

Emission Unit ID: 412

300 EP-331-01-V

EP-331-01-V

This is a MAJOR, ACTIVELY ventilated emission unit.

331 LIFE SCI LAB

Emission Unit Information

Stack Height: 62.00 ft. 18.90 m. Stack Diameter 6.50 ft. 1.98 m.

Average Stack Effluent Temperature: 76 degrees Fahrenheit. 24 degrees Celsius.

Average Stack Exhaust Velocity: 28.00 ft/second. 8.53 m/second.

Abatement Technology ALARACT WAC 246-247-040(4)

state only enforceable: WAC 246-247-010(4), 040(5), 060(5)

Zone or Area	Abatement Technology	Required # of Units	Additional Description
1	Fan	1	1 of 2 fans operating
1	HEPA	1	Required for room or hood where dispersible material is used
2	Fan	1	1 of 3 fans operating
2	HEPA	1	Required for room or hood where dispersible material is used

Monitoring Requirements

state enforceable: WAC 246-247-040(5), 060(5), and federally enforceable: 40 CFR 61 subpart H

Federal and State Regulatory	Monitoring and Testing Requirements	Radionuclides Requiring Measurement	Sampling Frequency
40 CFR 61.93(b)(4)(i) & WAC 246-247-075(2)	Appendix B, Method 114(3)	Each radionuclide that could contribute greater than 10 percent of the potential-to-emit TEDE	Continuous

Sampling Requirements Record Sample

Additional Requirements

Additional monitoring or sampling requirements established by this License will be listed in the Conditions and Limitations section, if applicable.

Operational Status This 62 foot tall stack exhausts filtered building ventilation air. Particulate emissions are sampled. The mission of the 331 Building is to conduct fundamental science and to develop environmental technology. Research activities conducted in the 331 Building support the Hanford Site environmental mission and other key DOE missions of national and international importance. Research activities performed within the 331 Building include the use of radioactive materials. Laboratory processes are conducted "continuously" (i.e., year round, during normal business, swing shift, night shift, and weekend hours). The 331 Building provides research capabilities to study the interactions of chemicals and radionuclides with plants, animals, and microorganisms and the fate of chemicals and radionuclides in the environment. The building also has research capabilities for conducting studies on the uptake and transformation effects of radioactive material and chemicals in soils, plants, animals, and microorganisms.

This Emission Unit has 1 active Notice(s) of Construction.

Project Title	Approval No	Date Approved	NOC_ID
Life Sciences Laboratory-1 (331 Building)	AIR 06-665	7/5/2006	710

Conditions (state only enforceable)

- 1) The total abated emission limit for this Notice of Construction is limited to 9.10E-02 mrem/year to the Maximally Exposed Individual (WAC 246-247-040(5)).
- 2) This approval applies only to those activities described below. No additional activities or variations on the approved activities that constitute a "modification" to the emission unit, as defined in WAC 246-247-030(16), may be conducted.

The mission of the 331 Building is to conduct fundamental science and to develop environmental technology. Research activities conducted in the 331 Building support the Hanford Site environmental mission and other key DOE missions of national and international importance. Research activities performed within the 331 Building include the use of radioactive materials. Laboratory processes are conducted “continuously” (i.e., year-round, during normal business, swing-shift, night-shift, and weekend hours). The 331 Building provides research capabilities to study the interactions of chemicals and radionuclides with plants, animals, and microorganisms and the fate of chemicals and radionuclides in the environment. The building also has research capabilities for conducting studies on the uptake and transformation effects of radioactive material and chemicals in soils, plants, animals, and microorganisms.

The inventory of radioactive material in the building can include gram quantities of fissionable materials and up to curie quantities of other radionuclides. The laboratory activities conducted in the 331 Building include:

- Experimental studies with molecular and cellular processes.
- Studies to determine precise cross-species and low-dose extrapolation of health risks and to understand disease mechanisms.
- Basic and applied research concerning microorganisms and/or their processes in various environments.
- Subsurface microbiology including the physiology and ecology of subsurface microorganisms, degradation of organic contaminants and bioremediation, enzymatic reductions of metals, and biogeochemical cycling of nutrients.
- Studies investigating macromolecular structure and dynamics and consequences of observables on molecular function.
- Development of instrumentation and analytical methods.
- Development of comprehensive environmental monitoring programs.
- Development of advanced scientific and technological solutions for long-term stewardship of waste sites.
- Waste management activities including satellite accumulation areas and <90 day storage areas.
- Characterizing and monitoring aquatic and terrestrial ecosystems including the development and monitoring of new technologies and methods.
- Studies of impacts of water use practices on fisheries and wildlife and the response of the ecosystems to engineered structures and natural and man-induced stresses.
- Activities involving nuclear process engineering, radiomaterials characterization, and radiochemical separations and processing.
- Studies of the health effects of chemical and radiation exposure on animals (rodents) and in cells grown in culture.
- Examining the uptake and transformation effects of radionuclides in soils, plants, animals and microorganisms.
- Studies with radioactive tracer materials in biological and non-biologic systems.
- Research to promote the understanding of the chemical and biological processes that govern the mobility and degradation of a range of inorganic, radionuclide and organic contaminants in soils, sediments, and ground water systems.
- Measurements of exposures to physical, radiological, and chemical agents.
- Developing technology for the separation, purification, production, and delivery of radioisotopes (e.g., for medical purposes, and standards development).
- Research and laboratory activities that may include processes where the temperature may be equal to or exceed 100°C.
- Research activities involving mixed activation products (MAP) and mixed fission products (MFP).
- Laboratory setup projects involving fume hood removals/upgrades and ductwork tie-in.

- 3) The PTE for this project as determined under WAC 246-247-030(21)(a-e) [as specified in the application] is 3.60E+00 mrem/year. Approved are the associated potential release rates (Curies/year) of:

Ac - 225

Liquid/Particulate Solid

WAC 246-247-030(21)(a)

Contributes less than 0.1 mrem/yr to the MEI, and represents less than 10% of the unabated PTE and represents less than 25% of the abated dose.

Yb - 175	Liquid/Particulate Solid	WAC 246-247-030(21)(a)
Contributes less than 0.1 mrem/yr to the MEI, and represents less than 10% of the unabated PTE and represents less than 25% of the abated dose.		
Yb - 177	Liquid/Particulate Solid	WAC 246-247-030(21)(a)
Contributes less than 0.1 mrem/yr to the MEI, and represents less than 10% of the unabated PTE and represents less than 25% of the abated dose.		
Zn - 65	Liquid/Particulate Solid	WAC 246-247-030(21)(a)
Contributes less than 0.1 mrem/yr to the MEI, and represents less than 10% of the unabated PTE and represents less than 25% of the abated dose.		
Zn - 69	Liquid/Particulate Solid	WAC 246-247-030(21)(a)
Contributes less than 0.1 mrem/yr to the MEI, and represents less than 10% of the unabated PTE and represents less than 25% of the abated dose.		
Zn - 69 m	Liquid/Particulate Solid	WAC 246-247-030(21)(a)
Contributes less than 0.1 mrem/yr to the MEI, and represents less than 10% of the unabated PTE and represents less than 25% of the abated dose.		
Zr - 88	Liquid/Particulate Solid	WAC 246-247-030(21)(a)
Contributes less than 0.1 mrem/yr to the MEI, and represents less than 10% of the unabated PTE and represents less than 25% of the abated dose.		
Zr - 89	Liquid/Particulate Solid	WAC 246-247-030(21)(a)
Contributes less than 0.1 mrem/yr to the MEI, and represents less than 10% of the unabated PTE and represents less than 25% of the abated dose.		
Zr - 93	Liquid/Particulate Solid	WAC 246-247-030(21)(a)
Contributes less than 0.1 mrem/yr to the MEI, and represents less than 10% of the unabated PTE and represents less than 25% of the abated dose.		
Zr - 95	Liquid/Particulate Solid	WAC 246-247-030(21)(a)
Contributes less than 0.1 mrem/yr to the MEI, and represents less than 10% of the unabated PTE and represents less than 25% of the abated dose.		

The radioactive isotopes identified for this emission unit are (no quantities specified):

Ac - 225	Ac - 227	Ac - 228	Ag - 108 m	Ag - 108
Ag - 109 m	Ag - 110 m	Ag - 110	Ag - 111	Al - 26
Al - 28	Am - 241	Am - 242 m	Am - 242	Am - 243
Am - 245	Ar - 37	Ar - 39	Ar - 41	Ar - 42
As - 74	As - 76	At - 217	Au - 195	Au - 198
Ba - 131	Ba - 133	Ba - 133 m	Ba - 137 m	Ba - 139
Ba - 140	Ba - 141	Ba - 142	Be - 10	Be - 7
Bi - 207	Bi - 210	Bi - 211	Bi - 212	Bi - 213
Bi - 214	Bk - 249	Bk - 250	Br - 82	Br - 83
Br - 84	Br - 85	C - 11	C - 14	C - 15
Ca - 41	Ca - 45	Ca - 47	Cd - 109	Cd - 113 m
Cd - 113	Cd - 115 m	Cd - 115	Ce - 139	Ce - 141
Ce - 142	Ce - 143	Ce - 144	Cf - 249	Cf - 250
Cf - 251	Cf - 252	Cl - 36	Cm - 241	Cm - 242
Cm - 243	Cm - 244	Cm - 245	Cm - 246	Cm - 247
Cm - 248	Co - 56	Co - 57	Co - 58	Co - 60
Cr - 51	Cr - 55	Cs - 131	Cs - 134	Cs - 134 m
Cs - 135	Cs - 136	Cs - 137	Cs - 138	Cs - 139
Cu - 64	Es - 254	Eu - 150	Eu - 152	Eu - 152 m
Eu - 154	Eu - 155	Eu - 156	Eu - 157	F - 18
Fe - 55	Fe - 59	Fr - 221	Fr - 223	Ga - 67
Ga - 72	Gd - 148	Gd - 149	Gd - 151	Gd - 152
Gd - 153	Ge - 68	H - 3	Hf - 175	Hf - 178
Hf - 178 m	Hf - 181	Hf - 182	Hg - 203	Ho - 166
Ho - 166 m	I - 122	I - 123	I - 125	I - 129
I - 130	I - 131	I - 132	I - 133	I - 134
I - 135	In - 106	In - 113 m	In - 114 m	In - 114

In - 115	In - 115 m	Ir - 192	K - 40	K - 42
Kr - 81	Kr - 83 m	Kr - 85	Kr - 85 m	Kr - 87
Kr - 88	Kr - 89	Kr - 90	La - 138	La - 140
La - 141	La - 142	Lu - 177	Mg - 27	Mn - 52
Mn - 54	Mn - 56	Mo - 93	Mo - 99	N - 13
Na - 22	Na - 24	Nb - 91	Nb - 91 m	Nb - 92
Nb - 93 m	Nb - 94	Nb - 95	Nb - 95 m	Nb - 97
Nb - 97 m	Nd - 144	Nd - 147	Ni - 56	Ni - 59
Ni - 63	Ni - 65	Np - 235	Np - 236	Np - 237
Np - 238	Np - 239	Np - 240	Np - 240 m	O - 15
P - 32	P - 33	Pa - 231	Pa - 233	Pa - 234
Pa - 234 m	Pb - 209	Pb - 210	Pb - 211	Pb - 212
Pb - 214	Pd - 107	Pd - 109	Pm - 145	Pm - 146
Pm - 147	Pm - 148 m	Pm - 148	Pm - 149	Pm - 151
Po - 208	Po - 209	Po - 210	Po - 211	Po - 212
Po - 213	Po - 214	Po - 215	Po - 216	Po - 218
Pr - 143	Pr - 144	Pr - 144 m	Pu - 234	Pu - 236
Pu - 237	Pu - 238	Pu - 239	Pu - 240	Pu - 241
Pu - 242	Pu - 243	Pu - 244	Ra - 223	Ra - 224
Ra - 225	Ra - 226	Ra - 228	Rb - 86	Rb - 87
Rb - 88	Rb - 89	Rb - 90	Rb - 90 m	Re - 186
Re - 187	Re - 188	Rh - 102	Rh - 103 m	Rh - 105
Rh - 105 m	Rh - 106	Rn - 219	Rn - 220	Rn - 222
Ru - 103	Ru - 105	Ru - 106	Ru - 97	S - 35
Sb - 124	Sb - 125	Sb - 126	Sb - 126 m	Sb - 127
Sc - 46	Sc - 47	Se - 75	Se - 79	Si - 31
Sm - 145	Sm - 146	Sm - 147	Sm - 151	Sm - 153
Sm - 157	Sn - 113	Sn - 117 m	Sn - 119 m	Sn - 121 m
Sn - 123	Sn - 125	Sn - 126	Sr - 85	Sr - 89
Sr - 90	Sr - 91	Sr - 92	Ta - 179	Ta - 182
Ta - 183	Tb - 160	Tc - 101	Tc - 95 m	Tc - 97
Tc - 97 m	Tc - 98	Tc - 99	Tc - 99 m	Te - 121 m
Te - 121	Te - 123	Te - 123 m	Te - 125 m	Te - 127 m
Te - 127	Te - 129 m	Te - 129	Te - 131	Te - 131 m
Te - 132	Te - 133	Te - 133 m	Te - 134	Th - 227
Th - 228	Th - 229	Th - 230	Th - 231	Th - 232
Th - 233	Th - 234	Ti - 44	Ti - 51	Tl - 204
Tl - 207	Tl - 208	Tl - 209	Tm - 170	Tm - 171
U - 232	U - 233	U - 234	U - 235	U - 236
U - 237	U - 238	U - 239	U - 240	V - 48
V - 49	W - 181	W - 185	W - 187	W - 188
Xe - 122	Xe - 123	Xe - 125	Xe - 127	Xe - 131 m
Xe - 133	Xe - 133 m	Xe - 135	Xe - 135 m	Xe - 137
Xe - 138	Y - 88	Y - 90	Y - 90 m	Y - 91
Y - 91 m	Y - 92	Y - 93	Yb - 164	Yb - 175
Yb - 177	Zn - 65	Zn - 69	Zn - 69 m	Zr - 88
Zr - 89	Zr - 93	Zr - 95		

The potential release rates described in this Condition were used to determine control technologies and monitoring requirements for this approval. DOE must notify the Department of a "modification" to the emission unit, as defined in WAC 246-247-030(16). DOE must notify the Department of any changes to a NESHAP major emission unit when a specific isotope is newly identified as contributing greater than 10% of the potential TEDE to the MEI, or greater than 25% of the TEDE to the MEI after controls. (WAC 246-247-110(9)) DOE must notify the Department of any changes to potential release rates as required by state or federal regulations including changes that would constitute a significant modification to the Air Operating Permit under WAC 173-401-725(4). Notice will be provided according to the particular regulation under which notification is required. If the applicable regulation(s) does not address manner and type of notification, DOE will provide the Department with advance written notice by letter or electronic mail but not solely by copies of documents.

- 4) To account for all the radioisotopes that may be affected by a process in which the temperature may be equal to or exceed 100 degrees Celsius, a release factor of one is applied to a gaseous form of Am-241 and Cs-137.
- 5) Total design flow through each HEPA filter bank shall not exceed the maximum rated flow rate for the individual HEPA filters multiplied by the number of filters. This does not limit the design flow rate of the stack, just that of the filters.