Response to Environmental Protection RAI No. 3; NRC Request for Additional Information in Support of License Renewal Application for AREVA NP, Inc.; July 31, 2008

- In the Supplement to Applicant's Environmental Report, Chapter 3.0 "Analysis of Environmental Effects", Table 11 reports fluoride air emission samples from 2000 through 2005. Samples collected in 2004 and 2005 show an order of magnitude increase in the fluoride emission rate which approaches the 0.5 ug/m3 emission limit.
 - Please provide an explanation for the increase in fluoride emissions in 2004 2005. Also provide recent data (2006 – 2008) so the NRC can determine if the increasing trend continues.
 - ii) Based on a recent conversation, AREVA NP indicated that the emission data may need correction. Please explain the method used to re-analyze ambient air fluoride samples and include in this explanation the approach used to adjust prior year data. Based on the low concentration levels, how did AREVA NP identify that acetate caused the ion interference? By what process will AREVA NP apply to correct future ion chromatographic readings?
 - iii) Discuss what procedures AREVA will use to ensure that the HF concentration in the forage will remain below the regulatory limits during a period of 40 years, including the steps implemented if an increasing trend of this chemical is identified.

Response:

i) In April 2004 AREVA NP switched from the ion specific electrode (ISE) to ion chromatography (IC) as its analytical method for analysis of its fluoride in ambient air samples. These monthly integrated samples are collected at two fixed environmental monitoring locations as a condition of AREVA's current NRC license. Continuation of monitoring at these two locations is proposed in AREVA's current license renewal application (October 2006); locations of the stations are shown in Figure 9.1 of that application.

The IC method is newer technology and offers advantages relative to precision, efficiency, and operability but was also recognized to be subject to certain analytical blank/analyte interference issues not present with the ISE methodology. The primary interference initially recognized was that of acetate. Initial IC column information received from the vendor revealed an acetate peak immediately adjacent to the fluoride peak. This same peak was noted in AREVA's field samples. The verification of the interference as acetate was confirmed by purchasing and running acetate standards in the laboratory. Initial efforts to quantify the acetate interference indicated it to be significant relative to the fluoride contribution. This positive interference, along with a blank interference more significant than that encountered with the ISE method, artificially increased the ambient fluoride data. These interference issues were being accepted because they were both in the conservative direction (i.e., increasing reported fluoride levels) and the

reported ambient fluoride levels remained below applicable long term (growing season) ambient air limits. The unintended consequence of this approach was that the Table 11 data, lacking any explanation of the change in analytical methods, created the false impression of a real step change in ambient fluoride levels, which could then be taken as evidence of increased fluoride emissions from AREVA's facility.

ii) Although historic ambient fluoride samples cannot be re-analyzed, retrospective correction of past fluoride data to remove at least a major portion of the blank and acetate interference can be accomplished by reviewing the archived IC chromatograms and associated analytical data documenting the historic analyses. This work conducted by an analytical chemist involves both analytical blank subtraction as well as manual chromatogram peak adjustments to minimize acetate interference. This manual peak adjustment can only be applied to the extent that the original chromatogram resolved the separate fluoride and acetate contributions.

AREVA previously (July 22) reported to the NRC the results of applying these corrections to two quarters of ambient fluoride data previously reported to the NRC via Table 11 of the Environmental Report. As committed to the NRC, the correction process (blank subtraction and peak adjustment to minimize fluoride interference) has now been applied to 2006, 2007, and 2008 ambient fluoride data collected subsequent to the samples reported in Table 11. That data, along with the two quarters previously corrected and reported, is provided as Attachment 1.

AREVA has contacted its IC vendor to investigate potential changes to the IC methodology (column selection, eluent selection, etc.) to optimize resolution of the fluoride and acetate peaks. New column information received in that regard has identified a second potential interference with fluoride detection using AREVA's current methodology, namely glycolate. This interference appears to be significant relative to the fluoride contribution. To confirm this the laboratory has procured a glycolate standard. Using a modified eluent recommended by the vendor for glycolate resolution, analysis of AREVA's recently collected July 2008 ambient fluoride contribution. This interference would not be more than twice the fluoride contribution. This interference would not be recognized by AREVA's current IC analyses and is not accounted for in the corrected fluoride data provided in Attachment 1 likely remains highly conservative relative to actual airborne fluoride levels.

To address these interference issues, during an interim period of not less than three months, AREVA will analyze its ambient fluoride samples in parallel using both the ISE and IC methodologies. AREVA's preference is to retain the IC methodology and believes this will be a viable option via utilization of a new column and modified eluent that will adequately resolve fluoride, acetate, and glycolate contributions. If this is not the case, AREVA will revert to full reliance on the ISE methodology.

iii) Fluoride levels in vegetation are measured at two designated sampling stations under AREVA's current NRC license. The renewal application

proposes continuation of this surveillance effort. CY 2000-2005 data from these stations were reported in Table 11 of the Environmental Report. Data collected since 2005 (2006-2008 to date) is also provided in Attachment 1.

The data are highly variable but more importantly do not indicate fluoride levels in forage threatening the average growing season (now April-September) limit. Furthermore, there is no consistent trend for the more predominantly downwind station (Station 6) to show levels in excess of Station 5. The fluoride levels in forage are in all likelihood not attributable to AREVA emissions. Relative to the plant's airborne fluoride emissions, offgases from all of the dry conversion reactors and calciners are passed through consecutive banks of condensers for hydrogen fluoride removal. Gases exiting the final condensers are then passed through liquid (caustic) scrubbers for the removal of residual HF. Actual fluoride emissions from the dry conversion process stack are very low; no relaxation of emission controls is anticipated.

Additional Information

- NRC had requested that AREVA revisit the 0.26 µg/m³F result reported as the ambient air level at Station No. 3 over the first quarter of 2003. This result was out of line with fluoride ambient levels typically reported by the ISE method (≤0.10 µg/m³F). The 0.26 µg/m³ entry is in error; both the laboratory records and the environmental engineer's desk records show the correct entry to be 0.05 µg/m³F. AREVA apologizes for this error.
- 2. There is no strong evidence to indicate that the ambient air fluoride levels reported for Stations 3 and 4 are attributable to AREVA plant emissions, whether analyzed by either the ISE or IC methodology. As discussed under iii) above, HF emissions from AREVA's dry conversion process stack (the process handling all of AREVA's UF₆ conversion effluents) are well controlled and very low. Although Station 3 is more predominantly downwind from the AREVA plant as opposed to Station 4, the averages of the last 32 months of ambient fluoride data for the two stations are essentially identical (0.168 μ g/m³ for the predominantly downwind Station 3 and 0.178 μ g/m³ for Station 4).

Attachment 1

Environmental Sampling Data

Fluoride in Ambient Air (corrected results from blank subtraction and peak adjustment to minimize acetate interference; no correction for positive glycolate interference).

Fluoride in Forage

| Year | Qtr. | Ambient Air | Ambient Air | Forage ¹ | Forage ¹ |
|-------|------|------------------|-------------|---------------------|---------------------|
| | | Station #3 | Station #4 | Station #5 | Station #6 |
| | | F, μg/m³ | F, μg/m³ | F-ppm | F-ppm |
| 2004 | 3 | 0.12 | 0.08 | | |
| 2005 | 3 | 0.13 | 0.10 | | |
| 2006 | 1 | 0.03 | 0.06 | | |
| 2006 | 2 | 0.07 | 0.15 | | |
| 2006 | 3 | 0.26 | 0.20 | 9.5 | 8.3 |
| 2006 | 4 | 0.36 | 0.17 | | |
| 2007 | 1 | 0.05 | 0.05 | | |
| 2007 | 2 | 0.12 | 0.21 | 1.6 | 1.6 |
| 2007 | 3 | 0.24 | 0.40 | 1.9 | 1.6 |
| 2007 | 4 | 0.24 | 0.06 | | |
| 2008 | 1 | 0.03 | 0.06 | 12.2 | 8.4 |
| 2008 | 2 | 0.23 | 0.33 | | |
| Limit | | 0.5 ² | 0.5 | 40 ³ | 40 |

¹ Monthly grab sample during growing season only (April – September).
² WAC 173-481-110. Average for entire growing season.
³ WAC 173-303-100. Average for entire growing season.