TA-73

Department of Energy
Albuquerque Operations Office
Office of Los Alamos Site Operations
Los Alamos, New Mexico 87544

APR 0 4 2002

The Honorable Gary E. Johnson
Governor of New Mexico
State Capitol
Santa Fe, NM 87503

Dear Governor Johnson:

The Department of Energy (DOE) will transfer parcels of land to the U.S. Department of the Interior, to be held in trust for the Pueblo of San Ildefonso (Pueblo). These transfers will take place pursuant to Public Law (PL) 105-119, which directs DOE to identify parcels of land at or in the vicinity of Los Alamos National Laboratory (LANL) suitable for conveyance to the County of Los Alamos (the County) or for transfer to the Pueblo. Also as required by PL 105-119, the County and the Pueblo have entered into an allocation agreement which determined which parcels would be conveyed to the County and which would be transferred to the Pueblo. Some of the ten parcels identified by the DOE were divided as a result of the allocation agreement. Four subparcels of land from three of the initial ten parcels will be transferred to the Pueblo.

As a general rule, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requires that a federal agency transferring real property include in the deed or transfer agreement a covenant warranting that all remedial action necessary to protect human health and the environment from hazardous substances remaining on the property has been taken before the date of the property transfer (the CERCLA covenant). However, in certain cases, the federal agency may defer the covenant requirement. This is done through the process known as a "covenant deferral request" (CDR).

Because LANL is not on the Environmental Protection Agency's (EPA) National Priority List (NPL), this covenant deferral is accomplished with the concurrence of the governor of the state in which the land parcel is located. (See CERCLA Sections 120(h)(3)(C)(I)(I)-(IV)). Under the covenant deferral process, DOE is required to determine that the intended use of the property is consistent with the protection of human health and the environment, and that the DOE is responsible for any environmental cleanup required on the property.

The Pueblo has expressed a strong desire to have the parcels transferred to it as soon as possible. Two of the subparcels have not been sufficiently investigated to permit DOE to transfer the land with the CERCLA covenant. DOE and representatives of the Pueblo and the Bureau of Indian Affairs (BIA) met in July 2001 to discuss transferring these two subparcels under the covenant deferral process. The Pueblo and BIA agreed that using the covenant deferral process would be appropriate in order for the land to be transferred as quickly as possible.

DOE has prepared the enclosed draft CDR, entitled *Covenant Deferral Request for Parts of the Technical Area 74 Parcel and the White Rock Parcel at Los Alamos National Laboratory, New Mexico* (Enclosure 1). DOE has determined that early transfer would be appropriate, and has

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prepared the CDR following EPA's *Guidance on the Transfer of Federal Property by Deed Before All Necessary Remedial Action Has Been Taken Pursuant to CERCLA Section 120(h)(3)* (Enclosure 2).

CERCLA also requires the federal agency requesting deferral to provide notice of the proposed transfer, by publication in a newspaper of general circulation in the vicinity of the property. The notice provides for the opportunity for the public to submit, within a period of not less than 30 days after the date of the notice, written comments on the suitability of the property for transfer. EPA's guidance states that the federal agency should invite the State to participate in the development and review of the draft CDR, before providing the public notice.

After the public comment period has expired, the landholding federal agency may then submit the final CDR to the Governor for concurrence in the final CDR. Property may not be transferred until the CERCLA Covenant is explicitly deferred by the State.

DOE would like to transfer these two subparcels of land to the Pueblo by September 30, 2002. In order to meet that date, DOE intends to provide public notice of the proposed transfer under the covenant deferral process by May 1, 2002. I believe it would greatly facilitate the deferral process if our staffs meet to discuss the enclosures, and then work together in developing the CDR, which will be made available to the public for comment. After the public comment period, DOE will finalize the CDR, by considering any comments received, and submit it to the State for concurrence.

I would be pleased to arrange a meeting between our staffs to discuss the draft CDR and the land transfer activities of the DOE.

Please contact me at 505-667-5105 or ask your staff to contact Ted Taylor of my staff at 505-665-7203 if you have questions or concerns.

Sincerely,

Corey A. Cruz
Acting Director

DIR:3TT-015

Enclosures

cc:
See page 3

APR 0 4 2002

cc w/enclosures:
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Santa Fe, NM 87502

James Bearzi, Chief
Hazardous Waste Bureau
New Mexico Environment Department
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cc w/o enclosures:
E. D. Martinez, D/DIR, OLASO
T. Taylor, DIR, OLASO
D. Garvey, ESH-EIS, LANL, MS-M889

Enclosure 1

Covenant Deferral Request for Parts of the Technical Area 74 Parcel and the White Rock Parcel at Los Alamos National Laboratory, New Mexico

Introduction

The United States Department of Energy (DOE) is transferring to the U.S. Department of the Interior, to be held in trust for the Pueblo of San Ildefonso, 2,088.3 acres of real property (hereinafter referred to as "the property"), designated as part of Technical Area (TA) 74 and part of the White Rock "Y." DOE is submitting this Covenant Deferral Request (CDR) pursuant to Section 120(h)(3)(C) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended.

The transfer of land is being done pursuant to Public Law (PL) 105-119, which was passed by the United States Congress in 1997. P.L. 105-119 directs the Secretary of Energy to convey to the County of Los Alamos (the County) or its designee, and to transfer to the Secretary of the Interior, in trust for the Pueblo of San Ildefonso (the Pueblo), parcels of land under the jurisdictional administrative control of the Secretary at or in the vicinity of the Los Alamos National Laboratory (LANL). DOE identifed ten parcels of land totaling about 4,800 acres that would be suitable for conveyance to the County and transfer to the Pueblo. As required by P.L.105-119, the County and the Pueblo subsequently entered into discussions, and on January 7, 2000 reached an agreement allocating between them the ten parcels of land. This CDR relates to parts of two of the subparcels of land, which the Pueblo is to receive and which are located in areas of LANL known as TA-74 and the White Rock "Y." Attachments 1 and 2 contain maps of these subparcels.

CERCLA was enacted in 1980 to provide for the cleanup of contaminated sites. CERCLA was amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 that added Section 120. Section 120 directs Federal Entities to comply with CERCLA and imposes requirements prior to transfer of real property owned by federal entities. A covenant must be made by the federal entity prior to transfer of real property, warranting that all remedial action necessary to protect human health and the environment from hazardous substances remaining on the property has been taken before the date of the property transfer. All remedial action has been considered taken if the construction and installation of an approved remedial design has been completed, and the remedy has been demonstrated to EPA (or the State) to be operating properly and successfully.

In 1996 an amendment to CERCLA, Section 120(h)(3), allowed transfer of real properties by deferring the necessary covenant. Section120(h)(3)(C) allows transfer even if remediation is not complete or a remedy has not yet been demonstrated to be operating properly and successfully. It is important to note that the CERCLA covenant is not waived under the circumstances involving early transfer. Rather, it is deferred until the cleanup has been completed, at which time the federal government will execute and deliver to the transferee an appropriate document containing a warranty that all response actions have been taken.

For federal property such as LANL, which is not on the EPA's National Priority List (NPL), the deferral of the CERCLA covenant is accomplished with the concurrence of the governor of the state in which the land is located. In arriving at the determination of whether to concur with a proposal to transfer early and defer the CERCLA covenant, the governor must make certain findings in satisfaction of the statutory requirements contained in the amendment to CERCLA.

These findings are:

(1) The property is suitable for transfer for the use intended by the transferee, and the intended use is consistent with the protection of human health and the environment;

(2) The deed or other agreement proposed to govern the transfer between the United States and the transferee of the property contains assurances that:

(a) Provide for any necessary restrictions on the use of the property to ensure the protection of human health and the environment;

(b) Provide that there will be restrictions on the use necessary to ensure that required remedial investigations, response actions, and oversight activity will not be disrupted;

(c) Provide that all necessary response actions will be taken and schedules identified for investigation and completion of all necessary response actions as approved by the appropriate regulatory agency; and

(d) Provide that the Federal agency responsible for the property will submit a budget request to the Director of the Office of Management and Budget that adequately addresses schedules for the investigation and completion of all necessary response actions, subject to Congressional authorizations and appropriations;

(3) The Federal agency requesting the deferral has provided Notice, by publication in a newspaper of general circulation in the vicinity of the property, of the proposed transfer. The Notice must give the public the opportunity to submit, within a period of not less than 30 days after the date of the Notice, written comments on the suitability for transfer of the property; and

(4) The deferral and the transfer of the property will not substantially delay any necessary remedial response action at the property.

These findings are intended to assure that there is a sound basis for the proposed transfer because the expected re-use of the property does not pose an unacceptable risk to human health or the environment. As stated in CERCLA Section 120(h)(3)(C)(iv), all statutory obligations required of a federal entity remain the same, regardless of whether the property is transferred subject to a covenant deferral.

DOE hereby requests that the Governor determine that the Property is suitable for transfer and that the CERCLA covenant may be deferred. Once the deferral request is granted, DOE will

proceed to transfer the property while DOE continues to complete all necessary remediation, if any is required.

Property Description

LANL is owned by the United States Government and is operated by the University of California, pursuant to a contract with DOE. Established in 1943 as part of the Manhattan Project to create the first atomic weapons during World War II, LANL occupies approximately 43 square miles of Department of Energy (DOE) land situated on the Pajarito plateau in the Jemez mountains of northern New Mexico. Today, LANL conducts extensive research in energy, nuclear safeguards and security, biomedical science, computational science, environmental protection and cleanup, materials science, and other basic research.

TA-74 North Subparcel

LANL is divided into numerous technical areas or TAs. TA-74 represents a large area of LANL buffer lands, consisting of approximately 2,715 acres. TA-74 is to be transferred as four subparcels. The northern part is identified as the TA-74 North Subparcel, consisting of 2,062.8 acres, and is the subject of this CDR. Other Subparcels are to be conveyed to the County and transferred to the Pueblo as separate actions.

The TA-74 parcel is located east of the Los Alamos Town Site and below the mesa upon which the Town Site is built. The northern half of the parcel is dominated by lower Bayo Canyon; the southern half includes much of Pueblo Canyon.

TA-74 is isolated from LANL operations and contains numerous archaeological sites and sensitive wildlife habitat. The site is heavily forested with ponderosa pine and pinon-juniper woodlands. Existing uses at the parcel include activities associated with the State Highway Maintenance Facility and the water wells and tanks present at the site.

U.S. Forest Service (USFS) property borders the Subparcel to the north. The bottom of Pueblo Canyon approximately forms the southern border of the Subparcel. Pueblo of San Ildefonso lands lie to the east. The principal use of the Subparcel is recreational use. The intended future use by the Pueblo is for cultural preservation.

White Rock "Y" Subparcel

The White Rock "Y" parcel is adjacent to and south of the TA-74 parcel. The White Rock "Y" parcel consists of approximately 540 acres, of which a 25.5 acre subparcel will transferred to the Pueblo and is the subject of this CDR. The parcel incorporates the alignments and intersections of State Road 502, State Road 4, and lands on both sides of the easternmost portion of East

Jemez Road. The parcel shares its southern boundaries with the Pueblo of San Ildefonso, Bandelier National Monument, TA-74 and TA-53.

The area is moderately forested with ponderosa pine and pinon-juniper woodlands. Numerous archaeological sites and one possible historic structure are present at the parcel, although not in the Subparcel that is the subject of this CDR. Portions of the parcel also are adjacent to wetlands and sensitive wildlife habitat. Current land use at the parcel is limited to the wells, power-lines, and transportation facilities constructed previously in support of LANL operations. In addition, a portion of the parcel is used for recreational rock climbing.

The Subparcel is located at the easternmost part of the parcel, north of Highway 502. In general, the Subparcel consists of steep cliffs and some lands to the north of Highway 502 that are moderately forested with pinon-juniper woodland. The present use of the Subparcel is recreational use. The intended future use by the Pueblo is for cultural preservation.

Nature and Extent of Contamination

TA-74 North Subparcel

The nature and extent of potential contamination within the TA-74 North Subparcel are unknown at this time, because this area has not been investigated. No solid waste management units (SWMU) are located on or within the boundaries of the TA-74 North Subparcel. However, the potential exists for contamination from upstream areas to have migrated through the surface water and air pathways onto the Subparcel. Extensive investigation of these upstream areas has been performed, and the results of these investigations provide detailed knowledge of the nature of contaminants that may have migrated downstream onto the Subparcel. The *Final Environmental Restoration (ER) Project Documentation Supporting a Covenant Deferral Request for Technical Area (TA) 74 North and White Rock "Y" North Subparcels,* dated January 8, 2002, Attachment 3, provides detailed information regarding possible upstream contamination.

The potential for contamination in the Subparcel is expected to be minimal, based on the DOE's current knowledge of the Subparcel and best professional judgment. If contamination does exist within this Subparcel, it would most likely be confined to the channels and flood plains of Bayo and Barrancas Canyons or relatively near the source of aerial emissions at former TA-10.

White Rock "Y" Subparcel

No SWMUs are located on or within the boundaries of the White Rock "Y" Subparcel. However, the Subparcel is transected by a portion of Pueblo Canyon, whose upper reaches are known to have received contaminants from several former Laboratory TAs. Over the past decade, the LANL Environmental Restoration Project has conducted numerous investigations of these upstream areas. The data from these investigations provide a detailed knowledge of the

nature of the contaminants that have been released from these upstream sources into the Pueblo Canyon system.

The exact nature and extent of potential contamination within the White Rock "Y" Subparcel are unknown at this time because the ER Project has not sampled that portion of Pueblo Canyon that transects the Subparcel. However, extensive sampling has been conducted to investigate the nature and extent of contamination in specific upstream reaches within the Pueblo Canyon watershed. Information from this investigation does not indicate that there are unacceptable risks to human health and the environment from migration of contaminants in these upstream reaches.

Radionuclides are the primary chemicals of potential concern (COPC), the most significant of these being plutonium-239 and -240. Several inorganic COPCs were identified, including cadmium, lead, silver, and zinc. Twenty-nine organic COPCs (including PCBs, pesticides, and polyaromatic hydrocarbons) were measured at low concentrations at discrete locations located upstream of the Subparcel. Attachment 3 also provides more detailed information.

The potential for contamination in the Subparcel is expected to be minimal, based on the DOE's current knowledge of the Subparcel and best professional judgment. If contamination does exist within this Subparcel, it would most likely be confined to the channels and flood plains of Pueblo Canyon.

Analysis of Intended Land Use during the Deferral Period

The intended use for both the TA-74 North Subparcel and the White Rock "Y" Subparcel is for cultural preservation. The Pueblo has no development plans for this land. The Pueblo currently has access to the TA-74 parcel for cultural purposes, pursuant to a letter from DOE, dated December 19, 2000 (Attachment 4). The area is accessed by the Pueblo on an occasional basis for cultural purposes and ceremonial activities, including the gathering of plant materials, and for wood gathering. Because any potential contamination is minimal and because the land is used only for cultural purposes and wood gathering, as opposed to a use which would result in more exposure, such as residential or commercial use, DOE believes the intended use is consistent with protection of human health and the environment.

Results from a Risk Assessment

TA-74 North Subparcel

A risk assessment has not been performed for the TA-74 North Subparcel. However, several risk assessments have been performed for TA-10. TA-10 is located immediately adjacent to and upstream of the Subparcel. This area is believed to be the only significant contributor to potential contamination for this Subparcel. Therefore, the risk posed to human health and the environment at TA-10 would represent the maximum risk present on the Sub-parcel.

Human health risk assessments performed in Bayo Canyon upstream of the Subparcel indicate that no unacceptable risk is posed except in one localized area near PRS 10-002(a)-99 at TA-10. This area is outside the Subparcel. Radionuclides, primarily strontium-90, are present within the soils at PRS 10-002(a)-99. The risk due to these contaminants was evaluated using both the recreational (current use) and residential (potential future use) land use scenarios. These constituents do not pose an unacceptable risk for the current recreational land use. However, unacceptable risk levels were obtained for the residential land use scenario. In order to limit access to these areas, the ER Project implemented access and stormwater migration controls in the appropriate areas in 1997.

Ecological risk associated with TA-10 has not been evaluated. However, it is possible that the ecological risk posed by the radionuclides could be unacceptable in a localized area outside the Subparcel. Migration of these contaminants downstream in concentrations likely to affect the level of risk at the Subparcel is unlikely.

White Rock "Y" Subparcel

A risk assessment specific to the White Rock "Y" Subparcel has not been performed to date. However, an assessment of the potential human health and ecological risk posed by portions of Pueblo Canyon upstream of the Subparcel has been performed as part of the Pueblo Canyon Reach Report. This assessment of risk indicates that levels of contamination in the sediments of Pueblo Canyon do not require immediate remedial actions with regard to present-day risk. In addition, other assessments indicate that the concentrations of contaminants in sediments have been stable or have declined for decades, and the redistribution of contaminated sediments by flooding will not result in future increases in contaminant concentrations in downstream areas.

Response/Corrective Action and Operation and Maintenance Requirements

TA-74 North Subparcel

The LANL ER Project has prepared the North Canyons Work Plan to investigate potential contamination in Bayo, Barrancas, Rendija, and Guaje Canyons. No further investigations are planned for Pueblo Canyon. The implementation of this Work Plan is currently scheduled for implementation in 2012. This Work Plan will:

Determine the degree to which stream channel sediments, active floodplain sediments, and, if present, persistent surface water in the north canyons, have been affected by Laboratory releases;

Refine the conceptual model for contaminant occurrence, transport, and exposure routes and for contaminant transport pathways and mechanisms specific to the canyon systems as they relate to risk evaluation; and

Provide supplemental characterization of surface water and alluvial groundwater (if present) that is associated with PRSs located in the canyons.

Upon implementation of the North Canyons Work Plan and assessment of potential human health and ecological risk posed in these canyons, a determination will be made as to the need for remedial actions with regard to present-day risk. Until that time, it is unknown if remedial actions will be warranted. Because concentrations of contaminants in sediments carried by floods are not increasing over time, it is unlikely that remedial action will be warranted.

White Rock "Y" Subparcel

No further investigations are planned for this Subparcel. Because concentrations of contaminants in sediments carried by floods are not increasing over time, it is believed that no remedial actions will be warranted at the White Rock "Y" Subparcel.

Contents of Deed/Transfer Agreement

DOE shall include the following language in the Transfer Agreement between DOE and the U.S. Department of the Interior:

"DOE warrants that it shall take any response action found to be necessary after the date of this conveyance regarding hazardous substances located on the property on the date of this conveyance. This covenant shall not apply in any case in which (1) Grantee or any successor in interest to the property or part thereof is a potentially responsible party (PRP) with respect to the property, or (2) any additional response action found to be necessary is the result of an act or failure to act of the Grantee, its successors, or any party in possession after the date of this conveyance that: a) results in a release of a hazardous substance that was not located on the property on the date of this conveyance; or b) exacerbates the release of a hazardous substance; the existence of which was known and identified to the applicable regulatory authorities as of the date of this conveyance. For purposes of this covenant, DOE and its successors shall not be considered to be a PRP with respect to the property solely due to the purchase or ownership of the property or part thereof that is effective with or subsequent to the execution of this deed.

"The Grantor reserves a right of access to all portions of the Property for environmental investigation, remediation or other corrective action. This reservation includes the right of access to and uses of, to the extent permitted by law, available utilities at reasonable cost to the Grantor or its successors and assigns. Pursuant to this reservation, DOE, its officers, agents, employees, contractors and subcontractors shall have the right (upon reasonable notice to the owner and any authorized occupant of the Property) to enter upon the Property and conduct investigations and surveys, to include drillings, test-pitting, borings, data and record compilation, and other activities related to environmental investigation and to carry out remedial or removal actions as required or necessary under applicable authorities, including but not limited to monitoring wells, pumping wells, and treatment. Any such entry, including such activities, responses or remedial

actions, shall be coordinated with the Grantee or its successors and assigns and shall be performed in a manner which minimizes interruption with Grantee's activities on the Property. Nothing herein shall be construed as limiting DOE's right of entry, pursuant to any applicable statute, regulation or permit.

"The Grantee covenants and agrees for itself, its successors and assigns and every successor in interest to the property or part thereof, that a party occupying the property shall not hinder or prevent DOE from conducting required environmental investigation, response action, including remediation, or corrective action or oversight activities. Any such entry, including such activities, responses or remedial actions, shall be coordinated with the Grantee or its successors and assigns and shall be performed in a manner which minimizes interruption with Grantee's activities on the Property.

"DOE shall submit, on an annual basis, through established channels, appropriate budget requests to the Director of the Office of Management and Budget that adequately addresses the need for investigation and completion of investigative and necessary response actions. The actual amount available for such activities is subject to congressional authorizations and appropriations.

"When any response actions necessary to protect human health and the environment with respect to any substance remaining on the property on the date of transfer have been taken, DOE will execute and deliver to the transferee an appropriate document containing a warranty that all response actions have been taken."

Responsiveness Summary

DOE will provide notice, by publication in a newspaper of general circulation in the vicinity of the property, of the proposed transfer and of the opportunity for the public to submit, within a period of not less than 30 days after the date of the notice, written comments on the suitability of the property for transfer. DOE will address any comments received from the public or regulatory agencies and will include its response in the final CDR.

Transferee Response Action Assurances and Agreements

The transferee is the Pueblo of San Ildefonso. DOE does not contemplate that the Pueblo will assume any response actions at the property.

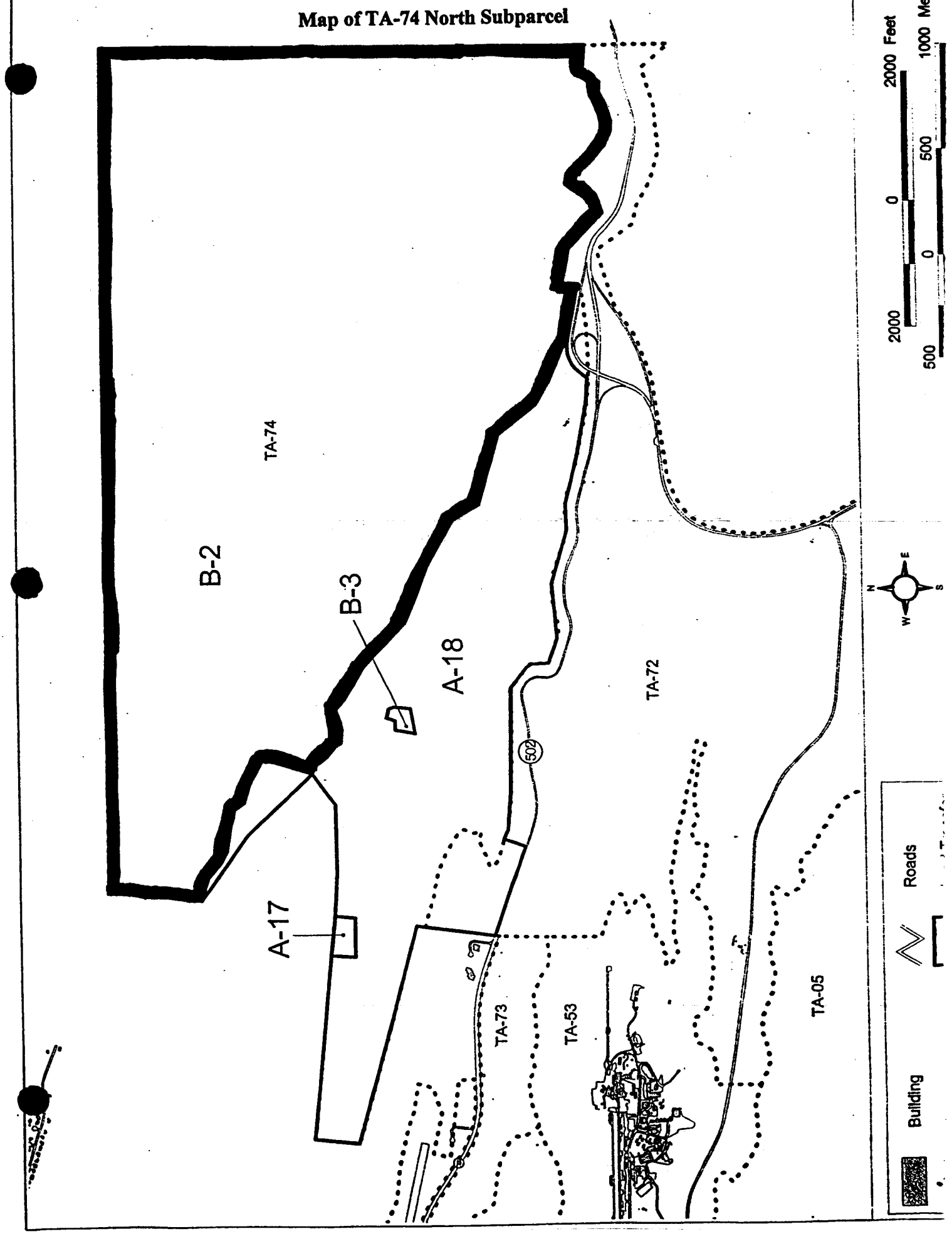
Effect of Covenant Deferral Request

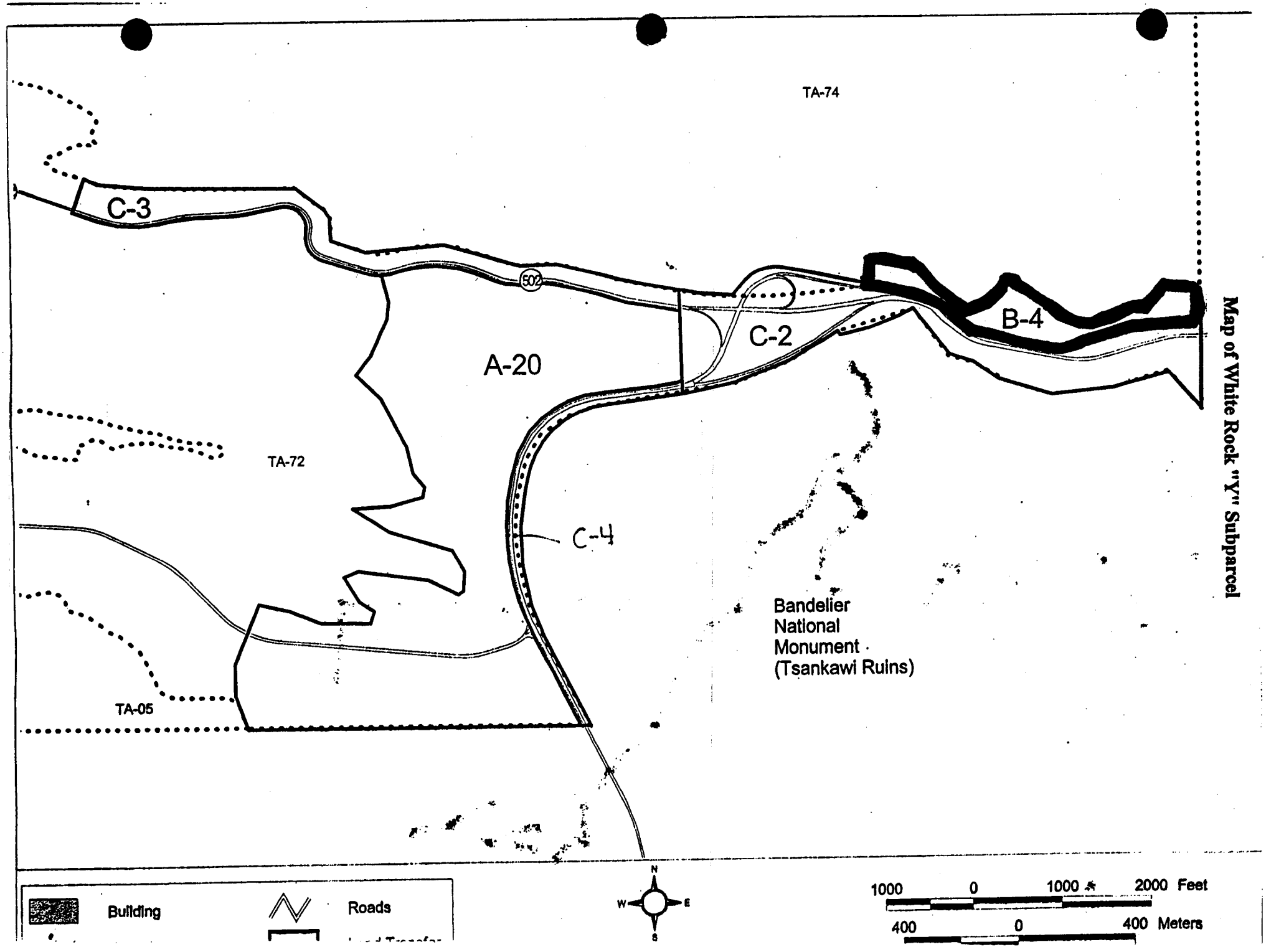
Nothing in this CDR shall be construed to alter DOE's obligation or any PRP's obligation to complete all necessary response actions as required by CERCLA or RCRA. In accordance with

with CERCLA Section 120(h)(3)(B), this covenant deferral request pertains solely to the transfer of this property or any portion thereof to a non-PRP.

Attachment 1

Map of TA-74 North Subparcel





Map of White Rock "Y" Subparcel

Attachment 3

Environmental Restoration Document

ENVIRONMENTAL RESTORATION PROJECT

Los Alamos National Laboratory/University of California
Environmental Science and Waste Technology (E)
Environmental Restoration (ER) Project, MS M992
Los Alamos, New Mexico 87545
(505) 667-0808/FAX (505) 665-4747

Date: January 8, 2002
Refer to: ER2002-0006

Mr. Mat Johansen
Department of Energy
Los Alamos Area Office, MS A316
Los Alamos, NM 87545

SUBJECT: FINAL ENVIRONMENTAL RESTORATION (ER) PROJECT DOCUMENTATION SUPPORTING A COVENANT DEFERRAL REQUEST FOR TECHNICAL AREA (TA) 74 NORTH AND WHITE ROCK "Y" NORTH SUB-PARCELS

Dear Mat:

The purpose of this letter is to respond to Mr. Ted Taylor's October 18, 2001 memorandum. In his letter, Mr. Taylor requested the following four pieces of information necessary for the completion of the subject Covenant Deferral Request:

1. Identification of potential release sites and canyons with potential contamination,
2. Summary of investigations conducted to date,
3. Summary of future investigations to be conducted, together with a schedule, and
4. Summary of potential remediation to be conducted, together with a schedule.

The enclosed finalized document addresses each of the above items and is organized with four sections, each providing information responsive to one of the bullets listed above. In addition to the four sections is a list of references upon which this information was based, and an appendix containing more detailed information on each of the Potential Release Sites (PRSs).

If you have any questions regarding this information, please contact Paul Schumann at (505) 667-5840.

Sincerely,

Julie A. Canepa

Julie A. Canepa, Program Manager
Environmental Restoration Project

JC/KB/vn

Enclosure: ER Project Documentation Supporting The TA-74 North/White Rock "Y" North (San Ildefonso) Sub-parcels Covenant Deferral Request

Cy (w/enc.):
M. Baker, E-DO, MS J591
K. Birdsall, E/ER, MS M992
L. Cummings, LAAO, MS A316
D. Garvey, ESH-EIS,MS M889
D. Gregory, LAAO, MS A316
M. Kirsch, E/ER, MS M992
E. Louderbough, LC-GL, MS A187
D. McInroy, E/ER, MS M992
W. Neff, E/ET, MS M992
A. Pratt, E/ER, MS M992
S. Reneau, E/ER, MS M992
T. Rust, E/ER, MS M992
P. Schumann, E/ER, MS M992
V. Smith, E/ER, MS M992
P. Wardwell, LC-GL, MS A187
E/ER File, MS M992
IM-5, MS A150
RPF, MS M707

Cy (w/o enc.):
J. Canepa, E/ER, MS M992

1 INTRODUCTION

This documentation has been compiled to support preparation of the Covenant Deferral Request (CDR) for two sub-parcels, hereinafter referred to as the "Technical Area (TA)-74 North" Sub-parcel and the "White Rock 'Y' North" Sub-parcel, both of which are being transferred to the Department of Interior to be held in trust for the San Ildefonso Pueblo.

DOE has determined that a CDR is necessary to support immediate transfer of these two sub-parcels because both sub-parcels contain stream channels and floodplains listed as Areas of Concern (AOCs) by the Environmental Restoration (ER) Project. Bayo, Barrancas and Pueblo Canyons are AOCs that have the potential to contain contaminants attributable to up-stream sources; however, the ER Project does not believe that these AOCs pose a significant risk to human health or the environment.

The Technical Area 74 North Sub-parcel. Technical Area (TA)-74 is an undeveloped safety buffer zone located in the northeast corner of the current Los Alamos National Laboratory ("the Laboratory") site. A small portion of the parcel (less than 20 acres) is situated on a mesa top and is adjacent to a business park on Los Alamos County land (LANL 2001, No ER ID). No current Laboratory structures are associated with TA-74; the Laboratory maintains the site as a safety buffer zone. Former TA-19 was located on the south side of TA-74 (not the subject of this transfer), but within its current boundaries.

TA-74 is to be transferred as two sub-parcels, the northern half being the TA-74 North Sub-parcel, the subject of this CDR, and the southern half ("TA-74 South") to be transferred to Los Alamos County at a later date and as a separate transfer action.

The TA-74 North Sub-parcel is bounded by US Forest Service land to the north, San Ildefonso Pueblo land to the east, Los Alamos County land to the west, and Pueblo Canyon to the south. It includes portions of Bayo and Barrancas Canyons. Because the portion of TA-74 within the north canyons area has not been used for Laboratory operations, no potential release sites (PRSs) are present in TA-74 North other than the stream channels and floodplains themselves, which are listed as Areas of Concern or "AOCs" (LANL 2001, No ER ID). AOCs are potential release sites by definition, although they are not listed on the Laboratory's Resource Conservation and Recovery Act (RCRA) operating permit at this time.

The White Rock "Y" North Sub-parcel is approximately 25 acres in size and contains a very small portion of the stream channel and floodplain of Pueblo Canyon. The entire length of Pueblo Canyon has received contamination from multiple PRSs located within the watershed several miles upstream of the sub-parcel. Sediments contained within the channel and floodplain are known to contain contaminants derived from these upstream PRSs. In addition, Pueblo Canyon has received contaminants from urban runoff associated with normal municipal activities occurring in the Los Alamos town site since its development as a community shortly after the Manhattan Project.

1.1 Sources of Potential Contaminants in TA-74 North Sub-parcel

As stated above, no PRSs are present in TA-74 North other than the stream channels and floodplains themselves, which are AOCs and PRSs by definition. The information compiled in Section 1.1 describes the TAs and PRSs that are potential contributors of contaminants to the TA-74 North Sub-parcel, primarily through surface water transport or aerial deposition of contaminants. Past and future investigations related to this Sub-parcel are discussed in Sections 2 and 3 of this document.

The information in this document is based on data available as of December 2001. As it becomes available, additional and updated information about the status of potential release sites can be obtained from the Laboratory's ER Project Office and/or the Laboratory's Public Reading Room in Los Alamos, New Mexico, as described in Section 7.2.2 of "Installation Work Plan for Environmental Restoration Project" (LANL 2000, 66802, p. 7-3).

1.1.1 Bayo Canyon

Bayo Canyon traverses from west to east across the central portion of the TA-74 North Sub-parcel. PRSs on the mesa tops within the Bayo Canyon watershed and their current regulatory status are excerpted from the Work Plan for the North Canyons (LANL 2001, No ER ID) and provided in Table 1 below. Further PRS-specific information may be found in Appendix A.

TAs located in the Bayo Canyon watershed that does not contain PRSs (i.e., TA-74) are not described or included in this section (LANL 2001, No ER ID).

TABLE 1

Bayo Canyon Watershed PRSs

Technical Area	PRS	Consolidated Unit	PRS Type/Name	NFA Status
TA-00	00-008	None	Surface disposal site	Department of Energy (DOE) has concurred on the proposal for no further action (NFA).
TA-00	00-011(d)	None	Mortar impact area	Proposed in RCRA Facility Investigation (RFI) report (not yet approved).
TA-00	00-025	n/a[a]	Landfill	DOE has concurred on the proposal for NFA.
TA-00	00-026	None	Landfill	DOE has concurred on the proposal for NFA.
TA-00	00-028(b)	00-028(a)-00	Effluent discharge, ball fields (active)	PRS proposed for NFA in work plan or RFI report that received a notice of deficiency (NOD) or disapproval letter from the Administrative Authority (AA) (not yet approved).
TA-10	10-001(a)	10-001(a)-99	Firing site (inactive)	PRS proposed for NFA in work plan or RFI report that received a NOD or disapproval letter from AA (not yet approved).
TA-10	10-001(b)	10-001(a)-99	Firing site (inactive)	PRS proposed for NFA in work plan or RFI report that received a NOD or disapproval letter from AA (not yet approved).
TA-10	10-001(c)	10-001(a)-99	Firing site (inactive)	PRS proposed for NFA in work plan or RFI report that received a NOD or disapproval letter from AA (not yet approved).
TA-10	10-001(d)	10-001(a)-99	Firing site (inactive)	PRS proposed for NFA in work plan or RFI report that received a NOD or disapproval letter from AA (not yet approved).
TA-10	10-001(e)	None	Detonation test area - doesn't exist	DOE has concurred on the proposal for NFA.
TA-10	10-002(a)	10-002(a)-99	Disposal pit	PRS proposed for NFA in RFI report (not yet approved).

Technical Area	PRS	Consolidated Unit	PRS Type/Name	NFA Status
TA-10	10-002(b)	10-002(a)-99	Disposal pit	Radiological (rad)/other components must be addressed prior to proposal for NFA.
TA-10	10-003(a)	10-002(a)-99	Disposal pit	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-003(b)	10-002(a)-99	Disposal pit	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-003(c)	10-002(a)-99	Disposal pit	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-003(d)	10-002(a)-99	Disposal pit	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-003(e)	10-002(a)-99	Disposal pit	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-003(f)	10-002(a)-99	Disposal pit	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-003(g)	10-002(a)-99	Manholes	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-003(h)	10-002(a)-99	Manholes	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-003(i)	10-002(a)-99	Septic tank	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-003(j)	10-002(a)-99	Tank	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-003(k)	10-002(a)-99	Tank	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-003(l)	10-002(a)-99	Tank	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-003(m)	10-002(a)-99	Waste line	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-003(n)	10-002(a)-99	Leach field	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-003(o)	10-002(a)-99	Leach field	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-004(a)	None	Septic system	Proposed in RFI report (not yet approved).
TA-10	10-004(b)	10-002(a)-99	Septic system	Proposed in RFI report (not yet approved).
TA-10	10-005	10-001(a)-99	Surface disposal	Proposed in RFI report (not yet approved).
TA-10	10-006	None	Burn site - doesn't exist	Proposed in permit modification (not yet approved).
TA-10	10-007	10-002(a)-99	Landfill	Rad/other components must be addressed prior to proposal for NFA.
TA-10	10-008	10-001(a)-99	Tree rimmed firing point, Bayo Canyon (inactive)	Proposed in RFI report (not yet approved).

Technical Area	PRS	Consolidated Unit	PRS Type/Name	NFA Status
TA-10	10-009	None	Former Bayo landfill	No documentation in support of NFA has been submitted.
TA-10	C-10-001	None	Surface soil, 2 10 x 10 ft plots, Bayo Canyon	Cleanup report submitted (not yet approved).

1.1.1.1 Technical Area 00

The term "Technical Area 00" or "TA-00" applies to sites formerly used by the Laboratory that are located on land no longer owned by DOE. TA-00 consists of a series of geographically separated structures and areas scattered across the Pajarito Plateau in the northern part of Los Alamos County and in adjacent Santa Fe County. All PRSs in TA-00 are located outside the boundaries of active TAs.

The stream channel and floodplain of Bayo Canyon have been designated as an AOC, C-00-004. (AOCs are PRSs by definition.) Bayo Canyon may have received contaminants from multiple PRSs within the watershed.

1.1.1.2 Technical Area 10

Former TA-10 was located in the middle portion of Bayo Canyon and is sometimes referred to as the "Bayo site." Used as a firing site (i.e., an explosives testing area) from approximately 1944 through 1963, TA-10 also housed a radiochemistry laboratory to facilitate preparation of the explosives test shots. Four shot pads were rotated in use because the area immediately surrounding a pad would be radioactively contaminated for up to a month after each shot. The principal structures comprising former TA-10 included a radiochemistry laboratory (10-1); two assembly buildings (10-10 and 10-12); an inspection building (10-8); a personnel building (10-21); and structures at two detonation control complexes, particularly the control buildings (10-13 and 10-15) and adjacent firing pads. Ancillary facilities, mainly for the Laboratory, included sanitary and radioactive liquid waste sewage lines, manholes, septic tanks and seepage pits, and solid radioactive waste disposal pits (Mayfield et al. 1979, 11717, p. 12).

TA-10 was established to test assemblies of conventional high explosives (HEs) that included components fashioned from depleted or natural uranium. The assemblies were loaded with a lanthanum-140 "source" of several hundred to several thousand curies used for blast diagnostics. The lanthanum-140 (half-life 40.3 hr) was contaminated with a small portion of strontium-90 (half-life 28.8 yr). The lanthanum-140 was separated from its host material and prepared as a source in the radiochemistry building. Detonation of the assemblies at the firing sites dispersed uranium and source material radioactivity to both air and ground. Liquid and solid wastes generated at the radiochemistry laboratory were placed in waste pits near structure 10-1, which resulted in contaminants being deposited in the subsurface (Courtright 1963, 4771, p. 19).

1.1.2 Barrancas Canyon

Barrancas Canyon traverses from west to east across the northern portion of the TA-74 North Sub-parcel. The Laboratory has used Barrancas Canyon as a buffer zone (TA-74) for Laboratory operations. No Laboratory operations or discharges are known to have occurred in Barrancas Canyon. Barrancas Canyon may have been impacted by air-borne debris from explosives testing in nearby Bayo Canyon during the 1940s and 1950s (LANL 2001, No ER ID).

1.1.2.1 Technical Area 00

PRS 00-025, a possible waste disposal area, is located within the Barrancas Canyon watershed. Historic records do not indicate that this area was used for waste disposal and the PRS has been recommended for No Further Action. This PRS is listed in Table 1 above and discussed further in Appendix A (LANL 2001, No ER ID).

The stream channel and floodplain of Barrancas Canyon has been designated as an AOC, C-00-003. AOCs are PRSs by definition

1.1.2.2 Technical Area 10

Former firing sites at TA-10 adjacent to and upstream (west) of TA-74 in Bayo Canyon are described above and may have introduced shrapnel and contaminants into Barrancas Canyon (LANL 2001, No ER ID).

1.1.2.3 Technical Area 74

TA-74 is an undeveloped safety buffer. No current Laboratory structures are associated with TA-74; therefore, no PRSs are present within TA-74 North other than the stream channel and floodplain themselves which are listed as AOCs as described above (LANL 2001, No ER ID).

1.2 Sources of Potential Contaminants in White Rock "Y" North Sub-parcel

As stated above, no PRSs are present in the White Rock "Y" North Sub-parcel other than the Pueblo Canyon (stream channel and floodplain) itself, which is an AOC and a PRS by definition. The information compiled in Section 1.2 describes the TAs and PRSs that are potential contributors of contaminants to the TA-74 North Sub-parcel, primarily through surface water transport of contaminants. Past and future investigations related to this Sub-parcel are discussed in Sections 2 and 3 of this document.

The information in this document is based on data available as of December 2001. As it becomes available, additional and updated information about the status of potential release sites can be obtained from the Laboratory's ER Project Office and/or the Laboratory's Public Reading Room in Los Alamos, New Mexico, as described in Section 7.2.2 of "Installation Work Plan for Environmental Restoration Project" (LANL 2000, 66802, p. 7-3).

1.2.1 Pueblo Canyon

Several former Laboratory sites within the Pueblo Canyon watershed have or may have contributed contaminants to the main channel of Pueblo Canyon, including some of the original Manhattan Project facilities within the current Los Alamos townsite that date back to 1943. Treated and untreated radioactive liquid waste derived from many separate facilities was discharged from former TA-45 into Acid Canyon, a small tributary to Pueblo Canyon, constituting the principal source of contamination in the watershed. Liquid releases from septic tank outfalls and from municipal wastewater treatment plants constitute additional potential sources of Laboratory-derived contaminants for the main channel; surface runoff from contaminated sites also may have contributed some contaminants (Reneau et al. 1998, 65406.5). Brief summaries of pertinent information on TAs in the Pueblo Canyon watershed are presented below.

TABLE 2

Pueblo Canyon Watershed PRSs

Technical Area	PRS	Consolidated Unit	PRS Type/Name
TA-00	00-018(a)	None	Sludge bed, Pueblo Canyon WWTP
TA-00	00-018(b)	None	Sludge bed wastewater treatment plant
TA-00	00-019	None	Central WWTP
TA-00	00-028(a)	00-028(a)-00	Effluent discharge – golf course
TA-00	00-028(b)	00-028(a)-00	Effluent discharge – ball fields
TA-00	00-029(a)	None	Transformer
TA-00	00-029(b)	None	Transformer
TA-00	00-029(c)	None	Transformer
TA-00	00-030(c)	None	Septic system
TA-00	00-030(d)	None	Septic system
TA-00	00-030(eN)	None	Septic system
TA-00	00-030(eS)	None	Septic system
TA-00	00-030(f)	None	Septic system
TA-00	00-030(g)	None	Septic system
TA-00	00-030(h)	None	Septic system
TA-00	00-030(j)	None	Septic system
TA-00	00-030(k)	None	Septic system
TA-00	00-030(n)	None	Septic system
TA-00	00-030(o)	None	Septic system
TA-00	00-030(p)	None	Septic system
TA-00	00-030(q)	None	Septic system
TA-00	00-034(a)	None	Landfill, eastern area
TA-01	01-002	45-001-00	TA-45 WWTP system
TA-19	19-001	19-001-99	Septic system
TA-19	19-002	19-001-99	Surface disposal site
TA-19	19-003	19-001-99	Septic tank
TA-19	C-19-001	19-001-99	Soil contamination
TA-31	31-001	None	Outfall (sanitary septic system)
TA-31	C-31-001	None	Buildings
TA-45	45-001	45-001-00	TA-45 WWTP system
TA-45	45-002	45-001-00	TA-45 WWTP system
TA-45	45-003	45-001-00	TA-45 WWTP system
TA-45	45-004	45-001-00	TA-45 WWTP system

TA-45	C-45-001	45-001-00	TA-45 WWTP system
TA-73	73-001(a)	73-001(a)-99	Landfill
TA-73	73-001(b)	73-001(b)-99	Surface disposal site (waste oil pit)
TA-73	73-001(c)	73-001(b)-99	Landfill
TA-73	73-001(d)	73-001(b)-99	Landfill
TA-73	73-002	73-002-99	Incinerator surface disposal
TA-73	73-003	73-002-99	Steam cleaning plant
TA-73	73-004(a)	73-002-99	Septic tank
TA-73	73-004(b)	73-002-99	Septic tank
TA-73	73-004(c)	None	Septic tank
TA-73	73-004(d)	73-001(a)-99	Septic tank (landfill)
TA-73	73-006	73-002-99	Outfalls

1.2.1.1 Technical Area 0

The stream channel and floodplain of Pueblo Canyon is an AOC, C-00-005. (AOCs are PRSs by definition.) Pueblo Canyon received contaminants from multiple PRSs within the watershed, including PRSs within TAs 0, 19, 31, 45 and 73 as well as contaminants in urban runoff, resulting from typical municipal sources within the Los Alamos townsite.

Effluent from the three municipal wastewater treatment plants in the watershed could potentially provide Laboratory-derived contaminants to Pueblo Canyon, although effluents from these plants also have non-Laboratory contaminants (Reneau et al. 1998, 65406.5).

Additional releases into Acid Canyon occurred from the outfall of a septic tank that was installed in the 1940s (PRS 00-030[g]). Plutonium-239,240 and polychlorinated biphenyls (PCBs) above screening action levels (SALs) were found below the outfall during ER Project investigations (LANL 1995, 51983; Reneau et al. 1998, 65406.5).

1.2.1.2 Technical Area 1

TA-1 was the first technical area at the Laboratory. Beginning in November 1942, it housed the theoretical divisions, Laboratory Administration, plutonium chemistry, physics research, and other activities. Between 1943 and 1945 much of the theoretical, experimental, and production work to develop the atomic bomb occurred in this main technical area. Beginning in the 1950s, those facilities were moved to TA-3. By 1965, TA-1 became inactive, and beginning in 1966 it was decontaminated and demolished in stages. By the late 1960s, the US Atomic Energy Commission relinquished TA-1 to Los Alamos County to be used for residential and commercial development (LANL 1995, 50290).

1.2.1.3 Technical Area 19

TA-19, formerly known as the East Gate Laboratory, is now part of TA-72 and is located in Santa Fe County. It is on Los Alamos Mesa east of the Los Alamos Airport and East Gate Industrial Park. It is bounded by Pueblo Canyon on the north and by a small branch of Pueblo Canyon on the south. The East Gate Laboratory was built in 1944 for a scientist who needed an isolated location for his experimental work on small sources. In 1947 the site consisted of a storage

hutment and laboratory building. The laboratory building was used for a variety of experiments, some of which used radioactive sources and chemicals. More buildings were added until the site consisted of a laboratory building, battery building, guard building, latrine, retreat building, septic tank, and shelter building. All buildings at TA-19 were abandoned and removed in 1974. Suspect contaminants are radionuclides, organic chemicals, and inorganic chemicals.

1.2.1.4 Technical Area 45

The principal source of contamination to Pueblo Canyon was TA-45, site of the first radioactive liquid waste treatment facility at the Laboratory (PRS 45-001) (LANL 1981, 6059; LANL 1992, 7668). Effluent from TA-45 released into Acid Canyon included untreated liquid waste from 1944 to 1951 and treated liquid waste from 1951 to 1964 (Reneau et al. 1998, 65406.5).

1.2.1.5 Technical Areas 31 and 73

Pueblo Canyon may also have received contaminants from operations at former TA-31 and TA-73 near the Los Alamos Airport, although this is not certain. TA-31 was known as the "east receiving yard" (Reneau et al. 1998, 65406.5).

TA-73 comprises the current and former operational structures located at the site of the Los Alamos Airport, as well as a former municipal landfill used by DOE and Los Alamos County. This technical area is located on Los Alamos Mesa east of the townsite. It is bounded by Pueblo Canyon on the north and DP Canyon (a branch of Los Alamos Canyon) on the south (LANL 1992, 7667).

During a redefinition of Laboratory boundaries in 1989, the Los Alamos Airport and associated SWMUs were renumbered from TA-00 to TA-73. TA-73 includes that portion of former TA-26 retained by the DOE. Existing structures in this technical area include the airport terminal building (TA-73-1), a storage building converted from the former incinerator (TA-73-2), a Morgan shed (TA-73-3), the airport fire station (TA –73-4, a gas meter station (TA-73-5), three transformer stations (TA-73-6 through -8) and four gasoline underground storage tanks (USTs) (TA-73-1-1 through -4). The USTs are owned by a private aviation club but are located on DOE property. A number of privately owned buildings, storage sheds, and hangars are also located at the site (LANL 1992, 7667).

Several structures, which include a steam-cleaning plant for garbage trucks, cans and dumpsters and four storage bunkers (magazines), have been removed from TA-73. The truck- and can-cleaning plan, which was removed in 1971, was located immediately south of the incinerator. The four storage bunkers, removed in 1974, were located on Fox Street at the northeastern end of the runway (LANL 1992, 7667).

Other operations at TA-73 included a landfill, a portion of which underlies the tie-down area for private planes, a waste oil pit located just west off the bunkers, and a surface disposal area located south of East Road and north of DP Canyon. Outfalls, drainlines, and septic systems were associated with a number of former operations at TA-73 (LANL 1992, 7667).

Operations at TA-73 included incinerating classified documents and disposing of various types of waste; steam-cleaning garbage cans, trucks, and dumpsters; operating a landfill and burning municipal and laboratory waste; disposing of waste oil; storing high explosives; operating a surface disposal facility; and operating an asphalt batch plant (LANL 1992, 7667). Outfalls, drain lines, and septic systems were associated with a number of former operations at TA-73 (LANL 1992, 7667).

2 INVESTIGATIONS CONDUCTED TO DATE

2.1 Bayo Canyon

2.1.1 Technical Area 0

PRSs located within the Bayo Canyon watershed at TA-00 have been addressed in the "RFI Work Plan for Operable Unit 1079" (LANL 1992, 7668) and are more fully discussed in Appendix A. All PRSs within TA-00 in Bayo Canyon have been recommended for no further action (NFA) (LANL 2001, No ER ID).

2.1.2 Technical Area 10

During operation of TA-10, several environmental investigations were conducted to determine the presence and extent of potential contaminants. A radiological survey of surface sediments was conducted in the summer 1954 at the Bayo site explosive testing pads and laboratory as follow-up to similar work conducted in 1946 and 1947. Twenty-four samples were collected and analyzed for plutonium, polonium, strontium, and uranium. Results from the investigation indicated that sediments contained 5,000 disintegrations per minute per gram (d/m/g) of beta activity and 15,000 d/m/g of gross beta/gamma activity in a small area adjacent to the former Bayo laboratory building. Other sediment samples at the site contained gross beta/gamma activity ranging from 36 to 125 d/m/g (Dodd 1956, 4695, pp. 3, 4, 10).

In 1956, an investigation of Bayo site was conducted to assess potential contaminants from Laboratory activities. Sediment samples were collected near the Bayo site laboratory. The surface sediment samples contained 15,000 counts per minute per gram (c/m/g) and samples from a depth of 3 ft (0.9 m) contained 200 to 300 c/m/g. The results of the investigation identified runoff and groundwater as potential migration pathways for contaminants (Abrahams 1956, 5319).

During 1961 and 1962, the Albuquerque-Los Alamos Area Aerial Radiological Measuring Survey (ARMS) conducted radiation surveys in the Los Alamos area, including Bayo Canyon. The nationwide program was designed to measure current environmental gamma radiation levels by conducting aerial surveys using a thallium-activated sodium iodide detector to count activity at specific altitudes. The results from the ARMS investigation determined that the measured terrestrial radioactivity could be attributed to area geology and materials used in urban development. Furthermore, results indicated that artificial radionuclides are present in small quantities, which were assumed to be in uniform distribution (Guillou 1964, 15096, pp. 5, 11, 16). The ARMS test was conducted again in 1975 using improved equipment. The results of the aerial survey found that yttrium-90 and uranium-238 were not measured in significant concentrations in the vicinity of Bayo site (Mayfield et al. 1979, 11717, p. 15).

Investigations performed at specific PRSs are summarized in Appendix A.

2.1.2.1 Decontamination and Decommissioning (D&D) Activities

Decontamination and decommissioning activities started at TA-10 in 1960 with the demolition and/or burning of several buildings. The site-wide decommissioning of both the firing sites and the radiochemistry laboratory and associated structures was completed in 1963. During cleanup activities in 1963, 90 truckloads of debris, shrapnel, and HE materials were removed from a radius of 760 m from the detonation control buildings at the firing sites, and transported to Material Disposal Area (MDA)-C at TA-50 and MDA-G at TA-54. The liquid waste disposal system associated with the radiochemistry laboratory was also removed, and the contaminated waste pits were excavated (Courtright 1963, 4771, pp. 19–20). Radiological surveys showed that the site was sufficiently free of contaminants to permit the land to be released from federal

control. The land was transferred to Los Alamos County by quitclaim deed on July 1, 1967 (Mayfield et al. 1979, 11717, p. 1).

2.1.2.2 Post-D&D Investigations

In 1973, 3 boreholes were drilled to investigate the subsurface at former TA-10; in 1974, 12 additional boreholes were drilled near each of the 3 test holes drilled in 1973. Subsurface samples were collected and analyzed for gross alpha and gross beta activity. Samples collected from the boreholes indicated that strontium-90 was present above background levels in the subsurface near several former structures at TA-10. Samples collected from a borehole near the former concrete tank (10-50) contained 1500 to 24,000 picocuries per gram (pCi/g) gross beta activity at 14- to 16-ft (4.3- to 4.9-m) depth, indicating that some migration of radionuclides into the bedrock tuff had occurred (Mayfield et al. 1979, 11717, pp. 14, 51).

2.1.2.3 Formerly Utilized Sites Remedial Action Program (FUSRAP) Investigation

In 1976 the Energy Research and Development Administration identified former TA-10 for reevaluation as part of the FUSRAP. The FUSRAP used modern instrumentation and analytical methods to determine whether any further corrective actions were needed. The investigation was undertaken by the Los Alamos Scientific Laboratory under contract to the Energy Research and Development Administration and subsequently to the DOE (Mayfield et al. 1979, 11717, p. 1).

The FUSRAP investigation included surface and subsurface soil sampling and radiochemical analyses. Results showed that surface materials contained an average concentration of 1.4 pCi/g of strontium-90, which was about 3 times the level attributable to worldwide fallout. The average uranium concentration in surface materials was about 4.9 micrograms per gram (µg/g), about 1.5 times the level naturally present in the soils. Subsurface contamination associated with the waste disposal system at former TA-10 was found confined within an area of about 10,000 m^2 (108,000 ft^2 or about 2.5 acres) that extended to a depth of about 5 m (16 ft). A total of 378 subsurface samples was collected, of which about 12% contained gross beta activity that exceeded background levels (Mayfield et al. 1979, 11717, p. 1).

During the 1977 FUSRAP investigation, several boreholes were drilled and trenches were dug around several former structures at TA-10 including the former septic tank (10-40), the personnel building (10-21), the acid-waste lines leading from the radiochemistry laboratory to a manhole (10-51), and the acid waste septic tank (10-39). Trench samples showed background levels of gross-alpha and gross-beta activity. However, strontium-90 levels were nearly 6 pCi/g, approximately 15 times the background level (LANL 1992, 7668, p. 3-60).

Radiological dose calculations based on a residential scenario were calculated based on the results of the FUSRAP sampling and analyses. The calculated residential dose for an average resident of Bayo Canyon was 0.43 millirem per year (mrem/yr) due to external penetrating radiation from the sediments. This dose amount was 0.086% of existing DOE guidelines (500 mrem/yr) and 0.24% of the dose received from natural radiation in Bayo Canyon (180 mrem/yr). The maximum exposure scenario was ingestion of 50 kg/yr (for 50 yr) of vegetables and fruits produced from garden plots located in contaminated soil in Bayo Canyon. The calculated dose for this scenario was 45.6 mrem to the bone, which was 3.0% of the DOE guidelines for annual exposure and 25% of annual exposure from natural radiation in the canyon. Another exposure scenario that was calculated provided for inhalation of dust containing contaminants, such as which would be expected for a construction worker. The calculated dose was 23 mrem to the bone (Mayfield et al. 1979, 11717, p. 2).

2.1.2.4 RCRA Facility Investigation

PRSs located within the Bayo Canyon watershed at former TA-10 were addressed in the "RFI Work Plan for Operable Unit 1079" (LANL 1992, 7667). Results of the investigations performed under the work plan were reported in the RFI report for TA-10 PRSs 10-002(a,b), 10-003(a–o), 10-004(a,b), 10-005, 10-007, (LANL 1996, 54332) and the addendum RFI report on the results of radionuclide analyses (LANL 1996, 54617). The results of a voluntary interim action (IA) cleanup at PRSs 10-002(a,b), 10-003(a–o), 10-004(a,b), and 10-007 were reported in an IA report (LANL 1996, 54491).

2.1.2.4.1 RFI Characterization

The 1994 RFI for the TA-10 subsurface disposal aggregate included geodetic, radiological, and geophysical surveys; drilling; and subsurface sampling. The geodetic survey identified the locations of former buildings and structures associated with TA-10 operations. The radiological survey was conducted for health and safety purposes by the Laboratory's Health Physics Operations Group (ESH-1). The results of the geophysical survey were used to determine the location of PRS 10-005, a surface disposal pit (LANL 1996, 54332).

A total of 93 boreholes was drilled and sampled. Boreholes were advanced to a minimum depth of 50 ft below ground surface. At least four subsurface samples were collected from each borehole for laboratory analysis of selected radiological and non-radiological constituents (LANL 1996, 54332). Soil samples were collected at 5-ft intervals for on-site analysis of gross radioactivity by the Laboratory's Analytical Chemistry Services Group (CST-9) Mobile Radiochemical Analytical Laboratory (MRAL) and off-site analyses of selected non-radiological constituents by CST-9's Mobile Chemical Analytical Laboratory (MCAL). The TA-10 Bayo Canyon subsurface sampling field summary report describes the site characterization activities conducted to address potential contaminant releases from PRSs 10-002(a-b), 10-003(a–o), 10-004(a,b), 10-005, and 10-007 (LANL 1995, 49073, p. i).

Analyses of target analyte list (TAL) metals and semi-volatile organic compounds (SVOCs) indicated that neither metals nor SVOCs were present above SALs in any of the 93 boreholes. Radiological screening results indicated the presence of radioactivity above background levels in some boreholes associated with former structure 10-48. On average, radiological contaminants were detected in the various boreholes in depths ranging from approximately 14- to 22-ft depth (LANL 1995, 49073, p. i).

The 1996 RFI report for TA-10 was for the subsurface aggregate, which includes all areas of TA-10 where subsurface contaminants were of concern. The PRSs in the subsurface aggregate are located near the former radiochemistry laboratory, and include PRSs 10-002(a-b), 10-003(a–o), 10-004(a,b), 10-005, and 10-007. The list of chemicals of potential concern (COPCs) for these PRSs includes TAL metals, HE compounds, volatile organic compounds (VOCs), SVOCs, total uranium, isotopic uranium, and strontium-90 (LANL 1996, 54332).

2.1.2.5 Interim Action for Shrapnel Removal

Radioactively contaminated shrapnel fragments were found in 1993 during geomorphic mapping activities at the former TA-10 firing site. The shrapnel present in middle Bayo Canyon resulted from surface detonations at the firing sites at former TA-10; the original distribution of shrapnel was primarily on the ground surface. However, in the more than 50 years since the detonations began, and since 1960 when activities were suspended, shrapnel was redistributed by a combination of natural and anthropogenic processes (LANL 1996, 54491, p. 3).

When the firing sites at former TA-10 were active in the late 1940s and 1950s, shrapnel was redistributed by human activities at the firing sites. Shrapnel was redistributed when firing pads were cleared for subsequent shots, the area around firing sites was re-graded with earth-moving equipment, and shrapnel material was deliberately buried for disposal. Redistribution of shrapnel fragments also likely occurred during decommissioning of the site in the early 1960s when firing pads, bunkers, and other structures were removed. Additional inadvertent transport and burial of shrapnel probably occurred during decommissioning disturbance by trucks and heavy equipment (LANL 2001, No ER ID).

Storm water runoff may have transported shrapnel fragments down canyon side slopes to the canyon floor and possibly into the main stream channel. A geomorphic survey of the middle Bayo Canyon area found that surface and geological processes in the area are dynamic (Drake and Inoue 1993, 53456). At least two cycles of erosion and deposition have occurred since the firing sites at former TA-10 began activity, resulting in incorporation of shrapnel into alluvium up to depths of 1.1 m (3.6 ft). Shrapnel may have been transported downstream by flood events along the main drainage channel (LANL 1996, 54491, pp. 3, 4).

During the RFI characterization of the former TA-10 site, a small percentage (1% to 2%) of shrapnel fragments were found to be radioactively contaminated. Several shrapnel fragments contained radioactivity with measured dose rates up to 8 mrem/hr (LANL 1996, 54491, p. 5).

Due to the potential for human health risks to recreational users of the canyon, a voluntary corrective action (VCA) was planned initially. The VCA plan called for shrapnel pieces in the upper 4 ft of soil to be located using geophysical techniques and removed by hand. During the first few days of the survey, thousands of pieces of shrapnel per acre were discovered in the vicinity of the former firing pads. Removal of all the shrapnel by hand was then recognized to be an impractical solution (LANL 1996, 54491, p. I).

The VCA plan was changed to an IA with the following three main objectives:

- immediately reducing potential public risk by removing surface shrapnel from those areas of Bayo Canyon that are open to the public;
- performing a systematic shrapnel-density distribution study to support future remedy selection alternatives, should further shrapnel removal be necessary; and
- obtaining data concerning radioactive contaminant distribution on shrapnel pieces sufficient to support a risk assessment.

The IA shrapnel project was performed in fall and winter 1994. The shrapnel density distribution investigation was performed in an area about 2400 ft (730 m) wide and 24,000 ft (7300 m) long, which covered approximately 11 acres. Shrapnel distribution was determined by close inspection of selected 10-ft (3-m)-square grids. Shrapnel depth distribution was recorded in 3-in. (7.6-cm)-depth intervals. Depth-distribution data and shrapnel count data from the selected grid squares were used to estimate the total distribution of shrapnel over the middle Bayo Canyon area. Additionally, a geophysical survey was conducted in the active stream channel (dry streambed). Shrapnel densities were recorded in 10-ft (3-m)-square grids at 200-ft (60-m) intervals along the length of the stream channel for 8600 ft (LANL 1996, 54491, p. 7).

The results of the shrapnel distribution investigation showed considerable variation in shrapnel densities within Bayo Canyon at former TA-10. Near the former firing sites, shrapnel densities in excess of 2,000,000 pieces per acre were found. Shrapnel densities of 5000 pieces per acre or greater covered an area of approximately 75 acres. Most (65%) of the shrapnel was found within the upper 3 in. (7.6 cm) of soil and 68% of the shrapnel was found within the upper 6 in. (15 cm) of soil. Less than 4% of the shrapnel was present at depths greater than 1 ft (0.3 m). During the shrapnel density distribution investigation, less than 1% of the 8,513 pieces of shrapnel that were

collected were radioactive. In the stream channel, from 1 to 3 pieces of shrapnel consistently were found to be present in each of the 10-ft^2 (3-m^2) grids that were located every 200 ft (60 m) along the stream channel (LANL 1996, 54491, p. 11).

During the shrapnel removal phase of the project, a 10-ft^2 (30-m^2) grid pattern was established over an area about 1,000 ft (305 m) wide and 6,000 ft (1830 m) long in middle Bayo Canyon and on the adjacent Kwage Mesa. Over 19,000 pieces of shrapnel were collected, of which 458 pieces (2.4%) were radioactive. Most shrapnel pieces (87%) were less than 6 in. (15 cm) long and 53% were greater than 2 in. (5 cm) long (LANL 1996, 54491, p. 8).

A risk assessment was performed based on the data collected during the shrapnel distribution investigation and the surface shrapnel removal activity. Exposure pathways considered by the risk assessment included ingestion of radioactive shrapnel fragments and external exposure to the skin surface. The external skin exposure assessments included a two hypothetical scenarios: a child picking up a piece of radioactive shrapnel and carrying it in a pocket for up to 48 hours and an adult making a necklace of a piece of shrapnel and wearing the necklace next to the skin for 18 hours a day for a year (LANL 1996, 54491, pp. 12–15).

Risk modeling shows that the increased cancer risk from the shrapnel is less than the US Environmental Protection Agency (EPA)-accepted risk range of 1 in 10^4 to 1 in 10^6. The potential acute effects were determined to be negligible. Therefore, the human health consequences of the remaining Bayo Canyon shrapnel were determined to be minimal and no further action was recommended for the remaining shrapnel in Bayo Canyon (LANL 1996, 54491, pp. i, ii).

2.1.2.6 Interim Action for Strontium-90 in Vegetation

An IA was conducted in 1996 and in 1997 to address strontium-90 in vegetation at the former site of the central portion of TA-10 in Bayo Canyon. The IA related to PRSs 10-002(a,b), 10-003(a–o), 10-004(a,b), and 10-007 (LANL 1997, 56358). Initially, IA activities were planned to address only chamisa that contained elevated activity (LANL 1996, 55698, p. 1). However, during a radiation survey conducted to determine which chamisa plants would be removed, surface soil and several plant species in addition to chamisa were found to contain elevated radioactivity. A characterization plan was prepared and implemented to define the nature and extent of plant and soil contaminants. A total of 56 soil and sediment samples was collected during the characterization phase of the IA. Strontium-90 in the sediment samples ranged from 2 to 146 pCi/g and vegetation samples ranged from 14 to 199 pCi/g dry weight (LANL 1997, 56358, Table 1). This information was used to prepare a revised IA approach. This revised approach was expected to mitigate the potential for exposure to strontium-90 in plants and soil at the TA-10 central area pending selection and implementation of a final remedy for the site. Pending implementation of a final remedy, silt fences and straw bales were installed at the site (LANL 1997, 56358, p. 1).

A risk assessment was developed from the characterization data obtained during the IA. Pathways used in the assessment included (1) inhalation of re-suspended dust and soil, (2) ingestion of soil, (3) ingestion of plant material, (4) ingestion of meat from animals that had foraged in the area, and (5) inhalation of wood smoke from firewood gathered at the site. Plant ingestion was the primary contributor to annual dose (93%) and ingestion of game meat was the second highest contributor (5%). The annual dose calculated from the plant ingestion scenario was less than 10 mrem/yr (LANL 1997, 56358, p. 11).

2.2 Barrancas Canyon

Potential contaminant sources for Barrancas Canyon include PRSs on mesa tops within the watershed. In addition, former firing sites at TA-10 may have introduced shrapnel and

contaminants into Barrancas Canyon. Barrancas Canyon was sampled above the confluence with Guaje Canyon and analyzed for gross activity in 1965 and again in 1970 for gross activity and plutonium (LANL 2001, No ER ID).

2.2.1 Technical Area 00

A single PRS, PRS 00-025, is located within the Barrancas Canyon watershed. This PRS is discussed above under Bayo Canyon (LANL 2001, No ER ID).

2.2.2 Technical Area 10

Former firing sites at TA-10 adjacent to and upstream (west) of TA-74 in Bayo Canyon are described above in Bayo Canyon and may have introduced shrapnel and contaminants into Barrancas Canyon.

2.2.3 Technical Area 74

No PRSs are present within TA-74 within the Barrancas Canyon watershed (LANL 2001, No ER ID).

Operations at former TA-10, which is adjacent to and upstream (west) of TA-74, have been described previously and may have created environmental impacts at TA-74 (LANL 2001, No ER ID).

2.3 Pueblo Canyon

2.3.1 Technical Area 00

2.3.1.1 PRS 00-005 (Pueblo Canyon)

Contaminants associated with sediments in Pueblo Canyon have been investigated in many studies since the initial contaminant releases from TA-45. The first sediment sampling, in 1946, indicated the presence of plutonium along the full length of Pueblo Canyon downstream from Acid Canyon, documenting rapid transport along a distance of 11 km from the source (Kingsley 1947, 4186).

Subsequent work has included repeated sediment sampling at a series of stations as part of the Laboratory Environmental Surveillance Program since 1970 (e.g., Environmental Surveillance and Compliance Programs 1997, 56684) and more intensive studies in the 1970s. Work in the 1970s included studies by the Laboratory Environmental Sciences Group (e.g., Hakonson and Bostick 1975, 29678; Nyhan et al. 1976, 11747; Nyhan et al. 1982, 7164) and investigations under FUSRAP (LANL 1981, 6059).

Sediments in the stream channels of Los Alamos Canyon and Pueblo Canyon were sampled under the FUSRAP in the late 1970s. A comprehensive report on these activities was issued in 1981 (LANL 1981, 6059). Samples were collected at regular intervals along canyon transects and included sediments from active channels, inactive channels, and banks. In lower Pueblo Canyon and lower Los Alamos Canyon, the predominant radionuclide present above background level was plutonium-239; however, uranium, strontium-90 and cesium-137 were also present at levels above background values (LANL 1995, 50290).

More recently, existing data on plutonium in sediments were combined with geomorphic mapping of Pueblo Canyon to provide an improved estimate of the inventory of plutonium in the canyon (Graf 1995, 48851; Graf 1996, 55537).

In 1996 and 1997, sediment sampling in Pueblo Canyon was conducted by defining four reaches within the canyon itself (Reneau et al. 1998, 65406.5). The initial locations of the Pueblo Canyon reaches were selected to address a variety of goals, including identifying variations in contaminant concentration, contaminant inventory, and risk along the length of Pueblo Canyon:

- Reach P-1 (approximately 6 miles upstream of the White Rock "Y" North Sub-parcel) includes the confluence of Acid Canyon and Pueblo Canyon; it is the area where contaminant concentrations were expected to be highest because of proximity to TA-45, the primary source of contaminants in the watershed.
- Reach P-2 (approximately 3 miles upstream of the White Rock "Y" North Sub-parcel) is an area downstream of P-1 where the channel becomes less steep and the canyon floor begins to broaden, enhancing the opportunity for sediment deposition.
- Reach P-3 (approximately 1.5 miles upstream of the White Rock "Y" North Sub-parcel) includes the area of the Bayo Canyon WWTP.
- Reach P-4 (immediately upstream of the White Rock "Y" North Sub-parcel) includes the lowest part of Pueblo Canyon, a geomorphically complex area where the channel elevation has varied greatly since 1942 because of the deposition of large amounts of sediment and subsequent channel incision.

Field investigations at all reaches were initiated with a geomorphic survey for geomorphic mapping, a field radiological survey, and finally analytical sampling of the sediment. Sediment samples collected in the Pueblo Canyon reaches included samples for full-suite, limited-suite, and key contaminant analyses. The full-suite analyses included radionuclides, PCBs, pesticides, SVOCs, and inorganic chemicals. Limited-suite sampling includes analyses for PCBs, pesticides, inorganic chemicals, and radionuclides. Key contaminant sampling was conducted for isotopic plutonium because this radionuclide was shown by preliminary assessments to be the primary contributor to human health risk.

Across the four reaches, 289 samples were collected for isotopic plutonium analysis, 30 samples were collected for PCB/pesticides analysis, 16 samples were collected for SVOC analysis, 44 samples were collected for inorganic chemicals analysis, and approximately 164 additional samples were submitted for specific or gross radionuclide analyses. Based on the sampling results and data assessment, there are 6 radionuclides, 8 inorganic chemicals, and 29 organic chemicals recommended for further evaluation.

The Pueblo Canyon Reach Report identifies radionuclides as the primary COPCs, the most significant of these being plutonium-239,240 (Reneau et al. 1998, 65406.5). Several inorganic COPCs were identified, including cadmium, lead, silver, and zinc. Twenty-nine organic COPCs were measured at low concentrations including PCBs, pesticides, and polyaromatic hydrocarbons (PAHs).

2.3.1.2 PRSs 00-030(h,l,n,o,p) - Septic Systems

These septic systems were abandoned in place after the Central Wastewater Treatment Plant became operation in 1947. Each septic tank was either completely or partially backfilled with material when it was initially taken out of service. All of these septic tanks, except for PRS 00-030(p) were located during a 1996 VCA. PRS 00-030(p) was not located and is believed to have been removed during the installation of a high-pressure gas line that bisects its expected location.

During the 1996 VCA, the three septic tanks that were located were excavated and removed. Drainlines associated with PRS 00-030(p) were also located and removed. Confirmation samples obtained demonstrated that the remaining soils did not pose a risk to human health or the

environment. All four PRSs were recommended for NFA in the 1996 VCA Completion Report (LANL 1996, 62416.1).

2.3.2 Technical Area 1

TA-1 was the site of Manhattan Project activities that involved basic chemical operations including wet chemistry experimentation, and wet and dry chemistry processing. TA-1 also housed several mechanical operations such as casting, machining, and powder metallurgy. As operations gradually relocated to new technical areas between 1945 and 1965, phased decontamination and decommissioning activities occurred at TA-1. All building superstructures were demolished and removed. Soils surrounding the buildings, within the former building footprints, and adjacent to former plumbing structures were radiologically surveyed; any identified radioactively contaminated soil was excavated and disposed of and replaced with clean fill. Backfilling and re-contouring was completed on the mesa-top area where considerable excavation of contaminated soils and volcanic tuff occurred during decontamination and decommissioning activities in the 1970s. The area has since been subject to extensive residential and commercial development.

2.3.3 Technical Area 19

2.3.3.1 PRS 19-002

The ER Project conducted a VCA in 1995 at former PRS 19-002 to remove the solid waste. In June 1995, a site reconnaissance was completed to assess the extent of the concrete and battery debris prior to removing the materials. Three samples (two surface soil and one that consisted of materials from each of the three battery types at the site) were collected. No elevated organic, inorganic or radionuclide contaminants were detected. In August 1995, former PRS 19-002 was sampled as part of an RFI. Nineteen surface soil and drainage sediment samples were collected from areas immediately surrounding battery piles and from first-order drainages around the former PRS. Sample analysis indicated no residual chemical or radiological contaminants were present above SALs. About two cubic yards of concrete debris and 1.5 cubic yards of old batteries and associated debris were removed from the site and were disposed of at the Los Alamos County landfill. The VCA report recommended no further action for PRS 19-002.

2.3.3.2 PRSs 19-001, 19-003 and C-19-001

The ER Project conducted an RFI at former PRSs 19-001, 19-003, and AOC C-19-001 in 1997 to determine if residual contamination from historic operations was present. A geodetic survey was conducted to establish the original locations of the septic tank, drainlines, outfalls, building corners, and fences. The septic tank, associated inlet and outlet lines (former PRS 19-001), and the drainline (former PRS 19-003) were removed. After the drainline was removed, a sump pump was lowered into the septic tank and about 300 gallons of liquid was pumped into containers. Fifteen surface and subsurface soil samples and two replicates from fifteen locations were collected, field screened for organic chemicals, gross alpha and gross beta/gamma radiation and submitted for laboratory analysis of organic chemicals, inorganic chemicals, and gamma spectroscopy.

At former PRS 19-001, two samples were collected in the outfall area on the mesa slope and eight were collected from the mesa top. Acetone, aluminum, anthracene, barium, bis(2-ethylhexyl)phthalate, benzo(g,h,i) perylene, calcium, carbazole, cesium-137, chromium, cobalt, copper, dibenzofuran, lead, manganese-54, magnesium, methylene chloride, 2-methyl naphthalene, nickel, phenanthrene, toluene, vanadium, zinc, and 12 PAHs were detected above background screening values. Cesium-137 (detected at 5.85 mg/kg with a SAL of 5.1 mg/kg) and

the following PAHs were detected at concentrations greater than SAL: benzo(a)anthracene (detected at 13 mg/kg with a SAL of 0.61 mg/kg), benzo(b) fluoranthene (detected at 16 mg/kg with a SAL of 0.61 mg/kg), benzo(a)pyrene (detected at 13 mg/kg with a SAL of 0.061 mg/kg), dibenzo(a,h)anthracene (detected at 1.2 mg/kg with a SAL of 0.061 mg/kg), and indeno(1,2,3-cd)pyrene (detected at 3.8 mg/kg with a SAL of 0.61 mg/kg). Calcium and magnesium have no SALs and are essential nutrients. The RFI report compared the two inorganic chemicals to their RDAs. The intakes associated with incidental soil ingestion would be considerably less than the RDAs and calcium and magnesium were eliminated from further consideration. Some PAHs have no SALs. For those chemicals, surrogate toxicity values were used based on similar chemical structure to other PAHs. Two soil samples were collected from the outfall area (mesa slope) at former PRS 19-003. The sample locations were within the boundaries of former PRS 19-002. Acetone, cadmium, calcium, cesium-137, copper, lead, manganese, mercury, methylene chloride, toluene, zinc, and two PAHs were detected above background screening values. Manganese was detected at concentrations greater than SAL (detected at 6210 mg/kg with a SAL of 3200 mg/kg). At the mesa top location for former PRS 19-003, five samples were collected. Acetone, aluminum, arsenic, barium, benzo(g,h,i) perylene, calcium, carbazole, cesium-137, chromium, cobalt, copper, dibenzofuran, magnesium, mercury, methylene chloride, 2-methyl naphthalene, nickel, phenanthrene, selenium, vanadium, and 13 PAHs were detected above background screening values. Arsenic (background value is greater than SAL; detected at 3.3 mg/kg with a SAL of 0.38 mg/kg) and the following PAHs were detected at concentrations greater than SAL: benzo(a)anthracene (detected at 13 mg/kg with a SAL of 0.61 mg/kg), benzo(b) fluoranthene (detected at 16 mg/kg with a SAL of 0.61 mg/kg), benzo(a)pyrene (detected at 13 mg/kg with a SAL of 0.061 mg/kg), dibenzo(a,h)anthracene (detected at 1.2 mg/kg with a SAL of 0.061 mg/kg), and indeno(1,2,3-cd)pyrene (detected at 3.8 mg/kg with a SAL of 0.61 mg/kg).

Because former PRSs 19-001 and 19-003 are planned for a land transfer, future land use on the mesa top was assumed to be residential for the purposes of the human health risk assessment. The outfall drainage area is too steeply sloped, and its future land use was assumed to be recreational. The RFI report concluded that risk associated with both use scenarios at former PRS 19-001 and the mesa-top portion of former PRS 19-003 fell into EPA's acceptable range. At the mesa slope portion of former PRS 19-003, the RFI report stated that the detected contamination is associated with historic battery disposal at former PRS 19-002. PAHS, which would be associated with former PRS 19-003, were not detected at levels greater than 0.1 times SAL in the outfall. The RFI report stated that soil contamination associated with the battery disposal area at former PRS 19-002 will be revisited and will include the outfall area of former PRS 19-003 since the outfall contamination is associated with batteries and not with the drainline. The RFI report recommended NFA at former PRSs 19-001 and 19-003 because the sites were characterized in accordance with applicable state and federal regulations and available data indicate that contaminants are not present in concentrations that pose an unacceptable human health risk under projected future land use. Contaminants identified in the outfall area at former PRS 19-003 were not related to the drainline of the former PRS. Former PRS 19-002 will be revisited and will include evaluation of the battery-related contaminants that were detected in the outfall samples of former PRS 19-003.

The ER Project conducted an RFI at former AOC C-19-001 in 1997 to determine whether residual contamination was present in the surface drainages south of the former laboratory. A geodetic survey was performed to establish the original locations of the corners of buildings and fences. Seven surface soil samples were collected. Samples were field screened for organic chemicals and radionuclides. They were submitted for laboratory analysis of inorganic chemicals, organic chemicals, and gamma spectroscopy. All samples indicated no organic chemicals and background levels of radioactivity. Acetone, calcium, dibenzofuran, lead, methylene chloride, 2-methylnaphthalene, phenanthrene, sodium, toluene, and four PAHs were detected above background screening values. No chemicals were detected at concentrations greater than SAL.

Calcium has no SAL and is an essential nutrient. The RFI report compared calcium to its RDA. The intake associated with incidental soil ingestion would be considerably less than the RDA and calcium was eliminated from further consideration. The RFI report recommended NFA at former AOC C-19-001 because the site was characterized in accordance with applicable state and federal regulations and available data indicate that contaminants are not present in concentrations that pose an unacceptable human health risk under projected future land use.

2.3.4 Technical Area 31

TA-31, known as the "east receiving yard," was located on East Mesa north of East Road and west of Los Alamos Airport. The site was the main receiving area for supplies at LANL from 1945-1954. Group A-4 operated TA-31, which was responsible for procuring everything from office supplies to technical apparatus. Group A-4 maintained a chemical storage area at TA-21, therefore, it is unlikely that large quantities of bulk chemicals were stored at TA-31. No documented spills occurred at TA-31. PRS 31-001 is the only identified PRS at TA-31 and is further discussed in Appendix A.

2.3.5 Technical Area 45

Radionuclides detected above background values downstream from the outfalls (PRSs 01-002 and 45-004) in sediment samples collected during ER Project investigations include americium-241; cesium-137; plutonium-238; plutonium-239,240; strontium-90; uranium-234; uranium-235; and uranium-238. Americium-241; cesium-137; and plutonium-239,240 locally exceeded SALs (LANL 1996, 54468). In addition lead, mercury, and silver were detected above background values but below SALs (LANL 1995, 48856).

Demolition of structures at TA-45 and excavation of contaminated soils occurred in 1966 before the land was released to Los Alamos County in 1967; additional remediation occurred in 1982.

PRS-specific information is provided in Appendix A.

2.3.6 Technical Area 73

Historical operations at TA-73 included incinerating classified documents and disposing of various types of waste (PRS 73-002); steam-cleaning garbage cans, trucks, and dumpsters (PRS 73-003); operating a landfill and burning municipal and laboratory waste [PRS 73-001(a)]; disposing of waste oil [PRS 73-001(b)]; storing high explosives [PRS 73-001(c)]; operating a surface disposal facility (PRS 73-005); and operating an asphalt batch plant (LANL 1992, 7667). Outfalls, drain lines, and septic systems were associated with a number of former operations at TA-73.

An airport improvement project included excavating a portion of the inactive landfill in 1984 and backfilling with clean, compacted fill to produce a firm base for construction of hangars and a plane tie-down area. The western half of the landfill was excavated and placed in two 60-ft deep pits in the northeast portion of the airport. The soil and tuff removed from the pits were subsequently used to backfill the excavated landfill.

In April 1987, as part of a DOE environmental survey, soil and waste samples were collected in the vicinity of the airport landfill and from the canyon disposal area behind the incinerator. The sample from the landfill was analyzed for organic, inorganic and radiological contaminants.

PRS-specific information is provided in Appendix A.

3 FUTURE INVESTIGATIONS AND ASSOCIATED SCHEDULES

3.1 Bayo and Barrancas Canyons

The Work Plan for the North Canyons (Bayo, Barrancas, Rendija and Guaje Canyons) was prepared in September 2001 (LANL 2001, No ER ID). When implemented, this Work Plan will evaluate the present-day human health and ecological risks from Laboratory-derived contaminants within the north canyon systems and to assess future impacts from the transport of these contaminants. To achieve these goals, the Work Plan will:

- Assess present-day risk to human health and ecological systems and evaluate the potential for transport of contaminants that could cause future human health and ecological risks;
- Determine the degree to which stream channel sediments, active floodplain sediments, and if present, persistent surface water in the north canyons, have been affected by Laboratory releases;
- Refine the conceptual model for contaminant occurrence, transport, and exposure routes and for contaminant transport pathways and mechanisms specific to the canyon systems as they relate to risk evaluation;
- Provide supplemental characterization of surface water and alluvial groundwater (if present) that is associated with PRSs located in the canyons;
- Conduct characterization activities in support of proposed transfer parcels within the north canyons investigation area;
- Determine if any portions of the canyon floors currently have unacceptable human health or ecological effects; and
- Recommend possible remedial actions for canyon-floor areas that have unacceptable present-day human health or ecological effects (LANL 2001, No ER ID).

This Work Plan is currently scheduled for implementation in FY04.

3.2 Pueblo Canyon

The assessments of potential human health and ecological risk presented in the Pueblo Canyon Reach Report indicate that levels of contamination in the sediments of Pueblo Canyon do not require immediate remedial actions with regard to present-day risk. Similarly, the geomorphic assessments indicate that the concentrations of contaminants in sediments carried by floods have been stable or have declined for decades, and the redistribution of contaminated sediments will not result in future increases in contaminant concentrations in downstream areas. Therefore, no remedial actions have been proposed or planned, although remedial actions may be warranted in the future following additional assessments (Reneau et al. 1998, 65406.5).

Additional risk assessments will be required beyond what was possible in the context of the Pueblo Canyon Reach Report, including both human health and ecological risk, and some additional sampling and analysis will be required to support these assessments. In particular, water quality data will be required for both human health and ecological risk assessments, and continued collection of sufficient data to perform risk assessments is considered a priority. In addition, more analyses from sediment samples may be required to complete these risk

assessments. Goals of additional sampling may include determining the specific chemical form and sources of the mercury, and also determining the most significant source for the mercury. Additional goals of further sampling may include determining the source and distribution of PAHs. If it is decided that additional sediment sampling is required outside of the sampled reaches (e.g., closer to the Pueblo Canyon Wastewater Treatment Plant) or within the White Rock "Y" North Sub-parcel, then additional geomorphic mapping in these areas will also be required (Reneau et al. 1998, 65406.5).

4 POTENTIAL REMEDIATIONS AND ASSOCIATED SCHEDULES

4.1 Bayo and Barrancas Canyons

Upon implementation of the North Canyons Work Plan and assessment of potential human health and ecological risk posed in these canyons, a determination can be made as to the need for remedial actions with regard to present-day risk. Similarly, the geomorphic assessments that will be conducted as part of the North Canyons Work Plan will provide an indication of the fate and transport of potential contamination in sediments. Until that time, it is unknown if remedial actions will be warranted (LANL 2001, No ER ID).

4.2 Pueblo Canyon

The assessments of potential human health and ecological risk presented in the reach report for Pueblo Canyon indicate that levels of contamination in the sediments of Pueblo Canyon do not require immediate remedial actions with regard to present-day risk. Similarly, the geomorphic assessments indicate that the concentrations of contaminants in sediments carried by floods have been stable or have declined for decades, and the redistribution of contaminated sediments will not result in future increases in contaminant concentrations in downstream areas. Therefore, no remedial actions have been proposed or planned, although it is not yet known whether remedial actions will be warranted in the future following additional assessments (Reneau et al 1998, 65406.5).

Decision points concerning the transport of contaminants from Pueblo Canyon into Los Alamos Canyon and toward the Rio Grande are not yet defined; thus, it is uncertain if remedial actions may be required to reduce either the concentrations of contaminants in sediments carried by floods or the total mass (inventory) of contaminants transported downstream over various time frames. Therefore, decisions concerning the possible need for remedial action in this context will depend on the development of specific decision criteria. (Reneau et al. 1998, 65406.5).

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APPENDIX A

PRS 00-008

PRS 00-008, the North Mesa surface disposal area, is a small, open disposal area containing building debris that appears to have come from a demolished weather hutment called "Point Weather." The hutment, which was located on Kwage Mesa (an eastern arm of North Mesa) either near the eastern end of the mesa or approximately 1.25 mi (2 km) east of the rodeo grounds, housed a generator and served as a weather station used in connection with shots fired at Bayo Canyon (Aldrich 1991, 11493). No Laboratory testing activities were conducted on North Mesa or Kwage Mesa. PRS 00-008 is located on Los Alamos County land and was proposed for NFA in the RFI work plan (LANL 1992, 7667, p. 6-2).

The following reasons are provided in support of proposing PRS 00-008 for NFA:

- No known laboratory activities occurred at the site,
- The generator probably was removed before the building was demolished in accordance with standard operation procedures (SOPs) for demolition,
- The debris observed by the Comprehensive Environmental Assessment and Response Program (CEARP) field survey team in 1986 is consistent with the type of debris that would be expected from demolition of the weather station hutment, and
- No hazardous materials were used at the weather hutment (Aldrich 1991, 11493; LANL 1992, 7667, p. 6-1; DOE 1986, 8657; DOE 1987, 52975).

PRS 00-011(d)

PRS 00-011(d) is the Barranca Mesa firing impact area in upper Bayo Canyon just northeast of the intersection of San Ildefonso Road and Diamond Drive. The US Army fired various types of ordnance into this area between 1944 and 1948 (LANL 1990, 7511; LANL 1992, 7667, p. 5-26).

Currently the site is fenced and marked to prevent the public from entering the site. Materials recovered from the PRS included ordnance fragments of 2.36-in. (6.00-cm) bazooka rounds. After the ER Project performed geomorphic mapping, 20 soil/sediment samples were collected during 2 sampling events. The data quality and screening assessments of the analytical results show that no HEs are present at the site and the concentrations of all inorganic chemicals except lead are comparable to regional background levels. Concentrations of lead ranged from 31 to 156 mg/kg, below the SAL value of 500 mg/kg (LANL 1994, 59427, p. ii).

All ordnance shrapnel and fragments recovered from the site were found in an area about 160 x 80 ft along the base of the cliff. The fragments were entirely 2.36-in. (6.00-cm) bazooka fragments except for one partly intact round. The material included tail fin assemblies, motors, bullets, and other fragments. The fragments mostly were found in the subsurface. Approximately 0.5 m^3 of ordnance fragments were recovered. The geophysical survey identified over 100 ferrous objects. All objects identified in the geophysics survey were investigated by an explosives ordnance team (LANL 1994, 59427, p. 15).

Based on the absence of any significant contaminants found in the search and removal operation and the absence of any significant contaminants in the soil or sediments, PRS 00-011(d) was

recommended for NFA and the site was recommended for approval as residential land use (LANL 1994, 59427, p. ii).

PRS 00-018(a and b)

PRS 00-018(a), the decommissioned Pueblo Canyon Waste Water Treatment Plant, is located at the end of Olive Street in Pueblo Canyon. This plant began operating in 1951, and was the primary supplier of effluent for irrigation at the Los Alamos Golf Course and recreational ball fields. The plant received waste from the health research laboratory at TA-43 until 1983, in addition to sanitary waste from local Los Alamos businesses and residences from 1983 to 1991. Los Alamos County decommissioned the plant in 1992.

Structures at TA-1 were served by an industrial waste line (PRS 01-002(a)) and three sanitary waste lines (PRSs 01-001(s, u and t)). The three sanitary waste lines discharged (via outfalls, septic tanks, and/or treatment plants) outside of TA-1 boundaries and are being addressed as part of other single or consolidated PRSs. During FY00, PRS 01-002 was divided into two parts: PRS 01-002(a)-00 - the industrial drain lines, and 1-002(b)-00 - the outfall from the TA-45 wastewater treatment plant. PRS 01-002(a)-00 will be addressed as part of this consolidated unit and PRS 1-002(b)-00 will addressed as part of consolidated unit 45-001-00. Additionally, PRS 01-001(m), former septic tank 275, was removed from this consolidated unit during fiscal year 2000 to address site-specific issues regarding the private property owner.

As operations gradually relocated to new technical areas, phased decommissioning and decontamination activities occurred. All former TA-1 buildings have been removed. Soils surrounding the buildings, within former building footprints, and adjacent to former plumbing structures were radiologically surveyed; any identified radioactively contaminated soil was excavated and disposed and replaced with clean fill. Backfilling and re-contouring was completed on the mesa-top area where considerable excavation of contaminated soils and volcanic tuff occurred during D&D activities in the 1970s. The area has been subject to substantial private and commercial development consisting of various retail stores, office buildings, and residences. Any remaining COPCs are commingled.

PRSs 00-018(a,b) were the subject of a 1997 RFI Report. The investigations conducted for this document determined that sludge from the Pueblo Canyon Wastewater Treatment Plant (PRS 00-018[a]) upstream of Acid Canyon contained a series of analytes above background values (barium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, vanadium, zinc, and uranium-235), although none of these are above SALs (LANL 1997, 56614).

PRS 00-018(a), the decommissioned Pueblo Canyon Waste Water Treatment Plant, is located at the end of Olive Street in Pueblo Canyon. This plant began operating in 1951, and was the primary supplier of effluent for irrigation at the Los Alamos Golf Course and recreational ball fields. The plant received waste from the health research laboratory at TA-43 until 1983, in addition to sanitary waste from local Los Alamos businesses and residences from 1983 to 1991. Los Alamos County decommissioned the plant in 1992.

Structures at TA-1 were served by an industrial waste line (PRS 1-002(a)) and three sanitary waste lines (PRSs 1-001(s, u and t)). The three sanitary waste lines discharged (via outfalls, septic tanks, and/or treatment plants) outside of TA-1 boundaries and are being addressed as part of other single or consolidated PRSs. During FY00, PRS 1-002 was divided into two parts: PRS 1-002(a)-00 - the industrial drain lines, and 1-002(b)-00 - the outfall from the TA-45 wastewater treatment plant. PRS 1-002(a)-00 will be addressed as part of this consolidated unit and PRS 1-002(b)-00 will addressed as part of consolidated unit 45-001-00. Additionally, PRS 1-001(m), former septic tank 275, was removed from this consolidated unit during FY00 to address

site-specific issues regarding the private property owner.

As operations gradually relocated to new technical areas, phased decommissioning and decontamination activities occurred. All former TA-1 buildings have been removed. Soils surrounding the buildings, within former building footprints, and adjacent to former plumbing structures were radiologically surveyed; any identified radioactively contaminated soil was excavated and disposed and replaced with clean fill. Backfilling and re-contouring was completed on the mesa-top area where considerable excavation of contaminated soils and volcanic tuff occurred during D&D activities in the 1970s. The area has been subject to substantial private and commercial development consisting of various retail stores, office buildings, and residences. Any remaining COPCs are commingled.

PRS 00-019

PRS 00-019 is also known as the Central Wastewater Treatment Plant (CWWTP) in TA-0. The CWWTP was operated from 1947 to 1965 when it was taken out of service and kept in standby status until the property was transferred to Los Alamos County (LAC) in 1967. PRS 00-019 is in the eastern part of Los Alamos town site, between the Sombrillo Nursing Facility and East Park, at the north edge of the mesa, above Graduation Canyon, a hanging tributary canyon of Pueblo Canyon. The PRS comprises a primary settling tank, sludge digestion tank, final settling tank, trickling filter, chlorine contact tank, clarifier, pump house, two sludge drying beds, two outfall areas, former manholes, and associated underground piping. CWWTP operations were confined to the mesa-top, but the two outfalls discharged into Graduation Canyon. The plant was used to treat sanitary sewage from Laboratory buildings and residential areas, including wastewater from sanitary drains at former TA-1 buildings, residences, and local businesses. The treated waste was discharged to the eastern outfall into Graduation Canyon. Beginning in 1948 the treated effluent was diverted via a pipeline along Canyon Road to the Los Alamos Golf Course. In 1951 most of the effluent from the CWWTP was used as make-up water for the cooling towers at TA-3. LAC did not operate the CWWTP but did use the site for various storage and staging activities after assuming ownership. LAC removed CWWTP structures as needed. This PRS is made up of two topographically defined and distinct areas. The first is the mesa top portion of the property which includes the former above-ground structures and subsurface piping, and the second area is the canyon-side of hill-slope outfall drainage areas to the north of the former facility, which terminate at the drainage contour of Graduation Canyon. During the investigation for the VCA plan in 1999 it was determined that LAC had decommissioned the CWWTP. All indications and recollections from interviewed site workers were that the CWWTP structures were removed, except for the original pump house and an undetermined amount of subsurface piping (LANL 1992, 7667).

In June 1999, LANL personnel began site remediation as described in the VCA Plan (LAUR-99-1707). They removed the pump house, the remaining piping, and the asbestos in the pump house. Over 2200-linear-ft. of cast iron pipe was removed and sent for recycling. Over 350-cu.-yd. of concrete was screened before its disposal at the LAC landfill. During the removal of the remnant piping and pump house, it was discovered that some of the process structures might still remain on-site. After a series of exploratory excavations, it was determined that all the process structures (primary settling tank, sludge digestion tank, trickling filter, final settling tank, and chlorine contact tank) remained in place. Preliminary investigation indicates that each of the process tanks was emptied, then completely or partially collapsed in on itself, and then filled and buried with soil of unknown origin to provide a broad open expanse for LAC use. The soil depths on-site range from 4-ft. to 8-ft. above the tanks. The mesa-top at PRS 00-019 is an open area that contains some asphalt and debris on the surface. The subsurface contains some remaining concrete walls and bottoms of tanks that were part of the original WWTP. Samples were taken for analysis. The mesa-top area is currently used by LAC for storage of equipment and disposal of

debris. LAC is planning to use the land to build a nursing facility, similar to Sombrillo, located adjacent to the property now owned by Sombrillo. When the nursing facility is built, it is anticipated that asphalt and the associated building(s) will cover the site. A VCA Report describing field activities, sampling, and conclusions was completed in September 2001 (LANL, No ER ID).

PRS 00-025

PRS 00-025 is the "Tank Mesa Landfill," which was listed as a possible waste disposal area (LANL 1990, 7511). "Tank Mesa," currently known as Otowi Mesa on topographic maps (USGS 1984, 736), is located between Barrancas and Bayo Canyons at the east end of Barrancas Mesa in what is now a residential area. Examination of historic engineering files did not reveal documentation that "Tank Mesa" was the site of a landfill. The only reference to "Tank Mesa" occurred in what appear to be reminder notes from a meeting. Although the notes include a few references to disposal areas, the words "Tank Mesa" were distinctly separate from those references. There was no evidence that Otowi Mesa was ever associated with the disposal areas. The archive search uncovered no additional information for PRS 00-025, which was recommended for NFA in the RFI work plan (LANL 1992, 7667, p. 6-4).

The basis for recommending NFA for PRS 00-025 includes the following:

- Re-examination of available site information shows that the reference cited for a landfill on Tank/Otowi Mesa in the PRS report contains no documentation that such a site ever existed (LANL 1990, 7511), and

- Based on this information and on the fact that Otowi Mesa is an extremely narrow arm of Barranca Mesa, whose surface consists of undisturbed bedrock, there is no reason to expect that a landfill ever existed on the mesa (LANL 1992, 7667, p. 6-4).

PRS 00-026

PRS 00-026 is the "Gun Mount Landfill" on North Mesa. The actual physical location of this PRS is unknown. According to the PRS report the "Gun Mount Landfill" consisted of a buried gun mount, radio poles, hutments, and similar miscellaneous structures (LANL 1990, 7511). A CEARP interviewee reported that a uranium-contaminated gun mount, approximately 5 x 5 x 6 ft, was disposed of on North Mesa in 1946 (LANL 1992, 7667, p. 6-4), although that report has not been verified. Interviews with another former Laboratory employee and a Zia Company employee who had knowledge of such operations indicate that the gun mount is probably not on North Mesa but may be somewhere on Laboratory property or perhaps was shipped to Idaho or some other location (LANL 1992, 7667, p. 6-4).

The radio poles and hutments are shown on a 1948 topographic map at a location that is now in the vicinity of the Los Alamos Middle School. The exact function of the former hutments is unknown; however, they may have housed generators. The disposition of the decommissioned structures is unknown. The PRS report speculates that the gun mount and remains of two structures are in a "landfill" but provides no supporting information (LANL 1990, 7511).

PRS 00-026 was recommended for NFA in the RFI work plan (LANL 1992, 7667) based on the following:

- If the gun mount is buried in North Mesa, the exact location is unknown. The best information available indicates that it is not on North Mesa; however, even if it were buried there, the associated uranium would not be in a form that could migrate in the

environment, or it would not be biologically available even if the structure were uncovered.

- The disposition of the decommissioned structure that was associated with radio communications is unknown. However, because no known Laboratory activities occurred at the site, any debris associated with the hutments should not pose a hazard to human health or the environment (LANL 1992, 7667, p. 6-4).

PRS 00-028(a)

PRS 00-028(a) is the Los Alamos County Golf Course which was irrigated first by the former Central WWTP (PRS 00-019) from 1948 until 1964 and by the Pueblo WWTP (PRS 00-018(b)) from 1951 until 1991. Both treatment plants were intended to handle only sanitary wastewater. Results from the RFI Report for PRSs 00-018(a,b), (LA-UR-97-3392) indicate that the only COPCs are metals.

PRS 00-028(b)

PRS 00-028(b), the North Mesa athletic fields, is located in the northern portion of Los Alamos County. The North Mesa athletic fields may have been watered by effluent from the former Pueblo Canyon Wastewater Treatment Plant beginning in 1952; however, there is no documentation to support this possibility. Although the plant was intended to handle only sanitary waste, small but detectable levels of radiation and chemical wastes have been observed in its effluents (LANL 1992, 7667, p. 5-78).

Field investigations were performed in April 1996 at PRS 00-028(b). Activities consisted of a soil and hand-augered borehole sampling program designed to determine if contaminants were present in the soil. Samples were collected at the surface, from a depth approximately half the distance to welded tuff contact, and at the welded tuff interface. Five locations at the North Mesa athletic fields were sampled. The results of the analyses showed that two samples contained low concentrations of mercury, nickel, silver, and sodium. Neptunium-237 was detected in low (estimated) concentrations in several samples. Organic constituents detected in low levels in some samples included dieldrin, trichloroethane, tetrachloroethene, and toluene. PRS 00-028(b) was recommended for NFA in the RFI report (LANL 1996, 54837, p. 19).

PRS 00-029(a-c)

PRSs 00-029(a-c) are three areas of soil potentially contaminated by systematic releases from pole-mounted transformers containing PCB-bearing oil. The transformers power nearby groundwater production wells on the San Ildefonso Indian Reservation (Los Alamos Canyon Wells #4 and #5) or on Santa Fe National Forest land (Guaje Canyon Well #1).

In a 1993RFI Report, it was determined that no PCBs above regulatory standards were present at any of the three PRSs. However, two out of the twenty soil samples from PRS 00-029(a) showed detectable concentrations (albeit below regulatory standards) of PCBs. Because the Pueblo of San Ildefonso requested that the well house remain intact, DOE made a conservative decision to remove approximately 20 yards of soil to eliminate the potential exposure to the detected PCBs (LANL 1993, 31591).

PRS 00-030(c)

PRS 00-030(c) was a septic tank located on private property north of the intersection of Canyon Road and Manhattan Loop. There is no archival documentation regarding this tank; however, its location suggests that it served a residential area (LANL 1995, 59880).

PRS 00-030(d)

PRS 00-030(d) is a septic tank located at the Pine Street cul-de-sac that was installed either in 1943 or 1944. This septic tank serviced the McKee houses, apartments and dormitories west of Canyon Road (LANL 1996, 53799.1).

Both a RFI and a VCA were conducted on PRS 00-030(d). The 1992 RFI determined that there were no contaminants present that would pose an unacceptable risk to human health (LANL, 7667). The 1997 VCA removed 170 feet of outfall piping but left the tank in place due to inaccessibility. Both the RFI and VCA proposed this PRS for no further action (LANL 1997, 62542.1).

PRS 00-030(eN, eS and f)

PRSs 00-030(eN and eS) are septic tanks located on private property north of Canyon Road at the old Boy Scout Lodge and south of Canyon Road at the Chapel Apartments. PRS 00-030(f) consists of two septic tanks located on private property south of Canyon Road and north of Rose Street near the United Church. Each of these septic tanks served residences and may have been connected to TA-1 buildings. A 1994 Phase I RFI was performed to confirm the presence or absence of the septic tanks and to determine the presence or absence of potential contamination. These septic tanks were recommended for no further action based on a human health risk evaluation in a 1996 RFI Report (LANL 1996, 56432).

PRS 00-030(g)

PRS 00-030(g) is a former Atomic Energy Commission septic tank located outside the current boundaries of LANL. Thirteen septic tanks were installed in TA-0, group 0-3, in the 1940s and remained in use until the Central Wastewater Treatment Plant was completed in late 1947.

PRS 00-030(g), referred to as septic tank #6, is located on private and Los Alamos County properties north of Canyon Road and west to the intersection with Central Avenue. A drainline extended north to an outfall on a rim of a small drainage channel that is a tributary of upper Acid Canyon—a small, narrow, one-half mile long side canyon to the much larger Pueblo Canyon.

The RFI activities at PRS 0-030(g) were conducted over a period of approximately six years. The initial field investigations were conducted in accordance with the "RFI Work Plan for Operable Unit 1071" (LANL 1992, 07667). The RFI commenced in 1993 with geophysical and geodetic surveys designed to locate the septic tank and drainlines. Once located, the septic tank contents were sampled for waste characterization, the contents were removed, concrete samples of the tank were collected, and samples beneath the septic tank were collected to determine if there had been releases from the tank. Subsequently the septic tank, the drainlines, and 12–18 in. of tuff were excavated and disposed of at Area G, TA-54, in 1993. Confirmatory samples were then collected beneath where the septic tank and drainlines had been located. The results of this initial investigation were presented in an RFI report for PRS 0-030(g) in 1995 (LANL 1995, 51983).

Beginning in 1996 and continuing in 1998 and 1999, additional sampling on the mesa top and in the PRS 0-030(g) drainage channel was conducted to better define the nature and extent of the contamination and provide data necessary for assessing the potential risk to human and ecological receptors. The 1996 sampling was in response to New Mexico Environment Department (NMED) concerns regarding polychlorinated biphenyl (PCB) contamination in the drainage channel area. The 1998 sampling was in response to additional NMED comments and

concerns with the 1995 RFI report and was based on the sampling and analysis plan (SAP) written in August 1998 (LANL 1998, 59917). The investigations conducted during May 1999 and September 1999 in the drainage channel addressed NMED concerns and were based on the SAP for the drainage channel area at PRS 0-030(g) (LANL 1999, 63027). The subsequent investigations consisted of the following tasks:

- 1996 Drainage Channel—The drainage channel below the outfall was sampled for PCBs only in 1996. The sample locations included two sites previously sampled in 1993 for metals, radionuclides, semivolatile and volatile organic chemicals, pesticides, and PCBs and 1994 locations that had been sampled for radionuclides only. The samples were collected from the steep hill slope below the outfall as well as from the drainage channel extending approximately 250 ft north of the hill slope.

- 1998 Mesa Top—The sampling conducted on the mesa top was intended to augment the 1993/1994 RFI confirmation data associated with the former septic tank and vitrified clay pipe drainline. The data demonstrated that the extent of contamination from these structures was defined. The investigation involved sampling tuff beneath the former structures at the same, or similar, locations sampled in 1994 and at several depths at each location. A total of 16 "reconfirmation" samples were collected from the tuff beneath the former location of the septic tank, beneath the former location of the outlet line from several depths, and beneath the former location of the inlet line. These samples were collected via hand auger, drill rig coring, and backhoe trenching between September 3 and September 9, 1998. Samples were analyzed for target analyte list (TAL) metals, PCBs/pesticides, semivolatile organic chemicals (SVOCs), volatile organic chemicals (VOCs), isotopic americium, plutonium and uranium, tritium, and other radiochemicals via gamma spectroscopy. Full-suite analysis was conducted on all 1998 samples. Hexavalent chromium (Cr+6) was analyzed for in two samples.

- 1999 Drainage Channel—The sampling was designed to geomorphically characterize the sediment in the PRS 0-030(g) drainage channel. This characterization included mapping, physical descriptions of the sediment, and particle-size analysis, with the purpose of bounding the lateral and vertical extents of post-1942 sediments and determining the distribution of contamination in the sediments. The sample locations were chosen based on the geomorphic mapping and analysis and included relatively young and old sediments, fine-grained and coarse-grained sediments, and sites in the upgradient and downgradient portions of the drainage channel. In addition, samples were collected from the stream channel sediments in the bottom of Acid Canyon upstream and downstream of the PRS 0-030(g) drainage channel. Fourteen samples were collected in May 1999: eight from the drainage channel and six from the Acid Canyon stream channel. These samples were analyzed for PCBs, TAL metals, isotopic plutonium, isotopic uranium, and americium-241. The NMED/Department of Energy (DOE) Oversight Bureau (OB) also participated in this sampling event and collected eight separate sediment samples: seven from the PRS 0-030(g) drainage channel and one from the Acid Canyon stream channel downstream from its confluence with the PRS 00-030(g) drainage channel. A second sampling event occurred in September 1999 to resample the May 1999 sample locations for pesticides and to collect two additional samples from locations where the NMED/DOE OB had previously collected samples. These latter two samples were analyzed for all suites of concern.

The sample data have adequately defined the nature and extent of the contamination associated with both the mesa top and drainage channel portions of the PRS. Contamination beneath the former locations of the septic tank and drainlines extended into the tuff a few feet below the former structures. The downgradient extent of PRS 00-030(g) was defined by the unmaintained service road at the bottom of Acid Canyon which currently acts as a barrier to most of the flow within the drainage channel leading from the former septic tank outfall. North of this road is a stream channel at the bottom of Acid Canyon that receives non-point-source runoff from the surrounding area.

The review of all available RFI data identified 11 chemicals of potential concern (COPCs) on the mesa top (8 inorganic chemicals, 2 radionuclides, and 1 pesticide) and 33 COPCs in the drainage channel. The latter COPCs comprised 13 inorganic chemicals either detected or with detection limits above background values (BVs), 6 radionuclides detected above background or fallout values, and 14 organic chemicals (VOCs, PCBs, and pesticides) detected in the sediment and/or tuff. Most of the COPCs identified at this PRS were consistent with the contents of the former septic tank. Each of these COPCs was evaluated as to its potential for unacceptable risk to human and ecological receptors.

The human-health screening assessment found that several COPCs were detected above their screening action levels (SALs) (for carcinogens) or 0.1 SAL (for non-carcinogens), both on the mesa and in the drainage channel. Chromium and antimony exceeded their respective SALs or 0.1 SALs on the mesa, but did not pose an unacceptable risk to human health. Lead, thallium, aroclor-1254, arsenic, dieldrin, toxaphene, plutonium-239, and uranium-234 exceeded their respective SALs or 0.1 SALs in the drainage channel and were evaluated further to determine if they posed a potential risk to receptors. These COPCs were subsequently evaluated using a recreational scenario because this is more representative of current and future land use. This assessment found that the contaminants in the drainage channel do not pose the potential for unacceptable hazard, risk, or dose to an adult or child recreational user. Therefore, the human-health screening assessment of the COPCs at PRS 0-030(g) did not find the potential for unacceptable risk to human receptors either on the mesa or in the drainage channel.

The ecological screening assessment identified 21 chemicals of potential ecological concern (COPECs) by comparison with ecological screening levels (ESLs). These COPECs pose no potential for adverse impacts to ecological receptors due to the relatively low hazard quotients (HQs)/hazard indices (HIs) for each receptor and COPEC, the infrequent detection of COPECs along the drainage channel, the broad distribution of receptor populations in Acid Canyon in relation to the area of contamination (the drainage channel), the conservative nature of the ESLs, the similarity of exposure concentrations to background concentrations for the inorganic chemicals, and the abundant species and healthy habitat found in Acid Canyon. The samples collected from the bottom of Acid Canyon did not show an increase in concentrations of COPCs downstream from PRS 0-030(g) to indicate any contaminant contributions from this PRS. The analytical results indicated that fewer COPCs occur at lower concentrations in the Acid Canyon stream channel than in the PRS 0-030(g) drainage channel. The surface water assessment for PRS 0-030(g) resulted in a score of 47.2, which included 23.5 for site setting, a runoff score of 16.7, and a run-on score of 7.0. The results of the assessment indicate a moderate potential for erosion and indicate that contaminant transport from the PRS via surface water or sediment is likely. However, surface runoff from PRS 0-030(g) into the drainage channel currently terminates at the bottom of Acid Canyon in the deposition area south of the unmaintained service road before it reaches the Acid Canyon stream channel. Infrequent heavy runoff events may occasionally cause overflow to move over the service road and into the stream channel.

As a result of the site assessments for PRS 0-030(g), the PRS was recommended for no further action (NFA) based on the fact that the PRS has been characterized or remediated in accordance with current applicable state or federal regulations, and that the available data indicate that chemicals of concern are either not present or are present in concentrations that would pose an acceptable level of risk under the projected future land use (LANL 2001, No ER ID).

PRS 00-030(h)

PRS 00-030(h) is a septic tank located on private property north of Canyon Road at the "new" Catholic Church. The topography suggest that the area serviced by this septic tank was probably bounded on the east by a north and south line that coincides with what is now the east wall of the Catholic Parish Hall, the areas between Canyon Road and Trinity Drive, the small housing area that was immediately north of Canyon Road, and bound on the west by what is now known as Diamond Drive. All of the buildings contained by this outlined area were Fort Leonard Wood housing units, dormitories, and military barracks (LANL 1996, 53799.1).

PRS 00-030(j)

Based on a 1947 Zia Company post-plan drawing, PRS 00-030(j), a septic tank, was located approximately 600 feet north of East Road and east of the eastern segment of Manhattan Loop on Los Alamos County property. Logically, this septic tank would have served other Fort Leonard housing units and a group of unidentified buildings that were located in the immediate vicinity of Manhattan Loop (LANL 1996, 53799.1).

PRS 00-030(k)

PRS 00-030(k) is a septic tank located on private property north of the former Zia Warehouse area, north of East Road, and east of what is now the Dog Obedience Club building. The Zia Company Warehouse area and PRS 00-030(k) are shown on the 1947 Zia Company post-plan drawing. Although no information exists concerning the dimensions of the septic tank or the buildings it served, it is likely that this septic tank serviced the Zia Company Warehouse complex. The Warehouse Complex contained building materials, electrical supplies, plumbing supplies, nails, cement, and machinery warehouses. The Warehouse Complex also stored sheet lead and small quantities of pesticides and herbicides (LANL 1996, 53799.1).

PRS 00-030(n)

PRS 00-030(n) is a septic tank located on Los Alamos County property west of 15th Street between Canyon Road and Pueblo Canyon. The septic system connected to this tank was not found on available drawings (LANL 1996, 53799.1).

PRS 00-030(o)

PRS 00-030(o) is a septic tank located on private property between Canyon Road and Pueblo Canyon according to a map prepared in 1947. This septic tank serviced the Sundt Apartments, McKee Housing, a dormitory and a laundry facility located in the area that is now known as Sage Loop, Oakwood Loop and the area east of 15th Street (LANL 1996, 53799.1).

PRS 00-030(p)

PRS 00-030(p) is a septic tank located on private property at the eastern end of the Rim Road cul-de-sac. It is logical that this septic tank serviced the Rim Road and Quartz Street residential areas. There were no TA-1 buildings connected to this septic tank (LANL 1996, 53799.1).

PRS 00-030(q)

PRS 00-030(q) was a septic tank located on private property north of the Mesa Public Library and east of the intersection of Ponderosa and Spruce Streets. An archival map indicates that the tank served a residence and discharged to a sanitary waste line connected to PRS 00-030(e), a septic system located further to the north. Prior to the Manhattan Project, the tank was used by the Ranch School and may not have had an overflow pipe or outfall (LANL 1995, 59880).

PRS 00-034(a)

PRS 00-034(a) is located northwest of Nambe Place in the Eastern Area, a residential area west of the Los Alamos Airport. It was mistakenly identified from a 1946 aerial photograph as a trench. However, a former site worker has identified the trench-like image on the photograph as part of the Zia Company's operation for making concrete blocks and small batches of concrete. No field investigations were conducted because the site was used only for the production of cement/concrete material, and no RCRA solid or hazardous wastes or constituents or other CERCLA hazardous substances were managed at the site.

PRS 01-002

PRS 01-002 released untreated waste generated by Laboratory operation into Acid Canyon from 1943 until the radioactive waste treatment facility was constructed in 1951 at former TA 45.

PRSs 10-001(a–d)

PRSs 10-001(a), 10-001(b), 10-001(c), and 10-001(d) are former firing sites in the western part of former TA-10. The firing sites included shot pads and a series of buildings and chambers. The COPCs at the former firing sites are HE, uranium, strontium-90, lead, beryllium, and barium. Explosives testing may have also dispersed SVOCs (LANL 1995, 49974, p. 1).

The 1995 RFI report summarizes the results of surface sampling and analyses done at PRSs 10-001(a–d) during 1994. A geodetic survey was performed to establish the surface sampling grid, stream sampling transects, and former structures associated with former TA-10 operations. The grid consisted of 68 surface sampling locations plus 10 random sampling locations. Of the 68 grid samples, the 10 samples that indicated the highest radioactivity during field screening were to have been analyzed for TAL metals, radionuclides, and HE (LANL 1995, 49974, p. 21). Samples were collected from the finest-grained sediments from the surface to a depth of no more than 6 in. to maximize the potential for detecting residual contaminants. An additional 10 samples were collected 100 ft (30 m) from randomly selected grid nodes in a randomly selected cardinal direction. These random samples were analyzed for gross alpha, beta, and gamma radiation by the MRAL and for total uranium, strontium-90, beryllium, barium, lead, TAL metals, and HE at fixed laboratories (LANL 1995, 49974, p. 23).

PRSs 10-001(a–d) were recommended for NFA in the RFI report because the PRS had been characterized or remediated in accordance with current applicable state or federal regulations; available data indicate that contaminants pose an acceptable level of risk under current and projected future land use (LANL 1995, 49974). In 1999, the four firing site PRSs were consolidated into one decision set, 10-001(a)-99.

PRSs 10-001(e)

PRS 10-002(a)

PRS 10-002(a) is the site of a former pit (10-44) dug for the disposal of spent chemicals, laboratory equipment, and trash. The pit received such items as gloves, rags, and acid bottles. The exact dates of use for this pit are unknown, but are thought to have been between 1945 and 1950. This PRS measured about 8 ft (2.4 m) wide, 5 ft (1.5 m) long, and 12 ft (3.6 m) deep (LANL 1990, 7511). It is not known whether this pit was covered during or after the period of active use, but it is thought that after it was no longer in use in the early 1950s, it was covered with soil until cleanup activities began in 1963. The quantities of contaminants buried in the pit are also unknown. The COPCs for PRS 10-002(a) are strontium-90, total uranium, barium, cadmium, VOCs, and SVOCs (LANL 1996, 54332, p. 40).

During the RFI in 1994, no inorganic constituents were detected at concentrations greater than background values (BVs) (LANL 1996, 54332, p. 46). The organic compounds bis(2-ethylhexyl)phthalate and diethyl phthalate were detected in low concentrations (LANL 1996, 54332, p. 46). Strontium-90 was measured in concentrations up to 1.62 pCi/g at a depth of 41 ft in borehole 10-1252 (LANL 1996, 54617, p. 15). No analyses were obtained for VOCs or HE, which represented a deviation from the approved sampling plan (LANL 1996, 54332, p. 43). The IA to address strontium-90 in vegetation at former TA-10 included the site of PRS 10-002(a).

PRS 10-002(a) was recommended for NFA in the RFI reports because the PRS had been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use (LANL 1996, 54332; LANL 1996, 54617). In 1999, PRS 10-002(a) was consolidated into one decision set with other similar PRSs; the decision set was designated 10-002(a)-99.PRS 10-002(b)

PRS 10-002(b) was the site of a former pit (10-48) dug for the disposal of spent chemicals, laboratory equipment, and trash. The pit received gloves, rags, and acid bottles. In addition, this pit was used for the disposal of residues from the lanthanum-140 extraction process performed in the radiochemistry laboratory. The total amount of liquid waste generated at the radiochemistry laboratory contained an estimated 117 Ci of strontium-90. The exact dates for use of this pit are unknown, but it is thought to have been used between 1945 and 1950. Former structure 10-48 was divided into two sections, each measuring approximately 5 ft (1.5 m) wide, 5 ft long, and 10 ft (3 m) deep. The pit sections were lined with boards and had wood covers (LANL, 1990, 7511).

It was thought that after use of 10-48 was discontinued in the early 1950s, PRS 10-002(b) was covered with soil until cleanup activities began in 1963. The quantities of contaminants buried in this pit are unknown. Specific contaminants listed as present in the wastes include strontium-90, uranium, barium, cadmium, platinum, benzene, carbon tetrachloride, unspecified acids (probably nitric, hydrochloric, hydrofluoric, and sulfuric acids), and other unspecified organic and inorganic compounds (LANL 1992, 7668, p. 3-55).

During the 1963 D&D, it was determined that some strontium-90 remained in the bottom of the pit. All solid waste was removed and the pit was excavated to a depth of 26 ft (8 m). Because gross beta radioactivity was near background levels, the pit was backfilled with clean fill (LANL 1996, 54332, p. 49).

An RFI was conducted in 1994. The COPCs for PRS 10-002(b) include strontium-90, total uranium, barium, cadmium, VOCs, and SVOCs (LANL 1996, 54332, p. 49). The results of the

investigation showed that two inorganic compounds, copper and zinc, had concentrations greater than the background screening values. Statistical comparisons were made between copper and zinc for PRS data and Laboratory-wide soil background data. The concentrations of copper and zinc were not above BVs.

The highest concentration of strontium-90 was 340.02 pCi/g in a sample from 4.2-ft (1.3-m) depth. Four organic compounds were detected in subsurface samples at PRS 10-002(b), including acetone; di-n-butylphthalate; 2,-4,dinitrotoluene; and 2,-6,dinitrotoluene at levels below SALs (LANL 1996, 54332, p. 57). No inorganic constituents exceeded soil BVs. The IA to address strontium-90 in vegetation at former TA-10 included PRS 10-002(b).

PRS 10-002(b) was not recommended for NFA in the RFI report (LANL 1996, 54332; LANL 1996, 54617). In 1999, PRS 10-002(b) was consolidated into one decision set with similar PRSs; the decision set was designated 10-002(a)-99.

PRSs 10-003(a–o) and 10-007

PRSs 10-003(a–g, m) are associated with the former liquid waste disposal complex that served the former radiochemistry laboratory, structure 10-1. The radiochemistry laboratory was used to process lanthanum-140 into radioactive sources. The liquid disposal complex consisted of liquid disposal pits, industrial waste (acid waste), manholes and septic tanks, industrial waste (acid waste) lines, and a leach field that handled the liquid radioactive and chemical wastes generated by the radiochemistry laboratory operations. PRSs 10-003(a–c) were three liquid disposal pits (10-41, -42, and -43) constructed of reinforced concrete with steel covers. Each pit was 2 ft (0.6 m) wide, 2 ft long, and 5 ft (1.5 m) deep. A leach field was found beneath PRS 10-003(c). A clay drain pipe [PRS 10-003(m)] that connected PRSs 10-003(a–c) was discovered 10 ft below the surface during the D&D of TA-10 and was removed in 1963 (LANL 1990, 7511; LANL 1992, 7668, pp. 3-46 et seq.).

PRSs 10-003(d–f) are the sites of three former liquid disposal pits with unidentified structure numbers. These pits were discovered during the 1963 D&D of TA-10. PRS 10-003(g) is the site of a former industrial waste (acid waste) manhole (10-50) constructed of reinforced concrete, which was 4 ft (1.2 m) wide, 5 ft (1.5 m) long, and 5 ft (1.5 m) deep. This manhole was along the industrial waste (acid waste) line leading from the radiochemistry building. A drainpipe from the manhole (10-50) discharged to the leach field [PRS 10-003(n)] in the stream channel approximately 125 ft (38 m) north-northeast of the manhole (TA-10-50) (LANL 1990, 7511). During the 1963 D&D of the pits, tanks, drain lines, and large amounts of contaminated soil were removed (LANL 1990, 7511).

Test holes drilled in 1973 and 1974 at the former disposal pits indicated the presence of surface and subsurface strontium-90. Five additional test holes were drilled in 1974. Samples from these holes had gross beta activity at levels above background, with some indication of contaminant movement. Extensive sampling also was performed at the former radiochemistry laboratory (10-1) and the entire liquid waste disposal complex [PRS 10-003(a–o)] through trenching and drilling during the FUSRAP survey. The FUSRAP results indicated that subsurface contaminants mostly were present in low levels and were within about 31 ft of the radiochemistry laboratory and the liquid waste disposal complex. The highest levels of contaminants were found near the former liquid waste disposal pit 10-42 [PRS 10-003(b)] (LANL 1996, 54332, p. 60).

PRS 10-003(h) was the former site of an industrial waste (acid waste) manhole (10-51) constructed of reinforced concrete, and measured 4 ft (1.2 m) wide, 5 ft (1.5 m) long, and 5 ft deep. This manhole was along the industrial waste (acid waste) line leading from the

radiochemistry laboratory (LANL 1992, 7668, p. 3-58). Manhole 10-51 was removed during the D&D of TA-10 in 1963.

PRS 10-003(i–l) was the site of part of the liquid waste disposal complex for the radiochemistry laboratory. PRS 10-003(l) is the site of the former acid waste septic tank (10-39). PRSs 10-003(j–l) are the sites of three former stainless steel tanks with no identified structure numbers. Each tank had a capacity of 200 gal. (LANL 1990, 7511). The steel tanks were removed during the D&D of TA-10 in 1963 (LANL 1992, 7668, p. 3-60).

PRSs 10-003(n–o) are the former site of a leach field for the liquid waste disposal complex that served the radiochemistry laboratory (TA-10). It is likely that this was also a leach field for the septic system [PRS 10-004(b)] that served the radiochemistry laboratory. This leach field was located in the streambed north of TA-10. The dimensions and description of the leach field are unknown. A chemist who worked at the radiochemistry laboratory remembers decontamination holes [PRS 10-003(o)] that were located near the streambed leach field. It is possible that the decontamination holes were part of the streambed leach field [PRS 10-003(n)] (LANL 1990, 7511).

During the D&D of TA-10 in 1963, the highest levels of radioactivity encountered were associated with the liquid waste disposal complex that served the radiochemistry laboratory. The entire complex of tanks, lines, and manholes was excavated to a depth of approximately 20 ft (6 m). During the excavation, radiation levels ranged as high as 35 mrad/hr, and the bottom of this excavation contained up to 1.5 mrad/hr. The large excavation was backfilled with dirt from other parts of the canyon and building debris from the D&D of the Bayo site. It is unknown whether the leach field and decontamination holes were excavated during this effort (LANL 1992, 7668, p. 3-60). Residual radiation levels during the D&D project were much higher in the samples collected from the trench near the streambed. In the 2- to 4-ft (600- to 1200-cm) layer, samples contained no gross-alpha activity, but maximum gross-beta activity was 48 pCi/g and the maximum strontium-90 activity was 67.2 pCi/g (LANL 1992, 7668, p. 3-61).

The RFI at PRS 10-003(a–o) performed in 1994 included investigation of the nearby landfill used during D&D of the site, PRS 10-007. The RFI at PRS 10-003(a–o) and PRS 10-007 detected silver in nine samples above background screening values. The maximum concentration was observed in one sample from the alluvium that contained 13.3 mg/kg silver; however most detects of silver were below 1 mg/kg (LANL 1996, 54332, p. 74). Organic compounds detected in the samples included bis(2-ethylhexyl)phthalate, dichloroethene, diethylphthalate, dinitrotoluene, ethylbenzene, high melting explosive (HMX), naphthalene, nitrotoluene, trimethylbenzene, and xylenes (LANL 1996, 54332, pp. 76, 77). Americium-241 was detected in three samples from depths of 11 to 20 ft (3.3 to 6 m) in one borehole. The maximum observed americium-241 concentration was 1,395 pCi/g. Cesium-137 was detected in a concentration of 0.0777 pCi/g in one sample from a borehole in the alluvium at 16.5 ft (5 m) depth. Strontium-90 was detected at up to 41,887 pCi/g in borehole 10-1220 in alluvium at 17.5-ft (5.3-m) depth (LANL 1996, 54617, pp. 29–32).

The IA to characterize strontium-90 in vegetation at former TA-10 included the site of PRS 10-003(a–o). PRSs 10-003(a–o) were not recommended for NFA as a result of the RFI (LANL 1996, 54332; LANL 1996, 54617) because concentrations of strontium-90 detected at depths of 11 to 16 ft (3.3 to 4.9 m) in the area of PRSs 10-007 and 10-003(a–o) could result in an unacceptable dose under a residential-use scenario. Under a residential-use scenario, a dose of 2,400 mrem/yr could occur, mainly from routine ingestion of garden produce, which equates to an excess cancer risk of 1 in 100. This represents an unacceptable dose rate for potential future use as a residential area (LANL 1996, 54617, pp. 36–37). In 1999, PRSs 10-003(a–o) were consolidated into one decision set with similar PRSs; the decision set was designated 10-002(a)-99.

PRS 10-004(a)

PRS 10-004(a) is the location of a former sanitary septic tank that served the personnel building (10-21) at TA-10 from 1949 through 1963. The tank had a capacity of 1,060 gal. (4 m^3) and discharged to a pit 8 ft (2.4 m) long x 12 ft (3.6 m) deep. This septic system discharged to a drain line and outfall located in a stream channel approximately 200 ft (60 m) north-northeast of PRS 10-002(a). The COPCs for this site are strontium-90, total uranium, barium, cadmium, lead, beryllium, VOCs, and SVOCs (LANL 1992, 7668, p. 3-61).

The septic tank, structure 10-21, was removed during the D&D of TA-10 in 1963 and was taken to MDA-G at TA-54. No information is available concerning the fate of the dispersal pit associated with this PRS. It was not clear whether the 4-in. (10-cm)-diameter tile drain to this outfall or soil around the outfall was removed during decommissioning (LANL 1990, 7511).

The RFI at PRS 10-004(a) was conducted in 1994. The investigation found mercury above background levels in two subsurface samples (maximum concentration 0.84 mg/kg) and silver was detected in a concentration of 0.38 mg/kg in one sample (LANL 1996, 54332, p. 86). Organic compounds detected in the samples included bis(2-ethylhexyl)phthalate, di-n-butylphthalate, ethylbenzene, propylbenzene, trimethylbenzene, and xylenes (LANL 1996, 54332, p. 88). Strontium-90 was detected in one sample in borehole 10-1276 at a depth of 3.6 ft in a concentration of 0.78 pCi/g (LANL 1996, 54617, p. 41).

The IA to address strontium-90 in vegetation at former TA-10 included the site of PRS 10-004(a) (see Section 2.3.2.5.3). PRS 10-004(a) was recommended for NFA in the RFI reports because the PRS had been characterized or remediated in accordance with current applicable state or federal regulations, and available data indicate that contaminants pose an acceptable level of risk under current and projected future land use (LANL 1996, 54332; LANL 1996, 54617).

PRS 10-004(b)

PRS 10-004(b) is the site of a former 5,400-gal. (2-m^3)-capacity sanitary septic tank (10-38) that served the radiochemistry laboratory. It was constructed of reinforced concrete and measured 4 ft (1.2 m) wide, 10 ft (3 m) long, and 4 ft (1.2 m) deep. This tank handled sanitary waste, but is suspected to have also received liquid wastes from the radiochemistry laboratory (10-1). The overflow from tank 10-38 drained through a 4-in. (10-cm)-diameter vitrified-clay, open-joint drainpipe to the stream channel. Tank 10-38 was used from 1944 to 1963 (LANL 1990, 7511).

The septic tank was removed during the 1963 D&D activities and taken to TA-54 for disposal. The line and soil surrounding the tank probably were removed during the liquid waste disposal system excavation. Gross beta activity from the tank prior to its removal was less than 5.0 mrad/hr (LANL 1990, 7511).

In 1973, a test hole designated as M-2 was drilled to a depth of 6.1 m (19 ft) at the outfall of the former septic tank. Sample analysis indicated strontium-90 in the surface and subsurface, while plutonium levels were at background. Five additional test holes were drilled near the M-2 hole in 1974. These holes indicated above background gross beta activity (Mayfield et al. 1979, 11717, p. 51).

The RFI at PRS 10-004(b) was conducted in 1994. COPCs for PRS 10-004(b) include strontium-90, total uranium, barium, cadmium, lead, beryllium, VOCs, and SVOCs. The investigation found no inorganics exceeding soil background concentrations. One organic compound, di-n-butylphthalate, was found in low concentrations in three samples (LANL 1996, 54332, p. 96). Strontium-90 was detected in one sample from borehole 10-1264 at a depth of 4.1 ft (1.25 m) in a

concentration of 2.54 pCi/g (LANL 1996, 54617, p. 46). EPA Region VI approval of the NOD response for the RFI work plan stipulated that samples must be collected for VOC analysis regardless of field screening results. No samples were submitted for VOCs or HE, which was a deviation from the sampling plan (LANL 1996, 54332, p. 93).

The IA to address strontium-90 in vegetation at former TA-10 included the site of PRS 10-004(b). PRS 10-004(b) was recommended for NFA in the RFI reports because the PRS had been characterized or remediated in accordance with current applicable state or federal regulations, and available data indicate that contaminants pose an acceptable level of risk under current and projected future land use (LANL 1996, 54332; LANL 1996, 54617). In 1999 PRS 10-004(b) was included with decision set 10-002(a)-99.

PRS 10-005

PRS 10-005 is the former site of an open pit about 100 ft (30 m) west of the northwest firing point. During the 1940s and 1950s, the pit was used to contain shot debris swept from the firing sites and adjacent areas. The exact dimensions of this former pit are unknown, as are the quantities and type of materials that were placed into it. The debris may have contained small quantities of uranium, strontium-90, lead, HE residues, and possibly beryllium (LANL 1990, 7511). In 1957, the pit debris was excavated, the wastes burned, and the ash taken to MDA-C at TA-50. The specifics on how this operation was conducted (i.e., whether uranium was burned), including pre- and post-burning monitoring activities, is unknown (LANL 1990, 7511).

During the 1986 CEARP field survey the approximate extent of this disposal area (observed as a depression) was discovered, as was residual metal debris within the depression (LANL 1992, 7668, p. 3-63). The RFI at PRS 10-005 was conducted in 1994. No inorganic chemicals exceeded soil background concentrations, and no inorganic chemicals were carried forward to the screening assessment for PRS 10-005. No inorganic chemicals, organic chemicals, or radionuclides were found to be COPCs in samples collected from PRS 10-005 (LANL 1996, 54332, p. 102, LANL 1996, 54617, p. 51).

PRS 10-005 was recommended for NFA in the RFI reports because the PRS had been characterized and remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use (LANL 1996, 54332; LANL 1996, 54617, p. 51). In 1999 PRS 10-005 and the four firing site PRSs were consolidated into one decision set, 10-001(a)-99.

PRS 10-007

PRS 10-007 is the site of a landfill located in and near the arroyo at TA-10 that was used to dispose of building debris from the 1963 D&D of TA-10 facilities. The boundaries of the landfill are not well known. However, the landfill was located within the excavation created by the removal of the liquid disposal complex [PRSs 10-0039(a–o)], thus providing some constraints on the location and dimensions. Some items in the landfill were concrete from the two former firing-site detonation control buildings (10-13 and -15), soil from the vicinity of the former inspection building (10-8), one of the former battery buildings (10-14), and former building 10-13 (LANL 1990, 7511).

RFI activities for PRS 10-007 were performed in 1994 and are discussed above with the description of activities at PRSs 10-003(a–o). The IA to address strontium-90 in vegetation at former TA-10 included the site of PRS 10-007. The contaminated vegetation is believed to be associated with residual contaminants contained within the landfill material.

PRS 10-007 was not recommended for NFA in the RFI reports because elevated levels of strontium-90 were detected at depths of 11 to 16 ft (3.3 to 4.9 m) in the area of PRS 10-007. In

1999, PRS 10-007 was consolidated into one decision set with other similar PRSs; the decision set was designated 10-002(a)-99.

PRS 10-008

PRS 10-008 is a former satellite firing site located approximately 1,400 ft (427 m) northwest of the primary firing sites (PRSs 10-001[a–d]). This PRS was identified during 1994 IA activities to address shrapnel in Bayo Canyon. During the IA, shrapnel was found embedded in the northwestern sides of trees in this area, opposite the known primary firing sites. This suggested the existence of an additional firing site. Archival records indicate that this firing site was used for non-radioactive shots during the 1940s. The primary firing pads were active from 1943 to 1961 (Environmental Restoration Project 1997, 56660.423, p. i).

The RFI for PRS 10-008 was performed using previously obtained results from part of the investigation of PRSs 10-001(a–d). Samples were collected and shipped to fixed laboratories for analysis of TAL metals, HE, gamma spectroscopy, total uranium, and strontium-90. No COPCs were detected at concentrations greater than their SALs (Environmental Restoration Project 1997, 56660.423, p. 26).

The results of the evaluation for PRS 10-008 indicated that no chemical levels at the site pose an unacceptable risk to human health (Environmental Restoration Project 1997, 56660.423, p. 25). Therefore, PRS 10-008 was proposed for NFA because the PRS had been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use (Environmental Restoration Project 1997, 56660.423, p. i). In 1999 PRS 10-008 was consolidated into one decision set with the firing site PRSs 10-001(a–d); the decision set was designated 10-001(a)-99.

PRS 10-009

PRS 10-009 is a small landfill located in Bayo Canyon west of the main TA-10 area. PRS 10-009 currently is not listed in Module VIII. During the 1994 RFI for PRSs that are part of former TA-10, the site was fenced to restrict public access. A preliminary magnetic gradiometer survey was conducted over the landfill in 1995. This survey identified numerous buried metallic objects. No other investigations have been conducted at this site.

PRS C-10-001

PRS C-10-001 consists of two small sites that contained radioactive soil. These sites were within an area where materials and soil associated with the former firing sites at TA-10, PRSs 10-001(a–d), were apparently bulldozed and left remaining after D&D activities were conducted in 1963. The sites were discovered using hand-held radiation screening instruments during routine shrapnel removal operations in summer and fall 1994 (LANL 1995, 53782, p. 1).

Field activities were implemented in 1995 in accordance with the VCA plan for PRS C-10-001 (LANL 1995, 49546). The initial phase of the VCA involved a survey at each site to delineate the areas with elevated radioactivity but previous removal of shrapnel during 1994 from one site effectively removed the field-detectable radioactivity from that site. At the second site, analyses of soil from the area that showed the highest level of radioactivity, as determined by field screening, yielded 3,518 pCi/g of strontium-90 (LANL 1995, 53782, p. 1).

The second phase of the VCA involved collecting subsurface samples from shallow hand-augered holes at each site to determine the extent of subsurface contaminants and the appropriate mode of excavation. The area containing the strontium-90 was approximately 1 m in

diameter and 30 cm deep (LANL 1995, 53782, p. 1). The third phase of the VCA involved excavation of approximately 1 m^3 of the radioactive soil and site restoration. Confirmation samples indicated that the highest concentration of strontium-90 remaining after excavation was 12.8 pCi/g. PRS C-10-001 was recommended for NFA in the VCA completion report (LANL 1995, 53782).

PRS 19-001-99

Consolidated PRS 19-001-99 consists of former PRSs 19-001, 19-002, 19-003, and AOC C-19-001. TA-19, formerly known as the East Gate Laboratory, is now part of TA-72 and is located in Santa Fe County. It is on Los Alamos Mesa east of the Los Alamos Airport and East Gate Industrial Park. It is bounded by Pueblo Canyon on the north and by a small branch of Pueblo Canyon on the south. The East Gate Laboratory was built in 1944 for a scientist who needed an isolated location for his experimental work on small sources. In 1947 the site consisted of a storage hutment and laboratory building. The laboratory building was used for a variety of experiments, some of which used radioactive sources and chemicals. More buildings were added until the site consisted of a laboratory building, battery building, guard building, latrine, retreat building, septic tank, and shelter building. All buildings at TA-19 were abandoned and removed in 1974. Suspect contaminants are radionuclides, organic chemicals, and inorganic chemicals.

Former PRS 19-001 is a septic system. It consists of a tank (Structure 19-6), piping, and an outfall that reported handled sanitary waste from the retreat building (19-5). The tank's dimensions were about 7 ft long x 4 ft wide x 5 ft deep. It was made of reinforced concrete. The piping was made of asphaltic composition fiber known as orangeburg pipe. East Gate personnel used the retreat area for breaks and meals. The septic system operated from 1957 to 1974 when all buildings were abandoned and removed.

Former PRS 19-002 is the former surface disposal area located on DOE property along the north-facing wall of Pueblo Canyon. The area measures about 10 ft x 100 ft. Several structures including a battery building were located at TA-19. The battery building and several other structures were decommissioned in 1956; remaining buildings were removed in 1974. Batteries and concrete debris from the decommissioned TA-19 structures were disposed of at former PRS 19-002. Battery-related waste includes two sizes of dry cell batteries, batteries consisting of vertical plates, and a tar-like substance derived primarily from the interior of batteries. All batteries found on the site were carbon-type batteries, akin to flashlight batteries.

Former PRS 19-003 is the former sewer drainline and outfall that reportedly handled sanitary waste from the retreat building. The drainline was about 90 ft long and was made of orangeburg pipe. Wastes were discharged through the sewer drainline to an outfall in Pueblo Canyon. The system was probably used from 1944 until the building was decommissioned in 1974. The building operated from 1944 to 1962 when it was transferred to the Zia Company and used for civil defense purposes. It later was leased to the Los Alamos Radio Club, which used the site until 1974. The outfall area of former PRS 19-003 is contained within the battery disposal area identified for former PRS 19-002.

Former AOC C-19-001 is potentially contaminated soil beneath the former laboratory, battery building, guard building, latrine, retreat building, and shelter building at TA-19. The laboratory was built in 1944 and the other buildings were added by the early 1950s. The battery building, guard building, and latrine were removed in 1956. Other structures were transferred to the Zia Company in 1957 and 1962.

In 1974, building and property surveys were conducted at TA-19 to identify any potential contamination. Survey results indicated that the structures were free of HE, radioactive, chemical,

and toxic contamination. Soil samples collected in the vicinity of two effluent discharge points in 1974 were analyzed for radionuclides. Sample results indicated that no radioactivity had been released.

The ER Project conducted a VCA in 1995 at former PRS 19-002 to remove the solid waste. The VCA report was written in lieu of preparing a separate RFI report. In June 1995, a site reconnaissance was completed to assess the extent of the concrete and battery debris prior to removing the materials. Three samples (two surface soil and one that consisted of materials from each of the three battery types at the site) were collected. Samples were screened for radioactivity and were submitted for laboratory analysis of inorganic chemicals, organic chemicals, and gamma spectroscopy. No elevated contaminant levels were detected. In August 1995, former PRS 19-002 was sampled as part of the RFI. Nineteen surface soil and drainage sediment samples were collected from areas immediately surrounding battery piles and from first-order drainages around the former PRS. Sample analysis indicated no residual chemical or radiological contaminants were present above SALs. About two cubic yards of concrete debris and 1.5 cubic yards of old batteries and associated debris were removed from the site and were disposed of at the Los Alamos County landfill. Site restoration was not required because no excavation was performed. The VCA report requested regulator concurrence to remove former PRS 19-002 from the HSWA module.

The ER Project conducted an RFI at former PRSs 19-001, 19-003, and AOC C-19-001 in 1997 to determine if any residual contamination was present from historic operations. A geodetic survey was conducted to establish the original locations of the septic tank, drainlines, outfalls, building corners, and fences. The septic tank, associated inlet and outlet lines (former PRS 19-001), and the drainline (former PRS 19-003) were removed. After the drainline was removed, a sump pump was lowered into the septic tank and about 300 gallons of liquid was pumped into containers. Samples were grouped into three types by location: at former PRS 19-001, on the mesa slope at former PRS 19-003, and on the mesa top at former PRS 19-003. Fifteen surface and subsurface soil samples and two replicates from fifteen locations were collected, field screened for organic chemicals, gross alpha and gross beta/gamma radiation and submitted for laboratory analysis of organic chemicals, inorganic chemicals, and gamma spectroscopy. Screening results for all samples were negative for organic chemicals and below background for radioactivity. At former PRS 19-001, two samples were collected in the outfall area on the mesa slope and eight were collected from the mesa top. Acetone, aluminum, anthracene, barium, bis(2-ethylhexyl)phthalate, benzo(g,h,i) perylene, calcium, carbazole, cesium-137, chromium, cobalt, copper, dibenzofuran, lead, manganese-54, magnesium, methylene chloride, 2-methyl naphthalene, nickel, phenanthrene, toluene, vanadium, zinc, and 12 PAHs were detected above background screening values. Cesium-137 (detected at 5.85 mg/kg with a SAL of 5.1 mg/kg) and the following PAHs were detected at concentrations greater than SAL: benzo(a)anthracene (detected at 13 mg/kg with a SAL of 0.61 mg/kg), benzo(b) fluoranthene (detected at 16 mg/kg with a SAL of 0.61 mg/kg), benzo(a)pyrene (detected at 13 mg/kg with a SAL of 0.061 mg/kg), dibenzo(a,h)anthracene (detected at 1.2 mg/kg with a SAL of 0.061 mg/kg), and indeno(1,2,3-cd)pyrene (detected at 3.8 mg/kg with a SAL of 0.61 mg/kg). Calcium and magnesium have no SALs and are essential nutrients. The RFI report compared the two inorganic chemicals to their RDAs. The intakes associated with incidental soil ingestion would be considerably less than the RDAs and calcium and magnesium were eliminated from further consideration. Some PAHs have no SALs. For those chemicals, surrogate toxicity values were used based on similar chemical structure to other PAHs. Two soil samples were collected from the outfall area (mesa slope) at former PRS 19-003. The sample locations were within the boundaries of former PRS 19-002. Acetone, cadmium, calcium, cesium-137, copper, lead, manganese, mercury, methylene chloride, toluene, zinc, and two PAHs were detected above background screening values. Manganese was detected at concentrations greater than SAL (detected at 6210 mg/kg with a SAL of 3200 mg/kg). At the mesa top location for former PRS 19-003, five samples were collected. Acetone,

aluminum, arsenic, barium, benzo(g,h,i) perylene, calcium, carbazole, cesium-137, chromium, cobalt, copper, dibenzofuran, magnesium, mercury, methylene chloride, 2-methyl naphthalene, nickel, phenanthrene, selenium, vanadium, and 13 PAHs were detected above background screening values. Arsenic (background value is greater than SAL; detected at 3.3 mg/kg with a SAL of 0.38 mg/kg) and the following PAHs were detected at concentrations greater than SAL: benzo(a)anthracene (detected at 13 mg/kg with a SAL of 0.61 mg/kg), benzo(b) fluoranthene (detected at 16 mg/kg with a SAL of 0.61 mg/kg), benzo(a)pyrene (detected at 13 mg/kg with a SAL of 0.061 mg/kg), dibenzo(a,h)anthracene (detected at 1.2 mg/kg with a SAL of 0.061 mg/kg), and indeno(1,2,3-cd)pyrene (detected at 3.8 mg/kg with a SAL of 0.61 mg/kg).

Because former PRSs 19-001 and 19-003 are planned for a land transfer, future land use on the mesa top was assumed to be residential for the purposes of the human health risk assessment. The outfall drainage area is too steeply sloped, and its future land use was assumed to be recreational. The RFI report concluded that risk associated with both use scenarios at former PRS 19-001 and the mesa-top portion of former PRS 19-003 fell into EPA's acceptable range. At the mesa slope portion of former PRS 19-003, the RFI report stated that the detected contamination is associated with historic battery disposal at former PRS 19-002. PAHS, which would be associated with former PRS 19-003, were not detected at levels greater than 0.1 times SAL in the outfall. The RFI report stated that soil contamination associated with the battery disposal area at former PRS 19-002 will be revisited and will include the outfall area of former PRS 19-003 since the outfall contamination is associated with batteries and not with the drainline. The RFI report recommended NFA at former PRSs 19-001 and 19-003 because the sites were characterized in accordance with applicable state and federal regulations and available data indicate that contaminants are not present in concentrations that pose an unacceptable human health risk under projected future land use. Contaminants identified in the outfall area at former PRS 19-003 were not related to the drainline of the former PRS. Former PRS 19-002 will be revisited and will include evaluation of the battery-related contaminants that were detected in the outfall samples of former PRS 19-003.

The ER Project conducted an RFI at former AOC C-19-001 in 1997 to determine whether residual contamination was present in the surface drainages south of the former laboratory. A geodetic survey was performed to establish the original locations of the corners of buildings and fences. Seven surface soil samples were collected. Samples were field screened for organic chemicals and radionuclides. They were submitted for laboratory analysis of inorganic chemicals, organic chemicals, and gamma spectroscopy. All samples indicated no organic chemicals and background levels of radioactivity. Acetone, calcium, dibenzofuran, lead, methylene chloride, 2-methylnaphthalene, phenanthrene, sodium, toluene, and four PAHs were detected above background screening values. No chemicals were detected at concentrations greater than SAL. Calcium has no SAL and is an essential nutrient. The RFI report compared calcium to its RDA. The intake associated with incidental soil ingestion would be considerably less than the RDA and calcium was eliminated from further consideration. The RFI report recommended NFA at former AOC C-19-001 because the site was characterized in accordance with applicable state and federal regulations and available data indicate that contaminants are not present in concentrations that pose an unacceptable human health risk under projected future land use.

PRS 31-001

PRS 31-001 is a former septic tank system consisting of two manholes, a reinforced concrete aboveground septic tank, and a septic line. The septic line ran north from the former main warehouse (Building 31-7) to the former septic tank, located on a small topographic bench above the mesa rim of Pueblo Canyon. The septic tank drained through a 4-in. diameter drainage pipe on the southern slope of Pueblo Canyon. It is not documented which chemicals were received

and stored at TA-31, but operational history indicates that no radioactive materials were stored there.

PCBs at levels above SALs were found at the mouth of a former septic tank outfall pipe (PRS 31-001) (LANL 1995, 57050).
PRS C-31-001PRS C-31-001 consists of the soil beneath former structure locations and the paved parking area. The structures included several warehouses, a loading dock, and an oil drum storage site. No chemicals were routinely stored at the site during its operation. The only liquid storage documented was oil products. The storage yard was paved, which protected soils from liquid spills. Any possible contamination would have been removed during decommissioning (exact date unknown).

PRS 45-001-00

Consolidated unit PRS 45-001-00 includes the following PRSs associated with the former TA-45 Wastewater Treatment Plant (WWTP): 45-001, 45-002, 45-003, 45-004, C-45-001 and 01-002-00. The TA-45 WWTP received radioactive liquid waste from TA-1 and TA-3 and began operation in 1951. The TA-45 WWTP was decontaminated and decommissioned in 1966 and 1967.

The TA-45 treatment plant is designated as PRS 45-001 and the associated industrial (acid) waste sewer lines are designated as PRS 45-003. PRS 45-002 was a vehicle decontamination facility adjacent to PRS 45-001, where large radioactively contaminated items and vehicles were steamed cleaned. Wastewater from the facility was initially discharged directly to Acid Canyon, and was subsequently pumped to PRS 45-001. PRS 45-004 is the former location of a sanitary sewer outfall located directly adjacent to PRS 45-001.

PRS 01-002-00 (formerly PRS 01-002) is described as the outfall that received untreated radioactive wastewater from TA-1 prior to construction of the TA-45 WWTP. The outfall areas from PRSs 01-002-00, 45-001, 45-002 and 45-004 overlap and COPCs are commingled.

PRS C-45-001 is the location of a one-time release of plutonium-contaminated sludge. This release occurred in the parking lot south of the TA-45 treatment plant. Contaminated soils and an area of the parking lot were remediated at the time.

PRS 73-001(a)-99

PRSs 73-001(a) and 73-004(d) are associated with disposal activities in the vicinity of the TA-73 airport landfill. PRS 73-001(a) is the main landfill situated north of the airport runway. It initially consisted of a natural, hanging valley into which municipal waste was disposed. As more capacity was required, trenches were excavated into the tuff adjacent to the original hanging valley. Laboratory use of the disposal area probably began in 1943, and Los Alamos County operated the landfill from 1965 until 1973. Landfill volume is estimated to be 489,500 cubic yards.

PRS 73-001(b)-99

PRS 73-001(d) is a debris disposal area consisting of two roughly parallel, unlined trenches with a depth of approximately 35 feet. In 1984, the site was used to bury debris excavated from the western portion of 73-001(a) for airport hanger space expansion and the excavation of PRSs 73-001(b) and 73-001(c). The trenches are estimated to contain 126,000 cubic yards. In 1986, PRS 73-001(d) was covered with soil and re-vegetated. PRS 73-004(d) was a septic system that served the landfill office located east of the present airport terminal building and within the footprint of PRS 73-001(a). A 4 in. diameter vitrified-clay pipe connected the building's toilet to the

septic tank located about 20 ft northeast of the building. The building and septic tank were removed as part of the decommissioning of the landfill operation in the early 1970s.

PRS 73-002-99

PRSs 73-002, 73-003, 73-004(a,b) and 73-006 are associated with former structures and activities located on the east end of the airport landfill. PRS 73-002 is a surface disposal area associated with operation of an incinerator. An ash pile from the former incinerator (PRS 73-002) contains several analytes above SALs (antimony, barium, cadmium, copper, lead, silver, thallium, and PCBs) (LANL 1997, 56606), and surface runoff from this site may provide an additional source of contaminants for Pueblo Canyon. PRS 73-003 was a steam cleaning plant for garbage trucks, cans, and dumpsters that were used for the collection of municipal waste. The wash water was discharged into a septic tank (PRS 73-004(b)) located to the west of the plant. The plant was used from 1949 until October 1970 and was demolished in 1971. The septic tank was concrete and discharged through a 6 in. vitrified-clay pipe to an outfall to Pueblo Canyon; the tank and associated piping were removed in 1996.

PRS 73-004(a) was a septic tank that received sanitary waste from toilets and shower facilities located in the adjacent incinerator building. The tank was concrete and discharged through a 6 in. vitrified-clay pipe to an outfall to Pueblo Canyon. The tank and associated piping were removed in 1996.

PRS 73-006 consists of the outfalls associated with two drain lines that discharged to Pueblo Canyon from the incinerator building. One drain line that originated at a floor drain in the stoking room was constructed of 6 in. vitrified-clay pipe and extended from the north side of building to the canyon rim while the second vitrified-clay pipe drain line is reported to have exited the northeast side of the building and extended to the canyon rim. These drains are presumed to have handled wash water and been in operation concurrent with the incinerator (PRS 73-002). These drain lines have been removed.

PRS 73-004(c)

PRS 73-004(c) is a septic system that served the former airport terminal. A 4-in. diameter vitrified-clay pipe connected the building toilets to the septic tank. Investigation into the tank location has been unsuccessful; however, it is believed the tank was removed prior to or during the 1984 airport expansion. The area of the former terminal building and septic tank was capped with 9-in. thick concrete pavement as part of the 1984 Los Alamos Airport Improvement Project.

Kay Kramer

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G-38

Letter to San Ildefonso Pueblo

Department of Energy
Albuquerque Operations
Los Alamos Area Office
Los Alamos, New Mexico 87544

DEC 19 2000

The Honorable Perry Martinez
Governor
Pueblo of San Ildefonso
Route 5, Box 315-A
Santa Fe, NM 87501

Dear Governor Martinez:

The purpose of this letter is to confirm that the Department of Energy (DOE) has agreed that San Ildefonso tribal members may enter the area known as "TA-74" for the purpose of ceremonial activities. Such ceremonial activities are understood to include the gathering of plant materials, including the collection of wood. It is my understanding that the Pueblo has a map indicating the location of TA-74. This letter will serve as your authority to conduct such activities from the time of receipt of this letter until June 30, 2001, or until a Memorandum of Agreement between the Pueblo and the Department of Energy has been negotiated and signed.

As was the case in 1998 when DOE and the Pueblo reached a similar agreement, tribal members should avoid Bayo and Pueblo Canyons where environmental remedial work is being done. These areas are identified on the site by orange ribbons or by signs.

If you have any questions, please contact me at (505) 667-5105.

Sincerely,

E. Dennis Martinez

E. Dennis Martinez
Deputy Area Manager

Enclosure 2

EPA Guidance on the Transfer of Federal Property by Deed Before All Necessary Remedial Action Has Been Taken Pursuant to CERCLA Section 120(h)(3) -- (Early Transfer Authority Guidance)

I. PURPOSE

This guidance addresses the transfer by deed, under Section 120(h)(3)(C) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), of real property listed on the National Priorities List (NPL) held by a federal agency (landholding federal agency[1]) where the release or disposal of hazardous substances has occurred, but where all necessary remedial action has not yet been taken. This document provides guidance to the EPA Regions that have received a request from a landholding federal agency for the deferral of the covenant mandated by CERCLA Section 120(h)(3)(A)(ii)(I) that all necessary remedial action has been taken prior to the date of transfer. This guidance establishes EPA's process to determine, with the concurrence of the Governor, that the property is suitable for transfer prior to all necessary remedial action being taken.

II. EPA's REQUIREMENTS FOR APPROVING A DEFERRAL REQUEST

When a federal agency transfers to another person (i.e., an entity other than another federal agency) real property on which hazardous substances have been stored for one year or more, known to have been released, or disposed of, the deed must contain a covenant warranting that "all remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of transfer" (the CERCLA 120(h)(3)(A)(ii)(I) Covenant) and that "any additional remedial action found to be necessary after the date of the transfer shall be conducted by the United States."[2] EPA, with the concurrence of the Governor of the State in which the facility is located, may defer the CERCLA Covenant for parcels of real property at facilities listed on the NPL.[3]

The Agency's general current view is that it will seek the concurrence of federally recognized Indian tribes for purposes of determining whether the covenant requirement under CERCLA 120(h) should be deferred pursuant to CERCLA 120(h)(3)(C) for property located in Indian country within tribal jurisdiction. However, the Agency will only make a final determination as to the appropriate tribal role under CERCLA 120(h)(3)(C) in the context of an actual Covenant Deferral Request made for property located in Indian country within tribal jurisdiction. The Agency's determination should be made in light of the specific facts and circumstances surrounding a particular Covenant Deferral Request. If the EPA Regional office receives a Covenant Deferral Request concerning a transfer of property that is located in Indian country with tribal jurisdiction, the EPA Regional office should contact EPA Headquarters, the American Indian Environmental Office and the Federal Facilities Restoration and Reuse Office, for specific guidance.

In order for EPA to defer the covenant requirement, CERCLA Section 120(h)(3)(C)(I)(I)-(IV) requires that EPA determine that the property is suitable for transfer based on a finding that:

1. the property is suitable for transfer for the use intended by the transferee, and the intended use is consistent with protection of human health and the environment;

2. the deed or other agreement proposed to govern the transfer between the United States and the transferee of the property contains the Response Action Assurances described in section IV of this guidance;

3. the federal agency requesting deferral has provided notice, by publication in a newspaper of general circulation in the vicinity of the property, of the proposed transfer and of the opportunity for the public to submit, within a period of not less than 30 days after the date of the notice, written comments on the suitability of the property for transfer; and

4. the deferral and the transfer of the property will not substantially delay any necessary response action at the property.

These findings are intended to assure that there is a sound basis for the proposed transfer based on the finding that the particular reuse of the property identified by the transferee does not pose an unacceptable risk[(4)] to human health or the environment. As stated in Section 120(h)(3)(C)(iv), all statutory obligations required of a federal agency remain the same, regardless of whether the property is transferred subject to a covenant deferral.

III. APPLICABILITY AND SCOPE

This guidance applies to all early transfers by deed under CERCLA Section 120(h) of contaminated real property owned by a federal agency and listed on the National Priorities List (NPL), regardless of the statutory authority underlying a cleanup, including transfers of property at DoD installations selected for closure or realignment.

This guidance does not apply to federal-to-federal transfers of property or to transfers of uncontaminated property. A federal agency that is sponsoring a public benefit conveyance may use this guidance as a model for obtaining useful information. Under a public benefit conveyance, a sponsoring federal agency acts as a conduit through which title will ultimately pass from the United States to a public benefit recipient. For further information regarding the relationship between a sponsoring federal agency and the Department of Defense (DoD) for Base Realignment and Closure (BRAC) property (a landholding federal agency), please see the Memorandum of Agreement signed by DoD and the federal agencies that sponsor public benefit transfers (dated April 21, 1997).

IV. GUIDANCE

EPA should generally not consider deferral of the covenant request for real property unless the landholding federal agency submits a Covenant Deferral Request (CDR) containing the information recommended by this guidance.

While the statute does not explicitly require a signed Interagency Agreement (IAG) to be in place as a prerequisite for deferring the covenant requirement, EPA believes that the existence of an IAG will significantly aid the Agency in making the covenant deferral decision.

A. Covenant Deferral Request

As discussed in Section II, EPA may defer the CERCLA Section 120(h)(3) covenant requirement if EPA determines that a property is suitable for transfer based on certain findings. To commence the process, the landholding federal agency should submit information of a sufficient quality and quantity to EPA to support its request for deferral and provide a basis for EPA to make its determination. This information should be submitted to EPA in the form of a Covenant Deferral Request (CDR). EPA should consider a CDR complete when it includes all of the following components.

1. Property Description

A legal description of the real property or sufficient information which clearly identifies the property for which the CERCLA Covenant is requested to be deferred.

2. Nature/Extent of Contamination

A description of the nature and areal extent of contamination (with supporting documentation) which affects the property to be transferred and which will not be remediated prior to transfer. There is a presumption that the Covenant Deferral Request should include the results from a completed Remedial Investigation (RI) for the parcel that will be transferred. However, the landholding federal agency should have an opportunity to demonstrate why such data and findings are not necessary before the land is transferred.

When determining what information is necessary, the EPA Region should take into consideration, at a minimum, the degree of uncertainty regarding the nature and extent of contamination; the future use of the property prior to completion of the response action; who is to perform future work; and any existing information or data on the parcel under consideration. Generally, the greater the uncertainty about any of these factors, the more information the EPA Region may require to make the determination. As noted below, the landholding Federal agency remains responsible for all necessary response actions including the remedial investigation and the cleanup remains subject to the requirements of Section 120.

3. Analysis of Intended Land Use During the Deferral Period

A description of the intended land use of the property during the deferral period and an analysis of whether the intended use is reasonably expected to result in exposure to CERCLA hazardous substances at sites where response actions have not been completed. This analysis should be based on the environmental condition of the property and should consider the contaminant(s), exposure scenarios, and potential and actual migration pathways that may occur during the future use. Where a potential or actual unacceptable exposure to hazardous substances is identified, the analysis should identify what response actions should be taken to prevent such exposure. Treatment, engineering controls and use restrictions (see Section 6.d - Response Action Assurances), may be considered as a means of limiting unacceptable exposures to hazardous substances while allowing for property reuse. Any other response actions necessary to protect human health and the environment should be included in the deed (or other agreement governing the transfer) as described in Subsection 6 of this policy. The land use during the deferral period cannot be inconsistent with any necessary response actions.

4. Results From A Risk Assessment

Results from a CERCLA risk assessment, taking into consideration reasonably anticipated future land use assumptions. There is a presumption that the Covenant Deferral Request include the results from a completed risk assessment, as defined in the National Continency Plan (NCP) and EPA guidance. However, the landholding federal agency should have an opportunity to demonstrate why a risk assessment does not have to be completed before the land is transferred.

When determining whether a completed risk assessment is needed before the early transfer, the EPA Region should take into consideration, at a minimum, the degree of uncertainty regarding the potential risks posed by the contamination; existing analyses; certainty about future use; and who is conducting the response. The greater the uncertainty about the risk from the contamination, the more information EPA may require. As noted below, the landholding Federal agency remains responsible for all necessary response actions, including the risk assessment.

In the absence of the completed risk assessment, at a minimum, EPA Regions should examine potential exposure(s) during the deferral period, taking into account any proposed restrictions to ensure the protectiveness of human health and the environment.

5. Response/Corrective Action and Operation and Maintenance Requirements

A description of any ongoing or planned response or corrective action, including aprojected milestone date for the selection and completion of the action, and/or projected date for the demonstration that a remedial action is "operating properly and successfully." Also, it will be necessary to provide adequate information regarding ongoing or planned response actions and operation and maintenance of the response or corrective action.

6. Contents of Deed/Transfer Agreement

a. Notice

A copy of the notice to be included in the deed as required by CERCLA Section 120(h)(1)and(3) and in accordance with regulations set forth at 40 CFR Part 373.

b. Covenant

A copy of the covenant warranting that any additional remedial action found to be necessary after the date of transfer shall be conducted by the United States as required by CERCLA Section 120(h)(3)(A)(ii)(II).

c. Access

A copy of the clause which reserves to the United States access to the property in any case in which an investigation, response, or corrective action is found to be necessary after the date of transfer as required by CERCLA Section 120(h)(3)(A)(iii).

d. Response Action Assurances

A copy of the Response Action Assurances that must be included in the deed or other agreement proposed to govern the transfer as required under CERCLA Section 120(h)(3)(C)(ii). As required by statute, these assurances shall:

i. provide for any necessary restrictions on the use of the property to ensure the protection of human health and the environment;

ii. provide that there will be restrictions on the use necessary to ensure that required remedial investigations, response action, and oversight activities will not be disrupted;

iii. provide that all necessary response action will be taken and identify the schedule(s) for investigation(s) and completion of all necessary response action (s) as approved by the appropriate regulatory agency; and

iv. provide that the landholding federal agency has or will obtain sufficient funding through either: (a) submission of a budget request (or budget requests in the event multi-year funding is needed) to the Director of the Office of Management and Budget that adequately addresses schedule for investigation and completion of all necessary response action, subject to congressional authorizations and appropriations; or (b) sufficient current appropriations to accomplish investigation(s) and completion(s) of all necessary response action (s). In addition to (a) or (b), the landholding federal agency may also have an agreement with the transferee to fund and/or accomplish all or part of the remediation.

The Response Action Assurances should include a description of requirements to assure the protectiveness of the response action and shall specify the mechanisms for assuring that such measures remain effective. These measures should reflect discussions among the reuse entity, the community, the landholding federal agency and any appropriate federal, State, or local government.

7. Responsiveness Summary

The final CDR should include a response to comments document which contains the landholding federal agency's responses to the written comments received during the public comment period under Section 120 (h)(3)(C)(I)(III) and to the written comments received from the regulatory agencies on the draft CDR.

8. Transferee Response Action Assurances and Agreements

A transferee may agree to conduct response actions on the property. However, the landholding Federal agency remains responsible for ensuring that all necessary response actions including , as appropriate, investigations and requirements under an IAG are done.

When property is transferred prior to completion of the cleanup, the landholding federal agency should include in each deed provisions notifying the transferee of the requirement for, and status of, an Interagency Agreement or other enforceable environmental cleanup agreement or order, as appropriate.

The landholding federal agency should also notify the transferee that EPA and the State and

their agents, employees and contractors, will have rights of access as necessary to implement response actions and oversight responsibilities at the facility.

Where the transferee has agreed to fund and conduct the cleanup or portions of the cleanup as a condition of the transfer, the landholding federal agency should provide to EPA documentation demonstrating that the transferee has or will become legally obligated to conduct the required response actions in accordance with the existing IAG. Should the transferee become unable or unwilling to complete the cleanup or order under its agreement with the landholding federal agency, EPA expects the landholding federal agency will complete the cleanup. Nothing in this guidance shall be interpreted to affect EPA's or the landholding federal agency's authority or responsibility under CERCLA or any other federal statute to enforce the terms and conditions of an existing IAG or to limit EPA's authority to impose requirements necessary to protect public health and the environment.

If the transferee is expected to perform any response action (e.g., excavation of contaminated soil in an area where facilities are to be constructed), then EPA should receive assurance from the landholding federal agency that the transferee has:

a. the technical capacity (in-house or through appropriate contract management) to perform anticipated investigations and response or corrective actions; and

b. the financial capacity to execute environmental cleanup activity requirements that are known or can reasonably be anticipated, based on current information available.

Financial capacity may be an especially sensitive area for a transferee and/or the landholding federal agency. While the assurance does not need to contain the actual documentation of the financial capacity, the EPA Region may request such information from the landholding federal agency if there are questions in this regard.(5) Any proprietary or confidential business information should be handled as required under Federal regulations.

If the landholding federal agency submits information supporting the technical and financial assurances, but the EPA Region disagrees with the adequacy of such assurances, and they cannot resolve their differences, there will be the opportunity to elevate the disagreement to the federal agency headquarters and EPA Headquarters. The EPA Region should contact the Federal Facilities Restoration and Reuse Office in OSWER and the federal agency should elevate the issue to its headquarters component when resolution cannot be reached at the Senior Manager level. EPA Headquarters and the headquarters of the landholding federal agency will resolve the disagreement in an expeditious fashion so as not to delay transfer.

The transferee should agree to conduct all necessary environmental response actions in accordance with CERCLA and the National Contingency Plan (NCP). In the case where the transferee does not perform cleanup in accordance with CERCLA and the NCP or the terms of a cleanup agreement, then the United States may enter the property and perform any necessary response action.

B. Process for Requesting Covenant Deferral

Before preparing a CDR, the landholding federal agency should notify the Administrator of EPA or designee and the Governor of the State of the intent to request a CERCLA Covenant Deferral and invite participation in the development and review of the draft CDR. This notice should allow sufficient time for EPA, and State agencies, to participate in the development and review and comment on a draft CDR.

As required by Section 120(h)(3)(C)(I)(III), the landholding federal agency must provide notice, by publication in a newspaper of general circulation in the vicinity of the property, of the proposed transfer. The notice should include:

1. The identity of the property proposed for transfer, the proposed transferee and the intended use of the property;

2. A statement that the property is listed on the National Priorities List and that the proposed transfer is pursuant to CERCLA 120(h)(3)(C) which allows the transfer of federal property before remedial action is completed when certain conditions are satisfied;

3. An assessment of whether the transfer is consistent with protection of human health and the environment will be made only after a comprehensive evaluation of the environmental condition of the property in consultation with the U.S. EPA and the appropriate State agencies;

4. A summary of the decision-making process, e.g., that the property will not be transferred until U.S. EPA determines, with the Governor's concurrence, that the transfer of the property for use as intended is consistent with protection of human health and the environment and that the federal agency has provided assurance that response actions will be taken;

5. The address and telephone number of the agency office which may be contacted for obtaining a copy of the draft Covenant Deferral Request, site- specific information and the address of the location of the administrative record for the response program; and

6. A statement that interested members of the public may comment on the suitability of the property (the draft Covenant Deferral Request) for transfer and must submit such comments to the agency before a date not less than 30 days from the date of the publication of the notice.

It is also recommended that the draft CDR be made available to any existing Restoration Advisory Boards (RAB), Site Specific Advisory Boards (SSAB), affected local governments, and/or other interested community-based groups. Specific efforts should be made to involve tribes surrounding the property that is to be transferred. As stated in the notice requirement, the public shall be provided with at least a 30 day period in which to submit comments on the suitability of the property for transfer. It may be appropriate under certain circumstances (i.e., large and/or complicated land transfers) to extend the public comment period beyond 30 days.

After the public comment period has expired, the landholding federal agency may then submit the final CDR to the appropriate EPA Regional office and State representative. Property cannot be transferred by deed until the CERCLA Covenant is explicitly deferred by EPA and the State. The request to defer the CERCLA Covenant should be made simultaneously to the EPA and the State. EPA and the State should work closely to assure careful evaluation of the request. EPA Regional offices are

encouraged to take steps to streamline the coordination process to avoid unnecessary delay.

C. Completion of Response Actions After Transfer

When all response actions necessary to protect human health and the environment have been taken, e.g., when there has been a demonstration to EPA that the approved remedy is "operating properly and successfully[6]" pursuant to CERCLA Section 120(h)(3)(B) (regardless of whether the landholding federal agency or the transferee has taken the action), the landholding federal agency shall execute and deliver to the transferee an appropriate document containing a warranty that all such response action has been taken. This warranty will satisfy the requirement of CERCLA Section 120(h)(3)(A)(ii)(I).

V. NOTICE

This guidance and internal procedures adopted for implementation are intended solely as policy for employees of the US EPA. Such guidance and procedures do not constitute rule making by the Agency and do not create legal obligations. The extent to which EPA applies this guidance will depend on the facts of each case.

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1. A landholding federal agency is the federal agency that holds custody and accountability for the property on behalf of the United States. 41 CFR 101-47.103.7 *Return to Document*

2. CERCLA Section 120(h)(3)(A)(ii) sets forth the two components of the covenant that shall be contained in each deed. For purposes of this policy and the request for deferral, the term "CERCLA Covenant" refers only to the first component contained in Section 120(h)(3)(A)(ii)(I). *Return to Document*

3. For non-NPL sites, the Governor of the State in which the facility is located may defer the CERCLA Covenant. *Return to Document*

4. See, 40 CFR 300.430(d)(4) and U.S. EPA 1989a. *Risk Assessment Guidance for Superfund* (RAGS): *Volume 1: Human Health Evaluation Manual* (HHEM), *Part A, Interim Final and Part B, Development of Risk-Based Preliminary Remediation Goals.* Office of Emergency and Remedial Response, Washington, D.C. EPA /540/1-89/002, NTIS PB90-155581/CCE and Publication 9285.7-01B NTIS PB92-963333. *Return to Document*

5. Financial capacity may be demonstrated through, but not limited to: reasonably anticipated cash flows, existence of appropriate insurance, posting of a construction/ indemnity bond, authority of the transferees to issue revenue bonds for such purpose, or assets, excluding the real property to be transferred. Obtaining a security interest in the transferee's assets may be used as a means of assuring project completion. *Return to Document*

6. See, *"Guidance for Evaluation of Federal Agency Demonstrations That Remedial Actions Are Operating Properly and Successfully Under CERCLA Section 120(h)(3),"* August 1996, NTIS PB97-143770; http://www.epa.gov/swerffrr. *Return to Document*