



Intermountain Forensics

SOP #

ADM-101

Revision #

02

Forensic DNA Technical Leader Approval

Issue Date

Aimee Walker

11/28/2022

Facilities and Security

1. Purpose

This document summarizes the physical space and security of the Intermountain Forensics Laboratory.

2. Summary

Describes the physical space and utilization of rooms within the Intermountain Forensics Laboratory locations. Defines security measures within the lab space, both physical and digital. Indicates contamination prevention measures that are required for staff, processing and physical space.

3. Procedure

Physical Space: Intermountain Forensics - Salt Lake City (IMF-SLC)

1. The Laboratory is located at the following address:
4885 South 900 East
Suite 300
Salt Lake City UT 84117
2. This location is primarily office space and has several secured entry points
3. The laboratory is divided into six physical rooms
 - a. Administrative Room (Admin)
 - b. Evidence Lock Up (Lock Up)
 - c. Preparation Laboratory 1 (Prep 1)
 - d. Preparation Laboratory 2 (Prep 2)
 - e. Processing Laboratory (Lab)
 - f. Identification Lab (ID)
4. Each room is physically separated from each other by walls and door(s); there is no open passage between the rooms.
5. Administrative Room (Admin)
 - a. Admin room is accessed to the rest of the building and provides the main door to the rest of the office building
 - b. The primary purpose of this space is for evidence receipt, package/reagents/consumable delivery and registration and administrative staff access (analysis, documentation, e-mails etc.)
 - c. There is two doorways to the main hall of the office building and one doorway that connect to other offices
 - i. Access to the office spaces that are connected to the Admin room are locked and physically bolted shut and secured from the Intermountain Forensics side of the doorway, see **Physical Security** section)
 - d. A windowed steel door provides access to Prep, Lab and ID rooms. A steel, non-windowed door provides access to the Evidence Lock Up room.
6. Evidence Lock Up (Lock Up)
 - a. Lock Up room is only accessible from the Admin room and is the most secure location within the lab space
 - b. The primary purpose of this space is evidence storage, WiFi/Internet Router physical security



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- i. A combination Refrigerator/Freezer is housed in this room for cold/frozen storage
 1. This is the main location (freezer) for long term extract storage
 - c. There are no windows within this room.
 - i. West and South walls are inaccessible (underground) from outside
 - ii. East wall connects (via steel door) to Admin
 - iii. North wall is separated from ID lab by fully framed and sheetrock wall
 - d. A hard ceiling and walls are extended to the hard ceiling (above drop ceiling in admin room) and cannot be accessed from Admin or ID Lab
7. Preparation Laboratory 1 (Prep 1)
 - a. Prep Lab is only accessible from Admin
 - b. The primary purpose of this space is Evidence Itemization, Serology testing, Bone/Teeth Pre-Processing and Known sample (direct amplification) setup
 - i. A combination refrigerator/freezer is housed in this room for cold/frozen storage of samples and reagents
 - ii. These are sequestered spaces within the refrigerator/freezer
 - c. Bone/Teeth Pre-Processing as well as Known sample setup are restricted to the lab station with a hood/dead air box
 - d. A hand wash/eye wash station is housed near the doorway to this room
8. Preparation Laboratory 2 (Prep 2)
 - a. Prep Lab is only accessible from Admin
 - b. The primary purpose of this space is Evidence Itemization, Serology testing, and ALS examination
9. Processing Laboratory (Lab)
 - a. Lab is only accessible from Admin
 - b. The primary purpose of this space is questioned sample DNA Extraction, DNA quantification and amplification setup
 - i. A combination refrigerator/freezer is housed in this room for cold/frozen storage of samples and reagents
 - ii. These are sequestered spaces within the refrigerator/freezer
 - c. This lab houses extraction instruments:
 - i. Qiagen EZ1 Advanced XL instrument(s)
 - ii. Qiagen Qiacube Connect Liquid Handling robot
 - d. A hand wash/eye wash station is housed near the doorway to this room
10. Identification Lab (ID)
 - a. Lab is only accessible from Admin
 - b. The primary purpose of this space is PCR Amplification and loading of identification instruments for Next Generation/Massively Parallel Sequencing (NGS/MPS) and/or STR fragment analysis
 - i. A combination refrigerator/freezer is housed in this room for cold/frozen storage of samples and reagents
 - ii. There are sequestered spaces within the refrigerator/freezer
 - c. This lab houses amplification and analyzer instruments:
 - i. Applied Biosystems ProFlex PCR Thermal Cycler
 - ii. Benchmark Thermal Cycler
 - iii. Applied Biosystems Quant Studio 5 RT-PCR instrument
 - iv. Applied Biosystems 3500 Genetic Analyzer
 - v. Verogen Miseq FGX NGS/MPS Sequencer
 - d. A hand wash/eye was station is housed near the doorway to this room **and must be utilized to wash/decontaminate hands before exiting this room**



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- e. This lab is considered a post amplification or “dirty room” and houses amplified DNA product
 - i. This is a unidirectional processing room. Any samples, reagents or any other items can be brought into this room but cannot be returned to the admin area unless housed in trash and/or biohazard bags that are closed and decontaminated (20% Bleach on outside surface) prior to exit
 - ii. Any instrument, pipette or other equipment that is intended to be removed from this room must be decontaminated prior to physical transportation into the admin area
- f. This room has been constructed to have negative pressure, ensuring air flows into the ID lab and does not flow back into the Admin room, further restricting potential contamination

Physical Security: Intermountain Forensics – Salt Lake City (IMF-SLC)

11. Building Security

- a. The building has security policies to help restrict access to the laboratory location
 - i. Outer doors lock overnight and on weekend
 - ii. Keypad access allows access during lock down
 - iii. Security cameras throughout the building monitor movement

12. Laboratory Security

- a. The external door into the Admin area as well as all 4 of the inner rooms are locked and restricted access
 - i. Electronic swipe cards are issued to all employees to access electronic lock doors
 - ii. Security is maintained by software restricting or allowing access with the swipe cards
 - iii. All laboratory staff will have equal and unrestricted access to all 5 electronic lock doors
 - iv. All electronic swipes are registered and auditable via the software
- b. Two copies of the master key (allows access to the doors when electrical locks are not functioning) will be maintained and kept on the below listed approved lab staff. These keys will be secured at all times and a documented check will occur annually as per DNA Technical Leader annual audit.
 - i. Laboratory Director (or designee)
 - ii. Laboratory Manager (or designee)
- c. One copy of the master key and one copy of the lock removal key (allows the lock cylinder to be removed) will be maintained in a specified area of the Evidence Lock Up room. These key locations will be documented during DNA Technical Leader annual audit.
- d. Video monitoring
 - i. There are three cameras located within the laboratory with 24/7 monitoring access
 - 1. One is dedicated to Evidence Lock Up
 - ii. The cameras are able to view into each of the rooms in the space and will record any movement that is detected
 - iii. Access to the security footage is restricted to the Laboratory Director (or Designee)
- e. Non-lab personnel access



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- i. A camera and doorbell is located outside of the main laboratory space for non-staff access
 - ii. A monitor (Lab room) and restricted iOS or Android app used within the lab space (on the lab WiFi) allows monitoring and unlocking of the outer door.
 - iii. Non-staff personnel should be restricted to the admin area unless absolutely required (instrument maintenance etc)
- f. Admin room doors
- i. There are three doors that are accessible to the main laboratory that lead to other offices within the building, until a future time when the laboratory will expand to those locations, these doors will be locked and barred with a physical, no key lock that is only accessible from the IMF Admin area.

General Decontamination: Intermountain Forensics – Salt Lake City (IMF-SLC)

1. IMF-SLC Laboratory doors are self-closing and should remain closed at all times when not entering or exiting the room
2. Staff should utilize the following processes to limit lab-induced contamination
 - a. Use dedicated lab coats for ID Lab (post amplification) and Admin, Prep and Lab (pre-amplification)
 - b. Use bleach pad between touching items/tubes/evidence
 - i. Replace gloves whenever they may have been contaminated
 - c. Disposable paper (Kimwipe, butcher paper) should be used to cover work areas and discarded after processing or between cases during itemization
 - d. Clean work areas with 20% bleach prior to and after use
 - e. Facemask must be used while processing pre-amplification samples
 - f. Cell phones should not be used while in laboratory areas (Prep, Lab, ID Rooms)
3. Additional Laboratory Decontamination
 - a. Common areas of the laboratory will be decontaminated with 20% bleach monthly (during monthly maintenance)
 - i. Include doorknobs, light switches, common use bench areas, instrument external handled areas, faucets, common use tools and pens, centrifuges internal and external surfaces, and vortexes
 - ii. Floors will be cleaned as needed
 - a. Completion will be documented in in the Equipment Log

Internet Security: Intermountain Forensics – Salt Lake City (IMF-SLC)

1. Intermountain Forensics utilizes a Microsoft Azure cloud-based server for data storage and application implementation
 - a. Microsoft Azure houses all laboratory data and is restricted to only IMF personnel login
 - b. Cloud-based security far exceeds physical server security and is constantly updated with security enhancements
 - c. All data is secured and backed within the Microsoft Azure server structure to ensure absolute data integrity in the event of an emergency or natural disaster
2. Instruments connected to computers are connected only through physical ethernet connections to the internet router
3. WiFi security is maintained with Comcast Business Internet
 - a. This includes “Comcast Business Security Edge” which scans WiFi network for internet security issues every 10 minutes (malware, phishing scams, botnet, ransomware etc.)
4. This Intranet is considered the main location for data storage and access is authorized to all individuals working both remotely and at other IMF laboratory locations.



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Physical Space: Intermountain Forensics – Astrea Santa Cruz (IMF-ASC)

1. The Laboratory is located at the following address:
100 Enterprise Way, Suite 101A, Scotts Valley, CA, 95066
2. The laboratory is divided into two physical rooms
 - a. Forensic Lab (FL)
 - b. Main Lab (ML)
3. The Forensics Laboratory (FL) operates in a similar way to an ancient DNA laboratory. All pre-PCR work is completed in the FL and all post-PCR work is completed in the Main Lab (ML) using a unidirectional workflow. All FL procedures **must** be completed before entering the ML. Re-entry into the FL laboratory space after being in the ML is prohibited.
4. Personnel whose main office space is in the FL area may only reenter to come back to their desks. However, this movement should be minimized.
5. FL internal laboratory spaces are subdivided by task:
 - a. Accession bench – Used to open packages, photograph evidence items, enter information into Astrea laboratory information system (LIMS), prepare items for storage or for shipping.
 - b. Lab bench – Used for extraction cleanup and extract quantification procedures. Also used for preparing reagents and general laboratory tasks.
 - c. PCR hood – Used for preparing sequencing libraries and pre-PCR procedures.
6. PCR amplifications and post-PCR procedures such as bead cleanup, quantification and QC of indexed libraries, pooling libraries for sequencing, reamplifying libraries or enrichment must be completed in the ML either in the dedicated Astrea bench space or the sequencer room dedicated to Claret Bio and Astrea

Physical Security: Intermountain Forensics – Astrea Santa Cruz (IMF-ASC)

1. The room containing all IMF-ASC instrumentation will be secured through the use of an assigned key, or through the use of an assigned electronic key card.
 - a. Individuals authorized for entry will be tracked
2. On occasion, law enforcement clients may request to hand-deliver evidence items with an in-person visit. Coordinate and schedule these visits directly with the agents who will travel to Astrea facilities. Note that these customers as well as any other external must be accompanied by an authorized Astrea representative at all times when entering our facilities.
3. Once dates and times have been set, notify all Astrea and Claret Bio personnel and schedule the visit in the Astrea and Claret Outlook calendars.
4. On the day of the visit arrive at least one hour before the scheduled meetup time.
5. Ask visitors who are entering the restricted area to sign in by signing a visitor's log. See template available in: ERS > ClaretBio-Documents > General > Astrea > Setup > AstreaLab_VisitorsLog.docx

General Decontamination: Intermountain Forensics – Astrea Santa Cruz (IMF-ASC)

1. Bench space and hoods must be cleaned regularly to maintain contamination control. After each use, benches must be wiped with a 70% ethanol solution or with a 1% bleach solution followed by 70% ethanol.
 - a. Exercise caution using bleach immediately after conducting DNA extraction. The binding buffer contains Guanidinium Hydrochloride which **cannot** be in contact with bleach. If there is a buffer spill on the bench, do not use bleach for cleanup.
 - b. If metal surfaces come into contact with bleach, immediately wipe them with water to prevent oxidation.



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2. The dead air and PCR hoods have integrated UV lights. After each use, decontaminate the hoods by turning on the UV light for 10 minutes.
3. Reusable labware such as tube racks, tweezers, scissors, magnetic racks, beakers must be cleaned after each use, with a 1% Alconox dilution and tap water. This cleanup can be followed by soak in 1% bleach, water (if metallic parts are present, and a final rinse with 70% ethanol. Further decontaminate all items by exposing to UV light for 10 minutes in the FL UV box or by placing the items close to the UV lights in their respective hoods.
4. Pipettors must also be regularly decontaminated by wiping with 70% ethanol and exposing to UV light for 10 minutes.
5. Centrifuges must be cleaned regularly to prevent residue buildup. Use 70% ethanol solution to wipe metallic components.
6. Lab floors must be swept regularly.
7. Sticky floor mats at entryways must be changed regularly (once they are no longer sticky).
8. Equipment and materials used in laboratory spaces must not be moved out of the laboratory area. Do not move computers, markers, timers, measurement tools, or other items into the office space where they could be used without gloves or be exposed to potential contamination.
9. At least one computer will be available for use in the FL and must be used with gloves to prevent contamination.
 - a. Accession bench computer – Solely for entering data into Astrea LIMS.
 - b. Lab bench computer – For usage while conducting experiments.
10. Personal protective equipment (PPE) must be used at all times when working in the FL. This includes coverall body suit, double gloves, hair net, face mask and eye protection.
 - a. While gloves, face mask and hair net are necessary for accessioning, use of coverall body suit is not necessary unless working with human remains that still have tissue attached or other items that may represent a biological hazard.

Internet Security: Intermountain Forensics – Salt Lake City (IMF-ASC)

Internet access used by IMF-ASC and Claret Bio employees and will meet standard internet security criteria.

Remote Space

1. Intermountain Forensics will utilize remote staff wherever possible. To that end, many of the laboratory staff will be working from remote locations and require access to common files and software. This is accomplished by a Microsoft Azure cloud-based server structure for more secure and accessible storage.
 - a. Access to laboratory server is limited to only those individuals who have an IMF login
 - i. Access is granted and maintained by the Lab Director (or designee)
 - b. Login to the IMF server will be restricted to only personal or secure private networks.
 - i. Public Wi-Fi and non-secure networks are not allowed to access
 - c. Intermountain Forensics server houses all SOP's, Validation, Case Files, Training Records, Proficiency documentation and all other files needed for laboratory analysis and reporting for remote employees

4. References

Microsoft Azure Server security details: <https://azure.microsoft.com/en-us/product-categories/security/>
Comcast Business WiFi Security: <https://business.comcast.com/learn/internet/security-edge>



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Swipe Card Access (IMF_SLC)



Camera Monitoring (IMF-SLC)





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Doorbell/Video Monitoring (IMF-SLC)



5. Definitions

Post Amplification: A room in which Polymerase Chain Reaction (PCR) amplification and/or post PCR processing occurs. This creates billions of copies of DNA which has the potential to contaminate upstream lab spaces. Also termed “dirty room”.

Unidirectional processing: All processing pre amplification (PCR) will be done outside of the ID Lab. Processing then proceeds into the ID lab for PCR and post-PCR processing and does not return to upstream spaces. Unidirectional processing will always be maintained