Effective Key Performance Indicators in SSMPs

BACWA Collection Systems Group

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Presentation Outline

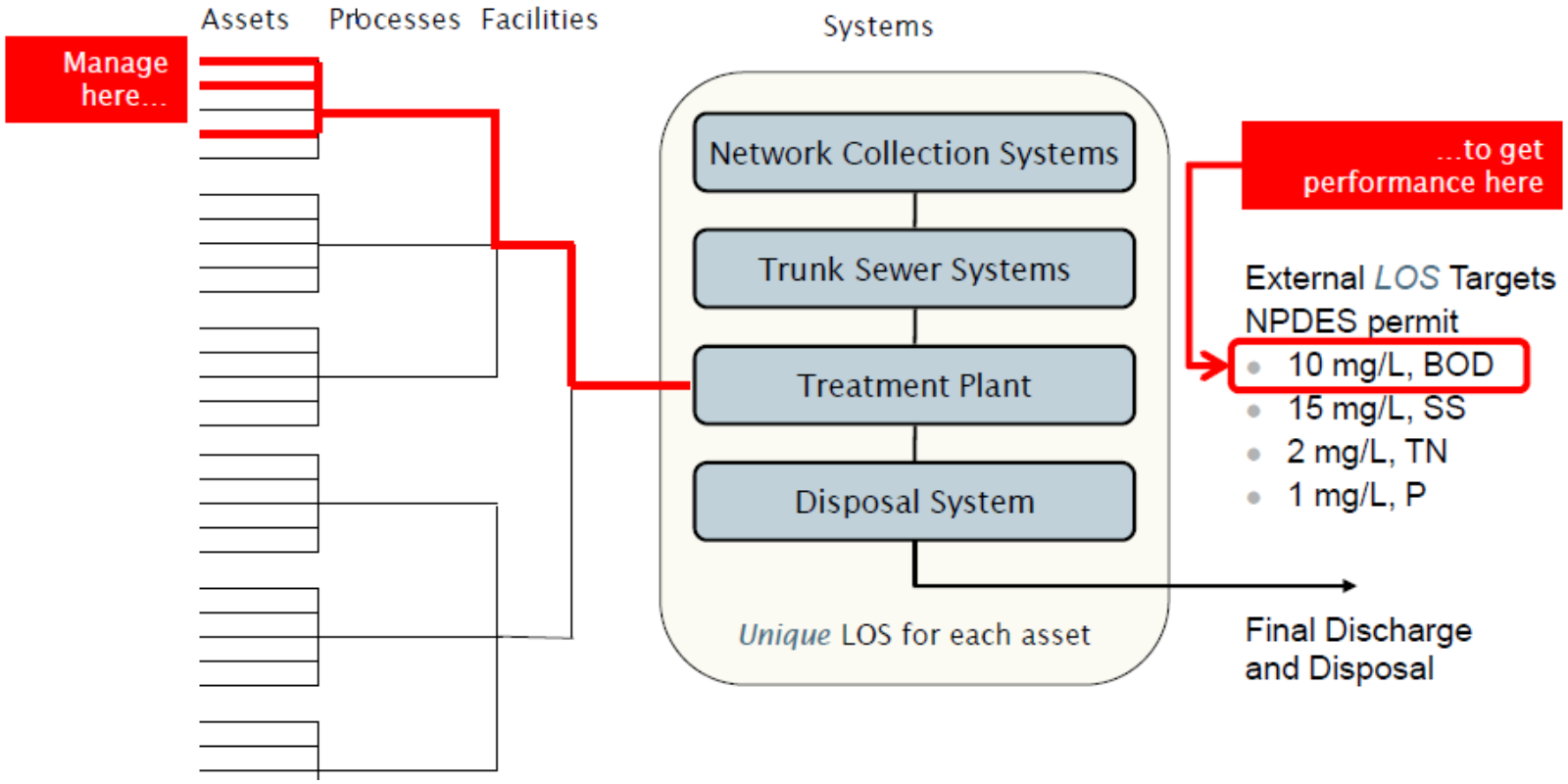
- A Little Background
- Typical SSMP Effectiveness KPIs
- Balanced SSMP KPI Options

A Little Background

KPI Definition

- A *Key Performance Indicator* (*KPI*) is a measurable value that demonstrates how effectively an organization is achieving *key* organizational objectives.

KPIs From Asset Management Perspective



KPIs From Asset Management Perspective

ENVIRONMENTAL	
Key Performance Indicators	**2005 Target Level of Service**
1. OCSD will comply with effluent quality standards.	
a. Compliance with all Ocean Discharge Permit Limits, %	100%
b. Concentration of Emerging Chemical Constituents of Concern, Plant No. 1 Secondary Effluent	NDMA < 150 ppt 1,4 Dioxane <2ppb
c. Effluent total coliform bacteria after initial dilution, mpn	<1,000
d. Source Control permitee compliance with permit conditions, percent	>90%
2. OCSD will manage flows reliably.	
a. Frequency of use of emergency 1-mile outfall	0 per year during dry weather < once per 3 years in peak wet weather
b. Sanitary sewer spills per 100 miles	< 2.1
c. Contain sanitary sewer spills within 5 hours	100%
3. OCSD's effluent will be recycled.	
a. Treated effluent reclaimed, % (flow)	4% (10 mgd)
4. OCSD will implement a sustainable biosolids management program.	
a. National Biosolids Program Certification for Environmental Management System	Maintain
b. Percent of biosolids beneficial reuse Class "B" Class "A/EQ"	100% 40% 60%
5. OCSD will improve the regional watershed.	
a. Dry weather urban runoff collected and treated	4 mgd
b. Rainfall induced inflow and infiltration, wet weather peak factor	<2.2
c. Stormwater management, % of treatment process area runoff treated on-site	100%
d. Per capital wastewater flow rate, gallons per person per day	<105
6. OCSD will protect the air environment.	
a. Odor complaints: Reclamation Plant No. 1 Treatment Plant No. 2 Collection System	 5 4
b. Air emissions health risk to: Community, cancer risk per 1 million Employees	 <25 <25

Triple Bottom Line Category

Value Statements

1. Set strategic levels of service & tolerable risk limits

Example of "Triple Bottom Line" LOS statement

Key Performance Indicators

KPI Targets

WERF: Three Types of KPIs

- **Level of Service**
  - Customer
  - Environment
  - Regulatory
- **Asset-Related**
  - Condition
  - Performance
- **Derived**
  - Rehabilitation $
  - CIP $
  - Staffing $

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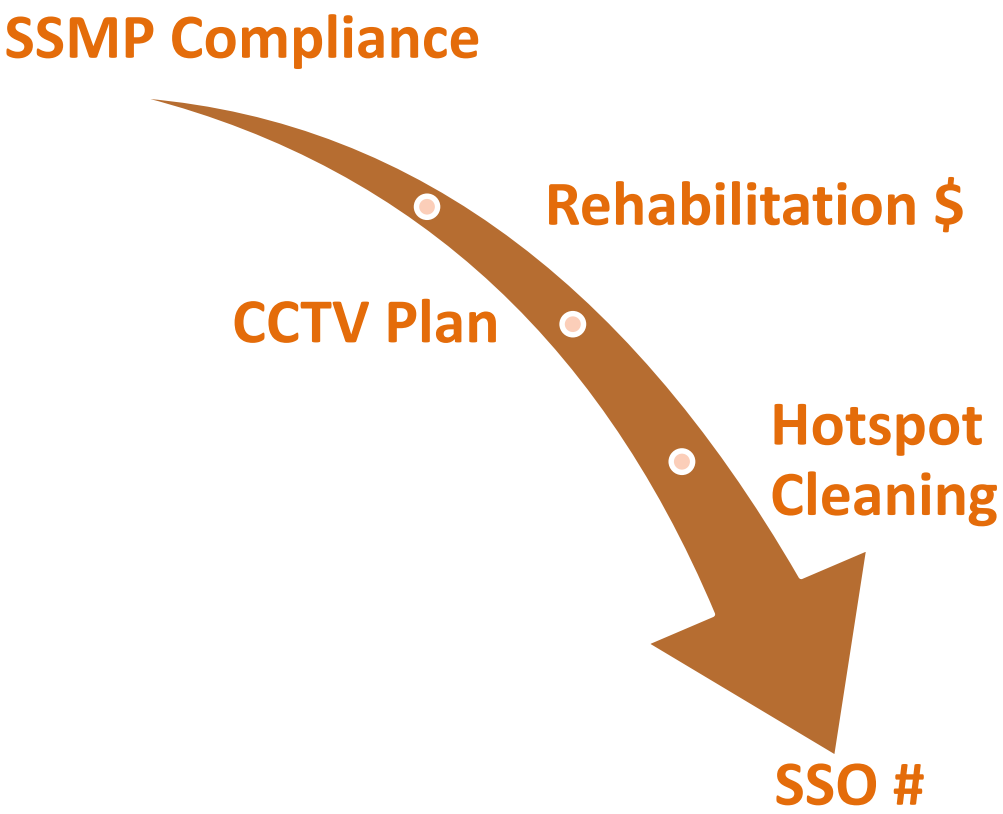
KPIs: Lagging Versus Leading

- **Lagging**
  - Output-Oriented
  - Easier to measure
  - Harder to influence
- **Leading**
  - Input-Oriented
  - Harder to measure
  - Easier to influence

KPI Spectrum



Typical SSMP Effectiveness KPIs

Selected Bay Area SSMP KPIs

The performance criteria that are monitored include:

- Total number of SSOs;
- Number of SSOs for each cause (roots, grease, debris, pipe failure, capacity, and others);
- Portion of sewage contained compared to total volume spilled;
- Volume of spilled sewage discharged to surface water;
- Miles of sanitary sewer lines cleaned.

The intention of this section is to monitor the effectiveness of each SSMP element and update and modify SSMP elements to keep them current, accurate, and available for audit as appropriate. One way to track the effectiveness of each SSMP element is to use performance indicators. Performance indicators will be used during the audit process to determine any deficiencies in the SSMP. Examples of performance indicators that will be used to assess the SSMP include:

- Number of SSOs over the past 12 months
- SSOs by cause (roots, grease, debris, etc.)

The indicators that the City will use to measure the performance of its wastewater collection system and the effectiveness of its SSMP are:

- SSO Sewer Main Rate (SSOs/100 miles/year);
- Number of lower lateral overflows
- Number of SSOs for each cause (roots, grease, debris, pipe failure, capacity, lift station failures, and other);
- Median SSO volume (gallons);
- Percentage of SSOs greater than 100 gallons;
- Percentage of sewage contained compared to total volume spilled; and
- Percentage of total spilled sewage discharged to surface water.

Detailed SSO KPIs

OVERFLOW EMERGENCY RESPONSE PLAN

Item	Overflow Emergency Response Plan Detail	Response
46.	Reference Material • Data submitted to CIWQS • Service call data	
47.	*Annual SSO Statistics Summary*	

Indicator	2009	2010	2011	2012	2013
Number of SSOs (total)					
Wet season SSOs					
Dry season SSOs					
Number of SSOs by volume (gallons)					
<10					
10 – 99					
100 – 999					
1000 – 9999					
>10,000					
Total SSO Volume					
Volume reaching waters of the State					
Volume not contained but not reaching waters of the State					
Volume recovered					
Net volume (total minus recovered)					
Number of SSOs per 100 mile of sewer per year					
Volume of SSOs per 100 mile of sewer per year					
Total Volume conveyed to the plant (million gal)					
Total volume SSO / Total volume conveyed (gal)					
Number of SSOs (by Cause)					
Blockages:					
Roots					
Grease					
Debris					
Debris from Laterals					
Animal Carcass					
Construction Debris					
Multiple causes					
Infrastructure Failure					
Inflow & Infiltration					
Electrical Power Failure					
Flow Capa District Deficiency					
Natural Disaster					
Bypass					
Cause Unknown					
Average Emergency Response Times, Minutes					
Business Hours					
Notification to arrival on site					
Notification to complete clearage					
Non-business hours					
Notification to complete clearage					
Number of locations with multiple SSOs					

More Balanced SSMP KPI

Table 9-1: Performance Metrics for Monitoring and Measurement

	Performance Measure	Source
System Statistics	Total miles of gravity sewer	GIS
	Total miles of pressure sewer	GIS
	Total number of manholes	GIS
	Total number of sewage pumping stations	GIS
Measures Based on SSO Number	Total number and percentage of SSOs by Category	CIWQS
	Number and percentage of dry weather versus wet weather SSOs	CIWQS
	Number of SSOs by cause	CIWQS
	Number of SSOs per 100 miles of sewer per year	CIWQS
	Number of locations with repeat SSOs	CIWQS
	Number of locations where SSOs occurred in pipes previously rehabilitated	CIWQS and GIS
Measures Based on SSO Volume	Volume of SSOs per 100 miles per Year	CIWQS
	Number and percentage of SSOs by Volume	CIWQS
	Total volume of SSOs	CIWQS
	Mean and median SSO volume	CIWQS
	Total SSO volume recovered and percentage of overall total SSO volume	CIWQS
	Net volume of SSOs (total minus recovered) and percentage of overall total SSO volume	CIWQS
	Total volume reaching storm drainage channel and not recovered or reaching surface waters and percentage of overall total SSO volume	CIWQS
SSO Response Time	Average response time during business hours	CIWQS
	Average response time outside of business hours	CIWQS
Maintenance	Number of blockages in the past year by cause	Accela CMMS
	Amount of "hot spot" cleaning performed (LF)	Accela CMMS
	Amount of routine cleaning performed (LF)	Accela CMMS
	Amount of cleaning QA/QC CCTV performed (% of cleaning footage)	POSM
	Amount of root control performed (LF)	Accela CMMS
Condition Assessment, Rehabilitation, and I/I Control	Amount of CCTV inspection performed (LF)	POSM
	Number of manholes inspected	POSM
	Amount of mainlines (LF) and number of manholes and lower laterals rehabilitated	GIS, Contract Documents
	Number of inflow sources detected and corrected	Spreadsheet
	Number of PSLs repaired or replaced and certified	HTE

Balanced SSMP KPI Options

Collection System Investment

- **Maintenance**
  - $
  - Feet
  - Percentage of Plan
- **Rehabilitation**
  - $
  - Feet
  - Percentage of Plan
- **CIP**
  - $
  - Feet
  - Percentage of Plan

Length of gravity sewers cleaned annually,

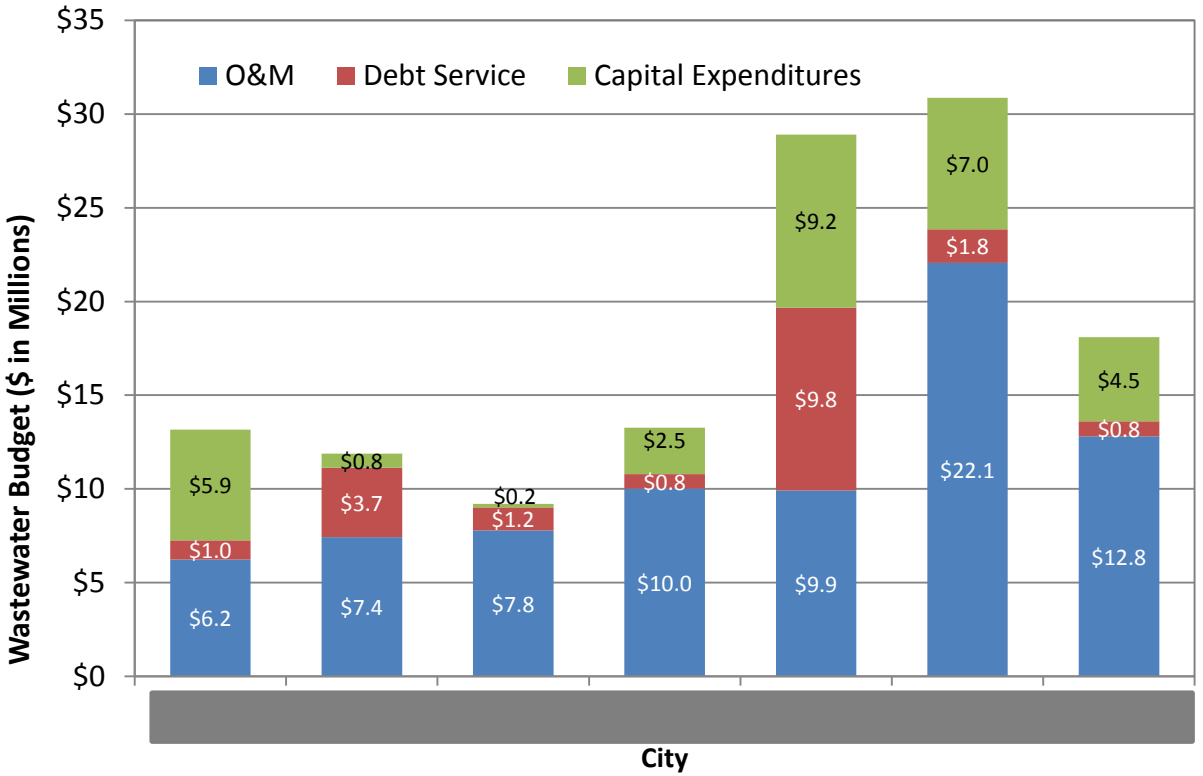
Actual versus scheduled cleaning dates for gravity sewers,

Length of gravity sewers inspected by CCTV annually,

Record of pump station maintenance work orders completed annually, and

Location of SSOs.

Collection System Investment



Balancing KPIs With Leading KPIs

9.3 Performance Measures

The indicators that the Town will use to measure the performance of its wastewater collection system and the effectiveness of its SSMP are:

- Total number of SSO locations per 100 miles of sewer,
- Volume of spilled wastewater recovered (million gallon (MG) per year) compared to total volume of wastewater spilled (MG/yr),
- Volume of spilled wastewater discharged to surface waters (MG/yr) compared to total volume of wastewater spilled (MG/yr),
- Footage of collection system inspected, including separate evaluation of priority areas,
- Footage of collection system cleaned, including separate evaluation of priority areas, and
- Completion of yearly-updated Collection System Management Goals.

Balancing KPIs With Leading KPIs

Performance Measure	Quarterly Calculation Jun 2014	Quarterly Calculation Sep 2014	Quarterly Calculation Dec 2014	Yearly Performance Evaluation Dec 2014
Total number of SSO locations per 100 miles of sewer				
Volume of spilled wastewater recovered (MG/yr) compared to total volume of wastewater spilled (MG/yr)				
Volume of spilled wastewater discharged to surface waters (MG/yr) compared to total volume of wastewater spilled (MG/yr)				
Footage of collection system inspected within 200 feet of waterway (feet)				
Footage of collection system inspected not within 200 feet of waterway (feet)				
Footage of collection system cleaned within 200 feet of waterway (feet)				
Footage of collection system cleaned not within 200 feet of waterway (feet)				
Completion of yearly-updated Collection System Management Goals				
Collection System Management Goals	**Quarterly Assessment Jun 2014**	**Quarterly Assessment Sep 2014**	**Quarterly Assessment Dec 2014**	**Yearly Performance Evaluation Dec 2014**
Complete GIS update of sanitary sewer collection system.				
Produce GIS-based map book for collection system.				
Complete five-year implementation of collection system CMMS.				
Implement Full Condition Assessment				
Implement Lateral Inspection/Repair Program				
Implement Water Balance Analysis for High Flow EQ Ponds				
Complete Bi-Annual SSMP Audit.				

Training KPIs

Training Area	Training	January 2014	February 2014	March 2014
Core Training	Customer Service			
	Sexual Harassment			
	Cultural Diversity			
	Commercial Drivers			
	IIPP			
Equipment Training	Equipment Operations			
	Chain Saw			
	High Pressure Equipment			
	Forklift			
	Power Rodding			
Operations Training	Confined Space			
	Gas Detector			
	Shoring			
	Traffic Control			
	USA Locating			
	Creeks and Waterways			
	SSO Prevention			
	Overflow Emergency Response Plan			
	CCTV Inspection			
	SSMP and NPDES Permit Compliance			
	SSO Water Quality Sampling			
	SSO Spill Volume Estimating			
	SSO Record Keeping			
Pump Training	Pump Repairs			
	SCADA			
	Electrical			
	Routine Maintenance			
Medical Training	Blood Borne Pathogen			
	Dehydration/Heat Stroke			
	First Aid Training			
	CPR			
Emergency Training	Emergency Evacuation Plan			
	Hazardous Materials			

Training Area	Training	Employee 1	Employee 2	Employee 3
Core Training	Customer Service			
	Sexual Harassment			
	Cultural Diversity			
	Commercial Drivers			
	IIPP			
Equipment Training	Equipment Operations			
	Chain Saw			
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	Creeks and Waterways			
	SSO Prevention			
	Overflow Emergency Resposne Plan			
	CCTV Inspection			
	SSMP and NPDES Permit Compliance			
	SSO Water Quality Sampling			
	SSO Spill Volume Estimating			
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	Dehydration/Heat Stroke			
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Emergency Training	Emergency Evacuation Plan			
	Hazardous Materials			

Questions?

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