

# Environmental Monitoring

## 1 PURPOSE & SCOPE

To describe Environmental Monitoring and provide guidelines for the Environmental testing to be carried out within DNA Analysis.

Where equipment, consumables, work areas or clothing come into contact with a sample or exhibit there is a possibility that DNA may transfer from these objects to the exhibits or sample. Environmental Sampling is used to monitor this DNA transfer/contamination and help reduce the chances of contamination to exhibits and samples.

This procedure shall apply to all Environmental Monitoring performed by DNA Analysis including all areas where Coronial / DVI / Skeletal Remains testing is conducted on behalf of DNA Analysis.

## 2 DEFINITIONS

Risk – Risk is assessed according to the probability that a contamination would occur, the frequency of exposure to the risk and the possible consequences of the contamination. The level of risk determines the level of investigation required in the event of a profile being obtained from the Environmental Monitoring Samples.

## 3 ACTIONS

### 1. Environmental Sampling

- 1.1 To monitor for incidental and accidental DNA contamination by staff and by samples/exhibits processed within DNA Analysis and to determine the efficacy of cleaning procedures within DNA Analysis.
- 1.2 In the DNA Analysis Laboratory, Environmental Monitoring involves the sampling of areas that may come into direct or indirect contact with exhibits (including samples from exhibits) prior, during or after sampling that may cause contamination eg. Contamination of subsequent samples from benches or pipettes.
- 1.3 Environmental Sampling shall be conducted on a monthly basis before the deep clean. All staff may be required to assist in this process. Operational officers that are deemed competent in environmental may perform this task. Sampling of the Skeletal Remains Project shall be performed by Skeletal Remains Project staff.
- 1.4 Once a year environmental sampling shall be conducted before and after deep clean.

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2. Samples representative of the following areas shall be submitted, the areas sampled shall be chosen according to the risk of DNA contamination to the exhibits or samples. If contamination has been detected in previous month's monitoring the Quality Officer may ask for a specific area to be tested to ensure that new cleaning procedures etc have been effective.
3. A minimum of five samples per section should be submitted. An attempt should be made to sample from different areas within each section each month which may include but not be limited to:
  - a. Major Crime
    - i. Stainless Steel Benches
    - ii. Metal drying rails
    - iii. Examination Trolley / Bays/ Tackle boxes
    - iv. Photocopier
    - v. Spray Bottles
    - vi. Laptop Computers
    - vii. Cameras
    - viii. Fridge
    - ix. Chairs
    - x. Tape dispensers/ Brown paper dispensers
    - xi. Instruments/Pens
  - b. Volume Crime Sampling
    - i. Stainless Steel Examination Benches
    - ii. Instrument racks – where instruments are placed after flaming
    - iii. Computer Keyboards
    - iv. Chairs
    - v. Cupboard handles
    - vi. Label Printers
    - vii. Photocopier
    - viii. Cameras
    - ix. Instruments/Pens
  - c. Analytical
    - i. Rooms 6118,6120,6121,6122
      1. Fume hood
      2. Bench
      3. Biohazard Cabinet
      4. Centrifuge
      5. Vortex
      6. Hot Block
      7. Water Bath
      8. Fridge Door
      9. Pipettes
    - ii. Workflow area (6117)
      1. Computer Keyboards
      2. Phone
      3. Freezer Door Handles
      4. Bench
      5. Work book
    - iii. Automation
      1. Environmental Sampling of the automated equipment is done by an automation team staff member OR an authorised analytical staff member.

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- d. Decontamination Room (part of Major Crime Sampling/Cleaning)
  - i. Clothesline (Used for crimelight examination and exhibit drying)
  - ii. Examination Bench

## 4. Sampling Process

- a. After the area for sampling has been chosen by the quality team, staff member will receive a list of area's to sample with a packet of swabs and barcodes
  - i. open a sterile swab
  - ii. moisten the swab with Nanopure water
  - iii. rub the swab head along the surface of the object to be tested
  - iv. assign each swab a unique barcode
  - v. label accordingly including the area and item the sample was taken from (ie Major Crime –bay 2 , work bench)
  - vi. Information and barcode is to be placed on list from quality team for future reference.
  - vii. Once swabs are sub-sampled the information and barcodes are transferred on to form (17034) and stored in the Environmental Sampling folder, kept within the quality team.

## 5. Registration of the Environmental Sampling "Case" in AUSLAB

- a. From the main menu
  - i. "1 Request Registration"
  - ii. "1 Full Reception Entry"
  - iii. Enter a new barcode in Lab Number Field – this will be the Case number
  - iv. UR /Case No. starts with the prefix FBE and is generated by the month and year the sample was taken eg. A sample taken in Feb 05 would have the UR/Case No. FBE0205.
  - v. SURNAME: ENVIRONMENTAL SAMPLING
  - vi. Collected "?Date of Collection"
  - vii. Received"? Same as collection date"
  - viii. Specimen = Case
  - ix. Loc./Client = FBQC
  - x. Order a CS [enter] and a MILE [enter]
  - xi. F7 (billing) category = NFO, Requested Date = Same as Date Collected, F4, F4.

## 6. Registration of Environmental Samples in AUSLAB

- a. From the main menu
  - i. "1 Request Registration"
  - ii. "1 Full Reception Entry"
  - iii. Enter the assigned environmental swab lab number in Lab Number Field
  - iv. Enter the assigned FBE No into the UR /Case No. field eg. A sample taken in Feb 05 would have the UR/Case No. FBE0205.
  - v. SURNAME: ENVIRONMENTAL SAMPLING
  - vi. Collected "?Date of Collection"

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- vii. Received"? Same as collection date"
- viii. Specimen = Cells (Bone for Skeletal Remains Samples)
- ix. Primary Site = Swab
- x. Client Reference = Each month's monitoring shall be assigned a case number eg. 209471564 and the second sample taken will have a Client Reference No. of 209471564-002.
- xi. DNA Priority = 4 (this allows time for sub-sampling)
- xii. Loc./Client = FBQC
- xiii. Sample Info 1 = Description of where the sample was taken from. Ensure the Area from which the sample was taken (MAJOR, VOLUME, ANALYTICAL, SKELETAL) is first then the description of the area sampled. Enter the Room it was taken from and specific identifying information eg. ANALYT - Room 6120, Pipette No.2022626 20-200uL. This information is found on list from the quality team.
- xiv. Order a 9PLEX
- xv. F7 (billing), category = NFO, Requested Date = Same as Date Collected, F4, F4.

**7. Sub – Sampling of Environmental Samples**

- a. After sample has been registered the entire swab is sub sampled and submitted in a 1.5ml tube for analysis as cells.
  - i. Print out nunc labels for each swab barcode
  - ii. Clean work area with bleach/alcohol
  - iii. Flame scissors/tweezers with alcohol and Bunsen burner
  - iv. Cut tip of swab off with scissors holding tip of swab in place with tweezers over a disposable Petri dish.
  - v. Place tip of swab in 1.5ml tube and place nunc label barcode on tube
  - vi. Place 1.5ml tube in 5ml tube and place barcode on tube with details of where sample was taken from ie: MC – Photocopier.
  - vii. Dispose of remaining swab and used Petri dish in biohazard bag
  - viii. Flame scissors/tweezers with alcohol and Bunsen burner between each sample.
  - ix. When all swabs have been sub-sampled, enter Auslab and change priority to [1] urgent. These 5ml tubes are then stored in the workflow area rm 6117 in the freezers.

**8. Cleaning****a. DNA Analysis**

- i. Routine cleaning between exhibits and at the end of the day should be conducted as required as outlines in the Anti-Contamination Procedure ([22857](#))
- ii. The monthly cleaning of all work areas and equipment should be completed after sampling has been conducted. All work areas should be cleaned 10x bleach/ 70% ethanol. This includes all areas previously mentioned within each section that may come into contact with samples or exhibits

**b. Multi-Purpose Laboratory – Mortuary**

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- i. As mortuary and histopathology staff routinely use the multi-purpose laboratory, it is standard procedure for the DNA Analysis staff to clean all work surfaces with a 10x bleach/ 70% ethanol before commencing their sampling.

**9. Results**

- a. Results should be collated by the Quality team and results discussed with area supervisors. A report will be sent to all area supervisors on a monthly basis regarding any profiles found and any action taken.
- b. Assessing the initial results
  - i. Priority - The results of environmental sampling should be given priority and followed up in a timely manner.
  - ii. Optimal Result - The optimal result for all environmental samples is a quant value of 0ng/uL and no DNA profile.
  - iii. Profile Obtained - All environmental samples that produce a DNA profile should undergo investigation (according to the level of risk). Any samples that produce a partial DNA profile (including NR's) or no profile but a quant value of  $\geq 0.1\text{ng/uL}$  should be microconcentrated to assist in identifying the source of contamination.
    - 1. If these samples are not microconcentrated the reason for not completing the testing shall be recorded by the quality officer.
    - 2. If the partial profile has sufficient alleles to identify the source of contamination then no further reworking is required.
- c. Assessing the final result
  - i. Contamination
    - 1. Check against Staff - Run the profile through the "StaffMatch" macro to determine if the DNA profile obtained is a staff profile. Ensure that the check includes a search down to 5 loci.
    - 2. Check against Crime Scene and Person Samples – Run the profile through staff match using the "Multi – Line on Query Sequence Only". This allows a choice of searching KOD, DNAMaster, 3100 Upload Tables and Older DNAMasters if necessary. Ensure that the check includes a search down to 5 loci.
    - 3. These checks should help to determine the source of the contamination and determine if the contamination is the result of prolonged exposure or due to a sample contamination instead.
    - 4. If an unknown profile is located this should be added to the staff match macro in AUSLAB and in I drive.
- d. Risk Assessment
  - i. Where a full or partial profile is obtained a risk assessment shall be performed to determine the actual risk to the samples or exhibits. Refer to 22872 Change Management Template for Risk Assessment Form.

This should be based on the following:

- How often does contact occur?
  - What is the likelihood of contamination occurring (Is the sample open/exhibit unpacked when in contact with this possible contamination source?)
  - What impact will this contamination have on the sampling/testing process?
  - The impact already caused to the sampling/testing process
- ii If the risk is assessed at less than moderate then no action is necessary
- iii If the risk is greater than moderate then an OQI should be generated and an investigation into the contamination and a review of the cleaning protocol for the piece of equipment/area should be conducted. To ensure any actions taken are effective the items or areas should be re-sampled during the next month's environmental sampling to confirm effectiveness.
- iv Should the contamination be identifiable as a staff member and the risk is greater than moderate then the investigation should include an audit of all processes involved in producing the result to determine when the contamination occurred (ie Did the staff member perform the extraction?).

#### 10. Updates

- a. The results of Environmental Monitoring and the preventative measures required should be reported back by the Quality team regularly at team meetings (ideally monthly). If a staff profile is found no names shall be attached to the results. As part of the investigation those identified will be notified to increase their awareness and assist with the implementation of the preventative action.

#### **4 RECORDS**

Nil

#### **5 ASSOCIATED DOCUMENTATION**

[22857](#) Anti-Contamination Procedure  
 17117 Procedure for Case Management  
[22872](#) Change Management Template  
 17034 Forensic Biology General Examination Record

#### **6 REFERENCES**

Supplementary Requirements for Accreditation in the Field of Forensic Science  
 Guidelines for Forensic Science Laboratories – ILAC-G19:2002

**7 AMENDMENT HISTORY**

<b>Revision</b>	<b>Date</b>	<b>Author/s</b>	<b>Amendments</b>
0	05 Oct 2005	Mary Gardam	First Issue
1	13 Feb 2007	Mary Gardam	DNA Priority added. Unknown profiles added.
1	April 2008	QIS2 Migration Project	Headers and Footers changed to new CaSS format. Amended Business references from QHSS to FSS, QHPSS to CaSS and QHPS to Pathology Queensland
2	13 May 2008	C Revera	Major Revision
Version 3	April 09	QIS2 Migration Project	Changed revision to version and updated hyperlinks for QIS2

Not Current