State Water Resources Control Board

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FILE: YUCCA MTN.

Commissioner Robert A. Laurie
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Dear Commissioner Laurie:

REVIEW OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR THE PROPOSED YUCCA MOUNTAIN RADIOACTIVE WASTE REPOSITORY, NEVADA

We appreciate the opportunity to review the draft EIS for the proposed Yucca Mountain Radioactive Waste Repository in Nevada. We reviewed Chapters 3, 4, 5, 8, 9, and 10 of the draft EIS with regard to a potential impact of the proposed repository on groundwater quality under the site and down-gradient of the site, specifically in the Amargosa and Death Valleys. Due to time constraints our review of the pertinent references was very superficial and may not have included all information regarding hydrogeological conditions. The final EIS should better characterize regional hydrogeology of the area and address water quality monitoring.

Hydrogeologic Conditions

The draft EIS's risk assessment related to groundwater consumption is based on groundwater migration from the proposed Yucca Mountain repository into the Amargosa and Death Valleys. The draft EIS does contain some information on the regional geology of the Yucca Mountain area. However, the draft EIS does not contain a hydrogeologic cross-section, a basic tool for evaluation of potential impact of contaminants on groundwater. It appears that there is enough information about the area to prepare such a cross-section. Therefore, the EIS should be modified to include: a single, regional, hydrogeological cross section showing the piezometric surface along the potential pathway of groundwater flow; geological formations; the relationships among the volcanic, alluvial and carbonate aquifers; and the outflow locations of carbonate aquifer springs down-gradient from the site. The EIS should also include maps showing water level isocontours. Together, these maps and the cross-section would convey a conceptual model of the site hydrogeologic conditions. Without such maps and cross-sections potential environmental impacts cannot be reasonably assessed.

The draft EIS appears to contain contradictions regarding which aquifer is present at the actual repository site. For example on page 3-48, the draft EIS states that the saturated zone at Yucca Mountain has three aquifers: upper volcanic, lower volcanic and lower carbonate aquifer. However, the last two sentences of this paragraph indicate that only two aquifers are present as follow: "The lower volcanic aquifer discussed here corresponds to the middle volcanic aquifer shown in Figure 3-15. The lower volcanic aquifer shown in Figure 3-15 has not been identified in the area of the proposed repository"

The upper volcanic aquifer shown in Figure 3-15 does not occur at the site (Topopah Spring Welded Unit - host rock for repository). However, because the upper volcanic aquifer occurs down-gradient of the site, the EIS should address the potential pathway of contaminated plume across different hydrogeologic units, including aquicludes and faults.

We are concerned that the draft EIS characterization of the carbonate aquifer in the vicinity of the Yucca Mountain is insufficient. It appears that only a single well completed in this aquifer was tested. This is not an adequate method to provide reliable data on groundwater flow direction or aquifer hydraulic conductivity. We suggest that more effort should be concentrated on acquisition of field data. These data could enhance the computer-modeling effort. The models try to predict fate and transport of radionuclides 10,000 years into the future. However, without the actual parameters of the aquifer it is difficult to judge the model's reliability.

The risk assessment indicates that Amargosa and Death Valleys are the points of discharge of volcanic and carbonate aquifers into the alluvial aquifer used as a water source by the local population. However, according to some publications (e.g. USGS OFR 83-542) most of the water recharged into Amargosa Valley alluvial aquifer is from snow melt and rainfall from the surrounding mountains. The EIS should provide support for either of these two cases: that the majority of recharge is from surface recharge or that it is from underflow from the volcanic and/or carbonate aquifers.

Monitoring

The draft EIS does not address monitoring of the unsaturated and saturated zones for a potential migration of radionuclides from the repository. A well-designed, constructed and operated monitoring system is necessary to detect such a migration. The EIS should be modified to describe how groundwater will be monitored, how the monitoring network will be determined, how the unsaturated zone will be monitored and how repository drifts and containers with nuclear waste will be monitored. If such monitoring systems are to be installed, the EIS should describe monitoring device(s) that will be used.

Hot Thermal Load vs. Low Thermal Load

From our review, it appears that the "hot thermal load alternative" would be more protective for the groundwater under the proposed repository than the proposed "low thermal load alternative", as follows. Thermal changes of the surrounding rocks will be probably minimal and limited to the nearest zone around the repository. Benefits from keeping water away from the radioactive materials would greatly exceed any potential benefits from keeping rocks cooler. It would also retard any potential penetration of water into the repository. In contrast, the "low thermal load alternative" appears to be more risky and more labor extensive, to cause more environmental

disturbances, and to increase a chance of fault(s) and fractures interception by repository drifts. The alternative should be chosen based on data available from the ongoing thermal drift scale test.

If you have any questions concerning our review, please call Jan Stepek at (916) 227-4363.

Sincerely,

Edward C. Anton, Chief
Division of Clean Water Programs

cc: Ms. Barbara Byron
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