Ontario

Ministry of the Environment
Ministère de l'Environnement

Provincial Officer's Report

Order Number
6076-8RJRUP

Reference Number
3827-8RJSTB

Northstar Aerospace (Canada) Inc.
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Milton, Ontario, L9T 3H5
Canada

Northstar Aerospace, Inc.
6006 WEST 73RD St
Bedford Park, Illinois, 60638
USA

Site
695 Bishop St N
Cambridge, Regional Municipality of Waterloo

Introduction
As a Provincial Officer with the Ministry of the Environment (the Ministry), Guelph District Office, West Central Region I have been involved with the Northstar Aerospace (Canada) Inc. site located at 695 Bishop Street North in Cambridge, ON since 2004. This Provincial Officer's Report has been prepared to summarize the environmental investigations in an area of Cambridge referred to as the Bishop Street Community in support of the attached Director's Order.

Background

Northstar Aerospace (Canada) Inc. ("Northstar") is the owner of 695 Bishop Street North ("Site") in Cambridge, Ontario. Northstar's core business involves the manufacturing and processing of flight critical gears for the aerospace industry.

Historically, Northstar operated a manufacturing and processing facility at the Site. The processing operations involved the metal plating of parts and the use of Trichloroethylene (TCE) as a metal degreaser.

TCE is an industrial solvent that has been commonly used as a metal degreaser since the 1930's. It is a volatile organic compound and has recently been identified as a human carcinogen. TCE is a volatile, non-flammable, colourless liquid.

On October 19, 2004, a lawyer for Northstar notified the Ministry that soil and groundwater contamination had been found in the southwest corner of the Site , and that contaminated groundwater could possibly be flowing off-Site. The primary contaminants consisted of TCE and hexavalent chromium.

On June 30, 2005, Northstar notified the Ministry that groundwater sampling results from monitoring wells installed in a residential area southwest of the Site showed elevated TCE concentrations of up to 4,000 parts per billion. At the time the applicable Ministry standard for TCE in groundwater was 50 parts per billion. The main concern based on the TCE groundwater concentration would be for the TCE to evaporate from the groundwater, enter the surrounding soil as vapour and then migrate into the indoor air of the overlying buildings. The phrase "soil vapour intrusion" refers to the process by which volatile substances move from a subsurface source into the indoor air of overlying buildings. The TCE groundwater concentrations prompted Northstar to meet with residents of approximately 12 homes and to arrange for indoor air sampling so Northstar could assess if TCE soil vapour intrusion was occurring.

An initial phase of indoor air sampling was completed by Northstar in ten homes in the first half of July 2005. The results from this sampling showed elevated concentrations of TCE in indoor air. Based on the discovery of the TCE in indoor air and the TCE groundwater concentrations Northstar commenced an extensive groundwater and soil vapour intrusion investigation.

610 IS GE SITE

In August 2007, the Ministry completed a review of hydrogeological reports for 610 Bishop Street North. The Ministry's review concluded that 610 Bishop Street North is a source of TCE in the groundwater, that contamination from Northstar is migrating onto the 610 Bishop Street North property and that the western portion of the groundwater plume is a co-mingled plume originating from both 610 Bishop Street North and the Site.

NOT ALWAYS CLOSEST TO SOURCE

Borg-Warner (Canada) Limited is the last known user of TCE at 610 Bishop Street. GE Canada is the legal successor to Borg-Warner (Canada) Limited. GE Canada has been actively engaged in the groundwater and soil vapour intrusion investigations.

The area under investigation is referred to as the Bishop Street Community and the investigation is currently ongoing.

BUT DIRECTORS ORDER IS ONLY AGAINST NAK - NOT GE

Indoor Air Monitoring and Mitigation

In 2005, Northstar prepared and submitted a draft Indoor Air protocol to the Ministry and the Region of Waterloo Public Health ("Public Health"). This protocol proposed the sampling methodology and the actions to be taken should indoor sample results identify concentrations of TCE. The Ministry reviewed the protocol and provided recommendations to Public Health. Based on the protocol, and the recommendations from the Ministry, Public Health published a TCE Fact Sheet including the recommended action levels for indoor air TCE concentrations.

An improved understanding of the human toxicity of TCE resulted in changes to the generic soil and groundwater standards under Regulation 153/04 which were finalized on December 29, 2009. The groundwater standard was lowered from 50 parts per billion to 1.6 parts per billion. The science behind the change to the groundwater standard was also applicable to the understanding of the acceptable TCE indoor air concentrations as a result soil vapour intrusion.

Based on the regulatory changes the ministry lowered the interim indoor air no action level for the Bishop Street Community from 2.3 µg/m3 to 0.5 µg/m3 (micrograms per cubic metre) for TCE. The target value of 0.5 ug/m3 represents a one in million lifetime cancer risk.

To address the regulatory changes Northstar, in cooperation with GE Canada, resubmitted to the Ministry and Public Health a revised Indoor Air Protocol, dated September 1, 2010, for the Bishop Street Community. Public Health subsequently revised their TCE Fact Sheet.

The current version of the indoor air protocol for the Bishop Street Community dated December 14, 2011, requires homes be assessed for mitigation systems when indoor air TCE concentrations are above 5 µg/m^3. This is consistent with the current version of the TCE Fact Sheet published by Public Health (Schedule "D"). The interim indoor air action levels have been put in place to be protective of human health. The indoor air protocol is to be revised and updated as required on an annual basis.

The below table shows the levels of TCE as of February 2012

410	223	7	8	648

The below table shows the historical levels of TCE

Number of Residences with TCE µg/m3 levels				Total
< 0.5	0.5 - 5	5 - 10	>= 10	
119	221	55	253	648

Indoor air concentrations have been reduced due to the installation of indoor air mitigation systems and because of a reduction in TCE groundwater concentrations.

To date, 212 properties have some form of mitigation system installed. Active mitigation systems which require ongoing operation and maintenance are soil vapour extraction systems ("SVES"), sub-slab depressurizations systems ("SSDS"), heat recovery ventilation systems ("HRVS"), photo-catalytic oxidizers ("PCO"), and portable carbon units.

The continued operation of indoor air mitigation systems is essential in ensuring TCE levels, as a result of soil vapour intrusion, are maintained within the accepted framework.

Groundwater Monitoring and Remediation

An Interim Remedial Action Plan ("IRAP") to address ground water impacts at the Site and the Study Area was issued in draft on July 05, 2006, as a Conceptual Remedial Action Plan (AMEC, 2006d), issued in revised draft form as an Interim Remedial Action Plan on 30 August 2006 (AMEC, 2006e) and finalized as an Interim Remedial Action Plan on 31 January 2007 (AMEC, 2007). The finalized IRAP was deemed acceptable by the Ministry.

On September 2, 2011, an update to the original IRAP was finalized. The updated IRAP was deemed acceptable to the Ministry. This IRAP Update covers the next 18 months of remediation activity, after which the Ministry expect another performance review will be undertaken and another IRAP Update issued. The groundwater remediation strategy includes:

- In-situ Chemical Oxidation ("ISCO")
  - Injection of potassium permanganate into the ground water to actively destroy TCE
- Pump and Treat Remediation
  - Groundwater is extracted from a possible six extraction wells located on and off-Site, treated and discharged to the municipal storm sewer. The pump and treat system not only helps remove contaminants from the groundwater but also prevents the further migration of contaminants off-Site. The Ministry has issued Certificate of Approval No. 2388-7KLJ35 to Northstar for the operation of the pump and treat system.
- Soil Vapour Extraction

To date, Northstar has installed approximately 130 groundwater monitoring wells on the Site and to the south and the south-west of the Site. Currently, the highest off-Site TCE groundwater concentration is 43,000 parts per billion. The current groundwater standard under Regulation 153/04 is 1.6 parts per billion.

The continued operation of the pump and treat system is essential to preventing the further migration of contaminants off-Site.

Surface Water Monitoring

Groundwater impacted with TCE and hexavalent chromium extends to the Grand River where there is some groundwater discharge, from springs and seeps, to the river.

Three times per year Northstar collects surface water samples discharging from seeps and springs on the eastern shore of the Grand River, from the river at locations along the eastern shore and from three transects across the river in addition to the collection of ground water samples from nearby monitoring wells.

The results of the sampling is reported to and reviewed by the Ministry.

The most recent surface water sampling was completed in October 2011. Sample results collected from a "spring" flowing to the Grand River had concentrations of TCE and hexavalent chromium above their respective Provincial Water Quality Objectives. However, TCE and hexavalent chromium did not exceed their respective Provincial Water Quality Objective in any samples collected from the Grand River.

The continuation of the surface water sampling program is necessary to evaluate potential adverse effects to the Grand River.

Drinking Water

Groundwater supplies the City of Cambridge with a significant source of drinking water. The nearest Regional well (P6) is located in the Dumfries Conservation area, approximately 750 m south east (and not directly down gradient of) the groundwater contaminant plume. Since August 2005, P6 has been monitored on a monthly basis by the Region of Waterloo. There have been no detections of TCE in P6.

A sentry well has been installed between where groundwater contamination is known and P6. There have been no detections of TCE in the sentry well.

The continued monitoring and remediation of the groundwater is necessary to prevent potential impacts to P6 and the Region of Waterloo drinking water supply.

Communications

Northstar has been very proactive in communicating with the Public, the Region of Waterloo (Public Health and Water Services), City of Cambridge, the Grand River Conservation Authority, and the Ministry.

Northstar established a Community Information Centre (CIC) located at the Site to serve as the first point of contact for the Public and government agencies, and as the central hub of operations for the environmental programs including indoor air monitoring and groundwater investigations. The CIC is open daily Monday through Thursday.
On a routine basis Northstar prepares and delivers Update letters to all the property owners (tenants) within the current area of investigation. The Update letters provides the public an update on the status of the project and informs them of any changes or news relating to the project.

Northstar also communicates directly with any other stakeholders that may have an interest or be affected by this project. (e.g. banks, insurance accompanies, real estate agents, family doctors, and potential home buyers)

On a routine basis (generally monthly) Northstar meets with the government agencies to provide an overview of the work being undertaken, the future plans, and to answer questions.

Since 2005, Northstar has attended or hosted approximately ten face to face public meetings. At these meetings Northstar has made presentations to the public describing in detail the work being completed in the Bishop Street Community. These meetings also provided the public with the opportunity to ask questions or voice their concerns.

Conclusion

TCE and hexavalent chromium are both know human carcinogens. Groundwater impacted by TCE or hexavalent chromium poses potential adverse effects to human health and the environment.

While Northstar has undertaken all needed investigation, mitigation and remediation programs on a voluntary basis without the need for a Director's Order, recent financial disclosures made by Northstar have revealed there is significant doubt regarding the Corporation's ability to continue as a going concern which could impact on the environmental remediation programs.

The purpose of the attached Order is to ensure the potential adverse effects from TCE and hexavalent chromium impacted groundwater to human health and the environment continues to be monitored, mitigated and remediated where necessary.

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The requirements of the attached Order, of which this Provincial Officer's Report forms a part, represent the minimum actions to be taken to ensure the protection of human health and the environment, the prevention and mitigation of potential adverse effects associated with the groundwater contamination, and the remediation of the groundwater contamination in the Bishop Street Community.

Provincial Officer: Phil Shewen

Badge Number: 357
Date: March 15, 2012
District Office: Guelph