REGISTRATION OF UNDERTAKING
FOR
ENVIRONMENTAL ASSESSMENT
CLASS 1 UNDERTAKING

(NOVEMBER 16, 2004 ADDENDUM)

ALPHA CHEMICAL LIMITED
533 ROCKY LAKE DRIVE
WAVERLEY, NOVA SCOTIA B4A 3X5
PROJECT NO. NSD18986

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1.0 SETTING AND POTENTIAL IMPACTS

1.1 General Site Setting

The proposed undertaking is located off Rocky Lake Drive, along the southeast side of Rocky Lake, approximately 2 km northeast of Bedford and 3 km southwest of Waverley (Figure 1 in **Appendix A**). Development in the general surrounding area is limited to a concrete contractor (Mobile Ready Mix) located across the road to the north (528 Rocky Lake Drive), a recreation vehicle sales office (Ambassador Recreational Services N.S. Ltd.) located approximately 200 m to the northeast (585 Rocky Lake Drive), and Rocky Lake Quarry located behind the site to the south. Rocky Lake is located across the road to the north.

Site development presently includes a single warehouse building with an office and two railway spur lines extending onto the site from the southwest (Drawing No. NSD18986 –1 in **Appendix B**). The site is gravel surfaced and relatively flat lying. Treed areas lie to the northeast and southeast of the site. A small seasonal stream that receives surface water from the treed hill area to the south was reported to exist near the site's eastern property boundary, but no flow was observed during a site visit on August 26, 2004. However, it is expected that surface water at the site would infiltrate and flow through the rock fill towards a small pond area located at the north corner of the site, adjacent to Rocky Lake Drive. Seasonal outflow from the pond occurs via a ditch along the highway. The ditch water flows through a culvert beneath Rocky Lake Drive and into Rocky Lake. However, it is expected that the pond is also directly hydraulically connected to Rocky Lake through coarse rock fill used to construct the Rocky Lake Drive across this low-lying area.

Rocky Lake receives water from First Lake in Lower Sackville, as well as surface water runoff and groundwater discharge from surrounding areas. Outflow from Rocky Lake occurs via a small stream to the north that discharges into Powder Mill Lake, which in turn discharges into Lake William, which forms part of the Shubenacadie Canal system.

1.2 Species of Special Concern and Species at Risk

A literature search was conducted to determine if any species of concern or species at risk have been reported from the vicinity of the proposed facility. This consisted of a review of the Atlas of Rare Vascular Plants in Nova Scotia (Pronych and Wilson 1993), the Atlas of Breeding Birds of the Maritime Provinces (Erskine 1992), as well as through a data request to the Atlantic Canada Conservation Data

Centre (ACCDC). Jacques Whitford Limited personnel have conducted a number of field studies in the vicinity of the proposed facility. This information was also integrated into the literature review. Data derived from the Atlas of Rare Vascular Plants in Nova Scotia, Atlas of Breeding Birds of the Maritime Provinces and ACCDC have limited precision regarding the locations where species have been recorded. The best resolution currently available is a listing of species within a 5 km radius of the location of interest. As such, it is necessary to compare the habitat requirements of the species found in the general area to the types of habitat present in the study area to determine if there is potential for those species to be present within the footprint of the project.

The area potentially affected by construction and operation of the facility includes the footprint of the facility, which is situated in an abandoned gravel pit. The containment system incorporated into the design of the facility would contain spilled product within the facility under most spill scenarios. In the event of a catastrophic accidental event in which the facility is heavily damaged there is potential for chemicals to migrate off the property into Rocky Lake. As such, habitats potentially affected by the facility include the footprint of the facility as well as aquatic habitats associated with the northern half of Rocky Lake.

Table 1 lists the 21 uncommon, rare and sensitive terrestrial species that have been recorded in the general vicinity of the proposed facility. These species of concern are listed as very rare to uncommon by ACCDC (2004) or are listed as red, yellow or status undetermined by NSDNR (2004a). No species at risk (species listed as endangered, threatened, vulnerable or of special concern by COSEWIC (2004) or NSDNR (2004b)) have been recorded in the vicinity of the proposed facility.

Table 1 Habitat Preferences of Species of Concern Found in the Vicinity of the Study Area

Binomial	Preferred Habitat	Preferred Habitat Present	ACCDC Status	NSDNR Status
Arenaria groenlandica (Mountain Sandwort)	Granitic ledges and gravel on coasts at higher elevations	No	S2	Yellow
Aster undulatus (Waxy-leaved Aster)	Old fields and edges of thickets	No	S2	Yellow
Eleocharis flavescens (Capitate Spikerush)	Peaty muck in bogs, wet sandy shores, and swales	No	S2	Yellow
Elymus wiegandii (Wiegand's Wild Rye)	Streambanks and meadows	No	S1	Red

Binomial	Preferred Habitat	Preferred Habitat Present	ACCDC Status	NSDNR Status
Empetrum rubrum var. eamesii (Purple Crowberry)	Exposed headlands, on top of lichen covered rocks with thin soils	No	S2S3	Yellow
Equisetum variegatum (Variegated Horsetail)	Ditches, quarries, mine tailings, stream banks, bogs, and wet thickets	Yes	S3	Green
Euthamia tenuifolia (Grass-leaved Goldenrod)	Dry sandy soils and beaches	Possibly	S3	Yellow
Polygala sanguinea (Field Milkwort)	Poor or acidic fields, damp slopes, edges of woods roads, and open woods or brush	No	S2S3	Yellow
Thuja occidentalis (Northern White Cedar)	Lakesides, and swamps, or old pastures	No	S1S2	Red
Aster borealis (Boreal Aster)	Gravely soil of lake beaches, along streams and edges of bogs	Possibly	S2?	Undetermined
Gavia immer (Common Loon)	Adults nest on lakes and large rivers. Adults winter in coastal waters. Juveniles live in coastal waters year round	Yes	S	Yellow
Sterna hyrundo (Common Tern)	Generally nest on coastal islands, sand spits, beaches and occasionally salt marshes	No	S3	Yellow
Dolichonyx oryzivorus (Bobolink)	Hay fields and pastures	No	S3	Yellow
Eremophila alpestris (Horned Lark)	Open grasslands with large areas of short or sparse grass cover. Most nesting records in the Maritime Provinces are associated with airfields	No	S2	Green
Caprimulgus vociferous (Whip-poor-will)	Typically associated with dry open deciduous forest	No	S2	Green
Myiarchus crinitus (Great-crested Flycatcher)	Nests in tree cavities in open hardwood forests	No	S2S3	Green
Mimus polyglottos (Northern Mockingbird)	Typically nest in urban and suburban areas in gardens and vacant lots	No	S3	Green
Piranga olivacea (Scarlet Tanager)	Nest in mature hardwood forest	No	S3	Green
Poecile hudsonicus (Boreal Chickadee)	Coniferous forest, particularly stands dominated by black spruce and balsam fir	No	S3S4	Green

Binomial	Preferred Habitat	Preferred Habitat Present	ACCDC Status	NSDNR Status
Euphagus carolinus (Rusty Blackbird)	Typically associated with swamps along sluggish streams or stillwaters, generally in areas remote from human settlement	No	S3S4	Green
Hemidactylium scutatum (Four-toed Salamander)	Nests in sphagnum moss hummocks adjacent to pools or sluggish streams. Outside of breeding season found in woodlands adjacent to breeding sites	No	S3	Yellow

ACCDC Status Key

- S1 – Very rare throughout its range in Nova Scotia.
- S2 – Rare throughout its range in Nova Scotia.
- S3 – Uncommon throughout its range in Nova Scotia.
- S4 – Widespread, abundant, and apparently secure throughout its range in Nova Scotia.
- S#S# - Numeric range rank: A range between two consecutive numeric ranks. Denotes range of uncertainty about the exact rarity of the species (e.g. S3S4)
- S#? – Denotes inexactness or uncertainty regarding the rank (e.g. S2?)

NSDNR Status Key

- Green (Secure) - Species that are not believed to be at risk, or sensitive.
- Yellow (Sensitive) - Species that are not believed to be at risk of immediate extirpation or extinction, but which may require special attention or protection to prevent them from becoming at risk.
- Red (At Risk or Maybe at Risk) - Species for which a formal detailed risk assessment has been completed (COSEWIC assessment or a provincial equivalent) and that have been determined to be at risk of extirpation or extinction. Species that maybe at risk of immediate extirpation or extinction and are therefore candidates for interim conservation action and detailed risk assessment by COSEWIC or the Province.
- Undetermined – Insufficient data to rank the population.

Suitable habitat is present in the study area for 4 of the 21 species, Common Loon, grass-leaved goldenrod, boreal aster, and variegated horsetail. Common Loons are regularly observed on Rocky Lake and loon nesting has been confirmed on this lake. Although Common Loons are still common in Nova Scotia, they are susceptible to a number of anthropogenic activities. These include flooding of nests by power boat wakes and water level fluctuations associated with hydroelectric dams; disturbance of nesting loons by recreational boaters and fishermen; loss of nesting habitat through development of lakefront properties; lead poisoning through ingestion of lead fishing sinkers; and mercury poisoning associated with aerial deposition of mercury and the production of methyl mercury in impoundments. Common Loons could be adversely affected by catastrophic failure of the facility resulting in the release of stored chemicals into Rocky Lake either directly through ingestion of contaminated fish or water, or

indirectly through reductions in the number of fish in Rocky Lake. Common Loons can be expected to be present on Rocky Lake from mid-April to October.

Several methods could be used to minimize the effect of a catastrophic chemical spill on Common Loons. Many of the chemicals stored at the facility are water soluble and it would be difficult to contain them once they entered the pond (approximately 3 million litres) and lake. If contaminants enter the lake a brief scare program could be used to keep Common Loons off the eastern end of the lake until contaminant concentrations in the lake had been reduced to non-toxic levels. This would require boat patrols to frighten loons from the eastern end of the lake and ensure that they do not return until conditions become safe. A better approach would be to contain spilled chemicals before they entered the lake. One means of doing this would be to construct a sump along the projected course of the chemicals to intercept the plume before it reaches the lake.

Common Loons could be adversely affected by chronic releases of small quantities of chemicals. The spill containment structures incorporated into the design of the facility would substantially reduce the potential for chemicals to escape from the facility. Spill containment and clean-up equipment should be inspected on a regular basis to ensure that it is functioning properly. A series of monitoring wells should be constructed to detect chronic leakage from tanks or dikes. These monitoring wells would be used to provide data regarding the best location for a sump to intercept spilled chemicals.

Construction and normal operation of the facility are not expected to have a significant adverse effect on local Common Loon populations. Accidental events associated with the proposed facility are not expected to have a significant effect on Common Loon populations provided mitigative measures are employed to minimize chronic and catastrophic spills of chemicals at the facility.

Both grass-leaved goldenrod and boreal aster are associated with lake shores. Grass-leaved goldenrod is listed as uncommon (S3) by ACCDC and the Nova Scotia population is considered to be sensitive to anthropogenic activities and natural events (Yellow listed) by NSDNR. The status of boreal aster is more poorly understood. It is listed as possibly rare (S2?) by ACCDC and NSDNR lists the status of this species as undetermined. Grass-leaved goldenrod has been reported from the shores of Third Lake in Windsor Junction. Boreal aster has been found locally in a bog near the northern end of Rocky Lake and in a bog in Beaverbank. Both species are associated with sandy or gravely beaches. The northern half of Rocky Lake is characterized by a shoreline composed of large boulders which is unsuitable for these two species. However, there may be small patches of sand or gravel beach interspersed along the bouldery shoreline that may provide suitable habitat. Construction and normal operation of the facility are not expected to adversely affect these species. A large scale spill of chemicals that enter the lake

could affect these species if they are present along the lake shore. The most effective means of mitigating the effects of a spill on these species would be to construct a sump to intercept a plume of spilled chemicals before it reaches the lake.

Variegated horsetail is typically associated with disturbed areas. It has been found in several locations in the vicinity of Rock Lake including an old quarry in the Bedford Industrial Park and in roadside ditches along Highway 118. It has been found at a number of locations in the vicinity of Halifax, mainly in ditches, road excavations, quarries and on mine tailings. Variegated horsetail is listed as uncommon by ACCDC and NSDNR considers the Nova Scotia population to be secure. The presence of this species within the footprint of the project would not be a significant constraint to the project since this species is well represented in the local area.

Fish species in Rocky Lake is diverse and that community is comprised of white perch (*Morone americana),* brook trout (*Salvelinus fontinalis*), white sucker (*Catostomus commersoni*), black bass (*Micropterus dolomieui*), American eel (*Anguilla rostrata*), and gaspereau (*Alosa pseudoharengus*). All of these species are common in Nova Scotia lake systems. None of these species are considered rare, threatened or endangered.

While Rocky Lake is immediately adjacent to the proposed bulk tank storage facility and downstream receiving waterbodies are still at risk in the event of a spill. Rocky Lake flows into Powder Mill Lake, which in turn flows into Lake William. Lake William does support two species of fish that are red listed by the Nova Scotia Department of Natural Resources: Atlantic Salmon (*Salmo salar*) and striped bass (*Morone saxatilis*). A red listed species is one that is known to be or is thought to be at risk. The Atlantic Canada Conservation Data Centre supports this ranking. COSEWIC lists the inner Bay of Fundy stock of Atlantic Salmon. Therefore, all measures must be taken to ensure that any spill is contained on site to prevent introduction into the lake system. However, any product spilled at this site and bypassing the sump and berm would probably be diluted to non-toxic levels in the eastern section of Rocky Lake.

1.2.1 References

Atlantic Canada Conservation Data Centre (ACCDC). 2004. Species Lists and Rare Species. Internet Publication: http://www.accdc.com/products/lists/.

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2004. Canadian Species at Risk. Internet Publication. http://www.sis.ec.gc.ca/msapps/ec_species/htdocs/ec_species_e.phtml.

Erskine, A.J. 1992. Atlas of Breeding Birds of The Maritime Provinces. Nimbus Publishing and the Nova Scotia Museum, Halifax, NS. 270 pp.

Nova Scotia Department of Natural Resources (NSDNR). 2004a. General Status Ranks of Wild Species in Nova Scotia. Internet Publication: http://www.gov.ns.ca/natr/wildlife/genstatus/ranks.asp.

NSDNR. 2004b. Species at Risk in Nova Scotia. Internet Publication: http://www.gov.ns.ca/natr/wildlife/endgrd/specieslist.htm.

Pronych, G. and A. Wilson. 1993. Atlas of Rare Vascular Plants in Nova Scotia. Nova Scotia Museum of Natural History, Halifax, NS, Curatorial Report No. 78, 331 pp.

1.3 Geology

The geology at this site is expected to include a thin discontinuous till deposit which overlies bedrock. Geological mapping indicates surficial soil in the area is characterized as discontinuous, till plain with a stony sandy matrix derived from local bedrock. Bedrock in the area is the Goldenville Formation of the Meguma Group, which includes metamorphosed sandstone and siltstone (e.g. greywacke and minor slate). Site observations indicate that much of this site is gravel surfaced with occasional bedrock outcrops, which suggests the till cover is thin and discontinuous across the site, and that a gravel fill was used in the past to infill low areas to create the site's present flat grade.

1.4 Hydrogeology

Shallow groundwater beneath the subject site is expected to flow in a northwesterly direction, originating in the higher elevation area to the south of Rocky Lake Quarry, and locally discharging to Rocky Lake. Groundwater recharge (or any uncontrolled spills) occurring at the site is expected to discharge into the site pond or Rocky Lake. Deep groundwater beneath the site may flow towards Bedford Basin to the southwest.

1.5 Water Wells

A review of Nova Scotia Department of Environment and Labour (NSDEL) water well records between 1977 and 2000 did not identify any domestic wells located along Rocky Lake Drive. However, it is understood that the subject site presently obtains domestic water from a 15 metre (50 ft) deep well

located just outside the footprint of the office at the southeast corner of the building. Included in **Appendix D** is a copy of the recent water analysis results for this well. Mobile Ready Mix report that they obtain water directly from the lake for site usage and their site does not have a water well. The recreational vehicle sales outlet reported that they obtain domestic water from a site water well. Although further construction details of the two reported domestic wells are not known, based on the inferred geology of the area it is expected that each would be constructed into bedrock with approximately 6 m (20 ft) of steel casing. The water levels are expected to be relatively shallow based on the presence of the nearby lake.

1.6 Potential Groundwater Impacts

Any potential impacts released to the groundwater near the existing warehouse structure or the proposed storage facility at the subject site, would be expected to migrate towards the site pond that is connected to Rocky Lake, and/or beneath the highway and directly into Rocky Lake. The areal extent of the resulting groundwater plume would be limited in size due to the inferred shallow groundwater flow direction being directly towards the site pond and nearby lake. Since the site's domestic well would lie within this area, it is expected that it would become impacted. The neighboring domestic well would not be affected from any impacts originating from the subject site.

2.0 CONTAINMENT PLAN AND STORMWATER MANAGEMENT

The proposed bulk storage facility, located near a lake that has an active ecosystem, has been given special containment considerations in line with the environmental sensitivity of the area. In order to prevent any adverse effects to the local ecosystem Alpha Chemical Ltd. (Alpha) has redesigned its containment system to include 110% of the largest vessel (Rail Car) plus 10 % of all other tanks in containment. There is also primary, secondary and tertiary (except for the existing Warehouse) containment for each transfer process or storage facility listed below:

In addition to installing a tertiary containment system Alpha Chemicals will have detailed work instructions outlining the step by step process control for each product handled on site. These work instructions will be performed by Process Operators to ensure zero release to the environment. Each Process Operator that handles and transfers product on site will be thoroughly trained in the proper handling procedure for each product stored, handled, or blended onsite. Process Operators will also be trained on the operation and maintenance of the bulk tank containment system, along with a training component on the sensitivity of the local environment.

2.1 Rail Car Loading/Offloading Containment

2.1.1 Primary

The rail car is the largest container of product while on site. Each car has a top and a bottom offloading valve system. The top offloading valve system will be used during product transfer whenever possible. All valves on the rail car will be locked while not in use to prevent unauthorized access. As a further safety precaution, a ball valve will be installed on the end of the transfer hose to prevent product release during connection and disconnection to the car.

2.1.2 Secondary

Underneath the rail car's valve system, a steel catch pan will be installed to divert any product released during loading/offloading onto the reinforced concrete truck loading/offloading containment pad. The catch pan will be fastened to the rail line to prevent movement during the loading/offloading of product. The truck loading/offloading containment pad will be sloped into the Bulk Tank Containment Area thereby preventing any release of product to the environment.

2.1.3 Tertiary

The bulk tank containment area will be the third line of defense to prevent product release during rail car offloading. This system is designed with a double liner complete with a concrete slab and wall. Between the two liners a small bore plastic pipe with holes is installed to periodically check the integrity of the concrete slab and primary liner. See sections D and E on drawing ACL-04-09, page 2 of 2 in **Appendix C**.

2.1.4 Special Provisions for Rail Car Offloading

1) A safety boot will be installed to the rail car to prevent movement during any product transfer.

2) Safety signs will be placed in front and behind each rail car to warn personnel that product is being transferred from the car.

3) A ball valve will be installed at the end of the transfer hose to prevent any leakage if the hose is pulled off inadvertently.

See attached drawings ACL-04-09, pages 1 and 2 of 2 in **Appendix C**, for details on each containment system and a typical flow drawing showing the rail car offloading process.

2.2 Truck and Rail Loading/Off Loading Containment Pad

2.2.1 Primary

The tanker truck will be the most common container on site and each tanker is equipped with two isolation valves to protect against accidental product release during transfer. Each tanker used for transporting products is DOT approved, with each tanker inspected on a regular basis under this program.

2.2.2 Secondary

The truck and rail loading/off-loading containment pad will be constructed with reinforced Portland Cement Concrete and will be sloped from the rail siding into the bulk tank containment area. Any product accidentally released on the containment pad during loading and offloading will flow into the Bulk Tank Containment Area.

2.2.3 Tertiary

The Bulk Tank Containment Area will be the third line of defense to prevent product release during loading and offloading. This containment system is equipped with a double liner complete with a concrete wall. Between the two liners a small bore plastic pipe with holes is installed to periodically check the integrity of the primary liner. See sections D and E on drawing ACL-04-09, page 2 of 2 in **Appendix C**.

2.2.4 Special Provisions for Tanker Truck Loading and Offloading

1) The release of clean rainwater collected in the Bulk Tank Containment Area will be performed via a double valve system. At all times the two valves will be closed and locked to prevent opening. Only authorized person will be permitted to open these valves. The release of clean rainwater will only be performed after water has been tested and the analyses indicate that the collected water meets the criteria for metals, volatile organic compounds (EPA624), glycol,

alcohol and methanol. This information will be recorded on a log sheet and maintained by Alpha Chemicals for review by the Department of Environment and Labour (NSEL) on request.

2) Truck wheels will be blocked to prevent movement during the transfer of product.

3) Safety signs will be posted preventing any unauthorized traffic in the area.

4) Each tanker truck is equipped with a double valve system consisting of a belly valve and gate valve. The hose connection to the tanker truck will have a safety breakaway coupling. This will prevent any product release if the hose is accidentally pulled off.

5) Tanker trucks will be loaded and off loaded over the secondary containment pad. The truck loading and off loading pad will be sloped to the Bulk Tank Containment Area.

Products will be transferred in accordance with specific detailed safe work instructions developed for each product type.

2.3 Bulk Tank Containment Area

2.3.1 Primary

ULC and API rated steel tanks will provide the primary containment. These tanks will have gate valves installed to provide isolation of product in the tanks and a second isolation valve will be installed in the process piping for extra protection. Each tank will have a High and High-High Level Alarm System installed to protect against overflow during filling.

2.3.2 Secondary & Tertiary

The bulk containment system consists of a concrete wall, equipped with a double liner. Between the two liners a small bore plastic pipe with holes is installed to periodically check the integrity of the primary liner. See sections D and E on drawing ACL-04-09, page 2 of 2 in **Appendix C**.

A pump will be attached to the plastic pipe with holes to check for liquid between the liners, at all four (4) corners, thereby checking the integrity of the primary liner. This liner check will be carried out quarterly with written instructions included and records kept in Alpha's ISO system.

2.3.3 Special Provisions to Protect Against Overflow

The following instrumentation will be installed to ensure that there is no overflow during infilling:

1) The control panel shall be a NEMA 4X (water tight) steel construction suitable for mounting in a non-hazardous area and includes the following:
   - (4) RED indicator lights dedicated as high level tank alarms
   - ALARM ACK (momentary) button to reset alarm conditions
   - main power switch (keyed)
   - emergency stop button
   - 24 Vdc power supply to power tank level transmitters
   - Selector switch for tank/process meter selection
   - E-Stop reset button
   - H/O/A keyed switch for valve operation
   - keyed manual valve override switch

2) The control panel will accept 4-20 mA input signals corresponding to 0 –100 % tank levels from (4) tank mount sensors.

3) Each tank will have a dedicated RED indicator light mounted on the front of the control panel.

4) Each bulk tank will have instrumentation for continuous level measurement, along with a High Level Alarm Condition and a High-High Level Alarm Condition. The Process Operators transferring product will be able to continuously monitor tank volume from a process gauge.

5) When the tank volume reaches 90% capacity, the High Level Alarm Condition will trigger a flashing light. The flashing light is the Process Operator's warning that the tank is almost full.

6) If any tank should reach 95% full, the High-High Level Alarm Condition, the following shall occur in addition to High-Level Alarm Condition.

   - An external RED light will illuminate and cycle on and off until the tank level falls below 92%;

   - A horn will sound at short intervals until the tank level falls below 92%;

- A control output from the electrical panel shall close the main valve, stopping the flow of product to the tank. This valve shall remain closed until the tank level drops to a safe level and the operator has acknowledged the alarm by pressing the ALARM ACK button at the control panel.

7) In addition to the above precautions to prevent tank over-filling, the following items will be supplied:

- Each tank will have a secondary point alarm switch. This switch will be mounted at a point higher then the 95% full point. If for any reason this switch is made (indicating a failure in the primary measuring device), the main control valve shall close stopping flow of product to the tank and sound an alarm horn.

- The Alpha Chemical Limited offloading policy calls for two operators to be present at all times when offloading. A display indicating 0-100% of tank level shall be installed in a location that can be viewed by one operator while the tanks are being filled. This will allow the other operator to be positioned in a location with the control to shutdown the transfer operation at any time once bulk movements are underway.

8) When transferring product from rail car or tanker truck two pumping systems will be utilized; one will a truck gear pump and the other will be an electrical driven centrifugal pump. The maximum flow rate of any pump to be used at this site to fill the bulk storage tanks will be 450 L/min (99 gal/min).

2.4 New Blending Packaging and Flammable Storage Building

2.4.1 Secondary

The new blending, packaging and flammable storage building will be constructed such that concrete walls are extended 0.3 m (12 “) above the floor. This creates a secondary containment area in excess of the 110% volume of the largest vessel (blending vat) plus 10 % of the volume of all other vessels (255 litre drums) in containment.

2.4.2 Tertiary

The truck loading/offloading containment pad that is sloped into the Bulk Tank Containment Area will be the third line of defense in the event of accidental product release during blending, packaging and storage operations inside this building.

2.5 Existing Warehouse (Storage of Non-Flammable Liquids and Solids)

2.5.1 Secondary

A reinforced concrete curb will be installed around the entire inside perimeter of the building with secondary containment well in excess of the 110% volume of the largest vessel (255 litre drums) plus 10% of the volume of all other drums (255 litre) in containment.

2.6 Total Containment Volume

The total containment volume calculations are based on the largest container being the rail car as indicated below. The Bulk Tank Containment Area is designed to hold 110% volume of the largest tank plus 10% of the volume of all other tanks in containment.

Vessel Description	Vessel Volume	Percentage	Containment Volume
Rail Car	114,000 liters	110%	125,400 liters
Tanker Truck	45,000 liters	10%	4,500 liters
Tank 1	36,320 liters	10%	3,632 liters
Tank 2	36,320 liters	10%	3,632 liters
Tank 3	90,000 liters	10%	9,000 liters
Tank 4	90,000 liters	10%	9,000 liters
Tank 5	90,000 liters	10%	9,000 liters
Tank 6	90,000 liters	10%	9,000 liters
		Total	173,164 liters

The Bulk Tank Containment Area is designed with a capacity of 234,000 liters that reserves a holding capacity of 60,836 liters.

2.7 Truck and Rail Loading/Offloading

Any liquid discharged onto the truck and rail loading/unloading containment pad, whether through an accidental spill or stormwater, will be directed to the Bulk Tank Containment Area. Under this condition stormwater will overflow into the containment area unimpeded. This would be the normal situation when the site is unattended whether or not a tanker truck or rail car is storing product at the time on the containment pad.

The Truck and Rail Loading/Offloading Containment Pad will be constructed of reinforced Portland Cement Concrete (PCC). The PCC will be saw cut to control uneven cracking. Jacques Whitford's Concrete Materials Section have reviewed the products to be stored on site and have confirmed that the PCC surface will not require any special surface treatment other than the PCC will have to be air-entrained. In addition, they have recommended that the joints be filled with a joint fuel resistant compound that is used exclusively on concrete runways. A reinforced PCC curb will be constructed around the perimeter of the containment pad to ensure product does not escape from the sides if there is a release. The PCC used in the curbs will also be air-entrained and joint fuel resistant compound will be used to fill the control joints.

During normal work operations when the site is attended, stormwater may be discharged via the trench collection system to the yard when a valve is opened. Under all other circumstances this valve is closed and locked.

In the event of a product spill during normal work operations when the site is attended, runoff will be discharged via the trench drain to the bulk tank containment.

3.0 TANK FARM INSPECTION AND MAINTENANCE GUIDELINES

To ensure the integrity of the Bulk Tank Containment Area, Alpha has developed the following inspection and maintenance processes.

3.1 Transfer Hoses

3.1.1 Daily Inspection

All hoses used in the transfer process will be inspected before each transfer commences.

3.1.2 Six Month Inspection

All transfer hoses will be recertified by a third party and tagged. Records will be kept in Alpha's ISO system.

3.1.3 QA/QC

Transfer hoses used for chemical transfer will be certified through Alpha's QA/QC internal process to ensure compatibility with the products being transferred. Compatibility charts for each transfer hose will be kept on file for review at any time.

3.2 Bulk Tanks

3.2.1 Daily Inspection

Each tank to be inspected for leaks and damage. Records will be kept on file for all daily site inspections.

The Process Operators will perform a daily inspection of the bulk tank farm system that will include tanks, level instrumentation, and isolation valves. Tank volumes will be recorded on the Bulk Tank Farm Board and associated computer system. A daily site inspection form will be completed by a Process Operator. Any deficiency observed during the inspection will be noted on the daily site inspection form. A work order will be generated to repair the deficiency in a timely manner.

3.2.2 Annual Inspection

We will be visually inspecting the tank external, valves, pumps and piping system for corrosion, damage and function. Any problems observed will be recorded on a tank inspection report and repairs will be performed as required.

3.2.2.1 5 Year Inspection

An internal inspection for corrosion metal thickness and tank integrity will be preformed by a third party every five years. Records will be kept in Alpha's ISO system.

3.2.3 Inventory Management

1) Incoming product – each product delivered to site will have a weigh ticket indicating the net weight delivered.

2) Tank inventory – an electronic radar system will be used for continuous level indication. Process Operators will monitor tank levels using radar and once per week via manual dips. Volumes will be recorded and reconciled on a daily basis and any discrepancies will immediately be reviewed through internal QA/QC.

2) Out going product - will be filled into pails, drums, and IBC and tanker trucks and a record will be kept of the net weight leaving the site.

3.3 Instrumentation

3.3.1 Daily Inspection

Process Operators will inspect instrumentation for physical damage. Records will be kept on the daily site inspection form.

3.3.2 Annual Inspection

Third party calibration by a qualified instrument supplier or sub-contractor will be carried out on a yearly basis.

3.4 Pumps Valves and Pipe Fittings

3.4.1 Daily Inspection

Process Operators will visually inspect pump valves and pipe fittings for any damage. Records will be kept on daily site inspection form.

In all cases where a Process Operator observes a problem with equipment an internal work order will be generated. The internal work order is used to record the repair and maintenance of each piece of

equipment worked on. Each piece of equipment will have a unit number and a file. The equipment file will contain the following:

1) Specifications, and
2) Repair and Maintenance records.

3.5 Containment Systems

3.5.1 Daily Inspection

As part of the daily inspection, Process Operators will inspect all containment systems for damage. Records to be kept on daily site inspection form. Any damage to the containment system will be fixed immediately and work records kept on file.

3.5.2 As Required

A third party lab will test rainwater collected in the Bulk Tank Containment Area. If the water meets the criteria for metals, volatile organic compounds (EPA624), glycol, alcohol and methanol it will be discharged on site. If the test results fail to meet the required criteria, the water will be further treated or sent off site for third party disposal.

3.5.3 Quarterly Inspection

A third party will test water samples from on site monitoring wells. Results will be forwarded to the Department of Environment (Bedford Office) to demonstrate the effectiveness of the containment systems on site.

Alpha Chemicals will also inspect the interstitial space between liners (Bulk Tank Containment System) by use of a hand held pump connected to a ½ inch tube inserted into the perforated piping between the liners. If there is fluid between the liners it will be tested to determine if it is ground water or product from the tanks. If the liners are working properly there should be no fluid between the liners.

4.0 SAFE WORK INSTRUCTION FOR OFFLOADING FLAMMABLE LIQUIDS

4.1 Rail Car to Bulk Tank

4.1.1 Description of Procedure

1) Transfer flammable liquids safely from rail car and tanker truck to a bulk tank.

4.1.2 Personnel: (Two-Man Rule)

1) Two Process Operators will be involved in the process at all time.

4.1.3 Transfer Equipment

1) Chemical transfer pump
2) Chemical transfer hose
3) Safety break away coupling
4) Nitrogen cascade system

4.1.4 Personal Protective Equipment

1) Safety boots
2) Nomex coveralls
3) Safety gloves (refer to MSDS for specific type)
4) Mono goggles and safety shield
5) Hard hat
6) Respirator, if required (see MSDS for specific type)

4.1.5 Safety Equipment

1) Continuous gas monitor for LEL
2) Grounding cables
3) Safety boot for rail car and safety signs to warn CN that product is being transferred
4) Safety signs to keep non essential workers and traffic out of area while offloading

4.1.6 Key Safety Issues

1) Ensure rail car is secure by installing a safety boot to prevent movement during transfer.
2) Set up safety signs to ensure no unauthorized personnel enter the area while transferring product.
3) Continuous monitoring of LEL levels will be taken during transfer [Check MSDS to determine vapour density of product and to ensure gas detector is located properly].
4) All equipment to be grounded to prevent static electricity.
5) No vehicle entry will be permitted during product transfer operations.

4.2 Detailed Work Instructions (Rail Car Offloading)

1) When CN delivers the rail car, ensure that it is placed in the right position over the secondary containment area. Install spill catch pan underneath valve and secure to the rail siding.

2) Verify product delivered is what was ordered by reviewing the following documentation:
   - Alpha PO to supplier
   - Bill of lading from supplier
   - C of A from supplier
   - Visual inspection of rail car
   - Take sample of product from rail car

   This review will determine if the product and quantity delivered is correct. Process Operators to sign off bill of lading from supplier to confirm review.

3) Process Operators to verify the existing level in the bulk tank and determine if there is enough room to hold the quantity from the rail car.

4) Before hooking up any transfer equipment install the safety boot on the rail car. Set up safety signs to prevent un-authorized entry.

5) Hook up chemical transfer hose and transfer pump as per Alpha's Rail Car Offloading Flammables work procedure. Hook up all grounding cables.

6) Set up gas monitor in location of potential flammable vapours, determined by the following criteria:
   - Vapour density of product
   - Wind direction

   The gas detector must be located down wind of operations.

7) [Safety Pause]

   Before proceeding to transfer any product all personnel involved in the transfer will review the safe work procedures. Each operator sill sign off on the daily tool box talk to verify they understand the process.

8) Open top vent on rail car to prevent a vacuum in rail car tank while transferring.

9) Open valves on rail car to allow product to gravity fill the suction lines. Check all fittings to ensure there are no leaks.

10) Open valves to bulk tank and verify there are no leaks.

11) [Safety Note]

   At any time a leak is observed the operation will be stopped so that the leak can be repaired immediately.

12) When all valves are opened start transferring product while continuously monitoring for:
   - Leaks in the fittings
   - LEL
   - Bulk tank level

   The bulk tank level will be monitored with an explosion proof radar transmitter hooked up to a display process meter. The radar level system will be equipped with a high level alarm. The high level alarm will be set off if 90% tank capacity and trigger a flashing light visible to the Process Operators. A pointed level switch will be installed in the bulk tank for a high/high

alarm. When the level in the bulk tank reaches 95% the high/ high level switch will sound an audible alarm to warn the operator to shut down the transfer operation.

13) [Safety Note]

During the transfer, the two Process Operators will be continuously monitoring the transfer process. Voice, hand, and radio communication will be used by the operators to relay process information, especially the volume in the bulk tank.

14) When the product has been completely transferred from rail car to the bulk tank the Process Operators will turn off the pump and close all valves on the rail car.

15) Nitrogen will then be used to empty any remaining fluid in the transfer hoses and pump. Nitrogen will purge the hoses into the bulk tank at a maximum pressure of 15 psig. The nitrogen will be regulated using a cascade bottle system, complete with a pressure regulator.

When the transfer hoses are emptied of all fluids, all valves to the bulk tank will be closed.

16) Vent pressure from transfer hoses and pump before disconnecting.

17) Disconnect all transfer equipment and sign off daily toolbox talk. Record volumes of product transferred into the bulk tank on the bulk tank form board and in the bulk inventory report on the computer.

18) Contact CN to release rail car from site.

5.0 GROUNDWATER AND SURFACE WATER MONITORING PROGRAM

It is recommended that a groundwater and surface water monitoring program be implemented to confirm that the proposed containment systems are effective at mitigating potential impacts to groundwater and the nearby lake (and pond). It is recommended that four groundwater monitor wells be constructed at locations indicated on Drawing No. NSD18986-1. These monitor wells will facilitate the collection of representative groundwater samples for confirmatory laboratory analysis, as well as confirming groundwater depth and flow directions.

The monitor wells will be constructed within boreholes that are drilled to depths of approximately 5 to 6 metres below grade. The wells will be constructed with 51 mm diameter, PVC pipe. Each well screen will extend across the seasonal groundwater table and a bentonite plug will be installed above the sand pack to prevent potential surface water infiltration. Following construction, each well will be developed (i.e. using a dedicated polyethylene tubing and waterra foot value to purge drilling fluids, solids or other particulate), slug tested (i.e. to assess in-situ hydraulic properties), and surveyed.

The monitoring program should include the collection of representative groundwater samples from each of the monitor wells and from the site's domestic water well, and a surface water sample from the site's pond. These samples should be collected on a quarterly basis and delivered to a CAEAL accredited laboratory for analysis.

The Material Safety Data Sheets (MSDS) that describe the chemicals that will be handled and stored at the facility are included in **Appendix E**. These chemicals include the following:

- Methanol;
- Ethylene Glycol;
- N-Methyldiethanolamine (MDEA); and
- PCL Blend #3 (comprised of ethyl alcohol, methyl alcohol, propyl alcohol and propyl acetate).

Based on this information and discussions with a certified analytical laboratory, it is recommended that the groundwater monitoring program include the following analysis:

- General chemistry, metals and VOCs (EPA-624) for general quality;
- Glycol scan for ethylene glycol;
- Alcohol scan for the PCL Blend #3 (printer ink solvent); and
- Methanol scan for methanol.

The laboratory reports that there is no available analytical method to test water samples for the MDEA compound. Results for groundwater will be compared to the Guidelines for Canadian Drinking Water Quality (GCDWQ) and surface water results will be compared to the Freshwater Aquatic Life guidelines (FAL).

Groundwater samples will be taken from each of the four monitoring wells, the domestic well, and a surface water sample from the pond prior to any storage of chemicals on this site to establish baseline conditions and to determine if there are any existing issues of concern at the site.

6.0 EMERGENCY RESPONSE PLAN

Refer to Drawing No. NSD18986-1 in Appendix B to note the sump and berm to be constructed on site to address the catastrophic release of chemicals or contaminated fire water to the environment. Such releases would be a result of the failure of a number of storage tanks in the bulk tank containment area at the same time (not a very plausible scenario) or water generated from combating a fire on site.

The location and depth of sump and interceptor trenches will be determined from monitoring wells to be installed on site which will establish the direction and depth of groundwater flow. The purpose of the sump and berm are to intercept surface water and groundwater and then provide a dedicated location where such water could be siphoned off in the event of a catastrophic release of chemicals or contaminated fire water. The berm is included if such an event was to occur during frozen ground conditions. The yard will be graded such that all surface water is directed towards the sump.

The sump will consist of a 1500 mm diameter manhole with a catch basin frame and grate connected to approximately 60 metres of 150 mm diameter perforated PVC pipe (backfilled with 50 mm clear stone) to intercept and collect surface water and groundwater flow. Under normal conditions surface water and groundwater flow would be intercepted by the perforated pipe, directed to the manhole and then released in the direction of the pond via a 250 mm diameter PVC out fall.

In the event of a catastrophic release of chemicals or contaminated fire water in the manhole would be pumped to a dedicated tanker on site by way of an air diaphragm. This maneuver would be operational within minutes. Storage in the tanker will provide the necessary response time for a registered waste disposal company to arrive on site to collect and properly dispose of the chemicals or contaminated fire water.

APPENDIX A

Figure 1, Project Location Map

APPENDIX B

Drawing No. NSD18986-1, Property Drawing

APPENDIX C

Drawing No. ACL-04-09 (Sheets 1 and 2) Product Transfer Containment Pad

APPENDIX D

Analyses of On-Site Domestic Well

APPENDIX E

MSDS for Chemicals to be Stored On-Site