

# Regional Source Control Program

## 2015 Annual Report

Capital Regional District | Environmental Partnerships



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# REGIONAL SOURCE CONTROL PROGRAM 2015 ANNUAL REPORT

## EXECUTIVE SUMMARY

### Introduction

The purpose of the Capital Regional District (CRD) Regional Source Control Program (RSCP) is to protect sewage collection and treatment facilities, public health and safety, and the marine receiving environment by reducing the amount of contaminants that industries, businesses, institutions and households discharge into the district's sanitary sewer systems. Source control is widely accepted as a cost-effective and essential first step in sewage treatment in all major urban areas throughout North America.

The program regulates approximately 2,000 businesses through industrial wastewater discharge permits, authorizations and 11 sector-specific Codes of Practice (CoP).

### 2015 Program Activities

The RSCP continued to apply a "sector-by-sector" approach to CoP inspections, focusing on the automotive repair, vehicle wash and food services sectors. Overall compliance rates for CoP, permitted industrial facilities and facilities operating under authorizations reached 97% in 2015.

Inspections coordinated with internal programs and external agencies have been very successful, with over 1,000 coordinated inspections being completed in 2015.

Outreach and education staff commissioned a residential survey to evaluate current behaviours and barriers to adopting new source control practices. Results identified successes, but also highlighted a growing challenge to the RSCP: a general belief that source control practices would no longer be required once enhanced sewage treatment is implemented in the core area.

The main activities and accomplishments of the program in 2015 are outlined below.

### Industrial, Commercial and Institutional Liquid Waste Regulation

- Sector-by-sector inspections included the automotive, vehicle wash, and food services sectors.
- CoP inspections in 2015 (1491) represented a substantial increase over 2014 (964).
- 632 food services operations were inspected in 2015, with an additional 284 follow-up visits for compliance and/or further support.
- 457 automotive and vehicle wash sector inspections conducted in 2015.
- All permit inspections scheduled at the beginning of 2015 were completed within the year.
- Eight new permits were issued (total of 39 active) and 22 new authorizations were issued (total of 100 active).

### Monitoring

- The monitoring targets set for 2015 were achieved.
- On average, there were two scheduled audit monitoring events per permit in 2015.
- CoP monitoring focused on the fermentation and automotive repair sectors in 2015.

### Enforcement

- Five tickets were issued under the CRD Ticket Information Authorization (TIA) Bylaw in 2015.

## **Contaminants Management**

- RSCP continued research into nonylphenol ethoxylates (NPE) alternatives.
- RSCP staff prepared a business case to identify a suitable technological solution for improving grease interceptor maintenance compliance and inspection efficiency.

## **Contaminant Reductions**

- For the seventh consecutive year, Ganges Wastewater Treatment Plant mixed liquor results met the Class A criteria for all metals, including mercury. Saanich Peninsula Wastewater Treatment Plant dewatered sludge monitoring, initiated in 2013, continued in 2015. All of these results also met the Class A criteria for metals.

## **Significant Incident Response**

- There were three significant incidents formally reported: one involving fats, oils and grease (FOG) build-up, one involving electroplating wastewater and another involving a diesel oil spill.

## **Residential Outreach**

- A residential survey to gauge attitudes, practices and barriers regarding source control behaviors was implemented in 2015. A continuing trend toward proper disposal of medication (46% in 2007 to 71% in 2015) was noted; 50% of the respondents recognized “Clean Green” and “Medication Return” campaigns and 98% of respondents agreed that “what is disposed through the water system in my home can make a difference in protecting the marine environment”.
- A new “Green 365” campaign, “In the Bathroom” included significant source control messaging.
- Staff hosted outreach booths in nine pharmacies throughout the region to provide information and prompts promoting the Medications Return Program. Over 11 tonnes of medications were returned for disposal by participating pharmacies.

## **Business Outreach**

- Outreach material, including the sector guidebook and a new rack card for “Automotive Repair Operations” was updated, revised or created to focus on “Mechanical Repair Operations”.
- CRD joined BizPal, a province-wide web-based tool for new and current businesses to promote awareness of, and access to, information on a range of business licenses and permits.
- Staff worked with other CRD programs and the non-governmental organization Synergy Sustainability Institute to revitalize the EcoStar business recognition awards.

## **Education**

- Staff engaged the three main post-secondary institutions in the region to identify opportunities for incorporating CRD sustainability messaging in to their lesson plans. A web page was created for post-secondary students and educators to better access CRD environmental education resources.

## **Partnerships Initiatives**

- RSCP staff conducted water audits for a large transit facility, 11 hair salons, a brew pub/restaurant/marina, and a commercial catering company.
- RSCP staff collaborated in a Salon and Spa Working Group, focusing on water saving strategies, wastewater characterization and contaminant reduction opportunities.
- A seafood processing facility, under authorization with the RSCP, worked with staff to explore water conservation opportunities, resulting in approximately \$12,000 per year in water savings.
- RSCP worked with the CRD Integrated Watershed Management Program and View Royal staff to resolve pollution coming from a car dealership site and contaminating a nearby stream.

## **Program Planning and Development**

- A five-year review of the program (2009-2013), a commitment in the Core Area and Saanich Peninsula Liquid Waste Management Plans, was completed by a consultant.
- A new four-year implementation plan for the program (2016-2019), aligning program activities with the next CRD budget cycle, was developed and approved by the Board.
- A consultant was hired in November, 2015 to undertake a full technical review of the CRD's Code of Practice for Food Services Operations.

## **Performance Measures**

- The percentage of businesses with a rating of "overall compliance" in 2015 was 97%.
- For the seventh consecutive year, the percentage of mixed liquor and dewatered sludge samples that met Class A standards for metals was 100%.
- The percentage of priority contaminants showing no increase in loads to the core area environment was 95% – based on the trend assessment for 1990-2011 core area wastewater data.

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**1.0 INTRODUCTION**

Source control is a waste management strategy that is aimed at reducing the amount of contaminants that industries, businesses, institutions and households discharge to sewers. The need for a Source Control Program within the Capital Regional District (CRD) was assessed during the period 1990-1992 and a commitment to develop a program followed in 1993.

Following discussions with municipal representatives in 1993, it was agreed that the CRD would assume full responsibility for regulating the quality of wastewater entering its trunk sewers and sewage treatment facilities by applying for designation as a sewage control area. In 1993, the CRD also committed to the development and implementation of a region-wide Source Control Program and adoption of a Sewer Use Bylaw under the *BC Environmental Management Act*. This bylaw was designed to serve as the main regulatory instrument for source control in sanitary sewer systems, creating a level playing field for businesses and institutions throughout the district.

The first phase of implementation of the Regional Source Control Program (RSCP) began in 1995, following adoption of the Sewer Use Bylaw in August 1994. This early phase (1995-1998) focused on identifying, inspecting, assessing and permitting larger industrial facilities operating within the CRD. In 1998, the focus of the program shifted toward development, adoption and implementation of codes of practice (CoP) to regulate discharges from a large number of smaller commercial and institutional facilities. The first of these CoP were adopted in 1999 and development and implementation of a total of 11 CoP was achieved by early 2005.

A five-year internal review of the program was completed in 1999 and annual reporting on the achievements of the program was initiated the following year as one of the commitments in the Core Area Liquid Waste Management Plan (LWMP). The first independent five-year review of the RSCP was completed in 2005. The main recommendations from this review were incorporated into a five-year plan for the period 2006-2010. A comprehensive internal program review, with a focus on reducing priority contaminants, was undertaken in 2008. This led to the development of a revised work plan for 2009-2010, updating the five-year plan and including efforts to increase program efficiency. A second independent review of the program was completed in 2010. The findings of this review, covering the period 2004-2008, was used to develop a new five-year plan for 2011-2015 (see Table 13).

The most recent independent review of the program was completed in June 2015 (KWL, 2015). Consultant's recommendations were considered along with the results of a residential outreach survey (May 2015) and a service planning session (June 2015) to prepare an implementation plan for the period 2016-2019.

The goals and objectives of the RSCP are documented in the 1996 Saanich Peninsula LWMP and the Core Area LWMP (July 2000). The program goals, which were reviewed in 2008, are as follows:

- protect the marine receiving environment adjacent to the CRD's sewage outfalls
- protect sewage facilities belonging to the CRD and its member municipalities
- protect the health and safety of sewage workers and the general public
- protect the quality of sewage sludge and biosolids
- protect treatment plants against upsets
- consistently apply the program for all users of CRD sewage facilities

The Core Area and Saanich Peninsula LWMPs contain commitments to prepare an annual report on the RSCP for submission to the CRD Board and the BC Ministry of Environment (MOE). This annual report presents a summary of program activities and accomplishments for the period January to December 2015 and provides a brief account of initiatives planned for 2016.

The RSCP is a key component of effective wastewater treatment and will form an integral part of the core area wastewater treatment strategy. The current program meets or exceeds Canadian best practices for source control and the CRD is a nationally recognized leader in this field.

## **2.0 BACKGROUND**

### **2.1 Program Components**

The activities undertaken by RSCP staff in 2015 have been categorized under the following component headings:

- inspections
- monitoring
- enforcement
- outreach
- partnerships initiatives
- contaminants management
- data management
- planning and development

### **2.2 Policies and Procedures**

The following policies and procedures are used to provide guidance and ensure fair and consistent application of the CRD Sewer Use Bylaw and associated enforcement, cost recovery and monitoring activities.

#### Policies Approved by the CRD Board

- Regional Source Control Program Enforcement Policy
- Regional Source Control Program Fees and Charges Policy
- Sewer Use Bylaw Process of Review
- Regional Source Control Program Code of Practice Management Policy–Food Services

#### Operating Procedures

- Sampling and Analysis Procedure Manual
- Analytical Result Reporting Procedure
- Non-domestic Waste Discharge Reporting Procedure
- Significant Incident Reporting Procedure
- Procedure for Managing Contaminated Water Produced During Firefighting Operations in the CRD

The policies and procedures are periodically updated to reflect changes within the program.

### **2.3 Sewage Collection Areas and Sewage Facilities**

The CRD Sewer Use Bylaw applies to any discharge of non-domestic waste into a sewer that is connected to a sewage facility operated by the CRD. The RSCP is designed to ensure that the bylaw and its associated policies and procedures are applied consistently within the separate collection areas for these sewage facilities.

The CRD owns and operates eight wastewater treatment plants, as shown in Table 1. Four of these plants–Macaulay Point, Clover Point, Saanich Peninsula and Ganges–receive significant industrial, commercial or institutional wastewater flows, while the remaining four are small plants receiving mostly residential flows.

The sewage flows into each treatment plant are reported in the annual compliance monitoring reports for CRD sewage outfalls.

The ten CRD municipalities, three electoral areas and six other participating areas with sanitary sewers were regulated under the RSCP in 2015. Estimated annual sewage flows contributed by each participating area, over the period 1 October 2014 to 30 September 2015, are listed in Table 2. The annual sewage flows are used to calculate the municipal requisition for the RSCP (see Section 3.9).

**Table 1: CRD Treatment Plants and Sewage Collection Areas – 2015**

CRD Sewage Treatment Plant	Sewage Collection Areas
Macaulay Point	Victoria (west), Esquimalt, Saanich (west), View Royal, Colwood, Langford, Department of National Defence, Esquimalt First Nation, Songhees First Nation
Clover Point	Victoria (east), Oak Bay, Saanich (east)
Saanich Peninsula	Sidney, Central Saanich, North Saanich, Pauquachin First Nation, Tseycum First Nation, Institute of Ocean Sciences
Ganges	Township of Ganges (Salt Spring Island Electoral Area)
Maliview	Maliview area (Salt Spring Island Electoral Area)
Schooner Way	Buck Lake area (Southern Gulf Islands Electoral Area)
Canon Crescent	Magic Lake Estates (Southern Gulf Islands Electoral Area)
Port Renfrew	Port Renfrew (Juan de Fuca Electoral Area)

**Table 2: Annual Sewage Flows 2014-2015**

Participant	Estimated Annual Flow (m <sup>3</sup> /year)*	Percentage of Total Flows
Saanich	9,603,274	27.95
Oak Bay	2,810,037	8.18
Victoria	12,257,294	35.68
Esquimalt	2,272,375	6.61
View Royal	589,359	1.72
Colwood	961,201	2.80
Langford	2,078,984	6.05
Sidney	1,304,639	3.80
Central Saanich	1,327,466	3.86
North Saanich	452,794	1.32
Esquimalt First Nation	10,299	0.03
Songhees First Nation	208,026	0.61
Pauquachin First Nation	31,346	0.09
Tseycum First Nation	11,765	0.03
Institute of Ocean Sciences	4,494	0.01
Department of National Defence	141,635	0.41
Ganges Sewer	160,928	0.47
Maliview Sewer	15,954	0.05
Magic Lakes Estates Sewer	88,010	0.26
Port Renfrew Sewer	23,087	0.07
<b>Total Flow</b>	<b>34,352,967</b>	<b>100%</b>

Note: \*Yearly flows cover the period 1 October 2014 to 30 September 2015

### **3.0 REGIONAL SOURCE CONTROL ACTIVITIES AND ACCOMPLISHMENTS – 2015**

Regional source control activities and accomplishments in 2015 are discussed under the following broad groups of activities:

- industrial, commercial and institutional liquid waste regulation
- enforcement
- contaminants management
- contaminant reductions
- significant incident reporting
- outreach
- partnerships initiatives
- data management
- revenue and expenditures
- planning and development
- performance measures

#### **3.1 Industrial, Commercial and Institutional Liquid Waste Regulation**

##### **3.1.1 Regulatory Background**

The Sewer Use Bylaw serves as the main regulatory instrument for source control within CRD sanitary sewer systems. The bylaw specifies the various regulatory conditions under which facilities must operate if they discharge non-domestic waste into a sanitary sewer. The regulatory conditions for businesses include operation under waste discharge permits, authorizations or sector-specific CoP.

Following adoption of the Sewer Use Bylaw in August 1994, the RSCP focused primarily on identifying, inspecting, assessing and permitting larger industrial facilities and preparing authorizations for smaller commercial and institutional dischargers operating within the district. This process was largely completed over the period 1995-1998. Waste discharge permits require ongoing management, inspection and periodic amendment to accommodate changes in site-specific processes, practices and discharge conditions. New businesses continue to be assessed for operation under permits or authorizations each year.

In 1998, the focus of the program shifted toward development, adoption and implementation of CoP to regulate discharges from larger numbers of smaller commercial and institutional facilities operating in the district. The first regulatory CoP, considered to be unique in North America, were adopted in 1999 and inspections and enforcement for these codes commenced the following year. By the end of 2003, 11 CoP had been adopted under the Sewer Use Bylaw. All codes were developed using extensive stakeholder involvement to help ensure their practicality and acceptance within each sector. For further information on CoP, see Section 3.1.4.

The Sewer Use Bylaw and its associated policies and procedures have been amended periodically during the first 12 years of the program—largely to accommodate adoption of CoP, but also to add new restricted waste limits and a structure for cost recovery.

##### **3.1.2 Waste Discharge Permits**

Waste discharge permits are site-specific regulatory documents, issued to businesses or institutions under the CRD Sewer Use Bylaw, that outline requirements for wastewater pre-treatment, effluent quality, monitoring and reporting. Waste discharge permits are issued to facilities or operations that discharge significant non-domestic wastewater flows (greater than 10 m<sup>3</sup>/day) or wastewater containing high loads of restricted wastes or specified chemical contaminants into the sanitary sewer. Table 3 provides a summary of waste discharge permit activity in 2015.

**Table 3: Summary of Waste Discharge Permit Activity in 2015**

<b>Waste Discharge Permit Activity</b>	<b>2015</b>
Permits active (at year end)	39
New permits issued	8
Permits closed	4
Permits amended	3
Permit site inspections (including evaluations for new permits)	66

At the end of 2015, there were 39 active waste discharge permits being managed by RSCP staff. The majority of these permits were ongoing, with no expiry date. Eight new permits were issued; one for short-term discharges of seawater from a Department of National Defense (DND) ship-repair caisson, one an upgrade to a local brewery (previously regulated within the fermentation code of practice, but an increased production to 10,000 HL/annum triggering a permit), and six temporary site remediation permits.

Permit management activity includes reviewing discharger self-monitoring reports on a monthly or quarterly basis, preparation of compliance letters, meetings and regular phone contact with permittees and site inspections. Permit managers are also responsible for comparing CRD audit sampling data to permittee self-monitoring data and submitting permit fee billing information to CRD Finance and Technology Department, Financial Services Division.

All permit inspections scheduled at the beginning of 2015 were completed within the year. During 2016, inspection staff will begin a permit confirmation process, which may take several years to complete. This includes conducting investigations into potential new non-domestic waste discharge permits or authorizations in known “hot spots” within the region e.g., industrial parks, or those identified through municipal engineering department contacts or business licensing staff.

In late 2015, RSCP saw the emergence of a new sector, “craft distilleries”, with three new facilities applying for permits. Sector evaluation and permit processing will continue in 2016.

### **3.1.3 Authorizations**

Letters of authorization are issued under the Sewer Use Bylaw in cases where overall contaminant loads to sanitary sewer are low or where discharges are predicted to have a minimal impact on collection and treatment systems and/or the receiving environment. Authorizations contain site-specific discharge requirements and best management practices (BMP) designed to decrease the impact of the discharge or limit the potential for illegal discharges. They are normally issued without expiry dates. Some authorizations have self-monitoring and/or reporting requirements.

Authorizations are commonly issued to regulate unusual discharges or discharges from small groups of similar operations, such as ship and boat waste facilities, laundromats and sani-dumps. They can also be issued to businesses where a CoP is either planned or under development, or where requirements differ from those specified in a code e.g., an alternative treatment technology such as an automatic grease recovery device in a food services business rather than a grease interceptor.

Inspections are carried out on a periodic basis by source control staff with an emphasis on those authorizations which had previously been regulated under permits or those which include operations discharging priority contaminants. Table 4 summarizes authorization activity in 2015.

**Table 4: Summary of Authorization Activity in 2015**

Authorization Activity	2015
Authorizations active (at year end)	100
New authorizations issued	22
Authorizations closed or transferred to codes or permits	4
Authorizations amended	0
Authorization site inspections (including evaluations for new authorizations)	69

Regular inspections were originally scheduled for 33 existing high priority authorizations in 2015 and, overall, 69 inspections were completed by December 2015, including those for 22 new authorizations.

### 3.1.4 Codes of Practice

#### Background

The CRD has made commitments in the Core Area and Saanich Peninsula LWMPs to the development and implementation of CoP to regulate non-domestic waste discharges from commercial and institutional sectors to the district's sanitary sewers. The RSCP defines CoP as "regulatory documents containing mandatory sanitary sewer discharge standards for specific industrial, institutional or commercial sectors."

RSCP staff began developing CoP in 1996, following consultants' recommendations that this approach would be well-suited to the CRD's existing blend of small industrial facilities, commercial businesses and institutions. CoP development and adoption became one of the main focal points of program activities over the period 1998-2003. Stakeholder task forces were formed for each code sector to guide the development process and to help ensure the practicality and effectiveness of the final product. By December 2003, the development and adoption process for CoP had been completed on schedule. All codes had been fully implemented by January 2005. The adoption, amendment and effective dates of the 11 codes are summarized in Table 5.

**Table 5: Summary of RSCP Codes of Practice Adoption and Effective Dates (Bylaw No. 2922)**

Code of Practice	Adoption Date	Initial Effective Date (New Operations <sup>1</sup> )	Final Effective Date (Existing Operations <sup>2</sup> )
Food Services Operations	24 November 1999 <sup>3</sup>	1 January 2000	1 January 2003
Dry Cleaning Operations	24 November 1999 <sup>4</sup>	1 January 2000	1 July 2004 <sup>4,6</sup>
Photographic Imaging Operations	24 November 1999	1 June 2000	1 June 2000
Dental Operations	22 November 2000	1 January 2001	1 July 2001
Automotive Repair Operations	12 December 2001 <sup>4</sup>	1 January 2002	1 January 2004
Vehicle Wash Operations	12 December 2001 <sup>4</sup>	1 January 2002	1 January 2005
Carpet Cleaning Operations	11 December 2002	1 July 2003	1 July 2003
Fermentation Operations	11 December 2002	1 January 2003	1 July 2003 <sup>5</sup>
Printing Operations	11 December 2002	1 January 2003	1 January 2005
Laboratory Operations	10 December 2003	1 January 2004	1 July 2004 <sup>6</sup>
Recreation Facility Operations	10 December 2003	1 January 2004	1 January 2005 <sup>7</sup>

**Notes Table 5:**

<sup>1</sup> Businesses or institutions that commence operation within a specific code sector on or after the code's initial effective date.

<sup>2</sup> Businesses or institutions that were operating within a specific code sector before the code's initial effective date.

<sup>3</sup> Code amended December 2001 and March 2003.

<sup>4</sup> Code amended December 2003.

<sup>5</sup> For fermentation operations producing waste containing yeast.

<sup>6</sup> Spill response plans required.

<sup>7</sup> Monitoring point installation required.

In general, CoP include mandatory requirements for waste treatment, inspection, maintenance and record keeping for businesses and institutions discharging non-domestic wastes to sanitary sewer. They are

believed to be among the first of their type to be adopted in North America. RSCP staff have prepared plain language guidebooks for each code sector explaining the applicable regulations and providing BMP to help businesses achieve compliance and improve environmental performance. These guidebooks are also accessible through the program's webpage.

**Code of Practice Inspection Summary – 2015**

In 2015, RSCP continued to emphasize customer service and support as part of CoP inspections, in addition to ensuring compliance with the CoP requirements. This involves making every effort to educate regulated operations, provide guidance, and in some cases feedback through lab analysis of effluent quality - sometimes at the cost of multiple visits to the same establishment.

Five inspectors conduct all of the CoP inspections, in addition to managing the RSCP permits and authorizations. During front-line interactions with businesses, the inspectors can provide auditing and reporting services for other CRD programs, technical services for other Parks and Environmental Services projects or programs as required, and participate in the development and implementation of outreach initiatives.

Efforts to inform businesses about other CRD programs, coordinate inspections with other regulators, and to provide augmented services such as water audits have been successful. Regional Source Control Program inspectors have provided customers with literature and contacts for Cross Connection Control, Demand Management, Trucked Liquid Waste, the Regional Kitchen Scraps Strategy and the Onsite Wastewater Management Program.

Table 6 provides a summary of CoP inspection activity in 2015. The sector estimates shown in the table are the numbers of active operations estimated within each sector at the beginning of each year. The total number of site inspections includes first (or primary) inspections within an inspection cycle and repeat (or follow-up) inspections to confirm compliance status. The overall inspection levels in 2015 (1491) showed a substantial increase over 2014 levels (964).

**Table 6: Summary of Code of Practice Activity in 2015**

Code of Practice	Est. Sector Size (2015)	# Site Inspections* (2015)
Automotive Repair	164	457
Carpet Cleaning	38	2
Dental	101	2
Dry Cleaning	10	2
Fermentation	33	3
Food Services	1252	916
Laboratory	28	4
Photographic Imaging	76	5
Printing	17	6
Recreation Facility	13	0
Vehicle Wash	31	94
<b>Total CoP Operations</b>	<b>1763</b>	
<b>Total CoP Site Inspections*</b>		<b>1491</b>

**Note:** \* Includes both primary and repeat inspections. Some inspections were conducted on facilities that were deemed, through the inspection to have "no regulated waste". In that case, the facility would not be included in the sector size estimate, but the inspection would be counted.

The "sector-by-sector" review process includes inspecting all the businesses due for an inspection in each sector for baseline compliance, reviewing the CoP for any necessary amendments or updates, and updating data for new and/or newly sewered facilities. Sectors of focus in 2015 were automotive repair, vehicle wash, and food services. Other sectors were visited only for "follow-up" inspections.

The inspection team utilized program spatial tools for planning the inspections in broad geographic areas, working each sub-region as a team. The businesses inspected were comprised of those within the existing CRIMS database, and also facilities identified through an online search, cross-referencing the CRD Cross Connection Program and a BC Assessment code query.

There were 457 automotive and vehicle wash sector inspections conducted in 2015 as part of a Phase II sector review, which began in 2014. It is more efficient to do these two sectors together as many facilities in the region operate both.

The sector review included a re-naming of the regulated sector to “Mechanical Repair”, done to expand the reach of the code of practice to any commercial operations that are working with the same types of restricted wastes. “Mechanical Repair” was used in a revised BMP for the sector; however the new name won’t be formally adopted until the Automotive CoP is amended. Business types captured within the “Mechanical Repair” sector include automotive repair, marine engine repair stations, small motor repair shops, transportation businesses (servicing their own vehicles), machine shops, storage companies, detailing shops, tire shops, vehicle rentals, equipment rental, gas stations, elevator installation and repair and auto parts stores.

In preparation for the inspections, a new rack card was developed to distribute to businesses that had not previously had contact with the program. The rack card helped businesses to easily identify whether or not they were regulated by the code.

Facilities within the sector were sampled for effluent quality downstream of installed oil/water separators. Follow-up work with three compliant automotive facilities, with significant exceedances for copper, iron, zinc, PAHs, MOG, and BETX, is scheduled for early 2016 to investigate the causes for the high contaminant levels.

Of the new facilities inspected, such as small motor repair operations, it was found that the majority were “dry shops” treating their waste through offsite disposal companies, and overall a strong stewardship ethic appeared to be in operation within the sector. Many of the smaller operations were dealing with comparatively little restricted waste volumes, and there were no issues arising with bypasses to sewer via floor drains.

Rigorous food service inspections are a constant every year, given the high volume of restaurants in the region. Of the 916 inspections conducted, 284 were repeat inspections. The majority of those repeat inspections focused on assisting the facility to comply with regulatory requirements such as proper maintenance of existing grease interceptors.

In 2015, RSCP worked with a local museum and a federal agency in developing proactive strategies for handling food truck wastewater. In the former, treatment works were installed at a site hosting food trucks; at the latter their food cart hosting site was dealing with wastewater through providing collection vessels on site for pumping and transport to offsite treatment facilities. Continued partnerships of this type will continue in 2016 as RSCP gears up to work more proactively with regional events planning committees.

In 2015, staff developed a terms of reference for assessing compliance-tracking software technologies for grease interceptors. Whether developed with an external company or internally, RSCP is interested in a technology which can be applied to any treatment works maintenance scheduling. The starting point, however, would be to apply a technology for increasing efficiencies within the food services sector, tracking required maintenance schedules, based on hauling service provider inputs. A pilot involving the three major hauling companies in the region is scheduled for 2016 to assess the feasibility of such a technology.

### 3.1.5 Coordinated Inspections

A primary goal of the Environmental Partnerships Division is to provide superior customer service to businesses regulated by three CRD bylaws (Sewer Use Bylaw No. 2922, Water Conservation Bylaw No. 3061 and Cross Connection Control Bylaw No. 3516). The opportunity to provide better service in less time is achieved through a “water management” approach to business owners, combining wherever possible, services related to all three bylaws in fewer visits. Superior customer service is further achieved through collaboration with our external regulatory partners (e.g., Island Health and municipal inspectors) and other CRD divisions. Aligning with the Partnerships theme, other CRD Environmental Services programs have capitalized on the visibility and established relationships of RSCP inspectors with the business community. As such, inspectors have been called upon to represent a variety of programs with their inspections, helping customers to access information, services and grants or through provision of relevant information to customers on behalf of other CRD programs.

This approach required adoption of a “coordinated inspection” which was subsequently defined as:

*Working with all our partners, Environmental Partnerships provides augmented inspection services that achieve superior customer service and promote high environmental performance within businesses.*

The number of coordinated inspections achieved within a year is based on an assumption that every inspection is conducted with the *intention* to include coordinated services such as CRD program information or co-attendance with another regulator. However, there are some conditions whereby a coordinated inspection would not occur such as:

- A repeat inspection within a year
- An inspection with a serious compliance issue
- An inspection where staff were not able to converse with management and/or owners.

Therefore, the method for estimating number of coordinated inspections is based on the following assumptions:

- Inspected facilities with a “compliant” or “Step 1” compliance status are assumed to be a coordinated inspection.
- Inspected facilities with a “Step 2” or higher compliance status are not considered to be a coordinated inspection.
- Repeat inspections within one year are not considered to be a coordinated inspection.

In total, 1095 coordinated inspections were completed in 2015. These inspections included:

- **Multi-jurisdiction combined inspections:** On several occasions, RSCP inspectors combined site visits with one or more additional regulators from either Island Health or a municipality to assess compliance with multiple bylaws and/or regulations.
- **Colwood restaurant FOG inspections:** RSCP staff worked with CRD Integrated Watershed Management Program staff, Health Authority staff and Colwood Fire Department staff to resolve potential stormwater pollution and fire hazard resulting from leaking external grease traps operated by a RSCP-regulated facility in Colwood.
- **Automotive pollution View Royal:** RSCP staff continued to work with CRD Integrated Watershed Management Program staff and View Royal staff to sample, strategize and collaborate in addressing pollution coming from a car dealership site, contaminating a nearby stream. RSCP staff conducted dye tests to ascertain where the vehicle wash water and shop floor drains were discharging. It was determined that no commercial discharges were connected to sewer, and therefore the Town of View Royal had jurisdiction and responsibility for the property drainage to storm sewer.

- **DND facilities authorizations:** RSCP staff worked with DND staff to find a quick solution for a non-routine effluent with an unusually high zinc content due to galvanized staging and contact with wash water for a number of days. DND staff devised a process for treating the water on site.
- **Seafood processing authorization:** A seafood processing facility under authorization worked with RSCP and Demand Management ICI staff to explore water conservation opportunities. This resulted in the elimination of a once-through thawing water process. These modifications saved the business approximately \$12,000 per year in water savings and allowed them to continue being regulated under an authorization, rather than a permit.
- **City of Victoria co-inspections:** RSCP staff worked with City of Victoria stormwater regulators in a joint inspection of a bakery; responding to complaints of hoses from the kitchen discharging directly to storm drain. RSCP staff worked with Victoria staff responding to complaints of a contractor dumping catch basin waste into the municipal sewer system. RSCP staff worked directly with Victoria stormwater regulators in tracing grease contamination from a restaurant to a city sump.
- **Island Health collaborative planning:** RSCP staff met with Island Health staff in 2015 to discuss tactics for working with food carts, sharing information on problem facilities, as well as a number of other program updates.

In general, the following practices also contribute to the RSCP inspector's ability to provide coordinated services during inspections:

- **Cross Connection Control (CCC) inspections – information sharing:** CCC inspectors are invited to attend RSCP bi-weekly meetings as needed, for updates on targeted sectors. Both programs share information relevant to improving and aligning inspection strategies such as related renovations occurring, opening of new businesses, changes in ownership, and compliance observations.
- **Island Health applications for food facility forms:** Island Health admin staff direct hundreds of new food facility applicant forms to the RSCP inspection team via email. The forms indicate either a change of ownership or a new business, both of which are a priority for inspectors to communicate bylaw requirements and services available via a site visit, phone call or email.
- **CRD programming and initiatives:** Inspectors helped their customers to stay informed on CRD programs and initiatives that are relevant to their business, such as the Regional Kitchen Scraps strategy. RSCP inspectors distributed brochures, engaged in dialogue, and connected their customers with primary contacts for these programs.

### 3.1.6 Monitoring

RSCP staff carried out the following types of monitoring in 2015: permit compliance, authorization compliance, code of practice and key manhole monitoring. All wastewater samples collected in 2015 were analysed by a contract laboratory using standard analytical procedures specified in the *RSCP Sampling and Analysis Procedure Manual*. Monitoring of dewatered sludge produced at the SPWWTP commenced in March 2013. Table 7 provides a summary of RSCP monitoring activity in 2015.

**Table 7: Summary of RSCP Monitoring Activity in 2015**

<b>Monitoring Events</b>	<b>2015</b>
Permit compliance	57
Authorization compliance	20
Code of practice	12
Key manhole	18
SPWWTP influent	8
SPWWTP dewatered sludge	14
Ganges influent	1
Ganges mixed liquor	13

#### Permit Compliance Monitoring

Businesses operating under waste discharge permits are required to carry out self-monitoring of their wastewater for a range of parameters on a specified regular basis. This data is normally submitted to RSCP staff on a monthly or quarterly basis for compliance assessment. An important component of the RSCP is the collection and analysis of audit samples from each permitted site twice per year. This is done to verify compliance and confirm that the self-monitoring data being submitted are representative of discharges from each permitted site. RSCP staff normally collects these samples throughout the year following a pre-arranged schedule. Additional sampling events are carried out, as necessary, on suspected problem discharges from permitted sites.

The average number of scheduled audit events per permit in 2015 was two. The goal of collecting audit samples from each permitted site twice per year was achieved at all but two permit sites. Both of those samples were not collected due to the permit sites eliminating their discharge for a portion of the year. One permit site was sampled three times to assess a new treatment system. Another site was sampled only once because it became a newly permitted facility halfway through the year.

The environmental science officer (ESO) responsible for managing a specific permit reviews the data submitted by the permittee. If a significant difference is detected between permittee self-monitoring results and RSCP audit results, the permittee is contacted and an investigation into the discrepancy is initiated.

The majority of all audit results obtained in 2015 were not significantly different from self-monitoring results reported from the same site. This indicated that most of the self-monitoring results being submitted by permittees had been collected and analysed in an appropriate manner as required by each permit.

Since RSCP audit monitoring is carried out in accordance with strict quality assurance procedures, it provides reliable information when calculating characteristic contaminant levels or loads for a particular industry or business type. This information is useful for planning purposes in specified collection areas.

#### Authorization Compliance Monitoring

Monitoring was also carried out in 2015 at 20 businesses operating under authorizations with self-monitoring requirements. The RSCP monitoring provides, at minimum, an annual check on the quality of effluent being discharged by businesses known to have reported restricted waste generation or handling on site. The results of this monitoring indicated that discharges from authorizations in 2015 were generally in compliance with Sewer Use Bylaw restricted waste limits.

#### Code of Practice Monitoring

A sector-focused approach to CoP monitoring was implemented in January 2012. The approach involves focusing on fewer sectors per year, but sampling the entire sector, where possible, rather than a portion

of it. This focused monitoring is coordinated with inspections in order to address any compliance issues which may influence monitoring results.

The new monitoring approach generates a comprehensive overview of the composition of the wastewater within each sector and provides information on the effectiveness of specified treatment works reducing contaminant loads. The data generated also assists businesses in meeting the restricted waste criteria defined in the CRD Sewer Use Bylaw (Bylaw No. 2922).

Businesses operating under codes are not required to sample their own wastewater and report results to the RSCP. Compliance with a code is usually achieved by installing the required properly sized treatment works, carrying out regular maintenance and keeping records.

In 2015, CoP monitoring was carried out on two of the eleven regulated sectors; fermentation and automotive repair.

### **Fermentation**

The fermentation sector has a total of seven microbrewery sites in the region and each site was sampled at least once. Samples collected in 2014 and 2015 were taken as grab samples as the Mash Tun was being drained and cleaned. The samples were then analysed for chemical oxygen demand (COD), total suspended solids (TSS), biochemical oxygen demand (BOD), pH and temperature.

Five of the seven sites had the appropriate pre-treatment in place upon first inspection, and samples were taken prior to discharge to the sanitary sewer. Two of the sites were required to alter their pre-treatment configuration to meet the bylaw requirements (Schedule "P", Bylaw No. 2922), and samples were taken once these changes were made, in early 2015.

The typical permit limits of 1800 mg/L and 2500 mg/L for BOD and COD respectively were exceeded at every microbrewery site. However, the treatment works that yielded the lowest results were screens and sumps used in conjunction, or the use of a centrifuge. TSS results were below the bylaw limit of 350 mg/L at five out of the seven sites, and the two sites where the limit was exceeded used only screens as the treatment works. Temperature and pH were within the bylaw limits of 65°C and 5.5-11 respectively at all sites.

TSS is the parameter of primary concern in this sector as it can significantly contribute to blockages in the sanitary sewer system. Based on the 2014/2015 sampling results, there seems to be a correlation between treatment type and the effectiveness at reducing the amount of TSS discharged into the sanitary sewer system. When sumps or centrifuges are used, the TSS generally seems to be the lowest, and when screens are used exclusively, the TSS often seems to be over the bylaw limit.

Due to the current wastewater treatment method in the CRD's core area, high COD and BOD concentrations are not as much of a concern; however, when advanced treatment is introduced in the region more focus will need to be placed on the COD and BOD loadings into the sanitary sewer system from this sector. It is encouraging to note that all pH results are within the bylaw range, as overly acidic or basic water can degrade sanitary sewer infrastructure.

It is recommended to repeat this sampling of microbreweries to increase the sample size, to encourage new microbreweries to use screens and sumps or centrifuges to treat waste effluent, and to thoroughly review BOD and COD loads from this sector once the installation of advanced treatment is completed in the core area.

### **Automotive Repair**

In 2015, 457 automotive facility inspections were conducted, including repeat visits. There are currently 35 automotive repair shops operating with oil/water separators (OWS) in the region. Of these, sampling was carried out at 12 properly-sized and maintained OWS. These samples were analysed for: chemical oxygen demand (COD), total suspended solids (TSS), mineral oil and grease (MOG), total metals, BETX

(benzene, ethyl benzene, toluene, xylenes), total Polynuclear Aromatic Hydrocarbons (PAH), pH, and temperature. Chemical analytical results have been evaluated against Schedule "M" discharge regulations and Schedule "B" Restricted Waste Criteria, established in CRD Sewer Use Bylaw No. 5, 2001 (Bylaw 2922), hereafter referred to as the 'limits'. These samples were collected from the most downstream chamber in the OWS, about one inch below the surface and as close to the outlet pipe as possible.

Most of the results were within the limits, except COD, which exceeded the limit of 1000 mg/L at 10 facilities. There were three sites of concern that vastly exceeded the bylaw limits for copper, iron, zinc, PAHs, MOG, and BETX. All of the other facilities sampled had results that were either all within the bylaw limits, or had minor exceedances, with the exception of COD. Consideration could be given to an exemption for COD and BOD in the amended code for Mechanical Repair Operations since an OWS is not designed to treat or remove these parameters.

It is recommended that the sampling be repeated in another three to five years to see whether the results are consistent, improved, or worse, and that the sampling technician be accompanied by an inspector to collect other information that may be used to draw conclusions about why some OWS are working more effectively than others. It is also recommended that the three facilities where multiple exceedances were found be re-inspected to ensure maintenance frequency is still effective and best practices are being used within the shop.

#### Key Manhole Monitoring

Key manhole monitoring is carried out to monitor for contaminants originating from sources within wide sanitary sewer collection areas. This includes monitoring at three residential sites and two DND sites within the Macaulay Point and Clover Point collection areas. It also includes one residential site and Victoria International Airport within the Saanich Peninsula wastewater treatment plant (SPWWTP) collection area.

#### **Residential Sites**

Residential (or domestic) key manhole monitoring has been carried out by RSCP staff since 1996. This sampling has provided information on background levels of typical contaminants found in residential wastewater and the data have been used to predict contaminant loads from domestic sources for planning purposes.

The 2015 residential sampling program included sampling events at Dean Park (North Saanich), Harling Point pump station (Oak Bay) and Lang Cove pump station (Esquimalt) in January, April, July and October. All events included sampling and analysis for a wide range of parameters, including priority contaminants. There were three exceedances of sewer use bylaw restricted waste limits at the Lang Cove monitoring point: TSS in July and October, and BOD in October. All of the other results from all residential sites were within the bylaw limits in 2015.

#### **DND Sites**

In 2015, key manhole sampling was carried out at the Esquimalt pump station, serving the DND Dockyard area and at the DND Colwood pump station in May and October. There was one COD exceedance in April at the DND Dockyard site, all other results were within the sewer use bylaw restricted waste limits.

#### **SPWWTP Collection Area Sites**

Monitoring at the Airport #5 site was continued and samples were collected in April and October. One sample in April exceeded sewer use bylaw restricted waste limits for sulfide, all other parameters were within the bylaw limits.

### SPWWTP Influent and Dewatered Sludge Monitoring

Monthly grab samples (for metals analysis) and four composites (for metals and priority pollutant analysis) of SPWWTP influent were collected annually by RSCP staff in past years. Monthly grab sampling was discontinued in June 2007, following a consultant's review of the plant's influent/effluent sampling program. The monthly grab samples were replaced by quarterly triplicate composite sampling (on three consecutive days) beginning in April 2008. This triplicate composite sampling, conducted by Marine Programs staff on behalf of RSCP, was referred to as "quarterly plus" sampling.

Golder Associates Ltd., (2013), recommended that SPWWTP monitoring could be reduced to biannual triplicate 24-hour composite sampling (on three consecutive days) with single 24-hour composites taken in the remaining two quarters. As a result, there were two triplicate influent sampling events carried out by Marine Programs staff at SPWWTP in 2015 – those scheduled in January and July. Single 24-hour composite samples were collected in April and October.

Fourteen composite dewatered sludge samples were collected by Operations staff at the SPWWTP for analysis in 2015. Daily samples were combined into weekly composites which were submitted for moisture, metals and cyanide (WAD) analysis on a monthly basis, with a field duplicate submitted in February and September.

### GWWTP Influent and Mixed Liquor Monitoring

As in past years, a single (grab or composite) sample of influent was collected at the Ganges wastewater treatment plant (GWWTP). The 24-hour composite sample collected in July 2015 was submitted for priority pollutant analysis.

Thirteen mixed liquor (treatment plant wastewater mixed with activated sludge) samples were collected by Operations staff at the GWWTP for analysis in 2015. Grab samples were generally collected on a monthly basis (with the exception of August), with a field replicate taken in February and September. Samples were submitted for moisture and metals analysis.

The influent, dewatered sludge and mixed liquor data are routinely entered into the Environmental Services Information System (ESIS) database by Environmental Protection staff. The data are used to identify contaminants of concern, provide ongoing information on contaminant variability, loads and trends at the treatment plants and provide input to planning initiatives.

## **3.2 Enforcement**

The district has adopted a stepwise approach to enforcement of the Sewer Use Bylaw as outlined in the *Regional Source Control Program Enforcement Policy*. This enforcement policy classifies offences, outlines enforcement steps and includes use of cooperative measures, such as increased communication, education and monitoring, to resolve issues of non-compliance. The policy was originally approved by the CRD Board in February 1997 and was last amended in November 2006.

The CRD Ticket Information Authorization (TIA) Bylaw contains fines (tickets) that have been set for specific offences under the Sewer Use Bylaw and its associated CoP. These fines were last amended in December 2006.

Enforcement activities are directed at ensuring or restoring discharger compliance with the terms and conditions of the Sewer Use Bylaw, waste discharge permits, authorizations and CoP. Enforcement action is applied in an escalating manner that is reasonable, fair, consistent and impartial. Warnings, tickets, orders and fines are issued, as necessary, in cases of continuing non-compliance.

The strategic direction and implementation approach outlined in the 2009 Service Delivery Review specified introduction of a more supportive, proactive and collaborative approach to enforcement within the Environmental Partnerships Division. This more collaborative approach has been applied by RSCP staff since 2010.

## Operations Regulated By Waste Discharge Permit

Of the 39 active waste discharge permits in place at the end of 2015, 29 sites were in “full compliance” with their permits and the Sewer Use Bylaw. Three permits were at “staff assessment”, one site was classified as a discharger under review (DUR) and the remaining 9 sites were considered to be “in progress”, but still in compliance with their permits under the enforcement policy. The enforcement levels and numbers of permits at each level are summarized in Table 8.

**Table 8: Summary of Waste Discharge Permit Compliance (2015)**

<b>Enforcement Level</b>	<b>Number of Permits</b>
Full Compliance	29
Step 1	5
Step 2	1
Step 3	0
Staff Assessment	3
Discharger Under Review (non-compliant)	1

Above Step 3, a significant escalation of enforcement action occurs, including notification of compliance status by letter, increased inspection or monitoring frequency, staff assessment of treatment works or procedures and scheduling of meetings to discuss remedial actions. Commitments and requirements agreed to at these meetings are confirmed in a follow-up letter to the permittee. Further non-compliance incidents can result in elevation from staff assessment to DUR status. Dischargers at the DUR level or above are considered to be non-compliant with their permits.

Operations having DUR status must prepare and submit a detailed compliance plan for approval by the deputy sewage control manager (DSCM). A 90-day period is allowed for the preparation of this plan. This period of time allows for a discharger to hire a consultant to help determine appropriate actions to achieve compliance. Progress meetings are held with the discharger after 30 and 60 days to measure progress, fully communicate the intent of any requirements and clarify any outstanding issues. A compliance plan, once approved by the DSCM, becomes a compliance program that usually forms part of the discharger's waste discharge permit through an amendment.

If no acceptable compliance plan is received within the 90-day period, an order may be issued under the *Environmental Management Act* to set conditions for discharge, or a lawyer's letter is issued. Failure to comply with an order or a lawyer's letter will result in consideration of legal action.

Four permit sites classified above Step 3 were subject to assessment by RSCP staff in 2015. These sites included:

- A septage disposal facility was escalated to discharger under review for sulphide exceedances in 2015. At this stage of enforcement, the permittee was directed to submit a detailed compliance plan, with input from an external consultant, for a more in-depth review of existing practices and recommendations for treatment upgrades. This review will continue for a one year period through 2016.
- A food distributor and processing facility was escalated to staff assessment for total oil and grease exceedances. The facility is assessing operational causes related to an expanded operation, which now includes fish processing, and proposed additional screening and operations to reduce oils and grease being released into sewer system.
- A municipal street waste facility continued their staff assessment through 2015 for exceeding its permit limit for mineral oil and grease (MOG). Some recent changes in operating procedures such as increased catch basin cleaning may have been a contributing factor, as well as a potentially higher concentration of oil, along with a lower than normal annual precipitation in the region. The

facility modified their treatment works to include a newer “polishing” technology, which will result in an amended permit.

- A chocolate-making facility was placed under staff assessment for pH levels outside of the allowable threshold. The facility misunderstood their permit requirements and has adjusted their neutralizing processes.

No charges were laid against waste discharge permit holders under the Sewer Use Bylaw during 2015.

#### Operations Regulated by Authorization

A small group of the total number of authorizations issued is scheduled for inspection each year based on the types of contaminants regulated, the contaminant levels, discharge volumes and the overall impact of discharges from these operations. Discharges from authorizations are considered to have a relatively minor impact in comparison to discharges from permitted facilities.

Sixty-nine inspections were carried out at sites operating under authorizations in 2015. At the end of 2015, 88 of the inspected businesses were in full compliance with their authorizations, eight were at a Step 1, three at Step 2, and one authorization was classified as a discharger under review (DUR).

A federally-owned ship and boat waste facility was classified as a DUR in October 2013 as a result of a discharge of prohibited waste (Bunker “C” fuel oil) into the CRD sanitary sewer system at Lang Cove pump station in September 2013. A working group was formed in January 2015 to discuss measures that could be put in place to better control discharges from this facility in future.

The overall compliance level (“full compliance” or “in progress”) for the total 100 authorizations active at the end of 2015 was 99%.

#### Operations Regulated by Codes of Practice

The stepwise approach to achieve compliance is applied to all CoP sectors in a similar way to dischargers operating under permits or authorizations as outlined in the enforcement policy. Dischargers are classified as being in “full compliance” if they have been inspected and no unsatisfactory issues are identified. Dischargers having committed offences up to and including Step 3 are classified as being “in progress” and those at the DUR level and above are classified as being in “non-compliance” with the code. A summary of the CoP enforcement results for inspections carried out from the implementation date of each code to 2015 is presented in Table 9.

**Table 9: Code of Practice Enforcement Summary – from implementation date to end of 2015**

<b>Code of Practice</b>	<b>% Full Compliance<sup>1</sup></b>	<b>% In Progress<sup>2</sup></b>	<b>% Non-Compliance<sup>3</sup> (DUR)</b>
Automotive Repair	94%	6%	0
Carpet Cleaning	97%	3%	0
Dental	89%	11%	0
Dry Cleaning	80%	20%	0
Fermentation	94%	6%	0
Food Services	94.6%	5%	0.4%
Laboratory	82%	18%	0
Photographic Imaging	96%	4%	0
Printing	82%	18%	0
Recreation Facility	100%	0	0
Vehicle Wash	90%	10%	0

**Notes:**

- <sup>1</sup> Percentage of active operations, regulated within the sector and in compliance with all requirements of the code at the last inspection – including sites with required treatment works and those using offsite waste management.
- <sup>2</sup> Percentage of active operations, regulated within the sector classified at Step 1, 2 or 3 of the enforcement policy at the last inspection date.
- <sup>3</sup> Percentage of active operations, regulated within the sector classified as DUR at the last inspection date.

Most CoP enforcement actions to date have been associated with implementation of the food services code, which regulates one of the largest business sectors in the district. This sector has been very cooperative during application of the escalating approach to enforcement, and approximately 5% of food services operations inspected were considered to be “in progress”, with 0.4% being classified as DUR. The main non-compliance issues continue to be failure to maintain grease interceptors and failure to install properly-sized grease interceptors.

There were five tickets issued under the CRD Ticket Information Authorization Bylaw to food services operations in 2015. Three tickets were cancelled due to compliance being obtained and two were paid. There were three files still open at the end of 2015, for resolution in 2016.

The Dry Cleaning sector had 20% of the facilities “in progress”, which equates to two of the ten regulated facilities. One was at Step 1, and one was at Step 2; both for minor PERC exceedances. In each case the facilities were set up with the prescribed treatment works, and staff continue to work with the businesses to make the adjustments necessary to achieve the restricted waste limits.

The laboratory and printing sectors both had 18% of the facilities “in progress” in 2015, which equates to five of the twenty-eight and three of the seventeen regulated facilities respectively. Of the “in progress” lab facilities, all were located within the same large post-secondary institution, and all had Step 1 infractions for either inadequate spill materials, absent spill response plans, or no secondary containment. Of the “in progress” printing facilities, all were at Step 1 for minor infractions.

Replacing “Proper Waste Treatment” with “Overall Compliance” as a Measure of Success

In 2014, a definition of “overall compliance” was established in this report to include facilities with either a “compliance” or “Step 1” inspection status. A “Step 1” compliance status is indicative of a “first infraction”, e.g., a late permit report, or failure to keep records as required. A single infraction does not have a significant impact on the program; any facility without proper treatment works would be given a “Step 2” (“first major infraction” or higher level of enforcement depending on the situation).

Prior to 2014, the RSCP reported out on percentage of facilities with proper waste treatment as a measure of success. This was a significant marker of program influence in the developing years, as new Codes of Practice were being introduced to the region. The shift to “overall compliance” is thought to provide a better indicator of effective contaminants diversion for the following reasons:

- **Consistent high compliance with proper treatment works installed:** Overall high compliance (>90%) for each sector has been standard since 2008. With no new codes implemented since 2005, ample time has passed for businesses to upgrade to compliant treatment works. As such, we can assume as a baseline that almost all regulated facilities are operating with proper waste treatment in place.
- **Treatment works maintenance:** The top enforcement issue amongst regulated facilities is proper maintenance of treatment works. All treatment works systems are rendered ineffective if they are not maintained, and consequently, as a compliance indicator, this is much more accurate in representing how well waste is being managed. Failure to properly maintain treatment works is considered a major infraction and such facilities are automatically raised to a Step 2 enforcement level.
- **Working with facilities with inadequate or no treatment works:** On the rare occasion where a facility is found to have no treatment works on site, staff work swiftly with the business towards adopting an effective treatment or diversion program. When there is resistance to working proactively with staff, enforcement actions escalate quickly. When inspected treatment works are viewed as ineffective (e.g., under capacity, in poor repair, or not meeting a certified standard) the inspector will work with the business to improve treatment performance through either an upgraded system that meets CRD requirements, or assisting the business with modifying their practices to eliminate the need for onsite treatment works (e.g., an automotive shop disconnecting their floor drains and using off-site treatment services exclusively). Failure to install treatment works is considered a major infraction and such facilities are automatically raised to a Step 2 enforcement level.

In 2015, **97%** of facilities regulated under RSCP Codes of Practice, Permits and Authorizations achieved **overall compliance**.

### 3.3 Contaminants Management

Contaminants management builds on the program's successful regulatory approach, but involves a shift in focus towards avoidance, elimination or substitution of polluting products, processes or materials in order to make reductions in specific priority contaminants that have proven difficult to control or treat. Contaminants management projects initiated or completed in 2015 are outlined below.

#### NPE Alternatives Research

One of the recommendations made in a report prepared by consultants for RSCP in 2014 (Ecofish Research Ltd, 2014) was to investigate alternatives to nonylphenol ethoxylates (NPE's) in household and commercial detergents and cleaning products to assist in outreach initiatives. In 2015, RSCP staff conducted online research into NPE alternatives and found that the US Environmental Protection Agency (USEPA) had been working on this issue since 2010. A very useful website called "Safer Choice" had been created by the USEPA which identifies ingredient safety criteria and safer alternatives to a range of products used in homes and businesses. The information mostly covers products available in the US, however, many ingredients and some of the products listed would likely be similar to those available in Canada.

USEPA's "Design for the Environment" surfactant assessment identified seven groups of chemical compounds which contain safer alternatives to NPE's. The Safer Choice website also provides an extensive list of individual "safer" ingredients through which consumers can determine their own safe product choices.

The above information and website links were shared with outreach staff responsible for updating existing "Clean Water Begins at Home" and "Clean Green" initiatives and staff preparing for the "In the Laundry Room" residential outreach initiative planned for the spring of 2016.

Some additional interesting findings during the above research were:

- The US laundry product industry had pledged to eliminate the use of NPE's in liquid detergent formulations by December 2013 and in powdered detergent formulations by December 2014.
- The New Zealand Ecolabelling Trust have issued new criteria for laundry detergent manufacture in that country in August 2015. One of the groups of substances banned for use in formulation or manufacture of laundry detergents was alkyl phenol ethoxylates (a wide group of compounds that includes NPE's).

### Grease Interceptor Maintenance Tracking Technology

The largest CoP sector in the CRD is the Food Service sector, with approximately 1,200 regulated business operations. Due to the size of this sector, only one third of existing operations are able to be inspected for compliance with the Food Services CoP each year. The main requirement for this CoP is that each operation has a properly sized Grease Interceptor (GI), or multiple GI's, installed to remove fats oils and grease (FOG) and solids from wastewater before discharge to sewer.

Another key requirement in this CoP is that FOG and solids accumulated in the GI must be cleaned out regularly to allow it to function properly. Without this regular maintenance, the GI will fail and continually discharge excess FOG and solids to sewer – increasing the potential for sewer line blockage, sewer backups, overflow and odors and associated increases in municipal sewer line maintenance costs.

Food Service operations are required to keep written maintenance records on site for inspection by a source control officer, however, with most cleanout frequencies varying from monthly to quarterly, and full source control inspections occurring only once every three years, effective oversight of GI maintenance continues to be a challenge. Excess FOG and solids discharges may continue for years until either an inspection, random hauler complaint or an excess FOG load on regional or municipal infrastructure (e.g., an alert by municipal pump station workers) identifies a problem.

In most cases where a blockage of a sewer or an overflow is reported in a municipal sewer line, RSCP staff must reactively inspect all businesses that discharge to that line in order to identify the business, or businesses, most likely responsible. This is a time-consuming process which does not always produce clear results or effective enforcement actions (e.g., the offending business may have serviced their GI prior to the inspection, thereby eliminating them from enforcement action). Time spent on tracking and identifying businesses with full or failing GI's is time that RSCP inspectors could better be using to inspect businesses and industries in several other regulated sectors.

In 2015, RSCP staff commenced preparation of a business case to identify a suitable technological solution to the above challenges that will improve GI maintenance compliance, increase inspection efficiency, optimize GI pump-out frequency and reduce FOG-related sewer blockage incidents.

The technology ultimately selected must be proven and fully meet the CRD's needs. All proposed technologies and concepts will have to comply with municipal and CRD bylaws, and all relevant provincial and federal legislation.

## **3.4 Contaminant Reductions**

### **3.4.1 Reduction Targets**

The Core Area LWMP contains a commitment to develop "contaminant reduction targets" for existing and future waste discharge permit holders and CoP sectors. Since the RSCP's jurisdiction extends beyond the core area, staff has developed contaminant reduction targets that would be applicable in all participating sewage collection areas within the CRD.

### Waste Discharge Permit Targets

The contaminant reduction targets established for waste discharge permit holders are considered to be the individual permit discharge concentration limits that are established either during the initial permitting process or during permit reassessment and amendment.

Many permit holders have consistently met their permit discharge concentration limits since their permit was issued through application of good operating procedures. Other sites have met their target concentration limits following installation of treatment works and/or adoption of good operating procedures or pollution prevention measures. At the end of 2015, 74% of permitted sites were meeting their target concentration limits and 23% were in progress toward meeting their targets. These estimates are based on the number of outstanding non-compliance issues due to permit limit exceedances for all permits in place at the end of 2015.

There have been significant contaminant load reductions over the years as a result of permitted sites implementing changes to meet their concentration limit targets, as documented in annual reports for previous years. Please refer to Appendix 3 for a summary table of permitted industry types, typical contaminants and treatment works.

### **Code of Practice Targets**

Contaminant reduction targets were prepared for each of the 11 existing CoP using the year before the full implementation date as the “baseline” year. The general procedure for setting the targets and annual progress reports has been documented in previous annual reports. The degree of achievement of each CoP target was assessed following the completion of the five-year inspection cycle following full implementation of each code.

In 2009, the end of the five-year inspection cycle was reached for the final three CoP, which were fully implemented in January 2005. By the end of 2011, all five-year reduction targets established for CoP had been achieved.

### **3.4.2 Marine Outfall Contaminant Reductions**

One of the main objectives of the RSCP is protection of the marine receiving environment. A specific goal associated with this objective, included in both the Core Area and Saanich Peninsula LWMPs, is “to maintain or reduce effluent contaminant loadings to the receiving environment”.

#### Core Area Outfall Effluent

CRD Marine Programs staff regularly monitor effluent quality at the Macaulay and Clover point outfalls for a wide range of substances. Several trend analyses of the data collected through core area effluent monitoring have been carried out in the past (PLA, 2002; PLA, 2004; Golder Associates Ltd., 2006; Golder Associates Ltd., 2009a) and results have been summarized in previous RSCP annual reports.

The most recent effluent trend analysis was undertaken in 2012 (Golder Associates Ltd., 2013). This report provided a statistical assessment of wastewater trends at Clover and Macaulay point outfalls over the period 1990-2011 and wastewater and biosolids trends at the SPWWTP from 2000-2011. The findings of this report for Clover and Macaulay points over the 21-year period of record included the following:

- Overall, the trend results for priority substances evaluated in previous studies was confirmed in this latest assessment. Changes observed indicated more evidence of stable or decreasing loads of substances in the wastewater stream.
- Over the period 2009-2011 the detection frequency for several parameters has decreased dramatically. These parameters, now classified as “infrequently detected” (detected in less than

50% of samples analysed), include: mercury, hexavalent chromium, 1,4-dichlorobenzene, tetrachloroethene (PCE) and xylenes.

- Loads of priority metals (those presenting the greatest concern regarding aquatic toxicity) including cadmium, chromium, copper, lead, mercury, manganese, nickel and zinc exhibited significant decreases ranging from 1% to 19% per year.
- Cobalt loads showed a decrease of 7% at Clover Point and an increase of 3% at Macaulay Point.
- Loads of weak acid dissociable (WAD) cyanide showed a 6% increase at Clover Point; however, a trend for this parameter could not be determined at Macaulay Point.
- Organic compounds, including certain polynuclear aromatic hydrocarbons (PAHs), 1,4-dichlorobenzene and PCE showed significant decreases in loads, ranging from 2% to 16% per year.
- A significant decrease of 6% per year was also observed for oil and grease at both outfalls. Loads of mineral oil and grease decreased by approximately 4% per year.
- Several individual PAHs (e.g., fluorene, phenanthrene, 2-methylnaphthalene) displayed significant decreases in loads over time (2% to 10% per year).
- Phthalate esters did not exhibit significant trends in loads over time with the exception of an apparent decrease of 3% for diethyl phthalate.
- In general, interpretation of trends for PAHs and phthalates was confounded by elevated analytical detection limits in recent years.
- Non-priority substances showing increasing trends in loads at Macaulay Point included dimethyl ketone and trichloromethane. The result for trichloromethane may also have been influenced by elevated detection limits.

The continuing decreasing trends and recent changes in loads for most parameters are thought to be largely due to a combination of the success of source control efforts at regulating contaminants, increasing public and industry awareness regarding product selection and use of proper waste treatment practices. For example, the reported load reductions for PCE, a solvent commonly used in the dry cleaning industry, is probably linked to the adoption of an amended CoP for dry cleaning operations in 2003.

The reported significant decreases in loads of mercury and silver are likely attributable to the implementation of the dental and photo imaging CoP in the core area over the past few years. Significant decreases in loads of oil and grease at both outfalls are probably associated with the continued implementation of the food services CoP and increasing compliance levels.

The continuing decreases in a range of metals, significant decreases in certain individual PAHs and mineral oil and grease are likely partly attributable to the full implementation of the automotive repair CoP and vehicle wash CoP in recent years.

The significant reductions in 1,4-dichlorobenzene may be due, in part, to the success of ongoing business and institutional outreach regarding the use of less harmful alternatives to urinal deodorizers which contain this chemical.

The slight increase in cobalt at Macaulay Point may be linked to an identified source which discontinued discharge to sewer in June 2010. This increasing trend is expected to reverse over the next few years.

The apparent increase in WAD cyanide at Clover Point over recent years is under investigation. Wastewater contaminant trends at Macaulay and Clover points will continue to be monitored over the next few years with the next full trend assessment scheduled for 2016.

Further information about core area effluent quality in 2015 can be found in the upcoming Macaulay and Clover Point Wastewater and Marine Environment Program (WMEP) annual report for 2015, to be completed in October 2016.

#### Saanich Peninsula Wastewater Treatment Plant Influent and Effluent

Influent and effluent data has been collected at the SPWWTP since the plant commenced operation in 2000. The first summary of trends in these data was reported in Hatfield Consultants Ltd, 2005. Golder Associates Ltd., 2009a included a statistical assessment of wastewater influent and effluent trends at the SPWWTP over the period 2000-2008. Golder Associates Ltd., 2013 provided an update of trends to 2011. The findings of this report over the 11-year period of record at the SPWWTP included the following:

- Trends in influent and effluent contaminants were similar to those described in Golder Associates Ltd., 2009a in terms of direction and significance.
- A higher number of significant trends were observed than in the previous study due to an increase in statistical power through the addition of three years of sampling data.
- Reductions in detection frequency for several parameters have occurred since the previous report. Hexavalent chromium, 1,4-dichlorobenzene and total low molecular weight PAHs are now classified as “infrequently detected” (detected in less than 50% of samples analysed) in both influent and effluent.
- Priority metals generally showed significant decreases in influent loads. The largest decreases were observed for total arsenic, cadmium, chromium, lead, mercury, nickel and silver (ranging from 4% to 26% per year).
- There were significant increases reported in influent loads for total manganese, molybdenum and zinc (2%, 3% and 1% per year respectively).
- Other priority contaminants such as oil and grease and strong acid dissociable (SAD) cyanide showed significant decreases in influent loads of 6% and 7% per year respectively. Conversely, influent loads of WAD cyanide increased by 9% per year.
- In general, there were no significant trends in influent loads of PAHs and phthalate esters; however, one phthalate (bis(2-ethylhexyl)phthalate) demonstrated a significant decrease (4% per year) in influent loads over the study period.
- Assessment of trends for PAHs and phthalates were confounded by elevated detection limits for some samples from recent years. The report noted that trend results for these parameters should be interpreted with caution.

Source control initiatives appear to have yielded benefits in terms of concentrations and loads of priority contaminants in both influent and effluent at the SPWWTP. Influent loads of several of the key metals of interest (arsenic, cadmium, lead, mercury, nickel and silver) exhibited significant decreasing trends over the study period. The large decreases in total mercury and silver loads in influent are likely associated with the implementation of the dental and photo imaging CoP. In addition, significant decreases in loads of oil and grease in influent are probably associated with the continued implementation of the food services CoP and increasing compliance levels within that sector.

Observed increases in molybdenum loads could be associated with the continued use of molybdate corrosion inhibitors in heating and cooling systems, as identified in earlier annual reports.

The apparent increase in WAD cyanide, despite decreasing levels of SAD cyanide, will require further investigation by RSCP staff. In addition to continuing WAD cyanide analysis in influent and effluent, WAD cyanide analysis was added to dewatered sludge analysis in March 2013 in order to monitor temporal trends for this parameter. Further investigation of potential WAD cyanide sources, including two permitted electroplating operations located on the peninsula, is scheduled for 2016.

Wastewater contaminant trends at SPWWTP will continue to be monitored over the next few years with the next full trend assessment scheduled for 2016.

Further information about the trend analysis and SPWWTP influent and effluent quality in 2015 can be found in the SPWWTP Wastewater and Marine Environment Program Annual Report for 2015, to be completed in September 2016.

### **3.4.3 Biosolids, Sludge and Mixed Liquor Contaminant Reductions**

Another important objective of the RSCP is the protection of sewage treatment plant biosolids, sludge and mixed liquor quality. Biosolids are stabilized sludge from wastewater treatment processes that have been treated to allow beneficial recycling in accordance with the requirements of the *Organic Matter Recycling Regulation of British Columbia* (OMRR). Mixed liquor is the term used for a mixture of wastewater and activated sludge produced at a sewage treatment plant. The specific goal associated with this objective, included in both the Core Area and Saanich Peninsula LWMPs, is “to meet BC standards for Class A biosolids as outlined in the OMRR”. More specifically, these are the standards established for Class A compost set out in Schedule 4 of the OMRR and the Class A biosolids standards for maximum acceptable metal concentrations specified in Table II of Canadian Food Inspection Agency Trade memorandum T-4-93 (CFIA, 1997).

Lime and heat-treated biosolids produced at the SPWWTP were monitored for a range of metals and other substances on a regular basis since the plant was commissioned in 2000. This monitoring ended in April 2011 following CRD Board direction to cease land application of biosolids. Monitoring of dewatered sludge produced at the SPWWTP commenced in March 2013 and continued in 2015. Monitoring of the mixed liquor produced at the smaller GWWTP began in 1994 and continued in 2015.

#### Saanich Peninsula Wastewater Treatment Plant Biosolids and Sludge

The quality of SPWWTP biosolids consistently met the most stringent (Class A) criteria for all parameters over the period 2000-2011. Biosolids trend analysis at SPWWTP (reported in Hatfield Consultants Ltd, 2005) confirmed that there were significant downward trends in mercury, chromium, barium and manganese concentrations over the period 2000-2004.

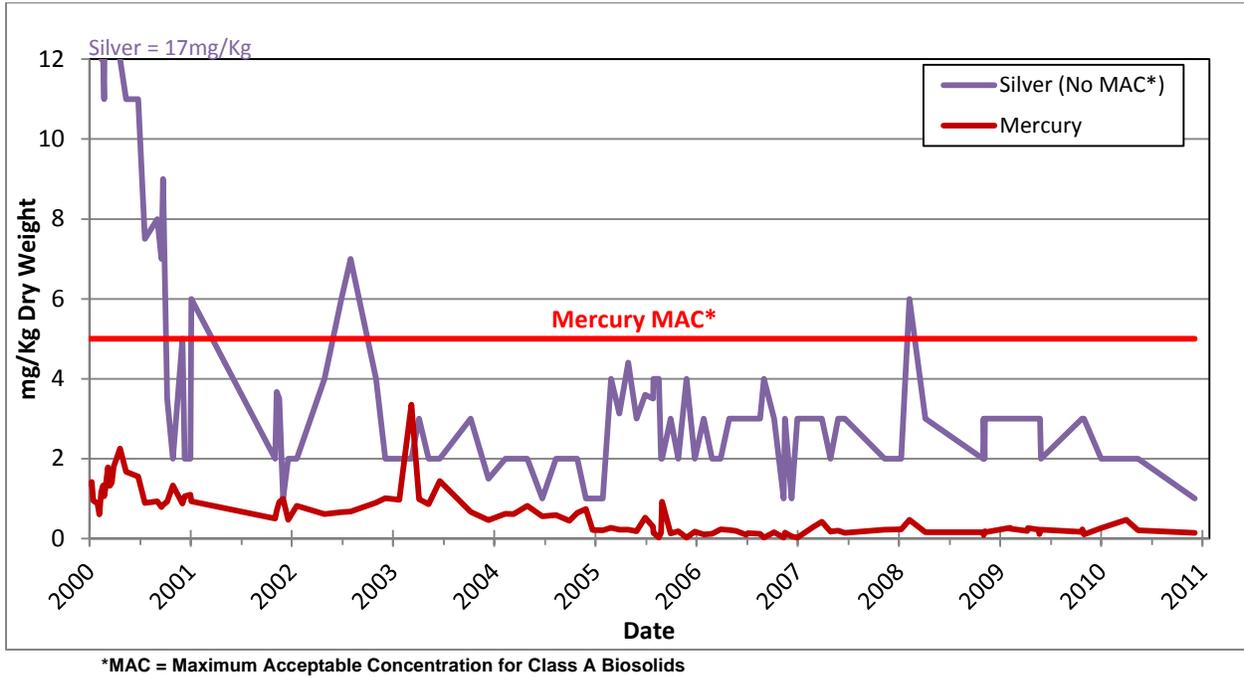
The Golder Associates Ltd., 2009a report included a reassessment of biosolids trends at the SPWWTP over the period 2000-2008 and Golder Associates Ltd., 2013 provided an update for the period 2000-2011. The main findings of this report included the following:

- Significant decreases in the detection frequency of a number of priority metals, including arsenic, cadmium, chromium, nickel and selenium were observed in the last three years.
- The detection frequency for lead and molybdenum increased significantly over the same period. This was largely attributable to a decrease in detection limit for these parameters in recent years.
- Significant decreases, ranging from 4% to 21% per year, were observed for concentrations of a range of priority metals including chromium, copper, manganese, mercury and zinc.
- The only substances for which a significant increase in concentration was observed were the unregulated, non-priority, elements calcium and strontium.

Many of the above observed decreases are likely a result of the application of source control regulations within the SPWWTP sewage catchment area, as previously noted for SPWWTP influent and effluent.

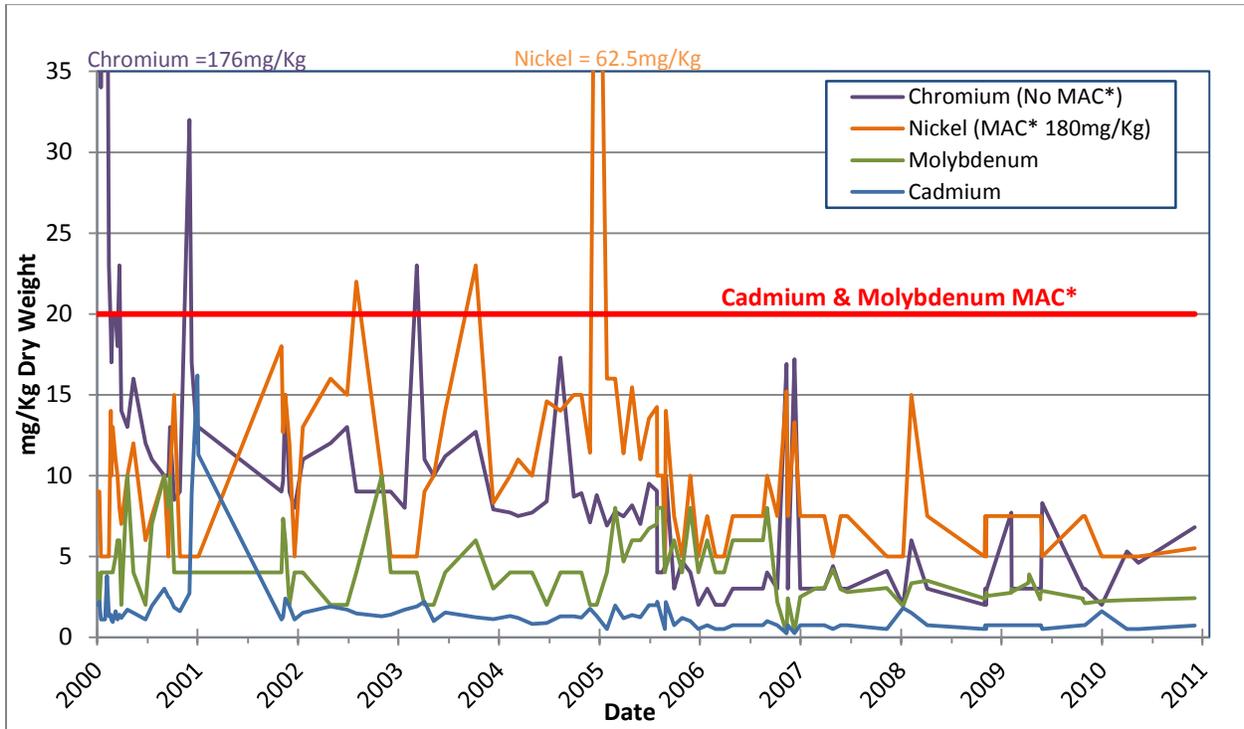
Mercury levels in SPWWTP biosolids met the Class A criterion of 5 mg/kg over the period 2000-2011 and were less than 0.5 mg/kg from August 2005 to April 2011 (see Figure 1). These very low and relatively stable results confirm the continuing success of the implementation of the dental CoP in July 2001 in reducing and controlling mercury and silver levels in SPWWTP biosolids.

**Figure 1: Mercury and Silver in Saanich Peninsula Wastewater Treatment Plant Biosolids (2000-2011)**



Concentrations of some common metals used in electroplating and in corrosion inhibitors are shown over the same period in Figure 2. The metals levels show a general decline over the period of record and, for cadmium and molybdenum, are well below the Class A criteria for biosolids. The highly variable nature of chromium and nickel levels over the period 2000–2007 suggest that uncontrolled discharge of plating solutions may have been occurring during this time, with a much lower frequency of these events in later years.

**Figure 2: Chromium, Nickel, Cadmium and Molybdenum in Saanich Peninsula Wastewater Treatment Plant Biosolids (2000-2011)**

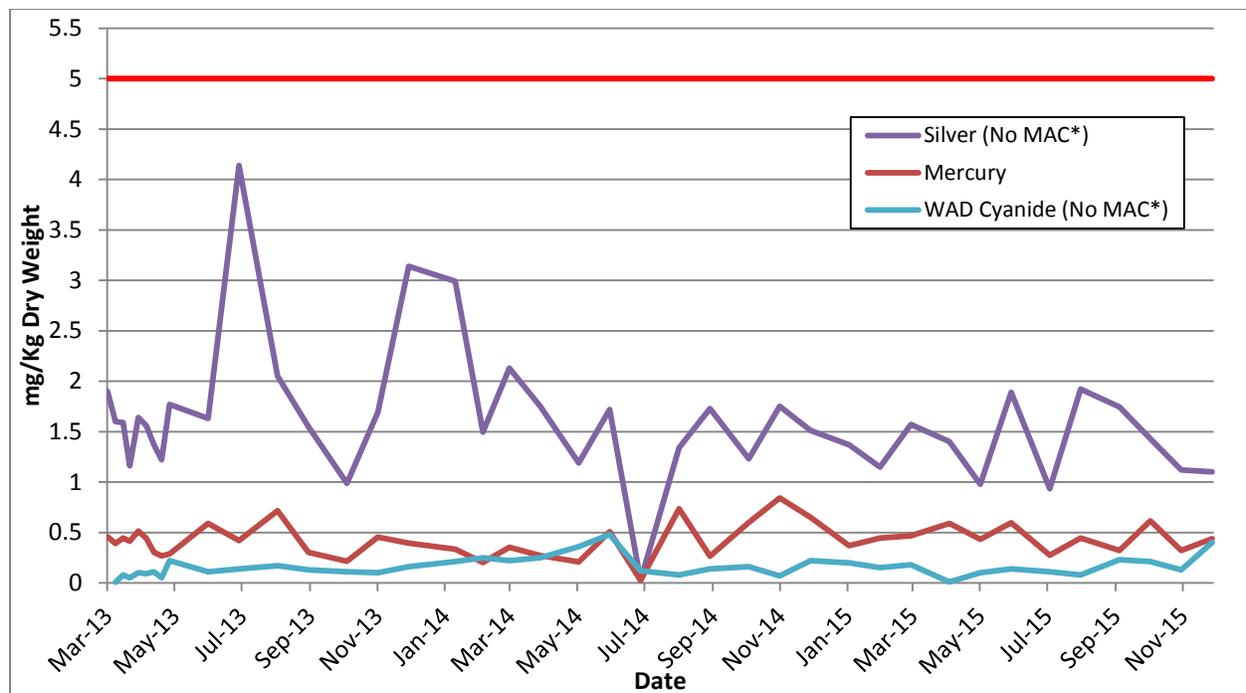


\*MAC = Maximum Acceptable Concentration for Class A Biosolids

Following CRD Board direction to cease land application of biosolids, SPWWTP produced only dewatered sludge after April 7, 2011. This sludge was not sampled or analysed prior to disposal at Hartland landfill as a controlled waste throughout the period April 2011 to February 2013.

A SPWWTP dewatered sludge monitoring plan was developed and implemented in March 2013. The dewatered sludge is not a biosolids product as defined by the OMRR. The sludge is sampled as described in Section 3.1.6 and is assessed using the Class A biosolids quality criteria for comparison purposes to evaluate overall metal concentrations and end-product quality. This monitoring is not intended to characterize the material as a biosolids product. The first two years' results for metals and weak acid dissociable (WAD) cyanide in dewatered sludge are presented in Figures 3 and 4. Mercury and silver continue at levels similar to those in biosolids in the last three years of production. Cyanide (WAD), first monitored in 2013 to confirm increasing trends in SPWWTP influent, shows a slight rise to a high point in June 2014 and again in December 2015. There is, however, no criterion for this substance in biosolids to use as a benchmark for evaluating the impact of these observations.

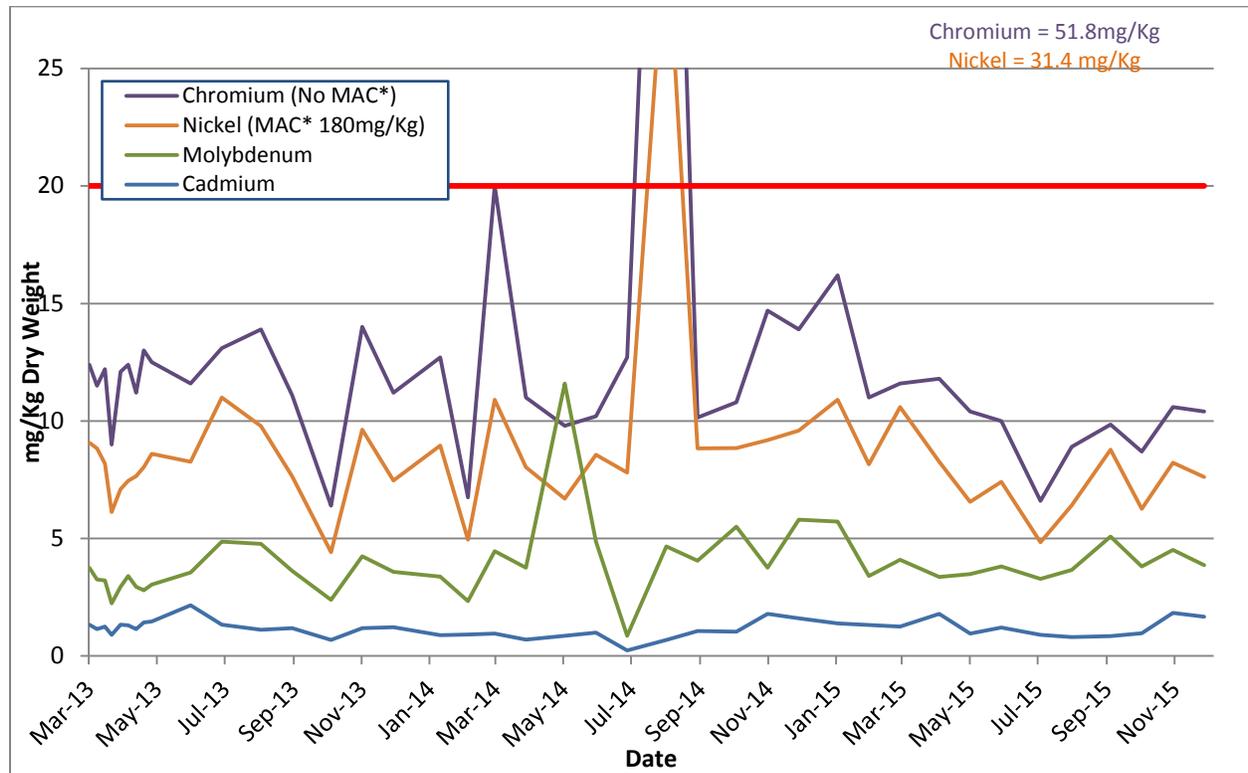
**Figure 3: Mercury, Silver and Cyanide in Saanich Peninsula Wastewater Treatment Plant Dewatered Sludge (2013 - 2015)**



\*MAC = Maximum Acceptable Concentration for Class A Biosolids

Cadmium and molybdenum levels in SPWWTP dewatered sludge generally continued at levels similar to biosolids in the last few years of production. Results were all below the respective biosolids criteria, however there was a single high result for molybdenum in May 2014. The levels of the electroplating metals chromium and nickel appear to be closely correlated with one another – possibly suggesting a common source on the peninsula, where there are two electroplating operations under permit. In addition, the August 2014 result for both metals shows a return to levels last seen in biosolids in the period before 2007. This situation is of concern and merits further investigation in 2016.

**Figure 4: Chromium, Nickel, Cadmium and Molybdenum in Saanich Peninsula Wastewater Treatment Plant Dewatered Sludge (2013-2015)**



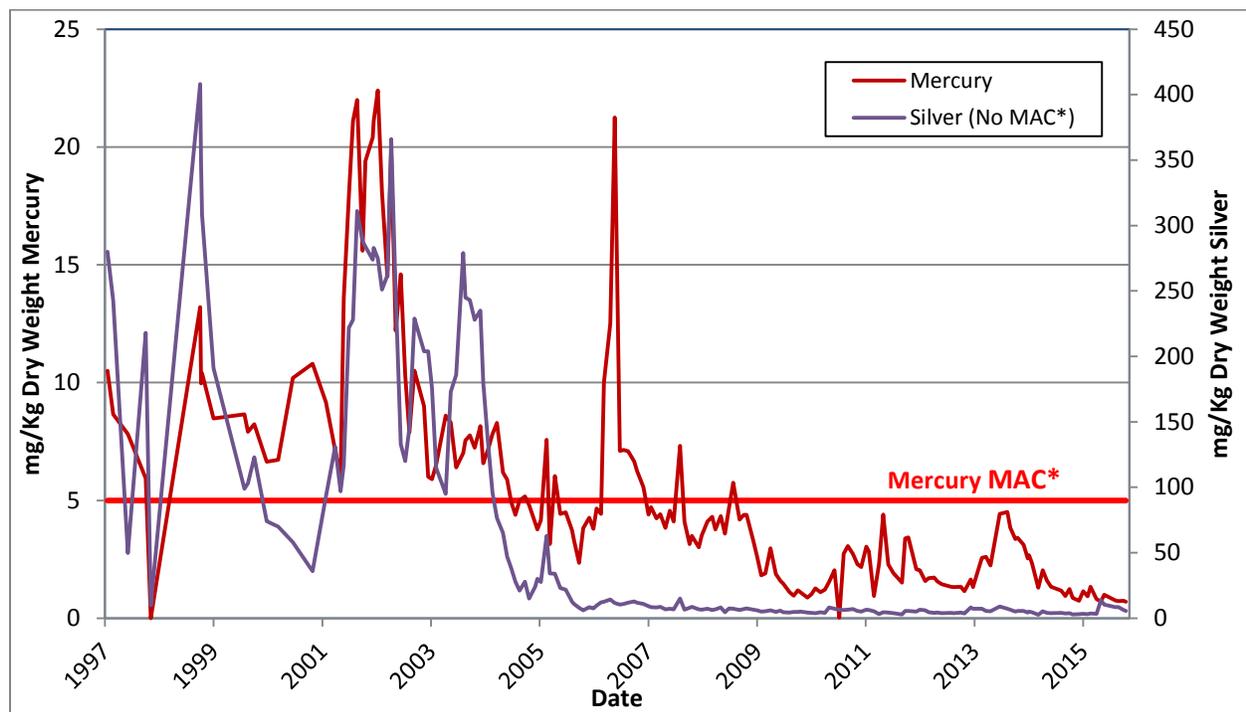
\*MAC = Maximum Acceptable Concentration for Class A Biosolids

## Ganges Wastewater Treatment Plant Mixed Liquor

The GWWTP process produces a mixed liquor product, not a biosolids product as defined by the OMRR. The mixed liquor is sampled and is assessed using the Class A biosolids quality criteria for comparison purposes to evaluate overall metal concentrations and end-product quality. This monitoring is not intended to characterize the material as a biosolids product. The GWWTP mixed liquor has met Class A quality criteria for all parameters except mercury (and occasionally molybdenum, once for cadmium) since monitoring began in 1994.

Mercury and silver levels in Ganges mixed liquor show a different temporal pattern than that for SPWWTP biosolids; however, the overall trend is toward lower levels for both metals (see Figure 5). Implementation of the dental and photo imaging Cops is thought to be the main reason for the reductions in mercury and silver concentrations at the GWWTP.

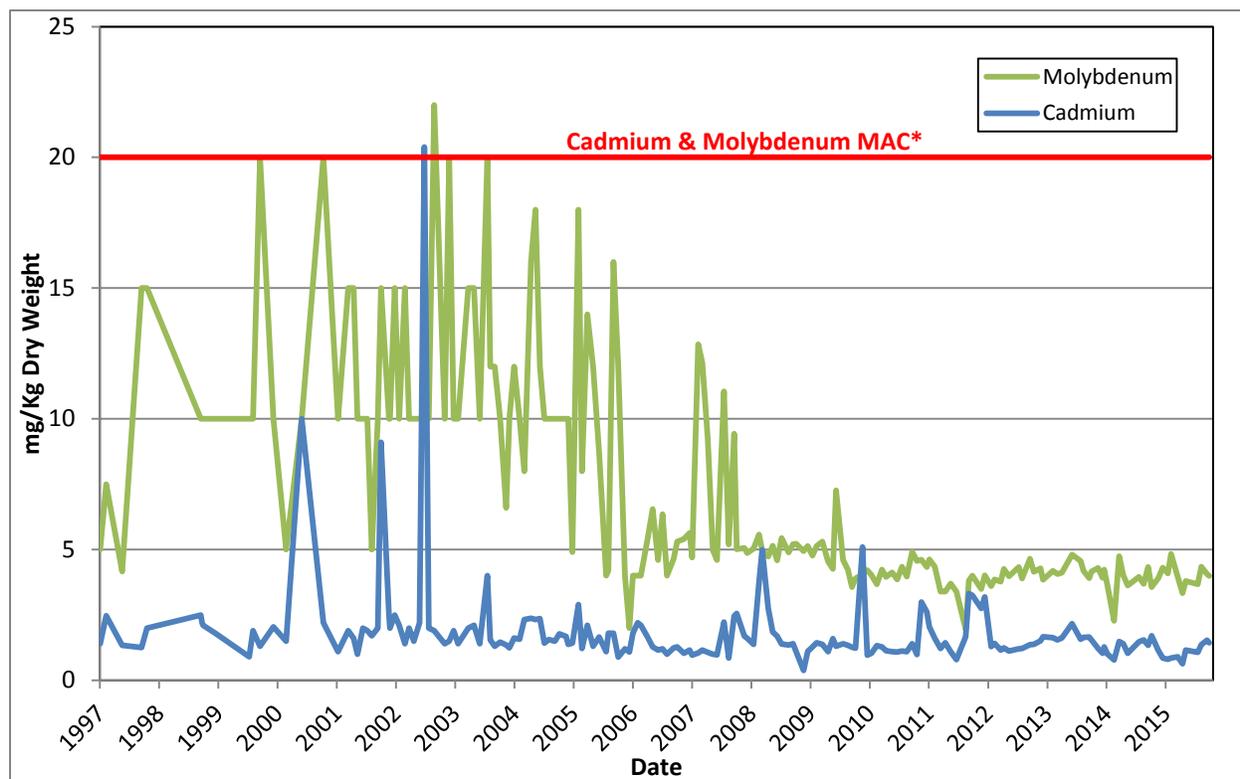
**Figure 5: Mercury and Silver in Ganges Wastewater Treatment Plant Mixed Liquor (1999-2015)**



\*MAC = Maximum Acceptable Concentration for Class A Biosolids

Figure 6 illustrates the decrease in historic levels of cadmium and molybdenum in GWWTP mixed liquor over time. Prior to 2008, molybdenum levels were high and variable, sometimes exceeding the Class A criterion. This may have been due to the use of molybdate corrosion inhibitors in heating and cooling systems within the collection area. More recent levels suggest that there may have been a change to molybdate-free products in at least some situations.

**Figure 6: Cadmium and Molybdenum in Ganges Wastewater Treatment Plant Mixed Liquor (1999-2015)**



\*MAC = Maximum Acceptable Concentration for Class A Biosolids

For the seventh consecutive calendar year, the 2015 GWWTP mixed liquor results met the Class A criteria for all metals, including mercury.

### 3.5 Significant Incident Reporting

CRD operations and municipal engineering department staff communicate periodically with RSCP staff regarding sanitary sewer wastewater quality problems, suspicious discharges or significant incidents leading to contamination of the district's collection and treatment systems. A "significant incident report form" was initially developed in 2000 to record operational problems within all trunk sewers and treatment plants operated by the CRD. The report form and response procedure was reviewed in 2013 following an incident involving a spill of Bunker "C" fuel oil into the CRD's Lang Cove pump station. A new significant incident response procedure was developed by RSCP staff for implementation in 2014. Training sessions for Core Area and SPWWTP operations staff regarding the new procedure were conducted by RSCP staff in January and February 2014. In 2015, staff worked with Environmental Engineering GIS technicians to produce detailed sewer catchment area maps for the CRD's Trent and Lang Cove pump stations. These maps were used for training purposes. Similar maps for the new CRD Craigflower pump station will be developed in 2016.

Table 10 provides a summary of incidents reported in 2015 that impacted, or had the potential to impact, the environment, sewerage works, sewage treatment facilities or public health and safety. Notes on

incident follow-up were summarized from CRD significant incident reports, municipal grease reports, complaint forms, memos, e-mails, conversation records and other notes on file. There were no incidents reported which affected the operation of CRD sewage treatment plants in 2015.

**Table 10: Summary of Reported Sewer System Incidents (2015)**

Contaminant	Nature of Incident	Potential Impact	Incident Follow-up
Electroplating Wastewater	A permitted electroplating facility reported an accidental spill of electroplating rinse water to a containment pond and possibly sanitary sewer. March 2015	Sewage treatment plant (SPWWTP) upset, toxicity to organisms in nearby Reay Creek	RSCP staff determined that the majority of the spilled wastewater was captured in a containment pond. The contained water was sampled, found not to be restricted waste and released, under permit, to sanitary sewer.
Fats, Oils and Grease	A restaurant regulated under the food services code was reportedly discharging into a sewage lift station operated by a parking company. December 2015.	Grease blockages and resultant overflows in municipal and regional sewer pipes and mains.	RSCP staff reviewed facility site plans and worked with City of Victoria Stormwater staff to co-inspect the facility. The restaurant was found to be in compliance with Food Services CoP regulations. The parking company agreed to pump out the lift station and monitor, no further complaints to date. The FOG may have been residual from a previous FOG spill.
Diesel	A diesel spill at the Lang Cove pump station. February 2015.	Pollution to marine receiving environment.	RSCP staff were informed by operations staff. The spill was responded to by DND and Township of Esquimalt staff. PEP was notified.

### 3.6 Outreach

RSCP staff continued to develop and maintain program-specific outreach and education messaging throughout 2015. Where appropriate, source control messaging was also integrated with other initiatives, campaigns and community outreach events held throughout the year across the region.

Key source control initiatives and campaigns for 2015 are summarized below under separate sections for residential and business outreach, education and the RSCP website.

#### Residential Outreach

- RSCP staff continued partnerships with the BC Pharmacy Association (BCPhA) and the Health Products Stewardship Association. “Point of sale” tools, including shelf signs and flyers were distributed to 65 pharmacies (BCPhA members) within the capital region to promote the Medication Return Program. Seventy percent of the region’s pharmacies are members of the BCPhA.
- To further develop and increase proper disposal of medications, the BC College of Pharmacy was engaged by RSCP staff to add medication return labelling on medication containers. A pilot to access the barriers and uptake of using labels, including CRD funding for the production of the labels, was proposed to the College. After some discussion on the proposal, the College did not wish to proceed.

- In 2015, the CRD continued to have one of the highest medication return rates per capita (0.0299 kg/capita) amongst regional districts in the province, second only to the Cowichan Regional District (0.0325 kg/capita). Approximately 11.3 tonnes of medications were collected in the region during 2015.
- A survey of residents regarding current source control attitudes, practices and barriers was completed in 2015. The survey was similar to surveys carried out in 2007, 2009 and 2011; however, a new section was created to evaluate attitudes, practices and barriers to proper management of “non-flushable” products. In addition, a new section was added to evaluate campaign recognition.

The results indicate that there continues to be a significant positive environmental ethic in the region. Although most residents (99%) surveyed agree that what is disposed through the water system can make a difference in protecting the marine environment, 92% incorrectly believe that, once the secondary treatment is in place in the Core Area, source control practices will make no difference.

Clean Green was the most recognized Source Control campaign, while the weakest was the surfactant reduction campaign. The medication return has been successful but additional support is required to reach the 18-35 age group. Results indicate most residents (>80%) are not disposing of “flushables” (e.g. “flushable” wipes, female hygiene products, condoms and dental floss) into the sanitary sewer. However, based on impacts of “flushables” in other regional districts and municipalities, and current issues in the region from the 20% that do dispose of waste in the sanitary sewer, “flushables” may become a bigger issue in the capital region.

The survey also concluded that there was little difference in disposal behaviours and attitude between residents on sanitary sewer vs. those on onsite sewer.

- Based on concern that 92% of those surveyed believe that source control practices will not be relevant with wastewater treatment, RSCP staff initiated refreshing the “Clean Water Begins at Home” campaign. The campaign will be redeveloped in 2016 to promote source control as the first step in wastewater treatment. Furthermore, staff will work with other CRD programs to develop an integrated approach to protecting private infrastructure related to wastewater and stormwater.
- The “Slogan Master” social media campaign promoted the proper disposal of residential fats, oils and grease (FOG) and generated the slogan “To prevent the clog reduce the FOG”. T-shirts and kitchen screens with the slogan were created and distributed at 2015 outreach events, a social marketing strategy.
- Supported by the results of the residential survey, RSCP and CRD Onsite Wastewater Management Program continue, where applicable, to have an integrated approach to outreach material, webpages and advertisements as related to proper source control waste disposal.
- Based on the successful components of the 2013/2014 “Green 365” pilot, themed displays carried on into 2015. Three themed displays were used in 2015,
  - Green 365: In the Kitchen
  - Green 365: In the Bathroom
  - Green 365: Spring/Summer Sustainability

Source control practices were highlighted heavily in the “In the Kitchen” and “In the Bathroom” displays. The kitchen and bathroom are the primary locations in a household where there are connections to the sanitary sewer and septic systems. The RSCP information was promoted and distributed at 25 outreach events.

## Business Outreach

Inspectors continued to be the front line staff delivering RSCP outreach messaging to local businesses. Outreach included distribution of RSCP sector-based posters and guidebooks. In addition, inspectors worked with business owners to highlight the benefits associated with protection against cross connections (protection of public health), water conservation (potential cost savings), kitchen scraps collection programs and other CRD initiatives. See Section 3.1.5 Coordinated Inspections for additional information.

Revised and new mechanical repair resources, developed in late 2014, were completed and distributed in 2015. "Mechanical Repair" terminology replaced "Automotive Repair" to reflect the original intent of the Code of Practice for Automotive Repair Operations, to be inclusive of all repairs associated to "gas" (i.e., hydrocarbon) powered engines and motors. Due to the term "automotive repair", owner and operators of repair facilities working marine engines, power equipment, motorcycles, gas powered scooters and aviation motors wrongly assumed that the Code of Practice only applied to car, truck and bus repairs.

RSCP staff continued to develop sector-specific tools which incorporate environmental messaging from a wide range of CRD programs into one package, also known as the "One Window Approach". A key development in the One Window Approach initiative was the CRD joining BizPaL. BizPaL is a web-based tool to help new and current business owners find and learn about required licenses and permits to operate their business. The BizPaL website also provides information on other applicable bylaws. RSCP staff worked with the BC provincial Ministry of Jobs, Tourism and Skills Training, Industry Canada and CRD programs and departments that offer permit and licenses, to customized BizPaL to fit the Capital Regional District.

## Post-Secondary Education

RSCP continue to support K-12 education initiative including "Food Lessons and Resources" and "Automotive Lessons and Resources". However, for 2015, the resource was re-focused to developing partnerships with post-secondary institutions. Camosun College provided the most opportunities for integration of source control messaging.

### **3.7 Partnerships Initiatives**

Since its inception, the RSCP has worked with many agencies to expand program reach and effectiveness, improve services and resolve problems of mutual concern. These agencies have included Ministry of Environment, federal agencies such as the Department of National Defense and Public Works, regional districts, municipalities, Island Health and local academic institutions.

In 2015, there were continued collaborative efforts between RSCP staff, other Environmental Services programs and external partners to enhance the One Window Approach to providing augmented inspection services and superior customer service and to promote high environmental performance within businesses.

Some examples of both internal and external collaborative partnerships initiatives undertaken in 2015 are outlined below.

#### Co-inspections, Multi-jurisdictional Collaborations

CRD received a complaint of a Langford resident dumping a camping trailer sewage tank into a storm drain. CRD followed up with Langford staff who spoke to the resident.

RSCP collaborated with City of Victoria, Esquimalt and DND in resolving a complaint from an Esquimalt resident reported that a "pipe originating on DND property" was discharging brown, silty water for five hours. The pipe was a stormwater outfall. Staff investigated potential water main leak and cross-connection issue.

RSCP staff and City of Victoria staff co-inspected a bakery found to be discharging from the kitchen to a storm drain in the back.

RSCP staff collaborated with DND, Esquimalt and PEP concerning a diesel spill found at the Lang Cove outfall.

RSCP staff continued to work with CRD Integrated Watershed Management Program staff and View Royal staff to sample, strategize and collaborate in addressing pollution coming from a car dealership site contaminating a nearby stream. RSCP staff conducted dye tests to ascertain where the vehicle wash water and shop floor drains were discharging. It was determined that no commercial discharges were connected to sewer, therefore the Town of View Royal had jurisdiction and responsibility for the property drainage to stormwater.

#### Salon and Spa Working Group

In 2015 RSCP staff collaborated in a Salon and Spa Working Group, hosted by Synergy Sustainability Institute. The group had representation from local salons, a salon “greening” company and a wastewater treatment designer. The group worked to identify 11 local salons willing to participate in water audits. The group also explored possible wastewater characterizing opportunities and contaminant reduction strategies, and worked together on a unified Best Management Practices document to expand the reach of salons receiving a unified message from RSCP, salon greening companies and Synergy’s Vancouver Island Green Business Certification Program.

#### Water Audits

RSCP continued to integrate Demand Management Program (DM) water audits for businesses as an expanded inspection service, working collaboratively with the Integrated Water Services Department.

In 2015, RSCP staff further developed and refined the “2 Hour Water Audit” (2HWA), a simple, step-by-step guide to assessing the relative water efficiency of commercial facilities such as offices, retail and food services. In 2015 the 2HWA was modified to evaluate 11 salons. The need for improved salon water audits came about through RSCP involvement with the Salon and Spa Working Group, and the efforts involved replacement of aerators and hair washers as well as recommended best practices for participating businesses. The 2HWA was also used for auditing a brew pub/ restaurant/ marina, and a commercial catering company/residential building in 2015.

A seafood processing facility under authorization worked with RSCP and Demand Management ICI staff to explore water conservation opportunities. This resulted in the elimination of a once-through thawing water process. These modifications saved the business approximately \$12,000 per year in water savings and allowed them to continue being regulated under an authorization, rather than a permit.

In 2015 a major transit company underwent a major complex audit by RSCP staff, finding potential for over 6,000 m<sup>3</sup> of water savings through fixture upgrades and operational improvements.

RSCP staff also identified opportunities for water savings at the CRD downtown office, replacing all of the washroom aerators in the phase I building, to 1.0 US Gallon/minute flow rates from 4.0 US Gallons/minute.

Inspectors looked for water savings opportunities during inspections of high water use facilities, identifying use of once-through cooling equipment, and discussing water saving best practices.

#### Onsite Wastewater Management Collaboration

RSCP staff met regularly with Onsite Wastewater Management Program (OWMP) staff to exchange information and identify synergies for sharing messaging and efforts to maximize efficiencies. As the messaging for infrastructure, human and environmental health are virtually identical for both sewer use and onsite septic systems, there are opportunities for increasing economies of scale and addressing grey

areas (e.g., RSCP regulates businesses on sewer; OWMP regulates residents on septic – there are some businesses on septic which aren't officially targeted by either program).

#### Island Health Collaboration

Island Health collaborative planning: RSCP staff met with Island Health staff in 2015 to discuss tactics for working with food carts, sharing information on problem facilities, as well as a number of other program updates.

RSCP and Island Health staff continued their information-sharing efforts in 2015 through an administrative practices agreement whereby Island Health administrative staff commenced forwarding all "application for food facility" forms to RSCP staff. The forms provide contact and operating details for new food service businesses, enabling RSCP staff to work with new applicants more proactively, and dramatically improving RSCP data quality. The forms are forwarded to Cross Connection Control (CCC) staff so that, wherever possible, CCC inspections can be conducted quickly for new businesses, and in some cases jointly with RSCP inspections, saving the businesses money and time for inspection visits.

#### Collaboration with Academic Institutions

The RSCP also developed various partnerships with educational institutions in 2015.

RSCP inspectors and outreach staff presented workshops to Camosun College Environmental Technology students, identifying regional issues and the RSCP role in addressing them, as well as a detailed workshop on the RSCP functioning. In addition, RSCP staff continued to participate in the Camosun College Environmental Technology program advisory committee.

#### Municipal Collaboration

Since 1999, municipal staff have been encouraged to issue waste discharge assessment forms (WDAFs) to persons applying for new building licenses or new sewer connections for businesses that have the potential to discharge non-domestic waste to sewer. Completed forms are forwarded by the municipality to the CRD for evaluation. In addition, businesses or plumbers contracted to perform upgrades at CoP operations directly contact RSCP staff regarding CoP requirements. Letters copied to municipal plumbing or licensing contacts are sent directly to CoP operations outlining specific requirements and providing information.

In the past year, RSCP staff worked with municipal staff to resolve various oil and grease blockages in sewers. Municipal staff continued to provide plumbing and building information, flow data and other information to RSCP staff to assist in the preparation of permits, authorizations and CoP treatment works installations in 2015.

In 2015, RSCP staff continued a semi-regular presence with the VIPCC (Vancouver Island Plumbing Code Committee). This is an opportunity to improve personal relationships with municipal plumbing inspectors, provide regulatory updates and problem solve with issues that affect both municipal and regional inspectors.

RSCP staff met with Metro Vancouver staff in 2015 to discuss challenges and solutions associated with treatment work standards, emerging technologies, industrial permitting processes and other relevant topics.

### **3.8 Data Management**

The RSCP portion of the Cross Connection and Regional Source Control Information Management System (CRIMS) was integrated with the CRD geographic information system (GIS) in 2012; operational integration for inspection planning continued throughout 2015. The integrated product, CRIMS Spatial, makes CRIMS regulatory database viewable via a GIS web mapping application, allowing RSCP inspectors to have access to enhanced spatial relationships regarding all facilities regulated under the

Sewer Use Bylaw. The integration allowed RSCP staff to take advantage of other available spatial data (e.g., sewer lines, flow direction and manhole locations). CRIMS Spatial is designed to assist with compliance tracking, inspection planning, tracking implementation plans, providing ad hoc and regular statistics and assisting with spill or incident response.

In 2015, RSCP staff requested that IT develop a “devices” inventory process in CRIMS that allowed treatment works to be more effectively inventoried, complete with photos and relevant documents (e.g., manufacturer’s manuals) in the database.

### 3.9 Revenue and Expenditures

A summary of revenue and expenditures for the RSCP in 2015 is provided in Table 12.

A portion of program revenue is provided through the imposition of fees and charges on businesses and institutions under the Source Control Local Service Establishment Bylaw. The total waste discharge permit fees and fines (tickets) collected in 2015 amounted to **\$104,253**.

**Table 12: Regional Source Control Program Revenue and Expenditures – 2015**

Description	Revenue (\$)	Expenditure (\$)	
Fees, fines, grants, surplus, other	209,511		
Requisition	1,250,513		
<b>Total Program Revenue</b>	<b>1,460,024</b>		
Program Expenditures		1,441,773	
Administration Expenditures		18,251	
<b>Total Program Expenditure</b>		<b>1,460,024</b>	
<b>Carry Forward to 2016</b>			<b>0</b>

#### Waste Discharge Permit Fees

The RSCP waste discharge permit fee structure was developed in 1997 in consultation with stakeholders to reflect the size and impact of the discharge from each business type. The fee structure is outlined in the Sewer Use Bylaw, and the RSCP fees and charges policy governs the administration of the fees. In addition to a fixed annual administration fee, permittees pay discharge fees in proportion to the loads of specific contaminants discharged, based on their own self-monitoring results. Permit application and amendment fees are also charged in order to offset administrative costs.

### 3.10 Planning and Development

The following is a summary of the main activities and achievements related to the management, planning and administration of the RSCP in 2015.

- The RSCP continued to meet the commitments outlined in the Core Area and Saanich Peninsula LWMP’s in 2015.
- The RSCP annual report for 2014 was presented to the Core Area Liquid Waste Management Committee, as part of a consolidated annual report for all Liquid Waste Management Plan programs, on November 25, 2015. Copies of the annual report were sent to the Ministry of Environment on December 9, 2015.
- The findings of the second five-year independent review of the program for the period 2004-2008 (Morrison Hershfield, 2010) were used to develop a five-year plan for the RSCP covering the period 2011-2015. This five-year plan, substantially completed by December 2015, is summarized in Table 13.

- The 2015 RSCP work plan was developed in January 2015 and was updated throughout the year. This plan assisted in setting project timelines and defining responsibilities for activities and projects within the overall context of the five-year plan.
- A consultant delivered the third independent review of the program in June 2015 (KWL, 2015). The consultant's recommendations were considered along with the results of a residential outreach survey (May 2015) and a service planning session (June 2015) to prepare a new program implementation plan for the period 2016-2019, aligning program activities with the next CRD budget cycle.
- A consultant, WSP Canada Inc., was hired in November, 2015 to undertake a full technical review of the CRD's Code of Practice for Food Services Operations. The main areas of focus specified for the review included:
  - GI sizing formula
  - Requirements for GI's with flow ratings greater than 100 gpm
  - Storage limits for FOG and solids, cleaning frequency and terms
  - Fixtures requiring connection to a GI
  - Flow control fittings and venting requirements
  - GI types and alternative technologies
  - Food services types and definition

A final report on the findings of the review is expected to be delivered in May, 2016.

**Table 13: Regional Source Control Program Five-Year Plan (2011-2015)**

The RSCP five-year implementation plan consists of four main strategies which were aligned with the main elements of the Environmental Partnerships Strategic Plan and Business Plan. The five-year plan was designed to assist in the delivery of Environmental Partnerships' mandate and to help the CRD prepare for the initiation of advanced sewage treatment in the core area.

Main Strategies and Activities	Timeline
<b>1. Coordinated Outreach and Education</b>	
<ul style="list-style-type: none"> <li>• Develop, through stakeholder consultation, new business outreach materials for industrial, commercial and institutional sectors incorporating a “one-window” approach to service delivery.</li> </ul>	2011-2015
<ul style="list-style-type: none"> <li>• Enhance and update four existing “Clean Water Begins at Home” residential outreach campaigns, including:               <ul style="list-style-type: none"> <li>- Medications return—expand to home and community care and investigate container labelling</li> <li>- Launch Source Control 201, “Sustainable U”, social media campaign</li> </ul> </li> </ul>	2011-2015 2011 2012
<ul style="list-style-type: none"> <li>• Develop and launch new “Clean Water Begins at Home” initiatives, including:               <ul style="list-style-type: none"> <li>- Promote alternative household cleaners through “Clean Green”</li> <li>- Promote proper hazardous waste and hobby waste disposal</li> </ul> </li> </ul>	2011-2015 2011 2013
<ul style="list-style-type: none"> <li>• Develop education plans for K-12, post-secondary and trade schools, incorporating RSCP themes and information from other CRD programs</li> </ul>	2012
<ul style="list-style-type: none"> <li>• Enhance relationships with municipal and other agency staff by establishing procedures that facilitate efficient information exchange</li> </ul>	2012
<ul style="list-style-type: none"> <li>• Update business and residential components of RSCP website, incorporating interactive features and a “one-window” approach</li> </ul>	2015
<b>2. Coordinated Inspections and Monitoring</b>	
<ul style="list-style-type: none"> <li>• Coordinate inspections and audits for all Partnerships' programs               <ul style="list-style-type: none"> <li>- Demand Management, Cross Connection Control, Onsite Systems, Stormwater Source Control (Saanich Peninsula)</li> </ul> </li> </ul>	2012
<ul style="list-style-type: none"> <li>• Focus inspection efforts on priority industrial, commercial and institutional sources               <ul style="list-style-type: none"> <li>- Hospitals, metal platers, ship waste treatment, vehicle washing, photo imaging, printing</li> </ul> </li> </ul>	2011-2015
<ul style="list-style-type: none"> <li>• Enhance all RSCP monitoring plans (annual reviews) for:               <ul style="list-style-type: none"> <li>- Permits, authorizations, codes of practice, key manholes</li> </ul> </li> </ul>	2011-2015
<b>3. Program Review and Metrics</b>	
<ul style="list-style-type: none"> <li>• Maintain existing program components to ensure Liquid Waste Management Plan commitments are met</li> </ul>	2011-2015
<ul style="list-style-type: none"> <li>• Review program measures of success</li> </ul>	2012
<ul style="list-style-type: none"> <li>• Review, develop and adopt standard operating procedures for all RSCP activities</li> </ul>	2013
<ul style="list-style-type: none"> <li>• Review, update and amend the Sewer Use Bylaw (coordinate with reviews of other program bylaws)</li> </ul>	2014
<ul style="list-style-type: none"> <li>• Coordinate data management and database development with all Partnerships' programs</li> </ul>	2015
<b>4. Research and Emerging Technologies</b>	
<ul style="list-style-type: none"> <li>• Research priority contaminants, sources, reduction strategies and targets               <ul style="list-style-type: none"> <li>- Investigate use of molybdenum-based corrosion inhibitors in heating/cooling systems and potential local impacts</li> <li>- Develop a reduction plan for phthalates (plasticizers)</li> <li>- Research use of copper-based algaecides and local impacts</li> <li>- Investigate local use of nano-silver products and potential impacts</li> </ul> </li> </ul>	2011-2015 2011 2012 2013 2014
<ul style="list-style-type: none"> <li>• Research and pilot test new pre-treatment technologies for effectiveness at achieving contaminant reductions and meeting regulations</li> </ul>	2011-2015

### 3.11 Performance Measures

Three program performance measures were developed over the period 2004-2006. These measures have been incorporated in RSCP “program budgets” since 2007 and were included in the scope of the five-year review undertaken in 2009. The performance measures are as follows:

- Percentage of regulated businesses with proper waste treatment installed. This measure is associated with the RSCP objective of consistent application of the program for all users of CRD sewage facilities.
- Percentage of priority contaminants showing no increase in loads to the core area environment. This measure is associated with the RSCP objective of protecting the marine environment adjacent to the CRD’s sewage outfalls.
- Percentage of biosolids and sludge samples that meet Class A standards for metals. This measure is associated with the RSCP objective of protecting the quality of sewage sludge and biosolids.

A fourth performance measure, Overall Compliance, was established in 2014 to replace “Percentage of regulated businesses with proper waste treatment installed”. See write-up below for rationale.

The method of calculating each performance measure is described in Appendix 2, using 2014 data as an example. The results of performance measure calculations for the period 2005-2015 are summarized in Table 14.

**Table 14: Results of RSCP Performance Measures (2005-2015)**

Performance Measure	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Proper waste treatment <sup>1</sup>	80	85	87	93	95	96	97	90	97	N/M <sup>5</sup>	N/M <sup>5</sup>
Priority contaminants <sup>2</sup>	92	N/M	N/M	79	N/M	N/M	95	N/M	N/M	N/M	N/M
Biosolids and sludge <sup>3</sup>	92	67	88	93	100	100	100	100	100	100	100
Overall Compliance <sup>4</sup>	N/M	95	97								

**Notes:**

1. Percentage of regulated businesses with proper waste treatment installed.
2. Percentage of priority contaminants showing no increase in loads to the core area environment.
3. Percentage of biosolids and sludge samples that meet Class A standards for metals.
4. Overall Compliance is now substituting “Proper waste treatment” as of 2014.
5. N/M = Not measured
6. I/P = In preparation

Performance measure #1 was not able to be calculated prior to 2004 due to the lack of complete data on the installation of proper waste treatment for CoP. Steady progress had been recorded for this measure over the period 2005-2011.

Performance Measure #1 was modified in 2014 to “Overall Compliance”. Proper waste treatment was a significant marker of program influence in the developing years, as new Codes of Practices were being introduced to the region, however it is the belief of RSCP staff that a shift to “overall compliance” is now a better indicator of effective contaminants diversion. An enforcement status of “compliant” or “Step 1” inherently indicates proper treatment works or that an acceptable performance-based treatment arrangement has been made, though not necessarily compliant with what is prescribed in the code of practice. Further a “compliant” or “Step 1” enforcement status assumes that the treatment works are

being properly maintained. All treatment work systems are rendered ineffective if they are not maintained, thus as a compliance indicator this is much more accurate in representing how well waste is being managed.

Performance measure #2 is based on the “yearly trend” in loads at both Macaulay and Clover point outfalls for 39 priority contaminants, as documented in the most recent trend assessment report (Golder Associates Ltd, 2013). This report found that there were significant decreasing trends, or no significant trend, in 36 of the 39 priority contaminants listed in Appendix 1. Increasing trends were recorded for cobalt at Macaulay Point and WAD cyanide at Clover Point, resulting in a 95% rating for this performance measure in 2011.

Long-term analysis of effluent trends for the core area outfalls is only undertaken every three to four years. This measure cannot be calculated for the two to three years in between. The next analysis, including data from 1990-2015, is scheduled for 2016.

The final performance measure has shown some variability over the years, largely due to the mixed liquor metals results from the GWWTP exceeding Class A criteria for biosolids. However, for the seventh consecutive year, the 2015 GWWTP mixed liquor results met the Class A criteria for all metals, including mercury. SPWWTP dewatered sludge monitoring commenced in March 2013. All of these results also met the Class A criteria for metals. The combined results from the two plants provided an overall 100% rating for this performance measure in 2015.

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- PLA, 2002. CRD Clover and Macaulay Point Wastewater Outfalls: 1988-2000 Effluent Quality and Quantity. Report prepared for the CRD by Paine, Ledge and Associates, August 2002.
- PLA, 2004. Trend Analysis of Selected Substances in the Clover and Macaulay Point Effluents, 1996-2003. Report prepared for the CRD by Paine, Ledge and Associates, 2004.

## APPENDIX 1

### RSCP Priority Contaminant List (2015)

<b>TOTAL METALS</b>
arsenic (As)
cadmium (Cd)
chromium (Cr)
cobalt (Co)
copper (Cu)
lead (Pb)
manganese (Mn)
mercury (Hg)
molybdenum (Mo)
nickel (Ni)
selenium (Se)
silver (Ag)
zinc (Zn)
<b>POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)</b>
Total PAHs
Low molecular weight PAHs
naphthalene
acenaphthylene
acenaphthene
fluorene
phenanthrene
anthracene
fluoranthene
High molecular weight PAHs
pyrene
benzo(a)anthracene
chrysene
benzo(b)fluoranthene
benzo(k)fluoranthene
benzo(a)pyrene
dibenzo(a,h)anthracene
indeno(1,2,3-cd)pyrene
benzo(g,h,i)perylene
<b>Phthalates</b>
bis(2 ethylhexyl)phthalate
di-n-butyl phthalate
<b>Miscellaneous</b>
1,4-dichlorobenzene
Cyanide - weak acid dissociable (WAD)
Cyanide - strong acid dissociable (SAD)
phenol
total oil and grease



## APPENDIX 2

### Calculation Methods for RSCP Performance Measures

The following methods are used to calculate the four RSCP performance measures referred to in Section 3.11.

#### RSCP Performance Measure #1:

##### **“Percentage of regulated businesses with proper waste treatment installed”**

As of 2014, this performance measure has now been replaced with “Overall Compliance”. “Number of regulated business with proper waste treatment installed” was, in earlier program years, a significant marker of program influence. As new Codes of Practice were being introduced to the region, it was important to measure how many (and how quickly) businesses were adopting proper wastewater treatment systems. It is the belief of RSCP staff that a shift to “overall compliance” is now a better indicator of effective contaminants diversion, due to:

- **Consistent high compliance with proper treatment works installed:** We know from our inspection history that, as a baseline, almost all regulated facilities are operating with proper waste treatment.
- **Performance-based compliance site-specific practices:** Alternative arrangements in practices or technologies, which might deviate from what is prescribed in a code, may be effectively treating the waste. For example, there are several automotive facilities with (technically) under-sized oil water separators, who are supplementing their systems with oil coalescing plates, analyzing the wastewater effluent and being monitored through an authorization to ensure that the systems are not bypassing hydrocarbons or in excess of other restricted waste limits.
- **Treatment works maintenance:** The top enforcement issue amongst regulated facilities is proper maintenance of treatment works. All treatment work systems are rendered ineffective if they are not maintained; thus as a compliance indicator this is much more accurate representation of proper contaminants diversion. A facility not maintaining a system will receive a major infraction (Step 2) compliance status.
- **Working with facilities with inadequate or no treatment works:** On the rare occasion where a facility is found to have no treatment works on site, staff work swiftly with the business towards adopting an effective system. When there is resistance to working proactively with staff, enforcement actions escalate quickly, typically resulting in positive action from the facility. When inspected treatment works are viewed as ineffective (e.g., under capacity, in poor repair, or not undergone base standard certification), the inspector will work with the business to improve treatment performance through either an upgraded system that meets CRD requirements, authorizing modifications to the existing system to meet or beat base performance requirements or assisting the business in modifying their practices to eliminate the need for onsite treatment works (e.g., an automotive shop disconnecting their floor drains and using off-site treatment services exclusively).

#### RSCP Performance Measure #2

##### **“Percentage of priority contaminants showing no increase in loads to the core area environment”**

This measure is associated with the RSCP objective of protecting the marine environment adjacent to the CRD’s sewage outfalls.

CRD Environmental Protection Division’s Marine Programs group has collected samples of wastewater from the Macaulay and Clover point outfalls since 1988. Wastewater samples have been analysed for over 200 parameters, including priority substances and conventional parameters. Statistical analyses

have been conducted periodically in the past to evaluate long-term trends in concentrations and loads of these substances in wastewater. The most recent trend assessment (Golder Associates Ltd., 2013), utilizing data from the period 1990-2011, updates the previous assessment (Golder Associates Ltd., 2009a), which included data from 1990-2008.

In 2008, the RSCP prepared a list of core area priority contaminants based on information provided by Marine Programs and other sources. The following table shows the current list of 39 RSCP priority contaminants (Appendix 1 of this report). Most of these contaminants have been targeted for reduction by RSCP, either through regulation or outreach, or a combination of initiatives.

Performance measure #2 is based on the “yearly trend” in loads at both Macaulay and Clover point outfalls for the above 39 priority contaminants, as documented in the most recent trend analysis report. All RSCP priority contaminants showing either a decrease or “no significant trend” in loads at either Macaulay or Clover point outfalls are identified and reported as a percentage of the 39 listed priority contaminants. Note that trends for “total” metals, not “dissolved”, are used in the calculation. For PAHs, trends for individual PAHs, LMW, HMW and Total PAHs are used in the calculation.

#### Performance Measure Calculation

The following table shows how performance measure #2 was calculated for 2005, 2008 and 2011, based on information provided in Golder Associates Ltd., 2006, 2009a and 2013. Note: only the contaminants for which a significant increasing trend was reported are shown – all other contaminants showed either a “significant decrease”, no “significant trend” (ns) or “could not be calculated” (nc).

<b>RSCP Priority Contaminant</b>	<b>Yearly Trend (1990-2005) Core Area Loads</b>	<b>Yearly Trend (1990-2008) Core Area Loads</b>	<b>Yearly Trend (1990-2011) Core Area Loads</b>
<b>TOTAL METALS</b>			
arsenic (As)		Increase	
cadmium (Cd)			
cobalt (Co)			Increase (Macaulay only)
chromium (Cr)			
copper (Cu)			
lead (Pb)			
molybdenum (Mo)	Increase (Clover only)	Increase (Macaulay only)	
manganese (Mn)			
mercury (Hg)			
nickel (Ni)			
selenium (Se)		Increase	
silver (Ag)			
zinc (Zn)			
<b>POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)</b>			
<b>Low molecular weight PAHs</b>			
naphthalene			
acenaphthylene			
acenaphthene		Increase	
fluorene			
phenanthrene			
anthracene			
fluoranthene		Increase	

RSCP Priority Contaminant	Yearly Trend (1990-2005) Core Area Loads	Yearly Trend (1990-2008) Core Area Loads	Yearly Trend (1990-2011) Core Area Loads
<b>High molecular weight PAHs</b>	Increase	Increase	
pyrene			
benzo(a)anthracene			
chrysene			
benzo(b)fluoranthene			
benzo(k)fluoranthene			
benzo(a)pyrene			
dibenzo(a,h)anthracene			
indeno(1,2,3-cd)pyrene			
benzo(g,h,i)perylene			
<b>Total PAHs</b>		Increase (Macaulay only)	
<b>Phthalates</b>			
bis(2 ethylhexyl)phthalate	Increase	Increase (Macaulay only)	
di-n-butyl phthalate			
<b>Miscellaneous</b>			
1,4-dichlorobenzene			
phenol			
total oil and grease			
Cyanide - WAD			Increase in WAD Cyanide (Clover only)
Cyanide - SAD			
<b>Total # Increase</b>	<b>3</b>	<b>8</b>	<b>2</b>
<b>Total # Decrease or “ns”</b>	<b>35</b>	<b>30</b>	<b>36</b>
<b>% of 39 Priority Contaminants</b>	<b>92%</b>	<b>79%</b>	<b>95%</b>

### RSCP Performance Measure #3

#### **“Percentage of biosolids and sludge samples that meet Class A standards for metals”**

Performance measure #3 is linked to the RSCP objective of protecting the quality of sewage sludge and biosolids.

Composite samples of biosolids produced at the SPWWTP were analysed on a regular basis during periods of production from May 2000 – April 2011. Samples were analysed for metals, moisture, pH, nutrients and microorganisms. Analytical results for metals were assessed using Class A Biosolids Standards as specified in *Canadian Food Inspection Agency Trade memorandum T-4-93 Table II* (see below).

Following CRD Board direction to cease land application of biosolids, SPWWTP has produced only dewatered sludge since April 2011. The dewatered sludge was landfilled as controlled waste throughout 2012 without routine sampling and analysis. Consequently, there was no 2012 SPWWTP dewatered sludge data available for input to this performance measure. SPWWTP dewatered sludge monitoring commenced in March 2013.

## Class A Biosolids Standards, Maximum Acceptable Metal Concentrations\*

Metal	Concentration (mg/Kg dry weight)
Arsenic	75
Cadmium	20
Cobalt	150
Mercury	5
Molybdenum	20
Nickel	180
Lead	500
Selenium	14
Zinc	1,850

\*From: Canadian Food Inspection Agency Trade memorandum T-4-93 Table II

The GWWTP produces a mixed liquor product, and the SPWWTP produces dewatered sludge. Neither of these are biosolids products by definition. Grab samples of GWWTP mixed liquor are analysed for metals and moisture on a monthly basis. Composite samples of SPWWTP dewatered sludge are submitted for metals cyanide and moisture analysis initially on a weekly, and finally on a monthly, basis. The results are assessed using the Class A Biosolids standards referred to above.

The performance measure is calculated using the ratio of the annual number of samples of both dewatered sludge and mixed liquor that were compliant with Class A standards and the total annual number of samples collected and analysed – expressed as a percentage.

### Performance Measure Calculation – 2015

The following table illustrates how performance measure #3 is calculated, using 2015 data as an example.

Treatment Plant	# Samples (2015) <sup>1</sup>	# Compliant (2015) <sup>2</sup>
Ganges WWTP (Mixed Liquor)	11	11
Saanich Peninsula WWTP (Dewatered Sludge)	12	12
<b>Totals</b>	<b>23</b>	<b>23</b>
<b>Percentage Compliant</b>		<b>100%</b>

#### Notes:

<sup>1</sup> the number of dates on which discrete samples were submitted for analysis.

<sup>2</sup> the number of samples with results that were fully compliant with Class A Biosolids standards for nine metals. Results for any field duplicates taken on the same date are averaged. If the standards are exceeded for one or more of the nine metals, a “failure” is recorded for the entire sample.

The overall percentage of biosolids and sludge samples that met Class A standards for metals in 2015 was **100%**.

### RSCP Performance Measure #4

#### “Overall compliance”

This new performance measure, replacing “Number of facilities with proper waste treatment” would include facilities regulated through permits, authorizations or Cops receiving either a “compliance” or “Step 1” inspection status. A “Step 1” compliance status is indicative of a “first infraction” e.g., a late permit report, or failure to keep records as required. A single infraction does not have a significant impact on the program. Any facility without proper treatment works or not maintaining treatment works would be given a “Step 2” (first major infraction” or higher level of enforcement depending on the situation).

## Performance Measure Calculation – 2015

The first step in estimating overall compliance is establishing the individual CoP sector size. All of the facilities within each CoP data set are assessed and screened on the following criteria:

- Repeat inspections removed
- “No Regulated Waste” Discharge Types removed
- “Not Connected to Regional Sewers” Discharge Types removed
- “Storm Drain Discharge” Discharge Types removed
- Facilities with no inspection dates removed
- “Unknown Discharge Type” Discharge Types removed
- “Closed Facilities” removed
- “Unknown Discharger Types” Discharge Types removed
- “Operating Under Another Regulatory type” Discharge Types removed
- “Operation Under Construction” Discharge Types removed
- Facilities operating under an authorization removed
- “Groundwater Discharger” Discharge Types removed

It should be noted that the screened facilities are not assumed to permanently exist in that state, and are re-visited for updates through “newly sewerred facility” GIS mapping updates and/or site contact to determine if practices have changed. Sector sizes for permitted and authorized facilities are simply based on number of active permits/authorizations at that time.

### **Summary of Code of Practice/Permit/Authorization Sector Sizes in 2015**

<b>Code of Practice</b>	<b>Est. Sector Size (2015)</b>
Automotive Repair	164
Carpet Cleaning	38
Dental	101
Dry Cleaning	10
Fermentation	33
Food Services	1252
Laboratory	28
Photographic Imaging	76
Printing	17
Recreation Facility	13
Vehicle Wash	31
<b>Total CoP Operations</b>	<b>1763</b>
Total Active Permits	39
Total Active Authorizations	100
<b>Total Regulated Facilities</b>	<b>1902</b>

With the established CoP sector sizes and number of permitted/authorized facilities, number of “overall compliant” facilities within each data set are established using the last compliance status of 2015. Facilities with “Compliant” or “Step 1” status are considered “Overall compliant” i.e., minor infractions but assumed treatment works and associated maintenance. Overall Compliance since full implementation of CoP are presented below.

**Progress on Overall Compliance for 2015 since Adapting New Success Measures**

CODE	S-SIZE	# INSP 2016	COMP	COMP %	IN PROG	IN PRO %	Step 1	# Overall Compliance (compliant or step 1)	% Overall Compliance (compliant or step 1)	DUR	DUR %	Coordinated Inspections
AUTO	164	457	154	93.9%	10	6.1%	9	163	99.4%	0	0.00%	277
CARPET	38	2	37	97.4%	1	2.6%	0	37	97.4%	0	0.00%	2
DENTAL	101	2	90	89.1%	11	10.9%	10	100	99.0%	0	0.00%	2
DRY CL	10	2	8	80.0%	2	20.0%	1	9	90.0%	0	0.00%	0
FERM	33	3	31	93.9%	2	6.1%	2	33	100.0%	0	0.00%	3
FOOD	1252	916	1185	94.6%	62	5.0%	29	1214	97.0%	5	0.40%	603
LABS	28	4	23	82.1%	5	17.9%	5	28	100.0%	0	0.00%	4
PHOTO	76	5	73	96.1%	3	3.9%	2	75	98.7%	0	0.00%	5
PRINTING	17	6	14	82.4%	3	17.6%	3	17	100.0%	0	0.00%	6
REC	13	0	13	100.0%	0	0.0%	0	13	100.0%	0	0.00%	0
VEH WASH	31	94	28	90.3%	3	9.7%	2	30	96.8%	0	0.00%	85
<b>TOTAL</b>	<b>1763</b>	<b>1491</b>	<b>1656</b>	<b>93.9%</b>	<b>102</b>	<b>5.8%</b>	<b>63</b>	<b>1719</b>	<b>97.5%</b>	<b>5</b>	<b>0.28%</b>	<b>987</b>
permits	39	66	29	74.4%	9	23.08%	5	34	87.2%	1	2.6	39
authorizat	100	69	88	88.0%	12	12.00%	8	96	96.0%	1	1	69
<b>ALL TOTAL</b>	<b>1902</b>		<b>1773</b>		<b>123</b>		<b>76</b>	<b>1849</b>	<b>97.2%</b>	<b>7</b>	<b>0.37%</b>	<b>1095</b>

As a result, the “Overall Compliance” in 2015 is **97%**.

### APPENDIX 3

#### CRD Regulated Industrial Categories (Currently Operating under RSCP Permits or Authorizations)

BUSINESS TYPE	TYPICAL CONTAMINANTS OF CONCERN	TYPICAL PRE-TREATMENT INSTALLED
<b>METAL PLATERS</b>	toxic metals, cyanide, solvents, pH	process control, metals adsorption, offsite waste management
<b>INDUSTRIAL LAUNDRIES</b>	fats (and mineral) oil and grease, solids, organics	grease interceptors, filtration, oil skimmers
<b>FOOD PROCESSING</b>	fats, oil and grease, solids, organics	solids separation, grease interceptors, neutralization, dissolved air floatation
<b>HAZARDOUS WASTE TREATMENT</b>	mineral oil and grease, toxic organics, sulphides, solids, solvents	filtration, oil water separation, chemical oxidation, aeration, precipitation, flocculation, adsorption, sulphide reduction
<b>ORGANIC WASTE TREATMENT</b>	fats, oils and grease, metals, solids, pH, sulphides	dewatering, grease interceptors, bio-reactors, sulphide reduction, dissolved air floatation
<b>TRANSPORTATION</b>	mineral oil and grease, fuel, solids, de-icing fluid,	neutralization, oil water separation, dissolved air floatation
<b>BREWERIES</b>	solids, organics, pH	solids diversion, filtration, pH adjustment
<b>SHIP REPAIR</b>	mineral oil and grease, solvents, toxic metals, toxic organics, solids	settling, flocculation, filtration, electrocoagulation
<b>GROUNDWATER REMEDIATION</b>	mineral oil and grease, toxic metals, toxic organics, solids, sulphides	settling, filtration, sulphide reduction, adsorption
<b>CHEMICAL MANUFACTURING</b>	pH, toxic metals, solvents	process control, waste neutralization, offsite waste management
<b>STREET WASTE TREATMENT</b>	fuel, toxic metals, mineral oil and grease, organics, solids	filtration, settling, oil water separation
<b>HOSPITALS</b>	fats, oils and grease, solids, organics, solvents, pH	solids separation, grease interceptors, offsite waste management, absorption