



CANADA'S **CHEMICALS** **MANAGEMENT** **PLAN**

Progress Analysis 2006-2011

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EXECUTIVE SUMMARY

In December 2006, the Government of Canada embarked on a plan to protect Canadians and their environment from dangerous chemicals in industrial and consumer products. The Chemicals Management Plan (CMP) seeks to monitor, assess, and regulate the effects of particular substances, including those on the Domestic Substances List (DSL). Of these substances, 500 were considered high priorities for monitoring.

This is a report card on the three CMP initiatives addressing these high-priority substances. These initiatives are The Challenge to Industry, The Petroleum Sector Stream Approach, and The Significant New Activity Approach. Substances within these approaches have been or are being assessed to determine if they meet one or more Canadian Environmental Protection Act (CEPA) 1999 Section 64 criteria such that they are “toxic” in Canada. Substances found to be “toxic” could either have nothing done about them, be added to the Priority Substances List for further assessment, or be added to the Toxic Substances List (TSL) (i.e., Schedule 1 of CEPA 1999) for preventive or control actions, (via CEPA 1999-enabled tools), to be taken. Risk management under acts, regulations, et cetera outside of CEPA’s domain may be taken on substances not yet added to the TSL.

Substances being addressed under The Challenge to Industry were divided into 12 distinct batches of approximately 15 chemicals for the purpose of chemical-by-chemical assessment. A Challenge Advisory Panel of independent experts in various fields provided the government with advice and guidance throughout the process. As far as can be told, government action was consistent with Challenge Advisory Panel recommendations in all cases. In contrast to The Challenge, the substances being addressed via the Petroleum Sector Stream Approach were divided into five categories and assessed as groups within these categories. Those substances addressed via the Significant New Activity Approach were ones meeting the persistence, bioaccumulation, and inherent toxicity criteria, but having no reports of stakeholder interest or industrial activity above the reporting threshold. They were concluded to not be “toxic” because of the latter.

The potential overall contribution of the Petroleum Sector Stream Approach to The Challenge is unknown. There are 164 high-priority substances being assessed via this approach and of the 70 assessed to date, 40 will likely be concluded “toxic” in the final assessment and will likely be proposed for TSL addition.

Meanwhile, it is likely that 45 of the 196 high-priority substances being assessed via The Challenge (23%) will have been concluded “toxic” and added to the TSL after completion of all final assessments. This number has been arrived at because to date:

- **25 substances have been concluded “toxic” and added to the TSL**
- **14 substances have been concluded “toxic” and been proposed for TSL addition**
- **6 substances will likely be concluded “toxic” in the final assessment and will likely be proposed for TSL addition**

Many of these substances are not found on California's Proposition 65 list, the European Union's Substances of Very High Concern list, or the United States' List of Hazardous Air Pollutants.

The CMP has been an important and valuable program. The Challenge in particular, has resulted in timely, systematic chemical assessments and frequent, world precedent-setting risk management decisions. This is no small feat considering the number of substance assessments and the limited timeframe for such to occur. It has also sparked additional assessment and risk management activity, including long-awaited action on chemicals assessed via the Priority Substances List. Unfortunately though, momentum has failed to materialize within the Petroleum Sector Stream Approach. This is difficult to overlook since approximately one-third of the high-priority substances were to be assessed within this stream. In terms of moving forward with regards to the management of chemicals in Canada, it is therefore recommended that the federal government:

1. **Assess, and risk manage where appropriate, high-priority substances with the Petroleum Sector Stream Approach without further delay.**
2. **Develop and implement a second CMP phase to address the 2,600 substances categorized as medium priorities (and others now considered such) by the 2020 target. It is imperative that these substances be addressed since they are not without environmental and/or health concerns. For example, triclosan, a substance with many possible negative health effects that is used widely as an antibacterial, is a medium priority substance.**
3. **Assess, and risk manage where appropriate, medium priority substances within CMP2 as soon as possible.**
4. **Develop a plan for how CMP2 will be carried out and communicate it to stakeholders and the public. Efforts should also be made to more fully engage the public.**
5. **Consider using a class and/or sectoral approach (where applicable and, in the case of the latter, provided the full scope of uses is considered in the case of the latter) for the medium priorities' assessments.**
6. **Continue to engage the Stakeholder Advisory Council and The Challenge Advisory Panel throughout CMP2.**

We assessed the government’s performance in dealing with substances, and assigned grades on three areas: The Challenge to Industry, The Petroleum Sector Approach, and The Significant New Activity Approach.

TABLE 1: CHALLENGE REPORT CARD

MEASURE	THE CHALLENGE TO INDUSTRY	THE PETROLEUM SECTOR APPROACH	THE SIGNIFICANT NEW ACTIVITY APPROACH
NUMBER OF SUBSTANCES	196	164	145
TIMELINES	<p>ON TRACK FOR A+</p> <p>While there have been delays at times, all assessments are on track to be completed within the general timeframe.</p>	<p>D- Assessments were to occur within the Challenge timeframe, but only draft assessments for Stream 1 substances have been released.</p>	<p>A+ Action under this approach is complete. Significant New Activity provisions have been applied.</p>
RISK MANAGEMENT	<p>A+ Every substance that has been concluded “toxic” in the final assessment has been either added to or proposed for TSL addition.</p>	<p>ON TRACK FOR B+</p> <p>It has been suggested that substances concluded to meet Section 64 (i.e., is considered “toxic”) in the final assessment will be proposed for TSL addition.</p>	<p>B SNAc (Significant New Activity Approach) provisions are appropriate given the conclusion.</p>

INTRODUCTION

Origins

A number of fortuitous factors converged to prompt the Government of Canada to create the Chemicals Management Plan (CMP). There was an obligation for the government to deal with substances on the Domestic Substances List (DSL) (Department of Justice, 1999) and rising public concern regarding the health impacts of toxic chemicals and consumer product safety. Regulatory reform in Europe was well-advanced. Additionally, ENVIRONMENTAL DEFENCE'S Toxic Nation campaign was garnering substantial media coverage, and politicians from all political parties had agreed to have their blood and urine tested for measurable levels of toxic chemicals.

Canada became the first country in the world to take a systematic look at existing substances when it began categorizing the approximately 23,000 substances on the DSL (Government of Canada, 2007b). The DSL is a list of substances that were, between January 1, 1984, and December 31, 1986, manufactured in, imported into, or used in Canada on a commercial scale. The vast majority of these “existing substances” had never been examined for their environmental or health effects in Canada or elsewhere (Government of Canada, 2007b, 2010b). Most substances not on the list are considered “new” and have had to undergo health and environmental risk assessments before importation into, or manufacture, in Canada (Government of Canada, 2007b, 2010b).

According to The Canadian Environmental Protection Act, 1999 (CEPA 1999), the Minister of the Environment and the Minister of Health (hereafter referred to as the Ministers) had to complete the process of categorizing (i.e., sorting) DSL substances by September 2006 (Department of Justice, 1999). Substances were categorized to identify those suspected of being inherently toxic to humans or non-humans (iT) and persistent (P) and/or bioaccumulative (B) according to the *Persistence and Bioaccumulation Regulations*, and those presenting the greatest potential for human exposure (Environment Canada, 2010e). Having these characteristics indicated that “the Government should assess the risks that may be associated with their continued use in Canada” (Environment Canada and Health Canada, 2006). Approximately 4,300 substances were identified; 500 were considered high priorities, 2,600 were considered medium priorities, and 1,200 were considered low priorities for action (Easton, 2008). The CMP is the program through which this is occurring.

Relation To CEPA 1999 And Other Acts

The federal government is responsible for over 25 different laws pertaining to the environment and environmental health issues (Government of Canada, 2007a), but CEPA 1999 is one of the most important ones in terms of preventing pollution, and protecting human health and the environment (Environment Canada, 2010f). This law not only had a role in CMP initiation, but also is the backbone of assessments being conducted under the CMP.

Using CEPA 1999 Section 71, industry has to submit certain information about substances being assessed via the CMP to the government for the purpose of risk assessment, and risk management practices if applicable. Substance risk assessments are then conducted to see if the substance meets one or more CEPA 1999 Section 64 criteria such that it is “toxic” in Canada. According to this section, “a substance is toxic if it is entering or may enter the environment in a quantity or concentration or under conditions that

- (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity;
- (b) constitute or may constitute a danger to the environment on which life depends; or
- (c) constitute or may constitute a danger in Canada to human life or health.”

(Department of Justice, 1999)

For “toxic” substances, “Ministers can propose to take no further action with respect to the substance, add the substance to the Priority Substances List (PSL) for further assessment, or recommend the addition of the substance to the List of Toxic Substances” (Environment Canada, 2009). Addition to the Toxic Substances List (TSL) (i.e., Schedule 1 of CEPA 1999) means that preventive or control actions via CEPA 1999-enabled regulations (Environment Canada, 2010c), guidelines or codes of practice (Environment Canada, 2010b) that address any aspect of the substances life cycle can be taken (Environment Canada, 2011b). However, this is not a necessary condition for all risk management action. Effective risk management measures via provincial or territorial programs, or federal acts may already be in place for a substance concluded to be “toxic”. When Ministers feel that this is the case, they may decide to take no further action on a “toxic” substance (i.e., not add it to the TSL) (Environment Canada, 2010i).

Risk management under acts, regulations, et cetera outside of CEPA’s domain may also be taken on a substance not yet added to the TSL. For example, the Batch 2 Challenge substance bisphenol A (BPA) was banned in baby bottles under the Hazardous Products Act before it was added to the TSL (Health Canada, 2010b; Environment Canada and Health Canada, 2010a).

CMP Initiatives And Their Results To Date

The Government of Canada announced Canada’s CMP on December 8, 2006 (Prime Minister of Canada, 2006). This program is made up of various initiatives, including those focused on monitoring, research, assessment, regulation and enforcement (Government of Canada, 2010d). In terms of monitoring, the Canadian Health Measures Survey and the Maternal-Infant Research on Environmental Chemicals initiative are two biomonitoring projects under the CMP. The first cycle of the former measured 91 chemicals in the blood and urine of 5,600 Canadians (Health Canada, 2010c) for the purpose of establishing baseline levels to track trends over time. The results were released in 2010, and those of the second cycle are expected in 2011 (Health Canada, 2010e). The latter is a five-year study of approximately 2,000 pregnant women that aims to study the extent of chemical exposure, assess what “health risks, if any, are associated with exposure to heavy metals”, and measure chemical levels in breast milk (Health Canada, 2010a). As of 2009-2010 recruitment for this study was underway (Treasury Board of Canada Secretariat, 2010). Meanwhile, much has been invested

into monitoring and research activities for BPA as this chemical has a specific research plan with an emphasis on fetal exposure (Government of Canada, 2010g). Research conducted under the CMP umbrella has also been focused on tool and model development, endocrine disruptors, metals mixtures, and perfluorinated alkyl compounds (Treasury Board of Canada Secretariat, 2010). Reevaluation of older pesticides' active ingredients is also occurring under the CMP, with 90% of the 401 active ingredients being addressed, and over 20% being identified for phase-out, as of September 2010 (Health Canada, 2010d; Treasury Board of Canada Secretariat, 2010). CMP-related regulatory and enforcement activities have included the introduction of mandatory cosmetic ingredient labels (Government of Canada, 2010d; Health Canada, 2009), and action on legacy chemicals such as polybrominated diphenyl ethers (PBDEs), perfluorooctane sulfonate (PFOS), and polychlorinated biphenyls (PCBs) (Government of Canada, 2010e).

However, some of the main CMP initiatives are those addressing the 500 substances categorized as high-priority for action. These main initiatives, and the focus of this report, are The Challenge to Industry, the Petroleum Sector Stream Approach, and the Significant New Activity Approach.

The Challenge

The key CMP initiative is called The Challenge to Industry, more commonly known as The Challenge. Under this initiative, 196 of the high-priority substances considered to be persistent, bioaccumulative, and inherently toxic (PBiT) and in Canadian commerce and/or a high hazard to humans with a high likelihood of Canadians' exposure (Environment Canada and Health Canada, 2006) were divided into 12 distinct batches of approximately 15 chemicals for the purpose assessment.

A Challenge Advisory Panel (CAP) of independent experts in various fields has been providing the government with advice throughout The Challenge. Early in The Challenge process, it provided general guidance on the appropriate application of the precautionary principle and the weight of evidence approach (Government of Canada, 2010c), commenting specifically on only a few substance assessments. However, from Batch 6 and onward it commented on the assessments of all substances.

TABLE 2: CHALLENGE REPORT CARD

MEASURE	NOTE	GRADE
TIMELINES	Government planned to launch, and then complete, the screening assessments for all batches within a three-year timeframe (Government of Canada, 2007c, 2009a).	ON TRACK FOR A+ All batches were launched within three years of each other and all final assessments are on track to be completed in just over three years of each other. To date, the final screening assessments for substances in Batches 1 through 10 have been completed, with only a few exceptions. The draft assessments for these exceptions, Batch 11, and Batch 12 substances have been released. Finals assessments for the exceptions and Batch 11 substances were expected in April 2011, with final for Batch 12 expected in July 2011.
RISK MANAGEMENT	For substances found to be “toxic” according to Section 64 criteria Ministers can propose to take no further action, add it to the PSL, or add it to the TSL (Environment Canada, 2009).	A+ Every substance that has been concluded to meet Section 64 (i.e., is considered “toxic”) in the final assessment has been either added to or proposed for TSL addition.
CAP RECOMMENDATIONS	Government’s approach for non-threshold carcinogens* and approach for PBiT** supported (Government of Canada, 2008) various substance assessment-specific recommendations.	A+ As far as can be told, government action was consistent with Panel recommendations in all cases.

* Substances where the critical effect is assumed to have no-threshold are assumed to have a probability of harm at any level of exposure (and mode of action does not have to be known to conclude such) and are considered to meet definition of “toxic” under Section 64(c)

** PBiT substances in commerce considered to meet definition of “toxic” under Section 64(a) and/or (b)

The Petroleum Sector Stream Approach

Through this approach, 164 high-priority substances are being assessed (Environment Canada, 2010g; Government of Canada, 2010f). These were set aside for assessment via a sectorial approach because they constitute a large number of substances; are primarily related to the petroleum sector; and are complex mixtures. Based in examination of their production in use, they were divided into the following five categories and assessed as groups within these categories:

1. **STREAM 0 - Substances concluded not to be relevant to the petroleum sector and/or not in commerce**

.....

2. **STREAM 1 - Site-restricted substances** (i.e., those not expected to be transported off refinery, upgrader or natural gas processing facility sites), they were further subdivided and assessed in four groups (Government of Canada, 2011):

- a. **Site-Restricted Gas Oils** (2 substances)
 - b. **Site-Restricted Heavy Fuel Oils** (8 substances)
 - c. **Site-Restricted Low Boiling Point Naphthas** (20 substances)
 - d. **Site-Restricted Petroleum and Refinery Gases** (40 substances)
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3. **STREAM 2 - Industry-restricted substances** (i.e., those that may leave a petroleum-sector facility and be transported to other industrial facilities, but that do not reach the public market in the form originally acquired)

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4. **STREAM 3 - Substances primarily used by industries and consumers as fuels**

.....

5. **STREAM 4 - Substances that may be present in products available to the consumer**

(Government of Canada, 2010f)

.....

TABLE 3: **PETROLEUM SECTOR STREAM REPORT CARD**

MEASURE	NOTE	GRADE
TIMELINES	Petroleum sector stream substances were to be addressed within the same timeframe as The Challenge (Government of Canada, 2010f).	D- Only draft screening assessments for Stream 1 substances have been released to date and this only occurred in 2010.
RISK MANAGEMENT	For substances found to be “toxic” according to Section 64 criteria, Ministers can propose to take no further action, add it to the PSL, or add it to the TSL (Environment Canada, 2009).	ON TRACK FOR B+ It has been suggested that substances concluded to meet Section 64 (i.e., is considered “toxic”) in the final assessment will be proposed for TSL addition. (Environment Canada and Health Canada, 2011)

The delay in the petroleum stream is of concern given the rapid rise of fossil fuel production in the tar sands and the vast lakes of toxic tailings now covering an area larger than the City of Vancouver. ENVIRONMENTAL DEFENCE used industry data to estimate that the tailings lakes are leaking at a rate of 11 million litres per day. It is also a concern that naphthenic acid (CAS number 1338-24-5) is not on the high priority substance list for the Petroleum Stream. Alberta Environment has acknowledged that naphthenic acids are the “primary source of toxicity” in tar sands tailings¹, and Environment Canada has also identified naphthenic acids are a primary source of toxicity in tar sands tailings². Given this and the recognition in scientific literature that naphthenic acids are one of the most significant pollutants associated with the rapidly growing tar sands industry,³ its exclusion from the 164-strong priority list of the Petroleum Stream is concerning.

Naphthenic acids are one of the main pollutants responsible for the toxicity of tar sands tailings to aquatic organisms, and have been shown to harm liver, heart and brain function in mammals. Naphthenic acids are also very long-lived, taking decades to break down.

The Significant New Activity Approach

Almost all of the remaining high priorities were addressed with Significant New Activity Approach (SNAC) provisions. These are provisions under CEPA 1999 requiring that persons planning to manufacture, import, or use DSL substances subject to SNAC provisions submit certain information so that the substances can be assessed prior to introduction to Canada (Environment Canada, 2010d).

The 145 high-priority substances addressed via this approach were ones that met PBIT criteria, but had no reports of stakeholder interest or industrial activity above the reporting threshold (100 kg) in response to Section 71 notices issued in 2001 and 2006 (Environment Canada and Health Canada, 2006; Minister of the Environment and Minister of Health, 2008). Because of this, they were considered to not be entering or likely to enter the environment because of commercial activity and were thus concluded to not meet Section 64 criteria (Environment Canada, 2008).

TABLE 4: **SIGNIFICANT NEW ACTIVITY REPORT CARD**

MEASURE	GRADE
TIMELINES	<p>A+ Action on high-priority substances under this approach is complete. Publication of the final assessment decision occurred on June 7, 2008 and three days later SNAC provisions were applied. Now, industry must submit certain data to government 90 days before planned manufacture, import, or use involving more than 100 kg of these substances for the purpose risk assessment. (Government of Canada, 2009c; Minister of the Environment, 2008; Minister of the Environment and Minister of Health, 2008)</p>
RISK MANAGEMENT	<p>B SNAC provisions are appropriate given the conclusion, however, the argument could be made that they should have been concluded “toxic” on the basis that they “may enter the environment...” in the event of industrial activity under the reporting threshold or in the event of increased industrial activity.</p>

Substances Added To The TSL Because Of The CMP

The potential overall contribution of the Petroleum Sector Stream Approach to The Challenge is unknown. There are 164 high-priority substances being assessed via this approach and of the 70 assessed to date, 40 will likely be concluded “toxic” in the final assessment and will likely be proposed for TSL addition.

Meanwhile, it is likely that 45 of the 196 high-priority substances being assessed via The Challenge (23%) will have been concluded “toxic” and added to the TSL after completion of all final assessments. This number has been arrived at because to date:

- **25 substances have been concluded “toxic” and added to the TSL**
- **14 substances have been concluded “toxic” and been proposed for TSL addition**
- **6 substances will likely be concluded “toxic” in the final assessment and will likely be proposed for TSL addition**

These substances are highlighted in Table 4, Table 5, and Table 6. The tables also highlight whether or not these substances are found on California’s Proposition 65 (Prop 65) list, the European Union’s (EU) Substances of Very High Concern (SVHC) list, and the United States’ (US) List of Hazardous Air Pollutants (LHAP). California businesses knowingly and intentionally exposing anyone to Prop 65 substances have to provide these individuals with a “clear and reasonable” warning (i.e., a consumer product label, distributing notices at a rental housing complex), and these substances cannot be knowingly discharged in significant amounts into sources of drinking water (Office of Environmental Health Hazard Assessment, 2007a). Substances on the EU’s SVHC list are those that have the potential to be recommended for addition to REACH’s Authorisation List (European Chemicals Agency, 2011a, 2011b). The latter is a list of substances that cannot be placed on the market or used after a certain date unless authorized (European Chemicals Agency, 2011c). To date, six substances have been added (European Chemicals Agency, 2011d). Finally, those substances on the LHAP are to be controlled by the Environmental Protection Agency because they cause or may cause cancer or other serious health effects (e.g., reproductive effects or birth defects), or adverse environmental and ecological effects (United States Environmental Protection Agency, 2009).

Other Activities Sparked By CMP

Other assessment activity has been sparked by the CMP. Some azo- and benzidine-based substances included in The Challenge are now part of a group of 350 substances (Environment Canada, 2010a) proposed to be assessed using a class approach. The intention to use this approach was announced on June 5, 2010 because azo- and benzidine-based substances share common features that may result in similar properties and degrade into substances that could be hazardous to health (Government of Canada, 2010a).

Some regulatory activity has also been sparked. While the government first proposed the establishment of the *Virtual Elimination List* under CEPA 1999 in 2003, it was not until five days after the CMP announcement that it came into place (Government of Canada, 2010d; Minister of the Environment and Minister of Health, 2006). Four fluorotelomers, which first underwent government assessment in 2004, have also been added to the TSL (TSL #92, 93, 94, 95) since CMP initiation (Environment Canada and Health Canada, 2010b). This and amendments to the *Prohibition of Certain Toxic Substances Regulations, 2005*, was announced on October 13, 2010 (Environment Canada, 2010h). Another two groups of substances that were first assessed in 1993 have also been proposed for TSL addition; tributyltins and tetrabutyltins were proposed for addition on October 3, 2009 (Government of Canada, 2009d), and chlorinated paraffins of a certain length were proposed for addition on September 20, 2008 (Government of Canada, 2009b).

CONCLUSIONS AND RECOMMENDATIONS

The CMP has been an important and valuable program. The Challenge in particular, has resulted in timely, systematic chemical assessments and frequent, world precedent-setting risk management decisions. This is no small feat considering the number of substance assessments and the limited timeframe for such to occur. The CMP also resulted in the application of SNAc provisions to many substances with the potential to become “toxic” in Canada, and it sparked long-awaited risk management action on chemicals assessed via the PSL. Unfortunately though, the momentum has failed to materialize within the Petroleum Sector Stream Approach. The lack of completed assessments within this approach is difficult to overlook since approximately one-third of the high-priority substances were to be assessed within this stream, and within the same timelines as The Challenge. In terms of moving forward with regards to the management of chemicals in Canada, the following is recommended:

- 1. Assess, and risk manage where appropriate, high-priority substances with the Petroleum Sector Stream Approach without further delay.**
- 2. Develop and implement a second phase of the CMP (CMP2) to address the 2,600 substances categorized as medium priorities (and others now considered such) by the 2020 target.** It is imperative that these substances be addressed since they are not without environmental and/or health concerns. For example, triclosan, a medium priority substance, has several possible negative health effects; it can cause allergies and asthma by weakening the immune system; it disrupts the hormonal system; it can bioaccumulate; and, it belongs to a class of chemicals that are suspected of causing cancer in humans. Studies have also shown that when triclosan is exposed to sunlight in water it may convert into the potent toxic chemical dioxin. Plus, it currently enjoys widespread use as an antibacterial in toothpastes and mouthwashes, deodorants, cosmetics, fabrics, plastics and other products.
- 3. Assess, and risk manage where appropriate, medium priority substances within CMP2 as soon as possible.** The CMP program, and especially The Challenge, has a good momentum and systematic ways of collecting, analyzing, and reporting on substances. Both should be capitalized on. A non-gapped transition to CMP2 is recommended so that this momentum can be carried forward and so that it can translate into a smooth resource transition for government, industry, and non-governmental organizations alike.
- 4. Develop a plan for how CMP2 will be carried out and communicate it to stakeholders and the public.** Efforts should also be made to more fully engage the public.
- 5. Consider using a class approach and/or sectoral approach (where applicable and provided the full scope of uses is considered in the case of the latter) for the assessment of the medium-priorities.** The possible synergistic effects of substances should be considered, and the current risk assessment and batch process should be used. Before proceeding, further prioritizing substances for assessment according to decided-upon criteria should also be considered.
- 6. Continue to engage the Stakeholder Advisory Council and The Challenge Advisory Panel through out CMP2.**

APPENDIX A

TABLE 4: TWENTY-FIVE CHALLENGE SUBSTANCES ADDED TO THE TSL

SUBSTANCE	Challenge Batch #	TSL #	California Prop 65 ⁴	EU REACH SVHC ⁵	US LHAP ⁶
Methyloxirane (CAS 75-56-9)	1	86	■		■
TDI: Benzene, 2,4,-diisocyanato-1-methyl- (CAS 584-84-9)	1	89			■
TDIs: Benzene, 1,3,-diisocyanato-2-methyl- (CAS 91-08-7)	1	89			
TDI: Benzene, 1,3,-diisocyanatomethyl- (CAS 26471-62-5)	1	89	■		
Naphthalene (CAS 91-20-3)	1	88	■		■
Oxirane, ethyl- (CAS 106-88-7)	1	87			■
1,2-benzenediol (CAS 120-80-9)	1	90	■		■
1,4-benzenediol (CAS 123-31-9)	1	91			■
Thiourea (CAS 62-56-6)	2	97	■		
Isoprene (CAS 78-79-5)	2	98	■		
BPA (CAS 80-05-07)	2	96			
Epichlorohydrin (CAS 106-89-8)	2	99	■		■
D4 (CAS 556-67-2)	2	102			
2,4,6-tri-tert-butylphenol (CAS 732-26-3)	2	103			
CI Pigment Yellow 34 (CAS 1344-37-2)	2	100			
CI Pigment Red 104 (CAS 12656-85-8)	2	101			
Ethanol, 2-methoxy-, acetate (CAS 110-49-6)	3	104			
DEGME (CAS 111-77-3)	3	107			
2-Methoxypropanol (CAS 1589-47-5)	3	105			
Pigment Red 3 (CAS 2425-85-6)	3	106			
Diethyl sulfate (CAS 64-67-5)	4	108	■		■
Dimethyl sulfate (CAS 77-78-1)	4	109	■		■
BNST (CAS 68921-45-9)	4	110			
Acrylamide (CAS 79-06-1)	5	111	■	■	■
Ethanol, 2-chloro-, phosphate (3:1) (CAS 115-96-8)	5	112	■	■	

APPENDIX B

TABLE 5: **FOURTEEN CHALLENGE SUBSTANCES PROPOSED FOR TSL ADDITION**

SUBSTANCE	Challenge Batch #	California Prop 65 ⁴	EU REACH SVHC	US LHAP ⁶
D5 (CAS 541-02-6)	2			
Benzyl chloride (CAS 100-44-7)	6	■		■
Michler's ketone (CAS 90-94-8)	7	■		
Butanone oxime (CAS 96-29-7)	7			
n-butyl glycidyl ether (CAS 2426-08-6)	7	■		
DTBSBP (CAS 17540-75-9)	8			
MAPBAP acetate (CAS 72102-55-7)	8			
2-Nitropropane (CAS 79-46-9)	8	■		■
2-Nitrotoluene (CAS 88-72-2)	8	■		
TGOPE (CAS 7328-97-4)	9			
Methyl eugenol (CAS 93-15-2)	9	■		
Vanadium oxide (CAS 1314-62-1)	9	■		
Potassium bromate (CAS 7758-01-2)	9	■		
Hydrazine (CAS 302-01-2)	10	■		■

APPENDIX C

TABLE 6 SIX CHALLENGE SUBSTANCES LIKELY TO BE PROPOSED FOR TSL ADDITION

SUBSTANCE	Challenge Batch #	California Prop 65 ⁴	EU REACH SVHC	US LHAP ⁶
Solvent Red 23 (CAS 85-86-9)	6			
PREPOD (CAS 68412-48-6)	11			
BENPAT (CAS 68953-84-4)	11			
BENTAX (CAS 68478-45-5)	11			
DEHA (CAS 103-23-1)	11			
Trisiloxane, octamethyl- (CAS 107-51-7)	12			

APPENDIX D

TABLE 7: FORTY PETROLEUM SECTOR SUBSTANCES LIKELY TO BE PROPOSED FOR TSL ADDITION

SUBSTANCE	Stream #
Tail gas (petroleum), catalytic polymerized naphtha fractionation stabilizer (CAS 68307-99-3)	1
Fuel gases (CAS 68476-26-6)	1
Hydrocarbons, C2-C4, C3-rich (CAS 68476-49-3)	1
Gases (petroleum), butane splitter overheads (CAS 68477-69-0)	1
Gases (petroleum), catalytic cracked gas oil depropanizer bottoms, C4-rich acid-free (CAS 68477-71-4)	1
Gases (petroleum), catalytic cracked naphtha debutanizer bottoms, C3-C5-rich (CAS 68477-72-5)	1
Gases (petroleum), catalytic cracked naphtha depropanizer overhead, C3-rich acid-free (CAS 68477-73-6)	1
Gases (petroleum), catalytic cracked, C1-C5-rich (CAS 68477-75-8)	1
Gases (petroleum), catalytic polymerized naphtha stabilizer overhead, C2-C4-rich (CAS 68477-76-9)	1
Gases (petroleum), catalytic reformed naphtha stripper overheads (CAS 68477-77-0)	1
Gases (petroleum), deethanizer overheads (CAS 68477-86-1)	1
Gases (petroleum), deisobutanizer tower overheads (CAS 68477-87-2)	1
Gases (petroleum), gas concentration reabsorber distillation (CAS 68477-93-0)	1
Gases (petroleum), hydrogen-rich (CAS 68477-97-4)	1
Gases (petroleum), recycle, hydrogen-rich (CAS 68478-00-2)	1
Gases (petroleum), reformer make-up, hydrogen-rich (CAS 68478-01-3)	1
Gases (petroleum), thermal cracking distn. (CAS 68478-05-7)	1
Tail gas (petroleum), catalytic cracker refractionation absorber (CAS 68478-25-1)	1
Tail gas (petroleum), cracked distillate hydrotreater separator (CAS 68478-29-5)	1
Tail gas (petroleum), saturate gas plant mixed stream, C4-rich (CAS 68478-32-0)	1
Tail gas (petroleum), vacuum residues thermal cracker (CAS 68478-34-2)	1
Hydrocarbons, C3-C4-rich, petroleum distillates (CAS 68512-91-4)	1
Gases (petroleum), hydrocracking depropanizer off, hydrocarbon-rich (CAS 68513-16-6)	1
Gases (petroleum), light straight-run naphtha stabilizer off (CAS 68513-17-7)	1
Gases (petroleum), reformer effluent high-pressure flash drum (CAS 68513-18-8)	1

(APPENDIX D / Table 7, continued)

SUBSTANCE	Stream #
Hydrocarbons, C1-C4 (CAS 68514-31-8)	1
Hydrocarbons, C1-C4, sweetened (CAS 68514-36-3)	1
Hydrocarbons, C1-C3 (CAS 68527-16-2)	1
Gases (petroleum), C1-C5, wet (CAS 68602-83-5)	1
Gases (petroleum), secondary absorber off, fluidized catalytic cracker overheads fractionator (CAS 68602-84-6)	1
Gases (petroleum), alkylation feed (CAS 68606-27-9)	1
Petroleum products, refinery gases (CAS 68607-11-4)	1
Gases (petroleum), refinery (CAS 68814-67-5)	1
Gases (petroleum), hydrotreated sour kerosene depentanizer stabilizer off (CAS 68911-58-0)	1
Gases (petroleum), crude oil fractionation off (CAS 68918-99-0)	1
Gases (petroleum), fluidized catalytic cracker fractionation off (CAS 68919-02-8)	1
Gases (petroleum), heavy distillate hydrotreater desulphurization stripper off (CAS 68919-04-0)	1
Gases (petroleum), preflash tower off, crude distillation (CAS 68919-08-4)	1
Gases (petroleum), straight-run stabilizer off (CAS 68919-10-8)	1
Tail gas (petroleum), catalytic hydrodesulphurized naphtha separator (CAS 68952-79-4)	1

FOOTNOTES

- ¹ Kem Singh, Regional Approvals Manager, Northern Region, Alberta Environment. In "Follow-up on Committee Hearings", Standing Committee on the Environment and Sustainable Development. Document released under the Access to Information Act.
- ² Ian Shugart, Environment Canada. Memorandum to the Minister: tar sands Tailings Ponds. MIN-118731. Document released under the Access to Information Act.
- ³ Rogers et al. Acute and Subchronic Mammalian Toxicity of Naphthenic Acids from tar sands Tailings. *Toxicological Sciences* 66 347-355, 2002.
- ⁴ Office of Environmental Health Hazard Assessment. (2007b). Proposition 65 List. Retrieved March 12, 2011, from http://www.oehha.org/prop65/prop65_list/Newlist.html
- ⁵ European Chemicals Agency. (2010). Candidate List of Substances of Very High Concern for authorisation. Retrieved March 12, 2011, from http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp
- ⁶ United States Environmental Protection Agency. (2010). The Clean Air Act Amendments of 1990 List of Hazardous Air Pollutants. Retrieved March 12, 2011, from <http://www.epa.gov/ttn/atw/orig189.html>



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