

Molecular Imaging Facility Policies and Procedures

Contents:

1 – Facility Description	2
2 – Acknowledgement of Facility Support	2
3 – Personnel Definitions	2
4 – Instrumentation	4
5 – Molecular Imaging Facility as a Recharge Center	5
6 – MRI Suite – General Safety	7
7 – MRI suite - Zoning/Access Restrictions	8
8 – Access to the MRI Suite	9
9 – MRI Screening	11
10 – MRI – Quality Control Testing	11
11 – MRI – Safety	12
12 – MRI – Emergency Procedures	12
13 – DXA – Quality Control Testing	14
14 – DXA – Safety	14
15 – Cleaning the MRI Suite	14
16 – Records Retention	15
17 – NMR – Access Restrictions	16
18 – NMR – Quality Control Testing	16
19 – NMR – Safety	16
20 – NMR Room – Emergency Procedures	17
21 – Cleaning in the NMR Room	18
22 – Commonly used acronyms	18
23 – Zone Map of MRI Suite	19
24 – MIF Policies Agreement	20

Rev. 2021-03-03

- 1 Facility Description
 - A. The Institute of Arctic Biology-Molecular Imaging Facility (MIF) maintains and provides access to state-of-the-art techniques for the University of Alaska System.
 - B. The primary goal of the Facility is to maintain the instruments within the Facility for the support of research and teaching efforts while maintaining the safety of all persons that enter the facility.
 - C. The policies set forth in this document are established to facilitate the primary goal of the Facility with a minimum of hindrance to research and teaching efforts.
 - D. To support the instrumentation in the Facility now and in the future, the Facility is a recharge center, with hourly rates set for all of the instruments and for Facility Staff time.
- 2 Acknowledgement of Facility Support
 - A. The Facility receives support from multiple sources including, but not limited to the NIH COBRE and INBRE programs. Users of the facility are expected to acknowledge this support in all products that result from the use of the Facility using the wording below.
 - a. Research reported in this publication was supported by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number 2P20GM103395. The content is solely the responsibility of the authors and does not necessarily reflect the official views of the NIH.
 - b. Research reported in this publication was supported by the National Institute of General Medical Sciences of the National Institutes of Health under Award Number P20GM130443. The Content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.
- 3 Personnel Definitions
 - A. Facility Manager – The person responsible for the operation of the Molecular Imaging Facility and the safety of all persons and animals that enter the facility, as we maintain the instrumentation within the Facility.
 - a. Currently Dr. Carl Murphy
 - B. MR Personnel - Those affiliated with the university either for research-related work, or other work within the MRI suite.
 - a. Level 1: Those that are performing research / facilities / custodial work in the MRI suite.
 - 1) Level 1 Personnel must be supervised at all times while in the MRI suite
 - b. Level 2: Those that have a demonstrated need to work within the MRI suite without direct supervision.
 - 1) Affiliated with the university
 - 2) Attend live MRI safety presentation annually.
 - a. At this time, live and virtual safety training is being performed by Philip Shenk.
 - 3) Have a current MR-Personnel Screening form on file

- 4) Have demonstrated the ability to be safe in the MRI suite and be trusted to be unsupervised in the MRI suite.
 - 5) Have read and signed the MIF policies
 - c. Level 3: Must meet criteria for level 2. There must be a defined operational benefit to the facility for granting level 3 MR personnel status.
 - 1) Level 3 personnel may access zone 4 without supervision from level 4 MR personnel.
 - 2) Level 3 personnel may supervise MRI users when non-living specimens are being examined.
 - 3) Level 3 personnel are appointed from level 2 personnel based on the needs of the facility. Personnel may not request appointment to Level 3.
 - d. Level 4: Those who have been appointed to be responsible for the safety and operations within the MRI suite. (Currently Dr. Carl Murphy).
 - 1) Only Level 4 personnel can grant MRI suite access to others.
 - 2) Only Level 4 personnel may scan living humans or animals in the MRI.
 - 3) If an IRB or IACUC includes the use of the MRI, the Level 4 personnel should be included on the Personnel list for the project for operating the MRI.
 - 4) If an IRB or IACUC includes the use of the DXA, the Level 4 personnel should be included on the Personnel list for the project for operating the DXA.
 - e. Medical Director: The facility medical director is Dr. Jeff Zuckerman.
 - 1) The medical director must approve all human research subjects before they are scanned.
 - 2) All protocols used for human research must be approved by the medical director before they are used.
 - f. Radiologist: The facility radiologist is Dr. Jeff Zuckerman.
 - 1) All images acquired on human subjects will be inspected by the radiologist.
 - 2) The radiologist will provide any recommendations for medical follow-up as warranted by the images.
- C. Non-MR Personnel – Anyone that is not on the list as MR-personnel. All non-MR personnel must be supervised by level 2, 3, or 4 MR personnel at all times while in the MRI suite.
- a. MRI subjects: Those entering the MRI suite with the intent of being scanned within the MRI magnet.
 - 1) This also includes any immediate family who wish to be present with the subject during the scan.
 - 2) All MRI subjects must complete the human subject screening form.
 - a. Research animals must have MRI listed on their IACUC protocols, and be documented as MR safe.
 - b. Animals receiving clinical MRI scans must have owner and veterinary approval before they can be considered MR-Safe.

- c. All animal MRI research scans must be supervised by a licensed veterinarian and someone trained on the MRI conditional gas anesthesia machine.
- d. Volunteers – those getting scanned, but not currently involved in a research project, must read and sign the volunteer consent form and the UAF Volunteer Waiver form.
 - 1. Volunteers are requested by the Facility on a case by case basis for the instructional or developmental needs of the Facility.
- 3) Human subjects under the age of 18 will not be scanned in the MRI or the DXA.
 - a. Exceptions may be made for the DXA with prior notification of the Facility Manager and authorization of parent or guardian.
 - b. Exceptions will only be granted for individuals participating in University of Alaska based programs.
- 4) Pregnant subjects will not knowingly be scanned in either the MRI or the DXA.
 - a. Exceptions may be made on a case by case basis if warranted by IRB or IACUC protocols.
- 5) Hearing protection must be made available for all MRI subjects.
 - a. MRI subjects are permitted to decline scanning if not satisfied with hearing protection offered.
 - b. MRI subjects are permitted to decline use of the provided hearing protection.
- 6) Anesthesia – No human subjects will be anesthetized.
 - a. Animal subjects will be anesthetized/sedated based on the needs of the study.
- 7) Contrast agent will not be used on any human subject.
- b. Others: Those that are not in any of the above categories and are entering the MRI suite without the intent of getting scanned in the MRI.
 - 1) This includes anyone that is not included in the above categories.
 - a. Must be supervised at all times.
 - b. May not enter the MRI scan room (Zone 4).

4 Instrumentation

A. Locations

- a. Toshiba 1.5 T Excelart/Vantage MRI
 - 1) MRI suite Room 015C in the Murie Building
- b. GE Lunar iDXA
 - 1) Room 015H within the MRI suite
- c. 300 MHz Varian Mercury NMR
 - 1) Reichardt room 136
- d. 600 MHz Bruker Avance-III NMR
 - 1) Reichardt room 136

B. Training

- a. Training is available on all of the instruments within the Molecular Imaging Facility
- b. In general training should be performed by the Facility Manager.
 - 1) All training and instrument access must be approved by the Facility Manager, who has the authority to delegate training of new users to currently trained users within their research group.

C. Reservations

- a. Each instrument in the Facility has an online calendar for reservations.
- b. Instrument reservations must be made on the calendar for the instrument at least 1(one) business day prior to the start of the reservation.
- c. It should be made clear in the reservation which SOP is going to be used during the reservation, so that the instrument can be made appropriately ready for use. If a user fails to show up for their reservation, without notice, they may be billed for the staff time required to prepare for their reservation (minimum 1 hour, but no more than 2 hours) and/or the instrument time reserved. Reservations requiring staff to run the instrument must be submitted 3 (three) days prior to the reserved time in order to confirm the availability of personnel.
- d. Reservations requiring staff to be on standby for a block of time in addition to the time required for the prep/running of the instrument may be billed the hourly staff rate for the time that staff is "on-call" awaiting the researchers.
- e. The facility may be unable to honor reservations that are made with less notice than specified above.

D. In the case of scheduling conflicts, the order of priority is as follows:

- a. Project supported by the Center for Transformative Research in Metabolism (TRiM)
- b. Pilot projects supported by the TRiM Center
- c. Revenue Generating Activities
 - 1) Research (including research supported by Merit Awards)
 - 2) Teaching
 - 3) Clinical Veterinary MRI
- d. Projects supported by Facility Service Awards

E. Log Sheets

- a. Each instrument has a log sheet that should be filled out every time that the instrument is used.
- b. The log sheets help to keep accurate accounting of instrument usage, and is a necessary part of the Facility operating as a recharge center.

5 The Molecular Imaging Facility as a Recharge Center

A. Rates

- a. Each instrument has an hourly rate for usage as calculated based on projected expenses and available instrument time.
- b. Instrument rates can be found on the [TRiM's website](#).

- c. The rates are updated annually, and the current rate proposal may be found [here](#).
- B. Usage accounting
 - a. The instrument log sheets are collected monthly and compared with the online calendar reservations.
 - b. The calendar and log sheets are used to tabulate the instrument usage for all instruments, users, and projects.
 - c. This tabulation is used by the HaMR staff to generate invoices that are sent to the PI responsible for the usage and to the IAB Fiscal Officer to handle the payment for usage.
- C. Project Registration Forms
 - a. All projects using staff and/or instrumentation within the Molecular Imaging Facility must have a Project Registration Form on file.
 - b. Project Registration Forms accomplish several things including
 - 1) Informing the Facility about your project.
 - a. The Facility is routinely asked about what projects are taking place, so it is important to maintain a current list of projects.
 - 2) Informing the Facility about who is authorized to bill instrument time to the project
 - 3) Inform the Facility about the funding status of your project, and the associated Fund/Org for the project.
 - a. If needed, the Project Registration Form will direct you to either the Service Award or Merit Award Application.
- D. Service Awards
 - a. The Molecular Imaging Facility will provide opportunities for University of Alaska researchers to develop pilot data sets that will demonstrate the feasibility of their research approaches making them competitive for external research grant support (must be submitted by the PI responsible for the project).
 - b. Service Awards are for individual projects
 - c. For projects spanning multiple fiscal years, service awards must be renewed annually
 - d. Service Award applications are reviewed by HaMR Core Key Personnel and an external reviewer.
 - e. Approval of Service Award Applications is based on the following criteria:
 - 1) Feasibility
 - 2) Instrument and staff availability
 - 3) Potential for the award to generate future revenue through submission of successful grant proposals
 - 4) Potential of the award to lead to publication, patents, or commercialization
 - 5) Accomplishments resulting from prior service awards
 - 6) Student involvement leading to an MS or PhD.
 - f. Service Awards are not transferrable to other institutions.

- E. TRiM Merit Awards: The purpose of Merit Awards is to recognize individuals whose research, funded by other sources, contributes to the growth and sustainability of the HaMR Core. Merit Awards are to complement other funding sources.
 - a. Support from the Center for Translational Research in Metabolism (TRiM) allows the MIF to provide awards to support research projects that fit within the vision of the Center as researchers are applying for research grants.
 - b. Merit Awards are for individual projects that are funded by grants.
 - c. The Merit award is granted for the entire length of the funded project. Merit Award applications are reviewed by HaMR Core Key Personnel, the PI for the Center of Translational Research in Metabolism, and an external reviewer.
 - d. Approval of TRiM Merit Awards is based on the following criteria:
 - 1) Goals of the project align with the vision of the TRiM Center
 - 2) Instrument and staff availability
 - 3) Potential for the award to generate future revenue through submission of successful grant proposals
 - 4) Potential of the award to lead to publication, patents, or commercialization
 - 5) Accomplishments resulting from prior service awards
 - 6) Student involvement leading to an MS or PhD.
 - e. Merit Awards are not transferrable to other institutions.
- F. All forms for research projects including Project Registration Forms, Service Award Applications, and Merit Award applications are available on the HaMR Core website (<https://trimalaska.com/health-metabolism/>)
- G. All projects must have either a declared funding source, an approved Service Award application, or an approved Merit Award application before any work can be performed on the project.
- H. All users must have read and signed the MIF Policies Agreement (at the end of this document) in order to have access to facility resources.
- I. Refusal to pay for use of the staff/instrumentation time within the MIF will result in the refusal of future services from the MIF.

6 MRI Suite – General Safety

- A. To ensure a safe and secure working environment all instrumentation users and Facility personnel are expected to follow all policies outlined in this document in addition to policies laid out by the University of Alaska and regulations put forth by OHSA.
- B. Failure to follow any of these policies can result in actions being taken. These actions can include:
 - a. Revoking of MRI suite access
 - b. Revoking of instrument access
 - c. Reports being filed with EHS&RM at the University of Alaska

- C. Standard Operating Procedures (SOP) must be followed during the operation of any of the Facility instrumentation.
 - a. If an SOP does not currently exist for your desired experiment, contact Level 4 Personnel to request a new SOP be generated.
- D. All instrument specific safety rules should be followed at all times. These include, but are not limited to:
 - a. Do not take non-approved items into the MRI scan room.
 - b. Wear your radiation badge when operating the DXA.
- E. When you are the last person leaving the MRI suite, turn off all of the lights that you are able to turn off. Emergency personnel do not readily have access to the MRI suite. Turning off the lights shows emergency personnel that no one is present in the area, thus speeding up building evacuation in an emergency.
- F. All users wishing to have independent access to the MRI suite, must sign the MIF Policies Agreement at the end of this document.

7 MRI suite - Zoning/Access Restrictions (Murie room 015)

- A. Zone 1 – Public areas outside of the MRI suite and connected hallway.
 - a. No safety restrictions
- B. Zone 2 – Hallway immediately outside of the MRI suite.
 - a. No safety restrictions. This area allows for the meeting of those wishing to enter Zone 3, so that they may be screened.
- C. Zone 3 – Areas within the MR suite, but outside the magnetic field.
 - a. Any personnel of level 2 and up needs to have a screening form on file regardless of what they will be doing in the area.
 - 1) The one exception is personnel entering Zone 3 during a building emergency.
 - a. Emergency personnel must be properly briefed on safety and supervised closely.
 - b. Any non-MR personnel who enter the MRI suite must be supervised at all times by level 2, 3, or 4 MR personnel.
 - 1) Non-MR-personnel must be strictly supervised. Care should be taken to maintain the privacy of any MRI subjects (i.e. images/screening forms, etc.).
- D. Zone 3b – The DXA room (room 015H).
 - a. Anyone in the DXA room while the DXA is in operation must be wearing a radiation badge issued by the University of Alaska.
 - b. Contact Level 4 Personnel to request a radiation badge.
 - 1) Exceptions:
 - a. The subject being scanned by the DXA is not required to wear a radiation badge.
 - c. Dr. Coker and Dr. Murphy should be consulted before any facility and/or infrastructure work can take place within the DXA room to minimize any possible impact on clinical research.
- E. Zone 3c – The Procedure room (room 015F).
 - a. Work conducted in this room is under the purview of Dr. Coker and his

- lab, for clinical research.
 - b. Dr. Coker and Dr. Murphy should be consulted before any facility and/or infrastructure work can take place within the Procedure room, to minimize any possible impact on clinical research.
- F. Zone 4 – The MRI scan room (015C) and the equipment room (015D)
- a. Anyone entering zone 4 must have filled out either the MR-Personnel, non-MR-Personnel, or human research subject screening form.
 - b. The MRI Scan room is secured with a punch-code lock. The code will be changed on a routine basis (at least once per year).
 - 1) Only Level 4 personnel, Toshiba field engineers, and the level 4 personnel's immediate supervisor may know the code to the scan room.

8 Access to the MRI Suite:

A. Granting access to the MRI suite

- a. Keycard access to the MRI suite is considered on a case by case basis.
 - 1) Requests for card access must be sent to level 4 MR personnel and may be discussed by the MRI User Committee.
 - 2) Keycard access is granted only with written authorization of Level 4 MR Personnel.
 - a. Level 1 MR personnel and non-MR personnel are not eligible for keycard access.
 - b. Department Emergency Action Plan training and other required University training must be completed before card swipe access can be granted.
 - c. Courtesy keycard access for visiting technicians may be granted with written authorization of Level 4 MR personnel.
 - d. Undergraduate students may be granted card swipe access to the MRI suite to facilitate data analysis. While the undergraduate is working within the MRI suite, other level 2, 3, or 4 personnel must be within the Murie building and aware of the undergraduate in the MRI suite.
 - 3) Keycard access to the MRI suite expires no later than one year after the most recently attended Live MRI Safety Training.
 - a. If a Live MRI Safety Training is unavailable on a timeline conducive to your need for access to the suite, an online safety training is available as a temporary substitute.
 - 1. The online training will count in place of a live MRI Safety training for up to two months, to allow for a Live Training to be scheduled.
 - 2. The online training is available at <https://www.appliedradiology.org/courses.aspx>
 - 3. Complete the "Basic MRI Safety Training, Level 1 MR Personnel", and email your completion certificate to the Level 4 Personnel.

3. Upon successful completion of the online training, Level 4 personnel will meet with you at the MRI suite, for a walkthrough, review of hazards, and completion of an MR-Personnel screening form.
 4. You will still be expected to attend a Live MRI Safety training as soon as possible, to continue your access to the MRI suite after the two-month period has elapsed.
- b. The MIF Manager will maintain a list of those who have attended a Live MRI safety Training, with the most recent date attended.
 1. After each MRI Safety Training, the MIF manager will create an event on google calendar for 10 months from the training, reminding attendees of the pending expiration of their MRI Safety Training.
 2. Please contact the MIF Manager if your access is about to expire and you need uninterrupted access to the MRI suite.
 3. The MIF Manager will coordinate the scheduling of the MRI Safety training with anyone whose card swipe access is nearing its expiration.
 - 4) Before receiving card swipe access to the MRI suite, you must have read and signed the MIF Policies Agreement at the end of this document.
 - b. Key access to the MRI suite will not be granted under any circumstances.
 - 1) The equipment room (015D) may have keys issued for it with written authorization from level 4 MR-personnel.
 - a. Courtesy keys for visiting MR technicians may be granted with written authorization of Level 4 MR personnel.
 - c. Requests for keys to the other rooms within the MRI suite will be handled on a case-by-case basis.
 - 1) Requests for these keys should be sent to level 4 MR personnel and may be discussed by the MRI User Committee.
- B. If you need entrance to the MRI suite:
- a. Level 1 Personnel needing to be let into the MRI suite
 - 1) Contact Level 2, 3, or 4 MR-personnel to be let in
 - b. Level 2 or 3 Personnel with access locked themselves out of MRI-suite
 - 1) Contact Level 2, 3, or 4 MR-personnel to be let in
 - c. Level 4 MR-personnel locked out of MRI suite
 - 1) Contact Level 2 or 3 MR-personnel to be let in
 - 2) Contact lock shop to be let into MRI suite
 - 3) Locked out and lock shop closed, wait until lock shop opens
 - d. If locked out of the MRI suite, do not call campus police. They do not have access to open the MRI suite.
 - e. If access cannot wait for Level 2, 3, or 4 personnel to arrive, contact the

Fire Department and explain the nature of the emergency that requires immediate attention.

- 9 MRI-Screening:
- A. Everyone entering the MRI suite must be briefed on safety within the MRI suite by MR Personnel.
 - a. No screening form is required for university employees staying in Zones 1 & 2.
 - b. The Non-MR-Personnel Form is acceptable for workers only entering the equipment room (015D) and not the MRI scan room.
 - c. The MR-Personnel screening form is required for all personnel going into the scan room.
 - d. The Human Research Subject screening form must be used for all people who will be within Zone 4 during a scan.
 - e. Screening forms must be updated routinely (at least annually). Personnel must update their screening form anytime there has been a change that affects the answers currently on the form (i.e. had a pace-maker installed, hip replacement, etc.).
 - f. Screening forms will be stored in a cabinet in a locked room within the MRI suite for confidentiality. Only the manager of the facility has access to this room, and keys will not be issued for this room.
 - 1) They will be securely disposed of on an as needed basis.
 - g. Current forms must be kept on hand for all personnel and subjects.
 - h. Screening forms may be filled out while in the MRI suite to help ensure confidentiality.
 - B. Human research subjects filling out screening forms will also receive a screening interview to ensure their safety.
 - C. Only Level 4 personnel may scan living humans or animals in the MRI.
 - D. Objects that need to enter the scan room are only determined MR safe/conditional based on information provided by the manufacturer.
 - a. Objects declared MR conditional, may only get as close to the magnet as described based on their conditional rating.
- 10 MRI – Quality Control Testing:
- A. Daily:
 - a. Each day the MRI is used, basic testing using the provided QC cube will be performed and the results will be recorded in the MRI log book.
 - 1) Recorded results will include, but not be limited to, S/N for each axis of cube and current liquid helium level.
 - B. Weekly:
 - a. Each week the ACR phantom will be scanned following the ACR guidelines to ensure that the magnet continues to meet the American College of Radiology (ACR) quality standards.
 - C. Monthly:

- a. Preventative maintenance check-ups will be performed on the MRI at least once per month.
 - 1) At least once every three months, this checkup will be performed by a representative from Toshiba.
 - 2) All relevant results will be recorded in the MRI logbook.
 - D. Annually:
 - a. Once per year a representative from Baltzo Health Physics Services Inc. will test the function and image quality of the MRI.
 - 1) At this time the instrument is recertified as safe for human use.
 - b. Once per year representatives from Toshiba will inspect the MRI system and refill the cryogenes.
 - 1) No facility personnel are authorized to perform a cryogen fill on the MRI.
 - c. Once per year Tru-Test Certification Services, LLC will send an engineer to inspect, test, and maintain the MRI conditional anesthesia machine.
- 11 MRI – Safety
- A. All chemicals in the MRI suite are to be stored in room 015A.
 - a. A binder containing all relevant Safety Data Sheets is stored in room 015A.
 - b. Exception:
 - 1) Chemicals only for use in Zone 3c (room 015F) must be stored in room 015F along with relevant data sheets.
 - c. Personnel must be familiar with safety precautions and proper use of any chemical before they use it.
 - B. To ensure the safety of all personnel and research subjects, no metal objects of any kind can be brought into the MRI room unless it has been tested and approved by Level 4 MR personnel.
 - C. Only items that have been approved by Level 4 MR personnel may be taken into the scan room.
 - D. Level 3 or 4 MR personnel must be present at all time if a living subject is within the MRI scan room.
- 12 MRI - Emergency Procedures:
- A. Training – Emergency personnel will attend live MR safety presentations annually.
 - B. These procedures are meant to be in addition to standard Murie Building Procedures, and not intended to replace the Department Emergency Action Plan for the Murie Building.
 - C. Any incidents within the facility should be reported to Environmental Health and Safety as per University policies.
 - D. Quench –
 - a. In the event of a magnet quench:
 - 1) Stop any experiment running.
 - 2) Remove living research subject (if any) from the magnet.
 - 3) Evacuate scan room and MRI suite as quickly and safely as possible.

E. Thermal Burns –

- a. Every effort will be made to reduce the chance of thermal burns being inflicted on research subjects.
- b. In the event of a mild thermal burn, basic first aid will be available within the MRI suite.
 - 1) Subject may request paramedics and then MR Personnel will call emergency first responders.
- c. In the case of more severe burns the MR personnel will call emergency first responders to treat the subject.
- d. Mild versus severe burns are decided based on the discomfort level of the subject.

F. Fire

- a. Situation 1: Fire alarm sounds for the building and fire is not located within the MRI suite.
 - 1) Stop any MRI scans in progress.
 - 2) Evacuate everyone from the MRI suite.
 - 3) Confirm that the door closes after the last person exits.
 - 4) Exit the building and wait for the all clear before entering again.
- b. Situation 2: Fire in the MRI suite outside of Zone 4.
 - 1) If fire is small enough extinguish it using safe fire practices (i.e. fire extinguisher, water, smothering, etc.). Inform Level 4 MR-Personnel.
 - 2) If fire cannot be dealt with by MR-personnel, call the fire department and explain exactly where the fire is located, and that fire is outside of the magnetic field zone. Inform Level 4 MR-personnel. Follow instructions.
- c. Situation 3: Fire in the MRI Scan room (Zone 4).
 - 1) If fire is small enough extinguish it using safe fire practices (i.e. fire extinguisher, water, smothering, etc.). Inform Level 4 MR-Personnel.
 - 2) If fire cannot be dealt with by MR-personnel, call the fire department and explain exactly where the fire is located, and that fire is inside of the magnetic field zone and that only MR-safe equipment may be used. Inform Level 4 MR-personnel. Follow instructions.
 - 3) If fire seems likely to spread and jeopardize the building, inform level 4 MR-personnel immediately. Follow the instructions of the level 4 personnel which may include the pushing of the big red quench button. Then, call the fire department and explain what the situation is within the MRI suite. Follow instructions.

G. Someone pinned to magnet by non-MR-safe item

- a. Situation 1: Victim not in any imminent danger of life or limb.
 - 1) Victim must wait for personnel to assist and pull item away from the magnet.
- b. Situation 2: Victim is in imminent danger of life or limb.
 - 1) Push the red quench button and remove the victim from the MRI room.

- H. Medical emergency – Person experiencing the emergency will be defined as the patient in this section.
- a. Situation 1: Patient is outside of Zone 4
 - 1) Call emergency responders.
 - 2) Seal off zone 4, so that no one can enter while emergency responders are present.
 - 3) Follow instructions of emergency responders.
 - b. Situation 2: Patient is inside Zone 4
 - 1) Call emergency responders
 - 2) Retract table to remove patient from magnet.
 - a. If it is safe to do so remove patient from the MRI room for ease of access for emergency responders.
 1. Seal off zone 4, so that no one can enter while emergency responders are present.
 2. Follow instructions of emergency responders.
 - b. If patient cannot be safely moved, inform the emergency responders that patient is in a high magnetic field zone.
 - c. Remind them to leave any metal equipment outside of zone 4.
 - d. Follow instructions of emergency responders.

13 DXA – Quality Control Testing

A. Daily:

- a. Each Day the DXA is used, basic testing using the provided test block will be performed and the printed report will be stored in a binder in the DXA room.

B. Annually:

- a. Once per year, Block Imaging will send an engineer to inspect, test, and maintain the DXA.

14 DXA – Safety

- A. During operation of the DXA, everyone present in the DXA room must be wearing a radiation badge supplied by the University of Alaska.
 - a. The subject being scanned is not required to wear a radiation badge.
- B. Contact level 4 MR personnel to request a radiation badge.
- C. The DXA is maintained on an isolated electrical circuit. Do not use any electrical outlets within the DXA room for anything other than the DXA and the associated computer.
- D. Any person being scanned by the DXA that is not covered under an IRB protocol, may be scanned no more than once per 90 days, to minimize exposure to radiation.
 - a. This person must also have a waiver form filled out before the scanning can take place.

15 Cleaning the MRI suite:

- A. Any users/personnel in the MRI suite are expected to clean up after themselves.
 - a. MR-Safe cleaning supplies will be available in the MRI suite

- b. Any equipment brought out must be put away before leaving the MRI suite.
- B. Routine floor cleaning will be scheduled by level 4 MR-personnel.
 - a. Level 2 or higher MR-personnel must be present during the cleaning.
 - b. MRI suite floors are cleaned Friday mornings by ABM services.
 - c. Floors are to be cleaned with a Virex cleaning solution.
- C. Whenever possible animal and human imaging sessions are not to take place on the same day.
 - a. If they must occur on the same day the human imaging should be first, or at least two hours after the animal imaging is completed.
 - b. After the last animal imaging session of the day, every surface that came into contact with the animal **MUST** be wiped down with Vindicator solution and/or chlorhexidine. This includes, but is not limited to any coils used, the magnet bed, and the magnet bore.

16 Records retention:

- A. Records stored within the MRI suite include:
 - a. Screening forms for personnel
 - b. Screening forms for human research subjects
 - c. Veterinary MRI forms
 - 1) Patient Imaging Consent Forms
 - 2) Screening forms for the attending veterinarians
 - 3) Invoices for imaging services
 - d. Maintenance records and log sheets relating to using and maintaining the MRI
 - e. Electronic copies of all images acquired using the MRI
 - f. Waiver forms resulting from non-research use of the MRI or DXA.
- B. All records pertaining to human subjects are the responsibility of the researcher and should be covered in their IRB protocols before any research is to be conducted.
 - a. Whenever possible identifying information will not be entered into the MRI or DXA for human subjects.
 - b. Human subject images will not be transferred electronically outside of the MRI suite, except for transfer to a radiologist.
 - 1) MRI Images may be given to researchers on a CD.
 - 2) DXA results will be printed out and given to the researchers.
 - a. Electronic copies of DXA reports may be provided if requested.
 - 3) For research participants, their printed DXA results and MRI images on CD are provided upon request.
- C. All records will be stored in a filing cabinet in a locked room within the MRI suite for confidentiality. Only the manager of the facility has access to this room, and keys will not be issued for this room.
- D. Any paper records containing confidential/sensitive information will be destroyed following University of Alaska procedures for secure disposal.
 - a. Screening forms and veterinary forms older than one year will be securely disposed.

- b. A Certificate of Destruction, provided by the University of Alaska Statewide system, will be filled out declaring the numbers of the types of documents to be destroyed, and the date range included at that time.
- c. The documents to be destroyed will then be deposited in the secured bin within the IAB offices to await destruction by Shredway.

17 NMR - Access Restrictions

A. The NMR room (Reichardt Room 136)

- a. The NMR room includes two superconducting magnets.
- b. Each magnet has a 5 Gauss region denoted around it with black and yellow tape on the floor.
- c. Only trained NMR users should cross the 5 Gauss line.
- d. The NMR room is secured with a punch code.
 - 1) The punch code is granted to fully trained NMR users on an as needed basis.
 - 2) Users wishing to obtain the punch code must demonstrate that they have completed the Department Emergency Action Plan training for the Reichardt Building.
 - 3) To receive the punch code to the NMR room you must have read and signed the MIF Policies Agreement at the end of this document.

B. The NMR Wet Lab (Reichardt Room 132)

- a. This is the laboratory space made available to the Facility for the preparing of liquid samples.
 - 1) The NMR Wet Lab is secured with a punch code that is shared with users on an as needed basis.

18 NMR – Quality Control Testing:

A. Daily:

- a. The primary shim file for the 600 MHz NMR will be updated as needed to ensure optimal performance for requested experiments.

B. Weekly:

- a. Every week, both NMR instruments will be filled with liquid nitrogen, and then shimmed.

C. Monthly:

- a. At least three times per year, both NMR magnets will be filled with liquid helium.

D. Annually:

- a. Once per year, Bruker will send an engineer to inspect, test, and maintain the 600 MHz NMR.

19 NMR – Safety

- A. To ensure a safe and secure working environment, all instrumentation users and Facility personnel are expected to follow all policies outlined in this document in addition to policies laid out by the University of Alaska and regulations put forth by OHSA.

- B. Failure to follow any of these policies can result in actions being taken. These actions can include:
 - a. Revoking of room access
 - b. Revoking of instrument access
 - c. Reports being filed with EHS&RM at the University of Alaska.
- C. Standard Operating Procedures (SOP) must be followed during the operation of any of the Facility instrumentation.
 - a. If an SOP does not currently exist for your desired experiment, contact the Facility Manager to request that a new SOP be generated.
- D. All instrument specific safety rules should be followed at all times. These include, but are not limited to:
 - a. Do not take ferrous items past the 5 Gauss line
 - b. Be cognizant of the 5 gauss lines in the NMR room
- E. When you are the last person leaving the NMR room, turn off all of the lights. Emergency personnel do not readily have access to the NMR room. Turning off the lights shows emergency personnel that no one is present in the area.
- F. Chemical Safety
 - a. NMR Room
 - 1) The NMR room is not a laboratory space and as such chemicals should not be present except in the following situations:
 - a. Liquids samples for NMR that have been prepared elsewhere may be brought to the NMR room.
 - b. Squeeze bottles of isopropyl alcohol and de-ionized water are maintained in the NMR room for the wiping down of NMR tubes before insertion in to the magnet.
 - c. Broken liquid samples and the solvents necessary to clean them up.
 - d. NMR samples for use in Magic Angle Spinning probes may be prepared in the NMR room on the benchtop maintained for this purpose.
 - e. The benchtop should be cleaned once the sample preparation is complete.
 - b. NMR Wet Lab
 - 1) All chemicals in this room must have a current Safety Data Sheet in the binder in this room.
 - 2) Users should be familiar with the safe use of any chemicals before using them.

20 NMR – Emergency Procedures

A. Magnet Quench

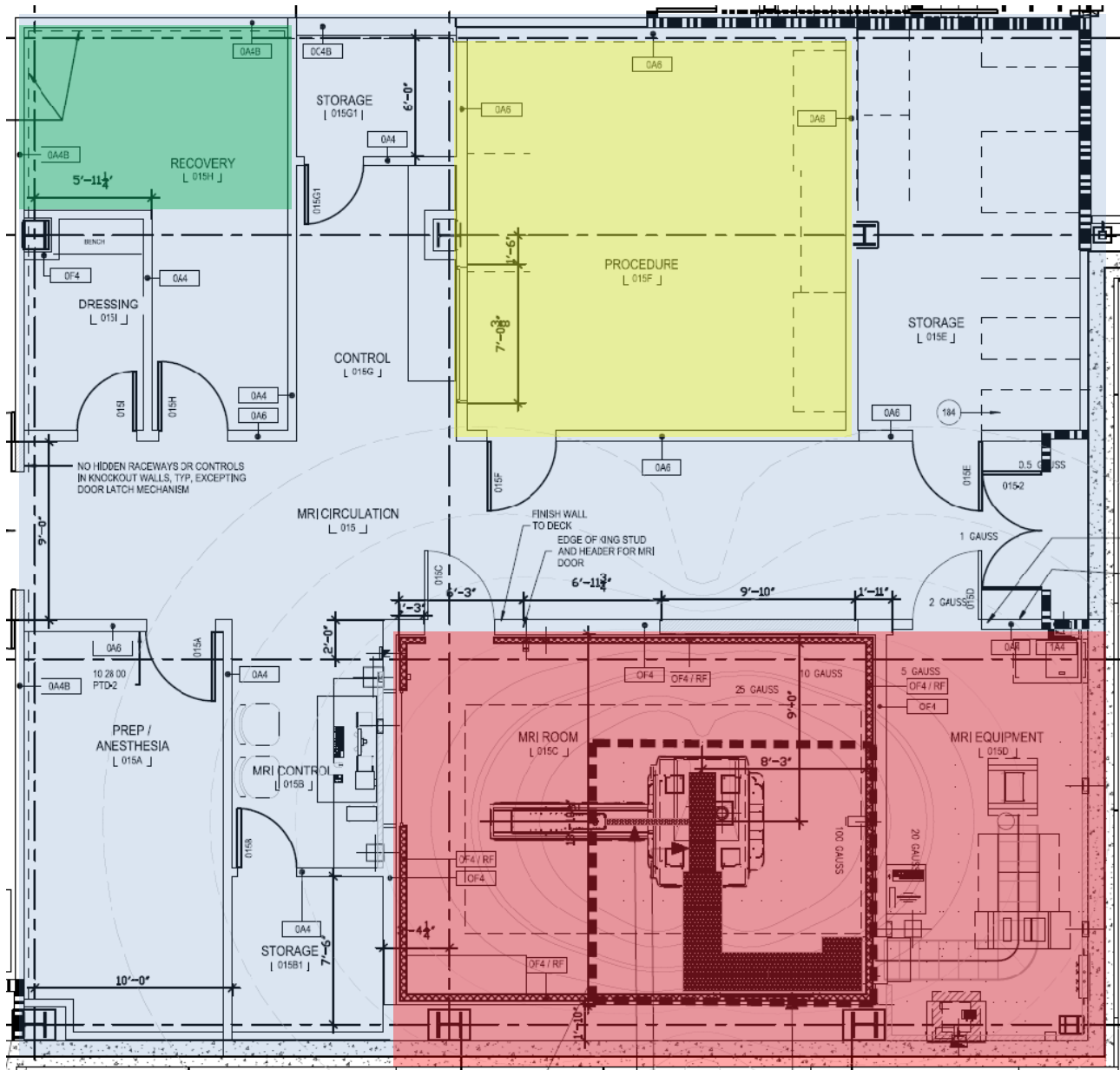
- a. If either of the NMR magnets quench while you are in the NMR room, exit the room as quickly and safely as possible, making sure that anyone else present in the room also exits the room.
 - 1) If possible, abort any experiment currently in progress on the NMR.
- b. Contact the Facility Manager to inform them of the quench.

- c. If no one is injured or suffering from oxygen deprivation, there is no need to contact emergency personnel/first responders.
 - d. If there is an injury and/or person suffering from oxygen deprivation, contact emergency personnel at once.
 - B. In case of fire or other building emergency follow the plans as laid out in the Department Emergency Action Plan for the Reichardt Building.

- 21 Cleaning the NMR room
 - A. Reichardt Building custodial employees, do not routinely clean in the NMR room.
 - B. Any users/personnel in the NMR room are expected to clean up after themselves.
 - a. Small wash bottles of cleaning solvents are maintained within the NMR room for general cleaning and wiping down NMR samples.
 - C. At least once per year the Facility Manager will reserve a large block of time (up to one day) to schedule/supervise and/or perform a thorough cleaning of the NMR room.

- 22 Commonly Used Acronyms
 - A. NMR – Nuclear Magnetic Resonance
 - a. A technique by which a magnetic field and radio-frequency pulses are used to analyze a sample to get a spectrum providing information about the chemical make-up of the sample.
 - B. MRI – Magnetic Resonance Imaging
 - a. A technique by which a magnetic field, radio-frequency pulses, and magnetic field pulses are used to generate an image of a sample showing show tissues and/or fluid within the sample.
 - b. An NMR-like can also be performed to generate a spectrum of a small region within the sample
 - C. DXA or DEXA – Dual-Energy X-ray Absorptiometry
 - a. A technique where two different X-ray beams are used to scan a subject (human or animal) to obtain body composition information.

23 Zone Map of MRI Suite



- Zone 3 Blue
- Zone 3b Green, DXA area
- Zone 3c Yellow, Procedure Room/Coker Lab Clinical Research area
- Zone 4 Red, region containing the magnetic field

24 MIF Policies Agreement

I, _____, do hereby confirm that I have read the Molecular Imaging Facility Policies and Procedures document. I understand that this is a requirement to work on any project within the Facility. I agree to follow the policies within this document, and accept responsibility for any consequences resulting from any failure on my part to follow the policies within the document, as revised on March 3, 2021.

Printed Name

Signature

Date