Green Diamond Resource Company

Forest Management Waste Discharge Requirements

To be issued by the North Coast Regional Water Quality Control Board

PROJECT DESCRIPTION

July 17, 2012

Green Diamond Resource Company (Green Diamond) is seeking programmatic Waste Discharge Requirements (WDR) issued by the Regional Water Quality Control Board that would provide conditional authorization of discharges to area waters that may result from all Green Diamond's forest management activities that occur within the area covered by its Aquatic Habitat Conservation Plan and Candidate Conservation Agreement with Assurances (AHCP). This paper summarizes the activities and the area that would be covered and describes the foundation of federal and state approvals—including existing programmatic WDRs—upon which the Forest Management WDRs (FMWDRs) would be built.

Overview

Building upon the approval of Green Diamond's Aquatic Habitat Conservation Plan by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS), in 2010 the Regional Water Board issued Road Management WDRs (RMWDRs) to provide authorization for discharges that could result from Green Diamond's activities carried out under the AHCP. At the same time, the California Department of Fish and Game approved a Lake and Streambed Alteration Agreement with Green Diamond referred to as a Master Agreement for Timber Operations (MATO).

The RMWDRs cover Green Diamond's road repair and maintenance, upgrading and decommissioning associated with its timber harvesting operations and related activities. The FMWDRs are intended to complement the RMWDRs by providing programmatic, ownership-specific coverage for the remainder of Green Diamond's forest management activities not already covered by the RMWDRs that may result in discharges of sediment and other pollutants to watercourses within the covered area. Once programmatic coverage provided by the FMWDRs is granted, Green Diamond would no longer be required to seek project-by-project coverage for such activities from the Regional Water Board under the *General Waste Discharge Requirements For Discharges Related to Timber Harvest Activities On Non-federal Lands in the North Coast Region* (Order No. R1-2004-0030, referred to herein as the General WDRs) or other Regional Water Board authorities. These WDRs supersede Resolution No. R1-2006-0042 *Waste Discharge Requirements for Timber Harvesting Plan Activities Conducted by or on Land Owned by the Green Diamond Resource Company in the South Fork Elk River Watershed*, the Watershed-wide WRD No. R-1-2006-0043 and the Monitoring and Reporting Program No. R1-2008-0092. The RMWDRs would remain in place during the development and implementation of the FMWDRs; the Regional Board and Green Diamond may consider combining the two in the future following a period of implementation.

I. Project Area

The Project Area for the FMWDRs includes all commercial timberland acreage on the west slopes of the Klamath Mountains and the Coast Range of California in Del Norte and Humboldt counties where Green Diamond owns lands or harvesting rights that are covered by the AHCP. This area is currently 384,400 acres, and is subject to adjustment as Green Diamond buys and sells property (see Map 1).

During the term of the FMWDRs, Green Diamond may elect to add commercial timberlands consisting of fee lands and harvesting rights to the Project Area for coverage. The potential expansion area where commercial timberlands may be added shall be limited to Del Norte and Humboldt Counties and must be within the 11 Hydrographic Planning Areas (HPAs) defined by the AHCP (see Map 1). Based upon the analysis of these areas, it is presumed that all commercial timberlands within these potential expansion areas share similar relevant characteristics and, therefore, will not likely require additional Conditions necessary to protect water quality and other biological resources beyond that analyzed in connection with the original Project Area.

II. Activities Covered by the Existing RMWDRs and Activities to be Covered by the FMWDRs

As discussed above, the FMWDRs would complement the RM WDRs, which will remain in effect. Together, the two sets of WDRs would cover discharges of sediment and other pollutants that result from the following activities. The description of these activities is supplied to provide the basis for evaluating and controlling these discharges and their potential water quality impacts, as well as to support the Regional Water Board's evaluation of the project under the California Environmental Quality Act ("CEQA"). Accordingly, it is the discharges and their impacts, rather than the activities themselves, that are regulated under the WDRs. However, the activities are carried out pursuant to management practices and measures designed to control the discharges, minimize impacts and protect and improve water quality.

In addition to being regulated under the Porter-Cologne Water Quality Act and these WDRs, the Covered Activities are carried out pursuant to regulation under the California Forest Practice Act and Forest Practice Rules, as well as a number of other statutes and regulations. A summary of the other permits and approvals that apply to the Covered Activities are summarized in the next section.

The following sections describe the activities covered under the RMWDRs, followed by the activities to be covered under the FMWDRs. The discussion of the RMWDRs is included to provide context for consideration of the WDRs as well as to provide information relevant to the Regional Board's CEQA review. As discussed above, these RMWDRs would remain intact during review, approval and implementation of the FMWDRs.

A. Timber-Product Harvest and Transport Activities Covered by the Existing RMWDRs

This section describes Green Diamond's road management activities that are covered under the existing RMWDRs, including road upgrading, decommissioning and maintenance and road use associated with these activities.

The RMWDRs incorporate all the applicable requirements of the AHCP, the MATO and the Mitigated Negative Declaration adopted by Fish and Game at the time the RMWDRs were approved. The RMWDRs and the measures incorporated to protect water quality are further described in the Mitigated Negative Declaration.

1. Road Upgrading, Decommissioning and Maintenance

Road upgrading involves improving a road that does not meet current road standards. Road upgrading typically includes upgrading culverts to current specifications, installing additional drainage structures, hydrologically disconnecting the road from watercourses, improving road surface drainage, installing critical dips, and stabilizing unstable fill and cutslopes.

Road decommissioning includes pulling all watercourse crossings, backsloping of fills at crossings to the approximate natural slope contours, draining road surfaces, and pulling back excess overburden where there is a significant risk of failure that could result in delivery to a watercourse. Green Diamond employs two types of decommissioning depending on the intent of future reuse: 1) Temporarily decommissioned roads are those roads that may be used again in the future (typically unused for 20 or more years); and 2) Permanently decommissioned roads are those roads that will not be needed for future management activities and typically includes roads that were constructed on unstable slopes or within or adjacent to riparian zones.

Road maintenance typically includes surface grading, clearing bank slumps, repairing slumping or sliding fills, clearing ditches, repairing or replacing culverts and bridges, adding surface material, dust abatement, and installing or replacing surface drainage structures. Road maintenance for fire prevention, public access, and timber management may include mechanical control of roadside vegetation. Mechanical control may include grading, hand cutting or pulling, using a brush buster-type mechanical device, burning, steaming, other experimental methods, etc. Green Diamond is not seeking coverage of herbicide use for control of roadside vegetation as a part of these WDRs.

In summary, the activities covered by the RMWDRs, include all activities that provide a well-designed, located and maintained transportation system for long-term access to allow Green Diamond to conduct its forest management activities such as:

- Harvest timber
- Haul logs and wood products
- Inventory, regenerate and maintain forests

- Perform biological and geological study and assessments
- Allow general administration and protection to Green Diamond's ownership

The RMWDRs would remain in place during the development and implementation of the FMWDRs; the Regional Board and Green Diamond may consider combining the two in the future following a period of implementation.

B. Activities to be Covered by the FMWDRs

The Covered Activities include timber operations and related land management activities described herein in the following categories:

- Road Construction and Reconstruction
- Timber-Product Harvest and Transport Activities
- Silviculture and Timber Stand Regeneration and Improvement
- Minor Forest-Product Harvest
- Instream and Riparian Restoration

1. Road Construction and Reconstruction

Green Diamond constructs new roads on lands owned in fee by approval under the Forest Practice Rules (FPR) administered by the California Department of Forestry and Fire Protection's (CalFire) under the Timber Harvest Plan (THP) process and is accomplished mostly by felling and yarding timber along a predetermined road alignment designated on the ground. This activity is followed by excavating or filling hillslope areas using tractors or excavators. Road construction typically involves construction of watercourse crossings that use culverts, bridges, and occasionally fords. Roads also include vehicle turnouts and log landings that are wide spots used for yarded logs and loading log trucks. Road construction may also involve surfacing soil roads with rock, dust treatments (such as lignin), pavement, or other surface treatments approved by NMFS and USFWS under the AHCP.

Green Diamond also designs and constructs temporary roads when its use is planned for a single harvest entry in a THP. The temporary road must have surfacing adequate for the period of use (wet verses dry periods) according to the AHCP standards and have drainage structures, if any, adequate to carry the anticipated flow of water during the period of use. Temporary roads are decommissioned upon completion of operations which minimizes the risk of sedimentation from the unused road and reduces the amount of future maintenance liability.

Road reconstruction is the process of restoring or improving an existing road to be reused for timber harvesting operations. The reconstruction process usually involves substantial changes to the original road prism.

2. Timber-Product Harvest and Transport Activities

The following sections describe Green Diamond's timber-product harvest activities to be regulated by the FMWDRs:

- Felling and bucking timber
- Yarding timber
- Landing construction and maintenance
- Loading and other landing operations
- Salvaging timber products
- Transporting timber and rock products
- Rock pit development and use
- Equipment maintenance
- Water drafting and storage

a. Felling and Bucking Timber

Timber felling is the first step in logging operations. It usually includes felling of the tree and may include bucking, or cutting felled trees into predetermined log lengths specified by the timber owner to maximize tree value. Some trees may also be felled and left "tree length" that will be manufactured into logs later in the process. Independent contractors (sometimes working in pairs) typically fell and buck trees with chain saws. Where terrain is not too steep, mechanical felling machines (feller-bunchers) cut down trees. These machines are structurally similar to tracked excavators. Using an articulated attachment, they grab, cut, and bunch the trees with others trees or logs for subsequent skidding to the landing. Feller-bunchers that are more complex have "processor heads" to delimb and buck trees into logs. Some of these machines have tracked undercarriages and self-leveling mechanisms so they can operate on moderate slopes. Feller-bunchers have no blade or attachments capable of moving soil. Their wide track design and ability to travel on top of forest debris (limbs and chunks) minimize soil disturbance and compaction.

b. Yarding Timber

Yarding or skidding involves moving logs from the stump where they are felled to the landing. Major yarding system classifications include: ground based, cable, and aerial logging. Timber Stand Improvement describes biomass or slash debris yarding, an additional classification involving non-traditional wood products (not exclusively in log form).

(i) Ground-Based Yarding

Ground based logging traditionally involves tracked or rubber tired tractors (rubber tired skidders) skidding logs to the landing. These machines grasp the log using either powered grapple attachments or wire rope winch lines. They require constructed skid trails to operate on all but the mildest terrain (generally under 35%). A related system, forwarder logging, is used only for small logs on mild terrain. It uses a specialized tractor with a small hydraulic boom loader. The boom loader travels into the logging unit and lifts logs on bunks mounted on a rearward tractor frame extension. This specialized machine is a small self-loading truck designed with low pressure tires, gearing, and ground clearance that allows off-road operation.

Whenever possible Green Diamond utilizes a more modern and technically improved ground skidding variant called shovel logging. A shovel, or hydraulic boom log loader, is an excavator equipped with a log loading boom and grapple instead of an excavator boom and bucket. These machines are specially designed for yarding and provide more off-road mobility because they have additional horsepower and are mounted on tracked undercarriages with generous ground clearance. The shovel is capable of travelling off the truck road, picking up felled logs in a unit, and passing them back towards the truck road using its upper structure 360 degree rotation or swing function. This system is very efficient over short distances, since the same machine that does the yarding can load the logs on trucks. It is not used over longer distances because increased space from the truck road requires repeated log handling. As with feller-bunchers, shovels have no blade or other attachment capable of moving soil and have the additional benefit of operating without requiring road or trail construction. Shovel harvesters also have very wide tracks that have low ground pressure and very low grousers (traction blades) that operate on top of the natural layer of residual slash debris and the residual stumps. This provides significant additional protection by minimizing soil compaction and ground disturbance. Green Diamond prefers to use shovel logging ground-based yarding method wherever feasible rather than tractor or skidder logging. Shovel logging can only be used in evenaged units, and is not compatible with selection or thinning silviculture because there is no room for the machine to ‘swing’ felled trees in a unit with retained trees.

(ii) Cable Yarding

Cable yarding uses wire ropes to skid logs to a truck road or log landing. A yarder has a number of powered drums filled with wire rope and a vertical tower or leaning boom that elevates the cables as they leave the machine. Three to eight wire rope guy lines hold the tower in position. With rare exception, cable systems yard logs uphill. Green Diamond utilizes cable yarding systems where the terrain is too steep (typically ground averaging over 35% slopes) to accommodate ground-based yarding systems such as shovel logging.

Cable yarding is usually skyline or high-lead, depending on the amount of lift required during yarding. High-lead logging essentially attaches logs directly to the end of the mainline that exits the top of the yarder tower. The only lift provided is the difference in elevation between the location of the log and the top of the tower to prevent logs from digging into the soil surface during yarding. This system is quick to implement and effective over short distances (generally less than 500').

Skyline (or running skyline) is preferred over high-lead yarding and reduces drag since one end of the log is always elevated. This system is preferred over longer distances and significantly increases yarding speed and minimizes ground disturbance. In these circumstances, Green Diamond uses some form of skyline logging that provides sufficient lift. Skyline logging uses a skyline cable that extends from the top of the tower (or boom) to an anchor located at some elevated point beyond the edge of the logging area. This anchor is usually a stump or a suitable tree at the perimeter of the logging unit rigged to provide the necessary skyline elevation on an opposing hill slope. Logs are attached to a carriage that rides on the skyline. The yarder pulls the carriage to the landing with its mainline (also referred to as the skidding line in this application).

Depending on the skyline variant used, the yarder lowers the skyline to attach the logs and then raises it for lift, or the carriage can unwind its own skidding line and then lift the logs towards the skyline. Either way, the yarder provides enough lift to suspend the uphill end of logs above the ground. Green Diamond uses skyline cable yarding systems extensively throughout the ownership, which minimizes overall ground disturbance and mid-slope road building.

(iii) Aerial Yarding

Aerial yarding (e.g., by helicopter or balloons) typically occurs when steep and/or unstable terrain or lack of road right-of-way prevents road construction for ground based or cable yarding systems. Balloon aerial logging uses cables or grapples suspended from long cables with the balloon providing lift and suspend the logs for transport to the landing. Aerial equipment lowers and releases logs to the loading area. Helicopter yarding utilizes a cable extending from the helicopter that is attached to the logs and fully suspends the logs to the landing area. Both of these types of yarding generate virtually no soil disturbance. However, both require large landings to safely accommodate concurrent log landing, log sorting, truck loading operations, and log decking during peak production hours. Helicopters also require a separate service landing that is clean and rock-, debris- and dust-free to protect the engines from damage. Disadvantages of helicopter logging include:

- It is expensive; roughly three times more than cable yarding
- The absence of in-unit roads minimizes future site preparation, reforestation and other forest management activities, resulting in higher post-harvesting costs.

Helicopter service landing areas are secondary to the THP area.

c. Landing Construction and Maintenance

Covered Activities include constructing and maintaining landings. Log landings are cleared areas or wide spots in roads to which logs are yarded, swung, skidded, lowered or forwarded for subsequent loading onto trucks for transport. They are constructed and maintained as part of the timber harvest and transport process. Landings must be located and constructed to complement the yarding system used to move the logs from the stump. The AHCP and MATO include measures to minimize ground disturbance and erosion from landings.

d. Loading and Other Landing Operations

Logs yarded to a landing or roadside may need bucking into shorter segments, breakage removal and delimbing by hand or mechanically. A mechanical delimber is a tracked machine similar to an excavator with a long boom and moving cutting head that delimbs, accurately measures and bucks trees into log-length pieces.

At the landing or roadside, a shovel or front-end loader (a wheeled bucket loader equipped with log loading forks instead of a bucket) then loads logs onto log trucks. Shovels (or heel-boom loaders) can operate on small landings or, if side slopes are suitable, they can deck logs on the roadside and load trucks without leaving the road grade. In contrast, front-end loaders have a longer turning radius and require larger landings. Shovels are Green Diamond's preferred loading equipment because they offer flexibility, utility and lower ground pressure.

e. Salvaging Timber Products

Green Diamond periodically salvages dead, dying and wind thrown trees primarily for road maintenance or fire damage resulting from prescribed burns. This involves removing dead or dying trees that are easy to salvage and yard onto an adjacent road. Green Diamond conducts timber product salvage through annual filing of a property wide Exempt Notice (i.e., subject to the FPRs but exempt from THP requirements) through the THP process. Products removal requires a licensed timber operator. A THP is required if the salvage volume exceeds 10% of the average existing timber volume per acre. Salvage harvesting is not permitted within floodplains or channel migration zones and Green Diamond's AHCP specifically limits it in watercourse Riparian Management Zones (RMZs).

f. Transporting Timber and Rock Products

Covered Activities include timber, biomass or rock product transport on private and public roads. Trucks and trailers typically transport timber and rock materials on private and public roads. Helicopters infrequently transport logs directly to sawmills. This would include any road use not already covered by the RMWDRs, which cover all road use associated with the road management activities.

g. Rock Pit Development and Use

Under the AHCP, Green Diamond accounts for any effects on historic properties under the National Historic Preservation Act (NHPA). Rock pits or borrow pits are locations for rock excavating, crushing, blasting, or producing road surface, road fill, or rock bank stabilization materials. Activities associated with rock pits include loading trucks with rock, hauling mined rock, and constructing and maintaining rock pit access roads (see above). This includes conducting an archaeological review for any new rock quarry development within the Project Area.

h. Equipment Maintenance

The use of falling, yarding, loading, trucking, and road maintenance equipment requires fueling and maintenance. Green Diamond and/or its contractors use maintenance trucks to perform equipment maintenance and refueling. This generally occurs on or adjacent to roads and landings.

i. Water Drafting and Storage

Water drafting involves the direct drafting of stream flow into a water truck. Storage involves diverting water using gravity fed systems that provide it directly to storage reservoirs or tanks that in turn supply water trucks. These trucks then periodically apply water to roads for dust abatement, road maintenance, construction, and surfacing, or to control prescribed fuel reduction burning or wildfire. Occasionally, Green Diamond excavates and cleans debris from existing water drafting locations within or adjacent to watercourses to increase the in-channel storage area for drafting.

3. Silvicultural Regimes and Timber Stand Regeneration and Improvement

Green Diamond's silvicultural practices are designed to enhance the productivity of its timberlands by ensuring both prompt regeneration of harvested areas and rapid forest growth. Treatments vary by stand age, stand condition, site class and species composition. Green Diamond does not apply all treatments to every site. Table 1 summarizes the treatments in approximate chronological order that Green Diamond includes as part of its forest management regime.

Table 1. Green Diamond's forest management regime.

Treatment	**Stand Age**
Regeneration Harvest	45 and older
Selection Harvest	45 and older
Site preparation	0 – 1
Planting	1
Vegetation Management	0 – 10
Pre-commercial thinning	10 – 20
Commercial Thinning	30– 40

Silvicultural activity involves specific methods used to harvest and regenerate forest stands over time to achieve desired management objectives. Typical management objectives include achieving maximum sustained yield, and the maintenance, alteration or creation of habitat. Examples of regeneration methods include individual (single) tree selection, group selection, seed tree, shelterwood and clearcut.

Timber stand regeneration and improvement includes activities necessary to establish, grow, and achieve desired species composition, spacing and rate of growth of young forest stands, including:

- Site preparation, prescribed burning and slash treatment
- Tree planting
- Control of competing vegetation
- Precommercial thinning and pruning
- Commercial thinning
- Selection Harvesting
- Even-aged Harvesting

Green Diamond manages timber in the Project Area under a Maximum Sustained Production (MSP) plan prepared and approved in accordance with state law. Under the MSP plan, annual harvest levels are carefully scheduled to balance forest growth and timber harvest over a 100-year period and to achieve maximum sustained production of high quality timber products while protecting other resource values such as water quality and wildlife. Stands are ready for rotation harvest once they enter the 50-year age class (45 to 55 years-old). However, state laws that constrain both the size of even-aged management units and the timing of adjacent even-age harvesting operations can postpone the harvest of many stands past the 50-year age class. The

age of harvest stands as currently modeled is approximately 50 years as the age class distribution across the property is balanced with the harvest rate over the 100 year planning period. Although the 45 year rotation age sets the allowable age to initiate regeneration harvest, in the near term, the actual harvest age of harvest units is significantly older.

Green Diamond currently uses the Forest Projection and Planning System (FPS), developed by the Forest Biometrics Research Institute (FBRI), for inventory tracking, growth modeling and long-term harvest scheduling. In 2008-9, this model was used to develop a 100-year projection of harvesting and growth in order to demonstrate MSP as required by the FPRs under Title 14 CCR 913.11(a). The rule requires the landowner to demonstrate achievement of MSP by satisfying the following five requirements:

1. *Producing the yield of timber products ... while accounting for limits on productivity due to constraints imposed from consideration of other forest values, including but not limited to, recreation, watershed, wildlife, range and forage, fisheries, regional economic vitality, employment and aesthetic enjoyment;*
2. *Balancing growth and harvest over time;*
3. *Realizing ... adequate site occupancy;*
4. *Maintaining good stand vigor;*
5. *Making provisions for adequate regeneration.*

The modeling used spatially explicit simulation of harvesting and growth of individual stand components over more than one rotation for 100 years, based on the Geographic Information System (GIS) mapping of the standing inventory for Green Diamond's California timberlands as of January 1, 2008. This stand mapping and its projections included both harvested and unharvested areas retained for wildlife and fisheries protection. This portrayed projected stand ages and structure across the whole property at various times (*e.g.*, at decadal intervals) throughout the simulation period. The MSP modeling resulted in a constant level of harvest for approximately 50 years, followed by an increase to a higher level for the last 50 years, with growth exceeding harvest at all times throughout the period, and with a concomitant increase in standing inventory throughout the whole period.

With the exceptions noted below, Green Diamond plans to practice even-aged management on the ownership using clear-cutting as the harvest/regeneration method. Clearcutting provides for prompt regeneration of redwood and Douglas-fir, the principal commercial tree species in these forests, and maintains these trees in a *free-to-grow* state that is not compromised by competition from a predominate residual overstory influence of older trees or by the possibility of damage from the repeated site disturbance that is implicit in the application of other silvicultural systems. The growth potential inherent in the use of clearcutting in these forest types was assumed in the calculation of yields for Green Diamond's sustained yield (Option A document)[1].

[1] The Option A document contains confidential proprietary information that is protected from public disclosure under California law. This reference to the Option A document is explanatory and the Option A document has not been provided to the Regional Water Board and is not intended to be part of the administrative record for its action on the FMWDRs.

The primary exceptions to clearcutting occur in the following situations:

- Areas where past use of selection or seed tree logging left residual mature timber that will be harvested in *seed tree removal* or *overstory removal* operations
- Areas where buffers along public roads or near urban development are harvested using the shelterwood or selection systems so that the visual impact of timber harvesting is ameliorated
- Overly steepened or unstable slopes where slope stability concerns take precedence over forest productivity
- RMZs, Habitat Retention Areas (HRAs), single tree retention of trees possessing high value habitat features or other areas managed principally for fish and wildlife habitat.

Clearcut management units will continue to reflect the provisions of Green Diamond's Northern Spotted Owl (NSO) HCP, principally through the retention of wildlife trees that are left within thee clumps or designated habitat retention areas to provide vertical structure. These retained trees, and those left in RMZs, will result in a significant portion of the area within even-aged harvesting units supporting post-harvest vertical structures. These structures will provide various habitat attributes for terrestrial and aquatic wildlife.

Because essentially all of Green Diamond's property has been harvested at some time in the past, the progress of timber harvesting across the ownership will always reflect to some extent the pattern of age classes imprinted on the landscape by the timing of prior logging activity. In areas where large ownership blocks were initially harvested in more or less continuous logging operations during the railroad logging era (pre-WWII), harvesting operations will be more concentrated within these general watershed regions, although FPR constraints will result in the dispersal of activities over time and space within these blocks during subsequent rotation periods. This is a product of the FPR adjacency harvesting constraints that are applied to even-aged harvesting units resulting in retention of many stands beyond planned rotation age. If harvesting of a tract of mature timber is initiated around age 45, the harvesting of much of that tract will be constrained into the following decades, and the harvest of a few stands will be constrained past 70 years of age. This effect has been demonstrated in Green Diamond's growth and yield planning and in our Harvest Stand Availability Forecast (HSAF) modeling. For example, in our current HSAF ending in 2021, the projected average age of harvest stands that are projected to be harvested in a given year ranges from 51 to 63 years old. The projected average age of all harvest stands during this period is about 59 years old..

a. Site Preparation, Prescribed Burning, and Slash Treatment

Site preparation may be required where accumulations of slash following timber harvesting constitute a physical barrier to effective planting, or where weed species (brush or non-merchantable trees) remaining on the site significantly compromise establishment of planted seedlings. In either situation, Green Diamond may use prescribed burning, machine piling, mechanical scarification, bio-mass harvesting, or a combination of these methods to prepare the site for hand planting and reduce fuel concentrations for fire safety.

Green Diamond may retain slash created by logging activity on site without treatment if it does not prevent replanting or represent excessive fuel concentrations that pose an unacceptable fire risk. The FPRs require removal of accidental deposits of slash within Class I and Class II watercourses. Slash deposited into Class III watercourses must be removed unless it is stable within the channel. In all logging areas, slash developed on log landings from yarding and truck loading activities may be piled and burned on the landing.

Site preparation occurs as soon as possible after completion of logging so that planting will not be delayed. Mechanical site preparation may occur concurrently with logging operations. If prescribed burning is required, it is scheduled during the first spring or fall following completion of timber harvesting. Prescribed burning is facilitated utilizing two main techniques:

- Broadcast burning the harvest unit (excluding RMZs and other resource protection areas)
- Pile burning where logging debris and slash is accumulated and piled concurrent with harvesting operations and then ignited during the winter period under appropriate burning conditions

Piles of slash are accumulated by either cable yarders bringing debris to landings or by ground-based falling and shovel yarding equipment piling excessive accumulations of logging debris within the units or along the sides of adjacent roads and landings. Timing of prescribed burns is predicated upon temperature, wind, humidity and fuel moisture conditions that will result in low intensity burns. Such conditions minimize the probability of escape and allow retention of large woody debris and the finer organic matter concentrated at the soil/litter interface, and must be coordinated with the local Air Quality officials. Ignition patterns are designed to keep fire from intruding into RMZs.

Prescribed burning is used to reduce slash concentrations or to reduce vegetative levels or control species composition. This practice involves the introduction of fire under controlled conditions to remove specified forest elements with little risk of catastrophic fire damage. Prescribed burning is also used for slash control and the reduction of fuel concentrations for fire hazard abatement. The practice of utilizing prescribed burning, especially broadcast burning, has been greatly diminished in recent years to comply with air quality regulatory standards.

Biomass harvesting techniques, developed and implemented over recent years, provide a successful and efficient alternative to broadcast burning. In areas where slash and other logging debris is accessible to ground based equipment, a portion of the logging slash is removed (harvested) from harvest units and landings as a site preparation and hazard abatement treatment. Advanced specialized harvesting equipment and techniques such as mechanized feller-bunchers, shovel logging and piling loaders, articulated off highway dump trucks and forwarders with low ground pressure capabilities, and high capacity mobile slash chippers and grinder equipment are used to gather up and process previously unutilized woody material. The biomass that is harvested is in the form of limbs, tops, chunks and slabs that were previously considered non-merchantable and uneconomical to retrieve from the landscape.

Where feasible and concurrent to harvesting operations, shovel logging operators are instructed to stack excessive slash into piles located along the roadway and in harvest units. Mechanized

delimber operators stack tops and other debris in piles along the roadway, adjacent to landings and in units. After completing normal log harvesting operations, specialized biomass harvesting equipment (often a shovel loader with specialized tongs designed to pick up slash) gathers slash in untreated areas and deposits it into specialized articulated dump trucks capable of driving over uneven topography and slash. Alternatively, in areas with piles, the slash is loaded into the specialized dump trucks. These trucks deliver biomass to a centrally located landing where a mobile slash chipper grinds/chops the material into chips and then loads large trucks that deliver chips to conversion facilities such as paper chip utilizers or power generation plants.

With development of specialized equipment, techniques, and new markets for biofuels, biomass harvesting has become a viable alternative in some areas to site preparation using broadcast burning. All operational constraints associated with topography, seasonal restrictions, and resource protection and retention of important aquatic and terrestrial wildlife habitat elements are comprehensively identified and documented in Green Diamond's AHCP. In areas where biomass operations occur, a residual layer of slash is retained throughout the unit to insure needed ground cover is present for erosion prevention.

b. Tree Planting

Tree planting generally involves hand planting nursery-grown tree seedlings directly into the soil, ensuring good contact between the soil and roots. Tree seedlings are hand planted in even-aged management areas including landings during the first winter following completion of a THP. In general, the tree species selected for planting are chosen to best fit the site specific conditions of the area harvested.

Areas that exhibited pre-harvest high redwood conifer species composition are planted primarily with redwood seedlings. Some areas that are well stocked with redwood stump sprouts after harvest may be deemed unnecessary to replant except if it is necessary to fill areas void of regeneration. Areas exhibiting both redwood and Douglas-fir species prior to harvest will commonly be planted with a mix of both species often favoring one species over another depending upon the site specific conditions. In areas that were poorly stocked with conifers prior to harvest that are dominated by hardwoods, conifers (either redwood or Douglas-fir depending upon site conditions) will be replanted with the purpose of not eliminating the hardwood component but to ensure a better representation of conifer species. In other locations on the ownership where elevation or growing site dictates, other tree species such as ponderosa pine or incense cedar may be selected for planting.

Planting will be postponed only if site preparation is necessary but cannot be completed prior to the planting season. The summer after initial planting, Green Diamond surveys the planted areas to determine seedling survival rates and, where necessary to achieve desired stocking, will plant additional seedlings during the following winter. At age two, a more detailed stocking survey will be done, and if necessary, additional trees are planted. It is common for some harvested sites to become stocked with additional volunteer tree species (western hemlock, Sitka spruce, red alder) that become established. Volunteers come from adjacent stands that provide seed sources. This is the most common process that allows for a wide variety of species across the landscape.

c. Control of Competing Vegetation

To provide successful establishment and continued, rapid growth of desired tree species, it is often necessary to control species that compete with desired species for water and sunlight. Control methods are mechanical cutting and chipping. Green Diamond is not seeking coverage of herbicide use for control of competing vegetation as a part of these WDRs.

d. Pre-commercial Thinning and Pruning

Precommercial thinning involves thinning dense, young forest trees by mechanical means, including cutting individual trees or mechanically sawing or chipping rows or groups of trees. Pruning removes the lower limbs of desirable tree species to increase the eventual product value of the pruned trees. Between age ten and 20, pre-commercial thinning may occur to remedy overstocked conditions in planted stands so that crop trees will achieve optimum diameter growth. Currently, Green Diamond does not remove pre-commercial stems from the site because they are too small to meet current merchantable standards. This operation is performed only once in the life of a stand and only in those stands with an excess number of trees per acre. Although chainsaws are used to cut the non-crop trees, progress in the development of feller-bunchers may eventually lead to machines capable of executing this operation more efficiently and with less risk of injury to workers. Alternatively, improvements in markets for small wood and in the machinery used to harvest small stems may allow economic harvesting of the excess trees, thus converting pre-commercial thinning to commercial thinning as described below.

e. Commercial Thinning

Commercial thinning involves removing selected trees that may contain commercial value to create additional growing space for crop trees. Thinning a portion of the competing trees allows for the release of the selected crop tree by providing more light, and in some cases, more nutrients and soil moisture when they are limiting factors. On Green Diamond's forestlands in the Project Area, the most significant limiting factor in a young forest is typically sunlight. Commercial thinning on Green Diamond timberlands usually occurs when stands are identified as needing this treatment and when they are around the 30-40 year age class. The log size of these younger thinned stands is inherently smaller than those of an older stand ready for the final harvest stage of even-aged management. The harvesting systems however are fundamentally the same except the size of the yarding equipment can be significantly reduced to correspond with smaller payloads and logs. Both cable and ground based yarding systems are utilized to harvest the selected trees to be thinned with the goal of improving the growth potential of remaining stands and protecting residual trees from damage during the yarding process. During the planning and design stage of a thinning harvest, Green Diamond's Registered Professional Foresters (RPF) and professional biologists ensure key resource protection measures and mitigations included in a final clearcut harvest also apply to intermediate thinning harvest. This harvesting activity will comply with all measures covered under the AHCP and measures in the NSO HCP. Green Diamond's goal is to ensure that important key resource values existing at the time of the thinning harvest are identified and protected so as to provide for a continuity of protection of sensitive habitats and habitat features throughout the harvesting cycles.

f. Selection Harvest

Selection harvest involves choosing either individual trees or small groups of trees for harvest. This silviculture practice retains a significant component of the original stand with the intention of reentry after a prolonged period (~10 years) to select another component of individual trees after the stand experiences subsequent re-growth and natural regeneration. On the north coast of California and within Green Diamond's ownership, selection harvest occurs where competing resource values take precedence over even-aged harvesting. Selection harvesting is an ideal method used to ensure robust retention of stands and individual trees within riparian management zones, geological sensitive areas and in locations where protection of other resource values is the foremost management factor. Areas designated for selection harvest are managed within that prescription for long periods to ensure the specific retention that is desired continues to persist on the landscape.

g. Even-aged Harvest

Even-aged harvest involves the cutting of essentially all overstory trees in a designated area to expose the microclimate for the development of a new age class of species that grow best in full sunlight. This silviculture practice is accompanied by selection harvest in reserve areas such as RMZs, geologically sensitive areas and in locations where protection of other resource values is the foremost management factor. Cable, ground based and aerial yarding systems may be utilized to harvest the trees. During the planning and design stage of an even-aged harvest, Green Diamond's RPFs and professional biologists ensure key resource protection measures and mitigations are applied. This harvesting activity complies with all measures covered under the AHCP and measures in in the NSO HCP. Green Diamond's goal is to ensure that important key resource values existing at the time of the harvest are identified and protected so as to provide for a continuity of protection of sensitive habitats and habitat features throughout the harvesting cycles.

4. Minor Forest-Product Harvest

Minor forest products include burls, stumps, boughs, and greenery. Green Diamond collects, harvests and tranports these products on its timberlands. Third parties perform these activities subject to Green Diamond's permits with conditions that protect sensitive habitats and minimize the risk to the beneficial used of waters.

5. Instream and Riparian Restoration

Instream restoration involves improving aquatic habitat within the stream channel by altering the local channel morphology by placing objects such as logs, root wads, and boulders in or adjacent to the stream channel that provides or creates additional habitat complexity, structure, or cover. The Covered Activities include the installation, repair, replacement, maintenance, and upgrading of instream restoration structures. Riparian restoration involves improving the riparian habitat adjacent to watercourses by providing bank stability, future recruitment of wood and shade canopy to the stream.

III. Other Permits, Approvals, Programmatic Plans and Agreements, and Environmental Reviews Covering Green Diamond's Covered Activities.

The activities subject to the FMWDRs are also regulated pursuant to the California Forest Practice Act and the FPRs. All Green Diamond Timber Operations, as defined in the Forest Practice Act are carried out pursuant to THP or other authorization pursuant to the FPR. In addition, Green Diamond's forest management activities in the Project Area are subject to the following programmatic federal and state authorizations and accompanying environmental reviews under the National Environmental Policy Act and/or the California Environmental Quality Act. In addition, these activities are subject to the existing RMWDRs and the MTO A. Following are Green Diamond's programmatic approvals, agreements and environmental review documents:

- Northern Spotted Owl Habitat Conservation Plan and Incidental Take Permit [USFWS; September 1992]
- Salmon Creek Watershed Management Plan [GDRCo; June 1993]
- Terrestrial Deadwood Management Plan [DFG; April 2005]
- South Fork Elk River Watershed-wide Waste Discharge Requirements Pursuant to South Fork Elk River Management Plan prepared by GDRCo May 2006 [NCRWQCB; August 2006]
- McNeil Creek Watershed Agreement [GDRCo; 2007]
- Environmental Impact Statement for AHCP [NMFS and USFWS October 2006]
- Aquatic Habitat Conservation Plan/Candidate Conservation Agreement with Assurances [NMFS, USFWS; July 2007]
- ESA Section 7 Biological Opinions for AHCP [USFWS and NMFS July 2007]
- Consistency Determination by the California Department of Fish and Game on the AHCP [DFG; March 2008]
- Sensitive Plant Conservation Plan [DFG; November 2008
- Coastal Lagoons and Little River Botanical Management Plan [DFG; February 2009]]
- Green Diamond Option A Document Addressing Maximum Sustained Production [Cal Fire; May 1995, revised 2009]
- Mitigated Negative Declaration Covering Master Agreement for Timber Operations and Road Management WDRs Pursuant to California Environmental Quality Act [DFG; April 2010]
- Master Agreement for Timber Operations (Property Wide Programmatic Lake and Streambed Alteration Agreement under Fish and Game Code Section 1600) [DFG; May 2010]
- Road Management Waste Discharge Requirements (Programmatic Road Management WDR) [NCRWQCB; June 2010]

These programmatic approvals and environmental review documents are incorporated in the CEQA evaluation for this project.