

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

DATE: APR 29 1986

KIRK
40061

SUBJECT: Radioactivity in Samples Taken at the Combe Fill South Landfill

FROM: *for* Paul A. Giardina
Regional Radiation Representative

TO: John Czapor, Chief
Northern New Jersey Remedial Action Section

I am forwarding to you a copy of the Office of Radiation Program's reply concerning the above site. They concur in our recommendation for additional nuclide analysis at location #S-3 and #S-5. This analysis can be performed at the Eastern Environmental Radiation Facility if requested and funded by CERCLA.

In addition, they suggest the possibility of a search through the landfill records to determine the possible source of the radioactive contamination. They will also review the Remedial Investigation/Feasibility Study should you request it.

Please contact me at extension 4418 should you have any questions on this matter or wish to submit further material for evaluation.

cc: Conrad Simon, AWM
Laraine Koehler, AWM-RAD
Kirk Stoddard, ERRD-NJRA
Carol Jordan, OD/ORP (ANR-458)

303140



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 23 1986

OFFICE OF
AIR AND RADIATION

MEMORANDUM

SUBJECT: Combe Fill South Landfill - CERCLA Project
FROM: *Sheldon Meyers*
Sheldon Meyers, Acting Director
Office of Radiation Programs (ANR-458)
TO: Paul A. Giardina
Radiation Representative, Region 2

As you requested in your memorandum of April 7, 1986, the correspondence you forwarded related to the subject project has been reviewed by the Environmental Studies and Statistics Branch, Analysis and Support Division. There is not enough data in the material you have given us to permit intelligent speculation as to the identification of the source of the contamination. In your memorandum, you did not indicate if there are any records on the landfill or landfill users that might disclose the source of the radioactive contamination. Review of such records might help identify the radionuclide(s) and the amount disposed of in the landfill.

Your suggestion for more specific analysis is definitely in order. We recommend nuclide specific analyses at sites #S-3 and #S-5. If requested and funded by CERCLA, the Office of Radiation Programs could perform the analysis at the Eastern Environmental Radiation Facility.

The Office could also assist by reviewing the Remedial Investigation/Feasibility Study for this site.

cc: Carol J. Jordan, OD/ORP (ANR-458)
J. William Gunter, ESSB/ASD (ANR-461)
Charles R. Porter, ORP/EERF

303141

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

KICK

DATE: APR 9 1986

SUBJECT: Radioactivity in Samples Taken at the Combe Fill South Landfill
(Morris County, NJ)

FROM: Paul A. Giardina *Paul A. Giardina*
Regional Radiation Representative

TO: John Czapor, Chief
Northern New Jersey Remedial Action Section

This is in response to your April 4, 1986 request for assistance concerning the above site. The water sampling data does show two anomalously high levels of radiation in water (S-3 and S-5). What is of particular interest is the fact that S-3 has elevated gross alpha and gross beta while S-4 has only elevated gross beta.

I believe that additional sampling appears in order, however, specific analysis should be done to identify the specific radionuclides causing the elevated alpha and beta readings. It may be possible to identify the source(s) of the elevated levels relatively quickly and inexpensively by radiochemical analysis. Since you have not indicated your time frame for review, please take these as interim recommendations until I can have our Office of Radiation Programs review the matter.

Please let me know of any schedule for our review and comments.

cc: Conrad Simon, AWM
Laraine Koehler, AWM-RAD
Kirk Stoddard, ERRD-NJRA

303142

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

TE: APR 7 1986

SUBJECT: Radioactivity in Samples Taken at the Combe Fill South Landfill -
CERCLA Project

FROM: Paul A. Giardina
Regional Radiation Representative

TO: Carol Jordan (ANR-458)
Program Specialist
Office of Radiation Programs

J. William Gunter (ANR-461)
Chief, Environmental Studies and Statistics Branch
Office of Radiation Programs

Attached is correspondence related to the above-mentioned subject. I request assistance from the Office of Radiation Programs (ORP) in reviewing the correspondence attached from the Environmental Studies and Statistics Branch, and approval for this assistance from the Director of ORP. Specifically, my request is for the following:

1. Would a more specific analysis as I preliminarily suggested be in order?
2. What, if anything, should we expect?

I also assume that, if requested and funded by CERCLA, ORP could do the analysis.

Attachment

cc: Conrad Simon, AWM
John Czapor, ERRD-NJRA
Laraine Koehler, 2AWM-RAD

303143

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

APR 04 1986

Radioactivity in Samples Taken at the
Combe Fill South Landfill (Morris County, NJ)

John V. Czapor, Chief
Northern New Jersey Remedial Action Section

Paul Giardina, Radiation Representative
Air & Waste Management Division

This is to request your assistance, if possible, in interpreting anomalous levels of radioactivity detected in the groundwater and surface waters at the Combe Fill South Landfill, located in Washington and Chester Townships. Enclosed are data tables, a site map, and excerpts from the draft RI/FS report now being reviewed. We would appreciate any information you could provide as to whether the source is natural or unnatural. The Combe Fill South study is a state-lead remedial investigation/feasibility study. We understand that our state counterparts have provided their information to the Division of Environmental Quality for a similar review.

Thank you for your assistance in this matter. Kirk Stoddard is the project manager for this site and is thoroughly familiar with the data.

Enclosures

303144

ERRD: NARAB: NNJRAS: KSTODDARD: et al		CONCURRENCES		4/2/86	
SYMBOL	NNJRAS	NNJRAS			
SURNAME	STODDARD	CZAPOR			
DATE	4/3	4/16			

EPA Form 1320-1 (12-70)

OFFICIAL FILE COPY

ALSO: ^{241}m in smoke detectors (replaced Radium
[static eliminators] in 19__)

SUPPLEMENT to LANDFILL REPORT: RADIOACTIVITY

OR: Cathode tubes from AT&T/Bell Labs (Ra^{226})

Test results for radioactivity in the form of gross alpha and gross beta contamination were received by the Upper Raritan Watershed Association on May 27, 1981.

Princeton Testing Labs subcontracted the tests to Radiation Management, Inc. of Philadelphia, Pennsylvania which has an EPA certification to conduct such tests. Princeton is not certified to conduct radioactivity testing.

Radioactivity was measured in picocuries per liter (pci/l). A picocurie is that quantity of radioactive material producing 2.22 nuclear transformation per minute. U.S.E.P.A. Drinking Water Regulations (which apply only to public water supply systems used by twenty-five or more persons) set the maximum alpha particle activity at 15 pci/l. EPA regulations for beta activity are more complex and cover only radiation from man-made radionuclides. The limit is set at a total body dose or internal organ dose greater than 4 millirem per year, based on a two liter per day intake of water. A millirem is 1/1000 the amount of radiation which will cause the same biological effect as that due to one roentgen of x-rays.

The site of Combe Fill South is located in an area of known natural radioactivity from an element known as thorium. Thus, natural background radiation in the vicinity might be higher than in other areas. Exact data on natural background radiation are lacking at this time.

TEST RESULTS:

Test #	gross alpha	permissible counting error	gross beta	permissible counting error
G-5 (control)	1.05		2.56	
G-2 5646	3.49+2.8	79%	5.10+2.0	40%
G-4 Station 1	2.64		3.26+1.9	57%
S-1 Station 2	3.21		2.47+1.8	73%
S-2 Station 3	1.18		2.56	
S-3 Station 4	40.9+11	26%	33.4+3.7	11% - STRONG
S-4 5647	2.28		14+2.6	18% $\alpha \pm \beta$
S-5 5649	2.94		34.9+3.7	10%

SUMMARY:

Station S-3, located on the west branch of Trout Brook on the Tingu property, had the highest levels of gross alpha (40.9+11) and the second highest levels of gross beta (33.4+3.7).

Station S-5, located within the landfill at the head of the east branch of Trout Brook, recorded the highest gross beta level (34.9+3.7).

Ground water samples generally showed lower amounts of both alpha and beta activity. The highest gross alpha reading (3.49+2.8) came from Site G-2, a shallow well (+20') just to the rear of the Filiberto residence. The same site also showed the highest gross beta reading (5.10+2.0).

303145

CONCLUSION:

At present it is not possible to determine if the radioactivity measured by these tests is caused by purely natural activities, natural activities aggravated by the landfilling action or by radioactive substances deposited in the fill.

However, it is clear that the West Branch of Trout Brook contained elevated levels of radioactivity in comparison to the other sites tested. Radioactive activity at this site exceeded the EPA standard for drinking water by 2.6 times. If this were a potable water source for 25 individuals, it would be in violation of the Federal standards.

In addition, the higher beta activities recorded at S-5 may indicate the presence of radioactive material in the older section of the fill. Whether or not this material is natural or man-made, could not be determined by this sampling process.

Groundwaters showed generally lower concentrations of radioactive activity. However, G-2 showed levels of gross alpha over 3 times the levels found in the control groundwater sample (G-5) and roughly twice the gross beta activity.

RECOMMENDATIONS:

1. Testing for gross alpha and gross beta be continued in residential well tests. Cost is low (\$6.00/sample for gross alpha, \$8.00 for gross beta).
2. An attempt be made to establish more accurate background data for the area as a whole.
3. An attempt be made to trace the source of the radioactive activity at S-3.
4. Make testing for radioactivity mandatory for all new wells established in areas of known radioactive occurrence.
5. Attempt to ascertain whether the landfill has or could have accepted radioactive materials in the past.

303146

radiation in drinking water is a total dose of 4 mr/yr, the drinking water regulations for community water supplies require that when the beta counts exceed 50 pCi/l, analyses must be performed to identify the concentrations of beta-emitting radionuclides. These analyses are performed in order to determine whether isotopes are present, causing annual beta radiation doses in excess of the millirems standard. Tritium and strontium-80 are usually the first parameters for which testing is performed, followed by analysis for cesium-134, barium-131, and iodine-131.

The URWA report also stated that, because of the elevated levels of gross beta in the East Branch of Trout Brook at station S-5, there may be a man-made source of radioactive material in the older (north and east) sections of the landfill.

7.3.2 Results of RI Sampling

COMBE FILL SOUTH

Selected potable wells, monitoring wells, surface waters, and leachate seeps were sampled for gross alpha and beta parameters during this RI/FS. Figure 7-2 shows the locations of monitoring wells, leachate seeps, and potable wells sampled for gross alpha and beta activity. Figure 7-3 shows the locations of surface water sites sampled for gross alpha and beta activity. Table 7-2 presents a summary of the gross alpha and beta assays.

Monitoring wells S-3 and S-4, both screened in the saprolite aquifer, had the highest groundwater gross alpha concentrations of 13 ± 12 pCi/l and 13 ± 7.8 pCi/l, respectively, which are close but below the MCL. These concentrations do, however, exceed the public water supply screening concentration of 5 pCi/l for gross alpha radioactivity, which would require testing for radium-226. None of the monitoring wells had elevated gross beta readings.

303147

Table 7-1

COMBE FILL SOUTH LANDFILL
RADIATION MONITORING DATA DURING DRILLING
AND GEOPHYSICAL WELL LOGGING OPERATIONS

WELL #	D-1	D-2	D-3	D-4	D-5	D-6	D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8	D-9
DEPTH															
0	NT	0.02	NT	0.03	0.03	NT	0.03	0.02	0.03	NT	0.02	0.02	0.03	0.04	0.02
5	NT	N	NT	N	N	0.02	N	0.03	N	NT	N	NT	N	N	0.02
10	NT	N	NT	0.01	N		N		N	NT	0.04	NT	N	N	0.03
15	NT	N	NT	N	N	N	N	N	N	NT	N	NT	N	N	NT
20	NT	N	NT	N	N	N	NT	N	N	NT	N	NT	N	N	NT
25		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
30		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
35		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
40		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
45		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
50		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
55		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
60		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
65		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
70		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
75		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
80		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
85		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
90		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
95		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
100		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
105		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
110		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
115		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
120		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
125		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
130		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
135		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
140		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
145		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
150		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
155		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
160		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
165		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
170		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
175		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
180		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
185		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
190		N	NT	N	N	N	NT	N	N	NT	N	N	NT	N	0.02
WELL HEAD 1															
WELL HEAD 2															

COMMENTS: All readings are in millirem per hour.
All measurements are to the nearest five feet in depth.
NT indicates that a reading was Not Taken.
N indicates that the reading was less than or equal to background.
BG indicates a background reading prior to geophysical well logging operations.
WELL HEAD 1 and 2 are radiation readings taken prior and after gamma-gamma or density well logging.

