9th International Forest Quarantine Research Group Meeting

Canberra, Australia

September 26th to September 30th, 2011

Meeting Report

Abbreviations and Acronyms	
AGM	Asian gypsy moths
ALB	Asian Longhorned Beetle
APPPC	Asia and Pacific Plant Protection Commission
AQIS	Australian Quarantine and Inspection Service
BA	Biosecurity Australia
CLB	Chinese Longhorned Beetle
COFO	IPPC – Committee on Forestry
CPM	Commission on Phytosanitary Measures
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)
DAFF	Department of Agriculture, Fisheries and Forestry (Australia)
EAB	Emerald Ash Borer
EPPO	European Plant Protection Commission
EU	European Union
FAO	Food and Agricultural Organisation (United Nations)
HT	Heat treatment
IFQRG	International Forest Quarantine Research Group
INRB	Instituto Nacional de Recursos Biologicos (Portugal)
IPPC	International Plant Protection Convention
IUFRO	International Union of Forest Research Organisations
ISPM	International Standards for Phytosanitary Measures
KD	Kiln drying
MBr	Methyl Bromide (CH_3Br)
NAPPO	North American Plant Protection Organisation
OCPPO	Office of the Chief Plant Protection Organisation (Australia)
PWN	Pine Wood Nematode
RF	Radio frequency
SC	Standards committee
SF	Sulfuryl fluoride
TPFQ	Technical Panel on Forest Quarantine
TPPT	Technical Panel on Phytosanitary Treatments

International Forest Quarantine Research Group
IFQRG-9 September 2011
Meeting Proceedings

1.	**Introduction**
1.1	Biosecurity Australia Chief Executive Officer Colin Grant opened the meeting, welcoming the participants to Australia. Eric Allen thanked DAFF members who had made preparations for IFQRG and provided a brief history of the group and background on its function and collaborative relationship with other agencies. Eric paid tribute to the work o the late Nils Larsson of Canada, who sadly, passed away in August 2011.
2.	**Action items from IFQRG-8**
2.1	1. On the update to the FAO fumigation manual: Various approaches for the development of an updated fumigation manual were discussed, recognizing that several countries have already developed guidance materials. *Action: Mike Ormsby to act as IFQRG point to provide a web resource to direct users to existing MBr manuals.* 2. *On the paper that defines the characteristics of the pests included in ISPM-15 annexe and the risks associated with them:* This action item was partially addressed in IFQRG-9 documents 17-18. However, the issue of pests and characteristics needing quarantine treatments still need to be addressed. 3. *On analysis on chip size and its relationship with pest risk*: Still being progressed by Eric Allen, largely due to a need to consider new markets for chip products (eg. biofuel). 4. *Microwave and RF manual:* John Janowiack suggested that it might be too early to develop guidance manuals fo dielectric treatments. RF treatments are still in development and MW still needs IPPC approval. 5. *Literature Review of Bacteria as forest pests:* David Letham noted that work on this action item is still in progress. However, Bacterial Wetwood (North America) and Batcerial leaf scorch (*Xylella fastidiosa*) were the most important. Other diseases identified were Bacterial wilt, Brown gall, *Xanthomonas* shoot blight of Eucalypts and Bacterial canker of popular. More information was needed on whether these pathogens can be spread by wood products. *Pseudomonas syringae* affecting chestnut in UK was cited as a trigger for this action item; research investigating pathways for this pathogen is currently in progress in the UK. Eric Allen suggested that the issue of *P. syringae* could be put at the forefront of this work. Hugh Evans and Eric Allen suggested pathology colleague from their respective organisations may be able to assist with this action item. Eckhard Brockerhoff suggested that work in NZ on PSA of kiwifruit may be applicable to this action item. Jack Simpson noted that *Pseudomonas syrignae* is nearly cosmopolitan and suggested that it may not be possible to consider it a quarantine pest. 6. Completed at IFQRG-8 7. Collect information on fumigant penetration in word, with/without bark: To be discussed in presentation.

	8. *Lack of criteria for choosing substitute species to TPPT:* The TPPT drafted a discussion document for general quarantine use. The panel identified interrelation of organisms' biology and treatment type to be a major issue to inform choice of surrogates. However, TPPT accepted that surrogate species could be useful, provided they respond in the same manner to treatments as intended targets. 9. *Investigate validity of 56*C/30 mins. as a treatment, including for EAB* 10. *Review applicability/necessity of Probit 9 in determining the efficacy of all wood treatments (TPFQ request):* Two papers (IFQRG 18 & 19) to be presented during IFQRG-9. See action items for IFQRG-9. *11. Investigate relevance of wood flies in wood packaging:* Edson Ide Tedeau (Brazilian entomologist) provided information on biology and indicated that Brazil did not have records of interception of wood flies in timber or solid wood packaging material. He will contact other NPPOs for more interception data. John Nielsen noted that there were no quarantine interceptions made by Australia.
8.	**Update of other bodies**
8.1	Update on IPPC: Budget cuts have resulted in TPFQ not meeting this year. Additional support has since been obtained, so the panel will continue. No progress in TPFQ projects; standards committee have been tasked by parent bodies to make methods more efficient and transparent. Standard on the international movement of wood is on hold. Standards committee have prepared comments and submitted them to TPFQ, but no progress due to lack of meeting. Draft SF treatment standards withheld for consultation due to issues with treatment schedule and concern that SF may be a greenhouse gas. TPPT propose addressing these concerns via submitter and independent researcher. Plants for planting standard has been made available for member consultation, with results to go to SC in November 2011.
8.2	**CPM –** no report
8.3.1	**TPPT report** The TPPT considered SF treatments. Brent reported that SF has been identified as a potentially significant greenhouse gas, however TPPT recognised that their role was not to act as a greenhouse gas regulator. Investigations into the use of SF continue, and testing to investigate the temperature range for treatment is expected to be completed late 2011. The use of surrogate species for use in treatment efficacy tests was also considered. Discussions focused on taxonomic differences between target and surrogate taxa and the relationship between target/surrogate lifestyle and the effects of individual treatments. It was considered that it should be possible to identify lower-risk or more common surrogate taxa for high risk or difficult to obtain pest taxa.
8.4	**TPFQ update** Due to budget difficulties, TPFQ did not meet during 2010-2011.
8.5	IFQRG reviewed SC requests to the group and incorporated them into this years discussions. Specifically the group addressed: • Experimental protocols for treatment testing • Pests to be included in treatment testing • Determination of efficacy data for HT and MB • Statistical confidence levels acceptable for ISPM 15 treatments

9.1	Eckehard Brockerhoff gave an update recent IUFRO meeting and reported an outbreak of ALB in Italy and discussed chemical treatments as phytosanitary measures.
9.2	Shane Sela gave an update from NAPPO region, regarding movement of wooden handicrafts and Christmas trees and the development of these standards. Refer www.nappo.org to view these documents.
9.3	Hugh Evans gave an update from EPPO meeting Madera in March 2011. He indicated that the group was working on the standard for pinewood nematode, and reported on measures and impacts of ALB. *Chalara fraxinia* (fungi) and ambrosia beetle that may lead to a full PRA. EAB PRA has been completed. Discussed wood biomass and the imports of chips. New insect (*Apriona* sp.) on of poplars, eucalyptus; a PRA to be conducted later this year. *Phytophthora pinifolia* was also discussed.
10.2	Hugh Evans gave a presentation on IMPACT, ISEFOR, PERMIT that look at pathway management. Also the REPHRAME project that focuses on vectors. Previous PHRAME project can be viewed at www.forestresearch.gov.uk
11.1	Brent Larson reviewed the status of the draft ISPM on phytosanitary risks and international movement of wood. The group also discussed firewood risks. Firewood in North America and some commercial use is a risk for domestic movement. Also looked as fuel wood in a global context. Firewood and fuelwood as a whole is a significant problem. NZ is working on treatments for export logs which could be perfect for firewood, running electric currents through the logs. IFQRG members were encouraged to provide firewood treatment information to Kerry Britton (US).
11.2	Gillian Allard made a presentation of the FAO Forestry "Guide to the implementation of international standards in forestry" and demonstrated an e-learning approach that was used in Fiji in September 2011. Training materials are being developed and will be discussed at the Asia-Pacific Forest Invasive Species Network meeting to be held in Beijing in November 2011.
11.3.1	Regarding the document "Criteria for treatments for wood packaging material in international trade (2006-011)", IFQRG considered the country comments and questions specifically raised by the SC. The IFQRG discussed and reviewed approaches and considerations regarding determination of efficacy and statistical reliability, as well as target species, with a view to facilitate the development of new treatments. An approach was proposed, that considered the perspectives raised in two recent publications (Haack et al. 2011 and Schortemeyer et al. 2011). It was generally agreed that probit-9 was impractical for many wood pests and would result in treatment doses that were impractical (with negative environmental and/or economic consequences). Haack et al. 2011 proposed an alternative approach to treatment testing that did not prescribe an efficacy target; this 3-step testing protocol was discussed at length and refinements were made for consideration by the SC or TPFQ (see appendix 1). With regards to the pests that should be used for testing, the group reviewed the current list of species to offer a more simplified and practical approach. This should facilitate testing while supporting comparability and consistency between treatments. The group decided that specific species such as *Anoplophora glabripennis* (Asian longhorned beetle, ALB) do not necessarily needed to be tested. It was proposed that a standard group of reference species, complemented with additional pests available to researchers be used. This would allow for testing of several groups of organisms at the genus or family level. The group noted that reference species are used successfully in other fields (e.g. agronomy). The revised list of pests, as per SC7 suggestion, attempts to target the "lowest possible taxonomic level, i.e. Family, Genus". Specific genera or species are identified for testing only where quarantine risks are significant (e.g. *Bursaphelenchus xylophilus* and *Heterobasidion spp.* a pathogenic fungus that readily produces asexual spores and could find pathway from infected WPM while most other pathogenic fungi have very reduced risk of pathway via WPM). The group understood that any new treatment needs to eradicate a large number and variety of pests that can be found on WPM. However to

	prove that a treatment is efficacious under laboratory conditions , a pre-screening process is proposed using a variety of pests of higher taxonomic rank to determine which of these is likely to be most tolerant to the treatment. The pre-screening step would include pinewood nematode, a species of *Heterobasidion* and pests selected from other groups known to have species of quarantine significance. Lengthy discussions took place regarding which pests should be used during testing. Initally, IFQRG members explored various organisms from the following broad groups or specific species: Scolytinae, Anobiidae, Bostrychidae, Buprestidae, Cerambycidae (any *Anoplophora* spp. or another taxon if unavailable), Siricidae, Lepidoptera, Pine wood nematode (PWN), *Heterobasidion annosum, Fusarium circinatum*, a tree killing Phytophthora spp., Deep penetrating blue stain, *Chryptonectria parasitica* (chestnut blight). While understanding that all of these pests are important to be controlled by a treatment the committee agreed that some may present challenges to find or handle due to their biology. The committee further discussed which of these organisms should be kept or removed from the revised list based on scientific reasoning. **The final recommended list from which a single organism from each group needs to be selected for Step 1 testing is: a reference screening pest, pine wood nematode (PWN), *Heterobasidion spp.*, Scolytinae, Bostrychidae, Buprestidae, and Cerambycidae.** The group felt that the following organisms do not need be included in the pest list: Anobiidae: remove, as they are not significant as tree killers and are rare from interception data; They may though be considered as good testing reference species. Lepidoptera: (Cossoid-Sessoid-Tortricoid assemblages) remove, as they are rarely intercepted; large size makes them vulnerable to sawmilling. Siricidae: remove - challenging to collect samples for testing; possibility of using sawflies as reference species. *Fusarium circinatum:* remove - WPM not seen as major pathway known on wood chips; potentially easy reference species. A tree killing *Phytophthora* spp. : remove - low evidence of establishment from WPM Deep penetrating blue stain fungi: remove - saprophytes only affect living trees when associated with aggressive bark beetles that mass attack trees, low evidence of establishment from WPM; Australia currently regulates for bluestain fungi. Canker fungi/chestnut blight: remove. There is paucity of evidence of spread via pathway historical evidence shows that this fungi are unlikely to be spread by WPM Root rot fungi: remove - deemed to be very low risk of spreading via WPM. Much discussion took place on the issues of efficacy, statistical reliability and appropriate experimental protocols. This led to general agreement within IFQRG on how to report the efficacy level reached by a given treatment. Since the experimental protocol aims for 100% kill in all three stages of the protocol, the statistical reliability will depend on the number of pests that are present in the amount of material tested. The proposed approach, which aims for 60-100 pieces of wood, allows for the Probit level of the treatment to be calculated and reported. Where pests can be found in abundance (e.g. PWN) the probit level that can be achieved will most likely be probit nine or even larger. For pests that are found in very small number (e.g. ALB or other large wood borer) the calculated probit level may be significantly lower than probit nine, while still providing 100% mortality at a suitable level of confidence that the experimental lethal levels can be

	achieved during operational treatments to a level that can be equated to existing ISPM15 approved treatments. Specific information on the species tested would be necessary to provide rational for what is a suitable level of confidence in the test data. Information on pest biology and incidence will help put this information in context. In addition, data from tests of references species at high densities may provide the acceptable confidence. An alternative view from a few members supporting the continued requirement of prescribed efficacy targets was also raised. This approach pursued a concept raised in by Schortemeyer et al. 2011; whereby a required efficacy could be established by calculating the "maximum pest limit" for a worst-case-scenario considering a number of factors including the expected prevalence of a pest on wood packaging, consignment size, etc. This type of analysis, for individual pests or groups of pests remains to be carried out in detail.
11.3.3	Ron Mack presented a talk discussing the history of fumigant timber penetration studies. Current penetration work being conducted by the USDA OTIS laboratory was also presented, including a description of the methodology being used.
11.3.4	Marcus Schortemeyer & Adnan Uzunovic presented papers based on the 2011 probit-9 publications (2011 IFQRG-9-17, 18). The group discussed the concepts and struck a sub-group to craft some guidance to provide to the TPFQ and SC. Mike Ormsby responded to the previous speaker's presentations. Mike Ormsby explained in more detail the MPL (maximum pest limit) model for estimating treatment efficacy requirements. The example used in the Schortemeyer paper, had it followed the established model more closely, would have used an estimate of aggregated WPM (e.g. in a packaging company yard) rather than a single container. Group discussion also identified that the infestation rates used were much higher than would occur even in worst-case reality. The group agreed that in principle this approach could inform the discussion on the level of protection (efficacy) required for the movement of WPM in international trade. Mike Ormsby noted that the current international norm for describing treatment efficacies is to provide the statistical confidence level (e.g. 95%) together with the level of target pest survival (e.g. no more than 1 pest in 10,000 will survive, otherwise described as 99.99% efficacy). He felt that the alternative efficacy description of 95% confidence in 99.99% reliability of 100% mortality is not considered sufficiently clear and might not be understood by regulators.
11.3.7	David Letham led a discussion on blue stain fungi on wood packaging. Concerns regarding blue stain fungi ranged from quarantine of exotic species (Australia's NPPO currently intercepts blue stain fungi on timber pallets) to wood damage. Adnan noted that blue stain fungi taxa tended to be widespread internationally and saprophytic. Different blue stain fungi were noted to use different infestation strategies, ranging from first colonisers of wood that became active shortly after harvest to secondary and tertiary invaders associated with insects using similar infestation strategies. Exposure of susceptible timber to moisture was noted to be important for development of infestations. Adnan Uzunovic also noted that although heat treatment was likely to kill any blue stain fungi present at time of treatment, timbers were still susceptible to re-infestation by other taxa at a later time. Adnan and Ken Glassey agreed that blue stain fungi could only be transferred to other timbers if beetles were present, as sticky spores prevented aerial dispersal and limited dispersal via water. Eric Allen noted that it was important to understand the invasion strategies of different blue stain fungi taxa to appreciate quarantine risks. Adnan noted that other fungi (eg. *Sphaeropsis*) not currently considered under the broader definition of blue stain fungi were capable of causing similar staining in timbers, although some of these were also internationally widespread. He also noted that molecular tools are available for the identification of many blue stain fungi. Commonly heat treated but not dried wood can develop blue stain fungi /mould problems in transit, but this has not been raised as a quarantine issue yet (except by Australia).
12.1.2	Chuck Ray provided a talk regarding the environmental impacts of different pallet types and application of different treatment types to timber pallets using Life Cycle Analysis.
12.1.3	Eckehard Brockerhoff gave a presentation on the biosecurity risk posed by live plants for planting. Inspection was found to be a relatively poor method of detecting risk organisms

	from live plant material.
12.2.1	John Nielsen presented a talk regarding the use of geospatial intelligence as a method o identifying risk pathways for maritime vessels.
12.2.2	Adnan Uzunovic presented a talk on genomic-based forest pest diagnostics and monitoring project funded by Genome Canada for the next 3 years.
12.2.3	Eric Allen presented a talk on a molecular method to identify whether PWN in timbers were alive or dead.
12.3.1	Hugh Evans & Marc Michielsen presented material on the passive movement of PWN from infested "donor" timbers to "recipient" timbers under various experimental moisture content conditions. 20% moisture content of wood seems to act as a transfer barrier between adjacent timbers. Under the conditions of the reported experiments, no live PWN could be extracted from previously infested timbers after 40 weeks.
12.3.2	David Rees presented a talk regarding *Hylesia nigricans* as a potential quarantine pest from Argentina.
12.4.1	Ken Glassey presented world trends in Methyl Bromide use: how the Montreal Protocol has impacted on use in the past 10 years. Non-QPS MBR use has decreased dramatically with QPS use now exceeding non-QPS use. WPM is estimated to account for 13% of QPS MBR use.
12.4.2	Chris Dolman from BOC presented on development of Ethane dinitrile (EDN) a possible alternative to Methyl Bromide. EDN is a gas that occurs naturally. Possible applications include fumigation of strawberry runners and fruit, timber and logs for export, imported grains. For timber applied in the same way as MB, however does not require a vaporise Currently, BOC have efficacy data for *Anoplophora glabripennis*, *Monochamus alternatus*, *Bursaphelenchus xylophilus*, several termites, and pathogens, including *Shizophyllum* and *Ganoderma*. Additional data exists for stored product insects (eg. *Rhizopertha*). Some of the alternatives considered to MeBr include PH_3, SF and EDN. According to Chris Dolman, EDN is more effective to timber beetles and termites than MI based on CT data. Preliminary research indicates that EDN is water soluble and will penetrate will into wet wood. It can be biocidal during that phase. Dosing still need to be looked at under different temps, times and moisture of the wood. Questions remain regarding its mode of action.
12.4.3	Don Brash presented a talk on disinfestation of pine logs using phosphine and New Zealand's experience in developing PH_3 as a timber treatment and use of MeBR. Discussion was also given on their success to date in attempting to rear captive burnt pine longicorn beetles.
12.4.4	Don Brash presented a talk regarding the hazards associated with MeBr desorption of from pine logs after fumigation. MeBR recapture techniques were also discussed.
12.4.5	Adnan Uzunovic presented data on phosphine efficacy against PWN and three fungi.
12.4.6	Jack Simpson presented Ken Thomas' critique of dielectric heating as a quarantine treatment. Their findings show concerns with high variability of temperature within the wood due to density and moisture content. More guidance is needed on how to proceed with this on an industrial level, although comments were made that the scientific basis fo the treatment were not disputed. It is likely that innovative methods will be developed in future to deliver this treatment method in a cost effective manner.
12.4.6.1	The group discussed dieletric heating on frozen wood paper (IFQRG 9-31). John Janowiak raised some questions regarding the experimental design, noting different timbers would exhibit different heating patterns from frozen, which may affect experimental consistency. John Janowiak and Chuck Dentelbeck both noted that timber should be thawed before receiving thermal treatment (pretreatment).

12.4.7	Ken Glassey presented the MBTOC review of SF efficacy on eggs of stored product insects, showing large variation in CT required to achieve greater than 99% efficacy.
12.4.8	Jakub Sandek presented a talk regarding the use of near-IR spectroscopy as a method o identifying whether timber had received heat treatments. This method of analysis shows promise for verifying heat treatments have taken place.
12.4.9	Eric Allen presented discussion on Integrated Measures for Pest Risk Reduction. This looked at principles used in water management and how these may be applied to timber pest management. Applying risk reduction values to each step of the production pathway add robustness to the system. What can move us forward is quantifiable information to give a good understanding to build confidence in the whole system and not just the treatment.
12.4.10	Adnan Uzunovic presented a talk on radio frequency (RF) as a method of heat treatment using PWN as the target/test organism. Thermal imaging systems and a set of 8 optic probes were used to record temperatures induced by RF treatment in timber pre-infested with PWN. Data presented demonstrated that RF treatment (56*C for 1 minute) is capable of successfully killing PWN to probit 9 levels. Discussion focused on the design and development of RF treatment technology to produce a practical, commercial process that will deliver 60/1 throughout the wood. Emphasis was placed on developing a system that was outcome based, rather than prescriptive. Adnan noted that this research will investigate fungal survivorship under RF treatment in the near future.
13.1	The group discussed the work program for 11/12. See below.

Next meeting proposed date: Sept 17-21 2012 (tentative)
Location: Cardiff, Wales

Appendix 1

STANDARDIZED TESTING PROTOCOL

STEP 1 –Pre-screening process to select tolerant test pest/stage and approximate lethal level dose.

Use one of the reference screening pests, (eg. *Sitophilus*, *Oryzaephilus, Trogoderma, Tribolium*[1], or other arthropod taxa such as ambrosia beetles), plus *Bursaphelenchus xylophilus* (pinewood nematode), *Heterobasidion spp.*, and any species from each of the Scolytinae, Bostrychidae, Buprestidae, and Cerambycidae

Expose these 7 test organisms to different levels of the treatment. Do a control treatment in parallel (handling organisms in the same way but without a treatment). Replicate each organism 5-10 times. Use TEST UNITS that are either a small piece of wood that contains the pests (e.g nematodes or small insects) or the pest itself where all replicas of the pest will survive handling in the control treatment. The mortality/survival of the pests in the screening process will give an idea of a lethal level of treatment and the most tolerant pest[2]. (Additional screening using one or a few tolerant pests and narrower range of treatment level around possible lethal dose will pinpoint the dose more accurately). If the success of a treatment is likely to be affected by certain physical parameters (such as ambient temperature, wood moisture, etc), conduct additional experiments using the most tolerant pest(s) under several different conditions of the physical parameter (e.g. at three different temperatures, three different moisture levels, density, etc, in a range that would be experienced under operational conditions under several physical parameters that my limit efficacy of treatment) to determine whether a particular impediment exists for the treatment under study (e.g. a fumigant cannot penetrate or gets diluted; a treatment is least efficient at particular temperature; etc.).

STEP 2 – Validate Lethal Dose on the most tolerant pest(s)

Expose 60 – 100 TEST UNITS (wood pieces infested with pest or the pest itself) to the lethal level. The expected goal is to have no survivors. If this is the case, this provides statistical reliability of 0.95 - 0.97 (according to sample size) that this is the real lethal level. In addition, test one dose below and above the lethal level (choose level as appropriate or defensible). The bracketing will allow confirmation that the right level has been achieved. There may be survivors at the lower level, but there should be no survivors at the upper level.

STEP 3 – Simulate Operational Conditions

Expose to the lethal level 60 – 100 units of wood of a representative size of wood. .The maximum size tested may limit approved profile of the wood in the approved treatment. infested with the test organisms with loads representative of field conditions. If there are no survivors this will provide 0.95 – 0. 97 statistical reliability that this is the lethal level and therefore gives sufficient assurance that the treatment warrants consideration for adoption. However if there are survivors, there is a need to determine whether the survival is the result of the treatment not being adequately delivered to the pest as a result of scaling up the size of the test unit (large test size material) or other factors which may have interfered with treatment delivery. Testing one or two doses above (e.g. 10% and 20%) should produce no survivors. If 100% mortality is achieved with any of the two raised doses, this dose is then chosen as the lethal level. This approach provides assurance that the treatment and associated lethal dose be considered for adoption. In the case of survival after bracketing, go back to step 1, in order to determine whether a particular impediment exists for the treatment under study.

This protocol allows for the efficacy level of the treatment to be reported. The efficacy level of the treatment can be calculated based on the total pest load in the treated material. The pest load is calculated/estimated based on a sample size of the treated lot that will be destructively sampled.

Work programme of TPFQ/IFQRG 2010-2011

IFQRG Action Item No	Action Item description	Expected date	IFQRG member(s) responsible	Deliverable: - Submission to: (TPFQ, TPPT, IPPC, Secretariat) - Journal Publication	Status
01	Review what is collectivel known about efficacy of HT & MBR on key taxa (eg. PWN, ALB, etc)	DEC 2011-JAN 2012	Ron Mack Ken Thomas Mike Ormsby	· Analysis paper	
02	Review table 1 in draft treatment schedule	Oct 2011	Eric Allen	-Deliver paper to SC	Done
03	Consider efficacy schedules for test organisms.	March 201	Mike Ormsby David Rees Tom Searles Chuck Dentelbeck Hugh Evans Jacques Gagnon Ecki Brockerhoff	Report to IFQRG	
04	Further development of quantification of integration measures for risk reduction in wood products	June 2012	Eric Allen Mike Ormsby Hugh Evans Chuck Dentelbeck	Report to IFQRG	
05	Evaluate EDN as a wood treatment	June 2012	Ron Mack David Rees Adnan Don Brash Ken Glassey John Nielsen	Report to IFQRG	
06	Continue work on evaluating bacterial pathogens as forest pests	June 2012	David Letham	Report to IFQRG	
07	Develop guidance document for MBR and microwave treatments	June 2012	Ken Glassey	Report to IFQRG	
08	Solicit interest in determining fraudulent/non-treated timber products	June 2012	Ken Glassey	Report to IFQRG	
09	*Provide a web resource to direct users to existing MBr manuals*	Jan 2012	Mike Ormsby	Report to IFQRG	

IFQRG-9 list of participants

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