Tier 2 Review / Evaluation Procedures

The purpose of this document is to detail some of the factors that are reviewed and evaluated for the THPs submitted under the Elk River and Freshwater Creek WWDRs' receiving water limitations zero discharge of sediment from harvest-related landslides (Tier 2 THPs). It also describes the submittal and review processes.

Regional Water Board staff review each Tier 2 THP unit enrollment application, requesting additional information and/or modifications of the THP when necessary to meet enrollment requirements and address concerns regarding potential harvest-related landslide discharge. It is an iterative process designed to address the factors commonly known to contribute to landsliding on the North Coast. As such, this document is guidance document for Palco for their development of Tier 2 THPs and submittal of information to substantiate a THP, and for the public to assist their review of the application materials.

THP review

The THP is examined to ensure it meets WWDRs requirements

- ECP is specific to the Tier 2 unit and appurtenant roads, up to date, and accurate. Any ECP that has over-wintered prior to submittal for a Tier 2 THP will be checked by Palco to ensure new sediment delivery sites and changes in the priority of sites are updated and current)
- Non-concurrences are resolved (a THP with an unresolved nonconcurrence is not eligible for enrollment)
- Existing Orders are complied with. The Receiving Water Limitations in the WWDRs are based on compliance with other sediment minimization and remediation orders. The current compliance status may restrict the enrollment of Tier 2 acres.

Tier 2 Review

Tier 2 has a zero harvest-related landslide discharge requirement, both within and downslope of harvest units. This review is conducted to determine if this requirement can be met, given the sensitivity of the landscape, its response to previous harvesting activities, and the activities that are proposed.

Review available materials for completeness and evaluate in terms of the "Factors for Hillslope Stability" (the Factors) below

- PALCO's Unit Review for Tier 2 Enrollment write-up including maps
    - Geologic summary
    - Summary of any changes resulting from the Tier 2 landslide hazard assessment

    - Polygon descriptions
        - Polygons based on topography, hydrology, geology
        - General observations
        - Harvest related impacts and hillslope sensitivity
        - Forestry/Silviculture plan
        - Operational design plan
    - LIDAR derived elevation map with 10 ft contours
    - LIDAR derived Shalstab map
    - LIDAR derived slope class map
    - CGS Landslide map
    - Mass Wasting Potential map
    - Aerial Photo map
    - PALCO's deep-seated landslide map
    - Road condition map
- THP Geology report
- In-house materials
    - LIDAR derived hillshade map
    - CGS Landslide map
    - Inspection reports (including PHI reports)
    - Non-concurrences
    - CAOs

When reviewing the available materials, the following factors are among those considered (adapted from Soeters and van Westen, 1996, Table 8.1).

Factors for Hillslope Stability Analysis

GEOMORPHOLOGY	
1. Geomorphologic units	Geomorphologic description
2. Existing landslides	Type, activity level, potential causative factors, estimated depth, dimension etc.
3. Drainage	Type, order, length, organization
4. Catchment areas	Order, size, proportion unit area
5. Precipitation	Rainfall (limited by lack of local differentiation)
TOPOGRAPHICAL ATTRIBUTES	
6. Slope map	Slope angle classes
7. Slope direction map	Slope direction classes (aspect)
8. Slope length	Slope length classes
9. Slope shape	Concavity/convexity/planar
ENGINEERING GEOLOGY	
10. Bedrock properties	Physical character, relative rock strength
11. Soil Properties	Material types, depth, classification, grain-

	size distribution, bulk density, relative strength
12. Structural geological map	Fault type, length, dip, dip direction, fold axis, etc.
13. Seismic influences	Proximity to faults (thresholds in MRP Order) and activity level

MANAGEMENT HISTORY

14. Timber harvest history (recent) and landscape response	Roads, cut blocks, skid trails, yarding, silviculture
15. Infrastructure and landscape response	Road types, railroad grades

HYDROLOGY

16. Evapotranspiration	Evapotranspiration over time
17. Subsurface hydrology	Preferential flow paths, based on topography
18. Springs/seeps	Presence of springs, seeps, wet areas

Palco submits, along with the information listed above, a cover letter that summarizes any changes that were made to the Timber Harvest Plan units, or measures that were added, to eliminate the risk of landsliding. Attached to each package will be a "Professional Certification of Design" to be signed and stamped by California-licensed professionals in the employ of Palco.

Analytical Review Procedures

Applications for Tier 2 units will be evaluated in a watershed context, ensuring that disturbance is distributed over time and space and concentration of activity is avoided. Concentration of disturbance in time and space increases the potential for cumulative watershed effects.

Identify areas of concern (areas that had landslide activity or have potential for landslide activity). No harvest is allowed on active landslides. Harvest on dormant and inactive slides is evaluated on a case-by-case basis against the factors listed above.

Identify areas where ground-based yarding should not be considered. Generally, cable systems or helicopter yarding should be considered on slopes exceeding 35%.

Identify any inconsistencies and/or shortcomings in the available materials and require submittal of corrected or additional materials to address the shortcomings.

Identify areas, either on the ground or in the review materials, where further discussion or documentation is necessary.

Identify any necessary operational changes, for example, requiring wider stream buffers or a different yarding method.

Notify PALCO of any inconsistencies and/or shortcomings in the available materials, areas of concern or areas where further discussion or documentation is necessary. Require additional materials or modifications of the THP where deemed warranted. Review PALCO's response for compliance.

Conduct field inspections where necessary to verify conditions detailed in Tier 2 Unit Review write-up, verify actual harvest methods, and verify monitoring by PALCO: preharvest, active, post-triggering events.

When any areas of concern are resolved (or removed from the unit), any inconsistencies are reconciled, and any further discussion or documentation has provided enough detail that staff agrees the plan can meet the zero landslide discharge requirements, then the unit is enrolled in Tier 2.

PALCO must amend the THP through CAL-FIRE procedures to reflect any operational changes resulting from the Tier 2 evaluation.

Procedural

Regional Water Board staff will make this procedure available to the public prior to enrolling any Tier 2 THP units by posting informational documents on the Regional Water Board internet web site.

Palco will submit a list of THPs proposed for enrollment. They must be categorized on the basis of the level of modifications and need for analysis. No enrollments will be considered for a calendar year on Tier 2 THPs that are submitted after October 15 of that year.

Reference

Soeters, R. and C. J. van Westen. 1996. Slope instability recognition, analysis, and zonation. *In* Landslides Investigation and Mitigation Special Report 247. Transportation Research Board National Research Council. *Eds. A. K. Turner and R. Schuster*. National Academy Press Washington, D. C.