



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII

999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2466



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ADMINISTRATIVE
RECORD

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402862

Ref: 8HWM-SR

MEMORANDUM

TO: Jack W. McGraw
Acting Regional Administrator

FROM: Robert L. Duprey, Director
Hazardous Waste Management Division *R. Duprey*

SUBJECT: Explanation of Significant Differences to the ROD for
Denver Radium Superfund Site, Operable Unit VII -
Streets

Attached is the final Explanation of Significant Differences (ESD) to the 1986 Record of Decision (ROD) and the remedy which will be implemented at Operable Unit VII of the Denver Radium Superfund Site.

The ROD signed in March 1986, called for radium-contaminated asphalt in the streets to be left in place with the exception of material excavated during routine maintenance, repair or other construction activities. Such material was to be removed to an off-site repository approved for storage or disposal of radium-contaminated material.

The change to the original remedy will allow for on-site retention and reburial of radium-contaminated material excavated during all maintenance, repair or other construction activities. The excavated material will simply be placed back in the street and covered with new asphalt.

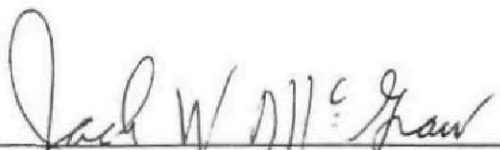
The State of Colorado supports implementation of the remedy as proposed in this ESD. In addition, EPA Headquarters has reviewed this ESD and has provided written concurrence to the Region (attached). I recommend approval of the changes to the remedy as proposed in this ESD.

Attachment

EXPLANATION OF SIGNIFICANT DIFFERENCES
RECORD OF DECISION (ROD) - OPERABLE UNIT VII
DENVER RADIUM SUPERFUND SITE

DECLARATION

Considering the new information that has been developed and the changes that have been made to the selected remedy chosen in the March 24, 1986 ROD, EPA has determined that the remedy remains protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to this remedial action, except those for which a waiver is invoked, and is cost-effective. In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site.



Jack W. McGraw
Acting Regional Administrator

Date 10/9/92

EXPLANATION OF SIGNIFICANT DIFFERENCES

DENVER RADIUM SUPERFUND SITE OPERABLE UNIT VII - STREETS

September 15, 1992

OVERVIEW

The purpose of this document is to explain the significant differences between the remedy selected in the Record of Decision (ROD), signed by the U.S. Environmental Protection Agency (EPA) on March 24, 1986, and the remedy which will be implemented at Operable Unit VII of the Denver Radium Superfund Site. Operable Unit VII - Streets, is located in Denver, Colorado and consists of eight street segments and certain intersections in the Cheesman Park area and one segment in the upper downtown area (see Figure 1). The exact location of these street segments are as follows:

- 9th Avenue from Ogden Street to Cheesman Park;
- 11th Avenue from Josephine Street to Cheesman Park;
- 23rd Street from California Street to Lawrence Street;
- Corona Street from 7th Avenue to 10th Avenue;
- Downing Street from 7th Avenue to 10th Avenue;
- Humboldt Street from 7th Avenue to 9th Avenue;
- Lafayette Street from 1st Avenue to 10th Avenue;
- Marion Street from 6th Avenue to 10th Avenue; and
- York Street from 6th Avenue to 13th Avenue.

These nine contaminated street segments extend approximately 4.5 miles through largely residential areas and are owned by the City and County of Denver. Approximately 800 households are situated adjacent to these contaminated streets. Other than minimal excavation controls imposed by Denver Public Health Engineering and Denver Public Works Departments, use of these streets has not been restricted.

EXPLANATION OF SIGNIFICANT
DIFFERENCES (ESD)

This ESD describes a significant change to the remedy that will be implemented at Operable Unit VII of the Denver Radium Site.

- The ROD signed in March 1986, called for radium-contaminated material in the streets to be left in place with the exception of material excavated during routine maintenance, repair or other construction activities. Such material was to be removed to an off-site repository approved for storage or disposal of radium-contaminated material.

- The significant difference and change to the original remedy relates to on-site retention and reburial of radium-contaminated material excavated during all maintenance, repair or other construction activities.

Due to the low levels of radioactive contamination at Operable Unit VII, no remedial activities are planned for this specific operable unit. Should maintenance, repair or other construction activities be required, excavated radium-contaminated materials will be retained and reburied on-site, if feasible, provided that the area to be excavated is not greater than 20% of the total area of the roadway in one city block. The 20% figure is based on the assumption that all maintenance, repair or other construction activities can be successfully performed without excavation of more than 20% of the total area of the street. Special variance to the 20% limit may be granted by the Colorado Department of Health should an unusual circumstance require such a variance. The location of radium-contaminated asphalt reburied on-site will be permanently documented by the implementing agency. Reburied materials will be covered with a new, hard surface, such as asphalt or concrete, having a minimum depth of 6 inches to insure no direct exposure. If retention and reburial are not feasible, the materials will be disposed of at a licensed, off-site disposal facility, consistent with the ROD.

This ESD provides a brief background on the Site, describes the original remedy selected in the ROD, and explains the ways in which the modified remedy differs from the original remedy. It also discusses the modified remedy's compliance with all legal requirements, and provides instructions on how to obtain more information on this Site.

The Administrative Record which contains this ESD, as well as complete documentation relating to the remediation of the Site, is available for public review at the location indicated below.

ADMINISTRATIVE RECORD LOCATION

EPA Superfund Record Center
999 18th Street, Suite 500
Denver, Colorado 80202
Hours: M-F 8:00 AM - 4:30 PM
Phone (303) 293-1807
Toll-free Number 1-800-759-4372, ext 1807.

This ESD is prepared in fulfillment of EPA's public participation responsibilities under Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. Section 9601, et seq. (CERCLA) (more commonly referred to as Superfund), as amended by the Superfund Amendments and Reauthorization Act of 1986, and Section 300.435(c)(2)(1) of the National Contingency Plan, 40 C.F.R. Part 300 (NCP).

SITE HISTORY AND BACKGROUND

In 1979, EPA discovered the presence of several long-forgotten radium processing locations which were active in Denver from 1914 through 1925. Historically, production of refined radium produced large quantities of radioactive waste materials. These waste materials were discarded or left on-site when the processing facilities were closed. Subsequently, much of this waste material was used as fill, cover and foundation material and sometimes as an aggregate in cement and asphalt mixtures. As a result, contaminated asphalt pavement was placed in certain city streets in Denver.

The Denver Radium Site was placed on the Interim Priorities List in October 1981 and on the National Priorities List (NPL) in September 1983. The Colorado Department of Health began engineering assessment studies and a total of nine contaminated street segments were identified. The Denver Public Health Engineering Department began monitoring gamma radiation levels during any excavation carried out in these streets. State studies were discontinued when RCRA grant funds ran out. EPA resumed RI/FS activities in 1983. In July 1985, EPA completed a study further defining contamination in City streets. A Draft Feasibility Study was released on July 26, 1985. No Final Feasibility Study was issued. A Record of Decision was issued by EPA on March 24, 1986.

SITE DESCRIPTION

Street segments in Operable Unit VII contain a 4 to 6 inch layer of radium-contaminated asphalt. This contaminated layer is underlain by compacted gravel road base material and is usually overlain by 4 to 12 inches of uncontaminated asphalt pavement. Estimates indicate that Operable Unit VII - Streets contain approximately 38,500 cu/yds of radium-contaminated material covering some 832,000 square feet. Radium contamination does not extend beyond the paved right-of-way of the streets and does not appear to have migrated into the soils below the contaminated asphalt.

CURRENT SITE STATUS

The risk assessment for OU VII, found in the July 26, 1985, Feasibility Study, stated that contamination in Operable Unit VII - Streets poses a minimal threat to public health. This is due to the fact that the radioactive material is bound in the asphalt and is not free to move in any direction. As long as the contaminated material remains in its present location, the potential routes of human exposure to the radioactivity are limited because the contaminated material is well-contained. None of the contaminated streets are near surface or ground water resources and there is little potential for erosion or leaching of the contaminated material due to the pavement cap.

In general, the most significant routes of exposure to radiation from radium contamination at the Denver Radium Site are, in descending order of importance: (1) inhalation of radon gas and its decay products; (2) direct gamma radiation exposure from the decay of radium and its progeny; and (3) ingestion or inhalation of radium-contaminated material. In general, the greater the exposure rate and the longer the exposure to radiation, the greater the associated health risks.

The risk assessment for OU VII determined that the most significant risk to public health associated with the contaminated asphalt was that posed by gamma radiation emanating from the streets. However, the risk assessment concluded that this represented a negligible health threat since an individual would have to stand at the location of the highest gamma radiation (in the middle of York Street) for five hours a day every day of the year in order to exceed the recommended exposure guideline of 100 milirems per year above background set by the International Council on Radiologic Protection.

In addition, the risk assessment stated that the other routes of exposure were insignificant for the following reasons: (1) all radon gas generated by the decay of radium will immediately be diluted by atmospheric air to the degree that it will pose no health hazard; and (2) the radium is encased in asphalt, so it is

not in a form that easily lends itself to ingestion or inhalation.

Radium-contaminated material in the streets presents only a minimal hazard in its present state. However, uncontrolled excavation in the streets would present the possibility of release of radon or radioactive materials potentially increasing the risks from all three exposure pathways. Both the original remedy described in the ROD and the modified remedy described in this ESD provide measures to ensure that maintenance, repair or other construction activities within OU VII will not result in the uncontrolled release of radon or radioactive materials.

SUMMARY OF THE MARCH 24, 1986, RECORD OF DECISION

The objective of the remedy selected in the ROD is to reduce human exposure to radium contamination bound in the asphalt of certain streets of Operable Unit VII. The major components of the remedy selected in the March 24, 1986 ROD are:

- * Leaving the contaminated material in place;
- * Improving institutional controls so that all maintenance, repair or other construction activities in the affected streets by government agencies, utility companies, contracting companies and private individuals, will be monitored; and
- * Taking any contaminated material excavated during maintenance, repair or other construction activities in the affected streets to a facility approved for storage or disposal of contaminated material.

According to the ROD, the standards found in 40 C.F.R. Part 192 serve as the cleanup goals which remedial actions taken at the Denver Radium Site must attain. The ROD states that the relevant and appropriate requirement is found at 40 C.F.R. Section 192.12(a), which specifies the maximum allowable radium concentration in soil. In order to comply with 40 C.F.R. Section 192.12(a), remedial actions must be conducted when the concentration of radium in land averaged over any area of 100 square meters exceeds the background level by more than (1) 5 picocuries of radium per gram soil averaged over the first 15 centimeters of soil below the surface, and (2) 15 picocuries of radium per gram of soil averaged over 15 centimeter thick layers of soil more than 15 centimeters below the surface. The concentrations of radium present in Operable Unit VII - Streets exceed these levels.

In addition, the ROD states that only total excavation would satisfy the standard outlined in 40 C.F.R. Section 192.12(a), and that the Total Excavation Alternative was eliminated during the initial screening of remedial alternatives for Operable Unit

VII - Streets because the cost of implementing that alternative far exceeded the cost of other alternatives, without providing substantially greater public health or environmental protection. According to 40 C.F.R. Section 192.21(c), the use of supplemental standards is appropriate when the estimated cost of remedial action to satisfy 40 C.F.R. Section 192.12(a) at a Site is unreasonably high relative to the long-term benefits, and the residual radioactive materials do not pose a clear present or future hazard. In evaluating this hazard, the likelihood that buildings will be erected or that people will spend long periods of time at such a Site should be considered. Section 192.21(c) further states that "remedial action will generally not be necessary where residual radioactive materials have been placed semi-permanently in a location where site-specific factors limit their hazard and from which they are costly or difficult to remove, or where only minor quantities of residual radioactive materials are involved." Examples given include residual radioactive materials present under hard surface public roads and around public sewer lines.

Furthermore, the ROD states that if a supplemental standard is applied, the implementing agency must select and perform remedial actions that come as close to the otherwise pertinent standard as is reasonable under the circumstances. The remedial alternative selected in the ROD, the Modified No Action Alternative, includes leaving contaminated materials in place and establishing institutional controls to monitor all routine maintenance, repair or other construction activities in the affected streets. This remedy complies with the supplemental standards and comes as close to the standards outlined in 40 C.F.R. Part 192.12(a) as is reasonable under the circumstances. Finally, the ROD states that the Operation and Maintenance (O & M) activities required to ensure the effectiveness of the remedy include off-site disposal of contaminated material removed from the streets during maintenance, repair or construction activities.

DESCRIPTION OF SIGNIFICANT DIFFERENCES

The significant differences between the remedy described in the ROD and this ESD are:

In the ROD, a portion of the remedy dealt with off-site removal and disposal of any radium-contaminated materials excavated during maintenance, repair or other construction activities in the affected streets of Operable Unit VII of the Denver Radium Site. This document modifies the original ROD to allow for the retention and on-site reburial of radium-contaminated materials that are excavated during maintenance, repair or other construction activities within Operable Unit VII streets, if such retention and reburial is feasible, provided that the area to be excavated is not

greater than 20% of the total area of the roadway in one city block. Special variance to the 20% limit may be granted by the Colorado Department of Health should an unusual circumstance require such a variance. The location of radium-contaminated asphalt reburied on-site will be permanently documented by the implementing agency. Reburied materials will be covered with a new, hard surface having a minimum depth of 6 inches. In situations where the retention and reburial of contaminated materials is not feasible, the materials will be disposed of at a licensed off-site disposal facility consistent with the ROD. Examples of situations where it may not be feasible to rebury contaminated material include: (1) a water main break which results in flooding that may preclude the retention and on-site reburial of contaminated asphalt; and (2) an activity such as construction of handicapped sidewalk ramps which could take up contaminated material from the asphalt surface and not provide a place for reburial. All other aspects of the 1986 selected remedy remain the same.

The modified remedy described in this ESD meets the above-referenced supplemental standards and comes as close to standards outlined in 40 C.F.R. Section 192.12(a) as is reasonable under the circumstances.

JUSTIFICATION FOR CHANGE

The remedy selected in the ROD included leaving contaminated material in place and establishing institutional controls to monitor all routine maintenance, repair or construction activities in the affected streets. O & M activities required to ensure the effectiveness of the selected remedy included off-site disposal of contaminated material removed from the streets during these activities. The sole change engendered by the modified remedy is that a relatively minor amount of contaminated material removed from the streets during routine or emergency maintenance, repair or other construction activity, would be retained and reburied, if feasible. The location of radium-contaminated asphalt reburied on-site will be permanently documented by the implementing agency. The modified remedy reduces the need to transport contaminated material and the risk associated with such transport. In addition, the modified remedy meets the supplemental standards outlined in 40 C.F.R. Sections 192.21 and 192.22, comes as close to the standards outlined in 40 C.F.R. Section 192.12(a) as is acceptable under the circumstances and is cost effective.

SUMMARY OF SIGNIFICANT DIFFERENCES

The major differences between the original ROD remedy and the modified remedy in this ESD are summarized as follows:

ORIGINAL REMEDY

* Off-site disposal of radium-contaminated materials excavated during routine maintenance, repair or construction activities in the affected streets of Operable Unit VII.

MODIFIED REMEDY

* On-site retention and reburial of radium-contaminated materials excavated during routine or emergency maintenance, repair or other construction activities in the affected streets of Operable Unit VII, if feasible, provided that the area to be excavated is not greater than 20% of the total area of the roadway in one city block. Special variance to the 20% limit may be granted by the Colorado Department of Health should an unusual circumstance require such a variance. Contaminated materials that are reburied will be covered with a new, hard surface having a minimum depth of 6 inches to ensure no direct exposure. If retention and reburial of contaminated materials is not feasible, the materials will be disposed of at a licensed, off-site disposal facility, consistent with the ROD.

SUPPORT AGENCY COMMENTS

The Colorado Department of Health has reviewed this ESD and supports implementation of the modified remedy as defined herein.

STATUTORY DETERMINATIONS

It is affirmed by both EPA and the State of Colorado that this modified remedy continues to satisfy all statutory requirements. Further, both EPA and the State of Colorado believe that the modified remedy is protective of both human health and the environment and complies with Federal and State requirements that are applicable or relevant and appropriate to this remedial action, and is cost effective.

GLOSSARY

ADMINISTRATIVE RECORD: The body of documents upon which EPA bases a cleanup decision about a Superfund site. By law, the administrative record file, which is the file containing the documents used in selecting the remedy for a site, must be made available to the public at a repository located near the Superfund site.

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS):

Refers to the Federal and State requirements that a selected remedy is required to attain. ARARs include requirements such as allowable air emissions limits and allowable levels of contaminants in site media (such as soils and water).

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA OR SUPERFUND): A law passed in 1980 that establishes a program to clean up abandoned hazardous waste sites.

EXPLANATION OF SIGNIFICANT DIFFERENCES (ESD): Refers to a requirement of Section 117(c) of CERCLA, as amended, and Section 300.435(c)(2)(i) of the NCP, that the lead agency, following the adoption of the ROD, document and explain any significant changes to the ROD. The ESD and supporting information must be made available to the public in the administrative record and information repository for the site. In addition, a public notice summarizing the ESD must be published in a major local newspaper of general circulation.

FEASIBILITY STUDY (FS): A study required under Superfund in which alternatives for cleaning up site contamination are identified, screened and compared.

INSTITUTIONAL CONTROLS: This term may refer to legal, non-engineering methods used to prevent or restrict use of, or access to, contaminated soils and ground water. In general, institutional controls may take the form of rules, regulations, laws, or covenants such as county or city ordinances, building permits, or other appropriate measures, as necessary.

NATIONAL CONTINGENCY PLAN (NCP): A body of Federal regulations governing the implementation of CERCLA.

NATIONAL PRIORITIES LIST (NPL): EPA's list of top-priority hazardous waste sites that are eligible for investigation and cleanup under the Federal Superfund program.

RECORD OF DECISION (ROD): A public document that sets forth and explains the cleanup alternative(s) to be used at a Superfund site. The ROD is generally based on information from the remedial investigation and feasibility studies, public comments, and community concerns.

REMEDIAL ACTION: The actual construction or implementation phase of Superfund work during which the selected remedy is put into place.

REMEDIAL INVESTIGATION (RI): A study required under Superfund that is conducted in order to identify the types, amounts and locations of contamination at a site.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986: A law passed in 1986 that reauthorizes the Superfund law.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20480OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

SEP 24 1992

Transmitted via Fax

MEMORANDUM

SUBJECT: ESD Consultation - Denver Radium Superfund
Site OU VII

FROM: Nancy T. Briscoe *Nancy T. Briscoe*
OWPE Regional Coordinator

TO: Tim Rehder
Remedial Project Manager

The purpose of this memorandum is to confirm Headquarter's support of the September, 1992 Explanation of Significant Differences (ESD) for Denver Radium Site, Operable Unit VII. Consultation regarding this ESD was conducted between Tim Rehder (Denver Radium RPM), Neilima Senjalia (OWPE Section Chief) and Nancy Briscoe (OWPE Regional Coordinator) on September 23, 1992.

Because the ESD proposes a relatively minor fundamental change in the remedy (on-site retention and reburial of radium-contaminated materials excavated during routine or emergency maintenance or repair), and because the modified remedy is consistent with the remedy chosen for the majority of radium-contaminated materials on-site, the Office of Waste Programs Enforcement supports the ESD. Accordingly, EPA Region VIII has met and complied with all consultation requirements of the Twenty Third Remedy Delegation Report.

cc: Lori Boughton
Neilima Senjalia