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**DECORATIVE CONCRETE**

**PANAMA SHIPYARD UPDATE**

**MARCH 2023**

# **CoatingsPro**<sup>TM</sup> M A G A Z I N E

## **LANDMARK MAKES AIRWAVES**

- » **LEADING EDGE SAFETY**
- » **NO-SPARK AREA RECOAT**
- » **IMPROVE ONLINE EXPERIENCE**



STEEL

TANK

EPOXY

OIL / GAS

INDUSTRIAL

## Recoating a Natural Gas Tank at Sunny Solar Turbine Plant

BY **CLAIRE TRAGESER**

PHOTOS COURTESY OF **HITECH PAINTING INC.**

**S**olar Turbines Inc., is headquartered in sunny San Diego, Calif., an appropriate location based on the type of business they do. The company is a wholly owned subsidiary of Caterpillar Inc., and it manufactures the world's most widely used family of mid-sized industrial gas turbines, ranging from 1 to 39 megawatts.

Solar Turbines provides a range of products, including gas turbine-powered compressor sets, mechanical drive packages, and generator sets. The company has helped install more than 16,000 solar units in more than 100 countries with more than 3 billion operating hours. The units are used in a variety of areas, including production, processing and pipeline transmission of natural gas and crude oil, and generation of electricity and thermal energy for processing applications, such as manufacturing chemicals, pharmaceuticals, and food products.

All of this business at Solar Turbines is powered by a massive workforce of more than 8,000 employees across the globe.

But at Solar Turbines' headquarters, this work is done in a highly controlled and specialized environment. It's a Class 1, Division 1 no-spark area, which means that work has to be done carefully and with restrictions. So when Solar Turbines needed repainting on a natural gas tank, they had to call in a company who could operate in that kind of environment.

### High Tech for High Performance Coatings

That's where Mark Heuslein and the crew at HiTech Painting Inc. came in. The company, also based in the San Diego area, does a variety of applications on residential, commercial,



Solar Turbines' headquarters is a Class 1, Division 1 no-spark area, so when the company needed a natural gas tank to be repainted, they had to call in the experts at HiTech Painting Inc.







# Natural Gas Tank



The coatings on the 60-foot long by 12-foot wide 30,000-gallon fuel tank were failing. Over three weeks, the crew would recoat the prepped steel with a Sherwin-Williams system.

and industrial jobs. The aim is to bring innovative, high-tech resources to their customers with a variety of products that are ecofriendly and protective, Heuslein said. “Our mission at HiTech Painting Inc. is to use leading environmental technologies for painting and preservation projects,” said the HiTech owner. “What’s safe for the environment is safe for the family and our employees.”

Heuslein started HiTech Painting in 1999, and he has been in the paint and coatings industry for more than 35 years. After launching the company, he has led it to provide commercial and industrial surface preparation of all types, complete with painting and high-performance coating installations.

“We use the latest technologies in corrosion control and chemical attack protection,” Heuslein said. “We also perform installations of high-temperature, abrasion- and impact-resistant coatings, and moisture barrier coatings to protect concrete, metals, masonry.”

The company is made up of 10 employees, and for this job, HiTech used a crew of 6.

## Finding the Right Solution

The work in front of the HiTech crew was daunting. The job was to recoat the steel natural gas tank because the coatings were failing.

To do so, first the crew would have to blast the live fuel tank in a Class 1, Division 1 no-spark area. The plan was to complete that using crushed glass and a vapor blaster. That would be followed by the application of the Sherwin-Williams’ coating system that used epoxy and polyurethane materials.

And they’d have to do that to the tank “all while still in service,” Heuslein said.

What’s more, the job had a potential blast range of a 3-mile (4.8 km) radius, which covered a fuel farm within that area. That fuel farm increased the blast radius to 7 miles (11.3 km). HiTech worked out the details beforehand with the client’s rep and a

little help from Graco.

“We had a conversation saying, ‘Mark, because it’s Class 1, Division 1, it’s a 3-mile blast radius with this size of tank, which means in a 3-mile radius, it would level a 3-mile area right here if that tank were to explode,’” Heuslein explained. “So it means if you’re blasting with sand or garnet or another metal on the metal, it could create a spark, and, boom, you’re going, and then you have that fuel farm. That’s a 4-mile [6.4 km] blast radius if there’s an explosion there. So he’s all, ‘Mark, you realize you’re going to have a 7-mile blast radius if you have any problems; you have to present a ‘no risk of’ spec.’ So I went back to Graco, and they sent me specs from the Navy that shows that the vapor blaster would work and not have a spark. So I presented all the documents. The engineers said, ‘OK let’s do it.’ So we did it. We blasted that tank while it was full. We didn’t have to purge it, and we didn’t have to do a lockout tag out. We just had to be careful around the valves. And we masked everything off and blasted it and then primed it and painted it.”

All of this work required a lot of preparation up front, but Heuslein had some experience with the vapor-blasting technology, so he was able to offer that as a solution.

“I have vapor blasted some tanks in the past where they didn’t want to spend the money on scaffolding, shrink wrap, push in positive air, bring out negative air, dust collection, and vacuum up all the grid,” Heuslein said. According to Heuslein, that’s expensive. “With the EcoQuip vapor blaster, it’s basically dustless. So I can set up tarps around the area and vapor blast and not have a big mess. It’s not a big, dusty mess. So I have done a couple of tanks, and some of these tanks where they mix gasses at like 500 °F [260.0 °C] for fuel for some of their engines, and then some other fuel tanks I’ve done in the past. Well, then they called, they have this 60-foot [18.3 m] long, 12-foot [3.7 m] round — this tank is huge. And the paint was peeling, and they’re all, ‘Can you paint it?’”

*Natural Gas Tank continued on page 60*

Because the tank was still in service during this project, the crew used vapor-blasting specs from the Navy and had to work within a 7-mile blast radius.



# Natural Gas Tank

*Natural Gas Tank continued from page 58*

The client initially wanted HiTech to scrape, sand, and paint it, but Heuslein said that method wasn't going to fix the solution. They'd have to come up with another solution that wouldn't create the same peeling result in a few years. He said, "If you want to do this right, I'll figure out a way so that we can do it right."

## To the Work

The crew set up scaffolding to access the entire exterior of the tank, but there were specifications on that as well.

"You can't use a [steel] hammer — you have to use a brass hammer for the spikes — for the scaffolding for no sparks," Heuslein said. "You can't have a spark, so I figured out we could put up scaffolding and put up a barrier around it and then vapor blast it with recycled glass. Recycled glass is not going to leave a spark on a metal tank. I wrote the specs on this, and submitted it to the engineers." And they approved.

It was time for the crew to get to work. With the scaffolding and 9-mil (228.6 microns) poly containment up, they power washed the exterior first to remove any grease, dirt, or debris. That was completed using a Mi-T-M 4,000 psi (27.6 MPa) power washer. The dried materials on the ground were removed and disposed of at a local waste site.

"After we removed all of the failing coatings, we did an SP-6 commercial blast," Heuslein said. That's SSPC: The Society for Protective Coatings/NACE No. 3 Surface Preparation 6, "Commercial Blast Cleaning." They completed that with Graco's



The six-person crew from HiTech used crushed glass and a vapor blaster to prepare the steel surface. They achieved a profile that adhered to the SSPC-SP-6 standard.

EcoQuip 2 Mobile, CHLOR\*RID's HOLD\*BLAST to remove the chlorides, and the glass media from TruAbrasives. According to Heuslein, the EcoQuip uses so little media compared to dry blasting that the crew was able to manage any spent media by hand. "So 33% of your allowed stains are intact coatings. And so I got all that. I did my inspections and got it all ready. And then we sprayed on an epoxy primer and brush and rolled in the hard-to-get areas. And then we sprayed on the polyurethane

*Natural Gas Tank continued on page 62*

Access also had to include consideration for the no-spark zone. The crew was sure to equipment without steel, including hammers and scaffolding.





# Natural Gas Tank

*Natural Gas Tank continued from page 60*

topcoat and brushed and rolled in those hard-to-get areas, measured it all.”

The coatings application portion was fairly straightforward. For the 30,000-gallon (113,562.4 L) live natural gas fuel tank, the crew applied a total overall average dry film thickness of 10.9 mils (276.9 microns). They put down Sherwin-Williams’ Pro-Line 4000 Two Component High Build Epoxy Barrier Coat in one coat and Pro-Line Hi-Solids Polyurethane 250 two-component, aliphatic, acrylic polyurethane resin coating in two coats.

The crew took the surface temperature, ambient air temperature, dew point, relative humidity, dew point delta, profile thickness, and coating mil thickness measurements multiple times through each day for all coatings and stayed within the manufacturer’s specifications. They used equipment from Elcometer to complete those measurements.

“We kept it within the thickness of the data sheet and then tested it all when it was done,” Heuslein said. “And it worked.”

## Dipped in Paint

Although the job took place in San Diego, which has arguably one of the most ideal temperatures in the United States, one challenge that the crew experienced had to do with the



temperature. Working in September meant working during one of the hottest months of the year. Ambient temperatures reached up to 102 °F (39 °C).

According to Heuslein, vapor blasting creates a kind of slurry when the water and media mix together, but it was so hot on the jobsite that they didn’t even need to use the dust collector that they’d rented from MES Equipment for that specific material. They didn’t even get a chance to turn it on! “It was so hot that [the slurry] just dried and then we just swept it up,” he said.

The heat also required that the crew follow an Injury and Illness Prevention Program (IIPP) for Southern California, which, in this case, meant taking frequent breaks and changing the person on the blasting nozzle so they can get water. These precautions were taken in order to avoid heat exhaustion.

The other challenge was that blast radius. “It’s natural gas, and it’s the tank that supplies all the solar turbines,” Heuslein

First, the crew power washed the exterior to remove grease, dirt, and debris using 4,000 psi. Dried material on the ground was removed and disposed of, as was the glass media since so little was used.



## VENDOR TEAM

### **CHLOR\*RID by Milliken & Co.**

*Material manufacturer*  
Westlake, OH  
(800) 321-9696  
LI: chlor-rid-international-inc  
www.chlor-rid.com

### **Elcometer USA**

*Equipment manufacturer*  
Warren, MI  
(800) 521-0635  
@elcometer  
www.elcometerusa.com

### **Graco Inc.**

*Equipment manufacturer*  
Minneapolis, MN  
(800) 275-5574  
@GracoInc  
www.graco.com

### **MES Rentals**

*Equipment supplier*  
Theodore, AL  
(888) 281-2643  
FB: MESRentals  
https://mes.us

### **Mi-T-M**

*Equipment manufacturer*  
Peosta, IA  
(563) 556-7484  
@MITMCorporation  
www.mitm.com

### **The Sherwin-Williams Company**

*Coatings manufacturer*  
Cleveland, OH  
(800) 474-3794  
@SherwinWilliams  
www.sherwin-williams.com

### **TruAbrasives/Strategic Materials**

*Material manufacturer*  
Holmes, PA  
(866) 775-6226  
@TruAbrasives  
www.truabrasives.com

# JOB AT A GLANCE

## PROJECT:

Replace the failing coatings of an exterior system on a natural gas tank in a Class I, Division 1 no-spark area

## COATINGS CONTRACTOR:

HiTech Painting Inc.  
El Cajon, CA  
(619) 456-9007  
LI: hitechpaintinginc  
www.hitechpaint.com

## SIZE OF CONTRACTOR:

10 employees

## SIZE OF CREW:

6 crew members

## PRIME CLIENT:

Solar Turbines Inc.  
San Diego, CA  
(619) 544-5352  
@SolarTurbines  
www.solarturbines.com

## SUBSTRATE:

Steel

## CONDITION OF SUBSTRATE:

Used

## SIZE OF JOB:

60' long by 12' wide 30,000-gallon fuel tank

## DURATION:

3 weeks

## UNUSUAL FACTORS/CHALLENGES:

- » The crew worked with vapor-blasting specs from the Navy to be able to keep the tank in service while being recoated.
- » The crew had to work within a 7-mile blast radius due to a 3-mile explosion radius and a nearby fuel farm with a 4-mile explosion radius.
- » Scaffolding had to be put up with a brass hammer, and glass media was used for blasting to avoid sparks.
- » Ambient temperatures reached 102 °F during the job, which meant they didn't need to use the slurry vacuum equipment from MES.

## MATERIALS/PROCESSES:

- » Set up scaffolding and 9-mil poly containment and removed any grease, dirt, or debris with a Mi-T-M 4,000 psi pressure washer
- » Blasted to an SSPC-SP-6 with Graco's EcoQuip, CHLOR\*RID's HOLD\*BLAST for chlorides removal, and TruAbrasives' crushed glass media
- » Spray applied Pro-Line 4000 Two Component High Build Epoxy Barrier Coat in one coat and Pro-Line Hi-Solids Polyurethane 250 in two coats at an overall average dry film thickness of 10.9 mils, followed with brush and rollers for hard-to-reach areas
- » Measured surface temps, ambient air temps, dew point and delta, RH, profile thickness, and coating mil thickness measurements multiple times/day for all coatings and to stay within manufacturer's specs

## SAFETY CONSIDERATIONS:

- » Followed an IIPP to avoid heat exhaustion



Working in September in San Diego meant dealing with ambient temperatures up to 102 °F. That required that the crew follow an IIPP to avoid heat exhaustion.

said. "That whole plant, it's got lines running all over the whole plant. That is the main tank. So you're always kind of thinking this could go wrong if something happens." He said that's top of mind during the entire project, but there is a sprinkler system for fire suppression on site, too. "Right now, it's a fire-suppression system that, if it does blow, it'll get encapsulated with foam. Sometimes there's a little glass bubble in the fire sprinkler, and if that bubble breaks, then we would be encapsulated in foam in one second. So we had to [mark] those off and be careful not to get the blast hose or the nozzle or bump into one for the ones that were overhead. So we had to be careful and cognizant the whole time."

The crew got the job done in three weeks, and it came out looking great. "I just got another compliment the other day on how beautiful it looks," Heuslein said. "It looks like it was dipped. Looks brand new." That's a sunny outcome for all. **CP**

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