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**TOXIC SUBSTANCE REDUCTION PLAN
FOR PHOSPHORUS (TOTAL)**

Sivaco Ontario,
330 Thomas Street
Ingersoll Ontario N5C 3K5

December 16, 2013





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APPENDICES

Appendix A – Accounting Calculation Sheets

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1 General Information

1.1 Basic Facility Information

Toxic Substance Information		
Name of Substance	Phosphorus (total)	
Facility Identification and Site Address		
Company Name	SIVACO Ontario	
Facility Address	Physical Address: 330 Thomas Street, Ingersoll Ontario, N5C 3K5	Mailing Address: 330 Thomas Street, Ingersoll Ontario, N5C 3K5
Spatial Coordinates of Facility	17N 4763628 509188	<i>Expressed in Universal Transverse Mercator (UTM) within a North American Datum 83 (NAD83) datum.</i>
Number of Employees	75	<i>Number of full time employee equivalents</i>
NPRI ID	3328	
Parent Company Information (if applicable)		
Parent Company Name	SIVACO Wire Group 2004 L.P.	
Parent Company Address	Physical Address: 1040 Country Road 17 C/O IRM LOriginal Ontario K0B 1K0	Mailing Address (if different): 700 Ouelette C/O Infasco Marieville Quebec J3M 1P6
Business Number for Parent Company	141221879	
Facility Owner Information		
Owner of the Facility		
Address of Owner	Physical Address:	Mailing Address (if different):
Facility Operator Information		
Operator of the Facility	SIVACO Ontario	
Address of Operator	Physical Address: 330 Thomas Street, Ingersoll Ontario, N5C 3K5	Physical Address: 330 Thomas Street, Ingersoll Ontario, N5C 3K5
Primary North American Industrial Classification System Code (NAICS)		
2 Digit NAICS Code	33 - manufacturing	
4 Digit NAICS Code	3328 – metal coating, engraving, heat treating and allied services	



1.2 Contact Information

Company Contact Information		
Facility Public Contact	Name:	Lawrence Pye
	Email:	pye@sivaco.com
	Phone:	519-485-4150
	Fax:	519-485-3039
	Contact Address:	330 Thomas Street, Ingersoll Ontario, N5C 3K5
Person Coordinating Plan Development Contact	Name:	Norman Courage
	Email:	courage@sivaco.com
	Phone:	519-485-4150
	Fax:	519-485-3039
	Contact Address:	330 Thomas Street, Ingersoll Ontario, N5C 3K5
Highest Ranking Employee	Name:	Bill Stevens
	Email:	stevens@sivaco.com
	Phone:	519-485-4150
	Fax:	519-485-3039
	Contact Address:	330 Thomas Street, Ingersoll Ontario, N5C 3K5
Planner Contact Information		
Person Who Prepared the Plan	Name:	Eric Shilts
	License Number	TSRP0083
Person Responsible for Making Recommendations	Email:	eric@concentriceng.com
	Phone:	519-452-7700
Person Responsible for Plan Certification	Fax:	519-452-1712
	Contact Address:	Suite 307 700 Richmond Street London Ontario N6A 5C7



2 Statement of Intent

2.1 Statement of Intent to Reduce

Phosphorus (total) is currently used by SIVACO Ontario. This facility does not create phosphorus and therefore this plan will not address reducing its creation.

While SIVACO Ontario does not intend to reduce its use of phosphorus (total), it will take proactive measures to reduce the risk of phosphorus releases.

3 Objectives and Targets

All employees at SIVACO Ontario will be involved in the reduction of toxic substances released at SIVACO Ontario. SIVACO Ontario is committed to implementing options (which were identified as a result of this planning exercise) which will provide a proactive approach to toxics reduction at the facility. The goal is to implement these proactive reduction options through spill and leak prevention (standard operating procedure review and revision) and improved training record keeping as per the timeline noted in this plan.

SIVACO Ontario will continue to monitor advancements in technology which may result in future reductions of phosphorus (total) at the facility.

4 Facility Description

SIVACO Ontario (a HEICO Company) is an integral part of the SIVACO Wire Group. The facility in Ingersoll, Ontario treats a wide range of Hot Rolled Wire Rod (HRWR) for Cold Heading Quality and Industrial Quality products. The finished products are used in various commercial and industrial applications such as fasteners, automotive parts and construction materials.

Steel treatment at SIVACO Ontario may involve many steps. The particular treatments (and their order) by which HWRW is treated vary according to client requirements. The various methods of HWRW are listed below:

- Heat Treatment
- Pickling Treatment
- Zinc Phosphate Conversion Coating and Rinse Treatment
- Neutralizer Treatment
- Soap Treatment
- Polymer Treatment
- Borax Treatment
- Lime Treatment
- Sizing Treatment
- Bundling and Shipping



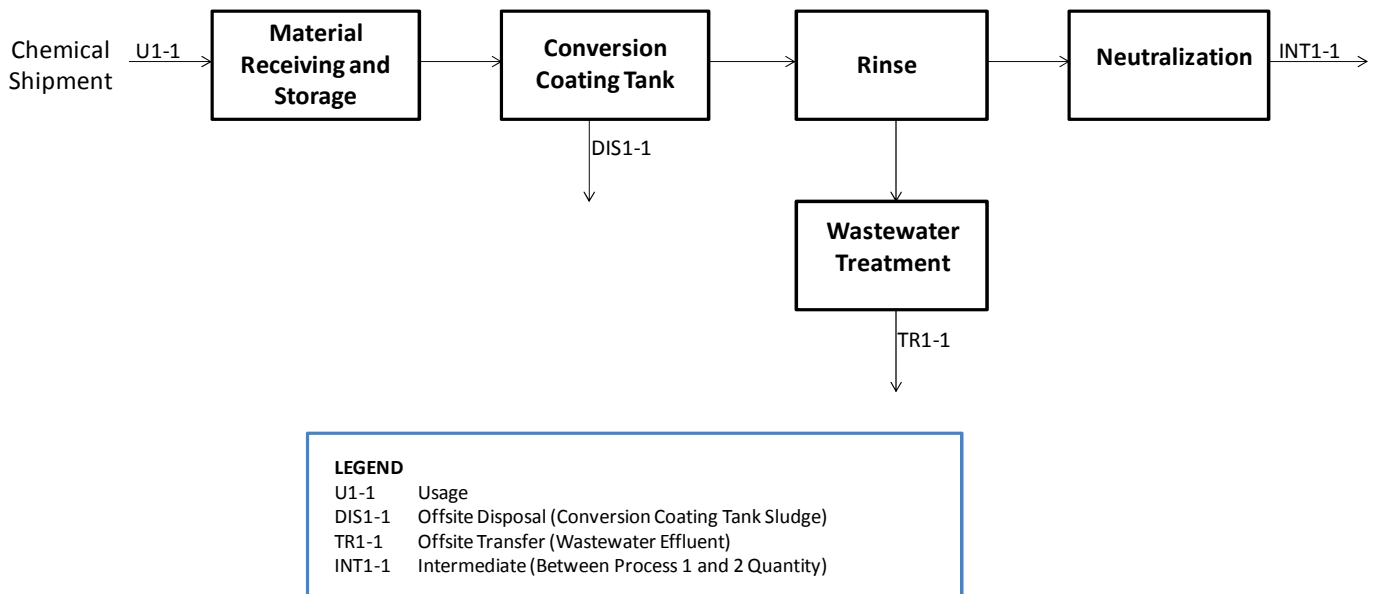
The SIVACO Ontario facility also relies on various other auxiliary operations which facilitate HWRW treatment (e.g. wastewater treatment, chemical receiving and storage etc).

5 Phosphorus Process Flow Diagrams and Quantifications

Zinc phosphate coatings are commonly used on steel for corrosion resistance, lubricity or as a foundation for subsequent coatings or painting. A zinc phosphate compound is used at SIVACO Ontario to deposit a zinc phosphate coating on steel surfaces. Presence of phosphorus is limited to the Zinc Phosphate Conversion Coating Stage (comprised of Zinc Phosphate Conversion Coating Process, Additional Steel Treatment Process, and Shipping Process).

5.1 Zinc Phosphate Conversion Coating Process

Process Flow Diagram



Process Description

Phosphorus is received at the site as a component of zinc phosphate solution via tanker truck. The zinc phosphate solution is offloaded in the chemical receiving area (which has concrete secondary containment) and transferred to a bulk storage tank. The zinc phosphate solution is stored here until its use is required in the Zinc Phosphate Conversion Coating Process.

The zinc phosphate solution is routed to the conversion coating tank from materials storage. Once in the conversion coating tank, submerged steel becomes coated with an insoluble crystalline zinc phosphate salt formed in a chemical reaction between the steel and the zinc phosphate solution. The contents of the coating tank are decanted to a holding tank approximately once a month (depending on production levels) to allow for collection of solid sludge from the phosphate coating tank. The solid sludge is



collected and held for removal off-site for disposal. The decanted contents are then returned to the coating tank.

After coating, the steel coils (which are coated in zinc phosphate) are transferred to the rinse step, where residual zinc phosphate solution (containing the zinc phosphate) is removed. The rinse solution (containing the residual zinc phosphate) is routed to the wastewater treatment process.

The zinc phosphate - containing steel coils are subsequently submerged in a neutralizing solution, which neutralizes any residual acid present on the steel coil which was not removed during rinsing.

The steel coils (coated in zinc phosphate) then undergo further treatment in the Additional Steel Treatment Process.

Toxic Substance Accounting Summary

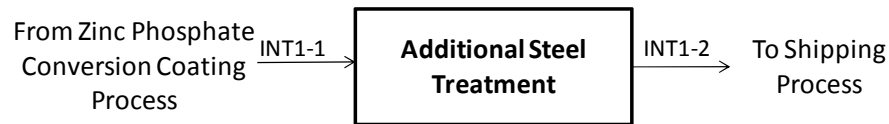
A summary of toxic substance accounting for phosphorus in the Zinc Phosphate Conversion Coating Process is presented in the table, below. Accounting calculations have been completed for phosphorus and are presented in the Substance Accounting Calculations in Appendix A. The calculations include information on the quantification method and its rationale as well as the input/output balance for the Zinc Phosphate Conversion Coating Process.

Code	Description	Quantity (tonnes)
<i>Process Inputs</i>		
U1-1	Usage	19.53
<i>Process Outputs</i>		
DIS1-1	Offsite Disposal (Conversion Coating Tank Sludge)	18.34
TR1-1	Offsite Transfer (Wastewater Effluent)	0.042
INT1-1	Between Process Quantity (Phosphorus on Steel to Additional Steel Treatment Process)	1.14



5.2 Additional Steel Treatment Process

Process Flow Diagram



LEGEND

INT1-1 Intermediate (Between Process1 and 2 Quantity)
 INT1-2 Intermediate (Between Process 2 and 3 Quantity)

Process Description

The steel coils coated in zinc phosphate undergo further treatment in the Additional Steel Treatment Process. These steel coils may be treated in a variety of ways (e.g. soaping, polymer, borax, lime and extruding) and the coils may receive treatments multiple times (i.e. there potential for the same steel coil to pass through the Zinc Phosphate Conversion Coating, or other treatments more than once) depending on client requirement. In the majority of additional steel treatments, the zinc phosphate coating will remain unaltered on the steel coils.

Toxic Substance Accounting Summary

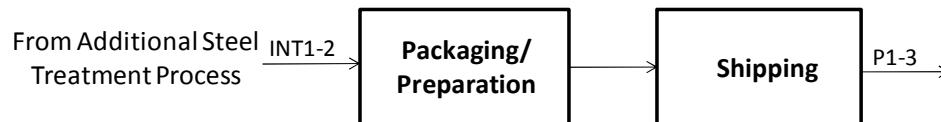
A summary of toxic substance accounting for phosphorus in the Additional Steel Treatment Process is presented in the table, below. Accounting calculations have been completed for phosphorus and are presented in the Substance Accounting Calculations in Appendix A. The calculations include information on the quantification method and its rationale as well as the input/output balance for the Additional Steel Treatment Process.

Code	Description	Quantity (tonnes)
Process Inputs		
INT1-1	Between Process Quantity (Zinc on Steel to Additional Steel Treatment Process)	1.14
Process Outputs		
INT1-2	Between Process Quantity (Zinc on Steel to Shipping Process)	1.14



5.3 Shipping Process

Process Flow Diagram



LEGEND

INT1-2 Intermediate (Between Process 2 and 3 Quantity)
P1-3 Contained in Product (Zinc Phosphate Coating on Steel)

Process Description

Once all treatment steps are completed according to the client requirements, the zinc phosphate coated steel coils are prepared for shipping. Preparation may include sizing, bundling and packaging. The coils are then shipped to clients via truck. In the entire Shipping Process, the zinc phosphate coating remains unaltered on the steel coils.

Toxic Substance Accounting Summary

A summary of toxic substance accounting for phosphorus in the Shipping Process is presented in the table, below. Accounting calculations have been completed for phosphorus and are presented in the Substance Accounting Calculations in Appendix A. The calculations include information on the quantification method and its rationale as well as the input/output balance for the Shipping Process.

Code	Description	Quantity (tonnes)
Process Inputs		
INT1-2	Between Process Quantity (Phosphorus on Steel to Additional Steel Treatment Process)	1.14
Process Outputs		
P1-3	Between Process Quantity (Phosphorus on Steel to Shipping Process)	1.14



6 Direct and Indirect Costs

Direct Costs Associated with Phosphorus

Item	Total Cost (\$)
Zinc Phosphate Purchase (Bonderite 196X)	\$109,931.72
Zinc Phosphate Purchase (Formcoat 28A)	\$14,648.45
Zinc Phosphate Purchase (Formcoat 28B)	\$59,189.00
Sludge Disposal	\$33,743.00
Total Costs	\$217,512.17

Indirect costs associated with phosphorus use at the facility were also considered and a total amount of \$40,500 was assigned. This figure took into account an appropriate percentage of costs associated with personal protective equipment, administration, office overhead and training.



7 Identification of Toxics Reduction Options

Category #	Category	Description of Option (or rationale for why an option could not be identified)
1	Materials or Feedstock Substitution	No option identified. Product design is based on client specifications and therefore cannot be altered. Client requirements involve a specific zinc phosphate conversion coating and thus making zinc phosphate use necessary.
2	Product design or reformulation	No option identified. Product design is based on client specifications and therefore cannot be altered.
3	Equipment or process modifications	No option identified. Variety of zinc phosphate conversion coating technology is limited. The current process has a history of proven results. Therefore no option has been identified for equipment or process modifications.
4 and 7	Spill and leak prevention Training or improved operating practices	Review (and revise as necessary) current operating practices (and associated standard operating procedures) involving phosphorus onsite and improve training record keeping.
5	On-site reuse or recycling	No option identified. A zinc phosphate reclamation procedure is currently operating at SIVACO Ontario, resulting in maximum possible recycling of zinc phosphate (and therefore phosphorus) at the facility.
6	Improved inventory management or purchasing techniques	No option identified. In past years, SIVACO Ontario has completed zinc phosphate inventory/purchasing procedures in order to optimize cost efficiency and reduce total onsite quantities. Presently, a minimal quantity of zinc phosphate is kept onsite to coincide with supplier shipment times. Since SIVACO Ontario has already reviewed inventory management and purchasing techniques and are operating with minimal quantities of zinc phosphate onsite, there are no reduction options identified in this category.



8 Estimates of Phosphorus Reduction, Technical Feasibility and Economic Feasibility

8.1 Spill and Leak Prevention and Training or Improved Operating Practices

Option: Review (and revise as necessary) current operating practices (and associated standard operating procedures) involving zinc phosphate onsite and improve training record keeping.

8.1.1 Estimates of Reduction

Category		Baseline	Reduction	Reduced Total	% Reduction
Used (tonnes/year)		19.53	0	19.53	0
Created (tonnes/year)		NA	NA	NA	NA
Contained in Product (tonnes/year)		1.14	0	1.14	0
Onsite Releases (tonnes/year)	Air	0	0	0	0
	Water	NA	NA	NA	NA
	Land	NA	NA	NA	NA
Disposal (tonnes/year)	Air	NA	NA	NA	NA
	Water	NA	NA	NA	NA
	Land	18.34	0	18.34	0
Transfer Offsite for Recycling (tonnes/year)		0.0416	0	0.0416	0

8.1.2 Technical Feasibility

Review (and revision as necessary) of current operating practices (and associated standard operating procedures) involving zinc phosphate and improved record keeping of personnel training is a technically feasible option with a relatively small amount of required resources. Although there were no reported spills of zinc phosphate solution in 2012, this option will ensure that the potential risk of future spills and leaks is minimized.

8.1.3 Economic Feasibility

Implementing this option has minimal financial implications as the majority of the work associated with its completion can be done in house. The implementation would then be carried forward for training which occurs on a regular basis at the facility. Although there would be no immediate and direct savings



(due to no reportable spills in 2012) by implementing this option there are also no direct costs associated with its implementation. There is the potential of payback in the future, as implementing this option will ensure that potential risk of future spills and leaks is minimized.

9 List of Technically and Economically Feasible Options

One option (in categories 4 and 7) was found to be technically and economically feasible:

Review (and revise as necessary) current operating practices (and associated standard operating procedures) involving zinc phosphate onsite and improve training record keeping.

10 Options to be Implemented

10.1 List of Options to be Implemented

SIVACO Ontario intends to implement the sole option which was found to be technically and economically feasible for the reduction of phosphorus at its facility:

Review (and revise as necessary) current operating practices (and associated standard operating procedures) involving zinc phosphate onsite and improve training record keeping.

10.2 Implementation Steps and Timetable for Steps

Step	Description	Timetable (years)
1	Review and revise as necessary existing onsite operating practices and standard operating procedures involving zinc phosphate.	1
2	Develop and implement training record-keeping template.	1

10.3 Estimated Reductions and Associated Timeline

SIVACO Ontario plans to implement the option to review (and revise as necessary) current operating practices (and associated standard operating procedures) involving zinc phosphate and improve record keeping of personnel training within a year. As previously mentioned, there were no reportable spills of zinc phosphate at SIVACO Ontario in 2012 and thus implementing this option will not provide immediate reductions of phosphorus at the facility. However as a result of planning exercises related to the Toxic Reduction Act and associated Regulation, SIVACO was able to identify this option as a means of providing a proactive approach to minimizing the risk of future potential releases of zinc phosphate. For purposes of providing a quantity, it is estimated that implementing this proactive option will yield



anticipated reductions in release of zinc phosphate of approximately 0.01%. This exemplifies SIVACO Ontario's commitment to a continued leadership role in protecting the environment.

11 Certifications

11.1 Highest Ranking Employee

As of December 16, 2013, I, Bill Stevens, certify that I have read the toxic substance reduction plan for the toxic substance referred to below and am familiar with its contents, and to my knowledge the plan is factually accurate and complies with the *Toxics Reduction Act, 2009* and Ontario Regulation 455/09 (General) made under that Act.

Phosphorus

Highest Ranking Employee

Date

11.2 Toxic Substance Reduction Planner

As of December 16, 2013 I, Eric Shilts certify that I am familiar with the processes at SIVACO Ontario that use or create the toxic substance referred to below, that I agree with the estimates referred to in subparagraphs 7 iii, iv and v of subsection 4 (1) of the *Toxics Reduction Act, 2009* that are set out in the plan dated November 29, 2013 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Phosphorus (total)

December 16, 2013

Toxic Substance Reduction Planner

Date



APPENDIX A
Substance Accounting Calculations

TRA Substance Accounting Summary - Phosphorus

Stage: Zinc Phosphate Conversion Coating
Process: 1 - Conversion Coating
 2 - Additional Steel Treatment
 3 - Shipping

Code	Description	Quantity (tonne)
U1-1	Usage - Process 1 (Raw Materials)	19.53
DIS1-1	Offsite Disposal - Process 1 (Conversion Coating Tank Sludge)	1.83E+01
TR1-1	Offsite Transfer - Process 1 (Wastewater Effluent)	4.16E-02
INT1-1	Between Process Quantity - Process 1/2 (Phosphorus on Steel to Additional Steel Treatment)	1.14
INT1-2	Between Process Quantity - Process 2/3 (Phosphorus on Steel to Shipping)	1.14
P1-3	Contained in Product - Process 3 (Phosphorus on Steel)	1.14

Note: Phosphorus is neither created or destroyed at the Sivaco facility.

Quantity Entering the Process/Usage + Creation = Air Release + Destruction + Disposal + Transfer + Contained in Product/Quantity Exiting the Process

Mass Balance - Stage 1

		Code	Quantity (tonne)
Process 1	Usage/Quantity Entering the Process	U1-1	19.53
	Creation	-	-
	Air Releases	-	-
	Destruction	-	-
	Disposal	DIS1-1	18.34
	Transfer	TR1-1	4.16E-02
	Quantity Exiting the Process/Contained in Product	INT1-1	1.14
	Unaccounted Material (Difference between inputs and outputs)		0

		Code	Quantity (tonne)
Process 2	Usage/Quantity Entering the Process	INT1-1	1.14
	Creation	-	-
	Air Releases	-	-
	Destruction	-	-
	Disposal	-	-
	Transfer	-	-
	Quantity Exiting the Process/Contained in Product	INT1-2	1.14
	Unaccounted Material (Difference between inputs and outputs)		0

TRA Substance Accounting Summary - Phosphorus

		Code	Quantity (tonne)
Process 3	Usage/Quantity Entering the Process	INT1-2	1.14
	Creation	-	-
	Air Releases	-	-
	Destruction	-	-
	Disposal	-	-
	Transfer	-	-
	Quantity Exiting the Process/Contained in Product	P1-3	1.14
	Unaccounted Material (Difference between inputs and outputs)		0

Process Mass Balance Rationale

Process 1	Approximately equal. No rationale is required.
Process 2	Approximately equal. No rationale is required.
Process 3	Approximately equal. No rationale is required.

Quantification Method and Best Available Method Rationale

Process: 1 - Zinc Phosphate Conversion Coating

Quantity Codes	Quantification Method	Best Available Method Rationale
U1-1	Mass balance based on material quantity and composition from MSDS.	MSDS composition provided by manufacturer (above average data quality)
DIS1-1	Mass balance based on quantity of sludge generated and laboratory analysis.	Analysis provided by qualified laboratory with QA/QC practices (above average data quality)
TR1-1	Mass balance based on quantity of wastewater sent for treatment and laboratory analysis.	Analysis provided by qualified laboratory with QA/QC practices (above average data quality)

Process: 2 - Additional Steel Treatment

Quantity Codes	Quantification Method	Best Available Method Rationale
INT1-1	Mass balance based on assumption that most of the zinc used is applied to the coated steel.	Most accurate method available which accounts for all material (average data quality)
INT1-2	Mass balance based on assumption that most of the zinc used is applied to the coated steel.	Most accurate method available which accounts for all material (average data quality)

TRA Substance Accounting Summary - Phosphorus

Process: 3 - Shipping

Quantity Codes	Quantification Method	Best Available Method Rationale
P1-3	Mass balance based on assumption that most of the zinc used is applied to the coated steel.	Most accurate method available which accounts for all material (average data quality)

Mass Balance - Facility Wide

Facility		Code	Quantity (tonne)
	Usage/Quantity Entering the Process	U1-1	1.95E+01
	Creation	-	-
	Air Releases	-	-
	Destruction	-	-
	Disposal	DIS1-1	1.83E+01
	Transfer	TR1-1	4.16E-02
	Quantity Exiting the Process/Contained in Product	P1-3	1.14E+00
	Unaccounted Material (Difference between inputs and outputs)		0





APPENDIX B
Planner Recommendations



The main purposes of planner recommendations are to improve the potential for toxics reduction and improve the business rationale for implementing a plan. As per the Toxics Reduction Act and associated Regulation, there are several areas for which the planner must make recommendations (with accompanying rationale) or provide a reason why no recommendations are made. Recommendations are presented in the following subsections. It should be noted that it is up to the facility as to whether or not to implement the planner's recommendations.

1 Recommendation: General Information

There are no recommendations pertaining to general information contained in this plan.

1.1 Rationale

General information provided is complete.

2 Recommendation: Expertise Relied on to Prepare the Plan

There are no recommendations pertaining to expertise relied on to prepare this plan.

2.1 Rationale

Expertise was adequately considered during the preparation of this plan.

3 Recommendation: Statement of Intent and Objectives

There are no recommendations pertaining to the statement of intent or objectives contained in this plan.

3.1 Rationale

Both the statement of intent and objectives are present and reflect the intentions of SIVACO Ontario with respect to toxic substance reductions.

4 Recommendation: Identification and Description of Stages and Processes

4.1 Identification and Description of Stages and Processes

There are no recommendations pertaining to identification and description of stages and processes contained in this plan.

4.1.1 Rationale

Stages and processes where phosphorus (total) is present are clearly identified and described. The process descriptions accurately provide information on the use, release, disposal, transfer and destruction of phosphorus (total) at SIVACO Ontario.



4.2 Description of Why the Substance is Used and/or Created

There are no recommendations pertaining to the description (of why phosphorus (total) is used) contained in this plan.

4.2.1 Rationale

The description (of why phosphorus (total) is used) contained in this plan is clear and accurate.

4.3 Process flow diagrams

There are no recommendations pertaining to process flow diagrams contained in this plan.

4.3.1 Rationale

The process flow diagram contained in this plan accurately represents the use, release, disposal, transfer and destruction of phosphorus (total).

5 Recommendation: Data and Best Available Methods Used

There are no recommendations pertaining to the data and best available methods used for calculations contained in this plan.

5.1 Rationale

All quantities were calculated using the best available data and methods. The rationale for best available methods used is reasonable.

6 Recommendation: Quantifications

There are no recommendations pertaining to the quantifications (including input/output balance) contained in this plan.

6.1 Rationale

All quantities were calculated using the best available data and methods. The input/output balance was approximately equal.

7 Recommendation: Direct and Indirect Costs

It is recommended that a more detailed analysis of indirect costs be completed.

7.1 Rationale

Completing a more detailed analysis of indirect costs will better enable SIVACO Ontario to consider the financial benefits/implications of implementing plan options.



8 Recommendation: Identification and Description of Toxics Reduction Options in Seven Categories

There are no recommendations pertaining to identification and description of toxic substance reduction options in seven categories presented in this plan.

8.1 Rationale

The plan provides an option in each category or a reason why no option was identified, showing due consideration to each of the seven categories.

9 Recommendation: Estimates of Reduction

There are no recommendations pertaining to estimates of toxic substance reduction presented in this plan.

9.1 Rationale

The reduction estimates have been completed for each option and are reasonable for the option with which they are associated.

10 Recommendation: Determination of Technical Feasibility

There are no recommendations pertaining to estimates of toxic substance reduction presented in this plan.

10.1 Rationale

Technical feasibility assessments contained in this plan appear to be well thought out and explained clearly.

11 Recommendation: Economic Feasibility Analysis

There are no recommendations pertaining to economic feasibility analysis presented in this plan.

11.1 Rationale

Economic feasibility analysis was adequately completed in preparation of this plan.

12 Recommendation: List of Technically and Economically Feasible Options

There are no recommendations pertaining to the list of technically and economically feasible options presented in this plan. At present time, there are no other recommendations of additional options which are technically and economically feasible.



12.1 Rationale

Options identified by the plan as technically and economically feasible are representative of the available options to reduce toxic substances.

13 Recommendation: Options to be Implemented or Rationale for Why No Options will be Implemented

13.1 List of Options to be Implemented (if implementing)

There are no recommendations pertaining to the list of options to be implemented which are presented in this plan.

13.1.1 Rationale

SIVACO Ontario has chosen to implement the sole option which was found to be technically and economically feasible.

13.2 Implementation Steps and Timetable for Steps (if implementing)

It is recommended that more detail be provided regarding implementation steps and timetable for steps.

13.2.1 Rationale

Further detail will provide enhanced clarity for the implementation steps and timetable for steps.

13.3 Estimated Reductions and Associated Timeline (if implementing)

There are no recommendations pertaining to estimated reductions and associated timelines which are presented in this plan.

13.3.1 Rationale

Planner agrees with the estimated reductions and associated timelines which are presented in this plan.