Pennsylvania Environmental Laboratory

Leading the Nation in Energy Efficiency, Mobile Capabilities

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Director

Roger Carlson has always taken a holistic approach to public health. "My academic background is environmental health science," he said. "But again my technical background is a microbiologist. I've always been interested in environmental applications of microbiology throughout my academic and working careers." Thus it made sense for Carlson to settle for 25 years in Kansas, serving as the director of the laboratory for the Kansas Department of Health and Environment. At the end of that time, in December 2000, a new opportunity tempted him to move. "What attracted me to Pennsylvania," he explained, "was a plan that I thought was very forward-thinking, in which all state analytical laboratories were going to co-locate in a centers for excellence." Although the political situation did not allow that vision to pan out, Carlson, now the director of the state laboratory for the Pennsylvania Department of Environmental Protection, is finding other ways to make those linkages in a state that considers environmental quality a high priority.

Location

Just last year the laboratory relocated to the edge of the Harrisburg metropolitan area. "Two characteristics were important to us in choosing a location," said Carlson. "We insisted that the new laboratory be within five miles of the programs that we serve . . . to keep that interaction close. And we wanted to be near major interstate highways so that we could rapidly receive materials, supplies and so forth."

Facility

The laboratory is in a five-year-old, 110,000-square-foot building that was completely restructured to meet the needs of a modern analytical laboratory, while simultaneously meeting the stringent requirements necessary to earn a gold Leadership in Energy & Environmental Design (LEED) award from the US Green Building Council (www.usgbc.org). Carlson said such a feat was not easy "because we use a lot of energy," with single-pass air on three floors and over 100 chemical fume hoods. The facility has two gas fire generators that can provide full back-up power and whose waste heat is captured and redirected for either heating or cooling, as needed. Carlson said, "It's almost like a living, breathing kind of organism, the kind of inter-linked systems we have here to make it as energy efficient as possible. We even have waterless urinals." The commonwealth of Pennsylvania, he said, has elected to build energy efficiency into all new or renovated government buildings. "It's a major issue and it just makes sense from a renewable, sustainable kind of philosophy. These are challenges that we must undertake and they can be incorporated into the economics of state government and should be."

Staff

91, primarily chemists, microbiologists, laboratory technicians and administrative personnel.

Revenue

"We never have enough," said Carlson, whose $8 million annual budget comes entirely from fees from either analytical work or from a laboratory certification program that regulates all commonwealth labs reporting analytic data to the state in relation to Pennsylvania environmental statutes. The certification program has historically focused on water testing but has just been expanded to include hazardous wastes and other discharges, which will increase the number of laboratories that need to be certified from 126 to almost 1,000. Still, with no general revenue from the state, Carlson said, "we have no flexibility" to do testing of public health significance when there is no apparent payer. "That's the dilemma that we face. We're not comfortable with that."

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Distinguishing Characteristics

In addition to its sophisticated energy conservation systems, the laboratory is notable for having perhaps more mobile capabilities than any other state environmental laboratory in the nation. One mobile laboratory is focused on organic chemical analysis, one on inorganic chemical analysis, one on emergency response and yet another on the immediate detection of analytes without the need to collect samples. "We can shoot a beam across a landfill, for example, or search for fugitive methane sources. We even have an aroma-scan with which we can detect odors, remember odors and even track down the source of an odor." All of the instruments are ruggedized (some originally designed for the space program) and many are exchangeable among vehicles. "People who operate these are sort of the cowboys of laboratory analytical staff. They work all hours and live on the road and it takes a special cadre of laboratory scientist to be successful. They work very closely with our regional offices throughout the commonwealth. Once they are launched, they will not fail. They will not come back until they get the answer."

The Pennsylvania Environmental Laboratory.

Highest Volume Testing

The laboratory handles about 80,000 environmental samples/year, ranging from air to hazardous wastes to animals. Acid mine drainage is a "big issue" in Pennsylvania and the laboratory does a fair amount of water quality monitoring to help mitigate the problem. Pennsylvania is also the only state in the nation that monitors trout produced in state hatcheries for PCBs and other contaminants. Altogether, the laboratory produces roughly 700,000 quality-assured analytical results annually.

Notable Success Stories

- Designing and building a new laboratory. "We worked very hard over four or five years to accomplish that. We didn't have the luxury of closing down our laboratory for 30 days [to relocate equipment]; we wanted to maintain productivity during that moving process. We're pretty proud of that."

- Updating the academic and training requirements for chemists and microbiologists. "This is not your grandmother's laboratory, and so the credentials candidates need to have when we have a vacancy have changed within the past 20 years. That's frankly one of the most important things we can do to ensure the future of our laboratory. Any laboratory is only as good as the quality of staff that it employs."

Biggest Challenges

"One of the biggest challenges for any state lab director is to exist in this plane between the programmatic and political arenas that operate immediately above you and the scientific and administrative arenas that are your responsibility. I feel sort of like a gymnast sometimes on the balance beam. If you don't manage that role well you won't serve your laboratory as well as you should and you won't serve the programs that use your data as well as you should. . . . . That's the toughest thing that we do for sure."

Vacancies

"It's unusual for us to have more than a 4 to 5% vacancy level at any one time. To try to recruit the best and the brightest, which is our goal, is never easy, but we seem to be reasonably successful."

Goals

- Achieve more fiscal flexibility. "It would be really great if the time comes that we could have some state general revenue in our budget. That would give us some breathing room."

- Introduce new assays into the laboratory based on the molecular technologies clinical laboratories use to track the source of infectious disease microbes. "Those technologies are now being applied to environmental source tracking. So, for example, when you have a source of fecal pollution you can tell whether it came from humans—from an undiscovered sewage outfall—or from geese or deer or whatever. [Acquiring that capability] obviously takes funding and staff, but we're pressing hard." APHL

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