

4.0 ENVIRONMENTAL PROTECTION MEASURES

4.1 AIR QUALITY

Minimal impacts to air quality are expected due to light travel along the existing and newly constructed dirt roads. The following practices would reduce impacts:

- Dust suppression techniques, such as applying water and DusTreat DC9112 (Appendix H) during road construction activities would be used.
- Water would be used in the drilling process at all times, nearly eliminating any dust production from the drill.
- Service vehicles would drive slowly on the dirt roads and adjust their speed depending on conditions to avoid creating a dust tail.

4.2 WATER QUALITY

Water would come into contact with bentonite drilling mud and ground rock at depth. It would be treated after it is pumped back out of the hole by evaporation and by allowing solids to settle out in excavated mud pits at each drill site. If excess material cannot be managed in the mud pits, the material would be pumped and disposed of at a permitted facility. Resolution will obtain authorization under the AZPDES De Minimus General Permit from ADEQ for well development activities.

Resolution would develop and implement a construction SWPPP. The effects of erosion and sediment discharge into offsite drainages would be mitigated through the use of water bars on the steeper sections of roadway, and silt fences or other BMPs below fill slopes and elsewhere, as appropriate.

The strategic installation of bentonite seals and professional drilling practices would minimize potential impacts of the drilling program to the existing groundwater aquifer system.

4.3 SOLID WASTES

Solids from drilling (e.g. rock and drilling mud) may be pumped and disposed of at a permitted landfill or may be allowed to dry out in the excavated pits. When all drilling is completed, the material contained in the pits would be removed from the Forest Service lands and disposed of in accordance with applicable laws and regulations. During reclamation activities, these pits would be covered over, graded and revegetated. All other wastes, such as paper and food waste, would be stored in garbage sacks and removed from the site each day. A portable toilet would be placed at each active drill site and serviced periodically by a contractor.

4.4 SCENIC VALUES

Scenic values would be protected by good housekeeping practices, minimizing disturbance, and implementation of timely reclamation.

4.5 FISH AND WILDLIFE

A site-wide Biological Evaluation (BE) was conducted on the Resolution Parcel and species-specific survey for the Arizona hedgehog cactus (*Echinocereus triglochidiatus* var. *arizonicus*), a listed endangered species, was conducted over the proposed disturbance areas, with negative results.

All proposed activity areas were surveyed for the endangered Arizona hedgehog cactus in July and September 2007 and January, February, and March 2008. This cactus occurs near portions of the proposed activities. Detailed plan views of proposed activities that identify Arizona hedgehog cacti locations with respect to ground clearing activities were submitted to the Forest Service. All Arizona hedgehog cacti that occur in the proximity of ground-disturbing activities will be avoided. Clear-limit fencing and cactus guards will be used when necessary and a biological monitor will be present at the time clearing takes place. A Biological Evaluation and Assessment is in preparation and will be submitted to the Forest Service upon its completion.

Potential Sonoran Desert Tortoise shelters (a Forest Service Sensitive species which has the potential to occur in the areas of proposed activities) will be examined during field work for the project. If encountered, the desert tortoise would be handled according to the Arizona Game and Fish Department (AGFD) protocols. A copy of the tortoise protocol is on file at the drilling operations office located at the Resolution Core Facility.

Noxious weed surveys will be conducted within construction areas prior to ground disturbance and in accordance with Forest Service guidelines. Additional mitigation may be required depending on the results of the survey.

Open mud pits at unoccupied drill sites would be covered to prevent wildlife from becoming trapped. Drilling operations are anticipated to be continuous, however, and wildlife would not likely approach active rigs.

4.6 CULTURAL RESOURCES

A Class III cultural resources survey was conducted on the Resolution Parcel in 2003. Class III survey was conducted within the remaining proposed pre-feasibility activities in 2007 and 2008. A Class III cultural resource survey report was completed and will be submitted to the Forest Service under separate cover. Detailed plan views of proposed activities that identify eligible cultural resources site locations with respect to ground clearing activities were submitted to the Forest Service.

Ground-disturbing activities associated with drilling activities and obtaining access to drill sites would occur within some register-eligible cultural resource sites as part of this Plan (Table 9). To the extent practicable impacts to cultural resource sites would be avoided. Field visits with a certified archaeologist were made to define the boundaries of those cultural sites that occur within the proximity of proposed vegetation clearing and an archaeological monitor would be present during vegetation clearing within or adjacent to any register-eligible cultural resource site boundaries.

Table 9. Class III Cultural Resource Survey Review and Planned Approach for Avoiding Impacts to Register-Eligible Cultural Resource Sites

Disturbance Area	Within Register-Eligible Site?	Approach for Avoidance
Exploration Drill Pads		
QC-04	No	Located outside any register-eligible cultural resource sites.
MB-03	Yes AR-03-12-02-1517 (AZ U:12:173)	This drill pad is located within a register-eligible site consisting of historic mining features dating from the early to mid 1900's. No features or artifacts were discovered within the area proposed for vegetation clearing. An archaeologist will monitor site construction.
OF-1	Yes AR-03-12-02-125 (AZ U:12:26)	This site is located within a 1930's Civilian Conservation Corps (CCC) register-eligible site. No features or artifacts were discovered within the area proposed for vegetation clearing. An archaeologist will monitor site construction.
OF-2	No	Located outside any register-eligible cultural resource sites.
OF-3	No	Located outside any register-eligible cultural resource sites.
Deep Hydrogeologic Testing/Monitor Wells		
DHTW-01	Yes AR-03-12-02-1077 (AZ V:2:101)	No features or artifacts were discovered within the area proposed for vegetation clearing. An archaeologist will monitor site construction.
DHTW-02	No	Located outside any register-eligible cultural resource sites.
DHTW-03	No	Located outside any register-eligible cultural resource sites.
Shallow Hydrologic Monitor Wells		
H-C	No	A prehistoric, register-eligible site (AR-03-12-02-1720) is located in the proximity of this well site. A site visit was made with a certified archaeologist and the drill pad was relocated to the extent practicable to avoid impacts to this site. An archaeological monitor will be present for clearing activities associated with this site.
H-E	No	Located outside any register-eligible cultural resource sites.
H-F	No	Located outside any register-eligible cultural resource sites.

Table 9. Class III Cultural Resource Survey Review and Planned Approach for Avoiding Impacts to Register-Eligible Cultural Resource Sites (Continued)

Disturbance Area	Within Register-Eligible Site?	Approach for Avoidance
H-G	No	Located outside any register-eligible cultural resource sites.
H-I	No	Located outside any register-eligible cultural resource sites.
H-K	No	Located outside any register-eligible cultural resource sites.
Tunnel Characterization Boreholes		
PVT-3	Yes AR-03-12-02-125 (AZ U:12:26) and AR-03-12-02-1077 (AZ V:2:101)	PVT-3 is located on the early 1920's alignment of US 60. This portion of the historic site is considered a non-contributing element to the eligibility of the site. This site is also located within a Civilian Conservation Corps (CCC) register-eligible site, however, no features or artifacts were discovered within the area proposed for vegetation clearing. An archaeologist will monitor site construction. No adverse impact is anticipated.
PVT-4	Yes AR-03-12-02-1077 (AZ V:2:101)	PVT-4 is located within the mapped historic site as mapped on AZSITE. However, this drill site is located just west of the historic highway and would not impact it. An archaeologist will monitor site construction. No adverse impacts is anticipated.
PVT-5	No	Located outside any register-eligible cultural resource sites.
PVT-6	No	Located outside any register-eligible cultural resource sites.
PVT-7	No	Located outside any register-eligible cultural resource sites.
PVT-8	No	Located outside any register-eligible cultural resource sites. A prehistoric register-eligible site (AR-03-12-02-1714 [AZ V:9:534]) occurs in the proximity of PVT-8. Site construction would not impact this site. An archaeologist will monitor site construction.
PVT-9	No	Located outside any register-eligible cultural resource sites.
APV-6	No	Located outside any register-eligible cultural resource sites.
APV-8	No	Located outside any register-eligible cultural resource sites.
Access Road Improvements		
FR 315	No	Located outside any register-eligible cultural resource sites.

Table 9. Class III Cultural Resource Survey Review and Planned Approach for Avoiding Impacts to Register-Eligible Cultural Resource Sites (Continued)

Disturbance Area	Within Register-Eligible Site?	Approach for Avoidance
FR 320	Yes AR-03-12-02-1077 (AZ V:2:101)	FR 320 is located within the 1920's alignment of US 60. No adverse impact would occur to the site due to the implementation of the following procedures: <ul style="list-style-type: none"> • Fill potholes will fill dirt • Use only rubber-tire vehicles. • Cleanly remove ramps used to access drill pad. • Keep vegetation removal to a minimum. An archaeologist will monitor site construction.
FR 898	No	Located outside any register-eligible cultural resource sites.
FR 2261	No	Located outside any register-eligible cultural resource sites.
FR 2440	Yes AR-03-12-02-1517 (AZ U:12:173)	Access road improvements along FR 2440 for exploration sites QC-04 and MB-03 occur within a register-eligible cultural resource site. No features or artifacts were discovered within areas proposed for vegetation clearing. An archaeologist will monitor site construction.
FR 2461	No	Located outside any register-eligible cultural resource sites.
FR 2463	No	Located outside any register-eligible cultural resource sites.
FR 2466 (and small portion of FR 2467)	No	Located outside any register-eligible cultural resource sites.
FR 2469	No	Located outside any register-eligible cultural resource sites.
FR 2505	No	Located outside any register-eligible cultural resource sites.
FR 2511	No	Located outside any register-eligible cultural resource sites.
FR 3139	No	Located outside any register-eligible cultural resource sites.
FR 3786	Yes AR-03-12-02-1517 (AZ U:12:173)	Access road improvements along FR 3786 for exploration site MB-03 occur within a register-eligible cultural resource site. No features or artifacts were discovered within the area proposed for vegetation clearing. An archaeologist will monitor site construction.
Existing road from FR 315 to H-E	No	Located outside any register-eligible cultural resource sites.
Existing Road from FR 2438 to DHTW-01	Yes AR-03-12-02-125 (AZ U:12:26)	The DHTW-01 access road is located within a register-eligible cultural resource site and there are archaeological features (check dams) near the proposed disturbance area. An archaeologist will monitor site construction.

Table 9. Class III Cultural Resource Survey Review and Planned Approach for Avoiding Impacts to Register-Eligible Cultural Resource Sites (Continued)

Disturbance Area	Within Register-Eligible Site?	Approach for Avoidance
Existing Road from FR 2440 to QC-04	No	Located outside any register-eligible cultural resource sites.
Existing Road from FR 2466 to H-F	No	Located outside any register-eligible cultural resource sites.
Existing Road from US Highway 60 to PVT-9	No	Located outside any register-eligible cultural resource sites.
Existing Road from Magma Mine Road to private inholding	No	Located outside any register-eligible cultural resource sites.
New Access Roads		
New Access from FR 2458 to H-K	No	Located outside any register-eligible cultural resource sites.
New Access from FR 2458 to DHTW-02	No	Located outside any register-eligible cultural resource sites.
New Access from FR 2461 to PVT-5	No	Located outside any register-eligible cultural resource sites.
New Access from FR 3791 to OF-1	Yes AR-03-12-02-125 (AZ U:12:26)	A small stretch of new access road to OF-1 is located within a register-eligible cultural resource site. No features or artifacts were discovered within the area proposed for vegetation clearing. An archaeologist will monitor site construction.

4.7 HAZARDOUS SUBSTANCES / PETROLEUM PRODUCTS / DRILLING MATERIALS

Resolution will revise the project's Spill Prevention, Control, and Countermeasures (SPCC) Plan to include additional proposed drill sites for submittal to the Forest Service under separate cover. The SPCC Plan details good engineering practices used to prevent releases when handling and storing petroleum products.

No extremely hazardous substances, as defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Superfund Amendments Reauthorization Act (SARA), and Emergency Planning and Community Right-To-Know Act (EPCRA), would be used in any of the activities described in this Plan. Storage for materials such as drilling mud, fuel, and lubricants, would be provided at the Resolution Core Facility. Only small quantities (container capacity of less than 5 gallons) of fuels and lubricants would be stored in secondary containment structures adjacent to the active rigs. An adequate supply of fire extinguishers would be placed at these containment structures, and each active rig would maintain enough spill supplies for any incidental releases. During drilling operations, drill rigs would be parked on top of plastic sheeting overlain by absorbent material. Plastic and absorbent materials would also be used under other gas or diesel motors, or other equipment that may leak oil, as needed. Refuse containers designated for disposal of the absorbent materials would be located at each drill rig. This material would be disposed of offsite in accordance with applicable laws and regulations.