Board of County Commissioners

DEPARTMENT OF PUBLIC WORKS
SOLID WASTE MANAGEMENT DIVISION

December 11, 2012

Mr. Steve Morgan, Environmental Engineer
Florida Department of Environmental Protection
Southwest District
Solid Waste Program
13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926

Re: Permit Condition C.8.g (3) Leachate Storage Tank Systems Inspection

Dear Mr. Morgan,

In compliance with Permit Condition C.8.g (3), please find the Leachate Storage and Treatment Tank(s) Inspection Report. It should be noted that no deficiencies were noted during the inspection and the leachate storage tank system was found to be in good condition and is functioning as designed.

If you have any questions, please do not hesitate to contact me.

Sincerely

T. Casey Stephens
Director

Dept. Of Environmental Protection
DEC 14 2012
Southwest District

CC: Ken Frink, P.E., Director, Public Works Department
Cathy Winter, Contract Compliance, Solid Waste Division
Jerry Nussbaum, Citrus County Utilities

T. Casey Stephens, Director
Citrus County Division of Solid Waste Management
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Citrus County, Florida

Leachate Storage and Treatment Tank(s)

Inspection Report

Prepared by

T. Casey Stephens

Citrus County Division of Solid Waste Management

P.O. Box 340, Lecanto, Fl 34460

Citrus County Central Landfill

230 W. Gulf to Lake Highway, Lecanto, Fl 34461

December 12, 2012

Leachate Storage Tank and Treatment Tank Inspection Regulations

Leachate Storage and Treatment Tanks shall be inspected in compliance with Rule 62-701.400 (6) (c) 9. F.A.C., "the interior inspections of tanks shall be performed whenever the tank is drained, or at a minimum of every three years."

Background – Leachate Storage Tanks

The Leachate storage tanks consists of two 125,000 gallon each cast-in-place concrete tanks constructed in 1996. During a site inspection by FDEP at the landfill facility, a series of visible cracks on the exterior of the leachate storage tanks was noted on the report.

Cracks were first visible in 2000, at which time an inspection was made by WCG, Inc. Their conclusion indicated that they were possibly caused by concrete shrinkage and to repair with epoxy injection, which was completed during May of 2000.

The County decided to have another structural inspection evaluation completed to insure the integrity of the tanks have not been compromised. On July 26, 2011, the inspection was completed by Cardno TBE and its structural engineering sub-consultant, Engineering Technologies. A copy of the report including site evaluation, existing conditions, pending improvements, summary and recommendations is attached.

The County had started the process for refurbishing the secondary containment area, the removal and replacement of all of the existing joint sealants in the tank walls, the secondary containment walls and the secondary containment base slab and tank exterior. An inspection had been completed by Tnemec products sales representative, Bill Langer with Florida Protective Coatings and an inspection recommendation for surface preparation and materials to be used submitted. (A copy of the report is included in the Cardno report for reference.)

Evaluation

The Cardno TBE and Engineering Technologies evaluation found the storage tanks and the containment structure to be in good condition relative to their age and there does not appear to be major structural deficiencies or the need for major structural repairs.

Items noted: Several surface cracks were observed around the perimeter of the tanks; the epoxy coating on the interior of the secondary containment had minor blisters and the expansion joints within the walls and slab of the secondary containment were in poor condition.

It was also stated that they concurred with the proposed surface preparation and application of the proposed Tnemec products and preparation.

Storage Tank Exterior and Secondary Containment Refurbishing

During the month of April, 2012 the project was completed using the following products by Crystal Coating LLC, a contractor with experience on previous projects for the Landfill's leachate system using Tnemec products. (Notation: Products used were revised from the initial inspection recommendation)

Tnemec products: Series 151 Part A Elasto-Grip FC, Series F 151-1051B Elasto-Grip FC Green Converter, Series 156 Enviro-crete, Series N69 Part B H-B Epoxoline II Converter, Series 215 Part A Surfacing Epoxy Primer, Series 215 Part B Surfacing Epoxy Converter and No. 4 Thinner was used for the Storage Tanks.

Sikaflex 1A from Coastal Construction Products, Inc. and backer material purchased at Lowe's was used to complete the expansion joint replacement. Figures 1 and 2 illustrate completion of the refurbishing.

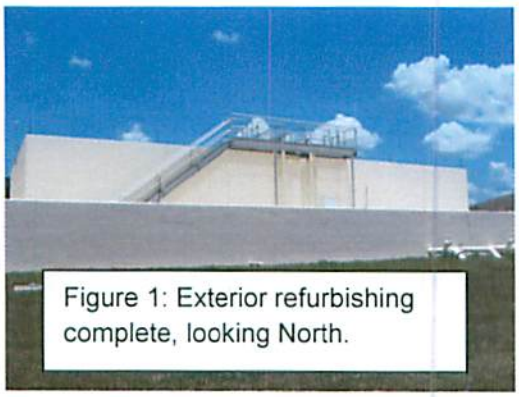

Figure 1: Exterior refurbishing complete, looking North.

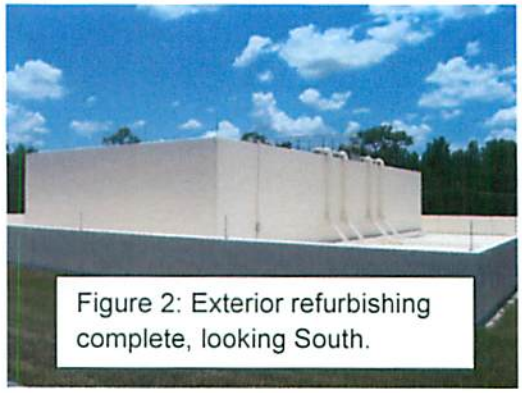

Figure 2: Exterior refurbishing complete, looking South.

Leachate Treatment Tanks Cleaning and Inspection (Permit Compliance)

During the month of March, 2012 Citrus County Utilities conducted a Cleaning and Inspection of the Leachate Treatment Tanks (SBR #1 - #4). The tanks were drained, sludge/sediment were removed using manual labor and a 5,000 gallon Pump Truck. The tanks were then inspected by Citrus County Certified Wastewater Treatment Operators familiar with the maintenance and operation of the plant, for imperfections in the walls or floors of the tanks. No imperfections or damage to the interior of the tanks were noted during the inspection. Minor rust spots identified were mechanically sanded and spot painted to prevent further corrosion of the tanks. The tanks were observed to be in good operating condition and able to perform as intended. Figures 3 - 6 document the condition of the interior of the tanks after they were cleaned and inspected. The Citrus County Utilities Department recommended continuing preventative maintenance to prevent long term deterioration of the tanks. Notes documenting the cleaning and inspection of the Leachate Treatment Tanks are maintained on site and are available for inspection. Utilities also recommended continued use of the tanks until such time as they are taken out of service due to the future installation of the Leachate Force Main to connect directly to Citrus County Utilities Wastewater Treatment System.

Figure 3: SRB #1 (Digestor) Tank interior post-cleaning.

Figure 4: SBR #2 – Tank interior post-cleaning, prior to diffuser re-installation.

Figure 5: SBR #3 – Tank interior post-cleaning, diffusers re-installed.

Figure 6: SBR #4 – Tank interior post-cleaning.

Storage Tank Interior Cleaning and Inspection (Permit Compliance)

During the month of April, 2012 and prior to the exterior refurbishing project, Citrus County Solid Waste contracted with Citrus County Utilities to conduct the inspection of the interior of the two 125,000 gallon cast-in-place concrete tanks.

This cleaning and inspection of the Leachate Storage Tanks was intended to be completed by May 2012. The North tank was completed; however, as is well documented over 30" of rain was recorded on the site between late May and September of 2012 generating millions of gallons of leachate. Therefore Solid Waste was forced to suspend the cleaning/inspection operation until such time as leachate levels returned to normal and steps could be taken to reinitiate the project. The inspection on the South tank was finally completed on December 5, 2012.

The individual tanks were drained; sludge/sediment was cleaned through a combination of manual labor and water jetting and vacuumed out of the tank by a Citrus County Road Maintenance Vacuum Truck. The diffusers were removed, cleaned and re-installed. The interior of the tanks (walls and floor) were inspected by Citrus County Certified Wastewater Treatment Operators. The elasticized polymer coating on the interior of the tanks was found to be intact and functioning as intended. Some air bubbles were found between the concrete wall and the interior coating and according to previous reports, as long as the "bubbles" were intact and not broken, the interior coating would continue to function and not be a threat to allow leachate to come into contact with the concrete walls or floor. Notes documenting the cleaning and inspection of the Leachate Treatment Tanks are maintained on site and are available for inspection. Figures 7-10 document the cleaning and inspection of tanks.

Figure 7: South Tank cleaning process, December, 2012.

Figure 8: North Tank interior post-cleaning, May, 2012.

Figure 9: North Tank interior wall with intact air bubble.

Figure 10: South Tank interior post-cleaning, December 2012.

Conclusions

The cleaning and inspection of the Leachate Storage Tanks and the Leachate Treatment Tanks by Certified Operators from the Citrus County Utilities Department as required by permit found that the tanks are in good condition, properly maintained and able to function as designed. Citrus County Utilities Department recommends that Solid Waste continue regular maintenance and inspection of the Leachate Storage Tanks and the Leachate Treatment Tanks in order to continue to provide proper safe and environmentally sound handling of the leachate.

CITRUS COUNTY, FLORIDA

Technical Memorandum

Landfill Leachate Storage Tank Evaluation

Prepared for

CITRUS COUNTY
SOLID WASTE MANAGEMENT

P.O. Box 340
Lecanto, FL 34460

Prepared by

Cardno TBE

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Engineering Technologies, Inc.
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Cardno TBE Project Number 00084-006-01

September 2011

Introduction

The Citrus County Central Landfill is located at 230 W. Gulf to Lake Highway, in Lecanto, Florida. Included with the leachate treatment system are two 125,000 gallon each cast-in-place concrete tanks constructed in 1996. The County contracted with Cardno TBE to evaluate the condition of the existing tanks and make recommendations on repairs, if needed.

Site Evaluation

On July 26, 2011, Cardno TBE and its structural engineering subconsultant, Engineering Technologies, accompanied Mr. Jerry Nusbaum of Citrus County to the subject site to inspect the existing leachate storage tanks. Visual inspection of the tanks was made and digital photographs were taken. Representative photographs are included below:

Storage tank and containment structure looking west

Exterior of storage tank (south end)

Containment structure viewed from stairs

Exterior of storage tank (north end)

Interior of storage tank viewed from walkway

Subsequent to the site inspection, "Constructin" drawings of the existing tanks and perimeter masonry walls were viewed at the County's office. These drawings indicate that the tank walls are 12-inch thick cast-in-place reinforced concrete and approximately 40 ft x 80 ft in plan dimension. The secondary masonry containment walls are constructed of 12" CMU and are 4'-8" tall.

Existing Conditions

The existing concrete tanks and containment structure generally appear to be in good condition. County personnel indicated that leakage from the tank has not been observed to date. Upon inspecting the tanks, several surface cracks were observed around the perimeter of the tank. These cracks appeared to be related to temperature and shrinkage and are likely made more visible due to the coating on the exterior of the tank. Similar cracking patterns were not visible on the interior of the tank due to the existence of an epoxy coating. The coating did appear to have a few locations containing minor blisters but appeared to be in good condition.

The masonry perimeter wall and slab-on-grade were previously painted similar to the exterior of the tanks. The expansion joints within the walls and slabs were in poor condition and the County indicated some backer material had been removed in anticipation of rehabilitation work. The containment area had standing water from rainwater present near the existing drains.

Pending Improvements

It is our understanding that the exterior of the tanks are to be sandblasted and re-coated in the near future. This includes the secondary masonry containment wall. The interior of the tank, which is currently coated, will not be re-coated. We understand the tanks had been previously inspected by a Tnemec representative to provide recommendations for the suggested coating materials of the tank exterior and masonry walls. These recommendations have been provided to us (attached). It is also our understanding that the existing joint sealants in the tank walls, the secondary containment walls, and the secondary containment base slab are going to be repaired.

Summary and Recommendations

In general, the storage tanks and the containment structure are in good condition relative to their age. There does not appear to be major structural deficiencies or the need for major structural repairs. Tnemec provides high quality products and we concur with the proposed application of products in the attached *Coating Recommendations* provided by Mr. Langer of Florida Protective Coatings Consultants, Inc. Please note the following recommendations to consider relative to the proposed resurfacing work:

- Preparation and resealing/painting work should be performed by a properly trained contractor with adequate experience on similar projects.
- Existing piping, conduit, panels, and appurtenances should be adequately protected during sand blasting activities.
- All joints should be repaired using a backer rod and sealant. The backer rod should be sized at least 25% larger than the joint itself. These repairs are considered to be of more pertinence than any coatings that may be performed due to their ability to ensure water-tightness of the secondary containment structure.
- Where leakage occurs after the tank wall surface preparation has been performed an appropriate crack injection system should be used to achieve water-tightness.
- All coatings and surface preparation should be performed as described in Tnemec's *Coating Recommendations* provided by Mr. Langer.

Coating Recommendation
Secondary Containment
Citrus County Landfill Leachate Tank Area
Lecanto, FL

Service:

Provide a secondary containment lining for an existing concrete dyke area which includes a floor, block walls, and a portion of the poured wall on the existing storage tank. Exposure is exterior central Florida weathering and potential spillage of leachate from the tank. An optional polyurethane finish has been included for the secondary containment area to provide enhanced color and gloss resistance. All areas to be coated are currently coated.

Substrate: Concrete

Two areas to be coated;

The secondary containment area consists of the lower portion of the tank, which is equal to the height of the perimeter wall, existing concrete floor, and cmu perimeter wall.

The tank exterior, above the height of the perimeter wall, and the exterior of the containment wall all to be coated.

The caulking joints.

Surface Preparation: Concrete

Remove all grease, oil, dirt, dust, mold, mildew, and other soluble contaminants by High Pressure Water Cleaning (minimum 3000 psi, 3 to 5 gallons per minute, potable water) or steam cleaning. Steam cleaning with a degreaser or emulsifier may be required before abrasive blasting for oily areas. A cleaner such as TSP or equivalent must be used.

Check for oil contamination and clean appropriately.

Brush-off Blast abrasive clean (abrasive blasting) the secondary containment coating. Abrade the surface to achieve a minimum 1.5 mil blast profile.

For the tank exterior and exterior perimeter wall, pressure wash using a minimum 3000 psi, 3 to 5 gallons per minute, potable water.

All surfaces must be clean and dry prior to the application of any coatings. Apply the first coat as soon as possible to avoid contamination of the surface.

Remove all old and loose caulking to bare substrate. Caulking should be ½ as deep as it is wide with backer rod. Use Sika 2c NS for all joints after the coating has been replaced. Contact Coastal Construction products.

Coating System: Secondary Containment Concrete

Spot Prime: For areas damaged to bare concrete, prime with Tnemec Series N69-1211 Hi-Build Epoxoline II polyamidoamine epoxy @ 4.0-6.0 mils DFT. If surfacing is required, use Tnemec Series 215 Surfacing Epoxy to bring up to level.

First Coat: Apply one coat (1) Tnemec Series N69 Hi-Build Epoxoline II polyamidoamine epoxy @ 4.0-6.0 mils DFT.

Note: Broadcast aggregate at this point in the application for a non-skid surface.

Second Coat: Apply one coat (1) Tnemec Series N69 Hi-Build Epoxoline II polyamidoamine epoxy @ 4.0-6.0 mils DFT.

Optional Topcoat: Apply one coat (1) Tnemec Series 290 CRU aliphatic polyester polyurethane at 2-3 mils dft.

Coating System: Exterior Tank and Perimeter Wall

Patching: Areas where the existing concrete has been damaged or spalled should be brought up to level before proceeding.

Primer: Apply (1) coat of Tnemec Series 151 Elasto-Grip FC water-based polyamine epoxy at between 250 and 350 sf / gallon.

Crack Repair: Fill hairline cracks (less than 1/64" wide) by brushing 1 coat of Series 156 into the crack.

Finish Coat: Apply one (1) coat of Tnemec Series 156 Enviro-Crete modified waterborne acrylate at 4.0-6.0 mils d.f.t. Use the color of choice.