To date RLC Technologies has delivered nearly forty ATDU systems to projects around the world. The following presents an overview of a selection of these projects.

Project List

Africa 1 — Ghana

Material:
Contaminated Soils & Sludge
Drilling & Refinery Waste

Composition:
Solids Content: ±60%
Oil Content: ±20%
Water Content: ±20%

Start Date: November 2010
Processing Rate: 3 to 6 ton/hour

Project Description:
RLC Technologies was contracted by ZOIL Services Limited to deliver a 72" diameter ATDU facility for operation in Ghana. The unit was to treat crude oil tanker bottoms and marine waste, drill cuttings, fixed tank bottoms and oily sludge, general refinery waste, filter cakes, PAHs, PCBs as well as soils contaminated with engine and hydraulic oil, kitchen and galley grease. Pesticides, TCE, PCE and other chlorinated organic compounds can be treated in the ATDU without the formation of dioxins and furans due to the non-oxidizing environment inside the ATDU.

The unit was provided with a stack disc centrifuge skid as well as thermal oxidizer for the treatment of non-condensable process gases.

Africa 2 Nigeria

Material:
Contaminated Soils & Sludge
Drilling & Refinery Waste

Composition:
Solids Content: ±60%
Oil Content: ±20%
Water Content: ±20%

Start Date: November 2010
Processing Rate: 3 to 6 ton/hour

Project Description:
RLC Technologies delivered an 84" ATDU for Titan Projects Ltd. operations at the Bonny facility in Port Harcourt, Nirgeria for the processing of oily sludges and exploration waste. The unit has been in continuous operation since 2006.

Canada

Material:
Hydro catalyst Waste

Composition:
Solids Content: ±25%
Oil Content: ±25%
Water Content: 50%

Start Date: 2022
Processing Rate: 3-6 ton/ hour

Project Description:
RLC Technologies was contracted to design build a thermal desorption facility for the de-oiling of spent catalyst. After the oils are removed the catalysts materials are further processed to recover the base metals.

China 1 中国石油天然气集团公司

Material:
Contaminated Soils & Sludge
Drilling & Refinery Waste

Composition:
Solids Content: ±60%
Oil Content: ±20%
Water Content: ±20%

Start Date: November 2010
Processing Rate: 3 to 6 ton/hour

Project Description:
RLC Technologies delivered a pilot scale thermal desorption unit to China for the demonstration of treatment capability for oil refinery waste inside a PetroChina oil refinery. The unit has operated successfully and further expansions are now underway.

China 2 舟山麦哲伦环保科技有限公司

Material:
Marine waste and tank bottoms

Composition:
Solids Content: ±20%
Oil Content: ±20%
Water Content: ±50%

Start Date: March 2021
Processing Rate: 8 ton/hour

Project Description:
RLC Technologies was contracted by Magellan to deliver our largest ATDU system to date. The unit is built around a 96 inch diameter rotary kiln 56 feet in length. The unit is designed to process 8 tons per hour of heavy tank bottom waste to a clean-up level of less than 0.3 percent hydrocarbons.

China 3 上海永津环保技术有限公司

Material:
Drilling Waste

Composition:
Solids Content: ±60%
Oil Content: ±20%
Water Content: ±20%

Start Date: May 2021
Processing Rate: 10 ton/hour

Project Description:
RLC Technologies contracted by YEPS to deliver an ATDU system for the processing of drilling waste in Chinas Sichuan region. The unit is built around a 76 inch diameter drum 48 feet in length. The unit is reducing oil concentration in drilling waste to less than 0.3 percent.

Europe 1 — Tradebe

Material:
Contaminated Soils & Sludge
Drilling & Refinery Waste

Composition:
Solids Content: ±60%
Oil Content: ±20%
Water Content: ±20%

Start Date: November 2010
Processing Rate: 3 to 6 ton/hour

Project Description:
RLC Technologies was contracted by Tradebe to construct a 66" diameter ATDU system for the processing of oily refinery waste and bio-solids for an oil refinery in Puertollano, Spain. The unit operated at a nominal capacity of 5 tons per hour with a material cleanup level of over 99%.

Europe 2 — Lezama

Material:
Refinery Waste
Bio-Solids
Contaminated Soils & Sludge

Composition:
Solids Content: <30%
Oil Content: >30%
Water Content: >40%

Start Date: September 2008
Quantity Treated: +30,000 tons
Processing Rate: 2.5 ton/hour

Project Description:
RLC Technologies was contracted by Lezama to construct a 54" diameter ATDU system for the processing of oily refinery waste and bio-solids in Bilbao, Spain. The unit is installed in a Repsol oil refinery. Twin centrifuge operations preceded the ATDU system. Due to the high liquid loading in the feed material, special provisions were made to allow for the direct pumping of oily sludge into the ATDU feed screw conveyor. The ATDU has processed feed materials with liquid loading up to 90% by weight. Discharged solids have a high caloric value and are therefore sold as an auxiliary fuel which can be blended for firing in cement kilns or industrial furnaces. Non-Condensable process gases are returned to the ATDU furnace for oxidation.

Kuwait 1 — NNC / Kuwait Oil Company

Material:
Crude Oil Contaminated Soil

Composition:
Solids Content: ±70%
Oil Content: ±25%
Water Content: ±5%

Start Date: July 2005
Quantity Treated: +75,000 tons
Processing Rate: 3.5 ton/hour

Crude Oil Sludge Pond Remediated by ATDU

Project Description:
RLC Technologies was contracted to manufacture equipment the National Cleaning Company to remediate a Kuwait Oil Company (KOC) crude oil waste lagoon as well as process waste from drill cuttings, crude oil and waste from the '91 war. The RLCT plant has been in continual use and remains in use today, processing these waste streams. Cleanup criteria was 1% (~10,000 mg/L)

RLC Technologies continues to support the equipment by providing technical knowledge as needed and procuring spare parts for our customer.

Kuwait 2 — NCC / Kuwait Oil Company

Material:
Crude oil contaminated soils and Sands, drill cuttings

Composition:
Solids Content: ±40%
Oil Content: ±20%
Water Content: ±30%

Start Date: Q1 2015
Processing Rate: 5-10 ton/ hour

Project Description:
RLC Technologies was contracted by National Cleaning Company to construct an 84" diameter by 56' length ATDU system for the processing of crude oil contaminated soil and sand for the Kuwait Oil Company. The unit is the second ATDU provided to this customer in Kuwait and will service the Kuwait Oil Company. The plant is fired with No.2 oil and features an RLC built Thermal Oxidizer Unit for the handling of non-condensable vapors.

Kuwait 3 — Kuwait Oil Company

Material:
Crude oil contaminated soils and drill cuttings

Composition:
Solids Content: ±40%
Oil Content: ±20%
Water Content: ±30%

Start Date: Q4 2015
Processing Rate: 5-8 ton/ hour

Crude Oil Waste – Kuwait Oilfields

Project Description:
RLC Technologies was contracted by GS Engineering & Construction to construct an 76" diameter by 48' length ATDU system for the processing of crude oil contaminated soil and sand for the Kuwait Oil Company. The plant is fired with No.2 oil and features an RLC built Thermal Oxidizer Unit for the handling of non-condensable vapors.

Kuwait 4 — NCC / Kuwait Oil Company

Material:
Crude oil contaminated soils and drill cuttings

Composition:
Solids Content: ±30%
Oil Content: ±20%
Water Content: ±40%

Start Date: Q2 2022
Processing Rate: 5 ton/ hour

Kuwait Indirect Fired Thermal Desorption Unit

Project Description:
RLC Technologies was contracted by National Cleaning Company Kuwait to construct an 84" diameter by 56' length ATDU system for the processing of fresh OBM drilling waste for the Kuwait Oil Company. The plant is fired with No.2 oil and features an RLC built Thermal Oxidizer Unit for the handling of non-condensable vapors.

Mexico

Material:
Drilling Waste

Composition:
Solids Content: ±60%
Oil Content: ±20%
Water Content: ±20%

Start Date: 1995
Processing Rate: 8 to 10 ton/hour
Project Description:
The first ATDU designed and built for operations outside the US, this 84” diameter ATDU operated in Villahermosa, Mexico processing drilling waste at a rate of 8-10 tons per hour. The unit went into operation in the mid 1990’s.

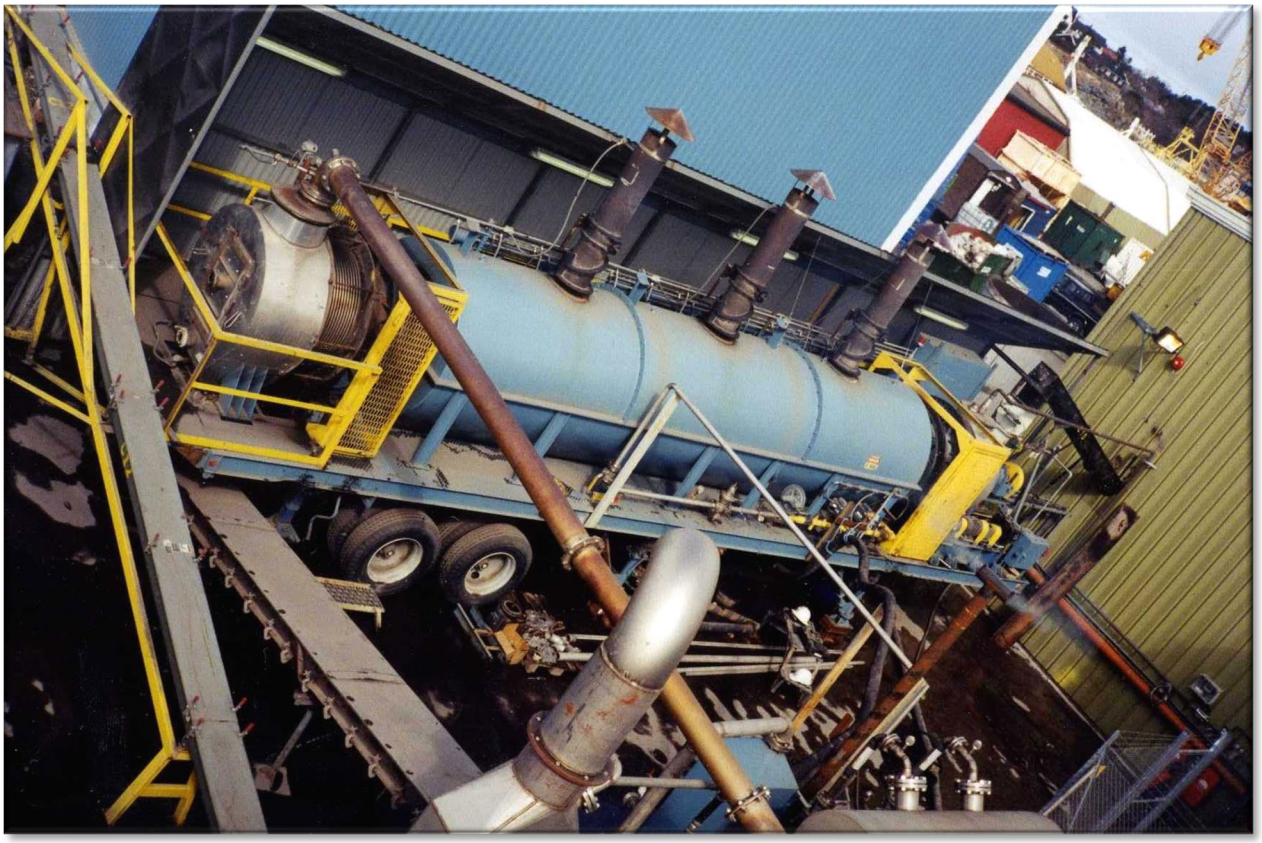
Norway

Material:
Drill Cuttings

Composition:
Solids Content: ±50%
Oil Content: ±25%
Water Content: ±25%

Start Date: 2000
Processing Rate: 2 to 4 ton/hour

Project Description:
RLC Technologies delivered a 42” diameter indirect fired thermal desorption unit to Kristiansund, Norway for the processing of drilling cuttings from the North Sea.



Oman 1 — TRADEBE / PDO

Material:
OBM Drill Cuttings

Composition:
Solids Content: ±80%
Oil Content: ±10%
Water Content: ±10%

Start Date: 2017
Processing Rate: 8 ton/ hour

Project Description:
The 54" Diameter ATDU system is operated by Tradebe in the service of the PDO (Petroleum Development Oman). The unit is processing OBM drilling waste at a maximum rate of 5 metric tons per hour. The unit operates in parallel with a 66” diameter RLC ATDU.

Oman 2 — TRADEBE / PDO

Material:
OBM Drill Cuttings

Composition:
Solids Content: ±80%
Oil Content: ±10%
Water Content: ±10%

Start Date: 2017
Processing Rate: 12 ton/ hour

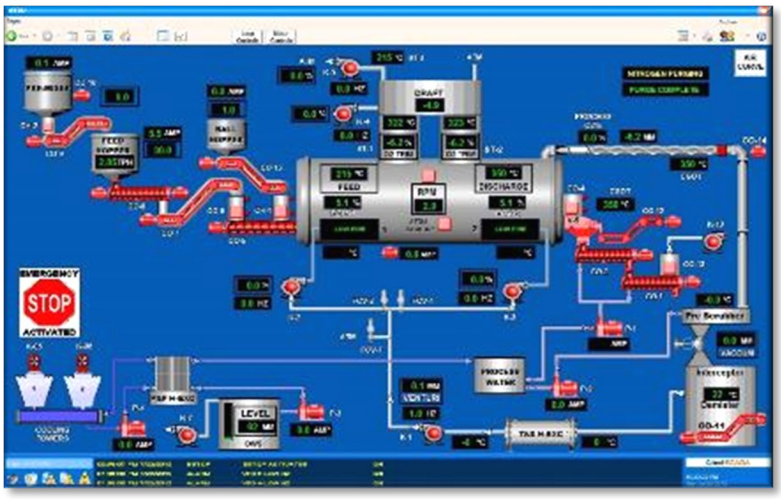
Project Description:
The 66" Diameter ATDU system is operated by Tradebe in the service of the PDO (Petroleum Development Oman). The unit is processing OBM drilling waste at a maximum rate of 8 metric tons per hour. The unit operates in parallel with a 54" diameter RLC ATDU.

Russia — Lukoil

Material:
Refinery Waste

Composition:
Solids Content: ±70%
Oil Content: ±10%
Water Content: ±20%

Start Date: 2013
Processing Rate: 2.5 ton/hour



Custom H.M.I. Control Screen

Project Description:
RLC Technologies was contracted by Argus Limited to construct a 54" diameter ATDU system to be installed in the Lukoil owned oil refinery in Perm, Russia. The unit is designed to process oily refinery waste at a rate of 2 metric tons per hour. A pre-mixer was provided to homogenize the various feed materials entering the system. Solids exiting the ATDU system travel to an adjoining briquetting facility for stabilization of heavy metals prior to disposal. Due to the extreme climate of the region (winter temperatures as much as -40°C) the unit is installed inside a building. Local regulations required that the ATDU system be built fully explosion proof (Ex d or NEC Class 1 Division 1) and feature a continuous emissions monitor system (CEM). The unit was built to all required Russian regulatory codes for GOST-R certification. Cleanup criteria was 0.5% (5,000 ppm)

Saudi Arabia

Material:
Crude oil contaminated waste

Composition:
Solids Content: ±60%
Oil Content: ±20%
Water Content: ±20%

Start Date: 2003
Processing Rate: 1 ton per hour

Project Description:
This ATDU system was a World Bank funded project for the processing of drill cuttings and the remediation of crude oil contaminated sands and soils. The unit has been in continuous operation for more than 15 years.

Singapore 1

Material:
Tank & Tanker Bottoms

Composition:
Solids Content: ±35%
Oil Content: ±35%
Water Content: ±30%

Start Date: 1997
Processing Rate: 1 to 2 ton/hour

Project Description:
The first ATDU in Singapore was were put into operation as part of the Singapore Clean Seas project for the remediation of tanker bottom sludge and marine wastes. This operation is notable for its successful processing of heavy, long chain hydrocarbons. A further 2 units were installed for parallel operation.

Singapore 2

Material:
Tank & Tanker Bottoms

Composition:
Solids Content: ±35%
Oil Content: ±35%
Water Content: ±30%

Start Date: 1997
Processing Rate: 2 to 4 ton/hour

Project Description:
Expanding on the success of RLCs first unit in Singapore, this second ATDU was put into parallel operation on the Singapore Clean Seas project for the remediation of tanker bottom sludge and marine wastes. This operation is notable for its successful processing of heavy, long chain hydrocarbons.

Singapore 3

Material:
Marine Waste
Contaminated Soils & Sludge

Composition:
Solids Content: >50%
Oil Content: <40%
Water Content: <30%

Start Date: January 2013

Processing Rate: 2 ton/hour

Project Description:
RLC Technologies was contracted by Vac-Tech Engineering to deliver a 54" ATDU system to Singapore for the processing of drill cuttings and oily sludge. The LPG fired ATDU features a double pass single stack design and is equipped with a continuous emissions monitor system (CEM) to ensure compliance to strict Singapore Air Emissions Regulations. Entering service in 2012, this unit remains in operation today processing of oily wastes, tank bottoms, drill cuttings and marine sludge at a rate of 2 metric tons per hour.

Hydrocarbon cleanup criteria is >0.5% (5,000 ppm)

St. Croix, US Virgin Islands

Material:
Refinery Sludge

Composition:
Solids Content: ±35%
Oil Content: ±35%
Water Content: ±30%

Start Date: 2001

Processing Rate: 1 ton/hour

Project Description:
RLC Technologies was contracted by Tetra Process Services to supply one 42” diameter indirect thermal desorption unit for the remediation of oil refinery waste sludges for the Hess Oil refinery in the US Virgin Islands.

Hydrocarbon cleanup criteria was >1% (10,000 ppm)

UAE 1 — Ruwais 1

Material:
Refinery Waste
Contaminated Soils & Sludge
Centrifuge Cake

Composition:
Solids Content: ±60%
Oil Content: ±20%
Water Content: ±20%

Start Date: September 2008
Quantity Treated: +40,000 tons
Processing Rate: 1.5 ton/hour

Project Description:
Commissioned for the TAKREER Central Environment Protection Facility (BeAAT) in the United Arab Emirates, this 54" ATDU system was put into operation in the fall of 2008 and has now been in continuous operation for more than 10 years. The equipment is used to process petroleum hydrocarbon sludge, filter clays and contaminated soils from the Takeer facility located in Ruwais, UAE. The RLCT plant has been in continual use and remains in use today, processing these waste streams. RLC Technologies provided on site support for the equipment and training for the operation of the Thermal Desorption System. RLC Technologies also provides ongoing support and spare parts for our customer.

UAE 2 — Habshan

Material:
Drill Cuttings

Composition:
Solids Content: ±70%
Oil Content: ±25%
Water Content: ±5%

Start Date: October 2002
Completion: 2005
Quantity Treated: +30,000 tons
Processing Rate: 3.5 to 4.5 ton/hour

Project Description:
RLC Technologies was contracted to manufacture equipment to be used for the ADCO drilling operations in Habshan, UAE. The equipment was used to process drill cuttings. The waste was be treated to reduce the Total Petroleum Hydrocarbon (TPH), as per EPA procedures SW846/8015B and 1664, to below an environmentally acceptable limit of 0.5% Weight/Weight and to satisfactorily dispose of or recycle all recovered solids, liquids and other material used in the performance of the Services in compliance with all applicable environmental laws, regulations and also ADNOC / ADCO guidelines. Additional TDU equipment supplied by RLC was installed in parallel as part of a facility expansion.

UAE 3 — Fujairah

Material:
Tanker Bottoms & Marine Waste

Composition:
Solids Content: ±35%
Oil Content: ±35%
Water Content: ±30%

Start Date: 2001

Processing Rate: 1.5 ton/hour

Project Description:
Located near the port in Fujairah, this 42" ATDU system was put into operation in the eastern United Arab Emirates for the processing of tanker bottoms and marine waste.

UAE 4 — Ruwais 2

Material:
Refinery Waste
Contaminated Soils & Sludge
Centrifuge Cake

Composition:
Solids Content: ±60%
Oil Content: ±20%
Water Content: ±20%

Start Date: 2020
Processing Rate: 1.5 ton/hour

Project Description:
Located near the port in Fujairah, this 42" ATDU system was put into operation in the eastern United Arab Emirates for the processing of tanker bottoms and marine waste. This is the second RLC ATDU unit commissioned by TAKREER at the same location.

UAE 5 — Habshan Expansion

Material:
Drill Cuttings

Composition:
Solids Content: ±70%
Oil Content: ±25%
Water Content: ±5%

Start Date: October 2003

Completion: 2005
Quantity Treated: +30,000 tons
Processing Rate: 3.5 to 4.5 ton/hour

Project Description:
RLC Technologies was contracted to manufacture equipment to be used for the ADCO drilling operations in Habshan, UAE. The equipment was used to process drill cuttings. The waste was be treated to reduce the Total Petroleum Hydrocarbon (TPH), as per EPA procedures SW846/8015B and 1664, to below an environmentally acceptable limit of 0.5% Weight/Weight and to satisfactorily dispose of or recycle all recovered solids, liquids and other material used in the performance of the Services in compliance with all applicable environmental laws, regulations and also ADNOC / ADCO guidelines. This facility was installed as an expansion to the existing ATDU facility installed the year previous. The two systems operated in parallel.

Drill cuttings in receiving pit prior to treatment

USA 1 — Tradebe SDS-I

Material:
Hazardous Materials
Industrial Wastes
Composition:
Solids Content: ±40%
Oil Content: ±20%
Water Content: ±30%
Metals: ±10%
Start Date: 2004
Quantity Treated: +50,000 tons
Processing Rate: 1.5 ton/hour

Project Description:
Commissioned in 2004 in East Chicago Indiana, the ATDU Solids Distillation System (SDS) has been in operation for more than 15 years processing RCRA listed waste streams and converting them into saleable products.

The ATDU facility offers waste generators an effective and cost-efficient method for recycling organic solid waste that might otherwise be disposed of. Prior to this technology, most organic hazardous waste solids were incinerated in a process designed to destroy the organic content by driving off volatiles and burning excess gases. Alternatively, the ATDU technology extracts the organics from hazardous waste solids to recover viable chemical products.

Most organic solids can be processed, including paint waste, solvent soaked rags, resins, polymers, production debris, refinery waste and discared commercial products. Sol long as the material is recycled, the process is exept from Resource Conservation and Recovery Act rules. Rather, once the material has been processed, the generator receives a Certificate of Recycling that affirms the materials have been recycled. The generator then has no further liability.

There are many benefits utilizing this process for organic solid waste. By virtue of receiving a Certificate of Recycling, the material is removed from the solid waste definition in 40CFR261. Putting potentially hazardous chemicals back into industrial process, the environmental friendly process achieves waste minimization and recycling goas by turning waste into a valuable product for industry. Recycled products are now used in numerous industries throughout the US in place of virgin chemicals. The system is even capable of processing materials contained in steel drums and containers, producing recyclable scrap metals for resale.

USA 2 — Tradebe SDS-II

Material:
Hazardous Materials
Industrial Wastes

Composition:
Solids Content: ±40%
Oil Content: ±20%
Water Content: ±30%
Metals: ±10%

Start Date: Q1 2015
Processing Rate: 3 ton/ hour

Project Description:
Building on the success of SDS-I, RLC Technologies built a new, higher capacity thermal desorption system for the SDS-II expansion in 2014. The unit remains in continuous parallel operation with SDS-1 processing RCRA listed waste streams and converting them into saleable products.

Materials are shredded to 2" parts prior to feeding into the ATDU. Once inside the ATDU organics are vaporized and plastics are pyrolyzed into vapors which are condensed in the provided vapor recovery unit. SDS-2 is the second ATDU installation at the site.

The ATDU facility offers waste generators an effective and cost-efficient method for recycling organic solid waste that might otherwise be disposed of. Prior to this technology, most organic hazardous waste solids were incinerated in a process designed to destroy the organic content by driving off volatiles and burning excess gases. Alternatively, the ATDU technology extracts the organics from hazardous waste solids to recover viable chemical products. Most organic solids can be processed, including paint waste, solvent soaked rags, resins, polymers, production debris, refinery waste and discarded commercial products.

USA 3 — HydrochemPSC 1

Material:
Refinery Waste Contaminated Soils & Sludge

Composition:
Solids Content: ±60%
Oil Content: ±20%
Water Content: ±20%

Start Date: September 2008
Quantity Treated: +40,000 tons
Processing Rate: 2.5 to 3.5 ton/hour

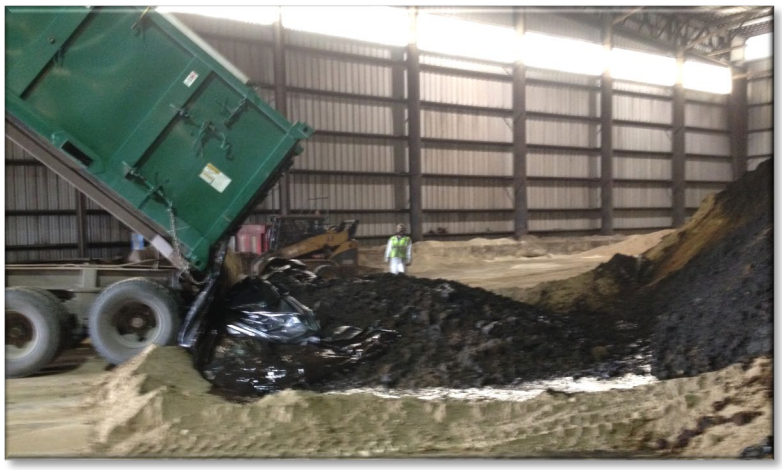
Project Description:
RLC Technologies was contracted by PSC to supply an ATDU system for a hazardous material recycling facility located in Norco, Louisiana. The facility processes refinery waste from the Shell and Valero refineries, as well as outside sources. The RLCT plant has been in continual use and remains in use today, processing these waste streams. Through the use of our ATDU system, PSC is able to 'de-list' hazardous waste materials, thereby substantially lowering their disposal costs for processed solids.

RLC Technologies continues to support the equipment by providing technical knowledge as needed, and procuring spare parts for our customer.

Cleanup criteria was 1% (10,000 ppm)

USA 4 — Waste Management 1

Material:
Crude oil contaminated soils and drill cuttings



Composition:
Solids Content: ± 75%
Oil Content: ± 15%
Water Content: ± 10%

Start Date: 2017
Processing Rate: 5 ton/ hour

Project Description:
As a replacement and upgrade to the existing ATDU system, Waste Management contracted RLC Technologies to build a new 84" diameter x 56' length ATDU system for their Chemical Waste Management Northwest facility in Arlington, Oregon. The system was designed with custom feed and discharge systems. RLC also designed and built a tank farm with more than 200,000 gallons of storage capacity including a custom water filtration and carbon absorption unit.

USA 5 — Veolia / Philips 66

Material:
Refinery Waste including centrifuged tank bottoms

Composition:
Solids Content: ±40%
Oil Content: ±30%
Water Content: ±30%

Start Date: 2014
Processing Rate: 8 ton/ hour

Project Description:
RLC Technologies was contracted by Veolia Water North America to construct a 96” diameter by 48’ length ATDU system for the processing of tank bottoms, oily sludge and refinery waste. The 96” ATDU is the largest built by RLC to date. The plant is fired with natural gas and features an RLC built Thermal Oxidizer Unit for the handling of non-condensable vapors.

USA 6 — Waste Management 2

Material:
Refinery Waste including centrifuged tank bottoms

Composition:
Solids Content: ±40%
Oil Content: ±30%
Water Content: ±30%

Start Date: 2018
Processing Rate: 5 ton/ hour

Project Description:
RLC Technologies was contracted by Waste Management to construct an 84” diameter by 56’ length ATDU system for the processing of petroleum hydrocarbons and contaminated soil. The plant is fired with natural gas oil and features an RLC built Thermal Oxidizer Unit for the handling of non-condensable vapors.

USA 7 — Gadieux Metals Recycling 1

Material:
Hydro catalyst Waste

Composition:
Solids Content: ±25%
Oil Content: ±25%
Water Content: 50%

Start Date: 2020
Processing Rate: 3-6 ton/ hour

Project Description:
RLC Technologies was contracted by Gadieux Metals Recycling to construct a 66 inch diameter rotary indirect thermal desorption unit for the processing of oily catalyst waste in their Texas facility. The processed catalysts is subsequently passed along for further processing to recover precious metals.

USA 8 — Gadieux Metals Recycling 2

Material:
Hydro catalyst Waste

Composition:
Solids Content: ±25%
Oil Content: ±25%
Water Content: ±50%

Start Date: 2021
Processing Rate: 3-6 ton/ hour

Project Description:
RLC Technologies was contracted by Gadieux Metals Recycling to construct a 66 inch diameter rotary indirect thermal desorption unit for the processing of oily catalyst waste in their Oklahoma facility. The processed catalysts is subsequently passed along for further processing to recover precious metals.

USA 9 — HydrochemPSC 2 / Marathon Petroleum

Material:
Refinery Sludge

Composition:
Solids Content: ±45%
Oil Content: ±10%
Water Content: ±45%

Start Date: 2020
Processing Rate: 2.5 ton/ hour

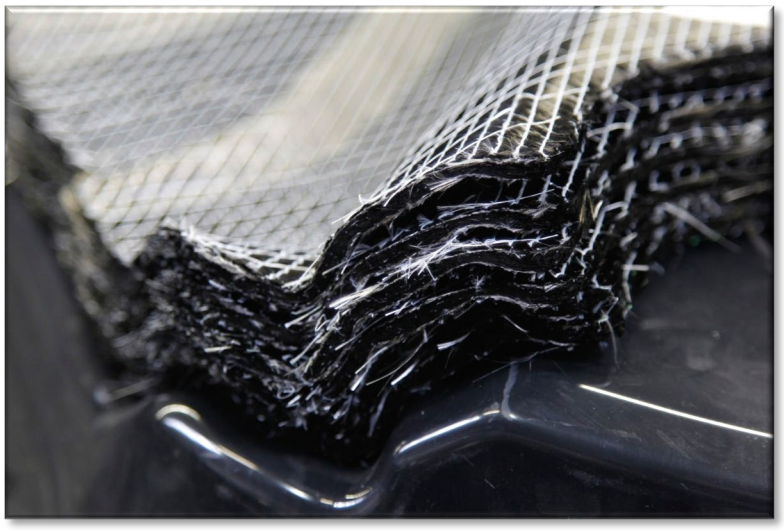
Project Description:
RLC Technologies was contracted HydrochemPSC to deliver a new ATDU system to replace an outdated thermal screw system at the Marathon Petroleum refinery in Garyville Louisiana. RLC supplied a new 54 inch diameter by 48 foot length indirect rotary thermal desorption unit. The unit is processing heavy oil refinery sludge and meeting US EPA delisting requirements.

USA 10 — Carbon Fiber Recycling

Material:
Carbon Fiber Waste Products

Composition:
Solids Content: ±90%
Resins

Start Date: 2022
Processing Rate: 1 tph



Project Description:
RLC Technologies was contracted Carbon Fiber Recycling to design and build a specialized indirect fired pyrolysis unit for the processing of carbon fiber waste. The unit is utilized in a process which is able to recover virgin quality carbon fiber for resale into the industry.