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Memorandum

155 Grand Avenue, Suite 800
Oakland, California 94612
United States
www.jacobs.com

Subject	**Work Plan for Historical Water Supply Well Reconnaissance – Well #1; Area 1A, Topock Compressor Station, Needles, California**
Prepared For	Mr. Aaron Yue, Project Manager Geological Services Branch California Environmental Protection Agency, Department of Toxic Substances Control
Prepared By	Jacobs Engineering Group (Jacobs) for Pacific Gas & Electric Company (PG&E)
Date	19 July, 2022

In September 2011, Pacific Gas and Electric Company (PG&E) developed a draft well inventory[1] to facilitate discussions regarding future well decommissioning activities. Based on previous well inventory assessments and estimations of historical well survey areas it is possible that Well #1 (also referred to as PGE Well 1, PGE-1, Well No. 1) is present in the subsurface of Area 1A (Figure 1), which is located on land owned by PG&E This work plan defines the activities PG&E will undertake to try and determine if Well #1 is buried in this area, and if located, activities that might be conducted to verify compliance with the Department of Water Resources, California Well Standards Bulletin 74-90 (California Well Standards).

1. Estimation of Historical Well #1 Location

Records were reviewed to estimate the potential location of Well #1. The type and condition of records available for Well #1 varied from text references in drawings or reports to inclusion on scaled drawings. Proposed survey Area 1A was developed primarily by 1) Reviewing historical drawings and overlaying them on current aerial photography; 2) Analyzing topographic maps to identify a suitable potential Well #1 location based on documented well head elevations; and 3) Utilizing professional judgement to refine and/or eliminate survey areas.

2. Proposed Survey Area 1A

Proposed survey Area 1A is depicted in Figure 1 (“A” being used for the most likely, or only, location). The boundaries of proposed survey Area 1A was selected to be as comprehensive as possible within the parcel owned by PG&E. As discussed below, the entirety of the proposed area might not be surveyed depending on site access or discoveries made during early phases of investigation.

Well #1 is plotted on historical drawings R-2538 (1950), 580808 (1950) and 580855 (1957).[2] These drawings place Well #1 in the area of the site referred to as the Transwestern Bench and likely predate the facility constructed there. The approximately 0.4-acre survey area is depicted on Figure 2. When plotted on the same image, the independent locations from each historical map form a tight cluster (approximately 35 feet). An area shown on Figure 2 within the Transwestern facility is not accessible and is also excluded from the survey area due to the extensive ground disturbance that was required for its construction. The proposed survey will be conducted within accessible areas and exclude areas where infrastructure would create interference.

[1] Pacific Gas and Electric Company. 2011. *Well Inventory Data Package to Support Discussion of Future Well Decommissioning Activities*. Draft. September.

[2] Historical Drawing 580855. 1957. Topography, Colorado River Crossing to Topock Compressor Station, Topock Compressor Station. January 17.

Key observations made during review of the historical drawings include:

- Drawing R-2538 contains a north arrow for orientation, Public Land Survey System (PLSS) section boundaries for scaling and georeference. In addition, ravine topography, a surviving concrete culvert, property lines, and a surveyor's transect increase confidence in the accuracy of the map and resulting historic image overlay.
- Drawing 580855 contains PLSS quadrant borders for orientation and scaling. Depiction of the TCS and associated access road allow for accurate georeference.
- Both drawings R-2538 and 580855 list the elevation for Well #1 as 535.9 feet (datum not reported). This elevation suits the surface of the Transwestern Bench area estimated between 520 and 540 feet in elevation.

A surface feature found in June 2022[3] is depicted in Figure 2 and is located within the proposed survey area. The feature has been described as a metal casing estimated to be about 16 inches in diameter with a cement apron around the outside and containing compacted soil. The feature will be investigated in the survey.

3. Historical Well Area Evaluation

In the absence of documented well destruction details, PG&E will attempt to locate Well #1 using the procedures outlined in this section. The general procedure that will be used to locate and develop plans for decommissioning of the wells, if found, will include the following steps:

1. Conduct pre-survey activities.
2. Conduct non-intrusive surface geophysical surveys.
3. Evaluate geophysical results with the appropriate regulatory agencies to determine if detected anomalies require confirmation using intrusive methods (e.g., potholing).
4. Confirm anomalies, as determined necessary.
5. If located, assess Well #1 condition to the extent practicable without mobilizing a drill rig to the site.
6. Reporting, including the development of plans for subsequent evaluation of well condition and decommissioning, as necessary.

3.1 Pre-survey Activities

Key planning activities that will be conducted before and upon mobilization for fieldwork include:

- **Archaeological and Historical Resource Survey**. Per current practice for the Topock remediation project, the immediate survey area and associated access route will be field verified before field activities to ensure no resources will be impacted.
- **Biological Resource Survey**. A biological resource survey will be conducted for the work area and associated access route prior to historical well area evaluation activities to determine if any impacts to natural resources exist. PG&E will comply with all State and Federal laws pertaining to the proposed project, including, but not limited to, the Federal Endangered Species Act, the California Endangered Species Act, Section 404 and 401 of the Clean Water Act and the Fish and Game Code.

Once the field team is mobilized, the initial on site geophysical survey field work is estimated to require 1 to 3 days to complete. The duration of any additional field work that may result from review of the geophysical survey results will be estimated at that time.

3.2 Non-Intrusive Geophysical Survey

The planned geophysical investigation will be conducted at Area 1A using a Ground Penetrating Radar (GPR) survey. A GPR survey provides focused images of small-scale discrete conductive and/or resistive

[3] Letter from Department of Toxic Substances Control. 2022. *Metal casing discovered on the TransWestern Bench*. June 2.

objects (for example, abandoned wells, drums, voids, utilities), as well as high-resolution images of subsurface stratigraphy and depth to water table (GPR signals are rapidly attenuated within fully saturated zones).The main objective of the GPR survey is to locate Well #1 across accessible survey locations within Area 1A (i.e., excluding areas of steep topography or areas that are constrained by infrastructure). The GPR method was selected as the best technical tool for this site because, unlike magnetic (MAG) and electromagnetic (EM) methods, the GPR survey is not susceptible to above-ground cultural interference. This makes the GPR system ideal for surveying and covering more ground near the different manmade metallic objects located across Area 1A. Jacobs will use an ultra-fast, high-resolution data acquisition GPR system – MALÅ Easy Locator Pro WideRange HDR equipped with 450 megahertz (or equivalent). The MALA system includes a built-in global positioning system (GPS) and visual display for in-the-field assessments of buried objects and data storage capabilities for data download and post-processing. Additionally, this GPR system (1) significantly improves the depth and data resolution performance compared with traditional GPR systems, (2) can detect subsurface objects and changes in soil conditions with a vertical resolution of about 3 inches, and (3) capable of achieving maximum depth of investigation up to about 40 ft deep or above the water table, whichever is shallower.

The GPR system will be handheld, and the survey will be conducted along transects spaced at 2 ft apart to provide 100% data coverage and ensuring sufficient lateral resolution to locate well #1 with confidence and distinguish it from other underground utilities.

3.3 Evaluation of Geophysical Survey Results

The collected GPR profiles will be processed to improve signal-to-noise ratio through rigorous 1D and 2D data filtering, energy decay and gain adjustments. 3D depth slices showing anomalous locations across the site will be generated. Findings of the geophysical surveys will be compiled and evaluated within 8 weeks of field demobilization. In some cases, it may be prudent to review the data earlier in the reporting process, or contemporaneously with field work, should data suggest a well has been located prior to survey completion. The following deliverables will be prepared for this investigation:

- GPR survey report including raw data, data processing steps, and quality control results
- Portable document format (.pdf) files with graphic images of QC test results and processed 3D depth slices.
- Site map showing survey coverage and potential location of Well #1.
- The GPS coordinates of potential Well #1 location in ASCII and ESRI shapefile formats.

3.4 Well Condition Assessment

If located, the condition of Well #1 will be evaluated to the extent practicable using equipment available at the site (e.g., backhoe) without the mobilization of a drill rig. The purpose of this evaluation is to collect the information required to develop a plan for well decommissioning in accordance with the California Well Standards, as necessary. Evaluation will be conducted as follows:

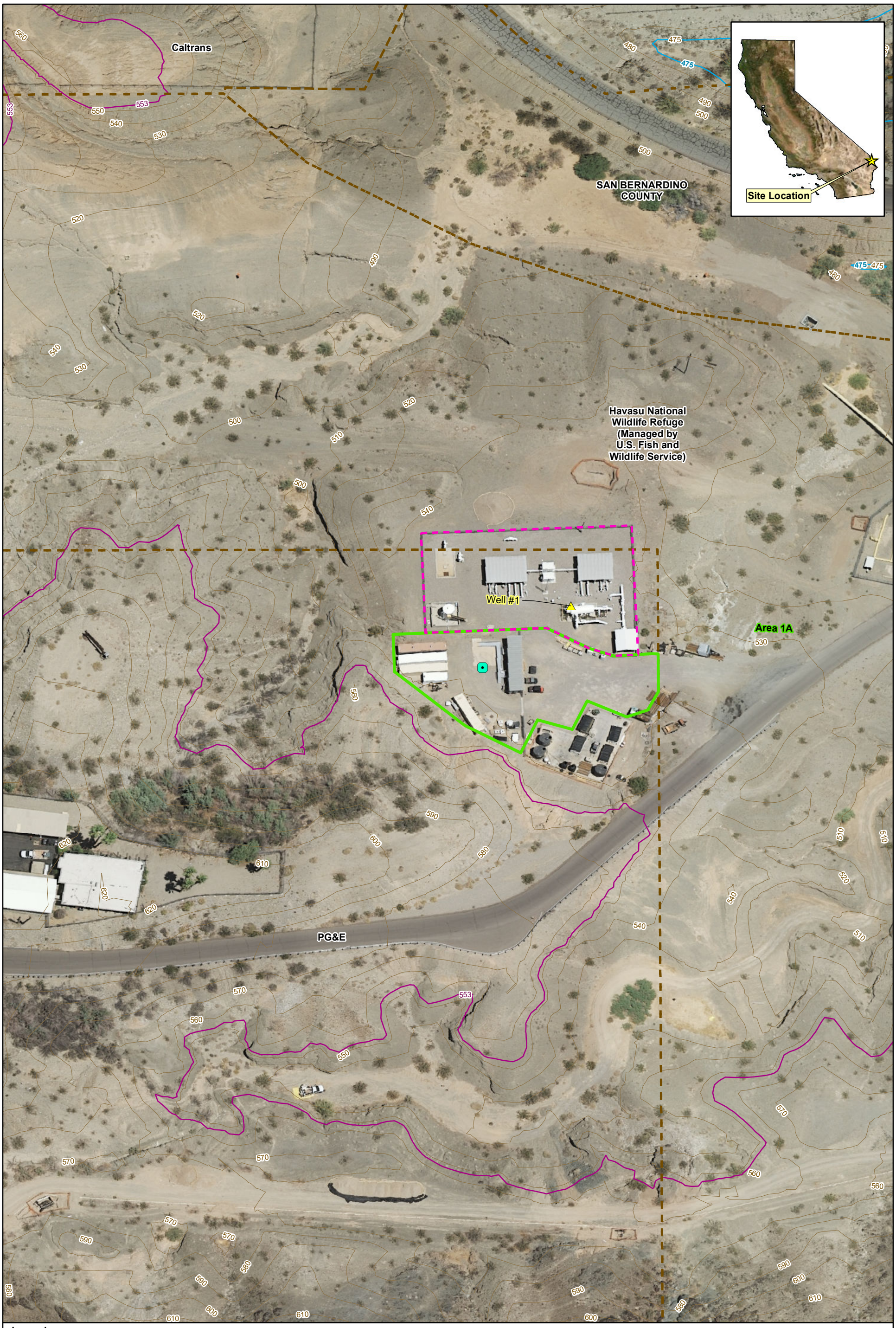
- Well #1 will be accessed in a manner that ensures workers may safely remove any cap that may exist and prevent material from falling into the well.

- The inside of Well #1 will be evaluated to determine details such as total depth, well diameter, and casing material and condition. This evaluation will be conducted using borehole geophysical logging tools including, but not limited to, caliper logging, borehole televiewer/camera logging, and cement bond logging, as determined appropriate and practicable.

- Once borehole geophysical logging is complete, the well head will be secured such that surface water cannot enter the well and any remaining excavation around the well/pipe is backfilled using the originally removed material. If the well is located greater than a few feet below ground surface, a temporary well casing extension may be installed to bring the top of casing near or above ground surface so future excavation to gain access inside the well can be minimized.

3.5 Reporting and Well Decommissioning Work Planning

PG&E will develop a technical memorandum that summarizes the reconnaissance work conducted, evaluation of field observations and the data collected (including summary of discussions with DTSC, DOI and the affected land owner), and the recommendations for use or decommissioning of the well. In addition, PG&E will update the Topock Well Inventory for Well #1 cited in this work plan to indicate whether the well was found and any relevant well information collected. After the development of the technical memorandum, PG&E will develop a work plan for well decommissioning, as determined necessary in accordance with the California Well Standards and the standard operating procedures established for the Topock site.



Legend

- Well Location - Estimated
- Surface feature found in June 2022
- Transwestern Disturbed Area
- Proposed Survey Area
- Property Owner Area
- Elevation (10-foot contour)

Elevation Contour (feet AMSL)

- 475 ft
- 553 ft

0 37.5 75 150
Feet

N

FIGURE 1

Water Supply and Historical Well Location
Historical Water Supply Well Reconnaissance
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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BAO \\DC1VS01\GISPROJ\P\PGE\TOPOCK\MAPFILES\2022\WELL_RECON\FIG1_WATERSUPPLY_HISTORICWELLS.MXD GMOON 7/18/2022 5:45:05 PM

Drawing R-2538 (3/1/1950)

Drawing 580855 (1/17/1957)

Drawing 580808 (3/1950)

SAN BERNARDINO COUNTY

Havasu National Wildlife Refuge (Managed by U.S. Fish and Wildlife Service)

Area 1A

PG&E

Legend

- Location of Well on Drawing
- Surface feature found in June 2022
- Transwestern Disturbed Area
- Property Owner Area

N

0 60 120 240

Feet

Notes:
1. Drawing R-2538 is dated March 1, 1950.
2. Drawing 580855 is dated January 17, 1957.
3. Drawing 580808 is dated March, 1950.

FIGURE 2

Well #1 Historic Map Overlays
Historical Water Supply Well Reconnaissance
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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