Unleash the Beast™

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Field Trial: San Francisco Mall – Facility Summary

Commencing Date: 6/27/2007

Study Description: Observe and document the effectiveness of Green Bull Drain Cleaner and Grease Trap Treatment over a 90-day period

Goal: Remediate and prevent future grease build up, associated odors and catastrophic failure of the sewage collection system caused by occlusion with grease.

Initial Observations: Sewage lift stations and pipes are constantly accumulating grease buildup that eventually prevents the injection pumps and pipes from functioning properly resulting in sewage spills, interior air quality issues and down time.

Remarks: This facility has implemented a program of mechanical grease removal using a combination of wet-well pumping and pipe hydro jetting. Two of the three sewage injection sites accumulated grease for an approximate period of 90 days prior to mechanical removal. This practice leads to interior air quality concerns as the accumulated grease begins to decompose and produce methane or hydrogen sulfide (H_2S) gases towards the end of the accumulation cycle.

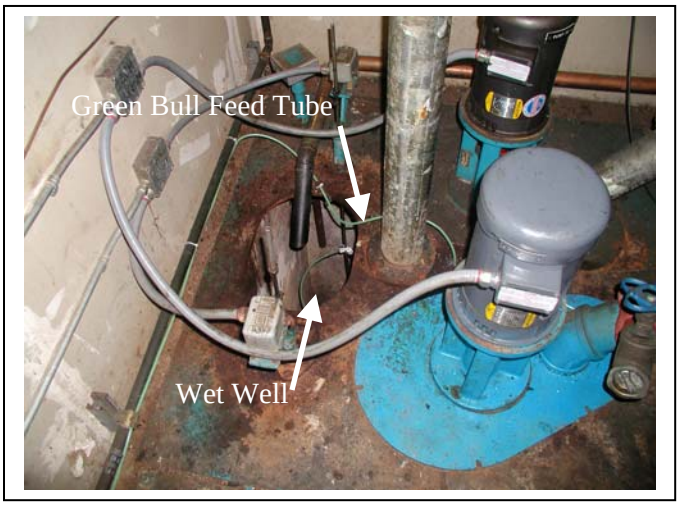
Sump one is even more critical. This site has no regularly scheduled periodic maintenance due to the location's inaccessibility to vehicle-mounted pumping or hydro jetting machinery. This inevitably creates a catastrophic situation since this wet well has the highest volume of grease inflow and accumulation. Local personnel have described a recent sump failure at this site due to accumulation of grease that caused raw sewage to flow out of adjacent toilets.

Green Bull Installation and Application: A combination of drip and misting timed dispense systems apply Green Bull's proprietary blend of grease-digesting bacteria directly to the wet wells and effluent. The location of the feed tubes allows the mist to blanket the top of the grease cap or drip into the inflow stream mixing with the wet well contents. The microorganisms must reach a critical mass in relationship to the amount of grease accumulated and the volume of the daily inflow. Although the microbes will begin to feed and reproduce immediately it is estimated that critical mass will not be achieved for six to ten weeks. An initial population, capable of remediating the accumulated mass, will then die off to a level commensurate with the daily inflow volume. Consistent introduction of Green Bull organisms is required to create a stable eco-system compatible with the microenvironment in each wet well.

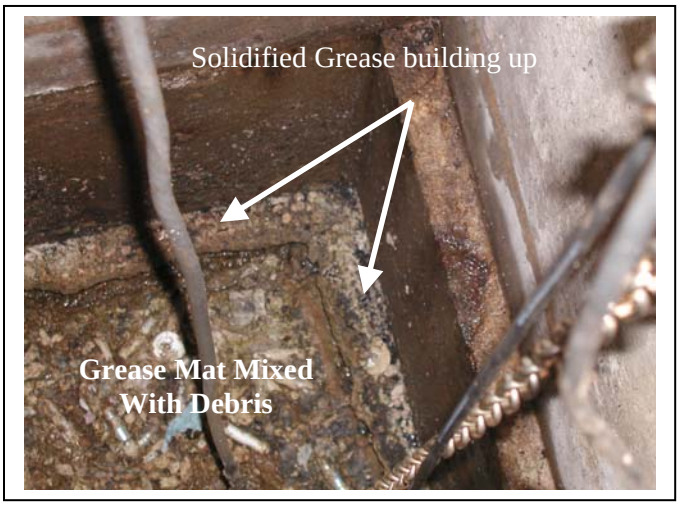
Installation Images:

Sump Station 2

6 Inch Lateral



Sump Station 3



Inside Wet Well Sump 2

Results

Observation Date: 8/28/2007 **Day number:** 61

Observations: All locations are demonstrating remediation in varied degrees dependent on flow volume and site-specific factors. All locations have reversed the process of grease accumulation and are exhibiting reduction of accumulated mass.

Remarks: The sewage collection system involving the three treated lift station sites is significantly healthier than prior to the Green Bull application. Employees have commented on the reduction of odor and have expressed specific appreciation for our work at the Sump 1 site. "I've been here years but I don't ever want to do that again" said one employee referring to entering the wet well and manually removing the grease accumulation when the lift station recently failed. The volume of grease flowing into the wet well at Sump 1 is remarkable.

It was necessary to monitor each site in order to establish flow rates, retention time and wet well capacity, which were unavailable from the engineering staff but necessary to calculate appropriate dosages. Data are provided below for preservation. All data reflects high volume times during the lunch period (11:30 am to 1:30 PM).

Site	High Volume Flow Rate	Pump Cycle Rate	Retention time	Functional Well volume
Sump 1	151.5 GPH	2 hours	4 hours	530 Gallons
Sump 2	4562.4 GPH	1.66 min	0.1 hours	450 Gallons
Sump 3	473.3 GPH	1.66 min	0.9 hours	450 Gallons

Result Images:

BEFORE

Sump Station 3 Wet Well

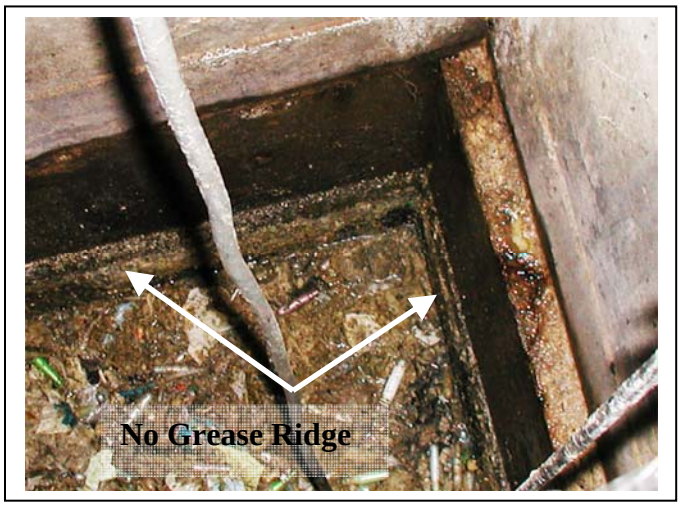
AFTER

Sump Station 3 Wet Well

Grease Ridge on 6/27/2007

Sump Station 2 Wet Well

No Grease Ridge on 8/28/2007



Sump Station 2 Wet Well

Summary of Benefits Achieved:

- **Reliability:** The test wet wells at the San Francisco Mall no longer present the potential for pump, pipe or float failure due to grease build-up. Applying Green Bull on a consistent and regular basis will ensure the effluent will remain in a pumpable state without associated accumulation of grease.
- **IAQ:** The interior air quality, once a significant issue, has improved dramatically. Odors, indicative of poisonous gases like methane or hydrogen sulfide, are produced by undesirable bacteria that are eliminated by over competition from the beneficial Green Bull organisms.
- **Environmental**: When considering a total lifecycle assessment analysis, the positive impacts of bacterial treatment in grease traps and wet wells significantly outweigh those of alternative options, such as caustic chemical treatment or mechanical removal of grease for disposal. The use of “green” products such as Green Bull is favorable to the environment.
- **LEED Certification:** Implementation and continued use of the Green Bull biological grease mitigation system in all waste collection areas warrant an award of a point toward LEED certification.
- **Cost:** Although the decision to implement Green Bull’s biological system is driven by the need to improve system dependability, environmental concerns and improvement of interior air quality most facilities realize an economic benefit as well. Our analysis demonstrates that San Francisco Mall will realize an annual cost savings of over $3,000. When considering the potential costs of emergency overtime, customer satisfaction and possible health concerns associated with catastrophic failure of a collection system the savings are much greater.