STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF THE TRIENNIAL REVIEW OF STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS, 20.6.4 NMAC	)))))	WQCC No.08-13 (R)

REBUTTAL STATEMENT OF ARJUN MAKHIJANI

Submitted on Behalf of Amigos Bravos
October 22, 2009

This rebuttal to New Mexico Environment Department's (NMED's) August 28, 2009, filing by Pamela Homer (NMED's Water Quality Standard's Coordinator for the Surface Water Bureau) applies only to the statements regarding radionuclide criteria proposed in New Mexico Administrative Code, Section 20.6.4.114, which would be amended to protect certain specified sections of the Rio Grande Basin. My testimony on behalf of Amigos Bravos dealt with this same section.

First, I would like to note that NMED's filing deals with an earlier Amigos Bravos filing, which was superseded by my testimony in regard to 20.6.4.114, since my testimony was filed at a later time and since I am the expert on this subject for Amigos Bravos.

NMED's testimony has not directly addressed my testimony but rather the earlier filing by Amigos Bravos, which is similar to my testimony in some respects, but differs in others and does not contain the same analysis and recommendations in several respects.

NMED states:

> *The Department opposes these proposals because they are unclear and poorly supported. The justification for lowering the criteria values refers to Colorado's radionuclide criteria, California's tritium guideline, and publications by the Institute for Energy and Environmental Research, and suggests that these sources contradict the Department's proposal. In fact, all of these sources rely on the same Federal Guidance Report 13 methodology that the Department used to derive its proposed criteria. (Colorado, whose last radionuclides hearing was in 1996, relied on an earlier guidance document that has since been superseded by Federal Guidance Report 13.)*[1]

[1] Pamela Homer. *Testimony of Pamela Homer*. In *New Mexico Environment Department's Notice of Intent to Present Technical Testimony*, State of New Mexico Water Quality Control Commission. Triennial Review of 20.6.4 NMAC - Standards For Interstate and Intrastate Surface Waters, as Required by §303(C) of the Federal Clean Water Act. WQCC 08-13 (R). August 28, 2009. Page 70 of Testimony. Italics from original. Hereafter: Homer 2009.

However, I do no state or suggest in my testimony[2] that Colorado's criteria "contradict" NMED's proposal. Nor could I find such a statement in the Amigos Bravos June 1, 2009, filing.

While I do not discuss the California Public Health Goal, that goal also does not "contradict" NMED's proposal in any technical sense. All use EPA Federal Guidance Reports, whether 11 or 13. FGR 13 is the most current and I have used that, as has NMED. My testimony is not poorly supported. Rather it is fully documented. And if the use of FGR 13 is poor support, then of course NMED's own proposal and every other such federal and state official calculation could be said to be poorly supported. This is not the case. NMED has made a very misleading representation of the matter to reject the proposal. NMED should address the testimony that I have filed should it want to argue the specifics of the technical analysis. I recognize that Ms. Homer may not have seen my testimony in preparing her own, but that is the relevant one that NMED should address in regard to 20.6.4.114.

I take this opportunity to reiterate some points in my testimony and rebut some of those in Ms. Homer's filing of August 28, 2009.

The questions do not concern the use of EPA's guidance report. One of the main questions is the level of lifetime risk that should be used in assessing the criteria contaminant levels. I argue, based largely on the Federal government's actions at Rocky Flats, that the risk level should be 10^{-6} rather than the 10^{-5} that NMED has used. NMED agrees that the values for the radionuclides for which it proposes to set criteria levels would be ten times stricter if 10^{-6} were used as the risk level:

> *The Department chose a 10^{-5} cancer risk to be consistent with the risk level used for the human health-organism only criteria and the risk level specified in Section 900.B for the domestic water supply use. The same cancer risk is used in other New Mexico environmental programs. The choice of an acceptable risk level is a policy - not a technical - decision. If a cancer risk of 10^{-6} were used, then the resulting plutonium, americium and tritium criteria would be 0.15, 0.19 and 400 pCi/L, respectively. The cesium and strontium criteria would likewise be ten times more stringent than the Department's proposal.*[3]

NMED presents no argument other than that New Mexico currently uses a risk level that is ten times higher (10^{-5}) than the one I have argued should be used (10^{-6}). Policy inertia is surely not an adequate argument much less a rebuttal in any setting but it should be rejected with special vehemence in the context of the safety of drinking water supply and its protection from a known source of pollutants that pose risks to human health. Specifically, the federal government agreed to limit risks to a 10^{-6} level for Rocky Flats surface water run-off in the context of the clean up of

[2] Arjun Makhijani. *Witness Statement for Arjun Makhijani*, In the Matter of the Triennial Review of Standards for Interstate and Intrastate Surface Waters, 20.6.4 NMAC, State of New Mexico Water Quality Control Commission, WQCC 08-13 (R), August 27, 2009. Running title: Amigos Bravos, Technical Testimony, Arjun Makhijani.

[3] Homer 2009, page 71 of Testimony. Italics from original.

that site even though that surface water is not used for drinking. Why should the people of New Mexico be protected to any lesser degree? We have also argued that when large numbers of people are potentially at risk from the pollution of a drinking water source that the more stringent risk level is appropriate. This is under consideration in Ontario, for instance, for tritium. NMED has completely failed to address the issue of whether New Mexico needs to revisit the risk level in the segments of the Rio Grande under consideration in view of the imminent use of the water by a larger population. We believe that the risk level of 10^{-6} is appropriate for the reasons discussed in my testimony. For the radionuclides for which NMED proposes to tighten criteria levels, the levels should be as specified in Table 2 of my testimony, which is reproduced below for convenience.

Table 2: Criteria contaminant levels for some man-made radionuclides

Radionuclide	**pCi/L**
Americium-241	0.19
Cesium-137	0.64
Plutonium239/240	0.15
Strontium-90	0.35
Tritium	400

Note: Values are rounded to two significant figures, except for tritium, where the value is rounded to one significant figure, following the NMED practice in its table.

NMED is right in noting that the Amigos Bravos list (and also my list) does not include Am-243 in the term "all long-lived alpha emitting radionuclides." I agree that the term "all" in this context is in error and should be deleted. However, this matters little to the substance of the argument in this case. Am-243 can be excluded here, along with some other man-made radionuclides, because the thrust of the testimony is that criteria levels should be set for man-made alpha-emitting radionuclides of importance at LANL. My list includes all the long-lived alpha-emitting TRU radionuclides that are important for LANL. I amend my testimony to drop the term "all" from the following sentence on page 8 of my testimony as follows:

> I therefore propose that a row be added to the table that specifies that the maximum level criterion for ~~all~~ long-lived alpha-emitting transuranic radionuclides would be 0.15 pCi/L.

If NMED wants to include Am-243, I would have no objection.

NMED argues that a common value for the long-lived alpha-emitting TRU radionuclides listed are not all equal and that they are not identical in risk terms:

> *Although these radionuclides behave similarly in the body (they are identified by the International Commission on Radiological Protection as "bone-surface-seeking" radionuclides), they are not identical and do not pose identical health risks. As a result, the morbidity coefficients in*

Federal Guidance Report 13 are different. Accordingly, the Department opposes setting the same criterion for the separate radionuclides.[4]

My recommendation for a single level for the added radionuclides, Np-237, Cm-244, and Pu-238 is based on the fact that their dose conversion factors are quite close to those of plutonium-239/240 – the risks are all within a factor of about 2. A common level would be more convenient and would be in the same spirit as a (very different) common level set for all alpha-emitting radionuclides (other than radon and uranium) in the federal drinking water standard. Plutonium-238 is not identical to Pu-239/240, but within 3 percent of it in terms of its risk factor. If NMED chooses to forgo the convenience of a single combined level for all these radionuclides, I have no objection to the setting of different levels based on a 10^{-6} risk level. In that case, I would suggest a common level for Pu-238, Pu-239, and Pu-240 of 0.15 pCi/L and levels for the others as follows:

Np-237: 0.3 pCi/L
Cm-244: 0.24 pCi/L

Should NMED wish to add Am-243, that level should be set at 0.2 pCi/L. If NMED wants to set a common limit for Am-241 and Am-243 that can be set at 0.19 pCi/L.[5] These levels would provide full consistency at the 10^{-6} risk level. As noted above, we do not believe that it is necessary to include Am-243. As discussed in my testimony, we are taking our cue mainly from the federal government's actions at Rocky Flats and believe that the public in New Mexico deserves the same level of protection from radionuclides associated with LANL in the context where the drinking water use from specific segments of the Rio Grande is set to increase. We are not proposing that the criteria levels apply to all New Mexico drinking water or surface water. Similarly, we are not dealing with all possible LANL radionuclides – just the important man-made ones. This follows the federal Rocky Flats precedent.

I also recommended that NMED set a ratio test for combined limits when more than one radionuclide is present. This approach is a basic element of federal regulation, as for instance, in 10 CFR 20. NMED provides no response to the recommendation perhaps because my testimony had not yet been reviewed at the time of the NMED filing. I want to reiterate my recommendation here that a combined ratio test, specified in Section B of my testimony, be used when more than one radionuclide is present.

Finally, NMED has also not commented on my recommendation that it negotiate an agreement similar to that at Rocky Flats for surface water run-off from LANL so long a LANL is in operation and so long as the site has not been declared fully decommissioned. Perhaps this was because Ms. Homer had not reviewed my testimony at the time of her filing. I take this opportunity to reiterate my recommendation here.

[4] Homer 2009, page 71 of Testimony. Italics from original.
[5] The Am-241 and Am-243 risk coefficients are almost the same – the risk coefficient of Am-243 is about 1 percent lower (FGR 13 lifetime morbidity values).