



KERR-McGEE CORPORATION

KERR-McGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125



ENVIRONMENT AND HEALTH MANAGEMENT DIVISION

August 7, 1984

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Steve Asher, Director
Environmental Improvement Division
State of New Mexico
P.O. Box 968
Santa Fe, New Mexico 87504-0968

Re: T. Buhl, et al. "Radon and Radon Progeny Concentrations
in New Mexico's Uranium Mining and Mill District" (Draft)

Dear Mr. Asher:

This letter provides the comments of Kerr-McGee Corporation and the Quivira Mining Company on the above-captioned draft report. We appreciate the opportunity to comment as the report has great significance to the uranium industry in New Mexico. In fact, we believe that special efforts by your office are warranted to assure both that the report is fair and accurate and that its conclusions can withstand close scientific scrutiny. We are pleased to have the opportunity to assist you in this process.

The report describes a program undertaken by the NMEID staff to collect and analyze data concerning the concentrations of radon and radon daughters in the Grants Mineral Belt. Of particular interest to us is the conclusion that the radon concentrations in the air exceed the concentration limits set by New Mexico regulations at several of the monitoring stations in the vicinity of uranium mines in the Ambrosia Lake region. This conclusion is said to be justified by comparison of data for stations in Ambrosia Lake with data elsewhere that is alleged to represent the "background" at Ambrosia Lake -- the radon concentrations that would occur naturally in the absence of uranium mining and milling. Guided by this comparison, the report recommends that "[s]ince uranium mines have been shown to release significant amounts of radon, regulation of mine effluents must be considered." (Draft at 49.)

For reasons described below, we believe the report is fundamentally flawed in its data analyses and contains numerous inaccuracies and erroneous conclusions. This observation is supported not only by our analysis of the report itself, but also by the monitoring of radon concentrations in the Ambrosia Lake Valley and surrounding area that we have undertaken for several years. Our data base includes radon and radon daughter measurements of the following types:

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1. Integrated measurements of radon concentrations over calendar quarters at selected sites by track-etch chips; and
2. Instantaneous measurements of radon daughter equilibrium using a COMRAD, an instrument developed by Kerr-McGee that provides measurement of radon daughter working levels in a sampling area. We currently have six COMRADs in operation in various locations and are now evaluating data taken during 1983.

The data from our environmental monitoring programs are voluminous and far exceed the more limited data on which the draft report is based.

Guided by this extensive data, we believe the following points warrant your particular attention and justify substantial revision of the draft:

1. Radon Background

In order to assess whether the measured concentrations of radon result from mining activities, it is necessary to obtain an accurate estimate of naturally occurring background levels. As the report acknowledges, "underestimating background would cause the incorrect conclusion that mine and mill contributions to total radon levels are greater than they actually are." (Draft at 27.) Nonetheless, the authors of the report seem to have made the very error they were so careful to identify.

The error arises from the fact that the authors chose sites to characterize the background radon concentration that are distant from and dissimilar to the Ambrosia Lake region. (See Draft at 13.) Although the Ambrosia Lake area is the "heart of the Grants Mineral Belt," it is scientifically invalid to assume that the natural radon concentrations at Ambrosia Lake are similar to those found elsewhere in the Belt at locations that are tens of miles away. Radon concentration is a function of many variables. The capacity of any soil to emit radon depends on its radium concentration. The rate of emission is governed by the characteristics of the soil, including moisture content, density, porosity, grain size, and vegetative cover. The concentrations of radon are dependent as well on local topography, the transient effects of atmospheric changes, the micro-meteorology of the area, surface wind flow patterns, surface soil temperatures, and barometric pressure. All of these factors can vary widely over short distances, rendering suspect an estimate of background that is based on measurements at locations that are miles from the area of concern. Nonetheless, these factors were not addressed (and evidently not considered) in determining the radon background.

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The draft itself contains internal evidence that the disregarded factors play a crucial role. Statistically significant differences in radon concentrations were found among even the so-called background stations. (Draft at 26.) It thus should not be surprising that statistically significant differences should also be revealed by comparison with data from some of the Ambrosia Lake stations. In short, the elevated levels of radon that are attributed to mining may well be the result of variations in the naturally occurring radon concentration.

Data collected by Quivira establish that the background level of radon in Ambrosia Lake is much higher than that assumed in the draft. Quivira has established 30 track-etch radon monitoring stations throughout the Ambrosia Lake area to measure the average integrated radon concentration. The results of this program through the second quarter of 1984 (Data for four quarterly sampling periods and a map of the monitoring locations) are attached (See Attachment 1). An estimate of the background concentration in Ambrosia Lake may be made by selecting those track-etch stations that are located more than a mile from a mine vent or a tailings pile. (These stations are listed separately in Attachment 2.) An estimate made in this fashion indicates the Ambrosia Lake background concentration is significantly higher than the 0.5 pCi/l assumed in the draft report. In fact, these recent data show that background concentration is on the order of 2.5 pCi/l. Of course, one obvious consequence of the selection of a more accurate measure of the background level is to diminish the role of the mine vents as a major source of radon and to undermine the report's recommendation that mine effluents be considered for regulation.

2. Lack of Hazard

The draft report contains numerous statements concerning the risk posed by radon concentrations in Ambrosia Lake that merit clarification and revision. First, the report should acknowledge that the population at risk is very small. In fact, there is currently only one individual residing in the area -- the caretaker at the Anderson Trucking Company property. Thus, even if the report were assumed to be accurate in assessing the contribution of uranium mining to the local radon concentrations, the resulting risk of long-term and continuous exposure -- and the need for regulatory concern -- is slight.

Second, and perhaps more serious, the report fails to consider adequately the implications of the fact that radon daughters are the source of health risks, not radon itself. Thus the relevant health and safety concern is not the 3 pCi/l limit, but rather the 0.033 WL limit for radon daughters. To measure these daughter concentrations, Quivira has established several monitoring stations using our COMRAD system. Our early findings, as reported in the submittal to Mr. Guimond of EPA

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(Attachment 3), as well as more recent data, show that equilibrium is on the order of 20 to 30 percent. Thus, radon concentrations may be well in excess of 3 pCi/l above background at Ambrosia Lake without approaching the 0.033 WL standard. In view of this fact, even assuming the validity of the report's assessment of background, it is misleading for the report to imply that a health-based standard is violated at any location at Ambrosia Lake.

3. Failure to Consider Relevant Data

In commenting on a previous draft of the report Quivira submitted extensive data concerning background levels of radon in Ambrosia Lake during a mine shutdown. Radian Corporation analyzed these data and reported that "there is no conclusive evidence that the mining operations increase the radon or radon daughter levels in the area." (Attachment 3). This evaluation by an independent consultant stands in sharp contrast to the conclusions drawn in the draft report. Nonetheless, the current draft makes only passing reference to the data and its evaluation, choosing only to dismiss it as "inconclusive." (Draft at 29.)

The draft states the data were rejected in part because "many of the vents ran for several hours per day and some vents operated for 100 percent of the shutdown." (Draft at 29.) We are not sure of the source of this information, but our operating records show it to be inaccurate. None of the vents were operated 100 percent of the time. Moreover, 43 of 62 vents were never turned on during the shutdown and the other 19 vents operated for only 5 percent of the shutdown period. It is apparent that our data previously submitted have great significance to the subject matter of the report and should not have been so hastily rejected. Indeed, in light of the fact that the report elsewhere acknowledges that "[f]urther radiological monitoring is necessary," (Draft at 50), it is unfortunate that our extensive data were ignored.

In light of the many flaws in the draft report, Kerr-McGee Corporation and Quivira Mining Company urge that the report not be published in its present form. Because of the importance of the subject matter of the report, we believe every effort should be made to assure that a complete, accurate, and scientifically valid study can be released.

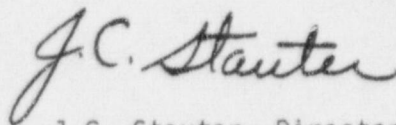
In addition to the points noted above, we believe that many of our earlier comments submitted on a previous draft remain valid but have not as yet been adequately considered. We are therefore enclosing a copy of those comments. (Attachment 4.)

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If NMEID should choose to publish the report in its current form, we request that a statement be included at the outset to indicate that the report's conclusions as to effects of uranium mining on radon concentrations at Ambrosia Lake are not supported by more extensive data collected over several years by the uranium industry.

We very much appreciate the opportunity to comment. Please feel free to contact me if I can provide any further information.

Sincerely,



J.C. Stauter, Director
Nuclear Licensing & Regulation

JCS/cwp

- Attachments:
1. Data for 4 quarters of 30 track-etch monitors and map showing monitoring locations
 2. Track-etch stations used for background.
 3. Submittal to Mr. Guimond at EPA
 4. Copy of previously submitted comments