

SUMMARY OF IMPACTS
ASSOCIATED WITH REMEDIAL
ACTION AT THE GRAND JUNCTION
TAILINGS SITE AND ASSOCIATED
VICINITY PROPERTIES

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1.0 INTRODUCTION

This paper summarizes the impacts associated with remedial action at the Grand Junction tailings site and associated vicinity properties. This summary is intended to be used along with the engineering design summary (previously provided) to familiarize representatives of the cooperating agencies with the environmental issues associated with the various remedial action alternatives. A meeting will be held between DOE and the cooperating agencies in Denver, Colorado on July 22, 1985 to discuss the issues of greatest concern.

Table 1.1 is a summary of the impacts on all components of the environment. Section 2.0 is a discussion of the major impacts of each alternative.

All of the alternatives, except no action, include remedial action at the vicinity properties. The impacts of remedial action at 3465 vicinity properties are identified in Table 1.1. These impacts must be added to the impacts from remedial action of the tailings pile to obtain an understanding of the project's total impacts.

The impacts identified are based on conservative assumptions and impact assessment procedures and thereby represent a realistic upper limit on the severity of the impacts that may occur. The actual impacts that will occur will probably be less severe than those identified in this summary.

Table 1.1 Summary of impacts

Environmental component	Alternative 1 No action	Alternative 2 Stabilization at Grand Junction	Alternative 3 Disposal at Cheney Reservoir with truck transport	Alternative 4 Disposal at Cheney Reservoir with train- truck transport	Alternative 5 Disposal at Two Road with truck transport	Alternative 6 Disposal at Two Road with train- truck transport	Vicinity Properties ^d For all action alternatives (Alternatives 2 through 6)
Remedial Action Worker Health	None	0.121 cancer fatali- ties, 0.1 equip- ment use injuries.	0.209 cancer fatali- ties, 0.09 equipment use injuries.	0.192 cancer fatali- ties, 0.1 equipment use injuries.	0.205 cancer fatalities, 0.09 equipment use injuries.	0.204 Cancer fatali- ties, 0.1 equipment use injuries.	0.136 cancer fatalities 0.46 equipment use injuries.
Public Health ^b	3.89 cancer fata- lities in 10 years and 389 cancer fatalities in 1000 years.	0.703 cancer fatal- ities in 10 years and 16.6 cancer fatalities in 1000 years.	0.578 cancer fata- lities in 10 years and 1.63 cancer fatalities in 1000 years.	0.641 cancer fata- lities in 10 years and 1.69 cancer fatalities in 1000 years.	0.587 cancer fatalities in 10 years and 2.48 cancer fatalities in 1000 years.	0.629 cancer fatalities in 10 years and 2.48 cancer fatalities in 1000 years.	
Mineral Resources	None	Consumption of 549,500 cubic yards of borrow material (gravel, rock).	Consumption of 236,300 cubic yards of borrow material (gravel, rock).	Same as Alternative 3.	Consumption of 227,400 cubic yards of borrow material (gravel, rock).	Same as Alternative 3.	Consumption of 363,825 cubic yards of borrow material (gravel, rock).
Soils	Continuously in- creasing area of contaminated soils due to wind and water erosion.	Permanent loss of 93 acres of soils. Re- clamation of 21 acres of soils.	Permanent loss of 80 acres of soils. Re- clamation of 114 acres of soils.	Same as Alternative 3.	Same as Alternative 3.	Same as Alternative 3.	Removal and replacement of 856 acres of soils.
Water Resources	Continued contamin- ation of unused, brackish alluvium ground water in the immediate vicinity of the tailings pile.	Gradual cleansing of unused brackish alluvium ground water. Uranium concentrations would stabilize above background levels in 100 years.	No discernable impact at the Cheney Reservoir site. Uranium concen- trations would stabilize at background levels in 100 years at the Grand Junction site.	Same as Alternative 3.	No impact on ground water resources at the Two Road site. Uranium concen- trations would stabilize at background levels in 100 years at the Grand Junction site.	Same as Alternative 3.	No impact on ground water quality.

Table 1.1 Summary of impacts (Continued)

Environmental Component	Alternative 1 No action	Alternative 2 Stabilization at Grand Junction	Alternative 3 Disposal at Cheney Reservoir with truck transport	Alternative 4 Disposal at Cheney Reservoir with train-truck transport	Alternative 5 Disposal at Two Road with truck transport	Alternative 6 Disposal at Two Road with train-truck transport	Vicinity Properties ^a For all action alternatives (Alternatives 2 through 6)
Cultural/Historic Resources	None	None	None	None	None	None	None
Aesthetic Resources	None	Stabilized pile would be 55 to 71 feet above the surrounding terrain - visual annoyance to many persons.	Stabilized pile would be 35 feet above the surrounding terrain and would conform with the surrounding terrain.	Same as Alternative 3.	Stabilized pile would be 35 feet above the surrounding terrain and would conform with the surrounding terrain.	Same as Alternative 5.	None Properties would be reclaimed to nearly their pre-remedial action condition.
Noise	None	Daytime annoyance to residents near the Grand Junction site.	Daytime annoyance to residents near the Grand Junction site and along transportation route.	Daytime annoyance to residents near the Grand Junction site and at Whitewater.	Daytime annoyance to residents near the Grand Junction site and along the transportation route.	Daytime annoyance to residents near the Grand Junction site and at Mack.	Short-term daytime annoyance to property owner and adjacent residents.
Land Use	Continued restricted use of 114 acres at the Grand Junction site and adjacent state repository.	Permanent restricted use of 93 acres at the Grand Junction site and adjacent state repository. Release of 21 acres for other uses.	Permanent restricted use of 80 acres at the Cheney Reservoir site. Release of 114 acres at the Grand Junction site for other uses.	Same as Alternative 3.	Permanent restricted use of 80 acres at Two Road site. Release of 114 acres at the Grand Junction site for other uses.	Same as Alternative 5.	None
Population	None	Increase in population of 295 persons in Grand Junction and 501 persons in Mesa County during maximum site activities.	Increase in population of 322 persons in Grand Junction and 560 persons in Mesa County during maximum site activities.	Increase in population of 329 persons in Grand Junction and 555 persons in Mesa County during maximum site activities.	Increase in population of 355 persons in Grand Junction and 596 persons in Mesa County during maximum site activities.	Increase in population of 362 persons in Grand Junction and 608 persons in Mesa County during maximum activities.	Increase in population of 600 persons in Grand Junction and 957 persons in Mesa County during maximum site activities.

Table 1.1 Summary of Impacts (Continued)

Environmental component	Alternative 1 No action	Alternative 2 Stabilization at Grand Junction	Alternative 3 Disposal at Cheney Reservoir with truck transport	Alternative 4 Disposal at Cheney Reservoir with train- truck transport	Alternative 5 Disposal at Two Road with truck transport	Alternative 6 Disposal at Two Road with train- truck transport	Vicinity Properties ^a For all action alternatives (Alternatives 2 through 6)
Water Consumption	None	66.4 million gallons.	72,548 million gallons.	73,105 million gallons.	69,174 million gallons.	69,834 million gallons.	11,985 million gallons.
Air Quality (Non-Radiological)	None	Maximum 24-hour concentration of suspended particulates of 425 micrograms per cubic meter. Exceeds Federal and state standards.	Maximum 24-hour concentration of suspended particulates of 445 micrograms per cubic meter. Exceeds Federal and state standards.	Same as Alternative 3.	Maximum 24-hour concentration of suspended particulates of 331 micrograms per cubic meter. Exceeds Federal and state standards.	Same as Alternative 3.	Very small temporary increase in suspended particulates.
Wildlife	None	Permanent loss of 93 acres of disturbed grassland habitat.	Permanent loss of 80 acres of common shrub and grassland habitat.	Same as Alternative 3.	Permanent loss of 80 acres of common grassland habitat.	Same as Alternative 3.	Temporary disturbance of urban wildlife.
Vegetation	None	Permanent loss of 93 acres of disturbed grasslands.	Permanent loss of 80 acres of common shrubs and grasslands.	Same as Alternative 3.	Permanent loss of 80 acres of common grasslands.	Same as Alternative 3.	None
Threatened and Endangered Species	None	None	None	Same as Alternative 3.	None	Same as Alternative 3.	None
Archaeological Resources	None	None	Disturbance of four sites potentially eligible for the NHP. Data collection and analysis would be conducted.	Same as Alternative 3.	None	Same as Alternative 3.	None

Table 1.1 Summary of impacts (Concluded)

Environmental component	Alternative 1 No action	Alternative 2 Stabilization at Grand Junction	Alternative 3 Disposal at Cheney Reservoir with truck transport	Alternative 4 Disposal at Cheney Reservoir with train- truck transport	Alternative 5 Disposal at Two Road with truck transport	Alternative 6 Disposal at Two Road with train- truck transport	Vicinity Properties ^a For all action alternatives (Alternatives 2 through 6)
Employment	None	Average direct employment of 125 persons for 33 months. Maximum direct employment of 185 persons.	Average direct employment of 128 persons for 33 months. Maximum direct employment of 146 persons.	Average direct employment of 112 persons for 34 months. Maximum direct employment of 127 persons.	Average direct employment of 127 persons for 34 months. Maximum direct employment of 147 persons.	Average direct employment of 118 persons for 34 months. Maximum direct employment of 136 persons.	Average direct employment of 495 persons for 27 months. Maximum direct employment of 815 persons.
Social Services	None	The Grand Junction and Mesa County school, sewer, water, power, fire, and police facilities are adequate to accommodate the increased population.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.	Same as Alternative 2.
Transportation Networks	None	Maximum of 45 percent increase in traffic on D Road during maximum site activities. Some congestion.	Maximum of 32 percent increase in traffic on U.S. Highway 50 during maximum site activities. Some congestion.	Maximum of 11 percent increase in traffic on U.S. Highway 50 during maximum site activities.	Maximum of 64 percent increase in traffic on U.S. Highway 6 & 50 during site activities. Some congestion.	Maximum of 38 percent increase in traffic on U.S. Highway 6 and 50 during maximum site activities.	80 truck trips per day from various locations in Mesa County - no discernable impacts.
Traffic Accidents	None	3.00 injuries 0.08 fatalities	6.85 injuries 0.19 fatalities	4.14 injuries 0.11 fatalities	11.58 injuries 0.32 fatalities	6.13 injuries 0.17 fatalities	2.85 injuries 0.08 fatalities
Energy Resources	None	Consumption of 3.247 million gallons of fuel and 1.768 million kwh of electricity.	Consumption of 4.948 million gallons of fuel and 1.323 million kwh of electricity.	Consumption of 5.147 million gallons of fuel and 1.323 million kwh of electricity.	Consumption of 5.137 million gallons of fuel and 1.365 million kwh of electricity.	Consumption of 6.818 million gallons of fuel and 1.365 million kwh of electricity	Consumption of 1.740 million gallons of fuel and 0.007 million kwh of electricity.
Costs	None	\$65.38 million	\$56.30 million	\$93.17 million	\$77.48 million	\$106.69 million	\$99.36 million

^aAlternatives 1 through 6 include remedial action at the vicinity properties; impacts listed for the vicinity properties must be added to the impacts of each alternative to identify the impacts of the entire project.

^bAssumes a constant population. Increase in population would cause a greater increase in health impacts for no action and stabilization at the Grand Junction site than for the other alternatives.

2.0 MAJOR IMPACTS

The major impacts associated with each of the remedial action alternatives are identified in Table 2.1 and are discussed in this section.

Radiation Health Impacts

There are five principal environmental pathways by which individuals could be exposed to radioactivity during and after remedial action. There are: 1) inhalation of radon and radon daughters, 2) exposure to direct gamma radiation from the tailings pile, 3) inhalation or ingestion of windblown radioactive particulates, 4) ingestion of contaminated foods produced in areas contaminated by tailings, and 5) ingestion of ground or surface water contaminated by radioactive materials. For the calculation of health effects, the first four pathways mentioned above are considered. Exposures via the ground or surface water pathways are not considered because the water sources used for human consumption do not show evidence of contamination.

Exposure to radon daughters were calculated for two separate population categories: 1) those persons living one to 80 kilometers from the site boundaries and 2) those persons living within one kilometer of the site boundaries. The MILDOS computer code was used to estimate radon daughter exposures for case (1) above. The Gaussian sector-average dispersion model modified to predict radon concentrations close to an area source was used to estimate radon concentrations at 0.5 kilometer from the sites in the quadrant to which the winds blow the majority of the time. It was assumed that the entire population living within one kilometer of the site boundaries was exposed to this concentration. This population was assumed to spend six hours a day outdoors and 18 hours a day indoors. Radon daughter equilibrium was assumed to be 25 percent outdoors and 50 percent indoors. A lung cancer risk estimate of 300×10^{-6} lung cancer death per person-rem was applied for all population groups.

Direct gamma radiation from the tailings pile was assumed to affect all persons living within one kilometer of the site boundaries. An exposure rate of 5 microR/hr above background was applied for the no action alternative. To account for expected increases in exposure rate while the pile is excavated and mounded during the action alternatives, the above-background gamma exposure rate was assumed to double.

Inhalation and ingestion exposure from radioactive particulates were predicted entirely by the MILDOS Code. Particulate inhalation exposures to the population within one kilometer of the sites were shown to be negligible when compared to radon daughter inhalation and gamma exposure.

A summary of the estimated excess health effects is shown in Table 1.1. The relatively high number of cancer fatalities is due to the large population exposed, an increase in the lung cancer risk estimator, and conservative assumptions applied for the population living within one kilometer of the site boundaries.

Table 2.1 Major impacts

Stabilization on the Grand Junction Site

- o Loss of 93 acres of potentially valuable land at the Grand Junction site.
- o Exceedence of Federal and State air quality standards for particulates.
- o Permanent visual annoyance to many residents.
- o Annoyance to residents near the site due to noise from construction activities.
- o Increase in traffic volumes (with some congestion) on D Road.

Stabilization at the Cheney Reservoir Site with Truck Transport

- o Major increase in traffic volumes (with some congestion) on U.S. Highway 50, D Road, 32 Road and on city streets around the tailings pile.
- o Exceedence of Federal and State air quality standards for particulates.
- o Annoyance to residents near the Grand Junction site due to noise from construction activities.

Stabilization at the Cheney Reservoir Site with Train and Truck Transport

This alternative would have the same major impacts as stabilization at the Cheney Reservoir site with truck transport with the following exceptions:

- o Major increase in traffic would occur only between Whitewater and the Cheney Reservoir site.
- o Annoyance to residents in Whitewater due to noise from construction activities would occur.
- o The costs of remedial action would be relatively high.

Stabilization at the Two Road Site with Truck Transport

- o Major increase in traffic volumes (with some congestion) on Interstate 70, U.S. Highway 6 and 50 and on city streets around the tailings pile.
 - o Exceedence of Federal and State air quality standards for particulates.
 - o Annoyance to residents near the Grand Junction site due to noise from construction activities.
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Table 2.1 Major impacts

Stabilization at the Two Road Site with Train and Truck Transport

This alternative would have the same major impacts as stabilization at the Two Road site with truck transport with the following exceptions:

- o Major increases in traffic would occur only between Mack and the Two Road site.
- o The costs of remedial action would be relatively high.

Remedial Action at Vicinity Properties

- o Increased population in Grand Junction and Mesa County.
 - o Annoyance of adjacent residents due to noise from construction activities.
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Land Use

Stabilization at the Grand Junction site would permanently preclude the use of 93 acres from any other uses. The Grand Junction site is zoned for recreational uses associated with the adjacent Colorado River. The site also has a high value as land for industrial development although this use would not be consistent with existing land use plans. Twenty-one acres of the existing 114 acre site would be released for uses consistent with local land use plans.

Stabilization at the Two Road site (80 acres restricted use) would preclude use of the site by the U.S. Bureau of Reclamation for the Glenwood-Dotsero desalinization project. This project has not been funded by the U.S. Congress nor approved by the State of Colorado and may not be a viable project even if the Two Road site is not selected for disposal of the Grand Junction tailings.

If either the Cheney Reservoir or Two Road site are selected, the DOE would work with local officials to incorporate cost-effective measures into the reclamation of the Grand Junction site which are consistent with the long-term land use plans for the site.

Air Quality

The Industrial Source Complex Short-term (ISCST) dispersion model was used to estimate suspended particulate concentrations for each of the alternatives. Federal and state air quality standards for suspended particulate concentrations (TSP) would be exceeded by all of the action alternatives. These standards would be exceeded at the Grand Junction site, the disposal site and along the transportation route for each alternative. The maximum 24-hour concentrations would range from 331 to 445 micrograms per cubic meter. The Federal primary 24-hour TSP standard is 260 micrograms per cubic meter. Annual TSP concentrations would be substantially less than the maximum 24-hour concentrations but the primary Federal annual standard (75 micrograms per cubic meter) may be exceeded. It should be noted that the maximum 24-hour concentrations are based on very conservative assumptions such as maximum site activity and worst-case atmospheric conditions. Therefore, the maximum 24-hour concentration observed during remedial action should not be as high as those projected above and the average 24-hour concentration would be considerably less than the concentrations discussed above.

The concentrations of all gaseous pollutants would be within all Federal and state standards.

Noise

Residents near the Grand Junction site, borrow sites, the vicinity properties and along the transportation routes would be annoyed by the remedial action activities.

A noise prediction model was used to estimate the maximum A-weighted equivalent sound level (L_{eq}) emitted during construction at the tailings, disposal, and borrow sites. The noise-level model is conservative (i.e. the noise level that it predicts are higher than would be realized) as no attenuation for air absorption, berms, or foliage is considered in the model.

All alternatives except no action would involve excavation at the Grand Junction site. The maximum potential equivalent sound level at the Grand Junction site for the stabilization on site alternative would be approximately 95 decibels at a location 100 feet from the center of activity. This would result in maximum outdoor noise levels of approximately 75 and 73 decibels at the closest residential areas to the west and southwest of the site, respectively. These residential areas are at distances of approximately 1400 and 1500 feet, respectively. These potential noise levels would occur only during daytime hours and represent a worst-case situation in equipment utilization; average daytime noise levels through the duration of the project would probably be up to three decibels less.

The alternatives involving tailings disposal at either the Cheney Reservoir or Two Road sites would result in noise levels about three to four decibels lower at the Grand Junction site. However, under any of the alternatives except the no action alternative, daytime noise levels for nearby residents would be elevated more than 10 decibels above existing noise levels.

The noise levels associated with tailings disposal at the Cheney Reservoir and Two Road sites would be almost as great as for excavation and disposal at the Grand Junction site, however, the nearest residences that could be affected are about 1.5 miles away from the Cheney Reservoir site and three miles away from the Two Road site. Noise levels from the disposal sites would probably be in the 50 to 55 decibel range at these nearest residences, even under worst-case conditions.

Most remedial action activities for vicinity properties would involve hand held tools and the occasional use of small front-end loaders, backhoes and dump trucks. The noise levels associated with these activities would be similar to small-scale street repair work that is common in residential areas. Typical daytime equivalent noise levels associated with these activities are expected to be in the 79 to 81 decibel range at a distance of 100 feet. Remedial action at some of the larger and more complex vicinity properties may involve larger equipment such as dozers, scrapers and large front-end loaders and trucks. The noise levels associated with these activities are expected to be in the 87 to 89 decibel range at 100 feet. All vicinity property remedial action would occur during normal working hours and would last an average of one month per property.

The maximum equivalent noise levels associated with equipment activities at the 32 and C-1/2 borrow site and at the Unawep site (for stabilization on site alternative), and at the Fruita site (for both of the Two Road disposal alternatives) would be approximately 91, 89, and 87 decibels, respectively 100 feet away from the centers of activity. The nearest residence to the 32 and C-1/2 site would be subjected to daytime noise levels up to 63 decibels. The nearest residence to the Fruita site would be subjected to daytime noise levels up to approximately 66 decibels. Daytime noise levels at the residences near these borrow sites would be elevated by about 20 decibels. Noise impacts at the Unawep site and borrow sites would be minor because of the isolation of the site from sensitive receptors.

Trucks traveling the haul routes would cause noise of approximately 79 decibels at 200 feet. For the stabilization on site alternative, high levels of truck activity on D Road may cause substantial annoyance to nearby residential areas. For the Cheney Reservoir truck alternative, D-Road would receive substantially lower use but some areas along U.S. Highway 50 southeast of Grand

Junction may be adversely affected. The Two Road truck alternative would involve high levels of truck activity and disturbance in the downtown area of Grand Junction and along some parts of U.S. 50 northwest of Grand Junction.

The rail transport alternatives would result in much lower noise emissions in Grand Junction and in the affected corridors since the trains would only travel these corridors twice a day. However, unloading operations in Whitewater or Mack and increased truck activities would result in substantially increased noise levels in Whitewater and the corridor southeast of Whitewater for the Cheney train and truck alternative, and in Mack and the corridor northwest of Mack for the Two Road train and truck alternative.

Scenic Resources

Stabilization on the Grand Junction site would require the construction of a stabilized pile extending 55 feet above the terrain on the north side of the pile and 71 feet above the terrain on the east and west sides of the pile. The stabilized pile would be visible from many locations in the city of Grand Junction and from the housing development on the south side of the Colorado River directly across from the Grand Junction site. The pile would be considered a visual annoyance by many people.

A stabilized pile at either the Cheney Reservoir or Two Road site would be 35 feet above the surrounding terrain and would generally conform to the surrounding terrain.

Population

For stabilization on the Grand Junction site, the immigrant project workers and immigrants searching for work related to the remedial action would create population increases. The peak population increases in Mesa County and Grand Junction would be 501 and 295 persons, respectively. These impacts would result in a six percent increase in the total population of both Mesa County and the Grand Junction area.

For the Cheney Reservoir-truck transport alternative, the countywide population increase caused by immigrant project workers and immigrants searching for remedial action related work would reach a peak of 560 persons in 1989. The estimated population increase in Grand Junction would reach a peak of 322 persons in 1989, or seven percent of the Grand Junction area population.

For the Cheney Reservoir-train-truck alternative, the countywide population increase caused by immigrant project workers and immigrants searching for remedial action related work would reach a peak of 555 persons in 1989. This peak would represent a six percent increase in the county population. The estimated population increase in the Grand Junction area would reach a peak of 329 persons in 1989, or seven percent of the Grand Junction area population.

For the Cheney Reservoir train-truck alternative, the countywide population increase caused by immigrant project workers and immigrants searching for remedial action related work would reach a peak of 555 persons in 1989. This peak would represent a six percent increase in the county population. The estimated population increase in the Grand Junction area would reach a peak of 329 persons in 1989, or seven percent of the Grand Junction area population.

For the Two Road truck alternative, the population increase caused by immigrant project workers and immigrants searching for remedial action related work would reach a peak of 596 persons in 1989. This peak would represent a seven percent increase in the county population. The estimated population increase in the Grand Junction area would reach a peak of 355 persons in 1989, or seven percent of the Grand Junction area population.

For the Two Road train-truck alternative, the countywide population increase caused by immigrant project workers and immigrants searching for remedial action related work would reach a peak of 608 persons in 1989. The estimated population increase in the Grand Junction area would reach a peak of 362 persons in 1989, or seven percent of the Grand Junction area population.

For remedial action at vicinity properties, the countywide population increase caused by immigrant project workers and immigrants searching for remedial action related work would reach a peak of 957 persons in 1988. The estimated population increase in the Grand Junction area would reach a peak of 669 persons in 1988.

Transportation

The stabilization on-site alternative would involve an average of 154 round trips daily (peak of 247) for trucks carrying borrow materials from the 32 and C-1/2 borrow site to the Grand Junction processing site. This represents a percentage increase in average daily traffic along the route ranging from four percent to 28 percent.

Disposal of tailings at Cheney Reservoir under the truck alternative would involve 209 round trips daily under both average and peak conditions. Thus, U.S. Highway 50 between 32 Road and the turn-off for the Cheney Reservoir site, being used for both initial and return trucks trips, would be travelled 418 times daily. The remainder of the route, being traveled only once each round trip, would be travelled 20 times daily. The percentage increases in daily traffic volumes along the route under average and peak conditions would range from one percent on U.S. Highway 50 between Unaweep Avenue and Noland Avenue to 32 percent on Struthers Avenue between Seventh Street and the processing site.

Under both average and peak conditions, disposal of the tailings at Cheney Reservoir (train-truck transport) would involve 209 one-way trips daily for trucks between Whitewater and the turnoff to the Cheney Reservoir site. Trucking of borrow materials from the Cheney Reservoir site to the Grand Junction site would involve 34 round trips daily under both average and peak conditions. Thus, the maximum increases in traffic on U.S. Highway 50 would be 418 vehicles per day, while the maximum increase in traffic on affected streets in Grand Junction would be 68 vehicles per day. Under average and peak conditions, the percentage increase in daily traffic volume would range from less than one percent on U.S. Highway 50 between 4th and Unaweep Avenue to 10 percent on Struthers Avenue between Seventh Street and the processing site.

Disposal of the tailings at the Two Road site would involve an average and peak of 209 round trips. Thus, the proposed routes would be travelled a total of 418 times daily. This represents a percentage increase in traffic ranging from two percent on U. S. Highway 6 and 50 (Loop 70) between North Avenue and 25 Road to 64 percent on Struthers Avenue between the processing site and Ninth Street.

Under both average and peak conditions, disposal of the tailings at the Two Road site via the truck/train alternative would involve 209 round trips daily for trucks between Mack and the Two Road site. Trucking borrow materials from the Two Road site to the Grand Junction site would involve 34 daily truck trips under both average and peak conditions.

Under both average and peak conditions, trucks would make a maximum of 478 trips daily on U.S. Highway 6 and 50 between Mack and Two Road. This maximum would represent a percentage increase in traffic of 38 percent. Trucks would travel the route between Mack and the Grand Junction site a total of 68 times daily under average and peak conditions representing a percentage increase in average daily traffic ranging from less than one percent on U.S. Highway 6 and 50 (Loop 70) between 25 Road and North Avenue to six percent on Interstate 70 between Mack and Loma.

The vicinity properties cleanup would involve approximate 80 truck trips daily either from the 32 and C-1/2 borrow sites to the active vicinity properties or from the active vicinity properties to the processing site. Because vicinity properties are spread throughout Grand Junction, the impacts on traffic networks would also be spread throughout Grand Junction and would have relatively small impacts.

Ground Water

Two potential aquifers were evaluated for indicators of contamination, the alluvium and the Dakota Sandstone. Within the alluvium, only two chemical constituents could be used to define contaminant plumes: ammonium and uranium. For stabilization on site, uranium concentrations would decrease over the next 100 years, then stabilize above background concentrations, and would constitute the main impact to water resources. There is no existing use of the alluvium; background quality is generally brackish. The water quality analyses of the Dakota Sandstone exhibited no indication of contamination. The presence of entrapped oil in the Dakota is an indication that there is minimal communication between the alluvium and the Dakota.

For relocation of the tailings to Cheney Reservoir, the alluvium at the processing site would be flushed. Uranium would return to background concentrations after about 100 years.

At the Cheney Reservoir site, low-permeability unconsolidated deposits hold small amounts of water; the estimated yield of a well would be only about 3 gallons per day. There is no existing use of this shallow ground water. Any contamination of this water by the tailings would preclude use of only a very minimal water resource.

There is no existing shallow ground water at the Two Road site. Thus the tailings could have only minimal impacts on a virtually non-existent water resource. The impacts on ground water at the processing site would be the same for relocation to Two Road as for relocation to Cheney Reservoir.

Costs

The costs of the alternatives in order of increasing costs are shown below:

<u>Alternative</u>	<u>Cost in millions</u>
Cheney Reservoir truck	56.30
Grand Junction	65.38
Two Road truck	77.48
Cheney train-truck	93.17
Two Road train-truck	106.69
Vicinity properties	99.36

These estimates do not include the costs of property acquisition, engineering designs, overall project management, or long-term surveillance and maintenance.

The major costs involved with stabilization at Grand Junction result from the need to construct a base for the tailings that is above the ground water level and from the need to place riprap around the entire pile to protect it against erosion from a PMF.

The major costs for the Cheney Reservoir truck and Two Road truck alternatives result from the relatively long haul distances; 10 miles for Cheney Reservoir truck and 33 miles for Two Road truck alternatives.

The major costs for the Cheney Reservoir train-truck and Two Road train-truck alternatives result from the construction of rail spurs and loadout facilities as well as the need to transfer the tailings to trucks for the last leg of the haul route.