



Office of the Inspector General
U.S. Department of Justice



**Audit of Compliance with Standards
Governing Combined DNA Index
System Activities at the Arizona
Department of Public Safety Northern
Regional Crime Laboratory
Flagstaff, Arizona**

AUDIT OF COMPLIANCE WITH STANDARDS GOVERNING COMBINED DNA INDEX SYSTEM ACTIVITIES AT THE ARIZONA DEPARTMENT OF PUBLIC SAFETY NORTHERN REGIONAL CRIME LABORATORY FLAGSTAFF, ARIZONA

EXECUTIVE SUMMARY

The Department of Justice Office of the Inspector General (OIG), Audit Division, has completed an audit of compliance with standards governing Combined DNA Index System (CODIS) activities at the Arizona Department of Public Safety, Northern Regional Crime Laboratory (Laboratory) in Flagstaff, Arizona.

Background

The Federal Bureau of Investigation's (FBI) CODIS program combines forensic science and computer technology to provide an investigative tool to federal, state, and local crime laboratories in the United States, as well as those from select international law enforcement agencies. The CODIS program allows these crime laboratories to compare and match DNA profiles electronically to assist law enforcement in solving crimes and identifying missing or unidentified persons.¹ The FBI's CODIS Unit manages CODIS, as well as develops, supports, and provides the program to crime laboratories to foster the exchange and comparison of forensic DNA evidence.

The FBI implemented CODIS as a distributed database with hierarchical levels that enables federal, state, and local crime laboratories to compare DNA profiles electronically. The hierarchy consists of three distinct levels that flow upward from the local level to the state level and then, if allowable, the national level. The National DNA Index System (NDIS), the highest level in the hierarchy, contains DNA profiles uploaded by law enforcement agencies across the United States and is managed by the FBI. NDIS enables the laboratories participating in the CODIS program to electronically compare DNA profiles on a national level. The State DNA Index System (SDIS) is used at the state level to serve as a state's DNA database and contains DNA profiles from local laboratories and state offenders. The Local DNA Index System (LDIS) is used by local laboratories.

OIG Audit Objectives

Our audit generally covered the period from August 2012 through September 2014. The objectives of our audit were to determine if: (1) the Laboratory was in compliance with select NDIS operational procedures; (2) the Laboratory was in

¹ DNA, or deoxyribonucleic acid, is genetic material found in almost all living cells that contains encoded information necessary for building and maintaining life. Approximately 99.9 percent of human DNA is the same for all people. The differences found in the remaining 0.1 percent allow scientists to develop a unique set of DNA identification characteristics (a DNA profile) for an individual by analyzing a specimen containing DNA.

compliance with certain Quality Assurance Standards (QAS) issued by the FBI; and (3) the Laboratory's forensic DNA profiles in CODIS databases were complete, accurate, and allowable for inclusion in NDIS.

Our review determined the following:

- The Laboratory was in compliance with the NDIS operational procedures tested. Specifically, the Laboratory had sufficient measures to physically and electronically safeguard CODIS; all appropriate documents were provided to the FBI for each CODIS user; and for the sample of NDIS matches we reviewed, the match confirmation process was timely.
- The Laboratory was in compliance with the QAS we reviewed, including: (1) completion of periodic external QAS reviews; (2) proper controls to prevent Laboratory access by unauthorized personnel; and (3) adequate procedures to ensure the integrity of evidence samples.² We also found the Laboratory does not currently outsource the analysis of its forensic DNA samples to another laboratory.
- We reviewed 100 of the Laboratory's 525 forensic profiles that were uploaded to NDIS as of August 12, 2014.³ Of the 100 forensic profiles sampled, we found 94 profiles were complete, accurate, and allowable for inclusion in NDIS. Our audit questioned six profiles because, although they were complete and accurate, they were either not from crime scene evidence, were developed from the suspect, or did not have sufficient detail in the case file to determine allowability. The Laboratory deleted four of the six profiles. Two of the four deleted profiles migrated from the Laboratory's local database after the 2007 CODIS software update. Through human error, the previous CODIS Administrator inadvertently marked profiles for upload to NDIS that were unallowable. Our review of the 100 forensic profiles the Laboratory uploaded to NDIS as of August 12, 2014 identified two unallowable profiles in NDIS as a result of complications associated with the 2007 software upgrade and the Laboratory's efforts to correct the problem.

We made three recommendations to address the Laboratory's compliance with standards governing CODIS activities, which are discussed in detail in the Findings and Recommendations section of the report. Our audit objectives, scope, and methodology are detailed in Appendix 1 of the report and the audit criteria are detailed in Appendix 2.

We discussed the results of our audit with Laboratory officials and have included their comments in the report as applicable.

² The Laboratory is an LDIS lab, and therefore does not process offender samples.

³ We requested from the FBI the universe of forensic profiles uploaded to NDIS by the Laboratory from August 11, 2009 to August 12, 2014. However, due to a 2007 CODIS software update, the processed date used to run the universe of profiles was not the original processed date. As a result, there are profiles included in our sample that were processed prior to August 11, 2009.

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INTRODUCTION

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Background

The Federal Bureau of Investigation's (FBI) CODIS provides an investigative tool to federal, state, and local crime laboratories in the United States using forensic science and computer technology. The CODIS program allows these laboratories to compare and match DNA profiles electronically, thereby assisting law enforcement in solving crimes and identifying missing or unidentified persons.¹ The FBI's CODIS Unit manages CODIS and is responsible for its use in fostering the exchange and comparison of forensic DNA evidence.

OIG Audit Objectives

Our audit generally covered the period from August 2012 to September 2014. The objectives of our audit were to determine if: (1) the Laboratory was in compliance with select National DNA Index System (NDIS) operational procedures; (2) the Laboratory was in compliance with certain Quality Assurance Standards (QAS) issued by the FBI; and (3) the Laboratory's forensic DNA profiles in CODIS databases were complete, accurate, and allowable for inclusion in NDIS. Appendix 1 contains a detailed description of our audit objectives, scope, and methodology. Appendix 2 contains the criteria used to conduct the audit.

Legal Foundation for CODIS

The FBI's CODIS program began as a pilot project in 1990. The DNA Identification Act of 1994 (Act) authorized the FBI to establish a national index of DNA profiles for law enforcement purposes. The Act, along with subsequent amendments, has been codified in a federal statute (Statute) providing the legal authority to establish and maintain NDIS.² *Allowable DNA Profiles*

¹ DNA, or deoxyribonucleic acid is genetic material found in almost all living cells that contains encoded information necessary for building and maintaining life. Approximately 99.9 percent of human DNA is the same for all people. The differences found in the remaining 0.1 percent allow scientists to develop a unique set of DNA identification characteristics (a DNA profile) for an individual by analyzing a specimen containing DNA.

² 42 U.S.C.A. § 14132 (2006).

The Statute authorizes NDIS to contain the DNA identification records of persons convicted of crimes, persons who have been charged in an indictment or information with a crime, and other persons whose DNA samples are collected under applicable legal authorities. Samples voluntarily submitted solely for elimination purposes are not authorized for inclusion in NDIS. The Statute also authorizes NDIS to include analysis of DNA samples recovered from crime scenes or from unidentified human remains, as well as those voluntarily contributed from relatives of missing persons.

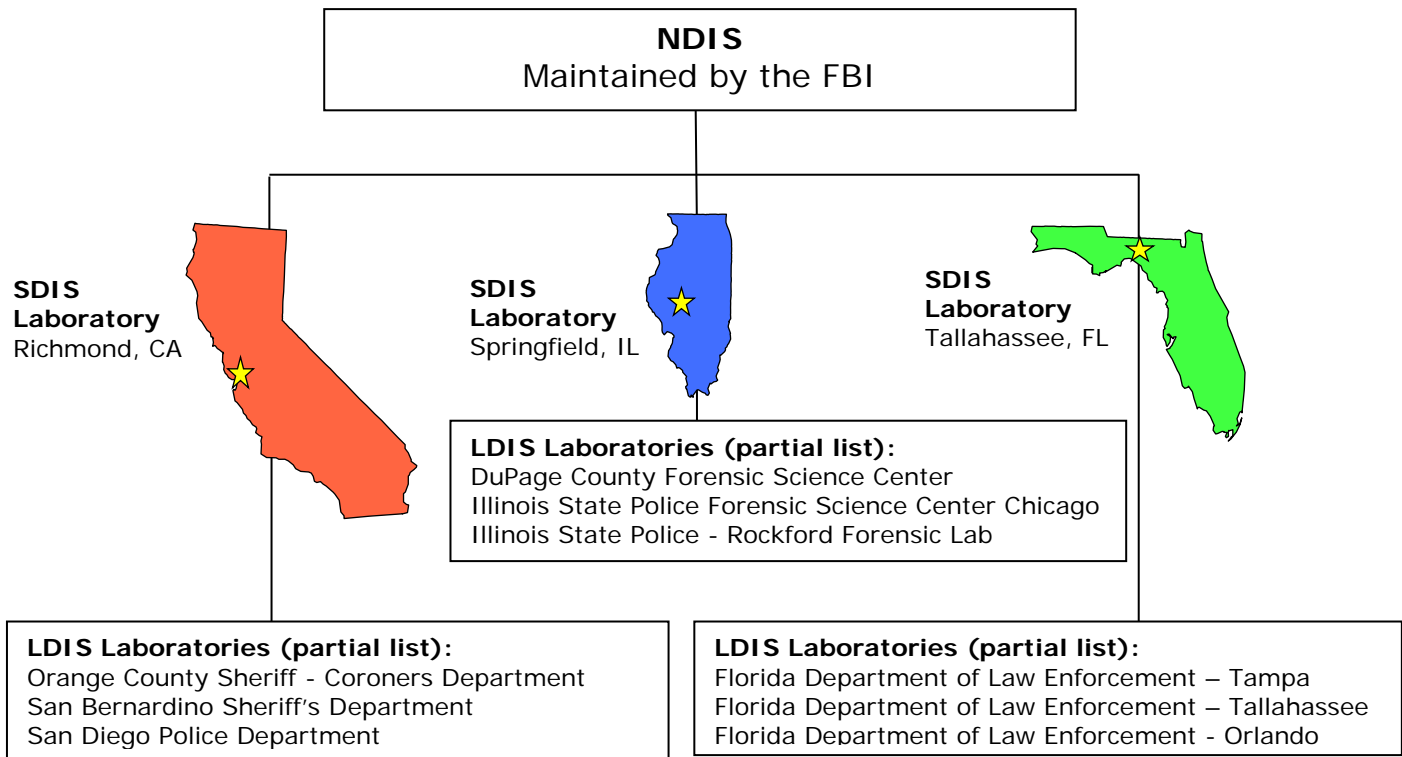
Allowable Disclosure of DNA Profiles

The Statute requires that NDIS only include DNA information that is based on analyses performed by or on behalf of a criminal justice agency – or the U.S. Department of Defense – in accordance with QAS issued by the FBI. The DNA information in the index is authorized to be disclosed only: (1) to criminal justice agencies for law enforcement identification purposes; (2) in judicial proceedings, if otherwise admissible pursuant to applicable statutes or rules; (3) for criminal defense purposes, to a defendant who shall have access to samples and analyses performed in connection with the case in which the defendant is charged; or (4) if personally identifiable information (PII) is removed for a population statistics database, for identification research and protocol development purposes, or for quality control purposes.

CODIS Structure

The FBI implemented CODIS as a distributed database with hierarchical levels that enables federal, state, and local crime laboratories to compare DNA profiles electronically. CODIS consists of a hierarchy of three distinct levels: (1) NDIS, managed by the FBI as the nation's DNA database containing DNA profiles uploaded by participating states; (2) the State DNA Index System (SDIS), which serves as a state's DNA database containing DNA profiles from local laboratories within the state and state offenders; and (3) the Local DNA Index System (LDIS), used by local laboratories. DNA profiles originate at the local level and then flow upward to the state and, if allowable, national level. For example, the local laboratory in the Florida Department of Law Enforcement Orlando, Florida, sends its profiles to the state laboratory in Tallahassee, Florida, which then uploads the profiles to NDIS. Each state participating in CODIS has one designated SDIS laboratory. The SDIS laboratory maintains its own database and is responsible for overseeing NDIS issues for all CODIS-participating laboratories within the state. The graphic below illustrates how the system hierarchy works.

Example of System Hierarchy within CODIS



National DNA Index System

NDIS, the highest level in the CODIS hierarchy, enables laboratories participating in the CODIS program to electronically compare DNA profiles on a national level. NDIS does not contain names or other PII about the profiles. Therefore, matches are resolved through a system of laboratory-to-laboratory contacts. NDIS contains the following 10 searchable indices:

- Convicted Offender Index contains profiles generated from persons convicted of qualifying offenses.³
- Arrestee Index is comprised of profiles developed from persons who have been arrested, indicted, or charged in an information with a crime.
- Legal Index consists of profiles that are produced from DNA samples collected from persons under other applicable legal authorities.⁴

³ The phrase “qualifying offenses” refers to state or federal crimes that require a person to provide a DNA sample in accordance with applicable laws.

⁴ An example of a Legal Index profile would be one from a person found not guilty by reason of insanity who is required by the relevant state law to provide a DNA sample.

- Detainee Index contains profiles from non-U.S. persons detained under the authority of the United States and required by law to provide a DNA sample for analysis and entry into NDIS.
- Forensic Index profiles originate from a single source Forensic Sample (biological sample found at the scene of a crime) attributable to the putative perpetrator.
- Forensic Mixture Index profiles originate from forensic samples that contain DNA contributed from more than one source attributable to a putative perpetrator(s).
- Forensic Partial Index profiles that originate from a single source (or a fully deduced profile originating from a mixture) Forensic Sample attributable to the putative perpetrator with either locus or allelic dropout at any of the 13 core CODIS loci.
- Missing Person Index contains known DNA records of missing persons and deduced missing persons.
- Unidentified Human (Remains) Index holds profiles from unidentified living individuals and the remains of unidentified deceased individuals.⁵
- Relatives of Missing Person Index is comprised of DNA profiles generated from the biological relatives of individuals reported missing.

Given these multiple databases, the main functions of CODIS are to: (1) generate investigative leads that may help in solving crimes, and (2) identify missing and unidentified persons.

The Forensic Index generates investigative leads in CODIS that may help solve crimes. Investigative leads may be generated through matches between the Forensic Index and other indices in the system, including the Convicted Offender, Arrestee, and Legal Indices. These matches may provide investigators with the identity of suspected perpetrators. CODIS also links crime scenes through matches between Forensic Index profiles, potentially identifying serial offenders.

In addition to generating investigative leads, CODIS furthers the objectives of the FBI's National Missing Person DNA Database program through its ability to identify missing and unidentified individuals. For instance, those persons may be identified through matches between the profiles in the Missing Person Index and the Unidentified Human (Remains) Index. In addition, the profiles within the Missing Person and Unidentified Human (Remains) Indices may be searched against the Forensic, Convicted Offender, Arrestee, Detainee, and Legal Indices to provide investigators with leads in solving missing and unidentified person cases.

⁵ An example of an Unidentified Human (Remains) Index profile from a living person is a profile from a child or other individual, who cannot or refuses to identify themselves.

State and Local DNA Index Systems

The FBI provides CODIS software free of charge to any state or local law enforcement laboratory performing DNA analysis. Laboratories are able to use the CODIS software to upload profiles to NDIS. However, before a laboratory is allowed to participate at the national level and upload DNA profiles to NDIS, a Memorandum of Understanding (MOU) must be signed between the FBI and the applicable state's SDIS laboratory. The MOU defines the responsibilities of each party, includes a sublicense for the use of CODIS software, and delineates the standards laboratories must meet in order to utilize NDIS. Although officials from LDIS laboratories do not sign an MOU, LDIS laboratories that upload DNA profiles to an SDIS laboratory are required to adhere to the MOU signed by the SDIS laboratory.

States are authorized to upload DNA profiles to NDIS based on local, state, and federal laws, as well as NDIS regulations. However, states or localities may maintain NDIS-restricted profiles in SDIS or LDIS. For instance, a local law may allow for the collection and maintenance of a victim profile at LDIS but NDIS regulations do not authorize the upload of that profile to the national level.

CODIS becomes more useful as the quantity of DNA profiles in the system increases because the potential for additional leads rises. However, the utility of CODIS relies upon the completeness, accuracy, and quality of profiles that laboratories upload to the system. Incomplete CODIS profiles are those for which the required number of core loci were not tested or do not contain all of the DNA information that resulted from a DNA analysis and may not be searched at NDIS.⁶ The probability of a false match among DNA profiles is reduced as the completeness of a profile increases. Inaccurate profiles, which contain incorrect DNA information, may generate false positive leads, false negative comparisons, or lead to the identification of an incorrect sample. Further, laws and regulations exclude certain types of profiles from being uploaded to CODIS to prevent violations to an individual's privacy and foster the public's confidence in CODIS. Therefore, it is the responsibility of the Laboratory to ensure that it is adhering to the NDIS operational procedures and the profiles uploaded to CODIS are complete, accurate, and allowable for inclusion in NDIS.

Laboratory Information

The Laboratory is one of four laboratories in the Arizona Department of Public Safety, Scientific Analysis Bureau. The Laboratory serves hundreds of agencies and tribes in the Northern Region of Arizona including, but not limited to, the Bullhead City Police Department (PD); Pinetop PD; Snowflake PD; and the Apache, Mohave, and Navajo tribes. In addition, the Laboratory maintains a contract with the FBI to process DNA from Indian reservations, which extends the areas served by the Laboratory into New Mexico and Utah. The Laboratory participates in the CODIS program as a LDIS laboratory and maintains a forensic database. The Laboratory

⁶ A "locus" is a specific location of a gene on a chromosome. The plural form of locus is loci.

began processing evidence in criminal cases and uploading forensic profiles into NDIS in 1993.

The Laboratory was Legacy accredited by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB) in the 1980's, and received their ISO accreditation approximately 5 years ago. The Laboratory's most recent ASCLD/LAB review took place in January 2014, and the Laboratory is up for renewal in March 2019.

FINDINGS AND RECOMMENDATIONS

I. COMPLIANCE WITH NDIS OPERATIONAL PROCEDURES

The Laboratory was in compliance with the NDIS participation requirements regarding sufficient measures to physically and electronically safeguard CODIS; all required personnel have successfully completed the annual training; and for each CODIS user, the appropriate documents were provided to the FBI. We make no recommendations to the FBI regarding the Laboratory's compliance with the NDIS operational procedures.

The NDIS Operational Procedures Manual, which includes the NDIS Laboratories Participation Requirements, establishes the responsibilities and obligations of laboratories that participate in the CODIS program at the national level. The NDIS operational procedures provide detailed instructions for laboratories to follow when performing certain procedures pertinent to NDIS. The NDIS operational procedures we reviewed are listed in Appendix 2 of this report.

Results of the OIG Audit

We found that the Laboratory complied with the NDIS operational procedures we reviewed. Specifically, we found the Laboratory had sufficient measures to physically and electronically safeguard CODIS, match confirmations were processed within a timely manner, and the NDIS procedures were available and accessible to the CODIS users. These results are described in more detail below.

- The NDIS security requirements state that the NDIS participating laboratory shall be responsible for providing adequate physical security of the CODIS servers and terminals against any unauthorized personnel gaining access to the computer equipment or to any of the stored data. We found that the CODIS workstation was located in a secure section inside the Laboratory building, within the CODIS administrator's office. The workstation was password protected, each CODIS user had a unique user name and password, and the system automatically logged users off after 10 minutes of inactivity.
- CODIS users are required to complete annual DNA Records Acceptance training. The FBI provided us with a list of Laboratory personnel who had received this mandatory annual training. We compared that list to the list of authorized personnel provided by the Laboratory, and found that all authorized personnel had successfully completed the annual training. In addition, we interviewed the CODIS Administrator and two additional CODIS users and learned staff has access to the NDIS Operational Procedures Manual through the FBI's Criminal Justice Information System Wide Area Network, as well as a compact disc located next to the CODIS terminal.

- The Laboratory is required to submit fingerprint cards, background information, CODIS user information, and other appropriate documentation to the FBI for each CODIS user. We verified the Laboratory submitted the required information to the FBI for all five current CODIS users at the Laboratory.
- The NDIS operational procedures define the procedure for NDIS participating laboratories to follow when confirming matches that are identified in NDIS. In addition, these procedures require that the CODIS Administrator must review and make best efforts to disposition matches within 30 business days. We selected a judgmental sample of seven NDIS matches and reviewed available documentation and determined the Laboratory confirmed the matches in a timely manner.

Conclusion

We found that the Laboratory was in compliance with the NDIS participation requirements we reviewed, the Laboratory provided adequate physical security of the CODIS server and terminal, all required personnel had successfully completed the annual training, all necessary documents were provided to the FBI for all CODIS users at the Laboratory, and the judgmentally selected sample of seven NDIS matches were confirmed in a timely manner.

We made no recommendations concerning our review of the NDIS operational procedures.

II. COMPLIANCE WITH QUALITY ASSURANCE STANDARDS

We found that the Laboratory complied with the Quality Assurance Standards (QAS) we tested. Specifically, we found that the Laboratory: (1) underwent QAS reviews within designated timeframes, (2) had policies in place to help ensure Laboratory access was limited to authorized personnel, and (3) had adequate procedures to ensure the integrity of evidence samples. We make no recommendations to the FBI regarding the Laboratory's compliance with the QAS.

During our audit, we considered the Forensic QAS issued by the FBI.⁷ These standards describe the quality assurance requirements that the Laboratory must follow to ensure the quality and integrity of the data it produces. We also assessed the two most recent QAS reviews that the laboratory underwent.⁸ The QAS we reviewed are listed in Appendix 2.

Results of the OIG Audit

We found that the Laboratory complied with the Forensic QAS tested. Specifically, we found the Laboratory: (1) underwent QAS reviews, (2) had policies in place to help ensure Laboratory access was limited to authorized personnel, and (3) had adequate procedures to ensure the integrity of evidence samples. These results are described in more detail below.

- The QAS requires laboratories to undergo an annual review, including an external review every 2 years. The Laboratory had an external quality assurance review conducted in December of 2012 and January of 2014. In addition, the Laboratory had an internal quality assurance review conducted in June of 2013. The frequency of these reviews met the QAS requirements.
- We reviewed the Laboratory's prior 2 years of QAS review reports, and both the internal and external reviews were conducted using the FBI's QAS review document. In addition, we confirmed with the FBI that at least one auditor on both the internal and external audit teams had successfully completed the FBI DNA auditor's training course.

⁷ Forensic Quality Assurance Standards refer to the Quality Assurance Standards for Forensic DNA Testing Laboratories, effective September 1, 2011.

⁸ The QAS require that laboratories undergo annual audits. Every other year, the QAS requires that the audit be performed by an audit team of qualified auditor(s), from an external agency. These audits are not required by the QAS to be performed in accordance with the *Government Auditing Standards* (GAS) and are not performed by the Department of Justice Office of the Inspector General. Therefore, we will refer to the QAS audits as reviews (either an internal laboratory review or an external laboratory review, as applicable) to avoid confusion with our audits that are conducted in accordance with GAS.

- The QAS requires that external quality assurance reviews be forwarded to the FBI's NDIS custodian within 30 days of the participating laboratory's receipt of the report. We reviewed the submission of the most recent external reviews and found that the 2012 external review was not sent to the NDIS custodian within 30 days; it was submitted 13 days late. There was confusion on the Laboratory's part regarding whether the review had to be submitted within 30 calendar days or 30 business days. In June 2013, the Arizona Department of Public Safety updated their DNA Quality Assurance Manual to clarify that external reviews need to be submitted to the NDIS custodian within 30 "real" days as opposed to business days. The 2014 external review was submitted within 30 calendar days. As a result, we take no further exception to the late submission of the 2012 external audit.
- We toured the Laboratory and observed that access to the Laboratory is controlled and limited to prevent access by unauthorized personnel. Specifically, the Laboratory has one entrance for employees and the public, as well as an employee-only entrance. The main employee and public entrance leads to a lobby, which provides access to the property and evidence section or the Laboratory. Visitors need to be buzzed into the lobby, and then again into the Laboratory; employees have key card access. There are security cameras on the exterior of the Laboratory building as well as in the lobby of the building. The Laboratory has a security system that includes sensors on the exterior doors, so if they are left open Laboratory officials are notified. Visitors have to sign in and wear a visitor badge. We found no deficiencies in the external security at the Laboratory; it is in compliance with the QAS requirements we tested.
- While touring the Laboratory, we also observed the procedures used by the Laboratory to ensure the integrity of physical evidence. Evidence chain of custody is tracked in the Laboratory's Information Management System (LIMS). Property and Evidence custodians log the evidence into the LIMS, which generates a department report number, and a corresponding bar code sticker which is printed and placed on the evidence. The evidence is then placed in a freezer in the property and evidence room. Evidence is signed out of the LIMS, by analyst, by scanning their ID card. After evidence examination is complete, the original piece of evidence is returned to the Property and Evidence room. There are locked storage compartments at the analysts' work stations in the evidence examination room, as well as locked freezers. Amplified product is stored in a freezer located in the post Polymerase Chain Reaction (PCR) room. Overall, we found no significant deficiencies in the security of evidence; we found it to be in compliance with the QAS requirements we tested.
- The QAS requires amplified DNA to be generated, processed, and maintained in a room separate from the sample accessioning, evidence examination, DNA extraction, and PCR setup areas. We observed that the Laboratory has a separate post PCR room and after examination, extraction and PCR setup are completed the analyst walks the DNA to the post PCR room. Based upon our observations, we did not identify any material deficiencies with regard to

the Laboratory performing various DNA analysis processes in separate times and spaces.

- We learned that the Laboratory does not currently outsource the analysis of its forensic DNA samples to another laboratory, and has not done so in the past 2 years. We also learned the Laboratory has not employed any contract employees in the last 2 years.

Conclusion

We found that the Laboratory complied with the FBI's Forensic QAS that we tested. Specifically, we found that the Laboratory: (1) underwent Quality Assurance Standard reviews within designated timeframes, (2) had policies in place to help ensure Laboratory access was limited to authorized personnel, and (3) had adequate procedures to ensure the integrity of evidence samples. We make no recommendations to the FBI regarding the Laboratory's compliance with the QAS.

III. SUITABILITY OF FORENSIC DNA PROFILES IN CODIS DATABASES

Our audit questioned 6 of the 100 profiles we reviewed. Specifically, we found: (1) one profile was not developed from evidence found at a crime scene, (2) one had been developed from materials not associated with a crime, (3) three were developed from items taken from a suspect, the suspect's hotel room, or a person known to the suspect, and (4) one profile for which we could not determine suitability for inclusion in NDIS because there was not enough information in the case file to determine how the evidence related to the crime scene. The Laboratory deleted four of the six questioned profiles and according to Laboratory officials, two of the profiles deleted were inadvertently uploaded to NDIS by the Laboratory after a 2007 CODIS software update. We recommend the FBI: (1) work with the Laboratory to determine the NDIS eligibility for the questioned profiles that have not been removed, (2) ensure that the Laboratory obtains sufficient information to determine a profile's eligibility prior to uploading it to NDIS, and (3) work with the Laboratory to ensure all the unallowable profiles that were not intended for upload to NDIS, but inadvertently uploaded to NDIS after the February 2007 software update are not currently at NDIS.

We reviewed a sample of the Laboratory's Forensic DNA profiles to determine whether each profile was complete, accurate, and allowable for inclusion in NDIS. To test the completeness and accuracy of each profile, we established standards that require a profile include all the loci for which the analyst obtained results, and that the values at each locus match those identified during analysis. Our standards are described in more detail in Appendix 2 of this report.

The FBI's NDIS Operational Procedures Manual establishes the DNA data acceptance standards by which laboratories must abide. The FBI also developed a flowchart as guidance for the laboratories for determining what is allowable in the forensic index at NDIS. Laboratories are prohibited from uploading forensic profiles to NDIS that clearly match the DNA profile of the victim or another known person that is not a suspect. A profile at NDIS that matches a suspect may be allowable if the contributor is unknown at the time of collection, however, NDIS guidelines prohibit profiles that match a suspect if that profile could reasonably have been expected to be on an item at the crime scene or part of the crime scene independent of the crime. For instance, a profile from an item seized from the suspect's person, such as a shirt, or that was in the possession of the suspect when collected is generally not a forensic unknown and would not be allowable for upload to NDIS. The NDIS procedures we reviewed are listed in Appendix 2 of this report.

Results of the OIG Audit

We selected a sample of 100 profiles out of the 525 forensic profiles the Laboratory had uploaded to NDIS as of August 2014.⁹ Of the 100 forensic profiles sampled, we found 5 were unallowable for upload to NDIS; 2 of the unallowable profiles were inadvertently uploaded to NDIS as a result of complications associated with a February 2007 software update and the Laboratory's efforts to correct the problem. We could not determine the allowability of an additional profile due to a lack of documentation in the case file. The remaining profiles sampled were complete, accurate, and allowable for inclusion in NDIS. The specific exceptions are explained in more detail below.

Profile Allowability

Our review examined each profile in the sample to determine its suitability based on NDIS guidelines such as: (1) whether a crime was committed; (2) whether the profile was obtained from the crime scene; and (3) whether the profile was attributable to a putative perpetrator. Based on our review, we found 5 of the 100 profiles in our sample did not meet NDIS requirements and were unallowable for upload into the NDIS database. Two of the five unallowable profiles we identified migrated from LDIS after a 2007 software upgrade and were inadvertently uploaded to NDIS by Laboratory officials. For 1 of the 100 profiles in our sample, we were unable to determine if the profile was allowable for upload into the NDIS database due to a lack of documentation in the Laboratory's case file. The remaining 94 profiles were complete, accurate, and allowable for NDIS upload.

Specifically, we identified five profiles not suitable for upload to NDIS: (1) one profile was not developed from evidence found at a crime scene; (2) one had been developed from materials not associated with a crime; and (3) three were developed with evidence taken from a suspect, the suspect's hotel room, or a person known to the suspect. In addition, one profile was complete and accurate but we could not determine if it was allowable for inclusion in NDIS as there was not enough information in the case file to determine how the evidence related to the crime scene.

OIG Sample AZ-02

Sample AZ-02 was taken from jeans that were found in a garbage bag behind the suspect's friend's house, 2 miles from where the homicide took place, one month after the crime was committed. In a statement from the friend, he said the suspect gave him the clothes to hold. Based on this information, we originally deemed this profile to be unallowable in our draft audit report because we did not identify any evidence in the case file linking this profile to the crime scene, and recommended that the FBI determine this profile's eligibility. However, after our

⁹ We requested from the FBI the universe of forensic profiles uploaded to NDIS by the Laboratory from August 11, 2009 to August 12, 2014. However, due to a 2007 CODIS software update, the processed date used to run the universe of profiles was not the original processed date. As a result, there are profiles included in our sample that were processed prior to August 11, 2009.

draft audit report was issued, the FBI provided information linking the profile to the crime. Specifically, victim tissue was also found on the jeans from which the profile was developed. As a result, the FBI determined that this profile is allowable.

OIG Sample AZ-04

Sample AZ-04 was a swab from a sweatshirt collected from the suspect. We deemed this profile to be unallowable because the sweatshirt was taken directly from the suspect and the profile is not a forensic unknown. According to Laboratory officials, the profile was in their local database and was incorrectly marked for upload to NDIS by the previous CODIS administrator after the February 2007 CODIS software upgrade. The Laboratory removed the profile from NDIS.

OIG Sample AZ-51

Sample AZ-51 was a swab from a towel found in an attic of a rented house. The detective wanted to determine if the stain was blood, and if an investigation was warranted. We deemed this profile to be unallowable because the profile was not taken from a crime scene. According to Laboratory officials, this profile was an older case, according to the specimen ID number the case goes back to 2002 and the CODIS Administrator at the time thought this type of sample was allowable. The Laboratory removed the profile from NDIS.

OIG Sample AZ-64

Sample AZ-64 was a swab taken from a semen stain on a white pillowcase, which was taken from a room registered to the suspect, not from a nearby crime scene. We deemed this profile to be unallowable because we found no evidence linking the pillow case to the crime; it was taken from the suspect's room, and is not a forensic unknown. According to Laboratory officials, this profile was in their local database and was incorrectly marked for upload to NDIS by the previous CODIS Administrator after the February 2007 CODIS software upgrade. The Laboratory removed the profile from NDIS.

OIG Sample AZ-87

Sample AZ-87 was a swab of a nail file taken from a male suspect's mother; a female profile was obtained and uploaded. We deemed this profile to be unallowable because the nail file was taken from the suspect's mother and is not a forensic unknown. As per Laboratory officials, this was an oversight by the analyst. The Laboratory removed the profile from NDIS.

OIG Sample AZ-59 - Inadequate Case File Documentation

According to section 4.2.1.3 of the NDIS Procedures, a forensic unknown, forensic mixture, or forensic partial DNA record submitted to NDIS shall originate from or be associated with a crime scene, the source of which is attributable to a putative perpetrator. In addition, General Principle 1 of the FBI allowability flow chart from the CODIS Administrator's Handbook says an analyst must review the

details that are available in the case documentation. If the documentation does not indicate that a crime was committed, the profile is not allowable. Finally, the Laboratory's own DNA Quality Assurance Manual, Documentation section 3.3 says case files and case notes must provide a foundation for results and conclusions contained in the Laboratory's final report.¹⁰ The details on the crime scene and the evidence obtained need to be available to the analyst so they can determine the allowability of the profile.

We found that not all of the 100 case files we reviewed in relation to our sample of 100 profiles had sufficient details to know the profile was developed from biological material obtained from crime scene evidence. Specifically, we followed up with Laboratory officials on 28 of the 100 profiles; of those 28 profiles, 19 required additional information from law enforcement officials. Laboratory officials were able to obtain sufficient detail for all but 1 of the 100 cases in our sample. Sample AZ-59 had limited documentation, but we were able to determine that a fire department was broken into and there was a broken window in the women's rest room and a sink had been broken off the wall. However, the Laboratory was unable to tell us where in the fire house the swab was taken from, or how it was attributable to the putative perpetrator. As a result, we were unable to determine if the profile was allowable for upload to NDIS. In addition, the Laboratory was not following its own documentation policy requiring case files and case notes, to include a foundation for results and conclusions contained in the Laboratory's final report. As a result, we recommend the FBI work with the Laboratory to determine NDIS eligibility for this profile, and ensure that the Laboratory obtains sufficient information to determine a profile's eligibility prior to uploading it to NDIS.

2007 CODIS Software Update

In February of 2007 the Laboratory's previous CODIS Administrator performed a CODIS software upgrade. After this upgrade took place samples that were eligible for LDIS, but not eligible for NDIS were migrated for uploaded to NDIS. This affected approximately 200 profiles and resulted in profiles being migrated into NDIS that should not have been. In an attempt to correct the problem, the previous CODIS Administrator went through the approximately 200 affected profiles and removed the ones that should not have migrated to NDIS. In 2013, after the current CODIS administrator took over, approximately 65 profiles were identified that had once been marked for NDIS that were now unmarked; they were not in CODIS and were not being searched. The current CODIS Administrator pulled and reviewed the case files associated with the 65 profiles and marked the profiles that should have been uploaded to NDIS and removed some profiles that should not have been uploaded.

Our profile review identified two unallowable profiles still in NDIS as a result of complications resulting from the software upgrade and the Laboratory's efforts to fix the problem. In response to our audit work, the Laboratory generated a list of 49 profiles that need to be re-checked and have been pulling archived case files so

¹⁰ The Laboratory reports include the case identifier, a description of the evidence analyzed, the DNA loci tested, and the findings and conclusions of the analyst.

that they may be reviewed and profile eligibility at NDIS confirmed. The list was generated by filtering profiles by the "marked by date" for the day the previous CODIS Administrator marked profiles for upload. As of December 3, 2015, the Laboratory has reviewed seven cases and is waiting on the rest of the case files from archive storage. As a result, we recommend the FBI work with the Laboratory to ensure that all of the unallowable profiles that were not intended for upload to NDIS, but were inadvertently uploaded to NDIS after the February 2007 software upgrade, are not currently at NDIS.

Conclusion

We found 94 of the 100 profiles in our sample were complete, accurate, and allowable for upload to NDIS. We found 5 of the 100 profiles in our sample did not meet NDIS requirements and were unallowable for upload into the NDIS database. The Laboratory deleted four of the five profiles, but disagreed with us on the allowability of the fifth profile. For 1 of the 100 profiles in our sample, we were unable to determine if the profile was allowable for upload into the NDIS database due to a lack of documentation in the Laboratory's case file. In addition, two of the four deleted profiles were inadvertently uploaded to NDIS after a February 2007 CODIS software update.

As a result, we recommend the FBI (1) work with the Laboratory to determine the NDIS eligibility for the questioned profiles. Specifically, sample AZ-02 which the Laboratory believed to be allowable, and sample AZ-59, which allowability couldn't be determined due to lack of documentation, (2) ensure that the Laboratory obtains sufficient information to determine a profile's eligibility prior to uploading it to NDIS, and (3) work with the Laboratory to ensure all the unallowable profiles that were not intended for upload to NDIS, but inadvertently uploaded to NDIS after the 2007 software upgrade are not currently at NDIS.

Recommendations

We recommend that the FBI:

1. Work with the Laboratory to determine NDIS eligibility for the two remaining questioned profiles.
2. Ensure that the Laboratory obtains sufficient information to determine a profile's eligibility prior to uploading it to NDIS.
3. Work with the Laboratory to ensure all the unallowable profiles that were not intended for upload to NDIS, but inadvertently uploaded to NDIS after the 2007 software upgrade are not currently at NDIS.

APPENDIX 1

OBJECTIVES, SCOPE, AND METHODOLOGY

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Our audit generally covered the period from August 2012 through September 2014. The objectives of the audit were to determine if the: (1) Laboratory was in compliance with select National DNA Index System (NDIS) operational procedures; (2) Laboratory was in compliance with certain Quality Assurance Standards (QAS) issued by the FBI; and (3) Laboratory's forensic DNA profiles in CODIS databases were complete, accurate, and allowable for inclusion in NDIS. To accomplish the objectives of the audit, we:

- Examined internal and external Laboratory QAS review reports and supporting documentation for corrective action taken, if any, to determine whether: (a) the Laboratory complied with the QAS, (b) repeat findings were identified, and (c) recommendations were adequately resolved.

In accordance with the QAS, a laboratory shall establish, follow, and maintain a documented quality system with procedures that address, at a minimum, a laboratory's quality assurance program, organization and management, personnel, facilities, evidence and sample control validation, analytical procedures, calibration and maintenance of equipment, proficiency testing, corrective action, review, Documentation and reports, safety, audits, and outsourcing. The QAS require that internal and external reviews be performed by personnel who have successfully completed the FBI's training course for conducting such reviews. We obtained evidence concerning: (1) the qualifications of the internal and external reviewers, and (2) the independence of the external reviewers.

- Interviewed Laboratory officials to identify management controls, Laboratory operational policies and procedures, Laboratory certifications or accreditations, and analytical information related to DNA profiles.
- Toured the Laboratory to observe facility security measures as well as the procedures and controls related to the receipt, processing, analyzing, and storage of forensic evidence samples.¹¹

¹¹ The Laboratory is an LDIS lab, and therefore does not process offender samples.

- Reviewed the Laboratory's written policies and procedures related to conducting internal reviews, resolving review findings, and resolving matches among DNA profiles in NDIS.
- Reviewed supporting documentation for 7 of 68 NDIS matches to determine whether they were resolved in a timely manner. The Laboratory provided the universe of NDIS matches as of August 14, 2014. The sample was judgmentally selected to include both case-to-case and case-to-offender matches. This non-statistical sample does not allow projection of the test results to all matches.
- Reviewed the case files for selected forensic DNA profiles to determine if the profiles were developed in accordance with the Forensic QAS and were complete, accurate, and allowable for inclusion in NDIS.

We obtained an electronic file identifying the specimen identification numbers of 525 searchable forensic profiles the Laboratory had uploaded to NDIS as of August 12, 2014.¹² We limited our review to a sample of 100 profiles. This sample size was determined judgmentally because preliminary audit work determined that risk was not unacceptably high.

- Using the judgmentally-determined sample size, we employed a stratified sample design to randomly select a representative sample of profiles in our universe. However, since the sample size was judgmentally determined, the results obtained from testing this limited sample of profiles may not be projected to the universe of profiles from which the sample was selected.

The objectives of our audit concerned the Laboratory's compliance with required standards and the related internal controls. Accordingly, we did not attach a separate statement on compliance with laws and regulations or a statement on internal controls to this report. See Appendix 2 for detailed information on our audit criteria.

¹² We requested from the FBI the universe of forensic profiles uploaded to NDIS, by the Laboratory from August 11, 2009 to August 12, 2014. However, due to a 2007 CODIS software update, the processed date used to run the universe of profiles was not the original processed date. As a result, there are profiles included in our sample that were processed prior to August 11, 2009.

AUDIT CRITERIA

In conducting our audit, we considered the NDIS operational procedures, QAS, and guidance issued by the FBI regarding forensic profile allowability in NDIS.¹³ However, we did not test for compliance with elements that were not applicable to the Laboratory. In addition, we established standards to test the completeness and accuracy of DNA profiles as well as the timely notification of DNA profile matches to law enforcement.

NDIS Operational Procedures

The NDIS operational procedures, which include the NDIS Participation Requirements, establish the responsibilities of the FBI and the NDIS participating laboratories. We focused our audit on specific sections of the following NDIS requirements:

- NDIS Laboratories Procedures
- Quality Assurance Standards Audit Procedure
- NDIS Confirmation and Hit Dispositioning Procedure
- NDIS DNA Records Procedure
- DNA Data Acceptance Standards
- NDIS Searches Procedure
- NDIS Security Requirements Procedure

Quality Assurance Standards

The FBI issued two sets of QAS: (1) QAS for Forensic DNA Testing Laboratories, effective September 1, 2011 (Forensic QAS); and (2) QAS for DNA Databasing Laboratories, effective September 1, 2011 (Offender QAS). The Forensic QAS and the Offender QAS describe the quality assurance requirements that the Laboratory should follow to ensure the quality and integrity of the data it produces.

For our audit, we reviewed the Laboratory's most recent annual external review and performed audit work to verify that the Laboratory was in compliance with the QAS listed below because they have a substantial effect on the integrity of the DNA profiles uploaded to NDIS.

- Facilities (Forensic QAS and Offender QAS 6.1): The laboratory shall have a facility that is designed to ensure the integrity of the analyses and the evidence.

¹³ The FBI Flowchart is guidance issued to NDIS-participating laboratories separate from the NDIS Operational Procedures. The flowchart is contained in the 2013 CODIS Administrator's Handbook and has been provided to laboratories in forums such as CODIS conferences.

- Evidence Control (Forensic QAS 7.1): The laboratory shall have and follow a documented evidence control system to ensure the integrity of physical evidence. Where possible, the laboratory shall retain or return a portion of the evidence sample or extract.
- Sample Control (Offender QAS 7.1): The laboratory shall have and follow a documented sample inventory control system to ensure the integrity of the database and known samples.
- Analytical Procedures (Forensic QAS and Offender QAS 9.5): The laboratory shall monitor the analytical procedures using [appropriate] controls and standards.
- Review (Forensic QAS 12.1): The laboratory shall conduct administrative and technical reviews of all case files and reports to ensure conclusions and supporting data are reasonable and within the constraints of scientific knowledge.

(Offender QAS Standard 12.1): The laboratory shall have and follow written procedures for reviewing DNA records and DNA database information, including the resolution of database matches.

- [Reviews] (Forensic QAS and Offender QAS 15.1 and 15.2): The laboratory shall be audited annually in accordance with [the QAS]. The annual audits shall occur every calendar year and shall be at least 6 months and no more than 18 months apart.

At least once every 2 years, an external audit shall be conducted by an audit team comprised of qualified auditors from a second agency(ies) and having at least one team member who is or has been previously qualified in the laboratory's current DNA technologies and platform.

- Outsourcing (Forensic QAS and Offender QAS Standard 17.1): A vendor laboratory performing forensic and database DNA analysis shall comply with these Standards and the accreditation requirements of federal law.
- Forensic QAS 17.4: An NDIS participating laboratory shall have and follow a procedure to verify the integrity of the DNA data received through the performance of the technical review of DNA data from a vendor laboratory.
- Offender QAS Standard 17.4: An NDIS participating laboratory shall have, follow and document appropriate quality assurance procedures to verify the integrity of the data received from the vendor laboratory including, but not limited to, the following: Random reanalysis of database, known or casework reference samples; Inclusion of QC samples; Performance of an on-site visit by an NDIS participating laboratory or multi-laboratory system outsourcing DNA sample(s) to a vendor laboratory or accepting ownership of DNA data from a vendor laboratory.

Office of the Inspector General Standards

We established standards to test the completeness and accuracy of DNA profiles as well as the timely notification of law enforcement when DNA profile matches occur in NDIS. Our standards are listed below.

- **Completeness of DNA Profiles:** A profile must include each value returned at each locus for which the analyst obtained results. Our rationale for this standard is that the probability of a false match among DNA profiles is reduced as the number of loci included in a profile increases. A false match would require the unnecessary use of laboratory resources to refute the match.
- **Accuracy of DNA Profiles:** The values at each locus of a profile must match those identified during analysis. Our rationale for this standard is that inaccurate profiles may: (1) preclude DNA profiles from being matched and, therefore, the potential to link convicted offenders to a crime or to link previously unrelated crimes to each other may be lost; or (2) result in a false match that would require the unnecessary use of laboratory resources to refute the match.
- **Timely Notification of Law Enforcement When DNA Profile Matches Occur in NDIS:** Laboratories should notify law enforcement personnel of NDIS matches within 2 weeks of the match confirmation date, unless there are extenuating circumstances. Our rationale for this standard is that untimely notification of law enforcement personnel may result in the suspected perpetrator committing additional, and possibly more egregious, crimes if the individual is not deceased or already incarcerated for the commission of other crimes.

THE LABORATORY'S REPOSE TO THE DRAFT AUDIT REPORT



ARIZONA DEPARTMENT OF PUBLIC SAFETY

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"Courteous Vigilance"

JAMICE K. BREWER ROBERT C. HALLIDAY
Governor Director

Northern Regional Crime Lab
1140 W Keibah Ln Ste A
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(928) 773-3687

17 December 2014

Mr. David M. Sheeren,
Regional Audit Manager
U.S. Department of Justice
Office of the Inspector General
Denver Regional Audit Office
1120 Lincoln Street
Denver, Colorado 80203

Dear Mr. Sheeren:

In response to your letter dated 16 December 2014 concerning the draft audit report and findings at the Arizona Department of Public Safety Northern Regional Crime Laboratory ("NRCL"), we advised we are in agreement with the findings set forth in the *Results of the OIG Audit* and have complied with any requests therein with only two (2) specific exceptions.

With regard to OIG Sample AZ-02, the profile has not been removed from NDIS. The submitted profile predates the current requirements and we will work with the FBI to make a final determination as to the profile remaining in the system. Should the FBI determine the profile must be removed, despite the profile meeting the criteria in place at the time of submission, the profile will be removed from NDIS.

With regard to OIG Sample AZ-59, the profile was removed from NDIS on 14 October 2014 and a copy of the NDIS Specimen Delete Report is attached as evidence of same.

Should you have any additional questions or concerns, please don't hesitate to contact the undersigned at 928.773.3648.

Best regards,

A handwritten signature in blue ink that reads "Erin Higgins".

ERIN HIGGINS,
CODIS Administrator - NRCL

cc : DOUGLAS HAMES, - FBI
PAUL PAGANO, - FBI

THE FBI'S RESPONSE TO THE DRAFT AUDIT REPORT



U.S. Department of Justice
Federal Bureau of Investigation

Washington, D.C. 20535-0001
January 16, 2015

David M. Sheeren, Regional Audit Manager
Denver Regional Audit Office
Office of the Inspector General
1120 Lincoln, Suite 1500
Denver, CO 80203

Dear Mr. Sheeren:

Your memorandum, to Director Comey, forwarding the draft audit report for the Arizona Department of Public Safety Northern Regional Crime Laboratory, Flagstaff, Arizona ("Laboratory"), has been referred to me for response.

Your draft audit report contained three recommendations relating to the Laboratory's compliance with the FBI's Memorandum of Understanding and *Quality Assurance Standards for Forensic DNA Testing Laboratories*.

With respect to recommendation one relating to NDIS eligibility of two questioned profiles, it has been determined by the Laboratory and the FBI CODIS Unit that profile AZ-02 is allowable and profile AZ-59 is not and therefore has been deleted. Please see the attached Specimen Delete Report for profile AZ-59. The FBI CODIS Unit supports closure of this recommendation.

With respect to recommendation two relating to profile eligibility review processes, the Laboratory recognizes the need to strengthen its eligibility review process. The Laboratory is in the process of implementing an enhanced profile management procedure. The procedure will require the technical review of case information, case reports and any notes to verify that eligibility decisions were based upon complete and appropriate case file documentation. The CODIS Unit continues to monitor the Laboratory's progress in completing this task.

With respect to recommendation three relating to the review of profiles inadvertently uploaded to NDIS after the 2007 software upgrade, the Laboratory has not completed its review of all of the profiles. The CODIS Unit continues to monitor the Laboratory's progress in completing this task.

Thank you for sharing the draft audit report with us. If you have any questions, please feel free to contact Richard Wilson, Acting Chief of the CODIS Unit, at (703) 632-8315.

Sincerely,
Eric G. Pokorak
Acting Section Chief
Biometrics Analysis Section
FBI Laboratory

APPENDIX 5

OFFICE OF THE INSPECTOR GENERAL ANALYSIS AND SUMMARY OF ACTIONS NECESSARY TO CLOSE THE REPORT

The OIG provided a draft of this audit report to the Arizona Department of Public Safety, Northern Regional Crime Laboratory (Laboratory) in Flagstaff, Arizona and to the Federal Bureau of Investigation (FBI). The Laboratory's response is incorporated as Appendix 3 of this final report, and the FBI's response is included as Appendix 4.¹⁴ The following provides the OIG analysis of the responses and summary of actions necessary to close the report.

Recommendation:

1. Work with the Laboratory to determine NDIS eligibility for the two remaining questioned profiles.

Closed. In response to our report, the Laboratory stated that it deleted one of the two profiles we found to be unallowable, profile AZ-59. The Laboratory also stated that it did not delete the second profile we found to be unallowable, AZ-02 and that it will work with the FBI to make a final determination as to the profile remaining in the system.

The FBI did not state in its response whether it agreed with this recommendation. However, it concluded that profile AZ-59 was unallowable and confirmed that the Laboratory deleted the profile. The FBI also concluded that AZ-02 was allowable, and we obtained additional clarification from the FBI that linked the profile to the crime as clarified in the body of the report. As a result, we consider this recommendation to be closed.

2. Ensure that the Laboratory obtains sufficient information to determine a profile's eligibility prior to uploading it to NDIS.

Resolved. The Laboratory stated in its response that it has complied with this recommendation. The FBI did not state in its response whether it agreed with this recommendation, however it stated that the Laboratory is in the process of implementing an enhanced profile management procedure which will require the technical review of case information, case reports and any notes to verify that eligibility decisions were based upon complete and appropriate case file documentation. We determined that this proposed action will advance the resolution of the recommendation. As a result, this recommendation is resolved and can be closed when we receive

¹⁴ The Specimen Delete Reports for profile AZ-59, provided by both the Laboratory and the FBI were not appended to the final report because they are considered law enforcement sensitive documents.

documentation of the implementation of the enhanced profile management procedure.

3. **Work with the Laboratory to ensure all the unallowable profiles that were not intended for upload to NDIS, but inadvertently uploaded to NDIS after the 2007 software upgrade are not currently at NDIS.**

Resolved. The Laboratory stated in its response that it complied with this recommendation. The FBI did not state whether it agrees with this recommendation, however, it stated that the Laboratory has not completed its review of all of the profiles inadvertently uploaded to NDIS after the 2007 software upgrade, and that the CODIS Unit continues to monitor the Laboratory's progress in completing this task. We determined that this proposed action will advance the resolution of the recommendation. As a result, this recommendation is resolved and can be closed when we receive documentation that the Laboratory has completed its review of all the profiles inadvertently uploaded to NDIS after the 2007 software upgrade and that all unallowable profiles inadvertently uploaded to NDIS have been removed.