Notice number: 2022/00178

COMMISSION OF INQUIRY INTO FORENSIC DNA TESTING

IN QUEENSLAND

Section 5(1)(d) of the *Commissions of Inquiry Act 1950*

STATEMENT OF THOMAS NURTHEN

I, **Thomas Edmund Kersey Nurthen**, care of Queensland Health Forensic and Scientific Service, Reporting Scientist, do solemnly and sincerely declare that:

1. On 14 September 2022, I was requested to provide a statement responding to Notice 2022/00178 "Requirement to Give Information in a Written Statement".

Thomas Nurthen

Question 1 - State your full name, current position/title and where you work.

2. My name is Thomas Edmund Kersey Nurthen.

3. I am currently employed by Queensland Health Forensic and Scientific Services as a Reporting Scientist in the Forensic Reporting and Intelligence Team.

Question 2 – List your tertiary qualifications, the year you obtained them, and the institute from which the qualifications were obtained.

4. I obtained a Bachelor of Science from the University of Queensland in 1998.

5. I obtained a Bachelor of Science with Honours from the University of Queensland in 2001.

Question 3 – Identify the duties/responsibilities of your current position.

6. In my current position as Reporting Scientist, the key duties and responsibilities are to:

   (a) Supervise forensic testing and related duties in accordance with relevant forensic protocols and standards within DNA Analysis;

   (b) Supervise the development of scientific practices, procedures and protocols within the DNA Analysis work area;

   (c) Provide the results of forensic DNA Analysis and interpretation to senior staff and key stakeholders with respect to the National Criminal Investigation DNA Database, including the provision of expert testimony in court;

   (d) Monitor and report clinical work practices and outcomes within DNA Analysis and initiating, planning and evaluating scientific and service delivery improvement activities;

(b) Participating in Management Team meetings and decisions about the project and laboratory agenda items;

(c) Developing functional specifications for the enhancements of AUSLAB (i.e. creating new functionality within AUSLAB that allowed, for example, the integration of robotic platforms, new workflows to improve efficiency of case management of samples and improved sample auditing);

(d) Liaising with external laboratories in relation to the development and validation of the robotic systems; and

(e) Overseeing the planning of the validation experiments (which were a necessary party of continuous quality improvement and NATA accreditation requirements) and coordinating of the validation report publication (the validation reports were prepared by my direct reports and provided to me for review, approval and publication).

October 2008 to December 2013: Senior Scientist, Quality & Projects

11. In this role, my duties and responsibilities were to:

(a) Supervise and coordinate a medium-sized team in relation to quality management practices within the multi-speciality discipline of DNA Analysis, Forensic and Scientific Services;

(b) Ensure compliance of forensic DNA testing and related duties and practices with all relevant legislative, administrative and professional standards to meet NATA/ISO accreditation/certification requirements;

(c) Provide independent high level forensic services to all key stakeholders incorporating the interpretation of results, the use of information relating to the National Criminal Investigation DNA Database, and the provision of expert testimony on work performed within the laboratory in accordance with legislative requirements;

(d) Provide scientific judgement in the analysis of specimens and samples in the DNA Analysis Laboratory leading to the provision of forensic test results and advice to clients and stakeholders where appropriate;

(e) Provide clinical advice to practitioners, senior management, clients and relevant stakeholders, in particular regarding the interpretation of internationally recognised standards and forensic quality management systems; and

(f) Represent DNA Analysis in the Forensic & Scientific Services laboratory group which included decision making and strategic planning at a state-wide level.

12. I have been in my current role as a Reporting Scientist from December 2013 up to now. A summary of my duties and responsibilities in this position is summarised above at **Question 3**.

....

Thomas Nurthen Witness

(a) On deck lysis (this protocol is largely performed on the MultiPROBE II);

(b) Manual DNAIQ extraction (this protocol is a fully manual task without the use of the MultiPROBE II); and

(c) Off deck lysis (this protocol is performed on the MultiPROBE II instrument with some additional tasks performed off the instrument).

20. The 'on deck lysis' protocol was first introduced in around 2007 when the MultiPROBE II was first introduced into the laboratory for the purposes of DNA extraction. **Annexed and marked Exhibit TN-02** is an internal Standard Operating Procedure sets out the 'on deck lysis' protocol.

21. The other two protocols - Manual DNAIQ extraction and off deck lysis – were introduced into the laboratory in around February 2008. The Manual DNAIQ extraction method was validated prior to this time but later formalised in a protocol in February 2008. The off deck lysis protocol was introduced to improve DNA extraction for casework substrates. **Annexed and marked Exhibit TN-03** is an internal Standard Operating Procedure which sets out the Manual DNAIQ extraction and off deck lysis protocols. This Procedure was an updated version of TN-02 intended to collate all DNAIQ extraction methods into the same document.

Question 6 – Explain what problems with DNAIQ were experienced in approximately 2008.

Explain, to the best of your knowledge, how these problems were first detected.

22. All information I have set out below has been derived from my review of emails and files in my possession.

23. To the best of my recollection, sample cross contamination was recorded in an OQI (OQI#19330) on 21 April 2008 on a reference sample extraction batch (**First Contamination Event**). **Annexed and marked Exhibit TN-04** is the OQI#19930 report.

24. An OQI is an opportunity for quality improvement and is raised in circumstances where a potential issue is identified. To be clear, the date an OQI is raised is not necessarily when an issue is first detected. It is sometimes the case that OQIs are raised retrospectively to document an issue. For example, preliminary investigation into a potential issue may occur before an OQI is formally raised.

25. In respect of the First Contamination Event, it is my understanding that a mixed DNA profile (referred to as a 'mixture') was obtained in a reference sample with the contaminating source DNA profile occurring on the same automated extraction batch.

26. For context, reference samples are those samples taken from individuals for the purpose of comparison to casework/crime scene DNA profiles. As reference samples are taken from the mouth (buccal) or from blood samples, these should be single source DNA profiles.

27. The OQI#19330 report concluded that the reason for cross contamination could not be determined on the basis that there were multiple steps in the processing of the reference samples such that any one step could have been the source of the contamination.

....

Thomas Nurthen Witness

OQI#	Preparation batch ID	Prep date	Extraction batch ID	Extraction date	Summary of contamination detected
19330	FTAEXT20080205_01	5/02/2008	RFIQEXT20080205_03	6/02/2008	Single contamination event between reference samples
19349	N/A	27/02/2008	CWIQEXT20080225_02	27/02/2008	Single contamination event between casework samples and negative control
19703	CWIQLYS20080319_02	19/03/2008	CWIQEXT20080319_07	20/03/2008	Single contamination event between casework samples
20351	CWIQLYS20080401_02	2/04/2008	CWIQEXT20080402_01	4/04/2008	Multiple contamination events between casework samples
20925	CWIQLYS20080402_01	3/04/2008	CWIQEXT20080403_01	9/04/2008	Multiple contamination events between casework samples
20615	CWIQLYS20080408_01	9/04/2008	CWIQEXT20080409_01	16/04/2008	Possible multiple contamination events between casework samples
20231	CWIQLYS20080416_01	17/04/2008	CWIQEXT20080417_01	21/04/2008	Multiple contamination events
19477	CWIQLYS20080430_01	30/04/2008	CWIQEXT20080430_01	1/05/2008	Multiple contamination events between casework samples and between casework samples and negative control
19768	CWIQLYS20080502_02	6/05/2008	CWIQEXT20080506_01	7/05/2008	Single contamination event between casework samples and negative control
20422	CWIQLYS20080506_01	6/05/2008	CWIQEXT20080506_02	26/05/2008	Single contamination event between casework samples
19767	FTAEXT20080515_01	15/05/2008	RFIQEXT20080515_01	19/05/2008	Single contamination event between reference samples
21309	CWIQLYS20080530_01	31/05/2008	CWIQEXT20080531_01	4/06/2008	Possible multiple contamination events between casework samples
20617	CWIQLYS20080613_02	13/06/2008	CWIQEXT20080614_02	19/06/2008	Multiple contamination events between casework samples
21222	CWIQLY20080619_01	20/06/2008	CWIQEXT20080620_02	23/06/2008	Single contamination event between casework samples
20690	CWIQLYS20080627_01	28/06/2008	CWIQEXT20080628_01	1/07/2008	Multiple contamination events between casework samples
20437	CWIQLYS20080627_02	30/06/2008	CWIQEXT20080630_01	11/07/2008	Multiple contamination events between casework samples
21589	RFIQLYS20080627_01	30/06/2008	RFIQEXT20080630_01	1/07/2008	Single contamination event between project samples and negative control

37. **Annexed and marked Exhibit TN-09** is a collated bundle of the OQI reports listed in the above table.

Question 8 – What actions did the management committee and/or staff at the DNA laboratory take in response to the discovery of the problem? Provide a clear timeline which covers the problems identified, the decisions taken in response and by whom, and how those decisions were implemented.

38. Information about the actions taken by management and staff and a timeline covering the problems identified have been derived from my review documentation in my possession.

39. To the best of my recollection, a timeline of the actions taken by the management committee and/or staff at the DNA laboratory in response to the contamination issues is provided as follows:

Thomas Nurthen Witness

copy of the memorandum dated 14 July 2008 (which includes as diagram of the checkboard pattern).

(i) The QIS indicates that on 15 July 2008, Audit 8227 was conducted. The Memorandum confirmed that this Audit was already underway. **Annexed and marked Exhibit TN-15** is a copy of the QIS record. The purpose of the audit (among other things) was to assess whether the source of the contamination could be identified on the MultiPROBE II instrument. This practically involved direct observation of the application of the DNA extraction protocols on the MultiPROBE II instrument to identify any steps any steps in the DNA extraction protocols where a potential for quality breakdown was present, and also to identify areas of improvement that may benefit the protocols.

The audit was carried out Iman Muharam (Automation Team), Amy Cheng (Analytical Team) and Peter Clausen (Scientific Skills Development). I was the contact for this Audit and the interface between the auditing team and laboratory. This practically meant that if anyone had questions about the Audit, I would be the first point of contact.

(j) On 23 July 2008, Mr McNevin sent an email to the Management Team regarding further contamination events which had been identified. **Annexed and marked Exhibit TN-16** is a copy of this email. The Management Team changed from time-to-time but I believe at this time it likely consisted of myself, Cathie Allen, Justin Howes, Vanessa Ientile, Emma Caunt, Kylie Rika, Robyn Smith, Wendy Harmer, Adrian Pippia, Paula Brisotto, Peter Clausen and Amanda Reeves.

(k) On 28 July 2008, a Management Team meeting was held to discuss the draft Audit 8227 findings. I attended this meeting. **Annexed and marked Exhibit TN-17** is a copy of the agenda for this meeting.

(l) After the meeting, Chief Scientist (Vanessa Ientile) emailed the entire laboratory advising that from that day (28 July 2008), there would no be further DNA extractions on the MultiPROBE II instrument and all extractions which were already commenced were to be finished manually. **Annexed and marked Exhibit TN-18** is a copy of the email update dated 28 July 2008.

(m) The QIS indicates that on 28 July 2008 Audit 8752 commenced. **Annexed and marked Exhibit TN-19** is a copy of this QIS record. The purpose of this audit was to investigate to identify whether there were any additional contamination events that had not been detected to date. The audit team consisted of Susan Brady (lead auditor), Angelina Keller and Rebecca Gregory (all members of the Reporting team). Cathie Allen was the contact for this audit.

(n) On 29 July 2008, a DNA Analysis departmental meeting (which was the whole laboratory) was held to discuss the DNAIQ contamination issues. I attended this meeting.

(o) In around end of July 2008, some members of Management Team (including Cathie Allen and Emma Caunt), Greg Shaw (Executive Director, FSS) and members of the Queensland Police Service attended a meeting to discuss the DNAIQ contamination issues. I was aware of this meeting but I did not attend it.

....

Thomas Nurthen Witness

(w) In parallel with the Automation Team's discussions with PerkinElmer, the Automation Team was also reviewing the DNA extraction protocols to limit the risk of contamination and to improve efficiency. For example, the Automation Team in addition to the Analytical Team were re-extracting the lysates from contaminated batches to identify which step in the extraction process the contamination may have occurred.

(x) On 21 October 2008, Mr Greg Shaw (Executive Director, FSS) emailed Dr Theo Sloots (external scientist) about the possibility of him assisting with a scientific review of the response to the contamination problem. In an email from Cathie Allen on 23 October 2008, Mr McNevin and I were asked to arrange an appropriate person to show Dr Sloots and Dr Whiley around and have a general discussion with him about the process. **Annexed and marked Exhibit TN-27** is an email chain involving Justin Howes, Allan McNevin, Cathie Allen, Paula Taylor and Wendy Harmer between and 21 and 23 October 2008.

(y) On 28 October 2008, the Investigation Team (as listed above) released guidelines for reporting results from DNAIQ batches. **Annexed and marked Exhibit TN-28** is a copy of an email from Emma Caunt to Management Team (Adrian Pippia, Allan McNevin, Amanda Reeves, Cathie Allen, Ingrid Moeller, Justin Howes, Kylie Rika, Paula Brisotto and myself) attaching the reporting guidelines.

(z) On 6 November 2008, PerkinElmer wrote to Forensic Biology team. The letter indicates that the FSS DNA Analysis laboratory requested PerkinElmer to observe and ensure that the liquid handling was optimum. The letter lists the steps which required some modification. I understand these steps were implemented. **Annexed and marked Exhibit TN-29** is the letter dated 6 November 2008.

(aa) Following on from the request from Greg Shaw (as referred to above at paragraph 39(x)), on 12 November 2008, external auditors Dr Theo Sloots and Dr David Whiley (another external scientist) attended Forensic Biology to conduct the review of processes as part an external review. This external review was documented on the QIS as Audit 9175.

(bb) On 14 November 2008, Dr Sloots and Dr Whiley released a report. **Annexed and marked Exhibit TN-30** is a copy of the report dated 14 November 2008.

(cc) In around November 2008, I prepared a report summarising all of the contamination events that were being identified in DNAIQ extraction batches into a single document. I do not recall why I prepared this report but I believe maybe it was to bring all the contamination events, investigations and outcomes into a single document. I never finalised the report. I do not recall why this was the case but to the best of my collection, this may be because each of the individual OQIs had been actioned at this stage and some of the information in the report was available in other documents. The last version was saved by me in 2011. **Annexed and marked Exhibit TN-31** is copy of the draft report.

(dd) I transitioned to another role (Senior Scientist, Quality and Projects) in October 2008. As a result, I had less involvement with the MultiPROBE II issues and was largely responsible for managing operational staff (which were mostly non-scientists) in Quality and Projects.

....

Thomas Nurthen Witness

44. I was also the contact person for Audits 8227 (as mentioned above at paragraph 39) and 9642 (which was a follow-up audit). The objective of Audit 9642 was to check the changes made to the DNAIQ protocols for the MultiPROBE II sufficiently improved the quality and reliability of results. **Annexed and marked Exhibit TN-32** is the QIS record and report in relation to Audit 9642. During my direct involvement in responding to the DNAIQ issues, I understand that these audits and Audit 9175 (as explained below) are the only audits related to the DNAIQ issues.

Provide an explanation of the findings of audit 9175 and actions taken in response to that audit. When were the follow-up actions finalised?

45. As described above at Question 8, Audit 9175 was related to the external review undertaken by Professor Theo Sloots and Dr David Whiley. **Annexed and marked Exhibit TN-33** is the QIS record for this audit. The objective of this review was to review FSS' internal investigations into the cause of the contamination events.

46. As part of this audit, my role (along with Mr McNevin) was to brief Professors Sloots and Whiley about the nature of the contamination issues, the steps which had been taken by FSS to deal with the issues to date and provide them with any information or material they needed (including for example access to staff members and laboratories) to conduct the audit. I recall attending a meeting in-person at the laboratory with them on 12 November 2008 as part of this briefing process.

47. Professors Sloots and Dr Whiley finalised their report on 14 November 2008. A copy of this report is **Exhibit TN-30**.

48. An excerpt of their findings from the report is extracted below:

The procedures currently in place for the Off-deck Lysis and MPII extraction appeared to be adequate and specifically designed to prevent cross-contamination of test samples.

We agree with the Forensic Services Management team that the previous issue of possible cross-contamination of samples is most likely to related to the use of adhesive film in sealing deep well plates used in the off deck lysis procedure. The type of plate used, and the period of storage at reduced temperatures have in our experience caused similar problems in molecular diagnostics. The subsequent decision to change this procedure to the use of capped tubes has clearly solved the problem.

49. As outlined in the report, Professors Sloots and Whiley identified five items for further consideration. These items are outlined below.

Item 1*: Develop a standard validation protocol for each procedure based on the guidelines described by J Butler (www.promega.com; September 2006). Incorporate these into the Standard Operation procedures for the laboratory.*

Item 2: *We advise that the number of negative controls included in each batch of extractions be increased to comprise at least 10% of the total number of specimens tested. These controls should ideally be distributed randomly over the plate. Currently one negative control is included with 47 samples.*

Item 3: *Quality assessment might be increased by testing a control plate once every 3-4 weeks on each of the MultiPROBE II PLUS platforms. We would suggest alternating between the soccer ball, zebra and checkerboard formats.*

....

Thomas Nurthen Witness

Question 12 – Identify each staff member involved in detecting and responding to the problems with DNAIQ, and the nature of each person's involvement.

53. I do not recall the precise involvement of each staff member in detecting and responding to the problems with DNAIQ. However, generally speaking:

(a) the Management Team were responsible for the overall decision making in relation to addressing the DNAIQ issues;

(b) the Analytical Team were responsible for the day to day processing and re-processing of samples and provided feedback on practicalities of protocol changes;

(c) the Automation Team were responsible for the troubleshooting of the instrument protocols, subsequent re-optimisation and re-validation of instrument protocols.

54. Based on my review of the records in my possession, the following staff members likely had knowledge of, and assisted in detecting and responding to the DNAIQ problems:

(a) Greg Shaw, Executive Director;

(b) Vanessa Ientile, Managing Scientist;

(c) Cathie Allen, Team Leader/Managing Scientist;

(d) Allan McNevin, Senior Scientist Analytical;

(e) Iman Muharam, Internal Auditor QIS 8227/Automation Team Scientist/Senior Scientist Automation and LIMS implementation;

(f) Chiron Weber, Automation Team Scientist/Acting Automation Senior Scientist;

(g) Vojtech Hlinka, Automation Team Scientist;

(h) Breanna Gallagher, Automation Team Scientist;

(i) Generosa Lundie, Automation Team Scientist;

(j) Cecilia Iannuzzi, Automation Team Scientist;

(k) Alicia Quartermain, Reporting Scientist;

(l) Jacqui Wilson, Reporting Scientist;

(m) Shannon Merrick, Reporting Scientist;

(n) Julie Connell, Reporting Scientist;

(o) Rhys Parry, Reporting Scientist;

(p) Angelina Keller, Reporting Scientist;

(q) Claire Gallagher (nee Perrin), Reporting Scientist;

(r) Ingrid Moeller, Reporting Scientist;

....

Thomas Nurthen — Witness

(a) in a Biology Management Team meeting on 14 November 2008. The meeting minutes provide *'The auditors agreed with our actions taken and basic principles. A report will be issued from the external Auditors. Some recommendations are – Locked batches – CJA and Iman to explore this, Reagents to be tested at 35, Strip Cap seals for PCR Plates – Iman will source these, # of QC plates per month (i.e. checkerboard)'*. **Annexed and marked Exhibit TN-35** is a copy of the meeting minutes.

(b) An email from Justin Howes dated 21 November 2008 attaching the external report which says *'FYI-the external auditor's report. Cathie, for your distribution to the team, Greg commented it was complementary'*. This email was forwarded to me by Justin but I was not an original recipient of the email. **Annexed and marked Exhibit TN-36** is the email dated 21 November 2008.

60. It may be the case that there were other meetings and correspondence communicating the results of the audit however I have not found these records in my possession.

Question 15 – What permanent changes, or amendments to SOPs, were made as a result of identifying the problems related to DNAIQ?

61. I was not directly involved in making changes to the SOPs as a result of the DNAIQ issues. However, I may have had peripheral involvement. For example, I may have provided advice to other teams about these changes from a quality perspective.

62. Based on my review of records, I understand that the below changes were made to SOPs based on the amendment history recorded in the SOP and my recollection of the changes more generally:

(a) QIS#24897 DNAIQ Method of Extracting DNA from Casework and Reference Samples (from version 5). Based on the amendment history in the document, it says *'major changes to reflect new procedure. Update to reflect changes in procedure as an outcome of internal and external audits. Created version 6.4 ODLNP2 platforms. Minor changes in procedures using 4titude 4seal heat sealer to seal plates'*. **Annexed and marked Exhibit TN-37** is a copy of this SOP.

(b) QIS#17119 Procedure for the Release of Results; extraction batch checking & inclusion of quality paragraphs (from version 8). Based on the amendment history in the document, *'Added EB checking workflow, added to Quality Flag workflow, moved Quality paragraphs to own Appendix, deleted Pathology and Scientific services logo'*. **Annexed and marked Exhibit TN-38** is a copy of this SOP.

(c) QIS#30800 Adverse Event Standard Operating Procedure was amended to include how to deal with, document and investigate contamination. **Annexed and marked Exhibit TN-39** is a copy of this SOP.

(d) Extraction negative controls were also analysed below the reporting threshold (i.e. at the limit of detection threshold). I do not recall what SOP this was addressed in but it would have likely been an Analytical SOP.

Thomas Nurthen Witness

Question 18 – Has the DNA laboratory since returned to using DNAIQ processes, systems and/or products? Have there been any further problems with DNAIQ systems or products? Explain all future problems in detail, including what has been done in response to them. Attach any OQIs, Adverse Entry Log's or record of the problem being identified and investigated.

68. Once I moved into my current role in December 2013, I was no longer apart of any decision-making in relation to issues regarding the DNAIQ processes.

69. For this reason, there may be additional problems and/or actions which were taken in relation to DNAIQ systems or products which I am not aware of.

70. Based on my review of the records in my possession, there appears to be adverse entry logs related to contamination. For example, see entry on rows 18,49 (Events 16,46) in the LOG tab, Row 98 BATCH INVESTIGATIONS 2016_2017. I was not involved in investigating these events. **Annexed and marked Exhibit TN-42** is a spreadsheet of the current adverse event log as of 14 October 2022.

71. From the best of my recollection and based on my understanding of events occurring within the Forensic Analysis Laboratory:

    (a) The DNAIQ kit used on the MultiPROBE II instruments were retired from the laboratory in around 2016.

    (b) The DNAIQ kit was validated on the Promega Maxwell in around 2010 and on the Maxwell FSC instruments at a later date.

    (c) Different automated platforms (Qiagen QIAsymphony) replaced the MultiPROBE II instruments on 21 November 2016. I was not involved in this transition to these automated platforms.

All the facts and circumstances declared in my statement, are within my own knowledge and belief, except for the facts and circumstances declared from information only, and where applicable, my means of knowledge and sources of information are contained in this statement.

I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of the *Oaths Act 1867*.

TAKEN AND DECLARED before me at Brisbane this 17th day of October 2022

.....	.....
Thomas Nurthen	Witness
.....	.....
Thomas Nurthen	Witness