**STATEMENT**
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**BEFORE THE**
**SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES**
**COMMITTEE ON NATURAL RESOURCES**
**UNITED STATES HOUSE OF REPRESENTATIVES**
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**CONCERNING**
**ABANDONED MINE LANDS AND MERCURY IN CALIFORNIA**

Mr. Chairman and members of the Subcommittee, thank you for the opportunity to testify on the Abandoned Mine Land (AML) reclamation program and mercury contamination in California. I am Randy Moore, Regional Forester of the Pacific Southwest Region of the Forest Service which includes California, Hawaii, and the Pacific Islands. I am pleased to be here with you today.

Since the early 1990s the Forest Service has implemented programs to address the safety, human health and environmental hazards posed by abandoned mine lands throughout the nation and state. Key elements of these programs include protecting human health and safety by mitigating abandoned mine hazards; restoring land and water contaminated or disturbed by abandoned mines; and enhancing fish and wildlife habitat through reclamation of abandoned mines.

The human health and environmental impacts caused by abandoned mine lands cross many jurisdictional boundaries and affect federal, state and private lands across the nation and state. Despite the effort of federal and state agencies and other parties, abandoned mine lands continue to pose both physical safety hazards to the public and threats to human health and the environment from hazardous contaminants.

According to the State of California Department of Conservation, Abandoned Mine Lands Unit (AMLU) at least 15 adults have died and 23 adults and children have been injured in abandoned mines in California since 2000[1]. Contaminants from AML sites such as mercury and lead continue to affect drinking water and other water resources throughout the state. Acid rock drainage has caused fish kills and continues to degrade habitat and contribute to high concentrations of toxic metals to many streams in California. The recreating public is exposed to contaminated mill tailings and waste rock from AML sites on federal and state public lands and within historical mining communities[2].

## Abandoned Mines on National Forest System Lands in California

The eighteen (18) national forests in California cover approximately 20 million acres of land. Much of the lands managed by the Forest Service in California are in areas that have had significant historic activities such as hard rock and open pit gold, mercury, copper, and asbestos mining.

The California AMLU estimates that more than 47,000 abandoned mine sites exist statewide; that 84 percent of these sites present some form of physical safety hazards to the public and approximately 11 percent present human health and environmental hazards from contaminants[3]. The state also estimates that federal lands contain approximately 67 percent of the abandoned mines in the state (primarily on lands managed by the Bureau of Land Management (BLM), National Park Service (NPS), and Forest Service.

As shown on the attached statewide AML map, every National Forest in California has abandoned mine sites. Based on the Department of Conservation's abandoned mine database, there are approximately 7,500 abandoned mine sites located on the National Forests in

[1] "*California's Abandoned Mine Lands Program Fact Sheet, November 2009*". California Department of Conservation Office of Mine Reclamation, Abandoned Mine Lands Unit
[2, 3] "*California's Abandoned Mines- A Report on the Magnitude and Scope of the Issue in the State, 2007 Update*", and "*The Abandoned Mine Lands Unit (AMLU) Frequently Asked Questions, March 2009"* California Department Of Conservation Office of Mine Reclamation, Abandoned Mine Lands Unit

California, with the number of sites per National Forest ranging from 14 on the Lake Tahoe Basin Management Unit to over 1,780 on the Inyo National Forest.

The Forest Service estimates that approximately 65-70 percent of the abandoned mine sites on National Forest System lands in the State of California pose some form of physical safety hazard to the public from hazardous mine openings (adits and shafts), and decaying structures and equipment[4]. It is also estimated that approximately 20 percent pose some level of human health and environmental hazard and threat from hazardous substances associated with abandoned chemicals and explosives, acid mine drainage, and heavy metal (lead, mercury, etc.) contamination in mine waste rock and tailings.

Mercury impacts from historic gold mining operations are only one of the human health and environmental threats being addressed by the Forest Service's abandoned mine program. Visitor and wildlife exposure to heavy metals related to hazardous levels of other contaminants such as lead in waste rock and tailings piles is a key concern for the agency. Acid mine drainage and heavy metal discharges into surface water bodies and drinking water sources is another key concern as are the significant hazards posed by abandoned chemicals and explosives at AML sites. For example, on the Sierra National Forest, near Yosemite National Park the Forest Service discovered over 3,200 pounds of ammonium nitrate and 660 pounds of dynamite abandoned at one site that was routinely visited by the public.

## Forest Service's Regional and National Abandoned Mine Program

The Forest Service addresses AML hazards primarily through two programs; the AML Safety program which focuses on the mitigation of safety hazards posed by abandoned and/or inactive mines on National Forest System lands, and the Environmental Compliance and Protection program which utilizes authorities under the Comprehensive Environmental Response,

[4] Forest Service estimates are based on the professional experiences and knowledge of the agency AML staff and On-Scene coordinators in dealing with AML sites on NFS lands in California.

Compensation, and Liability Act (CERCLA) to address human health and environmental hazards posed by hazardous substances and contaminants such as mercury[5].

In the implementation of its CERCLA program, the Forest Service must comply with, and follow, the requirements of the National Contingency Plan as well as established Environmental Protection Agency CERCLA policy and guidance. A key first step in this process is conducting initial site characterization to determine if a site has contamination and poses a threat to human health and the environment. To date, the Forest Service has completed the initial site characterization work on less than 5 percent of the AML sites on National Forest System lands in California. The Forest Service estimates that the cost to conduct initial site characterization work at an AML site ranges from approximately $20,000 to $45,000 depending on the site complexity (number and type of mine features, type of historic operations, contaminants of concern, accessibility, etc.)[6].

USDA and Forest Service policy requires that, before appropriated funds are spent on the remediation of a site, a "potentially responsible party" (PRP) search must be performed to identify whether a viable responsible entity exits to fund the site clean-up in lieu of the government. As the Forest Service has moved forward with its PRP searches in California it has found that many of the abandoned mine sites on the national forests in the state are old, with the majority of the mining activities occurring from the 1800s through the early 1900s. Very few of these sites have resulted in the identification of a viable responsible party. These include many, if not most of the historic hydraulic mine sites in the Sierra Nevada which are the source of much of the mercury contamination concerns. The Forest Service has not found a viable responsible party at any of the mercury contamination AML sites investigated to date in California.

After the Forest Service and USDA legal counsel have determined that no viable responsible party exists at a site, the agency may then proceed with using appropriated funds to complete the CERCLA site investigation and remedy selection and implementation process. In California we

[5] Executive Order 12580 provided federal agencies like USDA lead agency authority under CERCLA to investigate and remediate contaminated sites on federal lands.
[6] Cost estimates based on Forest Service's regional experience in conducting CERCLA site characterization work at AML sites in California.

have found that the cost to complete this component of the CERCLA process varies greatly depending on the site and the environmental issues needing to be addressed.

- Less complex sites, where the issue is typically a small waste rock/tailings pile with hazardous levels of metals that can be hauled off for disposal or capped in place, can cost from $250,000 to $450,000. While sites with larger volumes of waste rock/tailings can cost much higher. Example, the Juniper Uranium Mine on the Stanislaus National Forest, is projected to cost between $4.5 million to $5 million to construct, implement and maintain the site remedy.

- More complex sites with water quality issues such as acid mine drainage cost significantly more to address. For example, at the Golinsky Mine on the Shasta-Trinity National Forest abating the release of copper into Lake Shasta, will cost 7.0 million dollars to install and operate a passive treatment system for up to 30 years.

A key factor in AML site remediation costs is site accessibility. The Forest Service has remediated several sites like the La Trinidad Mill site on the Tahoe National Forest and the Black Bob Mine on the Los Padres where helicopters had to be utilized to bring out contaminated equipment and material.

The Forest Service annual budget to address contaminated site remediation and AML safety mitigation has ranged from approximately $14 million to $19 million. This funding also funds remediation activities at abandoned landfills and dump sites and at Forest Service administrative sites. As part of the funding, each Forest Service region is allotted $500,000 of “base program” funding to pay for initial site characterization work and “potentially responsible party” searches. To obtain funding beyond this “base program” for site remediation and restoration efforts, each region must submit their highest priority projects and compete nationally for funding. Projects in California are competed against projects from other regions with a national emphasis to fund the “worst first”. Nationally competed projects are evaluated and ranked based on the following factors:

- Human health and safety;
- Environmental factors such as water quality, threatened and endangered species, etc;
- Economic and social factors including partnerships, public interest and overall cost.

AML safety mitigation projects go through a similar, but separate, competition process for funding. Costs to mitigate abandoned mine safety hazards vary and are also affected greatly by a site's accessibility and complexity (type and number of mine features, abandoned equipment, structures, etc.), with typical costs to close a single hazardous mine opening with a bat gate range from $8,000 to $15,000, while hazardous mine opening closures using foam can range from $2,000 to $4,000.

In 2009, additional funding for the reclamation and remediation of abandoned mine sites on National Forest System lands was appropriated through the American Recovery and Reinvestment Act (ARRA) (Public Law # 111-5). ARRA directed the Forest Service to use a portion of the $650 million in funding authorized for Capital Improvement and Maintenance for mitigation of safety, human health and environmental hazards at abandoned mine sites on National Forest System lands. The Forest Service has disbursed $22.704 million of its ARRA funds for 17 abandoned mine land projects in seven states across the country, of which, sites in California have received $11.339 million. The mitigation activities to be undertaken as part of these projects in California include closing hazardous mine openings and vertical shafts; removing or stabilizing abandoned buildings and equipment, removing contaminated mine wastes from waterways, and the construction of treatment systems to address acid mine drainage.

The Forest Service is continually looking at ways to maximize the effectiveness of its AML safety and cleanup programs. These efforts include partnering with other federal and state agencies, such as the Environmental Protection Agency (EPA), Bureau of Land Management, and the California Department of Conservation, to identify priority sites and combine resources to mitigate safety and environmental hazards. Since the 1990s, the Forest Service has partnered with the California Department of Conservation Abandoned Mine Lands Unit to successfully close 193 hazardous mine openings on 12 national forests throughout California. Other partnership efforts include:

- **Rinconada Mercury Mine**: From 2004-2005 the Forest Service partnered with EPA and BLM to conduct a CERCLA response action at the Rinconada Mercury Mine located within the Los Padres National Forest on BLM, Forest Service and private lands. The Rinconada Mercury Mine is a popular recreation spot for local teens and college students. The site was also featured in an August 19, 2007 San Francisco Chronicle article on "The Art of Urban Exploration". Because of the mixed ownership of the site, the Forest Service requested that EPA take the lead on the CERCLA response which resulted in approximately 4,770 tons of contaminated mercury material being sent off-site for disposal. The Forest Service has continued efforts to mitigate the safety hazards posed by the mine features and to date we have closed nine hazardous mine openings.
- **Altoona Mercury Mine**: The abandoned Altoona Mercury Mine is located within the boundaries of the Shasta-Trinity National Forest on both private and Forest Service lands. Studies conducted by USGS in the Trinity River Watershed indicated the Altoona Mercury Mine was one of the primary sources of mercury to Trinity Lake. In October 2005, the California Office of Environmental Health Hazard Assessment issued a fish consumption advisory for Trinity Lake and the East Fork of the Trinity River. Site remediation work was recently completed in 2009. Combined EPA and Forest Service Site costs to date are in excess of $7 million.
- The Forest Service partnered with USGS to conduct mercury studies in several watersheds in California. These included the Trinity River Watershed within the Shasta-Trinity National Forest and the Bear and Yuba River Watersheds within the Tahoe National Forest.
- The Forest Service also partnered with the California Department of Toxic Substance Control (DTSC) on their grant application to the Sierra Nevada Conservancy to conduct assessments of abandoned mines within the north and middle Yuba River Watersheds.

## Addressing Mercury Contamination

It is estimated that thirteen million pounds of mercury were released in to the environment from historic gold mining activities in California[7]. While many of the historic hydraulic mines which

[7] "*Mercury Contamination from Historic Gold Mining in California*", USGS Fact Sheet 2005-3014 Version 1.1 Revised October 2005

utilized much of the mercury during the Gold Rush era are on Forest Service and BLM administered lands, areas impacted by mercury contamination cross many jurisdictional boundaries and federal, state and private lands.

To date the Forest Service has completed remediation work and started investigation work on a variety of AML sites in California with mercury contamination. These include:

- **Gibraltar Mercury Mine, Los Padres National Forest**: Completed CERCLA removal action to address mercury contamination in abandoned mine buildings. CERCLA action involved removal of structures and the creation of an interpretive exhibit by preserving the mill building and equipment.
- **Deertrail Mercury Mine, Los Padres National Forest**: Completed CERCLA removal action to address mercury contamination in abandoned mercury processing equipment. CERCLA action involved removal of contaminated soil and equipment from the site.
- **Sailor Flat Hydraulic Mine, Tahoe National Forest**: Completed CERCLA removal action to address mercury contamination present in the site sluice tunnel. CERCLA action involved the obliteration of the tunnel and encapsulation of the mercury contamination to prevent offsite migration.
- **Rinconada Mercury Mine, Los Padres National Forest**: Joint CERCLA removal action with EPA and BLM to address mercury contamination present throughout the site. CERCLA action involved the off-site disposal of approximately 4,770 tons of mercury contaminated wastes, and the on-site encapsulation of ore to prevent downstream migration.
- **Alpha Diggings Hydraulic Mine, Tahoe National Forest**: Completed CERCLA removal action to prevent off-site migration of mercury contamination present in the waste rock at the site.

Addressing the impacts of mercury contamination from historic mining activities is a complex issue and is different from other AML contamination issues. While mercury is still present in the sluice tunnels and pit lakes at former hydraulic mine sites, much of it has already been released from these sites and is already present in the downstream sediments, river gravels and water bodies. USGS estimates that up to 30 percent of the mercury used in the gold mining operations

was released into the downstream environment[8]. A key factor in addressing and preventing mercury poisoning is preventing elemental mercury from being converted into methylmercury, an organic form of mercury that accumulates and biomagnifies in the food chain. Methylmercury is a potent neurotoxin that impairs the nervous system and is especially detrimental to developing fetuses and young children[9]. While mercury methylation is a complex process and is still being investigated, it has been found to typically occur in the environments and ecosystems (example wetlands) downstream of the actual mining sites where conditions exist for methylation to occur.

Focusing solely on AML sites, while a step in the right direction, will not solve the mercury contamination problems facing California. The Forest Service has observed that while federal and state programs work to address contamination at AML sites, other programs implement projects, such as wetland restoration projects, which are environments where mercury methylation occurs. To effectively address the hazards posed by mercury releases requires the cooperation of multiple federal and state agencies and programs and private partners.

## Impacts from Abandoned Mine Lands a Growing Concern

Over the past decade the Forest Service has observed that impacts of abandoned mine lands on public safety, health and the environment is an ever growing concern. The risks posed by abandoned mine lands in the state is increasing each year as a result of many factors, including:

- California's population growth and the associated urban development and encroachment on the national forests resulting in more and more people moving from the cities into areas of historic mining activities like the Sierra foothills and Southern California. This creates a great attraction to "explore." In 2002, two brothers died while exploring the Blue Light Mine on the Cleveland National Forest.

[8, 9] "*Mercury Contamination from Historic Gold Mining in California*", USGS Fact Sheet 2005-3014 Version 1.1 Revised October 2005

- Increased public demand for recreation and the increased recreational use of the forests is resulting in greater access to once remote areas of the national forest where historic mining activities occurred. Many remote sites now have evidence of public visitation (vehicle and motorcycle tracks on contaminated mine and mill waste piles, vandalism of abandoned structures, etc.) and some sites are being used for popular recreational activities such as geo-caching. Recently Forest Service staff found that the associated website for one AML site being used for geo caching has photographs showing children and Girl Scout troops down in the site mine adits.
- Off Highway Vehicle (OHV) use on California's national forests is increasing. Many remote sites now have evidence of OHV use (vehicle and motorcycle tracks on tailings piles, vandalism of abandoned structures, etc.). In 2004, a man died on the Six-Rivers National Forest when a 4x4 vehicle he was in fell into a vertical mine shaft.
- Many "urban explorer" internet websites prominently feature abandoned mine lands and sites on federal, state and private lands. These sites routinely show pictures of families inside hazardous mine openings and in structures contaminated with asbestos and heavy metals like mercury.

## Looking to the Future

Multiple federal and state agencies and private entities are implementing programs throughout the state to address the human health and environmental impacts from historic mining operations. While progress has been made in addressing the hazards posed by abandoned mine lands in the state, much more work is needed. Human health and environmental impacts from abandoned mine lands affects federal, state and private lands and cross federal and state jurisdictional boundaries. Continued success of these efforts in California depends on ensuring that cleanup costs are first borne by potentially responsible parties, where possible, and on the partnering of State and Federal Agencies, public interest groups, the mining industry and other interested third parties.

The Forest Service believes that many of the AML reclamation and remediation efforts being implemented by federal and state agencies and private entities could be improved. Many of the

parties use different protocol for investigating, ranking and remediating sites. In order to make progress on mitigating the safety, health and environmental impacts associated with abandoned mine sites, the Forest Service believes a long term commitment and coordinated program is required. While we have not yet discussed this with other parties represented here today, we believe such a long-term commitment would involve:

- Development and implementation of a common site screening and ranking process and common protocol for site investigation, characterization, and remediation. This effort would help state and federal agencies focus efforts and funding on the highest priority environmental and physical hazard projects.
- Establishment and implementation of a process for improving and maintaining data transfer, communication and coordination among federal and state agencies.

Some of the key benefits to the State from these efforts would be:

- Improved public safety and a healthier environment.
- Improved coordination among federal and state agencies on AML restoration and remediation projects.
- Improvement of interagency communication and technical exchange on abandoned mine restoration and remediation projects.

The Forest Service stands ready to assist and participate in a more coordinated approach.

Finally, preventing future AML sites is also a crucial goal of any land management agency's AML program. Responsible mining practices, environmentally protective mine closure planning, optimal permitting requirements and financial assurances are all tools that land management agencies are using to ensure mining companies operate under a sustainable business model that follows a mine's life from startup to clean closure.

Mr. Chairman, thank you for the opportunity to talk about the Abandoned Mine Lands and Mercury poisoning in California. I would be happy to answer any questions.