# THE 2008 PROPOSED FOREST PROTECTION PROGRAM

# AGAINST THE BALSAM FIR SAWFLY

# IN WESTERN NEWFOUNDLAND

# USING AERIALLY APPLIED BIOLOGICAL CONTROL AGENT

# ABIETIV™ (nucleopolyhedrovirus)

Submission to:

**DEPARTMENT OF ENVIRONMENT AND CONSERVATION**
**ENVIRONMENTAL ASSESSMENT DIVISION**

by:

**DEPARTMENT OF NATURAL RESOURCES**
**FORESTRY AND AGRIFOODS AGENCY**
**FORESTRY SERVICES BRANCH**

**May 2008**

2008-05-06

**NAME AND ADDRESS OF PROPONENT**

This application is submitted on behalf of

**FORESTRY AND AGRIFOODS AGENCY**
**FORESTRY SERVICES BRANCH**
**CORNER BROOK, NL**

**Chief Executive Officer:**

Mr. Leonard Moores

CEO – Forestry and Agrifoods Agency
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Corner Brook

**Contact Person:**

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Supervisor, Forest Insect and Disease Control

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Corner Brook

## THE UNDERTAKING:

In fulfilment of the mandate and commitment of the Forestry and Agrifoods Agency - Forestry Services Branch to protect the forest resource and limit damage from infestations of significant pests, and with due regard for human health and non-target environmental effects, the following undertaking is proposed.

**NATURE OF PROPOSED APPLICATION**

The Province is still faced with a serious infestation of the **balsam fir sawfly**. This infestation continues to threaten the substantial investment in silviculture and consequently the long-term wood supply for the forest industry. The Forestry and Agrifoods Agency – Forestry Services Branch is proposing to carry out an operational aerial control program to selected forest areas (including silviculturally treated stands) in western Newfoundland. The proposed program will involve application mainly on areas forecast to receive moderate and severe balsam fir sawfly defoliation in 2008 or additional adjacent silviculture areas which will be monitored and treated if necessary.

**PURPOSE OF PROPOSED APPLICATION**

**Background:**

Although coniferous defoliators are natural elements in the forests of Newfoundland and Labrador, the potential impact of unchecked forest pest outbreaks cannot be ignored.. The need to protect the forest resource against insect outbreaks has been evident from past, serious infestations of hemlock looper and spruce budworm. As a result of the 1980 Royal Commission on Forest Protection and Management, Government adopted the recommendation for a long-term policy on protection, particularly related to investment in expensive silvicultural practice aimed at renewing the forest resource. This policy did and does provide the basis for forest pest management within the Province. Control programs (as and if necessary) have become an integral part of sustainable forest management. The Forestry Services Branch is committed to forest protection against insect pests, using the most effective federally registered insecticides that have minimal impacts on the environment. It is imperative that a variety of control tools / methods be available to allow for efficient and effective control of pest infestations as the situation arises. No particular tool / method works well in all situations. In addition, the Branch is committed to actively seek more acceptable solutions to pest problems, such as: biological insecticides, enhancing natural control measures or any other practical methods of pest management. All pesticide usage is subject to annual environmental assessment and/or review processes within the Province, as deemed necessary. Annually, Government decides on the nature and extent of a program based on all available information and recommendations.

A healthy forest is important for ecosystem management, biodiversity and environmental health as well as the economic benefits to the people of the Province derived from this renewable resource.

The Forestry Services Branch has been successful in the past in dealing with major forest insect pests such as the spruce budworm and hemlock looper where treatment was adequate. Previous insect control programs have limited the potential impacts of infestations by minimizing extensive tree mortality and saving as much foliage as possible.

The balsam fir sawfly, historically a relatively minor insect pest, continues to defoliate forest stands and in particular pre-commercial thinning (silviculture) areas and younger second-growth forest stands. Pest management intervention is necessary. The Province and the pulp and paper industry (Corner Brook Pulp & Paper Ltd. and Abitibi-Consolidated Inc.) have invested over $300 million into silviculture activity over more than 30 years. This investment in the future forest cannot be lost as a result of tree mortality or through ongoing tree growth loss from insect defoliation, if we are to continue with sustainable forest management. On the west coast, the balsam fir sawfly has and is threatening part of this investment and pest management measures, using available tools, are required.

## BALSAM FIR SAWFLY

### Background:

The balsam fir sawfly is a native, defoliating insect and occasionally a common pest on balsam fir in Newfoundland, and to a minor extent in Labrador. It has become more important as a pest of young and semi-mature balsam fir, particularly in thinned stands. The population overwinters in the egg stage in fir needles and larvae (Figure 1.) usually hatch around mid-July (depending upon seasonal development influenced by weather) and feed on the previous year and older foliage (Figure 2.) for a number of weeks before pupating.

**Figure 1. Balsam Fir Sawfly Larva**

**Figure 2. Balsam Fir Sawfly Tree Defoliation**

Adult sawflies emerge in August, mate and eggs are laid in the needles of the current year (Figure 3.).

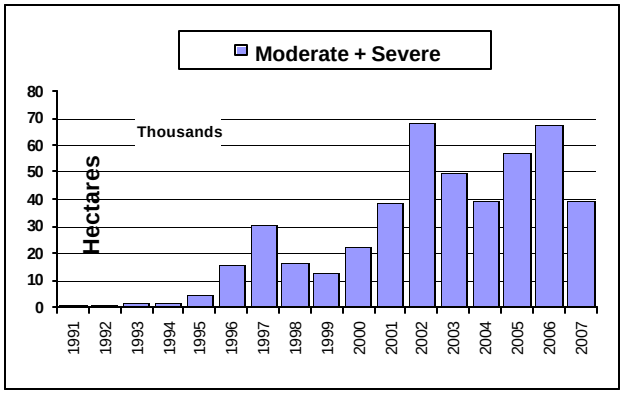
**Figure 3. Balsam Fir Sawfly Eggs**

Populations have been regulated by natural parasites and predators. Outbreaks have occurred every 3 or 4 years, in various places. Past epidemics of this insect have been of short duration (3 or 4 years) and were terminated by natural factors, including a naturally occurring viral (nucleopolyhedrovirus - NPV) disease. Although localized damage was often severe, tree mortality was limited. However, defoliation has caused and is causing significant growth loss to affected trees and weakened them, thus making them susceptible to other mortality factors. Research by Natural Resources Canada - Canadian Forest Service (CFS) has indicated that, based on growth prior to sawfly defoliation and expected future growth, that at two study sites, after defoliation has ceased, there may be from 13 - 18 years of reduced growth before the trees recover to pre-infested growth rates. Subsequent follow-up work has indicated that a minimum of 10 years will be required. This is significant particularly in relation to wood supply calculations.

The current infestation in western Newfoundland was detected in 1991 near Bottom Brook, east of Stephenville. The following figure (Figure 4.) summarizes the moderate and severe defoliation history in western NF, where the largest and longest lasting of the recent infestations is occurring.

The balsam fir sawfly infestation has and continues to expand and move northward and northeastward into previously unaffected areas, mainly second-growth and thinned stands. Research by the CFS has shown that

**Figure 4. Balsam Fir Sawfly Defoliation in Western NF (1991-2007)**




thinned stands were affected to a greater degree than unthinned stands at peak and subsequent declining phases of the infestation in study areas.

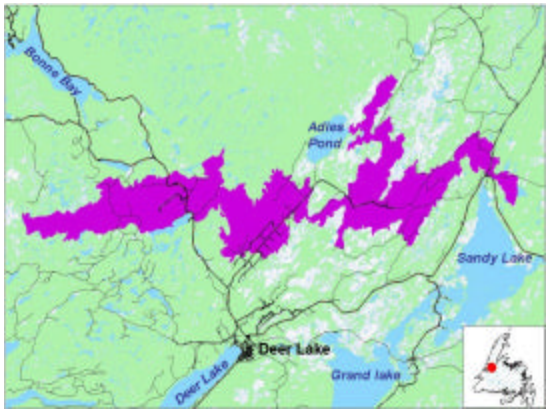
Other recent infestations have occurred on the Burin Peninsula (1998-2000) and Bay d'Espoir (1990-1991; and 1998-2001).

These sawflies feed on all age class needles except the current year's needles. In the first year of infestation with moderate and severe defoliation, all but the current growth turns a blasty orange color and is quite visible and easy to map. In the subsequent year(s), because only the needles of the previous year (1 years growth) remain on the branches and provide food for the sawfly larvae, the damaged needles do not show up as readily and therefore it is very difficult to map cumulative annual moderate and severe defoliation. As a result, mapped defoliation in the second and following years is likely underestimated.

**Current situation:**

The 2008 moderate and severe balsam fir sawfly defoliation forecast (Figure 5.) is for a total of approximately 19,500 ha to be affected in western Newfoundland.

**Figure 5. 2008 Balsam Fir Sawfly Moderate and Severe Defoliation Forecast**




**Control options:**

Because the sawfly historically had not been a major problem (except for the current outbreak), only very limited options existed to attempt to deal with the situation. Research and experimental programs were carried out in 1998 and continued up to and including 2005, in Newfoundland and in other jurisdictions, to develop acceptable control options with the main focus on biological solutions for a number of sawflies, principally the balsam fir sawfly and the yellowheaded spruce sawfly.

The common biological insecticide that has been applied aerially in forests against the spruce budworm and hemlock looper, *Bacillus thuringiensis* var. *kurstaki* (B.t.k.), is not effective against sawflies. B.t.k. was isolated from, and developed into a control product for, certain pest insects belonging to the Order Lepidoptera (the butterfly and moth group). Sawflies belong to the Order Hymenoptera, a different group. Balsam fir sawfly larvae are not susceptible to B.t.k. as are the budworm or looper. Other strains of the biological insecticide (B.t.), *Bacillus thuringiensis* var. *israelensis* (B.t.i.), registered for control of mosquito and black fly larvae and applied to water systems) have been looked at in terms of potential development for use against the sawfly groups, but none has shown great promise.

A chemical insecticide Dylox (trichlorfon) was used successfully in 1998 and 1999 for balsam fir sawfly and in 1998 for yellowheaded spruce sawfly, where application could occur. However, due to large buffer (no spray) zones around designated areas, it was not possible to adequately deal with the pest problem and thus Dylox was not a viable option. In addition, the Forestry Services Branch was moving away from traditional insecticides where there were effective and efficient alternatives or potential alternatives with minimal environmental impacts.

Neemix 4.5 (azadirachtin), a naturally occurring botanical insecticide derived from the seed of the neem tree, and a low risk, short-lived insect control product, was tested by the Canadian Forest Service in 1999, and the manufacturer had applied for and received Temporary Registration from Health Canada – Pest Management Regulatory Agency (PMRA) for forestry use. It was tried operationally in the province in 2001 and 2002. Azadirachtin

insecticides, registered for use in many countries including the USA and effective against more than 300 pest species in forestry, agriculture, home garden, storage of grains, and urban pests, are also listed for pest control in organic farming on crops such as lettuce, tomatoes and potatoes. Although effective in reducing sawfly larval numbers, there were problems with the formulation in terms of compatibility with product application equipment. The manufacturer did not pursue the solution to this problem with PMRA, the Temporary Registration lapsed and therefore this tool was no longer an option for forestry use. More work may occur on Neem derived control products in the future.

In terms of a biological approach (usually a longer-term endeavour) to the major problem with balsam fir sawfly but also the yellowheaded spruce sawfly, in 1997 a cooperative research agreement involving the Canadian Forest Service, Corner Brook Pulp and Paper Ltd., Abitibi-Consolidated Inc. and Forestry Services Branch was initiated. Along with determining what immediate options were available, this work also involved investigating the ecology of the balsam fir sawfly in terms of natural control factors such as viruses, fungi and parasites to try and determine what, if any, of these natural elements were present in the population and why natural factors had not affected these sawfly populations to date. In addition, the impact of both sawflies, particularly the balsam fir sawfly and any differences between thinned and unthinned stands that may have been causing this particular outbreak to expand without any obvious natural controls, was being investigated. This research continued in 1998 with the Canadian Forest Service (CFS) and again in 1999, 2000 and 2001 with additional resources available from a National Science and Engineering Research Council (NSERC) grant obtained by the University of New Brunswick and involving CFS personnel as well. This cooperative research agreement and subsequent on-going research by the CFS has led to identifying what natural factors are influencing these populations and what biological or other more acceptable means could be used to limit tree damage during outbreaks.

Identification of, and significant progress was made in determining, the parameters of the naturally occurring sawfly nucleopolyhedrovirus (NPV), a baculovirus collected from western Newfoundland in 1997. In 1999 up to 2005, this naturally occurring balsam fir sawfly biocontrol agent (NeabNPV) was tested experimentally on small areas (up to 5,000 hectares). NPV baculoviruses are restricted to arthropods, mostly insects and are essentially host specific or affect only closely related species. NPVs can and have caused population crashes in their host insects. This has not occurred with the current infestation on the west coast. This is probably due to the expanding nature of this outbreak as well as the structure and tree age of the affected stands.

NeabNPV affects its host, the balsam fir sawfly, and several other related sawfly defoliators. In the past, several NPVs were

registered for control of their specific host insect. Results from these current tests formed part of the submission by Canadian Forest Service to Health Canada – Pest Management Regulatory Agency to have this natural product registered for operational use. Part of the requirement for registration was to demonstrate that Abietiv™ does not affect non-target organisms including other vertebrates and humans. Research has shown that baculoviruses have no effect on mammals, birds, amphibians or aquatic microorganisms. Specific tests with Abietiv™ have shown no effect on indicator test species including moths, leafcutter bees, honey bees and Daphnia (water crustacean). Only several closely related sawfly defoliators were affected.

Additional scientific information compiled and research carried out by the Canadian Forest Service has been previously submitted (2004) under the Environmental Assessment process. This can be referenced on the Government web site.

Health Canada - Pest Management Regulatory Agency (PMRA) has given Abietiv™ a detailed review and granted a Temporary Registration (April 2006). The only outstanding information required is for the shelf-live of the product. A registration authorizes its operational use against the specified insect(s) subject to specific conditions and stipulations that ensure the health and safety of the public and the environment. Abietiv™ has a high degree of host insect specificity, has no impact on humans or other organisms (other than a very few related sawflies), and thus the best integrated pest management tool available for control of this sawfly consistent with the goal of using the product with the least environmental impact on non-target organisms. This NPV product has to be ingested by the susceptible feeding sawfly larvae to be effective. Once ingested, it affects the midgut cells of the insect, but before the larva dies it produces more NPV to cause infection in other sawfly larvae. (A copy of the Abietiv™ federal label from PMRA is attached.

In 2006, the Forestry Services Branch carried out the first operational control program using this new product. Some 15,200 ha were treated based out of Deer Lake Airport using single-engine fixed-wing spray aircraft. No problems were encountered during the operation and no adverse effects were detected. The Branch identified and treated some 15,240 ha in 2007 again based out of Deer Lake Airport for areas forecast to be affected last year. Again there were no problems encountered.

## DESCRIPTION OF UNDERTAKING

The ongoing infestation in western NF is still cause for concern. Over 200,000 ha of forest have been affected to date. Additional silviculture areas (pre-commercial thinnings – PCTs) are going to be affected as well as more second growth stands. The PCTs have been established, at an average cost in excess of $1,000 per hectare to enhance growth and are critical to maintaining an adequate wood supply for the forest industry. The impact of this infestation, if left unchecked, will be the loss of this substantial investment. The failure to adequately protect the investment in silviculture,

and the potential loss of future harvestable stands, would be significant to both the social and economic well being of the people, particularly on the west coast of the Island, both in terms of direct as well as indirect employment and in spin-off economics.

As indicated by the forecast, natural factors have not significantly affected this population to date. The infested and defoliated trees are not growing but merely (and just barely) surviving. They have reduced vigour, are under considerable stress, and are susceptible to other significant factors including mortality from secondary insects and diseases. It is estimated that, since the outbreak began, the Province has lost is excess of 2 $m^3$ of growth per hectare infested per year. This equates to the loss of in excess of 400,000 $m^3$ of incremental growth during this infestation.

The purpose of the proposed pest management program in western Newfoundland is to apply Abietiv™ and therefore introduce more of the naturally occurring control agent into the leading and peaking infestation areas earlier, thereby causing an earlier population reduction than is occurring in these stands at present. By reducing sawfly population levels in treated and adjacent areas this will minimize the loss of foliage, the loss of tree growth and to prevent potential tree mortality which could result from trees weakened by ongoing insect attack. This will help preserve growth and the substantial dollar investment made in establishing these areas to intensively manage the forest.

Research has indicated that although there will be some impact through larval reduction and saved foliage from the treatment in the year applied, the maximum effect from the treatment will occur in the second season and later from the carry over effect.

The locations of the **insect infestation (damage)** predicted for 2008 and the general proposed treatment locations are as indicated on the accompanying map. **These areas are not treatment block boundaries. These blocks will be identified later, subject to the necessary "no-spray" buffer zones and other stipulations, as dictated by the Department of Environment and Conservation, providing adequate protection for human habitation, sensitive areas, etc.**

**Balsam Fir Sawfly Control Activity**

As per the label, Abietiv™ will be applied in a single application of 1 to 3 million ($10^9$) polyhedral inclusion bodies (PIBs) of active ingredient per hectare. The higher rate is suggested for higher population levels. The Forestry Services Branch will apply the product as per the label rate(s)

In order to obtain additional material for future use, Sylvar Technologies Inc. from New Brunswick, may arrange for treatment of a small production area at the higher rate and using fixed wing aircraft and personnel, under a separate Operator's Licence. This will allow collection of enough infected sawfly larvae to produce more Abietiv™ for subsequent work, if necessary.

For the operational treatment, the Forestry Services Branch will request an Operator's Licence from the Department of Environment & Conservation to allow Abietiv™ use in 2008. The product will be applied to selected areas mainly within the forecast but also adjacent areas (important silvicultutre areas that) by single engine spray aircraft.

Within the designated areas, the Forestry Services Branch is proposing to operationally treat up to about 10,000 ha in western NF with Abietiv™. **As previously indicated, teatment areas will be refined as environmental concerns, e.g. buffer zones, are determined and stipulated in the Operator's Licence.**

Treatment is expected to start in early to mid-July, (depending on weather affecting insect hatching and development) and continue throughout the month. Operations will be based out of Deer Lake Airport. Final aircraft type that will be used will depend on aircraft availability, operational parameters, economics, logistics, and final spray block sizes. The Forestry Services Branch uses the most up-to-date standard technology to ensure the best delivery of the program.

## UNDERTAKING PARAMETERS

### SPRAY PROCEDURES

Since 1977, the Forest Engineering & Industry Services Division (formerly the Forest Protection Division) of the Forestry and Agrifoods Agency – Forestry Services Branch has assumed responsibility for any operational control programs conducted against forest insect and disease pests and to date have planned and supervised major insect control programs. The insect population forecast, now carried out by Forest Services Branch staff, predicts infestation levels for the following summer and this is used to determine if there is a need for control intervention and if so, provides the outline to identify proposed treatment areas. Forestry Services has carried out all other aspects of the operational aerial programs (apart from the actual aircraft application of the control product and aircraft maintenance), including the transportation, handling, mixing, loading and decontamination of equipment and containers, up to and including the loading of aircraft. Forestry Services also oversees the actual spraying by the contractor to ensure that the proper areas are treated under the appropriate weather conditions, and that all Licence stipulations, including buffer zones, are followed. The Forestry Services Branch monitors insect and host tree shoot development and larval numbers from early in the season, to determine the ideal application date(s) and priorities of areas to be treated. Monitoring to determine insecticide efficacy continues throughout the spray program, and a final assessment is made after insect feeding has ended. All necessary ground, communication and sampling equipment is supplied and owned by the Branch.

Forestry Services utilizes currently available equipment and technology. It complies with existing regulatory guidelines. In earlier programs navigation of spray aircraft was

provided by utilizing qualified and licenced Forestry personnel in a helicopter that led spray aircraft along pre-determined flight lines, and a supervisor, in a fixed-wing aircraft or a helicopter, determined the accuracy of the navigation and performance of the spray aircraft, and initiated corrective action, as necessary. The supervisor also assessed the favourability of weather parameters before and during spray missions. For the past 10 years (1998-2007), and because of the buffer zones stipulated in the provincial Operators Licences, Forestry Services has required the use of Differential Global Positioning System (DGPS) technology to enhance navigation thereby enabling the spray aircraft pilots and aerial supervisors to better anticipate identified buffer zones during spray missions and to facilitate the actual flight along the pre-determined flight lines. This technology is the best available at this time for operational programs, has worked reasonably well, and will be used in 2008. The aerial supervisor is still monitoring and directing the treatment as well as assessing the accuracy of the application and the suitability of weather, etc, as before.

Spray bases have been provided with appropriate equipment to ensure environmental safety by using approved containment dyking and currently acceptable safety and emergency equipment and materials.

**WORKER SAFETY**

Forestry Services has well-established safety guidelines for workers involved in insect control activity. Personnel have a lot of experience and an enviable safety record. To protect workers involved with the program, personnel handling the insecticide (each mixer/loader) will be required to wear hooded rubber suits, rubber gloves, rubber boots, goggles and appropriate respirators during the mixing of the insecticide formulation, the filling of loading and holding tanks and aircraft, and during the decontamination of insecticide drums (as necessary according to current occupational health and safety standards and product label instructions). Pilots and navigators/supervisors are not permitted to be involved in the handling of insecticides.

In addition, approved safety precautions and established rules and guidelines will be adhered to concerning personal hygiene of all mixer/loader personnel working with insecticides and what to do if contact with an insecticide occurs or if symptoms of illness occur during or after handling of any insecticide or mix. Hospital and emergency telephone numbers will also be posted in a conspicuous place to be used in the event of accident.

Applicable contingency measures will be available to personnel in the event of an accident.

**PUBLIC HEALTH CONSIDERATIONS**

To minimize the risk of exposure of people to insecticide spray, “no-spray” buffer zones will be left around known places of permanent human habitation and around areas such as cabin development and park (camp and day use) areas. **In 2008, any spraying near habitation will be subject to terms and conditions of the Operator’s Licence from the Department of Environment &**

**Conservation in consultation with the appropriate Health and Community Services personnel (if required). Identified and occupied cabins will be adequately buffered in relation to the product being applied. In addition, a 1.6 km buffer zone is left around identifiable intakes to known community water supplies**; however, it may be desirable to decrease buffers in specific cases. These are dealt with in consultation with the provincial Department of Environment & Conservation on an individual basis as and when identified. If, during the course of a spray mission, unauthorized personnel are detected in or near a treatment area, the aerial supervisor will instruct the spray aircraft pilot(s) to provide extra buffers or to terminate the mission, as applicable in the circumstance. Local hospitals and regional public health officials in the vicinity of the proposed spray areas are notified in advance of the program concerning which product(s) are to be used, general areas of treatment blocks, timing of spray season, etc. This action is to ensure full notification and preparation should an incident occur which would require medical assistance.

**ENVIRONMENTAL SAFETY**

In terms of environmental safety, all stipulations in the licence issued by the provincial Department of Environment & Conservation are followed. These include the reporting of any incidents, such as spills, to the appropriate authorities. In connection with this, the Forestry Services Branch has a contingency plan which is annually reviewed and approved prior to receiving of an Operator's Licence. The plan outlines procedures for spill reporting, emergency first aid for exposure, insecticide spill only, aircraft crash in bush, aircraft accident on or near the airport, jettisoned aircraft load, drum decontamination and disposal, and other general regulations and instructions as necessary.

**PUBLIC NOTIFICATION**

As part of the program, the public and media in the vicinity of the proposed treatment areas are notified, prior to commencement of the program, through ads or news releases, or through appropriate contact if required, with information of which product is being used, general areas of spray blocks, timing of application, contact numbers, etc. Access roads to the general areas are posted with signs indicating treatment, product, dates, and phone numbers for more information. A phone-in information line will be set up and the general public can call to find out the status of areas receiving treatment. Since 1977, daily messages have been sent to the news media with information indicating what areas are ready to be treated as well as the status of areas treated since the last update.

Regional offices of the Forestry Services Branch and the Department of Environment & Conservation, as applicable, will be provided with maps showing treatment areas. These maps are available for viewing by the general public during regular office hours. District offices of the Forestry Services Branch will be made aware of spray blocks in their area and are provided with applicable detailed maps so they can inform the public on specific local blocks, when requested.

**POTENTIAL CONFLICTS:**

There are always potential conflicts with insect control programs, such factors as: proximity to habitation, cabin development areas, individual cabins, water supply areas, recreational uses (fishing and camping, berry picking), and potential impacts on wildlife. However, in approving a product at the federal registration level and in granting a licence at the provincial level, mitigating measures are identified which eliminate or significantly reduce the potential for conflicts. These mitigating measures are outlined on the product label as approved by the PMRA-Health Canada and in terms of buffer zones stipulated in the Operator's Licence [**see attachments to this document**]. In addition, the proponent is also required to post signs and advise the public about the program to lessen accidental exposure.

**ALTERNATE OPTIONS FOR SAWFLY CONTROL**

**Integrated Pest Management Approach**

The Forestry Services Branch prefers, and has been actively encouraging and participating in research focussed on the identification and development of, biological solutions to insect problems. This work will continue. NeabNPV (Abietiv™), the naturally occurring balsam fir sawfly control agent, is one of these control tools that the Canadian Forest Service, in conjunction with the Forestry Services Branch and forest industry, has been pursuing for a number of years. Scientists will continue to look at alternate and more acceptable solutions for a number of pest problems.

Also, in attempting to improve control measures and techniques, the Canadian Forest Service, in cooperation with the Forestry Services Branch and the Forest Industry, will continue to identify methods of dealing with pest outbreaks. Research and experimental programs are an integral part of operational programs and essential to better manage pest problems in an effective and efficient manner.

The Forestry Services Branch will continue to explore control options (and assist in field testing promising candidates) for insect pests to determine cost effective, efficient control methods with regard to minimizing human health risks and environmental impacts.

**APPROVAL OF THE UNDERTAKING**

Aerial (and ground) application of insecticides falls under both federal and provincial legislation. The approval of product use (operationally or experimentally) has first to be given by the federal government. This mandate rests with the Pest Management Regulatory Agency (PMRA) of Health Canada.

In Canada, before they are registered, pesticides must have undergone extensive assessments for both environmental impact and human health risks, when used according to label directions under appropriate weather conditions.

In Newfoundland and Labrador,

pesticide application has to be carried out under an Operators Licence, issued by the Department of Environment and Conservation, and under the direction of qualified and licensed Applicators.

The Federal Government, insecticide manufacturers, universities and colleges are also involved in pesticide research. Decisions, made by government after all of the research has been reviewed, are made with wide safety margins.

Any manufacturer who wishes to sell a pesticide in Canada must first register that pesticide under the *Pest Control Products (PCP) Act*. To receive registration, the manufacturer must follow the registration process administered by the PMRA of Health Canada. Registration involves the submission of an application by the manufacturer. Before this is possible, the company must carry out specific studies on the product. The application must be supported by a very thorough data package documenting the effects of the pesticide on users, bystanders and the environment

The scientific testing may take years, depending on the nature of the product, as the study includes long and short term health effects of the user, exposure to bystanders, residues in food, ground water contamination, effects on wildlife and environmental fate. A scientific evaluation of the product is then performed by Health Canada – PMRA. A registration will be granted if the pesticide's safety, merit and value for the proposed use are found to be acceptable. If problems with the product are identified, registration will not be granted. All products are subject to re-evaluation, with provision for suspension or cancellation.

Once the federal government approves a registration, the provincial governments become more involved. Each province has legislation dealing specifically with pesticide use in that province. In Newfoundland and Labrador pesticide use is regulated under the *Pesticides Control Act.* This legislation requires all organizations and companies using pesticides to apply for and receive a Pesticide Operator License. This license regulates aspects of an operation not covered by federal legislation and requirements. As with federal regulations, the Pesticide Operator License is designed to minimize risks to human health and the environment. Aspects of a pesticide operation like buffer zones, spill response, public information and notification programs, monitoring requirements, weather conditions, etc are all specified in the license as they relate to a particular control program.

Provincial legislation also requires individuals to be trained in the safe use of pesticides. Only individuals that successfully pass the provincial pesticide applicator exam (administered by the Department of Environment & Conservation - Pesticides Control Section) are granted an applicator license and authorized to handle pesticides. Compliance and enforcement activities are also carried out by the Pesticides Control Section.

As with all commercial pesticide operations, the 2008 insecticide program will be

regulated by the Pesticides Control Section of the Department of Environment and Conservation [**see attachments to this document**]. The Federal registration system combined with the provincial licensing and regulatory system ensures that any pesticide that is used in Canada has passed a comprehensive environment/health evaluation.

**SCHEDULE**

The insects will emerge, and the best time for application of control, is expected to be early July to late July, but weather dependent. Because of the logistics and acquisition of supplies and services, it is essential that approval be given at the earliest.

May 6, 2008
*Date*

Original signed by
Leonard Moores
CEO - Forestry &
Agrifoods Agency

## ATTACHMENTS

**Map of infested areas predicted for 2008 within which treatment is proposed** ***See Attachment A***

**Copy of 2007 OPERATORS LICENCE (TERMS AND CONDITIONS) - FOREST INSECTICIDE USE from the Department of Environment and Conservation** ***see Attachment B***

**Health Canada – Pest Management Regulatory Agency approved ABIETIV™ label**
***See Attachment C***

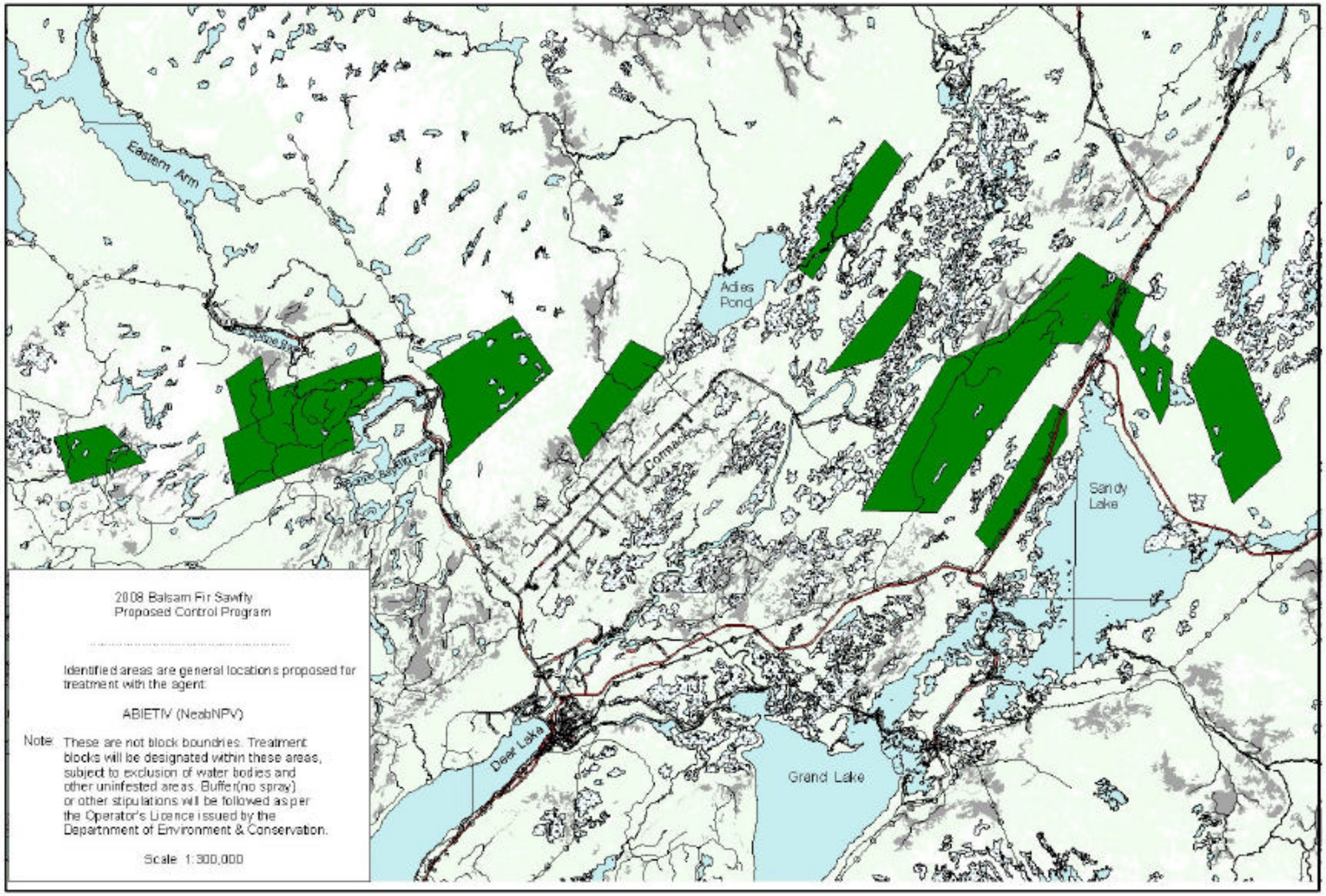
**Material Safety Data Sheet (MSDS) for ABIETIV™** ***See Attachment D***

***Attachment A***

1) Map of **infested** areas **predicted** for 2008 within which treatment may occur

**NOTE:**

**The areas outlined on the following map indicate where the balsam fir sawfly populations and expected defoliation / damage is predicted to occur in 2008 AND the general areas within which treatment with Abietiv™ is being proposed. They are not final treatment areas. Spray (treatment) blocks will be established within these boundaries once the terms and conditions and buffer zones (no-spray areas) are determined by the provincial Department of Environment and Conservation under the approval and licensing process.**


Eastern Arm
Adies Pond
Sandy Lake
Deer Lake
Grand Lake
2008 Balsam Fir Sawfly
Proposed Control Program
Identified areas are general locations proposed for treatment with the agent.
ABIETIV (NeabNPV)
Note: These are not block boundries. Treatment blocks will be designated within these areas, subject to exclusion of water bodies and other uninfested areas. Buffer(no spray) or other stipulations will be followed as per the Operator's Licence issued by the Department of Environment & Conservation.
Scale 1:300,000

**NOTE: The following is the 2007 Operator Licence – Terms & Conditions. These are subject to annual review by Environment & Conservation and could change from the preceding year(s) based on new information.**

***Attachment B***

Government of Newfoundland and Labrador
**Department of Environment and Conservation**

# Pesticide Operator Licence - Terms and Conditions

## Department of Natural Resources

PESTICIDE OPERATOR LICENCE NO: **07-049**
EFFECTIVE DATE: June 29, 2007
EXPIRY DATE: December 31, 2007

### Definitions

Water body: means any surface (high water mark) or subterranean source of fresh or salt water within the province, whether such course usually contains water or not, and includes coastal water within the jurisdiction of the province and includes water above the bed of the sea that is within the jurisdiction of the province, any river, stream, brook, creek, water course, lake, pond, spring, lagoon, ravine, gully, canal and any other flowing or standing water and the land usually or at the time covered by any such body of water.

Well: means an artificial opening in the ground from which water is obtained or that is made for the purpose of exploring for or obtaining water.

Human habitation: means every structure in which a person or persons resides on either a part-time or full time basis.

Penstock: means a pipeline leading from the intake to the turbines.

Right-of-Way (ROW) means an easement, granted by the land owner, that permits the construction and operation of a utility corridor for the purpose of transmitting electricity. The utility corridor may be of varying lengths and widths.

## LEGISLATION

1. For the purpose of this licence, all definitions and regulations as indicated in the ***Environmental Protection Act SNL 2002 cE-14.2*** and the ***Pesticides Control Regulations, 2003*** shall apply.

2. All applications shall be conducted in strict compliance with the label registered under the authority of the ***Pest Control Products Act*** (Canada).

## PESTICIDE OPERATOR RESPONSIBILITY

3. The operator shall be limited to using only those pesticides (See Appendix A) and applicators (See Appendix B) and vehicles (see Appendix C) as indicated on its Pesticides Operators License Application dated **June 22, 2007**. Any changes in the program outlined in the application must receive the written approval of the Manager, Pesticides Control Section, prior to their implementation.

4. The operator shall review these terms and conditions with each applicator prior to the start of each season, and a copy of the terms and conditions shall be provided to each applicator.

5. A copy of the operator's license and these terms and conditions shall be available at each site during the application of a pesticide. In addition the operator shall ensure that all applicators have their pesticide applicator licenses in their possession while applying pesticides unless otherwise indicated by the Pesticides Control Section.

6. Upon completion of the pesticide program for the year the operator shall submit to the Pesticides Control Section details regarding the type and quantity of each pesticide used and the name of the vendor/s from whom the pesticide was purchased. This information shall be submitted no later than **December 31** of each year**.** Licenses for the following season will not be processed until this information is received.

## VEHICLES

7. All vehicles used during the application of pesticides for Landscape, Structural or Industrial Vegetation Management programs shall have the registered/incorporated company name, or any other name under which this company trades, **as per your Pesticide Operator Licence**, prominently displayed on the vehicle. The name shall be displayed on both the driver and passenger sides of vehicle.

## SPILLS

8. All spills involving greater than 100 litres of mixed pesticide or the equivalent of unmixed formulation shall be reported immediately. All spills involving mixed or unmixed pesticide into a water body or within 100 metres of a water body, well or area frequented by people shall be reported immediately. Spills involving less than 100 litres

of mixed pesticide or equivalent amount of unmixed formulation in areas not frequented by people, or remote from water bodies or wells shall be duly recorded by the Operations Supervisor. Records of all such incidents (spills) shall be kept on file by the Operator. Reporting of spill incidents shall be made to the Pesticides Control Section, Newfoundland and Labrador Department of Environment and Conservation, St. John's (ph. 1-800-563-6181) and to Environment Canada, St. John's (ph.709-772-2083).

## CONTINGENCY PLAN

9. A copy of the Operator's Contingency Plan shall be located on all vehicles carrying liquid pesticide formulations and at the entrance of the Operator's approved pesticide storage area.

The Contingency Plan shall include:
Section 1 – Emergency Telephone Numbers
Section 2 – Spill Reporting Instructions
Section 3 – Emergency First Aid Procedures from Pesticide Labels (as listed in Appendix A of this document)
Section 4 – Pesticide Spill Procedure
Section 5 – Spill Response Kit
Section 6 – Protocol to Respond to Fires
Section 7 – Protocol to Respond to Theft
Section 8 – First Aid Procedures for Pesticide Poisoning
Section 9 – Pesticide Labels or Material Safety Data Sheets (MSDS) (as listed in Appendix A of this document)

10. A quantity of approved absorbent materials is to be on hand in case of a spill. The vehicle shall also carry clean-up equipment including but not limited to, shovels, brooms, and bags/buckets.

## STORAGE

11. All pesticide storage sites shall meet the requirements of Section 13 of the ***Pesticides Control Regulations 2003*** which are as follows*:*

- A source of water in an area in or adjacent to the storage area;
- Approved safety equipment as required which is properly maintained, functional and available at all times for personnel handling and working with pesticides;
- Flooring which shall not contain a floor drain or catch basin which is directly or indirectly connected to a private or municipal sewage system or public water course;
- Adequate ventilation by either natural or mechanical means so as to prevent the accumulation of toxic and/or flammable vapours;
- A "Danger Stored Pesticide" sign posted on all entrances which is printed in block letters 5 centimetres or more in height.
- Clean-up procedures, materials and equipment available to cleanup spills or leakage;
- Security procedures consistent with the instructions of the minister or person

designated by the minister.

In addition to the above storage requirements, each pesticide storage site shall have prominently displayed on all entrances contact telephone numbers for the Operator and the Department of Environment and Conservation, Pesticides Control Section, and indicated accordingly.

All entrances to the storage must be locked when the owner or an employee of the owner is not present.

12. Pesticides shall be stored in their original container or a substitute container approved by the manufacturer. Substitute containers shall be labelled appropriately.

13. Concentrated pesticides transported in a vehicle during spray operations shall be contained in a lock box, secure area or compartment which must be locked while unattended. Pesticides shall not be transported in the passenger compartment of any vehicle.

## PROTECTIVE EQUIPMENT

14. The operator shall provide and ensure that all personnel involved in the mixing, loading, and application of pesticides wear appropriate protective equipment in accordance with the pesticide manufacturer's product label and/or Material Safety Data Sheet.

## DISPOSAL

15. Empty pesticide containers which have been triple rinsed, cleaned and rendered unusable may be disposed of at an approved waste disposal site. Contaminated material shall be disposed of in accordance with the manufacturer's directions and in consultation with the Pesticides Control Section.

## WEATHER CONDITIONS

16. All exterior spraying are permitted only when wind speeds are between 2 and 15 km/h, air temperatures are below 25$^{o}$C, the relative humidity is above 50% and it is not raining nor is rain anticipated over the next 2 hour period.

**Exceptions to wind speed conditions may be granted on a case by case basis. Contact the Pesticides Control Section for details.**

All exterior granular pesticide applications are permitted only when air temperatures are below 25$^{o}$C, the relative humidity is above 50% and it is not raining nor is rain anticipated over the next 2 hour period.

## PUBLIC NOTIFICATION

17. The operator shall ensure that public notification programs are carried out as per the applicable attachment to these terms and conditions.

## BUFFER ZONES

18. The operator shall adhere to all buffer zones indicated in the applicable attachment when applying pesticides near water bodies.

## ADDITIONAL STIPULATIONS

19. The operator shall adhere to all additional conditions stipulated in the applicable attachment.

## REVOCATION

20. Failure by an operator, its agent, employee or a licensed pesticide applicator under its control, to adhere to the ***Environmental Protection Act SNL 2002 cE-14.2***, the ***Pesticides Control Regulations, 2003*** or the stipulations attached to its Operator Licence shall authorize the Minister of Environment and Conservation to suspend, revoke, or cancel the subject licence or prosecute under the ***Environmental Protection Act SNL 2002 cE-14.2***.

## PENALTY

21. Failure by an operator, its agent, employee or a licenced pesticide applicator under its control to comply with any of the terms and conditions of its licence is guilty of an offence under the ***Environmental Protection Act SNL 2002 cE-14.2***.

# APPENDIX A
# PESTICIDE LIST

## Department of Natural Resources

PESTICIDE OPERATOR LICENCE NO: **07-049**

These are the only pesticides that have been approved for use for this pesticide operator license. The operator is not permitted to purchase, apply, store or otherwise handle pesticides not on this list**.**

If you require additional pesticides, please submit the form, "**Request for Additional Pesticide(s)"**, to **Fax # (709) 729-6969** or in writing to:

Pesticide Control Section
P.O. Box 8700
St. John's, NL
A1B 4J6

| Pesticide Name | PCP Act Reg. # | Formulation |
|---|---|---|

# APPENDIX B
# EMPLOYEE LIST

## Department of Natural Resources

PESTICIDE OPERATOR LICENCE NO: **07-049**

These are the only employees that have been approved as pesticide applicators for this pesticide operator License. The operator is not permitted to allow any other employee to apply or handle pesticides for the company**.**

If you intend to make changes to the pesticide applicators in your employ, please submit the form, **"Notice of Pesticide Applicator Addition / Removal"**, to **Fax # (709) 729-6969** or in writing to:

Pesticide Control Section
P.O. Box 8700
St. John's, NL
A1B 4J6

| Applicator Name | PAL # |
|---|---|

# ATTACHMENT C

## PESTICIDE OPERATOR LICENCE

## FORESTRY – INSECTICIDE PROGRAM

C1. (i) **For all ground pesticide operations** involving a total of 300 ha or more, dyking, security, storage and communications plans shall be provided and approved by the Pesticides Control Section in advance of any spray program for all locations where any pesticide is to be mixed or loaded.

(ii) **For all aerial pesticide operations** dyking, security, storage and communications plans shall be provided and approved by the Pesticides Control Section in advance of any spray program for all locations where any pesticide is to be mixed or loaded.

(iii) The operator will also be responsible for the development of contingency plans and associated call out notifications to the satisfaction of the Pesticides Control Section in advance of any spray program.

C2. For aerial insect control programs, the Pesticides Control Section shall be advised of the spray plan. Block rediness, treatments carried out, etc on a daily basis. To contact the Pesticides Control Section, please call **Eastern Office** - (709) 729-6054 or (709) 729-1019; FAX: (709) 729-6969); **Western Office** – (709) 637-2528; FAX: (709) 637-2541.

C3. (i) Aerial spraying of pesticides is generally not permitted within Protected Water Supply Areas. The storage, mixing, loading and application of any pesticide within Protected Water Supply Areas requires a separate approval from the Water Resources Management Division of the Department of Environment and Conservation. The approval request shall provide detailed information on the type and duration of activity, location of activity (to be delineated on a 1:50 000 NFS topographical map), name of the pesticide along with its composition and toxicity data, application rate, application method, as well as any other information required.

(ii) The operator assumes liability to provide an alternate source of water to the affected community or communities as a result of the source of water supply being contaminated due to the spray program.

**PUBLIC/MUNICIPALITY NOTIFICATION PROGRAMS**

C4. (i) For pesticide operations involving treatments of **pesticides applied aerially,** the public shall be advised of the purpose and scope of the project and of the issuance of this licence by means of a notice published in at least one (1) newspaper with circulation in municipalities whose boundaries encompass treatment areas. The newspaper ad will appear in any issue at least one week prior to commencing the program. The ad will state all areas that are proposed for treatment during the program. The ad will also contain contact information (website address, toll free information number or other) for

individuals who wish to obtain additional information; and the telephone numbers of the Operations Supervisor and the Pesticides Control Section, 1-800-563-6181, and indicated accordingly.

A copy of the newspaper ad and/or receipt shall be mailed or faxed to the Pesticides Control Section.

(ii) A toll-free information line shall be set up one week prior to commencement of the spray program, for the duration of the spray program, and will remain operational until September 30 of this year. The toll-free number will be advertised prior to the beginning of the spray program.

(iii) Daily notification through press releases shall be made by the licensed pesticide operator, for the duration of the spray program. Regular updates will be made regarding the status of the program. All updates will identify the toll-free information number.

C5. (i) For aerial control programs, municipal governments whose boundaries encompass treatment and storage areas shall be notified prior to commencement of the programs. As per provisions of the ***Urban and Rural Planning Act*** and the ***Municipalities Act***, any activity within a town boundary requires approval of the town council in question.

(ii) For all programs involving the aerial application of pesticides, the operator shall be required to submit the details of municipality information programs to the Department of Environment and Conservation. The details of said municipality information programs must be approved in advance by the Department of Environment and Conservation.

C6. For aerial insect control programs, the public shall be advised of local treatments by the posting of signs in the area. The sign shall be as follows:

**COMPANY NAME**

**this area has been treated with the federally registered pesticide**

**Name of Formulation**

**Date of Application**

**For more information call toll free:**

**1-800-563-6181**

**Department of Environment and Conservation**

The particulars (location, timing, size of sign, etc.) of said posting shall be set by the

Pesticides Control Section prior to spray programs.

C7. The Operator and/or his agent shall make every reasonable attempt to verbally notify adjacent owners, prior to the spray program, who, given the nature of the control operation, might be expected to benefit from said notification. In the event that this cannot be done, the operator shall post signs (as specified in C6) along access road(s) leading to all dwellings located within the proposed spray area(s).

C8. In the event that formulations containing Btk are to be used, the brochure, "Protecting the Forests with Btk"**,** is to be distributed to all municipal councils with boundaries that may contain spray blocks. In addition, the brochure is to be made readily available to members of the general public. Additional distribution is encouraged but is done so at the pesticide operator's discretion.

**BUFFER ZONES**

C9. For any pesticide application involving, either directly or indirectly, an aircraft of any sort, the operator shall maintain an 800 metre buffer zone around all occupied osprey and bald eagle nests and a minimum aircraft height of 250 meters during the period May 1 to August 15.

C10. ***Bacillus thuringiensis kurstaki* (*Btk*)**
If approved for aerial application in Protected Public Water Supply Areas, the operator shall provide the following widths of buffer zones, or any other buffer widths as specified by the Water Resources Management Division, along and around water bodies from the high water mark in a designated area:

| **WATER BODY** | **WIDTH OF BUFFER ZONE** |
|---|---|
| Intake pond or lake | a minimum of 150 metres |
| River intake | a minimum of 150 metres for a distance of one (1) kilometre upstream and 100 metres downstream |
| Main river channel | a minimum of 75 metres |
| Major tributaries, lakes or ponds | a minimum of 50 metres |
| Other water bodies | a minimum of 30 metres |

C11. **Mimic 240 LV (tebufenozide) PCP Act #24502.**
For all aerial applications of Mimic 240LV, the operator shall maintain a minimum buffer of 100 metres from all scheduled salmon rivers and their tributaries. A 25 meter buffer

shall be maintained around all bodies of water identified on a 1:50,000 NFS Topographical map. The proponent will also maintain a minimum buffer of 50 metres from any occupied cabin or any other inhabited areas.

**MIXING RINSING AND LOADING**

C12. All pesticide mixing and rinsing sites shall be located a minimum of 50 metres from the nearest water body. Loading of equipment with **water only** prior to the addition of pesticide can be done up to 5 metres from a water body. Addition of pesticide to the water in the equipment shall be performed at least 50 metres from the nearest water body.

C13. Where water must be pumped directly into the formulation tank, an antibackflow device must be fitted onto the pump and the siting should be that the formulating unit be at least 30 metres from the watercourse and that the pesticide not be opened for addition to the formulation tank until the equipment has been filled with water and is out of the respective buffer zone.

***Attachment C***
Abietiv™ Label

**ABIETIV**
**Flowable Biological Insecticide**

For Use in Forestry to Reduce Populations of Balsam Fir Sawfly Larvae (*Neodiprion abietis*)

RESTRICTED

**READ THE LABEL BEFORE USING**
**KEEP OUT OF REACH OF CHILDREN**

**CAUTION – EYE IRRITANT**
POTENTIAL SENSITIZER

GUARANTEE: *Neodiprion abietis Nucleopolyhedrovirus*, NeabNPV:
$4 \times 10^9$ polyhedral inclusion bodies (PIBs) per milliliter.

**REGISTRATION NO: 28304 PEST CONTROL PRODUCTS ACT**

Net Contents: 40 mL ($1.6 \times 10^{11}$ PIBs)

Natural Resources Canada
Canadian Forest Service – Atlantic Forestry Centre
P. O. Box 4000, 1350 Regent Street
Fredericton, New Brunswick, E3B 5P7

**GENERAL DIRECTIONS FOR USE:**

**ABIETIV Flowable Biological Insecticide** is a naturally occurring baculovirus within the genus *Nucleopolyhedrovirus* which is selectively toxic to Balsam Fir Sawfly Larvae **(*Neodiprion abietis*)**. To be effective deposits of **ABIETIV Flowable Biological Insecticide** must be ingested by susceptible larvae. Thorough coverage of target foliage where larvae are feeding is essential. **ABIETIV Flowable Biological Insecticide** when ingested by the host larvae will infect and replicate in the midgut epithelial cells of a single host species, resulting in larval mortality within 7 to 14 days.

Applications should coincide with sufficient foliage development (shoot elongation or leaf expansion) to ensure maximum spray deposit. To the extent possible, apply treatments after egg hatch has been completed to assure that the maximum number of larvae are present during the treatment

period. Avoid application when significant rainfall is imminent. For early morning applications, foliage should not be wet with dew to the point of runoff.

**RESTRICTED USES**
**FORESTRY**

**NOTICE TO USER:** This control product is to be used only in accordance with the directions on this label. It is an offence under the *Pest Control Products Act* to use a control product act under unsafe conditions.

**NATURE OF RESTRICTION:** This product is to be used only in the manner authorized; consult local provincial pesticide regulatory authorities about use permits that may be required.

**RESTRICTED USE:** For use against balsam fir sawfly larvae (*Neodiprion abietis*) in forests.

Apply at the rate recommended. Best results are expected when ***ABIETIV Flowable Biological Insecticide*** is applied to dry foliage with well calibrated aircraft delivering a droplet size of 100 µm.

**DIRECTIONS FOR USE:** A 20% aqueous solution of molasses serves as the carrier for ***ABIETIV Flowable Biological Insecticide***. For preparation of spray solution add between 1 and 3 mL of ***ABIETIV Flowable Biological Insecticide*** in each 10 L of the molasses solution. Use the higher rate under higher pest pressure. The spray solution will yield a rate of 1 to 3 billion ($10^9$) polyhedral inclusion bodies (PIBs) of NeabNPV when applied at a rate of 2.5 L per hectare. For example, 40 mL of ***ABIETIV Flowable Biological Insecticide*** mixed with 400 L of 20% aqueous molasses and applied at a rate of 2.5 L per hectare will yield a rate of 1 billion PIBs NeabNPV per hectare. **Note:**
To be effective, larvae must ingest foliage with deposits of ***ABIETIV Flowable Biological Insecticide***. Uniform spray deposit coverage of the foliage is essential for optimal efficacy.

**Aerial Application Instructions:**
Apply only by fixed-wing or rotary aircraft equipment that has been functionally and operationally calibrated for the atmospheric conditions of the area and the application rates and conditions of this label.

Label rates, conditions and precautions are product specific. Apply only at the approved rates on this label.

Ensure uniform application by using appropriate marking devices and/or electronic tracking equipment.

**Use Precautions:**
Apply only when meteorological conditions at the treatment site allow for complete and even coverage. DO NOT apply when wind speed is greater than 16 km/h at flying height at the site of application.

**Operator Precautions:**
Do not allow the pilot to mix product to be loaded onto the aircraft. Loading of premixed product with a closed system is permitted. It is desirable that the pilot has communication capabilities at each treatment site at the time of application.

The field crew and the mixer/loaders must wear the personal protective equipment described in the PRECAUTIONS section of this label. All personnel on the job site must wash hands and face thoroughly before eating and drinking. Protective clothing, aircraft cockpit and vehicle cabs must be decontaminated regularly.

**Product Precautions:**
Read and understand the entire label before opening this product. If you have questions, call the manufacturer at 1 888 870 6444 or obtain technical advice from the distributor or from your provincial agricultural or forestry representative. Application of this specific product must meet and/or conform to the aerial uses and rates on this product.

**PRECAUTIONS:**
KEEP OUT OF REACH OF CHILDREN. MAY CAUSE SENSITIZATION. CAUTION-EYE IRRITANT. Avoid contact with skin, eyes or clothing. Wear a long-sleeved shirt, long pants, water-proof gloves, shoes, socks and eye goggles when handling, or mixing/loading the product and during all clean-up/repair activities. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

**ENVIRONMENTAL PRECAUTIONS**
DO NOT apply this product directly to freshwater habitats (such as lakes, rivers, sloughs, ponds, prairie potholes, creeks, marshes, streams, reservoirs, ditches and wetlands), estuaries or marine habitats.

DO NOT contaminate irrigation or drinking water supplies or aquatic habitats by cleaning of equipment or disposal of wastes.

**FIRST AID:**
IF SWALLOWED - Rinse mouth and throat with copious amounts of water. Do not induce vomiting.
IF ON SKIN/CLOTHING – Take off contaminated clothing. Wash skin with plenty of soap and water.
IF INHALED – Move to fresh air.
IF IN EYES – Hold eye open and rinse slowly and gently with water. Remove contact lenses, if present, then continue rinsing eye.
GENERAL – Seek medical attention immediately if irritation or signs of toxicity occur and persist or are severe. Take container, label or product name and Pest Control Product Registration Number with you, when seeking medical attention.

**TOXICOLOGICAL INFORMATION**: Treat symptomatically.

**STORAGE:** Store in the refrigerator at 4°C for up to 5 months. Store container upright and keep tightly closed when not in use. Shake vigorously to resuspend contents immediately prior to addition to molasses solution.

**DISPOSAL**: Triple- or pressure-rinse the empty container. Add the rinsings to the spray mixture in the tank. Follow provincial instruction for any required additional cleaning of the container prior to its disposal. Make the empty container unsuitable for further use. Dispose of the container in accordance with provincial requirements. For information on disposal of unused, unwanted product, contact the manufacturer or the provincial regulatory agency. Contact the manufacturer and the provincial regulatory agency in case of a spill, and for clean-up of spills.

**NOTICE TO BUYER**: Seller's guarantee shall be limited to the terms set out on the label and, subject thereto, the buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

**NOTICE TO USER**: This control product is to be used only in accordance with the directions on this label. It is an offense under the *Pest Control Products Act* to use a control product under unsafe conditions.

## ***Attachment D***

# MATERIAL SAFETY DATA SHEET

*Product name*: Abietiv Flowable Biological Insecticide
Registration number 28304 Pest Control Products Act
*Chemical name*: Balsam fir sawfly (*Neodiprion abietis*) nucleopolyhedrovirus (NeabNPV)
*Physical state:* Suspension
*Formula*: Biological organism, virus, Baculoviridae: Nucleopolyhedrovirus
*Formulation type:* Suspension
*Molecular weight*: Not applicable
*Synonyms*: Balsam fir sawfly nuclear polyhedrosis virus
*Chemical family*: Not applicable

**I. Physical data**
*Boiling point*: Not applicable
*Freezing point*: Not applicable
*Specific gravity*: 1.0 g/mL
*Viscosity:* 1.0 centipoise
*pH (in solution):* Neutral
*Vapour pressure*: Not applicable
*Vapour density*: Not applicable
*Evaporation rate*: Not applicable
*Corrosion character:* Not corrosive
*% Volatiles by volume*: None
*Solubility in water* (% by wt): Insoluble
*Appearance and colour*: brownish suspension, musty odor.

**II. Ingredients**
Balsam fir sawfly nucleopolyhedrovirus (NeabNPV) polyhedral inclusion bodies (PIBs) 1.5%
Water 98.5%
*Guarantee:* $4.0 \times 10^9$ PIBs/mL
*Formulants:* Does not contain any EPA List 1 formulants or formulants known to be TSMP Track-1 substances
*Impurities*: Proteins, fats, cells, tissues, cuticle from host insect (balsam fir sawfly).

This nucleopolyhedrovirus is non-toxic to vertebrate animals. Impurities may cause eye irritation.

**III. Fire and explosion hazard data**
*Flash point*: Not applicable
*Flammable limits*: Not applicable
*Extinguishing media*: Water
*Special fire fighting procedures*: None except to avoid inhalation of particulates released by fire.
*Unusual fire and explosion hazards*: Not applicable

**IV. Health hazard data**

*Oral*: A single dose of 1 x $10^8$ PIBs by oral gavage showed no evidence of acute oral toxicity or pathogenicity to Sprague-Dawley® rats (average initial weights 101-124 g).

*Intravenous injection*: A single dose of 1 x $10^7$ PIBs by intravenous injection showed no evidence of acute injection toxicity or pathogenicity to Sprague-Dawley® rats (average initial weights 112-129 g).

*Inhalation*: A single dose of 1 x $10^8$ PIBs by intratracheal instillation showed no evidence of acute pulmonary toxicity or pathogenicity to Sprague-Dawley® rats (average initial weights 123-148 g).

*Dermal*: A single topical dose of 2 g NeabNPV/kg body weight showed no evidence of acute dermal toxicity or pathogenicity to New Zealand white rabbits.

EMERGENCY AND FIRST AID PROCEDURES:

Remove from exposure situation. If in eyes, flush with plenty of water. If irritation persists, get medical attention. If on skin, wash with soap and water.

NOTES TO PHYSICIAN

Prolonged exposure may cause allergies and hypersensitivity in some individuals.

**V. Reactivity data**

*Stability*: Stable

*Conditions to avoid*: Do not store in direct sunlight (ultraviolet sensitive) or at temperatures above $30^0$C.

*Incompatibility*: Not applicable

*Hazardous decomposition products*: May contain bacteria

**VI. Spill or leak procedures**

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Containment and cleanup by placing in a sealable container for transport to an approved disposal site.

WASTE DISPOSAL METHOD

Triple rinse containers and dispose of them at an approved site. Washing waste from this product may be disposed of on site or at an approved disposal site.

**VII. Special protection information**

*Respiratory protection*: Medical face mask as appropriate.

*Ventilation*: Use in areas with good ventilation

*Protective clothing*: Coveralls, gloves, safety goggles and medical facemask are required for mixers.

*Other protective equipment*: Have eyewash, soap and water available at project location.

**VIII. Special precautions**

KEEP OUT OF REACH OF CHILDREN.

1. Avoid direct application to bodies of water.
2. Do not contaminate water, food or feed by inappropriate storage and disposal.
3. Only for use as a biological insecticide for balsam fir sawfly control programs limited to forestry.
4. Avoid heat and direct sunlight.
5. Other handling and storage conditions: Wastes from this product may be disposed of on site or at an approved waste disposal facility.
6. Do not reuse empty containers but arrange for disposal in a sanitary landfill or by incineration.