Data Driven Approach to Improve Source Control Program

Improving Restaurant FOG Compliance

Lean Six Sigma

Lean Six Sigma is a method that uses a collaborative team effort to improve performance by systematically removing waste and reducing variation

Define

Need to Reduce Overflows due to FOG

Measure

Get data to qualitatively focus on problem locations

Analyze

Take data and determine best way to Improve

Complete Failure Modes & Effect Analysis (FMEA)

Improve

Implement improvements

Control

Monitor success of implementation

Revisit FMEA

The Team

Principal Engineer for Collections- Team Leader (Lather)

Collections Superintendent- Pipeline/Overflow Specialist (Lauer)

Treatment Plant Engineer- Data Analysis Specialist (Treanor)

Treatment Plant Superintendent- Source Control Manager (Waggoner)

Pretreatment Supervisor- Inspection Specialist (De Ocampo)

Goal

Reduce grease in sewer collections system by improving:

- Inspections,
- Outreach to restaurants, and
- Compliance follow up

Measure/Data Considered

- Collections Crew Line Cleaning Observations
- Pipelines with a PACP O&M score >3 for grease
- SSO History for past 10 years
- Grease trap/interceptor sizing for each restaurant
- Seat Meals info for each restaurant (records questionable due to increase in take-out orders)
- Pipeline Material

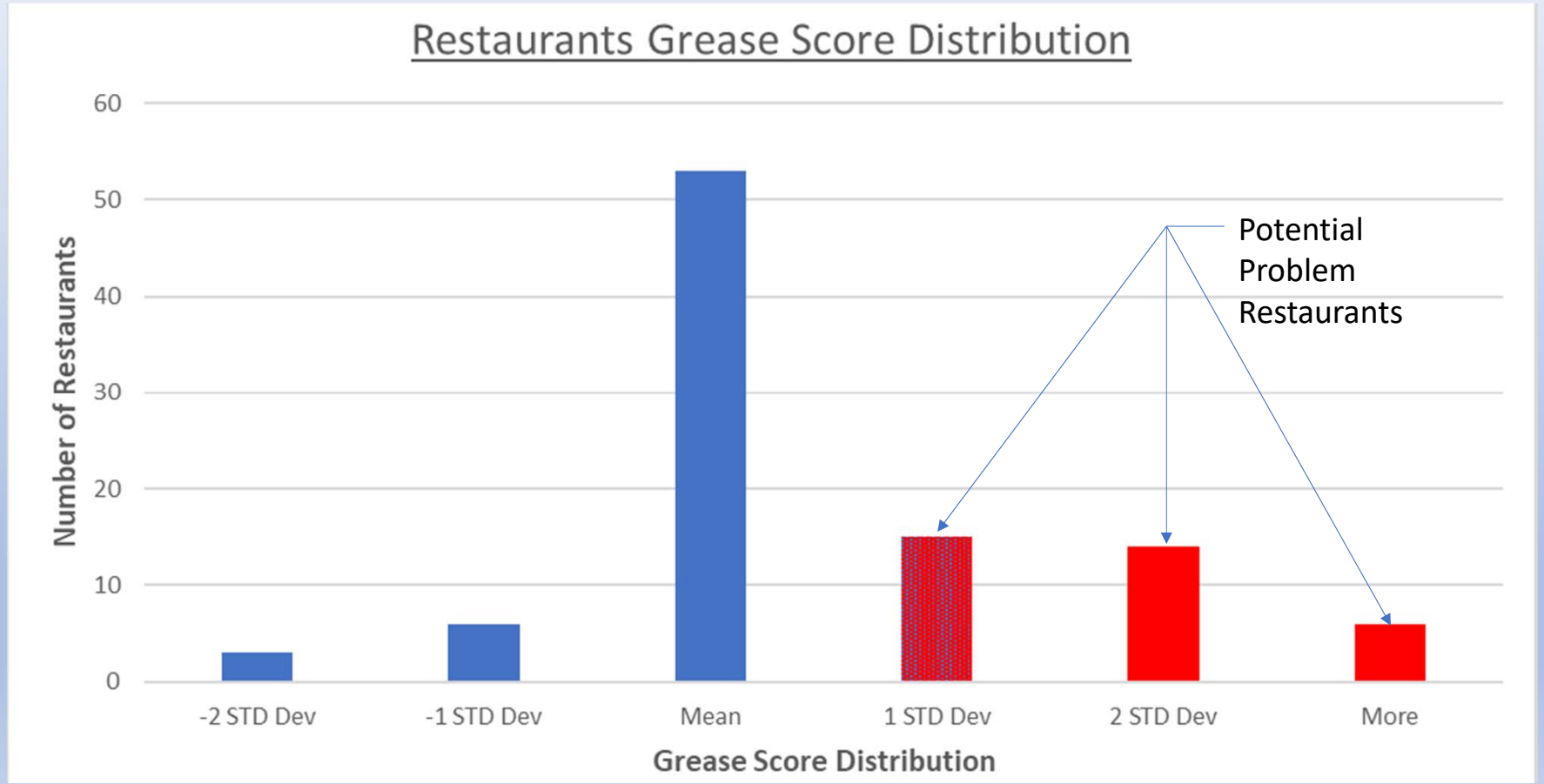
Initial Data Collection (Measurement Phase)

Physical Address	All Downstream Line Segments (Comma delineated list)	Seat/Meals (#	Grease Trap Brand	Grease Trap LBS
Restaurant #1	O6104,O6104-O6105,O6105-O698,O698-O688,O688-	90	Endura	100
Restaurant #2	O6105,O6105-O698,O698-O688,O688-O6141,O6141-	140	No model	70
Restaurant #3	O6104,O6104-O6105,O6105-O698,O698-O688,O688-	11	Wade	20
Restaurant #4	O6105,O6105-O698,O698-O688,O688-O6141,O6141-	150	Canplas	122
Restaurant #5	O6104,O6104-O6105,O6105-O698,O698-O688,O688-	50	Endura	50
Restaurant #6	O6105,O6105-O698,O698-O688,O688-O6141,O6141-	320	Rockford	70
Restaurant #7	O6141,O6141-O681,O681-O677,O677-P628,P628-	96	Qty 2 - Rockford 14 lb and 30 lb	44
Restaurant #8	O6141,O6141-O681,O681-O677,O677-P628,P628-	120	Endura	50
Restaurant #9	O697,O697-O698,O698-O688,O688-O6141,O6141-	197	Black Series	40

Initial Data Collection (Measurement Phase)

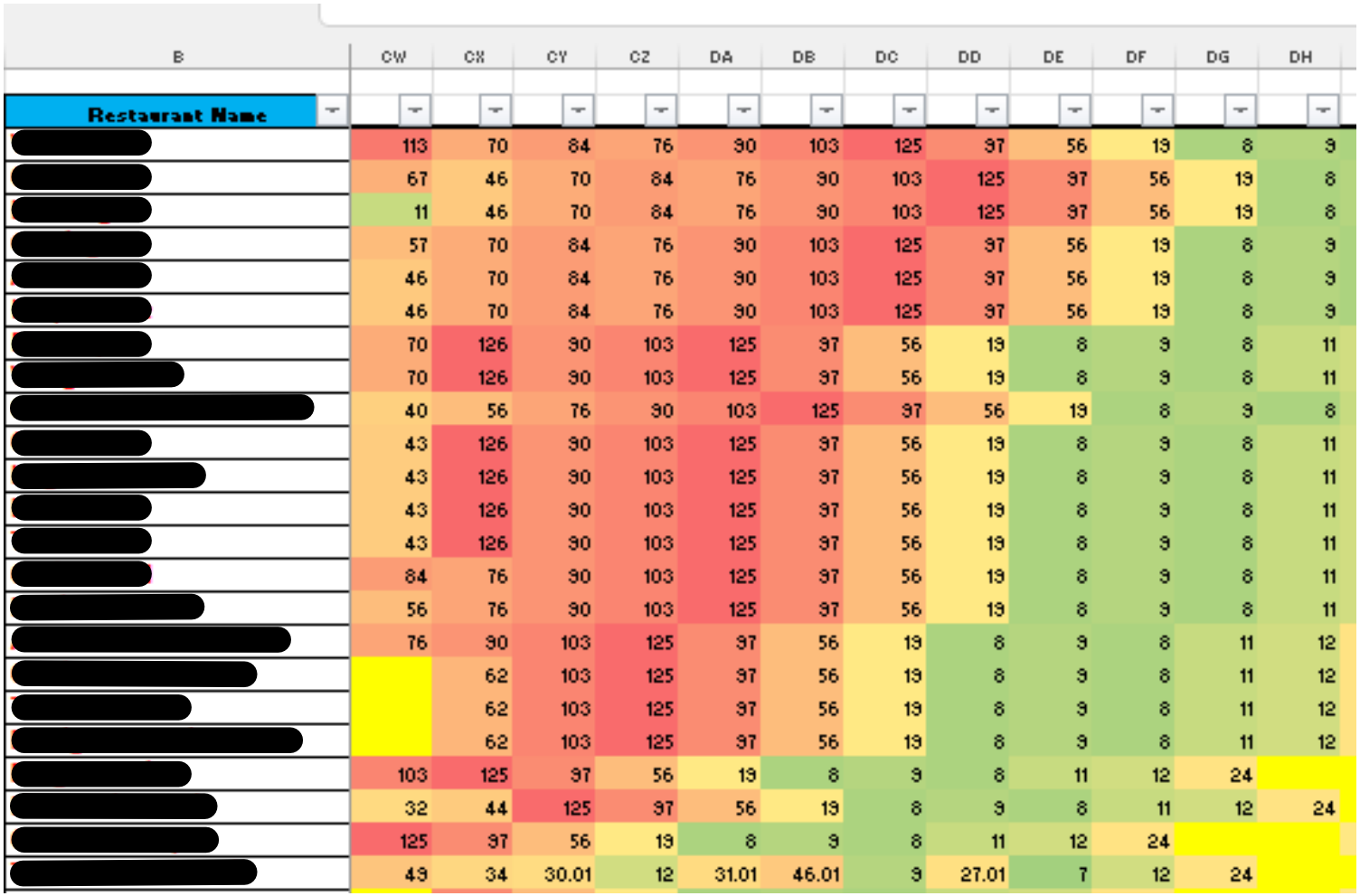
Line Segment	SSO (#)	Heavy Grease Observances (#)	Medium Grease Observances (#)	Light Grease Observances (#)	PACP <3	PACP 3+	Total Grease Score	Pipe Type
Weighting	20.01	4	3	1	2	4		
S616-S608	8	1	3	1	0	0	174.08	Ductile Iron Pipe
Q642-Q643	3	6	13	3	1	1	132.03	Other
O687-O688	2	10	9	13	1	1	126.02	Polyvinyl Chloride
O681-O677	0	13	22	5	1	0	125	Polyvinyl Chloride
Q870-Q808	6	0	1	1	0	0	124.06	Other
O6103-O6104	0	12	18	5	1	1	113	Vitrified Clay Pipe
O821-O822	5	0	2	0	0	0	106.05	Polyvinyl Chloride
O6141-O681	0	10	15	12	1	1	103	Polyvinyl Chloride
O677-P628	0	10	15	10	1	0	97	Polyvinyl Chloride
O688-O6141	0	9	14	10	1	0	90	Polyvinyl Chloride
S708-S706	0	14	11	1	0	0	90	Vitrified Clay Pipe
R789-R743	4	1	1	0	0	0	87.04	Vitrified Clay Pipe
S711-S708	0	12	12	3	0	0	87	Vitrified Clay Pipe
O6105-O698	0	7	15	9	1	0	84	Polyvinyl Chloride
S610-S609	4	0	0	0	0	0	80.04	Vitrified Clay Pipe

Analysis Phase



Analysis Phase

Heat Map of Downstream Pipeline Impact



B	CW	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH
Restaurant Name												
[redacted]	113	70	84	76	90	103	125	97	56	19	8	9
[redacted]	67	46	70	84	76	90	103	125	97	56	19	8
[redacted]	11	46	70	84	76	90	103	125	97	56	19	8
[redacted]	57	70	84	76	90	103	125	97	56	19	8	9
[redacted]	46	70	84	76	90	103	125	97	56	19	8	9
[redacted]	46	70	84	76	90	103	125	97	56	19	8	9
[redacted]	70	126	90	103	125	97	56	19	8	9	8	11
[redacted]	70	126	90	103	125	97	56	19	8	9	8	11
[redacted]	40	56	76	90	103	125	97	56	19	8	9	8
[redacted]	43	126	90	103	125	97	56	19	8	9	8	11
[redacted]	43	126	90	103	125	97	56	19	8	9	8	11
[redacted]	43	126	90	103	125	97	56	19	8	9	8	11
[redacted]	43	126	90	103	125	97	56	19	8	9	8	11
[redacted]	84	76	90	103	125	97	56	19	8	9	8	11
[redacted]	56	76	90	103	125	97	56	19	8	9	8	11
[redacted]	76	90	103	125	97	56	19	8	9	8	11	12
[redacted]		62	103	125	97	56	19	8	9	8	11	12
[redacted]		62	103	125	97	56	19	8	9	8	11	12
[redacted]		62	103	125	97	56	19	8	9	8	11	12
[redacted]	103	125	97	56	19	8	9	8	11	12	24	
[redacted]	32	44	125	97	56	19	8	9	8	11	12	24
[redacted]	125	97	56	19	8	9	8	11	12	24		
[redacted]	49	34	30.01	12	31.01	46.01	9	27.01	7	12	24	

Findings from Analysis

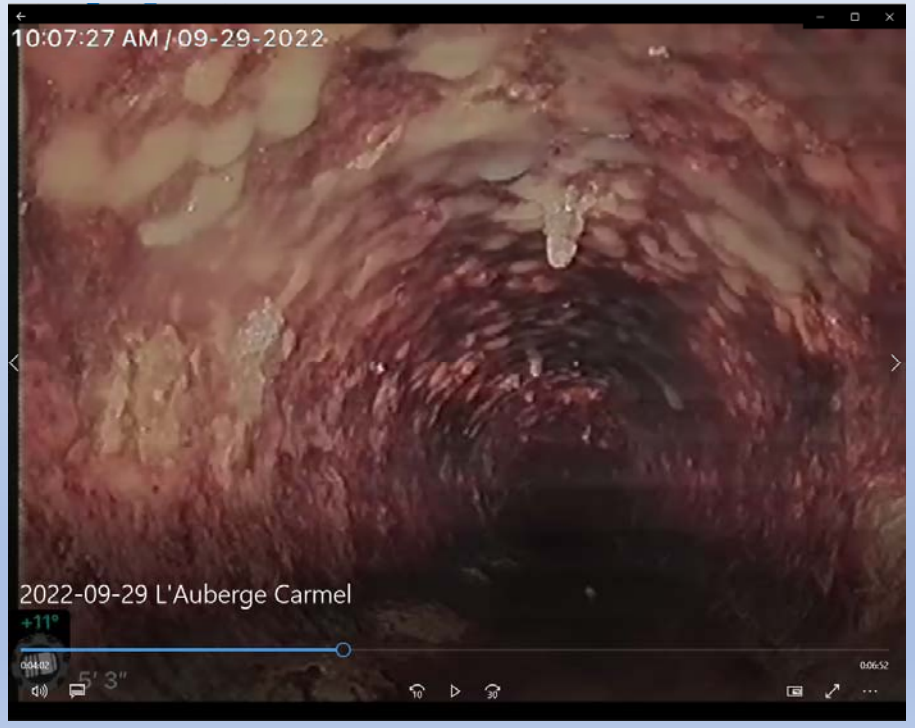
- There were about 34 of 96 restaurants that had a high grease score and were identified as Potential Problem Restaurants
- Looks like 150-lb or 200-lb grease interceptor should be required at a minimum
- Conduct video inspections of laterals of the top 34 restaurants to verify grease is being discharged from these restaurants
- Purchase a push camera and train Source Control staff to conduct lateral video inspections

Additional Data Collected

Rigid Sea Snake Model M40
Push Camera

Quick Video Example

Example of Heavy and Light Grease Videos From Source Control Inspection



Round 2 Data Collection- Video Laterals

Restaurant Name	Lateral Discharge Line Segment	Grease Trap LBS	Results of Video of Lateral	Date of Video Inspection	No Cleanout
[redacted]	O6103-O6104	70	Heavy Grease in Video of Lateral	8/24/2022	
[redacted]	O6142-O6102	100	Heavy Grease in Video of Lateral	7/27/2022	
[redacted]	O6101-O6102	50	Light to Moderate Grease	8/24/2022	Carmel Trap
[redacted]	O6147-O6104	122	Heavy Grease in Video of Lateral	7/27/2022	
[redacted]	O6102-O6104	20	Light Grease	8/24/2022	
[redacted]	O6102-O6104	70			**None**
[redacted]	O686-O687	44	Heavy Grease in Video of Lateral	10/12/2022	
[redacted]	O686-O687	50			**None**
[redacted]	O696-O697	40	Medium to Heavy Grease	9/27/2022	
[redacted]	O685-O687	50			**None**
[redacted]	O685-O687	70	Heavy Grease in Video of Lateral	10/4/2022	
[redacted]	O685-O687	70	Camera could not bend into pipe	10/4/2022	**no access**
[redacted]	O685-O687	70	Heavy Grease in Video of Lateral	9/29/2022	
[redacted]	O6105-O698	0	Medium to Heavy Grease	10/4/2022	

Findings

- Eight of the top 30 potential problem restaurants had no CCTV access
- CAWD's Plumbing and Pretreatment Ordinances require cleanouts
- 19 of the 22 laterals CCTV'd had Moderate to Heavy Grease
- All 30 grease interceptors were sized under 150 pounds

Immediate Next Steps

- Outreach to City of Carmel-by-the-Sea **and** Restaurant owners/managers regarding problem
- Outreach to the 19 Restaurants that had heavy grease in laterals and provide requirements to improve
- Need to put together a list of all restaurants that are missing cleanouts. Then send letter to property owner to rectify that issue.

Next Steps for Lean Six Sigma

- **Improve** -Implement improvements & measure in 6 months
- **Control -**Monitor success of implementation and revisit Failure Modes & Effect Analysis (FMEA)