DOE F 1325.8 (8-89) EFG (07-90)

PA.11-3

United States Government

Department of Energy

memorandum

8452

PA.11

DATE: OCT 08 1992

REPLY TO ATTN OF: EM-421 (W. A. Williams, 903-8149)

SUBJECT: Authorization for Remedial Action at the Former C. H. Schnoor & Company Site, Springdale, Pennsylvania

TO: Manager, DOE Oak Ridge Field Office

This is to notify you that the former C. H. Schnoor & Company facility in Springdale, Pennsylvania, is designated for remedial action under the Formerly Utilized Sites Remedial Action Program (FUSRAP). This notification does not constitute a FUSRAP baseline change control approval. Approval of the baseline change will be accomplished through the normal baseline change control procedures.

The site was used by the former Manhattan Engineer District for the machining and shaping of uranium metal during the 1940s. A radiological survey found residual uranium under the building slab and small amounts of residual uranium in soil outside the building. Because of the limited extent of the contamination, the site may be remediated using the expedited cleanup process now under development.

R. P. Whitfield
Deputy Assistant Secretary
for Environmental Restoration

cc:
J. Fiore, EM-42
J. Wagoner, EM-421
W. A. Williams, EM-421
L. Price, OR

DOE F 1325.8
(8-89)
EFG (07-90)

PA.11-4

United States Government **Department of Energy**

memorandum

DATE: SEP 25 1992

REPLY TO ATTN OF: EM-421 (W. A. Williams, 903-8149)

SUBJECT: Authorization for Remedial Action at Schnoor Site in Springdale, Pennsylvania

TO: L. Price, OR

The former C. H. Schnoor & Company site located at 644 Garfield Street in Springdale, Pennsylvania, is designated for remedial action under the Formerly Utilized Sites Remedial Action Program (FUSRAP). As of 1992, the site was owned by Conviber, Inc. This designation is based on the results of a radiological survey and conclusions from an authority review as noted in the attached Designation Summary (date). Copies of the radiological survey report and authority determination are provided for information.

The site has been assigned a low priority under FUSRAP protocol. The survey concluded that the property contains residual radioactive contaminants in concentrations that exceed current guidelines. However, the radioactivity is very localized and limited in extent, and under present conditions and use, no significant radiation exposures would occur to individuals who access the area. There is also on-going litigation concerning the current site owner and the former site owner regarding the residual uranium.

Because of the limited radiological contamination, we recommend that cleanup of the site follow the expedited FUSRAP protocol for a removal action.

The effect of this designation on the FUSRAP baseline should be evaluated, documented, and submitted for approval under the baseline change control procedures.

James W. Wagoner II
Director
Division of Off-Site Programs
Office of Eastern Area Programs
Office of Environmental Restoration

Attachments

Designation Summary
Schnoor, Springdale

bcc:
Weston

Distribution:
EM-40 (2)
EM-42 (3)
Williams Reader
Pat Suspense
EM-GTN
EM-FOR

EM-421:wagoner:djn:903-8145:9/18/92:schnoor.dag

P. Hevner Review: ph 10/1
M. White Review: MLW 10/1

Williams
EM-421
9/17/92

Wagoner
EM-421
9/25/92

Fulmer
EM-42
10 /92

Fiore
EM-42
10 /92

Baublitz
EM-40
10/5/92

Whitfield
EM-40
10/7/92

09/18/92

FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

DESIGNATION SUMMARY
FOR C.H. SCHNOOR & COMPANY
SPRINGDALE, PENNSYLVANIA

June 9, 1992

U.S. Department of Energy
Office of Environmental Restoration

CONTENTS

INTRODUCTION

The Department of Energy (DOE), Office of Environmental Restoration, has reviewed the past activities of the Manhattan Engineer District (MED) at the former C.H. Schnoor & Company site in Springdale, Pennsylvania, and has completed a radiological survey of the site (Foley, et al 1991). DOE has determined that the residual radioactive materials inside and outside the building exceed current guidelines (USDOE 1987, 1990) for use without radiological restrictions.

Based on a review of the available historical documentation and the results of the survey, the DOE has concluded that this site shall be designated for remedial action under the Formerly Utilized Sites Remedial Action Program (FUSRAP). The site has been assigned a low priority as the survey results indicate that the residual radioactivity is limited in extent and poses no immediate risk to workers. The remainder of this report summarizes the site information and the designation decision.

BACKGROUND

Site Function

The following discussion is based upon the Authority Review (Williams 1992).

C.H. Schnoor & Company provided metal fabrication services in support of MED operations as early as 1943. A November 1943 teletype record indicated that Schnoor provided cast iron sleeves to Hanford. DuPont placed Purchase Order RPG-4018 1/2 with this firm in May 1944 to machine unbonded slugs from uranium metal rod. This priority task in support of the overall project known as Project 1553 was accomplished on a 24-hour-per-day schedule and was completed by the end of July 1944. Judging from cost data contained in the history, Schnoor machined about half of the total 48,000 slug requirement.

C.H. Schnoor & Company was one of the several commercial metal fabrication firms that participated in the MED slug procurement program under purchase orders and subcontracts with the University of Chicago and DuPont, agents for MED.

Site Description

The following discussion is based upon the survey report (Foley, et al 1991).

The Schnoor site is located at 644 Garfield Street in Springdale, Pennsylvania. Apparently in 1943, the same location was referred to as 643 Railroad Street (Williams 1992).

At the time the metal fabrication work was done for the MED, the site consisted of a concrete block building and a loading dock. During the uranium machining period, materials were reportedly received through the Garfield Street entrance and stored near the loading dock. Over the years this building has been enlarged and a new loading dock added (Foley et al 1991).

Owner History

The following is based upon the survey report (Foley et al 1991).

During the 1940s, C.H. Schnoor & Company owned the site. The property was sold in the spring of 1951 to a manufacturer of toys and coat hangers. In 1967, the property was acquired by the Unity Railway Supply Company, who founded the Premier Manufacturing Company and used the site to manufacture journal lubricators for railroad cars. Conviber, Inc., presently owns the property.

Radiological History and Status

The following summary is based upon the authority review (Williams 1992).

Although records are available that indicate several visits or inspections of this or other contractors' facilities by the medical staff of the Metallurgical Laboratory during the machining operations, no record has been found of the final inspection and cleanup of these facilities when the work described above was completed.

In October 1980, a radiological scanning survey of the site was conducted by DOE and Argonne National Laboratory staffs. At that time, the concrete block building housed a manufacturing operation. Radioactive contamination was measured in a very small area of the lunchroom floor near what appeared to be an asphalt-covered drain. However, it was noted that much of the floor was not accessible to the survey team.

DOE directed another more-comprehensive survey to be performed. In 1989 and 1990, Oak Ridge National Laboratory performed the survey indoors and outdoors. The result confirmed the presence underneath the floor of radiation contamination above DOE guidelines (DOE 1987). The results also revealed several outdoor areas with soil contaminated with radionuclides (primarily uranium-238) in excess of the typical, derived, site-specific guidelines.

Authority Review

In 1992, the DOE determined that it had the authority to conduct remedial action at the site (USDOE 1986; Williams 1992). This determination of authority under FUSRAP was based upon the following significant factors.

- Available records indicate that C.H. Schnoor & Company was directly supervised by MED agent and that MED staff were directly involved in the arrangements to use the facility.

- As a part of the operations at the site, there were strict requirements concerning security, accountability, health, and safety. These were controlled by MED or its prime contractors.

- The uranium machined at the site was owned by the government.

- Some residual contamination from the uranium machining is present at the site at levels exceeding DOE guidelines.

An earlier authority determination, dated October 28, 1985, found that DOE had authority to perform remedial action for a group of MED metal fabrication contractors, including C.H. Schnoor & Company. Since this earlier determination, DOE has surveyed the site and identified contaminated areas of the former C.H. Schnoor & Company site where residual radioactive contamination exceeded DOE guidelines.

DESIGNATION DETERMINATION

The results of the preliminary radiological survey indicate that contamination in excess of DOE guidelines exists in several localized areas inside and outside of the buildings. The survey report noted there is no current significant risk to workers or to the general public from the residual contamination at the site.

The DOE has authority to conduct remedial action at the site under FUSRAP. This authority is based on prime contractor and MED use of the site and control of operations. As current use of the site will not result in doses in excess of guidelines, and because potential health risk and spread of contamination are small, the site is designated a low priority site.

REFERENCES

Foley, R.D., W.D. Cottrell, and J.W. Crutcher, 1991: Results of the Radiological Survey at Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania (CVP001). ORNL/RASA-89/18, Oak Ridge National Laboratory, Oak Ridge, Tennessee, October.

United States Department of Energy (USDOE), 1986: Formerly Utilized Sites Remedial Action Program, Summary Protocol, Identification - Characterization - Designation - Remedial Action - Certification. Office of Nuclear Energy, January.

USDOE, 1987: U.S. Department of Energy Guidelines for Residual Radioactive Material at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites. Revision 2, Office of Nuclear Energy, March.

USDOE, 1990: Radiation Protection of the Public and the Environment. DOE Order 5400.5. Office of Environment, Safety, and Health, February 8.

Williams, W.A., 1992: Authority Review for the C.H. Schnoor & Company in Springdale, Pennsylvania. USDOE, June 4.

DOE F 1325.8
(6-89)
EFG (07-90)

United States Government | Department of Ener

memorandum

DATE: JUN 4 1992

REPLY TO ATTN OF: EM-421 (W. A. Williams, 903-8149)

SUBJECT: Authority Determination -- Former C. H. Schnoor & Company facility, Springdale, Pennsylvania

TO: The File

The attached review documents the basis for determining whether DOE has authority for taking remedial action at the former C. H. Schnoor & Company facility in Springdale, Pennsylvania, under the Formerly Utilized Sites Remedial Action Program (FUSRAP). The facility was used for the shaping of uranium by the Manhattan Engineer District (MED) during the Second World War. The following factors are significant in reaching a decision and are discussed in more detail in the attached authority review:

- The C. H. Schnoor & Company was likely to have been closely controlled by the Manhattan Engineer District directly through the approval of contracts and purchase orders or indirectly through prime contractors;
- There were significant security requirements in all activities involving uranium during this time period;
- The uranium residues at the site are clearly the result of the uranium metal machining;
- The uranium metal was furnished by the government;
- The MED retained responsibility for health and safety protection;
- In all likelihood, the contractor had no knowledge of the nature of hazards associated with the handling of uranium metal; and
- An authority review in 1985 found that DOE had authority for remedial action at this and other metal fabrication sites.

A draft copy of the attached authority review was furnished to the Office of General Counsel, which had no comments.

06/04/92

After review of the available original records and the authority review, I have determined that the Department of Energy has authority to conduct remedial action at the former C. H. Schnoor & Company facility in Springdale, Pennsylvania.

W. Alexander Williams, PhD
Designation and Certification Manager
Division of Off-Site Programs
Office of Eastern Area Programs
Office of Environmental Restoration

Attachment

cc:
S. Miller, GC-11

06/04/92

Authority Review for the C. H. Schnoor & Company in Springdale, Pennsylvania

1. INTRODUCTION

As part of the Formerly Utilized Sites Remedial Action Program (FUSRAP), the U.S. Department of Energy (DOE) has reviewed available information on the former C. H. Schnoor & Company site in Springdale, Pennsylvania. This site is being investigated as a candidate for inclusion in the FUSRAP, which includes certain sites that were previously involved with activities of the Manhattan Engineering District (MED) or U.S. Atomic Energy Commission (AEC), both DOE predecessors. Such sites may require remedial action, if they have residual contamination from those previous activities. This review is conducted to determine whether DOE would have the authority to conduct remedial action at the former C. H. Schnoor & Company site.

The site is located at 644 Garfield Street in Springdale, Pennsylvania. Apparently in 1943, the same location was referred to as 643 Railroad Street (Christensen 1943; Wallo 1980). During the mid-1940s, the property was owned by C.H. Schnoor and Company and was used to machine uranium metal rods to produce slugs to be used as feed material for MED production reactors. Schnoor was one of several commercial firms involved in the MED uranium slug procurement program under the direction of the University of Chicago and I. E. du Pont de Nemours and Company (Du Pont), MED prime contractors. The period of interest is late 1943 through 1944.

The remainder of this review consists of the following sections:

2. Operational History
3. Current Conditions
4. Authority Analysis
5. Discussion and Conclusions
6. Copies of References

The information presented in these sections is in summary form. Pertinent references are identified in the text and provided in Section 6 for further use.

2. OPERATIONAL HISTORY

C.H. Schnoor & Company provided metal fabrication services in support of MED operations as early as 1943. A November 1943 teletype record (Christensen 1943) indicated that Schnoor provided cast iron sleeves to Hanford. DuPont placed Purchase Order RPG-4018 1/2 with this firm in May 1944 to machine unbonded slugs from uranium metal rod. This priority task in support of the overall project known as Project 1553 was accomplished on a 24-hour-per-day schedule and was completed by the end of July 1944. Judging from cost data contained in the history, Schnoor machined about half of the total 48,000 slug requirement (Whitman 1985).

As indicated above, C.H. Schnoor & Company was one of several commercial metal fabrication firms that participated in the MED slug procurement program under purchase orders and subcontracts with the University of Chicago and Du Pont. The following summary of conditions that prevailed during the period is significant to a basic understanding of the manner in which this procurement program was conducted (Whitman 1985).

a. Metal fabrication and other services were procured through subcontracts and/or purchase orders initiated by the University of Chicago and Du Pont and approved by a government contracting officer. In most instances, information on the services purchased reflected on purchase orders and subcontracts were limited, probably to prevent classification of the document. In at least one instance, uranium metal was identified only as "special metal" and in other instances as metal rods or tubes.

b. Equipment and facilities used were contractor owned and operated. And, in most instances, contractual arrangements were for the use of manpower and equipment to perform work specified under the direction and control of the MED or its agent.

c. During the initial phase of the program in the early 1940's, contractors or site operators had little or no knowledge of the materials processed or the potential hazards associated with the handling or working with the radioactive materials. The MED was responsible for identification of the hazards, monitoring the work place and health of workers in the contractor's plants, and making specific recommendations for measures to protect the workers against the hazards of handling radioactive materials.

d. Radioactive material furnished the contractors or site operators were government owned. Both finished product and scrap (residue) remained the property of the government. Accountability was such that every effort was made to balance the amount of metal delivered to the contractors with the finished product and the scrap recovered.

At the time the metal fabrication work was done for the MED, the site consisted of a concrete block building and a loading dock. During the uranium machining period, materials were reportedly received through the Garfield Street entrance and stored near the loading dock. Over the years this building has been enlarged and a new loading dock added. (Foley et al 1991)

The property was sold in the spring of 1951 to a manufacturer of toys and coat hangers. In 1967, the property was acquired by the Unity Railway Supply Company, who founded the Premier Manufacturing Company and used the site to manufacture journal lubricators for railroad cars. Conviber, Inc. now owns the property.

3. CURRENT CONDITIONS

In October 1980, a radiological scanning survey of the site was conducted by the DOE Headquarters and Argonne National Laboratory (ANL) staffs (Shipp 1980). The only anomaly noted in this survey was a "hot spot" measuring about 300 micro Roentgen per hour (μR/h) on contact [20 μR/h at ~1 m (3 ft)] with an associated beta-gamma measurement of 4000 counts per minute (cpm) per 61 cm^2. At that time, the concrete block building housed a manufacturing operation, and these measurements were taken on the lunchroom floor. The survey noted that this room was part of the old building and was located near the site of the former uranium machining activities and that the elevated measurements were near what appeared to be an asphalt-covered drain. The contaminated area was described as small (~0.1 m^2 or ~1 ft^2). However, it was noted that much of the floor was not accessible to the survey team.

As a result, DOE directed another survey to be performed. On June 6, 1989, and June 21, 1990, Oak Ridge National Laboratory (ORNL) performed a more comprehensive radiological survey. (Foley et al 1991) Although outdoor soil samples demonstrated near-background for radium-226 and thorium-232, some showed concentrations of uranium-238 up within the typical range of site-specific uranium guidelines for similar DOE FUSRAP sites of 35 to 150 picoCuries per gram. Direct beta-gamma measurements taken inside the building and on the roof were within DOE guidelines (U.S. Department of Energy Guidelines for Residual Radioactive Material at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites. Revision 2, March 1987).

However, there was one elevated surface gamma measurement of 20 μR/h taken on the floor inside the concrete block building. A sample of concrete chips was taken at this site. When the radionuclide analysis of this sample failed to determine the source of radiation, the ORNL survey team returned to the site and core drilled through the concrete floor to a depth of ~64 cm (25 in) at this indoor location. Gamma measurements and eight soil samples drawn through a core in the concrete floor yielded gamma levels ranging from 52,000 to 480,000 counts per minute and uranium-238 concentrations ranging from 90 to 20,000 picoCuries per gram, which is well above the typical site-specific uranium guidelines for use without radiological restrictions. Thus, remedial action is required to remove the radioactive contamination.

4.0 AUTHORITY ANALYSIS

The authority determination is made according to the FUSRAP protocol by considering the answers to five questions based on available records. The answers to these questions from a review of available information, including the results of the radiation surveys are provided below.

4.1 Was the site/operation owned by a DOE predecessor or did a DOE predecessor have significant control over the operations or site?

No. A DOE predecessor never owned the site. Although information pertaining to operations at the site during the time metal fabrication services were performed for the MED is limited, it is likely that the MED and/or its agents exercised significant control over the operations, including the handling and control of the uranium metal during the fabrication process.

4.2 Was a DOE predecessor agency responsible for maintaining or ensuring the environmental integrity of the site (i.e., was it responsible for cleanup)?

No records addressing environmental integrity have been located. However, at other metal fabrication sites during the era, DOE predecessors were responsible for health and safety during the fabrication process.

4.3 Is the waste or radioactive material on the site the result of DOE predecessor related operations?

Yes. No information has been discovered that would indicate the presence of radioactive material on the site except for the uranium metal that was processed for the MED.

4.4 Is the site in need of further cleanup and was the site left in non-acceptable condition as a result of DOE predecessor related activities?

Yes. The radioactive contaminant found on the site is uranium-238 in soil below a concrete floor. It is present in concentrations exceeding the site-specific guidelines developed for other sites containing similar contaminants for use without radiological restrictions. The radioactive contamination found on the site is most likely contaminants the result of metal fabrication services performed on uranium metal for the MED in 1944.

4.5 Did the present owner accept responsibility for the site with knowledge of its contaminated condition and that additional remedial measures are necessary before the site is acceptable for use without radiological restrictions?

There is no indication that the present owner was aware of the radioactive contamination on the site prior to its discovery by DOE.

5. DISCUSSION AND CONCLUSIONS

Surveys of the former Schnoor site indicate uranium contamination, attributed to machining of uranium for the MED.

Based upon the results of the surveys, interviews with the current site owner, and information contained in a previous authority review that addressed metal fabrication services performed under purchase order or subcontract with MED or its agent by a number of commercial firms during the period, there is sufficient evidence to indicate authority for remedial action at the former Schnoor site under the Atomic Energy Act through FUSRAP.

6. COPIES OF REFERENCES

The following is the list of references that are provided in this section.

a. Argonne National Laboratory (ANL), 1984: Notes and Comments, Premier Manufacturing, Springdale, Pennsylvania (formerly Schnoor). August 17.

b. Christensen, C.A., 1943 (estimated). MED teletype regarding shipment of iron sleeves from Schnoor to Hanford.

c. Foley, R.D., W.D. Cottrell, and J.W. Crutcher, 1991: Results of the Radiological Survey at Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania (CVP001). ORNL/RASA-89/18, Oak Ridge National Laboratory, Oak Ridge, Tennessee. October.

d. MED undated. Summary of shipments including 160-pound x metal bars from Schnoor.

e. Shipp, B.D., 1980: Premier Manufacturing-Springdale, Pennsylvania. DOE memo to Mott. October 21.

f. Wallo, A., 1980: New Site Investigation for the former Schnoor & Company. Aerospace letter to Mott, DOE. September 29.

g. Whitman, A., 1985, DOE letter to A. Wallo: Authority decision for a number of sites (including Schnoor). Attached authority recommendation from C. Young to A. Whitman, Authority Review - Metal Fabrication Contractor Sites, September 1985. October 28.

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ORNL/RASA-89/1

OAK RIDGE
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LABORATORY

MARTIN MARIETTA

RESULTS OF THE RADIOLOGICAL SURVEY AT CONVIBER INC., 644 GARFIELD STREET, SPRINGDALE, PENNSYLVANIA (CVP001)

R. D. Foley
W. D. Cottrell
J. W. Crutcher

MANAGED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

ORNL/RASA-89/18

HEALTH AND SAFETY RESEARCH DIVISION

Environmental Restoration and Waste Management Non-Defense Programs
(Activity No. EX 20 20 01 0; ADS3170000)

RESULTS OF THE RADIOLOGICAL SURVEY AT CONVIBER INC., 644 GARFIELD STREET, SPRINGDALE, PENNSYLVANIA (CVP001)

R. D. Foley, W. D. Cottrell, and J. W. Crutcher

Date published— October 1991

Investigation Team

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U.S. DEPARTMENT OF ENERGY
under Contract No. DE-AC05-84OR21400

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ACKNOWLEDGMENTS

Research for this project was sponsored by the U.S. Department of Energy's Office of Environmental Restoration under Contract No. DE-AC05-84OR21400 with Martin Marietta Energy Systems, Inc. The authors wish to acknowledge the contributions of T. R. Stewart and D. A. Roberts, of the Measurement Applications and Development group, and J. M. Fielden, of the Environmental Remediation group, for participation in the analyses, graphics, and reporting of data for this survey.

ABSTRACT

As part of the Formerly Utilized Sites Remedial Action Program (FUSRAP), the U.S. Department of Energy (DOE) is implementing a radiological survey program to determine the radiological conditions at sites that were used by the department's predecessor agencies. During the mid-1940s, and possibly continuing until 1951, the Conviber site in Springdale, Pennsylvania, was used to machine extruded uranium in support of government efforts. In 1980 a radiological scanning survey of this site was conducted by DOE and Argonne National Laboratory (ANL) staffs. Their report noted one anomaly: elevated radiation levels over a small area inside the building where uranium had been machined. Because much of the floor was inaccessible for surveying and because of the lack of definitive records documenting use of this site, a comprehensive radiological assessment was recommended.

The radiological survey discussed in this report for the site of Conviber, Inc., Springdale, Pennsylvania, was conducted by members of the Measurement Applications and Development Group of Oak Ridge National Laboratory in June of 1989. The survey included a surface gamma scan, collection of concrete and soil samples, and measurement of direct and removable alpha and beta-gamma contamination. One indoor location with a gamma measurement of 20 μR/h was found. In June of 1990 ORNL staff returned to investigate the location with elevated gamma. A hole was drilled through the concrete, gamma measurements were taken, and soil samples were obtained for analyses. In these eight indoor soil samples, concentrations of ^{238}U ranged from 90 to 20,000 pCi/g. However, under current site use, residual uranium covered by concrete does not pose a health risk.

Based on the above findings, it is recommended that this site be considered for inclusion under FUSRAP.

RESULTS OF THE RADIOLOGICAL SURVEY AT CONVIBER, INC., 644 GARFIELD STREET, SPRINGDALE, PENNSYLVANIA (CVP001)*

INTRODUCTION

The U.S. Department of Energy (DOE) is conducting a program to determine radiological conditions at former Manhattan Engineer District and Atomic Energy Commission sites used for operations involving radioactive materials. Although much of the government-sponsored research was centered at the national laboratories, commercial facilities were used for storage and processing of uranium and thorium ores and for fabricating and machining metal made from these ores. As a result of these activities, in some instances equipment, buildings, and land became contaminated with radionuclides. These sites were later decontaminated in accordance with contemporary standards. However, subsequent radiological criteria, guidelines, and proposed guidelines have become more stringent for the release of such sites without radiological restrictions, and records documenting decontamination are sometimes not adequate for determining final radiological conditions. Thus, the Formerly Utilized Sites Remedial Action Program (FUSRAP) was initiated to identify these sites and to reevaluate their radiological status.[1] The radiological survey discussed in this report for the site of Conviber Inc., Springdale, Pennsylvania, is part of the FUSRAP effort and was conducted by members of the Measurement Applications and Development Group of Oak Ridge National Laboratory (ORNL).

The Conviber site is located at 644 Garfield Street in Springdale, Pennsylvania (Figs. 1 and 2). During the mid-1940s, the property was owned by C. A. Schnorr and Company and was used to machine extruded uranium for the Hanford Pile Project, a project whose objective was to produce an alternate charge for the Hanford Reactor. The uranium operation may have continued until the spring of 1951, when the building was sold to a manufacturer of toys and coat hangers. In 1967 the property was acquired by the Unity Railway Supply Company, who founded the Premier Manufacturing Company and used the site to manufacture journal lubricators for railroad cars. The current owner, Premier Manufacturing, uses the site for the fabrication of industrial drive and conveyer belts.

The original site (areas labeled "old" on the drawings) consisted of a concrete block building and a loading dock. Over the years this building has been enlarged and a new loading dock added. During the uranium machining period, materials were reportedly received through the Garfield Street entrance and stored near the loading dock, where uranium spills and fires may have occurred.

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*The survey was performed by members of the Measurement Applications and Development Group of the Health and Safety Research Division at Oak Ridge National Laboratory under DOE contract DE-AC05-84OR21400.

In October 1980 a radiological scanning survey was conducted by DOE and Argonne National Laboratory (ANL) staffs. The only anomaly noted in this survey was a "hot spot," measuring about 300 μR/h on contact [20 μR/h at ~1 m (3 ft)] and with an associated beta-gamma measurement of 4000 cpm per 61 cm^2.[2,3] At that time, the concrete block building housed a manufacturing operation, and these measurements were taken on the lunchroom floor. The survey noted that this room was part of the old building and was located near the site of the former uranium machining activities and that the elevated measurements were near what appeared to be an asphalt-covered drain. The contaminated area was described as small (~0.1 m^2 or ~1 ft^2). However, it was noted that much of the floor was inaccessible to the survey team. Because of this inaccessibility and because of the lack of definitive records documenting operations conducted at this site, a comprehensive radiological assessment was recommended.[2,3]

A radiological survey of the commercial property, Conviber Inc., 644 Garfield Street, Springdale, Pennsylvania, was conducted by members of ORNL's Measurement Applications and Development Group on June 6, 1989. Additional samples were taken on June 21, 1990.

SURVEY METHODS

The radiological survey included (1) a surface-level gamma scan of accessible areas of the interior of the concrete block building and of most of the property outdoors; (2) measurement of direct and removable alpha and beta-gamma contamination inside the building and on the roof of the building; (3) sampling of concrete chips from the floor of the concrete block building; (4) collection of surface and subsurface soil samples; and (5) drilling an auger hole, with gamma logging and soil sampling, to define the extent of possible contamination under the concrete floor.

Using a portable gamma scintillation meter, ranges of surface measurements were recorded inside the concrete block building, inside the Quonset building east of the concrete block building, and for areas of the property outdoors. Alpha and beta-gamma activity measurements were taken at selected surface locations in the building and on the roof. Smears were also obtained to establish activity levels for removable alpha and beta-gamma contamination.

A sample of concrete chips was taken from an indoor area with elevated gamma measurements. Biased soil samples were taken outdoors at locations with elevated gamma readings.

A comprehensive description of the survey methods and instrumentation has been presented in another report.[4]

SURVEY RESULTS

Applicable DOE residual guidelines for protection against radiation are summarized in Table 1.[5] Normal background radiation levels for the area near Springdale, Pennsylvania, are presented in Table 2.[6] These data are provided for comparison with survey results presented in this section. With the exception of measurements of removable radioactive contamination, which are reported as net disintegrations rates, all direct measurements presented in this report are gross readings; background radiation levels have not been subtracted. Similarly, background concentrations have not been subtracted from radionuclide concentrations in soil samples.

INDOOR SURVEY RESULTS

Gamma Radiation Levels

Surface gamma exposure levels measured over the major area of the floor of the concrete block building ranged from 4 to 8 μR/h. Part of the floor of this building was being used to store machinery and large rolls of industrial belting material and was inaccessible to the survey team. One higher gamma level, 20 μR/h, was noted in a work area in the northeast quadrant of the concrete block building (Fig. 3). At this location, alpha and beta-gamma measurements were taken, a smear was taken to measure removable alpha and beta-gamma contamination, and a sample of concrete chips was taken to be analyzed for specific radionuclide content.

It could not be confirmed that this 20-μR/h area and the 300-μR/h "hot spot" reported in the 1980 ANL survey are the same, because the building had been extensively remodeled between the ANL and ORNL surveys. Also, significant areas of the floor were inaccessible for survey.

Gamma measurements were also taken on the floor of the Quonset building (Fig. 3, east of the concrete block building). These measurements ranged from 5 to 6 μR/h.

Alpha and Beta-Gamma Measurements

Direct alpha and beta-gamma measurements were taken at seven locations inside the concrete block building. Locations of these measurements are given in Fig. 3. Direct alpha measurements ranged from <25 to 36 dpm/100 cm^2, and direct beta-gamma measurements ranged from 0.02 to 0.04 mrad/h. These values are well below the guideline values given in Table 1 for fixed-on-surface contamination (5000 dpm/100 cm^2) and beta-gamma dose rates (1.0 mrad/h in any 100-cm^2 area).

Seven smear samples were obtained from inside the concrete block building at the same locations as the direct measurements shown in Fig. 3. Analysis of these smear samples for removable alpha and beta-gamma contamination resulted in levels below the minimum detectable activity for the instrument used (10 dpm/100 cm^2 for removable alpha contamination and 200 dpm/100 cm^2 for removable beta-gamma contamination). The DOE guideline for removable surface contamination from uranium residuals is 1000 dpm/100 cm^2 (Table 1).

Concrete Sample

A sample of concrete chips (M1) was taken from the floor of the work area in the concrete block building at the location of the 20 μR/h gamma measurement (Figs. 3 and 4). This sample was analyzed for radionuclide concentrations and the results tabulated (Table 3). Concentrations of ^{137}Cs, ^{226}Ra, and ^{232}Th were 0.25, 1.4, and 1.3 pCi/g, respectively. Concentrations of ^{238}U were less than 18 pCi/g.

Additional Indoor Sampling

Following analyses of the above data, the ORNL Measurements Applications and Development Group elected to return to the Conviber site for further sampling of the 20-μR/h location in the work area of the concrete block building. On June 21, 1990, an auger hole was drilled beneath the concrete, at the location of the elevated gamma measurement and the concrete chip sample, to a depth of 64 cm (25 in.). Eight soil samples were taken at ~8-cm (~3-in.) increments, and gamma measurements were recorded at or near each sampling depth. These readings are in thousand counts per minute* (kcpm) and range from 52 to 480 kcpm, with the highest measurement taken at 33 cm (13 in.). A gamma profile of this auger hole is presented graphically in Fig. 5.

These samples were analyzed for concentrations of ^{137}Cs, ^{226}Ra, ^{232}Th , and ^{238}U. Results are given in Table 3. For ^{137}Cs analysis, all measurements were <1.2 pCi/g. For ^{226}Ra analysis, the surface soil sample (A1A) showed 1.7 pCi/g, and the subsurface samples ranged from 1.1 to 5.2 pCi/g. The surface sample showed 1.3 pCi/g of ^{232}Th, and values for the subsurface samples ranged from 0.89 to 1.6 pCi/g. These values are below DOE guidelines for ^{137}Cs, ^{226}Ra, and ^{232}Th concentrations in surface and subsurface soils (Table 1).

Uranium-238 concentrations were 2800 pCi/g in the surface sample, and ranged from 90 to 20,000 in the subsurface samples. Concentration limits for uranium at FUSRAP remedial action sites are site specific and are derived in accordance with DOE guidelines. The process ensures that doses to individuals using the sites are well below the 100 mrem/yr dose limit. The ^{238}U concentrations found in the eight samples taken from the work area location exceed typical site-specific uranium guidelines for soil that were derived for similar DOE FUSRAP sites (35-150 pCi/g).

*Counts show relative gamma intensity, not exposure.

OUTDOOR SURVEY RESULTS

Gamma Radiation Levels

Gamma exposure rates measured during a scan of the surface of the property outdoors are shown in Fig. 6. Over the major portion of the property, gamma radiation levels ranged from 4 to 10 μR/h. Gamma exposure rates were measured on the roof of the concrete block building, and ranged from 6 to 8 μR/h. Two higher gamma measurements were taken near the dripline on the east and south sides of the concrete block building (14 and 13 μR/h, respectively). The 13 μR/h gamma measurement from the south side of the building was taken near the old loading dock where, reportedly, uranium spills and fires may have occurred. Biased soil samples were obtained from the 13 and 14 μR/h locations.

Soil Samples

During the June 1989 survey, four biased soil samples, taken from the two outdoor locations with 13 and 14 μR/h measurements, were analyzed for radionuclide concentrations. In June 1990, following the analysis of the four biased samples, three additional samples (B3A, B3B, and B3C) were taken at the B1 location (Fig. 6). Results of radionuclide analysis are given in Table 3. Locations of all biased (B) samples are shown on Fig. 6.

The ^{226}Ra concentrations ranged from 0.84 to 2.5 pCi/g. Concentrations of ^{232}Th ranged from 0.84 to 1.8 pCi/g. All of these values are below the DOE guidelines given in Table 1. Concentrations of ^{226}Ra and ^{232}Th are at or near background soil concentrations for the area near Springdale, Pennsylvania (Table 2). Concentration of ^{238}U ranged from 2.2 to 83 pCi/g, with the higher concentrations (33 to 83 pCi/g) found at soil sample location B1/B3. These values are within the typical site-specific uranium guidelines for soil derived for similar DOE FUSRAP sites (35-150 pCi/g).

Results of laboratory analysis for ^{137}Cs ranged from 0.18 to 11 pCi/g. Samples collected from locations B1/B3 and B2 were taken near the foundation of the building which was indicated to the survey team as being the "old" or "original" section of the current building. The ^{137}Cs levels in soil at these two locations is within the range of values of cesium measured in soil from roof driplines and downspouts of other properties in the eastern United States and attributed to fallout from nuclear weapons testing. The current building does not have external downspouts. However, based on the sample locations and the proximity to the original building, it is probable that the slightly elevated cesium is due to fallout in roof runoff.

Alpha and Beta-Gamma Measurements

A beta-gamma scan of the roof of the concrete block building was performed, revealing a range of 0.02 to 0.04 mrad/h (Fig. 7). The background beta-gamma, measured in air, was determined to be approximately 0.02 mrad/h. While these direct beta-gamma measurements are slightly above background measured at this site, they are well within DOE guidelines (Table 1).

Four smears were obtained from the roof and analyzed for removable alpha and beta-gamma contamination. Analysis of these smear samples resulted in levels below the minimum detectable activity for the instrument used (10 dpm/100 cm^2 for removable alpha contamination and 200 dpm/100 cm^2 for removable beta-gamma contamination).

Copper flashings on the roof of the concrete block building were observed to have direct alpha measurements that ranged to approximately 500 dpm/100cm^2. These measurements are well below the guideline for fixed-on-surface contamination (5000 dpm/100 cm^2). Two smears were taken from the copper (smears # 23 and 25, Fig. 7). Results indicated no detectable transferable contamination on either sample.

SIGNIFICANCE OF FINDINGS

Radiological assessment of outdoor soil samples from Conviber Inc., Springdale, Pennsylvania, demonstrated near background concentrations of ^{226}Ra and ^{232}Th. Concentration of ^{238}U in the seven outdoor soil samples ranged from 2.2 to 83 pCi/g. Two of the samples are within typical site-specific uranium guidelines for soil, derived for similar DOE FUSRAP sites (35-150 pCi/g).

Direct beta-gamma measurements taken inside the building and on the roof are within DOE guidelines.

One elevated surface gamma measurement (20 μR/h) was taken on the floor inside the concrete block building. A sample of concrete chips was taken at this site. When the radionuclide analysis of this sample failed to determine the source of radiation, the ORNL survey team returned to the Conviber site and core drilled through the concrete floor to a depth of ~64 cm (25 in.) at this indoor location. Gamma measurements and eight soil samples were taken at approximately 8-cm (3-in.) increments. The gamma levels ranged from 52 to 480 kcpm. Results of analysis of the eight soil samples for radionuclide concentrations showed ^{238}U concentrations ranging from 90 to 20,000 pCi/g.

Under current site use, residual uranium that is covered by concrete does not pose a health risk. However, concentrations of ^{238}U found in soil samples taken from the location of the elevated gamma measurement exceed typical site-specific uranium guidelines for soil that were derived for similar DOE FUSRAP sites. Based on these findings, it is recommended that this site be considered for inclusion under FUSRAP.

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4 T. E. Myrick, B. A. Berven, W. D. Cottrell, W. A. Goldsmith, and F. F. Haywood, *Procedures Manual for the ORNL Radiological Survey Activities (RASA) Program*, ORNL/TM-8600, Martin Marietta Energy Systems, Inc., Oak Ridge Nat'l Lab., April 1987.

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ORNL-PHOTO 7852-91

Fig. 1. Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania.

ORNL-DWG 91-14160

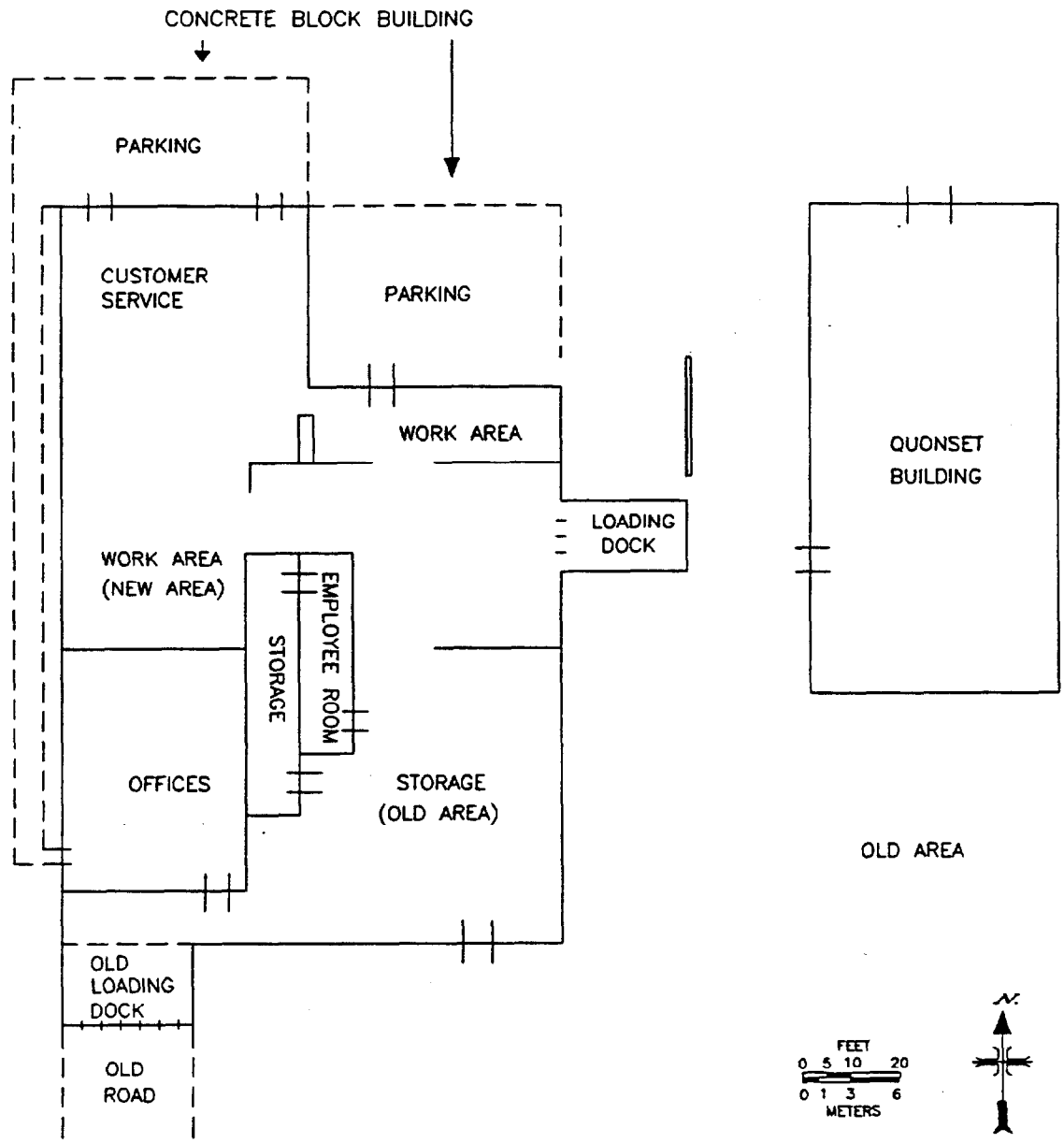

Fig. 2. Diagram showing building locations at Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania.

ORNL-DWG 91-14161

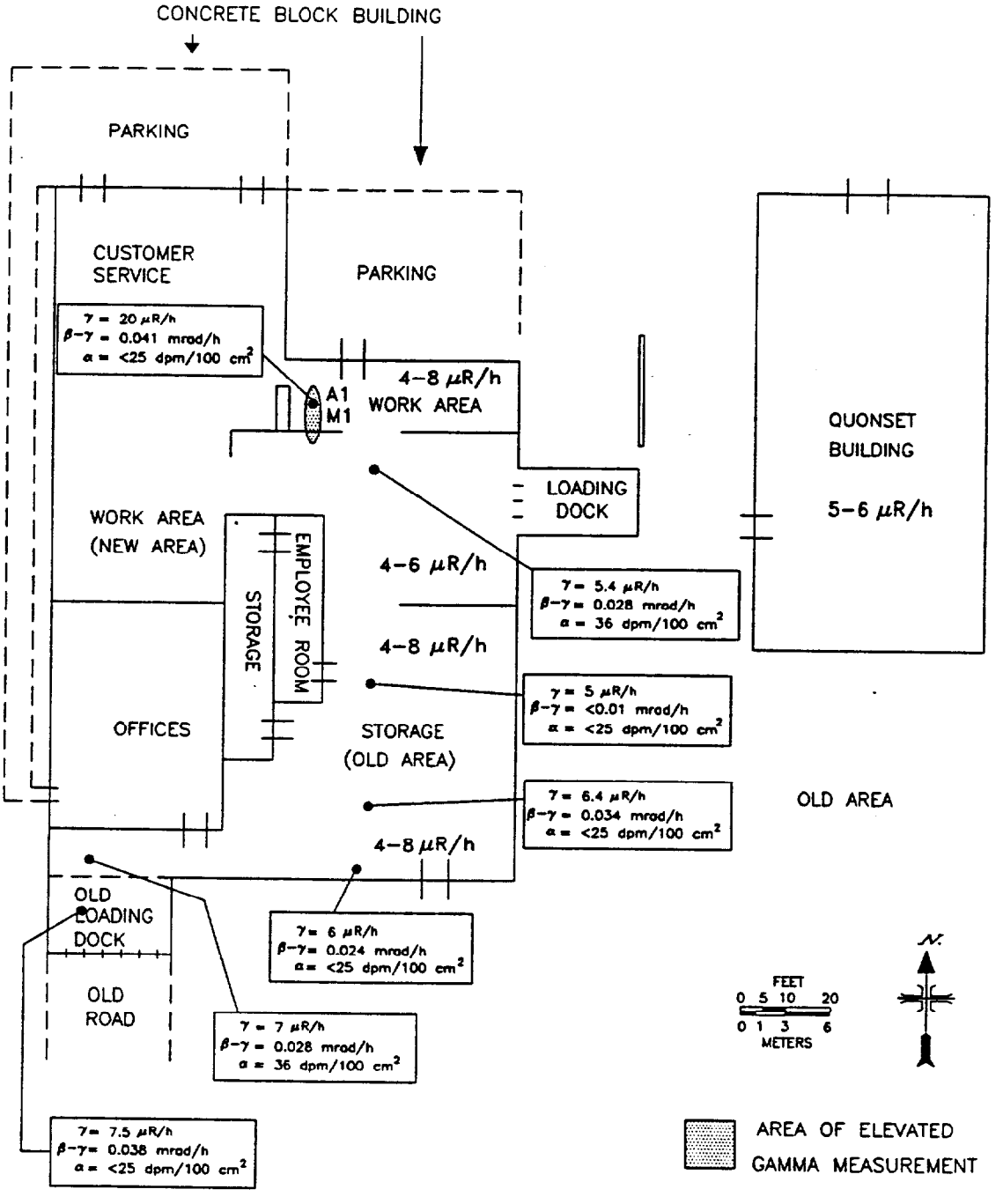

Fig. 3. Locations of gamma exposure rate measurements and direct alpha and beta-gamma measurements taken indoors at Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania.

ORNL-PHOTO 7853-91

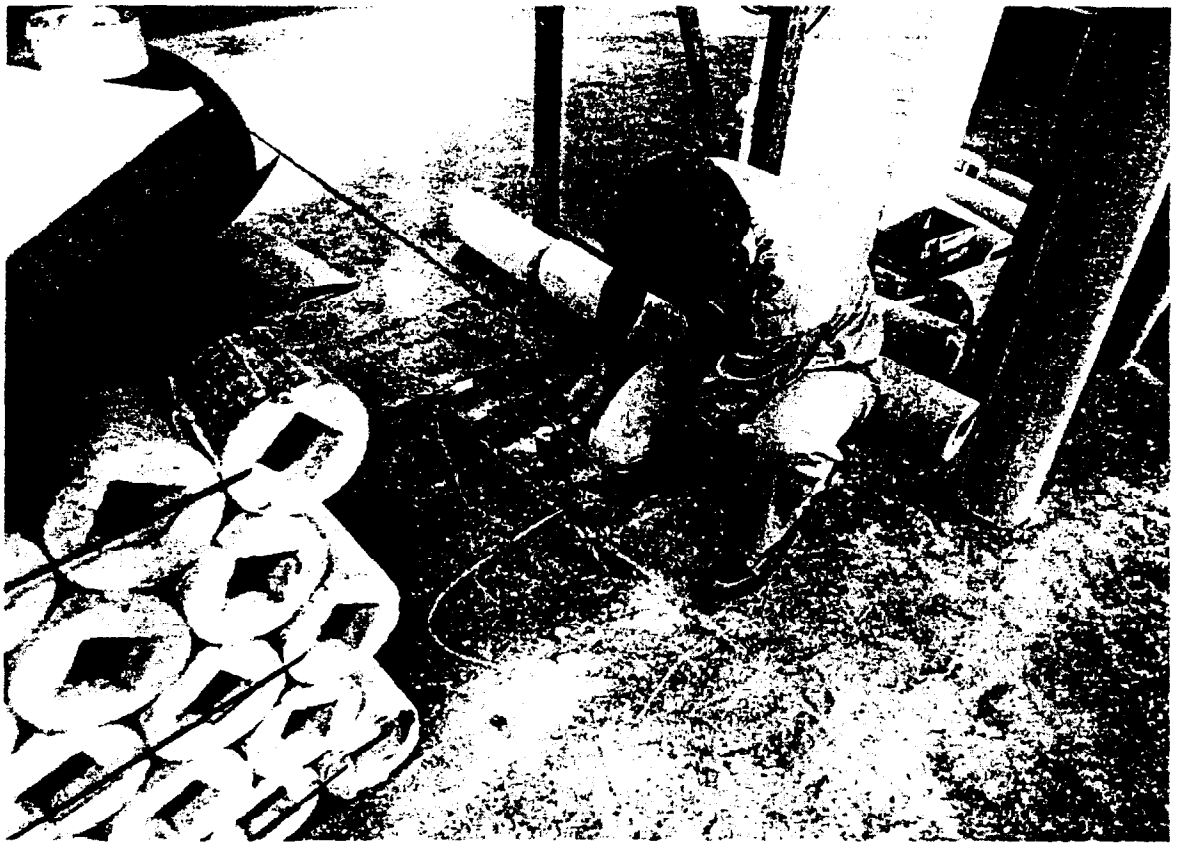

Fig. 4. Location of elevated gamma measurements in a work area, Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania. A survey team member takes a sample of concrete chips.

ORNL-DWG 91-14162

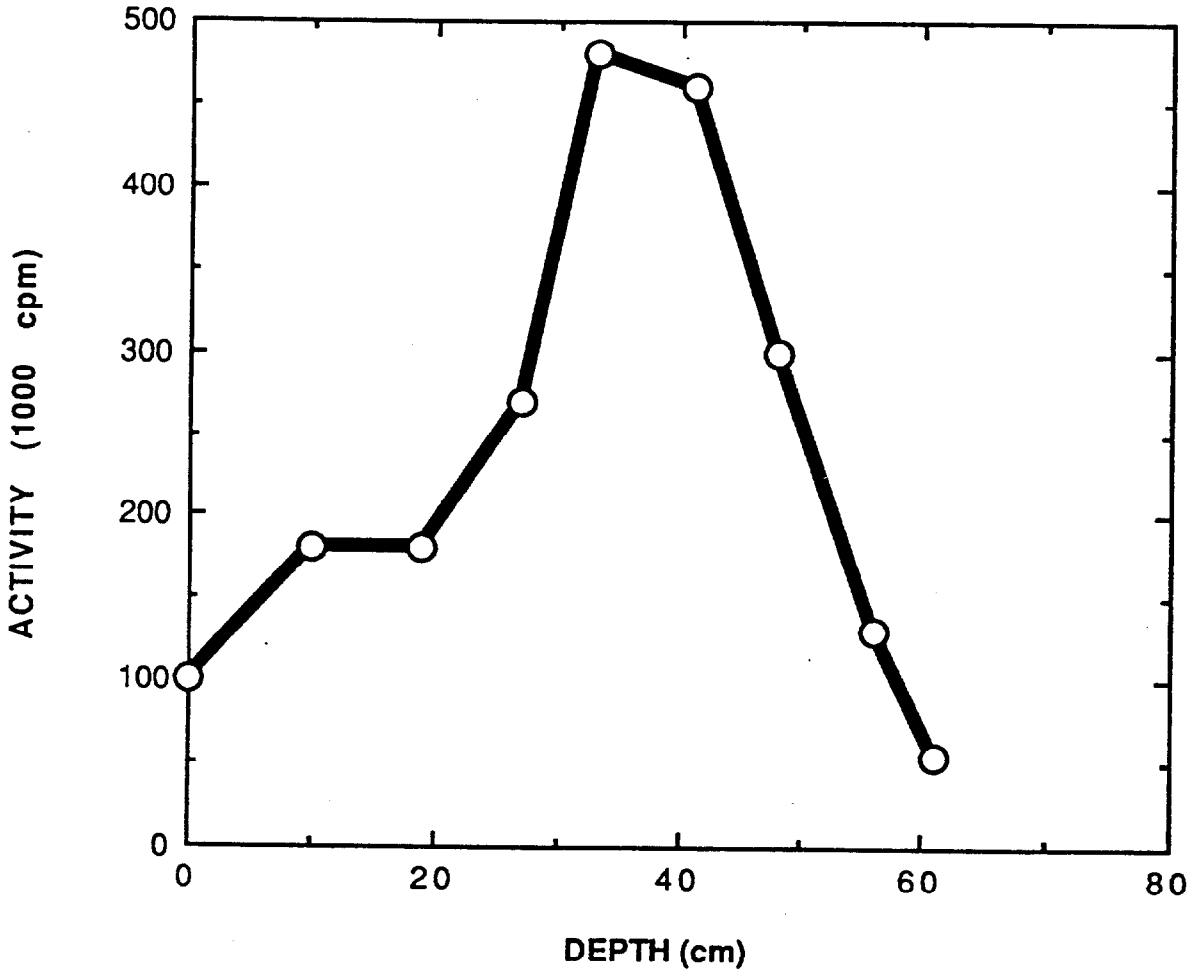

Fig. 5. Gamma logging of auger hole drilled at the location of elevated gamma inside the concrete building, Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania.

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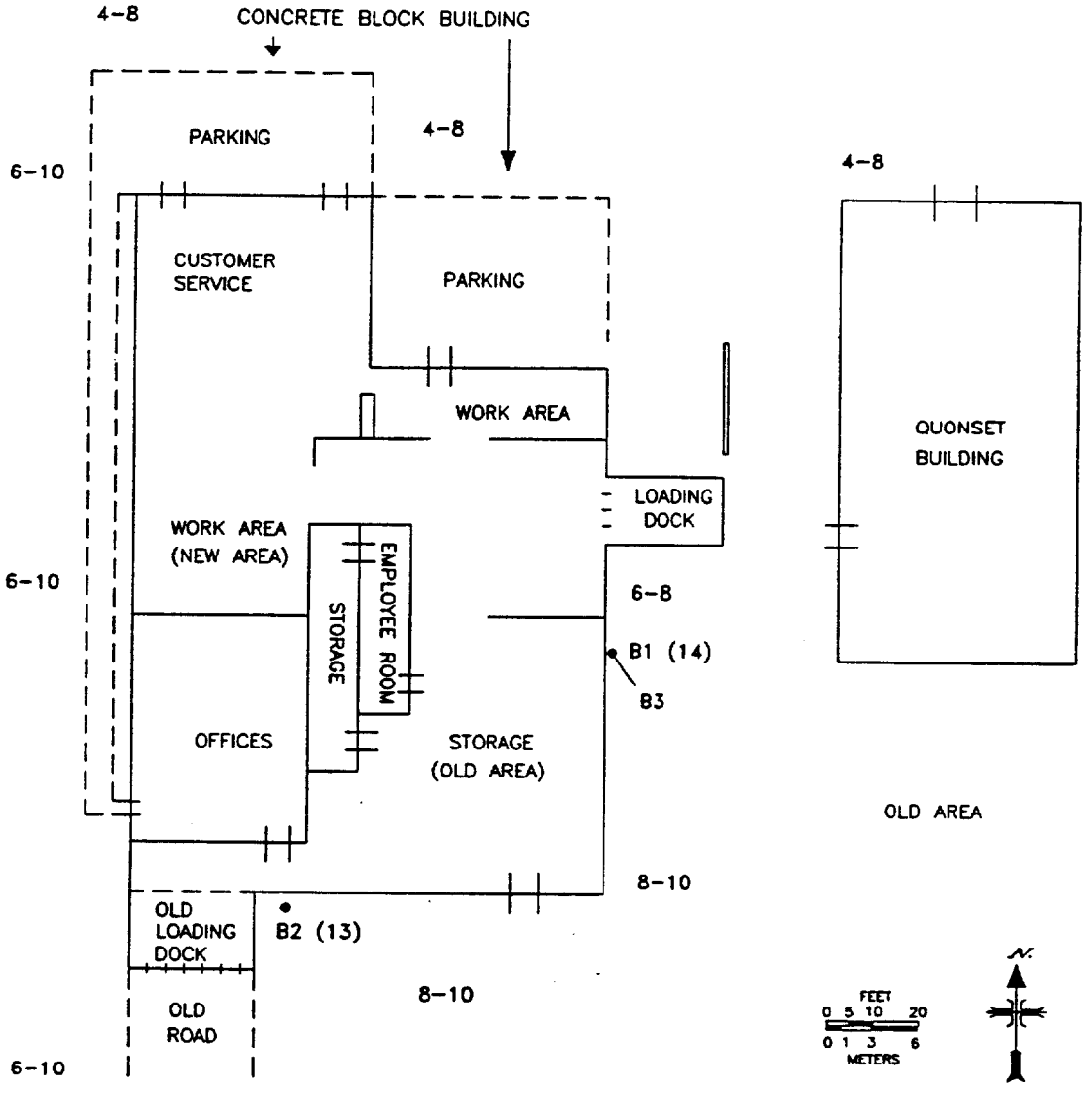

Fig. 6. Gamma exposure rates (μR/h) measured outdoors on the surface, and locations of soil samples taken at Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania.

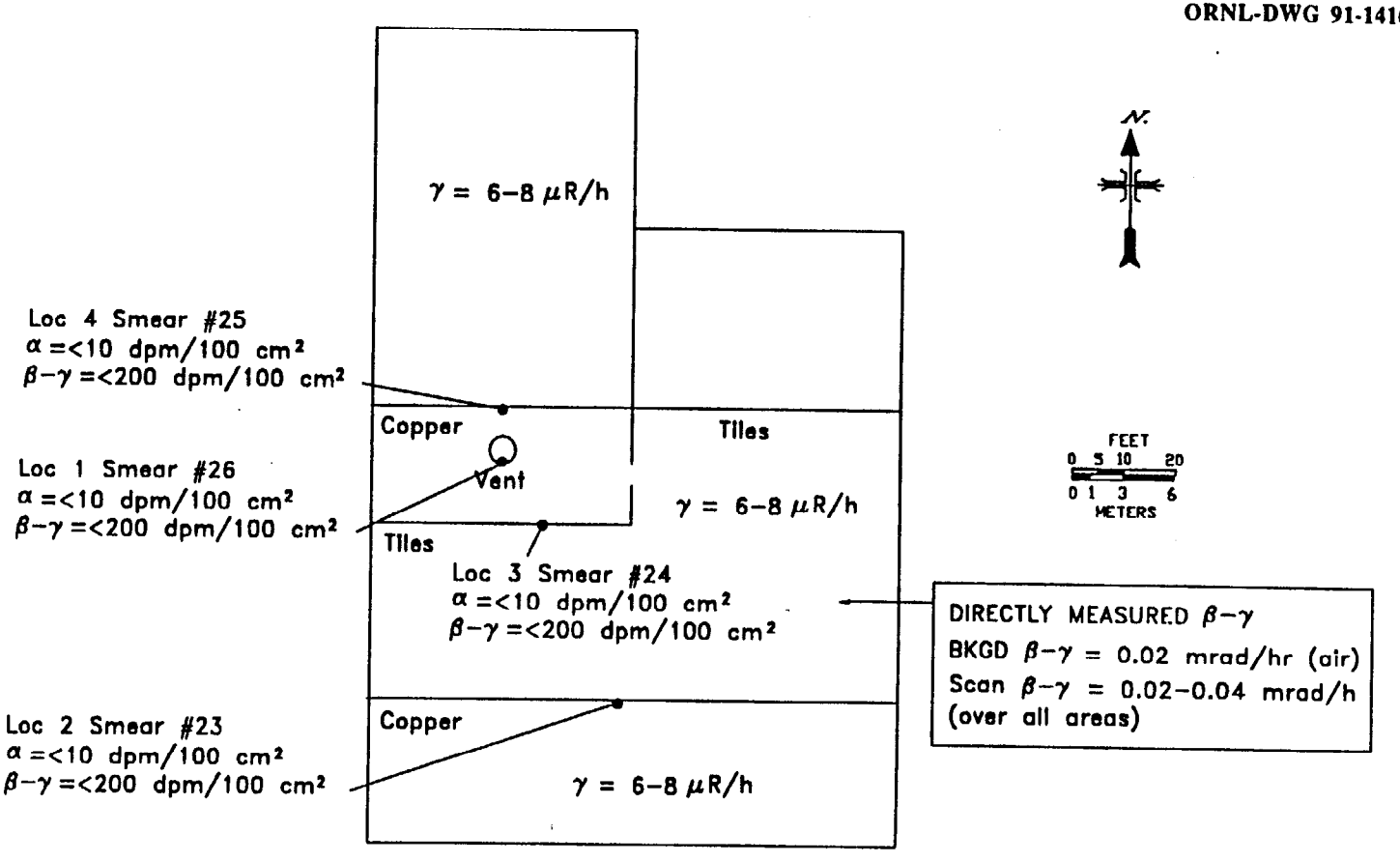

Fig. 7. Gamma exposure rate measurements, transferable alpha and beta-gamma measurements, and direct beta-gamma measurements taken on the roof of the concrete block building at Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania.

Table 1. Applicable guidelines for protection against radiation

Mode of exposure	Exposure conditions	Guideline value
Gamma radiation	Indoor gamma radiation levels (above background)	20 μR/h
Surface contamination[a]	U-natural, ^{235}U, ^{238}U, and associated decay products	
	Fixed on surface	5000 dpm/100 cm^2
	Removable	1000 dpm/100 cm^2
Beta-gamma dose rates	Surface dose rate averaged over not more than 1 m^2	0.2 mrad/h
	Maximum dose rate in any 100-cm^2 area	1.0 mrad/h
Radionuclide concentrations in soil	Maximum permissible concentration of the following radionuclides in soil above background levels, averaged over a 100-m^2 area	
	^{226}Ra	5 pCi/g averaged over the first 15 cm of soil below the surface; 15 pCi/g when averaged over 15-cm-thick soil layers more than 15 cm below the surface
	^{232}Th	
	^{238}U	Derived (site specific)[b]
	Concentration limit in surface soil above background levels based on dose estimates from major exposure pathways	
	^{137}Cs	80 pCi/g over a 100-m^2 area of contamination

[a]As used in this table, disintegrations per minute (dpm) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[b]DOE guidelines for uranium are derived on a site-specific basis. While none have been derived for this site, guidelines of 35–40 pCi/g for ^{238}U have been applied at other FUSRAP sites.

Sources: Adapted from *Guidelines for Residual Radioactive Material at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites*, Rev. 2, U.S. Department of Energy, March 1987. Cesium-137 exposure conditions and guideline value from J. W. Healy, J. C. Rodgers, and C. L. Wienke, *Interim Soil Limits for D&D Projects*, Los Alamos Scientific Laboratory, LA-UR-79-1865-Rev., Los Alamos, N.M., 1979. Cited in U.S. Department of Energy, *Radiological Guidelines for Application to DOE's Formerly Utilized Sites Remedial Action Program*, Oak Ridge Operations, ORO-831, March 1983.

Table 2. Background radiation levels for the area near Springdale, Pennsylvania

Type of radiation measurement or sample	Radiation level or radionuclide concentration
Gamma exposure rate at 1 m (μR/h)	6
Concentration of radionuclides in soil (pCi/g)	
^{226}Ra	1.9
^{232}Th	1.3
^{238}U	1.7

Source: T. E. Myrick, B. A. Berven, and F. F. Haywood, *State Background Radiation Levels: Results of Measurements Taken During 1975–1979*, ORNL/TM-7343, Martin Marietta Energy Systems, Inc., Oak Ridge Nat'l Lab., November 1981.

Table 3. Concentrations of radionuclides in soil and concrete samples from Conviber Inc., 644 Garfield Street, Springdale, Pennsylvania

Sample ID[a]	Depth (cm)	Radionuclide concentration (pCi/g)[b]			
		^{137}Cs	^{226}Ra	^{232}Th	^{238}U
		Biased soil samples[c]			
B1A	0–5	11 ± 0.3	1.3 ± 0.1	1.1 ± 0.2	33 ± 4
B1B	5–15	7.3 ± 0.06	1.2 ± 0.03	1.2 ± 0.04	77 ± 1
B2A	0–5	5.4 ± 0.04	2.5 ± 0.03	1.8 ± 0.03	2.2 ± 0.5
B2B	5–15	4.7 ± 0.05	2.2 ± 0.04	1.4 ± 0.06	2.9 ± 1
B3A[d]	0–15	6.1 ± 0.1	1.3 ± 0.05	1.3 ± 0.08	13 ± 2
B3B[d]	15–25	0.52 ± 0.06	0.84 ± 0.07	0.94 ± 0.1	83 ± 8
B3C[d]	25–33	0.18 ± 0.01	0.92 ± 0.02	0.84 ± 0.03	19 ± 0.7
		Concrete sample[e]			
M1	*f*	0.25 ± 0.2	1.4 ± 0.6	1.3 ± 0.9	<18
		Auger soil samples[g]			
A1A	0–10	<0.24	1.7 ± 0.2	1.3 ± 0.3	2,800 ± 40
A1B	10–19	<0.08	1.6 ± 0.1	1.5 ± 0.2	530 ± 20
A1C	19–27	<0.05	1.4 ± 0.07	1.6 ± 0.1	90 ± 7
A1D	27–33	<1.2	4.3 ± 1	<3.7	12,000 ± 300
A1E	33–41	<0.80	5.2 ± 2	<2.5	20,000 ± 200
A1F	41–48	<0.10	1.5 ± 0.1	1.5 ± 0.2	490 ± 20
A1G	48–56	<0.06	1.2 ± 0.09	1.2 ± 0.2	280 ± 10
A1H	56–64	<0.02	1.1 ± 0.03	0.89 ± 0.04	120 ± 3

[a]Unless otherwise noted, locations are shown on Fig. 3.

[b]Indicated counting error is at the 95% confidence level (± 2σ).

[c]Biased samples are taken from areas shown to have elevated gamma exposure rates (Fig. 6).

[d]Biased samples from location B3 (A-C) were taken in June 1990 from the biased sample B1 location, shown on Fig. 6. Biased samples B1 (A-B) were taken in June 1989.

[e]A sample of concrete chips was taken from the floor in the work area of the concrete block building (Fig. 3) at the area of the elevated gamma measurement.

[f]Surface (Fig. 3).

[g]An auger sample was taken from a hole drilled to further define the depth and extent of radioactive material. These eight samples were taken in June 1990 from the work area shown in Fig. 3 (20-μR/h location), which is also the location from which the concrete sample was taken in June 1989.

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