

## WADA Technical Document – TD2017LDOC Version 2

Document Number:	TD2017LDOC	Version Number:	2.0
Written by:	WADA Laboratory Expert Group	Approved by:	WADA Executive Committee
Date of Approval:	15 November 2017	Effective Date:	15 November 2017

### **LABORATORY DOCUMENTATION PACKAGES**

#### **1.0 Introduction**

This Technical Document (TD) and its appendices outline the requirements for the production of Laboratory Documentation Packages.

This TD includes instructions for producing Laboratory Documentation Packages for results from qualitative test methods (applied to Non-Threshold Substances) and quantitative test methods (applied to Threshold Substances).

This TD also includes the following appendices which list additional documentation that is required for specific analyses:

- Appendix A: Urine *ABP* (applicable to the steroidal module of the *Athlete Biological Passport*);
- Appendix B: GC/C/IRMS (applicable to analyses by Gas Chromatography/Combustion/Isotope Ratio Mass Spectrometry);
- Appendix C: ESA (applicable to the analysis of Erythropoiesis Stimulating Agents using electrophoretic methods);
- Appendix D: hGH (applicable to the analysis of human Growth Hormone);
- Appendix E: Blood *ABP* (applicable to the hematological module of the *Athlete Biological Passport*).

If requested by the Testing Authority (TA), Results Management Authority (RMA) or WADA, Laboratory Documentation Packages shall be provided by the Laboratory which reported the results supporting an *Adverse Analytical Finding (AAF)* or *Atypical Finding (ATF)*<sup>1</sup>. Laboratories are not required to produce a Laboratory Documentation Package for a *Sample* in which no *Prohibited Substance* or *Prohibited Method* or their *Metabolite(s)* or *Marker(s)* was detected in the test menu.

A Laboratory Documentation Package shall be comprised of the information outlined below to support the result of the Laboratory's analysis of the relevant *Sample*. Laboratory working documents, computer printouts, and similar documents may be in the native language of the Laboratory. The table of contents, summaries and any flowcharts explaining the sequence of steps in the process and any other explanatory portions of the Laboratory Documentation Packages shall be provided at least in English.

The items outlined in this TD shall be the only information that the Laboratory includes in the Laboratory Documentation Package for the relevant analyses supporting the *AAF* or *ATF*. Therefore, the Laboratory is not required to provide any

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<sup>1</sup> *Athletes* shall only make requests for a Laboratory Documentation Package through the relevant Testing Authority or Results Management Authority.

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additional documentation, such as Standard Operating Procedures (SOP), general quality management documents (e.g., ISO compliance documents), validation or External Quality Assessment Scheme (EQAS) data or any other data or document, in hardcopy or electronic format, not specifically required by this TD.

A Laboratory Documentation Package should be provided to the IA, RMA or WADA within the timelines stipulated in the International Standard for Laboratories (ISL) [1].

Laboratory Documentation Packages may be requested for "A" and "B"<sup>2</sup> *Samples*. However, Laboratory documents applicable to both "A" and "B" *Samples* (e.g. *Doping Control Form*, *Sample receipt documentation*, etc.) need only be provided once in the Laboratory Documentation Packages.

This TD sets forth formal requirements. Deviations from the requirements set forth herein shall not invalidate the *AAF(s)* or *ATF(s)*.

### 2.0 Formatting Requirements

Laboratory Documentation Packages shall meet the following formatting requirements:

- 2.1. A Table of Contents;
- 2.2. Sequentially numbered pages;
- 2.3. Presentation in a format that will allow proper review by relevant stakeholders such as clearly scanned documents, descriptors, etc. (annotations may be included by the Laboratory to assist interpretation);
- 2.4. Information that appears on data and forms that refers to other *Samples* may be redacted by the Laboratory;
- 2.5. Data, charts, graphs, etc. shall be clearly described and presented.  
*[Descriptions may be provided in the Table of Contents, page headers, titles, etc; data and chart details shall be legible].*

### 3.0 Laboratory Documentation Requirements

Laboratory Documentation Packages shall contain the following information:

#### 3.1. Cover Page

- Identification of the Laboratory preparing the Laboratory Documentation Package, including the relevant *Sample* code and whether it is an "A" or a "B" *Sample*;
- A signed statement by the Laboratory Director or authorized delegate certifying that the Laboratory Documentation Package contains authentic copies of original data and forms;
- A declaration specifying that the Laboratory Documentation Package shall be handled as confidential information, shall not be disclosed to third

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<sup>2</sup> Including split portions of the B *Sample*.

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parties or be reproduced or forwarded unless written approval is obtained from the Laboratory;

- A statement certifying that the *Sample* was analyzed according to the relevant WADA rules in force (e.g. ISL, TDs);
- Any relevant comments.

### 3.2. Chain of Custody

- List of Laboratory staff involved in the analysis of the *Sample*, including signatures and/or initials and position title(s)<sup>3</sup>;
- The *Doping Control* Form related to the *Sample*. The *Sample's* external chain of custody form shall also be included if provided by the Testing Authority;
- The Laboratory's documentation of receipt of the *Sample*, including a declaration about any condition observed upon *Sample* receipt that may adversely impact the integrity of the *Sample* (in accordance with the ISL [1]);
- Documentation linking the *Sample* code (collection kit code) to the Laboratory identification code (if available);
- The relevant "A" and/or "B" *Sample* bottle Laboratory Internal Chain of Custody documentation;
- Summary of the chain of custody which is supported by the Laboratory Internal Chain of Custody documentation provided.

### 3.3. Analytical data

#### 3.3.1. Confirmation Procedure (CP) Data

- CP method details to be provided within the documentation:
  - SOP title or identification code of the CP method applied;
  - Instrument type/identification code;
  - Description of the composition of each positive quality control (QC) sample(s) analyzed in the same batch;
  - The monitored ions/transitions in the method for identification of the target compound(s) (for GC-MS<sup>n</sup> and/or LC-MS<sup>n</sup> procedures);
- "A" and/or "B" *Sample* Laboratory Internal Chain of Custody documentation for the CP relevant to the storage and handling of the *Sample* bottle (if not provided under 2.2 above);

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<sup>3</sup> Each individual's complete signature/initials/name is provided to assist in the interpretation of the Laboratory Internal Chain of Custody documents.

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- CP Aliquot Laboratory Internal Chain of Custody documentation;
- CP analytical instrument sequence file<sup>4</sup>;
- CP chromatographic and spectral data (for GC-MS<sup>n</sup> and/or LC-MS<sup>n</sup> procedures)<sup>5</sup>:
  - Positive QC sample(s);
  - Negative QC sample(s); and
  - *Athlete Aliquot(s)* analyzed to conclude the *Adverse Analytical Finding(s)*;

[CP data shall be copies of the original data evaluated by the Laboratory to support the conclusion of an *AAF* or *ATF*.]
- For GC-MS<sup>n</sup> and/or LC-MS<sup>n</sup> procedures, identification data<sup>6</sup> demonstrating compliance with the TD IDCR [2] including:
  - A summary table with relative abundances of diagnostic ions, retention time (RT) data and relevant calculation results;
  - The applicable criteria utilized to identify the target substance(s) and report an *AAF* or *ATF*;
  - The summary table shall include signed/initialed (or electronic signature/ validated LIMS outputs) statements that the results meet the applicable criteria<sup>7</sup>;
- Statement that there was no deviation from the written CP.  
*[If deviation(s) exist (e.g. a change in the split ratio or a dilution of the derivatized Sample due to Sample overload in the instrument; application of an additional cleanup step; or an explanation for the re-analysis of the Sample with a new Aliquot) then documentation of the deviation(s) from the written CPs shall be provided]*
- Statement of acceptable performance based on the evaluation of the analytical instrument which was used to generate the *Sample's CP* data.<sup>8</sup>

<sup>4</sup> A copy of the original file (preferably generated by the analytical instrument software) which demonstrates the identification and order of analysis of each *Sample* analyzed in the Confirmation Procedure.

<sup>5</sup> Data shall contain appropriate header information including date and time of analysis, identification code(s), instrument identification, etc. which allows traceability to other Laboratory documentation.

<sup>6</sup> The Laboratory is not required to quantify or report a concentration for a Non-Threshold Substance.

<sup>7</sup> For example “pass/fail” as a statement of compliance with criteria.

<sup>8</sup> For example: “Instrument [identification] meets performance criteria based on the Laboratory SOP and QC data”. This statement shall be signed and dated by the operator performing the evaluation.

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### 3.3.2. Additional documentation for quantitative CP methods only

- A summary of the quantitative data for the Threshold Substance(s) including:
  - The calibration curve;
  - The mean concentration (or ratio or score) from triplicate determinations as well as the individual concentrations determined for all the Athlete Aliquots and QC sample(s) determined with appropriate units (as applicable);
  - The nominal and measured concentrations of the QC sample(s) in addition to the acceptance criteria with a statement that the QC(s) test results pass the acceptance criteria;
  - The Measurement Uncertainty (in compliance with the TD DL [3]):
    - If an adjustment for Specific Gravity (SG) is necessary, the SG of the *Sample*, the adjusted Threshold and resulting adjusted DL shall be provided;
    - A statement that the relative  $u_c$  (%) for results at the Threshold does not exceed the maximum permissible relative  $u_{c\ Max}$  (%) in Table 1 of the TD DL and applicable Technical Document or Guidelines;
    - The Laboratory result for the Threshold Substance in the *Sample* (units), as determined and without truncation as per TD DL, with the  $u_c$  associated with the result. Generally this is provided by reporting the  $U_{95\%}$  (units) determined by the Laboratory based on a two-tailed 95% coverage interval ( $k=2$ ) and expressed as  $x \pm U_{95\%}$ .

*[The summary table provided shall compile the necessary data and applicable criteria utilized to evaluate the quantitative results obtained for the target substance(s) in order to report an AAF or ATF.]*

### 3.4. Laboratory Test Report(s)

Laboratory Documentation Packages shall include the Laboratory (ADAMS) Test Report(s)<sup>9</sup> provided to the Results Management Authority including the relevant Laboratory Test Report(s) from the Laboratory which performed subcontracted analyses, if applicable.

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<sup>9</sup> In the case of Threshold Substances confirmed by quantitative test methods, the *ADAMS* Test Report shall include details in compliance with the TD DL.

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### 3.5. Subcontracted analysis

If an *AAF* or an *ATF* resulted (in whole or in part) from a subcontracted analysis, then the subcontracted Laboratory shall provide the documentation (described in this TD) to the Laboratory which subcontracted the analysis and reported the result for the preparation of the Laboratory Documentation Package. The Laboratory Documentation Package shall clearly describe the steps conducted by each Laboratory.

**WADA Technical Document – TD2017LDOC Version 2**  
**Appendix A: Urine Steroidal Module of the ABP**

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**Urine ABP LABORATORY DOCUMENTATION PACKAGE**  
**and**  
**Urine ABP LABORATORY CERTIFICATE OF ANALYSIS**

The requirements of this Appendix of the TD2017LDOC v2 are relevant to urine *Samples* analyzed in support of the steroidal module of the *Athlete Biological Passport (ABP)*.

This Appendix of TD2017LDOC v2 outlines the requirements for the production of a Urine ABP Laboratory Documentation Package or a Urine ABP Laboratory Certificate of Analysis. The Laboratory may be requested by the relevant Athlete Passport Management Unit (APMU), Expert Panel or WADA to provide these types of documentation to support an *Adverse Passport Finding (APF)*<sup>1</sup>.

It is only mandatory to have a Urine ABP Laboratory Documentation Package for those test results that are deemed essential by the APMU or Expert Panel. Laboratories are not required to produce a Urine ABP Laboratory Documentation Package for a *Sample* that is judged to confirm the baseline level of a *Marker* by an APMU or Expert Panel. In such case, Laboratories shall provide a Urine ABP Laboratory Certificate of Analysis, in accordance with the requirements indicated in Section 3 of this Technical Document (TD) Appendix, upon request by an APMU or Expert Panel.

Deviations from this TD Appendix shall not invalidate the *APF*.

## **1.0 Formatting Requirements**

A Urine ABP Laboratory Documentation Package shall meet the formatting requirements as detailed in Section 2.0 of the TD2017LDOC v2.

## **2.0 Urine ABP Laboratory Documentation Package Requirements**

### **2.1. Cover Page**

The cover page shall meet the requirements detailed in Section 3.1 of the TD2017LDOC.

### **2.2. Chain of Custody**

The chain of custody shall meet the requirements detailed in Section 3.2 of the TD2017LDOC v2.

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<sup>1</sup> *Athletes* shall only make requests for a Urine ABP Laboratory Documentation Package or a Urine ABP Laboratory Certificate of Analysis through the relevant Testing Authority or Results Management Authority.

**WADA Technical Document – TD2017LDOC Version 2**  
**Appendix A: Urine Steroidal Module of the ABP**

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**2.3. Confirmation Procedure (CP) data**

- Confirmed value of the Specific Gravity (SG) of the *Sample*;
- CP method details to be provided within the documentation (e.g. scheme/sequence of different analysis steps):
  - Standard Operating Procedure (SOP) title or identification code of the CP method applied;
  - Instrument type/Identification code;
  - Description of quality control (QC) sample(s) analyzed in the same batch;
  - The monitored ions/transitions in the method for identification of the target compound(s).
- “A” and/or “B” Sample Laboratory Internal Chain of Custody documentation for CP relevant to the storage and handling of the *Sample* bottle (if not provided under 2.2 above);
- CP Aliquot Laboratory Internal Chain of Custody documentation;
- CP analytical instrument sequence file<sup>2</sup>;
- *Sample* preparation details:
  - Data on controlling for efficiency of hydrolysis;
  - Data on controlling for completeness of derivatization.
- CP GC-MS<sup>n</sup> analysis chromatographic and spectral data:

[CP data shall be copies of the original data evaluated by the Laboratory to support the conclusion of an *APF*.]

  - Calibration curve for all confirmed *Markers* of the steroid profile or concentrations of the calibration standards;
  - Clearly integrated chromatograms for the relevant *Markers* of the steroid profile and their respective (deuterated) Internal Standards;
  - Identification data of the chromatographic peaks of the relevant *Markers* demonstrating compliance to the TD IDCR [2], including:
    - QC sample(s);
    - *Sample*;
    - A summary table with relative abundances of diagnostic ions, retention time (RT) data and relevant calculation results;

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<sup>2</sup> A copy of the original sequence file (preferably generated by the analytical instrument software) which demonstrates the identification and order of analysis of each *Sample* analyzed in the Confirmation Procedure.



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**Appendix A: Urine Steroidal Module of the ABP**

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- The applicable criteria utilized to identify the target *Marker(s)*;
- The summary table shall include signed/initialed statements (or electronic signature/ validated LIMS outputs) that the results meet the applicable criteria<sup>3</sup>.
- Confirmed values of the relevant *Markers* of the steroid profile (including the calculation of the T/E ratio from the T and E chromatographic peak heights or peak areas corrected against a calibrator or a calibration curve) for:
  - QC sample(s); and
  - *Sample*<sup>4</sup>;

*(In addition, the acceptance criteria for the concentrations of the Markers in the QC(s) shall be provided with a statement that the QC(s) test results pass the acceptance criteria);*
- Statement regarding the associated  $u_c$  (%) for the relevant *Markers* of the steroid profile (including T/E, if applicable)<sup>5</sup>;
- Information about the presence/absence of confounding factors including reporting the estimated concentration of Ethyl-Glucuronide if confirmed above 5 µg/mL;
- Confirmed values of:
  - 5 $\alpha$ -androstenedione (5 $\alpha$ AND) concentration; and/or
  - 5 $\beta$ -androstenedione (5 $\beta$ AND) concentration, and
  - ratio of 5 $\alpha$ AND/A; and/or
  - ratio of 5 $\beta$ AND/Etio;
  - ratio of T<sub>free</sub>/T<sub>total</sub> (if determined) in the *Sample*.
- Statement regarding the validity of the “steroid profile” of the *Sample*<sup>5</sup>.
  - Statement that there was no deviation from the written CP.  
*[If deviation(s) exist (for example, a change in the split ratio or a dilution of the derivatized Sample due to Sample overload in the instrument; application of an additional cleanup step; or an explanation for the re-analysis of the Sample with a new Aliquot) then documentation of the deviation(s) from the written CPs shall be provided]*
  - Statement of acceptable performance based on the evaluation of the analytical instrument which was used to generate the *Sample's CP* data.<sup>5</sup>

<sup>3</sup> For example “pass/fail” as a statement of compliance with criteria.

<sup>4</sup> ADAMS printout of *Sample* record containing this information may be provided to address this requirement.

<sup>5</sup> For example: “Instrument [identification] meets performance criteria based on the Laboratory SOP and QC data”. This statement shall be signed and dated by the operator performing the evaluation.

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**Appendix A: Urine Steroidal Module of the ABP**

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### **3. Urine *ABP* Laboratory Certificate of Analysis Requirements**

A Urine *ABP* Laboratory Certificate of Analysis shall only contain the following information:

#### **3.1. Cover Page**

A signed and dated document by the Laboratory Director or authorized delegate including:

- 3.1.1. Identification of the Laboratory preparing the Urine *ABP* Laboratory Certificate of Analysis, including the relevant *Sample* code;
- 3.1.2. A statement certifying that the Urine *ABP* Laboratory Certificate of Analysis contains authentic copies of original data and forms;
- 3.1.3. A statement specifying that the Urine *ABP* Laboratory Certificate of Analysis shall be handled as confidential information which shall not be disclosed to third parties and shall not be reproduced or forwarded unless written approval is obtained from the Laboratory;
- 3.1.4. A statement certifying that the *Sample* was analyzed according to the relevant *WADA* rules in force (*e.g.* ISL, TDs);
- 3.1.5. Any relevant comments.

#### **3.2. GC-MS<sup>n</sup> analysis chromatographic printout of the *Sample* steroid profile, including:**

- 3.2.1. All relevant *Markers* of the steroid profile;
- 3.2.2. *Sample* code;
- 3.2.3. Analysis date and time;
- 3.2.4. Instrument identification code.

**WADA Technical Document – TD2017LDOC Version 2**  
**Appendix B: GC/C/IRMS**

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**LABORATORY DOCUMENTATION PACKAGE FOR GC/C/IRMS**  
**ANALYSIS**

This Appendix of the TD2017LDOC v2 includes instructions for producing Laboratory Documentation Packages for confirmatory analysis results supporting an *Adverse Analytical Finding (AAF)* or an *Atypical Finding (ATF)* based on the application of Gas Chromatography/Combustion/Isotope Ratio Mass Spectrometry (GC/C/IRMS).

### **1.0 Formatting Requirements**

A GC/C/IRMS Laboratory Documentation Package shall meet the formatting requirements detailed in Section 2.0 of the TD2017LDOC v2.

### **2.0 Laboratory Documentation**

#### **2.1. Chain of Custody**

The chain of custody shall meet the requirements detailed in Section 3.2 of the TD2017LDOC v2.

#### **2.2. Confirmation Procedure Analytical data**

##### 2.2.1. Analysis description

*(e.g. scheme/sequence of different test steps);*

##### 2.2.2. *Sample* preparation:

2.2.2.1 Documentation demonstrating the order of sequence injection;

2.2.2.2 Statement on the verification of retention time (RT) stability.

##### 2.2.3. IRMS analysis:

2.2.3.1 Data on CO<sub>2</sub> pulses stability test and statement on when the linearity signal was checked last;

2.2.3.2 Confirmation Procedure analytical instrument sequence file<sup>1</sup>;

2.2.3.3 IRMS Test Results, including chromatograms with the integration and annotation of the peaks and  $\delta^{13}\text{C}$  values obtained (before and after correction for acetylation, if applicable) for the relevant Target Compounds (TCs) (which produced the *AAF* or *ATF*) and Endogenous Reference Compound (ERC). These results shall be produced for:

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<sup>1</sup> A copy of the file (preferably generated by the analytical instrument software) which demonstrates the order of analysis of each *Sample* in the Confirmation Procedure.

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**Appendix B: GC/C/IRMS**

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- The Reference Material (RM)
  - o The relevant TCs and ERCs injected at the beginning and end of the sequence;
  - o The acceptance criteria for the  $\delta^{13}\text{C}$  determinations of the TCs and ERC in the RM shall be provided;
  - o It shall be stated whether the RM test results pass the acceptance criteria;
- The negative (QCN) and positive quality control (QCP) samples
  - o The acceptance criteria for the  $\delta^{13}\text{C}$  determinations of the TCs and ERC in the QC samples shall be provided;
  - o It shall be stated whether the QC test results pass the acceptance criteria;
- The test *Sample*.

2.2.3.4 Summary of results: Worksheet with  $\delta^{13}\text{C}$  (and associated  $u_c$ ) and  $\Delta\delta^{13}\text{C}$  values obtained for the test *Sample*, the QCN and QCP for the relevant TCs and ERC.

2.2.4. GC-MS analysis

2.2.4.1. Mass spectrum of each relevant TC and ERC (average and not apex) in the *Sample* and a comparison with mass spectrum obtained from a reference preparation;

2.2.4.2. Proof of identification of the peaks of the relevant TC(s) and ERC, including determination of relative abundances of diagnostic ions and RT in accordance with TDIDCR [2] requirements;

2.2.4.3. A statement about steroid peak purity.

2.2.5. Second Opinion (if requested).

**2.3. Laboratory Test Report(s)**

The Test Report documentation as detailed in Section 3.4 of the TD2017LDOC v2.

**2.4. Subcontracted analysis**

Subcontracted analysis shall meet the requirements detailed in Section 3.5 of the TD2017LDOC v2.

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**Appendix B: GC/C/IRMS**

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**Appendix C: ESA**

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**LABORATORY DOCUMENTATION PACKAGE FOR ESA ANALYSIS BY ELECTROPHORETIC METHODS**

This Appendix of the TD2017LDOC v2 includes instructions for producing Laboratory Documentation Packages for results supporting an *Adverse Analytical Finding (AAF)* reported for erythropoiesis stimulating agents (ESAs) when using electrophoretic methods.

### **1.0 Formatting Requirements**

An ESA Laboratory Documentation Package shall meet the formatting requirements as detailed in Section 2.0 of the TD2017LDOC v2.

### **2.0 Laboratory Documentation**

#### **2.1. Chain of Custody**

The chain of custody shall meet the requirements detailed in Section 3.2 of the TD2017LDOC v2.

#### **2.2. Analytical data**

##### **2.2.1. Initial Testing Procedure (ITP)**

Provision of the ITP data is optional (at the Laboratory's discretion):

##### **2.2.1.1. Test description**

*(e.g. description of IEF-PAGE or SAR-PAGE procedure, including method used for ESA enrichment/purification);*

##### **2.2.1.2. Sample sequence description (content and lane position on the gel);**

##### **2.2.1.3. ITP results including gel images and report (e.g. GASepo Analysis Report) on:**

##### **2.2.1.3.1. Negative control sample (QCN);**

**2.2.1.3.2. Reference preparations used to define basic, acidic and endogenous areas in IEF-PAGE or apparent molecular mass in SDS-PAGE and SAR-PAGE; and**

##### **2.2.1.3.3. Sample Aliquot;**

##### **2.2.1.4. Statement on quality control, instrument operation and other test validity data**

*(e.g. "The overall system performance is demonstrated by the quality control samples of the Initial Testing Procedure. It is considered to be valid for the entire procedure");*

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**Appendix C: ESA**

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2.2.1.5. Conclusion from the Initial Testing Procedure

*(e.g. “The band in Sample x shows a faint, diffuse area above the corresponding endogenous band on the SAR-PAGE gel; therefore, the presence of recombinant EPO cannot be excluded. Consequently this result is considered a Presumptive Adverse Analytical Finding and the Sample shall be subjected to a Confirmation Procedure”);*

2.2.2. Confirmation Procedure(s):

2.2.2.1. Test Description

*(e.g. description of SAR-PAGE procedure, including method used for ESA enrichment/purification);*

2.2.2.2. *Sample* sequence description (content and lane position on the gel);

2.2.2.3. Confirmation results including gel images and report (e.g. GASepo Analysis Report) on:

2.2.2.3.1. Negative control sample (QCN);

2.2.2.3.2. Positive control sample(s) (QCP);

2.2.2.3.3. Reference preparations used to define basic, acidic and endogenous areas in IEF-PAGE or apparent molecular mass in SDS-PAGE and SAR-PAGE; and

2.2.2.3.4. *Sample Aliquot*;

2.2.2.4. Statement on quality control, instrument operation and other test validity data

*(e.g. “The overall system performance is demonstrated by the positive and negative control samples of the Confirmation Procedure. It is considered to be valid for the entire procedure”);*

2.2.2.5. Conclusion from Confirmation Procedure.

*(e.g. “The band in Sample x shows a faint, diffuse area above the corresponding band for endogenous EPO on the SAR-PAGE gel; therefore, the presence of recombinant EPO is confirmed according to the WADA TD EPO [4]. Consequently, a second opinion for this Sample shall be requested”);*

2.2.2.6. Second Opinion (signed by a member of the WADA EPO Working Group whose name is listed in the effective TD EPO [4]).

**2.3. Laboratory Test Report(s)**

The Test Report documentation as detailed in Section 3.4 of the TD2017LDOC v2.

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**Appendix C: ESA**

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**2.4. Subcontracted analysis**

Subcontracted analysis shall meet the requirements detailed in Section 3.5 of the TD2017LDOC v2.



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**Appendix D: hGH**

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**LABORATORY DOCUMENTATION PACKAGE FOR hGH ANALYSIS**

This Appendix of the TD2017LDOC v2 includes instructions for producing Laboratory Documentation Packages for confirmatory analysis results supporting an *Adverse Analytical Finding (AAF)* or an *Atypical Finding (ATF)* reported for human Growth Hormone (hGH).

**1.0 Formatting Requirements**

An hGH Laboratory Documentation Package shall meet the formatting requirements as detailed in Section 2.0 of the TD2017LDOC v2.

**2.0 Laboratory Documentation**

**2.1. Chain of Custody**

The chain of custody shall meet the requirements detailed in Section 3.2 of the TD2017LDOC v2.

**2.2. Confirmation Procedure Analytical data**

2.2.1. Summary Analysis description, including

- kit lot numbers if applying the Isoforms Test;
- IGF-I and P-III-NP assay pairs and kit lot numbers if applying the Biomarkers Test;
- scheme/sequence of different analytical steps;

2.2.2. Statement of acceptable performance based on the evaluation of the analytical instrument which was used to generate the *Sample's Confirmation Procedure (CP)* data<sup>1</sup>;

2.2.3. Assays' calibration curve;

2.2.4. Sequence of analysis;

2.2.5. Test data for negative (QCN) and positive quality control (QCP) sample(s) and *Sample*, including:

2.2.5.1. *Isoforms Test*

2.2.5.1.1. The REC and PIT concentrations, expressed to three (3) decimal places, for the three (3) *Sample Aliquots* analyzed using kit-1 and kit-2;

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<sup>1</sup> For example: "Instrument [identification] meets performance criteria based on the Laboratory SOP and QC data". This statement shall be signed and dated by the operator performing the evaluation.

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**Appendix D: hGH**

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2.2.5.1.2. The mean concentrations from the triplicate determinations expressed to three (3) decimal places;

2.2.5.1.3. The Relative Standard Deviation (RSD, %) of the triplicate determinations;

2.2.5.1.4. The resulting REC/PIT ratios (ratio-1; ratio-2), expressed to two (2) decimal places, calculated from the corresponding mean REC and PIT concentrations from the triplicate determinations;

2.2.5.1.5. The applicable (kit, sex of the *Athlete*) Decision Limit(s) (DL);

2.2.5.1.6. The  $u_c$  (%) at values close to the DL as determined by the Laboratory during method validation, and

2.2.5.1.7. The expanded MU ( $U_{95\%}$ ) equivalent to the 95% coverage interval ( $k = 2$ ) for the value of the REC/PIT ratios for the *Sample*.

2.2.5.2. *Biomarkers Test*

2.2.5.2.1. The IGF-I and P-III-NP concentrations (expressed to the nearest integer for IGF-I<sup>2</sup> and two decimal places for P-III-NP) for the three (3) *Sample Aliquots* analyzed with two (2) different IGF-I / P-III-NP assay pair combinations;

2.2.5.2.2. The mean concentrations from the triplicate determinations (expressed to the nearest integer for IGF-I<sup>1</sup> and two decimal places for P-III-NP);

2.2.5.2.3. The GH-2000 scores, expressed to two (2) decimal places, calculated from the natural logarithms (ln) of the mean concentrations (ng/mL) of IGF-I<sup>3</sup> and P-III-NP;

2.2.5.2.4. The applicable DL(s) (assay pair, sex of the *Athlete*);

<sup>2</sup> When the bottom-up LC-MS/MS or LC-HRMS method is used for IGF-I quantification during the Confirmation Procedure, the Laboratory shall report the IGF-I concentrations (triplicate determinations, mean concentration) determined from the quantification of T1 and T2 peptides, as well as the calculated difference between these mean (T1, T2) concentrations. The Laboratory shall also report the average (overall) IGF-I concentration determined from the quantification of T1 and T2 [5].

<sup>3</sup> When the bottom-up LC-MS/MS or LC-HRMS method is used for IGF-I quantification during the Confirmation Procedure, the GH-2000 score is calculated from the natural logarithm (ln) of the average (overall) concentration (ng/mL) of IGF-I determined from the quantification of T1 and T2 [5].

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### Appendix D: hGH

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2.2.5.2.5. The  $u_c$  at values close to the DL as determined by the Laboratory during method validation, and

2.2.5.2.6. The expanded MU ( $U_{95\%}$ ) equivalent to the 95% coverage interval ( $k = 2$ ) for the value of the GH-2000 score for the *Sample*.

2.2.6. The acceptance criteria for the concentrations and ratios/scores of each QC sample, and a statement on whether the QC test results passed the acceptance criteria.

### 2.3. Laboratory Test Report(s)

- Laboratory Test Report from *ADAMS* including the conclusion from the Confirmation Procedure;

*Example Isoforms Test:*

“The analysis of the *Sample* using the hGH differential immunoassays has produced the following analytical values of assay ratios: 2.52 for kit “1” and 2.40 for kit “2”, which are greater than the corresponding DLs of 1.84 and 1.91, respectively. The relative combined standard uncertainty ( $u_c$ , %) estimated by the Laboratory at levels close to the DL is 15% for kit “1” and 17% for kit “2”. This constitutes an *Adverse Analytical Finding* for hGH”.

*Example Biomarkers Test:*

“The analysis of the *Sample* with the hGH Biomarkers Test has produced the following GH-2000 scores: 10.90 for assay pair ‘1’ [IDS IGF-I + Centaur P-III-NP] and 9.90 for assay pair ‘2’ [LC-MS/MS IGF-I + Orion P-III-NP], which are greater than the corresponding male-specific DLs of 10.61 and 9.70, respectively. The combined standard uncertainty ( $u_c$ ) estimated by the Laboratory at levels close to the DL is 0.40 for assay pair ‘1’ and 0.35 for assay pair ‘2’. This constitutes an *Adverse Analytical Finding* for hGH”.

- Relevant Laboratory Test Report(s) from subcontracted analyses, if any.

### 2.4. Subcontracted analysis

Subcontracted analysis shall meet the requirements detailed in Section 3.5 of the TD2017LDOC v2.

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**Appendix E: Blood ABP**

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**Blood *ABP* LABORATORY DOCUMENTATION PACKAGE**  
**and**  
**Blood *ABP* LABORATORY CERTIFICATE OF ANALYSIS**

The requirements of this Appendix of the TD2017LDOC v2 are relevant to blood *Samples* analyzed in support of the hematological module of the *Athlete Biological Passport (ABP)*.

This Technical Document (TD) appendix outlines the requirements for the production of a Blood *ABP* Laboratory Documentation Package or a Blood *ABP* Laboratory Certificate of Analysis. The Laboratory or WADA-Approved Laboratory for the *ABP* may be requested by the relevant Athlete Passport Management Unit (APMU), Expert Panel or WADA to provide these types of documentation to support an *Adverse Passport Finding (APF)*<sup>1</sup>.

It is only mandatory to have a Blood *ABP* Laboratory Documentation Package for those test results that are deemed essential by the APMU or Expert Panel. Laboratories are not required to produce a Blood *ABP* Laboratory Documentation Package for a *Sample* that is judged to confirm the baseline level of a *Marker* by an APMU or Expert Panel. In such case, Laboratories shall provide a Blood *ABP* Laboratory Certificate of Analysis in accordance with the requirements as indicated in Section 3 of this TD Appendix, upon request by an APMU or Expert Panel.

A template of the Blood *ABP* Laboratory Certificate of Analysis is available to Laboratories and WADA-Approved Laboratories for the *ABP* upon request to WADA.

Deviations from this TD Appendix shall not invalidate the blood *APF*.

## **1.0 Formatting Requirements**

A Blood *ABP* Laboratory Documentation Package shall meet the formatting requirements as detailed in Section 2.0 of the TD2017LDOC v2.

## **2.0 Blood *ABP* Laboratory Documentation Package Requirements**

### **2.1. Cover Page**

The cover page shall meet the requirements detailed in Section 3.1 of the TD2017LDOC v2.

### **2.2. A copy of the *Sample's* temperature data logger report (if not attached to the result in *ADAMS*).**

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<sup>1</sup> *Athletes* shall only make requests for a Blood *ABP* Laboratory Documentation Package or a Blood *ABP* Laboratory Certificate of Analysis through the relevant Testing Authority or Results Management Authority.

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## Appendix E: Blood *ABP*

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### 2.3. Chain of Custody

The chain of custody shall meet the requirements detailed in Section 3.2 of the TD2017LDOC v2.

### 2.4. Analytical data

2.4.1. Original Sysmex printouts of all *Sample* full blood count and scattergrams, including:

2.4.1.1. *Sample* code;

2.4.1.2. Analysis date and time;

2.4.1.3. Instrument identification and serial number.

2.4.2. *Sample* and e-checks (level 1,2,3) quality control (QC) results summary table, including:

2.4.2.1. Results of all *Sample* analyses (minimum two);

2.4.2.2. All e-check QC levels from the same batch as the *Sample*;

2.4.2.3. Criteria;

2.4.2.4. Statements of acceptance.

[The summary table provided shall compile the necessary data and applicable criteria as per the TD BAR [6].]

2.4.3. e-CHECK manufacturer assay sheets for each QC level.

2.4.4. *ADAMS* record printout which contains:

2.4.4.1. Date and time of submission of the results into *ADAMS*;

2.4.4.2. Date and time of *Sample* reception;

2.4.4.3. Date and time of *Sample* analysis;

2.4.4.4. Sport/discipline;

2.4.4.5. Testing Authority (TA), Results Management Authority (RMA), Sample Collection Authority (SCA);

2.4.4.6. Biological parameter results for the *Sample*.

### 3.0 Blood *ABP* Laboratory Certificate of Analysis Requirements

A Blood *ABP* Laboratory Certificate of Analysis shall only contain the following information:

#### 3.1. Cover Page

A signed and dated document by the Laboratory Director or the Director of the WADA-Approved Laboratory for the *ABP* or authorized delegate including:

3.1.1. Identification of the Laboratory or the WADA-Approved Laboratory for the *ABP* preparing the Blood *ABP* Laboratory Certificate of Analysis, including the relevant *Sample* code;

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**Appendix E: Blood ABP**

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- 3.1.2. A statement certifying that the Blood *ABP* Laboratory Certificate of Analysis contains authentic copies of original data and forms;
  - 3.1.3. A statement specifying that the Blood *ABP* Laboratory Certificate of Analysis shall be handled as confidential information which shall not be disclosed to third parties and shall not be reproduced or forwarded unless written approval is obtained from the Laboratory or the WADA-Approved Laboratory for the ABP;
  - 3.1.4. A declaration certifying that the *Sample* was analyzed according to the relevant *WADA* rules in force (e.g. ISL, TDs);
  - 3.1.5. Any relevant comments.
- 3.2.** Original Sysmex printout of the accepted *Sample* analysis, including:
- 3.2.1. Full blood count and scattergram;
  - 3.2.2. *Sample* code;
  - 3.2.3. Analysis date and time;
  - 3.2.4. Instrument identification and serial number.

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### REFERENCES

1. The World Anti-Doping Code International Standard for Laboratories v8.0. World Anti-Doping Agency, Montreal, Canada (current version).  
<https://www.wada-ama.org/en/resources/laboratories/international-standard-for-laboratories-isl>
2. WADA Technical Document TD IDCR (current version): Minimum Criteria for Chromatographic-Mass Spectrometric Confirmation of the Identity of Analytes for Doping Control Purposes.  
<https://www.wada-ama.org/en/resources/science-medicine/td2015-idcr>
3. WADA Technical Document TD DL (current version): Decision Limits for the Confirmatory Quantification of Threshold Substances  
<https://wada-main-prod.s3.amazonaws.com/resources/files/WADA-TD2014DL-v1-Decision-Limits-for-the-Quantification-of-Threshold-Substances-EN.pdf>
4. WADA Technical Document TD EPO (current version): Harmonization of Analysis and Reporting of Erythropoiesis Stimulating Agents (ESAs) by Electrophoretic Techniques  
<https://wada-main-prod.s3.amazonaws.com/resources/files/WADA-TD2014EPO-v1-Harmonization-of-Analysis-and-Reporting-of-ESAs-by-Electrophoretic-Techniques-EN.pdf>
5. WADA Guidelines on human Growth Hormone Biomarkers Test for Doping Control Analyses (current version).  
<https://www.wada-ama.org/en/resources/laboratories/guidelines-human-growth-hormone-hgh-biomarkers-test>
6. WADA Technical Document TD BAR (current version): Athlete Biological Passport Operating Guidelines & Compilation of Required Elements.  
[https://wada-main-prod.s3.amazonaws.com/resources/files/wada\\_abp\\_operating\\_guidelines\\_2014\\_v5.0\\_en.pdf](https://wada-main-prod.s3.amazonaws.com/resources/files/wada_abp_operating_guidelines_2014_v5.0_en.pdf)