DOE/EA-1338

FINAL

Environmental Assessment for the Transfer of the Department of Energy Grand Junction Office to Non-DOE Ownership

April 2000

U.S. Department of Energy • Grand Junction Office • 2597 B ¾ Road • Grand Junction, CO 81503

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Abbreviations and Acronyms

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act*
CFR	Code of Federal Regulations
CO	Colorado
DOE	U.S. Department of Energy
DOE-GJO	Department of Energy, Grand Junction Office
EA	environmental assessment
EPA	U.S. Environmental Protection Agency
GJO	Grand Junction Office
GJPO	Grand Junction Projects Office
GJPORAP	Grand Junction Projects Office Remedial Action Project
NEPA	*National Environmental Policy Act*
OSHA	Occupational Safety and Health Administration
PCBs	polychlorinated biphenyls
RCRA	*Resource Conservation and Recovery Act*
USC	United States Code
UMTRA	Uranium Mill Tailings Remedial Action

Definitions

Curie: A unit of activity of a radionuclide. A curie is equal to 3.7 x 10^{10} disintegrations (i.e., nuclear transformations) per second. (DOE Order 5400.5, Radiation Protection of the Public and Environment)

Decommissioning: Actions taken to reduce the potential health and safety impacts of inactivated DOE contaminated facilities, including activities to stabilize, reduce, or remove radioactive materials or to demolish the facilities. (DOE Order 430.1, Life Cycle Asset Management)

Decontamination: The removal of radioactive contamination from facilities, equipment, or soils by washing, heating, chemical or electrochemical action, mechanical cleaning, or other techniques. (DOE Order 430.1, Life Cycle Asset Management)

Hazardous waste: Those wastes that are listed by EPA in 40 CFR Part 261, Subpart D; exhibit any of the four hazardous waste characteristics (ignitability, corrosivity, reactivity, or toxicity) identified in 40 CFR Part 261, Subpart C; or are a mixture of non-hazardous and hazardous wastes. Listed wastes are divided into three groups according to their origin: nonspecific sources (e.g., spent solvents such as toluene), specific sources (e.g., bottom sediments from the treatment of waste waters from wood preserving), and discarded commercial chemical products, all off-specification species, containers, and spill residues thereof. The Federal statute concerning hazardous wastes is the *Resource Conservation and Recovery Act* (RCRA) (Title 42 U. S. Code [USC] 6901 et seq.). In Colorado, hazardous wastes are also defined by the Colorado Hazardous Waste Regulations at Part 6 Colorado Code of Regulations Sections 1007-3.

High-level waste: The highly radioactive waste material that results from the reprocessing of spent nuclear fuel, including liquid waste, produced directly in reprocessing and any solid waste derived from the liquid, that contains a combination of transuranic waste and fission products in concentrations requiring permanent isolation. (*Nuclear Waste Policy Act* of 1982 [42 USC 10101, et seq.]) and DOE Order 435.1, Radioactive Waste Management)

Institutional Controls: Restrictions on use of land or natural resources. Some examples of implementation methods are by deed restrictions, restrictive covenants, access controls (e.g., fencing), posting of notices, and information distribution. (Adapted from U.S. EPA guidance)

Low-level waste: Waste that contains radioactivity and is not classified as high-level waste, transuranic waste, spent nuclear fuel, or uranium mill tailings (UMT) waste. (*Nuclear Waste Policy Act* of 1982 [Title 42 USC 10101, et seq.] and DOE Order 435.1, Radioactive Waste Management)

Mixed waste: Waste containing both radioactive and hazardous components as defined by the RCRA (42 USC 6901 et seq.), as amended by the *Federal Facilities Compliance Act* (Public Law 102-386). Mixed waste can also include hazardous or radioactive waste containing asbestos or polychlorinated biphenyls (PCBs) which are regulated under the *Toxic Substances Control Act* (15 USC 2601 et seq.).

Naturally occurring radioactive material: Naturally occurring materials not regulated under the RCRA (42 USC 2011 et seq.), as amended, whose composition, radionuclide concentrations, availability, or proximity to man have been increased by or as a result of human practices. Naturally occurring radioactive material does not include the natural radioactivity of rocks or soils, or background radiation. (DOE Order 435.1)

Non-hazardous solid waste: Waste that is not subject to stringent storage, treatment, or disposal requirements and that can be disposed of in a municipal landfill or other *Resource Conservation and Recovery Act* (42 USC 6901 et seq.) Subtitle D facility.

Radiological contamination: Contamination of property, material, or equipment by radionuclides at levels above those specified in DOE Order 5400.5, Radiation Protection of the Public and the Environment, Table IV-1.

Regulated waste: Waste that is deemed to be hazardous, radioactive, mixed, or toxic under the RCRA (42 USC 6901 et seq.), *Atomic Energy Act* (42 USC 2011 et seq.), and *Toxic Substances Control Act* (15 USC 2601 et seq.). These wastes are subject to stringent storage, treatment, and disposal regulations.

Release: The exercising of DOE's authority to release property from its control after confirming that residual radioactive material has been determined to meet the guidelines for residual radioactive material in accordance with DOE 5400.5, Radiation Protection of the Public and the Environment and other applicable radiological requirements. (Adapted from DOE Order 5400.5)

Release CERCLA: Any discharging, dumping, emitting, emptying, escaping, injecting, leaching, leaking, pouring, pumping, spilling of radioactive substances into the environment including abandoning any type of receptacle containing radioactive substances, but does not include disposal in a permitted disposal facility. (42 USC 9601 et seq.) (Adapted from DOE Order M435.1-1)

Release Survey: A radiological inspection conducted in order to verify that buildings are free of radiological hazards. The objective of the release survey is to demonstrate that radiological conditions in buildings satisfy DOE guidelines for unrestricted use upon completion of remediation. (Adapted from DOE Order 5400.5)

Residual radioactive material: Waste in the form of tailings resulting from the processing of ores and other waste related to such processing; these wastes are regulated under the *Uranium Mill Tailings Radiation Control Act* (42 USC 7901 et seq.). It also refers to any radioactive material which is in or on soil, air, equipment, or structures as a consequence of past activities or operations. (DOE Order 5400.5)

Spent nuclear fuel: Fuel that has been withdrawn from a nuclear reactor following irradiation, but that has not been reprocessed to remove its constituent elements. (DOE Order 435.1, Radioactive Waste Management)

Transuranic waste: Without regard to source or form, waste that is contaminated with alpha-emitting transuranium radionuclides with half-lives greater than 20 years and concentrations greater than 100 nanocuries per gram at the time of assay. Applies to isotopes with an atomic number greater than 90 (*Waste Isolation Pilot Plant Land Withdrawal Act* of 1992 [Public Law 102-579, Section 2], as amended).

Uranium mill tailings waste: Uranium mill tailings and associated wastes derived from the processing of ores and related activity and controlled by the Grand Junction Projects Office Remedial Action Project. UMT wastes are defined as such to maintain a distinction with residual radioactive material, which is defined under the *Uranium Mill Tailings Radiation Control Act* (42 USC 7901 et seq).

EXECUTIVE SUMMARY

Pursuant to the *National Environmental Policy Act* (NEPA) (Title 42 U.S. Code [USC] Section 4321 et seq.), the Department of Energy (DOE) has prepared this environmental assessment (EA) of the proposed transfer of real and personal property at the Grand Junction Office (GJO) to non-DOE ownership. The GJO consists of 24.7 hectares (61.7 acres) and approximately 35 structures. The DOE has determined that it no longer needs to own the facility to perform its ongoing missions. To reduce costs, DOE proposes to transfer real and personal property at the site to non-DOE ownership using its authority under Section 161(g) of the *Atomic Energy Act* (42 USC 2011 et seq.). In addition, DOE will conduct a Federal screening of the property to determine other agency interest following guidance found in the Federal Property Management Regulations (Title 41 Code of Federal Regulations [CFR] Part 101).

The property is composed of the following three tracts or land uses:

(1) 3.2 hectares (8 acres) Army Tract: This tract is currently under lease to the U.S. Army Reserve. It will be transferred in 2000 with no changes in use (e.g., administrative offices and combat construction vehicle maintenance). The U.S. Army Reserve has prepared a separate Environmental Baseline Survey for this project. The DOE will conduct a separate NEPA review of this agency-to-agency transfer.

(2) 10 hectares (24.7 acres) Open Space with Ponds and Wetlands: Approximately 40% of the site consists of ponds, wetlands, upland and riparian vegetation. Most of this area has previously been disturbed and currently remains as the only undeveloped area of the site. The current land use is considered to be Open Space/Recreational.

(3) 11.7 hectares (29 acres) Developed Area: This remaining portion of the site contains most of the buildings, pavement, and grassy areas. Due to the remediation efforts that have been ongoing at the site for the past ten years, most of the non-paved areas have been disturbed and back-filled. There are approximately 35 structures in this area, most of which date to the late 1940s or early 1950s. Approximately 3.2 hectares (8 acres) of the 11.7 hectares (29 acres) of space is currently leased to the Western Colorado Business Development Center's Small Business Incubator. The property does not include the 0.5 hectares (1.3 acres) of land currently leased by the DOE's facility operations and support contractor from the Union Pacific Railroad.

The Proposed Action is to transfer real and personal property at the GJO Site to a non-DOE entity. The DOE plans to complete the transfer by September 30, 2000, in one transaction. The DOE and its contractors plan to remain at the site as a tenant. At this time, the DOE intends to lease office space at the GJO until its existing contracts with its prime contractors end on September 30, 2001, or longer. Potential future users of the site could be other Federal agencies, state/local quasi-governmental agencies, or the private sector.

The transaction itself does not have the potential for causing impacts to the human environment. The DOE will not control future land uses at the site, and future uses may cause impacts to the human environment. In this EA, the DOE will address reasonably foreseeable land use scenarios and the environmental effects that may result from the transfer of the facility. The land use scenarios considered under the Proposed Action are: (1) Commercial; (2) Industrial (Gravel Pit) ; (3) Mixed Used; and (4) Open Space. The No Action Alternative is also evaluated. In this case, DOE would retain ownership of the site and continue its present day activities as the owner.

The EA addresses the following environmental resource areas: geology/soils/topography, groundwater/surface water, floodplains and wetlands, land use and infrastructure, human health, ecological resources, cultural resources, air quality, noise, visual resources, solid and hazardous waste management, transportation, and socioeconomics/environmental justice. As part of this analysis, the DOE has performed a floodplains and

wetlands assessment as required by 10 CFR Part 1022, *Compliance with Floodplain/Wetlands Environmental Review Requirements.* The GJO property lies within the 1000-year floodplain. In addition, two jurisdictional wetlands were created on the GJO Site in 1994. DOE has incorporated the results of the assessment in this EA.

Environmental consequences associated with most of the land use scenarios were found to be similar to those of the present day, No Action Alternative. A Memorandum of Agreement between the DOE and the State Historic Preservation Officer commits the DOE to providing the Historic American Engineering Record documentation for the potential historic district located on site. This would allow for building demolition to take place under all the land use scenarios, include clearing of the site under the Industrial and Open Space scenarios.

No impacts are anticipated in the geology and soils resource area, although the site topography would be altered under the gravel pit scenario. Upon completion of mining activities, the area would be left as a topographic depression that would fill with groundwater.

Excavation of the gravel layer, which lies below the water table, could increase the suspended solids load (i.e, turbidity) in the groundwater. Potential impacts to groundwater quality and also to the Gunnison River (because of the interconnection of the shallow aquifer with the river) during normal mine operations would be addressed during permitting of the mine by the Colorado Department of Public Health and Environment.

Environmental consequences associated with air quality and noise are expected to be minimal assuming dust suppression techniques are employed during demolition activities and gravel mining operations, and truck traffic is restricted to normal business hours. The Floodplains and Wetlands Assessment found that the proposed action would be consistent with Executive Orders 11988 (Floodplains Management) and 11990 (Protection of Wetlands) if the recipient of the property complies with applicable regulations before initiating wetland fills and fulfills mitigation responsibilities. The subject wetlands can be readily recreated through mitigation and certain offsite mitigation options could result in functionally superior wetlands.

Environmental impacts to land use and infrastructure would be minimal. The site would be considered industrial if subject to zoning. However, there is no assurance that the necessary permits or approvals could be obtained for certain types of industrial uses. Upgrades to the utility system may be necessary under the commercial and mixed use alternatives but this would not result in any environmental impacts.

Impacts to ecological resources would be minimal. Wetlands lack maturity and are likely to be easily replaced in more desirable locations upstream or downstream of the site. There would be no impacts to the dike that run adjacent to the Gunnison River and protect the site.

Volumes of hazardous materials and wastes generated and stored at the site would likely decrease under all the potential land uses. Large volumes of solid waste would be generated under two of the scenarios due to building demolition but demolition waste represents less than one-tenth of 1 percent of the capacity of the Mesa County Landfill.

Impacts to transportation are considered to be negligible under all alternatives. The industrial alternative would generate an increase in heavy truck volume but would have little effect on traffic volumes on local surface roads and state highways. Socioeconomic impacts are considered negligible as well. Any increases or decreases to population, employment, housing, or services are minor when compared to the entire Metropolitan Statistical Area which is the entire Mesa County. There would be no impacts to minority or low-income populations.

1.0 INTRODUCTION

The scope of this environmental assessment (EA) is to analyze the potential consequences of the Proposed Action on human health and the environment. Accordingly, this EA contains an introduction to the site and the history of the Grand Junction Office (Chapter One), a description of the Purpose and Need for Agency Action (Chapter Two), a description of the Proposed Action and Alternatives (Chapter Three), and the description of the Affected Environment and the Environmental Consequences (Chapter Four). Resource categories addressed in this EA include geology, soils and topography, groundwater and surface water, floodplains and wetlands, land use and infrastructure, human health, ecological resources, cultural resources, air quality, noise, visual resources, solid and hazardous waste management, transportation, and socioeconomics and environmental justice.

1.1 BACKGROUND

The U.S Department of Energy (DOE) Grand Junction Office (GJO) has prepared this EA to present the public with information on the potential impacts associated with transfer of real and personal property at the site to non-DOE ownership. DOE is required to assess the potential consequences of its activities on the human environment under the regulations of the *National Environmental Policy Act* (NEPA) (Title 42 U.S. Code [USC] 4321 et seq., codified at Title 40 Code of Federal Regulations [CFR] Parts 1500-1508). Currently, DOE's primary missions at the site are environmental restoration, environmental science, technology development, and long-term stewardship of inactive waste sites. The mission of the office has decreased over the past several years, and the DOE has determined that it no longer needs to own the GJO facility to perform its assigned missions. To lower its operating costs, the DOE intends to transfer the facility to non-DOE ownership in 2000. Non-DOE ownership could include other Federal entities, quasi-state/local government agencies, or the private sector.

The DOE completed a site-wide EA for the GJO in 1996, which resulted in a Finding of No Significant Impact (DOE 1996a). This EA considered the impacts due to ongoing operations and activities at the site, but did not consider transfer of the property to non-DOE ownership. As a result, the DOE has determined that a new EA must be prepared to consider the potential environmental consequences of a range of reasonably foreseeable future land use scenarios if the facility is transferred to non-DOE ownership.

If the impacts associated with the transfer of the property are identified as insignificant as a result of this EA, DOE shall issue a Finding of No Significant Impact and will authorize transfer of the property to a non-DOE entity. If impacts are identified as significant, an Environmental Impact Statement will be prepared.

As part of this analysis, the DOE has performed a floodplains and wetlands assessment as required by 10 CFR 1022, *Compliance with Floodplain/Wetlands Environmental Review Requirements.* The GJO property lies within the 1000-year floodplain. In addition, two jurisdictional wetlands were created on the GJO Site in 1994. DOE has incorporated the results of the assessment into this EA.

The GJO has developed the *"U.S. Department of Energy Grand Junction Office Site Transition Plan"* (DOE 1999b) which outlines the process that DOE will use to determine the best option for achieving cost savings, or mortgage reduction. This EA is part of that decision process and allows the DOE to consider the potential environmental consequences of its decisionmaking process. It is DOE policy to enable beneficial reuse of excess or underutilized property by making it available to other DOE programs, agencies, or communities. DOE recognizes the fact that transfer of entire parcels of land for local economic development purposes can also benefit the Federal Government by reducing or eliminating DOE's landlord costs and generating revenue from payroll taxes through job creation.

1.2 SITE DESCRIPTION AND HISTORY

The facility is located about 3 kilometers (2 miles) south of the main business district of the city of Grand Junction at an elevation of 1,390 meters (4,570 feet) above sea level (Figure 1.2-1). Situated on a bend of the Gunnison River, the facility is bounded on the north, south, and west by the Gunnison River. Bordering the east side of the facility is a 0.5 hectares (1.3 acres) tract of land leased from the Union Pacific Railroad and a city-owned cemetery (DOE 1996a).

The facility consists of 24.9 hectares (61.7 acres) of land and approximately 35 structures (Figure 1.2-2). The property is composed of the following three tracts or land uses:

(1) 3.2 hectares (8 acres) Army Tract: This tract is currently under lease to the U.S. Army Reserve. It will be transferred in late 2000 with no changes in use (e.g., administrative offices and combat construction vehicle maintenance). The U.S. Army Reserve has prepared a separate Environmental Baseline Survey for this project. The DOE will conduct a separate NEPA review of this agency-to-agency transfer.

(2) 10 hectares (24.7 acres) Open Space with Ponds and Wetlands: Approximately 40 percent of the site consists of ponds, wetlands, upland and riparian vegetation. Most of this area has previously been disturbed and currently remains as the only undeveloped area of the site. The current land use is considered to be Open Space/Recreational.

(3) 11.7 hectares (29 acres) Developed Area: This remaining portion of the site contains most of the buildings, pavement, and grassy areas. Due to the remediation efforts that have been ongoing at the site for the past ten years, most of the non-paved areas have been disturbed and back-filled. There are approximately 35 structures in this area, most of which date to the late 1940s or early 1950s. Approximately 3.2 hectare (8 acres) of the 11.7 hectares (29 acres) of space is currently leased to the Western Colorado Business Development Center's Small Business Incubator. The property does not include the 0.5 hectares (1.3 acres) of land currently leased by the DOE's facility operations and support contractor from the Union Pacific Railroad.

Formerly a gravel pit, the GJO facility lands were acquired by the U.S. War Department in August 1943 to procure uranium for the Manhattan Project. Under contract with the Federal Government, the U.S. Vanadium Corporation constructed and operated a refinery from 1943 to 1947 in which green sludges of uranium oxide were roasted and concentrated. A 20-percent uranium oxide sludge and a vanadium concentrate ("fused black flake") were produced in the refining process. Wastes from the refinery consisted of dust, several hundred tons of alumina cake, and liquid discharges.

In December 1947, the U.S. Atomic Energy Commission established the Colorado Raw Materials Office at the GJO facility to manage the domestic uranium exploration and procurement programs. Personnel at the office were responsible for the receipt, sampling, and analysis of uranium and vanadium concentrates purchased from ore-processing operations in the western United States. Between 1948 and 1971, a total of 157,500 metric tons (173,650 tons) of uranium oxide and 12,970 metric tons (14,300 tons) of vanadium oxide were received and stockpiled in steel drums at the facility. The last shipments of vanadium and uranium to the facility occurred in 1965 and 1975, respectively (DOE 1996a).

A pilot-plant program was initiated in 1953 with the construction of a small plant that was used for research into the development of a resin-in-pulp milling process. After 1954, the pilot-plant program was dedicated to amenability testing of uranium ores and to the development and testing of new uranium milling processes. A new larger pilot plant, consisting of two mill buildings, a crushing and sampling plant, office, laboratory, warehouse, and maintenance shop, was constructed in the south portion of the GJO facility. From 1954, until it was closed in

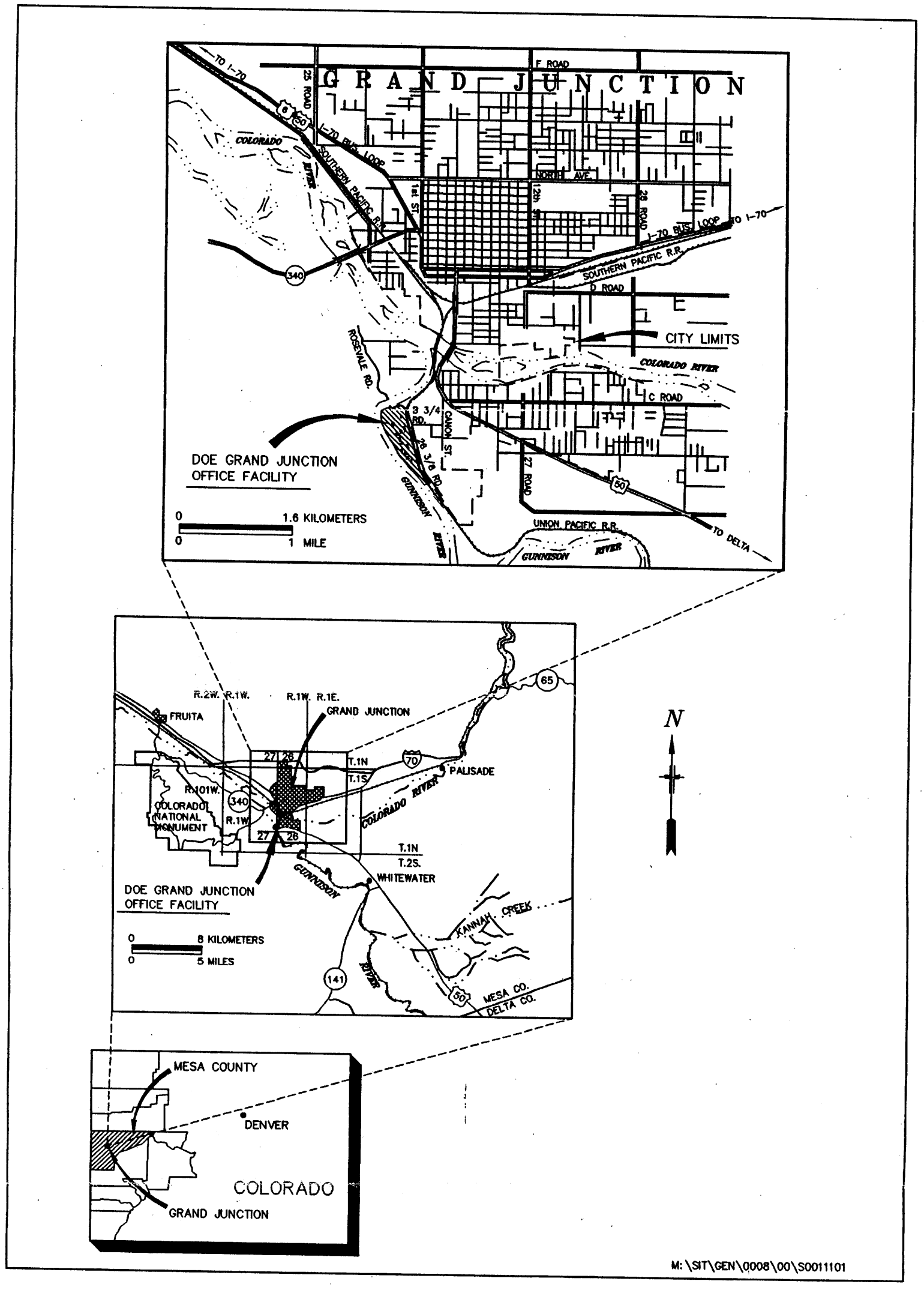

Figure 1.2-1. ***Location Map***

Figure 1.2-2. *Site Layout*

1958, the pilot plant operated three circuits on a 24-hour-a-day, 7-day-a-week basis. Uranium mill tailings from this plant, at first, were allowed to pond just west of what were once Buildings 31A and 33. A slurry line was later constructed to carry the tailings to a gravel pit located at the present-day site of the South Pond (DOE 1996a).

After the closure of the pilot plant in 1958, the GJO facility was used as a regional office for a variety of DOE programs directed toward uranium procurement, domestic uranium resource evaluation, and the advancement of geological and geophysical techniques. In recent years, the GJO has provided technical and administrative support personnel for various DOE, U.S. Department of Defense, and U.S. Environmental Protection Agency (EPA) programs, including laboratory and construction services that are required to support environmental restoration activities (DOE 1996a).

In the 1970s, the office conducted the National Uranium Resource Evaluation, a nationwide assessment of available uranium reserves. In the 1980s, the office mission shifted to environmental restoration and long-term surveillance and maintenance. As part of the Uranium Mill Tailings Remedial Action (UMTRA) Project, the cleanup of uranium mill tailings from over 4,000 properties in the Grand Junction area was managed at the GJO. In 1988, the Long Term Surveillance and Maintenance Program was assigned to GJO. The office was also assigned responsibility for the cleanup of the Monticello Millsite and Monticello Vicinity Properties *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) (42 USC 9601 et seq.) sites in Utah. The GJO also began cleanup of the GJO facility under a voluntary CERCLA cleanup. That effort continues to the present day. In 1996, GJO was assigned responsibility for the UMTRA Groundwater Program, which addresses groundwater contamination at 24 former uranium processing sites around the United States. In 1998, the GJO was assigned responsibility for the environmental restoration work at the former Pinellas Plant Site in Florida. GJO continues to manage the Uranium Lease Management Program, which administers uranium lease tracts in the western United States. GJO also performs Work-for-Others projects and technology development projects in the field of environmental restoration.

1.3 GRAND JUNCTION PROJECTS OFFICE REMEDIAL ACTION PROJECT

In 1984, site characterization and remedial action studies were initiated to assess the extent of radiological contamination on the facility from early GJO operations. The studies and subsequent cleanup were conducted under the Grand Junction Projects Office Remedial Action Project (GJPORAP). The studies showed that the site did not meet the criteria to be placed on the CERCLA National Priorities List. However, DOE decided to conduct a voluntary CERCLA cleanup. A Remedial Investigation/Feasibility Study-EA (DOE 1989) was prepared to determine clean-up strategies and to satisfy requirements of NEPA and the CERCLA of 1980 (42 USC 9601 et seq.). DOE issued a Finding of No Significant Impact for the cleanup in 1989, and the GJPORAP Record of Decision (DOE 1990a) was made final and approved by the DOE Idaho Operations Office in April 1990.

Removal of uranium mill tailings and associated radioactive materials (see Definitions section) began in 1989 and continues today. By July 1, 1994, all known exterior (i.e., open-land-area) uranium mill tailings waste had been removed from the facility and transported to the UMTRA Project Cheney Disposal Cell (DOE 1995a). This cell is located 18 miles southeast of Grand Junction and is designed to permanently contain residual radioactive materials. A description and analysis of the cell is in the *Final Environmental Impact Statement, Remedial Actions at the Former Climax Uranium Company Uranium Mill Site, Grand Junction, Mesa County, Colorado* (DOE 1986).

The GJPORAP Record of Decision (DOE 1990a) selected natural flushing as the remedy for contaminated groundwater and surface water. Contaminant levels are expected to reach acceptable levels in 50 to 80 years. The DOE will maintain restrictions on groundwater and surface water use after the transfer until acceptable levels are reached.

2.0 PURPOSE AND NEED FOR AGENCY ACTION

The historic missions that required ownership of the DOE-GJO Site have been completed, and appropriate regulatory response actions have been or will be taken to address contamination at the site. DOE does not need to retain ownership for GJO to perform its missions. To reduce mortgage liabilities, the DOE intends to transfer ownership of the site using Section 161(g) of the *Atomic Energy Act* (42 USC 2011 et seq.) and other statutory and regulatory authorities.

In addition, DOE will screen the property as surplus to determine other agency interest following guidance found in the Federal Property Management Regulations (41 CFR 101).

3.0 DESCRIPTION OF PROPOSED ACTION AND NO ACTION ALTERNATIVES

This chapter describes both the Proposed Action and the No Action Alternatives. The No Action Alternative is continued ownership of the GJO facility by the DOE.

3.1 DESCRIPTION OF THE PROPOSED ACTION–DISPOSAL OF REAL AND PERSONAL PROPERTY TO ANOTHER ENTITY

The Proposed Action is to transfer real and personal property at the GJO Site to a non-DOE entity. Potential future users of the site could be other Federal agencies, state/local quasi-governmental agencies, or the private sector. DOE will conduct a Federal property screening to determine other agency interest following guidance found in the Federal Property Management Regulations (41 CFR 101). The Proposed Action does not include the 3.2 hectare-tract (8 acres) that will be transferred to the U.S. Army Reserve. A separate NEPA review will be conducted for the transfer of this parcel to the U.S. Army Reserve.

The real property under consideration in this EA consists of approximately 24.9 hectares (61.7 acres) of land and 35 structures. The transfer is planned to be completed by September 30, 2000, and will be conducted in one transaction. The DOE and its contractors plan to remain at the site as a tenant. At this time, the DOE intends to lease office space at the GJO, at least until its existing contracts with its prime contractors end on September 30, 2001.

The transaction itself does not have the potential for causing impacts to the human environment. The DOE will not control future land uses at the site, and future uses may affect the human environment. In this EA, the DOE will address reasonably foreseeable land use scenarios and the environmental effects that may result from the transfer of the facility. Not all of the land uses may, in fact, be feasible. There is no assurance that any given land use or activity will receive the necessary approvals or permits.

The following subsections describe the potential land use scenarios under the Proposed Action Alternative.

3.1.1 All Commercial Land Use

Under the all commercial land use scenario, the site would be used for a mixture of office space, retail space, and wholesale space. It is possible that future occupants could be other Federal, state or local agencies in addition to the private sector. The types of activities occurring at the site would be very similar to the current land uses as a DOE Site. Under this scenario, it is estimated that the site would employ approximately 200-400 individuals with annual income levels ranging from $15,000 to $40,000. A mixture of businesses would occupy the current buildings. It is envisioned that some existing buildings on the site could be torn down and replaced with new office or commercial structures. Demolition debris would result from this activity. It is also possible that development could occur in the northern portion of the site that is now open space, including the wetland areas.

A variety of commercial ventures could inhabit the site. Typical uses could include: analytical laboratory, professional services firms (public accounting, consulting services), caterers, medical care, software manufacturing, furniture making, and book publishing. Some types of businesses may be required to obtain environmental or other types of permits.

3.1.2 All Industrial Land Use

Under the all industrial land use scenario, the site would be entirely used for heavy manufacturing or processing operations. To estimate the environmental effects of such use, the DOE will assess the effects of the property reverting back to its previous land use as a gravel pit prior to being acquired by the War Department in 1943.

Under this scenario, the site would be redeveloped into a gravel pit. All or almost all buildings located on the site would be demolished and the debris would be transported to an appropriate landfill. The site would become a full-scale gravel mining operation similar to the gravel pit located approximately 0.8 kilometers (0.5 miles) south of the site. Approximately ten individuals would be employed on-site with annual incomes ranging from $15,000 to $40,000. Under this scenario, the existing open space area of the site that includes wetland/upland environments would also be disturbed by the gravel pit operation. This all industrial land use is envisioned to be the bounding case scenario for potential impacts. Bounding case scenarios are used to provide an upper limit of anticipated impact levels. Bounding cases are not necessarily representative of what will actually take place. As such, this land use is being evaluated strictly to assess worst-case environmental effects; there is no assurance that a gravel pit would receive the necessary approvals to operate.

3.1.3 Mixed Use Land Use

Under the mixed use land use scenario, it is envisioned that the site would house a variety of uses including office space, commercial, light and heavy industrial, manufacturing, research and development, and high technology. It is possible that future occupants could be other Federal, state, or local agencies, in addition to the private sector. Land use would be similar to the current DOE land use. Estimated employment levels would be similar to the all commercial land use scenario with between 200-400 individuals being employed at the site. Annual incomes would range from $15,000 to $40,000. Typical businesses would include: analytical laboratory, professional services firms (public accounting, consulting services, etc), caterers, medical care, software manufacturing, furniture making, book publishing, auto repair, and light to medium manufacturing. It is anticipated that only minor quantities of hazardous materials and hazardous wastes would be handled by these businesses. Some of the businesses may be required to obtain environmental permits. The potential exists that the open space areas of the site could be filled in for possible expansion. Some of the existing structures may be renovated or replaced by new construction.

3.1.4 All Open Space Land Use

Under the all open space land use scenario, the site is envisioned as reverting back to open space. The buildings on the site would be demolished and the debris would be transported to an appropriate landfill. The site would attract local recreational users and school children on field trips/science class trips. Possible expansion of the existing wetlands might take place. Future uses could also include a state or Federal wildlife preserve.

3.2 NO ACTION ALTERNATIVE

The DOE is required to assess the potential environmental consequences of the No Action Alternative in addition to the Proposed Action and any other alternatives. The DOE plans to transfer ownership of the site to a non-DOE entity by October 2000. As a result, the likelihood of the No Action Alternative taking place is minimal. The NEPA, however, requires analysis of the No Action Alternative. In the case of this EA, the No Action Alternative represents continuation of present day activities on the site and continued ownership by the DOE. It serves as the baseline against which the other alternatives are compared.

Under the No Action Alternative, present day activities would continue at the site. DOE would retain ownership of the site. The 3.2 hectares (8 acres) of the U.S. Army Reserve tract would still be transferred on schedule (on December 31, 2000). Under the terms of the lease, the Western Colorado Business Development Center's Small Business Incubator would continue to occupy approximately 3.2 hectares (8 acres) at the southern end of the site. The 10 hectares (24.7 acres) of the open space area occupying the north end of the site would continue in its undeveloped state. The remainder of the site would contain a mixture of commercial and light industrial uses.

Mixed uses continuing at the site include an analytical laboratory, an environmental sciences research laboratory, and office space for DOE employees and contractors *WASTREN,* Inc., and Mactec-ERS. Other uses include

instrument calibration facilities, copying services, telecommunication services, facility maintenance support, hazardous materials storage facilities, office space, and a small laboratory for a tenant from the Oak Ridge National Laboratory.

Current employment at the site is approximately 325 individuals with 23 DOE government employees and approximately 300 contractors. Annual salaries average between $30,000 and $50,000. Approximately 300 vehicle trips are generated daily to and from the site. Employment at the site will decrease over the course of the next two years leveling off at approximately 125 employees with 20 DOE employees and approximately 100 contractors.

Electrical power and natural gas would continue to be supplied by the Public Service Company of Colorado. Water supply would continue to be provided by the city of Grand Junction. GJO would continue to route its sanitary sewer effluent to the publicly owned treatment works operated by the city of Grand Junction. An outside firm would continue to perform facility ground maintenance and any fertilizers or herbicides would be applied by licensed applicators and materials would be stored off-site at the firm's facility.

Environmental monitoring activities would continue at the site. DOE would continue to maintain institutional controls preventing use of contaminated groundwater and surface water.

3.3 ALTERNATIVES AND LAND USE SCENARIOS CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

DOE considered but eliminated the alternative of leasing the facility to other entities. DOE has determined that this permanent transfer of the site to non-DOE ownership best meets its objectives for mortgage reduction and beneficial reuse.

Residential and educational use as a primary or secondary school were considered but eliminated for the following reasons:

(1) Location adjacent to railroad with frequent freight traffic.

(2) Nearby location of police firing range.

(3) Heavy truck traffic from nearby gravel pit.

However, under commercial or mixed use, professional or vocational training may occur at the site.

4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

4.1 GEOLOGY/SOILS/TOPOGRAPHY

Affected Environment

The GJO is located in the Canyonlands section of the Colorado River Plateau physiographic province at the interface of the Grand Valley (carved by the Colorado River) and the Uncompahgre Plateau. It is located within the floodplain of the Gunnison River. The site is protected from flooding by a levee or dike constructed along the west, south, and north side of the site. Because of this protection, the GJO is considered to be in the 1,000-year floodplain. The topography of the area is mainly flat, with elevations ranging from approximately 1,390 meters to 1,393 meters (4,560 feet to 4,570 feet) above mean sea level.

Rocks exposed in the Grand Junction area range in age from Precambrian to Cretaceous. The Precambrian basement complex consists of meta-sedimentary, meta-igneous, and igneous rocks. This basement is directly overlain by the Chinle Formation, composed of red siltstones and thin discontinuous conglomerate. Directly over the Chinle Formation is the Wingate Sandstone, a fine-grained, cross-bedded sandstone of Late Triassic age. Over the Chinle Formation, and also of Late Triassic age, is the Kayenta Formation, a white, buff, or gray, fine- to medium-grained fluvial sandstone containing minor lenses of siltstone, shale and conglomerate.

Overlying the Kayenta is the Entrada Sandstone, of Late Jurassic age. This is the main artesian aquifer of the Grand Junction area. Above the Entrada Sandstone lies about 15 meters (50 feet) of alternating sandstone, siltstone, and shale, formerly called the Summerville Formation, but recently classified as the basal part of the Salt Wash Member of the Morrison Formation.

The Upper Jurassic Morrison Formation comprises four members, but only two of them are present in the Grand Junction area. These are the Salt Wash and the Brushy Basin Members. A measured section of the Brushy Basin, about 4 kilometers (2.5 miles) southwest of the GJO Facility, indicates the total thickness of this member is approximately 90 meters (300 feet). The Brushy Basin consists of mudstone, siltstone, and shale (about 90 percent), and minor lenses of sandstone (approximately 10 percent), and is overlain by Quaternary alluvium at the GJO.

The alluvium consists of poorly sorted, unconsolidated basal gravel with a silt and sand matrix and an overlying unit of sand and silt. A cross section of the GJO area is presented in Figure 4.1-1. Geologic logs from the 1989 Remedial Investigation/Feasibility Study monitoring well-installations indicate that both the gravel unit and the overlying silts and sands are laterally continuous throughout the GJO area. The basal gravel unit was likely deposited as the Gunnison River migrated east to its present position. As migration occurred, older alluvial sediments to the west were eroded and a new layer of sediment was deposited, resulting in a laterally continuous layer of gravel, sand, and silt (DOE 1989).

According to well logs included in the 1989 Remedial Investigation/Feasibility Study, most borings encountered river gravel at depths approximately 7 to 10 feet below the surface. The river gravel deposit is described as a silty, sandy unit that varies in thickness from approximately 5 to 25 feet (DOE 1989), although in some areas the thickness is unknown because the borings were terminated within the river gravel deposit.

Groundwater typically occurs at approximately 8 to 10 feet below ground surface. Groundwater is discussed in Section 4.2.

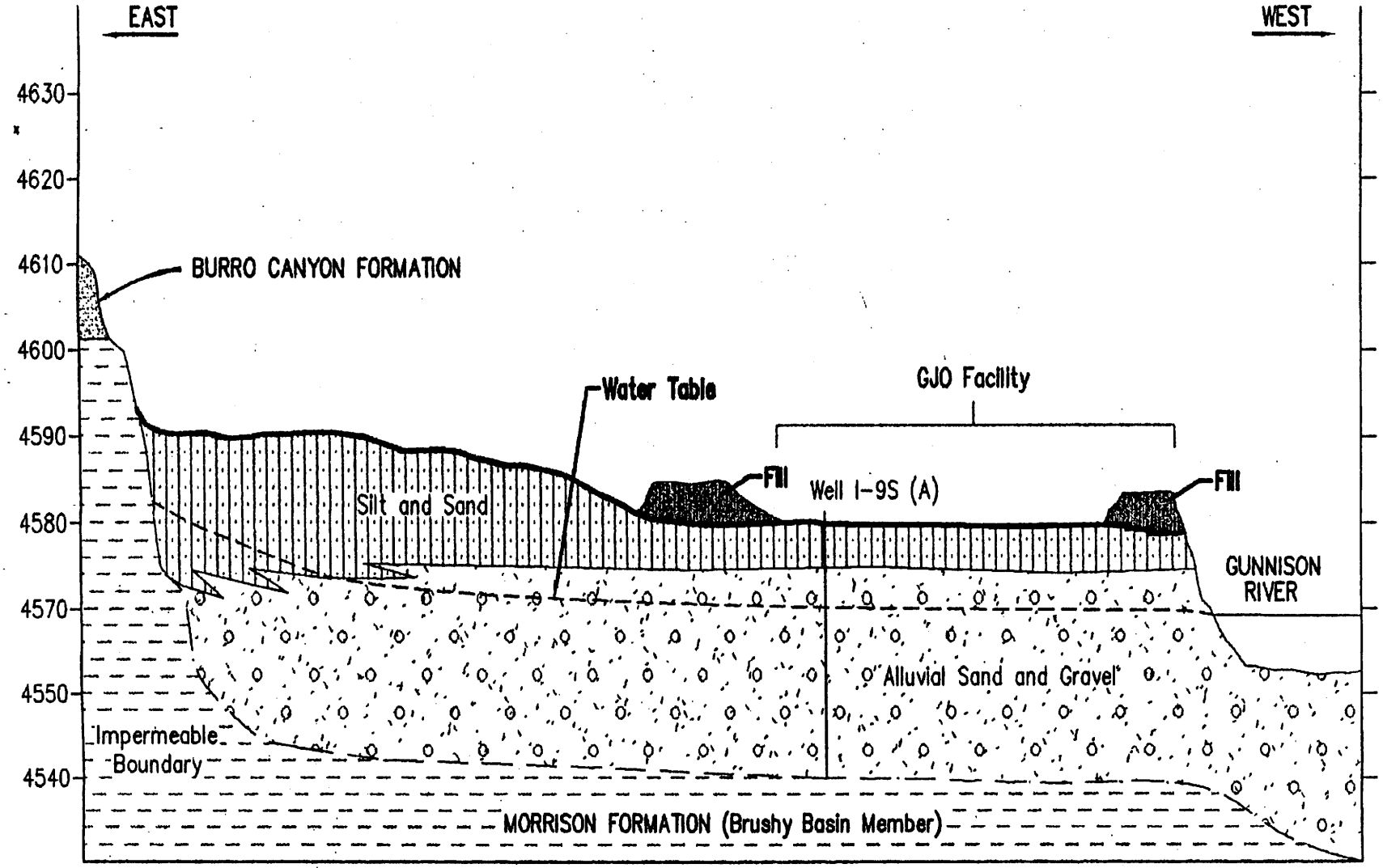

Figure 4.1-1. Cross Section of the GJO Area.

Potentially active faults of Late Cenozoic age have been identified in the Grand Junction area. The closest to GJO are those of the Jacobs Ladder Fault complex, located less than 3.2 kilometers (2 miles) southwest of the facility. There are also two small faults with displacements of 9 meters (30 feet) and 1.5 meters (5 feet) located on the canyon wall adjacent to the facility, and beneath the north end of the GJO, respectively. The largest has displaced the Morrison Formation. However, it is not likely to affect the groundwater within the alluvial aquifer because of the small displacement and the presence of clay particles from the Morrison Fault that would tend to secure the fault plane (DOE 1989).

According to the Uniform Building Code (ICBO 1997), the GJO is located in seismic zone 1, which indicates a low damage risk. The facility could be used by other DOE offices for similar activities without additional seismic considerations (DOE 1998a).

The GJO facility lies above the Gunnison River, where approximately 11 meters (35 feet) of alluvial sand and gravel have been deposited. Soils formed in this material modulate from a thickness of a few inches to a few feet, and are classified as fine-loamy, mixed (calcareous), mesic Typic Torrifluvents, which are young, undeveloped soils formed in alluvium. Sediment accumulations at the site have been primarily fluvial and derived from igneous, metamorphic, and sedimentary parent material. Soil textures fluctuate from sandy loam to loam, and soil pH ranges from 7.9 to 8.4. There are minor quantities of colluvial debris and alluvial outwash from contiguous highland areas along the valley boundaries.

Before remediation began, soils contaminated by radium-226, thorium-230, and uranium covered approximately 9 hectares (23 acres) of the facility, essentially in areas of buried uranium mill tailings waste. These areas were remediated to meet the standards in 40 CFR 192, "Health and Environmental Standards for Uranium and Thorium Mill Tailings." By July 1, 1994, remediation of open-land areas had been completed, and those soils are now considered uncontaminated. Soils beneath paved areas and adjacent to buried utility lines have been characterized and are considered to be uncontaminated, as defined by the standards in 40 CFR 192. Characterization continues of soils adjacent to buried septic tanks.

Environmental Consequences

Commercial Use. Under this scenario, there would be a slight increase in the potential impacts to soils compared to the No Action Alternative. It is assumed that the Analytical Chemistry Laboratory would continue to operate at a similar level of effort, and would generate a similar amount of waste. An increase in hazardous waste generation could be expected if new light industrial small businesses are located at GJO. By increasing the amount of waste transported to hazardous waste storage areas, there would be a corresponding slight increase in the potential for soil contamination from spills.

Another potential source of soil contamination would be leaks in the buried sewer pipelines. Because there is no leak detection system, unknown leaks could occur. If a leak were discovered, contaminated soils would be treated and/or disposed of properly.

Construction of new buildings and potential demolition of existing buildings would cause some disturbance to soils. The effect would be similar to the disturbance caused by the environmental cleanup at the site.

Industrial Use. As discussed in Section 3.1.2, the bounding case for the all industrial scenario is use of the entire facility as a gravel mining operation. In this case, the gravel underlying the area would be excavated and used as a valuable geologic resource. Prior to removal of the gravel deposits, the overlying soils would be removed and most likely stockpiled for use as backfill when the gravel deposits are depleted. Soil disturbance would be similar to that caused by the environmental cleanup at the site. Upon depletion of the gravel deposits and cessation of mining activities, the topography of the area would be left as a depression that would fill with groundwater.

Because of the presence of the earthen dike between the possible excavation area and the Gunnison River, there is no potential for erosion and subsequent sediment deposition into the river.

Mixed Use. Under this scenario, the potential for impacts to soils would be slightly less than that described above for the all commercial scenario. It is assumed that the Analytical Chemistry Laboratory would continue to operate at a similar level of effort, and would generate a similar amount of waste. A small increase in hazardous waste generation could be expected if new light industrial small businesses joined the incubator facilities. By increasing the amount of waste transported to the hazardous waste storage areas, there would be a corresponding slight increase in the potential for soil contamination from spills.

Another potential source of soil contamination would be leaks in the buried sewer pipelines. Because there is no leak detection system, unknown leaks could occur. If a leak were discovered, contaminated soils would be treated and/or disposed of properly.

Construction of new buildings and potential demolition of existing buildings would cause some disturbance to soils. The effect would be similar to the disturbance caused by the environmental cleanup at the site.

Open Space. Some soil disturbance would occur during the demolition of the existing buildings. No other impacts to soils would be expected.

No Action Alternative. DOE would continue present day operations. Hazardous, low-level and mixed low-level radioactive, and/or polychlorinated biphenyls (PCB) wastes from replacing old light ballasts would continue to be transported across the facility from satellite accumulation areas to the current waste storage facilities. During transport, there is potential for soil contamination from waste spillage. However, spills would be unlikely because of the primary and secondary containment features of the packaging. If a spill did occur, the affected area would be small because of the relatively small volumes (less than 40 gallons) of waste typically transported. Procedures established in Chapter 12 of the *GJPO Emergency Preparedness and Response Plan* – Hazardous Materials Contingency Plan and Emergency Procedures – would be followed if a spill occurred. In order to minimize the affected area, contaminated soils would be immediately treated and/or contained.

Another potential source of soil contamination would be leaks in the buried sewer pipelines. Because there is no leak detection system, unknown leaks could occur. If a leak were discovered, contaminated soils would be treated and/or disposed of properly.

4.2 GROUNDWATER

Affected Environment

Three hydrogeologic units of interest underlie the GJO facility. In descending order, they are the shallow unconsolidated alluvial aquifer along the Gunnison River, the Morrison Formation aquitard, and the Entrada Sandstone aquifer. The alluvial aquifer occupies approximately 22.8 hectares (56.4 acres) of the Gunnison River floodplain; its thickness varies from 6 to 21 meters (20 to 70 feet), with an average of 6 to 8 meters (20 to 25 feet).

The aquifer is bounded on the west and north by the Gunnison River, and on the east by the shales and sandstones of the Morrison Formation. It is open to the south where the alluvium continues along the east margin of the river. Recharge is predominantly from river fluctuations, although it is also affected by precipitation to a lesser extent. Groundwater is discharged into the Gunnison River along the north and west boundaries of the GJO. The aquifer has a hydraulic conductivity of about 30 feet per day, and the specific yield is about 0.05. The water table averages 7 feet below the ground surface, but fluctuates with changing river levels. The aquifer has a tendency to

be salty (almost brackish) and is rarely used for agricultural purposes. It is not used as a significant source of water regionally and is not used at all at GJO (DOE 1998a).

Underlying the alluvial aquifer is the Morrison Formation, comprising the Brushy Basin and Salt Wash Members in the Grand Junction area. These primarily shale formations are described in more detail in Section 4.1. The Morrison Formation serves as an aquitard beneath the facility, as it inhibits downward groundwater flow and prevents communication between the overlying alluvial aquifer and the underlying Entrada Sandstone aquifer.

As shown on Table 4.2-1, groundwater in the alluvial aquifer is contaminated with low levels of arsenic, radium, uranium, selenium, and molybdenum. This contamination is attributed to the past uranium milling and processing activities on the site. Of the components measured in 1998, concentrations of arsenic, molybdenum, nitrate, selenium, total dissolved solids, uranium-234+238, and net gross alpha exceeded standards (DOE 1999a). Groundwater monitoring data suggests that contamination levels may be declining over time and continued monitoring will verify this if it is the case. The remedy selected in the 1990 Record of Decision was natural attenuation (flushing). Groundwater modeling of the alluvial aquifer predicts that the groundwater will be cleaned to below standards within 50 to 80 years after the removal of the exterior uranium mill tailings waste (DOE 1989), which was completed July 1, 1994.

Environmental Consequences

Commercial Use. Impacts to groundwater quality could occur as a result of a fuel or waste spill, or a sewer line leak and subsequent migration of contaminants through the soil profile to the groundwater table. A spill directly into the surface water bodies onsite could also potentially affect the groundwater quality because the shallow aquifer and the surface water bodies are hydraulically connected. However, it is expected that under this scenario the quantities of fuel or waste transported or stored on the facility would be small and not significantly greater than those expected under the No Action Alternative described below.

Institutional controls would be in place to ensure that there continues to be no use of the shallow groundwater. Groundwater quality would be expected to improve over time via natural flushing.

Industrial Use. Under the gravel pit scenario, disturbance to the gravel layer below the water table during excavation could increase the suspended solids load (i.e, turbidity) in the groundwater. The magnitude of this increase would be dependant on the amount of organic matter and fine material such as silt and clay present in the void spaces of the gravel deposit (in other words, how "clean" the gravel is). There is currently no data on the grain size distribution of the gravel layer, although the unit is described as a silty, sandy gravel in the 1989 Remedial Investigation/Feasibility Study (DOE 1989).

Because of the shallow water table in the area, the mine would have to be dewatered to allow for gravel excavation. Dewatering of the mine would alter the hydraulic gradient in the area, causing groundwater to flow from the surrounding area towards the pit, or mine. This would limit transport of the more turbid groundwater away from the mined area. Computer modeling of the groundwater/surface water hydraulics of the area would be necessary to determine exact flowpaths and the radius of influence of the dewatering activities. Potential impacts to groundwater quality and to the Gunnison River (because of the interconnection of the shallow aquifer with the river) during normal mine operations would be addressed during permitting of the mine by the Colorado Department of Public Health and Environment.

Because the groundwater is contaminated, the Colorado Department of Public Health and Environment would require that the mine operators properly handle the effluent from mine dewatering. The ultimate treatment and disposition of the extracted groundwater would be regulated by the Colorado Department of Public Health and Environment.

Table 4.2-1. ***Comparison of Federal and State Groundwater Quality Standards to 1998 and Historical Maximum Concentrations in the Alluvial Aquifer***[a,b]

Constituent	Federal/ State Standard	1998 Maximum[c,d,e]			Historical Maximum[d,e]		
		Upgradient	On Site	Down-Gradient	Upgradient	On Site	Down-Gradient
Common Ions (mg/L)							
Nitrate (as N)[f]	10	<0.004	16.74	0.271	1.581	69.573	33.883
Total Dissolved Solids[g]	2,138	1,710	5,690	2,890	2,180	10,200	8,620
Metals (mg/L)							
Arsenic	0.05	~0.0018	0.35	~0.0058	0.0114	0.68	~0.031
Barium	1.0	~0.0177	~0.0464	0.037	~0.0187	0.4	0.038
Cadmium	0.01	<0.001	<0.0034	<0.0051	<0.002	0.055	<0.005
Chromium (total)	0.05	<0.002	~0.01	<0.0216	0.010	0.039	0.112
Lead	0.05	<0.001	0.0006	0.0007	~0.0026	0.0571	0.0046
Mercury	0.002	-	-	-	0.0002	0.00023	0.0002
Molybdenum	0.1	~0.0067	0.54	0.138	0.023	19	0.413
Selenium	0.01	<0.001	0.107	0.0092	~0.0025	0.685	0.073
Silver	0.05	-	<0.0076	<0.0114	<0.01	0.006	0.0056
Radionuclides (pCi/L)							
Gross Alpha (excluding radon and uranium)[h]	15	<12.37	113.59	-3.2912	71.02	1073.14	620.52
Radium 226+228	5.0	0.32	0.57	0.25	1	36	2.70
Thorium 230+232	60	-	-	-	0.2	18	4.3
Uranium 234+238[i]	30	5.50	1140.7	192.58	22.77[j]	6039	1006.5

[a] Standards from the *Uranium Mill Tailings Radiation Control Act*, revised in 1986.

[b] Colorado Department of Public Health and Environment, Water Quality Control Division, *Basic Standards for Groundwater*, effective August 30, 1997. Standards in the "Potentially Usable Quality" classification were used for GJO groundwater.

[c] "_" indicates no data available; "<" indicates that the maximum concentration was below the detection limit (number shown is detection limit); "~" indicates an approximate value (the value was outside the limits for which the instrument was calibrated).

[d] The units are indicated in the "Federal/State Standard" column.

[e] Based on maximum concentrations observed from 1984 through 1997.

[f] Nitrate (as N) was derived for measured nitrate using the conversion $N=NO_3 + 4.427$.

[g] This is a site-specific standard calculated as background x 1.25. The background value is based on the June 1998 sampling event.

[h] Measured values represent total gross alpha minus uranium activity. Negative values indicate uranium concentrations exceeded gross alpha activity. Uranium concentrations that were measured in grams were converted to pCi/L. The conversion assumes equilibrium and an activity of 0.687 pCi/µg.

[I] Total uranium concentrations that were measured in grams were converted to uranium 234+238 in pCi/L for comparison. The conversion assumes equilibrium and an activity of 0.671 pCi/µg.

[j] Extreme-values testing of uranium results from samples collected in 1985 and 1989 indicated that two values (201 pCi/L and 84 pCi/L) were outliers; these values from upgradient wells were not included in this table.

Source: DOE 1999a.

Groundwater quality could also be affected by a fuel or hydraulic fluid spill or leak from the heavy equipment used in the mining operation. It is expected that the mine operators would have spill response procedures in place that would minimize potential impacts.

Since all known uranium mill tailings waste that historically contaminated the groundwater of the shallow aquifer was removed by July 1, 1994, groundwater quality should improve over time via natural flushing or attenuation. As mentioned above, concentrations of water quality parameters associated with the historic leaching of uranium mill tailings waste are expected to be below applicable standards within 50 to 80 years.

Institutional controls would be in place to ensure that there continues to be no use of the shallow groundwater. Groundwater quality would be expected to improve over time, via natural flushing. Dewatering during mining operations could accelerate the natural flushing of the aquifer.

Mixed Use. Impacts to groundwater quality from this scenario would be expected to be similar to those described for the No Action Alternative described below.

Institutional controls would be in place to ensure that there continues to be no use of the shallow groundwater. Groundwater quality would be expected to improve over time, via natural flushing.

Open Space. Barring a heavy equipment fuel spill or leak during building demolition, no adverse impacts to groundwater quality would be expected from this scenario. Institutional controls would be in place to ensure that there continues to be no use of the shallow groundwater. Groundwater quality would be expected to improve over time, via natural flushing.

In the case of a fuel spill or leak during building demolition, it is expected that the heavy equipment operators would have spill response procedures in place that would minimize potential impacts.

No Action Alternative. Impacts to groundwater quality could occur as a result of a fuel, hazardous materials or waste spill, or a sewer line leak. A spill could cause contaminants to move through the soil profile to the groundwater table. A spill directly into the surface water bodies onsite could also potentially affect the groundwater quality because the shallow aquifer and the surface water bodies are hydraulically connected. Spill response procedures that minimize the potential for any spilled materials to reach the groundwater table would be in place.

Because all known uranium mill tailings waste that historically contaminated the groundwater of the shallow aquifer was removed by July 1, 1994, groundwater quality should improve over time via natural flushing or attenuation. As mentioned above, concentrations of contaminants associated with uranium mill tailings waste are expected to drop below applicable standards within 50 to 80 years. Meanwhile, institutional controls would be in place to ensure that there continues to be no use of the shallow groundwater.

4.3 SURFACE WATER

Affected Environment

Surface water bodies at or near the GJO include the Gunnison River, the North Pond, and the South Pond, as well as some wetland areas adjacent to the North Pond (see Figure 1.2-2). All of these water bodies contain water perennially. The ponds and wetland areas are located within the GJO, and the Gunnison River is contiguous to the facility's western and northern boundaries. The state has designated four use classifications for the segment of the Gunnison River near the GJO facility: (1) Recreation-Class I; (2) Cold Water Aquatic Life-Class 1; (3) Domestic Water Supply; and (4) Agriculture (DOE 1999a). Other than wildlife habitat, there is no use of the North or South Ponds, and there is no known consumptive use of the Gunnison River between the facility and the confluence with the Colorado River (DOE 1996a).

The wetland area and South Pond (in its current configuration) were created in the spring of 1994 during remediation of the uranium mill tailings waste-related contamination. The North Pond is the remnant of a gravel pit mining operation that occurred on the site in the early 1920s (DOE 1989).

The Gunnison River, which is hydraulically connected to the shallow aquifer, is subject to the Colorado Water Quality Control Commission's general narrative water-quality standards and specific water-quality standards for radioactive materials and organic pollutants. These standards are also used to evaluate the water quality of the

North and South Ponds. Water in the North Pond, South Pond, and wetland areas is contaminated with the same constituents as the groundwater because these surface waters are recharged by the shallow alluvial aquifer. They contain comparable concentrations of substances associated with uranium mill tailings waste, including arsenic, manganese, uranium, selenium, molybdenum, vanadium and sulfate.

Tables 4.3-1 and 4.3-2 show the 1998 sampling results for the Gunnison River and the ponds/wetlands, respectively. The Water Quality Control Commission's standards are also shown for comparison, as are historical maximums for the Gunnison River.

In addition to the parameters shown on Table 4.3-2, the North Pond, South Pond, and wetland areas samples were also analyzed for gross alpha, gross beta, and radium-226 activity. Although gross alpha and beta activities were above instrument detection limits, no surface water quality standards exist for comparison. The state and Federal standard for radium 226+228 of 5 picocuries per liter was not exceeded in any on-site surface water sample.

Radionuclide concentrations in samples collected in 1998 from three locations in the Gunnison River (upstream, adjacent to, and downstream of the GJO) were below applicable Colorado Department of Public Health and Environment Water Quality Control Commission's standards. In addition, total uranium and radium-226 concentrations in 1998 were relatively constant in all samples, indicating the contaminated groundwater underlying the GJO is not impacting the Gunnison River.

Environmental Consequences

Commercial Use. The water quality of the North Pond, South Pond, and wetland areas would be expected to improve over time through passive remediation of the shallow aquifer. Under this scenario, the potential for spills or other releases that could affect surface water would be slightly greater, but similar to that described below for the No Action Alternative. Institutional controls would be in place to restrict use of these surface waters. Because the dike isolates the Gunnison River from the site, no impacts to the river would be expected.

Industrial Use. Under the bounding case for this scenario, a gravel mining operation, the existing surface water bodies at the facility would be destroyed during excavation of the gravel and dewatering of the excavated areas. As mentioned above in the groundwater section, under the gravel mining scenario there is a potential for excavation activities to cause an increase in the suspended solids load, or turbidity, of the groundwater. Because the shallow groundwater at the site and the Gunnison River are hydraulically interconnected, there is potential for the more turbid groundwater to reach the river and potentially increase its total suspended solids load. Because of the lack of data concerning the grain size distribution of the gravel layer below the water table, a quantitative analysis of the potential for impacts to the Gunnison River is not possible at this time.

As mentioned above in the groundwater section, dewatering of the mine would alter the hydraulic gradient in the area, thus limiting transport of the more turbid water away from the mined area. However, computer modeling of the groundwater/surface water hydraulics of the area would be necessary to determine if dewatering activities would affect the Gunnison River.

Mixed Use. Under this scenario, the water quality of the North Pond, South Pond, and wetland areas would be expected to improve over time through passive remediation of the shallow aquifer. The potential for spills or other releases that could affect surface water would be similar to that described below for the No Action Alternative. Institutional controls would be in place to restrict use of the surface waters. Because the dike isolates the Gunnison River from the site, no impacts to the river would be expected.

Open Space. Under this scenario, the water quality of the North Pond, South Pond, and wetland areas would be expected to improve over time through passive remediation of the shallow aquifer. Since there would be no use of hazardous materials on the property, there would be no potential for spills or other releases that could affect

Table 4.3-1. ***Comparison of State Surface Water Quality Standards to 1998 Historical Maximum Concentrations in the Gunnison River***[a,b]

Constituent	State Standard	1998 Maximum[c]			Historical Maximum[d]		
		Upgradient	Adjacent to Site	Down-Gradient	Upgradient	Adjacent to Site	Down-Gradient
Common Ions (mg/L)							
Chloride	250	4.83	4.93	5.03	12.4	12.6	80
Nitrate (as N)[e]	10	0.707	0.673	0.642	6	6	6
Nitrite (as N)[f]	0.05	-	-	-	<0.304	-	<0.304
Sulfate	480	215	215	215	513	512	584
Field Measurements							
Dissolved Oxygen[g]	7.0 mg/L	-	-	-	9.5	9.3	9.5
pH	6.5-9.0	8.44-8.44	8.45-8.50	8.58-8.58	7.20-9.04	7.29-9.19	7.33-9.01
Inorganics							
Fecal Coliform[h]	200	-	-	-	1500	300	1300
Metals (mg/L)[i]							
Arsenic	0.05	<0.001	<0.001	<0.001	0.011	~0.0086	0.011
Cadmium	0.001	<0.001	<0.001	<0.001	0.002	~0.00063	~0.00032
Chromium+6	0.011	<0.002	<0.002	<0.002	~0.0038	~0.0045	~0.0034
Copper	0.013	-	-	-	0.056	0.013	0.05
Iron	0.300	~0.0135	~0.0264	<0.0199	0.44	0.1	0.32
Lead	0.004	<0.001	<0.001	<0.001	0.059	0.0193	0.027
Manganese	0.050	~0.0065	~0.0068	~0.0065	0.2	0.0766	0.122
Mercury	0.0001	-	-	-	<0.002	<0.002	<0.002
Nickel	0.101	-	-	-	0.005	<0.025	0.021
Selenium	0.008	~0.0038	~0.0038	~0.0036	0.0096	0.014	0.0148
Silver	0.0001	-	-	-	<0.0005	<0.0005	0.0005
Zinc	0.113	-	-	-	1.07	0.86	1.72
Radiological (pCi/L)							
Radium 226+228	5	0.68	0.39	0.38	16.8	15.5	16.3
Uranium[j]	40	~2.7	~2.6	~2.7	10.42	14.39	23.35

[a] Colorado Department of Public Health and Environment Water Quality Control Commission surface water standards; Regulation No. 31 and 35, effective March 2, 1998 and May 30, 1998, respectively.

[b] "_" indicates no data available; "~" indicates an approximate value (the value was outside the limits for which the instrument was calibrated; "<" indicates that the maximum concentration was below the detection limit (number shown is detection limit).

[c] The units are indicated in the "State Standard" column.

[d] Based on maximum concentrations observed from 1980 through 1997.

[e] Nitrate (as N) was derived for measured nitrate using the conversion $N=NO_3 + 4.427$.

[f] Nitrite (as N) was derived for measured nitrite using the conversion $N=NO_3 + 3.285$.

[g] The standard value for dissolved oxygen represents a minimum concentration. Measured values must be greater than 7.0 mg/L to comply with this standard. Listed values represent the minimum measurements observed.

[h] Number of colonies per 100 mL.

[I] All values given are for dissolved constituents.

[j] Uranium concentrations that were measured in milligrams per liter were converted to picocuries per liter for comparison. The conversion assumes equilibrium and an activity of 0.687 pCi/µg.

Source: DOE 1999a.

Table 4.3-2. ***Comparison of Onsite Surface Water Quality in 1998 with State Standards***

Constituent	State Standard	North Pond	South Pond	Wetland Area
Chloride	250 mg/l	334	116	651
Sulfate	480 mg/l	2,240	1,600	6,780
Uranium	40 pCi/l	102	269	111

Source: DOE 1999a.

surface water quality. Institutional controls would be in place to restrict use of the surface waters. This land use scenario would not be expected to impact the Gunnison River.

No Action Alternative. Surface water quality of the North Pond, South Pond, and wetland area is expected to improve over time through passive remediation of the shallow aquifer (see Section 4.2). Impacts to surface water quality could occur as a result of a fuel or waste spill near or directly into a surface water body or into the storm drainage system. However, it would be unlikely for the spilled contaminant to adversely affect water quality because of the generally small quantities of waste and fuel stored or transported on the facility. In the event of a spill, procedures are in place for rapid containment and removal of potential contaminants before they migrate to water bodies. Institutional controls would be in place to restrict use of the surface waters. Because of the presence of the dike, no impacts to the Gunnison River would be expected.

4.4 FLOODPLAINS AND WETLANDS

Affected Environment

The U.S. Army Corps of Engineers has determined that those areas of the GJO property inside (north and east) of the riverside dike are not in the 100-year or 500-year floodplain of the Gunnison River (DOE 1999a; DOE 1996a). The dike follows the southern and eastern shores of the river and was constructed to protect the developed areas from the river (see Figure 1.2-2). A Flood Insurance Rate Map for Mesa County dated July 1978 indicates that areas inside the dike still lie within the 1,000-year floodplain (DOE 1999a). To comply with Executive Order 11988, *Floodplain Management*, GJO obtained a permit in 1989 authorizing operations within the designated 1,000-year floodplain.

An updated Flood Insurance Rate Map for Mesa County, dated July 15, 1992, designates areas inside the dike as "Other Areas, Zone X" (FEMA 1992). Areas with that designation have been determined to be outside of the 500-year floodplain. The updated Flood Insurance Rate Map designates areas between the dike and the river as Zone A (100-year floodplain), but no base flood elevations are indicated.

Wetlands totaling approximately 0.6 hectares (1.45 acres) (Figure 1.2-2) were restored in 1994 and 1995 on open land that had been disturbed by the removal of uranium mill tailings (DOE 1996a; DOE 1999a). The wetlands were restored to comply with a *Clean Water Act* Section 404 permit issued by the U.S. Army Corps of Engineers (Number 10040, dated March 13, 1989) (COE 1989). The permit authorized GJO to discharge approximately 26,132 cubic meters (34,200 cubic yards) of permanent fill material and approximately 1,528 cubic meters (2,000 cubic yards) of temporary fill material into wetlands on the property. The authorized fill was necessary to remove uranium mill tailings waste from the property and to reconstruct the dike. Other non-delineated wetlands exist at the site; there are approximately 0.8 hectares (2 acres) of wetlands on GJO. There is an on-going effort to further delineate the presence of wetlands at GJO. This information will be available prior to the transfer.

The restored wetlands were revegetated using willow (*Salix* sp.) and Fremont cottonwood (*Populus fremontii*) seedlings, common cattail (*Typha latifolia*) plants, hardstem bulrush (*Scirpus acutus*) cuttings, and a seed mix of

native and adapted grasses. GJO also restored 1.26 hectares (3.11 acres) of jurisdictional riparian vegetation between the dike and the Gunnison River using willows, cottonwoods (*Populus* sp.), silver buffaloberry (*Shepherdia argentea*), skunkbush sumac (*Rhus trilobata*), and a grass seed mix. Additionally, GJO seeded grasses and planted willow seedlings on 1.7 hectares (4.20 acres) of other (non-jurisdictional) riparian lands and on 4.35 hectares (10.69 acres) of uplands inside the dike. The entire planted area has been monitored annually since 1995. Much of the planted vegetation had to be replaced in 1996 due to flooding.

Environmental Consequences

Commercial Use. The existing dike and land between the dike and the river would not be disturbed by the recipient of the property, and the action would be in compliance with Executive Order 11988 (*Floodplain Management*). This scenario could result in the permanent filling of all or part of the approximately 0.8 hectares (2 acres) of wetlands inside the dike to accommodate commercial development. The wetlands subject to disturbance are isolated wetlands inside of the dike, which prevents surface connection with the river, even during most major floods. Loss of the wetlands would therefore neither affect regional flood patterns, nor increase erosion of the riverbanks. In addition, water quality and the availability of nutrients or biomass in the river also would not be affected. Because the majority of the wetlands were recently created on land disturbed by environmental remediation, they are not irreplaceable natural resources of exceptional significance. Loss of the wetlands would result in the loss of a small amount of riparian wetland habitat favored by species such as the snowy egret (*Egretta thula*). However, the value of the onsite wetlands as habitat for most wildlife has already been reduced due to the urban setting.

The recipient would be responsible for complying with Section 404 of the *Clean Water Act* and other applicable regulations prior to disturbing the wetlands. The recipient would also be responsible for implementing any mitigation required by regulation. As long as the recipient complies with any applicable wetland regulations, transfer of the property by DOE is consistent with Executive Order 11990 (*Protection of Wetlands*). Because the majority of the affected wetlands were created as a mitigation project within the last five years, new wetlands with similar properties could be rapidly established.

Industrial Use. The existing dike and land between the dike and the river would not be disturbed by the recipient of the property. There would be no changes to the 100-year floodplain and the action would be in compliance with Executive Order 11988 (*Floodplain Management*).

The recipient of the property could excavate all or part of the approximately 0.8 hectares (2 acres) of wetlands inside the dike to establish a gravel pit. As noted for the Commercial Use scenario, the wetlands are hydrologically isolated from other surface water features and not expected to contribute substantially to regional flood protection, water quality, or wildlife habitat. Transfer of the property would be in compliance with Executive Order 11990 (*Protection of Wetlands*) if the recipient complies with applicable regulations before excavating in wetlands and fulfills mitigation responsibilities. The subject wetlands can be readily recreated, and certain offsite mitigation options could result in functionally superior wetlands.

Mitigation options could include creating wetlands on the gravel pit site once extractive operations cease, or establishing wetlands elsewhere along nearby reaches of the Gunnison or Colorado Rivers. Such offsite wetland mitigation could result in the establishment of higher quality wetlands in a less urban setting that are of greater value to the regional river system and more closely resembling the wetlands formerly present on the GJO Site prior to its initial development.

Mixed Use. The existing dike and land between the dike and the river would not be disturbed by the recipient of the property, and the action would be in compliance with Executive Order 11988 (*Floodplain Management*). The Mixed Use scenario could result in the permanent filling of all or part of the approximately 0.8 hectares (2 acres) of wetlands inside the dike to accommodate various types of development. As described for the Commercial Use

scenario, the restored wetlands are hydrologically isolated from other surface water features and not expected to contribute substantially to regional flood protection, water quality, or wildlife habitat. Transfer of the property would be in compliance with Executive Order 11990 (*Protection of Wetlands*) if the recipient complies with applicable regulations before filling wetlands and fulfills mitigation responsibilities. As described for the Commercial and Industrial Uses, the subject wetlands can be readily recreated, and certain offsite mitigation options could result in functionally superior wetlands.

Open Space. The wetlands and areas within the 100-year floodplain on the site would remain undisturbed under the Open Space scenario. The existing dike would remain unchanged and would continue to be maintained as necessary to prevent deterioration. The Open Space scenario would therefore be in compliance with Executive Orders 11988 (*Floodplain Management*) and 11990 (*Protection of Wetlands*). Conversion of adjoining developed areas to naturally vegetated lands could improve the value of the wetlands and riparian areas as wildlife habitat.

No Action Alternative. The wetlands and areas within the 100-year floodplain on the site would remain undisturbed under the No Action Alternative. The existing dike would remain unchanged and would continue to be maintained as necessary to prevent deterioration. The No Action Alternative would therefore be in compliance with Executive Orders 11988 (*Floodplain Management*) and 11990 (*Protection of Wetlands*).

4.5 LAND USE

Affected Environment

The DOE-GJO Site is a 24.9 hectare (61.7 acres) triangular tract of land wedged between the Union Pacific Railroad on the east and the Gunnison River on the north, west, and south. The main parcel of land was acquired from a private landowner in 1943 by a predecessor agency to the DOE. A more detailed history of the site is provided in Section 1.2 of this EA. The legal description of the site is available in the *Facility Condition Assessment* (DOE 1998a). A title search (DOE 1999c) of the property was ordered by the DOE in April 1999 and completed in late April. This title search shows the property to be in the possession of the DOE with the exception of a 200-foot right-of-way that runs the entire length of the eastern edge of their property. In addition, there is a road right-of-way that was granted in 1959 for purposes of extending 25 7/8 Road to connect it with the Black Bridge (subsequently demolished) into town. The Denver and Rio Grande Western Railway granted right-of-way back to DOE for the south gate entrance. Maps depict two more right-of-way grants back to DOE for the North Gate and the far northern end of the property, but the title search did not reveal these grants.

The nearest residence to the GJO is approximately 0.4 kilometers (0.25 miles) from the site. Land used for agricultural purposes lies across the Gunnison River to the north, west, and south of the site. Patented lands, subsequently acquired by the city of Grand Junction for use as a cemetery, lie to the east of the site across the railroad right-of-way. A police firing range and the main railroad track are adjacent land uses to the GJO Site. A quarry operation exists approximately one mile (1610 meters) southeast of the site.

The land is near the Orchard Mesa neighborhood, a community located to the south of both the Colorado River and the city of Grand Junction. The GJO Site is approximately 3.2 kilometers (2 miles) south of Grand Junction's main business district and less than 4.8 kilometers (3 miles) northeast of lands included in the Colorado National Monument administered by the National Park Service. It is approximately 1 kilometer (one-half mile) east of public lands administered by the Bureau of Land Management. The Redlands Dam on the Gunnison River is upstream from the site.

The facility is located within Mesa County, outside the city limits of Grand Junction. The site is located within the boundaries covered by the *Orchard Mesa Neighborhood Plan* (Mesa 1996), which was adopted jointly by the city of Grand Junction and Mesa County Planning Commissions in March 1995. If the land were privately owned

it would be zoned "industrial." Under the existing Mesa County zoning ordinance, a range of manufacturing, commercial, and related uses could be allowed. Federal lands are not subject to zoning.

The *Orchard Mesa Neighborhood Plan* adopts the following goals that may impact future uses of the site:

- No additional areas on Orchard Mesa should be zoned industrial.
- Complete planning and design for a pedestrian/bicycle/emergency vehicle bridge across the Gunnison River at or near the Old Black Bridge Site from 1998 to 2001 and construction from 2002 to 2005.

The entrances to the GJO Site face east. The site entrances are accessible from U.S. Highway 50, through a large cemetery, by way of the narrow, two-lane, city-maintained streets of Canon Street (0.8 kilometers [0.5 miles]) and B 3/4 Road (0.8 kilometers [0.5 miles]). Until the mid 1980s, the site was also accessible from the west side of the Gunnison River across Black Bridge which was located just north of the facility. Black Bridge was removed due to disrepair.

In 1979, a 2.15 hectare (5.32 acres) parcel on the north side of the site adjoining the Gunnison River was deeded out of the DOE tract to Mesa County. The property came to be known as "Black Bridge Park". The deed stipulated that the property be used as a public park and public recreation area for its exclusive and perpetual use. The deed also provided that the property would revert to the Federal Government in the event of a breach or failure to maintain the property for the specified use. By 1993, Mesa County determined that it could not properly maintain Black Bridge Park as a public recreation area. There were numerous complaints of vagrancy, property destruction, disorderly conduct, and other disturbances. On May 27, 1994, DOE-GJO reimbursed the General Services Administration $5,000 to re-acquire the property. The GSA transferred the parcel back to DOE on June 10, 1994.

Immediately to the east of the enclosed site area is a parking lot, partially owned by the railroad and leased to the GJO facility contractor. Further to the east are railroad tracks, and another parking lot within land owned by the railroad (but leased to the GJO contractor for parking). The lease of land west of the tracks consists of three 18.15 meter (60 feet)-wide strips of land. The lease can be terminated by either party within thirty days written notice. The facility contractor holds a commercial lease from the railroad for a fourth 18.15 meter (60 feet)-wide strip of land for use as a parking lot on the east side of the tracks. Rent, which was $564 per year in 1992, is paid annually and is adjusted annually based on the Consumer Price Index. This lease is for a term of thirty days and continues on a month-to-month tenancy that is terminable by either party within thirty days written notice. In 1992, the previous facility contractor purchased a Private Way License from the railroad for two 8-foot concrete pedestrian walkway crossings at grade across the right-of-way and trackage. The private way license is "a strictly private one and is not intended for public use (DOE 1998c)." The leases and private way license are not transferable and are not part of the property transfer addressed in this EA.

There are two railroad crossings for vehicular traffic and two additional crossings for pedestrians. None of the crossings have warning guards or lights. The railroad line in front of the DOE facility is a spur line used from a few times to several times daily for the transport of coal. Because trains must maneuver a sharp curve near the DOE Site, they travel past the site at very slow rates of speed. A train occasionally stops on the tracks for brief periods to switch cars, but an informal arrangement with the DOE provides that while a train may block one entrance to the site during these stops, it will not block both crossings.

A gravel road, 26 3/8 Road, runs from B 3/4 Road south past a police firing range to a Gunnison River access area south of the GJO Site. Because of vegetation and the curve of the river, this access area is neither accessible nor visible from the GJO Site. The river bank across from the GJO Site to the west is steep and rises to form a mesa. Only a few houses are built on and near the edge of the mesa, in the Little Park Road area. These houses are

accessible from Grand Junction only by crossing a bridge several miles from the GJO Site and traversing a road which winds up the west side of the mesa.

Two ponds, wetland areas and open space occupy approximately 8.1 hectares (20 acres) at the north end of the GJO Site. The North Pond, South Pond, and much of the wetland areas now located on the GJO Site were actually the location of a "gravel pit lake" and the "gravel development." These features appear on the tract map recorded with the warranty deed that conveyed the property to the United States in 1943.

The U.S. Army Corps of Engineers determined, in its Flood Hazards Study of 1976, that the GJO facility was not in either the 100-year or 500-year floodplain of the Gunnison River because of the protection afforded by the earthen dike, which is located between the facility and the river. The dike must be maintained in order to secure the facility from 100-year and 500-year flood events. The Mesa County Housing and Urban Design Flood Insurance Rate Map (FEMA 1992) places the GJO facility within the 1,000-year floodplain.

Environmental Consequences

Commercial Use. The site would be a mix of office space and retail space but no industrial uses would be present.

Industrial Use. This use would be similar to land uses approximately 1.6 kilometers (1 mile) south of the site where another gravel pit is located. It would not affect the firing range adjacent to the site.

Mixed Use. Under the mixed use scenario, it is envisioned land use would be nearly the same as the current use.

Open Space. Under the open space scenario, the land would revert to open space.

No Action Alternative. There would be no changes in land use under the No Action Alternative.

4.6 INFRASTRUCTURE

Building utilities include electricity, natural gas (heating), water, sewer, and telecommunications. Other than electricity, none of the utilities extend beyond the main grouping of buildings. Distribution for each of the utility systems can be seen in Figures 6 through 11 in Section 3.5 of the *Facility Condition Assessment* (DOE, 1998a). The following data is compiled from the *Facility Condition Assessment* (DOE 1998a).

Electrical Power. Electrical power is supplied to the facility by the Public Service Company of Colorado through a 13,000-volt main feeder to the main substation south of Building 810. GJO owns the primary and secondary electrical systems on the facility. Average monthly on-peak and off-peak electrical usages for the GJO are 929 and 787 kilowatts, respectively.

Forty electrical transformers are located on the facility. In 1988, all on-site electrical transformers owned by DOE that contained 50 or more parts per million PCBs were retrofitted with dielectric fluid containing less than 50 ppm of PCBs. An off-site contractor disposed of the removed dielectric fluid at a permitted EPA treatment facility. Several of the on-site transformers belong to the Public Service Company of Colorado; the PCB content in the dielectric fluid in these transformers is unknown.

Natural Gas. The Public Service Company of Colorado and the Western Natural Gas and Transmission Corporation supply natural gas to the facility through a feed-line located in Building 40. From Building 40, natural gas is distributed through polyethylene lines to all the gas-fired hot-water boilers on the facility. There are 18 water boilers located in 13 facilities. Heat is generated in these cast-iron sectional hot water boilers and

distributed to individual rooms. Exhaust gases produced by the heating system include negligible amounts of carbon monoxide and nitrous oxide.

Water Supply. The GJO contracts with the city of Grand Junction for domestic water. The city generally obtains water from Kannah Creek and rarely draws water from the Colorado and Gunnison Rivers. Domestic water is used for drinking water, laboratory purposes, fire protection, and lawn irrigation. In 1989, drinking water from all water coolers on site was tested for lead. The analytical results indicated that the drinking water was in compliance with the Colorado drinking water standard for inorganic lead (0.005 milligram per liter). The DOE conducted lead testing and installed back flow preventers.

Fuel Storage. Fuel is stored in four areas on the GJO facility. An approximately 100-gallon above ground storage tank with secondary containment is located west of Building 3022. A small quantity (approximately 10 gallons) of unleaded gasoline for use in the maintenance shops is stored in approved 2.5- and 5-gallon gasoline containers inside Building 3022. About 10 gallons of diesel fuel is stored in a metal fuel tank in Building 20 for use in operating an emergency generator in the event of a power outage. The fourth source is a 500-gallon propane tank located south of Building 20. Propane fuel is piped into Building 20 and is used to operate fusion furnaces in the Analytical Laboratory. Protection of the tank is ensured by the placement of six steel posts around the tank.

Storm-Drain System. A series of drain lines underlie the GJO facility and collect storm-water runoff. During precipitation events, storm water is routed through the buried lines into a lift station near the southern terminus of the South Pond. It is discharged into the South Pond once the water level within the lift station reaches the elevation of the discharge line. Because the storm-water effluent consists of runoff from the facility parking lots, office buildings, and paved areas, EPA determined in 1992 that a National Pollutant Discharge Elimination System permit was not required for the facility. Current site activities and operations are continually evaluated for applicability to National Pollutant Discharge Elimination System regulations. To date, no activities that would require DOE to obtain a National Pollutant Discharges Elimination System storm-water permit have been identified.

Sanitary Sewer. Sewer effluent from the GJO facility is routed to the publicly owned treatment works operated by the city of Grand Junction. The effluent consists of domestic sewage, discharges from the Analytical Chemistry, Radon, and Environmental Sciences Laboratories, detergent wash water from the cafeteria, and water used for facility maintenance purposes.

In March 1989, the city issued an Industrial Pretreatment Permit (No. 0023) to the GJO in accordance with provisions in Article 10 of Chapter 25, Code of Ordinance for the city of Grand Junction. Article 10 sets forth uniform requirements for users of city and county publicly owned treatment works and enables the city to comply with the *Clean Water Act of 1977*, as amended, the General Pretreatment Regulations (40 CFR 403), and the *Colorado Water Quality Control Act*, as amended. The permit was revised by the city in February 1993. The revision required that the sewer effluent be sampled for biological oxygen demand, oil and grease, PCBs, pH, silver, total suspended solids, total dissolved solids, ammonia, and temperature. The revised permit established threshold limits for temperature, pH, oil and grease, PCBs, and silver. The permit expired in June 1999. The city did not require GJO to renew the permit because it is no longer a significant industrial user due to lower flow rates. GJO continues to sample its sewer effluent as part of its ongoing environmental monitoring program, although no longer required to do so by the city. The City of Grand Junction maintains its own NPDES permit for the city owned treatment plant.

Telephone Service. Telecommunications specialists install, program, and maintain telephones and telephone lines at the GJO facility. The U.S. West central office in Grand Junction, Colorado, provides phone service for off-site local calls; the Federal Telephone System furnishes long-distance phone service.

Environmental Consequences

Commercial Use. Under this scenario, some utility systems might need to be retrofitted or upgraded to accommodate individual users or tenants. Currently, most buildings are not individually metered. The system has the design capacity to handle in excess of 600 personnel.

Industrial Use. Under this scenario, the existing utility systems would be disconnected at or near the facility boundary and capped. The utility system would likely be demolished and removed or abandoned in place.

Mixed Use. Environmental effects would be similar to the all Commercial scenario and the No Action Alternative. Some upgrades might be required to the existing system and individual metering would likely be needed at individual buildings. The system has the design capacity to handle in excess of 600 personnel.

Open Space. Environmental effects would be similar to the Industrial scenario. The on-site utility system would be capped and abandoned in-place. Impacts to the local and regional utility system would be negligible.

No Action Alternative. Environmental consequences under the No Action Alternative would be similar to those under the Proposed Action. The site operated with over 600 personnel as late as 1996, so the utility system is properly sized to handle the projected future population at the site. Some upgrades/retrofits may be necessary in the near future due to the age of the systems.

4.7 HUMAN HEALTH

Affected Environment

Because of the GJO facility's history as a uranium milling operation, contamination in buildings, soils, groundwater and surface water posed risks to human health. Ongoing cleanup of the site and controls restricting use of the groundwater and surface water will minimize the risks to workers and the general public.

All buildings have been surveyed for radiological contamination and will be remediated if necessary, then released for unrestricted use or demolished. Building 2 was released with supplemental limits that were determined through a Public Dose Evaluation (DOE 1996b) to pose no unacceptable risk to the general public. Building 20 is also undergoing a Public Dose Evaluation.

Current on-site operations include chemical and radiological analytical laboratories. Situations in which an on-site worker potentially could be exposed to above-background levels of radiation would be during preparation and analysis of radiological samples in the analytical laboratory and during handling of radon sources. If exposure were to occur, the primary pathways would be inhalation and ingestion of airborne particulates; inhalation of radon and radon daughters; or, direct exposure to gamma radiation from samples.

The primary risks to human health under present conditions are from nonradiological hazards such as (1) falling, tripping, or slipping; (2) industrial accidents; or (3) exposure to chemicals. The risk of hazards in the first two categories is about the same as for workers in any office setting or on any construction site. Implementation of health and safety measures, such as job-site safety meetings helps to reduce these risks. The potential for laboratory workers to be exposed to chemicals is reduced by implementation of laboratory hygiene plans.

Currently, use of the groundwater and surface water is prohibited. DOE evaluated the risks of recreational use of the surface water, as discussed below.

Environmental Consequences

Commercial Use. Activities identified as potentially occurring under this scenario are similar to those currently ongoing at the site: light industrial, general office, and analytical laboratory. Potential hazards associated with these operations are the same as described below for the No Action Alternative. Activities identified in this scenario will not significantly increase the current air emissions and will not provide the groundwater for public use.

Personnel involved in construction or building modifications/demolitions would have the highest exposure to construction hazards and industrial accidents. The risks are similar to those at other construction sites. The potential for other workers on the facility and general public to be exposed to chemicals, toxic substances, radioactive substances, radioactive sources, tripping hazards, or industrial accidents would be low and typical for an office environment.

In the event that the ponds/wetlands are left intact under this scenario, the potential impacts to human health from contact with the ponds would be the same as that described below for the Open Space scenario.

Industrial Use. Activities identified in the Industrial Use scenario include mining the site for gravel resources. Potential hazards associated with these operations are consistent with gravel mining activities currently ongoing in active gravel pits near the site. Water generated from dewatering operations would be handled according to site-specific requirements established by the Colorado Department of Public Health and Environment. These requirements would minimize the risk to workers and the general public. Overall dust emissions would increase, but emissions of radionuclides would cease.

Gravel mining operations are regulated under Occupational Safety and Health Administration (OSHA) and industrial accidents would be about the same as for general construction or other earthmoving operations.

Mixed Use. Activities identified as potentially occurring under this scenario are similar to those currently ongoing at the site: light industrial, general office, analytical laboratory. Potential hazards associated with these operations are the same as described below for the No Action Alternative. Activities identified in this scenario will not significantly increase air emissions. Groundwater and surface water for use as drinking water would be prevented by institutional controls.

Risks to personnel involved in construction or building modifications/demolitions would be the same as those described above for the Commercial Use scenario. Similarly, the potential for other workers on the facility and general public to be exposed to chemicals, toxic substances, radioactive substances, radioactive sources, construction hazards, or industrial accidents would be low or about the same as that for a worker in a similar office environment.

In the event that the ponds are left intact under this scenario, the potential impacts to human health from contact with the ponds would be the same as that described below for the Open Space scenario.

Open Space. Under this scenario, all structures at the GJO facility would be demolished and the entire area would be used as an open space, park-like area. Since prior remedial actions have eliminated risks from the soils, the surface water bodies onsite would be the remaining potential sources of risk to human health. In order to quantify these potential risks, a human health risk assessment was conducted as a separate task from this EA. Various potential future uses of the GJO facility were analyzed, including potential uses of the surface water bodies onsite under the Open Space scenario. These potential uses include ecological viewing, teaching, field trips, and recreational fishing.

Two potential sources of risks are: (1) ingestion of fish from the ponds, and (2) unintentional ingestion of small quantities of pond water (incidental ingestion) during educational and recreational activities. From fish ingestion, manganese and uranium are contaminants that may pose risks to human health. Assuming consumption of fish at

a conservative rate of 25 grams (approximately one ounce) per day, 365 days per year, the risks were determined to be unacceptable, according to EPA guidelines. It is therefore recommended that the taking of fish for human consumption not be permitted under all scenarios.

Incidental ingestion of surface water was assumed at the rate of 20 milliliters per day, 2 days a year for a child; and 20 milliliters per day, 7 days a year for an adult. No adverse human health effects would be expected to occur for these exposure assumptions. Sulfate, however, is present in the surface water above drinking water guideline levels. It is recommended that prohibitions on the use of surface water as a drinking water source remain in place.

No Action Alternative. As concluded in the June 1996 EA (DOE 1996a), current facility operations do not present a risk to the general public. Current air emissions are well below Federal and state standards. Potential health risks from contamination due to previous site uses would be mitigated via remediation. Contaminated groundwater would remain unavailable for public use. Also, institutional controls would restrict use of the surface water bodies at the GJO.

Workers involved in onsite activities would potentially be exposed to chemicals, toxic substances, and radioactive sources. All these personnel would be required to follow established operational, health, and safety procedures to reduce or eliminate their exposure to harmful elements. Additionally, standard operating procedures would require engineering or radiological controls to be implemented to reduce exposure limits.

4.8 ECOLOGICAL RESOURCES

Affected Environment

The existing environment is commercial and office use with residential style landscaping and maintenance. Developed areas on the property contain buildings, asphalt, concrete, gravel, roads, and lawns of low value as habitat for indigenous plants and wildlife. This habitat is marginal for most wildlife species that inhabit the adjacent native habitat. Areas closer to the Gunnison River include two small ponds (the North and South Ponds) and small patches of upland, wetland, and riparian vegetation (see Figure 1.2-2). Most of this open space was disturbed by environmental remediation activities between 1989 and 1994 and subsequently restored as natural habitats (DOE 1996a and 1999a). Lists of plant and wildlife species inhabiting the property and surrounding vicinity are included in the *Environmental Assessment of Facility Operations* completed in 1996 (DOE 1996a) and are copied in Appendix B. A list of bird species sighted on (or in the immediate vicinity of) the property by DOE-GJO employees is provided in Appendix C.

Specific ecological restoration activities completed on the property are described in Section 4.4 and depicted in Figure 1.2-2 (DOE 1998b). Vegetation in the restored wetland areas is presently dominated by reed canary grass (*Phalarus arundinacea*), hardstem bulrush (*Scirpus acutus*), common cattail (*Typha latifolia*), and willows (*Salix* sp.). Restored riparian vegetation includes seedlings of indigenous Fremont cottonwood (*Populus fremontii*), skunkbush sumac (*Rhus trilobata*), and buffaloberry (*Shepherdia argentea*). But it is dominated by naturalized exotic shrubs and trees such as saltcedar (*Tamarix ramosissima*) and Russian olive (*Elaeagnus angustifolia*) (DOE 1996a).

Vegetation in the restored wetland and riparian areas, and in undeveloped upland on the property, provides habitat for diversity of reptiles, amphibians, birds, and small mammals. Large mammals, such as coyotes (*Canis latrans*) and mule deer (*odocoileus hemionus*), may occasionally visit the undeveloped areas on the property but are likely discouraged by the urban surroundings. The surrounding area is too urban to provide habitat for bears. Mature trees adjacent to the property and along the Gunnison River provide roosting habitat for the bald eagle (*Haliaeetus leucocephalus*) and snowy egret (*Egretta thula*). The ponds also provide habitat for small fish (such as various minnows and shiners), but do not likely support sport fish. The Gunnison River supports a diverse fish population, including large mouth bass (*Micropterus salmoides*) and various species of trout.

A search of the Biological and Conservation Data system maintained by the Colorado Natural Heritage Program revealed six natural heritage resources that have been documented in the immediate vicinity of the property (Table 4.8-1) (Johnson 1999). Natural heritage resources include occurrences of significant natural communities and rare, threatened, or endangered plants or animals. Of the resources documented for the property, only the Colorado pikeminnow has a Federal or state status as threatened or endangered. The Colorado pikeminnow (or Colorado squawfish) migrates long distances in rivers and streams to spawn, using deep pools or eddies to rest and feed and riffles or shallow runs to mate. Although once inhabiting much of the Colorado and Gila River basins, its populations have declined due to changes in stream flow and temperature, loss of habitat from reservoir construction, blockage of migration routes, and the introduction of non-native fish (UNR 1999a; Arizona 1999).

The other species indicated by Colorado Natural Heritage Program have no special Federal status, but they are listed by the State of Colorado as "Special Concern." One, the roundtail chub, is another migratory fish inhabiting the Gunnison River. The other "Special Concern" species are amphibians, not likely to occur in developed areas, but they could potentially inhabit the wetlands, riparian lands, and other naturally vegetated areas adjoining the Gunnison River. The Grand Junction milkvetch and snowy egret lack Federal or state status but are considered somewhat rare in the state. Each could potentially occur in the naturally vegetated lands adjoining the Gunnison River.

In addition to the Colorado pikeminnow, a recent review of the area by the U.S. Fish and Wildlife Service noted that the Gunnison River may also provide habitat for three other federally endangered fish species: the humpback chub (*Gila cypha*), bonytail chub (*Gila elegans*), and razorback sucker (*Xyrauchen texanus*) (Moyer 1999). Each of these fish species have experienced population declines from the same causes as the Colorado pikeminnow (UNR 1999b, c, and d). The U.S. Fish and Wildlife Service review also noted that the riparian vegetation associated with the Gunnison River could provide habitat for the federally endangered willow flycatcher (*Empidonax traillii extimus*), and mature cottonwood trees along the river could provide roosting sites for the federally threatened bald eagle (*Haliaeetus leucocephalus*).

In a separate review, the Colorado Division of Wildlife noted the potential occurrence of the Colorado pikeminnow and razorback sucker in the Gunnison River, and the willow flycatcher in the associated riparian vegetation (Creeden 1999). The Colorado Division of Wildlife further emphasized that the riparian vegetation provides important habitat to a diversity of wildlife, including various hawk, eagle, and migratory songbird species. The Colorado Division of Wildlife review also noted that a kit fox (*Vulpes macrotis*) was sighted in the vicinity of Grand Junction but that it was unknown if it occurred on the DOE property. The preferred habitat for the kit fox is desert scrub and desert grassland (Southwest Wildlife 1999), which occurs in areas outside of the DOE property, but not inside. Extensive human activity has likely discouraged entry onto the property by this species.

Environmental Consequences

Commercial Use. The recipient of the property could convert all or part of the remaining 10 hectares (24.7 acres) of open space to commercial development, resulting in the permanent loss of up to approximately 0.8 hectares (2 acres) of wetland habitat, 1.7 hectares (4.2 acres) of riparian habitat, 4.4 hectares (11 acres) of upland habitat, and 1.2 hectares (3 acres) of shallow water habitat comprising the North and South Ponds. Most of the affected habitat is of recent origin, having been planted in 1995 and 1996 on exposed soils following an environmental remediation. Mature willow and cottonwood saplings in the adjacent areas provide roosting sites for the bald eagle or snowy egret. The habitat value of the riparian vegetation for the willow flycatcher is reduced by the predominance of invasive species such as saltcedar and Russian olive.

Development under the Commercial Use scenario would not disturb the existing dike and riverbanks and thus not likely affect the habitat value of the Gunnison River for the federally endangered fish species. Riparian

Table 4.8-1. ***Natural Heritage Resources Documented for Immediate Area of DOE-GJO Site. Colorado Natural Heritage Program, Biological and Conservation Datasystem Township 1 South, Range 1 West, Sections 26 and 27***

Scientific Name	Common Name	Taxon	Federal Status	State Status	Global Rank	State Rank	Typical Habitat
Astragalus linifolius	Grand Junction Milkvetch	Plant	None	None	G3Q	S3	Dry clayey slopes and gullies in pinyon-juniper woodlands and occasionally near cottonwoods.
Egretta thula	Snowy Egret	Bird	None	None	G5	S2B, SZN	Reservoirs, grassy marshes, wet meadows, and rivers. Nests in trees or shrubs adjacent to reservoirs and marshes.
Gila robusta	Roundtail Chub	Fish	None	SC	G2G3	S2	Slow moving water adjacent to faster water. Young in river eddies and irrigation ditches.
Hyla arenicolor	Canyon Treefrog	Amphibian	None	SC	G5	S2	Permanent pools or cottonwoods, especially in rocky canyons with pinyon-juniper cover on slopes.
Ptychocheilus lucius	Colorado Pikeminnow	Fish	LE	T	G1T?Q	S1	No information provided.
Spea intermontana	Great Basin Spadefoot	Amphibian	None	SC	G5	S3	Pinyon-juniper woodland, sagebrush, semi-desert shrublands, usually in or near dry rocky slopes or canyons.

Federal Status: LE - Listed as Endangered under the *Endangered Species Act*

State Status: T - Threatened, SC - Special Concern

Global Ranks: G1- Critically imperiled, G2 - Imperiled, G3 - Rare or uncommon, G5 - Demonstrably secure,
G2G3 - rank intermediate between G2 and G3,
G1T?Q - Species is G1, variety or subspecies unranked, questionable taxonomy

State Ranks: S1 - Critically imperiled, S2 - Imperiled, S3 – Vulnerable,
SZN - Non-breeding season imperilment of nonresident (migratory) species

Habitat descriptions based on draft descriptions under development by Colorado Natural Heritage Program using various scientific sources.

vegetation on the river shoreline would not be disturbed. The dike would prevent potential sedimentation of the river from construction activities. Stormwater and wastewater discharges from the commercial facilities would be directed to municipal sewers.

Industrial Use. The recipient of the property could convert all or part of the remaining 8 hectares (20 acres) of open space inside the dike to a gravel pit operation, resulting in the loss of up to approximately 0.8 hectares (2 acres) of wetland habitat, 1.7 hectares (4.2 acres) of riparian habitat, 4.4 hectares (11 acres) of upland habitat, and 1.2 hectares (3 acres) of shallow water habitat comprising the North and South Ponds. However, most of the affected habitat is of recent origin, having been planted in 1995 and 1996 on exposed soils following an environmental remediation. Mature willow and cottonwood saplings in the adjacent areas provide roosting sites for the bald eagle or snowy egret. The habitat value of the riparian vegetation for the willow flycatcher is reduced by the predominance of invasive species such as saltcedar and Russian olive.

Because the existing dike and riverbanks would not be disturbed, the gravel pit operation would not likely affect the habitat value of the Gunnison River or affect any of the federally endangered fish species potentially inhabiting the river. Riparian vegetation on the river shoreline would not be disturbed. The dike would prevent potential sedimentation from the gravel pit. The gravel pit operations would not likely discharge to the river, and any discharges would require a permit and have to meet applicable state and Federal water quality criteria.

There would be a future potential to restore riparian, wetland, and/or upland vegetation on areas of the gravel pit once extractive operations have been completed and the land reclaimed. The ability to restore such vegetation would depend upon future land use decisions for the site. Restoring natural vegetation to reclaimed mine sites is similar in practice to restoring vegetation to land disturbed by environmental remediation. Thus, re-establishment of habitats similar to those on the site at this time would be possible in the future.

Mixed Use. The recipient of the property could convert all or part of the remaining 8 hectares (20 acres) of open space inside the dike to various types of urban development, resulting in the permanent loss of up to approximately 0.8 hectares (2 acres) of wetland habitat, 1.7 hectares (4.2 acres) of riparian habitat, 4.4 hectares (11 acres) of upland habitat, and 1.2 hectares (3 acres) of shallow water habitat comprising the North and South Ponds. But, as explained for the Industrial and Commercial Use scenarios, most of the affected habitat is of recent origin, having been planted in 1995 and 1996 on exposed soils following an environmental remediation. Mature willow and cottonwood saplings in the adjacent areas provide roosting sites for the bald eagle or snowy egret. The habitat value of the riparian vegetation for the willow flycatcher is reduced by the predominance of invasive species such as saltcedar and Russian olive.

As for the Industrial and Commercial Use scenarios, the development under the Mixed Use scenario would not disturb the existing dike and riverbanks and thus not likely affect the habitat value of the Gunnison River for the federally endangered fish species. Riparian vegetation on the river shoreline would not be disturbed. The dike would prevent potential sedimentation of the river from construction activities. Stormwater and wastewater discharges from the new development would be directed to municipal sewers.

Open Space. The existing natural habitats on the property would not be disturbed under the Open Space scenario. Furthermore, these habitats would be complemented by additional upland habitats that establish, through restoration or natural succession, on formerly developed uplands on the property. Standard erosion control practices would be implemented during the demolition process to protect adjoining ponds, wetlands, and naturally vegetated areas. Departure of industrial activity from the site would likely make the existing natural habitats on the site more attractive to most wildlife. The entire site would likely be placed under an integrated wildlife habitat by the Colorado Department of Natural Resources or other state or Federal agency.

No Action Alternative. The existing natural habitats on the property would remain undisturbed under the No-Action Alternative. The DOE would continue to manage the open space as wildlife habitat.

4.9 CULTURAL RESOURCES

Affected Environment

Cultural resources are those aspects of the physical environment that relate to human culture and society, and those cultural institutions that hold communities together and link them to their surroundings. Cultural resources include expressions of human culture and history in the physical environment such as prehistoric or historic archaeological sites, buildings, structures, objects, districts, or other places including natural features and biota which are considered to be important to a culture, subculture, or community. Cultural resources also include traditional lifeways and practices, and community values and institutions.

The cultural resources present in western Colorado demonstrate the prehistoric use of the region for over 10,000 years; the ongoing tradition of the Utes and other Native American groups; EuroAmerican settlement, agriculture, ranching and mining; and the importance of the GJO in the history of uranium exploration, mining and processing activities for the Manhattan Project during World War II and the Cold War.

Cultural Resource Regulations. The identification of cultural resources and DOE responsibilities with regard to cultural resources are addressed by a number of laws, regulations, executive orders, programmatic agreements and other requirements. The principal Federal law addressing cultural resources is the *National Historic Preservation Act* of 1966, as amended (16 USC 470 et seq.), and implementing regulations (36 CFR 800) that describe the process for identification and evaluation of historic properties; assessment of the effects of Federal actions on historic properties; and consultation to avoid, reduce, or minimize adverse effects. The term "historic properties" refers to cultural resources that meet specific criteria for eligibility for listing on the National Register of Historic Places. This process does not require preservation of historic properties, but does ensure that DOE's decisions (as a Federal agency) concerning the treatment of these places result from meaningful considerations of cultural and historic values and of the options available to protect the properties.

The identification and evaluation of cultural resources for National Register of Historic Places eligibility is the responsibility of the DOE with the concurrence of the State Historic Preservation Officer. The Advisory Council on Historic Preservation, an independent Federal agency, administers the provisions of Section 106 of the *National Historic Preservation Act,* regarding cultural resources and has review and oversight responsibilities defined in 36 CFR 800.

Cultural Resources of the GJO. A literature review indicates that the GJO area has been extensively disturbed by past activities including development, environmental restoration, prior use as an ore processing facility, and floods. The potential for the existence and discovery of intact prehistoric or historic archaeological resources that would meet National Register of Historic Places eligibility requirements is considered very low. Likewise, no Native American or other traditional use areas or religious sites are known to be present on the GJO property. No Native American remains or artifacts of religious or cultural significance are known to exist or to have been removed from the GJO.

All buildings and structures on the GJO have been surveyed and evaluated for National Register of Historic Places eligibility. An historic district has been defined which encompasses the GJO area. The contributing elements to the district include 13 buildings (2, 12/12A, 19, 20, 26, 28, 29, 32, 40, 43, 810, 938, and 3022), an instrument calibration facility, and the protective dike (See Table 4.9-1). Twenty-seven buildings and structures within the boundaries are considered non-contributing elements and three buildings have been demolished since the survey was conducted. The district is considered significant for its association with the Manhattan Project during World War II, and the Cold War Federal programs for the exploration, mining and processing of uranium and vanadium. As an administrative center for Federal programs, the GJO was the focus of the uranium prospecting and mining boom of the 1950s and was associated with the development of technical processes that substantially advanced the exploration and processing of uranium ores. The proposed district includes buildings that appear to meet the criteria of "exceptional importance" required for listing properties that are less than 50

years old (Schweigert 1999a). In a Memorandum of Agreement dated August 14, 1998, the DOE-GJO agreed to consult with the State Historic Preservation Officer on the management of, and potential impacts to, the GJO Historic District.

Environmental Consequences

Impact Analysis Methods. Potential impacts on historic properties are assessed by applying the Criteria of Adverse Effect (as defined in 36 CFR 800.5a). An adverse effect is found when an action may alter the characteristics of a historic property that qualify it for inclusion in the National Register of Historic Places in a manner that would diminish the integrity of the property's location, design, setting, workmanship, feeling, or association. Adverse effects may include reasonably foreseeable effects caused by the action that may occur later in time, be farther removed in distance, or be cumulative.

Table 4.9-1. ***Contributing Elements of the Grand Junction Project Office Historic District***

Building/ Feature	Use / Function	Constructed	Integrity
2	Communications	1943	Fair
12/12A	Administration	Pre-1943/1948	Fair
19	Guard House	1948	Fair
20	Laboratory	1953/1957	Fair
26	Offices	1954	Good
28	Warehouse/Repair	1955	Fair
29	Truck Dispatch	1955	Good
32	Laboratories	1954	Good
43	Storage	Post-1967	Good
40	Utilities	1958	Excellent
810	Offices	1949/50/80	Good
938	Office/Auditorium	1954/55/63	Fair
3022	Laboratories/Offices	1953/55	Fair
	Calibration Facility	1950s	Good
	Earthen Dike	1957	Good

Source: Schweigert 1999.

Commercial Use. The lands proposed for transfer include the National Register of Historic Places-eligible GJO Historic District. Impacts to this historic property from the transfer itself would include the loss of Federal protection and responsibility for this resource if transferred to a non-Federal entity. The transfer, lease, or sale of historic properties out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's significance would be an adverse effect. When transferred, future consideration of this historic property under the *National Historic Preservation Act* and other Federal laws, regulations, guidelines, and executive orders would be limited. Transferred to a Federal entity would provide continued Federal protection and responsibility for the resources.

The All Commercial Land Use scenario represents a continuation of current land uses and expansion of similar site activities. Under this scenario, it is anticipated that many of the buildings in the GJO Historic District could be reused by the receiving entities. The continued use of historic buildings in a manner that does not diminish the integrity of the resource would be a positive impact and any abandonment leading to deterioration would be a negative impact.

New commercial construction is anticipated under this scenario. The Commercial Land Use scenario does not specifically call for the removal of any of the buildings or features that are contributing elements of the historic

district, but removal by the receiving entities in the future is possible. Likewise, possible modifications by the receiving entities to enhance reuse of these historic buildings or features have not been defined, but such modifications could reasonably be expected to occur in the future. Modifications to historic buildings could negatively impact the integrity of the historic property. New development could also alter the setting of the historic district.

The proposed transfer of the facility would limit the effective options for management of the historic property unless it was transferred to another Federal entity. The DOE would not maintain an interest in the facility or control future uses. Any covenants or other restrictions on future owners would be unlikely to effectively preserve the historic appearance of the facility and would discourage reuse of the site. The long-term preservation of the GJO facility in its current form is practically impossible. Therefore, historic preservation actions by DOE must be undertaken before the property is divested.

The *Final Historic Structures Survey of the Department of Energy Grand Junction Office* recommends that the historical values of the facility can be preserved and made available for public appreciation by (a) completing Historic American Engineering Record documentation of the facility at a level determined in consultation with the National Park Service, (b) completion of a public information document that addresses the history and importance of the facility, and (c) the installation of commemorative signage at the site. The change in the proposed disposition of the facility and these mitigations will be reflected in a new Memorandum of Agreement between DOE and the State Historic Preservation Officer (Schweigert 1999a).

Industrial Use. Impacts of this scenario from the transfer itself would include the loss of Federal protection and responsibility for the GJO Historic District. In addition, most or all of the contributing features of the GJO District except the dike could be demolished under this land use scenario. The physical destruction of the historic property would be an adverse effect.

As described for the Commercial Use scenario, the proposed transfer of the facility would limit the effective options for management of the historic property and, therefore, historic preservation actions by DOE must be undertaken before the property is divested. The management recommendations of the *Final Historic Structures Survey of the Department of Energy Grand Junction Office* should be implemented prior to transfer.

Mixed Use. Impacts to the GJO Historic District and potential mitigations would be the same for the Mixed Use scenario as those described for the Commercial Use scenario.

Open Space. Impacts to the GJO Historic District and potential mitigations associated with the Open Space scenario would be similar to those described for the Industrial Use scenario. There would be a loss of Federal protection and responsibility for the resource and contributing elements of the district would be removed. The management recommendations of the *Final Historic Structures Survey of the Department of Energy Grand Junction Office* (Schweigert 1999b) should be implemented prior to transfer.

No Action Alternative. Under the No Action Alternative, the GJO would remain under the responsibility of the DOE and the treatment of the cultural resources present would continue to be subject to Federal laws, regulations, guidelines, and executive orders. The use of the historic structures for DOE and tenant activities would continue. Ongoing minor impacts from natural processes and aging on the physical integrity of the buildings would occur. The development of a Programmatic Agreement that addresses the potential effects to the GJO Historic District that may accrue from DOE-GJO's operation, remediation, divestiture, or other activities at the facility would continue in accordance with the Memorandum of Agreement dated August 14, 1998. In addition, the GJO would also develop a Cultural Resources Management Plan in consultation with the State Historic Preservation Officer and the National Park Service which will be referenced in the Programmatic Agreement. Management recommendations from the *Draft Historic Structures Survey of the Department of Energy Grand Junction Office,* which were predicated on the continued management of the GJO Historic District, would provide the basis for the provisions of the Cultural Resources Management Plan. These recommendations include Historic American

Engineering Record documentation of the site and contributing elements, maintenance of property boundaries, maintenance of visual associations among contributing elements where possible, preservation of exterior appearances of contributing elements, and encouragement of adaptive reuse of contributing buildings (Schweigert 1999b).

4.10 AIR QUALITY

Affected Environment

Regional Air Quality. The Federal *Clean Air Act* (42 USC 7401, et seq.), as amended, authorizes the EPA to establish national ambient air quality standards to protect public health and welfare. Federal ambient air quality standards have been adopted for the following six criteria pollutants: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, inhalable and fine particulate matter (PM_{10} and $PM_{2.5}$), and lead. National ambient air quality standards for these pollutants are presented in Table 4.10-1. Colorado has adopted the national ambient air quality standards as the state air quality standards, with the exception of sulfur dioxide.

Areas that violate Federal air quality standards are designated as Federal nonattainment areas for the relevant pollutants. Nonattainment areas are sometimes further classified by degree (marginal, moderate, serious, severe, and extreme). Areas that comply with air quality standards are designated as attainment areas for the relevant pollutants. Areas for which monitoring data are lacking are designated as unclassified. Unclassified areas are treated as attainment areas for most regulatory purposes. Mesa County, Colorado, where the GJO Site is located, is unclassified for all criteria pollutants.

Air Quality Emission Sources. Sources of criteria air pollutants associated with GJO facility and tenant operations include vehicle traffic, building heating, painting activities, and small amounts of fugitive dust.

Two radon emission sources and two radioparticulate emission point sources are located at the GJO facility (DOE 1996a). Radon is emitted from instrument calibration facilities and radon calibration chambers, and radioparticulates are emitted from the Analytical Laboratory and Baghouse. Radon emissions released from the GJO facility do not affect atmospheric radon concentrations at the facility boundary (DOE 1996a). Radioparticulate emission dose modeling indicates that the total dose to off-site receptors is well below EPA and DOE standards (DOE 1996a).

DOE maintains an air permit from the Colorado Department of Public Health and Environment for the Analytical Laboratory; all other stationary sources are exempt from permit requirements.

Regulatory Considerations. Section 176(c) of the *Clean Air Act* (42 USC 7401, et seq.) requires Federal agencies to ensure that their actions are consistent with the *Clean Air Act* (42 USC 7401, et seq.) and with applicable air quality management plans (state implementation plans). Agencies are required to evaluate their proposed actions to make sure they will not violate or contribute to new violations of any Federal ambient air quality standards, will not increase the frequency or severity of any existing violations of Federal ambient air quality standards, and will not delay the timely attainment of Federal ambient air quality standards.

The EPA has promulgated separate rules that establish conformity analysis procedures for transportation-related actions and for other (general) Federal agency actions. The EPA general conformity rule requires a formal conformity determination document for Federal actions occurring in nonattainment areas or in certain designated maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The *Clean Air Act* (42 USC 7401, et seq.) conformity guidelines do not apply to Federal actions at the GJO Site since it is not in a nonattainment area.

Table 4.10-1. ***Federal Ambient Air Quality Standards***

Pollutant	Symbol	Averaging Time	Standard		Violation Criteria
			ppm	$\mu g/m^3$	
Ozone	O_3	1 Hour	0.12	235	If exceeded on more than 3 days in a 3-year period.
		8 Hours	0.08	160	If exceeded by the mean of annual. 4^{th} highest daily values for a 3-year period.
Carbon Monoxide	CO	8 Hours	9	10,000	If exceeded on more than 1 day per year.
		1 Hour	35	40,000	If exceeded on more than 1 day per year.
Inhalable Particulate Matter	PM_{10}	Annual Arithmetic Mean	---	50	If exceeded as a 3-year single station average.
		24 Hours	---	150	If exceeded by the mean of annual 99^{th} percentile values over 3 years.
Fine Particulate Matter	PM_{25}	Annual Arithmetic Mean	---	15	If exceeded as a 3-year spatial average of data from designated stations.
		24 Hours	---	65	If exceeded by the mean of annual 98th percentile values over 3 years.
Nitrogen Dioxide	NO_2	Annual Average	0.053	100	If exceeded.
Sulfur Dioxide	SO_2	Annual Average	0.03	80	If exceeded.
		24 Hours	0.14	365	If exceeded on more than 1 day per year.
		3 Hours	0.5	1,300	If exceeded on more than 1 day per year.
Lead Particles	Pb	Calendar Quarter	---	1.5	If exceeded.

Source: 40 CFR 50, 53, and 58.

Environmental Consequences

Commercial Use. Demolition of structures would have temporary short-term effects similar to those described below for the Industrial Use scenario but at a smaller scale. Construction of additional commercial space in developable parcels would result in fugitive dust emissions from soils disturbance and vehicle exhaust emissions from construction equipment. Site grading in particular has the potential for creating localized dust nuisance conditions. These conditions would be temporary in nature and, if necessary, could be reduced using standard dust control measures, such as watering.

The Commercial Use scenario would result in the continuation of many of the same uses of the site as under existing conditions, though the number of vehicle trips projected under this scenario would be less than under baseline conditions. Operation of the Analytical Laboratory by a private entity would be required to comply to the same standards and permitting requirements as under DOE operation. Air quality conditions would be similar to those under the No Action Alternative.

Industrial Use. Demolition of existing structures would result in temporary short-term emissions from construction equipment exhaust, from site disturbance, and from demolition of the buildings themselves. Demolition activities could introduce asbestos and lead particles into the air if present in the structures, creating a potentially hazardous situation for workers. If asbestos and lead-based paint are present, demolition activities should be undertaken by personnel certified by the OSHA to handle hazardous materials and wastes.

Operation of the site as a gravel pit would be subject to state permitting requirements for this type of operation. Gravel pits can be substantial sources of particulate emissions from crushing and loading operations and may require emissions controls to reduce dust generation.

Mixed Use. Construction in developable areas would have temporary short-term effects similar to those described for the Commercial Use scenario.

The Mixed Use scenario would result in the continuation of many of the same uses of the site as under existing conditions, though more light industrial uses are projected than under the Commercial Use scenario. Use of newly developed areas would result in minor increases in air pollutant emissions similar in type to current nonradiological pollutants emitted by existing users. Operation of the Analytical Laboratory by a private entity would be required to comply to the same standards and permitting requirements as under DOE operation. The number of vehicle trips projected under this scenario would be less than under baseline conditions and overall air quality conditions would be similar to those under the No Action Alternative.

Open Space. Demolition of existing structures to restore the site to open space would have the same temporary short-term effects as described for the Industrial Use scenario. Configuring the site for open space uses, such as parkland or a wildlife preserve, would result in fugitive dust emissions from site grading and in minor emissions from construction vehicle exhaust; these emissions also would be temporary and short-term.

Operation of the site as parkland or as another public use area would result in emissions from employee and visitor vehicle trips to the site; these vehicle trips likely would be less than the numbers of vehicle trips under baseline conditions, though use times could be concentrated more on weekends and evenings during spring, summer and fall months.

No Action Alternative. Under the No Action Alternative, air pollutants would continue to be emitted at current rates. Because current emissions comply with permitting regulations, conform to DOE and EPA standards for radioparticulates, and do not result in a violation of air quality standards, no adverse effects to air quality are predicted. Because the GJO Site is not in a nonattainment area, it is not subject to the requirements of the *Clean Air Act* (42 USC 7401, et seq.) general conformity rule.

4.11 NOISE

Affected Environment

Sound travels through the air as waves of minute air pressure fluctuations caused by some type of vibration. Sound level meters measure pressure fluctuations from sound waves, with separate measurements made for different sound frequency ranges. These measurements are reported in a logarithmic decibel (dB) scale. Because the human ear is not equally sensitive to all frequencies, the "A-weighted" decibel scale (dBA) is used to weight the meter's response to approximate that of the human ear.

Average noise exposure over a 24-hour period often is presented as a day-night equivalent noise level. Equivalent noise level values are calculated from 24-hour averages, with the values for the nighttime period (10 PM to 7 AM) increased by 10 dB. The weighting of nighttime noise levels reflects the greater disturbance potential from nighttime noises.

Existing Noise Conditions

Noise Receptors. Sensitive receptors are land uses, such as residences, schools, libraries, and hospitals, that are considered to be sensitive to noise. There are no sensitive receptors on-site. Off-site receptors include a cemetery and residences across the river within one-half mile of the GJO Site.

Noise Sources. The primary noise sources at the GJO Site are vehicle traffic and light industrial activities. Temporary sources of noise are construction and cleanup activities. Off-site noise sources include a police firing range located about 200 yards east of the site and the railroad. Use of the firing range results in intermittent periods of sudden, high noise. The railroad is an intermittent source of noise; trains run by the site from twice a day to several times a day at five to ten miles per hour. The crossings do not have gates; therefore, the train engineers use the locomotive horns to warn motorists and pedestrians.

Regulatory Guidelines. The Federal *Noise Control Act of 1972* (42 USC 4901, et seq.) established a requirement that all Federal agencies must comply with applicable Federal, state, interstate, and local noise control regulations. Federal agencies also were directed to administer their programs in a manner that promotes an environment free from noise that jeopardizes public health or welfare.

The U.S. Department of Housing and Urban Development is the lead Federal agency setting standards for interior and exterior noise for housing. These standards, outlined in 24 CFR 51, establish site acceptability standards based on day-night equivalent sound levels. The standards are used to designate noise levels as acceptable, normally unacceptable, or unacceptable. The acceptable exterior noise level for residential housing is 65 dB or less, the normally unacceptable noise level is 65 dB to 75 dBA, and the unacceptable noise level is above 75 dBA.

The OSHA, Occupational Noise Exposure guidelines, codified at 29 CFR 1910.95, set an action level of 85 dBA as the maximum acceptable noise level for the workplace.

Environmental Consequences

Commercial Use. The Commercial Use scenario would result in the continuation of similar site uses at a similar level of activity as under current conditions. Demolition and construction activities could result in temporary noise disturbances to adjacent lands. Construction noise would be greatest in the immediate vicinity of construction equipment. Given the commercial nature of the surrounding parcels, noise effects on existing land uses would be minor. New commercial development would be compatible with existing land uses; new noise-sensitive land uses may not be compatible with existing commercial uses or with the off-site firing range.

Industrial Use. This scenario would result in a much more industrial use of the site than under current operating conditions. Demolition and construction would result in temporary noise disturbances that would be greatest in the immediate vicinity of the construction equipment; given the commercial nature of the surrounding parcels, construction noise effects on existing land uses would be minor. Because the site would be completely redeveloped for use as a gravel pit, noise levels under this scenario would be greater than under current conditions, both from mining operations and from hauling operations. This land use may not be compatible with some surrounding land uses, such as nearby residences and the cemetery. Restrictions on operations may be required to lessen the effects of noise; restrictions could include limiting the time of day or days of week of noise-generating operations or placing conditions on haul routes.

Mixed Use. The Mixed Use scenario would result in the same noise effects as described for the Commercial Use scenario since this scenario is also a continuation of similar site uses at a similar level of activity.

Open Space. The Open Space scenario would result in a lower intensity of use than under existing conditions. Demolition and construction would result in temporary noise disturbances that would be greatest in the immediate vicinity of the construction equipment; as the site would be vacant and given the nature of the surrounding parcels, noise effects on existing land uses would be minor. The primary source of noise from use of the site would be employee and visitor vehicles trips; however, the number of vehicle trips likely would be similar or less in number than under current operation conditions. Noise generated from the adjacent firing range could make the site less attractive for some uses, such as parkland.

No Action Alternative. Under the No Action Alternative, there would be little to no change in existing noise levels or noise patterns; therefore, no adverse noise effects would occur.

4.12 VISUAL RESOURCES

Affected Environment

Visual resources are those aspects of the environment that determine the physical character of an area and the manner in which it is viewed by people. Visual resources include scenery in the near, middle, and distant landscape and include cultural modifications, landforms, water surfaces and vegetation. This analysis inventories the existing visual resources, assesses any changes that could result from the alternatives, and determines the impact of those changes on the viewsheds observed by the public.

Visual Resources of the GJO. The visual character of the GJO Site reflects its past and current uses as a uranium milling site, an administrative center, and commercial/industrial center. As such, the site has been subject to extensive disturbance that has altered the original landscape through grading, construction, environmental restoration, and active use as an industrial site. The developed areas include pavement, gravel road base, fencing, some grassy areas and older utilitarian buildings in good to fair condition. The building development pattern does not represent a unified architectural style or campus arrangement. There are several temporary and modular buildings and many buildings have been altered to respond to changing needs. The site is adjacent to the Gunnison River on the north, south and west side but a dike limits views of the river from the site. There are approximately 8.1 hectares (20 acres) of open space with vegetation and manmade ponds and wetlands. There is a large mesa west of the site with some homes visible on top. On the east side there is a parking area, and railroad tracks. An escarpment that includes the city cemetery overlooks the site on the east side. The scenic quality of the GJO would be considered low.

The site is primarily viewed by workers and tenants. Views are limited as the single road that connects the highway with the GJO is used primarily by workers accessing the site. Overall views are observed by residents living in the Little Park Road area and by visitors to the city cemetery.

Environmental Consequences

Impact Analysis Methods. Potential impacts to visual resources are assessed by determining whether changes could result from the alternatives that would noticeably increase visual contrast and reduce scenic quality from current conditions; would block or disrupt existing views or reduce public opportunities to view scenic resources; or would conflict with regulations governing aesthetics.

Commercial Use. The Commercial Use scenario anticipates the reuse of many of the existing buildings by the receiving entities and the construction of new commercial properties on the site. The reuse of existing buildings would not likely result in any changes to visual resources. The construction of new facilities and possible replacement of aging structures and temporary buildings would maintain or improve visual resources through planned development. If current open space or wetland areas are developed, there may be some loss in quality of visual resources. If development is extensive, there may be some loss in quality of views from the Little Park Road area and the cemetery.

Industrial Use. The Industrial Use scenario would remove the current buildings and revert the site back to its pre-war use as a gravel pit. The removal of buildings and use of the site for a single purpose would provide more visual unity to viewers, but the industrial use would maintain or decrease overall visual quality. The loss of current open space and wetland areas would reduce current quality of visual resources. Dust associated with gravel mining activities could also reduce visibility and access to current views.

Mixed Use. The Mixed Use scenario anticipates the reuse of many of the existing buildings by the receiving entities and the construction of new commercial or industrial properties on the site. The impacts to visual resources of the Mixed Use scenario would be similar to those of the Commercial Use scenario.

Open Space. The Open Space scenario would remove the current buildings and restore the site to open space and recreational use. The removal of buildings and other manmade features would provide more visual unity to site viewers and would represent an aesthetic improvement over current conditions. The possible expansion and enhancement of wetland areas would also improve the visual quality of the site. The potential development of a walkway/bikeway along the riverfront would also improve the visual quality of the tract. Opening these areas to the public would increase opportunities to view scenic resources.

No Action Alternative. Under the No Action Alternative, the visual resources of the GJO would remain the same.

4.13 SOLID AND HAZARDOUS WASTE MANAGEMENT

Affected Environment

Hazardous wastes are generated at the GJO in typical day-to-day activities, although in small quantities. Hazardous waste is regulated under the Federal *Resource Conservation and Recovery Act* (RCRA) (42 USC 6901, et seq.) and State of Colorado equivalent regulations. The Analytical Chemistry Laboratory (Building 20) is the primary user of hazardous materials and hence generates the majority of hazardous wastes. The hazardous materials used are mainly various solvents and calibration standards. These wastes and quantities are typical of those generated during normal day-to-day operations at facilities such as GJO. Wastes are stored in accordance with the RCRA (42 USC 6901 et seq.) in three modular hazardous waste storage units (Buildings. 61A, B, and C). They are shipped offsite for treatment and disposal at facilities that operate under RCRA (42 USC 6901, et seq.) permits.

The facility typically operates as a conditionally exempt small quantity generator under the RCRA (42 USC 6901, et seq.). However, the GJO occasionally moves into small quantity generator status and has been a large quantity generator once or twice in the past, primarily from generating regulated wastes during remedial actions. In order to accommodate the possibility of future generation of large quantities of waste, GJO maintains full compliance with all of the requirements of the RCRA (42 USC 6901, et seq.) for large quantity generators.

In addition to the RCRA (42 USC 6901, et seq.) regulated wastes, the GJO also generates waste regulated under the *Toxic Substances Control Act* (15 USC 2601, et seq.) – PCBs and asbestos. The rate of generation of these wastes at GJO is low and is generated primarily from replacement and removal of PCB-containing light ballasts. Asbestos waste is generated from the removal of asbestos-containing materials such as ceiling insulation, damper material, and linoleum. The PCB waste generated is stored on site in Building 42 for later disposal at offsite facilities (within the mandated 9-month time period).

Because the GJO was the site of uranium processing, residual radioactive material still exists on the site, and both asbestos and PCB waste present on the GJO (such as light ballasts) may be radioactively contaminated with residual radioactive material. The GJO stores radioactive PCB wastes in Building 42 in compliance with 40 CFR 761.65, *Facilities Compliance Agreement on the Storage of Polychlorinated Biphenyls*. Approximately 204 kilograms (450 pounds) of this material is currently in storage. This waste will be shipped offsite for treatment and disposal.

Non-radioactive asbestos that is removed from buildings is disposed of at the Mesa County Landfill in compliance with local, state, and Federal regulations; radioactive asbestos is disposed of at the Cheney Disposal Cell. Small amounts of asbestos containing materials will be produced as remediation efforts continue and buildings are remodeled or demolished. All asbestos abatement work has been and will continue to be performed

by a licensed subcontractor in accordance with Colorado Regulation 8, The Control of Hazardous Air Pollutants. The site also generates non-hazardous, non-radioactive solid wastes, including sanitary wastes and building debris. This waste is hauled to the Mesa County Landfill for disposal.

Environmental Consequences

Commercial Use. Under this scenario, future users of the site will likely be small quantity generators similar to the current situation. In the event that they generate sufficient quantities to require reporting status, they would likely qualify as conditionally exempt small quantity generators. Users would be expected to comply with the temporary storage provisions under the RCRA (42 USC 6901, et seq.). Under this scenario, similar quantities of solid nonhazardous waste would be generated at the site and disposed at the Mesa County Landfill. Minor increases in demolition material may occur as older buildings are demolished and replaced with either new construction or open space.

Industrial Use. Minor quantities of hazardous waste and hazardous materials would likely be handled at the site under this scenario. As is the case with the Commercial Use scenario, quantities would likely be small and not require reporting. Fuel would be stored at the site for the gravel pit equipment and solvents and degreasers would be used for vehicle maintenance. Large quantities of demolition debris (15,000-25,000 cubic meters [60,000-100,000 cubic yards]) would be generated in clearing the site for gravel pit operations. It is anticipated that some small percentage of this material would be classified as asbestos containing material and would need to be disposed of in accordance with the State of Colorado solid waste regulations, Title 6, Code of Colorado Regulations Part 1007-2. In addition, previous surveys have indicated the presence of lead-based paint on most of the buildings. Future demolition activities will need to conform with Regulation No. 19 of the Colorado Air Quality Control Commission. The remainder of the solid waste would be taken to the Mesa County Landfill. The Mesa County Landfill currently has a life-expectancy of 50 years based on a design capacity of 11,250,000 cubic meters (15,000,000 cubic yards); removal of this debris would decrease the landfill life expectancy by approximately 0.07-0.1 years.

Mixed Use. Under this scenario, impacts to solid and hazardous waste management would be similar to the Commercial Use scenario with the possibility that slightly larger quantities of materials and wastes would be generated. Quantities would likely be small and not require reporting. Minor demolition could occur at the site but debris volume would be considerably smaller than for the Industrial Use scenario.

Open Space. Under the Open Space scenario, all buildings on site would be demolished and debris would be transported to an appropriate landfill. Quantities would be similar to the Industrial Use scenario. It is anticipated that a small percentage of the material would be classified as asbestos-containing material and would need to be disposed of in accordance with State of Colorado solid waste regulations, Title 6, Code of Colorado Regulations Part 1007-2. In addition, previous surveys have indicated the presence of lead-based paint on most of the buildings. Future demolition activities will need to conform with Regulation No. 19 of the Colorado Air Quality Control Commission. The remainder of the solid waste would need to be taken to the Mesa County Landfill. The Mesa County Landfill currently has a life expectancy of 50 years based on a design capacity of 11,250,000 cubic meters (15,000,000 cubic yards); removal of this debris would decrease the landfill life expectancy by approximately 0.07-0.1 years.

No Action Alternative. Under the No Action Alternative, the GJO would continue to operate as a conditionally exempt small quantity generator utilizing Buildings 61A-C and 42 as hazardous waste storage areas. Hazardous and toxic waste would continue to be shipped offsite for treatment and disposal. Though not a large quantity generator, the site would continue to maintain full compliance with all of the requirements of the RCRA (42 USC 6901, et seq.) for large quantity generators. The site would continue to generate a similar volume of non-regulated solid waste and contract with a commercial vendor to collect and transport the waste to the Mesa County Landfill.

4.14 TRANSPORTATION

Affected Environment

Daily traffic to and from the GJO facility primarily consists of 300-330 vehicle trips per day by employees and about 50 vehicle trips per day by service vehicles driven by subcontractors or delivery personnel. The only ingress to and egress from the GJO facility is a two-lane, city-maintained road (B ¾ Road) about 0.8 kilometers (0.5 miles) in length. This road connects the GJO facility to U.S. Highway 50, one of the major transportation routes through Grand Junction and across southern Colorado. Within the city limits, U.S. Highway 50 has four lanes and numerous traffic lights. Outside the city limits it has two lanes and crosses sparsely populated desert rangelands. Other major transportation routes in the vicinity of the GJO are U.S. Interstate 70, which is part of a major east-west transcontinental trucking route; Colorado State Highway 141, which provides access to the south along with U.S. Highway 50; and the Union Pacific Railroad, which borders the east side of the facility.

Walker Field Airport, nine miles northeast of the GJO, provides scheduled commercial airline, air cargo and general aviation services. It is also used by military and fire fighting aircraft. It is outside of the area affected by the proposed transfer.

Environmental Consequences

Commercial Use. Under this scenario, the number of vehicle trips per day to the site would likely be similar to or slightly less than under the No Action Alternative. Vehicular emissions and the potential for vehicle-related accidents would also be similar.

Industrial Use. Under this scenario, the number of vehicle trips to the site would be greatly reduced, based on the reduced number of workers. There would be more truck traffic related to the gravel pit, but overall vehicular emissions and the potential for vehicle-related accidents would be reduced from the baseline. Increased heavy truck traffic would pass by residences on the road to State Highway 50.

Mixed Use. Under this scenario, the number of vehicle trips per day to the site would likely be similar to or slightly less than under the No Action Alternative. Vehicular emissions and the potential for vehicle-related accidents would also be similar.

Open Space. Under this scenario, there would be little or no employment or development at the site. The number of vehicle trips to the site would be reduced, but vehicle trips could be more concentrated on weekends and evenings. Overall, vehicular emissions and the potential for vehicle-related accidents would be reduced from the baseline.

No Action Alternative. Under the No Action Alternative, there would be no change from the baseline level of vehicle trips, vehicular emissions, or the potential for accidents involving vehicles. At the baseline level of activity, traffic volume is considered to be within the existing transportation infrastructure's capacity and therefore the potential for accidents is considered acceptable. Vehicle emissions at the baseline level have no adverse effects on air quality in the area.

4.15 SOCIOECONOMICS

Affected Environment

This section provides an overview of the current socioeconomic conditions within the Grand Junction Region of Influence. The Region of Influence for this analysis is Mesa County, Colorado.

Employment and Income. The Region of Influence has historically been dependent on the wholesale and retail trade and service sectors for employment. These sectors have become increasingly important in recent years as farming and mining employ a smaller percentage of the workforce, as shown in Table 4.15-1. In 1997, the service sector provided almost 32 percent of the regional employment while wholesale and resale trade provided almost 25 percent of the employment (BEA 1999).

The unemployment rate in the Region of Influence has averaged much higher than the unemployment rate in Colorado, as shown in Table 4.15-2. The 1998 unemployment rate was 5.0 percent in the Region of Influence, but only 3.8 percent in Colorado (BLS 1999). Employment in the Region of Influence totaled 55,779 in 1998, while the labor force totaled 58,691.

The per capita income in the Region of Influence was $20,593 in 1997, significantly lower than the state average of $27,015. The Region of Influence per capita income increased 35 percent from the 1990 level of $15,280, while the state per capita income increased more than 40 percent from the 1990 level of $19,290 (BEA 1999).

Population and Housing. The Region of Influence population grew steadily between 1980 and 1998, increasing an average of 1.3 percent annually, the same rate of increase as the state population. Region of Influence population totaled 112,891 in 1998, and is projected to reach 163,602 by 2020 (Census 1995, Census 1999). Historic and projected populations for the Region of Influence and Colorado are shown in Table 4.15-3.

In 1990, there were 39,208 housing units in the Region of Influence, 36,250 of which were occupied. The majority of these were single family, detached houses. The owner-occupied vacancy rates in the Region of Influence was 2.2 percent and the rental vacancy rate was 5.9 percent (Census 1992). Region of Influence housing characteristics are shown in Table 4.15-4.

Community Services. There are five hospitals in the Region of Influence with a total of 785 beds. All of the hospitals operate well below capacity (AHA 1995). In addition, there are 215 physicians in the Region of Influence (AMA 1995).

The Region of Influence encompasses three school districts with 42 schools, and approximately 19,750 students and 1,100 teachers. The student/teacher ratios range from 5.6 in the DeBeque School District to 14.0 in the Plateau Valley School District (CDE 1999). Mesa State College in Grand Junction is the only post-secondary school in the Region of Influence (HPI 1999).

There are six law enforcement agencies in the Region of Influence with approximately 300 officers (HPI 1999). The Grand Junction Police Department and Mesa County Sheriffs Department are the largest departments in the Region of Influence with 107 and 174 employees, respectively.

Environmental Justice. Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" (59 Federal Register 7629, February 16, 1994), requires Federal agencies to identify and address any disproportionately high and adverse human health or environmental impacts on minority or low-income populations from Federal actions. In the Region of Influence, almost 95 percent of the population was identified as white, compared to 88.2 percent of the population in Colorado, as shown in Table 4.15-5. Over 15 percent of the Region of Influence population was identified as living in poverty, compared to 11.7 percent of the state population. Minority and low-income populations are distributed throughout the county and are not concentrated in any one area.

Environmental Consequences

Commercial Use. Under this scenario, employment at the site would be similar to the baseline employment. Due to variations in potential workforce, there could be either a slight increase or decrease in the Region of Influence employment. Variations either way would represent less than 1 percent of the labor force.

Table 4.15-1. ***Employment by Sector in the Region of Influence***

Sector	Percentage of ROI Employment		
	1980	1990	1997
Services	23.7	31.3	31.9
Wholesale and Retail Trade	22.2	23.4	24.7
Government and Government Enterprise	12.5	13.2	12.2
Construction	8.8	5.7	7.8
Manufacturing	6.4	7.3	6.8
Finance, Insurance, and Real Estate	9.7	7.9	6.5
Transportation and Public Utilities	5.7	4.9	5.3
Farm	4.3	3.6	2.5
Agriculture Service, Forestry, Fishing, and other	0.6	1.1	1.3
Mining	5.9	1.7	0.9

ROI = Region of Influence; Source: BEA 1999.

Table 4.15-2. ***Unemployment in the Region of Influence and Colorado***

Area	1990	1995	1998
ROI	5.9	5.5	5.0
Colorado	5.0	4.2	3.8

ROI = Region of Influence; Source: BLS 1999.

Table 4.15-3. ***Historic and Projected Population for the Region of Influence and Colorado***

Area	1980	1990	1998	2000	2005	2010	2015	2020
ROI	81,530	93,145	112,891	117,317	128,201	139,624	151,321	163,602
Colorado	2,889,964	3,294,394	3,970,971	4,175,003	4,542,169	4,892,567	5,230,705	5,547,647

ROI = Region of Influence; Source: Census 1999, Census 1995, CDLA 1998.

Table 4.15-4. ***Region of Influence Housing Characteristics***

Area	Total Number of Housing Units	Number of Owner-Occupied Units	Owner-Occupied Vacancy Rate	Median Value	Number of Occupied Rental Units	Rental Vacancy Rates	Median Monthly Contract Rent
ROI	39,208	23,534	2.2%	$62,700	12,716	5.9%	$275

ROI = Region of Influence; Source: Census 1992.

Population in the Region of Influence could be affected if the site workforce decreased. Some workers and their families may out-migrate from the Region of Influence. This would result in a less than 1 percent decrease in the Region of Influence population. Some currently occupied housing units would become vacant or the housing construction rate would decrease as a result of the out-migration. If the site workforce increases over the baseline

Table 4.15-5. ***Race, Ethnicity, and Poverty for the Region of Influence and Colorado***

Race, Ethnicity, and Poverty	ROI	Colorado
White	94.7	88.2
Black	0.4	4.0
American Indian, Eskimo, or Aleut	0.7	0.8
Asian or Pacific Islander	0.7	1.8
Other	3.5	5.1
Hispanic[a]	8.1	12.9
Living in Poverty	15.1	11.7

[a] Note: Persons of Hispanic ethnicity may be of any race.
ROI = Region of Influence; Source: Census 1992.

level, there would not likely be any change in the Region of Influence population or housing markets. The current Region of Influence labor force would be sufficient to fill any additional employment requirements.

Industrial Use. Under this scenario, employment at the site would decrease significantly from the baseline level. No more than ten employees would be involved in the gravel pit operation. Total employment generated by the site (including both direct employment at the site and indirect employment in local suppliers within the Region of Influence) would be much less than the baseline level. The decrease in total employment would represent approximately 1 percent of the Region of Influence labor force. Total income in the Region of Influence would also decrease.

There could be some change in Region of Influence population and housing as a result of the change in workforce requirements. Some workers and their families may out-migrate from the Region of Influence. This would result in a less than 1 percent decrease in the Region of Influence population. Some currently occupied housing units would become vacant or the housing construction rate would decrease as a result of the out-migration.

Mixed Use. Under this scenario, employment at the site would be similar to the baseline employment. Due to variations in potential workforce, there could be either a slight increase or decrease in the Region of Influence employment. Variations either way would represent less than 1 percent of the labor force.

Population in the Region of Influence could be affected if the site workforce decreased. Some workers and their families may out-migrate from the Region of Influence. This would result in a less than 1 percent decrease in the Region of Influence population. Some currently occupied housing units would become vacant or the housing construction rate would decrease as a result of the out-migration. If the site workforce increases over the baseline level, there would not likely be any change in the Region of Influence population or housing markets. The current Region of Influence labor force would be sufficient to fill any additional employment requirements.

Open Space. Under this scenario, there would be no employment at the site. The decrease in total employment would represent approximately 1 percent of the Region of Influence labor force. Total income in the Region of Influence would also decrease.

There could be some change in Region of Influence population and housing as a result of the change in workforce requirements. Some workers and their families may out-migrate from the Region of Influence. This would result in a less than 1 percent decrease in the Region of Influence population. Some currently occupied housing units would become vacant or the housing construction rate would decrease as a result of the out-migration.

No Action Alternative. Under the No Action Alternative, there would be no change from the baseline level of employment. There would be no change in the Region of Influence employment, income, population, housing, or community services.

Environmental Justice. As shown in the other environmental impacts sections, there would be no significant adverse impact from implementing either of the alternatives. Therefore, there would be no disproportionately high or adverse impacts to minority or low-income populations in the area.

4.16 CUMULATIVE EFFECTS

The Council on Environmental Quality regulations implementing NEPA (40 CFR 1500-1508) define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions (40 CFR 1508.7)." The regulations further explain that "cumulative effects can result from individually minor but collectively significant actions taking place over a period of time." The cumulative effects section presented is based on the potential effects of transfer of the GJO property on resources also affected by other past, present, and reasonably foreseeable future actions in the Region of Influence.

The DOE assessed cumulative effects by examining potential future activities at the GJO Site after its transfer and other activities in the Grand Junction area. Potential activities that may occur after the transfer of the GJO property have been presented in Chapter Three, Description of Proposed Action and No Action Alternatives. It is important to note that the DOE will not control future land uses under the Proposed Action, and there is no assurance that any specific scenario or activity will in fact take place. For purposes of this analysis, the All Industrial Land Use scenario will be used to examine cumulative effects. It provides a reasonable upper limit of impacts when combined with the cumulative effects from the Region of Influence.

Anticipated activities in the local region include ongoing activities as well as reasonably foreseeable future activities. The most significant construction activity is the ongoing widening of U.S. Highway 50, outside of the city and several miles southeast of the site. The highway is being widened from a mostly two lane road to four lanes between Grand Junction and Delta, Colorado. This activity represents a source of added heavy truck traffic and the noise and fugitive dust emissions associated with such activity. It also temporarily contributes to a reduced level of service on this important commercial and tourist route. Long-term effects will be beneficial because the widening will contribute to an improved level of service rating upon completion of the project.

The existing gravel pit operation, approximately one mile (1610 meters) south of the site, contributes to the noise exposure experienced in the Region of Influence. In addition, it is a source of heavy truck traffic on local surface streets leading to U.S. Highway 50 north of the site. Mining operations also contribute minor fugitive dust emissions to the local ambient air conditions along with particulate emissions from crushing and loading operations. The gravel pit is a permitted operation and is required to control dust emissions.

The police firing range, located approximately 200 yards (183 meters) east of the GJO site, is a source of intermittent periods of sudden, high noise. Noise is considered to be a nuisance when there are sensitive local receptors that would be affected by the intrusion of noise. The receptors considered to be sensitive in the local area are visitors to the cemetery, adjacent to both GJO and the firing range, and residents of the Little Park Road neighborhood across the river west of the site.

Another source of noise at the site and in the surrounding area is the Union Pacific Railroad running along the eastern boundary of the GJO Site. Trains run by the site from twice to several times a day at five to ten miles per hour and are a short-term minor source of noise. Noise levels are such that speech is interrupted, but only for brief periods of time.

As a result of analyzing the combined effects of the industrial land use scenario and the previously described current and future activities in the Region of Influence, four resource areas warranted further evaluation. Noise, transportation, air quality, and surface water quality were evaluated for cumulative effects and are described below.

Four activities have been identified in the Region of Influence that currently contribute to the noise environment. The widening of U.S. Highway 50, the Union Pacific Railroad, continued operation of the firing range, and continued operation of the gravel pit south of the site all contribute to the noise environment around GJO. All noise is of an intermittent nature and would be mostly noticeable to receptors within approximately one-fourth of a mile (402 meters) from the sources. Noise contributions from operation of the GJO Site as a gravel pit would also be localized and affect receptors very close to the site. Restrictions on operations at the site may be required to lessen the effects of noise; restrictions could include limiting the time of day or days of the week of noise generating operations or placing conditions on haul routes.

The widening of U.S. Highway 50 and the continued operation of the gravel pit are contributing elements to the heavy vehicle traffic in the local Region of Influence. Daily traffic to and from the GJO consists of 300-330 passenger vehicle trips by employees and about 50 service vehicle trips per day. Under the All Industrial Land Use scenario, the number of daily vehicle trips to the site would be greatly reduced and replaced by periodic truck traffic hauling gravel to various job sites throughout the region. When combined with activities in the local region, there will be a slight increase in heavy truck traffic, though service levels on local transportation routes are not expected to be affected. Overall vehicle trips will be significantly reduced, potentially providing for an increase in the level of service on local transportation routes.

Air quality in the region could also receive cumulative effects from two of the identified activities. The widening of U.S. Highway 50 and continued operation of the gravel pit south of the site are contributing minor sources of fugitive dust emissions and particulate emissions. In addition, operation of the heavy equipment is a minor source of vehicle exhaust emissions. It is expected that both activities are required to use standard dust control measures, such as water sprays. In addition, any future operator of a gravel pit mining operation at the former GJO Site would be subject to state permitting requirements for this type of operation. It is thus expected that dust emissions would not cause adverse impacts in the area. Overall vehicle emissions would decrease due to reduced numbers of personnel working at the site and the subsequent reduction in the number of vehicle trips to and from the site on a daily basis. The decrease may be offset to some extent by the widening of U.S. Highway 50 and increased residential development south of Grand Junction, resulting in more vehicle trips from the Delta and white water areas.

As discussed in the surface water and groundwater sections, there is a potential for excavation activities below the water table to increase the suspended solids load of the shallow groundwater. Because this groundwater is hydraulically connected to the Gunnison River, it is possible that the suspended solids load of the river could be increased under this scenario. If this is occurring at the gravel pit located one mile (1610 meters) southeast of the GJO Site, there is potential for a cumulative effect on the Gunnison River. There is currently insufficient data available to assess the potential cumulative effect. However, this issue would be considered by the Colorado Department of Public Health and Environment during the permitting process for the gravel mining operation at the GJO Site.

Cumulative effects on noise, transportation, and air quality associated with the proposed transfer of the GJO facility to a non-DOE entity and local activities in the Region of Influence are minor in nature. In the case of transportation and air quality, there may be beneficial effects due to a reduction in vehicular trips. The potential cumulative effects on the Gunnison River from two gravel mining operations located within one mile (1610 meters) of each other have yet to be determined. However, if this scenario were to occur, the Colorado Department of Public Health and Environment would consider the potential cumulative effects on the Gunnison River during the permitting process for the gravel mining operation at the GJO Site.

No past, present, or reasonably foreseeable future projects have been identified in the local region which, when added to the effects of the proposed action, would result in a significant impact.

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6.0 REFERENCES

10 CFR 1022	U.S. Department of Energy, "Compliance with Floodplains/Wetlands Environmental Review Requirements."
24 CFR 51	U.S. Department of Housing and Urban Development, Office of Assistant Secretary for Equal Opportunity, "Environmental Criteria and Standards."
29 CFR 1910	U.S. Department of Labor, Occupational Safety and Health Administration, "Occupational Safety and Health Standards."
36 CFR 800	Advisory Council on Historic Preservation, "Protection of Historic Properties."
40 CFR 50	U.S. Environmental Protection Agency, "National Primary and Secondary Ambient Air Quality Standards."
40 CFR 53	U.S. Environmental Protection Agency, "Ambient Air Monitoring Reference and Equivalent Methods."
40 CFR 58	U.S. Environmental Protection Agency, "Ambient Air Quality Surveillance."
40 CFR 192	U.S. Environmental Protection Agency, "Health and Environmental Standards for Uranium and Thorium Mill Tailings."
40 CFR 261	U.S. Environmental Protection Agency, "Identification and Listing of Hazardous Wastes."
40 CFR 403	U.S. Environmental Protection Agency, "General Pretreatment Regulations for Existing and New Sources of Pollution."
40 CFR 761	U.S. Environmental Protection Agency, "Polychlorinated Biphenyls Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions."
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7.0 LIST OF PREPARERS

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GJO Transfer Responsibility: Ecological Risk Assessment and Ecological Resources; Floodplains and Wetlands Assessment

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APPENDIX A: CONSULTATION LETTERS

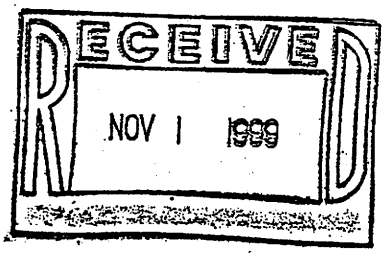
Colorado Natural Heritage Program, 254 General Services Building · CSU, Fort Collins, CO 80523

Colorado State University

Natural Heritage Program Colorado

The Nature Conservancy

9/09/1999



J. Peyton Doub
Tetra Tech NUS, Inc.
910 Clopper Road, Suite 400
Gaithersburg, MD 20878-1399

Dear J. Peyton Doub:

The Colorado Natural Heritage Program (CNHP) is in receipt of your request for information regarding the Grand Junction project. In response, CNHP has searched its Biological and Conservation Datasystem (BCD) for natural heritage resources (occurrences of significant natural communities and rare, threatened or endangered plants and animals) documented from the immediate area of T1S R1W S26, 27.

We have enclosed two reports from BCD. One describes natural heritage resources known from the area and gives location (by Township, Range, and Section), precision of the locational information, and the date of last observation at that location. Please note that "precision" reflects the resolution of original data. For example, an herbarium record from "4 miles east of Colorado Springs" provides much less spatial information than a topographic map showing the exact location of the occurrence. "Precision" codes of Seconds, Minutes, and General are defined in the report footer.

You may notice that some occurrences do not have sections listed. Those species have been designated as "sensitive" due to their rarity and threats by humans. Peregrine falcons, for example, are susceptible to human breeders removing falcon eggs from their nests. For these species, CNHP does not provide locational information beyond township and range. Please contact us should you require more detailed information for sensitive occurrences.

A second report outlines the status of the known elements. We have included status according to Natural Heritage Program methodology and legal status under state and federal statutes. Natural Heritage ranks are standardized across the Heritage Program network, and are assigned for global and state levels of rarity. They range from "1" for critically imperiled or extremely rare elements, to "5" for those that are demonstrably secure. For your convenience we have also included habitat descriptions. However, please be aware that these descriptions are in draft form and have not been edited for content. Please do not cite CNHP habitat information; instead, cite the original source of the habitat information as indicated.

The Colorado Division of Wildlife has legal authority over wildlife in the state. CDOW would therefore be responsible for the evaluation of and final decisions regarding any potential effects a proposed project may have on wildlife. If you would like more specific information regarding

these or other vertebrate species in the vicinity of the area of interest, please contact the Colorado Division of Wildlife.

The information contained herein represents the results of a search of Colorado Natural Heritage Program's (CNHP) Biological and Conservation Data System (BCD). However, the absence of data for a particular area, species or habitat does not necessarily mean that these natural heritage resources do not occur on or adjacent to the project site, rather that our files do not currently contain information to document their presence.

The information provided can be used as a flag to anticipate possible impacts or to identify areas of interest. If impacts to wildlife habitat are possible, these data should not be considered a substitute for on-the-ground biological surveys.

Although every attempt is made to provide the most current and precise information possible, please be aware that some of our sources provide a higher level of accuracy than others, and some interpretation may be required. CNHP's data system is constantly updated and revised. Please contact CNHP for an update or assistance with interpretation of this natural heritage information.

Sincerely,

Laine Johnson

Laine Johnson
Acting Environmental Review Coordinator

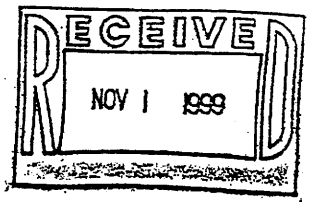
enc.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
764 Horizon Drive, Building B
Grand Junction, Colorado 81506-3946

IN REPLY REFER TO:
ES/CO:DOE
MS 65412 GJ



October 6, 1999

J. Peyton Doub, Environmental Scientist
Tetra Tech Nus, Inc.
910 Clopper Road, Suite 400
Gaithersburg, Maryland 20878-1399

Dear Mr. Doub:

The Fish and Wildlife Service has reviewed your September 9, 1999, letter requesting a species list for the Grand Junction, Colorado, Department of Energy site. The 56.4 acre site is located in sections 26 and 27, T. 1 S., R. 1 W., Ute P.M. along the Gunnison River.

Federally listed species that occur or may occur in the area include the threatened bald eagle (*Haliaeetus leucocephalus*) and the endangered southwestern willow flycatcher (*Empidonax traillii extimus*), Colorado pikeminnow[1] (*Ptychocheilus lucius*), bonytail (*Gila elegans*), humpback chub (*Gila cypha*), and razorback sucker (*Xyrauchen texanus*). The bald eagle may occasionally roost in the cottonwood trees in the area especially in the winter. The southwestern willow flycatcher may occur in shrubby riparian vegetation. Any activities on the site should avoid impacting habitat for the bald eagle and southwestern willow flycatcher. The Colorado pikeminnow and the razorback sucker are known to occur in the area. They, along with the other two endangered fishes, could be impacted by water depletions or contamination of water as a result of activities on the site.

If the site does not contain contaminants at levels of concern to the endangered fishes, the Service would be particularly interested in cooperating with the DOE to use and modify habitat on the site to benefit the endangered fishes. Section 7(a)(1) of the Endangered Species Act directs all Federal agencies to use their authorities to further recovery of threatened and endangered species and the Service believes this would be an excellent opportunity for the DOE to exercise that authority. Habitat modifications may include removal of dikes to allow water onto the historic floodplain and to flow through existing ponds, creation of seasonally ponded backwater areas, and/or creation of side channels. These modifications will provide spawning, resting, feeding, and nursery sites for the endangered fishes. Additionally, the Service may be interested in using the existing ponds, with some reconfiguration, for raising young endangered fishes.

---

[1]formerly squawfish

The Service would appreciate a response back from the DOE with their interest in cooperating on recovery activities for the endangered fishes. If the Service can be of further assistance, please contact Terry Ireland at the letterhead address or (970) 243-2778.

Sincerely,

Susan T. Moyer

Susan T. Moyer
Assistant Colorado Field Supervisor

pc: FWS/ES, Lakewood
CDOW, Grand Junction

TIreland:DOEClosing.ltr:100699

STATE OF COLORADO
Bill Owens, Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
AN EQUAL OPPORTUNITY EMPLOYER

John W. Mumma, Director
6060 Broadway
Denver, Colorado 80216
Telephone: (303) 297-1192

For Wildlife-
For People

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NOV 1 1999

Mr. J. Peyton Doub, CEP
Tera Tech NUS
910 Clopper Rd., Suite 400
Gaithersburg, MD 20878-1399

29 September 1999

Dear Mr. Doub,

I have examined our database for information on the possible occurrence of threatened, endangered, and special-status species in the vicinity of the DOE-GJO site along the Gunnison River in Mesa County, Colorado. This report is only an estimate of the possible occurrence of rare species in that area, and is not a substitute for a thorough biological inventory of that location.

The Gunnison River corridor with its native cottonwood-willow riparian habitat is critically important to many species of wildlife, including hawks, owls, eagles and migratory songbirds. The DOE-GJO property is located within bald eagle winter range and a winter roost is located near the site. The mature cottonwoods located on-site serve as potential roost sites or hunting perches and the preservation of those trees is of critical importance. The river corridor on and adjacent to the site is considered potential suitable habitat for the southwest willow flycatcher. Disturbance of the willow riparian habitat would negatively impact its value to that species.

The Gunnison River itself is considered occupied habitat for the endangered fishes of the Colorado River drainage, including the Colorado pikeminnow and the razorback sucker. Any impacts development of the site would have on the Gunnison River could potentially impact those species.

We have a recorded sighting of a kit fox in T 1S, R1W, Sec. 36, but it is unknown if kit fox occur on the DOE-GJO site.

Thank you for your interest in Colorado's wildlife. Don't hesitate to call if you have any further questions. I can be reached at (970) 255-6112.

Sincerely,

Paul J. Creeden
Wildlife Manager
Glade Park District

xc: Yamashita

Global and State Rarity Ranks, Agency Sensitive Status, Federal and State Legal Status
and State Habitat Description for Species known from the Grand Junction Project Area (T1S R1W S26,27)
Data provided by the COLORADO NATURAL HERITAGE PROGRAM

report generated: 9/09/1999

Note that habitat information is provided in "draft" format and should not be formally cited.

Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status	Federal Sensitive	Habitat Description
*** Amphibians							
HYLA ARENICOLOR	CANYON TREEFROG	G5	S2		SC	BLM	Usually found near permanent pools or cottonwoods in rocky canyons with pinon-juniper communities on slopes. Often found in depressions in boulders. Do not climb trees. (descriptions?) also (Hammerson 1982) found in intermittent streams in deep rocky canyons. Scattered cottonwoods often occur along intermittent stream courses. Pinon-juniper woodland also occurs on the canyon slopes. Retreats to rock crevices in hot weather and during the cold season.
SPEA INTERMONTANA	GREAT BASIN SPADEFOOT	G5	S3		SC	BLM	Pinyon-juniper woodland, sagebrush, semi-desert shrublands, usually found in or near dry rocky slopes or canyons (Hammerson 1982).
*** Birds							
EGRETTA THULA	SNOWY EGRET	G5	S2B,S2N				Reservoirs, grassy marshes, wet meadows, and rivers. Nesting colonies in trees or shrubs adjacent to reservoirs and marshes. (Andrews and R 1982)
*** Fish							
GILA ROBUSTA	ROUNDTAIL CHUB	G2G3	S2		SC	BLM	Occupy slow moving waters adjacent to areas of faster water. Groups of adults concentrate in quiet eddying water adjacent to fast moving water. If younger than 1 year old, they concentrate in river eddies and irrigation ditches. (Woodling 1985)
PTYCHOCHEILUS LUCIUS	COLORADO PIKEMINNOW	G1T1Q	S1	LE	T		
*** Plants							
ASTRAGALUS LINIFOLIUS	GRAND JUNCTION MILKVETCH	G3Q	S3			BLM	This species occurs on dry clayey slopes and gullies in pinyon juniper woodlands and occasionally near cottonwood trees (Osterhout 1928). Grows on the Cliola and Mancos formations with pinyon-juniper and sagebrush (O'Kane 1988). Associated species may include: Pinus edulis, Juniperus osteosperma, Oryzopsis hymenoides, Heterotheca villosa, Chrysothamnus viscidiflorus, and Gutierrezia sarothrae (pers. comm. Coles, 1994).

COLORADO NATURAL HERITAGE PROGRAM
Element Occurrence Locations known from the Grand Junction Project Area (T1S R1W S26,27)
Sorted by Taxonomic Group and by Species Name

report generated: 9/09/1999

precision codes: "G" = only general level data provided;
M = moderately precise data provided (mapped within 1 square mile);
S = actual mapped location provided

Scientific Name	Common Name	Quad Name	Town-Range	Sections	Precision	Last Seen
*** Amphibians						
HYLA ARENICOLOR	CANYON TREEFROG	GRAND JUNCTION	001S001W	34	G	5/15/95
SPEA INTERMONTANA	GREAT BASIN SPADEFOOT	GRAND JUNCTION	001S001W	34	M	1966-06
*** Birds						
EGRETTA THULA	SNOWY EGRET	GRAND JUNCTION	001S001W	23	M	1980
*** Fish						
GILA ROBUSTA	ROUNDTAIL CHUB	GRAND JUNCTION	001S001W	27	S	10/22/80
PTYCHOCHEILUS LUCIUS	COLORADO PIKEMINNOW	GRAND JUNCTION	001S001W		S	1979-09
*** Plants						
ASTRAGALUS LIXIFOLIUS	GRAND JUNCTION MILKVETCH	GRAND JUNCTION	001S001W	26	G	6/19/26

6 Records Processed

APPENDIX B: PLANT AND WILDLIFE SPECIES OBSERVED ON DOE-GJO SITE

APPENDIX B

Table B-1. ***Plant and Wildlife Species Observed at DOE-GJO Site***

Scientific Name	Common Name	Scientific Name	Common Name
Invertebrates		*Mephiris mephiri*	striped skunk
Cambarus Spp.	crayfish [a]	*Mustela frenaia*	long-tailed weasel
		Myotis leibil	small-footed myotis[a]
Fish		*Odocolleus hemionus*	mule deer[a]
Catostomus commersoni	white sucker x bluehead sucker [b]	*Ondatra zibethicus*	muskrat[a]
x Catostomus discobolus		*Peromyscus maniculatus*	deer mouse
Catostomus latipinnis	flannelmouth sucker	*Pipistrellus hesperus*	western pipistrelle[a]
Catostomus latipinnis	white x flannelmouth sucker	*Piecotus towwnsendil*	Townsend's big-eared bat[a]
x C. commersoni		*Procyon lotor*	raccoon
Catostomus latipinnis	flannelmouth x razorback sucker	*Rattus norvegicus*	Norway rat
x Xyraunchen texanus		*Spilogale gracilis*	spotted skunk
Cyprinus carpio	carp [a]	*Sylvilagus audubonii*	desert cottontail[a]
Gila cypha	humpback chub	*Tamiasclurus hudsonicus*	red squirrel[a]
Gila robusta	roundtail chub	*Taxidea taxus*	badger
Ictalurus melas	black bullhead	*Urocyon cinereoargenteus*	gray fox
Lactalurus punctanis	channel catfish	*Vulpes fulva*	red fox
Lepomis cyanellus	green sunfish		
Lepomis machrochirus	bluegill	Amphibians	
Micropterus salmoides	largemouth bass	*Ambystoma tigrinum*	tiger salamander
Notropis lutrensis	red shiner	*Bufo woodhousei*	woodhouse toad[a]
Notropis stramineus	Sand shiner	*Rana catesbeiana*	bullfrog
Pimephales promelas	flathead minnow[a]	*Rana pipiens*	leopard frog[a]
Prychocheilus lucius	Colorado squawfish		
Pomoxis nigromaculatus	black crappie	Reptiles	
Phinichthys osculus	speckled dace	*Chelydra serpentina*	snapping turtle
Salmo clarki	cutthroat trout	*Chrysemys picta*	painted turtle
Salmo gairdneri	rainbow trout	*Cnemidophorus velox*	plateau whiptail
Salmo trutta	brown trout	*Crotalus viridis concolor Woodbury*	midget faded rattlesnake
		Pituophis melanoleucus	bullsnake
Mammals		*Phrynosoma douglassii*	short horned lizard
Antilocapra americana	pronghorn antelope	*Sceloporus graciosus*	sagebrush lizard
Canis latrans	coyote	*Sceloporus undulatus*	eastern fence lizard
Castor canadensis	beaver	*Thamnophis elegans*	wandering garter snake[a]
Cynomys leucurus	white-tailed prairie dog		
Felis cattus	feral cat[a]		
Lepus californicus	blacktail jackrabbit		

Table B-1. ***Plant and Wildlife Species Observed at DOE-GJO Site (continued)***

Scientific Name	Common Name	Scientific Name	Common Name
Birds			
Accipiter cooperii	Cooper's hawk	*Corvus corax*	common raven
Aix sponsa	wood duck	*Dendroica petechia*	yellow warbler
Alectoris chukar	chukar	*Eremophila alpestris*	horned tark
Amphispiza Belli	sage sparrow[a]	*Euphagus cyanocephalus*	Brewer's blackbird[a]
Anas acuta	northern pintail	*Falco sparverius*	American kestrel[a]
Anas cyanopiera	cinnamon teal	*Hellaeetus leucocephalus*	bald eagle[a]
Anas discors	blue-winged teal	*Hirundo pyrrhonota*	cliff swallow[b]
Anas formosa	green-winged teal	*Hirundo rustica*	barn swallow[b]
Anas platyhynchos	mallard[a]	*Junco hyemalis*	dark-eyed junco[a]
Aquila chrysaetos	golden eagle[a]	*Meleagris gallopavo*	wild turkey
Ardea herodias	great blue heron[a]	*Melosphiza melodia*	song sparrow[a]
Asio otus	long eared owl	*Molothrus ater*	brown-headed cowbird
Aythya valisineria	canvasback	*Nycticorax nycticoras*	black-crowned night heron
Branta canadensis	Canada goose	*Passerina amoena*	lazuli bunting
Bucephala albeola	bufflehead	*Phalaenoptilus nuttallii*	whippoorwill
Bucephala ciangula	common goldeneye	*Phasianus colchicus*	ring-necked pheasant
Buteo jamaicensis	red-tailed hawk	*Pica pica*	black-billed magpie[a]
Calamospiza melanocorys	lark bunting	*Picoides pubescens*	downy woodpecker[a]
Callipepla gambelii	Gambel's quail	*Pipilo chlorurus*	green-tailed towhee
Carpodacus mexicanus	house finch[a]	*Selasphorus platycercus*	broad-tailed hummingbird[a]
Cathartes aura	turkey vulture	*Sialis currucoides*	mountain bluebird
Charadrius vociferus	killdeer	*Spizella breweri*	Brewer's sparrow[b]
Chen caerulescens	snow goose	*Sturnello neglecta*	western meadowlark
Chondestes grammacus	lark sparrow[b]	*Sturnus vulgaris*	European starling[a]
Chordeiles minor	common nighthawk[a]	*Tachycineta thallassina*	violet-green swallow[b]
Colaptes auratus	northern flicker[a]	*Turdus migratorius*	American robin[a]
Columba livia	rockdove[a]	*Tyrannus verticalis*	western kingbird
Contopus sordidulus	western wood pewee	*Zenalda macroura*	mourning dove[a]
Corvus brachyrhynchos	American crow[a]		

[a] Species observed at the GPO facility.
[b] "x" indicates a hybrid between the two species listed.
[c] Animals possibly observed at the GJO facility, but which were only identified in general terms (i.e., bat, swallow, toad, etc.).

APPENDIX C: BIRD SPECIES OBSERVED ON DOE-GJO SITE

APPENDIX C

Table C-1. *Bird Species Observed on DOE-GJO Site* [a]

Scientific Name[b]	Common Name[c]
Anseriformes: Anatidea[d]	
Aix sponsa	Wood Duck
Anas acuta	Northern Pintail
Anas cyanoptera	Cinnamon Teal
Anas platyrhynchos	Mallard Duck
Aythya collaris	Ring-necked Duck
Branta canadensis	Canada Goose
Bucephala clangula	Common Goldeneye
Mergus mersanger	Common Mersanger
Apodiformes: Apodidae	
Aeronautes saxatalis	White-throated Swift
Apodiformes: Trochilidae	
Archilochus alexandri	Black-Chinned Hummingbird
Selasphorus platycercus	Broad-tailed Hummingbird
Selasphorus rufus	Rufous Hummingbird
Caprimulgiformes: Caprimulgidae	
Chordeiles minor	Common Nighthawk
Charadriiformes: Charadriidae	
Charadrius vociferus	Killdeer
Ciconiiformes: Ardeidae	
Ardea herodias	Great Blue Heron
Nycticorax nycticorax	Black-crowned Night Heron
Columbiformes: Columbidae	
Zenaida macroura	Mourning Dove
Coraciiformes: Alcedinidae	
Ceryle alcyon	Belted Kingfisher
Falconiformes: Accipitridae	
Accipiter cooperi	Cooper's Hawk
Accipiter striatus	Sharp-shinned Hawk
Aquila chrysaetos	Golden Eagle
Buteo jamaicensis	Red-tailed Hawk
Circus cyaneus	Northern Harrier
Haliaeetus leucocephalus	Bald Eagle
Pandion haliaetus	Osprey
Falconiformes: Cathartidae	
Cathartes aura	Turkey Vulture
Falconiformes: Falconidae	
Falco peregrinus or	Peregrine Falcon or
Falco mexicanus	Prairie Falcon
Falco sparverius	American Kestrel
Galliformes: Phasianidae	
Callipepla gambelii	Gambel's Quail
Phasianus colchicus	Ring-necked Pheasant
Gruiformes: Rallidae	
Fulica americana	American Coot
Passeriformes: Aegithalidae	
Psaltriparus minimus	Bushtit
Passeriformes: Bombycillidae	
Bombycilla cedrorum	Cedar Waxwing
Bombycilla garrulus	Bohemian Waxwing

Table C-1. *Bird Species Observed on DOE-GJO Site* [a]

Scientific Name[b]	Common Name[c] *(continued)*
Passeriformes: Corvidae	
Corvus brachyrhynchos	American Crow
Corvus corax	Common Raven
Pica pica	Black-billed Magpie
Passeriformes: Emberizidae	
Agelaius phoeniceus	Red-winged Blackbird
Amphispiza bilineata	Black-throated Sparrow
Chondestes grammacus	Lark Sparrow
Dendroica coronata	Yellow-rumped Warbler
Euphagus cyanocephalus	Brewer's Blackbird
Guiraca caerulea	Blue Grosbeak
Icteria virens	Yellow-breasted Chat
Icterus galbula	Northern Oriole
Junco hyemalis	Dark-eyed Junco
Melospiza melodia	Song Sparrow
Molothrus ater	Brown-headed Cowbird
Passerina amoena	Lazuli Bunting
Pipilo erythrophthalmus	Rufous-sided Towhee
Piranga ludoviciana	Western Tanager
Pheucticus melanocephalus	Black-headed Grosbeak
Quiscalus quiscula	Common Grackel
Sturnella neglecta	Western Meadowlark
Vermivora celata	Orange-crowned Warbler
Zonotrichia leucophrys	White-crowned Sparrow
Passeriformes: Fringillidae	
Carduelis psaltria	Lesser Goldfinch
Carduelis tristis	American Goldfinch
Carpodacus cassinii	Cassin's Finch
Carpodacus mexicanus	House Finch
Passeriformes: Hirundinidae	
Hirundo rustica	Barn Swallow
Tachycineta thalassina	Violet-green Swallow
Passeriformes: Muscicapidae	
Myadestes townsendi	Townsend Solitaire
Regulus calendula	Ruby-crowned kinglet
Sialia mexicana	Western Bluebird
Sialia currucoides	Mountain Bluebird
Turdus migratorius	American Robin
Passeriformes: Paridae	
Parus atricapillus	Black-capped Chickadee
Parus gambeli	Mountain Chickadee
Parus inornatus	Juniper Titmouse
Passeriformes: Passeridae	
Passer domesticus	House Sparrow
Passeriformes: Sturnidae	
Sturnus vulgaris	European Starling
Passeriformes: Troglodytidae	
Catherpes mexicanus	Canyon Wren
Salpinctes obsoletus	Rock Wren
Thryomanes bewickii	Bewick's Wren
Troglodytes aedon	House Wren

Table C-1. *Bird Species Observed on DOE-GJO Site* [a]

Scientific Name[b]	Common Name[c]
Passeriformes: Tyrannidae	***(continued)***
Contopus sordidulus	Western Wood-Peewee
Tyrannus verticalis	Western Kingbird
Piciformes: Picidae	
Colaptes auratus	Red-shafted Northern Flicker
Picoides pubescens	Downy Woodpecker
Sphyrapicus nuchalis	Red-naped Sapsucker
Podicipediformes: Podicipedidae	
Podilymbus podiceps	Pied-billed Grebe

[a] Source: Personal observations of Larry Arnold of DOE-GJO, as communicated to J. Peyton Doub of Tetra Tech, Inc.
[b] Scientific names and taxonomy are based on *Colorado Birds* by Robert Andrews and Robert Righter, 1992, published by Denver Museum of Natural History.
[c] Other birds sighted but for which species data is not available include certain flycatchers, owls, swallows, swifts, terns, woodpeckers, wrens, and warblers.
[d] The first term refers to Order; the second refers to Family.