MOJAVE SOLAR PROJECT

DESERT TORTOISE CLEARANCE AND RELOCATION/TRANSLOCATION PLAN

DRAFT

Docket No. 09-AFC-5

Submitted to:

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1.0 BACKGROUND

1.1 Project Description and Setting

Mojave Solar, LLC, (Mojave Solar) proposes to develop the 1,765-acre Mojave Solar Project (MSP or Project), approximately nine miles northwest of the town of Hinkley, California, in an unincorporated area of San Bernardino County (Figure 1). The Project is a 250 MW, parabolic solar thermal trough facility, the details of which can be found in the Application for Certification (Mojave Solar 2009). In summary, the Project facilities will include the following:

- Within the Project Area (i.e., Project footprint), there will be two, independent Plant Sites (Alpha and Beta), each of which includes a solar electric generating facility with a nominal net electrical output of 125 megawatts (MW). Each Plant Site contains a solar array, power block and power generating equipment, support facilities and two evaporation ponds with a nominal surface area of 5 acres each (10 acres total, or 20 acres for the entire Project).
- The Project will connect to the Southern California Edison (SCE)-owned Kramer-Coolwater 230 kilovolt (kV) transmission line located adjacent to the southern border of the Project. The interconnection will be entirely located within the boundaries of the southern portion of the Project Area.
- Natural gas for the Project's ancillary purposes will be supplied by a pipeline owned by Southern California Gas (SoCal Gas) that runs to the Project boundary. No off-site pipeline facilities are proposed as a part of this Project.
- Water for all industrial and construction uses will be supplied from on-site groundwater wells. Drinking water will be produced using an onsite water treatment system to meet potable standards.
- A sanitary septic system and on-site leach field will be used to dispose of sanitary wastewater.

The Project is sited on formerly and currently farmed lands (Figure 2). Abandoned agricultural operations include crops, especially alfalfa, irrigated by center-pivot irrigation, as well as some livestock operations. Half of one center-pivot field is still farmed for alfalfa and wheat. Existing adjacent anthropogenic development includes the Solar Electric Generating Systems (SEGS) VIII and IX facility to the north-northwest and

Figure 1
Location of the Mojave Solar Project
Near Hinkley, San Bernardino County, California

MSP Desert Tortoise Translocation Plan/March 2010
P:\2008\08080191 Harper Lake Abengoa AFC\4.0 Documents_References\4.7 Draft Documents\Figures\2009 Botanical Survey Ltr Rpt corona-bennettj 7/23/09

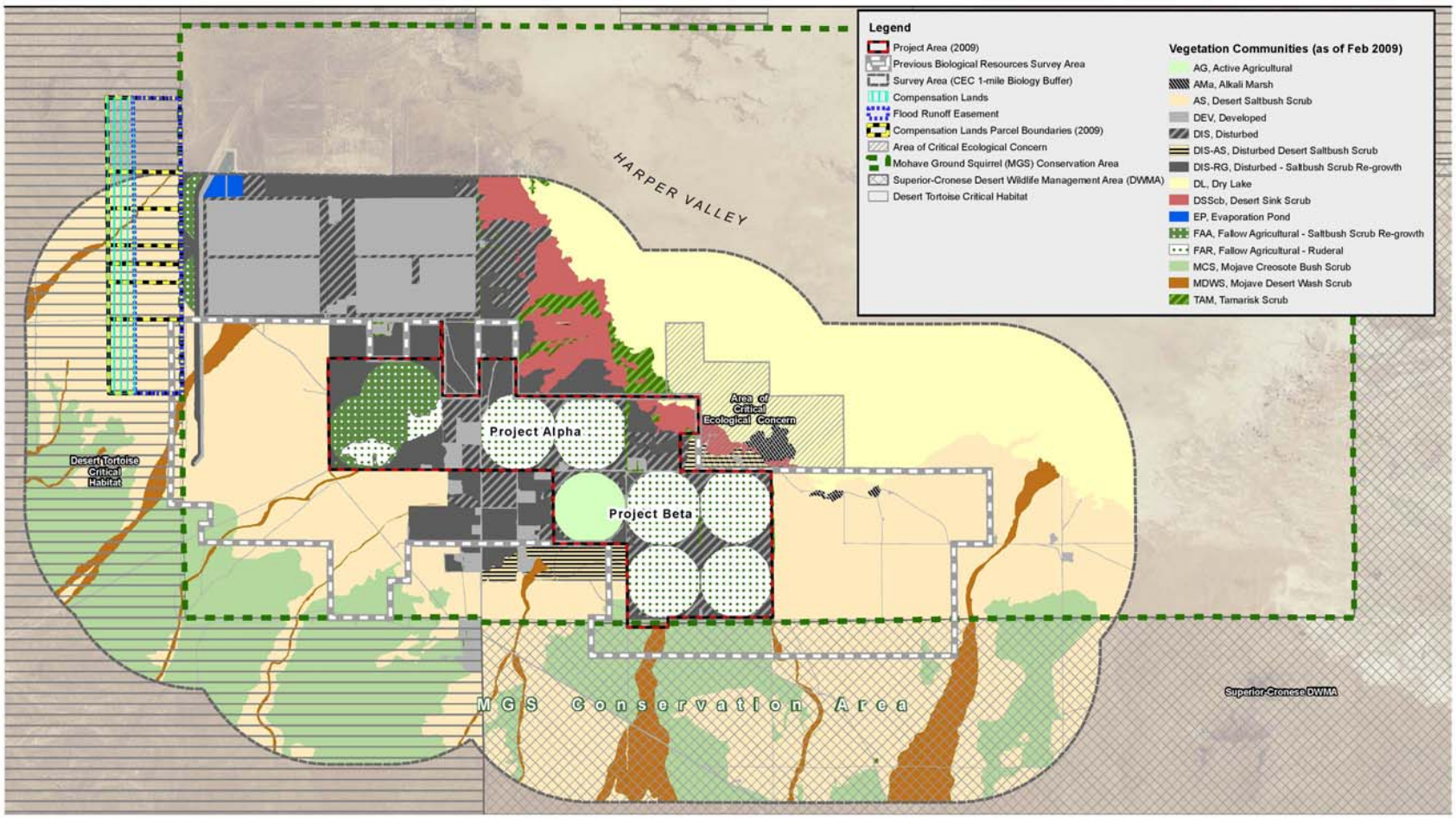

Figure 2
Mojave Solar Project Vegetation Cover and Special Management Areas

MSP Desert Tortoise Translocation Plan/March 2010

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a few remaining residences. Other aboveground development includes SCE's Kramer-Coolwater 230-kV transmission line, which travels east-west, south of the Project, and the paved Harper Lake Road, which runs through the Project Area.

Relict native plant communities on the site exist in the corners of the center-pivot fields and consist of disturbed saltbush scrub (*Atriplex polycarpa* and *A. confertifolia*). There is also some saltbush scrub regrowth in the former dairy operation and formerly farmed fields west of Harper Lake Road, and northeast of Harper Lake Road. Areas surrounding the Project Area include developed or disturbed lands, native Mojave creosote bush scrub and native saltbush scrub. Harper Dry Lake and associated shoreline vegetation intersects the northeastern corner of the Project Area.

The topography is generally flat with elevations ranging from approximately 2,025 to 2,105 ft. The Project Area is covered by older alluvium consisting of dry, loose-to-moderately dense, silty fine-to-coarse sand with occasional gravel; subsurface layers of layers of silt and possibly clay are likely to be present (Ninyo & Moore, 2006). In general, the hydrology of the Project Area, which was originally characterized by washes flowing northeast into the dry lake, has been disrupted by long-term farming.

Conservation areas in the Project vicinity include the Harper Dry Lake Area of Critical Ecological Concern (ACEC), adjacent and northeast of the Project Area (Figure 2). U. S. Fish and Wildlife Service (USFWS)-designated desert tortoise critical habitat abuts or is near the Project in the north, west and south. The U. S. Bureau of Land Management (BLM) has also designated the Superior-Cronese Desert Wildlife Management Area (DWMA) abutting the southern boundary of the Project and a Mohave Ground Squirrel Conservation Area to the south and east that overlaps the DWMA.

1.2 Desert Tortoise Occurrence in the Project Area

Desert tortoise focused surveys were conducted in April and May of 2007, 2008, and 2009 according to USFWS desert tortoise survey protocol (USFWS 1992). The survey area changed each year with refinements in the Project footprint, but was always a subset of the broadest area surveyed in 2007 - the Biological Resources Survey Area (BRSA) - which also included a one-mile buffer around the BRSA (see Mojave Solar [2009], Figure 5.3b in Section 5.3). In 2008, the proposed Project Area was modified as a subset of the BRSA. Surveys in 2008 were conducted within an updated Project Area and out to one mile from the Project Area boundary. During 2009, supplemental protocol-level surveys for desert tortoise were conducted within select locations of the Project Area. (See Mojave Solar [2009] for a detailed description of surveys completed each year.)

The survey data (Figure 3) indicate that tortoises are unlikely to currently occupy the Project Area. Tortoise sign observed on the Project Area consisted of carcass parts and one full carcass of an immature tortoise; one old scat was observed in a center-pivot field,

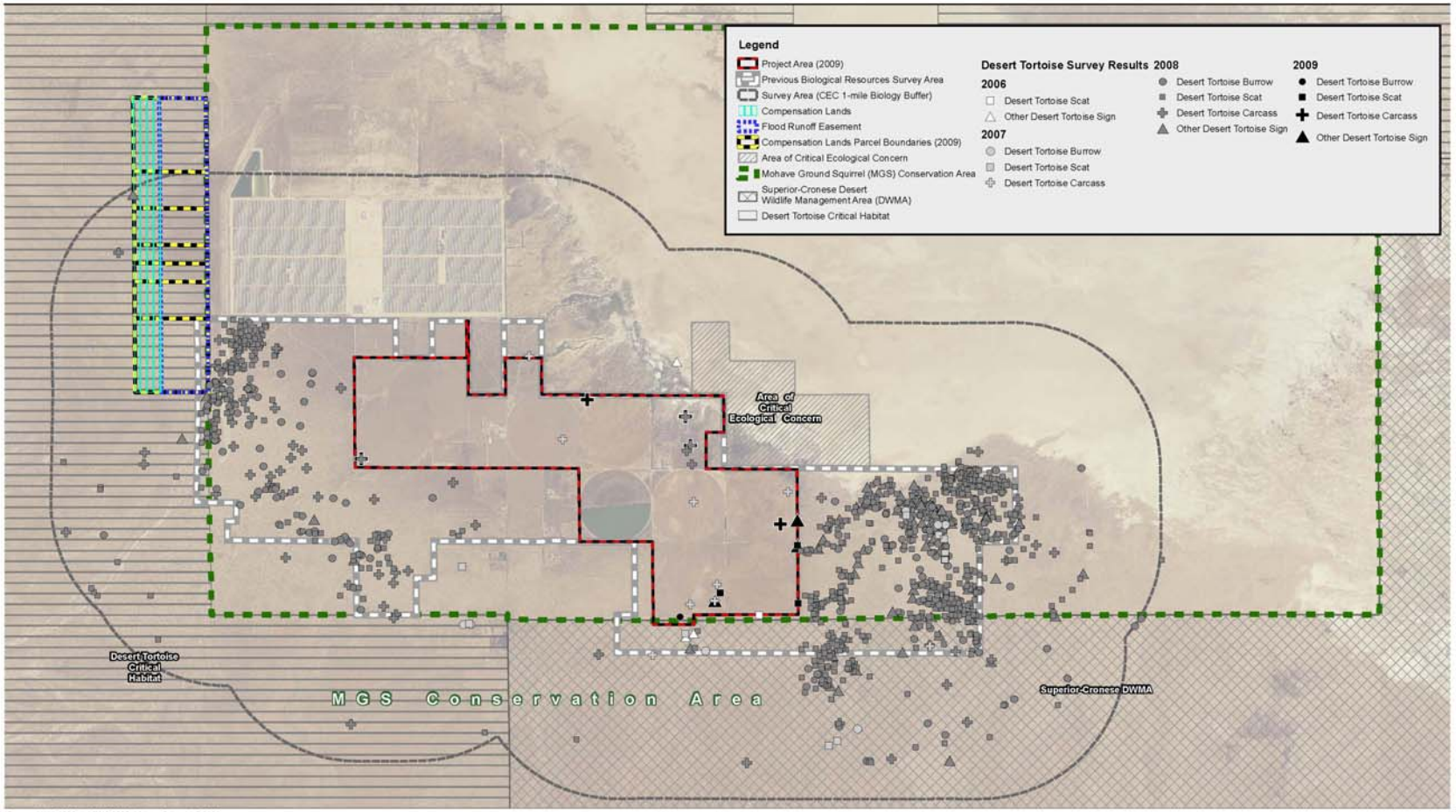

Figure 3
Desert Tortoise Sign

MSP Desert Tortoise Translocation Plan/March 2010

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approximately 600 ft from the southern Project Area border. No recent scat and no burrows were observed. No live desert tortoise were documented on the Project Area during any focused surveys, although one tortoise was observed in the northeastern Project Area near a residence and along the southern Beta field border during surveys in 2006 for another project. During the cumulative surveys, substantial quantities of tortoise sign were observed outside the Project Area to the east, west and south. (See Mojave Solar [2009], Section 5.3, for details of desert tortoise observations.)

2.0 PURPOSE OF THE PLAN

The purpose of this desert tortoise clearance and relocation/translocation plan (Plan) is to provide direction for the removal of tortoises from harm's way on the Project Area during all Project phases. For the purposes of this Plan, the following terminology is used:

- *Relocation* – Moving a tortoise out of harm's way to a point within that tortoise's home range.
- *Translocation* – Moving a tortoise out of harm's way to a point distant from the tortoise's home range

Generally, males have been shown to have larger home ranges than females in studies of sufficient length and sample size (O'Connor et al. 1994; TRW 1999), approximately 43.5 acres (range: 4.7–143.3 acres) (17.6 ha; range: 1.9–58.0 ha) for adult females and 111.6 acres (range: 10.4–487.8 acres) (45.2 ha; range: 4.2–197.5 ha) for males, in a three-year study when tortoises were recaptured at least 50 times/year (TRW 1999). Studies of shorter duration or with a smaller sample size found smaller home ranges (e.g., Burge 1977, Barrett 1990, O'Connor et al. 1994, Duda et al., 1999). Home ranges for both genders (Duda et al, 1999) or for males only (TRW 1999) decreased significantly in drought years.

This Plan first addresses desert tortoise clearance and relocation or translocation prior to Project construction. It then addresses relocation or translocation activities that might occur during Project construction, Project operations, and Project decommissioning, including final site restoration. The Plan then describes general procedures applicable to all tortoise relocations/translocations (data collected on all tortoises, temperature considerations, tortoise transportation, authorized handlers, monitoring). The Plan also discusses options that may occur based on the timing of construction. All avoidance, protection, and minimization measures that are identified in other Project documents will be implemented in concert with this Plan.

3.0 CLEARANCE

All desert tortoises will be removed from the Project Area prior to surface disturbance. Methods are identified in the sections below.

3.1 Fencing

Prior to the onset of construction, the entire Project Area will be fenced with permanent, tortoise exclusion fence per USFWS requirements, in order to keep tortoises in habitat adjacent to the Project Area from entering during construction and operations phases. The fencing type will be one-inch by two-inch vertical wire mesh fence, extending at least two (2) feet above the ground and buried at least one (1) foot, consistent with USFWS guidelines (USFWS 2009). Where burial is impossible, the mesh will be bent at a right angle toward the outside of the fence and covered with dirt, rocks, or gravel to prevent the tortoises from digging under the fence. Tortoise-proof gates will be established at all site entry points.

Should any areas outside the Project Area require construction activity (e.g., the interconnection with the SCE transmission line), then temporary fencing may be installed to prevent tortoise entry during construction. Alternatively, monitoring during construction can be used to protect tortoises instead of temporary fencing, if the construction activity is brief, involves little or no heavy equipment, and/or fencing would result in other difficulties. Temporary fencing must follow guidelines and materials for permanent fencing, with supporting stakes sufficiently spaced to maintain fence integrity.

The construction area required for fence installation will occur entirely within the Project Area. Within one week prior to fence installation, biologists will survey the staked fenceline location for all desert tortoise burrows and tortoises, covering a swath of at least 60 ft centered on the fenceline, using 15-ft-wide transects. Tortoise burrows will be mapped using Global Positioning System (GPS), and the size and age identified. Where flagging would not attract poaching, burrows will also be flagged. All fence construction will be monitored by qualified biologists to ensure that no desert tortoises are harmed. Maps of burrows from the pre-construction survey will be provided to all biological monitors.

Fencing may occur during any part of the year, based on a minimal disturbance area, pre-construction surveys and continual monitoring, and options to address any tortoises observed along the construction path that could be in danger (see Section 4.2.2, below). Because of the minimal footprint, few tortoises are likely to be disturbed. Also, there is precedence for pipelines and transmission lines to work during the entire year.

If exclusion fencing is installed during a period when tortoises are known to be active (the end of March through early November, but possibly in winter depending on weather), then all installed exclusion fence will be checked at least three times each day for the first week to ensure that no tortoise is fence-walking inside the fence, attempting to gain access to the other side of the fence. In that case, the tortoise will be relocated outside the fence as identified in Section 4.0, below. Tortoises fence-walking outside the fence will be monitored to insure that they have suitable coversites outside the fence, if the daily temperatures exceed lethal thresholds (see Section 4.1, Temperature Considerations, below).

All tortoises observed during fencing activities that require relocation to avoid harm, will be relocated and monitored, according to procedures identified below in Section 4.0, below.

All permanent exclusion fencing will be inspected monthly and during all major rainfall events; temporary fencing will be inspected at least weekly. Any damage to the fencing will be repaired immediately.

3.2 Clearance Surveys

A clearance survey for tortoises will be conducted inside all fenced areas. If fencing is completed in the winter, when tortoises are largely inactive, then clearance will occur beginning in April, or in March, if tortoises in the area are found to be active. If fencing is completed during any other part of the year, when tortoises are active, then clearance must occur in the nearest clearance window following fencing. (During fence monitoring, tortoises observed to be fence-walking will be relocated outside the Project Area, in accordance with Section 4.0, below.)

A minimum of two (2), 100% coverage clearance passes will be completed, using using a maximum of 15-ft-wide transects. Narrower transects will be used if dictated by dense shrub vegetation or where visibility is otherwise compromised. Clearance surveys will coincide with heightened tortoise activity from late March through May and during late September through early November. This will maximize the probability of finding all tortoises. Once the site is deemed free of tortoises, heavy equipment will be allowed to enter the site to perform construction activities. However, the Project Authorized Biologist(s) (ABs) (see Section 5.3, Authorized Handlers, below) will be continuously available during the construction period to remove any tortoises overlooked during the clearance surveys.

Depending on the ambient temperatures, burrows may be collapsed during the first pass. If ambient temperatures are expected to exceed lethal thresholds (see Section 4.1, Temperature Considerations, below) during the second pass, such that a tortoise might be trapped in the open because a burrow had been excavated and collapsed during the search effort, then a combination of methods will be used to ensure that tortoises are not occupying burrows. This will include:

a. Excavating only burrows that show no recent sign;
b. Excavating enough of the entrance that the entire burrow inside can still be completely viewed and felt;
c. In combination with (b), above, placing “stick” gates along the entrance to detect if there is use;
d. Using a fiberoptics scope.

After the second pass, all burrows that were mapped and remained unexcavated during the first two passes will be excavated and any tortoises removed. Burrows will be excavated using standardized techniques approved by the USFWS (2009) and the Desert Tortoise Council (1994). During excavation, attention will be given to potential nests (see Section 4.3.4, Nest Relocation, below).

All tortoise sign will be mapped and evaluated (e.g., type, age, size) during the first pass, and all scat collected. During the second pass, areas where fresh scat is found will prompt concentrated searches.

After the second pass, concentrated searches will be conducted in all areas where recent sign is concentrated, unless a tortoise has been found in that area.

3.3 Additional Considerations

For a site as large as the MSP Project Area, it generally might be wise to cross-fence the site with temporary fencing, with clearance surveys in the smaller blocks, to ensure that tortoises are not missed. In a large, unfenced area, it could be easy for a tortoise to move behind and beyond the search teams and remain undetected. However, the MSP Project Area is so open and barren of shrubs and tall herbaceous vegetation that it would be unlikely for tortoise to remain undetected.

3.4 Authorized Clearance Personnel

Only experienced, dedicated personnel will conduct clearance surveys. The Project AB (see Section 5.3, Authorized Handlers, below) is responsible for approving biologists to conduct clearance surveys and ensuring that all clearance activities are conducted effectively.

4.0 RELOCATION/TRANSLOCATION DURING SPECIFIC PROJECT PHASES

Based on the quality of the vegetation cover and the survey results, it is anticipated that no or very few desert tortoises will require removal from the Project Area. Except on the remote chance that a tortoise were found in the northeastern corner of the Project Area, any tortoise found on the Project Area likely would be near the site's border abutting native vegetation, either travelling in the open or associated with the poor quality shrub vegetation in the regrowth or center-pivot corners. Such a tortoise simply would be relocated to another part of its home range by moving this tortoise to a location immediately adjacent to its capture site outside the Project Area fence. The Project would be maintaining the tortoise within its home range, with the tortoise merely excluded from undesirable areas. For fence construction or the small area of transmission line interconnect, a tortoise would be removed a short distance from the construction zone.

Because any tortoise moved would still be inside its home range, carrying capacity is not an issue[1].

4.1 Temperature Considerations

In general, it is unwise to move tortoises in seasons when daily ground surface temperatures exceed 109°F (43° C; mid-April through early October) because tortoises must find new refuges in unfamiliar areas, with the added pressure of lethal daily temperatures. Karl (1992) and Zimmerman *et al.* (1994) observed that 109°F was the approximate surface temperature at which tortoises must go underground to escape heat. USFWS (2009) protocols state that tortoises shall not be handled when air temperatures at two inches (five centimeters) above the ground exceed 95°F (35°C). Because surface temperatures can easily exceed 109°F when air temperatures at two inches are still below 95°F, the more conservative temperature will dictate handling methods. During each Project phase discussed below, options are provided for relocating/translocating tortoises found at ground temperatures exceeding 109°F and/or air temperatures above 95°F. Moving tortoises at air temperatures higher than 95°F would also require approval by USFWS.

4.2 Construction Phase

Tortoise relocation/translocation that is necessary during Project construction may occur during Project Area clearance, initial perimeter and exclusion fence construction, revegetation of temporarily disturbed areas, or initial grading on the Project Area. Based on the survey results, it is anticipated that no or very few desert tortoises would require removal from the Project Area.

Construction on the Project Area is projected to begin in 2010. Construction on the interconnect outside the fenced Project Area may occur at any time of the year. Measures for relocation/translocation within the Project Area boundary are based on either:

1. Project Area perimeter/exclusion fencing beginning in the winter, with tortoise clearance and relocation/translocation occurring the following late March and early April; or
2. Project Area perimeter/exclusion fencing beginning in the fall, with tortoise clearance and relocation/translocation occurring in later October or early November.

Should this schedule change, then other options will be employed to ensure that tortoises are safe during construction, clearance and relocation/translocation procedures (see

[1] Note: Tortoise populations are currently well below carrying capacity throughout their documented range due to a long-term drought and other factors [Karl 2004, McLuckie et al. 2006, Boarman et al. 2008]. So, in any circumstance, moving tortoises to another area, either within or outside their home range, would not result in exceeding long-term carrying capacity, unless habitat changes had occurred.

Attachment 1). These alternatives will be approved by the resource agencies prior to their implementation.

4.2.1 Project Area

During tortoise clearance surveys (following Project Area perimeter fencing and prior to any surface disturbance) and during initial vegetation removal on the Project Area, any tortoise found will be relocated outside the Project Area's perimeter fence on suitable habitat, as close to the capture location as possible. Tortoises will be placed onto BLM land or Project-owned land. All tortoises will be placed in the shade of a shrub[2] and monitored as described in Section 5.4, below.

A tortoise removed from the northeastern corner of the Project Area will be translocated east of the Beta solar array because it could be trapped by fencing and the non-habitat of the lake if placed outside the nearest fence. An artificial burrow will be constructed for this tortoise per Desert Tortoise Council (1994) guidelines and the tortoise monitored as described in Section 5.4, below.

Based on the Project construction schedule, tortoises will be relocated from the Project Area during site clearance, when daily ground surface temperatures are below 109°F and air temperatures are below 95ºF. However, the possibility exists that a tortoise could be found when temperatures are higher. In such cases, the following options would be employed at the AB's discretion and upon approval by the California Department of Fish and Game (CDFG) and USFWS. A summary of these activities is found in Table 1.

- *If a tortoise is >125mm in carapace length and is found under a shrub*, a small transmitter (e.g., Holohil R1-2B) can be taped to the rear carapace (to avoid interference with normal movements) with duct or sports tape, and the tortoise released at the capture site. Alternatively, and for smaller tortoises, the tortoise can be secured in an individual, sterilized box and placed in a quiet, climate-controlled environment (e.g., the onsite Project office). Adult tortoises that are either transmittered or held temporarily due to ambient temperatures would be released in the late afternoon/early evening of the same day, when ambient temperatures subside. Juvenile tortoises, which are highly subject to depredation by canids, badgers, and ravens, would be released in the early morning to minimize depredation. Relocated tortoises would be released to a shrub; translocated tortoises would be released to an artificial burrow. All transmittered or boxed tortoises would be monitored periodically during the day to ensure their safety.

[2] In past relocation/translocation efforts, an artificial burrow has typically been constructed for tortoises. However, relocated and translocated tortoises do not use these burrows and it is anticipated that most tortoises removed from the Project Area will be relocated - i.e., have known burrows. Therefore, no artificial burrows will be constructed for relocated tortoises.

- *If a tortoise is found in a burrow*, either of the above options is applicable. A third option is to erect a temporary pen around the tortoise and burrow. The pen would be constructed of 1- by 2-inch mesh or other, adequate temporary fencing (e.g., silt fencing), and would be several meters across. The tortoise would be relocated or translocated when temperatures subside, as above. All transmittered, boxed, or penned tortoises would be monitored periodically during the day to ensure their safety.

In all cases, relocated/translocated tortoises will be monitored as described in Section 5.4, below, following their release.

Table 1. Alternatives for relocating tortoises found at ground temperatures above 109ºC and air temperatures above 95ºF. See the text for an explanation of each alternative.

Project Phase	Project Activities	Alternatives for Relocation/Translocation	
		Tortoise Found Under Shrub	Tortoise Found In Burrow
Construction	Project Area clearance	• Temporarily affix transmitter; release late afternoon; monitor • Hold in climate-controlled facility; release late afternoon; monitor	• Temporarily affix transmitter; release late afternoon; monitor • Hold in climate-controlled facility; release late afternoon; monitor • Erect pen around burrow; release late afternoon; monitor
	Construction of Project Area perimeter fence and transmission interconnect	• Relocate to a shrub or burrow • Erect pen around burrow; release late afternoon; monitor	• Erect pen around burrow; release late afternoon; monitor • Hold in climate-controlled facility; release late afternoon; monitor
Operations	Project Area	• Hold in climate-controlled facility; release late afternoon; monitor	
	Access road, utilities' maintenance	• Allow tortoise to proceed out of area unimpeded • If relocation is necessary, hold in climate-controlled facility; release late afternoon; monitor	
Decommissioning	Project Area decommissioning and site restoration	• Relocate to a shrub or burrow • Erect pen around burrow; release late afternoon; monitor	• Erect pen around burrow; release late afternoon; monitor • Hold in climate-controlled facility; release late afternoon; monitor

4.2.2 Project Area Fence Construction

Construction of the perimeter fence will occur in unfenced, native habitat[3]. Tortoises that need to be relocated will be placed outside the construction zone on BLM land or, where the nearest habitat is on private land, then on Project-owned land outside the immediate construction activity[4]. All tortoises will be placed in the shade or, where possible, in the entrance of the tortoise's known burrow and monitored as described in Section 5.4, below. It is possible that a tortoise might attempt to re-enter an unfenced construction zone (for example, during fence construction), in which case a temporary fence could be erected to exclude the tortoise to increase its safety.

All tortoises needing to be moved during the construction the Project Area perimeter/exclusion will be moved a very short distance inside familiar areas, where burrows are well-known. As such, relocation can occur when ground temperatures exceed 109°F and air temperatures exceed 95ºF using the following alternatives:

- *If a tortoise is found under a shrub*, at the AB's discretion it may be moved to another shrub or known burrow for that tortoise. Alternatively, a temporary pen can be erected around the tortoise and shrub and flagged to ensure avoidance. The pen would be constructed of 1 by 2-inch mesh or other, adequate temporary fencing (e.g., silt fencing can be used for very short-term needs). The pen would be removed later in the day when the tortoise could be safely moved or allowed to move away from the construction area of its own accord. All penned tortoises would be monitored adequately to ensure their safety.
- *If a tortoise is captured in a burrow*, it can be penned as described above and then put outside the pen in the late afternoon/early evening. If it is either impractical to pen the tortoise or it cannot be avoided by construction activities, then it will be held in a climate-controlled location (e.g., Project office) and released in the early evening after temperatures fall below 109°F and 95ºF.

If these activities occur during winter (e.g., Winter 2010/11), tortoises found in burrows will be avoided, and the burrow fenced with high visibility fencing; a biological monitor would continually monitor the burrow and fence to ensure tortoise safety. If a tortoise in a burrow cannot be avoided, and tortoises are still in hibernation, then an artificial burrow that replicates the capture burrow (location relative to a shrub, direction, length) will be

[3] There are currently no disturbance areas anticipated outside the Project Area. There will be no temporarily disturbed areas that will require revegetation. The transmission line interconnect will be constructed by SCE.

[4] It is generally appropriate that any tortoise removed from utility ROWs or fence construction areas be placed 100-200 feet away, preferably outside a known or suspected burrow for that tortoise (it is anticipated that the Biological Monitors would have found and mapped most burrows close to the linear construction areas). This distance would be within the home range of any tortoise found in the fence construction area but sufficiently far from construction activity for minimal disturbance to the tortoise from construction activities. No tortoises will be placed on private land without permission from the landowner.

constructed 100 ft outside the construction zone. The tortoise will be captured at night and placed in the artificial burrow along with soil and scat from the capture burrow. The tortoise will be blocked into the burrow for two weeks (unless the weather warms, in which case the barriers will be removed) and then monitored to ensure that it either remains in the burrow or finds another burrow. If the tortoise attempts to find another burrow but is unsuccessful, and the nighttime air temperatures fall below approximately 35ºF, then the tortoise will be captured, held in a climate-controlled, dark, quiet, and safe location (e.g., Project office closet), until seasonal temperatures warm and tortoises are observed to be active in the area. At that point, it will be released within 100 ft of it's capture burrow and monitored as described in Section 5.4, below.

In all cases, relocated/translocated tortoises will be monitored as described in Section 5.4, below, following their release.

4.2.3 Nest Relocation

Any nests found between November 1 and April 15 are unlikely to be viable and will not be moved; hatching will typically be finished by October. In the event that nests are found between April 15 and October 1 and must be moved (e.g., for construction of linear facilities), the nests will be moved. Eggs would be inspected to determine if they are viable and, if so, will be moved to an identical microsite (e.g., cover, plant species, soil type, substrate, aspect) on adjacent BLM land using standard techniques (e.g. Desert Tortoise Council, 1994). Translocated nests will be fenced with open-mesh fencing (e.g. 2-inch wide mesh) that will permit hatchlings to escape but prevent depredation by canids that might be attracted to the new nests by human scent predator entry. Open-mesh fencing or avian netting also will be installed on the roof to prevent predator entry. Nests will be monitored from a 30-foot distance once a month until late November, at which time they will be excavated for examination. If possible, hatchlings will be weighed, measured, photographed, described and marked.

4.3 Operations Phase

Because it is anticipated that the Project Area will be entirely devoid of vegetation (except for small, landscaped areas at the offices) following surface grading, there will be no areas where a tortoise could reside onsite. Therefore, any tortoise found during Project operations likely will have entered the Project Area through a gate or breach in the fence. It is likely, although not impossible, that any tortoise found during Project operations would not yet have constructed a burrow and would have entered the site only recently. Any such tortoise will be relocated to the nearest suitable habitat outside the fence on BLM land adjacent to BLM Wilderness or into the BLM Wilderness Area. Because any tortoise found inside the Project Area is likely to be a transient, it is anticipated that the tortoise would seek a familiar burrow when released outside the Plant Site. All tortoises will be placed in the deep shade of a large shrub and monitored, as described in Section 5.4, below, to ensure their safety.

In the event that surface temperatures are in excess of 109°F or air temperatures higher than 95°F, the tortoise will be secured in an individual, sterilized box and placed in a quiet, climate-controlled environment (e.g., the onsite Project office). The tortoise will be released in the late afternoon/early evening of the same day, when ambient temperatures subside. Juvenile tortoises will be released in the early morning to minimize depredation. All transmittered or boxed tortoises will be monitored periodically during the day to ensure their safety, and following release, according to Section 5.4, below.

Tortoises observed on the utility corridors during inspection activities or along the main access road by personnel leaving or entering the Project will not be disturbed or handled and will be allowed to move away of their own accord. Any maintenance that required surface disturbance or heavy equipment would require the same protection measures as for construction.

4.4 Decommissioning Phase

During the Project decommissioning phase, activities will take place both inside fenced areas and in unfenced native habitat. Techniques provided above for tortoise relocation during perimeter fence construction will apply to decommissioning activities. Newer information will be incorporated as appropriate to optimize tortoise relocation.

5.0 PROCEDURES APPLICABLE TO ALL RELOCATIONS/TRANSLOCATIONS

5.1 Data Gathered on Relocated/Translocated Tortoises

Each captured tortoise will be processed prior to relocation/translocation. The gender, carapace length, distinguishing morphology, clinical signs of disease, capture site location and description, release site location and description, and the amount of void, if any, will be recorded and the tortoise photographed and drawn. All tortoise handling will be accomplished by approved techniques (e.g., Desert Tortoise Council, 1994), incorporating newer research for minimization of disease transmission (e.g., Brown 2003)[5]. Each tortoise will be assigned an individual number. Marking techniques will be approved by USFWS, but temporary marks using very small epoxy numbers with a Project-specific identifier are suggested. Such numbers will last for several years, long enough to be able to identify specific tortoises if subsequently observed during Project maintenance or other activities.

5.2 Tortoise Transportation

[5] The USFWS is currently developing a manual that will address several aspects of handling. Specific measures will replace those in this Plan, as appropriate.

Most tortoises will be captured sufficiently near the fence or release site to be hand-carried to the release site. Each tortoise that is hand-carried will be kept upright and the handler, wearing disposable examination gloves (one pair per tortoise), will move the tortoise as quickly and smoothly as possible. Tortoises kept in a climate-controlled situation due to temperature considerations or captured further from the release site will be transported to their release sites in individual, sterilized tubs or boxes with taped, sterilized lids. If transported by vehicle, the tortoise tub will be kept shaded during transport and the tub will be placed on a well-padded surface, not over a heated portion of the vehicle floor.

5.3 Authorized Handlers

USFWS describes a single designation for biologists who can be approved to handle tortoises - "Authorized Biologist" (AB) (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt). Such biologists have demonstrated to USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately. ABs are permitted to then approve specific monitors to handle tortoises, at their discretion. The California Department of Fish and Game (CDFG) must also approve such biologists, potentially including individual approvals for monitors approved by the AB. Notwithstanding that the California Energy Commission (CEC) only has designations for "Designated Biologist" and "Biological Monitor," only those biologists authorized by USFWS and CDFG, presumably including the Designated Biologist and certain Biological Monitors, can handle desert tortoises.

5.4 Post-Release Monitoring

All tortoises moved, whether during initial fence construction, during Project Area clearance, during construction for the interconnection, or other activities, will be monitored sufficiently to ensure their safety. This is especially critical for juvenile tortoises, which are highly subject to depredation. Any tortoise moved will be watched for at least two hours to determine if it is behaving safely (e.g., seeking shade or a burrow) or if it is likely to try and re-enter a construction area (e.g., during fence construction or for the interconnect construction). In addition to the initial monitoring at release, the release location and surrounding area will be visited for at least the next two days during tortoise activity temperatures to ensure that the tortoise is not fence-walking. The latter would suggest that the release site had been incorrectly chosen and that release outside a different fence should be attempted. If moved to another area, the monitoring of the desert tortoise would be re-initiated.

Tortoises released in the evening due to temperature considerations will be monitored until dark with a resumption of monitoring at dawn. Such tortoises will be watched until they entered a burrow that provides thermal relief and predator protection. Juveniles similarly released at dawn will be watched to ensure that they enter a burrow before temperatures exceed lethal thresholds.
Because the sample size of tortoises relocated/translocated is anticipated to be zero or very low, and because most, if not all, will be released into another part of their current

home range, no scientific study is proposed for these tortoises. Even a tortoise that moves onto the Project Area prior to clearance and requires translocation is already highly likely to be familiar with the release area, since it currently lives outside the Project Area. Monitoring these few (if any) tortoises for survival therefore appears unwarranted. If determined to be necessary, a short-term monitoring program can be implemented that would include telemetry and a sufficiently frequent monitoring schedule (e.g., for tortoises translocated in the spring: daily for two to three weeks, then twice weekly until the tortoise enters hibernation the following winter; for tortoises translocated in fall: daily until hibernation, then monthly until March 10, then weekly) to identify that the tortoise has established a home range in the translocation area. Such a monitoring program will be determined in consultation with the resource agencies.

5.5 Health Considerations

Because any tortoises removed from the Project Site will likely be relocated – i.e., moved into another part of their existing home range - disease testing is unwarranted. Since no tortoises currently reside on the Project Area, even a tortoise that moves onto the Plant Site and requires translocation will have had its previous home range in the population outside the Plant Site. Clinical signs of disease will be recorded during the examination of all tortoises relocated/translocated.

6.0 REPORTING

Following site clearance, a report will be prepared by the AB to document the clearance surveys, the capture and release locations of all desert tortoises found, post-release monitoring, individual tortoise data, and other relevant data. This report will be submitted to the USFWS and CDFG. Should long-term monitoring be required by these resource agencies, a relevant reporting schedule will be developed.

7.0 LITERATURE CITED

Barrett, S.L. 1990. Home range and habitat of the desert tortoise (*Xerobates agassizii*) in the Picacho Mountains of Arizona. Herpetologica 46:202-206.

Boarman, W.I. 1994. Effectiveness of fences and culverts for protecting desert tortoises along California State Highway 58: summary of the 1993 field season. Draft. Unpub. rept. to the California Energy Commission. Contract No. 700-90-015, Phase 3, Task 3-3. 23 pp. plus appendices.

---, W.B. Kristan, III, and A.P. Woodman. 2008. Neither here nor there: current status of Sonoran desert tortoise populations in Arizona. Paper presented at the 2008 Desert Tortoise Council Symposium, Las Vegas, NV.

Brown, M.B., 2003. Disinfection protocol. Unpub. document from the University of Florida Mycoplasma research laboratory. 1 pp.

Burge, B.L. 1977. Movements and behavior of the desert tortoise, *Gopherus agassizi*. M.S. Thesis, Univ. of Nevada, Las Vegas. 225 pp.

Desert Tortoise Council, 1994 (rev. 1999). Guidelines for handling desert tortoises during construction projects. E.L. LaRue, Jr. (ed.) Wrightwood, CA.

Duda, J.J., A.J. Krzysik, and J.E. Freilich. 1999. Effects of drought on desert tortoise movement and activity. Jour. Wildlife Mgmt. 63(4):1181-1192.

Genesis Solar, LLC. 2009a. Genesis Solar Energy Project Application for Certification. Submitted to the California Energy Commission, Sacramento, CA. August 31, 2009.

---. 2009b. Genesis Solar Energy Project Application for Incidental Take of threatened and endangered species, Section 2081 of the California Endangered Species Act. Submitted to the California Department of Fish and Game, Inland Deserts Region, Ontario, CA. 24 pp plus attachments.

---. 2009c. Genesis Solar Energy Project Biological Assessment. In prep.

Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. California Department of Fish and Game, Nongame-Heritage Program. 155 pp.

Karl, A.E. 1989. Investigations of the desert tortoise at the California Department of Health Services' proposed low-level radioactive waste facility site in Ward Valley, California. Unpub. rept. submitted to US Ecology and Ecological Research Services. 116 pp.

---. 1992. Annual report to the U.S. Fish and Wildlife Service for Permit No. PRT-746058. 12 pp.

---. 2004. Drought: acute effects and impacts to recovery of the desert tortoise. Paper presented at the 2004 Desert Tortoise Council Symposium, Las Vegas, NV.

LaRue, E.L. 1993. Distribution of desert tortoise sign adjacent to Highway 395, San Bernardino County, California. Draft. Unpub. rept. from Tierra Madre Consultants to Gratten, Gersick, Karp, and Miller, Sacramento, CA. 17 pp.

Marlow, R. W., K. von Seckendorff Hoff, and P. Brussard. 1997. Management of wild tortoise populations is complicated by escape or release of captives. Pp. 479-480 *in* J. van Abbema (ed.), Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles – an International Conference. Joint publ. of the New York Turtle and Tortoise Society and the WCS Turtle Recovery Program.

McLuckie, A.M., M.R.M. Bennion, R.A. Fridell, and R. Radant. Status of the desert tortoise in the Red Cliffs Desert Reserve. Paper presented at the 2006 Desert Tortoise Council Symposium, Las Vegas, NV.

Mojave Solar, LLC. Application for Certification. Submitted to the California Energy Commission 10 August 2009.

Nicholson, L.L. 1978. The effects of roads on desert tortoise populations. Pp. 127-129 *in* M. Trotter (ed.) Proceedings of the 1978 Desert Tortoise Council Symposium.

Ninyo & Moore, 2006. Ninyo & Moore Geotechnical and Environmental Sciences Consultants (Ninyo & Moore), 2006. Geotechnical Reconnaissance Harper Lake Dairy Park, Lockhart, California. Prepared for Metcalf & Eddy. July 7.

O'Connor, M. P., L. C. Zimmerman, D. E. Ruby, S. J. Bulova, and J. R. Spotila. 1994. Home range size and movements by desert tortoises, *Gopherus agassizii*, in the eastern Mojave Desert. Herp. Monogr. 8:60-71.

Orr, William. 2009. Personal communication. Paleontologist, Dept. of Geology, Univ. of Oregon, Eugene, OR. rr_bll@yahoo.com. May 15.

Rosen, P.C., P.A. Holm, and E.B. Wirt. 2007. Studies of drought and highway effects on tortoises at Organ Pipe Cactus national Monument, Arizona. Paper presented at the 2007 Desert Tortoise Council Symposium, Las Vegas, NV.

TRW Environmental Safety Systems, Inc. 1999. Movement patterns of desert tortoises at Yucca Mountain. Unpubl. rept. to U.S. Department of Energy, Yucca Mountain Site Characterization Office, North Las Vegas, NV. Document No. B00000000-01717-5705-00049.

United States Fish and Wildlife Service. 1992. Field survey protocol for any federal action that may occur within the range of the desert tortoise. Ventura, California Field Office.

---. 2009. Desert tortoise field manual. Available online at (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt/dt_fieldmanual)

Zimmerman, L.C., M.P. O'Connor, S.J. Bulova, J.R. Spotila, S. J. Kemp, and C.J. Salice. 1994. Thermal ecology of desert tortoises in the eastern Mojave Desert: seasonal patterns of operative and body temperatures, and microhabitat utilization. Herp. Monogr. 8:45-59.

ATTACHMENT 1.

A SUMMARY OF DESERT TORTOISE CLEARANCE ALTERNATIVES ASSOCIATED WITH THE MOJAVE SOLAR PROJECT (KARL 2009)

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June 2009

A Summary of Desert Tortoise Clearance Alternatives for the Mojave Solar Project

This is a general summary of alternatives for tortoise removal and translocation from the MSP site, especially as they are affected by the issuance of permits. It is intended strictly for in-house use and not as a protocol for translocation.

Timing is a critical factor for moving tortoises. In general, it is unwise to translocate tortoises in seasons when daily ground temperatures exceed 43ºC (i.e., mid-April through early October) because tortoises must find new refuges in unfamiliar areas, with the added pressure of lethal daily temperatures. In the MSP area, tortoises hibernate between approximately November 1 and March 20 (although they may become active in winter if there is a prolonged warm period). Tortoise clearance surveys must take place when tortoises are most active – late March through May and October - in order to best find the animals. The combination of translocation and clearance constraints consequently leaves two narrow windows within which tortoises may be translocated, late March to approximately April 10 and the all or part of October (depending on ambient temperatures).

In addition to temperature constraints that affect tortoise translocation, there are several other Project activities must take place before tortoise clearance and translocation can proceed. The following is a chronological summary of those activities:

1. CEC licenses the project.
2. Federal and state ITPs are issued.
3. The Project is fenced with permanent tortoise exclusion fencing, with constant biological monitoring during fencing. (This will require several weeks to complete.)
4. Tortoise clearance and removal proceeds (several weeks, depending on the size of the crew). This requires a minimum of two, 100% passes, with at least one pass during a period of high tortoise activity (April, May or October).

5. Construction of all linear facilities outside the exclusion fence receives constant biological monitoring.

Permit Timing and Associated Options

The best scenario for both the Project proponent and tortoises is to receive all permits (B.O., 2081 and CEC licensing) in sufficient time before a critical tortoise translocation period to fence the site with tortoise exclusion fencing, while not causing undue restrictions to normal tortoise movements should a tortoise be caught inside the fenced area. As such, it is best to receive permits by January or early February. This allows two months to mobilize and fence the site while tortoises are still in hibernation. No tortoise movements are affected. Following site fencing, clearance can be completed in late March through early April when tortoises are active but it is safe to translocate tortoises.

Less desirable is to receive permits in July. Again, this permits fencing to be completed over the next two months, with clearance and tortoise translocation in October. But, some tortoises may be trapped inside the fence, thereby affecting their normal activity patterns.

Should permits fail to be issued by the above dates, the following options are offered to accommodate construction as much as possible, while keeping tortoises safe. These options are specifically tailored to the conditions at MSP and are based on the concept that few, if any, tortoises will be found on MSP because the entire Project footprint is either non-habitat or unoccupied. (This does not apply to Harper Lake or other access roads that travel through tortoise habitat.) All options assume that the relevant permits have been acquired. All options also assume that all tortoise exclusion fencing, both temporary and permanent, would be adequately monitored to ensure its function.

A. Permits are received after approximately April- i.e., after it is safe to move tortoises in the spring following the necessary period for site fencing..

Option A.1.

1. Construct permanent tortoise fencing only for the areas where tortoises are most unlikely (Sections 32, 33, south half of 29). (Note: Because tortoises are also highly unlikely in Section 30 and the rest of Section 29, the Project could risk that there would be no tortoises there and permanently fence those parcels also. Should a tortoise be found several hundred meters inside the fence during clearance surveys, then the fence probably would have to be removed sufficiently for the tortoise to have unhampered movement within its home range [a few hundred meters of fencing]. If no burrows are found inside the Project, it could be assumed that the tortoise was a transient, with most of its home range outside the Project and the fencing could be re-erected after the tortoise left.)
2. Any tortoises found along the edges (likely to be the only place where tortoises will be found) can be "fenced out" of the site during fence construction (using specific protocols).
3. Conduct clearance surveys of the fenced area only.
4. Conduct grading and other construction activities within the fenced area only.
5. Sufficiently prior to the next translocation period (presumably October), erect permanent fencing around the remainder of the site (must be completed by late September).
6. Clear tortoises from the remainder of the fenced site in October.
7. Continue with grading and site construction activities.

Option A.2.

1. Erect permanent tortoise fencing for the entire site (must completed by late September). Any tortoises observed to be fence-walking can be moved

immediately outside the fence (under specific procedures to insure its safety) and monitored, as outlined in the Translocation Plan..

2. Conduct tortoise clearance for entire site in October.
3. Continue with grading and site construction activities.

B. *Permits are received in early fall, not in time to move tortoises in October.*

Option B.1.

1. Erect permanent tortoise fencing for the entire site (must completed by mid-March). Any tortoises observed to be fence-walking can be moved immediately outside the fence (under specific protocols) and monitored.
2. Conduct tortoise clearance and removal the following late March and early April.
3. Continue with grading and site construction activities.

Option B.2. This is similar to Option B.3., below, but the initial clearance can be conducted anywhere on the site and must be conducted when tortoises are active.

1. If time is available, temporary fencing can be quickly erected around any portion of the Project area in order to facilitate partial site clearance during October. Silt fencing, which can be used as temporary fencing only in very short-term situations (less than two months), cannot be used at MSP. Instead, hardware cloth, erected on T-posts, would be used to help ensure fence integrity over the winter and for purposes of construction within the fenced area.
2. Conduct tortoise clearance within the temporarily fenced area, to be completed by November 1.
3. Conduct grading only within the temporarily fenced and cleared area.
4. Simultaneously, erect the permanent tortoise exclusion fence around the entire site.

5. Conduct tortoise clearance for the remainder of the fenced site the following late March and early April.
6. Continue with grading and site construction activities.

Option B.3. This is similar to Option B.2., but early clearance only applies to currently barren areas where tortoises are assumed to be absent and the clearance can be completed during the winter, when tortoises are inactive.

1. Erect permanent tortoise fencing for the entire site (must completed by mid-March). Any tortoises observed to be fence-walking can be moved immediately outside the fence (under specific protocols) and monitored.
2. Erect temporary fencing around only those portions of the site that are devoid of shrubs (see above notes for temporary fencing).
3. Conduct a tortoise clearance inside those temporarily fenced areas (no seasonal constraints).
4. Conduct grading only within the temporarily fenced and cleared area.
5. Conduct tortoise clearance on the rest of the site the following April.
6. Continue with grading and site construction activities.