



OPPORTUNITIES ABOUND:

IN COLLABORATION WITH
BCG
THE BOSTON CONSULTING GROUP

A Primer to the Wastewater Industry





OPPORTUNITIES ABOUND:

A Primer to the Wastewater Industry

AUTHORS

Effram Kaplan is a Managing Director and Principal and Head of the Environmental & Industrial Services practice at Brown Gibbons Lang & Company. Effram can be reached at ekaplan@bglco.com.

Rebecca Dickenscheidt is a Director in the Research Group at Brown Gibbons Lang & Company. Rebecca can be reached at rdickenscheidt@bglco.com.

CONTRIBUTORS

Peter Czerepak, Partner and Managing Director, The Boston Consulting Group
Alex Wright, Project Leader, The Boston Consulting Group

ACKNOWLEDGMENTS

Bill Fahey, Senior Vice President, Veolia North America
Andy McNeill, Chief Executive Officer, Denali Water Solutions
John O'Connell, Chief Executive Officer, Wind River Environmental
Gerald (J.J.) Smith, Jr., Chief Executive Officer, Valley Proteins
Brandon Velek, President, Intergulf Corporation



OPPORTUNITIES ABOUND:

A Primer to the Wastewater Industry

TABLE OF CONTENTS

EXECUTIVE SUMMARY	5
INDUSTRY	6
GREASE	11
SEPTIC	12
WASTEWATER INFRASTRUCTURE	15
OUTLOOK	18
CONSOLIDATION	19





A Primer to the Wastewater Industry

Demand for non-hazardous liquid waste management services is growing, spurred by environmental regulation, landfill diversion, and waste-to-energy initiatives, with waste recovery a driving theme. Scarcity and demand for clean water have perpetuated an increasingly stringent regulatory environment with greater attention on wastewater discharges, positioning the industry for growth.

This spotlight was designed to serve as an industry primer on the non-hazardous liquid waste market and was compiled through discussions with industry executives and data analysis. We conducted a series of interviews within the corporate community to gauge opinions on the “state of the market” in the United States. Interviews were designed to obtain broad coverage of the liquid

waste market and garner opinions from companies involved in wastewater and non-hazardous liquid waste management. Questions encompassed a broad array of topics, ranging from customer trends and preferences, regulation, and competition to technology and beneficial reuse. Such discussions and analysis yielded insight into market trends that are driving industry growth.

HIGHLIGHTS

- Demand drivers point to continued strength in the broader non-hazardous liquid waste industry:
 - The refinery, chemical, and general manufacturing industries are currently benefiting from strong economic tailwinds and poised for increased demand. Oil production is at an all-time high with spending on refinery construction and maintenance expected to increase, particularly as aging facilities experience increased utilization and capacity. Chemical processing projects are also set to increase demand and spending. Plants will need to comply with government regulations, quality management, and safety and health policies, and all have a regular need for wastewater collection at their sites.
 - Wastewater infrastructure is aging and will require investment in the construction, repair, and maintenance of treatment systems to meet projected demand. Companies that serve the municipal wastewater market are poised to benefit with rehabilitation stimulating demand.
 - Macro drivers of population growth, changing demographics, and rising disposable income will sustain demand in the grease and septic markets.
- A growing regulatory focus on water and waste recovery, both at the state and federal level, with bipartisan support, is expected to spur demand for services.
- Customers are consolidating vendors as purchasing becomes more centralized to the benefit of larger liquid waste service providers. Greater environmental awareness is elevating compliance and safety in purchasing decisions.
- Investment in technology is accelerating as operators diversify into new waste streams and seek to maximize resource recovery.
- The highly fragmented industry is capturing the attention of private equity investment, illustrated by recent financial sponsor platform activity, which is indicative of a favorable near-term outlook and expectations of growth. Private equity will be a driver of consolidation with acquisitive growth central to the investment thesis.
- Consolidation is continuing as participants look to build scale in a fragmented market. Acquisitions will be necessary to drive outsized growth, with strategies focused on expanding into new markets and waste streams to diversify revenues.



A Primer to the Wastewater Industry

INDUSTRY

The liquid waste management industry is highly fragmented and serviced by hundreds of operators with varying levels of sophistication. Market participants handle multiple waste streams and engage in various services along the value chain, from collection and hauling to processing, recycling, and disposal. Large players typically control the waste streams through collection and are vertically integrated from waste handling and treatment through disposal. Liquid waste streams are diverse and derived from many sources including commercial, industrial, and residential generators of waste. In this paper we focused on the following types of wastewater:

- Restaurant and food waste
 - Yellow grease (used cooking oil)
 - Brown grease
 - Septic waste
- Residential waste
 - Septic waste
- Industrial waste
 - Chemical wastewater
 - Solid wastewater
 - Organic wastewater

Broadly, the industry is predominantly local market driven with competition coming primarily from small operators. Virtually all types of residences and businesses produce wastewater in some form. For the purposes of this paper we focused on the following key customer types:

- Municipalities
- Food production and processing
- Restaurants
- Industrial manufacturing
- Residences

We intentionally excluded energy producers from the study. Although entities like power plants have permits to produce large amounts of wastewater, particularly nuclear power plants, they typically recycle their own water in a closed loop that never enters the larger wastewater treatment ecosystem and therefore was considered out of scope.

Municipalities operate from a taxable base to clean water and wastewater. Recent statistics identified 14,748 municipal wastewater treatment plants in operation nationwide.¹ Service providers bid for operation and maintenance (O&M) contracts in the wastewater market. More large municipalities are soliciting bids in the form of RFPs (request for proposal) or best value as companies try to promote different ways of handling the wastewater. Additionally, municipalities are increasingly outsourcing steps in the residuals process in a wastewater treatment plant, including O&M contracts for dewatering and running centrifuges, belt presses, and compost operations. The municipal market is highly fragmented. Participants are seeing companies like Veolia and Casella Organics when competing for O&M contracts in certain regions of the country.

Food Processing includes captive waste from industrial food processing plants. Converted waste is land applied for beneficial reuse as fertilizer or is rendered for use in animal feed.

Restaurants broadly refers to the waste grease market with restaurants and foodservice establishments as major customers. More than 1 million restaurants are in operation across the United States² and produce both yellow grease (used cooking oil) and brown grease (fats, oils, and grease from cooking).

Industrial Manufacturing is diverse and includes customers such as petrochemical plants, refineries, and LNG plants, of which a large concentration are located along the Gulf Coast, as well as general manufacturing plants. Hazardous waste companies like Clean Harbors will cross-over and participate in the market.



A Primer to the Wastewater Industry

PERMITTED FACILITIES

Liquid waste management is regulatory driven with macro trends favoring more stringent oversight as demands on water increase.

The Clean Water Act (CWA) is the federal regulatory framework governing wastewater discharge control and is administered predominantly at the state level. Regulations govern treatment of waste delivered to centralized waste treatment (CWT) facilities. CWTs are permitted wastewater treatment plants that must adhere to CWA effluent guidelines and pretreatment standards and meet the discharge parameters of publicly-owned treatment works (POTWs), or municipal wastewater collection systems.³ Recent statistics identified 14,748 municipal wastewater treatment plants in operation nationwide.¹

CWA guidelines classify waste streams in the following categories: metal-bearing waste, oily waste, organic waste, wastewater, or used material received from off-site. Pretreatment involves reducing pollutants and solids prior to discharge to POTWs. Residual solids are further processed for reuse or disposal.³

PERMITS

Permits and capital cost were cited as key challenges in greenfield expansion and barriers to entry in certain markets.

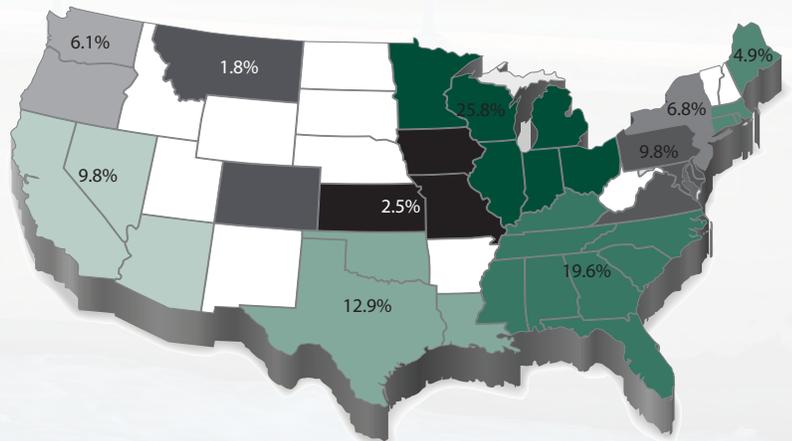
“There are certain markets where you are just not going to get a permit. There are other markets where, if you get a permit, it is going to be incredibly stringent. And there are some markets that are very friendly and welcome the wastewater. You really need to pick the right spot for expansion,” said a provider of commercial wastewater treatment services.

“Each of these plants is set up differently, and the waste streams can vary significantly. Municipalities are waking up to the cost of running their own plants and the impact that the users are

having on their day-to-day activity, so they are minimizing some of these constituents to keep the plants running at peak efficiency.”

“It is not cheap to set up a commercial wastewater treatment operation. To come in and greenfield a location, you have to be pretty confident you can take business from an incumbent in a given marketplace. As a result, you are more likely to see a facility acquired than a greenfield expansion,” said an industrial services company in our survey.

GEOGRAPHIC DISTRIBUTION OF CENTRALIZED WASTE TREATMENT FACILITIES



An online search using the EPA’s DMR Pollutant Loading Database identified 21 direct discharging centralized waste treatment (CWT) facilities, i.e., facilities which discharge directly to a surface water. Direct discharging facilities are required to get NPDES (National Pollutant Discharge Elimination System) permits and to submit discharge monitoring reports (DMRs) to the EPA. Direct discharging facilities are tracked at the national level. A search of indirect discharging facilities—facilities which discharge to POTWs—identified 102 facilities.⁴ An early EPA study of the CWT Industry identified 223 CWT facilities in the United States of which 163 discharge wastewater.⁵ The graphic was created using EPA study data to provide a directional indication of CWT locations, although the actual number is likely larger in certain regions.



OPPORTUNITIES ABOUND:

A Primer to the Wastewater Industry

EPA WASTEWATER DATA AND INDUSTRY PERSPECTIVE SUGGEST UP TO ~100+ BILLION GALLONS OF WASTEWATER TREATED DAILY IN U.S.

	TAXONOMY		WATER FLOW (BGAL/DAY)	DESCRIPTION	
NON-HAZARDOUS WASTEWATER	INDUSTRIAL	CHEMICAL	6	Chemical: Water that requires treatment to neutralize foreign chemicals e.g., nitrogen, phosphorus, etc.	
		SOLID	17	Solid: Water that requires filtration to remove solid particles that have contaminated water	
		ORGANIC	3	Organic: Oxygen demanding (biochemical and chemical) pollutants that develop in wastewater that adversely affects discharge location	
	COMMERCIAL (RESTAURANTS, HOTELS, COMMERCIAL KITCHENS)	SEWER	31	Sewer: Water discharged from commercial or residential source that travels through sewage systems to either private or public wastewater treatment plants	
		SEPTIC	2	Septic: Water that is from a commercial or residential source that is stored in a septic tank. Effluent water is slowly discharged into a drain field while sludge is to be manually removed	
		GREASE	6	Grease: In commercial settings (e.g., food preparation) grease must be stored in a grease trap and be manually removed once every quarter	
	RESIDENTIAL	SEWER	30		
		SEPTIC	9		
			TOTAL	104	

1. Hazardous waste is not in scope. Source: EPA DMR Database, Industry interviews. Energy SIC Codes excluded from analysis



A Primer to the Wastewater Industry

TIPPING FEES

Industry participants discussed trends in wastewater tipping prices and differences by geography and type of wastewater.

Insiders indicate there has been little to no growth in tipping fees. “It is all about efficiency,” said Brandon Velek, President of Inter-gulf Corporation. “We have not seen the per gallon rate increase like it should in the Houston market where there is heavy competition and a struggling oil and gas industry.”

“Pricing varies by geography,” commented Andy McNeill, chief executive officer at Denali Water Solutions. “These facilities are landfill-esque. The closer the treatment facility is to a generator, the higher the tipping fee because the transportation costs will be lower.”

“Tipping does vary by location, and the municipalities drive it a lot. Some municipalities charge a fixed annual fee, others charge by truck size or the actual gallon,” offered J.J. Smith, chief executive officer at Valley Proteins. “Our cost of getting rid of the waste is going up, but it is going up more because we have to haul more waste away, more so than the cost per gallon is increasing.”

Insiders expect tipping fees and processing fees for grease and food waste to decline over time as additional capacity comes into the market. “It really comes down to who controls the waste stream,” commented John O’Connell, chief executive officer at Wind River Environ-

mental. “In the Northeast, there seems to be a lot of activity surrounding responding to the mandates for food waste processing. That is creating some additional capacity in the market that ultimately can only do one thing which is to reduce tipping fees.”

CAPACITY

Executives addressed current constraints around wastewater disposal capacity in the marketplace.

Capacity constraints vary by geography, not by type of wastewater, insiders said. Industry participants are seeing more municipalities sensitive to volume. “In the past, it was a simple process to get our limits increased if our wastewater volume had increased. It hasn’t been as easy. In many cases, if we want to get our capacity increased, our limits from the POTW get lowered,” said a regional provider of commercial wastewater treatment services.

“It is driven by changes in permit discharge requirements. Whether you discharge into another plant or into a watershed, those all have limits. In certain places, those limits can be tighter because you might be attached to an endangered watershed,” added Andy McNeill at Denali Water Solutions.

“Municipalities are more knowledgeable about monitoring generators and more vigilant to do so,” said a regional liquid waste company.

“Municipalities are more knowledgeable about monitoring generators and more vigilant to do so,”

- Regional Liquid Waste Company



A Primer to the Wastewater Industry

“Scarcity and clean water are prevalent themes. We are not going to see any loosening of rules to deliver clean water.”

- Andy McNeill
Denali Water Solutions

REGULATORY

Participants do not anticipate broad scale changes in regulations that will affect the industry dramatically in the near-term. Any changes are expected to be incremental favoring a tightening of standards in the future. “Scarcity and clean water are prevalent themes,” said Andy McNeill at Denali Water Solutions. “We are not going to see any loosening of rules to deliver clean water.”

“It is a very local question about which region or even which state is going to enforce its environmental regulations. You have a federal government now that sends mixed messages. They’re trying to modify some environmental regulations but heavily enforcing others,” commented Bill Fahey at Veolia North America. “It is going to matter where the states regulate hard. I would argue that it will be the blue states that will try to enforce regulations with greater tenacity than they would have a year ago.”

Wastewater discharge requirements are becoming more stringent, illustrated by an increasing focus to limit constituents to protect water sources. “Each municipality is different depending on the treatment capabilities they have. We have been seeing push back from local POTWs to lower limits because of issues that they are facing in generating clean water,” said a national provider of container cleaning and commercial wastewater treatment services. “Effluent limits that had been consistent for many years are now being lowered to meet new, more stringent standards.” Insiders say the trend is particularly apparent in areas where clean water may be scarce.

“The EPA is making it more and more difficult. They want to regulate the least number of point sources possible, so it is very difficult to get a private wastewater treatment system approved for direct discharge to a water body if you have a municipal sewer option,” commented J.J. Smith at Valley Proteins. “The EPA is going to push toward going through a municipal sewer.

They don’t want more discharge points to regulate than necessary. That is certainly a focus.”

Insiders point to challenges posed by variability in state oversight when managing different waste streams. “The industry would be well served by greater enforcement of existing regulations than has been the case,” observed John O’Connell at Wind River Environmental. “In Massachusetts, for example, there are detailed septic system inspection requirements mandated under Title 5. In other states, there are no regulations. Many states have grease pumping frequency requirements, but in many instances, they are not strictly enforced.”

DEVELOPMENTS

There is growing attention on nutrient levels in wastewater discharges, with increasing levels of phosphorus and nitrogen being discharged into sensitive areas. “It is those constituents on a parts per million or milliliters per liter basis that are measured inside water. You are going to continue to see a tightening of those limits over a period of time,” said McNeill. “This is especially true of those watersheds that have issues around the country, like the Chesapeake Bay where excess nutrients are impacting water quality.”

The EPA is currently evaluating production water in oil and gas drilling which could have a significant impact on treated wastewater volumes at CWTs. An EPA study is being conducted to examine various operating and financial characteristics of CWTs that accept oil and gas extraction wastewater. Treatment technologies and environmental impacts of discharges are also under assessment.³ “If oil field production waters are treated as an EPA regulated waste as opposed to an exempt waste, there will be a significant change in volumes for CWTs,” commented Brandon Velek at Intergulf Corporation. “The EPA has been looking at this issue for several years now. It could be a potential growth area for facilities that are located close to oil drilling activities.”



A Primer to the Wastewater Industry

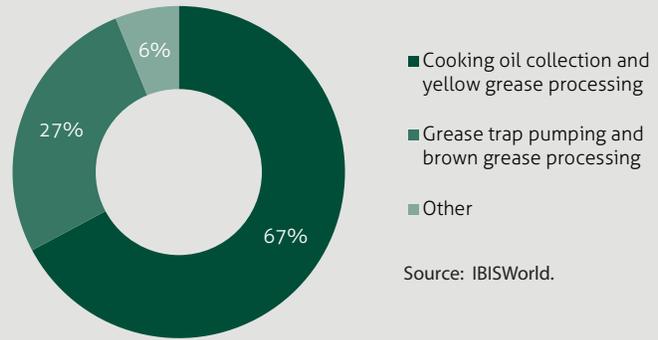
GREASE

Waste grease is an estimated \$4.0 billion market serviced by more than 500 operators. Waste streams consist of yellow grease (used cooking oil (UCO)) and brown grease collected from commercial and industrial cooking operations and foodservice establishments. Spent UCO is typically disposed of in barrels that are picked up by service providers and then processed. Brown grease is often washed down the drain and collects in grease traps. Services consist of grease trap pumping, cleaning, and maintenance; processing; and disposal. The industry has seen steady growth, with compound annual growth in revenues of .7 percent between 2012 and 2017 and is forecasted to grow 2.7 percent annually through 2022.⁶

Local markets are serviced by dozens of small operators but will typically have two or three dominant players that have the collection network and are vertically integrated through treatment and disposal. Grease trap service providers are often handling other types of sundry wastewaters that are typically easy to handle with septic waste. Examples of national and regional providers include Liquid Environmental Solutions (LES), Restaurant Technologies, Wind River Environmental, Southwaste Services, and Mahoney Environmental. Rendering companies such as DAR Pro Solutions, part of Darling Ingredients (NYSE: DAR); Valley Proteins; and Baker Commodities also participate in the market, collecting byproducts (i.e., used cooking oil) that can be recycled into feedstock for use in the production of biofuels or animal feed ingredients. These companies also provide grease trap services as a way to deepen relationships with their customers.

The market has seen M&A activity accelerate with a number of large assets trade in recent months, including Wind River Environmental (Gryphon Investors) in 2017. Liquid Environmental Services has been particularly active and consolidating the industry, completing three acquisitions during the last 18 months.

GREASE MARKET SEGMENTATION



Waste grease processing involves extracting and recycling fats, oils, and grease (FOG) from wastewater for beneficial reuse. Yellow grease is recycled for use as feedstock in the production of alternative fuels and feed additives. Brown grease is used as a feedstock in anaerobic digestion and alternative fuels. The Food Safety Modernization Act now prohibits restaurant trap grease from being processed and used in animal feed.

Strict state and local regulations mandate regular cleaning and maintenance of grease traps to prevent FOGs from entering municipal sewer systems, which can lead to blockages resulting in sanitary sewer overflows (SSOs). Nationwide, approximately 35 percent of the blockages resulting in SSOs are attributed to brown and yellow grease.⁶

Frequency of grease trap maintenance and pumping is typically mandated by state or local governmental agencies every 60 or 90 days for larger, in-ground grease interceptors and monthly for point-of-use traps. Many municipalities impose fines for noncompliance. Over the next five years, stricter financial penalties will be compulsory for businesses that do not properly dispose of FOGs.⁶ The industry is shifting toward full evacuation of grease trap contents which has increased cost to service providers. Trucks are required to haul away more waste which reduces capacity to service additional stops.



A Primer to the Wastewater Industry

SEPTIC

Septic waste* is an estimated \$1.3 billion market and highly fragmented.⁷ Markets are localized and serviced by multiple small operators. Septic systems—also called onsite wastewater systems, decentralized wastewater treatment systems, and private sewage systems—process residential and commercial sewage. According to the EPA, more than 60 million Americans (more than one in five households) rely on onsite systems to treat their wastewater. Septic or decentralized systems account for approximately one-third of new development.⁸ The National Association of Home Builders estimates that about 16 percent of new single-family homes constructed in 2015 contained a septic system.⁹

Septic tank cleaning services include pumping, inspection, and maintenance. Pumping is typically performed every three to five years, with older systems requiring more frequent maintenance and inspection. Providers of septic

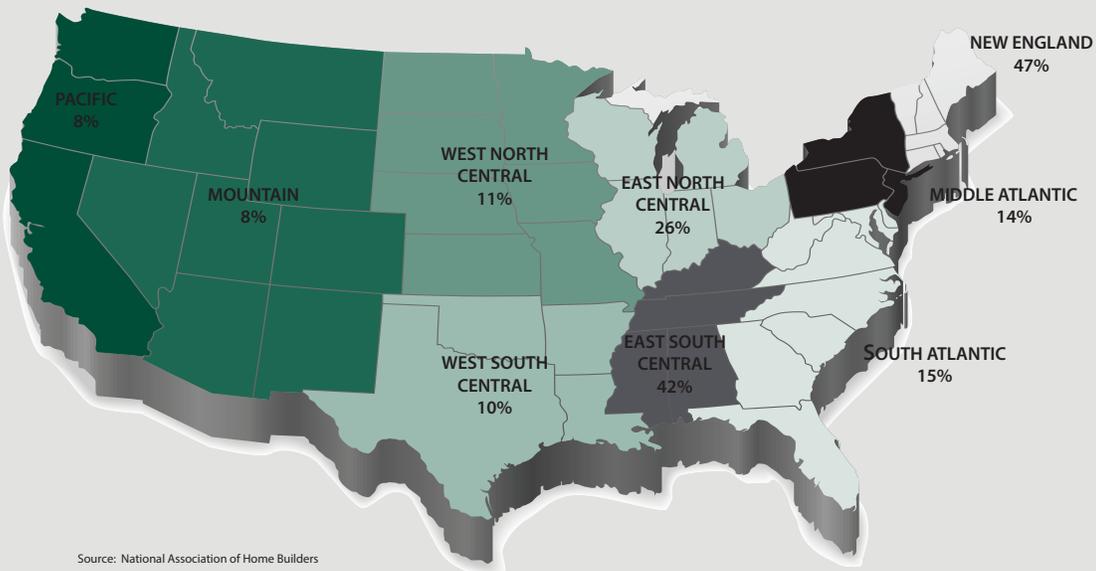
tank services will also typically offer additional services such as drain cleaning and pipelining.⁷

Distribution of septic systems varies by region and state. Concentration of residential septic systems is the highest in the New England states, with an estimated 55 percent of all homes in Vermont and about 50 percent in New Hampshire and Maine served by individual systems. This contrasts with California at only 10 percent.^{7,8}

More than one-third of homes in the Southeastern U.S. are on septic systems, with high concentrations in North Carolina (about 48 percent) and Kentucky and South Carolina, both at around 40 percent.^{7,8}

*Revenue for Septic Tank Cleaning and Maintenance in 2017, a segment of Portable Toilet Rental & Septic Tank Cleaning, valued at \$5.3 billion. Additional segments include Drain and Sewer, with an estimated revenue of approximately \$1.2 billion and Other (includes removal of wastewater), valued at \$1.4 billion.⁷

REGIONAL DISTRIBUTION OF NEW HOMES BUILT WITH SEPTIC SYSTEMS, 2015



Source: National Association of Home Builders



A Primer to the Wastewater Industry

CUSTOMERS

VENDOR SELECTION

Customer behavior is evolving as greater environmental awareness elevates compliance and safety in purchasing decisions. We polled market participants to gauge the importance of key measures in vendor selection. Competitive dynamics continue to pressure pricing, which was consistently cited as the most important criterion in the selection of a service provider. Professionalism, safety, compliance, and breadth of services were identified among other critical benchmarks.

“We have seen price erosion from a competitive standpoint, but our customers, major corporations, have been more focused on compliance and this is where we shine,” offered Brandon Velek at Intergulf Corporation. “The regulations, especially air regulations, that water treatment plants are required to comply with have become more and more stringent. With environmental and safety compliance becoming more of a customer focus for vendor selection, many of our larger customers have contracted with third party auditing entities to review records and audit the facilities. These auditing entities share compliance records, for a fee, with other corporations interested in doing business with us. Hopefully, compliant facilities will be able to fetch better gate rates as compared to facilities that are not as focused on safety and environmental compliance.”

Surveyed companies identified automated vendor compliance management as a growing trend in the industrial market, citing increasing use of web-based tools like ISNetworld to help manage vendor relationships. Customers utilize scoring mechanisms to rate vendors against their safety and compliance standards. “Nobody had that five years ago. It makes it harder for the smaller operators to meet these minimum bars,” said Andy McNeill at Denali Water Solutions. “Safety has always been important, but the compliance aspects become more high-

lighted in that environment. Having a safety track record is a minimum standard now. You just can't hide from it.”

“We have heavy competition, so wastewater disposal fees are cheap in the Houston market. The only way you can be successful at it is by being efficient and auditable, both from a regulatory and customer perspective,” Velek said. “Our customers are very concerned about their liability, so we focus on having a facility that has an outstanding safety and regulatory record and audits well from the customer's standpoint.”

There are still a fair number of customers that are dealing with local “mom and pop” operators with less than robust environmental safety practices, insiders said, making it challenging to differentiate on these services. “I wish customers were more engaged in environmental and safety compliance and would look at those criteria, but their key determinant in most cases is price,” said a national provider of industrial cleaning and commercial wastewater treatment services. “In time, people will do a better job of selling those differentiating factors and getting paid for them. That is our hope. In order to do so, you need to bring some value to the customer.”

“Across the board, if people were ranking their priorities in order of importance, service levels and quality of service would generally be high on the list, but then when you look at their decision making, it actually always revolves around cost,” commented John O'Connell at Wind River Environmental. “So the challenge is being able to provide the highest service level possible and meet the challenges the marketplace is requiring from a cost standpoint.”

There has been a clear trend toward the importance of safety, particularly for the larger, more sophisticated customers, O'Connell indicated.

“Our customers are very concerned about their liability, so we focus on having a facility that has an outstanding safety and regulatory record and audits well from the customer's standpoint,”

**- Brandon Velek
Intergulf Corporation**



A Primer to the Wastewater Industry

“There has definitely been a trend towards centralized buying decisions on the part of chains with the objective of reducing the number of service providers”

**- John O’Connell
Wind River
Environmental**

“If you map out the level of sophistication of buyers of our services on a continuum, you have the small, local companies that aren’t that concerned with safety. Then you have the industrial customers or municipalities on the far end of the spectrum that are very concerned,” stated O’Connell. “What that essentially means is the larger industrial companies are going to be less likely to use the small, local companies than companies that have the means to ensure that they have the proper training and investment in safety and equipment.”

The presence of and growth in third party service aggregators was identified as a significant development in the industry. “Their presence has forced companies that provide direct service to make a decision whether to provide the services to these aggregators,” offer John O’Connell at Wind River Environmental. Aggregators operate with strict requirements on service execution, particularly for administrative issues, sometimes presenting challenges for operators to collect services. “We have seen a shift towards these aggregators. The upside for the end user has been a short-term reduction in expenses. However, the longer-term implications may be a reduction in service levels and their systems could be negatively impacted as a result.”

VENDOR CONSOLIDATION

Large customers are becoming more centralized in their decision process, insiders said. National chains are aggregating their purchasing decisions and looking for service providers that can cover a broad geographic area. Their success is often dependent on the level of fragmentation in a given market. Procurement groups in larger companies have taken on a greater share of the decision making.

“The industries that are under more stress tend to fight that stress with more aggressive procurement approaches, so pushing for more competition, questioning more pricing, and seeking more cost justification of value. Every sector is very different in that sense,” commented Bill Fahey at Veolia North America. “There certainly is much more of a push towards national and centralized accounts,” said J.J. Smith at Valley Proteins. “Large chains like Walmart are moving toward hiring consultants like Quest to manage all of their waste streams, and that has certainly advantaged the larger providers at the expense of the smaller providers. It has been frustrating for us because we prefer to have the relationship directly with Walmart rather than with Quest. It has kind of been the way of the world over the last few years.”

“You might see that in waste grease where a large restaurant chain uses a procurement company such as Rubicon or Oakley to manage its vendors. The trend is less prevalent in industrial cleaning or in biosolids,” offered Andy McNeill at Denali Water Solutions.

“There has definitely been a trend towards centralized buying decisions on the part of chains with the objective of reducing the number of service providers, because every incremental service provider that they need to have to fill in their geography is additional administrative overhead and cost in it,” stated O’Connell. “Being able to centralize their purchases and consolidate the service execution within fewer vendors is in their interest. That being said, it doesn’t change the competition on the local front. That’s a local market-by-market challenge.”



A Primer to the Wastewater Industry

WASTEWATER INFRASTRUCTURE

Today, over 76 percent of the U.S. population (240 million Americans) is served by centralized wastewater collection and treatment systems. The remaining population uses septic or other onsite systems. Recent statistics identified 14,748 municipal wastewater treatment plants in operation nationwide.¹

The American Society of Civil Engineers (ASCE) released the Infrastructure Report Card this January, assigning a grade of D+ to the nation's wastewater systems.¹ The study is performed every four years and evaluates the condition of national infrastructure categories to assess needs and investment. Age and deteriorating condition, population growth, and growing quantity and complexity of contaminants are straining current systems creating a need for new facilities.

"It is an industry that is severely underinvested. Most municipalities haven't made the necessary investment in automation and visibility into operations and have become very inefficient," commented Bill Fahey at Veolia North America. "Municipalities have been reluctant to raise rates and really charge the true cost of water. Because of that, there is a lack of money available for them to invest."

According to EPA estimates, \$271 billion will be required to fund wastewater infrastructure improvements over the next 25 years, with treatment plant improvements, new conveyance systems and system repairs, and recycled water distribution accounting for the majority (75 percent) of spend.¹⁰ A major driver will be projected demand on wastewater systems. Centralized treatment systems are expected to add more than 56 million new users by 2032 representing a 23 percent increase in demand. These are users moving from private septic systems to centralized treatment plants, which is estimated will require the construction of 532 new systems to meet forecasted treatment needs.¹

While federal funding for wastewater infrastructure is made available through the Clean Water State Revolving Fund, the majority occurs at the local level. According to the ASCE Report Card, an estimated 95 percent of water infrastructure funding is made locally. The Water Infrastructure Finance and Innovation Act was later introduced with the goal to fund large water infrastructure projects.¹

Private equity is expected to play a significant role in project funding in the coming years with capital raised targeting infrastructure and wastewater. Private investment the form of public-private partnerships holds promise, although market participants indicate wastewater infrastructure is in the early stages of development. Insiders see significant upside for companies that serve the municipal wastewater market due to the lack of infrastructure spending.

"There is a lot of money that has to be spent in this sector. What is going to drive investment? Obviously, public health is a driver. There have been some major catastrophic failures of water and wastewater systems that have caused investment," said Fahey.

"Your link to investment in water and wastewater is really regulation and enforcement," he continued. "If you look at all the major spends in the municipal sector, all have been very much regulatory driven. As you see more enforcement, it will give municipalities the political cover to spend the money and raise rates. Hopefully, economic growth will contribute to it as industries need water too."

"There is probably an argument that there is a good play for private equity if the pricing is right. If the public-private partnership model were to be embraced by local politicians and water authorities, I think there is a real opportunity for private investment."

"Most of the major investment in water and wastewater has been the result of either regulation or major issues with the systems."

**- Bill Fahey
Veolia North America**



A Primer to the Wastewater Industry

“Digesters are being added to municipal systems, but only benefit the municipality if they know how to use them to their full potential or full capacity. Private systems are built with that in mind,”

- Regional Liquid Waste Company

BENEFICIAL REUSE

Broader themes of diversion and waste-to-energy are encouraging beneficial reuse. Liquid waste companies are exploring ways to utilize material streams and convert them into valuable resources. There is greater demand for and capital being deployed into conversion and processing technologies, which is expected to become more meaningful to waste recovery in the coming years.

Processing of liquid waste streams and residual solids from wastewater takes on different forms in waste recovery:

- Recycled yellow grease (used cooking oil): feedstock in the production of alternative fuels and additives
- Organic residuals, including biosolids (sewage sludge) from wastewater treatment and commercial, industrial, and residential food waste: treated for use in fertilizer, compost, alternative fuels and power (electricity/heat). More than half of recovered biosolids are land applied as fertilizer or soil amendments, according to the EPA.
- Recoverable oil products from wastewater: feedstock in recycled fuel oil and fuel additives

The commodity markets impact the value of waste byproducts subjecting operators to market exposure. In high commodity price environments, renewable alternatives are more attractive. “If we continue to subsidize renewables, then you will more likely see reuse,” said J.J. Smith at Valley Proteins. “If countries are less aggressive with mandates and eliminate subsidies, then it is going to be harder and harder to recover enough value to justify the processing.”

Regulation is a driver that is advancing waste recovery. Legislative mandates and subsidies have served to advance the production of alternative fuels in the United States and abroad. Federal legislation was enacted through the passage of the Renewable Fuel

Standard and Energy Independence and Security Act to promote biofuel development in the United States. Legislation mandating diversion and food waste bans is advancing organics management, with California and several Northeast states among the first movers to tackle the nation’s food waste challenge. Vermont, Connecticut, Massachusetts, and Rhode Island are among the states with state-level waste bans, and California has mandated a statewide organics recycling law.¹¹

“Today, Solid Separated Organics (SSO) is an emerging waste stream in the municipal market,” commented Andy McNeill at Denali Water Solutions. “You are going to see SSO waste moving from the trash stream through regulation.”

“It is a very big market potentially, but it is heavily dependent on enforcement of regulations and government incentives,” commented Bill Fahey at Veolia North America. “Regulations often only apply if you are a large producer of organic waste. The issues are siting the facilities, how much solids they have, and if there is a business case. Usually, what you often find is without incentives, it is very hard to justify capex.”

Anaerobic digestion (AD) as a solution in beneficial reuse is a positive trend in the industry and its application in organics management will steadily increase due to regulatory mandates. The digester count has increased significantly over the last five years supported by growth in merchant digestion facilities. Data from the American Biogas Council (ABC) identifies 1,269 water resource recovery facilities using digesters, of which approximately 860 supply energy from biogas. More than 2,440 plants are considered viable for future biogas development.¹ Merchant facilities accept various organic waste streams as feedstock, including food waste, food industry processing residuals, brown grease, and wastewater treatment



A Primer to the Wastewater Industry

residuals. Private capital is entering the market to finance AD projects which has contributed to expansion.

“Siting is very important. Typically, discharge coming out of those plants is really high in biochemical oxygen demand (BOD). Most of the loads are so high, it would cripple even a mid-sized wastewater plant. For those facilities to be successful financially, I would argue they have to be tied into a large sewer system,” Fahey offered. “You also want to be close to the waste. In urban areas, it is easier because the waste is going to be where there are a lot of people.”

City and county odor ordinances have been a hurdle in the organics movement, in addition to opposition from not-in-my-backyard (NIMBY) initiatives. In addition, waste companies are required to navigate a myriad of regulatory issues in every state. “The actual process to land apply, compost, or digest are similar across states; however, the permitting process can be radically different,” said Andy McNeill at Denali Water Solutions.

“In regions like the Northeast where landfill pricing is high, you can afford to do creative things with waste streams,” said McNeill. The organics movement is going to require a shift in infrastructure to handle the waste, so it won’t happen overnight, indicated McNeill. Highly populated areas with low landfill capacity will go first. Companies like Denali Water Solutions are among a growing number beginning to offer specialty services to meet anticipated demand—drying, anaerobic digestion, composting. “You will see the market shift depending on the breadth of services provided,” said McNeill.

“In California today, if you are a commercial producer of a high quantity of organics, you now have to separate it. By 2022, your average homeowner is going to have to separate organics as well. Landfill scarcity and like-minded communities are driving recycling,”

McNeill added. “New York is running a volunteer program that they will eventually make mandatory on that fourth stream of trash. You are going to see the emergence of those sorts of waste, and companies with composting or anaerobic digestion capabilities will be well positioned.”

“Waste recovery is going to become really big. There is a real opportunity not only in the municipal market but also in the industrial market on treating these wastes and converting them into useful products. Take phosphorus removal in a wastewater plant. There is only a finite amount of phosphorus in the world, and phosphorus is a valuable commodity. There are technologies that are pulling phosphorus out of waste streams and converting it into a marketable product,” Fahey said.

“I believe that beneficial reuse will continue to be a disposal option,” commented McNeill. “The term beneficial reuse can mean many things—land application, composting, digestion, waste-to-energy—and each has different cost points. Sometimes pricing and quantity dictate the lower cost solutions.” He continued, “As a society, we would rather beneficially reuse our waste than landfill it. But as we make that shift, there needs to be recognition that it will take time to build the facilities to handle the waste streams.”

TECHNOLOGY

Technology investment is accelerating as operators diversify into new waste streams. “It all depends on the waste stream that you have and the type of water you are trying to clean,” said a provider of container cleaning and wastewater treatment services. “You see people zeroing in on different streams of wastewater and perfecting the way that they treat that wastewater, for example, oily water and the extraction of reusable fuel or refined fuel.”

“The really interesting driver in this market is going to be technology,” Fahey added. There is investment coming. You are seeing better methods for

“I believe that beneficial reuse will continue to be a disposal option,”

**- Andy McNeill
Denali Water Solutions**



A Primer to the Wastewater Industry

“We are seeing more investment in technology, and it comes in many forms—everything from digesters and composters to separating the oils and selling into the fuel market. Depending on where you are in the country, there is different penetration of each of those. That has been a positive trend”

**- John O’Connell
Wind River
Environmental**

drying solids that are more cost-effective. Some people are looking at gasifying the solids. If a strong technological player comes in and finds a way to do things cheaper, they are going to do really well in this market.”

“We are seeing more investment in technology, and it comes in many forms—everything from digesters and composters to separating the oils and selling into the fuel market. Depending on where you are in the country, there is different penetration of each of those. That has been a positive trend,” said John O’Connell at Wind River Environmental. “I think it is an opportunity for margin enhancement on the part of companies that are of the size that can support it.” He added, “If you are going to make an investment in any kind of technology, whether it is dewatering or any of the beneficial reuse streams like digesters or composting, you want to make sure that you have sufficient flow to justify the investment. You tend to see mid-size to larger companies making those investments.”

Wind River Environmental has expanded into green waste streams through acquisition with the purchase of Kline’s Services and Earth Farms Organics, adding anaerobic digestion and composting capabilities to offer sustainable waste diversion solutions.

Denali Water Solutions recently merged with WeCare Organics. The combination joins WeCare’s strong footprint in the Northeast with Denali’s west coast and southern United States presence creating a national platform with expertise in composting, biosolids, and green waste. Commenting on the merger, Denali CEO Andy McNeill said: “The combined team puts us in the pole position to provide innovative solutions around sustainable waste practices and waste conversion. The future is bright.” Jeff LeBlanc, the former CEO of WeCare and now the President of Denali North America commented that “the

focus and structure of the combined entity will allow us the opportunity to strategically align with industry technology providers and play a pivotal role enacting change within the industry.”

The company also formed a new division called Denali Technologies to advance technology development across its platform. Strategic partnerships with industry players including technology and equipment providers, engineers, regulators, and infrastructure investors will further innovation in waste recovery.

OUTLOOK

DEMAND

Demand drivers continue to support a favorable industry outlook:

- A growing regulatory focus on water and waste recovery, both at the state and federal level, with bipartisan support, is expected to spur demand for services.
- Population growth will drive increased consumption and demand for clean water.
- Rising disposable income will positively influence consumer spending, a driver of restaurant growth. Restaurant industry sales are projected to grow 4.3 percent (1.7 percent adjusted for inflation) in 2017, according to the National Restaurant Association, with steady growth anticipated over the next several years driven by favorable economic fundamentals and pent-up consumer demand for restaurant services.²
- Industrial consumption will grow in line with the economy. The Congressional Budget Office is projecting real GDP growth of 2.2 percent in 4Q 17 and 2.0 percent in 2018.¹² While uncertainty surrounds timing and implementation, Republican policy changes addressing tax reform, infrastructure spending, and regulatory easing offer the potential to stimulate economic growth.



A Primer to the Wastewater Industry

"If the economy grows, there will be more demand for water and waste. If the economy contracts, the water and wastewater infrastructure still has to be maintained. There is a lot of money that has to be spent in this sector," offered Bill Fahey at Veolia North America.

"Market forces will continue to be strong. You are going to continue to see a tightening of discharge parameters over a period of time. This is especially true of those watersheds that have issues around the country. There will continue to be more people, so there will be greater demands on water and treatment of wastewater. Those really are not forces that are influenced by commodity markets," offered McNeill.

"The industry is in great shape and should continue to be. Whether it is the introduction of additional regulations, the enforcement of existing regulations, or the move towards beneficial reuse to a greater extent, all that bodes well for the industry," offered John O'Connell at Wind River Environmental. "Even during the recession in 2008 and 2009, while the world seemed to be crumbling around, it seemed like demand for our services was constant throughout that period. The industry might not be recession proof, but I think it is largely recession resistant."

"Anywhere there is regulation, there will be more growth in this business," Bill Fahey at Veolia North America. "Where the market is going to be in five or ten years is also a function of what waste is going to be produced. Technology is going to play a major role. Significant capital is being invested into research in these areas. Whoever figures out how to treat the waste cost-effectively will win."

INDUSTRY GROWTH

Executives are forecasting modest organic growth of 1 to 5 percent (citing 1-2 percent price and volume growth). Focus will be on efficiency, cost containment, and innovation. The residen-

tial segment is expected to remain flat, with no material net increase in the number of homes on offsite wastewater treatment systems. The commercial and industrial segments will offer more significant opportunities for growth.

Acquisitions will be necessary to drive outsized growth. Industry participants will be looking to expand into other services to diversify revenue streams.

"It is difficult to get substantial organic growth unless you are moving out of your own market, geographically or into another waste stream, because somebody is handling all of it right now. It is not emerging waste, other than maybe the organics coming out of landfills, but that is going to come slowly," said Andy McNeill at Denali Water Solutions. "The bigger growth continues to be through acquisitions. There will be companies that can consolidate parts of the market successfully."

"Anybody in this business who is successful has been acquisitive," added J.J. Smith at Valley Proteins.

CONSOLIDATION

The non-hazardous liquid waste management industry is primed for continued consolidation, with new capital coming into the market to fund acquisition growth platforms. Industry consolidators are actively evaluating acquisitions as a means to accelerate growth and gain economies of scale. Private equity sponsors are drawn to the sector's recession resilience given the essential nature of services provided, while the high level of fragmentation presents significant opportunity to build platforms for consolidation. Similar to the solid waste business model, liquid waste shares the attraction of recurring revenue, customer diversification, and permitted waste treatment facilities. Recent private equity investment has involved a number of large assets, indicative of a favorable near-term

"Whether it is the introduction of additional regulations, the enforcement of existing regulations, or the move towards beneficial reuse to a greater extent, all that bodes well for the industry"

**- John O'Connell
Wind River
Environmental**



A Primer to the Wastewater Industry

“Anybody in this business who is successful has been acquisitive”

**- J.J. Smith
Valley Proteins**

outlook and expectations of growth. Valuation multiples are rising, a dynamic which participants attribute to private equity’s growing participation in the sector and capital available for deals.

“The industry is ripe for some roll-ups. The main driver is consolidating a highly fragmented industry,” said Brandon Velek at Intergulf Corporation. “Consolidating this highly fragmented industry could produce significant economies of scale resulting in a competitive advantage. And I think you can acquire some of these small operators at fairly reasonable multiples.”

“Whether it is private equity or corporate acquirers, buyers are looking for the growth model of expanding organically and through acquisition and greenfield development,” said an operator involved in industrial cleaning and commercial wastewater treatment services. “The capital and infrastructure that some of these private equity firms bring enables them to have a platform to go out and do just that.”

Private equity will be a driver of consolidation. Large liquid waste and industrial services platforms that have traded in the last 12 months have sold to private equity funds, including Valicor (Wind Point Partners) and Wind River Environmental (Gryphon Investors) in 2017.¹³

- Wind Point Partners acquired Valicor in June 2017, stating the growth strategy of “launching new locations and executing add-on acquisitions in a highly fragmented market”. Valicor acquired Ultra Environmental Services in July 2017, an operator of a centralized wastewater pretreatment facility in Kentucky.
- Wind River Environmental (WRE), acquired by Gryphon Investors in April 2017, has a history of private equity backing and a track record of acquisitive growth having completed more than 60 acquisitions to become a regional player in

diverse waste materials, from septic and grease to green streams. WRE acquired Soucy’s Septic Service and Plumb Crazy in July 2017.

Market participants shared their observations on private equity’s growing participation in the industry:

“Private equity groups see the value and synergies created through consolidation in this industry,” observed Andy McNeill at Denali Water Solutions. “The recent platforms that have been acquired—Valicor, Wind River Environmental, and others—in order for them to create value, a likely strategy will be to expand their markets to create scale.”

“Valicor has done well building CWTs in strategic areas, and now they have capital behind them to find single-facility CWTs in strategic areas and buy them, roll them into their operations and marketing programs, and make them more profitable through efficiencies,” offered Brandon Velek at Intergulf Corporation.

“To pursue the roll-up strategy, you want to take capacity out of the market rather than add to it, so the dynamic of where you locate your wastewater plant is important. There can be two locations in a city that are a mile apart, but they might have different local POTWs. One might be very friendly from a discharge perspective, and the other might be very difficult. It is important to look at the competition, the current infrastructure, and discharge landscape to determine where is the right market,” said a national operator of container cleaning and commercial wastewater treatment services.

Liquid waste is a route-based business with similarities in the services, equipment, and permitting, insiders said, with complementary acquisitions offering the potential for operating synergies and margin enhancement. Insiders argue that



A Primer to the Wastewater Industry

there are few “pure play” commercial wastewater opportunities which can make the search for acquisitions challenging.

“It is a fragmented industry with over 100 permitted commercial wastewater facilities. The ones that we’ve seen vary greatly from one to the next,” said a provider of industrial cleaning services. “What has made us hesitant about moving forward on a number of deals is getting too far outside of our core. We are looking at whether our scope is too narrow, and asking, do we need to be more open to looking at other niches that include exposure to grease or oil or other constituents.”

Acquisition strategies will focus on expanding into new markets and waste streams. “You are going to see the larger companies entering into various spaces. That will be a theme in this business,” commented Andy McNeill at Denali Water Solutions. Participants identified Clean Harbors and Veolia among the participants that crossover into areas of the non-hazardous liquid waste market.

“Clean Harbors is a large player in hazardous waste, an area where there is not tremendous growth. They have a choice—acquire other companies that are handling hazardous waste material or move into adjacent spaces,” McNeill added. “From time to time, we compete against companies like Clean Harbors or Veolia. I think you will see them move into other markets, and there will be logical reasons to do so besides just buying growth because there will be overlaps in service

lines.” “Clean Harbors and Veolia would alter the landscape significantly if they decided to get into the game. They are all involved in commercial wastewater in varying degrees, but nothing of scale,” said a regional player in the commercial wastewater market.

Despite an increasing level of mergers and acquisitions activity, consolidation is not expected to alter the landscape dramatically, executives said. The localized market and low barriers to entry will continue to encourage fragmentation.

“There are so many small operators, and the barriers to entry are so low. I think you’ll continue to see the industry consolidate, but I don’t see any forces in the market that are driving it to happen fast,” said J.J. Smith at Valley Proteins. “For many years, there has been a trend towards consolidation, and it still continues to be a highly fragmented market,” observed John O’Connell at Wind River Environmental. “Even if you look at the consolidation that has occurred in the solid waste business, every community still has local trash providers that coexist alongside the major players, and that will continue to be the case in liquid waste as well. There will clearly be consolidation of small, 1 to 3 truck operators. However, 10 years from now, there will still likely be a largely fragmented market, and part of the reason is that it is a very difficult and challenging business to run at scale.”

“It is important to look at the competition, the current infrastructure, and discharge landscape to determine where is the right market”

- National Operator Container Cleaning and Commercial Wastewater Treatment Services



OPPORTUNITIES ABOUND:

A Primer to the Wastewater Industry

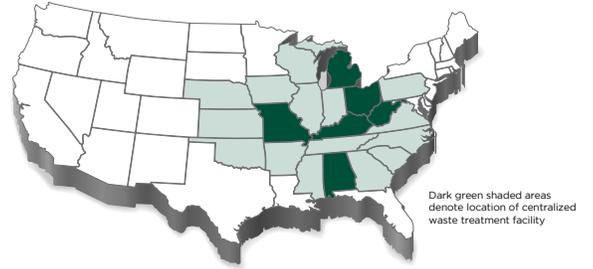
SELECTED RECENT INVESTMENT ACTIVITY IN LIQUID WASTE



In June 2017, Wind Point Partners (WPP) acquired Valicor Environmental Services from Valicor Inc. WPP acquired all of Valicor’s wastewater and oil processing assets as well as ownership of the Valicor brand. WPP partnered with industry veteran James Devlin, former CEO of ReCommunity and Thermo-Fluids, in the transaction.

- Valicor’s facility-based network includes 8 centralized waste treatment facilities in the Midwest.
- Waste streams serviced include industrial, leachate, recoverable petroleum products, heavy metal wash waters, and others.
- Valicor treats more than 200 million gallons of wastewater and 20 million gallons of oil annually.

GEOGRAPHIC FOOTPRINT



SELECTED ACQUISITIONS

July 2017 Ultra Environmental Services

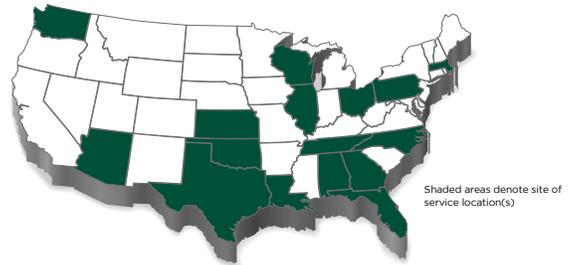
“We intend to build on Valicor’s excellent foundation by expanding services in our current facilities, launching new locations, and executing add-on acquisitions in a highly fragmented market.”
- James Devlin, CEO, Valicor



Liquid Environmental Solutions (LES) has leveraged acquisitions to build its national footprint, which today comprises 54 collection branches and 20 wastewater treatment plants across 49 states. Waste sources treated include grease trap waste, industrial and manufacturing process waters, used cooking oil, and oily wastewaters.

- To date, LES has raised more than \$71 million in venture capital funding, including a \$31.6 million Series C minority growth investment led by ABS Capital Partners in July 2014.
- Stated capital plans include targeted acquisitions and greenfield expansion to grow the company’s wastewater collection, treatment, and recycling network.

GEOGRAPHIC FOOTPRINT



SELECTED ACQUISITIONS



“This is an outstanding opportunity to work with a strong, entrepreneurial management team and help them to continue to execute on their growth strategy.”
- Phil Clough, Managing General Partners, ABS Capital Partners



A Primer to the Wastewater Industry

SELECTED RECENT INVESTMENT ACTIVITY IN LIQUID WASTE



In April 2017, Gryphon Investors acquired Wind River Environmental (WRE) from RFE Investment Partners in a leveraged buyout valued at \$250 million. Members of the WRE management team, including CEO John O’Connell, participated in the transaction and retained a significant ownership stake in the company. Kevin Walbridge will serve as Chairman. Walbridge is a former COO of Republic Services.

- WRE is a vertically integrated provider of non-hazardous liquid environmental waste solutions serving residential, commercial, and municipal customers. Waste streams serviced include septic, grease trap, and green waste.
- WRE has been actively consolidating the industry, having completed more than 60 acquisitions to broaden its capabilities and geographic reach.

GEOGRAPHIC FOOTPRINT



SELECTED ACQUISITIONS



“We are highly enthusiastic about providing capital and expertise to Wind River’s management team as they continue to build this market-leading platform through the execution of organic initiatives and add-on acquisitions.”
- Phil Petrocelli, Partner, Gryphon Investors



In August 2016, Gryphon Investors acquired HEPACO from Carousel Capital, which exited its investment after nearly five years of ownership. HEPACO senior managers including CEO Ron Horton, Jr. retained a significant equity stake in the company.

- HEPACO provides a broad range of critical environmental services ranging from emergency response and environmental remediation to wastewater treatment and hazardous waste management for customers in diverse end markets, including rail, oil and gas, transportation, power and utility, and manufacturing.
- The company operates wastewater facilities in Georgia and Virginia.

GEOGRAPHIC FOOTPRINT



Dark green shaded areas denote location of centralized waste treatment facility

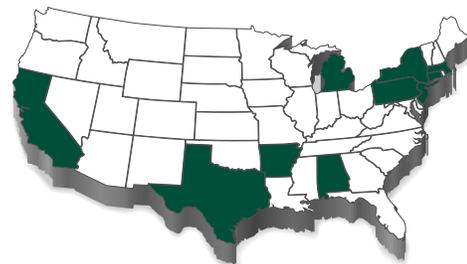
“We are excited to partner with HEPACO, a market leader in the Mid-Atlantic and Southeastern United States, and to provide capital and expertise to support management’s organic growth initiatives and make acquisitions.”
- Alex Earls, Partner, Gryphon Investors



McLarty Capital Partners is an investor in Denali Water Solutions, which is involved in the transportation, collection, processing, conversion, and disposal of organic waste streams for municipal and industrial customers. The company has been operating in the organic waste industry for more than 20 years.

- Denali merged with WeCare Organics in October 2016, expanding its footprint in the northeastern U.S.
- Denali processes more than one million tons of wastewater residuals annually.

GEOGRAPHIC FOOTPRINT



SELECTED ACQUISITIONS





A Primer to the Wastewater Industry

RESOURCES

1. 2017 Infrastructure Report Card on Wastewater, American Society of Civil Engineers, March 2017
2. Centralized Waste Treatment Guidelines, U.S. Environmental Protection Agency
3. Discharge Monitoring Report (DMR) Pollutant Loading Tool and Jesse W. Pritts, P.E., U.S. Environmental Protection Agency, July 2017
4. Document for Effluent Limitations Guidelines and Standards for the Centralized Waste Treatment Industry – Final, Environmental Protection Agency, August 2000
5. Chrystalleni Stivaros, Cooking Oil Recycling in the US, IBISWorld, March 2017
6. Meghan Guattery, Portable Toilet Rental & Septic Tank Cleaning in the US, IBISWorld, July 2017
7. Septic Systems Overview, U.S. Environmental Protection Agency
8. The Geography of Homes Built on Private Wells and with Individual Septic Systems, National Association of Home Builders, September 6, 2016
9. EPA Survey Shows \$271 Billion Needed for Nation's Wastewater Infrastructure, U.S. Environmental Protection Agency, January 2016
10. Emily Broad Leib, Christina Rice and Jill Mahoney, Fresh Look At Organics Bans And Waste Recycling Laws, BioCycle, November 2016
11. 2017 State of the Industry, National Restaurant Association
12. An Update to the Budget and Economic Outlook: 2017 to 2027, Congressional Budget Office, June 2017
13. PitchBook and Company Websites