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Rev. 0

Environmental Assessment of Ground-Water Compliance at the Falls City, Texas, Uranium Mill Tailings Site

Final

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Prepared for
U.S. Department of Energy
Albuquerque Operations Office
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Note: Some of the section page numbers in the Table of Contents may not correspond to the page on which the section appears when viewing them in Adobe Acrobat.

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Acronyms and Abbreviations

CFR	U.S. Code of Federal Regulations
cm	centimeter
DOE	U.S. Department of Energy
EA	environmental assessment
EPA	U.S. Environmental Protection Agency
ft	foot
ha	hectare
km	kilometer
LTSM	long-term surveillance and maintenance
m	meter
mi	mile
NEPA	National Environmental Policy Act
NRC	U.S. Nuclear Regulatory Commission
PEIS	Programmatic Environmental Impact Statement
RRM	residual radioactive material
s	second
TDS	total dissolved solids
UMTRA	Uranium Mill Tailings Remedial Action (Project)
UMTRCA	Uranium Mill Tailings Radiation Control Act

1.0 Introduction

The U.S. Department of Energy (DOE) is in the process of selecting a ground-water compliance strategy for the Falls City, Texas, Uranium Mill Tailings Remedial Action (UMTRA) Project site (Figure 1). This environmental assessment (EA) discusses two alternatives and the effects associated with each. The compliance strategy must meet U.S. Environmental Protection Agency (EPA) ground-water standards defined in Subpart B of 40 CFR 192 in areas where ground water beneath the site is contaminated as a result of past milling operations. Contamination in the ground water consists of soluble residual radioactive material (RRM) as defined in the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA) (42 USC 4321 *et seq.*) and in the Programmatic Environmental Impact Statement for the UMTRA Ground Water Project (PEIS) (DOE 1996).

1.1 Falls City Site Location and Description

Section 3.2.17 of the PEIS provides a physical description of the Falls City site. Weather, climate, geology, surface water, flora and fauna, historical and cultural resources, socioeconomics, and transportation at the Falls City site are described in the *Final Environmental Assessment of Remedial Action at the Falls City Mill Tailings Site, Falls City, Texas* (Surface EA) (DOE 1991).

The Falls City site is in Karnes County, Texas, approximately 46 miles (mi) (74 kilometers [km]) south of San Antonio and 8.0 mi (13 km) southwest of Falls City (see Figure 1).

Before remediation, the Falls City site consisted of two parcels. Parcel A comprised 473 acres (191 hectares [ha]), including the former millsite and mill building, former tailings piles 1, 2, 4, 5, and 7, and former tailings pond 6 (see Figure 2). A fence enclosed all of Parcel A before remediation but now surrounds only the area of the disposal cell. For the purpose of this EA, the fenced area is considered the Falls City disposal site. Parcel B was a 120-acre (49-ha) area northeast of Parcel A in an area formerly occupied by tailings pile 3. Windblown contamination surrounded both parcels: 298 acres (121 ha) surrounded Parcel A and 80 acres (32 ha) surrounded Parcel B. The two parcels were approximately 1 mi (1.6 km) apart. Figure 2 shows the location of the disposal cell and the remediated tailing piles and ponds.

1.2 Background

UMTRCA authorized DOE to perform remedial action at 24 inactive uranium ore processing sites. The Falls City UMTRA site was one of the 24 sites identified for tailings remediation. DOE and the State of Texas (the State) entered into a cooperative agreement that established terms and conditions of remedial action at the Falls City site (DOE 1989).

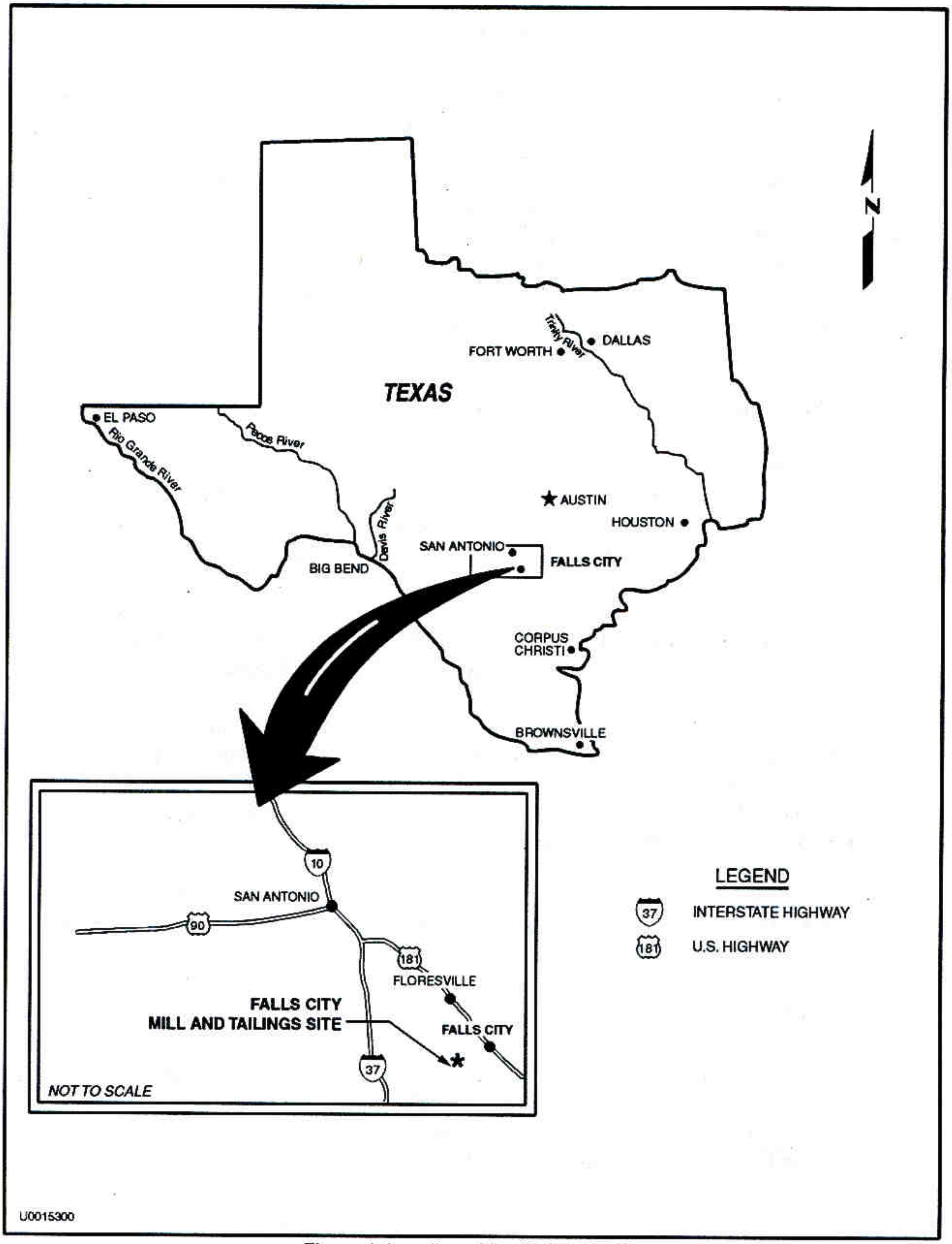

Figure 1. Location of the Falls City Site

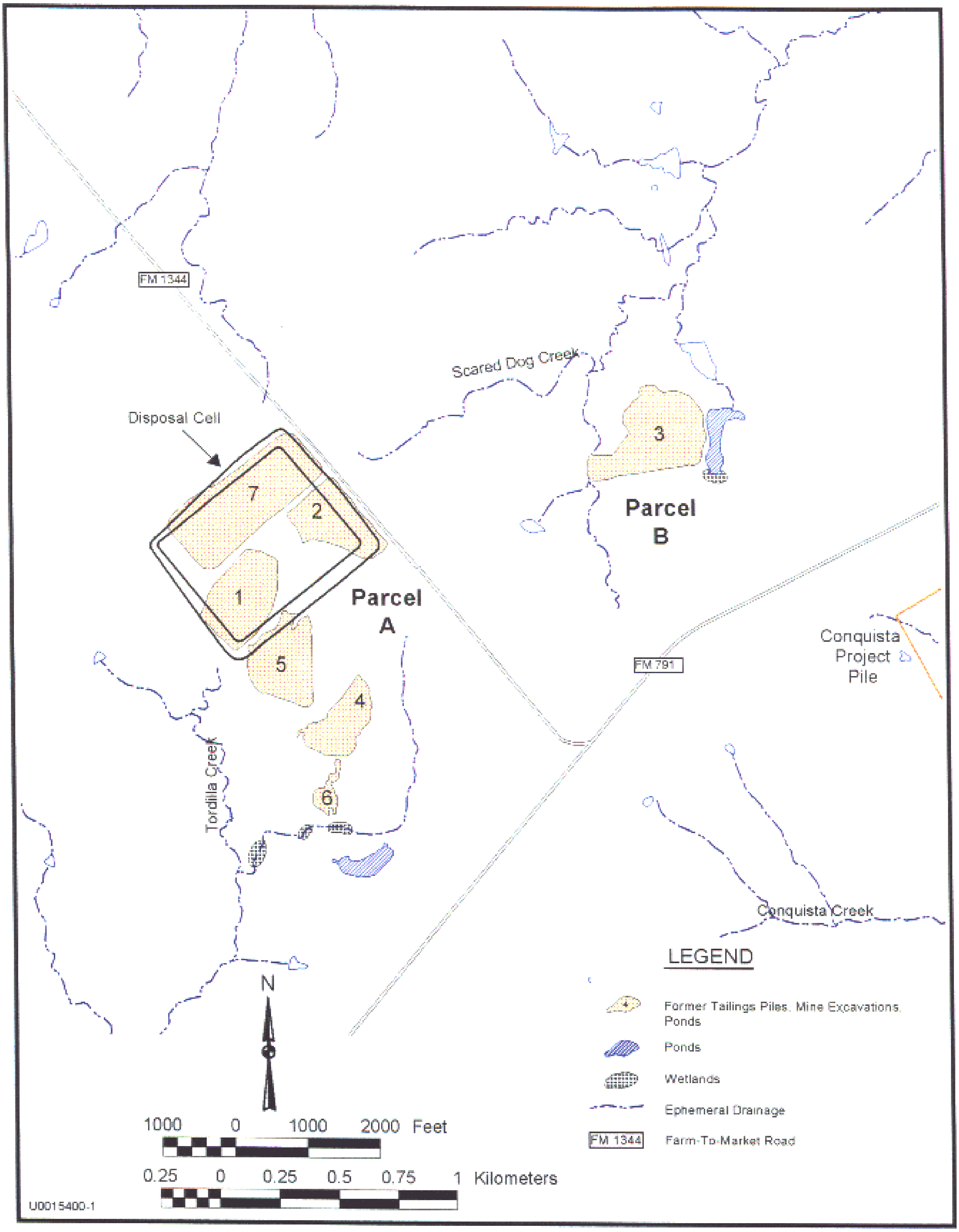

Figure 2. Falls City Site

In 1992, surface remediation of contaminated material (the UMTRA Surface Project) began at the Falls City site. Contaminated material from the site was placed in a disposal cell on site that was completed in June 1994. Environmental effects of the Surface Project were evaluated in the Surface EA (DOE 1991). The U.S. Nuclear Regulatory Commission (NRC) and the State concurred that DOE's remedial action plan would provide compliance with the ground-water protection standards in Subpart B of 40 CFR 192. Because final EPA ground-water standards were not established, remedial action was designed to comply with EPA's proposed ground-water standards that were published in 1987. To protect ground-water quality and to comply with the proposed ground-water standards, DOE proposed the use of supplemental standards for the Falls City site. The NRC and the State approved the proposal and concurred that ground water in the uppermost aquifer beneath the Falls City site is Class III "limited-use ground water"[1] and concurred also with DOE's ground-water protection strategy for the Surface Project (DOE 1995).

DOE's UMTRA Ground Water Project was established in 1991 to further evaluate all UMTRA sites for compliance with the final ground-water standards. The purpose of the UMTRA Ground Water Project is to protect human health and the environment and to meet EPA's final ground-water standards in areas where surface contamination has been cleaned up, but ground water is contaminated with soluble RRM as a result of historical processing of uranium ore. In 1995, EPA published the final ground-water standards for the UMTRA Project.

The PEIS (DOE 1996) was prepared by DOE for the UMTRA Ground Water Project. A Record of Decision was issued in April 1997 in which DOE selected the Proposed Action alternative for conducting the UMTRA Ground Water Project. Under the Proposed Action alternative, DOE has the option of implementing active remediation, natural flushing, no ground-water remediation, or any combination of the three strategies (see Table 1).

These options, identified as "strategies" in the PEIS, provide the alternatives for this site-specific EA. The issues discussed and the environmental impacts analyzed in this EA are tiered to the PEIS. Section 1.3.1 of the PEIS discusses the process of tiering and the actions that are required in each site-specific National Environmental Policy Act (NEPA) document. DOE used a consistent, risk-based framework established in the Proposed Action alternative of the PEIS to identify the specific strategy for the Falls City site that would comply with EPA ground-water standards and ensure protection of public health and the environment (see Figure 3). Using the step-by-step approach from the PEIS, the decision process led DOE to the No Ground-Water Remediation strategy (see Box 7, Figure 3) as the selected compliance strategy at the Falls City site. No Ground-Water Remediation means that a site would qualify for the application of supplemental standards or alternate concentration limits, or that contaminant concentrations at the site are at or below maximum concentration limits or background levels. The decision to conduct this strategy is further supported by the Surface EA (DOE 1991), the Baseline Risk

[1] 40 CFR 192.11(e) defines limited-use ground water as "groundwater that is not a current or potential source of drinking water because...widespread, ambient contamination not due to activities involving residual radioactive materials from a designated processing site exists that cannot be cleaned up using treatment methods reasonably employed in public water systems..."

Assessment (DOE 1995), and the Site Observational Work Plan (DOE 1997).

Table 1. Ground-Water Compliance Strategies Allowed by the Proposed Action of the PEIS

Strategy	Alternative			
	Proposed Action	**No Action[a]**	**Active Remediation to Background Levels [b]**	**Passive Remediation**
Active ground-water remediation methods	T		T	
Natural flushing[c]	T			T
No ground-water remediation				
• Sites that qualify for supplemental standards[d] or alternate concentration limits[e]	T			T
• Sites where ground-water contaminant concentrations are at or less than maximum concentration limits or background levels (no impacts) [f]	T			T

[a]Analysis of the No-Action alternative is required by the Council on Environmental Quality and DOE.
[b]Active remediation methods would not be used at sites where contaminant concentrations do not exceed background and probably would not be used at sites that qualify for supplemental standards because of the presence of limited-use ground water.
[c]Natural flushing allows the natural ground-water movement and geochemical processes to decrease contaminant concentrations.
[d]Supplemental standards are applicable for certain site conditions, as identified in the EPA standards, that are protective of human health and the environment and may be applied in lieu of prescriptive levels.
[e]Alternate concentration limits are established for contaminants whose concentrations may be allowed to exceed the maximum concentration limits and for contaminants that have no established maximum concentration limits. If DOE demonstrates, and NRC concurs that human health and the environment would not be adversely affected, DOE may use an alternate concentration limit.
[f]?No remediation” at sites where contaminant concentrations do not exceed maximum concentration limits or background levels is not the same as “no action” because the “no-action” sites would require activities such as site characterization to show that no remediation is warranted.

2.0 Need for DOE Compliance Action

DOE is required by UMTRCA to comply with EPA standards for the ground water beneath and near the Falls City site that is contaminated as a result of historical processing of uranium ore. Ground-water compliance strategies applicable to the Falls City site are designed to achieve conditions that are protective of human health and the environment and that meet EPA's ground-water standards.

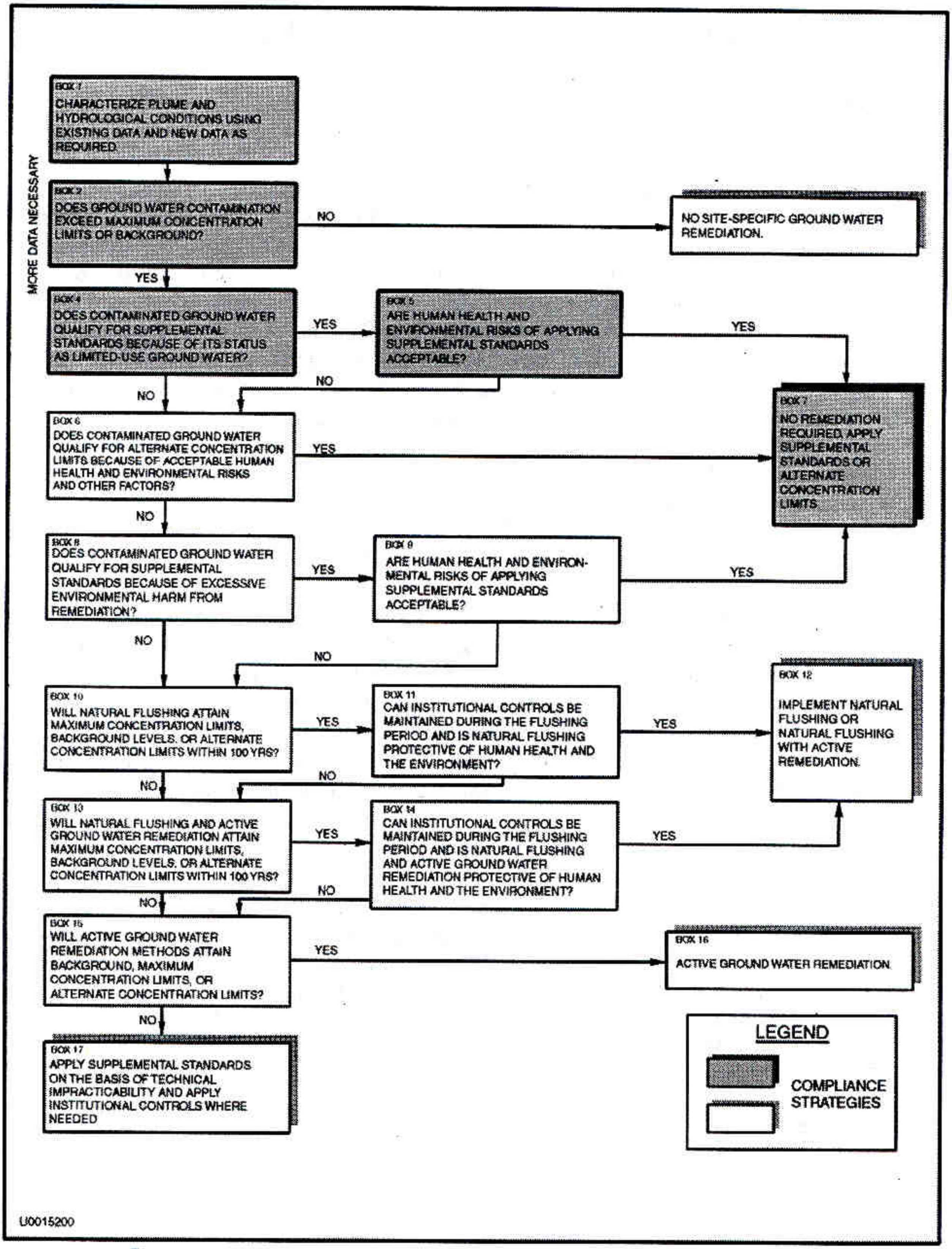

Figure 3. Risk-Based Framework Established by Proposed Action of the PEIS

3.0 Proposed Action and No-Action Alternatives

3.1 Proposed Action Alternative

On the basis of the decision process (Figure 3), DOE would adopt the No Ground-Water Remediation strategy as its proposed action at the Falls City site and would apply supplemental standards. Because of its status as “limited use,” ground water beneath and near the site meets the criteria for applying EPA supplemental standards described in 40 CFR 192.21(g). The application of supplemental standards means that no remediation strategies (such as active remediation or natural flushing) would be implemented, and contaminated ground water would be left in place. However, ground-water sampling would continue at selected DOE monitoring wells near the site to ensure protection of potential beneficial uses of the uppermost aquifer. Three wells (886, 924, and 963) were selected for monitoring in the Deweesville/Conquista aquifer, and two wells (891 and 862) were selected for monitoring in the Dilworth aquifer (see Figures 4 and 5). Well 862 was selected to verify that the Dilworth aquifer is not being contaminated. The remaining four wells would be monitored to track changes in ground-water pH and contaminant concentrations over time (see Section 4.2.2). Sampling would be conducted annually for 5 years until the year 2003. Surface-water samples would be collected from Tordilla Creek if water is present during scheduled sampling activities. Molybdenum would be included as an analyte.

Sampling is also being conducted under the Long-Term Surveillance and Maintenance (LTSM) program to ensure disposal cell effectiveness. Although the LTSM program does not require ground water to be monitored, a ground-water monitoring program was implemented to address concerns expressed by the State about documentation of disposal-cell effectiveness. Other activities conducted under the LTSM program include semiannual inspections, sampling of selected wells, surveys and maintenance of the cell, and maintenance of institutional controls (e.g., fences, signs, site markers, and boundary monuments). Samples are collected from seven wells (709, 858, 880, 906, 908, 916, and 921; see Figure 4) that are currently monitored at the disposal site. Wells 908 and 916 are typically dry but are sampled if water is present.

With the exception of some of the “clean” wells, DOE monitoring wells that are not selected for sampling would be decommissioned. DOE would explore the option of making available to the public the wells that are not currently or expected to be in the plume of mill-related contaminants. Analytical results of ground-water monitoring under the Proposed Action alternative would be distributed to local libraries so that the public would be kept informed of any changes in ground-water contaminant concentrations.

At the end of the 5-year monitoring period, DOE would consult with the State and the public to determine if continued monitoring is required.

3.2 No-Action Alternative

The *U.S. Code of Federal Regulations*, Title 10, Part 1021, "National Environmental Policy Act Implementing Procedures," paragraph 321, "Requirements for environmental assessments," directs that DOE consider the No Action alternative even though it was eliminated from further analysis in the PEIS. Under the No Action alternative, no further activities would be carried out to comply with EPA ground-water standards (DOE 1996 and Record of Decision). Contaminated ground water would be left in place. DOE would cease collecting data to characterize ground water, and contaminated ground water would not be monitored. Essentially, DOE would not perform additional administrative or remedial activities such as monitoring at the site under the UMTRA Ground Water Project. Required activities at the designated disposal site would continue under the LTSM program, but ground-water monitoring would be limited to the area of the disposal cell and would exclude monitoring of contaminated ground water identified farther from the disposal cell.

4.0 Affected Environment and Environmental Consequences

This section describes the environmental effects that may result from each alternative. Section 4.1 lists the environmental effects that were considered but were not likely to occur and lists those effects that were considered to be potential environmental issues.

4.1 Environmental Issues

Table 2 lists the potential environmental issues considered in this EA and the section in which the issues are discussed. Threatened and endangered species, floodplains, air quality, visual resources, transportation, and socioeconomics do not apply to the Proposed Action and No Action alternatives and are not discussed further. The remainder of Section 4.0 is a discussion of the potential issues that may be affected by the two alternatives.

Table 2. Potential Environmental Issues

Potential Issue	Section
Ground Water	4.2
Surface Water	4.3
Water and Land Use	4.4
Human Health	4.5
Ecological Resources	4.6
Historical and Cultural Resources	4.7
Environmental Justice	4.8
Wetlands	4.9

4.2 Ground Water

The Baseline Risk Assessment (DOE 1995), the final Site Observational Work Plan (DOE 1997), and the Remedial Action Plan (DOE 1992) describe the ground-water conditions at the Falls City site. Assessments of the nature and extent of the contaminants, contaminant release mechanisms, potential risks to human health and the environment, and the interaction of site-related contaminants with the local environment are based on descriptions in those documents. The documents are available at the Karnes County Public Library in Falls City and also from the DOE Public Affairs office in Grand Junction, Colorado, telephone (800)399**S**5618.

4.2.1 Hydrogeologic Setting

A detailed discussion of the hydrogeologic setting, a geologic map (Plate 1), and a cross-section (Plate 2) of the Falls City site are provided in the Site Observational Work Plan (DOE 1997).

Three low-yield water-bearing strata (generally less than 1 gallon [4 liters] per minute) are within the upper 200 ft (60 m) of the Whitsett Formation sediments that underlie the site. These water-bearing strata, in descending order, are the Deweesville Sandstone Member, the Conquista Clay Member, and the Dilworth Sandstone Member. The Conquista Clay Member is composed of three subunits: the upper Conquista Clay/silt, the middle Conquista Sandstone, and a lower Conquista Clay. The Deweesville Sandstone Member and the upper and middle subunits of the Conquista Clay Member are grouped together as the Deweesville/Conquista aquifer because no continuous impermeable strata separate the members, and no restrictions in ground-water movement are apparent between the two members. The Dilworth Sandstone Member is considered a second aquifer underlying the site. The Dilworth aquifer is separated from the Deweesville/Conquista aquifer by 30 to 50 ft (9 to 15 m) of carbonaceous clay of the lower Conquista Clay Member that acts as an aquitard to downward seepage (DOE 1997).

Commercial uranium exploration in the area during the 1950s and 1960s resulted in a number of improperly abandoned exploration boreholes that created a potential hydraulic connection between the Deweesville/Conquista aquifer and the Dilworth aquifer. Consequently, the Dilworth Sandstone Member is included as part of the uppermost aquifer.

Deweesville/Conquista Aquifer: Depths to the water table in the Deweesville/Conquista aquifer range from 5 to 30 ft (2 to 9 m) below land surface. The aquifer is recharged by precipitation infiltrating into Deweesville/Conquista outcrops, from past seepage of tailings fluids, and from downdip interformation leakage. Ground-water levels in the area of the former tailings piles have risen since initial mining. Before milling and tailings-disposal activities, little water was present in the Deweesville/Conquista aquifer in the area from the tailings area to the tributary of Tordilla Creek (Bureau of Economic Geology 1992). During uranium milling operations in the 1960s, processing solutions and volumes of tailings pore water were introduced into the Deweesville/Conquista aquifer. Ground-water flow is predominantly southeast with a maximum horizontal hydraulic conductivity of 2.6 ft/day (9.0×10^{-4} centimeters per second [cm/s]). The average hydraulic gradient is 0.013 to the east-southeast, and the maximum linear ground-water velocity is 130 ft (40 m) per year (DOE 1997).

Dilworth Aquifer: Depth to ground water in the Dilworth aquifer is about 100 ft (30 m) below land level at the disposal cell. Downdip to the southeast, ground water becomes confined by the overlying lower Conquista Clay. The aquifer is recharged at the outcrop north of the site. In general, ground water flows along the geologic strike in the recharge area. Average linear ground-water velocities in the Dilworth aquifer were calculated using a hydraulic conductivity of 0.68 ft/day (2.4×10^{-4} cm/s), a hydraulic gradient of 0.009 to the east-southeast, and an assumed effective porosity of 0.1 for the fine sands of this zone (DOE 1997). The average linear velocity for ground-water flow in the Dilworth aquifer is approximately 22 ft (6.7 m) per year (DOE 1997).

4.2.2 Ground-Water Quality

The background quality of ground water in the Deweesville/Conquista and Dilworth units is defined as the quality of ground water that would be present if uranium ore had not been processed at the site. Elevated concentrations of uranium ore constituents occur naturally throughout the units and were present in the ground water before uranium processing began at the site. As a result, the uppermost aquifer is limited-use ground water as defined in 40 CFR 192.11(e). The background quality of ground water was determined by assessing regional ground-water conditions within the uppermost aquifer and conditions in downgradient monitoring wells that were not affected by uranium processing (DOE 1997).

Contamination near the Falls City site is in ground water of the uppermost aquifer. The Deweesville/Conquista aquifer contains two contaminant plumes (see Figure 4), and the Dilworth aquifer contains one (see Figure 5). “Marker” contaminants are sulfate, manganese, and uranium in the Deweesville/Conquista aquifer and iron, sulfate, and uranium in the Dilworth aquifer. The extent of ground-water contamination that resulted from uranium processing was determined by evaluating ground-water pH and other indicator chemistry. Low ground-water pH (less than 4.75 to 5.0) is an indication of process-related contamination. Because the contaminant source (i.e., the tailings) was removed during site cleanup, no further degradation of ground-water quality should occur.

Elevated concentrations of cadmium, molybdenum, selenium, and uranium occur naturally in the uppermost aquifer and render the water untreatable by methods used in public water-treatment systems of the region. Elevated concentrations of arsenic, cadmium, molybdenum, radium, selenium, and uranium are associated with naturally occurring oxidized ore deposits and open pit mining near the site. Hazardous constituents in ground water that are derived from uranium milling operations at the Falls City site include the constituents listed above that are present in concentrations that exceed background and are above EPA’s maximum concentration limits.

Proposed Action

The Proposed Action would have little or no effect on ground-water quality in the uppermost aquifer because the ground water is already of poor quality as a result of naturally occurring minerals. The ground water meets the definition of limited-use ground water.

Contaminants migrating downgradient from their present locations (Figures 4 and 5) would be detected in samples collected from monitoring wells. With time, soluble contaminants in the uppermost aquifer should disperse and dilute because (1) the disposal cell now limits further contaminant seepage, and (2) natural geochemical processes (e.g., adsorption and precipitation) will attenuate contaminant concentrations.

No Action

The No Action alternative would also have little or no effect on ground-water quality in the uppermost aquifer because the ground water is naturally of poor quality. However, because no ground-water monitoring program would be in place, any future contaminant migration would be undetected.

4.3 Surface Water

Figure 6 shows the regional surface-water drainage around the site. Runoff from the northern portion of former Parcel A flows northward to the San Antonio River via an unnamed ephemeral stream. Runoff from the former tailings pile 3 area (Parcel B) flows into Scared Dog Creek, an ephemeral stream that flows northeast into the San Antonio River. Runoff from the southern portion of Parcel A flows southward into Tordilla Creek and ultimately into the Nueces River via Borrego Creek, the Atascosa River, and the Frio River (DOE 1991). These rivers have not been affected by the former milling operations.

Stock ponds are the only perennial surface water near the site; storm-water runoff creates ephemeral surface flows in Tordilla Creek. Limited sampling data indicate that concentrations of analytes in Tordilla Creek and in the stock ponds are within EPA primary drinking water standards. Concentrations of manganese and total dissolved solids (TDS) in surface water are below the concentrations detected in background ground water. Concentrations of TDS may increase through evaporation. The fact that concentrations of TDS and manganese in Tordilla Creek are below concentrations in background ground water indicates that surface-water quality is presently unaffected by the ground-water contaminants.

Proposed Action

As stated in the Surface EA (DOE 1991) and in the Baseline Risk Assessment (DOE 1995), the potential for discharge of contaminated ground water into surface-water bodies is unlikely.

No Action

The No Action alternative would exclude any further sampling, monitoring, and other activities except those implemented as part of LTSM. Although discharge of contaminated ground water into surface-water bodies is unlikely, if millsite-related ground-water contaminants were to intersect surface-water drainages and ponds, the contaminant concentrations would be within the range of background. It is likely that periodic storms would result in sheet runoff and high flows in the surface drainages and would dilute contaminant concentrations.

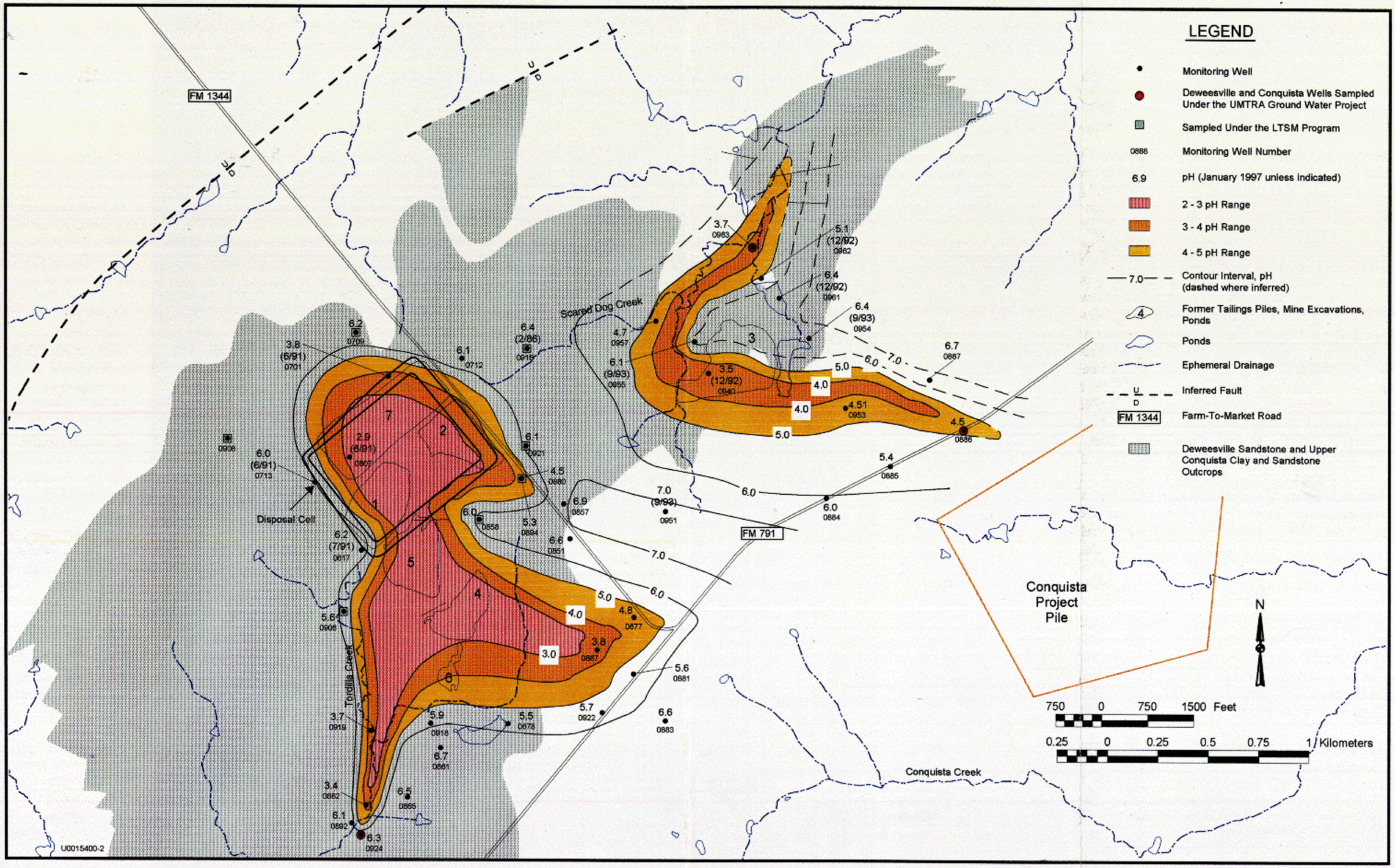

Figure 4. Deweesville/Conquista Aquifer Plumes

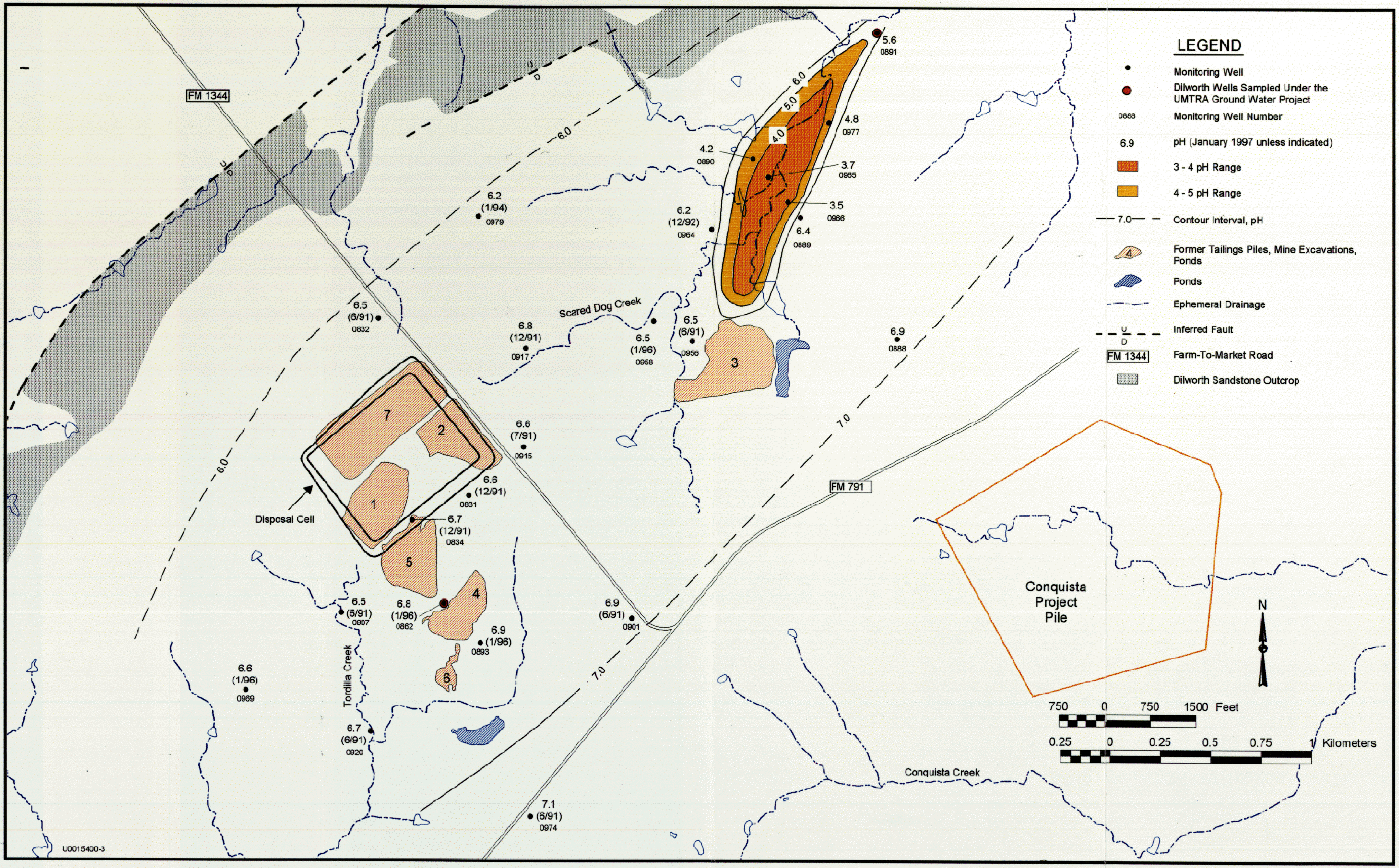

Figure 5. Dilworth Aquifer Plume

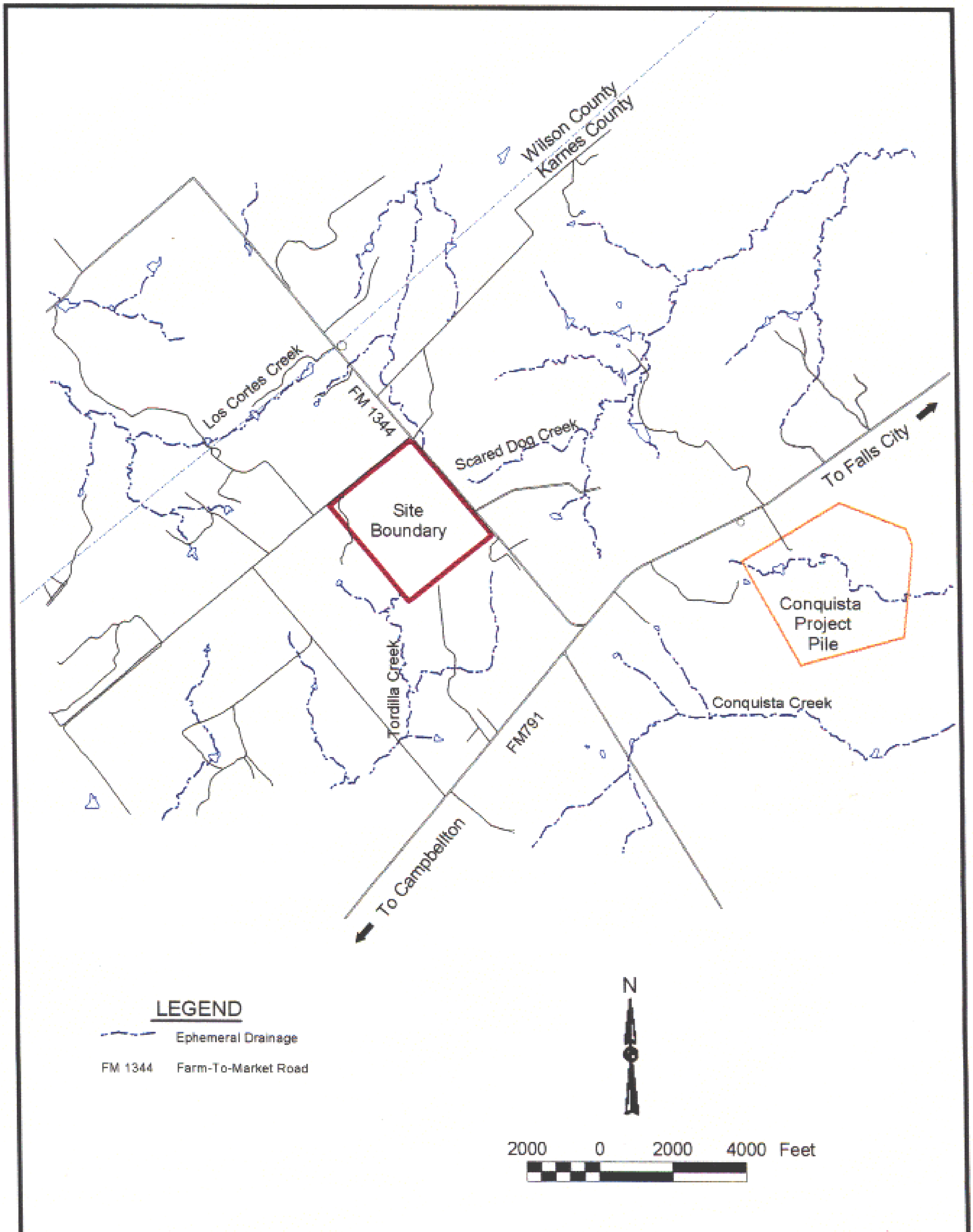

Figure 6. Regional Surface-Water Drainage

4.4 Water and Land Use

Water Use

Residents near the Falls City site use ground water from the deeper Carrizo aquifer for drinking water. The Carrizo aquifer is not affected by past mining and milling activities at the Falls City site (DOE 1997). The Deweesville/Conquista aquifer is not used for livestock, domestic, or drinking water (DOE 1995). The Dilworth aquifer is not used for drinking or domestic water supply within a 2-mi (3-km) radius of the Falls City site; evidence indicates that it is used occasionally for livestock near the Falls City site (DOE 1997).

Although livestock water is provided primarily in ponds and surface collection tanks, ranchers occasionally mix Dilworth water with municipal water for livestock. Eighteen privately owned wells are within the 2-mi (3-km) radius of the Falls City site. Nine wells appear to be in the Dilworth or Manning Formation, and four are in the deeper Yegua or Carrizo Formations. The completion zones of the remaining five could not be determined, but well depths range from about 65 ft (20 m) to about 405 ft (120 m). Eight of the eighteen wells are presently inactive because of corrosion of the well casing, broken pumps, or collapse of the borehole wells. None of the wells are within 2,000 ft (600 m) of the identified contaminant plume of the Dilworth aquifer.

Land Use

Most of the land in Karnes County is privately owned. Historical land use in the area has consisted of dryland grain farming and swine production. Cattle ranching provides most of the current agricultural income in Karnes County. Farms in Karnes County average 300 acres. Although population density is low in the Falls City area, several farms are within 1 mile (1.6 km) of the disposal site. Karnes County does not have a land-use plan or any land-use restrictions that are applicable to the Falls City site. However, the disposal cell area in former Parcel A does have institutional controls (e.g., fenced area with signs) that limit access and prevent the public or residents from using the land or ground water directly beneath it.

More recently, exploration and mining of uranium, oil, and gas have resulted in modified land-use patterns in the Falls City area. The area consists mainly of small farms, densely wooded areas, and low hills. The Falls City UMTRA site was previously part of a large dairy farm. Cattle are currently permitted to graze within portions of former Parcels A and B.

Proposed Action

The Proposed Action alternative would not disturb the land at the Falls City site and would not limit access to land above the contaminant plume outside the fenced area of the disposal cell, and thus would not affect current land use. No domestic wells are located in the contaminant plume of the Dilworth aquifer, and ground water from the plume is not used for irrigation or livestock.

Ground-water monitoring would continue, and if contaminants began to extend farther downgradient, local residents would be kept informed of the changes because analytical results of ground-water monitoring would be distributed to local libraries and to the State Department of Health. Some residents may seek alternative water supplies.

No Action

Under the No Action alternative, the land surface and ground water would not be disturbed, and land use would not be affected outside the fenced disposal cell area. Ground-water monitoring would therefore not continue and notice to residents of changes in the contaminant plumes would not be required.

4.5 Human Health

The UMTRA ground-water regulations were promulgated to protect human health and the environment. Determining how contaminated ground water affects human health requires an analysis of present and projected future uses of land and ground water and an assessment of the risks. Appendix B of the PEIS describes the methods used to assess the human-health risk at the Falls City site. A screening-level human-health risk analysis was performed on the basis of background water-quality data from the uppermost aquifer (Deweesville/Conquista aquifer and Dilworth aquifer). Because of the geochemical and hydrogeologic conditions of the ground water and the lack of exposure points and receptors, no complete exposure pathways were identified for current ground-water use (DOE 1995).

Proposed Action

Human health would be protected by the Proposed Action alternative. Ground water in the uppermost aquifer has not been used historically as a domestic or drinking water supply and no future use is anticipated. The generally poor quality of the ground water is due to naturally occurring dissolved metals and salts.

Water that meets drinking water standards is readily available from deeper aquifers that are not hydraulically connected to the Deweesville/Conquista and Dilworth aquifers. Therefore, the potential for human exposure to contaminated ground water and to the surface expression of this water at the Falls City site is highly remote. The nature and extent of contamination, contaminant release mechanisms, interaction of site-related contaminants with the environmental setting, and potential risks to human health were assessed in the Baseline Risk Assessment (DOE 1995) and the Site Observational Work Plan (DOE 1997).

No Action

Effects on human health under the No Action alternative would be similar to those under the Proposed Action alternative. No ground-water monitoring analytical results would be made available to the public.

4.6 Ecological Resources

The Falls City site is within the Mesquite-Granjeno woods plant community on the South Texas Plains. Five plant communities are described in Section 3.5 of the Surface EA (DOE 1991). No threatened or endangered species have been identified at the site. However, several species of birds and reptiles, one mammal, and one amphibian have been observed in areas surrounding the site.

Proposed Action

The Proposed Action alternative would not adversely affect plant and animal communities because the ground would not be disturbed. Contaminated ground water would not adversely affect ecological receptors because it does not surface near the site. Because of the limited opportunities for receptors to directly contact the contaminated ground water, adverse effects are not anticipated. Historically, the indigenous ecological receptors have survived despite naturally poor ground-water quality.

No Action

Implementation of the No Action alternative would also not result in adverse effects to wildlife or plant communities because the ground surface would not be disturbed.

4.7 Historical and Cultural Resources

Historical Resources

Settlers came to Karnes County relatively recently. Although major towns in the area date to the late 19th century, the first Mexican land grant was awarded in the mid 18th century.

The Panna Maria Historic District is the only site in the county on the National Register of Historic Places. This small community, less than 10 miles east of Falls City, consists mostly of 19th-century stone cottages similar to those of the builders' native Poland and has the distinction of being the oldest Polish community in the country (MESA 1982).

Cultural Resources

Evidence of early human activity indicates that the area was first inhabited about 12,000 years ago at the beginning of the Paleo-Indian Period. This period was followed by the Archaic Period 8,000 years ago. The majority of cultural resources in the Falls City region are from the Archaic Period. The Archaic Period was followed by the Neo-American Period, which began 1,250 years ago and continued until the 1600s when the Historical Period began.

A cultural resources record search was conducted by Minority Enterprise Service Associates and forwarded to the Texas State Historic Preservation Officer. The records search identified 10 prehistoric sites within a 5-mi (8-km) radius of the tailings site. These included one Paleo-Indian site, six lithic sites (including a Paleo-Indian quarry), and three lithic scatter sites (MESA 1982).

No cultural resource surveys were required at the tailings site, which is in areas where the ground has been disturbed by agriculture, mining, milling, and prospecting. This location is not expected to yield cultural resources (DOE 1991).

Proposed Action

The Proposed Action alternative would not affect historical or cultural resources because no surface disturbance would take place.

No Action

The No Action alternative would not affect historical or cultural resources because no surface disturbance would take place.

4.8 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* states that "... each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations...." A meeting open to the public and to interested stakeholders was held in Falls City on June 30, 1997, to discuss the Environmental Assessment and the Site Observational Work Plan. Notice of the meeting was published in local newspapers and through the mayor's office.

Proposed Action

The Proposed Action would not have adverse effects to ground water, surface water, land or water use, ecological resources, or wetlands. The application of supplemental standards would be protective of human health and the environment. Therefore, no disproportionately adverse effects to minority or low-income populations would be expected.

No Action

Under the No Action alternative, disproportionately high or adverse effects to minority or low-income populations would not occur.

4.9 Wetlands

Four wetlands areas near the Falls City site were identified in the Surface EA (DOE 1991). After remediation of the millsite, two areas remained (Figure 2). Approximately 1 acre (0.4 ha) of wetland is located at the southern edge of the stock pond east of former tailings pile 3, and approximately 3.3 acres (1.3 ha) of wetland is located along an ephemeral drainage south of the disposal cell.

Proposed Action

Wetland areas would not be affected by the Proposed Action alternative because the land surface would not be disturbed. The wetland areas shown on Figure 2 are topographic depressions that are recharged by surface runoff. As discussed in Section 4.3, surface water at the site appears to be unaffected by contaminated ground water in the uppermost aquifer.

No Action

Wetland areas would not be affected by the No Action alternative because the land surface would not be disturbed.

5.0 Persons and Agencies Consulted

Information included in this document was compiled from other sources, such as the Surface EA (DOE 1991) and the PEIS (DOE 1997). During preparation of those documents, several public meetings were held and notices were published in the *Federal Register*. Federal and State agencies were invited to participate in the public meetings. The public and stakeholders were routinely notified during development of the Baseline Risk Assessment and the Site Observational Work Plan. Analytical results from ground-water sampling are routinely mailed to landowners and stakeholders. Copies of all site-related documents are available at the Karnes County library in Falls City, and a toll-free number was established for anyone who needed additional information. Audrey Berry of the DOE Public Affairs office in Grand Junction, Colorado, can be contacted at (800)399**S**5618 for more information or copies of documents and data prepared for the Falls City site.

6.0 References

10 CFR 1021. “National Environmental Policy Act Implementing Procedures,” *U.S. Code of Federal Regulations*, January 1, 1997.

40 CFR 192. “Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings,” *U.S. Code of Federal Regulations*, July 1, 1996.

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———, 1996. *Final Programmatic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project*, DOE/EIS–0198, prepared by the U.S. Department of Energy, UMTRA Project Office, Albuquerque Operations Office, Albuquerque, New Mexico, October.

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Appendix A. Glossary

Alternate concentration limits—Concentrations of constituents that may exceed the maximum concentration limits; or, limits for those constituents without maximum concentration limits. If DOE demonstrates, and NRC concurs, that human health and the environment would not be adversely affected, DOE may meet an alternate concentration limit.

Limited-use ground water is defined in 40 CFR 192.11(e) as "groundwater that is not a current or potential source of drinking water because...widespread, ambient contamination not due to activities involving residual radioactive materials from a designated processing site exists that cannot be cleaned up using treatment methods reasonably employed in public water systems...."

Long-Term Surveillance and Maintenance (LTSM) program—A program created to ensure that the mill tailings disposal cell continues to perform as designed. Components of the program include annual inspections, sampling of selected wells, surveys and maintenance of the cell, and maintenance of institutional controls (e.g., fences, signs, site markers, and boundary monuments).

Maximum concentration limit—EPA's maximum concentration of certain constituents for ground-water protection. Constituents with maximum concentration limits that may be present in the ground water at the Falls City site are arsenic, cadmium, chromium, lead, mercury, molybdenum, net gross alpha, nitrate, radium, selenium, and uranium.

National Environmental Policy Act of 1969 (and subsequent amendments)—A national policy for promoting efforts to prevent or eliminate damage to the environment. This act requires Federal agencies to prepare a detailed statement that identifies and analyzes the environmental effects of a proposed action that may significantly affect the quality of the human environment. Regulations in NEPA also require that each Federal agency develop its own implementing procedures. The DOE implementing requirements for compliance with NEPA are in 10 CFR Part 1021.

Residual radioactive material (RRM)—Uranium mill tailings that DOE determines to be radioactive and that have resulted from the processing of uranium ore and other waste at a processing site that DOE determines to be radioactive and that relates to such processing. EPA has interpreted this to include sludges and captured contaminated water from processing sites.

Supplemental Standards—Regulatory standards that are protective of human health and the environment that may be applied when the concentrations of certain constituents exceed the standards.

UMTRA Surface Project—A program established by DOE under the direction of UMTRCA to stabilize, dispose of, and control, in a safe and environmentally sound manner, uranium mill tailings (including abandoned mill buildings) at the designated inactive uranium millsites.