United States Department of the Interior

BUREAU OF LAND MANAGEMENT
FISH AND WILDLIFE SERVICE
BUREAU OF RECLAMATION

MEMORANDUM

DATE: May 28, 2009

SUBJECT: Request for Time-Critical Removal Action Number 4 at AOC 4 Debris Ravine, Pacific Gas and Electric Topock Compressor Station

FROM: Pamela S. Innis
DOI Topock Remedial Project Manager

TO: Dr. Willie Taylor, Director
Office of Environmental Policy and Compliance
Department of the Interior

THROUGH: John Earle, Manager – Havasu National Wildlife Refuge
Rebecca Heick – District Manager, Bureau of Land Management, Colorado River District
Joe Leibhauser – Bureau of Reclamation, Resource Management Office, Lower Colorado Region

I. PURPOSE

The purpose of this Action Memorandum is to document the basis for, and recommend, a time-critical removal action under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C §§ 9601 et seq., to address the substantial threat of a release of hazardous substances from the Pacific Gas and Electric ("PG&E") Topock Compressor Station near Topock, Arizona. Hazardous substances located on PG&E property have been released and pose a substantial threat of release onto the Havasu National Wildlife Refuge ("HNWR" or "the Refuge"). The Refuge land is under the jurisdiction of the Department of the Interior ("DOI") and is managed by United States Fish and Wildlife Service (USFWS) as a national wildlife refuge. Specifically, hazardous substances including, without limitation, arsenic, cadmium, hexavalent chromium, copper, lead, and dioxins, have been found at concentration exceeding human health and ecological risk-based screening levels in an area at the Compressor Station referred to as Area of Concern 4 ("AOC 4") or the "Debris Ravine." AOC 4 is one area currently being characterized in a Remedial Investigation ("RI") being

performed by PG&E under the direction and oversight of DOI. In addition, PG&E is concurrently performing a RCRA Facility Investigation ("RFI") under the direction and oversight of the Department of Toxic Substances Control ("DTSC") of the California Environmental Protection Agency.

The recommended time-critical removal action is authorized pursuant to the response action authority of Section 104(a) of CERCLA as amended, 42 U.S.C. §9604(a). Pursuant to Executive Order 12580, as amended, Section 104 authority is delegated to the Secretary of the Interior to address the release or substantial threat of release of hazardous substances on or from property under DOI's jurisdiction, custody, or control.

II. SITE CONDITIONS AND BACKGROUND

A. Site Description

1. Physical Location and Site Characteristics

The PG&E Topock Compressor Station ("the Compressor Station") is located in eastern San Bernardino County, California, approximately 12 miles southeast of Needles, California, south of Interstate 40, in the north end of the Chemehuevi Mountains. The Compressor Station occupies approximately 15 acres of a 65-acre parcel of PG&E-owned land. The PG&E property is surrounded by the Refuge and directly south of land under the jurisdiction of the Bureau of Land Management ("BLM") and the Bureau of Reclamation ("BOR").

PG&E began operations at the Topock Compressor Station in December 1951 to compress natural gas supplied from the southwestern United States for transport through pipelines to PG&E's service territory in central and northern California. The property on which the Compressor Station was built was owned by the State of California. From 1951 to 1965, PG&E leased the property from the State. In 1965, PG&E gained ownership of the property.

Current operations at the Compressor Station are very similar to the operations that occurred from the start of facility operations in 1951. The operations consist of six major activities: compression of natural gas, cooling of the compressed natural gas and compressor lubricating oil, water conditioning, wastewater treatment, facility and equipment maintenance, and miscellaneous operations. The greatest use of chemical products involves treatment of cooling water, and the greatest volume of waste produced consists of blowdown from the cooling towers.

From 1951 to 1985, Cr(VI)-based corrosion inhibitors and biocides were added to the cooling water. Several different corrosion inhibitors were used during this period; however, all are believed to have contained Cr(VI). Product specification sheets available for one of the additives (Krom-Trol X-5, also known as DE-307) indicate that it contained 30 percent sodium chromate (Betz 1985). In the early 1960s, a separate biocide

was also apparently added to assist in the control of algae, fungi, and/or bacteria (Betz 1965).

At the outset, hexavalent chromium was used in the Compressor Station cooling towers. Beginning in 1964, PG&E treated the cooling tower blowdown to remove chromium prior to discharge. Around 1970, they began discharging treated cooling tower blowdown to four single-lined evaporation ponds. PG&E replaced the Cr(VI)-based cooling water treatment products with non-hazardous phosphate-based products in 1985, at which time PG&E discontinued operation of the cooling tower blowdown treatment system. Use of the four, single-lined evaporation ponds continued until 1989. In 1989, the single-lined ponds were replaced with four new, Class II (double-lined) ponds, located approximately 1.2 miles to the northwest. The cooling tower blowdown treatment system and the single-lined ponds were physically removed and clean-closed from 1988 to 1993. The four, Class II double-lined ponds, which are on BLM-managed property, are still in use and are operated pursuant to a permit issued by the State of California Regional Water Quality Control Board, Colorado River Basin Region (PG&E 2009).

AOC 4

AOC 4, the Debris Ravine, is south of most of the PG&E Topock Compressor Station facilities along a narrow, steep-sided arroyo (Figure 1). Most of AOC 4 is located on PG&E property; however, the western-most end is located on the Refuge (Figure 2). As documented in the RFI/RI Soil Investigation Work Plan Part A dated November 16, 2006, the bottom of the Debris Ravine mainly consists of bedrock, with a thin veneer of channel fill alluvium. Due to storm deposition and scouring, channel fill alluvium in the bottom of the Debris Ravine varies in thickness from less than 1 foot to 3 feet. The sides of the Debris Ravine are very steep, with waste and soil varying in thickness. The Debris Ravine drains directly into Bat Cave Wash and the Refuge.

Historical operations in this area are not documented; however, over the years materials disposed in the Debris Ravine include glass, wood, metal, concrete, broken transite panels, garbage, and unknown quantities of white powder. A former employee reported disposing of 200 to 300 bags of lime in this area after the old lime softening process was discontinued (Russell 2006a).

2. Release or Threatened Release into the Environment of a Hazardous Substance, or Pollutant, or Contaminant

During Phase I of the RFI (April 1997), soil samples were collected from seven locations within the Debris Ravine. The analytical results of soil samples collected from AOC 4 are presented in the RFI/RI Soil Investigation Work Plan Part A dated November 16, 2006.

The following summarizes the results of the soil and sediment data collected at AOC 4 (CH2M HILL 2005a). Total chromium, copper, zinc, lead, barium and selenium were detected at concentrations outside the background comparison range. Sample results

exceeded the ecological comparison value (ECV) (Arcadis 2008 and 2009) in at least 3 of the 12 samples for each constituent. Detected concentrations of the polyaromatic hydrocarbons (PAHs) benzo(a)anthracene, benzo(k)fluoranthene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene exceeded their respective industrial California Human Health Screening Levels (CHHSL 2005) and U.S. EPA Region 9 Regional Screening Levels (RSLs).

Fourteen new soil sample locations were proposed as part of the RFI/RI Soil Investigation Work Plan, Part A (PG&E 2006). Samples were analyzed for Cr(VI), Title 22 metals, PAHs, and asbestos. During sample collection activities, concerns were raised about the sampling approach with respect to the steepness of the slope. Sample locations were modified as a result of discussions among DTSC, DOI and PG&E. Additionally, trenches were excavated along the upper portion of the area to identify the thickness of fill along the slope and to provide sample location access for areas of potential contamination at depth. A total of 55 samples were collected as part of this effort.

In November 2008, DOI and DTSC directed PG&E to perform dioxin and furan analyses on soil samples collected from two locations within AOC 4. The sampling activities occurred in December of 2008 and sample results were submitted to DOI and DTSC by PG&E in January 2009. Two samples locations were specified in burn areas along the north slope of the Debris Ravine and the upper debris area. Final sample locations are provided in Figure 2.

Results of the sampling are provided in Table 1 and are summarized below.

- Cr(T) was detected at concentrations outside the background comparison range in majority of the soil samples and the concentration of Cr(T) exceeded the ECV of 36.3 mg/kg in all but fifteen samples.
- Cr(VI) was above background in 42 of the soil samples; however, Cr(VI) was only found above the industrial CHHSL in five samples and the ECV in three samples.
- Copper and zinc were detected at concentrations outside their background comparison ranges in 45 and 42 of the soil samples, respectively. At 45 locations, the ecological comparison value of 20.6 mg/kg was exceeded for copper. The zinc ecological comparison value of 0.164 mg/kg was exceeded at all 42 locations. However, none of the detected concentrations exceeded the industrial CHHSL.
- Lead was detected at concentrations outside the background comparison range in 43 samples, and concentrations in all 55 samples exceeded the ecological comparison value. Two of the detected concentrations of lead exceeded the industrial CHHSL.
- Vanadium exceeded the ecological comparison value in all but two samples and was outside the background comparison range in three samples. The concentrations of vanadium did not exceed the industrial CHHSL.
- Barium detected at concentrations outside the background comparison range in 19 samples, and concentrations in 21 samples exceeded the ecological comparison value.

- Detected concentrations of the PAHs, expressed as benzo(a)pyrene equivalents, exceeded their respective industrial CHHSLs. Background comparison ranges for PAHs have not been determined.
- Dioxins and furans were found in areas where material had been burned. Dioxin results exceed the industrial CHHSL.
- Asbestos was detected in two soil samples and one debris sample (0.3, 1.9, and 15 percent, respectively). Trace amounts of asbestos (less than 0.1 percent) were detected in 21 of 55 soil samples analyzed.

Table 1

Constituent	**Max. Detection**	**ECV**	**CHHSL[2] 2005 – Industrial**	**USEPA RSL[3] Industrial**	**Background Threshold Value[4]**
Inorganics (mg/kg)					
Antimony	69	0.285	380	410	NA
Arsenic	40	11.4	0.24	1.6	11
Barium	2,900	330	6,300	190,000	410
Cadmium	27	0.0151	7.5	810	1.1
Chromium (total)	15,000	36.3	NA	1,400	39.8
Hexavalent Chromium	1,560	139.6	37	200	0.606
Cobalt	61	13	3,200	300	12.7
Copper	5,900	20.6	38,000	41,000	16.8
Lead	11,000	0.0166	3,500	800	8.39
Manganese	480	220	NA	NA	NA
Mercury	29	0.0125	180	310	NA
Molybdenum	190	2.25	4,800	5,100	1.37
Nickel	580	0.607	16,000	20,000	27.3
Selenium	1.7	0.177	4,800	5,100	1.47
Vanadium	57	13.9	6,700	5,200	52.2
Zinc	9,900	0.164	100,000	310,000	58.0
SVOCs (ug/kg)					
PAHs[1]	12,000	NA	130	210	NA
Pentachlorophenol	8,900	2,490	13,000	9,000	NA
Dioxins/Furans (ug/kg)					
Dioxin[5]	3.9	0.0016	0.019	0.018	NA

mg/kg – milligram per kilogram; ug/kg – microgram per kilogram; ng/kg – nanogram per kilogram
NA – Not Available
Footnotes:
1 – Expressed as Benzo (a) pyrene equivalents
2 – CHHSL – California Human Health Screening Level
3 – USEPA Region 9 Screening Level available for download at:
http://www.epa.gov/region09/superfund/prg/pdf/master_sl_table_run_12SEP2008.pdf
4 – PG&E 2008b.
5 – as tetrachlorodibenzo-p-dioxin Toxic Equivalent (TCDD TEQ)

It is probable that soil contaminants in AOC 4 have been released and transported to areas outside of AOC 4; notably AOC 1 (Bat Cave Wash). The likely release and transport mechanism involves:

- Entrainment of contaminated soils by storm-water events and local surface water runoff,
- Transport along the surface water flow pathway, and
- Deposition in downstream locations.

This secondary source, release and transport mechanism is depicted conceptually in the top portion of Figure 3. Moreover, this model of transport is consistent with Figure 4-1 shown in the Risk Assessment Work Plan (PG&E 2008a).

Evidence that this mechanism is functional is displayed in the lower portion of Figure 3 where select data from the August, September, October TAL/TCL soils sampling conducted in AOC 4 and AOC 1 is displayed. The Benzo(a)pyrene Equivalent (B(a)P Eq[1] data suggests that the conceptual mechanism is functioning. The lower portion of Figure 3 indicates:

- B(a)P Eq detection rates are higher in AOC 4 than in the downstream AOC 1:
    - 83% in AOC 4, 50% in AOC 1
- B(a)P Eq concentrations are higher in AOC 4 than in the downstream AOC 1:
    - Maximums: 12,000 µg/kg in AOC 4, 80 µg/kg in AOC 1
    - Medians: 34 µg/kg in AOC 4, 11 µg/kg in AOC 1

Additionally review of the data indicates areas of notably elevated AOC 4 B(a)P concentrations:

- Sample AOC 4-13-3040 (0 to 0.5 ft. depth) = 12,000 µg/kg
- Sample AOC 4-4-3010 (0 to 0.5 ft. depth) = 6,100 µg/kg

Taken as a whole, and considering that AOC 4 flows into Bat Cave Wash near the local headwaters, the conceptual model of contaminant release and transport, coupled with pertinent data collected with the conceptual model in mind suggest that soil contamination in AOC 4 has released and transported to the Refuge. Barring some mitigative measures, releases or the substantial threat of releases of hazardous substances are likely to continue.

[1] B(a)P Eq was selected for this illustration because: 1) visual inspection of AOC 4 indicated probability of fire in the area; polycyclic aromatic hydrocarbon (PAHs), of which B(a)P Eq is a moniker, are associated with combustion process, 2) there are many PAH detections revealed in the data that followed this pattern, and 3) PAHs are hazardous substances with notable human and ecological toxicity; B(a)P Eq is a human health PAH toxicity surrogate.

Recreational activities at the Refuge include sightseeing, bird watching, fishing, hunting, and canoeing. All areas within the Refuge and outside the Compressor Station are currently accessible for these activities and are expected to remain accessible in the future

The terrestrial habitats in the vicinity are typical of Mojave Desert uplands, consisting of creosote bush scrub, with Mojave wash, desert riparian, and tamarisk thicket. Creosote bush scrub is the dominant upland plant community. Representative upland avian, mammalian, and reptilian species and upland plant species can be expected at the site. The Topock Marsh is within the Refuge and provides important aquatic marsh and riparian habitat in the local vicinity.

Both the Debris Ravine and Bat Cave Wash may periodically flood during stormwater runoff events, but remain dry throughout most of the year due to arid desert conditions.

The surface and shallow soil may be contacted without substantial intrusive activity. However, the soil at the site is loose desert sand and is not compacted or densely vegetated. Wind erosion and surface water runoff may mix the material at the surface more readily than in other areas of California. Access to soil deeper than 3 feet would require intentional intrusive activity. Potential soil exposure pathways for recreational or tribal use receptors at the Refuge include incidental ingestion, dermal contact, and inhalation of dust in ambient air. The principal exposure pathways for ecological receptors in the terrestrial environment are exposure to constituents in surface soil, shallow soil, and subsurface soil via direct contact, incidental ingestion, and/or ingestion of chemically affected biota (PG&E 2008a).

3. National Priorities List (NPL) Status

The PG&E Topock Compressor Station is not listed as a NPL site. The site is listed in CERCLIS EPA ID No. CAT080011729.

4. Figures

The location of the site, sampling locations, and the PG&E/Refuge boundary are shown in Figure 2.

B. Other Actions to Date

1. Previous Actions

In 1988, PG&E completed a soil investigation in the Bat Cave Wash area at the request of the California Department of Health Services (now known as the Department of Toxic Substances Control ("DTSC")) and the U.S. Environmental Protection Agency ("EPA"). The soil investigation documented chromium releases to the environment. In 1989, a “Comprehensive Ground Water Monitoring Evaluation" prepared by the California Regional Water Quality Control Board identified chromium releases in groundwater.

By letter dated May 29, 1995, PG&E reported the presence of chromium in groundwater samples taken on the east side of Bat Cave Wash near the north boundary of the PG&E facility. In response, on February 26, 1996, DTSC and PG&E executed a Corrective Action Consent Agreement pursuant to State law under which DTSC directed PG&E to perform a "Facility Investigation" as well as any "Interim Measures" determined to be necessary to address immediate or potential threats to human health and/or the environment.

In the course of implementing groundwater monitoring required under the Corrective Action Consent Agreement, PG&E has documented an extensive plume of groundwater contaminated with Cr(VI) that stretches from the PG&E facility under the Refuge and BOR lands managed by BLM toward the Colorado River. On February 3, 2004, PG&E reported concentrations of Cr(VI) of 111 parts per billion ("ppb") in groundwater taken from monitoring well MW34-80. This monitoring well is located on BLM-managed property within 100 feet of the Colorado River.

Based on this finding, DTSC ordered PG&E to prepare and submit Interim Measures ("IM") Work Plan No. 2 "to immediately begin pumping, transport and disposal of groundwater from existing monitoring wells at the MW20 cluster." These monitoring wells located on or near the "MW20 bench" are on BLM-managed lands. By Action Memorandum issued March 3, 2004, BLM authorized PG&E to conduct a time-critical removal action, consistent with IM No. 2, to prevent or abate the release of Cr(VI) into the Colorado River. The scope of this removal action was to extract contaminated groundwater from existing or, if necessary, new wells to maintain a landward gradient and ensure that Cr(VI) did not reach the Colorado River.

On May 20, 2004, BLM issued a second Action Memorandum authorizing PG&E to operate, for a limited period of time, a batch treatment system on the MW20 bench. The purpose of this time-critical removal action was to reduce the volume of hazardous waste being shipped offsite by allowing treatment of contaminated groundwater onsite prior to offsite transport and disposal as non-hazardous waste.

On September 17, 2004, BLM issued a third Action Memorandum authorizing PG&E to install and operate the IM No. 3 system, which included conveyance piping, monitoring wells, a wastewater treatment facility, and associated needed improvements to roads and the IM No. 2 system.

AOC 4

Following review of the sampling data collected in December 2008, PG&E implemented maintenance measures to temporarily mitigate the potential for erosion of soils at AOC 4 in January 2009. SoilTac, which is a non-toxic and biodegradable soil fixation polymer, was mixed with water and applied to surface soils on the north slope of the Debris Ravine and to a smaller extent, the upper area to the east of the Debris Ravine. This measure is intended to temporarily stabilize soil erosion from wind and surface runoff while a determination is made regarding the need for and implementation of a time-critical

removal action. The polymer does not completely mitigate risks from direct surface exposure or infiltration of water, and is not intended to permanently stabilize the soil. Silt fencing was placed along a portion of the base of the side slope to minimize transport of material during runoff events.

2. Current Actions

PG&E is continuing with the ongoing conduct of the RFI/RI and Corrective Measures Study/Feasibility Study (CMS/FS) for soils and groundwater at the Compressor Station.

C. State and Local Authorities' Roles

On February 26, 1996, DTSC and PG&E executed a Corrective Action Consent Agreement pursuant to State law under which DTSC directed PG&E to perform a "Facility Investigation" as well as any "Interim Measures" determined to be necessary to address immediate or potential threats to human health and/or the environment.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Pursuant to Section 104 of CERCLA and consistent with the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 CFR Part 300, DOI is authorized to respond to the release or substantial threat of release of hazardous substances on or from property under DOI's jurisdiction, custody, or control. DOI is authorized to act to remove or arrange for the removal of such hazardous substances whenever DOI determines that such action is necessary to protect the public health or welfare or the environment. When DOI determines that such action will be done properly and promptly by the owner or operator of the facility, DOI may allow such person to carry out the action.

Pursuant to Section 300.415(b)(2) of the NCP, where DOI determines that there is a threat to public health or welfare or the environment, DOI may take any appropriate removal action to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or threat of release. The following sections evaluate, based on the factors outlined in Section 300.415(b)(2) of the NCP, threats to public health or welfare or the environment posed by the release and threatened release of hazardous substances at and from AOC 4.

A. Threats to Public Health or Welfare

1. Actual or potential exposure to nearby human populations or the food chain from hazardous substances or pollutants or contaminants

AOC 4 is located adjacent to and partially on the Refuge managed by USFWS. Recreational activities at the Refuge include sightseeing, bird watching, fishing, hunting, and canoeing. All areas within the Refuge and outside the Compressor Station are

considered publicly accessible for such activities and are likely to remain publicly accessible in the future.

Table 1 indicates eighteen constituents with maximum concentrations exceeding recognized human health and/or ecological health soil screening levels. In some cases, the maximum concentration significantly exceeds screening levels and sometimes by several orders of magnitude, as indicated by the following select examples:

- Hexavalent Chromium is forty-two times the Industrial CHHSL.
- Lead is three times the Industrial CHHSL.
- PAH's (as B(a)P Eq) is ninety-two times the Industrial CHHSL.

All of these constituents have significant human health and/or ecological receptor toxicity endpoint and exposure at or in the range of the maximum concentrations could have significant biological impacts. This is indicated by the conceptual site model (CSM) for ecological exposure found in the Risk Assessment Work Plan, Figure 6-1 (PG&E 2008a). The CSM denotes potentially complete Ingestion and Dermal Contact exposure pathways for: Recreational Users, Tribal Users, and Maintenance workers in AOC 4(See Figure 4-2 [PG&E 2008a]).

2. High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate

Contaminated soil and debris are known to be present on the surface of and within the debris pile on the north slope of the Debris Ravine adjacent to the Lower Yard of the Topock Compressor Station. The maximum concentrations of Cr(IV) are above 1, 560 mg/kg, and exceed the Industrial CHHSL, background concentrations and the ECV. Other hazardous substances, including organic chemicals, metals, and dioxins are also present in soil at levels that exceed applicable human health and ecological risk screening levels. Past erosion of the loosely consolidated soil and waste on the slope is evident and will eventually resume as the temporary polymer degrades. In the event of severe runoff, substantial erosion and/or slope failure is possible.

Contaminated soil transported down the slope is deposited in the bottom of the Debris Ravine, where it can be rapidly transported via stormwater runoff to the adjacent Refuge located only a few hundred feet downstream.

On this basis, it is apparent that conditions at AOC 4, as documented by December 2008 investigation, pose a significant threat to human health.

3. Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released

Precipitation in the vicinity of the Compressor Station is minimal year round, with the most rain typically falling in January. The total precipitation for the entire year averages 2.7 inches. During monsoon season (June – September), however, clouds build

throughout the day and result in strong afternoon thunderstorms. These events are sporadic with heavy winds and rain. Localized conditions can result in significant flooding and erosion in arroyos.

Substantial quantities of contaminated waste material occur on steep, unstable slopes in AOC 4. Evidence of significant flooding and mass transport in the arroyo has been demonstrated by the movement of concrete debris to Bat Cave Wash. A significant rain event in the area could result in severe erosion of the contaminated materials on the steep slope and rapid migration of hazardous substances from AOC 4 to the Refuge.

B. Threats to the Environment

1. Actual or potential exposure to nearby animals or the food chain from hazardous substances or pollutants or contaminants

The number of hazardous substances detected in AOC 4 soils, and their concentrations indicate a substantial potential risk to the environment. Table 1 indicates eighteen constituents with maximum concentrations exceeding recognized human health and/or ecological health soil screening levels. In some cases, the maximum concentration significantly exceeds screening level and sometimes by several orders of magnitude, as indicated by the following selected examples:

- The maximum detected concentration of Cr(V) exceeds the ECV by a factor of 11.
- The maximum detected concentration of lead exceeds the ECV by a factor of 660,000.
- The maximum detected concentration of mercury exceeds the ECV by a factor of 2,320.

All of these constituents have significant human health and/or ecological receptor toxicity endpoint and exposure at or in the range of the maximum concentrations could have significant biological impacts.

Exposure of ecological receptors to the hazardous substance found in AOC 4 is occurring, or may occur in the future. This is indicated by the CSM found in the Risk Assessment Work Plan, Figure 6-1 (PG&E 2008a).

On this basis, it is apparent that conditions at AOC 4, as documented by December 2008 investigation, pose a significant threat to the environment.

2. Actual or potential contamination of sensitive ecosystems

AOC 4 is located adjacent to and partially on the Refuge managed by USFWS. The Refuge was established in 1941 to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. The federally listed species that occur on the Refuge include the southwestern willow flycatcher

(*Empidonaz traillii extimus*), the desert tortoise (Mohave population) (*Gopherus agassizii*), the Yuma clapper rail (*Rallus longirostris yumanensis*), the Colorado pikeminnow (*Ptychocheilus lucius*), the razorback sucker (*Xyrauchen texanus*), and the bonytail chub (*Gila elegans*). Some of the state-listed species that occur on the Refuge include western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), the Gila woodpecker (*Melanerpes uropygialis*), the elf owl (*Micrathene whitneyi*), and Arizona Bell's vireo (*Vireo bellii arizonae*). Since AOC 4 is located in an upland wash west of the Colorado River, the only federally listed species that could occur in this area is the desert tortoise. PG&E does yearly surveys for the desert tortoise and has not found any evidence of recent, active desert tortoise use of the area. However, the contamination pathway from AOC 4 to AOC 1 leads from upland terrestrial/wash habitat to the confluence of Bat Cave Wash with the Colorado River. At this point, there is a salt cedar (*Tamarix* spp.) thicket that is saturated with water year round. This salt cedar thicket provides some of the best southwestern willow flycatcher habitat on the Refuge on the west bank of the Colorado River. This habitat has likely functioned as a sink for sediment deposition over time. In addition, the Refuge is charged with protecting wildlife and wildlife habitat for species other than threatened and endangered species. The habitat in and around AOC 4 is suitable for bighorn sheep, bobcats, chuckwallas, red-tailed hawks and other mammals, reptiles, and birds. Observations of mountain lion activity have been reported in this area as well.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from the Debris Ravine, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare or the environment. This time-critical removal action is necessary to abate, prevent or eliminate the release or substantial threat of release of hazardous substances onto the Refuge lands which are under federal jurisdiction. Due to the high levels of contamination documented by the December 2008 sample results, DOI has determined, in accordance with Section 300.415(b)(2) of the NCP, that a time-critical response is necessary.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed action description

Removal of the contaminated debris and fill material and disposal in an appropriately-permitted landfill will help to mitigate in the short term the human and environmental health risks posed by potential direct contact with contaminated materials. Historical operations at AOC 4 are not well documented. Based on observations made during the recent investigation, there are two primary areas of fill material and debris deposition at AOC 4: (1) the western portion of the north slope of the ravine and (2) a smaller, upper area located along a service road in the eastern portion of the AOC. However, because characterization at this AOC has not been completed, the full potential extent of

contaminated fill material deposition is not known. Figure 2 provides a vicinity map and shows the two primary areas of fill material and debris. For work planning purposes, it is estimated that up to 4000 cubic yards of debris/fill material shall be removed from the primary areas of fill material and debris. The time-critical removal action will not be limited to these primary areas – it shall also include removal of other surface debris and fill materials within the anticipated primary work zone shown in Figure 2. This action is focused on removal of fill and debris. Removal of the alluvium and bedrock comprising the original slope will be avoided to the extent practicable.

The extent of removal activities will be determined in the field using a combination of visual observations, readily available field screening instruments, and samples collected for laboratory analysis. Field screening instruments and visual observations will also be used to guide segregation of the excavated material, to the extent practicable, into stock piles to limit the amount of uncontaminated material that is removed from AOC 4. Material stock piling and other support/staging areas will be on PG&E property within and adjacent to the Topock Compressor Station. Specific locations will be provided in the Removal Action Work Plan. The final waste profiles used to identify the appropriate permitted landfill facility for disposal shall be dependent on laboratory analysis of samples collected from the stock piles. Subsequent to waste profiling, the stockpiled material shall either be transported offsite to permitted landfills or left onsite, as appropriate. Possible landfill sites include, but are not limited to, the US Ecology landfill in Beatty, Nevada and the Waste Management landfill in Kettleman City, California.

Following removal action, post-excavation samples shall be collected from the underlying material to characterize the existing soil conditions. The removal shall be focused on fill and debris material, removal of alluvium and bedrock comprising the original slope shall be avoided to the extent practicable.

Additionally, the removal areas shall be stabilized and erosion control measures shall be implemented. Slope stabilization and erosion control measures will depend on the extent of removal; however, potential measures may include backfilling and compacting selected areas with non-contaminated fill material derived from the site to minimize the aesthetic impact of the removal, and applying biodegradable soil stabilization material (e.g., SoilTac) for dust/erosion control as appropriate. Following implementation of the stabilization and erosion control measures, periodic inspection and maintenance shall be conducted as needed to confirm effective slope stabilization and erosion control until a final remedy is developed and implemented for this AOC.

The scope of work is anticipated to include the following tasks:

- Pre-work plan activities to support work planning and the development of the work plan. It is anticipated that the field tasks associated with this phase may include, but are not limited to:
    - Geotechnical evaluation of the strength of the existing slope and its capacity to safely support the weight of equipment used for removal (involves drilling/sampling/testing).

    - Survey of surficial soils in areas with sparse deposition of fill material and debris (e.g., the area between the two primary fill areas) using field screening instruments to further define the anticipated extent of removal.
    - Performance of a topographic survey of the slope before and after the removal action.
    - Performance of a biological survey of the AOC before and after the removal action.
- Work plan development for removal implementation and associated activities.
- Secure permits for off-site activities, as needed,
- Field implementation of the work plan – it is anticipated that the primary field tasks associated with the removal may include, but are not limited to:
    - Installation of control/monitoring measures such as air monitoring, dust suppression, runoff control, and access control.
    - Removal of debris and fill material (removal of the alluvium or bedrock comprising the original slope shall be avoided to the extent practicable).
    - Sorting/stockpiling/physical and chemical profiling of excavated materials.
    - Loading/transporting contaminated materials offsite.
    - Collection of post-excavation samples.
    - Implementation of post-removal slope stabilization, erosion control, and access control (if needed).
- A Removal Action Completion report and a Biological Survey report are required.

Activities authorized by this Action Memorandum require compliance with OSHA 1910.120 and include the development of site-specific activities subject to DOI review and/or approval prior to implementation, including a transportation plan and a health and safety plan. DOI may review and/or approve additional plans pursuant to this Action Memorandum.

This time-critical removal action is intended to stabilize and mitigate the threat of release of contaminated material and is not intended to be the final remedy for this AOC. DOI has established target endpoint concentration requirements to guide the cleanup of AOC 4. The target endpoint concentrations used to guide the extent of the removal on non-native material (primarily debris and fill material) on PG&E property are the CHHSL or RSLs Industrial levels for metals, PAHs, and dioxins, which ever is more restrictive. The target endpoints for the removal on the Refuge are background levels. For the SVOCs and Dioxins/Furans, no current background level exist, therefore ECVs shall be used for the target endpoint concentration. These target endpoints shall be used to screen non-native debris and fill material for removal and shall not be used for removal of native bedrock and alluvial material. The Refuge has a unique mission for the conservation of wildlife and habitat for the benefit of the American people. To adequately support this mission, FWS has chosen a lower target endpoint for the Refuge than industrial level target required on PG&E property. The target endpoint concentrations are shown in Table 2.

Table 2.

Constituent	Max. Detection	Target Endpoint Concentrations: PG&E Property	Source	Target Endpoint Concentrations: Refuge Property[2]
Inorganics (mg/kg)				
Antimony	69	380	Industrial CHHSL	NA
Arsenic	40	11	Background	11
Barium	2,900	6,300	Industrial CHHSL	410
Cadmium	27	810	Industrial RSL[3]	1.1
Chromium (total)	15,000	1,400	Industrial RSL	39.8
Hexavalent Chromium	1,560	37	Industrial CHHSL	0.606
Cobalt	61	300	Industrial RSL	12.7
Copper	5,900	38,000	Industrial CHHSL	16.8
Lead	11,000	800	Industrial RSL	8.39
Manganese	480	NA	NA	NA
Mercury	29	180	Industrial CHHSL	NA
Molybdenum	190	4,800	Industrial CHHSL	1.37
Nickel	580	16,000	Industrial CHHSL	27.3
Selenium	1.7	4,800	Industrial CHHSL	1.47
Vanadium	57	5,200	Industrial RSL	52.2
Zinc	9,900	100,000	Industrial CHHSL	58.0
SVOCs (ug/kg)				
PAHs[4]	12,000	130	Industrial CHHSL	NA
Pentachlorophenol	8,900	9,000	Industrial RSL	2,490[6]
Dioxins/Furans (ug/kg)				
Dioxin[5]	3.9	0.050	DTSC Draft Residential PRG	0.0016

Acronyms and Abbreviations:
mg/kg – milligram per kilogram
ug/kg – microgram per kilogram
NA – Not Available

[2] Background threshold value (PG&E 2008b).
[3] The RSL was selected because the lower CHHSL value (derived in 2005) assumes that cadmium is an oral carcinogen, but the oral cancer potency factor used to derive the CHHSL was withdrawn in 2008.
[4] Expressed as Benzo (a) pyrene equivalents
[5] As tetrachlorodibenzo-p-dioxin Toxic Equivalent (TCDD TEQ)
[6] Ecological Comparison Value

2. Contribution to remedial performance

This removal action is expected to be consistent with and contribute to any subsequent remedial action selected to respond to contaminated soils that are the subject of the ongoing RFI/RI.

3. Project Schedule

The removal action implementation shall be initiated once this Action Memorandum is approved. Field pre-work activities will start immediately. It is estimated that total time needed to complete the removal action is approximately twelve months.

B. Estimated Costs

Because such actions will be financed by PG&E, DOI has not determined the estimated costs to implement this time-critical removal action.

VI EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

In the event response action is delayed or not taken, hazardous substances will continue to be released, or there is a substantial threat of such release, into Bat Cave Wash and the Refuge.

VII OUTSTANDING POLICY ISSUES

This time-critical removal action must be coordinated with the ongoing RFI/RI and CMS/FS being conducted by PG&E pursuant to the Administrative Consent Agreement entered with DOI and the Corrective Action Consent Agreement entered with DTSC. In addition, several federally-recognized tribes have identified areas of traditional religious and cultural importance within the Area of Potential Effects previously established for the remedial investigation underway. Consultation with these tribes has been completed on the draft of this Action Memorandum.

The approximate boundaries of the RFI/RI study area are defined by the Area of Potential Effect (APE). The location of AOC 4 is within the expanded APE. Applied Earthworks, Inc. completed a study titled: "Archaeological and Historical Investigations Third Addendum: Survey of the Original and Expanded APE for Topock Compressor Station Site Vicinity San Bernardino County, California, and Mohave County, Arizona," prepared for Pacific Gas and Electric Company in May of 2007. That study indicates that no historically significant sites are within the AOC 4 work area. There are two archaeological sites located within a few hundred meters of AOC 4 Debris Ravine, but, they are not on or within the AOC 4 Debris Ravine at the PG&E Topock Compressor Station. To insure compliance with Section 106, it is recommended that an archaeologist monitor the AOC 4 work area during the AOC 4 clean up and that PG&E notify the Tribes of the work schedule such that a (Native American) cultural monitor may be

present during the AOC 4 clean up to ensure that unknown, buried prehistoric or historic sites are not impacted.

VIII ENFORCEMENT

DOI has determined that PG&E is a responsible party pursuant to Section 107 of CERCLA, 42 U.S.C. § 9607. As defined by CERCLA, PG&E is the owner and operator of a facility from which hazardous substances have been released into the environment. In July 2005, PG&E and DOI entered into the Administrative Consent Agreement to implement response actions at the site, including any removal actions determined to be necessary to protect public health or welfare or the environment. Pursuant to that Consent Agreement, DOI has requested, and PG&E has agreed, that PG&E shall perform this removal action.

IX RECOMMENDATION

This decision document identifies and recommends the selected removal action for AOC 4, the Debris Ravine, at the PG&E Topock Compressor Station, developed in accordance with CERCLA as amended and not inconsistent with the NCP. This recommendation is based on the administrative record for the site and the data and endangerment determination contained herein. DOI has determined that PG&E is capable of performing this removal action in a manner consistent with the NCP, contingent on PG&E's full compliance with the requirements of this Action Memorandum. Conditions at the site meet the criteria for undertaking the proposed time-critical removal action, as specified by Section 300.415 (b)(2) of the NCP, 40 CFR § 300.415(b)(2). We recommend your approval of the proposed time-critical removal action.

Department of Interior – Office of Environmental Policy and Compliance

Approval — Date: 6/18/2009

Disapproval — Date

Bureau of Land Management – Colorado River District

Approval — Date: 6/10/2009

Disapproval — Date

Bureau of Reclamation – Lower Colorado Region

Approval — Date: 9 June 2009

Disapproval — Date

U.S Fish and Wildlife Service – Havasu National Wildlife Refuge

Approval — Date: 6-5-9

Disapproval — Date

ACRONYMS, ABBREVIATIONS, AND UNITS OF MEASURE

AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirements
B(a)P Eq	Benzo(a)pyrene Equivalent
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
CFR	Code of Federal Regulations
CHHSL	California Human Health Screening Level
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
Cr (T)	Total Chromium
Cr (IV)	Hexavalent Chromium
CSM	Conceptual Site Model
DOI	Department of Interior
DTSC	California Department of Toxic Substances Control
ECV	Ecological Comparison Value
HNWR	Havasu National Wildlife Refuge
IM	Interim Measure
NPL	National Priorities List
PAH	Poly Aromatic Hydrocarbons
PG&E	Pacific Gas and Electric
ppb	parts per billion
OSHA	Occupational Safety and Health Administration
RCRA	Resource Conservation and Recovery Act

RFI/RI	RCRA Facility Investigation/ Remedial Investigation
RSL	Regional Screening Level
TAL	Target Analyte List
TCL	Target Compound List
USFWS	United States Fish and Wildlife Service
USC	United States Code
µg/kg	Micrograms per kilogram

REFERENCES

Arcadis 2008. Topock Compressor Station: Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil.

Arcadis 2009. Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.

Betz 1965. Topock Cooling Water Analyses Report. February 2.

Betz 1985. Transmittal letter from Harold M. March (Betz) to Dick Davis (PG&E) and material safety data sheets for Betz products. August 16.

CH2M Hill 2005(a). RCRA Investigation/Remedial Investigation Report PG&E Topock Compressor Station, Needles, California. February.

CH2M Hill 2009. January 20, 2009 email from CH2M Hill to DOI and DTSC entitled: AOC 4 Soil Data Tables and Figure.

CHHSL 2005. Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties, January 2005. California Environmental Protection Agency.

PG&E 2006. RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A. November 2006.

PG&E 2007. Revised Final RCRA Facility Investigation/Remedial Investigation, Volume 1 – Site Background and History Report.

PG&E 2008a. Pacific Gas and Electric Company. Human Health and Ecological Risk Assessment Work Plan, Topock Compressor Station, Needles, California. August 2008.

PG&E 2008b. Soil Background Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California. December 12, 2008. Interim.

PG&E 2009. Revised Final RCRA Facility Investigation/Remedial Investigation, Volume 2.

Russell, Curt. 2006. Personal Communication in “Final Field Notes Memorandum, May 8 to 9, 2006.” May.

Figures

Figure 1. Northwesterly view of debris in foreground placed along old road within the central portion of AOC 4 (Debris Ravine).

Figure 2. Site Location, AOC 4 Boundaries and Sampling Locations

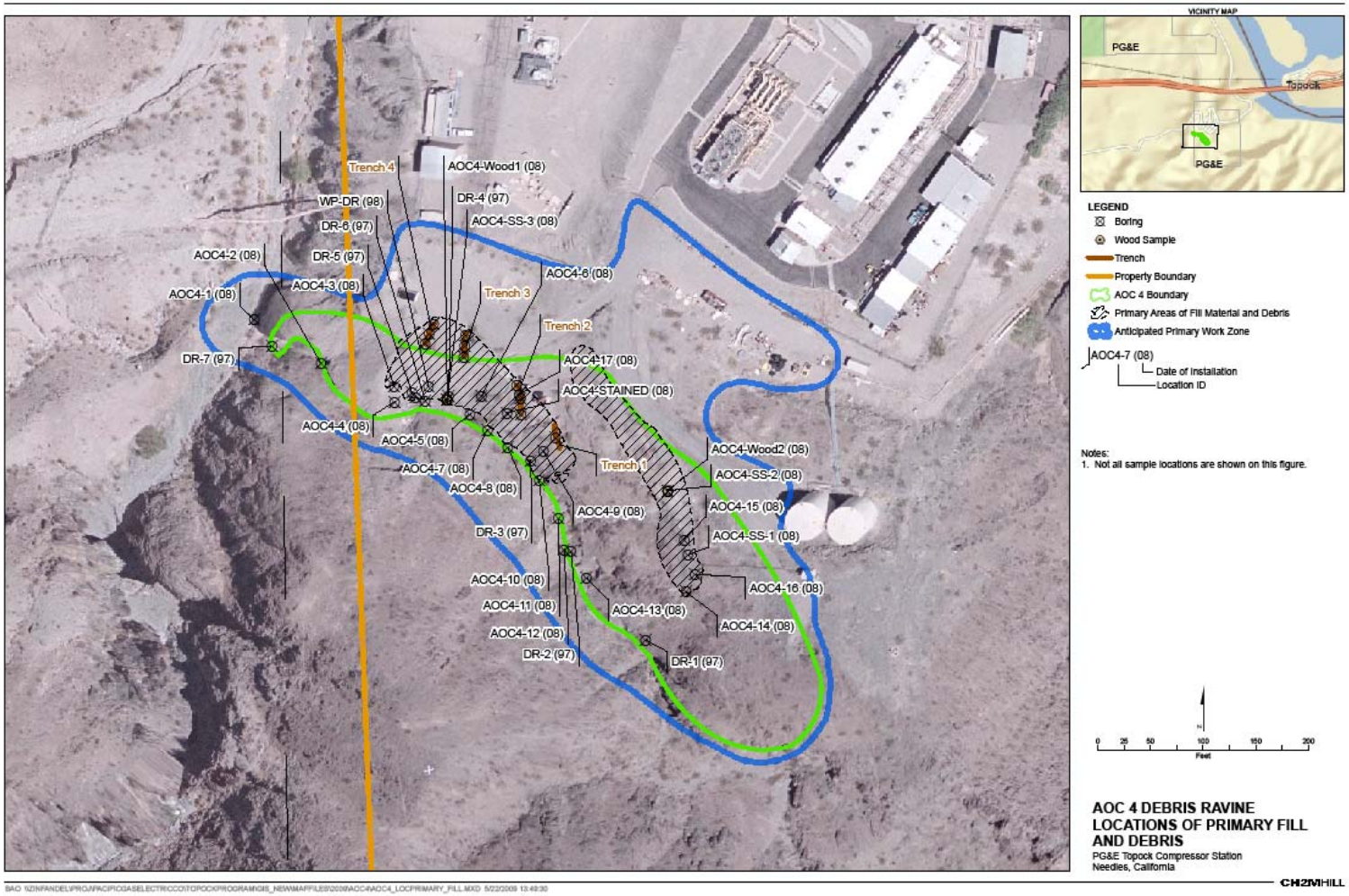

Figure 3 – Conceptual Release and Transport and Evidence for AOC 4 and AOC 1