



MEMO

TO: Greg Macievic, NIOSH; Los Alamos National Laboratory Work Group
FROM: Joe Fitzgerald, SC&A
DATE: May 30, 2012
SUBJECT: Comments Regarding Cerro Grande White Paper (Revision 01, April 4, 2011)

SC&A has reviewed the recent revision to the NIOSH white paper on the Cerro Grande fire (NIOSH 2011) and has the following specific comments. The first, “Representativeness of Fixed Air Sampling Results,” was discussed at last year’s work group meeting without clear resolution. The second, “Treatment of Uncertainties,” stems from an apparent shift by NIOSH from the averaging of Pu and Am results (given uncertainties involved) to reliance on maximum radionuclide-specific monitoring results from the fixed sampling stations onsite and offsite at the Los Alamos National Laboratory (LANL); this shift reflects a change in the way results were presented in respective 2001 and 2010 LANL reports on the subject.

Representativeness of Fixed Air Sampling Results

As discussed at the May 2011 work group meeting, interviewees who were involved in firefighting during the Cerro Grande fire noted that they were not only involved in fire mitigation activities, but also were extensively involved in sifting through burnt underbrush and soils looking for “hotspots,” which would have potentially exposed them to resuspended particulates. It is not likely that the measurements made by stationary air samplers as far away as the “McDonalds” or the “Los Alamos Inn” in town (as indicated by both NIOSH 2011 and Cerro Grande 2010) would have reflected this proximity of exposure. How does NIOSH reconcile use of the offsite measurements (along with TA-54 and TA-5), without adjustment or validation, to represent the maximally exposed firefighter in close proximity during both the peak of the fire emergency and its aftermath for the radionuclides in question? Assuming this question may be difficult to resolve given the fixed location of the air monitoring stations, has NIOSH determined whether bioassays were taken and are available for the firefighters during and immediately following these activities? This possibility was acknowledged by NIOSH at the May 2011 work group meeting (ABRWH 2011); it would serve to resolve this question better than such distant air sampling.

Treatment of Uncertainties

The NIOSH Evaluation Report for SEC Petition 00109 (NIOSH 2009) references a LANL report from 2001 (Cerro Grande 2001) as the basis of bounding dose calculations for a “hypothetical maximally exposed firemen or volunteer who was working actively in the Los Alamos area throughout the worst of the burn duration.” This referenced LANL report notes:

Because of the short sampling times during the fire, the uncertainties associated with the plutonium and americium analyses were very large compared to the calculated concentrations. If the uncertainty of a number is larger than the number itself, the number is generally not considered quantitative...because of

the very large uncertainty of any single concentration value for these radionuclides, averages were used because they are better estimates (with less uncertainty) of concentrations that may have occurred. (Cerro Grande 2001)

In a footnote to their dose estimates, the report authors further noted that:

Because there was so much more airborne ²¹⁰Po and ²¹⁰Pb than plutonium or americium, the uncertainties associated with the Pb and Po were a much smaller fraction of the reported concentration than they were for plutonium and americium. In other words, the polonium and lead data were very significant whereas most of the plutonium and americium values were on the same order of or smaller than their associated uncertainty, and are not considered significant statistically. (Cerro Grande 2001)

In the most recent LANL report on the fire (Cerro Grande 2010) that is cited in the recently received April 4, 2011, NIOSH white paper, *Revision to Cerro Grande White Paper*, Rev. 01 (NIOSH 2011), more comprehensive and updated air measurement data are provided. Rather than averaged air concentrations, this LANL paper provides both short-term and biweekly radionuclide-specific measurements for the time period in question. However, unlike the earlier LANL report, other than an acknowledgment in that report about short sampling times for some of the filters, no mention is made of the implications of monitoring uncertainties on data validity:

The first samples that may have been impacted by fire emissions were biweekly particulate matter filters collected on May 9 or May 10. By this time, accumulation of smoke particles on some of the filters was becoming a problem because they were clogging the filters and reducing the sample airflow rate. Therefore, filters were replaced as often as possible in subsequent days (May 11 through May 14) to decrease the potential for air sampling rates dropping to zero. (Cerro Grande 2010)

While this report does provide 2 and 3 sigma uncertainty values to reduce inclusion of false positives and negatives, it is not clear how NIOSH in its April 4, 2011, white paper is addressing such uncertainties as it likewise moves away from averaging the reported values [as provided in the earlier June 15, 2010, NIOSH white paper, Rev. 0 (NIOSH 2010)] to use of actual Pu-238, Pu-239, and Am-241 air measurements based on the LANL report. This question is of particular relevance to the work group proceedings, as the petitioner has raised concerns regarding the “clogging of air filters” and air monitoring stations being shut down during the fire (ABRWH 2010; ABRWH 2011). SC&A agrees that in either case (averaging or maximum values), the resulting dose estimates will be low; however, whether or not the dose is “below the level regarded as significant” as indicated on page 3 of the revised white paper is questionable. Can NIOSH clarify what level is regarded as “significant,” and by whom and on what basis?

References

ABRWH 2010. Advisory Board on Radiation and Worker Health, Los Alamos Work Group meeting, May 4, 2010, transcripts, pages 313–314.

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Cerro Grande 2001. “Updated Calculation of the Inhalation Dose from the Cerro Grande Fire Based on Final Air Data,” Los Alamos National Laboratory report LA-UR-01-1132. Authors D.H. Kraig, Thomas E. Buhl, Craig F. Eberhart, and Ernie S. Gladney. February 2001. SRDB Ref ID: 46247.

Cerro Grand 2010. “Measurements of Air Contaminants during the Cerro Grande Fire at Los Alamos National Laboratory,” LA-14250. Author: Craig Eberhart, Los Alamos National Laboratory. August 2010.

NIOSH 2009. *SEC Petition Evaluation Report, Petition SEC-00109, Los Alamos National Laboratory (LANL)*, National Institute for Occupational Safety and Health. January 22, 2009.

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