



INTELLIGENCE AND INVESTIGATIONS DEPARTMENT

CASE: 2017-210

**FINAL REPORT TO THE CRC REGARDING THE
MOSCOW DATA**

20 November 2019



**WORLD
ANTI-DOPING
AGENCY**

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1 GLOSSARY

System Administrator:	An “ <i>administrator</i> ” account is a user account that allows that user to make changes that will affect other users. For example, an administrator can change security settings, install software and hardware, and access all files on the computer.
Archive:	An archive is a single file that contains multiple files and or folders. They are commonly used for backing up data and transferring multiple files between users.
Backup:	A backup is a copy of one or more files created as an alternate in case the original data is lost or becomes unusable.
Carving:	Carving is a method of rebuilding deleted files from fragments when initial metadata such as the file name, creation date, data path had been removed.
CLI:	A command line interface (CLI) is a text-based interface used for entering commands.
Database:	A database is a data structure that stores organized information.
Delete:	Delete is computer terminology for removing or erase. When you delete a file, it is not erased, but instead the reference to the file is removed. This means deleted files are still intact until they are written over. Special software can recover some deleted files.
Disk Image:	A disk image is a file containing a “ <i>byte-by-byte</i> ” copy of a hard drive.
Dump:	A database dump (also, “ <i>SQL dump</i> ”) contains records of the table structure and or the data from a database and is usually in the form of a list of SQL statements.
File:	A file is a collection of data stored in one unit, identified by a filename. It can be a document, picture, audio or video stream, data library, application, or other collection of data.
File System:	A file system organises all the files on the disk. The file system is created when a user initializes or formats your hard disk.
Folder:	Digital folders are designed for organizing files and storing documents. Folders can contain subfolders which may contain additional subfolders and files.
IP Address:	An Internet Protocol address is an address that identifies a device on the Internet or a local network. It allows a system to be recognized by other systems connected via the Internet protocol.
LIMS:	Laboratory Information Management System is a software-based solution with features that support a laboratory’s operations.
Metadata:	Metadata is data describing or giving information about another data. For example, the metadata of files can be its creation date, modification date, encoding.
Midnight Commander:	Midnight Commander is a visual file manager that allows a user to copy, move and delete files.
Moscow Data:	The Moscow Data comprises all the Moscow Laboratory servers and computer instruments that were forensically imaged during the Data Retrieval Mission (i.e. LIMS server, Server ONE, Disks provided by the Investigative Committee of Russia and computer instruments) and their content (e.g. LIMS data, Raw Data and PDF files).
Moscow LIMS:	The Moscow LIMS corresponds to the forensic image of the LIMS Database that was performed on 12 January 2019 in the Moscow laboratory during the Data Retrieval Mission. WADA formally took possession of the data on 17 January 2019.

- MySQL:** MySQL is an open source relational database management system. Based on the Structure Query Language (**SQL**), which is used for adding, removing, and modifying information in the database.
- NTP:** NTP servers are “*time*” servers designed to sync client systems time with official time.
- PDF:** A Portable Document Format (**PDF**) is a file format designed to present documents consistently across multiple devices and platforms.
- Raw Data File:** In the framework of the investigation, a Raw Data is the result of the Initial Testing or Confirmation Procedure analysis of a sample aliquot. Raw Data indicates whether a substance or metabolite was detected by an analytical instrument.
- Root User:** “Root” is the name of the user who has administrative privileges on a Unix or Linux server.
- Script:** A computer script is a list of commands that are executed by a certain program or scripting engine. Scripts may be used to automate processes on a local computer or to generate Web pages on the Web.
- WADA LIMS:** The WADA LIMS corresponds to the LIMS SQL Dump provided by a Whistleblower to the Intelligence and Investigations Department on 31 October 2017. The Dump was performed on 3 September 2015.
- Web-Interface:** The interaction between a user and software running on a Web server.
- Web-Server:** A web server is a system that delivers content or services to end users over the internet. A web server consists of a physical server, server operating systems and software used to facilitate the communication.

2 EXECUTIVE SUMMARY

This is the final report to the Compliance Review Committee (**CRC**) regarding the Intelligence and Investigations Department investigation of the “*Moscow Data*”.¹ More specifically, whether the data provided by Russian authorities in response to the “*Reinstatement Conditions*”² was an authentic copy.

The purpose of this report is fivefold.

Firstly, detail the result of the WADA Expert assessment of the “*New Data*” received from Russian Minister of Sport, Pavel Kolobkov (**Minister Kolobkov**), on 23 October 2019 (**New Data**).

Secondly, detail the result of the WADA Independent Expert assessment of the “*Russia Forensic Investigation*”³ and answers the question whether the Russia Forensic Investigation disturbs the findings of the “*WADA Technical Report*”⁴ (**Independent Expert Evaluation**).

Thirdly, detail the result of investigations conducted into the forensic veracity of three disks (**ICR Disks**) purportedly seized from the Moscow Laboratory by the Investigative Committee of the Russian Federation (**Investigative Committee**) on 21 July 2016.

Fourthly, detail the result of the meeting between the Independent Experts and Russian Experts held in Lausanne, Switzerland on 14 November 2019 (**Expert Meeting**).

Lastly, report the impact of the data manipulation and deletion, more specifically missing Raw Data files, on the ability to conduct complete and thorough investigation of “*Target Group*”⁵ athletes (**Impact**).

This report is to be read in conjunction with the “*Preliminary Report*” and “*CRC Report*” published to the CRC on 15 May 2019 and 6 September 2019, respectively.

Overview

On 6 September 2019, the Intelligence and Investigations Department reported (**CRC Report**) to

the CRC that based on observable digital forensic evidence detailed in the WADA Technical Report, the Moscow Data was altered before being provided to WADA on 17 January 2019. These alterations include backdating, disk formatting, deleted files, deleted database backups, secure erased files, selectively removed command history entries (**Command Logs**), as well as replaced databases, deleted records and removed tables.

On 17 September 2019, the CRC Report was provided to Minister Kolobkov and on 8 October 2019, the Minister responded by producing the Russia Forensic Investigation which disputed the findings of the CRC Report.

In short, the Russia Forensic Investigation asserts compliance with the Reinstatement Conditions and denies data manipulation. Moreover, it claims the LIMS has been so contaminated with “*falsified results*” by Doctor Grigory Rodchenkov (**Doctor Rodchenkov**), Doctor Timofey Sobolevsky (**Doctor Sobolevsky**) and Oleg Migachev (**Mr Migachev**), that it is of no evidentiary value and the only reliable evidence is Raw Data.

The Russia Forensic Investigation also identified additional data sources (i.e. the New Data) potentially relevant to the Reinstatement Conditions. The existence of the New Data was not previously known to WADA.

On 23 October 2019, following CRC request, Minister Kolobkov produced the New Data to the Intelligence and Investigations Department in Geneva, Switzerland. It was then examined by the Independent Experts.

New Data

The New Data is not a trustworthy source of information for evaluating claims made in the Russia Forensic Investigation. Furthermore, observed digital traces of data alteration and forged database backups in the New Data raises questions about its integrity and completeness.

¹ Moscow Data: Moscow Laboratory’s LIMS database covering the period 1 January 2012 to 31 August 2015, along with the data underlying the findings reported in the LIMS database for that period.

² On 20 September 2018 the WADA Executive Committee reinstated the Russian Anti-Doping Agency (“*RUSADA*”) to the list of Code-compliant Signatories, on condition that *RUSADA* and the Ministry ‘must procure’ the provision to WADA by 31 December 2018 of the Moscow Data.

³ This folio is comprised of Russia Statement of Facts, Russia Technical Report, Counter Research and Attachment E - Answers to Technical Questions – See Attachments B, C, D and E, respectively.

⁴ See Attachment A - Digital Forensic Examination Report (“*PFS 19.0333*”) (“*WADA Technical Report*”) dated 15 August 2019.

⁵ Target Group: 298 athletes identified as having the most suspicious LIMS data based on the WADA LIMS.

Independent Expert Evaluation

Following review, Independent Experts state that the Russia Forensic Investigation **does not disturb** the findings of the WADA Technical Report.

Moreover, during their evaluation, Independent Experts discovered that between 25 November 2018 and 10 January 2019, a person or persons unknown fabricated, modified and deleted messages (**Forum Messages**) contained within the Moscow LIMS.⁶

More specifically, Forum Messages referenced by the Russia Forensic Investigation as evidencing extortion and the manipulation of analysis results by Doctor Rodchenkov, Doctor Sobolevsky and Mr Migachev were fabricated and falsely "*created*" into the Moscow LIMS on or after 25 November 2018.

In addition, Forum Messages evidencing the involvement of then Moscow Laboratory head of the Sample Reception and Aliquoting Department, Evgeny Kudryavtsev (**Mr Kudryavtsev**), in sample swapping, analysis of "*pre-departure*"⁷ samples and falsification of Laboratory chain-of-custody records were deleted from the Moscow LIMS on or after 25 November 2018. Notably, Mr Kudryavtsev's sample swapping and record falsification activities immediately preceded WADA's 17 December 2014 attendance at the Moscow Laboratory to seize and remove 4,144 samples.

The significance of deleting these Forum Messages is best realised by the fact that Mr Kudryavtsev was named by Doctor Rodchenkov as being intimately involved in sample swapping at the Sochi Olympic Games (**Sochi Games**). Moreover, during subsequent CAS⁸ proceedings, Mr Kudryavtsev has vigorously disputed Doctor Rodchenkov's claims and stated that he wanted to prove to the world that Doctor Rodchenkov was lying and there was no sample swapping at the Sochi Games.

Scenario of Events

Based on confirmed facts, evaluative interpretation of forensic findings and the Russia Forensic Investigation, the Intelligence and Investigations Department proposes the following scenario of events as contextualising and evidencing the manipulation of the Moscow Data:

On 29 November 2013, Mr Kudryavtsev sent a Forum Message to a colleague advising that there were 15

"*pre-departure*" samples requiring analysis. Predeparture testing was the unofficial analysis of samples from select Russian athletes prior to competition to ensure their use of Prohibited Substances was not detectable. Mr Kudryavtsev also directed the colleague to falsify Laboratory chain-of-custody (**CoC**) records.

Between February 2014 and July 2016, LIMS database backups were generated on the "*primary*" disk of the LIMS server (**Imaged Primary Disk**), in a specific directory (**Directory**). Notably, the LIMS system had been configured to extract and store daily automated databases backups (**Automated Backups**). Backups of the LIMS system are valuable as they provide a reference point of comparison to identify altered or missing data from the Moscow Data. The absence of backups is considered suspicious.

On 3 December 2014, the German television channel ARD aired a documentary (**ARD Documentary**) alleging the existence of state-sponsored doping (**Protection Scheme**) in Russia.

On 9 December 2014, WADA, by letter, directed the Moscow Laboratory (i.e. Doctor Rodchenkov) to retain all samples until further notice by WADA.

On 10 December 2014, WADA launched an Independent Commission (**IC**) to investigate the ARD Documentary allegations.

On 11 December 2014, Doctor Rodchenkov was advised by the Russian Ministry of Sport that WADA staff had applied for visas to Russia. Expecting an imminent visit by WADA and the seizure of samples, Doctor Rodchenkov discarded samples, swapped samples and falsified CoC records.

On 15 December 2014, Mr Kudryavtsev received a Forum Message containing several sample (Laboratory) codes from Mr Migachev. Mr Kudryavtsev replied asking if these samples were apart from the "*21 substituted samples, or [was] it absolutely everything that had to be removed?*"

In this context the term "*substituted samples*" denotes the practice of sample swapping, whereby the contents of a "*dirty*" sample is replaced with urine clear of Prohibited Substances.

⁶ The Moscow LIMS is the forensic copy of the Moscow Laboratory LIMS imaged by WADA on 12 January 2019.

⁷ Doctor Rodchenkov asserted the existence of "*pre-departure*" testing of Russia athletes whereby select Russian athletes would be

unofficially tested prior to competition to ensure their use of Prohibited Substances was not detectable.

⁸ Court of Arbitration for Sport; For example: CAS 2017/A/5379 *Alexander Legkov v. International Olympic Committee (IOC)*, [352].

On 16 December 2014, Mr Kudryavtsev asked Mr Migachev via a Forum Message to falsify CoC records.

On 16 December 2014, WADA announced details of the three-person IC.

On 17 December 2014, WADA attended the Moscow Laboratory to secure and remove all samples stored in the facility.

On 9 November 2015, WADA received the IC's Report Part One.

On 17 November 2015, Doctor Rodchenkov fled Russia for the United States.

On 18 November 2015, the Russian Anti-Doping Agency (**RUSADA**) was declared non-compliant.

On 14 January 2016, WADA received the IC's Report Part Two.

On or before 22 January 2016, "a" mounted "secondary" disk existed in the LIMS server.⁹

On 15 April 2016, WADA revoked the accreditation of the Moscow Laboratory.

On 19 May 2016, WADA announces the Independent Person (**IP**) Commission.

On 9 June 2016, the Moscow LIMS was remotely accessed for the last time.

On 29 June 2016, the backups of the Moscow LIMS created in 2014 and 2015 were deleted from the Imaged Primary Disk.

On 18 July 2016, WADA received the IP's Report Part One.

On 19 July 2016, the International Olympic Committee (**IOC**) announce the "*Schmid*" Commission.

On 21 July 2016, the Investigative Committee entered the Moscow Laboratory to secure evidence in their investigation of Doctor Rodchenkov.

Between 21 July 2016 and 25 July 2016, a vast number of files, including Raw Data files, were deleted from 12 instrument computers and the Imaged Primary Disk.

On 2 August 2016, the Automated Backup script was run on the Imaged Primary Disk. However, Independent Experts cannot determine whether it continued to run on the Imaged Primary Disk or was subsequently run on a "secondary" disk.

Notably, database backup files generated between August 2016 and 17 December 2018 by the Automated Backup script do not exist on either the Imaged Primary Disk or the secondary disk as imaged by WADA (**Imaged Secondary Disk**). This absence is suspicious.

On 9 December 2016, WADA received the IP's Report Part Two. Accompanying this report was a release of the non-confidential evidence (Evidence Disclosure Package (**EDP**)). EDP's were publicly available via a website.

On 2 April 2017, "a" mounted secondary disk existed in the LIMS system. However, Independent Experts cannot state, based on observable forensic evidence, that this secondary disk was the same secondary disk observed in the system on 22 January 2016 or the Imaged Secondary Disk.

On 20 September 2018, the importance and intended purpose of the Moscow Data became known to Russian authorities with the introduction of the Reinstatement Conditions.

On 16 October 2018, WADA advised Minister Kolobkov, via letter, that the Moscow Data was sought solely to identify those athletes who may have committed anti-doping rule violations.

On or after 20 November 2018 but before 23 December 2018, logs from the Moscow LIMS "*log_do*" table from the years 2012, 2013 and 2014 were deleted.

The "*log_do*" table housed data files (**Logs**) that record events and a user's actions in a computer operating system (i.e. Moscow LIMS).

On or after 23 November 2018 but before 23 December 2018, logs from the Moscow LIMS "*log_do*" table for 2015 were deleted.

On or after 25 November 2018, select Forum Messages were fabricated, modified and deleted in the LIMS system by an "*unknown*" person.

On 27 November 2018, WADA arrived in Moscow to discuss operational issues related to retrieving the Moscow Data.

On 15 December 2018, "a" mounted secondary disk existed in the LIMS system. However, as previously stated, Independent Experts cannot state, based on observable forensic evidence, that this secondary disk was the same secondary disk observed in the system on 22 January 2016 or 2 April 2017.

⁹ Mounting a hard disk makes it accessible by the computer. This is a software process that enables the operating system to read and write

data to the disk. Most disks are automatically mounted by the operating system when they are connected.

On 17 December 2018, late in the afternoon, WADA arrived in Moscow to obtain a forensic copy of the Moscow Data. No data would be copied on this occasion.

On 17 December 2018, “a” secondary disk existed in the LIMS system. This disk (i.e. Imaged Secondary Disk) was ultimately forensically imaged by WADA. Notably, Russian Experts assert the Imaged Secondary Disk was first introduced to the LIMS system on this day. However, because of actions undertaken within the system on 17 December 2018, Independent Experts cannot state that the Imaged Secondary Disk was the same secondary disk observed in the system on 22 January 2016, 2 April 2017 or 15 December 2018.

On 17 December 2018, the following events occurred in the Moscow Laboratory:

- (a) The system administrator, Evgeniy Mochalov (**System Administrator**), backdated the LIMS system to **12 November 2015** – a date five days before Doctor Rodchenkov fled to the United States. Alterations were then made to the LIMS database, including file deletion and creation of files under directories related to databases labelled “2012”, “2013”, “2014”, “2015” and “forum_#”.¹⁰
- (b) Evidence of these activities in logs generated by Automated Backup (daily) processes were selectively deleted. In addition, Logs showing backdating to 12 November 2015 were subsequently selectively deleted.
- (c) Over 450 database backups of the Moscow LIMS database created in 2016 were deleted from the Imaged Primary Disk.

Notably, the Russia Forensic Investigation asserts that the System Administrator deleted these backups after he copied them to his working computer to free up space on the Imaged Primary Disk. However, Independent Experts established that the Imaged Primary Disk had approximately 93% of “free space” available, more than enough for LIMS operations. In other words, files did not need to be moved as enough free space already existed on the disk.

Additionally, Independent Experts did not find the “copied” backups in the New Data, despite the New Data purportedly containing a forensic copy of the System Administrator’s computer.

- (d) A command (**Zeroing Command**) was executed on the Imaged Primary Disk for anywhere up to 170 minutes. This command overwrites the free space of a disk with zeroes and renders unrecoverable all traces of prior commands, activities or previously deleted data. In other words, potentially a substantial amount of data.
- (e) A specific command was then executed which irretrievably deleted information as to the precise number of zeros written on the Imaged Primary Disk and the exact length of time the Zeroing Command operated.
- (f) The system date was then returned to 17 December 2018.
- (g) The LIMS system was then **backdated to 11 August 2015** - a time when Doctor Rodchenkov was still Director of the Laboratory.
- (h) Whilst the system was backdated, the Imaged Secondary Disk was formatted so that it now falsely appeared to have been formatted on 11 August 2015.

Formatting sets up the file system and cleans all references to existing and already allocated files. Formatting does not overwrite a disk with zeros. However, at the time of formatting the Imaged Secondary Disk contained no data, only zeros. While executing a Zeroing Command on the Imaged Secondary Disk would explain the zeros, Independent Experts could not find observable forensic evidence of this occurrence.

- (i) After formatting, the Imaged Secondary Disk was never remounted or used to store data.
- (j) The commands to overwrite free space with zeros, backdate the LIMS system and format the Imaged Secondary Disk were selectively deleted from the history files (**Command Logs**).

Command Logs are a means for identifying commands executed on a system, including modifications to the system and a database. The effect of deleting Command Logs is that the associated actions (zeroing, backdating and formatting) are invisible without digital forensic analysis.

On 8 January 2019, the System Administrator executed a script containing commands that backdated the LIMS system to 23 May 2015 and then:

¹⁰ Table “forum_#” is the Forum Message table.

- (a) replaced the LIMS database with a prior version (**Prior Version**);
- (b) deleted 632 LIMS database files (e.g. OPT, MYD, MYI and FRM);¹¹
- (c) backdated the timestamps of all database files.
- (d) The System Administrator then used automated scripts to alter the LIMS database and backdate multiple databases and associated files to various dates.
- (e) The System Administrator then deleted scripts designed to alter and backdate the LIMS database.

The effect of these actions is that Prior Version now falsely appeared to have been on the LIMS system since 23 May 2015.

An attempt was then made to restore the LIMS system back to the correct date of 8 January 2019, however, the System Administrator erroneously set the date to 1 August 2019. The system then remained on 1 August 2019 until it autocorrected at 03:05 hours (3:05AM) and reverted to the true date.

Analysis subsequently identified three instances where the digital forensic evidence shows that between 6 January 2019 and 9 January 2019, LIMS data indicative of doping was manipulated and or deleted to the betterment of the athletes (i.e. concealment of potential doping) in relation to three athletes, including one from the Target Group.

Between 1 January 2019 and 9 January 2019 (inclusively), 19,982 files and folders were deleted from the LIMS server, computer instruments and associated recycle bins,¹² including 11,720 “SLD”¹³ (**Sequence**) files, 531 PDFs and 337 Raw Data files. Of which, when considering files that were **not in the recycle bin**, 9,298 Sequence files, 500 PDFs and 1 Raw Data file had a creation timestamp between 1 January 2012 and 31 December 2015. In other words, material analytical files created within the relevant LIMS period were deleted.

¹¹ “OPT” files contain database characteristics and are updated every time a database is altered. “FRM” files describe a database tables format and structure. “MYI” files contain the index files of a database. “MYD” files contain data. When a LIMS MySQL database is used, all the database related data and metadata are stored in a folder with these files in it. These files are used for backup purpose for securing schema, data, and indexes, for migration or upgrade of the database.

¹² Recycle Bin: is a location where deleted files or folders are temporarily stored.

On 9 January 2019, WADA arrived in Moscow to obtain a forensic copy of the Moscow Data. WADA did not enter the Laboratory until the following day (10 January 2019).

On 9 January 2019, the following events occurred in the Moscow Laboratory:

- (a) The 2008, 2009, 2010 and 2011 LIMS databases were deleted from the Moscow LIMS database.
- (b) The Forum Message table (containing the fabricated and modified messages, and absent the deleted messages) was restored onto the LIMS database.¹⁴

On 10 January 2019, the following events occurred in the Moscow Laboratory:

- (a) 101 Sequence files and 137 PDFs were deleted from The Primary Disk.
- (b) late morning, WADA entered the Moscow Laboratory and inspected the specialised equipment to be used to forensically image the Moscow Data.

On 11 January 2019, WADA commenced forensically imaging of the Moscow Data, beginning with the ICR Disks.

On 14 January 2019, following a request by Russian Experts, WADA allowed the System Administrator to backup Server One to a new server to protect against data loss during forensic imaging of Server One.¹⁵

On 16 January 2019, the following events occurred in the Moscow Laboratory:

- (a) Server ONE was backdated to **19 August 2015** and a system administrator¹⁶ executed commands to format a secondary disk, making it appear that the disk was formatted on 19 August 2015.
- (b) A command was executed to overwrite the “free space” of the primary disk in Server ONE with zeroes.

¹³ Analytical Sequence files.

¹⁴ This event undoubtedly occurred between 5 January 2019 and 10 January 2019, Independent Experts believe the 9 January 2019 to be the more likely date.

¹⁵ Russian Experts were concerned that Server One may not restart after forensic imaging due to its been an old server.

¹⁶ Whilst this is suspected to have been Mr Mochalov, to date, this has not been acknowledged by Russian authorities.

- (c) In addition, Server ONE contains digital traces compatible with a specialized tool being used to secure erase files on 16 January 2019.
- (d) A system administrator selectively removed from Command Logs on Server ONE that overwrite areas of a disk with zeroes and run a specialized tool to secure erase files. As stated, overwriting the free space of a disk with zeroes renders unrecoverable all traces of prior commands, activities or previously deleted data.

On 16 January 2019, after these activities by the system administrator, WADA were advised that the backup of Server One was complete and could now forensically image Server One.

On 17 January 2019, WADA departed Moscow with a forensic image of the Moscow Data.

ICR Disks

In short, Independent Experts concluded there was insufficient information to verify that the ICR Disks were created on the dates nominated by their respective timestamps namely, 6 July 2016 (ICR-1), 5 July 2016 (ICR-2) and 14 August 2015 (ICR-3). That said, no activities or alterations were observed on the ICR Disks after 6 July 2016.

There is insufficient information to verify the Russian Expert claim that the ICR Disks were created using Server One and the LIMS server or that they (i.e. ICR Disks) were either currently or previously in use by Server One and the LIMS server.

However, the suggestion that the ICR Disks were either currently or previously in use in Server One and the LIMS server does not explain the fact that all the activities have creation timestamps on a single day.

The estimated 110 Raw Data and 120 PDF files missing from the ICR Disks indicates that data on the ICR Disks may not be complete.

The fact that PDF files are only found in deleted state in free space on Disk ICR-2 raises questions about the integrity and completeness of data on the ICR-2 Disk.

The fact that PDF files found only in deleted state in free space on Disk ICR-2 contain incongruities that indicate their content was altered after the original file creation, raises questions about the integrity and completeness of data on the Disk ICR-2.

Files found in deleted state in free space do not have any associated file system metadata and, therefore, it cannot be stated when they were copied or deleted on the disk.

Expert Meeting

During the expert meeting, Russian Experts did not provide evidence or further technical material which required the Independent Experts to revisit their reported findings.

Minister Kolobkov has personally undertaken to ensure Russian Experts investigate the fabricated, modified and deleted Forum Messages as well as the instances of deleted and manipulated LIMS data between 6 and 9 January 2019.

Impact

Raw Data and PDFs

There are 110 Raw Data files and 120 PDFs absent from the Moscow Data that are material to the investigation of Target Group athletes.

The absence of Raw Data and PDF files appears targeted and has materially affected the ability to pursue ADRVs against the respective athletes.

Minister Kolobkov has personally undertaken to ensure all possible efforts are made to locate and recover all absent Raw Data files.

To date, 9 Initial Testing Procedure (ITP) Raw Data files have been identified which are suspected to have been manipulated.

Independent Experts observed no digital trace of manipulation in the 9 ITP Raw Data files.

Manipulation of Raw Data appears restricted to ITP Raw Data.

Raw Data manipulation appears restricted to instances where there is a discrepancy between the WADA LIMS and Moscow LIMS.

ThermoFisher continue to investigate the ability to identify digital trace evidence of Raw Data file manipulation.

Doping Violations

To date, the Intelligence and Investigations Department has identified and forwarded prospective ADRV cases to the International Weightlifting Federation (IWF) (41 athletes), United World Wrestling (1 athlete), World Taekwondo (2 athletes) and the International Canoe Federation (ICF) (1 athlete).

Of the 41 cases provided to the IWF, 12 athletes have been "notified" of ADRV proceedings and provisionally suspended. Notably, upon review of the case, the ICF has declined to pursue an ADRV against the athlete.

The Intelligence and Investigations Department has also provided the International Association of Athletics Federations (**IAAF**) with the data of all IAAF athletes, including that of the 66 IAAF athletes included in the Target Pool.

Two cases have also been commenced by the International Biathlon Union (**IBU**) against two athletes outside of the Target Group.¹⁷ The Intelligence and Investigations Department are assisting the IBU in this regard.

The targeted reanalysis of samples retrieved from the Moscow Laboratory as part of the Reinstatement Conditions has, to date, resulted in **14** Adverse Analytical Findings (**AAFs**) from 94 samples reanalysed. The 14 AAFs come from three International Federations. Results Management of the 14 AAFs is being undertaken by RUSADA with the close assistance of the Intelligence and Investigations Department.

Conclusion

Taken in its totality, the above evidence is capable of establishing, to the required standard of proof, that the Moscow Data was intentionally altered prior and during to it being forensically copied by WADA. To this end, the Reinstatement Conditions are not fulfilled in that the Moscow Data is neither a complete nor authentic copy.

¹⁷ These two cases have discrepancies between the 2015 LIMS and 2019 LIMS.

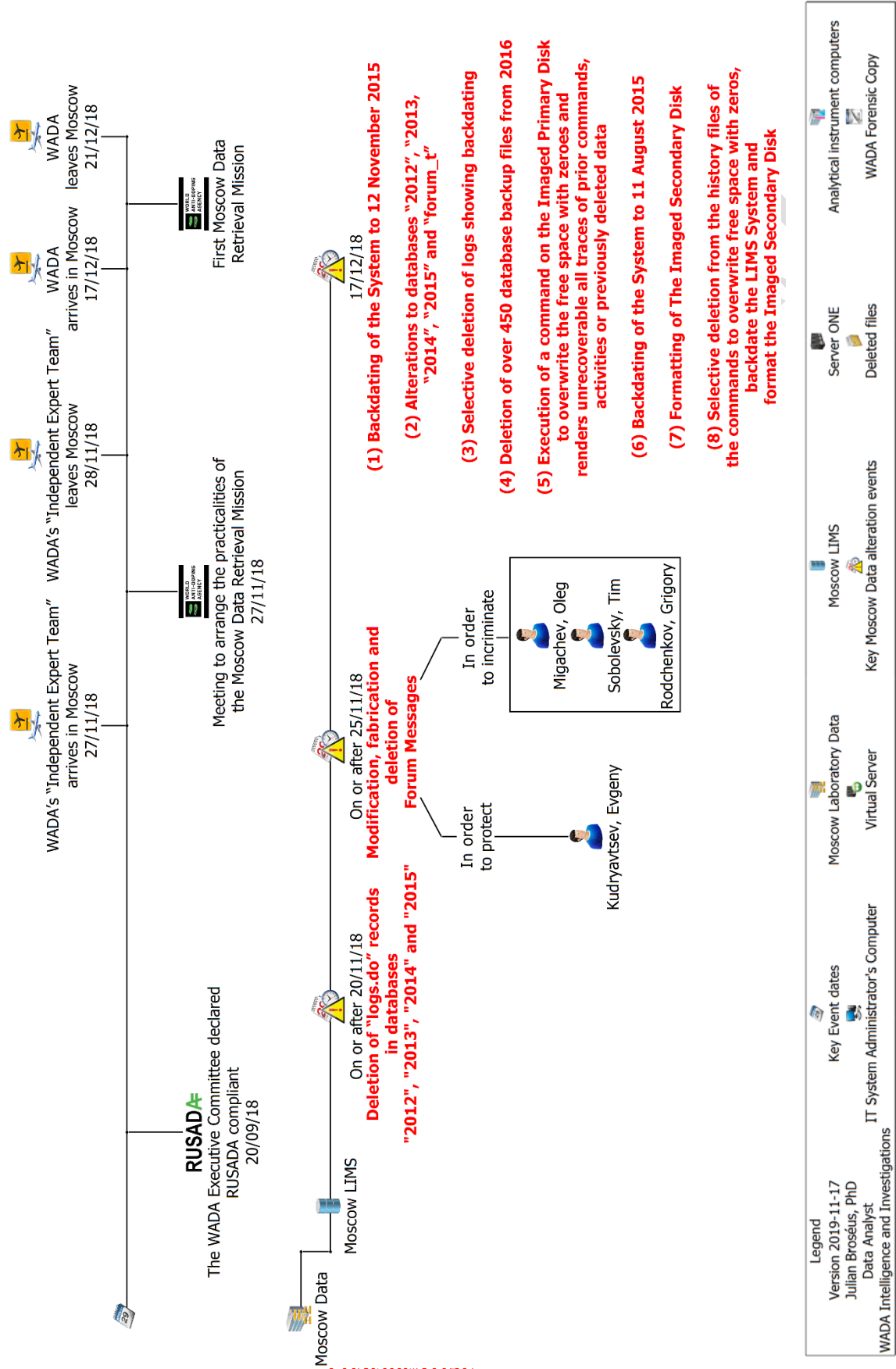
3 EVENT CHARTS

The following are a pictorial representation of key events associated with data manipulation.

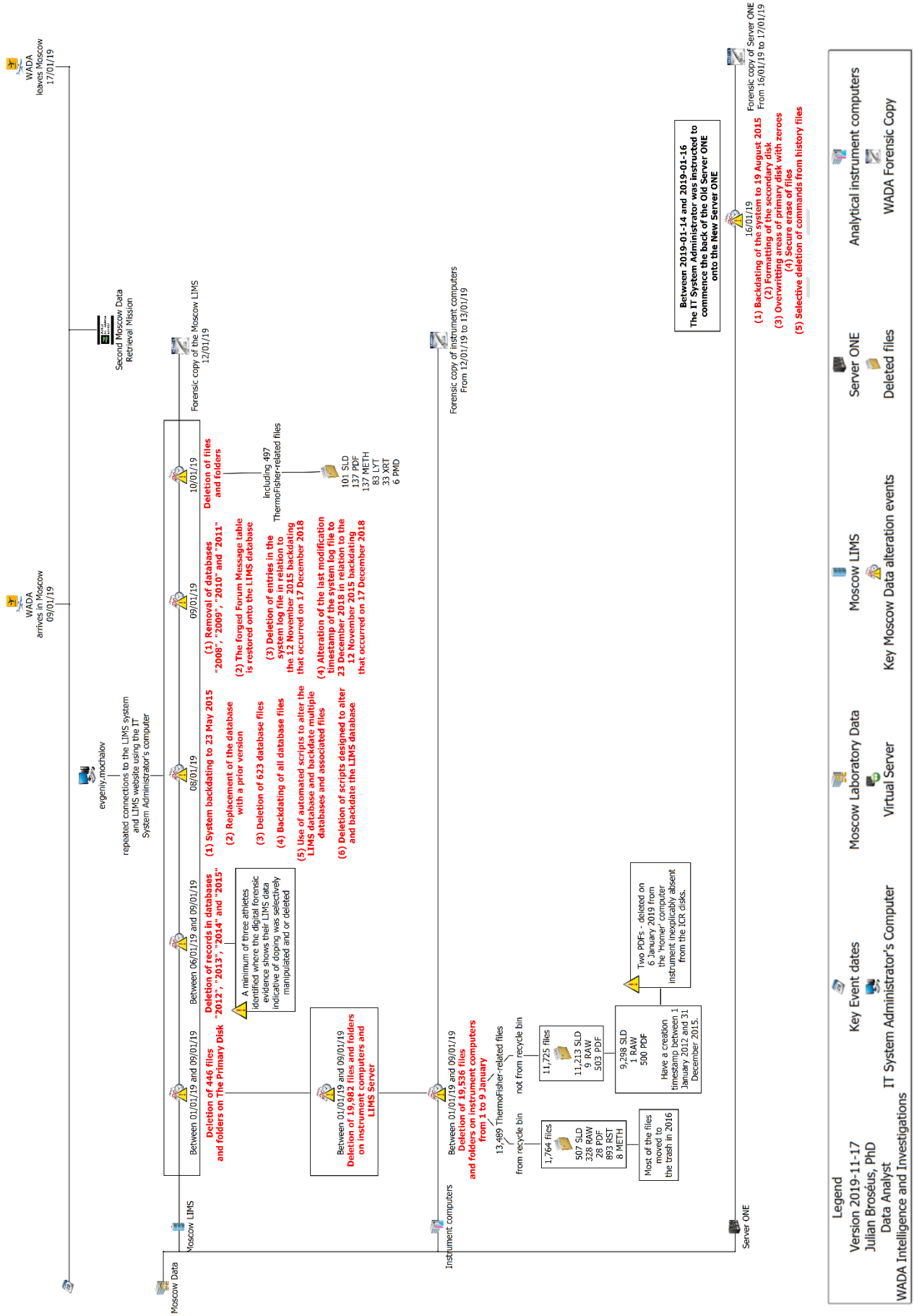
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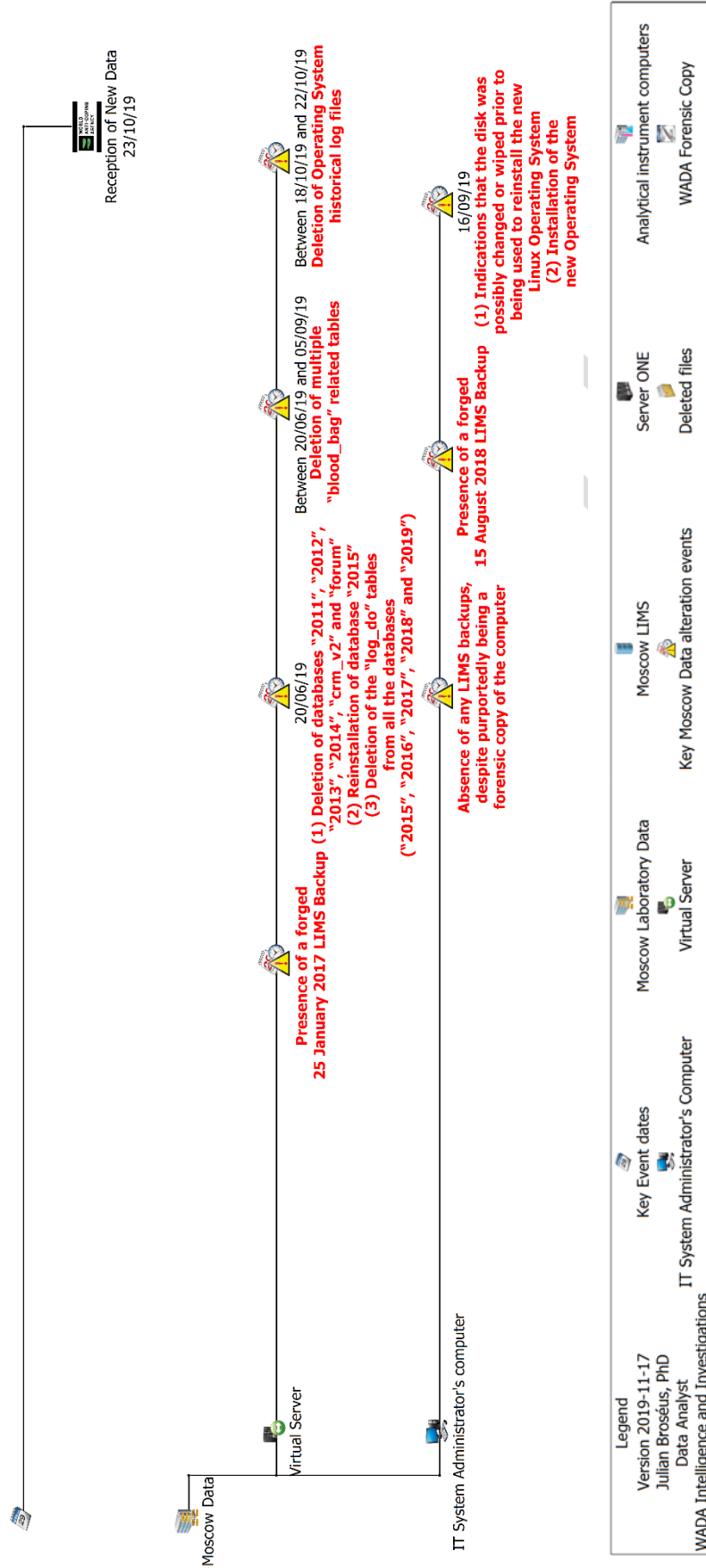
November to December 2018 alterations of the Moscow Data



January 2019 alterations of the Moscow Data



Alterations of the New Data



4 KEY EVENTS

On **18 November 2015**, the Russian Anti-Doping Agency (**RUSADA**) was declared “*non-compliant*”.

On **30 October 2017**, the Intelligence and Investigations Department obtained the “*WADA LIMS*”.¹⁸

On **12 June 2018**,¹⁹ Russian Minister for Sport, Pavel Kolobkov (**Minister Kolobkov**), informed WADA that the “*Moscow Data*”²⁰ and “*Moscow Samples*” were controlled by the Investigative Committee of Russia (**Investigative Committee**) and, therefore, inaccessible.

On **13 September 2018**,²¹ Minister Kolobkov publicly acknowledged that “*a number of individuals within the [Russian] Ministry of Sport (Ministry) and its subordinate entities, such as [the] Moscow and Sochi Laboratories*” were involved in the manipulation of the anti-doping system in Russia.

On **20 September 2018**, RUSADA was declared “*compliant*” subject to the production of the Moscow Data and the Moscow Samples (**Reinstatement Conditions**).

On **25 September 2018**, the World Anti-Doping Agency (**WADA**) instructed the Compliance Review Committee (**CRC**) to monitor Russia’s²² compliance with the Reinstatement Conditions. Instances of non-compliance were to be reported.

On **15 November 2018**, WADA proposed to Minister Kolobkov to hold a meeting in Moscow on 27 November 2018 to arrange the practicalities of obtaining the Moscow Data (**Data Retrieval Mission**).

On **19 November 2018**, Minister Kolobkov confirms in a letter to WADA the meeting.

On **27 November 2018**, WADA’s “*Independent Expert Team*” arrived in Moscow to discuss the operational issues of the Data Retrieval Mission. In a subsequent meeting, the Independent Expert Team was advised that the Moscow Data was controlled by the

Investigative Committee and Russian law prohibited its removal from Russia.

On **28 November 2018**, the Independent Expert Team left Moscow.

On **17 December 2018**, WADA representatives (**Data Retrieval Team**) arrived in Moscow to obtain the Moscow Data. Conditions imposed by the Investigative Committee for obtaining the Moscow Data were forensically unsound and contrary to the Reinstatement Conditions. Consequently, the Moscow Data was not collected.

On **20 December 2018**, the Data Retrieval Team visited the Moscow Laboratory and inspected the Moscow Data “*hardware*” (e.g. instrument computers, servers), under the supervision of the Investigative Committee.

On **21 December 2018**, the Data Retrieval Team left Moscow.

On **25 December 2018**, the “*Independent Expert*”²³ of the Data Retrieval Team published a report to the CRC on the failed data retrieval mission.

On **9 January 2019**, the Data Retrieval Team returned to Moscow to collect the Moscow Data.

On **10 January 2019**, the Data Retrieval Team entered the Moscow Laboratory and commenced forensic imaging of the Moscow Data, under the supervision of the Investigative Committee.

On **14 January 2019**, following a request by Russian Experts, WADA agreed to allow the System Administrator to backup Server One to a new server to protect against data loss during forensic imaging of Server One.²⁴

On **16 January 2019**, by the afternoon, the System Administrator had completed the backup of Server One and WADA commenced forensic imaging of the six disks.

On **17 January 2019**, forensic imaging of the Moscow Data concluded. The Investigative Committee and the

Server One (“1”) and its component hard-drives; and 19 instrument computers.

²¹ Letter from Minister Kolobkov dated 13 September 2018.

²² In this context, “*Russia*” means the Russian Anti-Doping Agency and the Ministry of Sport for the Russian Federation.

²³ Doctor Jose Antonio Pascual Esteban.

²⁴ Russian Experts were concerned that Server One may not restart after forensic imaging due to its been an old server.

¹⁸ Samples analyzed by the Moscow Laboratory between 1 January 2012 and 31 August 2015.

¹⁹ Letter from Russian Minister for Sport, Pavel Kolobkov (“*Minister Kolobkov*”), dated 12 June 2018.

²⁰ The “*Moscow Data*” is comprised of two LIMS hard-drives (a “*primary*” and “*secondary*”); three hard-drives (ICR-1 [Serial No.: WD30EZR], ICR-2 [Serial No.: WCC4N76LOUAY] and ICR-3 [Serial No.: S1Z042P4]) removed from the Laboratory’s file server in the instrument room by the Investigative Committee on 21 July 2016;

Data Retrieval Team received identical copies of the Moscow Data. The Data Retrieval Team then left Moscow with a copy of the Moscow Data.

On **17 January 2019**, the “*Data Retrieval Mission Report*” was published to the CRC.

On **14 February 2019**, WADA invited Minister Kolobkov to Montreal to review the progress of investigations into the authenticity of the Moscow Data.

On **22 March 2019**, representatives of Minister Kolobkov attended WADA and received a detailed briefing of investigations conducted to date.

On **27 April 2019**, Minister Kolobkov advised WADA that Russian Experts had completed their analysis (**Russian Technical Report**) of the Moscow Data and he proposed to share those results with WADA. WADA accepted the offer.

On **15 May 2019**, the “*Preliminary Report*” was published to the CRC. Evidence of data manipulation was identified.

On **20 May 2019**, the Preliminary Report was provided to Minister Kolobkov.

On **26 June 2019**, the CRC directed investigations be conducted into whether RUSADA and the Ministry had complied with the Reinstatement Conditions. More specifically, the requirement to provide a complete and authentic copy of the Moscow Data.²⁵

On **27 June 2019**, WADA requested Minister Kolobkov provide a copy of the Russian Technical Report.

On **31 July 2019**, WADA invited the Minister and Investigative Committee to a meeting in Lausanne²⁶ (**Switzerland Meeting**) to be updated on the investigation.

On **31 July 2019**, WADA provided the Minister and Investigative Committee with a list of 24 questions (**Authentication Questions**) relevant to the investigation. A response deadline of 26 August 2019 was set.

On **16 August 2019**, due to “*planned summer holidays*” the Minister sought an alternate date to the Switzerland Meeting.

On **19 August 2019**, WADA proposed an alternate, but earlier meeting date.

On **26 August 2019**, Minister Kolobkov accepted the original Switzerland Meeting date. Minister Kolobkov answered the Authentication Questions and posed 14 questions (**Russian Questions**) on behalf of the Russian Experts. Minister Kolobkov also provided a statement of general facts (**Russia Statement of Facts**)²⁷ concerning authentication of the LIMS system.

On **5 September 2019**, the Switzerland Meeting occurred. During the meeting, the Russian Questions were answered. WADA again requested a copy of the Russian Technical Report.

On **6 September 2019**, the “*CRC Report*” was published to the CRC. This report included a technical report (**WADA Technical Report**) from the Independent Experts.²⁸ In response to the report, the CRC directed further specific investigations be conducted by the Independent Experts.

On **9 September 2019**, WADA again requested Minister Kolobkov provide a copy of the Russian Technical Report.

On **17 September 2019**, the CRC Report was provided to Minister Kolobkov. The report included a copy of the WADA Technical Report and 31 “*Technical Questions*” posed by the Independent Experts to assist their investigation of the Moscow Data.

On **30 September 2019**, WADA requested Minister Kolobkov provide a copy of the “*Russian Technical Report*”.

On **8 October 2019**, Minister Kolobkov provided a folio of technical documents. This folio comprised the Russian Technical Report,²⁹ “*Counter Research*”³⁰ conducted by Russian Experts in response to the WADA Technical Report and answers to 23 of the 31 Technical Questions.³¹

On **11 October 2019**, the Intelligence and Investigations Department advised the CRC that the Russia Forensic Investigation identified, potentially, four additional data sources (**New Data**) relevant to the Reinstatement Conditions. The existence of the New Data was not previously known to WADA.

²⁵ Compliance Review Committee Minute dated 26 June 2019. This document has not been included in this report.

²⁶ On 5 September 2019.

²⁷ Attachment B – Russia Statement of Facts.

²⁸ Attachment A - Digital Forensic Examination Report “*PFS 19.0333*”, dated 15 August 2019 (“*WADA Technical Report*”). This

report was previously named “*Digital Forensic Report 2*” in the CRC Report.

²⁹ Attachment C (“*Russian Technical Report*”).

³⁰ Attachment D (“*Counter Research*”).

³¹ Attachment E (“*Attachment E - Answers to Technical Questions*”).

On **15 October 2019**, WADA requested Minister Kolobkov immediately procure the New Data and produce it to WADA no later than 23 October 2019. Minister Kolobkov was also asked to provide a response to each of the eight unanswered questions by the same date.

On **22 October 2019**, Minister Kolobkov provided answers to the eight unanswered Technical Questions.³²

On **23 October 2019**, the New Data was produced to the Intelligence and Investigations Department in Geneva, Switzerland.

On **8 November 2019**, Independent Experts produced three reports, namely:

- (i) A forensic analysis of content alterations within the Moscow Data (**WADA Alteration Report**);³³
- (ii) an evaluative assessment of the Russia Forensic Investigation (**WADA Evaluation Report**);³⁴ and
- (iii) An authentication assessment of the ICR Disks (**WADA ICR Disk Report**).³⁵

On **11 November 2019**, the Intelligence and Investigations Department published a preliminary report to the CRC primarily detailing the results of the Independent Expert evaluation of the Russia Forensic investigation.

On **13 November 2019**, Independent Experts produced a forensic analysis of the New Data (**WADA New Data Report**).³⁶

On **14 November 2019**, the Intelligence and Investigations Department and Independent Experts met with Minister Kolobkov and the Russian Experts in Lausanne, Switzerland.

On **15 November 2019**, the Intelligence and Investigations Department published a report to the CRC primarily detailing the results of the Independent Expert assessment of the New Data.

On **17 November 2019**, Intelligence and Investigations Department investigators attended a meeting of the CRC held in Geneva, Switzerland.

On **19 November 2019**, the Intelligence and Investigations Department reported the 14 AAFs (from

the Moscow sample reanalysis program) to RUSADA, the Results Management Authority.

On **20 November 2019**, the Intelligence and Investigations Department published a final report to the CRC combining the 11 November 2019 and 15 November 2019 reports.

³² These have been included in Attachment E.

³³ Attachment H – Forensic Analysis of Content Alterations Report “PFS 19.0425” (“WADA Alteration Report”).

³⁴ See Attachment F - Evaluative Interpretation “PFS 19.0426” (“WADA Evaluation Report”).

³⁵ See Attachment G – Authentication of ICR Disks “PFS 19.0427” (“WADA ICR Disk Report”).

³⁶ See Attachment I – WADA New Data Report “PFS 19.0431” (“WADA New Data Report”).

5 PURPOSE

This is the final report to the Compliance Review Committee (**CRC**) regarding the Intelligence and Investigations Department investigation of the “*Moscow Data*”.³⁷ More specifically, whether the data provided by Russian authorities in response to the “*Reinstatement Conditions*”³⁸ was an authentic copy.³⁹

The purpose of this report is fivefold.

Firstly, detail the result of the WADA Expert assessment of the “*New Data*” received from Russian Minister of Sport, Pavel Kolobkov (**Minister Kolobkov**), on 23 October 2019.

Secondly, detail the result of the WADA Independent Expert assessment of the “*Russia Forensic Investigation*”⁴⁰ and answers the question whether the Russia Forensic Investigation disturbs the findings of the WADA Technical Report.

Thirdly, detail the result of investigations conducted into the forensic veracity of three disks (**ICR Disks**) purportedly seized from the Moscow Laboratory by the Investigative Committee on 21 July 2016.

Fourthly, detail the result of the meeting between the Independent Experts and Russian Experts held in Lausanne, Switzerland on 14 November 2019.

Lastly, report the impact of the data manipulation and deletion, more specifically missing Raw Data files, on the ability to conduct complete and thorough investigation of “*Target Group*”⁴¹ athletes.

6 OVERVIEW

The Report is organized as follows.

In *Part Seven* (“**Scope**”), the report details the scope of this investigation as mandated by the CRC.

In *Part Eight* (“**Standard of Proof**”), the report details the standard of proof applied by the Intelligence and Investigations Department in the assessment and

³⁷ Moscow Data: Moscow Laboratory’s LIMS database covering the period 1 January 2012 to 31 August 2015, along with the data underlying the findings reported in the LIMS database for that period. The Moscow Data comprises all the Moscow Laboratory servers and computer instruments that were forensically imaged by WADA as part of the Reinstatement Conditions.

³⁸ On 20 September 2018 the WADA Executive Committee reinstated the Russian Anti-Doping agency (“RUSADA”) to the list of Code-compliant Signatories, on condition that RUSADA and the Ministry ‘must procure’ the provision to WADA by 31 December 2018 of the Moscow Data.

establishment of the relevant facts namely, “*comfortable satisfaction*”, having in mind the seriousness of the allegations.

In *Part Nine* (“**Due Process**”), the report details the process of engagement and fairness afforded to Ministry and the Investigative Committee (collectively, “**Russia**”) throughout the entire investigation.

In *Part Ten* (“**Background**”), the report provides an overview of the Russia Forensic Investigation.

In *Part Eleven*, (“**Analysis**”), the report details the results of the analysis conducted of the Russia Forensic Investigation by the Independent Experts.

In *Part Twelve*, (“**ICR Disks**”), the report details the results of investigations conducted into the forensic veracity of the three disks purportedly seized by the Investigative Committee from the Moscow Laboratory on 21 July 2016.

In *Part Thirteen* (“**Forum Messages**”), the report details the results of investigations conducted in the messages exchanged within the LIMS system by Laboratory staff at material times.

In *Part Fourteen* (“**Fabricated Evidence**”), the report details evidence that select Forum Messages have been fabricated, altered and deleted prior to WADA obtaining a forensic copy the Moscow Data.

In *Part Fifteen* (“**New Data**”), the report details the Independent Expert assessment of the New Data.

In *Part Sixteen* (“**Expert Meeting**”), the report details the result of a meeting between Minister Kolobkov, Russian Experts and the Independent Experts held in Lausanne, Switzerland on 14 November 2019.

In *Part Seventeen* (“**Impact**”) the report details the impact of data manipulation and deletion, more specifically missing Raw Data files, on the ability to conduct complete and thorough investigation of Target Group athletes.

In *Part Eighteen* (“**Conclusion**”), the report provides a comprehensive conclusion detailing the results of

³⁹ This report is to be read in conjunction with the “*Preliminary Report*” and “*CRC Report*” published to the CRC on 15 May 2019 and 6 September 2019, respectively.

⁴⁰ This folio is comprised of Russia Statement of Facts, Russia Technical Report, Counter Research and Attachment E - Answers to Technical Questions – See Attachments B, C, D and E, respectively.

⁴¹ Target Group: 298 athletes identified as having the most suspicious LIMS data based on the WADA LIMS.

investigations conducted by the Independent Experts. A comprehensive “*scenario of events*” is also proposed by investigators to better contextualise the totality of evidence discovered to date.

In *Part Nineteen* (“**Annexures**”), the report provides copies of the substantive documents comprising the Russia Forensic Investigation and the four reports produced by the Independent Experts.

In *Part Twenty* (“**Terminology**”), the report decodes the terminology used by the Independent Experts in assessing and describing the evidence strength of any observed (trace) digital forensic evidence.

7 SCOPE

7.1.1 Background

The CRC is required to evaluate whether RUSADA and the Ministry (collectively, “*Russia*”) has provided an “*authentic*” copy of the Moscow Data.

On 15 May 2019, the Preliminary Report identified evidence of data manipulation.

On 26 June 2019, the CRC directed investigation of the alleged data manipulation. However, “*to be efficient as possible, and because it may not be necessary to expand the scope if the initial results are definitive*”, the CRC narrowed the initial scope of the investigation focusing on events “*around*” 8 January 2019.⁴²

On 6 September 2019, the CRC Report identified evidence of data manipulation between 17 December 2018 and 10 January 2019.

7.1.2 Mandate

On 9 September 2019, the CRC directed Independent Experts review the Russia Forensic Investigation and assess its forensic rigor with a view to identifying those aspects which they agree and those which they do not agree. The Experts are requested to provide forensic evidence in support of their opinions.

The Independent Experts were also required to assess what, if any impact, the Russia Forensic Investigation has on their own forensic findings (WADA Technical Report).

⁴² Compliance Review Committee Minute dated 26 June 2019. This document has not been included in this report.

8 STANDARD OF PROOF

In the event of a dispute, the allegation of non-compliance will be determined by the Court of Arbitration for Sport (**CAS**).

The standard of proof applicable in any CAS proceeding is one of “*comfortable satisfaction*”. Accordingly, the Intelligence and Investigations Department has adopted this standard in its assessment of evidence in this case.

As detailed in the CRC Report, Independent Experts were previously provided with an explanatory note detailing the meaning and application of the “*comfortable satisfaction*” standard of proof prior to the finalization of their report.

9 DUE PROCESS

As outlined above (see **Part 4**, “**Key Events**”), this investigation has continued to be conducted fairly and in accordance with the principles of natural justice and due process.

10 BACKGROUND

This is a highly protracted and complex investigation. Comprehension is assisted by first providing a general overview of the findings of the Intelligence and Investigations Department investigation as reported to the CRC on 6 September 2019 (**CRC Report**) and the Russia Forensic Investigation. This report then details the results of the Independent Experts’ in-depth evaluation of the Russia Forensic Investigation (see **Part 10**, “**Analysis**”).

In short, the purpose of the evaluation was to see if the Russia Forensic Investigation disturbed the findings of the Independent Experts as detailed in WADA Technical Report.⁴³

10.1 WADA INVESTIGATION

On 6 September 2019, the Intelligence and Investigations Department advised the CRC that, for the following reasons, the Moscow Data was neither complete nor authentic.

First, on **17 December 2018**, “*a*” “*secondary*” disk connected to the LIMS computer was formatted while

⁴³ Attachment A – WADA Technical Report.

the system was backdated, thereby making it appear the formatting occurred on 11 August 2015.

Second, on **17 December 2018**, over 450 database backups of the Moscow LIMS database created in 2016 were deleted from the LIMS server.

Third, on **6 January 2019**, 10,565 files and folders were deleted from the Moscow Laboratory computers including, 7,309 “sequence” files, 336 Raw Data files and 187 PDFs.^{44 45} These types of files contain the most relevant anti-doping data. Notably, Independent Experts have since reviewed these figures and now assert that **15,325** files and folders were deleted on 6 January 2019 from the Moscow Laboratory servers and instrument computers. They include **11,720** “sequence” files, **337** Raw Data files and **531** PDFs.

Fourth, recovered “back-up” versions of LIMS database contain case relevant records that were deleted after **6 January 2019** but before **9 January 2019**.

Fifth, on **8 January 2019**, data in LIMS database, were deleted while the LIMS system was backdated, thereby making it appear the deletions occurred on 23 May 2015. A total of 623 files from 9 folders⁴⁶ were deleted on this occasion.

Sixth, automated scripts were discovered on the LIMS “primary” disk which were designed to alter the time and date of the LIMS system before data was imported into the LIMS database, thereby making it appear the data updates had occurred on earlier dates.

Seventh, on **9 January 2019** (most likely at 9:10PM), the 2008, 2009, 2010 and 2011 LIMS databases were “removed” from the LIMS database.

Eighth, on **10 January 2019**, 101 “SLD” (Sequence) files and 137 PDFs were deleted from The Primary Disk.⁴⁷

Ninth, log files show connections to the LIMS system from IP address 192.168.0.19 around the times the data alterations and deletions were made in January 2019. This IP address appears most often assigned to a computer from which the user authenticates on the LIMS website as “evgeniy.mochalov”. Evgeniy Mochalov (**Mr Mochalov**) is the IT manager of the

Moscow Laboratory since October 2016 and the husband of the current Moscow Laboratory “Interim” Director, Elena Mochalova (**Director Mochalova**). Mr Mochalov was heavily involved in retrieval of data by the Independent Experts in January 2019.

Tenth, on the systems examined, no traces of remote access (meaning from outside the local network) were found, generally, and more specifically during the time when the alterations were made in January 2019.

10.2 RUSSIA INVESTIGATION

On 8 October 2019, in response to the CRC Report, Russian authorities provided a folio of technical material (“Russia Forensic Investigation”) countering any suggestion of data manipulation. The folio revealed the existence of New Data.

On 23 October 2019, the New Data was produced to the Intelligence and Investigations Department in Geneva, Switzerland.

10.2.1 The Russian Case

In short, Russian authorities assert compliance with the Reinstatement Conditions and deny data manipulation. Moreover, the Moscow LIMS has been so contaminated with “falsified results” by Doctor Grigory Rodchenkov (**Doctor Rodchenkov**) and others, that it is of no evidentiary value and the only reliable evidence is Raw Data and samples where such exists.⁴⁸

In asserting this position, the Russian case is argued on three fronts. Firstly, the CRC investigation was incomplete and flawed (**The Investigation**). Secondly, the Moscow LIMS was a broken and antiquated system, designed under the supervision of Doctor Rodchenkov and others for unlawful financial gain (**Criminal Enterprise**). Lastly, WADA has mistaken human error and system malfunction as data manipulation (**The Circumstances**). Each will be examined in turn.

10.2.2 The Investigation

Russian authorities criticized the narrow mandate of the CRC investigation. More specifically, the focusing on events between 17 December 2018 and 10 January

⁴⁴ Following the completion of the analysis of a sample aliquot, an Initial Testing Raw Data file is created by the analytical instrument. A PDF is then generated from the Raw Data. A PDF contains information such as the Raw Data and Instrument Computer names as well as the operator and the date of analysis. More importantly, the PDF indicates whether prohibited substances were detected in the sample aliquot.

⁴⁵ Attachment A – WADA Technical Report, (Appendix *File_deleted_timestamp*).

⁴⁶ The files were deleted from the folders named “2012”, “2013”, “2014”, “2015”, “crm”, “crm_v2”, “forum”, “mysql” and “ref_urine”.

⁴⁷ The files were deleted from the folders named “2012”, “2013”, “2014”, “2015”, “crm”, “crm_v2”, “forum”, “mysql” and “ref_urine”.

⁴⁸ Attachment C - Russian Technical Report (Part 2), pages 59-62.

2019. Russia assert this has prevented Independent Experts from gaining a complete and true understanding of the LIMS system, its anomalies and shortcomings.⁴⁹

Consequently, the work of the Independent Experts is not objective, and their findings are improperly “one-sided” and incorrect.⁵⁰

Russian authorities also criticized purported inconsistencies between the content of the CRC Report and the WADA Technical Report.⁵¹

10.2.3 Criminal Enterprise

The case for the criminal enterprise and the frailty of the LIMS data is premised upon the following five evidential pillars. Each will be examined in turn.

Firstly, the Moscow LIMS was designed by Oleg Migachev (**Mr Migachev**) to further a criminal enterprise orchestrated by Doctor Rodchenkov and Doctor Timofey Sobolevsky (**Doctor Sobolevsky**) (**System Design**).⁵²

The criminal enterprise was the falsification of analysis results to coerce money from athletes and coaches.⁵³

Second, the Moscow LIMS was designed to allow the analysis results of select samples to be “hidden” from other users (**Restricted Records**).⁵⁴

Third, embedded within the LIMS was a “Message Exchange Platform” which enabled users to message (text) other users within the system. Messages were observed which show Doctor Rodchenkov and Doctor Sobolevsky discussing their criminal enterprise (**Forum Messages**).⁵⁵

Fourth, the Moscow LIMS system and all associated data, including PDFs, could be accessed remotely. Moreover, the system was remotely accessed by Doctor Sobolevsky and Mr Migachev after their resignations

from the Moscow Laboratory in August 2015 (**Remote Access**).⁵⁶

Lastly, inconsistency between some Raw Data files and their associated PDFs was observed, as was evidence of PDF manipulation (**Data Manipulation**).⁵⁷

10.2.3.1 System Design

The Moscow LIMS was a “personal initiative” developed, ostensibly, by Mr Migachev⁵⁸ under the “supervision” of Doctor Rodchenkov.⁵⁹

The LIMS system was “deeply integrated within the activity of the Laboratory” and automated actions within the Moscow Laboratory for the “reception, registrations and analysis of doping samples”.⁶⁰

However, embedded within the system were “mechanisms” (automated scripts) designed to manipulate information and modify “targeted” PDFs. According to Russian Experts, these mechanisms were “developed [and] used exclusively” under Doctor Rodchenkov’s leadership.⁶¹ Moreover, “hard evidence” exists that automated deletion programs existed on the analytical instrument computers and that these programs were used by “staff” between 2010 and 2015.⁶²

10.2.3.2 Restricted Records

Access to the LIMS system was restricted to “registered” users. Over the life of the system, 107 users have been registered.⁶³

A user’s “rights” within the system (to view data or carry out operations) are recorded in the “user-rights” table of the database.⁶⁴ Such rights are determined by the “system administrator”.⁶⁵

Seven past and current users have enjoyed “comprehensive” or full “administrator rights”, namely:⁶⁶

⁴⁹ Attachment D - Attachment D - Counter Research, page 4.

⁵⁰ Attachment D - Attachment D - Counter Research, page 2.

⁵¹ Attachment D - Attachment D - Counter Research, page 2.

⁵² Attachment C - Russian Technical Report (Part 1), pages 3-4.

⁵³ Attachment C - Russian Technical Report (Part 1), page 6.

⁵⁴ Attachment C - Russian Technical Report (Part 1), pages 4, 19; see also Attachment D - Counter Research, page 6.

⁵⁵ Attachment C - Russian Technical Report (Part 1), page 6.

⁵⁶ Attachment C - Russian Technical Report (Part 1), page 4.

⁵⁷ Attachment C - Russian Technical Report (Part 1), page 4; see also Russian Technical Report (Part 2), pages 61-62.

⁵⁸ Mr Migachev is the husband of Doctor Timofey Sobolevsky (“Doctor Sobolevsky”).

⁵⁹ Attachment C - Russian Technical Report (Part 1), page 3.

⁶⁰ Attachment C - Russian Technical Report (Part 1), page 3.

⁶¹ Attachment C - Russian Technical Report (Part 1), page 4; see also Russian Technical Report (Part 2), page 62.

⁶² Attachment D - Counter Research, page 22.

⁶³ Attachment C - Russian Technical Report (Part 1), page 12.

⁶⁴ See “adc.user” database.

⁶⁵ Attachment C - Russian Technical Report (Part 1), page 12; see also Attachment D - Counter Research, page 6.

⁶⁶ Attachment C - Russian Technical Report (Part 1), pages 12-13.

- (i) Doctor Sobolevsky;
- (ii) Mr Migachev;
- (iii) Doctor Rodchenkov;
- (iv) Marina Dikunets;⁶⁷
- (v) Grigory Dudko;⁶⁸
- (vi) Evgeniy Mochalov;⁶⁹ and
- (vii) Elena Mochalova.⁷⁰

Mr Mochalov and Director Mochalova are the only current users with “comprehensive” rights. Doctor Sobolevsky, Mr Migachev, Doctor Rodchenkov and Marina Dikunets are no longer employed at the Moscow Laboratory.

Evidence of restricted “records” (**Restricted Records**) within the LIMS was observed. More specifically, data within the “found”⁷¹ table could be restricted to specific users and not visible to “normal” users.⁷²

The “found” table house the result of the Initial Testing Procedure (ITP) analysis.

By entering a value of either “1” or “0” in the “do” column of the “found” table, the System Administrator could control whether an analysis result was visible to all users (“1”) or, visible to only select users (“0”).⁷³

Restricted Records had the ability to mislead normal users. For instance, assuming an ITP reported a Presumptive Adverse Analytical Finding (AAF) or Atypical Finding in a sample, if this record was restricted (“0”), the “found” table would be blank and the “normal” user would assume the analysis was ‘negative’ because the absence of data within the “found” table is interpreted as a negative ITP.

Russian Experts analyzed the Raw Data and PDF files for the Restricted Records and identified those samples that were restricted (“hidden”) from the normal user and where the Raw Data and PDF files showed the presence of a Prohibited Substance. In other words, the Raw and PDF files show the presence of Prohibited

Substances as indicated in LIMS but “hidden” to a normal user.

Russian Experts also identified samples that were restricted (“hidden”) and the Raw Data showed the presence of a Prohibited Substance, but the associated PDF file did not. This discovery, for the Russian Experts, suggested the PDF had been manipulated to ‘negative’ (i.e. no Prohibited Substances present) to corroborate the “hidden” nature of the records in LIMS.⁷⁴ Within the normal practice of the Moscow LIMS, the absence of an entry in the “found” table signaled to a user that the analysis was negative. Obviously, no entry in the “found” table but a PDF reporting a Presumptive AAF would be highly suspicious.

Notably, Restricted Records were first identified by the Intelligence and Investigations Department in November 2017, and their existence communicated to the Investigative Committee shortly thereafter in a failed attempt to gain their cooperation in pursuing cases of doping identified within the LIMS.⁷⁵ In addition, Restricted Records were discussed in an affidavit of WADA Senior Investigator Aaron Walker that was released to over 60 International Federations on 14 December 2017.

Restricted Records were also subject of discussion in an affidavit from Doctor Rodchenkov released by the Intelligence and Investigations Department to over 40 International Federations on 14 December 2017. In his affidavit Doctor Rodchenkov stated:⁷⁶

*“In order to accurately manage and track Samples that were subject of a “SAVE” directive, a hidden section of LIMS was created (**Hidden LIMS**). Access to the Hidden LIMS section was restricted and inaccessible to an authorized LIMS user. Additionally, only personnel involved in the [protection of Russian athletes] knew about the existence of Hidden LIMS. I had unrestricted access to the Hidden LIMS but did not routinely access Hidden LIMS. By having Hidden LIMS access, a user could identify those Samples that were subject to the Disappearing Positive methodology. For those Samples, the original PDF Reports contained in Hidden*

⁶⁷ Former Director of the Moscow Laboratory who replaced Doctor Rodchenkov.

⁶⁸ Current IT Manager, Moscow Laboratory.

⁶⁹ Current IT Manager and System Administrator for the Moscow Laboratory.

⁷⁰ Current “Acting” Director of the Moscow Laboratory.

⁷¹ The “found” table was called “scr_results” table in 2012. It was renamed the “found” table in 2013.

⁷² Attachment C - Russian Technical Report (Part 1), page 4.

⁷³ Attachment C - Russian Technical Report (Part 1), page 10.

⁷⁴ Attachment C - Russian Technical Report (Part 1), pages 21-29 and Russian Technical Report (Part 2), page 39-59.

⁷⁵ The Investigative Committee were provided a case example of a female Russian athlete involving Restricted Records. The athlete’s name has not been included for privacy reasons. However, it can be provided upon request.

⁷⁶ See 6 December 2017 affidavit of Doctor Rodchenkov, [75]. This document has not been included in this report. It may be provided upon request.

LIMS would provide precise and compelling evidence of the methodology and Russia's protection of doped Russian Athletes. The original Electronic Data Files remain in Russia."

10.2.3.3 Forum Messages

A "Message Exchange Platform" existed within the LIMS that allowed text communication (**Forum Message**) between staff. Forum Messages are visible only to the involved parties, in other words, the sender and recipient. However, the System Administrator can view all messages.⁷⁷ Forum Messages are also logged in the "log_do" table of the LIMS system.

The parties to a Forum Message are identified via a unique identifier,⁷⁸ for example, the "identification" numbers of Doctor Rodchenkov, Doctor Sobolevsky and Mr Migachev were 20, 1 and 2, respectively. Forum Messages are also timestamped, and their content stored.⁷⁹

Following analysis that included "linguistic tests", a "stable group" was identified within the Forum Messages. This group comprised Doctor Rodchenkov, Doctor Sobolevsky and Mr Migachev.⁸⁰

In terms of relevance, the centerpiece were messages observed between Doctor Rodchenkov and Doctor Sobolevsky which explicitly and openly "discussed the matter of [receiving] money from sportspeople and trainers for the manipulation" of analysis results.⁸¹ For example:⁸²

Sender	Forum Message
GR	"spoke with HO, 2780034, 2780424, 2780489 we clearly don't pony up !!!!! Don't throw anyone out... Do all the files for the scheme and you'll get a bonus"
TS	"Kudryatsev is not giving out the aliquote, he's asking for a request! I suggest that we let Kudryatsev into our sample scheme. We need to explain point blank that we create the appearance of dirty samples and sportspeople and their trainers give us bonuses. Otherwise he will grow suspicious and be unlikely to issue re-runs without requests. This work requires

⁷⁷ Attachment C - Russian Technical Report (Part 1), page 13; see also Counter Research Report, page 7.

⁷⁸ The unique identifiers for each staff member was recorded in the "adc.user" database.

⁷⁹ Attachment C - Russian Technical Report (Part 1), page 13; see also Counter Research Report, page 7.

⁸⁰ Attachment C - Russian Technical Report (Part 1), page 13.

	accuracy. Or tell him to show off and provide the aliquotes. I much prefer Option 2)"
GR	"Tim, calm down. I'll talk with them later. Everything's good"
TS	"do we have any news on the heavy Katina 11712? She has str, so much time has passed..."
GR	"it's not possible to put it in Adams yet. Just wait a little. We have to admit, our Syrtzov all... flat and maintenance and dacha..."
TS	"Katina doesn't have any, I took it all. I'll stop by when you get back"
GR	"Timothy, I cannot reach you. They are bringing 3 samples today т/а. collect them and check them as soon as possible. The envelope should still be there. Don't worry"
TS	"it's totally fucked up there. Oral turinabol, OXA, tren. For your examination"
GR	"here you are blockhead"

Russian authorities assert that these Forum Messages evidence both a general scheme of extortion and a specific example, namely discussions regarding "Katina 11712".

The Russian Experts assert "Katina" is "probably" Russian weightlifter "Ekaterina Katina" (**Athlete**), the number "11712"⁸³ is a sample Laboratory Code and the letters "str" denote "steroids". This sample was also a Restricted Record.⁸⁴

In the exchange Doctor Rodchenkov tells Doctor Sobolevsky not to report the analysis results to ADAMS but wait for "payment of some syrtzov". The phrase "flat and maintenance and dacha" is interpreted as a suggestion by Doctor Rodchenkov of how they could spend the money namely, the purchase of "properties (flats) [to] renovate".⁸⁵

In the later message Doctor Sobolevsky is said to have met with the Athlete, "collected everything" and will stop by and see Doctor Rodchenkov when he gets back. In the reply message from Doctor Rodchenkov, the

⁸¹ Attachment C - Russian Technical Report (Part 1), pages 6 and 13.

⁸² Attachment C - Russian Technical Report (Part 1), page 14.

⁸³ Sample Code 2946637 collected on 5 September 2014.

⁸⁴ Attachment C - Russian Technical Report (Part 2), page 41.

⁸⁵ Attachment C - Russian Technical Report (Part 1), page 15.

reference to “*envelope*” is interpreted as an envelope containing money.⁸⁶

The “*modified PDF*” obtained from the LIMS for sample 11712 did “*not show any signs of the presence*” of Prohibited Substances.⁸⁷

The Forum Messages are discussed in detail later in this report (see **Part 14, “Fabricated Evidence”**).

10.2.3.4 Remote Access

Evidence of remote access to the LIMS system was observed. More specifically, remote access to the “*web interface*” of the LIMS system by Doctor Sobolevsky and Mr Migachev.⁸⁸

Once remotely accessed to the system, a user was free to access “*any information*” stored within the LIMS⁸⁹ and Server “1”.⁹⁰ Moreover, a “*pdf_data*” link existed within the “*web-server directory*”⁹¹ that allowed a user to remotely access PDFs⁹² and substitute those files (PDFs) with other sample test results.⁹³

The last observed instance of remote access was via Doctor Sobolevsky’s user account on 9 June 2016.⁹⁴

10.2.3.5 Data Manipulation

Examination identified files “*presenting characteristic signs that testify to the obvious corruption of their structure*”.⁹⁵ In detail, a number of PDF files were identified with “*corrupted internal structure, corrupted correlation with the time properties or with various contents and concurrent identifiers*”. Moreover, some PDF files with “*various distortions of the text information on the test samples*” were identified. Finally, examination identified inconsistency between analytical results reported in some PDFs and those detailed in the associated Raw Data files.⁹⁶ In other words, instances

were observed where Raw Data files of some samples indicated the presence of a Prohibited Substance, but the associated PDFs did not.

Russian Experts “*unequivocally*” state that the only reliable source of information are the Raw Data files.

10.2.4 The Circumstances

Fundamental to the Russian case is the claim Independent Experts have mistaken system malfunction and human error as data manipulation. In support of their position, Russian authorities claimed the following:

- (i) Mr Migachev was solely responsible for the “*maintenance and refinement*” of the LIMS system.⁹⁷
- (ii) Mr Migachev did not produce any manual or instructional guide on the LIMS system or its “*operating algorithms*”.⁹⁸
- (iii) Subsequent system administrators had to learn the LIMS system through trial and error.⁹⁹
- (iv) The Moscow LIMS system was a “*crude set of programs*” with functional abnormalities.¹⁰⁰
- (v) The server equipment was “*aging*” and “*unstable*”.¹⁰¹
- (vi) During Doctor Rodchenkov’s tenure, the deficiencies and failings of the LIMS system was known to but ignored by WADA.¹⁰²
- (vii) Instances of file deletion are “*inevitable within the normal operation of the system*”.¹⁰³

Contextualized by these issues, Russian Expert then detailed actions taken by Mr Mochalov in December 2018 and January 2019 - actions which Independent Experts have mistakenly interpreted as data

⁸⁶ Attachment C - Russian Technical Report (Part 1), page 16.

⁸⁷ Attachment C - Russian Technical Report (Part 2), page 41.

⁸⁸ Attachment C - Russian Technical Report (Part 1), page 4.

⁸⁹ Attachment C - Russian Technical Report (Part 1), page 9; see also Attachment D - Counter Research, page 28.

⁹⁰ Attachment D - Counter Research, page 29.

⁹¹ Observed within the sub-directory structure of disk WD-WCC4N76L0UAY.

⁹² Attachment C - Russian Technical Report (Part 1), page 11; see also Attachment D - Counter Research, page 7.

⁹³ Attachment D - Counter Research, page 27.

⁹⁴ Attachment C - Russian Technical Report (Part 1), page 13.

⁹⁵ Attachment C - Russian Technical Report (Part 1), page 5; see also Attachment B - Russian Technical Report (Part 2), page 57.

⁹⁶ Attachment C - Russian Technical Report (Part 1), page 5; see also Russian Technical Report (Part 2), page 57.

⁹⁷ Attachment C - Russian Technical Report (Part 1), page 3.

⁹⁸ Attachment C - Russian Technical Report (Part 1), page 3; see Attachment D - Counter Research Report, page 13.

⁹⁹ Attachment C - Russian Technical Report (Part 1), page 3; see Attachment D - Counter Research Report, page 13.

¹⁰⁰ Attachment C - Russian Technical Report (Part 1), pages 4 and 13.

¹⁰¹ Attachment D - Counter Research Report, page 13.

¹⁰² Attachment C - Russian Technical Report (Part 2), page 59.

¹⁰³ Attachment B - Russia Statement of Facts Annex 1, page 5.

manipulation. Such is the importance of these events they will be recounted in detail.

10.2.5 Actions of Mr Mochalov

On 22 December 2018, Mr Mochalov, as the System Administrator, began to prepare the LIMS system for 2019 (**2019 Database**) on a “*virtual test server*” (**Virtual Server**).¹⁰⁴ The Virtual Server also housed a copy of the existing LIMS database.¹⁰⁵

Once completed, Mr Mochalov “*migrated the [new] 2019 database from the Virtual Server to the LIMS server*”. However, during this process Mr Mochalov “*erroneously saved over*” the 2016 LIMS database (**2016 Database**).¹⁰⁶

To correct his error, Mr Mochalov restored the 2016 Database using information available on the Virtual Server.¹⁰⁷ As a consequence of restoring the 2016 Database, the LIMS databases from 2008 to 2011 appeared on the “*LIMS server*” (from the Virtual Server).¹⁰⁸

Ordinarily, restorations of this kind were done using pre-existing “*database backups*” saved on “*removable media*” (hardware) kept in the Laboratory’s “*accounting safe*”. However, as it was a Saturday Mr Mochalov was alone in the office and could not access to the safe.¹⁰⁹

On 24 December 2018,¹¹⁰ Mr Mochalov attended the office intending to restore the LIMS system to its original condition using a database backup (“*reserve copy*”)¹¹¹ created on 21 December 2018 (**21 December Backup**), that had been retrieved from “*accounting*” safe.¹¹² However, due to the “*urgency*” of preparing the 2019 Database,¹¹³ Mr Mochalov postponed this restoration until 8 January 2019.¹¹⁴

On 8 January 2019, Mr Mochalov attempted to restore the LIMS system to its original state by using the 21

December Backup. However, during the restoration the LIMS database become “*unstable*”. Mr Mochalov attributed this instability to a “*time-date stamp*” issue and made attempts correct the problem by modifying the date and time within the system to 23 May 2015.¹¹⁵

During the restoration process, Mr Mochalov specifically recalled copying the “*log_do and log_error*” tables to a “*separate backup*” because he understood the importance of these tables.¹¹⁶

On 9 January 2019, Mr Mochalov attempted to arrest the worsening instability within the LIMS system by deleting the LIMS server database files before using the 21 December Backup to restore the databases on the Virtual Server.¹¹⁷ During the restoration Mr Mochalov added blood analysis data for tests conducted by the Laboratory between 21 December 2018 and 9 January 2019, as well as the “*log_do and log_error*” tables from the “*separate backup*”.¹¹⁸

Ultimately, a “*full authentic copy*” of the LIMS database was recovered to the Virtual Server.¹¹⁹

Mr Mochalov then deleted all data tables in the “*/var/lib/mysql/LIMS*”¹²⁰ server directory and transferred all “*correct and necessary database files*” from the “*sql.tar.qz*” archive on the Virtual Server to the main LIMS server using “*scripts*” he had written.¹²¹

On 9 January 2019 (at 10:50am), Mr Mochalov deleted the “*doa_bags*” and “*doa_samples*” tables from the 2019 LIMS database.¹²²

The “*doa_bags*” and “*doa_samples*” tables related to “*workplace drug testing*” analysis conducted by the Moscow Laboratory on behalf of private corporate clients. In other words, the tables are not related to athletes or anti-doping analysis.¹²³

¹⁰⁴ Attachment E - Answers to Technical Questions, page 19.

¹⁰⁵ Attachment D - Counter Research, page 13.

¹⁰⁶ Attachment D - Counter Research, page 14.

¹⁰⁷ Attachment D - Counter Research, page 14.

¹⁰⁸ This is detailed in the Russia Forensic Investigation video (“*Russia LIMS Video*”) at the 5 minutes and 10 second mark.

¹⁰⁹ Attachment D - Counter Research, page 14.

¹¹⁰ This was a Monday and a normal business day in Russia.

¹¹¹ The database backup was described as a “*reserve copy*” in the Russia LIMS Video, at 5 minutes 10 seconds.

¹¹² Attachment D - Counter Research, page 15.

¹¹³ Attachment E - Answers to Technical Questions, page 19.

¹¹⁴ Attachment D - Counter Research, page 15.

¹¹⁵ Attachment D - Counter Research, page 15.

¹¹⁶ Attachment D - Counter Research, page 16.

¹¹⁷ Attachment D - Counter Research, page 16; See also Russia LIMS Video, commencing 6 minutes and 30 seconds.

¹¹⁸ Attachment D - Counter Research, page 16.

¹¹⁹ Attachment D - Counter Research, page 16.

¹²⁰ LIMS Server.

¹²¹ Attachment D - Counter Research, page 16.

¹²² Attachment D - Counter Research, page 16.

¹²³ This information is derived from information provided by a whistleblower and corroborative analysis conducted by the

10.2.6 Comparison of recovered backups

Russian Experts conducted a comparative analysis of previously deleted, but since restored, database backups from 6 January 2019 and 10 January 2019. Minor differences were observed, for example, some records were present only in the 6 January 2019 backup, while other records were only present in the 10 January 2019 backup.¹²⁴

However, Russian Experts assert the “*minor*” differences were not the result of the “*deliberate distortion [of] the database by the System Administrator*”, but rather, the differences were a consequence of there being two “*sources for these records [namely, the Test Server and the LIMS server]*”.¹²⁵ Time zone difference observed in some table records supports the proposition that the backups occurred on different “*piece[s] of computer equipment*”.¹²⁶

By way of conclusion, Russian authorities assert the totality of this evidence “*show that the actions of [Mr Mochalov] did not lead to the destruction or modification of [analysis results] in the LIMS server databases*”.¹²⁷

11 ANALYSIS

Prior to receiving the Russia Forensic Investigation, Independent Experts asserted that based on observable digital forensic evidence, the Moscow Data was altered before it was forensically imaged (copied) by WADA in January 2019.¹²⁸ These alterations include backdating, formatted disk, deleted files and backups, secure erased files, selectively removed command history entries, as well as replaced database, deleted records, removed tables and missing logs (collectively, the “**WADA Forensic Findings**”).

The following is an evaluation of the WADA Forensic Findings in light of the Russia Forensic Investigation.

Intelligence and Investigations Department of the “*doa_bags*” and “*doa_samples*” tables.

¹²⁴ Attachment D - Counter Research, page 20.

¹²⁵ Attachment D - Counter Research, page 20.

¹²⁶ Attachment D - Counter Research, page 20.

¹²⁷ Attachment D - Counter Research, page 20.

¹²⁸ Forensic imaging of the Moscow Data was undertaken by WADA from 11 January 2019 to 17 January 2019.

¹²⁹ Attachment A - WADA Technical Report, Part 5.1.2, page 9.

11.1 BACKUP DELETION

The WADA Technical Report stated that on 17 December 2018, over 450 database backups of the Moscow LIMS database created in 2016 were deleted from the LIMS server.¹²⁹

11.1.1 Russia Forensic Investigation

Russia Forensic Investigation observed a “*script*”¹³⁰ (**Backup Script**) which created “*backups*” of the LIMS database, as well as web server files, and saved them to a directory (**Directory**).^{131, 132}

However, the Russia Forensic Investigation asserts there was no evidence within the system settings that “*allowed the [Backup Script] to be carried out*”.¹³³

11.1.2 WADA Expert Analysis

Independent Experts similarly observed the Backup Script.¹³⁴ However, the Russia Forensic Investigation failed to observe that the Directory contained recovered names and timestamps of backup files from 2014, 2015 and 2016 in deleted state. More specifically, over 1,250 of the backup files created in 2014 and 2015 have a deletion timestamp of 29 June 2016, and over 450 backup files created in 2016 have a deletion timestamp of 17 December 2018 (collectively, the “**Deleted Backups**”).¹³⁵

LIMS database backups are valuable to Independent Experts as they provide a reference point to identify altered or missing data from the Moscow Data.

The issue of backup deletion was again raised with Russian Experts in subsequent correspondence,¹³⁶ to this end they replied that Mr Mochalov had “*moved*” these files onto his personal computer to “*free some space*” on the Imaged Primary Disk.

However, Independent Experts established that the Imaged Primary Disk had approximately 93% of “*free space*” available, more than enough for LIMS operations. In other words, files did not need to be

¹³⁰ Script: “*backup_LIMS.sh*”.

¹³¹ Directory: “*/home/olegmigachev/backup_LIMS*”.

¹³² Attachment D - Counter Research, pages 11-12.

¹³³ Attachment D - Counter Research, pages 11-12.

¹³⁴ Attachment F - WADA Evaluation Report, Part 5.1, pages 10-11.

¹³⁵ Ibid.

¹³⁶ The question was repeated in request to answer the eight unanswered Technical Questions.

moved as enough free space already existed on the disk.¹³⁷

Notably, the New Data provided by Minister Kolobkov on 23 October 2019 does not contain files that correspond to these deleted backup files created in 2014, 2015 and 2016.¹³⁸

11.1.3 Conclusion

The original finding by the Independent Experts that, “On **17 December 2018**, over 450 database backups of the Moscow LIMS database created in 2016 were deleted from the LIMS server”, remains undisturbed by the Russia Forensic Investigation.

11.2 LIMS SYSTEM DISKS

The LIMS system was comprised of two disks, the “primary” disk (**Imaged Primary Disk**) and the “secondary” disk (**Imaged Secondary Disk**). Both were imaged by WADA.

The Imaged Primary Disk contained data, the Imaged Secondary Disk did not. Each will be examined in turn.

11.2.1 The Primary Disk

The substantive issue is whether the Imaged Primary Disk is authentic and complete.

11.2.1.1 Russia Forensic Investigation

The Russia Forensic Investigation asserts the following:

- (a) On 17 December 2018, Mr Mochalov executed a command¹³⁹ (**Zeroing Command**) to perform a “record speed check”.^{140 141}
- (b) Mr Mochalov had “moved” files from the Imaged Primary Disk onto his personal computer to “free some space” on the Imaged Primary Disk.¹⁴²
- (c) Mr Mochalov selectively deleted the command to perform the Zeroing Command from the

Command History¹⁴³ because he wanted “to avoid erroneous repetition”, in other words, or use of this command.¹⁴⁴

11.2.1.2 WADA Expert Analysis

In exploration of this issue, Independent Experts observed digital forensic evidence of the following:

- (i) The LIMS system was configured, since “1 March 2017”, to perform automatic backup operations daily (**Daily Backup**) to a specific directory.¹⁴⁵ However, it is not possible to determine whether the backups were stored on the “primary” disk or the “secondary” disk.¹⁴⁶
- (ii) The Daily Backups related to PDF files (run at 4:00AM daily) and the LIMS (run at 12:05AM daily).¹⁴⁷
- (iii) Logs on the LIMS system indicate that the Daily Backup ran in December 2018 and January 2019, as scheduled.¹⁴⁸
- (iv) Backup files expected to be created by the Daily Backup, and therefore observed by the Independent Experts, do not exist on the LIMS system.¹⁴⁹
- (v) On 17 December 2018, the Zeroing Command was executed on the Imaged Primary Disk which has the effect of overwriting areas of a disk with zeros,¹⁵⁰ including the “free space”.¹⁵¹ By overwriting the free space with zeros, traces of prior commands, activities and previously deleted data are rendered unrecoverable, such as the files “moved” by Mr Mochalov to “free [up] some space” on the disk.¹⁵²
- (vi) The Zeroing Command could have potentially run for “over two hours and 50 minutes” and

¹³⁷ Attachment F - WADA Evaluation Report, Part 5.1, pages 10-11.

¹³⁸ Ibid.

¹³⁹ Command: “dd if=/dev/zero of=/tmp/1.tmp bs=10240k”.

¹⁴⁰ Attachment E - Answers to Technical Questions, page 12.

¹⁴¹ A record speed check assesses the speed at which data is written onto a disk.

¹⁴² Attachment F - WADA Evaluation Report, Part 5.1, pages 10-11.

¹⁴³ Command History allows a user to recall, edit or rerun previous commands executed in a system.

¹⁴⁴ Attachment E - Answers to Technical Questions (Question 10), page 11.

¹⁴⁵ Directory: “/mnt/sdb1”.

¹⁴⁶ Attachment F - WADA Evaluation Report, Part 5.2.2, pages 13-14.

¹⁴⁷ Ibid.

¹⁴⁸ Ibid.

¹⁴⁹ Ibid.

¹⁵⁰ Attachment F - WADA Evaluation Report, Part 5.4.5, page 23-24.

¹⁵¹ On a disk “free space” is the space allocated for receipt of data and includes space on the disk which never held data and space that held data that has now been deleted.

¹⁵² Attachment F - WADA Evaluation Report, Part 5.4.5, page 23-24.

overwritten “*substantial amounts of data*” on the Imaged Primary Disk”.¹⁵³

- (vii) It is not possible to determine how many zeros were written to the Imaged Primary Disk or the length of time the Zeroing Command operated because a specific command¹⁵⁴ was executed which rendered recovery of this information impossible.¹⁵⁵
- (viii) The Zeroing Command, once completed, reports how much “*free space*” on the disk has been overwritten with zeros.
- (ix) The command to execute the Zeroing Command was selectively deleted from the “*Command History*” logs (**Command Logs**).¹⁵⁶

The Russia Forensic Investigation did not explain the following:

- (i) Why Mr Mochalov sought to perform a record speed check by using the Zeroing Command which assures the irretrievable deletion of data.

11.2.2 Conclusion

The original findings by the Independent Experts that:

On 17 December 2018, a command was executed to overwrite free space of Imaged Primary Disk in the LIMS system with zeroes; and

The System Administrator – now known to be Mr Mochalov - selectively removed from history files the commands that overwrite areas of the Imaged Primary Disk in the LIMS system with zeroes,

is not disturbed by the Russia Forensic Investigation.

Additionally, Independent Experts assert that the observed digital forensic evidence is **more probable** if Mr Mochalov executed the Zeroing Command to overwrite the “*free space*” of the Imaged Primary Disk with zeroes than if he did so to perform a “*record speed check*”. In any event, the result of this command is to

overwrite areas of the Imaged Primary Disk in the LIMS system with zeroes.¹⁵⁷

However, there is insufficient evidence to form a conclusion about the context in which Daily Backups were saved on the LIMS system before 17 December 2018.¹⁵⁸

11.2.3 The Secondary Disk

The substantive issue is why the Imaged Secondary Disk contained no data. In other words, is it the real secondary disk and or has its contents been wiped.

11.2.3.1 Russia Forensic Investigation

The Russia Forensic Investigation asserts the following:

- (a) The Imaged Secondary Disk contained no data (because it was an “*additional clean HDD*”).¹⁵⁹
- (b) The Imaged Secondary Disk was attached to the LIMS system on 17 December 2018, by Mr Mochalov, to improve the “*reliability of the storage of information*”.¹⁶⁰
- (c) On 17 December 2018, the LIMS system was backdated to 11 August 2015.¹⁶¹
- (d) The backdating of the time to 11 August 2015 during formatting was a consequence of Mr Mochalov having “*several windows open at the same time on his working computer, one of which was used by [him] to change time*” and this “*wrongly have the impression that the purpose of his actions was to create a file system*” dated 11 August 2015 when he executed the “*file system creation command*” (i.e. formatting).¹⁶²
- (e) The Imaged Secondary Disk “*file system*” was “*created*” on the disk on 11 August 2015,¹⁶³ and had not been mounted since. In other words, prior to its attachment by Mr Mochalov, the Imaged Secondary Disk had not been connected to a computer since 11 August 2015.¹⁶⁴
- (f) Mr Mochalov selectively deleted the backdating and formatting Command Logs¹⁶⁵ because he

¹⁵³ Ibid.

¹⁵⁴ Command: “*echo "" > /tmp/1.tmp*”.

¹⁵⁵ Attachment F - WADA Evaluation Report, Part 5.4.5, page 23-24.

¹⁵⁶ Attachment F - WADA Evaluation Report, Part 5.3, pages 15-17.

¹⁵⁷ Attachment F - WADA Evaluation Report, Part 5.4.5, page 23-24.

¹⁵⁸ Attachment F - WADA Evaluation Report, Part 5.2.2, page 13-14.

¹⁵⁹ Attachment D - Counter Research, page 9.

¹⁶⁰ Attachment E - Answers to Technical Questions, page 12.

¹⁶¹ Attachment D - Counter Research, page 9.

¹⁶² Attachment E - Answers to the eight (8) unanswered Technical Questions, page 7 (Question 7).

¹⁶³ At 14:21 hours or 2:21PM.

¹⁶⁴ Attachment D - Counter Research, page 9.

¹⁶⁵ Command Logs are a means of identifying commands executed on a system (e.g. Linux, UNIX) including modifications to the system and database.

wanted to preclude their accidental repeated execution.¹⁶⁶ However, the Russia Forensic Investigation was silent as to why these commands were used in the first place.

- (g) There is no evidence that another secondary disk was mounted or that backups were saved on it.¹⁶⁷
- (h) The execution of a command (such as a command to format a disk) is not evidence that the command was either successful or the corresponding operations completed.¹⁶⁸
- (i) Therefore, it is not possible to “*either unequivocally confirm nor rule out the possibility*” that the Imaged Secondary Disk was formatted (“*file system [was] created*”) on 17 December 2018.¹⁶⁹
- (j) Assuming the Imaged Secondary Disk was formatted on 17 December 2018, it was technically impossible to “*purge*” the disk’s entire content during the 17 seconds that the formatting commands were executed.¹⁷⁰

11.2.3.2 WADA Expert Analysis

In exploration of these issues, Independent Experts observed digital forensic evidence of the following:

- (a) The Imaged Secondary Disk contained no data, only zeros. The Zeroing Command could overwrite this disk with zeros. However, while the Command Logs suggests such commands were run on the “*LIMS system*”, no trace was found that links the Zeroing Command directly to the Imaged Secondary Disk being overwritten with zeros.¹⁷¹
- (b) On 17 December 2018, the LIMS system was backdated to 11 August 2015.

- (c) Whilst the system was backdated, the Imaged Secondary Disk was formatted. Formatting sets up the file system and cleans all reference to existing and already allocated files.¹⁷²
- (d) Formatting a disk, the size of the Imaged Secondary Disk, takes approximately 11 seconds.^{173 174}
- (e) At the time of formatting the Imaged Secondary Disk contained only zeros.¹⁷⁵
- (f) Formatting does not overwrite a disk with zeros.¹⁷⁶
- (g) After formatting the Imaged Secondary Disk was never mounted to the system directory and was not used to store data.¹⁷⁷
- (h) The commands executed to back date the LIMS system and format the Imaged Secondary Disk were selectively deleted from the Command Logs.¹⁷⁸

Review of Command Logs is a means for identifying commands executed on a system, including to make modifications to the system and a database. The effect of deleting Command Logs is that the associated actions (backdating and formatting) are invisible without digital forensic analysis. In other words, the Imaged Secondary Disk would falsely appear to have been formatted on 11 August 2015¹⁷⁹ and not 17 December 2018.¹⁸⁰

- (i) That “*a*” mounted¹⁸¹ secondary disk existed in the LIMS system on 15 December 2018.

Notably, this is contrary to the Russia Forensic Investigation which asserts that Mr Mochalov attached the secondary disk on 17 December 2018.¹⁸²

¹⁶⁶ Attachment E - Answers to Technical Questions (Question 10), page 11.

¹⁶⁷ Attachment D - Counter Research, pages 12-13.

¹⁶⁸ Attachment D - Counter Research, pages 8-9.

¹⁶⁹ Attachment D - Counter Research, page 9.

¹⁷⁰ Attachment D - Counter Research, page 9.

¹⁷¹ Attachment F - WADA Evaluation Report, Part 5.4.5, pages 23-24.

¹⁷² Attachment F – WADA Evaluation Report, Part 5.4.7, pages 26-27.

¹⁷³ Attachment F - WADA Evaluation Report, Part 5.4.7, pages 26-27.

¹⁷⁴ Based on tests run by Independent Experts.

¹⁷⁵ Attachment F - WADA Evaluation Report, Part 5.4.7, pages 26-27.

¹⁷⁶ Attachment F - WADA Evaluation Report, Part 5.2, pages 11-12.

¹⁷⁷ Ibid.

¹⁷⁸ Attachment F - WADA Evaluation Report, Part 5.3, pages 15-17.

¹⁷⁹ Notably, as at 11 August 2015, Doctor Rodchenkov was still the Director of the Moscow Laboratory.

¹⁸⁰ The Data Retrieval Team arrived in Moscow on 17 December 2018 but did not enter the laboratory until the follow day.

¹⁸¹ Mounting a hard disk makes it accessible by the computer. This is a software process that enables the operating system to read and write data to the disk. Most disks are automatically mounted by the operating system when they are connected.

¹⁸² Attachment F - WADA Evaluation Report, Part 3.2.1, page 7.

- (j) That “a” mounted secondary disk¹⁸³ existed in the LIMS system on 22 January 2016,¹⁸⁴ and on 2 April 2017.¹⁸⁵

However, Independent Experts cannot state, based on observable forensic evidence, that the Imaged Secondary Disk was the same secondary disk observed in the system on 22 January 2016, 2 April 2017 and 15 December 2018. Moreover, Independent Experts cannot determine what data existed in the secondary disk prior to 17 December 2018.¹⁸⁶

The Russia Forensic Investigation did not comment on the following:

- (a) Evidence that the LIMS system had been configured to store daily automated databases backups to “a” secondary disk.
- (b) Evidence that “a” Secondary Disk existed in the LIMS system “on or before” 15 December 2018.¹⁸⁷
- (c) Why the backdating and formatting commands – which were selectively deleted by Mr Mochalov – were executed on the LIMS system in the first instance.
- (d) Why Mr Mochalov did not mount the Imaged Secondary Disk to the system directory so it could be used to store any data if his true purpose for connecting it was to improve “reliability in the storage of information”?

11.2.4 Conclusion

The Russia Forensic Investigation confirmed the findings by the Independent Experts that:

*On 17 December 2018, the Imaged Secondary Disk was formatted while the system was backdated, thereby making it appear the formatting occurred on 11 August 2015.*¹⁸⁸

Additionally, Independent Experts assert that the digital forensic evidence is “**extremely more probable**” if “a” secondary disk existed in the LIMS system “**on and before**” 15 December 2018, rather than the Russian

proposition that a secondary disk (i.e. the Imaged Secondary Disk) was only attached on 17 December 2018.¹⁸⁹

The original finding by the Independent Experts that:

The System Administrator – now known to be Mr Mochalov – selectively removed from history files the [Command Logs] that backdate the system to 11 August 2015 and format the Imaged Secondary Disk,

is corroborated by the Russia Forensic Investigation.

However, there is insufficient digital forensic evidence to form a conclusion as to how the Imaged Secondary Disk came to be filled with zeros, or what data existed on the Imaged Secondary Disk before 17 December 2018.

11.3 ALTERATION OF LIMS SYSTEM

In the WADA Technical Report, Independent Experts observed that on 17 December 2018, the LIMS system was back dated to 12 November 2015.¹⁹⁰ However, at that time they had not determined whether any alterations were made to the system during this period.

11.3.1 Russia Forensic Investigation

The Russia Forensic Investigation did not observe the 17 December 2018 backdating of the LIMS system to 12 November 2015, or the selective removal of the Command Logs.¹⁹¹

11.3.2 WADA Expert Analysis

Following further investigation, Independent Experts observed the following:

- (i) On or after 20 November and before 23 December 2018, Moscow LIMS “logs.do” logs from the years 2012, 2013, 2014 and 2015¹⁹² were deleted; and

¹⁸³ Independent Experts cannot say that the secondary disk mounted on or before 22 January 2016 and on 2 April 2017 was the same secondary disk imaged by WADA (i.e. The Secondary Disk) or another secondary disk.

¹⁸⁴ First reported in “PFS 19.0127”; see also Attachment F - WADA Evaluation Report, Part 5.2.1, pages 12-13.

¹⁸⁵ Attachment F - WADA Evaluation Report, Part 5.2.1, pages 12-13.

¹⁸⁶ Ibid.

¹⁸⁷ Ibid.

¹⁸⁸ Attachment F - WADA Evaluation Report, Part 3.4, pages 11-17.

¹⁸⁹ Ibid, Part 3.2.1, page 8.

¹⁹⁰ Attachment A - WADA Technical Report, page 8. In that report the date was incorrectly stated as 12 November 2018. The correct date was 12 November 2015.

¹⁹¹ Attachment F - WADA Evaluation Report, Part 3.4.1, page 11.

¹⁹² The earliest date for the 2015 “log_do” table deletions is on or after 23 November 2018, not 20 November 2018 like the other years.

- (ii) On 17 December 2018, not only was the LIMS system backdated to 12 November 2015, but “activities” were undertaken in the system.¹⁹³

Activities undertaken in a system are recorded in the Command Logs. However, whilst the system was backdated, portions of the Command Logs¹⁹⁴ were selectively deleted.¹⁹⁵

Using specialized software, the deleted Command Logs were recovered. Examination of which revealed that whilst the system was backdated, files were opened and edited.¹⁹⁶

11.3.3 Conclusion

The Russia Forensic Investigation has provided no information to counter the original finding by Independent Experts that, “On 17 December 2018, the LIMS system was backdated to 12 November 2015”.

Therefore, Independent Experts were not able to evaluate the finding.

11.4 FILE DELETION

In the WADA Technical Report, Independent Experts observed that, “On 6 January 2019, 10,565 files and folders were deleted from the Moscow Laboratory computers”. Moreover, most of the deleted files contained the most relevant anti-doping data.^{197 198}

11.4.1.1 Russia Forensic Investigation

The Russia Forensic Investigation assert the deletions were a consequence of an established annual practice by the Laboratory, executed by Mr Mochalov, to remove “unnecessary files” from instrument computers at the beginning of the year. Moreover, the files showed no “signs” of being associated with the results of “doping sample tests” and “most ... were removed from the operating system recycling bin”. In other words, these files were unrelated to analysis results and most had already been deleted by other users at the time and were sitting in the recycle bins.¹⁹⁹

Consequently, the deletion activities of Mr Mochalov could not and did not “damage the integrity” of the Moscow Data.²⁰⁰

11.4.1.2 WADA Expert Analysis

During their evaluation of the Russia Forensic Investigation, Independent Experts identified that in fact 15,325 files and folders had been deleted on 6 January 2019, not 10,565²⁰¹. It was further observed that 19,982 files and folders had been deleted between the period of 1 January 2019 to 9 January 2019 (inclusively) – the day before the Independent Experts entered the Moscow laboratory.

That said, contrary to the Russia Forensic Investigation, Independent Experts did not observe the established practice of removing unnecessary files at the beginning of any other years. Moreover, 15,743 (79%) of the files deleted between the 1 and 9 January had a creation timestamp between 2008 and 2017.²⁰²

Furthermore, analysis by the Intelligence and Investigations Department of the 19,982 deleted files revealed that only 3,244 (15%) were in recycle bins. In other words, almost 85% of the deleted files were not in the recycle bin prior to deletion, moreover, they were deleted directly from their original path.

Of the files in the recycle bin, some had been placed there in 2013, but most were moved there in 2016. In fact, 1,764 files from the recycle bin had a ThermoFisher²⁰³ file format or one that could be produced by a ThermoFisher instrument, such as PDF files. The 1,764 files included 507 Sequence files, 28 PDFs and 328 Raw Data files.

Of the 16,738 files not in the recycle bin at the time of deletion, 11,725 (70%) had a ThermoFisher file format or one that could be produced by a ThermoFisher instrument, such as PDF files. More specifically, the System Administrator - asserted by the Russia Forensic Investigation to be Mr Mochalov - deleted 11,213 Sequence files, 503 PDFs and 9 Raw Data files. Of which 9,298 Sequence files, 500 PDFs and 1 Raw Data file had a creation timestamp between 1 January 2012 and 31 December 2015.

¹⁹³ Attachment F - WADA Evaluation Report, Part 3.4.1, page 13.

¹⁹⁴ Command Logs: “import_data” log files.

¹⁹⁵ Attachment F - WADA Evaluation Report, Part 3.4.1, page 11.

¹⁹⁶ Ibid, Part 3.4.1, page 13.

¹⁹⁷ 7,309 “sequence” files, 336 Raw Data files and 187 PDFs.

¹⁹⁸ Attachment A - WADA Technical Report, (Appendix File_deleted_timestamp).

¹⁹⁹ Attachment E - Answers to Technical Questions, pages 21-22.

²⁰⁰ Ibid, pages 21-22.

²⁰¹ Attachment F - WADA Evaluation Report, Part 3.6, pages 17-18; see also Attachment A - WADA Technical Report, Section 5.2.

²⁰² Attachment F - WADA Evaluation Report, Part 3.6, page 17.

²⁰³ Since late 2013, ThermoFisher is the sole manufacturer of the analytical instrument used by the Moscow Laboratory.

11.4.1.3 Sequence files

Sequence files are relevant to the investigation and the case file of each athlete, particularly for cases where there is a discrepancy between the WADA LIMS and the Moscow LIMS, as well as those cases where there has been a selective deletion of PDF and Raw Data files. A Sequence file records the code of the sample that was analysed as well as the name and path of the Raw Data that was ultimately generated. In a case where there had been a selective deletion of the Moscow Data, investigators could use a Sequence file to prove that a Raw Data file, and therefore the corresponding PDF, did exist. In other words, show that the WADA LIMS is correct.

11.4.1.4 PDF analysis

An analysis of the 503 PDF files deleted from the instrument computers between the 1 January 2019 and 9 January 2019 indicated that most of them were **not related** to anti-doping samples (370).

However, 133 PDF files were identified²⁰⁴ that **did relate** to the analysis of anti-doping samples, including one in which the name of an athlete appeared in the file name.²⁰⁵

None of the 133 PDFs were in the recycle bin prior to their deletion but were found in the "Temporary Internet Files" folder on the 'Homer' instrument computer. Moreover, these 133 PDFs have a creation timestamp between 1 January 2012 and 31 December 2015 and most concern the ITP results for anabolic steroids analysis (121). Furthermore, an examination of the LIMS 'pdfs' table showed that these PDF files were originally transferred to the LIMS server further to their creation from the respective Raw files analyzed on the instrument computers. This means the PDF files did exist and were made available on the LIMS server. This, in addition to the presence of these files in the "Temporary Internet Files" folder, suggests these files were downloaded from the LIMS server on the 'Homer' instrument computer.

²⁰⁴ Identification occurred through an analysis of the respective filenames.

²⁰⁵ PDF file: "██████████0716_R98_1374033602[1].pdf". Name redacted for privacy reasons.

²⁰⁶ PDF: "a_09719_R98_1372942802[1].pdf".

²⁰⁷ The Target Group is comprised of 298 Russian athletes whose evidentiary circumstances (e.g. LIMS data) presented the more compelling "potential" cases of doping.

11.4.1.5 An example of a material impact

While the following example pertains to an athlete identified as part of the "Target Group", those athletes whom comprise the Target Group were known only to the Intelligence and Investigations Department. In other words, at the time of the data manipulation, Russian authorities are not believed to have known who was in the Target Group.

That said, the Intelligence and Investigations Department has identified, out of the 133 above mentioned PDFs, one PDF file²⁰⁶ (**IAAF PDF**) that was deleted from the instrument computer on 6 January 2019 which was material to the case of a Target Group²⁰⁷ athlete.

The IAAF PDF related to a 2013 sample (**Sample**)²⁰⁸ of a Russian female IAAF²⁰⁹ athlete and was material because the ITP and Confirmation Procedure (**CP**) Raw Data were inexplicably "absent" from the Moscow Data. In other words, the PDF was, prior to its deletion, the only available analytical evidence.

Moreover, there was a discrepancy between the WADA LIMS and the Moscow LIMS in that the WADA LIMS reported the Sample as producing a Presumptive Adverse Analytical Finding (**AAF**) for an anabolic steroid, methandienone, while the Moscow LIMS did not. In other words, the Moscow LIMS reported the Sample as 'negative'.

Notably, the Sample was subject of a "SAVE" directive issued by the then Russian Ministry of Sport.²¹⁰

The reason for the absence of ITP and CP Raw Data is not known and attempts to forensically recover the files have been unsuccessful. Independent Experts managed to "carve" two copies of the IAAF PDF from one of the Investigative Committee Disks (**ICR Disks**),²¹¹ however, evidence of selective content manipulation was observed for each PDF.

The absence of any 'existing' copy of the IAAF PDF from the ICR Disks is not known. Notably, the file was successfully transferred to the LIMS server in 2013, as evidenced by the LIMS "pdfs" table and the existence of

²⁰⁸ Sample 2779322 (Laboratory Code 9719).

²⁰⁹ International Association of Athletics Federations.

²¹⁰ Refer EDP0120 and EDP0121. These documents have not been included in this report. They may be provided upon request.

²¹¹ ICR-2.

the file in the “*Temporary Internet Files*” folder of the ‘Homer’ instrument computer.

To this end, the deletion of the IAAF PDF that occurred on 6 January 2019 has materially impacted the ability to conduct a thorough and complete investigation.

11.4.2 Conclusion

The original finding by Independent Experts that, “*On 6 January 2019, 15,325²¹² files and folders were deleted from the Moscow Laboratory computers. Most of the deleted files contained the most relevant anti-doping data*”, remains undisturbed by the Russia Forensic Investigation.

Moreover, contrary to the Russia Forensic Investigation, Independent Experts assert that the observed digital forensic evidence is **extremely more probable** if the deletion of these files damaged the completeness of the Moscow Data, rather than the proposition of the Russia Forensic Investigation that the deletion of these files “*cannot damage the completeness*” of the Moscow Data.

11.5 EVENTS OF 8 JANUARY 2019

In WADA Technical Report, Independent Experts observed that on **8 January 2019**, data in LIMS database, were deleted while the LIMS system was backdated, thereby making it appear the deletions occurred on 23 May 2015. A total of 623 files from 9 folders²¹³ were deleted on this occasion.

11.5.1.1 Russia Forensic Investigation

The Russia Forensic Investigation asserts that on 8 January 2019 the following occurred:

²¹² As corrected with new valued form the WADA Technical Report.

²¹³ The files were deleted from the folders named “2012”, “2013”, “2014”, “2015”, “crm”, “crm_v2”, “forum”, “mysql” and “ref_urine”.

²¹⁴ Attachment D - Counter Research, page 16.

²¹⁵ Attachment D - Counter Research, page 15; See also Attachment E - Answers to Technical Questions (Question 10) (received on 22 October 2019), page 10.

²¹⁶ Attachment F - WADA Evaluation Report, Part 3.7.3, page 21.

²¹⁷ Attachment D - Counter Research, page 16.

²¹⁸ Attachment D - Counter Research, page 16; See also Attachment E - Answers to Technical Questions (Question 31), page 19.

²¹⁹ Attachment E - Answers to Technical Questions (Q.15), page 14.

²²⁰ “Russia Forensic Investigation Video” (“*Russia LIMS Video*”), commencing 6 minutes and 25 seconds.

²²¹ Between 15:00 hours and 15:09 hours.

- (a) Mr Mochalov recovered “*the LIMS databases*” from the 21 December Backup.²¹⁴
- (b) Mr Mochalov restored the LIMS database with the 21 December Backup version.²¹⁵ This restoration was done “*before*” the system was backdated.²¹⁶
- (c) During this process the “*database become unstable*”.²¹⁷
- (d) Mr Mochalov believed the system instability was a “*timestamp*” issue. Mr Mochalov attempted to correct the issue via means including, “*via system time modification*”. In other words, backdating of the LIMS system.²¹⁸
- (e) The fore-dating of the LIMS system to 1 August 2019 was the consequence of a “*command input error*” by Mr Mochalov.²¹⁹
- (f) The LIMS system date autocorrected.²²⁰

11.5.1.2 WADA Expert Analysis

On 8 January 2019,²²¹ the System Administrator (i.e. Mr Mochalov) executed a script containing command that backdated the LIMS system to 23 May 2015 and then:²²²

- (f) replaced the LIMS database with a prior version (**Prior Version**),²²³
- (g) deleted 632 database files (e.g. OPT, MYD, MYI and FRM),^{224 225}
- (h) backdated the timestamps of all database files.²²⁶
- (i) Mr Mochalov then used automated scripts to alter the LIMS database and backdate multiple databases and associated files to various dates.²²⁷

²²² Attachment F - WADA Evaluation Report, Part 5.6.1, page 30; See also Attachment A - WADA Technical Report, Part 5.1.2, page 8.

²²³ Attachment F - WADA Evaluation Report, Part 5.6.3, page 31.

²²⁴ OPT” files contain database characteristics and are updated every time a database is altered. “FRM” files describe a database tables format and structure. “MYI” files contain the index files of a database. “MYD” files contain data. When a MySQL LIMS database is used, all the database related data and metadata are stored in a folder with these files in it. These files are used for backup purpose for securing schema, data, and indexes, for migration or upgrade of the database.

²²⁵ Ibid, Part 5.6.2, page 31. The associated deletion timestamp was 00:17 hours 23 May 2015.

²²⁶ Attachment F - WADA Evaluation Report, Part 5.6.4, page 32.

²²⁷ Ibid, Part 6, pages 43-44.

- (j) Mr Mochalov subsequently deleted scripts designed to alter and backdate the LIMS database.²²⁸

The effect of these actions is that Prior Version now falsely appeared to have been on the LIMS system since 23 May 2015.²²⁹

Following these events, the System Administrator foredated the LIMS system to 1 August 2019 (15:23 hours).²³⁰

As detailed in the CRC Report and now confirmed by the Russia Forensic Investigation, the setting of this date was a “*command input error*”²³¹ by Mr Mochalov who entered the date according to the United States format of year, day then month (“2019-08-01”). The system,²³² however, expected the date to be entered according to the European date format of year, month then day (“2019-01-08”). Consequently, 8 January 2019 became 1 August 2019.²³³

At 03:05 hours on 9 January 2019, the LIMS system date autocorrected from 03:05 hours on 2 August 2019 to 03:05 hours on 9 January 2019.²³⁴

11.5.2 Conclusion

The original finding by the Independent Experts that, “*On 8 January 2019, data in LIMS database (623 files from 9 folders),²³⁵ was deleted while the LIMS system was backdated, thereby making it appear the deletions occurred on 23 May 2015*”, remains undisturbed by the Russia Forensic Investigation.

Mr Mochalov’s backdating created the erroneous and fraudulent appearance that the LIMS database had existed since 23 May 2015. A misconception that could only be discovered by digital forensic analysis.

Moreover, the backdating of the LIMS system was “*not necessary for normal operation*” of the LIMS databases. Furthermore, the Moscow LIMS application did not require such backdating to restore previous content.²³⁶

²²⁸ Ibid.

²²⁹ Ibid, Part 5.6.4, page 32.

²³⁰ Attachment F - WADA Evaluation Report, Part 5.10, pages 37-38.

²³¹ Attachment E - Answers to Technical Questions (Q.15), page 14.

²³² Ubuntu system.

²³³ Attachment A - WADA Technical Report, page 9.

²³⁴ Ibid, Part 5.1.2, pages 8-9.

²³⁵ The files were deleted from the folders named “2012”, “2013”, “2014”, “2015”, “crm”, “crm_v2”, “forum”, “mysql” and “ref_urine”.

Lastly, contrary to the Russia Forensic Investigation, Independent Experts assert that the observed digital forensic evidence are **extremely more probable** if, on 8 January 2019, while the LIMS system was backdated to 23 May 2015, the LIMS database was replaced with a version that was not a fully authentic copy of the LIMS database, rather than the Russia Forensic Investigation proposition that “*a fully authentic copy of the LIMS databases was placed on the test server.*”²³⁷

11.6 DELETION AND ALTERATIONS BETWEEN 6 AND 9 JANUARY 2019

In the WADA Technical Report, Independent Experts reported that comparative analysis conducted by Independent Experts of recovered LIMS backups from 5, 6, 9 and 10 January 2019 found selective differences.²³⁸

11.6.1.1 Russia Forensic Investigation

The Russia Forensic Investigation acknowledged that the various LIMS backups had “*minor differences*”. However, they were not “*deliberate distortions*”.²³⁹

In contextualizing these events, the Russia Forensic Investigation directed attention to the following:

- (i) On 22 December 2018 Mr Mochalov inadvertently migrated the 2008 to 2011 LIMS databases to the LIMS Server during his attempt to restore the 2016 Database.²⁴⁰
- (ii) On 9 January 2019, to correct the continued and “*worsening*” instability within the LIMS system, Mr Mochalov deleted the entire “*LIMS server database files*” including those from 2008 to 2011.²⁴¹ Mr Mochalov then restored the LIMS databases using the 21 December Backup, while also adding new data from “*blood sample tests*” conducted by the Moscow Laboratory between 21 December 2018 and 9 January 2019. Mr

²³⁶ Attachment F - WADA Evaluation Report, Part 5.6.4, page 32.

²³⁷ Ibid, Part 6 (“*Conclusion*”), page 45.

²³⁸ Attachment C - WADA Technical Report, sections 5.2.3 and 6.

²³⁹ Attachment D - Counter Research, page 20.

²⁴⁰ Attachment D - Counter Research, page 22; See also Russia LIMS Video at the 5 minutes and 10 second mark. This event was previously discussed in this report (see Part 9.2.5, “*Actions of Mr Mochalov*”).

²⁴¹ Russia LIMS Video, commencing 6 minutes and 30 seconds.

Mochalov then added the “log_do” and “log_error” tables to the restored system.

The inference being that the deletions observed by the Independent Experts were a consequence of Mr Mochalov correcting a problematic LIMS system whilst attempting to ensure a “full authentic copy of the LIMS databases” (2012 to 2019) was available on the LIMS Server for imaging and retrieval by WADA.²⁴²

Additionally, the Russia Forensic Investigation claimed that differences were caused by Mr Mochalov using information from “various sources when restoring the operability of the LIMS”.²⁴³

In any event, the Russia Forensic Investigation asserts that these events “did not lead to the destruction or modification of information on the results of doping samples tests stored on the LIMS server databases”.²⁴⁴

11.6.1.2 WADA Expert Analysis

As stated, comparative analysis of the recovered versions of LIMS databases contained “selective differences”.²⁴⁵ For instance, comparison of the “found”²⁴⁶ and “confirmation”²⁴⁷ tables for the years 2012, 2013, 2014 and 2015 revealed some records present in the 6 January 2019 version were absent from the 9 January 2019 version. Moreover, some values attributed to a sample in the LIMS have been changed between the versions.²⁴⁸ A more detailed analysis of these differences was outlined in the CRC Report.²⁴⁹

The “found” (named “scr_results” in 2012) and “confirmation” (named “confirmations” in 2012) tables contain the most relevant anti-doping data, namely, the indication whether the presence of a Prohibited Substance in a sample was reported following the Initial Testing or Confirmation Procedure, respectively.

Due to the complexity of the analysis, the investigation of the modifications between the 6 and 9 January 2019 LIMS backups is still on-going. However, the Intelligence and Investigations Department has

identified three samples reported ‘negative’ by the Moscow Laboratory where the forensic evidence shows the LIMS data was manipulated between 6 and 9 January 2019.

Example 1

The first example pertains to a 2013 sample from an IAAF Russian female athlete (**IAAF Sample**)²⁵⁰ who also appears on the Urine Bank.²⁵¹

By way of summary:

- (i) The WADA LIMS reported (in the “found” table)²⁵² an elevated and suspicious steroid profile (**SP**) value, more specifically, a Testosterone to Epitestosterone (**T/E**)²⁵³ ratio greater than 4. The suspicious SP value was also reported (in the “confirmation” table) as being confirmed²⁵⁴ by the Moscow Laboratory.
- (ii) The data from the “recovered” 6 January 2019 version of the Moscow LIMS matched the WADA LIMS for the IAAF Sample. In other words, a T/E ratio greater than 4 and an entry in the “confirmation” table.
- (iii) The data from the “recovered” 9 January 2019 version of the Moscow LIMS did not match the WADA LIMS for the IAAF Sample. Instead, this version of the LIMS reported a much lower and therefore non-suspicious T/E ratio of 2.3. Moreover, the entries in the “found” and “confirmation” tables had been deleted.
- (iv) The data from the Moscow LIMS (imaged by WADA on 12 January 2019) matched the 9 January 2019 version.

The totality of these circumstances necessarily implies that the SP values were manipulated - lowered from greater than 4 to a non-suspicious value of 2.3 - between 6 and 9 January 2019.

²⁴² Attachment D - Counter Research, pages 15-16; See also Russia LIMS Video, commencing 7 minutes and 5 seconds.

²⁴³ Attachment E – Answers to Technical Questions.

²⁴⁴ Attachment D - Counter Research, page 20.

²⁴⁵ Attachment A - WADA Technical Report, Part 6.1.2, Table 14.

²⁴⁶ In 2012 and prior, the “found” table was called “scr_results”.

²⁴⁷ In 2012 and prior, the “confirmation” table was called “confirmations”.

²⁴⁸ For example, in the 2012 database sample 8884, while in both versions, has different steroid profile values recorded in the Pro_4 table of each version.

²⁴⁹ See CRC Report, Part 9.2 “Comparative Analyses”, pages 19-20.

²⁵⁰ Sample 2729640 (Laboratory Code 8884)

²⁵¹ See EDP0757. This document is not included in this report. It may be provided upon request.

²⁵² This table was later renamed the “found” table.

²⁵³ The T/E ratio is the main parameter of the steroid profile.

²⁵⁴ Reported in the “confirmation” table.

Example 2

The second example pertains to a 2012 sample from an ISU²⁵⁵ Russian female athlete (**ISU Sample**).²⁵⁶

The Intelligence and Investigations Department had included this athlete in the Target Group and classified the ISU Sample (specifically, the Presumptive AAF for furosemide) as “*Category 1*”,²⁵⁷ being the most suspicious category.

By way of summary:

- (i) The WADA LIMS reported (in the “*scr_results*” table) a Presumptive AAF for furosemide²⁵⁸ and a subsequently successful Confirmation Procedure (**CP**) (in the “*confirmations*” table).
- (ii) The data from the “*recovered*” 6 January 2019 version of the Moscow LIMS matched the WADA LIMS for the ISU Sample. In other words, a Presumptive AAF in the “*scr_results*” table and successful CP in the “*confirmations*” table.
- (iii) The data from the “*recovered*” 9 January 2019 version of the Moscow LIMS did not match the WADA LIMS for the ISU Sample. In other words, the entries in the “*scr_results*” and “*confirmations*” tables had been deleted.
- (iv) The data from the Moscow LIMS (imaged by WADA on 12 January 2019) matched the 9 January 2019 version.

The totality of these circumstances necessarily implies that the Presumptive AAF and subsequently successful CP records were deleted between the 6 and 9 January 2019.

In addition to the LIMS manipulations, Independent Experts recovered a carved PDF from ICR-Disk 2²⁵⁹ that related to the analysis of diuretics (e.g. furosemide) for the ISU Sample²⁶⁰. This PDF showed signs that the chromatogram of furosemide had also been selectively manipulated.

²⁵⁵ International Skating Union.

²⁵⁶ Sample 2728513 (Laboratory Code 12411).

²⁵⁷ Category 1 identifies those samples with a concentration value above that which WADA-accredited laboratories are expected to be capable of identification.

²⁵⁸ Substance from the Schedule 5 Class of the List (*Diuretics and Masking Agents*) are always prohibited.

²⁵⁹ The “*ICR*” disks are three disks received from the Investigative Committee that were purportedly removed from the Moscow Laboratory on 21 July 2016.

²⁶⁰ PDF generated from the “*d_12411.raw*”.

Consequently, there is compelling evidence that manipulation of the ISU Sample was recent, targeted and thorough.

Example 3

The last example pertains to a 2013 sample from a WCF²⁶¹ Russian female athlete (**WCF Sample**).²⁶²

The Intelligence and Investigations Department had included this athlete in the Target Group.

By way of summary:

- (i) The WADA LIMS reported (in the “*found*” table)²⁶³ an elevated and suspicious steroid profile (**SP**) value, more specifically, a Testosterone to Epitestosterone (**T/E**)²⁶⁴ ratio of 7.4. The suspicious SP value was also reported (in the “*confirmation*” table) as being confirmed²⁶⁵ by the Moscow Laboratory.
- (ii) The data from the “*recovered*” 6 January 2019 version of the Moscow LIMS matched the WADA LIMS for the WCF Sample. In other words, a T/E ratio of 7.4 and an entry in the “*confirmation*” table.²⁶⁶
- (iii) The data from the “*recovered*” 9 January 2019 version of the Moscow LIMS partly matched the WADA LIMS for the WCF Sample. More specifically, the T/E ratio of 7.4 appeared in the “*found*” table, but the entry in the “*confirmation*” table had been deleted. In other words, the successful CP record²⁶⁷ had been deleted.
- (iv) The data from the Moscow LIMS (imaged by WADA on 12 January 2019) matched the 9 January 2019 version.

The totality of these circumstances necessarily implies that the “*confirmation*” record was deleted between the 6 and 9 January 2019.

Moreover, the Intelligence and Investigations Department had originally flagged the WCF Sample as

²⁶¹ World Curling Federation.

²⁶² Sample 2808583 (Laboratory Code 13564).

²⁶³ This table was later renamed the “*found*” table.

²⁶⁴ The T/E ratio is the main parameter of the steroid profile.

²⁶⁵ Testosterone to Epitestosterone ratio value of 6.6 reported in the “*confirmation*” table.

²⁶⁶ Testosterone to Epitestosterone ratio value of 6.6 reported in the “*confirmation*” table.

²⁶⁷ Testosterone to Epitestosterone ratio value of 6.6.

“suspicious” for SP manipulation,²⁶⁸ given that the WADA LIMS data was at odds with the T/E ratio of 3.4 recorded in ADAMS, i.e. below the ratio value of 4 triggering confirmation procedure.

Finally, the Independent Experts recovered a carved PDF related to the analysis of anabolic steroids for the WCF Sample²⁶⁹ from ICR Disk 2.

This PDF showed selective manipulation of the peak areas and reported concentrations for some specific compounds of the SP, namely Testosterone, Epitestosterone, DHEA and DHT.

Consequently, there is compelling evidence that manipulation of the ISU Sample was recent, targeted and thorough.

11.6.2 Conclusion

The original finding by the Independent Experts that they had observed selective differences between the recovered LIMS backups from 5, 6, 9 and 10 January 2019 found selective differences,²⁷⁰ remains undisturbed by the Russia Forensic Investigation.

And further, Independent Experts assert that the observed digital forensic evidence regarding the selective differences between LIMS database backups recovered from unallocated space on the LIMS system is **extremely more probable** given the proposition that entries were selectively deleted and altered in the LIMS database between 6 and 10 January 2019, rather than the proposition of the Russia Forensic Investigation that the differences are “*the result of the use of information from various sources when restoring the operability of the LIMS.*”²⁷¹

11.6.2.1 Investigator conclusion

The circumstances of the data associated with the IAAF, ISU and WCF Samples provide overwhelming evidence that Mr Mochalov’s actions did result in the “*destruction or modification of information on the results of doping samples tests stored on the LIMS server databases*”.

11.7 ALTERATIONS TO SERVER ONE

To evaluate the Russia Forensic Investigation, Independent Experts conducted further digital forensic analysis on Server One.

²⁶⁸ The Intelligence and Investigations Department identified this and other samples with suspicious Steroid Profiles to affected International Federations in March 2018.

²⁶⁹ PDF generated from the “a_13564.raw”.

11.7.1 Background

Server One is the main server of the Moscow Laboratory. It was comprised of six disks.

During the data retrieval mission, Russian Experts advised WADA that removing the disks of Server One may result in inability to restart Server One. Russian Experts proposed to transition (backup) the content of Server One onto a new server to enable WADA to forensically image the Server One disk without the risk of data loss to the Laboratory if the server did not ultimately restart.

On 14 January 2019, WADA agreed to the proposal of the Russian Experts.

By the afternoon of 16 January 2019, Russian Experts had completed the backup of Server One and WADA commenced forensic imaging of the six disks.

11.7.2 Independent Experts Analysis

Independent Experts observed digital forensic evidence of the following:²⁷²

- (a) On 16 January 2019, while Server One was backdated to 19 August 2015, a “*system administrator*” executed commands to format a “*secondary*” disk from Server One, making it appear that the disk was formatted on 19 August 2015.
- (b) A command was then executed to overwrite the “*free space*” of the “*primary*” disk in Server One with zeroes.
- (c) Server ONE contains digital traces compatible with a specialized tool being used to secure erase files on 16 January 2019.
- (d) On Server ONE, a “*system administrator*” selectively removed the Command Logs the commands that overwrite areas of a disk with zeroes and run a specialized tool to secure erase file.

11.7.3 Conclusion

By overwriting areas of a disk with zeros, a “*system administrator*” renders traces of prior commands, activities and previously deleted data unrecoverable.

The effect of a “*system administrator*” selectively removing the Command Logs is that the associated

²⁷⁰ Attachment A - WADA Technical Report, sections 5.2.3 and 6.

²⁷¹ Attachment F - WADA Evaluation Report, Part 5.7, page 33.

²⁷² Ibid, Part 5.11, pages 38-39.

actions on Server One were not observable without digital forensic analysis.²⁷³

To this end, digital forensic recovery was required to discover that commands were executed to overwrite areas of the “*primary*” disk in Server One with zeroes, to format “a “*secondary*” disk, and to use a specialized tool to secure erase files.²⁷⁴

None of these actions have ever been communicated to WADA representatives.

11.8 PDF ALTERATIONS

On 6 September 2019, in assessing the impact of the identified data manipulation, the CRC Report detailed evidence of PDF manipulation. Similarly, the Russia Forensic Investigation reported PDF manipulation.

Consequently, this issue is uncontentious as digital forensic evidence of PDF manipulation was observed by both WADA and Russian Experts. However, while Russian Experts identified manipulation via a specific script,²⁷⁵ Independent Experts identified multiple methods of manipulation.²⁷⁶

11.8.1 Conclusion

Independent Experts assert that the observed digital forensic evidence is **extremely more probable** if multiple methods were used to alter PDF files rather than one method were used.

12 ICR DISKS

12.1.1 Background

On 11 January 2019, the Investigative Committee delivered the ICR Disks (ICR-1, ICR-2 and ICR-3) and an accompanying protocol (**Protocol**) to WADA at the Moscow Laboratory.

The Protocol is the Investigative Committee’s official account of the circumstances surrounding the inspection of the Moscow Laboratory by the Investigative Committee on 21 July 2016, and the seizure of the ICR Disks. The Protocol is purportedly constructed by the Investigative Committee in real-time. In other words, as events happen.

WADA observed the ICR Disks were sealed in individual envelopes, each was labelled with a description of the contents and signed by those involved in its delivery and

receipt. However, the envelopes did not record the date or time they were sealed. According to the Investigative Committee, the envelopes had never been opened and the ICR Disks never examined.

The Protocol recorded the ICR Disks as having been voluntarily provided to the Investigative Committee by the Moscow Laboratory.

On 5 September 2019, the Intelligence and Investigations Department met with representatives of Minister Kolobkov and the Investigative Committee (**Russian Delegation**) in Lausanne, Switzerland.

During the meeting the Russian Delegation confirmed that the the Investigative Committee had received the ICR Disks from the Laboratory and that they were either currently or previously in use by the LIMS server and “*Server ONE*”. The Delegation also claimed that on 21 July 2016, the Investigative Committee transferred the Raw Data files from the computers interfaced with the respective instruments onto the ICR Disks and that this “*transfer*” of data has been mistakenly interpreted by WADA’s Forensic Experts as a deletion.

In response to the above, Independent Experts conducted certain investigations.

12.1.2 Mandate

Independent Experts were asked to investigate the ICR Disks for evidence of modification as having occurred after 9 June 2016 and 21 July 2016 (**Evidence of Modification**).

- 9 June 2016 was the last recorded instance of Remote Access to the “*web interface*” of the LIMS system.
- 21 July 2016 was the date the ICR Disks were purportedly seized by the Investigative Committee.

Additionally, Independent Experts were asked to examine the following three claims, made by the Russian Delegation:

As at 21 July 2016, the ICR Disks were either currently or previously in use by the LIMS server and Server ONE (**Claim One**).

On 21 July 2016, the Investigative Committee transferred Raw Data files from the computers interfaced with the respective instruments onto the ICR Disks (**Claim Two**).

²⁷³ Ibid, Part 5.11, pages 38-39.

²⁷⁴ Ibid.

²⁷⁵ Script: “*data.php*”.

²⁷⁶ Attachment F - WADA Evaluation Report, Part 4, page 10.

The “*transfer*” of the Raw Data files from the Instrument Computers has been mistakenly interpreted by the Independent Experts as a deletion (**Claim Three**).

12.1.3 Evidence of Modification

Forensic examination of the volume records of each ICR Disk revealed:²⁷⁷

- (i) ICR-1 had a file system creation date of 6 July 2016. All files on ICR-1 have a creation date of 6 July 2016, indicating that the disk was used to copy files on a single day, rather than being used as a backup disk for any longer period.
- (ii) ICR-2 had a file system creation date of 5 July 2016. All files on ICR-2 have a creation date of 5 July 2016, indicating that the disk was used to copy files on a single day, rather than being used as a backup disk for any longer period.
- (iii) ICR-3 had a file system creation date of 14 August 2015. All files on ICR-3 have a creation date of 14 August 2015, indicating that the disk was used to copy files on a single day, rather than being used as a backup disk for any longer period.

Consequently, based on the above, Independent Experts observed evidence of modifications to the ICR Disks after 9 June 2016. However, no evidence of modification was observed after 21 July 2016.²⁷⁸

12.1.4 Claim One

Forensic analysis of Server ONE and the LIMS server did not find any references to the ICR Disks.

However, there is insufficient available “*contextual information from the computer system used to create the ICR Disks*” to enable the Independent Experts to either dispute or verify Claim One.²⁷⁹

12.1.5 Claim Two

12.1.5.1 Transfer of Raw Data Files

Independent Experts observed folders on the Laboratory instrument systems containing previously existing Raw Data files had changed to deleted state on 21 July 2016. This deletion date is weeks after the creation dates of files on the ICR Disks (6 July 2016, 5

July 2016 and 14 August 2015). Therefore, the deletion of Raw Data files on laboratory instrument systems (discussed in detail below) does not correspond with the transfer of files to the ICR Disks as proposed by Claim Two.²⁸⁰

However, there is insufficient information to dispute or verify that ICR-1, ICR-2 and ICR-3 were created on 6 July 2016, 5 July 2016 and 14 August 2015, respectively.²⁸¹ Consequently, Claim Two in respect of the “*transfer*” of files can neither be disputed or verified.

12.1.5.2 Missing Raw Data Files

The Intelligence and Investigations Department have identified to date that 110 Raw Data files produced on the Instrument Computer within the Laboratory are not present on the ICR Disks. Independent Experts have confirmed that none of the 110 Raw Data files are “*existing*” or listed as “*previously existing*” on the ICR Disks.²⁸²

Examination of instrument systems confirms that none of the 110 RAW Data files are existing. This examination reveals that 58 out of the 110 RAW Data files are not listed as previously existing, and 52 are listed as previously existing. Of these previously existing files on instrument systems, 15 files were recovered, and their integrity was validated using a tool provided by Thermo Fisher.²⁸³

The fact that RAW Data files previously existed on instrument systems are not present on the ICR Disks, indicates that the data on the ICR Disks may not be complete and raises questions – but not conclusions – as to the veracity of Claim Two.²⁸⁴

12.1.5.3 Missing PDF files

Based on analysis of LIMS data, particularly entries in the “*pdf*” table, WADA specified a list of 120 PDF files that were produced in the Moscow laboratory but are not found on the ICR Disks.²⁸⁵

Examination of ICR Disks confirms that none of the 120 PDF files are existing, nor listed as previously existing. Moreover, examination of instrument systems confirms that none of the 120 PDF files are in an existing state on the file system. This examination reveals that 3 out of the 120 PDF files are listed as previously existing. One

²⁷⁷ Attachment G - Authentication of ICR Disks Report (“*PFS 19.0427*”) (“*WADA ICR Disk Report*”), Part 3.2, pages 5-6.

²⁷⁸ Attachment G - WADA ICR Disk Report, Part 4, page 10.

²⁷⁹ Ibid, Part 4, pages 10.

²⁸⁰ Ibid, Part 3.4, page 7.

²⁸¹ Ibid, Part 4, page 10.

²⁸² Ibid, Part 3.5, page 7.

²⁸³ Ibid.

²⁸⁴ Ibid.

²⁸⁵ Ibid, Part 3.6, page 8.

of these previously existing PDF files listed below has a deletion date on 06 January 2019.²⁸⁶

The fact that PDF files are listed in LIMS database tables, indicating that they previously existed, but are not found on the ICR Disks, indicates that data on the ICR Disks may not be complete and raises questions – but not conclusions - as to the veracity of Claim Two.²⁸⁷

12.1.5.4 Missing PDF files found in deleted state

Certain PDF files related to specific sample analysis are only found in deleted state in free space on the Disk ICR-2 using digital forensic file carving operations. These PDF files are missing from the corresponding group of existing files and were not recovered from any other disk. To determine the full extent of carved PDF files that are missing from the corresponding group of existing files, it would be necessary to perform an in-depth forensic analysis of specific cases and associated files.²⁸⁸

Because these carved PDF files do not have any associated file system metadata, it cannot be stated when they were copied or deleted on the Disk ICR-2.²⁸⁹

The fact that PDF files are only found in deleted state in free space on the Disk ICR-2 using digital forensic file carving operations and are missing from the corresponding group of existing files, raises questions about the integrity and completeness of data on the Disk ICR-2.²⁹⁰

12.1.5.5 Altered PDF content

PDF files only found in deleted state in free space of the Disk ICR-2 using digital forensic file carving operations contain incongruities that indicate their content was altered after the original file creation.²⁹¹

The fact that PDF files found in deleted state in free space on the Disk ICR-2 using digital forensic file carving operations contain incongruities that indicate their content was altered after the original file creation, raises questions about the integrity and completeness of data on the Disk ICR-2.²⁹²

12.1.6 Claim Three

Independent Experts observed that the folders on Laboratory instrument systems containing previously existing Raw Data files changed to deleted state on 21

July 2016. This deletion date is weeks after the creation dates of files on the respective ICR Disks (6 July 2016, 5 July 2016 and 14 August 2015). Therefore, the deletion of Raw Data files on Laboratory instrument systems does not correspond with the transfer of files to the ICR Disks as indicated by the Russian Delegation in Claim Three.²⁹³

12.1.7 Conclusion

Forensic analysis conducted in respect of these matters concluded as follows:

- (a) Absent specific contextual information from the computer system used to create the ICR Disks, there is insufficient information to verify that Disk ICR-1, Disk ICR-2 and Disk ICR-3 were created on 6 July 2016, 5 July 2016 and 14 August 2015, respectively.
- (b) No activities or alterations with dates after 6 July 2016 were observed on the ICR Disks.
- (c) The Russian Expert Claim One that “*These hard-drives were either currently or previously in use by the LIMS server and Server ONE*”, does not explain the fact that all activities on Disk ICR-1 have creation timestamps on a single day (6 July 2016), all activities on Disk ICR-2 have creation timestamps on a single day (5 July 2016), and all activities on Disk ICR-3 have creation timestamps on a single day (14 August 2015).
- (d) Absent specific contextual information from the computer system used to create the ICR Disks, there is insufficient information to verify Claim One that Disk ICR-1, Disk ICR-2 and Disk ICR-3 were created using the Server ONE and the LIMS server.
- (e) The Russian Expert Claim Two that all files were copied to these three disks in July 2016 is incompatible with the creation timestamps of 14 August 2015 on Disk ICR-3.
- (f) The transfer of files to the ICR Disks on and before 6 July 2016 does not correspond with deletion of Raw Data files on laboratory instrument systems in late July 2016 as indicated in Russian Expert Claim Three.

²⁸⁶ Ibid.

²⁸⁷ Ibid.

²⁸⁸ Ibid, Part 3.7, page 9.

²⁸⁹ Ibid.

²⁹⁰ Ibid.

²⁹¹ Ibid, Part 3.8, page 9.

²⁹² Ibid.

²⁹³ Attachment G - WADA ICR Disk Report, Part 3.4, page 7.

- (g) The 110 Raw Data files missing from the ICR Disks raises questions that data on the ICR Disks may not be complete.
- (h) The 120 PDF files missing from the ICR Disks indicates that data on the ICR Disks may not be complete.
- (i) The fact that PDF files are only found in deleted state in free space on Disk ICR-2 using digital forensic file carving operations raises questions about the integrity and completeness of data on the ICR-2 Disk.
- (j) The fact that PDF files found only in deleted state in free space on Disk ICR-2 using digital forensic file carving operations contain incongruities that indicate their content was altered after the original file creation, raises questions about the integrity and completeness of data on the Disk ICR-2.
- (k) Files found in deleted state in free space do not have any associated file system metadata and, therefore, it cannot be stated when they were copied or deleted on the disk.

13 FORUM MESSAGES

The relevance of Forum Messages was first raised by the Russian Experts in a letter from Minister Kolobkov to WADA President, Sir Craig Reedie, on 26 August 2019. The letter revealed the discovery of “correspondence” (i.e. Forum Messages) between Doctor Rodchenkov and Doctor Timofey Sobolevsky which included, topics of “money transfer” and “bonuses” in the context of “dirty samples”.

Given the significance placed on the Forum Messages by the Russia Forensic Investigation, Independent Experts conducted a thorough digital forensic examination of this message exchange platform and its contents.

It should be noted that all Forum Messages were in Russian and, where appropriate, have been translated (by a WADA appointed certified translator) to English for the purposes of this report.

13.1 OVERVIEW

As previously stated (see **Part 10.2.3.3**, above), the Russia Forensic Investigation asserts that specific Forum Messages exchanged between Doctor Rodchenkov and Doctor Sobolevsky evidence the

“receipt of money from sportspeople and trainers for the manipulation” of sample analysis results.²⁹⁴

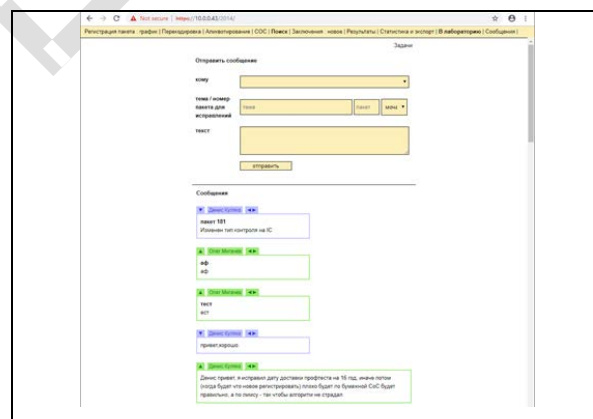
However, as detailed below, forensic analysis of LIMS data found that between 25 November 2018 and 10 January 2019, Forum Messages in the LIMS database were selectively altered to fabricate certain communications between Doctor Rodchenkov and Doctor Sobolevsky, as well as between Evgeny Kudryavtsev (**Mr Kudryavtsev**) and Anastasia Zharihina (**Ms Zharihina**).

In other words, the Forum Messages produced in the Russia Forensic Investigation as evidencing the receipt of money by Doctor Rodchenkov and Doctor Sobolevsky in exchange for the manipulation of test results are fabricated and were “created” into the Moscow LIMS sometime on or after 25 November 2018.

13.2 FORUM MESSAGES

The LIMS web application includes a Forum Message feature for LIMS users to exchange messages as shown in *Figure 1*, below.²⁹⁵

Figure 1



The WADA LIMS contains **3,828** Forum Messages from 25 March 2013 to 3 September 2015.

The Moscow LIMS contains **11,227** Forum Messages from 25 March 2013 to 12 January 2019.

Each of Forum Message is comprised of the unique identifier (**ID**) for the sender, recipient ID, sent

²⁹⁴ Attachment C - Russia Technical Report (Part 1), page 6.

²⁹⁵ WADA Alteration Report, Part 5.1, page 10.

timestamp, read timestamps, subject and message content as shown in *Figure 2*, below.²⁹⁶

Figure 2

id	DT	from	to	subject	message	read
1	2013-03-25 17:43:35	6	7	тестовые	441, очень похожи на тестовые, но нигде не указано	2013-04-02 15:14:58
2	2013-03-26 13:43:05	6	2	443	443 пакет, открытый чемпионат РБ	2013-03-28 13:31:45
3	2013-03-26 14:19:08	6	1	Р6	Тим, на все процедуры отдаем белорусскую пробу?	2013-03-27 18:03:29
4	2013-03-26 14:25:09	1	6		да, на все, кроме первой - пока побережем ночь, только надо просле...	2013-03-28 13:01:23
5	2013-03-26 16:11:59	6	2	кратов	внедо, пика, кратова в список исполнителей анализа по но-че	2013-03-28 13:31:45
6	2013-03-26 16:25:18	6	2	транслог	Олег, 446, доставил транслог, номер накладной - 007-795632, испра...	2013-03-28 13:31:45
7	2013-03-26 20:38:25	1	7	IRMS пробы 2551	Саша, по этой пробе UCL проигр выставить счет за IRMS на ник.	2013-04-02 15:14:58
8	2013-03-27 09:37:20	39	2	кровь пакет 104	принял Назаров	2013-03-28 13:31:45
9	2013-03-27 09:53:20	39	2	правка в пакетах	кровь 104 принял Назаров, а не Назаров, но-ча 447 и 448 принял Наз...	2013-03-28 13:31:45
10	2013-03-27 17:12:59	2	6		Жена, а кто такой Назаров? Если это новый сотрудник, то надо как т...	2013-03-28 13:01:23
11	2013-03-28 09:27:17	39	2	правка в пакетах	кровь 104 принял Назаров, а не Назаров, но-ча 447 и 448 принял Наз...	2013-03-28 13:31:45
12	2013-03-28 12:59:57	6	2	охрана	полностью с тобой согласен, уточню у Арнстова	2013-03-28 13:31:45
13	2013-03-28 13:01:23	6	2	бокс украина	Олег, я не могу понять 450 пакет - это бокс или профессиональный б...	2013-03-28 13:31:45
14	2013-03-28 13:30:43	7	6		ТТ планчик или абыйский бокс - это планчик.	2013-03-28 14:11:08

13.3 COMPARATIVE ANALYSIS

A comparative analysis was conducted of the Forum Messages found in the WADA LIMS and the Moscow LIMS. Differences were observed, more specifically:²⁹⁷

- (i) the content of three Forum Messages²⁹⁸ differ between the respective LIMS. In other words, the content of a message in the WADA LIMS is different to the content of the same message in the Moscow LIMS (**Modified Messages**).
- (ii) 10 Forum Messages in the Moscow LIMS are not present in the WADA LIMS (**Inserted Messages**).
- (iii) 25 Forum Messages present in the WADA LIMS are not present in the Moscow LIMS (**Deleted Messages**).

Investigations were then undertaken to determine which version of the Forums Messages was true. The results of which are detailed below.

14 FABRICATED EVIDENCE

Following highly technical, protracted and expensive digital forensic analysis, Independent Experts have established that the Moscow LIMS contains fabricated Forum Messages. More specifically, on or after 25

November 2018 but before 13:22 hours (1:22PM) on 10 January 2019, an “*unknown*” person or persons:

- (i) Modified the content of three Forum Messages in the Moscow LIMS (i.e. the Modified Messages);²⁹⁹
- (ii) Inserted 10 fabricated Forum Messages into the Moscow LIMS (i.e. the Inserted Messages);³⁰⁰ and
- (iii) Deleted 25 Forum Messages from the Moscow LIMS (i.e. the Deleted Messages).³⁰¹

Moreover, the sequence of alteration commenced with modification of the three Forum Messages, followed by the insertion of the 10 messages and, lastly, the deletion of the 25 messages.

14.1 MODIFIED MESSAGES

On 7 June 2013,³⁰² in the WADA LIMS, Mr Kudryavtsev sent Doctor Sobolevsky a Forum Message³⁰³ stating “OK”.

In the Moscow LIMS the message “OK” was removed and replaced with the words, “*spoke with NO [HO]: we are definitely not going to put 2780034, 2780424 and 2780489 out there!!!! They are far from being just some homeless people... Treat all the files using the scheme, and you can take your Bonus home*”.

Moreover, Mr Kudryavtsev had been removed as the sender and replaced by Doctor Rodchenkov. In other words, the message now appeared as though Doctor Rodchenkov has sent it.

The fabricated version of this message was specifically referenced in the Russia Technical Report.³⁰⁴

On 2 July 2013,³⁰⁵ in the WADA LIMS, Mr Kudryavtsev sent Doctor Sobolevsky a Forum Message³⁰⁶ stating “*Tim, we will soon be giving it*”.

In the Moscow LIMS this message underwent several changes.

Firstly, the parties were changed from Mr Kudryavtsev (sender) and Doctor Sobolevsky (recipient) to Doctor

²⁹⁶ WADA Alteration Report, Part 5.1, page 12.

²⁹⁷ Ibid, Part 5.1.1, pages 12-13.

²⁹⁸ Forum Message ID: 217, 309 and 311.

²⁹⁹ WADA Alteration Report, Part 5.1.4, pages 18-22.

³⁰⁰ Ibid.

³⁰¹ Ibid.

³⁰² At 14:35 hours (or 2:35PM).

³⁰³ Record ID: 217.

³⁰⁴ Attachment C - Russia Technical Report, Page 14.

³⁰⁵ At 10:55 hours (or 10:55AM).

³⁰⁶ Record ID: 309.

Sobolevsky (sender) and Doctor Rodchenkov (recipient).

Secondly, the time of the message was changed from 10:55 hours (WADA LIMS) to 11:05 hours (Moscow LIMS).

Thirdly, the time the message was opened (read) was changed from 10:55 hours (WADA LIMS) to 15:38 hours (Moscow LIMS).

Lastly, the content was changed from “*Tim we are about to send*” to the following:

“Kudryavtsev is not releasing his aliquots, he is asking for a request! I propose we enlighten Kudryavtsev about our scheme involving the samples. We need to tell him straight and clearly, that we are creating the appearance of dirty samples, and the athletes and their trainers are bringing us bonuses. Otherwise he will suspect something dodgy is going on and will be unlikely to release any repeats without requests. This work has to be done very precisely. Alternatively, order him to stop fucking around and start handing over those aliquots. I prefer option number two :)”

The fabricated version of this message was specifically referenced in the Russia Technical Report.³⁰⁷

On 2 July 2013,³⁰⁸ in the WADA LIMS, Doctor Sobolevsky sent Mr Kudryavtsev a Forum Message³⁰⁹ stating, “*Evgeny, I will clarify that*”.

In the Moscow LIMS this message underwent an almost complete change.

Firstly, the time was changed from 10:59 hours to 15:36 hours.

Secondly, the sender was changed from Doctor Sobolevsky to Doctor Rodchenkov.

Thirdly, the recipient was changed from Mr Kudryavtsev to Doctor Sobolevsky.

Lastly, the content was changed from “*I’m gonna get this straight*” to “*Tim, calm down. I will have a talk with him later. It is all OK.*”.

The fabricated version of this message was specifically referenced in the Russia Technical Report.³¹⁰

³⁰⁷ Attachment C - Russia Technical Report, Page 14.

³⁰⁸ 10:59 hours (or 10:59AM).

³⁰⁹ Record ID 311.

³¹⁰ Attachment C - Russia Technical Report, Page 14.

14.2 INSERTED MESSAGES

The following 10 Forum Messages were inserted into the Moscow LIMS.³¹¹

Commencing on 8 October 2013 and concluding 9 October 2013, Mr Kudryavtsev and Anastasia Zharihina (**Ms Zharihina**), the Deputy of the Sample Reception and Storage Department,³¹² had the following fictitious exchange of Forum Messages:

Kudryavtsev: *Nastya, GMR and TS asked, if heavy athletics brought through, then the aliquots for that should be released at our maximum speed. I am staying here, but you go home, it is already late.*

Zharihina: *Okay, I understand.*

Zharihina: *I am sorry, but I forgot to ask, obviously GMR is the director, but who is TS? :).*

Kudryavtsev: *You surprise me! TS is Sobolevsky. And just in case, OM is Migachev.*

The value in these four fabricated messages is they innocuously now establish that references in the Forum Messages to “*GMR*”, “*TS*” and “*OM*” are in fact references to Doctor Rodchenkov, Doctor Sobolevsky and Mr Migachev, respectively.

Commencing on 2 October 2014 and concluding on 5 October 2014, Doctor Sobolevsky and Doctor Rodchenkov had the following fictitious exchange of Forum Messages:

Sobolevsky: *Any news on Katina from heavy, 11712? She has got str, so much time has passed...*

Rodchenkov: *for the time being, we are definitely not putting anything out there on Adams. Wait a little. They should be bringing it. Syrtsov is everything to us! ... a renovated apartment and summer hous...*

Sobolevsky: *met about Katina, I took it all. I'll pop by yours when you get back.*

³¹¹ WADA Alteration Report, Part 5.1.4, page 19.

³¹² Refer 3 October 2018 Affidavit of Doctor Rodchenkov, page 11. This document is not included in this report. It may be provided upon request.

Rodchenkov: *Timofey, I cannot get through to you by phone. Three samples will be brought in today t/a [m/a]. Take them and check them as quickly as possible. There should also be an envelope. Don't go blabbing.*

Sobolevsky: *Well, it is a total fucking mess there. Oral turinabol, OXA, tren. At your discretion.*

Rodchenkov: *what fuckwits they are!*

14.2.1 Investigator Analysis

These fabricated messages were all specifically referenced in the Russia Technical Report (albeit with some minor differences in translation) and were subject of detailed analysis and interpretation (see **Part 13.2**, "Forum Messages", above).³¹³

The conclusion drawn by the Russia Forensic Investigation in respect of these messages is that they evidence Doctors Rodchenkov and Sobolevsky's scheme of extortion and manipulation of analysis results for money. In other words, they were the figurative "smoking gun" of incrimination against Doctor Rodchenkov and Doctor Sobolevsky. However, they were fabricated and "created" into the LIMS on or after 25 November 2018, but before 10 January 2019.

14.3 DELETED MESSAGES

Independent Experts identified 25 Forum messages deleted from the Moscow LIMS - the most relevant of which have been included in this report.³¹⁴

To contextualize the value in deleting these messages it is necessary to state the following:

- (i) Mr Kudryavtsev is party to 18 of the 25 deleted messages.
- (ii) Mr Kudryavtsev was the head of reception, storage and aliquoting section of the Sochi and Moscow Laboratories.
- (iii) Mr Kudryavtsev was named in an affidavit by Doctor Rodchenkov to the "Schmid Commission"³¹⁵ as being intimately involved in the swapping of samples in the Sochi Laboratory.

³¹³ Attachment C - Russia Technical Report, Page 14.

³¹⁴ WADA Alteration Report, Part 5.1.4, page. A complete list of these messages may be provided upon request.

(iv) In addition to sample swapping, Doctor Rodchenkov revealed the existence of "pre-departure" testing of Russian athletes whereby select Russian athletes would be unofficially tested prior to competition to ensure their use of Prohibited Substances was not detectable.

(v) Mr Kudryavtsev was a witness in the mostly successful appeal of 39 Russian athletes to the Court of Arbitration for Sport (**CAS**) following sanctions imposed by the International Olympic Committee Disciplinary Commission on the back of the McLaren Investigation and Schmid Commission.

(vi) During the CAS proceedings, Mr Kudryavtsev vigorously disputed Doctor Rodchenkov's claims that a sanctioned subversion of the doping control process, orchestrated by the Russian Ministry of Sport and facilitated with the assistance of the Moscow Laboratory, operated in Russia. Moreover, Mr Kudryavtsev stated in evidence that he had decided to testify in the proceedings because he wanted to prove to the world that Doctor Rodchenkov was lying and that no sample-swapping occurred at the Sochi Games.³¹⁶

(vii) Mr Kudryavtsev's credibility is essential to his effectiveness as a witness.

14.3.1 Deletion Example 1

On 18 September 2013, Mr Kudryavtsev sent Doctor Sobolevsky a Forum Message stating,

"Tim, 2424: need to swap the registration with the other one and print the first three pages with the same dates and time, but under Kudryavtsev. Can't find Svishyev any more :)"

14.3.1.1 Investigator Analysis

This Forum Message suggests that Mr Kudryavtsev is directing the manipulation of the reception time of a sample received at the Moscow Laboratory, including reprinting the internal Chain of Custody (**CoC**) form.

14.3.2 Deletion Example 2

Commencing on 29 November 2013 and concluding on 3 December 2013, Mr Migachev, Mr Kudryavtsev, Anastasia Zharihina (**Ms Zharihina**) and Doctor

³¹⁵ The Schmid Commission was established by the IOC to investigate allegations of Russian doping manipulations at the Sochi Games.

³¹⁶ CAS 2017/A/5379 *Alexander Legkov v. International Olympic Committee (IOC)*, [352].

Sobolevsky had the following Forum Message exchange:

Mr Migachev to Mr Kudryavtsev: "*Evgeny, please find the following pairs of samples: 13808 and 13807; 14809 and 14810*".³¹⁷

Mr Kudryavtsev to Ms Zharihina: "*Nast, please find the following pairs of samples: 13808 and 13807; 14809 and 14810 A and B*".³¹⁸

Mr Kudryavtsev to Ms Zharihina:³¹⁹

"*Nast, PK is ready for analysis, tell Masha to write the time of receipt in [CoC] as 29.11.13 + 1 min after the handover. GR is in the refrigerator, in the [CoC] I wrote that I aliquoted it, please pour it out yourself and in our refrigerator, there are about 15 pre-departure samples, pour them out please for all the procedures. Good luck!*"

Mr Kudryavtsev resent this message about a minute later.³²⁰

Mr Migachev to Mr Kudryavtsev: "*Evgeny, what is up with the other pairs of samples? Have they been found?*"³²¹

Mr Kudryavtsev to Mr Migachev: "*yes, we have them, we found them*".³²²

Mr Migachev to Doctor Sobolevsky: "*13808 and 13807; 14809 and 14810*".³²³

14.3.2.1 Investigator Analysis

This Forum Message exchange suggests that Mr Kudryavtsev is directing the manipulation of an CoC form (referenced by the letters CoC aka "*Chain of Custody*"). Mr Kudryavtsev appears also to be asking Ms Zharihina to aliquot the samples although it appears he had already written on the CoC form that he had. Lastly, and most significantly, this message has Mr Kudryavtsev referencing the existence of 15 "*pre-departure*" samples.

14.3.3 Deletion Example 3

On 15 December 2014 and 16 December 2014, Mr Kudryavtsev exchanged the following Forum Messages with Mr Migachev and Doctor Sobolevsky.

At 18:16 hours (6:16PM) on 15 December 2014, Mr Migachev sent Mr Kudryavtsev a Forum Message

stating: "*9095 4; 4093 5; 4733 5; 3491 6; 6315 6; 11083 18; 11115 18; 11115 P2.010; 11083 P2.010*."

This message appears to contain Laboratory Codes and an accompany analysis procedure (e.g. 9095 and analysis procedure "4" [anabolic steroids]).

At 18:25 hours (6:25PM) on 15 December 2014, Mr Kudryavtsev replied,

"*Oleg, are you sure that is everything? Is this apart from the **21 substituted samples**, or is it absolutely everything that had to be removed? I was with Tim 2 hours ago and he was telling me that much more had to be changed.*"

No reply was observed in the Forum Messages.

At 12:08 hours (12:08PM) on 16 December 2014, Mr Kudryavtsev sent Mr Migachev a Forum Message stating, "*Oleg, please correct the time of receipt to 14:08 as soon as possible. Thank you*".

At 14:36 hours (2:26PM) on 16 December 2014, Mr Kudryavtsev sent Doctor Sobolevsky a Forum Message stating, "*Please correct the time of receipt to 14:08 as soon as possible. Thank you.*"

14.3.3.1 Investigator Analysis

This exchange of Forum Messages must be contextualised by the following:

- (a) On 3 December 2014, the German television channel ARD aired a documentary (**Documentary**) alleging the existence of state-sponsored doping in Russia (**Protection Scheme**).³²⁴
- (b) On 9 December 2014, WADA, by letter, directs the Moscow Laboratory (i.e. Doctor Rodchenkov) to keep "*all the A and B samples currently stored*" in the facility. Moreover, the samples must be kept "*frozen and under strict chain of custody until further notice by WADA*".³²⁵

³¹⁷ 15:16 hours (3:16PM) on 29 November 2013.

³¹⁸ 18:53 hours (6:53PM) on 29 November 2013.

³¹⁹ 20:51 hours (8:51PM) on 29 November 2013.

³²⁰ 20:32 hours (8:32PM) on 29 November 2013.

³²¹ 11:15 hours (11:15AM) on 3 December 2013.

³²² 13:52 hours (1:52PM) on 3 December 2013.

³²³ 16:22 hours (4:22PM) on 3 December 2013.

³²⁴ Hajo Seppelt (2014). *Geheimsache Doping: Wie Russland seine Sieger macht*. WDR / ARD Sportschau.

³²⁵ 9 December 2014 WADA letter to Doctor Rodchenkov.

- (c) On 10 December 2014, WADA launched an Independent Commission (IC) to investigate the Documentary's allegations.³²⁶
- (d) On 11 December 2014, Doctor Rodchenkov asserts he was advised by the Ministry of Sport that WADA staff had applied for visa to Russia.³²⁷
- (e) Expecting an imminent visit from WADA, Doctor Rodchenkov undertook extreme actions to conceal the Protection Scheme including discarding approximately 1,417³²⁸ samples, falsifying CoC records and arranged for the "swapping" of select samples.^{329 330}
- (f) On 16 December 2014, WADA announced details of the three-person IC.³³¹
- (g) On 17 December 2014, a WADA team attends the Moscow Laboratory to secure and remove all samples currently stored in the facility.

Against this background, the Forum Messages provide compelling "real-time" corroboration to Doctor Rodchenkov's evidence that in preparation for the WADA visit evidence was destroyed via means including sample swapping ("21 substituted samples") and CoC record falsification ("Oleg, please correct the time of receipt..."). Moreover, Mr Kudryavtsev was an active participant.

14.3.4 Other messages

Deletion of highly relevant messages not involving Mr Kudryavtsev was also observed. For example:

On 21 August 2014, Doctor Sobolevsky sent a Forum Message to Ms Zharihina stating, "*the pH values have been cleaned up, so new values can be inserted. For density, too.*"

On 11 February 2014, Svetlana Garankina (Ms Garankina) sent a Forum Message to Mr Migachev stating, "*Oleg, please delete the pH result and the density for sample 1170.*"

On 25 August 2014, Ms Garankina sent a Forum Message to Mr Migachev stating, "*delete, please, the*

requests for repeat 10956 and 10966 (Krylova and Dikunets), to avoid recording in the [CoC]. We poured out the residue from the [Flacon]."³³²

14.4 CONCLUSION

The fabricated, modified and deleted Forum Messages are a stunning deception. They are the figurative "smoking gun". Moreover, their existence demonstrates intent and provides a lens through which the totality of manipulations within the Moscow Data should be observed.

The modified and inserted messages evidence an intent to incriminate Doctor Rodchenkov, Doctor Sobolevsky and Mr Migachev. While the deleted messages evidence an intent to hide incriminating evidence and protect Mr Kudryavtsev, a key witness against Doctor Rodchenkov and his claims of state sanctioned subversion of the doping control process in Russia.

The great effort required to establish this deception is evidenced by the fact that amongst the 11,227 Forum Messages stored within the Moscow LIMS, those responsible were able to identify and delete 25 highly inculpatory messages.

15 NEW DATA

15.1.1 Background

On 23 October 2019, the Intelligence and Investigations Department received the New Data from a representative of Minister Kolobkov at the Geneva Airport, Switzerland. The New Data comprised a one terabyte hard drive³³³ containing:

- (a) a purported copy of the virtual test server (**Virtual Server**);
- (b) a purported copy of the System Administrator's (i.e. Mr Mochalov) computer (**System Administrator Computer**);

³²⁶ <https://www.wada-ama.org/en/media/news/2014-12/wada-to-undertake-full-investigation-into-german-television-documentary>

³²⁷ See 7 December 2014 Affidavit of Doctor Rodchenkov, [65]. This document has not been included in this report. It may be provided upon request.

³²⁸ WADA Independent Commission Report, page 203.

³²⁹ See 7 December 2014 Affidavit of Doctor Rodchenkov, [65]. This document has not been included in this report. It may be provided upon request.

³³⁰ In preparation for the "swapping" Doctor Rodchenkov prepared a schedule of 37 samples he knew were "dirty" ("The Dirty Schedule") [see EDP0648] Of the 37 samples, Doctor Rodchenkov believed there were six that need not be swapped as he could argue that the concentration of prohibited substances within the samples fell below the minimum reporting thresholds.

³³¹ See <https://www.wada-ama.org/en/media/news/2014-12/wada-announces-details-of-independent-commission>.

³³² A "flacon" is a bottle.

³³³ Serial Number: NA9VTGYJ.

- (c) a purported copy of seven³³⁴ optical disk images (ISO Files).

15.2 EVALUATION

15.2.1 Virtual Server

For the following reasons, the Virtual Server does not provide “trustworthy” information for evaluating the “Russia Forensic Investigation”:^{335 336}

- (i) Historical “log files” automatically generated and archived by the operating system and relevant for forensic analysis were deleted between 18 October 2019 and 22 October 2019.³³⁷
- (ii) The databases labelled “2011”, “2012”, “2013”, “2014”, “crm_v2” and “forum” have been deleted. Moreover, the database labelled “2015” was reinstalled on 20 June 2019.³³⁸
- (iii) The “log_do” tables from all the databases (“2015”, “2016”, “2017”, “2018” and “2019”) were deleted on 20 June 2019.³³⁹
- (iv) Multiple “blood_bag” related tables were deleted between 20 June 2019 and 5 September 2019.³⁴⁰
- (v) A version of the LIMS database carved from the “free space” of the LIMS backup from 25 January 2017 (**2017 Backup**) contained Forum Messages established³⁴¹ to have been modified and fabricated on or after 25 November 2018, but before 10 January 2019.³⁴² In other words, the backup contained forged data.
- (vi) Data present in the WADA LIMS and Moscow LIMS was absent from the 2017 Backup.³⁴³
- (vii) Evidence of date inconsistencies within the 2017 Backup between the completion date of the backup process and the observed records in the database. In other words, the 2017 Backup was

not created on 25 January 2017 but “forged from later LIMS data”.³⁴⁴

- (viii) The presence of expected backup files of the LIMS server databases is not observed.³⁴⁵
- (ix) Many logs files, relevant for forensic analysis, also appear to have been deleted between the 18 October 2019 and the 22 October 2019.
- (x) Content dated 5 July 2017 observed on the Virtual Server suggested the 2017 Backup was fabricated on or after this date.³⁴⁶

15.2.2 System Administrator’s Computer

For the following reasons, the System Administrator’s Computer does not provide “trustworthy” information for evaluating the “Russia Forensic Investigation”:

- (i) the System Administrator’s Computer had a new operating system installed on 16 September 2019.³⁴⁷
- (ii) There are indications that the disk was possibly changed or wiped prior to being used to reinstall the new Linux operating system in the System Administrator’s Computer.³⁴⁸
- (iii) An archive file of a LIMS database backup completed on 15 August 2018 (**2018 Backup**) observed on the System Administrator’s Computer was found to contain Forum Messages established³⁴⁹ by Independent Experts as having been modified and fabricated on or after 25 November 2018, but before 10 January 2019.³⁵⁰ In other words, the 2018 Backup contained forged data.³⁵¹
- (iv) Data present in the WADA LIMS and Moscow LIMS was absent from the 2018 Backup.³⁵²
- (v) Evidence of date inconsistencies within the 2018 Backup between the completion date of the

³³⁴ New Data Report, Part 7, page 18.

³³⁵ The Russia Forensic Investigation is comprised of the following: (i) Statement of Facts; (ii) Russia Technical Report; (iii) Counter Research; and (iv) Answers to Technical Questions.

³³⁶ Attachment I – New Data Report, Part 8, page 21.

³³⁷ New Data Report, Part 5.2.1, page 7.

³³⁸ Ibid, Part 5.2.2, page 7.

³³⁹ Ibid.

³⁴⁰ Ibid.

³⁴¹ Attachment F - WADA Evaluation Report, Part 5.1.

³⁴² Ibid, Part 5.2.3, page 8.

³⁴³ Ibid.

³⁴⁴ Ibid, page 10.

³⁴⁵ Ibid, Part 5.3, page 11.

³⁴⁶ Ibid, Part 5.2.3, page 10.

³⁴⁷ Ibid, Part 6.2.1, page 12.

³⁴⁸ Ibid.

³⁴⁹ Attachment F - WADA Evaluation Report, Part 5.1.

³⁵⁰ Ibid, Part 5.2.3, page 8.

³⁵¹ Ibid, Part 6.2.3, page 15.

³⁵² Ibid.

backup process and the observed records in the database. In other words, the 2018 Backup was not created on 15 August 2018 but “*forged from later LIMS data*”.³⁵³

- (vi) Content dated 30 August 2018 observed on the System Administrator’s Computer suggests the 2018 Backup was fabricated on or after this date.³⁵⁴

15.2.3 ISO Files

The ISO Files contained compressed containers of LIMS database and web-server backups.³⁵⁵ However, these backups were generated on or after 5 August 2019 and, therefore, do not provide data additional to that contained in the Moscow LIMS obtained by WADA on 17 January 2019. Consequently, the ISO Files can neither support nor contradict any claims made by the Russia Forensic Investigation.³⁵⁶

15.3 CONCLUSION

The Virtual Server data and the System Administrator’s Computer are not trustworthy sources of information for evaluating claims made in the Russia Forensic Investigation. Furthermore, observed digital traces of data alterations and forged database backups raises questions about the integrity and completeness of the data.

The ISO Files only contain backups generated on or after 5 August 2019 and, therefore, do not provide data additional to that already contained in the Moscow LIMS. Consequently, the ISO Files can neither support nor contradict any claims made in the Russia Forensic Investigation.

16 EXPERT MEETING

On 14 November 2019, the Intelligence and Investigations Department and Independent Experts met with Minister Kolobkov and the Russian Experts in Lausanne, Switzerland.

The purpose of the meeting was to advise Minister Kolobkov of investigation findings arising from the Independent Experts’ evaluation of the Russia Forensic Investigation and to allow Russian Experts the opportunity to ask questions of the Independent Experts.

In delivering its findings, Minister Kolobkov was ultimately advised by the Intelligence and Investigations Department that the observable digital forensic evidence, when taken in its totality, revealed that the Moscow Data was altered prior to it being forensically copied by WADA.

The comprehensive briefing provided to Minister Kolobkov and the Russian Experts included detailed summary of the following:

- (i) Events of 17 December 2018
- (ii) Events of 8 January 2019
- (iii) Discrepancies and alterations in the LIMS data between 6 and 9 January 2019
- (iv) Forum Messages; and
- (v) Areas of agreement and non-agreement between the parties.

16.1.1 Expert question session

Russian Experts were afforded over two and a half hours of question time with the Independent Experts. A significant portion of that time was used for general commentary or statements by the Russian Experts to reinforce matters previously raised by the Russia Forensic Investigation. For example:

- (i) Russian authorities had initially proposed a joint investigation of these matters, but this was rejected by WADA.
- (ii) Russian Experts have not been given the opportunity to examine the WADA LIMS (received from a Whistleblower).
- (iii) Doctor Rodchenkov, Doctor Sobolevsky and Mr Migachev have had two years to “*create*” any version of LIMS they want.
- (iv) Russian Experts do not trust Doctor Rodchenkov, Doctor Sobolevsky or Mr Migachev and, therefore, neither do they trust the WADA LIMS.
- (v) Russian Experts cannot exclude the possibility that Mr Migachev (or another) has manipulated data, has deleted or altered logs then restored them remotely to the LIMS system.
- (vi) The Investigative Committee has seized Doctor Rodchenkov’s Russian assets and financial analysis revealed that his asset base exceeded that which he could have reasonable and lawfully

³⁵³ Ibid, page 15.

³⁵⁴ Ibid, page 16.

³⁵⁵ Attachment I - New Data Report, Part 7.1, page 18.

³⁵⁶ Ibid, Part 7.3, page 20.

afforded on the wage earned as Director of the Moscow Laboratory. In other words, Doctor Rodchenkov was making money through his unlawful means.

- (vii) The LIMS routinely had operability issues and malfunctions.
- (viii) The System Administrator addresses operability issues through trial, error and his own technical expertise. There was no “*instruction*” manual for the LIMS.
- (ix) Errors were addressed by restoring the system with previous backup versions.
- (x) Russian Experts have found multiple versions of LIMS backups.
- (xi) System Administrator made a backup of all 2012 to 2015 data when he started in July 2016 and these old backups “*can be stored anywhere*” but is not sure where or if they can be trusted.
- (xii) LIMS was remotely controlled by Mr Migachev and Doctor Sobolevsky, from Los Angeles, until the arrival of the System Administrator (Evgeny Mochalov) in “*July 2016*”.
- (xiii) The System Administrator should not be blamed, rather, the data issues are a consequence of circumstances and trying to maintain LIMS operability.
- (xiv) Russian Experts do not accept the findings regarding the Forum Message fabrication, alteration and deletion until being provided with a technical report from Independent Experts and conducting their own investigations.
- (xv) Russian Experts do not accept the findings regarding the data alteration and discrepancies in the LIMS data between 6 and 9 January 2019, until being provided with a technical report from Independent Experts and conducting their own investigations.
- (xvi) The findings of the Independent Experts, made on “*trace*” digital forensic evidence, are finding based on assumptions only.

Lastly, Russian Experts sought assurance that the LIMS “*book*” and movie produced by Russian authorities in relation to the LIMS investigation had been considered by the investigation – which it had.

³⁵⁷ See CRC Report (6 September 2019), Part 10.

³⁵⁸ ThermoFisher Scientific.

In asking their questions, Russian Experts did not provide evidence or further technical material which required the Independent Experts to revisit their findings to date.

16.2 CONCLUSION

Russian Experts did not provide evidence or further technical material which required the Independent Experts to revisit their findings to date.

Minister Kolobkov has personally undertaken to ensure Russian Experts investigate the fabricated, modified and deleted Forum Messages as well as the instances of deleted and manipulated LIMS data between 6 and 9 January 2019.

17 IMPACT

17.1.1 Background

The Intelligence and Investigations Department has previously reported on the impact that the absence of Raw Data files, manipulated PDFs and LIMS discrepancies has on the ability of pursuing Anti-Doping Rule Violations (**ADRVs**).³⁵⁷

The following is a summary of those matters.

17.2 RAW DATA AND PDF ISSUES

In the CRC Report (6 September 2019), the Intelligence and Investigations Department reported that the validity of the Raw Data files recovered from the Moscow Data were determined using a proprietary software (**Integrity Test**) provided by the manufacturers³⁵⁸ of the analytical instruments (**ThermoFisher**) used in the Moscow Laboratory. This software purportedly identified when the content of a Raw Data file was incomplete or altered.

It was originally conceived that manipulation of a Raw Data file, although not impossible, was so difficult and implausible to be discounted once a file has passed the Integrity Test. However, discrete instances have been identified where, based on circumstantial evidence, the veracity of a Raw Data file was highly questionable, despite passing the Integrity Test.

A compelling example of such was included in the CRC Report (6 September 2019).³⁵⁹

³⁵⁹ See Attachment “A” to the CRC Report (6 September 2019).

A pattern has appeared whereby the Raw Data was questionable in cases where there was a discrepancy between the respective LIMS databases, and the associated PDF to this Raw Data showed traces of manipulation.³⁶⁰

In other words, seemingly “*valid*” Raw Data files cannot be trusted when, for a specific sample, the data in the WADA LIMS does not match that in the Moscow LIMS. Notably, the nature of the discrepancy is the presence of a Presumptive AAF in the WADA LIMS but not in the Moscow LIMS.

The uncertainty regarding the Raw Data in select instances was based on circumstantial evidence. Consequently, assistance was sought from Independent Experts to forensically examine 9 suspicious ITP Raw Data files, identified by the Intelligence and Investigations Department, for evidence of digital inconsistencies.

17.2.1 Forensic Analysis of suspect Raw Data files

In short, Independent Experts reported that no digital trace of manipulation was detected in any of the 9 ITP Raw Data files.³⁶¹ In other words, in respect of the files examined, there is currently no forensic means available to distinguish whether it has been manipulated.

Enquiries with ThermoFisher were also undertaken. While acknowledging the possibility of manipulating a Raw Data file, ThermoFisher state that their investigation of the matter is not complete and cannot provide a time frame of when they will conclude.

17.2.2 Missing Raw Data and PDF files

17.2.2.1 Raw Data Files

As previously reported,³⁶² the Intelligence and Investigations Department identified **110 Raw Data files not present** on the ICR Disks.

Independent Experts have confirmed that none of the 110 Raw Data files are “*existing*” or listed as “*previously existing*” on the ICR Disks.³⁶³

³⁶⁰ These PDFs were in a deleted state and had been recovered through ‘carving’.

³⁶¹ Attachment H - WADA Alteration Report, Part 4, page 9. This report appeared as an attachment on the WADA Evaluation report (11 November 2019).

³⁶² See CRC Report, 6 September 2019.

³⁶³ Attachment G - WADA ICR Disk Report, Part 3.5, page 7.

³⁶⁴ Ibid.

³⁶⁵ Ibid.

Examination of instrument systems confirms that none of the 110 Raw Data files are existing. This examination reveals that 58 out of the 110 RAW Data files are not listed as previously existing, and 52 are listed as previously existing. Of these previously existing files on instrument systems, **15 files were recovered**, and their integrity was validated using a tool provided by Thermo Fisher.³⁶⁴

The fact that Raw Data files previously existing on instrument systems are not present on the ICR Disks indicates that data on the ICR Disks is not complete.³⁶⁵

In any event, the time when the Raw Data files were deleted was investigated. Investigations focused on Confirmation Procedure (**CP**) Raw Data files only as they have more evidential value than the Initial Testing Procedure Raw files.

Out of the 110 Raw Data files, 28 related to CP Raw Data files³⁶⁶ and these files were only listed as previously existing on the instrument computers Adam, Maximus and Odin.

As previously discussed by the Independent Experts,³⁶⁷ on 21 July 2016,³⁶⁸ multiple folders containing many Raw Data files from prior years were deleted from instrument computer systems. This deletion of folders resulted in mass deletion of all individual Raw Data files they contained. Moreover, the deletions were selective, targeted specific folders including “*sochi*”, “*2014*” and “*2015*”.

The 28 missing CP Raw Data files pertain to 15 samples. All 15 samples show discrepancies between the WADA LIMS and the Moscow LIMS. Moreover, 11 of the 15 samples have an associated PDF from ITP Raw Data files which has been manipulated.³⁶⁹ Moreover, 9 of the 15 samples belong to athletes who are part of the Target Group³⁷⁰. Notably, two samples, which relate to athletes not included in the Target

³⁶⁶ Assessment was based on the path of the file (“\Xcalibur\data\year\CONF”) and the file name.

³⁶⁷ Attachment A - WADA Technical Report.

³⁶⁸ This observation was based on their last access date, which was on 21 July 2016.

³⁶⁹ Notably, the ITP Raw Data files exist and do not report a Presumptive AAF. In other words, the ITP suggests the sample is ‘negative’, while the CP Raw Data reports an AAF.

³⁷⁰ Target Group: 298 athletes identified by the Intelligence and Investigations Department as having the most suspicious LIMS data.

Group, are also subject of current ADRV proceedings in a LIMS related prosecution.³⁷¹

17.2.2.2 Missing PDF files

Based on analysis of LIMS data, particularly entries in the “pdf” table, the Intelligence and Investigations Department identified 120 PDF files (relating to 95 samples from Target Group athletes) that were produced in the Moscow Laboratory on Thermo Fisher instruments but are not found on the ICR Disks.³⁷²

Examination of ICR Disks confirms that none of the 120 PDF files are existing, nor listed as previously existing. Moreover, examination of instrument systems confirms that none of the 120 PDF files are in an existing state on the file system. This examination reveals that 3 out of the 120 PDF files are listed as previously existing. One of these previously existing PDF files listed below has a deletion date on 06 January 2019.³⁷³

The fact that PDF files are listed in LIMS database tables, indicating that they previously existed, but are not found on the ICR Disks, further indicates that data on the ICR Disks are not complete.³⁷⁴

A deeper analysis identified the following:

- (i) 87 PDFs related to anabolic steroid analysis;
- (ii) 88 PDFs were directly related to a Presumptive AAF,³⁷⁵ the absence of which materially affected the ability to investigate the associated athlete.
- (iii) 92 of the 95 samples showed discrepancies between the WADA LIMS and Moscow LIMS.
- (iv) 48 of the 95 samples had manipulated PDFs.³⁷⁶

17.2.3 Conclusion

In the 15 samples examined, a perfect correlation exists between a discrepancy in the LIMS data (WADA and Moscow LIMS) and both the absence of the CP Raw Data from the ICR Disks and their deletion from the Instrument Computers.

In the 95 samples examined, a compelling correlation exists between the absence of the PDF from the ICR Disk, the existence of a Presumptive AAF, a discrepancy in the LIMS data (WADA and Moscow LIMS) and to a lower extent PDF manipulation.

In other words, the absence of the Raw Data and PDF files appears targeted.

³⁷¹ The International Biathlon Union.

³⁷² Attachment G - WADA ICR Disk Report, Part 3.6, page 8.

³⁷³ Ibid.

17.3 QUANTIFYING THE IMPACT

At the outset, it is important to note that one athlete may have multiple samples in the Target Group. Therefore, impact has been assessed on a per athlete basis, meaning if an athlete has two samples in the Target Group and one sample is impacted by the data alteration, then the ability to investigate that athlete has been adversely impacted.

From the Target Group, the data of **116 athletes (199 samples)** contain a material discrepancy between the Data Sources. Of the **182 athletes (379 samples)** that **do not have** a discrepancy, Raw Data and PDFs are only available for **153 athletes (268 samples)**. In other words, data alteration has also impacted the ability to investigate the cases of **29 athletes (111 samples)** where there is no discrepancy between the Data Sources.

Quantification of the **total impact** is achieved by combining the LIMS discrepancy cases (**116 athletes**) with the absent Raw Data and PDF cases (**29 athletes**), for a combined total of **145 athletes (310 samples)**. In other words, an **adverse impact** of almost **50%** of the Target Group.

17.3.1 Potential ADRVs

To date, the Intelligence and Investigations Department has identified and forwarded prospective ADRV cases to the International Weightlifting Federation (**IWF**) (41 athletes), United World Wrestling (1 athlete), World Taekwondo (2 athletes) and the International Canoe Federation (1 athlete).

All these cases showed consistent and similar LIMS information within the WADA and Moscow Data. In other words, no discrepancies were observed for any of the sample of the respective athlete between the Data Sources.

Of the 41 cases provided to the IWF, 12 athletes have been “*notified*” of ADRV proceedings and provisionally suspended.

The Intelligence and Investigations Department has also provided the International Association of Athletics Federations (**IAAF**) with the data of all IAAF athletes, including that of the 66 IAAF athletes included in the Target Pool. The IAAF has carriage of all IAAF athletes,

³⁷⁴ Ibid.

³⁷⁵ In the WADA LIMS.

³⁷⁶ Identified through Carving of the ICR-2 Disk.

including the investigation and identification of possible ADRVs.

Two cases have also been commenced by the International Biathlon Union (IBU) against two athletes outside of the Target Group.³⁷⁷ The Intelligence and Investigations Department are assisting the IBU in this regard.

Lastly, the targeted reanalysis³⁷⁸ of the approximately 2,262 samples - retrieved from the Moscow Laboratory as part of the Reinstatement Conditions – has, to date, resulted in **14** Adverse Analytical Findings (AAFs) from three International Federations. Notably, the 14 AAFs are the result of reanalysis from only 94 samples. Results Management of the 14 AAFs is being undertaken by RUSADA with the close assistance of the Intelligence and Investigations Department.

17.3.2 Conclusion

There is currently no forensic means available to distinguish whether a Raw Data file has been manipulated.

However, investigations have established there is no evidence of Raw Data manipulation in cases where there is no discrepancy between the WADA LIMS and Moscow LIMS.

Manipulation of Raw Data appears restricted to ITP Raw Data.

The absence of Raw Data and PDF files appears targeted.

The absence of Raw Data and PDFs has materially affected the ability to pursue ADRVs against select athletes.

ThermoFisher continue to investigate the ability to identify digital trace evidence of Raw Data file manipulation.

18 CONCLUSION

Independent Experts have reviewed the New Data and the Russia Forensic Investigation and **neither disturbs the findings** of the WADA Technical Report.

18.1.1 New Data

In short, the New Data is not a trustworthy source of information for evaluating claims made in the Russia Forensic Investigation. Furthermore, observed digital traces of data alterations and forged database backups

in the New Data raises questions about its integrity and completeness.

18.1.2 Forensic Findings

Based on confirmed facts, evaluative interpretation of forensic findings detailed in the WADA Evaluation Report, WADA Alteration Report, WADA ICR Disk Report and the WADA New Data Report, Independent Experts conclude that:

Regarding observations **confirmed by** the Russia Forensic Investigation:

- (a) PDF files were altered. However, the Russian experts might not agree on the impact and scope of these alterations.
- (b) Alterations to LIMS data in December 2018 and January 2019 were made by the System Administrator (i.e. Mr Mochalov) in the Moscow Laboratory from his working computer. The Russian experts might not agree on the impact and scope of these alterations.
- (c) On 17 December 2018, on the LIMS system, the System Administrator deleted over 450 database backups of the Moscow LIMS database created in 2016.
- (d) On 17 December 2018, the System Administrator executed the command `date -s "20150811 1721"` which completed successfully to backdate the LIMS system to 11 August 2015.
- (e) On 17 December 2018, while the system was backdated to 11 August 2015 at 17:21 hours (5:21PM), the System Administrator executed commands which completed successfully to format the secondary disk in the LIMS system.
- (f) On the LIMS system, the System Administrator selectively removed from history files the commands that overwrite areas of the primary disk in the LIMS system with zeroes, backdate the system to 11 August 2015, and format the secondary disk. The effect of selectively removing such commands from history files and deleting scripts for altering and backdating the LIMS database and Server ONE was that these activities (and those of the System Administrator) were not discoverable without advanced digital forensic analysis. Digital forensic recovery and analysis was required to discover that commands

³⁷⁷ These two cases have discrepancies between the 2015 LIMS and 2019 LIMS.

³⁷⁸ The targeted reanalysis is based on criteria

and scripts were executed to perform backdating and alterations of the LIMS system and database.

- (g) On 8 January 2019, the System Administrator backdated the LIMS system to 23 May 2015 using the command `date -s "2015-05-23"` and then replaced the LIMS database with a prior version.
- (h) On 8 January 2019 (while the LIMS system was backdated to 23 May 2015) hundreds of LIMS database files (e.g. OPT, MYD, MYI and FRM) became in deleted state.
- (i) On 8 January 2019, the System Administrator backdated database files to 23 May 2015.
- (j) The System Administrator used automated scripts to alter the LIMS database and backdate multiple databases and associated files to various dates.
- (k) The System Administrator deleted scripts designed to alter and backdate the LIMS database.
- (l) Between 9 and 10 January 2019, because of the System Administrator's actions on the LIMS system, the databases labelled "2008", "2009", "2010" and "2011" present in the recovered database backup from 9 January 2019 were removed from the recovered database backup from 10 January 2019.
- (m) On 8 January 2019, the fore dating of the LIMS system to 1 August 2019 was caused by the System Administrator executing the command `date -s "2019-08-01 15:23"` with the date mistakenly in incorrect format.

Regarding observations not included or reported in the Russia Forensic Investigation:

- (a) On 17 December 2018, the LIMS system was backdated to 12 November 2015.
- (b) On 17 December 2018, while the LIMS system was backdated to 12 November 2015, database files were altered and became in deleted state.
- (c) On 17 December 2018, on the LIMS system, log entries dated 12 November 2015 were selectively removed from a backup log file.
- (d) On the LIMS system, log entries dated 12 November 2015 were selectively removed from a system log file. Digital forensic recovery was required to find these log entries and establish that backdating occurred. Subsequently, the

touch command was used to alter the last modified date of the edited log file, and this command was selectively removed from history files. Digital forensic recovery was required to find this touch command and determine that the last modified date of the edited log had been altered.

- (e) On the LIMS system, digital forensic carving operations and in-depth analysis of MYD files as described in the WADA Technical Report found remnants of record deletion between 6 and 9 January 2019.
- (f) On 16 January 2019, while Server ONE was backdated to 19 August 2015, a system administrator³⁷⁹ executed commands to format a secondary disk, making it appear that the disk was formatted on 19 August 2015.
- (g) On Server ONE, the command `ddrescue -f /dev/zero rfc` was executed to overwrite free space of the primary disk in Server ONE with zeroes.
- (h) Server ONE contains digital traces compatible with a specialized tool being used to secure erase files on 16 January 2019.
- (i) On Server ONE, a system administrator selectively removed from history files the commands that overwrite areas of a disk with zeroes and run a specialized tool to secure erase files.

Regarding the evaluation of forensic observations detailed in this report on which the Independent Experts **do not agree** with the propositions in the Russia Forensic Investigation:

- (a) The observed digital traces are extremely more probable given the proposition that a secondary disk existed in the LIMS system before 15 December 2018, rather than the proposition that a secondary disk was only attached on 17 December 2018.
- (b) The observed digital traces are much more probable given the proposition that, on 17 December 2018, the command `dd if=/dev/zero of=/tmp/1.tmp bs=10240k` was executed to overwrite free space of the primary disk in the LIMS system with zeroes, rather than to perform "a record speed check" on the LIMS hard drive. Either way, the result of this command is to

³⁷⁹ Whilst this is suspected to have been Mr Mochalov, to date, this has not been acknowledged by Russian authorities.

overwrite areas of the primary disk in the LIMS system with zeroes.

- (c) The observed digital traces are far more probable given the proposition that the backdating and formatting commands were executed together, rather than the proposition that the backdating and formatting commands were executed separately, as alleged in the Russian responses.
- (d) The observed digital traces are extremely more probable given the proposition that, on 8 January 2019, while the LIMS system was backdated to 23 May 2015, the LIMS database was replaced with a version that is not a fully authentic copy of the LIMS database, rather than the proposition that “a fully authentic copy of the LIMS databases was placed on the test server.”
- (e) The observed digital traces of missing files are extremely more probable given the proposition that the deletion approximately 20,000 files after 1 January 2019 damaged the completeness of the data provided by the Moscow Laboratory to Independent Experts, rather than the proposition that “the deletion of these files cannot damage the completeness of the data provided by the Moscow Laboratory to Independent Experts.”
- (f) The observed digital traces of selective differences between LIMS database backups recovered from unallocated space on the LIMS system are extremely more probable given the proposition that entries were selectively deleted and altered in the LIMS database between 6 and 10 January 2019, rather than the proposition that these differences are “the result of the use of information from various sources when restoring the operability of the LIMS.”
- (g) The observed digital traces are extremely more probable given the proposition that a specialized secure erase tool was used to secure erase files on LIMS system in January 2019, rather than the proposition that “it is not possible to determine more precisely the time of use of this program.”

Lastly, regarding observed activities that could not be investigated:

- (a) Due to absence of information from before 17 December 2018, it is not possible to determine if backup files created by the automated daily

backup operation were stored on the primary disk or the secondary disk on the LIMS system. Under normal operations, we would expect under normal operations these backups to be present, but no such backup files exist on either the primary disk or the secondary. The Data and information given to WADA do not provide enough information to support a conclusion about the context that resulted in the secondary disk in the LIMS system being filled zeroes before it was formatted on 17 December 2018.

- (b) The Data and information given to WADA do not provide enough information to support a conclusion about the context that resulted in the secondary disk in Server ONE being filled zeroes, before it was formatted, on 16 January 2019.
- (c) The Data and information given to WADA do not provide enough information to support a conclusion about what data were stored on a secondary disk in Server ONE before it was formatted, on 16 January 2019.

18.1.3 Forum Messages

Independent Experts discovered that on or after 25 November 2018, but before 10 January 2019, a person or persons unknown fabricated, modified and deleted messages (Forum Messages) from within the Moscow LIMS.³⁸⁰

More specifically, Forum Messages referenced by the Russia Forensic Investigation as evidencing extortion and the doctoring of analysis results by Doctor Grigory Rodchenkov, Doctor Sobolevsky and Mr Migachev were fabricated and falsely “created” into the Moscow LIMS on or after 25 November 2018.

In addition, Forum Messages evidencing the involvement of Mr Kudryavtsev in sample swapping, “pre-departure”³⁸¹ sample analysis and the falsification of laboratory chain-of-custody records were deleted from the Moscow LIMS on or after 25 November 2018. Notably, Mr Kudryavtsev’s sample swapping and record falsification activities immediately preceded WADA’s 17 December 2014 attendance at the Moscow Laboratory and ultimate removal of 4,144 “unique” samples.

18.1.4 Scenario of Events

Based on confirmed facts, evaluative interpretation of forensic findings and the Russia Forensic Investigation,

unofficially tested prior to competition to ensure their use of Prohibited Substances was not detectable.

³⁸⁰ The Moscow LIMS is the forensic copy of the Moscow Laboratory LIMS imaged by WADA on 12 January 2019.

³⁸¹ Doctor Rodchenkov asserted the existence of “pre-departure” testing of Russia athletes whereby select Russian athletes would be

the Intelligence and Investigations Department proposes the following scenario of events as contextualising and evidencing the manipulation of the Moscow Data:

On 29 November 2013, Mr Kudryavtsev sent a Forum Message to a colleague advising that there were 15 “pre-departure” samples requiring analysis. Predeparture testing was the unofficial analysis of samples from select Russian athletes prior to competition to ensure their use of Prohibited Substances was not detectable. Mr Kudryavtsev also directed the colleague to falsify Laboratory chain-of-custody records.

Between February 2014 and July 2016, LIMS database backups were generated on the “primary” disk of the LIMS server (i.e. the Imaged Primary Disk), in a specific directory. Notably, the LIMS system had been configured to extract and store daily automated databases backups (i.e. Automated Backups). Backups of the LIMS system are valuable as they provide a reference point of comparison to identify altered or missing data from the Moscow Data. The absence of backups is considered suspicious.

On 3 December 2014, the German television channel ARD aired a documentary alleging the existence of the Protection Scheme in Russia.

On 9 December 2014, WADA, by letter, WADA directed the Moscow Laboratory (i.e. Doctor Rodchenkov) to retain all samples until further notice by WADA.

On 10 December 2014, WADA launched an Independent Commission (IC) to investigate the ARD Documentary allegations.

On 11 December 2014, Doctor Rodchenkov was advised by the Russian Ministry of Sport that WADA staff had applied for visas to Russia. Expecting an imminent visit by WADA and the seizure of samples, Doctor Rodchenkov discarded samples, swapped samples and falsified CoC records.

On 15 December 2014, Mr Kudryavtsev received a Forum Message containing several sample (Laboratory) codes from Mr Migachev. Mr Kudryavtsev replied asking if these samples were apart from the “21 substituted samples, or [was] it absolutely everything that had to be removed?”

In this context the term “substituted samples” denotes the practice of sample swapping, whereby the contents

of a “dirty” sample is replaced with urine clear of Prohibited Substances.

On 16 December 2014, Mr Kudryavtsev asked Mr Migachev via a Forum Message to falsify CoC records.

On 16 December 2014, WADA announced details of the three-person IC.

On 17 December 2014, a WADA attended the Moscow Laboratory to secure and remove all samples stored in the facility.

On 9 November 2015, WADA received the IC’s Report Part One.

On 17 November 2015, Doctor Rodchenkov fled Russia for the United States.

On 18 November 2015, RUSADA was declared non-compliant.

On 14 January 2016, WADA received the IC’s Report Part Two.

On or before 22 January 2016, “a” mounted “secondary” disk existed in the LIMS server.³⁸²

On 15 April 2016, WADA revoked the accreditation of the Moscow Laboratory.

On 19 May 2016, WADA announces the IP Commission.

On 9 June 2016, the Moscow LIMS was remotely accessed for the last time.

On 29 June 2016, the backups of the Moscow LIMS created in 2014 and 2015 were deleted from the Imaged Primary Disk.

On 18 July 2016, WADA received the IP’s Report Part One.

On 19 July 2016, the IOC announce the “Schmid” Commission.

On 21 July 2016, the ICR enters the Moscow Laboratory to secure evidence in their investigation of Doctor Rodchenkov.

Between 21 July 2016 and 25 July 2016, a vast number of files, including Raw Data files, were deleted from 12 instrument computers and the Imaged Primary Disk.

On 2 August 2016, the Automated Backup script was run on the Imaged Primary Disk. However, Independent Experts cannot determine whether it continued to run on

³⁸² Mounting a hard disk makes it accessible by the computer. This is a software process that enables the operating system to read and

write data to the disk. Most disks are automatically mounted by the operating system when they are connected.

the Imaged Primary Disk or was subsequently run on a “secondary” disk.

Notably, database backup files generated between August 2016 and 17 December 2018 by the Automated Backup script do not exist on either the Imaged Primary Disk or the secondary disk as imaged by WADA (i.e. the Imaged Secondary Disk). This absence is suspicious.

On 9 December 2016, WADA received the IP’s Report Part Two. Accompanying this report was a release of the non-confidential evidence (Evidence Disclosure Package (**EDP**)). EDP’s were publicly available via a website.

On 2 April 2017, “a” mounted secondary disk existed in the LIMS system. However, Independent Experts cannot state, based on observable forensic evidence, that this secondary disk was the same secondary disk observed in the system on 22 January 2016 or the Imaged Secondary Disk.

On 20 September 2018, the importance and intended purpose of the Moscow Data became known to Russian authorities with the introduction of the Reinstatement Conditions.

On 16 October 2018, WADA advised Minister Kolobkov, via letter, that the Moscow Data was sought solely to identify those athletes who may have committed anti-doping rule violations.

On or after 20 November 2018 but before 23 December 2018, logs from the Moscow LIMS “log_do” table from the years 2012, 2013 and 2014 were deleted.

The “log_do” table housed data files (**Logs**) that record events and a user’s actions in a computer operating system (i.e. Moscow LIMS).

On or after 23 November 2018 but before 23 December 2018, logs from the Moscow LIMS “log_do” table for 2015 were deleted.

On or after 25 November 2018, select Forum Messages were fabricated, modified and deleted in the LIMS system by an “unknown” person.

On 27 November 2018, WADA arrived in Moscow to discuss operational issues related to retrieving the Moscow Data.

On 15 December 2018, “a” mounted secondary disk existed in the LIMS system. However, as previously stated, Independent Experts cannot state, based on observable forensic evidence, that this secondary disk

was the same secondary disk observed in the system on 22 January 2016 or 2 April 2017.

On 17 December 2018, late in the afternoon, WADA arrived in Moscow to obtain a forensic copy of the Moscow Data. No data would be copied on this occasion.

On 17 December 2018, “a” secondary disk existed in the LIMS system. This disk (i.e. the Imaged Secondary Disk) was ultimately forensically imaged by WADA. Notably, Russian Experts assert the Imaged Secondary Disk was first introduced to the LIMS system on this day. However, because of actions undertaken within the system on 17 December 2018, Independent Experts cannot state that the Imaged Secondary Disk was the same secondary disk observed in the system on 22 January 2016, 2 April 2017 or 15 December 2018.

On 17 December 2018, the following events occurred in the Moscow Laboratory:

- (a) The “system administrator”, Evgeniy Mochalov, backdated the LIMS system to 12 November 2015 – a date five days before Doctor Rodchenkov fled to the United States. Alterations were then made to the LIMS database, including file deletion and creation of files under directories related to databases labelled “2012”, “2013”, “2014”, “2015” and “forum_t”.³⁸³
- (b) Evidence of these activities in logs generated by Automated Backup (daily) processes were selectively deleted. In addition, Logs showing backdating to 12 November 2015 were subsequently selectively deleted.
- (c) Over 450 database backups of the Moscow LIMS database created in 2016 were deleted from the Imaged Primary Disk.

Notably, the Russia Forensic Investigation asserts that the system administrator deleted these backups after he copied them to his working computer to free up space on the Imaged Primary Disk. However, Independent Experts established that the Imaged Primary Disk had approximately 93% of “free space” available, more than enough for LIMS operations. In other words, files did not need to be moved as enough free space already existed on the disk.

Additionally, Independent Experts did not find the “copied” backups in the New Data, despite the

³⁸³ Table “forum_t” is the Forum Message table.

New Data purportedly containing a forensic copy of the System Administrator's computer.

- (d) A Zeroing Command was executed on the Imaged Primary Disk for anywhere up to 170 minutes. This command overwrites the free space of a disk with zeroes and renders unrecoverable all traces of prior commands, activities or previously deleted data. In other words, potentially a substantial amount of data.
- (e) A specific command was then executed which irretrievably deleted information as to the precise number of zeros written on the Imaged Primary Disk and the exact length of time the Zeroing Command operated.
- (f) The system date was then returned to 17 December 2018.
- (g) The LIMS system was then backdated to 11 August 2015 - a time when Doctor Rodchenkov was still Director of the Laboratory.
- (h) Whilst the system was backdated, the Imaged Secondary Disk was formatted so that it now falsely appeared to have been formatted on 11 August 2015. Formatting sets up the file system and cleans all references to existing and already allocated files. Formatting does not overwrite a disk with zeros.

However, at the time of formatting the Imaged Secondary Disk contained no data, only zeros. While executing a Zeroing Command on the Imaged Secondary Disk would explain the zeros, Independent Experts could not find observable forensic evidence of this occurrence.

- (i) After formatting, the Imaged Secondary Disk was never remounted or used to store data.
- (j) The commands to overwrite free space with zeros, backdate the LIMS system and format the Imaged Secondary Disk were selectively deleted from the history files (**Command Logs**).

Command Logs are a means for identifying commands executed on a system, including modifications to the system and a database. The effect of deleting Command Logs is that the associated actions (zeroing, backdating and formatting) are invisible without digital forensic analysis.

On 8 January 2019, the system administrator executed a script containing commands that backdated the LIMS system to 23 May 2015 and then:

- (a) replaced the LIMS database with a prior version (**Prior Version**);
- (b) deleted 632 LIMS database files (e.g. OPT, MYD, MYI and FRM);
- (c) backdated the timestamps of all database files.
- (d) Mr Mochalov then used automated scripts to alter the LIMS database and backdate multiple databases and associated files to various dates.
- (e) Mr Mochalov then deleted scripts designed to alter and backdate the LIMS database.

The effect of these actions is that Prior Version now falsely appeared to have been on the LIMS system since 23 May 2015.

An attempt was then made to restore the LIMS system back to the correct date of 8 January 2019, however, the system administrator erroneously set the date to 1 August 2019. The system then remained on 1 August 2019 until it autocorrected at 03:05 hours (3:05AM) and reverted to the true date.

Analysis subsequently identified three instances where the digital forensic evidence shows that between 6 January 2019 and 9 January 2019, LIMS data indicative of doping was manipulated and or deleted to the betterment of the athletes (i.e. concealment of potential doping) in relation to three athletes, including one from the Target Group.

Between 1 January 2019 and 9 January 2019 (inclusively), 19,982 files and folders were deleted from the LIMS server, computer instruments and associated recycle bins,³⁸⁴ including 11,720 Sequence files, 531 PDFs and 337 Raw Data files. Of which, when considering files that were **not in the recycle bin**, 9,298 Sequence files, 500 PDFs and 1 Raw Data file had a creation timestamp between 1 January 2012 and 31 December 2015. In other words, material analytical files created within the relevant LIMS period were deleted.

On 9 January 2019, WADA arrived in Moscow to obtain a forensic copy of the Moscow Data. WADA did not enter the Laboratory until the following day (10 January 2019).

³⁸⁴ Recycle Bin: is a location where deleted files or folders are temporarily stored.

On 9 January 2019, the following events occurred in the Moscow Laboratory:

- (a) The 2008, 2009, 2010 and 2011 Moscow LIMS databases were deleted from the Moscow LIMS database.
- (b) The Forum Message table (containing the fabricated and modified messages, and absent the deleted messages) was restored onto the LIMS database.³⁸⁵

On 10 January 2019, the following events occurred in the Moscow Laboratory:

- (a) 101 Sequence files and 137 PDFs were deleted from The Primary Disk.
- (b) late morning, WADA entered the Moscow Laboratory and inspected the specialised equipment to be used to forensically image the Moscow Data.

On 11 January 2019, WADA commenced forensically imaging of the Moscow Data, beginning with three disks provided by the ICR (i.e. ICR Disks).

On 14 January 2019, following a request by Russian Experts, WADA allowed the System Administrator to backup Server One to a new server to protect against data loss during forensic imaging of Server One.

On 16 January 2019, the following events occurred in the Moscow Laboratory:

- (a) Server ONE was backdated to 19 August 2015 and a system administrator³⁸⁶ executed commands to format a secondary disk, making it appear that the disk was formatted on 19 August 2015.
- (b) A command was executed to overwrite the “free space” of the primary disk in Server ONE with zeroes.
- (c) In addition, Server ONE contains digital traces compatible with a specialized tool being used to secure erase files on 16 January 2019.
- (d) A system administrator selectively removed from Command Logs on Server ONE that overwrite areas of a disk with zeroes and run a specialized tool to secure erase files.

As stated, overwriting the free space of a disk with zeroes renders unrecoverable all traces of

prior commands, activities or previously deleted data.

On 16 January 2019, after these activities by the system administrator, WADA were advised that the backup of Server One was complete and could now forensically image Server One.

On 17 January 2019, WADA departed Moscow with a forensic image of the Moscow Data.

Expert Meeting

During the expert meeting, Russian Experts did not provide evidence or further technical material which required the Independent Experts to revisit their reported findings.

Minister Kolobkov has personally undertaken to ensure Russian Experts investigate the fabricated, modified and deleted Forum Messages as well as the instances of deleted and manipulated LIMS data between 6 and 9 January 2019.

Impact

Raw Data and PDFs

There are 110 Raw Data files and 120 PDFs absent from the Moscow Data that are material to the investigation of Target Group athletes.

The absence of Raw Data and PDF files appears targeted and has materially affected the ability to pursue ADRVs against the respective athletes.

Minister Kolobkov has personally undertaken to ensure all possible efforts are made to locate and recover all absent Raw Data files.

To date, 9 ITP Raw Data files have been identified which are suspected to have been manipulated.

Independent Experts observed no digital trace of manipulation in the 9 ITP Raw Data files.

Manipulation of Raw Data appears restricted to ITP Raw Data.

Raw Data manipulation appears restricted to instances where there is a discrepancy between the WADA LIMS and Moscow LIMS.

ThermoFisher continue to investigate the ability to identify digital trace evidence of Raw Data file manipulation.

³⁸⁵ This event undoubtedly occurred between 5 January 2019 and 10 January 2019, Independent Experts believe the 9 January 2019 to be the more possible date.

³⁸⁶ Whilst this is suspected to have been Mr Mochalov, to date, this has not been acknowledged by Russian authorities.

Anti-Doping Rule Violations

To date, the Intelligence and Investigations Department has identified and forwarded prospective ADRV cases to the International Weightlifting Federation (**IWF**) (41 athletes), United World Wrestling (1 athlete), World Taekwondo (2 athletes) and the International Canoe Federation (**ICF**) (1 athlete).

Of the 41 cases provided to the IWF, 12 athletes have been “*notified*” of ADRV proceedings and provisionally suspended. Notably, upon review of the case, the ICF has declined to pursue an ADRV against the athlete.

The Intelligence and Investigations Department has also provided the International Association of Athletics Federations (**IAAF**) with the data of all IAAF athletes, including that of the 66 IAAF athletes included in the Target Pool.

Two cases have also been commenced by the International Biathlon Union against two athletes outside of the Target Group. The Intelligence and Investigations Department are assisting the IBU in this regard.

The targeted reanalysis of samples retrieved from the Moscow Laboratory as part of the Reinstatement Conditions has, to date, resulted in **14** Adverse Analytical Findings (**AAFs**) from 94 samples reanalysed. The 14 AAFs come from three International Federations. Results Management of the 14 AAFs is being undertaken by RUSADA with the close assistance of the Intelligence and Investigations Department.

18.1.5 Conclusion

Taken in its totality, the above evidence is capable of establishing, to the required standard of proof, that the Moscow Data was intentionally altered prior and during to it being forensically copied by WADA. To this end, the Reinstatement Conditions are not fulfilled in that the Moscow Data is neither a complete nor authentic copy.



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19 ANNEXURES

Attachment No.	Description
A	WADA Technical Report (“PFS 19.0333”).
B	Russia Statement of Facts.
C	Russia Technical Report (Parts 1 and 2).
D	Russia Counter Research.
E	Answers to Technical Questions (Parts 1 and 2).
F	WADA Alteration Report (“PFS 19.0425”).
G	WADA Evaluation Report (“PFS 19.0426”).
H	WADA ICR Disk Report (“PFS 19.0427”).
I	WADA New Data Report (“PFS 19.0431”).

20 TERMINOLOGY

Digital traces are defined as any modification of a given environment resulting from a completed event.

The evaluative terminology used in this report is based on a standard verbal scale (the left column in the table below). The selection of the specific verbal term is based on expert knowledge, experience in research and casework, etc. To promote the transparency for the reader and the uniformity among the different experts, the European Network of Forensic Science Institutes has defined the verbal terms numerically. These definitions are expressed in orders of magnitude and are listed in the right column in the table below. For example, the term “slightly more probable” means that the probability of observing the results of the investigation is considered 2 to 10 times larger when one hypothesis is true than when the other hypothesis is true.

The conclusion expresses the evidential strength of the results regarding the hypotheses. The conclusion does not represent the probability that a hypothesis is true. That probability depends on other evidence and information outside the domain of forensic expertise and falls outside the scope of this report

Verbal equivalent	Order of magnitude of evidential strength
approximately equally probable	1-2
slightly more probable	2-10
more probable	10-100
appreciably more probable	100-1,000
much more probable	1,000-10,000
far more probable	10,000-1,000,000
extremely more probable	>1,000,000