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UMTRA Project

Identification of Water Source for Crescent Juntion Site

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IDENTIFICATION OF WATER SOURCE FOR CRESCENT JUNCTION SITE

MOAB UMTRA PROJECT

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for
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Moab UMTRA Project

1.0 Background Information and Introduction

The Moab UMTRA project involves the removal and transport of approximately 16 million tons of uranium mill tailings. The tailings material will be loaded into 32 cubic yard capacity containers, hauled to a rail siding adjacent to the mill tailings site, shipped by rail 30 miles north, and disposed in a new disposal cell at Crescent Junction. At Crescent Junction, water will be used during the construction of the disposal cell, to suppress dust on the roads, and within the cell. It will also be used to clean vehicles and concrete surfaces in work areas. These types of operations will be accomplished throughout the life of the Moab UMTRA Project which is forecasted to be approximately 20 years with a daily water use requirement of approximately 400,000 gallons.

This document identifies the preferred source of water as the Green River and specifies the location on the river where water will be extracted. This document also describes the routing and components of the pipeline that will deliver the water to Crescent Junction. Access requirements for the various properties that will be crossed and the permits that are expected to be needed are also discussed.

A dedicated pumping station for extracting water from the Green River was determined to be the appropriate alternative for the project. Other water source alternatives were investigated and ultimately rejected for the following reasons:

a. Colorado River – Stoller developed a conceptual plan for a pipeline from the Colorado River at the Moab DOE project, north to Crescent Junction. The pipeline would be approximately 31 miles in length. This approach was not considered viable due to the rights of way conflicts with other utilities and transportation corridors.

b. Colorado River – Stoller also developed a conceptual plan for a pipeline from the Colorado River east of Cisco to Crescent Junction. The pipeline would be over 32 miles in length and gains 1,000 ft of elevation. This approach was not considered to be economically viable due to the distance and elevation gain.

c. Thompson Springs – Use of the existing water source at Thompson Springs was investigated and found to be of insufficient quantity for both the nearby residents at Thompson Springs and the needs of the project at Crescent Junction.

d. New Well at Crescent Junction – A well was considered, but was ultimately rejected because pump tests indicate there is very little groundwater available. There is a small amount of briny perched water in the Mancos Shale formation and a small amount of water in the Dakota Sandstone, the first aquifer.

e. Potable Water from Green River – Purchase of potable water from the town of Green River was considered, but the Green River plant could not supply the additional 400,000 gallons per day (gpd) and potable water was determined to be prohibitively expensive.

f. Floy Wash – Shallow groundwater may be present at Floy Wash, five miles west of Crescent Junction. No investigation work has been performed to determine if water is present in sufficient quantity, and even if water was present it might not remain a reliable source. It was decided that the Floy Wash source was not promising enough to pursue.

g. Sharing Green River Township's Raw Water Extraction – Inquiries were made to the town of Green River about obtaining water from their raw water intake. Obtaining raw water from Green River would have avoided the cost of installation of a new intake, though the 21 mile pipeline would still be needed. The town of Green River responded that the town's water demand is nearly the same as their current water intake and they have no additional capacity. Therefore, this alternative is not considered viable.

h. Trucking Water from either Green River or Colorado River – Both of these alternatives would require the tankers to traverse county, state, and U.S. highways. This would give rise to an increased traffic safety risk by significantly increasing the number of vehicles on the highways. Assuming that the nominal capacity of a tankers operating on highways is 4,000 gallons, 100 daily trips would be required to provide the daily requirement of 400,000 gallons. Add to this the issues with transporting the water in the winter when freeze protection and slippery roads must be addressed, these options were not considered to be practical for the 20-year life of the project.

i. Transporting Water by Rail Car Tanker from the Green River – This alternative would require the construction of a rail siding in Green River Township to load the tankers with water. Another siding would be required at Crescent Junction for unloading of the water into the storage pond. Assuming a 20,000 gallon capacity tanker would be used, 20 tankers per day must be delivered to Crescent Junction to provide the required 400,000 gallons. This option was determined not to be economically feasible because of the cost of procuring the rail tankers, constructing the rail sidings and paying the operating costs for the rail system and the crews to load and unload the tankers.

The remainder of this paper discusses only the preferred option of extracting water from the Green River via a dedicated pumping station and delivering the water to Crescent Junction via a new pipeline. Figure 1 is a schematic of the Crescent Junction Water Source System.

2.0 Water Extraction Point and Route of the Pipeline

The water source for Crescent Junction disposal site will be the Green River at Green River, Utah, along the east shore. It is proposed that water be withdrawn from the Green River by a pump station located on property owned by the Vitere family. The property will be leased for the pumping station and pipeline. At least two water right sources are being investigated to provide water for withdrawal of 400,000 gallons per day for this project. An application for temporary change (point of diversion) of Colorado River water will be made with the Utah Division of Water Rights (State Engineer's Office). A second option is to utilize a portion of the Vitere family water rights that they are not currently using.

Once across the Vitere property, the pipeline will proceed southeast along an existing power line to Old Highway 6, near the refinery approximately 4 miles east of Green River. This route will cross the property of four land-owners in addition to the Viteres. The pipeline will be located in the road shoulder of Highway 6, cross under the Union Pacific Railroad in an existing underpass, and proceed east to a point near Floy Wash 15 miles from Green River. At Floy Wash, Highway 6 crosses Interstate 70, and the pipeline will continue east along an un-named

dirt road, cross under the Union Pacific Railroad at an existing box bridge (a box culvert without a concrete floor), and continue east to the disposal cell. The exact locations of some portions of the proposed pipeline route are currently being determined in the field by a survey contractor to minimize impact to property owners and through the most favorable terrain.

The pipeline will be below ground, a minimum of four feet to protect the pipe from freezing and to prevent damage due to traffic. As the pipe is installed and the pipe trench is being backfilled, plastic warning tape will be placed in the trench one foot below ground surface to warn future excavators of the presence of a pipe line.

3.0 Description of River Pumping Station, Pipeline and Booster Pumping Stations

The Moab UMTRA Project requires that a water source be developed for the Crescent Junction site. As described earlier, this document discusses the preferred option of pumping water from the Green River. The development of this source will include the Green River pumping station, water pipeline and booster stations, and Crescent Junction storage pond and water distribution system.

3.1 Green River Pumping Station

The proposed pumping site is adjacent to the river, but has a steep embankment down to the river level. The elevation at the bank is approximately 4065 ft above sea level. The pumping station will be installed in a prefabricated concrete wet well. The river embankment will be excavated for placement of the wet well. The bottom of the wet well will be placed at the lower of the 4040 feet above sea level river stage gage datum or river bottom. The wet well pump will be a multistage vertical turbine pump. The pump will be supplied with a closed shaft and oil lubricated bearings. The operating design for the pump is 278 GPM at 150 psi discharge pressure. A Flowserve 08ELM 3 stage Submersible Vertical Turbine Pump with a surface mounted 40 horsepower motor meets the operating requirements. The pump will be a single unit. A spare pump will be purchased, but will not be installed. The Crescent Junction holding pond will provide 10 operating days storage capacity and this is the reason for not installing an operating spare. The pump installed will have additional capacity beyond 278 gpm to allow recovery from any pipeline outages. The motor for the pump will be mounted at elevation 4065. The wet well will be provided with a slide gate shutoff inside the wet well at the river water inlet. The supply opening to the wet well will be approximately 3 feet by 5 feet and will be provided with a perforated metal screen or perforated plate to reduce the inlet water velocity and to prevent inlet of solids greater then 1/4 inch. The bar screen will meet U.S. Fish and Wildlife Service requirements to minimize capture of aquatic life. The wet well will be provided with a level gage system and a manway for access to the wet well. An “A” frame support will be provided to remove the pump motor or manway for maintenance. The pump station enclosure is planned to be above grade, if site conditions and owner requirements permit.

3.2 Water Pipeline and Booster Stations

The pipeline from the Green River to Crescent Junction will be 6 inch diameter. The pipeline will be HDPE grade DR 9 and installed approximately 4 feet below grade. The pipeline will be provided with vacuum breaks and low level pipeline drains along the route.

A series of seven booster stations is anticipated. The booster stations will operate at 278 gpm and 348 foot discharge pressure. The booster stations will be housed in below grade vaults. Each booster station will be supplied with a single inline vertical turbine pump. A Goulds model

3SMA 60 Hz 3500 rpm 4 stage pump with 40 hp motor meets the operating conditions with pump efficiency greater then 75%. Other pumping options will be evaluated. The retention pond to be installed at Crescent Junction will provide water storage at the site of approximately 4 million gallons. This storage capacity allows adequate time for pump maintenance. The series of seven booster stations and the river pumping station will allow the system to be operated at approximately 50% capacity, if one booster station is out of service. There will be suction and discharge shutoffs for each pump. There will also be a check valve and a valved bypass line around each pump. A vacuum break will be installed downstream of the check valve in the booster stations. The vacuum breaker will be utilized to allow restart of the lower elevation pumping stations by restarting from the last booster station and pumping down the head level on each preceding booster station to alleviate high pressure shutoff conditions.

Each pumping station will be provided with a control system which utilizes a programmable logic controller (PLC) to monitor operation and control the pump. The PLC will be equipped with accessories which will allow the PLC to communicate with other pump station controllers along the route. A master control station will be provided at the Crescent Junction site so that operations personnel can operate and monitor the status and performance of the water supply system. Manual controls will be provided locally at each pump station on the local control panel which will allow manual and automatic operation of the pump station.

A flow monitoring instrument will be installed on the suction side of each pump to provide a flow status signal to the PLC. Logic will be programmed into the PLC to shut down the pump if low or no flow is detected at the suction side of the pump. A pressure indicating transmitter will be provided on the suction side of the pump to provide a pressure signal to the PLC for control. Logic will be programmed into the PLC to prevent pump start up if there is not adequate head pressure on the suction side of the pump. A pressure indicating transmitter will be provided on the discharge of the pump to provide a pressure signal to the PLC for control. Logic will be programmed into the PLC to shut down the pump if high pressure is detected on the discharge. Other interlock and permissive signals for pump operation will be provided from pump station to pump station over the control system communications network. This will allow synchronized start up and shut down of the system. It will also provide for shut down signals to be transmitted to the other pump stations upon failure of any one of the pump stations. Flow rate and total flow meter will be installed on the pipeline.

The pump motor will operate on a 480-Volt 3-phase power supply from the local utility. A motor control panel will be provided to house the motor starter/overload equipment as well as short-circuit/over-current protective devices as required by the National Electrical Code.

The pump station enclosure will be provided with a large grating overhead to allow for heat removal. The grating will be removable to allow for maintenance and equipment removal. A boom truck and road access to the booster station will be required for equipment removal. The floor of the pump enclosure will exceed 4 feet below grade and confined space permitting procedures will be in place for all access to the pump enclosure. Each pump station vault will have a dry well beneath it to drain precipitation out of the vault.

3.3 Crescent Junction Water Storage Pond and Distribution System.

The Crescent Junction Storage Pond will be a lined pond with approximate dimensions of 280 feet X 280 feet X 12 feet. The pond will store 3,950,000 gallons of water with a 2-foot free board. The bottom slope and liner material are still to be determined.

The pond will be the termination point for the supply pipeline. The pipeline will supply the pond with the inlet pipe extending to the pond bottom. The inlet will be supplied with a gate valve and a pressure indicator. A pond depth gage will be provided to give a visual indication of pond depth. A high level float switch will provide a signal to either close the gate valve, or shut down the pipeline supply pumps. If the local gate valve is closed, the high pressure discharge controls in the booster stations will be relied upon to shut off the booster stations sequentially back to the river pumping station. Restart of the system will be initiated by Crescent Junction operations.

The Crescent Junction pumping station will consist of two horizontal centrifugal wastewater pumps. One pump will be operating, and the other pump will be a spare. The pumps will operate at 1500 gpm and 40 ft of head (17 psi). A Gorman Rupp model T8A60S-B self priming solids handling pump meets these requirements. There will be a pressure relief valve installed at the pump which will relieve back into the storage pond. The pump will have a local hand / off / auto station. There will also be start / stop stations for the pump at each loading boom. The distribution system will utilize an 8 inch main and will break down to two 6 inch lines supplying two truck loading booms.

The Crescent Junction water truck fleet is currently planned to be two trucks. There will be an 8,000 gallon tanker truck which will provide dust control to all roads and work areas outside the radiation controlled area. The 8,000 gallon truck will also serve as a tanker to haul water to a 4,000 gallon tanker truck working within the radiation controlled area. The transfer of water from the 8,000 gallon truck to the 4,000 gallon truck will be completed with the onboard pump on the 8,000 gallon tanker. The discharge hose for transfer pumping will be contaminated and extend across the control boundary. A portable filling boom will be provided inside the controlled area for top filling of the 4,000 gallon tanker truck. This filling operation will be an operator-controlled manual operation.

This water source evaluation assumes other water demands, i.e. revegetation, livestock permittee and wildlife mitigation are estimated to be minimal.

3.4 Technical Issues and Resolutions

The following issues were identified and resolved:

a. A wet well requires a water inlet on the Green River and will require Army Corps of Engineer approval and will be subject to US Fish and Wildlife Service requirements for aquatic life protection. A well intake away from the river would eliminate these issues; however, the geology at the river site is dense shale that will not support a pump inlet away from the river.

b. The Wet Well at the Green River must meet USF&WS requirements for aquatic life protection. This is being addressed by placing a 3 feet by 5 feet perforated plate inlet at the wet well. The open area at this inlet allows for significant velocity reduction at the inlet. The ¼ inch perforations also present a physical barrier to drawing marine life into the intake.

c. The Green River is very silty. This will lead to sedimentation in the wet well, pipeline and retention pond. These issues have been addressed as follows. The Green River pumping station will have a slide gate to allow closing off inlet flow to the wet well. The wet well also has a manway that will allow access of a vacuum truck hose to remove sediment from the wet well. The wet well will be confined space and below water level,

so all cleaning will be conducted with extended hoses rather then personnel entering the wet well. The problem of sedimentation in the pipeline itself will be minimal as the velocity in the pipeline will approach 5 ft/sec and will prevent sedimentation. The Crescent Junction storage pond will maintain a 10-day supply of water. This retention time in the pond will result in approximately 100 tons of sediment per year accumulating in the ponds. The pumps selected for the retention pond are horizontal centrifugal wastewater pumps capable of handling high solids content. The pond will need periodic solids removal by use of a Vac Truck or dredging of the retention pond.

d. The booster pumping stations are below grade and will accumulate heat from the pump motor. Heat removal will be addressed by providing grating at the top of the enclosure to vent the heat from the enclosure.

e. The Green River pumping station and booster pump stations must operate at a high operating efficiency to match the water demand at Crescent Junction. The booster stations were sized such that the system can operate at 50% capacity, if a booster station pump is out of service. A bypass line was installed at each booster station to allow the system to operate at 50% capacity while a pump is being maintained or replaced.

f. If the pipeline goes out of service, the Green River pumping station and lower level booster stations will not have the capacity to overcome the system head on restart. This is addressed by restarting the system from the Crescent Junction end of the pipeline. This will reduce the head on the lower elevation pumping stations. Vacuum breaks will be installed downstream of pump system check valves in the pipeline to allow the upper booster stations to operate without danger of implosion or of exceeding Net Positive Suction head requirements for the pump.

g. The Crescent Junction Retention Pond will be in constant use and there is no idle time for pump failures or maintenance. To resolve this issue, two supply pumps will be installed to provide an operating spare to assure a high operating efficiency.

4.0 Property Rights-of-Way and Permitting

4.1 Assumptions

Current pipeline route is successfully negotiated with private, federal and state landowners. Inventories for threatened and endangered species and cultural resources have no significant findings as expected.

4.2 Rights-of-Way (ROW)

The proposed pipeline will cross several private properties near the point of origin and at least one near Crescent Junction. A certified appraisal will be performed to determine “fair market value”. Energy*Solutions* will support Department of Energy (DOE) Consolidated Business Center (CBC) negotiations with the private landowners for rights-of-way (ROW) and water rights. The DOE CBC has been notified of the forthcoming negotiations. The pipeline will follow an existing power line corridor approximately one mile across the private land to intersect with County(s) frontage road or the old US 6 & 50, and parallel the frontage road for approximately fifteen miles to Floy Wash where the frontage road intersects I-70. Although the pipeline will be within the frontage road ROW, the ROW is within the Bureau of Land Management (BLM)

jurisdiction, and a ROW will be required from the BLM. The pipeline will make two crossings of the Union Pacific Railroad (UPRR) at existing underpasses. At Floy Wash the pipeline will parallel the UPRR across primarily BLM property, but also State and private land into the DOE disposal site for the final five miles. A ROW will be required from the State SITLA (School Institutional Trust Land Administration).

4.3 Permitting

As a result of the proposed pipeline being funded by federal dollars and constructed primarily on BLM administered land, an Environmental Assessment (EA) will be required. The BLM will prepare the EA for the entire pipeline with cultural resources, and threatened and endangered species inventories provided by Energy*Solutions* subcontractors. The Utah Division of Water Rights (UDWR) and U.S. Army Corps of Engineers will be consulted for possible jurisdictional washes which may require 404 or Nationwide General Permits. Crossings of the UPRR will require encroachment permits or pipeline crossing agreements. The pump station on the bank near the river will require a UDWR Stream Channel Alteration Permit for construction within 100 feet of the Green River. A Temporary Change Application to the SWDR will have to be approved to change the point of diversion for DOE water right #01-40 from the Colorado River to the Green River. Mr. Mark Page, former Southeast Regional Engineer for UDWR, is preparing the change application. The U.S. Fish and Wildlife Service will be consulted to confirm earlier discussions regarding insignificant impact to threatened and endangered species regarding point of diversion change and construction of pump station and pipeline.

5.0 Schedule

- Present through 10/17/07 – Prepare conceptual or general plan for construction water line
- 9/1/07 – 11/1/07 - Perform surveys such as field geotechnical, land appraisal, cultural resources, and threatened and endangered species inventories
- 10/1/07 – 2/1/08 - Prepare Environmental Assessment, and obtain rights of way and permits
- 12/17/07 – Submit design to DOE
- 1/17/08 – DOE approval
- 2/15/08 – 7/15/08 - Pipeline construction

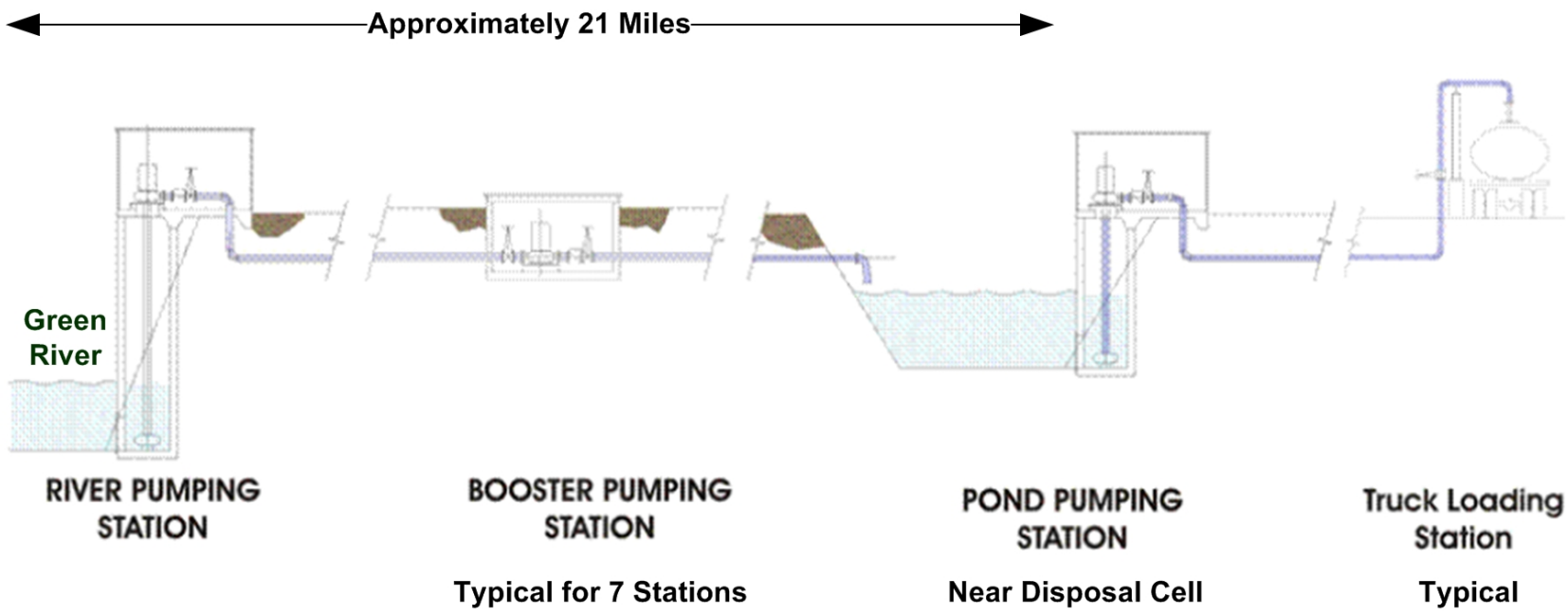

Figure 1: Crescent Junction Water Source System