1.9.4.1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

Reply To
Attn Of: OEA-095

May 10, 2004

MEMORANDUM

TO: Dr. D. Wayne Berman, Aeolus, Inc.

FROM: Julie Wroble, Office of Environmental Assessment, Risk Evaluation Unit

CC: Dan Heister, Office of Environmental Cleanup, Oregon Operations Office
Dr. Pat Cirone, Unit Manager, Office of Environmental Assessment, Risk Evaluation Unit
Dr. Aparna Koppikar, National Center for Environmental Assessment
Richard Troast, Office of Solid Waste and Emergency Response

SUBJECT: Comments on the Draft Soil Sampling Results and Preliminary Risk Assessment for the North Ridge Estates Site, Klamath Falls, Oregon (March 23, 2004)

Overview

Attached please find my initial comments on the above-referenced document. In general, this document is much improved over the previous version (November 21, 2003). Dr. Berman has addressed most of my comments and included additional details on the emissions and exposure modeling performed, the values selected and rationale for their use, and site-specific information that was considered. In addition, the approaches described for modifying the AP-42 dust models to be applicable to this site were clarified, but I would like additional assistance in reviewing the dust models.

Another issue that should be addressed is the discrepancy between EPA's "acceptable" risk range and Oregon DEQ's soil cleanup rules, which state that individual carcinogens in soil must be cleaned up to a level posing no greater than a 1 x 10-6 excess lifetime cancer risk (OAR 340-122-045).

Please contact me at 206/553-1079 if you have specific questions on these comments.

Specific Comments

Page 1, 2nd bullet: What is the basis for the statement: "Even if the remaining ACM were to completely degrade, the resulting asbestos concentrations in the soils would not be adequate to pose an unacceptable risk." I don't know that sufficient sampling and testing of soils has been completed to support this statement.

Page 1, 4th bullet: What constitutes occasional handling of pieces of ACM? Should this statement be qualified to discount handling of weathered material?

Page 1, 6th and 7th bullets; also page 4, 3rd paragraph; : Including the caveat about "required dust suppression activities" may not be acceptable to residents because of their prior experience with the developer, who did not comply with an EPA order for proper disposal of ACM. Further, such institutional controls cannot be considered as part of the risk assessment; however, a recommendation for dust suppression can and should be made.

USEPA SF
1196197

Page 2, first complete sentence: Add the word "visible" prior to "separated ACM."

Page 2, 2nd full paragraph: The last sentence in this paragraph implies that amphibole asbestos has been evaluated quantitatively in the risk assessment; however a less formal, qualitative assessment was performed. Some additional quantitative assessment of amphibole asbestos should be completed because in some areas of the site, amosite is present and has been detected in multiple media (e.g., air and soil).

Page 2, last complete sentence: Although the cut off appears to be around 1% ACM mass in soil, there is a sample where ACM comprised about 0.2% and asbestos was found in soil. Are there enough data to make this conclusion about the relative mass fraction of ACM? For areas where removal of ACM has already occurred from the soil surface, additional cleanup of the remaining soils may be warranted because the ACM may have released fibers in sufficient quantities to be releaseable from soils. How this is achieved requires careful consideration and implementation.

Page 3, bullet list: ***Consider adding "riding ATVs/4-wheelers" to list of modeled exposures. This activity has been observed on site in areas where ACM has been present. EPA is considering doing task-based monitoring of this scenario this summer.***

Page 4, second paragraph: If amphiboles are identified in any samples that EPA is analyzing, then additional evaluation of amphibole asbestos at NRE should be performed. EPA would like to see the raw data for all samples, particularly the sample in which amosite was detected.

Page 5, first bullet: ***Perhaps a physical handling/abrasion of ACM scenario could be performed in the glove box to measure release of fibers from such an activity. I expect that our glove box and elutriator results may help truth some of the modeling that Dr. Berman has completed.***

Page 5, remaining bullets: These are excellent recommendations for additional characterization and remediation at the site. However, note that asbestos has resurfaced at several locations across the site. Therefore, a more permanent remedy may be needed at such locations to prevent future resurfacing of ACM.

Page 11, first paragraph: Please use more explicit definitions of the various fibers listed in the table headings. I assume that no fibers shorter than 5 microns in length are represented in the table, but that should be explicitly stated. The second paragraph on this page alludes to that, but the table includes a total structures column which is unclear. EPA would like one copy of the raw data sheets.

Page 12, 3rd paragraph: Dan, can you provide me with more information about the nature of hot spot 6? See figure A-2.

Pages 13 - 17: Excellent discussion and description of the statistical evaluation performed for soil samples.

Page 18, Section 4.1.4, 4th paragraph: Given the conclusion that asbestos concentration associated with hot spots are elevated, how will additional hot spots be identified? Where removal has already occurred, what additional remediation of soil in the hot spot vicinity is warranted? What can residents do if new hot spots are identified or emerge over time?

Page 20, 3rd paragraph: I'm not sure I follow the logic in this paragraph. For the ACM component of each sample, was the ACM completely broken down so that all fibers were released? I know that the ACM was cut into small pieces, but would this liberate all the asbestos? Some may remain in some of the larger chunks remaining in the sample. So, in fact, the potential release of fibers in the future could be greater.

This uncertainty should be described.

Page 20, 4th paragraph: This paragraph describes the data presented in Figure 1. In this figure, has the outlier from HS-7 been omitted? It appears as if an outlier remains in the data set. If HS-7 has been omitted, what is the additional point that appears to be an outlier?

Page 21: ***Sarcenski sample - Dan, were additional weathered areas observed in April 2004?***

Page 22, top of page: As stated in earlier comments, EPA would be unlikely to accept a Monte Carlo type of analysis of risk for this site.

Page 22, Section 5.1, 2nd paragraph: The emission models referenced were published for different applications. Stating that they are published does not add credibility for their use in this particular application.

Page 23, first complete sentence: The emission models employed may be the best available models at this time for this application; however, there may still be a high degree of uncertainty associated with modeling emissions for walking, running, and biking. I question whether a vehicle emission model is applicable to a person or bike rider.

Page 23, section 5.2, last paragraph: Referencing experience at other hazardous waste sites within the context of this document is irrelevant. Unless specific methods from other sites are referenced, then previous experience should not be referenced generically.

Page 25, 2nd full paragraph and Table 11: Please add the EPA 2002 reference to the list of reference. From context, I assume the reference should be EPA's Soil Screening Guidance, Dec. 2002, OSWER 9355.4-24. Also, I'm curious what modifications from EPA 2002 are employed since the text states that the only modification to the original AP-42 equation is the insertion of the Ra/d parameter.

Pages 25 - 29: The emission models described on these pages could not be exactly reproduced given the references cited and the notes provided on the Tables. More explicit references should be given and an appendix added to show how the original models were adapted for use at this particular site.

Page 27: This page presents a justification for use of the Copeland emission model to estimate emissions from walking, running, and bicycling. I question whether this model is valid at the much lower weights for these scenarios as compared with vehicles traveling on unpaved roads. Also, for the running and walking scenarios, these movements are not as fluid as wheels moving on a road so is there the possibility that a greater amount of dust would be kicked up from these activities as compared with vehicles?

Page 32, 2nd bullet: The moisture content of 0.2% was assumed for this site based on a value recommended by EPA's Soil Screening Guidance. A moisture content of 2% was assumed when subsurface soils were assumed to be disturbed. A geologist should be consulted to verify these values. Alternatively, moisture content could be measured during field activities conducted in 2004.

Page 33, first bullet: Provide a reference to the specific page from the Soil Screening Guidance that was used to estimate 90 wet days/year at the site. ***Is there a local meteorological station that could provide a more accurate value?***

Page 33, 4th bullet: A running pace of 8 mph for 2 hours seems excessive. This would result in running 16 miles per day, which far exceeds even a marathon training schedule. Given that the risks for this pathway are slightly elevated, consider modifying the running scenario to a more realistic scenario. The rates given for biking and walking appear to be more reasonable. ***Riding 4-wheelers was not specifically evaluated and residents have been known to ride off-road vehicles around the site. Should this pathway be***

added?

Page 33, last bullet: The materials handling scenario may not represent the types of exposures that may be more likely to occur at the site. The residents consultant specifically asked about a utility worker scenario which would involve a smaller area. also, if new homes were to be constructed on the remaining lots, I would expect a smaller area of excavation but to greater depth, to install the home foundation. These comments are for consideration only. The modeled scenario should be protective of these exposures.

Page 34, 2nd bullet: The Oregon DEQ and Region 10 default body weight for adults is 70 kg. Although the difference in value is minimal, please update calculations to include a 70 kg body weight for adults.

Page 34, 5th bullet: Although the assumption of 50% on bare ground may be conservative, I'm curious whether the shoulders of roads near the site are dusty and if so whether asbestos may be present along roads. Dan, do you remember the condition of roads/shoulders? This comment may have minimal impact on the assessment.

Page 35, first bullet: Provide additional information on the reference for the dispersion factor (Appendix D, from EPA 2002).

Page 35, 3rd bullet: I think the length of the haul road would be shorter as most of the undeveloped road sites are adjacent to or near existing paved roads.

Page 35: For the scenario described on this page, what is the construction scenario being modeled? Construction of new homes? Remediation of the site? Please provide additional information to place this scenario into context for the risk assessment.

Page 36, Section 5.3.3, second equation: The term 5 m should be 3 m for wcp as given in Table 13, unless there is a discrepancy between the text and Table 13. Please resolve.

Page 37, 2nd equation: Please include a description of the assumptions for hours in a lifetime. Was a lifetime assumed to be 70 years, which is the standard EPA default value, or some other length of time?

Page 37, last paragraph: The EPA 2001 reference cited in the last paragraph does not need an "a" unless there's an additional EPA 2001 reference which was unintentionally excluded from the list of references.

Page 38, first full paragraph: I disagree with the assumption that children younger than 3 are unlikely to have regular access to ACM. In fact, ACM is scattered across most of the residential lots at the NRE site and as such, even toddlers could access this material.

page 38, equation: Please provide units for the numbers provided in the equation. Also, what is the source of the value 0.76? This value should have been the instantaneous dust concentration for walking, which is 1.3E+00 mg/m3 in Table 14.

Page 40, 4th paragraph: EPA would argue that in fact, hot spot areas may be present throughout undeveloped portions of the site. Because the work that EPA conducted during 2003 was part of an Emergency Response, efforts were primarily focused on areas adjacent to occupied residences. Given the findings at some of these locations, we anticipate that additional burial piles could be found in other areas of the site. As a result, for construction scenarios, perhaps data from hot spot samples should be evaluated. Additional information collected from undeveloped properties during 2004 may be used to assess this scenario.

Page 41, Section 5.4.1, 2nd paragraph: EPA notes that in most risk assessments, the slope factor

indicates the likelihood of contracting cancer, not *death* from cancer. This appears to be unique to the proposed asbestos unit risk factor. Also, in this paragraph, the analytical method should be corrected to "ISO Method 10312."

Page 42: In the equation for Rpop given in the middle of this page, what do the factors 0.786 and 0.214 represent?

Page 43, 3rd paragraph: this paragraph includes an excellent description of the limitations of the proposed URF and the need for analytical methods that can discriminate between "protocol" and other structures.

Page 44, Section 5.5.1, 2nd paragraph: Although surface removal of ACM occurred over much of the site in 2003, remediation did not occur in all areas. Undeveloped properties were not investigated or assessed to any real extent. Further, ACM has reemerged in 2004, demonstrating that surficial removal is not adequate to control long-term exposure to ACM. Apparently, a new layer of ACM may surface annual in some areas. Assumptions about the absence of ACM on the surface should be qualified as large amounts of ACM may remain beneath the surface and rise up over time. Further, risks associated with walking, running, bicycling and rototilling should be recalculated using soils containing ACM to more accurately assess potential risks. I did this quickly, and in most cases, based on the maximum composite concentration of asbestos and ACM, risks exceeded 1E-04 for both protocol and 7402 structures.

Page 44, Section 5.5.1, final paragraph: If risks are 20 times greater than those estimated in Table 19, then many scenarios would in fact exceed both the Oregon DEQ and EPA acceptable risk levels. Given the previous comment about ongoing and visible ACM migration to the surface, then the likelihood of activities occurring on areas containing ACM may exceed EPA's risk range.

Page 45, first complete sentence on page: Considering changing this statement given the recalculation of risks using soils with ACM.

Page 45, first full paragraph: Although people that currently reside at the site are educated about the ACM that may be present on their properties, a baseline risk assessment should not assume that people would avoid these areas. Also, as time passes, new families may move to the area and be less informed about potential risks. Assuming that people excavate in hot spots is not unreasonable, given that some excavations in such areas have already occurred at the site (e.g., excavation into a hillside to put in a deck resulted in exposure of large amounts of ACM).

Page 45, last paragraph: Comparison of EPA's sample results to Berman's should be interesting. First, if additional amphiboles are identified in EPA's samples, then a more careful, quantitative analysis of amphibole asbestos may be warranted. Second, EPA's glove box results may be useful to "truth" some of the emissions modeling presented in this report. Third, comparison of our elutriator results (for soils collected around residences) to the current report may indicate variability in concentrations and fiber releases across the site. Also, when the site was surveyed in April 2004, steam pipe wrap was identified at several properties. Thus, exposures to amphibole may be more likely than indicated in the current report.

Page 46, first paragraph: Consider modifying statements about percent overall exposures to amphibole in light of material observed on site in 2004. Additional data collected can be used to update the assessment.

Page 46, Section 5.5.2, 2nd paragraph: Assuming that workers will perform dust control activities should not be a consideration in a baseline human health risk assessment. Rather, the need for dust control may be an institutional control placed on the site if future development occurs. A means of ensuring that required dust control techniques are implemented is necessary.

Page 49, first paragraph: Performing any type of quantitative estimate of uncertainty is inappropriate at

this time, especially considering the large uncertainties associated with the emissions modeling and also given the comments on the current report.

Page 49, 3rd paragraph and page 50, 7th bullet: ***EPA may consider abrading ACM in a glove box and measuring fiber releases from this activity....***

Page 49, Section 5.7: The additional data evaluated by EPA using both the glove box and the elutriator may be useful for understanding the relationship between fiber releases from soil and observed ACM.

Page 50, 5th bullet: See previous comments about dust suppression activities. Risks associated with construction activities should not be tempered by assumptions regarding dust control activities. It is not routine to consider institutional controls in a baseline risk assessment.

Page 51, 2nd bullet: Additional investigation of the overall site should be completed to ascertain whether more than 9 additional hot spots require consideration. As mentioned earlier, EPA did not focus on undeveloped properties. Also, section 2 specifically mentions 7 hot spots - where are the two additional hot spots described in this bullet?

Table 3: The column headers in this table have typos - "strictires" should be "structures."

Table 9: The speed of the rototiller seems a bit fast, given that 4 mph is a brisk walking pace. Most people using a rototiller are walking slowly and may actually stop when tilling becomes difficult. To determine the time required to till an acre, what is the source value in the denominator?

Table 11: EPA 1989 is not provided in the references. What is the source of the model used in this table?

Table 13: Several discrepancies were noted in this table as compared with the text and with values derived from formulae presented in prior tables. To obtain the results for emissions provided in Table 14, the following additions/changes need to be made in Table 13:

- A particle size multiplier of 0.36 (or 0.35) should be added for the walking, running, and biking scenarios.
- The moisture content for "Transport" was listed as 2; however, 0.2 was used in calculating the emission rate.
- The wind velocity for Child-play/gardening and Handling ACM should be 3 m/s (not 1.5 m/s).
- The fraction of time on bare ground for walking, running and bicycling should be 0.5.
- As an explanation for No. of vehicle wheels, include a reference to Appendix C in the comment. Why is the No. of vehicle wheels for a bicycle given as 0.19, when Appendix C indicates 0.17 for an off-road bike?
- For silt content, include a reference to Appendix D.

Dr. Berman and I have discussed these issues; however, for the benefit of our partners and to document the discrepancy, I have included the comment.

Appendix B: Please make the following correction...4.7/(1 + 4.7) = 82%. Also, please provide the section in Berman and Crump (2001) which addresses how shorter structures are accounted for in epidemiology studies. In the final report, will a copy of the raw data sheets from TEM analyses be provided to EPA?

Table C-1: A child old enough to ride a bicycle is likely to weigh more than 30 lbs. The 50th percentile weight for a 5-year old (approximate age for kids riding two-wheeled bikes) is approximately 40 lbs for boys and girls (National Center for Health Statistics, 2000 Growth Chart, www.cdc.gov). Given that the bicycling scenario is assumed to occur for 2 hours per day, every day, then an older child may be

appropriate to evaluate for this scenario. Also, how do the values presented in Table C-1 and C-2 relate to the values used in Table 13 to model dust generation from bicycling. Footnote d contains a typo in the word "walking." In footnote g, the human foot dimensions seem rather long and thin to me, for an average foot.

Appendix D: Table 13 indicates that 35% was assumed for silt content based on the upper end of the values measured on site. Was a statistical analysis performed for measured values? If a 95th percentile was performed then the value likely would be higher than 35%.

Appendix E, page 87, 2nd to last paragraph: The mixing height of 1.75m may be appropriate for adults, but a relatively high number of children reside on site, and in many cases they are quite young. Especially since concentrations tend to be much higher closer to the ground, an additional scenario should be considered for children using a lower mixing height. In the subsequent section on gardening and children playing, additional comment about the conservatism associated with a mixing height of 0.5m for young children should be included.