CAS 2021/O/7977 World Athletics v. Shelby Houlihan

ARBITRAL AWARD

delivered by the

COURT OF ARBITRATION FOR SPORT

sitting in the following composition:

President: Prof Jens Evald, Law Professor in Aarhus, Denmark

Arbitrators: Prof Dr Ulrich Haas, Law Professor in Zurich, Switzerland

Ms Janie Soublière, Attorney-at-law in Montréal, Canada

in the arbitration between

World Athletics, Monaco

Represented by Mr Ross Wenzel, Attorney-at-law with Kellerhals Carrard, Lausanne, Switzerland

- Claimant -

and

Ms Shelby Houlihan, United States of America

Represented by Mr Paul Greene and Mr Matthew Kaiser, Attorneys-at-law with Global Sports Advocates, Portland, Maine, USA

- Respondent -

I. Parties

1. World Athletics (the "WA" or "Claimant") is the world governing body for the sport of Athletics, established for an indefinite period with legal status as an association under the laws of Monaco, where World Athletics has its registered seat.

2. Ms Shelby Houlihan (the "Athlete" or the "Respondent") is a 28-year-old International Level middle-distance runner from the United States of America. She placed 4th in the 1500m in the World Athletics Championships in Doha, Qatar in October 2019.

3. The Claimant and the Athlete are jointly referred to as the "Parties".

II. Factual Background

4. Below is a summary of the main relevant facts, as established on the basis of the Parties' written and oral submissions and the evidence examined in the course of the present arbitration proceedings and during the hearing. This background is set out for the sole purpose of providing a synopsis of the matter in dispute. Additional facts may be set out, where relevant, in connection with the legal discussion that follows. While the Panel has considered all the facts, allegations, legal arguments and evidence submitted by the Parties in the present proceedings, the Panel refers in this Award only to the submissions and evidence it considers necessary to explain its reasoning.

5. On 15 December 2020, the Athlete provided a urine sample (sample 105190V), out-of-competition, in Oregon, USA. The analysis of the A-Sample revealed the presence of nandrolone, specifically 19-norandrosterone ("19-NA"). 19-NA is classified under Section A1.1 of the World Anti-Doping Agency ("WADA") Prohibited list as an Anabolic Androgenic Steroid. It is a non-specified substance prohibited at all times. The INRS, the Montreal WADA accredited laboratory (the "Laboratory"), reported the finding of 19-NA as an Adverse Analytical Finding ("AAF").

6. On 14 January 2021, the Athletics Integrity Unit ("AIU") issued a Notice of Allegation to the Athlete on the basis of the AAF and imposed a provisional suspension upon the Athlete pursuant to Rule 7.10.1 of the World Athletics Anti-Doping Rules ("WA ADR").

7. On 15 January 2021, the Athlete exercised her right to the analysis of her B-Sample. On 27 January 2021, the findings of the A-Sample were confirmed.

8. There followed an exchange of correspondence between the Athlete and the AIU through which the Athlete provided her explanation for the AAF. In brief, the Athlete maintained that the 19-NA entered her body by eating a burrito from a food truck containing pork offal and that the burrito was the only possible source of the 19-NA in the Sample.

9. In support of her explanation, on 11 March 2021, the Athlete filed expert evidence, including a scientific report from Dr Emmanuel Strahm, which concluded that both the concentration of 19-NA in the A-Sample and B-Sample, and the ratio of 19-NA/19-NE were consistent with values reported by other individuals roughly 10 hours after ingestion of boar meat/offal. Noretiocholanolone ("19-NE"), is a metabolite of nandrolone and is also a prohibited substance that was detected in the Athlete's urine sample further to GC/C/IRMS (gas chromatography/carbon/isotope-ration mass spectrometry). However, as the nandrolone metabolites most affected by consumption of offal, 19-NE metabolites can in some instances be found to be endogenous. Dr Strahm's report therefore concluded that because the Athlete's 19-NA/19-NE ratio is consistent with the consumption of boar offal, her AAF should rather have been reported as an Atypical Finding pursuant to the TD2021NA.

10. On 12 April 2021, the Athlete filed an application to the AIU for the Provisional Suspension imposed upon her on 14 January 2021 to be lifted ("Provisional Hearing Request") pursuant to the WA ADR.

11. On 28 April 2021, the Athlete filed an appeal with the Court of Arbitration for Sport ("CAS") further to Rule 13.2 of the WA ADR requesting that the AIU be compelled to render a decision on the Athlete's Provisional Hearing Request (the "First CAS Appeal"). The basis for the Appeal was inter alia the Athlete's claim that the AIU's failure to issue a timely decision on the Provisional Hearing Request amounted to a denial of justice. The case was given the reference *CAS 2021/A/7913 Shelby Houlihan v World Athletics*.

12. On 7 May 2021, the Athlete filed an application for Provisional Measures within the context of the First CAS Appeal ("the Application for Provisional Measures") seeking the lifting of the imposed Provisional Suspension by 12 May 2021 to allow her to compete in Olympic Trials for the 10,000m race.

13. On 12 May 2021, World Athletics filed its response to the Application for Provisional Measures with the CAS.

14. In addition, also on 12 May 2021, the AIU issued its decision on the Athlete's Provisional Hearing Request (the "Provisional Suspension Decision") which rejected the Athlete's application and maintained the Provisional Suspension imposed on 14 January 2021.

15. On the same day, the AIU sent the Athlete a Notice of Charge ("NoC") asserting that she had committed an anti-doping rule violation ("ADRV") under the WA ADR. The NoC reads as follows:

> *"Pursuant to the foregoing, you are hereby charged with committing the following Anti-doping Rule Violations (the "Charge"):*
>
> *Presence of a Prohibited Substance or its Metabolites or Markers in an Athlete's Sample, pursuant to Rule 2.1, by virtue of the presence of a Metabolite of 19-*

nortestosterone (specifically 19-norandrosterone/19NA) consistent with exogenous origin in the Sample; and

Use of a Prohibited Substance pursuant to Rule 2.2."

16. Also on the same date, the Athlete filed a further request for Provisional Measures with the CAS (seeking the same relief as had been requested in the earlier Application for Provisional Measures).

17. Still on 12 May 2021, the CAS issued an Order on the Application for Provisional Measures dismissing the Athlete's Application for Provisional Measures.

18. Again still on 12 May 2021, the Athlete withdrew the Appeal.

19. On 20 May 2021, the Deputy President of the CAS Appeals Arbitration Division issued a Termination Order, terminating the case *CAS 2021/A/7913*.

20. In light of the 12 May 2021 ADRV against the Athlete, the Parties agreed that this matter may be heard in a single hearing, directly at CAS under CAS appellate procedures, with no requirement for a prior hearing at the WA level, further to Article 8.2.6 of the WA ADR.

III. Proceedings Before the Court of Arbitration for Sport

21. On 18 May 2021, the Claimant lodged a Request for Arbitration against the Respondent with the CAS pursuant to Article 38 of the CAS Code of Sports-related Arbitration (2020 edition) (the "CAS Code") and further to Article 8.2.6 of the WA ADR. The Claimant informed CAS that it intended to rely, without limitations, on the NoC and the Provisional Suspension Decision together with their enclosures, which should be considered integral parts of the Request for Arbitration. The Claimant confirmed that the Request for Arbitration (including its Exhibits) should constitute its Statement of Claim for the purposes of Article R44.1 of the CAS Code. The Claimant nominated as arbitrator Prof Dr Ulrich Haas, Professor in Zürich, Switzerland.

22. In addition, the Claimant indicated that the Parties agreed on an Expedited Proceeding further to Articles R44.4 and R52 of the CAS Code and on a Procedural Calendar that provided as follows:

PROCEDURAL TIMETABLE	
18 May 2021	World Athletics Request for Arbitration (serving as Statement of Claim) filed with the CAS
19 May 2021	Athlete to nominate arbitrator
21 May 2021	Athlete to file Response to the Statement of Claim
1 June 2021	World Athletics to file Reply to Athlete Response
7-11 June 2021	Hearing to be held by video conference (with second day in reserve)
12 June 2021	Operative Award to be issued by the CAS

23. On 19 May 2021, the Respondent nominated as arbitrator Mr Jacques Radoux from Luxembourg, as arbitrator.

24. On 20 May 2021, the CAS Court Office initiated the present arbitration and specified, as requested by the Claimant, that it had been assigned to the CAS Ordinary Arbitration Division but would be dealt with according to the CAS Appeals Arbitration Division rules, Articles R38 *et seq.* of the CAS Code. Further, the CAS Court Office noted that the Parties had agreed to expedite the procedure according to an agreed to Procedural Calendar, and further informed the Respondent that Mr Radoux had declined his appointment and that accordingly the Respondent was invited to nominate another arbitrator.

25. Also on 20 May 2021, the Respondent nominated as arbitrator Ms Janie Soublière, Attorney-at-law in Montréal, Canada.

26. On 21 May 2021, the Parties were provided with a disclosure made by Prof Dr Haas in accordance with Article R33 of the CAS Code, and reminded that Article R34 of the CAS Code granted a 7-day period for the Parties to file a challenge to the appointment of Prof Dr Haas, which neither of the Parties subsequently did.

27. On 22 May 2021, the Respondent filed its Answer/Response to the Request for Arbitration/Statement of Claim, further to Article R44.1 of the CAS Code.

28. On 26 May 2021, after having been consulted, the Parties were informed that the hearing would be held by video-conference on 4 June 2021, further to Articles R44.2 and R57 of the CAS Code.

29. Also on 26 May 2021, the United States Anti-Doping Agency ("USADA") was invited to indicate whether it would request to intervene in the proceeding, further to Article 8.2.6 of the WA ADR and Article R41.3 of the CAS Code.

30. On 27 May 2021, USADA informed the CAS Court Office that it would not request to intervene in this proceeding.

31. On 31 May 2021, and in accordance with Articles R33 and R40 of the CAS Code, the Panel was constituted as follows:

President:	Prof Dr Jens Evald, Law Professor in Aarhus, Denmark
Co-Arbitrators:	Prof Dr Ulrich Haas, Law Professor in Zürich, Switzerland
	Ms Janie Soublière, Attorney-at-law in Montreal, Canada

32. On 1 June 2021, the Claimant filed its Reply.

33. On 2 June 2021, an Order of Procedure was issued. It was signed by the Respondent on 2 June 2021 and by the Claimant on 3 June 2021.

34. On 3 June 2021, after consulting the Parties on inter alia both timing and witness participation, the Panel transmitted a Tentative Hearing Schedule to the Parties.

35. On 4 June 2021, a hearing was held by videoconference further to Article R44.2 of the CAS Code. In addition to the Panel and Ms Kendra Magraw, CAS Counsel, the following persons attended the hearing:

For the Claimant:

- Mr Ross Wenzel, Counsel;
- Mr Tony Jackson, WA Deputy Head of Case Management;
- Prof John McGlone, Expert Witness;
- Prof Christiane Ayotte, Expert Witness.

For the Respondent:

- Mr Paul J. Greene, Counsel;
- Mr Matthew Kaiser, Counsel;
- Ms Shelby Houlihan, Athlete;
- Dr Emmanuel Strahm, Expert Witness;
- Prof Anne Hope Jahren, Expert Witness;
- Dr Pascal Kintz, Expert Witness;
- Dr Jack Fritz, Expert Witness;
- Ms Courtney Frerichs, Witness.

36. At the opening of the hearing, both Parties confirmed that they did not object to the jurisdiction of the appointed Panel, the admissibility of this case or the expedited procedure.

37. During the hearing, two expert hot tubs were held, the first with Prof John McGlone, Prof Christiane Ayotte, Dr Emmanuel Strahm and Prof Anne Hope Jahren, and the second with Prof Christiane Ayotte, Dr Pascal Kintz and Dr Jack Fritz. The Respondent's remaining witness statements were taken as evidence-in-chief, namely the witness statements provided by Mr Jack Delaney, Mr Victor Montano, Ms Lindsey Frerichs, Mrs Karissa Schweizer, Mr Matthew Centrowitz and Ms Shalane Flanagan.

38. The Athlete also made an oral statement to the Panel, which is summarized below, together

with the other character witness testimony. The Athlete and all witnesses were informed by the President of the Panel of their duty to tell the truth, subject to the sanctions of perjury under Swiss law. The Parties and the Panel had the opportunity to examine and cross-examine the Athlete and the witnesses that testified during the hearing.

39. At the conclusion of the hearing, the Parties confirmed that they were given ample opportunity to submit their arguments, answer the questions posed by the Panel and that they had no objections to the overall conduct of the proceedings, in respect of the Parties' right to be heard and to be treated equally.

IV. Submissions of the Parties

A. The Claimant's Submissions

40. The Claimant's submissions on the merits may be summarized as follows:

- The Athlete's A- and B-Samples were properly reported as AAFs by the laboratory. The applicable Technical Document ("TD") is TD2019NA, since the 2021 version did not come into force until well after the analysis and reporting had been completed.

- It is clear under any version of the TD that the positivity criteria for IRMS were met, and that the sample had to be reported as an AAF. The IRMS was not borderline or inconclusive, it was clearly positive. Subsidiarily, the Claimant submits that even if the TD2021NA was applied, the result would not change.

- The Athlete's explanation that the 19-NA in her sample resulted from her consumption of the meat of an uncastrated boar simply cannot be accepted. The explanation pre-supposes a cascade of factual and scientific improbabilities, which means that its composite probability is (very) close to zero:

    - First, the Athlete would have had to have been served pork at the food truck despite ordering beef.

    - Second, the pork consumed would not have been 'normal' pork product ordered by the food truck, but uncastrated boar.

    - Third, uncastrated boar enters the food chain through completely different channels than pork. Thus, in order for uncastrated boar to end up in the normal pork supply chain, the boar(s) in question must have been cryptorchid (specimen with undescended testicles).

- Fourth, the uncastrated boar in question (cryptorchid) is (or rather was) of a small minority of uncastrated boars that – in addition – must have had elevated androgen levels, which would be abnormal for 6-month-old pigs.

- Fifth, the pork product that the Athlete allegedly ate is pork stomach. Pork stomach, for the purposes of human consumption, is stripped of the inner layer with the consequence that only the outer muscle remains. Even if uncastrated boars do have elevated androgen levels, those are not found in the muscle, but only in specific parts (such as kidneys, testes or liver). Pork stomach, on the contrary, has one of the lowest androgen levels.

- Sixth, the concentration of 19-NA in the Athlete's urine was 2-3 times higher than the highest values reported in the scientific literature after the ingestion of much more significant quantities of meat of mature (uncastrated) boar (differently from the alleged cryptorchid in question that would have been slaughtered after 6 months).

- Seventh, the carbon isotopic signature of the 19-NA detected in the Athlete's urine (-23 ‰ ng/mL) is fundamentally inconsistent with the largely corn-based diet of commercial pigs in the US (-19 ‰ ng/mL).

- Finally, in his expert witness report, Prof McGlone states that the chance of a cryptorchid ending up in the normal supply chain in the United States is far less than 1 in 10,000.

- As a result of her failure to establish the origin of the 19-NA in her system, the Athlete cannot benefit from a plea of No (Significant) Fault or Negligence. Similar, in order to demonstrate in those circumstances that the violation was not intentional, the Athlete would effectively have to exclude intentional use based on specific and concrete elements. The case law (and now the WADA World Anti-Doping Code ("WADC")) is clear that this can only occur in the rarest of cases. In this instance, the analytical result (including the Athlete's carbon isotope signature) is entirely consistent with the use of oral nandrolone (prohormones) that are known to exist on the market.

- For all these reasons, the Athlete has committed an intentional ADRV and must be sanctioned with the period of ineligibility of four years.

41. The Claimant makes the following requests for relief:

(i) "The CAS has jurisdiction to hear this arbitration.

(ii) The Athlete is found to have committed anti-doping rule violations pursuant to Rule 2.1 and Rule 2.2 of the Rules.

(iii) The Athlete is subject to a period of Ineligibility of four (4) years for the anti-doping rule violations.

(iv) The period of Ineligibility shall commence on the date of the CAS award with credit for the period of Provisional Suspension imposed since 14 January 2021.

(v) All competitive results obtained by the Athlete from 15 December 2020 through to 14 January 2021 shall be disqualified (with all the resulting consequences, including forfeiture of any medals, titles, ranking points and prize and appearance money).

(vi) The Athlete shall bear the arbitration costs of these proceedings, if any.

(vii) The Athlete shall be ordered to contribute to the legal costs incurred by World Athletics."

B. The Respondent's Submissions

42. The Respondent's submissions on the merits may be summarized as follows:

- The applicable version of the TD is the TD2021NA, published on 21 December 2020, since *lex mitior* applies for analytical and reporting requirements.

- Further to the A-Sample analysis, and the Athlete's invocation of boar offal as a possible source of the AAF, the laboratory should have reported the sample as an Atypical Finding rather than an AAF. Had the laboratory been notified of and considered the invoked boar offal explanation, it would have taken the same into consideration when conducting the analysis of the B-Sample in accordance with the applicable TD governing the analysis and reporting of nandrolone and other 19-norsteroids:

    - First, to account that the consumption of boar offal could cause a false positive for 19-NA, the TD2019NA requires the Laboratory to demonstrate that the 19-NA is not from the consumption of boar offal when it has been invoked by the Athlete as the source. While this burden existed under the TD2019NA, the TD2021NA clarifies precisely when a laboratory is required to demonstrate that the 19-NA is not from the consumption of boar offal. Specifically, it is when three elements are present: i) the athlete invokes the boar offal as the endogenous source; ii) the athlete's estimated concentration of excreted 19-NA

is less than 10 ng/mL; and iii) the athlete's delta-delta value (13C value) is between -15 ‰ and -25 ‰, which is the accepted delta-delta value range for boars.

- Second, the Athlete invoked boar offal as a source of the 19-NA prior to her B-Sample analysis, and therefore the Laboratory was required to demonstrate that the 19-NA detected in her urine was not from the consumption of boar offal before it could report an AAF. The TD2021NA mandates the Laboratory to perform a pharmacokinetics study to establish the origin of the 19-NA detected in the Athlete's urine. Yet no pharmacokinetics study was ever done.

- Third, the Athlete's urinary markers were precisely in the range contemplated by the TD for boar offal consumption. Her estimated concentrations of excreted 19-NA were in the low ng/mL range (≤10 ng/mL) for both her A-Sample (6.9 ng/mL) and B-Sample (7.8 ng/mL) and her delta-delta values were between -15 ‰ and -25 ‰ for both her A-Sample (-23.1 ‰ ng/mL) and B-Sample (-23.0 ‰).

- Contrary to the strictures of the TD, the Laboratory wrongly confirmed that the urinary 19-NA was of exogenous origin solely based on the unreliable GC/C/IRMS result without conducting subsequent testing or other pharmacokinetics analyses.

- Rather than reporting the Athlete's B-Sample as either an Atypical Finding or a No Prohibited Substance Detected, as was required under the TD further to the Athlete's invocation of boar offal as a possible source of the 19-NA, the AIU and the Laboratory reported her B-Sample as an AAF. Such decision is of enormous legal consequence since an Atypical Finding cannot form the basis for the Notice of Charge asserting that an athlete has committed an ADRV.

- In light of these failures to comply with the requirements of the TD, the AIU has no foundation for the case brought against the Athlete. In fact, there is no way for the AIU to prove to the Panel's comfortable satisfaction that the Athlete has committed an ADRV, since the 19-NA detected in her sample should have been found to be of endogenous origin.

- Further, the Athlete had a hair sample test performed by the toxicologist Dr Kintz, which showed no trace of synthetic nandrolone or 19-NA. The Athlete also successfully passed a polygraph examination conducted by former US Counter-Intelligence agent, Dr Fritz. The latter concluded that the Athlete was not lying when responding with "*no*" to the following questions: (i) "*Did you at any time knowingly ingest Nandrolone*?"; and (ii) "*Did you intentionally ingest the drug Nandrolone*?"

- The Athlete engaged Dr Strahm, a former certified scientist at the WADA-accredited laboratory in Stockholm to conduct an independent review of the results of the analysis. Dr Strahm confirmed that the results of the Athlete's 15 December 2020 urine sample "*show all the evidence of boar meat or offal consumption the day prior to when the urine test was performed*".

- Prof Anne Hope Jahren, a paleobiologist at the University of Oslo, confirmed that "*a pork-meat meal, be it standardly derived from muscle tissue or non-standardly derived from offal, may not only possibly to exhibit a carbon value between -21 and -25, but is indeed likely to do so*".

- In conclusion, the AAF was wrongly reported solely on the basis of GC/C/IRMS results, which are insufficient to report an AAF under the TD2019NA / TD2021NA given the Athlete's urinary markers and the estimated concentration of 19-NA detected that was below 15ng/mL and because the Laboratory did not perform a pharmacokinetic study to confirm that the 19-NA had not been endogenously produced as a result of the Athlete's inadvertent consumption of boar offal.

- The Athlete's case is a false positive caused by boar offal and to find otherwise would result in a miscarriage of justice because the Athlete is not a cheater, as evidenced by her own testimony, that of all the character witnesses she has brought forward, and the fact that there is no doping scenario that could explain this one-time presence of 19-NA in her urine sample.

43. The testimony of the Athlete at the 4 June 2021 hearing can be summarised as follows:

- She had never even heard of nandrolone until she opened the documents sent by the AIU and saw that she was tested positive.

- Her dream is to win an Olympic gold medal, but only on what she can do naturally. She even refused to wear carbon-plated spikes on her shoes because she thought that would give her an unfair advantage. Her coaches begged her to wear the carbon-plated spikes at the World Championships in 2019, but she refused.

- She would never intentionally take any banned substance. She is morally opposed to doping, since cheating the sport and herself goes against everything she stands for as a person. She would even go as far to say that cheaters should face jail time. She wants to have a family one day and would never do anything that might jeopardize that.

- After reviewing everything she ingested with her legal team, it became clear that the most likely source of nandrolone was a burrito she bought from a food truck in Beaverton. She ate the burrito at about 7:30 pm the night before her positive test for

nandrolone, i.e. about ten hours before she gave her urine sample just after 6 am on 15 December 2020.

- On 14 December 2020 she had a group text conversation for plans to have dinner and watch the show Bachelorette.

- She arrived at the food truck at 6:56 pm, after Ms Courtney Frerichs, and ordered and paid for her own burrito and a mandarin Jarrito. The food truck is very authentic and sells burritos that are made of beef and pig organs. She was handed her burrito that was unlabeled and wrapped in foil. The service was very quick that night, and she was handed her burrito more quickly than normal.

- She sat with Ms Courtney Frerichs and her sister Lindsey and ate the burritos at around 7:30 pm. She remembers she was really hungry since she had only eaten cheesecake for lunch that day. The burrito meat was chopped diced meat. It tasted very rich compared to other burritos she had eaten before from the food truck. She also remembers it being very uncharacteristically greasy with grease pooling at the bottom of the burrito into the foil. It was so rich and greasy that she was not able to finish it (she believes she ate about three-quarters of it).

- Thinking back now on that night, she thinks she might have been mistakenly handed a different kind of burrito than the carne asada burrito she ordered by the person working the food truck.

- The outcome of this case will deeply affect her reputation in the world of sports and could stay with her for the rest of her life. She has always been a clean athlete and did not intentionally take nandrolone.

44. The testimony of Ms Courtney Frerichs, who was heard as a witness for the Athlete at the 4 June 2021 hearing, can be summarized as follows:

- She runs for the Bowerman Track Club and is sponsored by Nike. In 2017, she won the silver medal in the 3000-meter steeplechase at the World Championships in London.

- She has been friends with the Athlete since 2014. They met when they were both still in college on a U-23 USA team that competed in Canada.

- She has always been amazed by the Athlete's fierce competitiveness: she loves pushing herself to see how good she can be and always trains as hard as she can.

- She and the Athlete are frequently tested and always happy to comply with this because they both support clean sport. They have talked about this countless times.

- 14 December 2020 was a really busy day for her, and she could not wait to hang out

with the Athlete and watch the Bachelorette that night.

- She texted the Athlete in the afternoon and asked her what her dinner plans were pre-Bachelorette. The Athlete said that she wanted to get dinner from the burrito truck. It had become a Monday night tradition for them to get together to watch the Bachelorette and they had on previous occasions purchased burritos from this food truck in Beaverton.

- When she came out of her chiropractor appointment, she drove to the lot where the food truck is located and parked waiting for the Athlete to arrive. About 5 minutes or so passed, and the Athlete still was not there, so Ms Frerichs got in line and texted the Athlete to see if the Athlete wanted Ms Frerichs to order for her, but then the Athlete arrived a few minutes later before Ms Frerichs could order.

- The food truck has an area with sauces and while they were waiting for their burritos, they got sauce to use for dipping. Then, the person working the food truck called out their names and handed them the wrapped burritos, which were unmarked.

- They went back to her house and sat down and had dinner around 7:30 pm.

- They unwrapped and ate their burritos, but none of them finished their burritos because the meat was very "heavy". It was actually very unusual that none of them could eat the entire burrito. She thinks they ate about ¾ of their burritos.

- Looking back, she thinks it was definitely possible that they were handed the wrong burritos, since other people were waiting with them at the food truck for their burrito orders. She recalls that the people in line in front of them ordered something not "basic" like carne asada or chicken, but some other type of meat.

- As she ate the burrito that night, it never crossed her mind to think about what kind of meat it was. But she is not sure if she would have known if it was something different from what she had ordered in the past.

45. Ms Shalane Flanagan, who was not examined or cross-examined at the hearing, provided a witness statement, which can be summarized as follows:

- She began running professionally in 2004 after graduating from university where she won back-to-back NCAA titles. Over the time she became a 4-time Olympian, the 2017 NYC Marathon champion, an Olympic silver medallist, a Bronze World XC medallist and an American record holder.

- She is currently coaching for Bowerman Track Club.

- She followed the Athlete through high school, through the collegiate ranks and then helped recruit her to the Bowerman Track Club.

- The Athlete has always been a well-respected competitor and progressed smoothly from year to year in her running.

- She trained with the Athlete for four years before becoming her mentor and coach. In those four years she helped the Athlete to an American record in 5k.
- She would never support an athlete in this way if she felt they were not clean, especially because, sadly, there are too many instances to list where she mourned the loss of a medal because of competitors doping. Her North Star and guiding principle and what she instills upon her athletes is, "*it's great to be fast, but it's better to be a great person*". She says the Athlete is definitely both.
- She knows with every fiber of her being that the Athlete is not a cheater and that she would never cheat.

46. Ms Lindsey Frerichs, who was not examined or cross-examined at the hearing, provided a witness statement, which can be summarized as follows:

- She is currently a graduate student at the university earning a master's degree in physician's assistant studies.
- She visits her older sister Courtney each December and stays with her at her house in Beaverton.
- She ate dinner together with Courtney every night during her visit.
- On the night of 14 December 2020, her sister and the Athlete went to pick up burritos for the three of them for dinner at a food truck.
- All three of them ordered the same burrito, which was a carne asada burrito. The burrito she ate definitely seemed more authentic than normal Midwestern burritos. She remembers it was finely chopped meat.
- They ate around 7:30 pm. She remembers this because they ate dinner and then they watched the Bachelorette, which started at 8 pm.

47. Ms Karissa Schweizer, who was not examined or cross-examined at the hearing, provided a witness statement, which can be summarized as follows:

- In 2018 she turned professional and joined the Bowerman Track Club.
- She had competed against the Athlete during high school during significant meets, but only got to know her on a personal level through the Bowerman Track Club where they both train.
- With the Athlete as her training partner, she made U.S. World Team in 2019, competed at the 2019 World Championships in Doha, Qatar and set the American record in 3k in 2020.
- Throughout the day of 14 December 2020, she recalls that she was texting back and forth with the others to figure out where to go to watch the Bachelorette that night. Several of them had been watching it as a group on Mondays since she joined the

Bowerman Track Club.

- She wanted to get there before the show started at 8 pm because she knew the others were eating together. When she arrived, she sat at the table with the Athlete, Courtney and Courtney's sister while they ate.

- She remembers that the Athlete and Courtney talked about the filling of their burritos. She does not think any of them finished their burritos, which was surprising to her, especially for Courtney because she always finishes her burritos.

- She knows that the Athlete would never have taken a prohibited substance intentionally because she gets really mad when people accuse her of cheating when she runs a very fast time. Her mentality is *"What else do I have to do to prove to you all that my success is due to my hard work?"*

- The Athletes is so pure that she even refuses to wear the new generation of spikes that other athletes have worn to improve their running times. The Athlete wants to show that everything she achieves is based on her own power and hard work.

48. Mr Matthew Centrowitz, who was not examined or cross-examined at the hearing, provided a witness statement, which can be summarized as follows:

- He was raised in an athletic household, his father was a two-time Olympian, and he turned professional in 2012. He has won silver and bronze medals at the Outdoor World Championships, a gold medal at the Indoor World Championships, and a gold medal in the 2016 Rio Olympics.

- He joined Bowerman Track Club in 2018 and after getting to know the Athlete for about a year, they began dating in October 2019. They have been basically inseparable ever since.

- The Athlete is one of the most resilient, tenacious people he ever come across (and he has the honor of training with multiple Olympic champions and medalists). Her work ethic is unmatched: no matter how she is feeling, she gets the work done.

- Even though running is an individual sport, she is one of the few people who actually lends a helping hand to others and is very selfless in this regard.

- He knows that she would not have taken any prohibited substance because they see each other a lot, meaning he would know if she was doing something suspect, and also because she is, simply, not that type of person: she never takes any shortcuts in life or tries to take the easy way out. Moreover, just like himself, she comes from a family of athletes and runners, so she knows the right way to do things and would never do anything that would reflect negatively on her family.

- He knows that the ladies on the Bowerman Track team have "Bachelorette Night" on Mondays where they get together to eat and watch the tv show. In the past, he knows that the ladies have gotten burritos from the food truck for their Bachelorette night.

- He did not watch the Bachelorette with the ladies on that night and stayed at home to eat dinner with his roommate.
- When the Bachelorette show was over, the Athlete came over to stay the night.
- He did not see her take any supplements, medication, or anything else before they went to bed.
- He was with the Athlete the day the AIU notified her of her positive test. His initial thought was that she was tested positive for COVID-19, but then she showed him the letter that she had received. He recalls that she was absolutely devastated and confused as to how this could have happened.
- Being someone who knows the Athlete very well and who regularly spends time with her, he would know if she was doing something suspect. He for sure would know, even before her family. He has never seen her do anything shady, nor has he ever even thought she would.
- The Athlete is truly one of a kind and would never take prohibited substances.

49. The Respondent makes the following requests for relief, asking the CAS to:

(1) "Find that her 15 December 2020 test results were wrongly reported as an Adverse Analytical Finding,

(2) Find that the AIU had no basis to bring a Notice of Charge,

(3) Find that the AIU did not meet its burden to establish that Ms Houlihan committed an anti-doping rule violation,

(4) Find that the AIU's provisional suspension must be lifted and that Ms Houlihan is immediately eligible to compete,

(5) Find that this entire proceeding must remain confidential so as to protect Ms Houlihan's hard-earned reputation as a clean athlete,

(6) Order any other relief for Ms Houlihan that the CAS deems to be just and equitable, including an order of costs against the AIU that includes both the arbitration costs and her legal costs since she has spent a considerable amount of money defending herself against charges that should never have been brought."

V. Jurisdiction and Admissibility

50. Rule 8.6.1 of the WA ADR provides as follows:

> *"8.6.1 Pursuant to Article 8.5 of the Code, anti-doping rule violations asserted against International-Level Athletes and other Persons may, with the consent of the Athlete or other Person, the Integrity Unit and WADA, be heard in a single hearing directly at CAS under CAS appellate procedures, with no requirement for a prior hearing, or as otherwise agreed by the parties."*

51. The Parties agreed that this matter may be heard in a single hearing, directly at CAS under CAS appellate procedures, with no requirement for a prior hearing. WADA has also provided its consent to that proposal.

52. No objections have been raised as to the admissibility of the matter before this Panel, and the Parties confirmed that CAS has jurisdiction in the signature of the Order of Procedure.

53. It follows, therefore, that the case referred to the Panel is admissible, and that CAS has jurisdiction to adjudicate and decide on the present dispute.

VI. Applicable Law

54. Article R58 of the CAS Code provides as follows:

> *"The Panel shall decide the dispute according to the applicable regulations and, subsidiarily, to the rules of law chosen by the parties or, in absence of such a choice, according to the law of the country in which the federation, association or sports-related body which has issued the challenge decision is domiciled or according to the rules of law that the Panel deems appropriate. In the latter case, the Panel shall give reasons for its decision."*

55. In accordance with Article R58 of the CAS Code, the applicable regulations to this case pertaining to the ADRV are the 2020 WA ADR and concerning the procedural rules, the current 2021 WA ADR shall apply. The applicable provisions of the WADC also apply.

VII. Merits

56. The Panel notes that while it has carefully considered the entirety of the Parties' written submissions, witness statements and oral arguments and testimony at the hearing, the Panel relies below on that evidence which it deems necessary to decide the dispute.

57. The main issues to be resolved by the Panel are:

(A) Was the AAF properly reported and notified?

In case of an affirmative answer to question (A)

(B) What consequences shall be drawn from the ADRV?

(C) Sanctions

58. These issued will be addressed in turn below by the Panel.

A. Was the AAF Properly Reported and Notified?

1. Burden and standard of proof

59. As an initial matter, the Panel observes that the Respondent asserts that the analytical results of the Laboratory should have been reported as an Atypical Finding and that they were wrongly reported as an AAF. The Athlete's conclusion is based on the fact that she invoked the ingestion of boar offal with the AIU as a possible explanation for the finding of 19-NA. This renders the GC/C/IRMS finding unreliable or inconclusive and, as a result, she finds that the AIU could not meet its burden to establish that the Athlete committed an ADRV without performing a pharmacokinetic study, which the Laboratory failed to do.

60. The Panel notes that Rule 3.2.1 of the 2020 (and 2021) WA ADR provide as follows:

> *"Analytical methods or Decision Limits approved by WADA after consultation within the relevant scientific community or which have been the subject of peer review are presumed to be scientifically valid".*

61. Further, Article 3.2.2 of the 2020 (and 2021) WA ADR rule that:

> *"WADA-accredited laboratories, and other laboratories approved by WADA, are presumed to have conducted Sample analysis and custodial procedure in accordance with the International Standard for Laboratories. The Athlete or other Person may rebut this presumption by establishing that the departure from the International Standard for Laboratories occurred which could reasonably have caused the Adverse Analytical Finding".*

62. The Panel further notes that the Laboratory has reported an AAF and that Rule 3.2.2 (2020 and 2021) of the WA ADR provide that the Laboratory is presumed to have conducted the analysis in accordance with the relevant International Standard for Laboratories ("ISL"). The onus is, thus, on the Respondent to rebut the presumption that the AAF was properly reported and notified pursuant to the WA ADR. In order to do so, the Athlete must show – inter alia – that the Laboratory departed from provisions of the ISL (including the TD). The latter follows from Article 1.1.2 of the ISL that provides as follows:

> *"Technical Documents are approved by the WADA Executive Committee and published on WADA's website. Once approved, a Technical Document becomes an*

integral part of the ISL and supersedes any previous publication on a similar topic 1, including Technical Letter(s) and/or the ISL."

63. The Panel notes that pursuant to Rule 3.2.1 of the WA ADR, the standard of proof is the balance of probabilities.

64. The Panel notes that this standard requires the Respondent to convince the Panel that the occurrence of circumstances on which the Athlete relies is more probable than their non-occurrence.

2. Which version of the Technical Documents Applies?

65. The Panel notes the Parties' assertions in respect of which version of the TD is applicable in this matter. The Claimant maintains that it is the TD2019NA as the TD2021NA did not come into force until well after the analysis and reporting had been completed. The Respondent contends that TD2021NA applies as it was approved and published by the WADA Executive Committee on 21 December 2021 and because the principle of *lex mitior* applies also to analytical and reporting requirements.

66. The Panel observes that the 2021 WADC under the heading "Purpose, Scope and organization of the World Anti-Doping Program and the Code" reads as follows:

"Technical Documents relating to mandatory technical requirements for the implementation of an International Standard may be approved and published from time to time by the WADA Executive Committee. Adherence to Technical Documents is not time-sensitive, the WADA Executive Committee shall allow for reasonable consultation with Signatories, governments and other relevant stakeholders. Technical Documents shall become effective immediately upon publication on the WADA website unless a later date is specified. [Comment: For example, where an additional procedure is required before reporting a Sample as an Adverse Analytical Finding, that procedure would be mandated in a Technical Document issued immediately by the WADA Executive Committee]."

67. The Panel also observes that Article 27.6 of the 2021 WADC reads as follows:

"Changes to the Prohibited List and Technical Documents relating to substances on the Prohibited List shall not, unless they specifically provide otherwise, be applied retroactively. As an exception, however, when a Prohibited Substance has been removed from the Prohibited List, an Athlete or other Person currently serving a period of Ineligibility on account of the formerly Prohibited Substance may apply to the Anti-Doping Organization which had Results Management responsibility for the anti-doping rule violation to consider a reduction in the period of Ineligibility in light of the removal of the substance from the Prohibited List."

68. The above provisions are not easy to reconcile. The Panel notes that the Effective Date of the TD2021NA is 1 April 2021. The Panel is also aware of Article 1.1.2 of the ISL that

reads inter alia as follows:

> *"**The most recently approved Technical Document shall be applied to the Analytical Testing of Samples prior to the effective date if it would lead to a result that benefits the Athlete** (e.g. increase of the Decision Limit for a Threshold Substance or of the Minimum Reporting Level for a Non-Threshold Substance, establishment of more stringent identification criteria for chromatographic-mass spectrometric or electrophoretic Confirmation Procedures)."* (emphasis added)

69. Prof Ayotte, the Director of the Laboratory, testified at the hearing that although she had applied the TD2019NA she had also respected the TD2021NA.

70. The Panel finds that it can leave the question open as to which version of the TD applies if the Laboratory complied with TD2021NA. Thus, the Panel has examined the present case in light of the TD2021NA. The TD2021NA has been established to harmonize the Confirmation Procedure ("CP") for the analysis and reporting of findings for 19-norsteroids related to nandrolone.

3. Did a departure from the ISL occur?

71. The part of the TD2021NA (page 3) on which the Respondent relies to argue that the finding should have been reported as an Atypical Finding reads as follows:

> *"Due to the occurrence of preparations of 19-norsteroids with a carbon isotopic signature 3C/12C close to that of endogenous human urinary steroids (e.g. 13C19-NA=16 ‰ to -24 ‰) the result of the GC/IRMS analysis of the excreted 19-NA may not always readily indicate its exogenous origin in Samples. Therefore, in samples from males and non-pregnant females, when the estimated concentration of 19-NA is equal to or less than (≤) 15 ng/mL and the result of the GC/IRMS analysis is negative (i.e. not consistent with an exogenous origin of 19-NA) or inconclusive, the Laboratory shall consider the ratio of 19-NA to 19-NE (based on the respective estimated concentrations) as a possible indicator of the administration of the 19-norsteroids when in situ formation of 19-NA and 19-NE is excluded [Comment: The possible Use for doping purposes of 19-norsteroid preparations with a pseudo-endogenous carbon isotopic signature may be established on the basis of the pharmacokinetics of 19-NA excretion, as determined from the analysis of previously collected and/or follow-up Samples. Following consumption of the edible parts of non-castrated male pigs, concentrations of excreted 19-NA in urine are usually in the low ng/mL range (≤ 10ng/mL) although higher concentrations have been exceptionally reported. The origin of the urinary 19-NA may not be established by GC/IRMS analysis, since the varying diets of migrating wild boars lead to dissimilar delta-delta 13C values which may range between -15 ‰ and -25 ‰. Therefore, if consumption of edible parts of intact pigs is invoked by an Athlete as the unlikely origin of a 19-NA finding, this may*

be established based on the pharmacokinetics of 19-NA excretion. Profiles of 19-NA and 19-NE excretion following oral ingestion will have a different time course than following an injection of 19-norsteroids]."

72. The Respondent submits that the Laboratory should have sought out additional evidence that could allow it to establish that the 19-NA was not from an endogenous source, here the consumption of boar offal, prior to reporting the finding as an AAF as all three elements mentioned in the TD2021NA are present: i) the Athlete invoked the consumption of boar offal; ii) the Athlete's estimated concentration of excreted 19-NA is less than 10 ng/mL; and iii) the Athlete's delta-delta 13 value is between -15 ‰ and -25 ‰. When these three elements are present, the only way for the Laboratory to establish that the 19-NA is not from the consumption of boar offal is – according to the Respondent – by way of a pharmacokinetics study of an athlete's 19-NA excretion. This is because the origin of the urinary 19-NA cannot be established by GC/C/IRMS analysis in such cases since the test cannot reliably differentiate between consumption of endogenous boar offal and the ingestion of exogenous synthetic nandrolone. Thus, the consumption of boar offal will – according to the Respondent – cause a false positive for nandrolone if the reporting of the AAF is based solely on the GC/C/IRMS analysis. Under any circumstance, the Laboratory should have sought a second opinion from another WADA-accredited laboratory pursuant to the TD2019IRMS before reporting the finding as an AAF in the Athlete's B-Sample Test Report. Instead, the Laboratory should have reported the B-Sample findings as an Atypical Finding meaning that the analysis was inconclusive.

73. The Claimant's submissions are based on the TD2019NA. The Claimant holds that the AAF was properly reported. First, the TD does not require an additional test or analysis to exclude the consumption of boar offal. In other words, a laboratory is not "required" to demonstrate that the 19-NA does not come from boar offal before reporting a finding as an AAF. Second, Section 4.C of the TD2019NA states that a finding will be qualified as an AAF if the sample shows a concentration of 15 ng/mL or less in circumstances where the GC/C/IRMS is consistent with the exogenous origin of the 19-NA, as set out in Section 3.2 of the TD2019NA. Further, the Laboratory had no obligation to seek a second opinion on the GC/C/IRMS. The language of the TD2019IRMS (Section 3.1.1.) says that a Laboratory "*should*" seek a second opinion and that, "*if*" one is obtained, it should be included in the Laboratory Documentation Package. The fact that the paragraph itself envisages the situation where a second opinion is not obtained makes clear that there is no such obligation. Moreover, the word "should" has consistently been found by CAS to be optional, not mandatory. The Claimant also referred to the testimony of Prof Ayotte, which can be summarized in its main part as follows:

- The results from the initial and confirmation procedures, including the GC/C/IRMS analysis, were reported as an AAF in accordance with the requirements of the relevant TD, TD2019NA (Section 4.0 Reporting, sub-section C). At the hearing, she also submitted that this was equally in line with the TD2021NA. She submitted that all required steps had been undertaken, in particular:

- Pregnancy was excluded (HCG: negative).
- Norethisterone was excluded (no tetrahydronorethisterone).
- Microbial demethylation was excluded (ratio 19-NA to 19-NE > 3, IRMS results).
- IRMS results were conclusive and showed the different origin of 19-NA (-23.0‰) when compared to the endogenous reference compounds ("ERCs"), androsterone (-19.0‰) and pregnanediol (-19.3‰), a difference greater than 3‰.
- The carbon isotopic signature of 19-NA in urine sample 105190V was measured at -23‰, a value that differed from the Athlete's other urinary steroids at around -19‰ (a typical North American carbon isotopic signature).
- These results (A- and B-Samples) were reproducible and consistent with the administration of a nandrolone or norsteroid preparation with a "pseudo-endogenous" carbon isotopic signature at around -23‰.

- Prof Ayotte rejects the claim that the Athlete's AAF should have been reported as an Atypical Finding, because:

  - The carbon isotopic signatures of 19-NA at -23‰ (A: -23.1‰, B: 23.0‰) are fully consistent with the most plausible source, i.e., the ingestion of a norsteroid product (nor-DHEA measured at -23.7‰, nandrolone injectable at -23.6‰ (mean value));
  - The ingestion of uncastrated pig meat in North America is extremely unlikely;
  - The carbon isotopic signature of 19-NA at -23‰ is extremely unlikely to have come from the consumption of a farm animal raised in North America;
  - The concentration of 19-NA measured at 7.8 ng/mL in the B-Sample (and estimated at 6.9 ng/mL from the initial testing procedure of the A-Sample) is not consistent with the ingestion of uncastrated pig meat, more than twice exceeding the highest amount reported in literature following the ingestion of much larger amounts of meat.

74. Prof Ayotte explains that nor-DHEA is a chemical/exogenous 19-NA prohormone which is found in norsteroid products and, when used orally, produces pseudo-endogenous results in urine analysis. According to her studies, the carbon isotopic signature of oral supplements of nandrolone precursors, such as nor-DHEA, possess a "pseudo-endogenous" carbon isotopic signature at -23‰ – similar to the one reported in the Athlete's samples.

75. The majority of the Panel does not agree with the Respondent's assertion that the Laboratory departed from the ISL / TD2021NA and, thus, finds that the Respondent failed to rebut the presumption that the AAF was properly reported and notified by the Laboratory.

76. First, the TD2021NA states that "[d]*ue to the occurrence of preparations of 19-norsteorids with a carbon isotopic signature (13C/12C) close to that of endogenous human urinary steroids (e.g. [delta-delta] 13C 19-N= 16 ‰ to -24 ‰), the result of the GC/C/IRMS analysis of the excreted 19-NA may not always readily indicate its exogenous origin in Sample*s". The Panel notes that a GC/C/IRMS analysis was performed on the Athlete's A- and B-Samples. The Athlete's A-Sample delta-delta values were 3.8 (i.e. -23 for 19-NA and -19.3 for pregnanediol) and the B-Sample delta-delta values were 3.8 (i.e. -23 for 19-NA and -19.2 for pregnanediol). In brief, the Athlete's delta-delta values were far out of range with that of human endogenous urinary steroids referred to in the TD2021NA. This interpretation of the analytical results is in line with Section 3.2.4 of the TD2021NA that reads as follows:

> *"To reject the hypothesis of endogenous or in-situ 19-NA formation based on the application of GC/C/IRMS analysis (i.e. to report the finding as an AAF), the following criterion shall be met:*
>
> *• The $\left|\Delta\delta 13C\right|$ values between two (2) ERCs and 19-NA, i.e. $|\Delta\delta 13C| = |\delta 13CERC - \delta 13C19\text{-}NA|$, is greater than (>) 3 ‰ (refer to the TD IRMS [12])."*

77. The Panel is of the opinion that this is undoubtedly the case here.

78. Second, the TD2021NA states that in samples from males and non-pregnant females, when the estimated concentration of 19-NA is equal to or less than (≤) 15 ng/mL **and** the result of the GC/C/IRMS analysis is negative, *i.e.* "*not consistent*" with an exogenous origin of 19-NA or "*inconclusive*", the Laboratory shall consider the ratio of 19-NA to 19-NE (based on the respective estimated concentrations) as a possible indicator of the administration of 19-norsteorids when the *in situ* formation of 19-NA and 19-NE is excluded. The majority of the Panel finds that irrespective of whether or not the Athlete invoked the ingestion of boar offal as a possible explanation for an AAF, it is the Laboratory's prerogative to interpret whether a GC/C/IRMS analysis is "*not consistent with the exogenous production of the parent compound*" or "*inconclusive*" in light of the TD2021NA. Of course, such interpretation and finding by the Laboratory can be challenged by the Athlete in an adjudicatory process and is then subject to a later review by the Panel. It is not for the Laboratory to finally decide on the origin/cause of the analytical finding. Instead, the final decision on this issue lies in the sole competence of the Panel. This view is backed by the fact that it cannot depend on the timing of when an athlete claims the ingestion of boar meat to determine what steps need to be undertaken by the laboratory. If the Athlete had, for example, invoked the ingestion of boar meat before the CAS only (which would have been perfectly legitimate), no one would have taken issue with the Laboratory qualifying the findings as an AAF.

79. The majority of the Panel also finds that in the case-at-hand the Laboratory disposed of its formal duty to interpret the data obtained by GC/C/IRMS according to the TD2021NA. Prof Ayotte testified that she concluded from the GC/C/IRMS analysis result, including the carbon isotopic signature, that the latter was entirely consistent with the use of oral

nandrolone (prohormones) that are known to exist on the market and that, in addition, the concentrations of 19-NA found in the Athlete's bodily specimen were incompatible with the ingestion of boar meat. Thus, the findings of the Laboratory were neither "*inconsistent with the exogenous production of the parent compound*" nor "*inconclusive*".

80. Further, the TD2019NA sets out the criteria for an "inconclusive" GC/C/IRMS analysis as follows:

> *"2.3.3 Inconclusive*
> *viii. When only one of the combined criteria specified in points i), ii) or vi) above is met (e.g. the 13C value for the ERC-T pair is > 3 ‰ but the 13C values or the ER-Adil pairs are both < 3 ‰).*
> *ix. Due to technical limitations, e.g. when there is insufficient Sample volume or very low concentrations of TC(s) or ER(s), or in the presence of interfering compounds or any other factor preventing a reliable measurement of the relevant diagnostic Metabolite or ERC-TC pair.*
> *x. The Laboratory may interpret the results as inconclusive when the criteria for reporting an Adverse Analytical Finding are not met, but in its opinion, are neither consistent with the endogenous origin of the urinary Metabolites (e.g. ERC 13 value at -24,5 ‰ and TC at – 27.0 ‰)."*

81. Third, Section 4 of the TD2021NA is clear that if a GC/C/IRMS analysis is conducted and the result is positive, the sample must be reported as an AAF. Section 4 of the TD2021NA states that there will be an AAF for samples with concentrations of 15 ng/mL or less where the IRMS is consistent with the exogenous origin of 19-NA.

82. Finally, Section 3 of TD2021NA ("Comments") states that "*varying diets of migrating wild boars*" lead to dissimilar delta-delta values, and therefore, if an athlete invokes the consumption of edible parts of "intact pigs" as the likely origin of a 19-NA, "*this may be established*" based on pharmacokinetics of 19-NA excretion. The use of the terms "*may be established*" implies that no obligation exists for a laboratory to perform a pharmacokinetic analysis or study when an athlete invokes consumption of "intact pigs" as the unlikely origin of 19-NA finding. Furthermore, the paragraph refers to migrating wild boars (because of their inconsistent and widely varying diet). However, it is clear that no wild boar meat was consumed by the Athlete. Instead, the meat consumed by the latter is alleged to be from farmed pigs that are known to be fed on consistent (and uniform) diets.

83. The majority of the Panel further does not agree with the Respondent's assertion that the Laboratory should have sought a second opinion from another WADA-accredited laboratory based on the language of the TD2019NA (Section 3.1.1). According thereto, a laboratory "*should*" seek a second opinion and that "*if*" one is obtained, it should be included in the Laboratory Documentation Package. The word "*if*" indicates that the drafter of the document has envisaged that a second opinion may not be obtained. Moreover, the word "*should*" indicates that a second opinion is optional and not mandatory.

84. Based on the above, a majority of the Panel finds that the Respondent neither rebuts the presumption that the AAF was properly reported pursuant to the ISL, nor rebuts the presumption that the ADRV was properly managed, asserted and notified pursuant to the ISRM.

85. Since the Athlete has failed to establish a deviation from any applicable International Standards or the TD that could reasonably have caused the AAF, the majority of the Panel concludes that the Athlete has committed an ADRV, by virtue of Rule 2.1 and Rule 2.2 of the WA ADR.

B. What Consequences Shall be Drawn from the ADRV

1. Regulatory Framework

86. The relevant parts of Rule 2 of the WA ADR read as follows:

> *"Doping is defined as the occurrence of one or more of the following (each an "Anti-Doping Rule Violation"):*
>
> *2.1 Presence of a Prohibited Substance or its metabolites or markers in an Athlete's Sample*
>
> *2.1.1 It is each Athlete's duty to ensure that no Prohibited Substance enters their body. Athletes are responsible for any Prohibited Substance or its metabolites or Markers found to be present in their Samples. Accordingly, it is not necessary that intent, Fault, negligence or knowing Use on the Athlete's part be demonstrated in order to establish an Anti-Doping Rule Violation under Rule 2.1.*
>
> *2.1.2 Sufficient proof of an Anti-Doping Rule Violation under Rule 2.1 is established by any of the following: presence of a Prohibited Substance or its metabolites or Markers in the Athlete's A Sample where the Athlete waives analysis of the B Sample and the B is not analyzed; or where the Athlete's B Sample is analyzed and the analysis of the Athlete's B Sample confirms the presence of the Prohibited Substance or its Metabolites or Markers found in the Athlete's A Sample* […].
>
> *2.2. Use or Attempted Use by an Athlete of a Prohibited Substance or a Prohibited Method*
>
> *2.2.1 It is each Athlete's personal duty to ensure that no Prohibited Substance enters their body and that no Prohibited Method is used. Accordingly, it is not necessary that intent, Fault, negligence or knowing Use on the Athlete's part be demonstrated in order to*

establish an Anti-Doping Rule Violation for Use of a Prohibited Substance or a Prohibited Method.

2.2.1 The success or failure of the Use or Attempted Use of a Prohibited Substance or Prohibited Method is not material. It is sufficient that the Prohibited Substance or Prohibited Method was Used, or attempted to be Used, for an Anti-Doping Rule Violation to be committed."

2. The Occurrence of an ADRV and the Standard Sanction

87. Nandrolone, specifically 19-NA, is classified under Section A1.1 of the WADA Prohibited List as an Anabolic Androgenic Steroid and is prohibited at all times.

88. With respect for the appropriate period of ineligibility, Rule 10.2 of the WA ADR provides that:

> *"The period of Ineligibility for a violation of Rule 2.1, 2.2 or 2.6 shall be as follows, subject to potential reduction or suspension pursuant to Article 10.4, 10.5 or 10.6:*
>
> *10.2.1 The period of Ineligibility shall be four years where:*
>
> *a. The Anti-Doping Rule Violation does not involve a Specified Substance, unless the Athlete or other Person establishes that the Anti-Doping Rule Violation was not intentional.*
>
> […]*"*

89. The Panel notes that the standard period of Ineligibility for an ADRV involving a non-specified substance is 4 (four) years, unless the Athlete (or other Person) can establish that the ADRV was not intentional.

3. Burden and Standard of Proof

90. In the present case, the burden of proof that the ADRV was not intentional is on the Athlete, see Rule 10.2.1 of the WA ADR. Unlike for "no fault" or "no significant fault", the WA ADR does not provide that the Athlete must show how the substance entered her system in order to claim that the ADRV was not intentional. This follows from CAS jurisprudence. For example, in CAS 2017/A/5178, no. 78, the panel stated as follows:

> *"The Panel feels comforted in its view when looking at the legislative history of Art. 10.2.1 of the IWF ADP (which corresponds to Art. 10.2.1 of the WADA Code). The legislative history clearly evidences that in order to rebut the*

presumption of intent the athlete need not show how the prohibited substance entered into his or her system.

The drafting team of the WADA Code 2015 had contemplated at the time to introduce such requirement into Art. 10.2 of the WADA Code and had requested a supplementary expert opinion by Judge Jean-Paul Costa on this issue, i.e. the new draft wording. The latter stated in his expert opinion as follows:

"Une telle preuve est difficile à rapporter. Ce durcissement est-il excessif ? On peut éprouver des doutes à cet égard, car une preuve impossible aboutirait à un renversement de la charge de la preuve ou à l'institution d'une présomption quasi-irréfragable de violation des règles antidopage. […] *J'en conclus donc, non sans quelque hésitation je l'admets, que la nouvelle rédaction du projet de révision peut être considérée comme acceptable, étant bien entendu précisé que ce seront les juridictions compétentes en cas de litige qui auront à apprécier les éléments de preuve fournis par les parties, et à les peser."*

free translation: *Such proof* [how the substance entered the body][1] *is difficult to provide. Is such aggravation excessive? One could have doubts in this respect, because an impossible proof either leads to a reversal of the burden of proof or to the irrefutable assumption of an anti-doping rule violation* […] *I conclude, thus, not without some hesitation, that this new text of the draft may be considered acceptable, subject however that it will be for the competent jurisdiction in the individual case to assess the elements of evidence adduced by the parties.*

In view of Judge Jean-Paul Costa's concerns ("I conclude, thus, not without some hesitation"), the WADA Code redaction group went back to the initial text of the draft (which corresponds to the final text enacted) and acknowledged that whilst the route of the ingestion of the prohibited substance is an important fact in order to establish whether or not an athlete acted intentionally, it should not be a mandatory condition to prove lack of intent on the part of the athlete."

91. While noting that CAS 2017/A/5178 was analyzing a different version of the WADC and another federation's regulations, the reasoning can be applied here and the Panel thus adheres to above, while acknowledging, however, that it is – in practice – very difficult to rebut the presumption of intent without showing how the prohibited substance entered the Athlete's system.

92. Pursuant to Rule 3.1 of the WA ADR, to rebut the presumption the standard of proof is the balance of probabilities:

[1] Inserted for better understanding.

> *"*[…] *Where these Anti-Doping Rules place the burden of proof upon the Athlete or other Person alleged to have committed an Anti-Doping Rule Violation to rebut a presumption or establish specified facts or circumstances, the standard of proof shall be by balance of probability."*

93. The Panel notes that this standard requires the Athlete to convince the Panel that the occurrence of the circumstances on which the Athlete relies is more probable than their non-occurrence, see CAS 2016/A/4377, at para. 51.

4. Did the Athlete rebut the Presumption of her ADRV being Intentional?

94. The Athlete has submitted an explanation as to why the ADRV she has been charged with can only be found to be not intentional. She explains that the prohibited substance must have entered her body due to consumption of a boar offal burrito that she ate from a food truck in Beaverton, Oregon, about 10 hours before her doping control test. She has not brought forward an alternative explanation.

95. The Panel will below examine this explanation and assess each of the premises on which the explanation is based to determine whether or not it is persuaded on a balance of probabilities that the facts occurred as the Athlete alleges.

a. Did the Athlete eat a burrito 10 hours before her doping control test?

96. The Athlete submits that she ate a burrito around 7:30 pm on the evening of 14 December 2020, about 10 hours before her test. She states that she bought the burrito from a food truck in Beaverton, Oregon. She says she went to the food truck with her friend and teammate Ms Courtney Frerichs, who bought burritos for herself and her sister.

97. The Athlete's explanation is supported by the witness statement and testimony of Ms Courtney Frerichs. The latter testified at the hearing that it had become "*kind of a Monday night tradition for her, Ms Houlihan and other teammates to buy burritos and watch the TV series* 'The Bachelorette'". This statement is further corroborated by SMS correspondence between Ms. Frerichs and Ms Houlihan, which was submitted as an exhibit by the Respondent. Furthermore, the Athlete's explanation is backed by her teammate Ms Karrisa Schweizer, who in a written statement corroborates the purchase of the burritos.

98. Based on the consistent explanations from the Athlete and the statements of the other witnesses, the Panel finds that the Athlete proved on the balance of probabilities that she purchased and ate a burrito on the evening of 14 December 2020.

b. Did the Athlete eat a pork burrito?

99. The Respondent has submitted a statement from the food truck owner, Ms Teresa Ramirez, that the food truck pig stomach burritos on its menu on the evening of 14 December 2020 were: i) the buche (maw/pig stomach) burrito; and ii) the chorizo (pork sausage) burrito.

100. The Athlete explained that she had ordered a beef burrito and that she was handed an unlabeled burrito wrapped in foil. The service was very quick that night, and she was handed her burrito more quickly than normal. She would not have been able to tell if she was mistakenly handed a different kind of burrito than the beef burrito she ordered. However, once she started to eat the burrito, she realized that it tasted very rich and was extremely greasy compared to the beef burritos she had eaten from the food truck in the past. She remembered that the burrito she ate that night was uncharacteristically greasy and that for this reason – even though she was very hungry – she was not able to finish it, which she found unusual because she had eaten a small lunch so she was very hungry. The Athlete explains that she ate about three-quarters of the burrito.

101. The Panel finds that it is possible that – contrary to what the Athlete ordered – she was handed a burrito containing pork meat. All witnesses that were present at the dinner testified or declared that the burrito was extremely greasy and it follows from the pictures submitted by the Respondent that the pork burrito is particularly greasy.

c. Was the pork in the burrito from an uncastrated boar?

102. The Respondent submits that the pig meat in the burrito came from an uncastrated boar. The Respondent, *inter alia*, bases her contention on records from the US Department of Agriculture ("USDA") according to which thousands of boars with abnormally high levels of nandrolone are sold and slaughtered in the United States every day. The US government document explains that boar and feral swine are two categories of uncastrated pigs that are legally slaughtered each day as part of the US pork production industry.

103. The Claimant maintains that the pork consumed by the Athlete could not have come from uncastrated boar, since the latter enters the food chain through completely different channels than pork. Thus, in order for uncastrated boar to end up in the normal pork supply chain, the boar(s) in question must have been cryptorchid (specimen with undescended testicles). The Claimant relies on expert scientific evidence from Prof John McGlone, Professor of Animal Science at Texas Tech University.

104. Prof McGlone submitted two reports before this Panel. The first report dates from 1 May 2021 and the second from 29 May 2021. Prof McGlone's expert testimony can be summarized as follows:

- Boar meat constitutes only a tiny fraction of the US pork market (0.33%). Furthermore, boar meat does not enter the food chain of ordinary pig meat. The meat from boars is prevented from entering the pork supply chain, or it is flagged by the slaughterhouses or the inspectors from the USDA and diverted to a non-human consumption path to make inedible products. It is rather difficult for an uncastrated pig to "slip through" the multiple check points. In principle, boars can be easily detected because of their big testicles. Furthermore, the slaughterhouse will fine the farmers delivering boars to their plants. Thus, only cryptorchid may end up at a slaughterhouse. The latter have

undescended testes and, thus, may be loaded on the transport trucks to the slaughterhouses undetected. Cryptorchids are, however, a rather rare phenomenon and furthermore would in most instances be detected after slaughtering. The policy in the United States is that the carcass of a cryptorchid is usually condemned (further to an evaluation of the look of the carcass and its odor). Consequently, the chance of consuming any meat from a boar in the normal pork supply chain is extremely low. Prof McGlone estimates that the probability of a cryptorchid actually entering the pork supply chain is far less than 1 in 10,000, because of:

- The low incidence of boar that is harvested (0.33%);
- The fact that boars are actively prevented from entering the pork supply chain;
- The fact that intact males – even if they make it to the slaughterhouse – are most often not killed to avoid the boar meat from entering the conventional pork supply;
- The low (less than 0.5%) rate of cryptorchidism (this data is from 1992);
- The fact that "[p]*ig breeding stock companies have selected against cryptorchidism and used genetic selection to lower androgen levels in market pigs*" and that therefore, the rate of cryptorchidism today is "*extremely low, approaching zero*";
- The slaughterhouse and USDA inspection practices, according to which the few cryptorchids that reach the slaughter plant will be set aside by the slaughterhouse and the USDA inspectors, and do not enter the food chain. Prof McGlone concedes that during the summer of 2020, the practices usually employed by pork farmers were impacted by COVID-19 pandemic, but that USDA inspectors would nonetheless have been present at all pork processing plants that were actively slaughtering pigs or the plants would not have been allowed to do so. Furthermore, Prof. McGlone submitted that by November 2020, the pandemic had no longer any impact on the usual practices applied in the industry; and
- The fact that IBP/Tyson (the plant where the food truck in Beaverton bought the pork meat from) does not operate a boar kill plant. Thus, it is "*near zero chance*" that any boar meat would get mixed with conventional fresh pork products.

105. The Claimant's above evidence remained basically uncontested by the Respondent. The Respondent did convincingly establish that the pork stomach meat from the food truck in December 2020 was from a frozen batch that had been purchased in September 2020 and was likely to have been affected by the summer disruption to the pork industry caused by the COVID-19 pandemic. However, Prof McGlone testified that this would not have impacted on USDA inspectors' presence at operational pork processing plants nor the

protocols for controlling for cryptorchids from entering the US food supply.

106. Based on the above, the Panel finds it is possible but improbable that the meat of an uncastrated boar ended up in the burrito that the Athlete ate. Therefore, the Panel finds that the Respondent did not establish on the balance of probabilities that the burrito she partially consumed on 14 December 2020 contained boar offal.

d. Does the meat of cryptorchid pork have elevated androgen levels?

107. The Claimant submits that the meat of a cryptorchid pig does not have elevated androgen levels but that the Athlete's A- and B-Samples did contain elevated androgen levels. Therefore, even if the Athlete ate the meat of a cryptorchid pig (which to the Claimant is highly unlikely), it could not explain her reported androgen levels. Prof. McGlone gave evidence on behalf of the Claimant. His evidence on this point may be summarized as follows:

- Cryptorchids are immature male pigs of no more than 6 months of age that typically show androgen levels that are significantly lower than fully adult boars. According to Prof McGlone, it is well known that old boars have higher steroid concentrations than young males. Of all the pigs processed in the United States, who would be 6 months old at the most, none would have androgen levels comparable to an adult mature boar. In addition, even if uncastrated boars would have elevated androgen levels, those are only found in specific parts of the animal such as the kidney, testes and (to a lesser extent) the liver. However, the Athlete claims to have eaten pork's stomach. Prof McGlone concedes that there is lack of data concerning androgen concentrations in the pig's stomach. In Prof McGlone's opinion the androgens levels in the pig's stomach are, however, far lower that in other organs such as the kidney, fat, testes or salivary glands, since:
- First, pig stomach ("menus") that is sold to the food industry is never the entire stomach. The commercial supply chain does not sell entire pig stomachs.
- Second, the product sold to retail vendors is called Hog Maw (processed stomach). In order to get Hog Maw, the processing plant removes the metabolically active inner lining of the stomach. Only the tough outer stomach that is basically a muscle tissue is sold to the food industry.
- Finally, the outer connective tissue of the stomach has protein and collagen, and is metabolically not as active as the inner lining. Based on the above, Prof McGlone opines that Hog Maw has a significantly lower steroid concentration compared to a whole stomach and one of the lowest androgen levels of any organ.

- Based on the above, Prof McGlone concludes that the chances of a person obtaining a high androgen level from eating commercial pork or pork products harvested in the United States is extremely low.

108. The Respondent relies on expert scientific evidence from Dr Emmanuel Strahm, Operational Leader, Institut de Chimie Clinique, Lausanne, Switzerland, whose testimony on this point can be summarized as follows:

- There is no study available on 19-norsteroids concentration in pig stomach. Because stomach is still offal, the amount of 19-norsteroids present in such tissue remains unknown.
- The report on androgens in pork produced by Prof McGlone is not relevant because while the report mentions estimated concentrations for various steroid hormones, the report does not mention the concentration of 19-norsteroids or precursors, which is the focus in this case. It is important to note that 19-norsteroids are found in low amounts in the meat of intact boar, cryptorchid and even barrow.

109. The Panel notes that the above evidence submitted by the Claimant remains in essence uncontested. The evidence presented by Dr Strahm was not very substantiated and does not alter the onus of proof, i.e. that is for the Respondent to show that her explanation of the analytical results is more likely than not. Thus, based on the above, the Panel finds it possible but highly improbable that normal pork products in the US food supply chain, in particular pork stomach, would show elevated androgen levels. The Panel – on a balance of probabilities – is not ready to accept this.

e. Does the consumption of the meat of a cryptorchid explain the concentrations of nandrolone found in the Athlete's sample?

1) The Claimant's Position

110. The Claimant submits that even if an uncastrated cryptorchid slipped into the US food chain, this could not explain the values found in the Athlete's sample. These values were as follows:

- 105190VA (i.e. the Athlete's A-Sample): Nandrolone: 19-norandrosterone at 6.9 ng/mL (SG: 1.027). IRMS results consistent with the exogenous origin of 19-norandrosterone (-23.1‰) v. androsterone (-19.0‰) and pregnanediol (-19.3‰). No tetrahydronorethisterone1.
- 105190VB (i.e. the Athlete's B-Sample): Nandrolone: 19-nortestosterone, 19-norandrosterone (19-NA, measured at 7.8 ng/mL), 19-noretiocholanolone. Ratio 19-NA to 19-NE: 3.9. IRMS results consistent with the exogenous origin

of 19-norandrosterone (-23.0‰) versus androsterone (-18.7‰) and pregnanediol (-19.2‰).

111. In coming to this conclusion, the Claimant relies on the expert testimony of Prof Ayotte, whose testimony / expert reports on this point can be summarized as follows:

- The consumption of uncastrated boar meat is highly unlikely to have caused the analytical results, because "*the levels that were found in her urine sample are too high, and inconsistent with those reported by Cologne, and by us. As a reminder, urine sample 105190V contained around 7 to 8 ng/mL of 19-NA (5.2 to 5.8 ng/mL when adjusted for specific gravity). None of the volunteers in our study or in the Cologne study excreted levels higher than 2.4 ng/mL (adjusted for specific gravity), following the ingestion of meat from a non-castrated boar:*

  a. In Guay et al., we deliberately used 'old' boars (three-year old animals), which are known to have higher levels of norsteroids to maximize the amounts excreted. Even in these conditions, the highest urinary concentration of 19-NA after the ingestion of meat was 2.4 ng/mL, after the ingestion of 300 g. The other subjects that ate 300 g of meat produced urinary concentration of 1.7 and 0.6 ng/mL. The test subject that ate 100 g of meat had a urinary concentration of 0.7 ng/mL (see Table 2).

  b. In the Cologne study (Hülseman et al.), twelve test subjects ate different amounts of 187 g to nearly 491 g of boar meat (and 90 g of "jerky") randomly purchased. Seven of them, including the test subject that ate 491 g of meat, produced no measurable 19-NA in their urine samples. Of the remaining five, three subjects had trace concentrations stated to be less than 1 ng/mL. The other two test subjects had urinary concentrations of 19-NA of 2.1 and 1.9 ng/mL (when adjusted for specific gravity16) and ate 300 g and 410 g of meat respectively.

  Therefore, even taking the most favourable examples from these two studies, the concentration of 19-NA in the Athlete's sample more than twice exceeds the highest value observed in our controlled study following consumption of 300 g of (old boar) meat (approximately double the quantity allegedly consumed by the Athlete). The concentration in the Athlete's urine is also nearly three times greater than the (highest) amounts excreted in the Cologne study following the consumption of 410 g and 300 g of boar meat."

- Prof Ayotte concludes that:

- The Athlete's urinary concentration of 19-NA is, based on the scientific literature, too elevated to have been caused by the ingestion of circa 140-180g of meat or stomach from an intact uncastrated boar;
- It is highly unlikely that, even if the Athlete did consume uncastrated boar meat and/or stomach 11 hours before the doping control, that this was the cause of the level of 19-NA in her samples;
- The AAF is consistent with the oral consumption of a prohormone possessing a pseudo-endogenous isotopic signature;
- To this day, there is no evidence suggesting that the North American population is involuntarily consuming edible parts of uncastrated pigs; and
- She is not aware of an athlete's case in North America where a positive finding was proven to be due to the ingestion of boar meat or offal.

2) The Respondent's Position

112. The Respondent relies on expert scientific evidence from Dr Emmanuel Strahm, Operational Leader, Institut de Chimie Clinique, Lausanne, Switzerland.

113. The testimony of Dr Strahm (including the two reports submitted in the course of the adjudication of this matter, dated 11 March 2021 and 10 May 2021) on this point can be summarized as follows:

- The Athlete's urine test performed on 15 December 2020 at 6:15am was reported to contain 19-NA estimated concentrations of 6.9 and 7.8 ng/mL in the A- and B-Samples, respectively. According to Dr Strahm, these concentrations are consistent with values reported around 10 hours after ingestion of boar meat or offal. The ratio between the two main metabolites of nandrolone, 19-NA and 19-NE, cannot discriminate between exogenous and endogenous origin of nandrolone. 19-NA on 19-NE ratios are found to be higher after exogenous nandrolone consumption (7±7) than boar consumption (4±3) The ratios between the two main metabolites of nandrolone (19-NA and 19-NE) under their glucuroconjugated forms were 4.5 and 3.9 in the Athlete's A- and B-Samples, respectively. Dr Strahm further took into account that:

    - The Athlete underwent doping control tests also on 22 November 2020 and 23 January 2021, and the tests were negative;
    - It is known that nandrolone abuse by injection could be evidenced up to nine months after a single dose. Thus, it would have been detected on 23 January 2021 and can be rejected as a possible source of administration;
    - Other routes of administration (oral, sublingual, transdermal) lead to very fast excretion and very high concentrations in urine;

- Concentrations in the range found in the Athlete's sample are definitely compatible with boar meat consumption and do not point to a 19-norsteroid abuse; and
- Considering WADA's TD2019NA, this conclusion is consistent with an endogenous origin of the 19-NA.

3) The Panel's findings

114. The Panel finds it possible but improbable that the ingestion of boar meat (cryptorchid) would have resulted in the urinary concentration found in the Athlete's A- and B-Samples. In coming to this conclusion, the Panel relies upon:

- Prof McGlone's report and testimony, which is not disputed by the Respondent in a substantiated manner, that pork stomach would have *"one of the lowest androgen levels of any organ"* and contain similar levels of 19-NA to boar meat.
- The fact that commercial pigs in the United States are slaughtered at the age of approximately six months. The fact that younger pigs would have lower androgen levels than mature boars is confirmed by the testimony of Prof McGlone. The studies by Guay and Hülsemann on which the Respondent relies are based on studies with older, non-castrated boars.
- Prof Ayotte's testimony that *"even taking the most favourable examples from these two studies, the concentration of 19-NA in the Athlete's sample more than twice exceeds the highest value observed in our controlled study following consumption of 300 g (old boar) meat (approximately double the quantity allegedly consumed by the Athlete). The concentration in the Athlete's urine is also nearly three times greater than the (highest) amounts excreted in the Cologne study following the consumption of 400 g and 300 g boar meat".*

f. Is the isotope signature of US pork meat compatible with the analytical data in the Athlete's sample?

1) The Claimant's Position

115. The Claimant submits that the isotopic signature of US pork meat is incompatible with the analytical data found in the Athlete's sample. The Claimant relies – again – on the expert testimony of Prof McGlone that can be summarized as follows:

- Nearly 100% of commercial pigs in the United States (and Canada) are fed a consistent corn-soy diet. The nutrients in corn and soybean are balanced to meet the nutrient requirement of the pig with minimal cost. The average proportion of corn to soybean in the pig feed is around 80:20: the soybean content is reduced to around 10% in the

period before slaughter (6 weeks of age). Prof McGlone conceded at hearing that the diet of some pigs was altered during the COVID-19 pandemic due to the fact that the supply chain slowed down, which resulted in certain pig farms increasing the amount of soy fed to their pigs as opposed to corn. However, Prof McGlone submits that this practice was not maintained for a sustained period of time because of the (higher) costs of soybean and that corn remained overall the main diet source for all pigs in the United States.

116. Furthermore, the Claimant relies also on Prof Ayotte, whose testimony / expert reports on this point can be summarized as follows:

- The Athlete's test results were not unusual or special, and were like many other AAFs that were reported by the Laboratory in the past years, both in terms of the amount of 19-NA and the carbon isotopic signature. The availability of norsteroids products with a "pseudo-endogenous" isotopic signature at around -23‰ is reflected by the shift in the isotopic signatures of 19-NA measured in positive athletes' samples tested in the Laboratory. Since 2018, the distribution of 19-NA isotopic signatures for 31 AAF (conclusive results) showed two "populations", one at -29‰, the second one centered at -23‰, ranging from -22 to -25‰. Prof Ayotte explains that oral precursors of nortestosterone (nandrolone), such as "19-nor DHEA" and "nor-Andro" can be purchased from the internet, including from Amazon. A similar "pseudo-endogenous" isotopic signature at -23.77‰ ± 0.13 was obtained when she tested a product purchased in 2016, "Nor-Andro Max" labelled as containing 19-norAndro (or 19-nor dehydroepiandrosterone).

- According to Prof Ayotte, there is ample evidence supporting the enriched (corn-based diet) delta-delta 13C values of meat in the United States (and Canada). Relying on literature and her own studies that the consistent corn feeding practices in the United States and Canada result in consistently enriched carbon isotope signatures. The consistent, corn-based diet in the United States (and Canada) produces enriched carbon isotope values in US pork products. Prof Ayotte concludes that "[s]*uch a diet is highly unlikely to produce farm animals that could lead to -23‰ values in the consumer's urinary 19-NA*". Over the years, her own studies' results from the consumption of uncastrated pork meat by several volunteers produced urinary 19-norandrosterone at delta-delta 13C values around -18.5 to -21‰. Therefore, such a diet is highly unlikely to produce farm animals that result in -23‰ delta-delta 13C values in the consumer's urinary 19-NA (assuming that the animal was not castrated).

- Prof. Ayotte maintains that:

    - An AAF was correctly reported for both the Athlete's A- and B-Samples.

- The analytical result is consistent with the consumption of a norsteroid oral supplement that has the same carbon isotopic signature as was reported in the Athlete's samples.
- A meal (around 175 g) of pork meat (even assuming it was boar) could not have caused the finding (based on both the concentration of 19-NA and the carbon isotope signature).
- Prof Ayotte also explains that the carbon isotopic signature of the nandrolone metabolites in the Athlete's urine was measured at the depleted delta-delta 13C value of -23 ‰. This differed from the reference endogenous compounds at -19‰ and it differs from the 19-NA excreted in urine samples collected after the consumption of intact (uncastrated) pig offal (mostly kidneys and livers) which, according to Prof Ayotte's experience, is measured around -18.5 to -21‰ in Canada.

2) The Respondent's Position

117. The Respondent rebuts the conclusions by the Claimant and relies on the expert testimony of Dr Strahm, which may be summarized as follows:

- The assumption by Prof Ayotte that the delta-delta 13C-value for endogenous 19-NA of -23‰ are unusually depleted for a pig is sharply undercut by Hülsemann, who states in his 2018 article[2] that "*it remains unknown which endogenous* [delta-delta] 13C-*value is typical for wild boar in Germany or in any other region of the world."* And then in his 2020 article when he states:

> *"the fact of varying* [delta-delta] *13C-values of wild boar could also be problematic for people living in countries with a high consumption of C4-plants like the United States* […]. *Human endogenous* [delta-delta] *13C-values in these countries are enriched in 13C compared with Germany, and for these, there is the possibility of adverse analytical findings after the consumption of the meat of 19-norsteroid producing C3-fed boars."*

- Dr Strahm further refers to another quote in the Hülsemann study,[3] which states as follows: *"Not only the consumption of wild boar's offal in the hours preceding a doping control test but also the consumption of wild boar meat may result in an atypical or even positive test result, albeit the urinary 19-NA concentrations are expected to be lower than after consumption of wild boar's offal. Both athletes as well as antidoping laboratories and authorities should still be aware of this aspect."*

[2] Hülsemann et al. Drug Test Anal 10 (2018) 1728-1733581-1586
[3] Hülsemann et al. Drug Test Anal 12 (2020) 1581-1586

- Dr Strahm opines that it follows from the TD2021NA that the respective WADA expert group accepts the fact that the consumption of pig meat might lead to a 19-NA concentration up to 10 ng/mL in urine. Therefore, he submits, for samples containing up to that concentration, a laboratory should undertake investigations to prove the non-endogenous origin of the 19-NA when an athlete invoked consumption of intact pig offal, and that the Laboratory here should have done so when the Athlete invoked her consumption of intact pig offal. He concludes that:

    - There is no evidence that the 19-NA did not come from meat of stomach from a boar in the United States;
    - It is very unlikely that the use of prohormone would lead to a doping test being performed at the exact time as when the urinary 19-NA concentration is remarkably similar to concentrations obtained during studies involving boar consumption;
    - It is impossible for Prof Ayotte to exclude meat as a potential source because of its depleted delta-delta 13C values based on the studies she cites;
    - In the present situation, it is impossible to exclude that the source of 19-NA is endogenous (from intact pig offal); and
    - A pharmacokinetic test is necessary to make sure that a clean athlete is not convicted due to an endogenous source.

118. The Respondent also relies on the expert testimony of Prof Anne Hope Jahren from the Centre for Earth Evolution and Dynamics, University of Oslo. Her testimony / expert reports can be summarized as follows:

- Carbon isotope signatures are not unique and that they may vary depending on various causes including diet. With regard to the diet of the pigs, one must take account of the near-ubiquitous presence of soy meal within pig feed. Soy is a C-3 plant with a much lower (i.e., more depleted) carbon isotope signature than corn. While corn is a dominant component in cattle feed, soy is – according to her – the dominant protein-bearing component in pig feed. Even if only 10% of a pig's diet comes from soy, she opines that this could still have a significant effect on an individual's carbon isotope signature. Based on her research, the soy-based diet may result in a carbon isotope signature ranging from -25.0 to -24.5, after being fed this soy-based diet. All edible components analyzed upon butchering of the adult pigs and sows (i.e., collagen, muscle, liver, plasma [blood]) showed carbon isotope values between -21 and -25 again, directly contradicting the claim that "typical" values of a pork meal are "around -18 / -20" as well as the claim that a value of -23 must be "unusually depleted". She is convinced that a pork-meat meal, be it standardly derived from muscle tissue or non-standardly derived from offal, may not only possibly exhibit a carbon isotope value between -21 and -25 in humans, but in fact is most likely to do so.

3) The Panel's findings

119. The Panel finds that the carbon isotope signature of the Athlete's A- and B-Samples is neither consistent with the carbon isotope signature of commercial pork in the United States nor her own signature. In coming to this conclusion, the Panel relies on the following:

- As explained by Prof McGlone in his report dated 29 May 2021, whereas the average proportion of corn to soybean in the pig feed is around 80:20, the soybean content is reduced to around 10% in the period before slaughter. The fact that commercial pig feed in the United States and Canada is predominantly corn-based is confirmed by Prof Ayotte in her second report dated 31 May 2021. As explained by Prof Ayotte, the consistent corn-based diet in the United States and Canada produces enriched carbon isotope values in US pork products and Prof Ayotte concludes that *"*[s]*uch diet is highly unlikely to produce farm animals that could lead to -23‰ values in the consumer urinary 19-NA".*

- The Panel notes that the study relied upon by Prof Jahren involving an experimental soy-based diet, in which the carbon isotope ratios of the 49 pigs varied between -21 and -25‰. In the Panel's view, this study is not relevant to this case since a predominantly soy-based diet is not being fed to commercial pigs in the United States.

- In addition, the Panel also finds Prof Ayotte's evidence convincing according to which her later analysis of the Athlete's prior test results indicated that the Athlete's usual carbon isotope signature was of roughly -19%. This further backs the Panel's conclusions.

g. The Expert Witness Statements Related to the Hair Analysis and the Polygraph Test

120. The Respondent relies on expert scientific evidence from Prof Pascal Kintz, independent expert in toxicology and pharmacy. Prof Kintz testified orally at the hearing and confirmed the accuracy of his report dated 29 January 2021.

121. Dr Kintz was requested to examine the Athlete's hair specimen for nandrolone. Six cm of hair was tested, each cm equal to a month of growth, with the 0-1 cm segment of hair reflecting the period of the Athlete's urine doping control. The results of the testing conducting on each segment of hair did not detect any nandrolone.

122. His conclusion further to the results of his hair analysis test is that the Athlete had not been repetitively exposed to nandrolone within the last 6 months and thus that nandrolone

injections could be excluded as the method of administration of the 19-NA detected in the Athlete's sample. This point was indeed conceded by all experts.

123. Dr Kintz also tested the same 6 hair segments for 19-norandrostenedione, which shares the same urinary metabolites at 19-NA and all results were negative.

124. Just as Dr Kintz excluded the possibility of nandrolone injections, he also excluded the Athlete's one time use of oral 19-NA preparations which he opines would be useless to an athlete in terms of performance enhancement.

125. He also indicated that there was very little availability of the 19-nor-DHEA preparations Prof Ayotte referred to on the black market and that such products were not being chatted about in doping forums or others. In his opinion, this only makes it possible, but not probable, that the Athlete used nor-DHEA.

126. The Claimant relies on expert scientific evidence from Prof Ayotte, who stated that although Dr Kintz concluded that the Athlete's hair testing excluded a repeated exposure to nandrolone and to nor-androstenedione, and even if that were true, Prof Ayotte rejects the findings because the relevant prohormones, for example 19-nor-DHEA, currently present on the internet were not tested for. These are specifically the prohormones possessing a pseudo-endogenous isotopic signature that Prof Ayotte has suggested the Athlete used.

127. The Panel notes that Dr Kintz confirmed at the hearing that his hair test did not include an analysis for nor-DHEA.

128. While Dr Kintz indicated in his oral evidence that such products were hard to purchase, Prof Ayotte explains that oral precursors of nortestosterone (nandrolone), such as "19-nor-DHEA" and "nor-Andro" can be purchased from the internet, including from Amazon, and that a similar "pseudo-endogenous" isotopic signature at -23.77‰ ± 0.13 was obtained when her laboratory tested a product purchased in 2016, "Nor-Andro Max" labelled as containing 19-norAndro (or 19-nor dehydroepiandrosterone).

129. Further, the Respondent relies on expert scientific evidence from Dr Jack Fritz, certified in polygraph and computerized voice analysis. Dr Fritz testified orally at the hearing and confirmed the accuracy of his report dated 30 January 2021.

130. Dr Fritz's report reads that the Athlete voluntarily submitted to a psychophysiological detection of deception examination (polygraph), regarding whether the Athlete knowingly ingested the drug nandrolone.

131. He explains that in accordance with a technique used in various legal and court systems and in the military among others, the Athlete's psycho-physiological recordings were obtained with a state-of-the-art LX-4000 polygraph workstation. The LX-4000 continuously recorded on a computer records precise measure of thoracic and abdominal respiration, skin conductance and relative blood pressure. In addition, an electronic seat

was used to identify any voluntary or involuntary movements. The relevant questions that were asked during the polygraph examination and the Athlete's answers were as follows:

- Question: "*Did you at any time knowingly ingest nandrolone?*"
  Answer: "*No*."

- Question: "*Did you intentionally ingest the drug nandrolone?*"
  Answer: "*No*."

132. After careful analysis of the polygraph charts, Dr Fritz's opinion is that the Athlete was truthful when she answered "*no*" to the relevant questions. In addition, the objective scoring system indicated no significant reactions and no deception. The probability of this result being produced by a deceptive person was reported to be 0.0002 or less than 0.2 %.

133. Dr Fritz states that Dr David Fruchtman, a psychologist and polygraph examiner who did not submit an expert report or witness statement in this proceeding, also independently evaluated the Athlete's Polygraph charts and concluded that the Athlete was truthful when she answered the above questions.

134. The Panel finds that neither the hair analysis nor the polygraph results are sufficient for the Athlete to rebut the presumption that the ADRV was intentional. As for the expert evidence of Dr Kintz, the Panel notes that the hair analysis failed to take into account oral precursors of nortestosterone (nandrolone), such as "19-nor-DHEA" and "nor-Andro". In addition, Dr Kintz admitted that he is not capable of specifying how intense the exposure of the Athlete to 19-NA must have been in order for the latter to be detectable in the context of a hair analysis test. As for the polygraph test, the Panel finds that the questions posed were rather restrictive. This is all the more true considering that the Athlete stated that, before receiving the charge letter, she was not aware of what nandrolone is. It would have made more sense to ask the Athlete whether she had taken doping substances at the material time. Irrespective of the above, the Panel also refers to the CAS case law in CAS 2011/A/2384, at paras. 233-243 (polygraph examination) and CAS 2017/A4954, at para. 128 (hair test).

h. Summary of the Panel's Findings and Conclusion

135. First, the Panel finds it possible but unlikely that the Athlete's burrito contained boar offal.

136. Second, the Panel finds it possible but unlikely that the ingestion of boar offal would have resulted in the urinary concentration of 19-NA found in the Athlete's A- and B- Samples.

137. Third, the Panel finds it possible but not probable that the ingestion of boar offal would have resulted in the Athlete's reported urinary concentration of 19-NA or her carbon isotope ratio of -23‰.

138. Fourth, the Panel finds that neither the hair analysis nor the polygraph results are sufficient

for the Athlete to satisfy her burden of proving that the ADRV was not intentional.

139. Finally, although the Athlete was a credible witness and has brought compelling character witness evidence in support of her defense, she has failed to establish the source of the 19-NA detected in her urine sample to the applicable standard of proof, and did not bring forward sufficient objective evidence that would warrant the application of Rule 10.2.1 a. of the WA ADR.

140. Accordingly, the Panel concludes that the Athlete has not satisfied her burden of proof on the balance of probabilities that the ADRV was unintentional, and the ADRV must be deemed to be intentional.

C. Sanctions

1. Disqualification

141. Rule 10.8 of the WA ADR reads as follows:

> *"In addition to the automatic Disqualification, pursuant to Rule 9, of the results in the Competition that produced the Adverse Analytical Finding (if any), all other competitive results of the Athlete obtained from the date the Sample in question was collected (whether In-Competition or Out-of-Competition) or other Anti-Doping Rule Violation occurred through to the start of any Provisional Suspension or Ineligibility period shall be Disqualified (with all the resulting consequences, including forfeiture of any medals, titles, ranking points and prize and appearance money), unless the Disciplinary Tribunal determines that fairness requires otherwise."*

142. The Panel rules that pursuant to Rule 10.8 of the WA ADR, all competitive results obtained by the Athlete from 15 December 2020 (i.e. the date of sample collection) are disqualified, with all resulting consequences, including forfeiture of medals, points and prizes.

2. Period of Ineligibility

143. With respect to the sanction start date, the Panel is guided by Rule 10.10.2 of the WA ADR provides that the period of ineligibility shall start on the date the decision is issued. The Panel notes that the period of ineligibility should in principle commence on 11 June 2021 (i.e. the date of issuance of the Operational Part of the Award).

144. Rule 10.10.2.a of the WA ADR provides that *"any period of Provisional Suspension served by the Athlete or other Person* […] *shall be credited against the total period of Ineligibility to be served"*.

145. In this case, the sample collection was made on 15 December 2021, and according to the AIU, the Athlete was provisionally suspended on 14 January 2021. It follows therefore, that the Athlete should receive 'credit' for the period of ineligibility already served without any interruption. Accordingly, the start of the Athlete's period of ineligibility shall be fixed on 14 January 2021.

VIII. Costs

(…).

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ON THESE GROUNDS

The Court of Arbitration for Sport rules that:

1. The request for arbitration filed by World Athletics on 18 May 2021 against Shelby Houlihan is upheld.

2. Shelby Houlihan is found to have committed an anti-doping rule violation pursuant to Rule 2.1 and Rule 2.2 of the World Athletics Anti-Doping Rules.

3. Shelby Houlihan is subject to a period of ineligibility of four (4) years starting on 14 January 2021.

4. All competitive results obtained by Shelby Houlihan from 15 December 2020 through to 14 January 2021 are disqualified, including forfeiture of any titles, awards, medals, points and prize and appearance money obtained during this period.

5. (…).

6. (…).

7. All other motions or requests for relief are dismissed.

8. The present decision is confidential, unless the President of the CAS Ordinary Arbitration Division decides that it should be made public.

Seat of arbitration: Lausanne, Switzerland

Operative Award Dated: 11 June 2021
Reasoned Award Dated: 27 August 2021

THE COURT OF ARBITRATION FOR SPORT

Jens Evald
President of the Panel

Ulrich Haas
Arbitrator

Janie Soublière
Arbitrator