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April 2, 2001

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Subject: **White Paper, Lead-210 Exceedances, United Nuclear Church Rock Site, Gallup, New Mexico**

Dear Messrs. Ting and Lyssy:

Enclosed is the above-referenced document that was prepared as requested during the meeting held in Santa Fe, New Mexico, on November 14 and 15, 2000. Please contact Roy Blickwedel (General Electric Corporation) at (610) 992-7935 or me at (570) 925-5063 if you have any questions or need additional information.

Very truly yours,
Earth Tech, Inc.

Suzie du Pont
Project Manager

Enclosure

cc: Roy Blickwedel, General Electric Corporation
Larry Bush, United Nuclear
Ken Hooks, Nuclear Regulatory Commission
Beiling Liu, New Mexico Environment Department
Diane Malone, Navajo Superfund
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WHITE PAPER
LEAD-210 EXCEEDANCES
UNITED NUCLEAR CHURCH ROCK SITE
GALLUP, NEW MEXICO

On behalf of United Nuclear Corporation (United Nuclear), Earth Tech, Inc., has prepared this white paper addressing lead-210 exceedances in groundwater at the Church Rock site near Gallup, New Mexico. As discussed in the meeting held November 14, 2000, the lead-210 exceedances at the site are not from the tailings seepage but rather are related to the limitations of the currently accepted analytical method. This paper discusses the analytical method and the lead-210 data for all three formations at the Church Rock site.

Energy Laboratories, Inc. (Energy Labs) in Casper, Wyoming, has been analyzing the Church Rock samples for lead-210 since 1984. According to Roger Garling of Energy Labs, the lead-210 analytical method was first applied to Church Rock samples in the early 1980s (Garling 2000). The method that has been used was adapted from Baratta et al. (1965), which is the only published analytical method for lead-210. The method includes several steps to prepare the sample for analysis including:

- Preparing an aliquot of sample containing lead nitrate and bismuth chloride,
- Running the aliquot through a cation exchange resin to isolate the lead from the bismuth,
- Precipitating the lead as lead sulfide,
- Filtering through 0.45-micron paper, and
- Counting for Beta on a low-background gas proportional system.

The counts can vary due to several different factors, including:

- Cosmic radiation,
- Lab contamination,
- An exceptionally low blank, and
- Particulates filtered in the resin that, when washed with nitric acid, could carry through the analysis.

The detection limit of 1.0 picoCurie per liter (pCi/L) was derived from Regulatory Guide Number 4.14, *Radiological Effluent and Environmental Monitoring at Uranium Mills* (U.S.

Nuclear Regulatory Commission 1980). Regulatory Guide Number 4.14 lists the required detection limit but provides no basis for this limit. The guide also requires that the error measured be less than 10 percent of the detection limit. According to Garling (2000), this detection limit and error requirement are unrealistic, given the variability in the data due to the factors that can affect the counting. A more achievable detection limit for this analytical method would be about 10 pCi/L.

The U.S. Environmental Protection Agency (EPA) recognized the limitations of the lead-210 analytical method in its Fact Sheet titled "Final Revisions to the Unregulated Contaminant Monitoring Regulation" (1999). The fact sheet discusses the contaminants the EPA is considering for possible new drinking water standards. Currently, lead-210 does not have an EPA drinking water standard. Lead-210 is included in List 3–Pre-Screen Testing of Contaminants Needing Research on Methods, which includes constituents that "... have methods in an early stage of development." As part of List 3, lead-210 will be evaluated for drinking water supplies, but "Monitoring ... will be performed only after future rulemaking specifies methods to determine whether a listed contaminant occurs in sufficient frequency in the most vulnerable systems or sampling locations to warrant its being included in future Assessment Monitoring or Screening Surveys. EPA will also be evaluating the method performance for List 3 Contaminants."

In light of the information from the analytical laboratory and EPA's fact sheet, the lead-210 data from the site would not be expected to provide an indication whether lead-210 is present in the site groundwater at concentrations near or less than 10 pCi/L. Review of the data confirms this conclusion. The lead-210 data for the period from May 1988 through the third quarter of 2000 are presented in Table 1 for Southwest Alluvium, Table 2 for Zone 3 and Table 3 for Zone 1. This time period was selected because it incorporates the most complete data set for the monitoring wells included in the Performance Monitoring Program that began in the third quarter of 1989. The wells listed in each table are categorized as either background wells or seepage-impacted wells. The background wells are listed in blue on the left side of the three tables. The

current site standard for lead-210 is 1.0 pCi/L, which is also the detection limit required by Regulatory Guide 4.14. Shaded values indicate concentrations exceeding the standard.

Review of the tables shows that there is no consistent pattern of exceedances for individual wells or for the three formations that would indicate the exceedances are from tailings seepage. Instead, the data indicate what one would expect if the variability related to the analytical method is the source of the detections. The lead-210 exceedances are scattered throughout time in all the wells in all three formations and in both background and seepage-impacted wells. If the exceedances were related to tailings seepage, then the frequency of exceedances and concentrations of lead-210 would be greater in the seepage-impacted wells. However, this pattern does not exist in the data. The detected concentrations of lead-210 are similar for all the wells in all the formations. Other than a couple of anomalously high-concentration detections (e.g., Table 2, 56.5 pCi/L for Well EPA 13 in June 1988), the detected concentrations are typically less than 5.0 pCi/L. They are also less than the practical detection limit of 10 pCi/L recommended for this analytical method by the laboratory.

Summary

Given:

- the documented limitations of the analytical method,
- the lack of indication that lead-210 concentrations are related to tailings seepage, and
- EPA's lack of a drinking water standard for lead-210,

continuing to require analysis for lead-210 is not beneficial. Therefore, United Nuclear requests that lead-210 be eliminated from the list of site standards. United Nuclear will continue to monitor for lead-210 but requests that it no longer be used for compliance.

References

Baratta, E.J., E.S. Ferri, and T.C. Reavey. 1965. *Analysis of Environmental Samples, Supplementary and Radiochemical Procedures.* Northeastern Radiological Health Laboratory Report Number NERHL-65-4, U.S. Department of Health Education and Welfare, Public Health Service, Winchester.

Garling, R. 2000. Personal communication. Energy Laboratories, Casper, Wyo.

U.S. Environmental Protection Agency. 1999. *Final Revisions to the Unregulated Contaminant Monitoring Regulation.* Fact Sheet.

U.S. Nuclear Regulatory Commission. 1980. *Radiological Effluent and Environmental Monitoring at Uranium Mills, Revision 1.* Regulatory Guide 4.14. Office of Standards Development. April.

TABLE 1
SOUTHWEST ALLUVIUM LEAD-210 CONCENTRATIONS
MAY 1988 - JULY 2000

	Background Wells								Seepage-Impacted Wells											
Date	627	639	642	644	645	EPA 22A	EPA 25	GW 4	509 D	624	632	801	802	803	EPA 23	EPA 27	EPA 28	GW 1	GW 2	GW 3
5/5/88	--	--	--	--	--	9.1	-1.0	11.6	-1.0	--	-1.0	--	--	--	-1.0	-1.0	1.9	-1.0	-1.0	1.4
6/16/88	--	--	--	--	--	1.7	-1.0	4.9	-1.0	--	-1.0	--	--	--	2.8	-1.0	-1.0	-1.0	-1.0	4.9
7/20/88	--	--	--	--	--	--	2.6	-1.0	-1.0	--	-1.0	--	--	--	-1.0	3.9	-1.0	-1.0	-1.0	-1.0
10/17/88	--	--	--	--	--	--	--	2.9	--	--	--	--	--	--	--	--	--	--	--	1.3
2/1/89	--	--	--	--	--	3.5	--	-1.0	--	--	--	--	--	--	--	--	--	--	--	-1.0
4/3/89	--	--	--	--	--	4.1	-1.0	-1.0	-1.0	-1.0	-1.0	--	--	--	1.1	1.5	1.1	-1.0	-1.0	-1.0
7/19/89	2.2	-1.0	-1.0	1.2	--	-1.0	1.0	-1.0	2.8	-1.0	-1.0	--	--	--	-1.0	-1.0	2.6	1.7	-1.0	2.7
10/16/89	1.1	-1.0	-1.0	-1.0	-1.0	-1.0	1.2	1.1	2.3	-1.0	-1.0	2.4	-1.0	-1.0	-1.0	-1.0	-1.0	1.5	1.5	-1.0
1/10/90	2.4	10.3	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	3.4	-1.0	-1.0	-1.0	-1.0	-1.0	1.5	-1.0	1.3	1.3	-1.0	-1.0
4/5/90	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.1	-1.0	-1.0	1.2	-1.0	-1.0	-1.0	-1.0	1.2	1.3	-1.0
7/3/90	1.9	-1.0	-1.0	-1.0	-1.0	1.7	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.0	-1.0	-1.0	-1.0	-1.0
10/3/90	-1.0	1.9	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.9	-1.0	-1.0	-1.0	1.4	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
1/15/91	-1.0	-1.0	-1.0	1.3	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	6.3	-1.0	-1.0	-1.0
4/2/91	-1.0	-1.0	3.0	3.8	--	-1.0	1.5	2.2	2.9	-1.0	-1.0	-1.0	2.1	-1.0	-1.0	1.3	-1.0	-1.0	-1.0	5.6
7/17/91	-1.0	-1.0	3.2	-1.0	--	-1.0	1.7	-1.0	-1.0	-1.0	-1.0	2.4	2.1	-1.0	-1.0	-1.0	-1.0	2.3	-1.0	12.8
10/15/91	-1.0	-1.0	-1.0	4.9	--	-1.0	-1.0	-1.0	-1.0	-1.0	1.6	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
1/15/92	-1.0	2.2	-1.0	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.5	-1.0	-1.0	-1.0	1.6	2.7	-1.0	2.2	13.6
4/8/92	1.2	3.3	-1.0	-1.0	--	2.2	-1.0	6.3	1.9	-1.0	1.6	-1.0	2.7	-1.0	-1.0	2.4	-1.0	-1.0	2.4	-1.0
7/8/92	-1.0	1.9	-1.0	-1.0	--	-1.0	7.0	-1.0	-1.0	-1.0	4.2	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	2.2	-1.0	-1.0
10/6/92	1.7	-1.0	-1.0	-1.0	--	-1.0	5.7	-1.0	2.3	-1.0	-1.0	-1.0	-1.0	-1.0	1.1	2.2	2.6	1.2	-1.0	-1.0
1/7/93	-1.0	3.9	2.7	--	--	1.6	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.2	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
4/7/93	1.2	-1.0	-1.0	--	--	2.0	1.9	2.8	2.9	1.4	1.2	1.8	-1.0	-1.0	-1.0	1.9	-1.0	2.2	-1.0	2.2
7/14/93	-1.0	-1.0	-1.0	--	--	-1.0	-1.0	3.2	-1.0	2.8	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	3.3	-1.0	-1.0
10/7/93	-1.0	2.0	-1.0	--	--	1.1	3.5	1.2	-1.0	4.8	1.2	-1.0	1.6	-1.0	-1.0	1.9	2.8	-1.0	-1.0	-1.0
1/6/94	-1.0	3.2	3.1	--	--	-1.0	5.2	6.8	1.1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.8	1.6
4/12/94	3.2	7.2	2.7	--	--	5.4	-1.0	-1.0	-1.0	-1.0	2.4	3.2	-1.0	3.2	-1.0	-1.0	2.0	1.9	3.2	-1.0
7/21/94	-1.0	--	3.5	--	--	-1.0	-1.0	-1.0	1.2	-1.0	-1.0	1.9	-1.0	-1.0	-1.0	1.9	-1.0	1.1	-1.0	5.9
10/5/94	-1.0	-1.0	3.9	--	--	-1.0	-1.0	-1.0	2.7	-1.0	3.6	1.0	-1.0	2.2	1.9	1.0	-1.0	3.1	1.4	-1.0
1/4/95	-1.0	--	-1.0	--	--	-1.0	4.3	-1.0	-1.0	-1.0	1.7	-1.0	-1.0	-1.0	1.9	3.0	2.6	-1.0	-1.0	1.7
4/5/95	1.4	--	2.8	--	--	-1.0	-1.0	-1.0	-1.0	2.1	1.1	1.9	2.6	1.1	-1.0	-1.0	-1.0	-1.0	4.4	-1.0
7/6/95	-1.0	--	1.2	--	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.6	-1.0	-1.0	-1.0
10/3/95	1.7	--	--	--	--	-1.0	-1.0	-1.0	-1.0	-1.0	3.3	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.8	-1.0
1/3/96	2.4	--	--	--	--	-1.0	-1.0	-1.0	1.5	-1.0	1.2	3.1	3.6	1.5	1.9	-1.0	-1.0	-1.0	2.4	-1.0
4/2/96	-1.0	--	--	--	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	2.9	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
7/7/96	-1.0	--	--	--	--	-1.0	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
10/1/96	-1.0	--	--	--	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
1/22/97	-1.0	--	--	--	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	6.3	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
4/8/97	-1.0	--	--	--	--	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
7/8/97	-1.0	--	--	--	--	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
10/7/97	-1.0	--	--	--	--	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	5.5	-1.0	-1.0	-1.0
1/16/98	-1.0	--	--	--	--	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
4/7/98	-1.0	--	--	--	--	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
7/7/98	-1.0	--	--	--	--	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	-1.0	-1.0	-1.0	-1.0
10/6/98	-1.0	--	--	--	--	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	-1.0	-1.0	-1.0	-1.0
1/5/99	-1.0	--	--	--	--	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	-1.0	-1.0	-1.0	-1.0
4/6/99	-1.0	--	--	--	--	--	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	-1.0	-1.0	-1.0	-1.0
7/13/99	3.0	--	--	--	--	--	-1.0	--	-1.0	-1.0	2.9	-1.0	-1.0	--	-1.0	--	-1.0	-1.0	-1.0	-1.0
10/5/99	-1.0	--	--	--	--	--	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	-1.0	-1.0	-1.0	-1.0
2/18/00	-1.0	--	--	--	--	--	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	-1.0	-1.0	-1.0	-1.0
6/21/00	5.7	--	--	--	--	--	-1.0	--	-1.0	6.4	-1.0	--	-1.0	-1.0	5.4	--	14.2	-1.0	5.9	-1.0
8/21/00	-1.0	--	--	--	--	--	-1.0	--	-1.0	-1.0	-1.0	--	-1.0	-1.0	-1.0	--	-1.0	-1.0	-1.0	-1.0

Note:
Shading indicates lead-210 concentrations exceeding the water quality standard of 1.0 pCi/L.

TABLE 2
ZONE 3 LEAD-210 CONCENTRATIONS
JUNE 1988 - JULY 2000

Date	Background Wells				Seepage-Impacted Wells									
	0411	0420	EPA 01	EPA 14	501 B	0502 B	0504 B	0517	0518	EPA 09	EPA 13	EPA 15	EPA 17	EPA 18
6/16/88	1.5	1.0	-1.0	-1.0	-1.0	-1.0	8.1	6.9	7.5	4.8	56.5	1.5	-1.0	10.8
7/13/88	2.4	-1.0	6.4	-1.0	-1.0	-1.0	-1.0	4.8	9.3	2.4	-1.0	3.6	-1.0	-1.0
4/10/89	-1.0	-1.0	2.0	1.2	2.0	-1.0	-1.0	-1.0	2.8	-1.0	-1.0	-1.0	-1.0	-1.0
7/23/89	-1.0	1.6	-1.0	-1.0	-1.0	2.3	-1.0	2.1	4.1	2.1	2.7	1.3	1.2	-1.0
10/11/89	-1.0	1.9	-1.0	7.1	-1.0	4.1	2.7	2.8	5.0	-1.0	-1.0	1.1	-1.0	2.1
1/3/90	-1.0	3.3	1.6	2.2	-1.0	6.7	5.7	4.5	5.1	-1.0	-1.0	-1.0	-1.0	-1.0
4/3/90	-1.0	1.9	-1.0	-1.0	-1.0	2.8	1.6	1.0	2.2	-1.0	-1.0	-1.0	-1.0	1.2
7/2/90	-1.0	1.5	-1.0	4.6	-1.0	7.9	3.3	1.2	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
10/2/90	1.8	-1.0	2.0	-1.0	1.4	-1.0	-1.0	-1.0	-1.0	-1.0	1.4	-1.0	-1.0	1.4
1/3/91	-1.0	-1.0	-1.0	-1.0	1.5	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
4/10/91	2.6	1.1	-1.0	-1.0	5.9	-1.0	-1.0	-1.0	1.5	-1.0	-1.0	-1.0	-1.0	2.5
7/16/91	2.0	2.2	-1.0	-1.0	-1.0	2.9	3.2	-1.0	4.6	-1.0	-1.0	-1.0	-1.0	-1.0
10/14/91	-1.0	-1.0	3.2	1.3	2.4	-1.0	-1.0	-1.0	-1.0	2.7	2.3	-1.0	-1.0	-1.0
1/14/92	3.5	1.3	-1.0	3.3	1.3	-1.0	-1.0	1.3	1.9	-1.0	-1.0	1.4	1.2	-1.0
4/7/92	2.8	-1.0	1.3	-1.0	1.6	2.0	-1.0	1.3	-1.0	-1.0	1.3	-1.0	-1.0	-1.0
7/7/92	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.3	-1.0	-1.0	--	1.0
10/6/92	-1.0	-1.0	-1.0	1.7	3.3	-1.0	-1.0	-1.0	-1.0	-1.0	1.2	-1.0	--	1.8
1/6/93	2.3	-1.0	-1.0	-1.0	2.6	-1.0	4.7	-1.0	3.7	-1.0	-1.0	-1.0	--	-1.0
4/6/93	-1.0	-1.0	-1.0	-1.0	1.7	3.3	-1.0	-1.0	1.9	-1.0	-1.0	-1.0	--	-1.0
7/16/93	1.2	3.0	4.7	-1.0	-1.0	-1.0	-1.0	3.6	-1.0	-1.0	-1.0	-1.0	--	-1.0
10/6/93	2.2	1.2	-1.0	-1.0	--	2.0	-1.0	-1.0	1.2	1.2	-1.0	1.4	--	1.8
1/5/94	2.7	1.4	1.8	-1.0	--	1.1	-1.0	1.1	3.1	-1.0	-1.0	-1.0	--	-1.0
4/14/94	3.7	-1.0	-1.0	-1.0	--	3.8	2.6	4.5	2.0	-1.0	-1.0	-1.0	--	-1.0
7/21/94	4.4	-1.0	1.4	-1.0	--	4.4	2.5	-1.0	7.6	-1.0	1.7	1.8	--	-1.0
10/5/94	-1.0	-1.0	3.5	1.7	--	1.2	2.0	-1.0	-1.0	5.0	-1.0	3.8	--	3.4
1/10/95	2.8	-1.0	1.1	1.1	--	-1.0	-1.0	-1.0	-1.0	1.2	-1.0	-1.0	--	--
4/11/95	-1.0	-1.0	-1.0	-1.0	--	2.0	-1.0	-1.0	2.4	-1.0	-1.0	-1.0	--	--
7/11/95	-1.0	-1.0	11.0	-1.0	--	2.0	1.3	3.8	1.9	-1.0	2.8	-1.0	--	--
10/3/95	1.5	-1.0	2.7	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	1.1	-1.0	--	--
1/4/96	2.6	1.6	-1.0	1.8	--	2.7	3.4	1.8	4.2	-1.0	-1.0	--	--	--
4/2/96	-1.0	-1.0	-1.0	-1.0	--	-1.0	-1.0	21.4	-1.0	-1.0	-1.0	--	--	--
7/17/96	-1.0	3.1	-1.0	-1.0	--	5.3	2.3	5.4	6.2	-1.0	-1.0	--	--	--
10/8/96	-1.0	-1.0	-1.0	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	--	--
1/21/97	-1.0	-1.0	-1.0	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	--	--
4/8/97	-1.0	-1.0	-1.0	-1.0	--	-1.0	-1.0	-1.0	5.6	-1.0	-1.0	--	--	--
7/8/97	-1.0	-1.0	--	-1.0	--	4.6	-1.0	-1.0	-1.0	-1.0	-1.0	--	--	--
10/7/97	-1.0	-1.0	--	-1.0	--	-1.0	-1.0	-1.0	-1.0	5.5	-1.0	--	--	--
1/16/98	-1.0	-1.0	--	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	--	--
4/7/98	--	-1.0	--	-1.0	--	-1.0	-1.0	6.1	-1.0	-1.0	-1.0	--	--	--
7/7/98	--	-1.0	--	-1.0	--	-1.0	-1.0	-1.0	7.0	-1.0	-1.0	--	--	--
10/6/98	--	-1.0	--	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	--	--
1/5/99	--	-1.0	--	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	--	--
4/6/99	--	-1.0	--	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	--	--
7/13/99	--	-1.0	--	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	--	--
10/5/99	--	-1.0	--	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	--	--
2/22/00	--	-1.0	--	-1.0	--	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	--	--	--
5/28/00	--	6.8	--	-1.0	--	--	-1.0	4.2	--	--	--	--	--	--
8/21/00	--	-1.0	--	-1.0	--	--	-1.0	-1.0	--	--	--	--	--	--

Note:

Shading indicates lead-210 concentrations exceeding the water quality standard of 1.0 pCi/L.

C02

TABLE 3
ZONE 1 LEAD-210 CONCENTRATIONS
MAY 1988 - JULY 2000

	Background Wells							Seepage-Impacted Wells					
Date	0141	0142	0143	0619	EPA 02	EPA 04	EPA 08	0604	0515 A	0516 A	EPA 07	0614	EPA 05
5/5/88	--	--	--	1.0	-1.0	1.9	-1.0	-1.0	6.6	-1.0	6.8	2.5	8.6
7/12/88	--	--	--	-1.0	-1.0	-1.0	3.6	-1.0	-1.0	-1.0	-1.0	1.9	-1.0
8/12/88	--	--	--	-1.0	--	--	--	-1.0	-1.0	-1.0	--	-1.0	--
4/10/89	1.8	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.4	-1.0	-1.0	-1.0	-1.0
7/22/89	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.7	1.7	3.0	2.9	-1.0	-1.0	1.2
10/12/89	1.2	3.1	-1.0	-1.0	3.4	2.2	2.1	-1.0	1.6	1.8	-1.0	2.1	-1.0
1/3/90	2.0	2.9	2.1	-1.0	-1.0	-1.0	-1.0	2.8	3.5	-1.0	-1.0	-1.0	-1.0
4/3/90	-1.0	-1.0	-1.0	-1.0	-1.0	2.4	1.7	2.6	2.2	-1.0	-1.0	-1.0	-1.0
7/2/90	-1.0	-1.0	-1.0	-1.0	-1.0	1.5	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	3.6
10/2/90	-1.0	-1.0	-1.0	-1.0	-1.0	1.1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
1/16/91	-1.0	-1.0	-1.0	2.5	-1.0	-1.0	-1.0	2.3	-1.0	-1.0	-1.0	1.3	-1.0
4/3/91	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.3	2.0	3.3	1.7	1.3	2.3
7/16/91	2.0	1.6	-1.0	1.6	-1.0	-1.0	-1.0	2.1	-1.0	-1.0	-1.0	-1.0	-1.0
10/14/91	-1.0	-1.0	-1.0	-1.0	-1.0	1.8	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.8
1/14/92	-1.0	-1.0	-1.0	-1.0	1.3	1.9	1.3	-1.0	4.2	-1.0	-1.0	-1.0	1.4
4/7/92	-1.0	-1.0	-1.0	-1.0	3.0	9.1	-1.0	1.2	-1.0	-1.0	-1.0	-1.0	6.0
7/7/92	-1.0	-1.0	-1.0	1.1	2.5	-1.0	-1.0	3.4	1.6	2.6	-1.0	-1.0	1.5
10/6/92	-1.0	1.4	-1.0	-1.0	2.1	-1.0	-1.0	1.9	-1.0	3.0	-1.0	1.9	-1.0
1/5/93	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
4/6/93	-1.0	2.6	2.2	1.9	1.6	-1.0	-1.0	1.7	4.4	2.6	1.3	-1.0	1.6
7/13/93	1.0	-1.0	-1.0	2.7	-1.0	-1.0	-1.0	3.1	2.9	3.0	-1.0	2.3	-1.0
10/6/93	-1.0	2.9	-1.0	-1.0	2.8	1.3	-1.0	-1.0	2.6	-1.0	1.8	1.8	2.9
1/5/94	6.2	-1.0	1.4	1.4	-1.0	-1.0	-1.0	2.3	-1.0	-1.0	1.7	-1.0	-1.0
4/13/94	1.7	1.6	-1.0	5.8	-1.0	1.8	1.3	2.3	3.9	1.5	-1.0	5.2	1.0
7/20/94	-1.0	1.2	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.4
10/4/94	-1.0	-1.0	-1.0	2.5	-1.0	-1.0	-1.0	3.8	1.0	3.4	-1.0	-1.0	-1.0
1/4/95	-1.0	-1.0	-1.0	-1.0	-1.0	3.0	-1.0	-1.0	-1.0	2.0	4.8	-1.0	-1.0
4/6/95	-1.0	-1.0	1.5	3.7	-1.0	-1.0	-1.0	4.0	2.9	3.1	-1.0	-1.0	-1.0
7/6/95	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	4.9	-1.0	-1.0	-1.0	14.9	-1.0	-1.0
10/3/95	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.7	-1.0
1/3/96	-1.0	-1.0	1.0	-1.0	-1.0	2.6	3.8	2.8	-1.0	1.7	-1.0	1.5	-1.0
4/2/96	-1.0	-1.0	-1.0	4.1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
7/7/96	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
10/1/96	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
1/21/97	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	7.9	-1.0	-1.0
4/8/97	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
7/8/97	28.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
10/7/97	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
1/15/98	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
4/7/98	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
7/7/98	-1.0	-1.0	-1.0	-1.0	7.5	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
10/6/98	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
1/5/99	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
4/6/99	-1.0	4.9	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	5.2	-1.0
7/13/99	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
10/5/99	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
2/22/00	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
6/4/00	--	-1.0	--	--	-1.0	-1.0	--	-1.0	-1.0	--	-1.0	-1.0	-1.0
8/21/00	--	-1.0	--	--	-1.0	-1.0	--	-1.0	-1.0	--	-1.0	-1.0	-1.0

Note:

Shading indicates lead-210 concentrations exceeding the water quality standard of 1.0 pCi/L.