Project Summary

The San Francisco Public Utilities Commission is rebuilding Calaveras Dam, our largest local Bay Area drinking water reservoir. The existing earth fill dam is located near the active Calaveras earthquake fault. We lowered water levels in the reservoir in response to seismic concerns in 2001. The project consists of building a new zoned earth and rock fill dam immediately downstream of the existing dam. The replacement dam will have a structural height of 220-feet and is designed to accommodate a maximum credible earthquake on the Calaveras fault. The dam will have a crest length of 1,210 feet, a base thickness of 1,180 feet, and crest thickness of 80 feet. The total volume of the dam will be approximately 3.5 million cubic yards. The replacement dam will restore the original reservoir capacity of 96,850 acre-feet, or 31 billion gallons of water providing water to the 2.6 million customers in the Bay Area.

About Naturally Occurring Asbestos

Portions of the approximately 10 million cubic yards of material being moved in order to construct the replacement Calaveras Dam are composed of rock formations that contain varying levels of Naturally Occurring Asbestos.

Geotechnical explorations in the area of the Calaveras Dam Replacement Project construction revealed that the Sunol Valley contains rock types, namely Franciscan Complex mélange and serpentinite that are known to contain naturally occurring asbestos and metals. Serpentinite rock (“California Jade”) is the state rock of California and occurs naturally. It is common in the Sierra foothills, the Klamath Mountains, and the Coast Ranges, and found in at least 44 of California’s 58 counties.

Asbestos is the name given by the United States Geological Survey to a group of different fibrous minerals that occur naturally in the environment. Asbestos fibers are microscopic, do not dissolve in water or evaporate, and are resistant to heat, fire, and chemical or biological degradation. Because of these qualities, asbestos has historically been used in many commercial products, including insulation, brake linings, and roofing shingles.

Fibers can be released into the air when disturbed by human activities or by natural erosion. There are two types of asbestos fibers that occur naturally in rock formations: chrysotile and amphibole asbestos. Many scientists believe that amphibole asbestos fibers are more of a health concern than chrysotile. Rock
General Risks from Naturally Occurring Asbestos

Most studies regarding asbestos risk involve occupational settings, where workers are exposed to high levels of purified asbestos in an indoor setting. It is more difficult to identify risks related to exposure to Naturally Occurring Asbestos (NOA) that is intermittent, uncontrolled, and outdoors. However, due to the prevalence of asbestos occurring naturally in the California environment, there is the possibility that some undetermined but low level risk is always present from background concentrations of airborne naturally occurring asbestos. In addition to variation in individual susceptibilities found with all such exposures, there are several factors that contribute to a person’s risk of contracting an asbestos-related disease, including: 1) higher levels of asbestos fibers in the air, 2) the mineral type of fibers and the size of the fibers, 3) higher frequency of exposure, 4) longer duration of exposure, and 5) the time that elapses after the start of exposure. Asbestos fibers may remain in the lungs for a lifetime without causing health-related issues, but in some cases, asbestos fibers can damage the lungs and cause asbestos-related disease, such as asbestosis, mesothelioma, or lung cancer. These diseases do not commonly appear for 20 or more years after the start of exposure. There also are other health considerations which exacerbate the risks associated with asbestos exposure, such as smoking.

What are the health risks from the Calaveras Dam Replacement Project?
Although dust potentially containing asbestos fibers may be generated during the project, the dust mitigation measures and work management practices incorporated into project plans will keep generation of any such dust to a minimum. Moreover, the air quality monitoring program integrated with the dust control measures, will assure that asbestos-containing dust does not leave the site at concentrations sufficient to pose unacceptable risks to workers or the public.

Human disease from asbestos is most often associated with cumulative, long-term inhalation exposure to airborne asbestos and the risk of disease increases with increasing exposure concentration and exposure duration as well as time that elapses since first exposure.

We have established thresholds at perimeter monitoring stations. As long as such thresholds are not exceeded on average over the six years of the project, than individuals in the area surrounding the CDRP who become exposed will experience no more than a 1 in 100,000 added risk for cancer from their exposure. Moreover, due to the assumptions built into these calculations, any actual risks will likely be even lower.

Are people in nearby houses, park districts, or communities at risk?
Federal, State, and local agencies have been grappling with this very question. At this time there is no clear answer. What complicates the issue is that asbestos is everywhere in our communities and in our environment. Serpentine and other asbestos-containing rock formations are located throughout California, including particularly the Bay Area. These formations may also be disturbed by a broad range of activities being conducted throughout the area. It is important to note that naturally occurring asbestos does not pose a health risk until it becomes airborne.

Find additional information about Naturally Occurring Asbestos Here:
U.S. Environmental Protection Agency
http://www.epa.gov/asbestos/pubs/clean.html

California Environmental Protection Agency Air Resources Board
http://www.arb.ca.gov/toxics/asbestos/asbestos.htm

California Geological Survey
http://www.conservation.ca.gov/cgs/minerals/hazardous_minerals/asbestos
Prevention of Asbestos Exposure

The SFPUC has implemented an extensive dust control and monitoring program that is designed to keep dust generation to a minimum while assuring that asbestos-containing dust does not leave the site at levels sufficient to pose unacceptable risks to individuals who may work, recreate, or reside in the vicinity of the site.

Comprehensive Dust Control
An important tool at our disposal is dust control. NOA fibers are a component of dust that is generated from NOA containing areas during construction. Therefore, by carefully controlling dust emissions, we can minimize NOA leaving the site as well. Real time dust monitors on site provide an important tool for construction managers to continuously monitor the efficacy of our dust control measures. The site will be kept wet, particularly in dry weather. Trucks will be covered, their wheels washed, and any use of explosives will be carefully controlled to keep dust emissions to a minimum.

We will also closely monitor air quality around the project site to ensure we are protecting the public and our workers at all times. The SFPUC and a team of air quality experts are working in coordination with regulatory agencies regarding the dust control program, including: San Francisco Planning and Health Departments, State of California Regional Water Quality Control Board, Bay Area Air Quality Management District (BAAQMD), and the California Occupational Safety and Health Administration (Cal/OSHA).

Background Air Monitoring
In order to establish the natural, background air quality in the area prior to construction, the SFPUC collected air quality samples from 14 stations for two and a half years. The results of these background data show that airborne asbestos was detected intermittently at all monitoring stations. Levels ranged from non-detectable to .0164 structures per cubic centimeter. These results indicate that the levels detected are typical of background levels of asbestos found near serpentine rock formations. These levels indicated the low level presence of airborne asbestos fibers prior to any construction activity on the project.

Trigger Levels for Construction Monitoring
We have established a system for monitoring air quality in concentric layers, beginning with samples collected in worker breathing zones and moving outward to samples collected in each construction area, at the perimeter of the project, and at locations throughout the Sunol Valley (ambient stations). The latter two are designed as “sentinel” stations sited to detect any potentially unacceptable concentrations of fugitive NOA from the project.

We have been working with industry experts to establish trigger levels for perimeter stations. Should levels of naturally occurring asbestos detected at these perimeter air monitoring stations exceed these trigger levels, we will modify our construction activities. We will be required to implement enhanced dust control measures, including if necessary, slowing down or stopping construction activities.

The trigger levels are designed to be conservative and consistent with regulatory guidelines. As long as such thresholds are not exceeded on average over the six years of the project, than individuals in the area surrounding the CDRP who become exposed will experience no more than a 1 in 100,000 added risk for cancer from their exposure. Moreover, due to the multiple, conservative assumptions built into these calculations, any actual risks will likely be even lower.
Weather and wind monitoring
We have installed a meteorological monitoring station at the construction site to provide continuous data including wind speed and direction. These data allow the SFPUC to assess local weather conditions, including wind patterns and determine how best to proceed with construction activities in a manner that minimizes potential dust generation.

Air Quality Sampling

Air Quality Sampling
The replacement of Calaveras Dam will require the movement of approximately 10 million cubic yards of rock and earth, a portion of which may contain Naturally Occurring Asbestos (NOA). Construction activities could cause asbestos fibers to become airborne, which could present a health concern. We have put into place an extensive dust control and air monitoring program to ensure that asbestos-containing dust does not leave the site at concentrations sufficient to pose unacceptable risks to workers or the public.

About Sampling
Air quality monitors have been strategically placed in and around the interior, perimeter, and outlying areas around the project site in rings. These locations are designed to detect fugitive fibers at concentrations potentially capable of posing unacceptable risks.

The monitors act like small vacuums that suck in air through a very small filter for several hours (varying from 8 to 24) at a time. The filters are then taken to an offsite independent laboratory where a technician examines the filters with a microscope to count the amount of fibers present in the air quality sample. The results must then be reviewed again for quality control and assurance purposes. Results come back to the project team in 48 hours from the taking of the sample.

Samples are examined using transmission electron microscopy (TEM). Electron microscopes offer a high level of magnification and, unlike light microscopes, allow the analyst to distinguish between asbestos and non-asbestos fibers and even to distinguish between types of asbestos. These detected concentrations are generally reported as asbestos structures per cubic centimeter of air collected (s/cc).

Results of Air Quality Sampling
We post results from our regular air quality testing on a weekly basis on our website at: www.sfwater.org/sunolvalley.
Click on “Air Monitoring Results” on right side bar.

For more information on the Calaveras Dam Replacement Project or the Naturally Occurring Asbestos Air Monitoring Program

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