

REPUBLIC OF COLOMBIA  
SERVICIO GEOLÓGICO COLOMBIANO

INVITATION TO BID  
SGC-CDP-005-2020

**TO CONTRACT THE PROVISION OF SAMPLE DATING SERVICES APPLYING THE AR/AR METHOD, TO DETERMINE THE AGE OF ROCKS, ACCORDING TO THE NEEDS AND SPECIFICATIONS PROVIDED BY THE SERVICIO GEOLÓGICO COLOMBIANO.**

**BOGOTA D.C. APRIL 2020**

## 1. TIMELINE

ACTIVITY	DATE	PLACE
<b>SENDING OF THE INVITATION TO BID</b>	April 29, 2020	The request for proposal document will be sent via e-mail.
<b>DEADLINE FOR COMMENTS ON THE INVITATION TO BID DOCUMENT</b>	From April 29 to May 7, 2020 Until 5:00 pm (Colombian time)	The documents will be received via e-mail to cd05@sgc.gov.co
<b>RESPONSE TO COMMENTS AND SENDING OF THE FINAL REQUEST FOR INVITATION TO BID DOCUMENT</b>	11 May 2020	The request for proposal document will be sent via e-mail.
<b>RECEIPT OF OFFERS</b>	May 13, 2020 until 4:00 p.m. (Colombian time)	The documents will be received via e-mail to cd05@sgc.gov.co
<b>RECEIPT OF PASSWORD AND OPENING PROCEDURE FOR BIDS</b>	May 13, 2020 until 4:30 p.m. (Colombian time)	The documents will be received via e-mail to cd05@sgc.gov.co
<b>DRAFT ASSESSMENT REPORT</b>	May 15, 2020	The document will be sent via e-mail to cd05@sgc.gov.co
<b>COMMENTS ON THE REPORT</b>	20 May 2020 Until 5:00 p.m. (Colombian time)	Documents will be received via email at cd05@sgc.gov.co
<b>FINAL EVALUATION REPORT</b>	22nd May 2020	The document will be sent via e-mail
<b>NOTICE OF ACCEPTANCE OF OFFER</b>	26 May 2020	The document will be sent via email
<b>IMPROVEMENT AND LEGALIZATION OF THE CONTRACT</b>	Within three days of notification of acceptance of the offer	Office of the contracts and agreements group of the SERVICIO GEOLÓGICO COLOMBIANO (SGC)

## 2. INITIAL RECOMMENDATIONS

Read the contents of this document carefully.

1. Please note that only natural or legal persons to whom the **SERVICIO GEOLÓGICO COLOMBIANO** has sent an invitation and Consortia or Temporary Associations formed between them may submit offers.
2. Verify, first of all, that you are not involved in any of the general or special inabilities and incompatibilities to contract.
3. Make sure that you meet the conditions and requirements stated here.
4. Proceed to gather all the required information and documentation, and verify the validity of the one that requires it.
5. Follow the instructions given in this application for the preparation of your offer.
6. Identify your offer, as indicated in this document.
7. Keep in mind the date and time scheduled for the submission of offers in this process, in no case will offers be received outside the time scheduled.
8. All enquiries must be made in writing; no personal or telephone enquiries will be accepted.
9. No verbal agreement with personnel of **SERVICIO GEOLÓGICO COLOMBIANO**, before or after the signing of the contract, may affect or modify any of the terms and obligations stipulated herein.
10. The Offerors, by the mere presentation of their Offer, authorize the entity to verify all the information provided therein.
11. Any communication sent by those interested in this document should be addressed to the Contracts and Agreements Group of the **SERVICIO GEOLÓGICO COLOMBIANO**, to the e-mail [cd05@sgc.gov.co](mailto:cd05@sgc.gov.co).

12. The submission of the Offer, by the Offeror, constitutes evidence that the technical specifications, formats and other documents have been fully studied; that it has received the necessary clarifications regarding the concerns or doubts previously consulted and that it has accepted that this request for the offer is complete, compatible and adequate to identify the scope of the objects to be supplied and that it has taken all the above into account to define the obligations to be acquired under the contract to be entered into.
13. If the information provided by the Offeror or one of the members of the Consortium or the Temporary Association is incorrect, the SERVICIO GEOLÓGICO COLOMBIANO may reject the proposal.

### 3. JUSTIFICATION

That the SERVICIO GEOLÓGICO COLOMBIANO - SGC, is a Scientific and Technical Institute, attached to the Ministry of Mines and Energy - MME, which is part of the National System of Science, Technology and Innovation - SNCTI, to which the provisions of Laws 80 of 1993 and 1150 of 2007 on administrative contracts and their regulatory decrees apply.

That through Resolution 1239 of November 15, 2017, the ADMINISTRATIVE DEPARTMENT OF SCIENCE, TECHNOLOGY AND INNOVATION - COLCIENCIAS recognized the SERVICIO GEOLÓGICO COLOMBIANO, as a research center, by complying with the requirements demanded by COLCIENCIAS (Today MINISTERIO DE CIENCIA TECNOLOGIA EN INNOVACION - MINCIENCIAS) for such purposes This implies that this entity is recognized as an organization dedicated to developing science and technology, with administration, financial and human resources and infrastructure for the development of this object.

That Article 3 of Decree Law 4131 of 2011 specified that as a result of the change in nature, the purpose of the COLOMBIAN GEOLOGICAL SERVICE is to "carry out basic and applied scientific research on the resource potential of the subsoil; advance the tracking and monitoring of threats of geological origin; administer subsoil information; guarantee the safe management of nuclear and radioactive materials in the country; coordinate nuclear research projects, with the limitations of Article 81 of the Political Constitution, and the management and use of the Nation's nuclear reactor.

That Article 4 of Decree Law 4131 of 2011 provides that, in order to fulfill its purpose, the Colombian Geological Survey shall perform the following functions, among others: "(...) 3. Generate and integrate knowledge and collect, compile, validate, store and supply, in an automated and standardized manner, information on geology, subsoil resources and geological hazards, in accordance with the policies of the National Government. (...) 10. Investigate geological phenomena that generate threats and evaluate threats of geological origin with regional and national impact on the national territory. (...)".

Article 6 of Decree Law 2703 of November 22, 2013 established the functions of the Basic-Geosciences Directorate, among which are the following "(...) 2. To generate knowledge and geological, geophysical and geochemical mapping of Colombia on a regional scale, including scales 1:100,000 and 1:250,000, depending on geological conditions and to update the Geological Map of Colombia in accordance with the progress of national mapping. 3. To direct and carry out research to know and characterize the evolution, composition and processes that determine the current morphology, structure and dynamics of the Colombian subsoil. 4. Direct, formulate and carry out exploration and research programs in geology, geomorphology, geophysics, geochemistry at a regional scale, geothermal, volcanology, tectonics, stratigraphy, paleontology and hydrogeology of the territory, to generate information coverage related to the properties and basic models of the subsoil. (...) 6. Generate and present geological information in accordance with the policies and standards of the SERVICIO GEOLÓGICO COLOMBIANO-SGC. (...)”

One of the objectives of the National Development Plan 2018-2022, in section Pact for Science, Technology and Innovation, is to increase public and private investment in science, technology and innovation. Within the framework of the advancement of scientific knowledge in the country, as an institution attached to the National System of Science and Technology (SNCT), the Colombian Geological Service with the projects developed by the Department of Basic Geosciences, specifically the groups Geological Map of Colombia and Stratigraphy, requires Ar/Ar data to advance knowledge on the temporality of geological phenomena that determined the geological configuration of the territory. Consequently, an improvement in geological mapping, the understanding of the regional geodynamic context and a greater understanding of volcanism over time can be achieved.

Radiometric dating is an analytical technique to determine the absolute age of rocks from the principle of radioactive decay. In nature some chemical elements are presented as unstable isotopes (parents) that decay to a more stable isotope (daughter), this occurs at a characteristic time period (half-life). By measuring the proportion of parent and daughter isotopes in the sample of interest it is possible to determine their age. There are several dating methods such as: U/Pb, Rb/Sr, Sm/Nd, Ar/Ar, among others. The application of a given dating method depends on the research question, the chemical composition of the rock and the age that is assumed from the relationship between lithostratigraphic units.

The Ar/Ar method has multiple applications in geology. It can be used to date events from the Precambrian to the Holocene (ideally >100,000 years), in rocks with a high content of potassium, a common element in the earth's crust. This dating method allows us to know the age of deformational events, thermal evolution of the crust, the occurrence of metamorphic events, the temporality of volcanic eruptions, the age of mineralizations, among others.

These data will be used in the projects Geological Evolution of the Central Cordillera of the Geological Map of Colombia group; and Paleozoic, Jurassic and Cretaceous Stratigraphy of the central part of the Eastern Cordillera of the Stratigraphy group, both from the Basic Geosciences department.

The stratigraphic, cartographic, geochemical, petrographic and petrogenetic information generated by these work groups, correlated with the ages obtained, will allow establishing the temporal relationship with magmatic, tectonic, metamorphic and sedimentary events, in the different zones where the projects are being carried out (central part of the Eastern Cordillera and central part of the Central Cordillera of Colombia).

The samples that will be analyzed by the Geological Evolution of the Central Cordillera project correspond to metamorphic rocks from the basement of the Cordillera collected along the Ibagué-Calarcá transect, in the zone of influence of the Pericos fault and in the surroundings of the Tolima department. These data will allow us to know the temporality of metamorphic events in the Cajamarca complex, one of the most representative geological units of the Central Cordillera; the Neises and Amphibolites unit of Tierradentro and older undifferentiated metamorphic rocks. This is in order to understand its relationship with larger regional geological events that occurred in the Paleozoic and Mesozoic continental margin of South America. Also, samples of volcanic rocks collected from monogenetic volcanoes, whose volcanic activity possibly took place between the Miocene and Pleistocene periods, will be considered in order to understand the dynamics of post-Eocene subduction and its relationship with the current subduction generated by active volcanism in the Central Cordillera.

On the other hand, the samples that will be analyzed by the Paleozoic, Jurassic and Cretaceous Stratigraphy project in the central part of the Eastern Cordillera correspond to a metamorphic unit identified for the first time in the study zone. The dating of this unit will improve the mapping of the region and will allow a better understanding of the relationship between the basement and the sedimentary sequences deposited on it.

That all the invited laboratories have references on the quality of their results and evidence of standardization, by showing that they participate in international intercomparison exercises and through a list of international publications in indexed journals.

That, since publications in indexed journals undergo rigorous review by expert researchers, the participation of laboratories in these journals supports the quality of the analyses they provide to users. The information of the published works was consulted through the sciencedirect search platform of SGC.

Bearing in mind that the need for Ar/Ar data increased for projects assigned to the Department of Basic Geosciences, direct contracting with a laboratory must be carried out, since the Colombian Geological

Service cannot supply the additional demand within the deadlines established by the institution for the deadline of project results, nor does it currently have contracts that allow such data to be carried out.

Additionally, it should be considered that the analytical procedures required for Ar/Ar dating are very time consuming: mineral separation by specific procedures according to the mineral to be dated (hornblende, biotite, muscovite, sanidine etc.), mounting and irradiation of the minerals, resting time until the radiation emission levels of the material are lowered, and stepwise heating procedures.

#### 4. DEVELOPMENT OF SCIENTIFIC AND TECHNOLOGICAL ACTIVITIES

In order to fulfill its functions and satisfy the described needs, the SGC requires to contract the provision of sample dating services applying the Ar-Ar method, to determine the age of rocks, according to the needs and specifications foreseen by the SERVICIO GEOLÓGICO COLOMBIANO.

In accordance with the provisions of Article 2.2.1.2.1.4.7. of Decree 1082 of 2015 and taking into account the contents of the Unique External Circular Letter of Colombia Compra Eficiente, it is observed in the first place that the object of the contracting is framed within the development of scientific and technological activities.

Science and Technology Activities (STA) can be defined as all systematic activities that are closely related to the generation, production, advancement, promotion, dissemination, and application of scientific and technical knowledge and that apply to all fields of science and technology (UNESCO, 1984). In the case of Colombia, this definition of ACT includes innovation activities, which the Frascati Manual (OECD, 2002) calls other industrial activities.

In particular, the object of the present contract is a Scientific and Technological service, framed in numeral 3 of article 2 of the Decree Law 591 of 1991, which establishes:

*"Article 2° For the purposes of this Decree, scientific and technological activities are understood as the following [CSG1]:*

*1. Scientific research and technological development, development of new products and processes, creation and support of scientific and technological centres and the formation of research and information networks.*

*2. Scientific and technological dissemination, that is, information, publication, popularization and advice on science and technology.*

3. Scientific and technological services relating to the implementation of science and technology plans, studies, statistics and censuses; homologation, standardisation, metrology, certification and quality control; resource prospecting, inventory of land resources and territorial planning; scientific and technological promotion; implementation of science and technology seminars, congresses and workshops, as well as the promotion and management of total quality and technology evaluation systems.

4. Innovation projects that incorporate technology, its creation, generation, appropriation and adaptation, as well as the creation and support of business incubators, technology parks and technology-based companies.

5. Technology transfer that includes the negotiation, appropriation, disaggregation, assimilation, adaptation and application of new national or foreign technologies.

6. National and international scientific and technological cooperation. (Underlined outside the original text).

The technical justification for this hiring is developed below for each of the items mentioned above:

*Item 1.*

The samples that will be analyzed by the Geological Evolution of the Central Cordillera project correspond to metamorphic rocks from the basement of the Cordillera collected along the Ibagué-Calarcá transect, in the zone of influence of the Pericos fault and in the surroundings of the Tolima department. These data will allow us to know the temporality of metamorphic events in the Cajamarca complex, one of the most representative geological units of the Central Cordillera; the Neises and Amphibolites unit of Tierradentro and older undifferentiated metamorphic rocks. This is in order to understand its relationship with larger regional geological events that occurred in the Paleozoic and Mesozoic continental margin of South America. Also, samples of volcanic rocks collected from monogenetic volcanoes, whose volcanic activity possibly took place between the Miocene and Pleistocene periods, will be considered in order to understand the dynamics of post-Eocene subduction and its relationship with the current subduction generated by active volcanism in the Central Cordillera.

*Item 2.*

The information obtained from the data will be divulged through specialized national and international scientific publications that provide new models, concepts and knowledge about the behavior of geodynamic phenomena in the Colombian territory.



### Item 3

In order to improve the state of the basic cartography of the Colombian territory, the geological units must be distinguished by means of analytical techniques that provide their absolute ages. In case of having lithologically similar units, these ages will allow to differentiate them properly.

On the other hand, the Sectorial Guide of Programs and Projects of Science, Technology and Innovation, of October 2015 by COLCIENCIAS, today MINISTERIO DE CIENCIA, TECNOLOGÍA E INNOVACIÓN - MINCIENCIAS in its capacity as rector of the sector and of the National System of Science, Technology and Innovation, defines the Scientific and Technological services, in the following terms:

*"It comprises activities related to research and experimental development that contribute to the production, divulgation, appropriation and application of scientific and technological knowledge, and may have a direct or indirect link with I+D, but are distinguished by the fact that they are not innovative in nature. Following UNESCO's approach,<sup>13</sup> the following services are envisaged:*

*"Systematic collection of data on natural phenomena, parameters and resources: topographical, geological and hydrological surveys; astronomical, meteorological and seismological observations; inventories of soils, plants, fishery resources and fauna; routine testing of soils, air and water; control, surveillance and monitoring of radioactivity levels.*

*Testing, standardization, metrology and quality control: Routine work related to the analysis, monitoring, control and testing - through recognized methods - of materials, products, devices and procedures. It includes the establishment and maintenance of standards and measurement patterns".*

In conclusion, the object of the present contract, referring to the dating of samples by the Ar/Ar method, is part of the development of scientific and technological activities, specifically as services and allows determination of new ages and increase of the geochronological database.

## 5. SELECTION METHOD

Following the provisions of subparagraph e. of paragraph 4 of Article 2 of Law 1150 of 2007, contracts for the development of scientific and technological activities may be contract directly.

Decree 1082 of 2015 states that direct contracting for the development of scientific and technological activities shall take into account the definitions established in the Decree-Law 591 of 1991 and other regulations that modify, add or replace it.

As it was analyzed in detail, the object of the present contract is framed in the development of scientific and technological activities, specifically, as scientific and technological services. For that reason, we are in the frame of the causal of direct contracting foreseen in literal e. of numeral 4 of article 2 of Law 1150 of 2007.

However, the entity understands that the causals for direct contracting must be interpreted within the framework of the principles that guide the administrative function and the public management and, in particular, the duty of objective selection. In this regard, the Constitutional Court ruled as follows:

*"This being so, it established as an exception to tendering or competition, direct contracting, understood as the power of the head of a State entity to choose the person who is to enter into the contract with the entity, dispensing with the procedure of public tendering or competition, **but subject in all cases to the principle of transparency and the exercise of control over that form or manner of contracting by the competent authorities.**" (bold and underlined are not from the original)*

And, in the same way, the Council of State has pointed out:

*"However, although the administration has the possibility of concluding this type of contract, without resorting to a public tender or competition, **this freedom is not absolute, since in the selection of the contractor 'compliance with the principles of economy, transparency and especially the duty of objective selection, established in Law 80 of 1993, must be guaranteed'.**" (Underline and bold are not from the original).*

In this sense, in order to guarantee transparency and objective selection in the present direct contracting, and with a view to the selection of the most suitable contractor for the satisfaction of the need posed, it is intended to summon the natural and legal persons, national or foreign, previously identified by the SERVICIO GEOLÓGICO COLOMBIANO and indicated above, to submit a offer in the present contracting, in accordance with the rules contained in the document Request for Proposals.

## 6. IDENTIFICATION OF THE CONTRACTUAL TYPE: PROVISION OF SERVICES

o contract the provision of sample dating services applying the Ar/Ar method, to determine the age of rocks, according to the needs and specifications provided by the SERVICIO GEOLÓGICO COLOMBIANO

This contracting is part of the exercise of the missionary functions of the SERVICIO GEOLÓGICO COLOMBIANO, mainly those provided for in paragraphs 3 and 10 of Article 4 of Decree Law 4131 of 2011.

In accordance with the above and taking into account that the SERVICIO GEOLOGICO COLOMBIANO does not have the necessary and sufficient specialized plant personnel to directly carry out the work to be contracted, nor the laboratories or specialized equipment required for this purpose, it is considered that the activities that are the object of this process are susceptible to being contracted through the service provision contract.

## CHAPTER I GENERAL INFORMATION

### 1.1 OBJECT OF THE CONTRACT

To contract the provision of sample dating services applying the Ar/Ar method, to determine the age of rocks, according to the needs and specifications provided by the SERVICIO GEOLÓGICO COLOMBIANO.

### 1.2 OFFICIAL QUOTATION

The SERVICIO GEOLÓGICO COLOMBIANO has established an official budget of up to ONE HUNDRED AND THIRTY-SIX MILLION NINE HUNDRED AND SEVENTEEN THOUSAND NINE HUNDRED AND THIRTEEN PESOS M/CTE (136,917,913 COP), including taxes, fees and contributions where applicable.

The value of this contract is covered by the Budget Availability Certificate number SPGR 46820 issued by the head of the Budget Office of the SERVICIO GEOLÓGICO COLOMBIANO on March 2, 2020

**Note: The offer(s) that exceed the available budget will not be taken into account**

### 1.3. COMMENTS ON THE INVITATION TO BID DOCUMENT

The SERVICIO GEOLÓGICO COLOMBIANO will only receive observations to the present document of Request of Offers, in writing in the dates indicated in the above schedule, via e-mail [cd05@sgc.gov.co](mailto:cd05@sgc.gov.co).

### 1.4. CLARIFICATIONS TO THE OFFER

In accordance with the provisions of Law 1150 of 2007 and Decree 1082 of 2015, in the strictest respect for the equal treatment of Offerors, the SERVICIO GEOLÓGICO COLOMBIANO may request, to all or any of them, the clarifications or information it deems relevant, in order to clear up any doubtful, obscure or misleading points in the offers. In these cases, such responses may in no way constitute an addition or complement to the Offer presented, in which case they will be inadmissible.

### 1.5. CITIZEN SUPERVISORS

The citizen supervision offices may carry out their activities during the pre-contractual, contractual and post-contractual stages of the present contract, in accordance with current regulations.

#### **1.6. OFFER**

The offer must be submitted in digital form through the e-mail [cd05@sgc.gov.co](mailto:cd05@sgc.gov.co), duly signed by the Legal Representative of the Offeror, in accordance with the order and requirements established in the invitation to bid document, with all its forms and appendixes.

The offer must be submitted without any erasures and alterations that would cause doubt about the offer unless a clarification is given, which is understood to be in truthfulness by the signature of the Offeror at the bottom of the corrections.

The Offeror must indicate in the offer the number of samples that will be analyzed considering the estimated official budget.

Offers submitted after the deadline set for the closing of this process will be considered untimely and will not be accepted.

The SERVICIO GEOLÓGICO COLOMBIANO will not require stamps, authentications, original or authenticated documents, recognition of signatures, official translations, or any other kind of formalities or ritual requirements, except when peremptory and expressly required by special laws (Numeral 15, Art. 25, Law 80 of 1993).

#### **1.7. PUBLIC CHARACTERISTIC OF INFORMATION**

The Offeror knows and accepts that in development of the principles of transparency, equality and impartiality, all the information included in its document to accredit the fulfilment of the requirements to participate and for the purposes of the evaluation is public, and any person would obtain a copy of it.

The Offeror shall be responsible for the handling of the information received from the SERVICIO GEOLÓGICO COLOMBIANO and in accordance with the Constitution and the law, shall keep the confidentiality required and respect the copyright, moral and property rights.

The offers submitted will be public and any document specified therein will be treated as confidential or with discretion only when it's established in the Constitution or Law. Accordingly, if the document contains texts of confidential nature without normative support will be understood as not written.

### **1.8. CONFIDENTIALITY OF INFORMATION**

In their offers, the Offerors must indicate which of the documents provided are of reserved nature and invoke the rule that covers such reservation, in order to comply with the provisions of paragraph 4 of Article 24 of Law 80 of 1993. If the Offeror does not make an express pronouncement protected by the law, it will be understood that the entire offer is public.

### **1.9 VALIDITY OF THE TERMS OF THE OFFER**

The conditions offered in the Offer must remain valid from the submission of the Offer and minimum until the end of ninety (90) more calendar days, counted from the date and time of the closing of the process.

### **1.10 CONTRACT TERM**

The execution of the activities corresponding to the contractual object must be carried out until November 10, 2020.

### **1.11 PROCESSING START DATE**

The selection process will begin in accordance with the schedule set out in this document.

### **1.12 COMMENTS ON THE INVITATION TO BID DOCUMENT**

Comments on the invitation to bid document will be received directly at [cd05@sgc.gov.co](mailto:cd05@sgc.gov.co), up to the time and date indicated in the schedule of this document and will be resolved by the SERVICIO GEOLÓGICO COLOMBIANO in the time indicated in the schedule.

Once the above term is over, the Entity will not accept any further concerns regarding the content and scope of the stipulations and requirements contained in this document.

The consultations, questions and corresponding answers, may be resolved by fax or e-mail.

### **1.13 OFFER PRICE**

The resulting contract will be awarded for the sum of up to ONE HUNDRED AND THIRTY-SIX MILLION NINE HUNDRED AND SEVENTEEN THOUSAND NINE HUNDRED AND THIRTEEN PESOS M/CTE (136,917,913 COP),

which includes all costs and other expenses inherent in the satisfactory performance of the contract, including contingencies, administration expenses, taxes, contributions and the Contractor's profits, and shall not be subject to adjustment for any reason or revision and change.

Accordingly, the offer must not have a different value to this, and instead must only indicate the number of samples to be analyzed in consideration of the official estimated budget.

The SERVICIO GEOLÓGICO COLOMBIANO will make a 20% withholding tax on income, if there is no agreement to avoid double taxation with the nation where the supplier resides and a 19% VAT withholding tax on the value of the contract.

#### **1.14 SUBMISSION OF OFFERS**

This process will be closed at the time and date indicated in the schedule of this contractual process and the Offerors through the process e-mail [cd05@sgc.gov.co](mailto:cd05@sgc.gov.co) must send their offer and the corresponding attachments in "pdf." format protected by a password, which must be duly completed in Spanish and signed by the Offeror's legal representative. Then, within 30 minutes of the closing time, the password that opens the Offer must be sent to the process e-mail so that it can be opened by the SERVICIO GEOLÓGICO COLOMBIANO.

Offers may be submitted before the closing time of the process through the process e-mail [cd05@sgc.gov.co](mailto:cd05@sgc.gov.co).

After the date and time indicated, no offers will be received. The Entity will not assume any responsibility for not taking into account any Offer that has been incorrectly submitted or identified.

In the case that any Offeror submits more than one Offer, the Entity will verify and consider as the valid offer which has been sent first. It is the responsibility of the Offeror to submit and verify that his/her "pdf." be password-protected so that it is considered confidential and private until the deadline when the Offeror must submitting the password of the document according to the schedule.

In any case, the SERVICIO GEOLÓGICO COLOMBIANO will consider the submitted offer as valid even if it is not sent protected by a password. The above is understood to be accepted by the Offeror upon submission of its Offer.

#### **1.15 OPENING PROCEDURE**

At the time and date indicated, the offers sent by e-mail will be opened and a minute will be taken, which will be signed by the attendees, a representative of the Entity's Internal Control Office, a representative of the Legal Advisory Office, a representative of the Technical Area, and a representative of the Contracts and Agreements Group and will be made public.

#### **1.16 COMPLETION OF THE APPENDIXES**

All appendixes and forms indicated in the Invitation to Bid document must be fully completed. The Offerors must fill out, in their entirety, the quantity and price forms corresponding to their offer.

#### **1.17 REASONS FOR REJECTION**

Offer/s will not be considered for any of the following events:

- When they are submitted by a natural or legal person different to whom the Entity has been sent the Invitation to Bid.
- When they do not comply with the Invitation to Bid document. A Offer will be considered not to be in conformity when it lacks any of the required documents that cannot be remedied; when its content is found to be inaccurate or when it does not comply with the stipulations for each of them.
- When the Offeror is subject to any of the causes of inability or incompatibility established in Law 80 of 1993, article 8, as well as in the other legal provisions in force.
- When the offer is submitted out of time.
- When the documents necessary for the comparison of offers present amendments that do not appear duly authorized or saved with the signature of the Offeror or the person signing the document.
- When inconsistencies are found in the offering documents or any attempted fraud or deception by the Offeror to the entity or other participants is discovered, without prejudice to any other legal actions that may be taken.
- When it does not comply with the minimum technical conditions set forth in the request for offer.
- When it is not rectified or when it is incorrectly rectified within the term established for such purpose by the Entity.
- When the Offeror does not provide the certification of the legal capacity to present an offer and contract and despite being required by the Entity to provide the document, does not do so within the time established for this purpose.
- When the value of the offer exceeds the budget established by the Entity.
- When the time and date established in the schedule arrive, the Offeror does not send the password, in case the document is protected with a password.

The absence of requirements or lack of documents relating to the future contracting or to the Offeror, which are not necessary for the comparison of offers, will not serve as sufficient reason for the rejection of the offers made (Law 80 of 1993, Article 25, Paragraph 15, Section 2).

The others contemplated in this document of Invitation to Bid and in the Constitution and the law.

## CHAPTER II

### 2 MINIMUM PARTICIPATION REQUIREMENTS AND OFFER DOCUMENTS

#### 2.1 MINIMUM PARTICIPATION REQUIREMENTS

Only those who have been invited to participate in this process may do so, provided that they meet the requirements set out below:

- 1) They are considered legally capable of submitting offers and entering into contracts with the State and are not ineligible or incompatible to contract, in accordance with the provisions set forth in the laws and specifically in Articles 8 and 9 of Law 80 of 1993 and 18 of Law 1150 of 2007 and its regulatory decrees.
- 2) To submit the offer within the time and place indicated in the Invitation to Bid document.
- 3) The Offeror must prepare its offer in Spanish, in accordance with the provisions of this document of Invitation to Bid and attach the required documentation.
- 4) Submit the offer whose value does not exceed the estimated official budget present here (Chapter I, 1.2).
- 5) Comply with the minimum legal, technical and financial requirements established in this document.
- 6) The members of the Consortium or the Temporary Association, made up of companies previously invited to the process, must designate the person who, for all purposes, will represent them and indicate the basic rules that regulate the relations between them.
- 7) The legal entities individually considered or in Consortiums or Temporary Association must prove that their duration will not be less than the duration of the contract and three (3) years more.

#### 2.2 REQUIREMENTS AND ENABLING DOCUMENTS

During the process of review, analysis and evaluation of the offers, the SERVICIO GEOLÓGICO COLOMBIANO may request from the Offerors clarifications and documents that it considers relevant to the issues involved within its offers.

##### 2.2.1 CONDITIONS RELATING TO LEGAL CAPACITY



The Offeror must submit all the documents listed below, in the same order as indicated here.

#### **2.2.1.1 LETTER OF PRESENTATION (APPENDIX No. 1)**

It must be signed by the Legal Representative of the national or foreign legal entity. In this letter, the Offeror shall state under the seriousness of the oath that it is not involved in the causes of inability, incompatibility, conflict of interest or in the prohibitions established in the Political Constitution, and the other rules applicable to the matter.

When the Offeror includes statements or conditions within the letter of presentation or in any part of the proposal that are contrary to the object, scope, obligations or technical specifications of the present process, it will be cause for REJECTION OF THE PROPOSAL. However, the Entity will request that the aspects it considers relevant be clarified.

In the cover letter, the Offeror must indicate which of the information provided in the proposal is of a reserved nature, indicating the rule that gives it that nature.

#### **2.2.1.2 COPY OF THE IDENTITY CARD OR PASSPORT OF THE LEGAL REPRESENTATIVE.**

The Offeror must present a copy of the citizenship card of the Legal Representative, and in the case of Consortiums or Temporary Associations, a copy of the citizenship card of the Legal Representative of each of the legal entities that are members of the Consortiums or Temporary Associations, and of the certificates of the natural persons that are members of the Consortiums or Temporary Associations. In the event that the Legal Representative is of foreign origin, a copy of the Passport may be submitted to validate the identity of the Legal Representative.

#### **2.2.1.3 COPY OF DOCUMENTS PROVING THE EXISTENCE AND LEGAL REPRESENTATION OF THE PROPOSER**

The Offerors must prove their existence and legal representation, with the appropriate document issued by the competent authority in the country of their domicile, with a date of issue no more than sixty (60) calendar days prior to the date of closure of the selection process, stating their existence and certifying the condition that its duration may not be less than the term of execution of the contract and one (1) year more. In order to participate, they must comply with the following conditions

- a) Proof that the corporate purpose demonstrates the possibility of advancing the object to be contracted,

- b) To prove the sufficiency of the capacity of its proxy or legal representative in Colombia, in accordance with Law 80 of 1993, Law 1150 of 2007, Decree 1082 of 2015 and the other provisions that regulate the subject, when applicable.
- c) If some of the requested information is not included in the certificate attesting to the existence and representation, or if such certificates do not exist under the laws governing these matters in the country of origin of the legal person, the information must be provided in a separate document issued by a competent authority of that country or, failing that, in a document issued by the highest management body of the legal person. Foreign persons who find themselves within the factual situation indicated in this paragraph must declare that, according to the legislation of the country of origin, the certifications or information cannot be provided in the terms required in these Instructions, as provided in Article 177 of the General Code of Procedure.

In the case of a consortium or joint venture, the Offerors shall indicate such capacity, the terms and extent of participation, the designation of the person who will represent them and indicate the basic rules of the relationship between them and their responsibility, in accordance with paragraph 1 of article 7 of Law 80 of 1993. They shall also attach the respective document of constitution of the consortium or Temporary Association.

The proposers who present themselves under one of these modalities must present the document which accredits the formation of the Consortium, or Temporary Association, with the fulfilment of the requirements demanded by paragraph 1 of article 7 of Law 80 of 1993.

## **2.3 ENABLING TECHNICAL REQUIREMENTS.**

### **ACCEPTANCE OF APPENDIX No. 2 "TECHNICAL SPECIFICATIONS"**

The Offeror must provide this appendix duly signed by the legal representative, with which he/she undertakes, if selected in this process, to comply with all the requirements therein.

The SERVICIO GEOLÓGICO COLOMBIANO has verified that all the invited laboratories have references on the quality of their results and evidence of standardization, by showing that they participate in international intercomparison exercises and through a list of international publications in indexed journals. The information of the published works was consulted through the sciencedirect search platform of the SGC. Since publications in indexed journals undergo rigorous reviews by expert researchers, the participation of laboratories in these journals supports the quality of the analyses they provide to users.

## CHAPTER III

### EVALUATION AND QUALIFICATION OF OFFERORS

#### 3. EVALUATION COMMITTEE

The Evaluation Committee will be appointed by the authorising officer of the expenditure of the SERVICIO GEOLÓGICO COLOMBIANO and will be subject to the inabilities and incompatibilities and conflict of interest provided for by law, recommending to the head of the Entity or his delegate the meaning of the decision to be taken in accordance with the evaluation carried out. The advisory nature of the committee does not exempt it from the responsibility of carrying out the work entrusted to it. If the head of the Entity or his/her delegate does not accept the recommendation made by the Evaluative Advisory Committee, he/she must justify this. The committee, when it considers it necessary, may ask for explanations from the Offerors in order to clarify possible inconsistencies that may arise.

Likewise, the head of the Entity or his/her delegate may hire individuals to evaluate the Offers submitted under this contracting modality when the conditions so require, which must be complied with, in accordance with the provisions of Article Decree 1082 of 2015, carrying out this work objectively and adhering to the Request for Proposals and its Addenda.

#### 3.1. TERMS FOR THE EVALUATION AND CLARIFICATION OF OFFERORS

The integral studies of suitability, (economic and technical), necessary for the evaluation of the offers, will be analyzed and reviewed by the Evaluation Committee designated by the SERVICIO GEOLÓGICO COLOMBIANO, in the dates indicated within the schedule.

#### 3.2. FORM OF VERIFICATION AND EVALUATION OF OFFERS

The following minimum requirements shall be considered for the verification of Offers:

CHECK CRITERIA	
LEGAL VERIFICATION, ENABLING REQUIREMENT	Comply/Does not comply
TECHNICAL VERIFICATION, ENABLING REQUIREMENT	Comply/Does not comply

The SERVICIO GEOLÓGICO COLOMBIANO will verify the offers according to the principles of prevalence of the general interest, legality, planning, equality, transparency, economy, responsibility, objective selection, celerity, morality, efficiency, impartiality, publicity, contradiction, efficiency, balance and commutability.

Likewise, it will evaluate, only the offers not discarded, that is to say, those that classified according to the legal, financial and technical analyses.

LEGAL ENTITLEMENT: Offerors that comply with all the requirements indicated in numerals 2.2. of this document shall be legally qualified.

TECHNICAL ENABLING: The Offers that comply with the provisions of section 2.3 of this document shall be technically qualified

### **3.3 SELECTION CONDITIONS**

To guarantee the selection of the most favorable offer for the SERVICIO GEOLÓGICO COLOMBIANO and for the purpose intended to be satisfied with this Public Invitation, the only evaluation criterion will be the highest number of samples to be analyzed considering the estimated budget, which will be listed in APPENDIX No. 3 - ECONOMIC OFFER, prior compliance with the legal and technical enabling requirements.

Pursuant to Article 2.2.1.1.2.2.4., Subsection 2 - Selection, of Decree 1082 of 2015, when, in accordance with the information available to it, the SERVICIO GEOLÓGICO COLOMBIANO considers that the value of a Offer is artificially low, it shall require the Offeror to explain the reasons for the value offered. Once the explanations are analyzed, and the value of the offer over which the SERVICIO GEOLÓGICO COLOMBIANO had doubts about its value, responds to objective circumstances of the Offerer and its Offer that do not put at risk the fulfillment of the contract if it is awarded to such Offer, the evaluating committee will recommend.

### **3.4. CLARIFICATIONS**

Within the strictest respect for the equal treatment of the Offerors, the SERVICIO GEOLÓGICO COLOMBIANO may request from all or any of them the necessary clarifications or information in order to clear up any doubt about the Offers.

### **3.5 ESTIMATION, CLASSIFICATION AND ALLOCATION OF FORESEEABLE RISKS THAT MAY AFFECT THE ECONOMIC EQUILIBRIUM OF THE CONTRACT**

In accordance with Article 4 of Law 1150 of 2007 and Decree 1082 of 2015, the foreseeable risks involved in this contract are estimated, classified and assigned as follows:

### 3.5.1. CONTRACTOR'S RISK ALLOCATION

As of the date of execution of the Contract, the Contractor assumes the effects arising from the risks listed below, in addition to those arising from other clauses or stipulations of the Contract, its appendixes arising from the nature of the Contract.

#### Foreseeable risks

In consideration of the characteristics of the Contracting Process, the foreseeable risks of this Contracting Process are identified below.

#### Economic Risks

The Contractor assumes all foreseeable risk of market behavior, such as fluctuations in input prices, shortages and speculation, among others.

The Contractor assumes all foreseeable risk of inflation behavior in Colombia and, consequently, assumes the effects, favorable or unfavorable, of the evolution of the real inflation of the Colombian Peso, regardless of whether or not such evolution coincides with any pre-calculation of the pairs known not to its counterpart. As a result of the foregoing, the Contractor assumes the effects, favorable or unfavorable, derived -among others- from the following phenomena associated to inflation:

- a) The variation in the market prices of the inputs necessary to advance the Contract, including the value of the equipment, elements, materials, systems and programs required in accordance with the Contract.
- b) Variation in the prices of the personnel remuneration required by the Contract or any other resource necessary for the execution of the Contract.

#### Profitability risk

The Contractor shall assume the risk arising from the return of the Contract, taking into account the obligations assumed and the distribution of risks agreed in the Contract. As a consequence of the foregoing, the Contractor shall bear the effects, favorable or unfavorable, derived from the variations in the profitability of the business and obtaining of profits or suffering of losses.

#### Regulatory risk

The Contractor assumes all the risk derived from variations in Colombian legislation and, consequently, assumes the effects, favorable or unfavorable, derived from any sovereign decision of the Congress of the Republic, the authorities of the Executive Branch of the Public Power or the jurisdictional authorities. Includes acts of authority, seizure, embargo, lawsuits; the licenses and permits of copyright and intellectual property of software, materials, equipment and techniques to be used by the Contractor.

### **Technological Risks**

The Contractor assumes all the risk derived from possible failures in telecommunications, availability of coverage, availability and suspension of public services, advent of new technological developments or standards that must be taken into account for the execution of the contract as well as technological obsolescence, operation and handling of equipment and tools; as well as the equipment and means necessary for the development of the Contract.

### **Force Majeure Risk**

The Contractor assumes the entire risk of destruction or loss of its own property, items and equipment intended for the performance of the Contract or damage to the Contractor's personnel. Accordingly, the Contractor assumes the adverse effects arising from any and all data, damages - including consequential damages and loss of profits - or losses of its property or damages to persons forming part of the personnel provided by the Contractor for the performance of the Contract, caused by Force Majeure or by third parties other than the SERVICIO GEOLÓGICO COLOMBIANO, without prejudice to the Contractor's authority to require third parties other than the SERVICIO GEOLÓGICO COLOMBIANO to make good or compensate for direct and/or consequential damages where applicable

### **3.5.2. 3.5.2. RISK DISTRIBUTION MATRIX**

The distribution of risks is summarized in the attached document.

## **CHAPTER IV CONTRACTUAL TERMS**

### **.1 PAYMENT MODE**

The SERVICIO GEOLÓGICO COLOMBIANO will pay the contractor in one (1) payment, upon presentation of the certification of receipt to the satisfaction of the totality of the data signed by the contract supervisor designated by the SERVICIO GEOLÓGICO COLOMBIANO.

**FIRST PARAGRAPH:** The SERVICIO GEOLÓGICO COLOMBIANO shall make payment in foreign currency up to the equivalent in Colombian legal currency corresponding to the total value of this contract, at the MTR of the effective day of payment. The SERVICIO GEOLÓGICO COLOMBIANO will not be responsible for any expenses incurred by the contractor, but up to the amount of the value of this agreement.

**PARAGRAPH TWO:** In cases where, after preparation of the samples, they are not suitable for dating, the SERVICIO GEOLÓGICO COLOMBIANO will pay the value of the preparation made in each case, for which the contractor must report the cost of sample preparation, which in no case may exceed 40% of the value resulting from the arithmetic operation of dividing the total value of the contract by the quantity of sample offered.

**PARAGRAPH THREE:** It is precisely established that the amount of money that the SERVICIO GEOLÓGICO COLOMBIANO is obliged to pay to THE CONTRACTOR, by virtue of this contract, is subordinated to the corresponding PAC and to the cash liquidity of the entity.

#### 4.2 EXECUTION TERM

The term of execution is until November 10, 2020 after fulfilling the requirements of the contract execution demanded by the law.

#### 4.4 GUARANTEE

According to Article 2.2.1.2.1.4.5. of Decree 1082 of 2015 "Non-mandatory nature of guarantees", in direct contracting the requirement of guarantees is not mandatory and the justification for requiring them or not must be in the previous studies and documents.

However, and considering that it is a foreign company, compliance risks are minimized with the requirements established in the form of payment where the SERVICIO GEOLÓGICO COLOMBIANO was established.

As a complement, the risks are minimized taking into account that once the analysis of the sector was performed, it was determined which are the companies/universities recognized worldwide that provide the data services in their laboratories.

#### 4.5 EXCLUSION FROM ALL EMPLOYMENT RELATIONSHIPS

In accordance with the provisions of Article 32, paragraph 3 of Law 80 of 1993, in no case does the contract to be entered into through this selection process generate an employment relationship, or social benefits, with respect to the Contractor or the personnel that it occupies for the development of the contracted object.

#### **4.6 CONTRACT TRANSFER**

The Contractor may not assign the contract without prior and express consent of the SERVICIO GEOLÓGICO COLOMBIANO.

#### **4.7 SUPERVISOR**

The SERVICIO GEOLÓGICO COLOMBIANO, will appoint a Supervisor during the whole time of the contract execution to verify that the contract is being developed according to the technical specifications, without this supervision relieving the Contractor of his responsibility.

#### **4.8 LEGALIZATION AND EXECUTION OF THE CONTRACT**

The contract resulting from this selection process will be perfected when it is signed by the parties, within two (2) working days following the acceptance of the offer. For its execution, the corresponding budget record must be issued by the SERVICIO GEOLÓGICO COLOMBIANO.

#### **4.9 CONTRACTOR'S COSTS**

The contractor shall bear all costs relating to the payment of taxes, duties, fees and contributions caused in the development and execution of the contract or on its basis.

For all purposes, it is considered that the value of the Offer includes the amounts to be paid for taxes.

#### **4.10 CONTRACT SETTLEMENT**

In accordance with the provisions of Article 11 of Law 1150 of 2007, the term for the bilateral liquidation of the contract will be four (4) months and unilateral, in accordance with the provisions of the aforementioned law, counted from the date of termination of the contract or the issuance of the administrative act ordering the termination, in accordance with the provisions of the regulations in force governing the matter.

#### **4.11 UNILATERAL INTERPRETATION**

If, during the execution of the contract, discrepancies arise between the parties regarding the interpretation of any of its stipulations that may lead to the paralysis or serious impairment of the performance of the object of the contract, the SERVICIO GEOLÓGICO COLOMBIANO, if no agreement is



reached, will interpret the stipulations or clauses that are the object of the difference, in accordance with the provisions of Law 80/93, in a duly motivated administrative act.

#### **4.12 UNILATERAL MODIFICATION**

If during the execution of the contract and in order to avoid the paralysis or the serious affect of the fulfillment of the object of the contract it is necessary to introduce variations in the contract and if previously the parties do not reach the respective agreement, the SERVICIO GEOLÓGICO COLOMBIANO, will modify it by means of administrative act duly motivated, by means of the suppression or addition of works, works, supplies or services.

If the modifications alter the value of the contract by twenty percent (20%) or more of the initial value, the CONTRACTOR may waive the continuation of the execution. In this event, the liquidation of the contract shall be ordered and the SERVICIO GEOLÓGICO COLOMBIANO shall immediately adopt the measures that may be necessary to guarantee the termination of the object of the contract, in accordance with the provisions of Law 80 of 93 article 16.

#### **4.13 UNILATERAL TERMINATION**

The SERVICIO GEOLÓGICO COLOMBIANO, in an administrative act duly motivated, will arrange the early termination of the contract in the following events:

- a. When the requirements of the contract so require or the situation of public order so requires.
- b. Due to the death or permanent physical disability of THE CONTRACTOR, if a natural person, or due to the dissolution of the Contractor's legal entity.
- c. By judicial interdiction of THE CONTRACTOR or declaration of bankruptcy.
- d. By cessation of payments, bankruptcy or judicial liens of THE CONTRACTOR that seriously affect the performance of the contract.

The initiation of the Concordat Procedure will not result in the Declaration of Unilateral Termination. In such event the execution will be made subject to the Rules on Debtor's Business Administration in Concordat. The SERVICIO GEOLÓGICO COLOMBIANO will provide the necessary inspection, control and surveillance measures, to ensure compliance with the contractual object and prevent the paralysis of the same, in accordance with Law 80 of 1993.

#### **4.14 CONTRACT'S EXPIRY**

The Expiration, is the sanction that the SERVICIO GEOLÓGICO COLOMBIANO may impose on THE CONTRACTOR, consisting of the Termination of the Contract by means of a motivated administrative act, which orders its liquidation in the state in which it is found, if any of the facts constituting a breach of obligations occurs, which seriously and directly affects the execution of the Contract and evidences that it may lead to its paralysis.

If the SERVICIO GEOLÓGICO COLOMBIANO decides to refrain from declaring the Expiry, it will adopt the necessary Control and Intervention Measures, which will guarantee the execution of the contracted object.

The Declaration of Expiration shall not prevent the SERVICIO GEOLÓGICO COLOMBIANO from immediately continuing the execution of the contracted object through another CONTRACTOR, who in turn may be declared Expiration, when applicable.

If the Expiration is declared, there shall be no place for compensation for THE CONTRACTOR, who shall be entitled to the sanctions and disabilities provided for in the current regulations governing this matter.

#### **4.15 CONTROL OF PART OF THE COLOMBIAN GEOLOGICAL SERVICE**

The SERVICIO GEOLÓGICO COLOMBIANO will be in charge of the integral surveillance of the contract, through the supervisor, who will perform the functions described in resolution D-166 of April 4, 2014.

The CONTRACTOR shall provide the supervisor with all the necessary facilities to carry out the control and supervision of the contract and in general any other activity directly related to it.

**CHAPTER V.  
APPENDIXES**

**APPENDIX 1** - Letter of presentation of the offer

**APPENDIX 2** - Technical Specifications

**APPENDIX 3** - Economic Offer

**JUAN CARLOS MALAGON BASTO**

Secretary-General

Projected by	Wendy Jhojana Urrea Almanzar	Lawyer-Contracts and agreements group
Revised by	Rene Sotelo	Lawyer-Contracts and agreements group
Revised by	Rubiela González	coordinator-Contracts and Agreements Group
Revised by	Oscar David Cortes	Lawyer - Office of the Legal Advisor
Revised by	Diego Rivera	Lawyer - General Secretariat

**APPENDIX No.1**  
**LETTER OF APPLICATION**

Bogotá, D.C.

**SERVICIO GEOLÓGICO COLOMBIANO**

City...

**Subject:** Direct Contracting - Science and Technology No. GSC- CDP- 005- 2020 whose purpose is to "To contract the provision of sample dating services applying the Ar/Ar method, to determine the age of rocks, according to the needs and specifications provided by the SERVICIO GEOLÓGICO COLOMBIANO".

Reference: Proposal submission for:

The undersigned \_\_\_\_\_ In my capacity as legal representative of [**name of proposer**] in accordance with the conditions set out in the documents of the Direct Procurement - Science and Technology No. GSC- CDP- 005- 2020, I submit a offer for the procurement process of the subject and make the following statements:

1. That this OFFER and the contract that will be concluded only commits the signatories hereto.
2. That no entity or person other than the signatories has a commercial interest in this OFFER or the contract derived from it.
3. That we are aware of the general and special information and other documents and accept the requirements contained therein.
4. That we undertake to comply with the terms of the contract in accordance with the schedule and conditions.
5. That we know, accept and commit ourselves to comply with all the MINIMUM TECHNICAL REQUIREMENTS established in Appendix No. 2 of this document, which shall be understood as the MINIMUM TECHNICAL OFFER.
6. That, if we are awarded the contract, we undertake to sign the contract and carry out all the necessary procedures for its completion and legalisation, within the deadlines indicated in the Specifications.
7. That we are not involved in any cause of inability and incompatibility of those indicated in the Law and the Colombian Political Constitution and we are not involved in any of the events of special prohibitions to contract.
8. That in all the actions derived from the stipulations of this document and the contract that forms part of it, we will act with the transparency and morality that the Political Constitution and the Colombian laws enshrine, in attention to the Government Program for the Fight against Corruption.

9. That the proponent whom I represent is aware of and accepts the content of this contract modality and its appendixes.
10. That the term of this bid is ninety (90) calendar days.

Yours sincerely,

Name or company name of the OFFERERER \_\_\_\_\_

Name of Legal Representative \_\_\_\_\_

Business registration number \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

Telephone \_\_\_\_\_

Fax \_\_\_\_\_

e-mail \_\_\_\_\_

SIGNATURE LEGAL REPRESENTATIVE \_\_\_\_\_

## APPENDIX 2 - TECHNICAL SPECIFICATIONS

For Ar/Ar radiometric data: the following stages of analysis are required to be performed by the offering laboratories:

**Mineral separation:** perform mineral separation from rock samples according to the scheme established in each laboratory. The laboratory must select the most appropriate material for dating (mineral or matrix with sufficient K content), as well as discard the samples that cannot be dated due to their degree of alteration or low isotope content required for obtaining the ages.

**Irradiation:** Once the dateable material is concentrated, the laboratory must send the samples for irradiation in a nuclear reactor to generate  $^{39}\text{Ar}$  from  $^{39}\text{K}$  nuclear reactions. The reactor must have a properly defined and characterized irradiation position to perform this type of analysis, so as to ensure that the neutron flux with which the sample is irradiated is adequate. Similarly, the laboratory should estimate irradiation times based on the K content of the sample and the preliminarily estimated age. Samples should be submitted with standard materials (monitors of known age) in order to establish the irradiation factor **J**.

**Argon extraction:** The Laboratory must extract the Ar by step-heating, preferably using the CO<sub>2</sub> laser system, however, it is left to the discretion of the Laboratory, which, under technical criteria, prefers to use oven heating. In any case, the methodology followed should be reported to the SERVICIO GEOLÓGICO COLOMBIANO.

**Isotope measurement by mass spectrometry:** Most of the samples that need to be dated by the Ar/Ar method correspond to metamorphic rocks (hornblende neisses, amphibolites, biotite shales, among other lithologies), in which the minerals to be dated constitute their main component. These rocks possibly generate ages between Paleozoic and Mesozoic.

On the other hand, volcanic samples (which represent a smaller proportion of the required samples) are likely to generate Miocene-Pleistocene ages. Such compositional conditions and in relation to the predictable age range allow flexibility in choosing between a multi-collector or a single-collector mass spectrometer.

**Data reduction, age calculation and reporting:** During the analytical session, argon isotopes should be corrected for isotope interference reactions derived from Ca, Cl and K, as well as for the presence of  $^{40}\text{Ar}$  in the atmosphere. The Laboratory should perform data reduction and age calculation according to its established protocol. In any case, the Laboratory shall provide data tables in Excel format with the results of the argon measurements, the ages (plateau age, total fusion, normal isochronous and inverse

isochronous), the graphical outputs of the ages obtained (plateau diagram by step heating, K/Ca diagram and isotope correlation diagrams), and any other information handled within its standards.

In cases where, after preparation of the samples, they are not suitable for dating, the SERVICIO GEOLÓGICO COLOMBIANO will pay the value of the preparation made in each case, for which the contractor must report the cost of preparing the sample, which in no case may exceed 40% of the value resulting from the arithmetical operation of dividing the total value of the contract by the quantity of sample offered.

#### **OBLIGATIONS OF THE SERVICIO GEOLÓGICO COLOMBIANO**

- (a) Send the samples by registered mail to the Contractor.
- (b) Send the samples to the Contractor duly marked, labelled and packaged.
- (c) Provide specific information for each of the samples sent regarding their location, stratigraphic location or relative age range.
- (d) Provide such information as the Contractor may require in relation to the subject matter of this contract.
- (e) Make payments in accordance with the terms of the Contract.

#### **SPECIFIC OBLIGATIONS OF THE CONTRACTOR.**

- a) To comply with the object of this contract.
- b) To carry out the procedure established in the technical specifications.
- (c) The proposing laboratory must specify in its results the cases in which the samples were not suitable for dating.
- (d) Keep confidential all the SERVICIO GEOLÓGICO COLOMBIANO'S information to which the contractor has access in the course of the contract and may not use it or disclose it to third parties.
- (e) In the event of any contingency or unforeseen event, or if the maintenance of the equipment in the laboratory or the availability of the Nuclear Reactor results in a stoppage of the process, the contractor must notify the SERVICIO GEOLÓGICO COLOMBIANO within two (2) days in order to take the necessary decisions.

#### **The following products must be delivered:**

A report containing the following information must be submitted for each batch of Ar/Ar data samples:

- 1) A technical report, in digital format (PDF), containing the following

- Indicate the sample preparation processes, including processes of crushing, separation and washing of the datable material. The Laboratory must specify for each sample the material analyzed (mineral, total rock or matrix), and indicate whether or not the separation of the minerals was successful. When a mineral is dated, indicate the size range of the crystals analyzed.

- Specify the conditions of irradiation of the samples (nuclear reactor and position in which they were irradiated, time of irradiation, irradiation monitors used). Additionally, you must include specifications on the calculation of the irradiation factor (**J**).
- Indicate the conditions and routine of the argon extraction experiments (extraction temperature in degrees Celsius or power in watts if heated by laser) as well as the conditions of the instrument.
- Describe the specifications of the mass spectrometer(s) used for the analysis. You must indicate the date of the last preventive maintenance and the name of the entity in charge.
- Describe the method of data reduction and age calculations, including the value of the decay rate used for data correction. In case of straight isochrones, include the equations used for the calculation of slopes
- Any other information that is established by Laboratory standards.

2) A summary table with general information on the sample, the resulting ages with a reported 2-sigma uncertainty, and a short interpretation of the results. The table should be provided in Excel format.

3) The Laboratory should provide for each sample the extended results table, with the results of the argon measurements, the ages (plateau age, total fusion, normal isochronous and inverse isochronous), the graphical outputs of the ages obtained (plateau diagram by step heating, K/Ca diagram and isotope correlation diagrams), and any other information that it handles within its standards. In case of obtaining straight isochrones, include the equations used for the calculation of the slopes. Data tables should be submitted in Excel format.

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**LEGAL REPRESENTATIVE**



**APPENDIX 3 - FINANCIAL OFFER  
DATING BY THE Ar/Ar METHOD**

Here, we present economic offer within the present process, which has the purpose of "To contract the provision of sample dating services applying the Ar/Ar method, to determine the age of rocks, according to the needs and specifications provided by the SERVICIO GEOLÓGICO COLOMBIANO".

<b>ELEMENT</b>	<b>QUANTITY OF SAMPLES TO BE ANALYSED OFFERED</b>	<b>ESTIMATED TOTAL BUDGET</b>
Dating by the Ar/Ar method.		<b>\$ 136.917.913</b>

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**LEGAL REPRESENTATIVE**