CASE STUDY

Trinity Consultants Ensures Safe Airflow at Military Hospital with Advanced CFD Modeling

CHALLENGE

A medical center needed to replace its hospital boilers, which required precise airflow analysis to ensure a safe, compliant environment.

SOLUTION

Trinity teams performed CFD modeling and provided consulting to determine the concentration of boiler emissions at various hospital ventilation intakes.

RESULT

Accurate modeling and prompt adjustments ensured a successful project that met stringent regulatory requirements, providing seamless client support.

Miller-Remick, a New Jersey-based engineering and construction management firm, embarked on a significant boiler replacement project at a southern military hospital. The project required specialized Computational Fluid Dynamics (CFD) modeling to ensure that emissions from new combustion equipment would not become entrained in the hospital's air intake units and ventilation system. For this highly technical challenge, and based on the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)'s general recommendation to use CFD to obtain accurate numerical solutions, Miller-Remick turned to **Trinity's Environmental Consulting (EC)** and **Advent Engineering teams**, due to the company's established reputation and expertise in environmental modeling.

Trinity Consultants ADVENT

CHALLENGE

Miller-Remick was tasked with replacing outdated boiler equipment at a prominent southern military hospital, a critical project complicated by the hospital's expansion over the decades and a lack of necessary drawings and data. The addition of a multi-story tower next to the original 1960s boiler house significantly altered airflow dynamics, raising concerns that emissions could potentially be drawn into the hospital's air intake systems. Given these complexities, the project demanded nearfield analysis modeling, including comprehensive evaluation of wind and environmental conditions across different seasons. This would ensure that the hospital could accurately predict and mitigate the risk of emissions entrainment and meet stringent regulatory standards.

SOLUTION

Recognizing the challenges, Trinity reached into its broad and technically diverse resources. The company's EC team kicked off the project by developing a detailed scope and cost proposal. Given the age of the site and the lack of drawings, a local Trinity team member visited the site to gather critical metadata, including photographs, measurements, and verified points of interest. This information was crucial for **Trinity's Advent Engineering** team, part of the company's Life Sciences division, which joined the team to lead the advanced CFD modeling efforts. With additional support from **Trinity's Cleveland EC team**, which provided meteorological data and plume dispersion guidance, Advent quickly conducted the nearfield analysis required for the project.

Initial CFD results indicated that the planned boiler stack locations would lead to unacceptable emission levels being entrained in nearby ventilation air intakes. In response, Miller-Remick authorized Trinity to perform another round of modeling, this time adjusting the boiler stack height and location. The revised model demonstrated that the risk of plume entrainment was dramatically reduced and was expected to be acceptable to hospital management.

RESULT

Through seamless collaboration and technical expertise, Trinity successfully addressed the complex challenges of the hospital's boiler replacement project. The iterative modeling process allowed for precise adjustments to the stack design, ensuring that emissions would not compromise the hospital's air quality. The entire modeling process, from initial inquiry to final report, spanned six to eight weeks, showcasing the efficiency and technical prowess of the company's seamless interoffice collaboration.

This successful endeavor exemplified Trinity's partnership with architectural firms to provide complex, accurate modeling solutions. Trinity's integrated approach, involving multiple teams and specialties, enabled the company to deliver on time and within scope, setting a new standard for similar projects and paving the way for future collaboration.

"We hired Trinity Consultants to perform some complex CFD modeling for multiple boiler plant stacks and generator exhausts on a hospital campus," said Benjamin Harless, Project Manager at Miller-Remick. "They worked with us through an interactive process in order to meet our high demands and produced a detailed report that was both highly technical, but also simplified so that the layman could understand the results. We've developed a process with Trinity that will allow us to streamline our collaborations in the future, and we look forward to working with them for years to come."

ABOUT TRINITY CONSULTANTS

Trinity Consultants, a leading global environmental consulting firm, provides services and solutions in the EHS Regulatory Compliance, Built Environment, Life Sciences, and Water & Ecology markets. Founded in 1974, Trinity has the technical expertise, industry depth, and capabilities to help clients achieve their goals across the natural and built environments.

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