2019 Toxic Substance Reduction Plan Summary
For Reporting Year 2018

Nachurs Alpine Solutions
1356 Nafziger Road
New Hamburg, Ontario
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Marion, Ohio 43302
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1.0 Basic Facility Information

Nachurs Alpine Solutions (Nachurs) is a specialty chemical company that receives raw materials and formulates, markets, and distributes liquid nutrient materials through all of North America. Nachurs specializes in liquid fertilizers sold by the gallon, which are mixed and produced on-site. The company also manufactures and sell products that use similar fertilizer ingredients to the industrial and service industries.

The toxic substances listed below were used at the New Hamburg facility in quantities above the reporting threshold:

- Copper CAS: 7440-50-8
- Manganese CAS: 7439-96-5
- Sulfuric (Sulphuric) Acid CAS: 7664-93-9
- Zinc CAS: 7440-66-6
- Ammonia CAS: NA-16
- Phosphorus CAS: NA-22
- Nitric Acid CAS: 7697-37-2
- Nitrate Ions CAS: NA-17

The National Pollutant Release Inventory (NPRI) identification number for the facility: 5705

The legal and trade names of the owner and the operator of the facility, the street address of the facility and, if the mailing address of the facility is different from the street address, the mailing address.

Owner: Wilbur – Ellis
345 California Street, 27th Floor
San Francisco, California 94104
USA

Operator: Nachurs Alpine Solutions
1356 Nafziger Road
New Hamburg, Ontario
Canada
N3A 3G8

The number of full-time employee equivalents at the facility: **19**

The six-digit NAICS Canada code for the facility.

- NAICS 6 Code: 325314 - Mixed Fertilizer Manufacturing

The name, position and telephone number of the individual who is the contact at the facility for the public.

Ms. Carrie Sciarra
Position: Plant Manager
Phone: 519.662.2352
Email: SciarraC@nachurs-alpine.com

The spatial coordinates of the facility expressed in Universal Transverse Mercator (UTM) within a North American Datum 83 (NAD83) datum:

Latitude: 43.391
Longitude: -80.689
UTM: 17T 525188 4804283
Datum: 1983

In respect of each person who is the Canadian parent company of the facility, if applicable. The legal name of the person, the street and mailing address of the company, if different from the addresses mentioned in paragraph 4.

Responsible: Nachurs Alpine Solutions
421 Leader Street
Marion, Ohio
43302

Percent ownership: 100% owned by Wilbur Ellis
San Francisco, California

2.0 Statement of Intent

The intent of this report is to investigate the use of NPRI substances at Nachurs Alpine Solutions (Nachurs) in New Hamburg, Ontario. While Nachurs does not intend to reduce its use of copper, manganese, sulfuric acid, zinc, ammonia, phosphorus, nitric acid and nitrate ions as it would not be beneficial to Nachurs' business. They are committed to ensuring it is manufactured in the most responsible and efficient way possible.

3.0 Objectives and Targets

Nachurs does not intend to reduce the use of copper, manganese, sulfuric acid, zinc, ammonia, phosphorus, nitric acid and nitrate ions. However, Nachurs is committed to reducing spills and leaks. This will be done by implementing frequent maintenance checks of all equipment and adding site-specific employee training.

4.0 Description of Why Each Toxic Substance is Used or Created

As stated elsewhere in this summary, the facility creates or uses eight (8) chemicals or substances that the MOECC has defined as a "toxic substance" under the Toxic Reduction Act.

- Copper
- Manganese
- Sulfuric Acid
- Zinc
- Ammonia
- Phosphorus
- Nitric Acid
- Nitrate Ions

Of the eight (8) toxic substances, all are used in the production of fertilizer and liquid nutrients. One (1) substance (nitrate ions) is created from facility operations, six (6) substances (ammonia, copper, manganese, nitrate ions, phosphorus, and zinc) are contained in final fertilizer and micronutrient products, and two (2) substances (sulfuric acid and nitric acid) enter the facility as raw materials and are used to formulate final products. As such, it is impossible to reduce the usage of each substance without altering the production levels of the facility, which would affect the business.

5.0 Reduction Options Considered

5.1 Materials or Feedstock Substitution

Material or feedstock substitution is not a feasible method of reduction for Nachurs Alpine Solutions Inc. While different sources of copper, manganese and zinc could be used, the amount of these micronutrients necessary to reach product specification would remain unchanged. All the copper, manganese and zinc added to the mixer are contained in the final product (with minimal losses) and are used to improve the nutrition of plants. Using lower concentrations of toxic substances in the raw materials could slightly reduce the amount of toxic substances that are lost during manufacturing, but would also increase manufacturing time and energy requirements, and potentially introduce unwanted impurities into the final product.

In regards to the use of sulfuric acid for ammonium sulfate production, material and feedstock substitution is not feasible. The final product must contain a specific amount of sulfur and the source of sulfur must be reactive towards ammonia. Sulfuric acid, being a strong acid, is able to push the reaction towards the final ammonium sulfate (AMS) product. It is also commercially available at a reasonable price to make a profit off the product.

The use of ammonia as a raw material is very important to provide the required nutrients to plants when used in fertilizers. Nitrogen is one of the three major nutrients required by plants, and in the form of ammonium ions, it is readily available and quickly absorbed by the plants. Ammonia is also essential for the manufacture of ammonium polyphosphate, which is a key ingredient for fertilizers. Other nitrogen sources, such as urea and nitrate ions, are available but not only do they have lower nitrogen content; they are also not as reactive with other fertilizer ingredients which help the final product be stable and have a neutral pH. It would be possible to switch from purchasing pure anhydrous ammonia to purchasing ammonium polyphosphate and aqua ammonia, but the facility would still require the same amount of ammonia in total and the raw material costs would increase greatly.

The use of phosphorus as an ingredient in the company's fertilizer is essential, and material or feedstock substitution is not feasible. Phosphorus is one of the three key nutrients required for plant growth, and is especially important for starter fertilizers as the phosphorus helps promote root growth. Phosphoric acid is the ideal feedstock for fertilizer productions as it is readily available in bulk, contains a high amount of phosphorus, and is useful to react with and neutralize the main sources of other nutrients such as aqua ammonia and potassium hydroxide. Since the toxic substance (phosphorus) is the desired nutrient, the use of different raw materials would not decrease the overall amount of phosphorus used in the process.

The use of nitric acid and nitrates as raw materials are also very important. Calcium nitrate is one of the products that is produced in the largest quantities at this facility. Calcium nitrate is used both as a fertilizer and for a variety of industrial uses. Another possible method of making calcium nitrate is by reacting hydrated lime with ammonium nitrate. However, many of Nachurs' industrial customers require ammonia-free calcium nitrate. In order to use this method, nitric acid would still be required to make the ammonium nitrate as well, so the amount of nitric acid used would not decrease it would only be redirected. If Nachurs' were to purchase all of their ammonium nitrate in using this method, raw material costs would greatly increase, which would hurt Nachurs' ability to be competitive in pricing. The other sources of nitrate ions used within the process are also essential for certain fertilizer blends. In many fertilizer applications, nitrate nitrogen is preferable to ammoniacal or urea nitrogen. A material substitution that has been implemented to reduce the amount of nitrate ions used at the facility is eliminating the use of ferric nitrate to produce the chelated iron micronutrient.

5.2 Product Design or Reformulation

Product design/reformulation is also not feasible for Nachurs. The copper, manganese and zinc in the feedstock are necessary to achieve the appropriate levels of chelated micronutrient in their fertilizer package. Since each micronutrient package is designed to give the plant the appropriate amount of each nutrient, it would not be economical to change the amount of copper, zinc or manganese in the final product.

To produce ammonium sulfate (AMS), ammonia and sulfuric acid are the most commonly used materials. AMS can be produced using ammonium carbonate and gypsum. However, this method would not be in Nachurs' best interests since it would involve a multiple-step process to produce AMS and filter/remove the calcium carbonate by-product. Since ammonia is already available on-site, it is more reasonable to bring in sulfuric acid and run a one-step process to produce AMS and water, which are both contained in the product.

Product reformulation is not possible with the use of phosphorus as a fertilizer ingredient. Phosphorus is one of the three major nutrients that are important for plant growth, and thus a vital ingredient in most fertilizers. Different forms or concentrations of phosphorus products as formulation components would still not reduce the total amount of phosphorus used in the process and contained in the final product. Phosphoric acid is also necessary as a reactant to produce ammonium polyphosphate.

The reduction of the use of ammonia is also not feasible by product reformulation. Ammonia provides a high amount of nitrogen, and is soluble and reactive with other fertilizer formulation components. There are other nitrogen sources available, but using them would significantly reduce the quality of the final product. Ammonia is also necessary as a reactant to produce ammonium polyphosphate, which is a key ingredient in liquid fertilizers.

The reduction of nitrate ions is not possible for most of the products that contains nitrates. Nitrate ions are usually the desired source of nitrogen in these products, and thus a vital ingredient. Nitrate ions are preferable to ammonium ions, in some cases, because they are less likely to be lost to vaporization. Nitrates are also useful because they are an acidic form of nitrogen, where ammonia and urea are basic. Urea ammonium nitrate, for example, is a very high nitrogen fertilizer that is still relatively neutral due to the nitrates reacting with the ammonium. The one (1) option that has been implemented to reduce the use of nitrate ions is replacing ferric nitrate with ferric chloride in the iron micronutrient product. This does eliminate the nitrogen component of this product, but the main purpose of this product is to provide iron and the nitrogen content is not critical.

5.3 Equipment or Process Modification

Current equipment and process steps are necessary to achieve the final product. All the ingredients (including toxic substances) are combined in a mixer/reactor and then transferred to storage until packaged or mixed into other fertilizers to add a specific nutrient package. The process to produce the copper, manganese and zinc micronutrient is a simple mixing of the necessary ingredients and result in no by-products. To produce AMS, all ingredients are placed in the reactor and consumed to produce AMS and water, which are both contained in the product. Ammonia is processed in continuous reactors either with water to make aqua ammonia or with phosphoric acid to create ammonium polyphosphate. The product is then stored for further use in fertilizer blends or sale.

There are no by-products or waste and very little air emissions of ammonia. One (1) potential process modification that would reduce the air emissions of ammonia would be to remove the ammonium polyphosphate cooling tower and use non-contact cooling water to dissipate heat from the product.

Phosphoric acid is processed directly off the railcar either by making it into ammonium polyphosphate or by cutting it with water on the way to storage. The diluted phosphoric acid and ammonium polyphosphate are both stored for use in fertilizer blends or for direct sale. Nitrate ions are used and produced in a variety of processes. The main process that produces nitrate ions is the manufacturing of calcium nitrate. Nitric acid is charged into a batch reactor with water and hydrated lime is slowly added to neutralize the nitric acid. Meanwhile, the batch is continuously cooled by recirculation through a non-contact heat exchanger. Once the batch is neutralized, a filter aid is added and the calcium nitrate is filtered using a filter press and then stored.

The filter cake residue from the filter press is collected and recycled as detailed in Section 5.5. Nitrate ions are also produced in the manufacture of ammonium nitrate. This is also a batch process where nitric acid and water are charged into a batch reactor, and then aqua ammonia is slowly injected into the reactor while it is being continuously cooled by recirculation through a non-contact heat exchanger. Once the batch is neutralized, it is pumped into a tank for storage or blending with other products. Potassium nitrate is purchased as a solid and added directly to any fertilizer blends. Urea ammonium nitrate is unloaded from delivery trucks into tank storage where it can be pumped into fertilizer blends or loaded out directly for resale.

5.4 Spill or Leak Prevention

In order to reduce spills and leaks, two (2) options have been adopted at the Nachurs facility. The first is to ensure all equipment receives frequent maintenance evaluations and that appropriate measures are taken to prevent potential leaks. The second is to train all employees on a regular basis in safe work practices to reduce the potential for accidental spills. The reduction of spills/leaks would eliminate the accidental release of any toxic substances. Based on the typical analyses of the containment water, there is a few hundred kilograms per year of the major fertilizer nutrients lost through minor spills and leaks.

5.5 On-site Reuse or Recycling

Nachurs currently recycles any fertilizer residue. Any residual run-off is collected along with storm water and tested for different nutrients (nitrogen, phosphorus, potassium, and micronutrients). It is then applied to local farmer's fields to improve crop and soil quality. This prevents waste from being discharged into the air or water (where it could be harmful) and allows all leaks and spills to leave the plant as a beneficial product. The filter cake from the filtration of calcium nitrate is also recycled in farmer's liquid manure tanks to add nutrients to the manure and dispose of it in a responsible manner.

5.6 Improved Inventory Management or Purchasing Techniques

Inventory management and purchasing techniques at Nachurs are documented in a well-organized manner. All orders for raw material are documented in a raw material inventory spreadsheet showing important information such as date, supplier, railcar number (if necessary), quantity, monetary value, etc. The quantity and product in each storage tank is known and documented on a monthly basis. Each product is formed through a specific recipe. Samples from each batch are tested for quality control to determine the percentage of active ingredient present. The amount of final product leaving the plant is also documented.

5.7 Training or Improved Operating Practices

As previously discussed in Section 5.4, all employees are trained on a regular basis in safe work practices to reduce the potential for accidental spills. All operators at Nachurs are trained on safe operating procedures to ensure proper transfer of materials and operation of machinery. They also received regular training in the transportation of dangerous goods. A review of these materials could be done more frequently to ensure these procedures are being followed.

5.8 Feasible Options

5.8.1 Technical Feasibility

Below is a list of options that have been determined to be technically feasible:

- Option 1: Spill or Leak Prevention through frequent maintenance checks.
- Option 2: Train more frequently to remind operators of safe operating procedures.

5.8.2 Economic Feasibility

For each option that has been determined to be technically feasible, Nachurs has already adopted the described processes. Frequent maintenance checks are performed by the maintenance team on a monthly basis. Furthermore, employees that work at or near the equipment inspect daily that all valves, gears, and visible equipment are in proper working order. Option 2 requires frequent training for safe operating procedures. As of right now, all general awareness and operating procedure, training is performed on an annual basis with additional training upon any new employees hired at the facility. In addition, supervisors and management staff go over daily production changes and reiterate safe operating practices.

6.0 Reduction Options to Be Implemented

There are no major reduction options being implemented at this time. The products containing the toxic substances are being sold to customers and it is Nachurs Alpine Solution's intent to increase the sale of these products. All the toxic substances that are being used are sold in the actual products. The only by-product that is created containing a toxic substance is the filter cake from the calcium nitrate process, and this by-product is recycled for use in fertilizer. None of these toxic substances are released to the environment in a way that they can cause harm. The only release to the environment is a small amount of air emissions from the ammonium polyphosphate cooling tower, which has been studied in the past and been determined to be a small enough release so as not to have any detrimental effects on the environment.

7.0 Certifications

7.1 By the Highest Ranking Employee

As of Dec 30, 2019, I, Carrie Sciarra, certify that I have read the reports on the toxic substance reduction plans for the toxic substances referred to below and am familiar with their contents, and to my knowledge the information contained in the reports is factually accurate and the reports comply with the Toxic Reduction Act, 2009 and Ontario Regulations 455/09 (General) made under the Act.

- Copper
- Manganese
- Sulfuric Acid
- Zinc
- Ammonia
- Phosphorus
- Nitric Acid
- Nitrate Ions

Carrie Sciarra

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Plant Manager
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