Submitted by: Assemblymember Tesche
Prepared by: Assembly Counsel
For reading: November 22, 2005

APPROVED
Date: 1-24-06
IMMEDIATE RECONSIDERATION FAILED 1-24-06

ANCHORAGE, ALASKA
AO NO. 2005–178

AN ORDINANCE AMENDING ANCHORAGE MUNICIPAL CODE SECTION 21.45.150 CONFIRMING THE ASSEMBLY'S INTENT THAT THE USE OF A DWELLING UNIT FOR THE OPERATION OF PARTICLE ACCELERATOR SYSTEMS, INCLUDING CYCLOTRONS, IS PROHIBITED IN HOME OCCUPATIONS; AND AMENDING ANCHORAGE MUNICIPAL CODE SECTIONS 21.40.030, 21.40.040, 21.40.045, 21.40.050, 21.40.060, 21.40.070, 21.40.080, 21.40.090. 21.40.100, 21.40.110, 21.40.115, 21.40.117 AND 21.40.130 TO CONFIRM THAT OPERATION OF PARTICLE ACCELERATOR SYSTEMS AND CYCLOTRONS IS PROHIBITED IN RESIDENTIAL AREAS.

THE ANCHORAGE ASSEMBLY ORDAINS:

Section 1. Anchorage Municipal Code section chapter 21.45.150, home occupations, is hereby amended as follows:

21.45.150 Home occupations.

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G. No equipment or process shall be used in such home occupation which creates noise, vibration, glare, fumes, radiation, or odors detectable to the normal senses off the lot, if the occupation is conducted in a single-family residence or in an accessory structure. Particle accelerator systems, including cyclotrons, may not be used in a home occupation. No equipment or process shall be used which creates visual or audible interference in any radio or television receivers off the premises, or causes a fluctuation in line voltage off the premises; and

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Section 2. Anchorage Municipal Code section 21.40.030, R-1 and R-1A single-family residential districts, is hereby amended to read as follows: (*Subsections not affected by this ordinance are not set out unless for context.*)

21.40.030. R-1 and R-1A single-family residential districts.

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E. *Prohibited uses and structures.* The following uses and structures are prohibited:

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2. Any use which causes or may reasonably be expected to cause excessive noise, vibration, odor, smoke, dust or other particulate matter, toxic or noxious matter, radiation, humidity, heat or glare at or beyond any lot line of the lot on which it is located. Operation of particle accelerator systems, including cyclotrons, is prohibited. The term "excessive" is defined for the purpose of this subsection as to a degree exceeding that generated by uses permitted in the district in their customary manner of operation, or to a degree injurious to the public health, safety, welfare or convenience.

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(GAAB 21.05.050.B; AO No. 77-355; AO No. 80-27; AO No. 81-67(S); AO No. 82-54; AO No. 83-216; AO No. 85-21; AO No. 85-28; AO No. 85-78; AO No. 85-23; AO No. 86-90; AO No. 88-171(S-1), 12-31-88; AO No. 88-147(S-2); AO No. 92-114; AO No. 98-53(S), § 1, 6-9-98; AO No. 99-49, § 1, 3-23-99; AO No. 99-62, § 9, 5-11-99)

Section 3. Anchorage Municipal Code section 21.40.040, R-2A two-family residential district (large lot) and R-2D two-family residential district, is hereby amended to read as follows: (*Subsections not affected by this ordinance are not set out unless for context.*)

21.40.040. R-2A two-family residential district (large lot); R-2D two-family residential district.

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E. *Prohibited uses and structures*. The following uses and structures are prohibited:

*** *** ***

2. Any use which causes or may reasonably be expected to cause excessive noise, vibration, odor, smoke, dust or other particulate matter, radiation, toxic or noxious matter, humidity, heat or glare at or beyond any lot line of the lot on which it is located. Operation of particle accelerator systems, including cyclotrons, is prohibited. The term "excessive" is defined for the purpose of this subsection as to a degree exceeding that generated by uses permitted in the district in their customary manner of operation, or to a degree injurious to the public health, safety, welfare or convenience.

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(GAAB 21.05.050.C; AO No. 77-355; AO No. 79-13; AO No. 80-27; AO No. 80-42; AO No. 81-67(S); AO No. 82-54; AO No. 83-217; AO No. 84.52; AO No. 85-18; AO No. 85-21; AO No. 85-23; AO No. 85-28; AO No. 85-78; AO No. 85-91, 10-1-85; AO No. 85-163; AO No. 86-19; AO No. 86-78; AO No. 86-90; AO No. 88-171(S-1), 12-31-88; AO No. 88-147(S-2); AO No. 92-114; AO No. 98-53(S), § 2, 6-9-98; AO No. 99-49, § 2, 3-23-99; AO No. 99-62, § 5, 5-

11-99)

<u>Section 4.</u> Anchorage Municipal Code section 21.40.045, R-2M multiple-family residential district, is hereby amended to read as follows: (*Subsections not affected by this ordinance are not set out unless for context.*)

21.40.045. R-2M multiple-family residential district.

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E. *Prohibited uses and structures.* The following uses and structures are prohibited:

*** *** ***

2. Any use which causes or may reasonably be expected to cause excessive noise, vibration, odor, smoke, dust or other particulate matter, <u>radiation,</u> toxic or noxious matter, humidity, heat or glare at or beyond any lot line of the lot on which it is located. <u>Operation of particle accelerator systems, including cyclotrons, is prohibited.</u> The term "excessive" is defined for the purpose of this subsection as to a degree exceeding that generated by uses permitted in the district in their customary manner of operation, or to a degree injurious to the public health, safety, welfare or convenience.

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(GAAB 21.05.050.C; AO No. 77-355; AO No. 79-13; AO No. 80-27; AO No. 80-42; AO No. 81-67(S); AO No. 82-54; AO No. 83-217; AO No. 84.52; AO No. 85-18; AO No. 85-21; AO No. 85-23; AO No. 85-28; AO No. 85-78; AO No. 85-91, 10-1-85; AO No. 85-163; AO No. 86-19; AO No. 86-78; AO No. 86-90; AO No. 88-171(S-1), 12-31-88; AO No. 88-147(S-2); AO No. 92-114; AO No. 98-53(S), § 3, 6-9-98; AO No. 99-49, § 3, 3-23-99; AO No. 99-62, § 6, 5-11-99)

<u>Section 5.</u> Anchorage Municipal Code section 21.40.050, R-3 multiple-family residential district, is hereby amended to read as follows: (*Subsections not affected by this ordinance are not set out unless for context.*)

21.40.050. R-3 multiple-family residential district.

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E. *Prohibited uses and structures.* The following uses and structures are prohibited:

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3. Any use which causes or may reasonably be expected to cause excessive noise, vibration, odor, smoke, dust or other particulate matter, <u>radiation,</u> toxic or noxious matter, humidity, heat or glare at or beyond any lot line of the lot on

which it is located. Operation of particle accelerator systems, including cyclotrons, is prohibited. The term "excessive" is defined for the purpose of this subsection as to a degree exceeding that generated by uses permitted in the district in their customary manner of operation, or to a degree injurious to the public health, safety, welfare or convenience.

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(GAAB 21.05.050.D; AO No. 77-355; AO No. 80-27; AO No. 80-42; AO No. 81-67(S); AO No. 82-54; AO No. 83-217; AO No. 84.52; AO No. 85-18; AO No. 85-21; AO No. 85-23; AO No. 85-28; AO No. 85-78; AO No. 85-91, 10-1-85; AO No. 85-163; AO No. 86-19; AO No. 86-78; AO No. 86-90; AO No. 88-171(S-1), 12-31-88; AO No. 88-147(S-2); AO No. 92-114; AO No. 96-131(S), § 2, 10-22-96; AO No. 99-62, § 7, 5-11-99)

Section 6. Anchorage Municipal Code section 21.40.060, R-4 multiple-family residential district , is hereby amended to read as follows: (*Subsections not affected by this ordinance are not set out unless for context.*)

21.40.060. R-4 multiple-family residential district.

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E. *Prohibited uses and structures.* The following uses and structures are prohibited:

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3. Any use which causes or may reasonably be expected to cause excessive noise, vibration, odor, smoke, dust or other particulate matter, radiation, toxic or noxious matter, humidity, heat or glare at or beyond any lot line of the lot on which it is located. Operation of particle accelerator systems, including cyclotrons, is prohibited. The term "excessive" is defined for the purpose of this subsection as to a degree exceeding that generated by uses permitted in the district in their customary manner of operation, or to a degree injurious to the public health, safety, welfare or convenience.

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(GAAB 21.05.050.E; AO No. 77-355; AO No. 80-27; AO No. 81-67(S); AO No. 82-54; AO No. 85-18; AO No. 85-21; AO No. 85-23; AO No. 85-28; AO No. 85-78; AO No. 85-91, 10-1-85; AO No. 86-90; AO No. 88-171(S-1), 12-31-88; AO No. 88-147(S-2); AO No. 92-114; AO No. 96-131(S), § 2, 10-22-96; AO No. 99-62, § 8, 5-11-99; AO No. 2003-124(S), § 2, 1-20-04)

Section 7. Anchorage Municipal Code section 21.40.070, R-5 rural residential district, is hereby amended to read as follows: (*Subsections not affected by this ordinance are not set out unless for context.*)

21.40.070 R-5 rural residential district; R-5A, rural residential district (large lot).

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E. *Prohibited uses and structures.* The following uses and structures are prohibited:

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3. Any use which causes or may reasonably be expected to cause excessive noise, vibration, odor, smoke, dust or other particulate matter, <u>radiation,</u> toxic or noxious matter, humidity, heat or glare at or beyond any lot line of the lot on which it is located. <u>Operation of particle accelerator systems, including cyclotrons, is prohibited.</u> The term "excessive" is defined for the purpose of this subsection as to a degree exceeding that generated by uses permitted in the district in their customary manner of operation, or to a degree injurious to the public health, safety, welfare or convenience.

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(GAAB 21.05.050.F; AO No. 77-355; AO No. 80-27; AO No. 81-67(S); AO No. 82-54; AO No. 83-52; AO No. 85-21; AO No. 85-28; AO No. 85-78; AO No. 85-23; AO No. 86-90; AO No. 88-171(S-1), 12-31-88; AO No. 88-147(S-2); AO No. 92-114; AO No. 99-62, § 9, 5-11-99; AO No. 2002-63(S), § 1, 5-21-02)

<u>**Section 8.**</u> Anchorage Municipal Code section 21.40.080, R-6 suburban residential district, is hereby amended to read as follows: (*Subsections not affected by this ordinance are not set out unless for context.*)

21.40.080 R-6 suburban residential district (large lot).

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E. *Prohibited uses and structures.* The following uses and structures are prohibited:

3. Any use which causes or may reasonably be expected to cause excessive noise, vibration, odor, smoke, dust or other particulate matter, <u>radiation,</u> toxic or noxious matter, humidity, heat or glare at or beyond any lot line of the lot on which it is located. <u>Operation of particle accelerator systems, including cyclotrons, is prohibited.</u> The term "excessive" is defined for the purpose of this subsection as to a degree exceeding that generated by uses permitted in the district in their customary manner of operation, or to a degree injurious to the public health, safety, welfare or convenience.

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(GAAB 21.05.050.G; AO No. 77-355; AO No. 80-27; AO No. 81-67(S); AO No. 82-54; AO No. 85-18; AO No. 85-21; AO No. 85-23; AO No. 85-28; AO No. 85-78; AO No. 85-91, 10-1-85;

AO No. 86-90; AO No. 88-171(S-1), 12-31-88; AO No. 88-147(S-2); AO No. 92-114; AO No. 99-27, § 1, 2-23-99; AO No. 99-62, § 10, 5-11-99)

Section 9. Anchorage Municipal Code section 21.40.090, R-7 intermediate rural residential district, is hereby amended to read as follows: (*Subsections not affected by this ordinance are not set out unless for context.*)

21.40.090 R-7 intermediate rural residential district.

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E. *Prohibited uses and structures.* The following uses and structures are prohibited:

3. Any use which causes or may reasonably be expected to cause excessive noise, vibration, odor, smoke, dust or other particulate matter, radiation, toxic or noxious matter, humidity, heat or glare at or beyond any lot line of the lot on which it is located. Operation of particle accelerator systems, including cyclotrons, is prohibited. The term "excessive" is defined for the purpose of this subsection as to a degree exceeding that generated by uses permitted in the district in their customary manner of operation, or to a degree injurious to the public health, safety, welfare or convenience.

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(GAAB 21.05.050.H; AO No. 77-355; AO No. 80-27; AO No. 81-67(S); AO No. 82-54; AO No. 83-219; AO No. 85-21; AO No. 85-28; AO No. 85-78; AO No. 85-23; AO No. 86-90; AO No. 88-171(S-1), 12-31-88; AO No. 88-147(S-2); AO No. 92-114; AO No. 99-62, § 11, 5-11-99)

Section 10. Anchorage Municipal Code section 21.40.100, R-8 rural residential district, is hereby amended to read as follows: (*Subsections not affected by this ordinance are not set out unless for context.*)

21.40.100 R-8 rural residential district (large lot).

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E. *Prohibited uses and structures.* The following uses and structures are prohibited:

3. Any use which causes or may reasonably be expected to cause excessive noise, vibration, odor, smoke, dust or other particulate matter, radiation, toxic or noxious matter, humidity, heat or glare at or beyond any lot line of the lot on which it is located. Operation of particle accelerator systems, including cyclotrons, is prohibited. The term "excessive" is defined for the purpose of this subsection as to a degree exceeding that generated by uses permitted in the district in their customary manner of operation, or to a degree injurious to the

public health, safety, welfare or convenience.

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(GAAB 21.05.050.U; AO No. 77-355; AO No. 80-27; AO No. 81-67(S); AO No. 82-54; AO No. 85-21; AO No. 85-23; AO No. 85-28; AO No. 85-78; AO No. 86-90; AO No. 88-171(S-1), 12-31-88; AO No. 88-147(S-2); AO No. 98-53(S), § 4, 6-9-98; AO No. 99-62, § 12, 5-11-99)

<u>Section 11.</u> Anchorage Municipal Code section 21.40.110, R-9 rural residential district, is hereby amended to read as follows: (*Subsections not affected by this ordinance are not set out unless for context.*)

21.40.110 R-9 rural residential district.

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E. *Prohibited uses and structures*. The following uses and structures are prohibited:

2. Any use which causes or may reasonably be expected to cause excessive noise, vibration, odor, smoke, dust or other particulate matter, <u>radiation,</u> toxic or noxious matter, humidity, heat or glare at or beyond any lot line of the lot on which it is located. <u>Operation of particle accelerator systems, including cyclotrons, is prohibited.</u> The term "excessive" is defined for the purpose of this subsection as to a degree exceeding that generated by uses permitted in the district in their customary manner of operation, or to a degree injurious to the public health, safety, welfare or convenience.

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(GAAB 21.05.050.V; AO No. 77-355; AO No. 80-27; AO No. 81-67(S); AO No. 82-54; AO No. 85-21; AO No. 85-23; AO No. 85-28; AO No. 85-78; AO No. 86-90; AO No. 88-171(S-1), 12-31-88; AO No. 88-147(S-2); AO No. 98-53(S), § 5, 6-9-98; AO No. 99-62, § 13, 5-11-99)

<u>Section 12.</u> Anchorage Municipal Code section 21.40.115, R-10 residential alpine/slope district, is hereby amended to read as follows: (*Subsections not affected by this ordinance are not set out unless for context.*)

21.40.115 R-10 residential alpine/slope district.

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E. *Prohibited uses and structures*. The following uses and structures are prohibited:

2. Any use which causes or may reasonably be expected to cause excessive noise, vibration, odor, smoke, dust or other particulate matter, <u>radiation,</u> toxic or noxious matter, humidity, heat or glare at or beyond any lot line of the lot on

which it is located. <u>Operation of particle accelerator systems, including cyclotrons, is prohibited.</u> The term "excessive" is defined for the purpose of this subsection as to a degree exceeding that generated by uses permitted in the district in their customary manner of operation, or to a degree injurious to the public health, safety, welfare or convenience.

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(AO No. 81-97; AO No. 81-217; AO No. 85-23; AO No. 85-28; AO No. 85-78; AO No. 86-90; AO No. 88-171(S-1), 12-31-88; AO No. 88-147(S-2); AO No. 98-53(S), § 6, 6-9-98; AO No. 99-49, § 1, 3-23-99; AO No. 99-62, § 14, 5-11-99)

<u>Section 13.</u> Anchorage Municipal Code section 21.40.117, R-11 Turnagain Arm district, is hereby amended to read as follows: (*Subsections not affected by this ordinance are not set out unless for context.*)

21.40.117 R-11 Turnagain Arm district.

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E. *Prohibited uses and structures.* The following uses and structures are prohibited:

3. Any use which causes or may reasonably be expected to cause excessive noise, vibration, odor, smoke, dust or other particulate matter, <u>radiation,</u> toxic or noxious matter, humidity, heat or glare at or beyond any lot line of the lot on which it is located. <u>Operation of particle accelerator systems, including cyclotrons, is prohibited.</u> The term "excessive" is defined for the purpose of this subsection as to a degree exceeding that generated by uses permitted in the district in their customary manner of operation, or to a degree injurious to the public health, safety, welfare or convenience.

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(AO No. 82-162; AO No. 84-34; AO No. 85-28; AO No. 85-78; AO No. 85-91, 10-1-85; AO No. 86-122; AO No. 86-182; AO No. 88-143; AO No. 88-144, 11-26-88; AO No. 88-171(S-1), 12-31-88; AO No. 94-120, § 1, 8-23-94; AO No. 94-238(S), § 3, 2-28-94; AO No. 94-239, § 1, 2-14-95; AO No. 96-118, § 1, 8-22-96; AO No. 96-118, § 1, 8-13-96; AO No. 99-62, § 15, 5-11-99; AO No. 2001-88, § 1, 6-5-01)

<u>Section 14.</u> Anchorage Municipal Code section 21.40.130, R-0 Residential-office district, is hereby amended to read as follows: (*Subsections not affected by this ordinance are not set out unless for context.*)

21.40.130 R-0 Residential-office district.

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E. *Prohibited uses and structures*. The following uses and structures are prohibited:

2. Any use which causes or may reasonably be expected to cause excessive noise, vibration, odor, smoke, dust or other particulate matter, radiation,, toxic or noxious matter, humidity, heat or glare at or beyond any lot line of the lot on which it is located. Operation of particle accelerator systems, including cyclotrons, is prohibited. The term "excessive" is defined for the purpose of this subsection as to a degree exceeding that generated by uses permitted in the district in their customary manner of operation, or to a degree injurious to the public health, safety, welfare or convenience.

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(GAAB 21.05.050.I; AO No. 77-219; AO No. 77-355; AO No. 78-199; AO No. 80-57; AO No. 81-67(S); AO No. 83-226; AO No. 85-18; AO No. 85-23; AO No. 85-69; AO No. 85-91, 10-1-85; AO No. 86-90; AO No. 86-171; AO No. 88-171(S-1), 12-31-88; AO No. 88-147(S-2); AO no. 91-97; AO 92-114; AO No. 96-131(S), §3, 10-22-96; AO No. 99-62, § 16, 5-11-99; AO No. 2003-124(S), § 3, 1-20-04)

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Section 15: Review by Planning and Zoning Commission:. AMC 21.10.015(A)(3) and all other provisions of AMC 21 notwithstanding, and the Assembly finding that protection of the public, health, safety, welfare requires this enactment without substantial delay, the Assembly may consider and enact this ordinance after public hearing without prior review by the Planning and Zoning Commission. If enacted, this ordinance and a record of Assembly proceedings will be submitted to the Planning and Zoning Commission so that the Commission may make recommendation to the Assembly as to whether this ordinance shall remain a part of the Municipal code as enacted, be amended, or be repealed by the Assembly.

Section 16: Intent: The safe and adequate design, fabrication, installation, and operation of particle accelerator systems, including cyclotrons, requires application of advanced principles of physics, chemistry, and engineering. Technology integral to safe operation goes well beyond technology integral to safe residential construction practices. Safe and adequate design, fabrication, installation, and operation of particle accelerator systems, including cyclotrons, require a level of expertise beyond that required for safe residential construction. Particle accelerators, including cyclotrons, are most commonly located in commercial or industrial areas operated by major public or private institutions such as the National Laboratories, universities, private scientific business corporations of substantial presence, or hospitals. To meet strict regulatory requirements, these facilities are located in carefully controlled environments designed to protect users, patients, and surrounding areas from radiation and other toxic exposures. Such facilities require utilities, particularly electrical power and water, substantially in excess of that required for residential uses, structures, or home occupations that are incidental and subordinate to a residential use. The required infrastructure (shielding, use of control rooms and measures intended to restrict unauthorized access) is not compatible with, nor incidental to residential development. Transportation of manufactured radioactive materials through residential areas proximate to schools, churches, parks and other areas of public assembly raises public safety and security concerns beyond the concerns normally associated with home occupations. For all of these reasons, the Assembly finds that under current provisions of AMC 21, the operation of particle accelerator systems, including cyclotrons, used to manufacture radioactive material is already forbidden in residential areas under the provisions of AMC 21 referenced in Sections 2-14 above and cannot be conducted in a dwelling unit or in a building accessory to a dwelling unit as a "home occupation" under AMC 21.45.150. Accordingly, this ordinance is declaratory of existing law.

Section 17. **Effective date:** This ordinance shall become effective immediately upon its passage and approval by the Assembly.

PASSED AND APPROVED by the Anchorage Assembly this 24th day of January, 2006.

Anna J. Fairclough
Chair

ATTEST:

Barbara S. Gruenstein
Municipal Clerk

MUNICIPALITY OF ANCHORAGE
ASSEMBLY MEMORANDUM
NO. AM 856–2005

Meeting Date: November 22, 2005

From: Assemblymember Allan Tesche
Subject: **AO 2005–178**

The recent introduction of Positron Emission Tomography (PET) in Alaska's medical facilities has created a local market for radioisotopes, including Flourine – 18, used in diagnostic imaging. That radioisotope is produced by particle accelerators typically operated in industrial areas owned by public or private institutions such as the National Laboratories, universities, private scientific business corporations of substantial presence, or hospitals. Private operation of particle accelerators in residential areas for these industrial purposes, however, may now be technically possible. Of concern to the South Addition Community Council are the statements of a local resident that he has purchased a used cyclotron from a major hospital and has negotiated a power agreement with Municipal Light and Power to operate a 16MEV cyclotron in a downtown residential area which is adjacent to the Delaney park strip and within 1/4 mile of two elementary schools, several churches, and scores of private residences.

Manifest issues of safety, radioisotope production and handling, radioisotope transportation, power consumption, and neighborhood nuisance associated with the location of particle accelerators, including cyclotrons, in residential neighborhoods suggest the Assembly's intent to preclude the operation and use of equipment such as particle accelerators, including cyclotrons, in residential districts and their similar preclusion as part of home occupations allowed under AMC 21. AO 2005-178 confirms this earlier and inherent intent and makes clear this prohibition in relevant provisions of the zoning ordinance.

Enactment of AO 2005-178 is recommended.

Allan Tesche
Assemblymember, Section 1

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SACC ***South Addition Community Council***

November 18, 2005

Anchorage Assembly Through Anna Fairclough, Assembly Chair:

The members of the South Addition Community Counsel have grave concerns for the risk to the public health and safety posed by Albert Swank's plans to install a cyclotron and manufacture radioactive materials in residences he owns at 318 and 326 West 10th Avenue, across from the Delaney Park Strip tennis courts recreation area. Our research indicates that operation of a cyclotron poses a serious threat of radioactive contamination to the surrounding neighborhoods and the whole community.

We urge you to bring these concerns to the Anchorage Municipal Assembly immediately to take action to preclude the installation of cylcotrons and manufacture of radioactive materials within Anchorage's residential neighborhoods, and in South Addition specifically.

We understand that the cyclotron being shipped to Mr. Swank, with an anticipated arrival in Anchorage on November 19, 2005, is an industrial quality device that requires an entensive buried concrete and lead vault in order to protect the public health from the millicuries of radiation that would be released if it were started. Yet, Mr. Swank informed the Community Counsel that he intends to install the radioactive producing device on his R2M lot in the South Addition residential neighborhood.

Research indicates that this cyclotron was designed without built-in radiation safeguards because it was to be operated in a concrete and lead underground vault, as it was in its former location at Johns Hopkins University. Operation of an unshielded cyclotron poses a direct risk of radioactive contamination to a wide area, resulting in death or blindness and/or sterility from discharges of millions of units of radioactive materials. It appears that using a cyclotron to manufacture even discrete amounts of radioactive isotopes (unstable radioactive material with a half-life that easily exceeds 200 years) for medical purposes, as Mr. Swank intends, raises an extremely serious health threat to the community. The irreversible damage that could be caused by an unmonitored accident with the cyclotron is almost unimaginable, but not unlike that posed by the Three Mile Island accident.

We appreciate your immediate attention to this serious threat.

Respectfully,

Kathleen Weeks, President
South Addition Community Council

MUNICIPALITY OF ANCHORAGE
ASSEMBLY INFORMATION MEMORANDUM
NO. AIM 101-2005

Meeting Date: December 20, 2005

From: Assemblymember Tesche
Subject: Summary of Economic Effects for AO 2005-178

Attached to this memo is the Summary of Economic Effects for AO 2005-178, regarding AN ORDINANCE AMENDING ANCHORAGE MUNICIPAL CODE SECTION 21.45.150 CONFIRMING THE ASSEMBLY'S INTENT THAT THE USE OF A DWELLING UNIT FOR THE OPERATION OF PARTICLE ACCELERATOR SYSTEMS, INCLUDING CYCLOTRONS, IS PROHIBITED IN HOME OCCUPATIONS; AND AMENDING ANCHORAGE MUNICIPAL CODE SECTIONS 21.40.030, 21.40.040, 21.40.045, 21.40.050, 21.40.060, 21.40.070, 21.40.080, 21.40.090. 21.40.100, 21.40.110, 21.40.115, 21.40.117 AND 21.40.130 TO CONFIRM THAT OPERATION OF PARTICLE ACCELERATOR SYSTEMS AND CYCLOTRONS IS PROHIBITED IN RESIDENTIAL AREAS.

Prepared By: Steven B. King, Utility Budget Analyst
Reviewed By: Barbara E. Gruenstein and Guadalupe Marroquin
Submitted By: Assemblymember

MUNICIPALITY OF ANCHORAGE
Summary of Economic Effects -- General Government

AO Number: 2005-178

Title: AN ORDINANCE AMENDING ANCHORAGE MUNICIPAL CODE SECTION 21.45.150 CONFIRMING THE ASSEMBLY'S INTENT THAT THE USE OF A DWELLING UNIT FOR THE OPERATION OF PARTICLE ACCELERATOR SYSTEMS, INCLUDING CYCLOTRONS, IS PROHIBITED IN HOME OCCUPATIONS; AND AMENDING ANCHORAGE MUNICIPAL CODE

Sponsor: Assemblymember Tesche
Preparing Agency: Assembly
Others Impacted:

CHANGES IN EXPENDITURES AND REVENUES: **(In Thousands of Dollars)**

	FY06	FY07	FY08	FY09	FY10
Operating Expenditures					
1000 Personal Services	$ -	$ -	$ -	$ -	$ -
2000 Non-Labor	-	-	-	-	-
3900 Contributions					
4000 Debt Service					
TOTAL DIRECT COSTS:	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Add: 6000 Charges from Others					
Less: 7000 Charges to Others					
FUNCTION COST:	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
REVENUES:					
CAPITAL:					
POSITIONS: FT/PT and Temp					

PUBLIC SECTOR ECONOMIC EFFECTS:
There are no substantive public sector economic effects associated with amending and Anchorage Municipality code.

PRIVATE SECTOR ECONOMIC EFFECTS:
There are no substantive public sector economic effects associated with amending and Anchorage Municipality code.

Prepared by: Steven B. King, Utility Budget Analyst — Telephone: 343-4714
Reviewed by: Barbara Gruenstein and Guadalupe Marroquin — Telephone: 343-4311 and 343-4376

MUNICIPALITY OF ANCHORAGE

ASSEMBLY INFORMATION MEMORANDUM

No. AIM 5-2006

MEETING DATE: January 10, 2006

FROM: **Municipal Clerk**

SUBJECT: **Minutes of the December 12, 2005 Planning and Zoning Commission Meeting** (Case 2005-155)

The Minutes of the December 12, 2005 Planning and Zoning Meeting concerning AO 2005-178 are provided for your information.

Respectfully submitted: Barbara E. Gruenstein, Municipal Clerk

PLANNING AND ZONING COMMISSION MEETING
Assembly Chambers
Z.J. Loussac Library
3600 Denali Street
Anchorage, Alaska

MINUTES OF
December 12, 2005
6:30 PM

6. **2005-155** Municipality of Anchorage. An Ordinance amending Anchorage Municipal Code Section 21.45.150 confirming the Assembly's intent that the use of a dwelling unit for the operation of particle accelerator systems, including cyclotrons, is prohibited in home occupations; and amending Anchorage Municipal Code Sections 21.40.030, 21.40.040, 21.40.045, 21.40.050, 21.40.060, 21.40.070, 21.40.080, 21.40.090, 21.40.100, 21.40.110, 21.40.115, 21.40.117 and 21.40.130 to confirm that operation of particle accelerator systems and cyclotrons is prohibited in residential areas.

Staff member SHARON FERGUSON explained that this is an ordinance to confirm the Assembly's intent that confirming the Assembly's intent that the use of a dwelling unit for the operation of particle accelerator systems, including cyclotrons, is prohibited in home occupations; amend Anchorage Municipal Code sections that deal with residential districts; and to confirm that operation of particle accelerator systems and cyclotrons is prohibited in residential areas. When Staff reviewed the information submitted by Assemblymember Tesche, it appeared apparent that these types of devices were not conducive to residential areas and were best located in institutional settings, such as hospitals or industrial areas. At the time of writing, Staff did not have benefit of the information supplied by Mr. Swank. The information supplied by Mr. Swank indicates that the cyclotron would pose few, if any, safety impacts in a residential setting. The recently passed State law regarding radioactive materials seems to suggest that particle accelerators pose potential danger to public health and safety. The letter from Clyde Pearce, chief of the Radiological Health Program for the State indicates that Mr. Swank meets several of the requirements needed to obtain a permit from the State to operate a device, machine, or process that produces a radioactive material directly or as a byproduct. The issue before the Commission is confirming whether or not home occupations extend to the idea of putting in a particle accelerator/cyclotron. The code reads that the use of a dwelling unit for a home occupation shall be clearly incidental and subordinate to its residential use. The ordinance also seeks to confirm that the use of a particle accelerator including cyclotrons are prohibited in home occupations and to confirm that particle accelerator including cyclotrons are prohibited in residential areas. The Assembly Memorandum on page 14 of the packet states that AO 2005-178 confirms this earlier and inherent intent and makes clear this prohibition and relevant provisions of the zoning ordinance. She believed this means that these types of uses were prohibited from residential areas; those sorts of things that cause nuisances, odors, vibrations, sounds.

The public hearing was opened.

CATHY GLEASON, representing the Spenard Community Council, stated the Council unanimously adopted a resolution supporting Assemblymember Tesche's proposed ordinance. The president of the Council decided it is probably not appropriate to approve this without investigating it himself, so he did so and discovered there are issues with this use. Perhaps this use is not posing a severe danger or threat to a residential area, but the safety of the community should always be in the forefront of people's mind when proposing a use of this type in a residential area. The Council also feared this might set an inappropriate precedent in terms of a use in a residential area that should really be in an industrial area or hospital setting where there are means to protect the community at large.

DAVID GILBERTSON felt this case was forced through without giving Mr. Swank the time or opportunity to submit any information to the Commission on the safety or specifics of his operation. He stated that investigating projects on the Internet does not speak to Mr. Swank's project. He believed Mr. Swank should have the opportunity to state his case. He felt that the Commission should at least put forward the time and effort to understand Mr. Swank's arguments, which could require postponement of this case.

KATHLEEN WEEKS, president of South Addition Community Council, stated this issue was brought into her neighborhood so her family and other neighbors in South Addition face the most critical health threats. The State recognized this health threat and revoked a temporary permit given to Mr. Swank and passed emergency health regulations to protect the public. She urged the Commission to adopt the safeguards in this ordinance that would prevent this industrial use from being sited in a residential neighborhood. Mr. Swank will argue that this cyclotron is no different than an X-ray machine; she posed this question to others who operate cyclotrons throughout the U.S. and they indicate they could not even begin to explain the difference between the cyclotron and an X-ray machine. She noted that Mr. Swank has reviewed the letter from the Council and indicated the Council does not know the difference between a nuclear reactor like Three Mile Island and a cyclotron. She clarified that she was not comparing the cyclotron to a nuclear reactor per se when she sent the Council's letter to the Assembly representatives. She stated she was public relations staff for Rural Electric Utilities in Pennsylvania just prior to the Tree Mile Accident and she lived one-quarter mile from Three Mile Island plant on the day of the accident. She explained that was a safe operation that she prompted as a safe operation. That day a small steam valve of the type that is on a furnace released as it should have, but did not close. There was also a problem that there was no dial telling the operator the plant was discharging effluent water more should be added. She could not say precisely what risks she or her neighbors face from this cyclotron because Mr. Swank has hidden details. John Hopkins has also refused to respond to the Council's questions about what type of cyclotron this is, what is the make, model and serial number. She explained that one would have to know the model and make of this cyclotron to know the secondary isotopes spun off when it operates. Neither the Assembly, the Baltimore Sun, nor she has been able to get information from John Hopkins as to the precise model. She stated that based on the general information she has on the cyclotron that John Hopkins is donating to Mr. Swank it appears it is a heavily contaminated machine. She stated it is likely that it is a positive ion cyclotron and not the newer preferred nuclear ion cyclotron. The earlier prototypes produce more dangerous and more numerous isotopes with much longer half-lives. She suggested that the question be put to Mr. Swank whether radioactive material could be produced that could be used in a dirty bomb. She stated he has answered "yes" in other meetings with the Council. He has said he can construct this in his garage or in a concrete vault. She stated that MSU recently constructed their vault at a cost of $9.8 million for their cyclotron, which is a newer model. She stated the cyclotron the neighborhood expects to be delivered is unshielded and will release radiation if not shielded.

DIANNE HOLMES stated that Ruth Moulton had to leave this evening's meeting, but she suspected that Ms. Moulton would agree with her testimony. She supported this ordinance change. There are many issues relating to this, including the safety of a shielded versus a non-shielded unit and the space considerations related to that. The question of the need for quick transportation of isotopes to facilities across town and the implications associated with that in any season. There is also a question of huge power consumption that would surely affect surrounding residences. She was not certain of the waste products that would be produced, are there any, and how would they be treated. She questioned whether the city has certified inspection personnel and the capability to deal with this. She noted that the Comprehensive Plan separates industrial, residential, and commercial zones. The good intent of citizens has resulted in non-industrial uses chipping away at industrial property. She foresaw that non-industrial users would come to the city for amenities and variances that would not normally be needed, blurring he line between the districts. She stated that areas designated for I-1 and I-2 use are large, connected parcels that have been set aside. She stated that fragmenting I-1 and I-2 districts is not good and neither is fragmenting neighborhoods by allowing a use that could occur if this amendment is not passed. On a personal note she stated that as a former diagnostic and therapeutic radiological technologist, while the shielding techniques at the time were in place, it did not adequately protect her from acquiring an immunological disorder of her thyroid, which is where her lead apron ended. She stated that it was not for decades that her disorder appeared.

SHARON WALSH, resident at 1436 S Street, stated she has been a homeowner in South Addition since 1986 and a resident of Anchorage since 1957. She is also the sole proprietor of Integrity Associates, a home-based consulting civil engineering and project management firm. She believed in Mr. Swank's project. She has known him for some time and believes in what he is trying to do, which is provide the Anchorage medical community with a much needed resource of benefit to those who are fighting cancer. As an operator of a home-based business and having studied Mr. Swank's operation plan, she did not agree that this business would cause harm or any undue inconvenience or nuisance to his neighbors. As an engineer, she understood the basics of the technology of what Mr. Swank is proposing and she is comfortable with this proposal. She knows Mr. Swank to be a thorough and detail-oriented engineer who would never install and operate machinery without due consideration for all operational safety and health parameters. She stated this is a shielded unit and was designed as such. She stated she is the mother of three grown children all of whom received their education in the Anchorage public school system. Her youngest daughter attended the Central Junior High School of Science, an experience that would have been enhanced by the opportunity to see and learn about a project like Mr. Swank's. She urged the Commission to postpone action until the entire situation can be given careful and thorough review by this body. She feared that momentum is overcoming common sense in this case. She felt it was inappropriate for the Commission to be forced into a decision tonight. She stated that consideration of this case does not need to be done on an emergency basis. There is an overwhelming amount of technical information that is critical to this case and the Commission has not been given adequate time to receive and review that information. Neither has Mr. Swank been given the time to present the details needed to make a good decision.

ALBERT SWANK JR. stated he was not notified of this meeting and was not given adequate time to prepare. He urged that the Commission delay action and to reassure the Commission that enactment of this ordinance is not urgent. He explained that the earliest possible date of installation would be April 2006. He resides at 318 and 326 West 10th Avenue, the former being in his family since 1944. He is the sole proprietor of Langdon Engineering, a home-based engineering and scientific services firm. The firm began in 1980 with operations never being noticed by neighbors. He stated this project is needed by the medical community, as well as the educational infrastructure. This home based business does not pose any risk to the public safety, health, or welfare. This business will not release any radiation and complies with all current zoning home occupation definitions. An apparent family member of Mr. Tesche has prepared a letter with documents. He stated that Dr. Tesche is not an expert in applicable, appropriate fields. Dr. Tesche, as a professional, should have qualified his response letter as such. Statements and quotes by Dr. Tesche are incorrect. MR. SWANK stated he has the appropriate education and experience within the appropriate engineering, experimental physics, and nuclear chemistry areas. He has supplied additional materials to the Planning Department on December 9, 2005 and this evening. A letter from Dr. Gerardo Duto, retired director, and Dr. Tom Ruth are included in the packet, two of the most acclaimed experts in cyclotrons and isotopes at the world's largest cyclotron facility, Triumf in Vancouver B.C. The Municipality of Anchorage has no staff qualified to review the documents submitted by Dr. Tesche or to have prepared responses based on such. The Municipality did not receive any documents from Langdon Engineering and thus prepared their review upon partial, inappropriate data, assumptions, preconceived ideas, and opinions. Langdon Engineering has prepared, submitted, and received approval from the State of Alaska covering all issues and items presented by any government, state or municipal agency or individual to date. The State of Alaska has re-reviewed documents as indicated within a draft document that only some clarifications are needed for resubmission and approval. The Municipal PM&E group has, in his opinion, prepared a professional and possible acceptable solution. The same concept could be expanded to include "the adoption of applicable regulations covering ionizing radiation, occupational safety, and transportation existing within federal regulation and others for home businesses." The proposed amendment requests are not acceptable for a wide range of issues, including legal. Homes and people contain vast amounts of radiation. Particle accelerator systems, including cyclotrons may not be used in a home occupation, again, of the same factors. Public and community council positions are still undecided and, in his opinion, favorable. Property valuation reduction issues have been stated without factual basis. The immediate neighbors are not in conflict with this project. a document prepared by Dr. Tesche and attached letter from an MOA plan reviewer is also incorrect. All project documents reviewed by appropriate professional staff and attorneys at John Hopkins. An overwhelming amount of technical information exists that is critical to this case and the Commission has not had adequate time to receive an review such. These issues include the rights of a home as specifically addressed in the Constitution of the United States, the Alaska Constitution Article I, Declaration of Rights, Section 1, Inherent Rights.

COMMISSIONER WIELECHOWSKI asked how much the cyclotron weighs. MR. SWANK replied that there are four or five options. The cyclotron is 4'x6'x5' tall. It was designed as a shielded unit. COMMISSIONER WEILECHOWSKI asked the weight of the machine. MR. SWANK replied that it approximately 20 tons, which is immaterial. COMMISSIONER WIELECHOWSKI asked if there is radioactive material inside the machine. MR. SWANK replied that, depending on the design characteristics, the existing radiation level of internal components varies dramatically depending on the operational criteria, that is, how hard it is used (beam current) and how long it is used. There is also a definition within federal regulations that stipulates that radioactive materials have 70 becharals per gram. Many of the components of the cyclotron do not even fall under the definition of federal regulations. Many materials in the machine are classified as non-radioactive. There are minimal internal components with a slight radioactivity. He stated he could open the machine and sit on it for 365 days continuously and not receive an excess dose by federal statute.

COMMISSIONER PEASE asked that Mr. Swank address the transport of radioactive materials in and out of the home. MR. SWANK replied that there are several options. In one option, there is a distance of 40 feet from the garage where the cyclotron would be to the alley and then 150 feet to C Street. The transport plan would be to the alley, to C Street, and then to Providence Hospital. COMMISSIONER PEASE asked if his personal vehicle would be used. MR. SWANK replied that all regulations allow transport materials in personal vehicles. This has been going on in Anchorage for three years and follows all appropriate federal laws.

COMMISSIONER SIMONIAN asked how often would the transport occur. MR. SWANK replied that the peak would be once per day and that is not envisioned to occur for years. He explained that the number of scans at Providence is approximately 15 to 20 and a scan takes an average of one hour. Essentially, eight patients are scanned a day. Patients are scanned on two days. Currently the transport would be once daily. COMMISSIONER SIMONIAN did not understand why the hospital would not accommodate the cyclotron with appropriate shielding, if there is such a need. MR. SWANK stated he has not been given the opportunity to produce anything. In the documentation he had supplied many of these points are discussed. He started this work with the medical community 10 years ago and in earnest 5 years ago. This community cannot afford the cyclotron. He came forward 4.5 years ago under the agreement that he would take care of this issue, which ensured the hospital that they would only have to purchase the camera. He also arranged for temporary provision of isotopes from Seattle. He stated he is funding this personally for the people of Alaska. If he were to locate this outside of his home the cost would be $1.6 million to $10 million. He would also be deprived of educational opportunities. COMMISSIONER SIMONIAN asked why it would be so expensive to locate somewhere more suitable for a business. MR. SWANK differed on the definition of "more suitable" but stated it would be more expensive because of the associated costs, such as lease, insurance, and utility. If he were to purchase another property, the cost would be even greater.

COMMISSIONER PEASE asked for a response to the claims this might affect power delivery in the neighborhood and require an additional transmission line. MR. SWANK stated the back side of this property has a 115,000 volt transmission line and two blocks away is Substation #6. He has worked with ML&P and there are no issues with power. If this were left as a typical installation without the options he has at his current location, his electrical costs would double. The current location presents the unique opportunity to do a control intertie to the substation that would allow ML&P to shut off power whenever they want and he does not have to pay a demand charge, which is 50% of the utility rate.

COMMISSIONER ISHAM noted there were indications that people were unable to get information on the cyclotron that would indicate the power, whether or not it is shielded, etc. MR. SWANK stated he owns the cyclotron. John Hopkins has issued an official corporate announcement. The agreement between John Hopkins and his firm is confidential. It is involved because it covers every aspect of concern that has arisen in the public. This includes complete permitting documents to the State of Alaska that are confidential because the State did not have the regulations and they were created. John Hopkins has been insistent that this is a local issue. He stated that he would supply technical information to the Assembly and Commission, but not to individuals.

COMMISSIONER WIELECHOWSKI there are articles in the packet including the one on page 21 that says "The high radioactivity generated by the cyclotron and chemistry systems necessitate maximum radiation safety to reduce the risk to the operational staff, public, and environment." He asked if Mr. Swank agreed or disagreed with that statement. MR. SWANK stated this is a general statement. The amount depends upon the targets, the energy level of the machine, and the beam current. There is a range of one million to one. He did not support a vague generality. COMMISSIONER WIELECHOWSKI quoted from the same article "Site selection as to be looked out in the perspective of minimizing potential hazard to the public, worker, and unit." MR. SWANK stated that is an illogical statement; this cyclotron is self-shielded. COMMISSIONER WIELECHOWSKI asked what shielding exists. MR. SWANK replied there is a floorplan in the packet he distributed. The machine was originally designed with shielding and that shielding exists now. It is operated robotically to work on the machine. The shielding consists of stainless steel tanks formed around the unit that are filled with borated water at 1.01 gravity. In appropriate areas, if required, there are lead bricks and polyethylene and boron materials. He stated everything designed for this machine ensures that the surface of the shields complies with all regulations. COMMISSIONER WIELECHOWSKI understood there is a tremendous amount of shielding. MR. SWANK stated there is a tremendous amount. One lead block can weight 100 pounds. COMMISSIONER WIELECHOWSKI assumed this is shielding something dangerous. MR. SWANK replied that the machine is designed for safety; the controls are located 3 to 4 feet away. No company or design firm assumes the liability of issuing a machine with an operator 3 feet away if there is the liability of death or injury. The machine sits operational in the middle of a hospital.

COMMISSIONER PEASE asked where the hospital currently gets these isotopes. MR. SWANK replied that only one of four of the isotopes can currently be obtained; it has the longest half-life of 112 minutes. He had to work out special flight arrangements initially with Federal Express, including minimizing ramp loading time. The isotopes come from Seattle. The shortest transit time from the cyclotron in Seattle to Anchorage is 6 hours and the worst case is 8 hours. They can be put off the flight if there is a higher priority.

COMMISSIONER SIMONIAN asked if there is an example of a cyclotron housed in a home. MR. SWANK referred to the letter he supplied from Triumf Research Laboratory, one of his clients. Triumf is the number one firm in the world for cyclotrons and this nuclear chemistry. The director of that facility Dr. Gerardo Duto and Dr. Ruth, two of his co-workers, also wrote a letter. It is not typical for a cyclotron to be located in a home, but there is no reason why it should not be. COMMISSIONER SIMONIAN noted this letter states "Nevertheless it is mandatory that these facilities be properly installed, operated, and licensed through the competent regulatory agency. It should be noted that there are components that remain radioactive for extended periods and proper handling for disposal must also be followed under the direction of the regulatory body." She stated the letter speaks to the need for a highly regulated approach to a facility, it does not address houses. MR. SWANK stated every statement in that letter has been addressed through regulations. Those regulations exist now with the State of Alaska, including how to handle closure of the facility. He stated that the State has re-reviewed all documentation and there is a draft letter from Clyde Pearce that has been given to the Administration.

COMMISSIONER PEASE asked why this information was not brought before the Commission earlier. DR. SWANK replied that either last Wednesday or Thursday he received a call from a third party informing him of this hearing. In communication with the Planning Department their position was that no single individual was affected by this document and it was an areawide action therefore no singular individual needed to be notified nor did the area around them. The Department also indicated that documents he wanted to submit had to be submitted 50 days prior to the hearing date, which was confusing because this hearing was scheduled less than 50 days ago.

COMMISSIONER PEASE asked if attempts were made to notify residents of the area, including Mr. Swank. MS. FERGUSON stated this ordinance is not site specific. In the instance of a site-specific case notification would be given to residents within 500 feet. In this case, which is an areawide ordinance affecting the entire Municipality, neighbors in the area would not have been directly notified. She explained to Mr. Swank what would have been the three types of notices for this meeting: a notice to the Federation of Community Councils, on municipal website, and in the newspaper.

LAURA BLOCKER strongly urged the approval of the amendment to make clear that running a cyclotron to manufacture radioactive isotopes is not a home occupation consistent with the residential character of a neighborhood or is such an operation properly sited in an area zoned for residential uses. The issue is not whether or not cyclotrons or the radioactive isotopes produced for medical use are good or bad, but it is simply one of land use planning. The sort of operation needed to support a safe cyclotron-driven manufacturing site has no place in a residential neighborhood surrounded by schools, churches and the local park. The ordinance confirms residents' ordinary understanding and investment backed expectations of what uses are permitted in areas zoned residential. The Commission and later the Assembly will focus on this ordinance, which is a land use planning issue. Safety factors influence what kinds of uses are permissible in different types of zoning. This is a residentially zoned area. Safety should not be debatable. More broadly when looking at a residential area, industrial use and the creation of a manufacturing compound is not appropriate. Such use is inconsistent with the residential character of the neighborhood. The operation of a cyclotron is not the sort of casual home occupation contemplated by the land use plan. She urged the Commission to support the ordinance, although she thought some of the comments by PM&E about the exact language of the ordinance were well taken. The issue at question is not whether or not Mr. swank is qualified to operate a cyclotron, rather it is what uses are appropriate to residentially zoned areas across the city and what are proper ancillary home occupations. The impact of this sort of use is of a wholly different character and magnitude than the impacts normal residential use. If Mr. Swank is qualified and meets all the necessary safety requirements, nothing prevents him from locating a cyclotron operation in a properly zoned area.

DAN GLEASON stated the issue before the Commission is one of land use. He though Mr. Swank feels he is being targeted, but that is not the case. This is an issue the community needs to discuss insofar as what is an appropriate home occupation. He did not think he would want this use next to his home. He stated he deals with radioactive material on the North Slope and there are myriad regulations associated with that. He was certain Mr. Swank had to jump through hoops to get this far. He stated there must be higher and proper use of facilities and of land.

BONNIE HARRIS, resident of the downtown area, stated that because she did not know much about cyclotrons when Mr. Swank came to the South Addition Community Council and showed some pictures of an M-16 scanning cyclotron, she did research. She was an X-ray technician some years ago and has some training in basic X-rays. She urged the Commission recommend approval of this ordinance to the Assembly. She stated that cyclotrons for producing medical radioisotopes are a commercial industrial use that is completely incompatible with a neighborhood that has a focus on family, homes, park, etc. She stated there is no way that a medical cyclotron can be safely installed and operated in 500 square feet of a primary residence or 200 SF of a garage, as permitted under the home occupation provisions of the municipal code. Safe and proper operation of a cyclotron requires at least

2000 SF to hold the radiation containment vault in addition to equipment and operations areas. Even the self-shielded cyclotrons are in containment vaults, which are shielded rooms. She discussed information she obtained on the Internet at GE's pet trace. She stated that the shielded cyclotron shown at that website is behind a wall of 6 to 10 feet of dense concrete. The shielded cyclotron also has a shielded vault that could be made of lead or stainless steel or other special materials. She reviewed a schematic of the GE pet trace, which is a modern smaller machine for making radioisotopes for hospitals for PET scans. The interior of the cyclotron room alone is 12'x12'x9' and there is 6 to 10 feet on concrete outside of that.

BARBARA BURG felt compelled to testifying because the Commission is being presented with misinformation that was pulled off the Internet by people who may or may not be qualified to discuss it. She urged the Commission to go through the proper process. She urged the Commission to take the time to hear the proper information. She felt the Commission must go through due process to determine whether or not it is appropriate to locate this use in a residential neighborhood.

COMMISSIONER PEASE asked for discussion of the comments from PM&E about the way that "radiation" is inserted in Section 1.G with other nuisances in home occupations, "detectable to the normal senses off the lot." Clearly radiation is dangerous at a level far exceeding obvious detection. She asked if there was clearer language. MS. FERGUSON suggested that radiation could be addressed in a separate sentence. COMMISSIONER PEASE asked what is the time frame for passage of this ordinance. MS. FERGUSON replied it is set to go before the Assembly on December 20, 2005.

The public hearing was closed.

COMMISSIONER WIELECHOWSKI moved to recommend approval of the amendment to Anchorage Municipal Code Section 21.45.150 confirming the Assembly's intent that the use of a dwelling unit for the operation of particle accelerator systems, including cyclotrons, is prohibited in home occupations; and amending Anchorage Municipal Code Sections 21.40.030, 21.40.040, 21.40.045, 21.40.050, 21.40.060, 21.40.070, 21.40.080, 21.40.090, 21.40.100, 21.40.110, 21.40.115, 21.40.117 and 21.40.130 to confirm that operation of particle accelerator systems and cyclotrons is prohibited in residential areas. COMMISSIONER ISHAM seconded.

COMMISSIONER WIELECHOWSKI stated he is very impressed with Mr. Swank and the work and research he is doing and he believes there is a place in the community for a cyclotron, but not in a residential district. The matter before the Commission is a land use issue. He did not think these types of machines are appropriate in residential districts. The fact they are heavily fortressed by lead and protective agents indicates a level of danger. He felt the community had the right to be concerned about that danger. The documents provided to the Commission show this is a potentially dangerous use. There are research articles in the packet that say it is a potentially dangerous machine. Specifically the document "*Radiological Safety Management in Medical Cyclotron Facilities*" states that high radioactivity is generated by the cyclotron. It states, "The high radioactivity generated by the cyclotron and chemistry systems necessitate maximum radiation safety to reduce the risk to the operational staff, public, and environment." It also speaks to site selection and suggests it must be "looked out in the perspective of minimizing potential hazard to the public, worker, and unit." It talks about tall buildings being nearby, seismic conditions, and soil composition. This is a very heavy piece of machinery weighing 20 tons or more.

COMMISSIONER PEASE also supported the motion agreeing that the cyclotron would have benefits to the community, but is a very inappropriate use in a residential area. This would also create a transportation situation that has not been clearly indicated can be safely managed. Any inspection and safety management plans appear to have not been presented to the Commission. She regretted that Mr. Swank was pressed for time to present his case, but this is clearly a use that creates a hazard in a residential area. The home occupation standards are written to such a strict level that nuisances such as odors are not allowed and this is clearly a life safety threat, so she did not believe it was illogical to assume this is not appropriate in a residential area.

COMMISSIONER SIMONIAN supported the motion. She stated AMC 21.45.150 that governs home occupations is clear that such uses shall be clearly incidental and subordinate to the residential use. She could not think of a similar home occupation that requires a 20 ton piece of equipment, a special $20,000 deal with ML&P in order to make it possible. This is an operation that certainly violates the spirit of 21.45.150, which is to have an occupation, like engineering, that has no real impact on the neighborhood and the residential focus of a neighborhood. She did not think there was a need for a finding whether or not it is hazardous, it is beyond what is contemplated by 21.45.150. Mr. Swank could not offer an example of another cyclotron housed in a residential neighborhood. There was nothing in the letter Mr. Swank submitted from experts in the field and nothing therein suggested it is safe to have this use in a residential neighborhood. She thought an industry that is so highly regulated is not contemplated by a home occupation.

COMMISSIONER T. JONES stated she looked at this case as not about a particular use in a particular neighborhood, but as a land use issue subject to any residential location in the Municipality. She believed it was appropriate that the ordinance to go forward to the Assembly. This is a public health and safety issue and a land use matter. This is a use that is appropriate to regulate and to prohibit from residential neighborhoods.

COMMISSIONER PEASE noted that the Commission did not address the issue of a standard for radiation, since it differs considerably from glares, fumes and other nuisance effects not allowed in home occupations. She noted this for the Assembly's consideration. She also noted the language in Section 1.G talks about if the occupation is conducted in a single family residence or accessory structure and she felt a multi-family residence is also not an appropriate location for a radiation-causing operation. COMMISSIONER WIELECHOWSKI noted that the ordinance does address all residential districts.

COMMISSIONER ISHAM concurred with the comments made by other Commissioners. He felt strongly that this type of activity does not belong in the home, but should instead be in an industrial or commercial district.

COMMISSIONER T. JONES stated in her review of this case she looked at industrial and commercial districts and she was not sure those adequately address this issue either. She suggested perhaps the Assembly may wish to address this use overall. She noted there are many facilities in the city that involve "captive populations," such as schools and institutions, so it is appropriate to address this issue.

COMMISSIONER WIELECHOWSKI felt Commissioner Jones's point was an excellent one. With the evolution of more mixed use in Anchorage, the Commission may want to suggest to the Assembly that they contemplate adding a site plan review or conditional use for business or industrial zones.

AYE: Isham, Pease, T. Jones, Poulton, Simonian, Wielechowski
NAY: None

PASSED

Municipality of Anchorage
MUNICIPAL CLERK'S OFFICE

Agenda Document Control Sheet

AIM 5-2006

(SEE REVERSE SIDE FOR FURTHER INFORMATION)

1 SUBJECT OF AGENDA DOCUMENT: MINUTES OF THE DECEMBER 12, 2005 PNZ MEETING (CASE 2005-155)

DATE PREPARED: 12/21/05

Indicate Documents Attached: [ ] AO [ ] AR [ ] AM [x] AIM

2 DEPARTMENT NAME: Assembly

DIRECTOR'S NAME: Anna Fairclough, Chair

3 THE PERSON THE DOCUMENT WAS ACTUALLY PREPARED BY: Barbara E. Gruenstein, Municipal Clerk

HIS/HER PHONE NUMBER: 343-4311

4	COORDINATED WITH AND REVIEWED BY	INITIALS	DATE
	Mayor		
	Municipal Clerk		
	Municipal Attorney		
	Employee Relations		
	Municipal Manager		
	Cultural & Recreational Services		
	Fire		
	Health & Human Services		
	Merrill Field Airport		
	Municipal Light & Power		
	Office of Management and Budget		
	Police		
	Port of Anchorage		
	Public Works		
	Solid Waste Services		
	Transit		
	Water & Wastewater Utility		
	Executive Manager		
	Community Planning & Development		
	Finance, Chief Fiscal Officer		
	Heritage Land Bank		
	Management Information Services		
	Property & Facility Management		
	Purchasing		
	Other		

5 **Special Instructions/Comments**

CONTINUED PUBLIC HEARING

6 ASSEMBLY HEARING DATE REQUESTED: 1/10/06

7 PUBLIC HEARING DATE REQUESTED: 1/10/06

MUNICIPALITY OF ANCHORAGE
ASSEMBLY MEMORANDUM
NO. AM 18–2006

Meeting Date: January 10, 2006

From: Assemblymember Allan Tesche
Subject: **AO 2005–178, Particle Accelerators (Cyclotrons) in Residential Districts**

A controversial proposal to install a used twenty–ton medical cyclotron into a two-car garage located within a residential area recently prompted the South Addition Community Council and eight other community councils[1] to urge enactment of AO 2005-178. The ordinance reaffirms the Assembly's intent that industrial cyclotrons used to manufacture radioisotopes in commercial quantities are prohibited in residential zones and may not be operated as "home occupations" under AMC 21.45.160. This memorandum explains the ordinance, its intent, and justification.

Although industrial cyclotrons are probably already unlawful in residential areas,[2] categorical references to "particle accelerators, including cyclotrons" in the enumeration of specifically prohibited uses in residential classifications under AO 2005-178 removes any uncertainty on that prohibition. Similarly, while it is quite difficult to physically locate a modern industrial cyclotron into a garage space no larger than 200 square feet[3] or

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1 Community councils urging enactment of AO 2005-178 include South Addition, Downtown, Government Hill, Mountain View, Campbell Park, Bayshore-Klatt, Fairview, Turnagain, and Eagle River Valley.

2 Land use planner and Title 21 consultant Don Alspach believes the installation of a medical or industrial cyclotron in a residential area "overwhelmingly fails" the requirement of AMC 23.45.160 that the proposed use constitute a "customary home business." *See* Letter of Donald P. Alspach to Municipal Assembly, Dec. 4, 2005. [Appendix 1, p. 1]

3 According to Jeff Clanton, Director of Radio Pharmacy Services and manager of Vanderbilt University's cyclotron facility, "the typical medical cyclotron facility used to produce PET drugs today is between 3,000 and 4,500 sq. feet of dedicated space." Response by Jeff Clanton to questions forwarded by Allan Tesche, Dec. 12, 2005. [Appendix 2] Cardinal Health Systems, which operates 17 medical cyclotrons across the country, suggests that at least 2,000 square feet is required for a medical cyclotron, an area *ten times* the maximum allowable area which may be devoted to a "home occupation" in a garage under AMC 21.45.160. Letter of Kevin Fong to Allan Tesche, Dec. 8, 2005. [Appendix 3]

to imagine an industrial cyclotron as "clearly incidental and subordinate to" residential use of the property, a similar reference to cyclotrons in the "home occupation" provisions of AMC 21.45.160 settles the issue.

It is not the intent of AO 2005-178 to regulate the use of common household appliances such as smoke detectors, microwave ovens, TVs, or personal computers. Although these appliances might be said to have some of the same electronic components as are found in particle accelerators, they are vastly different in operation and function, and are not used to produce commercial quantities of radioisotopes, nor do they require extensive shielding or operational protocols to operate safely.

Scientists Address the Proper Location of Industrial or Medical Cyclotrons

Approximately 230 industrial or medical cyclotrons safely operate today throughout the world, located within shielded areas of urban hospitals or nuclear medicine clinics.[4] The proper location of these facilities was addressed in the professional literature for the European Nuclear Energy Authority in 2004:

> Site selection has to be looked [at] in the perspective of minimizing potential hazard to the public, worker and unit. The location should not add any risk to the public. During site selection the domestic nature of the site, the level of occupancy, the tallest buildings nearby and their occupancy, any other source of risk to the public in the site, seismic condition, soil composition of the site, weight [bearing] capacity has to be taken in to account. The soil composition helps to analyze soil activation in the long run. After site selection, the design approval of lay out plan comes as the second step. The lay out plan suggested by manufacturer for the particular unit according to the unit dimension has to be followed with *** enough working space and with the necessary accessory modules nearby. In the case of medical cyclotrons lay out plan should be in such a way that the cooling mechanism, gas storage room, control electronics, control station, the chemistry module for chemical synthesis has to be *** properly

[4] *Radiological Safety and Health Physics Database for Cyclotron Accelerating Proton and Deuterons up to 250 MEV* B. Mukherjee, OECD NEA Data Bank 2004. [Appendix 4, p.1]

planned in their best place according to their importance, necessary interconnection and the potential hazard involved in each step.[5]

Dr. Jeff Clanton, Director of Radio Pharmacy Services and manager of Vanderbilt University's cyclotron facility, explained various reasons that medical cyclotron manufacturing of PET drugs are located in industrial/commercial areas and do not fit residential zoning restrictions. Operation of medical cyclotrons require a good deal of space: "the typical medical cyclotron facility used to produce PET drugs today is between 3,000 and 4,500 sq. feet of dedicated space."[6]

Medical cyclotron operations have industrial-type utility support requirements that usually are not available in residential zoned areas; e.g., three-phase electric power and access to ground water for emergency cooling of the electromagnets. Commercial operation of medical cyclotrons raises zoning issues in residential areas because PET drug producers are designated by the Food and Drug Administration Modernization Act as drug/pharmaceutical manufacturers, and "Manufacturing does not fit residential zoning (utility requirements, traffic, neighborhood nuisance, potential safety issues etc.)." *Id.* p. 3.

In addition, medical cyclotron operation raises federal and state regulatory issues. Dr. Clanton confirmed that "There is currently no technology (within economic feasibility) to prevent minute releases of radioactive material during the production of PET drugs" and "The Environmental Protection Agency (EPA) and most states have very strict regulations regarding this type of radioactive material release." *Id.* p. 1

Other regulatory issues arise because of the possession and use of compressed flammable gases that cyclotron operation requires. "Cyclotron operation and some of the quality control equipment require possession and use of cylinders of compressed hydrogen, air, nitrogen, argon, a mixture containing methane and helium. Most states and municipalities have existing regulations that stipulate what type(s) of zoning may possess compressed gases of this nature and quantity." *Id.* p. 1.

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[5] *Radiological Safety Management in Medical Cyclotron Facilities*, Sentihilkumar M, Nagalaskshmi B, Manisha V. I, Pushpangadan K.D., Radiological Safety Division, AERB (India). [Appendix 5, p. 1]

[6] Dr. Jeff Clanton Response to Allan Tesche, Dec. 12, 2005. [Appendix 2]

Finally, the cyclotron produces a small amount of waste that is "highly radioactive, long-lived and must be properly disposed." *Id.* p. 2. In addition, the cyclotron will eventually have to be properly decommissioned with inspection for radioactive concrete and metal and, if found, the activated parts removed and discarded as radioactive waste." *Id.* p. 2.

Industrial or medical cyclotrons are operated safely throughout the world only because scientists and engineers devote considerable effort to their safe operation. To understand the importance the scientific and engineering community devotes to health physics and radiological safety aspects of cyclotrons, one need only review the hundreds of journal articles published in the scientific literature as of 2004. About 150 of those articles are listed in *Health Physics and Radiological Safety Aspects of Cyclotrons* NEA, 2004. [Appendix 6]

Land Use Planners Address Cyclotrons In Residential Areas

"The first principle of zoning," according to local planning consultant Don Alspach, "is the segregation of land uses to provide property owners with some reasonable assurance of what will and can occur on nearby properties.[7] In residential areas, the priority is the quiet enjoyment of one's home without the intrusion of commercial enterprises." Zoning lawyer and municipal consultant Bob Odland agrees: "Zoning ordinances were passed in cities such as New York and Los Angeles to separate residential uses from other types of uses that would interfere with a safe and healthy living environment for people of all ages. This separation of uses has increasingly been modified to provide for a more efficient and interesting living environment but remains a leading technique for preserving the integrity of residential neighborhoods."[8]

In keeping with current zoning practices in Anchorage, AO 2005-178 addresses only the location and operation of industrial or medical cyclotrons in *residential* areas, leaving untouched current regulations governing institutional or industrial districts. The ordinance before the Assembly addresses basic land use issues in a residential district, and does not attempt analysis of the specific merits of any individual project.

On review of AO 2005-178, Odland commented:

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[7] Don Alspach Letter, Dec. 4, 2005. [Appendix 1, p. 1]

[8] Robert Odland Consulting, Comments, Dec. 12, 2005. [Appendix 7]

A particle accelerator designed for medical or research work is clearly not incidental to the primary use of residential lot. It is clearly an industrial use or an accessory use to an institutional use (a hospital). I know of no municipality in the United States or Europe that would allow such a use in a residential area unless, for some reason, it was explicitly authorized by the zoning ordinance. There are many issues which argue against such a use, among which are the following:

> Safety of the nearby residents. Security of the garage and its contents against vandalism. Safety of transporting radioactive material in a residential area. Inadequate infrastructure to support such a use. Lowering of property values in the area. Inadequate expertise of city staff to monitor such a use

Don Alspach examines the requirements of AMC 21.45.160, which for home occupations, prohibit any change in the outside of the building or premises, other visible evidence of the conduct of such home occupation as well as any equipment or process which creates noise vibration, glare, fumes, odors detectable off lot, interference with radio or television receivers, or fluctuation in line voltage. The physical aspects of medical cyclotrons, their size, output of radiation, power requirements and production of hazardous waste "clearly fail to meet the intent and spirit of the home occupation and accessory land use theory" in applicable zoning. [Appendix 1, pp. 1-2] Alspach recommends passage of the ordinance.

Municipal Planning Director Tom Nelson approved a staff recommendation of December 12, 2005, for approval of the ordinance. AO 2005-178 was reviewed by the Planning and Zoning Commission on December 16, 2005. After public hearing and an extensive conversation with a proponent of a residential cyclotron, the Commission unanimously recommended approval of the ordinance.

Conclusion

Radioisotopes used to diagnose and treat disease in Anchorage are currently manufactured in cyclotrons located outside of Alaska and flown to Anchorage. Increased demand for these materials by local medical providers may support installation of Alaska's first medical cyclotron, most likely in Anchorage. Alaskans will comfortably embrace this new technology and the improvement it will bring to local health care. While medical or industrial cyclotrons operate safely throughout the world, they require trained operators, commercial electrical power, and specially equipped facilities. The practical physical aspects of these facilities suggest they are best located in industrial or institutional areas, and not in existing residential areas or as "home occupations."

As Don Alspach stated:

> The disposition of this case will either continue what we as a community accept as customary home occupations or introduce a lowered benchmark that includes the manufacturing or storage of commercial quantities of hazardous substances. I urge the Assembly to use extreme caution when evaluating this home occupation. Personally and professionally, I believe it should not be permitted.

[Appendix 1, p. 2]

Enactment of AO 2005-178 is recommended

Respectfully submitted,

Allan Tesche
Assembly member, Downtown District 1

2101 Dawnlight Court
Anchorage, Alaska 99501
December 4, 2005

Municipal Assembly
c/o Anna Fairclough, Chair
Municipality of Anchorage
PO Box 196650
Anchorage, Alaska 99519-6650

Dear Assemblymembers:

I have been made aware of a proposal to install a cyclotron in a residence in a residential zone. Presuming the operator is using either accessory use or nonconforming use zoning rules to provide the legal basis for this commercial endeavor I would offer the Assembly some observations based on my experience with zoning in Anchorage

The first principle of zoning is the segregation of land uses to provide property owners with some reasonable assurance of what will and can occur on nearby properties. In residential zones, the priority is the quiet enjoyment of one's home without the intrusion of commercial enterprises.

The zoning ordinance does recognize that traditionally there are certain commercial uses that are associated with residential uses. Usually these uses are offices or other low-intensity enterprises such as barber and beauty services, artists selling their work, and in the past doctors worked out of their homes. In zoning, all residential commercial enterprises fall into first, the category of accessory uses, and second, a specific type of accessory use – home occupation.

The zoning ordinance definition of *accessory* includes the phrase *customarily subordinate or incidental*. The key word in this cyclotron case is "customarily[1]." It is likely the cyclotron will be subordinate to the residential use, but I suspect that no one can find or substantiate that it is a customary home business. In my opinion, this cyclotron proposal overwhelmingly fails this test.

With regard to the specific home occupation standards, there are two out of the eight that should receive perhaps the most scrutiny:

> *There shall be no change in the outside of the building or premises, nor shall there be other visible evidence of the conduct of such home occupation other than one sign not exceeding one square foot in area, nonilluminated, and mounted flat against the principal building*, and

> *No equipment or process shall be used in such home occupation which creates noise, vibration, glare, fumes or odors detectable to the normal senses off the lot, if the occupation is conducted in a single-family residence or in an accessory structure. No equipment or process shall be used which creates visual or audible*

[1] It must be noted that customary home businesses vary from community to community, so in court decisions, the courts have looked at each community historically and individually to determine customary accessory uses

> *<u>interference</u> in any radio or television receivers off the premises, or causes a <u>fluctuation in line voltage</u> off the premises;* (emphasis added)

I discovered, through brief research on cyclotrons, that it is housed in a vault that has walls between 6 and 10 feet thick. The thick walls fulfill the function of keeping cyclotron radiation from leaking out and to prevent outside background radiation from leaking in. The issue then is: "Can the vault be constructed and still meet the "no visible evidence" home occupation standard?"

It also appears that cyclotrons require large amounts of electric power and require dedicated cooling equipment. The installation of this power and cooling equipment must also be evaluated against the "no visible evidence" standard. Devices that have large magnetic fields generate noise. Will the thick walls of the vault provide compliance with home occupation "no noise or vibration" standard?

I also found that when a cyclotron is removed, the vault must go through a decommissioning process that includes demolition and disposal of the radiation saturated vault walls. The radioactive waste must be handled properly and sent to a facility authorized to accept such waste products. A home occupation that produces hazardous waste and byproducts would, in my opinion, clearly fail to meet the intent and spirit of the home occupation and accessory land use theory.

As an alternative, I understand the property owner is claiming that he has nonconforming rights to operate the cyclotron and other commercial devices on his residential property. In order to make such a claim the business must predate the residential zoning for the area. If my memory serves me, South Addition was zoned residential in the late 1940's or early 1950's, so the business would have to have been in place and operating then to be entitled to nonconforming rights. The documented nonconforming land use or use of structure would be for a commercial or industrial use and not a home occupation. Expansion of a nonconforming use is prohibited by our zoning ordinance. A change from one nonconforming use to another requires the Zoning Board of Examiners and Appeals to concur. If the property owner persists, he should be asked to produce the written documentation to back up his nonconforming rights claim.

Finally, notwithstanding any valid nonconforming rights claim, the disposition of this case will either continue what we as a community accept as customary home occupations or introduce a lowered benchmark that includes the manufacturing or storage of commercial quantities of hazardous substances. I urge the Assembly to use extreme caution when evaluating this home occupation. Personally and professionally, I believe it should not be permitted.

Sincerely

Donald S. Alspach

Response to questions forwarded by Allan Tesche
Jeff Clanton Dec. 12, 2005

1.Where are medical or industrial cyclotrons typically located: in residential, industrial, or commercial areas or within institutions such as universities or hospitals, and why?

Medical or self-shielded PET cyclotrons are typically located in hospitals, medical centers and commercial/industrial areas for several reasons. The rationale for hospitals and medical centers is simply for the ready access to the PET pharmaceuticals produced by the cyclotron. In addition to the production of F-18 which has a 109 minute half-life, these cyclotrons can also produce C-11 (20 minute half-life), N-13 (10 minute t1/2) and O-15 (2 minute t1/2). N-13 and O-15 have such short half lives that they cannot be produced and transported. They must be produced, administered and scanned on site.

The except for ceiling height requirements (11 – 12 feet), rationale for locating a medical cyclotron in an industrial/commercial area can be best segregated into three areas:

a) *Utility support* – A cyclotron requires 35 – 110 KVA of three phase electrical power not usually available in an area zoned residential. Additionally, if the user of the cyclotron ever desired to use ground water to cool the electro magnets in an emergency (would seem especially feasible in Alaska) the incoming water line would need to be greater than 1inch. This type of support is generally unavailable in an area zoned for retail business and/or residential use.

b) *Zoning issues* – According to the Food and Drug Administration Modernization Act (FDAMA) of 1997, all producers of PET drugs are designated as drug/pharmaceutical manufacturers and as such must adhere to the proposed regulations found in 21 Code of Federal Regulations (CFR) part 212. Because PET cyclotron facilities are designated as pharmaceutical manufacturers, most municipalities have zoning restrictions regarding 'manufacturing'.

c) *Regulatory issues* - There is currently no technology (within economic feasibility) to prevent minute releases of radioactive material during the production of PET drugs. The Environmental Protection Agency (EPA) and most states have very strict regulations regarding this type of radioactive material release. The EPA uses a complex formula to calculate the absolute amount of radioactivity a PET manufacturer can safely release annually. At the heart of these calculations are distance from the nearest residential building and prevailing winds. Therefore, when planning a site location it is in one's best interest to locate as far as possible from a residence to allow the greatest regulatory advantage.

Included in the regulatory issues are the possession and use of compressed flammable gases. Cyclotron operation and some of the quality control equipment require the possession and use of cylinders of compressed hydrogen, air, nitrogen, argon, a mixture containing methane and helium. Most states and municipalities have existing regulations that stipulate what type(s) of zoning may possess compressed gases of this nature and quantity.

In addition, most states have regulations that require devices like a cyclotron be permitted (based on site location, device and owner experience). You might want to contact your state office to inquire (could relieve the need to promulgate specific zoning restrictions)

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App. 2

2. Is it feasible to locate and operate a medical cyclotron such as a Scandatronix MC-16 within an enclosed area no greater than 500 sq. feet? What floor area do medical cyclotrons of that type typically require for the machine itself, shielding, and equipment?

Most self-shielded cyclotrons today can be physically located in an appoximate 500 sq foot area. However, this is just the cyclotron, shielding and support cabinets. It does not include an operators room, chilled water facility, maintenance, parts or any space for PET drug manufacturing, quality control, dispensing and shipping. The typical medical cyclotron facility used to produce PET drugs today is between 3,000 and 4,500 sq feet of dedicated space. The cyclotron is just a small part of the overall manufacturing space needed.

The Scandatronix MC-16 is an older machine that was delivered (to my knowledge) exclusively as an 'unshielded' device. Because the cyclotron is unshielded the facility that the cyclotron is located must be shielded Typical for this type installation are 4 foot thick concrete walls with an offset leading to the door usually shaped like a bank vault door. This type of cyclotron was expensive to install due largely to construction costs. Older cyclotrons of this nature can be 'self-shielded' with the use of properly designed tanks that are filled with specially formulated water. This would probably require 4 to 8 tanks that interlock and can hold in excess of 1,000 gallons of water each. Like other self-shielded cyclotrons made today, the floor then becomes the critical construction link. The minimum depth recommended is 20 inches, most manufacturers use 30 inches of concrete in the floor to support the cyclotron and shielding.

General Electric (GE) distributes a cyclotron built by Scandatronix today very similar to the MC-16 available with optional self-shielding tanks. GE's shielding tanks are mobile with the use of 'air bearings' so that the shielding can be moved for maintenance and repair This gives the construction a new level of complexity as the floor has to be almost perfectly level without imperfection. The necessity for the shielding to move is the reason why, what seems like a relatively small device must live in a minimum 506 sq foot home The shielding must move away from the cyclotron on all sides and allow adequate space for a person to comfortably work on the machine.

3. If shielding is inadequate or operational safety protocols not followed, what risks are faced by people living or working around the facility and in what geographic area?

The greatest risk when working with radiation of any type is to those closest to the radioactive material. In this case as in most, the greatest risk would be to the workers in the facility. The Nuclear Regulatory Commission (NRC) and most states have very strict limits as to the amount of radiation workers can receive annually and how much exposure the public may receive as a result of the operation Most states and the NRC are very diligent to see that these regulations are strictly enforced. That is why the nuclear industry is one of the safest occupations in the nation.

4. Do medical or industrial cyclotrons produce emissions of any kind - waste heat, gasses, radiation, particulate matter, wastes, or by products, including radioactive materials? If so, how are these emissions handled?

As described in question 1c, under the best of circumstances, cyclotron facilities will release very small quantities of radioactive material when in operation. These are all very short lived isotopes and pose little risk in the correct environment. The cyclotron does produce long lived radioactive waste in the targets that are bombarded to produce the desired isotopes. These long lived waste products will have to be disposed of on a regular basis using a properly licensed and bonded radioactive waste disposal company. The amount of waste generated is small (usually less than a cup full in a 6 month period) but is highly radioactive, long-lived and must be properly disposed.

Another potential issue will occur when a cyclotron ceases to be useful (or the company goes out of business). Dependent upon the method of shielding it is feasible that portions of the concrete and metal rebar (used to reinforce the concrete) can be activated and made radioactive. Should this occur, the affected concrete would have to be removed and discarded as radioactive waste. The cyclotron will have metal parts that are activated as well and must be disposed using a licensed disposal company. Some states require a 'decommissioning bond' in the amount estimated to properly decommission the facility in the event the company is insolvent at the time the cyclotron is removed.

All other waste generated would be typical of small drug manufacturing facilities (e.g. waste paper, organic solvents, etc)

5. Are there hazards associated with vehicular transportation of radioisotopes such as exposures resulting from accidents and if so, what precautions are normally taken?

Anytime an object is transported by road, rail or air, there is the potential for accidents. Currently, the PET drugs required by the hospitals in Anchorage arrive by air transport and are driven by dedicated couriers to the hospitals or clinics that use them. The Department of Transportation (DOT) has strong regulations regarding this type of hazardous material transport in 49 CFR (the Federal Aviation Agency - FAA has complimentary regulations for air transport). The regulations start with the shipping containers. The shipping containers for this type radioactive shipment are designated as Type 7A and must be able to survive a list of traumatic events (e.g. dropping from 30 feet after a thorough soaking with water). The containers must be blocked and braced when shipped to keep them from moving. Additionally, drivers must be trained and appropriate shipping documents accompany each shipment. Yes, accidents do occur (deer strikes, car gets rear ended in fog on interstate, driver falls asleep, etc.) and occasionally the containers burst if the severity of the accident is high. However, because the container has only one or two patient doses inside there is generally little risk due to the radiation.

These containers are relatively bulky and weigh from 50 to 80 pounds and can often hold only one patient dose. Just the shipping containers can take up a substantial amount of floor space.

6. If local laws allow medical cyclotrons in other districts such as those zoned for industrial, commercial or institutional purposes, are there valid reasons to prohibit these machines in residential areas or as "home occupations?" If so, please explain them.

All of the reasons listed in (1) of this document would apply in this regard. Unfortunately, in my opinion, exact legislation is often too restrictive and at times ineffective in future situations. It would seem that if an eccentric physicist would like to have a particle accelerator or cyclotron in his basement as a source of enjoyment and pride, and can meet all state and federal regulations required to own and operate the equipment, it should be allowable. However, should an individual wish to create a business that manufactures radioactive drugs and ship them to multiple institutions, this is quite a different scenario. The first scenario is residential use. The second is placing a manufacturing facility in a residential area. Manufacturing does not fit residential zoning (utility requirements, traffic, neighborhood nuisance, potential safety issues, etc).

7. Can you refer me to any journal article(s) available on the web which might shed light on the question of whether medical cyclotrons can be or should not be located within residential areas?

http://www.carroll-ramsey.com/ - good informational website especially regarding decomissioning

http://www.advancedcyclotron.com/services.html#planning reasonably good pictures to get an idea of space required

http://www.gehealthcare.com/company/docs/siteplanning.html#nmp this link will enable you to obtain a copy of GE's Installation manual. Figure 2.2 on page 36 provides an illustration of a shielded installation. Page 38 provides the minimum room dimensions for cyclotron site planning. Additional tables provide GE's estimate for minimum space required for radiopharmaceutical manufacturing (Hot Lab) and Quality control

CardinalHealth

December 8, 2005

Mr. Allan Tesche
Anchorage Assembly
510 L Street, Suite 300
Anchorage, AK 99501

Dear Mr. Tesche,

I understand your concern over Al Swank's proposal to open and operate a commercial cyclotron in a residential area and would like to clarify our involvement with him.

Mr. Swank contacted me in May 2005 to discuss a possible distribution agreement where he would produce bulk FDG with a cyclotron he purchased from John Hopkins University. The bulk material would be transported to our Cardinal Health nuclear pharmacy where it would be dispensed to health care facilities in patient specific unit dose form.

We indicated to Mr. Swank that we would only enter into a distribution agreement if his production process and final product met Cardinal Health standards as well as state and federal regulations. In addition, we wanted to make sure Mr. Swank's cyclotron was fully functional and producing material before resuming discussions on a distribution agreement. Currently, we have not entered into any type of verbal or written agreement with Al Swank.

Cardinal Health owns and operates a network of 16 cyclotrons throughout the United States. We work very closely with state and federal agencies including the NRC, DOT and FDA to ensure compliance with regulations. We typically require at least 2,000 sf of space to set up a cyclotron facility and locate our facilities in light industrial areas at least 1,000 feet from schools, churches, food services and residential buildings.

I hope this provides more insight into our association with Mr. Swank. Please let me know if you have any additional questions.

Sincerely,

Kevin Fong
Zone Operations Director
Cardinal Health Nuclear Pharmacy Services

PO Box 470517 • San Francisco, CA 94147 • 415 922 2444 Office • 614 652 4743 Fax

App. 3

A RADIOLOGICAL SAFETY AND HEALTH PHYSICS DATABASE FOR CYCLOTRONS ACCELERATING PROTONS AND DEUTERONS UP TO 250 MEV

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E. Sartori, OECD NEA Data Bank, 12 Bd. des Iles, 92130 Issy-les-Moulineaux, France

Abstract

An excess of 230 cyclotrons are at present in operation in many countries of the world. The majority of these cyclotrons are meant for basic scientific and technological research and advanced medical applications, such as the production of short-lived PET and longer-lived SPECT radiopharmaceuticals, as well as radiotherapy of tumours. Intense fields of ionising radiation are produced during the operation of cyclotrons. Today's cyclotron professionals often have to solve a diverse radiological safety and decision-making related tasks, which require a tedious and time consuming reference search and computation of intricate engineering/technical problems. Hence, as a practical problem-solution aid and scientific compendium, a hyperlinked database (NEA-1694 SATIF/CYCLO-RADSAFE) of scientific and technical reference work encompassing all major radiological safety related issues of cyclotrons has been developed. The main goal of this paper is to introduce the latest version of the database to the cyclotron user communities.

INTRODUCTION

Dr. Ernest Orlando Lawrence of the University of California in Berkeley, USA, invented the cyclotron in 1929. From its nascent stage until the 1950s the cyclotrons were the vital instruments of early nuclear physics and the predecessors of modern high-energy particle accelerators [1]. The significance of the radiological safety aspects of cyclotrons was well recognised by early days cyclotron experts. Consequently, they carried out a series of important research work in the relevant fields, which later gave birth to a new vocation, the Accelerator Health Physics [2].

Modern cyclotrons are capable of accelerating protons (^{1}H-) and deuterons (^{2}H-) to a wide-ranging application-specific energy and beam current levels. These machines are now vital to applied science and cutting edge environmental and medical research. There are at present in excess of 230 cyclotrons in operation in the world [3] and about 30 new units are planned (Figure 1). Noticeably, the largest number of cyclotrons operating today belongs to the category of low-energy (E < 20 MeV) machines primarily used for the production of high activities of short-lived medical radioisotopes.

These special types of cyclotron accelerating intense beams of protons (H^-) and /or deuterons (d^-) are known as "medical cyclotron". Most medical cyclotrons are installed in urban hospitals and nuclear medical clinics and are usually open to members of the public, including patients and children. During routine radioisotope production operation of the medical cyclotrons intense fields of gamma rays and high-energy neutrons as well as high levels of gaseous radioactive effluent are generated. Thus, the reign of a sound operational health physics and efficient radiological protection measures are vital to safe operation and public acceptance of medical cyclotron facilities [4]. Obviously, the same operational safety aspects including the amendments for high-energy options are mandatory for cyclotrons operating at higher energies (Figure 1).

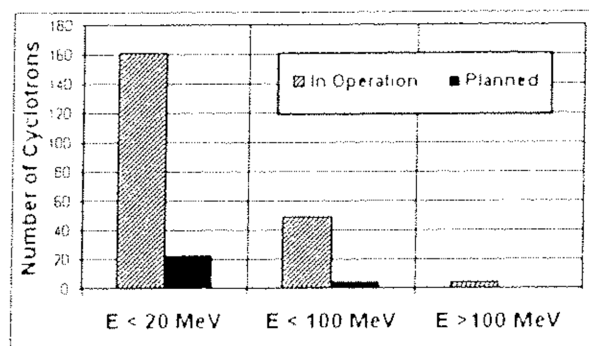

Figure 1. Bar graph showing the number of cyclotrons of different acceleration energy levels presently in operation and under the planning stage.

The modern industrial and medical cyclotron establishments have to comply with the varying work environment and operational conditions, such as (a) frequent installation of new cyclotron components, (b) dismantling (radio-) activated parts, (c) modification or undertaking of custom design of radiological shielding and (d) management of solid and liquid waste and (e) calculation of accidental radiation exposure.

Specialist knowledge of accelerator health physics and radiation dosimetry is imperative to tackle the above tasks and the responsible officer often has to carry out tedious and time-consuming information research. Hence, as an essential aid to those cyclotron physicists/engineers a hyperlinked information search database [5] concerning all major radiological safety aspects of industrial and medical cyclotrons has been developed. The other major objective of this database is to introduce the valuable early work on radiological safety of cyclotrons to today's radiation protection community [6].

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App. 4

THE RADIATION ENVIRONMENT

During routine cyclotron operation, i.e. target bombardment for radioisotope production or an unexpected beam loss when the defocused ion beam accidentally hits the internal wall of the beam tube, high levels of prompt neutron and gamma rays are generated. The prompt fast neutrons slow down via multiple scattering with the vault (containment) wall, bounce back to the centre of the vault, thereby activating the cyclotron parts, including the beam tubes, focusing magnets, target (irradiation) chambers, ducts and pipes and other ancillaries. These situations may cause radioactive contamination of skin and whole-body (external) exposure to persons working in the vault. On the other hand, the radioactive noble gas ^{41}Ar (half-life = 1.8 h) produced by the neutron capture (n,γ) reaction with ^{40}Ar present in the vault air may cause whole-body (external) inhalation (internal) radiation exposure.

The prompt gamma and neutron radiation may escape to the external environment through an inadequately shielded cyclotron/target vault, producing direct radiation exposure. In particular, the neutrons penetrated through the vault roof reach a long distance via multiple scattering with the nitrogen and oxygen molecules in air causing low-level exposure via the skyshine radiation. The generic flow chart explaining various major radiation production and corresponding exposure pathways of cyclotrons is shown in Figure 2. The exposure modalities and the associated radiological safety aspects of cyclotrons as described above constitute the main search criteria of a recently published database [5] dealing with the health physics and radiological safety of cyclotrons.

SATIF/CYCLO-RADSAFE DATABASE

The Cyclotron Radiation Safety Database (SATIF/CYCLO-RADSAFE) described in this paper is based on 15 hyperlinked key words (Table 1) dealing with various radiological safety-related issues of a wide range of modern cyclotrons. The key words used in this database are explained below.

Cyclotron classification (key words 1, 2, 3)

The cyclotrons are classified into three energy level categories, a) low-energy cyclotron (E < 20 MeV) for short-lived positron emission tomography (PET) radioisotope production, b) medium-energy cyclotron (E < 100 MeV) for longer-lived single photon emission computer tomography (SPECT) radioisotope production and industrial applications and c) high-energy cyclotron (E > 100 MeV) for radiotherapy of deep-seated tumours. The energy and intensity of the secondary neutron and gamma radiation field produced by a cyclotron primarily depend on the energy of the accelerated ion beam, ion beam species (i.e. proton, deuteron alpha particle) and the atomic weight of the target (beam interaction) material.

Table 1. Showing the keyword ID (KWID) including KW description used in SATIF/CYCLO-RADSAFE database. The number of literature entries for each keyword is also shown.

KWID	Key word description	Entries
1	Low-energy cyclotron (E < 20 MeV)	39
2	Med.-energy cyclotron (E < 100 MeV)	79
3	High-energy cyclotron (E > 100 MeV)	44
4	Shielding material	93
5	Source term	139
6	Monte Carlo (shielding) calculation	36
7	Deterministic (shielding) calculation	43
8	Duct and mazes	21
9	Optimisation technique	8
10	Skyshine	16
11	Dosimetry and Spectrometry	128
12	Radioactive effluent	23
13	Components and shielding activation	31
14	Waste management	19
15	Instrumentation and Control System	10

Shielding Materials and Source-Terms (key words 4,5)

The intensity and energy distribution (spectrum) of a radiation field (generated by beam interaction) at unit distance (1 m) from its production point is defined as a source term. For the purpose of cyclotron shielding calculation one requires the source term and the attenuation characteristics of the shielding material. The most popular shielding material is heavy concrete. However, the shielding attribute of the concrete is enhanced with the inclusion of thermal-neutron absorbing material, such as boron carbide (B_4C). Ultra compact radiation shield made of sophisticated composite materials are now used in self-shielded medical cyclotrons. Evidently, for a reliable shielding design the mechanical and structural properties of shielding material should also be taken into account.

Shielding calculations, Duct & Mazes and Optimisation technique (key words 6, 7, 8, 9)

Monte Carlo (stochastic) simulation and various deterministic (analytical) shielding calculation techniques have been reported. These calculation methods are used to estimate the shielding wall thickness, dimension of various types of mazes and ducts, estimate the skyshine radiation and to optimise the shielding parameters. The availability of fast personal computers with large memory capacity enables the health physicist to simulate dimension of a complex shielding geometry using Monte Carlo (MC) codes. However, the MC code data output may suffer severe pitfalls even in case of minor mistakes in input data including the assignment of shielding geometry. The deterministic shielding calculation methods are based on a simple neutron attenuation model (Moyer Model) producing sufficiently accurate results

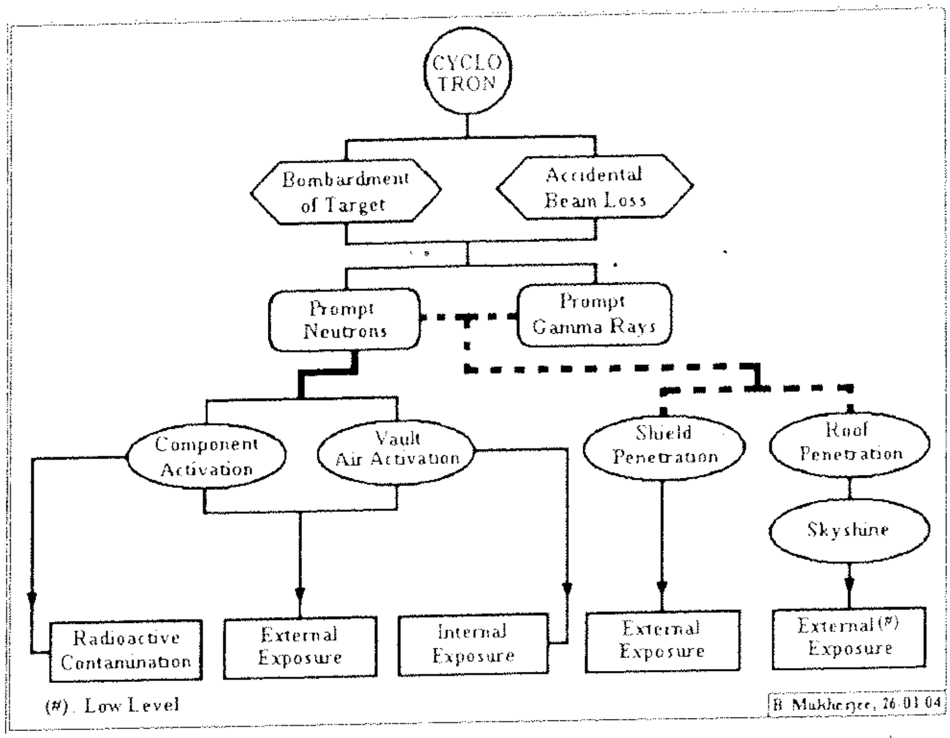

Figure 2 A generic chart showing the radiation production and associated radiological exposure pathways of cyclotrons designated for industrial and fundamental research and medical applications

Dosimetry & Spectrometry and Skyshine (key words 10, 11)

In the database various computational and experimental methods for the assessment of neutron and gamma dose distribution and the energy spectra of cyclotron-produced radiation fields, including neutron and gamma skyshine have been documented Such information is vital to determining the efficacy of the radiological shielding of the cyclotron facilities and various radiation safety, public health and exposure analysis related topics

Radioactive effluent, Activated parts and Waste management (key words 12, 13, 14)

Activities of gaseous radioactive effluent, solid and liquid radioactive waste produced by cyclotrons, in particular the radioisotope production facilities, play a vital role as regards compliance with the radiation safety regulations imposed by the statutory bodies, as well as public acceptance of cyclotron laboratories The management of radioactive waste plays a crucial role in safe and profitable operation of commercial cyclotrons

Instrumentation and Control (keyword 15)

Instrumentation and Control systems based on sophisticated microelectronic devices are essential for the monitoring of various operational parameters including the radiation exposure levels of the modern cyclotron The smart, computer driven radiation, stack emission and effluent monitoring systems are indispensable for assuring the safe and economic cyclotron operation

SUMMARY AND CONCLUSION

A hyperlinked database (SATIF/CYCLO-RADSAFE) on health physics and radiation safety-related information of a broad range of industrial and medical cyclotrons is available form OECD-NEA Databank The database includes a large collection of scientific literature of various researchers and technologists over the past forty-year period [6], aiming to provide cyclotron health physicists or engineers with valuable information to solve a myriad of scientific, technical and decision-making problems

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RADIOLOGICAL SAFETY MANAGEMENT IN MEDICAL CYCLOTRON FACILITIES

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Abstract

A new era of Nuclear Medicine diagnosis has started with Medical Cyclotron technology Medical Cyclotron produces positron emitters, which can be used in molecular imaging of the organs In Medical Cyclotron, particles such as protons, deuterons are accelerated and made to bombard with suitable target material to produce radioisotopes, which are positron emitters The positron emitters are produced by the (p,α), (p, n) or (d, n) reaction The neutron activation of the surrounding medium draws the major attention in radiation safety

The license for such medical cyclotron facilities is issued by Atomic Energy Regulatory Board in India on the basis of regulations drawn from Radiation Protection Rules 1971 promulgated by Govt of India under Atomic Energy Act, 1962

In this paper, the following aspects i) the steps involved in cyclotron installation ii) Design, Operational specifications and other features of various medical cyclotrons iii) Regulatory requirements for a cyclotron installation have been discussed

Analysing various factors before installation can extend long time usability of a medical cyclotron installation The factors include the site selection, appropriate safe layout plan of the installation, checking the performance of the unit and carrying out the pre commissioning survey

The main features and major operational specifications of the different commercial medical cyclotrons available in the field are discussed in this paper

All the regulatory requirements have to be met for any radiation installation The unit should be design approved and installed in approved premises A Preliminary Safety Analysis Report (PSAR) from radiological safety standpoint has to be furnished by the user for every installation This report (PSAR) should detail all the factors like seismic condition of the site, soil composition, weight baring capacity, layout plan of installation with design, structural shielding, operational safety features, the method of radioactive waste (solid, liquid& gas) disposal and safety guidelines for decommissioning

INTRODUCTION

The use of positron emission tomography in to clinical practice led to increase the number of medical cyclotrons (PET radioisotope production centres) Medical cyclotrons produce various short-lived positron emitting radioisotopes listed in table (1) with their nuclear target reaction The modern cyclotron employs the mechanism of accelerating negative ions and highly efficient beam extraction therefore the beam intensity is much higher than that of positive ion accelerators It increases the yield of radioisotope

The high radioactivity generated by the cyclotron and chemistry systems necessitate maximum radiation safety to reduce the risk to the operational staff, public and environment

THE STEPS INVOLVED IN CYCLOTRON INSTALLATION

Site selection

Site selection has to be looked out in the perspective of minimizing potential hazard to the public, worker and unit The location should not add any risk to the public During site selection the domestic nature of the site, the level of occupancy, the tallest buildings nearby and their occupancy, any other source of risk to the public in the site, seismic condition, soil composition of the site, weight baring capacity has to be taken in to account The soil composition helps to analyse soil activation in the long run

Design approval

After site selection, the design approval of lay out plan comes as the second step The lay out plan suggested by manufacturer for the particular unit according to the unit dimension has to be followed with the enough working space and with the necessary accessory modules nearby

In the case of medical cyclotrons lay out plan should be in such a way that the cooling mechanism, gas storage room, control electronics, control station, the chemistry module for chemical synthesis has to be in properly planned in their best place according to their importance, necessary interconnection and the potential hazard involved in each step

The path of radioisotope transfer from the target to chemistry module needs to have better plan This is one of the major factors to give high potential operational exposure to the workers The distance between the radionuclide delivery lines run from the cyclotron targets into hot cells should be minimized to reduce the radioactivity transit time and loss of radioactivity inside the tube There should be a good communication system between the cyclotron control and chemistry module

App. 5

Structural shielding for the unit location and each module has to be derived to be within the permissible dose limits prescribed by the Atomic Energy Regulatory Board. The dose limits are specified in Table (2). The vault structural shielding issues are very complex, it has to be worked out for the unit specified neutron dose rate and gamma dose rate.

Table 2 Dose Limits

Installation

Members	The cumulative effective dose over a block of five years	In any calendar year during the five-year block
Radiation workers	100 mSv	30 mSv
Public		1 mSv

Before installation a license has to be obtained from the competent Authority, AERB by submitting PSAR. The regulatory requirements will be discussed separately in this paper. After design approval the installation of the type approved medical cyclotron will be the next step then commissioning of the unit. After commissioning the performance of the unit has to be checked as a trial run. Then the unit will be used for routine purpose.

DESIGN, OPERATIONAL SPECIFICATIONS OF VARIOUS MEDICAL CYCLOTRONS

There are variety of medical cyclotrons are available in the market with different specifications. The medical cyclotrons can be classified in two ways one is self shielded units other one is unshielded unit.

There are four major vendors in the market IBA, GE, CTI-Siemens, and EBCO. In India the first medical cyclotron (GE-PET TRACE) installed in RMC, Mumbai.

There are certain advantages and disadvantages in self-shielded machine versus unshielded unit. The unshielded unit has great accessibility for maintenance but it has more space requirement. The self-shielded unit has limited access for maintenance and efficient usage of space. In radiation safety point of view the self-shielded unit needs less structural shielding compare to unshielded one.

Comparison table will be given in detail in the paper to analyse the cyclotron unit specifications and operational specifications. The parameters such as Proton energy MeV, Proton beam current μA, Deuteron Energy MeV, Acceptable Energy spread, Beam Direction at target, Beam Lines, Area Required, Wall Thickness, Shield Configuration, Self Shielding, provided Safety Interlocks, Ventilation Required, Target Max. Beam size at target, Vacuum Pumping system, Type of Extraction, Total Power consumption is tabulated.

Table-1 The list of PET radioisotopes

Radio Isotope	Target Reaction	Average positron energy	Half Life
^{11}C	$^{14}N(p,\alpha)^{11}C$	385 KeV	20.4 min
^{13}N	$^{16}O(p,\alpha)^{13}N$	491KeV	10 min
^{15}O	$^{14}N(d, n)^{15}O$	735KeV	2 min
^{18}F	$^{18}O(p, n)^{18}F$	242KeV	110 min

REGULATORY REQUIREMENTS FOR A CYCLOTRON INSTALLATION

Any radiation installation in the country needs to comply with regulatory requirements, which is enforced by competent authority, The Chairman, AERB under RPR 1971.

To import any new unit to the country, the manufacturer needs to get a No Objection Certificate (NOC) from the competent authority. The NOC can be issued on the basis of specifications of the unit given by the manufacturer and the certification from the regulatory body of the country of origin.

From the user side, the proposed unit has to be cleared by the qualified expert, the layout plan of installation has to be cleared by the qualified expert. A Preliminary Safety Analysis Report (PSAR) should be submitted to the AERB. The PSAR should contain i) site approval ii) layout design approval iii) The unit specifications iv) the maximum operational limits and the facility limitation v) safety interlocks in corporate with the unit vi) waste disposable methods and management of different kind of wastes (solid, liquid & gas) generated by the unit vii) Guidelines for decommissioning the unit. The paper will detail the need and importance of the each factor.

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Original Message-----
From: Bob Odland [mailto:bob@robertodland.com]
Sent: Mon 12/12/2005 3:12 PM
To: Tesche, Allan
Cc:
Subject: RE: Comment on legislation limiting industrial cyclotrons to non residential areas

Assemblyman Tesche,

My comments on the message you sent me:

Zoning ordinances were passed in cities such as New York and Los Angeles to separate residential uses from other types of uses that would interfere with a safe and healthy living environment for people of all ages. This separation of uses has increasingly been modified to provide for a more efficient and interesting living environment but remains a leading technique for preserving the integrity of residential neighborhoods.

Absent explicit provisions in the development code (zoning ordinance), non-residential uses have been very limited in residential areas. Both accessory uses and home occupations (a type of accessory use) have been traditionally limited to a use that is incidental to the primary use (residential). Not only must the use be incidental, it must be customarily incidental.

Many zoning ordinances do not list prohibited accessory uses or home occupations. Instead, they rely on the incidental criterion and, sometimes, on performance standards. When there is some question about whether a non-primary use is authorized, the inclination is to prohibit it in a residential area in order to protect the safety and welfare of the surrounding residents.

A particle accelerator designed for medical or research work is clearly not incidental to the primary use of residential lot. It is clearly an industrial use or an accessory use to an institutional use (a hospital). I know of no municipality in the United States or Europe that would allow such a use in a residential area unless, for some reason, it was explicitly authorized by the zoning ordinance.

App. 7

There are many issues which argue against such a use, among which are the following:

- Safety of the nearby residents
- Security of the garage and its contents against vandalism
- Safety of transporting radioactive material in a residential area
- Inadequate infrastructure to support such a use
- Lowering of property values in the area
- Inadequate expertise of city staff to monitor such a use

It should be noted that, under zoning law, operating a use in the past does not confer any right to operate it in the future unless the use was at one time legal at the particular location. A non-conforming use may be continued only if it was a legal use at some point before the regulations were changed. Also, even if a prior particle accelerator had been legally installed in the garage (an unlikely event), the proposed device would be a substantial expansion of the non-conforming use, something that is almost always prohibited. In any case, the city can prevent a non-conforming use, or any use for that matter, if it is a public nuisance - a strong case can be made that this use would be such a nuisance.

I hope this is helpful.

Bob Odland

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Municipality of Anchorage
MUNICIPAL CLERK'S OFFICE
Agenda Document Control Sheet

AM 18-2006

(SEE REVERSE SIDE FOR FURTHER INFORMATION)

1	SUBJECT OF AGENDA DOCUMENT AO 2005-178, PARTICLE ACCELERATORS (CYCLOTRONS) IN RESIDENTIAL DISTRICTS	DATE PREPARED 1/6/06
		Indicate Documents Attached ☐ AO ☐ AR ☒ AM ☐ AIM
2	DEPARTMENT NAME Assembly	DIRECTOR'S NAME Anna Fairclough, Chair
3	THE PERSON THE DOCUMENT WAS ACTUALLY PREPARED BY SUSAN LUTZ - ASSEMBLY COUNSEL'S OFFICE	HIS/HER PHONE NUMBER 343-4572

4	COORDINATED WITH AND REVIEWED BY	INITIALS	DATE
	Mayor		
	Municipal Clerk		
	Municipal Attorney		
	Employee Relations		
	Municipal Manager		
	Cultural & Recreational Services		
	Fire		
	Health & Human Services		
	Merrill Field Airport		
	Municipal Light & Power		
	Office of Management and Budget		
	Police		
	Port of Anchorage		
	Public Works		
	Solid Waste Services		
	Transit		
	Water & Wastewater Utility		
	Executive Manager		
	Community Planning & Development		
	Finance, Chief Fiscal Officer		
	Heritage Land Bank		
	Management Information Services		
	Property & Facility Management		
	Purchasing		
	Other		

2005 JAN -6 AM 10:30
CLERK'S OFFICE
MOA

5 **Special Instructions/Comments**

CONTINUED PUBLIC HEARING REF. AO 2005-178

6	ASSEMBLY HEARING DATE REQUESTED 1/10/06	7	PUBLIC HEARING DATE REQUESTED 1/10/06