

Category: 7 - Best Building Project—Specialty Contractor (Over \$10 million)
Contractor: Industrial Constructors/Managers, Inc. (ICM)
Project Name: Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP) “SDC Project”

Detail, Documentation, Timeliness and an Act of Congress – ICM Loves a Challenge

In 1985, the Program Manager for Chemical Demilitarization (PMDC) was created by Congress to destroy the remaining 10% of the United States’ chemical weapons stockpile out of concern for its effects on everything from the environment to citizen and soldier safety. Accomplishing this task was given to the US Army Program Executive Office, Assembled Chemical Weapons Alternatives, which it began executing in the 1990’s by identifying environmentally safer methods than incineration, which up until then had been the approved means of chemical weapons disposal.

Fast forward to today, and chemical weapons have been eliminated at six out of the original eight storage sites. The remaining two facilities are charged with destroying the last of these materials, including nerve agent in Richmond, Kentucky, and mustard agent at the Pueblo, Colorado Chemical Agent Destruction Pilot Plant (PCAPP).

As the PCAPP project was underway, general contractor Bechtel National, Inc. determined that roughly 97,000 mortar rounds of munitions couldn’t be handled by the existing automated plant, particularly in time to meet the Congressionally-mandated deadline of Dec 31, 2023. Static detonation chambers (SDCs) – which use thermal heat to detonate or deflagrate chemical weapons in an environmentally friendly way – were needed to get the job done safely and on time. So Bechtel commissioned three SDCs from Dynasafe, who specializes in the safe disposal of conventional and chemical munitions and hired Komada to oversee the SDC construction project.

Komada chose Industrial Constructors/Managers Inc. (ICM) to create the structures to support and house the SDCs because of the contractor’s skill and expertise with large industrial challenges such as this one. ICM’s portion of the work spanned June 2019 thru November 2020, and included concrete foundation work, the erection of tent structures, process piping, structural fab/erect and equipment setting.

ICM loves a good challenge and this project delivered! ICM set out to build with a proprietary construction system they'd never seen before, on a tight schedule, to facilitate a detailed mission on an act of Congress.

Problem Solving to Meet Timeline Challenges

One of the biggest challenges of the project was a tight construction schedule since the SDCs were created to help the Pilot Plant meet a non-negotiable Congressionally-mandated deadline. The timing issue was heightened when the project was changed from constructing the SDCs sequentially to having to construct all three at the same time due to permitting delays.

ICM mitigated the problem by hiring 24 additional workers, all of whom had to pass an extensive security clearance due to the nature of the work. ICM surpassed this challenge by talking to local unions, which were able to source workers from all across the United States. The ICM project team quickly put the additional workforce in action, and this new team remained on the job for roughly three months, joining 66 existing workers for a total of 90 workers at peak construction. In total, ICM's seven different trades worked simultaneously to complete the project, which included ironworkers, millwrights, pipe fitters, carpenters, cement masons, operators and laborers.

Strong Project Execution Through Innovative Construction Techniques and Methods

One of the most unusual construction techniques used on this project included the foundation pour, which was a monolithic pour involving continuous curbs around the perimeter and through the middle. It was four inches deep to contain any water leakage, set two feet inside the formwork and had to be done on three elevations - something that ICM had never done before.

To facilitate the concrete pour, ICM brought in a power screed and laser leveling, and because of the schedule ramp-up, the utilities were still being excavated and installed in the ground between the three foundations while the formwork was being built. The foundation work alone took over 5,300 man-hours, with 30 carpenters on hand.

Over 12,000 feet of process piping was installed on the project, which included copper for water and compressed air, carbon steel for chilled water, and stainless steel for vent gas, which was 100% X-ray to ensure it was leak free and EPA compliant. 75% of the piping was fabricated off site to speed up the timeline and help ensure quality control. ICM then set 50 associated

components for each SDC, including carbon filtration systems, air compressors and monitoring equipment.

The tent structures enclosing the SDCs are made of fabric walls erected on massive extruded aluminum arch frames. Two 60' x 60' structures are married together, slightly offset, for each SDC. The arch frames have a channel that allows the exterior membrane and insulation layers to be fed through from one side of the building to the other, utilizing a special winch mechanism. ICM utilized a 3-D model to construct the buildings.

Dot the i's and Cross the t's – Detail Leads to Quality Workmanship

Another challenge was the level of documentation required, due to the environmentally sensitive nature of the project. ICM created and maintained detailed QC documentation throughout the project's lifecycle.

The QC documentation helped ensure everything was installed correctly and to exact specifications – from how each of the 5,000 bolts needed to be set to whether an inch embedment was allowed, which had to be approved by various teams. At the beginning of the project, documentation included approving the initial inspection and test plans (ITPs), documenting the materials received, reviewing the welding procedure qualification records and conducting the American Concrete Institute (ACI) training for concrete finishing and post-installed anchor installation. Once the project was in motion, the pressure testing had to be approved, as did the flushing plans for the various processes the chamber used, such as natural gas purging, potable water flushing and chlorination for the above and below ground systems.

As a result of ICM's meticulous attention to detail and quality construction, only minor rework was requested by state agencies after reviewing the QC documentation.

Safety Plans to Protect the Project Teams and the Environment

In order to construct the SDCs, multiple safety plans were required to adequately prepare the team. The ICM team prepared separate safety plans for the concrete foundation, tent structure erection, process piping installation, fabrication and erection of the structural steel, and setting the equipment, and well as cleaning and sanitation processes. Each safety plan was developed several months in advance and reviewed with each employee who worked on the project. ICM took these additional measures to mitigate life and environmental safety issues.

In addition to developing customized safety plans, ICM conducted daily safety briefings, including a daily job safety analysis, designed to identify daily work hazards and review the controls needed to prevent unwanted incidents. ICM also performed daily site and equipment inspections for all equipment onsite and during all phases of work. An ICM team member even received a handwritten letter from the project's general contractor recognizing his extraordinary work at keeping the site clean and safe.

The project's commitment to safety and quality will help ensure that dangerous mustard agent munitions are destroyed in an environmentally friendly manner, minimizing their impact on the environment and on the workers helping to dispose of them, as well as the greater community. The world will quite literally be a safer place as a result of this project.

The ICM team completed its portion of the SDC project in 163,058 hours and with zero lost-time incidents.

Communication and Coordination Produces the Best Work

The ICM project team maintains the key to overcoming these challenges was constant communication and coordination at daily meetings with all the contractors onsite. Together, they discussed what each was going to do that day and what interferences may arise. The team prevented problems before they became problems.

"Communication was paramount," said David Rider, senior project manager at ICM. "It's important to trust your team and encourage everyone to support each other, because that produces the best work."









