



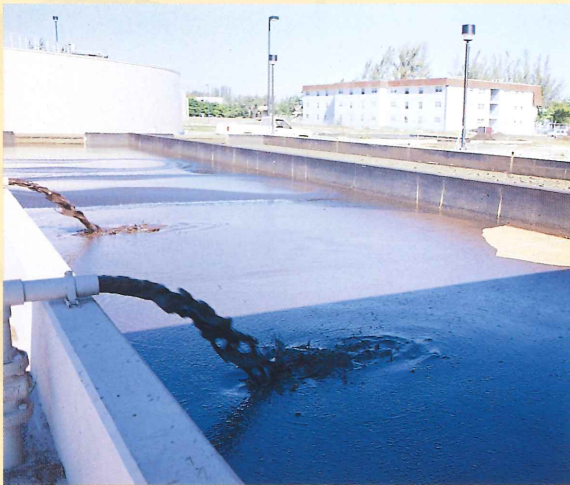
**WHITE
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The *Original* Vacuum Sludge Dewatering Bed



U. S. Environmental Products, Inc.

U. S. Patents 4,452,698, 4,481,114 ©1985 U. S. Environmental Products, Inc.

A Low-Cost Vacuum Sludge Dewatering System

The Vacuum Sludge Dewatering Bed uses a simple, efficient and cost-effective technology. It has become the system of choice for many sludge dewatering applications throughout the world. It accomplishes economical dewatering of most types of municipal waste and water treatment sludges, as well as a variety of industrial sludges.

The VSDB system combines the overall simplicity of conventional sand beds with the faster handling of sludges associated with mechanical systems. For most sludges, the result can be a liftable cake suitable for handling within 24 hours.

The advantages are several:

Versatile and Efficient Operation

At design operating conditions, the system reliably provides a dewatered sludge cake of predictable dry solids content. When operated at above normal design, the system still provides a liftable cake.

Low Labor and Maintenance Costs

The system has few moving parts. The reliable controls are familiar to most operators. Operating and maintenance costs are less than those of conventional drying beds. Because of the simplicity of the system, it may be operated and maintained by non-technical personnel.



Typical VSDB with Distribution Inlet Lines Shown.

The cake can be removed manually or by front-end loader. The rugged, abrasion-resistant media plates will withstand mechanical cake removal, providing years of trouble-free service. The durable media plates require essentially no maintenance. The VSDB filter is specifically designed for easy maintenance.

Low Energy Costs

Probably the lowest energy requirements of any system available.

Low Chemical Costs

The VSDB is furnished with a polymer feed system and normally uses less polymer than mechanical dewatering systems, resulting in substantial savings. Pilot testing in our laboratory provides predictable guaranteed results.

Low Total Costs

VSDB normally proves to be the most cost-effective dewatering device in the marketplace. Using EPA guidelines for 20 year Present Worth cost comparisons, the VSDB is typically less expensive than the cost of mechanical dewatering.

Other portions of the plant may be less expensive with a VSDB system. The filtrate from the system is low in solids and BOD, eliminating the need for extra treatment capacity to cope with recycled solids.



Four Bed VSDB Facility at a 120 MGD Water Treatment Plant in Sergio Cuevas, Puerto Rico.

Over 20 Years Experience In Vacuum Sludge Dewatering

U. S. Environmental Products, Inc. is the **ORIGINAL** manufacturer of the Vacuum Sludge Dewatering System.

EXPERIENCE

USEP has been in business since 1978 and enjoys over 20 years experience in the field of Vacuum Sludge Dewatering.

The VSDB has successfully been used for municipal waste, water, industrial and agricultural sludges such as:

- Aerobically Digested (W.A.S.)
- Aerobically Digested
- Ferric Sludge (Dewatering and Recovery)
- Alum (Dewatering and Recovery)
- Lime
- Primary
- Oxidation Ditch (Undigested)
- Livestock Waste
- Food Processing Industry
- Paper Industry
- Mining Industry
- Utilities
- Chemical Industry

RELIABILITY

For more than 20 years USEP has successfully installed over 200 vacuum dewatering systems.

USEP uses only high quality, long lasting components. Over 96% of the original equipment is still in operation.

All of USEP's mechanical and electrical systems use standard parts so replacement is days instead of weeks.

USEP now offers a 20-year limited warranty on its filter media which is the major component in the system.

FLEXIBILITY

The size of the beds is tailored to each of the installations. We presently have installations as small as 6' x 8' ranging up to beds 16' x 168', handling up to 20,000 lbs. of solids per application. In addition, USEP's VSDB's provide cross-over capabilities that result in minimum down time.

COMPATIBILITY

Vacuum Dewatering Beds have successfully been retro-fitted in existing sand beds, buildings, or within unusual land constraints.

When Supplemental processing of sludge is required, the VSDB has been used in conjunction with COMPOSTING-PRE-COAT-HEATING-BED ENCLOSURES-SOLAR.

Case histories and installation lists on all of the above are available through your local representative.



Composting VSDB Sludge at Cooper City, Florida.



Typical Bed Enclosure over a VSDB at Geneva, Illinois.

The System

How the Vacuum Sludge Dewatering Bed (VSDB) Works

Sludge is spread on the media plates through sludge inlet line valved discharge ports. Prior to this discharge, polymer is injected into the sludge and rapidly mixed at the polymer/sludge blender.

Gravity dewatering begins as the bed is filling. The clear liquid, separated from the flocculated solids flows down through the porous media, through the support plenum and out of the bed structure.

After the bed is filled to maximum liquid level, the conditioned sludge feed is shut off.

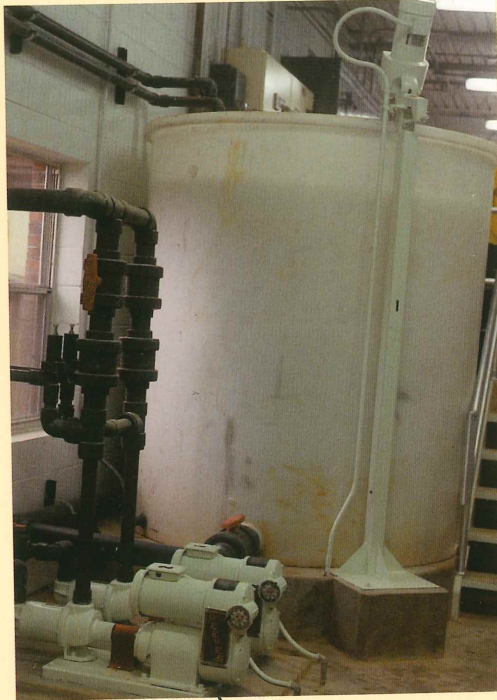
The vacuum pump is started creating a vacuum in the plenum and media causing a uniform pressure on top of the cake.

Motorized filtrate drain valves automatically controlled by level sensors discharge the filtrate from the plenum of the VSDB. Typically, filtrate suspended solids are less than 30 mg/l, indicating very high solids capture in the dewatered sludge.

As the sludge continues to consolidate and shrink, the resulting cake will start to crack. This will continue until the bed is uniformly cracked and the vacuum gradually lost. As the plenum area loses vacuum the vacuum pumps shut down.

The stop-gates can now be removed to allow a front-end loader access to the bed to remove the dewatered sludge. The surface is then washed down with high pressure, low volume water. This washdown water is discharged to the sewer or directed back to the head of the plant.

Following cleaning, the stop-gates are placed back into position and the facility is ready for another dewatering cycle. A complete dewatering cycle is typically 24 hours.



Polymer Feed Pumps

Polymer Mixing & Aging Tank



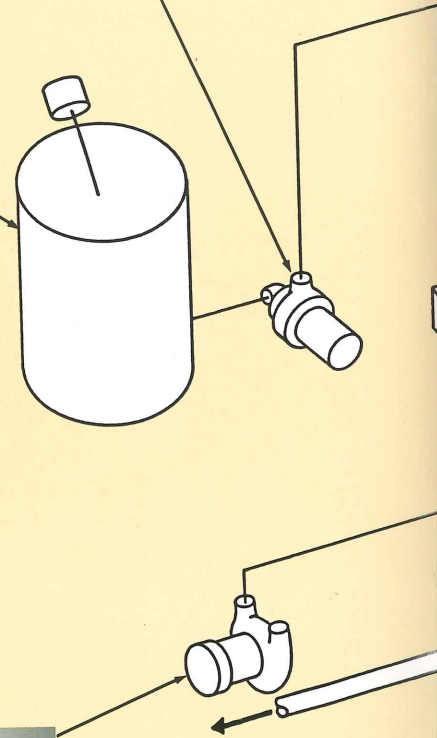
Typical Control Panel



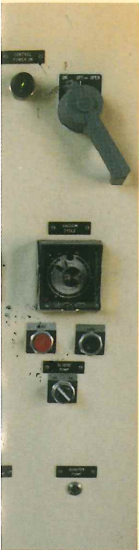
Typical Filtrate



Vacuum Pumps



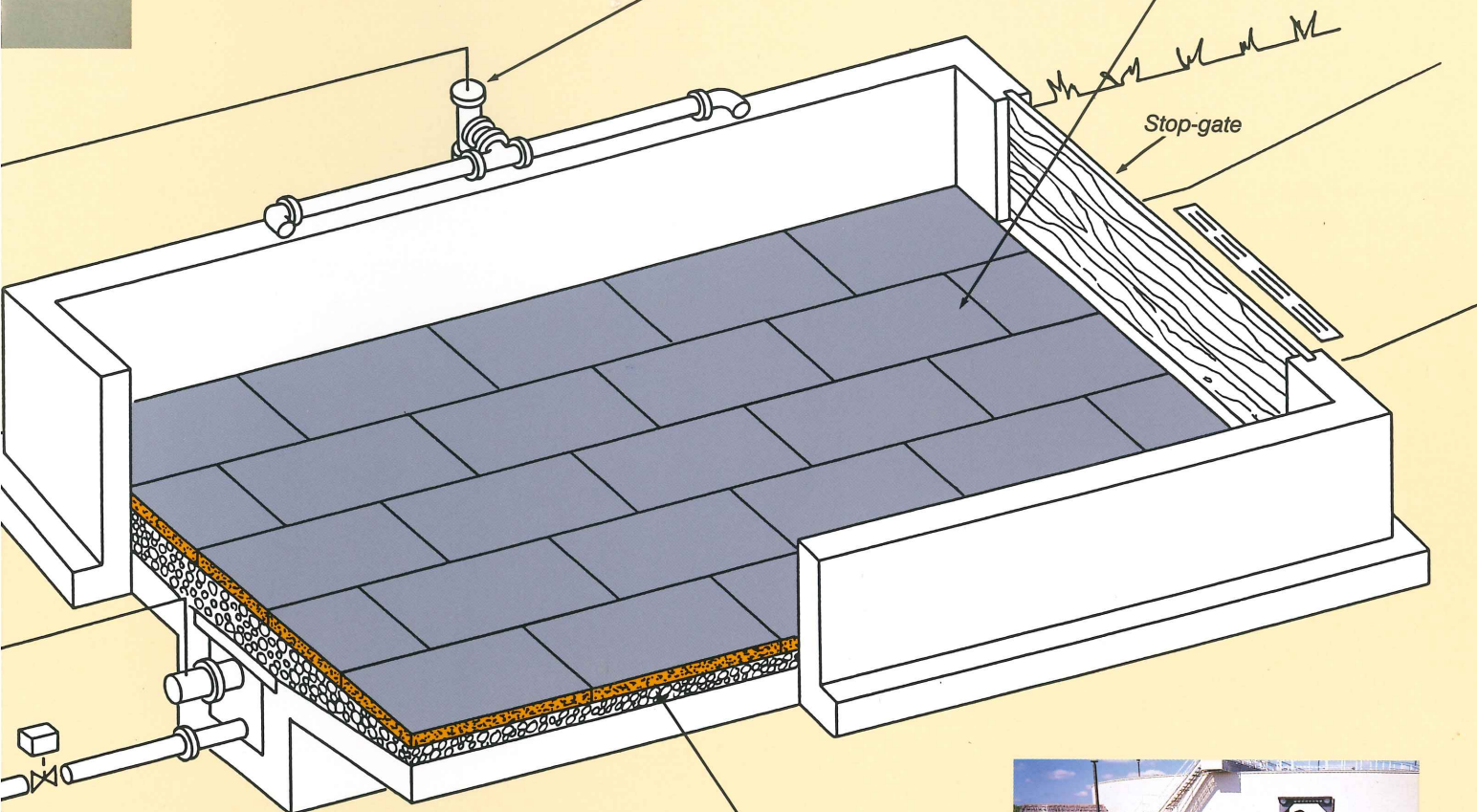
Level sensors a



Polymer/Sludge Blender



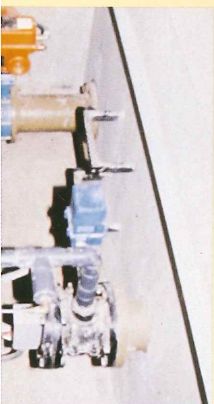
*Installed Filter Plates
Guaranteed for 20 years*



Plenum Area



Sludge removal by Front-end Loader



Motorized drain valve.



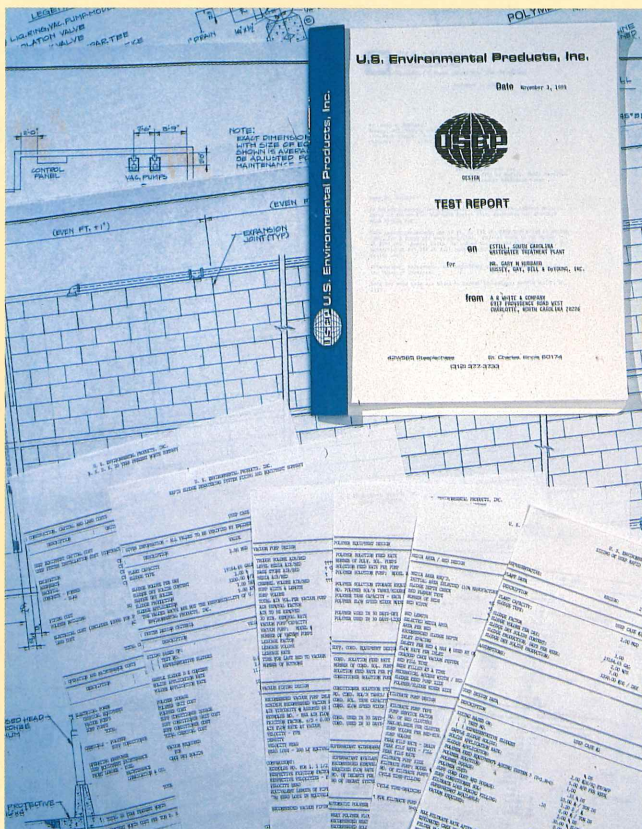
Typical Cracked Cake Uniformly Textured

Service You Can Expect From USEP

Lab Services

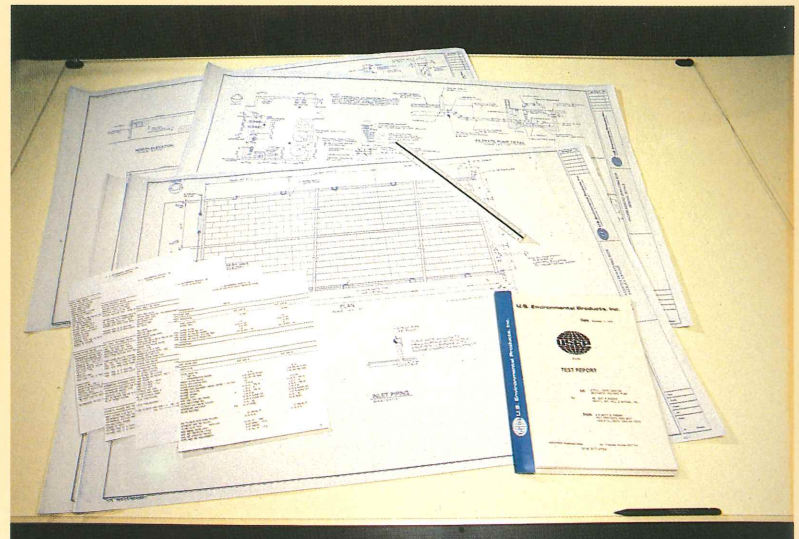
Our fully equipped laboratory is capable of analyzing most types of sludges as well as running bench scale pilot plants.

Highly-trained and experienced technicians are ready to test sludge to determine its dewatering characteristics, the most economical polymer and dosage, loading rates, and performance which can be expected from the sludge sample.



Engineering Services

~~USEP stands ready to submit complete engineering designs, estimates and the costs of operations. If desired, these can be compared to other types of dewatering methods using EPA and other currently accepted criteria to provide 20-year present worth cost-effective analyses. Standard 24" x 36" construction drawings are available which can be tailored to specific sites.~~



Field Service

USEP has field technicians with over 20 years experience in the field.

These technicians will supervise the installation as well as start-up and train plant personnel in proper use of the system.



Customer Service

USEP will periodically inspect your system to review operating procedures and equipment. You can at anytime send a sludge sample to have us verify type of polymer and dosage, loading rates, quality of sludge and performance. You can call USEP to help troubleshoot your dewatering problems.



Operational VSDB Facility

Completed water treatment facility with W-type thickeners designed by USEP.

20-Year Media Life Warranty

Warranty

U.S. Environmental Products, Inc. warrants the vacuum bed media plates to have a useful life of 20 years from the date of startup, subject to the terms herein. This applies to all projects; existing and future. The extended warranty is made in addition to the USEP customary "Twelve-Month Material and Workmanship Guarantee." If a media plate cannot be repaired and made suitable for its intended purpose; USEP will replace the media plate, fob jobsite. The charge for the replacement media plate shall be in proportion to the time in service to the 20-year warranted life. For example, should a media plate fail in five years, 25% of the life of the media plate, it will be replaced at a cost of 25% of the price in effect at the time of the replacement shipment.

Conditions

1. This warranty applies to the media plate itself, not including the expansion joints, caulking, piping, mechanical equipment, concrete structure or installation.
2. Charges for other services and expenses will be made at then-current standard published rates and terms.
3. The media shall have been in normal use, operated in accordance with USEP's instructions and Operating & Maintenance Manual.
4. Small repairable blemishes, nicks and gouges are not grounds for warranty replacement. It is recognized the aluminum oxide thickness above the top of the 1/4" silica gravel is sacrificial and subject to normal wear. The appearance of the silica gravel is normal in older plates, and provided it is not a cause of solids breakthrough, will not be a reason for warranty replacement.
5. This warranty does not cover incidental or consequential damages, accidental damage, misuse, unauthorized vehicular loading and the like.

USEP maintains a service organization to assist you in your operations, repairs, process optimization, and this warranty replacement should it ever become needed.

All of us at USEP hope you'll never have to use this document; but we want you to know that we are available if you need us.



**The Vacuum Dewatering Bed System
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