

000 1 000

JAN 8 1993

Ohio Department of Health  
Bureau of Radiological Health  
ATTN: Mr. Robert Owen  
246 N. High Street  
Post Office Box 118  
Columbus, OH 43216-0118

Gentlemen:

This letter is in response to your October 1, 1992 Draft 1991 Annual Environmental Monitoring Report submitted to Region III by the Ohio Radiological Health Program.

As discussed with you, and separately by Darrel Wiedeman and Ms. Matthews, our review of the referenced report has identified several deficiencies regarding obligations referred to in your NRC contract, NRC-30-83-646. There are also several deviations from what would be accepted as good laboratory practices. The specific deficiencies and deviations are outlined in the enclosure with this letter. In general, the contractual deficiencies pertain to:

- 1) contractual LLD requirements not being met for the radio-iodine analysis in milk samples;
- 2) analyses required by the cooperative agreement have not been completed as of October 1992;
- 3) there was no notification given to the NRC Region III office concerning unusual concentrations of radioactivity detected in environmental samples; and
- 4) the annual report was not submitted within the required timeframe.

Based upon these deficiencies we will release the funds for the third quarter of 1992; however, we will defer payment of the vouchers submitted for the fourth quarter of 1992 and the first quarter of 1993 in the amount of \$18,300.00. We request that you review each of the identified deficiencies and deviations, and respond to this office within 60 days of receipt of this letter informing us of what actions you have taken or will take to preclude further deficiencies. We will evaluate your response at that time and reconsider payment.

14C059

9301140282 930108  
PDR STPRG ESQOH  
PDR

1  
1007

JAN 8 1993

We will gladly discuss any questions concerning the matters addressed in this letter.

Sincerely,

ORIGINAL SIGNED BY W. L. AARLSON

*for*  
Charles E. Norelius, Director  
Division of Radiation Safety  
and Safeguards

Enclosure: Environmental  
Monitoring Report Evaluation

cc w/enclosure:

DCD/DCB (RIDS)

T. Essig, NRR

S. Crampton, Division of Contracts

RIII *yes*  
*KR*  
Glinski/dg  
01/7/93

*yes*  
RIII *N*  
Wiedeman  
1/7/93

RIII *N*  
Caniano  
1/7/93

RIII *yes*  
*yes*  
Kerlin  
1/8/93

*yes*  
RIII *for*  
Norelius

## Enclosure

### Environmental Monitoring Report Evaluation

- I. Apparent deficiencies of cooperative agreement requirements identified in the Draft of the 1991 Ohio Annual Environmental Monitoring Report.
  - Page 35 - milk analysis; the laboratory was unable to achieve the required 1 pCi/L LLD for I-131 until June of 1991. It is stated that a modification of their procedure enabled them to meet this requirement; however, there is no statement of what modifications were instituted. From correspondence dated 6/14/91, it appears that an increase in counting time from 400 to 1440 minutes is the only change in procedure. It is also stated that there were delays in counting the milk samples, and in fact page 74 reveals an analysis where the LLD was 34 pCi/L for the 4/8/91 sample.
  - Pages 7, 33, 34, 48; 37, 67 - analysis of quarterly air particulate composites for gamma emitting nuclides; the cooperative agreement requires that these analyses be performed. However, as of October of 1992, none of these samples have been counted. Since the sample volume of the combined air filters would be approximately 11,000 cubic meters, only a short counting time would be needed to meet the required LLDs. There appears to be insufficient reason as to why these required analyses are not being performed.
  - The cooperative agreement requires that any unusual concentrations of radioactivity are to be reported to the NRC Region III office. Gross beta results on water such as 110 +/- 78 pCi/L for the 5/20/91 sample is more than 10 times greater than any other similar analysis and should have been reported. The same is true for the gamma isotopic analysis of the horseradish sample (T-8) collected on 7/16/91, which was reported to contain 37200 +/- 1950 pCi/kg of Cs-134; and the bottom sediment sample from Location 25 collected on 5/16/91, which was reported to have 1900 +/- 580 pCi/kg of Cs-137. Other instances of anomalous radioanalytical results are described below.
  - The cooperative agreement requires that an annual report of all offsite analyses with comparison of similar analyses by the respective licensee be provided to the NRC Region III office within 120 days from January 1 of the following year. Contrary to this, a draft copy of the Ohio 1991 Annual Environmental Monitoring Report was not received by this office until November of 1992.
- II. Apparent deviations from good laboratory practices identified by the Region III staff concerning the sampling methodology, radioanalytical results, and data review of the Ohio Radiological Laboratory.
  - Pages 10, 11, 102, 103 - Water sampling methodology; the only method stated for the preservation of water samples is

refrigeration during transport as a means of inhibiting bacterial growth. However, refrigeration will not prevent hydrolysis and the subsequent loss of nuclides onto the container walls. This is of concern since the samples are stored in the cubitainers for at least one month. Samples collected for beta and gamma analyses should be acidified with either HCl or HNO<sub>3</sub> to a pH of 2 as soon as possible. It is also stated that aliquots are taken from these cubitainers on a quarterly basis for tritium analysis. However, water samples collected for tritium analysis should be in glass containers, because tritium atoms in the water will exchange with hydrogen atoms in the polypropylene cubitainer walls, thereby diluting the tritium present in the sample. In summary, water samples for beta and gamma analysis should be collected in polypropylene cubitainers and acidified soon afterwards; and water samples for tritium analysis should be collected in glass containers.

- Page 14 - Tritium analysis; it is stated that a complete transfer of tritiated water is assured by distillation to near dryness. Since it is the concentration of tritium that is being determined, it is unnecessary to make a complete transfer. In addition, taking a sample to near dryness may result in a spattering of the flask contents into the condenser and collection vessel.
- Pages 34, 49 - anomalous gross beta result; gross beta analysis of water collected on May 20, 1991 yielded a result of 110 +/- 78 pCi/L. The reason given for the high result, more than ten-fold higher than any other sample, is a delay between sample preparation and counting. There are no decay corrections, no significant daughter ingrowth or any other plausible reasons for a simple delay in counting to give a high result for gross beta analysis. There is also concern about the large degree of uncertainty in this analysis. The stated level of activity should yield more precise counting statistics than is indicated. There appears to be a lack of effort to investigate this anomalous result or re-analyze this sample.
- Pages 51, 70, 89 - results of tritium analyses; only the tritium analyses for the third quarter of 1991 gave positive results for the presence of this nuclide. The reason stated for these results are a delay in counting the samples. However, as noted above for gross beta, there is no reasonable explanation as to why a delay would cause higher count rates in samples that should consist only of distilled water. Again, there appears to be a lack of investigation into possible instrument malfunction, or a recounting of the samples, or re-analysis of the samples to determine the cause for the anomalous results.
- Page 53 - milk analysis; analysis of the milk sample collected on 9/9/91 gave a result for K-40 of less than 7 pCi/L, while all other milk analyses revealed K-40 levels that ranged from 1100 - 2600 pCi/L. Because milk will invariably contain significant

levels of this natural nuclide, it would appear that the K-40 peak in the spectrum was outside the energy tolerance set for the instrument and therefore it is probable that other nuclides would also go unidentified. Again, there was no indication of any investigation or effort to recount or in any other way to determine the cause for this anomalous result.

- Page 101 - milk preservation; the only indicated method for preserving milk samples is that the milk be placed in a cooler and taken to the laboratory as soon as possible. There is no indication that the samples are refrigerated or preserved in any other manner after arrival at the laboratory. Because the distance between the sampling locations and the laboratory would indicate that transport could take a few days, it may be advisable for the collection staff to add 50 ml of formaldehyde in order to more effectively inhibit bacterial growth. It would also be advisable for the collection staff to add 100 mg of sodium bisulfite to the milk to ensure that the iodine remains as the soluble iodide, I<sup>-</sup> oxidation state.
- Page 39 - Vegetation and produce analysis; although it is stated that differences in handling, storage, and preparation of these types of samples may explain the poor agreement with Perry Nuclear Power Plant data, no specific examples of these differences are offered in explanation. On page 105, there is no indication that any preservation of vegetation or produce is performed. It would be advisable to transport these samples on ice and refrigerate upon arrival at the laboratory to inhibit any deterioration.
- Page 54 - vegetation analysis; gamma spectrometry analysis of horseradish(T-8) collected on 7/16/91 revealed the presence of 37200 +/- 1950 pCi/kg of Cs-134. Since no other nuclides were detected, it is unlikely that Cs-134 was truly present. However, there appears to have been no investigation into the cause of this anomalous result (if not Cs-134, what could cause this large of a peak in the spectrum) or a simple re-counting or re-analysis of the sample.
- Page 76 - sediment analysis; gamma spectrometry analysis of the sediment presented Co-60 as "None Reported" rather than as an LLD. There is no reason offered for the poor agreement between the state laboratory and the utility data, even though the sediments are collected as split samples. The analysis of the 5/16/91 sediment sample showed the presence of 1875 +/- 580 pCi/kg, nearly a 30% uncertainty. This level of activity would seem to generate a count rate with more precise counting statistics than indicated. In addition, the sediment sample from 10/1/91 was not analyzed by 10/92; and although this would not be a required test, the level of Cs-137 found in the previous sample should have increased the priority for this analysis.

- Page 55 - sediment analysis; gamma isotopic analysis of the bottom sediment from Location 27 collected 5/2/91 is reported to contain only  $63 \pm 7$  pCi/kg of K-40. All other sediment analyses show K-40 levels between 9500 - 21000 pCi/kg of this same primordial nuclide. There is no indication of an investigation into an energy shift in the spectrum or any other cause for this unusually low result.
- Pages 17, 93-98 - QA/QC program; the documented program appears to be very good; however, there is no presentation of any data from the analyses of the internal QC samples. In order to ascertain the effectiveness of the internal QA program, the results of the spikes, duplicates, and replicates performed with the NRC agreement samples should be reported. In addition, the total number of QC samples analyzed (spikes, replicates, duplicates, and blanks) should be reported.