

Appendix 3.6 Health and Safety Issue Analysis Report

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Issue Statement: Roads that are located on serpentine or ultramafic rock types may pose a potential asbestos hazard for adjacent campers or residents, road maintenance workers, and others who travel such roads frequently. Some members of the public have expressed concern regarding the effects of inadequate maintenance on safety on certain roads. Native Americans and others who gather plant materials are concerned about potential health effects if herbicides are applied to roadside vegetation.

Findings:

- Potential for human exposure to asbestos from roads located on ultramafic rock types:
 - Bedrock geology maps show a large band of ultramafic rocks located along the east edge of the Forest that potentially contain asbestos. Smaller intrusions exist near Lake Pillsbury and on Etsel Ridge.
 - Table A3.6- 1 displays road mileages on ultramafic rock types, and rates the potential for human exposure to asbestos if it is present.
 - There are about seven miles of key routes located on ultramafic rock types.
 - Table A3.6- 2 displays mileages of key routes on ultramafic rock types, and rates the potential for human exposure to asbestos if it is present.
 - Key routes traversing ultramafic rock units that may contain asbestos are located in 5th field watersheds of Red Bank, Elder Creek, Thomes Creek, Grindstone Creek, Middle Fork Stony Creek, Black Butte River, Williams/Thatcher and Upper Main Eel River.
 - There are about 65 miles of classified roads traversing ultramafic rock types.
 - Watersheds with the most roads located on ultramafic rock areas are Middle Fork Stony (19 miles) and Thomes Creek (13 miles). Next highest watersheds are Elder Creek (7 miles) and Little Stony Creek (5 miles).
 - Previous sampling of some serpentine soil samples from the south end of the Forest determined that asbestos fibers that were present were not of the carcinogenic type. However, additional testing will be required under the new air quality regulations.
- Grading under dry soil conditions results in greater levels of traffic related dust. If done on high use roads or roads near human habitation, it can result in health and safety problems.

- There are no vehicle accident report findings that attribute the cause to poor road maintenance. The most common causes are driver error, including driving under the influence of alcohol or other substance.
- There is currently no roadside pesticide spraying done by the Forest Service, nor is there any planned. However, there could be future proposals.

Basis of asbestos ratings in Table A3.6- 1:

- Low (L) – There are no roads located on ultramafic rock types.
- Medium (M) – Some roads are located on ultramafic rock types, but there is low potential for exposure because the affected roads have low traffic levels.
- High (H) - Some roads are located on ultramafic rock types, and there is higher potential for exposure because of higher traffic levels on some roads (as indicated by key routes on ultramafic rock types, or as otherwise noted).

Table A3.6- 1:				
Watershed Name	Miles of Road on Ultramafic	Miles of Key Route on Ultramafic	Issue Description	Score
Bear Creek	2.7	0	•	L
Black Butte River	2.6	0.5	•	M
Briscoe Creek	2.5	0	•	L
Elder Creek	16.7	0.2	•	M
Elk Creek	2.2	0	•	L
Grindstone Creek	0.6	0.1	•	M
Lakeport	0	0	•	
Little Stony Creek	5.3	0	• High OHV use area, so potential for human exposure is higher than usual for non key routes roads.	H
Middle Fk Stony Cr	18.7	1.4	• High OHV use area, so potential for human exposure is higher than usual for non key routes roads.	H
North Fk Cache Creek	2.0	0	•	L

Table A3.6- 1:				
Watershed Name	Miles of Road on Ultramafic	Miles of Key Route on Ultramafic	Issue Description	Score
North Fk Stony Creek	0.2	0	•	L
North Fork Eel River	0	0	•	L
Red Bank Creek	2.6	0	•	M
Rice Fork	2.6	0	•	L
S Fk Cottonwood Cr	0	0	•	L
Soda Creek	0	0	•	L
Thomes Creek	13.2	4.1	• Most of the high use road on ultramafic is paved, so it is of lower concern.	M
Tomki Creek	0	0	•	L
Upper Lake	0	0	•	L
Upper Main Eel River	4.0	0.1	•	M
Upper Middle Fork Eel	0	0	•	L
Williams-Thatcher	0.9	0.4	•	M

Basis of asbestos ratings in Table A3.6- 2:

- Low (L) – The road does not cross ultramafic rock types, or it is paved on such sections.
- Medium (M) – Less than 0.25 mile of the road crosses ultramafic rock types.
- High (H) - Less than 0.25 mile of the road crosses ultramafic rock types.

Table A3.6- 2: Rating of 5th Field Watersheds for Potential Road/Asbestos Problems			
Key Route	Miles on Ultramafic	Issue Description	Rating
FH7	• 0.12	• All paved, so no dust potential.	L
M10	• 1.18	• All paved, so no dust potential.	L
M1c	• 0.80	•	H
M2	• 2.03	• All paved, so no dust potential.	L
M22	• 0.70	•	H
M4	• 2.03	• All paved, so no dust potential.	L
M5a	• 0.22	•	M
M61	• 0.18	•	M

Guidelines:

Need for Forest Plan Amendment

- None identified.

Identifying Opportunities and Setting Priorities

- Prioritize asbestos testing according to potential exposure ratings in Table A3.6-1.
- Prioritize any needed asbestos abatement projects according to results of testing.

Watershed and Project Scale Analysis

- Key routes or other high use roads through ultramafic rocks, such as serpentine, need to be identified and tested for asbestos.
- Key routes or other roads testing above the asbestos standard need to be identified in the Forest Road Atlas, and managed in accordance with the State Air Board regulations and County Air Quality District direction.
- Identify roads where dust is a health or safety concern, such as those with high traffic or near human habitation.

Construction

- Applicable Forest Plan Direction: Air Quality #1, 3 (LRMP pg IV-17); Facilities #1, (LRMP pg. IV-18).
- Continue to evaluate the effects of road maintenance and design on user safety when making project level road management decisions. When monitoring or other information indicates a potential road safety problem may exist, evaluate the need for corrective action.
- Road surface moisture, whether obtained naturally (rain) or by water truck will be necessary when road maintenance grading on key routes or high use roads through ultramafic rock types or until laboratory tests show the asbestos levels to be within the asbestos standard.

Reconstruction, and Deferred Maintenance

- Applicable Forest Plan Direction: Air Quality #1, 3 (LRMP pg IV-17); Facilities #1, (LRMP pg. IV-18).
- Continue to evaluate the effects of road maintenance and design on user safety when making project level road management decisions. When monitoring or other information indicates a potential road safety problem may exist, evaluate the need for corrective action.

- Road surface moisture, whether obtained naturally (rain) or by water truck will be necessary when road maintenance grading on key routes or high use roads through ultramafic rock types or until laboratory tests show the site to be within the asbestos standard.

Operation and Maintenance

- Applicable Forest Plan Direction: Air Quality #1, 3 (LRMP pg IV-17); Facilities #1, 13a (LRMP pg. IV-18, 20).
- Road surface moisture, whether obtained naturally (rain) or by water truck will be necessary when road maintenance grading on key routes or high use roads through ultramafic rock types or until laboratory tests show the site to be within the asbestos standard.
- Manage for reduced dust levels where it has been identified as a health or safety concern. Possible practices include:
 - Schedule grading when soil moisture is adequate.
 - Provide water trucks when soil moisture is inadequate.
 - Apply dust palliatives.
- Roads on ultramafic rock types containing asbestos greater than the standard and within one mile of a receptor such as a campground, residence, or work station needs to be surface treated to reduce dust generation.
- Consult with tribal governments and other tribal contacts regarding any proposals to use herbicides on roadsides.
- Establish and maintain a contact list of individuals and organizations that are concerned about herbicide use on the Forest. Contact these people when conducting the scoping for any proposals to use herbicides on roadsides.
- Continue to evaluate the effects of road maintenance and design on user safety when making project level road management decisions. When monitoring or other information indicates a potential road safety problem may exist, evaluate the need for corrective action.

Closure & Decommissioning

- No recommendations at this scale.

Analysis

Dust and Asbestos

Much of the key route system and other roads have a native surface. Soils in the forest are fine grained. Traffic use on this surface type causes the soil and even rocks to break down into fine clays (rock flour) that are easily airborne.

In low traffic areas, the average spacing between vehicles allows the dust generated by one vehicle to settle or drift away before the next vehicle passes, so that there is little impaired visibility. This is the case with all ML2 roads, and many ML3 roads.

However, in areas with heavy traffic, there may be significant periods when visibility is impaired because vehicle spacing is too close to allow the dust to clear adequately between passes. Such reduced visibility requires that prudent drivers reduce speed accordingly to avoid accidents.

There are various techniques for abating dust where it is a concern. A well-compacted surface has less free dust particles that can be mobilized by passing vehicles. The most basic method to provide for good surface compaction is to grade only when adequate soil moisture is present. This can be accomplished either by timing grading to occur when the soil is naturally moist, or by using a water truck to provide the needed moisture if the soil has dried out. Dust palliatives such as road oil, lignin, magnesium chloride or water can also be used to increase a native surface's resistance to being loosened by traffic. Because of the expense of applying these, their use is limited to situations where less expensive alternatives are not adequate to meet standards.

For example, when logging trucks use the forest roads, the timber purchaser is required to do dust abatement. This can be done by periodic watering of the road, or by applying a chemical palliative. Chemical palliatives are expensive, they usually only require a single application, with periodic touch-ups. Water, on the other hand would need to be applied multiple times, in many cases daily, during the haul period. So, if the haul period is long, it may be more economical to use a chemical palliative.

Air quality standards exist for two sizes of dust particles: large particles 10 microns in size (PM10) and fine particles 2.5 microns in size (PM2.5). Road use, road construction and maintenance develop dust, but the volume of dust is of de minimus¹ value and short lived. Surface dust abatement is of value in retaining fine materials to bind road surface materials, reduce soil runoff from road surfaces and reduce dust settling on nearby water sources and vegetation.

Human health may be of concern where trails or roads cross serpentine soils that contain asbestos. Recreationists and road maintenance crews may be subject to asbestos fibers while driving or operating equipment in the serpentine areas. In the early 1990's when the Forest designated OHV corridors, serpentine soil samples were taken from some routes. Lab analysis showed the asbestos fibers were not the ones that pose a lung cancer threat. (Jamie Tucker, personal communication, 2001).

State Air Resources Board has issued two regulations regarding naturally occurring asbestos. One regulation is for surfacing while the other is for construction, grading and quarrying.

¹ Emissions below which conformity determination is exempt.

The surface regulation deals with the extraction, use and sale of aggregate that contains asbestos. Asbestos is associated with ultramafic rock types. Exemptions to this regulation are sand and gravel operations, roads located at quarries, maintenance operations on existing roads and emergency road repairs. These exemptions apply to Mendocino NF road management practices.

The other regulation has requirements for road construction/maintenance, construction/grading and quarrying in areas with more asbestos than the standard allows. There is an exemption for road construction/maintenance in remote sites. Remote locations are those that are more than one mile from a receptor such as a residence, work site or campground. Even though Forest roadwork is in remote sites, it is a good practice to keep such areas wetted or chemically treated to reduce dust and worker exposure to possible airborne asbestos.

There is no mention in the regulation about keeping road surfaces dust free in remote ultramafic rock areas. However, this may be prudent practice in high use areas.

Under the state regulation, each county air resources board has their own asbestos airborne toxic control rules. In general, Colusa, Glenn, Lake and Tehama allow for road construction, road maintenance and emergency road repair on serpentine areas. However, no serpentine materials may be added to the roadbed if there is more than 1% asbestos in the rock.

Under the Mendocino County ARB regulation, road maintenance on ultramafic rock units requires dust control, plus other requirements. Lake County ARB regulation calls for an asbestos-dust-hazard mitigation plan on trails and roads that cross serpentine areas containing 1% or more of asbestos.

The Forest bedrock geology layer and road layer was used to determine which key routes and other roads pass through ultramafic rock types. Miles of road were calculated for each watershed.

Vehicle Accidents

At one of the public meetings a person raised the issue of safety with respect to sub-standard maintenance. The person cited a fatal accident in which a vehicle ran off of the road because it was poorly graded. This person also asserted that the poor grading bordered on criminal negligence.

We were not aware of any fatal accidents on any forest roads that had been attributed to inadequate road maintenance, so we investigated the claim. The Forest Transportation Planner contacted the Forest Law Enforcement Coordinator and all counties that manage roads within the Mendocino NF. We found that the original investigation of the accident in question had attributed the cause to driver error (excessive speed and driving under the influence). We also found no other information that indicated inadequate maintenance as a primary cause of any accidents.

Monitoring and evaluation reports for fiscal years 1996 through 1999 (Mendocino National Forest 1997b) provide summaries of vehicle accident statistics on the Forest. The number of vehicle accidents per year ranged from a low of 8 to a high of 21 during the period. Table A3.6- 2 displays the number and causes of accidents by year.

Table A3.6- 2: Vehicle Accident Statistics					
Fiscal Year	Total Number	Number of Accidents by Cause			
		Driver Error	Unavoidable Event²	Road Design / Mtc	Other
1996	12	7	2	0	3
1997	13	10	3	0	0
1998	8	8	0	0	0
1999	21	10	6	0	5

From the information that we have been able to develop, it appears that existing maintenance levels have been adequate to provide for safe vehicle use.

Pesticide Use

The Forest Service does not currently use herbicides to manage roadside vegetation. However, herbicides are one means of eradicating new noxious weed infestations. No current or proposed Forest Service eradication projects use herbicides. Nevertheless, it is conceivable that there could be future proposals for roadside herbicide use for that purpose.

Local tribal governments and individual tribal members have indicated that such herbicide use would be of concern to them if it was done in areas that plants are gathered for traditional uses. The locations of plant gathering areas are often held as very private information, so it can be a delicate matter to determine if a proposal might affect tribal members. So, if roadside herbicide use is proposed, careful attention needs to be paid to this issue.

Several organizations and individuals have also expressed concern over the use of herbicides (or other pesticides) in any situation on the Forest. These people should be advised of any roadside herbicide proposal to assure that they have an opportunity to review the specifics of the proposal and provide site-specific information regarding their concerns. To facilitate such contact, the Forest Planner should establish and maintain a contact list for use by interdisciplinary teams during project level roads and environmental analysis.

² Incidents such as a rock thrown by a passing vehicle's tire, or an animal suddenly crossing the road.

The 71 Questions from the RAP Book

This issue is relevant at both the forest scale and watershed/project scale. Table A3.6 -3 displays which of the questions were addressed in the forest scale analysis, and which will need to be addressed at the watershed/project scale. Some of the questions must be addressed at both scales.

Table A3.6 -3 – RAP Book Questions Relevant to Health and Safety Issue		
	Scale of Analysis	
	Forest	WS/Proj
Question		
GT4 – How does the road system address the safety of road users?	x	x
PT3 – How does the road system affect risk to firefighters and to public safety?	x	x
PT4 – How does the road system contribute to airborne dust emissions resulting in reduced visibility and human health concerns?	x	x

Information Sources

Literature Cited

- State of California, Air Resources Board. 2001. Final Regulation Order – Asbestos Airborne Toxic Control Measure for Construction, Grading and Quarrying and Surface Mining Operations.
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- County of Mendocino, Air Quality Management District. April 2002. Mendocino County Air Quality Management District policies for areas containing Naturally Occurring Asbestos (NOA).
- Mendocino National Forest. 1997a. Watershed Analysis Report – Thomes Creek Watershed.
- Mendocino National Forest. 1997b. FY1996 Monitoring and Evaluation Report.
- Mendocino National Forest. 1998. FY1997 Monitoring and Evaluation Report.
- Mendocino National Forest. 1999. FY1998 Monitoring and Evaluation Report.
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Persons Cited as Personal Communication

Name	Discipline	Agency
Tucker, Jamie	Engineer	Forest Service (retired)

Glossary

de Minimus - Emissions below which air quality conformity determination is exempt.

Palliative, Dust – products that are applied to native surfaced roads to bind soil particles together so that the road surface is more resistant to being loosened by traffic.

Serpentine – a soft metamorphic rock of igneous origin usually a greasy or silky dull greenish color.

Ultramafic – ultrabasic rocks of volcanic origin, such as basalt and greenstone.