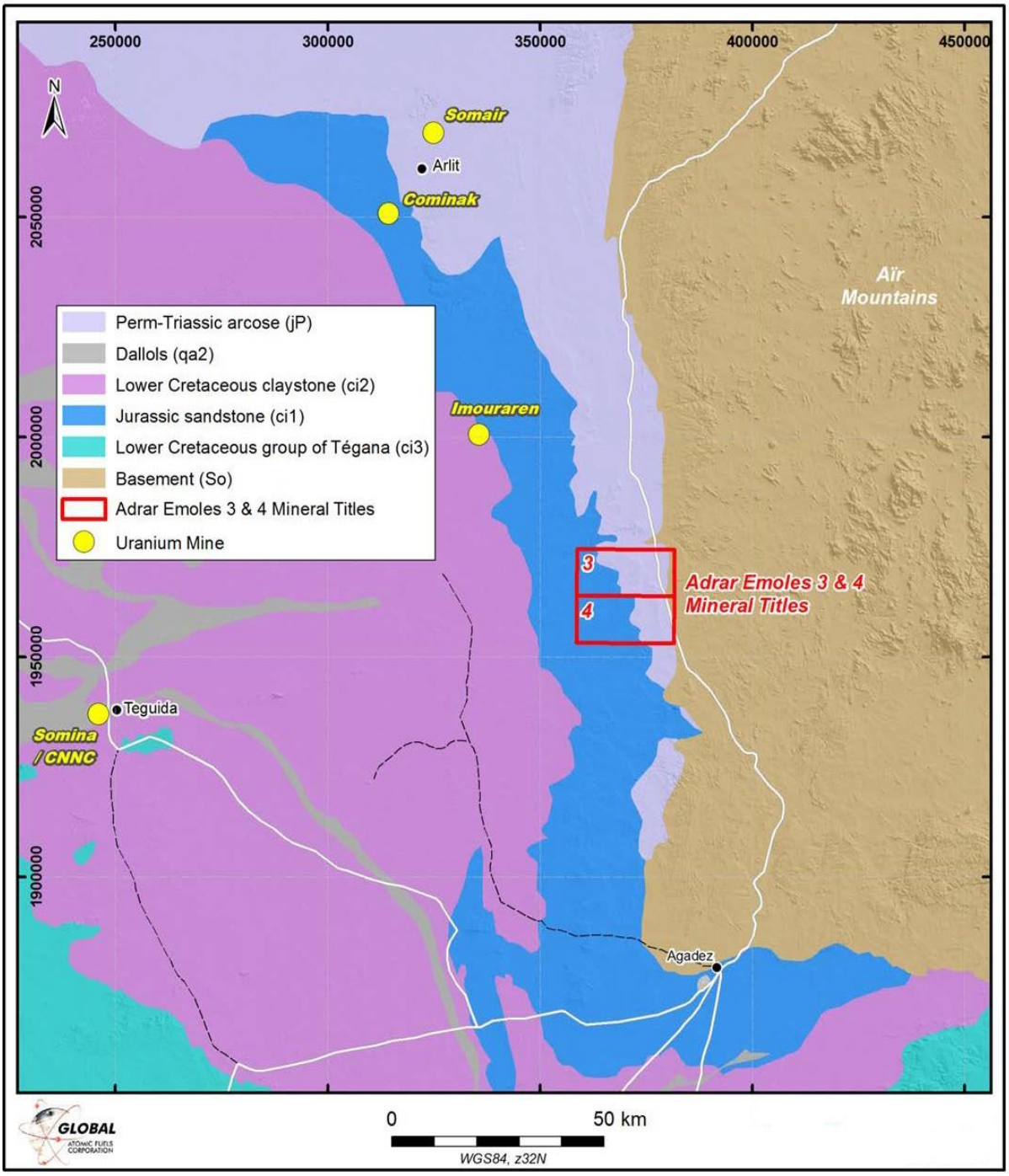


Figure 6-2: Regional Geology Map (source: Feasibility Study, after F. Julia (BRGM, 1963 at 1:500,000)

The rocks in the Project area range in age from Cambrian to lower Cretaceous (Figure 6-2). They are mostly clastic sediments (sandstone, siltstone and shale) with some minor carbonates. They originated from the Precambrian basement of the Aïr Massif, which has been continuously eroded since at least the Mesozoic period. The sediments were laid down in a continental setting and are generally the result of fluvial and deltaic deposition. In this environment, large shallow rivers meander across flat topography and create complex flow patterns where the coarse-grained sands and gravel are concentrated in the channels with the highest flow energies, while low energy flow regimes on the floodplains and tidal areas create silt and mudstone-type sediments.

Carboniferous sedimentary formations are the major host rocks for uranium mineralization, particularly in the northern part of the basin. Uranium mineralization occurs in almost every important sandstone formation, although not always in economic concentrations and tonnage.

The majority of the uranium mineralization at Dasa is comprised of carnotite, uranophane and uranium-rich titanite. The source of the uranium is very likely leaching of the frequent volcanic tuff and ash blankets and intercalations (now altered to analcimolite) that occur in the sedimentary sequence.

The mineralization is strongly controlled by stratigraphy and lithology, with mineralization mainly hosted within the Tchirézrine 2 sandstones, particularly in the coarser-grained micro-conglomeratic facies of greyish-greenish color containing frequent sulfides and organic matter such as plant remains. The mineralized lenses are contained within northeast-southwest trending channels. The thickness of the mineralization may vary considerably between drillholes, most likely an indication that channel stacking of favorable lithologies has increased the normal thickness of the sediment pile.

There are strong indications that the mineralization is influenced by a tectonic control along late northeast and southwest faults where some leaching has been observed.

Uranium mineralization is controlled by zones of oxidation – from surface (ground oxidation) and local/regional horizons at depth.

As noted in section 3.4, Acid Base Accounting (ABA) and Net Acid Generation (NAG) testing undertaken on ore samples in 2011 and 2022 suggested that the ore is unlikely to generate acid rock drainage (ARD).

6.4 Soils and Land Use

The ground surface in the Project area comprises sandy plains and rock outcrops in a desert landscape, traversed in places by koris (ephemeral watercourses). Three types of soils are recognized: sand, which results from water and wind erosion; gravel, which is mainly the result of detrital erosion and found in kori beds; and detrital clay, which corresponds to fine particles washed through the koris. Few soils in the Project area have agropastoral potential, and these are located along the koris and their tributaries. The geomorphology and the nature of the soils are not conducive to large-scale crop farming or stockbreeding, but grazing areas may be seen in the koris and on the plains (Groupe Art & Génie, 2020).

For consideration of naturally occurring radioactive materials (NORM) in soils of the area, please refer to section 6-12.

6.5 Biodiversity

This section draws on information from the Critical Habitat Screening Assessment carried out by Treweek Environmental Consultants Ltd (TEC) and Abell Geospatial Consulting Ltd (AGC) (TEC/AGC, 2021), as well as fieldwork undertaken by Groupe Art & Génie (2020) and FEED Consult (2022).

The Critical Habitat Assessment (CHA) was undertaken with the aim of aligning the Project with the requirements of IFC PS6. IFC PS6 requires the identification and assessment of three classes of area based on habitat condition:

- Natural Habitat: areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's

primary ecological functions and species composition. Natural Habitat is not restricted to pristine habitats. It is assumed that the majority of habitats designated as natural will have undergone some degree of historic anthropogenic impact.

- Modified Habitat: areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition. For example, areas managed intensively for agriculture, forest plantations, settlements and urban areas. Definitions of what might constitute a modified or degraded area vary, are location specific and may be influenced by the broader landscape context.
- Critical Habitat (CH): areas of Natural and/or Modified Habitat that support high biodiversity value, based on the presence of one or more of the following: Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species; Criterion 2: Endemic and/or restricted-range species; Criterion 3: Globally significant concentrations of migratory and/or congregatory species; Criterion 4: Highly threatened and/or unique ecosystems; and/or Criterion 5: Areas associated with key evolutionary processes. The presence of any one of these types of biodiversity features may "trigger" a determination of Critical Habitat, based on their extent or abundance within an Ecologically Appropriate Area of Analysis (EAAA) defined for each feature. For Criteria 1 to 3, presence of CH is confirmed by assessment against quantitative thresholds. Expert judgement is needed to determine presence of CH for Criteria 4 and 5. Legally protected areas and internationally recognized areas may also qualify an area as CH depending on the reasons for designation.

6.5.1 Legally protected areas and internationally recognized areas

Seven legally protected areas were identified during biodiversity studies, but all are more than 100 km from the Project site (Figure 6-3).

The Aïr et Ténéré Man and Biosphere (MAB) Reserve covers an area of almost 24 million hectares and is designated as a UNESCO World Heritage Site. The flora of the Reserve comprises about 300 higher plants, while the fauna boasts an outstanding variety of wild animals including three threatened antelope species, Loder's gazelle, Dama gazelle and Addax.

The Aïr and Ténéré Natural Reserve is listed as a UNESCO World Heritage Site. It is one of the largest protected areas in Africa and covers more than 7.7 million ha. It represents a small, isolated pocket of Sahelian plant life with Sudanese and Saharo-Mediterranean elements. One sixth of its total area is classified as a protected sanctuary.

The National Nature Reserve of the Aïr and the Teneré is classified as a Key Biodiversity Area (KBA) and Important Bird Area (IBA). This protected area shares the same boundary as the Aïr and Ténéré Natural Reserve described above.

The Gueltas et Oasis de l' Aïr Ramsar site was designated in 2005 and covers an area of 49,241 km^2 within the Aïr and Ténéré Natural Reserve. The site is a complex of permanent and temporary streams, oases and marshes at the center of Niger's part of the Sahara Desert. This isolated area hosts a number of threatened species such as the Cheetah (CR), Dorcas Gazelle (CR), Addax (CR) and Barbary Sheep (VU). The site hosts 290 species of flowering plants and 150 bird species, including permanent residents and Palearctic migrants.

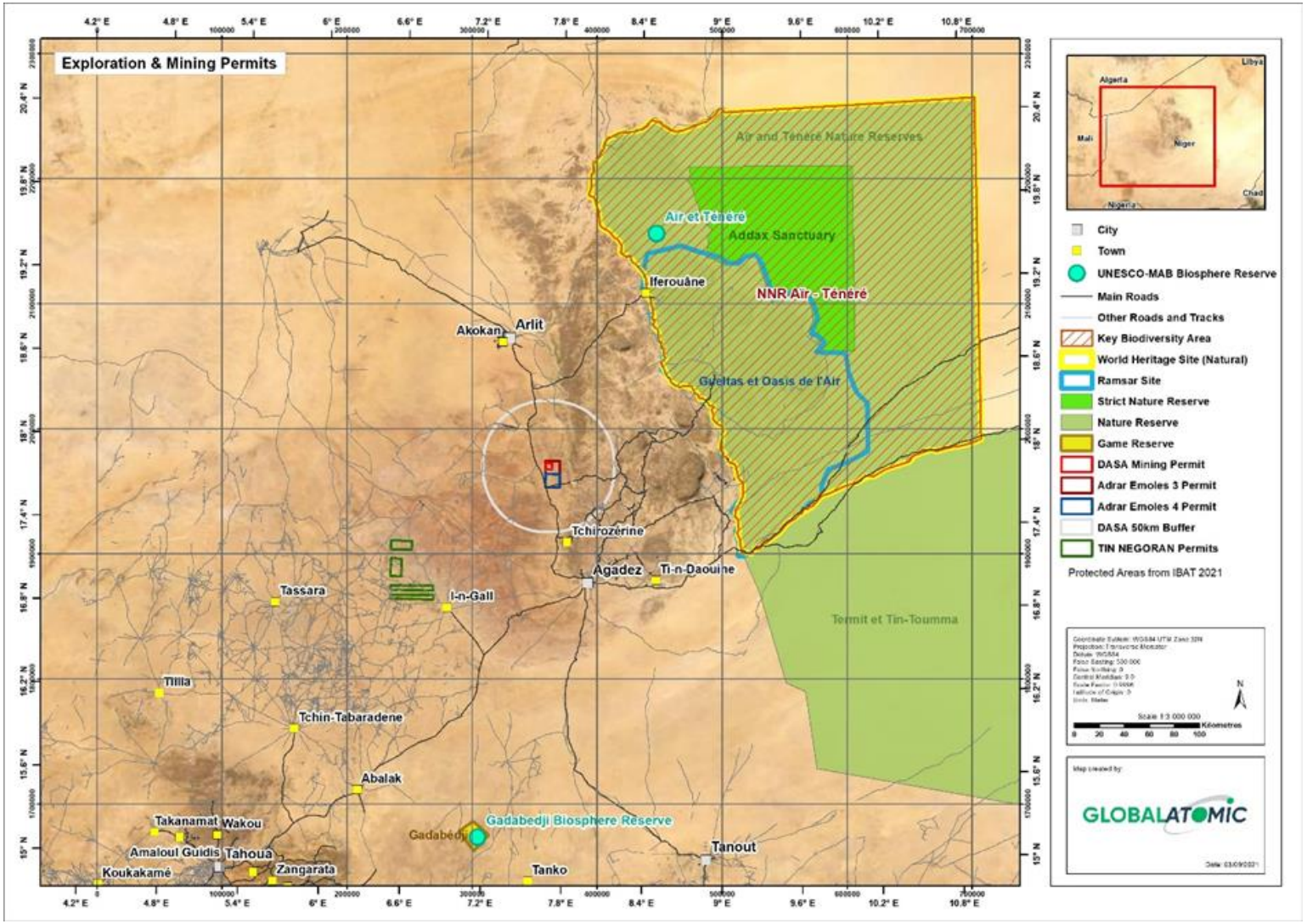


Figure 6-3: Legally Protected and Internationally Recognized Areas

The Addax Sanctuary is an IUCN Management Category I(a) site and a Strict Nature Reserve within the Aïr and Ténéré Natural Reserve. It covers an area of approximately 12,800 km^2 and exists to protect habitat for the Critically Endangered Addax.

Termit et Tin-Toumma Natural Reserve is located to the south of the Aïr and Ténéré Natural Reserve. It covers an area of 90,507 km^2 and is assigned to the IUCN management category IV. This natural reserve contains a large variety of desert habitats and is home to one of the last remaining wild populations of the critically endangered Addax, Dama Gazelle, North-west African Cheetah and Barbary Sheep.

Gadabedji MAB is located over 250 km south of the Project area. It covers an area of 1,413,625 ha and comprises a mosaic of savannas, depressions, pits and sand dunes. The fauna is diverse and includes large mammals such as the Dorcas Gazelle, Pale Fox and Golden Jackal.

6.5.2 Flora

Field surveys and GIS analysis have confirmed that areas of perennial vegetation exist in association with koris and in lowland areas. The extent of vegetation cover is similar across both the dry and wet seasons, suggesting areas of permanent (likely woody) vegetation.

Woody plant species previously listed as present in the Project area (Groupe Art & Génie, 2011 & 2020) include: *V. flava* (syn. *Acacia Ehrenbergiana*), *V. tortilis* (syn. *Acacia tortilis*), *V. tortilis* subsp. *raddiana* (syn. *Acacia raddiana*), *Balanites aegyptiaca*, *Boscia senegalensis*, *Calotropis procera*, *Zizyphus mauritiana*, *Maerua crassifolia*, *Leptadenia pyrotechnica* and *Salvadora persica*. The exotic species, *Prosopis juliflora* is also present around koris and lowland areas. The herbaceous layer is largely dominated by *Panicum turgidum*, however *Cornulaca monacantha*, *Stipagrostis pungens* and *Schouwia thebaica* were also noted as present (Groupe Art & Génie, 2011).

There is no regulation in Niger covering the protection of threatened plant species. A tree abatement restriction is defined in Act No 74 of March 04, 1974. This Act determines the rules for managing national forests, classified forests and protected forests and lists 15 tree species that are protected against abatement, unless authorized. Only one of these 15 species has been identified in the Project area: Desert Date (*Balanites aegyptiaca*), which is described as being of average abundance (Groupe Art & Génie, 2020).

No species of conservation concern listed in the IUCN Red List have been identified from previous reports.

In 2021 and 2022 FEED Consult carried out dry- and wet-season surveys to characterize the vegetation of the Project area.

During the dry-season survey in December 2021, a total of 31 survey points were selected to represent the different habitats found throughout the area within an approximate 15 km radius of the Project location. The results of the surveys are summarized in Table 6-3.

A total of 29 species were recorded in the study area: 17 herbaceous and 12 woody. The herbaceous plant species are concentrated into 10 families: Graminae (41%), Caesalpiniaceae (6%), Amaranthaceae (6%), Poaceae (6%), Capparidaceae (6%), Tiliaceae (11%), Cyperaceae (11%), Fabaceae (6%), and Aizoaceae (6%) (Table 6-4).

Table 6-3: Characterization of habitats along the transects (dry season)

Survey point	Transect	Geomorphology	Plant composition	Formation Type	Flora average height (m)	Latitude	Longitude	Elevation (m)
R1	T1	Valley / sandy-clay soil	*Balanites aegyptica, Acacia raddiana, Panicum turgidum, Acacia ehrenbergiana, Cyperus conglomeratus*	Gallery forest	6	17.9473	7.5846	449.9
R2	T1	Stony plateau	*Panicum Trigidium , Phragmites australis, Acacia ehrenbergiana*	Panicum steppe	2	17.7985	7.7358	502.3
R3	T1	Stony plateau	*Panicum turgidum, Phragmites australis*	Expanse of bedrock		17.7962	7.7456	513.9
R4	T1	Plain	*Acacia ehrembergiana, Balanites aegyptiaca, hyphaene thebeica, Panicum turgidum, Phragmites australis*	*Panicum turgidum* steppe	3	17.7567	7.7692	504.7
R5	T1	Stony plateau	*Phragmites australis, Panicum turgidum, Acacia ehrembergiana*	Grassy steppe	2	17.7433	7.7985	522.1
R6	T1	Sandy soil	*Acacia ehrembergiana, Panicum trigidium*		5	17.7272	7.8192	
R7	T2	Rocky plateau	*Acacia ehrenbergiana, Phragmites australis*	Serum on the part covered with mineral soil	3	17.8233	7.7800	505.3
R8	T2	Mineral soil	*Balanites aegyptica, Maerua crassifolia, Panicum turgidum, Acacia ehrenbergiana, Calotropis procera,*		6	17.8620	7.7881	485.8
R9	T2	Plain covered with bulk mineral soil	*Calotropis procera, Acacia ehrenbergiana, Balanites aegyptiaca, Panicum turgidum*	*Panicum turgidum* and *Calotropis procera* tree steppe	6			
R10	T2	Sandy-clay soil	*Bossia senegalensis, Balanites aegyptiaca, Acacia ehrenbergiana, Panicum turgidum*	Gallery forest	6	17.8601	7.7111	464.2

Survey point	Transect	Geomorphology	Plant composition	Formation Type	Flora average height (m)	Latitude	Longitude	Elevation (m)
R11	T2	Rocky plateau	*Balanites aegyptiaca, Acacia ehrenbergiana, Panicum turgidum*	Sparse formation	3	17.8525	7.6755	473.6
R12	T2	Rocky plateau	*Acacia Ehrenbergiana, Panicum turgidum, Cyperus conglomeratus, Aristida funiculata ou Aristida hordeacea*	*Panicum turgidum* steppe	2	17.8811	7.6849	501.7
R13	T3	Koris	*Acacia ehrenbergiana, Calotropis procera, Maerua crassifolia, Balanites aegyptiaca, Ziziphus mauritiana, Hyphaene thebeica, Panicum turgidum, Corchorus depressus*	Calotropis and Panicum tree steppe	6	17.7554	7.7252	481.0
R14	T3	Plateau covered with bulk mineral soil	*Acacia ehrenbergiana, Maerua crassifolia, Panicum turgidum, Phragmites australis*	Panicum turgidum steppe	3	17.7681	7.7085	492.5
R15	T3	Plateau covered with bulk mineral soil	*Acacia ehrenbergiana, Maerua crassifolia, Panicum turgidum, Phragmites australis, Balanites aegyptiaca*	Panicum turgidum steppe	6	17.7751	7.6873	480.3
R16	T3	Sandy plateau	*Panicum turgidum, Phragmites australis, Cyperus conglomeratus, corchorus depressus*	Panicum steppe	2	17.7868	7.6817	495.0
R17	T3	Sandy plateau	*Panicum turgidum, Phragmites australis, Maerua crassifolia, Acacia ehrenbergiana, ziziphus mauritiana*	Panicum steppe	3.5	17.8033	7.6551	462.4
R18	T3	Sandy plateau	*Panicum turgidum, Maerua crassifolia, Phragmites autralis, Cyperus conlomeratus*	Serum on the part covered with mineral soil	3	17.8542	7.6212	467.2
R19	T3	Stony plateau	*Acacia ehrenbergiana, Phragmites australis, Panicum turgidum*		2	17.8146	7.6083	457.2

Survey point	Transect	Geomorphology	Plant composition	Formation Type	Flora average height (m)	Latitude	Longitude	Elevation (m)
R20	T4	Rocky plateau	*Phragmites australis, Panicum turgidum, Acacia ehrrenbergiana, Maerua crassifolia*		2	17.7944	7.6007	470.3
R21	T4	Rocky plateau	*Acacia ehrenbergiana, Maerua crassifolia, Panicum turgidum, Phragmites autralis, Cyperus conglomeratus*	Panicum steppe	4	17.7650	7.6324	465.1
R22	T4	Valley	*Balanites aegyptiaca, Acacia ehrenbergiana, Panicum turgidum, Maerua crassifolia, Phragmites australis, Eragrostis tremula*	Gallery forest	6	17.7597	7.6529	469.1
R23	T4	Plateau	*Panicum turgidum, Phragmites australis, Acacia ehrenbergiana*	Sparse vegetation	2	17.7433	7.6649	479.1
R24	T4		*Cyperus conglomeratus, Phragmites australis, Panicum turgidum, Acacia ehrenbergiana, Maerua crassifolia*	Panicum steppe	5	17.7373	7.6870	469.7
R25	T5	Plateau	*Phragmites australis, Cyperus conglomeratus, Panicum turgidum, Acacia ehrrenbergiana, Maerua crassifolia*	Grassy steppe	3	17.6930	7.6416	465.4
R26	T5	Stony plateau	*Phragmites australis, Acacia ehrenbergiana, Maerua crassifolia, Panicum turgidum*	Tree steppe opening into the winded-up parts of the plateau	3	17.7095	7.6228	462.4
R27	T5	Plateau	*Pragmites australis*	Phragmites steppe	0.6	17.7618	7.5638	436.5
R28	T5	Valley	*Denine, Balanites aegyptica, Acacia ehrenbergiana*	Gallery forest	6	17.7509	7.5829	437.7
R29	T5	Plain	*Peuplement à Acacia ehrenbergiana*		5	17.7617	7.5650	443.5

Survey point	**Transect**	**Geomorphology**	**Plant composition**	**Formation Type**	**Flora average height (m)**	**Latitude**	**Longitude**	**Elevation (m)**
R30	T5	Plateau	*Corchorus depressus, Phragmites australis, Acacia ehrenbergiana*	Wild grass localized in depressions	4	17,2582	7.5011	453.8
R31	T5	Plateau	Phragmites australis, Cyperus conglomeratus			17,8198	7.5217	442.2

Table 6-4: Herbaceous plant species listed in and around the permit area (dry season)

Herbaceous plant species	**Family**
Andropogon gayanus	Gramineae
Aristida Sp	Gramineae
Cassia obtusifolia	Caesalpiniaceae
Celosia trigyna	Amaranthaceae
Cenchrus bilorus	Poaceae
Chrysopogon aucheri	Graminae
Cleome africana	Capparidaceae
Corchorus depressus	Tiliaceae
Corchorus olitorius	Tiliaceae
Cymbopogon sp	Gramineae
Cyperus Alopecuroides	Cyperaceae
Digitaria Horizontalis	Gramineae
Eragrostis tremula	Gramineae
Indicofera Nummulariifolia	Fabaceae
Limeum Viscosum	Aizoaceae
Panicum turgidum	Gramineae
Schoenoplectus corymbosus	Cyperaceae

The woody species include seven families comprising Mimosaceae (33%), Arecaceae (17%), Capparaceae (17%), Zygolaceae (8%), Asclepiadaceae (8%), Rhamaceae (8%) and Burseraceae (8%) (Table 6-5).

Table 6-5: Woody species and their protected status (dry season)

Scientific name	**Family**	**Local name**	**IUCN status**	**Nigerien status**
Acacia ehrenbergiana	Mimosaceae	Tamat	Least Concern	
Acacia raddiana	Mimosaceae	Afagak	Least Concern	
Accacia nilotica	Mimosaceae	Tiggaert	Least Concern	Protected
Accacia senegal	Mimosaceae	Dibshi	Least Concern	Protected
Balanites aegyptiaca	Zygophyllaceae	Aborak	Least Concern	Protected
Boscia senegalensis	Capparidaceae	Tedent	Least Concern	
Calotropis procera	Asclepiadaceae	Tirza	Least Concern	
Commiphora africana	Burseraceae	Adäras	Least Concern	
Hyphaene thebaica	Arecaceae	Taggeyt	Least Concern	Protected
Maerua crassifolia	Cappariacae	Agar	Least Concern	
Phoenix dactylifera	Arecaceae	Talizouk	Least Concern	
Ziziphus mauritania	Rhamnaceae	Abaka	Least Concern	Protected

During the wet season, the flora survey identified a total of 38 species (25 herbaceous and 13 woody) in the area, compared to 29 species in the dry season. The woody species are distributed in eight families including Mimosaceae (30%), Arecaceae (15%), Capparaceae (15%), Zygolaceae (7%), Asclepiadaceae (7%), Rhamaceae (7%), Burseraceae (7%), and Tiliaceae (7%). Compared to the dry season survey there is little change in woody species, although regeneration was observed at some survey points.

Table 6-6 summarizes the status of the species recorded during the two seasons.

Table 6-6: Flora species recorded in the dry and wet seasons

Species	**Dry season**	**Wet season**
Acacia ehrenbergiana	X	X
Acacia raddiana	X	X
Accacia nilotica	X	X
Accacia senegal	X	X
Andropogon gayanus	X	X
Aristida Sp	X	X
Balanites aegyptiaca	X	X
Boerhavia repens		X
Boscia senegalensis	X	X
Calotropis procera	X	X
Cassia italica		X
Cassia mimosoides		X
Cassia obtusifolia	X	X
Celosia trigyna	X	X
Cenchrus bilorus	X	X
Chrysopogon aucheri	X	X
Citrillus colocynthis		X
Cleome africana	X	X
Cleome viscosa		X
Commiphora africana	X	X
Corchorus depressus	X	X
Corchorus olitorius	X	X
Cryptolepis sanguinolenta		X
Cymbopogon sp	X	X
Cyperus Alopecuroides	X	X
Digitaria Horizontalis	X	X
Eragrostis tremula	X	X
Euphorbia aegyptiaca		X
Grevia tenax	X	X
Hyphaene thebaica	X	X
Indicofera Nummulariifolia	X	X
Indigofera cordifolia		X
Limeum Viscosum	X	X
Maerua crassifolia	X	X
Panicum turgidum	X	X

Species	Dry season	Wet season
Phoenix dactylifera	X	X
Schoenoplectus Corymbosus	X	X
Ziziphus mauritania	X	X

The cover of vegetation during the dry season varies between 1% and 75%. The highest cover, between 50% and 75%, is found at R1, R3, R8, R9, R14, R20, R23, R29, and R31. The lowest cover, less than 5%, is found at R2, R5, R6, R10, R12, R16, R18, R21, R22, R25, R27, and R30.

During the surveys, seven plant communities associated with various geomorphologies were observed (Table 6-7 and Figure 6-4).

Table 6-7: Plant communities associated with the land morphology

	Characteristic species	Geomorphology	Coordinates	
G1	*Acacia ehrenbergiana, Acacia tortilis, Panicum turgidum, Balanites aegyptiaca*	Valley	N 17°56'50.5''	E 007°35'04.5''
G2	*Calotropis procera, Acacia ehrenbergiana, balanites aegyptiaca*	Plain	N 17°45'19.6''	E 007°43'30.8''
G3	*Balanites aegyptiaca, Acacia ehrenbergiana*	Plain	N 17°45'34.8''	E 007°39'10.6''
G4	*Balanites aegyptiaca, Acacia ehrenbergiana, Boscia senegalensis*	Valley	N 17°51'36.3''	E 007°42'40.0''
G5	*Phragmites australis* (dry season) *Aristida finiculata* (wet season)	Plain	N 17°45'42.6''	E 007°33.49.8''
G6	*Acacia ehrenbergiana* (specific stand)	Plain	N 17°45'42.2''	E 007°33'54.1''
G7	*Panicum turgidum, Phragmites australis, Acacia ehrenbergiana. Aristida finiculata* (wet season)	Sandy plateau / Stony plateau	N 17°46'05.2''	E 007°42'30.5''

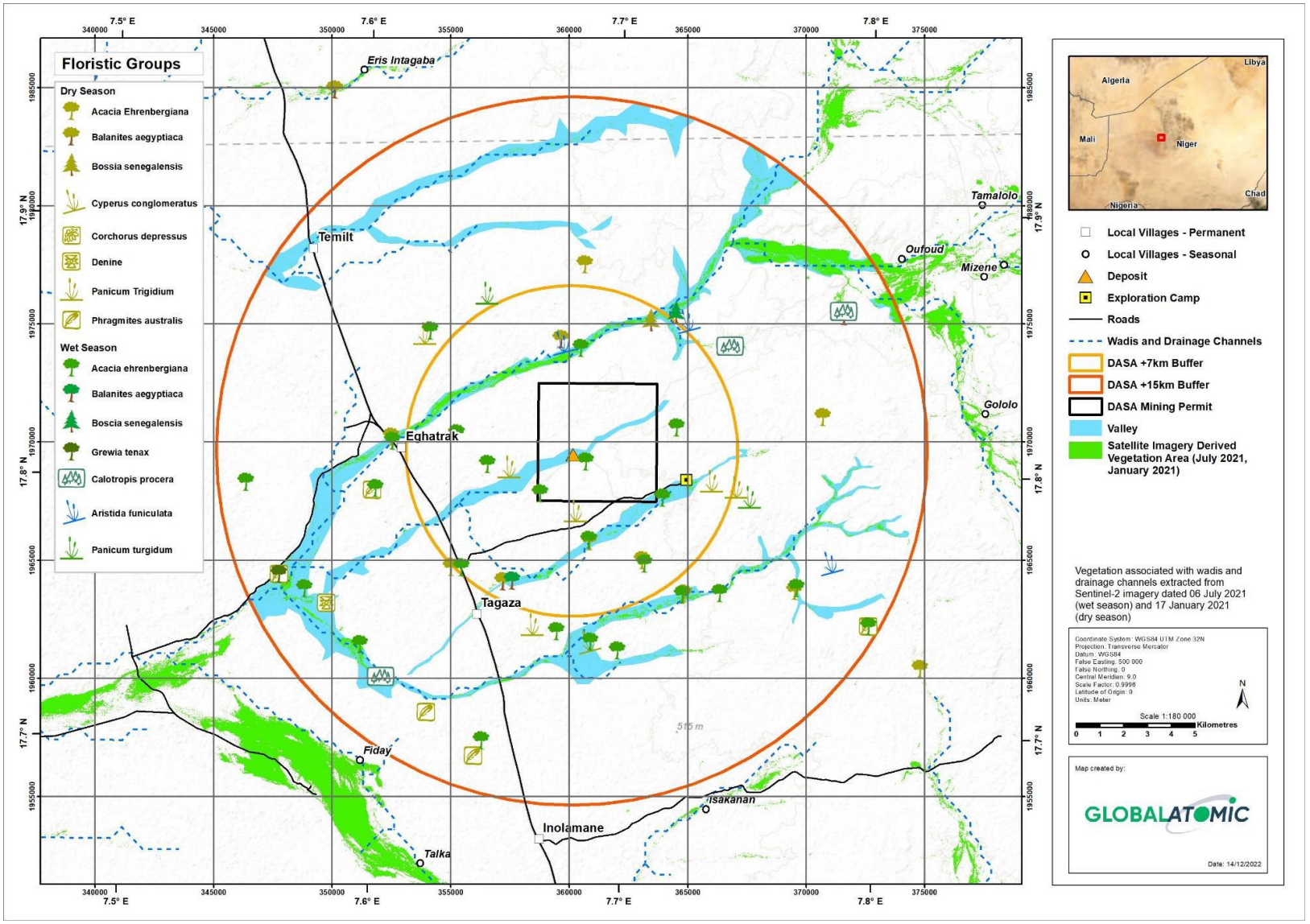


Figure 6-4: Floral groups in the Project area

Tree steppe with herbaceous carpet

Panicum turgidum grassy steppe

Acacia ehrenbergiana

Figure 6-5: Vegetation in the study area

6.5.3 Fauna

Groupe Art & Génie (2011 & 2020) describe the presence of animal species at a widespread regional scale. Populations of wild animals within the Tchirozérine department and Agadez region have substantially declined in recent years because of poaching and habitat destruction. Most residual wildlife populations have taken refuge in, and are now confined to, the Aïr Mountains and nature reserves.

Larger species such as Ostrich (*Struthio camelus*), Addax (*Addax nasomaculatus*), Oryx (*Oryx dammah*), Dama Gazelle (*Gazella dama*), and Cheetah (*Acinonyx jubatus*) are becoming increasingly rare, if not regionally extinct. Other mammal species present include: Dorcas Gazelle (*Gazella dorcas dorcas*), Olive Baboon (*Papio cynocephalus*), Patas Monkey (*Erythrocebus patas*), Common Jackal (*Canis aureus*), Palm Squirrel (*Epixerus ebii*), Fennec Fox (*Fennecus zerda*) and African Savannah Hare (*Lepus victoriae/crawshayi*).

Three broad groups of bird species are known to inhabit the area:

- Sahelian birds occur in the most heavily wooded habitats and include woodpeckers, sparrows, doves and common bulbuls;
- Sahelo-Saharan birds including Nubian Bustards (*Neotis nuba*), Dark Chanting Goshawks (*Melierax metabates*), and Spotted Sandgrouse (*Pterocles senegallus*); and,

- Saharo-mountain birds which are found mostly in wadis include Lichtenstein's Sandgrouse (*Pterocles lichtensteinii*), White-crowned Wheatears (*Oenanthe leucopyga*) and Blackstarts (*Oenanthe melanura*).

Among other bird species, a range of Afrotropical and Palearctic species also migrate from Europe or Asia.

Amphibians and reptiles are often found around water sources. Reptile diversity includes snake species such as horned vipers, spitting cobras and sand boas, sand racers, spiny-tailed lizards, desert tortoises, desert monitor lizards and several other species such as Agamas. Invertebrates are also commonly found and include beetles, crickets, butterflies, ticks, caterpillars, ants, praying mantis, and dangerous desert scorpions.

FEED Consult's 2021 dry season survey recorded both direct and indirect observations of fauna, including by the use of two camera traps in 10 different locations. A total of 54 animal species were observed, including 34 birds, 13 mammals and seven reptiles. During the wet season survey, one additional invertebrate, one additional amphibian, and four additional birds were observed.

Interviews with local communities suggested that Dama gazelle, Oryx and Common Ostrich were once present in the area, but have completely disappeared due to poaching, drought and climate change.

The mammal and reptile species observed are listed in Table 6-8 and indicated on Figure 6-7.

Table 6-8: Observed fauna

Species	**Scientific name**	**Local name**	**Dry season**	**Wet season**	**IUCN Status**
Squirrel	*Xerus erytropus*	KolanKolan	X	X	Least Concern
Fennec	*Vulpeszerda*	Ezagaz	X	X	Least Concern
Dorcas	*Gazella dorcas*	Azankat	X	X	Vulnerable
Cape hare	*Lepus capensis*	Tamarwarlt	X	X	Least Concern
Barbary sheep (Aoudad)	*Ammotragus lervia*		X	X	Vulnerable
Common patas monkey	*Erythrocebus patas*		X	X	Least Concern
Ratel	*Mellivora capensis*		X	X	Least Concern
African wildcat	*Felis lybica Felis silvestris*		X	X	Least Concern
Golden jackal	*Canis aureus*		X	X	Least Concern
Lesser jerboa	*Jaculus jaculus*		X	X	Least Concern
Crested porcupine	*Hystrix cristata*	Takonichit	X	X	Least Concern
Pale fox	*Vulpes pallida*		X	X	Least Concern

Species	Scientific name	Local name	Dry season	Wet season	IUCN Status
Desert hedgehog	*Paraechinus aethiopicus*		X	X	Least Concern
Spiny tailed lizard (Uromastyx)	*Uromastyx geyri*	Amakachaw	X	X	Near Threatened
Common agama	*Agama agama*		X	X	Least Concern
Desert monitor	*Varanus griseus*		X	X	Least Concern
Cobra	*Najanigri collis*	Safaltas	X	X	Least Concern
Horned rattlesnake	*Cerastes ceraste*	Tachile	X	X	Least Concern
Western yellow-bellied sand snake	*Psammophissibilansou Psammophissubtaeniatus*	Koumoetcho	X	X	Least Concern
Sand boa	*Eryx j.*		X	X	Least Concern
Emperor scorpion	*Pandinus imperator*		X		Not listed
Agile frog	*Rana dalmatina*			X	Least concern

Fennec

Uromastyx

Figure 6-6: Observed fauna

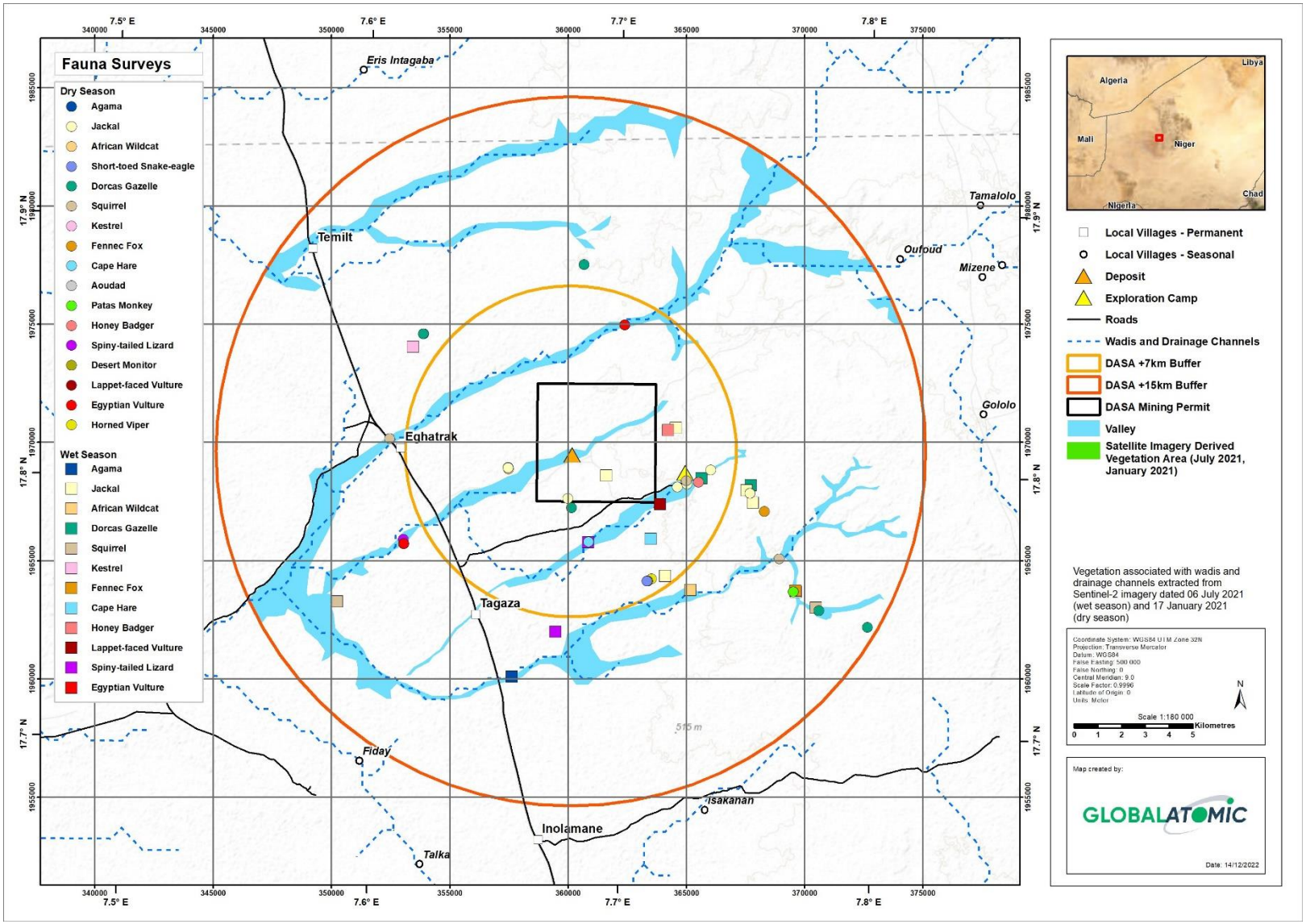


Figure 6-7: Fauna observations

The observed bird species are listed in Table 6-9.

Table 6-9: Observed birds

English name	Scientific name	Residence status	Dry	Wet	IUCN Status
Black scrub robin	*Cercotrichos podobe*	Resident	X	X	Least Concern
Rufous-tailed scrub robin	*Cercotrichas galactotes*	Resident	X	X	Least Concern
Tawny eagle	*Aquila rapax*	Resident		X	Vulnerable
Red-billed firefinch	*Lagonosticta senegala*	Resident	X	X	Least Concern
Striolated bunting	*Emberiza striolata*	Resident	X	X	Least Concern
African grey hornbill	*Tockus nasutus*	Resident	X	X	Least Concern
Crested lark	*Galerida cristata*	Resident	X	X	Least Concern
African silverbill	*Euodice cantans*	Resident	X	X	Least Concern
Greater blue-eared starling	*Lamprotornis chalybaeus*	Resident	X	X	Least Concern
Short-toed snake eagle	*Circaetus gallicus gallicus*	Migratory	X		Least Concern
Brown-naked raven	*Corvus ruficollis*	Resident	X	X	Least Concern
Fan-tailed raven	*Corvus rhipidurus*	Resident	X	X	Least Concern
Pied crow	*Corvusalbus*	Resident	X	X	Least Concern
Blue-naped mousebird	*Urocolius macrourus*	Resident	X	X	Least Concern
Fulvous babbler	*Turdoides fulvus*	Resident	X	X	Least Concern
Common kestrel	*Falco tinnunculus*	Migratory	X	X	Least Concern
Chestnut-bellied sandgrouse	*Pterocles exustus*	Resident	X	X	Least Concern
Lichtenstein's sandgrouse	*Pterocles lichtensteinii*	Resident	X		Least Concern
White throated bee eater	*Merops albicollis*	Migratory		X	Least Concern
African hoopoe	*Upupa epops senegalensis*	Migratory /Resident	X	X	Least Concern
Pharaoh eagle-owl	*Bubo ascalaphus*	Resident	X	X	Least Concern
Eurasian hoopoe	*Upupa epops*	Resident	X	X	Least Concern
Little swift	*Apus affinis*	Resident	X	X	Least Concern
Sudan golden sparrow	*Passer luteus*	Resident	X	X	Least Concern
Black-crowned sparrow-lark	*Eremopterix nigriceps*	Resident	X	X	Least Concern
Spotted thick-knee	*Burhinus capensis*	Resident		X	Least Concern
Egyptian vulture	*Neophron pernopterus*	Migratory /Resident	X	X	Endangered
Asian green bee-eater	*Merops orientalis*	Resident	X	X	Least Concern
Iberian grey shrike	*Lanius meridionalis*	Resident	X	X	Least Concern
Speckled pigeon	*Columba guinea*	Resident	X	X	Least Concern
Helmeted guineafowl	*Numida meleagris*	Resident	X	X	Least Concern
Laughing dove	*Streptopelia senegalensis*	Resident	X	X	Least Concern

English name	Scientific name	Residence status	Dry	Wet	IUCN Status
Namaqua dove	*Oena capensis*	Migratory /Resident	X	X	Least Concern
African mourning dove	*Streptopelia decipens*	Resident	X	X	Least Concern
White-crowned wheatear	*Oenanthe leucopyga*	Resident	X	X	Least Concern
Desert wheatear	*Oenanthe desertii*	Resident	X	X	Least Concern
Isabelline wheatear	*Oenanthe isabellina*	Migratory	X	X	Least Concern
Lappet-faced vulture	*Torgos tracheliotos*	Resident	X		Endangered

Lappet-faced Vulture

Egyptian Vulture

Figure 6-8: Observed birds

The field surveys conducted in the dry and wet seasons confirmed the following species of conservation concern to be present in the study area:

- Dorcas Gazelle (*Gazella Dorcas)* (Vulnerable);
- Barbary sheep (Aoudad; *Ammotragus lervia*) (Vulnerable);
- Spiny-tailed lizard (Uromastyx; *Uromastyx geyri*) (Near-threatened);
- Egyptian Vulture (*Neophron pernopterus*) (Endangered);
- Lappet-faced Vulture (*Torgos tracheliotos*) (Endangered); and,
- Tawny Eagle (*Aquila rapax*) (Vulnerable).

Cheetah, Oryx, Addax and Dama Gazelle were not found, and interviews with local communities suggested the species are no longer present in the study area.

The species of conservation concern that are present in the area are considered unlikely to trigger a critical habitat determination, because they are all wide-ranging.

Based on GIS spatial assessment, desktop critical habitat screening, historical and recent fieldwork, there is no critical habitat in the Project's area of influence.

6.6 Air Quality

Groupe Art & Génie (2020) noted that current sources of airborne emissions in the area are natural, comprising windblown dust. Naturally dusty conditions prevail in the region due to the soil type, dry desert climate, flat topography and winds. Anthropogenic emissions in the area are limited to research work and uranium exploration operations.

FEED Consult (2022) carried out spot-measurements of airborne particulate matter (PM) at the Project base camp and in the villages of Tagaza and Eghatrak:

- Site 1 (base camp north side): 17°47'58'' N, 7°45'44'' E;
- Site 2 (base camp south side): 17°47'52'' N, 7°43'34'' E;
- Site 3 (Tagaza): 17°48’36’’ N, 7°36’45’’ E; and,
- Site 4 (Eghatrak): 17°44’45’’ N, 7°48’37’’ E.

Measurements were made for PM with particle size less than both 10 and 2.5 microns (i.e. PM_{10} and $PM_{2.5}$). Sampling took place continuously over one or more 24-hour periods in December 2021. A portable weather station was used to measure temperature and wind speeds during the sampling. The wind was observed to be blowing from the north-east.

Table 6-10: Average concentration of particulate matter (PM2.5 and PM10)

PM_{10}, $PM_{2.5}$ concentration in µg/m³				**Meteorological data**	
Site	**Particulate matter**	**Average**	**Standard/day WHO**	**Temperature in °C**	**Wind speed in (km/h)**
Site 1	$PM_{2.5}$	54.65	25	32	1.44
Site 2	PM_{10}	113.27	50	29	1.44
	$PM_{2.5}$	22.24	25		
	$PM_{2.5}/PM_{10}$	0.196	<0.5		
Site 2	PM_{10}	68.73	50	32	4.68
	$PM_{2.5}$	14.10	25		
	$PM_{2.5}/PM_{10}$	0.205	<0.5		
Site 3	PM_{10}	61.84	50	33	6.48
	$PM_{2.5}$	32.74	25		
	$PM_{2.5}/PM_{10}$	0.529	<0.5		
Site 4	PM_{10}	135.70	50	29	4.78
	$PM_{2.5}$	23.95	25		
	$PM_{2.5}/PM_{10}$	0.176	<0.5		

It is observed that the PM_{10} concentration at all four measuring locations exceeded the WHO/IFC reference standard. The $PM_{2.5}$ concentration exceeded the standard at two of the four sites.

Note however that WHO has recently reduced its 24-hour air quality guideline levels for both PM_{10} (45 µg/m3) and $PM_{2.5}$ (15 µg/m3) (WHO, 2021). All but one of the above measurements exceed these guidelines.

Being only spot measurements, these data cannot be claimed to be representative of baseline conditions. They do, however, tend to corroborate the general observation that the environment in the Project area is dusty. SOMIDA will continue baseline testing to provide on-going monitoring of natural conditions, identify changes reasonably associated with construction and operation of the Project, and facilitate the evolution of mitigation strategies.

Measurement for other airborne pollutants such as nitrogen dioxide and sulfur dioxide has not been made at the Project site. Given the remote location and lack of industrial activity nearby, the baseline for these pollutants is considered to be effectively zero.

For consideration of naturally occurring radioactive materials (NORM) in air, please refer to section 6-12.

6.7 Noise

Groupe Art & Génie (2020) noted that the Project area is free of noise pollution and considered it unnecessary to carry out baseline monitoring.

Feed Consult (2022) took "spot" noise measurements at the Project site and surrounding locations. In cases where average measured noise levels exceeded WHO guideline levels, this was attributed either to the proximity of the highway, or to the wind in areas away from the road.

Table 6-11: Spot noise level measurements

Site	**Recorded noise level in decibels**			
	MIN	MAX	AVG	WHO standard
1	36.6	51.1	43.85	55/day
2 North	36.6	51.1	43.85	55/ day
2 South	46.8	72.5	59.65	55/ day
3	29.1	37.1	33.1	55/ day
4	29.6	57.9	43.75	55/ day
Center of the deposit	28.9	64.4	46.65	45/night

6.8 Hydrology and Hydrogeology

6.8.1 Surface water

There are no permanent water courses in the Project area. There is, however, a dense network of koris (ephemeral watercourses), the main flow direction of which is west-southwest from the Aïr Mountains in the east. The Project area lies between the Agatarak and Tagaza koris which run approximately 4.5 km to the north and 1.5 km to the south of the mine site, respectively (Figure 3-10). A smaller, unnamed kori runs just north of the Project location.

The kori channels are characterized by short duration, high flow events in response to heavy rainfall. They remain dry for most of the year, but flash floods can occur as a result of local storm events (CSA Global, 2021).

6.8.2 Groundwater

The following is summarized from CSA Global (2021).

Hydrogeological units in the Project area comprise an alternating sequence of high- to moderate-permeability sandstones and low-permeability siltstones and mudstones. The key aquifer units within the sequence are listed in Table 6-12.

Table 6-12: Key aquifer units

Aquifer	Description	Thickness range
Tchirézrine 2	Fluvial Sandstone formation of Jurassic age comprising fine to very coarse-grained sandstones.	53 - 78 m
Tchirézrine 1	Fluvial sandstone formation of Jurassic age comprising fine to coarse grained sandstone. The Tchirézrine 1 unit is separated from the Tchirézrine 2 unit by the overlying Abinky formation comprising mudstones and acting as an aquitard between the two units.	30 – 59 m
Teloua	The Teloua is the main unit and considered a regional aquifer. It can be divided into three separate geological units (Teloua 1, 2, and 3), however, it can be conceptualized as one hydrogeological unit comprising fine to medium grained sandstone.	36 – 79 m
Tarat	The Tarat is regarded as a productive sandstone aquifer.	37 m (average)

The Teloua aquifer is the main water-bearing unit. The Tchirézrine 1 and 2 units are secondary aquifers, important on a local scale for domestic and agricultural supplies. The Precambrian basement rocks are conceptually considered a basal aquiclude.

The geometry of the aquifer units is strongly influenced by the tectonic events that have occurred in the region. Regional and local faults have influenced the depth, thickness, extent and interconnection of the aquifer units throughout the area and locally in the vicinity of the proposed mine. Fault zones can act as barriers to flow, resulting in compartmentalization of units, or conversely, can act as preferential flow paths resulting in greater hydraulic connection between different units.

Three primary phases of hydrogeological investigations have been completed for the Dasa Project, in 2013-2014, 2020 and 2021. A total of eleven hydrogeological boreholes have been drilled and tested within the Project area. Extensive hydraulic testing (pumping test) programs have been completed on the boreholes.

Groundwater levels in the boreholes were recorded at the time of drilling/testing, and regular groundwater level monitoring was initiated in June 2021. The depth to groundwater within the boreholes monitored in 2021 ranged from 27 to 47 meters below ground level (mbgl) (corresponding to elevations between 425 and 443 m. The regional groundwater flow direction is generally from east to west. Groundwater recharge is considered to be negligible, with previous investigations suggesting recharge of less than 5 mm per year. Recharge, when it occurs, will primarily occur via infiltration along the koris.

A summary of hydraulic parameters, compiled from both on-site testing and regional data review, for the key aquifers is presented in Table 6-13.

Table 6-13: Summary of regional hydraulic parameters

Aquifer	General description	Transmissivity (m^2/s)	Hydraulic Conductivity (m/s)	Storage
Tchirézrine 2	Moderate permeability	$1x10^{-4}$ to $1x10^{-2}$	$4x10^{-7}$ to $2x10^{-6}$	-
Tchirézrine 1	Moderate permeability	$2.1x10^{-3}$ to $1x10^{-2}$	-	-
Teloua 2-3	Moderate permeability	-	-	-
Teloua 1	Moderate permeability	$3.4x10^{-4}$ to $1.9x10^{-3}$	$1x10^{-6}$ to $2.4x10^{-4}$	Ss $3x10^{-5}$ to $8x10^{-4}$
Tarat	Moderate permeability	$4.4x10^{-6}$ to $1x10^{-2}$	$1.1x10^{-7}$ to $8x10^{-4}$	Ss $7.5x10^{-6}$ to $1.1x10^{-4}$; Sy 0.15

Groundwater quality is generally good, with the majority of parameters tested falling below WHO drinking water standard limits. However, radiological testing has indicated exceedance of WHO standards. For consideration of naturally occurring radioactive materials (NORM) in groundwater of the area, please refer to section 6-12.

6.9 Socioeconomics

6.9.1 Demography

The population of Niger was estimated at 19.86 million in 2016, with an annual intercensus growth rate of 3.9%, one of the highest in the world. This high demographic growth rate is due in particular to a high fertility rate (the total fertility rate for the entire country increased from 7.1 children/ woman in 2006 to 7.6 in 2012), which results in the population doubling every eighteen years. The population of Niger is very young and predominantly rural. Children under 15 years of age make up 51.7% of the population. Of these, 21.16% are less than 5 years old and 4.56% are less than 11 months old. Women of childbearing age represent 20.13% of the population. The proportion of people 65 years of age and older is 3.5%. The working population aged 15 to 64 represents 44.9% of the population. The majority of the population is sedentary (98%) and lives in rural areas (81.6%).

The population density in the project area is less than one inhabitant/square kilometer, with over 70% of the population living in the administrative centers of the communes, department and regions. In the Project area, the total population of the two communes of Tchirozérine and Dannet is estimated at 116,630 inhabitants, with 80,000 inhabitants in the urban commune of Tchirozérine and 36,630 in that of Dannet. This population is characterized by its large number of young people. The population is of Kel Tamashek (Tuareg) origin and made up of several tribes belonging to the Kel Ewey Confederation. These tribes belong to three chiefdoms: Sultan, Anastafidat and Imakitan, which all live outside of these communes (Agadez and Timia).

The local Kel Tamashek (Tuareg) population is considered to be an 'indigenous people' in the context of IFC PS7. This standard recognizes that indigenous peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population and may have limited capacity to defend their rights and interests, or benefit from development projects. Since 2008, GAC has been consulting and seeking the

informed participation of the local community. More recently, broad community support has been demonstrated at both the local village and regional administrative levels.

The Kel Tamashek (Tuareg) have historical connections with their natural environment and temporarily migrate between regions and between departments in search of pasture and seasonal jobs. It is mainly the men who travel while the women stay in their village. With the decline in traditional livelihoods, young people in particular migrate to urban areas in search of alternative lifestyles. Migration from other parts of Niger, as well as from neighboring countries, is mainly associated with job opportunities in the mining industry. For several years now, Arlit, Akokan, Tchibarakaten, Djado and Tchirozérine have been multi-ethnic centers serving the mining industry.

FEED Consult (2022) estimates that 14,830 people live within a 15 km radius of the Project. Of the total population, approximately 10,000 are permanent residents, with the remainder being seasonal (Table 6-14).

Table 6-14: Local communities surrounding the site (resident and seasonal)

Type of resident	**Villages**								**Total**
	Dabous-Temilt	**Eghatrak**	**Gados**	**Galelo**	**Issakanan**	**Oufoud**	**Tagaza**	**Inolamane**	
Permanent	3,000	400	200	500	600	300	1,000	4,000	10,000
Seasonal	1,000	200	100	100	200	30	200	3,000	4,830
Total	4,000	600	300	600	800	330	1,200	7,000	14,830

In the Project vicinity, the vast majority of the population lives in villages, of which Eghatrak and Tagaza are nearest to the Project site, more than 5 km to the west. The area surrounding the mine site is sparsely populated, with small clusters of huts occupying land along the koris. Settlement within the koris is limited to families with small groups of animals on an approximate 200-300 m spacing. The inhabitants typical live within the kori during April to June and September to December. During the wet season from July to September and winter season from December to March, the inhabitants move to the edges of the koris where it is dryer and warmer respectively.

The nearest settlement to the Project site is a collection of three huts approximately 1.5 km to the east-southeast (Figure 3-10). These are occupied by a single family. The head of the family has been an employee of GAFC (and now SOMIDA) since the exploration phase. The family maintains a small number of animals and obtains water from the GAFC boreholes.

There are not believed to be any permanent residents within the 40 km^2 buffer area around the site.

6.9.2 Social and Land Organization

In Niger, at the local level, social organization reveals two distinct types of authority:

- Modern authority exercised by town councils headed by mayors; and,
- Traditional authority exercised by traditional chiefs and religious leaders for conflict resolution.

From a customary standpoint, governance is ensured by the traditional leadership which in the inhabitants' opinion is the institution that is most appropriate and closest to the people and to which they refer first for advice, arbitration and settlement of all disputes.

Traditional chieftaincies are structured around the canton chiefs and are groups with networks of village headmen and tribal leaders. The Project area has the following traditional structures:

- The Kel Tamashek (Tuareg) Confederation (Kel Ewey in the Aïr and the Anastafidet, Tchinwafara Tribe, and Kel Gharous); and,
- The Arlit Group (Kel Azara Tribe 1, Kel Azara Tribe 2, Kel Afagawel Tribe, Kel Afagawel Tribe [sic], Tcheguehe N'effes Tribe, Eklan Tawsit Tribe, and Gharouss Tribe).

The inhabitants' livelihoods are essentially agro-pastoral and productive land is therefore an important resource to support these activities. Nigerien legislation recognizes the State as the owner of the land but also establishes and recognizes the right to private property and customary property rights to the land. Pursuant to the Land and Public Domain Code, the State holds private property rights over all "vacant or unclaimed land" and over the public domain, i.e., over land allocated to provide public services and/or for public use.

The State is also entitled to expropriate land if a public interest has been established, to regulate land use for urban or rural development needs and, when it is in the public interest, to establish easements. Traditionally, the land belongs to the village's founding family and is acquired by the households through inheritance, donation or extended families.

6.9.3 Education, health, and infrastructure

In the two communes of Tchirozérine and Dannet, the education sector includes, in addition to conventional schools, medersa schools, literacy courses, and denominational schools. Basic programs are taught at conventional primary schools and medersas. Compared to conventional schools, medersas are very recent.

These two types of schools are characterized by a disparity between girls and boys in particular, between tenured and contractual teachers, and between classrooms in buildings constructed in solid materials and classes taught in huts.

The two communes offer the following schools:

- Dannet: Six middle schools dispensing general education programs (CEGs) and 30 elementary schools for a total enrolment of 984 elementary school students comprising 536 boys and 448 girls.
- Tchirozérine: One secondary school (CES) and three CEGs for 1,071 students. This commune also has 91 elementary schools of which 67 are "conventional" schools; six "community" schools; two "bilingual" schools (French-Tamasheq); 15 Franco-Arabic schools and a private school. These schools have a total enrolment of 7,801 students, with 3,502 girls (i.e., 45% of the total) and 4,299 boys.

Within the Agadez region there are six information and career guidance and support platforms for young people, and a number of opportunities for vocational training.

Healthcare facilities identified in the two communes are:

- Tchirozérine: 1 hospital run by SONICHAR, 1 functional integrated health center (CSI), 13 functional health clinics, 1 public pharmacy, and 1 private pharmaceutical dispensary in the commune's administrative center; and,
- Dannet: One CSI, 12 health clinics, and three healthcare facilities with modern water supply connections.

The healthcare services in the two communes are considered limited by the local authorities, with a lack of treatment products in the majority of cases.

The types of recurring illnesses seen at the CSIs in Tchirozérine and Dannet are measles, respiratory infections (cough, cold, pneumonia, tuberculosis), skin diseases, chickenpox, vectorborne diseases such as malaria and food/water-borne diseases such as diarrhoea and gastroenteritis. The most frequently declared illnesses are measles, pneumonia, diarrhoea, cough, cold and gastralgia.

In village and pastoral areas, the water supply system available to people is based mainly on small-scale drinking water sources (boreholes) and cemented wells. Tchirozérine Commune has over 150 water extraction points, whilst Dannet has 83 (these include cemented wells ('PC'), modern water points ('PME'), small water supply networks ('AEP'), and pastoral pumping stations ('SPP'). However, the coverage in both communes in terms of modern water extraction points remains limited, at 30% (according to the mayor of Tchirozérine).

The Project area is traversed by a 132 kV powerline connecting the Sonichar power plant, located some 60 km south of the Project near the small city of Tchirozérine. The power plant runs two 16 MW generators and is fed by coal.

6.9.4 Socioeconomic Activities

Stockbreeding is the primary economic activity of the inhabitants of Tchirozérine and Dannet. It is carried out by all sectors of the population, irrespective of ethnic group, gender or social category. Except for some large-scale stock farmers, the herds are family capital managed on behalf of the family members by the head of household. In general, family stock farming involves several species of animals: goats, sheep, donkeys, and camels. Cows are not kept everywhere, particularly in the mountainous areas of the commune.

One of the characteristics of stockbreeding is its high level of vulnerability to climate hazards. Despite the many droughts that the stock farmers have experienced over the past 40 years, there seems to have been little attempt at adaptation.

The stock farmers' main concern is the provision of pasture and water. The migration typical of transhumant stockbreeding involves seeking a delicate compromise between available pastures and available water, with an acceptable distance between these two resources. Traditionally, the stock farmers move into the valleys in the dry season, in search of pasture and water for their herds. It the wet season they move up the outcrops and onto land that does not flood. However, they also have their traditional lands with to which they return at certain times of the year.

In the Project area, it is understood that the east-northeast to west-southwest trending koris are used by local pastoralists (Figure 3-10). Use of the koris as a transit or nomadic herding corridor is limited in scope and undertaken in connection with the "Cure Salee", a meeting of Kel Tamashek (Tuareg) from around the region which celebrates the end of the rainy season and is held at the Town of In-gal, located approximately 150 km south-west of Dasa.

Animal health issues in the communes of Tchirozérine and Dannet are characterized by respiratory infections, digestive and urogenital disorders, mastitis, traumatic wounds, internal and external parasitosis, pasteurellosis, foot-and-mouth disease, anthrax, blackleg, sheep pox/chickenpox and diarrhea. In some areas, the most critical and recurring problems for stock farmers are the losses caused by jackal predation of small ruminants and by certain diseases that the farmers attribute to the ingestion of Prosopis juliflora pods.

FEED Consult (2022) estimates that there are approximately 150,000 head of livestock in the approximate 15 km area around the Project site, of which 33% are goats, 28% sheep, 20% camels and 19% other species.

Table 6-15: Livestock in the study area

Village	Cows	Sheep	Goats	Camels	Donkeys	Horses	Total
Dabos	600	2,000	2,000	2,000	300	0	6,900
Eghatrak	1,000	6,000	6,000	3,000	5,000	0	21,000
Galelo	50	2,000	1,000	300	100	0	3,450
Gados	20	250	300	80	100	0	750
Issakanan	2,000	7,000	6,000	4,000	5,000	5	24,005
Oufoud	300	3,000	1,500	300	250	0	5,350
Tagaza	2,000	20,000	30,000	10,000	1,000	4	63,004
Inolamane	700	2,500	2,500	10,000	5,000	8	20,708
Total	6,670	42,750	49,300	29,680	16,750	17	150,167
%	4.4	28.5	32.8	19.8	11.2	0	

The water infrastructure that constitutes the livestock watering points in the area includes pastoral wells, traditional wells, boreholes, and the temporary ponds of Gololo and Temilt. All of the surveyed villages were found to have at least one type of water facility, except for the village of Issakanan, which does not have one (its inhabitants therefore water their animals in the villages of Inolamane and Tagaza).

Favored species for grazing include *Panicum tirgidum*, *Chrysopogon Aucheri*, *Acacia raddiana*, *Balanites aegyptiaca*, and *Boscia Senegalensis*. Overgrazing tends to reduce their availability through the year.

Crop farming is an important activity that is carried out by a small number of men and women in both communes in the Project area. This activity is carried out in the main valleys, is irrigation-based and takes place practically all year round. The market gardens are laid out on both sides of the koris. The main crops are lettuce, bell peppers, cabbage, carrots, squashes, onions, potatoes and alfalfa. A portion of the crops is consumed locally and the rest is sold at the markets in Arlit, Tchirozérine and Agadez. These crops provide substantial revenues to the local communities, thereby enabling them to improve their income.

In the Project area, FEED Consult (2022) found market garden crops grown in valleys and along the koris. The estimated area under cultivation was 7.29 ha (within the approximate 15 km radius around the Project site), the closest being the market gardens of Elagozan, approximately 5 km to the south.

Trade in the Agadez region is characterized by the predominance of the informal sector in which a multitude of retailers and a few rare semi-wholesalers operate. The cities of Agadez and Arlit are the two main commercial centers, while there are about ten rural markets through the rest of the region.

In the Project area, commercial activities are essentially based on petty trade, particularly the sale of livestock products, truck (market gardening) products, wood products (fuelwood cutting, making charcoal, etc.) and on staple products. There are two main markets in the Dannet and Tchirozérine municipalities' main towns as well as many others in the area's villages.

Figure 6-9: Market gardening in the Elagozan valley

6.9.5 Community support and stakeholder engagement

GAC has been engaging with local communities since its arrival in the Dasa Project area in 2008. Engagement has included informal discussions with village elders and the development of community support programs which cover the following areas:

- Food security;
- Medical support;
- Infrastructure;
- Local business support and procurement; and,
- Regional and national procurement.

The sectors which have received support since 2008 are detailed in Table 6-16.

Formal consultation engagement undertaken as part of the 2020 ESIA took the form of a series of meetings in the communities around the project area, including Tagaza, Eghatrak (Agatara), Issakanan, Sikiret/Tadant, Oufoud, Mizeine, Ghalab, the Kelezeret Tribe and Inolamane.

Environmental concerns noted included potential effects of uranium mining, contamination of the food chain, human and animal health risks; occupation and loss of pastoral areas and crop lands, destruction of vegetation and loss of wildlife habitat; impacts to water resources, management of waste from the mining operations and restoration and rehabilitation of the mine.

Social concerns included population displacement, marginalization of local communities, the security of cultural and tourist sites, employment opportunities for young people from the local communities and management of labor risks.

Community development concerns included youth training and jobs for young people (eight villages each), a water well (seven villages), sanitation (six villages), construction of a health post (four villages), market gardening (three villages), business opportunities and a food bank (two villages each) and support for animal health and protection of the koris (one village each).

The consultations assisted GAC in selecting initial priority projects that will be monitored on a regular basis as the project moves into the construction and operations phases.

Additional consultation took place around the 2022 ESIA, focusing on the villages of Issakanan, Inolamane, Tagaza, *Temil Daabous*, *Eghatrak, Galelo*, Oufoud and *Gados*. Village names in *italics* were consulted in either 2020 or 2022, not both. (Village names in normal font were consulted twice). The 2022 engagement also include the Governorate, the Regional Council, the Regional Director of Mines, the Regional Directorate for the Environment and the Fight against Desertification, the Regional Directorate for the Advancement of Women and Child Protection, the Regional Directorate of Hydraulics and Sanitation, the Regional Labor Inspectorate, and the Regional Directorate of Livestock.

At Departmental level, the Town Hall and the Prefecture as well as the villages listed above were consulted. These consultations resulted in a list of concerns regarding the project, many of which are addressed by the impact assessment and associated mitigation measures and Management Plans, and a list of development goals for their areas of jurisdiction. In many cases, these are basic infrastructure needs that are more commonly provided by the state, such as electricity, health care and access to water. All villages consulted in 2022 requested a health center and local recruitment. Four villages requested water supply or reticulation, and three villages requested a livestock feedbank, mobile phone coverage and **'**classes in final materials'. Two villages asked for a vaccination program, electricity supply, the avoidance of the use of toxic materials at the mine site, and one village asked for local procurement and one for 'care of students'. These issues are similar to those identified by different villages in 2020 (summarized above).

Table 6-16 also indicates anticipated increased levels of support and new programs during the construction and development phases of the Project in the period 2022-2024. Support programs will be evaluated on an on-going basis through operations and closure.

Figure 6-10: A solar-powered water pump near the Dasa Project

Table 6-16: GAFC community support since 2008

Global Atomic Corp - CSR / ESG	Exploration														Construction		Ops
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Food																	
millet			x					x						x	x	x	x
sugar	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
rice			x					x						x	x	x	x
Medical																	
ambulance												x					
supplies												x		x	x	x	x
food												x		x	x	x	x
covid													x	x			
Infrastructures																	
roads					x									x	x	x	x
water well - local / nomadic herding			x											x		x	x
water well - Camps / community use					x	x					x		x		x	x	x
water well - farming support													x		x	x	x
Environment																	
EIS and baseline studies / inventory		x	x										x	x	x	x	x
project area inventory													x	x	x	x	x
re-vegetation initiatives														x	x	x	x
mitigation programs																x	x
Education / Training																	
education - exploration			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
training - exploration			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Mining – training / apprenticeship															x	x	x
Environment – training														x	x	x	x
Agriculture – training / support																x	x
Local Business Support / Procurement																	
agriculture														x	x	x	x
food services														x	x	x	x
micro business - community			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
camp supply				x	x	x	x	x	x	x	x	x	x	x	x	x	x
Regional / National procurement																	
exploration drilling			x	x	x	x	x	x			x		x	x	x		x
road work					x									x	x	x	x
camp site development					x	x	x	x	x	x	x	x	x	x	x	x	x
Food services			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
water wells install / maintain					x	x	x	x	x	x	x	x	x	x	x	x	x
camp security - regional / federal					x	x	x	x	x	x	x	x	x	x	x	x	x
ppp - solar farm																	x

Future development support will be delivered in partnership with NGOs currently active in country and will provide targeted benefits to women including enhanced irrigation, training and support of existing market gardening initiatives, support for development of goods and services related to workers apparel and PPE and associated education, training, and mentoring programs.

6.10 Human Rights and Community Health & Safety

Gender-based violence refers to any act directed against a man or a woman as a result of unequal social relations governing the community and disadvantaging a group. Gender-based violence is an umbrella term for any harmful act perpetrated against the will of others that is based on socially prescribed differences between men and women/girls and boys.

The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) defines it as "any act of gender-based violence that results in, or is likely to result in, physical or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life".

Through community consultations, FEED Consult (2022) identified the following types of gender-based violence as occurring in the Agadez region: child labor on gold washing sites (pounding, sifting and washing), sexual abuse, rape, sexual assault, unwanted pregnancies, physical violence, domestic violence, child marriage, psychological violence and economic violence.

6.11 Ecosystem Services

The woody and herbaceous plant species in the area provide the food base for livestock. They are also used as a source of energy by the local communities, as well as in traditional medicinal practices, construction, and arts and crafts.

FEED Consult (2022) gathered information on local communities' uses of flora and fauna in the area (Tables 6-17 and 6-18).

Table 6-17: Services provided by flora to local communities

Scientific name	Family	Local name	Livestock feed	Human food	Medicinal	Other
Woody species						
Acacia ehrenbergiana	Mimosaceae	Tamat	Yes	Yes	Yes	Firewood, construction
Acacia raddiana	Mimosaceae	Afagak	Yes	No	No	Firewood
Accacia nilotica	Mimosaceae	tiggaert	Yes	No	Yes	Firewood
Accacia senegal	Mimosaceae	dibshi	Yes	No	Yes	Firewood
Balanites aegyptiaca	Zygophyllaceae	Aborak	Yes	Yes	Yes	Firewood, handicrafts
Boscia senegalensis	Capparidaceae	Tedent	Yes	Yes	Yes	Firewood
Calotropis procera	Asclepiadaceae	Tirza	Yes	No	Yes	Firewood
Commiphora africana	Burseraceae	Adäras				Firewood
Hyphaene thebaica	Arecaceae	Taggeyt	Yes	Yes	Yes	Firewood
Maerua crassifolia	Cappariacae	Agar	Yes	No	Yes	Firewood
Phoenix dactylifera	Arecaceae	Talizouk	Yes	Yes	Yes	Firewood
Ziziphus mauritania	Rhamnaceae	Abaka	Yes	Yes	Yes	Firewood
Herbaceous species						
Andropogon gayanus	Gramineae	Katagoêts				
Aristida Sp	Gramineae	Tazmei				
Cassia obtusifolia	Caesalpiniaceae	Abaezzey	Yes	Yes	Yes	
Celosia trigyna	Amaranthaceae	Tajelanghitayt.				
Cenchrus bilorus	Poaceae	Wajjag	Yes	No	No	
Chrysopogon aucheri	Graminae	Taezmé				
Cleome africana	Capparidaceae	Taedak				
Corchorus depressus	Tiliaceae	Amadghos				
Corchorus olitorius	Tiliaceae	Melahya	Yes	Yes	Yes	
Cymbopogon sp	Gramineae	Tébéremt	Yes	No	Yes	
Cyperus Alopecuroides	Cyperaceae					
Digitaria Horizontalis	Gramineae	Ishibaen	Yes	Yes		

Scientific name	Family	Local name	Livestock feed	Human food	Medicinal	Other
Eragrostis tremula	Gramineae	Tegit	Yes			
Indicofera Nummulariifolia	Fabaceae	Agarof	Yes	Yes	Yes	
Limeum Viscosum	Aizoaceae	Tamasalt				
Panicum turgidum	Gramineae	Afazo	Yes	No	No	Construction
Schoenoplectus corymbosus	Cyperaceae	Alögi				

Table 6-18: Services Provided by Wildlife to Local Communities

Species	Scientific name	Local name	Usage
Squirrel	*Xerus erytropus*	KolanKolan	
Fennec	*Vulpeszerda*	Ezagaz	
Dorcas	*Gazella dorcas*	Azankat	Food
Cape hare	*Lepus capensis*	Tamarwarlt	Food, decorative
Barbary sheep	*Ammotragus lervia*		Food
Monkey	*Erythrocebus patas*		
Honey badger	*Mellivora capensis*		Snake hunter
Saharan sand cat	*Felis lybica Felis silvestris*		
Common jackal	*Canis aureus*		Traditional medicine
Jerboa	*Jaculus jaculus*		
Porcupine	*Hystrix cristata*	Takonichit	
Pale fox	*Vulpes pallida*		
Hedgehog	*Paraechinus aethiopicus*		
Uromastyx	*Uromastyx geyri*	Amakachaw	Traditional medicine
Lizard	*Agama agama*		
Desert lizard	*Varanus griseus*		Traditional medicine
Cobra	*Najanigri collis*	Safaltas	
Horned viper	*Cerastes ceraste*	Tachile	
Grass snake	*Psammophissibilans ou Psammophissubtaeniatus*	Koumoetcho	
Sand boa	----------		
Black scorpion	*Pandinus imperator*	Tazardimet	

6.12 Archaeology and Cultural Heritage

FEED Consult (2022) carried out a comprehensive review of archaeology and cultural heritage in the Project area, including consultation with local authorities. Identified sites are listed in Table 6-19 and shown on Figure 6-11.

Table 6-19: Project area cultural and archaeological sites

Village	Site	Type of site	Coordinates
Tagaza	Gani (Mouloud)	Cultural area	N : 17°43.88’ E : 07°33.53’
	Engravings (Ali Gourane)	Prehistoric	N : 17°43.76’ E : 07°37.30’
	Ancient cemetery	Cultural	N : 17°45.40’ E : 07°38.75’
	Dinosaur tracks	Palaeontologic	N : 17°47.85’ E : 07°36.36’
	Location ancient well with water bowls’ holders (stone blocks)	Historical	N : 17, 77217° E : 07,68478°
Eghatrak	Rock carvings	Prehistoric	N : 17°49.71’

Village	Site	Type of site	Coordinates
			E : 07°37.32’
	Ancient mosque (ruins)	Cultural	N : 17°48.60’ E : 07°35.88’
	Dinosaur tracks	Palaeontologic	N : 17°42.85’ E : 07°35.81’
Temilt -Dabous	Rock carvings (Giraffes of Dabous)	Prehistoric	N : 17°53.23’ E : 07°37.70’
Gados	Rock carvings (Giraffes)	Prehistoric	N : 17°52.15’ E : 07°44.10’
	Rock carvings (tifinagh)	Prehistoric	
	Ancient cemetery	Cultural	N : 17°52.45’ E : 07°43.62’

Of the cultural and archaeological sites identified, the Dabous giraffe carvings site is known worldwide. This site is managed by the community and has a guard-guide. The other sites are known by the communities but are not visited and have no management mechanism except for the Gani (Mouloud) cultural area. They have a public status because they belong to the whole community.

None of these cultural and archaeological sites are located within the Project license area. However, there are two small graveyards located along the access track to the west of the exploration camp, as indicated on Figure 3-10.

6.13 Naturally Occurring Radioactive Materials (NORM)

Groupe Art & Génie (2020) carried out a program of monitoring to initiate an understanding of the radiological baseline of the Project area.

The three main causes of radiation exposure to either workers or local inhabitants were considered to be:

- Outdoor exposure to gamma and beta radiation;
- Indoor exposure due to inhalation of radon-222 gas and radioactive dust containing 238 uranium and its long-life progeny; and,
- Ingestion of water and food containing natural radioelements.

Due to the lack of farming activity at the mine site, and the traditional nature (open and aerated) nature of houses, with no possibility for radon gas or dust to accumulate, the study focused on:

- Measurements of outdoor exposure dose rates at several points in the area of the uranium deposit and its vicinity;
- Measurement of uranium-238 concentrations in soil samples; and,
- Measurement of global alpha and global beta volumetric activity in samples from water supply sources (wells and boreholes) in the villages and camps within a 20 km radius around the uranium deposit.

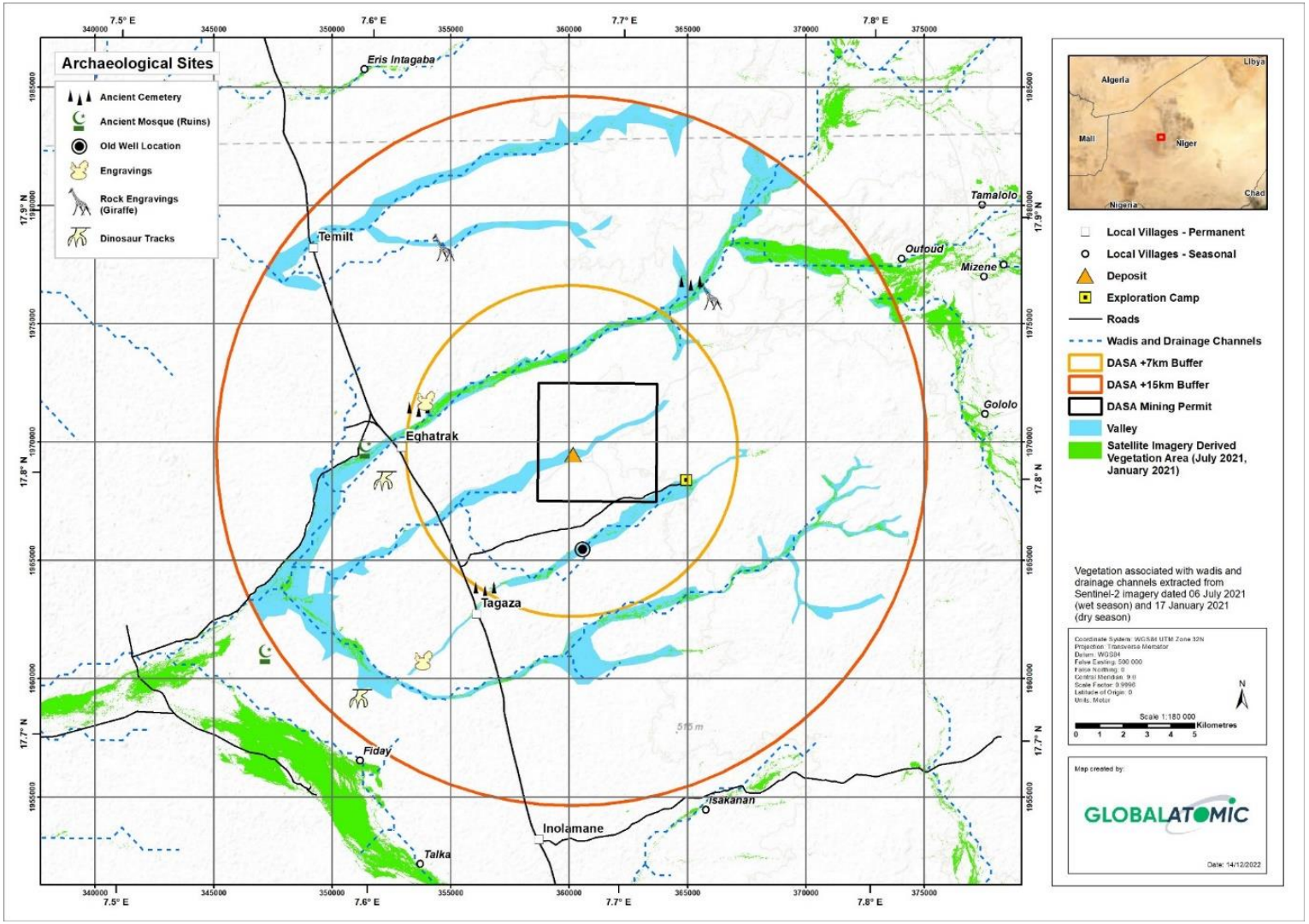


Figure 6-11: Location of archaeological sites in relation to the Dasa mining permit area

Outdoor exposure rates were measured at 33 planned locations, plus an additional 13 where water samples were obtained. The results suggested that the annual natural external exposure dose received by a member of the general public living in the area varies between 2.80 milli Sieverts (mSv) at a continuous dose rate of 320 nano-Sieverts per hour (nSv/h) and 0.53 mSv at a continuous dose rate of 60 nSv/h.

Soil samples were taken at 10 locations. Analytical results for uranium ranged from less than the detection limit to 4.28 mg/kg.

Thirteen water samples were collected from village or camp water wells or boreholes, and analysed for alpha and beta activity. Results showed global alpha activity ranging between 0.05 Bequerels per Liter (Bq/L) and 5.31 Bq/L, and global beta activity ranging between 0.15 Bq/L and 2.45 Bq/L.

In comparison to the WHO guidelines of 0.5 Bq/L for gross alpha and 1 Bq/L for gross beta radiation, it is observed that results for gross alpha are high for wells at Gani, Tilkin, and Adelay, and two boreholes at the base camp and Taden Sikiret; and results for gross beta are high for the Taden Sikiret well.

From June 2021 to May 2022, a sampling program was undertaken to establish the natural background radiological level of the area. The program comprised:

- The use of passive detectors (thermoluminescent dosimeters) to assess external exposure doses due to natural gamma and beta ionizing radiation; and
- Continuous sampling and radiological analysis of atmospheric air to determine average volume concentrations of radon potential alpha energy (Rn220, Rn222) and alpha activity of long-lived Uranium 238 and Thorium 232 in airborne dust.

Five monitoring stations were established: at the existing (exploration) camp site, the future accommodation camp site, the mine site, and at Tagaza and Eghatrak villages.

Results were processed to determine the annual dose received by a standard member of the public, as tabulated below.

Table 6-20: Annual doses from NORM

	External exposure dose mSv/year	**Internal exposure dose**			**Total dose mSv/year**
		EAP Rn220 mSv/year	**EAP Rn222 mSv/year**	**EAVL mSv/year**	
Station 1 (camp)	2.009	0.20	0.51	0.011	**2.73**
Station 2 (mine site)	2.375	0.25	0.76	0.011	**3.396**
Station 3 (Tagaza)	1.588	0.15	0.62	0.005	**2.363**
Station 4 (Eghatrak)	2.053	0.20	0.80	0.014	**3.067**
Station 5 (future camp)	1.474	0.15	0.52	0.005	**2.149**
Average	1.899	0.19	0.64	0.009	**2.74**

mSv/year = milli Sievert per year; EAP = potential alpha energy; EAVL = long-lived alpha emitter

The radon-220 / thoron gas effective doses are considered very low, at = 0.15 to 0.25 mSv/year. The radon-222 effective doses, though three times higher than those obtained for radon-220, are also low from the point of view of radiation protection of members of the public. The effective doses for long-lived alpha emitters are of the order of a few hundredths of a mSv/year and can effectively be considered as zero; there is practically no uranium-238 or its long-lived alpha emitting progeny in the atmospheric air of the area.

The above table shows that the average cumulative dose in the study area is 2.74 mSv/year, which is slightly higher than the global average background level of 2.4 mSv/year. The cumulative annual doses measured at the exploration camp, mine site and Eghatrak exceed this global average, and the dose measured at Tagaza is effectively equal to it. The figure for the future camp site is slightly below the global average.

External exposure doses to natural ionizing radiation (gamma and beta components) are higher than those due to internal exposure through inhalation of radionuclides contained in atmospheric air (radon gas and its short-lived alpha emitting progeny, uranium and its long-lived alpha emitting solid progeny). The contribution of the uranium / long-lived alpha component is practically zero, and that of Rn220 is also negligible.

Kando (2022) recommended that the highest values recorded for the various exposure scenarios should be considered to represent the baseline condition. In this case this would equate to an annual dose figure of (2.375 + 0.25 + 0.80 + 0.014) = 3.44 mSv. This should be considered as the highest level of natural exposure to ionizing radiation that can be encountered in the area of the DASA mine project.

Kando also recommended that additional sampling for external gamma and beta radiation exposure assessment should be undertaken at stations 2 (mine site) and 4 (Eghatrak) because the first quarter measurements may have been anomalous.

Also in 2022, nine water samples were collected from boreholes in the Project area, and subjected to laboratory analysis for global alpha activity, global beta activity, potassium-40, and dissolved potassium density. The results are summarized below.

Table 6-21: NORM in groundwater

Borehole	**Potassium-40 (Bq/L)**	**Gross alpha (Bq/L)**	**Gross beta (Bq/L)**	**Dissolved K density (mg/L K+)**
Inolamane village	0.031	0.18	0.20	1.0
Tagaza village	0.072	0.31	0.31	2.3
GAC camp	0.019	0.87	0.24	0.6
FORACO tank	0.028	1.92	0.44	0.9
Eghatrak village	0.025	2.76	1.31	0.8
Isakanen village	0.066	5.40	2.90	2.1
GAC borehole – Elagozan	0.022	1.26	0.36	0.7
Individual borehole	0.047	0.37	0.24	1.5
Ex FORACO camp borehole	0.022	1.05	0.37	0.7

Kando (2022) states that, based on the IAEA's (2014) consideration that the annual dose from drinking water consumption should not exceed 1 mSv, and making assumptions regarding a person's water consumption, the maximum gross alpha and gross beta concentrations in drinking water are 5 Bq/L and 10 Bq/L, respectively. The concentrations measured in the boreholes all fall below these levels, with the exception of the gross alpha concentration of 5.4 Bq/L from the Isakanen village borehole.

However, WHO (2022) recommends that further investigation, including ascertaining concentrations of individual radionuclides, should be undertaken when gross alpha and gross beta levels exceed 0.5 Bq/L and 1.0 Bq/L, respectively. The Niger standard for gross alpha levels in drinking water is even lower, at 0.1 Bq/L (Order no. 141/MSP/LCE/DGSP/DS of 27 September 2004). Several of the borehole samples fail on the WHO criterion, and all fail on the National standard.

Kando (2022) recommended that detailed radiological analyses should be carried out to determine the concentrations of individual radionuclides (uranium-234, uranium-238, radium-226, radium-228, lead-210 and polonium-210) present in labelled water where the WHO reference levels for global alpha activity (0.50 Bq/l) and/or global beta activity (1.0 Bq/l) were exceeded.

Also in 2022, ten surface soil samples were collected at locations around the mine site and subjected to laboratory analysis for uranium. The results ranged between <0.99 mg/kg and 4.28 mg/kg uranium. Eight of the ten samples had uranium concentrations below the world average, which is 3.2 mg/kg.

7 Impact assessment

7.1 Methodology and summary

FEED Consult (2022) carried out its impact assessment for each of the construction, operation, and closure phases of the Project. For each phase, the activities which might cause impacts were identified and then compared with a list of elements of the biophysical and human environments (i.e. 'receptors') which might be affected, in order to identify likely impact scenarios.

Then, for each scenario, a characterization exercise was undertaken, taking into consideration the likely intensity of the impact, the perceived value of the receptor, the degree of disturbance, its spatial extent, and the duration. Based on this characterization, the significance of each potential impact was evaluated as either Minor, Medium, or Major, and either positive or negative.

The following briefly summarizes the potential Major and Medium impacts identified for the three Project phases: construction, operations, and closure. The following sections 7.2 – 7.10 consider in detail the mitigation measures and best international industry practices which will be employed to reduce the negative impacts to acceptable levels.

For the **construction phase**, one potential impact was assigned a Major positive significance: the effects of the Project on the economy, including local employment. No potential impacts of Major negative significance were identified.

Potential impacts of Medium significance associated with the construction phase included:

- Contamination of soil by fuel, oil, and solid and liquid wastes;
- Degradation of air quality by exhaust gas emissions and dust;
- Depletion of groundwater resources by extraction for Project use;
- Modification of surface drainage patterns;
- Contamination of water resources;
- Disturbance to fauna by habitat destruction, noise, vehicle movements, and poaching by Project staff;
- Loss of vegetation due to site clearance, and smothering of nearby vegetation by dust;
- Health and safety risks to workers and local communities, including accidents, disease transmission, contamination, and risks of conflict;
- Noise nuisance; and,
- Reduction of access to land for pastoral activities.

For the **operational phase**, the effects of the Project on the economy were again assigned a Major positive significance. No impacts were assigned a Major negative significance.

Medium-significance impacts associated with the operational phase included:

- Increased soil erosion and contamination of soil by fuels, oils, process chemicals, solid and liquid wastes, and radioactive dust;
- Degradation of air quality by exhaust gas emissions from mobile plant and vehicles, and fugitive emissions from processing;
- Depletion of groundwater resources from extraction for Project use and mine de-watering;
- Contamination of water resources by process chemicals, or discharge of untreated wastewater;

- Disturbance to fauna by habitat destruction, noise, vehicle movements, poaching by Project staff, and risk of mortality from falling into ponds;
- Degradation of landscape quality (i.e. visual impact);
- Health and safety risks to workers and local communities, including accidents, disease transmission, contamination (including radiological), and risks of conflict;
- Noise nuisance;
- Reduction of access to land for pastoral activities, and potential injury to livestock from contamination, vehicle collisions, and falling into ponds;
- Decline of local traditions and customs due to in-migration of people; and,
- Degradation or destruction of archaeological or cultural heritage.

For the **closure phase**, the effect on the economy and local employment was considered a Major negative impact, due to the loss of direct and associated jobs and revenue after the mine closes. On the other hand, removal of mine infrastructure and restoration of the affected area was considered a Major positive impact on flora, and a Medium positive impact on fauna and landscape character.

Medium-significant negative impacts associated with the closure phase included:

- Potential contamination of soil by fuel, oil, solid and liquid wastes, and radionuclides during dismantling activities;
- Degradation of air quality by exhaust gas emissions and dust;
- Potential contamination of water resources by fuel, oil, solid and liquid wastes, and radionuclides during dismantling activities; and,
- Health and safety risks to workers and local communities, including accidents, disease transmission, and contamination.

It is acknowledged that some of the potential impacts listed above – for all Project phases - might represent human rights violations, particularly those relating to depletion of water supplies, degradation of air and water quality, degradation of ecosystem services including vegetation cover, and risks to human health.

The following sections outline, for each receptor, the mitigation measures deemed necessary to reduce the significance of the negative impacts identified above. These include FEED Consult's (2022) considerations, along with additional measures necessary to align the Project with good international industry practice. The measures will be incorporated into the existing Environmental and Social Management Plan (ESMP) for the Project, which was developed from the original, government approved ESIA. The existing Environmental and Social Management System (ESMS) will be updated and revised as necessary to facilitate implementation of the updated ESMP (see Chapter 10).

7.2 Greenhouse gases and climate change

7.2.1 Project greenhouse gas emissions

SOMIDA has estimated its base-case operations-phase GHG emissions as 65,395 tonnes per annum (tpa) which includes 12,477 tpa scope 1 emissions and 52,919 tpa scope 2 emissions and assumes that the majority of the Project's electricity will be provided by coal-fired power via the Nigerien national grid, and that vehicles will be fueled by diesel.

There is an optimized plan to install solar photovoltaic (PV) panels linked to battery storage and back-up diesel, with the intent of providing approximately 20% of the Project's total requirement as

renewable energy. This would reduce the total estimated GHG emissions to 52,871 tpa to include 21,275 tpa scope 1 emissions and 31,596 tpa scope 2 emissions. Furthermore, there is a conceptual plan to reduce the mine site power demand from 12 megawatts (MW) to 9 MW which, coupled with solar PV and battery storage, and back-up diesel, would target a reduction in GHG emissions to 43,000 tpa; a 34% reduction from the base case scenario to include 18,691 tpa scope 1 emissions and 24,422 tpa scope 2 emissions.

Regardless, GHG emissions will exceed 25,000 tpa and will therefore need to be measured and reported on an annual basis in order to comply with IFC PS3.

Power for the construction phase power is expected to be provided via diesel fuel (vehicles and generators).

In line with IFC PS3, SOMIDA has an obligation to continuously seek and implement cost effective measures for improving efficiency in its consumption of energy, as well as water and other natural resources and material inputs. SOMIDA plans to introduce battery electric vehicles (BEV) to the underground and surface fleets over time to the extent practical.

It should be noted that, according to the European Nuclear Society[1], one kilogram of natural uranium, following enrichment and used for power generation in light water reactors, can generate 45,000 kWh of electricity, equivalent to the electricity generation of 14,000 kg of coal. GAC has entered into two off-take agreements with North American utilities for a total of 650,000 pounds of uranium oxide to be delivered over five years starting Q1 2025.

7.2.2 Climate change

According to the African Development Bank (ADB) (2018), climate change is predicted to have the following effects by 2050 in northern Niger[2]:

- Temperatures increasing by between 2.0°C and 2.5°C;
- Rainfall either unchanging or increasing by up to 50%; and,
- Number of heavy rainfall days, and number of rainy days per year, either unchanging or increasing by up to 50%.

There is clearly considerable difficulty and uncertainty in predicting the rainfall trend, and the report cautions that some studies have suggested that increased convective rainfall intensity (e.g. thunderstorm-related rainfall) should generally be expected in a warmer climate.

The ADB considers that increasing temperature trends are likely to increase pressure on water resources, despite indications that rainfall trends may be normal to increasing into the future. Increasing temperatures and more extreme rainfall is of concern for both the economy and food security, given the dominating role of agriculture, a highly climate-sensitive sector which engages around half of Niger's workforce overall.

These climate change predictions suggest three main actions to be considered by SOMIDA in implementing the Dasa Project:

[1] https://www.euronuclear.org/glossary/fuel-comparison/

[2] The Dasa area lies close to the boundary between the 'Arid North' and 'Semi-arid South' regions defined by ADB (2018). The Dasa area climate described in Chapter 4 is more aligned with the characteristics of the Semi-arid South, and so figures for that region are referenced here.

- Ensure that potential heat-related effects (thermal stresses) are addressed in occupational health and safety planning (see section 7.8.1);
- Ensure that Project infrastructure is protected from potential surface water flooding (section 7.6); and,
- Support local initiatives for agricultural efficiency and food security for local people (see section 7.8.3).

7.3 Soils

Soils in the area are generally poor in terms of agricultural potential. Soils that support vegetation growth and small-scale livestock grazing are largely confined to the kori channels. Implementation of the Project risks increased erosion of those soil resources that do exist, as well as their contamination by fuels, oils, process chemicals, solid and liquid wastes, and radioactive dust.

As outlined in section 4.12, SOMIDA has collected and analyzed soil samples for their uranium content. The Project Environmental Monitoring Plan will include a program of periodic soil sampling and analysis to monitor any future variation from background concentrations.

Control of dust will be a critical part of Project operations, and this is detailed in section 7.5.

Soil (and water) resources will be protected by the implementation of good international industry practices for materials and waste handling, as exemplified by the IFC EHS General Guidelines (IFC, 2007a), as outlined below.

7.3.1 Hazardous materials management

A Hazardous Materials Management Plan will be developed, to address both occupational health and safety and environmental risks:

- The inventory of hazardous materials to be employed on site, provided in section 3.10, will be confirmed;
- Job safety analysis will be undertaken to identify specific potential occupational hazards. Chemical exposure levels will be monitored against applicable occupational exposure standards;
- Hazard communication and training programs will be developed to prepare workers to recognize and respond to workplace chemical hazards. Programs will include aspects of hazard identification, safe operating and materials handling procedures, safe work practices, basic emergency procedures, and special hazards unique to their jobs. Training will incorporate information from Material Safety Data Sheets (MSDS) for hazardous materials being handled. MSDS will be readily accessible to employees in their local language;
- Permitted maintenance activities, such as hot work or confined space entries, will be defined and documented;
- Suitable personal protective equipment (PPE) will be provided (e.g., footwear, masks, protective clothing and goggles in appropriate areas), as well as emergency eyewash and shower stations, ventilation systems, and sanitary facilities as required; and,
- Monitoring and record-keeping activities will be established, including audit procedures designed to verify and record the effectiveness of prevention and control of exposure to occupational hazards, and maintenance of accident and incident investigation reports on file for a period of at least five years.

Hazardous materials control measures will include:

- Secondary containment for liquids, comprising impervious berms, dikes, or walls capable of containing the larger of 110% of the largest tank or 25% percent of the combined tank volumes in areas with above-ground tanks with a total storage volume equal or greater than 1,000 L;
- Transfer of hazardous materials between vehicle tanks and storage tanks to take place in areas with surfaces sufficiently impervious to avoid loss to the environment, and sloped to a collection or containment structure;
- Availability of spill containment equipment such as portable drain covers (which can be deployed for the duration of the operations), automatic shut-off valves on storm water basins, or shut off valves in drainage or sewer facilities, combined with oil-water separators;
- Use of dedicated fittings, pipes, and hoses specific to materials in tanks (e.g., all acids use one type of connection, all caustics use another), and maintaining procedures to prevent addition of hazardous materials to incorrect tanks;
- Use of transfer equipment that is compatible and suitable for the characteristics of the materials transferred and designed to ensure safe transfer;
- Regular inspection, maintenance and repair of fittings, pipes and hoses; and regular reconciliation of tank contents;
- Provision of secondary containment, drip trays or other overflow and drip containment measures, for hazardous materials containers at connection points or other possible overflow points;
- Written procedures for transfer operations that include a checklist of measures to follow during filling operations and the use of filling operators trained in these procedures;
- Use of dripless hose connections for vehicle tank and fixed connections with storage tanks;
- Provision of automatic fill shutoff valves on storage tanks to prevent overfilling;
- Use of catch basins around fill pipes to collect spills;
- Use of piping connections with automatic overfill protection (float valve);
- Provision of overfill or over-pressure vents that allow controlled release to a capture point; and,
- Incorporation of leak detection systems, particularly in situations where secondary containment is not feasible or practicable.

A spill response and management plan will be formulated as part of the overall Emergency Preparedness and Response Plan:

- For each hazardous material in the site inventory, analysis will be undertaken of potential spill and release scenarios, the potential for uncontrolled reactions such as fire and explosion, and the potential consequences in terms of effects on Project workers and the surrounding environment;
- Project staff will be trained in release prevention, including drills specific to hazardous materials as part of emergency preparedness response training;
- Inspection programs will be implemented to maintain the mechanical integrity and operability of pressure vessels, tanks, piping systems, relief and vent valve systems, containment infrastructure, emergency shutdown systems, controls and pumps, and associated process equipment;
- Standard Operating Procedures (SOPs) will be prepared for filling storage tanks and other containers or equipment, as well as for transfer operations by personnel trained in the safe transfer and filling of the hazardous material, and in spill prevention and response;

- SOPs will be prepared for the management of secondary containment structures, specifically the removal of any accumulated fluid, such as rainfall, to ensure that the intent of the system is not compromised;
- Locations of stored hazardous materials and associated activities will be identified on an emergency plan site map;
- Availability of specific personal protective equipment and training needed to respond to an emergency will be documented;
- Availability of spill response equipment sufficient to handle at least initial stages of a spill and a list of external resources for equipment and personnel, if necessary, to supplement internal resources will be documented;
- Response activities in the event of a spill, release, or other chemical emergency will be documented, including internal and external notification procedures; specific responsibilities of individuals or groups; decision process for assessing severity of the release, and determining appropriate actions; facility evacuation routes; and post-event activities such as clean-up and disposal, incident investigation, employee re-entry, and restoration of spill response equipment.

Further considerations for hazardous materials management are included in section 7.8.1 on occupational health and safety.

7.3.2 Mining waste

As described in Chapter 3, all waste rock will be used either in construction of the tailings storage facility, or to backfill mined-out stopes underground. There will be no need for a separate waste rock dump.

The dry stack tailings storage facility (DSTSF) will incorporate an impermeable HDPE membrane basal liner and toe drains. Seepage collected by the toe drains will be routed to the evaporation pond.

Potential dust generation associated with operation of the DSTSF will be controlled, monitored and managed as described in section 7.5.1.

Upon mine closure, the DSTSF will be covered with a composite HDPE / compacted clay layer followed by a protective layer of waste rock.

As described in section 7.7, laboratory testing has shown that the uranium host rock does not have the potential to generate acid drainage and does not contain potentially hazardous metals at concentrations likely to generate a hazardous condition. However, routine sampling and testing of groundwater samples will be undertaken periodically throughout the Project life (and post-closure) to provide warning of any such condition.

It is expected that, following mine closure, radon-222 will continue to be generated by the tailings enclosed within the DSTSF, and will migrate to surface to be released to the air. Radon-222 has a half-life of only approximately 4 days, and mitigation can therefore be effected by increasing the time it takes for the gas to migrate through the tailings pile. This will be achieved by the specified degree of compaction of the tailings, and the placing of a low-permeability cover layer with native soil cover.

Radon emissions from the DSTSF will be monitored routinely throughout the Project life and post-closure.

7.3.3 Other waste

Non-mining waste generated by the Project will include various solid wastes (e.g. construction materials, metal scrap, packaging and containers, refuse), hazardous wastes (e.g. chemical containers, used oils, materials contaminated with uranium), and wastewater and sewage.

SOMIDA's existing Waste Management Plan will be reviewed for alignment with good international industry practice. The plan will be based on a waste hierarchy that considers, in order of preference, prevention, reduction, reuse, recovery, recycling, removal and finally disposal of wastes. The following will be included (IFC, 2007a):

- Instituting good housekeeping and operating practices, including inventory control to reduce the amount of waste resulting from materials that are out-of-date, off-specification, contaminated, damaged, or excess to plant needs;
- Instituting procurement measures that recognize opportunities to return usable materials such as containers and which prevents the over-ordering of materials;
- Minimizing hazardous waste generation by implementing stringent waste segregation to prevent the comingling of non-hazardous and hazardous waste to be managed;
- Investigation of external markets for recycling by other industrial processing operations located in the region;
- Establishing recycling objectives and formal tracking of waste generation and recycling rates, and providing training and incentives to employees in order to meet objectives;
- On-site or off-site biological, chemical, or physical treatment of waste material to render it non-hazardous prior to final disposal;
- Treatment or disposal at permitted facilities specially designed to receive the waste; and,
- Ensuring that contractors handling, treating, and disposing of hazardous waste are reputable and legitimate enterprises, licensed by regulatory agencies and following good international industry practice for the waste being handled.

For the operational phase of the Project, there will be a central waste storage facility at the site. Wastes will be gathered from the various buildings and site facilities and transported to the central waste storage facility, where it will be sorted and segregated according to its categorization (e.g., hazardous for on-site incineration, hazardous for off-site disposal, recyclables, etc.).

In accordance with good international industry practice (IFC, 2007a), hazardous waste will:

- Be stored in a manner that prevents contact between incompatible wastes, and allows for inspection between containers to monitor leaks or spills;
- Be stored in closed containers away from direct sunlight, wind and rain;
- Be stored within secondary containment where appropriate (e.g., liquid wastes when stored in volumes greater than 220 L; the available volume of secondary containment will be at least 110% of the largest storage container, or 25% of the total storage capacity (whichever is greater), in that specific location);
- Be adequately ventilated where volatile wastes are stored; and,
- Be labelled, including information on chemical compatibility.

Access to hazardous waste storage areas will be limited to employees having appropriate specialized training and PPE. Periodic inspections of waste storage areas will be carried out, and the results documented.

On-site and off-site transportation of waste will be conducted to prevent or minimize spills, releases, and exposures to employees and the public. All waste containers designated for off-site shipment will be secured and labelled with the contents and associated hazards, be properly loaded on the transport vehicles before leaving the site and be accompanied by a shipping manifest that describes the load and its associated hazards.

Contractors employed to transport and dispose of hazardous and non-hazardous wastes will have the required certifications and permits and will be audited periodically to ensure the waste is being managed correctly.

There will be two sewage treatment plants: one near the process plant, and one at the accommodation camp. The plants will be designed to treat wastewater to standards to the higher of Nigerien or IFC standards (see section 2.4).

7.4 Biodiversity

The Project site lies more than 100 km from any biodiversity protected or internationally recognized sites, and critical habitat per the definition of IFC PS6 has not been identified in the area. However, the Project does present a risk to local species, including smothering of vegetation by dust, disturbance to fauna by habitat destruction and noise, and risk of mortality from vehicle collisions, poaching by Project staff, and from falling into ponds or encountering hazardous materials.

The following measures will be implemented to minimize impacts to biodiversity. The measures for hazardous material and waste management (section 7.3), and air quality, dust, and noise (section 7.5) are also applicable to biodiversity.

- The land areas disturbed and used for the Project will be reduced to the minimum necessary. These areas will be clearly delineated (by fencing or otherwise) and there will be no encroachment outside them (this applies particularly to off-road driving);
- Trees or areas of dense vegetation will be retained when possible (species protected in Niger, as identified in section 6.5.2, will be respected);
- Areas presenting potential hazards to fauna (e.g. deep excavations, ponds, chemical storage areas) will be made secure (e.g., by fencing);
- There will be procedures in place for rescue of animals trapped in excavations or Project infrastructure, to be undertaken by suitably experienced staff;
- Disturbed areas will be restored progressively whenever possible, including in particular temporary laydown areas and borrow pits;
- Soils removed from the Project footprint will be stockpiled for future use (in progressive restoration). Stockpiles should not exceed 3 – 4 m in height and will be regularly inspected to check for erosion, weed growth, and loss of structure or soil fauna;
- Placed soils will be revegetated promptly, to reduce erosion and dust generation;
- Poaching will be prohibited, and workers will be made aware of the importance of protecting wildlife; and,
- There will be monitoring for the presence of invasive species and, if identified, a plan for their eradication will be implemented.

7.5 Air quality, noise and vibration

The Project will cause degradation of air quality by exhaust gas and particulate matter emissions from vehicles and plant, and by fugitive emissions from processing. The Project activities will generate noise, and vibration may be a consequence of underground blasting. The primary receptors at risk are Project workers. Residents of the huts located about 1.5 km east-southeast of the Project site are also potential receptors, although these huts are not located downwind of the Project site with respect to the main prevailing wind directions (north-east and south-west).

Air emissions may also have an impact on local flora and fauna. The most significant effect is smothering of nearby vegetation by dust. This is likely to be of most significance during the construction and mine closure phases.

Air quality measurements carried out in the Project area have shown levels of particulate matter (i.e., fine dust) that sometimes exceed WHO health standards. This is largely a natural phenomenon attributable to wind-blown dust from the desert surface, as opposed to industrial sources. Nevertheless, baseline conditions already represent a potential health risk to Project workers, and Project activities may increase this risk.

7.5.1 Control of dust

Control of dust will be of critical importance during all Project phases. A dust management plan will be implemented (as part of the Air Quality and Greenhouse Gas Emissions Management Plan), based upon the strategies outlined in the IFC EHS Guidelines for Mining (IFC, 2007b):

- Roads and working areas susceptible to dust generation will be watered;
- Traffic patterns will be optimized and vehicle speed limits imposed to minimize dust generation;
- Exposed soils and other erodible materials will be covered or rendered non-dust-generating, and revegetated as soon as possible;
- Undisturbed areas will be cleared only when absolutely necessary and immediately prior to construction works;
- Dusty materials will be stored in enclosed areas and used with efficient dust suppressing measures in place;
- Loading, transfer, and discharge of dust-generating materials will take place with a minimum height of fall, and be shielded against the wind;
- Trucks carrying dust-generating material will be covered;
- There will be a mechanism in place to suspend dust-generating activities in windy conditions;
- Dust suppression spray systems will be installed where necessary; and,
- Conveyor systems for dusty materials will be covered and equipped with measures for cleaning return belts.

See also section 7.8.1 regarding occupational health hazards from radioactive and silica-containing dust.

7.5.2 Gaseous emissions

Project stack emissions will be designed to comply with the established standards listed in Table 2-7. Preliminary calculations are presented in Table 7-1.

Table 7-1: Preliminary air emissions calculations

	Dust mg/m³	**SO_2 mg/m³**	**SO_2 kg/t acid**	**SO_3 mg/m³**	**SO_3 kg/t acid**	**NO_x mg/m³**
Standard	**50**	**450**	**3**	**60**	**0.15**	**300**
Baghouse stack	10	-	-	-	-	-
Absorber stack	-	-	-	-	-	220
Acid plant stack	-	146	2	35	0.075	-
Product stack	1	-	-	-	-	-

The Project will employ good international industry practices for the minimization of air emissions, as exemplified by the IFC EHS General Guidelines (IFC, 2007a):

- Low-sulfur fuels will be sourced if available;
- Fuel-efficient vehicles and equipment will be procured, and maintained in accordance with manufacturer recommendations;
- Drivers and mobile equipment operators will be trained in operating practices designed to reduce fuel consumption, including measured acceleration and driving within safe speed limits;
- Sulfur dioxide (SO_2) and nitrogen oxides (NO_x) control systems will be added to point sources;
- Stack heights will be designed to avoid excessive ground level concentrations due to downwash, wakes, and eddy effects, and to ensure reasonable diffusion to minimize impacts;
- IFC guidelines for small combustion facilities will be applied (see section 2.4);
- Leak detection and repair (LDAR) programs will be implemented to identify and control fugitive emissions; and,
- Where volatile compounds are in use, vapors will be collected through air extractors with subsequent removal by condensers, activated carbon absorption, incineration, etc.

7.5.3 Monitoring

Ambient air quality will be monitored at points around the Project site boundary. An Environmental Monitoring Plan will be established to define the number of monitoring stations required, and the methodologies to be employed. The residents of the huts 1.5 km east-southeast of the site will be considered the primary potential receptors for monitoring.

Reference criteria for air quality are included in section 2.4.

7.5.4 Noise and vibration

Good industry practice will be used to control and manage noise (IFC, 2007a and 2007b). The preferred method for controlling noise from stationary sources is to implement noise control measures at source. Noise reduction options that will be considered include:

- Enclosing and cladding of processing plants;
- Installation of proper sound barriers and / or noise containment, with enclosures and curtains at or near the source equipment (e.g., crushers, grinders, and screens);
- Installation of natural barriers at facility boundaries, such as soil berms;

- Optimization of internal-traffic routing, particularly to minimize vehicle reversing needs (reducing noise from reversing alarms) and to maximize distances to the closest sensitive receptors;
- Selecting equipment with lower sound power levels;
- Installing silencers for fans;
- Installing suitable mufflers on engine exhausts and compressor components;
- Installing acoustic enclosures for equipment casing radiating noise;
- Improving the acoustic performance of constructed buildings by applying sound insulation;
- Installing acoustic barriers without gaps and with a continuous minimum surface density of 10 kg/m^2 in order to minimize the transmission of sound through the barrier;
- Installing vibration isolation for mechanical equipment;
- Reducing work at night (construction phase);
- Relocating noise sources to less sensitive areas to take advantage of distance and shielding; and,
- Developing a mechanism to record and respond to complaints.

The Environmental Monitoring Plan will include a program of periodic noise and vibration monitoring (the latter for at least the first few blasts, to confirm that resulting vibration is not of concern). Interpretation of noise monitoring results will refer to the IFC EHS guideline criteria tabulated in section 2.4.

7.6 Surface water and groundwater

7.6.1 Surface water

There are no permanent surface water bodies in the Project area, but heavy rainfall can result in flash floods along the kori channels. Potential impacts arising from Project implementation include modification of surface water drainage patterns, and contamination of flood flows by hazardous materials or wastes.

Mine site construction will avoid the main koris which traverse the area. During clearing and construction works, topography will be respected and disturbed areas will be restored as quickly as possible to avoid the risk of altering the drainage system. Where necessary, diversionary channels and other storm water management structures will be installed both to manage the probable maximum flood level, and to allow sufficient retention time to allow suspended solids to settle out (see section 3.13). Site water management systems will be designed to separate clean water from contact water.

A flood risk area has been identified north of the mine infrastructure (CSA, 2021). While maximum flood levels are not predicted to impact the mine facilities, flood protection measures in these northern areas will be considered in order to reduce the potential flood risk to the mine surface infrastructure. This may be of increased significance given that climate change predictions include the possibility of increased and more extreme rainfall in the coming decades (see section 7.2).

Measures for protecting surface water from contamination by hazardous materials and wastes are the same as those listed in section 7.3 for soil protection.

7.6.2 Groundwater

Groundwater beneath the Project site is also at risk from contaminants penetrating the ground surface. In addition, the groundwater resource may be depleted by extraction for Project use and/or mine dewatering, which could have implications for local users (i.e., village wells going dry).

Measures for protecting groundwater against contamination by hazardous materials and wastes are the same as those listed in section 7.3 for soil protection. In addition, HDPE liners will be installed at the bottom of effluent storage basins to avoid the risks of infiltration, and such structures will be monitored to detect possible leaks.

As outlined in section 3.13, groundwater modelling (CSA Global, 2022) has predicted that inflow of groundwater to the mine will be significantly greater than the total Project water demand, including for processing and domestic needs (the maximum inflow, towards the end of the mine's life, is expected to be approximately 792 m^3/hr (220 L/s), compared with an approximate demand of 100 m^3/hr (28 L/s)).

The groundwater flowing into the mine must be removed to allow mining to progress safely. Natural groundwater levels in the surrounding area will be drawn down in response to the mine dewatering. Groundwater level drawdown will increase throughout the mine life, with the maximum groundwater level drawdown roughly corresponding with the final stage of mining.

Modelling suggests that most groundwater inflow – and therefore dewatering – will be in relation to the Teloua and Tarat aquifers, which are deeper than the Tchirézrine 1 and 2 aquifers used for local water supplies. Table 7-2 lists the predicted total abstraction (dewatering) from each aquifer over the life of the mine, compared with the overall aquifer resource (where known; unfortunately, there is no information on the Tchirézrine aquifers).

Table 7-2: Aquifer dewatering

Aquifer	**Total estimated resource (Mm^3)***	**Predicted abstraction (base case) (Mm^3)**	**Resource depletion (%)**
Tchirézrine 1	(unknown)	0.0028	-
Tchirézrine 2	(unknown)	0.0375	-
Teloua	1,320 – 6,000	0.7670	0.06 – 0.01
Tarat	1,300	0.6420	0.049

* Mm^3 = million cubic meters

As Table 7-2 shows, the overall resource depletion as a consequence of dewatering, where it can be estimated, is less than 0.1%.

Nevertheless, there will be some inflow and therefore dewatering from the shallower Tchirézrine aquifers, and mine-induced drawdown does present a potential risk to nearby village wells later in the mine life, where water levels may drop below the current level of the pump or below the base of the well.

Figure 7-1 shows the maximum predicted drawdown of the water table (at the end of mine life), and the locations of known water wells. The figure shows that wells in the villages of Tagaza and Eghatrak (Agatara) may be expected to experience falls in water level of approximately 2 m, whilst at Elagozan the fall may be 10 m or more.

However, any impact would be gradual, and detectable by appropriate monitoring, thus enabling the early planning of appropriate mitigation measures. These may include provision of an alternative

water supply (potentially including from mine dewatering), lowering the pump in the existing well, deepening the current well, or installing a replacement deeper well.

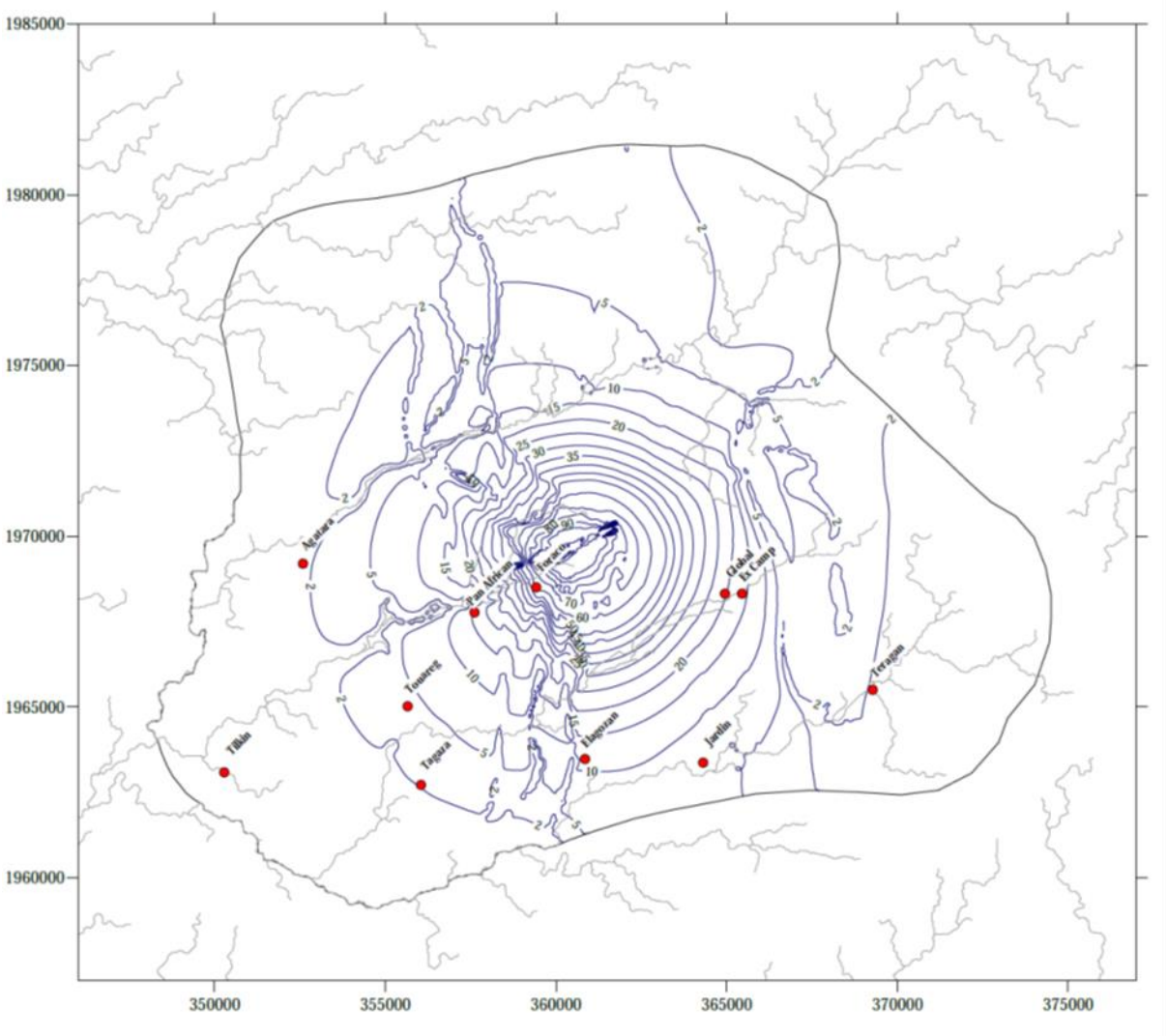


Figure 7-1: Predicted maximum end-of-mine water table drawdown (in m). Red dots are known local water supply wells

As per IFC PS3, the Project has an obligation to use natural resources, including water, sustainably. As outlined in section 3.11, SOMIDA is investigating strategies to reduce the inflow of groundwater to the mine, in order to reduce the requirement for dewatering and to minimize the requirement for water handling, storage and disposal. Such strategies should also lower the risk of significant drawdowns in local community wells. The strategies under consideration are:

- Grouting of drives at locations where mining intercepts the high-permeability Teloua and Tarat aquifers. Modelling this scenario achieved a reduction in maximum, end-of-mining flows of approximately 20%, i.e. from approximately 792 m^3/hr (220 L/s) to 522 m^3/hr (174 L/s);
- Installation of a 500 m deep borehole in the Teloua aquifer, to both reduce mine inflow and provide a 108 m^3/hr (30 L/s) water supply throughout the life of the mine. This measure was envisaged as a complementary measure to the grouting option outlined above. However, modelling suggested that the grouting measure when employed on its own would result in the larger reduction in total inflows. Nevertheless, this measure may be required in the early

years of mining when predicted inflows / dewatering will be insufficient to meet Project needs;

- Sequential installation of four horizontal dewatering boreholes, targeting the Teloua aquifer, in combination with a reduced grouting program. However, modelling suggested that although this scenario would result in reduced inflows, the reduction would not be as great as if the grouting measure was employed on its own; and,
- Installation of seven vertical dewatering boreholes, in combination with a reduced grouting program. Again, modelling suggested that although this scenario would result in reduced inflows, the reduction would not be as great as if the grouting measure was employed on its own. This option does have the advantage of providing a 'clean' water supply of up to 180 m^3/hr (50 L/s).

The modelling completed to date suggests that grouting to block water inflow to the mine could reduce the total inflow by about 20%. The various borehole options envisaged in tandem with a grouting program appear to result in lesser inflow reductions than the grouting program alone, but it is possible that optimization of the borehole locations could improve the situation.

Modelling work is ongoing, including an assessment of the potential for abstraction of water up-gradient of the mine and re-injection of the water into the aquifers down-gradient of the mine. It is likely that the optimal mine water management approach will be a combination of the options investigated (grouting, horizontal boreholes, vertical boreholes, abstraction and re-injection), with the ultimate final approach adopted likely to be driven by a combination of cost, water demand throughout the life of mine, and the maximum inflow rates/water volumes that can be effectively managed both underground and at surface.

As part of the Environmental Monitoring Plan, a program of periodic groundwater level measurement and sampling from both on-site boreholes and village wells will be devised. The borehole monitoring network will be selected in order to provide early warning of impacts – both on groundwater level and quality – that may later affect village wells, so that appropriate action can be taken.

As outlined in section 4.12, analysis of water samples taken from several boreholes in the Project area exhibited gross alpha and gross beta levels above 0.5 Bq/L and 1.0 Bq/L, respectively. In line with WHO recommendations, SOMIDA is currently devising a program of analysis for individual radionuclides in water samples, to better define the water quality baseline.

7.7 Geochemistry

As described in section 3.10, laboratory analysis and testing of rock samples in 2011 and 2022 found that none of the samples had the potential to generate acid rock drainage, nor contained potentially hazardous metals at concentrations likely to present a hazardous condition.

Testing of a neutralized tailings sample in 2022 similarly found low potential for acid generation and low concentrations of potentially toxic elements. Leachate testing did not suggest that the tailings will generate hazardous leachate, although it was noted that the concentration of uranium in the leachate, at 7.93 mg/L, was close to the 10 mg/L reference standard (being the limit generally imposed in Canada). In any case, at Dasa there will be no discharge of liquids from the DSTSF; any seepage will be collected and routed to the evaporation pond.

Based on these analytical results, no special mitigation measures are deemed necessary to address acid rock drainage or more general contaminated run-off / seepage risks. However, as described in

section 7.6, routine sampling and testing of groundwater samples will be undertaken periodically to provide warning of any such conditions.

7.8 Social impacts

The main social impacts associated with the Project are:

- Health and safety risks to both workers and local communities, including accidents, disease transmission, contamination (including radiological), and risks of conflict between local communities and local workers (including the Guarde Nationale and SOMIDA security personnel);
- Reduction of access to land for pastoral activities and potential injury to livestock from contamination, vehicle collisions, and falling into ponds;
- Degradation of landscape quality (i.e., visual impact);
- Decline of local traditions and customs due to in-migration of people; and,
- Regional economic impact upon mine closure, due to loss of direct and associated jobs, and revenue.

Mitigation and management measures to address these impacts are outlined in the following sections.

7.8.1 Occupational health and safety

The Dasa Project is intended to be an operation where people can work without being injured and where the health of the workforce is promoted. To this end, good international industry practice in health and safety management will be employed. It is beyond the scope of an ESIA to detail in full the occupational health and safety arrangements to be put in place, but the following over-arching principles will apply (IFC, 2007b):

- Project-specific occupational health and safety hazards will be identified based on job safety analysis or comprehensive hazard or risk assessment using industry-standard methodologies;
- Health and safety management planning will include the adoption of a systematic and structured approach for prevention and control of the identified physical, chemical, biological, and radiological health and safety hazards;
- Robust emergency response planning will be in place, including the provision and maintenance of necessary response and rescue equipment, and ensuring a sufficient number of first aid trained employees to respond to emergencies;
- There will be a training on worksite health and safety management for all personnel, including a communication program with a clear message about corporate management's commitment to health and safety. The communication program will include regular meetings such as daily talks prior to initiation of work shifts;
- Behavioral considerations will be integrated into health and safety management, including on-the-job behavioral observation processes;
- Employees will be trained on the recognition and prevention of occupational hazards specifically applicable to work in remote areas, such as safety with respect to wildlife; protection against the elements; thermal stress; acclimatization; and disease exposure;
- Illumination systems will be ensured to be adequate and safe for the planned working conditions in travel corridors, mine working areas, and within and around surface facilities and the tailings facility;

- Signage in hazardous and risky areas, installations, materials, safety measures, emergency exits, and other such areas will be in accordance with international standards (including standards of cleanliness, visibility and reflectance in areas of potentially poor illumination or sources of dust and pollution), be known and easily understood by workers, visitors, and as appropriate the general public;
- To the extent that alternative technologies, work plans or procedures cannot eliminate or sufficiently reduce a hazard or exposure, workers and visitors will be provided with the necessary PPE and will provide instruction and monitoring in its appropriate maintenance and use. Applicable PPE includes, as a minimum, safety helmets and footwear, in addition to ear, eye, and hand protection devices; and,
- Occupational health assessments will be conducted for employees on a regular basis, based on exposure to risk. Medical records will be retained for at least 20 years.

In addition to the above general considerations, the following specific occupational health and safety management measures will be applied:

- Working areas will be provided with adequate ventilation and dust / fume extraction systems to ensure that inhalation exposure levels for potentially hazardous substances are maintained and managed at safe levels (see section 5.6 for information on mine ventilation);
- Eye wash and emergency shower systems will be provided in areas where there exists the possibility of chemical contamination of workers and the need for rapid treatment. MSDS will be available for all hazardous materials held on site;
- The use, handling, and transport of explosives will be in accordance with national regulations, and undertaken by appropriately trained and certified operatives. Blasting-permit procedures will be implemented for all personnel involved with handling, transport, storage, charging, blasting, and destruction of unused or surplus explosives;
- Blasting activities will be managed actively in terms of loading, priming, and firing explosives, drilling near explosives, misfired shots and disposal; and consistent blasting schedules will be adopted, minimizing blast-time changes;
- Specific warning devices (e.g. horn signals, flashing lights) and procedures will be implemented before each blasting activity to alert all workers and third parties in the surrounding area;
- Blasting sites will be checked post-blast by qualified personnel for malfunctions and unexploded blasting agents, prior to resumption of work;
- Specific audited procedures will be implemented for all activities related to explosives (handling, transport, storage, charging, blasting, and destruction of unused or surplus explosives) in accordance with national and/or internationally recognized fire and safety codes;
- Qualified security personnel hired by SOMIDA will be used to control transport, storage, and use of explosives on site;
- A tagging system will be implemented to account for all persons traveling underground;
- Ventilation operators and maintenance personnel will undergo adequate training with respect to issues such as explosive atmospheres, products of combustion, dust and diesel fumes;
- Ventilation systems will be appropriate for the workplace activities and be able to maintain work area temperatures and concentrations of contaminants at safe levels (see section 3.11.6);
- Plans will be in place to prevent, detect, and combat the outbreak and spread of fires (see section 3.8);

- The underground mine will be developed with secondary or auxiliary exits and with refuge chambers that are clearly identified, and within 15 minutes' traveling time from anywhere in the mine for workplaces that are more than 300 m from a mine portal or shaft station that is used to access the workplace; and,
- Underground workers will be equipped and trained in the use of self-contained self-rescue devices (SCSR) providing at least double the time needed to reach a refuge bay or mine exit (minimum 30 minutes) (see section 3.8).

Given that the Project is a uranium mine, occupational health and safety with respect to the ionizing radiation hazard is a primary concern. Section 3.11 outlines the project's approach to radiation protection, which is currently in development. These arrangements and procedures will be compiled into a Radiation Management Plan, to include:

- An organizational structure for the allocation of the various levels of accountability, responsibilities, and roles;
- The provision of suitable and adequate resources for protection;
- Arrangements for the measurement of radiation levels at the site and potential exposures of workers and the public;
- The designation of areas where radiation control is required;
- Safe operating procedures and rules, including supervision;
- Maintenance of a data recording and reporting system related to the control of radiation, exposure of workers and decisions on measurements for occupational radiation protection;
- A training program on radiation hazards and requirements for protection;
- An emergency response plan (mostly in terms of environmental pollution);
- A health surveillance program;
- Quality assurance; and,
- Auditing and review of the effectiveness of the radiation management plan.

Radiation management will be undertaken in line with guidance published by the IAEA, including:

- Fundamental Safety Principles for Protecting People and the Environment (IAEA, 2006);
- Occupational Radiation Protection (IAEA, 2018a);
- Radiation Protection of the Public and the Environment (IAEA, 2018b);
- Regulations for the Safe Transport of Radioactive Material (IAEA, 2018c); and,
- Occupational Radiation Protection in the Uranium Mining and Processing Industry (IAEA, 2020).

SOMIDA is developing a procedure designed to protect workers from silicosis (a lung disease caused by the inhalation of silica dust). The procedure, which reflects the methodology employed at the Cominak mine, involves establishing a reference dust level (based on flow rate of air through the mine), and classification of each zone of the mine (and process areas as applicable) according to its dust content. Mitigation measures are applied according to the classification level, including for example water sprays and dust extraction, as well as appropriate levels of PPE. Personnel who have worked in high-dust area are subjected to additional medical surveillance.

National Order No. 140/MSP/LCE/DGSP/DS/DH of 27 September 2004 on standards for the discharge of waste into the natural environment reiterates Order No. 65/MME/DM of August 26, 1999, which sets the rules for allowable levels of silica-containing dust of size 0.5 – 5.0 microns as follows:

a) dust containing less than 6% silica: 5 mg/m^3;

b) dust containing between 6% and 25% silica: 2 mg/m^3 for a duration of 8 hours of work; and,

c) dust containing more than 25% silica: 1 mg/m^3.

(Note that the above apply in conjunction with the general emissions limits for dust – see Table 2-5.)

There is an infirmary at the mine camp, staffed full-time by a nurse, and equipped to deal with medical emergencies and minor illnesses and injuries. SOMIDA is in discussion with ORANO to agree access to its medical facility in Arlit for more serious injuries. There is also a regional hospital in Agadez.

7.8.2 Community health and safety

Although the Project site is relatively remote, there are health and safety risks to the local population when Project and community interact, particularly:

- Accidents relating to movement of Project-related vehicles on public roads and through communities, including transportation of hazardous materials (explosives, chemicals, uranium product, and wastes);
- Reduced availability and/or contamination of water supplies (see sections 7.3 and 7.6);
- Risk of physical harm to pastoralists or others present closer to the Project site; and,
- Risk of increased disease transmission from Project staff interacting with local communities.

SOMIDA plans to formulate a Community Health, Safety and Security Plan guided by the IFC EHS General Guidelines (IFC, 2007a) the United Nations Environment Program's Awareness and Preparedness for Emergencies at Local Level (APELL) standard, and the Voluntary Principles on Security and Human Rights (VPSHR). The APELL process aims to improves community-level emergency preparedness efforts and supports government and community initiatives to minimize the occurrence and harmful effects of technological hazards and environmental emergencies.

According to UNEP (2015), APELL is a coordinated planning process that has two parallel and complementary objectives:

- Creating a dialogue about hazards, risks, capabilities and plans involving all stakeholders, leading to consensus on responsibilities and expectations for all community members; and,
- Allowing a community to increase its resilience (the ability to recover from incidents) and reduce its vulnerability (susceptibility to damaging effects of a hazard) by building local capacity for multi-stakeholder responses and enabling open dialogue, building mutual understanding, and leveraging the existing resources in an effective way.

APELL first seeks to increase the awareness of all community members to the local hazards, regardless of the source. Next, community-wide response and preparedness capabilities are assessed and matched to these hazards and related risks in order to identify gaps, whether there are limitations on equipment or resources, or limitations on the scope of current plans. APELL then focuses on how the community addresses these gaps and creates a continuous cycle of improvements. The process of discussion and decision-making on which gaps to fill and how to fill them is the core of achieving the goals of the APELL Process. The APELL Process relies on coordination, cooperation and broad-based involvement by all sectors of a community to build this awareness.

Although the Project Community Health, Safety and Security Plan is intended to be comprehensive (i.e. to be in line with the IFC EHS Guidelines), the ESIA results require that the following be given particular attention:

- Safe transport of hazardous materials on public roads (explosives, chemicals, uranium product, and wastes) – see section 3.23 for arrangements for transporting hazardous materials via convoys;
- Radiological hazards, mitigation and monitoring (see section 3.11.9);
- Awareness raising of the risks associated with respiratory diseases;
- Awareness raising of the risks associated with sexually transmitted infections (STI) including HIV/AIDS. This can be a particular risk in cases where there is a large influx of migrant workers to an area. In addition, long-haul transport activities may serve as disease conduits; and,
- Awareness raising and establishing necessary protocols around COVID-19.

In implementing security measures associated with the Dasa Project, SOMIDA will be guided by the VPSHR an international, multi-stakeholder initiative that guides companies on providing security for their operations while respecting human rights. This will apply to security personnel hired by SOMIDA for internal site and personnel security and will include pre-hiring checks on individuals who may have been involved in recent conflicts in the region. Internal staff will be trained in the requirements of the VPSHR. As far as possible, SOMIDA will engage with the Guarde Nationale detachment to define roles and responsibilities and the rules of engagement.

7.8.3 Pastoral activities

As outlined in Chapter 3, a fenced area of approximately 2 km^2 will be established around the Project site. This area is outside the koris which host most of the area's natural vegetation and which constitute the main herding routes (see Figure 3-10). Outside the fenced zone is an approximate 40 km^2 buffer area, to which access will not be restricted. However, local people will be discouraged from prolonged stays in this area (e.g. setting up camps), via a program of stakeholder consultation and awareness raising. Again, the buffer area avoids the koris.

The above arrangements are not considered to represent a significant adverse impact to the Kel Tamashek (Tuareg). There will be no relocation of permanent communities, and traditional herding routes along the koris will not be affected. Nevertheless, SOMIDA will:

- Support pastoralists through the provision of livestock feed banks;
- Provide training in agricultural techniques to maximize fodder crop yields and ways of harvesting and storing fodder;
- Refurbish and maintain watering points; and,
- Set up a system to monitor impacts on pastoralists.

7.8.4 Landscape quality

The Project site will not be visible from the main settlements, but lighting may impact on the character of the area at night. SOMIDA will implement good practice including:

- Directing lights downwards or otherwise shielding them to prevent excessive illumination outside the working area;
- Maintaining a tidy site to reduce disturbance of the visual quality of the landscape;
- Planting tree screens around some facilities to reduce visibility; and,
- Selecting colors for buildings that blend with the landscape.

As outlined in Chapter 5, continuous circulation of air through the mine is required to protect the workforce from radiation. Air that has circulated through the mine will be drawn via an exhaust system

and routed back to surface via fans. In some situations, the venting of cool, moist mine air to the atmosphere can result in a visible plume. However, at Dasa the return air will encounter the hot desert environment and is expected to evaporate quickly, without resulting in a visible plume. The radiological make-up of the vented airflow will be monitored as part of the Project's overall Environmental Monitoring Plan.

SOMIDA will consult nearby villages to confirm materiality of impacts and the efficacy of mitigation measures.

7.8.5 Local traditions and customs

Although the Project is expected to bring significant benefits to the local area in terms of direct and indirect employment opportunities and incomes in general, stakeholder engagement raised concerns over local traditions and customs potentially being lost, as a result of an incoming workforce and a switch to mining-related livelihoods.

This risk will be lowered by the Project having its own, self-contained accommodation camp located at distance from the local villages. SOMIDA will formulate a plan to raise awareness among staff and subcontractors about respecting the traditional practices and customs of the local population. A Code of Conduct will be drawn up to encourage respectful interaction with the local communities. Camp residents will be discouraged from entering local communities for recreational purposes.

The mine camp will be designed and maintained according to good international practice with the aim of preventing overcrowding and reducing the transmission of communicable respiratory diseases. The IFC/EBRD's document, Workers' Accommodation: Processes and Standards (IFC/EBRD, 2009), will be used to guide camp development. The guidance includes:

General living facilities

- Adequate ventilation and/or air conditioning is provided;
- Both natural and artificial lighting are provided, including emergency lighting, and the window area is not less than 5-10% of the floor area;
- Workers have easy access to a supply of clean/potable water in adequate quantities, and the quality of the water complies with national/local requirements or WHO standards;
- Tanks used for the storage of drinking water are constructed and covered to prevent water stored therein from becoming polluted or contaminated;
- Wastewater, sewage, food and any other waste materials are adequately discharged in compliance with local or WBG EHS standards and without causing any significant impacts on camp residents, the environment or surrounding communities;
- Pest extermination, vector control and disinfection are undertaken throughout the living facilities;

Room/dormitory facilities

- Rooms/dormitories and sanitary facilities are located in the same buildings and cleaned regularly;
- Residents are provided with enough space (10 - 12.5 m^3 [volume] or 4 - 5.5 m^2 [surface]);
- Ceiling height is adequate (2.1 m minimum);
- The number of workers sharing the same room/dormitory is minimized (2 - 8 workers) and mobile partitions or curtains are provided;

- Every resident is provided with adequate furniture such as table, chair, mirror, and a bedside light;
- There are separate sleeping areas provided for men and women;
- There is a separate bed provided for every worker (no "hot-bedding") and a minimum space of 1 m between beds;
- Use of bunk beds is minimized for fire-safety and hygiene reasons, there are no triple deck bunks;
- Each worker has a comfortable mattress, pillows and clean bed linens, and linen is washed frequently and applied with adequate repellents and disinfectants (where conditions warrant);
- Facilities for the storage of personal belongings for workers are provided. Standards vary from an individual cupboard for each worker, to 475-litre lockers and 1 meter of shelf unit;

Sanitary and toilet facilities

- Toilets, showers/bathrooms and other sanitary facilities are designed to provide workers with adequate privacy including ceiling to floor partitions and lockable doors;
- Separate sanitary and toilet facilities are provided for men and women;
- Shower facilities are provided with an adequate supply of cold and hot running water;
- An adequate number of showers, handwash basins, and toilets is provided (standards range from 1 unit per 6 persons to 1 unit per 15 persons);
- Toilet facilities are conveniently located and easily accessible (standards range from 30 to 60 m from rooms/dormitories). Toilet rooms are located so as to be accessible without any individual passing through any sleeping room;

Canteen, cooking and laundry facilities

- Canteens have a reasonable amount of space per worker (standards range from 1 to 1.5 m^2);
- Places for food preparation are designed to permit good food hygiene practices, and provided with facilities to maintain adequate personal hygiene including a sufficient number of washbasins designated for cleaning hands with clean, running water and materials for hygienic drying;
- All kitchen floors, ceiling and wall surfaces adjacent to or above food preparation and cooking areas are built using durable, non-absorbent, easily cleanable, non-toxic materials;
- Adequate facilities for washing and drying clothes are provided;

Medical facilities

- First aid kits adequate to the number of residents are available and adequately stocked, and where possible a 24/7 first aid service/facility is available;
- An adequate number of staff/workers is trained to provide first aid;
- Where possible, other medical facilities are provided (nurse rooms, dental care, minor surgery);

Leisure and social facilities

- Basic social collective spaces and adequate recreational areas are provided to workers (e.g. multi-purpose halls, TV / cinema rooms);
- Workers are provided with dedicated places for religious observance;

Accommodation management

- There are carefully designed worker camp management plans and policies especially in the field of health and safety (including emergency responses), internal security, workers' rights and relationships with the local communities;
- There are sufficient staff to ensure the adequate implementation of housing standards (cleaning, cooking and internal security in particular);
- Persons in charge of the kitchen are particularly trained in nutrition and food handling and adequately supervised;
- Health and safety management plans including electrical, mechanical, structural and food safety have been designed and implemented;
- A specific and adequate fire safety management plan has been designed and implemented;
- Guidance on alcohol, drug and HIV/AIDS and other health risk-related activities is provided to workers;
- Emergency plans on health and fire safety have been prepared;
- A security plan including clear provisions on the use of force/rules of engagement has been designed and implemented;
- Internal security staff have a good understanding about the importance of respecting workers' rights and the rights of the surrounding communities and adopt appropriate conduct. As far as possible, this will be extended to the military detachment assigned to the site;
- Regulations on alcohol, tobacco and third parties' access to the camp are clear and communicated to workers; and,
- Workers are provided with processes and mechanisms to articulate their grievances.

7.8.6 Economy

SOMIDA intends that the Dasa Project will bring significant benefits to the local economy, via the provision of direct and indirect employment opportunities. SOMIDA will prioritize local labor in recruitment, prioritize local companies in subcontracting, and enhance local procurement opportunities for the providers of local goods and services.

Benefits to local communities will also accrue through education and training, and the enhancement of health care. These initiatives are in addition to the benefits that will accrue to the local and regional population from the payment by SOMIDA of mining royalties and tax revenue, a portion of which will be returned to local and regional authorities.

There is potential for significant impact on the local economy and livelihoods when the mine finally closes and those jobs and procurement activities cease. Therefore, the mine closure plan, which currently exists in conceptual form and will be developed as the Project progresses, will address social aspects of closure, in terms of direct workers, indirect livelihoods, and associated communities (those with a high proportion of workers or suppliers of goods and services). In particular, SOMIDA will devise a retrenchment program aimed at retraining workers in other occupations.

Throughout the Project lifetime, SOMIDA will provide support to traditional livelihoods and traditions as outlined in sections 7.8.3 and 7.8.5, such that such activities are not lost as a consequence of the Project's presence.

7.9 Archaeology and cultural heritage

There are two small graveyards located adjacent to the access track to the west of the exploration camp. In consultation with local communities, these will be fenced for protection during Project operations, including construction of the new accommodation camp. Access to the sites by local people will not be restricted.

No archaeological or cultural heritage sites have been identified as being at risk from Project activities, primarily due to the distance between the sites and any planned project activity. However, it is recognized that several ~~such~~ sites exist in the wider region, and as-yet undiscovered sites may be present within the Project footprint. Therefore, a chance-finds procedure and awareness-raising thereof will be put in place:

- All staff and contractors will be trained to recognize objects or sites of interest that may be encountered as part of their site induction, which will be periodically refreshed;
- In accordance with national legislation, works in the immediate vicinity of a suspected archaeological, cultural or paleontological site will be stopped, the site will be cordoned off and the Directorate of Cultural Heritage and the Directorate of Research will be informed. Work may be resumed after authorisation from the Directorate of Cultural Heritage;
- The company will prepare a chance find report providing information on the date, time and location of the discovery, the estimated dimensions of the item discovered and the temporary protection measures put in place. The report must be submitted to the Directorate of Cultural Heritage, the Ministry in charge of research, the Prefect and the Governor of the region.
- The collection of archaeological or cultural heritage objects by staff and contractors will be prohibited.

The importance of the Dabbous giraffe and other similar rock carvings as well as the dinosaur tracks in the area are recognized, and SOMIDA will enter into a dialogue with the Directorate of Cultural Heritage to explore ways that the company could support their protection and raise awareness of their significance.

7.10 Ecosystem services and land use

As outlined in section 7.4 on biodiversity, SOMIDA will aim to minimize the land-take for the Project. There is no indication that the Project will significantly reduce ecosystem resources for local people, for example firewood and grazing areas for livestock.

As described in section 7.6, mine dewatering may result in a drop in water levels in village wells. Such impact would be gradual, and detectable by the planned program of groundwater monitoring. Should significant impact be detected, SOMIDA will compensate for any losses by, for example, deepening the wells or providing alternative water supplies.

8 Cumulative impacts

Cumulative impacts are defined by IFC (2012) as those that result from the incremental impact of a project when added to other existing, planned and reasonably predictable future projects and developments. Examples of cumulative impacts include:

- Incremental contribution of pollutant emissions in an airshed;
- Increase in pollutant concentrations in a water body, in soil or sediments;
- Reduction of water flow in a watershed due to multiple withdrawals;
- Interference with migratory routes or wildlife movement;
- Increased pressure on the carrying capacity or the survival of indicator species in a given ecosystem;
- Wildlife population reduction due to increased hunting and road kills; and,
- Secondary or induced social impacts, such as in-migration, or more traffic congestion and accidents along community roadways due to increases in transport activity.

As made clear in Chapter 6, the Project is located in a remote area, and with no significant industrial facilities nearby. Any cumulative impacts are likely to be experienced at a more regional, rather than a local, scale.

The wider region is an established uranium mining center. Although the Cominak mine near Arlit (about 110 km north of Dasa) closed in March 2021, the Somair mine, also near Arlit, is currently operating and expected to do so until at least 2035. (It is worth noting that in many ways the commencement of the Dasa project can be viewed as a compensatory measure for the recent closure of the Cominak mine.

SOMIDA has already recruited experienced ex-Cominak workers; a benefit both to the company and to the regional economy, which otherwise would have suffered as a result of the Cominak mine closure. This is in addition to the payment of income taxes and mining royalties to the national Government, of which 16% is allocated to the Region.

Also near Arlit is the Madouela project, for which a mining feasibility study was published in 2022. Approximately 50 km west of Dasa is the Imouraren deposit, for which an operating permit was awarded in 2009 but whose development has been on hold since 2015, pending an improvement in market conditions. Both the Madouela and Imouraren deposits could be regarded as reasonably predictable future developments as per the IFC PS.

The other significant industrial development in the region is the Sonichar power station and coal mine, located approximately 80 km south of Dasa. This facility has powered the Cominak and Somair mines and will also serve Dasa. SOMIDA operations will benefit Sonichar through the replacement of at least a portion of the revenue associated with energy sales to the Cominak Mine until its closure in March 2021.

The relatively large distances between the various existing and potential future developments are such that cumulative impacts on ambient environmental conditions (air quality, groundwater, flora and fauna) are unlikely to add significantly to the impacts already identified for Dasa (Chapter 7). Dewatering of the Imouraren mine, in combination with activities at Dasa, might increase regional groundwater drawdown and impact existing water supply wells in Tagaza, Eghatrak and other villages. However, as described in section 7.6, the degree of drawdown is difficult to predict, and in any case it

would occur gradually and be detectable at an early stage, allowing remedial or compensatory actions to be taken.

Should both the Imouraren and Madouela projects come on stream during the Dasa project's life, social impacts may become significant. These may include common pressures associated with influx of workers, including inflation of the local economy, overwhelming of local infrastructure and services, over-depletion of natural resources, and loss of traditional cultural heritage and ways of life.

9 Alternatives Assessment

IFC PS1 requires that greenfield projects and projects likely to generate potentially significant adverse environmental and social risks and impacts be subjected to alternatives analysis. The purpose of the alternatives analysis is to improve decisions on project design, construction, and operation based on feasible alternatives to the proposed project. The analysis should consider aspects such as alternative project locations, designs, and operational processes, and alternative ways of dealing with environmental and social impacts.

For mining projects there is no option for considering alternative locations, at least for the mine itself: it has to be located where the target ore is. After location, the next major consideration in terms of environmental and social impact tends to be whether the mine is to be open-pit, or underground. At Dasa, the highest-grade ore is beyond reasonable depth for open-pit mining, and the smaller footprint of an underground operation versus an open pit was deemed to have far less of a short- and long-term effect on the surrounding environment.

It is normally preferable to site the ore processing facilities as near to the mine as possible, so as to minimize time and costs associated with transporting the ore. At Dasa, the relative remoteness of the ore body means that there was no identified need to consider locating the associated facilities anywhere other than adjacent to the mine. The only consideration was to ensure that key facilities were not positioned in areas liable to flash-flooding.

The comparative remoteness of Dasa also means that there is no realistic alternative to housing the workforce in an on-site camp.

Similarly, there are currently no serious alternatives to the proposed options for power supply (connection to the national electricity grid, though with a renewable component provided by solar PV), water sourcing (groundwater), or material transport (via road from the port of Cotonou in Benin). However, it is expected that options will be kept open through the life of the Project, and that opportunities for, for example, increased use of solar power, battery storage and recycling of water, will be sought.

The following sections summarize further options that were considered during the feasibility analysis of the Project, where these potentially have environmental and social implications.

9.1 Mining method

As part of the Feasibility Study, a number of alternative mining methods were considered. The geometry of the orebody lends itself to mechanized bulk mining methods. These can be split into two general types: short hole mining and long hole mining. Short hole mining employs drifting or development type drill rigs and results in smaller, more frequent blasts; long hole mining employs a long hole drilling rig with larger but fewer blasts. Within these two categories there are variations. The Feasibility Study considered that long hole mining methods are generally more efficient and productive than the short hole alternatives, and therefore should be employed where possible. Long hole methods were considered to be technically feasible at Dasa, and therefore only long hole methods were considered in the trade off study. Long hole methods include:

- Long Hole Open Stoping (LHOS) with pillars: adjacent stopes are mined leaving a rib pillar between them for stability;

- LHOS with backfill: mined out stopes are backfilled as mining progresses. The backfill may be either cemented or uncemented. The advantage of using cemented backfill is that adjacent stopes may be mined without a rib pillar between them. If uncemented fill is used a rib pillar must be left between adjacent stopes in order to contain the fill. Also, when using uncemented fill mining can only be conducted in a bottom-up sequence; whereas if a sufficiently strong cemented fill is used mining can be conducted in a top-down sequence providing the advantage of mining flexibility; and,
- Sub-level caving: this method was discounted at Dasa for geotechnical reasons.

The trade-off study considered LHOS with cemented backfill as the most attractive option, mainly due to the additional mining inventory (higher extraction ratio), which outweighs the increased operating cost.

From an environmental viewpoint it is noted that the required backfill can be sourced from process tailings, which results in a smaller tailings storage facility being required at surface.

9.2 Mining equipment

A trade-off study was undertaken to select the size class of mining equipment for Dasa. The study considered production rate, mine design, and orebody dimensions and geometry, and aimed at a balance between minimizing dilution and losses while maximizing productivity. A decision was required at an early stage because the size of the equipment has a direct bearing on the size of the access excavations required.

The main equipment under consideration was articulated dump trucks (ADT) and load-haul-dump (LHD) units. Three size classes of equipment were considered, plus an option, for one of the size classes, of a battery-powered option as opposed to diesel engine.

From a cost basis, the most favorable option was considered to be a combination of 32 t ADTs and 10 t LHDs. However, the costs of all options were within 7% of each other. The battery-powered option applied to a slightly larger size class (42 t ADT and 14 t LHD) and, initially, GAC selected this option. However, after consideration of delivery times of the battery-powered equipment, GAC opted for diesel units of the equivalent size. The intention is to start mining using these units, with the option for conversion to battery power at a later stage in the mine life.

9.3 Processing

Laboratory and pilot plant test work confirmed the process design parameters for the Dasa plant. The process route selected is similar to that employed at Orano's former Cominak and current Somaïr operations at Arlit.

Three trade-off studies were completed as part of process options selection. These included for dry milling processing, final product precipitation, and tailings disposal. The dry milling processing options were little different in terms of environmental considerations.

The final product precipitation study recommended the use of hydrogen peroxide as a precipitation reagent, in preference to magnesia or ammonia. The magnesia option would have required the use of sodium chloride and sulfuric acid as stripping agents, which would have then created saline solutions of high corrosive nature to be dealt with in tailings ponds. The magnesia option is also less environmentally preferred, since it reduces the concentration of uranium in final product (thus increasing transport carbon dioxide footprint) and increases waste generation at the uranium refinery.

The ammonia option would have created a wastewater disposal problem since the resulting aqueous outflow contains ammonia that must then be treated. For these reasons, the more effective and environmentally preferred peroxide process option was selected.

The tailings disposal trade-off study evaluated the most cost-effective method between dry stacking (by either conveyor or trucking) and wet tailings disposal. Dry stacking of tailings was considered to be the most cost-effective option. From an environmental perspective it is noted that a dry tailings storage facility should be a smaller structure since the dry tailings can extend well above the outer containment walls; in contrast, a wet facility requires full containment walls within which the slurry is pumped.

10 Environmental and social management of the Dasa Project

The results of the FEED Consult ESIA (2022), together with the additional good international industry practice outlined in this Addendum, will be incorporated into the existing Environmental and Social Management Plan (ESMP) developed as part of the original, government approved ESIA (Groupe Art & Génie, 2020) and managed under an Environmental and Social Management System (ESMS).

10.1 ESMP

The updated ESMP will ensure that mitigation measures identified in both the government approved and additional ESIAs are carried through to Project execution. The ESMP will include impact mitigation (or enhancement) programs, the monitoring and inspection programs necessary to ensure compliance and a capacity building program for stakeholders.

In practice, the ESMP will comprise a suite of topic-specific documents. These plans have been developed - or will be developed - for the construction phase and will be updated and amended as necessary to carry the Project into the operational phase and through the closure phase:

- Occupational Health and Safety plan;
- Radiation Management Plan (including worker protection);
- Community Health, Safety and Security Plan (including human rights, population influx, security, indigenous peoples);
- Human Resources Management Plan (including gender-based violence in the workplace, forced labor, child labor, etc.);
- Contractor Environmental Management Plan;
- Stakeholder Engagement Plan (including grievance mechanism);
- Progressive Restoration Plan;
- Water Management Plan;
- Air Quality and Greenhouse Gas Emissions Management Plan (including dust management);
- Noise and Vibration Management Plan;
- Biodiversity Management Plan (including invasive species management);
- Hazardous Materials Management Plan (including naturally occurring radioactive materials);
- Waste Management Plan;
- Tailings Management Plan (including geochemical considerations for waste rock and tailings);
- Emergency Preparedness and Response Plan (including spill prevention and management);
- Chance Finds Procedure (archaeology and cultural heritage);
- Environmental Monitoring Plan; and,
- Mine Closure Plan.

The initial two years of underground development will be undertaken with the assistance of a mining contractor. The contractor, who is responsible for managing and supervising all the underground operations during the period of the contract, is required to adhere to all of the provisions of the SOMIDA management plans listed above. The Contractor Environmental Management Plan (included in the above list) will set out the arrangements for achieving this.

10.2 ESMS

While the component management plans of the Project ESMP address technical topics, the role of the ESMS is to provide the organizational framework necessary to ensure the successful implementation of the ESMP. The ESMS defines, amongst others, the company organizational structure, staff training provisions, communication networks, document control procedures, and systems for checking progress that are required for assured and demonstrable achievement of the Project's aims for sustainable development.

The ESMS will aim to fulfil the IFC PS1 requirement to have "a dynamic and continuous process initiated and supported by management", which "involves engagement between SOMIDA, its workers and local communities directly affected by the project…".

The ESMS will be modelled on the ISO 14001 Environmental Management Systems standard and its "Plan-Do-Check-Act" (PDCA) methodology that strives for continuous improvement (Figure 10-1). As required by IFC PS1, the ESMS will incorporate social and labor elements.

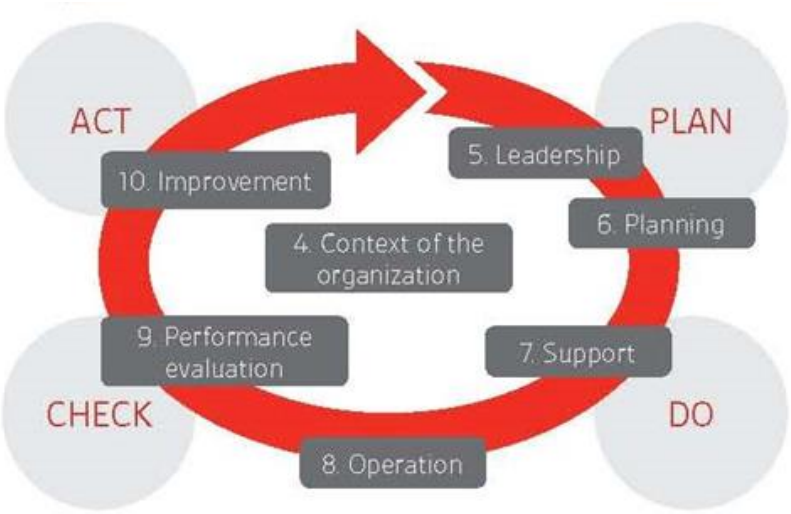


Figure 10-1: ISO 14001 (2015) continuous improvement cycle

The ESMS will include:

- Policy: SOMIDA's environmental and social policies, underpinning its commitment to sustainable development;
- Environmental and Social Impacts: reference to the ESIAs already carried out, and a description of how update and adaptation may be required as the Project progresses;
- Compliance Obligations: reference to national legislation, international standards, and Project-specific agreements with the Government of Niger, Project financiers, and others;
- Objectives and Targets: the objectives (overall environmental and social goals) and targets (detailed performance requirements) set for the Project, and how they will be monitored;
- Management of Change: a formal process for ensuring that the effects of changes in environmental and social conditions, methodologies of Project implementation, legislation, or resulting from experience implementing the Project, are accounted for in the continued implementation of the Project;
- Leadership, Roles & Responsibilities: sets out the people and resources dedicated to and responsible for maintaining the ESMS;

- Competence and Awareness: sets out the requirements for environmental and social awareness and training. All Project staff, contractors, and site visitors will require a basic awareness of environmental and social issues, and managers and specialist staff will require more detailed training;
- Communication: arrangements for ensuring that internal and external stakeholders are informed of ESMS-related issues as appropriate;
- Document Control: arrangements for ensuring that all Project staff have access to the latest, officially sanctioned documentation, and that Project records are stored in a logical, accessible and searchable manner;
- Operational Planning and Control: the ESMP and any other relevant plans, potentially including contractors' documents;
- Emergency Preparedness & Response: resources and arrangements put in place to respond to emergencies, including detailed considerations for various emergency situations that may arise;
- Incident Investigation & Reporting: a formal procedure for reporting, investigating, and learning from incidents;
- Compliance Assurance: actions designed to monitor and determine whether the Project is being undertaken in compliance with the ESMP;
- Non-conformance & Corrective Action: a formal procedure for identifying and documenting non-conformant situations, determining required corrective action, preventing recurrence, and follow-up monitoring; and,
- Management Review: senior management review to ensure that the ESMS is functioning according to expectations and the ESMP is being implemented successfully.

11 References

African Development Bank (ADB), 2018. National Climate Change Profile: Niger. https://www.afdb.org/en/documents/niger-national-climate-change-profile

CSA Global Mining Consultants (Ireland), 2021. Water Management Aspects of the Feasibility Study for the Dasa Project, Niger. Feasibility Report. Report No. R444.2021.

CSA Global Mining Consultants (Ireland), 2022. Feasibility Report. Addendum Report: Water Management Aspects of the Feasibility Study for the Dasa Project, Niger. Report no. R406.2022. 16 December 2022.

FEED Consult, 2022. Projet d'Exploitation des Gisements d'Uranium du Permis de Recherche "AdradE moles 3" (Région d'Agadez, Niger) Etude d'Impacts Environnemental et Social.

Groupe Art & Génie, 2011. Environmental Characterization Study of the Adrar Emoles III and IV Exploration Permit Area, Agadez Region – Tchirozerine Department.

Groupe Art & Génie, 2020. Adrar Emoles Project Environmental and Social Impact Assessment.

International Atomic Energy Agency (IAEA), 2006. Fundamental Safety Principles for Protecting People and the Environment. Safety Fundamentals no. SF-1.

International Atomic Energy Agency (IAEA), 2014. Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards. General Safety Requirements Part 3.

International Atomic Energy Agency (IAEA), 2018a. Occupational Radiation Protection. General Safety Guide no. GSG-7.

International Atomic Energy Agency (IAEA), 2018b. Radiation Protection of the Public and the Environment. General Safety Guide no. GSG-8.

International Atomic Energy Agency (IAEA), 2018c. Regulations for the Safe Transport of Radioactive Material. Specific Safety Requirements no. SSR-6 (Rev. 1).

International Atomic Energy Agency (IAEA), 2020. Occupational Radiation Protection in the Uranium Mining and Processing Industry. Safety Reports Series No. 100. April 2020.

International Finance Corporation (IFC), 2007a. Environmental, Health, and Safety General Guidelines. 30 April 2007.

International Finance Corporation (IFC), 2007b. Environmental, Health and Safety Guidelines for Mining. 10 December 2007.

International Finance Corporation (IFC) and European Bank for Reconstruction and Development (EBRD), 2009. Workers' accommodation: processes and standards. A guidance note by IFC and the EBRD. August.

International Finance Corporation (IFC), 2012. International Finance Corporation's Guidance Notes: Performance Standards on Environmental and Social Sustainability. January 1, 2012; last updated June 14, 2021).

Kando, H., 2022. Evaluation of the Natural Background Level of the Dasa Mining Project Area, Adrar Emoles 3 Permit. November.

METC Engineering (Pty) Ltd., 2023. Dasa Uranium Project Phase 1 Feasibility Study / NI 43-101 Technical Report 0093-00-00-REP-0010. Effective date: 15 November 2021. Revised and Amended date: 9 January 2023.

Treweek Environmental Consultants Ltd and Abell Geospatial Consulting Ltd, 2021. Adrar Emoles – DASA Mining Project, Niger. Critical Habitat Screening Assessment.

United Nations Environment Programme (UNEP), 2015. Awareness and Preparedness for Emergencies at Local Level, Second Edition.

World Bank Group / International Finance Corporation, 2007a. Environmental, Health, and Safety General Guidelines. April 30, 2007.

World Bank Group / International Finance Corporation, 2007b. Environmental, Health and Safety Guidelines for Mining. December 10, 2007.

World Bank Group / International Finance Corporation, 2007c. Environmental, Health and Safety Guidelines for Water and Sanitation. December 10, 2007.

World Bank Group / International Finance Corporation, 2007d. Environmental, Health and Safety Guidelines for Large Volume Inorganic Compounds Manufacturing and Coal Tar Distillation. December 10, 2007.

World Health Organization (WHO), 2021. WHO global air quality guidelines. Particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. Geneva: World Health Organization. ISBN 978-92-4-003421-1.

Appendix 1 – SOMIDA Traffic Management and Risk Prevention Procedures

Reference HSE/SEC PR 15	Index 0	**PROCEDURE** **Prevention of road risk in activities**	SOMIDA
Page: 1/11			

Date of implementation: 20 / 10 / 2022

Recipient	DS/CP	MINE	CPCMAC	HSE	DSA	CG	SRH
Number	1	1	1	1	1	1	1

Recipient							
Number							

DS/CP:
CPCMAC:
MINE
HSE:
DSA:
CG:
SRH:
CSST:

Related documents
HSE FI xx Workplace Accident Report HSE FI
38 Deviation Monitoring File
HSE FI 43 Work accident investigation report HSE FI
44 Work accident action plan

MODIFICATION HISTORY		
Index	**Date**	**Nature of the changes**

SOMIDA	Electronically validated by	Electronically validated by	Electronically validated by
	Editor	Auditor	Approver

Reference HSE/SEC PR 02	Index 0	PROCEDURE FOR THE TREATMENT OF ACCIDENTS IN WORK	SOMIDA
Page: 2/11			

SUMMARY

Reference HSE/SEC PR 15	Index 0	**PROCEDURE** **Prevention of road risk in activities**	SOMIDA
Page : 3/11			

Introduction and objective

The use of vehicles is the cause of many accidents in our activity and are particularly serious.

This document includes the minimum requirements that must be in place to ensure the safety of personnel when using light vehicles in our operations and remain applicable when making private trips with a SOMIDA vehicle.

Scope & Responsibilities

1. Scope

This document applies to SOMIDA personnel and to subcontractors working under the authority of SOMIDA personnel and requiring the use of light vehicles (whether owned by SOMIDA or its subcontractors). By light vehicles, it is understood, any vehicle:

- approved to drive on public roads with a driver's license
- with at least 4 wheels;
- with less than 9 seats (including the driver) all equipped with seat belts;
- with a maximum laden weight of less than 3.5 tons.

Vehicles with more than 9 seats (including the driver's seat) will be considered a transit vehicle. Any vehicle not meeting these criteria will be considered an industrial vehicle.
Local regulations that are more stringent than the SOMIDA instructions must be applied.

2. Responsibilities

The hierarchy is responsible for ensuring the application of these requirements. It must ensure that all persons concerned (SOMIDA or subcontractor), know, are able to apply and apply these requirements. Each subcontractor's manager is responsible for the safety of his personnel and for compliance with the requirements of this document.

Each manager, regardless of hierarchical level, must first ensure that his or her staff is:

1. Medically fit to drive under the conditions in which he/she will be required to drive.
2. Administratively authorized to work in the country where the mission is carried out.
3. In possession of a valid driver's license in the country (ies) concerned.
4. Current and valid driver's license.
5. Trained at :
    - Safe driving
    - Driving in mining areas (if applicable)
    - The use and wearing of Personal Protective Equipment (PPE) in the evolution zones.
    - Handling of first response equipment in case of fire in the vehicles

The use of the checklist to be carried out before taking over the vehicle. Each user (driver and passenger) must respect the requirements of this document and keep the vehicles entrusted to them in good working order.

Training & authorization of driving

1. *General risk training*

a. Safety training at driving

Each new employee, subcontractor and/or visitor who has to use a vehicle must undergo a safety training when he/she arrives on a SOMIDA site.

This will have to explain the conditions of use of the company vehicles by taking particularly into consideration:

- Risks associated with the use of vehicles.
- The areas where the vehicle is allowed to operate
- How to carry out the checks when picking up the vehicle.
- The principles of defensive driving.
- Conditions to be fulfilled in order to obtain a driving license
- Priority rules.
- The parking conditions of the site.
- The number of people allowed in the vehicles,
- Maximum load and loading conditions
- The nature of the checks to be carried out before each vehicle pick-up
- How to properly use and adjust the different types of seat belts in the site's fleet
- The site's zero alcohol and drug policy.
- What to do in case of an accident.
- The use of fire fighting equipment in the vehicles.
- Contact information for people to notify in case of accident or fire.
- How to perform a wheel change.
- How to drive in difficult local conditions (extreme temperatures and poor traction)
- This training may include safety training for passengers.

b. Training for passengers

Specific training will be provided to all staff:

- Seatbelt control for passengers and driver
- Reminder to the driver if deviations are observed during the trip
- Report any anomalies observed and reported to the driver to the site's safety department. This information can be included in the site reception training and/or in the safe driving training.

c. Training for driving in the mining zone

Training specific to driving in mining areas (open pit and underground), leading to a specific "mine" driving permit, must be provided to all persons authorized to drive in these areas. It will specify at least :

- Rules of access to the "mine" area;
- Instructions to follow in the event of a loss of ventilation
- Procedure in case of fire at the bottom
- What to do in case of a fire on the vehicle.
- The conditions of driving in the descent ramp
- What to do in case of loss of steering or braking during the descent.

- PPE to be worn in the mining zone
- Radio communication codes if they exist.

Signage must be present to distinguish the different areas and where it is necessary to have a specific permit.

2. Validation of training

These courses must be tested to validate the skills of the trainees. If the results of the tests are not good, the driving authorization cannot be given to the person concerned. A new training cycle will then have to be carried out.

An explanation of the subjects who had wrong answers to the test must be done (even if the authorization is issued).

Drivers must be retrained whenever the content of these courses changes or on an annual basis

Each participant with a satisfactory score on the evaluation will sign a "Driver's Charter "(and/or the passenger) committing him/her to respect the instructions given during the training.

A safety training register signed by the employees of external companies who have taken the training must be kept up to date. It will be made available to SOMIDA by the contractors.

3. Authorization for driving

Driving a vehicle on behalf of SOMIDA or on site requires prior authorization to drive.

This authorization is issued by the head of the school and is based on three essential points:

1. The driving competence which is formalized by a driving license (or a CACES if necessary)
2. The medical aptitude to drive, taking particular care to check the good vision of the person
3. The knowledge of the environment of evolution at the end of a training to the driving in the environment where the person will have to evolve and by taking into account the specific risks of the site and the measures of prevention and/or associated prevention.

The issuance of an authorization commits the driver to respect all the site's instructions.
Failure to comply with one or more of these instructions may result in the suspension or cancellation of the authorization.

Subcontractors must also have a driving license issued by SOMIDA in order to operate on our sites.
The driving authorization will be materialized by a bank card format to be placed behind the windshield of the vehicle when picking up the vehicle. The bottom of the "authorized area" box will be color coded so that it can be checked from outside the vehicle.

Face visible from the inside	Face visible from the outside	
	Name: First name: Personnel number: Company:	*PHOTO Driver*
	Expiry date : Authorized area:	*Text + color code*

Vehicles

1. *Equipment of vehicles*

All vehicles must be equipped with at least the following:

- Seat belts for each passenger in the vehicle;
- Load restraint systems for vehicles that have to carry material and whose cockpit is not separated from the cargo area.
- An external identification of the company's membership and a specific identification number for each vehicle.
- A first aid and survival kit (to be adapted to the climatic conditions and evolution of the vehicles).
- A signalling kit (two warning triangles and high visibility vests).
- High visibility stripes on each side of the vehicle
- A procedure to follow in case of an accident or breakdown.
- Roll-over safety bars for vehicles used on tracks, rough terrain or in the mine.

Vehicles that are to enter the mining area and/or communicate with industrial vehicles or the site must also possess:

- A communication system (telephone or radio)
- A high visibility device such as a flashing light and/or a signal flag)
- Driving with low beams

It is forbidden to carry out any work that modifies the vehicle's characteristics. The vehicles used must be adapted to the necessary use.

2. *Maintenance of vehicles*

All vehicles must be maintained, at a minimum, according to the frequency defined by the manufacturer. A higher frequency must be carried out in case of use in difficult evolution or climatic conditions. These maintenance operations must be carried out by professional mechanics authorized to perform this work.

Each vehicle must have a maintenance follow-up booklet specifying the program and the nature of the interventions carried out. This will be available in each vehicle.

3. *Inspection of vehicles*

Each user of a vehicle is responsible for the vehicle he/she uses. If he/she notices any damage, it must be reported in the maintenance booklet.

An inspection of the vehicle must be carried out when the vehicle is picked up to ensure that the vehicles are in good condition and guarantee the safety of their users. This inspection is formalized and must, at a minimum, include the items on the checklist in the appendix.

If any of these items are not in such condition as to ensure safety, the vehicle shall not be used and the duty manager shall be notified immediately. A sign stating that the vehicle is not to be used shall then be placed on the steering wheel of the vehicle so that :

- No one uses the vehicle;
- to easily identify it and take it in for repair.

All the inspection sheets are given to the head of the department that owns (or benefits) the vehicle to take into account the anomalies found.

Infrastructure

1. *Paths of traffic*

Traffic lanes must be :

- Wide enough to pass two vehicles abreast
- Maintained
- Be equipped with signs.
- Traffic lanes that can accommodate mining equipment must be equipped with a lane divider to avoid any risk of head-on collision.

2. *Signs*

Signage must be present to specify:

- The area you enter: factory, mine, other
- The current speed limit.
- The presence of mining equipment
- Priority rules

3. *Information panels*

Information panels are present on site in order to :

- Show the approach taken on the site in terms of road safety
- Specify PPE to be worn outside of vehicles

A plan specifying the traffic conditions is systematically given when the driving permits are issued in order to specify the different zones (mine/plant/other) as well as the general traffic conditions on the site.

Driving & parking of vehicles

1. *Access to vehicles*

For the highest vehicles (4x4 type) it is necessary to

- Maintain three attachment points at all times to prevent the risk of falling when climbing up or down.
- To remain facing the ladder when the vehicle is equipped with one (including when descending)
- Do not jump out of the vehicle.

2. *Driving vehicles*

Anyone operating a vehicle must observe the following safety rules:

- Seat belts must be worn for all passengers and in accordance with their intended use. Three-point belts must be worn properly and lap belts must be tightened to allow no slack.
- Phone use while driving is limited to the use of a hands-free kit;
- Respect the speed limits;
- Adapt your speed to the conditions (dust, wind, slippery road, fog, etc.)
- Always give priority to industrial vehicles and site intervention vehicles (firefighters, ambulances)
- Always give way to pedestrians
- Not having consumed alcohol or drugs before driving;
- Take regular breaks (maximum of two hours of driving between breaks).
- All personnel in the vehicle must have a seat equipped with seat belts
- Any incident occurring during the use of the vehicle must be reported to the head of the department that owns (or benefits from) the vehicle as well as to the safety officer.
- Do not smoke while driving.

3. *Parking of vehicles*

The parking of vehicles must be carried out :

- In areas specifically designed for this purpose;
- In reverse or in such a way that the exit from the parking lot can be done in forward gear.
- By not obstructing the visibility of other users or pedestrians.
- Do not park less than 50 meters behind a mining machine where visibility is reduced (risk of crushing).

- If the use of flashing beacons or signal lights is regulated in the parking area, they must remain on during the entire parking period.
- If the vehicle is left parked for another user, it is necessary to ensure that the vehicle has been refueled beforehand.

4. Communication and means

The following requirements are the minimum to be applied and may be supplemented by local requirements:

- A reliable communication system must be provided for emergencies.
- The communication is tested regularly to ensure that it is working properly.
- A procedure containing radio frequencies and/or telephone numbers is available in the vehicles and updated.
- All authorized personnel are trained in the use of emergency communications.
- The manual for the use of the emergency communication means is present in the vehicles.

5. Application controls and corrections of deviations

a. Controls on entry or exit of the site

When entering the site, the following checks will be performed when passing through the access controls (entry and exit):

- Effective wearing of seat belts for all passengers.
- Driver's license
- Blood alcohol control

b. On-site controls :

While on site, the following items can be checked:

- Compliance with traffic regulations
- Compliance with parking regulations
- Wearing a seat belt
- Respect of traffic speeds using GPS beacons and/or speed control binoculars
- Blood alcohol control

c. Off-site Travel:

- Reduce speed when passing villages to reduce the risk of hitting animals and people
- Visibility / Dust control – when travelling in convoy talk precautions to maintain visibility – if dust limits visibility, apply dust suppression actions ie: wetting the road surface, increase the distance between vehicles to allow dust to settle.

d. Gap correction:

If discrepancies are found during the controls, measures are immediately implemented.

Case	Deviation noted	Action	Deadline
1	Positive blood alcohol level	Immediate: driving prohibition and suspension of driving privileges Medium term: medical follow-up and daily breathalyzer tests for one month before taking the test again. driver's license training	Immediate
2	Speeding < 10km/h	Reminder of the instructions and speed limits on the whole site. Advise senior management. If recurrence within three months see case 3	Immediate
3	Speeding >10km/h and <20km/h	Suspension of authorization for one week, senior management notified If recurrence within three months see case 4	Immediate
4	Speeding >20km/h	Suspension for one month of the driving license and obligation to retake the road safety training.	Immediate
		Communication at the entrance of the site. If the offence is repeated within three months, the suspension is increased to three months.	
5	Lack of seatbelt use	Reminder of the safety instructions to the passenger concerned and the driver. Advise senior management	Immediate
6	Non respect of traffic rules on site	Reminder of traffic rules. Informed hierarchy. Suspension of one week of the driving license if repeated within three months.	Immediate
7	Maintenance deadline not met	Sending the vehicle for maintenance. Department / owner / recipient of the vehicle notified.	48h

First Aid

- A first aid kit must be kept in each vehicle at all times. Its location must be accessible and known to all persons authorized to drive.
- The contents of the kit should be checked regularly to replace expired and/or used products.
- At least all supervisory staff must be trained in first aid.