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PFS Exhibit HH

PFSF Transportation Study (SWEC 1998) § 3.3

CLEAR REGULATORY COMMISSION

Docket No. _____ Official Exh. No. HH
 in the matter of PFS
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 DATE 4/23/02 Witness _____
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SWEC Project No. 05996.02

REPORT NO. 05996.02-Y(D)-2 REV. 0

**PRIVATE FUEL STORAGE FACILITY
TRANSPORTATION STUDY**

Prepared for:
Private Fuel Storage L.L.C.
Private Fuel Storage Facility

February 13, 1998

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STONE & WEBSTER ENGINEERING CORPORATION
DENVER, COLORADO

3.3 DIRECT RAIL TRANSPORT OPTIONS

Direct rail transportation will utilize standard size equipment (engines and cars) for hauling the spent fuel shipping casks. A typical rail car used to haul the shipping casks (145 ton flat bed rail car) is shown on Figure 6-7.

Direct rail transport of shipping casks between the mainline railroad and the PFSF will require construction of a new railroad turnout and parking siding at the mainline and a new railroad spur approximately 24 miles in length (except option DR-5). A route for the new railroad spur must also be selected. Each of these items are described as follows:

Mainline Turnout and Rail Spur: A new turnout will be required at the mainline railroad to tie the railroad parking siding and spur into the main track. The turnout will require a switch and associated controls. The rail parking siding and spur will be of standard railroad construction.

The use of used (relay) rail is a consideration when attempting to lower construction costs. The decision to use new or used rail depends on the following:

- availability and location of relay rail that meets or exceeds the design capacity needed. Used bolted rail is more readily available as there is more of it and railroads are more willing to sell it.
- scheduled availability of the special rail transport trains that are set up to handle long strings of continuously welded relay rail.
- quality assurance measures that must be taken to assure that the relay rail meets the specified criteria. These include the use of a Sperry car to initially x-ray the rail in place to form a baseline condition. Imperfections in the rail will require repair.
- If the available relay rail comes in short lengths to be welded into continuous welded rail (CWR), there will be more repair and welding work.

While the initial cost of relay rail is less (approximately 40% less than new), additional costs and schedule impacts may be a factor in selecting this source over new rail.

The use of bolted vs. CWR rail depends on a number of factors. CWR has the advantage of being quieter with a better ride quality due to elimination of joints. It also requires less maintenance, since the welded joints will not loosen and require realignment. Also, the spikes require less maintenance since they are not vibrated loose from the joint impact experienced in bolted rail. Inspection of CWR is quicker and easier as well.

A comparison of costs for bolted vs. CWR rail must consider total costs, including initial installation and long-term maintenance. CWR typically has a higher initial cost, but a lower overall cost due to reduced lifetime maintenance. However, the PFSF project requires a choice with the lowest initial cost and as such, bolted rail is recommended.

Also, the PFSF rail spur favors the use of bolted rail, since it will carry infrequent traffic at relatively low speeds, which will reduce lifetime maintenance.

Concrete ties cost more initially but last longer than wood ties. Concrete ties are louder, provide more wear on rolling stock due to their more rigid support of the rails, and are more difficult to handle due to their weight of 900 lb. per tie. The life cycle cost of concrete ties vs. wood ties depends on the environmental and service conditions. In Utah, there is little wet/dry cycling of the ties which is detrimental to the wood. There were no concrete ties witnessed in service in the Salt Lake City area indicating that for the main lines carrying more rail traffic, Union Pacific does not feel that concrete ties are warranted. For the spur to the site, there are no overwhelming reasons to use anything but wood ties.

Direct Rail Route: Options DR-1 through DR-4 would utilize the Skull Valley road corridor for most of the route. Option DR-5 would be located on a new (proposed) corridor on the west side of Skull Valley.

For all of the options, the new rail spur will require obtaining a right of way for its entire length. For options DR-1 through DR-4, it is assumed the new rail spur could be constructed adjacent to the Skull Valley Road (preferably on the east side) and within the existing road right of way. Nevertheless, it would require obtaining a new and separate railroad right of way, because the existing right of way is granted exclusively for highway use. For option DR-5, a new right of way or easement granted by the BLM would be required for its entire length.

The remainder of Section 3.3 will describe the Skull Valley Road corridor, as it applies to Options DR-1 through DR-4, and each of the five direct rail options in detail.

Skull Valley Road Corridor (Applies to Options DR-1 Through DR-4)

Description: Options DR-1 through DR-4 would utilize the Skull Valley Road corridor for all or most of the route to the PFSF. The new railroad spur would be located parallel to the Skull Valley Road (on the east side) and within the road right of way. The railroad track would cross a number of private driveways and dirt roads along the route and would eventually cross the Skull Valley Road as it turns west on the reservation toward the PFSF. The spur would continue approximately 2-miles west to the PFSF.

The direct rail route for options DR-1 and DR-2 would require the new railroad spur to go beneath the existing Interstate 80 bridges, alongside the Skull Valley Road, since the mainline railroad is on the north side of the interstate. A significant consideration for these two options are the clearances currently available beneath the Interstate 80 bridges. Both bridges (eastbound and westbound) are posted with a 15'-8" vertical clearance above the Skull Valley Road. A PFSF rail car, loaded with a shipping cask in the horizontal position and with impact limiters attached, is estimated to have a maximum height of 15'-1" (refer to Assumptions, page 4). As such, minimal clearance is available for the rail car to pass beneath the bridges. The Union Pacific and UDOT require a minimum of 23'-0" of vertical clearance when railroad tracks are located beneath bridges. A lesser vertical clearance can be authorized from Union Pacific through an impaired clearance waiver and from the State through an oversized/overweight permit. The horizontal clearances beneath the bridges are also an issue. Since the required radius of turn for railroad track is large (approximately 450-ft), there is limited space between the mainline railroad and the bridges to accommodate the turn.

Direct rail option DR-3 would require a new bridge over Interstate 80 just east of Timpie. The south bridge termination would be on the west edge of the Stansbury Mountains, where it would run along the side of the mountains for a short distance (avoiding wetlands) and turn west to connect with the Skull Valley Road. Direct rail option DR-4 would also come from east of Timpie, but on the south side of Interstate 80, from Dolomite. The new rail spur would go around the north end of the Stansbury Mountains and run along the side of the mountains for a short distance (avoiding wetlands) and turn west to connect with the Skull Valley Road.

Improvements: The new railroad spur would require a minimum of 22 feet between the outside edges of the subballast. Along the Skull Valley Road, a guardrail would be placed at appropriate locations at the edge of the rail bed for safety purposes.

A description of the required earthwork is as follows:

- The track area would be graded to the specified elevations keeping the alignment at a maximum 1% slope.
- Drainage structures (existing culverts) would be extended from the higher elevations on the east side of the track to lower elevations on the west side of the road.
- Granular fill (well draining) would be installed beneath the subballast.

- subballast (minimum 8" layer) consisting of crushed limestone (or equal) would be installed.

A description of the required trackwork is as follows:

- Placing 8" of ballast
- Wood ties
- Relay or new rail with the associated hardware (plates, spikes, anchors, etc.)
- Road crossings
- Signals, where required
- Signage

Environmental Setting: By using the existing Skull Valley Road corridor, there will be relatively low vegetation and habitat disturbance associated with the new rail spur. A significant environmental area located near the Skull Valley Road is the Horseshoe Springs Wildlife Management Area controlled by the BLM. Horseshoe Springs is located approximately 14 miles south of Timpie on the west side of Skull Valley Road. The Horseshoe Springs Recreational Knoll is located across the road from Horseshoe Springs and provides an area for overnight camping behind this knoll. To the east side of the road at Horseshoe Springs there is a knoll that extends down to the road. BLM restricts disturbing activities within 1200 feet of all riparian/aquatic habitats. The route is to the east of the 1200 foot buffer zone, however in order to put the railroad on the east side of the road, a rock cut through a portion of the knoll would be required.

Additional work is required to more fully characterize the environmental setting of the entire Skull Valley Road corridor. Raptor nest surveys will need to be conducted along the Skull Valley Road corridor. There is one known raptor nest located at one of the ranches to the west of Skull Valley Road. This nest and any other active nests (to be determined during the surveys) are protected by BLM and the State of Utah. Disturbing activities (construction) should not occur within 0.5 miles of any active raptor nest during the nesting season. BLM places this restriction from March 1 to July 15.

Cultural Resources: The old Mormon settlement community of Iosepa (1889-1917) was located near the Skull Valley Road approximately 15 miles south of Timpie. A cemetery, approximately 1 mile east of the Skull Valley Road, is all that remains of the settlement. The cemetery is a State of Utah historic site and is listed on the National Register of Historic Places.

Existing Land Ownership and Right of Way: The Skull Valley Road is located on land owned by the BLM and private ranchers. The right of way along the Skull Valley Road varies between 100-ft (50-ft each side of road centerline) and 200-ft (100-ft each side of road centerline) for most of its length with smaller right of ways (70-ft total) located at 2 ranches with buildings close to the road.

Skull Valley Road Corridor Summary (Applies to Options DR-1 Through DR-4)

The option is viable, provided the following issues are resolved:

- BLM approval of the plan and activities near the Horseshoe Springs Wildlife Management Area and the Horseshoe Springs Recreational Knoll.
- Rail spur near the Horseshoe Springs Recreational Knoll requires partial rock cut of the knoll and temporary disturbance to recreation area.
- Obtain impaired clearance waiver(s) from Union Pacific to pass under the Interstate 80 bridges (options DR-1 and DR-2).
- State approval (waiver) for oversize load to pass under the Interstate 80 bridges (options DR-1 and DR-2).

Advantages of Skull Valley Road Corridor for Direct Rail:

- Would minimize environmental disturbance to the Skull Valley by staying close to the existing Skull Valley Road.

Disadvantages of Skull Valley Road Corridor for Direct Rail:

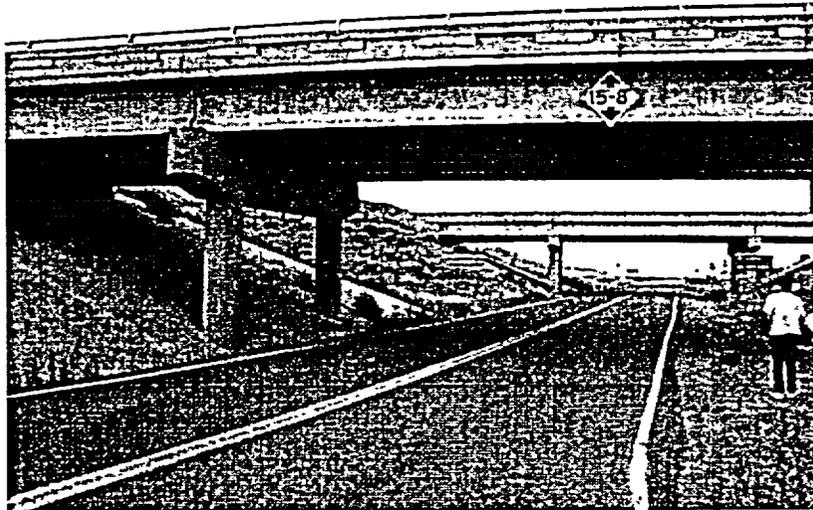
- Potential disturbance to ranches alongside the road during railroad construction and operation.
- Railroad would be close to existing ranch buildings on the east side of the Skull Valley Road and the railroad would require crossings at ranch driveways and dirt roads.
- Railroad would require crossing the Skull Valley Road near the PFSF.

Direct Rail Option DR-1 Rail Spur from Timpie Junction

Description: At Timpie, the Union Pacific east-west main line has a 2 track siding on the south side adjacent to Interstate 80. The turnout would come off of the southernmost siding from the east into a curve and proceed south beneath both bridges which carry Interstate 80 east and west. The track would run parallel to Skull Valley Road for a distance of approximately 24 miles to the PFSF access road. The track would then cross Skull Valley Road and proceed westerly approximately 2 miles to the storage site.



Photograph 10- Siding at Timpie looking west



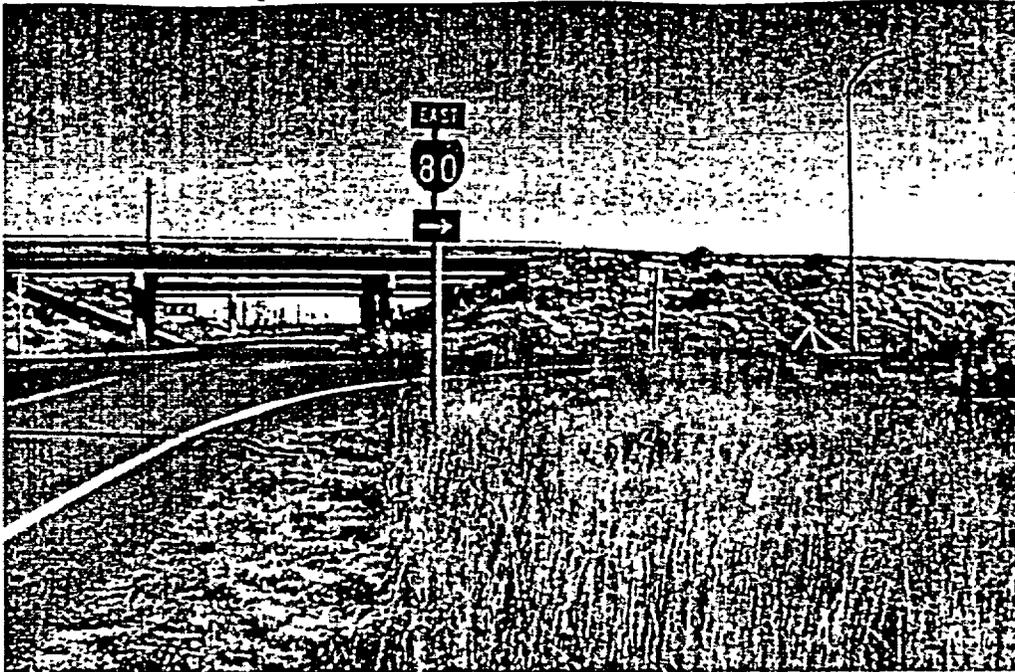
Photograph 11 - Interstate 80 bridges at Timpie looking south

At the Timpie siding, there are 2 existing siding tracks south of the main track. The southernmost siding track would be modified to include a No. 8 turnout. The track would then curve to the south from the east and go between the eastern bridge abutment and the eastern pier columns. The track would then parallel Skull Valley Road on the east side. Along the road corridor, the drainage ditch would be moved to the east side of the track and culverts would be lengthened or added where required. Driveways and roads that are intersected would be crossed at grade. Fill and sub-ballast would be added and graded to bring the railbed elevation up to approximately equal to the roadway. Signals and crossbucks would be required at the Interstate 80 ramps and where the track crosses the Skull Valley Road.

The distance from the siding's south track to the Interstate 80 bridge is approximately 328 feet and the bridge is 44 feet wide. Therefore, the curve would extend beneath the northernmost bridge. The concrete slope protection would be removed and a vertical retaining wall would be constructed to retain the earth around the abutment pile caps. The track would go between the abutment and the columns on the east end of the bridges.

Horizontal clearance requirements are 8'-2" on both sides of the track centerline. The distance from the abutment to the pier column is approximately 28 feet which would leave approximately 6 feet on both sides of the clearance envelope to adjust the horizontal alignment to fit the curve in the opening.

As can be seen in Photograph 11, the vertical clearance is 15'-8" above the Skull Valley Road centerline. The minimum required vertical clearance is 23'-0" per Union Pacific and the UDOT, which is non-negotiable. Union Pacific can issue an "impaired clearance" to a private railroad in which case all of the liability, no matter who travels on the track, falls to the private railroad. Lowering the track beneath the bridges will not work for the present configuration of the intersection, because the track would still have to meet the ramp grades at both sides of the interstate. In addition, the elevation of the tracks beneath the bridges is governed by the elevation of the mainline track and limiting the spur track slope to about 1%.



Photograph 12 - Timpie interchange looking north

The use of the presently configured Timpie interchange as the Interstate 80 crossing point requires at-grade crossings at the bottom of the eastbound entrance ramp and the westbound exit ramp. Crossbucks and signals would be required at both of these locations. It is Union Pacific's opinion that the UDOT will not approve of these crossings at the bottom of their interstate ramps due to safety issues. Therefore, the eastbound entrance ramp and the westbound exit ramp would be relocated to the west side of the interchange. The westbound exit ramp would be relocated to the west approximately 1000 feet west of the entrance ramp which would allow for weaving distance between the two access points. The relocated exit would terminate on the surface road. The eastbound entrance ramp would be moved to the southwest quadrant of the interchange and would be a quarter cloverleaf with the eastbound exit ramp. This would eliminate the two at-grade crossings at the railroad and the associated crossbuck/signal requirements. Also, the eastbound exit ramp would be relocated to avoid the new eastbound entrance cloverleaf ramp. This type of interchange is called a partial cloverleaf.

Environmental Setting: The siding is adjacent to Timpie Springs Waterfowl Management Area. Wetland areas occur along both the north and south side of the existing rail lines in the far eastern end of the intermodal site. Formal wetland delineations need to be done to ensure that the third siding can be installed without wetland impacts. If it is impossible to avoid wetland impacts, a Section 404 dredge and fill permit would have to be obtained from the Army Corps of Engineers. The Corps will require an alternatives analysis as part of this permit. The basis for their alternative analysis is first avoidance, then minimization, and finally mitigation for wetlands. Wetland impacts associated with this option would likely be a relatively small acreage of

fill along the existing railroad berm. Although mitigation would be required in the form of wetland replication, the ACOE could view this option favorably because of the smaller impact area.

Existing Land Ownership and Right of Way: The land in the proposed siting area is owned by the State (east side) and Cargill (west side), with right of ways granted for the railroad, interstate, and frontage road. A portion of the site area is within the boundary of the State-owned Timpie Springs Waterfowl Management Area. The new rail spur would be located on the Union Pacific right of way (200-ft ROW). It is assumed the frontage road ROW can be used for access to the Union Pacific ROW, but accessing the mainline will most likely require traversing a small isolated portion of Cargill's property.

Estimated Cost of Option DR-1: The estimated total life-cycle cost of Option DR-1 is \$85,317,000 in 1998 dollars. The total cost includes both capital construction costs (\$29,395,000) and life-cycle operating and maintenance costs (\$55,922,000) and is based on a 40,000 MTU facility with a 40-year life.

Summary of Direct Rail Option DR-1 Rail Spur from Timpie Junction

The option is viable, provided the following issues are resolved:

- Reconfiguration of the Interstate 80 interchange. Relocate the eastbound entrance ramp and the westbound exit ramp. This could be done on the north side of the interstate by moving the westbound exit ramp to the west and terminating it on the surface road. Vehicles could then follow the surface road to the underpass in order to go south on Skull Valley Road. This would eliminate the at-grade crossing at the bottom of the westbound exit ramp. The eastbound entrance ramp could be moved to the southwest quadrant of the interchange and constructed with a new eastbound exit ramp on privately owned land presently occupied by an abandoned truck stop.
- An impaired clearance waiver is required from Union Pacific.
- Easement, lease, or purchase of an isolated small piece (6,000 SF) of Cargill property.
- Ownership of the southwest quadrant of the interchange.
- State concurrence (if required) for construction and operation of the rail siding and rail spur in close proximity to the Timpie Springs Waterfowl Management Area. It is likely the State will impose construction timing restrictions based on waterfowl and endangered species (peregrine falcon) nesting seasons.
- Army Corps of Engineers Section 404 permit obtained if there are any wetland impacts.

Advantages of Option DR-1:

- The Union Pacific rail would be accessed at the closest point to the north-south Skull Valley Road corridor thereby minimizing the amount of required track.
- The effect on Interstate 80 through traffic could be minimized. The existing westbound and eastbound ramps could remain in service while the new ramps are being constructed. The traffic is such that the eastbound bridge and approaches could be reconstructed while both directions use the westbound bridge and vice versa.
- There would be no handling of the casks at Timpie as the cask stays on the rail car.
- Possibility of avoiding wetland impacts.

Disadvantages of Option DR-1:

- Requires resolution of the issues described above in a reasonable amount of time and at cost acceptable to the PFSLLC.

Direct Rail Option DR-2 Rail Spur from West of Timpie Junction

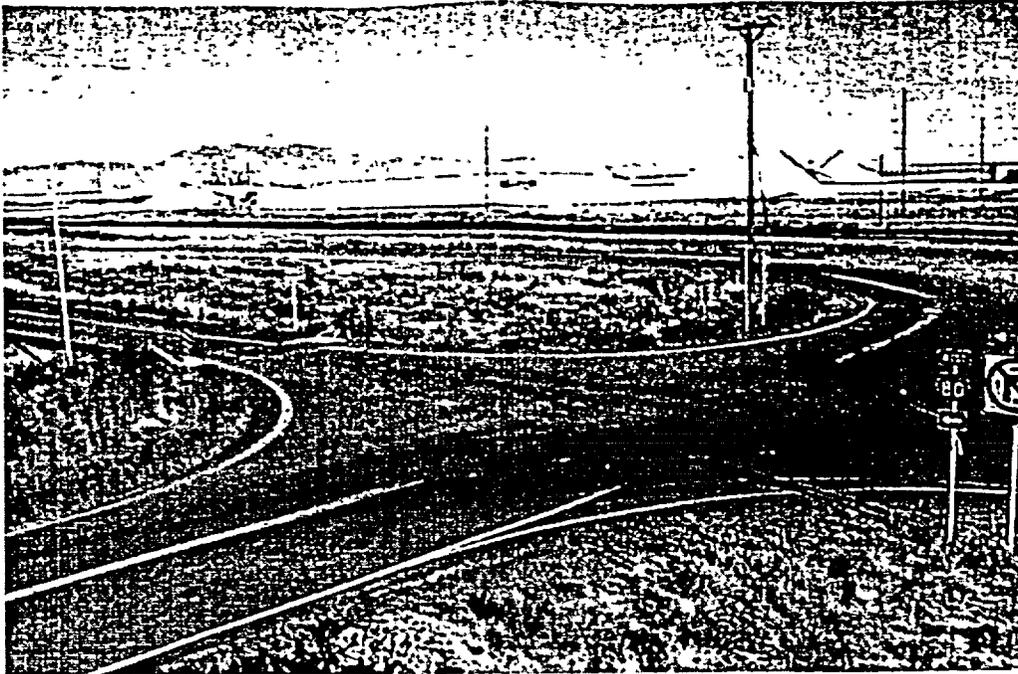
Description: Rather than approach the Timpie interchange from the east, the rail spur could be configured such that the trains approach Timpie on a siding from the west approximately 0.9 miles from Timpie and turn south beneath the bridges at Timpie. Similar issues as in option DR-1 exist, such as:

- the interchange ramps on the east side of the Skull Valley Road would have to be moved as there cannot be at-grade crossings at the bottom of highway ramps.
- the available clearance would be at the same 15'-8" height with the track passing between the east abutment and the east bridge piers.
- the curve would be approximately a 450' radius (12.73 degrees) curve.



Photograph 13 - Looking west from the Cargill Salt access road

Since the curve is coming from the west, the existing frontage road would have to be realigned to match the curve of the track. Also, the westbound entrance ramp would have to be realigned at the bottom along with frontage road in order to make a better entrance to the ramp once the road is realigned



Photograph 14- looking northwest at the north side of the Timpie interchange

The only difference between DR-1 and DR-2 is the additional realignment work on frontage road and the westbound entrance ramp to Interstate 80.

Environmental Setting: The site for the rail siding occurs on a high point on the railroad right of way between the main Union Pacific rail line and the frontage road. The rail spur would then be routed along the existing railroad right of way, crossing through one low, mudflat area.

Formal wetland delineations would be required. If it is impossible to avoid wetland impacts, a Section 404 dredge and fill permit would have to be obtained from the Army Corps of Engineers. The Corps will require an alternatives analysis as part of this permit. The basis for their alternative analysis is first avoidance, then minimization, and finally mitigation for wetlands. Mitigation would be required for the wetland impacts by wetland replication.

Threatened and endangered species consultation is required with the State, BLM, and USFWS.

Existing Land Ownership and Right of Way: The rail spur would be located within the railroad right of way to Timpie, where it would turn south, pass under the Interstate 80 bridges, and follow the Skull Valley Road corridor to the PFSF.

Estimated Cost of Option DR-2: The estimated total life-cycle cost of Option DR-2 is \$85,968,000 in 1998 dollars. The total cost includes both capital construction costs

(\$29,980,000) and life-cycle operating and maintenance costs (\$55,988,000) and is based on a 40,000 MTU facility with a 40-year life.

Summary of Direct Rail Option DR-2 Rail Spur from West of Timpie Junction

The option is viable, provided the following issues are resolved:

- Reconfiguration of the Interstate 80 interchange. Relocate the eastbound entrance ramp and the westbound exit ramp. This could be done on the north side of the interstate by moving the westbound exit ramp to the west and terminating it on the surface road. Vehicles could then follow the surface road to the underpass in order to go south on Skull Valley Road. This would eliminate the at-grade crossing at the bottom of the westbound exit ramp. The eastbound entrance ramp could be moved to the southwest quadrant of the interchange and constructed with a new eastbound exit ramp on privately owned land presently occupied by an abandoned truck stop.
- An impaired clearance waiver is required from Union Pacific.
- Ownership of the southwest quadrant of the interchange.
- Army Corps of Engineers Section 404 permit obtained if there are any wetland impacts.

Advantages of Option DR-2:

- The Union Pacific rail would be accessed at the closest point to the north-south Skull Valley Road corridor thereby minimizing the amount of required track.
- The effect on Interstate 80 through traffic could be minimized. The existing westbound and eastbound ramps could remain in service while the new ramps are being constructed. The traffic is such that the eastbound bridge and approaches could be reconstructed while both directions use the westbound bridge and vice versa.
- There would be no handling of the casks at Timpie as the cask stays on the rail car.
- Avoids Timpie Springs Waterfowl Management Area.

Disadvantages of Option DR-2:

- Requires resolution of the issues described above in a reasonable amount of time and at cost acceptable to the PFSLLC.

Direct Rail Option DR-3 Rail Spur and Flyover Bridge East of Timpie Junction

Description: As an alternative to using the existing highway bridges for the trains to pass beneath Interstate 80, this option features the construction of a railroad bridge to cross over Interstate 80 between the Stansbury Mountains and Timpie. A siding would be constructed east of Timpie on the south side of the Union Pacific east-west track. Heading west, the track would go up a slope turning onto the bridge over Interstate 80 and proceed south along the west side of the Stansbury Mountains for a short distance in order to avoid wetlands adjacent to Interstate 80.



Photograph 15 - Looking east with Union Pacific on the left and the Stansbury Mountains on the right.

The track would then turn west to join the Skull Valley Road corridor heading south parallel to the road (on the east side) and crossing the road on the Reservation to continue west to the PFSF site.



Photograph 16 - Looking west from siding (bridge would cross Interstate 80 where the rock is notched and travel on the west side of the Stansbury Mtns before heading west to Skull Valley Road.



Photograph 17 - looking northeast along Stansbury Mountains toward I-80. The bridge would travel close to the rock outcrop on the right and descend to the left to Skull Valley Road

The railroad right of way on the south side of the Union Pacific line is level for a distance sufficient to provide for placement of the new rail spur. The existing rail is approximately 2 feet below the level of Interstate 80 and the clearance needed over Interstate 80 would be approximately 16 feet. For the spans needed to cross I-80 at the desired skew angle, the depth of the bridge members would be approximately 10 feet. By using a through girder bridge, the bottom of bridge to top of rail dimension is approximately 6 feet instead of the 10 feet. This is accomplished by framing the railbed support steel into the webs of the main bridge girders, thereby having the track run through the bridge and not on top of the bridge. Therefore, the track would be elevated a total of 24 feet above the existing rails. At a 1% slope, this would require a 2400 foot long slope before and after the bridge. The bridge would be skewed at an angle of approximately 40 degrees to Interstate 80 resulting in spans of approximately 175 feet.

The approach on the east end of the bridge would be constructed on an earthen berm until the elevation causes the toe of slope to exceed the rail right of way or the track clearance envelope on the track side. From these points to the bridge abutments, concrete retaining walls would be required. A pier bent would be constructed between the eastbound and westbound lanes and an abutment at the south side of Interstate 80. From that point toward the south, the track would be on a down slope supported on the rock and eventually back onto an earthen berm with the track kept above surrounding grade by approximately 5 feet. At grade crossings would be needed where the existing gravel roads cross the proposed track location.

Environmental Setting: The rail spur would come off of the existing railroad east of Timpie. Wetlands (mudflats) occur at the far eastern end of the siding. The siding would be likely to occur primarily on the existing railroad berm, however in places the berm will need to be widened and wetland areas will need to be filled. In addition, bridge abutments and supports would have to be constructed in wetland areas. The railroad would go over Interstate 80 via a bridge and would follow the base of the mountains to avoid the spring and wetland complex (Big Spring) on the west side of the mountains. After passing this area the railroad would then run parallel to Skull Valley Road.

Formal wetland delineations are needed to determine the extent of wetland impacts and a Section 404 dredge and fill permit would have to be obtained from the Army Corps of Engineers. The Corps will require an alternatives analysis as part of this permit. The basis for their alternative analysis is first avoidance, then minimization, and finally mitigation for wetlands. Wetland replication will be required to mitigate for filled wetlands.

Threatened and endangered species consultation needs to occur with the State, BLM, and USFWS.

Existing Land Ownership and Right of Way: The siding and approach to the bridge would be within the railroad right of way. The bridge crossing Interstate 80 would require intermediate supports located in the Interstate 80 right of way. An easement for the land between the highway, the Stansbury Mountains and the Skull Valley Road would be required. The track would parallel the Skull Valley Road within the road right of way.

Estimated Cost of Option DR-3: The estimated total life-cycle cost of Option DR-3 is \$89,466,000 in 1998 dollars. The total cost includes both capital construction costs (\$33,485,000) and life-cycle operating and maintenance costs (\$55,981,000) and is based on a 40,000 MTU facility with a 40-year life.

Summary of Direct Rail Option DR-3 Rail Spur and Flyover Bridge East of Timpie Junction

The option is viable, provided the following issues are resolved:

- Obtain approvals (Federal, state, etc.) to build the rail spur bridge over Interstate 80. The bridge would require support piers located between the east and west roadways.
- Obtain a railroad right of way across private and BLM land to access the Skull Valley Road right of way.
- Obtain an ACOE Section 404 Permit.

Advantages of Option DR-3:

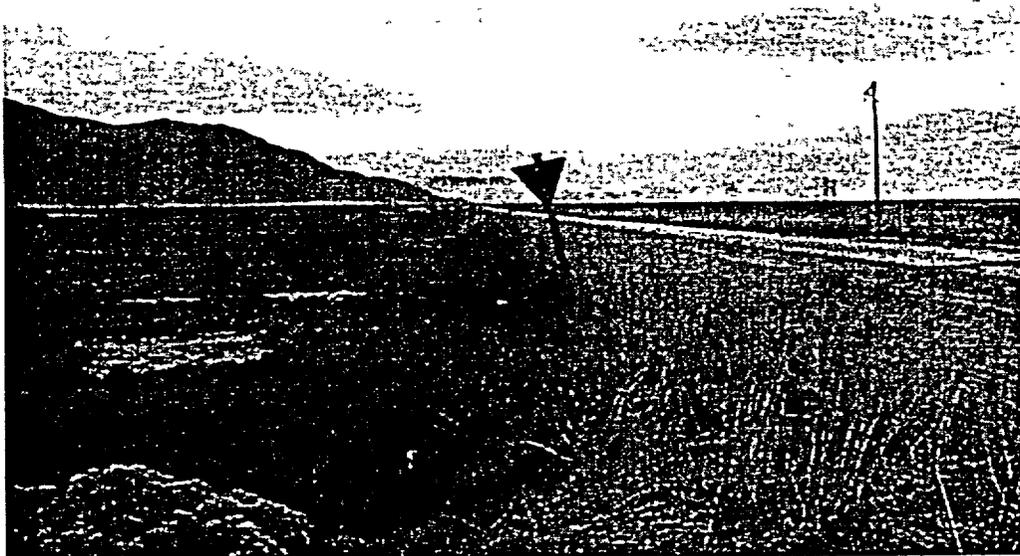
- All physical clearances could be achieved for both highway and rail.
- Union Pacific would own the rail down to the site thereby reducing maintenance costs.
- Interstate 80 through traffic would not be affected. The construction of the bridge and approaches could be done while traffic continues to operate.
- There would be no handling of the casks at an intermodal exchange as the cask stays on the rail car.

Disadvantages of Option DR-3:

- The expense of the approaches and the bridge itself.
- Close proximity to Timpie Springs Waterfowl Management Area
- Potentially large acreage of wetland impacts.

Direct Rail Option DR-4 Rail Spur from Dolomite

Description: Option DR-4 would include the extension of an existing railroad spur located on the east side of the Stansbury Mountains. The railroad spur extension would go through the north end of the Stansbury Mountains and continue southwest to meet the Skull Valley Road corridor. The existing railroad spur provides service to a lime production plant operated by the Chemical Lime Company and ends approximately 6 miles southeast of the interchange of Interstate 80 and the Skull Valley Road. A new turnout would be installed at the plant and a new railroad would be constructed adjacent to the existing road (old County Route 40) west to the point where the Stansbury Mountains meet Interstate 80. A rock cut would be made at the location where the mountain is the narrowest in width.



Photograph 18 - Looking west along county road from the lime production plant. The track would run parallel to the road on left side

The new railroad extension would pass through the cut in the Stansbury Mountains and proceed westerly to the Skull Valley Road corridor. The railroad would then turn south and run parallel to the Skull Valley Road (on the east side) crossing the road on the Goshute Reservation and running west to the PFSF site.



Photograph 19- Looking west toward proposed rock cut in Stansbury Mountains. The rock cut would be located near the center of the photograph.



Photograph 20 - Looking east at the area of the rock cut through the Stansbury Mountains.

From the turnout at the lime production plant, the track would be located adjacent to the roadway on the south side. Top of rail would be approximately 2' above the level of the roadway. The railbed would be constructed on the south side of the road adjacent to

the 40 foot roadway width. The area adjacent to the road on the south side is wet and may be a problem regarding wetlands.

The track would curve to the south as it approached the Stansbury Mountains and rise at a 1% slope to the rock cut. This will reduce the amount of excavation needed. The sides of the rock cut will be at a 1:1 slope and the width of the cut at the track bed will be 30 feet providing sufficient space for an access road adjacent to the track thereby keeping the county road right of way (existing jeep trail over the mountains) open to vehicle traffic.

The track would curve to the south as it leaves the rock cut in order to avoid the wet areas directly west of the Stansbury Mountains. From that point toward the south, the track would be on a down slope supported on the rock and eventually back onto an earthen berm with the track kept above surrounding grade by approximately 5 feet until reaching the Skull Valley Road. At-grade crossings would be needed where the existing gravel roads cross the proposed track location prior to the Skull Valley Road.

Environmental Setting: The rail spur would come off of the existing railroad before the lime production plant. Emergent marsh wetlands occur along both sides of the railroad from south of the lime production plant north for most of the way to Interstate 80. A pond fed by springs occurs adjacent to the existing County road, in front of the lime production plant. The railroad would go through the tip of the Stansbury Mountains. On the west side of the mountains there is a spring and wetland complex (Big Spring). The route would avoid this area by following the contours of the mountain until it has passed this area and then turning west to connect with the Skull Valley Road. It would then run parallel to Skull Valley Road to the reservation. The railroad would have to cross wetlands both at the lime production plant and along the entire route north of the plant, along the existing road.

Formal wetland delineations need to occur to determine the extent of the wetland impacts. Since it is impossible to avoid wetland impacts, a Section 404 dredge and fill permit would have to be obtained from the Army Corps of Engineers. The Corps will require an alternatives analysis as part of this permit. The basis for their alternative analysis is first avoidance, then minimization, and finally mitigation for wetlands. This route would require a large amount of wetland fill. Because of this, the ACOE is unlikely to prefer this route over the alternatives.

Threatened and endangered species consultation needs to occur with the State, BLM, and USFWS. In addition, further information needs to be obtained about the ecological resources found in Rush Valley and the Stansbury Mountains. Raptor nest surveys would need to be conducted at the site and along the entire route.

Existing Land Ownership and Right of Way: Property between the end of the existing railroad spur and the Stansbury Mountains is owned by the BLM, State, and a private party (Gemstar Lime Co.). The rail spur extension would travel west alongside the existing highway (old County Route 40) up to the end of the Stansbury Mountains, where it would require extension over a short length of State-owned land and through a rock cut on private land to pass through the Stansbury Mountains. From this point, the

rail spur extension would be constructed southeast to the Skull Valley Road on BLM land. The land in the area proposed for the new railroad is owned by BLM, State, and private parties. Easements or right of ways would be required over the entire length of new railroad through and west of the Stansbury Mountains.

Estimated Cost of Option DR-4: The estimated total life-cycle cost of Option DR-4 is \$91,262,000 in 1998 dollars. The total cost includes both capital construction costs (\$34,711,000) and life-cycle operating and maintenance costs (\$56,551,000) and is based on a 40,000 MTU facility with a 40-year life.

Summary of Direct Rail Option DR-4 Rail Spur from Dolomite

The option is viable, provided the following issues are resolved:

- Use of the County Route 40 "corridor" and ability to obtain additional ROW adjacent to the County Route 40 ROW.
- Leasing or purchasing land from private landowners and BLM.
- Army Corps of Engineers Section 404 permit obtained.

Advantages of Option DR-4:

- All activity is south of Interstate 80 which eliminates approvals associated with the highway.
- The use of the existing County Route 40 corridor for a portion of the route.
- Timpie Springs Waterfowl Management Area is avoided.

Disadvantages of Option DR-4:

- The rock cut will add a degree of difficulty to the construction but the material can be used to construct the approaches on both sides.
- A large amount of wetland impacts
- Major land/habitat disturbance associated with a rock cut through the mountain.

Direct Rail Option DR-5 Rail Spur from Low Junction

Description: The Union Pacific line passing through Low Junction would provide access to the west side of Skull Valley. The mainline railroad is on the south side of the Interstate at Low, so there no crossing of Interstate 80 required. The new rail spur would run solely on BLM land along the base of the Cedar Mountains. The PFSF has clear access from the west.



Photograph 21 - Looking southwest from beneath the I-80 bridges, the siding at Low Junction would be on the left side of the existing tracks.

The proposed transportation corridor is currently undeveloped range land. Grades along the alignment range from 1.5% at the Low interchange to 0.0% (level) along the Skull Valley floor. For the railroad, a maximum grade of 1.0% is desirable and would require earthwork (cut and fill) along portions of the route to meet this criteria



Photograph 22 - Valley floor looking south.

Numerous small and large arroyos (dry watercourses) cross the transportation corridor where runoff from the Cedar mountains flows intermittently. None of the arroyos carried water during a field survey of the corridor, but each would require installation of a culvert to allow flows to pass. Larger drainage basins may require construction of a small bridge or trestle.

Approximately 56 arroyos occur within the transportation corridor. The following is an estimate of the culverts and bridges which would be required:

<u>Type and size</u>	<u>Number Required</u>
Small culverts (18" to 36" diameter)	22
Medium culverts (42" to 60" diameter)	22
Large culverts (60"x 80" box culvert)	10
Short bridge crossings	2

Small and medium culverts would be corrugated metal or concrete pipe. Large culverts would be reinforced concrete box sections.



Photograph 23 - Looking southeast toward the PFSF. The railroad spur would cross the valley floor to the site

Environmental Setting: The rail spur would begin at Low Junction, which is an upland community just south of Interstate 80. The rail spur would continue south along the west side of Skull Valley, at the base of the Cedar Mountains, to the PFSF. There are no known wetlands or other environmentally sensitive areas along this route. A number of arroyos do occur in the corridor but do not pose any significant concerns. However, consultation with the State needs to occur to determine if crossing some of these drainages would require a Stream Alteration Permit.

Threatened and endangered species consultation will be required with the State, BLM, and USFWS. Raptor nest surveys will need to be performed along the entire route. In addition, further information needs to be obtained about the ecological resources found in the western portion of Skull Valley and the Cedar Mountains.

Existing Land Ownership and Right of Way: The land where the railroad turnout and sidings would be located is owned by the BLM, with right of way granted for the railroad. The railroad turnout and sidings would be located on the railroad right of way. The new 32-mile railroad spur would cross the valley entirely on BLM land and would require an easement or right of way granted for the full length.

Estimated Cost of Option DR-5: The estimated total life-cycle cost of Option DR-5 is \$91,410,000 in 1998 dollars. The total cost includes both capital construction costs (\$34,823,000) and life-cycle operating and maintenance costs (\$56,587,000) and is based on a 40,000 MTU facility with a 40-year life.

Summary of Direct Rail Option DR-5 Rail Spur from Low Junction

The option is viable, provided the following issues are resolved:

- Obtain a right of way or easement from the BLM for the transportation corridor.
- Determine the need and obtain Stream Alteration permits, if necessary.
- Completion of a detailed environmental evaluation of the railroad corridor.

Advantages of Option DR-5:

- All activity is south of Interstate 80 which eliminates conflicts associated with the highway.
- There are no major landforms that must be circumnavigated.
- Avoidance of Horseshoe Springs and other wetlands areas.
- Avoidance of private ranches and the existing Skull Valley Road traffic.

Disadvantages of Option DR-5:

- New rail construction would result in vegetation/habitat disturbance for the entire route in a previously undeveloped corridor.

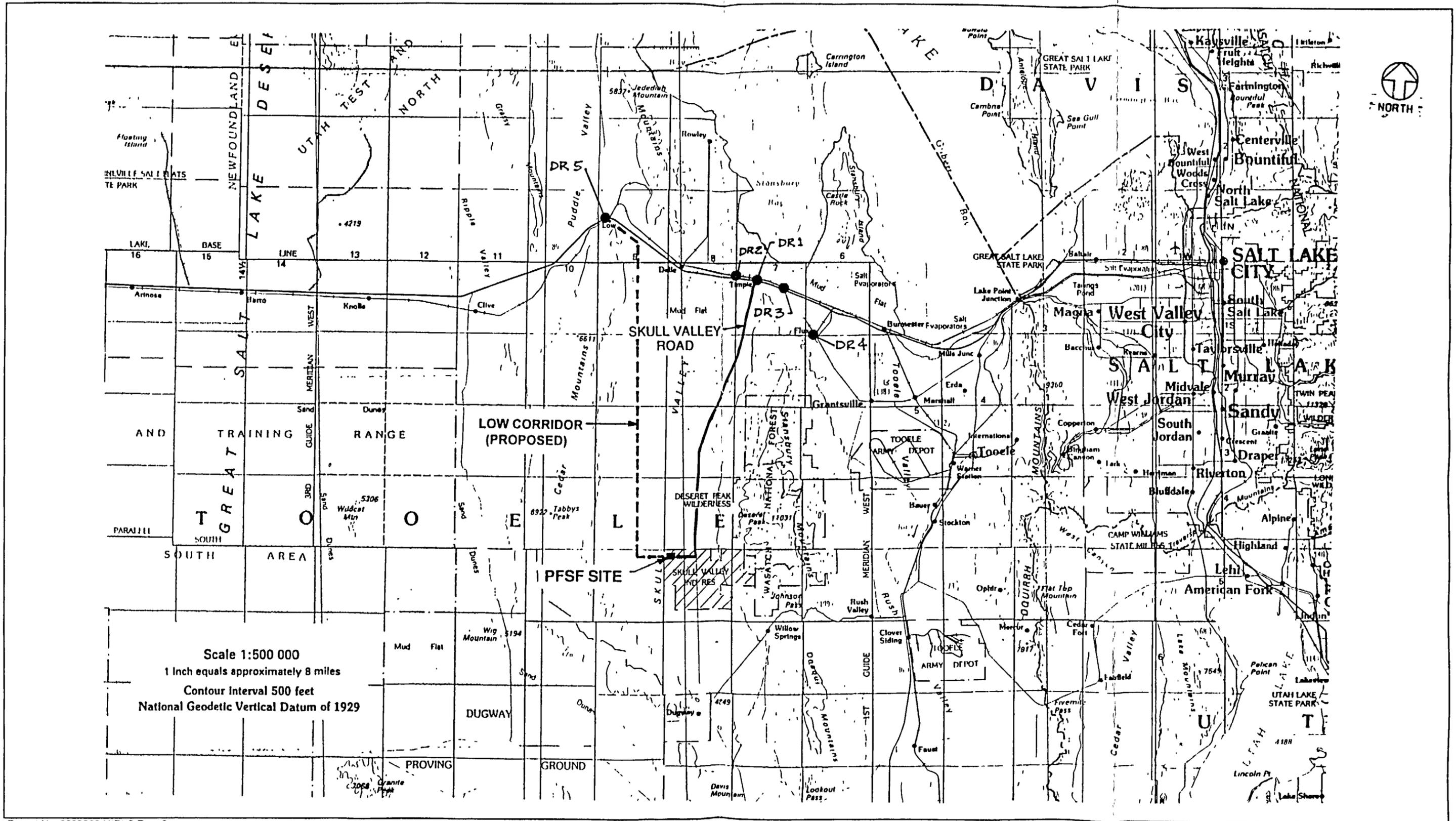


Figure 6-8
Direct Rail Sites
Options DR-1 to DR-5