



State of Ohio Environmental Protection Agency

Southwest District Office

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OH.07-3  
Reff

George V. Voinovich  
Governor

August 13, 1998

RE: RUNNYMEDE PLAYHOUSE SITE  
DAYTON UNIT IV, PRS 323

Mr. Mike Kelly  
City Manager  
City of Oakwood  
30 Park Avenue  
Oakwood, Ohio 45419

RECEIVED  
AUG 13 1998  
B02292

Dear Mr. Kelly,

Enclosed are documents pertaining to the May 5, 1998 surface soil sampling event which took place at the former Runnymede Playhouse site and surrounding areas. The "PRS 323 Dayton Unit IV Soil Screening Results, Interim Report" contains a full account of the event, as well as presentation and interpretation of analytical results. We are also supplying you with the related citizens advisory and fact sheet which will be made available to the press and public on Friday, August 14. The full report will also be available to the public at that time.

As we discussed, an Ohio EPA representative will be personally distributing the news release and fact sheet to residents in the immediate area. This will take place the morning of August 14.

If you have any questions or concerns, feel free to contact me at (937)285-6468 or Lisa Anderson at (937)285-6599.

Sincerely,

*Lisa Anderson for*

Brian Nickel  
Project Manager  
Office of Federal Facilities Oversight

Enclosures (3)

cc: Tom Winston, Ohio EPA  
Graham Mitchell, Ohio EPA  
James Karsten, U.S. Army Corps of Engineers  
Jane Greenwalt, DOE

Art Kleinrath, DOE  
Ruth Vandegrift, ODH  
Karen Bryant, Ohio EPA  
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State of Ohio Environmental Protection Agency

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August 14, 1998

## Citizen Advisory

### Ohio EPA Issues Soil Screening Results on Oakwood Site Previously Used to Process Polonium

Ohio EPA today issued soil screening results from Oakwood's former Runnymede Playhouse located near Dixon Avenue and Runnymede Road. The Ohio Department of Health (ODH) has determined that there are no current adverse health or safety impacts from continued normal use of the properties

In May, Ohio EPA and ODH, with assistance from the U.S. Department of Energy (DOE) conducted a radiological walk-over survey and collected surface and core soil samples from the former Runnymede Playhouse site and from other locations downslope of the site.

The area is identified by the DOE as Potential Release Site (PRS) 323. A PRS is a location previously used by the federal government for work which involved radioactive materials and/or chemicals, and which may have been contaminated. During the 1940s, the federal government rented the playhouse and processed radioactive materials for the Manhattan Project, which produced the atomic weapons.

The radiological walk-over survey did not detect anything unusual. Surface soil samples were taken from 10 locations, four of which also yielded core samples, and were tested for Polonium. Polonium-210 occurs naturally in the environment at low, background levels of 1 to 3 picocuries per gram (pCi/g) of soil. Five of six surface samples and eight of 14 core samples showed normal, background levels of Polonium. The seven samples which showed slightly elevated levels had readings which ranged from 5.5 to 16.0 pCi/g, with higher readings generally found at depths greater than one foot. (Core samples were taken at depths ranging from one to six feet.)

The elevated readings from core samples, along with uncertainties in historic drainage patterns and uncertainties in the exposures possible from future excavation, warrant further evaluation to determine potential future health risks.

## Potential Release Site (PRS) 323 Dayton Unit IV

### Introduction

The Ohio Environmental Protection Agency (Ohio EPA) has prepared this fact sheet to summarize the investigation relating to the Potential Release Site (PRS) 323 (also known as Dayton Unit IV) located northwest of the intersection of Runnymede and Dixon Avenue in the City of Oakwood, Ohio.

A PRS is a location previously used by the federal government at the Mound facility for work which involved radioactive or other hazardous materials, and which may have been contaminated.

As a result of public comments and as part of an ongoing investigation and the cleanup of the Mound facility associated with the U.S. Department of Energy (DOE) Miamisburg Environmental Management Project (MEMP), a routine radiological survey was conducted and soil samples were taken at the site.

### Site Background

PRS 323 is a site which was formerly used for the processing of polonium, a radioactive material, during the federal government's Manhattan Project which produced atomic weapons. PRS 323 is the former location

of the Runnymede Playhouse.

In 1944, the playhouse, part of the Talbot family property, was rented to the Army Corp of Engineers for polonium processing.

In 1948 all activity was stopped and the facility was demolished and removed. According to reports, no materials were buried on site, sent to city landfills or other disposal facility. All of the radioactive waste was packaged and shipped to Oak Ridge National Laboratories in Oak Ridge, Tennessee for burial.

In 1950, the site was transferred back to the Talbot family.

### Materials

Polonium-210 and Lead-210, both radioactive materials, were processed at PRS 323. All radioactive materials are classified by the U.S. Environmental Protection Agency (U.S. EPA) as Class A carcinogens which have been shown to cause cancer in humans. Polonium has been identified as a risk factor for lung cancer.

Polonium-210 occurs naturally in the environment at low (background) levels. 1-3 picocuries per gram of soil (pCi/g) is considered an average low

range in this part of the Ohio region. These ranges could vary in different areas. A picocurie is a unit of measure for radioactivity.

### Soil Sample Results

As a result of public comments from local residents and city officials on another Mound site in the Dayton area - PRS 322, an agreement was reached between Ohio EPA, DOE, Ohio Department of Health (ODH), and the City of Oakwood to take soil samples at PRS 323 as a screening measure.

A public meeting was held on March 11, 1998 to answer questions, take comments, explain our preliminary results at PRS 322, and outline our plan for future sampling at that site. We also presented our time line to start sampling at the Oakwood site.

On May 5, 1998, 20 samples were taken at PRS 323; 14 of which were core samples. Core samples are soil samples taken one to six feet underground.

Thirteen samples showed normal levels. Seven of the samples showed elevated levels of polonium-210. The higher readings were generally found at depths greater

than one foot.

(Results range = 5.5 - 16.0 pCi/g)

### Health Concerns

Based on these results, ODH has determined that while some of the readings were higher than expected, there are no current adverse health or safety impacts from continued normal use.

### The Next Step

Elevated readings from the core samples, plus uncertainties in historic drainage patterns and possible exposure from future excavation warrant further evaluation of the site.

Discussion between Ohio EPA, U.S. Army Corp of Engineers, ODH, and Oakwood City officials have resulted in a future course of action that may include additional historic research and core samples which may help outline any potential future health risk.

The U. S. Army Corp, Louisville District, will become the lead agency for further evaluation of this site. The Corps expects to develop an action plan within 90 days.

**Ohio Environmental Protection Agency**  
**PRS 323 Dayton Unit IV Soil Screening Results**  
**Interim Report**

**July, 1998**

**Executive Summary**

PRS 323 (Dayton Unit IV) is one of over 400 PRS's (Potential Release Sites) included in the DOE Miamisburg Environmental Management Project (MEMP) Mound cleanup decision-making strategy known as "Mound 2000". PRS 323 is located in a residential area in the City of Oakwood, Ohio. The site has a history of polonium-210 processing that occurred during the federal government's Manhattan Project. Because no known analytical soil sampling data had been collected for the site, further information was needed to determine if the site was contaminated. DOE MEMP, USEPA, Ohio EPA and the City of Oakwood agreed that Ohio EPA would sample soils at PRS 323 to screen for potential contamination.

Sampling was conducted on May 5, 1998. Of the twenty samples collected and analyzed, four exhibited levels of polonium-210 above expected values. Although the screening data indicate that no current health risks exist at the site due to polonium-210 contamination, further evaluation of PRS 323 is recommended to better define contamination and to evaluate potential future health risks at the site. Existing sample results and all related information should be presented to U.S. Army Corps of Engineers, as the Corps will become lead agency for further evaluation of the site.

**1.0 Introduction**

The U.S. Department of Energy (DOE) MEMP Mound facility contains over 400 sites (called Potential Release Sites or PRS's) where potential releases of hazardous materials may have occurred. In order to accelerate cleanup of the Mound facility and make it available for economic development, a decision-making strategy was developed which addresses the potential for contamination at each of the PRS's. This process is known as "Mound 2000". PRS 323 (known also as Dayton Unit IV) is located in the City of Oakwood and is not part of the Mound property. DOE MEMP consulted with Ohio EPA, Ohio Department of Health and USEPA Region V regarding how to proceed with PRS 323 since it appears in the Mound Operable Unit 9 Site Scoping Report (DOE, 1994). Consistent with the Mound 2000 process, DOE MEMP solicited public input before concluding that PRS 323 required no further assessment. No known analytical soil sampling data had been previously collected for the site. As a result, the stakeholders expressed their concerns through their involvement in the public comment process. The State of Ohio, DOE MEMP and the City of Oakwood

agreed that the Ohio Environmental Protection Agency (Ohio EPA) would obtain samples at PRS 323 to screen for potential contamination.

## **2.0 Site Background**

### **2.1 Site Description**

Potential Release Site (PRS) 323 is a site which was formerly used for chemical and metallurgical processing of polonium during the federal government's Manhattan Project. The purpose of the Manhattan Project was to develop an atomic bomb, and polonium was needed as a neutron source that would initiate a necessary chain reaction. PRS 323, also known as Unit IV, is located northwest of the intersection of Runnymede and Dixon Avenue in Oakwood, Ohio. PRS 323 is the former location of the Runnymede Playhouse. The playhouse, part of the Talbott family property, was rented to the Army Corps of Engineers in 1944 for polonium processing (Monsanto, 1969). Operations ceased at Unit IV in 1948, and the facility was demolished and removed. According to records, no materials were buried onsite, sent to city landfills or other disposal facilities. The resulting radioactive wastes were packaged and shipped to Oak Ridge National Laboratories in Oak Ridge, Tennessee for burial (Monsanto, 1979). In 1950, the site was transferred back to the Talbott family (Monsanto, 1950).

### **2.2 Process History**

The government first obtained polonium-210 ( $^{210}\text{Po}$ ) from lead dioxide wastes generated by the Port Hope radium refinery which was located in Ontario, Canada. The lead dioxide contained naturally occurring lead-210 ( $^{210}\text{Pb}$ ), which decays to  $^{210}\text{Po}$ , present at 1 to 3 curies per ton of lead dioxide. The lead dioxide was treated with nitric acid and hydrogen peroxide. The pH of this solution was then raised to create a precipitate which contained the  $^{210}\text{Po}$  (U.S. AEC, 1956).

In 1944, the government began using a more efficient method for obtaining  $^{210}\text{Po}$ . This method, thought to be used at PRS 323, involved the irradiation of bricks containing bismuth-209 via neutron bombardment. In this process, the resulting bismuth-210 has a half-life of 5.4 days, subsequently decaying to  $^{210}\text{Po}$ . This step was performed at the Clinton Reactor in Oak Ridge, Tennessee. The irradiated bricks were then transported to one of the Dayton Project units, apparently Unit IV (PRS 323), where  $^{210}\text{Po}$  was chemically separated from the bricks. (Lamberger, 1998).

In 1945, it was determined that the bismuth process was superior to the lead dioxide process for the manufacture of  $^{210}\text{Po}$ . The equipment used in the lead dioxide process was dismantled

and shipped to Oak Ridge, Tennessee, and facilities for the bismuth process were constructed (Monsanto, 1950).

### **3.0 Sampling Objectives**

Ohio EPA's objective for sampling at PRS 323 was to screen for residual  $^{210}\text{Po}$  in the soils due to historical polonium processing at the site, although with a half-life of 138 days, any residual polonium should have decayed to stable lead-206. Analysis for  $^{210}\text{Po}$  also allows the indirect testing for the presence of residual lead-210 which was historically used in the production of  $^{210}\text{Po}$  and which decays to  $^{210}\text{Po}$ . In addition to testing for residual  $^{210}\text{Po}$ , soils were analyzed for gamma emitting radionuclides using gamma spectroscopy. The gamma emitting radionuclides were associated with the process in trace quantities.

### **4.0 Sampling and Analytical Methods**

#### **4.1 Sample Collection and Field Methods**

On May 5, 1998 Ohio EPA, DOE MEMP and ODH conducted soil sampling at PRS 323 in accordance with the Sampling and Analysis Plan, PRS 323, Dayton Unit IV (OEPA, 1998). Sampling was performed to screen for the potential presence of residual  $^{210}\text{Po}$  and gamma-emitting radionuclides.. Sampling locations are shown in Appendix B. A total of ten different locations were sampled.

During the sampling event, The Ohio Department of Health (ODH) performed a walkover survey of PRS 323 and surrounding areas. The survey indicated that no areas of elevated risk were identified using surface scanning techniques. See Appendix A for the ODH Inspection Report.

Deviations from the Sampling and Analysis Plan include:

1. Shallow core C3: An additional interval was collected and sent for laboratory analysis beyond the specifications of the Sampling and Analysis plan (the 3-4 ft interval).
2. Separate sets of disposable sampling equipment (plastic scoop and aluminum soil mixing tray) were used at each sampling location and disposed of after use. Therefore, Standard Operating Procedure 1.6 for General Equipment Decontamination was not applicable.

Aside from the above, no deviations from the Field Sampling and Analysis Summary or Standard Operating Procedures occurred.

At deep core C1, refusal was reached at between 6 and 7 feet. This is the deepest interval obtained at the C1 location. At deep core C2, refusal was reached at just beyond 6 feet. Therefore, the deepest interval obtained at that location is the 5 to 6 foot interval. At both locations C1 and C2, the surface interval (0-1 ft) was collected and analyzed. As specified in the Field Sampling and Analysis Summary, intervals from 5 ft to refusal were collected and analyzed, and intervals between 1 ft and 5 ft were collected but not analyzed. Analysis of the surface and deep samples only was based on expected fill depth.

#### 4.2 Analytical Methods

The samples were analyzed for various radionuclides utilizing both gamma spectroscopy and alpha spectroscopy methods. The samples were analyzed for  $^{210}\text{Po}$  by alpha spectroscopy. Gamma spectroscopy was used to screen the samples for trace quantities of gamma emitting radionuclides associated with polonium processing that may be present in the samples.

The alpha spectroscopy method is performed by chemically separating the element of concern, i.e. polonium. The separated element is "plated" onto a planchette which is then counted in a specially designed alpha particle counter, which measures the number of alpha particles emitted as well as the energy of the emitted alpha particle. This information allows the radiochemist to determine which isotopes of the separated element are present in the sample.

The gamma spectroscopy method is performed by placing a prepared portion of the soil sample in a container which is placed under a high purity germanium detector. This detector counts the emitted gamma rays and their specific energies. The resulting spectrum acts as a "fingerprint" for the sample. A computer code is used to separate the spectrum into specific radionuclides present in the sample.

Samples were analyzed by Thermo NuTech in Albuquerque, New Mexico. Excess sample material not needed for laboratory analysis is being held by the Thermo NuTech until instructions are given for disposal.

### 4.3 Data Validation

Radiological data was validated without qualification by the Ohio Department of Health.

### 5.0 Results

Six surface samples were analyzed for Po-210 by alpha spectroscopy, and a gamma spectrum was counted for each sample. A summary of the surface sample results from the uranium-238 decay chain are shown in Table 5.1

Table 5.1

| Sample ID | Po-210 | Bi-214 | Pb-214 | Ra-226 | Th-234 | U-238 |
|-----------|--------|--------|--------|--------|--------|-------|
| S1-1      | 1.4    | 1.2    | 1.2    | 1.1    | NR     | 1.5   |
| S2-1      | 1.1    | 1.2    | 1.5    | 1.1    | NR     | <1.5  |
| S3-1      | 2.0    | 1.1    | 1.0    | 1.0    | 2.8    | <2.9  |
| S4-1      | 1.0    | 1.4    | 1.6    | 1.4    | NR     | <3.6  |
| S5-1      | 9.0    | 0.92   | 1.1    | 0.9    | NR     | <2.3  |
| S6-1      | 1.1    | 1.1    | 0.9    | 1.1    | NR     | <3.0  |

NR indicates not recorded.

Four cores were drilled allowing for samples at multiple depths from each core to be analyzed. Table 5.2 lists core sample results for the U-238 decay chain, sorted by sample depth.



Table 5.2

| Depth, ft | Sample ID | Po-210 | Bi-214 | Pb-214 | Ra-226 | U-238 |
|-----------|-----------|--------|--------|--------|--------|-------|
| 1         | C1-1      | 1.4    | 1.2    | 1.3    | 1.2    | <3.2  |
|           | C2-1      | 1.8    | 1.3    | 1.2    | 1.2    | <3.1  |
|           | C3-1      | 3.1    | 1.2    | 1.2    | 1.2    | <2.3  |
|           | C4-1      | 2.5    | 1.2    | 1.5    | 1.2    | <2.7  |
| 2         | C3-2      | 16     | 2.1    | 2.5    | 2.0    | <3.7  |
|           | C3-2D     | 2.5    | 2.0    | 2.4    | 2.0    | <1.8  |
|           | C4-2      | 10     | 1.6    | 1.8    | 1.6    | <1.6  |
| 3         | C3-3      | 3      | 1.7    | 2.0    | 1.6    | <4.0  |
|           | C4-3      | 6.2    | 2.7    | 2.7    | 2.6    | <1.8  |
| 4         | C3-4      | 3      | 1.3    | 1.5    | 1.2    | <1.6  |
| 6         | C1-6      | 5.5    | 1.5    | 1.5    | 1.4    | <1.7  |
|           | C1-6D     | 5.9    | 1.4    | 1.6    | 1.4    | <1.7  |
|           | C2-6      | 1.4    | 0.92   | 1.2    | 0.89   | <2.7  |
| > 6       | C1-R      | 2.8    | 1.4    | 1.5    | 1.3    | <1.6  |

## 6.0 Discussion of Results

The results ranged from 1.0 pCi/g to 16 pCi/g. The highest concentrations were generally at depths greater than one foot, with the exception of one surface sample with a concentration of 9.0 pCi/g. The results indicate the presence of Po-210 in concentrations greater than expected values (1-3.5 pCi/g).

### 6.1 Surface Samples

Of the six surface samples collected, five were at expected values, while one sample, S5-1, appears to be elevated. This result, 9.0 pCi/g, does not appear to be in equilibrium with its parent radionuclides in the uranium-238 chain, as one would expect if the concentration was naturally occurring. The other five samples appear to be in equilibrium with the parent

radionuclides that were measured. Refer to Table 5.1

## **6.2 Core Samples**

The core samples were analyzed at varying depths, ranging from 1 foot to greater than 6 feet. The results indicate slightly elevated concentrations present in the soil samples taken at depths greater than one foot. The maximum concentration measured was 16 pCi/g at 2 feet, location C3-2. The field duplicate for this sample was 2.5 pCi/g, which may indicate a high degree of heterogeneity in the sample, or some other anomaly in the data. The other results ranged from 1.4 pCi/g to 10 pCi/g, all at depths greater than one foot. Again, the elevated readings are not consistent with the parent radionuclides in the uranium-238 decay chain.

## **9.0 Conclusion**

The data collected from the screening samples at PRS 323 indicate concentrations of Po-210 in soils at greater than expected values. The process history in available documents indicates that the  $^{210}\text{Pb}$  process likely occurred at PRS 323 for a year. The presence of Po-210 in the soils cannot be explained from the data collected but supports that the  $^{210}\text{Pb}$  process was used initially at PRS 323.

## **10.0 Health Risk**

Based on the sample data and radiological survey conducted by the Ohio Department of Health (Appendix A), there is no immediate health risk at the site.

## **11.0 Recommendations**

The remainder of the soil samples not used in laboratory analysis should be analyzed for  $^{210}\text{Pb}$  to aid in determining the source of the  $^{210}\text{Po}$ . Samples results and all related information should be presented to the U.S. Army Corps of Engineers to determine a specific path forward. The U.S. Army Corps of engineers, Louisville District will become lead agency for further evaluation of the site.

REFERENCES

1. DOE, 1994. Operable Unit 9 Site Scoping Report: Volume 12 Site Summary Report, Final, Appendix A.1 (December 1994).
2. Monsanto, 1969. History of the Dayton Project, Monsanto Research Corporation, Mound Labora -8-tory, Miamisburg, Ohio, pages 35-46 (June 1969).
3. Monsanto Research Corporation, 1979. Historical Resume of Monsanto Operation of the Dayton Project Sites - Units I, II, III, IV, V and others. Waste Disposal 1943-1980. Unpublished Report (December 1979).
- 4.. Monsanto, 1950. Report No. 3 of Steering Committee for the Disposal of Units III and IV, (completion Report for Disposal of Unit IV, Runnymede Road and Dixon Avenue, Dayton, Ohio), Monsanto Chemical Company Report No. MLM-461, Mound Laboratory, Miamisburg, Ohio, pages 152-260 (April 17 1950).
5. OEPA, 1998. Sampling and Analysis Plan, PRS 323, Dayton Unit IV. Ohio Environmental Protection Agency (April 1998).
5. U.S. AEC, 1956. Polonium. Harvey V. Moyer, editor. U.S Atomic Energy Commission (July 1956).
6. Lamberger, 1998. Personal interview with Paul Lamberger, former Mound Plant employee (January 1998).

**APPENDIX A**

**Ohio Department of Health  
PRS 323 Inspection Record**


INSPECTION RECORD

Facility: Mound PRS 323  
Runnymede Playhouse  
Oakwood, Ohio

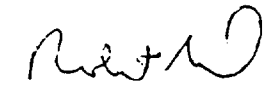
Date of This Inspection: 5/4/98

Type of Inspection: (X) Announced ( ) Unannounced  
( ) Routine (X) Special  
( ) Initial

Inspector(s)

  
Frank Talbot

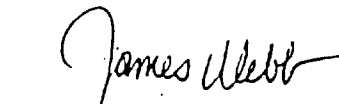
Date 6/29/98

  
Robert Reid

Date 6/30/98

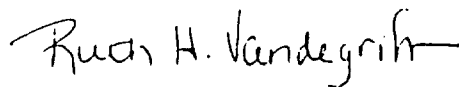
  
Charles McCracken

Date 6/29/98

  
James Webb

Date 6/29/98

Approved

  
Ruth Vandegrift

Date 6/29/98

## Runneymede Playhouse Survey

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### Purpose and Scope

The Ohio Department of Health (ODH) involvement on this site is directly related to ODH involvement at the Mound facility decommissioning. The Runneymede Playhouse Site was identified as an area of use by the Mound Facility during the decommissioning process at the Mound Site. This site was decommissioned by the Department of Energy's predecessor, the Atomic Energy Commission, during the 1950's. At that time, all identified contaminated material was removed from the site.

### Personnel

ODH, Ohio Environmental Protection Agency (OEPA), and United States Department of Energy (DOE) staff were on-site. Occurring at the same time as the walkover, OEPA and DOE staffers were involved in acquiring surface soil samples from the site. Radiological job coverage for this evolution was provided by ODH personnel.

### Instrumentation Used

| Instrument           | Serial Number | Calibration Due Date |
|----------------------|---------------|----------------------|
| Bicron $\mu$ rem     | B 513 B       | 5/20/98              |
| Bicron $\mu$ Analyst | B 647 E       | 2/99                 |
| Ludlum 18            | 120031        | 7/25/98              |
| Ludlum 12            | 18359         | 2/99                 |
| Ludlum 12-4          | 26215         | 6/25/98              |

All instruments were source checked and determined to be in proper operating condition prior to use. The source used for source checking ODH #A002 1.01  $\mu$ Ci Cs 137.

| Instrument           | Background            | Source Check     |
|----------------------|-----------------------|------------------|
| Bicron $\mu$ rem     | 2.5 $\mu$ rem/hr      | 135 $\mu$ rem/hr |
| Bicron $\mu$ Analyst | 3.8 $\mu$ R/hr        | 120 $\mu$ R/hr   |
| Ludlum 18            | 1220 cpm with 1x1 NaI | 140,000 cpm      |
| Ludlum 12            | 30 cpm with 44-9 GM   | 10,000 cpm       |

| Instrument  | Background            | Source Check |
|-------------|-----------------------|--------------|
| Ludlum 12-4 | 3200 cpm with 2x2 NaI | 160,000 cpm  |

Background radiation measurements were made with each instrument in representative areas which were believed to be unaffected. Additional measurements were obtained in areas which were remote from the site but consisting of similar geology. All remote sites were within the borders of Oakwood. Those remote measurements were within 10% of the background measurements recorded at the site.

#### ODH Staff

Frank Talbot, James Webb, Robert Reid, and Charles McCracken traveled to Oakwood and performed this survey.

#### Field Changes

Two field changes were made during the survey;

The first change was the determination that only a dose rate survey would be performed within the creek bed and surrounding area. The reason for not also performing a count rate survey in this area was the identification of poison ivy overgrowth in the area. It was determined that the risk of exposure from a second survey was not justified because the dose rate readings within the creek and in the surrounding area were at background levels.

The second field change was that no alpha scintillometer measurements would be taken on paved areas. This change was the result of the fact that all paved areas at the site which were placed prior to the Playhouse demolition had been removed. These areas were screened using both dose rate and count rate instruments.

#### Results

All accessible areas were scanned using both dose rate and count rate detectors. Areas that were overgrown were scanned to a lesser degree, but met the requirements of Draft NUREG CR/5849 and the Sampling and Analysis Plan for the site. Additional scanning was performed on several pieces of pipe that projected from the ground and is believed to be part of the former facility's fencing. No areas were detected that exceeded 1.5 times the recorded background measurements.

The storm water swales to the south of the site were surveyed. Particular attention was paid to the grates covering the storm sewers in this area. The creek at the extreme southern end of the

## Runnymede Playhouse Survey

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swale was scanned using a dose rate meter as discussed above. No areas exceeding 1.5 times the recorded background were detected.

All soil samples were scanned prior to packaging. No soil samples were contaminated.

### Findings

No areas of contamination were detected. No soil with detectable levels of contaminated was prepared for shipment. None of the areas from which soil samples were procured measured above background. No areas with elevated risk were identified by surface scanning techniques.



**APPENDIX B**

**PRS 323 Soil Sampling Locations**

THRUSTON BL

KATHERINE TE

RUNNY MEDE

PRS 323 Soil Samples

- ⊗ - Core Soil Sample Location
- ⊗ - Surface Soil Sample Location

S2 ⊗

S1 ⊗

C1 ⊗

C3 ⊗

C2 ⊗

C4 ⊗

S3 ⊗

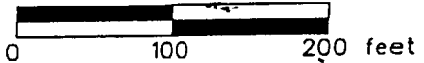
S4 ⊗

S5 ⊗

S6 ⊗



SCALE



**APPENDIX C**

**PRS 323  
Soil Sampling Results Map**

Po-210 in pCi/g

- - 1.00-3.50
- ◐ - 3.50-8.00
- - 8.00 and above

S6/1.1 ○

S5/9.0 ●

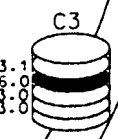
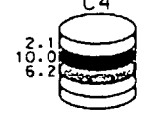
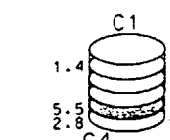
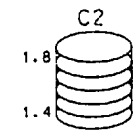
RUNNY MEDE

S3/2.0 ○

S4/1.0 ○

S2/1.1 ○

S1/1.4 ○



**OhioEPA**

SCALE

