

BR Fuel ESIA On Site Mitigation Action Plan 2011

Mitigation Measures	Action	Completed By	Responsible Person
Air Quality			
Maintain good housekeeping practices	Include cleanliness and order in relevant SOPs Include in staff training	15/04/11 Ongoing	Operations Managers Theresa Jordan
Set speed limits to 10 km/hr on-site	Include limit in Transport or Relevant SOP Signage up on site	1/5/11 1/5/11	Gerald Ray/ Ken Turk
Cover trucks when necessary	Cover trucks as necessary Switch to logging model to reduce woodchip loss	Ongoing 1/10/11	Ken Turk Steve Tarr
Perform regular maintenance of vehicles	Develop and implement regular maintenance schedule for vehicles Develop and implement regular maintenance schedule for equipment	1/6/11 1/10/11	Ken Turk Steve Tarr
Ensure that vehicles are turned off when not in use	Include in Transport SOP Train Drivers	15/04/11 Ongoing	Ken Turk Ken Turk/ Scania
Ensure proper availability of firefighting system	Preliminary review of fire plan Final review of fire plan Implement new fire plan	1/6/11 1/9/11 as per plan	Attie Niekerk Ed Fisher Ed Fisher
Prohibit littering on-site	Include in waste management SOP Include in employee training	1/5/11 Ongoing	Dave Darlow Theresa Jordan
Prohibit smoking or fire on-site generally, designate specific smoking areas	Include in Employee Handbook Include in employee training Mark designated smoking areas	Done Ongoing 1/8/11	Theresa Jordan Theresa Jordan Paul Leas
Ensure that flammable chemicals are properly stored an near washing and hygiene facilities appropriate to expected exposure.	Develop SOP for chemical storage Implement SOP	1/5/11 1/9/11	Paul Leas/ Dave Darlow Paul Leas/ Dave Darlow
Upgrade storage facility for lubricants	Develop lubricant storage upgrade plan Implement plan	1/6/11 end 2011	Attie Niekerk Attie Niekerk
Investigate options for biodiesel and/or alternative fuel sources for equipment and vehicles	Investigation of short and long-term options	end 2011	Attie Niekerk/ Dave Darlow
Water Quality			
Prevent oil spills and ensure proper containment is in place	Develop spill SOPs Train staff on spill prevention Train staff on spill SOPs and containment tools Ensure proper containment materials on site	Done Ongoing Ongoing 1/9/11	Dave Darlow Theresa Jordan Theresa Jordan Dave Darlow / Steve Tarr
Divert oil/mixtures to sand/silt made channels or oil/water separators	Develop plan to improve on site drainage Implement plan	1/9/11 end 2011	Ed Fisher/ Dave Darlow

Ensure that the septic tank is emptied whenever full	Include in waste management SOP	1/5/11	Dave Darlow/ Daniel Sorrel
Ensure that washing water from vehicles is drained in a sand/silt trap or adequate filtration system	Develop plan to improve on site drainage Implement plan	1/9/11 end 2011	Daniel S / Dave Darlow Daniel Sorrel
Ensure proper, locked storage of oil and lubricants and agrochemicals	Develop lubricant storage upgrade plan Implement plan Develop and implement chemical storage SOP	1/6/11 end 2011 1/9/11	Attie Niekerk Dave Darlow/ Paul Leas Dave Darlow/ Paul Leas
Minimize water use in cleaning and other activities	Integrate water conservation into environmental policy	1/6/11	Alexandra Baillie/ Dave D
	Reflect water conservation in vehicle cleaning and other relevant SOPs	1/8/11	Ken Turk/ Dave Darlow
	Include in employee training	Ongoing	Theresa Jordan
Prevent woodchips from falling into sea during loading	Integrate conveyor loading system into new woodchip storage facility plans	1/12/11	Ed Fisher/ Per Lysedal
	Include buffer zone between woodchip piles and edge of the quay into woodchip loading SOPs	1/8/11	Ed Fisher
	Include potential use of tarp between ship and quay, as required, in woodchip loading SOPs	1/8/11	Ed Fisher
Organic Loading from Rain on Woodpiles at Port			
Minimize contact between rain and wood piles	Develop and implement plan to cover woodchips Switch to logging methodology	1/9/11 1/10/11	Steve Tarr/Ed Fisher Steve Tarr
Improve drainage system for runoff from wood piles	Develop plan to improve current drainage Implement plan Develop drainage system for new materials handling facility	1/8/11 1/9/11 31/12/11	Dave Darlow/ Ed Fisher Dave Darlow/ Ed Fisher Ed Fisher/ Per Lysedal
Soil Cover			
Ensure that mitigation measures for the preservation of water resources are properly implemented	See water quality section		
Biodiversity			
Ensure proper management of solid and liquid wastes	Develop waste management SOP Implement SOP Include in employee training	1/5/11 1/7/11 Ongoing	Dave Darlow Dave Darlow/ Ed Fisher Theresa Jordan
Promote growth/planting of natural vegetation around the site	Landscape site with native species	1/8/11	Ed Fisher
Create buffer zone between sites and alternative land uses or natural forests	Include in site management and development SOPs	1/9/11	Ed Fisher
Prohibit any action that leads to the destruction of the ecological system	Include in Environmental Policy and Harvesting and other relevant SOPs Include in employee training	1/5/11 Ongoing	Alexandra Baillie / Dave Darlow Theresa Jordan

Prevent any hunting activities	Include in Environmental Policy and Harvesting and other relevant SOPs Include in employee training	1/5/11 Ongoing	Alexandra Baillie / Dave Darlow Theresa Jordan
Solid Waste Management			
Ensure proper sorting and labeling of different waste materials according to their nature	Develop waste management SOP Implement SOP Include in employee training	1/5/11 1/7/11 Ongoing	Dave Darlow Dave Darlow/ Ed Fisher Theresa Jordan
Fence the site border to prevent any flying material to deposit in nature	Fence in waste collection site on workshop site	1/9/11	Dave Darlow/ Ed Fisher
Store waste in fenced area with impermeable floor, adequate drainage and roofing as required; ensure at least 1 day extra storage capacity	Reflect in waste management SOP Fence in waste collection site on workshop site	1/5/11 1/9/11	Dave Darlow Dave Darlow/ Ed Fisher
Ensure no direct discharge of waste water into water bodies	Develop plan to improve current drainage Implement plan Develop drainage system for new materials handling facility	1/8/11 1/9/11 31/12/11	Dave Darlow/ Ed Fisher Dave Darlow/ Ed Fisher Ed Fisher/ Per Lysedal
Prohibit any open fires	Include in waste management SOP Post signs on sites	1/5/11 1/9/11	Dave Darlow Daniel Sorrel
Provide proper containment of stored liquids and avoid any leakages	See water quality measures		
Develop system to record transfer of waste	Define system in waste management SOP	1/5/11	Dave Darlow
Train and instruct workers on proper segregation and management of different waste materials	Train staff in waste management	Ongoing	Theresa Jordan
Noise			
Reduce noise emissions by enclosing any continuous source of noise where feasible e.g. generator	Conduct site assessment for noise and ID corrective actions Implement corrective actions	1/7/11 as per plan	Dave Darlow/ Ed Fisher Ed Fisher/ Dave Darlow
Install suppression equipment as required	Order new equipment Install suppression as required	Ongoing Ongoing	Paul Leas Paul Leas
Perform periodic maintenance of equipment	Develop and implement regular maintenance schedule for vehicles Develop and implement regular maintenance schedule for equipment	1/6/11 1/10/11	Ken Turk Steve Tarr
Occupational Health and Safety			
Avoid public access by proper fencing and guarding	Fence off all facilities Ensure all facilities are adequately guarded Provide ID cards to all employees	end 2011 1/5/11 1/5/11	Paul Leas Ash Pearson/ Milton Farley Theresa Jordan
Use adequate signs and safety barriers	Develop Health and Safety SOPs Ensure signage and safety barriers at all sites	1/8/11 1/7/11	H&S Manager/ Paul Leas Ed Fisher

Provide proper labeling of chemical storages	Include in SOPs for storage of hazardous materials Implement SOP	1/5/11 1/9/11	Dave Darlow Dave Darlow/ Paul Leas
Provide personnel with proper personal protection equipment	Identify PPE required for each activity Develop schedule for PPE distribution Train employees in use of PPE Enforce use of PPE as per Employee Handbook	1/7/11 1/9/11 Ongoing 1/8/11	H&S Manager H&S Manager Theresa Jordan, Ops Mgers All Managers, H&S Manager
Train workers on emergency plans	Train workers on emergency fire procedures Train workers on emergency medical procedures Train workers on emergency evacuation procedures	Ongoing Ongoing Ongoing	Theresa Jordan Theresa Jordan Theresa Jordan
Control leakages from equipment and storage	Implement regular maintenance schedule Improve storage for oils and lubricants Develop spill SOPs Train staff on spill prevention Train staff on spill SOPs and containment tools Ensure proper containment materials on site	1/6/11 end 2011 Done Ongoing Ongoing 1/9/11	Ken Turk/ Steve Tarr Attie Niekerk Dave Darlow Theresa Jordan Theresa Jordan Dave Darlow / Steve Tarr
Provide appropriate lighting and ventilation in closed areas and at night	Conduct an assessment of lighting and ventilation on sites and ID corrective actions Implement corrective actions	1/9/11 As per plan	H&S Manager
Keep working spaces free from spills	Develop spill SOPs Train staff on spill prevention Train staff on spill SOPs and containment tools Ensure proper containment materials on site	Done Ongoing Ongoing 1/9/11	Dave Darlow Theresa Jordan Theresa Jordan Dave Darlow / Steve Tarr
Delineate adequate space for loading and off-loading activities	Delineate areas for loading and off-loading and other potentially dangerous activities	1/9/11	Ed Fisher
Implement speed limits on-site	Include limit in Transport or Relevant SOP Signage up on site Include in employee training	1/5/11 1/5/11 Ongoing	Gerald Ray/ Ken Turk Theresa Jordan, Ken Turk
Landscape			
Promote growth/planting of natural vegetation around the site	Landscape site with native species	1/8/11	Ed Fisher
Ensure proper management of solid and liquid waste	Develop waste management SOP Implement SOP Include in employee training	1/5/11 1/7/11 Ongoing	Dave Darlow Dave Darlow/ Ed Fisher Theresa Jordan
Socio-economic			
Promote jobs for local communities	Integrate into HR Policy - advertise jobs locally (community message boards, radio, print media etc.), hire temporary labor locally	1/6/11	Theresa Jordan

Publicize data on environmental performances	Submit annual reports to EPA	31/12/11	A Baillie/ Dave Darlow
	Review monitoring and reporting framework	1/10/11	Alexandra Baillie
	Define reporting mechanisms and communication plan for each stakeholder group	1/11/11	A Baillie/ Michelle
	Complete 2011 CSR Report	31/12/11	A Baillie/ Dave Darlow
	Publicize data as per plan	1/3/12	A Baillie/Momolu
	Perform public consultations regarding new activities	Include in EIA SOP	1/5/11
	Include in Stakeholder Engagement Strategy	1/8/11	Alexandra Baillie
	Undertake consultations as new activities develop	Ongoing	A Baillie/ Dave Darlow
Analyze potential future impact on charcoal production	Conduct study on BR's impact on the industry	1/9/11	Brian Caouette/ MIGA
	Develop a mitigation plan as required	1/9/11	Consultant
	Implement plan	As per plan	As per plan
	Create buffer zones between operations and any important cultural heritage sites	Conduct impact assessments for all new projects	1/6/11
	Reflect in environmental management plans as required	Ongoing	Dave Darlow
	Develop a chance finds SOP	1/6/11	Dave Darlow
Traffic			
Train drivers on safe and responsible practices	Develop transport SOPs	1/5/11	Ken Turk
	Train Scania drivers	Ongoing	Scania staff seconded to BR
	Train other vehicle drivers	Ongoing	Theresa Jordan/ Ken Turk
	Develop a transport management plan (speed limits, traffic signs and directions of traffic routing, etc..)	Develop transport management plan	1/10/11
General			
Conduct spot checks on SOP implementation	Develop plan for spot checks	1/8/11	Hylke Sluis
	Conduct spot checks	Ongoing	Hylke Sluis
	Develop corrective action reports	Ongoing	Hylke Sluis

BR Fuel ESIA Off Site (Harvesting) Mitigation Action Plan 2011

Potential Negative Impact	Mitigation Measures	Action	Completed By	Responsible Person
Air Quality				
Gaseous emissions from transportation	Ensure proper maintenance of engines and any machine used off-site	Develop and implement regular maintenance schedule for vehicles Develop and implement regular maintenance schedule for equipment	1/6/11 1/10/11	Ken Turk Steve Tarr
	Set low speed limits for trucks	Limit physical speed of truck Include GPS monitoring units in new trucks Include limits in driver training Monitor speed of trucks through GPS units	Complete Complete Ongoing Ongoing	Ken Turk
	Do not exceed a tool's life expectancy	Develop a Cap Ex replacement plan Assess all old equipment and develop a retirement plan	Complete 1/10/11	Paul Leas/ Steve Tarr Paul Leas
	Train drivers and operators in environmentally responsible driving techniques	Include environmental considerations in driver training (not idling, turning off vehicles, not speeding)	Ongoing	Ken Turk
Dust emissions from cutting, sawing and chipping of wood	Require workers to use personal protective equipment during operations	Include requirement in Employee Handbook Include in employee training Enforce regulation of "No PPE, No work"	Complete Ongoing 1/9/11	Theresa Jordan Theresa Jordan Steve Tarr
	Change to stationary chipping model	Change methodology to logging and stationary chipping at the woodchip storage facility	1/10/11	Steve Tarr/ Gerald Ray
Increase in green house effect	Replant rubber trees at least at a ratio 1:1.	Include in Environmental Policy Include in silviculture SOPs Include in employee training	1/5/11 1/8/11 Ongoing	Alexandra Baillie Brian Caouette/ Morris N Theresa Jordan
	Replant trees as soon as possible after clearing. Replant during first replanting season after harvesting.	Include in silviculture SOP Include in employee training Develop agreed replanting schedule with each farmer	1/8/11 Ongoing 1/9/11	Brain Caouette/ Morris N Theresa Jordan Brian Caouette
	Explore use of biodiesel and alternative fuels for equipment and machines	Investigation of short and long-term options	end 2011	Attie Niekerk/ Dave Darlow
	Plant vegetation in buffer zones if required	Include in Harvesting Manual for pre-harvest assessment (assessment of need for planting) Include in site specific Harvest Management Plan as required	1/5/11 Ongoing	Gerald Ray Gerald Ray
Water Quality				
Sediment loading into downstream water bodies	Build natural embankment at water bodies as required	Identify water bodies in pre-harvest assessment Identify need for natural embankments Include development plan in site specific HMP Reflect this process in the Harvesting Manual	Ongoing Ongoing Ongoing 1/5/11	Gerald Ray Gerald Ray/ Dave D Gerald Ray Gerald Ray
	Avoid littering or discharge of any debris into nearby water bodies	Identify water bodies in pre-harvest assessment Define necessary RMZs in site specific HMP Include the above and minimizing water crossings in Harvesting manual	Ongoing Ongoing Complete	Gerald Ray Gerald Ray Gerald Ray
	Reduce need for fertilizer by using nitrogen fixing cover crops	Include in silviculture SOP Include in farmer and employee training	1/8/11 Ongoing	Brain Caouette/ Morris N Brian C/ Theresa Jordan
Water quality degradation by potential use of pesticides	Raise farmer awareness on the application of biological fertilizers	Integrate into silviculture SOPs Integrate into farmer training through Farm Builders	1/8/11 end 2011	Brian Caouette/ Morris N Brian Caouette/ Morris N
	Use chemical fertilizers in low doses, and during dry periods as far as possible	Integrate into silviculture SOPs Include in employee training Integrate into farmer training through Farm Builders	1/8/11 Ongoing end 2011	Brian Caouette/ Morris N Theresa Jordan Morris/ B Caouette
Water quality deterioration from chemical spills	Store used oil in clearly identified containers	Integrate into Waste Management SOPs Clearly mark used oil containers on site Include waste management into employee training	1/5/11 1/7/11 Ongoing	Dave Darlow Gerald Ray Theresa Jordan
	Train staff to avoid spills	Include in employee training	Ongoing	Theresa Jordan
	Provide preventative spill kits and absorbing material off-site	Develop spill SOPs Train staff on spill prevention Train staff on spill SOPs and containment tools Ensure proper containment materials on site	Done Ongoing Ongoing 1/9/11	Dave Darlow Theresa Jordan Theresa Jordan Dave Darlow / Gerald Ray

Disturbance to riparian zones	Preserve any riparian zone detected off-site from any activities at a distance of 15 meters from both sides	Identify water bodies in pre-harvest assessment Define necessary RMZs in site specific HMP Clearly mark RMZs Include process in Harvesting manual Include in employee training	Ongoing Ongoing Ongoing Complete Ongoing	Gerald Ray Gerald Ray Gerald Ray Gerald Ray T Jordan/ Gerald Ray
	Map out riparian management zones and show operators/Supervisors Minimize water crossings as far as possible	Include in site specific HMP	Ongoing	Gerald Ray
Water consumption for the plantation of new trees	Rely on rain water, rain water collection basins and regulation of water extraction	Identify water bodies in pre-harvest assessment Define necessary RMZs in site specific HMP Identify water crossing plans in site specific HMP Include minimizing water crossings in Harvesting Manual Include in employee training	Ongoing Ongoing Ongoing Complete Ongoing	Gerald Ray Gerald Ray Gerald Ray Gerald Ray T Jordan/ Gerald Ray
		Integrate regulation of water extraction into silviculture SOPs Include in employee training Integrate into farmer training through Farm Builders	1/8/11 Ongoing end 2011	Briand Caouette/ Morris N Theresa Jordan Morris/ B Caouette
Water quality deterioration due to local sanitation	Provide lavatories at off-site locations and encourage workers to use them	Build sanitation facilities on site as required Include location of sanitation facilities in site specific HMP Include in employee training	1/9/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
Soil Cover				
Degradation of soil cover properties	Conduct felling activities on susceptible land (greater slopes) during dry season as far as possible	Reflect in overall Harvesting Management Plan	1/12/11	Gerald Ray
	Even spreading of mulch and/or organic material, including slash (approx. 6 tons per acre)	Reflect in Harvesting manual Include in employee training Include in site specific HMP	1/5/11 Ongoing Ongoing	Gerald Ray Theresa Jordan/ G Ray Gerald Ray
	Planting of fast growing vegetation and crops	Include cover crops and revegetation in silviculture SOPs Investigate optimal fast growing cover crops Include in employee training Include in farmer training through Farm Builders	1/6/11 end 2011 Ongoing end 2011	Brian Caouette Brian Caouette/ Morris Theresa Jordan Morris/ B Caouette
	Excavate shallow water channels that collect rain water	Assess need for erosion lines in pre-harvest assessment Include need for erosion lines in site specific HMP Develop erosion lines post harvest	Ongoing Ongoing Ongoing	Gerald Ray Gerald Ray/ D Darlow Gerald Ray
	Construct and maintain water and sediment basins that control runoff	Assess need for basins in pre-harvest assessment Include plan for basin development and maintenance in site specific HMP Develop and maintain basins post harvest	1/7/11 1/7/11 1/9/11	Gerald Ray Gerald Ray/ D Darlow Gerald Ray/Brian C
Deterioration of soil quality by potential use of pesticides	Control and raise worker awareness of proper agricultural practices	Develop silviculture SOPs Train agriculture employees in silviculture SOPs (Farm Builders)	1/8/11 Ongoing	Morris N/ B Caouette Morris N/ Nelson Hill
	Minimize pesticide use as far as possible	Integrate into silviculture SOPs Develop SOPs for pesticide use Include in employee training Integrate into farmer training through Farm Builders Explore alternatives to pesticide use	1/6/11 1/6/11 Ongoing end 2011 end 2011	Brian Caouette Brian Caouette/D Darlow Theresa Jordan Morris/ B Caouette Morris/ B Caouette/ Darlow
Soil compaction due to vehicle circulation	Minimize equipment use on site	Change methodology to us of feller bunchers instead or excavators and logging instead of chipping on site to minimize equipment use on site Include minimal use of equipment in employee training	1/10/11 Ongoing	Gerald Ray/ Steve Tarr Theresa Jordan/ G Ray
	Define skidding trails	Define skidding trails in site specific HMP Include keeping to defined trails in employee training Discipline employees that do not keep to skidding trails	Ongoing Ongoing 1/7/11	Gerald Ray Gerald Ray Gerald Ray
	Turn the soil after clearing a land parcel as required	Integrate into silviculture SOPs Include in employee training Integrate into farmer training through Farm Builders	1/8/11 Ongoing end 2011	Briand Caouette/ Morris N Theresa Jordan Morris N/ B Caouette
Biological Environment				
Degradation of the biological environment	Encourage growth of natural vegetation on cleared sites and planting of additional vegetation as required	Include cover crops and revegetation in silviculture SOPs Include minimization of vegetation disturbance in Harvesting SOPs	1/8/11 1/5/11	Briand Caouette/ Morris N Gerald Ray
		Include in employee training Include in farmer training through Farm Builders	Ongoing end 2011	Theresa Jordan Morris/ B Caouette

	Replant trees as soon as possible after clearing. Replant during first replanting season after harvesting.	Include in silviculture SOP Include in employee training Develop agreed replanting schedule with each farmer	1/8/11 Ongoing 1/9/11	Brain Caouette/ Morris N Theresa Jordan Brian Caouette
	Preservation of riparian zones as ecological corridors, as well as other areas of high conservation value (special management zones - SMZs)	Identify water bodies or areas of high conservation value in pre-harvest assessment Define necessary SMZs in site specific HMP Clearly mark SMZs Include process in Harvesting manual Include in employee training	Ongoing Ongoing Complete Ongoing	Gerald Ray Gerald Ray Gerald Ray T Jordan/ Gerald Ray
	Preservation of wetlands	Identify wetlands in pre-harvest assessment Define necessary RMZs in site specific HMP Clearly mark RMZs Include process in Harvesting manual Include in employee training	Ongoing Ongoing Ongoing Complete Ongoing	Gerald Ray Gerald Ray Gerald Ray Gerald Ray T Jordan/ Gerald Ray
	Prevent any hunting activities	Include in Environmental Policy and Harvesting and other relevant SOPs Include in employee training	1/5/11 Ongoing	Alexandra Baillie / Dave Darlow Theresa Jordan
Noise				
Increase in noise levels due to different vehicles and equipment used off-site	Minimize cutting and sawing activities at early and late hours of the day close residential areas	No harvesting related activities are undertaken in the dark (reflect in Harvesting SOP) Change to logging methodology with chipping at the woodchip storage facility only	1/5/11 1/10/11	Gerald Ray Steve Tarr/ Gerald Ray
	Purchase new equipment with sound suppression systems where possible	Consider sound suppression in purchasing decisions Replace old equipment with new equipment with better sound suppression systems (standardize to CAT where possible)	1/5/11 Ongoing	Paul Leas Paul Leas
	Ensure that workers off-site employ personal sound proof devices	Include in H&S SOP Develop schedule for PPE distribution Train employees in use of PPE Enforce use of PPE as per Employee Handbook	1/8/11 1/9/11 Ongoing 1/8/11	Steve Tarr H&S Manager Theresa Jordan, Ops Mgers All Managers, H&S Manager
Landuse				
Disturbance to landuse	Avoid extensive use of pesticides near agricultural lands (croplands)	Integrate into silviculture SOPs Include in employee training Integrate into farmer training through Farm Builders	1/8/11 Ongoing end 2011	Briand Caouette/ Morris N Theresa Jordan Morris/ B Caouette
	Avoid disturbance to any natural resource, public and cultural site by defining buffer zones around them	Include buffer zone of at least 15m around sites of cultural or environmental importance (SMZs - special mgmt zones) Identify any SMZs in pre-harvest plan & site specific HMP Clearly mark SMZs Include process in Harvesting Manual	Ongoing Ongoing Ongoing 1/5/11	Gerald Ray Gerald Ray Gerald Ray
Socio-economic				
	Integrate local residents and other stakeholders in different phases of the project	Develop stakeholder engagement strategy Develop PR strategy Advertise jobs locally, hire temporary labor locally (reflect in HR Policies)	1/9/11 1/9/11 1/6/11	Alexandra Baillie/ Momolu A Baillie/Michelle VF Theresa Jordan
	Coordinate with local communities before and during harvesting operations	Include in stakeholder engagement strategy Include in Harvesting Manual Meet with communities prior to and during harvesting ops	1/9/11 1/5/11 Ongoing	Alexandra Baillie/ Momolu Gerald Ray Gerald Ray
	Provide proper awareness on proper practices and working instructions	Develop best practice manuals for harvesting Develop SOPs for each work area Train employees Develop best practice manuals for key work areas (workshop, transport, chip storage)	Done 1/7/11 Ongoing April 2012	Dave Darlow Ops Managers Theresa Jordan/ Mgers Dave Darlow
	Prohibit employment of children and use of forced labor	Reflect in CSR policy & HR policies Reflect in supplier code of conduct Reflect in major supplier agreements Require employees to report any child or forced labor (Employee Handbook) Include in employee training	1/5/11 1/7/11 Ongoing 1/5/11 Ongoing	A Baillie/ T Jordan Alexandra Baillie Paul Leas/ Gerald Ray Theresa Jordan Theresa Jordan
Health and Safety				

Provide workers with personal protective equipment	Identify PPE required for each activity Develop schedule for PPE distribution Train employees in use of PPE Enforce use of PPE as per Employee Handbook	1/7/11 1/9/11 Ongoing 1/8/11	H&S Manager H&S Manager Theresa Jordan, Ops Mgrs All Managers, H&S Manager
Provide safety signs, systems, labels and/or stripes to avoid hazards and accidents	Include in Harvesting Manual (ex. mark harvesting area - only operators within 2 tree lengths of feller bunchers) Include in Health and Safety SOP Include in employee training	1/5/11 1/8/11 Ongoing	Gerald Ray H&S Manager/ Steve Tarr Theresa Jordan
Raise worker awareness of chemicals used, storage and disposal and ensure chemicals are stored in safe locations	Develop SOP for hazardous waste Include in employee training	1/5/11 Ongoing	Dave Darlow Theresa Jordan
Provide spill kits and train workers on their use	Develop spill SOPs Train staff on spill prevention Train staff on spill SOPs and containment tools Ensure proper containment materials on site	Done Ongoing Ongoing 1/9/11	Dave Darlow Theresa Jordan Theresa Jordan Dave Darlow / Gerald Ray
Provide first aid kit, fire extinguishers, and emergency numbers	Update fire safety plan Ensure all sites equipped with first aid kits, fire extinguishers and emergency numbers Train employees in emergency procedures	1/6/11 1/7/11 Ongoing	Attie Niekerk Gerald Ray/ Steve Tarr Theresa Jordan
Provide transportation signs or controllers and define speed limits	Develop transport SOPs for on site practices Train controllers to direct traffic	1/5/11 Complete	Ken Turk Ken Turk
Train workers on routine check-ups and maintenance of equipment	Develop and implement regular maintenance schedule for vehicles Develop and implement regular maintenance schedule for equipment Train workers to undertake scheduled check-ups	1/6/11 1/9/11	Ken Turk Steve Tarr/ T Jordan
Provide workers with health care for work related illnesses and injuries	Develop medical plan Provide trauma clinic at main sites (Buchanan & Kakata) Provide first aid kits and revolving medics/ambulances on site Train employees to use first aid kits	1/5/11 1/9/11 Complete Ongoing	Gerrit Beukes Gerrit Beukes Gerrit Beukes Gerrit Beukes
Assess health care data regularly to determine areas for improvement	Assess health care data quarterly and make recommendations for improvement	1/7/11	Gerrit Beukes
Delineate free spaces during cutting, sawing, loading and unloading of material	Delineate areas for harvesting, sawing and loading Include in Harvesting Manual	1/7/11 1/5/11	Gerald Ray Gerald Ray
Provide appropriate lighting at night	Identify lighting requirements during HMP	Ongoing	Gerald Ray
Prohibit felling activities at night	Include in Health and Safety SOP Include in Employee Training	1/8/11 Ongoing	Steve Tarr Theresa Jordan
Train workers on proper sanitation and hygiene practices, as well as basic first aid	Develop employee training on sanitation, hygiene and basic first aid Implement employee training	1/10/11 Ongoing	Gerrit Beukes, T Jordan Theresa Jordan
Landscape Degradation			
Promote planting of trees and cover crops, as well as natural re-vegetation of cleared site	Include cover crops and revegetation in silviculture SOPs Include in employee training Include in farmer training through Farm Builders	1/8/11 Ongoing end 2011	Briand Caouette/ Morris N Theresa Jordan Morris/ B Caouette
Sanitation Services			
Avoid littering in the open fields	Include in waste management SOP Include in employee training Provide clearly marked waste bins on site	1/5/11 Ongoing 1/7/11	Dave Darlow Theresa Jordan Gerald Ray
Educate workers on sorting waste	Include in employee training on environmental issues	Ongoing	Theresa Jordan
Identify bins according to waste type	Include in waste management SOP Clearly mark all waste bins	1/5/11 1/8/11	Dave Darlow Gerald Ray
Raise worker awareness of hazardous waste and proper management and employ Material Safety Data Sheets	Develop SOP for hazardous waste Develop Material Safety Data Sheets for all hazardous waste Include in employee training	1/5/11 1/9/11 Ongoing	Dave Darlow Dave Darlow Theresa Jordan
Provide lavatories off-site	Include location of sanitation facilities in site specific HMP Build sanitation facilities on site as required Include in employee training	1/9/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
Perform laboratory tests for any source of drinking water given to staff	Test drinking water sources for staff according to ESIA monitoring plan (once before use and monthly during use)	1/9/11	Dave Darlow

Access to Road Network			
Set speed limits	Limit physical speed of truck Include GPS monitoring units in new trucks Include limits in driver training Monitor speed of trucks through GPS units	Complete Complete Ongoing Ongoing	Ken Turk Ken Turk Ken Turk Ken Turk
Cover trucks transporting material as required	Cover trucks as necessary Switch to logging model to reduce woodchip loss	Ongoing 1/10/11	Ken Turk Steve Tarr
Do not exceed weight limit of vehicles	Include in Transport SOPs	1/6/11	Ken Turk
Collect any waste material resulting after each activity performed off-site	Include in Harvesting Manual for site rehabilitation Include in employee training	1/5/11 Ongoing	Gerald Ray Theresa Jordan/ Gerald Ray

BR Fuel ESIA Mitigation Plan 2011: Road Rehabilitation

Potential Impacts	Mitigation Measures	Action	Completed By	Responsible Person
Dust Emissions				
Operation activities including transportation, excavation, dumping and deposition will cause increased amounts of atmospheric dust. This impact would be temporary and limited to the time of operation, and in fact long-term road rehabilitation and paving will result in a decrease of dust emission from road surfaces.	Dampening using water to decrease dust emissions including spraying road surfaces and construction piles	Include in Road Maintenance SOP Include in project specific rehabilitation plans Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
	Enclosing loose soil and crushed material with tarpaulin on trucks and when placed in piles near road works.	Include in Road Maintenance SOP Include in project specific rehabilitation plans Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
	Landscaping with early replanting of cleared areas using native grasses and trees to stabilize topsoil.	Include in Road Maintenance SOP Include in project specific rehabilitation plans as required Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
	Dust masks for workers in areas exposed to high levels of dust.	Identify PPE required for road maintenance Develop schedule for PPE distribution Train employees in use of PPE Enforce use of PPE as per Employee Handbook	1/7/11 1/9/11 Ongoing 1/8/11	H&S Manager H&S Manager Theresa Jordan All Managers
	Monitoring of atmospheric dust levels.	See monitoring plan in ESIA		
Atmospheric Emissions				
Atmospheric emissions from transport vehicles and heavy machinery will result in an increase in toxic atmospheric pollutants including SO ₂ , NO _x and heavy metals; as well as in the increased production of greenhouse gases.	Vehicle and machinery maintenance with regular inspection to ensure acceptable standards of operation which will limit atmospheric emissions.	Develop and implement regular maintenance and inspection schedule for vehicles Develop and implement regular maintenance and inspection schedule for equipment	1/6/11 1/10/11	Ken Turk Steve Tarr
	Instruction and information to drivers to decrease rates of idling of vehicles.	Include environmental considerations in driver training (not idling, turning off vehicles, not speeding)	Ongoing	Ken Turk
Hazardous Material Spill				
Risk of Petrochemical spills from machinery and trucks may result in soil and water contamination with traffic oils, grease, and heavy metal contaminants.	Hazardous materials including fuel solvents and lubricants, will be stored in locked, paved, well ventilated areas.	Develop SOP for hazardous materials storage Upgrade storage facilities Include in employee training	1/5/11 end 2011 Ongoing	Dave Darlow Attie Niekerk Theresa Jordan
Increased sanitary and other waste generation due to employees in the area of operation.	Proper handling and storage of sanitary waste to prevent soil and water contamination.	Develop waste management SOP Implement SOP Include in employee training	1/5/11 1/7/11 Ongoing	Dave Darlow Dave Darlow/Ed Fisher Theresa Jordan
Impacts on Water Resources				
Compaction of road surfaces due to heavy machinery as well as paving of roads as a result of road-works may increase runoff due to decreased infiltration as a result of impermeability. Increased runoff would result in increased soil erosion and sedimentation and increased turbidity of watercourses. In addition a decrease in quality of the water could occur with changes in pH and increased oil contamination.	Identify surface water bodies including rivers, streams, swamps, and wetlands.	Include in Road Maintenance SOP Include in project specific rehabilitation plans Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
	Identify where roads cross water courses and develop a plan to decrease impact including the building of bridges and culverts in a way as not to obstruct water flow.	Include in Road Maintenance SOP Include in project specific rehabilitation plans Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
	Install proper drainage for storm water along embankments	Include in Road Maintenance SOP Include in project specific rehabilitation plans Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
	Road rehabilitation should occur in the dry season as much as possible.	Include in Road Maintenance SOP Plan road maintenance for dry season where possible Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
	Vegetation removal should be limited as much as possible and early replanting should be undertaken as soon as possible.	Include in Road Maintenance SOP Include in project specific rehabilitation plans Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan

Inappropriate placement of construction residue may block water flow and increase risk of flooding.	Ensure construction residue material is placed in suitable areas and does not result in water flow obstruction. The residue should be suitably landscaped to decrease risk of erosion and planted with native grasses and flora if required.	Include in Road Maintenance SOP Include in project specific rehabilitation plans Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
Occupational Safety				
Possibility of increased road accidents due to increased road traffic or diversions.	Traffic management plan should be implemented especially where diversions are to take place.	Include in Road Maintenance SOP Develop traffic management plan for specific projects as needed Include in employee training	1/8/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
	Local authorities should be alerted and should work in conjunction with project employees to ensure safe flow of traffic.	Include in Road Maintenance SOP Include in project specific rehabilitation plans Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
	Clear well lit warning signs should be installed.	Include in Road Maintenance SOP Include locations in project specific rehabilitation plans Develop standard warning signs Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
	Clear speed limits should be set around work areas and diversions.	Include in Road Maintenance SOP Include in employee training	1/8/11 Ongoing	Gerald Ray Theresa Jordan
	Traffic safety education should be provided to employees, local authorities as well as local residents.	Develop a traffic safety training plan Integrate traffic safety training into staff training Integrate traffic safety awareness into stakeholder engagement	1/10/11 1/10/11 end 2011	Gerald Ray Gerald Ray/ T Jordan A Baillie/ Momolu
Possibility of excessive exposure to asphalt fumes during repaving.	Excessive exposure to asphalt fumes should be limited.	Focus road rehabilitation on laterite roads Do not undertake repaving projects	Complete Complete	Gerald Ray Gerald Ray
Noise Emissions				
Construction phase: increased noise due to moving vehicles, heavy machinery operation including bulldozers, excavators, compactors and drills. Post-completion: increased noise due to increase in road traffic.	Proper maintenance of all vehicles and machinery.	Develop and implement regular maintenance and inspection schedule for vehicles Develop and implement regular maintenance and inspection schedule for equipment	1/6/11 1/10/11	Ken Turk Steve Tarr
	Provide mufflers where appropriate.	Consider sound suppression in purchasing decisions Replace old equipment with new equipment with better sound suppression systems (standardize to CAT where possible)	1/5/11 Ongoing	Paul Leas Paul Leas
	Provide noise protection equipment for employees	Develop schedule for PPE distribution Train employees in use of PPE Enforce use of PPE as per Employee Handbook	1/9/11 Ongoing 1/8/11	H&S Manager Theresa Jordan All Managers
	Limit activities near communities to daytime working hours	Include in Road Maintenance SOP	1/8/11	Gerald Ray
	Avoid known fauna breeding times	Include EIA in Road Maintenance SOP Conduct EIA and EMP for each road project (may be included in HMP for harvesting sites) Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
	Warn farmers so that they can take measures to protect their livestock from sudden loud noises.	Include in Road Maintenance SOP Include specific actions to inform local communities about road work in project specific rehabilitation plans Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
Biodiversity				
Possible fragmentation of habitats.	Focus on rehabilitating old plantation or access roads Provide tunnels under roads or overpasses where significant fragmentation of habitat for threatened species is likely to occur.	Include in Road Maintenance SOP Include EIA in Road Maintenance SOP Conduct EIA and EMP for each road project (may be included in HMP for harvesting sites) Include in employee training	1/8/11 1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Gerald Ray Theresa Jordan

Possible disturbance of breeding season.	Focus on rehabilitating old plantation or access roads Avoid critical breeding times	Include in Road Maintenance SOP Include EIA in Road Maintenance SOP Conduct EIA and EMP for each road project (may be included in HMP for harvesting sites) Avoid critical breeding times and habitat for threatened or keystone species Include in employee training	1/8/11 1/8/11 1/9/11 1/6/11 Ongoing	Gerald Ray Gerald Ray Gerald Ray Gerald Ray Theresa Jordan
Improved roads may lead to increased hunting.	Focus on rehabilitating old plantation access roads Raise employee awareness about conserving threatened species	Include in Road Maintenance SOP Include in employee training	1/8/11 Ongoing	Gerald Ray Theresa Jordan
Increased road traffic may lead to increased animal/vehicle collision.	Train drivers in safe driving techniques	Include environmental and safety considerations in driver training	Ongoing	Ken Turk
Possible improvement of dispersal due to newly formed dispersal corridors.				
Visual Impact				
Change in land topography due to road widening and removal of roadside flora.	Replanting of roadside with native trees and grasses	Include in Road Maintenance SOP Include in project specific rehabilitation plans Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
Visual intrusion during the construction phase by operation machinery and materials.	Efficient disposal and landscaping of construction residues.	Include in Road Maintenance SOP under rehabilitation Include in project specific rehabilitation plans Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
Soil Erosion				
Increased soil erosion due to compaction by heavy machinery.	Limit operations to dry season as much as possible.	Include in Road Maintenance SOP Plan road maintenance for dry season where possible Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
Increased soil erosion due to increased runoff from paved impermeable surfaces.	Limit vegetation removal, and ensure early and efficient replanting and re-vegetation with native grasses and flora.	Include in Road Maintenance SOP Include in project specific rehabilitation plans Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
Socio-Economic				
Temporary or permanent loss of property due to diversions and widening of roads or relocation of street vendors during project operations	Focus on rehabilitation of plantation and plantation access roads on private land to minimize impact on community members Ensure adequate and just compensation for land loss	Include EIA in Road Maintenance SOP Include in EIA and EMP for each road project (may be included in HMP for harvesting sites) Include in employee training	1/8/11 1/9/11 Ongoing	Gerald Ray Gerald Ray Theresa Jordan
Increased risk of theft and poaching	Train employees regarding poaching, hunting and theft.	Include in Employee Handbook Include in employee training	1/6/11 Ongoing	Theresa Jordan Theresa Jordan
Increased risk of disease due to unsafe practices by incoming workers	Train employees regarding STD's	Develop employee training on health and hygiene Implement employee training	1/10/11 Ongoing	Gerrit Beukes, T Jordan Theresa Jordan
Positive economic impacts due to: -employment of local community on project activities (male and female) -increase in road led development -improved road access and connections -widening of roads with safer road access -secondary multiplier economic effects due to improvement in local economy.	Employment of local community as much as possible. Sourcing materials locally as much as possible.	Include in HR policies Advertise for jobs locally Recruit day labor locally Include local sourcing in Procurement policies and supplier code of conduct Include in employee training	1/6/11 1/6/11 Complete 1/6/11 Ongoing	Theresa Jordan Theresa Jordan Theresa Jordan Paul Leas/ A Baillie Theresa Jordan

Budget for BR Fuel 2011 Environmental Mitigation Plan

Line Item	Budget (k USD)	Comments
Training	35	
PPE	200	
Equipment Cap Ex (Methodology Change)	20,050	Capex required for purchase of new equipment (i.e. Production equipment, trucks and trailers)
Replanting	3,344	
Environmental Monitoring	73	Capex + Opex
Community Engagement	120	
Emergency Response Equipment	40	
Clinic	387	staff, tools, drugs, lab testing, hospitalization costs
GPS Units in trucks	104	Capex + Opex
Upgrade chemical storage	10	
Covering Woodchips	150	
Waste Management	20	Includes spill management
Charcoal Study	MIGA Funded	
Road Maintenance	810	