Department of Energy

National Nuclear Security Administration
Albuquerque Operations Office
Office of Los Alamos Site Operations
Los Alamos, New Mexico 87544

Los Alamos Land Transfer Project Office

General
Land Transfer
Covenant Deferral Request
Colorado, Grand Junction
DOE

June 24, 2002

James Bearzi, Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87502

Dear Mr. Bearzi:

In completing one of the action items from the June 11, 2002 meeting with you, Peter Maggiore, and Matthew Hoyt on the draft Covenant Deferral Request (CDR), I am enclosing one example of a CDR which was approved by a state governor. The enclosed CDR, for the Department of Energy's Grand Junction Site, was approved by Colorado Governor Bill Owens on August 15, 2001.

I am still searching for other examples of CDRs which were approved by state governors, and I will forward them to you as I locate them.

Please call me at 505-665-7203 if you have questions or concerns.

Sincerely,

T J T

Theodore J. Taylor
Project Manager

Enclosure: As stated

Cc w/o enclosure:
E. Dennis Martinez, Deputy Director, OLASO
E. Romero, Program Manager, OLASO
L. Cummings, Counsel's Office, OLASO
T. Taylor, Project Manager, DIR, OLASO
K. Rea, RRES-ECO, UC-LANL, MS M887
LandTran File

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Enclosure

STATE OF COLORADO

EXECUTIVE CHAMBERS

136 State Capitol
Denver, Colorado 80203-1792
Phone (303) 866-2471

Bill Owens
Governor

NOTICE OF DECISION UPON THE DEFERRAL APPLICATION

Findings of the Governor of the State of Colorado regarding early transfer of property at the Department of Energy's Grand Junction Office Site

I make the following findings to authorize the Department of Energy ("DOE") to transfer the property located at 2597 B ¼ Road in Grand Junction, Mesa County, Colorado, to the Riverview Technology Corporation ("RTC") and to defer inclusion in the quitclaim deed of the covenant required by Section 120(h)(3)(A)(ii)(I) of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"). This covenant requires that, prior to the transfer of property on which any hazardous substance was stored for one year or more and known to have been released or disposed of, DOE must take "all remedial action necessary to protect human health and the environment." Pursuant to section 120(h)(3)(C), this covenant may be deferred if an evaluation of the property determines that it can be safely used and DOE provides adequate assurances that it will satisfy its commitment to complete all remediation in a timely manner and provide for necessary restrictions on the use of the property.

I have reviewed the particulars of the proposed transfer and make the following findings:

1. The property is suitable for transfer for the mixture of commercial, industrial, office space and open space uses intended by RTC and these uses are consistent with the protection of human health and the environment. This finding is based on determinations made in DOE's Deferral Request and supporting documentation as well as an analysis of the Deferral Request conducted by the Colorado Department of Public Health and Environment ("CDPHE").

2. The quitclaim deed and agreement governing the transfer contain the response action assurances required by section 120(h)(3)(C)(ii) of CERCLA. These include assurances that DOE will impose all necessary restrictions on the use of the property, take all necessary response actions, and request adequate funding for the completion of all remedial actions.

3. DOE provided public notice of the transfer on March 25, 2001 in the Grand Junction Daily Sentinel, a newspaper in the general vicinity of the property. The public submitted comments to which DOE and CDPHE responded.

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

5. The deferral of the property will not increase, diminish or affect in any manner any rights or obligations of DOE (including any rights or obligations under sections 106, 107, and 120 of CERCLA existing prior to transfer) or the State with respect to the property.

6. The deferral of the property will not affect DOE's continuing obligation to pay State oversight costs.

Accordingly, pursuant to section 120(h)(3)(C) of CERCLA, I find the property suitable for transfer.

Bill Owens.

Bill Owens
Governor

8/15/01

Date

Request for Deferred Remediation
U.S. Department of Energy Grand Junction Office Site

1.0 Introduction

In accordance with State of Colorado *Executive Order D-013-98* and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the U.S. Department of Energy (DOE) is requesting the consent of the Governor's office for early transfer of the DOE site located in Mesa County near Grand Junction, Colorado, at 2597 B ¾ Road (known as the Grand Junction Office or GJO site).

This Request for Deferred Remediation application constitutes one portion of the process for obtaining regulator concurrence with the DOE proposal to defer remediation. The process includes, sequentially, (1) obtaining concurrence from the Colorado Department of Public Health and Environment that this request results in protection of human health and the environment and compliance with applicable laws and regulations, (2) providing an opportunity for public comment, (3) resolving public comments, and (4) obtaining the consent of the Governor's office. Pending said consent, the GJO site will be transferred. The GJO site will be transferred to a nonprofit organization representing the City of Grand Junction and Mesa County (the Riverview Technology Corporation or RTC) in late 2001, with the DOE remaining as a tenant at the site for the foreseeable future.

The Request for Deferred Remediation is organized to follow the specific requirements of the State of Colorado's *Executive Order D-013-98*. The Request itself primarily contains basis and background information. It also summarizes the information found in detail in Attachments A-G. The Request and all attachments constitute the entire application and should be reviewed as such. Each attachment is noted by a tab displaying the name and letter of the attachment.

This Request for Deferred Remediation application contains the following information (attachments are identified by the letter preceding the document title):

Errata Sheet
Request for Deferred Remediation

A. Enforceable Agreement
B. Quitclaim Deed, including Notice of Hazardous Substance Activity in Accordance with CERCLA 120(h)
C. *Long-Term Surveillance Plan for the Grand Junction Office Site* (June 2001)
D. *Ground Water/Surface Water/Sediment Compliance Action Plan*
E. *Riverview Technology Corporation Reuse Plan*
F. *Summary of Ecological Risk for the U.S. Department of Energy Grand Junction Office*
G. *Evaluation of Human Health Risks Associated with the Grand Junction Office Surface and Ground Water*
H. Public Comments and Responses

Copies of other documentation used as a basis for this document were provided to the Colorado Department of Public Health and Environment (CDPHE) in April 2000.

Additional copies of information may be obtained by contacting Dr. Cooper H. Wayman, Senior Legal Counsel for the DOE-GJO, at (970) 248-7620.

2.0 Legal Description of the Property

The property to be transferred is legally described in the Deed (Attachment B) as follows:

All that portion of Lot 1 lying West of the right-of-way of the Denver and Rio Grande Western Railroad Company, and all of lots 6 and 7, subject to right-of-way of the Denver and Rio Grande Western Railroad Company, all being in Section 27, Township 1 South, Range 1 West, Ute Meridian, Mesa County, Colorado, containing 55.71 acres of land more or less, together with the private railroad spur thereon, and all rights and appurtenance thereto, also all water and water rights used thereon or appurtenant thereto, including the private line from artesian well, and all rights in connection therewith, and all buildings and improvements thereon as recorded in Book 415, page 405;

And, that portion of G.L.O. Lot 1, Section 26, Township 1 South, Range 1 West, Ute Principal Meridian, Mesa County, Colorado, lying west of the right-of-way of the Denver and Rio Grande Western Railroad Company containing 1.14 acres of land more or less, as recorded in Book 668, page 202;

Except: Parcel 1, located in G.L.O. Lot 7 of Section 27, Township 1 South, Range 1 West, Ute Principal Meridian, Mesa County, Colorado, containing 2.68 acres of land more or less as conveyed to A. N. Applebaum and recorded in Book 1606, page 986; and

Except that portion to be reserved to the United States and called the Army Reserve Tract: containing 7.97 acres more or less.

This parcel then contains 46.20 acres calculated as follows: 55.71 acres (1943 Deed in Book 415, page 405) plus 1.14 acres (Deed in Book 668, page 202), minus 2.68 acres (Deed in Book 1606, page 986), minus 7.97 acres (Army Reserve Tract to be recorded) equals 46.20 acres of land more or less. Said Property and Army Reserve Tract are further shown and described in Exhibit A of the Deed (see Attachment B).

The Army Reserve Tract will remain under federal ownership and be transferred in 2001; the remainder of the Property will be transferred to private ownership in late 2001, pending approval of this request. The Property includes 22 buildings ranging from in-use office space to warehouse and light manufacturing areas. A small number of sheds and covered areas exist on the Property. Portions of the site are currently occupied by the Western Colorado Business Development Corporation Small Business Incubator Project under a lease signed in February 1999, which expires when ownership of the Property changes.

3.0 Information providing basis for a determination that 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.

3.1 Basis for Request

Section 120(h) of CERCLA was enacted to protect citizens and communities from the costs of cleaning up contamination on land transferred to them by federal agencies. CERCLA 120(h) requires that federal agencies transferring property remain liable for all contamination occurring during federal ownership and the associated cleanup costs, regardless of the future ownership of the Property. These assurances of liability must be included in the Deed along with any restrictions required to ensure protection of human health and the environment.

To transfer a property prior to completion of all necessary remedial actions, the federal agency must provide for final cleanup of the property and all costs related to completing the remedial action. The federal agency must also apply any restrictions necessary to ensure that members of the public are not exposed to the hazards that remain behind. These provisions and restrictions must be included in the transfer documentation.

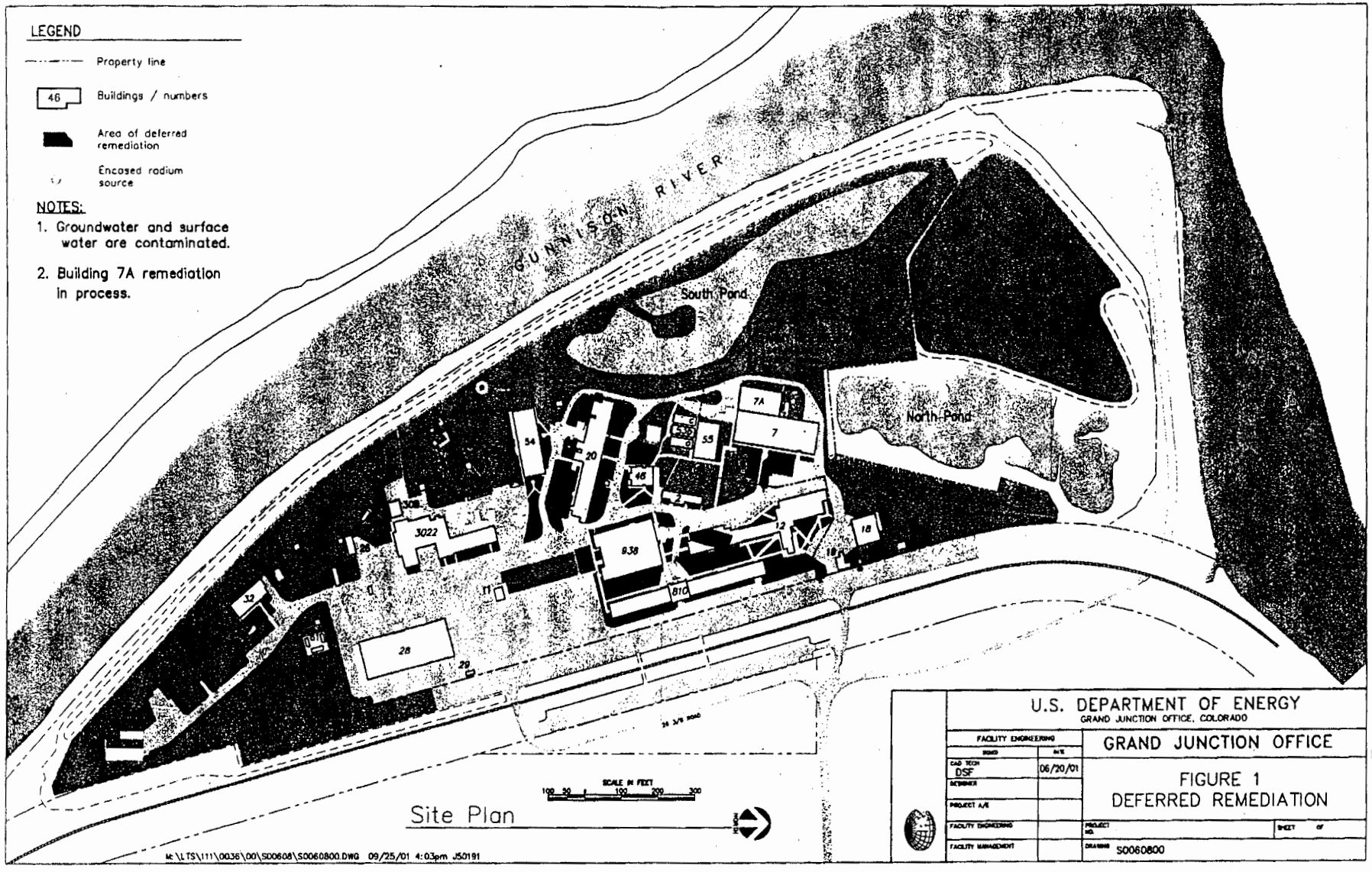
Under CERCLA 120(h), transfers of contaminated federal property not listed on the National Priorities List (NPL) under CERCLA are subject to the approval of the governor of the state where the property is located. Concurrence by the governor for transfer of the GJO site is required because contamination will remain on the site in the following forms:

- The ground water and surface expressions of ground water (the North Pond, South Pond, and wetland areas (Figure 1) are contaminated with constituents leached from stockpiled uranium ore and processing operations.
- Radioactive contaminants are present underneath portions of Buildings 12 and 20 (Figure 1). Building 7A is being demolished and any contamination found in soils will be removed and disposed by appropriate regulatory requirements.
- Two foil radioactive sources that have been encased in concrete in accordance with a State-approved well permit closure of a 300-foot well on the Property and will remain in place (Figure 1).

The DOE has determined that the GJO site meets the criteria for early transfer for the reasons described below.

1. DOE has completed all of the actions required by CERCLA 120(h), including:

    a. DOE has performed surveys of the site, reviewed historical information and records, current records, interviews with past employees, and has conducted a remedial investigation to determine the presence of contaminants at the site as part of the CERCLA process.
    b. DOE prepared a Record of Decision Summary identifying that soil contamination would be removed and appropriately disposed of, and ground water would be clean within 50–80 years by natural flushing.



U.S. DEPARTMENT OF ENERGY
GRAND JUNCTION OFFICE, COLORADO

FACILITY ENGINEERING		GRAND JUNCTION OFFICE
CAD TECH DSF	06/20/01	FIGURE 1 DEFERRED REMEDIATION
DESIGNER		
PROJECT A/E		
FACILITY ENGINEERING		PROJECT NO. / SHEET OF
FACILITY MANAGEMENT		DRAWING S0060800

c. DOE has included language in the Deed and transfer documentation that maintains DOE liability and responsibility for all future cleanup of DOE-generated contamination at the site, specifically the contamination identified in the bullets on Page 3.
d. The DOE has reserved all necessary rights of access and authority to complete required actions to ensure that contamination discovered in the future can be effectively remediated.
e. The DOE has imposed relevant and protective restrictions on the future use of the Property to ensure continued protectiveness, as stated in the Deed.

2. The DOE has removed all known contamination at the site (with the exceptions noted above) and has had the effectiveness of the remedies, which are protective of both human health and the environment, independently verified.
3. The DOE has conducted all removal actions in accordance with the remedy identified through the processes identified by both CERCLA and the National Environmental Policy Act (NEPA).
4. Each of the remaining sources of contamination described above has been managed in accordance with applicable regulations and DOE Orders; relevant and protective restrictions have been imposed on future use of the Property in the transfer documentation.
5. As detailed in this Request, the planned use for the site is a mixture of commercial, industrial, office space, and open space. DOE's planned institutional controls are protective, given the planned future use.
6. The remaining contamination should not present a risk to human health and the environment if managed by future owners in accordance with the Deed restrictions and monitored by DOE through the Long-Term Surveillance and Maintenance (LTSM) Program for the next 50 to 80 years, or until passive remediation of the ground water contamination is successful.
7. The DOE is entering into an Enforceable Agreement with CDPHE that contains a remedial action plan for the remaining on-site contamination and provides a funding mechanism for CDPHE oversight costs.

The following documents were provided to CDPHE as supporting documentation with DOE's draft Request for Deferred Remediation submittal on June 6, 2000. These documents form the basis for this determination:

- *Final Remedial Investigation/Feasibility Study—Environmental Assessment for the U.S. Department of Energy Grand Junction Projects Office Facility* (July 1989)
- *Grand Junction Projects Office Remedial Action Project Declaration for the Record of Decision and Record of Decision Summary* (April 1990)
- *Environmental Assessment of Facility Operations at the U.S. Department of Energy Grand Junction Projects Office, Grand Junction, Colorado* (April 1996)
- *Finding of No Significant Impact—Facility Operations at the U.S. Department of Energy Grand Junction Projects Office, Grand Junction, Colorado (April 1996)*
- *U.S. Department of Energy Grand Junction Office Facility Condition Assessment* (April 1998)

- *Environmental Assessment for the Transfer of the Department of Energy Grand Junction Office to Non-DOE Ownership* (April 2000)
- *Finding of No Significant Impact—Transfer of the Department of Energy Grand Junction Office to Non-DOE Ownership* (April 2000)
- *Final Summary Environmental Baseline Survey of the Grand Junction Office* (May 2000)

In addition, this revised submittal contains additional documents (see Section 1) relating to health and ecological risk, ground water compliance strategy, site reuse, and the latest version of the previously submitted LTSP.

4.0 Description of the nature and extent of contamination with supporting documentation.

4.1 History

The GJO site property was acquired by the U.S. War Department in August 1943 to refine uranium for the Manhattan Project. Uranium was milled, analyzed, and stored on the GJO facility from 1943 to 1975. Operations included ore processing, ore concentrating, research and analytical laboratories (chemistry, analytical, mineralogical, environmental and petrology), a radon chamber, drum storage, and vehicle and site maintenance activities. All known environmental contamination is believed to be the result of these past activities. According to historical records (maintained by DOE and its predecessor agencies, the Atomic Energy Commission, the Nuclear Regulatory Commission, and the Energy Research and Development Administration), approximately 32,000 tons of ore were processed between 1943 and 1958. The resulting tailings, consisting of approximately 178,000 cubic yards (yd^3) of material, were stored or used at many locations at the site.

4.2 Summary of GJO Site Completed Remedial Action, Removal, and Verification

In planning for cleanup of the facility, DOE-GJO complied with the NEPA process and also used the environmental management protocols of CERCLA (as required by DOE policy), although the site did not score high enough to qualify for placement on the NPL (*Grand Junction Projects Office Remedial Action Project Declaration for the Record of Decision and Record of Decision Summary* (April 1990)). A final Remedial Investigation/Feasibility Study-Environmental Assessment (RI/FS-EA) that addressed remediation of the facility was completed in 1989. The *Record of Decision* was completed in 1990.

As a result of the site investigations, the total volume of uranium mill tailings and tailings-contaminated material at the site was estimated at 250,000 yd^3. The tailings and related materials occupied approximately 20 acres. Removal of uranium mill tailings and contaminated soil began in late 1989, and most of the contamination was removed by 1994. During 1999 and the early part of 2000, DOE removed many old drain lines and other underground systems in which contamination was found to further reduce the potential for harm to human health and the environment.

In 1984, the DOE-GJO facility was accepted into the DOE Surplus Facilities Management Program (SFMP). The first comprehensive survey report was completed in 1986. This assessment was based on a 100-foot by 100-foot grid system that was established over the facility to define the extent of Ra-226 contamination. The assessment identified 17.8 acres of the facility with radiologically contaminated soil. This report is entitled *Radiologic Characterization of the Department of Energy Grand Junction Projects Office Facility*, prepared by Bendix Field Engineering Corporation for the Department of Energy SFMP Program (Henwood and Ridolfi, 1986, report GJ-41). This comprehensive assessment collected:

- 348 soil samples; analyzed for Ra-226, Thorium-232, and K-40
- 793 delta-gamma measurements (equivalent Ra-226)
- 205 exterior and 6 interior boreholes depth data
- 103 truck-mounted augers to bedrock in 1982
- 4 building surveys (Buildings 31, 33, 34, and 35)

The results from the assessment identified two separate contaminated areas of 31,440 yd^3 and 28,610 yd^3. It identified tailings used as fill to level low-lying areas along the dike and other areas.

In 1988, the facility was transferred to the DOE Decontamination and Decommissioning (D&D) Program. An additional comprehensive assessment was conducted in 1990. Results are reported in *Radiological Assessment for Construction Phase IB,* (DOE-GJO, April 9, 1990), and supplements the 1986 assessment. The 1990 assessment covered the facility areas inside the security fence (except the mill area on the southern end of the facility). It was conducted to more accurately determine the areal extent and quantity of contamination. In this assessment:

- 274 soil samples were collected and analyzed for Ra-226, K-40, Th-232, Th-230, total uranium, and some for Cs-137; and
- 649 sample locations were established to collect either delta-gamma measurements and/or depth borehole data.

The total volume of contaminated material was revised to 136,000 yd^3as a result of this assessment. Alpha and beta contamination were also detected near Building 2 and Building 7.

A radiological assessment of Black Bridge Park, at the north portion of the facility, is addressed in *Radiological Assessment for Black Bridge Park* (DOE-GJO, October 1989). Black Bridge Park and Treasure Island, on the northwest portion of the facility, were reassessed in 1993 to accurately determine the quantities of contaminated material and extent of Th-230 and total uranium. This report is entitled *Final Report and Recommendation, Grand Junction Projects Office Remedial Action Project Supplemental Radiological Characterization, Treasure Island and Black Bridge Park* (DOE-GJO, May 1993). The additional data collection was needed in part for the program changes that recognized clean-up criteria for Th-230 and total

uranium. Existing data were supplemented with exploratory trenching in areas of known or suspected contamination. The disposal trenches in the landfill area of Treasure Island were monitored and sampled for radiological and nonradiological contamination. This reassessment identified approximately 44,000 yd^3 of additional radiologically contaminated material.

In 1994, sediment samples were collected from the North Pond and analyzed for Ra-226, Th-230, Th-232, and total uranium. The results of the investigation are summarized in a memorandum entitled *Results of the Sampling of the North Pond, June and July 1994, U.S. Department of Energy Grand Junction Projects Office,* internal memorandum from S.J. Lindholm to C.L. Jacobson. This survey was used to augment the sediment sampling results from the 1986 site characterization. This sample analysis showed that all sample results were below the guideline limits.

The results of the initial characterization and all of the supplemental characterization data were used in the remedial design. Decontamination activities for the exterior areas of the DOE-GJO facility were initiated in July 1989 and were completed in January 1995.

Some decontamination activities took place before the Grand Junction Projects Office Remedial Action Project (GJPORAP) was initiated in 1989. These activities included the remediation in 1984 and 1985 of the area south and east of and adjacent to Building 7, the remediation in 1985 of a portion of the Army Lease Area north of Building 18, and the remediation in 1987 of several sections of sidewalk near Building 46. In 1988, five underground storage tanks located west of Building 28 and south of Building 33 were removed. Radiologically contaminated soil associated with these tanks was removed and stockpiled.

The contamination areas were confirmed and marked to indicate excavation boundaries. Technicians monitored the excavation by using scintillometers and by sampling soils to ensure that all contaminated material was removed with minimal over-excavation. When contamination was found to be more extensive than originally assessed, excavation continued horizontally and vertically until all contaminated material was removed. Areas that were assessed as free of contamination were rescanned and sampled, if necessary, to confirm the absence of contamination. The excavated areas went through a verification process that used a 10-foot by 10-foot grid system or a Large Area Verification procedure that used a 30-foot by 30-foot grid system. When a remediated area was verified to meet cleanup standards, the excavation was backfilled with uncontaminated material. A total of 416,133 tons of contaminated materials, representing a volume of approximately 255,250 $yd^3$and covering an area of approximately 22.6 acres, was removed. This material was disposed of at the Grand Junction (also known as Cheney), Colorado, Disposal Cell, a local repository approved to accept uranium mill tailings.

A survey in June and July 1999 to assess windblown contamination used a triangular grid system with spacing between the sample measurement location to provide a 95 percent certainty of finding a circular deposit with an area not greater than 100 square meters (m^2). Surface and subsurface beta-gamma measurements were

made to determine possible uranium contamination, and soil samples were collected immediately under the asphalt pavement. No elevated uranium windblown contamination was found during this survey; however, additional ore contamination was found in the parking lot east of Buildings 810 and 19. The deposits of ore were remediated.

During site remedial action activities, utility trenches were remediated if tailings were found. However, in some areas of the facility, utilities pass under areas that did not require remediation. The potential existed that tailings could have been used for pipe bedding or backfill and would be shielded by clean backfill, although this was not a standard construction practice at the GJO facility. Twelve locations were investigated in July 1999 to determine if the water, sanitary sewer, storm sewer, natural gas, and steam utilities were affected. Trench backfill and bedding material was scanned in the 12 locations. Since the utilities were laid in relatively long segments, it was assumed that if no mill tailings were identified in this investigation, then tailings were not used in the remaining utility trenches. If tailings were identified in the utility trenches, then additional locations would be investigated. The telecommunications lines were not investigated because of their relatively shallow depth and recent installation. No elevated readings were found in any of the utility investigations.

Many of the legacy septic tanks, dry wells, and sewer lines were either removed, as documented through field maps showing depths of remediation, or were abandoned when the current sewer system was installed. An investigation of the remaining septic tanks and exterior sewer lines was conducted from December 1999 through March 2000. All known septic tanks were surveyed for radiological contamination and to determine if they had been abandoned properly.

Each tank was exposed with a backhoe, along with the exterior side, entrance, and exit pipes if possible. If the tank had sludge, it was sampled for radiological constituents. Readings were collected of the interior and exterior walls of the tank, the entrance and exit pipes, and any possible leach field associated with the tank. In this investigation, 33 septic tanks were identified from historical utility drawings. Six of them are known to have been removed during GJPORAP remediation, and 27 tanks were searched for and 18 were found. The results of the investigation found that three tanks had not been abandoned properly. These tanks had no radiological contamination in the sludge, although one tank was found to have contaminated entrance and exit pipes and approximately 200 feet of associated drainpipe. The contaminated tank and drain system was located south of Building 32. This tank and the drainpipe were remediated, and the results have been presented in a close-out report. The improperly abandoned tanks were pumped and then filled with a concrete/soil mixture.

Each building on the facility has been evaluated through a systematic process involving radiological classification, characterization (to determine if residual radioactive material is present), remediation (if necessary), radiological verification and/or release survey, and preparation of a close-out report recommending release for unrestricted use. Nine radiologically contaminated buildings (Buildings 1, 6, 31, 34, 36, 37, 39, 44, and 52) were demolished during GJPORAP. Since these initial

demolitions, other buildings have been removed from the facility (Buildings 31A, 33, 35, and 56).

For all site structures, radiological contamination results collected from release surveys and verifications are statistically analyzed. The average levels are calculated and compared with the guideline values and conditions. If the averages exceed the applicable guideline values, further remediation is required, and follow-up measurements are performed to verify the effectiveness of the actions.

After the averages satisfy the guideline values and conditions, the results are further evaluated. The test uses the mean, standard deviation, sample size, and probabilities to provide a 95 percent confidence that the true mean activity level meets the guideline. This test is outlined in NUREG/CR-5849, *Manual for Conducting Radiological Surveys in Support of License Termination*, equation 8-13.

Independent (third-party) verifications were performed to verify the effectiveness of remedial actions conducted within the various remedial action programs. Oak Ridge National Laboratory–Grand Junction Office (ORNL-GJO) is the independent verification contractor (IVC) for remediation of the GJO facility.

The IVC confirmed that: the surveys; the sampling and analyses conducted before, during, and following remedial action; and the associated documentation presented an accurate and complete description of the condition of the site. The IVC also confirmed that remedial action reduced contaminant levels to below applicable radiological and hazardous waste guidelines for soil, water, and structures.

The IVC performed either a Type-A or Type-B independent verification. A Type-A verification consists of only a review of the verification documentation written by the remedial action contractor (RAC). A Type-B verification consists of a document review of the verification activities as well as an assessment of independent field measurements taken by the IVC to determine if the measurements are within guidelines and for comparison with measurements taken by the RAC.

ORNL-GJO has published individual verification reports for all buildings that have been decontaminated or demolished. In 1997, ORNL published the *Confirmatory Radiological Survey of the Grand Junction Projects Office Remedial Action Project Exterior Portions, 1989-1995* (Oak Ridge National Laboratory, April 1997).

4.3 Resource Conservation and Recovery Act (RCRA) Permits

DOE operations at the site today use the facility for office space and an analytical chemistry laboratory (located in Building 20) with associated waste management activities. DOE will continue to operate the analytical laboratory and will remain responsible for associated waste management. When, in the future, DOE decides to no longer operate the analytical laboratory, DOE will demolish Building 20 and remediate the contaminated materials remaining beneath the structure. In 1992, the GJO submitted Part A of a Hazardous Waste Permit Application to CDPHE to operate a waste storage area (Building 42). Through the submission of the

application, the GJO is allowed to operate as an Interim Status storage facility under RCRA. The application was revised in April 2000 to change the storage location to Building 61C so that Building 42 could be closed prior to site transfer. Hazardous wastes are stored in accordance with RCRA, including requirements for timely disposal, if possible, primarily in Buildings 61A and 61C.

Building 42 has been closed in accordance with Part 265, Subpart G, of the Colorado Hazardous Waste Regulations. The building was demolished in July 2000. DOE is currently using Building 61C as the Interim Storage facility under the Part A application filed with the State in January 1992. A closure plan that meets the requirements of Part 265, Subpart G, of the Colorado Hazardous Waste Regulations, has been filed in accordance with the regulations.

DOE-GJO will lease the storage facility from the RTC for DOE's sole use and will maintain total liability for the maintenance and operation of the storage facility until it is formally closed on or before August 31, 2001. DOE will ensure that all operations are conducted in accordance with applicable regulations and will perform any clean-up actions that may be required as a result of historic or on-going operations.

Because DOE-GJO uses small quantities of hazardous materials, the facility has typically operated as a conditionally exempt small quantity generator (CESQG) under RCRA. However, because GJO has occasionally generated waste over CESQG quantity limits, the site maintains full compliance with all of the requirements of RCRA for large quantity generators. Once the site is transferred, DOE will not generate significant quantities of waste. The RTC, as owner, will be responsible for sewer effluent discharges and permits, except for sewer effluent discharges associated with analytical laboratory operations, for which DOE will remain responsible.

4.4 Remaining Ground Water/Surface Water/Sediment Contamination (see Tables 1 and 2)

Concentrations of uranium, gross alpha, molybdenum, arsenic, selenium, nitrate, chloride, iron, manganese, sulfate, and total dissolved solids in samples from the alluvial aquifer exceed ground water quality standards. The original ground water modeling of the alluvial aquifer predicts that concentrations of ground water contaminants will be below applicable standards within 50 to 80 years after removal of the contaminant source (uranium mill tailings), which was predominantly completed in 1994. The surface expressions of ground water (the North Pond, South Pond, and wetland areas) contain elevated quantities of some chemical constituents typically associated with uranium mill tailings (e.g., manganese, molybdenum, sulfate, and vanadium). Chloride concentrations in samples collected from the North Pond and wetland area, and sulfate concentrations in samples collected from the North Pond, South Pond, and wetland areas, exceeded applicable State standards for these analytes. Tables 1 and 2 identify the regulatory limits and constituents found to exceed the limits during the most recent monitoring episode.

DOE sampled the North Pond on 100-foot centers in 1986 and 1994 for radiological constituents, and sediments did not exceed regulatory limits (*Final Report of the*

Decontamination and Decommissioning of the Exterior Land Areas at the Grand Junction Project Office Facility, September 1995). The earth materials beneath the South Pond and wetland areas were remediated and verified to comply with regulatory limits. The excavations were backfilled with clean material. No excavation has occurred in the North Pond. DOE's planned remedial action for surface/ground water and sediments is detailed in Section 5.1.

Table 1. Summary of Contaminants Remaining in Ground Water

Contaminant of Concern/ Applicable Standard[1]		Known Levels of Contamination[2]	Potential Hazard/Comments
Common Ions (mg/L)			
Nitrate (as N)	10	16.74	The contamination remaining in the ground water does not present a hazard unless the ground water is exposed to the surface and used for some purpose. Any activities affecting ground water must be reviewed in accordance with the Deed restrictions. The passive remediation of the ground water should be complete in 50 to 80 years.
Total Dissolved Solids	2,138	5,690	
Metals (mg/L)			
Arsenic	0.05	0.23	See above.
Barium	1.0	0.0483	
Cadmium	0.01	0.0015	
Chloride	250	397	
Chromium (total)	0.05	0.0146	
Iron	0.3[4]	1.69	
Lead	0.05	<0.001	
Manganese	1.7[5]	5.26	
Molybdenum	0.1	0.229	
Selenium	0.01	0.122	
Silver	0.05	not analyzed[3]	
Sulfate	250[4]	1850	
Radionuclides (pCi/L)			
Gross Alpha (excluding radon and uranium)	15	113.59	See above.
Radium-226+228	5.0	0.57	
Uranium-234+238	30	1140.7	

[1] Uranium Mill Tailings Radiation Control Act, revised in 1986; Title 5, *Colorado Code of Regulations*, Part-1002–8; and EPA Region 3 Risk-based Concentration Table (October 2000).
[2] Concentrations are reported in the *U.S. Department of Energy Grand Junction Office Site Environmental Report for Calendar Year 1999* (GJO–2000–158–FOS, September 2000).
[3] Ground water was not analyzed for silver in 1999 because historical concentrations have been near background levels.
[4] Title 5, *Colorado Code of Regulations*, Part 1002-8, "Basic Standards for Ground Water."
[5] EPA Region 3 Risk-Based Concentration Table, October 2000 Update.

Table 2. Summary of Contaminants Remaining in Surface Water

Contaminant of Concern/ Applicable Standard[1]	Known Levels of Contamination[2]	Potential Hazard/Comments
Chloride/250 mg/L	North Pond-334 mg/L Wetland Areas-651 mg/L	The potential hazard for exposure is ingestion (drinking) of the water or fish, or prolonged exposure through swimming or wading. Both activities are controlled through restrictions in the Deed.
Sulfate/ 480 mg/L	North Pond-2,240 mg/L South Pond-1,600 mg/L Wetland Area-6,780 mg/L	See above.
Uranium/40 picocuries per liter (pCi/L)	North Pond-102 pCi/L South Pond-269 pCi/L Wetland Area-111 pCi/L	See above.

[1] Title 5, *Code of Colorado Regulations*, Part 1002–8
[2] Figures are reported in the *U.S. Department of Energy Grand Junction Office Site Environmental Report for Calendar Year 1998* (September 1999).

4.5 Remaining Radium Sources in Well

DOE will leave a pair of radium foil sources on-site encased in a 300-foot-deep well. The radium sources are low-activity sources that were used for the calibration of equipment. The well has been abandoned in accordance with a State-approved plan, and the sources are encased in concrete approximately 150 feet below the surface, eliminating the potential for future exposure unless the well is excavated. No further remediation is required by the State for these sources. DOE has placed a physical marker over the well to identify the location.

4.6 Remaining Soil Contamination Under Building 12 (see Table 3)

The contamination present beneath Building 12 is believed to consist of soil with elevated concentrations of radium-226 and uranium from an old mill slab. The contamination is believed to be present beneath the building based on the concentrations in soil found during the removal of portions of the former mill slab on the east and west exterior sides of Building 12. The triangular pieces of the slab that extended beyond the Building 12 footprint were removed in August 1999 and April 2000. All exterior portions of the deposit were removed except for a small concrete box that was structurally tied to the east Building 12 foundation. A single corehole was cut near the center of the former mill slab in March 2000. The core cut through 4 inches of Building 12 concrete, 4 inches of soil, and 6 inches of former mill slab concrete. Soil samples collected from the core did not exceed the radium, thorium, or total uranium concentration guidelines found in the *Survey Plan for Releasing the Buildings at the Grand Junction Projects Office for Unrestricted Use*, (GJPO-GJ-16, December 1995). The top surface of the core did display elevated fixed surface contamination measurements; however, this slab is covered with the Building 12 slab and 4 inches of soil, so no detectable readings can be seen inside the building. Additional coreholes were not possible at the time because of untraceable electrical conduit beneath the slabs that could cause electrical shock if cored through. Additional coreholes were drilled during a planned electrical outage in August 2000. This further defined the extent of contamination beneath the slab. Deposits beneath the former slab on the outside of Building 12 contain soil concentrations of

24 picocuries per gram (pCi/g) Ra-226; 100.6 pCi/g total uranium on the west side; 123 pCi/g Thorium-230 and 1,430 pCi/g total uranium on the east side.

Table 3. Summary of Contaminants Remaining Under Building 12

Contaminant of Concern/ Applicable Standard[1]	Known Levels of Contamination[2]	Potential Hazard/Comments
Thorium-230/ 15 pCi per gram (pCi/g)	123 pCi/g	The contamination presents a danger of exposure if disturbed. The remaining contamination is situated under the building. Activities that might disturb the soils will be subject to review by DOE. DOE will demolish the building and take appropriate remedial action when DOE no longer has a use for the building. There is no hazard to occupants of the building.
Uranium-106 pCi/g	1,430 pCi/g	See above.

[1]DOE Order 5400.5, *Radiation Protection of the Public and Environment.*
[2]Levels of contamination identified in areas proximate to Building 12.

A release survey was conducted in Building 12; no elevated gamma exposure rates were found, no elevated beta-gamma activity was found, and the average radon decay-product concentration for this building was 0.006 working level, which is below the 0.020 working level guideline. These measurements indicate that the mill slab and underlying soil do not pose any increased health risk to the workers inside Building 12.

DOE proposes to postpone remediation of contamination located underneath Building 12. Immediate removal of the contamination would require demolition of the building, which houses critical computer equipment. The contamination will remain in place and will be managed appropriately until DOE ceases to lease the building. At that time, DOE will demolish the building and will remove and dispose of all contamination. Requirements to complete the work are established in the Deed (Attachment B) and the Enforceable Agreement (Attachment A) and are discussed further in Section 5.2.

4.7 Remaining Soil Contamination Under Building 20 (see Table 4)

DOE recently discovered contamination underlying Building 20, the analytical laboratory, and has characterized the material to determine the levels of contamination and required remediation. The contamination present beneath the southwest corner of Building 20 consists of soil with elevated concentrations of radium-226 and uranium that was placed there as fill to bring up the elevation of a pond bank. The volume of the deposit is estimated at 95 yd^3 of soil and concrete rubble that has varying thickness, with the greatest thickness of contaminated soil being 8 feet. It extends inside the west wall of Building 20, approximately 5 feet to the east. The top of the deposit starts approximately 4.5 feet below the uncontaminated soil surface and goes down to a total depth of 13 feet at its thickest point. Maximum contaminant concentrations determined through analytical

laboratory analyses of soil samples were 177 pCi/g radium-226, 148 pCi/g thorium-230, and 269 pCi/g total uranium.

Table 4. Summary of Contaminants Remaining Under Building 20

Contaminant of Concern/ Applicable Standard[1]	Known Levels of Contamination	Potential Hazard/Comments
Thorium-230/ 15 pCi per gram (pCi/g)	148 pCi/g	The contamination presents a danger of exposure if disturbed. The remaining contamination is situated under the building. Activities that might disturb the soils will be subject to review by DOE and are subject to Deed restrictions. DOE will take appropriate remedial action when the new owner no longer has a use for the building. There is no hazard to occupants of the building.
Uranium/106 pCi/g	269 pCi/g	See above.
Radium-226/15 pCi/g	177 pCi/g	See above.

[1]DOE Order 5400.5, *Radiation Protection of the Public and Environment*

The depth, size, and concentrations of this deposit are estimated from 45 vertical drill rig investigations along the western exterior boundaries of the building, six angled drill rig investigations near the southwest corner of the building, and soil samples collected from the vertical face of the excavation on the west side of the building. The drilling and sampling occurred in May and June 2000. Because the deposit starts several feet below the surface, no detectable radiological readings have been found inside the building due to this deposit. This is supported by the *Building 20 Characterization Report* (DOE-GJO, May 1996). This report states that the gamma exposure rates and the indoor radon decay-product concentrations are both below the guideline values. Other measurements of exposure have been collected inside the building through long-term dosimeters placed on the east and west sides. No increase in exposure can be seen in comparison of the east and the west ends of the building. Based on these measurements, this deposit does not pose any increased health risk to the workers inside Building 20.

DOE will leave the contamination in place until DOE vacates the building. At that time, DOE will demolish the building and remediate the underlying contamination. Additional details are provided in Section 5.3 and in Attachments B and C.

4.8 Status of Buildings 7 and 7A

Buildings 7 and 7A were historically used for uranium oxide sample preparation and analysis. The structures and the associated soil were contaminated with uranium oxide and uranium mill tailings.

Building 7 was remediated in 1999, after which the structure and associated soils were surveyed in accordance with approved plans and using the best available technology. The building was verified to be free of contamination and was released

for unrestricted use and unlimited exposure. Transfer of the building to the U.S. Army is pending.

Building 7A was demolished in 2001. Contaminated soil in the footprint was excavated, and contaminated material was disposed of at the Grand Junction Disposal Site. Verification surveys indicate that the site (including associated Building 62 and the fan house) can be released for unrestricted use and unlimited exposure.

4.9 Remaining Friable Asbestos

Friable asbestos is present in limited quantities on the Property and is subject to the reporting requirements of CERCLA 120(h). The GJO facility has operated under an asbestos management plan since 1995. The asbestos management plan was created in compliance with the Asbestos Hazard Emergency Response Act (AHERA) and has been managed by an AHERA-certified management/planner. As part of the development of that plan, DOE undertook an extensive sampling and analysis project to identify and quantify the types and amounts of asbestos on the site. Asbestos abatement projects have been conducted in accordance with the Toxic Substances Control Act; State of Colorado Regulation 8, Part B, "Asbestos Control"; and applicable standards for worker protection under the Occupational Safety and Health Act. Remaining quantities of friable asbestos that are regulated under CERCLA are listed below in Table 5. The site transfer documentation clearly states that all asbestos remaining on-site (both friable and non-friable) is the responsibility of the owner (see Attachment B).

Table 5. Reportable Friable[a] Asbestos[b]

Location	Homogeneous Material Description	Material Condition	Quantity Linear or Sq. Ft.	Asbestos Content
Building 20	Soils in Trench	Fibers in Soil	341 sq. ft.	14%
GJO Site	Buried Debris (Various locations where pipe insulation was replaced during the 1970's and the removed insulation was reburied with the utility.)	Friable/Damaged[c]	Estimate 500 lf	25% to 30%

[a] "Friable" means that the material, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure, and includes previously non-friable material that becomes damaged to the extent that when dry may be crumbled, pulverized, or reduced to powder by hand pressure (40 CFR 763.83)
[b] The CAS Number for friable asbestos is 1332214; the Reportable Quantity is 1 pound. The linear footage is the result of physical inspection, the number of pounds cannot be estimated from available data.
[c] "Damaged" means asbestos-containing material that has deteriorated or sustained physical injury such that the internal structure (cohesion) of the material is inadequate or, if applicable, which has delaminated such that its bond to the substrate (adhesion) is inadequate or which for any other reason lacks cohesion or adhesion qualities (40 CFR 763.83).

4.10 Remaining Non-reportable Friable Asbestos and Non-friable Asbestos

Buildings on the Property contain non-friable asbestos in the form of floor tiles, ceiling tiles, and mastic carpet adhesive. CERCLA 120(h) does not require the reporting of non-friable asbestos, and the materials present at the site are not considered to be a hazard unless disturbed (e.g., tile removal using destructive methods, sanding, scraping, or sandblasting). DOE has also identified a trench running along the northern portion of Building 810 on the east side that contains remnants of asbestos transite siding that was removed from Building 810 between 25 and 30 years ago. The siding is not friable at this time and does not present a hazard to human health or the environment. Removal actions using heavy equipment or destructive methods may render the transite friable.

Additionally, there are areas at the site where friable asbestos exists, but the friable asbestos has not been stored, released, or disposed of as defined by CERCLA 120(h). The materials are therefore non-reportable and are classified as "damaged" because damage may have occurred to portions of the materials; but the damage has not rendered the materials unusable for their intended purposes (for example, pipe insulation). In every instance, the materials are being managed in-place to mitigate any potential hazard. Table 6 lists the known locations of non-reportable, friable asbestos. The site transfer documentation states that all remaining asbestos is the responsibility of the new owner (see Attachment B).

Table 6. Non-reportable Friable[a] Asbestos[b]

Location	Homogeneous Material Description	Material Condition	Quantity Linear or Sq. Ft.	Asbestos Content
Building 18	Spray-on Ceiling Insulation	Friable/Damaged[c]	2,297 sq. ft.	20%
Building 20	Pipe Insulation	Friable/Damaged	3,133 lf	4%
Building 810	Pipe Insulation (South Crawlspace) Risers, Air Duct	Friable/Damaged	716 lf	25%
Building 938	Pipe Insulation, Risers	Friable/Damaged	48 lf	25%
Building 3022	Pipe Insulation (South Crawlspace) Risers	Friable/Damaged	690 lf	25%
GJO Site	Buried Pipe Insulation between Buildings 28 and 29 and between Buildings 1 and 56	Friable/Damaged	Estimate 500 lf	25% to 30%

[a] "Friable" means that the material, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure, and includes previously non-friable material that becomes damaged to the extent that when dry may be crumbled, pulverized, or reduced to powder by hand pressure (40 CFR 763.83)
[b] The CAS Number for friable asbestos is 1332214; the Reportable Quantity is 1 pound. The linear footage is the result of physical inspection, the number of pounds cannot be estimated from available data.
[c] "Damaged" means asbestos-containing material that has deteriorated or sustained physical injury such that the internal structure (cohesion) of the material is inadequate or, if applicable, which has delaminated such that its bond to the substrate (adhesion)is inadequate or which for any other reason lacks cohesion or adhesion qualities (40 CFR 763.83).

4.11 Remaining Lead-based Paint

Because of the age of the buildings on the site, lead-based paint is presumed to be present on the exterior surfaces of all buildings. There are no data available to quantify the amount of paint remaining on the buildings. In most cases, the lead-based paint has been encased with non-lead-based paint and presents no danger to site occupants as long as it remains undisturbed (e.g., sanding, scraping, sand blasting). Reporting of remaining lead-based paint is discussed here at the request of CDPHE. It is not a CERCLA hazardous substance. The site transfer documentation clearly states that remaining lead-based paint is the responsibility of the new owner (see Attachment B).

5.0 Deferred Remediation

5.1 Ground Water/Surface Water/Sediments

The *Grand Junction Office Remedial Action Project Declaration for the Record of Decision and Record of Decision Summary* concluded that passive remediation of the ground water contamination was the most efficient and protective restoration method. Modeling indicated that natural flushing of the ground water underlying the site would remove all added contaminants to acceptable limits within a 50- to 80-year period.

5.1.1 Constituents of Concern

The selected remediation strategy is described in detail in Attachment C, *Long-Term Surveillance Plan (LTSP) for the U.S. Department of Energy Grand Junction, Colorado, Office Facility* (June 2001), and also in Attachment D.

Ground water and surface water have been monitored at the site since 1979. In 1992, the ground water monitoring network was reduced to 12 monitor wells. Also in 1992, quarterly sampling was reduced to sampling every 9 months to allow an annual assessment of compliance with ground water standards while still collecting data to assess the effect of seasonal fluctuations in contaminant concentrations. Many constituents have been analyzed over the years to establish a ground water quality baseline for the area. Monitoring results have been presented in annual site environmental reports since 1980.

Data for site ground water constituents of concern have been plotted to show trends over time (see Attachment D). Uranium is the principal constituent of concern in site ground water and, as a conservative species, is considered representative of current migration of site-related contaminants in ground water in the alluvial aquifer. Uranium in ground water plotted over time from 1982 through 1998 shows concentrations generally above the maximum concentration limit but consistently decreasing, indicating that natural flushing is occurring in the alluvial aquifer (Figure 2 in Attachment D). Concentrations of uranium, molybdenum, arsenic, and selenium (radium was consistently below the regulatory limit), plotted from January

1992 to June 1998, presents data for the period during and after surface remediation (Attachment D, Section 2.2). Results for uranium and molybdenum show consistently decreasing concentrations in ground water at most locations. Linear trend lines have been plotted for uranium in ground water from three monitor wells (8-4S, 11-1S, and GJ84-04) to show the projected decrease in concentrations over time. Trend-lines indicate that concentrations of uranium should decrease to below the standard well within the 100-year regulatory time frame. Migration of arsenic and selenium tends to be more retarded in site ground water, and trends are not yet obvious. Also, selenium occurs naturally in ground water in the Grand Junction area, and elevated concentrations are not necessarily site-related.

Monitoring will continue, and trends will be evaluated until concentrations of constituents of concern are below the standards. Statistical ground water data comparison methods will be implemented as discussed in Section 5.1.3.

Surface and ground water contaminants of concern are different because exposure pathways and receptors are different, and different mechanisms (e.g., evaporation in the wetland areas) affect constituent concentrations. However, the analyte list proposed in Attachment C, the LTSP, is the same for both surface and ground water (see Table 7). This list includes all constituents identified as potentially posing a risk and/or exceeding regulatory limits. Tables 2.2 and 2.3 of the LTSP identify the regulatory limits and constituents exceeding these limits, based on the latest monitoring data.

Table 7. Surface and Ground Water Analyte List

Analyte	Basis for Retention		
	Exceeds Regulatory Limit	Poses Ecological Risk	Poses Human Health Risk
Arsenic	X		X
Chloride	X		
Gross Alpha	X		
Iron	X		
Manganese	X	X	X
Molybdenum	X	X	X
Nitrate			X
Selenium	X		
Sulfate	X		X
Total dissolved solids	X		
Uranium	X	X	X

DOE has reevaluated the risks to human health and the environment, as requested by CDPHE (see Section 6). The ecological risk assessment concluded that ecological constituents of potential concern included uranium for ground water and molybdenum and uranium for surface waters. The human health risk identified arsenic, manganese, molybdenum, sulfate, and uranium as constituents of potential concern in site surface and ground water.

Table 7 summarizes the results of defining the list of analytes on the basis of regulatory compliance, ecological risk, and human health risk. Sample analysis will include these analytes and standard field parameters. Vanadium was deleted from the analyte list because the ecological and human health risk analyses did not identify this analyte as a constituent of concern, and vanadium concentrations in GJO site ground water have consistently been below the regulatory limit.

DOE does not have the analytical data to demonstrate that pond sediments will not accumulate contaminants from ground and surface water. Consequently, DOE will conduct sampling to establish baseline chemistry data for pond sediments. This task is included in Attachment C, the LTSP.

Sediment samples will be collected from the South Pond, the North Pond, and the wetland areas. Sample locations will be selected to represent worst case and average conditions (e.g., deep water, near shore, and intermittently inundated areas). Analytes will include arsenic, chloride, total chromium, gross alpha, magnesium, manganese, molybdenum, nitrate, selenium, sulfate, total uranium, and isotopic uranium. On the basis of the results, DOE will develop a program for further sediment monitoring.

5.1.2 Summary of Compliance Strategy (see Attachment D for additional details)

Until spring 2000, the ground water monitoring network at the GJO facility consisted of 12 wells (see *U.S. Department of Energy, Grand Junction Office, Ground Water Protection Management Program Plan* (November 1999) and the *Annual Site Environmental Report*. The remaining 36 wells were found to be redundant or unnecessary and have not been sampled since 1995. In December 1999, the ground water monitoring program at the GJO facility was re-evaluated. The evaluation included a review of the alluvial aquifer model, sample results, and trends. As summarized below and in Attachment D, only a subset of the sampling locations were considered necessary for monitoring aquifer conditions, including the progress of aquifer flushing. The sampling network also is adequate to ascertain that there is no potential impact to human health and the environment.

The six monitor wells selected for the monitoring network (8-4S, 11-1S, 6-2N, 14-13NA, GJ84-04, and 10-19N) are distributed on-site and along the downgradient edges of the facility near the Gunnison River (see Figure 1, Attachment D, for graphic). The other six monitor wells did not enhance or add value to the network because concentrations have been consistently low since 1982 (GJ84-09 and 5-12NA), the wells were located too near the Gunnison River to provide useful data (14-6NA), or were located near other wells or were in the interior of the site where activity is less relevant (10-2NA, 11-12NA, GJ87-15).

The analytes to be monitored in ground water during each sampling event include the constituents of concern and other constituents that may be useful in assessing site conditions. In addition to these analytes, standard water quality indicators (pH, alkalinity, conductivity, temperature, and turbidity) will be measured during each sampling event.

Ground water monitoring at the GJO facility will be conducted annually, in late winter, for a minimum period of 5 years (through 2005). At the end of this period, DOE will evaluate monitoring results in consultation with the CDPHE to determine the requirements for future monitoring at the site. This will include a statistical evaluation of contaminant concentration trends. Criteria for modifying or terminating ground water and surface water monitoring will include (1) continued decrease in concentrations of constituents of concern as predicted and observed, (2) compliance with regulatory limits, and (3) no unacceptable risks to human health and the environment resulting from site-related contamination. Modification may include changing the number or location of sample points or the suite of analytes. The DOE will receive approval from the CDPHE prior to modification or termination of monitoring. The compliance strategy for surface waters at the GJO facility is also monitored natural flushing. The surface-water monitoring network includes two locations in the Gunnison River and one location each in the North Pond, South Pond, and wetland areas. The analytes to be monitored in surface water during each sampling event are the same for ground water. Surface water quality must comply with the State's water quality standards for the Gunnison River. The frequency and duration of surface-water monitoring will be the same as for the ground water monitoring. Trend analyses will be performed on surface-water sampling results in conjunction with analysis of ground water sampling results.

In 2001, DOE will conduct sampling to establish baseline chemistry data for pond and wetland areas sediments. These locations will be sampled again when ground and surface water complies with regulatory limits to verify that pond and wetland area sediments also comply with applicable limits. Sample locations will be selected to represent worst case and average conditions (e.g., deep water, near shore, and intermittently inundated areas). Analytes will include arsenic, chloride, total chromium, gross alpha, magnesium, manganese, molybdenum, nitrate, selenium, sulfate, total uranium, and isotopic uranium. On the basis of the initial results, DOE will revise the LTSP to present sampling locations and results, and, if necessary, invoke a program for further sediment monitoring.

5.1.3 Ground Water/Surface Water Connectivity and Statistical Analysis

Water levels in the ponds and wetland areas fluctuate with both the ground water and river water levels. There is practically no resistance to flow through the porous granular materials that make up the alluvial aquifer. (Conductivities ranged from 30 to 45 feet per day before remediation. Excavations were backfilled with clean granular river-run material.) Fresh water is introduced into the ponds as the river rises, which will dilute the concentrations of constituents in the surface water. Uranium concentrations of surface waters are decreasing, as shown in Attachment D.

This mechanism will eventually cause the surface waters to flush clean of contaminants. These high conductivities and the close proximity of the river, the aquifer, and the surface bodies also ensure that water in these features will quickly establish a common elevation. Consequently, hydraulic head will not prevent an influx of clean water each spring. This annual exchange of water should also dissolve to a state of equilibrium any available contaminants in sediments. Model inputs were

reviewed and found to remain valid in the post-remedial action configuration of the aquifer.

Evaluation of ground water monitoring data indicates that the concentration of a constituent may vary between sampling events and may not consistently decrease in subsequent sampling events. On the basis of the observation that the concentrations of multiple species covaries, this phenomenon probably reflects seasonal fluctuations of the ground water regime within the alluvial aquifer and the consequent changes in fresh water influx and dilution. These short-term variations are superimposed over the long-term trends, which are of significance in the overall assessment of compliance with ground water protection standards. Simple linear trend analysis (least squares) indicates that, overall, contaminant concentrations are decreasing with time since source control was achieved in 1994 (Attachment D).

As long as an overall negative trend in analyte concentrations is observed, DOE proposes not to undertake a rigorous statistical analysis of ground water quality on an annual basis. In 2005, DOE will evaluate monitoring data to confirm distribution assumptions and to conduct a rigorous analysis to identify statistically significant changes in ground water quality. This analysis will employ statistical methods such as those described at 6 CCR 1007-3, Subpart F, 264.97(h), or described in EPA guidance. DOE will provide a justification of the selection of a statistical analysis method and will report findings to CDPHE.

5.2 Soil Contamination Under Building 12

Upon notice of termination of DOE's lease of Building 12, DOE will prepare a remedial design package (including schedule and budget) for demolition of Building 12, remediation of contaminated soils, and disposal of waste material at an approved disposal site (i.e., the Grand Junction Disposal Cell). Once the design is concurred in by CDPHE, DOE will commence demolition, soil removal, and disposal of waste.

5.3 Soil Contamination Under Building 20

DOE will lease Building 20 from the RTC. When DOE decides to vacate the building, DOE will prepare a remediation design (including schedule and budget) to demolish Building 20, remove contaminated materials beneath the building to within regulatory limits, and properly dispose of the contaminated materials. DOE will obtain regulator approval of the remediation design.

5.4 Compliance with the CERCLA Process (see also Enforceable Agreement, Attachment A)

DOE will continue to follow the intent of the CERCLA process on this non-NPL site, as has been done to date. The selected remedy for site ground water (and the interconnected surface water expressions) is identified in the *Grand Junction Projects Office Remedial Action Project Declaration for the Record of Decision and Record of Decision Summary* (April 1990), as natural flushing in a 50- to 80-year time frame.

The selected remedy included decontaminating the three contaminated buildings known at the time, removing contaminated soil, and disposing of all wastes at the Grand Junction Disposal Cell. This remedy, of decontamination/demolition of structures, removal of contaminated soil/structural debris, and disposal at the Grand Junction Disposal Cell, has been followed during the entire site cleanup. The final cleanup identified above constitutes implementation of remedial action specified in the *Record of Decision.*

6.0 Detailed description of the Reuse Plan (approved by the local land-use authority), along with corresponding identification of specific exposure pathways and reasonable anticipated-use scenarios; and assessment of risk, pertinent to the parcel proposed for early transfer, which considers unrestricted use and reasonably anticipated use scenarios pursuant to the Reuse Plan for the parcel.

6.1 Planned Use of GJO Site

The RTC's planned use for the site is included in Attachment E. In summary, the planned use is for a mixture of commercial, industrial, office space and open space. The site would include manufacturing, research and development, technology applications, retail and wholesale sales, and office space associated with the above. It is likely that an environmental analytical chemistry laboratory would be located on the site. Planned tenants are the Western Colorado Business Development Corporation's operation of a small business incubator and the DOE GJO operation, which includes office space for federal and contractor staff and operation of the analytical laboratory. Future occupants may be governmental or private entities. Land use would be similar to existing uses on the site.

6.2 Re-evaluation of Human Health and Ecological Risk

GJO has re-evaluated the health and ecological risks associated with contamination remaining on-site, considering unrestricted use, as summarized below (see Attachments F and G). These identified risks form the baseline for then looking at the new owner's intended use of the site and the institutional controls proposed to be protective during such uses.

6.2.1 Human Health Risks (see Attachment G)

An analysis of risks associated with contaminated surface and ground water at the GJO was performed for both unrestricted and reasonable-use scenarios. Data used for the analysis were collected in 1999 as part of the annual monitoring efforts and represent the most current picture of the site. These data were reviewed and screened to develop a list of constituents for which quantitative risks were calculated. Parameters were eliminated from further evaluation if: (1) the majority of samples were below detection or no different from background (e.g., cadmium and lead in ground water); (2) if they are essential nutrients (e.g., calcium and magnesium); or (3) if all samples were well below established toxicity levels (e.g., chromium and iron in ground water). The constituents that remained after this screening process for ground water were arsenic, chloride, manganese, molybdenum, nitrate, selenium,

sulfate, uranium, and vanadium. For surface water, the constituents that passed the screening process were chloride, manganese, molybdenum, sulfate, and uranium. Chloride and sulfate were excluded from quantitative risk calculations due to lack of toxicity data. The remaining constituents were retained for quantitative risk calculations.

Risks were calculated using standard EPA equations and exposure parameters (see Attachment G). Both carcinogenic and noncarcinogenic risks were assessed. Six different exposure scenarios were evaluated in all–two for ground water and four for surface water. Each of these scenarios is described and results are discussed below.

The following exposure scenarios were evaluated for the GJO site:

- Residential ingestion of ground water. This reflects the worst-case unrestricted use of ground water. This scenario is based on a resident who gets all drinking water from ground water at the site. The exposure point concentrations used in calculations is the 95 percent upper confidence level on the mean (UCL95) of results from the 12 plume monitoring wells on the site. This is a reasonable worst-case estimate.

- Residential ingestion of radium-226 contaminated soil and radon inhalation. This scenario assumes that the contaminated soil is exposed and uncontrolled and that a residential structure is built over contaminated soil.

- Occupational ingestion of ground water. Given the probable future use of the site, this scenario reflects a more probable unrestricted use scenario. The assumption is that a worker ingests ground water from an on-site well on a regular basis. The UCL95 was used for the exposure point concentrations in this scenario.

- Occupational exposure to surface water-dermal exposure pathway. This scenario represents exposure that could occur if the North and South ponds on the site were used in some way by future site workers (e.g., as process water in some type of operation). Risks were not calculated for the wetland areas because it is assumed this area would remain protected. Maximum concentrations detected were used in these calculations because of the limited data for surface water.

- Incidental exposure to surface water by children playing. This exposure could occur if the area was available for use by children for play. It assumes both minor surface water ingestion as well as dermal exposure. Risks were calculated for the North Pond, South Pond, and wetland areas. Maximum concentrations were used.

- Ingestion of fish from the North Pond. Fish in the North Pond are classified as non-game species and are unlikely to be caught for consumptive purposes. However, this pathway was evaluated for information purposes. This exposure scenario is based on conservative assumptions associated with recreational fishing. One assumption is that contamination accumulates in fish and is subsequently consumed by humans. Two calculations were done for uranium.

One assumes that no biomagnification occurs (concentration of fish is the same as the ground water), and the other assumes a 55-fold concentration. The values reflect the range of bioconcentration factors (BCFs) obtained for uranium in a study of the Baltic Sea (information obtained on the Internet). No BCFs were available for manganese; calculations were done using the same BCFs as uranium for information purposes. Manganese concentrations were less than half of that established by EPA as a recommended water quality criteria for the consumption of organisms (63 FR 68354). Risks posed by molybdenum were not calculated due to lack of BCFs and recommended water quality criteria. Maximum concentrations of uranium and manganese were used in the calculations.

- Ingestion of fish from the South Pond. Assumptions associated with the South Pond calculations were the same as those for the North Pond.

For use of ground water in a residential or occupational setting, both carcinogenic and noncarcinogenic risks exceed EPA's acceptable criteria (acceptable being Hazard Quotient < 1 and carcinogenic risk between 10^{-4} and 10^{-6}). This confirms the need for institutional controls to prohibit unrestricted access at the present time. Risks for residential use are greater than those for occupational exposure.

Direct exposure to surface water, either in an occupational or recreational setting, are not likely to result in any unacceptable risk based on the assumptions made in the calculations. Risks in an occupational setting are very low, even when based on conservative assumptions. Risks are slightly higher for the children-playing scenario; highest risks are associated with the wetland areas where contaminants are more highly concentrated. These results suggest that future use of the surface water in a park-like setting or a similarly less restrictive manner would be acceptable from a human health perspective.

Risks associated with fish consumption are inconclusive. Calculations show that there *could* be some risk associated with uranium accumulation. If a low BCF for uranium is appropriate, both carcinogenic and noncarcinogenic risks are acceptable. If, however, a high-end BCF is more reasonable, both carcinogenic and noncarcinogenic risks are unacceptable. The risks associated with fish from the North Pond are marginal; those associated with the South Pond are slightly higher, but still relatively low. These calculations are based on the consumption of 8 ounces of contaminated fish per week throughout the year. This suggests that occasional consumption of fish from the ponds would be relatively safe.

The following table summarizes, from a health-based risk, the importance and effectiveness of DOE's institutional controls for protecting human health during the new owner's planned use of the site.

Table No. 8. Summary of Human Health Risk Calculations—Grand Junction Office Surface and Ground Water Use[1]

Exposure Scenario	Receptors	Contaminants	Assumptions	Proposed Institutional Controls	Risks w/o institutional controls	Comments
Residential ingestion of ground water	Residents using on-site wells	As, Cl, Mn, V, Se, SO_4, Mo, NO_3, U	All drinking water is from on-site wells; UCL95 of plume wells used in calculations	Prohibition on use of ground water for any purpose through deed restriction.	HI = 12.13 Carcinogenic risk = 2.3E-02	Greatest risks from As, U. Prohibition of ground water use would eliminate pathway and reduce risks to zero.
Occupational ingestion of ground water	Workers at the site using on-site wells for drinking water during the work day	As, Cl, Mn, V, Se, SO_4, Mo, NO_3, U	Half of drinking water consumed during the work day is obtained from on-site wells; UCL95 of plume wells used in calculations	Prohibition on use of ground water for any purpose through deed restriction.	HI = 4.36 Carcinogenic risk = 5.6E-3	Greatest risks from As, U. Prohibition of ground water use would eliminate pathway and reduce risks to zero.
Occupational incidental surface water exposure	Workers using surface water in some industrial process	Cl, Mn, Mo, SO_4, U	Dermal contact only; contact occurs for entire work day. Wetland area assumed unavailable for use. Maximum concentrations used in calculations.	Signage notifying public that use of surface water for swimming, fishing or drinking is prohibited.	North Pond: HI =.002; Carcinogenic risk = 1.2E-7 South Pond: HI=.005; Carcinogenic risk = 2.5E-7	Risk results indicate that surface water could be used in an industrial process with no unacceptable risk. Institutional controls would not be required to reduce this exposure.
Incidental surface water ingestion/dermal contact—recreational setting	Children playing in the ponds and wetland areas	Cl, Mn, Mo, SO_4, U	Children wade/splash in ponds and wetland areas contacting arms and legs; some incidental ingestion of surface water occurs. Maximum concentrations used in calculations. Exposure occurs 1/3 of the year.	Signage notifying public that use of surface water for swimming, fishing or drinking is prohibited.	North Pond: HI =.033; Carcinogenic risk = 2.9E-7 South Pond: HI =.065; Carcinogenic risk = 6.0E-7	No unacceptable risks are associated with this use of surface water. Results indicate that use of surface water in a recreational scenario (e.g., park, bike path) would be acceptable without restrictions.

Table No. 8. Summary of Human Health Risk Calculations—Grand Junction Office Surface and Ground Water Use[1] **(continued)**

Exposure Scenario	Receptors	Contaminants	Assumptions	Proposed Institutional Controls	Risks w/o institutional controls	Comments
Ingestion of fish from North Pond	Recreational fishermen and their families	U, Mn	U and Mn accumulate in fish living in the North Pond. Receptors ingest 8 oz. of contaminated fish per week. Bioaccumulation factors (BCF) of 1 and 55 used in calculations. Maximum concentrations used in calculations.	Signage notifying public that use of surface water for swimming, fishing or drinking is prohibited. Fish in ponds classified as non-game species.	For BCF of 1: HI=.03; Carcinogenic risk = 1.9E-6 For BCF of 55: HI = 1.5; Carcinogenic risk = 1.0E-4	If BCF at low end is appropriate, risks associated with this pathway would be acceptable. At high BCFs, risks are marginally high. Results suggest that occasional ingestion of fish from the pond would be acceptable, but reliance on pond as a major food source would not be. Some type of institutional control could be warranted. Most of risk is from U.
Ingestion of fish from South Pond	Recreational fishermen and their families	U, Mn	U and Mn accumulate in fish living in the North Pond. Receptors ingest 8 oz. of contaminated fish per week. Bioaccumulation factors (BCF) of 1 and 55 used in calculations. Maximum concentrations used in calculations.	Signage notifying public that use of surface water for swimming, fishing or drinking is prohibited. Fish in ponds classified as non-game species.	For BCF of 1: HI =.06; Carcinogenic risk = 3.8E-6 For BCF of 55: HI =3.03; Carcinogenic risk = 2.1E-4	If BCF at low end is appropriate, risks associated with this pathway would be acceptable. At high BCFs, risks are marginally high. Results suggest that occasional ingestion of fish from the pond would be acceptable, but reliance on pond as a major food source would not be. Some type of institutional control could be warranted. Most of risk is from U.
Residential ingestion of radium-226 contaminated soil.	Residents, including children and adults	Radium-226	The contaminated soil is uncontrolled in a residential setting.	DOE will maintain control of occurrences and will remediate soil when buildings are demolished.	1.38E-4	Does not include uranium in soil or radon inhalation. Institutional controls will prevent completion of exposure pathways.

See Attachment G for explanation of Risk Indices

6.2.2 Evaluation of Ecological Risk (see Attachment F)

An evaluation of the ecological risk from contaminated surface and ground water was performed. Table 9 summarizes ecological risks at the GJO. It is anticipated that constituent concentrations will continue to decrease through time. Healthy populations of algae, bullfrogs, and fish in the ponds have been observed for the past several years and most recently on August 8, 2000 (personal observations, R. Bleil, MACTEC-ERS). Contaminant levels do not appear to be affecting the ponds or wetland ecosystems, although comparisons to ecological benchmarks indicate potential risk to some wildlife receptors may occur from chronic and continuous exposures to molybdenum and uranium in these surface water bodies (continuous exposure to waters at the wetland areas is not possible because it is only seasonally wet). Due to evaporative loss, these water bodies exhibit relatively high levels of salinity, as indicated by the high TDS and elevated concentrations of calcium, magnesium, potassium, sodium, chloride, and sulfate. High salinity is a common characteristic of enclosed water bodies in arid regions of the southwest and is not expected to adversely affect ecological resources at the GJO.

Table 9. Summary of Ecological Risk Considerations and Final E-COPCs

Medium	Ecological Community	Exposure Pathway	Representative Nonsensitive Receptors	Sensitive Receptors[a]	Final E-COPCs[b]
Ground water	GJO site	Food chain, root uptake	Herbivores, omnivores, plants	None	Manganese, uranium
Surface water	North Pond, South Pond, Wetland	Direct ingestion, food chain	Omnivores (e.g., muskrat), aquatic receptors (e.g., fish)	Bald eagle, southwestern willow flycatcher	Molybdenum, uranium

[a]Includes threatened or endangered plant and animal species, migratory birds.
[b]"Constituents of Potential Concern"; selected because concentrations exceed a standard, benchmark, or value that may result in ecological risk.

Both the Colorado Division of Wildlife and U.S. Fish and Wildlife Service have been routinely consulted as part of the GJO facility remediation and site operations. In addition, the habitat provided for key threatened and endangered and indicator species is not unique and is generally less desirable than that of surrounding areas, primarily due to lack of vegetation density and diversity and the presence of human activity. Therefore, the potential for adverse effects to the bald eagle and southwestern willow flycatcher is minimal. Based on contaminant trends and recent field observations of ecological receptors in the South Pond and North Pond, the potential for ecological risk to sensitive and nonsensitive plant and wildlife receptors also appears to be minimal. The constituents of concern are included in the analyte list to be monitored for the long-term.

6.2.3 Risk from Soil Contaminants Under Buildings 12 and 20 and Foil Source

Risk assessments are not being performed on the remaining subsurface contamination beneath Buildings 12 and 20. Actual data collected for the last several years show exposure rates and inside the buildings to be within acceptable limits (see Section 4.6 and 4.7). Contamination is beneath either a concrete slab or under at least a foot of soil, and both areas have floor and sub-floor structures over this. The GJO has included the following institutional controls to protect building occupants under the new owner's planned usage scenario, as stated in the Deed (Attachment B). "Grantee" refers to the RTC; "Grantor" refers to DOE.

Building 12

Grantee shall not, under any circumstances, without express written permission of CDPHE and the Grantor, engage in any activity that would result in the disturbance of soils or structures underlying the south end of Building 12. Grantor is required to remediate all contamination under and around Building 12 prior to termination of Grantor's lease of the building. Grantee accepts that the remediation will include demolition of Building 12 as the most cost-effective process to complete the remedial action and hereby agrees to accept this remediation approach. Grantor will not be responsible to rebuild the building or otherwise compensate the Grantee for the loss of the building.

Building 20

Grantee and its assigns shall not, under any circumstances, without express written permission of CDPHE and the Grantor, engage in any activity that would result in disturbance of soils or structures underlying the south end of Building 20. Prior to altering the structural integrity of the floor at the south end of Building 20, such permission must be obtained. When Grantor decides to vacate the building, Grantor will demolish the building and remediate contaminated materials beneath the building to within regulatory limits.

Foil Sources in Abandoned Well

Grantee acknowledges that there is known contamination in the form of two foil radium sources encased in an abandoned well at the site. The well was abandoned in accordance with State of Colorado requirements, and the sources were encased in the well with the approval of the State.

Grantee shall not engage in any activity that disturbs the seal on the well encasement or the well itself without the express written consent of CDPHE and the Grantor.

Grantee is responsible for ensuring that the restrictions and Grantor's rights of access related to the above, and stated in the Deed, are stated in the instrument of conveyance if Grantee passes ownership to another entity. Grantee is responsible for notifying Grantor's LTSM Program of such transfer. Grantee acknowledges its landlord responsibilities to monitor tenants' activities to ensure protection of

Building 12 and 20 floors, to allow for safe soil excavation on the Property, to protect the abandoned well identified above, and to be protective of Grantee's remaining ground water monitoring wells.

7.0 Quitclaim Deed

Attachment B consists of the Quitclaim Deed. As of this Request for Deferred Remediation application submittal, the Offer to Purchase and Deed are essentially complete. DOE and the RTC are in final negotiations regarding the liability clauses.

In compliance with State of Colorado *Executive Order D-013-98*, the Quitclaim Deed includes, as Exhibit B, the CERCLA Notice of Hazardous Substances.

The Quitclaim Deed, in Section IV.C., identifies the remaining areas of contamination, restrictions on use by new owner, and DOE's commitment to remediate (including general time frame). This section of the Deed also refers to the Enforceable Agreement and CDPHE's oversight authority under CERCLA 120(h). This section then discusses the new owner's responsibilities to abide by the institutional controls, to notify DOE if the Property changes hands, and summarizes the planned site usage.

In Section IV.C., the Quitclaim Deed identifies DOE's responsibility to remediate. Section IV.E. states that the owner shall not disrupt DOE from any monitoring or restoration activity.

The requirements of Section VIII.D. have been completed.

Section IX.B states that the land ownership may revert to the federal government if there is just cause, after first being considered by the City and County.

Section IX.C. states that the conveyance of the Property is contingent upon State approval of the Request for Deferred Remediation.

The Executive Order's requirements that DOE provide assurance of funding and guarantee of timeliness are placed in the Enforceable Agreement (Attachment A). DOE's commitment to have a public comment period is found in the Request for Deferred Remediation, Section 9.0.

8.0 Enforceable Agreement

Attachment A contains the Enforceable Agreement between DOE and CDPHE. The Agreement outlines the requirements for DOE to conduct remediation on areas of the GJO site still containing contamination as described in previous sections of this Request. The Enforceable Agreement is organized to show adherence to the requirements of State of Colorado *Executive Order D-013-98*. The Enforceable Agreement includes an enforceable clean-up plan; identifies clean-up responsibilities; ensures DOE's financial obligations; reiterates the land-use restrictions placed on the new owner in the Deed; describes the enforcement authority to be used by CDPHE; contains language from the Deed stating that institutional controls are binding upon future owners; contains language from the Deed that

DOE is assured a right-of-access to monitor and conduct remediation; states that DOE will not raise sovereign immunity as a defense against the State's enforcement authority; and provides for a grant to provide funding for CDPHE's oversight of DOE's activities.

Upon approval of this Request for Deferred Remediation by the Governor of the State of Colorado, a grant will be executed with CDPHE to cover estimated CDPHE oversight activities for Fiscal Year 2001. Funding will be provided on an annual basis.

9.0 Public Participation and Comment

The initial Remedial Action Plan for the site was subject to the public participation requirements of both CERCLA and NEPA in 1989 when the remedial action for the site was determined. DOE addressed all comments that were received. Two additional opportunities for public comment were available for the *Environmental Assessment of Facility Operations at the U.S. Department of Energy Grand Junction Projects Office, Grand Junction, Colorado*, in April 1996, and for the *Environmental Assessment for the Transfer of the Department of Energy Grand Junction Office to Non-DOE Ownership* (April 2000). The State of Colorado was included in both comment periods and had no specific comments on the selected remedies.

A public comment period was "noticed" in the *Daily Sentinel,* Grand Junction, Colorado, from March 25, 2001, through April 24, 2001. All responses to the public comments have been completed. Notice of the comment period was provided to local governments, citizens or restoration advisory boards, local redevelopment authorities, and to all individuals and organizations that have expressed a prior interest in such matters.