Department of Construction Services

Office of School Construction Grants

# RADON RESISTANT NEW CONSTRUCTION (RRNC)

It is typically easier and much less expensive to design and construct a new building with radon-resistant or easy-to-mitigate features than to add these features after the building is completed and occupied.

Department of Public Health Web site: http://www.ct.gov/dph/cwp/view.asp?a=3140&q=387592

**C.G.S. Section 10-291 Approval of plans and site.**
... (b) The Department of Construction Services shall not approve a school building project plan or site, as applicable, if: (1) The site is in an area of moderate or high radon potential, as indicated in the Department of Environmental Protection's Radon Potential Map, or similar subsequent publications, except where the school building project plan incorporates construction techniques to mitigate radon levels in the air of the facility;…

**C.G.S. Section 10-220 Duties of boards of education.**
… (d) Prior to January 1, 2008, and every five years thereafter, for every school building that is or has been constructed, extended, renovated or replaced on or after January 1, 2003, a local or regional board of education shall provide for a uniform inspection and evaluation program of the indoor air quality within such buildings, such as the Environmental Protection Agency's Indoor Air Quality Tools for Schools Program. The inspection and evaluation program shall include, but not be limited to, a review, inspection or evaluation of the following: (1) The heating, ventilation and air conditioning systems; (2) radon levels in the water and the air...

Seven of Connecticut's eight counties have been deemed to have at least an overall radon potential of "moderate" (http://www.epa.gov/radon/states/connecticut.html). However, all eight counties have "hot spots", i.e., areas of elevated radon potential (http://ct-radon.info/CT_radon_map.html). Additionally, changes in a site's radon risk level can occur over time as a result of normally occurring seismic activity, expansion/contraction cycles, construction, etc. These geologic changes can produce "moderate" or "high" radon gas level readings in locations that are currently deemed areas of "low" radon potential (elevated readings might occur in only one room of an entire school).

Several industry recognized RRNC techniques are also considered "best practices" with regard to normal building construction and should have little or no cost implications in the construction of a new facility. Some examples include processed gravel and vapor barriers below floor slabs, sealants at potential radon entry routes, etc. Other elements of a properly designed radon prevention/removal system have a minor impact on construction costs and a potential impact on building operational expenses (radon vent piping, suction fans, etc.). Since these items could have an impact on a building's overall energy performance, they should be evaluated by the project commissioning agent and be incorporated into the design of the building environmental management system (Connecticut High Performance Building (HPB) requirements C.G.S. Sec 16a-38k). Fans (if required) need to be in conformance with acoustical standards (C.G.S. Sec. 10-285g).

Department of Construction Services
Bureau of School Facilities

# RADON RESISTANT NEW CONSTRUCTION (RRNC)
## (continued)

The EPA recommends the following radon prevention techniques for construction of schools and other large buildings in radon-prone areas:
(http://www.epa.gov/ORD/NRMRL/pubs/625r92016/625r92016.htm)

- Install an active soil depressurization system
- Pressurize the building using the heating, ventilating, and air conditioning system
- Seal major radon entry routes

The Department of Construction Services (DCS) recommends that for any school construction project utilizing a Chapter 173 grant, regardless of project location on any radon potential map, the project shall incorporate the following properly designed RRNC techniques (at minimum):

- Install a complete passive sub-slab radon gas removal system
- Seal major radon entry routes

Components of a properly designed radon prevention/removal system include:
(Also, see International Mechanical Code Section 512 for State Building Code minimum construction requirements.)

❑ Gravel under the slab
- Appropriate consistency and amount (DOT size 6 or larger)
- Gas permeable geotextile fabric between the gravel and the earth below
- Gas impermeable vapor barrier between the gravel and the slab

❑ Sealants (Polyurethane or similar, must have a combination of qualities such as strong adhesion to concrete under difficult conditions, long service life, and good elasticity.)
- Edges of all interior slabs where they meet walls
- Mechanical/electrical penetrations in slabs and foundation walls

❑ Radon collection
- Pit/box/pipe type of collector (or combination)
- Maximum area for chosen collector

❑ Vent pipe (3" diameter min., 4" diameter min. if connected to 2 suction points)
- Pipe sizing for collection area and desired CFM capacity
- Pipe routing through "conditioned" spaces
- Labeling
- Point of discharge 25 feet min. from air intakes (HPB)

❑ Vent fan (not required until testing deems necessary, but provide electrical rough-in)
- Fan size and speed variability (tied to building management system)
- Maintaining negative pressure below the slab