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REV. 2

United States Department of Energy

LONG-TERM SURVEILLANCE PLAN FOR THE GUNNISON, COLORADO DISPOSAL SITE

April 1997

Uranium Mill Tailings Remedial Action Project

INTENDED FOR PUBLIC RELEASE

Number of pages in this report: 64

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LONG-TERM SURVEILLANCE PLAN FOR THE GUNNISON, COLORADO, DISPOSAL SITE

April 1997

Prepared for
U.S. Department of Energy
Environmental Restoration Division
UMTRA Project Team
Albuquerque, New Mexico

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LIST OF ACRONYMS

Acronym	Definition
BLM	Bureau of Land Management
DOE	U.S. Department of Energy
EA	environmental assessment
EPA	U.S. Environmental Protection Agency
LTSP	long-term surveillance plan
MCL	maximum concentration limit
NGVD	National Geodetic Vertical Datum
NRC	U.S. Nuclear Regulatory Commission
QA/QC	quality assurance/quality control
POC	point of compliance
RAP	remedial action plan
TDS	total dissolved solids
UMTRA	Uranium Mill Tailings Remedial Action
UMTRCA	Uranium Mill Tailings Radiation Control Act

CHANGE HISTORY

Document version	Date	Pages/comments
Rev. 0	4/96	Initial version prepared for DOE review.
Rev. 1	5/96	DOE review comments incorporated; transmitted for agency review.
Rev. 2	4/97	CDPHE, NRC, GJO, and DOE review comments incorporated. Document format/structure streamlined.

1.0 PURPOSE AND SCOPE

This long-term surveillance plan (LTSP) describes the U.S. Department of Energy's (DOE) long-term care program for the Uranium Mill Tailings Remedial Action (UMTRA) Project Gunnison disposal site in Gunnison County, Colorado.

The U.S. Nuclear Regulatory Commission (NRC) has developed regulations for the issuance of a general license for the custody and long-term care of UMTRA Project disposal sites in 10 CFR Part 40. The purpose of this general license is to ensure that the UMTRA Project disposal sites will be cared for in a manner that protects the public health and safety and the environment. Before each disposal site is licensed, the NRC requires the DOE to submit a site-specific LTSP. The DOE prepared this LTSP to meet this requirement for the Gunnison disposal site. The general license becomes effective when the NRC concurs with the DOE's determination of completion of remedial action for the Gunnison site and the NRC formally accepts this LTSP.

This LTSP describes the long-term surveillance program the DOE will implement to ensure that the Gunnison disposal site performs as designed. The program is based on two distinct activities: 1) site inspections to identify threats to disposal cell integrity, and 2) ground water monitoring to demonstrate disposal cell performance. The LTSP is based on the UMTRA Project long-term surveillance program guidance (DOE, 1996a) and meets the requirements of 10 CFR §40.27(b) and 40 CFR §192.03.

2.0 FINAL SITE CONDITIONS

Remedial action at the former uranium processing site in Gunnison, Colorado, consisted of excavating and relocating the residual radioactive materials to the Gunnison disposal site. The DOE constructed a disposal cell to control the residual radioactive material in accordance with 40 CFR Part 192. The Gunnison disposal site is fenced, and its perimeter is marked with warning signs. The site completion report (MK-F, 1997) contains a detailed description of the final site conditions.

2.1 SITE HISTORY

The Gunnison mill, which had a processing capacity of 200 tons (180 metric tons) of ore per day, operated from 1958 to 1962. The mill ground the ore and then leached it with sulfuric acid and sodium chlorate. After leaching, the uranium-rich solutions and waste solids were separated. The solutions were then treated with sodium carbonate to extract the uranium and the washed solids were dumped in the tailings pile. During its operation, the mill processed about 540,000 tons (490,000 metric tons) of uranium ore.

The Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978 (42 USC §7901 *et seq.*) gave the DOE authority to perform remedial action at the Gunnison processing site. The DOE evaluated the environmental impacts associated with the Gunnison site remedial action in an environmental assessment (EA) (DOE, 1992a). The NRC and the state of Colorado concurred with the DOE's remedial action plan (RAP) (DOE, 1992b) to comply with the requirements of 40 CFR Part 192, Subparts A-C.

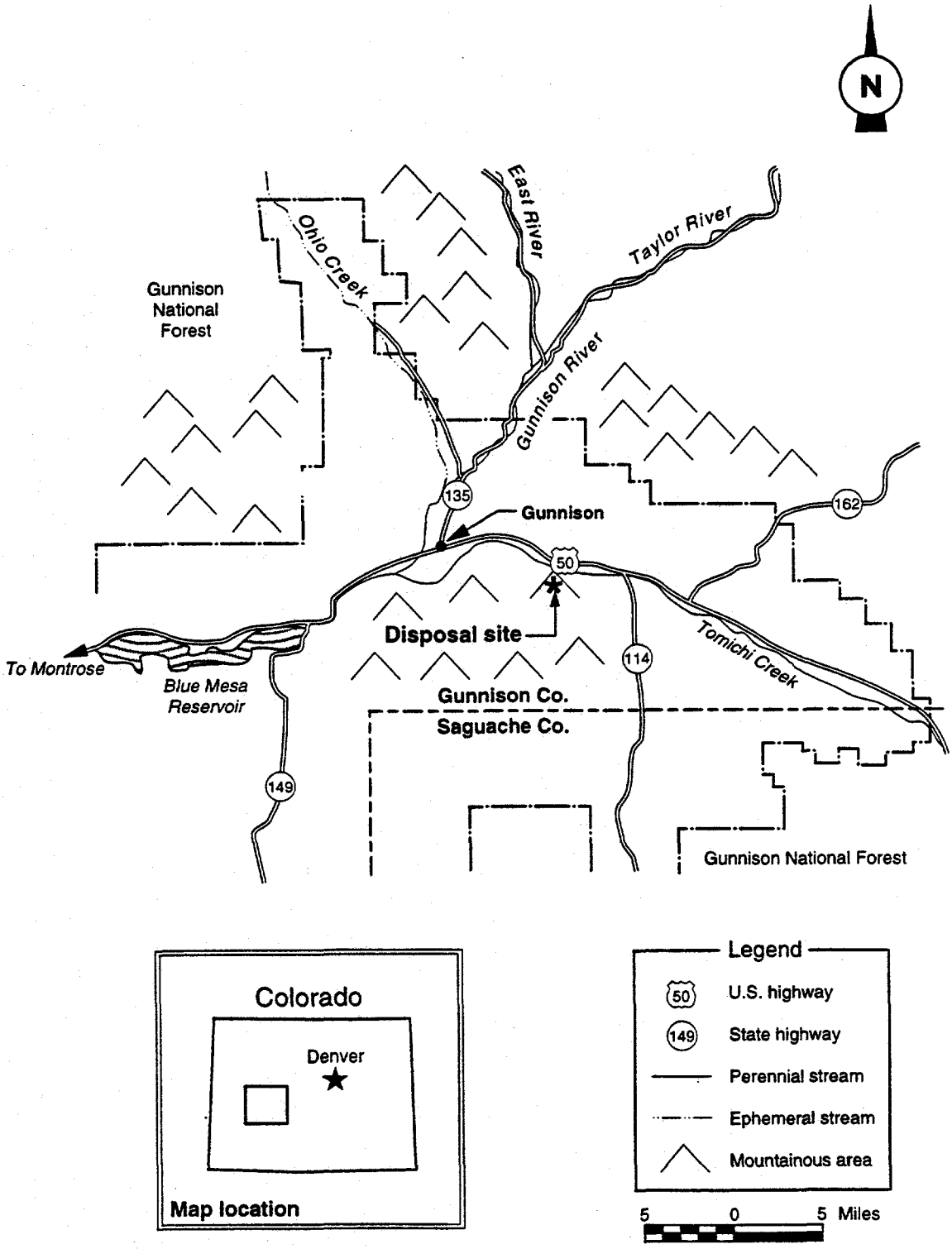
The DOE began constructing the disposal cell in 1992. During 1993 and 1994, the DOE relocated uranium mill tailings and other residual radioactive materials (such as contaminated demolition debris, soils, and vicinity property materials) and placed them in the disposal cell. Construction of the disposal cell was completed in 1995 with placement of a radon/infiltration barrier and frost and erosion protection layers.

The DOE has prepared a completion report documenting compliance with the RAP and the site as-built conditions (MK-F, 1997). In addition, the DOE will prepare a final audit report and certification summary and submit it and the completion report to the NRC for concurrence. NRC concurrence on the completion report will be included in the permanent site file.

2.2 GENERAL DESCRIPTION OF THE SITE VICINITY

The Gunnison disposal site is in Gunnison County in southwest Colorado on the western slope of the Rocky Mountains (Figure 2.1). The site is approximately 6 miles (mi) (10 kilometers [km]) southeast of the town of Gunnison, Colorado, in Township 49 North, Range 1 East, Section 15, New Mexico Principal Meridian (Figure 2.2). This section provides a brief description of the site vicinity;

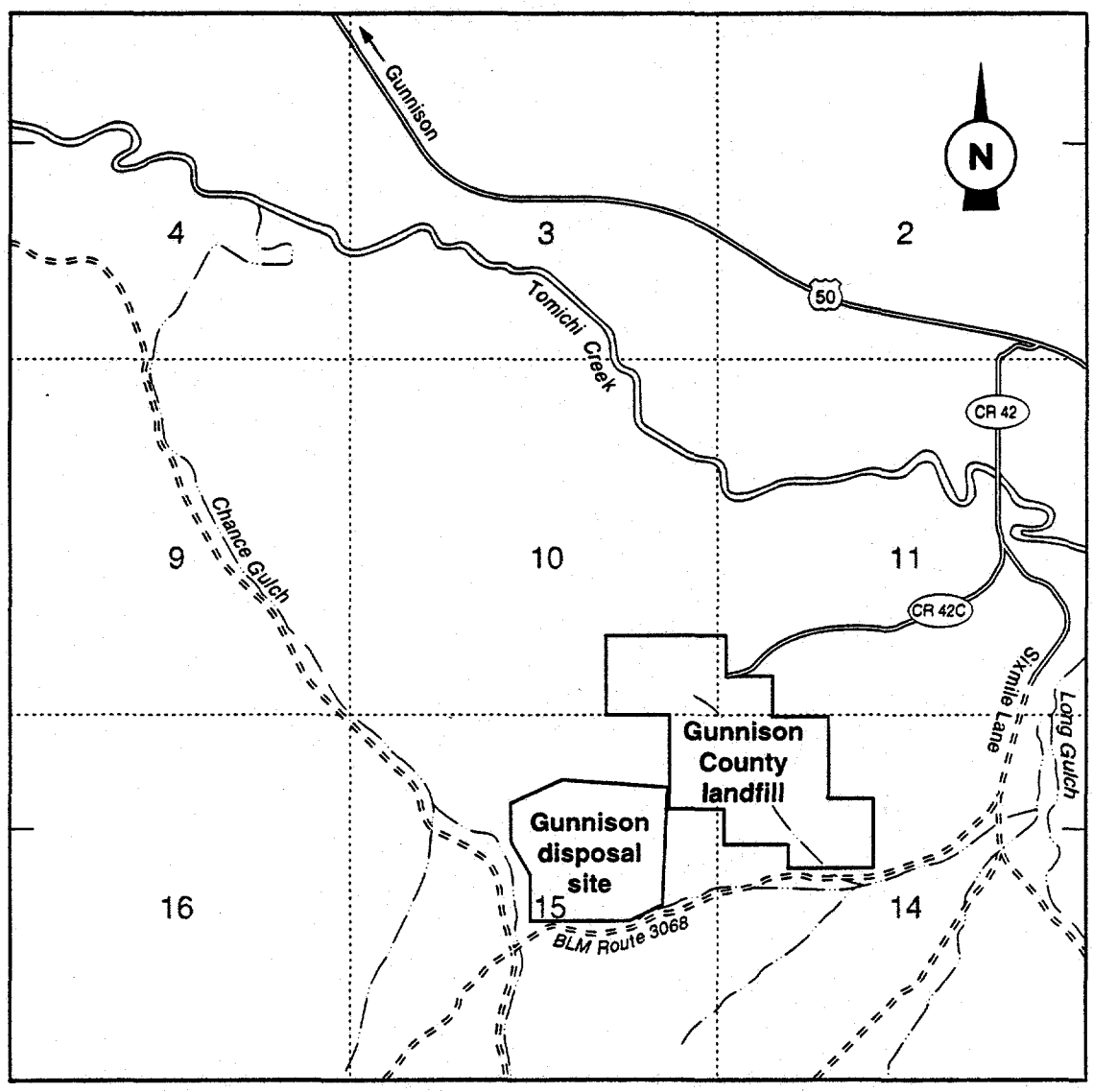
Figure 2.1
Location Map
Gunnison, Colorado, Disposal Site



MAC: SITE/GUN/LTSP/SITELOC

Modified from DOE, 1992a

Figure 2.2
Vicinity Map
Gunnison, Colorado, Disposal Site



Legend

- 50 — U.S. highway
- CR 42 — County road
- Ephemeral stream
- Dirt road
- Paved road
- Section line
- 15 — Section number (T49N, R1E)

1000 0 1000 2000 Feet

Modified from MK-F, 1996.

detailed descriptions can be found in the site EA (DOE, 1992a) and the RAP (DOE, 1992b).

The general climatic regime in the vicinity of the Gunnison disposal site is semiarid. The area is characterized by low humidity, frequent sunny days, and large diurnal and seasonal temperature ranges. The average annual precipitation is 11 inches (280 millimeters [mm]). The highest monthly rainfall usually occurs during July and August, while the least rainfall occurs from April through June. The adjusted annual evapotranspiration for the area is approximately 10 inches (250 mm). Winds are highly variable and heavily influenced by the local mountain and valley topography.

The average elevation of the Gunnison disposal site is about 8040 feet (ft) (2450 meters [m]) above National Geodetic Vertical Datum (NGVD) of 1929. The site is on the southern slope of an 8402-ft (2561-m)-high mountain, and is bounded on the west by Chance Gulch and on the east by Long Gulch. The disposal site lies on a drainage divide on a very gently sloping, dissected surface. Soil formation and movement of the material within the surficial deposits are affected by seasonal freeze-thaw cycles. Sheet-flow erosion appears to be the dominant process currently shaping the local topography. However, net surface erosion in the disposal site area appears to be insignificant. Some local soil erosion occurs off the site in the small rills and gullies at the heads of the large drainage channels that dissect the area.

Runoff from snowmelt and rainstorms contributes only small amounts of overland surface water flow toward the disposal site. A large gully extends along the northern boundary of the site and drains into Chance Gulch. A small gully is located on the southeastern portion of the site. Runoff in this gully flows into the drainage divide south of the disposal site, eventually draining into Long Gulch. Flooding is not considered a hazard at the site because of the distance from and elevation above Tomichi Creek, the closest perennial stream.

Most of the land in the area is used primarily for seasonal livestock grazing and wildlife habitat and, to a lesser extent, mineral extraction and recreation. There is no potential for future natural resource development in the immediate site vicinity. Additional local land use includes operation of the Gunnison County landfill, which is northeast of the disposal site. The closest residence is about 1.5 mi (2.4 km) east of the site and the nearest downgradient registered well is located 7500 ft (2300 m) from the site.

2.3 DISPOSAL SITE DESCRIPTION

This section provides a brief description of the disposal site; detailed descriptions can be found in the site RAP (DOE, 1992b) and completion report (MK-F, 1997).

2.3.1 Site ownership and legal description

The government currently owns the Gunnison disposal site and most of the surrounding area. The Bureau of Land Management (BLM) permanently transferred administration of public land to the DOE in 1992 for use as the Gunnison disposal site. The BLM administers the adjacent surrounding lands, except for the Gunnison County landfill. Attachment 1 provides a legal description of the disposal site. Plate 1 shows the final site boundary and identifies ownership of the site and surrounding areas at the time of licensing.

2.3.2 Directions to the disposal site

The Gunnison disposal site can be reached by automobile via paved and graded dirt roads (Figure 2.2) by following these directions.

Mile 0.0 - Junction of U.S. 50 and Colorado 135, in center of Gunnison at stop light, proceed east on U.S. 50.

Mile 5.9 - Turn right on gravel road, Gunnison County Road 42 (also known as Sixmile Lane).

Mile 6.5 - Bear left at Y in road.

Mile 7.4 - Turn right on BLM road 3068.

Mile 8.7 - Turn right at south entrance gate.

Entry to the disposal site is restricted by a barbed-wire fence around the site perimeter. The south access gate is kept locked and the key needed to enter the site may be obtained from the DOE.

2.3.3 Description of surface conditions

The Gunnison disposal site is located on approximately 92 acres (ac) (37 hectares [ha]) of land (Plate 1). The completion report (MK-F, 1997) contains a detailed description of the final site conditions including the results of the final site topographic survey. The site is enclosed with a 4-strand, barbed-wire fence, and the perimeter also is marked with warning signs, boundary markers, and survey monuments (Section 2.3.4). The tailings and other contaminated materials are contained in a rock-covered disposal cell located in the center of the site.

The final site grading has areas contoured to promote drainage away from the disposal cell. The DOE used a mix of five species of grasses to revegetate disturbed areas of the disposal site not covered by riprap (MK-ECE, 1995).

At the completion of remedial action, the DOE documented final disposal site conditions with site maps, as-built drawings, and ground and aerial photographs

(MK-F, 1997). This information illustrates baseline conditions for comparison to future disposal site conditions. Lithologic logs and construction data for monitor wells drilled on and around the disposal site provide detailed information on site hydrogeology. Original drawings, site maps, well logs, and photographs are part of the Gunnison permanent site file.

2.3.4 Permanent site-surveillance features

Survey and boundary monuments, site markers, and warning signs are the permanent long-term surveillance features of the Gunnison disposal site. In addition, the disposal site also has point-of-compliance (POC) and background ground water monitor wells. Plate 1 shows the locations of these features and Table 2.1 provides their survey grid coordinates. Typical construction and installation specifications for these features are shown in the long-term surveillance guidance (DOE, 1996a) and subcontract documents (MK-ECE, 1995).

Three survey monuments establish permanent horizontal control based on the Colorado State Plane Coordinate System (Central Zone) and are referenced to the Project Survey Control Point, which is located about 700 ft (210 m) east of the southeast corner of the site at an elevation of 7923.32 ft (2415.03 m) above NGVD. The three permanent survey monuments (SM-1, SM-2, and SM-3) are Berntsen RT-1 markers set in concrete, with the monument about 4 inches (10 centimeters [cm]) above ground level. Magnets in the markers permit easier detection if they become buried over time. The survey monument identification number is stamped on the top of the metal cap.

Eleven boundary monuments lie along the final site boundary. The three RT-1 survey monuments serve a dual purpose as boundary monuments (SM-1 as BM-1, SM-2 as BM-2, and SM-3 as BM-3). The remaining eight boundary monuments (BM-4 to BM-11) are Berntsen Model A-1 survey monuments set in concrete, with the monument about 1 inch (25 mm) above ground level. Magnets in the A-1 monuments allow easier detection if they become buried. The boundary monument identification number is stamped on the top of the metal cap.

Two unpolished granite markers with an incised message identify the Gunnison disposal site. The message includes a drawing showing the general location of the stabilized disposal cell within the site boundaries, the date of closure (26 July 1995), the weight of tailings (1,140,000 dry tons [1,034,000 metric tons]), and the amount of radioactivity (175 curies of radium-226). Site marker SMK-1 near the south access gate to the site is set in reinforced concrete that extends 3 ft (0.9 m) below the ground surface. Site marker SMK-2 at the crest of the disposal cell is set in reinforced concrete that extends to the top of the frost protection barrier.

Table 2.1 Locations of permanent surveillance features, Gunnison, Colorado, disposal site

Feature	Location coordinate[a]
Site markers	
SMK-1	N 14,678; E 12,600
SMK-2	N 15,539; E 12,974
Survey/boundary monuments	
SM-1/BM-1	N 15,002; E 14,326
SM-2/BM-2	N 16,648; E 14,321
SM-3/BM-3	N 16,663; E 12,500
Boundary monuments	
BM-4	N 16,394; E 11,660
BM-5	N 15,828; E 11,662
BM-6	N 15,343; E 11,996
BM-7	N 15,009; E 11,998
BM-8	N 14,685; E 11,999
BM-9	N 14,684; E 12,326
BM-10	N 14,679; E 13,632
BM-11	N 14,897; E 14,327
Background well	
GUN-08-0716	N 17499; E 13,216
GUN-08-0609	N14,961; E 12,563
POC wells	
GUN-08-0720	N 15,445; E 12,357
GUN-08-0721	N 16,059; E 12,636
GUN-08-0722	N 16,107; E 13,419
GUN-08-0723	N 15,776; E 13,593
GUN-08-0724	N 15,464; E 13,519
GUN-08-0725	N 15,047; E 13,422

Table 2.1 Locations of permanent surveillance features, Gunnison, Colorado, disposal site (Concluded)

Feature	Location coordinate[a]
Ground water level monitor wells	
GUN-08-0630	N 14,675; E 12,524
GUN-08-0634	N 15,391; E 11,640
GUN-08-0663	N 16,780; E 13,544
GUN-08-0709	N 17,094; E 10,206
GUN-08-0710	N 13,591; E 12,679
GUN-08-0712	N 15,096; E 10,504
GUN-08-0714	N 15,385; E 16,124
GUN-08-0715	N 15,450; E 14,336

[a]Coordinates in feet based on Project Survey Control Point (N 15,000; E 15,000 - modified Colorado State Plane Coordinate System).

From MK-ECE, 1995.

The DOE has posted property use warning signs (18 inches [46 cm] by 24 inches [610 mm]) around the disposal site perimeter at approximately 200-ft (60-m) intervals. These warning signs (44 total) are attached to the perimeter fences. The site entrance sign is at the south access gate to the disposal site near site marker SMK-1. The entrance sign also displays the DOE 24-hour phone number to call concerning the site.

The Gunnison disposal site has six POC monitor wells, two background wells, and eight ground water-level monitor wells (see Section 2.6.1) in the uppermost aquifer. The DOE installs and develops ground water monitor wells in accordance with U.S. Environmental Protection Agency (EPA) guidance (EPA, 1986). The lithologic logs for background wells (GUN-08-0716 and GUN-08-0609), POC wells, and ground water level monitor wells (Table 2.1) are in the site file.

2.4 DISPOSAL CELL DESIGN

The 29-ac (12-ha) disposal cell is located on an alluvial slope upland from active stream channels. The area of the disposal cell is not subject to significant hazard from slope failure processes such as landslides, debris flows, mud flows, and rock falls. The geomorphic processes posing a potential hazard to the stabilized disposal cell are ephemeral drainage channel changes, low-gradient slope erosion, and wind erosion; however, these processes are not reasonably expected to affect the disposal cell within the next 1000 years, or in any case for at least 200 years.

The disposal cell is constructed partially below grade and rises above the surrounding terrain to a maximum elevation of about 8065 ft (2458 m) above NGVD. The disposal cell contains approximately 740,000 cubic yards (565,000 cubic meters [m^3]) of relocated tailings and other residual radioactive materials, primarily contaminated soil and demolition debris. The disposal cell is capped with a 9-ft (3-m)-thick multiple-component cover.

A 1.5-ft (0.45-m)-thick radon/infiltration barrier is placed over the contaminated materials. This barrier is constructed of clayey soil amended with bentonite and is designed to reduce the radon-222 flux from the disposal cell to less than 20 picocuries per square meter per second and minimize water infiltration into the tailings. A 6-ft (2-m)-thick layer of compacted soil lies on top of the radon/infiltration barrier to prevent the clayey barrier from being adversely affected by freezing and thawing cycles. A 0.5-ft (0.15-m)-thick, coarse-grained bedding layer between the radon/infiltration barrier and the frost protection barrier provides a capillary break and promotes drainage of infiltrating water away from the radon barrier. The topslopes and sideslopes of the disposal cell are capped with rock to protect against wind and water erosion and prevent damage to the underlying radon/infiltration barrier. A rock-lined diversion ditch abuts the upslope portion of the disposal cell to divert surface flow away from the cell.

The erosion protection layer is 0.5-ft (0.15-m)-thick riprap on the topslopes and 1-ft (0.3-m)-thick riprap on the sideslopes. A 0.5-ft (0.15-m)-thick bedding layer between the riprap and the radon/infiltration barrier prevents damage to the barrier by rocks and loss of the fined-grained radon/infiltration barrier material. The maximum grade is 2.5 percent on the topslopes and 33 percent on the sideslopes. These grades, in conjunction with the bedding layer, will allow excess surface water to run off the disposal cell and be conveyed to adjacent site grades in a manner that minimizes the risk of significant erosion. The components of both the topslope and sideslope covers are intended to minimize the potential for deep percolation of precipitation into the residual radioactive material.

At the toe of the disposal cell there is a riprap apron, varying in thickness from 1.5 ft (0.45 m) to 4 ft (1.2 m). At the ground surface, riprap protection extends up to 20 ft (6 m) from the toe of the disposal cell. The 1800-ft (550-m)-long diversion ditch is also lined with riprap.

Detailed engineering drawings of the disposal cell are in the site completion report (MK-F, 1997).

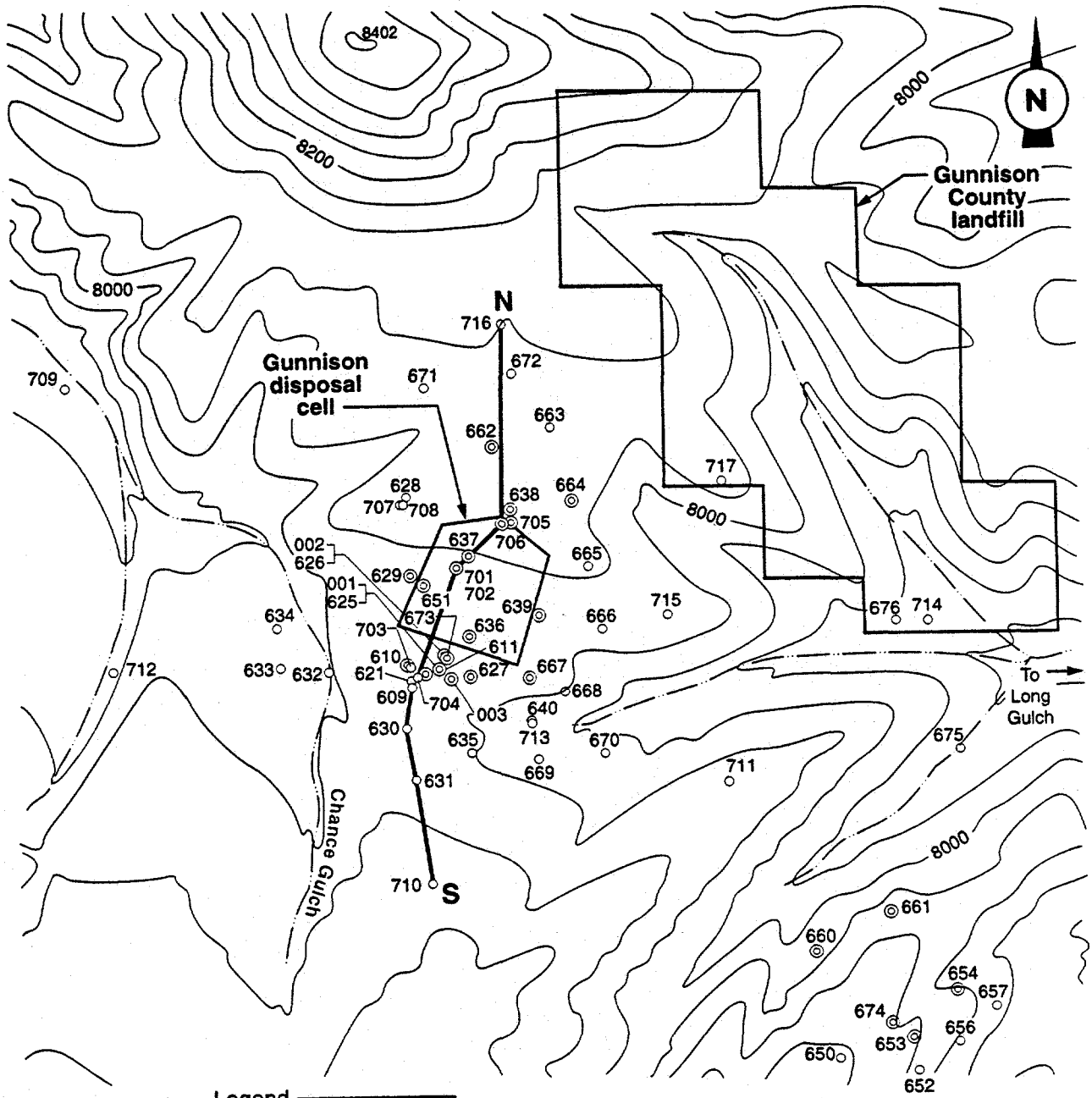
2.5 GROUND WATER CHARACTERIZATION

This section briefly describes the hydrogeologic units and background ground water quality at the Gunnison disposal site and identifies the constituents of concern at the site. More detail on ground water characterization of the site is found in the Gunnison RAP (DOE, 1992b).

2.5.1 Hydrogeology

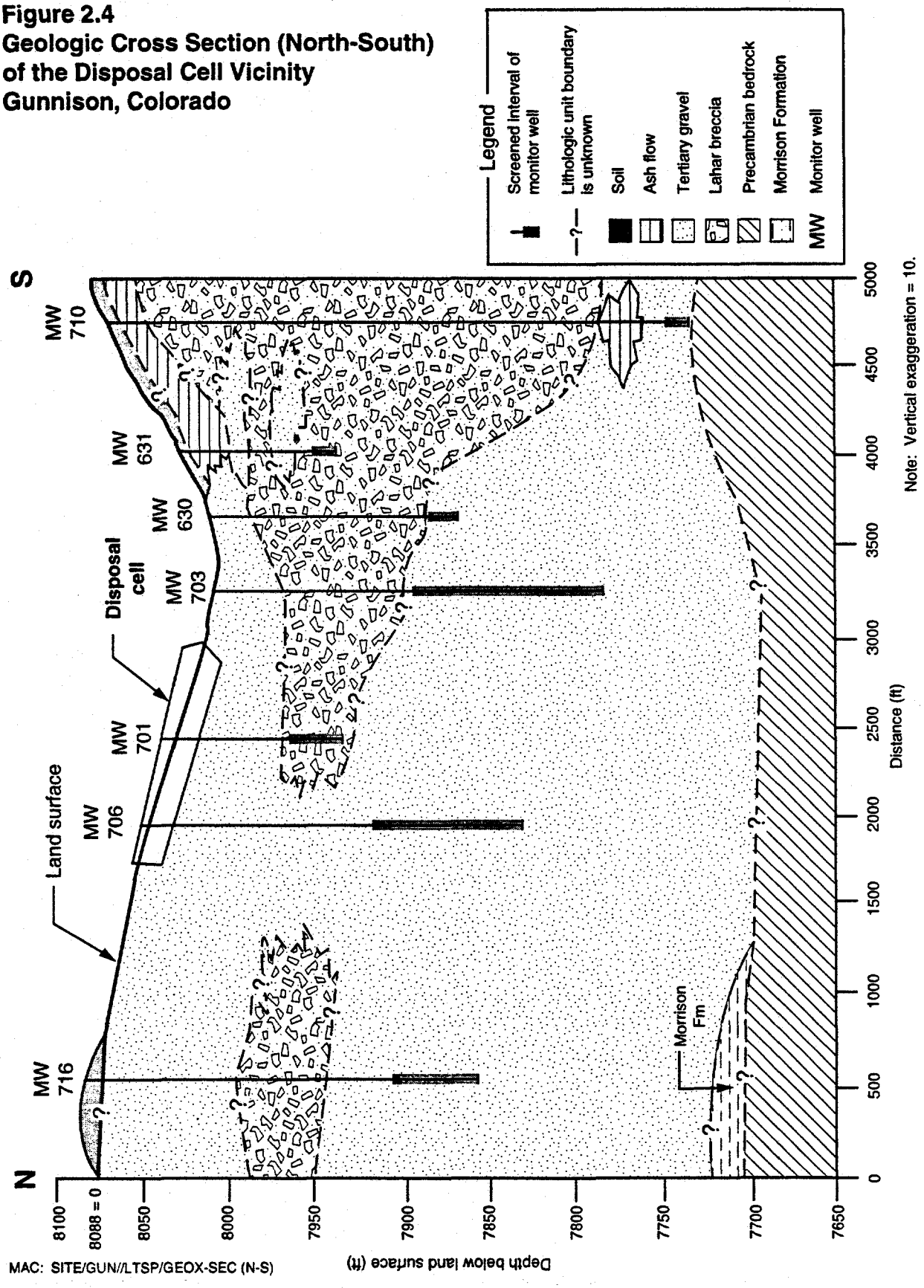
The hydrogeology of the Gunnison disposal site was characterized during preparation of the RAP (DOE, 1992b). The locations of monitor wells installed during the characterization efforts are presented in Figure 2.3. Four regional Tertiary hydrogeologic units underlie a thin veneer of recent alluvium at the disposal site. In descending order these units are 1) upper Tertiary gravels that form an unsaturated zone, 2) lahar breccia and undifferentiated volcaniclastic mudflows that comprise a low permeability semiconfining zone, 3) lower Tertiary gravels that comprise the uppermost (regional) aquifer, and 4) undifferentiated Tertiary gravels to the north where the intervening volcaniclastic mudflow pinches out. A geologic cross section is provided in Figure 2.4. Both the upper and lower Tertiary gravels consist of silty and clayey sand, subrounded cobbles, and welded tuff. The lahar breccia and volcaniclastic mudflows mentioned above generally form a semiconfining zone that prohibits or retards the movement of ground water downward to the lower Tertiary gravels (uppermost aquifer). In the northern portion of the project site, where the lahar breccia is absent, the upper and lower Tertiary gravels are essentially one hydrogeologic unit.

Figure 2.3
DOE Monitor Well Location Map
Gunnison, Colorado, Disposal Site



MAC: SITE/GUN/LTSP/MONWELLOC

Figure 2.4
Geologic Cross Section (North-South)
of the Disposal Cell Vicinity
Gunnison, Colorado



MAC: SITE/GUN//LTSP/GEOX-SEC (N-S)

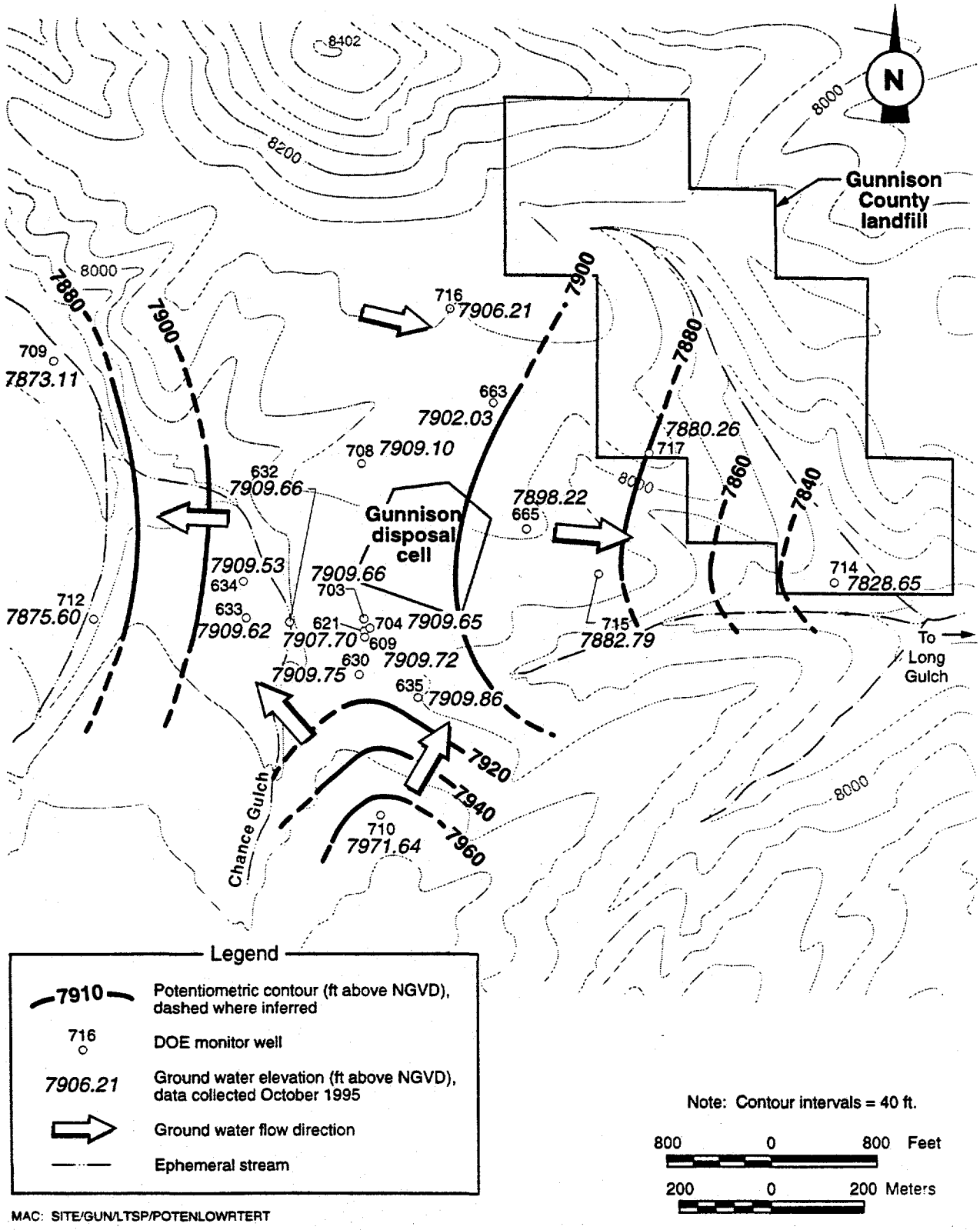
The Jurassic Morrison Formation, Jurassic Junction Creek Sandstone, and Precambrian metasedimentary and gneissic crystalline rock underlie the Tertiary gravels. The depth to these units averages 300 ft (90 m) below the surface.

At the Gunnison disposal site, the uppermost aquifer occurs in the lower portion of a regional Tertiary gravel unit; the top of the aquifer is, on average, 110 ft (34 m) below the disposal cell. Material thickness of the uppermost aquifer ranges from 43 to 240 ft (13 to 73 m) and averages 170 ft (52 m). A semiconfining zone composed primarily of the lahar breccia and volcaniclastic mudflow strata extends from the south and intertongues with the Tertiary gravels beneath the site. The semiconfining zone is present beneath the disposal cell but absent in the northern portion of the site area. Because wells completed within the volcaniclastic strata are incapable of yielding 150 gallons (0.57 m^3) per day per year, these strata are not considered to be an aquifer at the disposal site (DOE, 1992b).

Figure 2.5 is a potentiometric map of the lower Tertiary gravel aquifer. Because the disposal site is located within a topographic saddle, ground water flow at the disposal site is complex. In the immediate vicinity of the UMTRA Project disposal site, the primary component of flow is east, following the general topographic trend toward Long Gulch. However, as shown in Figure 2.5, a ground water divide in the disposal cell area causes a component of ground water beneath the site to flow west. The quality of the ground water under the Gunnison County landfill is not expected to affect the disposal site, as discussed in the RAP (DOE, 1992b).

Aquifer testing shows the uppermost aquifer responds as a confined aquifer when the lahar breccia and volcaniclastic deposits are present. Because the hydraulic conductivity of the lahar breccia and volcaniclastic deposits is very low (0.007 ft per day [2.5 x 10^{-7} cm per second] or less) (DOE, 1992b), they act as an aquitard to the downward movement of water. The hydraulic conductivity of the Tertiary gravel aquifer ranges from 0.4 to 0.5 ft per day (0.0001 to 0.0002 cm per second). No lateral boundaries were observed during two aquifer pumping tests (24 and 72 hours in duration) in the lower Tertiary gravel aquifer, and none of the monitor wells completed in the lahar deposits responded to pumping in the lower Tertiary gravel aquifer. In the lower Tertiary gravel aquifer, the primary (easterly) horizontal hydraulic gradient ranges from 0.004 to 0.014, and averages 0.010 (DOE, 1992b). Linear velocities of the uppermost aquifer were calculated by applying Darcy's Law using the calculated range of hydraulic conductivities, 0.4 to 0.5 ft per day (0.0001 to 0.0002 cm per second); hydraulic gradients, 0.004 to 0.014; and an assumed porosity value of 0.25 for gravely material appropriate for the site (Freeze and Cherry, 1979; Davis and DeWiest, 1966). From this calculation, the average linear ground water velocities in the uppermost aquifer (Tertiary gravels) are estimated to range from 2 to 10 ft per year (2 x 10^{-6} to 10 x 10^{-6} cm per second), averaging approximately 7 ft per year (7 x 10^{-6} cm per second) (DOE, 1992b).

Figure 2.5
Potentiometric Map of the Lower Tertiary Gravel Aquifer Gunnison, Colorado, Disposal Site



MAC: SITE/GUN/LTSP/POTENLOWRTERT

2.5.2 Background ground water quality

Periodic water quality sampling has been conducted at the Gunnison disposal site since 1988. Background water quality has been determined for the Tertiary gravel aquifer and the overlying semiconfining lahar breccia and volcaniclastic unit. A discussion of the water quality in the semiconfining lahar volcaniclastic unit is provided in the RAP (DOE, 1992b). As discussed in the RAP, monitoring within the semiconfining unit is not required; therefore, background water quality for this unit is not presented in this LTSP.

Table 2.2 provides construction information for 28 monitor wells sampled to determine background ground water quality in the Tertiary gravel aquifer. Background water quality was determined using wells that were sampled only before the start of disposal cell construction (June 1992) and wells located upgradient of the site that have been sampled since the start of cell construction. Water quality data collected from these wells cannot be affected by potential releases from the disposal cell.

Water quality data for the disposal cell site indicate that there are small but distinct differences in background water quality in the uppermost aquifer (the lower Tertiary gravel aquifer). Ground water south and southeast of the cell has slightly greater concentrations of total dissolved solids (TDS) and major elements when compared to ground water to the north and northeast of the cell. For example, sulfate concentrations average 65 milligrams per liter (mg/L) south of the cell, and 14 mg/L north of the cell. The disposal cell is at the boundary between these two types of background ground water and thus ground water at the POC likely includes both the higher and lower TDS types. In general, there are little or no differences in background trace element concentrations (e.g., uranium and arsenic) between the two types of ground water.

The pH values in background ground water quality in the uppermost aquifer range from 6.9 to 9.9. TDS concentrations range from 206 to 417 mg/L (Table 2.3). Analyses of background ground water samples indicate that concentrations of arsenic, net gross alpha, and radium-226 and -228 slightly exceeded the EPA UMTRA Project maximum concentration limits (MCL) (Table 1 of 40 CFR Part 192 Subpart A) in the Tertiary gravels in one or more DOE monitor wells (GUN-08-0609, -0610, -0626, -0630, -0632, -0639, -0663, -0704, and -0715). Because the occurrences of these concentrations in excess of the EPA MCLs were noted prior to tailings placement in the disposal cell, the exceedances are believed to be caused by naturally occurring sources in the aquifer materials that are leaching into the ground water system.

2.5.3 Hazardous constituents

Ground water samples initially were evaluated for hazardous constituents generally expected to be in or derived from the residual radioactive materials related to the uranium processing activities. The list of constituents was

Table 2.2 Monitor well information for wells completed in the Tertiary gravel aquifer, Gunnison, Colorado, disposal site

Well	Well diameter (inches)	Well diameter (cm)	Screened interval (depth below surface) (ft) top	Screened interval (depth below surface) (ft) bottom	Screened interval (depth below surface) (m) top	Screened interval (depth below surface) (m) bottom
GUN-08-0609[a]	2	5	138	148	42	45
GUN-08-0610[a,b]	2	5	137	147	42	45
GUN-08-0626[a,b]	2	5	130	140	40	43
GUN-08-0630[a]	4	10	125	135	38	41
GUN-08-0632[a]	4	10	103	113	31	35
GUN-08-0634[a]	4	10	93	103	28	31
GUN-08-0635[a]	4	10	149	159	45	49
GUN-08-0637[a,b]	4	10	155	165	47	50
GUN-08-0638[a,b]	4	10	164	174	50	53
GUN-08-0639[a,b]	4	10	145	155	44	47
GUN-08-0663[a]	2	5	171	173	52	53
GUN-08-0703[a]	4	10	105	225	32	69
GUN-08-0704[a]	6	15	105	225	32	69
GUN-08-0708[a]	4	10	153	163.5	47	50
GUN-08-0709	4	10	188	198	57	60
GUN-08-0710	4	10	318	328	97	100
GUN-08-0712	4	10	272	282	83	86
GUN-08-0713	4	10	203	213	62	65
GUN-08-0714	4	10	132	142	40	43
GUN-08-0715	4	10	130	170	40	52
GUN-08-0716[a]	4	10	185	225	56	69
GUN-08-0717[a]	4	10	158	198	48	60
GUN-08-0720[c]	4	10	130.5	140.5	40	43
GUN-08-0721[c]	4	10	147.5	157.5	45	48
GUN-08-0722[c]	4	10	157.5	167.5	48	51
GUN-08-0723[c]	4	10	147	157	45	48
GUN-08-0724[c]	4	10	138	148	42	45
GUN-08-0725[c]	4	10	135.5	145.5	41	44

[a]Data from these wells collected between February 1988 and April 1992 or October 1995 were used to establish background water quality.
[b]Well decommissioned after April 1992.
[c]POC well.
Note: For monitor well locations see Plate 1.

Table 2.3 Summary of water quality data and concentration limits for hazardous constituents in tailings solutions, Gunnison, Colorado, disposal site

Constituent	MCL	Tailings solutions			Background[a]			Concentration limit
		No. of samples	Median	Maximum	No. of samples	Median	Maximum	
Hazardous constituents with MCLs[b]								
Arsenic	0.05	43	8.3	1,760	73	0.03	0.10	0.1[c]
Cadmium	0.01	43	0.691	14.2	73	<0.001	0.001	0.01
Chromium	0.05	43	0.16	3.9	73	<0.01	0.02	0.05
Gross alpha	15	6	3,070	22,317	73	1.8	28	28[c]
Lead	0.05	42	<0.01	1.9	73	<0.01	0.03	0.05
Molybdenum	0.10	43	0.27	12.5	73	<0.01	0.04	0.10
Nitrate	44	25	5.9	190	71	<1	13	44
Radium-226, -228	5	5	16.2	843	73	0.9	8.0	8[c]
Selenium[d]	0.01	44	<0.005	60	70	<0.005	<0.005	0.01
Uranium	0.044	42	0.81	190	72	0.002	0.013	0.044
Hazardous constituents without MCLs								
Antimony	-	34	0.018	0.156	58	<0.003	0.012	0.012
Beryllium	-	30	0.16	1.14	58	<0.005	<0.01	0.005[e]
Cobalt	-	30	15.4	63.2	58	<0.05	<0.05	0.05[e]
Copper	-	43	9.34	96	58	<0.02	<0.02	0.02[e]
Lead-210	-	-	-	-	46	0.2	2.8	2.8
Nickel	-	43	15.4	99	58	<0.04	<0.04	0.04[e]
Thallium[d]	-	19	0.02	0.35	51	<0.005	<0.1	0.005[e]
Tin[a]	-	21	<0.005	0.11	58	<0.005	<0.05	0.05[e]
Vanadium	-	43	0.29	13	72	<0.01	0.02	0.02
Zinc	-	43	45.5	369	73	0.005	0.06	0.06

Table 2.3 Summary of water quality data and concentration limits for hazardous constituents in tailings solutions, Gunnison, Colorado, disposal site (Concluded)

Constituent	MCL	Tailings solutions			Background[a]			Concentration limit
		No. of samples	Median	Maximum	No. of samples	Median	Maximum	
General water quality indicators								
Alkalinity	-	2	89	136	72	162	255	-
Calcium	-	43	415	599	71	34	60	-
Chloride	-	24	27	210	71	9	31	-
Iron[f]	-	43	1,760	61,100	73	<0.03	0.22	-
Magnesium	-	43	176	1,010	73	4	8	-
Manganese[f]	-	43	38.5	197	51	<0.01	0.3	-
pH	-	21	3.12	7.67	73	7.5	9.9	-
Potassium	-	43	5.5	79.1	73	6	17	-
Sodium	-	43	129	5,220	73	52	103	-
Sulfate[f]	-	16	6,950	230,000	71	51	88	-
TDS[g]	-	10	23,400	63,100	71	280	417	-

[a]Background based on data collected during the period February 1988 through April 1992 from wells GUN-08-0609, -0610, -0626, -0630, -0632, -0634, -0635, -0637, -0638, and -0639, and during February 1991 through October 1995 from wells GUN-08-0663, -0703, -0704, -0708, -0716, and -0717.

[b]Values correspond to UMTRA Project MCLs of 10 mg/L for nitrate expressed as nitrogen, and 30 pCi/L for combined uranium -234 and -238 activity.

[c]Observed maximum background greater than MCL.

[d]Nondetects, reflecting inflated detection limit due to matrix interference, were removed from database for calculations.

[e]Concentration limit set at contract-required detection limit.

[f]Residual sulfuric acid in the tailings is responsible for unusually high concentrations of iron, manganese, and sulfate in tailings solutions.

[g]TDS was not measured all samples.

Note: All units reported in milligrams per liter except radium-226 and -228, lead-210, and net gross alpha which are reported in picocuries per liter.

modified during subsequent sampling events to reflect hazardous constituents related to uranium processing activities at the Gunnison processing site (DOE, 1994). After evaluating existing ground water quality data, the DOE chose the following constituents by comparing potentially hazardous constituents detected in the tailings source term and their relative concentrations in background ground water:

- antimony
- arsenic
- beryllium
- cadmium
- chromium
- cobalt
- copper
- gross alpha
- lead
- molybdenum
- nickel
- nitrate
- radium-226 and -228
- selenium
- thallium
- tin
- vanadium
- uranium
- zinc

2.6 GROUND WATER PROTECTION

The ability of the disposal cell to protect ground water depends on its engineering features. The design of the disposal cell minimizes contaminant migration from the disposal cell into foundation materials. The disposal cell will meet established ground water concentration limits at the POC wells in the uppermost aquifer because:

1. The multicomponent disposal cell cover will limit infiltration of precipitation into the cell, thereby minimizing long-term leaching of hazardous components from the tailings.

2. The contaminated materials were placed at a low moisture content that produces almost no transient drainage. The placement moisture content of the tailings is approximately equal to the *in situ* moisture content. The use of water for construction and dust suppression was controlled. As a result, very little transient seepage will be transmitted through the unsaturated zone during the design life of the disposal cell.

3. Depth to the uppermost aquifer averages over 100 ft (30 m); the aquifer is confined by a dense, clayey unit beneath the disposal cell.

4. Geochemical characteristics of the foundation soils and rock are favorable for attenuating hazardous constituents in tailings seepage from the base of the disposal cell. Hazardous constituents that exceed the MCLs or statistical maximum background concentrations will essentially be precipitated or adsorbed in the unsaturated zone before they reach the water table in the uppermost aquifer.

2.6.1 Monitor well network

The Gunnison RAP (DOE, 1992b) recommended monitoring at six POC monitor wells, existing background DOE monitor wells upgradient of the disposal cell, and existing DOE monitor wells downgradient from the POC wells (including wells 663 and 716). The sampling of monitor wells, as proposed in the RAP, has been altered under the long-term surveillance and maintenance program (Table 2.1). The monitor well network under the LTSP is shown in Figure 2.6. Justification for the modifications to the ground water monitoring network is provided below.

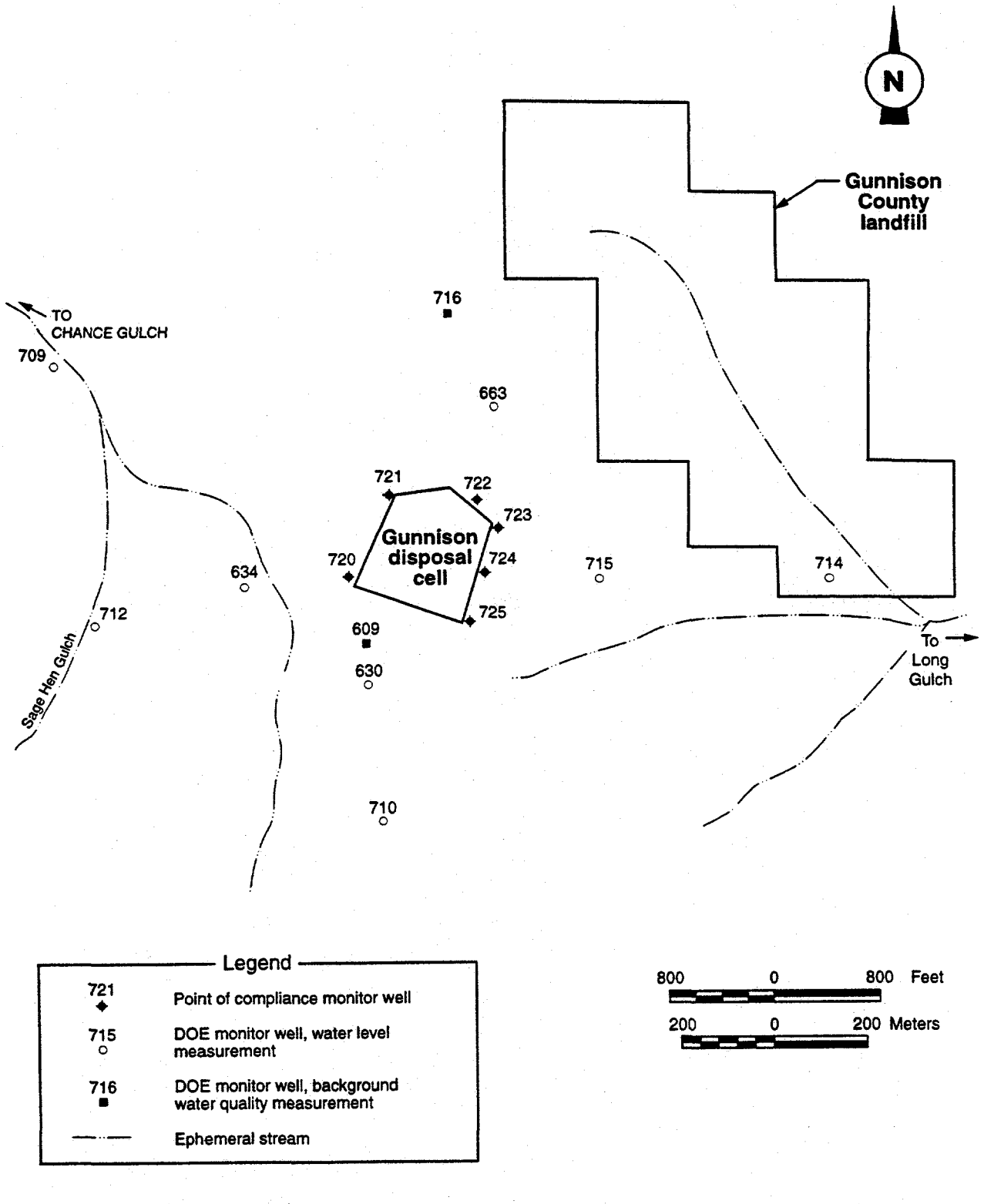
The monitor well network for long-term surveillance monitoring will include six POC wells and two background monitor wells. The six POC wells are approximately 50 ft (15 m) from the disposal cell around the east, west, and north perimeter (Figure 2.6 and Plate 1). These wells were installed and developed in accordance with standard operating procedures that are consistent with the EPA guidance (EPA, 1986) to ensure that representative ground water samples are collected. These wells are located downgradient of the disposal cell and screened in the lower Tertiary gravels (the uppermost aquifer). The close proximity of the wells to the disposal cell will allow for early detection of potential contaminant releases.

The location, as proposed in the RAP, of POC well GUN-08-0722 was changed under the LTSP. The original location was at the northernmost tip of the disposal cell and thus crossgradient from the cell. Under the LTSP, POC well -0722 is located about 300 ft (90 m) east-northeast of the northern tip of the cell (Plate 1 and Figure 2.6). This will place the well downgradient rather than crossgradient from the cell.

Existing wells GUN-08-0609 and -0716 will be the background ground water monitor wells (Plate 1). These wells will be monitored to detect changes in ground water conditions that are unrelated to the disposal cell itself, such as changes in ground water elevations or ground water chemistry. Water analyses from these wells will be compared to water analyses obtained from the POC wells to detect possible releases from the disposal cell into the uppermost aquifer. These two wells represent the higher TDS (well 609) and lower TDS (well 716) background ground water at the disposal cell.

Water quality sampling of existing downgradient monitor wells GUN-08-0714, -0715, and -0717 will not be part of long-term surveillance monitoring, and their periodic sampling will be discontinued upon implementation of this LTSP. These wells will not be monitored because the six POC wells provide sufficient coverage for compliance monitoring. Background water quality in monitor wells GUN-08-0707, -0708, -0663, and -0713 will not be included in the long-term surveillance monitoring because the background historical ground water quality has been sufficiently characterized.

Figure 2.6
Ground Water Monitoring Network



As part of the LTSP, water levels will be routinely measured in selected wells located away from the disposal cells. Wells -0710, -0712, -0709, and -0714 will be used to monitor regional water level changes along a wide perimeter around the disposal cell. Wells -0630, -0634, -0663, and -0715 will be used to monitor regional changes in ground water closer to the disposal cell (Figure 2.6). The purpose is to monitor potential regional changes in water levels or hydrologic gradients that could influence ground water levels and flow beneath the cell.

2.6.2 Concentration limits for hazardous constituents

Concentration limits for long-term monitoring of the disposal cell (Table 2.3) were established following EPA guidance (EPA, 1992). In its guidance, the EPA endorses the use of tolerance intervals for detecting contamination above background in downgradient wells. A tolerance interval is designed to contain all but a small percentage of all future measurements from wells accessing uncontaminated water. Therefore, repeated exceedances of the upper tolerance limit present statistical evidence of contamination.

A nonparametric approach was used to determine a tolerance interval for the hazardous constituents of concern at the Gunnison site. Using this approach, the upper tolerance limit is the maximum observed concentration in water samples collected between 1988 and 1995 from selected wells completed in the uppermost aquifer (Table 2.2). Data collected prior to 1992 were subject to less rigorous quality assurance and quality control (QA/QC) criteria, and thus required additional screening to detect statistically anomalous values. This was accomplished for each constituent by examining the data well-by-well for consistency with a lognormal distribution. One anomalous data point was identified (for uranium) and removed from consideration. Because the disposal cell is located in an area where the uppermost aquifer is influenced by two types of background ground water, it is appropriate to combine the data from both types for statistical analysis. Thus, at the Gunnison site, the maximum concentrations are based on databases ranging from 51 measurements for thallium up to 73 measurements for arsenic, cadmium, chromium, lead, molybdenum, net gross alpha, radium-226 and -228, uranium, and zinc. There is 95 percent confidence the maximum observed concentration of each constituent represents a level that will exceed background no more than 5 percent of the time. Therefore, using the maximum observed concentration as a concentration limit for long-term ground water monitoring produces reasonable protection against false-positive results from random background variation.

Regulations allow the concentration limits for hazardous constituents listed in 40 CFR Part 192 to be set at the background concentrations or MCLs, whichever are greater. Therefore, the concentration limits for hazardous constituents listed in Table 2.3 represent the larger of the maximum observed concentration and the UMTRA Project MCL for constituents with established MCLs.

3.0 SITE INSPECTIONS

The DOE will conduct routine inspections of the Gunnison disposal site to detect progressive change caused by slow-acting natural processes and to identify potential problems before the need for extensive maintenance, repairs, or corrective action. Inspections may also be performed if DOE receives information regarding events or conditions that could potentially affect the disposal site. The DOE will compare the findings from these inspections to initial baseline conditions to identify changes over time and to provide a basis for future inspections, repairs, and corrective actions. This process is shown in Figure 3.1. Custodial maintenance or repair is described in Section 5.0. Corrective action is detailed in Section 6.0.

3.1 INSPECTION FREQUENCY

The DOE will inspect the Gunnison disposal site annually. The DOE may schedule more frequent inspections at any time should the need arise. The DOE will notify the NRC of the inspection schedule.

3.2 INSPECTION TEAM

The inspection team will consist of a minimum of two inspectors qualified to inspect disposal cell integrity and make preliminary assessments of modifying processes that could adversely affect the disposal cell.

If problems are observed that require more investigation, follow-up inspections will be performed and include one or more technical specialists in appropriate disciplines to assess the problems under investigation. For example, a follow-up inspection by a plant specialist may be required to evaluate reports of significant plant growth on the rock cover or a soils scientist or geomorphologist may be needed to evaluate erosion processes.

3.3 SITE INSPECTION PROCEDURES

Before each inspection, inspectors will perform a preinspection briefing. The long-term surveillance program guidance (DOE, 1996a) contains information useful in preparing for inspections.

Site inspections will cover the disposal cell, the surrounding disposal site area, and the immediate off-site areas. Site inspections must be thorough enough to identify significant changes or active modifying processes that could potentially adversely affect the disposal cell. Surveillance should be performed to identify unanticipated effects of modifying processes such as gully formation, slope erosion, changes to the rock cover, ephemeral drainage channel changes, and significant modifications by humans, animals, or plants. Processes that were anticipated in the disposal cell design and should not cause undue concern during inspection are:

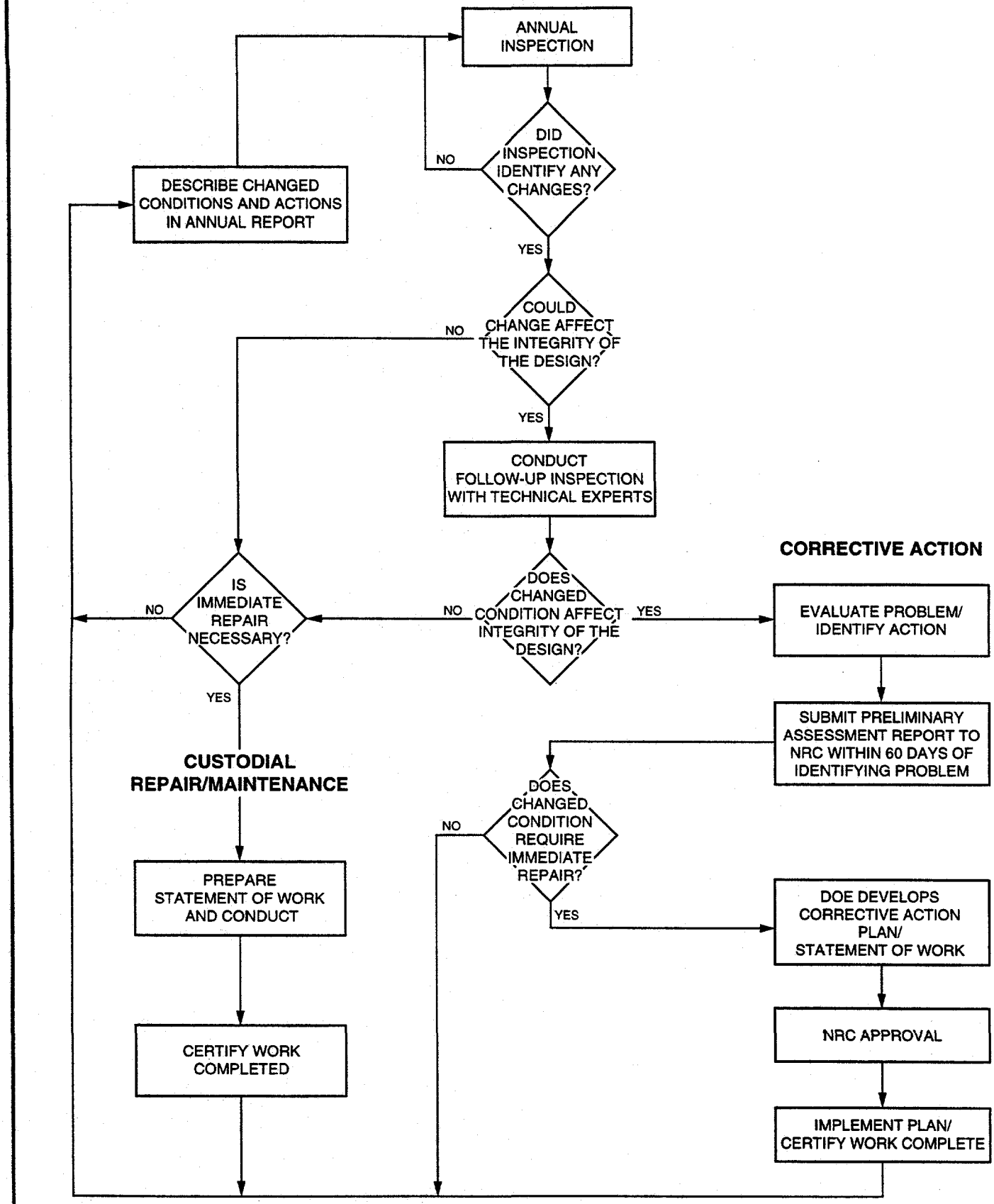


FIGURE 3.1
STEPS FOR FOLLOW-UP INSPECTIONS,
CUSTODIAL MAINTENANCE, AND CORRECTIVE ACTION
GUNNISON, COLORADO, DISPOSAL SITE

- Uniform erosion of the site area. It will not impact cell performance, e.g., erosion protection by the rock sideslopes and apron. Only if there is gully formation and documented headward erosion toward the cell would appropriate mitigation actions be warranted.

- Minor biointrusion on the sideslopes. It is not critical in this area because of the underlying cleanfill dikes (no tailings beneath the sideslopes); this also applies to the ditches. Biointrusion would be a concern only if it becomes significant enough to concentrate surface flows or disrupt the integrity of the rock and bedding layers.

Inspectors will evaluate the integrity of the disposal cell by walking a series of transects around the perimeter and over the rock cover. Sufficient transects, at approximately 150-ft (46-m) intervals, must be walked so that the disposal cell is thoroughly covered and inspected. Diagonal transects of the topslopes will be made and the crest line will be walked. Additional transects will be walked along the sideslopes and rock apron. Transects along the entire length of the diversion ditch will be made to determine whether it is functioning as designed and can be expected to continue to function properly. Inspectors will vary the path of transects from one inspection to the next to ensure small anomalies are not overlooked. The sample inspection checklist (DOE, 1996a) lists items that should be examined during inspections.

The disposal cell has a rock cover and there is no planned vegetation on the disposal cell. However, remedial action of the areas surrounding the disposal cell included revegetation with grasses. The area surrounding the disposal cell will be monitored to determine the success of the revegetation efforts. Inspectors also will inspect this area for evidence of erosion caused by wind, sheet wash, or changes in drainage patterns.

Site inspections also will monitor damage to or disturbance of permanent site-surveillance features, ground water monitor wells, fencing, gates, and locks.

From inside the disposal site, inspectors will visually survey the area within a maximum of 0.25 mi (0.40 km) from the boundary of the disposal site for evidence of land-use changes that indicate increased human activity such as land development or new roads and paths. Inspectors will note the condition of and changes to site access roads, surrounding vegetation, and relevant geomorphic features like gullies or ephemeral drainage channels; potential impacts to the site will be noted. Site inspections will also include a visual survey of the north side of the gully heading east from the disposal cell to check for the limited possibility of fluid seepage from the vadose zone in the vicinity of the disposal cell. The area of observation will be from the southeast corner of the disposal cell to monitor well 714. Observed areas of seepage will be sampled and documented.

3.4 SITE-SPECIFIC CONCERNS

Two site-specific concerns require special attention during the annual inspections: future expansion of the Gunnison County landfill, and potential breakdown of the erosion protection material caused by freeze-thaw effects. These two concerns are discussed in detail in the following paragraphs.

3.4.1 Future expansion of the Gunnison County landfill

Currently, the Gunnison County landfill is approximately 1200 ft (370 m) north of the disposal site. The designated landfill boundary extends to the north-northwest of the disposal site, with a portion of the western boundary of the county property adjoining the eastern boundary of the disposal site. Future expansion and subsequent filling and contouring at the county landfill could change the runoff characteristics of drainage areas north and north-northwest of the disposal site.

To monitor future expansions of the county landfill the inspectors will walk over the area north and north-northwest of the disposal site up to the southern fence of the landfill. The inspectors will check for significant changes in headcutting or sedimentation in this area. Future expansion of the landfill east of the disposal site is not a concern with respect to runoff as a large, deeply incised gully lies between the eastern boundary of the disposal site and western boundary of the county landfill property.

3.4.2 Freeze-thaw effects of erosion protection material

Because of the nature of the geologic formation where the erosion protection material (otherwise referenced as riprap or rock particles) was produced, the larger riprap (7 inches [18 cm] and greater) potentially could contain microscopic fractures. Over time the riprap potentially could begin to break along these microscopic fractures due to weathering and expansion resulting from freeze-thaw and temperature changes. If the size of the riprap were significantly reduced, there is potential that over time the larger riprap would not meet design requirements. Because of these concerns, a more detailed inspection will be implemented for some of the Types B, C, and D riprap.

While walking routine transects over Types B, C, and D riprap, inspectors will check for evidence of potential deterioration of material that is greater than 7 inches [18 cm] in diameter. Deterioration includes cracking, spalling, or slabbing along fracture planes. Special care must be taken to avoid misinterpretation of as-placed conditions. As-placed riprap will have, to a minor degree, the characteristics listed above. The key to determining if freeze-thaw is affecting the riprap is determining progressive deterioration of representative rock particles (not just minor amounts of rock particles with as-placed defects). If a large number of disintegrating rocks are found in a given area, they will be monitored using the procedure outlined below.

In addition to walking the routine transects, one specific location for each riprap type (B, C, and D) will be selected from the areas shown on Plate 1 to perform a more detailed, repetitive inspection. The flow paths in these areas are considered more critical than other areas on the cell. The specific locations for the detailed inspections will be determined by established random selection procedures to reduce human subjectivity in the selection process.

The following procedures will be used:

1. Each selected location will be marked or otherwise recorded in a manner that allows identification at future inspection of 1) the exact area to be observed, and 2) the exact location from which the photographs are taken.

2. The exact areas to be observed will be large enough to be photographed at a scale that includes an adequate number of rock particles and will allow a detailed observation of rock particles in the photograph. Therefore, each photograph will include a graduated scale at least 1 ft (0.3 m) long marked in 0.1-ft [0.3-m] increments. Enlarged prints will be sufficient to observe an area that will include at least 30 rock particles visible from the surface that are not blocked by overlying rock particles.

3. Photographs will be taken at each location according to the following schedule:

   - Once each year for the first 5 years of surveillance.
   - Once every 5 years for years 5, 10, 15, and 20.
   - The need for special surveillance will be reevaluated at year 20.

4. Observation procedures for riprap will be reevaluated if significant changes to rock particles occur at any location. The determination of significant changes will be made visually, using photographs to document the apparent change. Changes are defined as significant if 15 percent or more of the rock particles observed in the photographs exhibit cracking, spalling, or slabbing along fracture planes that cause complete or partial separation of one-third or more of the rock particle's mass.

If through this process it is determined that the riprap has deteriorated in a manner that could compromise the stability of the disposal cell design, the DOE will take actions to more thoroughly evaluate the problem outlined below.

3.5 FOLLOW-UP INSPECTIONS

In addition to annual inspections, the DOE may conduct follow-up inspections due to unusual or annual inspection results. The DOE will monitor the area of the disposal cell for the occurrence of extreme natural events (e.g., earthquakes, tornadoes, floods) and vandalism to ensure such events are investigated in a timely manner to assess their effect on the disposal cell. To

facilitate this, the DOE has requested notification from federal, state, and local agencies of discoveries or reports of purposeful intrusion or damage at the disposal site as well as in the disposal site area. Notification agreements with the Gunnison County Sheriff's Office and the U.S. Geological Survey's National Earthquake Information Center are included in Attachment 2. The DOE will also monitor the weather for the occurrence of severe storms in the vicinity of the disposal cells. In addition, the DOE 24-hour phone number is posted on the site entrance sign so the public can notify the DOE if problems are discovered. If an extreme natural event or vandalism has occurred, an inspection will be performed to assess the damage. The notification, response, and all follow-up activities will be documented. This documentation will be included in the annual site report to the NRC and become part of the permanent site file.

The nature of the occurrence and the amount of firsthand knowledge available will determine the DOE's response. If a situation poses a threat to the public, the DOE will notify individuals who may be affected and appropriate federal, state, and local agencies, including the NRC. If necessary, the DOE will schedule a follow-up inspection to assess potential effects from the unusual occurrence, and will take necessary response action. DOE may conduct follow-up inspections to investigate and quantify specific problems found during a previous inspection, other DOE-initiated activity, or other confirmed reports of vandalism, intrusion, damage, unusual occurrences, or other significant threat to the disposal site. Follow-up inspections will be conducted to determine whether processes currently active at or near the site threaten site security or stability and to evaluate the need for custodial maintenance, repair, or other corrective action. The scope of these follow-up inspections may be broad and similar in nature to routine site inspections or focused on specific areas of concern.

A follow-up inspection usually will begin with an on-site visit by technical specialists to further investigate the reported problem to determine whether or not the disposal cell has been damaged or to determine the need for more definitive tests or studies. The DOE will schedule additional site visits if more data are needed to draw conclusions and to recommend repairs or corrective action.

4.0 CELL PERFORMANCE MONITORING

The DOE evaluated the need for ground water monitoring to monitor cell performance at the Gunnison disposal site in accordance with the licensing regulations at 10 CFR §40.27(b)(2), the ground water protection standards at 40 CFR Part 192, Subparts A and C, and the DOE's long-term surveillance program guidance (DOE, 1996a). POC monitoring is required for the long-term surveillance program at the Gunnison disposal site to comply with the ground water protection standards at 40 CFR §192.03 to demonstrate disposal cell performance. This process is shown in Figure 4.1

4.1 GROUND WATER MONITORING PLAN

The ground water protection monitoring plan includes sampling and analyzing ground water from a series of monitor wells downgradient from the disposal cell at the POC and upgradient or crossgradient from the disposal cell as background (Section 2.6.1). The long-term monitoring strategy is to sample the direct monitor well network at prescribed intervals for water levels and a set of screening parameters. If elevated levels of contaminants are detected in POC wells, additional monitoring will be performed to determine if a release from the disposal cell may have occurred. The direct monitor well network and performance monitoring frequency are discussed below. Potential indirect monitoring techniques that may be used, if it is determined they are necessary, are discussed in Section 4.1.6.

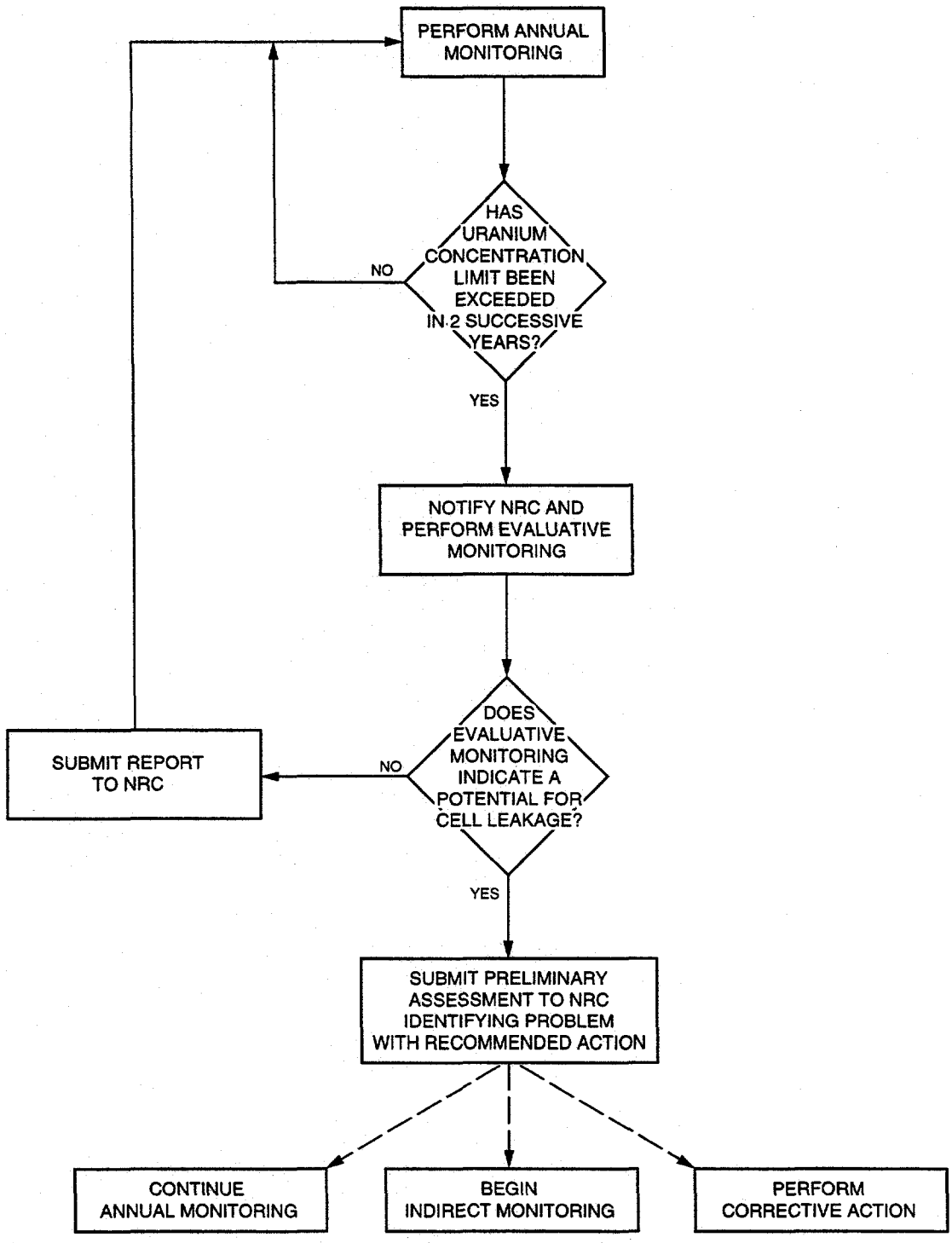
4.1.1 Direct ground water monitoring network

Ground water samples will be collected from six POC wells located downgradient of the disposal cell in the uppermost aquifer. Sampling will be performed to measure ground water quality and static water levels. The six POC wells are located approximately 50 ft (15 m) from the disposal cell (Plate 1). Placement of the POC monitor wells optimizes early detection of any hazardous constituents released in the uppermost aquifer without disturbing the design components of the cell.

Ground water quality and water level data will also be monitored in two background wells, wells GUN-08-0609 upgradient and well GUN-08-0716 crossgradient from the disposal cell. These wells are screened in the same aquifer as the POC wells and at approximately the same depth. The background wells will be sampled at the same frequency as the POC wells and will be monitored for the same constituents. Water levels will also be measured in 8 wells away from the disposal cell to monitor potential changes in regional hydrologic conditions (Section 2.6.1).

4.1.2 Sampling frequency

The schedule for sampling takes into account such factors as background ground water quality, the geochemistry of the tailings pore fluid solution,



NOTE: DASHED LINE INDICATES OPTIONS AVAILABLE.

FIGURE 4.1
CELL PERFORMANCE MONITORING PROCESS
GUNNISON, COLORADO, DISPOSAL SITE

horizontal and vertical ground water flow rates, the possibility of seasonal variations in ground water, and risk to human health and the environment. Ground water levels will be measured before each well is sampled. Monitor wells at the Gunnison disposal cell have been sampled annually or semiannually since 1988. During construction of the cell and placement of tailings, monitor wells were sampled semiannually (in the early summer and fall).

The long-term surveillance monitor well network will be sampled according to the sampling schedule in Table 4.1.

Table 4.1 Sampling schedule for the monitor well network at the Gunnison, Colorado, disposal site

Year	Number of sampling events	Time of sampling
1997	2	Fall and early summer
1998	1	Early summer
1999	1	Early summer
2000	1	Early summer
2001	1	Early summer
2006[a]	1	Early summer

[a]Monitoring network to be sampled every 5 years.

The monitor well network will be sampled to determine if water quality in each POC well is stable and representative of baseline conditions. Sampling will be conducted in the fall and early summer to maintain a consistent record in the historical database.

Sampling will be conducted annually through 2001. These data will establish a baseline for each POC well. It is expected that each POC well will be representative of one of the two types of ground water observed in background. Sampling will be conducted in the early summer to coincide with the expected time of greatest potential ground water recharge.

A sampling frequency of once every 5 years is recommended, starting with sampling on the tenth year following POC well installation. These sampling frequencies are recommended at the disposal cell for the following reasons:

- The average water level in the uppermost aquifer beneath the disposal cell is approximately 110 ft (34 m) below land surface (DOE, 1992b).

- Background water quality in the uppermost aquifer beneath the disposal cell is well established (Section 2.6.2).

- The disposal cell design minimizes infiltration through the cover; the tailings were placed into the disposal cell at a moisture content designed to produce almost no transient drainage (DOE, 1992b).

- Geochemical investigations conducted during preparation of the RAP (DOE, 1992b) determined that geochemical characteristics of the foundation materials are favorable in attenuating seepage of hazardous constituents in tailings from the base of the disposal cell.

- Ground water use is limited in the disposal cell vicinity. Only one private well is known to be located downgradient of the disposal cell (DOE, 1992b). This well is located approximately 7500 ft (2390 m) from the disposal cell. Using the estimated ground water velocity within the Tertiary gravel aquifer of approximately 7 ft per year (7×10^{-6} cm per second) (Calculation No. GUN-05-90-14-07-02), it would take over 1000 years for potential contamination from the disposal cell to reach this well.

This frequency may be changed, upon approval from the NRC, based on site-specific conditions and the effectiveness of disposal cell performance as determined through the ongoing monitoring program.

4.1.3 Ground water monitoring team

Water samples will be collected by a team consisting of, at a minimum, two water sampling technicians. The technicians will be knowledgeable in the general principles of ground water sampling techniques. Personnel will be required to follow a set of standard operating procedures or industry accepted standards, such as American Society for Testing and Materials standards, under strict QA/QC standards designed to produce ground water analyses that are defensible and representative of ground water conditions. Collected data will be evaluated by a technical specialist experienced in the interpretation of hydrogeological data.

4.1.4 Screening monitoring and exceedance validation

During the established ground water monitoring period, screening monitoring will be conducted to observe possible changes in ground water quality and to assess compliance with the ground water protection standards. Screening monitoring includes routine water-quality data collection, data evaluation, and possible resampling. It also includes analyzing constituents that are indicative of general water quality and hazardous constituents that are reliable indicators of contamination (Table 4.2). General water quality indicators include pH, electrical conductivity, temperature, alkalinity, oxidation-reduction potential, and major anions and cations. These data provide general information for

Table 4.2 Parameters to be measured during screening monitoring at the Gunnison, Colorado, disposal site

Parameter	Screening monitoring action level
Indicator parameter for detecting ground water contamination	
Uranium	0.013[a]
Field parameters for monitoring ground water quality	
Alkalinity	None
Oxidation-reduction potential	None
pH	None
Specific conductivity	None
Temperature	None
Major anions and cations for monitoring ground water quality	
Calcium	None
Chloride	None
Iron	None
Magnesium	None
Manganese	None
Potassium	None
Sodium	None
Sulfate	None
TDS	None

[a]Action level is in milligrams per liter and is based on maximum observed background value.

interpreting potential changes in ground water quality. Screening parameters indicative of contamination are those that 1) are known to be present in the tailings solutions at levels statistically greater than background levels, 2) are present at much higher levels in the tailings solutions than in background, 3) display low variability in background, and 4) are mobile in the ground water environment. The parameter that best meets these criteria is uranium.

Exceedances in concentration limits for uranium are evaluated on a well-by-well basis. If the screening monitoring action level for uranium listed in Table 4.2 is exceeded, the well will be resampled within 1 year for all screening monitoring parameters listed in Table 4.2. If the resampling indicates a second exceedance or if changes in other monitored constituents or wells are observed that clearly support the inference that contamination from the disposal cell is reaching ground water in excess of the design standards, then the monitoring program

will enter into the evaluative monitoring phase. The DOE will notify the NRC of this event and that an evaluative monitoring work plan is being prepared.

4.1.5 Evaluative monitoring

When sampling, evaluating, and resampling during screening monitoring does not eliminate the disposal cell as the cause for a water-quality exceedance, evaluative ground water monitoring, additional evaluation, and fieldwork may be required. The purpose of evaluative monitoring is to confirm that the disposal cell is causing the observed exceedances, and if so, to assess current and future impacts to ground water.

Evaluative ground water monitoring will involve sampling ground waters from POC and possibly other wells, and analyzing for the entire suite of hazardous constituents identified in Table 2.3 to determine if hazardous constituents exceed the concentration limits. Data and fieldwork will be evaluated further to determine if the disposal cell is the cause of an exceedance and if so, its nature and extent.

4.1.6 Indirect monitoring

As stated above, the DOE will directly monitor ground water at the disposal site. If screening and evaluative monitoring indicate a change in ground water quality attributable to the disposal cell design, the need for indirect monitoring will be assessed.

If evaluative monitoring indicates the performance of the disposal cell is the cause of an exceedance, it may be necessary to monitor the cover, the tailings, the subsoils, or a combination of components. Some indirect methods that may be applicable to monitoring changes in moisture content in the disposal cell include core sampling to determine gravimetric water content, neutron moisture probe monitoring, time-domain reflectometry, heat dissipation probes, or cross-hole tomography. Indirect monitoring instrumentation that may be required will be installed in accordance with the appropriate standard operating procedures or best management practices.

5.0 CUSTODIAL MAINTENANCE OR REPAIR

The DOE does not plan to conduct routine maintenance at the Gunnison disposal site. However, the DOE will perform needed custodial maintenance or repair as determined from site inspections. The DOE will prepare a statement of work that will include qualifications of the maintenance/repair contractor.

The need for unscheduled custodial maintenance or repair at the Gunnison disposal site may be identified during an annual inspection. These repairs may include the following:

- Repairing or replacing deteriorated or vandalized warning signs, fencing, gates, locks, and monitor well caps.
- Removing volunteer plant growth from riprap-covered areas.
- Reseeding areas surrounding the disposal cell.

After maintenance is completed and before contractors are released, the DOE will verify that work was performed according to the statement of work.

The annual report to the NRC will document any repair that is performed. Copies of records, reports, and certifications will be included in the permanent site file.

6.0 CORRECTIVE ACTION

Corrective action is the repairs needed to address problems affecting the integrity of the disposal cell. The NRC must approve the recommended action in advance. Site inspections and ground water monitoring are designed to identify problems at the developmental stage. Examples of conditions that might trigger corrective action are as follows:

- Surface rupture or subsidence of the disposal cell.
- Development of rills or gullies or slope instability on the disposal cell.
- Deterioration of the erosion protection rock on the disposal cell.
- Exceedance of ground water concentration limits at POC wells.
- Seepage originating from the disposal cell.
- Gully development on or immediately adjacent to disposal site property that could affect the integrity of the disposal cell.
- Damage to the cell cover or disposal site property from natural catastrophic events or vandalism.
- Evidence of hazardous material spills near monitor wells.
- Damage to the disposal cell cover from deep-rooted plant growth.

If conditions such as these are observed during an annual inspection, a follow-up inspection will be conducted. The DOE will evaluate the factors that caused the problem and identify actions to mitigate the impact and prevent recurrence by:

- Identifying the nature and extent of the problem.
- Reevaluating germane engineering design parameters.

The DOE will submit a preliminary assessment report to the NRC for review no more than 60 days after a problem is identified. The preliminary assessment report will evaluate the problem and recommend the next step (e.g., immediate action or continued evaluation). If the problem requires immediate repair, the DOE will develop a corrective action plan for NRC approval. Once the NRC approves the corrective action, the DOE will implement the plan. In some cases, corrective action could include temporary emergency measures taken prior to the completion of the normal approval process. If a problem does not require immediate repair, the problem will be documented in the annual report and assessed at the next annual inspection.

NRC regulations do not stipulate a time frame for implementing corrective action. However, 40 CFR §192.04 requires that a corrective action program begin within 18 months after a finding of an exceedance in established ground water concentration limits. The DOE does not consider assessing the extent of a problem and developing a corrective action plan to be initiation of the corrective action program.

In addition to the preliminary assessment report, the DOE may, as appropriate, prepare progress reports on each corrective action while it is under way or under evaluation.

After corrective action is complete, the DOE will certify work and submit a certification statement and supporting documentation to the NRC for review and concurrence. A copy of the certification statement will become part of the permanent site file, as will reports, data, and documentation generated during the corrective action.

7.0 RECORD KEEPING AND REPORTING

7.1 PERMANENT SITE FILE

The DOE will maintain a permanent site file containing site inspection reports and other supporting documentation of long-term surveillance program activities. The information placed in the site file will include:

- Documentation of disposal site performance (inspection/ground water monitoring).
- Demonstration that licensing provisions were met.
- Information needed to forecast future site surveillance and monitoring needs.
- Reports to stakeholders regarding disposal cell integrity.

After the site is brought under the general license, the DOE will compile copies of site documentation required by the long-term surveillance program guidance (DOE, 1996a) for the Gunnison disposal site permanent site file. Copies of deeds, custody agreements, and other property documents will be kept in the site file.

The surveillance and maintenance documentation identified in other sections of this LTSP will be maintained by the DOE and become part of the permanent site file. The DOE will update the site file as necessary after disposal site inspections, maintenance activities, or corrective actions are complete. These records will be handled in accordance with DOE directives to ensure their proper handling, maintenance, and disposition. The archival procedures set forth in 41 CFR Part 101 and 36 CFR Parts 1220-1238, Subchapter B, will be followed. Information in the site file will be available for NRC and public review.

7.2 INSPECTION REPORTS/ANNUAL REPORTS

During site inspections, significant observations will be recorded and described using site inspection checklists, maps, photographs and photo logs, and field notes. Documentary evidence of anomalous, new, or unexpected conditions or situations must describe developing trends and enable the DOE to make decisions concerning follow-up inspections, custodial maintenance, and corrective action. This information will be contained in the permanent site file at the DOE office. The DOE will prepare a site inspection report documenting the findings and recommendations from each field inspection.

Site inspection reports will be submitted to the NRC within 90 days of the annual site inspection. Inspection reports will summarize the results of follow-up inspections and maintenance completed since the previous annual inspection.

If unusual damage or disruption is discovered at the Gunnison disposal site during an inspection, a preliminary report assessing the impact must be submitted to the NRC within 60 days. If maintenance or repair or corrective action is warranted, the DOE will notify the NRC. The NRC will receive a copy of corrective action plans and each corrective action progress report, or the reports will be attached to the annual report.

The DOE will provide copies of inspection reports and other reports generated under the long-term surveillance program to the state of Colorado as required in their cooperative agreement.

7.3 GROUND WATER MONITORING DOCUMENTATION

Hard copies of reports of ground water data collected during the long-term surveillance monitoring program will be stored in the permanent site file; these data also will be stored in the DOE ground water quality database along with historical ground water quality data for the Gunnison site.

Once every 5 years, the DOE will describe the data and results of the ground water monitoring program in an evaluation report to the NRC. This report will include the following information:

- Water quality data, water level data, and other data collected during the reporting period.
- A table comparing water quality indicators to concentration limits.
- A summary of exceedances of concentration limits and the exceedance validation criteria.
- A summary of resampling, evaluative monitoring, indirect monitoring, or corrective action required during the reporting period.
- A discussion of significant trends or anomalies in the water quality, other data, or changes in the local hydrologic setting.
- A discussion of new wells or indirect monitoring stations that were installed, including the rationale for their installation, and completion data.
- Completed field and laboratory forms.

8.0 QUALITY ASSURANCE

8.1 INSPECTIONS

The DOE has developed and implemented a QA plan (DOE, 1996b) for the site inspection program that meets the requirements of DOE Order 5700.6C. Site inspections will be conducted in accordance with this plan.

8.2 DATA VALIDATION AND QUALITY ASSURANCE

The ground water monitoring plan will be in accordance with accepted industry QA practices, including DOE directives in DOE Order 5700.6C, and will be consistent with EPA ground water monitoring guidance (EPA, 1986).

The DOE has established standard operating procedures for monitor well installation and development, water and soil sampling, sample preservation and transport, field procedures, chain-of-custody samples for laboratory analyses, acquisition protocols, and validating and managing analytical data. Ground water monitoring is conducted in accordance with these procedures, which are updated regularly to reflect changes in industry standards, best management practices, and guidance from the DOE or EPA.

9.0 REFERENCES

Davis, S. N., and R. DeWiest, 1966. *Hydrology*, John Wiley & Sons, Inc., New York, New York.

DOE (U.S. Department of Energy), 1996a. *Guidance for Implementing the Long-Term Surveillance Program for UMTRA Project Title I Disposal Sites*, DOE/AL-62350-189, Rev. 0, prepared for the U.S. Department of Energy, Environmental Restoration Division, UMTRA Project Team, Albuquerque, New Mexico.

DOE (U.S. Department of Energy), 1996b. *Long-Term Surveillance and Maintenance Program, Quality Assurance Program Plan*, MAC-2152, Rev. 0, prepared by MACTEC Environmental Restoration Services for the U.S. Department of Energy, Grand Junction Office, Grand Junction, Colorado.

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DOE (U.S. Department of Energy), 1992a. *Environmental Assessment of Remedial Action at the Gunnison Uranium Mill Tailings Site Near Gunnison, Colorado*, DOE/EA-0376, prepared for the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico.

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EPA (U.S. Environmental Protection Agency), 1992. *Addendum to Interim Final Guidance Statistical Analysis of the Ground-Water Monitoring Data at RCRA Facilities*, Office of Solid Waste, U.S. Environmental Protection Agency, Washington, D.C.

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Freeze, R. A., and J. A. Cherry, 1979. *Ground Water*, Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

MK-ECE (Morrison Knudsen Corporation - Engineering, Construction, & Environmental Group), 1995. *UMTRA Project, Gunnison, Colorado, Surveillance and Maintenance Subcontract Documents - Final Design for Review*, prepared by MK-ECE for the U.S. Department of Energy, Environmental Restoration Division, UMTRA Project Team, Albuquerque, New Mexico.

MK-F (Morrison Knudsen-Ferguson), 1997. *Gunnison, Colorado, Draft Completion Report*, prepared by MK-F for the U.S. Department of Energy, Environmental Restoration Division, UMTRA Project Team, Albuquerque, New Mexico.

CODE OF FEDERAL REGULATIONS

10 CFR Part 40, *Domestic Licensing of Source Material*, U.S. Nuclear Regulatory Commission.

36 CFR Parts 1220-1238, *National Archives and Records, Subchapter B- Records Management*, National Archives and Records Administration.

40 CFR Part 192, *Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings*, U.S. Environmental Protection Agency.

41 CFR Part 101, *Federal Property Management Regulations*, General Services Administration.

DOE ORDERS

Order 5700.6C, *Quality Assurance*, 21 August 1991, U.S. Department of Energy, Washington, D.C.

UNITED STATES CODE

42 USC §7901 *et seq.*, *Uranium Mill Tailings Radiation Control Act*, 8 November 1978.

ATTACHMENT 1

SITE REAL ESTATE INFORMATION

SITE REAL ESTATE INFORMATION

The Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978, as amended, requires the Secretary of Energy to permanently acquire lands needed to carry out the purposes of the UMTRCA. The area the U.S. Department of Energy (DOE) selected for the Gunnison disposal site was located on public land being administered by the U.S. Department of the Interior's (DOI) Bureau of Land Management (BLM).

TRANSFER OF ADMINISTRATION OF THE DISPOSAL SITE

The disposal site is located on public land formerly administered by the DOI BLM. Under the requirements of the UMTRCA, as amended, the DOE acquired the disposal site land via a Public Land Order (PLO). The PLO permanently transferred 115 acres from the public domain to the DOE in accordance with the terms of the UMTRCA. As a result of the transfer, the land is no longer subject to the operation of the general land laws, including the mining and mineral leasing laws. This transfer to the DOE vested in the DOE the full management, jurisdiction, responsibility, and liability for the land and all activities conducted thereon, except that the DOI, through the BLM, retained authority to administer any claims, rights, and interests in the land established before the effective date of the transfer.

LEGAL DESCRIPTION

A tract of land located in Township 49 North Range 1 East, New Mexico Principal Meridian, described by the following government land survey. Section 15, S1/2 SW1/4 NE1/4 NE1/4, S1/2 S1/2 NW1/4 NE1/4, SW1/4 NE1/4, W1/2 SE1/4 NE1/4, S1/2 SE1/4 NE1/4 NW1/4, NE1/4 SE1/4 NW1/4, N1/2 SE1/4 SE1/4 NW1/4, SE1/4 SE1/4 SE1/4 NW1/4, NE1/4 NE1/4 NE1/4 SW1/4, N1/2 NW1/4 NE1/4 SE1/4, and N1/2 N1/2 NW1/4 SE1/4. The area described contains approximately 115 acres of public land in Gunnison County, Colorado.

RECORDED

The PLO was published in the *Federal Register*, Volume 57, No. 115, page 26607, dated 15 June 1992. The *Federal Register* document is listed as 92-13985 filed 12 June 1992 as 43 CFR Public Land Order 6931. The effective date of the transfer is 15 June 1992.

REAL ESTATE FILES

The DOE maintains its real estate correspondence and related documents at the Albuquerque Operations Office, Property Management Branch, Property and Administrative Services Division, P.O. Box 5400, Albuquerque, New Mexico 87115, under the supervision of the Branch Chief (505-845-6450).

CHAPTER 101—FEDERAL PROPERTY MANAGEMENT REGULATIONS

SUBCHAPTER G—AVIATION, TRANSPORTATION, AND MOTOR VEHICLES

Appendix to Subchapter G—Temporary Regulations

* * * * *

[FPMR Temp. Reg. G-54; Supplement 1]

April 16, 1992.

Use of Contractor for Express Small Package Transportation

1. *Purpose.* This supplement extends the expiration date of FPMR Temporary Regulation G-54.

2. *Effective date.* This supplement is effective January 15, 1992.

3. *Expiration date.* This supplement expires November 15, 1992, unless sooner canceled or revised.

4. *Background.* FPMR Temporary Regulation G-54, dated July 9, 1991, prescribes policies and procedures applicable to Federal agencies when transportation of express small packages from, to, and between specified locations in the United States (including Alaska and Hawaii) and Puerto Rico, is required and the contractor or its agent provides next day service. This regulation also identifies the contractor and the effective rates.

5. *Explanation of change.* The expiration date in paragraph 3 of FPMR Temporary Regulation G-54 is extended to November 15, 1992.

Richard G. Austin,

Administrator of General Services.

[FR Doc. 92-13747 Filed 6-12-92; 8:45 am]

BILLING CODE 6820-24-M

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

43 CFR Public Land Order 6930

[NM-940-4214-10; NMNM 81795]

Withdrawal of Public Land for Wild Rivers Recreation Area; New Mexico

AGENCY: Bureau of Land Management, Interior.

ACTION: Public Land Order.

SUMMARY: This order withdraws 4,979.94 acres of public land from surface entry and mining for a period of 20 years for the Bureau of Land Management to protect the Wild Rivers Recreation Area near the vicinity of Cerro, New Mexico. The land has been and remains open to mineral leasing.

EFFECTIVE DATE: June 15, 1992.

FOR FURTHER INFORMATION CONTACT: Clarence F. Hougland, BLM New Mexico State Office, P.O. Box 27115, Santa Fe, New Mexico 87502-7115, 505-438-7593.

By virtue of the authority vested in the Secretary of the Interior by section 204 of the Federal Land Policy and Management Act of 1976, 43 U.S.C. 1714 (1988), it is ordered as follows:

1. Subject to valid existing rights, the following described public land is hereby withdrawn from settlement, sale, location, or entry under the general land laws, including the United States mining laws (30 U.S.C. ch. 2 (1988)), but not from leasing under the mineral leasing laws, to protect the Wild Rivers Recreation Area:

New Mexico Principal Meridian

T. 28 N., R. 12 E.,
- Sec. 3, lots 1 to 4, inclusive, and S½N½;
- Sec. 4, lots 1 to 4, inclusive, S½N½, and S½;
- Sec. 5, lots 1 to 4, inclusive, S½N½, N½SW¼, and SE¼;
- Sec. 6, lot 1, and SE¼NE¼;
- Sec. 8, E½E½ and E½W½E½;
- Sec. 9, NW¼NE¼, W½SW¼NE¼, W½SW¼, W½E½SW¼, and NE¼NE¼SW¼;
- Sec. 16, NW¼NW¼;
- Sec. 17, E½NE¼ and E½W½NE¼.

T. 29 N., R. 12 E.,
- Sec. 22, W½SW¼ and W½E½SW¼;
- Sec. 27, W½W½E½ and W½;
- Sec. 28;
- Sec. 29, lots 1 to 8, inclusive, E½E½, SE¼SE¼NW¼, E½NE¼SW¼, and SE¼SW¼;
- Sec. 31, SE¼SE¼;
- Sec. 32, E½NW¼NW¼;
- Sec. 33;
- Sec. 34, W½.

The area described contains 4,979.94 acres in Taos County.

2. The withdrawal made by this order does not alter the applicability of those public land laws governing the use of the land under lease, license, or permit, or governing the disposal of its mineral or vegetative resources other than under the mining laws.

3. This withdrawal will expire 20 years from the effective date of this order unless, as a result of a review conducted before the expiration date pursuant to section 204(f) of the Federal Land Policy and Management Act of 1976, 43 U.S.C. 1714(f) (1988), the Secretary determines that the withdrawal shall be extended.

Dated: June 3, 1992.

Dave O'Neal,

Assistant Secretary of the Interior.

[FR Doc. 92-13986 Filed 6-12-92; 8:45 am]

BILLING CODE 4310-FB-M

43 CFR Public Land Order 6931

[CO-930-4920-10-4329; COC-53301]

Transfer of Public Land for the Gunnison Disposal Site; Colorado

AGENCY: Bureau of Land Management, Interior.

ACTION: Public Land Order.

SUMMARY: This order permanently transfers 115 acres of public land to the Department of Energy in accordance with the terms of the Uranium Mill Tailings Remedial Action Amendments Act of 1988.

EFFECTIVE DATE: June 15, 1992.

FOR FURTHER INFORMATION CONTACT: Doris E. Chelius, BLM Colorado State Office, 2850 Youngfield Street, Lakewood, Colorado 80215-7076, 303-239-1706.

By virtue of the authority vested in the Secretary of the Interior by the Uranium Mill Tailings Radiation Control Act of 1978 (42 U.S.C. 7918 (1988)), it is ordered as follows:

1. Subject to valid existing rights, the following described public land is hereby permanently transferred to the Department of Energy, and as a result of this transfer, the land is no longer subject to the operation of the general land laws, including the mining and mineral leasing laws, for the Gunnison Disposal Site:

New Mexico Principal Meridian

T. 49 N., R. 1 E.,
- Sec. 15, S½SW¼NE¼NE¼, S½S½N W¼NE¼, SW¼NE¼, W½SE¼NE¼, S½SE¼NE¼NW¼, NE¼SE¼NW¼, N½SE¼SE¼NW¼, SE¼SE¼S E¼NW¼, NE¼NE¼NE¼SW¼, N½NW¼NE¼SE¼, and N½N½N W¼SE¼.

The area described contains approximately 115 acres of public land in Gunnison County.

2. The transfer of the above-described land to the Department of Energy vests in that Department the full management jurisdiction, responsibility, and liability for such land and all activities conducted thereon, except as provided in paragraph 3.

3. The Secretary of the Interior shall retain the authority to administer any existing claims, rights, and interests in this land established before the effective date of the transfer.

Dated: June 3, 1992.

Dave O'Neal,

Assistant Secretary of the Interior.

[FR Doc. 92-13985 Filed 6-12-92; 8:45 am]

BILLING CODE 4310-JB-M

ATTACHMENT 2

AGENCY NOTIFICATION AGREEMENTS

Department of Energy
Albuquerque Operations Office
P. O. Box 5400
Albuquerque, New Mexico 87185-5400
APR 03 1996

Rick Murdie
Gunnison County Sheriff's Office
200 E. Virgina Avenue
Gunnison, Colorado 81230

Dear Sheriff Murdie:

The U.S. Department of Energy (DOE) Uranium Mill Tailings Remedial Action Project is requesting notification in the event of any unusual activities or events in southeast Gunnison County, Colorado, around the DOE's Gunnison uranium mill tailings disposal site. The site is located approximately six miles southeast of Gunnison, Colorado, in Township 49 North, Range 1 East, Section 15, just southwest the Gunnison County Landfill. The disposal site is reached by taking County Road 42 (Sixmile Lane) south from U.S. Highway 50 to BLM Route 3068 then proceeding west about one mile (see enclosed map).

The purpose of the notification request is to assist the DOE in monitoring and maintaining the integrity of the Gunnison disposal site and to ensure public safety.

If during the course of routine activities, anything out of the ordinary that could potentially impact the site is observed by your staff or reported to your office, we would appreciate notification to the DOE Grand Junction Projects Office's 24-hour phone line at (970) 248-6070.

If the notification request discussed above is agreeable to you, please sign and return the attached reply letter for our records as soon as possible.

Should you have any questions, please contact me at (505) 845-4865. Thank you for your attention in this matter.

Sincerely,

John M. Evett
Project Site Manager
Environmental Restoration
Division

Enclosures

cc w/o enclosures:
J. Virgona, GJPO

John M. Evett
Project Site Manager
Environmental Restoration Division
U.S. Department of Energy
P.O. Box 5400
Albuquerque, NM 87115

Dear Mr. Evett:

This letter is to concur with the U.S. Department of Energy (DOE) request for notification as set forth in the DOE's letter. As requested in your letter, this office will contact the DOE's Grand Junction Projects Office at (970) 248-6070 if any unusual event or anomaly is observed or reported at or around the DOE's Gunnison disposal site, Gunnison County, Colorado.

Sincerely,

Rick Murdie
Gunnison County Sheriff

cc: J. Virgona, GJPO

IN UPDC

National Earthquake Information Center

World Data Center A for Seismology

Director
(303) 236-1510
Research
(303) 236-1506

U.S. Geological Survey
Box 25046, DFC, MS-967
Denver, Colorado 80225 USA
Telex: (WUTCO) 5106014123ESL UD

Operations
(303) 236-1500
QED
(800) 358-2663

Clinton C. Smythe
Engineering and Construction Group Leader
Uranium Mill Tailings Remedial Action
Project Office
2155 Louisiana NE, Suite 4,000
Albuquerque, NM 87110

Dear Mr. Smythe:

This letter is to confirm that the DOE Grand Junction Projects Office (24-hour phone line, (303) 248-6070 has been added to our notification list for the occurrence of earthquakes near the following locations:

Disposal Site	Latitude	Longitude
COLORADO		
Durango (Bodo Canyon)	N37.15	W107.90
Grand Junction	N38.91	W108.32
Gunnison (Landfill)	N38.51	W106.85
Maybell	N40.55	W107.99
Naturita (Dry Flats)	N38.21	W108.60
Rifle (Estes Gulch)	N39.60	W107.82
Slick Rock (Burro Canyon)	N38.05	W108.87
IDAHO		
Lowman	N44.16	W115.61
NEW MEXICO		
Ambrosia Lake	N35.41	W107.80
NORTH DAKOTA		
Bowman	N46.23	W103.55
OREGON		
Lakeview (Collins Ranch)	N42.2	W120.3
PENNSYLVANIA		
Canonsburg	N40.26	W80.25
Burrell VP	N40.62	W79.65
TEXAS		
Falls City	N28.91	W98.13
UTAH		
Mexican Hat	N37.10	W109.85
Salt Lake City (Clive)	N40.69	W113.11

National Earthquake Information Center
World Data Center A for Seismology

Director
(303) 236-1510
Research
(303) 236-1506

U.S. Geological Survey
Box 25046, DFC, MS-967
Denver, Colorado 80225 USA
Telex: (WUTCO) 5106014123ESL UD

Operations
(303) 236-1500
QED
(800) 358-2663

Clinton C. Smythe -2-

We have entered the following selection criteria into our notification program:

1. Any earthquake of magnitude 3.0 or greater, within 0.3 degrees (about 20 miles) of any site shown above, or

2. Any earthquake of magnitude 5.0 or greater, within 1.0 degrees (about 70 miles) of any site shown above.

Sincerely,

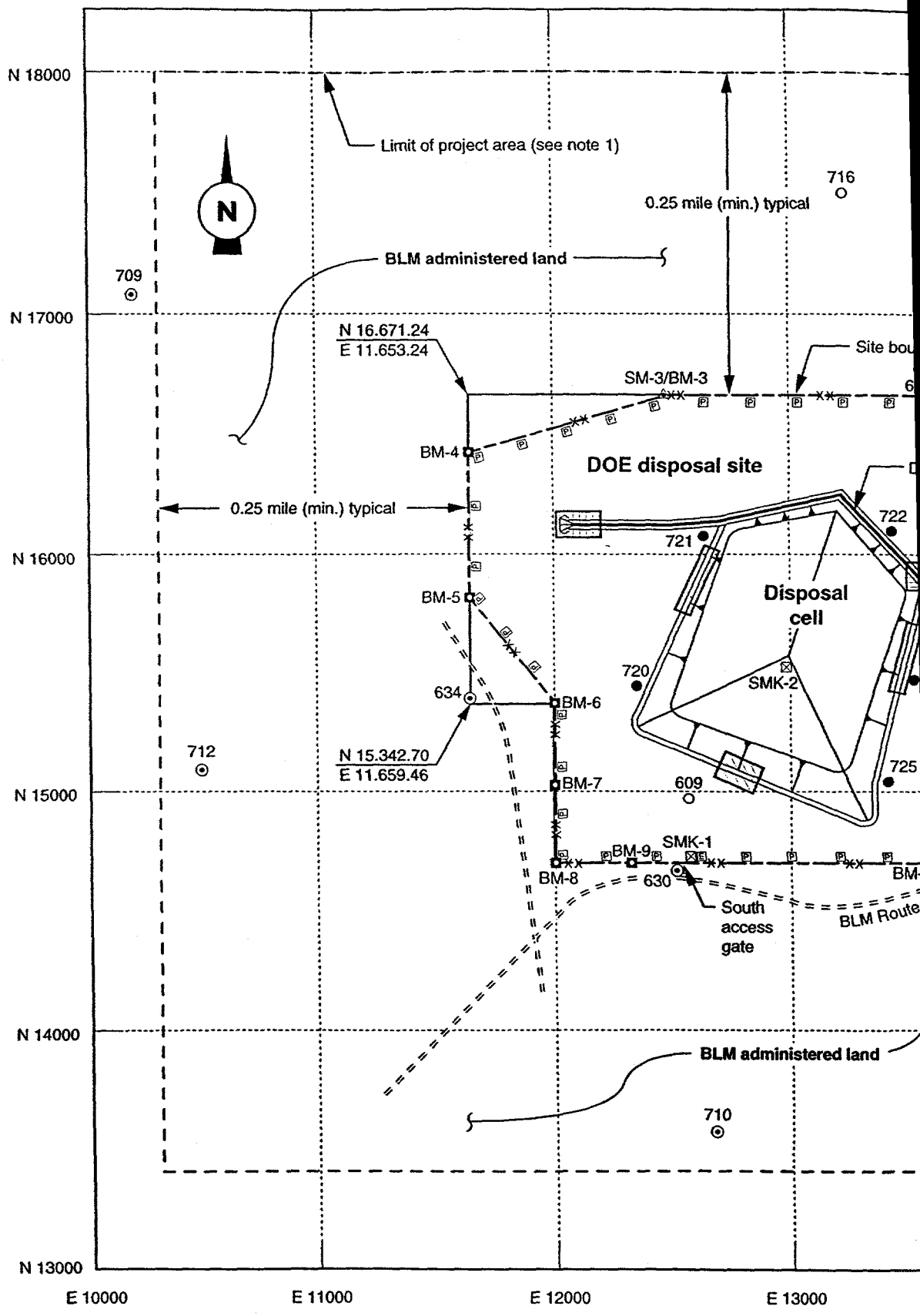
Bruce W. Presgrave

Bruce Presgrave
U.S. Geological Survey
National Earthquake Information Center
P.O. Box 25046
Mail Stop 967
Denver Federal Center
Denver, Colorado 80225

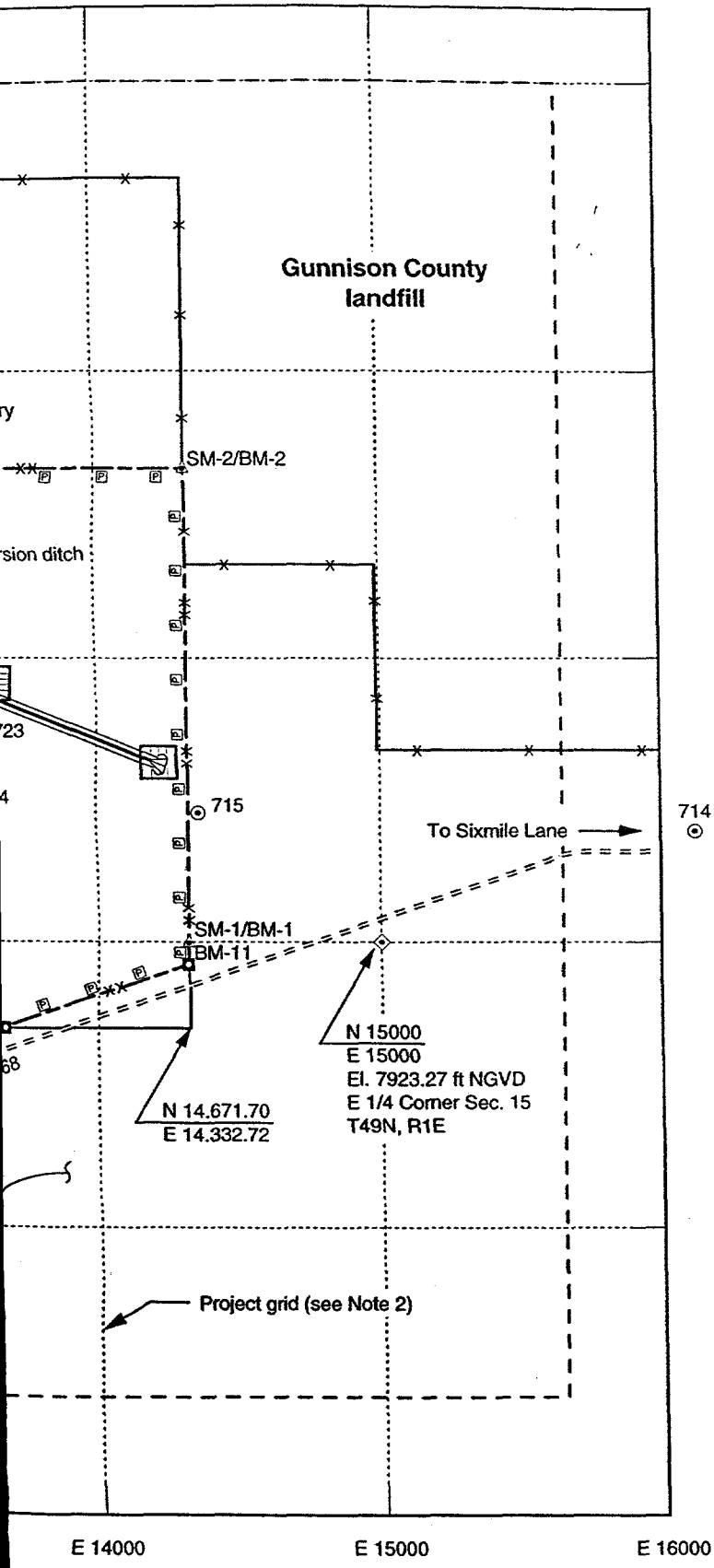
Please address future correspondence to Stuart Koyanagi at the above address. I have moved to a different project.

Thank you + best regards,

Bruce Presgrave



MAC: SITE/GUN/LTSP/BASELINE2



Modified from MK-F, 1996.

Legend

- Project survey control point (brass cap)
- SM-1/BM-1 — Permanent survey/boundary monument
- BM-2 — Permanent boundary monument
- SMK-1 — Site marker
- Perimeter sign
- Entrance sign
- Background monitor well
- Point-of-compliance monitor well
- Water level monitor well
- Critical riprap B location
- Critical riprap C location
- Critical riprap D location
- DOE site boundary
- Site boundary fence
- Landfill boundary fence
- Existing roadway

500 0 500 Feet

Note1: Project area covered by final aerial photography and topographic survey (about 0.25 mi. [0.40 km] beyond site boundary).

Note 2: Project grid coordinates in feet based on Colorado State Plane Coordinate System.

Plate 1
Baseline Map (GUN 08)
Gunnison, Colorado, Disposal Site