DNA Training Manual

Individualized training plan prepared for: _____

Date of start of training: _____

Date of completion of bench work training: _____

Date of completion of analysis and report writing training: _____

Date of Technical Review authorization: _____

7.1 Purpose

The primary objective reflected in this section is to demonstrate a comprehensive training program for all personnel entering the Division of Scientific Services DNA Unit, or being trained in particular tasks in the DNA Unit, to allow for, at its completion, employees to be fully capable of independent casework dependent upon their job title and assigned duties.

This program is designed to train personnel in laboratory-specific forensic DNA protocols. Here within is an outline of formal procedures for the training and assessment of new examiners and technicians in the DNA unit. The goal of this program is to develop DNA examiners and/or technicians capable of performing independent forensic DNA analysis. Successful completion of this program in its entirety will take approximately six months. However, the training program may be abbreviated as warranted for examiners and technicians that have previous experience in forensic DNA methods with approval of the TL. Each trainee will be given this training manual with the tasks that they are to complete documented by a check in the box to the left of each task. While new employees just starting their careers in forensic DNA examination will need to complete all tasks in their assigned modules, new employees with previous forensic DNA experience will have modified training plans geared due to their previous expertise. Therefore, some listed tasks will not be required, and will therefore not be checked off. Also, not every employee will be trained in every module. Some new employees will not be tasked with, for example, database processing or known DNA analysis. Therefore, it is possible that full modules of this manual will remain blank. Regardless of full or modified training, a competency test will be given prior to performing casework. The signature of the technical leader, assistant director, and deputy director on the last page of this manual will be documentation of his/her approval of the individual training plan, including the approval of omitted parts of the plan due to analysts previous experience.

This training program is designed to supplement, for analysts, successful completion of college coursework in biochemistry, molecular biology, genetics, and population genetics/statistics as required by the FBI QAS. The training program will expose the DNA trainee to the scientific principles underlying each DNA test used by the State of Connecticut Division of Scientific Services. Prior to the administering of competency tests and moot courts, a review of all training documents is to be completed by the Technical Leader, Quality Manager, and Assistant Director and/or Deputy Director. Moot courts will include direct and cross examination, as well as the introduction of evidence/exhibits. There will be documentation of the moot court exercise, containing an evaluation of the analyst's performance that will be retained by the laboratory. Assessment will be made at the completion of each module. Each module will be approved by the Training Coordinator, supervisor, or Training Coordinator designee once the trainee has been deemed competent at the specified tasks. Multiple modules may be assessed simultaneously.

The trainee will maintain (a) training binder(s) containing all worksheets, printouts generated, and results of each module as they are being completed. At the completion of training, the Training Coordinator will maintain the binder(s) in his/her office, being retained at the laboratory (please refer to GL-11 for the control of records for record retention policy). These records should clearly indicate which training module they pertain to. Most DNA Unit personnel must pursue yearly continuing education in the form of workshops, seminars, professional conferences or collegiate coursework as well as further on-the-job training as specified by FBI QAS, to be documented separate from this training binder.

If additional training above those tasks listed in this manual becomes necessary, a modified training plan must be created, documented on DNA QR-283 Addendum Training Record, and approved by the Technical Leader prior to implementation. A competency test will still be administered at the completion of this addendum.

For any necessary re-training of DNA Unit personnel, please refer to GL-14 General Training.

7.2 Responsibility

DNA Unit personnel: New hires to complete, and current personnel to assist in/augment their training process.

7.3 DNA Training Program: New Employees or Additional Training, DNA Unit

7.3.1 Introduction

This section must be completed by Forensic Science Examiners 1, 2, and 3, Laboratory Assistants, and Connecticut Careers Trainees (CCT).

7.3.1.1 Goal: Upon completion, the examiner will be familiar with the general forensic laboratory operations and his/her individual responsibilities.

		Trainee Initials/Date	Trainer Initials/Date
7.3.1.2	Tasks		
7.3.1.2.1 ☐	Orientation to the laboratory facility, personnel, table of organization, and the chain of command		
7.3.1.2.2 ☐	Familiarization with other forensic disciplines practiced at the laboratory, via laboratory tour		

		Trainee Initial/Date	Trainer Initial/Date
7.3.1.3	Required Reading		
7.3.1.3.1 ☐	Laboratory Quality Manual		
7.3.1.3.2 ☐	SWGDAM Guidelines – current version		
7.3.1. 3.3 ☐	Quality Assurance Standards for Forensic DNA Testing Laboratories (current version)		
7.3.1.3.4 ☐	Quality Assurance Standards for DNA Databasing Laboratories (current version)		
7.3.1.4	Assessment of Introduction Section		
7.3.1.4.1 ☐	Oral and/or written evaluation by the supervisor or designee, to include moot court questions		

7.3.2 Evidence Handling / Examination

This section must be completed by Forensic Science Examiners 1, 2, and 3, Laboratory Assistants, and CCTs.

7.3.2.1 Goals

7.3.2.1.1 To handle evidentiary samples in an appropriate manner

7.3.2.1.2 To preserve evidence that may need to be analyzed by other sections within the laboratory

7.3.2.1.3 To learn the operation of the LIMS computer system, understanding the importance of the chain of custody, and the creation of items of evidence at the time they are made.

7.3.2.1.4 To demonstrate competency in the basic tasks necessary to complete evidence documentation and handling for DNA (DNA QR-1 and DNA-QR-1A) through written exam and/or questions given in a moot-court setting.

7.3.2.2 Tasks

		Trainee Initials/Date	Trainer Initials/Date
7.3.2.2.1 ☐	Receive training on LIMS computer system from Laboratory LIMS Administrator		
7.3.2.2.2 ☐	To learn the laboratory procedures for receipt, transfer, storage, and return of evidence on the LIMS computer system for DNA casework		
7.3.2.2.3 ☐	To learn the written procedures and LIMS computer system for receipt, transfer, and storage of convicted offender samples for DNA database analysis		
7.3.2.2.4 ☐	To learn how and when to create sub-items for evidence on the LIMS computer system		
7.3.2.2.5 ☐	To demonstrate knowledge of how evidence is stored at the laboratory		
7.3.2.2.6 ☐	To demonstrate knowledge of safe handling procedures of evidence (to avoid contamination of evidence or exposure of examiner/co-workers to potential biohazards)		
7.3.2.2.7 ☐	To demonstrate knowledge of maintaining the the custody and integrity of evidence.		
7.3.2.2.8 ☐	To learn the laboratory case acceptance policies by reading ER SOP-01, ER SOP 1.1, ER SOP-02, ER SOP 02-1, and ER SOP-04		
7.3.2.2.9 ☐	To demonstrate knowledge of awareness of order of evidence examinations.		
7.3.2.2.10 ☐	Orientation to Evidence Receiving, given by an ECO		

		Trainee Initials/Date	Trainer Initials/Date
7.3.2.3	Required Reading		
7.3.2.3.1 ☐	Quality Manual for LIMS (GL-4)		
7.3.2.4	Assessment of Evidence Handling section		
7.3.2.4.1 ☐	Demonstrate/document proficiency/understanding regarding tasks in this section to trainer or designee by answering appropriate moot court questions		

7.3.3 Foundational Scientific Knowledge

This section must be completed by Forensic Science Examiners 1, 2, and 3, and CCTs. Laboratory assistants may complete tasks deemed appropriate by the supervisor, trainer, or designee.

7.3.3.1 Goal: To ensure examiners have both the formal education and a working knowledge of the fundamental scientific concepts underlying DNA analysis in a forensic laboratory setting.

7.3.3.2 Tasks: To document coursework and/or training in the following general subject areas and a working knowledge of the principles listed, providing transcripts. This approval shall be completed by the Technical Leader after review of transcripts.

		Trainee Initials/Date	Technical Leader Initial/Date
7.3.3.2.1 ☐	Genetics: Alleles; Mendelian inheritance; genotype vs. phenotype; coding vs. non-coding, DNA vs. protein markers		
7.3.3.2.2 ☐	Biochemistry: The study of the nature of biologically important molecules in living systems, DNA replication and protein synthesis, and the quantitative and qualitative aspects of cellular metabolism		
7.3.3.2.3 ☐	Molecular Biology: the study of theories, methods, and techniques used in the study and analysis of gene structure, organization, and function		

		Trainee Initials/Date	Technical Leader Initials/Date
7.3.3.2.4 ☐	Population genetics and statistics: Hardy-Weinberg equilibrium; allelic and genotypic frequencies; ideal population considerations; theta, population databases and minimum size; the use of different race/ethnicity population databases; population substructure; expected frequency (match probability) vs. likelihood ratio calculations; basic probability concepts (product rule, independence)		

		Trainee Initials/Date	Trainer Initials/Date
7.3.3.2.5 ☐	Document in training binder relevant continuing education and/or training (in-house or outside agency), providing certificates and/or topic outlines		
7.3.3.3	Required Reading		
7.3.3.3.1 ☐	NRC II (1996)		
7.3.3.3.2 ☐	Advanced Topics in Forensic DNA Typing: Methodology (Copyright 2012). (Selected chapters, as determined by trainer)		
7.3.3.4	Assessment of Foundational Scientific Knowledge Section		
7.3.3.4.1 ☐	Oral examination in moot court setting covering basic principles and required reading		

7.3.4 Applied Scientific Knowledge

This section must be completed by Forensic Science Examiners 1, 2, and 3 and CCTs. Laboratory assistants may complete tasks deemed appropriate by the supervisor or designee.

7.3.4.1 Goal: To train an examiner in the details of forensic DNA analyses such that he/she will be able to (a) Apply the knowledge to the processing of forensic DNA evidence and (b) Provide the court with an appropriate explanation of how DNA testing is performed.

7.3.4.2 Tasks: to provide instruction and theory regarding the following:

		Trainee Initials/Date	Trainer Initials/Date
7.3.4.2.1 ☐	Basic Biochemical Formulas: Performing serial dilutions, determining concentrations, etc.		
7.3.4.2.2 ☐	Basic theoretical understanding of past methodologies and platforms of forensic DNA typing (through assigned chapter readings)		
7.3.4.2.3 ☐	DNA Extraction Methods: Provide knowledge of the protocol differences for DNA extractions (manual and automation) of blood, buccal cells, hair, bone, teeth, tissue, and differential DNA extractions		
7.3.4.2.4 ☐	DNA Quantitation Method: Quantifiler Trio using 7500 real-time PCR and software		
7.3.4.2.5	PCR Based Methods		
7.3.4.2.5.1 ☐	Autosomal STRs		
7.3.4.2.5.2 ☐	Y-STRs		
7.3.4.2.6	Population Statistics		
7.3.4.2.6.1 ☐	Determining Allele Frequencies		
7.3.4.2.6.2 ☐	National Population DNA Databases		

		Trainee Initials/Date	Trainer Initials/Date
7.3.4.3	Required Reading		
7.3.4.3.1 ☐	Internal validation summaries of currently used methodologies performed by the Division of Scientific Services		
7.3.4.3.2 ☐	Developmental validation studies of amplification kits currently used by the Division of Scientific Services		
7.3.4.3.3 ☐	Review articles for STRs (Autosomal &Ys)		
7.3.4.3.2 ☐	SWGDAM Contamination Prevention and Detection Guidelines for Forensic DNA Laboratories		
7.3.4.3.3 ☐	Familiarization with risk assessment (noted in GL-1 and GL-9, briefly, and prevention of sample loss through reducing/preventing contamination		
7.3.4.4	Assessment of Applied Scientific Knowledge section		
7.3.4.4.1 ☐	Moot court to demonstrate theoretical understanding of all tasks/readings in section		

7.3.5 Laboratory Analytical Procedures

Definitions:

Trainer: Laboratory personnel competent in specific workflow process being taught.

Trainee: Laboratory personnel learning the workflow process.

Observed: Trainee will observe the trainer perform the workflow process.

Supervised: Trainer will observe the trainee perform the workflow process.

Independent: Trainee will perform the workflow process without supervision.

7.3.5.1 Casework Laboratory Procedures

This section must be completed by Forensic Science Examiners 1, 2, and 3, laboratory assistants, and CCTs working with casework evidentiary samples.

Extracted samples will be quantitated, amplified, run on a genetic analyzer, and analyzed to determine if a DNA profile is detectable from the extracted genomic DNA.

7.3.5.1.1 Goal: To provide practical instruction on the laboratory procedures to be used by the examiner, ending with a competency test covering all aspects and procedures trained in.

Note: Completion of Training: The trainer and trainee can evaluate the training and determine if additional or less training in a specific area is necessary. This alteration to the training must be documented and agreed upon by training coordinator, trainer, trainee, and Technical Leader. Examination and competency test will not be taken until training coordinator, trainer, and trainee deem the trainee ready.

		Trainee Initials/Date	Trainer Initials/Date
7.3.5.1.2	Tasks		
7.3.5.1.2.1 ☐	SOP Review: DNA SOP-20 Extraction of Unknown Samples on EZ1 Advanced XL		
7.3.5.1.2.2 ☐	Review Reagent QC List		
7.3.5.1.2.3 ☐	Training in DNA Worklist macro, to make worksheets for extraction and quantification		
7.3.5.1.2.4 ☐	(To be conducted by a member of Forensic Biology section) KM training, including observed and supervised testing of various stains and substrates, and theory.		
7.3.5.1.2.5 ☐	(To be conducted by a member of Forensic Biology section) Evidence examination training of swab-only evidence submissions		

		Trainee Initials/Date	Trainer Initials/Date
7.3.5.1.2.6 ☐	Understand the difference between evidence and work product		
7.3.5.1.2.7 ☐	Reading: Product inserts/instruction manuals for EZ1 and Investigator Kits		
7.3.5.1.2.8 ☐	Observed lab work: DNA extraction of real or mock evidence on Qiagen EZ1: at least three samples, including one hair, appropriate positive controls and reagent blanks		
7.3.5.1.2.9 ☐	Review PowerPoint presentation on theory of qPCR		
7.3.5.1.2.10 ☐	SOP Review: DNA SOP-3 DNA Quantitation		
7.3.5.1.2.11 ☐	Reading: product insert/instruction manuals for 7500 and Quantifiler Trio		
7.3.5.1.2.12 ☐	SOP Review: DNA WI-07 Quantifiler Trio DNA Quantification Work Instructions, paying attention to "stop at quant" procedure, and how degradation affects amplification.		
7.3.5.1.2.13 ☐	Training in 7500 software setup, to include use of macros		
7.3.5.1.2.14 ☐	Observed lab work: DNA quantitation of samples previously extracted		
7.3.5.1.2.15 ☐	Software Training: 7500 software, analysis, & troubleshooting		

		Trainer Initials/Date	Trainee Initials/date
7.3.5.1.2.16 ☐	Training in amplification, dilution, halt at quant, and staff search, worksheet creation		
7.3.5.1.2.17 ☐	SOP Review: SOP for current STR kit that covers its amplification and detection		
2.3.5.1.2.18 ☐	Overview of history of legacy typing kits		
7.3.5.1.2.19 ☐	Reading: Product insert for current STR amplification system		
7.3.5.1.2.20 ☐	Reading: Product insert for current Y-STR amplification system		
7.3.5.1.2.21 ☐	Observed lab work: Amplification of samples with STR kit currently used in casework		
7.3.5.1.2.22 ☐	Observed lab work: Amplification of appropriate samples with Y-STR kit currently used for casework		
7.3.5.1.2.23 ☐	Workbook macro training to create CE injection plate		
7.3.5.1.2.24 ☐	Learn routine maintenance of CE instrument		
7.3.5.1.2.25 ☐	Observed lab work: Operation of CE collection software, preparation of an injection plate for samples previously amplified		
7.3.5.1.2.26 ☐	Supervised lab work: DNA Extraction, quant, amplification (STR & Y-STR) through injection of mock evidence-type samples: five samples, one positive control, and one reagent blank. Creation of worksheets need not be supervised		

			Trainee Initials/Date	Trainer Initials/Date
7.3.5.1.2.27 ☐	Independent lab work: DNA Extraction, quant, amplification (STR& Y-STR) through injection of mock evidence-type samples: ten samples (including two hairs) , one positive control, and one reagent blank, including creation of worksheets, and importing samples into appropriate analysis software. (2X)	1)		
		2)		
7.3.5.1.2.28 ☐	Observed lab work: DNA Extraction of semen-containing evidence samples on Qiagen EZ1: one Sample, one positive control, and one reagent blank. (If previous EZ1 run has been observed, only necessary for observation through incubation of b-fractions.)			
7.3.5.1.2.29 ☐	Supervised lab work: DNA Extraction of semen-containing evidence samples on Qiagen EZ1: two samples, one positive control, and one reagent blank, through injection. (If previous EZ1 run has been supervised, only necessary to supervise through incubation of b-fractions.)			
7.3.5.1.2.30 ☐	Independent lab work: DNA Extraction of semen-containing evidence samples on Qiagen EZ1: five samples one positive control, and one reagent blank, through injection. (2X)	1)		
		2)		
7.3.5.1.2.31 ☐	SOP Review: DNA SOP-20.6 Concentration and Purification of DNA Samples, to include discussion on how to determine Microcon appropriateness.			
7.3.5.1.2.32 ☐	Observed lab work: Concentration of an appropriate sample previously extracted, or of a mock sample (will not proceed past concentration).			

		Trainee Initials/Date	Trainer Initials/Date
7.3.5.1.2.33 ☐	Supervised lab work: Concentrate an appropriate sample previously extracted		
7.3.5.1.2.34 ☐	Independent lab work: Concentrate 2 previously extracted samples		
7.3.5.1.2.35 ☐	Independent lab work: Perform amplification through injection of 3 concentrated samples		
7.3.5.1.2.36 ☐	Male Screen Protocol: Refer to separate training in DNA SOP-34.1 Male Screen Training Plan		
7.3.5.1.3	Assessment of Section Casework Laboratory Procedures section: Competency Exam to include:		
7.3.5.1.3.1 ☐	Evidentiary Sample Practical: To include evidence six non-semen containing (including two hairs), and two semen-containing samples, with appropriate controls, EZ1extraction through injection. A minimum of one sample to be concentrated, and a minimum of one sample to be amplified with Y-STRs		
7.3.5.1.3.2 ☐	Written Exam: pertaining to evidentiary sample processing		
7.3.5.1.3.3 ☐	Moot court: covering laboratory techniques from evidence examination through injection		

7.3.5.2 Database/Casework Knowns Laboratory Procedures

This section must be completed by Forensic Science Examiners 1, 2, and 3, Laboratory Assistants, and CCTs working with known evidentiary and/or database samples.

Extracted samples will be amplified, injected, and analyzed to determine if correct DNA profile is generated from the extracted genomic DNA. Convicted offender training

samples should all be in CODIS with expanded loci. Competency test samples will not be samples used in training.

7.3.5.2.1 Goal: To provide practical instruction on the laboratory procedures to be used by the examiner concluded with a competency test, to cover all aspects and procedures in which one is trained.

Note: Completion of Training: The trainer and trainee can evaluate the training and determine if additional or less training in a specific area is necessary. This alteration to the training must be documented and agreed upon by training coordinator, trainer, trainee, and Technical Leader. Examination and competency test will not be taken until training coordinator, trainer, and trainee deem the trainee ready.

7.3.5.2.2	Tasks	Trainee Initials/Date	Trainer Initials/Date
7.3.5.2.2.1 ☐	SOP Review: DNA SOP-19 Processing of Single Source Samples on the EZ1 Advanced XL		
7.3.5.2.2.2 ☐	Reading: Product inserts/instruction manuals for EZ1 and Investigator Kits		
7.3.5.2.2.3 ☐	Observed lab work: Extraction of one blood, one buccal FTA, one buccal swab, one positive control and one reagent blank using normalization procedure on EZ1(to include worksheet creation)		
7.3.5.2.2.4 ☐	Reading: Product inserts/instruction manuals for STR & Y-STR amplification kits		
7.3.5.2.2.5 ☐	Observed lab work: Amplification (STRs & Y-STRs) of samples previously extracted (to include worksheet creation)		
7.3.5.2.2.6 ☐	Learn routine maintenance of CE instrument		

		Trainee Initials/Date	Trainer Initials/Date
7.3.5.2.2.7 ☐	Observed lab work: Operation of CE instrument collection software, preparation of an injection plate for samples previously amplified (to include worksheet creation)		
7.3.5.2.2.8 ☐	Supervised lab work: Extraction of 3 bloods, 2 Buccal FTAs, 1 buccal swab, and appropriate controls using normalization procedure on EZ1, manual amplification (STRs & Y-STRs) and injection		
7.3.5.2.2.9 ☐	Independent lab work: Extraction of 5 bloods, 3 Buccal FTAs, 2 buccal swabs, and appropriate controls using normalization procedure on EZ1, manual amplification (STRs and Y-STRs) and injection		
7.3.5.2.2.10 ☐	SOP review: SOPs pertaining to processing of casework knowns and single source samples		
7.3.5.2.2.11 ☐	Use macro to create sample list of consecutive database or known samples, and setup plate workbook		
7.3.5.2.2.12 ☐	Reading: BSD Duet users' manual		
7.3.5.2.2.13 ☐	Training on BSD cleaning & Maintenance		
7.3.5.2.2.14 ☐	Observed lab work: Set-up & punching of up to one full plate		
7.3.5.2.2.15 ☐	Reading: GlobalFiler Express insert		
7.3.5.2.2.16 ☐	Observed lab work: Direct Amplification of up to one full plate of samples previously punched		

		Trainee Initials/Date	Trainer Initials/Date
7.3.5.2.2.17 ☐	Observed lab work: Injection of up to one full plate of samples, previously amplified		
7.3.5.2.2.18 ☐	Observed lab work: Reinjections (cherry-picking) of samples previously injected (minimum of 5 samples)		
7.3.5.2.2.19 ☐	Supervised lab work: Setup & punching of plate containing at least two full modules, followed by direct amplification, injection, and cherry-picking of samples needing reinjection (determined by analyst, minimum of 5)		
7.3.5.2.2.20 ☐	Independent lab work: Setup & punching of plate containing at least two full modules, followed by direct amplification , injection, and cherry-picking of samples needing reinjection (determined by analyst, minimum of 5) (X2)	1) 2)	
7.3.5.2.2.21 ☐	Macro training to create sample list of non-consecutive database or known samples, and setup plate workbook		
7.3.5.2.2.22 ☐	Observed lab work: Entire process of known examination, from evidence receiving, to storage, to examiner, to exam, back to storage. To include write-up and LIMS itemization. At least 10 knowns, including 2 FTA cards, 2 swabs, one blood FTA and one EZ collect device.		
7.3.5.2.2.23 ☐	Supervised lab work: Evidence examination of 2 mock knowns (one FTA and one buccal swab)		
7.3.5.2.2.24 ☐	Independent lab work: Evidence examination of 2 mock knowns (one FTA and one buccal swab)		

		Trainee Initials/Date	Trainer Initials/Date
7.3.5.2.2.25 ☐	Competency Exam: Set-up through injection of one module, using direct amplification, and 2 blood & 2 buccal samples on the EZ1 using the normalization procedure with moot court to demonstrate understanding of laboratory processes & concepts, as well as a written exam		

7.3.5.3 Convicted Offender Samples and CODIS

This section must be completed by Forensic Science Examiners 1, 2, and 3, Laboratory Assistants and CCTs working with convicted offender samples. It should be completed in addition to QR-284, CODIS Training.

7.3.5.3.1 ☐	SOP Review: DNA SOP-10, CODIS Administration, DNA SOP-15, CODIS Hit Confirmations, DNA SOP-11, Collection from Offenders, Missing Persons and Relatives of Missing		
7.3.5.3.2 ☐	Reading: State database statutes (CODIS)		
7.3.5.3.3 ☐	Reading: State database regulations (CODIS)		
7.3.5.3.4 ☐	CODIS Training on CJIS-WAN (modules taken at the discretion of the CODIS administrator)		
7.3.5.3.5 ☐	Observation: import of one full plate and one partial late of database samples including checking on duplicates & dispositions		
7.3.5.3.6 ☐	Supervised work: import of one full plate and one partial plate of database samples, including checking on duplicates & dispositions.		

		Trainee Initials/Date	Trainer Initials/Date
7.3.5.3.7 ☐	Independent work: import of one full plate and one partial plate of database samples, including checking on duplicates & dispositions.		
7.3.5.3.8 ☐	COLLECT training		
7.3.5.3.9 ☐	Training on hit confirmations: Understanding workflow to check for new hit confirmations, pull database cards, COLLECT searches, and processing of hit confirmation paperwork		
7.3.5.3.10 ☐	Training on post-processing of convicted offender samples		
7.3.5.3.11 ☐	Observed work: post-processing of 10 samples		
7.3.5.3.12 ☐	Supervised work: post-processing of 20 samples		
7.3.5.3.13 ☐	Competency test: Importing of one full plate of database samples, moot court describing laboratory CODIS policies.		
7.3.5.3.14 ☐	DNA QR-284, CODIS Training, completed		

7.3.5.4 Analysis for questioned & known samples

To be completed by Forensic Science Examiners 1, 2, and 3 and CCTs (prior to completion of program), who will be doing complex analysis on all types of forensic samples, including STRmix interpretation, with the eventual goal to be able to seamlessly portray all analyses and protocols in a court of law to a lay jury member. Sections pertaining to administrative review can be completed without the need for analysis or technical review training. Employees who are not deemed qualified analysts may be trained in, and complete administrative reviews of both batch paperwork and case jackets.

			Trainee Initials/Date	Trainer Initials/Date
7.3.5.4.1 ☐	SOP Review: DNA SOPs pertaining to analysis of STRs and Y-STRs, including software programs.			
7.3.5.4.2 ☐	GeneMarker Demonstration			
7.3.5.4.3 ☐	Review PowerPoint presentation on common artifacts found in forensic analysis			
7.3.5.4.4 ☐	Reading: SWGDAM Interpretation Guidelines for Autosomal STR Typing by Forensic DNA Testing Laboratories			
7.3.5.4.5 ☐	Number of contributor training, including training on theory, utilization, and limitations of DNA-QR-302 Contributor Estimation Worksheet			
7.3.5.4.6 ☐	Observed analysis: Review of a batch through analysis (3X) (to include macros used during analysis process such as concordance check, project comparison, etc.)	1) 2) 3)		
7.3.5.4.7 ☐	Review case jacket documentation upon batch completion			
7.3.5.4.8 ☐	Observed analysis: Technical Review of a batch through analysis (3X)	1) 2) 3)		
7.3.5.4.9 ☐	Observed analysis: Administrative Review of a batch through analysis			

			Trainee Initials/Date	Trainer Initials/Date
7.3.5.4.10 ☐	Independent analysis: review of mock-batch (to include a minimum of 30 STR profiles) for analysis, technical review, or administrative, review, as appropriate for required duties (3X)	1)		
		2)		
		3)		
7.3.5.4.11 ☐	Demonstration on GeneMapper IDX (Y-STR analysis only)			
7.3.5.4.12 ☐	Reading: SWGDAM Interpretation Guidelines for Y-Chromosome STR Typing			
7.3.5.4.13 ☐	Observed analysis: 5 Y-STR profiles			
7.3.5.4.14 ☐	Independent analysis: analysis of Y-STR data (at least 5 questioned samples)			
7.3.5.4.15 ☐	SOP Review: SOPs pertaining to processing of convicted offender/database/single source samples using current methods			
7.3.5.4.16 ☐	GeneMarker demonstration, specifically for known and/or database sample analysis			
7.3.5.4.17 ☐	Macro training for all macros associated with known analysis, including staff search when contamination is detected			
7.3.5.4.18 ☐	Observed analysis: analysis of one batch of casework known samples			
7.3.5.4.19 ☐	Observed analysis: analysis of one full plate of database samples			

			Trainee Initials/Date	Trainer Initials/Date
7.3.5.4.20 ☐	Independent analysis: analysis of two batches of previously completed casework known samples	1)		
		2)		
7.3.5.4.21 ☐	Independent analysis: analysis of two full plates of previously completed database samples	1)		
		2)		
7.3.5.4.22	Assessment of Analysis section			
7.3.5.4.22.1 ☐	Competency exam: Analysis of one previously completed casework batch			
7.3.5.4.22.2 ☐	Competency exam: Analysis of one previously completed casework knowns batch			
7.3.5.4.22.3 ☐	Competency exam: Analysis of one previously completed full plate of database samples			
7.3.5.5	**CODIS Training**			
7.3.5.5.1 ☐	Hands-on training: Deducing CODIS profiles from mixtures using and without using, elimination knowns			
7.3.5.5.2 ☐	SOP Review: DNA SOP-13 CODIS Profile Entry and Data Bank			
7.3.5.5.3 ☐	Independent analysis: Complete worksheet for CODIS eligibility and entry of 5 samples			
7.3.5.5.4 ☐	Independent analysis: Complete required CODIS elements per State CODIS Administrator, including all applicable examinations on CODIS WAN			
7.3.5.5.5	Written exam: determining eligibility of CODIS			

		Trainee Initials/Date	Trainer Initials/Date
☐	samples & profiles to be entered		
7.3.5.5.6 ☐	DNA QR-284, CODIS Training, completed		

7.3.5.6 Analytical Comparisons, STRmix and Report Writing

This section must be completed by Forensic Science Examiners 1, 2, and 3, as well as CCTs to become Forensic Science Examiner 1s.

7.3.5.6.1 Goals:

To provide training in interpretation of DNA results (including mixtures, single source profiles, parentage testing); to write a comprehensive report that accurately reflects the DNA typing results, to learn case flow from beginning to end.

	Tasks	Trainee Initials/Date	Trainer Initials/Date
7.3.5.6.2.1 ☐	SOP Review: DNA SOP-6 Report Templates, Statistic Templates, Stutters, and Criticals.		
7.3.5.6.2.2 ☐	Review case flow operations through current DNA WIs		
7.3.5.6.2.3 ☐	Reading: Forensic DNA Evidence Interpretation Second Edition, Chapters 8 & 9		
7.3.5.6.2.4 ☐	Reading: Read STRmix Operation Manual		
7.3.5.6.2.5 ☐	SOP Review: SOPs and workflows for STRmix		
7.3.5.6.2.6 ☐	Review of all PowerPoint presentations contained in in STRmix training folder, completing all associated quizzes and worksheets that complement the presentations (including likelihood ratio training)		

			Trainee Initials/Date	Trainer Initials/Date
7.3.5.6.2.7 ☐	STRmix software demonstration			
7.3.5.6.2.8 ☐	Practice: Complete STRmix analysis of sample profiles, completing 2nd diagnostic worksheets and number of contributor assessment			
7.3.5.6.2.9 ☐	Practical test: Complete STRmix practical tests #1 and #2, including report writing	1) 2)		
7.3.5.6.2.10 ☐	Read GL-11 Control of Records for lab polices on case file confidentiality, contents of file and discussion of lab results to submitting agencies and attorneys.			
7.3.5.6.2.11 ☐	Use of report templates/macros and standardized wording for report consistency			
7.3.5.6.2.12 ☐	Report Workbook macro training			
7.3.5.6.2.13 ☐	Understand writing of written notification, such as amended letters and reports, and change in CODIS profile memos.			
7.3.5.6.2.14 ☐	Observation of report writing, to include a minimum of 20 reports, 10 at least with known comparisons and 5 at least with STRmix			
7.3.5.6.2.15 ☐	Documentation of reports in the LIMS computer system			
7.3.5.6.2.16 ☐	Training on finalizing reports and submitting finalized reports to submitting agencies.			

		Trainee Initials/Date	Trainer Initials/Date
7.3.5.6.2.17 ☐	Observed review: Technical Review of 10 cases		
7.3.5.6.2.18 ☐	Observed review: Administrative Review of 3 cases		
7.3.5.6.2.19 ☐	Independent work: Write reports on one mock batch set for a minimum of 5 reports, trying to be inclusive of all aspects of Nuclear DNA report writing. To be documented on QR-4s to be kept in training binder, along with notes for discrepancies found.		
7.3.5.6.2.20 ☐	Competency exam: One previously analyzed mock batch (3 cases minimum) report writing, to include comparisons and STRmix		
7.3.5.6.2.21 ☐	Moot Court, to include all aspects of analysis		
7.3.5.6.3	Parentage		
7.3.5.6.3.1 ☐	Review SOP pertaining to Criminal Parentage Testing		
7.3.5.6.3.2 ☐	Hands-on Training: Statistics for Criminal Parentage testing, to include worksheet where independent statistics are manually calculated.		
7.3.5.6.3.3 ☐	Hands-on Training: Report writing for criminal parentage testing		
7.3.5.6.3.4 ☐	Observed training on parentage report writing and statistics		

		Trainee Initials/Date	Trainer Initials/Date
7.3.5.6.3.5 ☐	Overview of Paternity Calculations, view PowerPoint		
7.3.5.6.3.6 ☐	Competency test on parentage comparisons with report writing, written test and moot court		

7.3.5.7 Legal Issues

This section must be completed by Forensic Science Examiners 1, 2, and 3, laboratory assistants, and CCTs in the DNA section.

7.3.5.7.1 Goals

7.3.5.7.1.1 To give the examiner an overview of the criminal justice system regarding expert witness testimony

7.3.5.7.1.2 To become familiar with the legal requirements for testimony in Connecticut with the expectations of the CT DESPP Division of Scientific Services

7.3.5.7.2	Tasks		
7.3.5.7.2.1 ☐	Receive guidance on examiner qualifications (voir dire), courtroom appearance (attire and demeanor), court structure, and pertinent rules of a courtroom. Make analyst aware to review notes prior to testimony.		
7.3.5.7.2.2 ☐	Prepare a curriculum vitae able to be presented as part of a discovery process.		
7.3.5.7.2.3 ☐	Review discovery and admissibility rules located on S: Drive Legal Training Folder		
7.3.5.7.2.4 ☐	Review ethical responsibility of an expert witness, included in GL 1.4 and GL 5		

		Trainee Initials/Date	Trainer Initials/Date
7.3.5.7.2.5 ☐	Read DOJ Code of Professional Responsibility for the Practice of Forensic Science		
7.3.5.7.2.6 ☐	Read: Transcripts and testimony for presentation of DNA test results		
7.3.5.7.2.7 ☐	Review Federal DNA Identification act: https://www.govregs.com/uscode/34/12592		
7.3.5.7.2.8 ☐	Read specific chapters of "Strengthening Forensic Science in the United States" (Chapters 1, 3, 4, 5 (only as it pertains to trainee's job scope), & 7)		
7.3.5.7.2.9 ☐	Read: State admissibility standard (State V. Porter)		
7.3.5.7.2.10 ☐	Read: Federal admissibility standards (Frye, Daubert)		
7.3.5.7.2.11 ☐	Read: Compilation of Connecticut Statutes related to DNA		
7.3.5.7.2.12 ☐	Observe expert testimony		
7.3.5.7.2.13 ☐	Participate in a practice testimony, including direct and cross examinations		

7.4 **Estimated Schedule for Module Completion:** (Based on time for new employee with no previous experience.)

Section #	Estimated Time to Complete
7.3.1-4	4-8 weeks
7.3.5-7	4 months

Technical Leader of the DNA Section will approve all the training. Currently qualified analysts that have completed this training manual may use DNA QR-283 "Addendum Training Record" to document successful completion of new methodologies and/or platforms. This record will be kept with all other training records.

7.5 Authorizations – Nuclear DNA Casework

The analyst will perform casework and/or reviews and after gaining experience in conducting analysis and/or reporting findings in a variety of evidence type/conclusions in the discipline. Their experience will be evaluated for the ability to conduct technical reviews. Once training has been completed, they may be deemed competent to conduct administrative reviews. Once the analyst has completed the required number of cases (see below), they may be deemed competent to conduct technical and/or administrative reviews.

		Trainee Initials/Date	Trainer Initials/Date
7.5.1 ☐	For Technical Reviews: New Analyst: complete 15 total cases		
7.5.2 ☐	For Technical Reviews: Analyst with prior experience: complete 8 total cases		

7.6 Kinship Analysis

Upon successful completion of the DNA training program select personnel may be trained in Kinship Analysis. This program outlines formal procedures for the training of personnel in Kinship analysis procedures and defines how an individual examiner will be assessed for competency. The goal of this training program is to develop an examiner capable of performing independent Kinship analysis for non-criminal cases. For examiners that have previous experience in Kinship analysis methods, the training program may be abbreviated as warranted with approval of the Technical Leader.

This training program is designed to supplement successful college coursework in biochemistry, molecular biology, genetics, and population genetics/statistics as required by the FBI QAS. The training program will expose the DNA trainee to the scientific principles underlying Kinship analysis used by the Laboratory.

Assessments will be made at the completion of each module. Each module will be approved by the technical leader once the DNA trainee has been deemed competent at the specified tasks. The DNA trainee will maintain a training folder containing the results of each module as they are being completed. The final paperwork will be retained by the

Laboratory. DNA Section personnel must pursue continuing education in the form of workshops, seminars, professional conferences or collegiate coursework as well as further on-the-job training as specified by the FBI QAS standards.

The Laboratory complies with the coursework requirements set forth in the Scientific Working Group on DNA Analysis Methods (SWGDAM) *Guidelines for a Quality Assurance Program for DNA Analysis* and the DNA Advisory Board's standards, *Quality Assurance Standards for Forensic DNA Testing Laboratories*. Examiners must have completed coursework and/or training in Molecular Biology, Genetics, Biochemistry, and Population Genetics/Statistics prior to performing casework.

7.6.1 Goal: Upon completion, the examiner will be familiar with kinship calculations utilized for non-criminal cases.

7.6.2	Tasks	Trainee Initials/Date	Trainer Initials/Date
7.6.2.1 ☐	SOP Review: DNA SOP-25, Kinship Analysis		
7.6.2.2 ☐	Review: CT DESPP Internal Kinship Validation and summaries		
7.6.2.3 ☐	Reading: SWGDAM Guidelines for Missing Persons Casework (current version)		
7.6.2.4 ☐	Hands-on training: Practice exercises in Popstats		
7.6.2.5 ☐	Hands-on training: Perform kinship calculations by hand		
7.6.2.6 ☐	Competency: Written evaluation & moot court detailing trainees understanding of kinship analysis and calculations		

7.7 Competencies Memos Received

Method(s) covered in competency memo	Date Received

7.8 Approval of training plan by Technical Leader

The signature of the Technical Leader below signifies his/her review and approval of the individualized training program & tasks designated for Trainee to complete. Training will not commence until after approval of Technical Leader is obtained.

_____ _____

Technical Leader Date

7.9 Final approval of Technical Leader

The signature of the Technical leader below signifies the successful completion of all tasks assigned to trainee in this manual, assigned to such trainee at his/her commencement of employment at the DESPP Division of Scientific Services DNA Unit:

_____ _____

Technical Leader Date

7.10 Assistant Director or Quality Manager Review

_____ _____

Signature Date

7.11 Deputy Director Review

_____ _____

Signature Date