SECOND AMENDMENT AND RESTATEMENT AGREEMENT to the mRNA VACCINE TECHNOLOGY TRANSFER AGREEMENT

THIS SECOND AMENDMENT AND RESTATEMENT AGREEMENT TO THE mRNA VACCINE TECHNOLOGY TRANSFER AGREEMENT, as amended on 22 August 2024, (this "**Amendment**") is made as of 11 March 2025 (the "**Amendment Effective Date**")

BETWEEN:

THE MEDICINES PATENT POOL FOUNDATION, a non-profit foundation registered under the laws of Switzerland, and having a principal place of business at Rue de Varembé 7, CH-1202 Geneva ("**MPP**"); and

THE BIOLOGICALS AND VACCINES INSTITUTE OF SOUTHERN AFRICA, a company incorporated under the laws of South Africa and having its registered office at 15 Alexandra Road, Pinelands, 7405, Cape Town, South Africa ("**Biovac**"),

with the MPP and Biovac, collectively referred to as the "**Parties**".

RECITALS

WHEREAS, MPP and Biovac entered into an mRNA Vaccine Technology Transfer Agreement dated 04 August 2022 (the "**Agreement**") as part of the mRNA Technology Transfer Programme, based on which MPP will enable the transfer to Biovac of a technology developed by Afrigen for the manufacture of mRNA-based vaccines, and **Biovac** is willing and able to receive this technology, and in return, is willing to make certain commitments as to what **Biovac** will do with such technology;

WHEREAS, MPP and Biovac entered into an agreement on 22 August 2024 to amend and restate the Agreement ("**First Amendment**");

WHEREAS, MPP and Biovac wish to further amend and restate the Agreement to (i) amend Annex 1, Annex 2 , Annex 3, Annex 5 and Annex 6 of the Agreement, and (ii) make other amendments to the Agreement; and

NOW THEREFORE, based on the foregoing premise and in consideration of the mutual covenants and obligations contained herein and other good and valuable consideration, the receipt, adequacy, and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

AGREEMENT

1. **Definitions.** All capitalized terms not otherwise defined herein shall have the meanings assigned to them in the Restated Agreement.

2. **Amendment and Restatement.** The Agreement is, with effect from the Amendment Effective Date, amended to take the form set out in Schedule 1 to this Amendment, which restates the Agreement as amended by this Amendment (the "**Restated Agreement**").

3. **General.**

   3.1. **Amendments.** No provision of this Amendment may be modified or amended except expressly in writing signed by both Parties.

   3.2. **Governing Law and Jurisdiction.** The provisions of Section 17 (*Governing Law and Jurisdiction*) of the Restated Agreement are hereby incorporated into this Amendment as if set out herein.

   3.3. **Counterparts.** This Amendment may be executed in any number of counterparts, and by the Parties on separate counterparts, but shall not be effective until each Party has executed at least one

counterpart. Each counterpart shall constitute an original of this Amendment, but all the counterparts shall together constitute but one and the same instrument.

IN WITNESS WHEREOF the Parties have executed this Amendment by their duly authorised officers.

Signed for and on behalf of:

THE MEDICINES PATENT POOL FOUNDATION

Signature: DocuSigned by: Charles Gore 4713D0F59C13482...

Name: **Charles Gore**

Position: **Executive Director**

Date: 11 March 2025

Signature: DocuSigned by: Marie-Paule Kieny 331D2E7893C949A...

Name: **Marie-Paule Kieny**

Position: **Chair of the Board**

Date: 11 March 2025

Signed for and on behalf of:

BIOVAC

Signature : DocuSigned by: Morena Makhoana 879E633E5DFF4CF...

Name: **Morena Makhoana**

Position: **Chief Executive Officer**

Date: 13 March 2025

SCHEDULE 1
Restated Agreement

mRNA VACCINE TECHNOLOGY TRANSFER AGREEMENT

THIS mRNA VACCINE TECHNOLOGY TRANSFER AGREEMENT (this "**Agreement**") is made as of 04 August 2022 (the "**Effective Date**"), as amended on 22 August 2024, and is amended and restated on 11 March 2025 ("**Amendment Effective Date**").

BETWEEN:

THE MEDICINES PATENT POOL FOUNDATION, a non-profit foundation registered under the laws of Switzerland, and having a principal place of business at Rue de Varembé 7, CH-1202 Geneva ("**MPP**"); and

THE BIOLOGICALS AND VACCINES INSTITUTE OF SOUTHERN AFRICA, a company incorporated under the laws of South Africa and having its registered office at 15 Alexandra Road, Pinelands, 7405, Cape Town, South Africa ("**Biovac**"),

with the MPP and Biovac collectively referred to as the "**Parties**".

WHEREAS, MPP, in collaboration with the World Health Organization ("**WHO**"), has established the mRNA Technology Transfer Programme with the aim to establish or enhance sustainable mRNA vaccines manufacturing capacity in low- and middle-income countries ("**LMICs**"), in particular to improve the ability of such countries to better respond to the COVID-19 pandemic and other future pandemics;

WHEREAS, MPP has engaged with Afrigen Biologics (PTY) LTD ("**Afrigen**") to develop an mRNA technology platform for deployment into LMICs for this purpose;

WHEREAS, MPP has secured contractual commitments from Afrigen to transfer the technology of such mRNA technology platform to selected recipients;

WHEREAS, MPP has obtained sublicensable rights to Afrigen intellectual property, Know-How and data;

WHEREAS, Biovac has been identified by WHO as a suitable recipient of the mRNA technology platform;

WHEREAS, Biovac is willing and able to receive this technology, and in return, willing to make certain commitments as to what Biovac will do with such technology; and

WHEREAS, MPP is willing to provide financial support to Biovac to further develop this technology and have Biovac make additional technology transfers available to additional recipients as selected by WHO;

NOW THEREFORE in consideration of the covenants and obligations expressed in this Agreement, and intending to be legally bound, the **Parties** agree as follows:

1 DEFINITIONS

1.1 "**Affiliate**", in relation to an entity, shall mean any corporation, firm, partnership or other entity which is directly or indirectly controlled by, in control of, or under common control with such entity. For the purposes of this definition, "**control**" shall mean the ability of any corporation, firm, partnership or other entity, whether through ownership of shares or otherwise, to procure that the affairs of an entity are conducted in accordance with the wishes of such corporation, firm, partnership or other entity.

1.2 "**Afrigen Rights**" shall mean the sublicensable rights to data, Know-How and IP that was granted from Afrigen to MPP under the MPP-Afrigen Grant Agreement dated 21 January 2022, as amended from time to time.

1.3 "**Confidential Information**" shall mean all information that would reasonably be regarded as, or is designated as, of a confidential or commercially sensitive nature by the person to which the information relates including, without limitation, the Know-How and any matter relating to, or arising in connection with, this Agreement or the business or affairs of any of the Parties or any of their Affiliates, as amended from time to time.

1.4 "**Cost of Production**" shall mean the total of the following:

(a) raw material costs

(b) raw material wastage

(c) packaging material costs

(d) packaging material wastage

(e) costs of quality control testing

(f) transport costs

(g) warehousing at the request of WHO or the Public Sector Agency

(h) direct energy costs in production

(i) direct labour costs

(j) direct labour-related overheads

(k) amortization on capital investment provided by the Company:

(l) allocable portion of building used in connection with the production of the Product, over a period of 25 years.

(m) machinery or related equipment used in the production of the Product over a period of 5 years.

(n) fixed overheads for the manufacturing site

(o) allocable general and administrative costs

(p) other financial charges as specifically applicable to the sale of the Product

(q) interest charges on investment in the production and sale of the Product

(r) research and development costs directly attributable to the production of the Product

1.5 "**Event of Force Majeure**" shall have the meaning given in Section 12.

1.6 "**Facility**" shall mean the area in the Biovac premises where the intended transferred technology will be operationalized, unless the context requires otherwise.

1.7 "**Funded Project**" shall mean the Biovac activities described in the Scope of Work and financed by the Budget described in Annex 6.

1.8 "**Funders**" shall mean Third Parties that provide financial support to the Project or Funded Project, either through MPP or directly to **Biovac**.

1.9 "**Inventions**" shall mean all ideas, inventions, discoveries, data or Know-How conceived, first created or made in the performance the Project.

1.10 "**IP**" shall mean any and all rights in or to intellectual property, whether subsisting now or in the future, anywhere in the world, whether registered or not, including any and all rights in or to patents, supplementary protection certificates, utility models, rights to inventions, copyright and neighbouring and related rights, trade marks, business names and domain names, rights in get-up and trade dress, goodwill and the right to sue for passing off, rights in designs, rights in computer software, database rights, rights to use, and protect the confidentiality of, confidential information (including Know-How), any other rights and other rights of a similar nature, in the case of each of the foregoing, including all applications, and rights to apply, for registration, renewals or extensions, reissues, divisions, revisions, renewals, extensions, provisionals, continuations and continuations-in-part.

1.11 "**Know-How**" shall mean any and all confidential and proprietary information and materials, discoveries, processes, methods, protocols, formulas, molecular constructs, reagents, assays, data, results, inventions, improvements, trade secrets, compositions of matter (including compounds), formulations, and findings, in each case, patentable or otherwise, and including any copyrights therein.

1.12 "**Materials**" shall mean the materials described in Annex 2.

1.13 "**Product(s)**" shall mean any product developed by Biovac which receives Regulatory Approval by a Relevant Regulatory Authority, and which is entirely or partially based on the Technology.

1.14 "**Programme Agreement**" shall mean any other agreement entered into between **MPP** and a Third Party as part of the Project under which **MPP** is granted rights to data, Know-How or IP for further sublicensing.

1.15 "**Project**" shall mean the mRNA Technology Transfer Programme.

1.16 "**Public Sector Agency**" shall mean: (a) the following organisations to the extent that they are not for profit organisations: (i) Governments including without limitation government ministries and agencies, together with government-funded institutions and programs, such as state-run hospitals and prison services in those countries; (ii) NGOs including without limitation those recognized by the applicable local government ministry; (iii) UN-related organizations working for or in those countries, including but not limited to WHO, UNDP, PAHO and UNICEF; (iv) Not-for-profit organizations including without limitation, Médecins Sans Frontières, Save-the-Children, OXFAM and the International Committee of the Red Cross (ICRC); (v) Funding mechanisms and programs funded by such mechanisms, including without limitation, UNITAID, PEPFAR, USAID, Global Fund, GAVI, AVAT, etc.; and agencies based outside of an applicable country to the extent that they are supporting implementation locally in an applicable country, and (b) nominally for profit procurement organisations but only to the extent that such procurements are supporting not-for-profit treatment programmes as described in (a) of this Section.

1.17 "**Regulatory Approval**" shall mean the receipt of a marketing authorisation associated with that Product in a country.

1.18 "**Relevant Regulatory Authority**" shall mean (i) in relation to a particular country in the Territory, any applicable federal, national, regional, state, provincial, or local regulatory agencies, departments, bureaus, commissions, councils or other government entities regulating or otherwise exercising authority with respect to the Products in that country, or (ii) WHO pre-qualification programme where such approval has been deemed adequate by the authority referred to in (i).

1.19 "**Scope of Work**" shall mean the scope of work set out in Annex 5.

1.20 "**Technical Assistance**" shall mean the assistance detailed in Section 2.4 of this Agreement.

1.21 "**Technical Information**" shall mean the documentation listed in Annex 3 and Annex 4 detailing technical specifications and instructions for manufacturing and testing the selected mRNA vaccine candidate. Such Technical Information shall be transferred to Biovac (Annex 3) or provided by Biovac (Annex 4) written in the English language and in a single copy.

1.22 "**Technology**" shall mean Materials, Technical Information and Technical Assistance.

1.23 "**Technology Transfer**" shall mean a logical procedure that controls the transfer of any process together with its documentation and professional expertise from development to manufacture or between manufacturing sites. It is a systematic procedure that is followed in order to pass the documented knowledge and experience gained during development and or commercialization to an appropriate, responsible and authorized party. Technology transfer embodies both the transfer of documentation and the demonstrated ability of Biovac, to effectively perform the critical elements of the transferred technology, to the satisfaction of all parties and any applicable regulatory bodies. The specific contents of the Technology Transfer to Biovac are detailed in Annex 3 (Technical Information, Technical Assistance, Materials), and the specific contents of the Technology Transfer Technical Information that Biovac will generate is detailed in Annex 4.

1.24 "**Technology Transfer Package 1**" shall have the meaning described in Annex 3.

1.25 "**Technology Transfer Technical Information Package 2**" shall have the meaning described in **Annex 4**.

1.26 "**Territory**" shall mean all low- and middle-income countries, as defined by the World Bank.

1.27 "**Third Party(ies)**" shall mean any party other than a **Party** to this Agreement.

2 TECHNOLOGY TRANSFER

2.1 MPP will cause the Technology Transfer to be conducted in accordance with the roadmap as described in Annex 1. The Technology Transfer to Biovac will comprise of Technology Transfer Package 1, as described in Annex 3, called *"mRNA technology for R&D",* which will be provided by Afrigen and includes a documentation package and a technology platform hands-on demonstration training at Afrigen. Content of Technology Transfer Package 1 will be made accessible to Biovac as soon as information is available. The Parties will meet and confer following the Effective Date to agree on a Technology Transfer Plan setting out the timeline for the delivery of Technical Transfer Package 1, as well as detailing actions, reporting, deliverables, and success criteria linked to the Technology Transfer (the "**Technology Transfer Plan**").

Before Technology Transfer activities take place, Biovac will access an introduction to the mRNA technology training provided by Afrigen (timelines to be agreed upon between the Parties) and associated training material (Introduction to the mRNA Technology Package).

2.2 The Parties acknowledge that the timelines agreed in a Technology Transfer Plan are of paramount importance for planning purposes. In the event that the agreed timelines of any section of a Technology Transfer Plan changes after being agreed between the Parties, for any reason whatsoever including an Event of Force Majeure, the Parties agree to meet and discuss the potential changes and how it can be accommodated within any commercial obligations or other commitments which a Party may have towards a Third Party. While every reasonable effort will be made to accommodate changes to agreed timelines, the Parties agree and acknowledge that this cannot be guaranteed. If any amended timelines cannot be met by either Party, the Parties undertake to apply commercially reasonable efforts to continue the Project on amended timelines as soon as feasible.

2.3 The Technology Transfer of Technology Transfer Package 1 shall be considered complete by the Parties when Biovac has implemented the Technology and the Parties are satisfied that the production of the selected mRNA vaccine candidate meets the requirements outlined in the Technology Transfer Plan.

2.4 As part of Technology Transfer Package 1, MPP will, on dates to be agreed to by the Parties, cause Afrigen to provide Technical Assistance to Biovac, as follows:

(a) Training at Afrigen's site by sending qualified Biovac personnel to Afrigen's site for training on documentation and manufacturing process and analytics.

(b) Respond in a reasonable timeframe to any query concerning the Technology Transfer Package 1 that might arise during and after the on-site training.

(c) Should any additional on-site Technical Assistance (e.g. on-site assistance of Afrigen personnel at the Biovac Facility, additional on-site training at Afrigen) be requested by Biovac beyond Sections 2.4(a)-(b), Biovac shall bear all allowance, travel and accommodation expenses incurred.

2.5 Any additional services associated therewith and the means of delivery thereof not provided for in this Agreement shall, as the need for same arises i.e. assist in data analysis, non-routine investigations, be negotiated for and agreed to by the Parties in writing, prior to implementation thereof.

3 OBLIGATIONS OF MPP

MPP undertakes to:

3.1 Work with WHO to assess Biovac capabilities and identify actions and deliverables for the Technology Transfer to Biovac to proceed, as well as to convene appropriate expertise to support Technology Transfer to Biovac, as feasible and may be necessary.

3.2 Ensure Biovac is provided with the Technology reasonably necessary to fulfil the transfer of Technology Transfer Package 1, as contemplated in Annexes 1 and 3 herein.

3.3 Work with WHO to facilitate the strengthening of the Relevant Regulatory Authority as may be required in the Territory to enable Regulatory Approval of the vaccine and facilitate WHO pre-qualification.

3.4 Provide IP analysis on the Technology, as practicable and appropriate, and endeavour to provide better visibility on freedom to operate analyses in the Territory.

3.5 Monitor the activities of Biovac and the parties to other Programme Agreements to ensure good coordination and facilitate the sharing of data, Know-How and IP as provided for in this Agreement and other Programme Agreements.

3.6 In consultation with WHO, design and draft any further governance or technology transfer documents and provide on-going technical support as necessary and as feasible to fulfil the objectives of the Agreement within the agreed timeframes.

4 OBLIGATIONS OF BIOVAC

Biovac undertakes to:

4.1 Exercise due diligence in performing the actions and deliverables presented in the roadmap in Annex 1 and detailed in the Scope of Work (Annex 5) and the Technology Transfer Plan.

4.2 Provide technical reports to MPP detailing the progress made towards achieving the milestones defined in the Scope of Work. Biovac agrees that such reports will be treated as Confidential Information, but that they will be shared with WHO and any other Third Party as may be agreed between the Parties under confidentiality obligations no less stringent than contained in this Agreement.

4.3 Conduct any facility upgrades, equipment procurement and qualification, receive applicable approvals from the Relevant Regulatory Authority and perform any other activity necessary to ensure that the Facility is fit for the purposes for applying the Technology at the time of Technology Transfer.

4.4 Ensure that all Biovac personnel involved with the Technology Transfer be sufficiently qualified to as to ensure an efficient and effective transfer of the Technology.

4.5 Following the completion of Technology Transfer Package 1 from Afrigen as per the criteria outlined in Annex 3, perform all activities detailed in the Scope of Work (Annex 5) and the Technology Transfer

Plan in order to provide MPP with the Technology Transfer Technical Information Packages 2a and 2b (Annex 4).

4.6 In the event that Biovac develops and commercialises a Product that is responsive to a Public Health Emergency of International Concern as declared by WHO, to as soon as practically possible make available no less than ten percent of its real-time production capacity of Product for WHO and/or Public Sector Agencies at a price to be negotiated in good faith, but in no event to exceed its Cost of Production plus a twenty percent mark-up.

4.7 In the event that Biovac uses the Technology to commercialise a Product, file for WHO Pre-Qualification or Emergency Use Listing, if available and appropriate.

4.8 Allow the presence of Afrigen personnel at Biovac, as nominated and mutually agreed between the Parties and for a period as described in the Technology Transfer Plan, to ensure the technology is successfully transferred to Afrigen and subsequent manufacturing and analytical processes knowledge transfer to subsequent receiving units happens smoothly.

4.9 Respond within a reasonable timeframe to any query concerning any component of the Technology Transfer Technical Information Package 2 (Technology Transfer Technical Information Package 2a and/or Technology Transfer Technical Information Package 2b) that might arise during subsequent technology transfers to other receiving units in the mRNA Technology Transfer Programme.

4.10 Additional services may be negotiated and agreed upon before implementation.

4.11 Comply with all terms of the Grant Agreement between MPP and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) dated 15 December 2023 ("GIZ Agreement") as contained in Annex 8 of this Agreement as if it was MPP under that GIZ Agreement, where relevant. Biovac acknowledges that the funds received from MPP under this Agreement partially derive from the GIZ Agreement.

5 PROJECT MANAGEMENT

The Parties will form a joint project management committee (the "**Project Committee**") to oversee and facilitate the implementation and execution of the Project, to receive and review technical reports, and to review proposed changes to the Project scope, timeline and/or Budget. Each Party will have the right to designate its representatives (which may be consultants or advisers subject to the relevant terms and conditions set out herein) to the Project Committee and may replace its representatives upon notice to the other Party. The Project Committee may meet virtually or in person at mutually agreeably times and locations. All decisions at the Project Committee shall be taken unanimously. In the event the consensus cannot be reached, the matter shall be submitted to the executive director of each Party and in case the issue remains unsolved for 3 months from its first referral, the matter shall be resolved in accordance with Section 17.

6 GRANT PAYMENT AND USE OF FUNDS

6.1 Subject to the terms and conditions of this Agreement, and Biovac's compliance therewith, MPP will fund Biovac for performing the Funded Project in accordance with the approved budget attached as Annex 6 ("**Budget**"). The maximum amount hereunder shall not exceed the amount of 287 M ZAR. Subject to Section 10.2, MPP shall have the right to increase or decrease the total amount of the grant in accordance with the needs and the performance of the Funded Project.

6.2 The funds provided under this Agreement are to be spent by Biovac exclusively in accordance with the Budget. Biovac shall have the right to perform Budget revisions on a quarterly basis. Biovac shall request MPP's prior written approval if there is a variance of +/- 10% between the main budget categories. Any request for Budget modification must include sufficient documentation to justify such request. For the avoidance of doubt, no Budget revision or variance of the Budget'categories that is permitted under this Section 6.2 shall result in Biovac spending in excess of the total Grant. Any overspending on Budget

will be at the cost of Biovac, unless otherwise agreed between the Parties.

6.3 MPP shall make payments of the grant hereunder on a quarterly basis upon receipt of collectively the following:

(a) the disbursement request from Biovac based on the Project requirements ("**Disbursement Request**"), plus an estimated rolling advance of one month.

(b) financial report in accordance with this Agreement regarding the previous payment, showing the extent of the previous payment spent in accordance with the Budget.

(c) satisfactory technical report in accordance with Section 4.2.

6.4 MPP shall pay the amounts in accordance with each Disbursement Request within 30 days from its receipt via a bank transfer to the Biovac account set forth in Annex 6.

6.5 Biovac will submit to MPP quarterly financial reports in the format as indicated in Annex 6, and:

(a) be sent within 10 working days after the end of each calendar quarter;

(b) be issued in ZAR currency;

(c) contain the comparison between the actual spending versus the budgeted amounts;

(d) be certified as complete and accurate by an authorized official of Biovac for the activities performed; and

(e) be sent to the address set forth in Annex 6.

6.6 In addition to quarterly financial reports under this Agreement as per Section 6.5, Biovac shall provide to MPP:

(a) by no later than 20 January of each year, a letter relating to MPP's preceding financial year (i.e., ending 31 December) which includes:

i. MPP's open position as of 31 December; and

ii. a detailed summary of expenditures incurred by Biovac, by nature of expense, during the period from 1 January to 31 December; and

(b) by no later than 15 April of each year:

i. an "agreed-upon procedures report" on grant funding requirements based on a procedure mutually agreed between MPP and Biovac; and

ii. a questionnaire, in a format to be provided by MPP, regarding the use of funds under this Agreement. Such questionnaire shall be signed by an auditor mutually agreed upon by the Parties.

6.7 Biovac shall submit a final audited statement of cumulative costs incurred marked "FINAL" to MPP no later than 60 days after completion or termination of the Funded Project. The final statement of costs shall constitute the final financial report of Biovac. All payments hereunder shall be provisional and subject to adjustment within the total estimated cost under this Agreement in the event such adjustment is the result of a finding against Biovac pursuant to Section 6.13.

6.8 Biovac acknowledges and agrees that the Grant is provided to Biovac solely for the purposes of Biovac performing the activities set out in the Scope of Work. Biovac shall enter into the necessary sub-agreements and perform the necessary administrative activities to ensure the performance of the

activities set out in the Scope of Work. Biovac shall not use the Grant to perform activities outside the Scope of Work unless as otherwise agreed to in writing by the Parties.

6.9 During the Project, Biovac shall use the equipment, materials or goods, purchased or generated with the Grant primarily for the purpose of the Project. Biovac may use such equipment, materials or goods for purposes other than the Project provided that such use does not interfere with, compete with or delay the Project. If MPP reasonably suspects or becomes aware that Biovac's use of such equipment, materials or goods has interfered with, competed with or delayed the Project, upon the request of MPP, Biovac shall promptly provide MPP with documentary evidence demonstrating such has not occurred or such has been remedied.

6.10 Title to any equipment, materials or goods purchased or generated with the Grant shall vest in Biovac provided Biovac uses such in accordance with Section 6.9. Notwithstanding any other provision in this Agreement, if Biovac does not use such equipment, materials or goods in accordance with Section 6.9, MPP may direct Biovac to sell, donate or otherwise transfer such equipment, materials or goods, and reimburse MPP the fair market value of such, if applicable.

6.11 Without limiting Section 6.10, subject to MPP's prior written consent, during or after the Project, Biovac may:

(a) replace or substitute any equipment, materials or goods purchased or generated with the Grant with new or improved equipment, material or goods; or

(b) sell, donate or otherwise transfer any equipment, materials or goods purchased or generated with the Grant, and reimburse MPP the fair market value of such equipment, materials or goods, if applicable.

6.12 Biovac shall maintain supporting documentation for all costs associated with the Funded Project, including records substantiating time and/or percentage of effort for all salaries paid or funds expended with funds provided under this Agreement. All records and documentation related to this Agreement shall be maintained in accordance with applicable laws and regulations and generally accepted accounting principles for a period of five years from completion of the Funded Project.

6.13 MPP or its authorized representative shall have the right to review and audit all costs alleged to have been incurred hereunder and those records required by Section 6.12 at agreed upon times and locations. Biovac shall provide MPP with copies of any audit report which presents any instance of noncompliance with laws or regulations relating to the performance or administration of this Agreement. Biovac shall also provide copies of any response to any such report and a plan for corrective action. Biovac shall maintain a separate accounting cost code specific to this grant, and all costs and income properly relating to this grant shall be accounted for through that cost code. Biovac shall ensure that appropriate records are kept supporting the entries made on the cost code.

7 GRANT OF LICENCE AND INTELLECTUAL PROPERTY

7.1 Subject to the terms and conditions of this Agreement MPP hereby grants to Biovac:

(a) a non-exclusive, royalty-free, non-sublicensable, non-transferable, irrevocable, fully paid-up, royalty-free licence under the Technology and the Afrigen Rights to make, or have made, use, offer for sale, sell, have sold, export or import Product(s) in the Territory.

(b) as necessary, a non-exclusive, royalty-free, non-sublicensable, non-transferable, irrevocable, fully paid-up, royalty-free licence under any Inventions to which MPP has or will acquire sublicensable rights from other Programme Agreements to make, or have made, use, offer for sale, sell, have sold, export or import Product(s) in the Territory.

7.2 Biovac grants to MPP a non-exclusive, non-transferable but sublicensable, irrevocable, fully paid-up, royalty-free, licence to practice and have practiced the data and the Inventions for the purposes of fulfilling its mission to facilitate the development and equitable access of health technologies in the

Territory. In the event that MPP wishes to make such Inventions available for other purposes, MPP and Biovac will enter into good-faith negotiations. Biovac agrees to provide to MPP a licence in relation to any of its background rights only to the extent necessary to enable the use and exercise of the Inventions made by Biovac hereunder.

7.3 In the event that Biovac is provided with access to Third Party IP for the purposes of research, development and/or commercialization of Product(s), Biovac undertakes to use reasonable efforts to negotiate a licence to MPP for such Third Party IP under the same or similar terms as provided for in Section 7.2 herein.

7.4 MPP shall have the right to share any data generated under the Project with WHO for further sharing with any Third Parties for the purposes of fulfilling its mission to facilitate the development and equitable access of mRNA technologies in the Territory. For clarity, MPP shall also have the right to share data generated under the Project (a) with any Third Parties designated by WHO as eligible recipients of the mRNA technology platform under the Project, for the purpose of fulfilling its mission to facilitate the development and equitable access of mRNA technologies in the Territory; and (b) with any other Third Party (or Third Parties) agreed to in writing by the Parties.

8 EXCHANGE OF INFORMATION AND CONFIDENTIALITY

8.1 Subject to the terms of this Section 8, each Party shall hold the Confidential Information disclosed to it under or in connection with this Agreement in strict confidence, and shall not use such Confidential Information for any other purpose than the performance of this Agreement.

8.2 The Party that releases, exchanges, or discloses Confidential Information (the "**Disclosing Party**") shall use reasonable efforts to mark such Confidential Information as "Confidential." In the event that Confidential Information is disclosed and not so marked, the receiving Party agrees to treat such information as confidential to the extent that a reasonable person would consider such information to be confidential given the content and circumstances of the disclosure.

8.3 Neither Party shall disclose any Confidential Information received from the other Party under or in connection with this Agreement, or otherwise developed by any Party in the performance of activities in furtherance of this Agreement, except to:

(a) such of its officers, employees, agents, representatives, Affiliates, advisors, consultants, and governing bodies to whom disclosure is necessary to exercise the Party's rights or perform the Party's obligations under this Agreement and who are bound by confidentiality and non-use obligations no less onerous than those contained in this Section 8;

(b) the Funders, WHO, and/or any Third Party designated by WHO as an eligible recipient of the mRNA technology platform under the Project, where such disclosure (i) is necessary to fulfil its obligations under this Agreement or (ii) in the case of MPP only, is for the purposes of fulfilling its mission to facilitate the development and equitable access of mRNA technologies in the Territory; and

(c) any other Third Party agreed to in writing by the Parties.

8.4 The obligations in Sections 8.1, 8.2 and 8.3 shall not apply to the following as established by reasonable, written proof:

(a) information which at the time of disclosure is in the public domain; or

(b) information which, after its disclosure, becomes part of the public domain by publication or otherwise, except by breach of this Agreement; or

(c) information that a Party can demonstrate was lawfully possessed by it prior to disclosure under or in connection with this Agreement; or

(d) information that a Party receives from a Third Party which is not legally prohibited from disclosing such information; or

(e) information a Party is required by law to disclose, provided that the other Party is promptly notified of any such requirement: or

(f) information which is independently developed by the receiving Party or its Affiliates who had no knowledge of the Disclosing Party's Confidential Information.

8.5 If a receiving Party becomes obligated by law to disclose Confidential Information received under or in connection with this Agreement, or any portion thereof, to any Third Party, governmental authority or court, that Party shall immediately notify the Disclosing Party of each such requirement and identify the Confidential Information to be disclosed so that such Disclosing Party may seek an appropriate protective order or other remedy with respect to narrowing the scope of such requirement and, to the extent necessary, waive the receiving Party's compliance with the confidentiality obligations of this Agreement.

8.6 The Parties acknowledge that disclosure of any Confidential Information in breach of this Agreement could give rise to irreparable injury to the non-breaching Party and that such injury will not be adequately compensated by damages. Accordingly, the non-breaching Party shall be entitled to the remedies of specific performance and injunctive relief or other equitable relief for any threatened or actual breach of this Section 8. Such relief shall be in addition to all other remedies available to the non-breaching Party at law or in equity.

8.7 All Confidential Information shall remain the property of the Disclosing Party. In the event that a court or other legal or administrative tribunal of competent jurisdiction, directly or through an appointed master, trustee or receiver, assumes partial or complete control over the assets of a Party to this Agreement, based on the insolvency or bankruptcy of such Party (or based on any other analogous or similar status of that Party under foreign laws), the bankrupt or insolvent Party shall promptly notify the court or other tribunal:

(a) that Confidential Information remains the property of the Disclosing Party; and

(b) of the confidentiality obligations under this Agreement.

9 AUDIT

In addition to the audit rights in Section 6.13, MPP or its authorized representative will have the right to audit Biovac's compliance with Sections 4.6 and 7.2 of this Agreement. Biovac will be required to keep accurate records to allow MPP or its authorized representative to adequately conduct such audit.

10 TERM AND TERMINATION, SURVIVAL

10.1 This Agreement shall be deemed to come into effect on the Effective Date and shall continue for five years.

10.2 In the event the Funders reduce the funding for the Funded Project or the Project, the Parties will enter into good faith negotiations to determine if the Funded Project can be completed as originally anticipated or its scope must be modified. In the event of insufficient funding and the Parties cannot agree to a modified Scope of Work and Budget reasonably acceptable to the Funders, MPP may suspend this Agreement immediately. In the event of suspension of the Funded Project, Biovac will immediately cease incurring expenses and take every reasonable measure to cancel outstanding expenses. In the event Funders discontinue support of the Funded Project or Project, or if funding is reduced to the extent that MPP, in consultation with Biovac, determines it is not practicable to continue funding the Funded Project, MPP may terminate this Agreement effective immediately upon notice. In such event, to the extent funds are allowable by and available from Funders, MPP shall pay reasonable and allowable costs incurred up to and including the effective date of termination, and for reasonable and allowable non-

cancelable obligations made consistent with the Budget prior to Biovac's receipt of notice of termination.

10.3 Save as otherwise provided in this Agreement, if Biovac breaches any provision of this Agreement and if such breach is material and (i) is incapable of correction; or (ii) is capable of correction but is not corrected within thirty (30) days after Biovac receives written notice with respect to such default, MPP shall have the right to terminate this Agreement with immediate effect by giving written notice to the party in default.

10.4 Termination or expiry of this Agreement shall not affect those provisions of this Agreement which are expressly or by implication intended to survive the termination or expiration of this Agreement, including, but not limited to, Sections 4.6, 7.2, 7.3, 7.4, 8 and 9. In addition, any other provisions required to interpret and enforce the Parties' rights and obligations under this Agreement shall also survive, but only to the extent that such survival is required for the full observation and performance of this Agreement by the Parties.

10.5 Termination of this Agreement in accordance with the provisions hereof shall not limit remedies which may be otherwise available in law or equity and shall be without prejudice to any rights that any person may have pursuant to this Agreement for antecedent breaches.

10.6 Upon termination of this Agreement prior to the end of the Project and/or the Funded Project pursuant to this Section 10, Biovac shall return all funding received from MPP under this Agreement which is unspent at the date of termination (after deduction of costs and non-cancellable commitments incurred prior to the date of termination)

11 WARRANTIES, INDEMNITIES, COMPLIANCE WITH LAW

11.1 Each of the Parties warrants that, to the best of its knowledge and belief:

(a) it has power to execute and deliver this Agreement and to perform its obligations under it and has taken all action necessary to authorise such execution and delivery and the performance of such obligations; and

(b) this Agreement constitutes legal, valid and binding obligations of that Party in accordance with its terms.

11.2 Except as otherwise expressly provided in this Agreement, MPP does not make any representations or warranties, express or implied with respect to the Technology or Afrigen Rights or any other matter under this Agreement, including, without limitation, any express or implied warranties of merchantability or fitness for a particular purpose with respect to the Technology or Afrigen Rights. Furthermore, nothing in this Agreement shall be construed as a warranty that Biovac's use of the Technology or Afrigen Rights will not infringe any patent rights or other IP rights of any Third Party. MPP does not give any warranty, express or implied, with regard to the safety or efficacy of any Product(s) and it shall be the sole responsibility of Biovac to ensure such safety or efficacy.

11.3 Except as otherwise expressly provided in this Agreement, Biovac does not make any representations or warranties, express or implied with respect to the Inventions, including, without limitation, any express or implied warranties of merchantability or fitness for a particular purpose with respect to the Inventions. Furthermore, nothing in this Agreement shall be construed as a warranty that MPP, Afrigen or any other participant in the mRNA Technology Transfer Programme's use of the Inventions or any background intellectual property of Biovac will not infringe any patent rights or other IP rights of any Third Party.

11.4 The Parties hereby agree to indemnify one another and its respective officers, directors, shareholders, representatives, agents, employees, successors and assigns (each an "**Indemnified Person**") against any and all suits, claims (whether or not successful, compromised or settled), actions, demands, proceedings, judgments, liabilities, expenses and/or losses, including reasonable legal expense and attorneys' fees

("**Losses**"), that arise in connection with (i) a Party's breach of this Agreement; or (ii) a Party's exercise of its rights pursuant to this Agreement (including for the avoidance of doubt, in respect to MPP, any product liability claim relating to the Product(s) manufactured by or on behalf of Biovac), provided that the indemnification obligation established in this Section 11.4 shall not apply to the extent such Losses arise out of negligence or wilful misconduct by the other Party and its respective officers, directors, shareholders, representatives, agents, employees, successors and assigns. No Party shall be liable to the other Party for any indirect, incidental, consequential, reliance or special damages, including a loss of profit, in connection with this Agreement for any reason whatsoever and howsoever arising. Each Party undertakes to provide the other Party with prompt written notice of a claim under this Section 11.4. The Parties will agree on the appropriate Party to assume control of the defence or negotiation of settlement and will agree to make available all reasonable assistance in defending any claims.

11.5 Biovac represents and warrants that it respects the human rights of its staff and does not employ child labor, forced labor, unsafe working conditions, or cruel or abusive disciplinary practices in the workplace and that it does not discriminate against any workers on any ground (including race, religion, disability, gender, sexual orientation or gender identity) and aims to achieve greater equity along those lines in the workplace; and that it pays each employee at least the minimum wage, provides each employee with all legally mandated benefits, and complies with the laws on working hours and employment rights in the countries in which it operates.

11.6 Biovac commits to contribute to an inclusive manufacturing sector by ensuring adequate gender responsiveness and to empower women as key players, including promoting women in decision-making and leadership positions. Biovac will emphasize and demonstrate that manufacturing is a fulfilling career choice for women, with ample opportunities, and thereby encourage more women to participate in the sector; provide opportunities for women living in marginalized communities to participate in the manufacturing sector and compete in the marketplace, through proactively targeting those communities; and encourage involved countries to increase health and health security for women living in marginalized communities through ensuring availability of health products in populations which would otherwise not be reached.

11.7 Biovac shall be respectful of its employees' right to freedom of association and shall encourage compliance with the standards referred to in Sections 11.5 and 11.6 by any supplier of goods or services that it uses in performing its obligations under this Agreement, subject to any legislation in a territory where it operates.

11.8 Biovac shall comply fully at all times with all applicable laws and regulations, including but not limited to any Product's safety, pharmacovigilance, anti-corruption laws, and that it has not, and covenants that it will not, in connection with the performance of this Agreement, directly or indirectly, make, promise, authorise, ratify or offer to make, or take any act in furtherance of any payment or transfer of anything of value for the purpose of influencing, inducing or rewarding any act, omission or decision to secure an improper advantage; or improperly assisting in obtaining or retaining business, or in any way with the purpose or effect of public or commercial bribery, and warrants that it has taken reasonable measures to prevent subcontractors, agents and any other Third Parties, subject to its control or determining influence, from doing so.

11.9 Biovac shall manufacture and sell any Products in accordance with all laws and regulations relevant to the manufacture and sale of the Products and in accordance with good industry practice.

11.10 Biovac hereby makes the declarations and guarantees set out in Annex 7 (Specific Donor's Requirements) and undertakes to comply with the obligations therein.

12 FORCE MAJEURE

If the performance of any part of this Agreement by any Party, or of any obligation under this Agreement (other than those provisions which in any respect concern the payment under any indemnity or otherwise under this Agreement) is prevented, restricted, interfered with or delayed by reason of any cause beyond the reasonable control of the Party liable to perform (an "Event of Force Majeure"),

unless conclusive evidence to the contrary is provided, the Party so affected shall, upon giving written notice to the other Party, be excused from such performance to the extent of such prevention, restriction, interference or delay, provided that the affected Party shall use its reasonable endeavours to avoid or remove such causes of non-performance and shall continue performance with the utmost dispatch whenever such causes are removed. If the Event of Force Majeure continues for a period of more than six (6) months, any Party not prevented, restricted, interfered with or delayed or otherwise in terms of performance may terminate this Agreement by providing a written termination notice to the other Party. Without limitation as to the possible types of Event of Force Majeure, an epidemic, pandemic, government collapse, government-imposed isolation or government- imposed quarantine shall be capable of constituting an Event of Force Majeure, provided that the elements of the definition of that term specified in this Section 12 are satisfied.

13 SEVERABILITY

13.1 In the event that any portion of this Agreement is or is held by any court or tribunal of competent jurisdiction to be illegal, void, unenforceable or ineffective, the remaining portions hereof shall remain in full force and effect.

13.2 If any of the terms or provisions of this Agreement are in conflict with any applicable statute or rule of law, then such terms or provisions shall be deemed inoperative to the extent that they may conflict therewith and shall be deemed to be modified to the minimum extent necessary to procure conformity with such statute or rule of law.

14 ENTIRE AGREEMENT

14.1 This Agreement constitutes the entire agreement between the Parties relating to the subject matter hereof and supersedes all previous writings and understandings between the parties relating to the transactions contemplated by this Agreement.

14.2 Each Party acknowledges that in entering into this Agreement it has not relied on any representation, warranty, collateral contract or other assurance (except those set out in this Agreement) made by or on behalf of any other party before the date of this Agreement. Each Party waives all rights and remedies which, but for this Section, might otherwise be available to it in respect of any such representation, warranty, collateral contract or other assurance.

15 NO PARTNERSHIP OR AGENCY

Nothing in this Agreement shall be deemed to constitute a partnership between the Parties, nor constitute either Party as the agent of the other Party.

16 EXECUTION

This Agreement may be executed in any number of counterparts, each of which shall be deemed an original but all of which together shall constitute one and the same instrument. For the convenience of the Parties, an executed copy of this Agreement may be transmitted by email in portable document format (PDF), and such .pdf file shall be deemed equivalent to an original.

17 GOVERNING LAW AND JURISDICTION

17.1 This Agreement and any non-contractual obligations arising out of or in connection with it shall be governed by the laws of Switzerland.

17.2 All disputes arising out of or in connection with this Agreement shall be exclusively referred to and finally determined by arbitration in accordance with the WIPO Arbitration Rules. The arbitral tribunal shall consist of three arbitrators. The place of arbitration shall be Geneva, Switzerland. The language to be used in the arbitral proceedings shall be English. The foregoing however shall not prevent any Party from seeking and obtaining injunctive relief at any time in any country.

IN WITNESS WHEREOF the Parties, through their duly authorised representatives, have executed this Agreement.

Signed for and on behalf of:

THE MEDICINES PATENT POOL FOUNDATION

Signature: DocuSigned by: Charles Gore 4713D0F59C13482...

Name: **Charles Gore**

Position: **Executive Director**

Date: 11 March 2025

Signature: DocuSigned by: Marie-Paule Kieny 331D2E7893C949A...

Name: **Marie-Paule Kieny**

Position: **Chair of the Board**

Date: 11 March 2025

Signed for and on behalf of:

BIOVAC

Signature : DocuSigned by: Morena Makhoana 879E633E5DFF4CF...

Name: **Morena Makhoana**

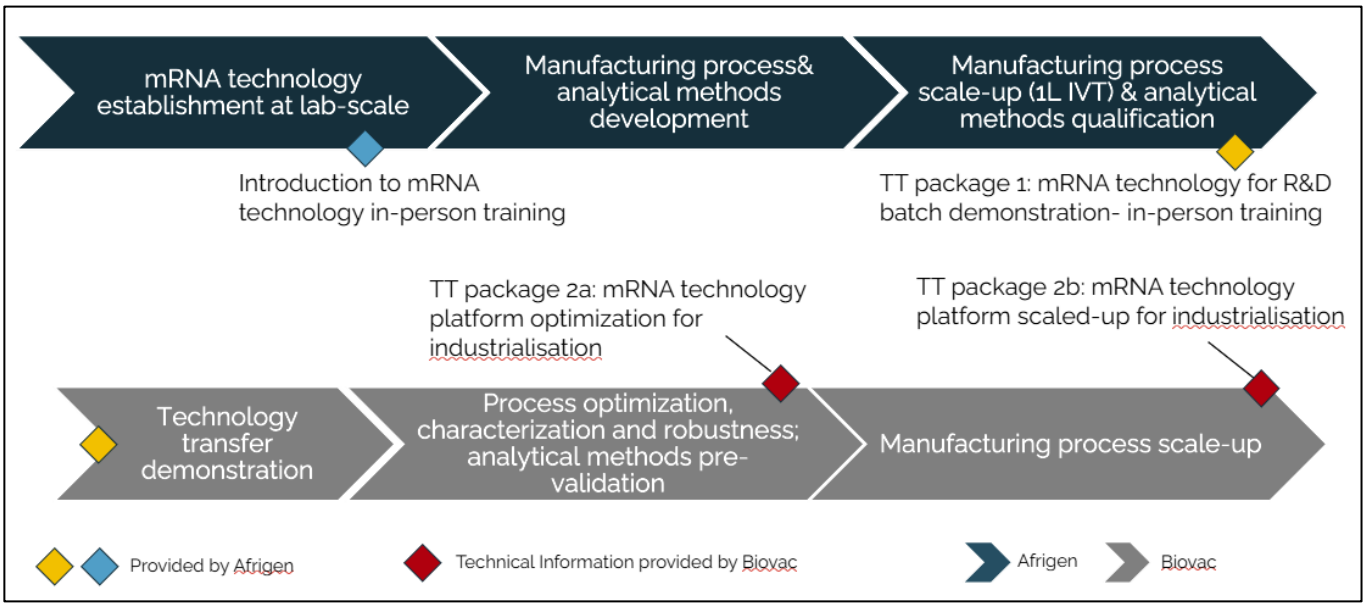
Position: **Chief Executive Officer**

Date: 13 March 2025

LIST OF ANNEXES:

ANNEX 1 – Technology Transfer Roadmap
ANNEX 2 – Terms of Material Transfer
ANNEX 3 – Technology Transfer Package 1 content
ANNEX 4 – Technology Transfer Technical Information Package 2 content
ANNEX 5 – Scope of Work
ANNEX 6 – Project budget, payment details
ANNEX 7 – Specific Donor's Requirements
ANNEX 8 – GIZ Agreement

ANNEX 1
TECHNOLOGY TRANSFER ROADMAP



ANNEX 2
TERMS OF MATERIAL TRANSFER

1. MPP shall ensure **Afrigen** will provide **Biovac** Quality Control Standards (Afrigen materials or information for procurement from commercially available sources as appropriate) and comparators (materials manufactured at Afrigen to confirm the successful technology transfer of the methods). Detailed list including sources and amounts will be included in the Technology Transfer Plan.

ANNEX 3
TECHNOLOGY TRANSFER PACKAGE 1 CONTENT

PACKAGE 1

Package 1 shall include:

- Technology Transfer Technical Information Package 1 (content listed below)
- Technical assistance (as defined in section 2.4 of this agreement)
- Materials (detailed in Annex 2)

Technology Transfer Technical Information Package 1 content:

Package 1a: mRNA Technology Platform Overview

1. Preliminary Process overview.
2. Preliminary GMP facility layout including materials, personnel and waste flows.
3. Preliminary Equipment lists for Drug Substance (DS, purified mRNA - 1L *in-vitro* transcription (IVT) reaction) and bulk Drug Product (bDP, mRNA encapsulated in Lipid Nano Particles (LNPs) at 3.7L of final product) manufacturing process and analytical methods (manufacturer, catalogue number, grade and supplier).
4. Preliminary Raw materials and consumables for DS and bDP manufacturing process and analytical methods (manufacturer, catalogue number, grade and supplier).

Package 1: – mRNA Technology Platform Description

1. GMP facility layout including materials, personnel and waste flows.
2. Shake flask cultivation and purification protocols for the manufacture of pDNA.
3. mRNA-based vaccine manufacturing of DS, bDP and final DP (manually filled and frozen DP): process descriptions (including equipment list, process parameters, process mass balances); manufacturing master batch records; equipment operation, maintenance and cleaning SOPs.

   NOTE: Process descriptions scales: mRNA *in-vitro* transcription -IVT- (100mL, 1L), bulk DP (100ml, 3.7 L).
4. Sampling plan for DS, bDP and final DP including the analytical testing performed and each process step and the type of tests (characterization test, in process test, in process control, release test).
5. Analytical methods for in-process and final quality control: development reports, SOPs, qualification protocols and reports (according to ICH Q2 R1) and laboratory book templates for non-compendial methods and corresponding Pharmacopoeia chapter for the compendial methods. Protocols and, where available, qualification reports for outsourced analytical methods.
6. Primary packaging specifications (including vials, caps and stoppers) and container closure integrity report for -80°C storage.
7. Control Strategies, including proposed DS, bulk DP and final DP acceptance criteria and their rationale based on regulatory requirements and experimental results.
8. Process development support data capturing key experience/product knowledge:
   a. Manufacturing instructions (including manufacturing process flows, process parameters, hold points, process mass balances) for DS and bDP manufacturing at 20uL, 1mL, 5mL and 10 mL IVT scales;
   b. Process development report that also outlines the manufacturing process rationale. It includes:
      i. Justified potential critical manufacturing process parameters/steps identification based on data or risk analysis;
      ii. Historical data including evolution of the process through the development phases (hereby comprising successes and failures);
      iii. Analytical results, including stability of DS, bDP and final DP obtained from pivotal batches representative of the final process (preclinical / technical/engineering) and technical

interpretation of the results (at least 3 batches at 100mL IVT scale and at least 3 batches at 1L IVT scale);

iv. Appropriate comparison between preclinical/technical/engineering batches showing any process differences and comparability of yields and analytical results.

9. Technical reports
   a. Stability reports for DS, bDP and final DP for batches representative of the final process (at least 3 batches at 100mL IVT scale and at least 3 batches at 1L IVT scale);
   b. Sterile filtration bacterial challenge, filterability and specific bubble point reports;
   c. Executed batch records for DS, bDP and final DP for batches representative of the final process (at least 3 batches at 100mL IVT scale and at least 3 batches at 1L IVT scale).
10. Pre-clinical (mice, hamsters, non-human primates) study protocols, study reports and analytical methods description.
11. Toxicology (rat animal model) study protocol and study report.

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ANNEX 4
TECHNOLOGY TRANSFER PACKAGE 2 CONTENT

PACKAGE 2

Package 2 shall include:

- Technology Transfer Technical Information Package 2 (content listed below)
- Technical assistance (as defined by Partner needs)

NOTE: Documentation to be provided in a CTD-like format

Technology Transfer Technical Information Package 2 content:

Package 2a – mRNA Technology Platform Optimization for Industrialisation

1. DS and bulk DP GMP facility layouts including personnel, materials and waste flows.
2. Catalogue number and supplier of raw materials, consumables including primary packaging.
3. Catalogue number, supplier, commissioning reports and maintenance plans of equipment.
4. Process optimisation, characterisation and robustness capturing key experience/product knowledge (conducted on process up to 1L IVT/3-6L bulk DP):
    i. Process optimisation development report, batch records and analytical results for DS, bulk DP and final DP (sterilizing filtration, manual filling and freezing) manufacturing.
    ii. Process description of optimised process at 1L IVT/3-6L bulk DP.
    iii. Sterilizing filter selection rational and bacterial retention efficacy verification.
    iv. Process characterization and robustness study reports. Critical manufacturing process parameters (CPP) and Key Process Parameters (KPP) identified with associated acceptable ranges.
    v. Hold times study protocols and reports for the end-to-end process up to final DP.
    vi. Template and executed manufacturing batch records and analytical results of post-optimisation demonstration batches and consistency batches at 1L IVT/3-6L bulk DP.
    vii. Product specifications for DS, bulk DP and filled DP.
    viii. Process performance qualification (PPQ) protocol executed on consistency batches.
5. Analytical procedures for Raw materials, DS, bulk DP and final DP, IPC and IPT in place and pre-validated:
    i. Analytical strategy and sampling plan with tests categorisation (release test, in process controls (IPC), in-process testing (IPT), characterization).
    ii. Pre-validation protocols and reports for each method (according to ICH Q2 R1 guidelines).
    iii. Trend summaries (where applicable).
    iv. For modified methods: amended SOPs, method development report describing method modifications implemented and their rationale.
    v. Elemental impurities rationale document.
6. Results of accelerated stability studies conducted in representative conditions (i.e., temperature, humidity, container materials) for DS, bulk DP, filled DP.
7. Appropriate immunogenicity evaluation in pre-clinical animal model studies of batches manufactured at Biovac with optimised process.
8. Process development report (PDR) reflecting optimisation of the manufacturing process (DS, bulk DP and filled DP) and rationale thereof, characterisation and robustness and comparison with the process as received from Afrigen (including pre-clinical results).
9. Updated Target Product Profile.
10. Process description of automated bulk DP filling.

Package 2b - mRNA Technology Platform Scaled-Up for Industrialisation

1. Manufacturing process scale-up: DS at 5-10 L, bulk DP 30-60L, final DP.
    i. Manufacturing Batch records (template and executed) and analytical results on at least 2 batches at scale.
    ii. Process descriptions for DS, bulk DP and final DP manufacturing process.
    iii. Product specifications for DS, bulk DP and filled DP.
    iv. Hold times, time out of refrigeration (TOR) and time out of freezing (TOF) study protocols and results for the end-to-end process up to final DP.
2. Catalogue number and supplier of raw materials, consumables including primary packaging.
3. Catalogue number and supplier, commissioning reports and maintenance plans of equipment.
4. Cleaning validation strategy plan for non-single use equipment (for DS, bulk DP and final DP manufacturing).
5. Reports of accelerated and real time stability studies (according to ICH Q1 R2 guidelines) conducted in representative conditions (i.e., temperature, humidity, container materials) for DS, bulk DP, final DP.
6. Appropriate immunogenicity evaluation in pre-clinical animal model studies of batches manufactured at Biovac with scaled-up process.
7. Process development report (PDR) on evolution and rationale of the manufacturing process (DS, bulk DP and final DP) and comparison (including pre-clinical results) along the product development across process as received from Afrigen up to scaled-up process.
8. Updated Target Product Profile.

ANNEX 5
SCOPE OF WORK

Biovac Principal Investigator: Seanette Wilson

Other Key Personnel: Ebrahim Mohamed (Department Head: S&I); Petrus van Zyl (Technical Lead), Malika Davids-Pooran (Analytical Lead)

PROJECT SCOPE OF WORK: Process industrialization including Optimization, characterization, robustness & scale-up of mRNA technology platform (process and analytics) transferred from Afrigen.

OVERALL TIMELINE: Jan 2024 – Dec 2026

OBJECTIVE PROJECT SCOPE:
Biovac will receive the mRNA manufacturing process and analytics from Afrigen defined at 1 L in-vitro transcription (IVT) reaction scale and a lipid nano particle (LNP) formulation up to 3.7 L scale.
Biovac will commence with familiarisation runs up to 100 mL IVT scale, followed by 1 L IVT scale. The tech transfer will be concluded with a 1L IVT scale demonstration run *(**NOTE:** (1) process scales are defined here and below in relation to IVT; scale of LNP is not specified as is related to process yields; even if only IVT scale is mentioned, it is intended that the process continues up to Bulk DP – mRNA formulated in LNP- and manual filling of a 1L batch for stability studies; (2) the 1L familiarization and demonstration runs will be released based on the assay templates received from Afrigen in Q1 2024).*
Following the tech transfer demonstration run, Biovac will commence process optimisation at 1-100 mL IVT scale focusing first on pDNA linearization, IVT & capping reactions and then on mRNA purification and LNP-mRNA formulation and purification. To confirm process optimisation, 2 x 1 L IVT/ 6L bulk DP scale confirmation runs will be completed under the selected optimal conditions.
Batches manufactured with the optimised process will be tested in mice immunogenicity studies.
In parallel to these activities, the analytical assays will be implemented at Biovac. Non-compendial methods will be established and qualified in the research facilities (up to pre-validation) while compendial methods will be verified.
2 x 1L IVT consistency batches (PPQ batches) will be manufactured and tested with pre-validated analytical methods.
Process characterization will encompass the definition of the critical process parameters (CPP). It will be followed by robustness studies determining the acceptable ranges for each CPP. This will be initiated at a 1 mL and 100 mL IVT scales following a risk assessment determining the scale dependency of these parameters.
Documentation related to process optimisation, characterisation and robustness and analytical methods pre-validation will constitute Package 2a, to be shared with Afrigen and the other Programme partners. Detailed list of documents will be provided in a separate Spreadsheet.
Afrigen will receive hands on training (back transfer) on the 1L IVT optimised process.
Once the process has been established at the 1 L IVT scale, 3 x 5 L IVT scale batches will be performed to ensure the process parameters apply to this scale. If deemed applicable, the process will be further scaled-up at a 10 L IVT scale by performing 2 x 10 L runs.
Batches manufactured with the scaled-up process will be tested in mice immunogenicity studies.
Stability studies with real-time and accelerated conditions will be conducted on Filled DP and on DS and bulk DP material, if possible. Material produced with both optimised and scaled-up processes will undergo stability studies. Stability protocols (e.g., timepoints, volumes and containers) to be discussed in detail.
Documentation related to scale-up will constitute Package 2b, to be shared with Afrigen and the other Programme partners. Detailed list of documents will be provided in a separate Spreadsheet.
As part of the activities listed above, the following industrialisation "elements" will be generated and provided in the packages:

- Primary packaging qualification dossiers (quality and technical) - standard vials;
- Equipment commissioning reports;
- Equipment maintenance plans;
- Cleaning validation strategy plan;
- Process descriptions;

- Template and executed Batch Records;
- Quality by design and process characterization reports;
- Sterilizing filter validation rational document and bacterial retention efficacy verification;
- PPQ protocol (1L IVT scale) and execution at 1L during consistency batches manufacturing;
- Analytical strategy and sampling plan with tests categorisation (release test, IPC, IPT, characterization);
- Elemental impurities rational document;
- Product Specifications and definition of acceptable ranges (or included in the analytical strategy);
- Analytical method pre-validation reports;
- Updated TPP (if required);
- Holding time, TOR, TOF reports (on DS, bulk DP and final DP steps with hold times);
- Stability reports on intermediate and final steps (DS, bulk DP and final DP);
- PDR in CTD like format (modules 3 and 4 and corresponding module 2 sections);
- DS GMP facility flows (personnel, materials, waste);
- Automated filling Process description.

All project activities will be managed by a Project Manager (Seanette Wilson), the technical activities will be managed by Technical Lead (Petrus van Zyl) and Analytical Lead (Malika Davids-Pooran) under the guidance of the S&I HoD (Ebrahim Mohamed). Morena Makhoana (CEO) will be Biovac's key point of accountability for all external stakeholders.

KEY ASSUMPTIONS:

- The IVT and LNP formulation processes will be transferred from Afrigen at the following minimum scales:
  - IVT 1 L
  - LNP formulation 1 L
- The process transferred will be further scalable (scalability up to 1L IVT and up to 6L bulk DP demonstrated by Afrigen).
- All non-compendial analytical methods required for release of DS and bulk DP will be qualified by Afrigen and transferred to Biovac.
- Afrigen will provide representative samples of DS and bulk DP or DP to Biovac for assays establishment.
- All pDNA required to complete the technology Transfer demonstration will be provided by Afrigen.
- All pDNA required to complete the process familiarisation, optimisation, characterisation, robustness and scale-up will be provided.
- Biovac will transfer the process back to Afrigen during post-robustness consistency runs (hands on training) and after scale-up (paper transfer).
- Biovac will not provide hands-on training to other Programme Partners.
- Timelines will be regularly revised. Buffer time included in lots manufacturing and testing (1 month/lot).
- Accelerated and real-time stability testing to be performed at time points beyond December 2026 on batches manufactured with the scaled-up process will be conducted at timepoints agreed upon and subject to availability of funds. Results will be made available to Programme Partners.

Table 1: Workplan

N	MILESTONE	DELIVERABLE	START DATE	DUE DATE
Technology Transfer from Afrigen				
1	Technology transfer (TT) training at Afrigen	Training completed	Jan 2024	Jan 2024
2	Order & receive reagents for assay	Reagents received	Feb 2024	Mar 2024
3	Establish assays	Assays established	June 2024	Aug 2024
4	Equipment procurement for 1L runs	Equipment delivered & installed	Apr 2024	Aug 2024
5	Up to 100 mL Familiarization runs	Team familiar with process	Aug 2024	Sept 2024
6	1 L Familiarization and 1L TT Demonstration runs	Acceptance criteria defined Batch records created	Dec 2024	Feb 2025
7	Completion of tech transfer report	Tech transfer report	Feb 2025	Mar 2025
Process Optimisation				
8	Optimization (linearization, IVT & capping reactions)	Process parameters established for linearization, IVT & capping reactions	Feb 2025	Apr 2025
9	Optimization (Chrom and LNP-mRNA formulation)	Process parameters established for Chrom & LNP formulation	May 2025	July 2025
10	2 x 1 L confirmation runs	Post-optimisation Confirmation runs successfully completed	Aug 2025	Oct 2025
11	Mice immunogenicity studies	Batch manufactured with optimised process is immunogenic.	Oct 2025	Nov 2025
Assays pre-validation				
12	Pre-validate Assays	Assays pre-validated	Sept 2024	Sept 2025
13	Completion of pre-validation assays report	Assays pre-validation reports	Oct 2025	Oct 2025
Characterisation and robustness				
14	Characterisation and Robustness (CCPs) (1 mL & 100 mL)	Characterisation and Robustness testing completed	Nov 2025	Jan 2026
15	2 x 1 L consistency runs (PPQ batches)	Consistency runs successfully completed	Mar 2026	May 2026
16	TT Package 2a Documentation package	Documentation package completed & delivered to Afrigen and the other partners	Jun 2026	Jun 2026
17	TT to Afrigen	Train Afrigen on the optimised technology	Jun 2026	Jun 2026
Process scale-up				
18	Procure & receive equip for 5 L batches	Equipment delivered & installed	Jan 2025	Mar 2025
19	3 x 5 L runs	5L runs successfully completed	Jun 2026	Aug 2026
20	2 x 10 L runs	10L runs successfully completed	Sep 2026	Nov 2026
21	Mice immunogenicity studies	Batch manufactured with scaled up process is immunogenic.	Nov 2026	Dec 2026
22	TT Package 2b Documentation package	Documentation package 2 completed & delivered to Afrigen and the other partners	Dec 2026	Dec 2026
23	Project close-out	Project close-out report completed	Dec 2026	Dec 2026

Figure 1: WORKPLAN GANTT chart: