

Date form last updated: 8-Jun-2016 Completed by: Blake Lazurko

1. Cyclotron Facility – Contact info

Institute (name/address):	Cross Cancer Institute 11560 University Avenue Edmonton Alberta Canada T6G 1Z2
Institution URL:	http://edmontonpetcentre.com/
Person in charge (name/ph#/email):	Vincent Bouvet/780-989-4306 Vincent.Bouvet@AHS.ca
Position/title:	Cyclotron Facility Manager
Cyclotron manager/engineer (name/ph#/email)	Blake Lazurko/780-989-4304 Blake.Lazurko@AHS.ca
QA manager (name/ph#/email)	
QC manager	
Other senior staff (titles/name/ph#/email):	

2. Cyclotron characteristics

Cyclotron manufacturer/model	Advanced Cyclotron Systems Inc. TR19/9
Cyclotron installation date (Year):	2002
Dual beam?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes
Any upgrades?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes, Describe:
Particles:	<input checked="" type="checkbox"/> ¹ H <input type="checkbox"/> ² H <input type="checkbox"/> ³ He <input type="checkbox"/> ⁴ He
Particle energy, or range (MeV):	<u>12-19</u> ¹ H _____ ² H _____ ³ He _____ ⁴ He
Max particle current (uA):	<u>125</u> ¹ H _____ ² H _____ ³ He _____ ⁴ He
Typical particle current (uA):	<u>75</u> ¹ H _____ ² H _____ ³ He _____ ⁴ He

3. Cyclotron Operation Prefer not to answer

Planned operating days per week:	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7
Number of planned maintenance days/month:	1
Number of planned shutdown weeks per year:	4
Total operating hours (h)/week:	68
h/week for radionuclide production:	55
h/week for research:	5
h/week for maintenance:	8
h/week for applications:	0

4. Is the cyclotron used to produce Prefer not to answer

Calibration sources? (specify which & quantity)	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes
Mossbauer sources? (specify which & quantity)	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes
X-ray sources? (specify which & quantity)	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes
Intense neutron beam? (specify average $E_n = ?$)	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes

5. Application questions Prefer not to answer

Are pre-clinical studies using cyclotron radiopharmaceuticals carried out on-site?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes (if available, types of radiotracers and name(s) and email(s) of PIs):
Are clinical studies using cyclotron radiopharmaceuticals carried out on-site?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes (if available, types of radiotracers and name(s) and email(s) of PIs):
Are cyclotron radionuclides/labelled compounds used or planned to be used for agricultural applications such as plant biochemistry/research?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (if available, types of radiotracers and name(s) and email(s) of PIs):
Is the cyclotron used for nuclear reaction cross-section measurements?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes (if available, name(s) and email(s) of PIs):
Is the cyclotron used for targetry development?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes (if available, types of isotopes, and name(s) and email(s) of PIs):
Is the cyclotron used for materials science?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (if available, name(s) and email(s) of PIs):
Is the cyclotron used for radiography?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (if available, name(s) and email(s) of PIs):
Is the cyclotron used for radiobiology?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (if available, name(s) and email(s) of PIs):
Is the cyclotron used for physics research?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (if available, name(s) and email(s) of PIs):
Is the cyclotron used for activation analysis?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (if available, name(s) and email(s) of PIs):
Is the cyclotron used for proton therapy?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (if available, name(s) and email(s) of PIs):
Is the cyclotron used for neutron therapy?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (if available, name(s) and email(s) of PIs):
Other (specify)	<input type="checkbox"/> No <input type="checkbox"/> Yes (if available, name(s) and email(s) of PIs):

6. Types of imaging equipment

N/A, Prefer not to answer

Single photon (specify if gamma camera, SPECT, or SPECT-CT):	
Number of clinical scanners:	
Number of pre-clinical scanners:	
Number of plant biochemistry scanners:	
PET (specify if PET, PET/CT, or PET/MR):	
Number of clinical scanners:	
Number of pre-clinical scanners:	
Number of plant biochemistry scanners:	

7. Do you supply radionuclide(s), radiotracer(s), or radiopharmaceutical(s) to other institutions? (No/ Yes/ Prefer not to answer). If yes, and if available, please provide the name of product, institution, and supply frequency:

Product	Institution	Frequency
¹⁸ F-FDG	University of Alberta Hospital	Daily
¹⁸ F-FDG	Foothills Medical Centre	Twice daily

8. Cyclotron/radionuclide/radiochemistry/radiopharmacy training

Is the cyclotron used for education and training in nuclear sciences, health physics, etc?	<input type="checkbox"/> No <input type="checkbox"/> Yes (if available, name(s) and email(s) of PIs):
Does your institute participate in trainee exchange (for production):	<input type="checkbox"/> No <input type="checkbox"/> Yes (if available, name(s) and email(s) of PIs):
Does your institute participate in trainee exchange (for research):	<input type="checkbox"/> No <input type="checkbox"/> Yes (if available, name(s) and email(s) of PIs):
Does your institute accept IAEA research fellows for training/experience:	<input type="checkbox"/> No <input type="checkbox"/> Yes (if available, name(s) and email(s) of PIs):
Other training opportunities (specify):	<input type="checkbox"/> No <input type="checkbox"/> Yes (if available, name(s) and email(s) of PIs):

9. Radionuclide production – ^{18}F (F) N/A, Prefer not to answer

Reaction	<input checked="" type="checkbox"/> $^{18}\text{O}(p,n)^{18}\text{F}$; <input type="checkbox"/> $^{16}\text{O}(^3\text{He},p)^{18}\text{F}$; <input type="checkbox"/> $^{20}\text{Ne}(d,\gamma)^{18}\text{F}$; <input type="checkbox"/> $^{16}\text{O}(\alpha,d)^{18}\text{F}$
Typical current (μA):	75
Typical energy (MeV):	17.7
Typical yield (GBq):	420
Typical target pressure (psi):	180
Is target He cooled?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes
Typical beam time (min):	215
Typical Y_{sat} if known (GBq/ μA):	8.5
% Isotopic enrichment ^{18}O	99
^{18}O supplier(s)	Rotem
Target volume [^{18}O]H ₂ O (mL)	3
Usage per year [^{18}O]H ₂ O (mL)	2100
Do you recycle [^{18}O]H ₂ O?	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes (if “yes”, <input type="checkbox"/> in-house <input checked="" type="checkbox"/> return to supplier)

10. Radionuclide production – ^{11}C ($[^{11}\text{C}]\text{CH}_4$) N/A, Prefer not to answer

Typical current (μA):	
Typical energy (MeV):	
Typical yield (GBq):	
Typical target pressure (psi):	
Typical beam time (min):	
Typical Y_{sat} if known (GBq/ μA):	
Gas mixture:	
Target volume:	
$[^{11}\text{C}]\text{CH}_3\text{I}$ production ASU model:	
Typical yield (GBq):	
Typical yield (% , d.c.):	

11. Radionuclide production – ^{11}C ($[^{11}\text{C}]\text{CO}_2$) N/A, Prefer not to answer

Typical current (μA):	30
Typical energy (MeV):	16.8
Typical yield (GBq):	110
Typical target pressure (psi):	450
Typical beam time (min):	40
Typical Y_{sat} if known (GBq/ μA):	
Gas mixture:	1%O ₂ 99%N ₂
Target volume:	
$[^{11}\text{C}]\text{CH}_3\text{I}$ production ASU model:	Tracerlab MeI
Typical yield (GBq):	25
Typical yield (% , d.c.):	

12. Other radionuclides produced

N/A, Prefer not to answer

Product	Yield on batch (GBq)	Irradiation parameters (MeV/ μ A/min)	Typical target mass/material	Extraction method	Used on site?	Distribution/sales?
^{13}N					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
^{15}O					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
$^{18}\text{F-F}_2$					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
^{44}Sc					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
^{64}Cu					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
^{67}Ga					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
^{86}Y					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
^{89}Zr					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
$^{94\text{m}}\text{Tc}$					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
$^{99\text{m}}\text{Tc}$					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
^{103}Pd					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
^{111}In					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
^{123}I					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
^{124}I					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
^{201}Tl					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
^{211}At					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
Other:					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes
					<input type="checkbox"/> No <input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Yes

13. Radiopharmaceutical production – ^{18}F (FDG)

N/A, Prefer not to answer

Production frequency (batches/week)	20
Used on site	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes
Distribution/sales	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes
ASU model	Coincidence
Typical yield (GBq):	120
Typical yield (% , decay corrected):	<u>55</u> <input checked="" type="checkbox"/> pre/post dose-cal; or <input type="checkbox"/> indirectly via ASU
ASU model	GE Tracer lab FX

Typical yield (GBq):	60
Typical yield (% , decay corrected):	<u>50</u> <input type="checkbox"/> pre/post dose-cal; or <input type="checkbox"/> indirectly via ASU
ASU model	<input type="checkbox"/> N/A
Typical yield (GBq):	
Typical yield (% , decay corrected):	<u> </u> <input type="checkbox"/> pre/post dose-cal; or <input type="checkbox"/> indirectly via ASU

14. Radiopharmaceutical production – Other Products (please copy table for as many products as desired)

N/A, Prefer not to answer

Product:	
Production frequency (batches/week)	
Stage:	<input type="checkbox"/> R&D <input type="checkbox"/> Pre-clinical <input type="checkbox"/> Clinical
Used on site	<input type="checkbox"/> No <input type="checkbox"/> Yes
Distribution/sales	<input type="checkbox"/> No <input type="checkbox"/> Yes
ASU model	
Typical yield (GBq):	
Typical yield (% , decay corrected):	<u> </u> <input type="checkbox"/> pre/post dose-cal; or <input type="checkbox"/> indirectly via ASU
ASU model	<input type="checkbox"/> N/A
Typical yield (GBq):	
Typical yield (% , decay corrected):	<u> </u> <input type="checkbox"/> pre/post dose-cal; or <input type="checkbox"/> indirectly via ASU

15. Radionuclides and radiopharmaceuticals planned to be produced in the next 1-3 years (specify)

N/A, Prefer not to answer

Product:	Application:

16. Additional comments:

N/A