# Deviation Request Form (DRF)

Directions: The Initiator will complete Sections A through C. Additional continuation pages can be included if necessary.

| **Initiator** | Cori Martin | **Date** | 7/13/2018 |
|---|---|---|---|

A. Requested deviation applies to (Technical Procedure – include specific section):

Procedure for Qiagen BioRobot Universal Using PowerPlex Fusion

B. Requested deviation:

See additional documentation.

C. Necessity for the deviation:

The computers that run the BioRobots have been updated to from Windows XP to Windows 7. This upgrade requires files to be stored with a different file structure. The procedure and protocol prompts need to be updated to accurately reflect the proper file locations.

D. Technical review and Authorization (to be completed by the Quality Manager and/or Technical Leader)
Comments(to include merits and impacts):

| Approved | ☑ | Yes | ☐ | No | Duration | Until next procedure revision. |
|---|---|---|---|---|---|---|
| Signature | Cori Martin Digitally signed by Cori Martin Date: 2018.07.13 09:58:29 -04'00' | | | | Date | 7/13/2018 |

E. Quality Assurance Authorization (to be completed by the Quality Manager, Forensic Scientist Manager or designee)

| | | | | |
|---|---|---|---|---|
| Acceptable within general QA guidelines and good laboratory practice? | ☑ | Yes | ☐ | No |
| Significant negative impact to Crime Laboratory Quality System? | ☐ | Yes | ☑ | No |

Restrictions/limitations:

| ☑ | Authorized | ☐ | Rejected | Signature | Zach Kallenbach Digitally signed by Zach Kallenbach Date: 2018.07.13 11:07:51 -04'00' | Date | 7/13/18 |
|---|---|---|---|---|---|---|---|

Form approved for use by: Timothy G. Suggs Digitally signed by Timothy G. Suggs DN: cn=Timothy G. Suggs, o=North Carolina State Crime Laboratory, ou=Quality Manager, email=tsuggs@ncdoj.gov, c=US Date: 2014.12.19 09:01:52 -05'00'

**5.2.4** When the protocol is finished, open the pre-amplification worksheet (DNA Database PowerPlex Fusion Punch/Amplification Sheet) corresponding to the run.

**5.3.4** When the protocol is finished, open the result file (Qiagen Amplification Report) corresponding to the run.

**5.3.5** Adjust page layout as needed to minimize the number of pages. Ensure the report is complete and accurate. A .pdf copy of the result file shall be maintained with the run file.

**5.4.4** When the protocol is finished, open the result file (Qiagen Amplification Report) corresponding to the run.

**5.4.5** Adjust page layout as needed to minimize the number of pages. Ensure the report is complete and accurate. A .pdf copy of the result file shall be maintained with the run file.

**5.5.1** Open the excel file containing the ExportData (.csv file) corresponding to the file name/batch number.

**5.5.5** Record lot number information for 3500xL setup. A .pdf copy of the 3500xL setup sheet shall be maintained with the run file.

# Deviation Request Form (DRF)

Directions: The Initiator will complete Sections A through C. Additional continuation pages can be included if necessary.

| **Initiator** | Cori Martin | **Date** | 4/26/2018 |
|---|---|---|---|

A. Requested deviation applies to (Technical Procedure – include specific section):

Procedure for Instrument and Equipment Quality Control
Note listed in 5.12.1.1
Procedure for the Qiagen BioRobot Universal Using PowerPlex Fusion
Note listed in 5.1.5

B. Requested deviation:

NOTE: Biannual and annual maintenance are due by the end of the quarter in which the maintenance is prompted. It is acceptable to run with these maintenance items pending as long as their due date has not passed.

C. Necessity for the deviation:

Annual maintenance is performed by the vendor. Based on the installation and the contract date the vendor is unable to service the instrument during the month in which the maintenance is prompted. The vendor would like to complete the annual maintenance in May, the month after the installation month (April). The window of time for the maintenance completion has been extended to the quarter in which the maintenance is prompted in order to allow the vendor enough time to schedule service. The extension of the deadline from 1 month to 3 months is not expected to have any adverse effects on the samples processed using the Qiagen BioRobot.

D. Technical review and Authorization (to be completed by the Quality Manager and/or Technical Leader)
Comments(to include merits and impacts):

| Approved | ☑ | Yes | ☐ | No | Duration | until next procedure revision |
|---|---|---|---|---|---|---|
| Signature | Cori Martin Digitally signed by Cori Martin Date: 2018.04.26 14:05:58 -04'00' | | | | Date | 4/26/2018 |

E. Quality Assurance Authorization (to be completed by the Quality Manager, Forensic Scientist Manager or designee)

| | | | | |
|---|---|---|---|---|
| Acceptable within general QA guidelines and good laboratory practice? | ☑ | Yes | ☐ | No |
| Significant negative impact to Crime Laboratory Quality System? | ☐ | Yes | ☑ | No |

Restrictions/limitations:

| ☑ | Authorized | ☐ | Rejected | Signature | Zach Kallenbach Digitally signed by Zach Kallenbach Date: 2018.04.27 13:30:15 -04'00' | Date | 4/27/2018 |
|---|---|---|---|---|---|---|---|

Form approved for use by: Timothy G. Suggs Digitally signed by Timothy G. Suggs DN: cn=Timothy G. Suggs, o=North Carolina State Crime Laboratory, ou=Quality Manager, email=tsuggs@ncdoj.gov, c=US Date: 2014.12.19 09:01:52 -05'00'

# Procedure for Qiagen BioRobot® Universal Using PowerPlex® Fusion

**1.0 Purpose –**To instruct users in the operation of the Qiagen BioRobot® Universal System (BioRobot) for the automated processing of database samples using PowerPlex® Fusion.

**2.0 Scope** – This procedure applies to DNA Database Section Forensic Scientists and trainees who perform DNA analysis using the Qiagen BioRobot® Universal.

## 3.0 Definitions

- **System Liquid** – System liquid is specified as purified water. Any water run through the robot shall be system liquid only. The software may prompt for the addition of deionized water in certain protocols. In these instances, purified water or an equivalent shall be used.

## 4.0 Equipment

- Deionized water (used for disinfection of robot components only)
- Qiagen BioRobot® Universal System
- 96 well amplification plates
- Qiagen QIAsoft Software
- System Liquid
- Various micropipettes and pipette tips
- Various laboratory equipment involved in DNA analysis (disposable tubes, gloves, trays, centrifuges, pipettes, vortexes, refrigerators, biohazard waste containers; reagents used for DNA amplifications)

## 5.0 Procedure

### 5.1 Basic Operation Instructions

**5.1.1** DNA Database Forensic Scientists shall wear gloves, lab coat and face mask when handling robotic materials including robot components, disposables, worktable, pipette tips, and reagents. DNA Database Forensic Scientists shall wear gloves when using the robot computer system.

**5.1.2** Turn on the computer and the robot.

**5.1.3** If the computer is already on but not logged in, the username is "Qiagen Instruments." Click on the username. A password is not required.

**5.1.4** Open QIAsoft software. The generic login information for the QIAsoft Software is:

Username: DNA DB
Password: DNA DB

**5.1.5** Prior to operating the Qiagen BioRobot®, perform any required maintenance. Ensure that any air bubbles are cleared out of the system liquid lines. If the run button is yellow, any needed maintenance is found listed in the maintenance environment.

NOTE: Biannual and annual maintenance are due by the end of the month in which the maintenance is prompted. It is acceptable to run with these maintenance items pending as long as their due date has not passed.

**5.1.6** To run protocols, go to Environment > Execute. Protocols used for analysis of samples on the robot are listed in the Applications menu under the Promega Protocols section and include:

**5.1.6.1 PPF Sample ID Scan and Process Sheets** – This protocol is used to scan sample IDs, assign tray positions, and create pre-amplification worksheets. It is used for samples that will be amplified with PowerPlex® Fusion. Tray positions are automatically assigned by the Qiagen BioRobot® for ladders and required controls (reagent blanks, negative amplification controls, and 2800Ms (positive amplification controls)).

**5.1.6.2 PPF Direct Amplification – 1 Plate** – This protocol is used to set up single PowerPlex® Fusion amplification reaction trays before placement on the thermal cycler. It includes the addition of Punch Solution and mastermix to the reaction tray. This protocol can process 1 to 86 samples and corresponding controls.

**5.1.6.3 PPF Direct Amplification – 1 to 4 Plates** – This protocol is used to set up between 1 and 4 PowerPlex® Fusion amplification reaction trays before placement on the thermal cycler. It includes the addition of Punch Solution and mastermix to the reaction trays. This protocol will process 80 samples per plate along with corresponding controls.

**5.1.7** Select the desired protocol from the Promega Protocols section of the drop down applications menu. To start each selected protocol, press the "run" button. For each protocol, follow the directions on the screen.

**5.1.8** Any plate run on the robot shall be logged in the appropriate binder (including water runs). Note any maintenance done when logging the run. Record any robotic errors/error codes and follow-up actions in the Error Log.

NOTE: The Forensic Scientist Manager/Supervisor and Technical Leader shall be notified in the event of a technical issue and informed of any issues with robot function. The Technical Leader shall investigate root causes.

**5.1.9** After the BioRobot has added PunchSolution and mastermix to the plate, verify that the expected wells have received each reagent. Manually add PunchSolution and mastermix to any wells that did not receive the expected amount.

## 5.2 PPF Sample ID Scan and Process Sheets Protocol

**5.2.1** When prompted, enter the number of samples to be processed. This number includes the Database samples and NIST-TS controls (if applicable).

**5.2.2** Enter the Database file name/batch number.

**5.2.3** One by one, scan the bar codes for the samples with the hand barcode scanner. Sample ID numbers may be manually inputted only if the barcode scanner is inoperable, the sample does not have a barcode (e.g., NIST-TS, employee sample), or if a small number of samples (e.g., proficiency test) are to be run on the Qiagen BioRobot®.

**5.2.4** When the protocol is finished, open the pre-amplification worksheet (DNA Database PowerPlex Fusion Punch/Amplification Sheet). It can be found on the desktop. Open the shortcut: (C:\Program Files\QIAsoft\UserData\Pre Amplification Worksheets). Open the file corresponding to the run.

**5.2.5** Review the sample numbers and correct any scanning issues. Use the pre-amplification worksheet as a guide for punching during the amplification protocol. Record Punch Information and Amplification Reagent Information for the amplification setup. A .pdf copy of the pre-amplification worksheet shall be maintained with the run file.

### 5.3 PPF Direct Amplification – 1 Plate Protocol

**5.3.1** Follow the prompts on the screen to prepare the BioRobot for amplification setup of one plate.

**5.3.2** When adding punches to the PCR plate, follow the instructions listed in the DNA Database Section Procedure for PCR Amplification with PowerPlex® Fusion.

**5.3.3** When the protocol is complete, ensure punches are appropriately distributed in the plate. Cap used wells in the 96-well reaction plate. Spin the plate for 1 minute at 2000 rpm to ensure all punches and reagents are at the bottom of the wells and no bubbles are present. Place the 96-well reaction plate onto a thermal cycler and amplify the plate as described in the DNA Database Section Procedure for PCR Amplification with PowerPlex® Fusion.

**5.3.4** When the protocol is finished, a result file (Qiagen Amplification Report) is created. This file can be found on the desktop. Open the shortcut: (C:\Program Files\QIAsoft\UserData\ReportData). Open the file corresponding to the run.

**5.3.5** Adjust page layout as needed to minimize the number of pages. Ensure the report is complete and accurate. A .pdf copy of the result file shall be maintained with the run file. A detailed report can be found in (C:\Program Files\QIAsoft\UserData\LogFiles).

### 5.4 PPF Direct Amplification – 1 to 4 Plates Protocol

**5.4.1** Follow the prompts on the screen to prepare the BioRobot for amplification setup of one to four plates.

**5.4.2** When adding punches to each PCR plate, follow the instructions listed in the DNA Database Section Procedure for PCR Amplification with PowerPlex® Fusion.

**5.4.3** When the protocol is complete, ensure punches are appropriately distributed in the plate. Cap used wells in each 96-well reaction plate. Spin each plate for 1 minute at 2000 rpm to ensure all punches and reagents are at the bottom of the wells and no bubbles are present. Place each 96-well reaction plate onto a thermal cycler and amplify each plate as

described in the DNA Database Section Procedure for PCR Amplification with PowerPlex® Fusion.

**5.4.4** When the protocol is finished, a result file (Qiagen Amplification Report) is created. This file can be found on the desktop. Open the shortcut: (C:\Program Files\QIAsoft\UserData\ReportData). Open the file corresponding to the run.

**5.4.5** Adjust page layout as needed to minimize the number of pages. Ensure the report is complete and accurate. A .pdf copy of the result file shall be maintained with the run file. A detailed report can be found in (C:\Program Files\QIAsoft\UserData\LogFiles).

### 5.5 Create the 3500xL setup sheet

**5.5.1** Open the desktop shortcut: (C:\ProgramFiles\QIAsoft\UserData\ExportData) and open the excel file (.csv file) corresponding to the file name/batch number.

**5.5.2** Open a copy of the 3500xL setup sheet (found on section shared drive).

**5.5.3** Starting at cell 2B in the .csv file, highlight and copy the sample names.

**5.5.4** Paste the copied selection into 3C of the 3500xL Plate Map tab of the .xls file. Type the file name/batch number in cell B1. Type the initials of the 3500xL operator in cell M15.

**5.5.5** Record lot number information for 3500xL setup. Save the file as a .xls file in the appropriate location (C:\Program Files\QIAsoft\UserData\3500 Files). A .pdf copy of the 3500xL setup sheet shall be maintained with the run file.

## 6.0 Limitations

**6.1** At a minimum, the Qiagen BioRobot® shall be run every ten working days. If a run is not scheduled, a water run shall be performed as described in the DNA Database Section Procedure for Instrument and Equipment Quality Control.

## 7.0 Safety

**7.1** The use of the procedures in this document may cause exposure to the following, and precautions as noted in the Laboratory and Section Safety Manuals shall be used:

**7.1.1** Blood borne pathogens

**7.1.2** Chemical hazards

**7.2** This instrument contains moving parts and their movement is not always indicated. Use caution during operation.

**7.3** Use caution when operating the bar code reader as the beam can cause serious eye damage. Avoid looking directly at the beam.

## 8.0 References

3500 Data Collection Software

DNA Database Administrative Policy and Procedure

DNA Database Administrative Procedure for Safety and Hazardous Waste Disposal

DNA Database Section Procedure for DNA Reagent Quality Control

DNA Database Section Procedure for Instrument and Equipment Quality Control

DNA Database Section Procedure for PCR Amplification with PowerPlex® Fusion

DNA Database Section Procedure for Sample Accessioning and Processing

DNA Database Section Procedure for Sample Processing Quality Control

DNA Database Section Procedure for Use of the 3500xL Genetic Analyzer

Procedure for CODIS-DNA Database

Protocols for PPF Sample ID Scan and Process Sheets, PPF Direct Amplification – 1 Plate, and PPF Direct Amplification – 1 to 4 Plates

Qiagen BioRobot® 8000 User Manual

QIAsoft 5 Operating System User Manual

State Crime Laboratory Quality Manual

State Crime Laboratory Safety Manual

## 9.0 Records

- BioRobot® Log Notebooks

## 10.0 Attachments – N/A

| **Revision History** | | |
|---|---|---|
| Effective Date | Version Number | Reason |
| 08/03/2015 | 1 | Original Document |
| 12/21/2015 | 2 | 5.1.9 include manually adding reagents; 5.4.3 specified spin time/rpm |
| 03/03/2017 | 3 | Updated Definitions; 4.0-Removed disposable plasticware; 5.1.4-Listed software login information; 5.1.5-Added note; 5.1.6.2 and 5.1.6.3-Removed the robotic addition of 2800M; 5.2.2-Removed naming convention; 5.3.3 and 5.4.3-Added requirement to check punch distribution after plate setup; 5.3.3-Specified spin time/rpm; Removed 5.6, 5.7 and 7.1.2.1; Updated References; Updated Records |
| 03/12/2018 | 4 | 3.0 and 4.0-Clarified System Liquid as purified water; 8.0-Updated CODIS procedure name |