2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summaries

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

December 14, 2013

Version Control

Version	Date Issued	Modifications
Original	December 14, 2013	Original version made available to the public and employees December 31, 2013

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TOXIC SUBSTANCE REDUCTION PLAN
SUMMARY FOR AMMONIA

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Ammonia

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

December 14, 2013

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1.0 INTRODUCTION

Suncor Energy Products Inc. Sarnia Refinery is a crude oil refinery that produces a number of fuel products including gasoline, jet and diesel fuels, residual oils for industrial use, as well as chemical feedstock.

Located at 1900 River Road, the Sarnia Refinery is situated on the shore of the St. Clair River beside a residential community. Like our residential neighbours, we want a clean and safe environment and a prosperous community.

Protection of the environment is a fundamental Suncor value. It is our responsibility to determine and manage the impacts of our business through programs like the Toxics Reduction Act.

We respect the important balance between economic growth and environmental stewardship and work diligently to:

- conduct our activities with sound environmental management and conservation practices;
- prevent risk to community health and safety from our operations or our products; and
- transfer expertise in environmental protection to host communities.

In keeping with our commitment to meet the latest quality standards and practices, the Sarnia refinery is ISO 14001 registered.

As part of our environmental stewardship, we will:

- demonstrate our commitment by maintaining our ISO 9001 and ISO 14001 registrations;
- ensure our operations comply with customer requirements, specific performance standards, government legislation, corporate policy and applicable industry standards;
- monitor the environmental impacts of our business during the start-up, normal operation and shutdown of our facilities, and through project planning, implementation and decommissioning to minimize any impact on the environment;
- ensure all employees and affiliates are informed, trained and authorized to meet our quality and environmental performance requirements;
- continually improve our products through design, manufacturing, delivery and service processes, achieved through our Quality and Environmental Management Systems; and
- continue to strive to establish quality and environmental objectives and targets, and periodically review performance through the Management Review Process.

This toxic substance reduction plan summary has been prepared to meet the regulatory obligations specified in Section 8 of the Act and has been prepared in accordance with the requirements of s. 24 of Ontario Regulation (O. Reg.) 455/09, as amended from time to time. It meets the relevant reporting requirements and will be updated, as required by the Act and O. Reg. 455/09.

To learn more about our business please visit our website at http://www.suncor.com/default.aspx.

2.0 BASIC FACILITY INFORMATION

Table 2-1 summarizes the general facility information with reference to the Act and/or O. Reg. 455/09.

Table 2-1: General Facility Information

Reporting Requirement	Facility Information	Reference to Act and/or O. Reg. 455/09
Parent Company Name	Suncor Energy Products Inc.	O. Reg. 455/09 s.18(2) subparagraph 14
Parent Company Address	150 6th Avenue SW Calgary, Alberta T2P 3E3	O. Reg. 455/09 s.18(2) subparagraph 14
Facility Name	Suncor Energy Products Partnership - Sarnia Refinery	O. Reg. 455/09 s.18(2) subparagraph 4
Facility Address	1900 River Road P.O. Box 307 Sarnia, Ontario N7T 7J3	O. Reg. 455/09 s.18(2) subparagraph 4
Universal Transverse Mercator (UTM) in North American Datum (NAD83)	Latitude: 42.93060 Longitude: -82.44330	O. Reg. 455/09 s.18(2) subparagraph 13
National Pollutant Release Inventory Identification Number	3071	O. Reg. 455/09 s.18(2) subparagraph 2
Ontario Regulation 127/01 Identification Number	Not applicable	O. Reg. 455/09 s.18(2) subparagraph 3
Two Digit North American Industry Classification System (NAICS) Code	32 – Manufacturing	O. Reg. 455/09 s.18(2) subparagraph 6
Four Digit North American Industry Classification System (NAICS) Code	3241 – Petroleum and Coal Product Manufacturing	O. Reg. 455/09 s.18(2) subparagraph 6
Six Digit North American Industry Classification System (NAICS) Code	324110 – Petroleum Refineries	O. Reg. 455/09 s.18(2) subparagraph 6
Number of Full-time Employee Equivalents at the Facility	892 (as of December 31, 2012)	O. Reg. 455/09 s.18(2) subparagraph 5
Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

Ammonia is a natural constituent of the incoming crude oil feedstock. Suncor does not produce ammonia as a product; however it is created in some of the hydrocracking and hydro-treating operations. Ammonia is destroyed in the sulfur recovery process and it is reacted in the wastewater treatment plant to form nitrogen prior to release of the refinery effluent.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use, creation, and release of ammonia. Some of these initiative and actions are highlighted in the following sections.

4.1 Equipment or Process Modification

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use or creation of ammonia, it does reduce the potential for losses to the environment.

Independent/redundant level switches have been installed on some tanks to help prevent overfill. This also reduces the risk of a spill and losses to the environment and enables Suncor to maximize sales.

There are Internal Floating Roofs installed on some tanks containing volatile materials to minimize vapour space loss.

A new sour water tank was installed in 2012 with vents tied into the incinerator to primarily reduce hydrogen sulfide emissions. However an additional benefit is that any trace ammonia emissions that come off these tanks are also treated by the incinerator. As part of that same project, two older sour water tanks which previously vented to the atmosphere have been taken out of service. Although these modifications do not reduce the use or creation of ammonia, they do reduce the emissions to the atmosphere.

4.2 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

The plant has had a mature leak detection and repair (LDAR) program since 1996. Components (e.g., valves, flanges, open-ended lines, etc.) are tested on an annual basis with pumps and compressors tested on a quarterly basis. The LDAR program is based on the CCME “Environmental Code of Practice for the Measurement and Control of Fugitive Emission from

Equipment Leaks, October 1993". When leaks are detected, the Maintenance department determines the best option for repair, which may include replacement of components with better (less leak-prone) equipment.

4.3 Improved Inventory Management or Purchasing Techniques

The refinery employs a just in time delivery inventory management process and has the ability to manage inventory through storage. Raw materials and feedstocks are purchased based on unit throughput, sales forecasts and feedstock availability in the market.

4.4 Training or Improved Operating Practices

The facility has documented procedures regarding the proper preparation of equipment for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet. Also as part of Turnaround Management, the EH&S personnel are involved in the discussions pertaining to equipment preparation and purging procedures to ensure that the impact on the environment is minimized (an example is the refinery fuel balance where the aim is to minimize flaring).

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and release of ammonia).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of ammonia which is present in small quantities as a constituent of the incoming crude oil feedstock. It can be also be found in trace amounts in other intermediate streams throughout the refining process. A reduction in throughput to reduce ammonia usage or creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of ammonia, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for ammonia, prepared by the Suncor Sarnia refinery dated December 1, 2013.

9.0 PLAN CERTIFICATION STATEMENT

The reduction plan certifications by the Highest Ranking Employee and the Licensed Planner are provided in Appendix 1 of this report, as required by the Act and regulation.

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APPENDIX 1 – TOXIC SUBSTANCE REDUCTION PLAN CERTIFICATION

9.0 CERTIFICATION BY PLANNER

As of December 1, 2013, I Mark Roehler certify that I am familiar with the processes at Suncor Energy Sarnia Refinery 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 December 1, 2013 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Toxic substances: Ammonia

Mark Roehler TSRP0128

10.0 CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 1, 2013, I Mark Hiseler, 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.

Toxic substances: Ammonia

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN
SUMMARY FOR BUTANE

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Butane

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

December 14, 2013

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1.0 INTRODUCTION

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Protection of the environment is a fundamental Suncor value. It is our responsibility to determine and manage the impacts of our business through programs like the Toxics Reduction Act.

We respect the important balance between economic growth and environmental stewardship and work diligently to:

- conduct our activities with sound environmental management and conservation practices;
- prevent risk to community health and safety from our operations or our products; and
- transfer expertise in environmental protection to host communities.

In keeping with our commitment to meet the latest quality standards and practices, the Sarnia refinery is ISO 14001 registered.

As part of our environmental stewardship, we will:

- demonstrate our commitment by maintaining our ISO 9001 and ISO 14001 registrations;
- ensure our operations comply with customer requirements, specific performance standards, government legislation, corporate policy and applicable industry standards;
- monitor the environmental impacts of our business during the start-up, normal operation and shutdown of our facilities, and through project planning, implementation and decommissioning to minimize any impact on the environment;
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- continually improve our products through design, manufacturing, delivery and service processes, achieved through our Quality and Environmental Management Systems; and
- continue to strive to establish quality and environmental objectives and targets, and periodically review performance through the Management Review Process.

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Number of Full-time Employee Equivalents at the Facility	892 (as of December 31, 2012)	O. Reg. 455/09 s.18(2) subparagraph 5
Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

Butane is a natural constituent of the incoming crude oil and chemical feedstocks and it is also a finished product sold by the refinery. Butane is also a key component in the alkylation process which generates a quality alkylate product used to enhance the octane rating of gasoline.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use, creation, and release of butane. Some of these initiative and actions are highlighted in the following sections.

4.1 Equipment or Process Modification

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use or creation of butane, it does reduce the potential for losses to the environment.

Independent/redundant level switches have been installed on some tanks to help prevent overfill. This also reduces the risk of a spill and losses to the environment and enables Suncor to maximize sales.

There are Internal Floating Roofs installed on some tanks containing volatile materials to minimize vapour space loss. Butane is also stored in underground wells thereby reducing vapour losses to the atmosphere.

4.2 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

The plant has had a mature leak detection and repair (LDAR) program since 1996. Components (e.g., valves, flanges, open-ended lines, etc.) are tested on an annual basis with pumps and compressors tested on a quarterly basis. The LDAR program is based on the CCME “Environmental Code of Practice for the Measurement and Control of Fugitive Emission from Equipment Leaks, October 1993”. When leaks are detected, the Maintenance department determines the best option for repair, which may include replacement of components with better (less leak-prone) equipment.

4.3 On-Site Reuse or Recycling

Butane is present in the refinery fuel gas system which supplies fuel to the heaters within the refinery. In this manner, the stream is partially reused.

4.4 Improved Inventory Management or Purchasing Techniques

Butane is purchased externally and stored in underground wells or blended directly in the gasoline pool. The refinery employs a just in time delivery inventory management process and has the ability to manage inventory through storage in the underground wells. Raw materials and feedstocks are purchased based on unit throughput, sales forecasts and feedstock availability in the market.

4.5 Training or Improved Operating Practices

The facility has documented procedures regarding the proper preparation of equipment for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet. Also as part of Turnaround Management, the EH&S personnel are involved in the discussions pertaining to equipment preparation and purging procedures to ensure that the impact on the environment is minimized (an example is the refinery fuel balance where the aim is to minimize flaring).

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and releases of butane).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of butane. Suncor is a manufacturer of butane products including n-butane and iso-butane. Butane is also present as a component in finished gasoline and various intermediate streams. A reduction in throughput to reduce butane usage or creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of butane, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for butane, prepared by the Suncor Sarnia refinery dated December 1, 2013.

9.0 PLAN CERTIFICATION STATEMENT

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APPENDIX 1 – TOXIC SUBSTANCE REDUCTION PLAN CERTIFICATION

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Toxic substance – Butane

Mark Roehler TSRP0128

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Toxic substance – Butane

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN
SUMMARY FOR BUTENE

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Butene (all isomers)

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

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Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

Butene is a natural trace constituent of the incoming crude oil and a major component of the butane-butylene chemical feedstock. Butene is a key reactant in the alkylation process which generates a quality alkylate product used to enhance the octane rating of gasoline. Some butene also ends up in the gasoline pool and the remaining streams end up in the refinery fuel gas system which is burned in the various heaters and boilers on site.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use, creation, and release of butene. Some of these initiative and actions are highlighted in the following sections.

4.1 Equipment or Process Modification

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use or creation of butene, it does reduce the potential for losses to the environment.

Independent/redundant level switches have been installed on some tanks to help prevent overfill. This also reduces the risk of a spill and losses to the environment and enables Suncor to maximize sales.

There are Internal Floating Roofs installed on some tanks containing volatile materials to minimize vapour space loss. Butane-butylene purchases, which contain the majority of the butene on site is stored in an underground cavern, thereby reducing vapour losses.

4.2 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

The plant has had a mature leak detection and repair (LDAR) program since 1996. Components (e.g., valves, flanges, open-ended lines, etc.) are tested on an annual basis with pumps and compressors tested on a quarterly basis. The LDAR program is based on the CCME “Environmental Code of Practice for the Measurement and Control of Fugitive Emission from Equipment Leaks, October 1993”. When leaks are detected, the Maintenance department determines the best option for repair, which may include replacement of components with better (less leak-prone) equipment.

4.3 On-Site Reuse or Recycling

Butene is recycled into the refinery fuel gas system which supplies fuel to the heaters and boilers within the refinery. As such, this stream is produced internally and reused internally, so some butene is already being reused in the process.

4.4 Improved Inventory Management or Purchasing Techniques

Butane-butylene is purchased externally and stored in underground caverns which help to lower air emissions. The refinery employs a just-in-time delivery inventory management process and has the ability to manage inventory through cavern storage. Raw materials and feedstocks are purchased based on unit throughput, sales forecasts and feedstock availability in the market.

4.5 Training or Improved Operating Practices

The facility has documented procedures regarding the proper preparation of equipment for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet. Also as part of Turnaround Management, the EH&S personnel are involved in the discussions pertaining to equipment preparation and purging procedures to ensure that the impact on the environment is minimized (an example is the refinery fuel balance where the aim is to minimize flaring).

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and releases of butene).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of butene. Suncor is not a manufacturer of butene and its isomers. It is present as a component in gasoline and various intermediate streams. A reduction in throughput to reduce butene usage or creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of butene, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for butene, prepared by the Suncor Sarnia refinery dated December 1, 2013.

9.0 PLAN CERTIFICATION STATEMENT

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Toxic substance – Butene

Mark Roehler TSRP0128

10.0 CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 1, 2013, I, Mark Hiseler, 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.

Toxic substance – Butene

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN SUMMARY FOR CARBON MONOXIDE

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Carbon Monoxide

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

December 14, 2013

Version Control

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1.0 INTRODUCTION

Suncor Energy Products Inc. Sarnia Refinery is a crude oil refinery that produces a number of fuel products including gasoline, jet and diesel fuels, residual oils for industrial use, as well as chemical feedstock.

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Protection of the environment is a fundamental Suncor value. It is our responsibility to determine and manage the impacts of our business through programs like the Toxics Reduction Act.

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- prevent risk to community health and safety from our operations or our products; and
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In keeping with our commitment to meet the latest quality standards and practices, the Sarnia refinery is ISO 14001 registered.

As part of our environmental stewardship, we will:

- demonstrate our commitment by maintaining our ISO 9001 and ISO 14001 registrations;
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- monitor the environmental impacts of our business during the start-up, normal operation and shutdown of our facilities, and through project planning, implementation and decommissioning to minimize any impact on the environment;
- ensure all employees and affiliates are informed, trained and authorized to meet our quality and environmental performance requirements;
- continually improve our products through design, manufacturing, delivery and service processes, achieved through our Quality and Environmental Management Systems; and
- continue to strive to establish quality and environmental objectives and targets, and periodically review performance through the Management Review Process.

This toxic substance reduction plan summary has been prepared to meet the regulatory obligations specified in Section 8 of the Act and has been prepared in accordance with the requirements of s. 24 of Ontario Regulation (O. Reg.) 455/09, as amended from time to time. It meets the relevant reporting requirements and will be updated, as required by the Act and O. Reg. 455/09.

To learn more about our business please visit our website at http://www.suncor.com/default.aspx.

2.0 BASIC FACILITY INFORMATION

Table 2-1 summarizes the general facility information with reference to the Act and/or O. Reg. 455/09.

Table 2-1: General Facility Information

Reporting Requirement	Facility Information	Reference to Act and/or O. Reg. 455/09
Parent Company Name	Suncor Energy Products Inc.	O. Reg. 455/09 s.18(2) subparagraph 14
Parent Company Address	150 6th Avenue SW Calgary, Alberta T2P 3E3	O. Reg. 455/09 s.18(2) subparagraph 14
Facility Name	Suncor Energy Products Partnership - Sarnia Refinery	O. Reg. 455/09 s.18(2) subparagraph 4
Facility Address	1900 River Road P.O. Box 307 Sarnia, Ontario N7T 7J3	O. Reg. 455/09 s.18(2) subparagraph 4
Universal Transverse Mercator (UTM) in North American Datum (NAD83)	Latitude: 42.93060 Longitude: -82.44330	O. Reg. 455/09 s.18(2) subparagraph 13
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Ontario Regulation 127/01 Identification Number	Not applicable	O. Reg. 455/09 s.18(2) subparagraph 3
Two Digit North American Industry Classification System (NAICS) Code	32 – Manufacturing	O. Reg. 455/09 s.18(2) subparagraph 6
Four Digit North American Industry Classification System (NAICS) Code	3241 – Petroleum and Coal Product Manufacturing	O. Reg. 455/09 s.18(2) subparagraph 6
Six Digit North American Industry Classification System (NAICS) Code	324110 – Petroleum Refineries	O. Reg. 455/09 s.18(2) subparagraph 6
Number of Full-time Employee Equivalents at the Facility	892 (as of December 31, 2012)	O. Reg. 455/09 s.18(2) subparagraph 5
Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

At the Suncor Sarnia refinery, incomplete fuel combustion results in the creation and release of carbon monoxide. All process heaters and boilers are either fired on natural gas and/or refinery fuel gas. Carbon monoxide emissions are generated as a result of the incomplete combustion of these gases. The heaters and boilers supply steam for production purposes as well as heat for the production units. Carbon monoxide emissions from fuel sources also include combustion in the Houdriflow Catalytic cracker, the thermal oxidizer and flares.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the creation and release of carbon monoxide. Some of these initiatives and actions are highlighted in the following sections.

4.1 Material or Feedstock Substitution

Suncor has stopped burning fuel oil in the heaters and boilers and replaced this with cleaner burning natural gas and refinery fuel gas. In the past, heavy fuel oil and bunker were burned which generated higher emissions of carbon monoxide along with other contaminants.

Flare gas recovery is the process of recovering the waste gases that would normally be flared, so they can be used, generally as fuel gas, elsewhere in the facility. Increased use of the flare gas recovery system has resulted in reduced carbon monoxide emissions.

4.2 Equipment or Process Modification

Analyzers are installed in the flue outlets from many heaters. These analyze the oxygen content in the flue gases from the heaters. Typically a target oxygen content of around 2% is maintained. This ensures that the presence of unburned hydrocarbons from these heaters is minimized. This excess oxygen level optimization keeps the carbon monoxide emissions in control.

The expanded flue gas from the Catalytic Cracker is routed through a steam-generating boiler where the carbon monoxide in the flue gas is burned as fuel to provide steam for use in the refinery. This helps in reducing carbon monoxide emissions.

Changes to the Crude/Vacuum unit and Hydrocracker unit to accommodate the commissioning of the Diesel desulfurization project in 2006 resulted in changes in heating requirements. As a result, carbon monoxide emissions were reduced due to the lower firing rates for the heaters in these units.

The generation of carbon monoxide emissions from boilers depends on the efficiency of natural gas combustion. Efficiencies of the Suncor equipment are constantly monitored by both Inspection personnel and Maintenance personnel. Properly tuned boilers and boilers operating at design conditions increase combustion efficiency resulting in decreased emissions.

4.3 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills or leaks before they occur.

4.4 On-Site Reuse or Recycling

Carbon monoxide is not reused or recycled as it is a product of combustion of natural gas and/or refinery fuel gas. Flue gas from the Catalytic Cracker containing carbon monoxide is however routed through a steam-generating boiler where the carbon monoxide in the flue gas is burned as fuel to provide steam. This minimizes carbon monoxide emissions from this process.

4.5 Training or Improved Operating Practices

The facility has documented procedures regarding the proper operation of equipment and the equipment preparation for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet.

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills or leaks), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the creation and release of carbon monoxide).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its creation and release of carbon monoxide. Carbon monoxide is not a product of the Suncor Sarnia refinery. It is created primarily as a result of the catalyst decoking operation in Houdriflow Catalytic Cracker and in the incomplete combustion of refinery fuel gas and natural gas. A reduction in the catalytic cracker throughput to reduce carbon monoxide creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia Refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the creation of carbon monoxide, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for carbon monoxide, prepared by the Suncor Sarnia refinery dated December 1, 2013.

9.0 PLAN CERTIFICATION STATEMENT

The reduction plan certifications by the Highest Ranking Employee and the Licensed Planner are provided in Appendix 1 of this report, as required by the Act and regulation.

APPENDIX 1 – TOXIC SUBSTANCE REDUCTION PLAN CERTIFICATION

10.0 CERTIFICATION BY PLANNER

As of December 1, 2013, I Mark Roehler certify that I am familiar with the processes at Suncor Energy Sarnia Refinery that use or create the toxic substances 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 December 1, 2013 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Toxic substances: Carbon Monoxide

Mark Roehler TSRP0128

11.0 CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 1, 2013, I, Mark Hiseler, certify that I have read the toxic substance reduction plan for the toxic substances 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.

Toxic substances: Carbon Monoxide

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN
SUMMARY FOR CUMENE

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Cumene

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

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Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

Cumene is a natural constituent of the incoming crude oil and chemical feedstocks used at the Sarnia Suncor refinery. Cumene is a constituent of the finished gasoline product and as a component in the Xylene and A-100 solvent sold by the refinery.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use, creation, and release of cumene. Some of these initiative and actions are highlighted in the following sections.

4.1 Equipment or Process Modification

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use or creation of cumene, it does reduce the potential for losses to the environment.

Independent/redundant level switches have been installed on some tanks to help prevent overfill. This also reduces the risk of a spill and losses to the environment and enables Suncor to maximize sales.

There are Internal Floating Roofs installed on some tanks containing volatile materials to minimize vapour space loss.

4.2 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

The plant has had a mature leak detection and repair (LDAR) program since 1996. Components (e.g., valves, flanges, open-ended lines, etc.) are tested on an annual basis with pumps and compressors tested on a quarterly basis. The LDAR program is based on the CCME “Environmental Code of Practice for the Measurement and Control of Fugitive Emission from Equipment Leaks, October 1993”. When leaks are detected, the Maintenance department determines the best option for repair, which may include replacement of components with better (less leak-prone) equipment.

4.3 Training or Improved Operating Practices

The facility has documented procedures regarding the proper preparation of equipment for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet. Also as part of Turnaround Management, the EH&S personnel are involved in the discussions

pertaining to equipment preparation and purging procedures to ensure that the impact on the environment is minimized (an example is the refinery fuel balance where the aim is to minimize flaring).

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and releases of cumene).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of cumene. Suncor is not a manufacturer of cumene. It is present as a component in various feedstocks, intermediate streams and products. A reduction in throughput to reduce cumene usage or creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of cumene, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

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Toxic substance – Cumene

Mark Roehler TSRP0128

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Toxic substance – Cumene

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN SUMMARY FOR CYCLOHEXANE

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Cyclohexane

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

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3.0 DESCRIPTION OF SUBSTANCE

Cyclohexane is a natural constituent of the incoming crude oil and some chemical feedstocks. It is created in the Catalytic Cracking unit and Hydrocracker and destroyed in the Reformer unit. Cyclohexane leaves these processes in the light naphtha, light hydrocrackate and reformate streams and feeds into the gasoline pool where it acts as a key gasoline component.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use, creation, and release of cyclohexane. Some of these initiatives and actions are highlighted in the following sections.

4.1 Equipment or Process Modification

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use or creation of cyclohexane, it does reduce the potential for losses to the environment.

Independent/redundant level switches have been installed on some tanks to help prevent overfill. This also reduces the risk of a spill and losses to the environment and enables Suncor to maximize sales.

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The facility has documented procedures regarding the proper preparation of equipment for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet. Also as part of Turnaround Management, the EH&S personnel are involved in the discussions pertaining to equipment preparation and purging procedures to ensure that the impact on the environment is minimized (an example is the refinery fuel balance where the aim is to minimize flaring).

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and release of cyclohexane).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of cyclohexane. Suncor is not a manufacturer of cyclohexane. It is present as a component in various products and intermediate streams. A reduction in throughput to reduce cyclohexane usage or creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of cyclohexane, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

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Toxic substance – Cyclohexane

Mark Roehler TSRP0128

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Toxic substance – Cyclohexane

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN
SUMMARY FOR HEPTANE

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Heptane

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This toxic substance reduction plan summary has been prepared to meet the regulatory obligations specified in Section 8 of the Act and has been prepared in accordance with the requirements of s. 24 of Ontario Regulation (O. Reg.) 455/09, as amended from time to time. It meets the relevant reporting requirements and will be updated, as required by the Act and O. Reg. 455/09.

To learn more about our business please visit our website at http://www.suncor.com/default.aspx.

2.0 BASIC FACILITY INFORMATION

Table 2-1 summarizes the general facility information with reference to the Act and/or O. Reg. 455/09.

Table 2-1: General Facility Information

Reporting Requirement	Facility Information	Reference to Act and/or O. Reg. 455/09
Parent Company Name	Suncor Energy Products Inc.	O. Reg. 455/09 s.18(2) subparagraph 14
Parent Company Address	150 6th Avenue SW Calgary, Alberta T2P 3E3	O. Reg. 455/09 s.18(2) subparagraph 14
Facility Name	Suncor Energy Products Partnership - Sarnia Refinery	O. Reg. 455/09 s.18(2) subparagraph 4
Facility Address	1900 River Road P.O. Box 307 Sarnia, Ontario N7T 7J3	O. Reg. 455/09 s.18(2) subparagraph 4
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Number of Full-time Employee Equivalents at the Facility	892 (as of December 31, 2012)	O. Reg. 455/09 s.18(2) subparagraph 5
Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

Heptane is a natural constituent in the crude oil feedstock and also in some of the external chemical feedstock purchases. It is created in the Catalytic Cracking unit, Hydrocracker and destroyed in the Reformer. Heptane is present as a by-product component in various refinery intermediate streams and finished products. It is also a constituent of gasoline sold by the refinery.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use, creation, and release of heptane. Some of these initiative and actions are highlighted in the following sections.

4.1 Equipment or Process Modification

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use or creation of heptane, it does reduce the potential for losses to the environment.

Independent/redundant level switches have been installed on some tanks to help prevent overfill. This also reduces the risk of a spill and losses to the environment and enables Suncor to maximize sales.

There are Internal Floating Roofs installed on some tanks containing volatile materials to minimize vapour space loss.

4.2 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

Efficiencies of the equipment are constantly monitored by both Inspection personnel and Maintenance personnel. The plant has had a mature leak detection and repair (LDAR) program since 1996. Components (e.g., valves, flanges, open-ended lines, etc.) are tested on an annual basis with pumps and compressors tested on a quarterly basis. The LDAR program is based on the CCME “Environmental Code of Practice for the Measurement and Control of Fugitive Emission from Equipment Leaks, October 1993”. When leaks are detected, the Maintenance department determines the best option for repair, which may include replacement of components with better (less leak-prone) equipment.

4.3 Training or Improved Operating Practices

The facility has documented procedures regarding the proper preparation of equipment for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet. Also as part of Turnaround Management, the EH&S personnel are involved in the discussions pertaining to equipment preparation and purging procedures to ensure that the impact on the environment is minimized (an example is the refinery fuel balance where the aim is to minimize flaring).

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and releases of heptane).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of heptane. Suncor is not a manufacturer of heptane. It is present as a component in various feedstocks, intermediate streams and finished products. A reduction in throughput to reduce heptane usage or creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of heptane, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for heptane, prepared by the Suncor Sarnia refinery dated December 1, 2013.

9.0 PLAN CERTIFICATION STATEMENT

The reduction plan certifications by the Highest Ranking Employee and the Licensed Planner are provided in Appendix 1 of this report, as required by the Act and regulation.

APPENDIX 1 – TOXIC SUBSTANCE REDUCTION PLAN CERTIFICATION

9.0 CERTIFICATION BY PLANNER

As of December 1, 2013, I Mark Roehler certify that I am familiar with the processes at Suncor Energy Sarnia Refinery 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 December 1, 2013 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Toxic substance – Heptane

Mark Roehler TSRP0128

10.0 CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 1, 2013, I, Mark Hiseler, 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.

Toxic substance – Heptane

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN SUMMARY FOR HYDROFLUORIC ACID

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Hydrofluoric Acid

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

December 14, 2013

Version Control

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1.0 INTRODUCTION

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Protection of the environment is a fundamental Suncor value. It is our responsibility to determine and manage the impacts of our business through programs like the Toxics Reduction Act.

We respect the important balance between economic growth and environmental stewardship and work diligently to:

- conduct our activities with sound environmental management and conservation practices;
- prevent risk to community health and safety from our operations or our products; and
- transfer expertise in environmental protection to host communities.

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As part of our environmental stewardship, we will:

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- ensure our operations comply with customer requirements, specific performance standards, government legislation, corporate policy and applicable industry standards;
- monitor the environmental impacts of our business during the start-up, normal operation and shutdown of our facilities, and through project planning, implementation and decommissioning to minimize any impact on the environment;
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Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

Hydrofluoric acid is used as a catalyst in the Alkylation process to help react iso-butane and mixed olefin feed to produce alkylate which is used as a gasoline component to enhance the octane rating. As is typical of a catalyst, the Hydrofluoric (HF) acid is recovered and re-used within the process.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use and release of hydrofluoric acid. Some of these initiatives and actions are highlighted in the following sections.

4.1 Material or Feedstock Substitution

Hydrofluoric acid is purchased from an external vendor. It is used as a catalyst in the Alkylation reaction to promote the reaction of the mixed hydrocarbon streams to produce an alkylate product. Alternatively Sulfuric acid can be used as the catalyst. Changing the current process to a Sulfuric acid alkylation process is only possible with a substantial engineered plant change including the development of a recovery plan for sulfuric acid. Substitution of hydrofluoric acid catalyst with another toxic substance is not an economically viable option and does not eliminate the use of a toxic substance – it merely replaces one with the other.

4.2 Equipment or Process Modification

Suncor has recently installed an Acid Soluble Oil Neutralization unit designed to neutralize the contaminated hydrofluoric acid waste prior to burning the oil in the process heaters. Contaminated hydrofluoric acid is removed through neutralization with a caustic solution. Although these modifications do not reduce the use of hydrofluoric acid they do effectively lower the hydrofluoric acid emissions.

In prior years, a Flare minimization project was implemented and included the installation of the Alkylation unit 2400 volt trip and the high pressure trips on the Acid settler and De-propanizer. These changes resulted in the minimization of flaring emissions that would result from a process upset.

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use of hydrofluoric acid, it does reduce the potential for losses to the environment.

4.3 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Suncor has replaced piping and heat exchangers tubes with enhanced metallurgy to prevent leakage due to under-deposit corrosion. This is particularly important in the Alkylation unit which uses once-through water for cooling. Although this does not reduce the use or creation of hydrofluoric acid, it does provide increased protection against leaks.

The Alkylation unit has a "Safe Park" and a de-inventory system as part of the unit's emergency procedures. This allows the hydrofluoric acid to be safely removed from the unit if needed and can safely shutdown the entire Alkylation unit. This minimizes the potential for a release of hydrofluoric acid during an upset condition. The unit is also equipped with hydrofluoric acid detectors which provide early warning of a release.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

Efficiencies of the equipment are constantly monitored by both Inspection personnel and Maintenance personnel. The plant has had a mature leak detection and repair (LDAR) program since 1996. Components (e.g., valves, flanges, open-ended lines, etc.) are tested on an annual basis with pumps and compressors tested on a quarterly basis. The LDAR program is based on the CCME "Environmental Code of Practice for the Measurement and Control of Fugitive Emission from Equipment Leaks, October 1993". When leaks are detected, the Maintenance department determines the best option for repair, which may include replacement of components with better (less leak-prone) equipment.

4.4 On-Site Reuse or Recycling

The hydrofluoric acid in the Alkylation process is used as a catalyst. As is typical of a catalyst, the hydrofluoric acid continues to be recovered and re-used within the process and is topped up only as needed. The acid rerun column separates acid soluble oils from the hydrofluoric acid, thus maintaining the required strength and keeping it suitable for re-use.

4.5 Improved Inventory Management or Purchasing Techniques

The refinery employs a just in time delivery inventory management process and has the ability to manage inventory through storage. Raw materials and feedstocks are purchased based on unit throughput, sales forecasts and feedstock availability in the market. Based on the gasoline production and Alkylation unit requirements, purchases of hydrofluoric acid can be optimized. The strength of the acid is continuously monitored by analyzer and top-ups from the unit storage are completed as required.

4.6 Training or Improved Operating Practices

The facility has documented procedures regarding the proper preparation of equipment for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet. The safety-critical procedures are reviewed and discussed on a regular basis at team meetings. Every team member is required to know how to respond to each of these situations.

Also as part of Turnaround Management, EH&S personnel are involved in the discussions pertaining to equipment preparation and purging procedures to ensure that the impact on the environment is minimized (an example is the flushing of the Alkylation unit in preparation for maintenance work). Specific Alkylation unit safety training is required before being allowed to enter the unit to ensure everyone is aware of the safety concerns when working around this acid.

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use and release of hydrofluoric acid).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use and release of hydrofluoric acid. Hydrofluoric acid is purchased for use as a catalyst in the Alkylation process. Suncor does not intend to reduce the usage of hydrofluoric acid as a reduction in the production of alkylate will not benefit Suncor's business growth. Suncor is however committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia Refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use of hydrofluoric acid, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for hydrofluoric acid, prepared by the Suncor Sarnia refinery dated December 1, 2013.

9.0 PLAN CERTIFICATION STATEMENT

The reduction plan certifications by the Highest Ranking Employee and the Licensed Planner are provided in Appendix 1 of this report, as required by the Act and regulation.

APPENDIX 1 – TOXIC SUBSTANCE REDUCTION PLAN CERTIFICATION

9.0 CERTIFICATION BY PLANNER

As of December 1, 2013, I Mark Roehler certify that I am familiar with the processes at Suncor Energy Sarnia Refinery 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 December 1, 2013 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Toxic substance: Hydrofluoric Acid

Mark Roehler TSRP0128

10.0 CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 1, 2013, I, Mark Hiseler, 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.

Toxic substance: Hydrofluoric Acid

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN
SUMMARY FOR N-HEXANE

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for N-hexane

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

December 14, 2013

Version Control

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1.0 INTRODUCTION

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Protection of the environment is a fundamental Suncor value. It is our responsibility to determine and manage the impacts of our business through programs like the Toxics Reduction Act.

We respect the important balance between economic growth and environmental stewardship and work diligently to:

- conduct our activities with sound environmental management and conservation practices;
- prevent risk to community health and safety from our operations or our products; and
- transfer expertise in environmental protection to host communities.

In keeping with our commitment to meet the latest quality standards and practices, the Sarnia refinery is ISO 14001 registered.

As part of our environmental stewardship, we will:

- demonstrate our commitment by maintaining our ISO 9001 and ISO 14001 registrations;
- ensure our operations comply with customer requirements, specific performance standards, government legislation, corporate policy and applicable industry standards;
- monitor the environmental impacts of our business during the start-up, normal operation and shutdown of our facilities, and through project planning, implementation and decommissioning to minimize any impact on the environment;
- ensure all employees and affiliates are informed, trained and authorized to meet our quality and environmental performance requirements;
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Facility Name	Suncor Energy Products Partnership - Sarnia Refinery	O. Reg. 455/09 s.18(2) subparagraph 4
Facility Address	1900 River Road P.O. Box 307 Sarnia, Ontario N7T 7J3	O. Reg. 455/09 s.18(2) subparagraph 4
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Number of Full-time Employee Equivalents at the Facility	892 (as of December 31, 2012)	O. Reg. 455/09 s.18(2) subparagraph 5
Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

N-hexane is a natural constituent in the crude oil feedstock and also in some of the external chemical feedstock receipts. It is created in the Catalytic Cracking unit, Hydrocracker and the Reformer. N-hexane leaves these reactors in the light naphtha, light hydrocrackate and reformate streams and feeds into the gasoline pool where it acts as a key gasoline component.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use, creation, and release of n-hexane. Some of these initiative and actions are highlighted in the following sections.

4.1 Equipment or Process Modification

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use or creation of n-hexane, it does reduce the potential for losses to the environment.

Independent/redundant level switches have been installed on some tanks to help prevent overfill. This also reduces the risk of a spill and losses to the environment and enables Suncor to maximize sales.

There are Internal Floating Roofs installed on some tanks containing volatile materials to minimize vapour space loss.

4.2 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

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The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and releases of n-hexane).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of n-hexane. Suncor is not a manufacturer of n-hexane. It is present as a component in various products and intermediate streams. A reduction in throughput to reduce n-hexane usage or creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia Refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of n-hexane, we will continue to optimize unit operations such that further reductions may be possible.

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Toxic substance – N-hexane

Mark Roehler TSRP0128

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Toxic substance – N-hexane

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN
SUMMARY FOR NONANE

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Nonane

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
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- ensure all employees and affiliates are informed, trained and authorized to meet our quality and environmental performance requirements;
- continually improve our products through design, manufacturing, delivery and service processes, achieved through our Quality and Environmental Management Systems; and
- continue to strive to establish quality and environmental objectives and targets, and periodically review performance through the Management Review Process.

This toxic substance reduction plan summary has been prepared to meet the regulatory obligations specified in Section 8 of the Act and has been prepared in accordance with the requirements of s. 24 of Ontario Regulation (O. Reg.) 455/09, as amended from time to time. It meets the relevant reporting requirements and will be updated, as required by the Act and O. Reg. 455/09.

To learn more about our business please visit our website at http://www.suncor.com/default.aspx.

2.0 BASIC FACILITY INFORMATION

Table 2-1 summarizes the general facility information with reference to the Act and/or O. Reg. 455/09.

Table 2-1: General Facility Information

Reporting Requirement	Facility Information	Reference to Act and/or O. Reg. 455/09
Parent Company Name	Suncor Energy Products Inc.	O. Reg. 455/09 s.18(2) subparagraph 14
Parent Company Address	150 6th Avenue SW Calgary, Alberta T2P 3E3	O. Reg. 455/09 s.18(2) subparagraph 14
Facility Name	Suncor Energy Products Partnership - Sarnia Refinery	O. Reg. 455/09 s.18(2) subparagraph 4
Facility Address	1900 River Road P.O. Box 307 Sarnia, Ontario N7T 7J3	O. Reg. 455/09 s.18(2) subparagraph 4
Universal Transverse Mercator (UTM) in North American Datum (NAD83)	Latitude: 42.93060 Longitude: -82.44330	O. Reg. 455/09 s.18(2) subparagraph 13
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Number of Full-time Employee Equivalents at the Facility	892 (as of December 31, 2012)	O. Reg. 455/09 s.18(2) subparagraph 5
Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

Nonane is a natural constituent in the crude oil and chemical feedstocks which are procured at competitive prices in the international market. Nonane is a paraffinic hydrocarbon that ends up as a component of gasoline sold by the Sarnia refinery.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use, creation and release of nonane. Some of these initiative and actions are highlighted in the following sections.

4.1 Equipment or Process Modification

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use or creation of nonane, it does reduce the potential for losses to the environment.

Independent/redundant level switches have been installed on some tanks to help prevent overfill. This also reduces the risk of a spill and losses to the environment and enables Suncor to maximize sales.

There are Internal Floating Roofs installed on some tanks containing volatile materials to minimize vapour space loss.

4.2 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

Efficiencies of the equipment are constantly monitored by both Inspection personnel and Maintenance personnel. The plant has had a mature leak detection and repair (LDAR) program since 1996. Components (e.g., valves, flanges, open-ended lines, etc.) are tested on an annual basis with pumps and compressors tested on a quarterly basis. The LDAR program is based on the CCME “Environmental Code of Practice for the Measurement and Control of Fugitive Emission from Equipment Leaks, October 1993”. When leaks are detected, the Maintenance department determines the best option for repair, which may include replacement of components with better (less leak-prone) equipment.

4.3 Training or Improved Operating Practices

The facility has documented procedures regarding the proper preparation of equipment for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet. Also as part of Turnaround Management, the EH&S personnel are involved in the discussions pertaining to equipment preparation and purging procedures to ensure that the impact on the environment is minimized (an example is the refinery fuel balance where the aim is to minimize flaring).

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and release of nonane).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of nonane. Suncor is not a manufacturer of nonane It is present as a component in gasoline and intermediate streams. A reduction in throughput to reduce nonane usage or creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia Refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of nonane, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for nonane, prepared by the Suncor Sarnia refinery dated December 1, 2013.

9.0 PLAN CERTIFICATION STATEMENT

The reduction plan certifications by the Highest Ranking Employee and the Licensed Planner are provided in Appendix 1 of this report, as required by the Act and regulation.

APPENDIX 1 – TOXIC SUBSTANCE REDUCTION PLAN CERTIFICATION

9.0 CERTIFICATION BY PLANNER

As of December 1, 2013, I Mark Roehler certify that I am familiar with the processes at Suncor Energy Sarnia Refinery 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 December 1, 2013 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Toxic substance – Nonane

Mark Roehler TSRP0128

10.0 CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 1, 2013, I, Mark Hiseler, 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.

Toxic substance – Nonane

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN SUMMARY FOR OXIDES OF NITROGEN

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Oxides of Nitrogen

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

December 14, 2013

Version Control

Version	Date Issued	Modifications
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Protection of the environment is a fundamental Suncor value. It is our responsibility to determine and manage the impacts of our business through programs like the Toxics Reduction Act.

We respect the important balance between economic growth and environmental stewardship and work diligently to:

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- prevent risk to community health and safety from our operations or our products; and
- transfer expertise in environmental protection to host communities.

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Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

Nitrogen oxides (NOx) are a combustion product (emission) and are produced mainly through the combustion of refinery fuel gas and natural gas in the heaters and boilers on site. Other combustion sources include the refinery flares, the thermal oxidizer and the catalytic cracking unit which make up a much smaller portion of the site's NOx emissions. The heaters and boilers supply steam for production purposes as well as heat for the production units.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the creation and release of nitrogen oxides. Some of these initiatives and actions are highlighted in the following sections.

4.1 Material or Feedstock Substitution

Suncor has stopped burning heavy fuel oil in the heaters and boilers and replaced this with cleaner burning natural gas and refinery fuel gas. In the past, heavy fuel oil and bunker were burned which generated higher emissions of NOx.

4.2 Equipment or Process Modification

In the past some of the heaters have been converted to low NOx burners. Low NOx burners reduce NOx by accomplishing the combustion process in stages. Staging partially delays the combustion process, resulting in a cooler flame which suppresses thermal NOx formation.

Flare Gas recovery is the process of recovering the waste gases that would normally be flared, so they can be used, generally as fuel gas, elsewhere in the facility. Increased use of the flare gas recovery unit has resulted in reduced nitrogen oxide emissions.

Changes to the Crude/Vacuum unit and Hydrocracker unit to accommodate the commissioning of the Diesel desulfurization project in 2006 resulted in changes in heating requirements. As a result, NOx emissions were reduced due to the lower firing rate for the heaters in these units.

Efficiencies of the equipment are constantly monitored by both Inspection personnel and Maintenance personnel. NOx is created in the heaters in the various refinery units as a result of combustion of natural gas or refinery fuel gas. The refinery is in the process of upgrading the Burner Management System as required by Ontario regulations under the TSSA. Although this does not reduce NOx emissions directly, Burner Management includes many safety interlock features which will shut off the heater fuel source when a flame is not detected thereby protecting against the escape of unburned fuel into the atmosphere.

The following technologies that aid in NOx reduction are being considered:

Low NOX burner technology is the most common technology utilized to control NOx emissions from heaters and boilers. The combustion of fuel gas and natural gas in process heaters and boilers results in the formation of NOx. There are various burner technologies that rely on air and fuel staging to lower flame temperature which minimizes the formation of NOx. These burner

technologies have seen great advancement from the 1980s to date. Various levels of NOx reduction are possible depending on what burner technology is selected. Low NOx Burners, Ultra Low NOx Burners and Next Generation Ultra Low NOx Burners, generally have incrementally longer flame lengths caused by the incrementally greater degree of air staging provided by their designs. This longer flame length creates retrofit issues in terms of a longer flame impinging on tubes in the heat recovery section of the heater. To avoid impingement from the longer flame onto the boiler tubes or heat exchange surface, it is often necessary to rebuild the bottom of the heater or boiler to provide for more room for longer flames or for smaller burners to achieve the total heat release provided by the original design. Suncor has converted some burners to Low NOx technology already and will continue to look for further opportunities.

Selective Catalytic Reduction (SCR) - SCR is a process where a reductant (most often ammonia), is added to the flue gas. The reductant then reacts with the NO_x in the emissions and forms water and ambient nitrogen. This process may take place at anywhere between 500°F and 1200°F depending on the catalyst used. SCR may reduce NOx emissions by up to 90% however it introduces the use of another toxic substance (ammonia). SCRs are mainly used in large industrial and utility boilers. Due to its higher capital cost, SCR is generally only applied where low NOx burner technology is infeasible.

Technical Feasibility: Suncor is currently working with a consultant hired by the Ministry of the Environment to review control technologies for Petroleum Refineries. When further information becomes available regarding the application of these technologies for the Sarnia refinery, Suncor will update the reduction plan at that time.

4.3 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills or plant upsets before they occur.

4.4 Training or Improved Operating Practices

The facility has documented procedures regarding the proper operation of equipment and the equipment preparation for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet.

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills or leaks), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the creation and release of NOx).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act Suncor has reviewed its creation and release of Nitrogen Oxides expressed as NO_2. Nitrogen oxides are not a product of the Suncor Sarnia refinery. They are created as a result of combustion of fuel gas and natural gas. Suncor optimizes its energy consumption which in turn minimizes NOx emissions. A reduction in heater and boiler throughput to reduce NOx creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia Refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the creation of nitrogen oxides, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for nitrogen oxides, prepared by the Suncor Sarnia refinery dated December 1, 2013.

9.0 PLAN CERTIFICATION STATEMENT

The reduction plan certifications by the Highest Ranking Employee and the Licensed Planner are provided in Appendix 1 of this report, as required by the Act and regulation.

APPENDIX 1 – TOXIC SUBSTANCE REDUCTION PLAN CERTIFICATION

10.0 CERTIFICATION BY PLANNER

As of December 1, 2013, I Mark Roehler certify that I am familiar with the processes at Suncor Energy Sarnia Refinery that use or create the toxic substances 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 December 1, 2013 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Toxic substances: Oxides of Nitrogen

Mark Roehler TSRP0128

11.0 CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 1, 2013, I, Mark Hiseler, certify that I have read the toxic substance reduction plan for the toxic substances 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.

Toxic substances: Oxides of Nitrogen

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN SUMMARY FOR OCTANE

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Octane

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

December 14, 2013

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1.0 INTRODUCTION

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- conduct our activities with sound environmental management and conservation practices;
- prevent risk to community health and safety from our operations or our products; and
- transfer expertise in environmental protection to host communities.

In keeping with our commitment to meet the latest quality standards and practices, the Sarnia refinery is ISO 14001 registered.

As part of our environmental stewardship, we will:

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Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

Octane is a natural constituent in the crude oil and chemical feedstocks which are procured at competitive prices in the international market. Octane is a key component in the finished gasoline product as it enhances an engine's ability to run smoothly.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use, creation and release of octane. Some of these initiatives and actions are highlighted in the following sections.

4.1 Equipment or Process Modification

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use or creation of octane, it does reduce the potential for losses to the environment.

Independent/redundant level switches have been installed on some tanks to help prevent overfill. This also reduces the risk of a spill and losses to the environment and enables Suncor to maximize sales.

There are Internal Floating Roofs installed on some tanks containing volatile materials to minimize vapour space loss.

4.2 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

Efficiencies of the equipment are constantly monitored by both Inspection personnel and Maintenance personnel. The plant has had a mature leak detection and repair (LDAR) program since 1996. Components (e.g., valves, flanges, open-ended lines, etc.) are tested on an annual basis with pumps and compressors tested on a quarterly basis. The LDAR program is based on the CCME "Environmental Code of Practice for the Measurement and Control of Fugitive Emission from Equipment Leaks, October 1993". When leaks are detected, the Maintenance department determines the best option for repair, which may include replacement of components with better (less leak-prone) equipment.

4.3 Training or Improved Operating Practices

The facility has documented procedures regarding the proper preparation of equipment for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet. Also as part of Turnaround Management, the EH&S personnel are involved in the discussions pertaining to equipment preparation and purging procedures to ensure that the impact on the environment is minimized (an example is the refinery fuel balance where the aim is to minimize flaring).

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and release of octane).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of octane. Suncor is not a manufacturer of octane. It is present as a component in gasoline and intermediate streams. A reduction in throughput to reduce octane usage or creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia Refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of octane, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

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Toxic substance – Octane

Mark Roehler TSRP0128

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Toxic substance – Octane

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN SUMMARY FOR HEXANE

(all isomers excluding n-hexane)

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Hexane (all isomers excluding n-hexane)

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
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N7T 7J3

December 14, 2013

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- continually improve our products through design, manufacturing, delivery and service processes, achieved through our Quality and Environmental Management Systems; and
- continue to strive to establish quality and environmental objectives and targets, and periodically review performance through the Management Review Process.

This toxic substance reduction plan summary has been prepared to meet the regulatory obligations specified in Section 8 of the Act and has been prepared in accordance with the requirements of s. 24 of Ontario Regulation (O. Reg.) 455/09, as amended from time to time. It meets the relevant reporting requirements and will be updated, as required by the Act and O. Reg. 455/09.

To learn more about our business please visit our website at http://www.suncor.com/default.aspx.

2.0 BASIC FACILITY INFORMATION

Table 2-1 summarizes the general facility information with reference to the Act and/or O. Reg. 455/09.

Table 2-1: General Facility Information

Reporting Requirement	Facility Information	Reference to Act and/or O. Reg. 455/09
Parent Company Name	Suncor Energy Products Inc.	O. Reg. 455/09 s.18(2) subparagraph 14
Parent Company Address	150 6th Avenue SW Calgary, Alberta T2P 3E3	O. Reg. 455/09 s.18(2) subparagraph 14
Facility Name	Suncor Energy Products Partnership - Sarnia Refinery	O. Reg. 455/09 s.18(2) subparagraph 4
Facility Address	1900 River Road P.O. Box 307 Sarnia, Ontario N7T 7J3	O. Reg. 455/09 s.18(2) subparagraph 4
Universal Transverse Mercator (UTM) in North American Datum (NAD83)	Latitude: 42.93060 Longitude: -82.44330	O. Reg. 455/09 s.18(2) subparagraph 13
National Pollutant Release Inventory Identification Number	3071	O. Reg. 455/09 s.18(2) subparagraph 2
Ontario Regulation 127/01 Identification Number	Not applicable	O. Reg. 455/09 s.18(2) subparagraph 3
Two Digit North American Industry Classification System (NAICS) Code	32 – Manufacturing	O. Reg. 455/09 s.18(2) subparagraph 6
Four Digit North American Industry Classification System (NAICS) Code	3241 – Petroleum and Coal Product Manufacturing	O. Reg. 455/09 s.18(2) subparagraph 6
Six Digit North American Industry Classification System (NAICS) Code	324110 – Petroleum Refineries	O. Reg. 455/09 s.18(2) subparagraph 6
Number of Full-time Employee Equivalents at the Facility	892 (as of December 31, 2012)	O. Reg. 455/09 s.18(2) subparagraph 5
Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

Hexane is a natural constituent in the crude oil and some external chemical feedstocks. It is created in the Catalytic Cracking unit, Hydrocracker and in the Reformer. Hexane leaves these reactors in the light naphtha, light hydrocrackate and reformate streams and feeds into the gasoline pool where it acts as a key gasoline component.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use, creation, and release of hexane. Some of these initiatives and actions are highlighted in the following sections.

4.1 Equipment or Process Modification

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use or creation of hexane, it does reduce the potential for losses to the environment.

Independent/redundant level switches have been installed on some tanks to help prevent overfill. This also reduces the risk of a spill and losses to the environment.

There are Internal Floating roofs installed on some tanks containing volatile materials to minimize vapour space loss.

4.2 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

Efficiencies of the plant equipment are constantly monitored by both Inspection personnel and Maintenance personnel. The plant has had a mature leak detection and repair (LDAR) program since 1996. Components (e.g., valves, flanges, open-ended lines, etc.) are tested on an annual basis with pumps and compressors tested on a quarterly basis. The LDAR program is based on the CCME “Environmental Code of Practice for the Measurement and Control of Fugitive Emission from Equipment Leaks, October 1993”. When leaks are detected, the Maintenance department determines the best option for repair, which may include replacement of components with better (less leak-prone) equipment.

4.3 Training or Improved Operating Practices

The facility has documented procedures regarding the proper preparation of equipment for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet. Also as part of Turnaround Management, EH&S personnel are involved in the discussions pertaining to equipment preparation and purging procedures to ensure that the impact on the environment is minimized (an example is the refinery fuel balance where the aim is to minimize flaring).

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and release of hexane).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of hexane. Suncor is not a manufacturer of hexane. It is present as a component in various products and intermediate streams. A reduction in throughput to reduce hexane usage or creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia Refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of hexane, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for hexane, prepared by the Suncor Sarnia refinery dated December 1, 2013.

9.0 PLAN CERTIFICATION STATEMENT

The reduction plan certifications by the Highest Ranking Employee and the Licensed Planner are provided in Appendix 1 of this report, as required by the Act and regulation.

APPENDIX 1 – TOXIC SUBSTANCE REDUCTION PLAN CERTIFICATION

9.0 CERTIFICATION BY PLANNER

As of December 1, 2013, I Mark Roehler certify that I am familiar with the processes at Suncor Energy Sarnia Refinery 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 December 1, 2013 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Toxic substance – Hexane, all isomers excluding n-hexane

Mark Roehler TSRP0128

10.0 CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 1, 2013, I, Mark Hiseler, 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.

Toxic substance – Hexane, all isomers excluding n-hexane

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN
SUMMARY FOR
POLYCYCLIC AROMATIC HYDROCARBONS

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Polycyclic Aromatic Hydrocarbons

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

December 14, 2013

Version Control

Version	Date Issued	Modifications
Original	December 14, 2013	Original version made available to the public and employees

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1.0 INTRODUCTION

Suncor Energy Products Inc. Sarnia Refinery is a crude oil refinery that produces a number of fuel products including gasoline, jet and diesel fuels, residual oils for industrial use, as well as chemical feedstock.

Located at 1900 River Road, the Sarnia Refinery is situated on the shore of the St. Clair River beside a residential community. Like our residential neighbours, we want a clean and safe environment and a prosperous community.

Protection of the environment is a fundamental Suncor value. It is our responsibility to determine and manage the impacts of our business through programs like the Toxics Reduction Act.

We respect the important balance between economic growth and environmental stewardship and work diligently to:

- conduct our activities with sound environmental management and conservation practices;
- prevent risk to community health and safety from our operations or our products; and
- transfer expertise in environmental protection to host communities.

In keeping with our commitment to meet the latest quality standards and practices, the Sarnia refinery is ISO 14001 registered.

As part of our environmental stewardship, we will:

- demonstrate our commitment by maintaining our ISO 9001 and ISO 14001 registrations;
- ensure our operations comply with customer requirements, specific performance standards, government legislation, corporate policy and applicable industry standards;
- monitor the environmental impacts of our business during the start-up, normal operation and shutdown of our facilities, and through project planning, implementation and decommissioning to minimize any impact on the environment;
- ensure all employees and affiliates are informed, trained and authorized to meet our quality and environmental performance requirements;
- continually improve our products through design, manufacturing, delivery and service processes, achieved through our Quality and Environmental Management Systems; and
- continue to strive to establish quality and environmental objectives and targets, and periodically review performance through the Management Review Process.

This toxic substance reduction plan summary has been prepared to meet the regulatory obligations specified in Section 8 of the Act and has been prepared in accordance with the requirements of s. 24 of Ontario Regulation (O. Reg.) 455/09, as amended from time to time. It meets the relevant reporting requirements and will be updated, as required by the Act and O. Reg. 455/09.

To learn more about our business please visit our website at http://www.suncor.com/default.aspx.

2.0 BASIC FACILITY INFORMATION

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Six Digit North American Industry Classification System (NAICS) Code	324110 – Petroleum Refineries	O. Reg. 455/09 s.18(2) subparagraph 6
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Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

As part of the Toxics Reduction Act (TRA), Suncor has reviewed its use, creation and release of some specific polycyclic aromatic hydrocarbons (PAHs). For the purposes of the reduction plan summary requirements under TRA, Suncor will combine the ten PAHs identified below into one reduction plan summary and will furthermore refer to these substances collectively as PAHs in the rest of this reduction plan summary.

- Acenaphthene
- Benzo(a)anthracene
- Benzo(a)phenanthrene
- Benzo(a)pyrene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Fluoranthene
- Fluorene
- Phenanthrene
- Pyrene

Suncor is not a manufacturer of PAHs. They are present as trace combustion products and as a component in some tank bottom waste streams.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use, creation and release of PAHs. Some of these initiatives and actions are highlighted in the following sections.

4.1 Material or Feedstock Substitution

In the past, heavy fuel oil and bunker were burned in the heaters which generated higher emissions of PAHs along with other contaminants. The refinery has changed to using either natural gas or refinery fuel gas for fuel in the various heaters. This has reduced the PAH emissions as a result of combusting a cleaner fuel.

4.2 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

Efficiencies of the equipment are constantly monitored by both Inspection personnel and Maintenance personnel. The plant has had a mature leak detection and repair (LDAR) program since 1996. Components (e.g., valves, flanges, open-ended lines, etc.) are tested on an annual basis with pumps and compressors tested on a quarterly basis. The LDAR program is based on the CCME "Environmental Code of Practice for the Measurement and Control of Fugitive Emission from Equipment Leaks, October 1993". When leaks are detected, the Maintenance department determines the best option for repair, which may include replacement of components with better (less leak-prone) equipment.

4.3 Training or Improved Operating Practices

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

There are also procedures in place to develop waste plans for plant maintenance Turnarounds such that tank sludge materials are disposed of in a timely manner as per the relevant regulations. Although this does not reduce the use or creation of PAHs, it does ensure that the waste materials are handled as per the provincial regulations.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and release of PAHs). The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of PAHs. Suncor is not a manufacturer of PAHs. They are present as trace combustion products and as components in some tank bottom waste streams. A reduction in throughput to reduce PAH usage or creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia Refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of PAHs, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for PAHs, prepared by the Suncor Sarnia refinery dated December 1, 2013.

9.0 PLAN CERTIFICATION STATEMENT

The reduction plan certifications by the Highest Ranking Employee and the Licensed Planner are provided in Appendix 1 of this report, as required by the Act and regulation.

APPENDIX 1 – TOXIC SUBSTANCE REDUCTION PLAN CERTIFICATION

9.0 CERTIFICATION BY PLANNER

As of December 1, 2013, I Mark Roehler certify that I am familiar with the processes at Suncor Energy Sarnia Refinery that use or create the toxic substances 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 December 1, 2013 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Toxic substances:

- Acenaphthene
- Benzo(a)anthracene
- Benzo(a)phenanthrene
- Benzo(a)pyrene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Fluoranthene
- Fluorene
- Phenanthrene
- Pyrene

Mark Roehler TSRP0128

10.0 CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 1, 2013, I, Mark Hiseler, certify that I have read the toxic substance reduction plan for the toxic substances 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.

Toxic substances:

- Acenaphthene
- Benzo(a)anthracene
- Benzo(a)phenanthrene
- Benzo(a)pyrene
- Benzo(g,h,i)perylene
- Benzo(k)fluoranthene
- Fluoranthene
- Fluorene
- Phenanthrene
- Pyrene

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN
SUMMARY FOR PARTICULATE MATTER

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Particulate Matter

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

December 14, 2013

Version Control

Version	Date Issued	Modifications
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1.0 INTRODUCTION

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Protection of the environment is a fundamental Suncor value. It is our responsibility to determine and manage the impacts of our business through programs like the Toxics Reduction Act.

We respect the important balance between economic growth and environmental stewardship and work diligently to:

- conduct our activities with sound environmental management and conservation practices;
- prevent risk to community health and safety from our operations or our products; and
- transfer expertise in environmental protection to host communities.

In keeping with our commitment to meet the latest quality standards and practices, the Sarnia refinery is ISO 14001 registered.

As part of our environmental stewardship, we will:

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Facility Name	Suncor Energy Products Partnership - Sarnia Refinery	O. Reg. 455/09 s.18(2) subparagraph 4
Facility Address	1900 River Road P.O. Box 307 Sarnia, Ontario N7T 7J3	O. Reg. 455/09 s.18(2) subparagraph 4
Universal Transverse Mercator (UTM) in North American Datum (NAD83)	Latitude: 42.93060 Longitude: -82.44330	O. Reg. 455/09 s.18(2) subparagraph 13
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Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

For the purposes of the reduction plan requirements under TRA, Suncor will combine the three particulate matter fractions identified below into one reduction plan summary and will furthermore refer to these substances collectively as particulate matter in the rest of this reduction plan summary.

- Total Particulate Matter
- PM 10
- PM 2.5

Particulate matter is a designation for a large variety of extremely small particles of organic and inorganic origin. They can contain carbon, metals, ash, soot (almost purely elemental carbon) and salts. Some particulate matter consists of partly combusted or non-combusted hydrocarbon material (fuel and lubrication oil). At the Suncor Sarnia refinery, particulate matter is primarily as a result of combustion activities.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the creation and release of particulate matter. Some of these initiative and actions are highlighted in the following sections.

4.1 Material or Feedstock Substitution

In the past, heavy fuel oil and bunker were burned in the various heaters which generated higher emissions of particulate matter along with other contaminants. The refinery has converted over to using either natural gas or refinery fuel gas for fuel. This change has reduced the particulate matter emissions as a result of combusting a cleaner fuel.

4.2 Equipment or Process Modification

Analyzers are installed in the flue outlets from many heaters. These analyze the oxygen content in the flue gases from the heaters. Typically an optimal oxygen content of around 2% is maintained. This ensures that the presence of unburned hydrocarbons and any associated particulate discharge is minimized from these heaters.

Efficiencies of the equipment are constantly monitored by both Inspection personnel and Maintenance personnel. Particulate matter is created in the heaters in the various refinery units as a result of combustion of natural gas or refinery fuel gas.

The Suncor Sarnia refinery is unique in that it uses a Houdriflow Catalytic cracker (HCC) rather than the typical fluidized catalytic cracking unit for cracking heavier hydrocarbons. The HCC disengager stack emissions represent a major portion of the total refinery emission of particulates. The flow characteristics of this unit are complex and pressure drop changes could disrupt the HCC operation. As such, there are limited options for process modifications.

The catalyst used in the HCC is made specifically for Suncor. There is no intent to change the catalyst as the technology guarantees the product specifications and has been proven to be effective.

The following technologies that aid in the removal of particulate matter from flue gas streams have been considered:

• Fabric Filters;

• Electrostatic Precipitators

• Wet Scrubbers

4.2.1 Fabric Filters

Fabric filters remove particles from a gas stream by passing it through woven fabric. As particles are removed from the gas stream by the fabric filter, a porous layer referred to as the filter cake, develops on the bag. It is the filter cake rather than the actual fabric that results in the high collection efficiencies. Fabric filters are not be the appropriate choice for particulate emission control from the HCC for the following reasons:

• The potential for fabric filter blinding from sticky or oily emissions or moisture condensation;

• Filter burning and damage as a result of entrained sparks;

• Fabric deterioration caused by acid gases or high temperature excursions (i.e. above normal operation); and

• Relatively large pressure drop which will impact the operation of the HCC.

4.2.2 Electrostatic Precipitators (ESP)

An electrostatic precipitator operates using discharge electrodes that are placed between grounded parallel plates, resulting in simultaneous charging and collection. The two types of ESPs are dry and wet. A dry ESP collects particles and removes them from the collection plate by 'rapping'. A wet ESP may remove the collected particles either intermittently or continuously, using water that flows down the plates. The disadvantage of an ESP is that they are not very effective in removing particles in the size range of 0.1 to 1.0µm. Most of the ESPs were designed to operate at temperatures in the range 175-315ºC to avoid acid gas corrosion.

This stream contains 4% carbon monoxide normally. In upset conditions, this could easily reach the Lower Explosive Limit, which could yield explosions in an ESP. For this reason, an ESP is not considered as a technically feasible option for particulate matter reduction.

4.2.3 Wet Gas Scrubbing

Wet scrubbing of the HCC disengager off-gas is an effective control technology for reducing both SO2 and particulate matter emissions. The wet scrubbers are effective for removal of micron size particles and their dust collection efficiency is as high as 95%. The only concern remains the impact of the back pressure on the HCC operation.

Technical Feasibility: Suncor is currently working with a consultant hired by the Ministry of the Environment to review Control Technologies for Petroleum Refineries. When further information

becomes available regarding the application of the wet gas scrubbing technology without impacting the pressure at the stack, Suncor will update the reduction plan at that time.

4.3 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills or leaks before they occur.

4.4 Training or Improved Operating Practices

The facility has documented procedures regarding the proper operation of equipment and the equipment preparation for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet.

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills or leaks), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the creation and release of particulate matter).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its creation and release of particulate matter. Suncor is not a manufacturer of particulate matter. Particulate matter is present in the exhaust streams from the heaters and the HCC where they are created as a result of combustion. Suncor optimizes its heater and burner operation which in turn minimizes particulate matter emissions. A reduction in throughput to reduce particulate matter creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia Refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the creation of particulate matter, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for particulate matter, prepared by the Suncor Sarnia refinery dated December 1, 2013.

9.0 PLAN CERTIFICATION STATEMENT

The reduction plan certifications by the Highest Ranking Employee and the Licensed Planner are provided in Appendix 1 of this report, as required by the Act and regulation.

APPENDIX 1 – TOXIC SUBSTANCE REDUCTION PLAN CERTIFICATION

10.0 CERTIFICATION BY PLANNER

As of December 1, 2013, I Mark Roehler certify that I am familiar with the processes at Suncor Energy Sarnia Refinery that use or create the toxic substances 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 December 1, 2013 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Toxic substances:

- Total Particulate Matter
- Particulate Matter less than 10 microns
- Particulate Matter less than 2.5 microns

Mark Roehler TSRP0128

11.0 CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 1e2013, I, Mark Hiseler, certify that I have read the toxic substance reduction plan for the toxic substances 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.

Toxic substances:

- Total Particulate Matter
- Particulate Matter less than 10 microns
- Particulate Matter less than 2.5 microns

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN
SUMMARY FOR PENTANE (all isomers)

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Pentane (all isomers)

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

December 14, 2013

Version Control

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1.0 INTRODUCTION

Suncor Energy Products Inc. Sarnia Refinery is a crude oil refinery that produces a number of fuel products including gasoline, jet and diesel fuels, residual oils for industrial use, as well as chemical feedstock.

Located at 1900 River Road, the Sarnia Refinery is situated on the shore of the St. Clair River beside a residential community. Like our residential neighbours, we want a clean and safe environment and a prosperous community.

Protection of the environment is a fundamental Suncor value. It is our responsibility to determine and manage the impacts of our business through programs like the Toxics Reduction Act.

We respect the important balance between economic growth and environmental stewardship and work diligently to:

- conduct our activities with sound environmental management and conservation practices;
- prevent risk to community health and safety from our operations or our products; and
- transfer expertise in environmental protection to host communities.

In keeping with our commitment to meet the latest quality standards and practices, the Sarnia refinery is ISO 14001 registered.

As part of our environmental stewardship, we will:

- demonstrate our commitment by maintaining our ISO 9001 and ISO 14001 registrations;
- ensure our operations comply with customer requirements, specific performance standards, government legislation, corporate policy and applicable industry standards;
- monitor the environmental impacts of our business during the start-up, normal operation and shutdown of our facilities, and through project planning, implementation and decommissioning to minimize any impact on the environment;
- ensure all employees and affiliates are informed, trained and authorized to meet our quality and environmental performance requirements;
- continually improve our products through design, manufacturing, delivery and service processes, achieved through our Quality and Environmental Management Systems; and
- continue to strive to establish quality and environmental objectives and targets, and periodically review performance through the Management Review Process.

This toxic substance reduction plan summary has been prepared to meet the regulatory obligations specified in Section 8 of the Act and has been prepared in accordance with the requirements of s. 24 of Ontario Regulation (O. Reg.) 455/09, as amended from time to time. It meets the relevant reporting requirements and will be updated, as required by the Act and O. Reg. 455/09.

To learn more about our business please visit our website at http://www.suncor.com/default.aspx.

2.0 BASIC FACILITY INFORMATION

Table 2-1 summarizes the general facility information with reference to the Act and/or O. Reg. 455/09.

Table 2-1: General Facility Information

Reporting Requirement	Facility Information	Reference to Act and/or O. Reg. 455/09
Parent Company Name	Suncor Energy Products Inc.	O. Reg. 455/09 s.18(2) subparagraph 14
Parent Company Address	150 6th Avenue SW Calgary, Alberta T2P 3E3	O. Reg. 455/09 s.18(2) subparagraph 14
Facility Name	Suncor Energy Products Partnership - Sarnia Refinery	O. Reg. 455/09 s.18(2) subparagraph 4
Facility Address	1900 River Road P.O. Box 307 Sarnia, Ontario N7T 7J3	O. Reg. 455/09 s.18(2) subparagraph 4
Universal Transverse Mercator (UTM) in North American Datum (NAD83)	Latitude: 42.93060 Longitude: -82.44330	O. Reg. 455/09 s.18(2) subparagraph 13
National Pollutant Release Inventory Identification Number	3071	O. Reg. 455/09 s.18(2) subparagraph 2
Ontario Regulation 127/01 Identification Number	Not applicable	O. Reg. 455/09 s.18(2) subparagraph 3
Two Digit North American Industry Classification System (NAICS) Code	32 – Manufacturing	O. Reg. 455/09 s.18(2) subparagraph 6
Four Digit North American Industry Classification System (NAICS) Code	3241 – Petroleum and Coal Product Manufacturing	O. Reg. 455/09 s.18(2) subparagraph 6
Six Digit North American Industry Classification System (NAICS) Code	324110 – Petroleum Refineries	O. Reg. 455/09 s.18(2) subparagraph 6
Number of Full-time Employee Equivalents at the Facility	892 (as of December 31, 2012)	O. Reg. 455/09 s.18(2) subparagraph 5
Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

Pentane is a natural constituent of the incoming crude oil feedstock. It is primarily created in the Catalytic Cracker, Hydrocracker and the Reformer units. The majority of the pentane ends up in the finished gasoline pool or in the refinery fuel gas system which is burned in the various heaters and boilers on site.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the creation and release of particulate matter. Some of these initiative and actions are highlighted in the following sections.

4.1 Equipment or Process Modification

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use or creation of pentane, it does reduce the potential for losses to the environment.

Independent/redundant level switches have been installed on some tanks to help prevent overfill. This also reduces the risk of a spill and losses to the environment and enables Suncor to maximize sales.

There are Internal Floating Roofs installed on some tanks containing volatile materials to minimize vapour space loss.

4.2 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

The plant has had a mature leak detection and repair (LDAR) program since 1996. Components (e.g., valves, flanges, open-ended lines, etc.) are tested on an annual basis with pumps and compressors tested on a quarterly basis. The LDAR program is based on the CCME “Environmental Code of Practice for the Measurement and Control of Fugitive Emission from Equipment Leaks, October 1993”. When leaks are detected, the Maintenance department determines the best option for repair, which may include replacement of components with better (less leak-prone) equipment.

4.3 On-Site Reuse or Recycling

Some pentane is recycled into the refinery fuel gas system which supplies fuel to the heaters and boilers within the refinery. As such, this stream is partially recycled internally.

4.4 Training or Improved Operating Practices

The facility has documented procedures regarding the proper preparation of equipment for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet. Also as part of Turnaround Management, the EH&S personnel are involved in the discussions pertaining to equipment preparation and purging procedures to ensure that the impact on the environment is minimized (an example is the refinery fuel balance where the aim is to minimize flaring).

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and release of pentane).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of pentane. Suncor is not a manufacturer of pentane and its isomers. It is present as a constituent of the incoming crude oil feedstock, some intermediate streams and in the finished gasoline product. A reduction in refinery throughput to reduce pentane usage or creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia Refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of pentane, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for pentane, prepared by the Suncor Sarnia refinery dated December 1, 2013.

9.0 PLAN CERTIFICATION STATEMENT

The reduction plan certifications by the Highest Ranking Employee and the Licensed Planner are provided in Appendix 1 of this report, as required by the Act and regulation.

APPENDIX 1 – TOXIC SUBSTANCE REDUCTION PLAN CERTIFICATION

9.0 CERTIFICATION BY PLANNER

As of December 1, 2013, I Mark Roehler certify that I am familiar with the processes at Suncor Energy Sarnia Refinery 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 December 1, 2013 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Toxic substance – Pentane

Mark Roehler TSRP0126

10.0 CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 1, 2013, I, Mark Hiseler, 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.

Toxic substance – Pentane

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN
SUMMARY FOR PROPANE

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Propane

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

December 14, 2013

Version Control

Version	Date Issued	Modifications
Original	December 14, 2013	Original version made available to the public and employees

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1.0 INTRODUCTION

Suncor Energy Products Inc. Sarnia Refinery is a crude oil refinery that produces a number of fuel products including gasoline, jet and diesel fuels, residual oils for industrial use, as well as chemical feedstock.

Located at 1900 River Road, the Sarnia Refinery is situated on the shore of the St. Clair River beside a residential community. Like our residential neighbours, we want a clean and safe environment and a prosperous community.

Protection of the environment is a fundamental Suncor value. It is our responsibility to determine and manage the impacts of our business through programs like the Toxics Reduction Act.

We respect the important balance between economic growth and environmental stewardship and work diligently to:

- conduct our activities with sound environmental management and conservation practices;
- prevent risk to community health and safety from our operations or our products; and
- transfer expertise in environmental protection to host communities.

In keeping with our commitment to meet the latest quality standards and practices, the Sarnia refinery is ISO 14001 registered.

As part of our environmental stewardship, we will:

- demonstrate our commitment by maintaining our ISO 9001 and ISO 14001 registrations;
- ensure our operations comply with customer requirements, specific performance standards, government legislation, corporate policy and applicable industry standards;
- monitor the environmental impacts of our business during the start-up, normal operation and shutdown of our facilities, and through project planning, implementation and decommissioning to minimize any impact on the environment;
- ensure all employees and affiliates are informed, trained and authorized to meet our quality and environmental performance requirements;
- continually improve our products through design, manufacturing, delivery and service processes, achieved through our Quality and Environmental Management Systems; and
- continue to strive to establish quality and environmental objectives and targets, and periodically review performance through the Management Review Process.

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Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

Propane is a natural trace constituent of the incoming crude oil feedstock. A small quantity of propane is found in the butane-butylene purchases as well. It is primarily created in the Catalytic Cracker, Hydrocracker and the Reformer units. Propane leaves some of these units as a finished product. The remainder ends up in the gasoline pool or in the refinery fuel gas system which is burned in the various heaters and boilers on site.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use, creation and release of propane. Some of these initiative and actions are highlighted in the following sections.

4.1. Product Design or Reformulation

Propane is a finished product sold by the Sarnia refinery so the ultimate goal is to optimize the process to maximize propane production. It has a product quality specification that must be met prior to being released to the market for sale.

4.2. Equipment or Process Modification

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use or creation of propane, it does reduce the potential for losses to the environment.

Independent/redundant level switches have been installed on some tanks to help prevent overfill. This also reduces the risk of a spill and losses to the environment and enables Suncor to maximize sales.

There are Internal Floating Roofs installed on some tanks containing volatile materials to minimize vapour space loss. Propane product and other C3/C4 streams which contain the majority of propane are stored in underground caverns thereby reducing vapour losses.

4.3. Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

The plant has had a mature leak detection and repair (LDAR) program since 1996. Components (e.g., valves, flanges, open-ended lines, etc.) are tested on an annual basis with pumps and

compressors tested on a quarterly basis. The LDAR program is based on the CCME "Environmental Code of Practice for the Measurement and Control of Fugitive Emission from Equipment Leaks, October 1993". When leaks are detected, the Maintenance department determines the best option for repair, which may include replacement of components with better (less leak-prone) equipment.

4.4. On-Site Reuse or Recycling

Propane is a constituent of the refinery fuel gas which supplies fuel to the heaters and boilers within the refinery. In this manner it is partly reused and offsets the purchase of natural gas.

4.5. Improved Inventory Management or Purchasing Techniques

The refinery employs a just-in-time delivery inventory management process and has the ability to manage inventory through cavern storage. Raw materials and feedstocks are purchased based on unit throughput, sales forecasts and feedstock availability in the market. The propane product is stored in underground caverns thereby minimizing emission losses.

4.6. Training or Improved Operating Practices

The facility has documented procedures regarding the proper preparation of equipment for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet. Also as part of Turnaround Management, the EH&S personnel are involved in the discussions pertaining to equipment preparation and purging procedures to ensure that the impact on the environment is minimized (an example is the refinery fuel balance where the aim is to minimize flaring).

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and releases of propane).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of propane. Suncor is a manufacturer of propane which is sold as a finished product. It is also present as a component in the finished gasoline product and in various intermediate streams. A reduction in throughput to reduce propane usage or creation will not benefit Suncor's business

growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia Refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of propane, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for propane, prepared by the Suncor Sarnia refinery dated December 1, 2013.

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APPENDIX 1 – TOXIC SUBSTANCE REDUCTION PLAN CERTIFICATION

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As of December 1, 2013, I Mark Roehler certify that I am familiar with the processes at Suncor Energy Sarnia Refinery 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 December 1, 2013 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Toxic substance – Propane

Mark Roehler TSRP0128

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As of December 1, 2013, I, Mark Hiseler, 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.

Toxic substance – Propane

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN SUMMARY FOR SULFUR DIOXIDE

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Sulfur Dioxide

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

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Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

Sulfur dioxide is an air emission and is created as a result of combustion of fuels that contain sulfur. At the Sarnia refinery, these sources include the combustion of fuel gas in the heaters, combustion of acid gases in the flares and incinerator and the decoking operation in HCC.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the creation and release of sulfur dioxide. Some of these initiatives and actions are highlighted in the following sections.

4.1 Material or Feedstock Substitution

Sulfur dioxide emissions are associated with the amount of sulfur in the refinery feedstocks. Suncor has stopped burning heavy fuel oil in the heaters and boilers and replaced this with cleaner burning natural gas and refinery fuel gas. In the past, heavy fuel oil and bunker were burned which generated higher emissions of SO_2 along with other contaminants. This change has reduced the SO_2 emissions as a result of combusting a cleaner fuel.

4.2 Equipment or Process Modification

In 2006, Suncor installed a Sulfur Recovery facility which includes an amine system, a sour water system, a sulfur recovery unit and a tail gas treating unit. The sulfur recovery facility is designed to recover elemental sulfur from hydrogen sulfide bearing gas from the Sour Water Strippers and Amine Regenerators. This reduces the emissions of SO_2 by more than 99% as most of the sulfur is recovered as molten sulfur.

Changes to the Crude/Vacuum unit and Hydrocracker unit to accommodate the commissioning of the Diesel desulfurization project in 2006 resulted in changes in heating requirements. As a result, sulfur dioxide emissions were reduced due to the lower firing rates for the heaters in these units.

The rate of sulfur dioxide emissions from boilers depends on the efficiency of fuel combustion. Improperly tuned boilers and boilers operating at off-design levels decrease combustion efficiency resulting in increased SO_2 emissions. Efficiencies of the equipment are constantly monitored by both Inspection personnel and Maintenance personnel.

The following are some possible options which were considered for SO_2 reduction on the flue gases emitted from Houdriflow Catalytic cracking unit:

4.2.1 Spray Dryer Absorbers

This type of technology utilizes alkaline reagents to remove SO_2 and acid gases. A complete system consists of a reagent preparation system, a spray dryer absorber, a dust collector and an ash handling system. A common reagent is hydrated lime which is prepared as slurry to the desired concentration. The slurry is subsequently atomized and intimately mixed with the incoming flue gas stream. SO_2 and acid gases in the exhaust stream are absorbed by the slurry

droplets and react to form calcium salts. Additional waste streams are generated using this technology which may contain other toxic substances.

4.2.2 Dry Injection

Injection of dry alkaline reagents into the exhaust stream has also been successful in removing SO_2 and other acid gases. The principal difference between this operation and that of spray dryer absorber is that preparation and handling of the wet slurry is eliminated. The reagent is injected into a vessel through which the flue gases pass, where it fluidizes and mixes with the gas stream. The stream then passes through a collection device such as an Electrostatic Precipitator or Fabric Filters. These particulate collection devices generate an additional waste stream which requires subsequent disposal.

4.2.3 Wet Gas Scrubbing

Wet scrubbing of the catalytic cracker disengager off-gas is an effective control technology for reducing both SO_2 and particulate. Limitations associated with wet scrubbers involve corrosion problems and the waste sludge that is formed requiring subsequent disposal.

Technical Feasibility: The major concern with each of these reduction options remains the impact of the back pressure on the catalytic cracker operation. Suncor is currently working with a consultant hired by the Ministry of the Environment to review control technologies for Petroleum Refineries. When further information becomes available regarding the application of these technologies, Suncor will update the reduction plan at that time.

4.3 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills or upsets before they occur.

4.4 Training or Improved Operating Practices

The facility has documented procedures regarding the proper operation of equipment and the equipment preparation for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet.

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills or leaks), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the creation and release of sulfur dioxide).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its creation and release of sulfur dioxide. Sulfur dioxide is not a product of the Suncor refinery but it is created as a result of combustion of fuel gas in the heaters, combustion of acid gases in the flares and incinerator and the decoking operation in the Catalytic Cracking unit. A reduction in refinery throughput to reduce SO_2 creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia Refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the creation of sulfur dioxide, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for sulfur dioxide, prepared by the Suncor Sarnia refinery dated December 1, 2013.

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Toxic substances: Sulfur Dioxide

Mark Roehler TSRP0128

11.0 CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 1, 2013, I, Mark Hiseler, certify that I have read the toxic substance reduction plan for the toxic substances 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.

Toxic substances: Sulfur Dioxide

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN SUMMARY FOR 1,2,4 TRIMETHYLBENZENE

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for 1, 2, 4 Trimethylbenzene

Suncor Energy Products Inc.
Sarnia Refinery
1900 River Road
Sarnia, Ontario
N7T 7J3

December 14, 2013

Version Control

Version	Date Issued	Modifications
Original	December 14, 2013	Original version made available to the public and employees

Table of Contents

1.0 INTRODUCTION

Suncor Energy Products Inc. Sarnia Refinery is a crude oil refinery that produces a number of fuel products including gasoline, jet and diesel fuels, residual oils for industrial use, as well as chemical feedstock.

Located at 1900 River Road, the Sarnia Refinery is situated on the shore of the St. Clair River beside a residential community. Like our residential neighbours, we want a clean and safe environment and a prosperous community.

Protection of the environment is a fundamental Suncor value. It is our responsibility to determine and manage the impacts of our business through programs like the Toxics Reduction Act.

We respect the important balance between economic growth and environmental stewardship and work diligently to:

- conduct our activities with sound environmental management and conservation practices;
- prevent risk to community health and safety from our operations or our products; and
- transfer expertise in environmental protection to host communities.

In keeping with our commitment to meet the latest quality standards and practices, the Sarnia refinery is ISO 14001 registered.

As part of our environmental stewardship, we will:

- demonstrate our commitment by maintaining our ISO 9001 and ISO 14001 registrations;
- ensure our operations comply with customer requirements, specific performance standards, government legislation, corporate policy and applicable industry standards;
- monitor the environmental impacts of our business during the start-up, normal operation and shutdown of our facilities, and through project planning, implementation and decommissioning to minimize any impact on the environment;
- ensure all employees and affiliates are informed, trained and authorized to meet our quality and environmental performance requirements;
- continually improve our products through design, manufacturing, delivery and service processes, achieved through our Quality and Environmental Management Systems; and
- continue to strive to establish quality and environmental objectives and targets, and periodically review performance through the Management Review Process.

This toxic substance reduction plan summary has been prepared to meet the regulatory obligations specified in Section 8 of the Act and has been prepared in accordance with the requirements of s. 24 of Ontario Regulation (O. Reg.) 455/09, as amended from time to time. It meets the relevant reporting requirements and will be updated, as required by the Act and O. Reg. 455/09.

To learn more about our business please visit our website at http://www.suncor.com/default.aspx.

2.0 BASIC FACILITY INFORMATION

Table 2-1 summarizes the general facility information with reference to the Act and/or O. Reg. 455/09.

Table 2-1: General Facility Information

Reporting Requirement	Facility Information	Reference to Act and/or O. Reg. 455/09
Parent Company Name	Suncor Energy Products Inc.	O. Reg. 455/09 s.18(2) subparagraph 14
Parent Company Address	150 6th Avenue SW Calgary, Alberta T2P 3E3	O. Reg. 455/09 s.18(2) subparagraph 14
Facility Name	Suncor Energy Products Partnership - Sarnia Refinery	O. Reg. 455/09 s.18(2) subparagraph 4
Facility Address	1900 River Road P.O. Box 307 Sarnia, Ontario N7T 7J3	O. Reg. 455/09 s.18(2) subparagraph 4
Universal Transverse Mercator (UTM) in North American Datum (NAD83)	Latitude: 42.93060 Longitude: -82.44330	O. Reg. 455/09 s.18(2) subparagraph 13
National Pollutant Release Inventory Identification Number	3071	O. Reg. 455/09 s.18(2) subparagraph 2
Ontario Regulation 127/01 Identification Number	Not applicable	O. Reg. 455/09 s.18(2) subparagraph 3
Two Digit North American Industry Classification System (NAICS) Code	32 – Manufacturing	O. Reg. 455/09 s.18(2) subparagraph 6
Four Digit North American Industry Classification System (NAICS) Code	3241 – Petroleum and Coal Product Manufacturing	O. Reg. 455/09 s.18(2) subparagraph 6
Six Digit North American Industry Classification System (NAICS) Code	324110 – Petroleum Refineries	O. Reg. 455/09 s.18(2) subparagraph 6
Number of Full-time Employee Equivalents at the Facility	892 (as of December 31, 2012)	O. Reg. 455/09 s.18(2) subparagraph 5
Facility Public Contact	Jennifer Johnson Communications and Stakeholder Relations Advisor Tel: (519) 346-2419 Email:jnjohnson@suncor.com	O. Reg. 455/09 s.18(2) subparagraph 7

3.0 DESCRIPTION OF SUBSTANCE

1, 2, 4 trimethylbenzene (further referred to as TMB throughout this document) is a natural constituent of incoming crude oil feedstock and some external chemical purchases. Suncor does not manufacture TMB however it is present as a component in gasoline and some intermediate streams.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use, creation, and release of TMB. Some of these initiative and actions are highlighted in the following sections.

4.1 Equipment or Process Modification

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use or creation of TMB, it does reduce the potential for losses to the environment.

Independent/redundant level switches have been installed on some tanks to help prevent overfill. This also reduces the risk of a spill and losses to the environment and enables Suncor to maximize sales.

There are Internal Floating Roofs installed on some tanks containing volatile materials to minimize vapour space loss.

4.2 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

Efficiencies of the equipment are constantly monitored by both Inspection personnel and Maintenance personnel. The plant has had a mature leak detection and repair (LDAR) program since 1996. Components (e.g., valves, flanges, open-ended lines, etc.) are tested on an annual basis with pumps and compressors tested on a quarterly basis. The LDAR program is based on the CCME “Environmental Code of Practice for the Measurement and Control of Fugitive Emission from Equipment Leaks, October 1993”. When leaks are detected, the Maintenance department determines the best option for repair, which may include replacement of components with better (less leak-prone) equipment.

4.3 Training or Improved Operating Practices

The facility has documented procedures regarding the proper preparation of equipment for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet. Also as part of Turnaround Management, the EH&S personnel are involved in the discussions pertaining to equipment preparation and purging procedures to ensure that the impact on the environment is minimized (an example is the refinery fuel balance where the aim is to minimize flaring).

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 TOXIC SUBSTANCE REDUCTION PLAN OPTION TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and releases of TMB).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of TMB. Suncor is not a manufacturer of TMB. It is present as a component in gasoline and intermediate streams. A reduction in throughput to reduce TMB usage or creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia Refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of TMB, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for TMB, prepared by the Suncor Sarnia refinery dated December 1, 2013.

9.0 PLAN CERTIFICATION STATEMENT

The reduction plan certifications by the Highest Ranking Employee and the Licensed Planner are provided in Appendix 1 of this report, as required by the Act and regulation.

APPENDIX 1 – TOXIC SUBSTANCE REDUCTION PLAN CERTIFICATION

9.0 CERTIFICATION BY PLANNER

As of December 1, 2013, I Mark Roehler certify that I am familiar with the processes at Suncor Energy Sarnia Refinery 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 December 1, 2013 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Toxic substance – 1, 2, 4 Trimethylbenzene

Mark Roehler TSRP0128

10.0 CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 1, 2013, I, Mark Hiseler, 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.

Toxic substance – 1, 2, 4 Trimethylbenzene

Mark Hiseler

TOXIC SUBSTANCE REDUCTION PLAN SUMMARY FOR TOTAL REDUCED SULFUR AND HYDROGEN SULFIDE

2012 TOXICS REDUCTION ACT

Toxic Substance Reduction Plan Summary for Total Reduced Sulfur and Hydrogen Sulfide

Suncor Energy Products Inc.
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3.0 DESCRIPTION OF SUBSTANCE

Total reduced sulfur refers to compounds containing the sulfur atom in its reduced oxidation state. It primarily consists of hydrogen sulfide (~95%), with some methyl mercaptan, dimethyl sulphide and dimethyl disulphide. Although there are other total reduced sulfur species, these are the most common and have similar properties. Total reduced sulfur species are produced during the hydrotreating and hydrocracking processes which serve to remove the sulfur from the product streams. There are also trace quantities of total reduced sulfurs in the incoming crude oil feedstocks.

For the purposes of the reduction plan summary requirements under the Toxics Reduction Act, Suncor will combine Total Reduced Sulfur and Hydrogen Sulfide into one reduction plan summary since hydrogen sulfide makes up roughly 95% of the total reduced sulfur.

4.0 ACTIONS TAKEN TO-DATE

As part of our environmental stewardship, the Sarnia Refinery has already undertaken and/or completed a number of initiatives and actions that have reduced the use, creation, and release of total reduced sulfur. Some of these initiative and actions are highlighted in the following sections.

4.1 Equipment or Process Modification

A new sour water storage tank with an internal floating roof was commissioned in 2013 with vents tied into the incinerator to reduce hydrogen sulfide emissions. As part of that same project, two older sour water tanks which previously vented to the atmosphere have been taken out of service. Also, as part of the asphalt storage system, a scavenger additive is fed to the storage tanks in order to minimize the hydrogen sulfide present in the tank headspace. Although these modifications do not reduce the use or creation of total reduced sulfur, they do reduce the emissions to the atmosphere.

The new Sulfur recovery unit was commissioned in 2006 and is designed to process the hydrogen sulfide from various plants at the refinery. In this unit, approximately 99.8% of the incoming hydrogen sulfide is converted into elemental (molten) sulfur. The reaction takes place in a Claus Reactor and is a proven technology.

A number of pumps throughout the refinery have been changed out from single mechanical to double mechanical seals in order to minimize releases of hazardous substances to the atmosphere. Although this may not significantly reduce the use or creation of total reduced sulfur, it does reduce the potential for losses to the environment.

Independent/redundant level switches have been installed on some tanks to help prevent overfill. This also reduces the risk of a spill and losses to the environment and enables Suncor to maximize sales.

There are Internal Floating Roofs installed on all crude storage tanks to minimize vapour space loss.

4.2 Spill and Leak Prevention

Suncor has established spill prevention, containment and contingency plans for each area of the plant. Operations routinely monitor the various production areas, storage and transfer areas. Monthly preventive maintenance plans also include non-destructive inspections to prevent spills before they occur.

Proper sampling points have been installed to reduce spills and leaks during sample collection. The Sarnia refinery has identified hazardous sampling points and installed closed loop sampling points using industry-wide accepted DOPAK sample systems.

The plant has had a mature leak detection and repair (LDAR) program since 1996. Components (e.g., valves, flanges, open-ended lines, etc.) are tested on an annual basis with pumps and compressors tested on a quarterly basis. The LDAR program is based on the CCME "Environmental Code of Practice for the Measurement and Control of Fugitive Emission from Equipment Leaks, October 1993". When leaks are detected, the Maintenance department determines the best option for repair, which may include replacement of components with better (less leak-prone) equipment.

4.3 On-Site Reuse or Recycling

Total reduced sulfur compounds form the feed stream into the Sulfur recovery unit which converts most of the entrained hydrogen sulfide into molten sulfur which is sold into the market place as a useful product. In this manner, the reduced sulfur and hydrogen sulfide compounds are recycled and converted into a product instead of being emitted to the atmosphere.

4.4 Improved Inventory Management or Purchasing Techniques

The refinery employs a just in time delivery inventory management process and has the ability to manage inventory through storage. Raw materials and feedstocks are purchased based on unit throughput, sales forecasts and feedstock availability in the market. Crude storage tanks are equipped with internal floating roofs which help to minimize any emissions from these tanks.

Molten sulfur is stored in covered sulfur pits which are lightly padded with nitrogen. This nitrogen pad is vented directly to the incinerator to eliminate hydrogen sulfide emissions to the atmosphere.

4.5 Training or Improved Operating Practices

The facility has documented procedures regarding the proper preparation of equipment for maintenance. This reduces the amount of material that could be released to the atmosphere. All procedures are documented and available in the control rooms and also on the Suncor intranet. Also as part of Turnaround Management, the EH&S personnel are involved in the discussions pertaining to equipment preparation and purging procedures to ensure that the impact on the environment is minimized (an example is the refinery fuel balance where the aim is to minimize flaring).

The refinery has an incident reporting system which is used to document losses of containment (i.e., spills), trigger root cause investigations and identify action plans such that these incidents do not recur.

5.0 OPTIONS TO BE IMPLEMENTED

There were no technically and economically feasible options identified for implementation at this time (above and beyond the actions the Sarnia Refinery has already taken to reduce the use, creation and release of total reduced sulfur).

The plan will be reviewed in accordance with the Act and regulation, at which time new options may be identified and considered for implementation.

6.0 STATEMENT OF INTENT

As part of the Toxics Reduction Act, Suncor has reviewed its use, creation and release of Total Reduced Sulfur and Hydrogen Sulfide. Total reduced sulfur is present as a trace component in the incoming crude oil feedstock and in small quantities in gasoline and intermediate streams. A reduction in refinery throughput to eliminate total reduced sulfur usage or creation will not benefit Suncor's business growth, however Suncor is committed to operating in the most responsible and efficient manner, in full compliance with all federal, provincial and municipal regulations.

7.0 OBJECTIVE

Suncor Sarnia Refinery is committed to producing high quality products in an environmentally responsible manner. While Suncor does not intend to reduce the use or creation of total reduced sulfur, we will continue to optimize unit operations such that further reductions may be possible.

8.0 PLAN SUMMARY STATEMENT

This Toxic Substance Reduction Plan Summary reflects the content of the Toxic Substance Reduction Plan for total reduced sulfur and hydrogen sulfide, prepared by the Suncor Sarnia refinery dated December 1, 2013.

9.0 PLAN CERTIFICATION STATEMENT

The reduction plan certifications by the Highest Ranking Employee and the Licensed Planner are provided in Appendix 1 of this report, as required by the Act and regulation.

APPENDIX 1 – TOXIC SUBSTANCE REDUCTION PLAN CERTIFICATION

9.0 CERTIFICATION BY PLANNER

As of December 1, 2013, I Mark Roehler certify that I am familiar with the processes at Suncor Energy Sarnia Refinery 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 December 1, 2013 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Toxic substances

- Total Reduced Sulfur
- Hydrogen Sulphide

Mark Roehler TSRP0128

10.0 CERTIFICATION BY HIGHEST RANKING EMPLOYEE

As of December 1, 2013, I, Mark Hiseler, 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.

Toxic substances

- Total Reduced Sulfur
- Hydrogen Sulphide

Mark Hiseler