

# **COLLECTION SYSTEM TREATMENT**

MICROBE-LIFT<sup>®</sup>/IND

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- Are designed and used to convey wastewater from source to some form of wastewater treatment facility.
- Problems consist of odor production via anaerobic biological processes and organic deposition
- These problems may be addressed through the use of biological treatment proving a natural method for odor abatement and organic reduction in line, and in sumps



# Piping and Mains Pumping MADE UP OF **Stations** Wet Wells





- Two Basic Types
  - Gravity Mains limited odor issues unless heavily loaded with organic matter (BOD)
  - Force Mains driven anaerobic with hydrogen sulfide generated through the sulfate process, combined with the development of attached organic matter that increases hydrogen sulfide and crown corrosion



#### Gravity Mains

- Water is pumped from wet well up and flows by gravity to next wet well.
- ELI's Biological Product works well in gravity mains since there is some oxygen available.
- Force Main treatment may require additional IND product and an electron acceptor; i.e., a modified calcium nitrate formulation MICROBE-LIFT<sup>®</sup>/EL-1 or EL-2 as providing a preferred pathway (anoxic respiration) to block the sulfate pathway, as well as increase rate of oxidation reduction of organic matter.

#### Force Mains

- Water is pumped under pressure from one point to another. During this process the pipe is under pressure and sealed off. Conditions within the pipe are driven anaerobic through the uptake of oxygen by the indigenous biology within the main.
- Biological treatment with MICROBE-LIFT/IND provides reduction of oil and grease, and controls and limits H2S generation by two methods, preferred pathway and biological processes that biologically control hydrogen sulfide releasing it as sulfate.

- Typical problems in the operation of collection systems
  - Oil and Grease Buildup in wet-wells and lines
  - Odors, especially H2S which result from anaerobic sulfate reducing process, this is increased as organic matter builds-up
  - Corrosion, primarily from H2S, referred to as crown corrosion resulting from the formation of sulfuric acid
  - MICROBE-LIFT<sup>®</sup> technology can be effective in the control of hydrogen sulfide, and promote the reduction of line deposition that results in odor causing biological reactions

- Typical problems in the operation of collection systems
  - In most cases, MICROBE-LIFT<sup>®</sup>/IND with the use of an electron acceptor technology can solve these primary problems, resulting in reduced maintenance, corrosion and odor complaints



#### • Oil and Grease -

- Can cause line blockages, failed pumps and fouled floats with subsequent backups.
- Can foul level switches causing pump to run when wet well is dry and burn out
- Can result in and provide biological oxygen uptake required to drive redox potential down leading to H2S generation



#### Odors

Some components of sewage cause odors, but H<sub>2</sub>S odors from anaerobic activity in most cases is the primary cause of malodors, and corrosion.



#### Corrosion

- Caused primarily by H<sub>2</sub>S, including "crown corrosion", leading to costly repairs and replacements
- This involves the conversion of hydrogen sulfide to sulfuric acid.



- How MICROBE-LIFT<sup>®</sup>/IND works to control FOG buildup and odor abatement
  - The bacteria grow in the sewage and attach to sump, pit, collection line and the oil and grease by charge relationships (+ vs -).
  - Once attached, they grow, cell divide, and begin to biologically breakdown and solubilize the organic matter and FOG for in place removal of the deposits.

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#### Additional Benefits

 Product can be used in collection line to effect treatment of sewage. Reductions of BOD as high as 10 to 30% and greater have been reported as the collections system acts like a long plug flow fixed film wastewater treatment system.



- How MICROBE-LIFT<sup>®</sup>/IND works to control odors and  $H_2S$ 
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- The following case studies will depict graphically how effective MICROBE-LIFT<sup>®</sup>/IND is in digesting oil and grease in the lift stations, as well as on the interior wall of pipes.
- This process assists in odor abatement



#### City of Kerman, California

• Kerman, CA is a city of 14,000, Kerman is located 15 miles West of Fresno, CA.

The business and commercial center for Fresno County, this city was cited as one of the fastest growing cities in central California with 150% growth since 1990. Typically fast population growth puts a strain on local services and the town's sewer maintenance was no exception.

#### City of Kerman, California

- This system is relatively new at approximately three years of service.
- It consists of 25 grease traps in the city leading to 2 lift stations.
- The lift stations empty into five ponds before reaching a final 48 mg pond that is utilized to irrigate silage crops.



#### City of Kerman, California

- The grease traps and lift stations were plagued with rapid grease build-up requiring expensive and timeconsuming pump out and disposal of grease in most locations.
- The wastewater manager stated that he had worked for the City of Kerman for 15 years and "tried everything" but he had never seen a technology that worked to clear the grease.

#### City of Kerman, California

#### Pumping Station with heavy accumulation of FOG on top.







#### City of Kerman, California

- Initially both the wastewater and collection wells were dosed once with 3 gallons of Microbe-Lift<sup>®</sup>/IND each.
- Thereafter 1 gallon was added to the collection pit daily for four days. The system was then maintained on a dosage of 1/2 gallon per week.



#### City of Kerman, California





#### City of Kerman, California

# Before treatment with MICROBE-LIFT<sup>®</sup>/IND

#### Five months after treatment with MICROBE-LIFT<sup>®</sup>/IND







#### City of Kerman, California

- Result:
  - The program was considered to be such a success that the wastewater manager budgeted for a city wide treatment program to be expanded to include the collections system, all grease traps, in addition to the sewer plant head works.



#### City of Fresno, California

- This city manages over 200 miles of sanitary sewer collection systems.
- They have 5 pump trucks on a constant rotation, flushing lines in an effort to reduce Sanitary System Overflows.
- The picture on the next slide is a 10" sewer line that had recurrent heavy grease buildups on the entire surface of the pipe prior to treatment with Microbe-Lift<sup>®</sup> products.

#### City of Fresno, California



MGO - General Observation @ 135.6 ft.

- Picture was taken on 8/29/2013.
- Treatment started on 9/24/2013

#### City of Fresno, California

#### Line prior to treatment

#### Line 5 months after starting treatment with MICROBE-LIFT<sup>®</sup>/IND





#### City of Fresno, California

Prior to treatment the line is coated in grease. The picture to the left is after the first six weeks of treatment, grease is reduced and the bottom is being digested along the top and sides.

#### Line Prior to Treatment

After Treatment





#### City of Fresno, California

#### **Line Before Treatment**



# Line after treatment with MICROBE-LIFT<sup>®</sup>/IND





#### City of Fresno, California



The final series of pictures show the buildup near the end of a 400 foot run, the grease buildup is significant prior to treatment on 8/29/2013. The camera could not make it to the manhole due to the pipe being so heavily clogged with grease. See after picture in following slide

#### City of Fresno, California



MGO - General Observation @ 360.3 ft.

Following treatments the grease has cleared and the camera was now able to run all the way through to the next manhole on 3/4/2014 when these pictures were taken.

#### City of Fresno, California

#### **Before Treatment**



MGO - General Observation @ 347.7 ft.

#### After 5 Months of Treatment



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#### City of Fresno, California



MGO - General Observation @ 360.3 ft.

It should be noted the treatment and accompanying results of all of the lines pictured, was introduced into one manhole 700 feet from the lift station.

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#### City of Fresno, California



MGO - General Observation @ 360.3 ft.

- The line was treated once per week in this location. All this was done with 10 gallons of Microbe Lift<sup>®</sup>/IND and 3 gallons Sludge Away. We are looking forward to the pictures after the next
  - two months when we are adding Sludge Away in addition to the IND.

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