



**Vulcan Drying Systems  
Indirect Fired Thermal Desorption Unit**



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## Your Equipment Manufacturer for Material Processing

**Vulcan Drying Systems** is the global leader in the environmental remediation, thermal drying and calcining industries, specializing in the processing and recovery of a variety of materials, including frac sand, automotive shredder residue, bone meal, drilling muds, tank bottom sludge, and iron ore. Our indirect fired rotary kilns, electrically heated units and hot oil processors are currently being used in numerous remediation and recovery projects worldwide.

Vulcan Drying Systems are able to capture waste energy and convert waste materials to beneficial use, helping to reduce your company's disposal costs and environmental footprint. Our experienced and highly-qualified team can design and manufacture a system to fit your specifications and offer set-up, commissioning, training and maintenance support services over the lifetime of your project.

Visit our website to view videos, case studies and information on drying, calcining and thermal desorption processes and applications. Our knowledgeable staff will answer any questions you may have and will provide you with a variety of services in the design of your system, including drafting, mass and energy balance, ASPEN simulation, project management, engineering, and repair and preventative maintenance.

From agriculture to mining to the oil and gas industry, Vulcan Drying Systems can design a solution for almost any material or application. Let us develop a turnkey solution and manufacture the ideal system to meet your processing needs.

# Design Process

## Basis of Design

A document that records the concepts, calculations, decisions, and product selections used to meet the Project Requirements and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

## Material Flow & Energy Balance

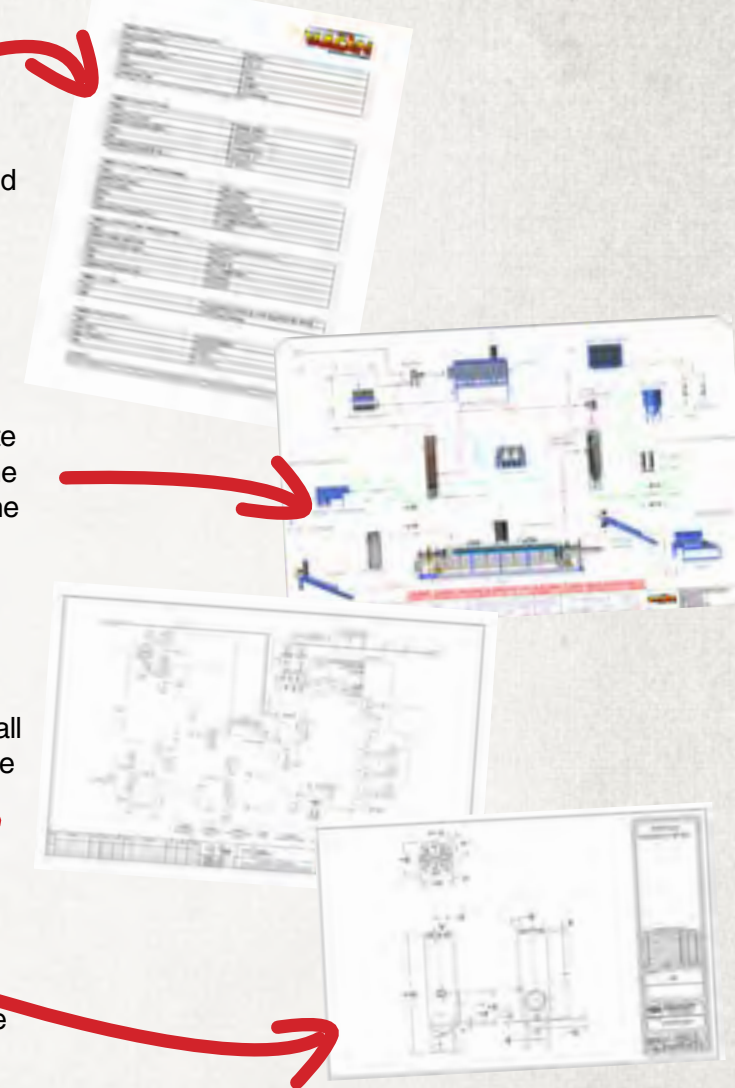
The Material Energy Balance document is used to calculate the mass transfer and/or conversion rate of material fed into the system, as well as the energy required and usage throughout the system.

## Piping & Instrumentation Diagrams

Piping and Instrumentation Diagrams are the basis from which all instrumentation, controls, operating and safety parameters of the system are designed.

## Detailed Design Drawings

All components are designed in detail and Bills of Material are produced for manufacturing, including additional parts for future maintenance.

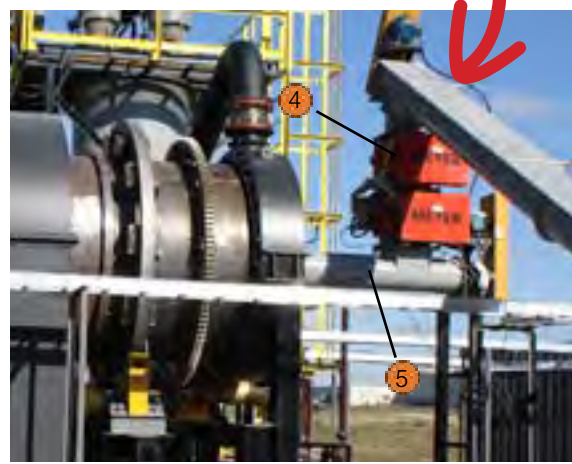


# Featured In



# Manufacturing





# Process & Components

Stockpiled drilling muds are transferred to a **1** feed hopper mounted on a **2** pugmill of the Primary Treatment Unit (PTU) by a backhoe or skid loader. From the pugmill, material travels via a **3** transfer auger to the system's **4** airlock, then through the **5** feed auger and into the PTU.

The PTU is a 6' diameter x 35' length, 3 heat zone, indirect fired 304 stainless steel **6** rotary kiln with **7** combustion chamber. The operating temperature of the drum is up to 950°F (510°C). The rotary kiln is housed in a combustion chamber with six (6) 2.7 MMBtu/hour **8** burners, totaling 16.2 MMBtu/hour of heat being transferred to the rotary kiln. The kiln operates in an oxygen-deficient and slightly negative atmosphere. Vapors from the contaminated soil are pulled out of the system in the opposite direction of the material flow.

The vapor from the PTU is pulled into the high-efficiency **9** quench scrubber that uses oil as the quench liquid, which is stored and redistributed in the **10** quench oil tank. The quench operates at 250°F (121°C) and removes dust particulate, as well as condensing the heavier hydrocarbons in the vapor stream.

The vapor not condensed in the quench scrubber is pulled through the **11** knock-out pot to our custom-built vertical helical heat exchanger. This unit is an **12** air-cooled helical rotary liquid chiller with 155 nominal tons of cooling provided by dual compressor circuits which reduces the vapor temperature to 70°F (21°C).

Fluid from the knock-out pot (the condensed water, oil, and sludge) is pumped through a series of **13** oil/water separator filters before being transferred to onsite storage tanks.

The non-condensable gases are pulled from the knock-out pot and pushed into the **14** Secondary Treatment Unit, also known as the thermal oxidizer, by an **15** induced draft fan where all remaining hydrocarbons are destroyed at temperatures of up to 2,000°F (1,093°C) with a residence time of up to two seconds.

The processed solids exit through the discharge system which consists of a **16** jacketed screw conveyor to cool the solids and an **17** airlock.

This entire operation is managed from the 8' wide x 40' long **18** control room that houses the programmable logic control, starters, and variable frequency drives for operating and monitoring the plant from a single console. Two fully-functional remote control panels are mounted outside right next to the equipment.



# Additional Options

## Caustic Scrubber

Optional caustic scrubber with mixing tanks, caustic spray manifold, and circulation system.

## Heat Recovery

Heat recovery system using heat from thermal oxidizer to preheat combustion air in burners. This option can save up to 25% of fuel consumption in the system.

## Waste Oil Burner System

Additional waste oil burner system consisting of waste oil burners, fuel train, filters, and waste oil storage tank with heating elements. Reusing recovered oil as fuel will drastically reduce fuel cost.

## Discharge Quench

The stack on the discharge auger can be fitted with spray nozzles alongside the length of the stack. The quench spray removes any excess particles from the gas stream before discharging the stream into the atmosphere.

# Solutions For Your Industry

This system can be custom-built to provide a solution to the environmental issues listed below, reducing your company's cost and environmental footprint.

Soil Remediation

Drill Cuttings

Tank Bottoms & Sludges

Mercury Contamination

Pesticide Contamination

Pyrolysis

Precious Metal Recovery



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