EXTRACTION BATCH CONTAMINATION – OQI#20925

Batch: [redacted]

Contaminated profile:

- Position No: 16
- Lab No: [redacted]
- Case No: [redacted]
- Case details: Alleged Sexual Assault - Goodna
- Profile details: Partial profile in this position not matching any ref samples for this case. Three alleles above threshold and partial at Amelogenin. Multiple 'NR' peaks throughout profile were manually designated for investigation purposes. The resulting DNA profile matched the DNA profiles in adjoining wells (23 and 24)
- This partial profile was reported as not containing sufficient information for comparison purposes as it was partial and indicated a sub-NR mixture.

Contaminating profile:

- Position No: 24 or 23
- Lab No: [redacted]
- Case No: [redacted]
- Case details: Alleged Sexual Assault - Moorooka.
- Profile details: Female DNA profile obtained from underpants of complainant matching the complainant. The quant values were 0.47ng/uL and 0.05ng/uL respectively.

Notes:

- These cases appear to be unrelated, thus obtaining matching DNA profiles for the samples in positions 16 and 23/24 described above, is considered an unexpected result.
- In my opinion, it is more likely that the source of the contamination is sample [redacted] due to the high quant value rather than from [redacted]
- The partial profile was reported as insufficient and there is no need to reissue a statement in my opinion.
- The batch was previously released from EAT but was found upon review of cases belonging to JAH that have had statements issued.

Investigation:
This OQI relates to sample [redacted] to have likely been contaminated by one or more of samples [redacted] or [redacted] as outlined above. Additionally, sample [redacted] has been possibly contaminated by one or more of samples [redacted]. This event was raised as OQI#21050, but investigation and actions are covered in this OQI. All of the above samples were extracted on the same extraction batch [redacted]

During the investigation, the stored lysate for all eight samples were re-extracted as well as the stored substrates. Throughout the investigation, the results from the original extraction and subsequent re-extractions were analysed using GeneMapper ID-X software with a peak detection threshold of 20RFU to gain the most information.

The re-extraction of the stored lysate (i.e. lysed material that was retained after removal from the para-magnetic resin during the automated DNA IQ extraction process) for each of the eight samples showed results consistent with that obtained from the initial extaction process. From these results, it can be concluded that the contamination of sample [redacted] by samples 334721596 or 334721585 must have occurred prior to or during the separation of the lysis solution and the para-magnetic resin. Additionally, contamination of sample [redacted] by one of samples [redacted], or [redacted] must also have occurred prior to or during the separation of the lysis solution and the para-magnetic resin.

The re-extraction of the stored substrate (i.e. the material originally submitted for DNA extraction that had passed through the initial off-deck lysis step of the original extraction process) gave a differing results for sample [redacted]. A partial single source DNA profile inconsistent with the profile observed from intial extraction was obtained. This profile was also inconsistent with the contaminating profiles obtained from extraction & re-extraction of samples 334721596 & 334721585. When re-analysed at lowered peak detection thresholds, the original profile obtained from the original extraction showed alleles consistent with both the profile obtained from re-extraction of the substrate and the contaminating profile. This indicates that there was no contamination of the substrate during the manual processing on initial extraction (off-deck lysis

procedure), and that contamination has occurred between this step in the procedure and the step noted above. The re-extraction of the stored substrate for sample [redacted] showed no DNA profile, so no conclusions could be drawn. Re-extraction of samples [redacted], [redacted] all yielded alleles consistent with the original extraction profiles.

The potential steps at which contamination may have occurred are:

1. During the transfer of the lystate obtained from manual lysis into the deep-well plate via the use of the STORstar. However this is unlikely as all staff are trained to perform such pipetting steps with due diligence and care. This is also unlikely in the case of sample [redacted] as there is a full column physically between the sample wells of this sample and the proposed contaminating sample.

2. Seepage of sample into well 16 [redacted] from one or other of the adjacent wells 23 or 24 [redacted] or [redacted] respectively) during cold storage of the lysed material in the deep-well plate. After the cessation of processing and the carrying out of investigations, it was noted in one instance that a heavily blood-stained lysate had condensed on the underside of the adhesive seal used to seal the stored plate. This had seeped across into an adjacent well. This was possibly due to insufficient application of the adhesive seal to the interstitial barrier. This mechanism is unlikely for sample [redacted] due to the wells not being adjacent.

3. During the removal of the adhesive seal. It was noted during Audit 8227 that condensation on the underside of the adhesive seal was not removed after centrifugation.

4. Operator error during the manual addition of DNA IQ para-magnetic resin during the start of the automated extraction procedure (i.e. incorrect pipetting procedure), however this is unlikely as staff are trained to perform such pipetting steps with due diligence and care. This mechanism is unlikely for sample [redacted] due to the wells not being adjacent.

5. During the mixing of the deep-well plate (containing 1.5mL of buffers and resin within a 2.2mL well) on the extraction platform DPC shaker. This had not been observed, however has been proposed a possible mechanism for adjacent well contamination during close scrutiny of

the automated procedure. This mechanism is unlikely for sample [redacted] due to the wells not being adjacent.

6. During the lysis removal from the para-magentic resin to the storage plate. This procedure occurs twice during the automated extraction protocol (fresh disposable tip for each step). If there was drippage of the lysate containing unbound DNA and this was to drip from one well to another well this may account for the contamination event. The same mechanism may occur where a bubble forms at the end of the pipette tip and bursts whilst still in the vicinity of another well.

The likely source of the contamination of sample 320123654 is sample [redacted] due the higher quantification values obtained for this sample.

The likely source of the contamination of sample 334230253 is either sample [redacted] due the higher quantification values obtained for these samples. Additionally, it must be noted that it could not be ruled out that the result obtained from sample [redacted] was the true result as there is the possibility of the cases being related.

Action:
As a result of previous OQI's raised and concerns identified around the automated DNA IQ extraction process, the extraction of samples using the automated DNA IQ procedure was halted on the 28-7-2008.

Prior to this, Audit 8227 had been commissioned and carried out. A number of areas for improvement were identified through the audit, and these have been implemented or are under investigation as outlined in OQI's 20367, 20368 and 20369.

After the cessation of the automated DNA IQ extraction protocol, a review of all batches processed through this protocol was carried out by a specially commissioned team. A number of potential contamination events were identified and each is to be investigated on batch-by-batch basis.

Additionally, careful review of results obtained from samples processed through the automated DNA IQ extraction procedure prior to reporting will be carried out. Every DNA result obtained from these samples will be interpreted with caution.

Modifications have been made to the automated DNA IQ extraction procedure (including the use of an alternative to the adhesive seal and an alternative resin mixing procedure). This modified procedure is undergoing extensive verification and approval from the DNA Analysis management team must be obtained prior to re-introduction.

The contamination events and concerns and improvements etc. that surround the automated DNA IQ extraction procedure have been discussed at various departmental and team meetings.