BEFORE THE AMERICAN ARBITRATION ASSOCIATION

NORTH AMERICAN COURT OF ARBITRATION FOR SPORT PANEL

United States Anti-Doping Agency, Claimant, v. Floyd Landis, Respondent.	CASE NO. AAA No. 30 190 00847 06 **[PROPOSED] FINDINGS OF FACT AND CONCLUSIONS OF LAW**

THIS PANEL, after having carefully read, reviewed and considered all of the evidence and arguments presented by the United States Anti-Doping Agency ("USADA"), on the one hand, and Floyd Landis, on the other hand, including, but not limited to, the pretrial briefs and arguments, the pretrial motions and related arguments and rulings, the testimony of the witnesses, exhibits and the opening and closing statements of counsel introduced during the trial held May 14–23, 2007, hereby makes the following ruling in the above-captioned case:

1. The case against Floyd Landis is DISMISSED because:
    a. USADA failed to present evidence of an anti-doping rule violation to the comfortable satisfaction of the Panel bearing in mind the seriousness of the allegation which was made, pursuant to Article 16 of UCI Anti-Doping Rules and Article 3.1 of the World Anti-Doping Code; and
    b. LNDD's testing procedures were inaccurate and unreliable; and
    c. LNDD's test results were inaccurate and unreliable.
2. Floyd Landis shall bear the costs of his representation.
3. USADA shall bear the costs of its representation.

4. USADA shall bear all other costs associated with the trial of this matter, with the exception of the costs for the trial transcript and the interpreter, which were divided equally between the parties.

5. The judgment is effective immediately.

This ruling is based upon the following FINDINGS OF FACT AND CONCLUSIONS OF LAW:

1. THE LITIGATION

1.1. This case involves the single issue of whether Floyd Landis committed a doping violation in conjunction with the provision of Sample 995474 following Stage 17 of the 2006 Tour. The evidence presented included the results of Gas Chromatography-Combustion-Isotope Ratio Mass Spectrometry ("GC/C/IRMS" or "IRMS") tests from the following samples taken on the following dates during the 2006 Tour: July 3 (Sample 995642), July 11 (Sample 994203), July 13 (Sample 994277), July 14 (Sample 994276), July 18 (Sample 994075), July 22 (Sample 994080), and July 23 (Sample 994171). These results, however, were admitted only as corroborating evidence for the alleged Adverse Analytical Finding of Sample 995474.

1.2. The trial was held at the Alternative Dispute Resolution Center at Pepperdine Law School in Malibu, California, on May 14–23, 2007.

1.3. At the trial, Floyd Landis was represented by:

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1.4. At the trial, USADA was represented by:

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1.5. Also in attendance at the trial, and present for the testimony of every witness, was Dr. Francesco Botrè, the Panel's science expert, and head of the WADA-accredited anti-doping laboratory in Italy.

1.6. During the trial, the Panel heard from the following fact and expert witnesses:

1.6.1. For USADA:

1.6.1.1. Dr. J. Thomas Brenna

1.6.1.2. Cynthia Mongongu

1.6.1.3. Claire Frelat

1.6.1.4. Dr. Cedric Shackleton

1.6.1.5. Dr. Christiane Ayotte

1.6.1.6. Dr. William Schanzer

1.6.1.7. Dr. Don Catlin

1.6.1.8. Greg LeMond

1.6.1.9. Joe Papp

1.6.2. For Floyd Landis:

1.6.2.1. Dr. Bruce Goldberger

1.6.2.2. Dr. John Amory

1.6.2.3. Floyd Landis

1.6.2.4. Dr. Corrine Buisson

1.6.2.5. Dr. Simon Davis

1.6.2.6. Dr. Wolfram Meier-Augenstein

2. FACTUAL HISTORY

2.1. The Testing of Sample 995474

2.1.1. The 2006 Tour de France (the "Tour") began on July 1, 2006, and ended on July 23, 2006. On July 23, 2006, Mr. Landis was declared the winner of the 2006 Tour, having won the general classification by 57 seconds.

2.1.2. On July 20, 2006, immediately after Stage 17, Mr. Landis provided a urine sample, Sample 995474, to the Union Cycliste International ("UCI"). Ex. 41, USADA0447. As set forth more fully below, this was one of eight samples Mr. Landis provided during the Tour. Sample 995474 was tested at the Labaratorie National de Depistage et du Dopage ("LNDD").

2.1.3. On July 25, 2006, LNDD notified the Conseil de Prevention et du Lutte Contre le Dopage ("CPLD") and the UCI that the A Sample from Sample 995474 displayed an Adverse Analytical Finding ("AAF"). *See* Ex. 24, USADA0188-0199.

2.1.4. On July 27, 2006, USADA notified Mr. Landis of the AAF and commenced prosecution of the present matter. *See* Exs. GDC00001-00003. In its communication to Mr. Landis, USADA indicated that he could either request testing of the B Sample or accept the AAF from the A Sample (both samples were numbered 995474). Mr. Landis refused to accept the AAF and elected to have the B Sample tested. *See* Exs. GDC00004-00005.

2.1.5. Between August 3 and 5, 2006, LNDD tested the B Sample from Sample 995474. Ex. 25, USADA0365, 0366.

2.1.6. Using its GC/C/IRMS instrument, LNDD eventually concluded that the B Sample confirmed the AAF. *See id.*

2.1.7. On August 5, 2006, UCI notified Mr. Landis, USADA, the Agence Française de Lutte Contre le Dopage ("AFLD") and the media of its findings. *See* Ex. GDC00006.

2.1.8. On September 11, 2006, Mr. Landis filed pleadings before USADA's Anti-Doping Review Board to have this case dismissed. *See* Exs. GDC00007-00022. On September 18, 2006, the Anti-Doping Review Board rejected Mr. Landis' petition and the instant litigation began. *See* Ex. GDC00023.

2.2. **The Retesting Procedure**

2.2.1. During the course of the 2006 Tour, Mr. Landis provided seven urine samples in addition to Sample 995474. Mr. Landis provided those samples at the conclusion of the following stages: Stage 2 (Sample 995642 on July 3), Stage 9 (Sample 994203 on July 11), Stage 11 (Sample 994277 on July 13), Stage 12 (Sample 994276 on July 14), Stage 15 (Sample 994075 on July 18), Stage 19 (Sample 994080 on July 22), and Stage 20 (Sample 994171 on July 23). *See* Ex. 41, USADA0412, 0419, 0426, 0433, 0440, 0447, 0458, 0465.

2.2.2. Each of these seven other samples was tested at LNDD. *See* Ex. 41, USADA0415, 0422, 0429, 0436, 0443, 0461, 0468.

2.2.3. None of these other samples displayed an AAF in the test of the A Sample. As such, during the Tour: (1) Mr. Landis was not notified of any issue related to anti-doping control and (2) no further testing of the B Samples was conducted.

2.2.4. Following extensive briefing and a ruling from this Panel, USADA commenced the retesting of the B Samples from each of the other seven stages.

2.2.5. The retesting began at LNDD on April 16, 2007.

2.2.6. The results of the retesting are summarized at Exhibit GDC01363.

2.3. **The Reprocessing of the Electronic Data Files**

2.3.1. Pursuant generally to the Panel's discovery rulings, and, specifically, Procedural Order No. 2, the Electronic Data Files ("EDFs") from Sample 995474 were extracted and analyzed in preparation for the trial.

2.3.2. The EDFs are the raw data files, in electronic form, of the results of the IRMS tests conducted on Sample 995474.

2.3.3. The extraction and analysis of the EDFs was observed by representatives of both Mr. Landis (Dr. Simon Davis and Dr. Will Price) and of USADA (Dr. Larry Bowers and Dr. Jeanine Jumeau), as well as by the Panel's expert, Dr. Francesco Botrè.

2.3.4. On April 26, 2007, Dr. Botrè and representatives for both parties arrived at LNDD. They were told that: (1) the EDFs from the IsoPrime1 (the instrument used to test Sample 995474) had already been copied to an archive CD and (2) the original information on the IsoPrime1 hard-drive had been erased.

2.3.5. Also on April 26, 2007, the log files from the IsoPrime2 were copied onto a separate CD. These log files are a record of the testing procedures performed in conjunction with the retesting of the other samples taken from Mr. Landis during the Tour. The log files are Exhibits GDC01056-01075.

2.3.6. On May 4, 2007, Dr. Botrè and representatives for both USADA and Mr. Landis arrived at LNDD. Pursuant to directions provided by Mr. Landis' representatives, LNDD technicians performed a series of operations on the EDFs.

2.3.7. Because LNDD technicians did not know how to transfer data from the CD onto the computer operating the IsoPrime1, Dr. Davis performed this part of the procedure.

2.3.8. The first operation occurred at Dr. Botrè's direction. This operation involved LNDD's attempt to reproduce the original test results using the same processes used to determine those results. In producing both the original and reprocessed test results, LNDD IRMS technicians used a manual processing technique, which included both: (1) manual adjustments to the background of the chromatograph, and (2) manual integration of peaks. Manually adjusting the background involves adding and deleting defined background points. Tr. of R. at 1763:1-10. Manual integration of the peaks involves manually defining the start and end point of each peak. In attempting to reproduce the original IRMS test results from Sample 995474, LNDD IRMS technicians again used a manual processing technique. However, despite twenty-two attempts to do so, LNDD technicians were unable to reproduce the original test results. The chart showing the number of reprocessing attempts is Exhibit GDC01365. The chart showing the results of the reprocessing is Exhibit GDC01350.

2.3.9. In addition, three other sets of values were obtained using three distinct processes: (1) delta-delta values were calculated using the automatic background subtraction embedded within the software program, (2) delta-delta values were calculated with the automatic background subtraction disabled and (3) delta-delta values were calculated using the Masslynx software loaded onto the IsoPrime2. The delta-delta value equals the delta value of the target compound minus the delta value of the endogenous reference compound. The delta-delta value

is the value used to determine an AAF and is expressed as the "per mil" value. The chart showing the results of this reprocessing is Exhibit GDC01350.

2.3.10. LNDD IRMS technicians did not know how to convert the EDFs into data readable by Masslynx. Therefore, Dr. Davis performed this part of the operation. Tr. of R. at 1764:4-10.

2.4. THE APPLICABLE LAW

2.4.1. The burden of proof in an anti-doping case is a multi-step process with a shifting burden.

2.4.2. The Anti-Doping Organization, in this case USADA, "shall have the burden of establishing that an anti-doping rule violation has occurred." Ex. 1, UCI Cycling Regulations, Art. 16; Ex. 4, World Anti-Doping Code, Art. 3.1. However, once the Anti-Doping Organization introduces evidence of an anti-doping violation from a WADA-accredited laboratory, the results are presumed correct. *See* Ex. 1, UCI Cycling Regulations, Art. 18 ("WADA-accredited laboratories . . . are presumed to have conducted *Sample* analysis and custodial procedures in accordance with the *International Standard* for laboratory analysis.").

2.4.3. The athlete is then entitled to rebut this presumption by establishing that a departure from the International Standard occurred. *Id.* ("The *Rider* may rebut this presumption by establishing that a departure . . . occurred."); *see* Ex. 4, World Anti-Doping Code, Art. 3.2.1. The athlete must demonstrate any departure by a "balance of probability." Ex. 4, World Anti-Doping Code, Art. 3.1 ("the burden of proof upon the *Athlete* . . . shall be by a balance of probability.").

2.4.4. Once the presumption is rebutted by showing a departure, the Anti-Doping Organization "shall have the burden to establish that such departure did not cause the *Adverse*

Analytical Finding." Ex. 1, UCI Cycling Regulations, Art. 18; *see* Ex. 4, World Anti-Doping Code, Art. 3.2.1.

2.4.5. To meet its burden, the Anti-Doping Organization must present evidence of an anti-doping violation to the "comfortable satisfaction of the hearing body bearing in mind the seriousness of the allegation which is made." Ex. 1, UCI Cycling Regulations, Art. 16; *see* Ex. 4, World Anti-Doping Code, Art. 3.1. In *USADA v. Montgomery*, the Court of Arbitration for Sport defined the "comfortable satisfaction" burden as a sliding scale of probability that depends on the seriousness of the allegation. Exs. GDC00134-00160. The Court of Arbitration for Sport held that:

> In all cases the degree of probability must be commensurate with and proportionate to those allegations; the more serious the allegation the higher the degree of probability, or 'comfort', required.

Ex. GDC00148 (emphasis added). Therefore, when the doping allegation is minor, the Anti-Doping Organization must establish that it is more likely than not that an anti-doping rule violation occurred. However, when the doping allegation is serious, stronger evidence is required. The rationale for this sliding scale is that "the more serious the allegation the less likely it is that the alleged event occurred and, hence, the stronger the evidence required before the occurrence of the event is demonstrated to be more probable than not. . . . The gravity of the allegations and the related probability or improbability of their occurrence become in effect part and parcel of the circumstances which must be weighed in deciding whether, on balance, they are true." *Id.*

2.4.6. The Panel finds that in this case, USADA must be held to the most stringent burden permitted by the rules given the seriousness of the allegations against Mr. Landis. The seriousness and gravity of the allegations are established by the nature and scope of the

prosecution and defense allegations, by the impact on the sport of cycling and its premier event, the Tour de France, by their the impact on the athlete and by their impact on future athletes who will participated in the Tour de France.

2.4.7. Given the potential ramifications of this decision for both Mr. Landis and for the anti-doping system, USADA's burden is very close to "proof beyond a reasonable doubt." *See id.* ("From this perspective, and in view of the nature and gravity of the allegations at issue in these proceedings, there is no practical distinction between the standards of proof advocated by USADA [comfortable satisfaction] and the Respondents [proof beyond a reasonable doubt]."). Thus, although USADA is entitled to an initial presumption, it must prove beyond a reasonable doubt that any deviation from any International Standard of Laboratories ("ISL") standard did not cause the AAF. As set forth more fully below in greater detail, USADA did not meet this burden with respect to the ISL violations identified by Mr. Landis, was not met.

2.4.8. The ISL governs this case and the ISO is expressly incorporated into the ISL. ISL Article 5.1 specifically incorporates all portions of ISO 17025 related to testing and management. Article 5.1 states that "[a]ny aspect of testing or management not specifically discussed in this document [ISL] *shall* be governed by ISO/IEC 17025." Ex. 8, ISL Art. 5.1 (emphasis added). As such, any violation of ISO 17025 is a violation of the ISL. Further, the ISL explicitly incorporates WADA Technical Documents. Ex. 8, ISL Art. 1 ("Once promulgated, Technical Documents become part of the *International Standard* for Laboratories. The incorporation of the provisions of the Technical Documents into the Laboratory's quality management system is mandatory for *WADA* accreditation."). WADA TD2003LCOC, which outlines the proper method of correcting errors in documentation, sets forth similar practices to those found in ISO 17025. Ex. 8, ISL Art. 5.2.2.2, Annex C at 57. This similarity underscores

that violations of ISO 17025 are ISL violations. Therefore, any violation of the ISO 17025 or of WADA Technical Documents is an ISL violation for purposes of rebutting USADA's initial presumption. *See* Ex. 8, ISL Art. 1 ("The *International Standard* for Laboratories, including all Annexes and Technical Documents, is mandatory for all *Signatories* to the *Code*.").

3. LNDD'S LABORATORY ERRORS

3.1. The substantive errors set forth in sections 4-12, *infra*: (1) demonstrate ISL violations that USADA failed to prove did not cause the alleged AAF and/or (2) support the Panel's finding that the test results that support the alleged AAF are inaccurate and unreliable. In making this finding, the Panel finds that Mr. Landis proved that LNDD committed errors at every critical stage of the testing process, with the exception of collection (i.e., the chain of custody after obtaining Sample 995474 until the transportation to LNDD, exclusive of everything that occurred after Sample 995474 arrived at LNDD). The Panel specifically finds that the laboratory errors set forth below in greater detail were often caused by, and necessitated by, each other. For example, the need to delete data arose from failed quality control measures and poor chromatography. The manual processing technique was needed because of poor chromatography. And, the failures in isotope identification resulted, in part, from poor chromatography. Finally, all of these ISL violations stemmed from a lack of expertise and training in proper testing procedures and proper maintenance of the instruments used by LNDD.

3.2. Ultimately, this Panel's conclusion that the alleged AAF results which support are inaccurate and unreliable is based on the totality of the errors set forth below. As a result of the totality of these errors, this Panel finds that USADA did not meet its burden to establish to a comfortable satisfaction, taking into account the seriousness of the allegations, that LNDD's laboratory errors did not cause the alleged AAF. In making this finding, the Panel further

recognizes that Mr. Landis proved instances in which LNDD failed to abide by its own Standard Operating Procedures ("SOPs"), demonstrated a lack of understanding of its own instruments and engaged in poor testing procedures. This additional evidence corroborates the ISL violations proven below.

4. THE FAILED IDENTIFICATION OF TESTOSTERONE AND EPITESTOSTERONE IN THE T/E TEST

4.1. The Panel finds that: (1) LNDD failed to properly identify testosterone and epitestosterone in the confirmation testing of the testosterone to epitestosterone ratio test ("T/E test") procedure using the Gas Chromatography-Mass Spectrometry ("GC/MS") test as required by WADA TD2003IDCR, and that (2) USADA introduced no evidence to carry its burden that the failure to comply with TD2003IDCR did not cause the AAF.

4.2. LNDD initially performed a T/E test. The theory behind the T/E test is that the urinary testosterone to epitestosterone ratio remains relatively constant and is not known to be altered by exercise. Ex. GDC00234. The administration of exogenous testosterone results in an increase in the concentration of testosterone in the urine but does not change the concentration of epitestosterone. *Id.* Thus, the ratio of testosterone to epitestosterone ratio increases.

4.3. The T/E test is performed using a GC/MS instrument, which identifies different substances within a urine sample. The GC/MS instrument produces a series of documents called chromatographs. A chromatograph is simply a graph with retention time on the X-axis and response, or quantity, on the Y-axis. The chromatograph also displays peaks associated with testosterone and epitestosterone. The absolute amount of testosterone and epitestosterone is calculated by measuring the area under their respective peaks. The ratio of testosterone to epitestosterone, however, is measured using their response factors from the chromatographs.

The reported concentrations of testosterone and epitestosterone are then corrected to a specific gravity.

4.4. In the absence of a positive IRMS test, a T/E ratio in excess of 4 to 1, combined with the required longitudinal study, may result in an AAF. *See* Ex. 49, WADA0011-0021.

4.5. The T/E test has two phases: the screen phase and the confirmation phase. WADA TD2004EAAS permits testing for an abnormal T/E ratio using a single aliquot and a single ion (m/z 432). *See id.* at WADA0011 ("The T/E value is given by the peak area or peak height ratio of testosterone and epitestosterone . . . obtained by measuring the ion at m/z 432 by GC/MS Analysis . . . [T]he Screening Procedure . . . is normally conducted on a single aliquot . . . .").

4.6. Pursuant to WADA TD2004EAAS, the confirmation of a purportedly elevated (1) concentration of testosterone, (2) concentration of epitestosterone or (3) T/E ratio must be conducted pursuant to WADA TD2003IDCR. *See* Ex. GDC00396-00400. WADA TD2004EAAS, which governs the testing and reporting of testosterone, epitestosterone, T/E ratios and other endogenous steroids, states:

> Confirmation of elevated T/E values, concentration of testosterone, epitestosterone or any other steroid metabolite under consideration is to be performed in triplicate. The confirmation of the identity of any steroid reported with abnormal properties must be made (refer to technical document TD2003IDCR). Appropriate calibration (e.g. calibration curve, deuterated standards, quality control samples) is to be included in the protocol of the Confirmation Procedure.

Ex. 9 at 2 (emphasis added).

4.7. WADA TD2003IDCR states:

> Selected Ion Monitoring[1] Mode. In some cases, it may be necessary to monitor selected ions in order to detect the substance at the Minimum Required Performance Limits. When selected ions are monitored, at least three diagnostic ions must be acquired. The relative abundance of a diagnostic ion shall preferably be determined from the peak area or height of integrated selected ion chromatograms.

See Ex. GDC00397.

4.8. The Panel finds that the requirements of WADA TD2003IDCR were not met on any confirmation testing.

4.9. The Data Analysis Parameters for the first A confirmation show the acquisition of a single diagnostic ion at m/z 432.40. Ex. 24, USADA0086.

4.10. The chromatogram for the first A confirmation shows the acquisition of a single diagnostic ion at m/z 432.40. Ex. 24, USADA0093.

4.11. The Data Analysis Parameters for the second A confirmation show the acquisition of a single diagnostic ion at m/z 432.40. Ex. 24, USADA0207.

4.12. The chromatograms for the second A confirmation show the acquisition of the same diagnostic ion at m/z 432.40. Ex. 24, USADA0213, 0215.

4.13. The Data Analysis Parameters for the B confirmation show the acquisition of a single diagnostic ion at m/z 432.40. Ex. 25, USADA0270.

4.14. The chromatograms for the B confirmation show the acquisition of a single diagnostic ion at m/z 432.40. Ex. 25, USADA0277, 0280, 0282, 0284.

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[1] "Selected Ion Monitoring" ("SIM") is defined in relevant part at TD2003IDCR: "Acquisition of ions of one or more pre-determined discrete m/z values for specified dwell times."

4.15. The Panel therefore finds that LNDD clearly violated TD2003IDCR by acquiring and analyzing only one diagnostic ion at m/z 432 in both the A and B confirmation T/E tests.

4.16. The Panel finds that LNDD's failure to comply with TD2003IDCR renders the T/E test results inaccurate and unreliable. The Panel notes that Mr. Landis introduced evidence of the proper confirmation procedure (i.e. a chromatogram showing the proper acquisition and analysis of three diagnostic ions) from the UCLA laboratory at Exhibit GDC00524. This chromatogram was unrelated to the testing of Mr. Landis' samples.

4.17. The Panel finds that the purpose of acquiring and analyzing three diagnostic ions is to be certain that the measured substances are testosterone and epitestosterone. When asked about the "significance of the fact that LNDD did not provide the chromatograms showing the analysis of the three diagnostic ions," Dr. Goldberger testified that LNDD's "T/E ratios are not supported by the chemistry that they conducted in their laboratory. It's unreliable." Tr. of R. at 1066:19-21.

4.18. Dr. Bruce Goldberger's testimony highlighted the importance of acquiring three diagnostic ions. Specifically, Dr. Goldberger testified that, even when conducting only a cursory search, he found more than ten other compounds, including non steroid-related compounds, at the same retention time and abundance as the diagnostic ion (m/z 432.10 to m/z 433.10) relied upon by LNDD in this case to characterize the substances as testosterone and epitestosterone. Tr. of R. at 1065:2-16. Therefore, the Panel has no assurance that the substances measured are actually testosterone and epitestosterone.

4.19. The Panel finds further proof of LNDD's flawed testing methodology for testosterone and epitestosterone in LNDD's identification of a substance that was not supposed to be present in the T/E test. LNDD's identification of deuterated androsterone – which should not have been

present in the T/E test – renders the T/E test results inaccurate and unreliable. Ex. 24, USADA0054. Deuterated androsterone, which does not appear naturally in human urine, is an artificial marker that is sometimes used as an internal standard. LNDD's identification of deuterated androsterone in an aliquot to which no deuterated androsterone has been added further underscores the problems associated with failing to adhere to TD2003IDCR. Therefore, LNDD's identification of deuterated androsterone in the T/E testing process gives this Panel no confidence that the T/E test results were accurate. Ex. 24, USADA00057

4.20. As further proof of LNDD's flawed testing methodology for testosterone and epitestosterone, LNDD proceeded with the B sample T/E confirmation even though it had determined that the sample was degraded. Pursuant to WADA TD2004EAAS:

> To report an Adverse Analytical Finding of an elevated T/E value, testosterone or epitestosterone concentration or any other endogenous steroid parameters, the concentration of free testosterone and/or epitestosterone in the specimen is not to exceed 5% of the respective glucuroconjugates.

Ex. 49, WADA0012. In this case, the test for degradation on the B Sample showed that the ratio was 7.7% – much greater than the allowable 5% limit.

4.21. USADA did not introduce any evidence to prove that LNDD acquired or analyzed three diagnostic ions as required by TD2003IDCR.

4.22. In finding that the T/E test results were inaccurate and unreliable, the Panel recognizes the importance of Dr. Goldberger's testimony. Dr. Goldberger testified that in his more than twenty years experience with GC/MS in drug testing, he had never seen so many errors in a single sample. Tr. of R. at 1090:12. Further, the Panel finds convincing Dr. Goldberger's testimony that he has no confidence in the GC/MS results for testosterone or epitestosterone in Sample 995474. *Id.* at 1090:1-7.

4.23. LNDD's widely varying results for testosterone and epitestosterone for Sample 995474 provide additional corroborating evidence that the T/E test results are unreliable and inaccurate. These variations resulted in T/E ratios ranging from a low of 4.9 (in the first screen) to a high of 11.4 (in the second B test confirmation). Ex. 24, USADA0054, 0057, 0101, 0223; Ex. 25, USADA0288. The Panel recognizes that USADA introduced no evidence to explain the dramatic variations in results from the same urine.

4.24. Pursuant to the finding that the T/E tests for Sample 995474 are unreliable and inaccurate, the Panel finds that the longitudinal studies introduced by USADA at Exhibit 30, are irrelevant and have no evidentiary weight.

4.25. As further evidence of the lack of evidentiary value of the T/E longitudinal studies, the Panel notes that USADA's own witness, Dr. Don Catlin, testified that Mr. Landis' profile exhibited no sign of steroid use prior to the testing of Sample 995474. Tr. of R. at 1256:9-11 ("I've seen a lot of profiles, and this one is – is very ordinary up until the box.").

4.26. As a result of the foregoing, the Panel finds that all evidence from the T/E tests is of no evidentiary value and, therefore, is entirely disregarded.

5. FAILED IDENTIFICATION OF TESTOSTERONE METABOLITES IN THE GC/C/IRMS TEST

5.1. The Panel finds that: (1) LNDD failed to properly identify the critical metabolites of testosterone as required by TD2003IDCR and (2) USADA introduced no evidence to carry its burden that the failure to comply with TD2003IDCR did not cause the AAF. Specifically, LNDD failed to identify and cannot identify: (1) 5αAndrostanediol ("5 Alpha"), (2) Androsterone ("Andro") and (3) Pregnandiol ("Pdiol") in any test associated with Sample 995474 using either retention time or relative retention time. Without this identification, the

Panel finds that the values purportedly assigned to the IRMS test results are inaccurate, unreliable and have no evidentiary value.

5.2. Without proper identification of (1) 5 Alpha, (2) Andro and (3) Pdiol, the following delta-delta values for Sample 995474 cannot be determined: (1) 5 Alpha – Pdiol, (2) 5ßAndrostanediol ("5 Beta") – Pdiol and (3) Andro – 11-ketoetiocholanolone ("11 ketoetio"). Further, because LNDD failed to comply with TD2003IDCR, the Panel assigns no evidentiary value to any AAF that relies upon the delta-delta values associated with (1) 5 Alpha – Pdiol or (2) Andro – 11-ketoetio. Therefore, none of the findings that support the AAF are valid, accurate or reliable, and the Panel expressly finds that the isotopic ratios and delta-delta values that underlie the AAF have no evidentiary value.

5.3. The identification of the testosterone metabolites and the corresponding determination of their isotopic values is the result of two separate testing processes. The first process is the identification of the testosterone metabolites by GC/MS (which is different than the GC/MS preformed in the T/E test). The second process is the determination of the isotopic values by GC/C/IRMS. GC/C/IRMS is incapable of identifying substances; rather, it can only determine the isotopic values of a peak. In order to be certain that the technicians are calculating the isotopic values of the correct peak, TD2003IDCR requires that the retention time of the peaks from the GC/MS process fall within specified time periods of each other: plus or minus .2 minutes or 1%, whichever is smaller. Without this requirement, there is no way to be certain that the peaks selected by the technician in the IRMS chromatographs are in fact the peaks that were previously identified as the target compounds (e.g. 5 Alpha, 5 Beta, Andro, Etiocholanolone ("Etio"), 11-ketoetio and Pdiol). *See* Tr. of R. at 1400:1-1419:3.

5.4. Retention time is the amount of time it takes a molecule of the target analyte to travel to the mass detector after it enters the GC column. Relative retention time is the retention time of the target analytes (in this case, 5alpha, 5beta, Andro, Etio, 11-ketioetio and Pdiol) divided by the retention time of a known internal standard (in this case, 5αAndrostanol Acetate).

5.5. WADA TD2003IDCR states that:

> For capillary gas chromatography, the retention time (RT) of the analyte shall not differ by more than one percent or ± 0.2 minutes (whichever is smaller) from that of the same substance in a spiked urine sample, Reference Collection sample, or Reference Material analyzed contemporaneously.

Exs. GDC00396-00400.

5.6. USADA's witnesses repeatedly asserted that LNDD used relative retention time to properly identify the metabolites of testosterone in the GC/C/IRMS test for Sample 995474:

5.6.1. Cynthia Mongongu testified that LNDD added an internal standard to the blank urine and to the athlete's sample "to calculate the relative retention time of the molecules analyzed." Tr. of R. at 653:8-10. Ms. Mongongu confirmed that the purpose of relative retention time is "to make sure that you're looking at the right peaks." *Id.* at 653:11-13.

5.6.2. Dr. J. Thomas Brenna testified that LNDD's chromatograms "have retention times that match on the previous – with the previous GC/MS, and the GC/MS delivers structural information, like aliquots and so forth, that tell us which is which." *Id.* at 255:18-22.

5.6.3. USADA's brief specifically asserts that LNDD used retention time and relative retention time to properly identify the metabolites of testosterone in the GC/C/IRMS test for Sample 995474. USADA's brief states, in relevant part:

> The second of the three steps in the LNDD test is pre-IRMS compound identification by GC/MS, the gold standard for compound identification in analytical chemistry applications. GC separates the compounds present in a

> mixture and MS identifies them. The first element of compound identification is the GC "retention time (RT)" and the second one is the molecular fingerprint recorded by the MS, which fragments the molecule into ions. Compound identification is achieved by matching GC retention times and MS ion patterns (Ion ratios) between the compound in the sample and a reference standard. . . .
>
> A parameter that is even better than the retention time is the relative retention time (RRT). It relies on the internal standard that was added to each tube during sample preparation. The internal standard has its own characteristic retention time. The relative retention time of any other compound is simply (RT of other compound)/(RT of internal standard). This makes comparisons of retention times easier because it normalizes them.

See USADA's Pre-Hearing Brief ¶¶ 41-42.

Therefore, USADA is barred from arguing that: (1) retention times do not matter or (2) relative retention times were not used to identify the testosterone isotopes in this case, following the introduction of evidence by Mr. Landis that ISL requirements related to relative retention time and retention time were not followed by LNDD.

5.7. As made clear by the summary chart prepared by Dr. Wolfram Meier-Augenstein, the difference between the absolute retention times and the relative retention times of the GC/MS and GC-IRMS were well in excess of those permitted by TD2003IDCR. In some cases, the difference in relative retention time was nearly nine times the permitted difference. Presentation of Dr. Meier-Augenstein ("Meier-Augenstein Presentation") at Slide 24; Closing Presentation at Slide 26.

5.8. The Panel finds that this violation is not a mere technicality, but rather directly affected whether LNDD properly identified the target analytes of testosterone that resulted in the alleged AAF. The failure to properly identify these target analytes renders LNDD's IRMS test results unreliable and inaccurate.

5.9. In finding that relative retention time is a critical component of accurate and reliable testing, the Panel finds the testimony of Dr. Meier-Augenstein compelling. Dr. Meier-

Augenstein testified that the variances in the relative retention times are so great that LNDD cannot identify its own internal standard or the other peaks associated with the target compounds. Tr. of R. at 1517:13–1520:15.

5.10. USADA's only response to Respondent's evidence that LNDD failed to properly identify the target compounds within the specification required by TD2003IDCR was to call Dr. Brenna in its rebuttal case. In that testimony, given on May 23, 2007, Dr. Brenna stated, in summary, that the retention times in the Mix Cal Acetate did not differ by more than one percent from the same substances found in the samples and blanks. Dr. Brenna continued that he would not "expect the retention times for the GC/MS instrument to be the same as the retention times for the GCC IRMS [*sic*] instrument[.]" *Id.* at 1933:12-15. The Panel finds Dr. Brenna's testimony unpersuasive for the following reasons:

5.10.1. Dr. Brenna admitted on cross-examination that it was not possible to calculate the relative retention time in this case from the Mix Cal Acetate for (1) 5 Alpha, (2) Andro and (3) Pdiol. *Id.* at 1958:1-3.

5.10.2. Dr. Brenna's testimony on May 23, 2007, was inconsistent with his earlier testimony given on May 14, 2007. Before the testimony of Dr. Meier-Augenstein, Dr. Brenna testified that that retention times and relative retention times of the target analytes on GC/MS were essential to the identification of the same compounds on IRMS. This directly contradicts his rebuttal testimony that the retention time and relative retention times from GC/MS are not expected to match within .2 minutes or 1% of the retention times and relative retention times on the IRMS. *Id.* at 1962:7–1965:25.

5.10.3. This Panel finds that Dr. Brenna's rebuttal testimony is not only inconsistent with his earlier testimony but also unpersuasive and misleading. On direct examination, he suggested

that the retention times and relative retention times for the target analytes would not match if performed on different instruments. *See id.* at 1933:12-16. However, Dr. Brenna later admitted on cross-examination that he would not expect to observe differences between retention times and relative retention times of the magnitude seen in this case. Tr. of R. 1969:6-1970:23

5.10.4. Also, USADA consistently argued that relative retention time was used to properly identify the target analytes (in this case, 5alpha, 5beta, Andro, Etio, 11-ketioetio and Pdiol). USADA is thus barred from making an inconsistent argument after the testimony of Dr. Meier-Augenstein.

5.11. The Panel finds that LNDD failed to identify properly the target analytes in violation of TD2003IDCR. Further, the Panel finds that USADA has presented no evidence that this violation did not cause the alleged AAF in question. Therefore, the Panel finds that LNDD's IRMS test results for Sample 995474 are inaccurate and an reliable because LNDD failed to properly identify the testosterone metabolites in that sample.

6. FAILED QUALITY CONTROL

6.1. The Panel finds that LNDD's quality control methods provide no assurance that the GC/C/IRMS instrument or the associated testing process were precise, accurate or reliable. The failure of the quality control measures to ensure precise, accurate and reliable testing is especially critical when considered in conjunction with the: (1) failed identification, (2) poor chromatography, (3) manual processing errors, (4) deleted data and (5) other ISL rule violations. Because LNDD's quality control measures were ineffective and in some cases deliberately manipulated by LNDD, this Panel has no assurance that the foregoing ISL violations did not cause the alleged AAF. Furthermore, the failure of LNDD's quality control measures eliminates

any "safety net" that might otherwise suggest that the ISL violations and other improper laboratory practices set forth in this opinion did not cause the AAF.

6.2. LNDD identified four quality control measures in its Response to the Second Request for Production of Documents. *See* Ex. B to USADA's Response to Second Request for Production of Documents ¶ 4 at 8. The Panel notes that LNDD argued that these quality control measures made additional discovery "completely unnecessary." *Id.* ¶ 4 at 7. These four quality control measures include: (1) internal standard 5 alpha-androstanol acetate, (2) negative control "blank urine," (3) positive control "mix acetate" and (4) an instrument performance check. USADA identified the same four quality control measures in its pretrial brief. *See* USADA's Pre-Hearing Brief ¶¶ 53-58.

6.3. The Panel finds that none of these quality control measures were effective or reliable and, therefore, they do not assure the Panel that LNDD's test results are accurate or reliable. Furthermore, that LNDD has asserted that its quality control measures were effective gives the Panel no assurance in the competence of LNDD's technicians.

6.4. Internal standard 5 alpha-androstanol acetate ("5 Alpha AC") provided no quality control assurance. 5 Alpha AC is added to the Mix Cal Acetate, as well as to every Sample Fraction ("F1, F2, F3") and Blank Urine Fraction (Blank Urine 1, Blank Urine 2, Blank Urine 3; hereinafter "BLU 1, BLU2, BLU3") in a known isotopic quantity. If LNDD's testing process was accurate, LNDD should have identified 5 Alpha AC at a theoretic delta value of -30.46, within a measurement of error of .5 delta units. *See* Ex. 24, USADA0175.

6.5. The Panel notes that USADA's expert, Dr. Brenna, identified 5 Alpha AC as a quality control measure. Dr. Brenna stated: "It also has . . . a standard that has been added to every sample that elutes early, and that standard is further checked to determine that the instrument is

running properly during analysis of every particular sample. And then there were standards run after the sets of analytes. So there were standards at each level." Tr. of R. at 237:13-19.

6.6. The Panel finds that 5 Alpha AC provided no quality assurance because LNDD could not determine its isotopic value within the acceptable range of error in four instances during the testing of Sample 995474. The exhibit prepared by Dr. Meier-Augenstein demonstrates that 5 Alpha AC was measured outside of its acceptable isotopic values. *See* Meier-Augenstein Presentation at Slides 52, 54; Closing Presentation at Slides 39, 40, 134, 136. The fact that LNDD failed to properly determine the isotopic values of 5 Alpha AC – the internal standard – within its measurement of uncertainty is strong evidence that LNDD's IRMS testing was inaccurate.

6.7. The Panel also finds that the Sample Blank Urines do not provide any quality control assurance. As described in paragraph 6.6 supra, internal standard 5 Alpha AC was determined to be outside of the measurement of uncertainty for the Sample B F3 fraction – the same fraction USADA relied upon to establish the AAF.

6.8. Furthermore, when the Blank Urine Samples were reprocessed on May 4–5, 2007, pursuant to this Panel's discovery order, the B Sample 5 Alpha, when measured with automatic subtraction, went from -1.6 delta-delta to -3.45 delta-delta, and the A Sample 5 Alpha went from -1.59 delta-delta to -3.65 delta-delta. The delta-delta variances between manual processing and automatic processing are too great (more than a 2 per mil difference) to provide any assurance that the blank urine provided effective quality control. This is especially important given that these blank urine fractions are the same fractions USADA relied upon to establish the AAF.

6.9. The Panel finds that the Mix Cal Acetate is neither a positive control nor an effective quality control. First, Mix Cal Acetate cannot serve as a positive control because it does not

contain the target analytes 5 Alpha, Pdiol or Andro. Without these three key target analytes, only one of the three delta-delta values, Etio – 11-ketoetio, can be determined. Etio – 11-ketoetio, for both the A Sample and the B Sample, was never an issue in this case because the delta-delta values were -2.58 and -2.02, respectively.

6.10. Furthermore, Mix Cal Acetate cannot serve as an effective quality control measure because the Mix Cal Acetate preparation is a "clean matrix." As such, it contains only 5 Alpha AC, Etiocholanolone AC, 5 Beta Androstanediol diAC, 11-ketoetio AC and a solvent. In short, there are no other unidentified substances in the Mix Cal Acetate that could create the interference that is routinely seen in the actual sample chromatograms. In contrast, urine is an exceptionally complex matrix, which means that it contains a number of unidentified compounds that can create matrix interference. As a result, the chromatograms for the Mix Cal Acetate show no matrix interference, and the test results of the Mix Cal Acetate provide no assurance that LNDD can accurately identify or determine the isotopic values of the compounds in urine. This is particularly true here, where the chromatography in the actual blanks and fractions is poor. *See* Ex. 24, USADA0173; Ex. 25, USADA0349. In finding that the Mix Cal Acetate does not serve as a quality control measure, the Panel finds the testimony of Dr. Meier-Augenstein compelling. Dr. Meier-Augenstein testified that conducting a chromatographic analysis of the Mix Cal Acetate is like "shooting fish in a barrel," unlike the related analysis of human samples. Tr. of R. at 1452:8-13.

6.11. The Panel finds that in this case, LNDD's instrument checks provided no quality control assurance. In particular, the Panel finds that LNDD failed to demonstrate that its IRMS instrument was linear. Linearity is the ability of an IRMS instrument to accurately quantify the isotopic ratio of each testosterone metabolite and endogenous reference compound in different

samples irrespective of their concentration. In other words, linearity is the ability of the instrument to accurately measure isotopic ratios across samples which often vary in concentration over different runs. The Panel finds that linearity is critically important to the accuracy and reliability of an IRMS instrument.

6.12. In this case, the linearity tests were not done pursuant to LNDD's Standard Operating Procedures ("SOP"). Pursuant to LNDD's SOP, Ex. 26, LNDD0161-0187, linearity runs were supposed to be performed once per month. They were not. LNDD's linearity testing dates were: (1) June 26, 2006, roughly one month before the Stage 17 A Sample was tested (Ex. 26, LNDD0313, 0315, 0317), (2) July 31,2006, roughly one week after Mr. Landis' A Sample was tested (Ex. 26, LNDD0320, 0322, 0324) and (3) September 25, 2006, roughly a month-and-a-half after Mr. Landis' B Sample was tested (Ex. 26, LNDD0327, 0329, 0331) (Ex. GDC00522, IsoPrime Manual Section 6, Page 31, "Checking the System") (describing how to perform the linearity tests.)

6.13. The Panel finds the testimony of Dr. Simon Davis to be credible and accepts his assessment that LNDD's IRMS instrument was not linear. Dr. Davis testified that the IsoPrime1 instrument "drifted in and out of linearity, and . . . there was also a degree of uncertainty as to how unlinear it was, because they [LNDD] did not do the tests properly over the full range." Tr. of R. at 1782:11-15.

6.14. Most importantly, the IsoPrime instrument was not linear under the specifications provided by GVI. Dr. Davis testified that the linearity on the IsoPrime instrument must be "equal or less of .3" to be within specification. Tr. of R. at 1986:9-10. Further, Dr. Davis explained that the instrument must be linear over the full range in the spectrometer from 1E minus 8 amps down to 1E minus 9 amps such that the isotopic value for the same compound

should not deviate by more than .3 per mil. However, as shown by Dr. Davis' exhibit at GDC01367, LNDD's IsoPrime instrument varied by more than .3 for the linearity runs done on June 26, 2006, just prior to the testing of the A Sample in this case.

6.15. Lastly, the Panel finds that quality controls were not run immediately before and immediately after the testing of the A and B Samples of Sample 995474. The Panel finds that the quality control measures of the IRMS testing process required running the Mix Cal Acetate and other quality control runs in sequence and without manual interruption.

6.16. The Panel recognizes that USADA, in both its pre-hearing and reply briefs, emphasized that quality controls were run "immediately before and immediately after" or "minutes before and minutes after" Mr. Landis' A and B Samples. *See* USADA Pre-Hearing Brief ¶ 79 ("The Mix Cal Acetate results from the controls run immediately before and immediately after Respondent's A and B samples . . . ."); USADA Response Brief ¶ 27 ("In its Pre-Hearing Brief, USADA went into considerable detail to explain how the Mix Cal Acetate, Blank Urine and Mix Cal IRMS controls run in the same sequence **minutes before, during, and minutes after Respondent's sample**. . . .) (emphasis added). This is not true.

6.17. As Dr. Meier-Augenstein made clear in his testimony there was a five hour fourteen minute gap between the running of the Sample A F2 fraction of Sample 995474, Ex. 24, USADA0166, and the running of the Mix Cal Acetate. Ex. 24, USADA0183. The summary chart can be seen at Closing Presentation at Slide 42.

6.18. Dr. Meier-Augenstein also made clear that there was a four hour forty minute gap between the running of the first Mix Cal Acetate, Ex. 25, USADA0362, and the running of the Sample B F3 Blank Urine of Sample 995474. Ex. 25, USADA0347. The summary chart can be seen at Closing Presentation at Slide 45.

6.19. The Panel recognizes that Ms. Mongongu, when pressed to explain these gaps, testified that she forgot to add the Mix Cal Acetate to the A Sample. Tr of R. at 600:20-601:3. Ms. Mongongu also testified that she could not remember what happened during the gap in the testing of the B Sample. Tr. of R. at 608:5-8.

6.20. In totality, the failure of LNDD's quality control measures gives the Panel no assurance in the accuracy or reliability of LNDD's test results.

7. POOR CHROMATOGRAPHY

7.1. The Panel finds that: (1) LNDD violated ISL 5.4.4.2.1 by failing to properly generate chromatograms that avoided interference in the detection of the prohibited substance or its metabolites and markers by components of the sample matrix and (2) USADA introduced no compelling evidence to carry its burden that LNDD's failure to comply with ISL 5.4.4.2.1 did not cause the AAF. The many violations of ISL 5.4.4.2.1, as seen in LNDD's poor chromatography, give this Panel no confidence in the accuracy or reliability of LNDD's GC/MS or IRMS findings.

7.2. The Panel finds overwhelming scientific support for the principle that good chromatography is critical to accurate results. Such support can be seen in the peer-reviewed literature referenced during Dr. Meier-Augenstein's testimony. *See* Meier-Augenstein Presentation at Slide 5; Ex. GDC01297.

7.3. ISL 5.4.4.2.1 requires that:

> Confirmation methods for Non-threshold Substances must be validated. Examples of factors relevant to determining if the method is fit for the purpose are: Matrix interferences. The method should avoid interference in the detection of Prohibited Substances or their Metabolites or Markers by components of the Sample Matrix.

The Panel finds that this ISL applies to the determination of the AAF in this case.

7.4. In support of, but independent of, the violation of ISL 5.4.4.2.1, the Panel finds that poor chromatography has a direct effect on the accurate, or inaccurate, determination of isotopic values (for the IRMS test) and the quantification of testosterone, epitestosterone and the T/E ratio (for the T/E test).

7.5. In support of this finding, the Panel refers to the testimony of Dr. Meier-Augenstein, who explained that matrix interference and poor chromatography can result in dramatic swings in isotopic values, as shown in the study of marine organisms described. *See* Meier-Augenstein Presentation at Slides 28-30.

7.6. Further, the Panel refers to the testimony of Dr. Meier-Augenstein, who, on cross-examination, explained that even small coeluting peaks can have a substantial isotopic effect on larger peaks. An example of this was Exhibit 120, a demonstrative that USADA's counsel asked Dr. Meier-Augenstein to prepare. This demonstrative proved that even a small coeluting peak could have more than a -2 per mil effect on the target peak, where the isotopic value of the smaller peak was a hypothetical -70 per mil.

7.7. Further, the Panel refers to Dr. Meier-Augenstein's testimony, which explained that IRMS peaks could have been incompletely combusted and the isotopic values of those peaks could be as low as -700 per mil. Tr. of R. at 1488:14-1489:23. Indeed, as Dr. Meier-Augenstein pointed out, the isotopic values for the background were more negative than -120 per mil in several of Respondent's samples. Tr. of R. at 1489:19-23.

7.8. For all of the foregoing reasons, the Panel finds that poor chromatography, especially of the kind present in this case, substantially impacts the accuracy and reliability of LNDD's GC/MS and IRMS findings, and that USADA has introduced no credible evidence to rebut this presumption.

T/E TEST RESULTS: POOR CHROMATOGRAPHY

7.9. In addition to the reasons set forth in Sections 3, 4, and 6, *supra*, the Panel finds that the T/E test results associated with Sample 995474 are inaccurate and unreliable because of poor chromatography.

7.10. In the GC/MS chromatograms related to the T/E test, Dr. Goldberger testified that the chromatogram at Ex. 24, USADA0093 (the Sample A confirmation), and the chromatogram at Ex. 25, USADA0277 (the Sample B confirmation), were so poor as to be unreliable. Specifically, Dr. Goldberger described them as "horrible." Tr. of R. at 1059:18.

7.11. USADA introduced no evidence to prove that the T/E chromatograms were reliable or accurate. As a result, USADA has not carried its burden, and the Panel finds this to be an additional and independent reason that the T/E test results are inaccurate and unreliable.

7.12. The Panel finds that the testimony of Mr. Landis' witnesses concerning poor chromatography is substantial corroborating evidence that poor chromatography contributed to inaccurate results, as shown by the greatly varying T/E ratios reported by LNDD for Sample 995474.

IRMS TEST RESULTS: POOR CHROMATOGRAPHY

7.13. Dr. Meier-Augenstein opined that the following chromatograms were so poor that they resulted in inaccurate and unreliable IRMS results for Sample 995474:

7.13.1. The chromatogram at Exhibit 24, USADA0173 (Sample A, Fraction 3). *See* Tr. of R. at 1433:18-1434:9.

7.13.2. The chromatogram at Exhibit 25, USADA0349 (Sample B, Fraction 3). *See* Tr. of R. at 1416:9-1417:10.

7.14. Dr. Davis opined that the following chromatograms were so poor that they resulted in inaccurate and unreliable IRMS results for all of the other AAF from other Tour stages:

7.14.1. Stage 11: The chromatogram at Exhibit 88, LNDD1110 (Sample B, Fraction 3). *See* Tr. of R. at 1848:7-1849:9.

7.14.2. Stage 15: The chromatogram at Exhibit 86, LNDD0894 (Sample B, Fraction 3). *See* Tr. of R. at 1850:23-1851:10.

7.14.3. Stage 19: The chromatogram at Exhibit 87, LNDD0991 (Sample B, Fraction 3). *See* Tr. of R. at 1851:11-1852:10.

7.14.4. Stage 20: The chromatogram at Exhibit 84, LNDD0704 (Sample B, Fraction 3). *See* Tr. of R. at 1852:11-1853:8.

7.15. The Panel finds that Cynthia Mongongu's testimony further demonstrates LNDD's poor chromatography in its IRMS testing. On cross-examination, Ms. Mongongu admitted that there was matrix interference around the internal standard. *See* Tr. of R. at 615:10-17. However, when comparing the matrix interference around the internal standard to the matrix interference around the target analytes, it is clear that there is much more matrix interference surrounding the target analytes. *See* Ex. 24, USADA0173; Ex. 25, USADA0349; Ex. 84, LNDD0704; Ex. 86, LNDD0894; Ex. 87, LNDD0991; Ex. 88, LNDD1110.

7.16. The Panel finds that Dr. Catlin's testimony confirms LNDD's poor chromatography in its IRMS testing. On cross-examination, Dr. Catlin was asked whether "the chromatography in at least some of the tests supporting the adverse analytical findings are not good?" Dr. Catlin answered "I would agree." Tr. of R. at 1213:8-13. Later, Dr. Catlin stated that some of the chromatograms were poor. Tr. of R. at 1213:9-13. Further, he described some of those

chromatograms as having a grade of C or lower. Tr. of R. at 1229:1-1230:25; *see* Ex. 86, LNDD0894; Ex. 88, LNDD1110.

7.17. The Panel notes that other witnesses called by USADA testified to the high quality of the chromatography in this case; however, the Panel assigns little weight to their testimony for the following reasons:

7.17.1. First, as set forth in greater detail at Sections 14.10-14.11, *infra*, the Panel believes that the testimony of WADA laboratory directors is inherently conflicted.

7.17.2. Second, the testimony of many of these witnesses was nonspecific.

7.17.3. Third, the testimony of USADA's witnesses was inconsistent. *See* Section 14, *infra*.

7.18. In response to testimony about poor chromatography, USADA called Dr. Brenna to testify that, notwithstanding the interference plainly shown by a visual examination of the F3 B Sample chromatogram, the two over one trace graph for the F3 B Sample showed good peak separation and a flat background. *See* Tr. of R. at 268:2-269:9. Dr. Brenna's testimony was ostensibly for the purpose of assuring the Panel that there was no effect from matrix interference. The Panel finds this testimony unpersuasive because Dr. Meier-Augenstein testified that the two over one trace alone does not provide the assurance that Dr. Brenna described. This is because the technician must account for the actual change, or rise, in background from the measurement of the internal standard (in this case, 5 AlphaAndrostanol AC) to the Pdiol peak in the F3 Sample in order to understand the effect of matrix interference. To illustrate this point, Dr. Meier-Augenstein created two summary charts, see Meier-Augenstein Presentation at Slides 17-18, which showed that the background changed by more than four per

mil between the internal standard and the pregnandiol and, thus, contrary to Dr. Brenna's testimony, was not flat.

7.19. The Panel further finds that USADA failed to prove that poor chromatography did not cause the AAF, as shown by Dr. Shackleton's testimony on cross-examination. In that cross-examination, Dr. Shackleton was asked "can you prove to me that the matrix interference we see here did not affect the adverse analytical result." Tr. of R. at 216:12–23. In response, Dr. Shackleton stated: "My answer is no, I cannot prove it, but it's not – I don't feel it's my – position to be that I should be able . . . " Tr. of R. at 217: 20 – 23.

7.20. The summary charts prepared, and testified to, by Dr. Meier-Augenstein are slides 17 and 18 from his presentation. Each summary chart shows that, for both Sample A and Sample B, the fraction on which USADA focused – the F3 fraction – had a high downward sloping baseline. The Panel finds that these summary charts are particularly persuasive because they do not rely upon a subjective evaluation of the quality of the chromatograms, but rather constitute a representation of background points over the retention times shown in each of the relevant chromatograms.

7.21. The Panel, in agreeing with Mr. Landis' witnesses that LNDD's chromatography was poor, and in disagreeing with USADA's witnesses that LNDD's chromatography was good, finds substantial corroborating evidence that poor chromatography contributed to inaccurate results in this case.

7.22. First and foremost, the Panel finds that LNDD's IRMS results show a breakdown of testosterone that is inconsistent with both the peer-reviewed literature and the science of testosterone metabolism. Pursuant to the peer-reviewed literature, the testosterone isotopes 5 Alpha and 5 Beta share the same carbon skeleton, and, therefore, their isotopic values should be

consistent. In particular, when influenced by of the administration of testosterone, their values should rise and fall together.

7.23. In this case, LNDD's IRMS results for Sample A report that the 5 Alpha - Pdiol is -6.14 and 5 Beta - Pdiol is -2.15, a difference of -3.99 per mil. Ex. 107. Likewise, LNDD's IRMS results for Sample B report that the 5 Alpha - Pdiol is -6.39 and 5 Beta - Pdiol is -2.65, a difference of -3.74 per mil. *Id.* A summary chart detailing this information was made part of Dr. Meier-Augenstein's Presentation at Slide 82.

7.24. The difference of -3.00 per mil between the 5 Alpha and 5 Beta for Sample A and the difference of -3.74 per mil between the 5 Alpha and 5 Beta for Sample B are far greater than the differences found in any peer reviewed study.

7.25. In the Shackleton study at Exhibit 40, USADA1245, the greatest difference between 5 Alpha and 5 Beta was -2.5 per mil delta-delta.

7.26. In the Aguilera study at Exhibit 40, USADA1229, the greatest difference between 5 Alpha and 5 Beta for control subjects was -1.39 per mil.

7.27. Even the Cologne Study, relied on heavily by USADA, shows no differences as large as those reported in this case. *See* Ex. 34.

7.28. The Panel thus finds that LNDD's IRMS test results for Sample 995474 are anomalous, unreliable and inconsistent with the known science of testosterone metabolism. This finding further supports the conclusion that poor chromatography resulted in inaccurate and unreliable measurement of delta-delta values and, therefore, the conclusions supporting the AAF are inaccurate and unreliable.

7.29. The Panel further finds that LNDD's IRMS test results for the retesting of Sample 994075 (Stage 15), Sample 994080 (Stage 19) and Sample 994171 (Stage 20) are similarly

inconsistent with the known science regarding the metabolism of testosterone and, therefore, unreliable. These results are inconsistent with the metabolism of testosterone because they each exhibit a difference between the 5 Alpha and 5 Beta values of -1.5, -3.13 and -3.54, respectively. Again, these differences are far greater than the maximum difference seen in peer-reviewed studies of the difference between the 5 Alpha and 5 Beta values. A summary chart of these values is at Exhibit GDC01363.

7.30. The Panel further finds that these results are anomalous, unreliable and inconsistent with known science because the IRMS test results for Sample 994277 (Stage 11), Sample 994075 (Stage 15), Sample 994080 (Stage 19) and Sample 994171 (Stage 20) previously tested negative in the T/E tests. *Id.*

7.31. The Panel further finds that the IRMS test results for these stages are anomalous, unreliable and inconsistent with known science because the pattern shown by the totality of the IRMS test results and the T/E test results is inconsistent with both the peer-reviewed literature, and the known effect of testosterone. Dr. Amory testified that the T/E results do not "look like anything we've seen in studies of men who have been administered exogenous testosterone." Tr. of R. at 1586:11-13. The only evidence to the contrary was the anecdotal testimony provided by Joe Papp, which for the reasons set forth below at Section 15.3, the Panel finds not credible.

7.32. The Panel further finds that the IRMS test results are anomalous, unreliable and inconsistent with known science because, as explained by Dr. Amory, Mr. Landis' leutenizing hormone ("LH") values, as shown before and after July 23 (Stage 20), are inconsistent with the chronic use of testosterone. *See* Tr. of R. at 1550:1-1552:13; *see also* Ex. GDC00620. Dr. Amory's testimony with respect to LH was never contested.

7.33. The Panel further finds that the IRMS test results are anomalous, and therefore unreliable, because the alleged doping would have been inconsistent with common sense. Mr. Landis testified that he knew he would be tested after certain stages. Furthermore, it would have been of no benefit to use testosterone for the final stage into Paris, which is suggested by LNDD's test results for Sample 994171, because the final stage is typically, and in fact was, uncontested for the Tour leader.

7.34. The Panel therefore finds that the chromatography supporting the AAF for Stage 17, as well as the chromatography for Stages 11, 12, 15 and 20, was poor, and, therefore, the IRMS test results are inaccurate and unreliable. Further, the Panel finds that the anomalous results produced by these tests, in total, corroborate the lack of accuracy and reliability in LNDD's testing processes.

8. MANUAL PROCESSING

8.1. The Panel finds that: (1) LNDD failed to comply with ISL 5.4.4.4.1.4, which requires that data entry be recorded with an audit trail, when it manually processed Respondent's samples during the IRMS testing, (2) LNDD failed to comply with ISL 5.2.6.1, which requires that the laboratory document procedures to ensure a coordinated record related to each analyzed sample, when it manually processed Respondent's samples during the IRMS testing, and (3) USADA introduced no evidence to carry its burden that the failure to comply with ISL 5.4.4.4.1.4 and ISL 5.2.6.1 did not cause the AAF in this case.

8.2. As discussed above, manual processing is the process by which LNDD's technicians manually adjusted the start and end points of the peaks and added and deleted background points in the chromatograms associated with Sample 995474. The widespread use of manual

processing in this case was necessitated by the poor chromatography in these chromatograms. *See e.g.*, Tr. of R. at 743:15-744:5.

8.3. The technician's ability to pick and choose where to begin and end each peak associated with an isotope of testosterone has a tremendous – and determinative – impact on the final delta-delta values, such that it can cause an isotopic value to vary from a positive to a negative finding. The Panel finds Dr. Davis' testimony on this point to be credible, and recognizes that his demonstrative use of the OS2 software highlighted the tremendous impact that LNDD's manual processing technique can have on the final isotopic values.

8.4. ISL 5.4.4.4.1.4. requires that:

> All data entry, recording of reporting processes and all changes to reported data shall be recorded with an audit trial. This shall include the date and time, the information that was changed, and the individual performing the task. LNDD applied manual processing to achieve the IRMS test results that constitute the AAF associated with Sample 995474.

See Tr. of R. at 724:11-17.

8.5. LNDD violated ISL 5.4.4.4.1.4 by failing to record, at any point, the calculations or data entry associated with the samples in question in this case.

8.6. Further, as made clear in Dr. Davis' testimony, the OS2 software on the IsoPrime1 was able to print and record data and results. *See* Tr. of R. at 1882:9-22; 1874:23-1875:13.

8.7. The Panel notes that LNDD provided misleading answers to document requests and interrogatories served upon LNDD and USADA.

8.7.1. For example, in his Second Request for Production of Documents at Request No. 10, Mr. Landis requested: "All DOCUMENTS that relate to the creation and accuracy of the background subtraction method used by LNDD in the IRMS test." In response, LNDD provided the following answer: "Background Subtraction is embedded in the instrument software, which is proprietary to the instrument manufacturer. LNDD has no separate documentation." *See* Ex.

B to USADA's Response to Respondent's Second Request for Production of Documents ¶10 at 10.

8.7.2. Mr. Landis also served the following interrogatory: "Please explain, with mathematical formulas, how LNDD performed and applied background subtraction to sample 995474 and related controls." First Request for Production of Documents § II ¶ 8. In response, LNDD answered: "See response to second request, C10." *See* Ex. C to USADA's Response to Respondent's Second Request for Production of Documents ¶ 8 at 2. The response cited by LNDD reads: "Background Subtraction is embedded in the instrument software, which is proprietary to the instrument manufacturer. LNDD has no separate documentation." *See* Ex. B to USADA's Response to Respondent's Second Request for Production of Documents ¶ 10 at 10. This answer misleadingly indicated that background subtraction was not done manually, but rather by the instrument software. This response was not true, because LNDD used a manual background subtraction method in obtaining the reported results for Sample 995474. *See* Tr. of R. at 724:15-17.

8.8. In support of its finding that the manual processing had a dramatic impact on the final isotopic values in this case, and that those results were inaccurate and unreliable, the Panel further relies upon the results of the reprocessing that occurred on May 4–5, 2007. As explained by Dr. Davis, during the reprocessing attempt LNDD was unable to reproduce its original results using "manual processing," even though the same technician working on the same machine that ran the original processing tried more than twenty times to do so. A summary of LNDD's failed attempts to achieve the same initial results is shown at Exhibit GDC01365. A summary of the different results is shown at Exhibit GDC01350.

8.9. The Panel notes that the variation between these different methods is often greater than 2 per mil. *See* Ex. GDC01350. This amount of variation gives the Panel no confidence in the accuracy and reliability of the final results. Indeed, USADA's expert, Dr. Brenna, testified that the variation in the reprocessing results would cause him concern. Tr. of R. 359:17-24.

8.10. The Panel emphasizes that its finding that LNDD's manual processing and background subtraction techniques were inaccurate and unreliable arises solely from observations in this case. The factors contributing to this finding include: (1) the inexperience of the LNDD technicians, (2) the evidence of other errors committed by LNDD technicians as proven during the trial and (3) the great variation in the results achieved by LNDD technicians in this case. In particular, the Panel's lack of confidence in the accuracy and reliability of the final isotopic data from LNDD's manual processing and background subtraction techniques highlights the need for compliance with ISL 5.4.4.4.1.4 and ISL 5.2.6.1. Such compliance is necessary to eliminate confusion about the methods which were used to achieve the IRMS values that constituted the alleged AAF.

8.11. The importance of complying with ISL 5.4.4.4.1.4 and ISL 5.2.6.1 is particularly evident in this case, given that LNDD technicians repeatedly discarded results that they felt were unacceptable. For example, on cross-examination:

8.11.1. Cynthia Mongongu admitted that she re-ran and saved a sample with the same number – thereby deleting the initial run – because the initial run "was not correct." *See* Tr. of R. at 595:22.

8.11.2. Claire Frelat admitted that, because she deleted over sample runs, the only way to know that she had not done so for improper purposes was to take her word for it. *See* Tr. of R. at 714:17-24.

8.11.3. The importance of complying with ISL 5.4.4.4.1.4 and ISL 5.2.6.1 is particularly evident in this case given that LNDD had no formal training program for its technicians, thereby allowing individual technicians to employ different techniques and standards. For example, on cross-examination:

8.11.3.1. Dr. Buisson stated that she was in charge of the chemistry department and supervised IRMS technicians, Tr. of R. 922:21-926:5, and had a PhD in IRMS. Tr. of R. 915:24-916:8.

8.11.3.2. Dr. Buisson testified that she did not train Claire Frelat to use a 1.5 per mil significant difference value. Tr. of R. at 928:2-9. Regarding the limited extent of her training of Claire Frelat, Buisson stated: "if she had any questions, I was there to answer them." Tr. of R. at 929:19-930:1.

8.11.3.3. Dr. Davis testified that, when he asked Cynthia Mongongu how she chose data points during manual reprocessing, she replied, "I'm using my experience." Tr. of R. 1841:14-15. According to Claire Buisson, that experience was not a product of training. *See* Tr. of R. at 929:19-930:1.

8.11.3.4. Although Dr. Brenna generally testified that LNDD's manual processing technique was acceptable, the Panel stands by its determination that LNDD's manual processing technique as used in this case was inaccurate and unreliable. Dr. Brenna also described the LNDD technicians' manual processing technique as being very "mechanical and identical from run to run to run." Tr. of R. at 275:10-11. That testimony conflicts with Dr. Davis' observations of the LNDD technicians' use of manual processing technique. *See, e.g.*, Tr. of R. at 1843:13-22. Moreover, Dr. Davis' testimony was corroborated by the actual reprocessing results, which were

not identical when the same LNDD technicians tried to repeat their analyses. *See* Ex. GDC01350.

8.11.3.5. The Panel notes that the large difference between the values obtained for the 5 Alpha (-3.05) and the 5 Beta (-7.19) in the reprocessing of the B Sample (using the manual reprocessing technique) provides further evidence that the results of the manual processing in this case were inconsistent and unreliable. Specifically, the difference between those values was -4.14 per mil. As discussed in greater detail at Sections 7.22-7.29, *infra*, this difference is far greater than the differences found in any other peer-reviewed study. For example, in the Shackleton study, Ex. 40, USADA1245, the greatest per mil difference between 5 Alpha and 5 Beta was -2.5 per mil. In the Aguilera study, Exhibit 40, USADA1229, the greatest per mil difference between 5 Alpha and 5 Beta for control subjects was -1.39 per mil. Therefore, pursuant to the testimony of Dr. Amory and the peer-reviewed studies admitted during the trial, the Panel finds that a difference of -4.14 per mil between the 5 Alpha and the 5 Beta is too great to be reliable or accurate.

9. THE DELETION OF DATA

9.1. The Panel finds that: (1) LNDD failed to comply with ISL 5.4.4.4.1.4, which requires that data entry be recorded with an audit trail, when its technicians deleted data during the testing of Sample 995474 and during the retesting process, (2) LNDD failed to comply with ISL 5.2.6.1, which requires that the laboratory have documented procedures to ensure a coordinated record related to each analyzed sample, when its technicians deleted data during the testing of Sample 995474 and during the retesting process and (3) USADA introduced no evidence to carry its burden that the failure to comply with ISL 5.4.4.4.1.4 and ISL 5.2.6.1 did not cause the AAF in this case.

9.2. The destruction of data in this case is consistent with LNDD's inability to properly conduct testing procedures, to achieve consistency in its testing processes or to produce accurate and reliable test results. The Panel finds that LNDD technicians deleted test results they found to be "incorrect" or that "did not correspond." *See* Tr. of R. 712:14-714:11. In particular, LNDD technicians deleted test results related to LNDD's quality control steps, including, but not limited to, results from the Mix Cal Acetate and blank urine runs.

9.3. The fact that the destruction and deletion of data involved quality control measures gives the Panel no confidence in the accuracy or reliability of the test results in this case.

9.4. The Panel recognizes that destruction of data does not always constitute an ISL violation. For example, there might not be a violation if sequence files were deleted, but the sequence was rerun in its entirety and the deletion was properly recorded. That is not the situation in this case. Here, LNDD manipulated the destruction and deletion of data, such that the total picture presented by LNDD made the testing and IRMS sequences look as if they were uninterrupted.

9.5. The first example of data destruction occurred in Sample 995474. For both the A and B Samples, there was a summary page entitled "Batch Data Processing Results." This summary page contained values reflecting the individual test results from each of the tests conducted in the Sample A and Sample B sequences. For Sample A, the summary page is Exhibit 24, USADA0155. For Sample B, the summary page is Exhibit 25, USADA0359. In both the Sample A and the Sample B sequences, it is clear that LNDD cherry-picked the results that appear on the "Batch Data Processing Results" page. LNDD's manipulation is clear because the individual test results on the "Batch Data Processing Results" page do not match the results on the individual test pages that were included in the document package.

9.6. For Sample A, the results of the Mix Cal IRMS 003-2, Exhibit 24, USADA0179, do not match the results shown on the "Batch Data Processing Results" page. Ex. 24, USADA0155.

9.7. For Sample B, the results of the Mix Cal IRMS 003-3, Exhibit 25, USADA0359, do not match the results shown on the "Batch Data Processing Results" page. Ex. 25, USADA0331.

9.8. Also for Sample B, the results of the Mix Cal IRMS 003-2, Exhibit 25, USADA0358, do not match the results shown on the "Batch Data Processing Results" page. Ex. 25, USADA0331.

9.9. There is no record in the document package of all the test results from the summary "Batch Data Processing Results" page for either Sample A or Sample B. The Panel finds that this evidence shows cherry-picking of data and deletion or destruction of the original data.

9.10. The second example of data destruction also occurred in conjunction with the testing of Sample 995474. For the Sample A and Sample B sequences, there are time gaps: 5 hours and 14 minutes and 4 hours and 40 minutes, respectively.

9.11. On cross-examination, Claire Frelat testified that controls were re-run because the results were "not correct." *See* Tr. of R. at 595:14-22.

9.12. The third example of data destruction occurred in conjunction with the retesting process, during which the B Samples taken on July 3 (Sample 995642), July 11 (Sample 994203), July 13 (Sample 994277), July 14 (Sample 994276), July 18 (Sample 994075), July 22 (Sample 994080) and July 23 (Sample 994171) were tested.

9.13. The IRMS testing of these samples was conducted on LNDD's IsoPrime2 instrument. The IsoPrime2 is able to retrieve a record of all operations performed in connection with the testing of a particular sample. These files, called "log files," were recovered for Sample 995642,

Sample 994203, Sample 994277, Sample 994276, Sample 994075, Sample 994080 and Sample 994171. *See* Exs. GDC01056-01075.

9.14. The log files from the IsoPrime2 show numerous instances where LNDD technicians deleted data as described below. The deletion of data occurred when an LNDD technician, either Cynthia Mongongu or Claire Frelat, saved over a file with identical file name, thereby deleting the original data. Such deletions occurred on multiple occasions for the same file. Absent production of these log files, there would have been no indication that this data manipulation occurred. The Panel notes that USADA's representative, Dr. Larry Bowers, resisted production of the log files, and that they were eventually produced only at the insistence of Dr. Botrè.

9.15. Some examples of the destruction of data are set forth below:

9.15.1. A sample run was saved at 11:48:08 and then saved over with the same file name at 12:05:22. This sample run at 12:05:22 was later saved over by a sample that was run at 12:32:50. Ex. GDC01056.

9.15.2. A sample run was saved at 12:16:25 and then saved over with the same file name at 12:48:27. Exs. GDC01056-01057.

9.15.3. A sample run was saved at 14:05:03 and then saved over with the same file name at 15:26:12. Ex. GDC01057.

9.15.4. A sample run was saved at 20:17:24 and then saved over with the same file name at 21:08:36. Ex. GDC01058

9.15.5. A sample run was saved at 08:45:36 and then saved over with the same file name at 08:48:14. The sample run saved at 08:48:14 was later saved over with the same file name at 8:59:07. Ex. GDC01069.

9.15.6. A sample run was saved at 09:40:44 and then saved over with the same file name at 10:31:27. Ex. GDC01070.

9.15.7. A sample run was saved at 09:56:19 and then saved over with the same file name at 10:47:05. Ex. GDC01070.

9.15.8. A sample run was saved at 10:11:56 and then saved over with the same file name at 11:00:53. Ex. GDC01070.

9.15.9. A sample run was saved at 13:53:00 and then saved over with the same file name at 13:55:43. Ex. GDC01073. The sample run saved at 13:55:43 was later saved over with the same name at 14:41:39. Ex. GDC01073

9.16. Indeed, USADA's own expert witnesses stated that they would not delete relevant data once it had been acquired. Dr. Catlin testified that UCLA never deleted data after it was obtained and that if he discovered that data had been deleted, he would investigate to determine why such a deletion occurred. Tr. of R. at 1237:7-1238:19. Dr. Ayotte, after significant cross-examination on the subject, also eventually admitted that her laboratory deleted only control samples that led to the IRMS instrument being corrected. Tr. of R. at 864:15-867:20; 907:21-25.

9.17. Based on the following evidence, the Panel finds that USADA and LNDD attempted to hide their destruction and deletion of data as follows:

9.17.1. USADA repeatedly stated that the quality controls for the A and B Samples were run either "immediate before and immediately after" or "minutes before and minutes" after the testing of the samples in the IRMS sequence. *See, e.g.,* Tr. of R. at 719:10-12. As set forth in greater detail at Sections 6.16-6.19, *infra*, this is simply not true.

9.17.2. In making its finding that the deletion of data and overwriting of files contribute to the conclusion that the test results are inaccurate and unreliable, the Panel explicitly

recognizes that these techniques, as employed by LNDD, constitute a substantial deviation from proper laboratory practices. Dr. Davis explained that he has fired engineers who provided testing in which there were time gaps or overwritten sample data files. *See* Tr. of R. 1818:15-17.

9.18. The Panel finds that the destruction and deletion of data in both the testing of Sample 995474 and the B Samples from the other Tour Stages constitutes a violation of ISL 5.4.4.4.1.4 and ISL 5.2.6.1, and that those deletions give the Panel no assurance in the accuracy or reliability of the final test results. Although the Panel notes that USADA's witnesses, Claire Frelat and Cynthia Mongongu, have explanations for some of these deletions, their explanations are based upon memory alone, and no corroboration exists for their memories. Indeed, at several points during the testimony of both witnesses, their memories were shown to be selective, inconsistent or wrong. For example, Cynthia Mongongu testified on cross-examination that she could not remember the last year that the IRMS instrument needed servicing. Tr. of R. 509:8–516:20. However, she remembered with precision all of the events, minute by minute, relating to chain of custody. Similarly, Claire Frelat insisted on cross-examination that she remembered that January 5, 2007, was a Saturday on which she did not work. However, she turned out to be wrong and conceded that January 5, 2007, was actually a Friday. Tr. of R. at 701:1-5. The Panel assigns little weight to the uncorroborated memories of these witnesses, which underlies the importance of following the ISL rules against the destruction of data in the first instance. For all of the foregoing reasons, the Panel finds that USADA introduced no substantial evidence to show that these ISL violations did not cause the AAF in this case, and, therefore, USADA has not met its burden.

10. THE ABSENCE OF CHAIN OF CUSTODY

10.1. The Panel finds that: (1) LNDD failed to comply with ISL 3.2 and WADA TD2003LCOC (Laboratory Internal Chain of Custody), which set forth the requirements of internal chain of custody within a laboratory and (2) USADA introduced no compelling evidence to carry its burden that the failure to comply with ISL 3.2 and WADA TD2003LCOC did not cause the AAF in this case.

10.2. ISL 3.2 defines Laboratory Internal Chain of Custody as:

> Documentation of the sequence of *Persons* in possession of the *Sample* and any portions of the *Sample* taken for Testing. *[Comment: Laboratory Internal Chain of Custody is generally documented by a written record of the date, location, action taken, and the individual performing an action with a Sample or Aliquot.]*

10.3. WADA ISL 5.2.2.2 requires that:

> The Laboratory shall have Laboratory Internal Chain of Custody procedures to maintain control of and accountability for *Samples* from receipt through final disposition of the *Samples*. The procedures must incorporate the concepts presented in the *WADA* Technical Document for Laboratory Internal Chain of Custody (Annex C).

10.4. WADA TD2003LCOC, states in pertinent part:

> The Laboratory Internal Chain of Custody is documentation (worksheets, logbooks, forms, etc.) that records the movement of *Samples* and *Sample* Aliquots during analysis. . . .
>
> Within the Laboratory, the Laboratory Internal Chain of Custody shall be a continuous record of individuals in possession of the samples or *Sample* Aliquots. . . .
>
> In the case of *Samples*, the Laboratory Internal Chain of Custody should record all movement from receipt in the Laboratory through storage and sampling to disposal. In the case of Aliquots, the Laboratory Internal Chain of Custody should record all movement from preparation through analysis.

10.5. Chain of custody must document all intra-laboratory transfers. Exs. GDC00219-00232. An impeccable chain of custody is necessary "[t]o ensure that the urine tested suffered no contamination, tampering, or mislabeling." Ex. GDC00222.

10.6. The Panel finds that LNDD's chain of custody documents, Exhibit 25, USADA0253-0254, are summary reports that show the date, time and location of the sample at a given moment, but do not show a record of intra-laboratory transfers of the A and B Sample bottles as required by the ISL.

10.7. Further, the Panel finds that the individual documents presented by USADA to support the summary report do not suffice to create a proper chain of custody. These documents simply indicate that a laboratory technician performed a task involving the sample bottle at the time recorded; they do not establish when the sample bottle was transferred to the laboratory technician and from who it was transferred.

10.8. Moreover, the complete failure to record both people to the transfer is fatal to USADA's position that there is no break in the chain of custody of the sample bottles because it requires the Panel to assume that the person previously listed on the summary report retained the sample bottle for the entire time before transferring the bottle to the person listed next on the summary report. In other words, the Panel must assume that there was no unrecorded transfer that took place between the two technicians listed on the summary report. The Panel will not make such an assumption.

10.9. The Panel notes the following breaks in the intra-laboratory transfers of the Sample A and Sample B bottles and aliquots:

10.10. On July 21, 2006, LNDD failed to record who removed the Sample A bottle from the refrigerator and when he or she did so. Ex. 25, USADA0253.

10.11. On July 21, 2006, LNDD failed to record how the Sample A bottle was transferred from Martin in Salle 107 to Garcia in Salle 106, when the sample was transferred and where it was transferred. *Id.*

10.12. On July 22, 2006, LNDD failed to record who removed that Sample A bottle from the refrigerator and when it was removed. Ex. 25, USADA0253.

10.13. On July 22, 2006, LNDD failed to record how the Sample A bottle was transferred from Cerpolini in S. 103 to Mongongu in S. 104, which occurred sometime between 10:50 and 11:20, where it was transferred and when it was transferred. *Id.*

10.14. On July 22, 2006, LNDD failed to record how the Sample A bottle was transferred from Mongongu in S. 104 to Cerpolini, which occurred sometime between 11:20 and 12:45, where the transfer occurred and when it was transferred. *Id.* The Panel notes that Ms. Mongongu testified that she had the bottle between 11:20 am and 11:25 am and that she gave it to Operator 18 at 11:25 am. However, the chain of custody document shows that Operator 18 had the bottle at 12:45 pm, so there is no documentation showing the location of the bottle from 11:25 am to 12:45 pm.

10.15. On July 23, 2006, LNDD failed to record who removed the Sample A bottle from the refrigerator and when the transfer occurred. *Id.*

10.16. On July 28, 2006, LNDD failed to record who removed the Sample B bottle from the freezer and where the transfer occurred. Ex. 25, USADA0254.

10.17. On August 3, 2006, LNDD failed to record how, where and when the Sample B bottle was removed from the freezer. And, LNDD failed to record how, when and where the B sample bottle was transferred from Cerpolini in an unknown location to Frelat in S. 004, which occurred between 9:12 and 11:03. *Id.*

10.18. On August 3, 2006, LNDD failed to record the transfer of the Sample B bottle from Frelat in S. 004 to Barlagne in S. 103. *Id.*

10.19. The Panel recognizes the significance of the testimony of Claire Frelat on cross-examination, when she indicated that there was no documentation of intra-laboratory transfers. In response to the question ". . . where does the form record how the bottle moved through the laboratory through each of those steps?" Ms. Frelat answered: "The transfer is not recorded, it is not written." Tr. of R. at 687:14-20; *see* Tr. of R. at 688:7-18.

10.20. The Panel notes that other WADA-accredited laboratories have chain of custody procedures that comply with the ISL, in contrast to the procedures used by LNDD in conjunction with Sample 995474.

10.21. The Montreal laboratory chain of custody document establishes the time, date, location of the bottle, who had the sample bottle and to whom the sample bottle was given. This is in contrast to LNDD, which only provides evidence of who had the sample bottle for a particular operation. Exs. GDC00030-00031.

10.22. The UCLA laboratory chain of custody documentation records both parties to the intra-laboratory transfer, which, unlike LNDD, creates a continuous chain of custody. Exs. GDC00032-00033.

10.23. The Panel finds that these breaks in the intra-laboratory chain of custody are not simply technical in nature. The Panel notes that there are extensive periods of time that are unaccounted for during the testing process.

10.24. On July 21, 2006, the A sample bottle was removed from the refrigerator at 7:25 and was not returned until 9:25, two hours later, during which time the only documented task completed was the creation of aliquots. *See* Ex. 25, USADA0253.

10.25. On July 22, 2006, the A sample bottle was removed from storage at 9:05 and not returned until 12:45, over three and a half hours later. During these three and a half hours, the

operators who purportedly had possession of the A bottle were conducting chemistry for both the T/E and IRMS tests. *See* Ex. 24, USADA0119-0120, 0200.

10.26. On July 23, 2006, the A sample bottle was removed from the refrigerator at 14:20 and not returned until 17:00, over two and a half hours later. During this time, the aliquot for the second confirmation T/E test, which was the only reason for removing the bottle from storage, was completed at 15:00. Despite the A sample bottle being removed for a task that takes approximately five minutes, the bottle was not replaced until two hours after it was removed. *See* Ex. 24, USADA0079; Ex. 25, USADA0253, 0256.

11. ERRORS IN THE PREPARATION OF LABORATORY DOCUMENTS

11.1. The Panel finds that LNDD failed to comply with WADA TD2003LCOC and ISO 17025.4.3.3.3, which prohibit the "corrections" made to the documentation supporting the alleged AAF for Sample 995474.

11.2. WADA TD2003LCOC states that:

> [a]ny forensic corrections that need to be made to the comment should be done with a single line through and the change should be initialed and dated by the individual making the change. . . . No white out or erasure that obliterates the original entry is acceptable.

> The ISO 17025.4.3.3.3 states:
>
> If the laboratory's document control system allows for the amendment of documents by hand pending the re-issue of the documents, the procedures and authorities for such amendments shall be defined. Amendments shall be clearly marked, initialed and dated. A revised document shall be formally re-issued as soon as practicable.

11.3. The Panel notes that there are numerous violations of WADA TD2003LCOC and ISO 17025.4.3.3.3 throughout the document package supporting the alleged AAF for Sample 995474.

These violations consist of improper corrections or deletions to the rider number, sample number, time, values and to other critical data.

11.4. An example of those cross-outs is at Exhibit 24, USADA0200, where there are six improper corrections on one page.

11.5. Another example is at Exhibit 24, USADA0009, where there is an improper change from an unknown number to what appears to be sample number 995474.

11.6. The Panel finds that these improper correction procedures reflect sloppy and unprofessional laboratory techniques that give this Panel no assurance as to the accuracy and reliability of LNDD's test results.

11.7. In making its finding that violations of WADA TD2003LCOC and ISO 17025.4.3.3.3 contribute to the conclusion that the test results are inaccurate and unreliable, the Panel explicitly recognizes that these errors constitute a substantial deviation from good laboratory practice and affect the reliability of the test results.

11.7.1. Dr. Goldberger testified that the mislabeling, misnumbering and correction technique of LNDD is of significant concern, and based on the totality of forensic corrections in this case, opined that "I can't trust [the reliability of the report and test results]. I think it's unreliable." *See* Tr. of R. at 1049:20-21.

11.8. Lastly, and importantly, the Panel finds that there is persuasive evidence that LNDD created a fraudulent document as shown at Exhibit 26, LNDD0440. This document was produced to Mr. Landis during discovery in March 2007. It purports to be a reference solution log maintained contemporaneously from January 19 to June 26, 2006. The Panel notes that there are cross-outs that indicate the date was changed in two of the entries from March 16, 2007, to March 6, 2006. The Panel finds it highly unlikely that the author of the document would have

mistakenly placed a "2007" date in 2006, especially considering that this document was provided to Mr. Landis in the middle of March 2007. Furthermore, the Panel notes that the handwriting on this document all appears the same. The Panel condemns this production of fraudulent evidence, and it gives the Panel no assurance in the accuracy or reliability of LNDD's test results or in the integrity of its laboratory processes and personnel.

12. OTHER ERRORS BY LNDD GIVE THE PANEL NO ASSURANCE IN THE RELIABILITY OR ACCURACY OF THE TEST RESULTS

12.1. In addition to the ISL violations discussed at Sections 4-11, *supra*, the Panel notes that substantial and persuasive evidence was admitted during trial concerning: (1) various other errors committed by LNDD technicians, (2) the failure of LNDD technicians to understand critical hardware and software and (3) other indicators that LNDD technicians lack of competence in the IRMS equipment and in its operation.

12.2. Some of this additional evidence does not directly implicate a specific ISL, WADA Technical Document or ISO. Still, the Panel finds this evidence highly probative because it explains and corroborates the errors that are ISL violations. This Panel finds that the errors that are ISL violations did not occur in a vacuum; rather, many of them resulted from inexperience, incompetence or lack of training by LNDD technicians or their supervisors. Evidence of these other errors highlights this fundamental inexperience, incompetence and lack of training. The evidence of other errors gives the Panel no assurance in the accuracy or reliability of LNDD's test results. USADA has therefore failed to prove the alleged doping violation to a "comfortable satisfaction."

12.3. Having observed the technicians at LNDD, Dr. Davis concluded that IRMS technicians Claire Frelat and Cynthia Mongongu neither understood the IsoPrime1 and

IsoPrime2 instruments nor seemed to know how the software worked. *See* Tr. of R. at 1845:5-12. The following evidence corroborates Dr. Davis' conclusion.

12.4. The Panel finds that the lack of a training program for the operation of the IRMS instruments gives the Panel no assurance in the accuracy and reliability of the test results.

12.4.1. Dr. Claire Buisson testified on cross-examination that:

12.4.1.1. She was the supervisor of IRMS testing at LNDD. *See* Tr. of R. at 927:10-12.

12.4.1.2. She did not directly train Claire Frelat and Cynthia Mongongu, the only technicians who performed IRMS testing in this case. *See* Tr. of R. at 929:19-930:1.

12.4.2. The effect of the lack of a training program was made clear when Claire Frelat testified that she defined a significant difference in the final per mil values in the IRMS testing process as between 1.5 and 1.6. When asked where the SOP defines a significant difference as 1.5 or 1.6, she stated that it was "not written anywhere – my answer was really concerning myself." *See* Tr. of R. at 729:9-11.

12.5. The fact that LNDD had no manual for its IsoPrime instrument gives the Panel no assurance in the accuracy and reliability of the test results.

12.5.1. LNDD admitted in discovery that it had no manual for its IsoPrime instrument. Ex. B to USADA's Response to Respondent's Second Request for Production of Documents ¶ 4 at 9.

12.5.2. Dr. Davis testified that the IsoPrime instrument is complex, that "[m]ass spectrometers are not washing machines" and that "it's essential [to have an operating manual]." *See* Tr. of R. at 1790:2-11.

12.5.3. The effect of the absence of a user manual was made clear by LNDD's operation of the IsoPrime1 at a Penning pressure in excess of the maximum allowable pressure. When it conducted the IRMS analysis of Sample 995474, LNDD operated the IsoPrime1 at a Penning pressure of 5.2×10^{-6} millibars. *See* Ex. 24, USADA0176.

12.5.4. The IsoPrime manual specifies that:

> Wait until the pressure shown on the Penning gauge falls below 5E-6 mbar. If there are no major leaks along the inlet capillaries the pressure will fall quickly and settle to the operating pressure between 2 and 4E-6 mbar. Failure to reach the operating pressure indicates major leaks. These must be cured before proceeding any further.
> Caution: Ensure that the Penning gauge reading is less than 5E-6 mbar.

See Ex. GDC00522.

12.5.5. Operating the IRMS instrument at pressures of 5E-6 millibars or above can result in reduced sensitivity and precision of the reported results and in increased variance values. *See* Tr. of R. at 1800:7-1802:15.

12.6. The fact that USADA and LNDD had no understanding of the indicator light on the control unit for the pump on the IRMS instrument gives the Panel no assurance in LNDD's ability to operate its IRMS instrument properly, nor does it give the Panel any confidence in the accuracy and reliability of LNDD's IRMS test results.

12.6.1. USADA's Brief asserts that the IRMS instrument has a light that indicates when the operating pressure is too high, and that "the light turns yellows as a warning followed by red and instrument shutdown." USADA's Pre-Hearing Brief ¶ 106. This assertion was accompanied by a picture of the light.

12.6.2. Actually, as explained by Dr. Davis, the light is on the control unit for the pump, and is lit when the pump is operating at a satisfactory speed. The light does not change color and

there is no warning. If there is a huge leak (low pressure) the light will go out. *See* Tr. of R. at 1788:10-1789:6.

12.6.3. LNDD's lack of familiarity with its own instrument gives the Panel no assurance in LNDD's ability to operate its IRMS instrument properly, nor does it give the Panel any confidence in the accuracy and reliability of LNDD's IRMS test results.

12.7. That LNDD did not understand that it had to remove the lifting rings on its IsoPrime2 instrument before operation, gives the Panel no assurance in LNDD's ability to operate its IRMS instrument properly, nor does it give the Panel any confidence in the accuracy and reliability of LNDD's IRMS test results.

12.7.1. The lifting rings are large metal rings, as shown in Exhibit GDC00734, which are designed to be used solely to install the IRMS instrument. *See* Tr. of R. at 1784:3-13. They must be removed prior to operating the instrument. *Id.* at 1786:12-17.

12.7.2. The IRMS instrument uses a large magnet to produce accurate IRMS results. The presence of so much metal so close to the magnet interferes with the accuracy of the results. *See* Tr. of R. at 1785:6-12.

12.7.3. LNDD's lack of familiarity with its own instrument gives the Panel no assurance in LNDD's ability to operate the IRMS instrument properly, nor does it give the Panel any confidence in the accuracy and reliability of LNDD's IRMS test results.

13. THE ERRORS IN USADA'S BRIEFS AND DISCOVERY RESPONSES GIVE THE PANEL NO ASSURANCE IN THE POSITIONS TAKEN BY USADA

13.1. In addition to the laboratory errors and ISL violations discussed above, the Panel notes that many of USADA's representations in its pre-hearing briefs and discovery responses were proven false at trial. In light of these inaccuracies, the Panel takes no assurance in

USADA's positions taken during the trial, especially when these positions were supported by baseless conclusions. Below are several examples of statements made by USADA to the Panel and to Respondent before the hearing that were later proven to be false. Many of these statements were proven false by USADA's own witnesses and by undisputed documentary evidence:

13.2. In its Pre-Hearing Brief, and again in its Pre-Trial Response Brief, USADA represented to the Panel that the reliability of LNDD's IRMS test results – the gravamen of this case – was unquestionable because "the Mix Cal Acetate, Blank Urine and Mix Cal IRMS controls run in the same sequence **minutes before, during, and minutes after** Respondent's sample produced the expected analytical results." USADA's Pre-Trial Response Brief ¶ 27 (emphasis added); *see* USADA's Pre-Hearing Brief ¶ 79. As the Panel discussed at great length above, despite USADA's repeated assertions in its Brief, the document package prepared by LNDD irrefutably establishes that the Mix Cal Acetates on Respondent's A and B samples were not run minutes before and/or minutes after Respondent's sample. *See* Sections 6.16-6.19, *supra*. Quite the contrary, the Mix Cal Acetate on the A sample was run 5 hours 14 minutes after the F3 fraction. *See* Ex. 24, USADA0166, 0183. And, the Mix Cal Acetate on the B sample was run 4 hours 40 minutes after the F3 fraction. *See* Ex. 25, USADA0347, 0362.

13.3. In further support of its assertions that LNDD's IRMS test was reliable, USADA claimed that "[b]ecause the IRMS instrument was accurate in measuring all of the controls, the results for Respondent's samples, which were analyzed by the IRMS instrument at the same time, must also be accurate." USADA's Pre-Trial Response Brief ¶ 27 (emphasis added); *see* USADA's Pre-Hearing Brief ¶ 77. Like the above representation, this assertion also was proved incorrect because the IRMS machine did not accurately measure the internal standard, 5α-

Androstenol, in several of the fractions associated with Respondent's A and B samples. *See* Meier-Augenstein Presentation at Slides 52, 54; Closing Presentation at Slides 39, 40, 134, 136.

13.4. Another representation found to be false during the trial was USADA's statement in its Pre-Hearing Brief that "Respondent's sample is positive by any criteria." USADA's Pre-Hearing Brief Heading L. USADA's witness, Dr. Catlin, testified that according to UCLA's positivity criteria, a sample is not classified as adverse unless the delta-delta values for both 5-Alpha and 5-Beta are more negative than -3 per mil. *See* Tr. of R. at 1222:10-20. The delta-delta values of the 5-Alpha and 5-Beta in Respondent's samples were not more negative than -3 per mil; thus, Respondent's IRMS test was not positive under UCLA's positivity criteria. *See* Exs. GDC00536-00537.

13.5. Dr. Catlin was not the only USADA expert to contradict a pre-trial representation by USADA. USADA asserted that "when WADA has established a positivity criteria, they [WADA laboratories] are not expected (let alone required) to conduct their own studies to validate that criteria." USADA's Pre-Trial Response Brief ¶ 6. Dr. Ayotte, however, testified to the contrary – WADA laboratories are required to validate their methods. *See* Tr. of R. at 856:13-857:18.

13.6. In addition to suffering contradictions by its own witnesses, USADA had no evidence to defend its pretrial statements when they were challenged by Respondent's witnesses. For instance, in its Pre-Hearing Brief, USADA wrote that "[t]he co-eluting peak [on the screen test] was substantially eliminated during the . . . confirmation . . . ." Pre-Hearing Brief ¶ 144. Later, in its Pre-Trial Response Brief, USADA again stated that "although considerable background is still visible, the confirmation chromatograms show a better (i.e., narrower) peak shape." Pre-Trial Response Brief ¶ 59. Dr. Goldberger explained that the co-eluding peak seen on the

GC/MS screen was not eliminated and that the confirmation chromatograms were either of the same quality as the screening or worse. Tr. of R. at 1075:19-1086:18. Despite having made contrary representations in its Brief, once challenged by Respondent, USADA presented no evidence to refute Dr. Goldberger's testimony.

13.7. Again, despite USADA's representing to this Panel before the hearing that there is a green light displayed on the IsoPrime instrument that will change colors if the Penning pressure of the machine rises too high, USADA had no evidence to contest Dr. Davis' testimony that the green light in question was simply a power light, was unrelated to the Penning pressure and certainly did not change colors. *Compare* USADA's Pre-Hearing Brief ¶ 106 *with* Tr. of R. at 1788:10-1789:6.

13.8. USADA's prior representations were not only contradicted by its own witnesses and those of Respondent, USADA's statements also conflicted with the plain meaning of relevant documents. In its Pre-Trial Response Brief, USADA claimed that "[t]here is no WADA requirement to document the location of a sample bottle." USADA Pre-Trial Response Brief ¶ 8 n.8. However, WADA TD2003LCOC specifically states that "[a] chain of custody is required for both 'A' and 'B' *Sample* bottles . . . prepared for a testing procedure." And, the same technical document further states that "[i]n the case of *Samples*, the Laboratory Internal Chain of Custody should record all movement from receipt in the Laboratory through storage and sampling to disposal." Ex. GDC00233.

13.9. Further, several of USADA's discovery responses were proven incorrect. For example, USADA confirmed that "no post acquisition corrections of the data have been performed by LNDD in relation to sample 995474 other than those shown in the laboratory documentation package." Ex. C to USADA's Response to Respondent's Second Request for

Production of Documents ¶ 6 at 2. Yet during Ms. Mongongu's and Ms. Frelat's testimony, both stated that they in fact manually processed and corrected data after it was acquired. *See* Section 8, *supra.*

13.10. Additionally, when Respondent asked for all documentation related to the creation and accuracy of the background subtraction method used by LNDD in the IRMS test, USADA responded that background subtraction was "embedded in the instrument software" and that "LNDD had no separate documentation." Ex. B to USADA's Response to Respondent's Second Request for Production of Documents ¶ 10 at 10. When Respondent asked LNDD to explain how it performed and applied background subtraction to Sample 995474 and related controls, USADA again stated that background subtraction was embedded in the instrument software. Ex. C to USADA's Response to Respondent's Second Request for Production of Documents ¶ 8 at 2. These statements were irrefutably proved false after both LNDD operators testified that they manually changed the background points and that LNDD had an SOP describing such a method. *See* Tr. of R. at 455:10-456:8; 724:11-725:25.

13.11. These false statements trouble the Panel. They are not isolated instances but rather a consistent pattern of statements that support USADA's blanket assurances that LNDD performed its tests properly, that its technicians were knowledgeable and well-trained and that the laboratory procedures occurred without error. Many of these blanket assurances were proven to be incorrect or false at trial. The Panel therefore assigns little weight to these and other unsupported conclusory statements made by USADA in conjunction with its assertions supporting the AAF. These false statements therefore contribute to the Panel's finding that the laboratory results were inaccurate and unreliable.

14. CREDIBILITY OF WITNESSES

14.1. In analyzing the foregoing laboratory errors and ISL violations, and in concluding that USADA has failed to prove the alleged doping violation to a comfortable satisfaction, the Panel has carefully considered the credibility of the expert witnesses whose testimony it observed. To the extent there were direct conflicts between the testimony of expert witnesses called by USADA and expert witnesses called by Mr. Landis, the Panel finds in favor of the credibility of the expert witnesses called by Mr. Landis for the following reasons:

14.2. Dr. John Amory is a widely recognized expert in the field of andrology, and recently received the Young Andrologist Award from the American Society for Andrology. Tr. of R. at 1541:3-6. His work requires him to review articles in the area of endocrinology and andrology. *Id.* at 1541:15-19. Most importantly, he is a member of USADA's independent anti-doping review board. *Id.* at 1542:15-25. Dr. Amory was not paid in conjunction for his work with this case. *Id.* at 1545:13-15. Rather, he became involved because "the case never sort of made a lot of sense to me." *Id.* at 1545: 20-1546: 2. The Panel notes that no USADA witnesses contradicted Dr. Amory's testimony with respect to the function of testosterone in the body. The Panel notes that on cross-examination, Dr. Amory's testimony was fully consistent with his testimony on direct examination, and that it served to provide greater consistent detail about his conclusions and analyses. In sum, the Panel finds Dr. Amory's testimony to be credible and compelling, and that it carries substantial weight in assessing: (1) the function of testosterone in the body and its impact on cycling performance and (2) the anomalous T/E and IRMS test results discussed in this ruling.

14.3. Dr. Bruce Goldberger is a widely recognized expert in the field of forensic toxicology, the director of a forensic toxicology laboratory and the current President of the

American Academy of Forensic Sciences. Tr of R. at 1034:5-1035:13. He has authored fifty-eight peer-reviewed articles, many of which deal with gas chromatography and mass spectrometry. Tr. of R. at 1041:1-7. Dr. Goldberger was recently solicited to replace Dr. Catlin as the Director of the Olympic analytical laboratory. Tr. of R. at 1095:23-1096:7. The Panel finds that Dr. Goldberger's testimony on cross-examination was fully consistent with his testimony on direct examination, and that it served to provide greater consistent detail about his conclusions and analyses. In sum, the Panel found Dr. Goldberger's testimony to be credible and compelling, and that it carried substantial weight in assessing (1) the importance of laboratory errors, (2) the errors in the GC/MS testing and violations of the select ion monitoring requirements, (3) LNDD's poor chromatography and its impact on results and (4) other issues related to GC/MS testing and LNDD's sloppy laboratory procedures.

14.4. Dr. Simon Davis holds a PhD in stable isotope mass spectrometry. After first working in Africa for the FAO, he spent his entire career designing and building isotope ratio mass spectrometers. Specifically, he was an engineer at MicroMass, and had worked specifically on the development of IsoPrime instruments. He now runs a company that designs and builds mass spectrometers. Tr. of R. at 1729:11-1737:21. The Panel finds that Dr. Davis' testimony on cross-examination was fully consistent with his testimony on direct examination, and that it served to provide greater consistent detail about his conclusions and analyses. In sum, the Panel found Dr. Davis' testimony to be credible and compelling, and that it carried substantial weight in assessing (1) the importance of good laboratory procedures, (2) the skill and competence of LNDD's technicians, (3) LNDD's poor chromatography and the impact of chromatographic errors on results, (4) the lack of linearity in LNDD's instruments, (5) the impact of the deletion of data, (6) the impact of the manual processing technique used by LNDD, (7) LNDD's poor

maintenance and operation of its IRMS instruments and (8) numerous other errors committed by LNDD in its IRMS analyses.

14.5. Dr. Wolfram Meier-Augenstein holds a PhD and serves on the Faculty at the Queen's University of Belfast, which houses the largest laboratory with regard to the number of isotope ratio mass spectrometers. His expertise is in IRMS testing. He has previously been invited to workshops held by the World Anti-Doping Association and has worked on numerous issues surrounding the use of IRMS in a forensic context. Tr of R. at 1340:18-1347:9. The Panel finds that Dr. Meier-Augenstein's testimony on cross-examination was fully consistent with his testimony on direct examination, and that it served to provide greater consistent detail about his conclusions and analyses. In sum, the Panel found Dr. Meier-Augenstein's testimony to be credible and compelling, and that it carried substantial weight in assessing: (1) the importance of good chromatography and the impact of chromatographic errors on IRMS results, (2) the errors committed by LNDD in its quality control and other IRMS testing procedures, (3) the breakdown of testosterone in the body as measured by IRMS, (4) LNDD's errors in retention time and relative retention time, (5) the lack of linearity in LNDD's instruments and (6) numerous other errors related to the accuracy and reliability of the IRMS results.

14.6. Furthermore, the Panel notes that Mr. Landis' expert witnesses were consistent with each other.

14.7. In contrast to Mr. Landis' witnesses, the Panel identifies a number of issues that make the Panel conclude that USADA's expert witnesses' testimony, as a whole, was not credible and did not carry USADA's burden of proof.

14.8. First, there were numerous instances in which USADA's expert witnesses contradicted each other in critical parts of their testimony. The Panel finds that USADA should

not be allowed to cherry-pick among the favorable parts of the testimony of its own expert witnesses to support its various arguments. For example, USADA's experts disagreed with each other, and often provided inconsistent statements within their own testimony about the quality of the chromatography supporting the AAF in this case. The following examples demonstrate this inconsistency:

14.8.1. Dr. Shackleton testified that some of the chromatograms were good, some were "not as aesthetically pleasing." *See* Tr. of R. at 212:6-15.

14.8.2. Dr. Brenna stated that some of the chromatograms were not "drawn reliably" and that he had concerns about the "baseline for specific peaks." *See* Tr. of R. at 294:7-13.

14.8.3. Dr. Ayotte testified that the chromatography was all "very good quality" and that there were well-resolved peaks with good baselines, no co-eluting peaks or matrix interference. *See* Tr. of R. at 812:22-813:4.

14.8.4. Dr. Catlin testified that some of the chromatograms were of C or C- quality. *See* Tr. of R. at 1229:2-6; 12:30:17-25.

14.8.5. Dr. Schanzer testified that all of the peak shapes were clear and the peaks were acceptable. *See* Tr. of R. at 1173:10-13.

14.9. The Panel finds that clearly, not all of USADA's experts can possibly be correct since their testimony is contradictory. This internal contradiction gives the Panel no assurance in the reliability of the testimony being provided by USADA's experts.

14.10. Second, with respect to USADA's expert witnesses who were affiliated with WADA-accredited anti-doping laboratories, the Panel finds that there is an inherent conflict between taking an oath to tell the truth and the requirements of the WADA Code of Ethics, Sections 3.3 and 3.4, both of which prohibit providing expert testimony or testing services in defense of an

athlete in an anti-doping case. *See* Ex. 8, at Annex B, Sections 3.3 and 3.4, *see also*, Closing Presentation at Slide 159. The Panel notes that this provision would require witnesses to either refuse to answer questions or answer questions in a dishonest manner. The Panel notes that while this may not be true of a carefully crafted and summary direct examinations based on conclusory statements, it truly creates a conflict on cross-examination. The Panel recognizes at least one instance of this, in the testimony of Dr. Catlin (a former WADA-accredited lab director) who repeatedly refused to answer questions on cross-examination. For example, in response to a question about what causes a high sloping baseline, Dr. Catlin responded "I don't wish to discuss it . . . it's just something I don't wish to discuss". Tr. of R. at 1225:13-22. The Panel believes that this may have been a factor when considering the many contradictory statements between USADA's expert witnesses.

14.11. The inappropriate control that WADA exercised or attempted to exercise in conjunction with WADA lab directors is also shown by the testimony of Dr. Catlin when he testified about his role in the Zach Lund case. Tr. of R. at 1207: 4–8, 1241:24-1244:20. In that case, Dr. Catlin testified at the request of USADA, to WADA's disappointment, that finasteride was not a masking agent. Tr. of R. at 1243:9-1244:1. During his testimony in the present matter, Dr. Catlin discussed how WADA officials emphasized that they were displeased and concerned about his testimony in the Lund case. Tr. of R. at 1244:2-11. Indeed, Dr. Catlin said that one of the WADA officials "made a comment that this was about getting to the truth, as if to say, I was not going to be providing the truth." Tr. of R. at 1244:17-20. The Panel finds Dr. Catlin's testimony about WADA's interference disconcerting, especially in light of Dick Pound's earlier comments about Respondent's guilt. Accordingly, the Panel has given due consideration

to WADA's potential interference in this case in determining the weight and credibility of the WADA lab directors' testimony.

14.12. The Panel also makes a specific adverse credibility finding with respect to Dr. Christiane Ayotte, insofar as she has previously publicly stated that "When rich athletes and American lawyers fight against the validity of tests and controls, we better be creative!" GDC01354; *see also* Closing Presentation at Slide 161. The Panel finds that this statement implies that Dr. Ayotte will provide answers to questions solely for the purpose of winning litigation, and not for the purpose of finding the truth. The Panel finds that this statement is particularly offensive and assigns the testimony of Dr. Ayotte no weight.

14.13. Additionally, Dr. Ayotte testified that her laboratory uses the same flawed IRMS procedures as LNDD. *See* Tr. of R. at 889:1-4; 910:17-913:7. The Panel finds that Dr. Ayotte's testimony merits no weight because her testimony serves to protect her own laboratory's procedures rather than establishing that such procedures are correct under the ISL.

14.14. The Panel also makes a specific adverse credibility finding with respect to Dr. Brenna's testimony on the subject of retention time and relative retention time as applied to the IRMS analysis in this case. Dr. Brenna appeared to be giving answers that were deliberately vague to provide a misleading view of the importance of relative retention time, which was only corrected on cross-examination. Specifically, on May 14, Dr. Brenna testified on direct examination that retention times in this case are a means of identifying which isotopes are 5 alpha and 5 beta. Tr. of R. at 255:5-25. After observing the testimony of Dr. Meier-Augenstein, Dr. Brenna, while being cross-examined on his rebuttal testimony, stated something entirely different. Dr. Brenna answered "Yes" to the following question: ". . . I'm asking whether or not you can calculate the relative retention time off the mix cal acetate in this case. The mix cal

acetate formulation used in this case. Yes or no?" Tr. of R. at 1957:13-19. Later on, however, Dr. Brenna admitted that because 5 alpha and Andro were not in the mix cal acetate such that "you cannot calculate a relative retention time from the mix cal acetate. That was your point. I'm sorry. . . . " Tr. of R. at 1958:1-6; *see also* Tr. of R. at 1958:20–1959:13, 1960:1–1965:13. The Panel is disturbed by this testimony insofar as Dr. Brenna appeared to be trying to provide a misleading view of the importance of relative retention time in direct response to the testimony of Dr. Meier-Augenstein, and therefore assigns no weight to Dr. Brenna's testimony on this subject.

14.15. The Panel makes an adverse credibility finding with respect to Dr. Shackleton because all of his analyses assumed that the values were correct. Tr. of R. at 183:7-11. The Panel finds that in order for an expert witness testimony to be persuasive, independent analysis must go into the assumptions behind the conclusions that support the AAF. The Panel makes a similar adverse credibility finding with respect to Dr. Catlin's testimony because he also focused solely on the good aspects of LNDD's analysis. Tr. of R. at 1214:4-19 ("I didn't go through and classify all of them. I was looking for the good ones.").

15. USADA'S LAY WITNESSES DO NOT CORROBORATE THE ALLEGED ADVERSE ANALYTICAL FINDING

15.1. The Panel notes that USADA called two lay witnesses, Joe Papp and Greg LeMond, to corroborate the alleged AAF. For the reasons set forth more fully below, the Panel finds that the testimony has no weight and does not corroborate any finding by LNDD.

15.2. Greg LeMond

15.2.1. The Panel finds that Greg LeMond's testimony concerning a telephone conversation following the 2006 Tour, Tr. of R. at 758:4-761:5, does not establish an admission by Floyd Landis that he used testosterone during the Tour.

15.2.2. The Panel further finds that the conduct of Mr. Will Geoghegan, described by Mr. LeMond at Tr. of R. at 769:16-774:15, while abhorrent and extremely distasteful, was not done at the direction of, nor condoned by, Mr. Landis.

15.3. Joe Papp

15.3.1. Joe Papp testified as to the effect of testosterone on cycling performance. The Panel assigns no weight to Mr. Papp's testimony for three separate, but equally pertinent, reasons that were made clear on cross-examination: (1) Mr. Papp took many performance enhancing drugs, known and unknown, and it is impossible to know which, if any, had the positive effects he described during direct examination, (2) Mr. Papp's cycling career and experiences differ so substantially from Mr. Landis' career and experiences that no parallels can be drawn between them and (3) Mr. Papp's credibility is negatively effected by the unknown deals that he appears to have made with USADA.

15.3.2. As made clear during cross-examination, Mr. Papp testified that he took EPO consistently from 2001 until he was caught for a doping violation. Tr. of R. at 1013:11-25. Mr. Papp also testified that he took performance enhancing drugs, but often did not know which drugs he was taking. *Id.* at 1014:19-22. Further, Mr. Papp testified that he took other performance enhancing drugs during the period of his testosterone use, including human growth hormone, insulin, amphetamine, corticosteroids, thyroid hormone and anabolic steroids. *Id.* at 1018:11-15. Based upon this wide-ranging drug use, this Panel assigns no weight to Mr. Papp's

testimony that testosterone, as opposed to some other performance enhancing drug or combination of other performance enhancing drugs, produced the effect Mr. Papp ascribed to testosterone.

15.3.3. The Panel also finds that Mr. Papp's cycling career and experiences are too different from Mr. Landis' to draw a performance parallel. Mr. Papp never raced on a Division I team, and in fact, quit racing in 1996 because he could not obtain a professional contract. *See* Tr. of R. at 1009:19-23. He has never won a major UCI cycling event, or even competed in the many major cycling events that Mr. Landis has won. *See id.* at 1004:12-1005:17.

15.3.4. Mr. Papp also admitted not knowing Mr. Landis and has never spoken with him. *See* Tr. of R. at 1103:23-1104:3.

15.3.5. Lastly, this Panel finds that Mr. Papp's credibility is negatively impacted by the resolution of an unannounced deal regarding the testosterone allegation on the day before his testimony. *See* Tr. of R. at 1024:1-7.

15.3.6. This Panel finds that Mr. Papp's credibility is negatively impacted by the lack of resolution related to the use of many other performance enhancing drugs that Mr. Papp admitted taking. *See* Tr. of R. at 1025:16-21.

15.3.7. Mr. Papp's credibility is negatively impacted by the absence of a resolution for the allegations relating to Mr. Papp's admitted trafficking of doping substances into the United States, which would otherwise be a violation of Part 14 of the UCI Anti-Doping rules and could result in a lifetime ban. *See* Ex. 1, Ch. X ¶ 263.2.

15.3.8. This Panel finds that the existence of other serious, unresolved charges that were not revealed until cross-examination negatively impacts Mr. Papp's credibility in that it makes him beholden to USADA's prosecutive decisions.

Accordingly, for the reasons set forth above, the Panel hereby DISMISSES the doping allegations against Mr. Floyd Landis.

DATED:

Patrice Brunet, Esq.
Chairman

Prof. Richard H. McLaren, C.Arb Esq.

Christopher L. Campbell, Esq.

ADVERSE FINDING DRAFT LANGUAGE

If the Panel renders an adverse decision, Mr. Landis respectfully requests the inclusion of the following language:

1. UCI Anti-Doping Rule 261 provides for a suspension of two years upon the finding of a doping offense.

2. UCI Anti-Doping Rule 275, which corresponds to Article 10.8 of the World Anti-Doping Code, provides that the commencement of any suspension period is the date of the hearing decision. That section further provides that:

> The period of Ineligibility shall start on the date of the hearing decision providing for Ineligibility or, if the hearing is waived, on the date Ineligibility is accepted or otherwise imposed. Any period during which provisional measures pursuant to articles 217 through 223 were imposed or voluntarily accepted and any period for which subsequent Competition results have been Disqualified under article 274 shall be credited against the total period of Ineligibility to be served. Where required by fairness, such as delays in the hearing process or other aspects of Doping Control not attributable to the License-Holder, the hearing body imposing the sanction may start the period of Ineligibility at an earlier date commencing as early as the date of the anti-doping violation.

3. UCI Anti-Doping Rules 217 through 223 allow for the voluntary acceptance of a suspension by the rider himself. *Hamilton v. USADA* (CAS 2005/A/884) at ¶ 95.

4. Respondent Floyd Landis was fired by his team on August 5, 2006. See Tr. of R. at 1311:16-1312:2. The Panel finds that he therefore "voluntarily accepted" a suspension on August 5, 2006. *Hamilton v. USADA* (CAS 2005/A/884) at ¶ 96.

5. Given the purpose of a sanction and in the absence of an express rule to the contrary effect, *lex sportiva* requires that a suspension run from the time that an athlete is prevented from practicing her or his sport, whether *de facto* or *de jure*. *Millar v. UCI* (CAS 2004/A/707) at ¶¶ 53-54. Since August 5, 2006, Floyd Landis has been *de facto* prevented from practicing his sport.

6. Of further guidance in determining the ineligibility start date in this case [if any], Chapter IX of the UCI Anti-Doping Rules provides that this proceeding be completed within one month from the time limit set for the dispatch of the summons, which, according to Article 225 of the UCI Anti-Doping Rules is within two working days of the receipt of the Anti-Doping Commission's notice to USA Cycling. The Panel was not provided with the date of the Anti-Doping Commission's notice to USA Cycling, but the date that the documentation package on the A and B samples was provided to USADA was August 5, 2006, so it can be assumed that this notice was dated shortly thereafter. *Id.* at ¶ 97. Regardless of any rationale that can be provided, it appears that there was no circumstance under which USADA could have complied with the one month requirement for completion of the proceeding provided for in the UCI rules.

7. On the basis of fairness, and based on the above facts, the period of ineligibility [if any] will run from August 5, 2006.

DATED: June 28, 2007

Respectfully submitted,

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