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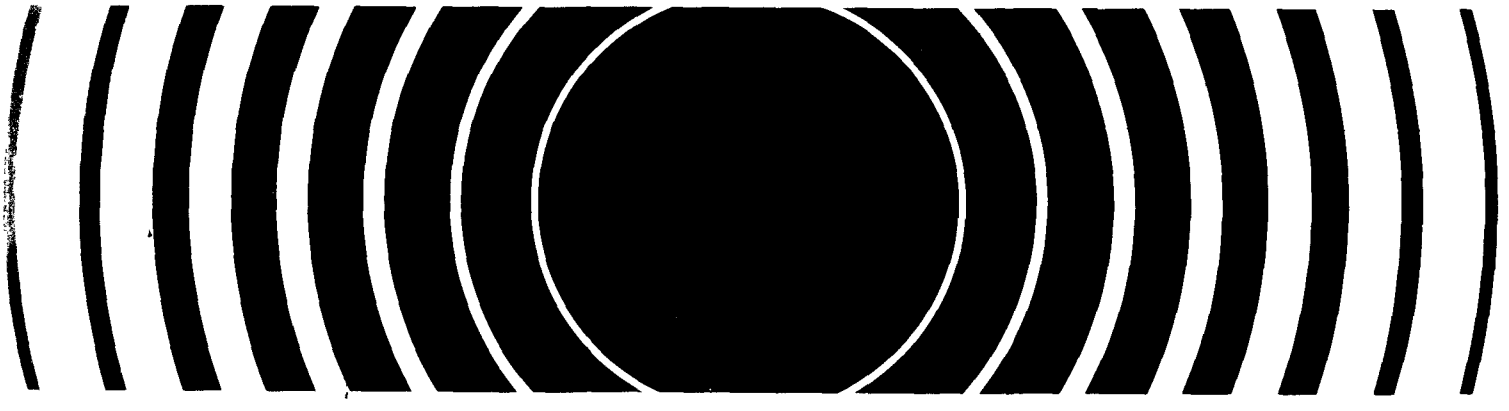
Airborne Particulate Radioactivity Measurements In Pocatello, Idaho



Technical Note
ORP/LV-80-4

AIRBORNE PARTICULATE RADIOACTIVITY MEASUREMENTS IN POCATELLO, IDAHO

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Office of Radiation Programs
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Las Vegas, Nevada 89114

DISCLAIMER

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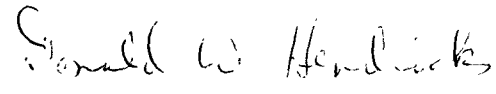
PREFACE

The Office of Radiation Programs of the U.S. Environmental Protection Agency conducts a national program designed to evaluate population exposure to ionizing and nonionizing radiation and to promote development of controls necessary to ensure the public health and safety. This report describes a study conducted in the Pocatello, Idaho area to evaluate the ambient airborne particulate concentration of naturally occurring radioactive materials. Readers are encouraged to inform this Office of any omissions or errors. Comments or requests for further information are also invited.



D. W. Hendricks, Director
Office of Radiation Programs
Las Vegas Facility

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INTRODUCTION

In 1974, the Idaho Department of Health and Welfare requested that the Office of Radiation Programs-Las Vegas Facility (ORP-LVF) provide support in sampling the air at five locations near the two phosphate plants in Pocatello, Idaho.

From April 1974 through June 1975, the ORP-LVF evaluated the radiological consequences of airborne effluents containing low levels of naturally occurring radioactive materials. In addition, "background" samples were obtained at Howe and Arco, Idaho, from July through September 1977.

Reported here are the airborne concentrations of isotopic uranium and thorium, and radium-226. Technical difficulties prevented the full assessment of the radiological impact of polonium-210 and lead-210.

SUMMARY AND CONCLUSIONS

Seven sites near Pocatello, Idaho were sampled and evaluated to determine levels of several of the naturally occurring radionuclides in airborne particulates. At the Pocatello Sewage Plant, airborne concentrations of natural uranium (U-234, -235, and -238), radium-226, and thorium-230 were found to be higher than the levels measured at the other sites and about an order of magnitude greater than levels measured at Howe, the "background" location. A correlation between the concentrations measured at the sewage plant location and meteorological data indicates that emissions from the phosphate plants caused the elevated levels in this area.

The other four locations in the Pocatello area are at least three miles from the phosphate plants and are not in the predominant downwind direction. Concentrations appear to be at background levels reported for Chicago and New York City (NCRP, 1975) and are within about a factor of three of levels measured at Howe. Moreover, uranium and radium concentrations measured at Howe and Arco were about an order of magnitude less than the reported NCRP "background" values, further indication that the airborne particulate radioactivity near Pocatello exceeds the levels in the surrounding areas.

The impact of polonium-210 and lead-210 concentrations is not reported here because technical difficulties were encountered during the radiochemical analyses of these samples. Nonetheless, findings indicate a probable significant radiological influence from these two radionuclides. To resolve this issue, future studies should involve additional sampling and a thorough evaluation of airborne polonium-210 and lead-210 radioactivity.

AIR SAMPLING PROGRAM DESCRIPTION

SAMPLING LOCATIONS

Figure 1 shows the five air sampling locations selected by the Idaho Department of Health and Welfare (IDHW). The basis for choosing these sites was either their proximity to population centers or the direction of the prevailing winds relative to the phosphate plants. A brief description of each site location follows:

#581 Hayes Fire Station 2, Pocatello (four miles southeast of the plants)

#582 Pocatello Sewage Plant, Interstate 15W, Pocatello (one-half mile northeast of the plants)

#583 NOAA Weather Station at the Pocatello Airport, Pocatello (three miles west of the plants)

#584 Courthouse Building, Center St. and 5th Ave., Pocatello (five and one-half miles southeast of the plants)

#585 The Chubbuck School, 5045 Hawthorne Road, Chubbuck, Idaho (three miles northeast of the plants)

During the summer of 1977, the ORP-LVF made background airborne radioactivity determinations in Howe and Arco, Idaho. Both communities are about 70 miles northwest of Pocatello and have no industrial activities that could "technologically enhance" the amount of radioactivity in their environment.

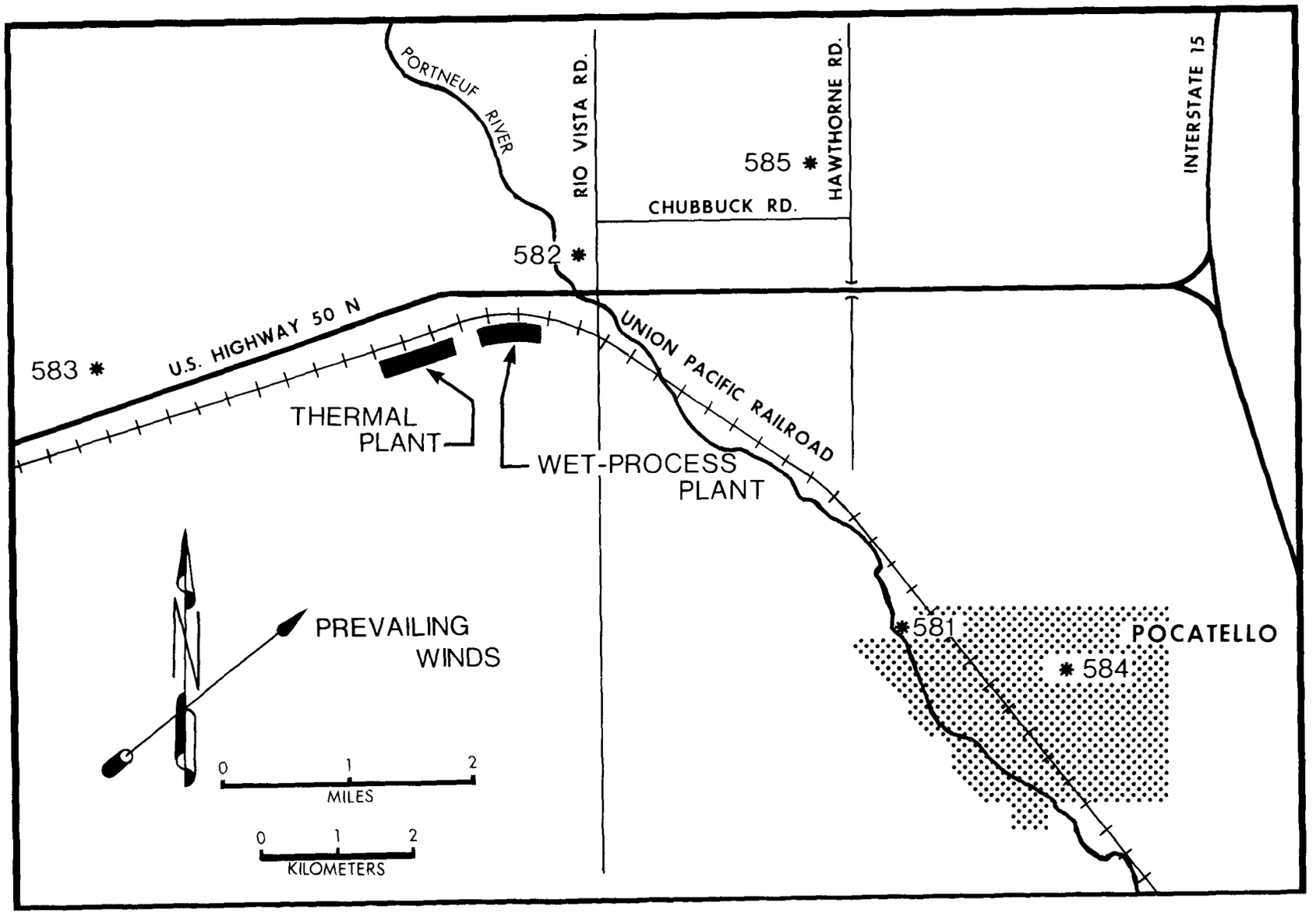

Figure 1. Pocatello air sampling locations (1974-75 study).

SAMPLER DESCRIPTION AND OPERATING PROCEDURES

The IDHW conducted volume particulate air sampling using heavy duty air samplers (Research Appliance Corp., Allison Park, PA; or Tempest Air Sampler, Gelman Instrument Corp., Ann Arbor, MI) that ran continuously without requiring routine maintenance.

Each sampler has a carbon-vane pump driven through a V-belt system by a 110 volt, 3/4 hp motor with overload protection, and a free flow capacity of 10.5 cubic feet per minute (CFM). Each unit has a built-in vacuum gauge, individually calibrated for pressure drop versus air flow rate. A cumulative time-meter, reading to tenths of an hour, provided total elapsed sampling time. The air volume passing the filter was determined by averaging the "on" and "off" flow rates and multiplying by the total elapsed time for the sampling period. A quick-change 110-mm-diameter filter holder was mounted one meter above ground and was secured so that the open face of the filter was toward the ground. The filters (Gelman Type E, 102-mm (4-inch) diameter glass fiber) were changed weekly.

The sampling period for three of the five stations extended from April 5, 1974 to June 20, 1975. Sampling site #585 operated only through August 22, 1974, and site #584 operated through November 4, 1974.

ANALYTICAL PROCEDURES

ORP-LVF analyzed each filter radiochemically at the U.S. EPA-Environmental Monitoring and Support Laboratory (EMSL) for radium-226, thorium-230, and -232, and uranium-234, -235, and -238. Standard radiochemical procedures (Johns, 1975) were used.

Radiochemical analyses for polonium-210 and lead-210 indicate that concentrations of these radionuclides may have a significant radiological impact; however, technical difficulties encountered during the analyses prevent ORP-LVF from reporting its determinations here. These difficulties are discussed in two previous ORP-LVF reports on the Idaho phosphate industry (EPA

1977 and 1978). A thorough evaluation focusing on the polonium and lead concentrations will have to wait for another sampling because the air filters collected during this study were consumed during analysis. However, a similar study (U.S. AEC, 1970) indicates that the polonium-210 content averaged about 88 percent of the gross alpha radioactivity measured on air samples collected in the Pocatello area in 1969-70.

In 1976, Eadie and Bernhardt reported the radioactivity analysis of blank Gelman Type E glass fiber filters. They also described methods for blank subtraction of composite samples, standard deviation determination of net results, and volume weighting of monthly averages. ORP-LVF obtained the sample net activity for this study by subtracting the average blank filter content from the measured gross analytical result.

METEOROLOGICAL MEASUREMENTS

Meteorological data for the Pocatello area were prepared by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), Environmental Data Service. Measurements cover one year beginning April 1, 1974. The weather station is located at the Pocatello Airport (Station #24156). Data are based on eight observations per day.

Figure 2 shows the 12-month average wind rose. Each bold faced number in a sector refers to the percentage of total time the wind was <u>from</u> the direction indicated and was between the velocities (mph) defined at the interface of each concentric circle along the north axis. Look, for example, at the ENE sector; the wind was blowing 18 to 24 mph <u>towards</u> the WSW less than 0.05 percent of the time, 13 to 18 mph 0.2 percent of the time, and 4 to 13 mph 2.5 percent of the time over one year. The figure in the center indicates a calm of 0 to 4 mph and is considered nondirectional.

RESULTS AND DISCUSSION

Table 1 summarizes the study data. Appendix A shows the composite monthly airborne particulate radioactivities at each sampling station, as well as the grand volume weighted average of monthly results and the associated standard error of the mean based on the t-distribution at the 95 percent confidence level.

All results represent ambient airborne concentrations (natural background levels have not been subtracted). For some of the air samples, dust particulate loading was determined by measuring the mass of dust collected on each air sample filter. Appendix B shows the specific activity of the dust. The solubility of the airborne particulate material was not determined.

Figure 3 shows the average concentration (pCi/m^3) of each radionuclide by location for the entire sampling period. Stations are arranged in geographical order, relative to the phosphate plants, from west to east-southeast. The relative percentage of time each station was downwind from the plant location is noted at the top of each set of bar graphs for a given station location. Station #582 (the sewage plant), predominantly downwind, had the highest airborne concentration of radioactivity--the levels are about an order of magnitude greater than levels measured at Howe, the "background" location. As shown in Figure 3, the measured concentrations at the sewage plant appear to correlate with meteorological data, indicating that these levels were probably due to emissions from the two phosphate plants.

The other four locations in the Pocatello area are at least three miles from the two phosphate plants and are not in the predominant downwind direction. Concentrations appear to be at background levels reported for Chicago and New York City (NCRP, 1975) and are within about a factor of three of levels measured at Howe. Moreover, uranium and radium concentrations measured at Howe and Arco were about an order of magnitude less than the reported NCRP "background" values, further indication that airborne particulate radioactivity near Pocatello exceeds the levels in the surrounding areas.

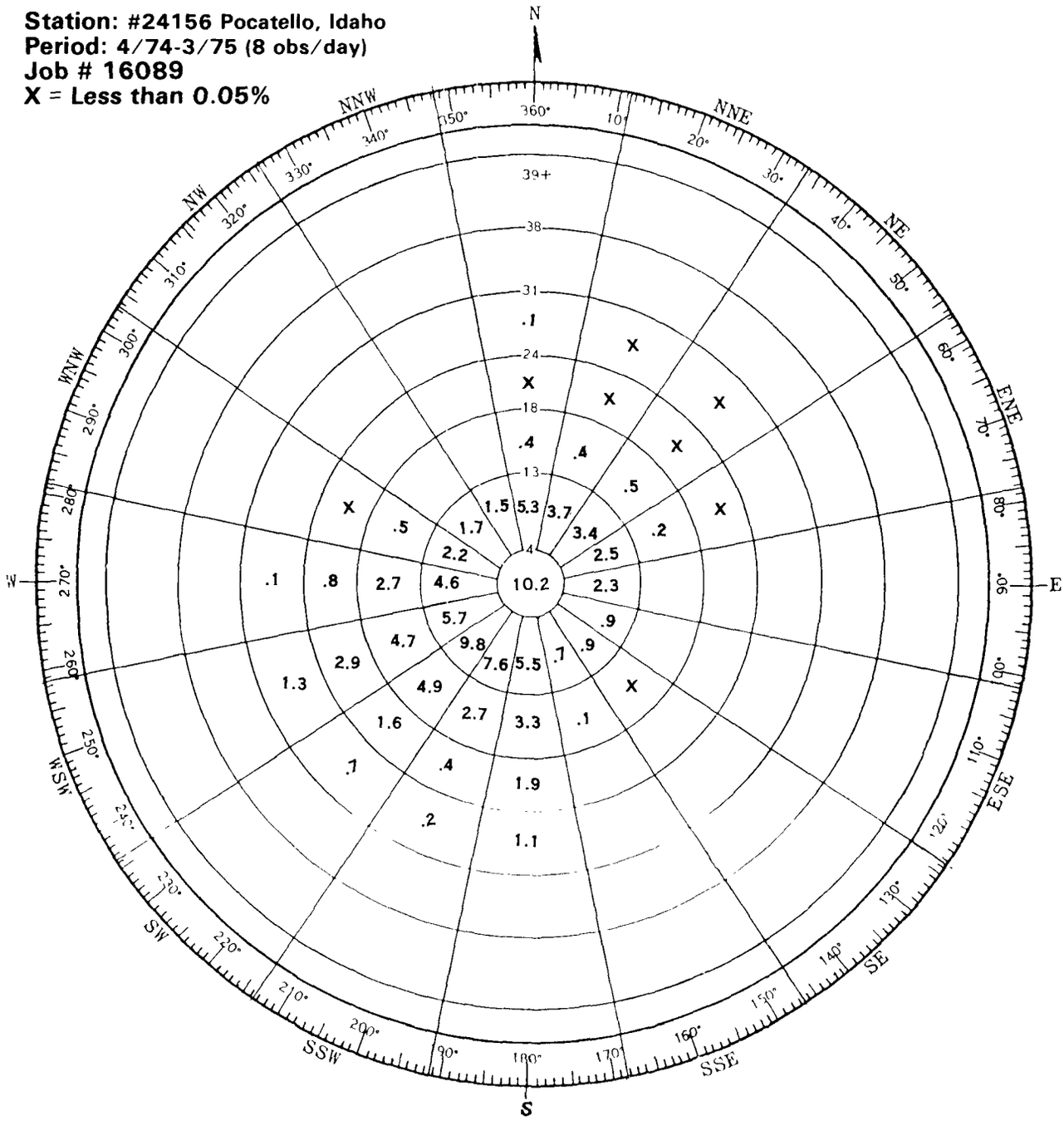

Figure 2. Average surface wind rose for Pocatello, Idaho (April 1974 to March 1975).

TABLE 1. ANNUAL AVERAGE AMBIENT AIRBORNE PARTICULATE RADIOACTIVITY* ± STANDARD ERROR AT 95% CONFIDENCE LEVEL (IN pCi/m^3)

LOCATION	URANIUM-234	URANIUM-235	URANIUM-238	THORIUM-230	THORIUM-232	RADIUM-226
Hayes Fire Station	0.0001 ± 0.000063	0.0000097 ± 0.0000048	0.0001 ± 0.000069	0.00016 ± 0.000088	0.000033 ± 0.000028	0.00027 ± 0.00015
Sewage Plant	0.00061 ± 0.00017	0.000038 ± 0.000014	0.00056 ± 0.00014	0.00087 ± 0.00015	0.000073 ± 0.000029	0.00072 ± 0.00016
Airport	0.00011 ± 0.000033	0.000018 ± 0.000008	0.0001 ± 0.000042	0.00014 ± 0.000063	0.000036 ± 0.000016	0.00015 ± 0.000083
Courthouse	0.00011 ± 0.000037	0.000031 ± 0.00001	0.000092 ± 0.000044	0.00014 ± 0.000087	0.000015 ± 0.000025	0.00045 ± 0.00037
Chubbuck School	0.00017 ± 0.000053	0.00002 ± 0.0000067	0.00018 ± 0.00005	0.00024 ± 0.000066	0.000047 ± 0.000027	0.00048 ± 0.00024
Howe Village	0.000032 ± 0.000018	0.0000068 ± 0.0000027	0.000032 ± 0.000027	0.00007 ± 0.000028	0.000045 ± 0.000025	0.000077 ± 0.000054
Arco Village	0.000063 ± 0.000019	0.0000075 ± 0.0000025	0.000053 ± 0.000017	0.000092 ± 0.000069	0.000045 ± 0.000018	0.000069 ± 0.000035
NCRP-45 Background**	0.00012	0.0000056	0.00012	0.000045	0.00003	0.0001

* Sampling period during April 1974 to June 1975; Howe and Arco from July to September 1977. All results are volume weighted average ± standard error term per discussions in Eadie and Bernhardt (1976)

** Taken from NCRP, 1975

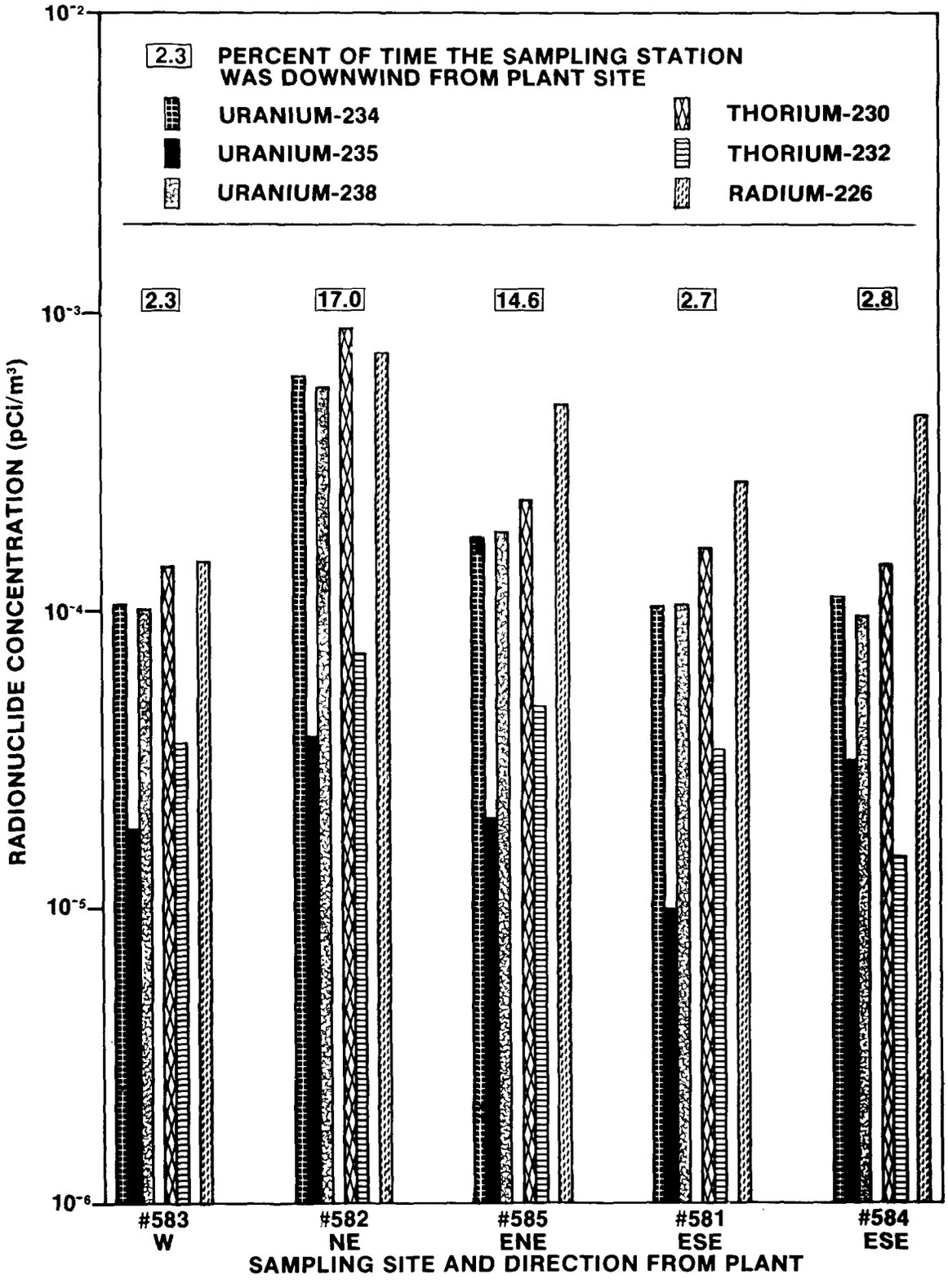

Figure 3. Volume weighted average concentration of airborne particulate radioactivity (pCi/m^3) for locations in Pocatello, Idaho (Table 1).

DOSE ESTIMATES

Defining natural background levels of airborne concentrations of specific radionuclides in the Pocatello area is difficult. The National Council on Radiation Protection and Measurements Report No. 45 (NCRP, 1975) summarized natural background airborne levels for several radionuclides at diverse geographic sites. These levels appear in Table 1. For this study, the measured airborne concentrations of uranium and radium-226 at the two background locations (Howe and Arco) are roughly an order of magnitude less than the NCRP-reported background values. However, the thorium concentrations measured at Howe and Arco are greater (but within a factor of two) than the NCRP background estimates for thorium levels.

In order to establish the "above background" concentrations for the five locations in Pocatello, the measured results from Howe have been subtracted from the ambient results. Table 2 shows the resultant "net concentrations."

Table 3 lists the dose conversion factors for each radionuclide measured in this study. (The doses due to radium-228, polonium-210, and lead-210 have not been estimated because these radionuclides were not evaluated for this study.) These factors represent the average annual dose equivalent in rems for each year of chronic inhalation at a concentration of 1 pCi/m^3. Dose estimates have been maximized by assuming that the indoor airborne concentrations would equal the measured outdoor ambient levels. The highest total dose of 10 millirem was calculated for an individual exposed to the annual average ambient radionuclide concentrations measured outdoors at the sewage plant (assuming a continuous exposure for the entire year at the average ambient values as reported in Table 1). Similarly, a total dose of less than 1 millirem was calculated for an individual exposed to the annual average ambient radionuclide concentrations measured outdoors at Howe -- the location having the lowest measured airborne concentrations. Therefore, considering Howe as representative of "background" conditions, the maximum additional dose (above background) to an individual in the Pocatello area would be about 9 millirem for each year of exposure to airborne radionuclide concentrations as measured during this study.

TABLE 2. ANNUAL AVERAGE NET AIRBORNE PARTICULATE RADIOACTIVITY CONCENTRATIONS* (IN pCi/m³)

LOCATION	URANIUM-234	URANIUM-235	URANIUM-238	THORIUM-230	THORIUM-232	RADIUM-226
Hayes Fire Station	0.000068	0.0000029	0.000068	0.00009	ND=0.000045	0.0002
Sewage Plant	[illegible]	[illegible]	[illegible]	0.00008	0.000028	0.00065
Airport	0.000068	0.000011	[illegible]	[illegible]	[illegible]	[illegible]
Courthouse	0.000068	0.000024	0.00006	[illegible]	ND=0.000045	0.00037
Chubbuck School	0.00014	0.000013	0.00015	0.00017	0.000002	0.00041

* Background concentrations measured at Howe have been subtracted from measured ambient results.
ND indicates not detectable above background value measured at Howe

TABLE 3. AVERAGE ANNUAL LUNG DOSE (MREM/YEAR) FOR INSOLUBLE RADIONUCLIDES

[illegible]	Dose Conversion Factor*	[illegible]	Sewage [illegible]	[illegible]	[illegible]	Chubbuck [illegible]	[illegible]	[illegible]	New York City (NCRP, 1977)	Argonne Nat'l Lab (NCRP, 1975)
U-234	3.7	0.37	2.3	0.41	0.41	0.63	0.12	0.23	0.33	0.44
U-235	3.4	0.032	0.13	0.001	0.11	0.068	0.023	0.026	0.04	0.023
U-238	3.2	0.32	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.38
Th-230	3.4	0.54	[illegible]	0.48	0.48	0.82	0.24	0.31	No data	0.25
Th-232	3.0	0.090	[illegible]	0.11	0.045	0.14	0.14	0.14	No data	0.090
Ra-226	3.7 (no radon)†	1.0	[illegible]	[illegible]	[illegible]	1.8	0.28	0.26	0.37	No data
Total Dose (mrem/year)		2.4	[illegible]	1.[illegible]	3.0	4.0	0.90	1.1	1.[illegible]	1.1

* Rem per year for continuous inhalation of 1 pCi/m³ for particles of 1.0 m AMAD, using a quality factor for alpha of 10. (U.S. EPA, 1973, Sullivan, 1977, letter from W.A. Mills to C.R. Porter, U.S. EPA, September 13, 1976)

† It has been assumed that radon-222 and its progeny escape from the aerosol particle and that the only dose is due to radium-226

However, the major dose would probably be due to the inhalation of elevated concentrations of polonium-210 and lead-210, based on previously reported data (U.S. AEC, 1970) indicating that the majority of alpha radioactivity (i.e., 88 percent) was due to the polonium-210 content.

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APPENDIX A

Composited Monthly Ambient Airborne Particulate Radioactivity Concentrations (pCi/m^3)

TABLE A-1. COMPOSITED MONTHLY AMBIENT AIR SAMPLING RESULTS* (in pCi/m^3) AT HAYES FIRE STATION, POCATELLO, IDAHO

YR / MO	DATE ON	DATE OFF	234U	235U	238U	230TH	232TH	226RA	TOTAL DUST LOAD $\mu g/m^3$
74/04	74/04/06	74/04/28	3.45E-05 (3.53E-05)	6.53E-06 (9.47E-06)	4.97E-05 (4.82E-05)	4.17E-05 (6.19E-05)	1.70E-05 (3.34E-05)	5.66E-05 (1.81E-04)	----
74/05	74/04/29	74/05/25	1.23E-04 (3.48E-04)	1.38E-05 (2.81E-05)	1.10E-04 (3.31E-04)	1.10E-04 (2.30E-04)	4.18E-05 (6.70E-05)	6.91E-04 (3.11E-03)	----
74/06	74/05/25	74/06/15	1.60E-04 (1.56E-04)	2.17E-05 (2.84E-05)	1.50E-04 (1.81E-04)	9.12E-05 (9.10E-05)	4.03E-06 (4.89E-05)	5.71E-04 (6.34E-04)	43
74/07	74/07/06	74/07/27	3.60E-04 (8.90E-05)	1.20E-05 (1.40E-05)	3.80E-04 (8.80E-05)	3.70E-04 (1.30E-04)	9.70E-05 (5.90E-05)	2.00E-04 (1.60E-04)	66
74/08	74/07/27	74/08/31	----	----	----	2.90E-04 (5.70E-05)	6.90E-05 (3.20E-05)	2.00E-04 (9.00E-05)	59
74/09	74/08/31	74/09/14	-1.40E-06 (1.80E-05)	8.80E-07 (2.50E-06)	3.90E-06 (1.40E-05)	3.40E-04 (1.30E-04)	6.00E-05 (5.80E-05)	6.40E-04 (2.90E-04)	94
74/10	74/10/19	74/10/26	1.60E-04 (8.90E-05)	2.80E-05 (2.90E-05)	2.60E-04 (8.80E-05)	3.60E-04 (1.40E-04)	7.20E-05 (8.80E-05)	-1.80E-05 (5.20E-05)	----
74/11	74/10/26	74/11/30	5.90E-05 (2.30E-05)	4.00E-06 (5.20E-06)	6.60E-05 (2.20E-05)	1.30E-04 (4.60E-05)	3.40E-05 (2.20E-05)	2.40E-04 (9.10E-05)	----
74/12	74/11/30	74/12/28	5.80E-05 (2.20E-05)	5.40E-06 (6.60E-06)	3.30E-05 (2.10E-05)	1.10E-05 (3.80E-05)	-3.10E-05 (9.50E-06)	2.00E-05 (6.70E-05)	----
75/01	74/12/28	75/01/04	----	----	----	----	----	3.60E-04 (2.70E-04)	----
VOLUME WEIGHTED AVERAGES STD ERR MEAN * T95(N-1)			1.01E-04 (6.28E-05)	9.68E-06 (4.84E-06)	1.04E-04 (6.90E-05)	1.62E-04 (8.83E-05)	3.33E-05 (2.84E-05)	2.68E-04 (1.53E-04)	

*Results corrected for blank filter content. Statistical considerations as discussed in Eadie and Bernhardt (1976). Results shown are volume weighted arithmetic average with values in parenthesis being the standard error at the 95 percent confidence level based on the t-distribution for (n-1) degrees of freedom. Blanks indicate no results.

TABLE A-2. COMPOSITED MONTHLY AMBIENT AIR SAMPLING RESULTS* (in pCi/m^3) AT SEWAGE PLANT, POCATELLO, IDAHO

YR/MO	DATE ON	DATE OFF	234U	235U	238U	230TH	232TH	226RA	TOTAL DUST LOAD $\mu g/m^3$
74/04	74/04/05	74/04/26	4.09E-04 (3.57E-04)	2.37E-05 (2.30E-05)	4.38E-04 (3.79E-04)	4.53E-04 (3.48E-04)	3.72E-05 (1.03E-04)	6.16E-04 (4.04E-04)	----
74/05	74/04/26	74/05/31	8.15E-04 (7.48E-04)	3.55E-05 (2.30E-05)	8.67E-04 (7.98E-04)	6.75E-04 (4.44E-04)	4.69E-05 (3.36E-05)	8.80E-04 (7.36E-04)	----
74/06	74/05/31	74/06/28	1.02E-03 (2.96E-03)	4.33E-05 (3.06E-04)	1.08E-03 (3.28E-03)	8.78E-04 (3.92E-03)	6.87E-05 (7.31E-04)	4.45E-04 (3.98E-03)	116
74/07	74/06/28	74/07/26	1.40E-03 (2.30E-04)	1.20E-04 (5.00E-05)	-1.20E-06 (2.20E-05)	1.10E-03 (1.30E-04)	1.30E-04 (5.10E-05)	----	106
74/08	74/07/26	74/08/30	7.70E-04 (9.10E-05)	3.10E-05 (1.40E-05)	7.70E-04 (8.90E-05)	1.00E-03 (1.10E-04)	1.40E-04 (4.70E-05)	4.60E-04 (1.30E-04)	143
74/09	74/08/30	74/09/13	6.00E-04 (1.10E-04)	3.40E-05 (1.70E-05)	6.10E-04 (1.10E-04)	1.00E-03 (1.50E-04)	1.50E-04 (4.60E-04)	9.70E-04 (2.80E-04)	146
74/11	74/10/25	74/11/29	5.50E-04 (6.40E-05)	2.80E-05 (1.20E-05)	6.30E-04 (6.80E-05)	1.20E-03 (9.70E-05)	9.10E-05 (3.50E-05)	5.80E-04 (1.30E-04)	----
74/12	74/11/29	74/12/27	4.50E-04 (2.70E-04)	6.10E-05 (6.30E-05)	6.40E-04 (3.00E-04)	1.10E-03 (1.20E-04)	2.80E-05 (3.10E-05)	7.40E-04 (1.70E-04)	----
75/01	74/12/27	75/01/31	4.50E-04 (6.70E-05)	2.80E-05 (1.40E-05)	4.70E-04 (6.60E-05)	1.00E-03 (1.10E-04)	4.40E-06 (2.60E-05)	7.80E-04 (1.40E-04)	----
75/02	75/01/31	75/02/28	5.80E-04 (9.70E-05)	2.80E-05 (1.90E-05)	6.20E-04 (9.60E-05)	1.00E-03 (1.30E-04)	7.20E-05 (4.20E-05)	1.20E-03 (1.70E-04)	----
75/03	75/02/28	75/03/28	3.60E-04 (7.00E-05)	2.20E-05 (1.60E-05)	3.70E-04 (6.90E-05)	7.00E-04 (1.00E-04)	2.60E-05 (3.10E-05)	4.00E-04 (1.20E-04)	----
75/04	75/03/28	75/04/25	5.10E-04 (9.70E-05)	2.10E-05 (2.20E-05)	5.30E-04 (1.10E-04)	8.30E-04 (1.20E-04)	9.00E-05 (4.60E-05)	7.90E-04 (1.50E-04)	----
75/05	75/04/25	75/05/30	6.50E-04 (8.00E-05)	3.70E-05 (1.50E-05)	6.50E-04 (7.90E-05)	8.60E-04 (9.50E-05)	3.40E-05 (3.00E-05)	4.90E-04 (1.20E-04)	----
75/06	75/05/30	75/06/20	1.80E-04 (7.40E-05)	2.50E-05 (2.60E-05)	2.00E-04 (7.50E-05)	3.40E-04 (7.00E-05)	1.20E-04 (4.20E-05)	1.10E-03 (1.50E-04)	----
VOLUME WEIGHTED AVERAGES			6.14E-04	3.78E-05	5.55E-04	8.66E-04	7.25E-05	7.24E-04	
STD ERR MEAN * T95(N-1)			(1.66E-04)	(1.38E-05)	(1.38E-04)	(1.45E-04)	(2.88E-05)	(1.60E-04)	

*Results corrected for blank filter content. Statistical considerations as discussed in Eadie and Bernhardt (1976). Results shown are volume weighted arithmetic average with values in parenthesis being the standard error at the 95 percent confidence level based on the t-distribution for (n-1) degrees of freedom. Blanks indicate no results.

TABLE A-3. COMPOSITED MONTHLY AMBIENT AIR SAMPLING RESULTS* (in pCi/m^3) AT AIRPORT, POCATELLO, IDAHO

YR/MO	DATE ON	DATE OFF	234U	235U	238U	230TH	232TH	226RA	TOTAL DUST LOAD $\mu g/m^3$
74/04	74/04/05	74/04/26	4.58E-05	9.65E-06	3.78E-05	3.86E-05	2.71E-05	1.35E-04	----
			(1.16E-04)	(1.35E-05)	(6.94E-05)	(1.03E-04)	(8.84E-05)	(4.52E-04)	
74/05	74/04/26	74/05/31	5.92E-05	1.48E-05	5.91E-05	3.29E-05	3.00E-06	3.70E-04	----
			(6.56E-05)	(1.06E-05)	(4.98E-05)	(5.81E-05)	(2.98E-05)	(1.74E-04)	
74/06	74/05/31	74/06/28	2.29E-04	1.76E-05	1.96E-04	2.10E-04	4.22E-05	3.85E-04	43
			(2.78E-04)	(2.31E-05)	(4.39E-04)	(4.77E-04)	(9.86E-05)	(2.63E-04)	
74/07	74/06/28	74/07/26	1.50E-04	2.30E-05	2.10E-04	1.90E-04	8.40E-05	4.00E-04	37
			(4.90E-05)	(1.60E-05)	(5.20E-05)	(6.50E-05)	(4.20E-05)	(1.30E-04)	
74/08	74/07/26	74/08/30	1.40E-04	1.20E-05	1.30E-04	2.90E-04	3.80E-05	-1.90E-05	71
			(3.80E-05)	(1.30E-05)	(3.40E-05)	(7.30E-05)	(3.40E-05)	(7.00E-05)	
74/09	74/08/30	74/09/20	1.20E-04	1.50E-05	1.00E-04	3.20E-04	8.30E-05	1.30E-04	57
			(4.00E-05)	(1.60E-05)	(3.50E-05)	(7.30E-05)	(4.00E-05)	(1.20E-04)	
74/10	74/09/27	74/10/25	----	----	----	3.20E-04	8.40E-05	-4.60E-06	----
						(6.10E-05)	(3.50E-05)	(6.50E-05)	
74/11	74/10/25	74/11/29	1.30E-04	1.80E-05	9.10E-05	1.90E-04	2.50E-05	5.10E-06	----
			(4.10E-05)	(1.30E-05)	(3.20E-05)	(5.70E-05)	(2.80E-05)	(6.40E-05)	
74/12	74/11/29	74/12/27	7.50E-05	5.60E-06	8.20E-05	8.00E-05	1.60E-05	1.10E-04	----
			(3.30E-05)	(6.80E-06)	(3.20E-05)	(4.40E-05)	(2.10E-05)	(8.60E-05)	
75/01	74/12/27	75/01/31	5.00E-05	1.10E-05	5.80E-05	3.90E-05	3.50E-05	5.50E-06	----
			(2.60E-05)	(1.20E-05)	(2.40E-05)	(3.90E-05)	(2.20E-05)	(6.70E-05)	
75/02	75/01/31	75/02/28	5.90E-05	1.80E-05	5.70E-05	5.80E-05	1.80E-05	7.30E-05	----
			(5.10E-05)	(1.90E-05)	(4.90E-05)	(5.40E-05)	(3.30E-05)	(7.80E-05)	
75/03	75/02/28	75/03/28	4.60E-05	1.60E-05	7.00E-06	3.70E-05	1.80E-06	1.30E-04	----
			(4.50E-05)	(1.70E-05)	(3.60E-05)	(4.80E-05)	(2.80E-05)	(8.50E-05)	
75/04	75/03/28	75/04/04	3.40E-04	1.70E-04	4.40E-04	-2.10E-05	1.50E-05	2.90E-04	----
			(3.70E-04)	(1.70E-04)	(4.70E-04)	(5.90E-05)	(5.70E-05)	(2.10E-04)	
VOLUME WEIGHTED AVERAGES			1.05E-04	1.81E-05	1.00E-04	1.41E-04	3.59E-05	1.47E-04	
STD ERR MEAN * T95(N-1)			(3.32E-05)	(7.99E-06)	(4.16E-05)	(6.25E-05)	(1.64E-05)	(8.26E-05)	

*Results corrected for blank filter content. Statistical considerations as discussed in Eadie and Bernhardt (1976). Results shown are volume weighted arithmetic average with values in parenthesis being the standard error at the 95 percent confidence level based on the t-distribution for (n-1) degrees of freedom. Blanks indicate no results.

TABLE A-4. COMPOSITED MONTHLY AMBIENT AIR SAMPLING RESULTS* (in pCi/m^3)
AT COURTHOUSE, POCATELLO, IDAHO

YR/MO	DATE ON	DATE OFF	234U	235U	238U	230TH	232TH	226RA	TOTAL DUST LOAD $\mu g/m^3$
74/04	74/04/09	74/04/26	1.08E-04	1.56E-05	1.10E-04	7.14E-05	1.75E-05	2.27E-04	----
			(2.34E-04)	(7.49E-05)	(1.92E-04)	(2.45E-04)	(1.40E-04)	(5.63E-04)	
74/05	74/04/29	74/05/23	1.03E-04	3.90E-05	7.95E-05	4.30E-05	6.63E-06	7.41E-04	----
			(1.19E-04)	(5.91E-05)	(1.10E-04)	(1.24E-04)	(7.83E-05)	(6.09E-04)	
74/06	74/05/29	74/06/19	9.22E-05	3.81E-05	8.54E-05	6.39E-05	1.54E-05	7.65E-04	50
			(1.53E-04)	(3.88E-05)	(1.53E-04)	(1.01E-04)	(7.18E-05)	(1.01E-03)	
74/08	74/08/23	74/08/27	----	----	----	-4.70E-05	-7.40E-05	1.70E-03	57
						(6.00E-05)	(1.50E-05)	(7.50E-04)	
74/09	74/08/27	74/09/24	9.30E-05	2.30E-05	6.20E-05	2.40E-04	3.40E-05	-4.00E-05	78
			(5.60E-05)	(1.70E-05)	(4.90E-05)	(1.10E-04)	(5.40E-05)	(1.40E-04)	
74/10	74/10/21	74/10/30	2.20E-04	4.80E-05	2.20E-04	3.30E-04	6.50E-05	3.10E-04	----
			(9.70E-05)	(4.00E-05)	(9.30E-05)	(1.40E-04)	(7.10E-05)	(2.50E-04)	
74/11	74/10/30	74/11/04	8.80E-05	3.60E-05	2.20E-05	1.70E-04	-8.10E-05	8.80E-04	----
			(9.40E-05)	(3.90E-05)	(7.00E-05)	(1.70E-04)	(4.30E-05)	(4.30E-04)	
VOLUME WEIGHTED AVERAGES			1.10E-04	3.06E-05	9.23E-05	1.39E-04	1.45E-05	4.49E-04	
STD ERR MEAN * T95(N-1)			(3.70E-05)	(1.03E-05)	(4.43E-05)	(8.65E-05)	(2.54E-05)	(3.68E-04)	

*Results corrected for blank filter content. Statistical considerations as discussed in Eadie and Bernhardt (1976). Results shown are volume weighted arithmetic average with values in parenthesis being the standard error at the 95 percent confidence level based on the t-distribution for (n-1) degrees of freedom. Blanks indicate no results.

TABLE A-5. COMPOSITED MONTHLY AMBIENT AIR SAMPLING RESULTS* (in pCi/m^3)
AT CHUBBUCK SCHOOL, POCATELLO, IDAHO

YR/MO	DATE ON	DATE OFF	234U	235U	238U	230TH	232TH	226RA	TOTAL DUST LOAD $\mu g/m^3$
74/04	74/04/05	74/04/26	1.08E-04	1.26E-05	1.06E-04	1.64E-04	3.46E-05	5.22E-04	----
			(5.73E-05)	(1.76E-05)	(5.33E-05)	(2.11E-04)	(1.10E-04)	(7.30E-04)	
74/05	74/04/26	74/05/31	1.58E-04	2.23E-05	1.50E-04	1.51E-04	5.40E-06	4.95E-04	----
			(8.55E-05)	(1.62E-05)	(1.03E-04)	(7.22E-05)	(2.40E-05)	(5.19E-04)	
74/06	74/05/31	74/06/28	2.73E-04	3.06E-05	2.83E-04	3.02E-04	7.16E-05	8.93E-04	68
			(2.63E-04)	(4.31E-05)	(1.95E-04)	(3.71E-04)	(1.53E-04)	(3.62E-04)	
74/07	74/07/08	74/07/26	1.90E-04	1.80E-05	2.20E-04	3.30E-04	6.60E-05	2.30E-04	53
			(6.90E-05)	(1.90E-05)	(6.90E-05)	(9.50E-05)	(5.00E-05)	(1.40E-04)	
74/08	74/07/26	74/08/22	1.30E-04	1.20E-05	1.60E-04	2.70E-04	7.20E-05	1.80E-04	59
			(4.20E-05)	(1.30E-05)	(3.80E-05)	(7.20E-05)	(4.40E-05)	(1.10E-04)	
VOLUME WEIGHTED AVERAGES			1.73E-04	1.97E-05	1.83E-04	2.36E-04	4.69E-05	4.80E-04	
STD ERR MEAN * T95(N-1)			(5.30E-05)	(6.65E-06)	(5.02E-05)	(6.57E-05)	(2.66E-05)	(2.40E-04)	

*Results corrected for blank filter content. Statistical considerations as discussed in Eadie and Bernhardt (1976). Results shown are volume weighted arithmetic average with values in parenthesis being the standard error at the 95 percent confidence level based on the t-distribution for (n-1) degrees of freedom. Blanks indicate no results.

TABLE A-6. COMPOSITED MONTHLY AMBIENT AIR SAMPLING RESULTS* (in pCi/m^3)
HOWE VILLAGE, IDAHO

YR / MO	DATE ON	DATE OFF	234U	235U	238U	230TH	232TH	226RA	TOTAL DUST LOAD $\mu g/m^3$
77/07	77/07/01	77/07/28	3.02E-05	7.32E-06	2.92E-05	7.09E-05	6.08E-05	3.95E-05	50
			(1.59E-05)	(8.37E-06)	(1.78E-05)	(3.44E-05)	(5.88E-05)	(4.46E-05)	
77/08	77/07/28	77/08/26	3.95E-05	6.87E-06	4.10E-05	8.16E-05	3.96E-05	6.99E-05	36
			(5.16E-05)	(5.79E-06)	(6.47E-05)	(7.24E-05)	(3.16E-05)	(4.88E-05)	
77/09	77/08/26	77/09/02	1.10E-05	4.60E-06	6.90E-06	2.40E-05	3.10E-06	2.50E-04	16
			(1.20E-05)	(4.90E-06)	(1.20E-05)	(1.30E-05)	(3.10E-06)	(8.40E-05)	
VOLUME WEIGHTED AVERAGES			3.21E-05	6.81E-06	3.19E-05	7.03E-05	4.48E-05	7.71E-05	
STD ERR MEAN * T95(N-1)			(1.75E-05)	(2.65E-06)	(2.16E-05)	(2.76E-05)	(2.46E-05)	(5.41E-05)	

*Results corrected for blank filter content. Statistical considerations as discussed in Eadie and Bernhardt (1976). Results shown are volume weighted arithmetic average with values in parenthesis being the standard error at the 95 percent confidence level based on the t-distribution for (n-1) degrees of freedom. Blanks indicate no results.

TABLE A-7. COMPOSITED MONTHLY AMBIENT AIR SAMPLING RESULTS* (in pCi/m^3)
AT ARCO VILLAGE, IDAHO

YR/MO	DATE ON	DATE OFF	234U	235U	238U	230TH	232TH	226RA	TOTAL DUST LOAD $\mu g/m^3$
77/07	77/07/01	77/07/28	6.90E-05 (3.70E-05)	8.26E-06 (7.06E-06)	4.98E-05 (3.00E-05)	5.33E-05 (5.89E-05)	2.62E-05 (2.70E-05)	7.72E-05 (9.50E-05)	59
77/08	77/07/28	77/08/26	6.53E-05 (4.34E-05)	5.88E-06 (4.96E-06)	5.57E-05 (4.85E-05)	1.34E-04 (1.93E-04)	5.81E-05 (3.12E-05)	5.87E-05 (6.81E-05)	59
77/09	77/08/26	77/09/02	3.30E-05 (3.90E-05)	1.10E-05 (1.10E-05)	5.70E-05 (2.70E-05)	7.30E-05 (2.50E-05)	6.50E-05 (2.20E-05)	7.70E-05 (5.70E-05)	69
VOLUME WEIGHTED AVERAGES			6.33E-05	7.49E-06	5.33E-05	9.21E-05	4.50E-05	6.88E-05	
STD ERR MEAN * T95(N-1)			(1.91E-05)	(2.50E-06)	(1.72E-05)	(6.86E-05)	(1.82E-05)	(3.52E-05)	

*Results corrected for blank filter content. Statistical considerations as discussed in Eadie and Bernhardt (1976). Results shown are volume weighted arithmetic average with values in parenthesis being the standard error at the 95 percent confidence level based on the t-distribution for (n-1) degrees of freedom. Blanks indicate no results.

APPENDIX B

Composited Monthly Ambient Airborne Particulate Radioactivity Concentrations (pCi/g)

TABLE B-1. COMPOSITED MONTHLY AMBIENT AIR SAMPLING RESULTS* (pCi/g) AT HAYES FIRE STATION, POCATELLO, IDAHO

YR/MO	DATE ON	DATE OFF	234U	235U	238U	230TH	232TH	226RA
74/05	74/05/18	74/05/25	2.40E+00	4.60E-01	2.20E+00	2.00E+00	6.60E-01	4.20E+01
			(1.90E+00)	(5.00E-01)	(1.50E+00)	(2.40E+00)	(1.70E+00)	(1.10E+01)
74/06	74/05/25	74/06/15	3.78E+00	5.05E-01	3.56E+00	2.27E+00	8.49E-02	1.32E+01
			(4.53E+00)	(6.65E-01)	(2.71E+00)	(2.11E+00)	(1.13E+00)	(1.67E+01)
74/07	74/07/06	74/07/27	5.50E+00	1.90E-01	5.60E+00	5.60E+00	1.50E+00	3.20E+00
			(1.30E+00)	(2.20E-01)	(1.30E+00)	(1.80E+00)	(8.80E-01)	(2.50E+00)
74/08	74/07/27	74/08/31	----	----	----	4.80E+00	1.10E+00	3.30E+00
						(9.60E-01)	(4.40E-01)	(1.50E+00)
74/09	74/08/31	74/09/14	-1.40E-02	8.70E-03	4.50E-02	3.60E+00	5.60E-01	6.90E+00
			(1.90E-01)	(2.60E-02)	(1.60E-01)	(1.30E+00)	(6.10E-01)	(3.10E+00)
VOLUME WEIGHTED AVERAGES			2.93E+00	2.53E-01	2.90E+00	4.12E+00	8.59E-01	7.48E+00
STD ERR MEAN * T95(N-1)			(3.46E+00)	(2.71E-01)	(3.42E+00)	(1.19E+00)	(4.74E-01)	(6.82E+00)

*Results corrected for blank filter content. Statistical considerations as discussed in Eadie and Bernhardt (1976). Results shown are mass weighted arithmetic average with values in parenthesis being the standard error at the 95 percent confidence level based on the t-distribution for (n-1) degrees of freedom. Blanks indicate no results.

TABLE B-2. COMPOSITED MONTHLY AMBIENT AIR SAMPLING RESULTS* (pCi/g) AT SEWAGE PLANT, POCATELLO, IDAHO

YR/MO	DATE ON	OFF	234U	235U	238U	230TH	232TH	226RA
74/05	74/05/10	74/05/31	1.04E+01	4.16E-01	1.11E+01	7.33E+00	5.12E-01	1.09E+01
			(1.86E+01)	(5.26E-01)	(1.97E+01)	(1.31E+01)	(7.19E-01)	(1.37E+01)
74/06	74/05/31	74/06/28	8.78E+00	3.71E-01	9.17E+00	7.18E+00	6.09E-01	3.69E+00
			(6.43E+00)	(1.31E+00)	(6.69E+00)	(5.49E+01)	(8.49E+00)	(2.00E+01)
74/07	74/06/28	74/07/26	1.30E+01	1.10E+00	-1.40E-02	1.00E+01	1.20E+00	----
			(2.10E+00)	(4.70E-01)	(2.10E-01)	(1.10E+00)	(4.80E-01)	
74/08	74/07/26	74/08/30	5.40E+00	2.10E-01	5.40E+00	7.20E+00	1.10E+00	3.20E+00
			(6.30E-01)	(1.00E-01)	(6.20E-01)	(7.90E-01)	(3.20E-01)	(9.00E-01)
74/09	74/08/30	74/09/13	4.10E+00	2.30E-01	4.20E+00	6.60E+00	1.10E+00	6.40E+00
			(7.10E-01)	(1.20E-01)	(7.10E-01)	(1.10E+00)	(4.70E-01)	(2.00E+00)
VOLUME WEIGHTED AVERAGES			8.03E+00	4.49E-01	5.59E+00	7.69E+00	9.54E-01	5.26E+00
STD ERR MEAN * T95(N-1)			(3.92E+00)	(4.03E-01)	(3.49E+00)	(2.05E+00)	(2.99E-01)	(3.22E+00)

*Results corrected for blank filter content. Statistical considerations as discussed in Eadie and Bernhardt (1976). Results shown are mass weighted arithmetic average wit values in parenthesis being the standard error at the 95 percent confidence level based on the t-distribution for (n-1) degrees of freedom. Blanks indicate no results.

TABLE B-3. COMPOSITED MONTHLY AMBIENT AIR SAMPLING RESULTS* (pCi/g) AIRPORT, POCATELLO, IDAHO

YR/MO	DATE ON	OFF	234U	235U	238U	230TH	232TH	226RA
74/05	74/05/10	74/05/24	2.67E+00	4.55E-01	2.38E+00	1.94E+00	-2.02E-01	8.32E+00
			(9.90E+00)	(2.16E+00)	(6.70E+00)	(7.87E+00)	(7.11E+00)	(2.43E+01)
74/06	74/05/31	74/06/28	5.35E+00	4.08E-01	4.56E+00	4.84E+00	9.61E-01	6.28E+00
			(4.34E+00)	(6.96E-01)	(5.74E+00)	(6.44E+00)	(1.53E+00)	(9.31E+00)
74/07	74/06/28	74/07/26	4.20E+00	6.30E-01	5.50E+00	5.10E+00	2.40E+00	1.10E+01
			(1.30E+00)	(4.30E-01)	(1.40E+00)	(1.70E+00)	(1.10E+00)	(3.30E+00)
74/08	74/07/26	74/08/30	2.00E+00	1.50E-01	1.80E+00	4.00E+00	4.80E-01	-3.50E-01
			(5.30E-01)	(1.70E-01)	(4.60E-01)	(1.00E+00)	(4.60E-01)	(9.70E-01)
74/09	74/08/30	74/09/20	2.30E+00	2.80E-01	1.80E+00	5.70E+00	1.60E+00	2.40E+00
			(7.30E-01)	(3.00E-01)	(6.00E-01)	(1.30E+00)	(6.90E-01)	(2.20E+00)
VOLUME WEIGHTED AVERAGES			3.22E+00	3.48E-01	3.10E+00	4.50E+00	1.08E+00	4.52E+00
STD ERR MEAN * T95(N-1)			(1.44E+00)	(2.13E-01)	(1.90E+00)	(1.16E+00)	(8.51E-01)	(5.14E+00)

*Results corrected for blank filter content. Statistical considerations as discussed in Eadie and Bernhardt (1976). Results shown are mass weighted arithmetic average with values in parenthesis being the standard error at the 95 percent confidence level based on the t-distribution for (n-1) degrees of freedom. Blanks indicate no results.

TABLE B-4. COMPOSITED MONTHLY AMBIENT AIR SAMPLING RESULTS* (pCi/g) COURTHOUSE, POCATELLO, IDAHO

YR/MO	DATE ON	OFF	234U	235U	238U	230TH	232TH	226RA
74/05	74/05/06	74/05/23	3.08E+00	1.43E+00	1.63E+00	8.10E-01	4.33E-01	2.34E+01
			(1.36E+01)	(7.15E+00)	(1.24E+01)	(1.46E+01)	(8.71E+00)	(5.70E+01)
74/06	74/05/29	74/06/19	1.81E+00	7.22E-01	1.69E+00	1.27E+00	2.78E-01	1.50E+01
			(2.71E+00)	(6.19E-01)	(2.72E+00)	(2.04E+00)	(1.30E+00)	(1.80E+01)
74/08	74/08/23	74/08/27	----	----	----	-7.70E-01	-1.20E+00	2.80E+01
						(1.00E+00)	(2.50E-01)	(1.20E+01)
74/09	74/08/27	74/09/24	1.30E+00	2.90E-01	9.10E-01	3.10E+00	4.90E-01	-5.40E-01
			(7.10E-01)	(2.20E-01)	(6.30E-01)	(1.50E+00)	(6.90E-01)	(1.80E+00)
VOLUME WEIGHTED AVERAGES			1.61E+00	5.22E-01	1.20E+00	2.14E+00	3.10E-01	7.72E+00
STD ERR MEAN * T95(N-1)			(7.96E-01)	(4.30E-01)	(7.35E-01)	(1.58E+00)	(4.50E-01)	(1.32E+01)

*Results corrected for blank filter content. Statistical considerations as discussed in Eadie and Bernhardt (1976). Results shown are mass weighted arithmetic average with values in parenthesis being the standard error at the 95 percent confidence level based on the t-distribution for (n-1) degrees of freedom. Blanks indicate no results.

TABLE B-5. COMPOSITED MONTHLY AMBIENT AIR SAMPLING RESULTS* (pCi/g) AT CHUBBUCK SCHOOL, POCATELLO, IDAHO

YR/MO	DATE ON	DATE OFF	234U	235U	238U	230TH	232TH	226RA
74/05	74/05/09	74/05/31	3.85E+00	5.68E-01	3.77E+00	3.32E+00	9.26E-02	1.17E+01
			(3.25E+00)	(7.46E-01)	(3.59E+00)	(3.05E+00)	(9.74E-01)	(1.38E+01)
74/06	74/05/31	74/06/28	4.00E+00	4.43E-01	4.22E+00	4.53E+00	1.09E+00	1.29E+01
			(1.97E+00)	(6.30E-01)	(2.01E+00)	(2.91E+00)	(1.57E+00)	(7.08E+00)
74/07	74/07/08	74/07/26	3.50E+00	3.40E-01	4.00E+00	6.10E+00	1.30E+00	4.30E+00
			(1.30E+00)	(3.70E-01)	(1.30E+00)	(1.70E+00)	(9.10E-01)	(2.60E+00)
74/08	74/07/26	74/08/22	2.40E+00	2.00E-01	2.80E+00	4.40E+00	1.20E+00	3.10E+00
			(7.20E-01)	(2.20E-01)	(6.40E-01)	(1.20E+00)	(7.50E-01)	(1.90E+00)
VOLUME WEIGHTED AVERAGES			3.42E+00	3.80E-01	3.68E+00	4.52E+00	9.55E-01	8.32E+00
STD ERR MEAN * T95(N-1)			(9.24E-01)	(1.60E-01)	(8.13E-01)	(9.81E-01)	(4.59E-01)	(5.08E+00)

*Results corrected for blank filter content. Statistical considerations as discussed in Eadie and Bernhardt (1976). Results shown are mass weighted arithmetic average with values in parenthesis being the standard error at the 95 percent confidence level based on the t-distribution for (n-1) degrees of freedom. Blanks indicate no results.

TABLE B-6. COMPOSITED MONTHLY AMBIENT AIR SAMPLING RESULTS* (pCi/g) HOWE VILLAGE, IDAHO

YR/MO	DATE ON	OFF	234U	235U	238U	230TH	232TH	226RA
77/07	77/07/08	77/07/28	5.65E-01	1.59E-01	5.17E-01	1.49E+00	1.29E+00	7.10E-01
			(5.17E-01)	(3.86E-01)	(6.02E-01)	(1.64E+00)	(1.91E+00)	(1.40E+00)
77/08	77/07/28	77/08/26	1.03E+00	1.77E-01	1.05E+00	2.09E+00	1.05E+00	1.90E+00
			(1.32E+00)	(1.50E-01)	(1.61E+00)	(1.41E+00)	(5.74E-01)	(1.37E+00)
77/09	77/08/26	77/09/02	6.30E-01	2.80E-01	4.40E-01	1.50E+00	1.90E-01	1.20E+01
			(7.40E-01)	(3.00E-01)	(7.50E-01)	(8.20E-01)	(1.90E-01)	(4.40E+00)
VOLUME WEIGHTED AVERAGES			7.84E-01	1.73E-01	7.57E-01	1.76E+00	1.12E+00	1.87E+00
STD ERR MEAN * T95(N-1)			(5.00E-01)	(9.59E-02)	(5.99E-01)	(7.11E-01)	(4.94E-01)	(1.72E+00)

*Results corrected for blank filter content. Statistical considerations as discussed in Eadie and Bernhardt (1976). Results shown are mass weighted arithmetic average with values in parenthesis being the standard error at the 95 percent confidence level based on the t-distribution for (n-1) degrees of freedom. Blanks indicate no results.

TABLE B-7. COMPOSITED MONTHLY AMBIENT AIR SAMPLING RESULTS* (pCi/g) ARCO VILLAGE, IDAHO

YR/MO	DATE ON	DATE OFF	234U	235U	238U	230TH	232TH	226RA
77/07	77/07/08	77/07/28	1.18E+00	1.56E-01	8.75E-01	1.05E+00	4.68E-01	1.69E+00
			(5.19E-01)	(2.08E-01)	(4.57E-01)	(1.49E+00)	(1.29E+00)	(4.54E+00)
77/08	77/07/28	77/08/26	1.06E+00	9.33E-02	8.90E-01	2.20E+00	9.48E-01	9.05E-01
			(3.27E-01)	(7.98E-02)	(3.40E-01)	(2.29E+00)	(2.71E-01)	(1.22E+00)
77/09	77/08/26	77/09/02	4.70E-01	1.50E-01	8.10E-01	1.10E+00	9.30E-01	1.50E+00
			(5.50E-01)	(1.50E-01)	(3.80E-01)	(3.50E-01)	(3.20E-01)	(9.80E-01)
VOLUME WEIGHTED AVERAGES			1.01E-00	1.24E-01	8.73E-01	1.63E+00	7.74E-01	1.27E+00
STD ERR MEAN * T95(N-1)			(2.49E-01)	(5.03E-02)	(1.39E-01)	(1.05E+00)	(3.46E-01)	(8.92E-01)

*Results corrected for blank filter content. Statistical considerations as discussed in Eadie and Bernhardt (1976). Results shown are mass weighted arithmetic average with values in parenthesis being the standard error at the 95 percent confidence level based on the t-distribution for (n-1) degrees of freedom. Blanks indicate no results.

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16. ABSTRACT

Airborne particulate radioactivity levels of naturally occurring radionuclides were measured at seven sites near Pocatello, ID. At one of the sites (Pocatello Sewage Plant) airborne concentrations of natural uranium, radium-226, and thorium-230 were found to be higher than the levels measured at the other sites and about an order of magnitude greater than levels measured at the "background" location at the village of Howe. There appears to be some correlation between the measured concentrations at the sewage plant and meteorological data to indicate that the measured levels were probably due to e issions from the two phosphate plants in the area. Airborne concentrations at the other four locations in the Pocatello area, which are at least three miles from the two phosphate plants and are not in the predominant downwind direction, appear to be at background levels as reported by NCRP for Chicago and New York City and are within about a factor of three of levels measured at the "background" location at Howe. The airborne concentrations of uranium and radium measured at the villages of Howe and Arco were about an order of magnitude less than the reported NCRP "background" values, providing further indication that the ambient airborne particulate radioactivity measured in the Pocatello area was indeed elevated compared to the surrounding areas. Polonium-210 and lead-210 concen-trations have not been reported here due to technical difficulties encountered during the radiochemical analyses of these samples, but there were indications that these two radionuclides may have a significant radiological impact.

17. KEY WORDS AND DOCUMENT ANALYSIS		
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