INFACT

INNOVATIVE NON-INVASIVE & FULLY ACCEPTABLE EXPLORATION TECHNOLOGIES

INFACT DELIVERABLE D3.7

CHOOSING SOCIALLY AND ENVIRONMENTALLY MORE ACCEPTABLE EXPLORATION TECHNOLOGIES

Summary:

This report has drawn on available literature and INFACT deliverables to prepare educational or guidance material to aid exploration decision makers in selecting the socially and environmentally most-acceptable technologies.

This is achieved by focusing on the exploration process and incorporating environmental, social and governance (ESG) factors into decision making alongside technical and logistical considerations. It proposes that ESG factors are given equal prominence alongside geological factors at the main decision points in an exploration programme. This stimulates the use of good social and environmental practices from the outset of exploration, with clear benefits for the long-term future of a project.

The report follows the exploration process from the initial idea of an exploration opportunity through to technical reporting at a more advanced stage of development via preparation of a Competent Person's Report or equivalent in accordance with international mineral reporting codes such as PERC.

In parallel to this, INFACT is providing technical input into the revision of the PERC reporting guidelines to support increased requirement of ESG consideration in public reporting, with a focus on social performance.

It is anticipated that this report will provide educational guidance for exploration projects to be more environmentally and socially responsible in both practice and use of technologies.

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1 INTRODUCTION

This report focuses on decision making and disclosure requirements for mineral exploration projects and how social and environmental acceptability can be fully incorporated into the decision making process. Implicit within this are the choosing or selection of socially and environmentally acceptable technologies.

SRK Exploration Services Ltd. (SRK) considers that exploration projects typically develop through three phases prior to mineral resource estimation: Phase A – Regional Target Selection, Phase B – Target Definition and Phase C – Target Evaluation. The INFACT project focusses on Phase A and Phase B in terms of researching the viability of a range of state of the art and innovative non-invasive exploration methods from a technological, environmental and social perspective.

From the INFACT research carried out to date, deciding what methods to use where and when during the different phases has involved determination and consideration of a range of technological, environmental, social and governance factors. A benchmarking framework to assess the performance of technologies with respect to these factors has been prepared and this is described in Deliverable 4.11.

This deliverable (Deliverable 3.7) seeks to complement the benchmarking framework by focussing on the decision making process in Phase A and B and the ESG requirements currently being developed, with input from INFACT, by the Pan-European Reserves & Resources Reporting Committee (PERC). As the responsible organisation for setting standards for public reporting of exploration results, mineral resources, and mineral reserves by companies listed on markets across Europe, PERC is strategically placed to influence decision making processes and the activities that an exploration programme should include. A member of CRIRSCO (the Committee for Mineral Reserves International Reporting Standards), the PERC Reporting Standard is fully aligned with the CRIRSCO Reporting Template and could thus be used worldwide.

2 PHASE A: REGIONAL TARGET SELECTION.

All projects start with an initial idea. Initial ideas for mineral exploration projects tend to be influenced by experience, indigenous knowledge or other information combined with a broad geological understanding of an area.

Prospectivity or the mineral potential of an area is usually mapped through a non-invasive process that utilises existing available geological and geophysical datasets such as structural, topographical, lithological and mineral occurrence maps together with remote sensing and geophysical data if available. This data is compiled and interpreted using Geographical Information Systems (GIS) to select broad areas that may have potential to host the targeted minerals. The key outcome is to prepare a prospectivity map.

The prospectivity map details spatial relationships that can be regarded as being statistically significant across a region of interest. In areas without much available data, a knowledge driven approach combining indigenous knowledge with theoretical understanding of an area's geological history can be used to identify, spatially quantify and combine with GIS to prepare a hybrid prospectivity map.

The method used often depends on how the initial idea was formed. For example, mineral exploration geologists working across Africa identified many of the large deposits through hybrid approaches, being drawn to areas initially by the presence of artisanal mining activity. Across Europe, there tends to be greater access to geological and geophysical data sets and the spatial relations are mostly data driven. That said, many of the main centres for exploration and mining in Europe have long mining histories spanning thousands of years, and this indigenous knowledge remains relevant. With the combination of novel, more capable exploration techniques this indigenous knowledge is upgraded and enhanced to provide the decision-makers with more precise prospectivity information.

The results of prospectivity mapping inform the first decision: whether or not to proceed. Poor or negative results usually stop a project proceeding. Good or positive results present an opportunity to consider ESG factors at this stage decision making.

The ESG factors should focus on potential critical issues that could stop the project proceeding and can be assessed through a desk top review. This would normally include the following:

- The administrative setting;
- The legal and permitting requirements for the development and the permitting route map;
- Governance structure, policies and processes of the exploration company;
- The environmental setting (including identifiable and surrounding land uses, the presence and designations of protected areas, habitats and species of conservation importance, water resources, water bodies and sensitivities, and air quality); and
- The social setting (including demographics and socioeconomics, regional development priorities, infrastructure, and community assets and features).

Examples of potential critical issues include the presence of UNESCO World Heritage Sites and Biospheres, Natura 2000 sites, Areas of Outstanding Natural Beauty, the presence of indigenous people, political or civil conflict or other sociocultural issues (i.e. adverse feelings towards mining due to its legacy in the area/region, acceptance of mining industry as the main economic factor of the area/region, .

The extent and degree to which these factors would be critical to the project idea are context-specific to individual cases. They could also depend on the type of mineral deposit and its perceived value.

Assuming that no critical flaw or stop factors were identified, the next step in an exploration process would be to secure initial finance. In terms of investment, to complete Phase A of an exploration project would normally require, for example, around €100,000 (SRK, 2019) depending on the size of the area and the amount of information available. A review of ESG factors is increasingly regarded by private investors and institutions as a form of risk assurance and may potentially increase confidence for an investor. It is not commonly conducted but can easily be accommodated by the typical budget for this stage of the exploration process and can reap substantial benefits in the long term.

Once initial investment has been secured, permission must be secured to start exploration activity. Depending on where the project is, this can range from completing an application on an online portal to engaging with the respective authorities through correspondence or direct communication. Once permissions have been secured its time to go to site.

This permission will usually take the form of a mineral exploration or prospecting licence which may grant the applicant the exclusive right to conduct exploration within the area applied for. Such licences are usually several tens to several hundred square kilometres in area, and are also temporally constrained. It is increasingly the case that the legal terms of these licences require exploration companies to behave in a socially and environmentally manner and to prepare reports on these factors. They will also be subject to inspections by relevant authorities. These may set the minimum standards that exploration companies should meet, but often a company's ESG policies and practices should exceed these in order to be fully effective with respect to current developments in Good International Industry Practice (GIIP).

Initial visits to exploration properties and the first phase of fieldwork are usually undertaken solely by geologists to scope out the area, however much has been written (MacCallum, 2016, Proctor and MacCallum, 2019, Mackenzie et al., 2020) on the importance of good social performance as soon as 'boots hit the ground'. Social performance is a term increasingly being used to describe the social

interactions, commitments and understanding that build or destroy the trust, acceptability and relationships required for a project to achieve a social licence to operate.

Consequently, for exploration processes and technologies to be environmentally and socially acceptable, it is recommended that a geologist carries out the initial site visit with a social performance specialist or a geologist trained in social performance. This, after all, is often the first time that an exploration company meets stakeholders in the host community and it is critical that this first impression is a positive one.

During, or even better, prior to the first visit or first phase of work, in addition to ground truthing areas identified by the prospectivity mapping and other reconnaissance work such as outcrop and geochemical sampling, meetings are held with local authorities to introduce the project and the people involved. The visit also presents an opportunity to carry out a more in depth ESG scan, building on the initial desktop review to determine the environmental, social and governance context of the area as well as any legacy issues resulting from previous exploration or mining activity and any cumulative effects the project may add to in terms of infrastructure, services, utilities etc.

All information gathered during the site visit is collated, analysed and presented in a field report. This report must include the outcomes of stakeholder engagement and an update of the ESG review for the area.

The findings of this phase of work, relating to both technical and ESG factors, determine the next steps in the exploration process. If they are negative and cannot be mitigated, the project stops. If the findings are negative but can be mitigated to become positive then the project warrants further investigation. If the findings are positive then the project will proceed to Phase B and the design of an exploration programme.

3 PHASE B TARGET DEFINITION

The design of an exploration programme traditionally has two components: technical and logistical. However, through the INFACT project, a third component has been added to ensure or improve the social and environmental acceptability of the exploration strategy and the methods employed. It is referred to as ESG but requires the skills of a social performance practitioner or a geologist trained in these skills.

Logistical considerations are as follows:

- Makeup of the geology team linked to the planned technologies;
- Social performance practitioner to support engagement and community relations;
- Infrastructure requirements in terms of accommodation, transport and supplies;
- The influence of climate and terrain on how or when exploration may be conducted;
- Requirements for access routes to be improved or constructed to working areas; and
- Health and safety aspects of what is being planned and where.

Technical considerations in exploration method selection should account for the following factors, but must always prioritise techniques that have the lowest possible environmental and social impact whilst being effective and appropriate to the targeted mineralisation:

- The availability of quality geological, geophysical and geochemical data especially that which relates to historical exploration and mining activity;

- The exploration status of the area and the degree of confidence in target areas; whether exploration needs to cover a wide area to identify targets, or if there are already well-defined targets that allow focussed work;
- The expected type, geometry and depth of mineralisation;
- Whether there is extensive rock outcrop, overburden or deep weathering;
- How responsive the targeted mineralisation or geology is to geophysical methods and/or whether it is likely to form distinctive geochemical anomalies;
- The budget available for exploration and how this is structured; and
- The technical capability and capacity of the exploration company.

ESG considerations focus on potential social and economic sensitivities as follows:

- Mapping of the different stakeholders and carrying out a political economy analysis detailing their interests, importance and influence in relation to the exploration programme and among themselves. This should build on information collected through the critical factor scan and the initial site visit;
- Development or procurement of a stakeholder data management system and preparation of an early stage engagement plan and grievance mechanism;
- Determination of the local social, economic and political context of the area, expanding on information from the stakeholder mapping to understand any particular considerations; and
- A natural resource use study to determine seasonal and other considerations related to land, air and water access for the exploration campaign as well as any additional or special permissions that may be required.

Completion of the exploration programme and interpretation of the results it yields should, if positive, highlight specific, well-constrained areas that have potential to be developed towards Mineral Resource definition and should be prioritised for further exploration.

A technical report should be produced at this stage. This will usually follow the guidelines and meet the minimum standards of a CRIRSCO mineral reporting code such as PERC and be produced under the supervision of a Competent or Qualified Person, especially if the company is publicly listed.

These reports typically have a heavy focus on the project's geology, mineral potential, outcomes of exploration and a Mineral Resource statement if exploration has reached that stage. Currently there is a limited focus on ESG within the reporting codes. However, through the involvement of INFACT in the current review of both the PERC, and the overarching CRIRSCO mineral reporting codes, which were last updated in 2017 and 2019 respectively, it is anticipated that the minimum requirement will include a more substantial focus on social performance and ESG considerations.

The cost of completing Phase B mineral exploration and associated reporting is c. €1 million. The outcomes of this work may be used to raise additional finance to further evaluate the mineral potential, define mineral resources and begin assessment of their economic viability. This third phase usually requires a more invasive exploration approach, typically some form of drilling to obtain representative samples of mineralised material and analyse its grade. This work may also include surface excavations such as pits or trenches through overburden or removal of relatively large volumes of rock for 'bulk sampling'. Compared to earlier stages of the programme, this phase poses the greatest challenges to the social or environmental acceptability of the project and/or the company. This further emphasises the importance of social performance at an early stage or even better in the preface to the early exploration phase; if positive relations have been established with affected stakeholders then three interrelated aspects of social performance, as described by Mackenzie et al (2020) should be applied:

1. Ongoing meaningful positive engagement, building on existing relationships;
2. Understanding of the local context through development and documentation of a social knowledge base so that lessons learned and experiential learning can be drawn upon when required; and
3. Local Content and shared value creation through strategic investment in the community, through supporting and enabling local content where possible, but also supporting activities that benefit natural resource access in the project area. It is quintessential that these investments are beneficial to a wider community to avoid any implication to bribery or corruption.

4 CONCLUSION

The decision-making process described in this deliverable and illustrated in Figure 4.1 follows an exploration project until production of the first publicly reported Mineral Resource Estimate. INFACT's piloting and application of non-invasive innovative and state of the art exploration technologies, while not able to make the whole of the exploration process non-invasive, can provide time and space to develop and nurture positive relationships and facilitate a more socially and environmentally sensitive and responsible approach to mineral exploration. This builds and maintains a solid foundation of social and environmental acceptability which will prove to be critically important should the project develop into a mining operation. A very useful testing playground for the technical, social and environmental acceptability of techniques are the three European Reference Sites in Germany, Spain and Finland that were developed within the project and that are set to become self-sustainable.

This deliverable proposes that ESG factors and good practice should be given equal prominence to technical factors from the outset of exploration and at key decision points through the exploration process. This applies to both the overall strategy of exploration as well as the selection of specific exploration methods. This is a change from way early-stage exploration is currently performed whereby ESG context and impacts are not thoroughly assessed or factored until more advanced stages.

Detail	Key
Key Activity/Outputs	
Geoscience	
ESG	
Logistics	
Decision making	

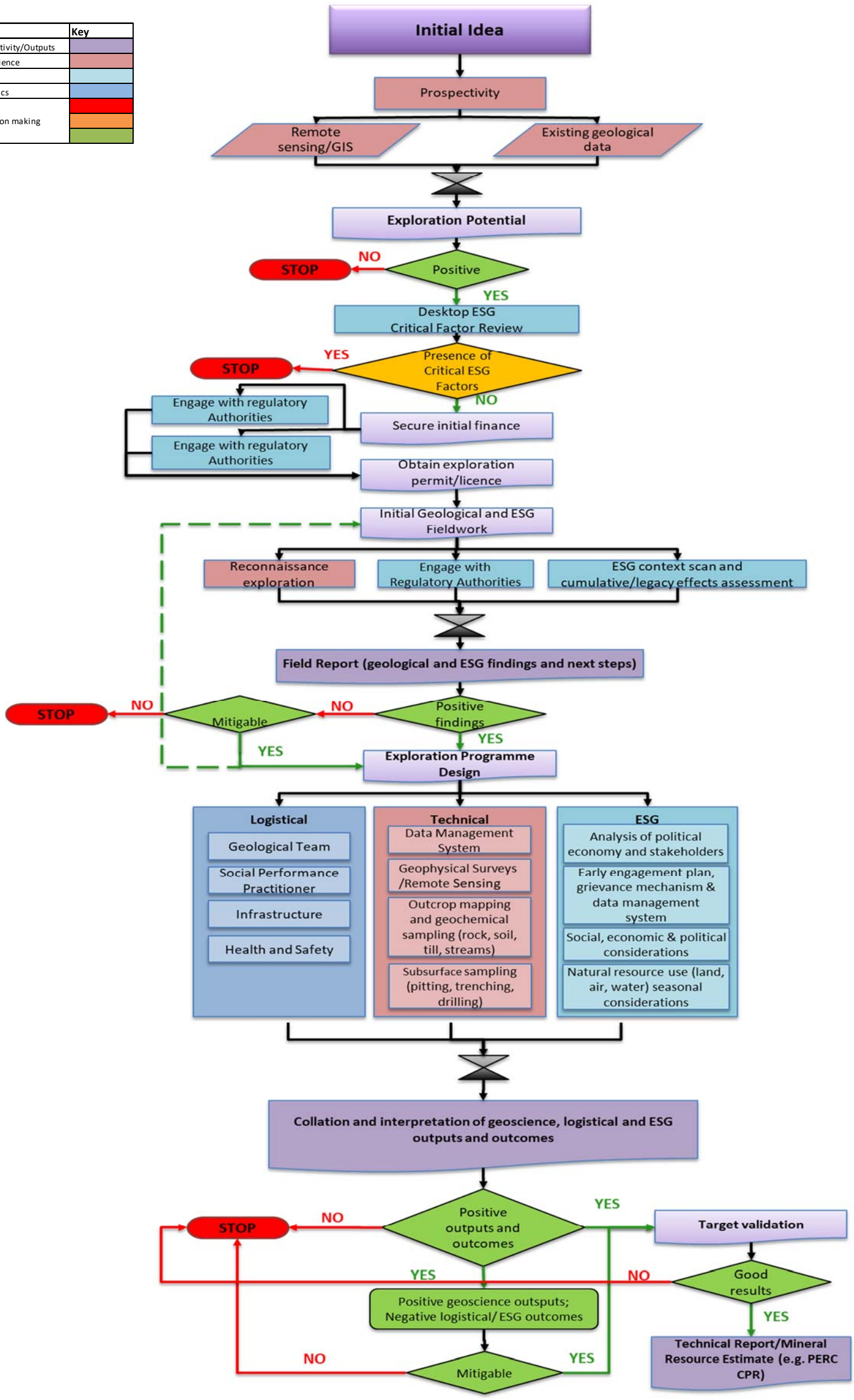

Figure 4.1 Exploration Process Decision Tree

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