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Certification Docket for the Remedial Action Performed at the C.H. Schnoor Site, Springdale, Pennsylvania, in 1994

Department of Energy
Former Sites Restoration Division
Oak Ridge Operations Office

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CERTIFICATION DOCKET FOR THE REMEDIAL ACTION PERFORMED AT THE C. H. SCHNOOR SITE SPRINGDALE, PENNSYLVANIA, IN 1994

NOVEMBER 1996

Prepared for

United States Department of Energy

Oak Ridge Operations Office

Under Contract No. DE-AC05-91OR21949

By

Bechtel National, Inc.

Oak Ridge, Tennessee

Bechtel Job No. 14501

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ACRONYMS

ALARA	as low as reasonably achievable
BNI	Bechtel National, Inc.
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DAC	derived air concentration
DCG	derived concentration guide
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FIDLER	field instrument for the detection of low-energy radiation
FUSRAP	Formerly Utilized Sites Remedial Action Program
HEPA	high-efficiency particulate air
IVC	independent verification contractor
NEPA	National Environmental Policy Act
ORNL	Oak Ridge National Laboratory
PIC	pressurized ionization chamber
PMC	project management contractor

UNITS OF MEASURE

cm	centimeter
dpm	disintegrations per minute
ft	foot
g	gram
h	hour
in.	inch
km	kilometer
μCi	microcurie
μR	microroentgen
m	meter
mi	mile
ml	milliliter
mrem	millirem
pCi	picocurie
yd	yard
yr	year

INTRODUCTION

The U.S. Department of Energy (DOE), Office of Environmental Management, Division of Off-Site Programs, conducted an expedited remedial action project during 1994 at the C. H. Schnoor site in Springdale, Pennsylvania. An expedited remedial action is an efficient, cost-effective, and environmentally acceptable approach for cleaning up small sites; this approach complies with the requirements of the National Environmental Policy Act (NEPA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Remedial activities at the C. H. Schnoor site were performed as part of DOE's Formerly Utilized Sites Remedial Action Program (FUSRAP) in full accordance with DOE protocols and procedures and U.S. Environmental Protection Agency (EPA) requirements. FUSRAP was established to identify and clean up or otherwise control sites where residual radioactive contamination remains from the early years of the nation's atomic energy program or from commercial operations causing conditions that Congress has authorized DOE to remedy.

The objectives of FUSRAP, as they apply to the C. H. Schnoor site, are to

- remove or otherwise control contamination on sites identified as contaminated above current DOE guidelines, and

- achieve and maintain compliance with applicable criteria for the protection of human health and the environment.

FUSRAP was established in 1974, and major remedial actions began at FUSRAP sites in 1981. Administered by DOE's Office of Environmental Management, FUSRAP currently includes 46 sites in 14 states. The C. H. Schnoor site was designated for remedial action under FUSRAP in 1992.

FUSRAP is managed by the DOE Oak Ridge Operations Office, Former Sites Restoration Division. Bechtel National, Inc. (BNI) is the project management contractor for FUSRAP.

Remedial action was conducted at the C. H. Schnoor site from August to September 1994. Post-remedial action surveys have demonstrated and DOE has certified that the locations remediated are in compliance with applicable DOE standards and criteria established to protect human health and safety and the environment. A notice certifying the radiological condition of the site was published in the *Federal Register* on September 12, 1996.

Environmental Regulations Affecting FUSRAP Cleanup Activities

Cleanup of residual uranium contamination at the Schnoor site was performed by DOE in accordance with protocols developed by DOE under the authority granted by the Atomic Energy Act that establishes cleanup procedures and guidelines for some FUSRAP sites.

NEPA considerations were addressed by the preparation and approval of a DOE categorical exclusion. Historic preservation and DOE floodplain/wetlands obligations were also assessed but determined to be inapplicable to site circumstances. Air monitoring was conducted for nonoccupational and occupational safety and health purposes. Meetings were held with the public to solicit and address community concerns.

Waste was tested for its hazardous characteristics, and standards established by the Resource Conservation and Recovery Act were determined to be inapplicable. No asbestos or waste containing polychlorinated biphenyls was present, and generated water was evaporated. Excavated concrete flooring was surveyed, reduced to rubble, and used as backfill in site restoration activities. State regulators and the site owner approved of the beneficial reuse of the crushed concrete.

DOE operations were conducted in compliance with local traffic, dust, and noise ordinances. Intermodal containers were used to transport radioactive waste to a licensed disposal facility. Shipped waste fully complied with disposal facility waste acceptance criteria and Department of Transportation regulations. Occupational Safety and Health Administration standards for general industry were practiced throughout cleanup activities.

Property Identification

The C. H. Schnoor site is currently owned by Mr. and Mrs. Frank Pucciarelli. Remedial action was conducted on the site [Parcel No. 733-A-82 filed in Deed/Plat Book (Colfax Plan 117), Page 281 in the records of Allegheny County, Pennsylvania] from August to September 1994.

Docket Contents

This docket documents the successful remediation of radioactively contaminated areas that are part of the C. H. Schnoor site. The material in this docket consists of documents supporting DOE certification that conditions at the subject property are in compliance with radiological guidelines and standards determined to be applicable. In addition, this certification docket provides the documents certifying that the use of the property will not result in any measurable radiological hazard to the general public.

Exhibit I of this docket is a summary of remedial activities conducted at the C. H. Schnoor site. The exhibit provides a brief history of the origin of the contamination at the site, the radiological characterizations conducted, the remedial action performed, and post-remedial action verification activities. Cost data for all remedial action conducted at the C. H. Schnoor site are also included in Exhibit I. Appendix A of Exhibit I contains DOE guidelines for residual radioactive materials at FUSRAP sites.

Exhibit II consists of the letters, memos, and reports that were produced to document the entire remedial action process, from designation of the site under FUSRAP to the certification that no radiological restrictions limit the future use of the site.

Exhibit III provides a diagram of the site identifying the areas of contamination that were remediated during the cleanup activities.

The certification docket and associated references will be archived by DOE through the Assistant Secretary for Management and Administration. Copies will be available for public review between 9:00 a.m. and 4:00 p.m., Monday through Friday (except federal holidays) at the DOE Public Reading Room located in Room 1E-190 of the Forrestal Building, 1000 Independence Avenue, SW, Washington, D.C. Copies will also be available in the U.S. DOE Public Document Room, Federal Building, 200 Administration Road, Oak Ridge, Tennessee, and in the Springdale Public Library, 331 School Street, Springdale, Pennsylvania.

EXHIBIT I
SUMMARY OF REMEDIAL ACTIVITIES AT THE C. H. SCHNOOR SITE IN SPRINGDALE, PENNSYLVANIA, IN 1994

1.0 INTRODUCTION

Exhibit I summarizes the activities culminating in the certification that radiological conditions at the C. H. Schnoor site are in compliance with applicable guidelines and that future use of the site will result in no radiological exposure above DOE criteria and standards established to protect members of the general public and occupants of the site. This summary includes a discussion of the remedial action process at the C. H. Schnoor site: characterization of the radiological status of the site, designation of the property as requiring remedial action, performance of the remedial action, and verification that the radioactivity has been removed to levels that are below guidelines.

The C. H. Schnoor site is located in Springdale, Pennsylvania (Figure I-1).

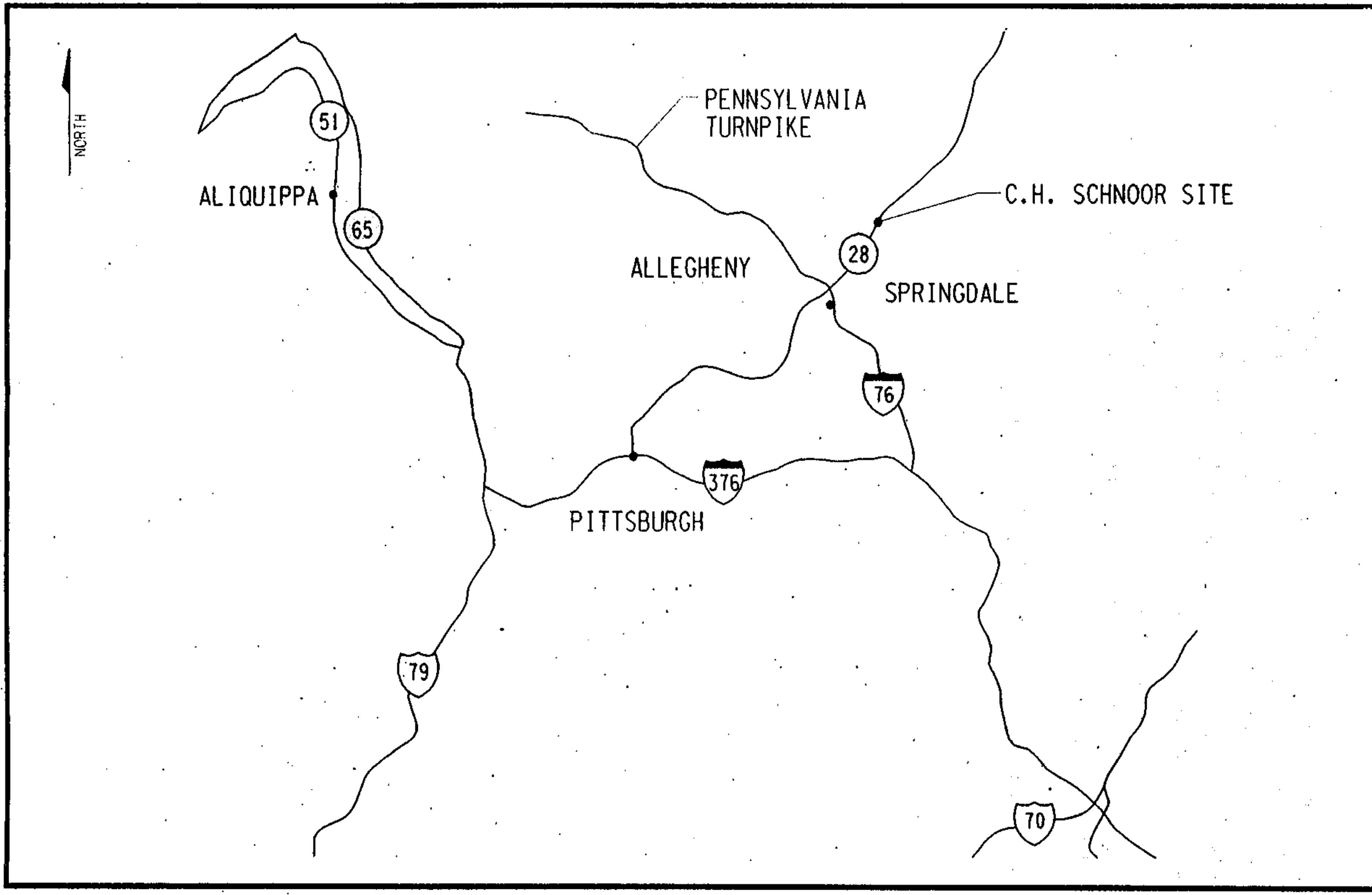

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Figure I-1
Location of the C. H. Schnoor Site

2.0 SITE HISTORY

During the mid-1940s the site was owned by C. H. Schnoor and Company and was used for machining extruded uranium for the Hanford Pile Project, a project with the objective of producing an alternate charge for the Hanford Reactor. 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, which founded the Premier Manufacturing Company and used the site to manufacture journal lubricators for railroad cars. The current occupant, Conviber Inc., uses the site for the fabrication of industrial drive and conveyor belts.

3.0 SITE DESCRIPTION

The original site consisted of a concrete block building and a loading dock. Over the years, this building has been enlarged, and a new loading dock has been added. During the uranium machining period, materials were reportedly received through the Garfield Street entrance and stored near the loading dock. Figure I-2 is a plan view of the site.

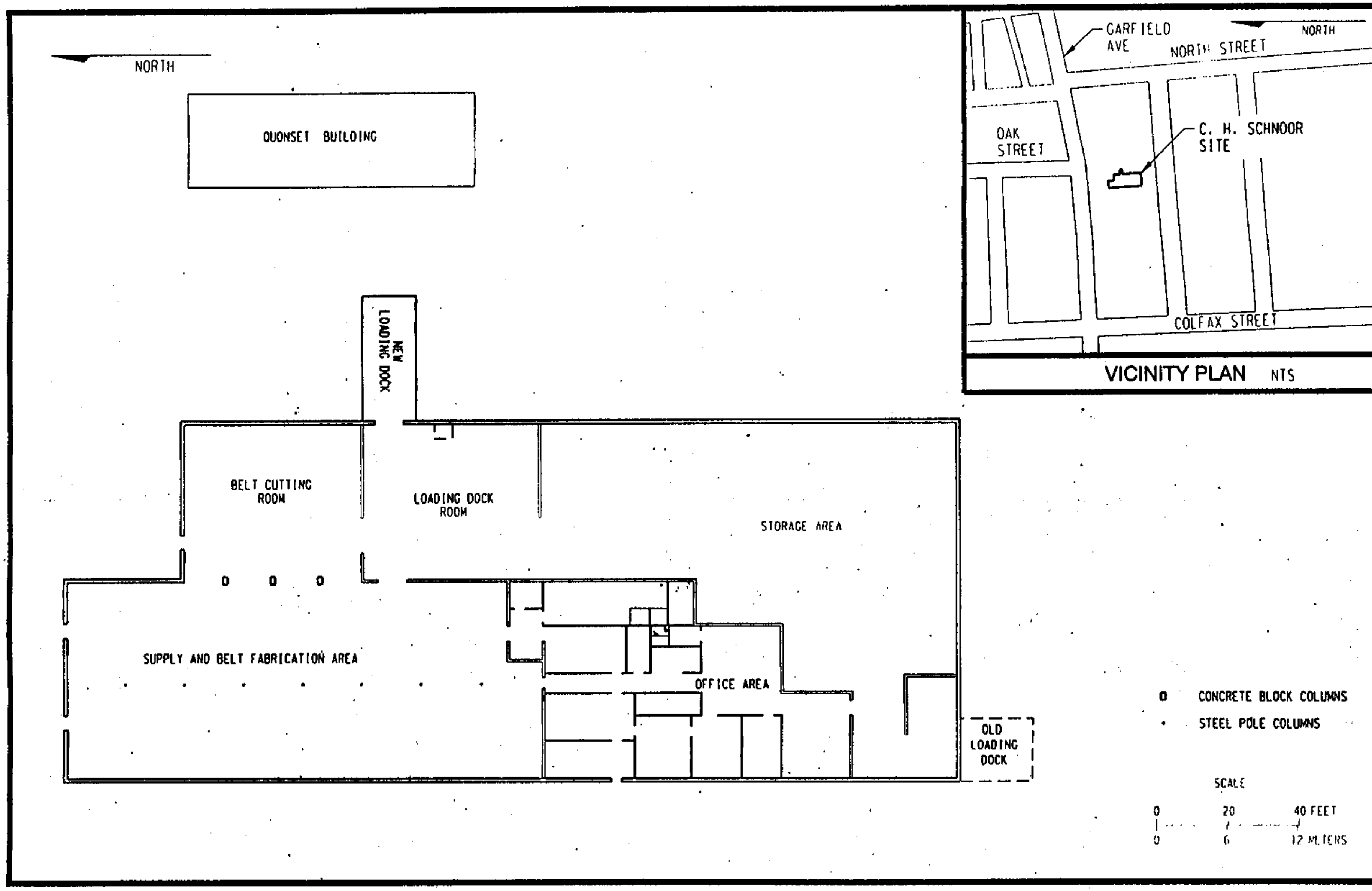

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Figure I-2
Plan View of the C. H. Schnoor Site

4.0 RADIOLOGICAL HISTORY AND STATUS

4.1 RADIOLOGICAL SURVEYS

In October 1980, DOE and Argonne National Laboratory conducted a radiological scanning survey of the site. The resulting report documented elevated radiation levels over only a small area inside the building where uranium had been machined. Because much of the floor was inaccessible for surveying and because definitive records documenting the use of the site were unavailable, DOE directed that an additional, more comprehensive survey be performed. In 1989 and 1990, Oak Ridge National Laboratory (ORNL) performed the survey (Ref. 1). The results of this survey confirmed that radioactive contamination at levels exceeding DOE guidelines remained under the floor. No contamination was detected outside the building.

On October 11-13, 1993, a team from ORNL conducted an additional radiological survey of the interior of the concrete building, at the request of DOE (Ref. 2). This survey was designed to thoroughly characterize the building before remediation efforts began. Because of concerns that the concrete floors severely limited the success of typical survey methods in adequately characterizing the contamination profile, an ORNL survey team returned to the site on November 14-17, 1993, with a different approach to characterizing subsurface contamination. Results of these supplementary radiological surveys showed contamination under the concrete in the northern half of the building (Ref. 2). In addition, surface contamination was found on concrete that had been placed in the area next to the new loading dock during the period of former Atomic Energy Commission activities.

BNI performed additional radiological surveys during October and December 1993 (Ref. 3). The purpose of the BNI radiological surveys was to supplement and refine existing survey information. ORNL was consulted during the design of the BNI surveys regarding the survey layout and strategy. Twenty-two additional boreholes were drilled and sampled during the October and December surveys; the locations of these boreholes are shown in Figure I-3. The BNI surveys detected radioactive contamination primarily in the belt-cutting and belt-fabrication areas of the building. Most of this contamination was in the soil beneath the concrete slab, and isolated areas of surface contamination were detected on a portion of the concrete floor adjacent to the belt-cutting room (also known as the loading dock room). During characterization and remedial action, no building drains were encountered that could have transported contamination outside the building.

4.2 REMEDIAL ACTION GUIDELINES

Radioactive contamination at the C. H. Schnoor site consisted primarily of natural uranium. Table I-1 lists the DOE residual contamination guidelines for release of formerly contaminated properties for use without radiological restrictions. These guidelines were adopted by DOE based

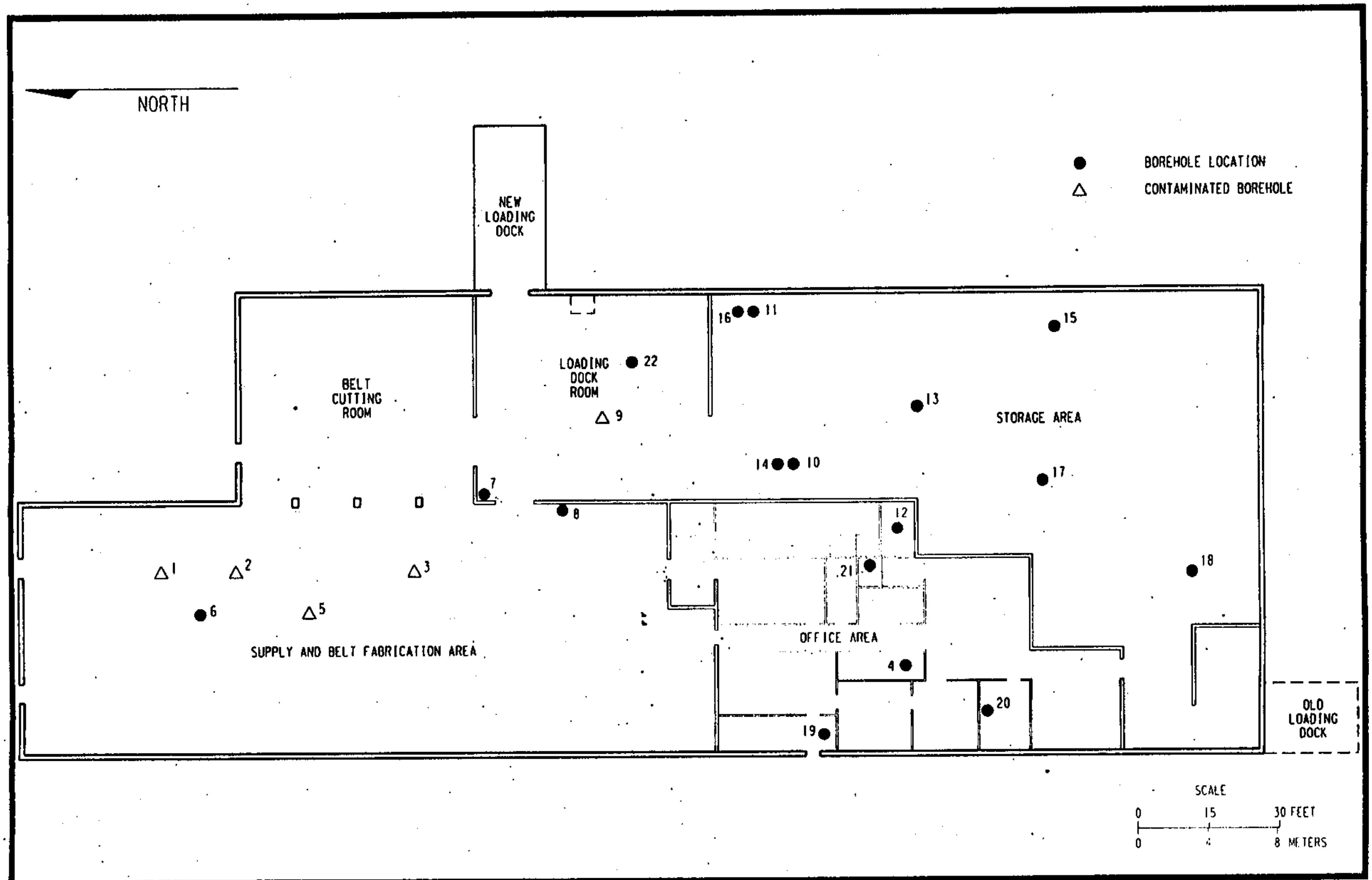

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Figure I-3
Boreholes Drilled During BNI Surveys

TABLE I-1
SUMMARY OF RESIDUAL CONTAMINATION GUIDELINES

BASIC DOSE LIMITS

The basic limit for the annual radiation dose (excluding radon) received by an individual member of the general public is 100 mrem/yr. In implementing this limit, DOE applies as-low-as-reasonably achievable principles to set site-specific guidelines.

SOIL GUIDELINES

Radionuclide	Soil Concentration (pCi/g) Above Background[a,b,c]
Radium-226 Radium-228 Thorium-230 Thorium-232	5 pCi/g when averaged over the first 15 cm of soil below the surface; 15 pCi/g when averaged over any 15-cm-thick soil layer below the surface layer.
Total Uranium	100 pCi/g when averaged over any 15-cm-thick soil layer.

STRUCTURE GUIDELINES

Airborne Radon Decay Products

Generic guidelines for concentrations of airborne radon decay products shall apply to existing occupied or habitable structures on private property that has no radiological restrictions on its use; structures that will be demolished or buried are excluded. The applicable generic guideline (40 CFR 192) is: In any occupied or habitable building, the objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL[d]. In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL. Remedial actions are not required in order to comply with this guideline when there is reasonable assurance that residual radioactive materials are not the cause.

External Gamma Radiation

The average level of gamma radiation inside a building or habitable structure on a site that has no radiological restrictions on its use shall not exceed the background level by more than 20 μR/h and will comply with the basic dose limits when an appropriate-use scenario is considered.

Indoor/Outdoor Structure Surface Contamination

	Allowable Surface Residual Contamination[e] (dpm/100 cm²)		
Radionuclide[f]	Average[g,h]	Maximum[h,i]	Removable[h,j]
Transuranics, Ra-226, Ra-228, Th-230, Th-228 Pa-231, Ac-227, I-125, I-129[k]	100	300	20
Th-Natural, Th-232, Sr-90, Ra-223, Ra-224 U-232, I-126, I-131, I-133	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay products	5,000 α	15,000 α	1,000 α
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above[l]	5,000 β - γ	15,000 β - γ	1,000 β - γ

TABLE I-1
(CONTINUED)

[a]These guidelines take into account ingrowth of radium-226 from thorium-230 and of radium-228 from thorium-232, and assume secular equilibrium. If either thorium-230 and radium-226 or thorium-232 and radium-228 are both present, not in secular equilibrium, the guidelines apply to the higher concentration. If other mixtures of radionuclides occur, the concentrations of individual radionuclides shall be reduced so that (1) the dose for the mixtures will not exceed the basic dose limit, or (2) the sum of ratios of the soil concentration of each radionuclide to the allowable limit for that radionuclide will not exceed 1 ("unity").

[b]These guidelines represent allowable residual concentrations above background averaged across any 15-cm-thick layer to any depth and over any contiguous 100-m^2 surface area.

[c]If the average concentration in any surface or below-surface area less than or equal to 25 m^2 exceeds the authorized limit or guideline by a factor of $(100/A)^{1/2}$, where A is the area of the elevated region in square meters, limits for "hot spots" shall also be applicable. Procedures for calculating these hot spot limits, which depend on the extent of the elevated local concentrations, are given in the DOE Manual for Implementing Residual Radioactive Materials Guidelines, DOE/CH/8901. In addition, every reasonable effort shall be made to remove any source of radionuclide that exceeds 30 times the appropriate limit for soil, irrespective of the average concentration in the soil.

[d]A working level (WL) is any combination of short-lived radon decay products in 1 liter of air that will result in the ultimate emission of 1.3×10^5 MeV of potential alpha energy.

[e]As used in this table, dpm (disintegrations per minute) 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.

[f]Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

[g]Measurements of average contamination should not be averaged over an area of more than 1 m^2. For objects of less surface area, the average should be derived for each such object.

[h]The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at a depth of 1 cm.

[i]The maximum contamination level applies to an area of not more than 100 cm^2.

[j]The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area, and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that total residual surface contamination levels are within the limits for removable contamination.

[k]Guidelines for these radionuclides are not given in DOE Order 5400.5; however, these guidelines are considered applicable until guidance is provided.

[l] This category of radionuclides includes mixed fission products, including the Sr-90 which is present in them. It does not apply to Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

Source: DOE Order 5400.5 and 40 CFR 192 on their compatibility with EPA criteria for remedial action found in 40 CFR 192, "Uranium Mill Tailings Remedial Action Program" (Ref. 4), and DOE Order 5400.5, "Radiation Protection of the Public and the Environment" (Ref. 5). *Design Criteria for Formerly Utilized Sites Remedial Action Program (FUSRAP) and Surplus Facilities Management Program (SFMP)* (Ref. 6) contains additional information regarding applicable federal regulations.

For the remedial action at the site, soil samples were compared to a site-specific cleanup criterion of 100 pCi/g for total uranium averaged over any 15-cm- (6-in.-) thick layer below the surface. Because no generic cleanup guidelines for uranium applicable to remedial actions at FUSRAP sites are available, uranium guidelines are derived on a site-specific basis. A concentration of 50 pCi/g for uranium-238 was used as an indicator because the material at the Schnoor site was natural uranium. The average background concentration of uranium-238 in soil representative of the site was determined by analyzing three soil samples. These samples were collected from areas that were selected because they are near the site but have not been greatly influenced by site activities, and because they are representative of area land uses. The average concentration of uranium-238 in background samples was 2.37 pCi/g.

4.3 POST-REMEDIAL ACTION STATUS

As shown in the post-remedial action report for the site (Ref. 7), all remediated areas meet DOE guidelines. The remedial activities performed at the site were reviewed by the independent verification contractor (IVC), an ORNL environmental survey team. The purpose of this review was to independently verify data supporting the adequacy of the remedial action and to confirm that the site is in compliance with applicable remedial action guidelines. Based on all data collected, the site conforms to all applicable radiological guidelines established for release without radiological or land use restrictions. The IVC also provided independent verification by collecting post-remedial action samples for independent radiological analysis and by conducting confirmatory radiological walkover surveys of the site.

5.0 SUMMARY OF REMEDIAL ACTION

The following discussion briefly describes the remedial action process and the measures taken to protect the public and the environment during this process.

5.1 PRE-REMEDIAL ACTION ACTIVITIES

Immediately before remedial action began, the contaminated areas were surveyed to accurately define the boundaries of radioactive contamination and to supplement existing characterization information. In addition, any areas that were previously inaccessible were surveyed as they became accessible during the remedial action.

5.2 DECONTAMINATION ACTIVITIES

Immediately before and during the remedial action, the ORNL radiological survey team performed surface surveys and drilled additional boreholes to assist in accurately defining the boundaries of contamination and to supplement existing information on the extent of contamination. Additional boreholes were drilled and sampled in the Quonset building, the new loading dock, the office area, and the western and southern sides of the supply and belt fabrication area. The ORNL team stationed a mobile gamma spectroscopy system onsite to provide preliminary soil results during the remedial action; the results were used to help determine the limits of the excavation. This system was used in conjunction with hand-held survey instruments such as the field instrument for the detection of low-energy radiation (FIDLER) and a Geiger-Mueller counter (HP-260) to direct the remedial action.

As remediation was completed, post-remedial action surveys were performed to ensure that decontamination efforts were successful in meeting DOE cleanup criteria. Exposure rate measurements were taken with a pressurized ionization chamber (PIC) to confirm that radiation levels were below the DOE guideline of 20 μR/h above background for building interiors and the dose limit of 100 mrem/yr to members of the general public (see Table I-1). Soil samples were collected and analyzed to establish that contaminated soil had been removed to levels below the cleanup guidelines. Concentrations of direct alpha and beta-gamma and transferable alpha and beta-gamma contamination were also measured to ensure that surface decontamination efforts were successful. Uranium metal was machined at this facility, so radium-226 and radon-222 were not of concern. Radon originates from radium-226 decay, so no measurements were taken for radon; however, radium-226 concentrations were measured to ensure that radon was not of concern.

Techniques used in the remedial action are summarized in Table I-2. After the remedial action, the owner performed site restoration activities.

Table I-2

Decontamination Techniques Used at the C. H. Schnoor Site

Type	Description
HEPA vacuuming	High-efficiency particulate air- (HEPA-) filtered vacuum cleaners were used to remove loose contamination. They were also used in conjunction with other techniques (grinding, pneumatic scalers, etc.) to eliminate the air contamination associated with these techniques.
Wire brushing/grinding/ pneumatic scalers (needle guns)	Small areas on concrete columns and floors were wire brushed to remove loose contamination. When wire brushing did not remove the contamination, a power hand grinder or a needle gun was used to remove the surface layer of more adherent contamination. Lead anchor bolts from the loading dock room were decontaminated with wire brushes (a method that eliminated potential mixed waste).
Mechanical shot blasting	A commercially available shot-blast system with self-contained dust collection, the VacuBlast™, was used to clean the concrete floor in the loading dock room. A metallic abrasive material was used on the work surface, and incremental layers of contaminated material were then removed.
Cutting with a gasoline-powered concrete saw	A gasoline-powered concrete saw with a diamond tip blade was used to prepare sections of the floor slab for removal.
Jackhammering	Conventional jackhammers were used on small areas and to break individual pieces of excavated concrete. Bobcats and track excavators equipped with hoe-ram attachments were used to remove chunks of concrete from the building.
Excavation	Contaminated concrete and soil were removed from within the building with a track excavator, truck loader, bobcats, a forklift, picks, and shovels.
Commercial rock crushing	Surface-contaminated concrete chunks were crushed with a commercial rock crusher and reused as fill after testing to confirm that no contamination remained above guidelines.

Volume reduction and waste minimization techniques employed during the remedial action included segregation, sampling, and surveying of the wastes produced. The following are specific examples of the waste volume reduction at the C. H. Schnoor site:

- Concrete removed from the building floor was surveyed and released to a sanitary landfill if it was below surface criteria. Concrete that was removed and exceeded surface criteria was decontaminated onsite if this could be done with minimal labor, and the concrete was then released to the sanitary landfill. This method saved transportation and disposal costs.

- Concrete that could not be released to the landfill was shipped to the Aliquippa Forge site in Aliquippa, Pennsylvania, and crushed with a commercial rock crusher. After crushing, representative samples were obtained, and the material was determined to have an average uranium-238 concentration of 7.50 pCi/g; this level is well below the cleanup criterion of 50 pCi/g. By making it possible to reuse approximately 31 m^3 (41 yd^3) of concrete as fill material at the site, this method eliminated transportation and disposal costs. This beneficial reuse was approved by the Pennsylvania Department of Environmental Resources.

- Materials used in controlled areas, including disposable clothing such as coveralls and gloves, were surveyed and released as radiologically clean rather than being disposed of as radioactive trash if no contamination was detected. If large portions of the disposable protective clothing were contaminated, the clothing was disposed of, and the soil was shipped to the licensed disposal facility. If only small areas of the clothing were contaminated, those areas were cut out and disposed of to minimize the generation of radioactive waste.

- Use of the ORNL onsite gamma spectroscopy instrument resulted in better definition of excavation limits and minimizing overexcavation and downtime for equipment operators.

- Decontamination of lead anchor bolt pourings allowed the release of 13.5 kg (30 lb) for clean recycling.

The remedial action lasted approximately 6 weeks, from August to October 1994. All remediation efforts were confined to the interior of the main building at the C. H. Schnoor site. Designation and characterization surveys revealed contamination beneath the concrete floor, primarily in the belt-cutting and the supply and belt-fabrication areas of the building and in a small area in the loading dock room (Figure I-2). Surface contamination was detected on the floor in the loading dock room and on the base of two of the cement block columns after contaminated soil had been removed from around them.

A section of the wall between two pilasters in the northern end of the building was removed so that equipment could enter the building to begin the remedial action. A concrete saw was used to cut joints in the concrete along the walls and at the perimeter of the contaminated area as determined from characterization data. Joints were cut along the walls to prevent damage to the cement block walls during concrete removal because the exact construction techniques used to erect the building were unknown. After removal of the concrete began, it was found that use of the concrete saw could be discontinued because no damage would occur to the walls, and any additional concrete removal would extend to control joints rather than cutting joints. The concrete was removed to a control joint because a "key-way" type of construction joint was used in the floor; this type of joint would be difficult to reconstruct, and the concrete saw was very labor intensive for the amount of additional concrete that would need to be removed. Concrete was removed from this wall for construction purposes only; no contamination was present on the wall.

Equipment fitted with hoe-ram attachments was used to break the concrete floor into approximately 1.2-m by 2.4-m (4-ft by 8-ft) pieces, which were radiologically surveyed. Uncontaminated concrete was placed in a dumpster for disposal at a sanitary landfill. Contaminated concrete that could not be decontaminated without excessive labor was placed in a tent constructed onsite to protect it from the weather; it was then shipped to the Aliquippa Forge site, crushed by a commercial rock crusher, and sampled. The average uranium-238 content was determined to be 7.50 pCi/g, which is well below the cleanup guideline of 50 pCi/g. This material was used as backfill at the C. H. Schnoor site after approval from the Pennsylvania Department of Environmental Resources. A total of 74.5 m^3 (97.4 yd^3) of concrete was removed from the building, of which 43.3 m^3 (56.6 yd^3) was shipped to the sanitary landfill and 31.2 m^3 (40.8 yd^3) was crushed and reused as backfill.

A track excavator, bobcats fitted with buckets, and picks and shovels were used to excavate the contaminated soil from inside the building. The soil was placed in the bucket of the truck loader, which was positioned at the opening in the northern end of the building and loaded into intermodal containers for shipment. This method of soil handling eliminated the need for equipment to enter and leave the controlled area, which would have required equipment surveys to be performed each time. The exterior transfer and loading areas were situated to prevent contamination of the grounds. Figure I-4 shows the areas of excavation inside the building. The average depth of excavation was approximately 0.6 m (2 ft). Two small areas excavated to a depth of approximately 1.2 m (3.9 ft) represent a total area of 26 m^2 (280 ft^2) (shown in Figure I-4). A total of 476 m^3 (626 yd^3) of soil and debris was excavated from the building. This material was shipped in 37 intermodal containers to a licensed disposal facility.

In addition to excavation, surface decontamination was performed in the loading dock room and on the base of two cement block columns. The VacuBlast™ unit was used to remove most of the surface contamination in the loading dock room, and the grinder and needle gun were used for smaller areas. A total of approximately 85 m^2 (915 ft^2) of surface area was decontaminated in the

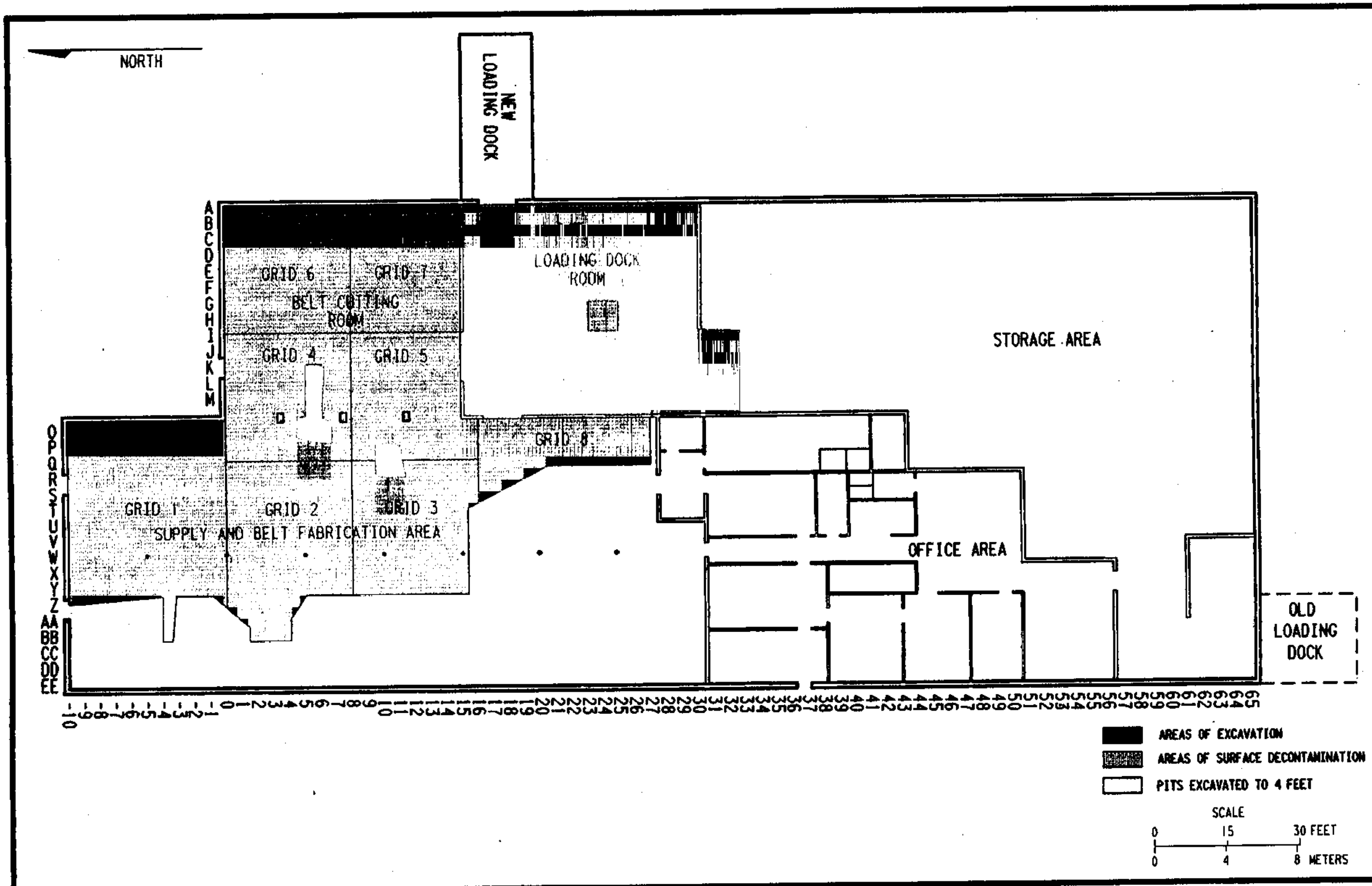

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Figure I-4
Excavation and Surface Decontamination Areas

loading dock room (see Figure I-4). The two cement block columns at the northern end of the room and the footer between them, determined to contain surface contamination, were decontaminated with the grinder and needle gun. Waste from this effort was also placed in intermodal containers and shipped to the licensed disposal facility.

5.3 POST-REMEDIAL ACTION MEASUREMENTS

After each portion of the property was decontaminated, a radiological survey of that area was conducted to confirm that all radioactive contamination above the cleanup criteria (Table I-1) had been removed. Initial post-remediation surveys were conducted by ThermoAnalytical (now known as Thermo NUtech) on behalf of BNI. Survey techniques used during post-remediation and verification surveys included direct (nontransferable) surface contamination measurements, transferable contamination measurements, walkover gamma scans, external gamma radiation exposure rate measurements, and soil sampling. ORNL, as the IVC, performed independent verification surveys of the remediated areas using similar or identical survey techniques.

As excavation was completed, walkover surveys were conducted to determine whether all the soil radioactively contaminated in excess of DOE remedial action guidelines had been removed. Final walkover surveys were performed with both the FIDLER and the HP-260. The walkover surveys provided immediate feedback so that additional excavation could be performed if residual contamination exceeded remedial action guidelines and so that the objective of maintaining exposures as low as reasonably achievable (ALARA) could be met.

Gamma radiation exposure rates were measured with a PIC at 26 locations at a height of 1 m (3 ft) above the ground surface in each remediated area to obtain measurements in μR/h.

Direct-contact beta-gamma measurements were obtained with Geiger-Mueller counters (HP-210 or HP-260), and direct-contact alpha measurements were obtained with alpha scintillation detectors (AC-3). Direct measurements were obtained by placing the probe on the surface to be surveyed and allowing pulses to accumulate for at least 30 seconds on the scaler that was attached to the probes. These measurements were converted, with appropriate calibration and conversion factors, to dpm/100 cm^2 and compared to the DOE guidelines.

Transferable alpha and beta-gamma contamination was determined by wiping a 100-cm^2 (15.5-$in.^2$) area with a smear and measuring alpha emissions from the smear with an alpha scintillation counter (SAC-4) and Geiger-Mueller counters (HP-210 or HP-260), respectively. Transferable contamination was measured, at a minimum, at any location that exhibited direct alpha or beta-gamma contamination above the guideline for removable contamination (1,000 dpm/cm^2).

Composite post-remedial soil samples were taken from the excavated areas and analyzed to determine the radionuclide concentrations in the remaining soil before the excavation was backfilled. Composite samples were collected to provide samples representative of a maximum area of 100 m^2 (1,076 ft^2). Twenty-five evenly spaced plugs per 100 m^2 (1,076 ft^2) were composited for each composite sample. For areas smaller than 100 m^2 (1,076 ft^2), the number of plugs for each composite sample was reduced proportionally to the reduction in area.

5.4 VERIFICATION ACTIVITIES

After remedial activities were completed, the IVC conducted a survey to verify that the site was remediated to levels below DOE guidelines. The objective of the independent verification survey was to confirm that surveys, sampling, and analysis conducted during the remedial action process provided an accurate and complete description of the radiological status of the property.

The IVC's activities included reviewing the published radiological survey reports and the post-remedial action report, conducting a visual inspection of the site, and performing radiological surveys and sampling. When the verification activities were completed, the IVC prepared a verification report and submitted it to DOE (Ref. 8).

5.5 PUBLIC AND OCCUPATIONAL EXPOSURE

During the remedial action, engineering and administrative controls (such as dust control and hazardous work permits) and personal protective equipment were used to protect remediation workers and members of the public from radiation exposure in excess of applicable standards.

All personnel working in contaminated areas were required to wear disposable coveralls, safety glasses, rubber boots, hard hats, hearing protection, and gloves. If conditions warranted, additional protective clothing and equipment such as face shields were used.

Workers leaving radiologically restricted work areas were scanned at the control point by a health physics technician with an alpha and/or beta-gamma detector to ensure that they were not contaminated and to prevent the spread of contamination.

The primary exposure pathways during remedial action for persons onsite and offsite were inhalation and ingestion of radioactively contaminated airborne dust from mechanical decontamination and excavation activities. HEPA filtration units and the Vacublast™ decontamination system were used to control the spread of dust and minimize the potential for contaminants to become airborne. In addition, water was sprayed to control dust during soil removal and transport. All equipment used in the controlled area was surveyed before being released from the site.

During remediation, particulate air monitoring devices were placed in the areas being remediated. Monitoring locations were selected to provide data for the worst-case scenario. Concentrations of uranium-238 ranging from 2.6×10^{-14} to 3.3×10^{-13} μCi/ml (0.000026 to 0.00033 pCi/L) were conservatively derived by collecting air particulate samples daily from lapel air samplers worn by workers. After the gross activity per volume of air that passed through the filter was determined, the source of all activity on the filter was assumed to be uranium-238. These derived air concentrations (DACs) were then compared with the applicable DOE guideline, which is a DAC of 2.0×10^{-11} μCi/ml (0.02 pCi/ml) for occupational exposures to airborne uranium-238 (DOE Order 5480.11).

Area air particulate sampling was also performed adjacent to areas being remediated to ensure that no member of the general public was exposed to radioactivity above the DOE guideline (Ref. 5). This guideline was established to protect members of the general public and the environment from undue risk from radiation. An Eberline RAS-1 high-volume monitor and a low-volume lapel monitor were used, and the filters were collected daily and counted after 4 days to allow for radon decay. The limits in DOE Order 5400.5 are derived concentration guides (DCGs); a DCG is the concentration of a particular radionuclide that would provide an effective dose equivalent of 100 mrem/yr, the DOE basic dose limit, to an individual continuously exposed to the radionuclide by one pathway for an entire year. Concentrations of uranium-238 measured by area particulate monitors ranged from 1.3×10^{-15} to 5.1×10^{-14} μCi/ml (0.0000013 to 0.000051 pCi/L). The DCG is 2.0×10^{-12} μCi/ml (0.002 pCi/L) for uranium-238.

5.6 COSTS

The final costs associated with the remedial action performed at the subject property are presented in Table I-3.

Table I-3

Costs of the Remedial Action at the C. H. Schnoor Site

Description	Amount
Remedial Action Operations	$1,181,000
Waste Transportation and Disposal	514,000
Final Engineering Reports	69,000
TOTAL	$1,764,000

REFERENCES

1. Oak Ridge National Laboratory (ORNL). Results of the Radiological Survey at Conviber Inc., 644 Garfield Street, Springdale, Pennsylvania (CVP001), ORNL/RASA-89/18, Oak Ridge, Tenn., October 1991. .

2. ORNL. Results of the Supplementary Radiological Survey at Conviber, Inc. (Formerly C. H. Schnoor and Company), 644 Garfield Street, Springdale, Pennsylvania (CVP001), ORNL/RASA-94/3, Oak Ridge, Tenn., February 1995.

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3. Bechtel National, Inc. (BNI), "Summary of the results for the Springdale characterization activities," FUSRAP Technical Bulletin 122-94-002, Rev. 0, CCN 114922, March 29, 1994.

4. U.S. Department of Energy (DOE). • "Uranium Mill Tailings Remedial Action Program," 1986.

5. DOE Order 5400.5, "Radiation Protection of the Public and the Environment," 1993.

6. DOE.. Design Criteria for Formerly Utilized Sites Remediat Action Program (FUSRAP) and Surplus Facilities Management Program (SFMP), 14501-00-DC-01, Rev. 2, Oak Ridge, Tenn., March 1986.

7. BNI. Post-Remedial Action Report for the C. H. Schnoor Site, Springdale, Pennsylvania, DOE/OR/21949-386, Oak Ridge, Tenn., September 1995.

8. ORNL. Results of the Independent Radiological Verification Survey at the Former C. H. Schnoor and Company Site, 644 Garfield Street, Springdale, Pennsylvania. (CVP001), ORNL/RASA-95-1, Oak Ridge, Tenn., September 1995.

9. Memorandum from J.W. Wagoner (DOE-HQ) to L. Price (DOE-ORO), "Uranium Guidelines for the Schnoor Site, Springdale, Pennsylvania," BNI CCN 119900, August 25, 1994.

10. Memorandum from J.W. Wagoner (DOE-HQ) to L. Price (DOE-ORO), "Authorization for Remedial Action at Schnoor Site in Springdale, Pennsylvania," BNI CCN 095788, September 25, 1992. Attachment: "Designation Summary for C. H. Schnoor and Company, Springdale, Pennsylvania" (June 9, 1992).

11. Memorandum from Joe La Grone (Manager, DOE-ORO) to Carol M. Borgsrom (Director, Office of NEPA Oversight, EH-25), "Categorical Exclusion (CX) Determination - Removal Action at Springdale Site," October 19, 1993.

12. Letter from M. E. Redmon (Project Manager - FUSRAP) to Frank Pucciarelli (Conviber, Inc.), "Transmittal of Fully Executed Real Estate License," BNI CCN 109584, October 15, 1993.

13. Letter from Michael E. Murray, Measurement Applications and Development Group, ORNL, to W. Alexander Williams, Designation and Certification Manager (DOE-HQ), "Independent Verification Survey of the Former C. H. Schnoor Site, Springdale, Pennsylvania," BNI CCN 129144, Oak Ridge, Tenn., April 21, 1995.

14. Letter from Gary S. Hartman, Environmental Scientist (DOE-ORO) to Susan Zacker, State Historic Preservation Office, *Springdale Site-National Historic Preservation Act (NHPA) (Section 106) Determination," BNI CCN 109297, October 6,.1993.

15. Letter from James D. Kopotic, Site Manager (DOE-ORO) to Charles A, Duritsa, Regional Director, Pennsylvania Department of Environmental Resources, "FUSRAP Pennsylvania Sites-Letter of Appreciation," BNI CCN 122151, October 21, 1994.

APPENDIX A
DOE ORDER 5400.5, CHAPTER IV
RESIDUAL RADIOACTIVE MATERIAL

CHAPTER IV

RESIDUAL RADIOACTIVE MATERIAL

1. PURPOSE. This chapter presents radiological protection requirements and guidelines for cleanup of residual radioactive material and management of the resulting wastes and residues and release of property. These requirements and guidelines are applicable at the time the property is released. Property subject to these criteria includes, but is not limited to sites identified by the Formerly Utilized Sites Remedial Action Program (FUSRAP) and the Surplus Facilities Management Program (SFMP). The topics covered are basic dose limits, guidelines and authorized limits for allowable levels of residual radioactive material, and control of the radioactive wastes and residues. This chapter does not apply to uranium mill tailings or to properties covered by mandatory legal requirements.

2. IMPLEMENTATION. DOE elements shall develop plans and protocols for the implementation of this guidance. FUSRAP sites shall be identified, characterized, and designated, as such, for remedial action and certified for release. Information on applications of the guidelines and requirements presented herein, including procedures for deriving specific property guidelines for allowable levels of residual radioactive material from basic dose limits, is contained in DOE/CH 8901, "A Manual for Implementing Residual Radioactive Material Guidelines, A Supplement to the U.S. Department of Energy Guidelines for Residual Radioactive Material at FUSRAP and SFMP Sites," June 1989.

   a. Residual Radioactive Material. This chapter provides guidance on radiation protection of the public and the environment from:

      (1) Residual concentrations of radionuclides in soil (for these purposes, soil is defined as unconsolidated earth material, including rubble and debris that might be present in earth material);
      (2) Concentrations of airborne radon decay products;
      (3) External gamma radiation;
      (4) Surface contamination; and
      (5) Radionuclide concentrations in air or water resulting from or associated with any of the above.

   b. Basic Dose Limit. The basic dose limit for doses resulting from exposures to residual radioactive material is a prescribed standard from which limits for quantities that can be monitored and controlled are derived; it is specified in terms of the effective dose equivalent as defined in this Order. The basic dose limits are used for deriving guidelines for residual concentrations of radionuclides in soil. Guidelines for residual concentrations of thorium and radium in soil, concentrations of airborne radon decay products, allowable indoor external gamma radiation levels, and residual surface contamination concentrations are based on existing radiological protection standards (40 CFR Part 192; NRC Regulatory Guide 1.86 and subsequent NRC guidance on residual radioactive material). Derived guidelines or limits based on the basic dose limits for those quantities are used only when the guidelines provided in the existing standards are shown to be inappropriate.

c. Guideline. A guideline for residual radioactive material is a level of radioactive material that is acceptable for use of property without restrictions due to residual radioactive material. Guidelines for residual radioactive material presented herein are of two kinds, generic and specific. The basis for the guidelines is generally a presumed worst-case plausible-use scenario for the property.

(1) Generic guidelines, independent of the property, are taken from existing radiation protection standards. Generic guideline values are presented in this chapter.
(2) Specific property guidelines are derived from basic dose limits using specific property models and data. Procedures and data for deriving specific property guideline values are given by DOE/CH-8901.

d. Authorized Limit. An authorized limit is a level of residual radioactive material that shall not be exceeded if the remedial action is to be considered completed and the property is to be released without restrictions on use due to residual radioactive material.

(1) The authorized limits for a property will include:

(a) Limits for each radionuclide or group of radionuclides, as appropriate, associated with residual radioactive material in soil or in surface contamination of structures and equipment;
(b) Limits for each radionuclide or group of radionuclides, as appropriate, in air or water; and
(c) Where appropriate, a limit on external gamma radiation resulting from the residual material.

(2) Under normal circumstances expected at most properties, authorized limits for residual radioactive material are set equal to, or below, guideline values. Exceptional conditions for which authorized limits might differ from guideline values are specified in paragraphs IV-5 and IV-7.

(3) A property may be released without restrictions if residual radioactive material does not exceed the authorized limits or approved supplemental limits, as defined in paragraph IV.7a, at the time remedial action is completed. DOE actions in regard to restrictions and controls on use of the property shall be governed by provisions in paragraph IV.7b. The applicable controls and restrictions are specified in paragraph IV.6 and IV.7.c.

e. ALARA Applications. The monitoring, cleanup, and control of residual radioactive material are subject to the ALARA policy of this Order. Applications of ALARA policy shall be documented and filed as a permanent record.

3. BASIC DOSE LIMITS.

a. Defining and Determining Dose Limits. The basic public dose limits for exposure to residual radioactive material, in addition to natural occurring "background" exposures, are 100 mrem (1 mSv) effective dose equivalent in a year, as specified in paragraph II.1a.

b. Unusual Circumstances. If, under unusual circumstances, it is impracticable to meet the basic limit based on realistic exposure scenarios, the respective project and/or program office may, pursuant to paragraph II.1a(4), request from EH-1 for a specific authorization for a temporary dose limit higher than 100 mrem (1 mSv), but not greater than 500 mrem (5 mSv), in a year. Such unusual circumstances may include temporary conditions at a property scheduled for remedial action or following the remedial action. The ALARA process shall apply to the selection of temporary dose limits.

4. GUIDELINES FOR RESIDUAL RADIOACTIVE MATERIAL.

a. Residual Radionuclides in Soil. Generic guidelines for thorium and radium are specified below. Guidelines for residual concentrations of other radionuclides shall be derived from the basic dose limits by means of an environmental pathway analysis using specific property data where available. Procedures for these derivations are given in DOE/CH-8901. Residual concentrations of radioactive material in soil are defined as those in excess of background concentrations averaged over an area of 100 m^2.

(1) Hot Spots. If the average concentration in any surface or below-surface area less than or equal to 25 m^2, exceeds the limit or guideline by a factor of $(100/A)^{0.5}$, [where A is the area (in square meters) of the region in which concentrations are elevated], limits for "hot-spots" shall also be developed and applied. Procedures for calculating these hot-spot limits, which depend on the extent of the elevated local concentrations, are given in DOE/CH-8901. In addition, reasonable efforts shall be made to remove any source of radionuclide that exceeds 30 times the appropriate limit for soil, irrespective of the average concentration in the soil.

(2) Generic Guidelines. The generic guidelines for residual concentrations of Ra-226, Ra-228, Th-230, and Th-232 are:

(a) 5 pCi/g, averaged over the first 15 cm of soil below the surface; and
(b) 15 pCi/g, averaged over 15-cm-thick layers of soil more than 15 cm below the surface.

(3) Ingrowth and Mixtures. These guidelines take into account ingrowth of Ra-226 from Th-230 and of Ra-228 from Th-232, and assume secular equilibrium. If both Th-230 and Ra-226 or both Th-232 and Ra-228 are present and not in secular equilibrium, the appropriate guideline is applied as a limit for the radionuclide with the higher concentration. If other mixtures of radionuclides occur, the concentrations of individual radionuclides shall be reduced so that either the dose for the mixtures will not exceed the basic dose limit or the sum of the ratios of the soil concentration of each radionuclide to the allowable limit for that radionuclide will not exceed 1. Explicit formulas for calculating residual concentration guidelines for mixtures are given in DOE/CH-8901.

b. Airborne Radon Decay Products. Generic guidelines for concentrations of airborne radon decay products shall apply to existing occupied or habitable structures on private property that are intended for release without restriction; structures that will be demolished or buried are excluded. The applicable generic guideline (40 CFR Part 192) is: In any occupied or habitable building, the objective of remedial action shall be, and a reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL. [A working level (WL) is any combination of short-lived radon decay products in 1 L of air that will result in the ultimate emission of 1.3 x 10^5 MeV of potential alpha energy.] In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL. Remedial actions by DOE are not required in order to comply with this guideline when there is reasonable assurance that residual radioactive material is not the source of the radon concentration.

c. External Gamma Radiation. The average level of gamma radiation inside a building or habitable structure on a site to be released without restrictions shall not exceed the background level by more than 20 μR/h and shall comply with the basic dose limit when an "appropriate-use" scenario is considered. This requirement shall not necessarily apply to structures scheduled for demolition or to buried foundations. External gamma radiation levels on open lands shall also comply with the basic limit and the ALARA process, considering appropriate-use scenarios for the area.

d. Surface Contamination. The generic surface contamination guidelines provided in Figure IV-1 are applicable to existing structures and equipment. These guidelines are generally consistent with standards of the NRC (NRC 1982) and functionally equivalent to Section 4, "Decontamination for Release for Unrestricted Use," of Regulatory Guide 1.86, but apply to nonreactor facilities. These limits apply to both interior equipment and building components that are potentially salvageable or recoverable scrap. If a building is demolished, the guidelines in paragraph IV.6a are applicable to the resulting contamination in the ground.

e. Residual Radionuclides in Air and Water. Residual concentrations of radionuclides in air and water shall be controlled to the required levels shown in paragraph II.1a and as required by other applicable Federal and/or State laws.

5. AUTHORIZED LIMITS FOR RESIDUAL RADIOACTIVE MATERIAL.

a. Establishment of Authorized Limits. The authorized limits for each property shall be set equal to the generic or derived guidelines unless it can be established, on the basis of specific property data (including health, safety, practical, programmatic and socioeconomic considerations), that the guidelines are not appropriate for use at the specific property. The authorized limits shall be established to (1) provide that, at a minimum, the basic dose limits of in paragraph IV.3, will not be exceeded under the "worst-case" or "plausible-use" scenarios, consistent with the procedures and guidance provided in DOE/CH-8901, or (2) be consistent with applicable generic guidelines. The authorized limits shall be consistent with limits and guidelines established by other applicable Federal and State laws. The authorized limits are developed through the project offices in the field and are approved by the Headquarters Program Office.

Figure IV-1

Surface Contamination Guidelines

	Allowable Total Residual Surface Contamination (dpm/100 cm^2)[1]		
Radionuclides [2]	**Average**[3,4]	**Maximum**[4,5]	**Removable**[4,6]
Transuranics, I-125, I-129, Ra-226, Ac-227, Ra-228, Th-228, Th-230, Pa-231	~~RESERVED~~ *100**	~~RESERVED~~ *300**	~~RESERVED~~ *20**
Th-Natural, Sr-90, I-126, I-131, I-133, Ra-223, Ra-224, U-232, Th-232	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay product, alpha emitters	5,000	15,000	1,000
Beta-gamma emitters(radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.[7]	5,000	15,000	1,000

[1] As used in this table, dpm (disintegrations per minute) 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.

[2] Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

[3] Measurements of average contamination should not be averaged over an area of more than 1 m^2. For objects of less surface area, the average should be derived for each such object.

[4] The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm.

[5] The maximum contamination level applies to an area of not more than 100 cm^2.

[6] The amount of removable material per 100 cm^2 of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wiping with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the limits for removable contamination.

[7] This category of radionuclides includes mixed fission products, including the Sr-90 which is present in them. It does not apply to Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

**Because no values are presented in this order, FUSRAP uses the values shown based on "DOE Guidelines for Residual Radioactive Materials at FUSRAP and Remote SFMP Sites," Revision 2, March 1987 (CCN 046176).*

b. Application of Authorized Limits. Remedial action shall not be considered complete until the residual radioactive material levels comply with the authorized limits, except as authorized pursuant to paragraph IV.7 for special situations where the supplemental limits and exceptions should be considered and it is demonstrated that it is not appropriate to decontaminate the area to the authorized limit or guideline value.

6. CONTROL OF RESIDUAL RADIOACTIVE MATERIAL. Residual radioactive material above the guidelines shall be managed in accordance with Chapter II and the following requirements.

a. Operational and Control Requirements. The operational and control requirements specified in the following Orders shall apply to interim storage, interim management, and long-term management.

(1) DOE 5000.3B, Occurrence Reporting and Processing of Operations Information

(2) DOE 5440.1E, National Environmental Policy Act Compliance Program

(3) DOE 5480.4, Environmental Protection, Safety, and Health Protection Standards

(4) DOE 5482.1B, Environmental, Safety, and Health Appraisal Program

(5) DOE 5483.1A, Occupational Safety and Health Program for DOE Employees at Government-Owned, Contractor-Operated Facilities

(6) DOE 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements

(7) DOE 5820.2A, Radioactive Waste Management.

b. Interim Storage.

(1) Control and stabilization features shall be designed to provide, to the extent reasonably achievable, an effective life of 50 years with a minimum life of at least 25 years.

(2) Controls shall be designed such that Rn-222 concentrations in the atmosphere above facility surfaces or openings in addition to background levels, will not exceed:

(a) 100 pCi/L at any given point;
(b) An annual average concentration of 30 pCi/L over the facility site; and
(c) An annual average concentration of 3 pCi/L at or above any location outside the facility site.
(d) Flux rates from the storage of radon producing wastes shall not exceed 20 pCi/sq.m-sec., as required by 40 CFR Part 61.

(3) Controls shall be designed such that concentrations of radionuclides in the groundwater and quantities of residual radioactive material will not exceed applicable Federal or State standards.

(4) Access to a property and use of onsite material contaminated by residual radioactive material should be controlled through appropriate administrative and physical controls such as those described in 40 CFR Part 192. These control features should be designed to provide, to the extent reasonable, an effective life of at least 25 years.

c. Interim Management.

(1) A property may be maintained under an interim management arrangement when the residual radioactive material exceeds guideline values if the residual radioactive material is in inaccessible locations and would be unreasonably costly to remove. provided that administrative controls are established by the responsible authority (Federal, State, or local) to protect members of the public and that such controls are approved by the appropriate Program Secretarial Officer.

(2) The administrative controls include but are not limited to periodic monitoring as appropriate; appropriate shielding; physical barriers to prevent access; and appropriate radiological safety measures during maintenance, renovation, demolition, or other activities that might disturb the residual radioactive material or cause it to migrate.

(3) The owner of the property should be responsible for implementing the administrative controls and the cognizant Federal, State, or local authorities should be responsible for enforcing them.

d. Long-Term Management.

(1) Uranium, Thorium, and Their Decay Products.

(a) Control and stabilization features shall be designed to provide, to the extent reasonably achievable, an effective life of 1,000 years with a minimum life of at least 200 years.

(b) Control and stabilization features shall be designed to limit Rn-222 emanation to the atmosphere from the wastes to less than an annual average release rate of 20 pCi/m2/s and prevent increases in the annual average Rn-222 concentration at or above any location outside the boundary of the contaminated area by more than 0.5 pCi/L. Field verification of emanation rates shall be in accordance with the requirements of 40 CFR Part 61.

(c) Before any potentially biodegradable contaminated wastes are placed in a long-term management facility, such wastes shall be properly conditioned so that the generation and escape of biogenic gases will not cause the requirement in paragraph IV.6d(1)(b) to be exceeded and that biodegradation within the facility will not result in premature structural failure in violation of the requirements in paragraph IV.6d(1)(a).

(d) Ground water shall be protected in accordance with legally applicable Federal and State standards.

(e) Access to a property and use of onsite material contaminated by residual radioactive material should be controlled through appropriate administrative and physical controls such as those described in 40 CFR Part 192. These controls should be designed to be effective to the extent reasonable for at least 200 years.

(2) Other Radionuclides. Long-term management of other radionuclides shall be in accordance with Chapters II, III, and IV of DOE 5820.2A, as applicable.

7. SUPPLEMENTAL LIMITS AND EXCEPTIONS. If special specific property circumstances indicate that the guidelines or authorized limits established for a given property are not appropriate for any portion of that property, then the DOE Field Office Manager may request, through the Program Office, that supplemental limits or an exception be applied. The responsible DOE Field Office Manager shall document the decision that the subject guidelines or authorized limits are not appropriate and that the alternative action selected will provide adequate protection, giving due consideration to health and safety, the environment, costs, and public policy considerations. The DOE Field Office Manager shall obtain approval for specific supplemental limits or exceptions from Headquarters as specified in paragraph IV.5, and shall provide to the Headquarters Program Office those materials required by Headquarters for the justification as specified in this paragraph and in the FUSRAP and SFMP protocols and subsequent guidance documents. The DOE Field Office Manager shall also be responsible for coordination with the State and local government regarding the limits or exceptions and associated restrictions as appropriate. In the case of exceptions, the DOE Field Office Manager shall be responsible for coordinating with the State and/or local governments to ensure the adequacy of restrictions or conditions of release and that mechanisms are in place for their enforcement.

a. Supplemental Limits. Any supplemental limits shall achieve the basic dose limits set forth in Chapter II of this Order for both current and potential unrestricted uses of a property. Supplemental limits may be applied to any portion of a property if, on the basis of a specific property analysis, it is demonstrated that

(1) Certain aspects of the property were not considered in the development of the established authorized limits for that property; and

(2) As a result of these certain aspects, the established limits either do not provide adequate protection or are unnecessarily restrictive and costly.

b. Exceptions to the authorized limits defined for a property may be applied to any portion of the property when it is established that the authorized limits cannot reasonably be achieved and that restrictions on use of the property are necessary. It shall be demonstrated that the exception is justified and that the restrictions will protect members of the public within the basic dose limits of this Order and will comply with the requirements for control of residual radioactive material as set forth in paragraph IV.6.

c. Justification for Supplemental Limits and Exceptions. The need for supplemental limits and exceptions shall be documented by the DOE Field Office on a case-by-case basis using specific property data. Every reasonable effort should be made to minimize the use of supplemental limits and exceptions. Examples of specific situations that warrant DOE use of supplemental standards and exceptions are:

(1) Where remedial action would pose a clear and present risk of injury to workers or members of the public, notwithstanding reasonable measures to avoid or reduce risk.

(2) Where remedial action, even after all reasonable mitigative measures have been taken, would produce environmental harm that is clearly excessive compared to the health benefits to persons living on or near affected properties, now or in the future. A clear excess of environmental harm is harm that is long-term, manifest, and grossly disproportionate to health benefits that may reasonably be anticipated.

(3) Where it is determined that the scenarios or assumptions used to establish the authorized limits do not apply to the property or portion of the property identified, or where more appropriate scenarios or assumptions indicate that other limits are applicable or appropriate for protection of the public and the environment.

(4) Where the cost of remedial action for contaminated soil is unreasonably high relative to long-term benefits and where the residual material does not pose a clear present or future risk after taking necessary control measure. The likelihood that buildings will be erected or that people will spend long periods of time at such a property should be considered in evaluating this risk. Remedial action will generally not be necessary where only minor quantities of residual radioactive material are involved or where residual radioactive material occurs in an inaccessible location at which specific property factors limit its hazard and from which it is difficult or costly to remove. Examples include residual radioactive material under hard-surfaced public roads and sidewalks, around public sewer lines, or in fence-post foundations. A specific property analysis shall be provided to establish that the residual radioactive material would not cause an individual to receive a radiation dose in excess of the basic dose limits stated in paragraph IV.3, and a statement specifying the level of residual radioactive material shall be provided to the appropriate State and/or local agencies for appropriate action, e.g., for inclusion in local land records.

(5) Where there is no feasible remedial action.

8. SOURCES.

a. Basic Dose Limits. Dosimetry model and dose limits are defined in Chapter II of this Order.

b. Generic Guidelines for Residual Radioactive Material. Residual concentrations of radium and thorium in soil are defined in 40 CFR Part 192. Airborne radon decay products are also defined in 40 CFR Part 192, as are guidelines for external gamma radiation. The surface contamination definition is adapted from NRC (1982).

c. Control of Radioactive Wastes and Residues. Interim storage is guided by this Order and DOE 5820.2A. Long-term management is guided by this Order, 40 CFR Part 192, and DOE 5820.2A.

EXHIBIT II
DOCUMENTS SUPPORTING THE CERTIFICATION OF THE REMEDIAL ACTION PERFORMED AT THE C. H. SCHNOOR SITE IN SPRINGDALE, PENNSYLVANIA, IN 1994

1.0 CERTIFICATION PROCESS

The purpose of this certification docket is to provide a consolidated and permanent record of DOE activities at the C. H. Schnoor site and of the radiological conditions of this property at the time of certification. A summary of the remedial activities conducted at the site was provided in Exhibit I. Exhibit II contains the letters, memos, reports, and other materials that were produced to document the entire remedial action process from designation of the site under FUSRAP to certification that no radiologically based restrictions limit the future use of the site.

2.0 SUPPORTING DOCUMENTATION

2.1 DECONTAMINATION OR STABILIZATION CRITERIA

The following documents contain the guidelines that determine the need for remedial action. The subject property has been decontaminated to comply with these guidelines. The third document listed is included as Appendix A of Exhibit I; the other documents are included in this section.

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

119900

United States Government — Department of Energy

memorandum

Aug 29 2 30 PM '94

DATE: AUG 2 5 1994

REPLY TO ATTN OF: EM-421 (W. A. Williams, 427-1719)

SUBJECT: Uranium Guidelines for the Schnoor Site, Springdale, Pennsylvania

TO: L. Price, OR

This is in response to the request for approval of uranium guidelines for the Schnoor Site of the Formerly Utilized Sites Remedial Action Program, pursuant to Department of Energy (DOE) Order 5400.5. The site, located in western Pennsylvania, was used for uranium machining to support the Manhattan Engineer District during the 1940s. Your staff requested approval of a residual uranium guideline for 100 picoCuries per gram of total uranium, based on a draft supporting analysis by Argonne National Laboratory (ANL). Further, your staff provided a brief analysis that this level achieves the DOE goal of keeping radiation exposures as low as reasonably achievable (ALARA).

Basic Dose Requirement:

The present land use of the Schnoor Site is industrial. Several residences are immediately adjacent to the site. For the cleanup of the site, it is necessary to determine a uranium soil guideline pursuant to DOE Order 5400.5, Chapters II and IV. The first step in this process is to determine (using site-specific data) the level of uranium that would lead to an exposure of 100 millirem per year for all plausible land uses. A draft analysis was performed by ANL and was submitted with the request.

The ANL analysis calculated a maximum residual concentration of total uranium in soil of 710 picoCuries per gram (pCi/g) to 4800 pCi/g, depending on future land use. These concentrations are equivalent to 100 millirem per year for various land uses. The recommended 100 pCi/g is equivalent to 3 millirem per year for an industrial worker (Scenario A in the ANL Report). For recreational use, the exposure is less than 2 millirem pear year (Scenario B). For residential use with off-site water (Scenario C), the recommended guideline is 13 millirem per year. For subsistence farming use with an on-site water well (Scenario D), the exposure is approximately 14 millirem per year.

Based on the draft ANL analysis, the recommended value of 100 pCi/g of total uranium is within DOE dose guidelines of 100 millirem per year, which must be met under all worst case, plausible scenarios, including the assumed residential and agricultural usa.

As Low As Reasonably Achievable Analysis:

In addition to meeting the basic radiation protection guideline, any cleanup guideline must be analyzed to keep exposures ALARA. In the application of ALARA, practical considerations, costs, and benefits are also taken into account. For practical considerations, it is likely that the contaminated areas will be cleaned up to a level below whatever guideline is established. This is likely for two reasons. First, in order to remove all material above the guideline, some soil contaminated below the guideline will be removed. This will have the practical effect of lowering the guideline as it is applied during cleanup operations. Second, during cleanup operations, it is difficult to precisely delineate the point at which contamination above the guideline ends. As a result, remedial personnel will remove all suspect materials to avoid repeated cleanup operations on the same property. For these reasons, it is likely that cleanup for uranium will be accomplished at some level lower than the approved cleanup guideline.

There are two practical considerations not considered in the ANL analysis. These are the use of clean fill material to replace excavated materials and the presence of a concrete floor in the building. These will both cause a shielding and covering effect on the remaining soils, reducing gamma ray and dust exposures. If the site were to be used for residential or agricultural use in the future, the clean fill would also reduce the projected doses by diluting the residual contamination. The ANL analysis does not assume that there is any clean fill or concrete floor placed over the site after cleanup. For this reason, the doses calculated in the ANL report are clearly a worst case scenario. In the actual application of a cleanup guideline, it is very likely that a cleanup level substantially below the established guideline will be achieved.

Selection of a uranium guideline significantly below 100 pCi/g would, as the request stated, negatively impact the project by reducing the utility of field measurements for confirming the cleanup of uranium. Although other measurement techniques could be used, the cost is much higher and involves extensive damage to the property by drilling holes in the concrete floor.

Summary and Approval:

Based on the above considerations, a guideline of 100 pCi/g for total uranium above background levels is approved for use in the cleanup of the Schnoor Site, pursuant to DOE Order 5400.5., Chapter IV, Section 5a.

In addition, please direct ANL to finalize the draft dose report for publication, subject to the comments which have been submitted to you separately.

119900

We understand that your staff has discussed site activities and the draft ANL analysis with State personnel. We recommend that the approved guideline and the supporting documentation be discussed with State personnel as soon as convenient.

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

cc:
J. Kapotic, OR
C. Yu, ANL
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R. Foley, ORNL

DESIGN CRITERIA FOR FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM (FUSRAP) AND SURPLUS FACILITIES MANAGEMENT PROGRAM (SFMP)

FEBRUARY 1986

Prepared by
U.S. DEPARTMENT OF ENERGY
OAK RIDGE OPERATIONS OFFICE

DESIGN CRITERIA
FOR
FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM (FUSRAP)
AND
SURPLUS FACILITIES MANAGEMENT PROGRAM (SFMP)

(ISSUED FOR CLIENT APPROVAL)

FEBRUARY 1986

Approved by: E. L. Keller
E. L. Keller, Director
Technical Services Division
Oak Ridge Operations Office

2-24-86
Date

Approved by: John T. Milloway
John T. Milloway
Assistant Manager for
Construction and Engineering
Oak Ridge Operations Office

2-24-86
Date

PREFACE TO DESIGN CRITERIA

These design criteria have been written in a generic form that summarizes criteria applicable for remedial action and long-term management activities associated with the radioactive wastes at the FUSRAP and SFMP sites. Site-specific information is provided in the appendices to this generic document. As a specific scope of work for a site is determined, design bases and work plans for each of the sites will be developed.

Appendix A contains definitions of terms used in these design criteria and referenced documents. Appendix B provides a listing of FUSRAP and SFMP sites by WBS number and contains estimated waste quantities at the sites. Appendix C contains the residual contamination and waste control criteria. Appendix D lists site information for specific sites which will be required as a remedial action for the specific site is developed. This information will be included in the work plan for each site.

The design criteria will be referenced by the designation 14501-00-DC-01.

These design criteria will be periodically revised, as appropriate, to reflect new practices, additional information, revisions of applicable regulations, and standard revisions.

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 SCOPE

This document defines the design criteria for the identification of materials, evaluation of remedial action alternatives, selection of design parameters for site cleanup remedial actions and interim storage, and long-term management methods for handling FUSRAP and SFMP radioactive wastes.

1.2 OBJECTIVE

The primary objective of the Formerly Utilized Sites Remedial Action Program (FUSRAP) and Surplus Facilities Management Program (SFMP) projects is to stabilize, decontaminate, and/or dispose of FUSRAP and SFMP derived wastes in such a manner as to minimize the radiological risks posed by these wastes and to enable certification of the cleaned up FUSRAP and SFMP sites for unrestricted future use. At some sites, remedial action may be in situ long-term management with monitoring as necessary to detect any contaminant migration from the site in excess of radiological design criteria. At other sites, an interim storage program may be established until a decision for final disposition is made.

1.3 DEFINITIONS

Appendix A contains definitions of terms that are used in these design criteria as well as in the referenced documents.

1.4 CHANGES TO CRITERIA

The criteria for FUSRAP and SFMP remedial actions set forth in this document are based on elements of various federal orders, regulations, and standards that may be subject to change. This document will be revised to reflect changed criteria as authorized and approved by DOE.

2.0 APPLICABLE DOCUMENTS

2.1 GENERAL

The intent of these design criteria is to use DOE Orders where applicable. Applicable orders, regulations and standards, and sections thereof, as well as industry standards, will be investigated on a site-specific basis to formulate the design bases for the specific site.

2.2 FEDERAL ORDERS, REGULATIONS, AND STANDARDS

The following federal orders, regulations, and standards contain elements that are generally applicable to the FUSRAP and SFMP projects, and are summarized for these criteria.

2.2.1 Quality Assurance

DOE Order 5700.6A--Quality Assurance and DOE/OR-FUSRAP-82-001 Plan for Quality Assurance. The Project Quality Assurance Program complies with DOE Order 5700.6A, and the FUSRAP Plan for Quality Assurance (DOE/OR-FUSRAP-82-001).

For each remedial action site, and interconnecting activities (such as transportation), a formal evaluation (Quality Assurance Assessment) will be made of the consequences of failure of equipment and facilities to perform satisfactorily in service. This Assessment, which will be an adjunct to design engineering with subsequent modifications as may be required, will give full consideration to safety, environment, costs, schedule delays, programmatic goals, public reaction, or any other factor important to achieving project objectives.

When the formal evaluation indicates that consequences of failure may be unacceptable, significant, or unknown and the probability of failure is high or unknown, additional deliberate actions to find and prevent quality problems are mandatory. The additional actions to assure quality of design and engineering, and particularly to assure implementation of that design and engineering, will be documented using a Quality Action Plan.

2.2.2 Radiation Protection

DOE Order 5480.1A. This order establishes control over the environmental protection, safety, and health protection programs. Chapter XI, Requirements for Radiation Protection, Attachment XI-1, defines radiation protection guides for concentration in air and water above natural background which will be used as criteria for releases from DOE's FUSRAP and SFMP operations. Chapter XII, Prevention, Control, and Abatement of Environmental Pollution, provides requirements for the control of sources of environmental pollution in accordance with the substantive and procedural aspects of all applicable federal, state, and local pollution control standards.

DOE Order 5480.2--Hazardous and Radioactive Mixed Waste Management. This order establishes hazardous waste management procedures for facilities operated under authority of the Atomic Energy Act of 1954, as amended (AEA). The procedures will follow, to the extent practicable, regulations issued by the Environmental Protection Agency (EPA) pursuant to the Resource Conservation and Recovery Act of 1976 (RCRA).

DOE Order 5481.1--Safety Analysis and Review System. This DOE Order establishes requirements for the preparation and review of safety analyses for each DOE operation, including: identification of hazards and their elimination or control; assessment of risk; documented management authorization of operation; and transportation of hazardous materials.

2.2.3 Land Disposal of Radioactive Wastes

Elements of the DOE Orders and federal regulations mentioned in the following sections provide technical guidelines for long-term, near-surface land burial facilities and ancillary facilities.

DOE Order 6430.1--General Design Criteria Manual. This order contains basic architectural and engineering design requirements for new DOE facilities; provides technical specification requirements; and outlines planning and design requirements for new facilities, facility additions, facility alterations, and building acquisitions to achieve economy of construction, operation, and maintenance.

40 CFR 192--Standards for Remedial Action at Inactive Uranium Processing Sites. This regulation defines remedial action criteria for inactive uranium processing sites. Some elements of these standards are applicable to the FUSRAP and SFMP programs. Service life of a mill tailings disposal site is defined in this regulation and has been adopted for FUSRAP and SFMP projects. Specific service life and release control requirements for interim storage sites and long-term management sites are noted in Section 3.2 of these Design Criteria.

2.2.4 Handling, Transportation, and Storage

DOE Order 1540.1--Materials Transportation and Traffic Management. Hazardous materials at FUSRAP and SFMP sites shall be shipped in accordance with DOE Order 1540.1. This document outlines DOE's policies and procedures for the management of materials transportation to ensure that it is accomplished in a manner commensurate with:

(1) Operational requirements for transportation services

(2) Established practices and procedures for transportation safety, economy, efficiency, and cargo security

(3) The National Transportation Policy as established by Congress and cognizant federal agencies

(4) Applicable federal, state, local, and international transportation regulations.

Intra-building and intra-site transfers are excluded from the provisions of this order.

DOE Order 5480.1A--Environmental Protection, Safety, and Health Protection Program for DOE Operations. Chapter 3 of this Order contains safety requirements for packaging of fissile and radioactive material. It also defines the requirements for design, evaluation, and testing of containers used for the transport of DOE's fissile and radioactive materials.

49 CFR 171-179--Transportation of Hazardous Materials. These regulations specify requirements for bulk shipments of uranium or thorium ores and physical or chemical concentrations of those ores and uranium metal or natural thorium metal, or alloys of these materials.

2.2.5 Health and Safety

Occupational Safety and Health Administration (OSHA) 29 CFR 1910. This section contains the health and safety regulations for general industry.

Occupational Safety and Health Administration (OSHA) 29 CFR 1926. This section establishes the general health and safety regulations for construction.

2.2.6 Surveys

Surveys for characterization and remedial action will be performed in accordance with the following specifications.

National Oceanic and Atmospheric Administration (NOAA).

- "Classification, Standards of Accuracy, and General Specifications of Geodetic Control Surveys"
- "Specification to Support Classification, Standards of Accuracy, and General Specifications of Geodetic Control Surveys"
- "Manual of Geodetic Triangulation," "Specification Publication No. 247

U.S. Department of Interior (USDI) "Manual of Instructions for the Survey of Public Lands of the United States," 1973, Bulletin 6.

2.2.7 Weather

National Oceanic and Atmospheric Administration. "Comparative Climatic Data for the United States through 1982," 1983.

2.3 STATE AND LOCAL REGULATIONS

State and local regulations governing handling, transportation, and storage of radioactive materials generally follow federal orders and regulations, but may vary depending on whether the particular state is an "Agreement State" under the Atomic Energy Act of 1954, as amended. DOE regulations will be followed, and state and local regulations will be reviewed on a site-specific basis.

2.4 DESIGN CODES, GUIDES, AND STANDARDS

The following industry and national codes, standards, and guides, as applicable, will also serve as guidelines for the Design Criteria for FUSRAP and SFMP:

- American Association of State Highway and Transportation Officials (AASHTO)
- American Concrete Institute (ACI)

- American Conference of Government Industrial Hygienists (ACGIH)
- American Institute of Steel Construction (AISC)
- American National Standards Institute (ANSI)
- American Nuclear Society (ANS)
- American Petroleum Institute (API)
- American Railway Engineering Association (AREA)
- American Society for Testing and Materials (ASTM)
- American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
- American Society of Mechanical Engineers (ASME)
- American Water Works Association (AWWA)
- American Welding Society (AWS)
- Institute of Electrical and Electronic Engineers (IEEE)
- Interstate Commerce Commission (ICC)
- Illuminating Engineering Society (IES)
- National Electrical Code (NEC)
- National Electrical Manufacturers' Association (NEMA)
- National Electrical Safety Code (NESC)
- National Fire Protection Association (NFPA) "National Fire Code"
- National Geodetic Survey (NGS)
- National Standard Plumbing Code (NSPC)
- Occupational Safety and Health Standards (OSHA)
- Underwriters' Laboratory (UL)
- Uniform Building Code (UBC)
- U.S. Army Corps of Engineers Dredging Documents
- U.S. Geological Survey (USGS)

3.0 DESIGN REQUIREMENTS

3.1 GENERAL

FUSRAP work may involve remedial action at a number of sites. The currently designated FUSRAP and SFMP sites are listed in Appendix B; waste characteristics and estimated volumes at each site are also given.

Additional sites may be added or deleted with passage of federal legislation; therefore, the list of sites may be subject to revision. The specific type and quantity of contaminated material at each site, as well as geologic, meteorologic, and other site conditions affecting the design and design approach, differ from site to site.

3.2 RADIOLOGICAL DESIGN CRITERIA

The proposed DOE Interim Residual Contamination and Waste Control Guidelines for FUSRAP and SFMP sites are summarized in Appendix C. This criteria should be followed in defining cleanup requirements, developing remedial action plans, and performing and verifying field remedial actions.

3.3 SPECIFIC SITE CONDITIONS

The following information is required for each site and will be completed before or during detailed design and engineering of disposal facilities.

3.3.1 Scope of Work

The Scope of Work for the needed remedial actions must be clearly defined. This may be initiated with the preparation of the Preliminary Engineering Evaluation Report for each site with a

Design Basis, or as a separate document. It will be in accordance with the waste management plan outlined in Section 3.3.4 of these Design Criteria.

3.3.2 State and Local Regulations

In consultation with appropriate DOE-ORO personnel, applicable state and local regulations and ordinances will be reviewed to determine requirements to achieve compliance with health, safety, and environmental regulations. Construction permits and local property access agreements will be obtained as required. Any permits, licenses, or other authorization required by federal, state, or local environmental protection statutes, or any other legal authorizations required by DOE, will be obtained by DOE, Oak Ridge Operations.

3.3.3 Site Information

Define the site conditions for each site as necessary for design decisions. Parameters that may be needed include the following (see Appendix D for detailed requirements):

- Property surveys, easements, and datum
- Water levels
- Precipitation
- Humidity
- Groundwater table
- Frost penetration
- Ice conditions
- Air temperature
- Noise levels
- Winds
- Seismology

- Soil and foundation conditions
- Site historical information (including past and current use; as-built design drawings of buried utilities, structures, and systems; and existing monitoring systems).

3.3.4 Waste Characterization

Complete information on the type, quantity, and existing disposition of the radioactive wastes at any given site will usually be required prior to initiation of the Preliminary Engineering Evaluation Report or detailed design. If data and information in existing reports is not complete, or possibly out of date, additional characterization survey work may be required. Examples of additional characterization, to be planned by Bechtel and approved by DOE on a site specific basis and according to a predetermined need, include the following:

- Location and depth of buried wastes.
- Radiological, physical, and chemical characteristics of wastes in ponds, under surface water, and/or in groundwater.
- Extent of radiological migration, groundwater flow patterns, and seasonal variations.
- Wastes/contamination in building structures that may be scheduled for dismantlement or demolition.

3.3.5 Support Facilities

The identification of the needed temporary and/or permanent support facilities will be made and may include the following:

- Security
- Contamination control
- Structures
- Equipment
- Water treatment and control

- o Utilities
- o Access routes
- o Monitoring system
- o Document control
- o Administration

3.3.6 Waste Transportation

The following facets for transporting the waste materials will be investigated as applicable:

- o Waste form and quantity to be transported
- o Mode of transportation
- o Packaging and control
- o Transportation routes
- o Local traffic patterns and impact on community.

APPENDIX A

DEFINITIONS

Abbreviations/Terms	Definitions
AEC	Atomic Energy Commission
alpha particle	A positively charged particle emitted from certain radioactive material. It consists of two protons and two neutrons, hence is identical with the nucleus of the helium atom. It is the least penetrating of common radiation, hence is not dangerous unless alpha-emitting substances have entered the body.
background radiation	Naturally occurring low-level radiation to which all life is exposed. Background radiation levels vary from place to place on the earth.
beta particle	A particle emitted from some atoms undergoing radioactive decay. A negatively charged beta particle is identical to an electron. A positively charged beta particle is called a position. Beta radiation can cause skin damage, and beta emitters are harmful if they enter the body.
BNI	Bechtel National, Inc.

buffer zone	A portion of the land disposal site that is controlled by the licensee and that lies between the disposal unit and the boundary of the site.
CFR	Code of Federal Regulations
Ci	Curie (the unit of radioactivity of any nuclide, which decays at a rate of 3.7×10^{10} disintegrations/second)
contamination	The radioactive substance which is not a portion of the material into and onto which it is now dispersed.
daughter product	The nuclide remaining after a radioactive atom (parent) has undergone radioactive decay. A daughter atom also may be radioactive, producing further daughter products.
decontamination	The removal of radioactive material by chemical or mechanical means from an undesirable location and placement of the removed radioactive material in an acceptable form and location.
dismantlement	The organized manner by which a system or structure is segmented into component pieces which can be managed.

disposal	Isolation of waste from the biosphere with no intent of retrieval in a manner which does not permit easy access to the waste after its emplacement, and does not require perpetual maintenance and monitoring.
disposal site	A portion of a land disposal facility which is used for disposal of waste. It consists of disposal units and a buffer zone.
disposal unit	For near-surface disposal, a "disposal unit" means a discrete portion of the disposal site into which waste is placed for disposal.
DOE	Department of Energy
dpm	Disintegrations per minute
egr	External gamma radiation (gamma radiation emitted from a source(s) external to the body, as opposed to internal gamma radiation emitted from ingested or inhaled sources)
engineered barrier	Man-made structures or devices that are intended to prevent an intruder from inadvertent exposure to radiation from certain waste or to prevent escape of radionuclides to the environment.
EPA	Environmental Protection Agency
exposure	Magnitude of radiation. It is defined and measured in terms of electrical charge produced per unit mass of air.

FUSPAP	Formerly Utilized (MED/AEC) Sites Remedial Action Program
gamma background	Natural gamma ray activity everywhere present, originating from two sources: (1) cosmic radiation bombarding the earth's atmosphere continually, and (2) terrestrial radiation. Whole body absorbed dose equivalent in the U.S. due to natural gamma background ranges from about 60 to 125 mrem/yr.
gamma ray	High energy electromagnetic radiation emitted from the nucleus of a radioactive atom, with specific energies for the atoms of different elements and having high penetrating power.
ground water	Subsurface water in the zone of full saturation.
half-life	The period of time required for one-half of the original amount of a radioisotope to decay into a daughter product.
health effect	An adverse physiological response to environmental pollutants. While physiological responses include sickness, genetic defects, and death, for FUSRAP/SFMP one health effect is defined as one death resulting from cancer caused by exposure to radiation.

hydrogeologic unit	Any soil or rock unit or zone which, by virtue of its porosity or permeability or lack thereof, has a distinct influence on the storage or movement of ground water.
inadvertent intruder	A person who might occupy the disposal site unknowingly after closure and engage in normal activities, such as agriculture, dwelling construction, and other pursuits in which the person might be exposed to radiation from the waste.
interim storage	A short-term disposal having control and stabilization features designed to ensure, to the extent reasonably achievable, an effective life of 50 years and, in any case, at least 25 years at which time ultimate disposal will be made.
intruder barrier	A sufficient depth of cover over the waste that exposure to radiation by an inadvertent intruder will meet the standards for protection against radiation specified in DOE Manual 5820.1 and in 10 CFR 61, or engineered structures that provide equivalent protection to the inadvertent intruder.
land disposal facility	The land, buildings, and equipment which are intended to be used for the disposal of radioactive wastes beneath the surface of the land.

long-term management	A form of ultimate disposal and storage involving near-surface burial of FUSRAP and SFMP radioactive wastes. Includes monitoring and corrective action, as necessary, to ensure that contaminants are not migrating from the site in excess of design criteria, and an institutional control period not less than that specified in 40 CFR 192. Control and stabilization features are designed to ensure to the extent reasonably achievable, an effective life of 1,000 years and, in any case, at least 200 years.
LSA	Low Specific Activity - A class of radioactive material as defined in 49 CFR 173.389(c).
umhos/cm	Micromhos per centimeter (10^{-6} mho/cm)
uR/hr	Microroentgens per hour (10^{-6} R/hr)
mR/hr	Milliroentgens per hour (10^{-3} R/hr)
mrad/hr	Millirads per hour (10^{-3} rad/hr)
MED	Manhattan Engineer District
mho	A unit of electrical conductance, the reciprocal of electrical resistance.
MPC	Maximum permissible concentration as defined per 10 CFR 20.103.

near-surface disposal facility	A land disposal facility in which radioactive waste is disposed within the upper 15-20 meters of the earth's surface.
NEPA	National Environmental Policy Act
NRC	Nuclear Regulatory Commission
nuclide	A general term applicable to all atomic forms of the elements; nuclides comprise all the isotopic forms of all the elements. Nuclides are distinguished by their atomic number, atomic mass, and energy state.
pCi/l	Picocurie per liter (10^{-12} Ci/l)
R	Roentgen (a unit of exposure to ionizing radiation). It is that amount of gamma or x-rays required to produce an electrical charge that is numerically equal to 2.58 x 10^{-4} coulombs/kg.
rad	The basic unit of absorbed dose of ionizing radiation. A dose of one rad means the absorption of 100 ergs of radiation energy per gram of absorbing material.
radioactivity	The spontaneous decay or disintegration of an unstable atomic nucleus, usually accompanied by the emission of ionizing radiation.

radioactive decay chain	A succession of nuclides, each of which transforms by radioactive disintegration into the next, until a stable nuclide results. The first member is called the parent, the intermediate members are called daughters, and the final stable member is called the end product.
radon	A radioactive, chemically inert gas having a half-life of 3.8 days (radium-222); formed as a daughter product of radium (radium-226).
radon background	Low levels of radon gas found in an area due to the presence of uranium or radium in soil and building materials.
radon daughter	One of the several short-lived radioactive daughter products of radon. (Several of the daughters emit alpha particles.)
remedial action	Steps and processes that are undertaken to physically identify, decontaminate, stabilize, or otherwise provide long-term management of radioactive materials to permit certification for unrestricted public use of the area or site.
rdc	Radon daughter concentration (the concentration in air of short-lived radon daughters, usually expressed in pCi/l; also measured in terms of working level (WL).

rem — Roentgen equivalent man. The unit of dose equivalence for all types of ionizing radiation which expresses the effectiveness of the absorbed dose on a common scale. The rem is the basic unit used to record the accumulated dose equivalent to personnel.

site closure and stabilization — Those actions that are taken upon completion of operations that prepare the disposal site for custodial care and that assure that the disposal site will remain stable and will not need ongoing, active maintenance.

SFMP — Surplus Facilities Management Program

surveillance — Observation of the disposal site for purposes of visual detection of need for maintenance, custodial care, evidence of intrusion, and compliance with other license and regulatory requirements.

WL — Working level. A unit of radon daughter exposure, equal to any combination of short-lived radon daughters in 1 liter of air, that will result in the ultimate emission of 1.3×10^5 MeV of potential alpha energy. This level is equivalent to the energy produced in the decay of the daughter products that are present under equilibrium conditions in a liter of air containing 100 pCi of radium-222. It does not include decay of lead-210 (22-year half-life) and subsequent daughter products.

WLM — Working Level Month - An exposure to a one-WL concentration for 170 hours per month.

WBS NO. — Work Breakdown Structure identification sequence number designated by DOE. (See Appendix B for list of identification numbers for the specific sites.)

APPENDIX B

LIST OF FUSRAP AND SFMP SITES

AND

ESTIMATED WASTE QUANTITIES(7/82)

FUSRAP SITES

WBS No.	Site Name	State	Radioisotope	Estimated Volume (yd³)	Concentration (pCi/g)	Radioactivity (Ci)	References	Remarks
101	Acid/Pueblo	NM	Plutonium-239	390*	110	4.8×10^{-2}	Remedial Action Completed	Soils
102	Albany Research	OR	Natural Uranium Uranium-238 Natural Uranium Radium-226	3,000[b]	a	a	b	Radiological characterization not complete
104	Bayo Canyon	NM	Strontium-90	1,520*	-	-	PB&DU 409-317	No Excavation Required - Marker Placed
105	Chupadera	NM	-	N/A	-	-	Remedial Action Not Required	
108	E. I. duPont	NJ	Uranium-238 Uranium-238 Uranium-238	7,000	1,400 1,100 6,600	2.7 0.5 0.9	DOE/EV-0005/8	Contam. Soils & Drainage Ditch
114	Kellex	NJ	-	175*	-	-		Completed
115	Niagara Falls Vicinity Properties	NY	Radium-226	48,000	a	a	BNI-2045, 2061, 2074	
117	Middlesex Landfill	NJ	Radium-226	33,000	11	1.4	DOE/EV-0005/20	
118	Middlesex Sampling Plant	NJ	Radium-226 Radium-226	- 57,000	- -	3.5 10.5 -	DOE/EV-0005/1	
121	Palos Park	IL	Hydrogen-3	4,030	-	3.0×10^{3}	DOE/EV-0005/7	
151	St. Louis Airport	MO	Radium-226	86,000	30	3.8	DOE/EV-0005/16	

APPENDIX B (Cont'd)

FUSRAP SITES

WMS No.	Site Name	State	Radioisotope	Estimated Volume (yd^3)	Concentration (pCi/g)	Radioactivity (Ci)	References	Remarks
125	Shpack	MA	Radium-226 Uranium-238	400	109 125	5.5 6.3	ORNL-5799 DOE/EV-0005/31	
126	Universal Cyclops	PA	-	30	-	-	ORO-777	
129	Linde Air Products	NY	Radium-226 Uranium-238 Actinium-227	26,000	9.3 349 2.3	8.0×10^{-2} 2.88 2.0×10^{-2}	DOE/EV-0005/5 PB&DU 409-323	
130	Univ. of Calif.	CA	-	30*	-	-	Completed 9/82	
131	Univ. of Chicago	IL	-	75*	-	-		
134	SLAPSS (Vic. Prop)	MO	-	13,000	-	-		
137	Wayne/Pequannock	NJ	Uranium-238 Thorium-232 Thorium-228 Radium-226	50,000	a	a		
138	Maywood	NJ	Uranium-238 Uranium-235 Uranium-234 Thorium-230 Thorium-232 Thorium-228 Radium-226	210,000	a	a		
139	Colonie	NY	Uranium-238	30,000	a	a		Radiological Characterization Not Complete
140	Hazelwood	MO	Thorium-230 Radium-226 Uranium-238 Uranium-235 Uranium-234	61,000	a	a		Radiological Survey Not Available
			Total Volume FUSRAP	638,650				

APPENDIX B (Cont'd)

SFMP SITES

WBS No.	Site Name	State	Radioisotope	Estimated Volume (yd³)	Concentration (pCi/g)	Radioactivity (Ci)	References	Remarks
201	Weldon Spring Storage Site	MO						
	o Raffinate Pits		Natural Uranium and Thorium, Radium-226	220,500	-	824	DOE/OR/20722-5	Sludge volume
	o Quarry		Natural Uranium and Thorium, Radium-226	130,800	-	-	-	
	o Vicinity Properties		Natural Uranium Radium-226	102,00	-	-	-	
202	Niagara Falls Storage Site	NY	Radium-226 Uranium-238	218,000	-	940	DOE/OR/20722-1	(Includes contaminated residues, soils and rubble)
			Total Volumes SFMP	671,300				

[a]Actual waste volume

[b]Volumes are from Project Plan

[c]Information is unknown at this time.

APPENDIX C

U.S. DEPARTMENT OF ENERGY GUIDELINES FOR RESIDUAL RADIOACTIVITY AT FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM AND REMOTE SURPLUS FACILITIES MANAGEMENT PROGRAM SITES

(Rev. 1, July 1985)

A. INTRODUCTION

This document presents U.S. Department of Energy (DOE) radiological protection guidelines for cleanup of residual radioactive materials and management of the resulting wastes and residues. It is applicable to sites identified by the Formerly Utilized Sites Remedial Action Program (FUSRAP) and remote sites identified by the Surplus Facilities Management Program (SFMP).* The topics covered are basic dose limits, guidelines and authorized limits for allowable levels of residual radioactivity, and requirements for control of the radioactive wastes and residues.

Protocols for identification, characterization, and designation of FUSRAP sites for remedial action; for implementation of the remedial action; and for certification of a FUSRAP site for release for unrestricted use are given in a separate document (U.S. Dept. Energy 1984). More detailed information on applications of the guidelines presented herein, including procedures for deriving site-specific guidelines for allowable levels of residual radioactivity from basic dose limits, is contained in a supplementary document--referred to herein as the "supplement" (U.S. Dept. Energy 1985).

"Residual radioactivity" includes: (1) residual concentrations of radionuclides in soil material,** (2) concentrations of airborne radon decay products, (3) external gamma radiation level, and (4) surface contamination. A "basic dose limit" is a prescribed standard from which limits for quantities that can be monitored and controlled are derived; it is specified in terms of the effective dose equivalent as defined by the International Commission on Radiological Protection (ICRP 1977, 1978). Basic dose limits are used explicitly for deriving guidelines for residual concentrations of radionuclides in soil material, except for thorium and radium. Guidelines for

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*A remote SFMP site is one that is excess to DOE programmatic needs and is located outside a major operating DOE research and development or production area.

**The term "soil material" refers to all material below grade level after remedial action is completed.

residual concentrations of thorium and radium and for the other three quantities (airborne radon decay products, external gamma radiation level, and surface contamination) are based on existing radiological protection standards (U.S. Environ. Prot. Agency 1983; U.S. Nucl. Reg. Comm. 1982). These standards are assumed to be consistent with basic dose limits within the uncertainty of derivations of levels of residual radioactivity from basic limits.

A "guideline" for residual radioactivity is a level of residual radioactivity that is acceptable if the use of the site is to be unrestricted. Guidelines for residual radioactivity presented herein are of two kinds: (1) generic, site-independent guidelines taken from existing radiation protection standards, and (2) site-specific guidelines derived from basic dose limits using site-specific models and data. Generic guideline values are presented in this document. Procedures and data for deriving site-specific guideline values are given in the supplement.

An "authorized limit" is a level of residual radioactivity that must not be exceeded if the remedial action is to be considered completed. Under normal circumstances, expected to occur at most sites, authorized limits for residual radioactivity are set equal to guideline values. Exceptional conditions for which authorized limits might differ from guideline values are specified in Sections D and F. A site may be released for unrestricted use only if the residual radioactivity does not exceed guideline values at the time remedial action is completed. Restrictions and controls on use of the site must be established and enforced if the residual radioactivity exceeds guideline values. The applicable controls and restrictions are specified in Section E.

DOE policy requires that all exposures to radiation be limited to levels that are as low as reasonably achievable (ALARA). Implementation of ALARA policy is specified as procedures to be applied after authorized limits have been set. For sites to be released for unrestricted use, the intent is to reduce residual radioactivity to levels that are as far below authorized limits as reasonable considering technical, economic, and social factors. At sites where the residual radioactivity is not reduced to levels that permit release for unrestricted use, ALARA policy is implemented by establishing controls to reduce exposure to levels that are as low as is reasonably achievable. Procedures for implementing ALARA policy are described in the supplement. ALARA policies, procedures, and actions must be documented and filed as a permanent record upon completion of remedial action at a site.

B. BASIC DOSE LIMITS

The basic limit for the annual radiation dose received by an individual member of the general public is 500 mrem/yr for a period of exposure not to exceed 5 years and an average of 100 mrem/yr over a lifetime. The committed effective dose equivalent, as defined in ICRP Publication 26 (ICRP 1977) and calculated by dosimetry models described in ICRP Publication 30 (ICRP 1978), shall be used for determining the dose.

C. GUIDELINES FOR RESIDUAL RADIOACTIVITY

C.1 Residual Radionuclides in Soil Material

Residual concentrations of radionuclides in soil material shall be specified as above-background concentrations averaged over an area of 100 m². If the concentration in any area is found to exceed the average by a factor greater than 3, guidelines for local concentrations shall also be applicable. These "hot spot" guidelines depend on the extent of the elevated local concentrations and are given in the supplement.

The generic guidelines for residual concentrations of Th-232, Th-230, Ra-228, and Ra-226 are:

- 5 pCi/g, averaged over the first 15 cm of soil below the surface
- 15 pCi/g, averaged over 15-cm-thick layers of soil more than 15 cm below the surface

These guidelines take into account ingrowth of Ra-226 from Th-230 and of Ra-228 from Th-232, and assume secular equilibrium. If either Th-230 and Ra-226 or Th-232 and Ra-228 are both present, not in secular equilibrium, the guidelines apply to the higher concentration. If other mixtures of radionuclides occur, the concentrations of individual radionuclides shall be reduced so that the dose for the mixtures will not exceed the basic dose limit. Explicit formulas for calculating residual concentration guidelines for mixtures are given in the supplement.

The guidelines for residual concentrations in soil material of all other radionuclides shall be derived from basic dose limits by means of an environmental pathway analysis using site-specific data. Procedures for deriving these guidelines are given in the supplement.

C.2 Airborne Radon Decay Products

Generic guidelines for concentrations of airborne radon decay products shall apply to existing occupied or habitable structures on private property that are intended for unrestricted use; structures that will be demolished or buried are excluded. The applicable generic guideline (40 CFR 192) is: In any occupied or habitable building, the objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL.* In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL. Remedial actions are not required in order to comply with this guideline when there is reasonable assurance that residual radioactive materials are not the cause.

C.3 External Gamma Radiation

The average level of gamma radiation inside a building or habitable structure on a site to be released for unrestricted use shall not exceed the background level by more than 20 μR/h.

*A working level (WL) is any combination of short-lived radon decay products in one liter of air that will result in the ultimate emission of 1.3×10^5 MeV of potential alpha energy.

C.4 Surface Contamination

The following generic guidelines, adapted from standards of the U.S. Nuclear Regulatory Commission (1982), are applicable only to existing structures and equipment that will not be demolished and buried. They apply to both interior and exterior surfaces. If a building is demolished and buried, the guidelines in Section C.1 are applicable to the resulting contamination in the ground.

	Allowable Total Residual Surface Contamination (dpm/100 cm^2)†[1]		
Radionuclides†[2]	Average†[3],†[4]	Maximum†[4],†[5]	Removable†[4],†[6]
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100	300	20
Th-Natural, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay products	5,000α	15,000α	1,000α
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5,000β-γ	15,000β-γ	1,000β-γ

†[1] As used in this table, dpm (disintegrations per minute) 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.

†[2] Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

†[3] Measurements of average contamination should not be averaged over an area of more than 1 m^2. For objects of less surface area, the average should be derived for each such object.

†[4] The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm.

†[5] The maximum contamination level applies to an area of not more than 100 cm^2.

†[6] The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. The numbers in this column are maximum amounts.

D. AUTHORIZED LIMITS FOR RESIDUAL RADIOACTIVITY

The remedial action shall not be considered complete unless the residual radioactivity is below authorized limits. Authorized limits shall be set equal to guidelines for residual radioactivity unless: (1) exceptions specified in Section F of this document are applicable, in which case an authorized limit may be set above the guideline value for the specific location or condition to which the exception is applicable; or (2) on the basis of site-specific data not used in establishing the guidelines, it can be clearly established that limits below the guidelines are reasonable and can be achieved without appreciable increase in cost of the remedial action. Authorized limits that differ from guidelines must be justified and established on a site-specific basis, with documentation that must be filed as a permanent record upon completion of remedial action at a site. Authorized limits differing from the guidelines must be approved by the Director, Oak Ridge Technical Services Division, for FUSRAP and by the Director, Richland Surplus Facilities Management Program Office, for remote SFMP--with concurrence by the Director of Remedial Action Projects for both programs.

E. CONTROL OF RESIDUAL RADIOACTIVITY AT FUSRAP AND REMOTE SFMP SITES

Residual radioactivity above the guidelines at FUSRAP and remote SFMP sites must be managed in accordance with applicable DOE Orders. The DOE Order 5480.1A requires compliance with applicable federal, state, and local environmental protection standards.

The operational and control requirements specified in the following DOE Orders shall apply to interim storage, interim management, and long-term management.

a. 5440.1B, Implementation of the National Environmental Policy Act

b. 5480.1A, Environmental Protection, Safety, and Health Protection Program for DOE Operations

c. 5480.2, Hazardous and Radioactive Mixed Waste Management

d. 5480.4, Environmental Protection, Safety, and Health Protection Standards

e. 5482.1A, Environmental, Safety, and Health Appraisal Program

f. 5483.1, Occupational Safety and Health Program for Government-Owned Contractor-Operated Facilities

g. 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements

h. 5484.2, Unusual Occurrence Reporting System

i. 5820.2, Radioactive Waste Management

E.1 Interim Storage

a. Control and stabilization features shall be designed to ensure, to the extent reasonably achievable, an effective life of 50 years and, in any case, at least 25 years.

b. Above-Background Rn-222 concentrations in the atmosphere above facility surfaces or openings shall not exceed: (1) 100 pCi/L at any given point, (2) an annual average concentration of 30 pCi/L over the facility site, and (3) an annual average concentration of 3 pCi/L at or above any location outside the facility site (DOE Order 5480.1A, Attachment XI-1).

c. Concentrations of radionuclides in the groundwater or quantities of residual radioactive materials shall not exceed existing federal, state, or local standards.

d. Access to a site shall be controlled and misuse of onsite material contaminated by residual radioactivity shall be prevented through appropriate administrative controls and physical barriers--active and passive controls as described by the U.S. Environmental Protection Agency (1983--p. 595). These control features should be designed to ensure, to the extent reasonable, an effective life of at least 25 years. The federal government shall have title to the property.

E.2 Interim Management

a. A site may be released under interim management when the residual radioactivity exceeds guideline values if the residual radioactivity is in inaccessible locations and would be unreasonably costly to remove, provided that administrative controls are established to ensure that no member of the public shall receive a radiation dose exceeding the basic dose limit.

b. The administrative controls, as approved by DOE, shall include but not be limited to periodic monitoring, appropriate shielding, physical barriers to prevent access, and appropriate radiological safety measures during maintenance, renovation, demolition, or other activities that might disturb the residual radioactivity or cause it to migrate.

c. The owner of the site or appropriate federal, state, or local authorities shall be responsible for enforcing the administrative controls.

E.3 Long-Term Management

Uranium, Thorium, and Their Decay Products

a. Control and stabilization features shall be designed to ensure, to the extent reasonably achievable, an effective life of 1,000 years and, in any case, at least 200 years.

b. Control and stabilization features shall be designed to ensure that Rn-222 emanation to the atmosphere from the waste shall not: (1) exceed an annual average release rate of 20 $pCi/m^2/s$, and (2) increase the annual average Rn-222 concentration at or above any location outside the boundary of the contaminated area by more than 0.5 pCi/L. Field verification of emanation rates is not required.

c. Prior to placement of any potentially biodegradable contaminated wastes in a long-term management facility, such wastes shall be properly conditioned to ensure that (1) the generation and escape of biogenic gases will not cause the requirement in paragraph b of this section (E.3) to be exceeded, and (2) biodegradation within the facility will not result in premature structural failure in violation of the requirements in paragraph a of this section (E.3).

d. Groundwater shall be protected in accordance with 40 CFR 192.20(a)(2) and 192.20(a)(3), as applicable to FUSRAP and remote SFMP sites.

e. Access to a site should be controlled and misuse of onsite material contaminated by residual radioactivity should be prevented through appropriate administrative controls and physical barriers--active and passive controls as described by the U.S. Environmental Protection Agency (1983--p. 595). These controls should be designed to be effective to the extent reasonable for at least 200 years. The federal government shall have title to the property.

Other Radionuclides

f. Long-term management of other radionuclides shall be in accordance with Chapters 2, 3, and 5 of DOE Order 5820.2, as applicable.

F. EXCEPTIONS

Exceptions to the requirement that authorized limits be set equal to the guidelines may be made on the basis of an analysis of site-specific aspects of a designated site that were not taken into account in deriving the guidelines. Exceptions require approvals as stated in Section D. Specific situations that warrant exceptions are:

a. Where remedial actions would pose a clear and present risk of injury to workers or members of the general public, notwithstanding reasonable measures to avoid or reduce risk.

b. Where remedial actions--even after all reasonable mitigative measures have been taken--would produce environmental harm that is clearly excessive compared to the health benefits to persons living on or near affected sites, now or in the future. A clear excess of environmental harm is harm that is long-term, manifest, and grossly disproportionate to health benefits that may reasonably be anticipated.

c. Where the cost of remedial actions for contaminated soil is unreasonably high relative to long-term benefits and where the residual radioactive materials do not pose a clear present or future risk after taking necessary control measures. The likelihood that buildings will be erected or that people will spend long periods of time at such a site should be considered in evaluating this risk. Remedial actions will generally not be necessary where only minor quantities of residual radioactive materials are involved or where residual radioactive materials occur in an inaccessible location at which site-specific factors limit their hazard and from which they are costly or difficult to remove. Examples are residual radioactive materials under hard-surface public roads and sidewalks, around public sewer lines, or in fence-post foundations. In order to invoke this exception, a site-specific analysis must be provided to establish that it would not cause an individual to receive a radiation dose in excess of the basic dose limits stated in Section B, and a statement specifying the residual radioactivity must be included in the appropriate state and local records.

d. Where the cost of cleanup of a contaminated building is clearly unreasonably high relative to the benefits. Factors that shall be included in this judgment are the anticipated period of occupancy, the incremental radiation level that would be effected by remedial action, the residual useful lifetime of the building, the potential for future construction at the site, and the applicability of remedial actions that would be less costly than removal of the residual radioactive materials. A statement specifying the residual radioactivity must be included in the appropriate state and local records.

e. Where there is no feasible remedial action.

G. SOURCES

Limit or Guideline	Source
Basic Dose Limits	
Dosimetry Model and Dose Limits	International Commission on Radiological Protection (1977, 1978)
Generic Guidelines for Residual Radioactivity	
Residual Concentrations of Radium and Thorium in Soil Material	40 CFR 192
Airborne Radon Decay Products	40 CFR 192
External Gamma Radiation	40 CFR 192
Surface Contamination	Adapted from U.S. Nuclear Regulatory Commission (1982)
Control of Radioactive Wastes and Residues	
Interim Storage	DOE Order 5480.1A
Long-Term Management	DOE Order 5480.1A; 40 CFR 192

H. REFERENCES

International Commission on Radiological Protection. 1977. Recommendations of the International Commission on Radiological Protection (Adopted January 17, 1977). ICRP Publication 26. Pergamon Press, Oxford. [As modified by "Statement from the 1978 Stockholm Meeting of the ICRP." Annals of the ICRP, Vol. 2, No. 1, 1978.]

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U.S. Environmental Protection Agency. 1983. Standards for Remedial Actions at Inactive Uranium Processing Sites; Final Rule (40 CFR Part 192). Fed. Regist. 48(3):590-604 (January 5, 1983).

U.S. Department of Energy. 1984. Formerly Utilized Sites Remedial Action Program. Summary Protocol: Identification - Characterization - Designation - Remedial Action - Certification. Office of Nuclear Energy, Office of Terminal Waste Disposal and Remedial Action, Division of Remedial Action Projects. April 1984.

U.S. Department of Energy. 1985. Supplement to U.S. Department of Energy Guidelines for Residual Radioactivity at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites. A Manual for Implementing Residual Radioactivity Guidelines. Prepared by Argonne National Laboratory, Los Alamos National Laboratory, Oak Ridge National Laboratory, and Pacific Northwest Laboratory for the U.S. Department of Energy. (In preparation.)

U.S. Nuclear Regulatory Commission. 1982. Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material. Division of Fuel Cycle and Material Safety, Washington, DC. July 1982.

APPENDIX D

SITE INFORMATION FOR SPECIFIC SITES
(See Design Criteria, Section 3.3.3)

1.0 GENERAL

This appendix is a general outline of the information that will be obtained for a FUSRAP/SFMP site through historical research and/or field investigation activities during site characterization. This information will be used as a starting point for preparation of Design Bases for the sites. The data unique to a particular site are enclosed between single asterisks (*..*).

2.0 SURVEYS AND DATUM

Information on site description, surveys, plant coordinates, plant datum, plant grade, horizontal and vertical survey control points, plant grid north, site boundary, access roads, railroads, etc., will be obtained.

3.0 WATER LEVELS

For sites located on rivers, lakes, or at the ocean, the probable maximum and minimum water levels and their fluctuations will be obtained. The design maximum flood elevations, as noted below, will be investigated and recorded for the site:

	Elevation Above Mean Sea Level (MSL) (*..*)
Maximum recorded high water	ft
100-year projected flood	ft
Probable maximum flood	ft
Maximum projected water level for plant safety	ft
Design high water	ft
Design low water	ft

(In general, the 100-year flood shall be used for design.)

4.0 PRECIPITATION (*..*)

Rainfall

Average annual	in.
Daily maximum	in.
Design hourly maximum (100-year storm)	in.
Probable maximum precipitation (PMP) per hour	in.

Flash floods caused by thunderstorm may occur and are to be considered in the design. (Note value to be used in flood design as *..* in. per hour.)

SNOWFALL (*..*)

Average annual	in.
Season maximum	in.
Maximum for month of *..*	in.
Daily maximum	in.
Design snow load	lb/sq. ft.

5.0 GROUNDWATER TABLE

The high water table to be used in design will be stated.

For the design of all underground structures, the high water table will be assumed as elevation *..* ft.

Average groundwater level is approximately at *..* ft.

6.0 FROST PENETRATION

Depth below grade	*..* in.

7.0 ICE

If applicable, ice pack formation will be described giving appropriate design loads.

8.0 AIR TEMPERATURE (*..*)

Maximum design	°F
Minimum design	°F
Average annual	°F
Average wet bulb	°F
Average dry bulb	°F

9.0 NOISE LEVELS

Noise level measurement and monitoring during construction will be maintained for sites as required by local authorities.

10.0 WINDS

Based on 100-year recurrence interval, the design wind velocity shall be *..* mph at *..* feet above grade in accordance with the Uniform Building Code (UBC). The prevailing wind is in *..* direction. Wind velocity will be adjusted as appropriate for structure height and gust factors. The effects of tornadoes will be investigated as required by site conditions.

11.0 SEISMOLOGY

The site is in UBC Zone *..*. Seismic loads shall be considered in accordance with Section 2312 of UBC criteria.

Verification of whether a higher zoning than that required by UBC may be more appropriate for the particular site will be made.

12.0 GEOTECHNICAL INVESTIGATIONS

Subsurface investigations will provide a description of the soil and geological and hydrological conditions and other data for the preparation of "Soil and Geological Investigation Report". The design basis will list from the report the hydraulic gradient of ground water, soil profile, location of bedrock, determination of confined and unconfined aquifers, establishment of monitoring wells, test results of soil and rock properties, allowable bearing and/or pile capacities (as applicable) for foundation design, active and passive lateral earth pressure, etc. Compaction criteria and maximum slopes for excavation will also be specified.

13.0 GUIDELINES FOR RESIDUAL RADIOACTIVITY

To be developed for each site. Refer to Appendix C.

2.2 DESIGNATION OR AUTHORIZATION DOCUMENTATION

The following document designated or authorized the remedial action at the Schnoor site.

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

United States Government Department of Ene

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

Attachments

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.

- o 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.

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06/10/92

United States Government

memorandum

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

Department of Energy
Washington, DC 20585

OCT 14 1992

Mr. Stuart Hunt
Sonnersheim, Nath, and Rosenthal
1301 K Street
Suite 600, East Tower
Washington, D.C. 20005

Dear Mr. Hunt:

As we discussed by telephone, the U.S. Department of Energy (DOE) has designated the former C. H. Schnoor & Company site in Springdale, Pennsylvania, for remedial action as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). In response to your request, I am enclosing a copy of the DOE documents authorizing the inclusion of this site into FUSRAP.

If you have any questions, please call me at 301-903-8149.

Sincerely,

W. Alexander Williams

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

Enclosures

cc:
F. Pucciarelli, Conviber, Inc.
T. Perry, OR

Department of Energy
Washington, DC 20585

OCT 1992

1992 OCT 20 AM 9:36

Mr. Frank Pucciarelli
Conviber, Inc.
644 Garfield Street
Springdale, Pennsylvania 15144

Dear Mr. Pucciarelli:

This is to notify you that the U.S. Department of Energy (DOE) has designated your company's facility for remedial action as a part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). Remedial activities are managed by the DOE Oak Ridge Field Office, and Ms. Teresa Perry (615-576-8956) will be the site manager. As a result of the designation decision, Ms. Perry will be the appropriate point of contact in the future.

If you have any questions, please call me at 301-903-8149.

Sincerely,

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

cc:
T. Perry, OR

2.3 RADIOLOGICAL CHARACTERIZATION REPORTS

The pre-remedial action status of the C. H. Schnoor site is described in the following documents.

ornl

ORNL/RASA-89

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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

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ACKNOWLEDGMENTS

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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 smear: -ere obtained from the roof and analyzed for removable alpha and beta-gamma contamination. ..alysis 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.

REFERENCES

1. U.S. Department of Energy, *A Background Report for the Formerly Utilized Manhattan Engineer District/Atomic Energy Commission Sites Program*, DOE/EV-0097, September 1980.

2. Memorandum, B. D. Shipp, Director, Operational and Environmental Safety Division, U.S. DOE, Chicago Operations and Regional Office, Argonne, Illinois, to W. E. Mott, Director, Environmental and Safety Engineering Division, Office of Environment, U.S. DOE, October 21, 1980.

3. Trip Report, A. J. Whitman to W. E. Mott, Environmental and Safety Engineering Division, Office of Environment, U.S. DOE, November 4, 1980.

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.

5. *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.

6. 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.

7. 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.

ORNL-PHOTO 7852-91

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

ORNL-DWG 91-14160

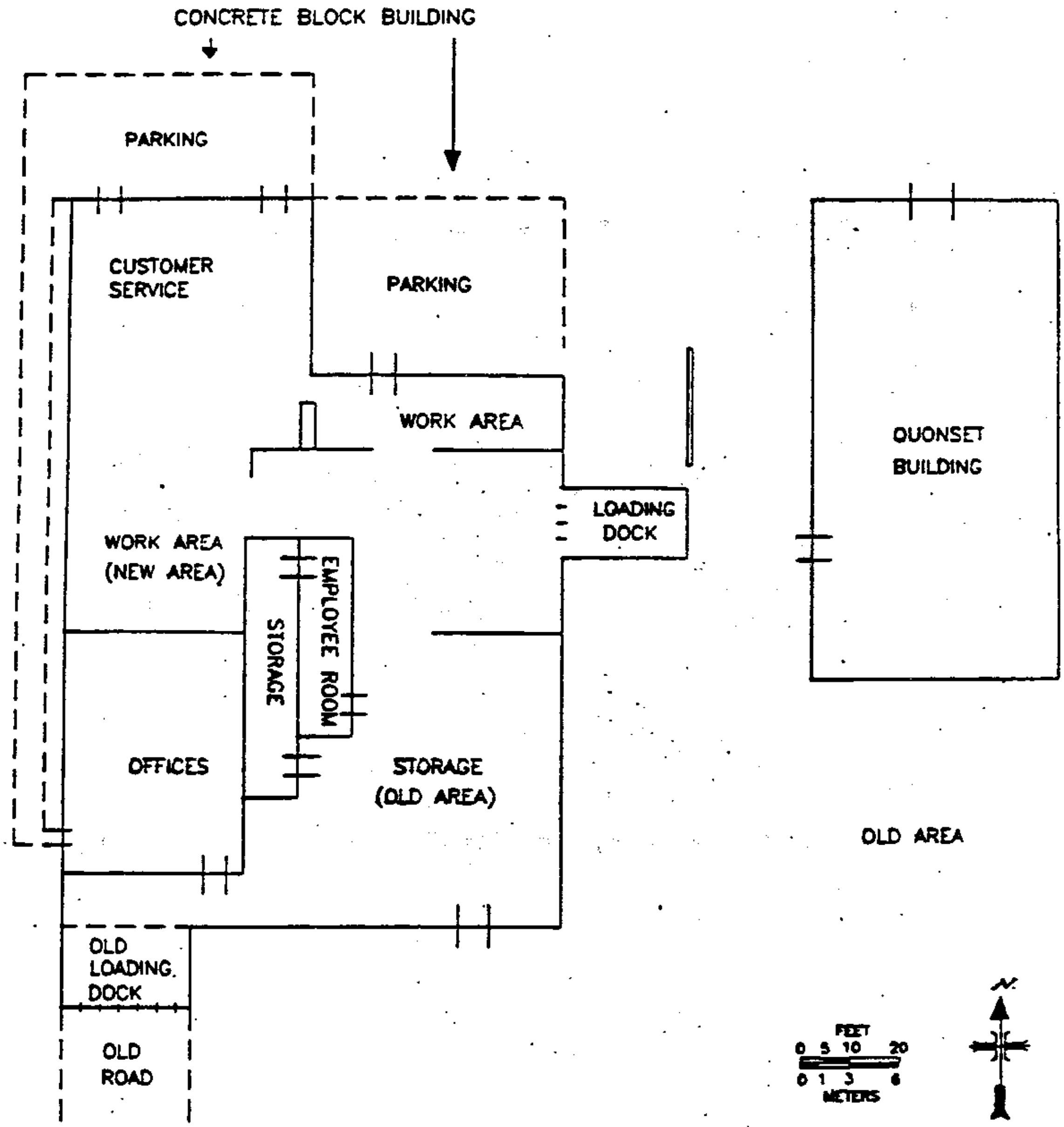

Fig. 2. Diagram showing building locations at Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania.

ORNL-DWG 91-14161

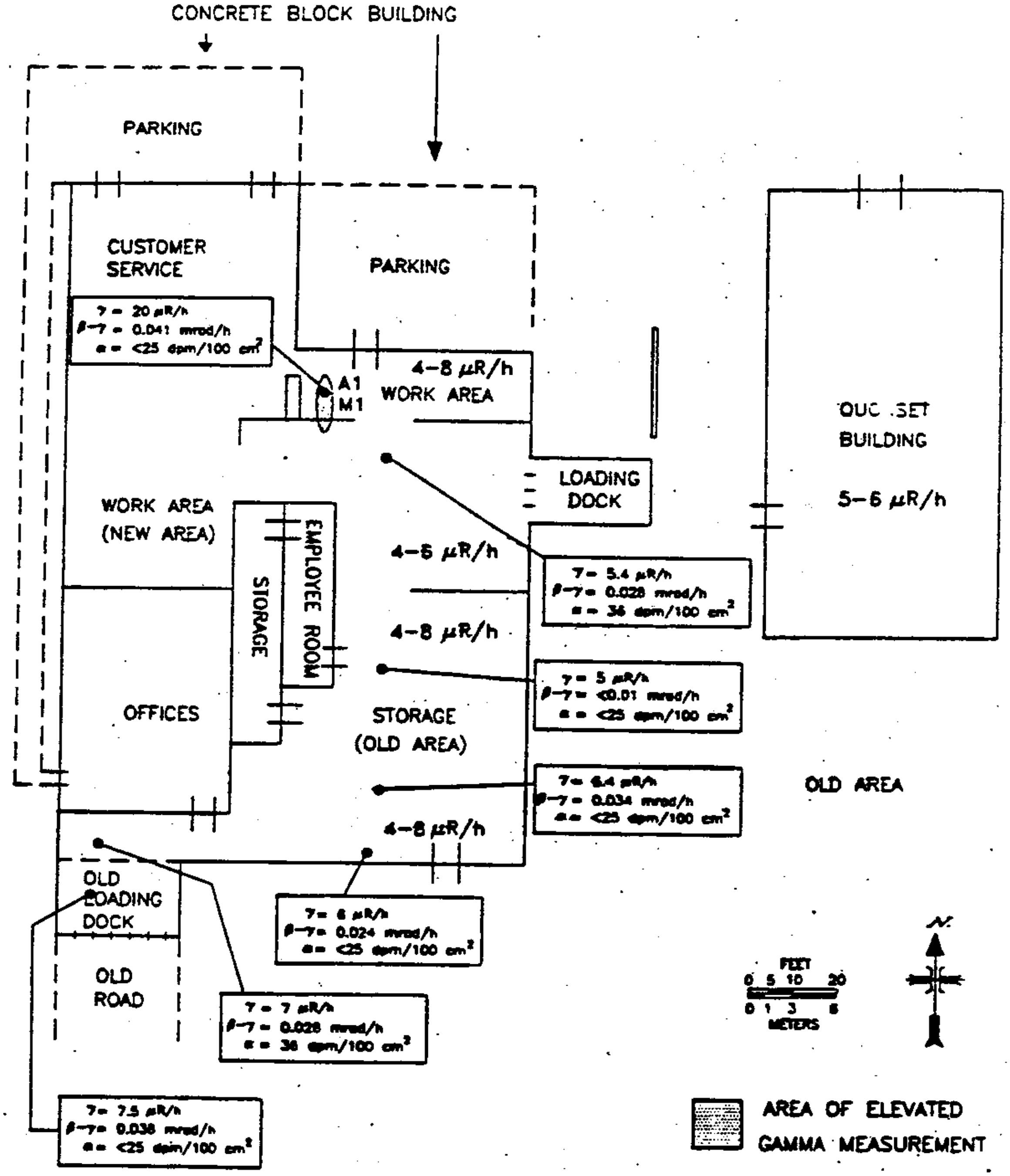

Fig. 3. Locations of gamma exposure rate measurements and direct alpha and beta-gamma measurements taken indoors at Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania.

ORNL-PHOTO 7853-91

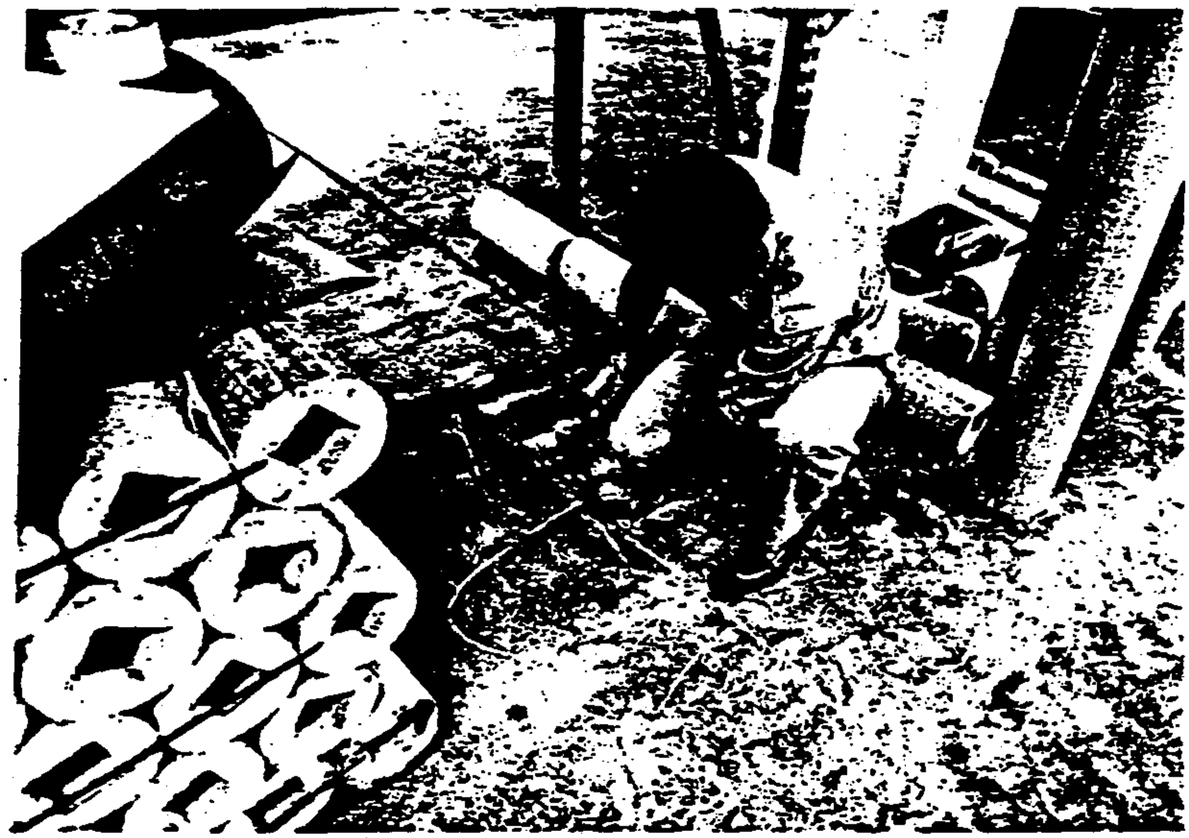

Fig. 4. Location of elevated gamma measurements in a work area, Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania. A survey team member takes a sample of concrete chips.

ORNL-DWG 91-14162

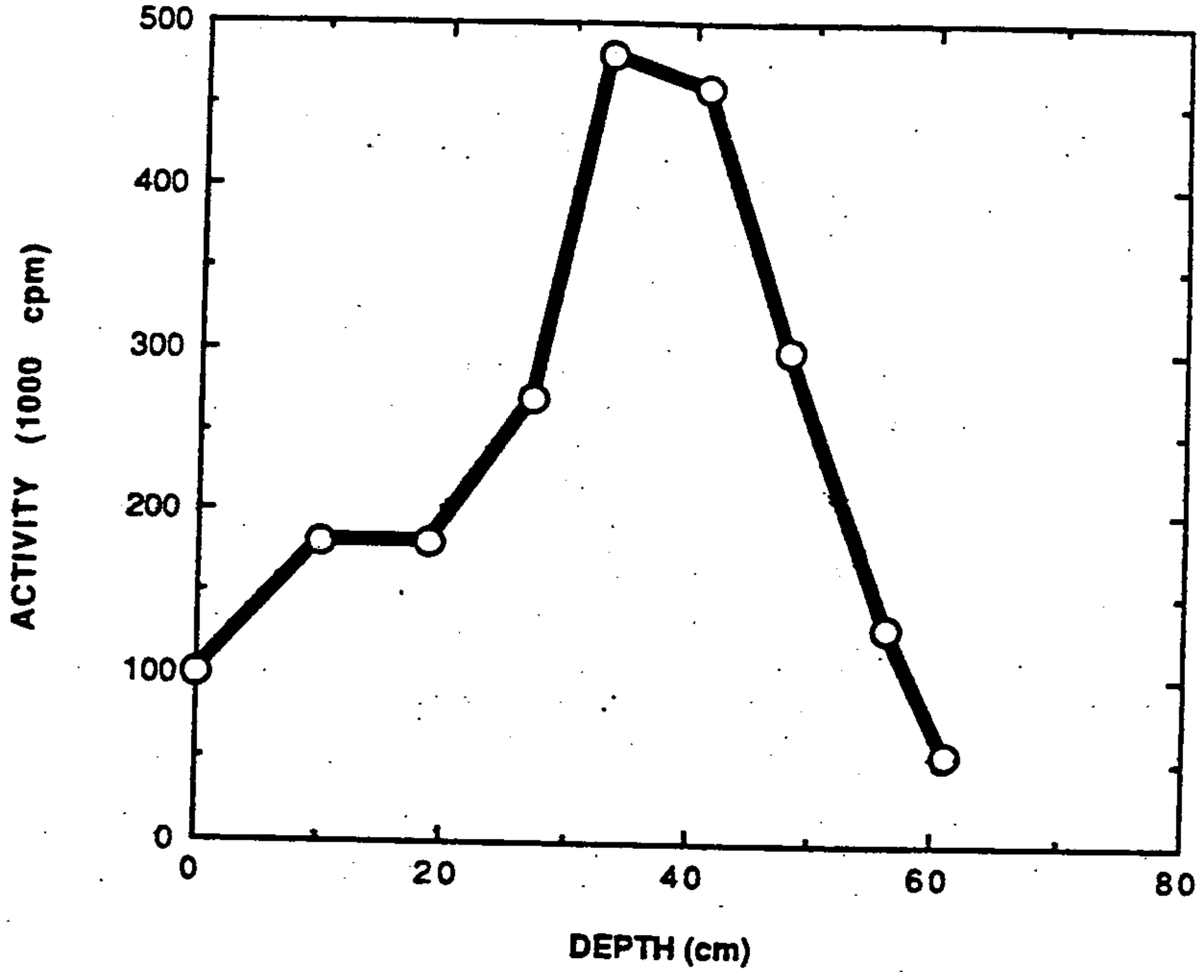

Fig. 5. Gamma logging of auger hole drilled at the location of elevated gamma inside the concrete building, Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania.

ORNL-DWG 91-14163

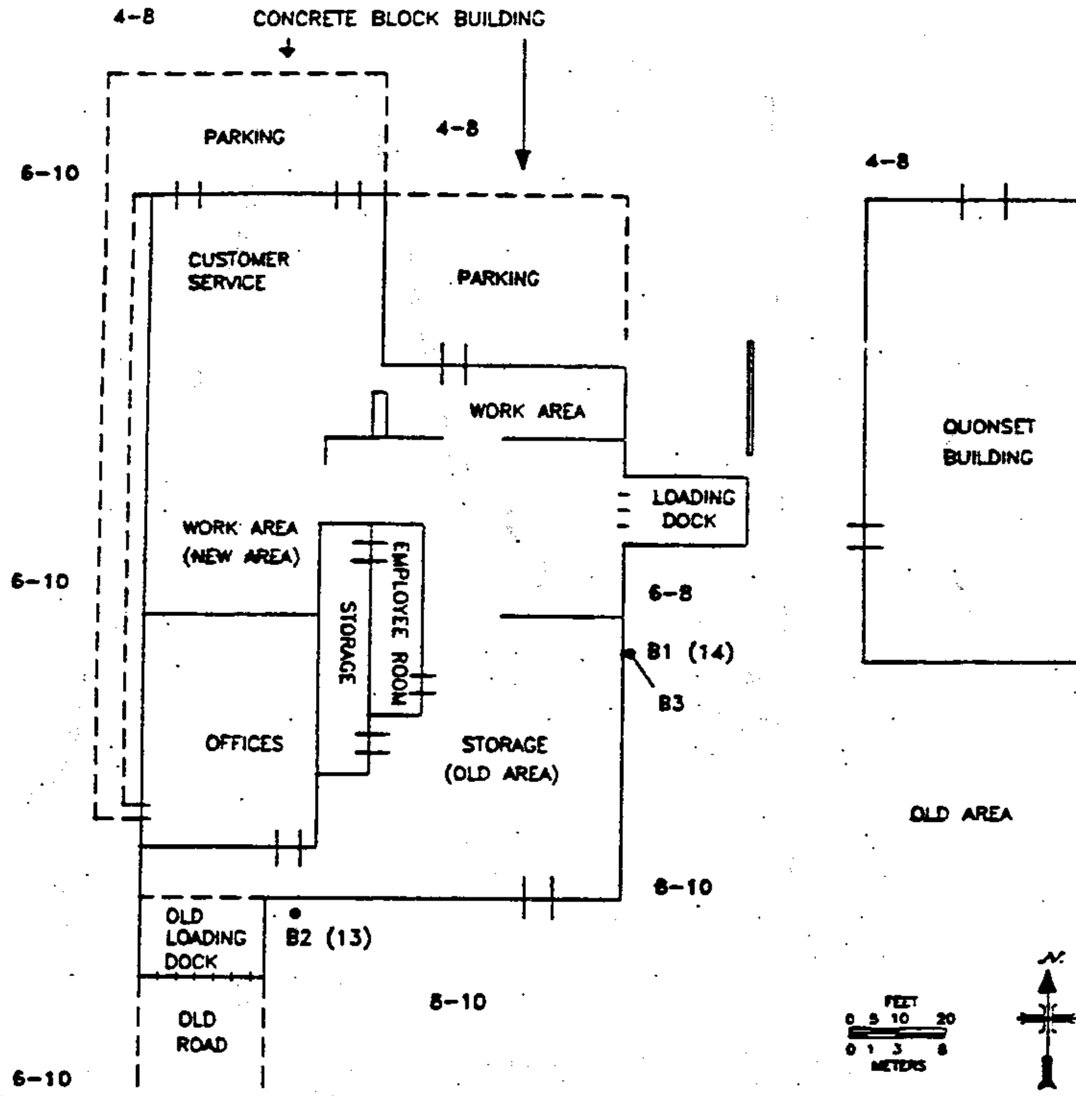

Fig. 6. Gamma exposure rates (μR/h) measured outdoors on the surface, and locations of soil samples taken at Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania.

ORNL-DWG 91-14164

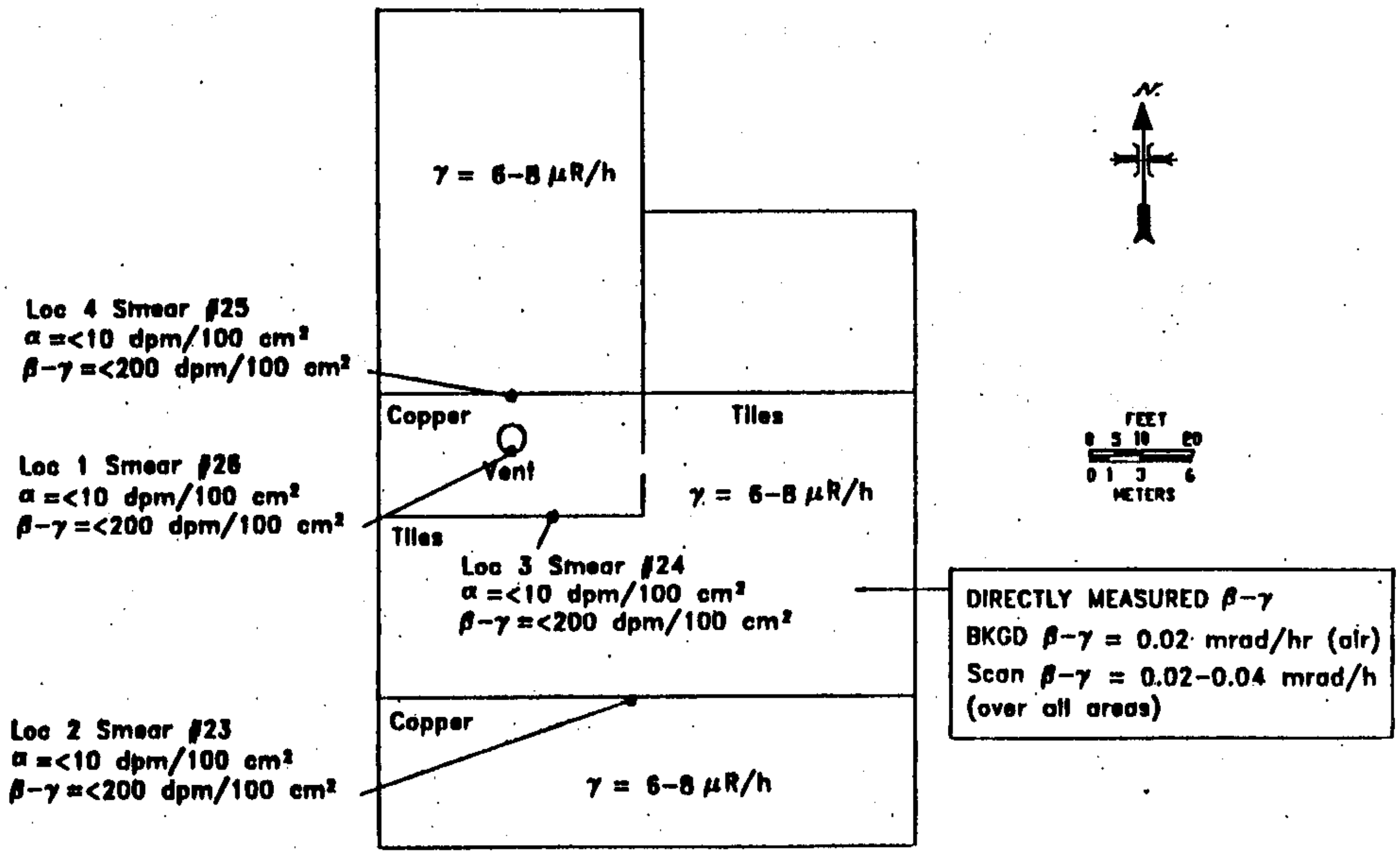

Fig. 7. Gamma exposure rate measurements, transferable alpha and beta-gamma measurements, and direct beta-gamma measurements taken on the roof of the concrete block building at Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania.

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 ^{232}Th	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
	^{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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FUSRAP Project
Job 14501

FUSRAP TECHNICAL BULLETIN

NO. 122-94-002 REV. 0
DATE: 3-29-94

Prepared By	Team Lead Approval	Project Engineer Approval	Project Engineering Manager
Tim King	Suzanne Carter	[signature]	J L McLaughlin

SUBJECT:

Summary of the results for the Springdale characterization activities performed per WI-94-015, Rev. 0.

SUMMARY:

Two separate radiological characterization surveys and a limited chemical characterization survey were performed on the Springdale Site in October and December, 1993. The design of the radiological surveys were to supplement and define existing ORNL surveys. The limited chemical characterization survey was performed to assist in the completion of waste disposal paperwork. Radiological contamination is primarily in the belt cutting and belt fabrication areas of the building with a small area of contamination in the south end of the building. The chemical sample came back negative for the RCRA characteristics.

DISCUSSION:

A fidler walkover was performed in all areas of the building at Springdale. Both systematic and biased boreholes were used in the characterization (see attached figure). Biased boreholes were located based on elevated fidler measurements.

During the October sampling effort six boreholes were drilled in the building. These boreholes are labeled 1 through 6 on the attached figure. Two samples were collected from each of these boreholes down to a depth of 1.5 feet. Results for U-238 ranged from 0 to 198.00 pCi/g and are presented in table 1. All boreholes except 4 and 6 had results above the U-238 guideline of 50 pCi/g.

There were 16 boreholes drilled during the December sampling effort to provide data on areas of the building that previously had not be sampled. These boreholes were placed based both on elevated fidler readings and systematically. Samples were collected every 6 inches to the bottom of the borehole. The sample from each borehole with the highest HP-260 reading was shipped to the laboratory for analyses. All other samples from the borehole were archived. Table 2 presents results from the December sampling effort. Results for U-238 ranged from 0 to 59.30 pCi/g. As can be seen from the data the sample from borehole 9 was the only result above the U-238 guideline. In addition, during the December sampling effort two additional samples were collected from areas 1 and 2 shown on the attached figure. The samples were analyzed for isotopic uranium, radium-226 and thorium-232. These results are presented in table 3. The results from these samples will be used to complete waste disposal paperwork. Both of these samples contained elevated results for U-234, U-235, and U-238.

One chemical sample from area 1 was collected to be used in completion of the waste disposal paperwork. This sample was analyzed for the RCRA characteristics (TCLP total, flashpoint, reactivity, and corrosivity). TCLP metals included copper and zinc. Results were negative.

ATTACHMENTS:

Attachment 1 - Figure 1 Site map showing sampling locations.

Attachment 2 - Table 1 Radionuclide Concentrations in Soil Samples During October Sampling Effort

Attachment 3 - Table 2 Radionuclide Concentrations in Soil Samples During December Sampling Effort

Attachment 4 - Table 3 Radionuclide Concentrations in Soil Samples From Areas 1 and 2

Note: The data contained herein are preliminary. Interpretations, conclusions, and recommendations based on these data are not to be used as a basis for final design, construction, remedial action, or as a basis for capital decisions.

Table 1
Radionuclide Concentrations in Soil Samples
During October 93 Sampling Effort

Location #	Sample ID	Depth (ft)	U-238 (pCi/g +/- 2 sigma)
1	122R001	0-0.5	0.00 +/- 0.00
1	122R002	0.5-1.5	60.50 +/- 10.40
2	122R003	0-0.5	33.00 +/- 7.50
2	122R004	0.5-1.5	120.10 +/- 14.50
3	122R005	0-0.5	0.00 +/- 0.00
3	122R006	0.5-1.5	198.00 +/- 14.60
4	122R007	0-0.5	0.00 +/- 0.00
4	122R008	0.5-1.5	0.00 +/- 0.00
5	122R009	0-0.5	170.00 +/- 15.20
5	122R010	0.5-1.5	55.00 +/- 12.50
6	122R011	0-0.5	35.70 +/- 13.00
6	122R012	0.5-1.5	27.70 +/- 10.20

Table 2
Radionuclide Concentrations in Soil Samples
During December 93 Sampling Effort

Location #	Sample ID	Depth (in)	Concentration (pCi/g +/− 2 sigma) U−238	R−226	T−232
7	12293013	4−10	0.00 +/− 0.00	1.70 +/−0.72	1.60 +/−0.51
8	12293019	4−10	0.00 +/− 0.00	1.60 +/−0.22	2.30 +/−0.39
9	12293028	22−28	59.30 +/− 7.10	1.60 +/−0.34	1.40 +/−0.15
10	12293031	7.5−13.5	0.00 +/− 0.00	1.60 +/−0.45	1.90 +/−0.27
11	12293033	4.5−10.5	3.70 +/− 2.20	1.00 +/−0.13	0.88 +/−0.48
12	12293042	5−11	0.00 +/− 0.00	1.40 +/−0.17	1.50 +/−0.32
13	12293048	5−11	0.00 +/− 0.00	1.50 +/−1.10	1.70 +/−0.46
14	12293036	8−14	0.00 +/− 0.00	1.10 +/−0.14	1.10 +/−0.09
15	12293054	5−11	0.00 +/− 0.00	1.90 +/−0.59	2.20 +/−0.97
16	12293060	5−11	38.30 +/− 9.00	1.70 +/−0.68	0.00 +/−0.00
17	12293063	17−23	0.00 +/− 0.00	1.50 +/−0.38	0.00 +/−0.00
18	12293067	18−24	0.00 +/− 0.00	1.50 +/−0.30	1.70 +/−0.35
19	12293074	11−17	0.00 +/− 0.00	1.40 +/−0.49	1.70 +/−0.57
20	12293079	4−10	0.00 +/− 0.00	1.20 +/−0.47	1.80 +/−1.20
21	12293080	5−11	0.00 +/− 0.00	1.90 +/−0.21	2.10 +/−0.19
22	12293087	16−22	0.00 +/− 0.00	0.00 +/−0.00	2.30 +/−2.30

Table 3
Radionuclide Concentrations in Soil Samples
From Areas 1 and 2

Location #	Sample ID	Depth (in)	Concentration (pCi/g +/− 2 sigma) U−234	U−235	U−238	R−226	T−232
Area 1	12293091	5.5−11	8677.00 +/− 2027.00	405.60 +/− 250.90	8887.00 +/− 2069.00	1.30 +/− 0.86	2.40 +/− 1.10
Area 2	12293092	5.5−11	208.60 +/− 153.20	26.20 +/− 52.60	130.40 +/− 119.40	2.20 +/− 0.51	1.90 +/− 0.41

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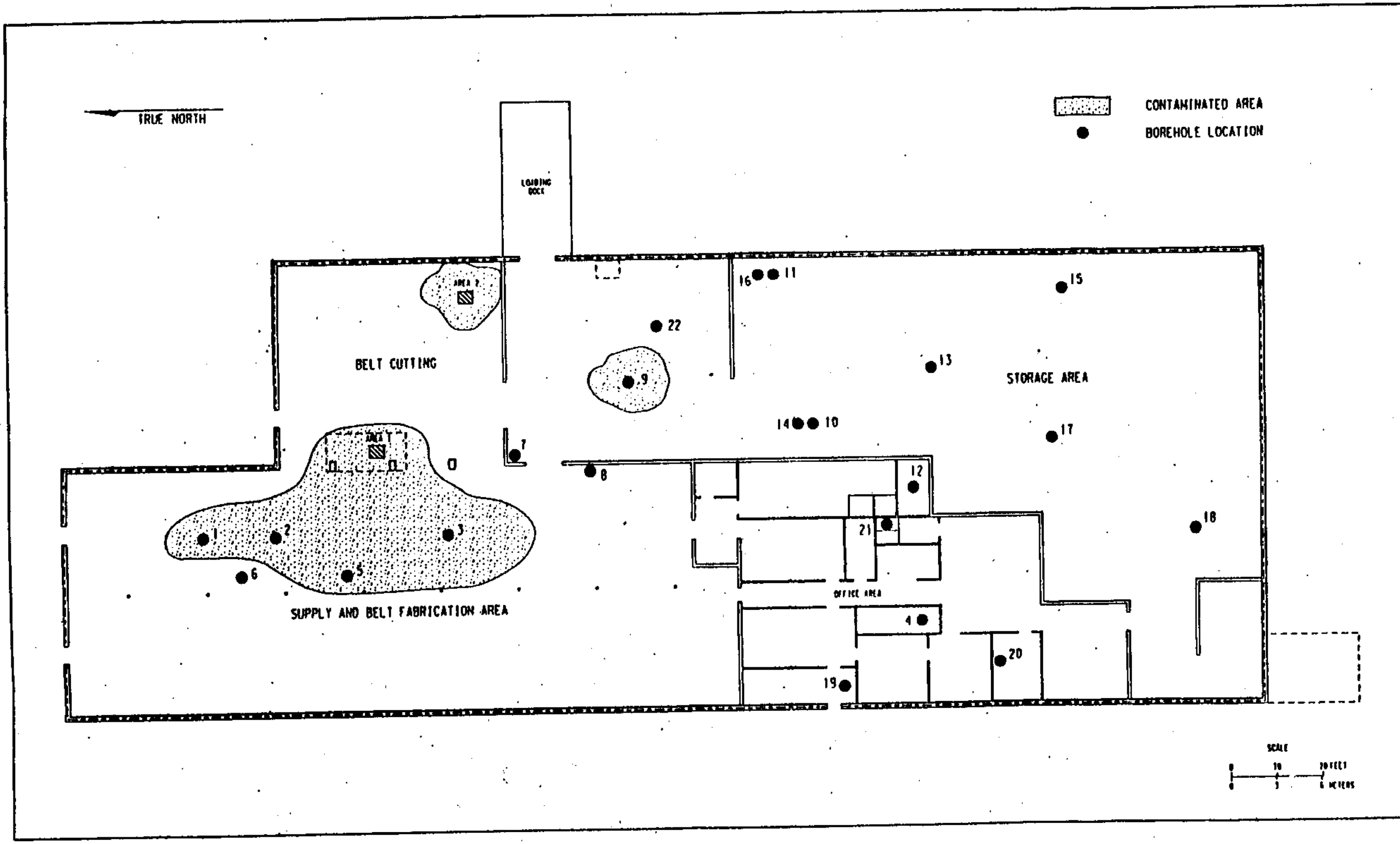

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Springdale Site

OAK RIDGE NATIONAL LABORATORY
MANAGED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE U.S. DEPARTMENT OF ENERGY

Feb 14 3 PM '95

POST OFFICE BOX 2008
OAK RIDGE, TENNESSEE 37831

February 9, 1995

Dr. W. A. Williams
EM-421
656 Quince Orchard Road
Department of Energy
Gaithersburg, Maryland 20878

Dear Dr. Williams:

Results of the Supplementary Radiological Survey at Conviber, Incorporated, Springdale, Pennsylvania

Enclosed for your review and comment are two copies of the survey report "Results of the Supplementary Radiological Survey at Conviber, Incorporated (formerly C. H. Schnoor & Company), 644 Garfield Street, Springdale, Pennsylvania." One copy will also be forwarded for review, to Mr. Jim D. Kopotic, Department of Energy, Oak Ridge Office.

If you have any questions please call me (615-576-7584).

Sincerely,

R. D. Foley
Measurement Applications
and Development Group

RDF:ec

Enclosure(s) 2

c: M. E. Murray
R. E. Swaja
File-Rc

c/att: J. D. Kopotic (DOE-ORO)

ORNL/RASA-94/3

Results of the Supplementary Radiological Survey at Conviber, Inc. (formerly C. A. Schnorr and Company), 644 Garfield Street, Springdale, Pennsylvania (CVP001)

R. L. Coleman
M. E. Murray
K. S. Brown

DRAFT

ORNL/RASA-94/3

HEALTH SCIENCES RESEARCH DIVISION

Environmental Restoration and Waste Management Non-Defense Programs
(Activity No. EX 20 20 01 0; ADS317AEX)

Results of the Supplementary Radiological Survey at Conviber, Inc. (formerly C. A. Schnorr and Company), 644 Garfield Street, Springdale, Pennsylvania (CVP001)

R. L. Coleman, M. E. Murray and K. S. Brown

Report Issued - February 1995

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U. S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

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ABSTRACT

At the request of the U.S. Department of Energy (DOE), a team from Oak Ridge National Laboratory conducted radiological surveys at Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania. The surveys were performed on October 11-13 and November 14-17, 1993, in order to provide a complete characterization prior to site remediation. The surveys included a gamma scan and a scan for surface contamination from alpha and beta-gamma emitters; measurement of direct and removable alpha and beta-gamma levels; systematic FIDLER measurements at the surface of the concrete; and the collection of samples from boreholes for radionuclide analysis.

Results of the surveys revealed radionuclide concentrations and surface contamination levels in excess of applicable DOE guidelines for ^{238}U. Radionuclide distributions were higher than typical background levels for ^{238}U in the Springdale, Pennsylvania area.

Results of the Supplementary Radiological Survey at Conviber, Inc. (formerly C. A. Schnorr and Company), 644 Garfield Street, Springdale, Pennsylvania (CVP001)*

INTRODUCTION

The Manhattan Engineer District (MED) was established as the lead agency in the development of nuclear energy for defense-related projects in the early 1940s. Commercial facilities were used as MED and Atomic Energy Commission (AEC) sites for storage and processing of uranium and thorium ores and for fabricating and machining metal made from these ores. At contract termination, sites used by contractors were decontaminated according to the criteria and health guidelines in use at that time. In some instances, however, documentation was limited and insufficient to establish the current radiological conditions at a site. Therefore, it was necessary to reevaluate the current radiological conditions at these sites under the U.S. Department of Energy (DOE) Formerly Utilized Sites Remedial Action Program (FUSRAP).

The Conviber site is located at 644 Garfield Street in Springdale, Pennsylvania. During the mid-1940's, the property was owned by C. A. Schnorr and Company and was used to machine extruded uranium for the Hanford Pile Project. 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, Conviber, Inc., uses the site for the fabrication of industrial drive and conveyer belts.

The original site consisted of a concrete block building, a quonset hut and a loading dock. The concrete building has since been enlarged with the addition of a new loading dock. During the uranium machining period, materials were reportedly received through the Garfield Street entrance and stored near the new loading dock.[1]

A radiological survey was conducted at Conviber, Inc., on June 6, 1989, by the Measurement Applications and Development Group of Oak Ridge National Laboratory (ORNL) at the request of DOE. Additional samples were taken on June 21, 1990. Radionuclide analysis of eight samples taken on this date from a drilled hole in an area with elevated surface gamma radiation levels revealed ^{238}U concentrations ranging from 90 to 20,000 pCi/g. Survey results from these trips are discussed in a separate report.[1] Under current site use, residual uranium covered by concrete does not pose a health risk. However, these concentrations exceed typical site-specific guidelines for soil derived for similar

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

FUSRAP sites (see Table 1). Based on these findings, the site was considered and designated for inclusion in the FUSRAP program and slated for remediation.

On October 11-13, 1993, a team from Oak Ridge National Laboratory conducted an additional radiological survey of the interior of the concrete building at the Conviber site at the request of DOE. The purpose of the survey was a thorough characterization of the building before remediation efforts began. Based on concerns that the concrete floors severely limited the success of typical survey methods to adequately understand the contamination profile, a survey team returned to the site on November 14-17, 1993, with a different approach to characterizing subsurface contamination. The results of the 1993 surveys are presented in this report.

SCOPE OF THE SURVEY

The radiological survey included: (1) a thorough gamma scan of accessible areas inside the building; (2) measurement of direct and transferable alpha and beta-gamma radiation levels at selected locations in the building; (3) collection of samples from boreholes at selected locations in the building; and (4) systematic FIDLER measurements on a 5-foot grid over a section of the building.

SURVEY METHODS

Procedural guidance for the survey methods and instrumentation used in this survey is given in *Procedures Manual for the ORNL Radiological Survey Activities (RASA) Program*, ORNL/TM-8600 (April 1987).[2]

A slow, thorough gamma scan was conducted throughout the building. Surface gamma levels were recorded for accessible areas of the floor using (1) a NaI scintillation detector system, and (2) a large area proportional detector (floor monitor). Measurements were recorded in counts per minute (cpm).

A Field Instrument for Detection of Low-Energy Radiation (FIDLER) was used during the November, 1993 survey to perform 2-minute and 5-minute timed interval counts on a 5-foot grid at contact with the floor surface. Measurements were concentrated in the present supply and belt fabrication area. Isolated readings were taken in other areas of the building. Measurements were recorded in cpm (see Fig. 1).

Using a Geiger-Mueller pancake detector, beta-gamma levels were recorded and then converted from cpm to dpm/100 cm^2. Alpha levels were measured at selected locations with a ZnS alpha scintillation detector, and then converted from cpm to dpm/100 cm^2.

The floors of the building are concrete of a 4 to 10-inch thickness; therefore, a coredrill was used to remove plugs of concrete to gain access to the subsurface soil. A hand auger was used to collect samples systematically in 15-cm increments from boreholes through the concrete floor. Sample locations S1-S8 are near the spot of elevated radiation ("hot spot") discovered in the July 1990 survey. Ten other sample locations were then drilled systematically in the building. Two biased sample locations are near an area adjacent to the new loading dock with original concrete which showed surface contamination. One biased sample was collected near the "hot spot." Concentrations of various radionuclides were determined in systematic and biased samples by gamma spectroscopy. Three smears were obtained from selected surfaces in the area adjacent to the new loading dock to determine the presence of transferable alpha and beta-gamma activity levels. Sample and smear locations are shown on Fig. 2.

SURVEY RESULTS

DOE guidelines are summarized in Table 1. Typical background radiation levels for the Springdale, Pennsylvania area are presented in Table 2. These data are provided for comparison with survey results presented in this section.

GAMMA MEASUREMENTS

A summary of normalized FIDLER measurements is shown on Fig. 1. Measurements range from 6,500 cpm to 21,000 cpm. The highest readings appear near the hot spot (Fig. 2). Data shown in Fig. 1 should be interpreted with caution. Although higher values indicate the presence of higher gamma radiation, the measurements cannot be related to the uranium concentration or volume of contamination. Also, low values cannot be used to infer that uranium contamination is not present under the concrete surface.

Using NaI detectors with conversion factors based on ^{238}U, gamma measurements at biased sampling sites B4, B5, and B6 were 45 μR/h, 25 μR/h, and 1.8 mR/h, respectively. The above measurements for B4 and B5 reflected surface contamination, while the measurement at B6 was made at approximately 12 inches below the concrete surface. Gamma levels at biased sampling locations exceeded DOE guidelines (Table 1), and also exceeded typical background levels for the Springdale, Pennsylvania area (Table 2).

DIRECT AND TRANSFERABLE BETA-GAMMA AND ALPHA RADIATION MEASUREMENTS

Direct beta-gamma and alpha radiation levels measured in the building were below DOE guidelines, with the exception of measurements taken adjacent to the new loading dock.

Eight direct alpha and beta-gamma measurements taken in the contaminated area adjacent to the new loading dock are summarized in Table 3. Locations are indicated on Fig. 2. Directly measured beta-gamma levels well exceeded the maximum DOE guideline of 15,000 dpm/100 cm^2 (Table 1). The three smears showed transferable alpha levels above the MDA but below DOE guidelines. One of the three smears showed transferable beta-gamma levels above the MDA but below DOE guidelines.

SOIL SAMPLES FROM BOREHOLES

Radionuclide analysis was performed on samples collected from boreholes at systematic and biased locations indicated on Fig. 2. Results of analysis are listed in Table 4. Concentrations of ^{238}U generally exceeded DOE guidelines for derived concentrations at FUSRAP sites in biased sample B6 and some systematic samples. Concentrations of ^{226}Ra were near typical background concentrations in the Springdale, Pennsylvania area and below DOE guidelines.

SIGNIFICANCE OF FINDINGS

Results of the supplementary radiological survey at Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania suggest that concentrations of ^{238}U above DOE guidelines may still be found under the concrete in the northern half of the building. In addition, concrete which was in place during the period of former AEC activities in the area adjacent to the new loading dock shows surface contamination.

REFERENCES

1. R. D. Foley, W. D. Cottrell, and J. W. Crutcher, *Results of the Radiological Survey at Conviber Inc., 644 Garfield Street, Springdale, Pennsylvania (CVP001)*, ORNL/RASA-89/18, Martin Marietta Energy Systems, Inc., Oak Ridge Natl. Lab, October 1991.

2. 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 Natl. Lab., April 1987.

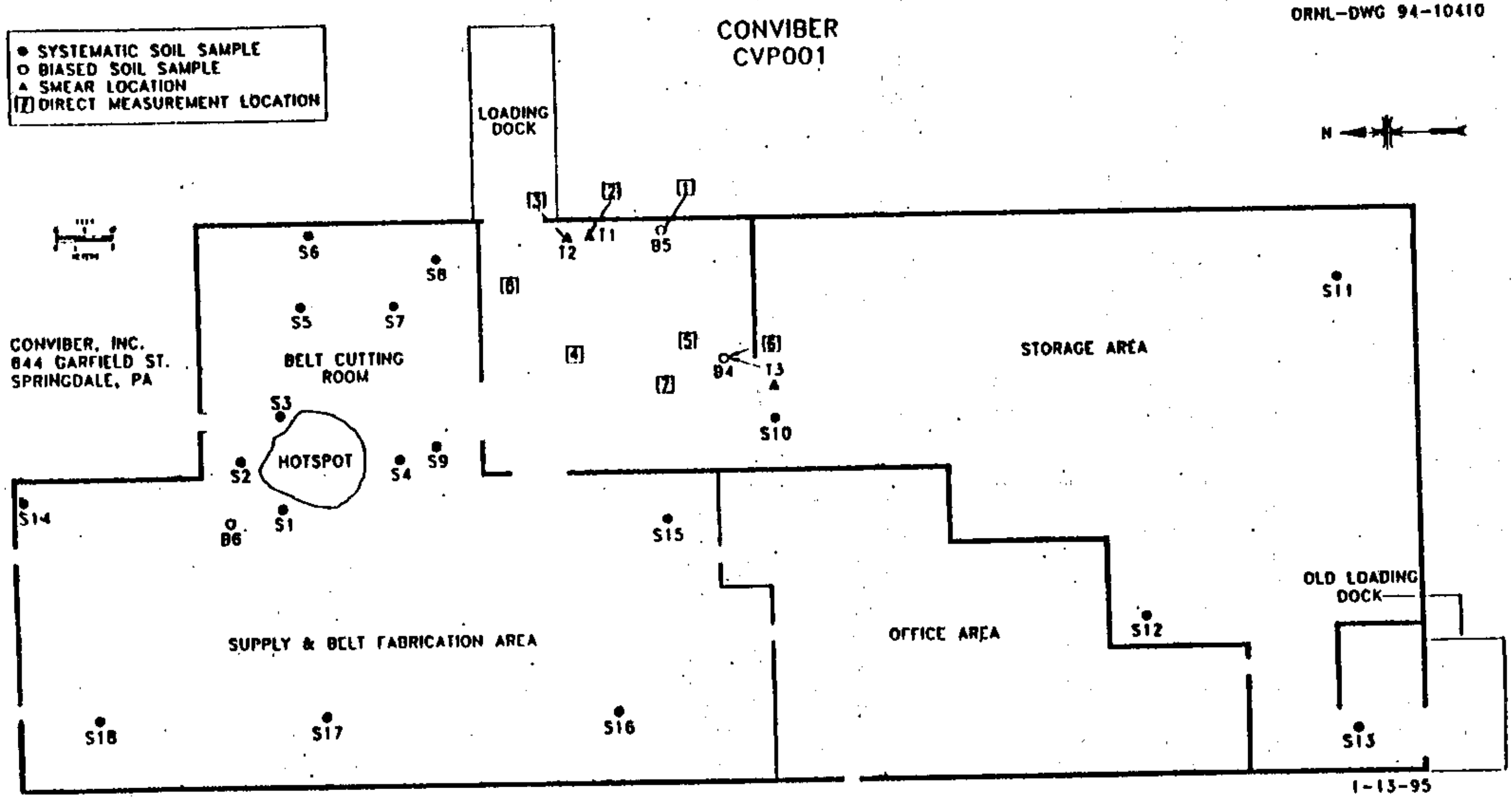


Fig. 2. Locations of direct measurements adjacent to the new loading dock, smears, systematic and biased samples at Conviber, Inc., Springdale, Pennsylvania.

Table 1. Applicable guidelines for protection against radiation
(Limits for uncontrolled areas)

Mode of exposure	Exposure conditions	Guideline value
Gamma radiation	Indoor gamma radiation level (above background)	20 μR/h[a]
Total residual surface contamination[b]	^{238}U, ^{235}U, U-natural (alpha emitters)	
	Maximum	15,000 dpm/100 cm^2
	Average	5,000 dpm/100 cm^2
	Removable	1,000 dpm/100 cm^2
Beta-gamma dose rates	Surface dose rate averaged over not more than 1 m^2	0.20 mrad/h
	Maximum dose rate in any 100-cm^2 area	1.0 mrad/h
Derived concentrations	^{238}U	50 pCi/g
Guideline for non-homogeneous contamination (used in addition to the 100-m^2 guideline)[c]	Applicable to locations with an area ≤25 m^2, with significantly elevated concentrations of radionuclides ("hot spots")	$G_A = G_i(100/A)^{1/2}$, where G_A = guideline for "hot spot" of area (A) G_i = guideline averaged over a 100-m^2 area

[a]The 20 μR/h shall comply with the basic dose limit (100 mrem/year) when an appropriate-use scenario is considered.

[b]DOE surface contamination guidelines are consistent with *NRC Guidelines for Decontamination at Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for By-Product, Source, or Special Nuclear Material*, May 1987.

[c]DOE guidelines specify that every reasonable effort shall be made to identify and to remove any source that has a concentration exceeding 30 times the guideline value, irrespective of area (adapted from *Revised Guidelines for Residual Radioactive Material at FUSRAP and Remote SFMP Sites*, April 1987).

Sources: Adapted from U.S. Department of Energy, DOE Order 5400.5, April 1990, and U.S. Department of Energy, *Guidelines for Residual Radioactive Material at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites*, Rev. 2, March 1987; and U. S. Department of Energy Radiological Control Manual, DOE N. 5480.6 (DOE/EH-256T), June 1992.

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

Type of radiation measurement or sample	Radiation level or radionuclide concentration
Average external gamma exposure rate at 1 m above ground surface	6 μR/h[a]
Concentration of radionuclides in surface soil	
^{226}Ra	1.9 ± 0.20 pCi/g[b]
^{238}U	1.7 pCi/g[c]

[a]Average of 3 to 4 measurements.
[b]Standard deviation is the 2σ value.
[c]Error in measurement is ±5% (2σ).

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 Natl. Lab., November 1981.

Table 3. Results of survey of contaminated area adjacent to new loading dock at Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania

Location Number[a]	Directly measured radiation levels[b]		Smear Number	Removable radioactivity	
	Alpha[c] (dpm/100 cm²)	Beta-gamma[d] (dpm/100 cm²)		Alpha[e] (dpm/100 cm²)	Beta-gamma[f] (dpm/100 cm²)
1	930	160,000	NA[g]	NA	NA
2	3500	200,700	T1	43	60
3	1800	170,000	T2	31	72
4	480	60,200	NA	NA	NA
5	1200	330,000	NA	NA	NA
6	7000	940,000	T3	240	460
7	180	29,000	NA	NA	NA
8	<60	33,000	NA	NA	NA

[a]Locations are shown on Fig. 2.
[b]Point measurements for 100-cm² sections of floor surface.
[c]MDA = 60 dpm/100 cm². Not corrected for absorption within surface residues or concrete.
[d]MDA = 1200 dpm/100 cm². Not corrected for absorption within surface residues or concrete.
[e]MDA = 17 dpm/100 cm².
[f]MDA = 95 dpm/100 cm².
[g]NA = Not applicable.

Table 4. Concentrations of radionuclides in samples collected from boreholes at Conviber, Inc., 644 Garfield Street, Springdale, Pennsylvania

Sample number[a]	Depth (cm)	Radionuclide concentration (pCi/g)[b]		
		^{226}Ra	^{238}U	^{235}U
		Systematic samples[c]		
S1A	15–30	1.6 ± 0.1	50 ± 10	2.2 ± 0.2
S1B	30–45	1.4 ± 0.4	5100 ± 400	230 ± 40
S1C	45–60	2.3 ± 0.2	380 ± 30	20 ± 3
S1D	60–76	1.3 ± 0.1	180 ± 50	8.0 ± 2
S2A	15–30	1.5 ± 0.1	30 ± 6	<1.5
S2B	30–45	1.1 ± 0.2	260 ± 10	14 ± 1
S2C	45–61	2.1 ± 0.2	20 ± 6	0.75 ± 0.2
S3B	12–29	2.0 ± 0.1	150 ± 50	6.5 ± 1.0
S3C	29–45	1.3 ± 0.1	310 ± 60	11 ± 2
S3D	45–61	1.2 ± 0.1	90 ± 10	4.5 ± 1.0
S4B	15–30	1.7 ± 0.1	150 ± 30	5.5 ± 0.6
S4C	30–45	1.1 ± 0.1	81 ± 10	3.2 ± 0.4
S4D	45–61	1.1 ± 0.1	62 ± 10	2.3 ± 0.2
S5A	15–30	1.6 ± 0.1	18 ± 6	0.74 ± 0.2
S5B	30–46	1.2 ± 0.1	7.9 ± 1.5	<0.3
S6A	12–30	1.3 ± 0.1	120 ± 30	5.0 ± 2
S6B	30–46	1.3 ± 0.1	35 ± 7	1.7 ± 0.4
S7A	12–30	1.5 ± 0.1	50 ± 10	2.0 ± 0.2
S7B	30–46	1.3 ± 0.1	37 ± 7	1.3 ± 0.3
S8A	15–30	1.4 ± 0.1	9.9 ± 2.0	<0.6
S8B	30–46	1.7 ± 0.1	2.9 ± 1.0	<0.3
S9A	15–30	1.7 ± 0.1	64 ± 7	2.7 ± 0.4
S9B	30–46	1.0 ± 0.1	10 ± 2	<0.7
S10A	20–30	1.2 ± 0.1	1.6 ± 0.4	<0.2
S10B	30–46	1.1 ± 0.1	1.7 ± 1	<0.2
S11A	10–31	1.7 ± 0.1	1.7 ± 0.7	<0.3
S11B	31–46	1.7 ± 0.1	1.8 ± 0.3	<0.2
S12A	10–30	1.4 ± 0.1	1.1 ± 0.6	<0.3
S12B	30–46	1.0 ± 0.1	1.5 ± 0.4	<0.2
S13A	10–30	1.6 ± 0.1	1.3 ± 0.4	<0.2
S13B	30–46	1.7 ± 0.1	2.0 ± 1	<0.3

Table 2 (continued)

Sample number[a]	Depth (cm)	Radionuclide concentration (pCi/g)[b]		
		^{226}Ra	^{238}U	^{235}U
S14A	12–30	1.1 ± 0.1	200 ± 50	10 ± 2
S14B	30–45	1.2 ± 0.1	330 ± 80	14 ± 3
S14C	45–61	1.1 ± 0.1	160 ± 30	7.0 ± 1
S15A	10–30	1.5 ± 0.1	5.2 ± 0.5	<0.4
S15B	30–46	1.7 ± 0.1	25 ± 5	1.0 ± 0.4
S16A	18–30	1.3 ± 0.1	3.0 ± 1.0	<0.3
S16B	30–46	1.6 ± 0.1	2.5 ± 0.6	<0.3
S17A	17–31	1.3 ± 0.1	3.9 ± 0.5	<0.3
S17B	31–43	1.2 ± 0.1	16 ± 4	0.7 ± 0.3
S18A	10–30	1.3 ± 0.1	4.0 ± 2	<0.3
S18B	30–46	1.8 ± 0.1	27 ± 5	1.4 ± 0.3
		Biased samples[d]		
B4B	10–31	1.4 ± 0.1	6.0 ± 1	<0.3
B4C	31–46	1.4 ± 0.1	2.7 ± 0.6	<0.3
B5B	10–31	1.4 ± 0.1	5.2 ± 2	<0.3
B6B	23–31	1.5 ± 0.1	31 ± 2	1.4 ± 0.4
B6C	31–46	<2.2	50,000±10,000	1500 ± 300
B6D	46–61	1.7 ± 0.4	4000 ± 500	170 ± 70
B6E	61–76	1.4 ± 0.2	1600 ± 400	60 ± 10

[a]Sample locations are shown on Fig. 2.
[b]Indicated counting error is at the 95% confidence level (±2σ).
[c]Systematic samples are taken at locations irrespective of gamma exposure rates.
[d]Biased samples are taken from areas with elevated gamma exposure rates. Biased samples B1-B3 were taken in a previous survey.[1]

2.4 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) AND COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA) DOCUMENTS

Documents listed in this section fulfill the NEPA documentation requirements for the C. H. Schnoor site.

ed States Government **Department of Energy**

Oak Ridge Operations

emorandum

E: October 19, 1993

Y TO
OF: EW-93:Hartman

T: **CATEGORICAL EXCLUSION (CX) DETERMINATION - REMOVAL ACTION AT THE SPRINGDALE SITE**

O: Carol M. Borgstrom, Director, Office of NEPA Oversight, EH-25 .

Attached is a categorical exclusion (CX) determination describing the proposed removal and disposal of radiologically contaminated materials at the Springdale, Pennsylvania, site. I have determined that this action conforms to an existing NEPA Subpart D CX and may be categorically excluded from further NEPA review and documentation.

If you have any questions concerning NEPA compliance issues, please contact Patricia W. Phillips, ORO NEPA Compliance Officer, at (615) 576-4200.

Joe La Grone
Manager

Attachment

cc w/attachment:
J. L. King, SAIC/FUSRAP
M. E. Redmon, BNI/FUSRAP
P. Doolittle, EM-421, BAH, TREV II
R. S. Scott, EM-20, FORS
J. W. Wagoner, EM-421, TREV II
L. E. Harris, EM-431, TREV II
G. S. Hartman, EW-93, ORO
N. Hendrix, EW-91, ORO
J. D. Kopotic, EW-93, ORO
P. W. Phillips, SE-311, ORO
W. M. Seay, EW-93, ORO

CATEGORICAL EXCLUSION (CX) FOR REMOVAL ACTION AT THE SPRINGDALE SITE

PROPOSED ACTION: Removal of radiologically contaminated materials at the Springdale site.

LOCATION: Springdale site, Springdale, Pennsylvania [FUSRAP site]. The Springdale site is located at 644 Garfield Street in Springdale, Pennsylvania, and is part of DOE's Formerly Utilized Sites Remedial Action Program (FUSRAP).

DESCRIPTION OF PROPOSED ACTION: The proposed action is to safely remove, decontaminate, and temporarily store, or transport and dispose of radiologically contaminated materials at the Springdale site, thereby eliminating potential exposure of workers and the public to contamination exceeding applicable cleanup guidelines. Proposed site activities include, but are not limited to, the following: Removal of radiologically contaminated materials beneath the concrete floor inside the building; removal of isolated radiologically contaminated materials outside the building; civil and radiological surveying; temporary on-site storage of wastes; and packaging, transporting, and disposing of low-level radiologically contaminated materials to existing appropriately licensed disposal facilities. In the event that disposal delays require temporary on-site storage of contaminated wastes, storage would be conducted in accordance with all applicable regulations. Removal action at this site would be undertaken as part of FUSRAP and would be conducted consistent with applicable requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The proposed removal action would be conducted under DOE authorities pursuant to the Atomic Energy Act (AEA), would be consistent with the final remedial action for the site, and meets the eligibility criteria for conditions that are integral elements of actions eligible for categorical exclusion as stated in 10 CFR 1021:

1. The proposed action would not threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, including requirements of DOE orders. All activities would be managed by the FUSRAP program. A site-specific health and safety plan would be used for this activity.

2. The proposed action would not require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators and facilities for treating wastewater, surface water, and groundwater). Wastes generated during the proposed action would be collected, analyzed to determine waste characteristics, and segregated into nonhazardous, RCRA-only, mixed, and radiological-only categories. If hazardous wastes are determined to be commingled with radioactive waste, removal and temporary storage would be done in

CATEGORICAL EXCLUSION (CX) FOR REMOVAL ACTION AT THE SPRINGDALE SITE (cont.)

accordance with applicable requirements; the mixed waste would then be disposed of at an existing facility designed to accept these wastes. Wastes would be transported offsite in accordance with applicable transportation and disposal requirements and disposed of at existing facilities or stored temporarily onsite in accordance with applicable requirements, pending evaluation of final disposal options in accordance with CERCLA. The wastes may be moved to the Aliquippa Forge site for consolidated shipments to a licensed disposal facility. If temporary onsite storage is required, wastes generated from these activities would be managed in accordance with regulations applicable to the types of wastes being managed.

3. The proposed action would not disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases. The removal action would be conducted in an environmentally responsible manner to ensure site-specific control of environmental contamination.

4. The proposed action would not adversely affect any environmentally sensitive resources defined in the Federal Register Notice referenced below, including archaeological or historical sites; potential habitats of endangered or threatened species; floodplain; wetlands; areas having a special designation such as Federally- and state-designated wilderness areas, national parks, national natural landmarks, wild and scenic rivers, state and Federal wildlife refuges, and marine sanctuaries; prime agricultural lands; special sources of water such as sole-source aquifers; and tundra, coral reefs, or rain forests. The proposed action would occur in a previously disturbed/developed area.

There are no extraordinary circumstances related to the proposal that may affect the significance of the environmental effects of the proposal, and the proposal is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211.

The estimated cost for this action is less than $2 million and would take less than 12 months to complete.

<u>CX TO BE APPLIED</u>: From the DOE NEPA Implementing Procedures, 10 CFR 1021, Subpart D, Appendix B, under actions that "Normally Do Not Require EAs or EISs," "B6.1 Removal actions under CERCLA (including those taken as final response actions and those taken before remedial action) and removal-type actions similar in scope under RCRA and other authorities (including those taken as partial closure actions and those taken before corrective action), including treatment (e.g., incineration), recovery, storage, or disposal of wastes at existing facilities currently handling the type of waste involved in the removal action."

**CATEGORICAL EXCLUSION (CX) FOR
REMOVAL ACTION AT THE
SPRINGDALE SITE (cont.)**

I have concluded that the proposed action meets the requirements for the CX referenced above. Therefore, I recommend that the proposed action be categorically excluded from further NEPA review and documentation.

for Patricia W. Phillips, ORO NEPA Compliance Officer 10/6/93
Date

Based on my review and the recommendation of the ORO NEPA Compliance Officer, I recommend that the proposed action be categorically excluded from further NEPA review and documentation.

William D. Adams, Assistant Manager for Environmental Restoration and Waste Management, ORO 10/15/93
Date

Based on the recommendations of the ORO NEPA Compliance Officer and the Assistant Manager for Environmental Restoration and Waste Management, I determine that the proposed action is categorically excluded from further NEPA review and documentation.

Joe La Grone, Manager, DOE Oak Ridge Operations Office, ORO 10-18-93
Date

2.5 REAL ESTATE LICENSES

A real estate license was obtained for the property before remedial activities began.

	Page
Letter from M. E. Redmon (Project Manager) to Frank Pucciarelli (Conviber, Inc.), "Transmittal of Fully Executed Real Estate License," BNI CCN 109584, October 15, 1993.	II-122

Bechtel

Oak Ridge Corporate Center
151 Lafayette Drive
P.O. Box 350
Oak Ridge, Tennessee 37831-0350

Facsimile: (615) 220-2100

Job No. 14501, FUSRAP Project
DOE Contract No. DE-AC05-91OR21949
Code: 2600/WBS 122

OCT 15 1993

Mr. Frank Pucciarelli
Conviber, Inc.
644 Garfield Street
Springdale, Pennsylvania 15144

Subject: **Transmittal of Fully Executed Real Estate License**

Dear Mr. Pucciarelli:

Enclosed for your files is a fully executed original real estate license between you and the U. S. Department of Energy. If you have any further questions, please contact me at (615) 576-4718, or call our toll free number 1-800-253-9759 and leave a message.

Very truly yours,

for M. E. Redmon
Project Manager - FUSRAP

Enclosure: Real Estate License

Bechtel National, Inc.

REAL ESTATE LICENSE NO.
REORDOER-7- 93-0190

DEPARTMENT OF ENERGY

LICENSE

PROJECT: FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM
LOCATION: SPRINGDALE, PENNSYLVANIA
PURPOSE: REMEDIAL ACTION, SAMPLING, SURVEYS

THIS LICENSE, between Conviber, Inc. ______________________________, known as the "Grantor" and the U.S. Department of Energy, known as the "Grantee", is subject to the following terms and conditions.

1. Rights Granted - The Grantor grants to the Grantee, its agents, employees, or representatives permission to use the premises or facilities, together with ingress and egress, for the purpose of removing low-level radioactive material or performing any other reasonable action consistent with the completion of the remedial action, taking soil samples, and conducting follow-up radiological surveys at the location shown depicted on Exhibit "A" attached to this instrument and more specifically identified in whole or in part as Parcel No(s). 733-A-182 filed in Deed/Plat Book * , Page 281 in the records of Allegheny County, Pennsylvania.

2. Term/Termination Rights - This License is valid upon execution by the Grantee and will be effective on the date of execution by the Grantor of this instrument and shall continue in effect for a period of/thru October 1, 1994 unless terminated by either of the parties on not less than thirty (30) days prior written notice given to the other; provided, however, that the Grantor may not terminate this License without the Grantee's approval.

~~3. Consideration - Upon execution of this License by the Grantee, the Grantee shall initiate action to pay to the Grantor the sum of $__________ __________ ($________) as full and complete payment for the rights granted within this License.~~

DELETED

4. Authority to License - The Grantor represents and warrants that it is the owner of the property and has full right, power, and authority to enter into this License and grant the rights set out in this License.

*Colfax Plan 117

DOE-RE FORM 16-FU (12-01-92)

5. Grantor Responsibility - The Grantor responsibility is set out within the terms and conditions of the rights granted under this License. The Grantor makes no representation as to the suitability or fitness of the premises for the intended purpose. Upon certification by the Grantee that the Grantor's property meets all applicable radiological criteria, the Grantor agrees to release the Grantee, its agents, employees, or representatives from all responsibility related to the radioactive contamination and the remedial action covered by this License.

6. Grantee Responsibility - The Grantee, its agents, employees, or representatives will be responsible for property damage or injury to persons caused by the sole and direct negligence of their respective employees in performing on the Grantor's premises the activities and restoration which are the subject of this License. Grantee shall obtain all necessary permits, licenses, and approvals in connection with the activities to be conducted by the Grantee on the premises. During the performance of the activities specified in this License, the Grantee shall not unreasonably interfere with the use and enjoyment of the premises by the Grantor.

7. Access - During the term of this License, the Grantee, its agents, employees, or representatives shall have the right of access to and egress from the premises as needed and shall have the right to bring necessary equipment upon the premises in connection with the performance of the Grantee's activities as set out in Condition 1.

8. Remedial Action - Grantee shall perform removal of low-level radioactive material in accordance with the Remedial Action Plan set forth in Exhibit "B" attached to this instrument. Grantee shall maintain the premises in such a manner as not to create a nuisance or be a hazard to the health, safety, and welfare of the citizens of the State in which the premises are located. Following completion of the remediation action, the Grantee shall restore the premises as set out in Condition 10.

9. Title to Equipment, Fixtures - Title to all equipment, fixtures, appurtenances, and other improvements furnished and/or installed in connection with the Grantee's activities under this License shall remain with the Grantee.

10. Restoration - Upon termination of this License, the Grantee shall remove all its equipment, fixtures, appurtenances, and other improvements furnished and/or installed on the premises in connection with the Grantee's activities under this License. The Grantee shall restore the premises, when such restoration is required in connection with the Grantee's activities, to the extent reasonably practical, to the condition existing at the time of initiation of the Grantee's activities. With the consent of the Grantor, the Grantee may abandon Grantee-owned equipment, fixtures, appurtenances, and other improvements in place in lieu of restoration when it is in the best interests of the Grantee.

11. Successors in Interest - This License and the parties' commitments within, shall be binding on both parties, their successors, and assigns.

12. Funding - Obligations of the Grantee under this License shall be subject to the availability of funds appropriated by the Congress which the Grantee may legally spend for such purposes and nothing in this License implies that Congress will appropriate funds to perform this License.

13. Notices - All notices regarding the specific terms and conditions of this License, and within the restrictions of this License, shall be in writing and shall be deemed effectively given upon personal delivery, upon verified facsimile receipt, or upon mailing by registered or certifed mail, postage prepaid, and addressed to the parties at the following respective addresses, or to such other persons or at such other addresses as may be designated in writing by either party to the other.

If to the Grantee:

Richard P. Nicholson
Realty Officer
Department of Energy
P.O. Box 2001
Oak Ridge, Tennessee 37831

If to the Grantor:

Mr. Frank Pucciarelli
Conviber, Inc.
644 Garfield Street
Springdale, Pennsylvania 15144
Phone: (412) 274-6300

14. Entire Agreement - This License represents the entire understanding of the parties on this matter and no oral statements or collateral documents (except as noted within) may modify this License.

15. Amendment - This License may not be amended or superseded except by an agreement in writing executed by the Grantor and Grantee.

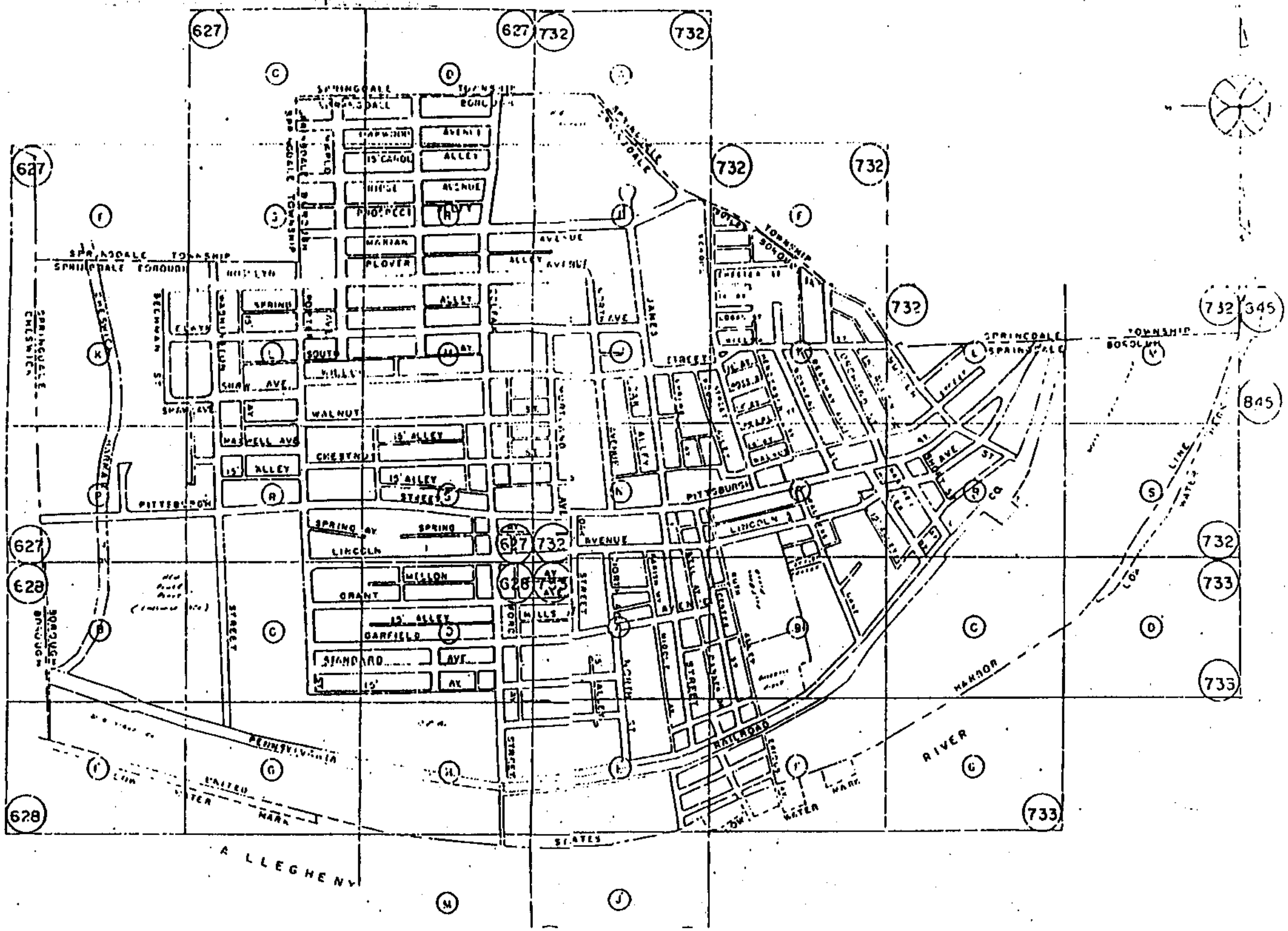
That prior to execution of this License certain Conditions were deleted, revised, and/or added (with the additions being as set out below or as designated as Page(s) n/a and being made a part of this License) in the following manner:

Condition 3 was deleted in its entirety.

The above terms and conditions are acknowledged and agreed upon as indicated by the signatures affixed below:

GRANTOR:	Mr. Frank Pucciarelli Conviber, Inc.	GRANTEE:	U.S. Department of Energy
By:	[signature]	By:	[signature] for Richard P. Nicholson
Title:	PRESIDENT	Title:	Realty Officer
Date:	9/20/93.	Date:	10-1-93

DOE-RE FORM 16-FU (12-01-92)



SPRINGDALE BOROUGH

SCALE 1" = 400'

BOARD OF COUNTY COMMISSIONERS

WILLIAM D. MC-CLELLAND CHAIRMAN
JOHN E. MC-GRADY
BLAIR F. GUNTHER

COUNTY CONTROLLER

INDEX MAP

LOT AND BLOCK SYSTEM

ALLEGHENY COUNTY

PENNSYLVANIA

EXHIBIT "A"

EXHIBIT "B"

REMEDIAL ACTION PLAN
Conviber, Inc.
644 Garfield Street
Springdale, PA 15144

Radiological surveys have shown that small amounts of low-level radioactive contamination are present on the property. The description below describes the work to be done. The following sequence of remedial action operations is anticipated for this property:

A. Radiological measurements and sampling to precisely establish and mark contamination limits to guide the excavation.

B. Removal of personal property items from the affected areas for storage by owner or by the remedial action contractor in an uncontaminated area during the cleanup operation.

C. Excavation of the contaminated soil from the affected areas

D. Radiological sampling and analysis to verify that contamination has been removed.

E. Backfilling of the affected area to its original grade prior to the start of remedial action.

F. Return of previously removed property items.

G. Contaminated soils and rubble will be placed in containers and shipped offsite.

H. ~~Restoration of the buildings and grounds to a condition comparable to the condition prior to remedial action.~~ KK

NOTED FP 10/1/93

2.6 POST-REMEDIAL ACTION REPORT

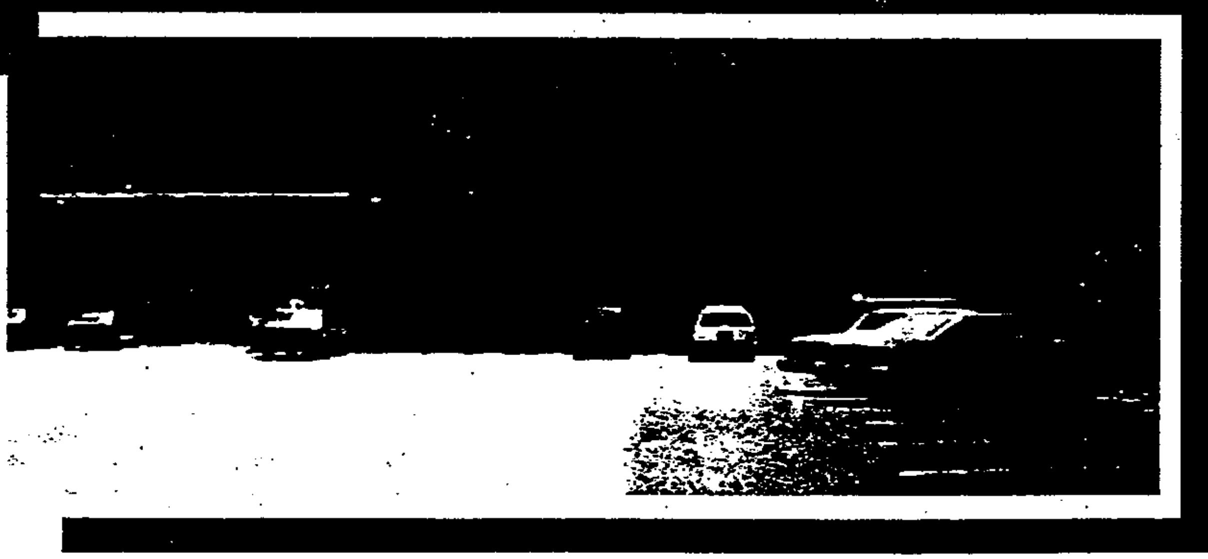
The following report documents the remedial activities and the post-remedial action radiological status of the C. H. Schnoor site.

DOE/OR/21949-386

Formerly Utilized Sites Remedial Action Program (FUSRAP)
Contract No. DE-AC05-91OR21949

POST-REMEDIAL ACTION REPORT FOR THE C. H. SCHNOOR SITE

SPRINGDALE, PENNSYLVANIA



September 1995

Printed on recycled/recyclable paper.

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DOE/OR/21949-386

POST-REMEDIAL ACTION REPORT

FOR THE

C. H. SCHNOOR SITE

SPRINGDALE, PENNSYLVANIA

SEPTEMBER 1995

Prepared for

United States Department of Energy

Oak Ridge Operations Office

Under Contract No. DE-AC05-91OR21949

By

Bechtel National, Inc.

Oak Ridge, Tennessee

Bechtel Job No. 14501

CONTENTS

FIGURES

TABLES

ACRONYMS

BNI	Bechtel National, Inc.
DAC	derived air concentration
DCG	derived concentration guide
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FIDLER	field instrument for the detection of low-energy radiation
FUSRAP	Formerly Utilized Sites Remedial Action Program
HEPA	high-efficiency particulate air
IVC	independent verification contractor
ORNL	Oak Ridge National Laboratory
PIC	pressurized ionization chamber

UNITS OF MEASURE

cm	centimeter
cpm	counts per minute
dpm	disintegrations per minute
ft	foot
g	gram
h	hour
kg	kilogram
lb	pound
L	liter
m	meter
μCi	microcurie
μR	microroentgen
ml	milliliter
mrem	millirem
pCi	picocurie
s	second
yd	yard
yr	year

1.0 INTRODUCTION

1.1 BACKGROUND

This report documents the expedited remedial action conducted at the C. H. Schnoor site in Springdale, Pennsylvania from August to October 1994 (Figure 1-1). An expedited remedial action is an efficient, cost-effective, and environmentally acceptable approach for cleaning up small sites; this approach complies with the requirements of the National Environmental Policy Act and the Comprehensive Environmental Response, Compensation, and Liability Act.

Remedial activities at the C. H. Schnoor site were performed as part of the U.S. Department of Energy's (DOE's) Formerly Utilized Sites Remedial Action Program (FUSRAP). FUSRAP was established to identify and clean up or otherwise control sites where residual radioactive contamination remains from the early years of the nation's atomic energy program or from commercial operations causing conditions that Congress has authorized DOE to remedy. FUSRAP was established in 1974 and currently includes 46 sites in 14 states. The C. H. Schnoor site was designated for remedial action under FUSRAP in 1992.

FUSRAP objectives for the C. H. Schnoor site were to

- remove or otherwise control contamination above current DOE guidelines, and
- achieve and maintain compliance with applicable criteria for the protection of human health and the environment.

Bechtel National, Inc. (BNI), the project management contractor, assisted DOE's Oak Ridge Operations Office in the planning, management, and implementation of the cleanup of the C. H. Schnoor site. DOE Headquarters uses Oak Ridge National Laboratory (ORNL) as an independent verification contractor (IVC) to provide independent assurance that the remedial action met the cleanup criteria.

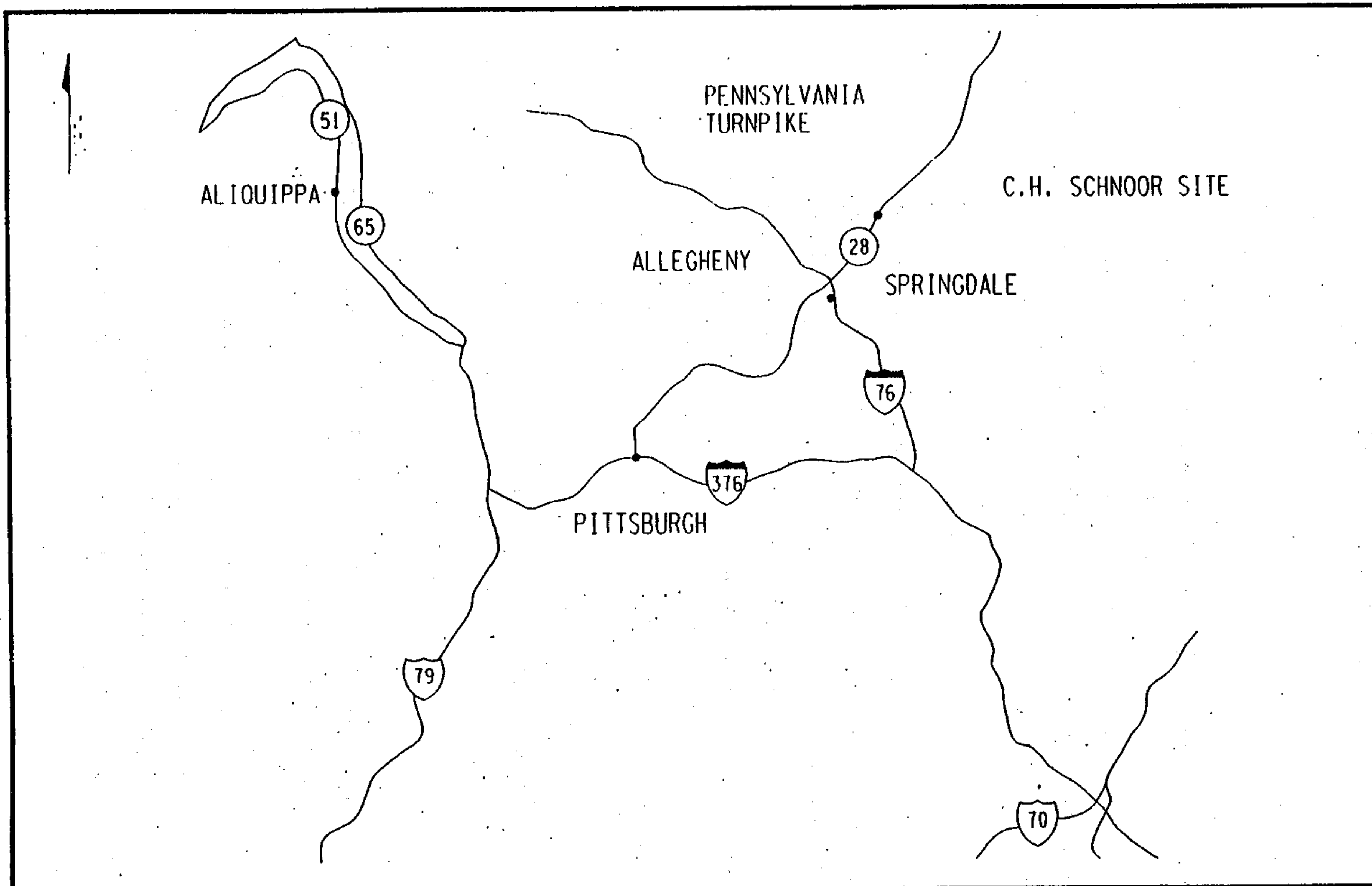

Figure 1-1
Location of the C.H. Schnoor Site

1.2 HISTORY

The C. H. Schnoor site is located at 644 Garfield Street in Springdale, Pennsylvania. During the mid-1940s, the property was owned by C. H. Schnoor and Company and was used to machine extruded uranium for the Hanford Pile Project, a project with the objective of producing 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, which founded the Premier Manufacturing Company and used the site to manufacture journal lubricators for railroad cars. The current owner, Conviber Inc., uses the site for the fabrication of industrial drive and conveyor belts.

The original site consisted of a concrete block building and a loading dock. Over the years this building has been enlarged, and a new loading dock has been added. During the uranium machining period, materials were reportedly received through the Garfield street entrance and stored near the loading dock. Figure 1-2 is a plan view of the site.

1.3 EXTENT OF CONTAMINATION

In October 1980, a radiological scanning survey was conducted by DOE and Argonne National Laboratory. The resulting report documented elevated radiation levels over only 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 the use of the site, DOE directed that an additional, more comprehensive survey be performed. In 1989 and 1990, ORNL performed the survey (ORNL 1991); the results confirmed that radioactive contamination at levels above DOE guidelines existed beneath the belt-cutting room floor (as shown in Figure 1-3). No contamination was detected outside the building.

On October 11-13, 1993, a team from ORNL conducted an additional radiological survey of the interior of the concrete building, at the request of DOE (ORNL 1995). The purpose of this survey was to characterize the building thoroughly before remediation efforts began. Because of concerns that the concrete floors severely limited the success of typical

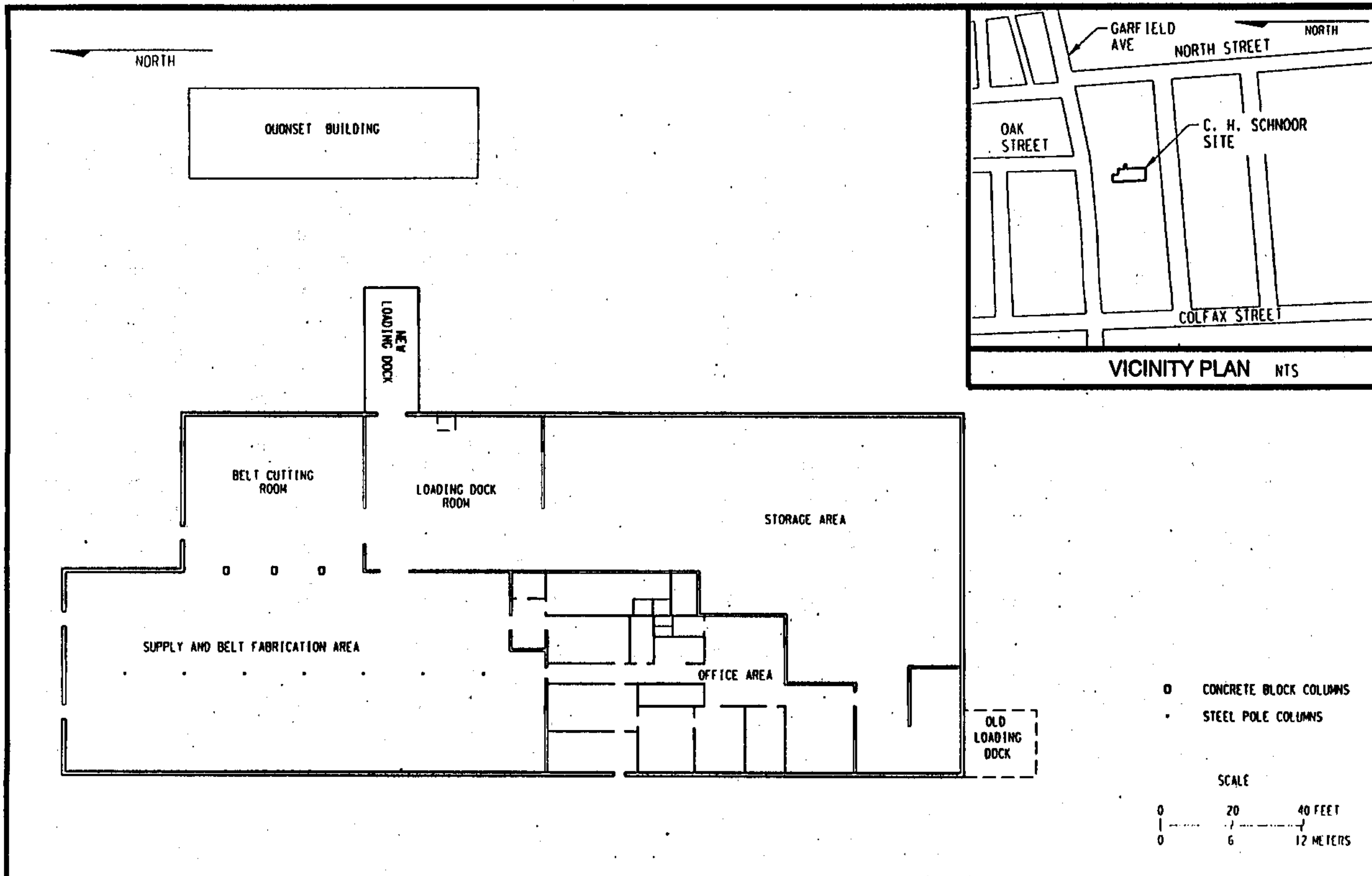

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Figure 1-2
Plan View of the C.H. Schnoor Site

4
II 144

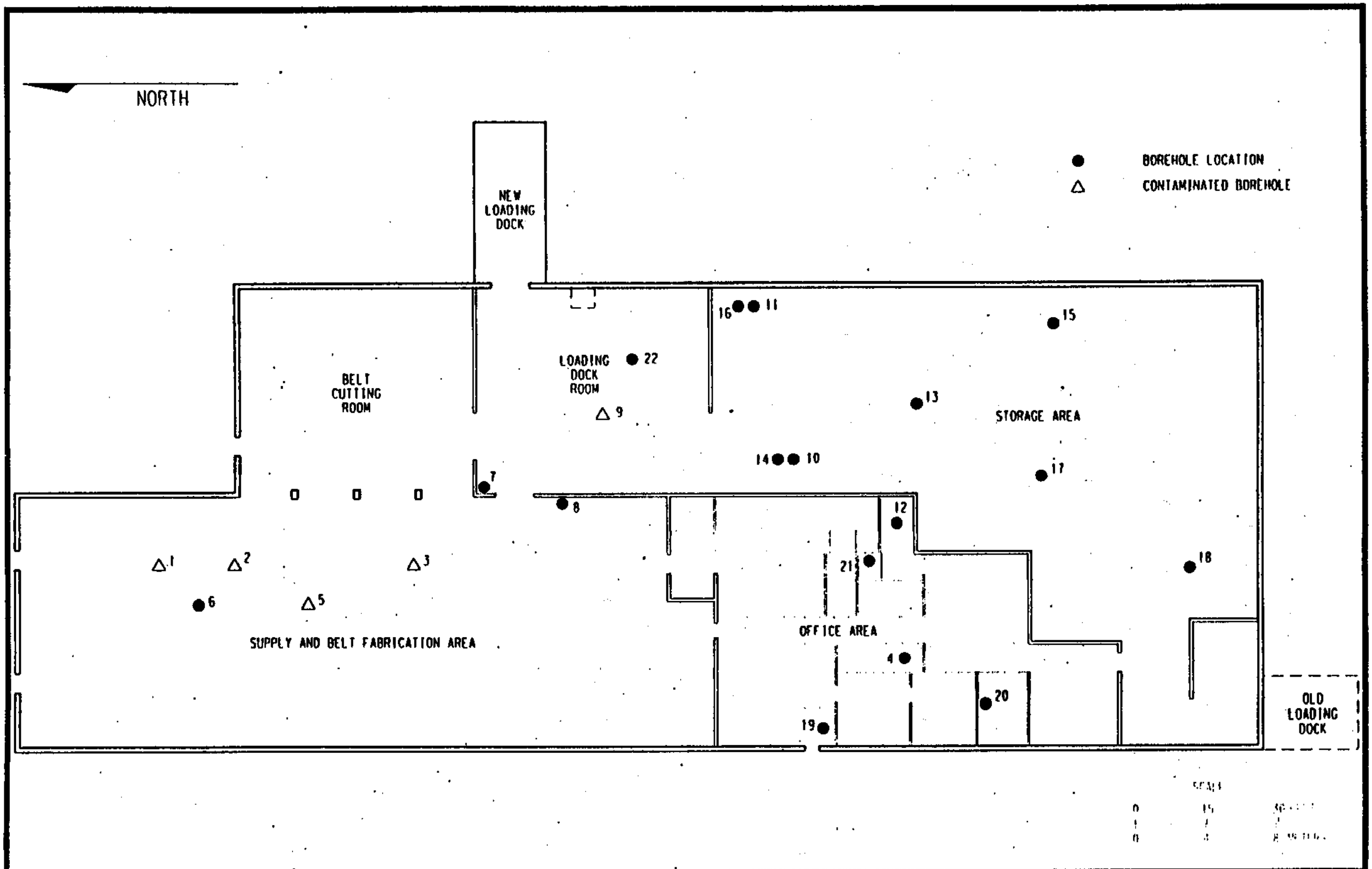

Figure 1-3
Boreholes Drilled During BNI Surveys

survey methods in adequately characterizing the contamination profile, an ORNL survey team returned to the site on November 14-17, 1993, with a different approach to characterizing subsurface contamination. Results of these supplementary radiological surveys showed contamination under the concrete in the northern half of the building (ORNL 1995). In addition, concrete that had been placed during the period of former Atomic Energy Commission activities in the area next to the new loading dock showed surface contamination.

BNI performed additional radiological surveys in October and December 1993 to supplement and refine existing survey information. ORNL was consulted during the design of the BNI surveys regarding the survey layout and strategy. Twenty-two additional boreholes were drilled and sampled during the October and December BNI surveys; these boreholes are shown in Figure 1-3. The BNI surveys detected radioactive contamination primarily in the belt-cutting and belt-fabrication areas of the building. Most of this contamination was in the soil beneath the concrete slab, and isolated areas of surface contamination were detected on a portion of the concrete floor adjacent to the belt-cutting room (also known as the loading dock room). During characterization and remedial action, no building drains were encountered that could have transported contamination outside the building.

2.0 REMEDIAL ACTION GUIDELINES

Radioactive contamination at the C. H. Schnoor site consisted primarily of natural uranium. Table 2-1 lists the DOE residual contamination guidelines for release of formerly contaminated properties for use without radiological restrictions. These guidelines were adopted by DOE based on their compatibility with U. S. Environmental Protection Agency (EPA) criteria for remedial action found in 40 CFR 192, "Uranium Mill Tailings Remedial Action Program" (DOE 1986); and DOE Order 5400.5, "Radiation Protection of the Public and the Environment" (DOE 1990).

For the remedial action at the site, soil samples were compared to a site-specific cleanup criterion of 100 pCi/g for total uranium averaged over any 15-cm- (6-in.-) thick layer below the surface. Because no generic cleanup guidelines for uranium applicable to remedial actions at FUSRAP sites are available, uranium guidelines are derived on a site-specific basis. A concentration of 50 pCi/g for uranium-238 was used as an indicator because the material at the Schnoor site was natural uranium. The average background concentration of uranium-238 in soil representative of the site was determined by analyzing three soil samples. These samples were collected from areas chosen based on their proximity to the site, relative independence from potential influence of the site, and representativeness of area land uses. The average concentration of uranium-238 in background samples was 2.37 pCi/g.

TABLE 2-1
SUMMARY OF RESIDUAL CONTAMINATION GUIDELINES

BASIC DOSE LIMITS

The basic limit for the annual radiation dose (excluding radon) received by an individual member of the general public is 100 mrem/yr. In implementing this limit, DOE applies as-low-as-reasonably achievable principles to set site-specific guidelines.

SOIL GUIDELINES

Radionuclide	Soil Concentration (pCi/g) Above Background[a,b,c]
Radium-226 Radium-228 Thorium-230 Thorium-232	5 pCi/g when averaged over the first 15 cm of soil below the surface; 15 pCi/g when averaged over any 15-cm-thick soil layer below the surface layer.
Total Uranium	100 pCi/g when averaged over any 15-cm-thick soil layer.

STRUCTURE GUIDELINES

Airborne Radon Decay Products

Generic guidelines for concentrations of airborne radon decay products shall apply to existing occupied or habitable structures on private property that has no radiological restrictions on its use; structures that will be demolished or buried are excluded. The applicable generic guideline (40 CFR 192) is: In any occupied or habitable building, the objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL[d]. In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL. Remedial actions are not required in order to comply with this guideline when there is reasonable assurance that residual radioactive materials are not the cause.

External Gamma Radiation

The average level of gamma radiation inside a building or habitable structure on a site that has no radiological restrictions on its use shall not exceed the background level by more than 20 µR/h and will comply with the basic dose limits when an appropriate-use scenario is considered.

Indoor/Outdoor Structure Surface Contamination

Radionuclide[f]	Allowable Surface Residual Contamination[e] (dpm/100 cm²) Average[g,h]	Maximum[h,i]	Removable[h,j]
Transuranics, Ra-226, Ra-228, Th-230, Th-228 Pa-231, Ac-227, I-125, I-129[k]	100	300	20
Th-Natural, Th-232, Sr-90, Ra-223, Ra-224 U-232, I-126, I-131, I-133	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay products	5,000 α	15,000 α	1,000 α
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above[l]	5,000 β - γ	15,000 β - γ	1,000 β - γ

TABLE 2-1
(CONTINUED)

[a]These guidelines take into account ingrowth of radium-226 from thorium-230 and of radium-228 from thorium-232, and assume secular equilibrium. If either thorium-230 and radium-226 or thorium-232 and radium-228 are both present, not in secular equilibrium, the guidelines apply to the higher concentration. If other mixtures of radionuclides occur, the concentrations of individual radionuclides shall be reduced so that (1) the dose for the mixtures will not exceed the basic dose limit, or (2) the sum of ratios of the soil concentration of each radionuclide to the allowable limit for that radionuclide will not exceed 1 ("unity").

[b]These guidelines represent allowable residual concentrations above background averaged across any 15-cm-thick layer to any depth and over any contiguous 100-m^2 surface area.

[c]If the average concentration in any surface or below-surface area less than or equal to 25 m^2 exceeds the authorized limit or guideline by a factor of $(100/A)^{1/2}$, where A is the area of the elevated region in square meters, limits for "hot spots" shall also be applicable. Procedures for calculating these hot spot limits, which depend on the extent of the elevated local concentrations, are given in the DOE Manual for Implementing Residual Radioactive Materials Guidelines, DOE/CH/8901. In addition, every reasonable effort shall be made to remove any source of radionuclide that exceeds 30 times the appropriate limit for soil, irrespective of the average concentration in the soil.

[d]A working level (WL) is any combination of short-lived radon decay products in 1 liter of air that will result in the ultimate emission of 1.3×10^5 MeV of potential alpha energy.

[e]As used in this table, dpm (disintegrations per minute) 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.

[f]Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

[g]Measurements of average contamination should not be averaged over an area of more than 1 m^2. For objects of less surface area, the average should be derived for each such object.

[h]The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at a depth of 1 cm.

[i]The maximum contamination level applies to an area of not more than 100 cm^2.

[j]The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area, and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that total residual surface contamination levels are within the limits for removable contamination.

[k]Guidelines for these radionuclides are not given in DOE Order 5400.5; however, these guidelines are considered applicable until guidance is provided.

[l]This category of radionuclides includes mixed fission products, including the Sr-90 which is present in them. It does not apply to Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

Source: DOE Order 5400.5 and 40 CFR 192

3.0 REMEDIAL ACTION

3.1 CLEANUP/DECONTAMINATION ACTIVITIES

Immediately before and during the remedial action, the ORNL radiological survey team performed surface surveys and drilled additional boreholes to assist in accurately defining the boundaries of contamination and to supplement existing information on the extent of contamination. Additional boreholes were drilled and sampled in the Quonset building, the new loading dock, the office area, and the western and southern sides of the supply and belt fabrication area. The ORNL team stationed a mobile gamma spectroscopy system onsite to provide preliminary soil results during the remedial action. The mobile laboratory provided real time data, which greatly assisted field crews to direct horizontal and vertical excavation zones, thus minimizing overexcavation. This system was used in conjunction with hand-held survey instruments such as the field instrument for the detection of low-energy radiation (FIDLER) and a Geiger-Mueller counter (HP-260) to direct the remedial action. The major instrumentation used is listed in Appendix A; survey and analytical procedures are described in Appendix B.

As remediation was completed, post-remedial action surveys were performed to ensure that decontamination efforts were successful in meeting DOE cleanup criteria. Exposure rate measurements were taken with a pressurized ionization chamber (PIC) to confirm that radiation levels were below the DOE guideline of 20 μR/h above background for building interiors and the dose limit of 100 mrem/yr to members of the general public (see Table 2-1). Soil samples were collected and analyzed to establish that contaminated soil had been removed to levels below the cleanup guidelines. Concentrations of direct alpha and beta/gamma and transferable alpha and beta/gamma contamination were also measured to ensure that surface decontamination efforts were successful. Uranium metal was machined at this facility, so radium-226 and radon-222 were not of concern because they had been removed during the processing of the uranium ores into uranium metal before the metal was brought to the site. Radon originates from radium-226 decay, so no measurements were taken for radon; however, radium-226 concentrations were measured to ensure that radon was not of concern.

Techniques used in the remedial action are summarized in Table 3-1. A summary of the remedial action is provided as Appendix C. After the remedial action, the owner performed restoration activities.

Volume reduction and waste minimization techniques employed during the remedial action included segregation, sampling, and surveying of the wastes produced. The following are specific examples of the waste volume reduction at the C. H. Schnoor site:

- Concrete removed from the building floor was surveyed and released to a sanitary landfill if it was below surface criteria. Concrete that was removed and above surface criteria was decontaminated onsite if this could be done with minimal labor, and the concrete was then released to the sanitary landfill. This method saved transportation and disposal costs.

- Concrete that could not be released to the landfill was shipped to the Aliquippa Forge site and crushed with a commercial rock crusher. After crushing, representative samples were obtained, and the material was determined to have an average uranium-238 concentration of 7.50 pCi/g; this level is well below the cleanup criterion of 50 pCi/g. By making it possible to reuse approximately 31 m^3 (41 yd^3) of concrete as fill material at the site, this method eliminated transportation and disposal costs. This beneficial reuse was approved by the Pennsylvania Department of Environmental Restoration. Appendix D includes a letter that provides state concurrence on the reuse of the material.

- Materials used in controlled areas, including disposable clothing such as coveralls and gloves, were surveyed and released as radiologically clean rather than being disposed of as radioactive trash if no contamination was detected. If large portions of the disposable protective clothing were contaminated, the clothing was disposed of with the soil being shipped to Envirocare. If only small areas of the clothing were contaminated, those areas were cut out and disposed of to minimize the generation of radioactive waste.

Table 3-1

Decontamination Techniques Used at the C. H. Schnoor Site

Type	Description
HEPA vacuuming	High-efficiency particulate air- (HEPA-) filtered vacuum cleaners were used to remove loose contamination. They were also used in conjunction with other techniques (grinding, pneumatic scalers, etc.) to eliminate the air contamination associated with these techniques.
Wire brushing/grinding/ pneumatic scalers (needle guns)	Small areas on concrete columns and floors were wire brushed to remove loose contamination. When wire brushing did not remove the contamination, a power hand grinder or a needle gun was used to remove the surface layer of more adherent contamination. Lead anchor bolts from the loading dock room were decontaminated with wire brushes (a method that eliminated potential mixed waste).
Mechanical shot blasting	A commercially available shot-blast system with self-contained dust collection, the VacuBlast™, was used to clean the concrete floor in the loading dock room. A metallic abrasive material was used on the work surface, and incremental layers of contaminated material were then removed.
Cutting with a gasoline-powered concrete saw	A gasoline-powered concrete saw with a diamond tip blade was used to prepare sections of the floor slab for removal.
Jackhammering	Conventional jackhammers were used on small areas and to break individual pieces of excavated concrete. Bobcats and track excavators equipped with hoe-ram attachments were used to remove chunks of concrete from the building.
Excavation	Contaminated concrete and soil were removed from within the building with a track excavator, truck loader, bobcats, a forklift, picks, and shovels.
Commercial rock crushing	Surface-contaminated concrete chunks were crushed with a commercial rock crusher and reused as fill after analyses had confirmed that the material contained no contamination above guidelines.

- Use of the ORNL onsite gamma spectroscopy instrument resulted in better definition of excavation limits and minimizing overexcavation and downtime for equipment operators.

- Decontamination of lead anchor bolt pourings allowed the release of 13.5 kg (30 lb) for clean recycle.

The remedial action lasted approximately 6 weeks, from August to October 1994. All remediation efforts were confined to the interior of the main building at the C. H. Schnoor site. Designation and characterization surveys revealed contamination beneath the concrete floor, primarily in the belt cutting and the supply and belt fabrication areas of the building and in a small area in the loading dock room (Figure 1-2). Surface contamination was detected on the floor in the loading dock room and on the base of two of the cement block columns after contaminated soil had been removed from around them.

A section of the wall between two pilasters in the northern end of the building was removed so that equipment could enter the building to begin the remedial action. A concrete saw was used to cut joints in the concrete along the walls and at the perimeter of the contaminated area as determined from characterization data. Joints were cut along the walls to prevent damage to the cement block walls during concrete removal because the exact construction techniques used to erect the building were unknown. After removal of the concrete began, it was found that use of the concrete saw could be discontinued because no damage would occur to the walls, and any additional concrete removal would extend to control joints rather than cutting joints. The concrete was removed to a control joint because a "key-way" type of construction joint was used in the floor; this type of joint would be difficult to reconstruct, and the concrete saw was very labor intensive for the amount of additional concrete that would need to be removed. Concrete was removed from this wall for construction purposes; no contamination was present on the wall.

Equipment fitted with hoe-ram attachments was used to break the concrete floor into approximately 1.2-m by 2.4-m (4-ft by 8-ft) pieces, which were radiologically surveyed. Uncontaminated concrete was placed in a dumpster for disposal at a sanitary landfill and concrete that could not be decontaminated without excessive labor was placed in a tent constructed onsite to protect it from the weather; it was then shipped to the Aliquippa Forge site, crushed by a commercial rock crusher, and sampled. The average uranium-238 content was determined to be 7.50 pCi/g, which is within the background range for natural radioactivity found in concrete materials, and is well below the site cleanup guideline of 50 pCi/g. This material was used as backfill at the C. H. Schnoor site after approval from the Pennsylvania Department of Environmental Restoration. A total of 74.5 m^3 (97.4 yd^3) of concrete was removed from the building, of which 43.3 m^3 (56.6 yd^3) was shipped to the sanitary landfill and 31.2 m^3 (40.8 yd^3) was crushed and reused as backfill.

A track excavator, bobcats fitted with buckets, and picks and shovels were used to excavate the contaminated soil from inside the building. The soil was placed in the bucket of the truck loader, which was positioned at the opening in the northern end of the building and loaded into intermodal containers for shipment. This method of soil handling eliminated the need for equipment to enter and leave the controlled area, which would have required equipment surveys to be performed each time. The exterior transfer and loading areas were situated to prevent contamination of the grounds. Figure 3-1 shows the areas of excavation inside the building. The average depth of excavation was approximately 0.6 m (2 ft). Two small areas excavated to a depth of approximately 1.2 m (3.9 ft) represent a total area of 26 m^2 (280 ft^2) (shown in Figure 3-1). A total of 476 m^3 (626 yd^3) of soil and debris was excavated from the building. This material was shipped in 37 intermodal containers for disposal by Envirocare of Utah, a licensed disposal facility in Clive, Utah.

In addition to excavation, surface decontamination was performed in the loading dock room and on the base of two cement block columns. The VacuBlast™ unit was used to remove most of the surface contamination in the loading dock room, and the grinder and needle gun were used for smaller areas. A total of approximately 85 m^2 (915 ft^2) of surface area was decontaminated in the loading dock room (see Figure 3-1). The two cement block columns at the northern end of the room and the footer between them, determined to contain surface contamination, were decontaminated with the grinder and needle gun. Waste from this effort was also placed in intermodal containers and shipped to Envirocare for disposal.

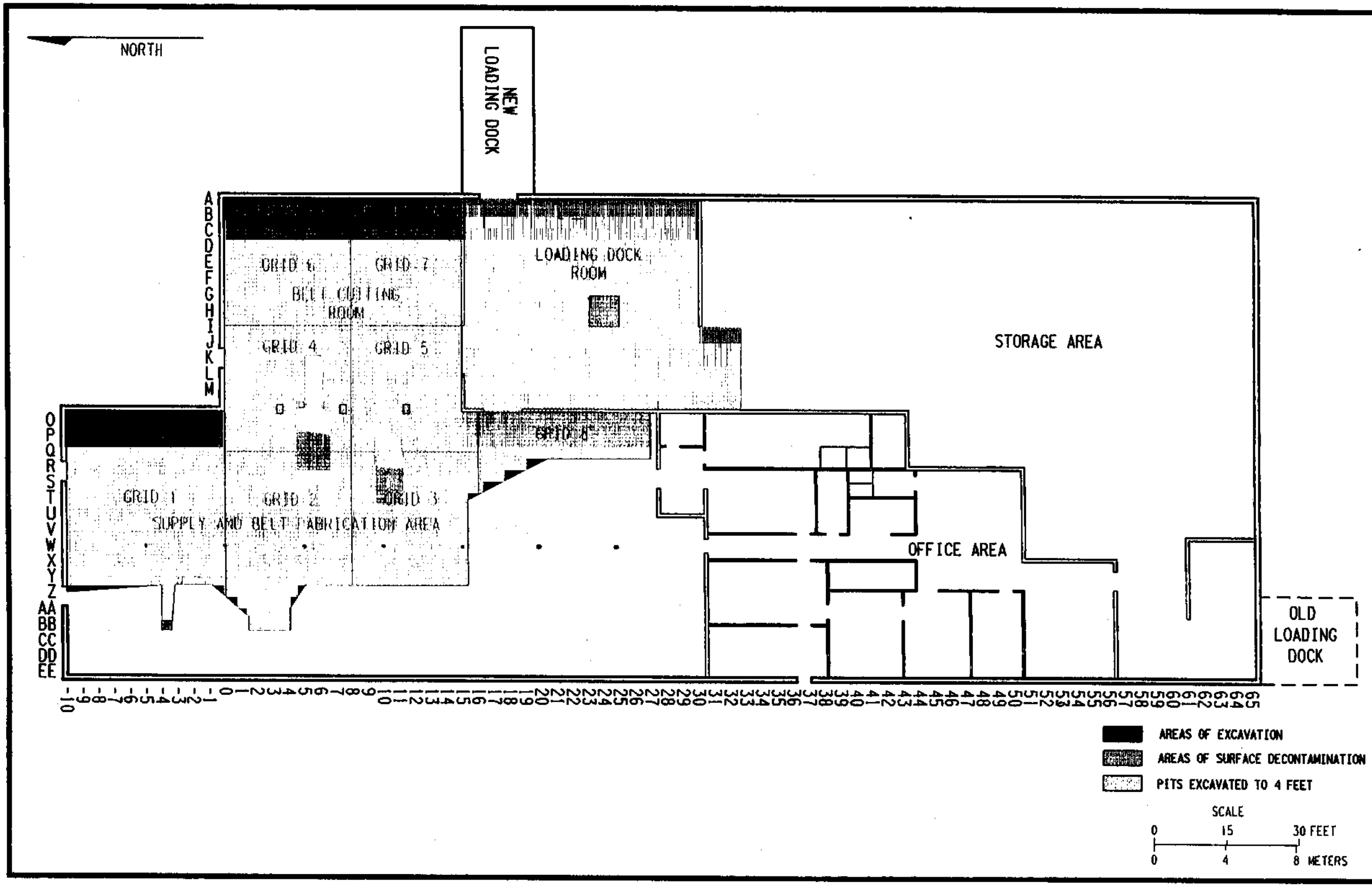

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Figure 3-1
Excavation and Surface Decontamination Areas

The final cost of the remedial action was $1,764,000; Table 3-2 is a breakdown of the costs.

3.2 CONTAMINATION CONTROL DURING REMEDIAL ACTION

During the remedial action, engineering and administrative controls (such as dust control and hazardous work permits) and personal protective equipment were used to protect remediation workers and members of the public from exposure to radiation in excess of applicable standards.

All personnel working in contaminated areas were required to wear disposable coveralls, safety glasses, rubber boots, hard hats, hearing protection, and gloves. If conditions warranted, additional protective clothing and equipment such as face shields were used. Site conditions did not necessitate the use of personnel respiratory protection.

Workers leaving radiologically restricted work areas were scanned at the control point by a health physics technician with an alpha and/or beta-gamma detector to ensure that they were not contaminated and to prevent the spread of contamination.

The primary exposure pathways during remedial action for persons onsite and offsite were inhalation and ingestion of radioactively contaminated airborne dust from mechanical decontamination and excavation activities. HEPA filtration units and the Vacublast™ decontamination system were used to control the spread of dust and minimize the potential for contaminants to become airborne. In addition, water was sprayed to control dust during soil removal and transport. All equipment used in the controlled area was surveyed before being released from the site.

During remediation, particulate air monitoring devices were placed in the areas being remediated. Monitoring locations were selected to provide data for the worst-case scenario. Concentrations of uranium-238 ranging from 2.6×10^{-14} to 3.3×10^{-13} μCi/ml (0.000026 to 0.00033 pCi/L) were conservatively derived by collecting air particulate samples daily from lapel air samplers worn by workers. After the gross activity per volume of air that passed

Table 3-2

Costs of the Remedial Action at the C. H. Schnoor Site

Description	Amount
Remedial Action Operations	$1,181,000
Waste Transportation and Disposal	514,000
Final Engineering Reports	69,000
TOTAL	$1,764,000

through the filter was determined, the source of all activity on the filter was assumed to be uranium-238. These derived air concentrations (DACs) were then compared with the applicable DOE guideline, which is a DAC of 2.0×10^{-11} μCi/ml (0.02 pCi/ml) for occupational exposures to airborne uranium-238 (DOE Order 5480.11).

Area air particulate sampling was also performed adjacent to areas being remediated to ensure that no member of the general public was exposed to radioactivity above DOE guidelines (DOE Order 5400.5). This guideline was established to protect members of the general public and the environment from undue risk from radiation. An Eberline RAS-1 high-volume monitor and a low-volume lapel monitor were used, and the filters were collected daily and counted after 4 days to allow for radon decay. The limits in DOE Order 5400.5 are derived concentration guides (DCGs); a DCG is the concentration of a particular radionuclide that would provide an effective dose equivalent of 100 mrem/yr, the DOE basic dose limit, to an individual continuously exposed to the radionuclide by one pathway for an entire year. Concentrations of uranium-238 measured by area particulate monitors ranged from 1.3×10^{-15} to 5.1×10^{-14} μCi/ml (0.0000013 to 0.000051 pCi/L). The DCG is 2.0×10^{-12} μCi/ml (0.002 pCi/L) for uranium-238.

4.0 POST-REMEDIAL ACTION MEASUREMENTS

After each portion of the property was decontaminated, a radiological survey of that area was conducted to confirm that all radioactive contamination above the cleanup criteria (Table 2-1) had been removed. Initial post-remediation surveys were conducted by ThermoAnalytical on behalf of BNI. Survey techniques used during post-remediation and verification surveys included direct (nontransferable) surface contamination measurements, transferable contamination measurements, walkover gamma scans, external gamma radiation exposure rate measurements, and soil sampling. ORNL, as the IVC, performed independent verification surveys of the remediated areas using similar or identical survey techniques. The IVC survey data will be issued in a separate report by ORNL.

4.1 SURFACE RADIATION SCANS IN EXCAVATED AREAS

As excavation was completed, walkover surveys were conducted to determine whether all the soil radioactively contaminated in excess of DOE remedial action guidelines had been removed. Final walkover surveys were performed with both the FIDLER and the HP-260. The walkover surveys provided immediate feedback so that additional excavation could be performed if residual contamination exceeded remedial action guidelines and the objective of maintaining exposures as low as reasonably achievable (ALARA) could be met. These same surveys were performed on the vertical face of the excavation outlined in Figure 3-1. These surveys are used only to obtain an approximate indication of contamination by correlating instrument readouts with soil concentrations; decisions concerning the final release of areas are based on the results of soil sampling and analyses for uranium-238 by gamma spectroscopy.

4.2 GAMMA RADIATION EXPOSURE RATE MEASUREMENTS

Gamma radiation exposure rates were measured with a PIC at 26 locations at a height of 1 m (3 ft) above the ground surface in each remediated area to obtain measurements in μR/h. Exposure rates ranged from 8.60 to 12.20 μR/h, including a background of

8.50 μR/h; locations are shown in Figure 4-1. All results were below the DOE guideline of 20 μR/h above background for building interiors. Results are presented in Table 4-1.

4.3 DIRECT AND TRANSFERABLE CONTAMINATION MEASUREMENTS

Direct-contact beta-gamma measurements were obtained with Geiger-Mueller counters (HP-210 or HP-260), and direct-contact alpha measurements were obtained with alpha scintillation detectors (AC-3). Direct measurements were obtained by placing the probe on the surface to be surveyed and allowing pulses to accumulate for at least 30 s on the scaler that was attached to the probes. These measurements were converted, with appropriate calibration and conversion factors, to dpm/100 cm^2 and compared to the DOE guidelines.

In the loading dock room, five readings were taken for each square meter of floor area. This conventional approach was used because the beta-gamma and alpha measurements were consistently below guidelines outlined in Table 2-1. The beta-gamma measurements, at the base of the two cement block columns and footing between them, were taken with a slightly different approach because they contained small areas of elevated surface contamination. After discussions with the IVC, it was decided that a weighted average would be applied to each 1-m^2 (10.8-ft^2) area rather than taking five systematic readings per square meter. This procedure was preferable because of the irregular and nonuniform shape of the surfaces. The process involved surveying the entire 1-m^2 (10.8-ft^2) area, recording the measurement and the area represented by each measurement, and then averaging the measurements by weighting them according to the area they represented. This method provided an accurate representation of the average surface contamination for each 1-m^2 (10.8-ft^2) area. These results were then compared to the applicable guidelines for allowable average surface contamination.

Transferable alpha and beta-gamma contamination was determined by wiping a 100-cm^2 (15.5-$in.^2$) area with a filter and measuring alpha emissions from the filter with an alpha scintillation counter (SAC-4) and Geiger-Mueller counters (HP-210 or HP-260), respectively. Transferable contamination was measured, at a minimum, at any location that exhibited direct

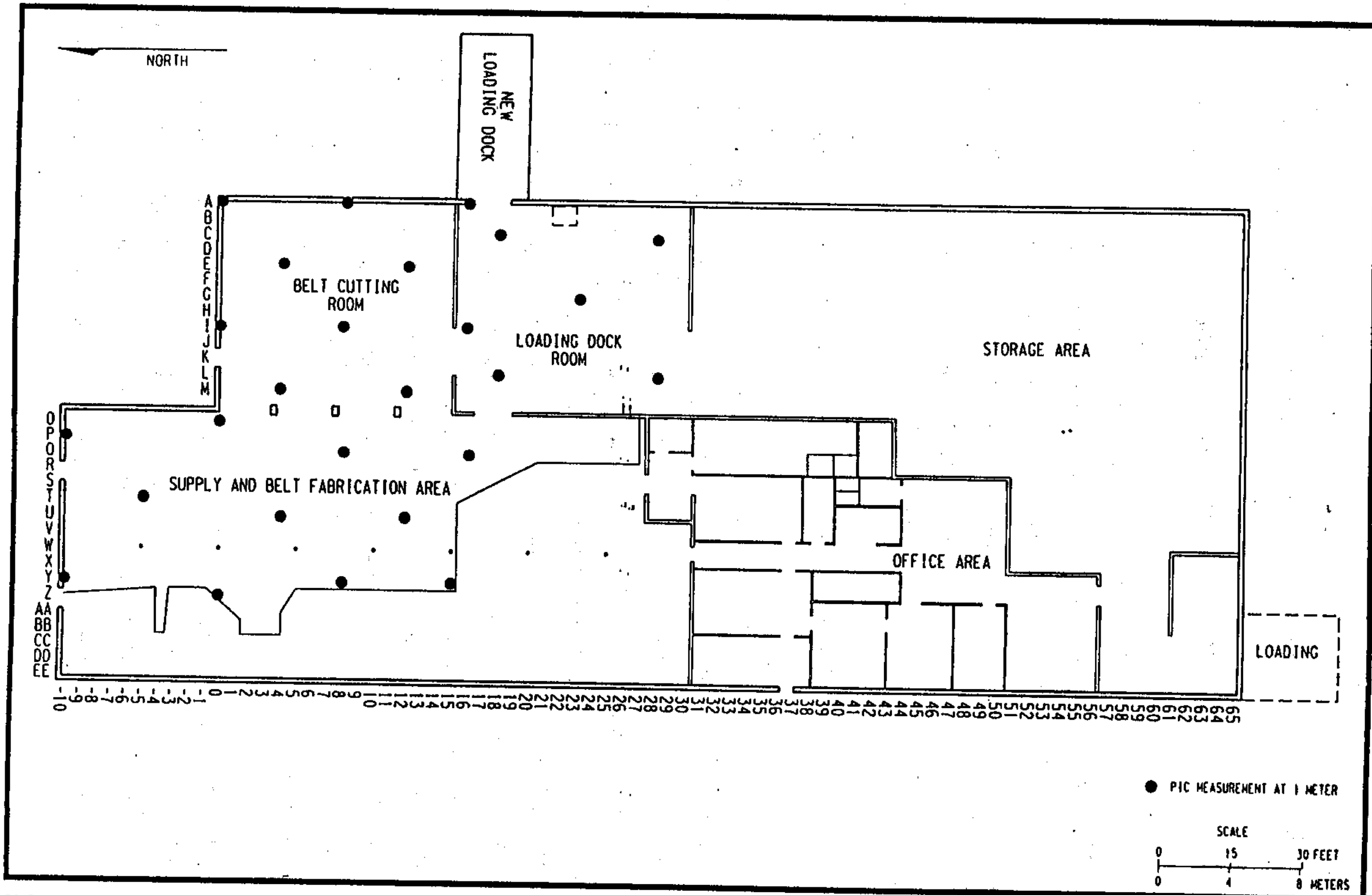

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Figure 4-1
PIC Measurement Locations

Table 4-1

Post-Remedial Action Gamma Radiation Exposure Rates

Grid	Coordinates[a]	Exposure Rate (μR/h)[b,c]
Y	-10	11.65
P	-10	11.86
T	-5	12.20
O	0	10.29
U	4	10.84
Z	0	11.13
Y	8	10.26
U	12	10.54
Q	8	10.59
Y	15	10.21
Q	16	9.61
M	12	11.52
I	16	10.44
I	8	10.44
M	4	10.67
I	0	10.67
E	4	10.51
A	8	10.99
E	12	10.44
A	16	10.99
A	0	10.83
C	18	10.00
L	18	8.60
C	28	10.00
L	28	10.00
G	23	8.60

[a]Locations are shown in Figure 4-1.

[b]All measurements include a background reading of 8.5 μR/h.

[c]DOE guideline is 20 μR/h, as shown in Table 2-1.

alpha or beta-gamma contamination above the guideline for removable contamination (1,000 dpm/cm^2).

Direct and transferable radiation measurements did not exceed applicable DOE guidelines (Table 2-1) at any of the post-remedial action measurement locations. Direct alpha and beta-gamma measurements for the loading dock area ranged from less than 8 to 225 dpm/100 cm^2 and less than 437 to 7,339 dpm/100 cm^2, respectively; transferable alpha and beta-gamma measurements ranged from less than 4 to 9 dpm/100 cm^2 and less than 30 to 40 dpm/100 cm^2, respectively. Average direct beta-gamma results for the columns and the footing were all below 2,867 dpm/100 cm^2, which is well below the DOE guideline of 5,000 dpm/100 cm^2. Direct alpha measurements for the columns and the footing ranged from less than 17 to 203 dpm/100 cm^2; transferable alpha and beta-gamma measurements ranged from less than 4 to 16 dpm/100 cm^2 and less than 31 to 43 dpm/100 cm^2, respectively. Results for the cement block columns, the footing, and the loading dock room are presented in Table 4-2.

4.4 SOIL SAMPLING

Composite post-remedial soil samples were taken from the excavated areas and analyzed to determine the radionuclide concentrations in the remaining soil before the excavation was backfilled. Composite samples were collected to provide samples representative of a maximum area of 100 m^2 (1,076 ft^2). Twenty-five evenly spaced plugs per 100 m^2 (1,076 ft^2) were composited for each composite sample. For areas less than 100 m^2 (1,076 ft^2), the number of plugs for each composite sample was reduced proportionally to the reduction in area. Three composite samples were also collected from the vertical face of the excavation. The depth of the excavation averaged approximately 0.6 m (2 ft) and was divided into 0.15-m (6-in.) intervals for sampling (see Figure 4-2). Because the top 0.15 m (6 in.) was concrete that had been found clean in previous surface surveys, only the bottom three intervals were sampled. A composite sample was obtained for each interval by collecting a plug every 2 m (6.6 ft) over the entire length of the vertical face and compositing the plugs (see Figure 4-2). This technique resulted in approximately

Table 4-2

Summary of Post-Remedial Action Radiological Survey Results for the C. H. Schnoor Site

		Direct Surface Contamination[a]				Transferable Contamination[a]			
		Alpha		Beta/Gamma		Alpha		Beta/Gamma	
Location	Area	Sample Activity Range (dpm/100 cm²)	Number of Measurements	Average Activity (dpm/100 cm²)	Number of Measurements	Sample Activity Range (dpm/100 cm²)	Number of Measurements	Sample Activity Range (dpm/100 cm²)	Number of Measurements
Center Column									
	North Face	37-138	6	2,095	7	<4	1	<31	1
	South Face	37-138	6	993	6	<4	1	43	1
	East Face	<32-120	6	2,509	10	<4	1	<31	1
	West Face	<17-46	6	1,820	6	<6	1	<31	1
North Column									
	North Face	<32-92	6	2,840	4	<6	1	<31	1
	South Face	<32-203	6	1,323	4	<4	1	<31	1
	East Face	<17-175	6	855	4	<6	1	<31	1
	West Face	28-129	6	2,288	3	4	1	<31	1
Concrete Footing									
	North 1 m²	28-175	6	2,702	8	16	1	<31	1
	Center 1 m²	<17-101	6	2,151	7	7	1	<31	1
	South 1 m²	<32-157	6	2,867	9	7	1	<31	1
Loading Dock Room		<8-225		<437-7,339		<4-9		<30-40	

[a]Guidelines are illustrated in Table 2-1.

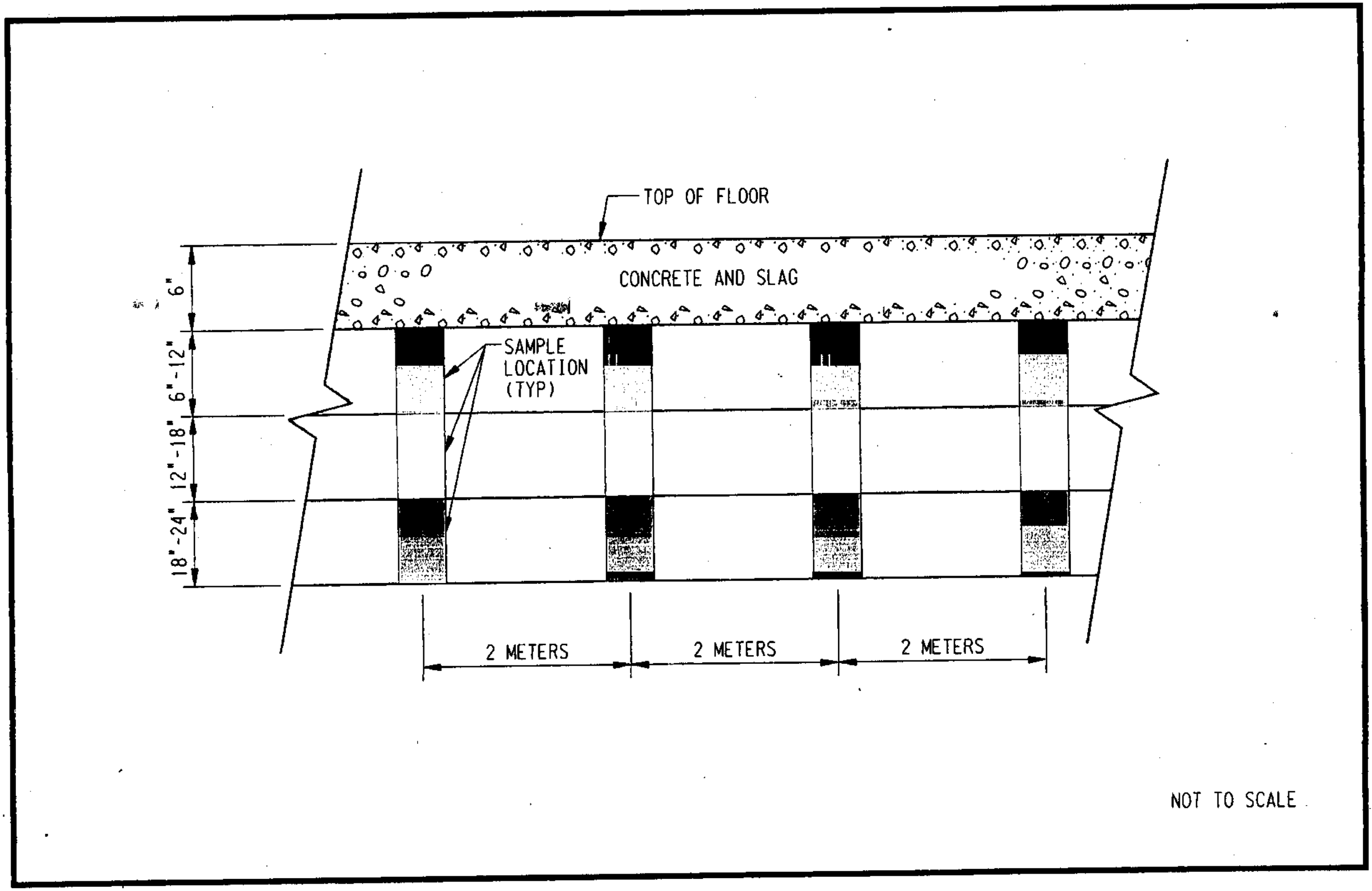

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Figure 4-2
Typical Section of Vertical Face of Excavation

25 plugs being composited for each interval. Results for the composite soil samples are presented in Table 4-3; all results are below the site-specific uranium guideline.

Two samples were also collected from hot spots that were detected during the final verification walkover surveys. One spot was in the bottom of the south pit, and the other was at the base of the central cement column (see Figure 3-1). DOE Order 5400.5 (see Table 2-1, Note c) allows for the development of hot spot limits for surface and below-surface areas of 25 m^2 (269 ft^2) or less provided that the average radionuclide concentration for the 100-m^2 (1,076-ft^2) area is below the DOE guideline. The hot spot result can exceed the soil guideline by a factor of $(100/A)^{0.5}$, where A is the area (m^2) of the region where concentrations are elevated. For areas less than 1 m^2 (10.8 ft^2), such as these two hot spots, protocol requires that an area of 1 m^2 (10.8 ft^2) be used for calculating the hot spot limit. Using 1 m^2 (10.8 ft^2) in the calculation results in a multiplication factor of 10, which means that the "hot spot" limit is 500 pCi/g for uranium-238. The uranium-238 results for the two hot spots were 169.0 and 267.0 pCi/g (Table 4-3).

Table 4-3

Soil Verification Samples

Sample Location[a]	Concentration (pCi/g ± 2 sigma)[a]		
	Uranium-238[b]	Radium-226	Thorium-232
Grid #1	6.60 ± 3.40	1.20 ± 0.34	0.88 ± 0.33
Grid #2	<3.50	1.30 ± 0.35	1.10 ± 0.39
Grid #3	<5.00	1.10 ± 0.32	1.00 ± 0.35
Grid #4	4.80 ± 2.70	0.76 ± 0.23	0.84 ± 0.23
Grid #5	<4.10	1.30 ± 0.32	0.96 ± 0.37
Grid #6	19.80 ± 12.70	1.50 ± 0.36	0.81 ± 0.42
Grid #7	1.70 ± 2.30	1.60 ± 0.48	1.30 ± 0.45
Grid #8	<5.40	1.40 ± 0.37	0.83 ± 0.30
Wall Face (0.5-1.0 ft)	11.60 ± 7.30	<0.27	0.71 ± 0.22
Wall Face (1.0-1.5 ft)	26.60 ± 16.50	<0.37	1.40 ± 0.38
Wall Face (1.5-2.0 ft)	29.40 ± 18.10	<0.29	1.20 ± 0.44
North Pit	19.10 ± 11.80	<0.24	0.65 ± 0.19
South Pit	19.20 ± 3.20	<0.28	0.69 ± 0.22
Loading Dock	1.50 ± 1.60	1.30 ± 0.21	1.50 ± 0.24
Hot Spots[c]			
South Pit	169.00 ± 103.00	<0.32	0.67 ± 0.20
Base of Central Column	267.00 ± 162.00	<0.42	0.65 ± 0.22

[a]Locations are shown in Figure 3-1.
[b]DOE guideline is 100 pCi/g for total uranium (see Table 2-1).
[c]See Table 2-1, Note c.

5.0 POST-REMEDIAL ACTION STATUS

Analytical results for post-remedial action surveys indicate that the levels of radioactivity in the remediated areas meet applicable DOE cleanup guidelines. The IVC has reviewed the post-remedial action surveys and results and determined that the measurements obtained verify that the remediated areas comply with the established DOE guidelines for the site. No areas of contamination above DOE guidelines remain at the site.

The IVC is responsible for preparing a plan outlining the procedures used in conducting verification activities. These procedures specify a verification process requiring two methods of review (Types A and B). The IVC conducted both types, in full conformance to the approved verification plan.

Type A verification consisted of reviewing the post-remedial action survey results and collecting and analyzing additional samples as required. In performing the Type B verification review, the IVC conducted a survey of the site that included direct measurements, review of the post-remedial action survey methods and results, sampling, and laboratory analysis of separate soil samples.

After completing the verification study, the IVC will report its findings and recommendations to DOE Headquarters and the DOE Oak Ridge Operations Office. Appendix D includes a copy of the IVC's verification letter to DOE. DOE will review the report to verify that the remedial action was successful, and a certification docket will then be prepared. The certification docket officially certifies that the site has been successfully remediated to established criteria. The issuance of the certification docket will be documented through publication of a notice in the *Federal Register*.

REFERENCES

Department of Energy (DOE), 1986. "Uranium Mill Tailings Remedial Action Program."

DOE, 1990. "Radiation Protection of the Public and the Environment," DOE Order 5400.5, Washington, D.C. (June).

Oak Ridge National Laboratory (ORNL), 1991. *Results of the Radiological Survey at Conviber Inc., 644 Garfield Street, Springdale, Pennsylvania (CVP001)*, ORNL/RASA-89/18, Oak Ridge, Tenn.

ORNL, 1995. *Results of the Supplementary Radiological Survey at Conviber Inc. (formerly C. H. Schnoor and Company) 644 Garfield Street, Springdale, Pennsylvania (CVP001).* ORNL/RASA-94/3, Oak Ridge, Tenn. (February).

GLOSSARY

Alpha-emitting - See **Radiation**.

Ambient Background Radiation - Ambient background radiation refers to naturally occurring radiation emitted from either cosmic (e.g., from the sun) or terrestrial (i.e., from the earth) sources. Exposure to this type of radiation is unavoidable, and its level varies greatly depending on geographic location. For example, New Jersey typically receives 100 millirem per year (mrem/yr), Colorado receives about 115 mrem/yr, and some areas in South America receive up to 7000 mrem/yr. Naturally occurring terrestrial radionuclides include uranium, radium, potassium, and thorium (see **Radionuclide**). The dose levels do not include the concentrations of naturally occurring radon inside buildings.

Beta-gamma-emitting - See **Radiation**.

Centimeter - A centimeter (cm) is a metric unit of measurement for length; 1 inch is equal to 2.54 cm; 1 foot is equal to approximately 30 cm.

Contamination - The term "contamination" is used generally to mean a concentration of one or more radioactive materials that exceeds naturally occurring levels. Contamination may or may not exceed the DOE cleanup guidelines.

Disintegrations per minute - Disintegrations per minute (dpm) is the measurement indicating the amount of radiation being released from a substance per minute.

Dose - As used in this report, dose is actually dose equivalent and is used to relate absorbed dose (mrad) to an effect on the body. Dose is measured in mrem. For comparison, a dose of 500,000 mrem to the whole body within a short time causes death in 50 percent of the people who receive it; a dose of 5,000,000 mrem may be delivered to a cancerous tumor during radiation treatment; normal background radiation at or near sea level results in an annual dose of about 100 mrem; DOE radiation protection standards limit the dose that may be received by members of the general public to 100 mrem/yr above background levels; living in a brick house typically results in a dose of about 75 mrem/yr above the background level.

Exposure Rate - Exposure rate is the rate at which radiation imparts energy to the air. Exposure is typically measured in microroentgens (μR), and exposure rate is typically expressed as μR/h. The dose to the whole body can be approximated by multiplying the exposure rate by the number of hours of exposure. For example, if an individual were exposed to gamma radiation at a rate of 20 μR/h for 168 h/week (continuous exposure) for 52 weeks/yr, the whole-body dose would be approximately 175 mrem/yr.

Gamma Radiation - See **Radiation**.

Meter - A meter (m) is a metric unit of length; 1 m is equal to approximately 39 inches.

Microroentgen - A microroentgen (μR) is a unit used to measure radiation exposure. For further information, see **Exposure Rate**.

Millirem - The millirem (mrem) is the unit used to measure radiation dose to man. The DOE dose limit is 100 mrem above background radiation levels within any one-year period for members of the general public. Naturally occurring radioactive substances in the ground result in a yearly exposure of about 100 mrem to each member of the population. To date, no difference can be detected between the health of population groups exposed to 100 mrem/yr above background and the health of groups who are not exposed.

Natural Background Radiation - Natural background radiation refers to radiation emitted from the naturally occurring radionuclides found in manmade materials. The concentrations of the radionuclide, and thus the radiation, will vary widely because of variations in the composition of the materials.

Radiation - There are three primary types of radiation: alpha, beta, and gamma. Alpha radiation travels less than an inch in air before it stops, and it cannot penetrate the outer layers of human skin. Beta radiation can penetrate the outer layers of skin but cannot reach the internal organs. Gamma radiation, the most penetrating type, can usually reach the internal organs.

Radionuclide - Radioactive elements are also referred to as radionuclides. For example, uranium-235 is a radionuclide, uranium-238 is another, thorium-232 is another, and so on.

Remedial Action - Remedial action is a general term used to mean "cleanup of contamination that exceeds DOE guidelines." It refers to any action required so that a property may be certified as being in compliance with guidelines and may therefore be released for future use. Remedial action also includes restoring remediated properties to their original conditions as far as possible.

Uranium - Uranium is a naturally occurring radioactive element. The principal use of refined uranium is for the production of fuel for nuclear reactors. Uranium in its natural form is not suitable for use as a fuel source.

APPENDIX A Major Instrumentation

Appendix A

Major Instrumentation

Instruments

Eberline Scaler/Ratemeter
ESP-1
(Eberline, Santa Fe, NM)

Eberline Scaler/Ratemeter
ESP-2
(Eberline, Santa Fe, NM)

Detectors

Eberline GM Detector
Model HP-210
Effective Area, 15.5 cm^2
(Eberline, Santa Fe, NM)

Eberline GM Detector
Model HP-260
Effective Area, 15.5 cm^2
(Eberline, Santa Fe, NM)

Alpha Scintillation Probe
Model AC-3-7
Effective Area, 59 cm^2
(Eberline, Santa Fe, NM)

Scintillation Alpha Counter
Model SAC-4
(Eberline, Santa Fe, NM)

Scintillation Alpha Counter
Ludlum 2000
(Ludlum Measurements, Inc., Sweetwater, TX)

Reuter-Stokes Pressurized Ion Chamber
Model RSS-111
(Reuter-Stokes, Cleveland, OH)

APPENDIX B Survey and Analytical Procedures

APPENDIX B

Survey and Analytical Procedures

SURVEY PROCEDURES

Surface Scans

Surface scans were performed by passing small-area (15.5 cm^2 or 100 cm^2), hand-held detectors slowly over the surface; the distance between the probe and the surface was maintained at a minimum—nominally about 1 cm. Combinations of detectors and instruments used for the scans were:

Beta-Gamma — pancake GM detector with ratemeter-scaler
Alpha — scintillation detector with ratemeter-scaler

Direct Surface Activity Measurements

Measurements of total beta-gamma activity levels were performed using GM detectors with portable ratemeter-scalers. Measurements of alpha activity level were performed using scintillation detectors with portable ratemeter-scalers.

Count rates (cpm), which were integrated over 1 minute in a static position, were converted to activity levels (dpm/100 cm^2) by subtracting detector background rates and dividing the net count rate by the detector efficiency and the area correction factor of the detector.

The detector background rates ranged from 29 to 33 cpm for beta-gamma and 2 to 3 cpm for alpha. Detector efficiency factors ranged from 0.15 to 0.19 for beta-gamma and 0.17 to 0.18 for alpha. The effective window was 15.5 cm^2 for beta-gamma detectors and 59 cm^2 for alpha detectors.

Removable Activity Measurements

Removable activity levels were determined using numbered filter paper disks. Moderate pressure was applied to the smear with two or three fingers, and approximately 100 cm^2 of the surface was wiped. Smears were placed in labeled envelopes with the location and other pertinent information recorded. Smears were analyzed onsite using the SAC-4 detector.

Count rates (cpm), which were integrated over 1 minute in a static position, were converted to activity levels (dpm/100 cm^2) by subtracting detector background rates and dividing by the detector efficiency.

The detector background rates ranged from 0.1 to 0.32 cpm; efficiency factors ranged from 0.33 to 0.37.

Gamma Exposure Rate Measurements

Measurements of gamma exposure rates were performed at 1 m above the surface, using a pressurized ionization chamber, for 4.25 to 6.25 minutes.

UNCERTAINTIES AND DETECTION LIMITS

The detection limit, referred to as critical level (L_c), was determined as follows:

$$1.65 * \frac{\sqrt{\frac{\text{Background cpm}}{\text{Background count time}}} * \sqrt{\frac{1 + \text{Background count time}}{\text{Sample count time}}}}{(\text{Detector efficiency}) * (\text{Detector Area})}$$

When the measured activity was determined to be less than the L_c of the measurement procedure, the result was reported with a "less than" sign. Because of variations in background levels, measurement efficiencies, and contributions from other radionuclides in samples, the detection limits differ from sample to sample and instrument to instrument.

CALIBRATION AND QUALITY ASSURANCE

Analytical and field survey activities were conducted in accordance with procedures from the following documents:

- TMA/Eberline, Health Physics Operational Procedures Manual (November 1993).
- TMA/Eberline, Quality Assurance Manual, Revision 8 (December 1993).

The procedures contained in these manuals were developed to meet the requirements of DOE Order 5700.6C, ASME NQA-1 for Quality Assurance, and federal and state rules and regulations and contain measures to assess processes during their performance.

Calibration of all field and analytical instrumentation was based on standards/sources, traceable to National Institute of Standards and Technology and American National Standard Institute, when such standard/sources were available; when they were not available, standards of an industry-recognized organization were used. Calibration of pressurized ionization chambers was performed by the manufacturer.

Quality control procedures include

- daily instrument background and check-source measurements to confirm that equipment operation is within acceptable statistical fluctuations;
- participation in EPA and Environmental Measurements Laboratory quality assurance programs;
- training and certification of all individuals performing procedures; and
- periodic internal and external audits.

APPENDIX C Remedial Action Summary

REMEDIAL ACTION SUMMARY

WBS 122

SITE C.H. Schnoor

OWNER Frank Pucciarelli

ADDRESS 644 Garfield Street

CITY, STATE Springdale, Pennsylvania

REMEDIATION AUTHORITY

- ☒ NEPA/CERCLA
- ☐ SUPERFUND
- ☐ RCRA

ACTION	DATE	RESPONSIBLE ENTITY	DOCUMENT
DESIGNATION	1992	DOE	Designation Summary
CHARACTERIZATION	1989 & 1990	ORNL	Characterization Report
CHARACTERIZATION	1993	BNI	Technical Bulletin
FINAL RA	1994	BNI	Post Remedial Action Report

TOTAL VOLUME 683 yd^3

To Remain In Situ NA
Volume Reduction NA
Net Disposal 683 yd^3

Documentation Used: PRAR

TYPE OF WASTE FOR NET DISPOSAL:

REGULATORY	VOLUME	DISPOSAL SITE
☒ Low Level Radiological Waste	626 yd^3	Envirocare
☐ 11(E)2		
☐ MIXED		
☐ CHEMICAL		
☒ Clean Waste	57 yd^3	Sanitary Landfill

PHYSICAL	VOLUME	DISPOSAL SITE
☒ BUILDING RUBBLE	57 yd^3	Sanitary Landfill
☒ SOIL	626 yd^3	Envirocare
☐ LIQUID		
☐ OTHER		

TREATMENT TECHNOLOGIES APPLIED AT THE SITE:

APPENDIX D Supporting Correspondence

122223

94-605

Department of Energy

Oak Ridge Operations
P.O. Box 2001
Oak Ridge, Tennessee 37831—

OCT 24 8 44 AM '94

OCT 14 1994

Mr. James G. Yusko, CHP
Regional Manager
Department of Environmental Resources
Commonwealth of Pennsylvania
400 Waterfront Drive
Pittsburgh, Pennsylvania 15222-4745

Dear Mr. Yusko:

C.H. SCHNOOR SITE - DISPOSITION OF CRUSHED CONCRETE DEBRIS RESULTING FROM THE CLEANUP

As was previously discussed during our telephone conversation on September 26, 1994, approximately 50 cubic yards of concrete rubble from the C. H. Schnoor Site remediation project was processed into a soil-like material using the Department of Energy's rock crusher, and placed back into the excavation area as beneficial reuse/fill material on October 11, 1994. Final results from the analysis of representative samples of the material revealed an average concentration of residual uranium of 7.5 pCi/g ^{238}U -- less than a fifth of the 50 pCi/g ^{238}U cleanup criteria for the surrounding soils remaining in place at the site.

Based upon preliminary results from the independent verification contractor, we have completed remediation activities at the site. Our current plans are to complete demobilization activities by the middle of October. Restoration activities are to be completed by the site owner at his request.

For purposes of documenting our previous conversations regarding the beneficial reuse of the crushed concrete and the state's awareness of DOE's progress and plans, I would appreciate your acknowledging this letter below and returning a copy to me.

If you have any questions or comments regarding this project please feel free to contact me at (615) 576-9441. I will be contacting you in the near future regarding final ve..fication results and site walkover. Again, thank you with your assistance with this project.

Sincerely

James D. Kopotic

James D. Kopotic, Site Manager
Former Sites Restoration Division

ACKNOWLEDGEMENT:

J G Yusko 1019.94

James G. Yusko, CHP
Regional Manager
Department of Environmental Resources

RECEIVED
OCT 17 1994
RADIATION PROTECTION

OAK RIDGE NATIONAL LABORATORY
MANAGED BY MARTIN MARIETTA ENERGY SYSTEMS, INC
FOR THE U.S. DEPARTMENT OF ENERGY

POST OFFICE BOX 2008
OAK RIDGE TENNESSEE 37831

April 21, 1995

Dr. W. Alexander Williams
Designation and Certification Manager
EM-421
Department of Energy
Cloverleaf Building
19901 Germantown Road
Germantown, Maryland 20874-1290

Dear Dr. Williams:

Independent Verification Survey of the Former C. H. Schnoor Site, Springdale, Pennsylvania

The Measurement Applications and Development Group of the Oak Ridge National Laboratory served as the Independent Verification Contractor for the remedial action work at the former C. H. Schnoor site in Springdale, Pennsylvania. The Measurement Applications and Development group conducted the initial designation radiological survey work and later supplemented the designation survey data with core sampling and detailed radiological mapping of the facility. As the Independent Verification Contractor, our work was closely coordinated with Bechtel National Incorporated, the remediation contractor. While still maintaining independence from the remediation efforts, the Oak Ridge National Laboratory and Bechtel National Incorporated teams were able to coordinate efforts and share resources to ensure the site met the Department of Energy guidelines for unrestricted use.

Because of the nature of the subsurface uranium contamination at the site, we felt an aggressive surveying and sampling campaign was necessary in order to validate the data collected by Bechtel National Incorporated. Oak Ridge National Laboratory staff also reviewed the Bechtel National Incorporated post remediation survey data as it became available and concur that it accurately represents the radiological condition of the site. During the remediation when discrepancies between our survey data and Bechtel National Incorporated survey data occurred, the personnel onsite worked to arrive at some mutually agreed understanding. In many cases, the as low as reasonably achievable concept influenced remediation efforts beyond the established Department of Energy guidelines.

After reviewing the radiological survey data provided by Bechtel National Incorporated and analyzing our samples and direct radiation measurements, we believe the site meets the Department of Energy guidelines and should not have any radiological restrictions. The Oak Ridge National Laboratory's formal report is in preparation and the draft should be sent to you soon. Please call me if you have any questions.

Sincerely,

Michael E. Murray
Measurement Applications
and Development Group

MEM:ec

c: R. D. Foley
J. D. Kopotic, DOE-ORO
G. L. Palau, BNI

2.7 VERIFICATION STATEMENT, INTERIM VERIFICATION LETTERS TO PROPERTY OWNERS, AND VERIFICATION REPORTS

This section includes documents related to the successful decontamination of the subject property.

OAK RIDGE NATIONAL LABORATORY
MANAGED BY MARTIN MARIETTA ENERGY SYSTEMS, INC
FOR THE U.S. DEPARTMENT OF ENERGY

APR 21 9 54 AM '95

POST OFFICE BOX 2008
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and Development Group

MEM:ec

c: R. D. Foley
J. D. Kopotic, DOE-ORO
G. L. Palau, BNI

ORNL/RASA-95/1

ornl

OAK RIDGE NATIONAL LABORATORY

MARTIN MARIETTA

Results of the Independent Radiological Verification Survey at the Former C. H. Schnoor and Company Site, 644 Garfield Street, Springdale, Pennsylvania (CVP001)

M. E. Murray
K. S. Brown

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

ORNL/RASA-95/1

HEALTH SCIENCES RESEARCH DIVISION
Environmental Restoration and Waste Management Non-Defense Programs
(Activity No. EX 20 20 01 0; ADS317AEX)

Results of the Independent Radiological Verification Survey at the Former C. H. Schnoor and Company Site, 644 Garfield Street, Springdale, Pennsylvania (CVP001)

M. E. Murray and K. S. Brown

Date Issued - September 1995

Investigation Team
R. D. Foley–Measurement Applications and Development Manager
B. A. Berven – FUSRAP Project Director
M. E. Murray – Survey Team Leader

Survey Team Members

J. F. Allred
R. L. Coleman
R. C. Gosslee
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S. P. McKenzie
D. D. McKinney[1]
V. P. Patania
D. E. Rice
R. E. Rodriguez
D. A. Roberts
M. E. Ward[1]

[1]Midwest Technical, Inc.

Work performed by the
MEASUREMENT APPLICATIONS AND DEVELOPMENT GROUP

Prepared by the
OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37831-6285
managed by
LOCKHEED MARTIN ENERGY SYSTEMS, INC.
for the
U. S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

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ACKNOWLEDGMENTS

This project was sponsored by the Office of Environmental Restoration, U.S. Department of Energy, under contract DE-AC05-84OR21400 with Lockheed Martin Energy Systems, Inc. The authors wish to acknowledge the contributions of J. M. Lovegrove, D. A. Rose, D. A. Roberts, R. L. Coleman, R. E. Rodriguez, and T. R. Stewart of the Measurement Applications and Development Group, Oak Ridge National Laboratory, for sample preparation and participation in the analyses, editing, and reporting of data for this survey.

ABSTRACT

At the request of the U.S. Department of Energy (DOE), a team from Oak Ridge National Laboratory (ORNL) conducted an independent radiological verification survey at the former C. H. Schnoor and Company Site in Springdale, Pennsylvania. The survey was performed from August to October of 1994. The purpose of the survey was to verify that the site was remediated to levels below DOE guidelines for FUSRAP sites.

Results of the independent radiological verification survey at the former C. H. Schnoor and Company Site confirm that the residual uranium contamination at the site is below DOE FUSRAP guidelines for unrestricted use.

Results of the Independent Radiological Verification Survey at the Former C. H. Schnoor and Company Site, 644 Garfield Street, Springdale, Pennsylvania (CVP001)*

INTRODUCTION

The former C. H. Schnoor and Company Site is located at 644 Garfield Street in Springdale, Pennsylvania. During the mid-1940's, the property was owned by C. H. Schnoor and Company, and was used to machine extruded uranium for the Hanford Pile Project. 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, Conviber, Inc., uses the site for the fabrication of industrial hoses and conveyer belts.[1]

At the request of the U.S. Department of Energy (DOE), a team from Oak Ridge National Laboratory conducted an independent radiological verification survey at the former C. H. Schnoor and Company Site, Springdale, Pennsylvania. Figure 1 is a diagram of the building and surrounding surveyed area. The survey was performed from September to October of 1994. The purpose of the survey was to determine whether radioactivity from residues of ^{238}U inside the Conviber Building and an adjacent quonset hut, was remediated to a level below acceptable DOE guideline levels for FUSRAP sites by Bechtel National, Inc. (BNI).

VERIFICATION PROCEDURES

A description of the typical survey methods and instrumentation providing guidance for the verification survey may be found in *Measurement Applications and Development Group Guidelines*, ORNL-6782 (January 1995).[2]

Gamma radiation levels were determined using portable NaI gamma scintillation meters; beta/gamma measurements were made with GM "pancake" probes; alpha measurements were made with ZnS "beer mug" detectors. A large-area proportional detector was used to scan floors.

---

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

The indoor survey of the building included the following:

- Measurement of alpha and beta-gamma radiation levels in all accessible areas of the building, after remediation activities occurred and wherever areas of elevated radiation levels were indicated during surveying activities.
- Smears of floor surfaces in the room adjacent to the new loading dock for measurement of transferable alpha and beta-gamma radioactivity levels. Smear locations are shown on Fig. 2.
- Sampling and radionuclide analysis of systematic scoping samples from floors in the Conviber Building (Fig. 2) and the adjacent quonset hut (Fig. 3). These samples were taken prior to remedial action.
- Sampling and radionuclide analysis of systematic and biased verification samples from floors in the Conviber Building (Fig. 2). These samples were taken after the BNI post-remedial action survey.

In addition to conducting independent radiological surveys, ORNL staff reviewed the radiological survey data resulting from BNI post-remedial action work.

VERIFICATION SURVEY RESULTS

DOE generic guidelines are summarized in Table 1. The site-specific guideline for total uranium is 100 pCi/g.[3] Typical background radiation levels for the Springdale, Pennsylvania area are presented in Table 2. These data are provided for comparison with survey results presented in this section. Background concentrations have not been subtracted from radionuclide concentrations measured in soil samples.

All floor, wall, subfloor, and overhead surfaces previously known to be or suspected of being contaminated were confirmed to be within DOE guidelines at the end of the verification survey. Results of field and laboratory analyses of systematic scoping samples and systematic and biased verification samples are listed in Table 3 for ^{238}U, the only contaminant identified. The field analyses were made using a NaI gamma spectroscopy system. Shortly after samples were collected, the NaI detection system was used to provide a "field screening" analysis enabling technicians to define the radiological status of the remediation effort. The correlation between field screening and laboratory results is generally acceptable, with some outliers. As set up, the field screening results were not reliable below 15 pCi/g of ^{238}U.

Soil samples fall into one of three categories based on time of collection. The first group includes scoping samples collected prior to remediation. The second group includes samples which were collected during remediation to determine if further excavation was required. The last group represents a sampled area after successful remediation. Sample depth as listed in Table 3 is measured relative to the original concrete surface. Therefore, the first sample increment collected from a sampling site in an excavated area might have a depth far below the original surface, with no samples between the original surface and the excavated surface.

In all sample locations where the uranium concentrations exceeded the average concentration guideline, one of the following occurred: (1) The contaminant was removed later, (2) the area average concentration was determined to be less than the guideline, or (3) the residual concentration was less than the DOE "hot spot" criteria (see Table 1). In most cases, the ALARA concept prevailed and the contamination was removed.

All smear samples taken on surfaces throughout the building indicated transferable radioactivity levels below the minimum detectable activity (MDA) of the instruments.

CONCLUSIONS

Review of BNI survey results by ORNL, and the independent radiological verification survey by ORNL at the former C. H. Schnoor and Company Site confirm that the site meets the DOE radiological guidelines for unrestricted use.

REFERENCES

1. R. L. Coleman, M. E. Murray, and K. S. Brown, *Results of the Supplementary Radiological Survey at the Former C. H. Schnoor and Company Site, 644 Garfield Street, Springdale, Pennsylvania,* ORNL/RASA-94/3, Martin Marietta Energy Systems, Inc., Oak Ridge Natl. Lab., May 1995.

2. *Measurement Applications and Development Group Guidelines,* ORNL-6782, Martin Marietta Energy Systems, Inc., Oak Ridge Natl. Lab., January 1995.

3. Memo, J. W. Wagoner II, Director, Off-Site/Savannah River Program Division, Office of Eastern Area Programs, Office of Environmental Restoration, U.S. DOE, to L. K. Price, Director, Former Sites Restoration Division, Oak Ridge Field Office, U.S. DOE, August 25, 1994.

ORNL-DWG 95-5589

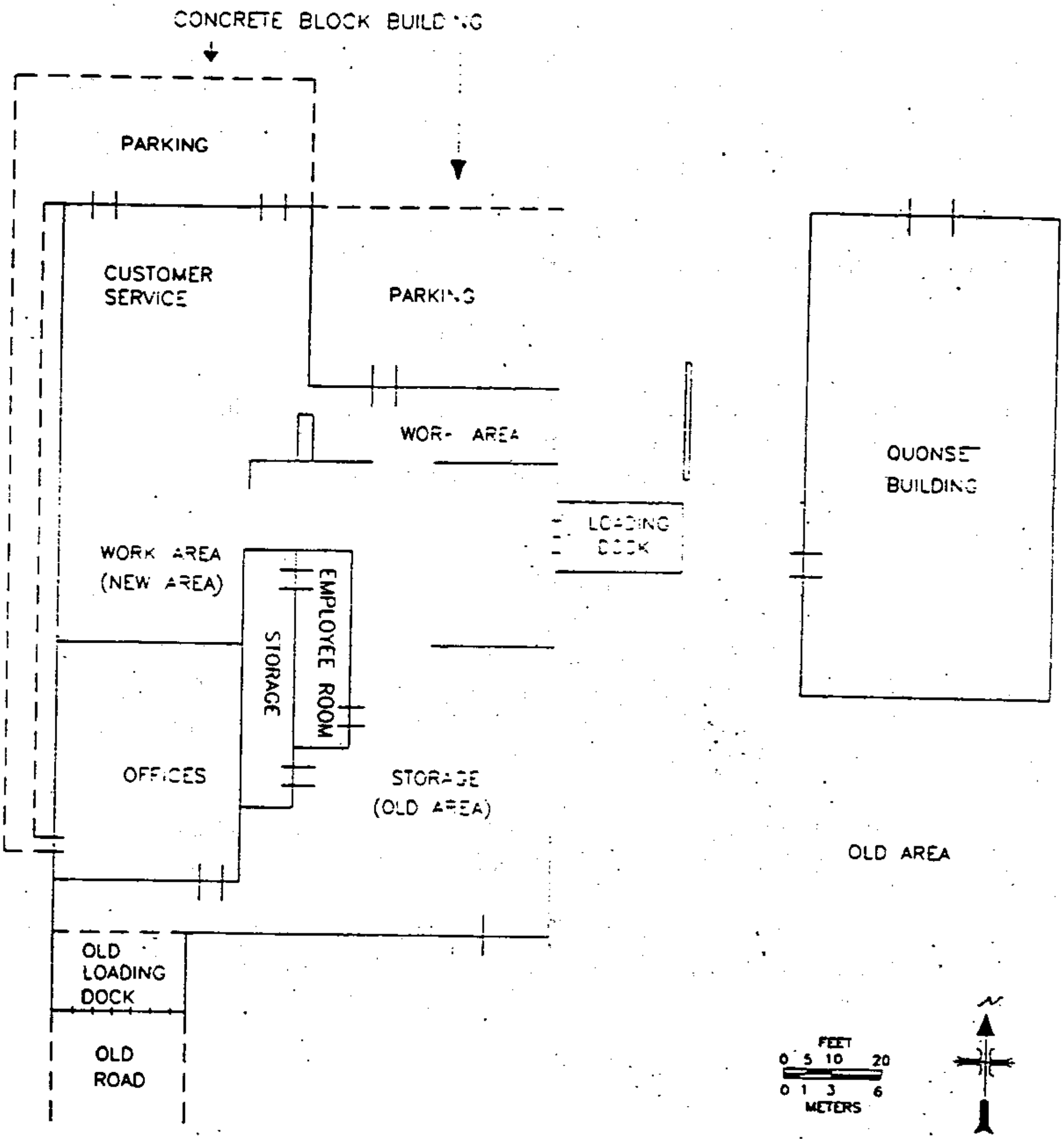

Fig. 1. Diagram of the Conviber Building and surrounding survey area at the site.

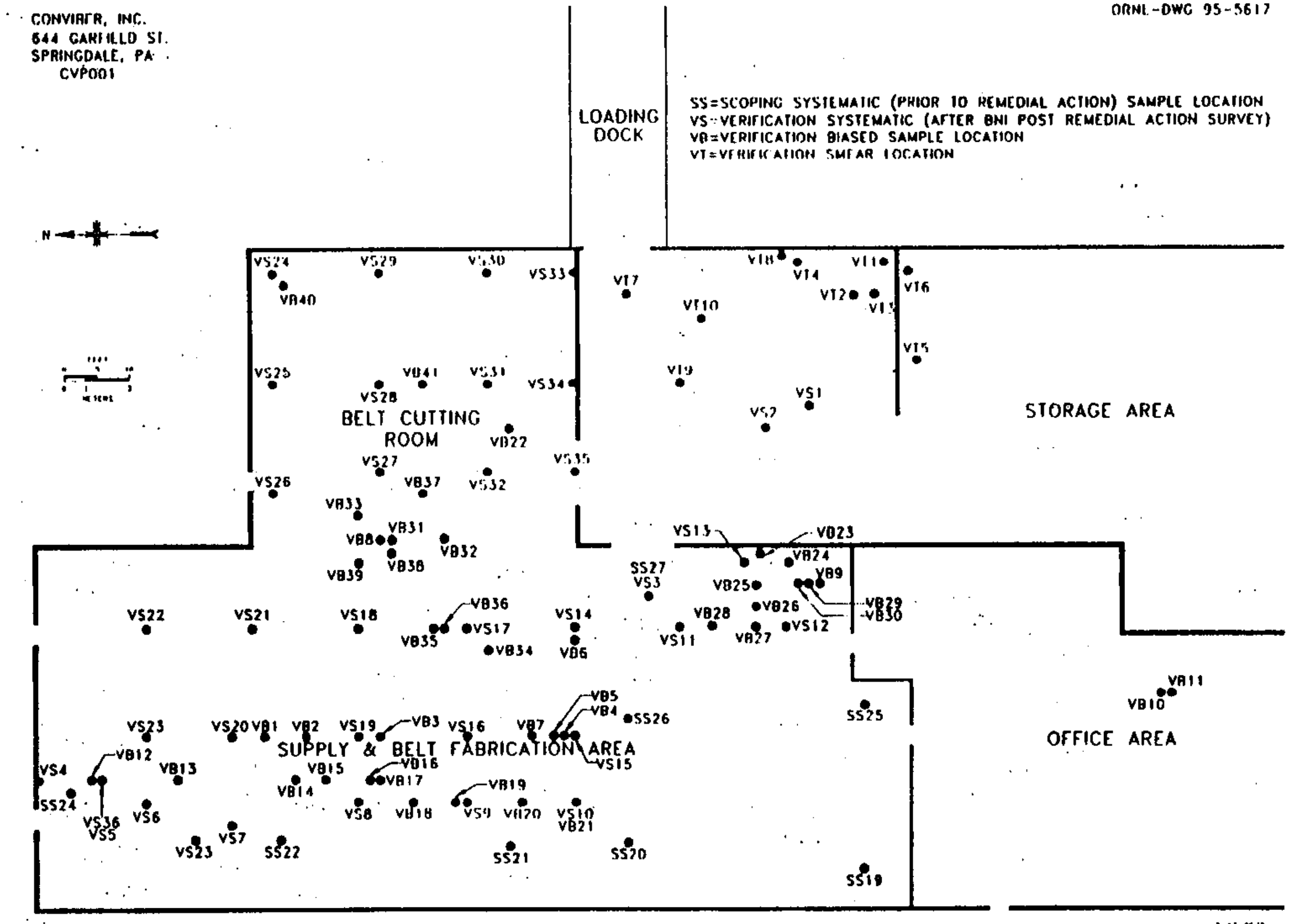

Fig. 2. Locations of smears, systematic scoping samples, and systematic and biased verification samples inside the Conviber Building.

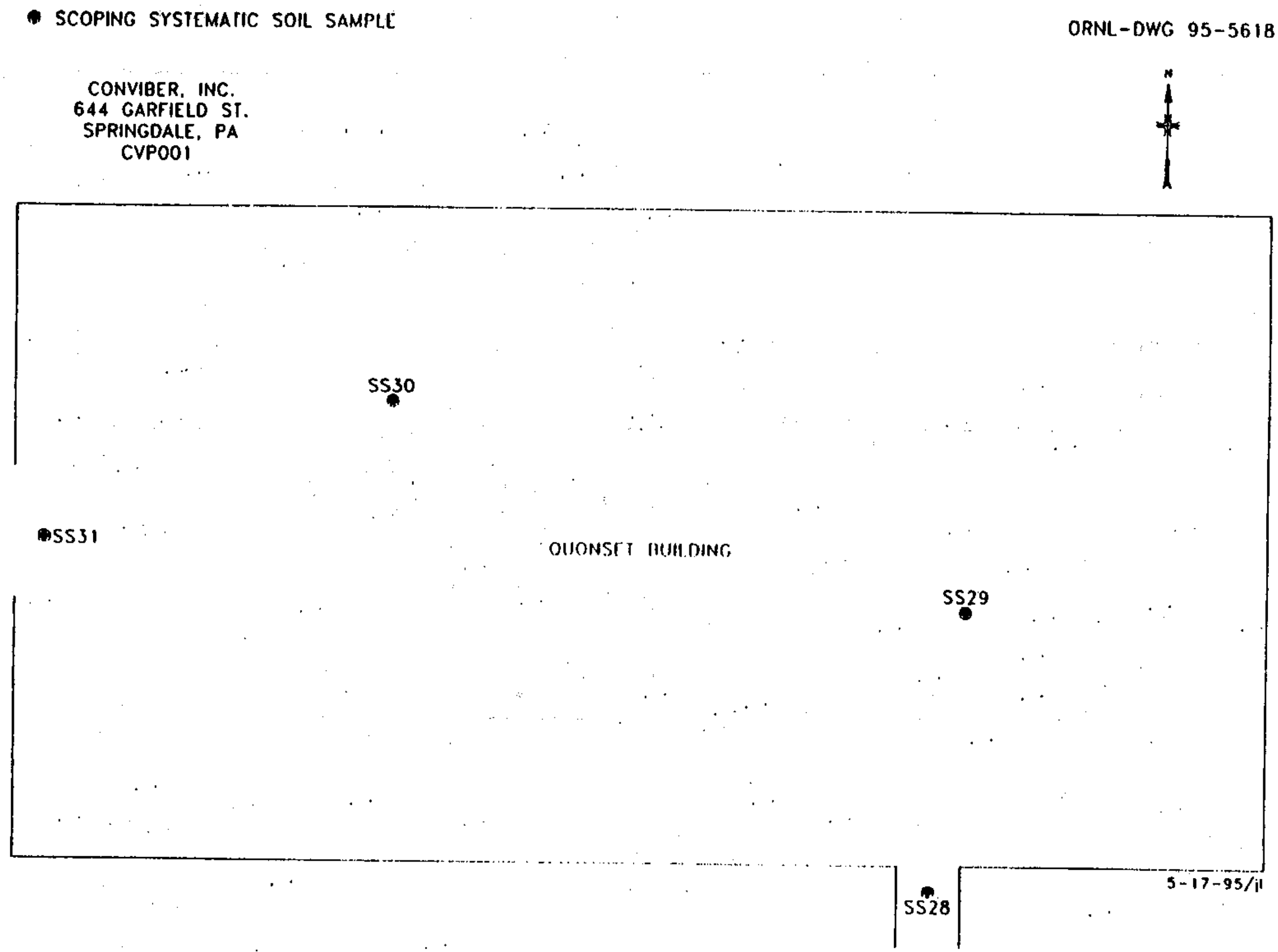

Fig. 3. Locations of systematic scoping samples at the quonset hut adjacent to the Conviber Building.

Table 1. Applicable guidelines for protection against radiation (Limits for uncontrolled areas)

Mode of exposure	Exposure conditions	Guideline value
Total residual surface contamination[a]	^{238}U, ^{235}U, U-natural (alpha emitters)	
	Maximum	15,000 dpm/100 cm^2
	Average	5,000 dpm/100 cm^2
	Removable	1,000 dpm/100 cm^2
Derived concentrations	Total uranium	100 pCi/g[b, c]
Guideline for non-homogeneous contamination (used in addition to the 100-m^2 guideline)[d]	Applicable to locations with an area ≤25 m^2, with significantly elevated concentrations of radionuclides ("hot spots")	$G_A = G_i(100/A)^{1/2}$, where G_A = guideline for "hot spot" of area (A) G_i = guideline averaged over a 100-m^2 area

[a]DOE surface contamination guidelines are consistent with *NRC Guidelines for Decontamination at Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for By-Product, Source, or Special Nuclear Material*, May 1987.

[b]Memo, J. W. Wagoner II, Director, Off-Site/Savannah River Program Division, Office of Eastern Area Programs, Office of Environmental Restoration, U.S. DOE, to L. K. Price, Director, Former Sites Restoration Division, Oak Ridge Field Office, U.S. DOE, August 25, 1994.

[c]The guideline value for ^{238}U was 50 pCi/g.

[d]DOE guidelines specify that every reasonable effort shall be made to identify and to remove any source that has a concentration exceeding 30 times the guideline value, irrespective of area (adapted from *Revised Guidelines for Residual Radioactive Material at FUSRAP and Remote SFMP Sites*, April 1987).

Sources: Adapted from U.S. Department of Energy, DOE Order 5400.5, April 1990, and U.S. Department of Energy, *Guidelines for Residual Radioactive Material at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites*, Rev. 2, March 1987; and U. S. Department of Energy Radiological Control Manual, DOE N 5480.6 (DOE/EH-256T), June 1992.

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

Type of radiation measurement or sample	Radiation level or radionuclide concentration
Average external gamma exposure rate at 1 m above ground surface	6 μR/h[a]
Concentration of radionuclides in surface soil	
^{238}U	1.7 pCi/g[b]

[a]Average of 3 to 4 measurements.

[b]Error in measurement is ±5% (2σ).

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 Natl. Lab., November 1981.

Table 3. Concentrations of ^{238}U in scoping and verification samples at the former C. H. Schnoor and Company Site, Springdale, Pennsylvania

Sample ID[a]	Depth (cm)	Uranium-238 concentration (pCi/g)[b]	
		Gamma-spectroscopy laboratory analysis	Field analysis[c]
		Scoping systematic samples[d]	
SS19B	15-30	1.9 ± 0.5	10
SS19C	30-45	4.0 ± 0.3	17
SS20B	15-30	4.0 ± 1.0	14
SS20C	30-45	4.6 ± 1.0	16
SS21B	15-30	3.8 ± 0.7	11
SS21C	30-45	4.8 ± 1.1	19
SS21D	45-61	4.0 ± 1.0	22
SS22B	15-30	3.0 ± 0.3	13
SS22C	30-45	14 ± 2	24
SS22D	45-61	24 ± 4	28
SS23B	15-30	3.2 ± 0.3	18
SS23C	30-45	14 ± 3	25
SS24B	15-30	8.0 ± 1.5	17
SS24C	30-45	14 ± 2	18
SS24D	45-61	8.5 ± 1.5	17
SS25B	15-30	5.0 ± 1.0	12
SS25C	30-45	9.0 ± 0.9	16
SS25D	45-61	4.7 ± 0.5	15
SS26B	15-30	4.7 ± 0.9	16
SS26C	30-45	12 ± 2	20
SS27B	15-30	17 ± 2	27
SS27C	30-45	60 ± 4	49
SS27D	45-61	70 ± 10	60
SS28B	15-30	3.2 ± 0.3	10
SS29B	15-30	2.3 ± 1.0	10
SS29C	30-45	1.1 ± 0.5	11
SS30B	15-30	2.9 ± 1.0	9
SS30C	30-45	1.3 ± 0.6	14

Table 3 (continued)

Sample ID[a]	Depth (cm)	Uranium-238 concentration (pCi/g)[b]	
		Gamma-spectroscopy laboratory analysis	Field analysis[c]
SS31B	15-30	1.2 ± 0.7	13
SS31C	30-45	2.9 ± 0.5	14
Verification systematic samples[d]			
VS1	20-25	18 ± 1	22
VS2	41-56	1.5 ± 0.3	13
VS3	45-61	190 ± 10	214
VS4	30-45	12 ± 1	22
VS5A	30-45	8.4 ± 0.4	13
VS5B	45-61	15 ± 2	16
VS6A	30-45	12 ± 2	12
VS6B	45-61	14 ± 1	11
VS7A	30-45	54 ± 3	24
VS7B	45-61	29 ± 3	23
VS8A	30-45	17 ± 2	17
VS8B	45-61	41 ± 3	32
VS9A	30-45	10 ± 1	12
VS9B	45-61	14 ± 2	19
VS10A	30-45	5.6 ± 1.1	11
VS10B	45-61	7.3 ± 1.4	11
VS11A	30-45	12 ± 2	13
VS11B	45-61	18 ± 1	16
VS12A	30-45	7.1 ± 1.2	11
VS12B	45-61	18 ± 1	15
VS13	61-76	1.9 ± 0.4	10
VS14	61-76	2.9 ± 0.6	8
VS15	61-76	13 ± 1	13
VS16	61-76	14 ± 1	16
VS17	61-76	4.6 ± 0.5	10

Table 3 (continued)

Sample ID[a]	Depth (cm)	Uranium-238 concentration (pCi/g)[b]	
		Gamma-spectroscopy laboratory analysis	Field analysis[c]
VS18	61-76	4.9 ± 0.7	10
VS19	61-76	8.9 ± 1.3	13
VS20	61-76	1.4 ± 0.5	9
VS21	61-76	1.8 ± 0.5	9
VS22	61-76	2.3 ± 0.5	11
VS23	61-76	17 ± 2	17
VS24	0-15	1.3 ± 0.5	10
VS25	0-15	2.7 ± 0.5	13
VS26	0-15	2.5 ± 0.6	12
VS27	0-15	3.8 ± 0.6	11
VS28	0-15	3.6 ± 0.5	12
VS29	0-15	6.4 ± 1.5	16
VS30	0-15	2.6 ± 0.7	12
VS31	0-15	1.6 ± 0.5	11
VS32	0-15	1.1 ± 0.5	11
VS33	0-15	1.8 ± 0.6	10
VS34	0-15	2.0 ± 0.4	13
VS35	0-15	2.3 ± 0.3	10
VS36	30-46	31 ± 3	24
Verification biased samples[e]			
VB1A	15-30	170 ± 10	126
VB1B	30-45	240 ± 20	185
VB2	45-61	85 ± 10	73
VB3A	30-45	50 ± 5	48
VB3B	45-61	160 ± 30	136

Table 3 (continued)

Sample ID[a]	Depth (cm)	Uranium-238 concentration (pCi/g)[b]	
		Gamma-spectroscopy laboratory analysis	Field analysis[c]
VB4	61-69	2800 ± 400	2436
VB5	35-41	90 ± 5	86
VB6	45-61	110 ± 20	81
VB7	45-61	27 ± 1	39
VB8	30-46	110 ± 10	72
VB9	61-76	100 ± 15	620
VB10A	5-20	1.3 ± 0.4	not analyzed
VB10B	20-25	1.4 ± 0.3	
VB11A	5-20	2.5 ± 0.4	13
VB11B	20-36	1.1 ± 0.5	15
VB11C	36-51	1.8 ± 0.3	14
VB11D	51-66	1.5 ± 0.5	11
VB12	30-46	28 ± 2	28
VB13	45-61	75 ± 7	55
VB14	45-61	75 ± 10	61
VB15	45-61	150 ± 30	122
VB16	45-61	39 ± 3	34
VB17	30-46	30 ± 1	36
VB18	30-46	30 ± 4	25
VB19	30-46	37 ± 3	37
VB20	30-46	24 ± 5	21
VB21	30-46	70 ± 10	55
VB22	30-46	1300 ± 300	843
VB23	15-31	17 ± 2	18
VB24	15-31	31 ± 3	32
VB25	15-31	44 ± 2	37

Table 3 (continued)

Sample ID[a]	Depth (cm)	Uranium-238 concentration (pCi/g)[b]	
		Gamma-spectroscopy laboratory analysis	Field analysis[c]
VB26	15-31	85 ± 10	77
VB27	15-31	5.4 ± 0.5	12
VB28	15-31	6.6 ± 1.2	15
VB29	15-31	32 ± 4	39
VB30	15-31	21 ± 3	31
VB31A	213-229	75 ± 5	96
VB31B	229-244	70 ± 10	91
VB31C	244-259	55 ± 5	67
VB32	concrete chips	54 ± 5	70
VB33A	213-229	27 ± 3	43
VB33B	229-244	15 ± 2	29
VB34A	122-137	0.9 ± 0.5	11
VB34B	137-152	0.8 ± 0.3	11
VB34C	152-168	1.0 ± 0.2	10
VB34D	168-183	1.2 ± 0.3	10
VB34E	183-198	0.7 ± 0.4	10
VB34F	198-213	1.1 ± 0.2	11
VB35	183-198	100 ± 15	107
VB36	183-198	70 ± 10	109
VB37A	137-152	1.1 ± 0.6	10
VB37B	152-168	1.3 ± 0.4	13
VB37C	168-183	1.4 ± 0.5	13
VB37D	183-198	1.3 ± 0.9	10
VB37E	198-213	0.6 ± 0.3	9
VB38	221-236	25 ± 4	43
VB39	213-229	2.1 ± 0.2	13

Table 3 (continued)

Sample ID[a]	Depth (cm)	Uranium-238 concentration (pCi/g)[b]	
		Gamma-spectroscopy laboratory analysis	Field analysis[c]
VB40	0-15	3.4 ± 0.9	10
VB41	0-15	5.0 ± 1.5	13

[a]Sample locations are shown on Figs. 2 and 3.
[b]Indicated counting error is at the 95% confidence level (±2σ). Results for other radionuclides are typical of background concentrations and are not included in the table.
[c]The correlation between field screening and laboratory results is generally acceptable, with some outliers. As set up, field screening results are not reliable below 15 pCi/g of ^{238}U.
[d]Systematic samples are taken at locations irrespective of gamma exposure rates.
[e]Biased samples are taken from areas with elevated gamma exposure rates.

INTERNAL DISTRIBUTION

1. B. A. Berven
2. J. S. Bogard
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24. ORNL Technical Library, Y-12
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26–31. MAD Records Center

EXTERNAL DISTRIBUTION

32. D. G. Adler, Former Sites Restoration Division, Oak Ridge Field Office, U.S. Department of Energy, P. O. Box 2001, Oak Ridge, TN 37831-8723

33. W. L. Beck, ORISE, E/ESD, 1299 Bethel Valley Road, Oak Ridge, TN 37831

34. Jack Russell, Booz-Allen & Hamilton, Inc., 4330 East-West Highway, Bethesda, MD 20814

35. J. J. Fiore, Director, Office of Eastern Area Programs, Office of Environmental Restoration, Cloverleaf Bldg. (EM-24) U. S. Department of Energy, 19901 Germantown Rd., Germantown, MD 20874-1290

36. R. R. Harbert, Bechtel National, Inc., FUSRAP Department, Oak Ridge Corporate Center, 151 Lafayette Drive, P.O. Box 350, Oak Ridge, TN 37831-0350

37. FUSRAP Document Center, Science Applications International Corp., P.O. Box 2501, 301 Laboratory Road, Oak Ridge, TN 37831

38. L. K. Price, Director, Former Sites Restoration Division, Oak Ridge Field Office, U.S. Department of Energy, P.O. Box 2001, Oak Ridge, TN 37831-8723

39. J. W. Wagoner II, Director, Division of Off-Site Programs, Office of Eastern Area Programs, Office of Environmental Restoration, U.S. Department of Energy, Cloverleaf Bldg., 19901 Germantown Road, Germantown, MD 20874-1290

40. W. Alexander Williams, Designation and Certification Manager, Division of Off-Site Programs, Office of Eastern Area Programs, Office of Environmental Restoration, U.S. Department of Energy, Cloverleaf Bldg. (EM-421), 19901 Germantown Road, Germantown, MD 20874-1290

41-43. Office of Assistant Manager, Energy Research and Development, DOE Oak Ridge Operations, P.O. Box 2001, Oak Ridge, TN 37831-8600

44-46. Office of Scientific and Technical Information, U.S. Department of Energy, P.O. Box 62, Oak Ridge, TN 37831

2.8 STATE, COUNTY, AND LOCAL COMMENTS ON REMEDIAL ACTION

This section contains correspondence with the state, county, or local governments.

Department of Energy

Oak Ridge Operations
P.O. Box 2001
Oak Ridge, Tennessee 37831— 8723

CONCURRENCE
RTG SYMBOL EW-93
INITIALS/SIG. Kopotic
DATE 10-4-
RTG SYMBOL EW-93
INITIALS/SIG. Hartman
DATE 10/6/4
RTG SYMBOL
INITIALS/SIG.
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DATE

October 6, 1993

Ms. Susan Zacker
State Historic Preservation Office
Pennsylvania Historical and Museum Commission
P.O. Box 1026
Harrisburg, Pennsylvania 17108

Dear Ms. Zacker:

SPRINGDALE SITE - NATIONAL HISTORIC PRESERVATION ACT (NHPA) (SECTION 106) DETERMINATION

In accordance with Section 106 of the National Historic Preservation Act (NHPA), the Department of Energy (DOE) has determined that the proposed removal of radiological contamination at the Springdale site located at 644 Garfield Street in Springdale, Pennsylvania, will have no effect on properties included, or eligible for inclusion, on the National Register of Historic Places.

A description of proposed site activities is enclosed, along with a site map and photographs. Your concurrence that this undertaking will have no effect on properties included, or eligible for inclusion, on the National Register of Historic Places is requested by October 15, 1993.

If you have any questions or if you need additional information, please call me at (615) 576-0273.

Sincerely,

Gary S. Hartman

Gary S. Hartman, Environmental Scientist
Former Sites Restoration Division

Enclosures

cc w/enclosures:
M. E. Redmon, BNI
R. T. Moore, SE-311, ORO
L. K. Price, EW-93, ORO
W. M. Seay, EW-93, ORO
J. G. Hart, EW-93, ORO
J. D. Kopotic, EW-93, ORO

EW-93:GSHartman:ms:6-0273:10/4/93
N:/GSH/SHPO_PA.002
DOE F 1325.10
(7-79)

OFFICIAL FILE COPY

SPRINGDALE SITE
KEY FACTS

- Site is located at 644 Garfield Street in Springdale, Allegheny County, Pennsylvania (approximately 50 miles north of Pittsburgh off Route 28).

- Site is presently owned by Conviber, Inc., a manufacturer of conveyor belts. Site was owned in the 1940s by C.H. Schnoor & Company. It was sold in 1951 to a manufacturer of toys and coat hangers. In 1967, the site was acquired by the Unity Railway Supply Company, who manufactured journal lubricators for railroad cars. Conviber purchased the site in 1992.

- C.H. Schnoor & Company, former site owner, provided metal fabrication services in support of Manhattan Engineering District (MED) activities.

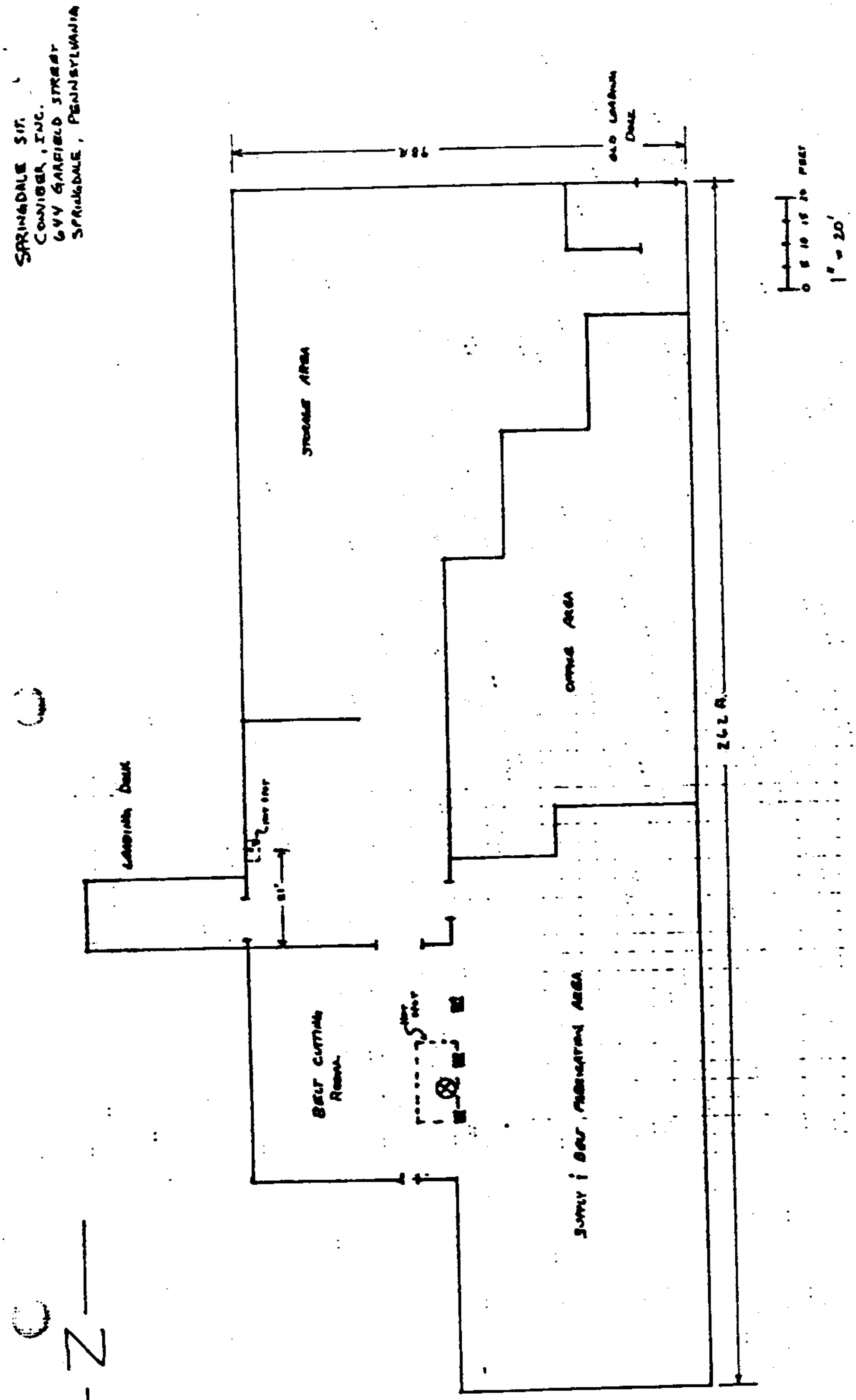
- Schnoor machined unbonded slugs from uranium metal rod from November 1943 to July 1944. The slugs were used as fuel in nuclear reactors.

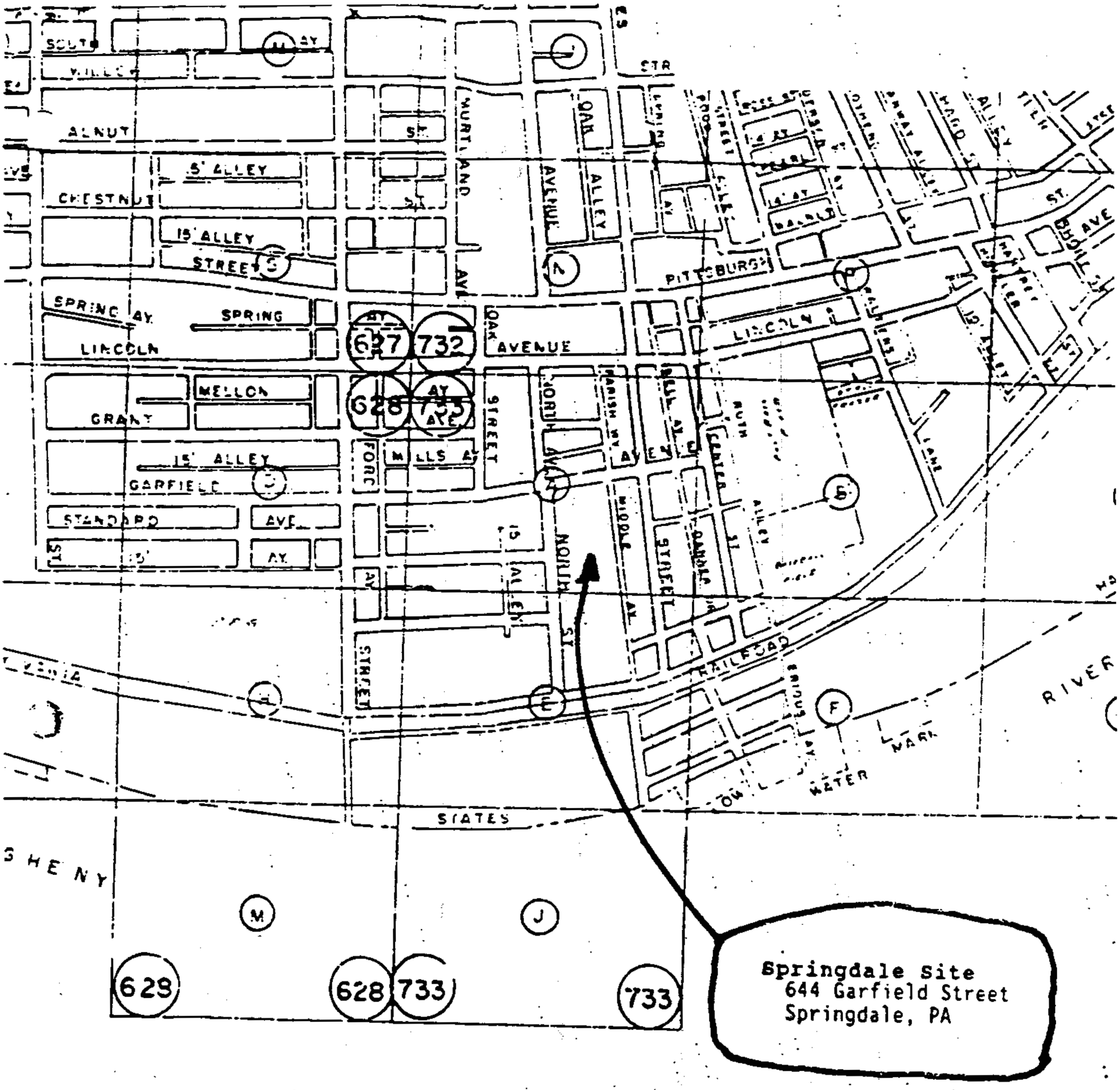
- Schnoor was one of several commercial metal fabrication firms that participated in the MED slug procurement program under purchase orders and subcontracts with the University of Chicago and DuPont, agents for MED.

- At the time metal fabrication work was done for the MED, the site consisted of a concrete block building and a loading dock.

- Over the years, the concrete block building was enlarged and a new loading dock added.

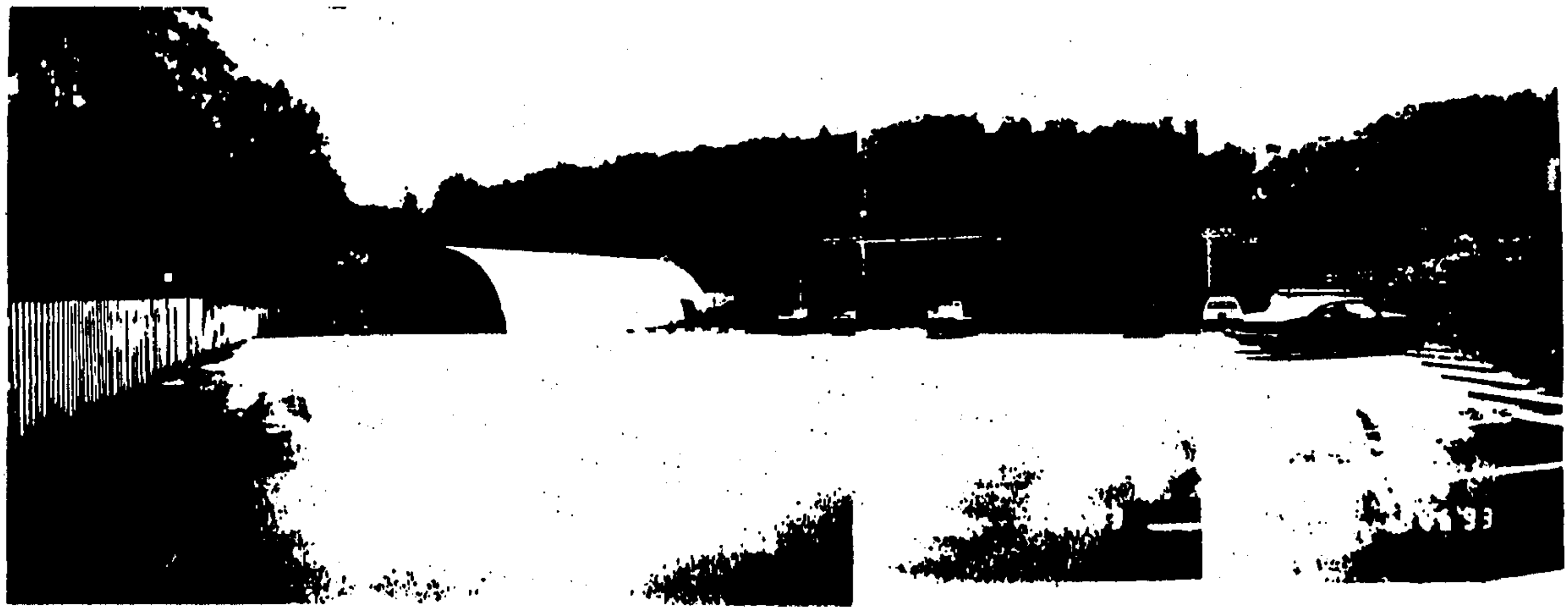
- Soil beneath the concrete floor is contaminated with uranium. The area inside the building to be excavated is approximately 100 square feet. The depth of contamination is approximately 5 ft. Approximately 20 cubic yards of concrete rubble and contaminated soil will be removed.


SPRINGDALE SITE
CONVIBER, INC.
644 GARFIELD STREET
SPRINGDALE, PENNSYLVANIA
78 ft
OLD LOADING DOCK
0 5 10 15 20 FEET
1" = 20'
STORAGE AREA
OFFICE AREA
262 ft
LOADING DOCK
31'
BELT CUTTING ROOM
SUPPLY & BELT FABRICATION AREA



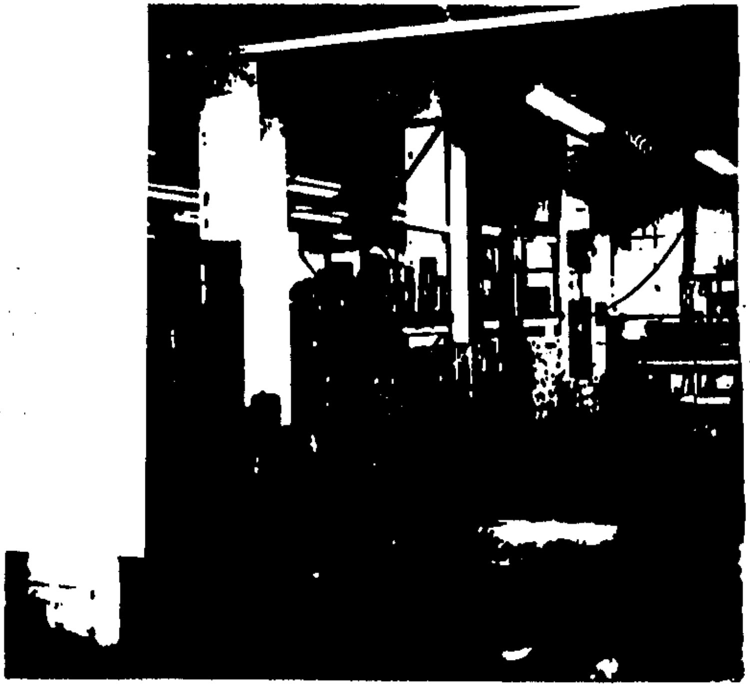
SPRINGDALE BOROUGH

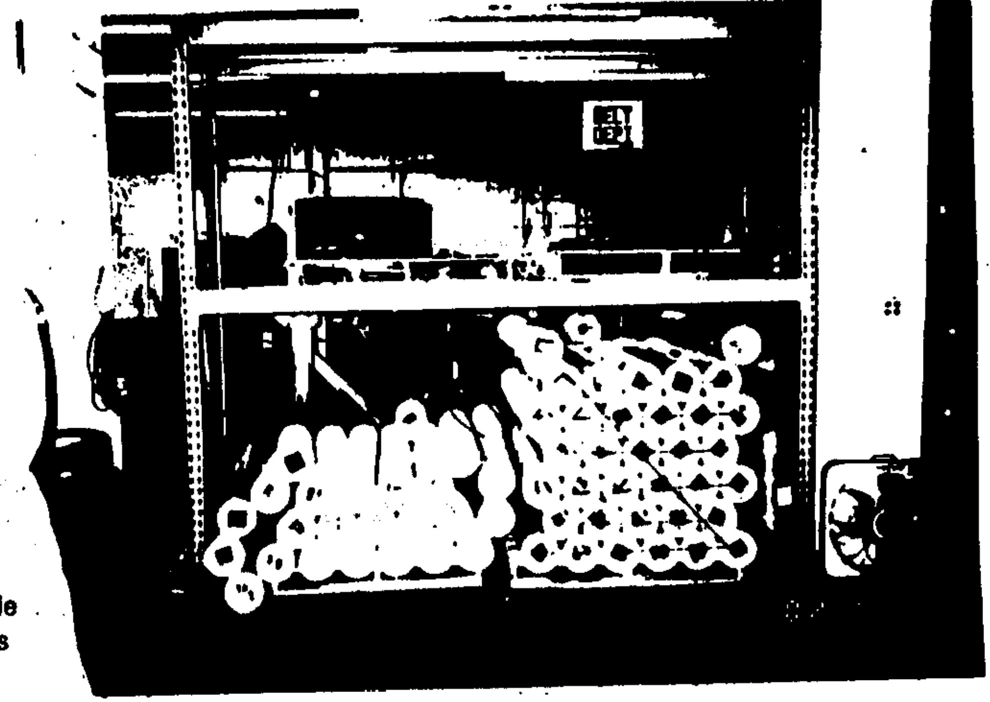
SCALE 1" = 400'



Springdale Site
644 Garfield Street
Springdale, PA

NOTE: Best available photograph





NOTE: Best available photographs

Springdale Site
644 Garfield Street, Springdale, PA

Interior views of building

2.9 RESTRICTIONS

There are no radiologically based restrictions on the future use of the subject property.

94-522

Department of Energy

Oak Ridge Operations
P.O. Box 2001
Oak Ridge, Tennessee 37831—8723

October 21, 1994

Mr. Charles A. Duritsa
Regional Director
Pennsylvania Department of
Environmental Resources
400 Waterfront Drive
Pittsburgh, Pennsylvania 15222-4745

Dear Mr. Duritsa:

FUSRAP PENNSYLVANIA SITES - LETTER OF APPRECIATION

I would like to express my appreciation for the assistance Jim Yusko, Mark Russell, Dennis Angelo, Steve Hepler, and Roy Woods provided to the Department of Energy (DOE) during the successful remediation of the C. H. Schnoor and Aliquippa Forge sites, two of DOE's Formerly Utilized Sites Remedial Action Program (FUSRAP) sites located in the Pittsburgh area. They were a pleasure to work with regarding the state's regulatory requirements and while on site overviewing our cleanup activities. These gentlemen were very responsive to our requests for information and guidance, and would travel to the sites on short notice to assist us with issues that would arise during our remediation efforts. My sincerest thanks to you and your staff for the assistance provided to DOE.

Sincerely,

James D. Kopotic, Site Manager
Former Sites Restoration Division

2.10 FEDERAL REGISTER NOTICE

This section contains a copy of the *Federal Register* notice. It documents the certification that the subject property is in compliance with all applicable decontamination criteria and standards.

ADDRESSES: The meeting will be preceded by visits to DoD overseas schools in Okinawa, Japan, and Korea, October 27–31. The formal meeting will be held November 1–2 at the New Sanno Hotel in Tokyo, Japan.

FOR FURTHER INFORMATION CONTACT: Ms. Marilee Fitzgerald or Ms. Amy Huffman, DoD Education Activity, 4040 N. Fairfax Drive, Arlington, Virginia 22203–1635; Telephone number: 703–696–4235, extension 101/extension 100.

SUPPLEMENTARY INFORMATION: The Advisory Council on Dependents' Education is established under title XIV, section 1411, of Public Law 95–561, Defense Dependents' Education Act of 1978, as amended by title XII, section 1204(b)(3)–(5), of Public Law 99–145, Department of Defense Authorization Act of 1986 (20 U.S.C., chapter 25A, section 929, Advisory Council on Dependents' Education). The Council is cochaired by designees of the Secretary of Defense and the Secretary of Education. In addition to a representative of each of the Departments, 12 members are appointed jointly by the Secretaries of Defense and Education. Members include representatives of educational institutions and agencies, professional employee organizations and unions, unified military commands, school administrators, parents of DoDDS students, and one DoDDS student. The Director, DoDEA, serves as the Executive Secretary of the Council. The purpose of the Council is to advise the Secretary of Defense and the DoDDS Director about effective educational programs and practices that should be considered by DoDDS and to perform other tasks as may be required by the Secretary of Defense. The agenda includes update on DoDEA math curriculum, minority recruitment, student achievement, and implementation of national standards.

Dated: September 6, 1996.

L.M. Bynum,

Alternate OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. 96–23270 Filed 9–10–96; 8:45 am]

BILLING CODE 5000–04–M

Office of the Secretary

Meeting of the Military Health Care Advisory Committee

AGENCY: Department of Defense, Military Health Care Advisory Committee.

ACTION: Notice.

SUMMARY: Notice is hereby given of the forthcoming meeting of the Military Health Care Advisory Committee. This is the fifth meeting of the Committee. The purpose of the meeting is to advise the Assistant Secretary of Defense (Health Affairs) and the Military Services on opportunities as well as potential solutions and strategies for the challenges facing the Military Health Services System.

A meeting session will be held and will be open to the public.

DATES: October 7, 1996.

ADDRESSES: Andrews Air Force Base, Garden Room in the Andrews Officers' Club, Bldg. 1352, Andrews Air Force Base, (Allentown Road), Washington, DC, unless otherwise published.

FOR FURTHER INFORMATION CONTACT: Mr. Gary A. Christopherson, Senior Advisor, or Commander Sidney Rodgers, MSC, USN, Special Assistant to PDASD (HA), Office of the Assistant Secretary of Defense (Health Affairs), 1200 Defense Pentagon, Room 3E346, Washington, DC 20301–1200; telephone (703) 697–2111.

SUPPLEMENTARY INFORMATION: Business sessions are scheduled between 8:00 am and 5:00 pm, on Monday, October 7, 1996. Contact Elaine L. Powell, CMP in the MHCAC Conference Support Office at (703) 575–5024, at least 24 hours prior to the meeting to gain access to the base.

Dated: September 5, 1996.

L.M. Bynum,

Alternate OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. 96–23269 Filed 9–10–96; 8:45 am]

BILLING CODE 5000–04–M

DEPARTMENT OF EDUCATION

President's Advisory Commission on Educational Excellence for Hispanic Americans; Amendment to Notice of Meeting

AGENCY: President's Advisory Commission on Educational Excellence for Hispanic Americans, Education.

ACTION: Amendment to notice of meeting.

SUMMARY: This amends the notice of an open meeting of the President's Advisory Commission on Educational Excellence for Hispanic Americans published on August 14, 1996, in Vol. 61, No. 158, page 42235. The meeting scheduled for September 4 and 5, 1996, has been postponed. The new meeting dates and times are September 26, 1996, form 9 a.m. (EDT) until 5 p.m. (EDT), and September 27, 1996, from 9 a.m. (EDT) until 5 p.m. (EDT). The new location is not yet available, but you may call Alfred Ramirez on (202) 401–1411 closer to the date of the meeting for that information.

Dated: September 9, 1996.

Edward M. Augustus, Jr.,

Acting Assistant Secretary.

[FR Doc. 96–23484 Filed 9–11–96; 8:45 am]

BILLING CODE 4000–01–M

DEPARTMENT OF ENERGY

Certification of the Radiological Condition of the C.H. Schnoor Site, Springdale, Pennsylvania

AGENCY: Office of Environmental Management, Department of Energy.

ACTION: Notice of certification.

SUMMARY: The Department of Energy (DOE) has completed remedial action to decontaminate the C.H. Schnoor site in Springdale, Pennsylvania. Formerly, the property was found to contain quantities of residual radioactive material resulting from activities conducted at the site by the owner under contract to DOE's predecessors. Radiological surveys show that the property now meets applicable requirements for use without radiological restrictions.

ADDRESSES: The certification docket is available at the following locations:

Public Reading Room, Room 1E–190, Forrestal Building, U.S. Department of Energy, 1000 Independence Avenue, S.W., Washington, D.C. 20585

Public Document Room, Oak Ridge Operations Office, U.S. Department of Energy, 200 Administration Road, Oak Ridge, Tennessee 37831, Springdale Free Public Library, 331 School Street, Springdale, Pennsylvania 15144.

FOR FURTHER INFORMATION CONTACT: John C. Lehr, Acting Director, Office of Eastern Area Programs, Office of Environmental Management, U.S. Department of Energy, Washington, D.C. 20585, (301) 903–2328 Fax: (301) 903–2385.

SUPPLEMENTARY INFORMATION: The U.S. Department of Energy (DOE), Office of Environmental Management, has conducted remedial action at the C.H. Schnoor site in Springdale, Pennsylvania, as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). The objective of the program is to identify and clean up or otherwise control sites where residual radioactive contamination remains from activities carried out under contract to the Manhattan Engineer District/Atomic Energy Commission, during the early years of the nation's atomic energy program. In 1992, the C.H. Schnoor site was designated for remediation as part of FUSRAP.

During the 1940s, the property was owned by C.H. Schnoor and Company and was used to machine extruded uranium for the Hanford Pile Project, a project with the objective of producing an alternate charge for the Hanford Reactor in the State of Washington. 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, which founded the Premier Manufacturing Company and used the site to manufacture journal lubricators for railroad cars. The current occupant, Conviber, Inc., uses the site for the fabrication of industrial drive and conveyor belts. In October 1980, a radiological scanning survey was conducted by DOE and Argonne National Laboratory. Because much of the floor was inaccessible for surveying and because of the lack of definitive records documenting the use of the site, DOE directed that an additional more comprehensive survey be performed. This survey was conducted by Oak Ridge National Laboratory in 1989 and 1990. From October through December 1993, Oak Ridge National Laboratory and Bechtel National Inc. performed additional radiological surveys of the interior of the concrete building to thoroughly characterize the building before remediation efforts began. Most of the contamination was in the soil beneath the concrete slab, and isolated areas of surface contamination were detected on a portion of the concrete floors. Based on these characterization data, DOE conducted remedial action at the C.H. Schnoor site from August to October 1994.

Post-remedial action surveys have demonstrated and DOE has certified that radiological conditions at the subject property comply with DOE radiological decontamination criteria and standards. The standards are established to protect members of the public and occupants of the property and to ensure that future use of the property will result in no radiological exposure above applicable guidelines. Accordingly, this property is released from FUSRAP.

The certification docket will be available for review between 9:00 a.m. and 4:00 p.m., Monday through Friday (except Federal holidays) in the DOE Public Reading Room, located in Room 1E-190 of the Forrestal Building, 1000 Independence Avenue, S.W., Washington, D.C. 20585. Copies of the certification docket will also be available in the DOE Public Document Room, U.S. Department of Energy, Oak Ridge Operations Office, Oak Ridge, Tennessee 37831 and at the Springdale Free Public Library, 331 School Street, Springdale, Pennsylvania 15144.

The Department, through the Oak Ridge Operations Office, Former Sites Restoration Division, has issued the following statement:

Statement of Certification: C.H. Schnoor Site in Springdale, Pennsylvania

DOE, Oak Ridge Operations Office, Former Sites Restoration Division, has reviewed and analyzed the radiological data obtained following remedial action at the C.H. Schnoor Site, 644 Garfield Street [Parcel 733-A-182, filed in Deed/Plat Book (Colfax Plan 117), Page 281 in the records of Allegheny County, Pennsylvania]. Based on analysis of all data collected, including post-remedial action surveys, DOE certifies that any residual contamination which remains onsite falls within current guidelines for use without radiological restrictions. This certification of compliance provides assurance that reasonably foreseeable future use of the property will result in no radiological exposure above current radiological guidelines established to protect members of the general public as well as occupants of the site.

Property owned by Mr. and Mrs. Frank Pucciarelli, 644 Garfield Street, Springdale, Pennsylvania 15144.

Issued in Washington, D.C., on September 4, 1996.

James M. Owendoff,

Deputy Assistant Secretary for Environmental Restoration.

[FR Doc. 96-23353 Filed 9-11-96; 8:45 am]

BILLING CODE 6450-01-P

Federal Energy Regulatory Commission

[Docket No. TM97-1-48-000]

ANR Pipeline Company; Notice of Proposed Changes in FERC Gas Tariff

September 6, 1996.

Take notice that on August 30, 1996, ANR Pipeline Company (ANR) tendered for filing as part of its FERC Gas Tariff, Second Revised Volume No. 1 and Original Volume No. 2, the following tariff sheets to become effective October 1, 1996:

Second Revised Volume No. 1

Fifteenth Revised Sheet No. 17
First Revised Sheet NO. 162C

Original Volume No. 2

Eighth Revised Sheet No. 14

ANR states that the above-referenced tariff sheets are being filed to reflect a decrease in the Annual Charge Adjustment (ACA) rate as permitted by Section 24 of its Second Revised Volume No. 1 FERC Gas Tariff. Pursuant to Order No. 472, the Commission has assessed ANR its ACA unit rate of $0.0020 per Dth. The new ACA rate to be charged by ANR will be effective October 1, 1996.

In addition, ANR submits in this filing First Revised Sheet No. 162C, which contains two appropriate ACA-related tariff changes to GT&C Section 24. ANR has updated its tariff to reference the new section number of the Commission's Rules and Regulations related to ACA expenditures. Also, due to the termination of several X-Rate schedules, ANR has updated the ACA reference to applicable Original Volume No. 2 sheets.

Any person desiring to be heard or to protest this filing should file a motion to intervene or protest with the Federal Energy Regulatory Commission, 888 First Street, N.E., Washington, D.C. 20426, in accordance with 18 CFR 385.214 and 385.211 of the Commission's Rules and Regulations. All such motions or protests must be filed as provided in Section 154.210 of the Commission's regulations. Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a motion to intervene. Copies of this filing are on file with the Commission and are available for public inspection in the Public Inspection Room.

Lois D. Cashell,

Secretary.

[FR Doc. 96-23288 Filed 9-11-96; 8:45 am]

BILLING CODE 6717-01-M

[Docket No. MT96-29-000]

ANR Pipeline Company; Notice of Proposed Changes in FERC Gas Tariff

September 6, 1996.

Take notice that on September 3, 1996, ANR Pipeline Company (ANR) tendered for filing as part of its FERC Gas Tariff, Second Revised Volume No. 1, the following tariff sheets, to become effective October 1, 1996:

First Revised Sheet No. 68C
Original Sheet No. 68C.1

ANR states that the above-referenced tariff sheets are being filed pursuant to the Commission's August 2, 1996 Order Authorizing Abandonment and Determining Jurisdictional Status of

2.11 APPROVED CERTIFICATION STATEMENT

The following statement documents the certification of the subject property for future use.

DOE F 1325.8
(08-93)

United States Government **Department of Energ**

memorandum

DATE: September 6, 1996

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

SUBJECT: Federal Register Notices for Certification of the Radiological Condition of the C. H. Schnoor Site

TO: R. Rosen, HR-622

Attached are the original (and three copies) and a disk of two signed Federal Register Notices certifying the completion of remedial action at the C. H. Schnoor Site in Springdale, Pennsylvania. This site was cleaned up by the Department of Energy Formerly Utilized Sites Remedial Action Program. The attached notice has been reviewed by and concurred in by the Office of General Counsel (GC-51 and GC-72), and a copy of that concurrence is also attached for your information and use.

We have also attached a letter for your signature to transmit the Federal Register Notice and disk to Ms. Martha Girard, Office of the Federal Register.

I am requesting that the notice be published in the Federal Register as soon as possible.

James M. Owendoff

James M. Owendoff
Deputy Assistant Secretary
for Environmental Restoration

4 Attachments

[6450-01-P]

DEPARTMENT OF ENERGY

Certification of the Radiological Condition of the C. H. Schnoor Site, Springdale, Pennsylvania

AGENCY: Office of Environmental Management, Department of Energy

ACTION: Notice of Certification

SUMMARY: The Department of Energy (DOE) has completed remedial action to decontaminate the C. H. Schnoor site in Springdale, Pennsylvania. Formerly, the property was found to contain quantities of residual radioactive material resulting from activities conducted at the site by the owner under contract to DOE's predecessors. Radiological surveys show that the property now meets applicable requirements for use without radiological restrictions.

ADDRESSES: The certification docket is available at the following locations:

Public Reading Room
Room 1E-190
Forrestal Building
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Public Document Room
Oak Ridge Operations Office
U.S. Department of Energy
200 Administration Road
Oak Ridge, Tennessee 37831

Springdale Free Public Library
331 School Street
Springdale, Pennsylvania 15144

FOR FURTHER INFORMATION CONTACT:

John C. Lehr, Acting Director
Office of Eastern Area Programs
Office of Environmental Management
U.S. Department of Energy
Washington, D.C. 20585
(301) 903-2328 Fax: (301) 903-2385

SUPPLEMENTARY INFORMATION:

The U.S. Department of Energy (DOE), Office of Environmental Management, has conducted remedial action at the C. H. Schnoor site in Springdale, Pennsylvania, as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). The objective of the program is to identify and clean up or otherwise control sites where residual radioactive contamination remains from activities carried out under contract to the Manhattan Engineer District/Atomic Energy Commission, during the early years of the nation's atomic energy program. In 1992, the C. H. Schnoor site was designated for remediation as part of FUSRAP.

During the 1940s, the property was owned by C. H. Schnoor and Company and was used to machine extruded uranium for the Hanford Pile Project, a project with the objective of producing an alternate charge for the Hanford Reactor in the

State of Washington. 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, which founded the Premier Manufacturing Company and used the site to manufacture journal lubricators for railroad cars. The current occupant, Conviber, Inc., uses the site for the fabrication of industrial drive and conveyor belts. In October 1980, a radiological scanning survey was conducted by DOE and Argonne National Laboratory. Because much of the floor was inaccessible for surveying and because of the lack of definitive records documenting the use of the site, DOE directed that an additional more comprehensive survey be performed. This survey was conducted by Oak Ridge National Laboratory in 1989 and 1990. From October through December 1993, Oak Ridge National Laboratory and Bechtel National Inc. performed additional radiological surveys of the interior of the concrete building to thoroughly characterize the building before remediation efforts began. Most of the contamination was in the soil beneath the concrete slab, and isolated areas of surface contamination were detected on a portion of the concrete floors. Based on these characterization data, DOE conducted remedial action at the C. H. Schnoor site from August to October 1994..

Post-remedial action surveys have demonstrated and DOE has certified that radiological conditions at the subject property comply with DOE radiological decontamination criteria and standards. The standards are established to protect members of the public and occupants of the property and to ensure that future use of the property will result in no radiological exposure above applicable guidelines. Accordingly, this property is released from FUSRAP.

The certification docket will be available for review between 9:00 a.m. and 4:00 p.m., Monday through Friday (except Federal holidays) in the DOE Public Reading Room, located in Room 1E-190 of the Forrestal Building, 1000 Independence Avenue, S.W., Washington, D.C. 20585. Copies of the certification docket will also be available in the DOE Public Document Room, U.S. Department of Energy, Oak Ridge Operations Office, Oak Ridge, Tennessee 37831 and at the Springdale Free Public Library, 331 School Street, Springdale, Pennsylvania 15144.

The Department, through the Oak Ridge Operations Office, Former Sites Restoration Division, has issued the following statement:

STATEMENT OF CERTIFICATION: C. H. SCHNOOR SITE
IN SPRINGDALE, PENNSYLVANIA

DOE, Oak Ridge Operations Office, Former Sites Restoration Division, has reviewed and analyzed the radiological data obtained following remedial action at the C. H. Schnoor Site, 644 Garfield Street [Parcel 733-A-182, filed in Deed/Plat Book (Colfax Plan 117), Page 281 in the records of Allegheny County, Pennsylvania]. Based on analysis of all data collected, including post-remedial action surveys, DOE certifies that any residual contamination which remains onsite falls within current guidelines for use without radiological restrictions. This certification of compliance provides assurance that reasonably foreseeable future use of the property will result in no radiological exposure above current radiological guidelines established to protect members of the general public as well as occupants of the site.

Property owned by Mr. and Mrs. Frank Pucciarelli

644 Garfield Street

Springdale, Pennsylvania 15144

Issued in Washington, D.C., on 4 September, 1996.

James M. Owendoff
Deputy Assistant Secretary
for Environmental Restoration

Distribution:
S. Oldham, DOE/OR
Booz, Allen and Hamilton, Inc.
B. Levitan, EM-20
EM-40 (2)
EM-42 (3)
EM-FOR
EM-GTN
Pat Suspense
Williams Reader

EM-42:Williams:djn:903-2531:8/13/96:frletter.waw
schnoor.waw
fedreg.waw

P. Hevner Review: pl 8/26
M. White Review: MLW 8/29

EM-42
Johnson
8/20/96

EM-42
Nace
8/ /96

EM-42
Lehr
8/26/96

EM-40
Owendoff
8/ /96

STATEMENT OF CERTIFICATION: C. H. SCHNOOR SITE IN SPRINGDALE, PENNSYLVANIA

DOE, Oak Ridge Operations Office, Former Sites Restoration Division, has reviewed and analyzed the radiological data obtained following remedial action at the C. H. Schnoor Site, 644 Garfield Street [parcel 733-A-182, filed in Deed/Plat Book (Colfax Plan 117), Page 281 in the records of Allegheny County, Pennsylvania]. Based on analysis of all data collected, including post-remedial action surveys, DOE certifies that any residual contamination which remains on site falls within current guidelines for use without radiological restrictions. This certification of compliance provides assurance that reasonably foreseeable future use of the property will result in no radiological exposure above current radiological guidelines established to protect members of the general public as well as occupants of the site.

Property owned by:

Mr. and Mrs. Frank Pucciarelli
644 Garfield Street
Springdale, Pennsylvania 15144

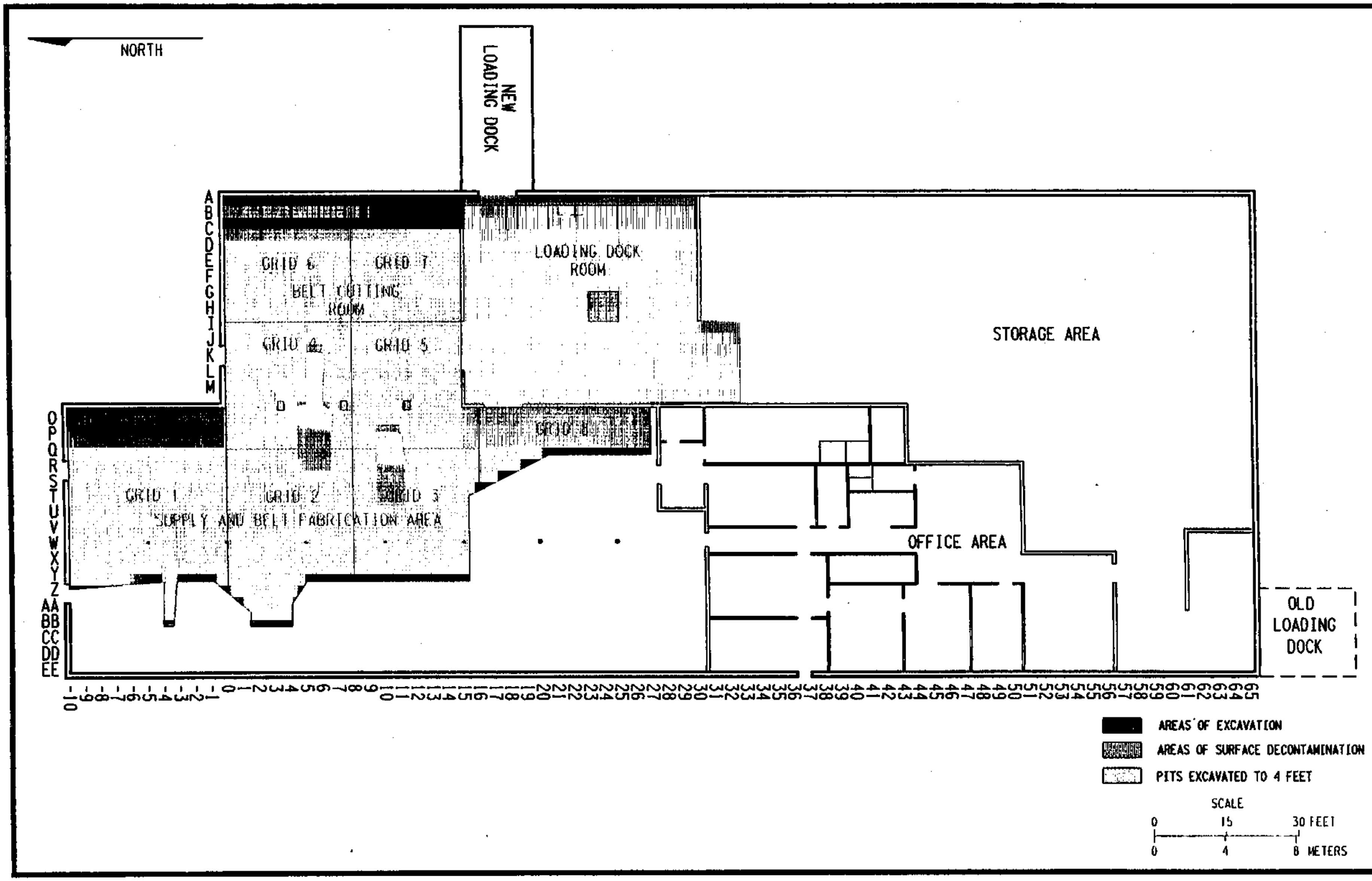
Lester K. Price, Director
Former Sites Restoration Division
Oak Ridge Operations Office
U.S. Department of Energy

8/15/96
Date

EXHIBIT III

DIAGRAM OF THE REMEDIAL ACTION PERFORMED AT THE C. H. SCHNOOR IN SPRINGDALE, PENNSYLVANIA, 1994

The figure on the following page is from the post-remedial action report; it illustrates the extent of remedial action performed at the subject property.



R61F005.DGN

Figure III-1
Excavation and Surface Decontamination Areas