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Subject **Work Plan for Historical Water Supply Well Reconnaissance – PGE-02, Topock Compressor Station, Needles, California**

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 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)

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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 the water supply well PGE-02 (also referred to as PGE-2, Well No. 2, PGE Well 2) may have been located in the area of Non-Time Critical Removal Action (NTCRA) Work Area of Concern 14 (AOC 14) (Figure 1), which is located within Caltrans Right-of-Way and will be accessed by PG&E later this year as part of the NTCRA soil remediation work. This work plan defines the activities PG&E will undertake as part of the NTCRA utility survey to verify if any potential infrastructure that may have been associated with the PGE-02 possible well site is in the area so that work can be safely executed at AOC14. If located, such infrastructure will be evaluated to determine whether additional actions may be advisable, such as abandonment in accordance with current Department of Water Resources, California Well Standards Bulletin 74-90 (California Well Standards).

1. Estimation of Historical PGE-02 Location

Records were reviewed to estimate the potential location of PGE-02. The type and condition of records available for PGE-02 varied from text references in drawings or reports to inclusion on scaled drawings. Records place PGE-02 within NTCRA Work Area AOC 14, a debris site which was investigated as part of the ongoing Soil Remedial Investigation.² A proposed survey area was developed primarily by 1) Reviewing historical drawings and overlaying them on current aerial photography; 2) Analyzing topographic maps to identify potential PGE-02 locations based on its documented well head elevation (552 ft above mean sea level); and 3) Utilizing professional judgement to refine survey areas.

2. Proposed PGE-02 Survey Area

NTCRA Work Area AOC 14 is depicted in Figure 1. The proposed survey for PGE-02, which will occur within the NTCRA Work Area AOC 14 boundary, will provide information about potential subsurface infrastructure associated with this well that could coincide with planned NTCRA excavation work. As discussed below, the entirety of the AOC 14 might not be surveyed depending on site access or discoveries made during early phases of investigation.

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

² Pacific Gas and Electric Company. 2011. *RCRA Facility Investigation and Remedial Investigation Report*. Topock Compressor Station. Revised Draft 2022.

PGE-02 is plotted on historical drawings 481911 (1957), 482629 (1957) and 482557 (original 1943, updated 1971)³. These drawings contain PLSS coordinates, surveyor’s measurements to the well head, and surviving landmarks. These drawings depict the well as Well No. 2 and were used to create historic map overlays (Figure 2). The historical maps depict PGE-02 as being to the west of an unpaved road and the east of cliffs along bat cave wash. Historical drawings depict a four-inch diameter water line leading from PGE-02 and connecting to a six-inch line that connected to PGE-01, which was located within the current-day footprint of Interstate 40. During the 2015 AOC 14 soil investigation, a conduit and electrical cables were discovered during trenching activities. Geophysical assessment of these lines and conduit may be used to determine if they trace back to the PGE-02 wellhead.

Records indicated that the estimated location of PGE-02 is within the NTCRA Work Area AOC 14. The survey area is depicted on Figure 2 along with the location of the well as shown on each historical drawing. When plotted on the same image, the independent locations from each historical map form a tight cluster (approximately 50 feet). The proposed survey will be conducted within accessible areas and exclude areas where infrastructure would create interference.

3. Historical Well Area Evaluation

In the absence of documented well destruction details, PG&E will attempt to locate PGE-02 using the following procedure:

1. Conduct pre-survey activities.
2. Conduct non-intrusive surface geophysical survey before part 2 of the NTCRA at AOC 14.
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 PGE-02 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

Pre-survey activities will be performed as part of the NTCRA work. It is anticipated that 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 will be estimated based on review of initial geophysical survey results.

3.2 Non-Intrusive Geophysical Investigation

The objective of the geophysical investigation is to locate PGE-02 across accessible survey locations within the NTCRA AOC 14 approved work area (i.e., excluding areas of steep topography or areas that are constrained by infrastructure). The geophysical investigation will be conducted at AOC 14 using a

³ Historical Drawing 580855. 1957. Topography, *Colorado River Crossing to Topock Compressor Station*, Topock Compressor Station. January 17.

combination of Ground Penetrating Radar (GPR), electromagnetic (EM), and magnetic (MAG) methods. Because AOC 14 contains miscellaneous construction debris including chunks of asphalt, concrete, railroad ties, piping, burnt material² distinguishing geophysical anomalies representative of buried objects from geophysical anomalies indicative of a well (i.e., PGE-02) will be difficult. Of the GPR, EM, and MAG methods the GPR method is likely best suited for differentiating anomalies. Accordingly, A GPR survey will be completed first, and the results evaluated to confirm if objectives are met. GPR data and site conditions present at the time of the GPR survey will also be evaluated to determine whether EM and MAG methods are feasible to implement at the site and to evaluate whether EM and MAG methods will provide data usable for achieving investigation objectives. The GPR method is anticipated to be the method best suited for mapping PGE-2 at AOC 14 because the GPR is not as susceptible to above-ground cultural interference as are MAG and EM methods.

A GPR survey provides focused images of small-scale discrete conductive and/or resistive 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). To complete the GPR survey Jacobs will use an ultra-fast, high-resolution data acquisition GPR system – MALA Easy Locator Pro WideRange HDR (or equivalent) equipped with 350 megahertz (or equivalent) monostatic antenna. 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) is ordinarily capable of achieving maximum depth of investigation between 5 and 20 feet deep, or above the water table, whichever is shallower.

GPR surveys will be conducted along transects spaced at 2 ft apart to provide 100% data coverage and ensure sufficient lateral resolution to locate PGE-02 and distinguish it from other subsurface features (e.g. underground utilities).

In accordance with DTSC comments, a handheld magnetometer such as the Schonstedt Magnetometer or equivalent will also be used.

Quality Control

Jacobs will perform daily quality control (QC) tests to ensure the functionality of geophysical systems, quality, and completeness of collected measurements. Table 1 presents the QC testing requirements.

Table 1. QC Testing Requirements for the GPR/EM/MAG Surveys

QC Test	Test Method and Requirements
Functionality	Collecting geophysical data at the beginning and end of each data collection day over a known buried object and detect it.
Data Quality	The collected data will be initially processed daily to ensure quality.
Data Completeness	Before demobilization, the field team will check that all instrument files and field notes have been uploaded.

In addition to the daily QC testing, Daily Quality Control Reports (DQCRs) will be generated after the conclusion of each workday. The DQCRs will document work performed, any health and safety issues, data quality control results, and next data collection steps.

3.3 Evaluation of Geophysical Survey Results

GPR data and 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, data may be reviewed earlier in the reporting process, or contemporaneously with field work, should data suggest a well has been located prior to survey completion. The following documents are expected to 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 PGE-02.
- The GPS coordinates of potential PGE-02 location in ASCII and ESRI shapefile formats.

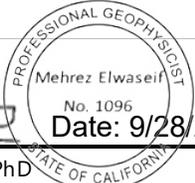
3.4 Well Condition Assessment

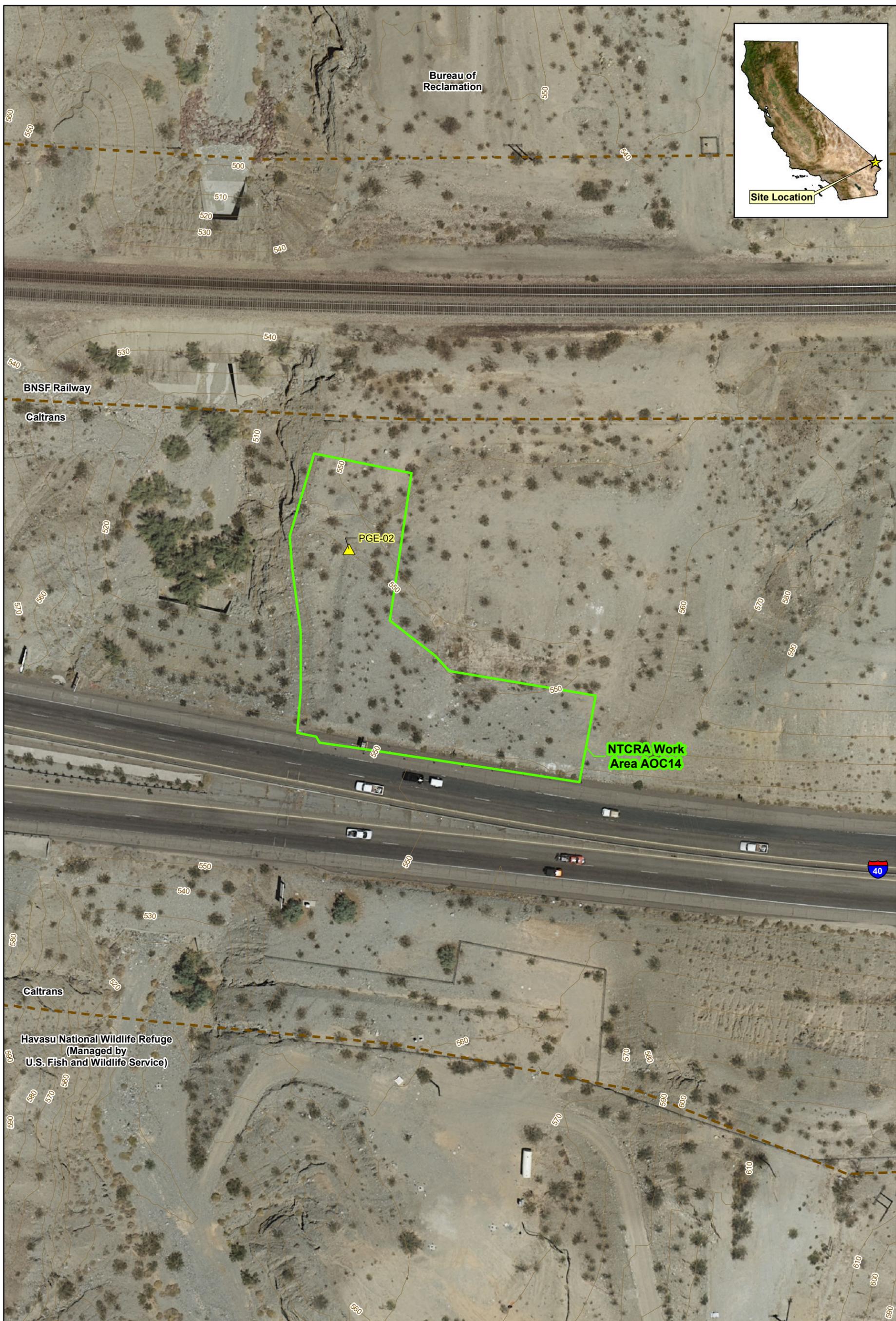
If located, the condition of PGE-02 will be evaluated using equipment available at the site without the mobilization of a drill rig, if feasible. The purpose of this evaluation is to collect the information required to assess the condition of any remaining infrastructure and develop a plan for well decommissioning in accordance with the California Well Standards, as necessary. Evaluation will be conducted as follows:

- If feasible, PGE-02 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 PGE-02 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 PGE-02 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. If the survey of this area does not identify PGE-02, then the need for investigation of this well will be considered complete.



Date: 9/28/2023
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California Professional Geophysicist #1096



Legend

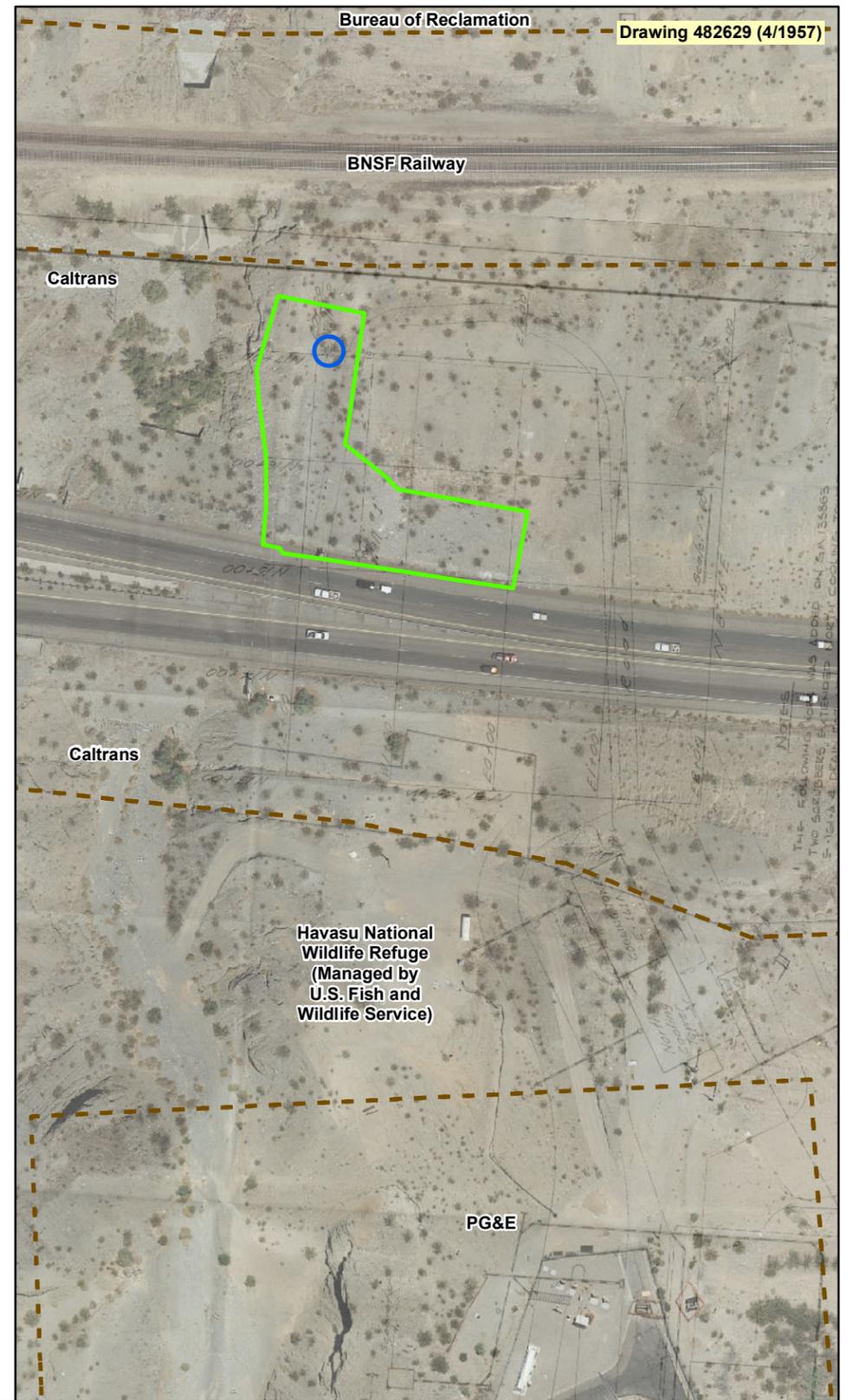
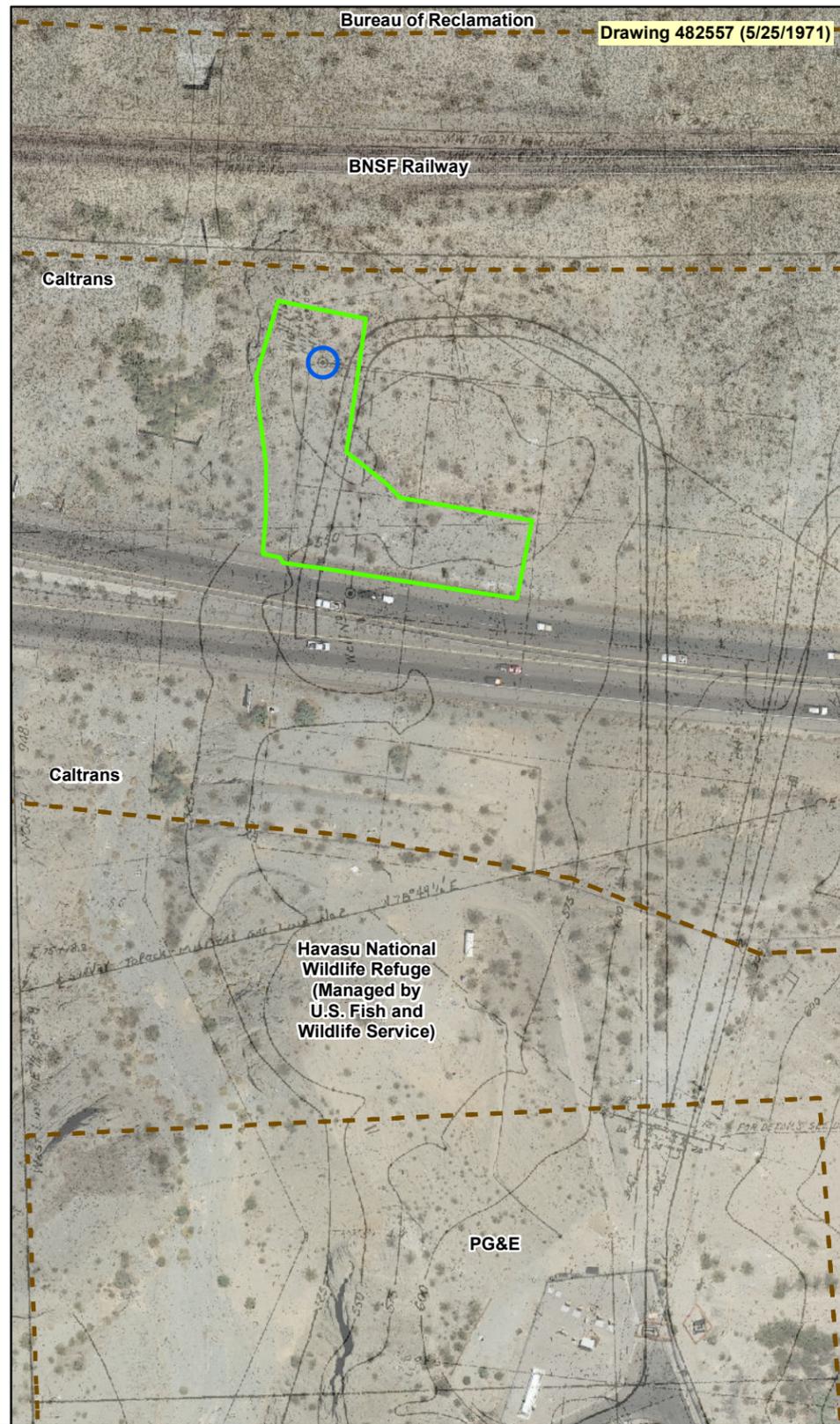
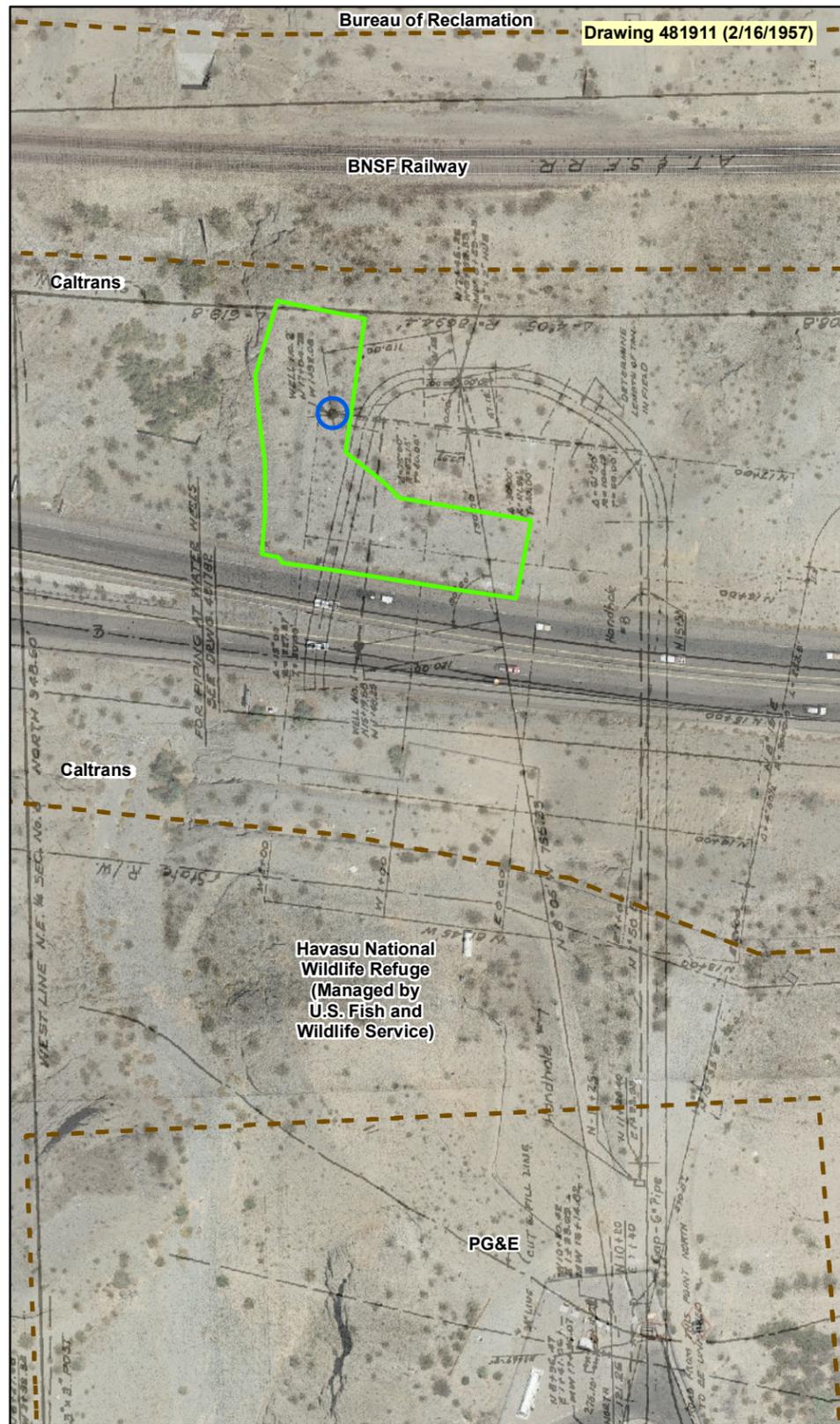
▭ Proposed Survey Area Property Owner Area
▲ Well Location - Estimated — Elevation (10-foot contour)

0 12.5 25 50
Feet

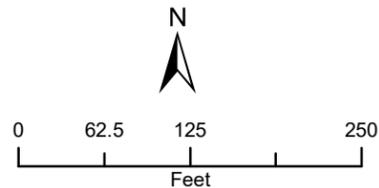


FIGURE 1
Water Supply and Historical Well PGE-02 Location
 Historical Water Supply Well Reconnaissance - PGE-02
 Pacific Gas and Electric Company Topock Compressor
 Station, Needles, California





- Legend**
- Proposed Survey Area
 - Location of Well on Drawing
 - Property Owner Area



- Notes:**
1. Drawing 481911 is dated February 16, 1957.
 2. Drawing 482557 is dated May 25, 1971.
 3. Drawing 482629 is dated April 1957

FIGURE 2
Well PGE-02 Historic Map Overlays
 Historical Water Supply Well Reconnaissance - PGE-02
 Pacific Gas and Electric Company Topock Compressor
 Station, Needles, California