



WELLCOME SANGER INSTITUTE

STANDARD OPERATING PROCEDURE PACKET

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SANGER INSTITUTE STANDARD OPERATING PROCEDURE

SUBJECT: DEXA using the UF100 – V1

SOP Number: SOP0180	To be reviewed:	
Author(s):	Signed:	Date:
Editor:	Signed:	Date:
Risk Assessor:	Signed:	Date:
Date of Implementation:		

INTRODUCTION:

Isoflurane inhalation provides safe general anaesthesia for a variety of animal species. This procedure outlines the use and maintenance of a compact inhalation anaesthesia machine that incorporates an oxygen flow meter, anaesthetic vaporiser and oxygen concentrator, and an active waste gas scavenging system. This will primarily be used in combination with the UF100 for Dual Energy X-ray Absorptiometry (DEXA) scans.

ABBREVIATIONS:

DCF = Data Capture Form
DEXA = Dual Energy X-ray Absorptiometry
IVC = Individually Ventilated Cage
LAA = Laboratory Animal Allergens
PAF = Project Authorisation Document
PAT = Portable Appliance Testing
PIL = Procedure Individual Licence
PPE = Personal Protective Equipment
PPL = Procedure Project Licence
QC = Quality Control
RA = Risk Assessment
RSF = Research Support Facility
SLT = Senior Leadership Team
SMP = Sick Mouse Procedure
SOP = Standard Operation Procedure

QUALITY CONTROL (QC) DURING PROCEDURE:

Refer to the table below for approved QC fail comments steps to be used during procedures.

If a value has been collected leave on the Data Capture Form (DCF) and then apply the fail reason from below;

Problem / Issue	QC fail reason
At any point during the procedure the mouse is deemed sick and processed through Sick Mouse Procedure (SMP)	Fail whole DCF as 'Sick mouse' – for all tests that day
Mouse incorrectly scheduled at wrong week	Fail whole DCF as 'Scheduling Issue'
Insufficient anaesthesia level affects the whole test DCF	Fail whole DCF as 'Anaesthesia Issue'
Insufficient anaesthesia level affects specific parameter(s)	Fail parameter(s) as 'Anaesthesia issue'
A welfare issue makes it impossible to collect specific parameters	Fail parameter(s) as 'Welfare issue'
Parameters affected by delays or noise due to fire alarms	Fail parameter(s) as 'Fire alarm'
An equipment failure affecting specific parameters	Fail parameter(s) as 'Equipment failure'
A software issue affecting specific parameters	Fail parameter(s) as 'Software failure'
A procedural error which affects data collection	Fail parameter(s) as 'Manual error'
Parameter cannot be assessed	Fail parameter(s) as 'Readout not possible'
Wrong value has been entered which cannot be re-measured or accounted for	Fail parameter(s) as 'Erroneous data'
Glucose meter unable to record high blood values	Fail parameter(s) as 'Meter reading HI'
Glucose meter unable to record low blood values	Fail parameter(s) as 'Meter reading LO'
Fighting occurs prior to or during data collection	Fail parameter(s) as 'Fighting during procedure' –
Parameter on the current DCF is not required for that specific test/pipeline	Fail parameter(s) as 'Not required'

HEALTH & SAFETY:

This procedure is covered by the following Risk Assessment (RA):

Name: WTSI-1937

Assessment Title: Performing Dual Energy X-ray Absorptiometry and X-ray Imaging Including QC and Maintenance of the Faxitron UltraFocus100, Use and Recovery from gas anaesthesia.

Assessor:

Approver:

- Appropriate Personal Protective Equipment (PPE) is to be worn at all times when handling animals. This includes:
 - Overshoes
 - Gown
 - Gloves
- In addition to the above, when sources for Laboratory Animal Allergens (LAA) (animals or soiled cages) are not contained within Local Exhaust Ventilation

Systems (change stations, fume hoods or down flow tables), a respiratory mask, for which you have passed a face fit test, must be worn.

- Ionising radiation is used during this test. No waste is generated from ionising radiation. Only the lowest levels required to generate image are used.
- Workers new to the process are trained and supervised by an experienced lab member until they are deemed competent to perform the task unsupervised. All operators receive local training and induction, including a radiation safety induction.
- Lone worker alarms should be used when working alone.
- The Faxitron UF100 machine is internally shielded minimising exposure to the user and other users in the area. The machine can be stopped at any time during a scan by pressing the red button on the software to stop the x-rays and the machine can be turned off by switching the key to the off position
- This procedure can only be performed during Research Support Facility (RSF) core hours (7:30am-7:30pm).
- All electrical equipment is to be inspected for damage before use. The UF100 Faxitron machine receives Portable Appliance Testing (PAT) and is serviced annually.
- Isoflurane monitoring is conducted once every 6 months and is documented via "Isoflurane exposure monitoring sheet".
- New or expectant mothers should have a separate risk assessment undertaken through Health & Safety.

RESPONSIBILITIES:

All staff performing this procedure are responsible for ensuring that this Standard Operating Procedure (SOP) and accompanying Risk Assessment have been read, understood and where applicable is followed in accordance with the relevant Procedure Project Licence (PPL). All staff should be trained and competent to perform the procedure, where applicable they should also be licensed to perform the procedure with a valid Procedure Individual Licence (PIL).

For secondary phenotyping, seek confirmation with project manager for deviations from this SOP. Any deviation will be detailed in the Project Authorisation Form (PAF).

RESOURCES:

Equipment:

1. Weight scale
2. Anaesthetic rig (clinipath system)
3. Continuous flow vaporiser for Isoflurane
4. Active scavenging unit (clinipath system)
5. O2 concentrator
6. Gas tubes and connectors
7. Induction chamber
8. Isoflurane – **irritant, sensitising substance** (Supplied via vet through RSF administrator)
9. Anaesthesia face mask
10. Keyed bottle adapter
11. Ruler
12. 1% Chemgene
13. Disposable hand towels
14. 70% Ethanol - **Hazardous substance: highly flammable**

15. Hydrex Pink hand spray- **Hazardous substance: highly flammable**
16. Hydrex Hard Surface spray- **Hazardous substance: highly flammable**
17. Techniplast mobile individually ventilated cage (IVC) transport rack
18. One clean cage and 1 nestlet per cage of mice tested
19. Diet (as defined by pipeline)
20. Empty cage base
21. Timer
22. 'Post Procedure Check Required' labels
23. UF100 Faxitron machine - **Source of ionising radiation, only to be used by trained personnel with the shield in place**
24. Faxitron plates
25. Key for UF100 Faxitron machine
26. Surgical tape (*Supplier name; Scientific Laboratory Supplies Ltd. Supplier product code; 4702*)
27. Safety spectacles
28. Down flow table
29. 'Hazardous gas do not enter' sign
30. 'Caution X-ray Procedure in Progress' sign

Associated SOPs/Documentation:

- **EQ1**– Setting up & Maintenance of Anaesthetic Machine
- **SOP0101** – Taking and Returning Cages for Procedures
- **SOP0045** – Weigh Mice for Phenotyping Procedures
- **SOP0087** – Dymorphology image video acquisition
- **Absorptiometry & Imaging Record Sheet**
- **Isoflurane exposure monitoring sheet**

Staff: This procedure requires 2 phenotypers trained in the use of gas anaesthesia, UF100 DEXA scanning and image/video acquisition.

NOTE:

In an emergency stop the Faxitron UF100 by pressing the red button on the machine during a scan and switch the key to the off position.

If a significant amount of Isoflurane is spilt or the bottle is dropped resulting in a large spillage, leave the procedure room immediately and ensure no one else enters the room and that the door is closed. Hang the "hazardous gas do not enter" sign, inform a member of the Senior Leadership Team (SLT) or the person responsible for the test. Do not attempt to clean the spillage.

PROCEDURE:

Before performing any tests verify this is the correct set of procedures at this time point in the pipeline or project, by consulting the cage card(s).

1. Place the 'Phenotyping in progress' and 'Caution X-ray procedure in progress' signs on the outside of the door.

2. Log onto the UF100 computer connected to the machine.
 - 2.1. Turn the key 90° clockwise to turn the UF100 on and start the timer.
 - 2.2. Ensure that the DEXA imaging platform is located on shelf 2.0.
 - 2.3. Check that all the cables are secured into the DEXA imaging platform.
 - 2.4. Ensure that no objects are on the platform and that the plastic X-ray imaging tray is stored in its slot at the base of the machine.
 - 2.5. After 30 minutes have passed since step 2.1, open the DEXA Bioptics vision software and allow the software to perform a full automated calibration of the machine.
 - 2.6. Place the anaesthesia face mask and tubing in the desired position and secure in place with surgical tape.

Gas anaesthesia equipment preparation

- 3.0 Filling of the vaporisers:
 - 3.1 Check the gauge on each vaporiser and refill if the isoflurane is over half way to the bottom of the gauge.
 - 3.2 If the vaporiser needs filling, remove the vaporiser and take to an available down flow table.
 - 3.3 **Put on safety spectacles**
 - 3.4 Remove cap from the anaesthetic bottle and match the keyed bottle adaptor to the keyed bottle collar, and screw together until airtight (Appendix 1, Figure 1).
 - 3.5 Turn the retaining top screw on the vaporiser filler unit in an anti-clockwise direction and withdraw the filler plug (Appendix 1, Figure 2).
 - 3.6 Match the two holes of the key fill adaptor plug with the filler socket of the vaporiser, ensure the bottle is below the level of the inlet to prevent spillage (Appendix 1, Figure 3).
 - 3.7 After insertion, turn the retaining screw clockwise and tighten to seal the filler adaptor in the filler socket (Appendix 1, Figure 4).
 - 3.8 Raise bottle above the level of the filler socket. A steady stream of air bubbles should emerge from the inner tube (Appendix 1, Figure 5).
 - 3.9 When the vaporiser is filled to the “full” level, lower the bottle. Remove the bottle adaptor and insert and tighten the filler plug (Appendix 1, Figure 6).
 - 3.10 **Remove safety spectacles.**
 - 3.11 Return the vaporiser to the anaesthesia rig and reattach.
 - 3.12 Store the isoflurane and filler key within the DEXA/X-ray cupboard.
4. Inspect the anaesthesia machine (Refer to EQ1- Setting up & Maintenance of Anaesthetic Machine), if an issue is found then report to the person responsible for the test or a member of SLT. There are two vaporisers, one is attached to the induction chamber and the other is intended to be attached to the mask in the UF100.
5. Ensure the vaporisers are set to off.

6. Switch on the O₂ concentrator, this should be set and kept at 4.5l/min.
 - 6.1. Check the oxygen flowmeter on both anaesthesia rigs is set to 1l/min.
 - 6.2. Check for positive flow out of the induction chamber circuit and the face mask circuit.
 - 6.3. If no flow is detected check the connections for all tubing between O₂ concentrator and vaporiser rig.
7. Check the charcoal canister, see Appendix 2 for instructions for loading, checking weight and disposal.
8. Switch on the active scavenging unit, with a loaded charcoal canister:
 - 8.1. Ensure the scavenging rate is set to 1l/min for the face mask circuit.
 - 8.2. Ensure scavenging rate is set to 5l/min for the induction chamber.
 - 8.3. Negative flow can be assessed by placing a finger over the end of each tube circuit to test for suction.
9. If positive and/or negative flow cannot be verified:
 - 9.1. Report to the person responsible for the test or a member of SLT before proceeding further.
10. Switch off O₂ concentrator and active scavenger.
11. Collect scheduled mice from the animal room, transport them to the procedure room and register them to the correct rack (Refer to SOP0101 – Taking and Returning Cages for Procedures).
12. Weigh the mice (Refer to SOP0045 – Weigh Mice for Phenotyping Procedures) and record the weights on the “Absorptiometry & Imaging Record Sheet”.
13. Add the procedure “Ultrafocus 100 DEXA 14-01-2016” to the database for the mice being tested.

Anaesthetising and scanning the mice

14. Prepare the induction chamber ensuring the lid is closed:
 - 14.1. Switch on the O₂ concentrator and active scavenger.
 - 14.2. Set the isoflurane vaporiser dial attached to the induction chamber to 3.5%.
15. Set the countdown timer to 3:00.
16. Select the correct mouse for anaesthesia, place it into the induction chamber and start the countdown timer.
17. While the first mouse in a cage is being anaesthetised, transfer all its cage mates to the new home cage along with their fun tunnel and some old nesting material. Add a new nestlet and transfer across the lid with water bottle, topping up the food if necessary.
18. On the computer, select the “DXA procedure” from the icons on the left hand side of the screen. Click on “Sample data” followed by “enter manually” to enter the details for a new mouse.
19. Enter all relevant information for the mouse into the software fields as follows:
 - 19.1. Sample name first: mouse name
 - 19.2. Sample name last: genotype
 - 19.3. Sample ID: mouse barcode
 - 19.4. Date: DOB (this must be in the format yyyy/mm/dd)
 - 19.5. Tech: operator
20. Add the time of induction on the “Absorptiometry & Imaging Record

Sheet”.

21. Open the UF100 door.
22. Observe the mouse carefully, monitor breathing and wait for the mouse to become unconscious.
 - 22.1. Once anaesthesia has been reached, turn the vaporiser attached to the face mask circuit to 2.5%
 - 22.2. Turn the vaporiser dial on the induction chamber to 0.
23. Open the induction chamber.
 - 23.1. Remove the mouse from the induction chamber.
 - 23.2. Close the lid of the induction chamber.
 - 23.3. Position the mouse into the face mask inside the UF100 cabinet.
 - 23.4. Observe the animal’s respiratory rate and withdrawal reflexes.
24. Close the UF100 cabinet and wait for ‘system ready’ to appear on the display.
 - 24.1. Start the scan by pressing the green button.
25. After completion of the scan:
 - 25.1. Turn the vaporiser dial on the face mask circuit to 0.
 - 25.2. Record time anaesthesia stopped on the “Absorptiometry & Imaging Record Sheet” sheet.
 - 25.3. Open the UF100 cabinet.
 - 25.4. Remove the mouse from the face mask.
 - 25.5. Measure and record the length of the mouse on the “Absorptiometry & Imaging Record Sheet” using the ruler.
 - 25.6. Perform the appropriate ROI analysis and save the data file.
 - 25.7. Start the DEXA procedure on the database.
26. If the mouse requires dysmorphology imaging and is showing signs of consciousness, then refer to “Re-induction of anaesthesia for image collection” in Appendix 3.
27. If no images are required, return the mouse to its new home cage, ensuring it has access to food and water and an updated cage card.
28. Once all the experimental mice for the cage have been processed, return the cage to the IVC rack.
 - 28.1. Monitor the status of the tested mice following anaesthesia, once mice are fully awake, record this on the “Absorptiometry & Imagine Record Sheet”.
29. Follow steps 16-28 for the remaining cages.
30. Once all the cages have been tested, turn both vaporisers to the off position.
31. Turn off the active scavenging unit.
32. Turn off the O2 concentrator.
33. Record the weight of the charcoal canister on the canister (Refer to Appendix 2).
34. Log off the computer when finished.
35. Clean all equipment, surfaces and the floor. **Transfer all waste to a yellow offensive waste bag or clearly labelled waste container.**

36. **All cages must display the updated cage card. Place a 'POST PROCEDURE CHECK REQUIRED' label on all cages and register them to the correct rack whilst returning them to their destination/home rack in the animal room. (Refer to SOP0101 – Taking and Returning Cages for Procedures).**

TROUBLESHOOTING:

Computer crash

If the computer crashes before you had time to analyse the body map or save your work, the software needs restarting and the mouse needs to be re-analysed.

1. Re-open the Vision DXA software.
2. Choose "DXA procedure" from the menu on the left hand side of the screen.
3. Select "Open database" from the new menu on the left hand side of the screen.
4. You should be able to see the last mouse X-rayed and still needing to be analysed at the top of the list in the left panel.
5. Double click on the mouse barcode to bring the details in the top right panel.
6. Double click on the procedure ID, it should start with a P. The X-ray images should appear below the database panels.
7. Double click one of them to re-start the analysis.
8. Proceed as per step 25.6 of this SOP.
9. After the analysis, continue to test the mice as per step 18 of this SOP.

Appendix 1: Filling of the vaporiser

Figure 1

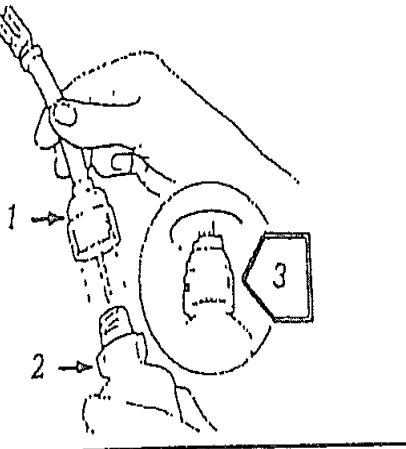
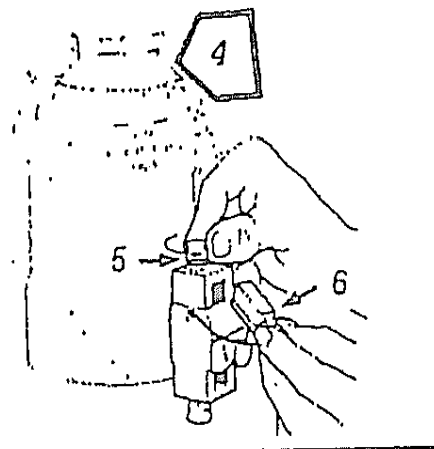


Figure 2



1 -Keyed bottle adaptor; 2- Keyed bottle collar; 3-Must be UPRIGHT; 4- Vaporizer control is off; 5 -Retaining screw; 6- Filler plug

Figure 3

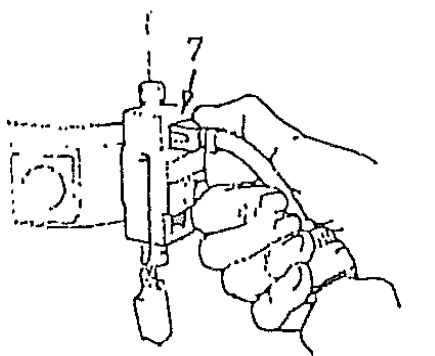
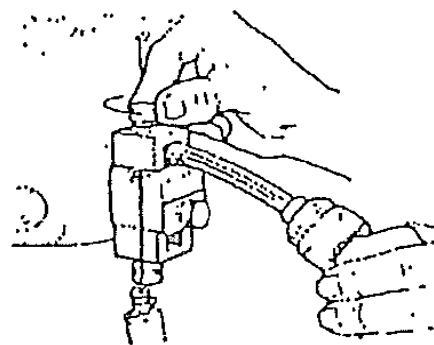


Figure 4



7- Filler socket

Figure 5

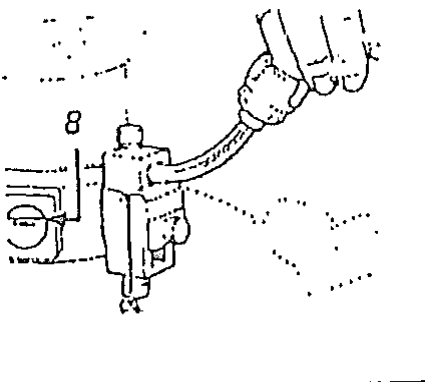
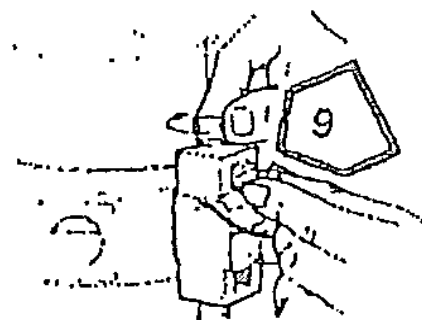
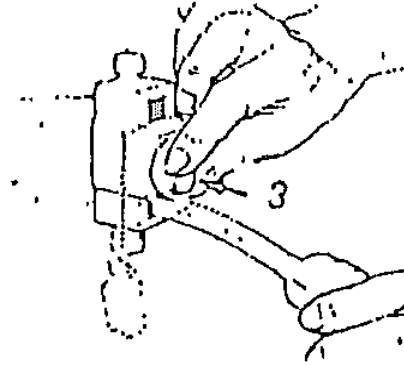
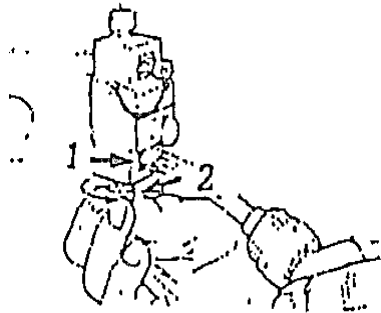


Figure 6



8- Liquid level indicated when full; **9-** let excess drain before inserting plug
Figure 7 **Figure 8**



1- Drain socket; 2- Retaining screw; 3- Drain valve

Appendix 2: Weighting of the charcoal canister



Patterson
Scientific

WAG (Waste Anesthetic Gas) Canister User Instructions

07-8909457



- A** Universal Tubing Connector: Will accommodate 19mm blue EVAC tubing (standard in industry), 22mm clear EVAC tubing or fitting for 15mm male to use 1/4" ID tubing.
 - a. Will also accommodate the Patterson T-Splitter Adaptor (07-8917858) for connecting tubing from multiple devices or multiple tubing sizes.
- B** Vent holes (8 total).
- C** Initial canister weight record.

Use and Operation:

1. Remove protective cap from top of Universal Tubing Connector (**A**)
2. Weigh WAG canister in grams before use and record weight in designated area (**C**).
3. Rest canister upright on level surface or in the Patterson WAG Canister holder (07-8909583).
 - a. As vent holes (**B**) are on the top of the canister, it is not necessary to place the WAG Canister at any orientation other than upright.
4. Connect EVAC tubing or T-Splitter to Universal Tubing Connector (**A**)
5. Weigh WAG Canister periodically during use and discard when it gains 200 grams.
6. Canister is disposed of in offensive waste bag.

Appendix 3: Re-induction of anaesthesia for image collection

1. If dysmorphology images are to be taken and the test mouse is showing signs of being awake (step 25 of this current SOP).
 - 1.1. At step 25.1, do not turn the vaporiser to 0%.
 - 1.2. Set the timer to 2:30 minutes.
 - 1.3. Start the timer.
2. Once the 2:30 minutes have elapsed:
 - 2.1. Set the isoflurane dial to 0.
 - 2.2. Take the images according to the SOP0087 - Dysmorphology image video acquisition.
3. After the images have been taken, put the mouse back to its home cage and proceed with the recovery (step 27).

SANGER INSTITUTE STANDARD OPERATING PROCEDURE

SUBJECT: UF100 Radiation Monitoring

SOP Number: SOP190	To be reviewed:	
Author(s):	Signed:	Date:
Editor:	Signed:	Date:
Risk Assessor:	Signed:	Date:
Date of Implementation:		

INTRODUCTION:

This procedure shows the correct way to monitor monthly environmental radiation around the UF100.

ABBREVIATIONS:

LAA = Laboratory Animal Allergens
PAF = Project Authorisation Form
PIL = Procedure Individual License
PPE = Personal Protective Equipment
PPL = Procedure Project Licence
RA = Risk Assessment
RPS = Radiation Protection Supervisor
RSF = Research Support Facility
SOP = Standard Operating Procedure

HEALTH & SAFETY:

This procedure is covered by the following Risk Assessment (RA):

Name: WTSI-1937

Assessment Title: Performing Dual Energy X-ray Absorptiometry and X-ray Imaging Including QC and Maintenance of the Faxitron UltraFocus100, Use and Recovery from gas anaesthesia.

Assessor:

Approver:

- Appropriate Personal Protective Equipment (PPE) is to be worn at all times when handling animals. This includes:
 - Overshoes
 - Gown
 - Gloves
- In addition to the above, when sources for Laboratory Animal Allergens (LAA) (animals or soiled cages) are not contained within Local Exhaust Ventilation Systems (change stations, fume hoods or downflow tables), a respiratory mask, for which you have passed a face fit test, must be worn.
- Lone worker alarms should be used when working alone.

- This procedure can only be performed during Research Support Facility (RSF) core hours (7:30am-7:30pm).
- All electrical equipment is to be inspected for damage before use.

RESPONSIBILITIES:

All staff performing this procedure are responsible for ensuring that this Standard Operating Procedure (SOP) and accompanying Risk Assessment have been read, understood and where applicable is followed in accordance with the relevant Procedure Project License (PPL). All staff should be trained and competent to perform the procedure, where applicable they should also be licensed to perform the procedure with a valid Procedure Individual License (PIL).

For secondary phenotyping, seek confirmation with project manager for deviations from this SOP. Any deviation will be detailed in the Project Authorisation Form (PAF).

RESOURCES:

Equipment:

1. UF100 machine **Source of ionising radiation, only to be used by trained personnel with the shield in place**
2. Bioptics vision software
3. 'Caution X-ray Procedure in Progress' Sign
4. Thermo Mini 900 Ratemeter radiation counter
5. Radiation compliance folder

Associated SOPs/Documentation:

- Faxitron UF100 monthly monitoring form

Staff: This procedure requires 1 person.

PROCEDURE:

1. Verify that this is the correct procedure at this point in time by checking when the last maintenance cycle was performed. The shield check should be performed monthly.
2. Place 'X-rays in progress' sign on the outside of the door and put on the correct PPE.
3. Turn the key on the machine 90° clockwise to turn the UF100 on and leave the machine to warm up for 30min.
4. Log into the UF100 computer connected to the machine.
5. Move the sensor tray at the bottom of the cabinet and ensure that no objects are on it. Ensure that the plastic X-ray imaging tray is stored in its slot at the base of the machine.

6. Open the Bioptics vision software (NOT the DXA version of the software) and allow the software to perform a full automated calibration of the machine.
7. Click on “Start Procedure” at the top on the left hand side of the screen (see Figure 1).



Figure 1: Select “Start Procedure”

8. Select “Device panel” from the menu on the left hand side of the screen to open the X-ray control panel (see figure 2):
 - 8.1. Select “full manual” mode
 - 8.2. Set the kV to 80
 - 8.3. Set the Time (s) to 5.00
 - 8.4. Click on “Set/Exit” to set the values

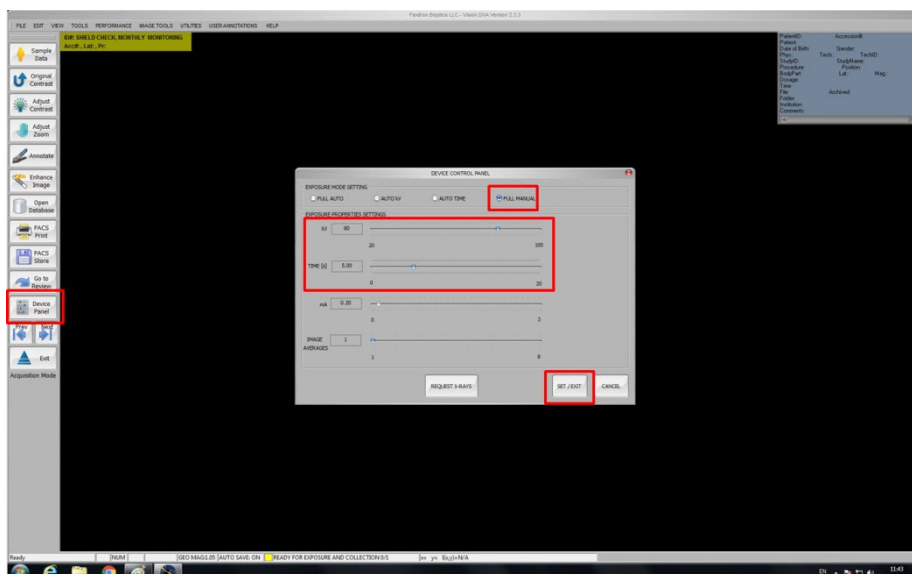


Figure 2: X-ray intensity settings

9. Select “Sample data” from the menu on the left hand side of the screen to open the Entry panel (see figure 3).

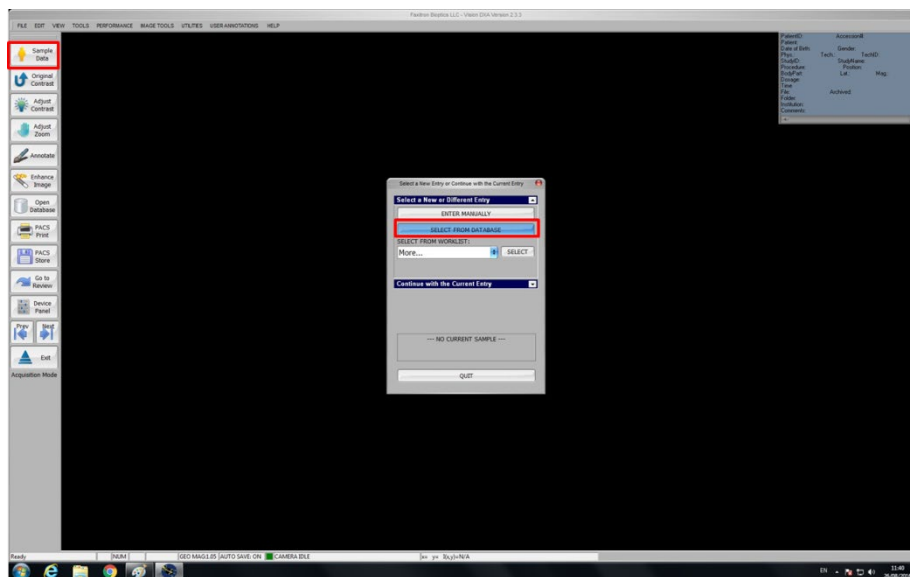


Figure 3: data entry panel

10. Choose “select from database”.
11. From the database, select the subject called “shield check, monthly monitoring”:
 - 11.1. Scroll down table 2 until you reach the date of the previous shield check. Tip: you can also look for the date of the last check on the right hand side to find the correct entry.
 - 11.2. Select the patient whose ID is “Shield check”. Double click on it.
 - 11.3. If anything appears in table 3, double click on the most recent procedure.
 - 11.4. Click OK.
12. The imaging information editor should now appear, pre-filled as shown in figure 4.

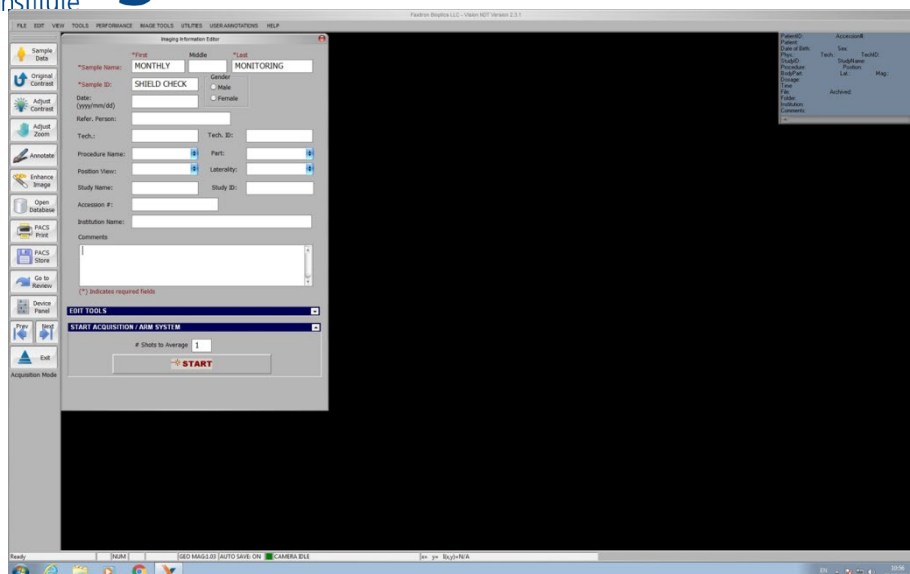


Figure 4: imaging information editor

13. Click “start” at the bottom of the window.
14. On a new Faxitron UF100 monthly monitoring sheet tick off items listed on the top part of the document by checking that:
 - 14.1. The door interlock appears clean free of any dark or green/blue colour. If that is not the case, please contact a responsible for the test or the radioprotection supervisor for this area.
 - 14.2. The “Power” LED is On.
 - 14.3. The “Ready” LED is On.
15. Press the “start” button on the machine as many time as needed to start the exposure and check that:
 - 15.1. The “X-ray On” LED is ON.
 - 15.2. The X-ray buzzer is working.
 - 15.3. The machine stops the X-ray emission when the door is opened during an exposure. A message window should appear on the computer screen. Click OK to accept.
 - 15.4. The emergency “stop” button located at the front of the machine stops the X-ray emission when pressed. A message window should appear on the computer screen. Click OK to accept.
16. Perform a visual check of the Thermo Mini 900 Ratemeter radiation counter and prepare it for use:
 - 16.1. Turn the knob briefly to **bat** – the pointer should move to the green area of the scale. If the pointer does not move or only reaches the white area indicating replace battery, then replace the battery.
 - 16.2. If the battery on the counter is fine, move the knob to the **on** position. The counter will give a sharp beep and will begin to crackle indicating the probe is now counting radiation it is exposed to. Continue to move the knob to the **≠<** (mute) position if the noise is not desired.

- 16.3. Remove the radiation probe from the holder on the radiation counter.
17. Press the “start” button on the machine as many time as needed to start the exposure.
18. During the X-ray emission, use the probe to take radiation measurements from less than 5cm away from (1 exposure per location):
 - 18.1. The **left wall** of the shield. Record the amount of radiation detected (in $\mu\text{Sv h}^{-1}$) on the monitoring sheet.
 - 18.2. The **top wall** of the shield. Record the amount of radiation detected (in $\mu\text{Sv h}^{-1}$) on the monitoring sheet.
 - 18.3. The **back wall** of the shield (near the hole). Record the amount of radiation detected (in $\mu\text{Sv h}^{-1}$) on the monitoring sheet.
 - 18.4. The **right wall** of the shield. Record the amount of radiation detected (in $\mu\text{Sv h}^{-1}$) on the monitoring sheet.
 - 18.5. The **front lead glass door** of the shield (careful not to hit it with the probe). Record the amount of radiation detected (in $\mu\text{Sv h}^{-1}$) on the monitoring sheet.
 - 18.6. **Under the Faxitron UF100 bench** with the probe pointing towards the machine. Record the amount of radiation detected (in $\mu\text{Sv h}^{-1}$) on the monitoring sheet.
 - 18.7. **On the bench away from the Faxitron UF100.** Record the amount of radiation detected (in $\mu\text{Sv h}^{-1}$) on the monitoring sheet as background radiation.
 - 18.8. If at any point the level of radiation is above $0.2 \mu\text{Sv h}^{-1}$, contact the lead phenotyper for the test, and/or the team Radiation Protection Supervisor (RPS) and team leader.
19. Complete the Faxitron UF100 monthly monitoring sheet with the name of the person performing the monitoring, the date it has been performed and the due date of the next monitoring. Archive it in the radiation compliance folder.
20. Update the “Next monthly monitoring due by” label displayed on the lead shield with the date the next check is due by (last Friday of the following calendar month).
21. Select “Exit” from the menu on the left hand side of the screen until you have fully exited the software and you are on the Windows desktop screen. Log off the computer.
22. Turn the key on the machine 90° anticlockwise to turn the UF100 off.

Clean all equipment, surfaces and the floor. **Transfer all waste to a yellow offensive waste bag or clearly labelled waste container.**