

CENTER FOR MEDICAL SCIENCE RENOVATES FOR BIODEFENSE EXPANSION

AcornVac Enlisted to Stop Dangerous Pathogens from Entering
the Public Waste Water System



CHALLENGES:

PROJECT: Center for Medical Science
LOCATION: Albany, New York

In BSL-3 labs, researchers conduct experiments on contagious materials in gas-tight enclosures. Clothing decontamination, sealed windows, specialized ventilation and **total control over waste water is absolutely essential to safety.** Scientists cannot be exposed to harmful agents, and no microorganisms can be allowed to escape into the environment. Safety is the lifeblood of every biocontainment laboratory, especially those engaged in biodefense.

FIGURE 1

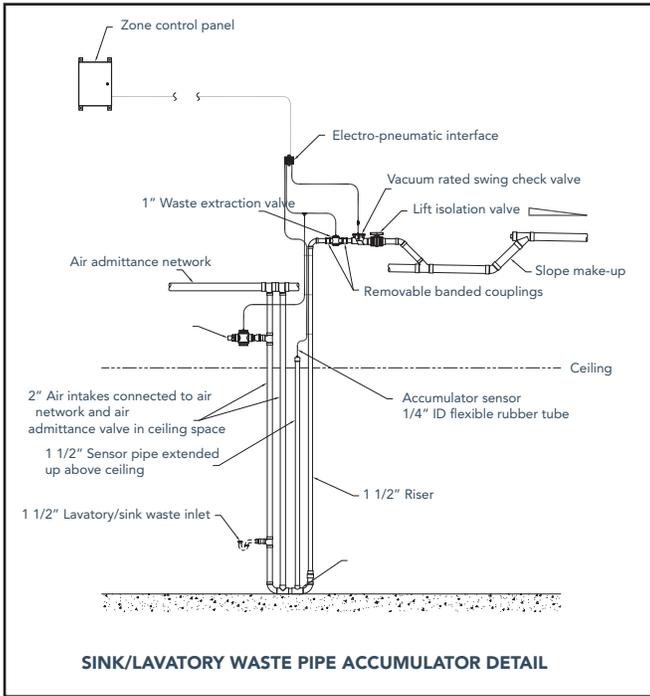
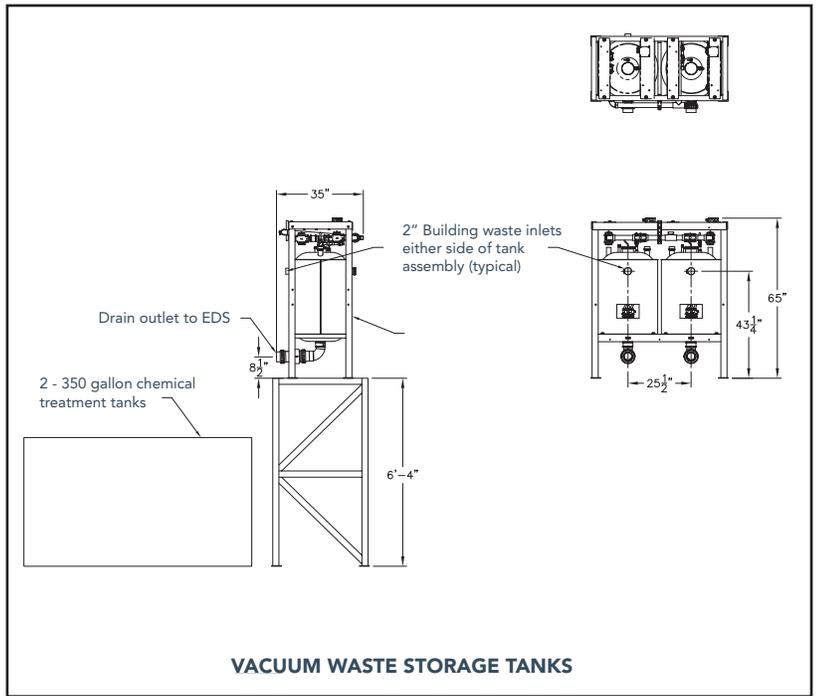


FIGURE 2



AN IMPOSSIBLE SITUATION

On the morning of September 18, 2001, Americans, still in shock from the events of 9/11, awoke to another unbelievable news story: Letters laced with anthrax spores were opened in the offices of two U.S. senators and several media outlets.

By the time we understood what happened, five innocent people died, 17 others were injured, and up to 68 people were believed harmed.

Defined as the intentional release of biological agents (bacteria, viruses, or toxins), an act of bioterrorism is highly infectious to people and places. The anthrax mailings caused \$1 billion in total damage by contaminating dozens of buildings in multiple states, reported The Washington Post. What do we do if this happens

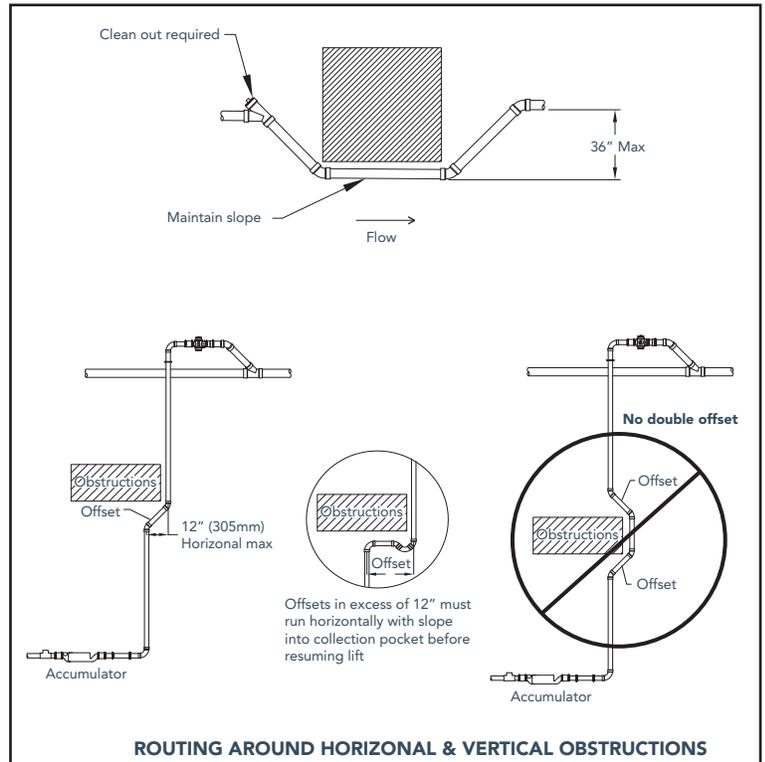
again? How do we halt these nasty bugs in their deadly tracks? And who is working on this problem? Enter the Center for Medical Science (CMS).

BSL-3 LABS - A SPECIAL BREED

Located in Albany, NY, CMS is one of an elite cadre of BSL-3 laboratories in the United States, which conducts beneficial research on dangerous and emerging pathogens. A biosafety level designates the biocontainment precautions required to isolate hazardous biological agents in an enclosed facility—BSL-1 is the lowest, BSL-4 is the highest. BSL-3 labs study airborne agents with potential to cause lethal infection, everything from anthrax and tularemia to the plague.

In BSL-3 labs, researchers conduct experiments on contagious materials in gas-

FIGURE 3



BENEFITS OF THE ACORNVAC VACUUM PLUMBING SYSTEM:

- No Digging Required
- Design and Construction Flexibility
- Health Safety and Security
- Fewer Line Blockages
- Lower Maintenance and Operational Costs

tight enclosures. Clothing decontamination, sealed windows, specialized ventilation and total control over waste water is absolutely essential to safety. Scientists cannot be exposed to harmful agents, and no microorganisms can be allowed to escape into the environment. Safety is the lifeblood of every biocontainment laboratory, especially those engaged in biodefense.

Recently, the federal government began to award millions in grant money for construction and renovation of biomedical labs, after a 'lost decade' in biological warfare research. Armed with this funding, leading scientists are now tirelessly at work to develop countermeasures to biological agents. In early 2010, one such scientist won funding to expand CMS's BSL-3 biosafety facilities to prepare for upcoming projects. Lab project manager Jim Hudspath was assigned to take an 8,000 sq. ft. allotment on the third floor of a fully occupied five-story building and transform the space for 21st century biological warfare research—a delicate balancing act.

RENOVATION CHALLENGE

Along with space issues, the CMS project required that: 1) research had to be validated within the precise space where scientists do the work; 2) work had to be completed before the Centers for Disease Control could begin its two-month long validation process for licensing; and, 3) the building had to stay operational with no interruption to tenant occupancy, a costly proposition demanding after-hours and weekend work.

The floor below the space contained densely populated administrative areas; the floor above housed BSL-2 lab facilities, offices and equipment alcoves, with both spaces occupied by another tenant. In addition, there was no surge space to relocate staff. Jim was confident HVAC and electrical would not pose a problem, but not so the sanitary plumbing. A chance conversation with an engineering colleague led him to AcornVac and its vacuum plumbing systems. AcornVac has a long history of success in safety-sensitive environments such as correctional facilities and supermarkets, but remained untested in biocontaminant laboratories

HOW IT WORKS

Jim met with AcornVac representatives for a system demo. He watched with amazement as the vacuum technology system transported waste water from sinks through an engineered, overhead drainage piping network before

discharging to sanitary waste mains.

The heart of the system, the Vac Central unit, features waste collection tanks, vacuum pumps and controls that automate operation of the entire system. The control programming runs the vacuum pumps only as needed to maintain vacuum pressure in the sealed waste collection tanks and in the drainage piping network, which routes through the facility to the waste collection tanks.

Vacuum interface valves separate plumbing fixtures and equipment from the vacuum waste piping network. Waste water is transported vertically to the overhead piping network via the interface of atmospheric and vacuum pressures. This flow occurs when the normally closed interface valves, separating the fixture from the drainage piping network, is opened.

Jim was an instant convert and scheduled installation.

NO FLOOR PENETRATION = NO CONTAMINATION

AcornVac was installed without any need to cut through the floor space. Labs require massive drainage capability, so eliminating the need to penetrate the floor for sanitary piping minimizes the risk of any accidental leak or spill from impacting the space below – a defining benefit of AcornVac. "Ninety-five percent of the work was done right within the space. A nice, neat package," says Hudspath.

ENGINEERING FOR SPACE CONTAINMENT

To optimize space concerns, Hudspath established an area within the space near a mechanical shaft for the mechanical equipment room. The size of the room was driven by the footprint of a BIBO HEPA filter bank and storage tanks for waste water contamination. The AcornVac Vac Center waste collection tanks were installed on a framework suspended above the waste water decontamination storage tanks. As the Vac Center waste collection tanks become full, they discharge into the waste water decontamination tanks below, operating in a lead-lag fashion, and delivering a continuous flow of waste water.

Because the vacuum pump and control portion of the AcornVac system does not need to be installed in close proximity to the space it services, Hudspath could house it in the mechanical equipment room next to the mechanical shaft, which also made possible the

installation of a platform for exhaust fans with continuous redundancy power. This flexible configuration keeps the fans and vacuum pumps free from contamination, and completely accessible for servicing whenever required.

BENEFITS PACKAGE

While safety is the number one concern in a BSL environment, CMS is accruing a wealth of benefits:

1. Significant cost savings in waste water containment (measured over time)
2. Improved efficiency in waste stream management
3. Flexibility in space layout, allowing scientists to respond to new programs or initiatives
4. Ease and economy of installing future sinks cut risks and costs at initial construction
5. Ability to renovate quickly, stay relevant and in full compliance

Though all the numbers are not yet in, Hudspath expects installation costs for AcornVac will bring his project in at or under budget.

Recently, CMS underwent inspection by the Centers for Disease Control inspection. The impressive new space is open and ready. Final license issuance is expected shortly. With this critical renovation, CMS is well equipped to collect and treat waste from dozens of lab sinks and decontamination showers, and eliminate those nasty bugs from sneaking into the final effluent and entering the public water system. At a time when the world feels like a pretty dangerous place already, it is comforting to know the Center for Medical Sciences is doing everything in its power to protect public safety, and that AcornVac made a small contribution to the scientific discovery process.

AcornVac Inc. is a subsidiary of Acorn Engineering family of companies, continuing the 50-year tradition of setting industry standards with innovative products and systems. AcornVac designs, manufactures and maintains reliable, economical alternatives to gravity plumbing for the transport of waste water.

Acorn Engineering is committed to environmental sustainability and social responsibility in manufacturing processes to benefit the environment and reduce landfills. By conserving earth's resources, the company proudly delivers the highest standard products under the latest code requirements.

For more information on AcornVac and the full range of Acorn Engineering products and services, please log onto www.acornvac.com or www.acorneng.com



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