

**ENVIRONMENTAL ASSESSMENT
CA-670-EA2000-34**

For

**THE INDIAN PASS WITHDRAWAL
CACA-39853**

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ENVIRONMENTAL ASSESSMENT

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Indian Pass Withdrawal
Serial Number CACA-39853

I. INTRODUCTION

1.1 Proposed Action

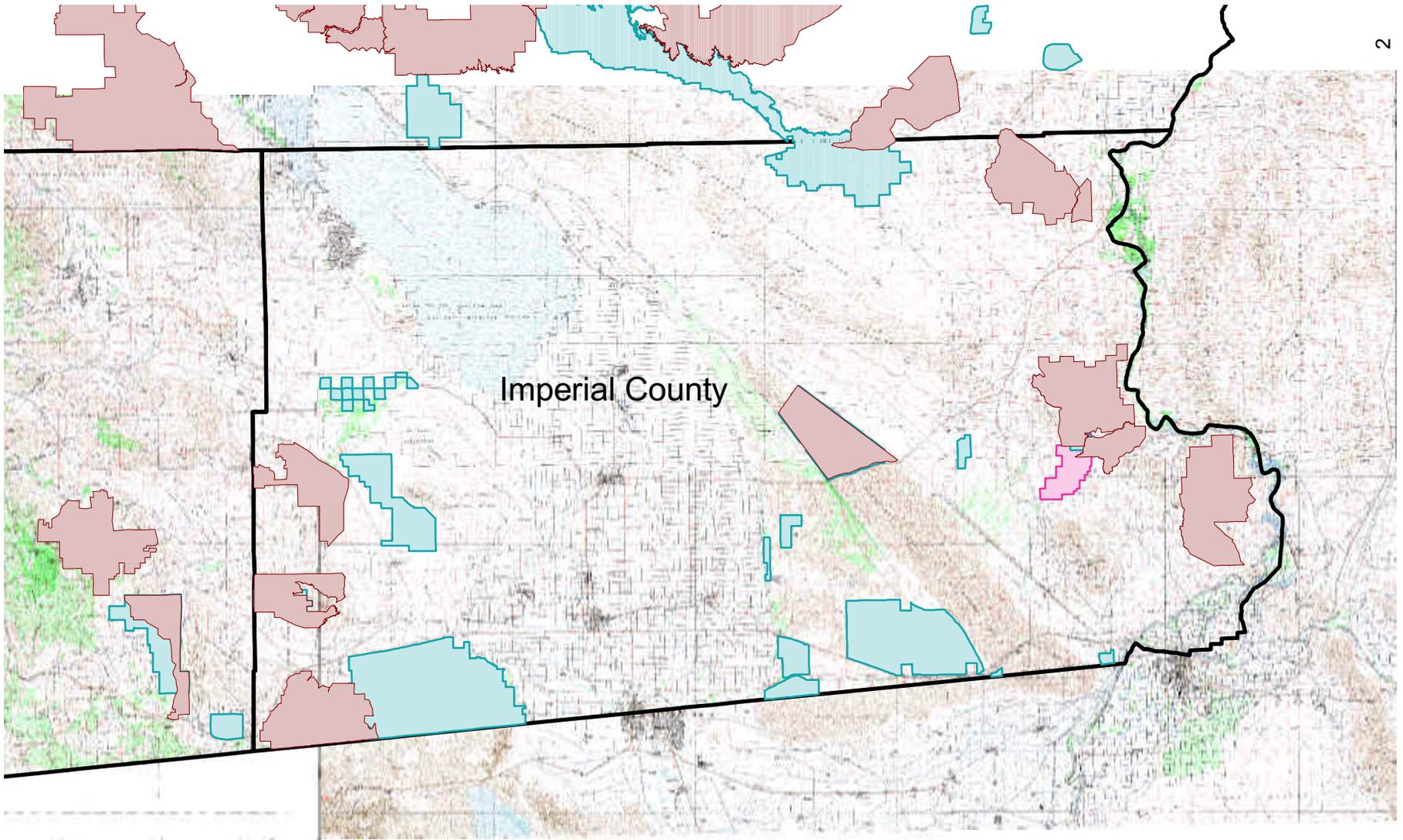
The Bureau of Land Management (BLM) proposes to withdraw approximately 9,360.74 acres of public lands in the Indian Pass area to protect cultural resources. To withdraw means to withhold (segregate) an area of Federal land from settlement, sale, location, or entry under some or all of the general land laws, for the purpose of limiting activities under those laws in order to maintain other public values in the area or reserving the area for a particular public purpose or program. The Indian Pass area is located in eastern Imperial County, California, approximately 45 miles northeast of El Centro, California and 20 miles northwest of Yuma, Arizona, northwest of Ogilby Road, along Indian Pass Road (Map 1).

1.2 History and Background

In 1994, the Glamis Imperial Corporation (Glamis) submitted a proposed plan of operations (POO) to the BLM for the Imperial Project, an open-pit gold mining operation using a heap leach process. The proposed mine, processing areas, and ancillary areas would result in approximately 1400 acres of surface disturbance. The mine would be located on claims staked by Glamis in the Indian Pass area as prescribed by the 1872 Mining Law. The Imperial Project area, is located entirely on public lands administered by BLM, El Centro Field Office.

A Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) for the Imperial Project was released for public comment in November 1996, and a revised DEIS/EIR was released for public comment in November 1997. The EIS has not been finalized, and a Record of Decision has not been prepared.

It was through the DEIS/EIR process that the extent of the archaeological and Native American religious concerns surfaced. Extensive consultations with both the Quechan Tribal Council and the Quechan Cultural Heritage Committee revealed that the area is considered to be a sacred site by the Quechan people. This suggested the potential presence of a traditional cultural property (TCP) in the Imperial Project area. A TCP is "A location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world" and furthermore "a location where Native American religious practitioners have historically gone, and are known or thought to go today, to perform ceremonial activities in accordance with traditional



Map 1

General Location of Proposed Indian Pass Withdrawal

- Wilderness
- ACEC
- Indian Pass Proposed Withdrawal
- County Boundaries



cultural rules of practice” (Parker and King 1992:1). A TCP is considered to have traditional values in that it “refers to beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice” (Parker and King 1992:1).

The values expressed by Quechan tribal members regarding the area center around four interrelated topics: Native American trails and their relationship to traditional religious beliefs and practices; the Running Man geoglyph; the traditional quest for spiritual knowledge and power; and, cultural transmission of traditional knowledge and practices.

In response to Native American concerns and comments on the 1996 DEIS/EIR, BLM required an additional inventory and TCP evaluation of the Imperial Project area be undertaken to ensure that the data was comprehensive and complete. Through a series of consultations with members of the Quechan Indian Tribe, and an intensive archaeological survey of the Imperial Project area, it was determined that the Indian Pass area is a portion of a very large TCP.

The 1997 DEIS/EIR did not determine the ultimate boundaries of the TCP, but focused on the identification and evaluation of an area of traditional cultural concern (ATCC) in the Imperial Project vicinity. The Quechan view their entire traditional territory as continuous with no clear boundaries. However, in order to conform to National Register standards, they agreed that an ATCC in the Indian Pass area could be defined by a combination of first and second order landscape features and the archaeological manifestations of traditional Quechan practices. This effort resulted in the identification of the Indian Pass-Running Man ATCC, which includes the proposed Imperial Project area.

In order to provide protection to the resources described above, BLM proposed to the Secretary of Interior that approximately 9,360.74 acres of public lands in the Indian Pass area be withdrawn. On October 26, 1998, the BLM petition/application to withdraw the lands was approved by the Assistant Secretary. A notice of the proposed withdrawal was published in the Federal Register on November 2, 1998. Upon publication the lands were temporarily segregated for a two year period. The segregation will terminate on November 1, 2000. The two year period is provided to allow BLM time to prepare various studies and analyses which will determine the final decision.

I.3 Description of the Proposed Action

The withdrawal, if approved, would segregate the public lands from settlement, sale, location, or entry under the general land laws, including the mining laws, subject to valid existing rights. The withdrawal would not segregate from the mineral leasing laws or material sale laws because proposed actions under these laws are fully discretionary and may be denied. The term of the withdrawal would be 20 years. Regulations found at 43 CFR 2310.3-4 state that a withdrawal for 5,000 acres or more may be made for a period not to exceed 20 years. After that period, the withdrawal would be subject to review to determine if it is still necessary.

The boundaries of the proposed withdrawal (withdrawal or proposed action) coincide with the ATCC identified through consultation with the Quechan during the 1997 Imperial Project DEIS/EIR process, and later confirmed through additional consultation specific to the withdrawal process. The lands proposed for withdrawal are described as follows and shown on Map 2.

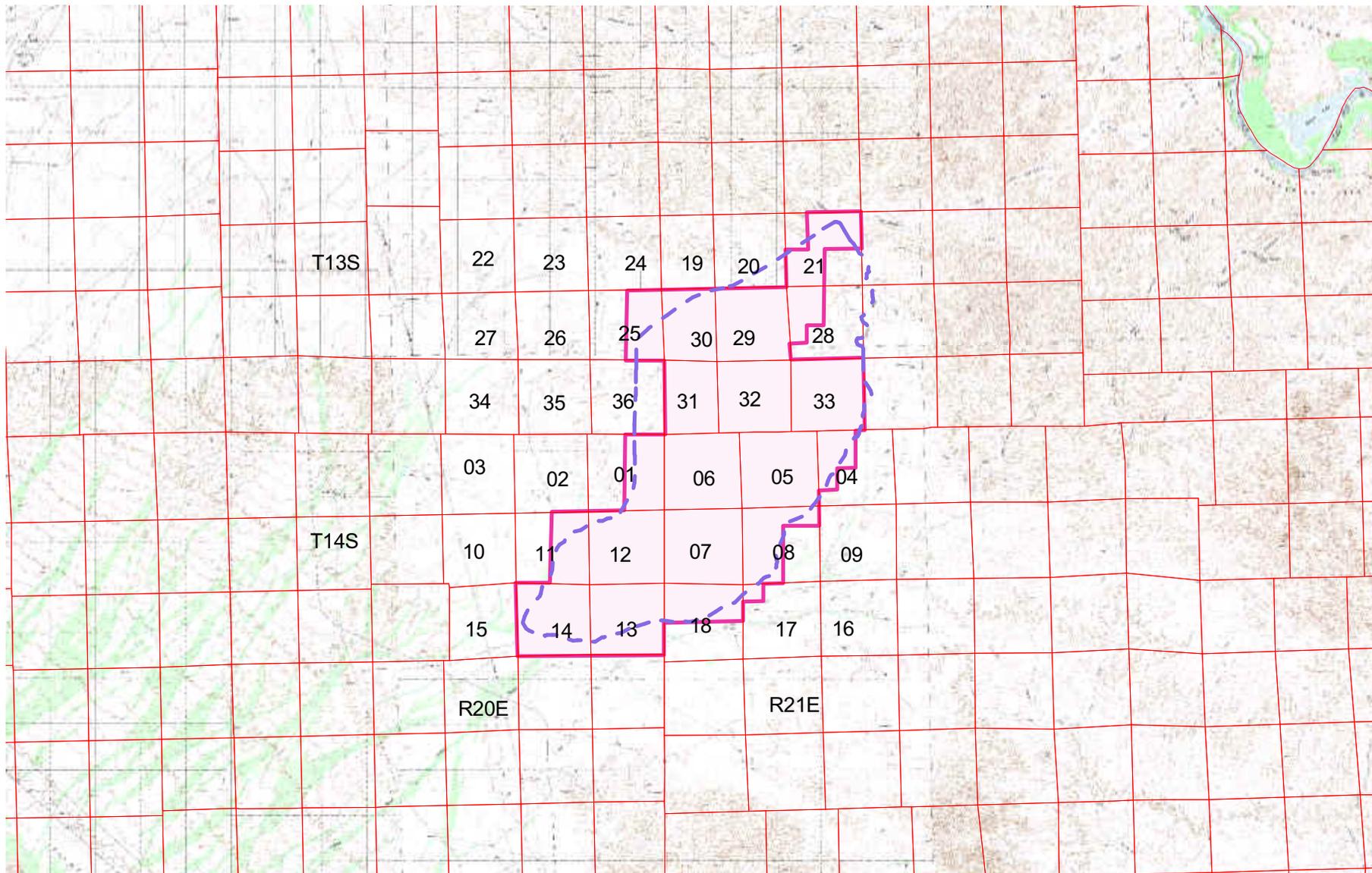
San Bernardino Meridian, Imperial County, California

	<u>Acres ±</u>
T. 13 S., R. 20 E. sec. 25, E $\frac{1}{2}$;	317.50
T. 13 S., R. 21 E. sec. 21, NE $\frac{1}{4}$, E $\frac{1}{2}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$;	400.00
sec. 28, NW $\frac{1}{4}$, NW $\frac{1}{4}$ SW $\frac{1}{4}$;	200.00
secs. 29 - 33, inclusive*	2844.00
T. 14 S., R. 20 E. sec. 1, E $\frac{1}{2}$;	356.50
sec. 11, E $\frac{1}{2}$;	320.00
secs. 12 - 14, inclusive*	2002.00
T. 14 S., R. 21 E. sec. 4, lots 1 and 2 of NW $\frac{1}{4}$, NW $\frac{1}{4}$ SW $\frac{1}{4}$;	201.53
sec. 5, lots 1 and 2 of NE $\frac{1}{4}$, lots 1 and 2 of NW $\frac{1}{4}$, S $\frac{1}{2}$;	643.74
sec. 6, lots 1 and 2 of NE $\frac{1}{4}$, lots 1 and 2 of NW $\frac{1}{4}$, lots 1 and 2 of SW $\frac{1}{4}$, SE $\frac{1}{4}$;	653.58
sec. 7, lots 1 and 2 of NW $\frac{1}{4}$, lots 1 and 2 of SW $\frac{1}{4}$, E $\frac{1}{2}$;	654.28
sec. 8, N $\frac{1}{2}$ NE $\frac{1}{4}$, W $\frac{1}{2}$;	400.00
sec. 17, NW $\frac{1}{4}$ NW $\frac{1}{4}$;	40.00
sec. 18, lots 1 and 2 of NW $\frac{1}{4}$, NE $\frac{1}{4}$;	327.61

* Unsurveyed lands. Acreages protracted.

The lands described aggregate approximately 9,360.74 acres.

The Imperial Project is located wholly within the proposed withdrawal boundaries. Since the withdrawal would be subject to existing rights, it would not prevent the claimant from exercising whatever rights attach to their current claims, subject to the validity of the rights, and compliance with the National Environmental Policy Act (NEPA). The Imperial



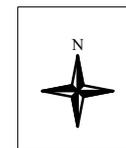
Map 2

Indian Pass Withdrawal Boundary

ATCC

 Sections

 Indian Pass Proposed Withdrawal



Project is currently under review through a process separate from the withdrawal. If the claims are determined to be valid, and the Plan of Operations is approved, the withdrawal would have no impact on the Imperial Project. Glamis also holds mining claims in the Indian Pass area outside of the Imperial Project. Approximately 4400 acres of those claims fall within the boundaries of the proposed withdrawal (Map 3). Any following discussion of “claims outside of the Imperial Project area” refers to the claims within the proposed withdrawal, unless otherwise specified.

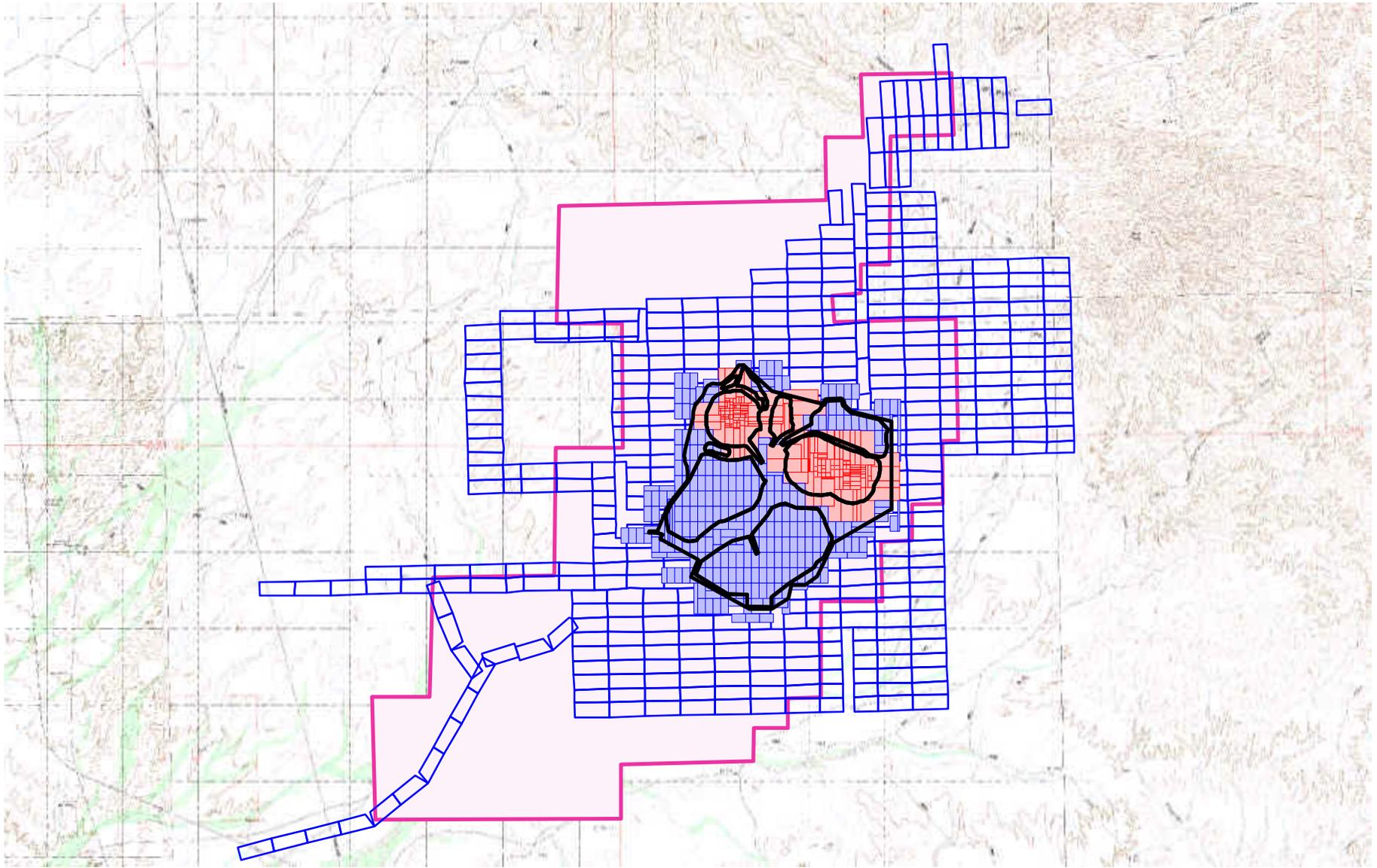
The withdrawal would *freeze* the status and configuration of the existing mineral rights and prohibit any new mineral entry within the withdrawal area. As such, development of the claims outside of the Imperial Project area may be restricted because new mill site claims could not be located within these areas. Mill site uses include, but are not limited to, processing plants and equipment (heap leach pad and process ponds), mine and overburden dump areas, mine tailings, tailings ponds, and tailings safety dams. To be economical the deposit must be within a reasonable limit of haul from the pit area to processing facilities. Under current economic conditions, hauling would reduce the profitability of development, and therefore, would reduce the potential for development of those claims outside of the Imperial Project. In addition, available data indicate that the vicinity of the Imperial Project pits has the highest potential for economical development within the area because the ore body is fairly close to the surface and accessible to open pit development. There is no exploration data for the claims outside of the Imperial Project area, but based on the geologic infrastructure and knowledge of other mines in the region, the mineral deposits are likely too deep to be economically developed under current gold prices. It is presumable that these claims would not support development without the link to the Imperial Project, and are therefore dependent upon the approval of the Imperial Project.

Since there are mining claims within the withdrawal area, some mining could occur. The proposed action could restrict development to the Imperial Project, if approved, and possibly a small scale expansion on adjacent claims.

The withdrawal would prevent the location of any mining claims on the approximate 3000 acres not currently encumbered by claims.

I.4 Need for the Proposed Action

During the preparation of the DEIS/EIR for the proposed Imperial Project, it was revealed through intensive archaeological surveys in the area and consultation with the Quechan Indians, that the Indian Pass area is a portion of a yet undefined very large TCP. The agreed upon boundaries of this smaller area was designated as the Indian Pass-Running Man area of traditional cultural concern (ATCC). Indian Pass is located between the two most important places in Quechan Indian religious mythology and religious belief, Spirit Mountain (*Avikwame*), near Needles, California and Pilot Knob (*Avikwalai*) located in California, west of Yuma, Az. The mountains are physically and spiritually linked by a north-south Native American trail system that passes through the Indian Pass region. Portions of these trails are located within the area of potential effect (APE) of the Imperial Project’s proposed open pit mine. The area also contains a



- Proposed Imperial Project Site
- Mill Site Claims
- Imperial Project Lode Claims
- Lode Mining Claims
- Indian Pass Proposed Withdrawal

Map 3
Mining Claims Within and
Near the Proposed
Withdrawal



plethora of cultural sites that are considered be sacred, such as rock alignments and dance circles, which were manufactured and maintained by important leaders of the Quechan Tribe. Thus the sites play an important role in Quechan history as well as their mythology and religious traditions. For the Quechan, this area represents a place of solitude, power, and source of knowledge where scenic qualities contribute to the integrity of the historic resources and of the area's religious and cultural value.

The Imperial Project DEIS/EIR states that impacts resulting from the proposed mine activities would be considered significant and unavoidable to cultural resources, even after implementation of the mitigation measures (DEIS/EIR, pg. 4-87). There is no reason to assume that any lesser impact would occur from mining activities outside of the Imperial Project area.

The proposed action, to withdraw the area, would impose some development restrictions on public lands where mining claims currently exist within the ATCC, and preserve cultural resources from mining related surface disturbance where no mining claims currently exist. The proposed withdrawal is the only reliable mechanism that offers BLM an opportunity to safeguard the cultural resources in an area that the Quechan feel is significant to their religious traditions and beliefs.

I.5 Conformance with Land use Plan

The proposed action is subject to the 1980 California Desert Conservation Area Plan (CDCA Plan), as amended, and the Indian Pass ACEC Management Plan (1987). For the reasons set forth below, BLM has determined that the proposed action is in conformance with these land use plans as required by 43 CFR 1610.5 and 43 CFR 2300.

Except for the lands within Wilderness, which are Class "C", the public lands proposed for withdrawal are classified as Multiple Use Class L" by the Desert Plan. The Class L designation is intended to protect sensitive, natural, scenic, ecological, and cultural resource values. Public lands designated as Class L are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished. The CDCA Plan recognizes that "judgement is called for in allowing consumptive uses only up to the point that sensitive natural and cultural values might be degraded."

The goals of the CDCA Plan's cultural resource element, as amended in 1985, are to protect and preserve a representative sample of the full array of the CDCA's cultural resources and to ensure that cultural resources are given full consideration in land use planning and management decisions. The Native American element of the Plan, also as amended in 1985, includes as a goal to give full consideration to Native American values in all land-use and management decisions, consistent with statute, regulation and policy, and to manage and protect Native American values wherever prudent and feasible.

The CDCA Plan acknowledges that only about 5 percent of the CDCA had been inventoried for cultural resources. This is reiterated in the Indian Pass ACEC

Management Plan which states “The actual boundaries of the ACEC are questionable. Other resources of merit lie well outside the known sites currently identified within the ACEC.” Both Plans acknowledge that additional inventory is essential to improve knowledge and management of the cultural resources of the Desert, and that selective decisions may be required to protect these resources.

The CDCA Plan takes into account the principles of multiple use and sustained yield in providing for resource use and development. The Federal Land Policy and Management Act of 1976 defines multiple use as:

“ the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output.”

Clearly the CDCA Plan is intended to be an evolving process which permits analysis of actions and impacts on a broad basis and provides a framework for ongoing analysis of specific subsequent actions, and impacts.

I.6 Relationship to Statutes, Regulations, Executive Orders, and Other Applicable Land Use Plans

Statutory authority for land withdrawals is found in sec. 204 of FLPMA of 1976 (43 U.S.C. 1714) and the implementing regulations are found in 43 CFR 2300.

Section 1 of Executive Order (EO) 13007 of May 24, 1996, states that agencies with statutory or administrative responsibility for the management of Federal lands shall, “to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, (1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites.” The EO defines *sacred site* as “any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of a Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site.

With respect to Environmental Justice, Executive order 12898 provides that “each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations.... .” Environmental justice is a potential issue because of the concerns raised by the Quechan tribe regarding the adverse effect of mining to an area that they feel is significant to their religious traditions and beliefs. It is felt the proposed withdrawal is responsive to EO 12898 because it would provide an opportunity to protect the cultural values, and responds to the concerns raised by the Quechan.

Imperial County’s Land Use Element of the General Plan indicates the entire area of the proposed action is within a large expanse of land currently dedicated to open space/recreation uses. The Conservation and Open Space Element of the General Plan is concerned with mineral resources, open space and other environmental resources. The purpose of the Conservation and Open Space Element of the General Plan is to:

Promote the protection, maintenance, and County’s natural resources with particular emphasis on scarce resources and resources that require special control and management;

Prevent the wasteful exploitation, destruction, and neglect of the State’s natural resources;

Recognize that natural resources must be maintained for their ecological value as well as for the direct benefit to the public; and

Protect open space for the preservation of natural resources, the managed production of resources, outdoor recreation, and public health and safety.

II. ALTERNATIVES TO THE PROPOSED ACTION

II.1 No Action

Under this alternative the temporary two year segregation period would expire, allowing the location of new mining claims and the expansion and/or modification of existing claims. Any new project proposals would be processed under applicable regulations and subject to NEPA requirements and validity determinations.

Potential development could involve some or all of the claims within and outside of the proposed Imperial Project area. The extent of development would be dependent on the economic feasibility. The ability to locate new claims, including mill sites, and modify existing claims, would increase the profitability, and, therefore, could increase the potential for mineral development.

Areas currently not encumbered by claims would be open to the location of new mining claims. The lack of existing claims imply a lack of mineral development interest at this

time. However, this situation could change if the price of gold increases, or if the economic feasibility increases either through new technology or new discoveries.

II.2 Other Alternatives Considered but Rejected

A. Reduced or Increased Acreage

The proposed withdrawal boundary was determined through consultation with representatives of the Quechan Tribal Council and the Quechan Cultural Heritage Committee, along with the cultural resource inventories, as the minimum area necessary to protect the cultural values within the Imperial Project vicinity. A reduced acreage alternative would not serve the need for protection.

Although BLM recognizes that the Indian Pass area is only a portion of the larger Quechan Traditional Area, the special concerns for the vicinity of the Imperial Project is the focus of the proposed action. Further planning and analysis is required to identify the ultimate boundaries of the traditional cultural properties and any appropriate subsequent actions. An increased acreage alternative is not necessary or reasonable at this time.

B. Cooperative Agreement or Right-of-Way

Neither a Cooperative Agreement nor right-of-way could adequately insulate the land from a possessory use such as mining, which might jeopardize the continued integrity of the archaeological and cultural resources and result in an irrevocable loss of significant Native American religious sites. The proposed withdrawal, although subject to existing rights, is the only mechanism that provides an opportunity for the needed protection.

III. **AFFECTED ENVIRONMENT**

III.1 General Setting

The Indian Pass area is located in southeastern Imperial County, approximately 12 miles west of the Colorado River. The general area consists of a broad westerly-facing alluvial plain extending between the Cargo Muchacho Mountains to the south and the Chocolate Mountains to the northeast. Topography is characterized by a series of gently rolling ridgelines paralleled by interconnecting drainages. Soils in the area are dominated by desert pavement, consisting of a basalt rock rubble field. A gravel-based alluvial soil is present in all major drainages. The area is classified as low desert, consisting of varied communities from creosote-bush scrub, barren soil in washes, desert pavement, upland rock and volcanic pyroclastic outcrops. Dominant plant species in the general area are creosote and burrobrush. A few mesquite and palo verde are limited to microphyll woodland areas in desert washes.

Climate in the area is typical arid low desert with hot, dry summers and mild winters. Precipitation in the vicinity averages four inches.

III.2 Affected Resources

A. Air Quality

Air quality throughout the area is good. There are, however, times that the area has not met air quality standards due to locally generated and/or transported in pollutants. This has led to the current classification of the area as non-attainment for ozone and PM₁₀ under both the National Ambient Air Quality Standards (NAAQS), and California Ambient Air Quality Standards (CAAQS). This area is a federal non-attainment area for PM₁₀. A control plan has been prepared for the Imperial Valley planning area which identifies sources of PM₁₀ emissions and control measures to reduce emissions.

B. Cultural/Native American Religious Concerns

The Indian Pass-Running Man ATCC was identified as a result of the intensive archaeological surveys and Native American consultation for the Imperial Project DEIS/EIR. The ATCC includes archaeological sites in the Imperial Project area and some sites in the ancillary area, but extends beyond the Imperial Project area. The boundaries of the ATCC, which were discussed with Quechan tribal members, is based on the distribution of Native American trails linking this area to other areas of traditional cultural value, and on a high concentration of evidence of native American religious practices, including geoglyphs, petroglyphs, cleared circles, ceramic scatters, rock features, broken quartz concentrations, flaking stations. Sixteen trails and trail segments have been recorded within the ATCC, including the Trail of Dreams. The Trail of Dreams links up the two most important places in Quechan Indian religious mythology and religious belief, Spirit Mountain (*Avikwaame*), near Needles, California and Pilot Knob (*Avikw lai*) located in California, west of Yuma, Az. *Avikwaame*, according to tradition, is where all yuman-speaking people were created, and may be the most important place in traditional Quechan culture and religion. The Quechan say that political and religious leaders can visit *Avikwaame* in their dreams and in doing so they travel along the Trail of Dreams through the ATCC.

Indian Pass region remains an important part of modern day Quechan sacred traditions. The trails from Pilot Knob to Spirit Mountain are still traveled both physically and spiritually by members of the Quechan Tribe. Indian Pass is also likely the final resting place of some of the Quechan ancestors (spiritually, not necessarily the physical remains) and will continue to function as a place for the spirits to go. In the Quechan World View the Indian Pass area was given to them, and to all of the Colorado River Tribes, for their use and their protection. If the area is disturbed it will be a major disruption of their spiritual traditions and prevent those dead, who have chosen Indian Pass as their place to go, from making that journey.

The *Running Man geoglyph* is the image of a human figure in full stride made from basalt boulders arranged on a desert pavement surface. It is believed the figure was made in the 1940's by members of the Quechan tribe for spiritual and religious practices. The figure is near the conjunction of two major prehistoric trails and a major spirit break. Several other archaeological features appear to be associated with this complex, including trail markers, pot drops, and shattered quartz. These types of features have been associated with religious practices.

Ethnographical and archaeological information indicate that the site has a long and continuing history of religious use by the Quechan and their ancestors. Patayan I ceramics from trail shrines have been reported in the Indian Pass area. This would suggest religious observances dating to as early as 1200 years ago.

Scenic qualities, such as an unmarked landscape and unobstructed viewshed, contribute to the integrity of the historic resources and the area's religious and cultural value.

Within the ATCC are numerous archaeological sites that are also of value to the Quechan in their own right. The entire ATCC was evaluated as a district as defined in the National Register Bulletin No. 15 (1991:5). The ATCC contains a concentration of linked sites and objects (features such as the Running Man geoglyph and spirit breaks), comprising of a culturally significant entity.

The area is relatively undisturbed. Only minor evidence of past or present mineral exploration and development activity was observed during field investigations.

The ATCC has been determined eligible for the National Register under criteria A (Association with Events), C (Embodiment of Distinctive Characteristics), and D (Important Information).

C. Wildlife

The Imperial Project DEIS/EIR provides a description of wildlife species that have geographic ranges and preferred habitats that indicate that they may potentially occur on or near the area, along with result of applicable historic surveys (pg. 3-61).

Mammalian species or their sign were observed during the Imperial Project survey: antelope ground squirrel, black-tailed hare, mule deer, coyote and American badger. Mule deer, coyote and mountain lion travel widely; they may use portions of the proposed withdrawal area for foraging, denning, and movement corridors. During small mammal trapping, at night, the following species were captured: Merriam kangaroo rat, spiny pocket mouse, Bailey pocket mouse and desert woodrat.

Microphyll woodland habitat was occupied by a large number of individuals and had greater variety than other habitat types. These species included: mourning doves, Gambel's quail, black-tailed gnatcatcher. Loggerhead shrikes and cactus wrens were found in succulent scrub.

During modeling for species diversity in the Northern and Eastern Colorado Desert (NECO) planning effort, which is currently ongoing, the proposed withdrawal area was found to be a Class 5; with Class 6 being the most diverse. Diversity is based on several parameters including, but not limited to, lack of habitat fragmentation, quality, type and number of vegetation communities, and, species ranges.

The Imperial Project surveys included several wildlife species that are either USFWS Special Status Species, BLM Sensitive Species and/or designated state Species of Special Concern: the chuckwalla, American badger, Loggerhead shrike, Crissal thrasher, Vaux's swift, Arizona Bell's vireo, Black-tailed gnatcatcher, and LeConte's thrasher, and Colorado Valley woodrat, Desert bighorn sheep, Yuma puma, California leaf-nosed bat, Townsend's big-eared bat, western mastiff bat and southwestern cave myotis, northern harrier, Sharp-shinned hawk, peregrine falcon, Golden eagle, Ferruginous hawk, Burrowing owl, Cooper's hawk, Long-eared owl, Prairie falcon, Barn owl.

Although the desert bighorn sheep was not sighted during the surveys, recent studies conducted for NECO indicate a portion of permanent range occurs in Section 21, T. 13 S., R. 21 E, the north end of the withdrawal area. It is possible then, that any portion of the withdrawal area could be used by bighorn as a movement area.

Several bat species were identified from vocalizations, including western mastiff bats, pocketed free-tailed bats, western pipistrel, and the California myotis. Surveys of the American Girl Mining Project (1994) documented the occurrence of the California leaf-nosed bat, Townsend's big-eared bat and the western mastiff bat. Two other sensitive bat species may have been heard during the American Girl surveys; the Spotted bat and the Cave myotis. These bats, as well as other species, may forage over the area. No large, roosting habitats are known to occur within the proposed withdrawal area.

The Couch's spadefoot toad is a State Species of Special Concern. In California, they occur from Chemehuevi Wash south to the Ogilby Hills in Imperial County. This species is known from a locality one mile south of the proposed withdrawal area. No surveys have ever been conducted for this species. Habitat may occur on the proposed withdrawal area.

C.1 Threatened and Endangered Species

Desert tortoise is a Federal Threatened Species (Mojave Population only) and State-listed Threatened Species. It is widely distributed in the desert; from as far

north as Olancho south to the Mexican border and from the Colorado River west to near Lancaster. The Desert Tortoise (Mojave Population) Recovery Plan shows a major population or recovery unit on the proposed withdrawal area; the Eastern Colorado Desert Recovery Unit. Critical habitat does not occur on the proposed withdrawal area; nor has a Desert Wildlife Management Area been proposed for the area (Desert Tortoise Recovery Plan, 1994).

Surveys of the proposed Imperial Project gold mine estimated from 33 to 57 desert tortoises in the Project area (1500 acres ±). Because desert tortoise habitat is similar, and there is no reason to assume greater or lesser densities of tortoises elsewhere on the proposed withdrawal area, there may be from 200 to 365 tortoises within the 9,360 acre withdrawal area.

Gila woodpecker is State-listed as an Endangered Species. It ranges from the extreme southeast of California through Arizona south into western Mexico. It was formerly found along the entire lower Colorado River and in cottonwood groves in Imperial Valley. Now the species is found only at scattered locations along the Colorado River from Needles to Yuma, and they have all but disappeared in the Imperial Valley. One Gila woodpecker was observed during the Imperial Project surveys. Although never observed again, even after extensive species-specific survey effort, Gila woodpeckers may move through areas such as the proposed withdrawal area.

D. Vegetation

Vegetation associations within the proposed Imperial Project area are shown on Figure 3.15 of the DEIS/EIR (pg. 3-47). The same vegetation associations are expected to occur throughout the proposed withdrawal area.

Sonoran Mixed Woody and Succulent Scrub occurs on of rocky, well-drained slopes and alluvial fans. Characteristic species of this plant association include cat's claw, desert agave, hedgehog cactus, barrel cactus, ocotillo, and prickly pear cactus and cholla. Succulent scrub areas typically have higher floristic and structural diversity than surrounding areas, which attracts more wildlife.

Desert Dry Wash Woodland, also known as Microphyll Woodland, occurs along the sandy and gravelly washes and arroyos. This plant community is dominated by ironwood and palo verde. Other species occurring in this association include cat's claw, desert lavender, Anderson thornbush, fairy duster, winged forget-me-not, and desert hibiscus.

The remaining areas are dominated by Sonoran Creosote Bush Scrub. Vegetation is typically sparsely distributed and concentrated in areas of well-drained slopes, fans, and valleys rather than upland sites with thin residual soils. Dominant plants include creosote, brittlebush, ocotillo, and Bigelow cholla. Although sparsely, several cactus species occur in this habitat, including cottontop cactus, beavertail, and diamond cholla.

Several USFWS special status species and BLM sensitive plant species were identified from lists which are known to occur in the general vicinity of the proposed Imperial Project, which is located entirely within the withdrawal boundaries. Habitat and species are expected to be similar throughout the withdrawal area. Potential habitat for the following species occurs within the area: ribbed cryptantha, winged cryptantha, fairy duster, California ditaxis, hairy stickleaf, slender-lobed four o'clock, foxtail cactus, orocopia sage, desert unicorn plant, thurber's pilostyles, crown-of-thorns.

Two sensitive plant species were noted in washes throughout the area, the fairy duster and winged cryptantha (forget-me-not). The fairy duster is classified as List 2 species by the California Native Plant Society (CNPS). List 2 species are rare or endangered in California but common elsewhere. Winged forget-me-not is classified as a List 4 species by the CNPS. List 4 species are of limited distribution. Although not rare from a statewide perspective, they are uncommon enough to warrant regular monitoring.

No State or Federal listed, proposed, or candidate species are known to occur within the area of the proposed withdrawal, or have been previously recorded.

E. Land Uses

E.1. Areas of Critical Environmental Concern

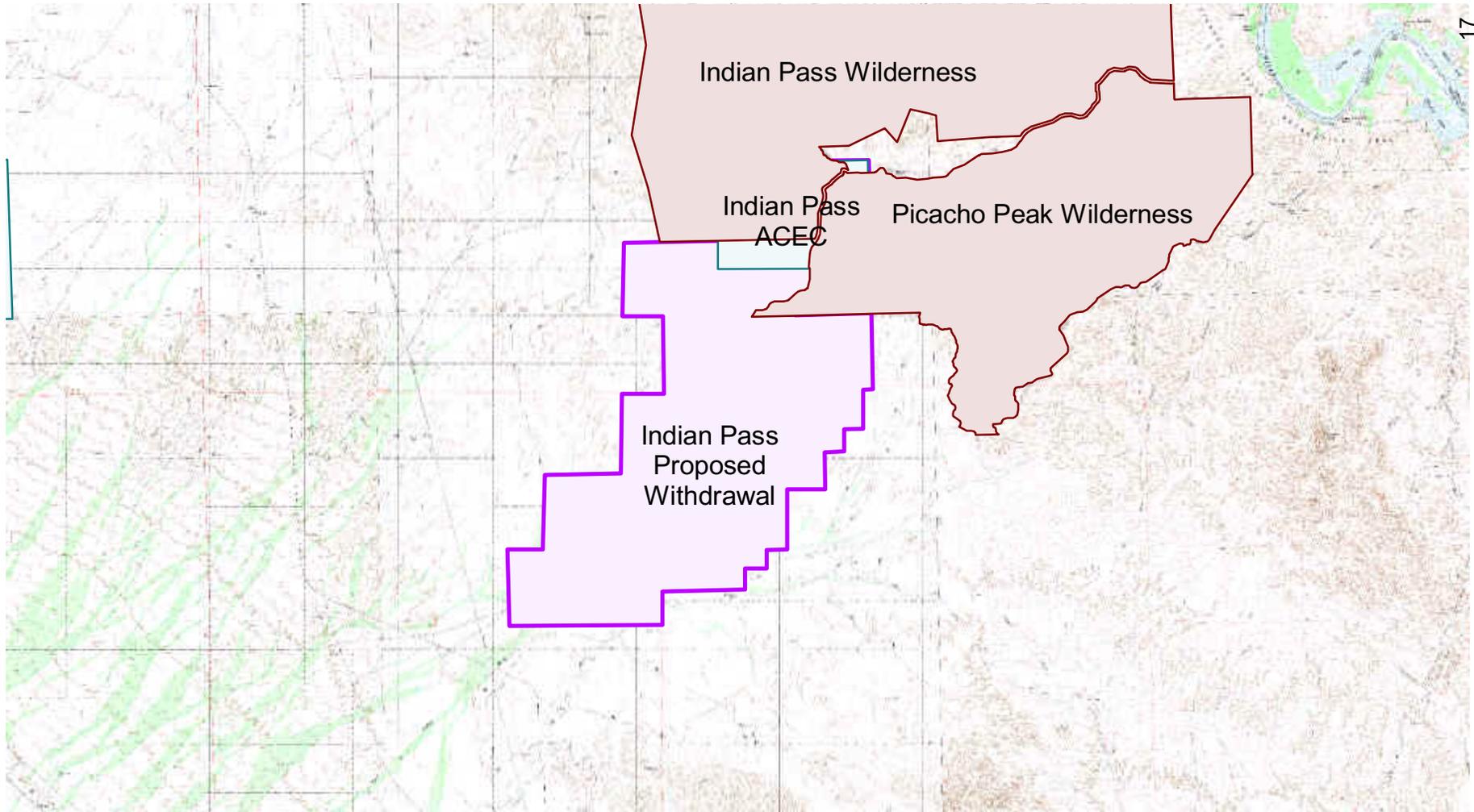
The Indian Pass Area of Critical Environmental Concern (ACEC) encompasses approximately 2,160 acres¹ in T. 13 S., R. 21 E. (Map 4). The presence of inscribed cobbles make the ACEC unique. This form of rock art is poorly documented in the Desert Southwest or elsewhere. The ACEC contains the largest collection of etched designs in southeast California (Welch, 1987). The ACEC Management Plan called for a closure to rock collection within the ACEC.

Of the ACEC, approximately 1,540 acres is within the boundaries of the BLM designated Indian Pass and/or Picacho Peak Wilderness. The withdrawal, which overlaps both Wilderness and ACEC designation on about 270 acres, would have no affect on those lands within Wilderness. The remaining 620 acres of the ACEC, outside of Wilderness, would be withdrawn by the proposed action.

E.2. Wilderness

As mentioned above, approximately 270 acres of the proposed withdrawal in sections 21, 28 and 29 in T. 13 S., R. 21 E., lie inside the Indian Pass and/or Picacho Peak Wilderness Areas (Map 4). These areas were designated Wilderness by the California Desert Protection Act of 1994 (CDPA) to protect

¹This acreage differs from the ACEC Management Plan description. This is likely due to the variance between regular sized sections and protracted sections in unsurveyed areas.



Map 4

Proposed Withdrawal
in Relationship to Existing
Management Areas

- Wilderness
- ACEC
- Indian Pass Proposed Withdrawal



their naturalness as well as their outstanding opportunities for solitude and primitive recreation. All Federal lands designated as wilderness withdrawn from mineral entry by the CDPA. Therefore, neither the proposed action or alternative would have any impacts on the Indian Pass or Picacho Peak Wilderness.

E.3 Cooperative Land and Wildlife Management Area

All of the lands proposed for withdrawal within T. 13 S., R. 21 E. (3,444 acres), overlap the Picacho/Colorado River National Cooperative Land and Wildlife Management Area (PCR). The PCR was established by Public Land Order No. 2812 (11/9/62). PLO 2818 withdrew the lands from the non-mineral public land laws and from disposition under the homestead, desert land, and scrip selection laws. The withdrawal provided for the cooperative management of the lands by BLM, U.S. Fish and Wildlife Service and California Department of Fish & Game, for the appropriate "development, conservation, utilization, and maintenance of their natural resources, including their recreational and wildlife resources." The PCR will not be effected by either the proposed action or the alternative.

E.4. Recreation

Recreational activity within the area is relatively low compared to other areas in Imperial County. Recreational vehicular camping occurs sporadically along Indian Pass Road. The Indian Pass Road is used by for traveling between the Colorado River area and Ogilby Road, and for vehicle touring. Hiking occurs throughout the area, but predominantly within and adjacent to the aforementioned wilderness areas. Some rock hound activities also occur in the area, but in low frequencies.

Vehicle access in the area is limited to the County maintained Indian Pass Road, and two to three open off-highway routes of travel. Indian Pass Road bisects the withdrawal area in a southwest/northeast direction.

F. Visual Resources

The area landscape consists of a series of gently rolling ridge lines and upland areas interspersed with a series of ephemeral drainages which all gently slope from north-northeast to south-southwest. Much of the upland areas are covered by well-developed desert pavement of gravel to cobble size rock. The area is relatively undisturbed, with only a few roads and trails and minor disturbances from historic and ongoing mineral exploration activities. The landscape color consists principally of browns, tans, and grays, while vegetation colors are generally browns, greens, yellow, and tans (DEIS/EIR, pg. 3-95). The area is entirely visible from the elevated vantage points on Black Mountain and the Picacho Peak Wilderness, and partially visible from of Indian Pass Road and Ogilby Road.

G. Minerals

G.1. Geologic Environment

The geology and mineral deposits within and adjacent to the withdrawal area are described to show their relationship to nearby mining areas. Please refer to the attached mineral report for details on the geologic features of the area identified below. While the affected environment would be within the withdrawal area, the nearby geology and mineral deposits were influenced by the same regional geologic processes as those within the withdrawal area, with slight local variations. It is important to describe the geology and mineral deposits at adjacent areas because exposure of rock outcrop on the withdrawal area is rare. Mineral deposits being developed at nearby mines are within the same mineralized belt as the deposits defined by Glamis-Imperial Corporation, for the proposed Imperial Project, located within the withdrawal area.

G.1.2. Regional Geology

The withdrawal area is located along the eastern boundary of the Salton Basin portion of the Salton Trough geomorphic province of California. This trough is positioned between the Peninsular Ranges and Mojave Desert geomorphic provinces of California (Oakeshott, 1978). The Salton Trough is located at the southern termination of the San Andreas transform system within the transtensional Gulf of California.

G.1.3. Local Geology

The northeast portion of the withdrawal area is located within a few miles of nearby desert ranges (e.g., Black Mountain; Peter Kane Mountain; Little Picacho Peak; Chocolate Mountains). The composition of these nearby ranges includes volcanic rocks, providing a source for a volcanic conglomerate which covers portions of the withdrawal area. P.K. Morton's geologic map (1966) describes the surface deposits of this area as older alluvium which is partly dissected, largely unconsolidated, poorly sorted silt and gravel of alluvial fans, desert pavement areas, and margins of larger canyons and terraces. Recent alluvium is also deposited on site as unconsolidated clay, silt, sand and gravel occurring primarily as valley fill and streamwash deposits.

G.1.4. Geology of Nearby Mines

American Girl Mine (from County Report 7, P.K. Morton, 1977)

The American Girl Mine of the Cargo Muchacho mining district is located on the western edge of the Cargo Muchacho Mountains, at elevations ranging from 600 to 900 feet. The Cargo Muchacho mining district lies in a terrane predominantly of crystalline rocks of pre-Mesozoic and Mesozoic age.

The remainder of the district is underlain by a complex of various Mesozoic granitic intrusive rocks including biotite granite, quartz monzonite, quartz diorite and leucogranite. Minor andesite dikes are found in the west-central areas. Isolated hills on the northeast and southwest fringes of the range are capped by olivine basalt of probable Quaternary age (Henshaw, 1942, p. 183).

Mesquite Mine

The geology of the area suggests that the complex rocks currently exposed represent sediments and supracrustal rocks at the subducting plate margin extending the length of California during the mid- to late-Mesozoic period. Later changes in the plate boundary movement to a strike-slip motion probably provided the force supporting the Chocolate Mountain-Vincent thrusting. Tertiary volcanic episodes covered the area with flows and tuffs (western Imperial County).

The Mesquite deposits lie within the upper plate of the Chocolate Mountain-Vincent thrust (Manske, et al (1987), and has exhibited a complex structural history. This history is represented by complex faulting, thrusting, shearing, and fracturing within the deposits between the Chocolate and Cargo Muchacho mountains.

Picacho Mining District (from County Report #7, P.K. Morton, 1977)

The oldest rock unit exposed in the district is quartz biotite gneiss, probably correlative with the Precambrian Chuckwalla Complex of Miller (1944). This rock outcrops mainly in three relatively small areas in the district. One of the three areas lies just southeast of Picacho Peak. It comprises approximately 1 square mile and contains several lode gold properties, the most important of which is the Picacho mine.

The most abundant rocks in the district are Tertiary volcanic rocks of widely variant composition and types. Northwest-trending ridges underlain by southwest-dipping multicolored beds and separated by wide alluviated valley are common in the area. The lithologic sequence appears to be repeated by faulting from ridge to ridge.

Proposed Imperial Project Area (within the proposed withdrawal area)

Approximately 95 percent of the Imperial Project area for this proposed gold mine consists of Quaternary age alluvium (in the active ephemeral stream channels) and older alluvium (in the upland areas), which vary in thickness from 10 to 1,000 feet. Below the Quaternary age sediments, the geologic section in the Imperial Project mine and process area consists of the Jurassic schist and gneiss units unconformably overlain by Tertiary andesites and basalts (Imperial Project DEIS/EIR, 1996).

Dominant regional structural features include the Chocolate Mountains thrust fault, which places basal gneissic rocks over the younger Orocopia Schist, and

the San Andreas fault system. The proposed Imperial Project mine and process area is structurally aligned and equidistant between the Picacho Mine and Mesquite Mine gold deposits. Structural patterns within the Project mine and process area identified by exploration drilling to date consist of west-northwest to northwest trending faults cut by northeast trending high angle faults (Dan Purvance, Chemgold, 1996).

G.2. Mineral Deposits

G.2.1 Locatable Minerals

General Information

Because of limited information (rock outcrops) within the withdrawal area, it is important to discuss the mineralogy of nearby mines. These mines are in a mature stage of development and best represent the mineralization model for eastern Imperial County. With exception of the (inactive) Colorado Mine (located approximately five miles south of the withdrawal area boundary) which produced relatively minor amounts of gold during the 1930s, several gold mining districts are located within an approximately 10 mile radius of the withdrawal area. These are the Mesquite district, approximately 10 miles to the northwest; the Picacho district, approximately 9 miles to the east; and the Cargo Muchacho district, approximately 10 miles to the south. The active Mesquite and Picacho gold mines, and the recently closed American Girl gold mine, are located in each of these districts, respectively. The historic Tumco site is located in the Cargo Muchacho district. The proposed Imperial Project (a proposed gold mine) is enclosed by the withdrawal area.

Major gold mining has occurred in the general area along the CMT, and is represented in the Picacho, Chocolate Mountain, Cargo Muchacho and Paymaster mining districts. Although gold was the principle commodity sought and mined, lead, manganese, copper and zinc deposits were also developed.

Areas Adjacent To The Proposed Withdrawal Area

American Girl Mine

At the American Girl mine, the genesis of mineral deposits in the Cargo Muchacho mountains has been postulated, as thrust fault-related with multiple veins (Tosdale et al., 1985). Gold mineralization is confined to the western side of the range as several separate mineralized zones in the vicinity of the Padre Madre, American Girl Canyon and Oro Cruz operations. The deposits, usually striking west but occasionally north, are up to eight hundred feet thick. The influence of fracturing on ore deposition is very important. Equally noteworthy is the close relationship between fracturing and rock type. Most of the gold produced in this district has been mined from metamorphic rocks or quartz diorite (Report XXXVIII of the State Mineralogist, Chapter 2).

Mesquite Mine

The ore body at the Mesquite Mine is more or less tabular, northwest trending, and steeply dipping. This is another area where gold mineralization is related to detachment faulting (Frost and Watowich, 1987; Shafiqullah and others, 1990). The origin of the fluids at the Mesquite Mine have been tied to Tertiary plutonic bodies (D.M. Frost, 1990). Structural events occurring contemporaneous with intrusions would provide for the brittle deformation and breccia and fracture formation allowing hydrothermal fluids access to pore space.

Picacho Mine (first paragraph from County Report #7)

The southeastern Chocolate Mountains district (including the Picacho mining district) has been mined for lode and placer gold, silver, lead and copper, although most of the activity was limited to the search for gold. The lode gold deposits are apparently pre-Tertiary in age, as are all the deposits in the older rocks. None of the volcanic rocks appear to be associated with the mineral deposits.

At the Picacho Mine, brecciation and hydrothermal alteration associated with detachment faulting are interpreted to have provided the environment for the deposition of disseminated gold (Drobeck and others, 1986; Frost and others, 1986; Liebler, 1986, 1988)

Proposed Imperial Project Area (Within The Proposed Withdrawal Area)

The proposed Imperial Project in the Indian Pass area, and entirely within the withdrawal area, is structurally aligned and between the Mesquite and Picacho gold deposits. Here the dominant structure is the Chocolate Mountain Thrust (CMT), which places basal igneous rocks over younger Orocopia Schist. Glamis Imperial Corporation interprets the Imperial Project property as having a similar geologic and mineralogic environment as the Picacho mine. Of economic significance is the same type of faulting found in both the Mesquite mine and the proposed Imperial Project areas. Hydrothermal flow along fracture/fault zones is critical for the formation of epigenetic precious metal deposits as found at the Mesquite and Picacho mines, and at the proposed Imperial Project area.

The upper plate of the CMT is known to contain economic deposits of low grade disseminated gold, as illustrated by the Mesquite mine in the west, and the Picacho and American Girl mines in the east and south respectively. Economic deposits within this zone occur when the deposit is close to the surface and accessible to open pit development. Within the proposed withdrawal area, the only outcrop of the upper plate containing anomalous gold deposit occurs within the proposed Imperial Project area. This is supported by Glamis-Imperial's proposal to process up to 95 million tons of gold-bearing rock from three open pits in this area (i.e., an area where the upper plate of the CMT is close to the surface). Areas encumbered by Glamis' proposed pits have a high potential for development of gold resources; mining claims showing interest in the project

area, but where detailed information on the mineral deposit is sparse or non-existent, have a moderate potential for development; areas not encumbered by mining claims have a low potential for development.

G.2.2. Leaseable Minerals Within the Proposed Withdrawal Area

No evidence of geothermal activity (e.g., mud volcanoes; geysers) was observed at the withdrawal area. The withdrawal area is located approximately 10 miles east of the Glamis KGRA and 15 miles northeast of the Dunes KGRA, but in a sediment package considerably thinner (i.e., 0-1,000 feet) than that underlying the KGRAs (i.e., 15-20,000 feet), and on the east side of the San Andreas Fault. The San Andreas appears to be a geologic and geothermal boundary zone for the Imperial Valley. While these variables may have an influence on the potential for geothermal resources beneath the withdrawal area, only additional data on local temperature gradients will determine if the resource actually exists.

The potential for oil and gas is strictly speculative and is related to the May, 1981 discovery of natural gas in Mexico, approximately 60 miles south of Mexicali. No active leases exist within the withdrawal area. No evidence of oil and gas potential (e.g., seeps) was observed in the area. No other leaseable minerals were observed at the withdrawal area.

G.2.3. Saleable Minerals Within the Proposed Withdrawal Area

While sand and gravel exists on the withdrawal area, the occurrence is not of sufficient quality to meet requirements as a commercial deposit for aggregate, plaster sand, or glass sand.

IV. IMPACTS OF THE PROPOSED ACTION

The proposed action to withdraw the area from certain activities is an administrative activity with no direct associated impacts. However, there may be indirect impacts as a result of the withdrawal.

A. Air Quality

There would be no adverse impacts from the proposed action since no increased emissions would result. Because there are no increased emissions as a result of the proposed action, the activity does not qualify under the applicability provision of the implementation plan which "apply to any Active Operation, and/or man-caused condition or practice capable of generating Fugitive Dust (PM₁₀)". Indirectly, the withdrawal could result in lowered future emissions due to restrictions in mining activities.

B. Cultural/Native American Religious Concerns

The withdrawal could have a positive impact to the cultural resources, and Native American religious traditions by providing an opportunity for protection from mining activities.

Since mining claims exist in the area, some mining could occur. Because of the inability to locate new mill sites within the withdrawal boundaries development could be limited to the Imperial Project, and possibly a small scale expansion on adjacent claims. If these assumptions hold true, surface disturbance could be restricted to less than 2,000 acres within the withdrawal area.

On lands where no mining claims currently exist, the religious, cultural and educational values of the Indian Pass area would be protected from the threat of mining related surface disturbance because no new mining claims could be located.

C. Wildlife

In the approximate one third of the withdrawal area that has no current claims, species and their habitat would be conserved. Since mining claims exist within the area, presumably some mining could occur. Depending upon the mining projects that may occur in the current claim areas, including the Imperial Project, different levels of habitat and species numbers could be impacted and/or protected. The withdrawal could have a positive affect on wildlife and habitat by potentially reducing the area that would be subject to surface disturbance.

C.1. Threatened and Endangered Species

In the approximately one third of the withdrawal area that has no current claims, desert tortoise and their habitat would be conserved. The level of impacts cannot be determined at this time, but presumably some mining activity can take place and thus some impacts will occur. Depending upon the mining projects that may occur in the current claim areas, different levels of habitat and tortoise numbers could be impacted and/or protected. The withdrawal could have a positive effect on desert tortoise and habitat by potentially reducing the area that would be subject to surface disturbance if mining occurs.

D. Vegetation

If mining occurs in the area, the proposed withdrawal could restrict development to the area of the Imperial Project and adjacent claims because of the inability to locate new mill sites within the withdrawal boundaries. Accordingly, impacts associated with mining development would be restricted to a smaller scale within the ATCC.

If the assumptions described in the Proposed Action hold true, surface disturbance could be restricted to a smaller scale within the withdrawal area.

In the area where no mining claims are located, vegetation would be preserved because no mining would occur.

The potential for weed spread and establishment would be reduced by any action that minimizes surface disturbances

E. Land Uses

E.1. Area of Critical Environmental Concern

Most of the ACEC is overlapped by BLM designated Indian Pass Wilderness and/or the Picacho Peak Wilderness. All Federal lands designated as wilderness by the CDPA were withdrawn from mineral entry on October 31, 1994, subject to valid existing rights. The proposed withdrawal will segregate the remaining lands, approximately 620 acres, from the mining laws.

By imposing restrictions on development, the withdrawal would provide the BLM with an opportunity to protect and further document the unusual phenomena that occurs within the ACEC and surrounding areas.

E.2. Recreation

The withdrawal would not close the lands to recreational opportunities, i.e., backpacking, primitive, unimproved site camping, hiking, horseback riding, rockhounding, nature study and observation, photography and painting, non-competitive vehicle touring on "approved" routes of travel, hunting, etc.

Indirectly the proposed action could reduce the adverse effects of mining activity, i.e., noise, light, dust, and visibility of mine components, by restricting the scale and duration of mining activities in the area.

F. Visual Resources

The withdrawal has the potential to reduce the magnitude of the negative effects of mining activities by limiting the area of surface disturbance and construction. It could also result in a shorter duration of mining activities by limiting the area suitable for development, with reclamation and revegetation activities to occurring sooner.

G. Minerals

G.1. Locatable Minerals

Location of mining claims under the General Mining Law of 1872 would not be allowed under this withdrawal, and is not currently allowed while the land is temporarily segregated. The withdrawal area that does not have existing mining claims (approximately one third of the total withdrawal area) would not be available for locatable mineral development under the withdrawal. However, any

valid existing rights relating to existing mining claims would survive the withdrawal. If claims are forfeited or declared void for any reason the withdrawal would preclude the relocation of claims.

If the Imperial Project is approved development, as currently proposed, could proceed. However, the withdrawal could impact any future mineral development of the claims outside of the Imperial Project because it would not allow for the expansion of processing facilities. For example, all claims outside of the proposed Imperial Project area are lode claims. Because lode claims could not, under the withdrawal, be relocated as mill site claims to accompany a new dump, leach pad or other ancillary facilities, any future expansion might become uneconomical. While a lode claim could be used for milling and processing of ores, the lode must be supported by a discovery of a valuable mineral deposit. The use of the surface of a lode with waste dumps, leach pad or other ancillary facilities may jeopardize the ability of the lode to be developed for mineral resources, and any valid rights associated with the lode claims.

G.2. Leaseable Minerals

The proposed withdrawal does not close the land to the mineral leasing laws. Applications would be considered on a case-by-case basis subject to the requirements of NEPA. However, the BLM mineral report indicates the area is not valuable, prospectively or otherwise, for leasing act minerals. Therefore no impact to leaseable minerals would result from the proposed action.

G.3. Saleable Minerals

The proposed withdrawal does not close the land to the material sales laws. Applications would be considered on a case-by-case discretionary basis, subject to the requirement of NEPA. At any rate, the BLM mineral report indicates low potential for occurrence and development of saleable minerals within the withdrawal area. Therefore, the proposed action would have no impact to saleable minerals.

Economics

Glamis-Imperial Corporation, as mentioned above, is in the permitting stages for the Imperial Project, a large dump-leach gold mine located entirely within the withdrawal area. This is the only project currently proposed within the proposed withdrawal boundary.

If the Imperial Project is approved, the withdrawal will have no impact on the Project as operations would be allowed to proceed. Areas considered as having a moderate potential for development (i.e., claims outside of the Imperial Project area) could be affected if gold-bearing material could not be hauled economically to the existing mill sites located within the Imperial Project area, or mill sites outside of the withdrawal. Because new mill sites could not be located close to the moderate potential areas, new mining operations could be jeopardized,

resulting in a potential economic loss to the local region. It is not known how much of the claims outside of the Imperial Project would be developed without the withdrawal, therefore, it is not possible to characterize how much mineral development might be forgone if the withdrawal is approved.

The withdrawal could also impact economic development of a section of State land at T. 13 S., R. 20 E., sec. 36. Glamis has applied to the State Lands Commission for a mineral prospecting permit for Section 36, which is located approximately 1-2 miles west of Imperial Project's proposed west pit. As stated in other sections of this document, the withdrawal could potentially restrict mining on public lands in the area due to the inability to locate new claims or alter existing claims. Since development of non-Federal lands is commonly associated with or precluded by activities on surrounding public lands the withdrawal could adversely affect development of the State land.

It is unknown whether economical ore deposits exist on the State lands which is located west to northwest of the Imperial Project area, therefore, it is not possible to determine the extent of any potential loss at this time. If economical deposits exist, the State could lose monetary benefits, i.e., royalties, associated with mining. If economic ore deposits do not underlie the State section, it might become a good location for ancillary facilities such as a waste rock pile or heap leach pad.

IV.1 Cumulative Impacts of the Proposed Action

The proposed action is an administrative activity with no direct associated impacts to the physical environment. The withdrawal of the described public lands from mineral entry would impose increased restrictions to mineral development in the Indian Pass area. In addition to the existing mineral withdrawal of the approximate 42,000 acres in the adjacent Indian Pass and Picacho Peak Wilderness Areas, the proposed withdrawal would have a cumulative impact of closing an additional 3,000 acres± to the location of mining claims, and restricting mining opportunities on approximately 4,400 acres due to the inability to adjust claims. Other areas in eastern Imperial County closed to mineral development, include the Palo Verde Wilderness (32,210 acres), the Little Picacho Peak Wilderness (33,600), the North Algodones Dunes Wilderness (32,240 acres), and the Chocolate Mountain Gunnery Range (135,000 acres). All of these withdrawals are subject to valid existing rights.

Indirectly, the proposed action would have a positive effect on other resources, i.e., cultural, wildlife, vegetation, visual, recreation, etc., by reducing the scale and duration of mining activities in the area.

V. IMPACTS OF THE NO ACTION ALTERNATIVE (NO WITHDRAWAL)

Under this alternative, some or all of the existing claims within the area of the proposed withdrawal area could be developed or mined. It would also allow for the location of new mining claims. Therefore, the potential for mineral development in the area would be increased.

A. Air Quality

The Imperial Project DEIS/EIR found that the level of impacts to air resources would be cumulatively significant for PM₁₀. Indirect impacts of the no action alternative could result in a higher level of future emissions due to the increased potential for mining activities.

Because there are no direct emissions as a result of this alternative, the activity does not qualify under the applicability provision of the implementation plan which “apply to any Active Operation, and/or man-caused condition or practice capably of generating Fugitive Dust (PM₁₀).

B. Cultural/Native American Religious Concerns

The affects of the no action alternative could leave the religious and cultural values of the Indian Pass area vulnerable to impacts beyond those addressed in the Imperial Project DEIS/EIR due to possible expansion activities on existing claims, and the location/development of new claims. In 1999, the BLM, in accordance with Section 106 of the National Historic Preservation Act and Stipulations 4 of the “Programmatic Agreement Regarding The Manner In Which The BLM will meet its Responsibilities Under The National Historic Preservation Act, requested the comments of the Advisory Council on Historic Preservation (ACHP) on the proposed Imperial Project. In a report, dated October 19, 1999, the ACHP found that the Imperial Project would be so damaging to historic resources that the Quechan Tribe’s ability to practice their sacred tradition as a living part of the communities life and development would be lost. Thus a no action alternative could leave the ATCC even more vulnerable to impacts to the cultural resources in an area that the Quechan Tribe feels is significant to their past and present day religious practices.

C. Wildlife

Under this alternative mineral development could involve some or all of the existing claims within the Indian Pass area. It would also allow for the location of new mining claims. Therefore, the potential for mineral development in the area would be increased. Wildlife and habitat would be open to impacts from the ground disturbing activities associated with mining operations throughout the area. Impacts could result in the loss of wildlife habitat, i.e, microphyll woodland, desert succulent scrub, desert wash microphyll woodland. Resident and non resident wildlife species dependent on this habitat would be subject to displacement and increased mortality.

C.1. Threatened and Endangered Species

There could be an increased potential for the ‘incidental take’ of desert tortoise. The Imperial Project DEIS/EIR estimated an unavoidable incidental take of an estimated 33 to 57 desert tortoises on 1500 acres. Since there is no reason to assume greater or lesser densities of tortoises elsewhere within the area, it is assumed any other development would result in a proportional increase of incidental take.

D. Vegetation

Vegetation would be open to impacts from the ground disturbing activities associated with mining operations throughout the area, potentially 6000+ acres. The expected impacts to vegetation from the Imperial Project are the loss of 1,215 acres of creosote bush scrub vegetation and 89 acres of micophyll woodland vegetation. Development of all or some of the existing claims could result in up to four times as much in lost vegetation. This magnitude of Impacts could result in the loss of some plant communities, and habitat of special status species.

If a withdrawal were not imposed, and existing claims were mined, there would be increased potential for the spread and establishment of weed species.

E. Land Uses

E.1. Areas of Critical Environmental Concern

The 620 acres of the ACEC not withdrawn by Wilderness designation would remain open to the location of new mining claims, and possible development of such claims. The level of impacts cannot be determined at this time, but presumably some mining activity could take place and thus some impacts could occur to the unique resources within the ACEC.

E.2. Recreation

Mining operations would not prevent camping, hunting or other dispersed recreation activities in the area, except for fenced boundaries. However, recreational activities would be affected by emissions of air pollutants, noise generated by mine operations, visibility of mine components, lighting during nighttime operations, and mining related traffic on Indian Pass Road. Hunters have specifically expressed concern regarding these effects on game species, i.e., deer. Dispersed recreational use of the area would likely be reduced during the life of any mining project. This alternative could result in a longer duration of mining activities in the area.

F. Visual Resources

The potential for mineral development in the area could be increased. Impacts to visual resources would increase in proportion to the level of mineral development that could occur under this alternative. This alternative could result in a longer duration of mining activities in the area.

G. Minerals

G.1 Locatable

The “no action” alternative would result in no effect on proposed locatable mineral development in the area of the proposed withdrawal. Mining projects proposed under the General Mining Law of 1872 could proceed, subject to valid existing rights and environmental laws and regulations. Exploration drilling programs by several companies have delineated possible economic gold deposits which could be mined by open-pit heap leach methods, in the area of the proposed Imperial Project. Filing of new mining claims and expansion of mining operations outside of the proposed Imperial Project area (assuming the operation was permitted), would be possible under this alternative.

G.2. Leaseable

The “no action” alternative would result in no effect on proposed leaseable mineral development in the Indian Pass area. The attached mineral report shows leaseable minerals probably do not exist, or are of quality not suitable for development under current technology.

G.3. Saleable

The “no action” alternative would result in no effect on proposed saleable mineral development in the Indian Pass area. The attached mineral report shows saleable minerals are of poor quality within the withdrawal area, and better quality material is being mined at a variety of locations in Imperial County.

G.4. Economics

The “no action” alternative would result in no effect on proposed locatable mineral development in the area of the proposed withdrawal. Therefore, there would be no impact to any potential economic benefits of future mineral development.

V.1 Cumulative Impacts of the No Action Alternative

The proposed action is an administrative activity with no direct associated impacts to the physical environment. However, indirectly, if the proposed withdrawal is not approved, the area of traditional cultural concern that the Quechan Tribe identified as of critical importance to the continuance of their traditional culture would be subject to future disturbance by potential mining developments. As the Imperial Project DEIS/EIR

acknowledges, the effects of the proposed mine on visual and cultural resources cannot be reduced below the level of significance. The development of some or all of the remaining claims could result in similar effects in an area up to four times the size of the Imperial Project. The cumulative adverse impact of past and present mining projects on highly sensitive, sacred, or scientifically valuable resources such as sacred mountains, trails, rock art, and geoglyphs would be increased.

Adverse impacts to other resources, i.e., wildlife, vegetation, visual, recreation, etc., could be increased by any future mining development, however, the cumulative effects likely would be below the level of significance.

TABLE 1. The proposed action and alternative have been analyzed to assess direct, indirect, and cumulative impacts to the following elements, which include the critical elements of the human environment required by NEPA. The following matrix summarizes the results by alternative.

Critical Element	Proposed Action		No Action	
	Affected		Affected	
	Yes	No	Yes	No
Air Quality	+			
ACEC's	+			
Cultural Resources	+			
Farmlands, Prime/Unique		X		X
Floodplains		X		X
Nat. Amer Rel. Concerns	+			
Wildlife	+			
T & E Species	+			
Plants	+			
T & E Species		X		X
Invasive, Nonnative Species (Weeds)	+			X
Water Quality (Surface & Ground)		X		X
Wetlands/Riparian Zones		X		X
Wild and Scenic Rivers		X		X
Wilderness		X		X
Recreation	+			
Visual Resources	+			
Environmental Justice	+			
Minerals	Locatable			+
	Leaseable		X	X
	Saleable		X	X

+ Positive
- Negative

VI. CONSULTATION AND COORDINATION

VI.1 Persons and Agencies Consulted

Quechan Tribal Council
Quechan Cultural Heritage committee
Planning Department, County of Imperial
Glamis Imperial Corporation
Rob Waiwood, BLM Geologist, California Desert District
Glenn Harris, BLM Natural Resource Specialist, Ridgecrest Field Office
Joan Oxendine, BLM Archaeologist, California Desert District

VI.2 Public Participation and Involvement

Several opportunities for public participation and coordination with other agencies, organizations, and individuals have occurred. The Petition/Application for withdrawal was signed on October 26, 1998, and was published in the Federal Register on November 2, 1998, followed by publication in the Imperial Valley Press on December 11, 1998. In addition, individual notices were sent to Federal, State and County representatives, Quechan Indian Tribe and representatives, Glamis Imperial, and several other parties of interest. These publications allowed for the submission of public comments through February 1, 1999. Approximately 45 comments were received during this period.

A public meeting was scheduled for September 7, 1999. A notice of the public meeting and comment period was published in the Federal Register on August 6, 1999, followed by a notice in the Imperial Valley Press on August 31, 1999. Individual notices were also sent to all parties that had submitted comments in response to the November 2, 1998 notice. Then comment period ended September 30, 1999. Approximately 15 people attended the scoping meeting, and an additional 27 written comments were received during the comment period.

In response to public request BLM allowed a third comment period. Notice was published in the Federal Register November 1, 1999, allowing public comments through December 1, 1999. Individual notices were sent to known parties of interest. Thirty-five more comments were received.

Most of the comments/issues raised at the public meeting and/or through written comments that require a response can be categorized in eight major topics:

1. how was the boundary of the withdrawal determined;
2. the withdrawal should be larger;
3. the withdrawal should be permanent;
4. the land should be withdrawn from the mineral leasing and material sale laws;

5. analysis needs to address economic impact of withdrawal;
6. the withdrawal is inconsistent with BLM Planning (California Desert Plan) and the concepts of multiple use;
7. the proposed withdrawal is arbitrary in light of the California Desert Protection Act of 1994;
8. the proposed withdrawal should be analyzed in an EIS rather than an EA.

The first six of these issues have been addressed in the EA. Responses to the last two issues are as follows:

Comment: The withdrawal is arbitrary in light of the California Desert Protection (CDPA) of 1994 because “The 1994 Act established major new National Park lands and wilderness areas, and the congressional findings reveal that the purposes for which these lands were protected are quite similar to the general concerns being raised in connection with the landscapes affected by the Glamis Imperial Project.” In addition, the proposed withdrawal is creating a buffer zone to wilderness which defies the intent of Congress.

Response: The purpose of the CDPA was to designate Federal lands, that met the requirements of the Wilderness Act of 1964, as congressionally designated Wilderness Areas. Wilderness, as defined by the Wilderness Act of 1964 is an area of undeveloped Federal land which (1) generally appears to have been affected primarily by the forces of nature with the imprint of mans work substantially unnoticeable: (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation: (3) has at least 5000 acres of land or is of sufficient size to make practicable it’s preservation and use in an unimpaired condition: and (4) it *may* also contain ecological, geological or other features of scientific, educational, scenic or historical value. The important point is that the distinguishing characteristics of designated wilderness are *naturalness* and *solitude*. The definition says wilderness *may* contain other features as noted, but these features are not required for the area to be a wilderness nor are they by themselves sufficient criteria to designate an area as wildemess. The Indian Pass and Picacho Peak Wildemess Areas do contain significant cultural resources, but they were designated to preserve primarily naturalness and solitude. The lands involved with the withdrawal also have significant cultural and historic value, but they did not meet the required levels of naturalness and solitude for wildemess designation. Therefore these lands were not designated as wilderness by the CDPA. The withdrawal will protect those important cultural resources on the lands that did not meet wildemess standards.

The proposed withdrawal is in no way attempting to create a buffer zone for the Indian Pass and Picacho Peak Wilderness Areas. The withdrawal is not designed to protect the wilderness resources of naturalness and solitude, but to protect valuable cultural resources that are located outside of wilderness.

Comment: The proposed withdrawal must be subject to a full EIS with related independent assessment.

Response: The evaluation in this environmental assessment has found no effect on the human environment that is of such a degree that would warrant producing a formal environmental impact statement. Although BLM recognizes that there is a high level of controversy surrounding the potential permitting of open-pit mining for the Imperial Project, no purpose would be served by looking in even more detail at the issues evaluated in this assessment.

The economic issues of mining are influenced by the fluctuating world gold price, and other than the attached mineral report, no further useful information would be expected to be discovered.

VI.3 Participating Staff

Lynda Kastoll, Realty Specialist
Margaret Hangan, Archaeologist
Nancy Nicolai, Wildlife Biologist
Debbie Sebesta, Botanist
Bryan Murdock, Wildemess Specialist
Kevin Marty, Geologist
Glen Miller, Environmental Coordinator
Elayn Briggs, Multi-Resource Staff Chief
Greg Thomsen, Field Manager

REFERENCES CITED

- Environmental Management Associates, Inc., 1997. Imperial Project, Imperial County, California, Draft Environmental Impact Statement/Environmental Impact Report.
- National Register Bulletin 15, 1991. How to Define Categories of Historic Properties. USDI, National Park Service, Interagency Resources Division, Washington, D.C.
- Parker, Patricia L. and Thomas F. King, 1992. Guidelines for Evaluating and Documenting Traditional Cultural Properties. National Register Bulletin 38. USDI, National Park Service, Interagency Resources Division, Washington, D.C.
- Welch, Patrick, 1987. Indian Pass Area of Critical Environmental Concern Management Plan. USDI, Bureau of Land Management, California Desert District, El Centro Resource Area.

APPENDIX A

Mineral Report

Mineral Potential and Surface Interference
in Support of the Withdrawal of Public Lands
in the
Indian Pass Area

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Attachment 2	Proposed Withdrawal Area with Legal Boundaries (i.e., Township, Range and sections).
Attachment 3	Mining Claim Map with proposed Imperial Project
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Attachment 6	BLMs 3031 guidelines
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SUMMARY

The purpose of this report is to assess the mineral interest of land held by the Bureau of Land Management (BLM) and being considered for withdrawal from mineral entry and location under the mining laws of the United States. This action is pursuant to section 204 of the Federal Land Policy and Management Act of 1976. This withdrawal of approximately 9,360.74 acres of public land in Imperial County, would provide an opportunity for BLM to protect the archaeological and cultural resources located in the Indian Pass Area of Critical Environmental Concern and Expanded Management Area from mineral activity determined to adversely impact such resources.

There are no existing sand and gravel operations within the Proposed Withdrawal Area (referred to as "PWA" hereafter), and no extraction is known to have occurred in the historically. Several prospects exist within the PWA, mainly in the northern portion of this area, and are characterized as shallow test sites in alluvium. This, and the fact that there is no indication of development within the PWA, the quality of the material does not meet marketable materials specifications other than common fill, and better quality material is located closer to the markets of Brawley, El Centro, Calexico and Cal Trans facilities and needs, indicates low potential for occurrence and development of salable minerals.

The PWA lies approximately 10 miles east of the Glamis Known Geothermal Resource Area (KGRA), and approximately 15 miles northeast of the Dunes KGRA. A KGRA is an anomalous area of high geothermal gradient, and is classified by the BLM as having a known potential for the development of geothermal resources. Development of this resource is occurring at some areas of the BLM designated KGRAs throughout Imperial Valley. This classification is supported by many operating geothermal plants extending from the Salton Sea area, southeast into Mexico. On the East Mesa alone (approximately 20 miles southwest of the proposed withdrawal area), there are approximately six producing geothermal plants. However, development of this resource has not occurred on the PWA. One reason for this may be attributed to the total thickness of sediments overlying bedrock beneath the PWA, when compared to the total thickness of sediments underlying the producing geothermal wells in East Mesa (see below).

Sediment thickness beneath the PWA ranges from approximately 0 (at outcrop) to 1,000 feet (Draft EIR/EIS for the Imperial Project dated November, 1997), in comparison to 15,000-20,000 feet of sediments beneath the geothermal plants in East Mesa. On average, geothermal fluid is extracted from an aquifer at a depth of 8,000 feet (personal communication with Tony Gutierrez of FPL Energy, 1999). The depth to aquifer and associated temperature and pressure which produces a marketable resource at East Mesa are, in my opinion, not present under the PWA. The area of the PWA does not contain a KGRA or is not considered by the BLM as being prospectively valuable (PV) for geothermal resources.

A low potential for oil and gas exists at the PWA. A record search indicates that only one oil

and gas lease has been issued in the past within the PWA (at section 25, T.13.S., R.20.E.), and this lease expired in 1985. No oil and gas exploration is known to have occurred on the PWA, and evidence of oil and gas potential does not exist (e.g., oil seeps; shows in well tests; producing basin or favorable sedimentary environment). The area does not meet BLM's criteria for classification as PV for oil and gas (i.e., the minimum thickness of sedimentary rocks should be 1,000 feet, and the maximum thickness should be 35,000 feet; however, the maximum thickness of sedimentary rocks at these parcels is approximately 1,000 feet). The U.S. Geological Survey administrative report on leasable minerals of the California Desert Conservation Area (CDCA) (1979), on the other hand, indicates that approximately 50% of the PWA (i.e., that portion that lies within R.20.E and R.21.E of T.14.S.) is PV for oil and gas.

Exploration and development of other leasing act minerals has not occurred within the PWA. However, approximately one-third of the PWA (mainly that portion located in T.14.S., R.20.E) is classified, according to the USGS report on leasable mineral resources of the CDCA (1979), as PV for sodium.

Deposits of locatable minerals are present at the PWA (i.e., gold and silver), and have been delineated by exploration drilling programs by various companies, which began during the early 1980's. The area is underlain by the upper plate of the Chocolate Mountain thrust (CMT). This broad sequence of rocks is known to contain economic deposits of low grade disseminated gold, as illustrated by the Mesquite mine in the west, and Picacho and American Girl mines in the east and south respectively. Economic deposits within this zone occur when the deposit is close to the surface and accessible to open pit development. Within the PWA, the only outcrop of the upper plate sequence containing anomalous gold deposits occurs within the proposed Imperial Project area owned by Glamis-Imperial Gold Company (referred to as "Glamis" hereafter). Currently, Glamis has submitted a plan of operations to mine disseminated gold deposits within the PWA at this location. Glamis proposes to produce 1.5 million ounces of gold from 95 million tons of gold bearing rock over a projected twenty year life of the mine, with an regional value of \$325,000,000 in purchases and \$81,000,000 in income and payroll taxes. They anticipate employing approximately 120 persons over the life of the mine.

Other than what is described above, no indications of other locatable mineral resources or other leasing act minerals were identified from the literature of the area, or found as a result of my field examinations of the PWA.

CONCLUSIONS AND RECOMMENDATIONS

Based on my field investigation of the property, in conjunction with literature on the geology and mineral resources of the Salton Trough, it is my opinion the approximately 9,360.74 acres being considered for withdrawal do not have value, prospectively or otherwise, for salable minerals.

While portions of the PWA are classified as PV for oil and gas and sodium minerals, based on my field examination and knowledge of the PWA, I have determined that the requirements for classification of such minerals as PV are not present, and the PWA is not valuable, prospectively or otherwise, for these leasing act minerals.

The PWA, while not classified by the BLM as PV for geothermal resources, may be characterized as an area having a relatively low potential for occurrence and development of these resources under BLM's mineral resource classification system (BLM Manual Section 3031). Even though the PWA is in close proximity to geothermal development at East Mesa, structural events like faulting along the San Andreas System and the relatively shallow depth to basement rock under the PWA, may inhibit the continuity of the resource into the subject area.

The PWA has a high potential for the occurrence of valuable locatable minerals. This is evidenced by mineral deposit models, supporting the Mesquite and Picacho mines, and inferred to exist within the PWA. These models show a low grade disseminated gold deposit occurring in the lower part of the upper plate of the Chocolate Mountain thrust zone, and are supported by the current mining proposal submitted by Glamis to process up to 95 million tons of gold-bearing rock from deposits delineated during exploration drilling programs (conducted by Glamis and other companies) over the last two decades.

I also support that the areas encumbered by Glamis' proposed pits have a high potential for the development of gold resources. Mining claims showing interest in the project area, but where detailed information on the mineral deposit is sparse or non-existent, have a moderate potential for development.

If the withdrawal is approved, mineral development in areas considered as having a moderate potential for development (adjacent to the Imperial Project area) could be jeopardized because mill sites necessary to support processing and mining ancillary facilities (waste dumps) could not be located. This could limit or prohibit mine development, and result in a potential loss, beyond the Imperial Project proposal, of up to \$20,000,000 in annual operating expenditures, \$3,000,000 in local wages annually and \$3,000,000 in annual capital purchases from the region. Furthermore, up to 120 jobs could be lost along with annual local, state and federal tax benefits of \$3,700,000 per year.

Prior to approval of any plan of operation in the PWA proposed under the mining laws of the United States, a verification of the validity of the mining claim(s) should be initiated by the

Bureau of Land Management (BLM). Costs of all mitigation required under the December 27, 1999, Memorandum Opinion of the Solicitor specific to the undue impairment standard in the CDCA should be considered when assessing the profitability of any deposit investigated under the validity examination.

INTRODUCTION

Public lands are being considered for withdrawal pursuant to section 204 of the Federal Land Policy and Management Act of 1976 (FLPMA; 43 USC 1714, *et seq.*). The El Centro Resource Area, BLM, has proposed to withdraw 9,360.74 acres of public land in Imperial County to protect archaeological and cultural resources located in the Indian Pass Area of Critical Environmental Concern and Expanded Management Area (Attachment 1). A notice was published in the Federal Register on November 2, 1998, which segregated the land proposed to be withdrawn, subject to valid existing rights, for a 2-year period from settlement, sale, location, or entry under the general land laws, including the mining laws. The land will, however, remain open to the operation of the mineral leasing, geothermal leasing and material sales laws.

The PWA is located in eastern Imperial County near Indian Pass and between the Cargo Muchacho and Chocolate mountains. The PWA slopes gently to the southwest and encompasses several four-wheel drive routes and a portion of Indian Pass road. The main access to the PWA is by Interstate 8 to the Ogilby Road exit (approximately 45 miles east of El Centro; see Attachment 1). Follow Ogilby Road north then northwest for approximately 13 miles to the Indian Pass Road exit (also known as BLM route A272). Follow Indian Pass Road northeast for approximately 2 miles to the southwest section of the withdrawal area. Access to the withdrawal area is also possible from the Picacho State Recreation Area on the Colorado River, then follow BLM route A272 approximately 5 miles to the northeast section of the withdrawal area.

A field investigation of the PWA was conducted by Kevin Marty, El Centro Resource Area Geologist. Photographs were taken of various features of the PWA and are included in this report. The field investigations were conducted to examine the geology and mineral development potential of the PWA and gather information to assess the potential for occurrence and development of mineral and energy resources. A records search (i.e., mining claim microfiche; plats) and investigation of geologic literature were also conducted in conjunction with the field exam, to provide a thorough examination of the geology and mineral occurrence at the PWA.

The purpose of this mineral report is to assess the mineral potential for occurrence and development within the PWA, and the impact to local, regional, and national economies and markets if such valuable mineral deposits were to be withdrawn from future access, availability, and development, subject to valid existing rights. This report is prepared to address this purpose, and is not to be used for any purpose other than that for which it is prepared.

LANDS INVOLVED

Legal Description

The following is the legal description of land considered for withdrawal for a 20-year period, subject to valid existing rights, from settlement, sale, location, or entry under the general land laws, including the mining laws, but not the mineral leasing, geothermal leasing, or the material sales laws (Attachment 2):

- T.13S., R.20E.; San Bernardino Meridian
Sec. 25, E1/2
- T.13S., R.21E.; San Bernardino Meridian
Sec. 21, NE1/4, E1/2NW1/4, and SW1/4
Sec. 28, NW1/4 and NW1/4SW1/4
Sec. 29 to 33, inclusive.
- T.14S., R.20E.; San Bernardino Meridian
Sec. 1, E1/2
Sec. 11, E1/2
Secs. 12 to 14, inclusive.
- T.14S., R.21E.; San Bernardino Meridian
Sec. 4, lots 1 and 2 of NW1/4, and NW1/4SW1/4
Sec. 5, lots 1 and 2 of NE1/4, lots 1 and 2 of NW1/4, and S1/2
Sec. 6, lots 1 and 2 of NE1/4, lots 1 and 2 of NW1/4, lots 1 and 2 of SW1/4, and SE1/4
Sec. 7, lots 1 and 2 of NW1/4, lots 1 and 2 of SW1/4, and E1/2
Sec. 8, N1/2NE1/4 and W1/2
Sec. 17, NW1/4NW1/4
Sec. 18, lots 1 and 2 of NW1/4, and NE1/4.

The area described above contains 9,360.74 acres, all located in Imperial County.

STATUS AND RECORD DATA

The PWA is public land, within an area classified as Multiple Use Class (MUC) "L" (Limited) under the CDCA Plan.

There are encumbrances within the PWA that existed at the time the area was segregated by the temporary withdrawal (published in the Federal Register on November 2, 1998). They include existing mining claims and land designations as follows:

Existing Mining Claims

Glamis holds lode, placer and millsite claims related to the proposed Imperial Project, and other mining claims in the PWA. A records search indicates the following claims are current in the PWA, and Glamis owns all of these claims (Attachment 3):

- i) GAV #48, 50, 52, 54, 56, 81-85, 87, 89, 91 (13 total lode claims)
- ii) CJ 93-102, 160, 162-169, 238, 240, 241, 302-305 (26 total lode claims)
- iii) DJP 1-26, 28, 37-48, 415, 432, 433, 1064 (43 total lode claims)
- iv) Indian Pass #1-24 (24 total lode claims)
- v) Indian Rose #11, 12 (2 total placer claims)
- vi) Imp 5 (1 lode claim)
- vii) KAY # 6-33, 35, 47-59, 84, 86-102, 106, 121-133, 414, 417, 419, 421, 423, 425, 427, 429, 431, 432, 434, 446, 448, 462 (88 total lode claims)
- viii) SWL 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 310, 312, 314, 316, 318-325, 327, 354-356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 428, 430, 450-455, 462-467, 492, 494, 1079 (52 total lode claims)
- ix) BB 1, 2, 9, 12-15, 16, 17, 26, 29, 30-32, 36-41, 43, 44-47, 50-52, 56-69, 71, 84, 85, 87, 90, 93-98, 103-112, 114-119, 120-131, 133-135, 137-153, 158, 159, 162-181, 191, 195-200, 202, 204-218, 221, 223-228, 231-237, 240-281, 283-303, 305-319, 321, 322, 324, 325, 328-334, 336-338, 340, 343-371 (282 total mill sites)
- x) UYA 1-181, 184-190 (188 total lode claims)

BLM records show the total number of unpatented mining claims by claim type within the PWA is 435 lode claims, 2 placer claims and 282 mill site claims.

With exception of the mining claims mentioned above, there are no other mining claims, mineral leases, or mineral material contracts or permits, or applications for such encumbering the subject parcels.

Other Encumbrances

The following are land designations within the PWA that existed prior to this proposed

withdrawal. These land designations are supported by management plans. These plans describe land management prescriptions that are in place prior to the land segregation under the proposed withdrawal.

Wilderness Area (Attachment 1): A portion of the Indian Pass and Picacho Peak Wilderness areas, totaling approximately 270 acres, are encompassed by the PWA at T.13.S., R.21.E., sections 21, 28 and 29. All lands designated as wilderness by the California Desert Protection Act were withdrawn from mineral entry by the Act on October 31, 1994.

Area of Critical Environmental Concern (ACEC; Attachment 1): Approximately 1,540 acres of the Indian Pass ACEC lie within either the Indian Pass or Picacho Peak Wilderness Areas. The PWA encompasses overlapping wilderness and ACEC designation on approximately 270 acres (the same 270 acres described above). An additional approximately 620 acres within T.13.S., R.21.E., not overlapped by wilderness area, is encompassed by the PWA (for an approximate total of 890 acres of ACEC within the PWA).

Other Management Plans: All of the involved land in T. 13 S., R. 21 E. (3,444 acres ±), overlap the Picacho Colorado River National Cooperative Land and Wildlife Management Area (PCR; Attachment 1). The PCR was established by Public Land Order No. 2818 (November 9, 1962). PLO 2818 withdrew the lands from the non-mineral public land laws and from disposition under the homestead, desert land, and scrip selection laws. The withdrawal provided for the cooperative management of the lands by BLM, U. S. Fish and Wildlife Service and California Department of Fish & Game, for the appropriate “development, conservation, utilization, and maintenance of their natural resources, including their recreational and wildlife resources”.

PHYSIOGRAPHY, NATURAL RESOURCES, CLIMATE AND ACCESS

This section identifies physical and environmental parameters that will have a cost affect on mineral operations, either through statutory limitations on mining and processing operations, or increase costs due to required mitigation of adverse environmental impacts necessary to prevent unnecessary or undue degradation, and undue impairment¹.

Land Forms

The PWA is located in the eastern part of the Colorado Desert geomorphic province of

¹ The Solicitor in the December 27, 1999, opinion indicated that the BLM may deny a plan of operation if it is found that the impact to non-mineral resources would cause “un due impairment”, and no reasonable measures or mitigation are available to mitigate that harm (pages 17 and 18). Undue impairment is based on the nature of the resources impacted, and cannot be judged on whether the mitigation would render the project uneconomic.

California, on portions of the U.S. Geological Survey (USGS) Ogilby and Quartz Peak California 7-½ minute topographic quadrangle maps. This province consists of the lower one-fourth of the state, bordered on the east by Nevada and Arizona, and by the Peninsular ranges to the west (Attachment 4). These area is made up of wide intermountain valleys, typically including dry lake basins. Narrow ridges make up most of the mountain ranges in the province.

Topographic relief in the PWA is low, sloping gently from the northeast to the southwest with an elevation drop of approximately 115 feet/mile, and is part of an alluvial plain which is cut by ephemeral channels draining south to southwest. Elevations across the proposed withdrawal site range from approximately 1,500 feet at the northeast portion of the PWA (i.e., Little Picacho Peak and that portion of the Chocolate Mountains near Indian Pass), to 650 feet at the southwest portion of the PWA (a distance of approximately 7.5 miles diagonally across the PWA).

Flora and Fauna

Considerable information on the biology of the project area was presented in the draft environmental impact statement. The following summarizes those biologic issues that will affect revegetation and operation costs due to species or habitat compensation.

Animal species are limited to the endemic species of mammals, birds and reptiles. Species observed or inferred to occur on site include the black-tail jack rabbit (Lepus californicus) and desert cottontail rabbit (Sylvilagus auduboni). Larger mammals include coyotes (Canis latrans), bobcats (Lynx rufus) and mule deer (Odocoileus hemionus).

Birds were abundant during site visits. Those observed include mourning dove (Zenaida macroura), western kingbird (Tyrannus verticalis), horned larks (Eremauphila alpestris), common raven (Corvus corax), rock wren (Salpinctes obsoletus), sage thrashers (Oreoscoptes montamis) and Gambels quail near water sources.

Based on records filed at the El Centro Field office and a field inspection (May 15, 1999), common fauna in the vicinity of the Imperial Project Area include: blacktail jackrabbits, desert kangaroo rats, pocket mice, California Myotis (bat), turkey vultures and common ravens. In addition, there are reported desert side-blotched lizards, great basin whiptails and desert glossy snakes.

The Desert Tortoise (Xerobates agassizii), a listed threatened species under the Endangered Species Act (16 USC 1531 et seq; ESA), occur in the surrounding area and is listed as threatened by both the U.S. Fish and Wildlife Service and the California Department of Fish and Game. The subject claims, however, have not been categorized for the occurrence of desert tortoise by the BLM. We did not see any tortoise on the subject claims during field visits to the site in 1998 and 1999. However, the habitat is such that compensation requirements were developed as part of the biologic assessments submitted to the U.S. Fish and Wildlife Service under section 7 of the ESA.

The area is classified as low desert, consisting of varied communities from creosote-bush scrub, barren soil in washes, desert pavement, upland rock and volcanic pyroclastic outcrops. The claims are located in creosote habitat. Dominant plant species in the general area of the Imperial Project mine area and claims are creosote bush (Larrea tridentata) and burrowbush (Ambrosia dumosa). A few ironwood and palo verde are limited to microphyl woodland areas in desert washes.

The desert bighorn sheep (a BLM sensitive species) reside in the vicinity of the Chocolate Mountains. Feral burros share part of their range with Desert Bighorn sheep.

No other threatened or endangered plant species occur (or are expected to occur) in any of the areas that might be disturbed by mining this gold deposit according to previous plans of operation. These plans of operation are supported by exploration drilling activity in the project area since 1986.

Climate

Climate in the area is typical arid low desert with hot, dry summers and mild winters. Temperatures vary from plus 100° F. in the summer to 30° F. in the winter. Mean annual temperature is about 82° Fahrenheit (F) at Winterhaven. Occasionally, the mid-winter temperatures can reach 0° at night.

Precipitation in the immediate vicinity averages 4 inches per year, occurring mainly as rain. During the period of the field examination, the weather varied between light rain and sunshine, with hot, windy days occurring on most visits.

Access

The main access to the PWA is by Interstate 8 to the Ogilby Road exit (approximately 45 miles east of El Centro). Follow Ogilby Road north then northwest for approximately 13 miles to the Indian Pass Road exit (also known as BLM route A272). Follow Indian Pass Road northeast for approximately 2 miles to the southwest section of the withdrawal area. Access to the withdrawal area is also possible from the Picacho State Recreation Area on the Colorado River, then follow BLM route A272 approximately 5 miles to the northeast section of the withdrawal area (see Attachment 1).

Power and Water

There is water at the subject area. Water is proposed to be developed approximately 3.9 miles west of the project area along Indian Pass road in association with the Imperial Project. Hydrologic reports support that at least 1,200 acre feet of water can be produced from the two wells at the site.

Power is available by linking to an existing 125 kilovolt (Kv) power line along Ogilby road.

Soils

There are no developed or recognized soils, valuable for agricultural purposes, within the project area. As proposed in the reclamation plan, an attempt will be made to salvage a portion of the regolith within the project area as part of a salvage program. It is expected that there could be sufficient seed base within the upper foot of rock soil that may support re-vegetation efforts.

Cultural Resources

The entire PWA is considered a Quechan Area of Traditional Cultural Concern (ATCC). Trails within the PWA connect, spiritually and physically, the Quechan's two most important places of Quechan Indian religious mythology and belief: Spirit Mountain (*Avikwame*), near Needles, California; and Pilot Knob (*Avikwalai*) located in California, west of Yuma, Az.

Within the proposed withdrawal boundaries are numerous archaeological sites that are also of value to the Quechan. The entire ATCC is considered a district as defined in the National Register Bulletin No. 15 (1991:5). This means it qualifies as a Traditional Cultural Property (TCP) under the Register's criteria for evaluations (36 CFR 60.4). Therefore, the Indian Pass region is considered to have traditional values because it "refers to beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice" (Parker and King, 1992:1). Consequently, the Indian Pass Area of Traditional Cultural Concerns (ATCC), which would include the proposed mining area, is "A location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world", and furthermore, "a location where Native American religious practitioners have historically gone, and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice" (Parker and King 1992:1).

The ATCC contains a concentration of linked sites and objects (features such as the Running Man geoglyph and spirit breaks), which comprise a culturally significant entity.

GEOLOGIC RESOURCES

Regional Geology

The PWA is located along the eastern boundary of the Salton Basin portion of the Salton Trough geomorphic province of California. This trough is positioned between the Peninsular Ranges and Mojave Desert geomorphic provinces of California (Oakeshott, 1978; see Attachment 4). The Salton Trough is located at the southern termination of the San Andreas transform system within the transtensional Gulf of California. This is believed to be one of the few places on

Earth where oceanic rifting is actively impinging upon continental crust with consequent hydrothermal activity, normal and right-lateral faulting, and active seismicity and volcanism (Lonsdale, 1989). The opening of the trough and the adjacent Gulf of California to the south probably started in Miocene time. Several geologic systems have influenced the present formation of the Salton Trough, the major systems being the Gulf of California, the Colorado River and the San Andreas Fault.

The Gulf of California was formed by middle Miocene (12-14 million years ago (Ma)) extension of the San Andreas rift zone based on several recent studies (Stock and Hodges, 1989; Sawlan and Smith, 1984; Sawlan, 1991; Lyle and Ness, 1991). This extension was focused on a single long and relatively straight rift-basin parallel to the pre-existing continental margin, along which Baja California began to detach from intact North America essentially as a single rigid block (Sawlan, 1991). Marine inundation occurred as early as 13 Ma. By around 6.5 Ma, marine waters had extended northwest to San Geronio Pass, and approached within 50 km of the marine Los Angeles Basin.

The Colorado River began to flow into the Salton Trough through a gap between the Chocolate and Gila Mountains during early Pliocene time. The influx of fine-grained Colorado River sediments built a deltaic dam across the rift, cutting off the northwestern corner to form the predominantly lacustrine Salton Basin. The Salton Trough thus became a geographic entity of its own, distinct from the Gulf of California (Winker and Kidwell, 1996).

Between middle Miocene and into the Pliocene, Baja California was shifted from the North American to the Pacific Plate. Thus, the original Gulf of California rift basin evolved into the present transtensional plate boundary, accommodating the majority of the 5-6 cm/yr of dextral slip observed today (between the Pacific and North American plates). The modern day San Andreas began accommodating interplate slip approximately 5 Ma (Crowell, 1982). Since that time, the Gulf of California and Salton trough have widened considerably (Winker and Kidwell, 1996).

Sedimentation in the Salton Basin began in the Miocene. Only minor marine invasions have been recorded since, mixed with alternating cycles of river sediments deposited as the Colorado River repeatedly changed its course. During the past 2,000 years, several episodes of Colorado River diversions have filled a portion of the Salton Trough (i.e., the Salton Basin) and resulted in several ancient lakes, with the Colorado River delta acting as the southern barrier. The last high stand of ancient Lake Cahuilla is estimated to have occurred 300-500 years ago (Hubbs et al., 1963, 1965).

The result of sedimentation is an unexposed succession of Tertiary and Quaternary sedimentary rocks with an estimated maximum thickness of 20,000 feet below the alluvial cover of Imperial Valley. Drill hole logs from exploratory holes drilled for oil and for geothermal steam indicate that the sedimentary rocks are composed predominantly of nonmarine deposits. Most of the drill holes encountered entirely nonmarine rocks. Basement depths are generally greater in the south

end of the valley. The depths to basement in the Imperial Valley range from at least 15,400 to 11,000 feet at the east and west margins to over 20,000 feet within the central portion of the valley (Rex, 1970).

Local Geology

The northeast portion of the PWA is located within a few miles of nearby desert ranges (e.g., Black Mountain; Peter Kane Mountain; Little Picacho Peak; Chocolate Mountains). The composition of these nearby ranges includes volcanic rocks, providing a source for a volcanic conglomerate which covers portions of the proposed withdrawal area. P.K. Morton's geologic map (1966) describes the surface deposits of this area as older alluvium which is partly dissected, largely unconsolidated, poorly sorted silt and gravel of alluvial fans, desert pavement areas, and margins of larger canyons and terraces. Recent alluvium is also deposited on site as unconsolidated clay, silt, sand and gravel occurring primarily as valley fill and streamwash deposits.

On November 2, 1999, a site investigation was conducted by geologist Kevin Marty. Photographs were taken and surface geology was observed; however, no samples were collected.

The surface geology is mainly older desert pavement areas cut by younger alluvial systems. Very few rock outcrops exist, most notably relatively small outcrops of highly-weathered, brecciated gneiss at the proposed "Singer Pit" of the Imperial Project (Attachment 3). The older alluvium is mainly desert varnished, boulder to cobble-sized, angular to subangular rocks interspersed by variably pebble to sand-sized rock fragments, overlying brown to tan silty-clay.



Photograph 1: Desert varnished, boulder to cobble-sized predominantly volcanic rock fragments, interspersed with variably large to small pebble-sized rocks. This desert pavement overlies brown to tan mostly silty-clay. Photograph taken at southwest portion of PWA. Photograph by Kevin Marty on 11-2-99.



Photograph 2: Upland area covered by desert pavement (background), adjacent to recent alluvial wash system (foreground). Vegetation mainly in washes which carry water during storm events. Photograph taken at southwest portion of PWA, view is toward the west. Photograph by Kevin Marty on 11-2-99.



Photograph 3: Rolling terrain of desert pavement area cut by alluvial system which emanates from nearby desert ranges. This wash supports microphyll woodland, and is lined with recent alluvium (e.g., pebbles, sand and silt) carried down from ranges during storm events. Photograph taken from Indian Pass road, view is approximately north to northwest. Photograph by Kevin Marty on 11-2-99.



Photograph 4: Major ephemeral wash system off of Indian Pass road, approximately 10' deep, and lined with light-colored sand and pebbles and occasional cobble to boulder-sized rock fragments. Note claim marker in wash (left side of photograph). Photograph by Kevin Marty on 11-2-99.

Geology as Described in The Imperial Project EIR/EIS

Approximately 95 percent of the project surface in the proposed Imperial Project gold mine consists of Quaternary age alluvium (in the active ephemeral stream channels) and older alluvium (in the upland areas), which vary in thickness from 10 to 1,000 feet. Below the Quaternary age sediments, the geologic section in the project mine and process area consists of the Jurassic schist and gneiss units unconformably overlain by Tertiary andesites and basalts.

Dominant regional structural features include the CMT, which places basal gneissic rocks over the younger Orocopia Schist, and the San Andreas fault system. The proposed project mine and process area is structurally aligned and equidistant between the Picacho Mine and Mesquite Mine gold deposits. A complex geologic setting exists within the area as evidenced by detachment fault features identified at the Picacho Mine and American Girl Mine and intricate strike-slip fault systems identified at the Mesquite Mine (Tosdal, et. al. 1991). Structural patterns within the project mine and process area identified by exploration drilling to date consist west-northwest to northwest trending faults cut by northeast trending high angle faults (Dan Purvance, Chemgold, 1996).

MINERAL DEPOSITS

Several gold mining districts are located within an approximately 10 mile radius of the PWA, with the PWA being somewhat the center of this activity (see Attachment 1). These are the Mesquite district, approximately 10 miles to the northwest; the Picacho district, approximately 9 miles to the east; and the Cargo Muchacho district, approximately 10 miles to the south. The active Mesquite, Picacho and American Girl gold mines are located in each of these districts, respectively, and the historic Tumco site is located in the Cargo Muchacho district. Furthermore, the proposed Imperial Project, proposed by Glamis to mine disseminated gold from the upper plate of the Chocolate Mountain thrust, is located within the PWA.

The first gold mining in the region is attributed to early Spanish communities in the Cargo Muchacho Mountains in 1780 (Clark, 1970). The California Gold Rush of 1849 resulted in increased mining interest in the region. At the turn of the Century, production peaked at the Picacho, Tumco, and American Girl Mines, which produced a cumulative total of approximately 500,000 ounces of gold. Increasing gold prices and bulk tonnage leaching technology developed in the 1970's led to open pit mining at the Picacho Mine in 1979, and the Mesquite and American Girl Mines in the 1980s. These three mines produced 265,000 ounces of gold during 1997, 172,000 ounces of gold during 1998 and 170,600 ounces of gold during 1999.

Mineralization is structurally controlled by faulting in this region. Recognition of gold mineralization associated with detachment or thrust faulting resulted in exploration for large-tonnage, low-grade gold deposits in the late 1970's. The intensive brecciation of large volumes of rock along detachment faults appears to be a strong control for favorable deposition of the ore minerals (Spencer and Welty, 1986, 1989). Hydrothermal circulation in the thick breccia zones alters the rock and probably mobilizes some of the base and precious metals (Spencer and Welty, 1986). These metals are then deposited in breccia zones directly overlying the detachment fault and in open spaces along normal faults in the hanging wall (Wilkins and Heidrick, 1982).

At the Picacho Mine, brecciation and hydrothermal alteration associated with detachment faulting are interpreted to have provided the environment for the deposition of disseminated gold (Drobeck and others, 1986; Frost and others, 1986; Liebler, 1986, 1988). The Mesquite Mine, approximately 19 miles northwest of the Picacho Mine, is another area where gold mineralization is related to detachment faulting (Frost and Watowich, 1987; Shafiqullah and others, 1990). The origin of the fluids at the Mesquite Mine have been tied to Tertiary plutonic bodies (D.M. Frost, 1990). Fluids associated with plutonism during Tertiary extension migrated along the brittle fault zones and precipitated along the structurally highest components of the detachment system.

However, thrust faulting along the CMT, and right-lateral movement along the San Andreas fault system adds complexity to ore depositional models for this region. The proposed Imperial project in the Indian Pass area, and entirely within the PWA, is structurally aligned and between the Mesquite and Picacho gold deposits. Here the dominant structure is the CMT, which places basal gneissic rocks over the younger Orocopia Schist. Mineralization occurs in Jurassic-age

granitic gneiss in the upper plate of the CMT, and is structurally controlled by the intersection of low-angle and high angle shear zones.

At the American Girl mine, the genesis of mineral deposits in the Cargo Muchacho mountains has been postulated, along with other models, as thrust fault-related with multiple veins representing stacked thrusts, or detachment fault-related with multiple veins representing stacked detachments (Tosdale et al., 1985). Gold mineralization is confined to the western side of the range as several separate mineralized zones in the vicinity of the Padre Madre, American Girl Canyon and Oro Cruz operations. The gold mineralization is of hydrothermal origin and the bulk of the mineralization occurs with sheared rock related to faulting.

The Tumco ore bodies occur within chemically and/or physically favorable metamorphosed sedimentary rocks or gneisses of the Tumco formation. The underground bodies occur within three structural zones dipping south at 20-30 degrees in lenticular bodies with a marked downdip elongation (Oro Cruz Final Environmental Impact Statement, Nov. 1994, pg 36). The influence of fracturing on ore deposition is very important. Equally noteworthy is the close relationship between fracturing and rock type. Where a major fault traverses granite or quartz monzonite, the rock remains unfractured. However, a major fault in the metamorphic rocks or in quartz diorite shatters the rock. Mining the veins in the granite and in the quartz monzonite has not proved valuable. Most of the gold produced in this district has been mined from metamorphic rocks or quartz diorite (Report XXXVIII of the State Mineralogist, Chapter 2).

There are no existing sand and gravel pits on the PWA, and no production of sand and gravel is known to have occurred within the PWA.

My observations, in conjunction with a records search, indicates no evidence of geothermal activity (e.g., mud volcanoes; geysers) at the PWA. The PWA is located approximately 10 miles east of the Glamis KGRA and 15 miles northeast of the Dunes KGRA (Attachment 5), but in a sediment package considerably thinner (i.e., 0-1,000 feet) than that underlying the KGRAs (i.e., 15-20,000 feet). In addition, the PWA is situated on the west side of the San Andreas Fault. While these variables may have an influence on the potential for geothermal resources beneath the PWA, only additional data on local temperature gradients will determine if the resource actually exists.

The potential for oil and gas is strictly speculative and is related to the May, 1981 discovery of natural gas in Mexico, approximately 60 miles south of Mexicali. No active leases exist on the PWA. No evidence of oil and gas potential (e.g., seeps) was observed at the PWA.

No other leasable minerals were observed at the PWA.

MINERAL PRODUCTION HISTORY

No known mineral production has occurred within the PWA.

MINERAL EXPLORATION AND DEVELOPMENT WORK

Little mining history is known for the PWA. Bedrock exposed in limited locations on the north side of the proposed Imperial Project location was first prospected by Dick and Alice Singer (Steve Bauman, Glamis Imperial, 1995).

Exploratory work for locatable minerals began during the early 1980's when Gold Fields drilled holes on their Indian Rose and Kay claims near Indian Pass. They eventually conducted a regional exploration program comprised of magnetic, gravity and resistivity surveys and stream wash geochemical studies (DEIS/EIR, Imperial Project, 1997). During 1987, Glamis Gold Exploration, Inc. (now Glamis-Imperial Gold Company) acquired the mining claims and began exploration drilling. Through development drilling, they eventually delineated three ore bodies containing gold and silver mineralization in Jurassic-age granitic gneiss in the upper plate of the Chocolate Mountains thrust (similar geology to that observed at the nearby Picacho and Mesquite Mine gold deposits). No other economically recoverable mineral resources are known within the proposed Imperial Project area (DEIS/EIR, Imperial Project, 1997).

Excluding the exploration drilling described above, relatively minor evidence of other past or present mineral exploration and development activity was observed during the field investigation of the subject parcels. There are some prospecting pits along zones of alteration in areas of the CMT upper plate exposed in the Singer properties of the Imperial Project area. I suspect most of this activity was conducted from the early 1960's to late 1980's. No know production is noted. I estimate total tonnage excavated at less than 100 tons.



Photograph 5: Shallow prospect excavated near Indian Pass road in sediments consisting of tannish-brown silty-clay with occasional pebble-sized rock fragments.

FIELD WORK, SAMPLING, AND ANALYTICAL METHODS

This PWA was investigated in the field on November 2, 1999. The purpose of the visit was to examine the geology/geomorphology, access routes and any other physical features which characterize the PWA. Photographs were taken and several are included in this report.

No mineral samples were collected. Known mineralization occurs at the outcrop where Glamis' proposed Singer Pit (Attachment 3) would be excavated (the only area where exposures of the mineralized zone occurs in the PWA as a result of fault related uplifting), and this mineralization has been characterized by Glamis as similar to the Picacho and Mesquite properties. The reported assay value for gold runs approximately 0.016 ounce per ton.

MINERAL POTENTIAL

This section analyses the potential for occurrence in compliance with BLM manual 3031 protocols (refer to Attachment 6 for a description of the classification criteria). Areas where interest through land appropriation is high, data is known on the character of the deposit, and economic conditions support development are classified as having a high potential for development in compliance with the classification protocols in BLM Manual 3060.

Leasable Mineral Resources

The PWA is not located within the general area of thermal springs and active geothermal activity. Furthermore, the area is not within an area of Quaternary volcanic activity. The PWA is located approximately 10 miles east of the Glamis KGRA and 15 miles northeast of the Dunes KGRA (Attachment 5). Because of its proximity to known geothermal development, the BLM could consider the PWA as being PV for geothermal resources. To the west of the San Andreas Fault (west of the Coachella Canal), bedrock lies at an estimated depth of 15,000-20,000 feet. The valley fill sediments are liquid-dominated, and the geothermal resources are controlled by the intersection of major faults with a suitable sandstone/siltstone horizon acting as a reservoir (BLM's G-E-M report, 1980). East of the fault (i.e., the PWA is approximately 10 miles east of the fault), bedrock is known to occur between 10 to 1000 feet below sediments at the proposed Imperial Project area (Imperial Project DEIS/EIR, 1997). In general, bedrock east of the San Andreas fault and beneath the PWA lies less than 5,000 feet below ground surface (Morton, P.K., County Report 7, California Division of Mines and Geology, 1977), and could contain hot dry rock resources, localized fracture controlled steam or hot water resources. The San Andreas appears to be a geologic and geothermal boundary zone for the Imperial Valley.

A records search indicated that no areas within the PWA have been leased in the past for geothermal minerals.

BLM Manual 3021 provides the criteria for classifying lands PV for geothermal resources. The

BLM Manual at 3021.28 provide the criteria for classifying geothermal resources. In order to be PV, the land must:

1. Have evidence of late Tertiary or Quaternary volcanic activity, such as caldera structures, cones, and volcanic vents;
2. Have evidence of thermal springs such as geysers, fumaroles, and mud volcanoes or thermal springs with temperatures at least 40° F. higher than ambient air temperature; and/or
3. Have a geothermal gradient in excess of two times normal as reflected in deep water wells, oil well tests, or other test holes.

Geothermal resources can provide kinetic energy to drive steam turbines directly, or through heat exchange with other mediums to provide kinetic energy to drive turbines to create electricity or other work. Geothermal resources can also be applied to passive uses such as thermal energy exchange with water or air to heat space or provide hot water. When used for development of energy, value of the resource is determined based on the value of the energy converted from the geothermal resource. When applied to more passive uses, however, the measure of value is based on the value of other forms of energy 'displaced' when used for the same purposes. For example, the United States determines royalties from Federal geothermal leases for space heating based on the value of natural gas, oil, coal or electricity most dominant in the market that is displaced by the thermal energy provided by the geothermal resource. Assuring that the operation will return a profit, and that other sources of energy are not cheaper when used for the same purposes, must be considered in any evaluation of geothermal resources in the area.

I feel that the potential for existence and development of geothermal resources at the PWA is low. However, absent drilling defining the resource on the property, I can only base my determination on geologic inference (e.g., relatively shallow depth to bedrock and possible structural control of the San Andreas Fault) and characteristics of geothermal development at the existing plants at East Mesa. Furthermore, the lack of interest shown in the past for geothermal development in this area suggests the existence and, therefore, development of geothermal resources is low.

A portion of the PWA is classified by BLM as PV for oil and gas resources. The BLM Manual at 3021.21 B provides the criteria for classifying lands PV for oil and gas. These criteria are:

1. Minimum 1,000 feet thickness in a sedimentary basin;
2. Maximum 35,000 feet thickness in a sedimentary basin;
3. Evidence of oil and gas potential such as seeps, oil or gas shows in well tests, and past or

present production. Indirect evidence such as seismic and similarity with other producing rocks can be used in the classification.

While the geology of the area may support that there are 1,000 feet of sediments within a sedimentary basin, there are no data supporting that there are 35,000 feet of rock conducive to forming oil or gas. A records search indicates there has only been one oil and gas lease on an area within the PWA in the past. However, this lease was terminated during 1985 (Attachment 7).

Oil wells were drilled in the Salton Sea (Tomahawk Oil) in 1992 without shows of hydrocarbons. In addition, wells were drilled in the East Mesa area in 1982 without confirmed shows of hydrocarbons. None of the water or geothermal wells in the area have encountered hydrocarbons or indications of such. Most of the initiative in the Salton Trench is the result of a well drilled by the Mexican government- owned Pemex in the Altar Desert area on Montague Island, approximately 80 miles from the PWA. This well is reported to have encountered commercial oil and gas; however, I have no verification as to the extent of the oil producing formation or whether the area is in continuity with the PWA. The record of wells maintained by Munger² show no wildcat oil or gas wells within the PWA. The records maintained by Petroleum Information Service, and subscribed to by the Bakersfield District, BLM, failed to show any data to support oil or gas indications in wells within the general area.

A portion of the area encompassing the PWA is classified by the BLM as being PV for sodium and potassium leasing act minerals. I suspect this classification was made because the PWA is within the Salton trough. However, it is not classified under BLM's G-E-M assessment program as having potential for sodium minerals. The Bureau's Manual at 3021.27 provide the criteria for classifying lands PV for sodium minerals. Because the historical development of salt within the Salton Trough was for carbonates, sulfates, and chlorides, and the geology appears to only support those minerals, only those classification criteria will be defined. The criteria are:

1. Sodium chlorides. Common salt is the most important mineral in the group.
 - a. Solid deposits.
 - (1) Minimum thickness.
 - (a) Surface crusts: 0.1 foot.
 - (b) Near-surface deposits (to 300 foot depth): 0.5-3 feet. (Below 50 feet the minimum thickness-to-depth ratio is 1:100.)
 - (c) Deposits below 300 foot depth: 3 feet.

² Munger Map Book, 1992, 36th Ed., 9800 S. Sepulveda Blvd., Ste. 723, Los Angeles, California, 90045.

- (2) Minimum quality.
 - (a) Surface crusts and deposits above 300 foot depth: 25 percent sodium chloride (NaCl).
 - (b) Deposits below 300 foot depth: 50 percent sodium chloride (NaCl).
- (3) Maximum depth: 10,000 feet.
- b. Sodium chloride brines.
 - (1) Minimum quality: 2.6 percent sodium chloride (solid equivalent).
 - (2) Maximum depth: 10,000 feet.
- 2. Sodium sulfates. Representative minerals in this group include: mirabilite, glauberite, hanksite, and glazerite.
 - a. Solid deposits.
 - (1) Minimum thickness.
 - (a) Surface crusts: 0.1 foot.
 - (b) Near-surface deposits (to 300 foot depth): 0.5-3 feet. (Below 50 feet, the thickness-to-depth ratio is 1:100.)
 - (c) Deposits below 300 foot depth: 3 feet.
 - (2) Minimum quality.
 - (a) Surface crusts and deposits to 300-foot depth: 10 percent anhydrous sodium sulfate (Na₂SO₄).
 - (b) Deposits below 300 foot depth: 20 percent anhydrous sodium sulfate (Na₂SO₄).
 - (3) Maximum depth: 10,000 feet.
 - b. Sodium sulfate brines.
 - (1) Minimum quality: 2 percent anhydrous sodium sulfate (Na₂SO₄ - solid equivalent).
 - (2) Maximum depth: 10,000 feet.

3. Sodium carbonates. Important members of this group include the sodium carbonate and bicarbonate minerals nahcolite, dawsonite, trona, natron, gaylussite and shortite.
 - a. Solid deposits.
 - (1) Minimum thickness.
 - (a) Surface crusts: 0.1 foot.
 - (b) Near-surface deposits (to 300 foot depth): 0.5-3 feet. (Below 50 feet the thickness-to-depth ratio is 1:100.)
 - (c) Deposits deeper than 300 feet: 3 feet.
 - (2) Minimum quality.
 - (a) Surface crusts and deposits (to 300 foot depth): 15 percent anhydrous sodium carbonate (Na_2CO_3).
 - (b) Deposits deeper than 300 feet: 25 percent anhydrous sodium carbonate (Na_2CO_3).
 - (3) Maximum depth: 10,000 feet.

Based on my field examination of the PWA, I have found that there is a lack of evidence of past mining for sodium and potassium minerals within the subject area (the closest sodium mining was in the Salton Sea basin), and lack of historical and present interest in the area for sodium minerals. In addition, no salt horizons or brines are known from any wells located within the PWA, or in the general area of the PWA.

The property is not known to be valuable, prospectively or otherwise for other leasing act minerals.

While sand and gravel exists on the PWA, the occurrence is not of sufficient quality to meet requirements as a commercial deposit for aggregate, plaster sand, or glass sand. Based on my field observations, aggregate material (plus 2 millimeter material) appeared to represent less than 20 percent of the sediments underlying the PWA. Most aggregate deposits being developed in the Imperial Valley are conglomerates sourced from the local mountains, fluvial bench gravels from Colorado river, and terrace deposits from lacustrine lake deposits, principally ancient Lake Cahuilla. Cobble deposits are highly desirable for crushing operations specifically required for asphalt surface material. The State Highway Department has a fractured-face requirement for all gravel used in surfacing material on highways. Material which has been reduced to gravel-size particles by stream action is normally rounded and unusable because of the requirement for at least one fracture face. This makes more of the gravel (cobble) deposits in the Imperial Valley not only desirable but in many cases imperative for road projects.

Waste material requiring removal before sand and gravel products can be sold in the market area usually are limited to fine silts and sands, and clay material. Deposits with over 30 percent waste generally are not mined, and are not considered valuable as aggregate resources. While processes can be designed to remove these wastes through wet screening, costs are very high in water acquisition costs and disposal requirements. In my opinion, the quality of the sediments on the PWA do not meet the specifications for an aggregate deposit, and as such, are not valuable for these resources.

There are adequate resources being mined from other areas in Imperial County. In addition to numerous small sales, 15 free-use areas and approximately five community pit areas, there are approximately 15 operating pits on public land in Imperial County in addition to 12 private pits and two proposed private pits. The extraction of mineral material from the operating pits is meeting the current demand for these resources in Imperial County. Sand and gravel reserves are available at other sites, most notably along the East Highline canal (i.e., the ancient shoreline), where the BLM is considering reopening former pits for further extraction.

Locatable Minerals

As described above, a fault controlled (e.g., CMT) mineralized zone comprised of epithermal precious metal deposits trends northwest-southeast through the PWA. Along this trend, gold extraction is occurring at the Mesquite mine, and at the Picacho mine (currently in the final reclamation stage of the operation). A large open pit/heap leach gold mine is currently proposed by Glamis within the PWA. Past exploration drilling supports that the upper plate of the CMT that is accessible within the proposed Imperial Project, and within the PWA, has a high potential for occurrence of gold (a locatable mineral) under BLM's manual 3031 mineral resource classification criteria (Attachment 6). This classification is based on the existence of the CMT upper plate as inferred throughout the PWA based on proximity between the Mesquite and Picacho mines, the interest expressed by various companies and individuals and the drilling activity that has occurred in the area since 1986, and sample data from the Imperial Project examined by BLM geologists.

MINERAL DEVELOPMENT MODEL

I have found that the PWA is best characterized by a low grade disseminated gold deposit model. This model has been developed within the region of the PWA by the Mesquite, Picacho, and American Girl mines. All mines developed this mineralization model by open pit/cyanide leach models. I feel that the character of the deposit model inferred to exist within the PWA also would utilize open pit and cyanide heap leach methods, if the economic environment supported profitability within this area.

Key to profitability is the price of gold, dropping from a high of \$328 per ounce at the time of the withdrawal to \$290 per ounce, remaining somewhat steady during the last quarter of 1999.

The deposit must be within reach by open-pit methods, and the deposit must be within a reasonable limit of haul from the pit area to processing facilities. The gold price defines the limit of the pit and haul distance from mine to processing. The higher the gold price, the deeper the pit can be to access resources, as well as resources covered by overburden. In addition, the higher the gold price, the longer the distance from pit to processing.

Mine Model

The mine model supporting development of a large low grade disseminated gold deposit reflects existing mine and processing models at the Mesquite and Picacho mines. Because of the considerable data collected to support the Imperial Project, and my knowledge of other mines in the region, I am basing a mine model for development of the CMT upper plate deposits on the elements contained in the plan of operations submitted by Glamis pursuant to the regulations at 43 CFR 3809.

The plan of operation submitted by Glamis defines the mine operations as a simple open pit mine model. The sequence of mining will start at the West pit and progress through to the East pit (refer to Attachment 8). Waste from the West pit will report to the West Waste pile, and initial waste from the East pit will report to the Northeast Waste pile. Most of the ancillary facilities and infrastructure are placed in the most efficient, and least costly, locations, resulting in a very compact site. Re-location of any facility would increase hauling costs. No alternative to the proposed action is being examined as no determination that the project facilities location under the proposal would cause “unnecessary or undue degradation” has been made.

Each pit was examined by Glamis to determine the minimum safe slope necessary to support stable walls. The company’s information supports that pit walls sloping within the range of 40 to 50 degrees would be stable. This information is based on past experience at the Picacho mine, and appears to be consistent with the similar Mesquite mine.

Blastholes within the pit are proposed using 10-5/8 inch diameter blastholes on a 32-foot centers. Typical of all open pit operations, splits of cuttings from each hole would be assayed, and the hole surveyed. Blasted rock is re-surveyed to locate ore, prot-ore and waste rock, and to direct each to the respective placement on the site. Excavation of blasted rock is proposed using a P&H electric cable shovel, with a 58 cubic yard (88-ton) capacity. Rock is loaded into 320 ton capacity rigid frame haulers (Komatsu 930E). Travel would be from the pit working floor up ramps grading 8 percent or less. Roads were designed for 120-foot width (approximately 3 times the width of a hauler; Glamis criteria).

Processing Model

Gold bearing rock will not be crushed or milled. Rock from the mining operations will be placed on approved leach pads consisting of a double layer of high density polyethylene. Distance from the three proposed open pits to the leach pad facility averages approximately

5,500 feet (1,700 meters). Weak cyanide solution will be seeped through the gold bearing rock in 40-foot layers, extending up to 400 feet in height. Pads are designed at 14,000,000 square feet. The solution is collected at the bottom of the leach pile, and transferred by pipe to the gold recovery facility where activated charcoal adsorbs gold. The carbon is stripped of the adsorbed gold by use of a highly concentrated cyanide-caustic solution. The solution carrying the gold is then electroplated onto steel wool bats. The gold-steel wool is further process by melting the gold and steel wool bats in a furnace, recovering the heavier gold as a dore' bar. The bar is sent to a refiner who pays on the contained gold at a market rate.

Upon completion of operations, the site will be reclaimed as proposed in the reclamation plan (DEIS), and the leach pads rinsed and closed in compliance with state law to assure no contamination of water resources of the state.

Overall, the project will occupy approximately 240 acres for pit development and infrastructure, and 1,400 acres for processing and waste storage facilities. The operation is planned for about 20 years, including periods for proposed reclamation and closure. Under Glamis' feasibility, 95,168,700 tons of gold bearing material will be mined and processed, and 251,242,400 tons of waste rock will be disposed in the West and Singer pits, and various waste piles on the site.

Salient data regarding the Imperial Project model include:

Proven Reserves:	81,168,700 tons	10K Report (1998)
Probable Reserves:	13,545,000 tons	10K Report (1998) (1996)
Reserves (Total):	95,168,700 tons	10K Report (1998)
Waste to Reserve Ratio:	2.64:1	10K Report (1996)
Total Waste:	251,245,400 tons	Calculated
Total Material to be Mined:	345,959,100 tons	Calculated
Contained Gold		
Proven:	1,324,405 ounces	10K Report (1998)
Probable:	191,140 ounces	10K Report (1998)
Total Contained Gold:	1,515,545 ounces	Calculated
Grade		
Proven:	0.01623 OPT	Calculated
Probable:	0.01411 OPT	Calculated
Average:	0.01592 OPT	Calculated
Average tons ore mined		
per contained ounce:	62.8 tons	Calculated
Average tons waste mined		
per contained ounce:	165.8 tons	Calculated
Recovery Rate:	80%	Glamis
Mining Costs Ore:	\$0.48 per ton	10K Report (1998)
Mining Costs Waste:	\$1.27 per ton	Calculated

Processing Costs:	\$0.58 per ton	10K Report (1998)
General and Administrative:	\$0.18 per ton	10K Report (1998)
Total Operating Costs:	\$2.51 per ton	Calculated
Mining Costs Ore:	\$0.48 per ton	10K Report (1998)
Mining Costs Waste:	\$1.27 per ton	Calculated
Processing Costs:	\$0.58 per ton	10K Report (1998)
General and Administrative:	\$0.18 per ton	10K Report (1998)
Mining Costs Ore:	\$ 45,680,965	Calculated
Mining Costs Waste:	\$120,597,777	Calculated
Processing Costs:	\$55,197,846	Calculated
General and Administrative:	\$17,130,366	Calculated
Total Operating Costs:	\$238,606,965	Calculated
Per ounce:	\$215	
Per ton:	\$2.51	
Initial Capital Investment:	\$ 47,600,000	News Rel. dated 2/16/9
Recapital:	\$ 1,700,000	per year; S. Bauman personn. comm. 01/16/98

The above information has not been verified by the BLM by the mineral investigation process as defined in BLM Manual 3893. However, I feel that the information best defines the development of a disseminated gold deposit of the nature encountered in the PWA, and also reflects operating models at the Mesquite and Picacho mines. I will use this model in any economic consideration in defining the potential for development of gold resources within the PWA.

Glamis proposes to employ approximately 120 persons during the life of the mine. Annual payroll is estimated by Glamis at \$3,000,000. Total capital purchases within the region are estimated at \$61,000,000, with operating purchases at \$180,000,000 over the life of the mine. Average annual total non-labor operating expenditures are estimated at \$20,000,000³ and annual capital purchases at \$3,000,000. Average local, state and federal tax benefits from the proposal are estimated at \$3,700,000 per year (includes an estimated 18 percent combined federal and state corporate income tax, 22 percent combined federal and state wage tax, and 1.09 percent Imperial county property tax).

³ Based on an average annual production of 10,500,000 tons of gold bearing rock at \$2.51 per ton, with deductions for labor and other non-operational expenditures.

Mineral Resource Classification

In my opinion, sufficient data supports a high potential for the development of gold resources within an area defined by the three Glamis pits. This does not indicate that the claims have met the test of discovery of a valuable mineral deposit within their boundaries, a requisite to a valid mining claim⁴. It only suggests, based on my opinion, that sufficient information exists that when determining the impact of such development with other resource values, a mine of the model defined above may occur within specific economic conditions. No information specific to the investigation of mining claims has been verified as required under BLM mining claim investigation protocols.

Glamis owns other mining claims north and west of the Imperial Project area. Because there is interest in mineral resources in the PWA by location of these mining claims, but a lack of exploration data confirming the existence of the CMT upper plate, I must classify these areas as having a moderate potential for development of gold resources. Areas not encumbered by mining claims support a lack of mineral development interest. Even though I infer the existence of the CMT upper plate in these areas, I suspect they are too deep to be economically developed under current or historic gold prices. These areas are classified as having a low potential for the development of gold resources. Because no other mineral resource is known or inferred in the PWA, there is a low to non-existent potential for development of other mineral resources.

SURFACE INTERFERENCE

The withdrawal is proposed to protect cultural and scenic values within the boundary of the withdrawal. Open pit mining typically results in significant alterations to existing topography of the area, changing the visual and physical features of the area. In addition, the level of activity results in an introduction of dust, noise, and noxious gases above ambient (but not necessarily above allowable minimums) in the area. Surface resources within the area of operations that cannot be moved or mitigated are generally destroyed by mineral development activity.

Protection under the withdrawal process is achieved by allowing only mining and ancillary operations verified as having valid existing rights to proceed, subject to prevention of

⁴ The best known test of discovery was in a Land Decision of the Department of the Interior in 1894: *Castle v. Womble*, 19 LD 455 (1894). This famous "prudent person" test or definition of discovery of a valuable mineral deposit was given as follows:

...where minerals have been found and the evidence is of such a character that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success in developing a valuable mine, the requirements of the statutes have been met.

unnecessary or undue degradation, and undue impairment to public lands and resources. No new appropriations of land will be allowed as a result of the closure to new mining claims and sites.

As a result of the review of the area of high potential for mineral development at the Glamis-Imperial project, there could be irreversible and irretrievable impacts to cultural resources proposed to be protected under this withdrawal. If the mining claims and sites supporting the Imperial project are determined to be valid, and concluded as not causing cause unnecessary or undue degradation, or undue impairment to public lands and resources, the withdrawal will have no impact as operations would be allowed to proceed. Areas considered as having a moderate potential for development could be impacted if gold bearing material could not be hauled economically to the existing mill sites located by Glamis within the Imperial Project area. Because new mill sites could not be located close to the moderate potential areas, expansion of proposed operations or new mining proposals could be jeopardized, resulting in a potential loss up to \$20,000,000 in annual operating expenditures, \$3,000,000 in local wages, and \$3,000,000 in capital purchases from the region⁵. In addition, a loss of up to 120 jobs and annual local, state and federal tax benefits of \$3,700,000 per year could be lost beyond the 20 years projected by Glamis under the existing proposal.

Forecasts of southern California housing unit starts in southern California indicates an increase of 32,000 units in each 10-year period to 2015 (SCAG, 1994). The report also indicates that population growth in Imperial county will increase approximately 30 percent every 10 years to the year 2015. This growth indicates a need for future energy sources, especially in those areas not previously developed in the past. Based on these projections, I expect the market demand for geothermal resources will force a demand for geothermal exploration. However, the impact from geothermal exploration and development would not occur at the PWA because the resource is, in my opinion, non-existent.

While sand and gravel exists on the PWA, the occurrence is not of sufficient quality to meet requirements as a commercial deposit for aggregate, plaster sand, or glass sand. There are adequate resources being mined from other areas in Imperial County. In addition to numerous small sales, 15 free-use areas and approximately five community pit areas, there are approximately 15 operating pits on public land in Imperial County in addition to 12 private pits and two proposed private pits. The extraction of mineral material from the operating pits is meeting the current demand for these resources in Imperial County. Sand and gravel reserves are available at other sites, most notably along the East Highline canal (i.e., the ancient shoreline), where the BLM is considering reopening former pits for further extraction. Therefore, the impact from mineral material exploration and development would not occur on the PWA because the demand for the resource is being met, and there is sufficient and higher quality material being mined at other areas throughout the county.

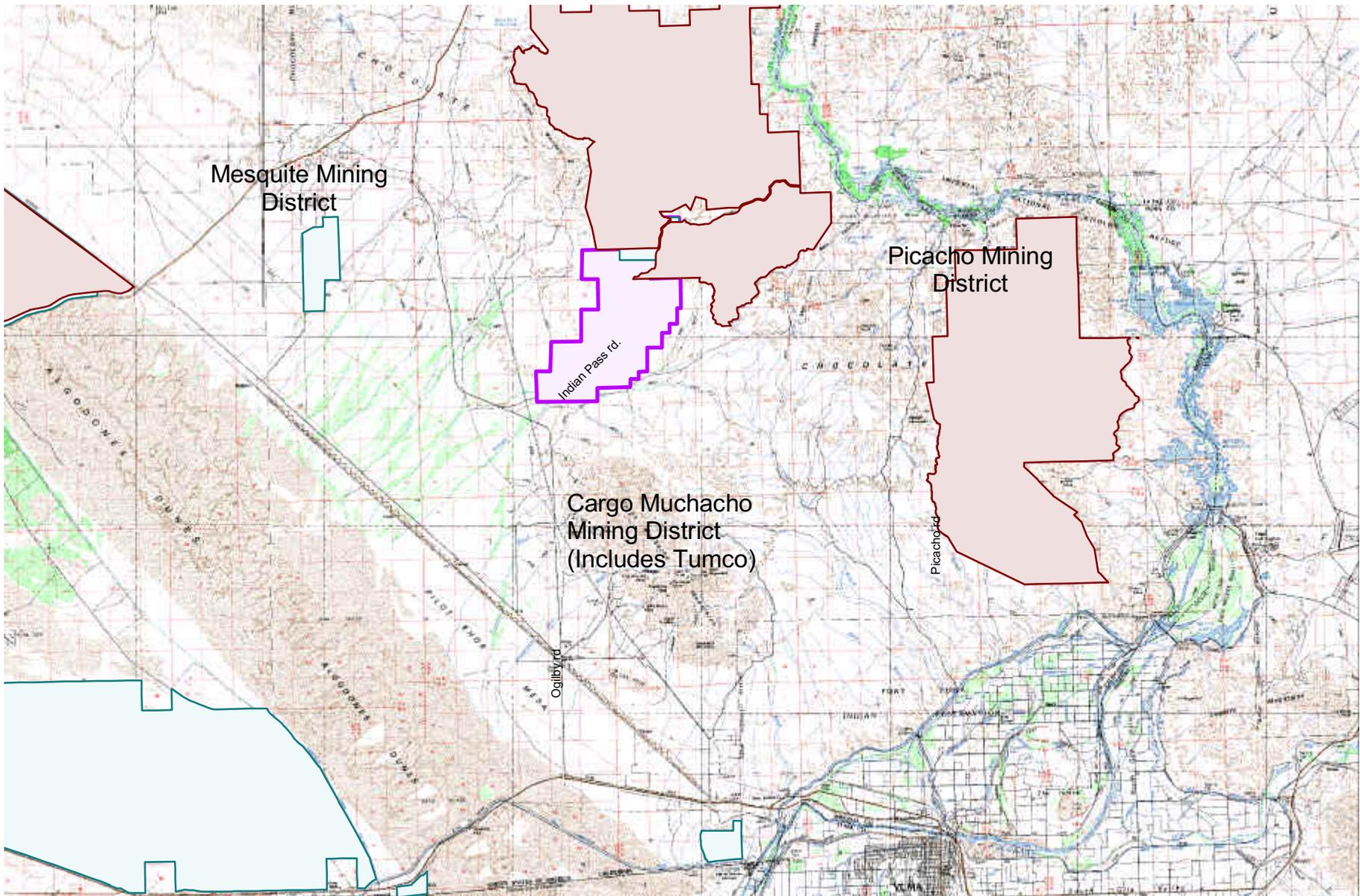
⁵ This is based on projections of Glamis' annual cash flow as addressed above for the Imperial Project .

REFERENCES CITED

- Clark, W.B., 1970, Gold Districts of California, California Division of Mines and Geology, Bulletin 193, 186.
- Crowell, J.C., 1982, The tectonics of Ridge Basin, southern California, in Crowell, J.C., and Link, M.H., eds, Geologic history of the Ridge Basin, southern California: Pacific Section, Society of Economic Paleontologists and Mineralogists, p. 25-41.
- Drobeck, P.A., Hillemeier, F.L., Frost, E.G., and Leibler, G.S., 1986, The Picacho Mine, a gold mineralized detachment fault in southeastern California, in Beatty, B., and Wilkinson, P.A.K., editors, Frontiers in geology and ore deposits of Arizona and the Southwest: Arizona Geological Society Digest, v. 16, p. 187-221.
- Frost, D.M., 1990, Gold ore has distinctive lead isotopic "fingerprint": Geological Society of America Abstracts with Programs, v. 22, no. 3, p. 24.
- Frost, E.G., Drobeck, P., and Hillemeier, B., 1986, Geologic setting of gold and silver mineralization in southeastern California and southwestern Arizona, in Cenozoic stratigraphy, structure and mineralization in the Mojave Desert (Geological Society of American annual meeting field trip guidebook): California State University, Los Angeles, p. 71-119.
- Frost, E.G., and Watowich, S.N., 1987, The Mesquite and Picacho gold mines: Epithermal mineralization localized within Tertiary extensional deformation, in Davis, G.H., and VandenDolder, E.M., editors, Geologic diversity of Arizona and its margins: Excursions to choice areas: Arizona Bureau of Geology and Mineral Technology Special Paper 5, p. 325-335.
- Hubbs, C.L., Bien, G.S., and Suess, H.E., 1963, La Jolla natural radiocarbon measurements III: Radiocarbon, v. 5, p. 254-272.
- Hubbs, C.L., Bien, G.S., and Suess, H.E., 1965, La Jolla natural radiocarbon measurements IV: Radiocarbon, v. 7, p. 66-117.
- Liebler, G.S., 1986, Geology of gold mineralization at the Picacho mine, Yuma County, California: Unpublished M.S. thesis, University of Arizona, Tucson, 57 p.
- Liebler, G.S., 1988, Geology and gold mineralization at the Picacho mine, Imperial County, California, in Schafer, R.W., Cooper, J.J., and Vikre, P.G., editors, Bulk mineable precious metal deposits of the western United States; symposium proceedings: Geological Society of Nevada, Reno, p. 453-472.

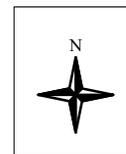
- Lonsdale, P., 1989, *Geology and Tectonic History of the Gulf of California: The Geology of North America, the Eastern Pacific Ocean and Hawaii*, vol. N, p. 499-521.
- Lyle, M., and Ness, G.E., 1991, The opening of the southern Gulf of California, in Dauphin, J.P., and Simoneit, B.R.T., eds., *The Gulf and Peninsular Province of the California: American Association of Petroleum Geologists Memoir 47*, p. 403-423.
- Majmudar, Hasmukhrai, H. 1983, *Technical Map of the Geothermal Resources of California*, Division of Mines and Resources, Map No. 5.
- Meidav, Tsvi., and Rex, R.W., 1970, *Investigation of geothermal resources in the Imperial Valley and their potential value for desalination of water and electricity production: Institute of Geophysics and Planetary Physics, University of California, Riverside.*
- Morton, P.K., 1977, *Geology and Mineral Resources of Imperial County, California: County Report 7*, California Division of Mines and Geology.
- Oakeshott, Gordon B., 1978, *California's changing landscape*, McGraw-Hill, Inc., New York, NY, pp. 24-25.
- Parker, Patricia L. and Thomas F. King, 1992, *Guidelines for Evaluating and Documenting Traditional Cultural Properties*. National Register Bulletin 38. USDI. National Park Service, Interagency Resources Division, Washington, D.C.
- Rex, R.W., 1970, *Investigation of geothermal resources in Imperial Valley and their potential value for desalination of water and electricity production: Riverside, California, California University, Institute Geophysics and Planetary Physics, Report No. 92502*, 14 pages.
- Sawlan, M.G., and Smith, J.G., 1984, Petrologic characteristics, age and tectonic setting of Neogene volcanic in northern Baja California Sur, Mexico, in Frizzell, V.A., ed., *Geology of the Baja California Peninsula: Pacific Section*, Society of Economic Paleontologists and Mineralogists, v. 39, p. 237-251.
- Sawlan, M.G., 1991, Magmatic evolution of the Gulf of California rift, in Dauphin, J.P., and Simoneit, B.R.T., eds., *The Gulf and Peninsular Province of the California: American Association of Petroleum Geologists Memoir 47*, p. 301-369.
- SCAG (Southern California Association of Governments), 1995, *Regional comprehensive plan and guide*, 818 West 7th Street, 12th Floor, Los Angeles, California 90017-3435, Tables 3-2 and 3-3.
- Shafiqullah, M., Frost, G., Frost, D.L., and Damon, P., 1990, *Regional extension and gold*

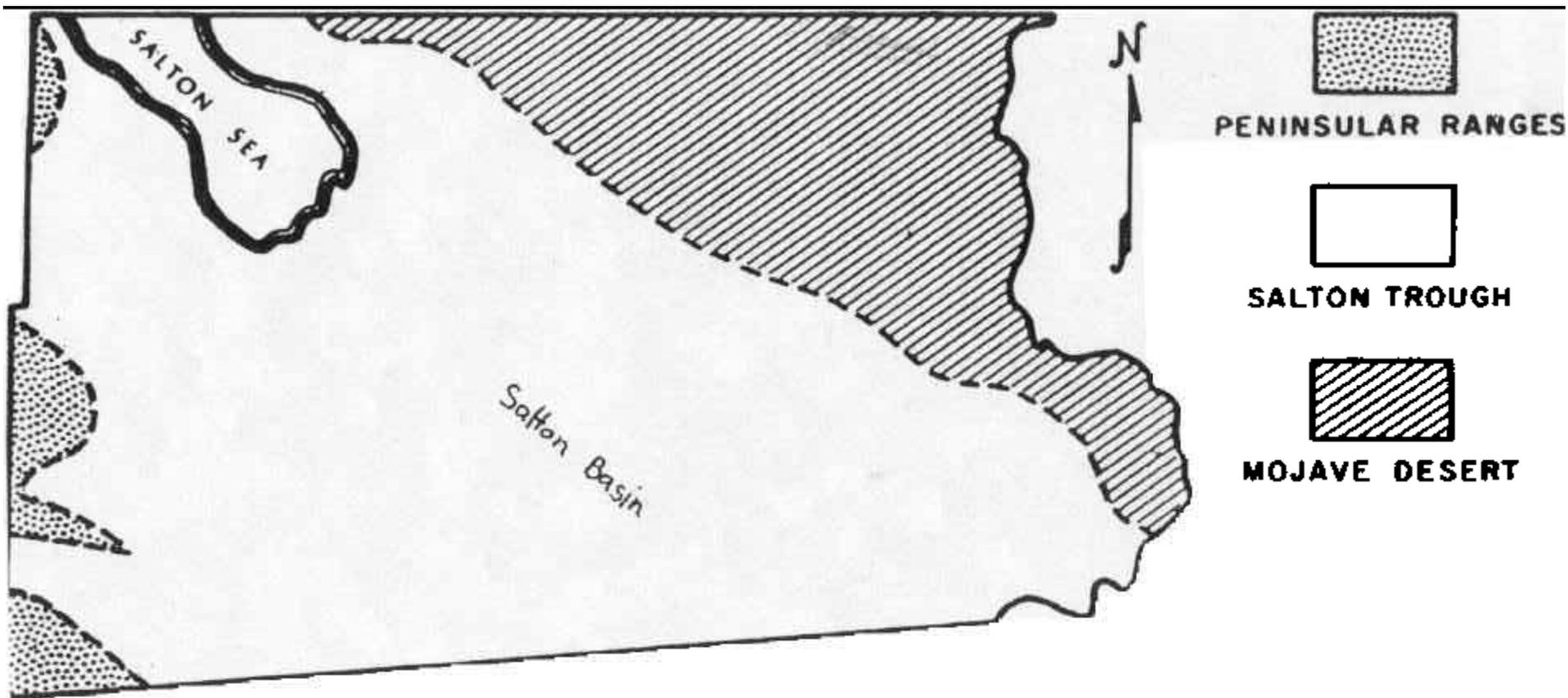
- mineralization in the southern Chocolate Mountains, southeastern California-KAr constraints from fault rocks: Geological Society of America Abstracts with Programs, v. 22, no. 3, p. 83.
- SME (Society for Mining, Metallurgy, and Exploration, Inc.), 1991, A guide for reporting exploration information, resources, and reserves, Mining Engineering, April 1991, pg. 379-384.
- Spencer, J.E., and Welty, J.W., 1986, Possible controls of base-and precious-metal mineralization associated with Tertiary detachment faults in the lower Colorado River trough, Arizona and California: Geology, v. 14, p. 195-198.
- Spencer, J.E., and Welty, J.W., 1989, Mid-Tertiary ore deposits in Arizona, in Jenney, J.P., and Reynolds, S.J., editors, Geologic evolution of Arizona: Tucson, Arizona Geological Society Digest 17, p. 585-607.
- Stock, J.M., and Hodges, K.V., 1989, Pre-Pliocene extension around the Gulf of California and the transfer of Baja California to the Pacific Plate: Tectonics, v. 8, p. 99-115.
- Tosdale, R.M., Haxel, G.B., Dillon, J.T., 1985, Lithologic associations of gold deposits, southeastern California and southwestern Arizona: Geological Society of America Abstracts with Programs, v. 17, no. 6, p. 414.
- Wilkins, J., Jr., and Heidrick, T.L., 1982, Base and precious metal mineralization related to low-angle tectonic features in the Whipple Mountains, California and Buckskin Mountains, Arizona, in Frost, E.G., and Martin, D.L., editors, Mesozoic-Cenozoic tectonic evolution of the Colorado River region, California, Arizona, and Nevada: Cordilleran Publishers, San Diego, p. 182-203.
- Winker, C.D., and Kidwell, S.M., 1996, Stratigraphy of a marine rift basin: Neogene of the western Salton Trough, California: for SEPM Guidebook, San Diego.



- Wilderness
- ACEC
- Indian Pass Proposed Withdrawal

Regional Map





After Morton, 1977

Attachment 4

BLM Manual 3031 - ENERGY AND MINERAL RESOURCE ASSESSMENT

Mineral Potential Classification System*

I. Level of Confidence

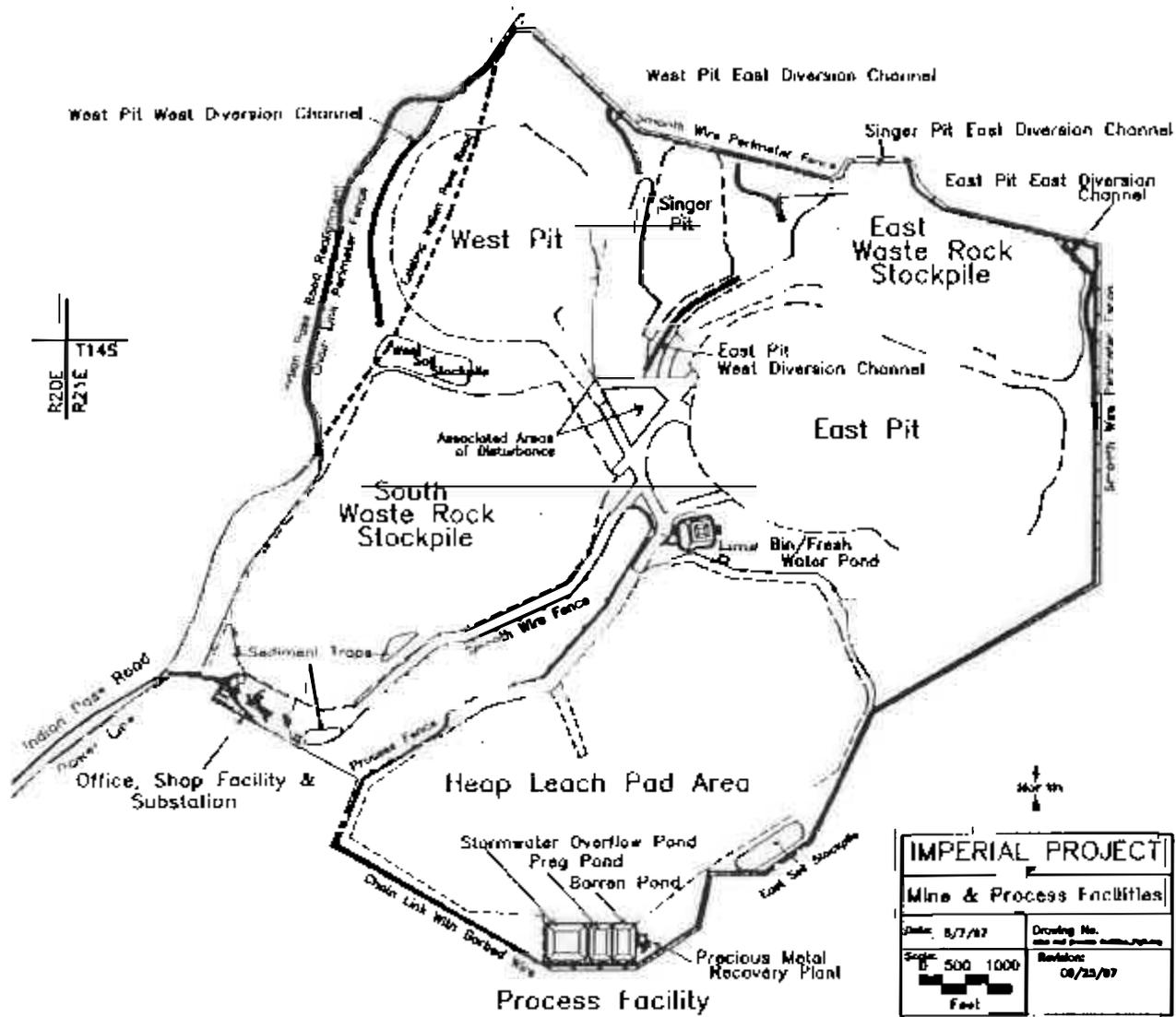
- O. The geologic environment, the inferred geologic processes, and the lack of mineral occurrences do not indicate potential for accumulation of mineral resources.
- L. The geologic environment and the inferred geologic processes indicate low potential for accumulation of mineral resources.
- M. The geologic environment, the inferred geologic processes, and the reported mineral occurrences or valid geochemical/geophysical anomaly indicate moderate potential for accumulation of mineral resources.
- H. The geologic environment, the inferred geologic processes, the reported mineral occurrences and/or valid geochemical/geophysical anomaly, and the known mines or deposits indicate high potential for accumulation of mineral resources. The "known mines and deposits" do not have to be within the area that is being classified, but have to be within the same type of geologic environment.
- ND. Mineral(s) potential not determined due to lack of useful data. This notation does not require a level-of-certainty qualifier.

II. Level of Confidence

- A. The available data are insufficient and/or cannot be considered as direct or indirect evidence to support or refute the possible existence of mineral resources within the respective area.
- B. The available data provide indirect evidence to support or refute the possible existence of mineral resources.
- C. The available data provide direct evidence but are quantitatively minimal to support or refute the possible existence of mineral resources.
- D. The available data provide abundant direct and indirect evidence to support or refute the possible existence of mineral resources.

For the determination of No Potential use O/D. This class shall be seldom used, and when used it should be for a specific commodity only. For example, if the available data show that the surface and subsurface types of rock in the respective area is batholithic (igneous intrusive), one can conclude, with reasonable certainty, that the area does not have potential for coal.

* As used in this classification, potential refers to potential for the presence (occurrence) of a concentration of one or more energy and/or mineral resources. It does not refer to or imply potential for development and/or extraction of the mineral resource(s). It does not imply that the potential concentration is or may be economic, that is, could be extracted profitably.



Comments must be received by Monday, June 5, 2000. Comments may be sent via:

MAIL	EMAIL	FAX
Bureau of Land Management El Centro Field Office 1661 South Fourth Street El Centro CA 92243	lkastoll@ca.blm.gov	760/337-4490