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January 14, 2022

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**Subject: Topock IM-3 Combined Fourth Quarter 2021 Monitoring, Semiannual July – December 2021 and Annual January - December 2021 Operation and Maintenance Report
PG&E Topock Compressor Station, Needles, California
Interim Measure No. 3 Groundwater Treatment System**

Dear Ms. Innis and Mr. Stormo:

Enclosed is the Fourth Quarter 2021 Monitoring, Semiannual July – December 2021 and Annual January – December 2021 Operation and Maintenance Report (4Q2021 Report) for the Pacific Gas and Electric Company (PG&E) Topock Compressor Station, Interim Measure No. 3 (IM-3) Groundwater Treatment System.

From July 2005 through September 2011 PG&E was operating the IM-3 groundwater treatment system as authorized by the Colorado River Basin Regional Water Quality Control Board (Regional Water Board) Order No. R7-2004-0103 (issued October 13, 2004); Order No. R7-2006-0060 (issued September 20, 2006); and the revised Monitoring and Reporting Program under Order No. R7-2006-0060 (issued August 28, 2008). Order No. R7-2006-0060 expired on September 20, 2011.

PG&E operated the IM-3 groundwater treatment system as authorized by the U.S. Department of the Interior (DOI) Waste Discharge Applicable or Relevant and Appropriate Requirements (ARARs) as documented in Attachment A to the Letter Agreement issued July 26, 2011 from the Regional Water Board to DOI, and the subsequent Letter of Concurrence issued August 18, 2011 from DOI to the Regional Water Board. Quarterly monitoring reports are required to be submitted by the fifteenth day of the month following the end of the quarter.

The IM-3 groundwater extraction and treatment system has extracted and treated approximately 1,084,161,828 gallons of water and removed approximately 8,470 pounds of total chromium from August 1, 2005 through December 31, 2021. The IM-3 extraction system was shut off on December 21, 2021 at 2:20 pm. in coordination with the startup of the newly constructed Final Groundwater Remedy equipment and process. IM-3 has entered the layup mode per the Final Groundwater Remedy workplans.

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The groundwater monitoring results for wells OW-1S/M/D, OW-2S/M/D, OW-5S/M/D, CW-1M/D, CW-2M/D, CW-3M/D, and CW-4M/D will be submitted under separate cover, as part of the Compliance Monitoring Program.

If you have any questions regarding this report, please call me at (760) 791-5884.

Sincerely,

A handwritten signature in blue ink, appearing to read "Curt Russell", is positioned below the word "Sincerely,".

Curt Russell
Topock Project Manager

Enclosures:

Topock IM-3 Combined Fourth Quarter 2021 Monitoring, Semiannual July - December 2021, and Annual January - December 2021 Operation and Maintenance Report

cc: Aaron Yue, California Department of Toxic Substances Control

Topock Project Executive Abstract

<p>Document Title: <i>Topock IM-3 Fourth Quarter 2021 Monitoring, Semiannual July - December 2021 and Annual January – December 2021 Operation and Maintenance Report</i></p> <p>Submitting Agency/Author: U.S. Department of the Interior and Regional Water Quality Control Board</p> <p>Final Document? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is this time critical? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>	<p>Date of Document: January 14, 2022</p> <p>Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other) PG&E</p>
<p>Priority Status: <input type="checkbox"/> HIGH <input type="checkbox"/> MED <input checked="" type="checkbox"/> LOW</p>	<p>Is this time critical? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p>Type of Document:</p> <p><input type="checkbox"/> Draft <input checked="" type="checkbox"/> Report <input type="checkbox"/> Letter <input type="checkbox"/> Memo</p> <p><input type="checkbox"/> Other / Explain:</p>	<p>Action Required:</p> <p><input checked="" type="checkbox"/> Information Only <input type="checkbox"/> Review and Input</p> <p><input type="checkbox"/> Other / Explain:</p>
<p>What does this information pertain to?</p> <p><input type="checkbox"/> Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA)/Preliminary Assessment (PA)</p> <p><input type="checkbox"/> RCRA Facility Investigation (RFI)/Remedial Investigation (RI) (including Risk Assessment)</p> <p><input type="checkbox"/> Corrective Measures Study (CMS)/Feasibility Study (FS)</p> <p><input type="checkbox"/> Corrective Measures Implementation (CMI)/Remedial Action (RA)</p> <p><input type="checkbox"/> California Environmental Quality Act (CEQA)/Environmental Impact Report (EIR)</p> <p><input checked="" type="checkbox"/> Interim Measures</p> <p><input type="checkbox"/> Other / Explain:</p>	<p>Is this a Regulatory Requirement?</p> <p><input checked="" type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p>If no, why is the document needed?</p>
<p>What is the consequence of NOT doing this item? What is the consequence of DOING this item?</p> <p>Submittal of this report is a compliance requirement of the ARARs for waste discharge as documented in Attachment A to the Letter Agreement issued July 26, 2011.</p>	<p>Other Justification/s:</p> <p><input type="checkbox"/> Permit <input type="checkbox"/> Other / Explain:</p>
<p>Brief Summary of attached document:</p> <p>This report covers the Interim Measure No. 3 (IM-3) groundwater treatment system monitoring activities during the Fourth Quarter 2021 period, and the operation and maintenance activities during the July 1, 2021 to December 31, 2021 semiannual and the January 1, 2021 to December 31, 2021 annual periods. The groundwater monitoring results for wells OW 1S/M/D, OW 2S/M/D, OW 5S/M/D, CW 1M/D, CW 2M/D, CW 3M/D, and CW 4M/D will be submitted under separate cover, as part of the Compliance Monitoring Program.</p> <p>Written by: Pacific Gas and Electric Company</p>	
<p>Recommendations:</p> <p>This report is for your information only.</p>	
<p>How is this information related to the Final Remedy or Regulatory Requirements?</p> <p>The Topock IM-3 Fourth Quarter 2021 Monitoring, Semiannual July - December 2021 and Annual January – December 2021 Operation and Maintenance Report is related to the Interim Measure. PG&E operated the IM-3 groundwater treatment system as authorized by the U.S. Department of the Interior (DOI) Waste Discharge Applicable or Relevant and Appropriate Requirements (ARARs) as documented in Attachment A to the Letter Agreement issued July 26, 2011 from the Colorado River Basin Regional Water Quality Control Board (Regional Water Board) to DOI, and the subsequent Letter of Concurrence issued August 18, 2011 from DOI to the Regional Water Board.</p>	
<p>Other requirements of this information?</p> <p>None.</p>	



Combined Fourth Quarter 2021 Monitoring,
Semiannual July – December 2021 and
Annual January – December 2021 Operation and
Maintenance Report
Interim Measure No. 3 Groundwater Treatment System

PG&E Topock Compressor Station
Needles, California

January 14, 2022

Prepared for
Colorado River Basin Regional Water Quality Control Board
and
United States Department of the Interior
on behalf of
Pacific Gas and Electric Company



Combined Fourth Quarter 2021 Monitoring,
Semiannual July – December 2021, and Annual January – December 2021
Operation and Maintenance Report
for Interim Measure No. 3 Groundwater Treatment System

PG&E Topock Compressor Station
Needles, California

Prepared for

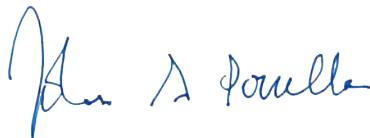
United States Department of the Interior
and
Colorado River Basin Regional Water Quality Control Board

on behalf of

Pacific Gas and Electric Company

January 14, 2022

This report was prepared under the supervision of a
California Certified Professional Engineer



John Porcella, P.E.
Project Engineer



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Acronyms and Abbreviations

ARARs	Applicable or Relevant and Appropriate Requirements
ASSET	ASSET Laboratories
DOI	United States Department of the Interior
gpm	gallons per minute
HMI	human-machine interface
IM	Interim Measure
IM-3	Interim Measure No. 3
IW	injection well
MRP	Monitoring and Reporting Program
O&M	operation and maintenance
PG&E	Pacific Gas and Electric Company
PLC	programmable logic controller
PST	Pacific Standard Time
RCRA	Resource Conservations and Recovery Act
Regional Water Board	Colorado River Basin Regional Water Quality Control Board
RO	reverse osmosis
Truesdail	Truesdail Laboratories, Inc.
WDR	Waste Discharge Requirements

1. Introduction

Pacific Gas and Electric Company (PG&E) is implementing an Interim Measure (IM) to address chromium concentrations in groundwater at the Topock Compressor Station near Needles, California. The IM consists of groundwater extraction for hydraulic control of the plume boundaries in the Colorado River floodplain, treatment of extracted groundwater, and treated groundwater injection into injection wells located on San Bernardino County Assessor's Parcel No. 650-151-06. The groundwater extraction, treatment, and injection systems collectively are referred to as Interim Measure No. 3 (IM-3). Figure 1 provides a map of the project area. All figures are located at the end of this report.

From July 2005 through September 2011 PG&E was operating the IM-3 groundwater treatment system as authorized by the Colorado River Basin Regional Water Quality Control Board (Regional Water Board) Order No. R7-2004-0103 (issued October 13, 2004), Order No. R7-2006-0060 (issued September 20, 2006), and the revised Monitoring and Reporting Program (MRP) under Order No. R7-2006-0060 (issued August 28, 2008). Order No. R7-2006-0060 expired September 20, 2011.

PG&E operated the IM-3 groundwater treatment system as authorized by the U.S. Department of the Interior (DOI) Waste Discharge Applicable or Relevant and Appropriate Requirements (ARARs) as documented in Attachment A to the Letter Agreement issued July 26, 2011 from the Regional Water Board to DOI, and the subsequent Letter of Concurrence issued August 18, 2011 from DOI to the Regional Water Board. Quarterly monitoring reports are required to be submitted by the fifteenth day of the month following the end of the quarter.

This report covers monitoring activities related to operation of the IM-3 groundwater treatment system during the Fourth Quarter 2021, as well as the operation and maintenance (O&M) activities during the July 1, 2021 to December 31, 2021 semiannual period and the January 1, 2021 to December 31, 2021 annual period. The groundwater monitoring results for wells OW-1S/M/D, OW-2S/M/D, OW-5S/M/D, CW-1M/D, CW-2M/D, CW-3M/D, and CW-4M/D will be submitted under separate cover, as part of the Compliance Monitoring Program.

The IM-3 extraction system was shut off on December 21, 2021 at 2:20 pm. in coordination with the startup of the newly constructed Final Groundwater Remedy equipment and process. The IM-3 system - including treatment, extraction, and injection - is shut off and will enter the layup mode per the Final Groundwater Remedy workplans (CH2M HILL, 2015a, b)¹. The layup mode involves flushing and cleaning the treatment plant and injection and extraction pipelines and then placing the system into a standby mode in the event it is needed to support groundwater cleanup. After the layup period is over, the system will be decommissioned, equipment and facilities removed, and the site restored.

¹ CH2M HILL, 2015a. *Construction/Remedial Action Work Plan for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California*. November 18.
_____, 2015b. *Interim Measure No.3 Decommissioning, Removal, and Restoration Work Plan PG&E Topock Compressor Station, Needles, California*. November 18.

2. Sampling Station Locations

Table 1 lists the locations of sampling stations (all tables are located at the end of this report.) Sampling station locations are shown on the process and instrumentation diagrams (Figures TP-PR-10-10-04, PR-10-03, PR-10-04, and TP-PR-10-10-06) provided at the end of this report.

3. Description of Activities

The treatment system was initially operated between July 25 and July 28, 2005 for the Waste Discharge Requirement (WDR)-mandated startup phase. Discharge to the injection wells was initiated July 31, 2005 after successfully completing the startup phase in accordance with Order No. R7-2004-0103. Full-time operation of the treatment system commenced in August 2005.

As previously noted, this report describes Fourth Quarter 2021 monitoring activities and the July 1, 2021 through December 31, 2021 (Third and Fourth Quarters) O&M activities related to the IM-3 groundwater treatment system. It also serves as the Annual January – December 2021 O&M Report for IM-3. IM-3 monitoring activities from January 1, 2021 through September 30, 2021 (First, Second and Third Quarters) were presented in the following monitoring and O&M reports:

- Topock IM-3 First Quarter 2021 Monitoring Report, submitted to the DOI and Regional Water Board April 15, 2021
- Topock IM-3 Second Quarter 2021 Monitoring and Semi-annual January 1, 2021 through June 30, 2021 Operation and Maintenance Report, submitted to the DOI and Regional Water Board July 15, 2021
- Topock IM-3 Third Quarter 2021 Monitoring Report, submitted to the DOI and Regional Water Board October 15, 2021

3.1 Groundwater Treatment System

The treatment system was initially operated between July 25 and July 28, 2005 for the WDR-mandated startup phase. Discharge to the injection wells was initiated July 31, 2005 after successfully completing the startup phase in accordance with Order R7-2004-0103. Full-time operation of the treatment system commenced in August 2005.

Influent to the treatment facility, as listed in Attachment A, Waste Discharge ARARs, to the Letter Agreement issued July 26, 2011, includes the following:

- Groundwater from extraction wells TW-2S, TW-2D, TW-3D, and PE-1
- Purged groundwater and water generated from rinsing field equipment during monitoring events
- Groundwater generated during well installation, well development, and aquifer testing

Operation of the groundwater treatment system results in the following three effluent streams:

- **Treated Effluent:** Treated water that is discharged to the injection well(s)
- **Reverse Osmosis (RO) Concentrate (brine):** Treatment byproduct that is transported and disposed of offsite at a permitted facility
- **Sludge:** Treatment byproduct that is transported offsite for disposal at a permitted facility, which occurs either when a sludge waste storage bin reaches capacity, or within 90 days of the start date for accumulation in the storage container, whichever occurs first

3.2 Groundwater Treatment System Flow Rates for Fourth Quarter 2021

Downtime is defined as any periods when all extraction wells are not operating so that no groundwater is being extracted and piped into IM-3 as influent. Periods of planned and unplanned extraction system downtime (that together resulted in approximately 5.5 percent downtime during Fourth Quarter 2021) are summarized in the Semiannual Operations and Maintenance Log provided in Appendix A. The times shown are in Pacific Standard Time to be consistent with other data collected (e.g., water level data) at the site. Periods of planned and unplanned extraction system downtime during the months July 2021 through September 2021 were originally reported in the *Third Quarter 2021 Monitoring Report for Interim*

Measure No. 3 Groundwater Treatment System, PG&E Topock Compressor Station, Needles, CA, published October 15, 2021, and are also included in Appendix A of this report.

Data regarding daily volumes of groundwater treated and discharged are provided in Appendix B. The IM-3 groundwater treatment system flowmeter calibration records are included in Appendix C.

3.2.1 Treatment System Influent

During the Fourth Quarter 2021, extraction wells TW-3D and TW-2D, and Final Groundwater Remedy test well TW-01 operated with a combined target pumping rate of 135 gallons per minute (gpm), excluding periods of planned and unplanned downtime. Extraction wells PE-01 and TW-2S were not operated during Fourth Quarter 2021. The operational run time for the IM groundwater extraction system (combined or individual pumping), by month, was approximately:

- 97.4 percent during October 2021
- 95.0 percent during November 2021
- 94.8 percent during December 2021

The Fourth Quarter 2021 treatment system monthly average flow rates (influent, effluent, and RO concentrate) are presented in Table 2. The system influent flow rate was measured by flowmeters at groundwater extraction wells TW-2S, TW-2D, TW-3D, and PE-1 (Figure TP-PR-10-10-03).

The IM-3 facility treated approximately 15,246,410 gallons of extracted groundwater during Fourth Quarter 2021.

Temporary piping to connect the Final Groundwater Remedy TW-01 aquifer testing well was installed, connecting to IM-3 at the MW-20 Bench. The test was designed to have approximately 90 gpm flow from TW-01, supplemented by approximately 28 gpm flow from TW-2D. The TW-01 aquifer testing began June 15, 2021 and was completed on December 13, 2021. From October 1, 2021, through the end of the TW-01 aquifer test, IM-3 processed 8,610,763 gallons of water from TW-01, 105,809 gallons from TW-2D, and 6,529,839 gallons from well TW-3D. The total treated groundwater injection rate remained within the limits of the ARARs.

In addition to extracted groundwater, during Fourth Quarter 2021 the IM-3 facility treated approximately 9,000 gallons of Final Groundwater Remedy wastewater (TW-01 pipeline final flush water), 660 gallons of water generated from the groundwater monitoring program, and 30,000 gallons of injection well development water.

3.2.2 Effluent Streams

The treatment system effluent flow rate was measured by flowmeters in the piping leading to injection wells IW-2 and IW-3 (Figure TP-PR-10-10-11) and in the piping running from the treated water tank T-700 to the injection wells (Figure TP-PR-10-10-04). The IM-3 facility injected 15,750,230 gallons of treatment system effluent during Fourth Quarter 2021. The monthly average flow rate to injection wells is shown in Table 2.

The RO concentrate flow rate is measured by a flowmeter at the piping carrying water from RO concentrate tank T-701 to the truck load-out station (Figure PR-10-04) or from Liquid Environmental Solutions non-hazardous waste manifests. Due to Final Groundwater Remedy construction activities at the MW-20 Bench adjacent to the IM-3 RO concentrate storage tank, the RO concentrate is temporarily being stored and shipped from the RO concentrate process collection tank. Since the flowmeter is located between the RO concentrate process collection tank and the RO concentrate storage tank, the RO concentrate flow from the process collection tank was not recorded by the flowmeter.

The IM-3 facility generated no RO concentrate during Fourth Quarter 2021. The monthly average RO concentrate flow rate is shown as zero on Table 2.

The sludge flow rate is measured by the size and weight of containers shipped offsite. Six sludge containers were shipped offsite from the IM-3 facility during Fourth Quarter 2021. The shipment dates and approximate weights are provided in Section 5.3.

3.3 Sampling and Analytical Procedures

With the exception of pH, samples were collected at the designated sampling locations and placed directly into containers provided by Truesdail Laboratories, Inc. (Truesdail) or ASSET Laboratories (ASSET). Sample containers were labeled and packaged according to standard sampling procedures.

The samples were stored in a sealed container chilled with ice and transported to Truesdail or ASSET via courier under chain-of-custody documentation. The laboratories confirmed the samples were received in chilled condition upon arrival. Truesdail is certified by the California Department of Health Services (Certification No. 1237) under the State of California's Environmental Laboratory Accreditation Program. ASSET is certified by the California Department of Health Services (Certification No. 2676) under the State of California's Environmental Laboratory Accreditation Program. California-certified laboratory analyses were performed in accordance with the latest edition of the *Guidelines Establishing Test Procedures for Analysis of Pollutants* (40 Code of Federal Regulations Part 136), promulgated by the U.S. Environmental Protection Agency.

Analysis of pH was conducted by field method pursuant to the Regional Water Board letter dated October 16, 2007 (subject: Clarification of Monitoring and Reporting Program Requirements) authorizing pH measurements to be conducted in the field. The field method pH samples were collected at the designated sampling locations and field tested within 15 minutes of sampling.

As required by the MRP, the analytical method selected for total chromium has a method detection limit of 1 part per billion, and the analytical method selected for hexavalent chromium has a method detection limit of 0.2 part per billion.

Influent, effluent, RO concentrate, and sludge sampling frequency were in accordance with the MRP. The Fourth Quarter 2021 sample collection schedule is shown in Table 3.

Groundwater quality is being monitored in observation and compliance wells according to Attachment A, Waste Discharge ARARs, to the Letter Agreement issued July 26, 2011, and the procedures and schedules approved in the *Groundwater Compliance Monitoring Plan for Interim Measure No. 3 Injection Area* submitted to the Regional Water Board on June 17, 2005. Quarterly groundwater monitoring analytical results for the injection area (wells OW-1S/M/D, OW-2S/M/D, OW-5S/M/D, CW-1M/D, CW-2M/D, CW-3M/D, and CW-4M/D) are reported in a separate document, in conjunction with groundwater level maps of the same monitoring wells.

4. Analytical Results

The analytical results and laboratory reports for the IM-3 groundwater treatment system monitoring program were previously reported for the First, Second and Third Quarters of 2021:

- The January 1, 2021 through March 31, 2021 results were included in the First Quarter 2021 Monitoring Report submitted to the DOI and Regional Water Board on April 15, 2021.
- The April 1, 2021 through June 30, 2021 results were included in the Second Quarter 2021 Monitoring Report submitted to the DOI and Regional Water Board on July 15, 2021.
- The July 1, 2021 through September 30, 2021 results were included in the Third Quarter 2021 Monitoring Report submitted to the DOI and Regional Water Board on October 15, 2021.

Laboratory reports for samples collected in Fourth Quarter 2021 were prepared by certified analytical laboratories, and are presented in Appendix D. The Fourth Quarter 2021 analytical results are presented in Tables 4, 5, 6, and 7:

- Influent analytical results are presented in Table 4.
- Effluent analytical results are presented in Table 5. There were no exceedances of effluent limitations during the reporting period.
- RO concentrate analytical results are presented in Table 6.
- Sludge analytical results are presented in Table 7.

The sludge is required to have an aquatic bioassay test annually. The most recent aquatic bioassay test was conducted in the third quarter 2021, and the results were presented in the Third Quarter 2021 Monitoring Report submitted to the DOI and Regional Water Board on October 15, 2021.

Table 8 identifies the following information for each analysis:

- Sample location
- Sample identification number
- Sampler name
- Sample date
- Sample time
- Laboratory performing analysis
- Analysis method
- Analysis date
- Laboratory technician

5. Semiannual Operation and Maintenance

This section includes the Semiannual Operation and Maintenance Report for the IM-3 groundwater treatment system for the period July 1, 2021 through December 31, 2021.

All O&M records are maintained at the facility, including site inspection forms, process monitoring records, hazardous waste generator records (i.e., waste manifests), and self-monitoring reports. These records will be maintained onsite for a period of at least 5 years. Operational programmable logic controller data (flow rates, system alarms, process monitoring data, etc.) are maintained electronically via data historian software. O&M records are also archived using maintenance software. The subsections below summarize the O&M activities during this semiannual reporting period.

5.1 Flowmeter Calibration Records

The IM-3 groundwater treatment system flowmeter calibration records are included in Appendix C. Flowmeter calibrations are performed in a timely manner consistent with the use, flow, material, and manufacturer recommendations. The following flowmeters are used at the facility to measure groundwater flow:

Location	Location ID Where Flowmeter is Installed	Current Flowmeter Serial No.	Date of Calibration	Date of Installation
Extraction well PE-1	FIT-103	6C037116000	9/17/2015	1/6/2016
Extraction well TW-3D	FIT-102	6C036F16000	2/7/2020	5/27/2020
Extraction well TW-2D	FIT-101	7700F216000	8/19/2020	6/12/2021
Extraction well TW-2S	FIT-100	6A021F16000	12/5/2018	8/22/2019
Injection well IW-03	FIT-1203	N6004E16000	6/13/2018	5/1/2019
Injection well IW-02	FIT-1202	6C037316000	2/7/2020	7/8/2020
Combined IW-02 and IW-03	FIT-700	L200E016000	5/28/2019	7/7/2020
Reverse osmosis concentrate	FIT-701	N6004F16000	6/13/2018	11/17/2018

5.2 Volumes of Groundwater Treated

Data regarding daily volumes of groundwater treated between July 1, 2021 and December 31, 2021 are provided in Appendix B. The daily volumes of groundwater treated from January 1, 2021 through June 30, 2021 were reported in the Second Quarter 2021 Monitoring Report and Semiannual January 1- June 30, 2021 Operation and Maintenance Report submitted on July 15, 2021.

Approximately 30,872,897 gallons of groundwater were extracted and treated between July 1, 2021 and December 31, 2021. Treatment of this water at the IM-3 facility is being performed in accordance with the conditions of ARARs.

Additionally, approximately 9,000 gallons of Final Groundwater Remedy wastewater (final flushing of the TW-01 extraction pipeline), 2,785 gallons of well purge water (generated during monitoring well sampling), as well as 62,000 gallons of injection well re-development water, were treated at the IM-3 facility during the July 1, 2021 through December 31, 2021 semiannual period.

A total of approximately 31,965,440 gallons of treated groundwater were injected back into the Alluvial Aquifer between July 1, 2021 and December 31, 2021. This is greater than the metered influent, but is within the accuracy of the flow meters.

5.3 Residual Solids Generated (Sludge)

During the July 1, 2021 through December 31, 2021 reporting period, ten containers of sludge were shipped offsite for disposal. The sludge was shipped to U.S. Ecology in Beatty, Nevada, for disposal. A listing of each shipment during the July 1, 2021 through December 31, 2021 reporting period is provided below.

Date Sludge Bin Removed from Site	Approximate Quantity from Waste Manifests (cubic yards)	Type of Shipment
8/3/2021	8	Non-RCRA hazardous waste
8/3/2021	8	Non-RCRA hazardous waste
9/2/2021	8	Non-RCRA hazardous waste
9/2/2021	8	Non-RCRA hazardous waste
10/12/2021	8	Non-RCRA hazardous waste
10/12/2021	8	Non-RCRA hazardous waste
11/16/2021	8	Non-RCRA hazardous waste
11/16/2021	8	Non-RCRA hazardous waste
12/16/2021	8	Non-RCRA hazardous waste
12/16/2021	8	Non-RCRA hazardous waste

Note:

RCRA = Resource Conservation and Recovery Act

5.4 Reverse Osmosis Concentrate Generated

Data regarding daily volumes of RO concentrate generated are provided in Appendix B, as measured by flowmeter FIT-701 (Figures PR-10-03 and PR-10-04) or from Liquid Environmental Solutions non-hazardous waste manifests. No RO concentrate was generated during the July 1, 2021 through December 31, 2021 reporting period.

RO concentrate is a by-product of the IM-3 treatment process and is shipped off-site by tanker truck as non-hazardous waste. Due to Final Groundwater Remedy construction activities at the MW-20 Bench adjacent to the IM-3 RO concentrate storage tank, the RO concentrate is temporarily being stored and shipped from the RO concentrate process collection tank. Since the flowmeter is located between the RO concentrate process collection tank and the RO concentrate storage tank, the RO concentrate flow from the process collection tank was not recorded by the flowmeter.

From July 1, 2021 through December 31, 2021, no RO concentrate was generated or transported to Liquid Environmental Solutions in Phoenix, Arizona for disposal. The monthly average flow rate is shown as zero on Table 2.

5.5 Summary of ARARs Compliance

No ARAR violations were identified during the July 1, 2021 through December 31, 2021 semiannual reporting period.

5.6 Operation and Maintenance – Required Shutdowns

Records of routine maintenance are kept onsite.

Appendix A contains a summary of the operation or maintenance issues that required the groundwater extraction system to be shut down during the July 1, 2021 through December 31, 2021 semiannual reporting period.

5.7 Treatment Facility Modifications

No modifications were made to the IM-3 treatment facility that resulted in a material change in the quality or quantity of wastewater treated or discharged, nor resulted in a material change in the location of discharge, during the July 1, 2021 through December 31, 2021 semiannual period.

6. Conclusions

There were no exceedances of effluent limitations during the reporting period.

In addition, no incidents of non-compliance were identified during the reporting period. No events that caused an immediate or potential threat to human health or the environment, and no new releases of hazardous waste or hazardous waste constituents, or new solid waste management units, were identified during the reporting period.

7. Certification

Certification Statement:

I declare under the penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations.

Signature:  _____

Name: Curt Russell

Company: Pacific Gas and Electric Company

Title: Topock Site Manager

Date: January 14, 2022

Tables

Table 1. Sampling Station Descriptions*Fourth Quarter 2021 Monitoring Report for Interim Measure No. 3 Groundwater Treatment System*

Sample Station	Sample ID ^a	Location
Sampling Station A: Groundwater Treatment System Influent	SC-100B-WDR-###	Sample collected from tap on pipe into T-100 (refer to Figure TP-RP-10-10-04).
Sampling Station B: Groundwater Treatment System Effluent	SC-700B-WDR-###	Sample collected from tap on pipe downstream from T-700 (refer to Figure TP-RP-10-10-04).
Sampling Station D: Groundwater Treatment System Reverse Osmosis Concentrate	SC-701-WDR-###	Sample collected from tap on pipe into T-701 (refer to Figures PR-10-03 and PR-10-04).
Sampling Station E: Groundwater Treatment System Sludge	SC-SLUDGE-WDR-###	Sample collected from sludge accumulated in the phase separator used this quarter (refer to Figure TP-RP-10-10-06).

Notes:

= Sequential sample identification number at each sample station

^a The sample event number is included at the end of the sample ID (e.g., SC-100B-WDR-015).

Table 2. Flow Monitoring Results*Fourth Quarter 2021 Monitoring Report for Interim Measure No. 3 Groundwater Treatment System*

Parameter	System Influent ^{a,b, d, e} (gpm)	System Effluent ^{a,b} (gpm)	Reverse Osmosis Concentrate ^{b, c} (gpm)
October 2021 Average Monthly Flowrate	130.0	135.3	0
November 2021 Average Monthly Flowrate	127.7	131.8	0
December 2021 Average Monthly Flowrate	127.5	90.0	0

Notes:

gpm: gallons per minute

^a Extraction wells TW-01, TW-3D and TW-2D were operated during the Fourth Quarter 2021. Extraction wells PE-01 and TW-2S were not operated during Fourth Quarter 2021. Extraction at IM-3 was shut off on December 21, 2021 at 2:20 pm and the plant entered the layup phase. December system flowrates are calculated based on the shutdown date.

^b The difference between influent flow rate (including Remedy waste water, and injection well backwash water) and the sum of the effluent and reverse osmosis concentrate flow rates during the Fourth Quarter 2021 is approximately 3.33 percent.

^c Due to Final Groundwater Remedy construction activities at the MW-20 bench, brine (RO) concentrate was no longer sent to the brine tanks since May 8, 2019. The total gallons removed from IM-3 since that date are an estimate from the Liquid Environmental Systems non-hazardous waste manifests.

^d The injection backwash water (30,000 gallons) during November 2021 was included in the system influent value shown.

^e The groundwater remedy wastewater (9,000 gallons) during December 2021 was included in the system influent value shown.

Table 3. Sample Collection Dates*Fourth Quarter 2021 Monitoring Report for Interim Measure No. 3 Groundwater Treatment System*

Parameter	Sample Collection Dates	Results
Influent	October 5, 2021 October 6, 2021 November 2, 2021 December 7, 2021	Refer to Table 4
Effluent	October 5, 2021 October 6, 2021 November 2, 2021 December 7, 2021	Refer to Table 5
Reverse Osmosis Concentrate	October 5, 2021 October 6, 2021	Refer to Table 6
Sludge ^a	Composite sample sent to lab October 5, 2021	Refer to Table 7

Note:^a Sludge samples analysis is required quarterly by composite.

Table 4. Influent Monitoring Results^a
Fourth Quarter 2021 Monitoring Report for Interim Measure No.3 Groundwater Treatment System

Analytes Units ^b MDL	TDS	Turbidity	Specific Conductance	Field ^c pH	Chromium	Hexavalent Chromium	Aluminium	Ammonia (as N)	Antimony	Arsenic	Barium	Boron	Copper	Fluoride	Lead	Manganese	Molybdenum	Nickel	Nitrate/Nitrite (as N)	Sulfate	Iron	Zinc	
	mg/L	NTU	µmhos/cm	pH units	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L	
	50.0	0.100	0.100	---	0.880	5.00	40.0	0.0670	0.220	0.0500	0.0830	0.0740	0.0460	0.0640	0.0180	0.0260	0.120	0.170	0.170	3.00	13.0	0.260	
Sampling Frequency		Monthly					Quarterly																
Sample ID	Date																						
SC-100B-WDR-620	10/5/2021	---	---	---	6.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
SC-100B-WDR-620	10/6/2021	4100	0.190	6600	---	1100	1000	52.0	ND (0.200)	ND (0.500)	0.410	38.0	1.30	ND (1.00)	3.50	ND (1.00)	1.50	30.0	ND (5.00)	8.60	500	ND (20.0)	ND (10.0)
RL		50.0	0.100	0.100	---	25.0	40.0	50.0	0.200	0.500	0.100	1.00	0.100	1.00	0.500	1.00	0.500	0.500	5.00	0.500	25.0	20.0	10.0
SC-100B-WDR-621	11/2/2021	4000	0.240	6600	7.1	1000	990	---	---	---	---	---	---	---	---	0.570	---	---	---	---	ND (20.0)	---	
RL		50.0	0.100	0.100	---	25.0	40.0	---	---	---	---	---	---	---	---	0.500	---	---	---	---	20.0	---	
SC-100B-WDR-622	12/7/2021	3800	0.160	6100	7.1	1000	900	---	---	---	---	---	---	---	---	ND (0.500)	---	---	---	---	ND (20.0)	---	
RL		50.0	0.100	0.100	---	25.0	40.0	---	---	---	---	---	---	---	---	0.500	---	---	---	---	20.0	---	

Notes:
(---) = not required by the ARARs Monitoring and Reporting Program
J = concentration or reporting limits estimated by laboratory or validation
MDL = method detection limit
mg/L = milligrams per liter
N = nitrogen
ND = parameter not detected at the listed value
NTU = nephelometric turbidity units
RL = project reporting limit
µg/L = micrograms per liter
µmhos/cm = micromhos per centimeter

^a Sampling Location for all influent samples is tap on pipe from extraction wells into tank T-100 (see attached P&ID TP-PR-10-10-04).
^b Units reported in this table are those units required in the ARARs.
^c Starting 11/20/2007, analysis of pH was switched from California certified laboratory analysis to field method pursuant to the Water Board letter dated October 16, 2007 – Clarification of Monitoring and Reporting Program Requirements, stating that pH measurements may be conducted in the field.

Table 5. Effluent Monitoring Results^a
Fourth Quarter 2021 Monitoring Report for Interim Measure No.3 Groundwater Treatment System

Analytes	Units ^c	MDL ^d	TDS	Turbidity	Specific Conductance	Field pH ^e	Chromium	Hexavalent Chromium	Aluminiur	Ammonia (as N)	Antimony	Arsenic	Barium	Boron	Copper	Fluoride	Lead	Manganese	Molybdenur	Nickel	Nitrate/Nitrite (as N)	Sulfate	Iron	Zinc
			mg/L	NTU	µmhos/cm	pH units	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	mg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	µg/L	µg/L
Effluent Limits ^b	Ave. Monthly		NA	NA	NA	6.5-8.4	25	8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Max Daily		NA	NA	NA	6.5-8.4	50	16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sampling Frequency			Monthly																					
Sample ID	Date																							
SC-700B-WDR-620	10/5/2021		---	---	---	7.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
SC-700B-WDR-620	10/6/2021		1300	0.180	2400	---	2.60	1.30	ND (50.0)	ND (0.200)	ND (0.500)	ND (0.100)	9.30	0.910	ND (1.00)	1.30	ND (1.00)	4.30	8.70	ND (1.00)	3.20	160	32.0	ND (10.0)
RL			17.0	0.100	0.100	---	1.00	0.200	50.0	0.200	0.500	0.100	1.00	0.100	1.00	0.500	1.00	0.500	0.500	1.00	0.100	25.0	20.0	10.0
SC-700B-WDR-621	11/2/2021		4200	0.120	6600	7.0	ND (1.00)	ND (0.200)	ND (50.0)	ND (0.200)	ND (0.500)	ND (0.100)	25.0	1.40	ND (1.00)	3.30	ND (1.00)	11.0	28.0	ND (5.00)J	8.10	490	ND (20.0)	ND (10.0)
RL			50.0	0.100	0.100	---	1.00	0.200	50.0	0.200	0.500	0.100	1.00	0.100	1.00	0.500	1.00	0.500	0.500	5.00	0.500	25.0	20.0	10.0
SC-700B-WDR-622	12/7/2021		3900	ND (0.100)	6100	7.2	ND (1.00)	ND (0.200)	200	ND (0.200)	ND (0.500)	ND (0.100)	26.0	1.10	ND (5.00)	3.70	ND (1.00)	11.0	27.0	ND (5.00)	8.40	510	92.0	ND (10.0)
RL			50.0	0.100	0.100	---	1.00	0.200	50.0	0.200	0.500	0.100	1.00	0.100	5.00	0.500	1.00	0.500	0.500	5.00	0.500	25.0	20.0	10.0

Notes:

(---) = not required by the ARARs Monitoring and Reporting Program

J = concentration or reporting limits estimated by laboratory or validation

MDL = method detection limit

mg/L = milligrams per liter

N = nitrogen

NA = not applicable

ND = parameter not detected at the listed value

NTU = nephelometric turbidity units

RL = project reporting limit

µg/L = micrograms per liter

µmhos/cm = micromhos per centimeter

^a Sampling location for all effluent samples is tap on pipe downstream from tank T-700 to injection wells (see attached P&ID TP-PR-10-10-04).

^b In addition to the listed effluent limits, the ARARs state that the effluent shall not contain heavy metals, chemicals, pesticides or other constituents in concentrations toxic to human health.

^c Units reported in this table are those units required in the ARARs.

^d MDL listed is the target MDL by analysis method; however, the MDL may change for each sample analysis due to the dilution required by the matrix to meet the method QC requirements. The target MDL for each method/analyte combination is calculated annually.

^e Starting 11/20/2007, analysis of pH was switched from California certified laboratory analysis to field method pursuant to the Water Board letter dated October 16, 2007 – Clarification of Monitoring and Reporting Program Requirements, stating that pH measurements may be conducted in the field.

Table 6. Reverse Osmosis Concentrate Monitoring Results^a
Fourth Quarter 2021 Monitoring Report for Interim Measure No.3 Groundwater Treatment System

Analytes	Units ^b	MDL	TDS	Specific Conductance	Field pH ^c	Chromium	Hexavalent Chromium	Antimony	Arsenic	Barium	Beryllium	Cadmium	Cobalt	Copper	Fluoride	Lead	Molybdenum	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	
			mg/L	µmhos/cm	pH units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
			100	0.100	---	0.000035	0.00013	0.00022	0.000050	0.000083	0.00015	0.000045	0.000017	0.000046	0.250	0.000018	0.00012	0.00012	0.000034	0.000044	0.000028	0.00012	0.000067	0.00026	
Sampling Frequency			Quarterly																						
Sample ID	Date																								
SC-701-WDR-620	10/5/2021	---	---	7.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
SC-701-WDR-620	10/6/2021	9000	13000	---	0.00270	ND (0.0010)	ND (0.00050)	0.00420	0.0360	ND (0.0025)	ND (0.00050)	0.000710	0.00480	7.50	ND (0.0010)	0.0560	ND (0.00020)	0.0100	0.0130	ND (0.00050)	ND (0.00050)	0.00490	0.0130		
RL		100	0.100	---	0.0010	0.0010	0.00050	0.00010	0.0010	0.0025	0.00050	0.00050	0.0010	2.00	0.0010	0.00050	0.00020	0.0010	0.00050	0.00050	0.00050	0.0010	0.0100		

Notes:
(---) = not required by the ARARs Monitoring and Reporting Program
MDL = method detection limit
mg/L = milligrams per liter
ND = parameter not detected at the listed value
RL = project reporting limit
µg/L = micrograms per liter
µmhos/cm = micromhos per centimeter

^a Sampling location for all reverse osmosis samples is tap on pipe T-701 (see attached P&ID PR-10-04).
^b Units reported in this table are those units required in the ARARs.
^c Starting 11/20/2007, analysis of pH was switched from California certified laboratory analysis to field method pursuant to the Water Board letter dated October 16, 2007 – Clarification of Monitoring and Reporting Program Requirements, stating that pH measurements may be conducted in the field.

Table 7. Sludge Monitoring Results^a
Fourth Quarter 2021 Monitoring Report for Interim Measure No.3 Groundwater Treatment System

	Analytes Units ^b MDL	Chromium	Hexavalent Chromium	Antimony	Arsenic	Barium	Beryllium	Cadmium	Cobalt	Copper	Fluoride	Lead	Molybdenum	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		0.270	0.510	1.30	0.100	0.710	0.510	0.460	0.540	0.560	0.820	0.750	0.530	0.0320	0.630	2.00	0.830	1.40	0.450	0.660
Sampling Frequency		Quarterly																		
Sample ID	Date																			
Phase Separator-620-Sludge	10/5/2021	4200	88.0	19.0	26.0	100	ND (3.20)	13.0	9.20	320	41.0	ND (3.20)	15.0	0.330	59.0	ND (3.20)	ND (3.20)	15.0	81.0	100
RL		3.20	3.20	6.40	0.800	3.20	3.20	3.20	3.20	6.40	6.40	3.20	3.20	0.320	3.20	3.20	3.20	6.40	3.20	3.20

Notes:
(---) = not required by the ARARs Monitoring and Reporting Program
J = concentration or reporting limits estimated by laboratory or validation
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
MDL = method detection limit
ND = parameter not detected at the listed reporting limit
RL = project reporting limit

^a Sampling location for all sludge samples is the sludge collection bin (see attached P&ID TP-PR-10-10-06).
^b Units reported in this table are those units required in the ARARs.
^c Sludge samples analysis is required quarterly by composite; sludge samples were collected from each container prior to shipment off-site, and combined for the composite sample of the preceding quarter.

Table 8. Monitoring Information*Fourth Quarter 2021 Monitoring Report for Interim Measure No.3 Groundwater Treatment System*

Location	Sample ID	Sampler Name	Sample Date	Sample Time	Lab	Analysis Method	Parameter	Analysis Date	Lab Technician
SC-100B	SC-100B-WDR-620	Cameron Stone	10/5/2021	11:50:00 AM	Field	HACH	PH	10/5/2021	Cameron Stone
				10/6/2021	ASSET	EPA 120.1	SC	10/7/2021	Lilia Ramit
			10/6/2021	3:23:00 PM	ASSET	EPA 200.7	AL	10/26/2021	Diane Jetajobe
					ASSET	EPA 200.7	B	10/26/2021	Diane Jetajobe
					ASSET	EPA 200.7	FE	10/26/2021	Diane Jetajobe
					ASSET	EPA 200.8	AS	11/6/2021	Claire Ignacio
					ASSET	EPA 200.8	BA	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	CR	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	CU	11/6/2021	Claire Ignacio
					ASSET	EPA 200.8	MN	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	MO	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	NI	11/6/2021	Claire Ignacio
					ASSET	EPA 200.8	PB	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	SB	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	ZN	11/4/2021	Claire Ignacio
					ASSET	EPA 218.6	CR6	10/8/2021	Ria Abes
					ASSET	EPA 300.0	FL	10/7/2021	Ria Abes
					ASSET	EPA 300.0	SO4	10/7/2021	Ria Abes
					ASSET	SM 2540C	TDS	10/8/2021	Lilia Ramit
					ASSET	SM2130B	TRB	10/7/2021	Lilia Ramit
					ASSET	SM4500-HB	PH	10/7/2021	Lilia Ramit
					BCLabs	SM4500NH3G	NH3N	10/22/2021	Marion Cartin
					BCLabs	SM4500NO3-E	NO3NO2N	10/18/2021	Marion Cartin
SC-100B	SC-100B-WDR-621	Tyler McGill	11/2/2021	10:36:00 AM	Field	HACH	PH	11/2/2021	Tyler McGill
				10:49:00 AM	ASSET	EPA 120.1	SC	11/3/2021	Lilia Ramit
			11/2/2021		ASSET	EPA 200.7	FE	11/19/2021	Diane Jetajobe
					ASSET	EPA 200.8	CR	11/11/2021	Claire Ignacio
					ASSET	EPA 200.8	MN	11/11/2021	Claire Ignacio
					ASSET	EPA 218.6	CR6	11/3/2021	Ria Abes
					ASSET	SM 2540C	TDS	11/3/2021	Lilia Ramit
					ASSET	SM2130B	TRB	11/3/2021	Lilia Ramit
SC-100B	SC-100B-WDR-622	Tyler McGill	12/7/2021	11:54:00 AM	Field	HACH	PH	12/7/2021	Tyler McGill
				11:57:00 AM	ASSET	EPA 120.1	SC	12/8/2021	Claire Ignacio
					ASSET	EPA 200.7	FE	12/12/2021	Diane Jetajobe
					ASSET	EPA 200.8	CR	12/17/2021	Claire Ignacio
					ASSET	EPA 200.8	MN	12/17/2021	Claire Ignacio
					ASSET	EPA 218.6	CR6	12/10/2021	Ria Abes
					ASSET	SM 2540C	TDS	12/11/2021	Claire Ignacio

Table 8. Monitoring Information*Fourth Quarter 2021 Monitoring Report for Interim Measure No.3 Groundwater Treatment System*

Location	Sample ID	Sampler Name	Sample Date	Sample Time	Lab	Analysis Method	Parameter	Analysis Date	Lab Technician
SC-100B	SC-100B-WDR-622	Tyler McGill	12/7/2021	11:57:00 AM	ASSET	SM2130B	TRB	12/8/2021	Claire Ignacio
SC-700B	SC-700B-WDR-620	Cameron Stone	10/5/2021	11:51:00 AM	Field	HACH	PH	10/5/2021	Cameron Stone
			10/6/2021	3:26:00 PM	ASSET	EPA 120.1	SC	10/7/2021	Lilia Ramit
					ASSET	EPA 200.7	AL	10/26/2021	Diane Jetajobe
					ASSET	EPA 200.7	B	10/26/2021	Diane Jetajobe
					ASSET	EPA 200.7	FE	10/26/2021	Diane Jetajobe
					ASSET	EPA 200.8	AS	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	BA	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	CR	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	CU	11/6/2021	Claire Ignacio
					ASSET	EPA 200.8	MN	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	MO	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	NI	11/6/2021	Claire Ignacio
					ASSET	EPA 200.8	PB	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	SB	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	ZN	11/4/2021	Claire Ignacio
					ASSET	EPA 218.6	CR6	10/8/2021	Ria Abes
					ASSET	EPA 300.0	FL	10/7/2021	Ria Abes
					ASSET	EPA 300.0	SO4	10/7/2021	Ria Abes
					ASSET	SM 2540C	TDS	10/8/2021	Lilia Ramit
					ASSET	SM2130B	TRB	10/7/2021	Lilia Ramit
					ASSET	SM4500-HB	PH	10/7/2021	Lilia Ramit
					BCLabs	SM4500NH3G	NH3N	10/22/2021	Marion Cartin
					BCLabs	SM4500NO3-E	NO3NO2N	10/18/2021	Marion Cartin
SC-700B	SC-700B-WDR-621	Tyler McGill	11/2/2021	10:36:00 AM	Field	HACH	PH	11/2/2021	Tyler McGill
				10:49:00 AM	ASSET	EPA 120.1	SC	11/3/2021	Lilia Ramit
					ASSET	EPA 200.7	AL	11/17/2021	Diane Jetajobe
					ASSET	EPA 200.7	B	11/18/2021	Diane Jetajobe
					ASSET	EPA 200.7	FE	11/19/2021	Diane Jetajobe
					ASSET	EPA 200.8	AS	11/15/2021	Claire Ignacio
					ASSET	EPA 200.8	BA	11/15/2021	Claire Ignacio
					ASSET	EPA 200.8	CR	11/11/2021	Claire Ignacio
					ASSET	EPA 200.8	CU	11/11/2021	Claire Ignacio
					ASSET	EPA 200.8	MN	11/11/2021	Claire Ignacio
					ASSET	EPA 200.8	MO	11/11/2021	Claire Ignacio
					ASSET	EPA 200.8	NI	11/15/2021	Claire Ignacio
					ASSET	EPA 200.8	PB	11/11/2021	Claire Ignacio
					ASSET	EPA 200.8	SB	11/11/2021	Claire Ignacio

Table 8. Monitoring Information*Fourth Quarter 2021 Monitoring Report for Interim Measure No.3 Groundwater Treatment System*

Location	Sample ID	Sampler Name	Sample Date	Sample Time	Lab	Analysis Method	Parameter	Analysis Date	Lab Technician
SC-700B	SC-700B-WDR-621	Tyler McGill	11/2/2021	10:49:00 AM	ASSET	EPA 200.8	ZN	11/11/2021	Claire Ignacio
					ASSET	EPA 218.6	CR6	11/3/2021	Ria Abes
					ASSET	EPA 300.0	FL	11/4/2021	Ria Abes
					ASSET	EPA 300.0	SO4	11/4/2021	Ria Abes
					ASSET	SM 2540C	TDS	11/3/2021	Lilia Ramit
					ASSET	SM2130B	TRB	11/3/2021	Lilia Ramit
					PACE	SM4500NH3G	NH3N	11/11/2021	Marion Cartin
					PACE	SM4500NO3-E	NO3NO2N	11/19/2021	Marion Cartin
SC-700B	SC-700B-WDR-622	Tyler McGill	12/7/2021	11:57:00 AM	Field	HACH	PH	12/7/2021	Tyler McGill
				11:59:00 AM	ASSET	EPA 120.1	SC	12/8/2021	Claire Ignacio
					ASSET	EPA 200.7	AL	12/19/2021	Diane Jetajobe
					ASSET	EPA 200.7	B	12/19/2021	Diane Jetajobe
					ASSET	EPA 200.7	FE	12/19/2021	Diane Jetajobe
					ASSET	EPA 200.8	AS	12/17/2021	Claire Ignacio
					ASSET	EPA 200.8	BA	12/17/2021	Claire Ignacio
					ASSET	EPA 200.8	CR	12/17/2021	Claire Ignacio
					ASSET	EPA 200.8	CU	12/19/2021	Claire Ignacio
					ASSET	EPA 200.8	MN	12/17/2021	Claire Ignacio
					ASSET	EPA 200.8	MO	12/17/2021	Claire Ignacio
					ASSET	EPA 200.8	NI	12/19/2021	Claire Ignacio
					ASSET	EPA 200.8	PB	12/17/2021	Claire Ignacio
					ASSET	EPA 200.8	SB	12/17/2021	Claire Ignacio
					ASSET	EPA 200.8	ZN	12/17/2021	Claire Ignacio
					ASSET	EPA 218.6	CR6	12/10/2021	Ria Abes
					ASSET	EPA 300.0	FL	12/8/2021	Ria Abes
					ASSET	EPA 300.0	SO4	12/8/2021	Ria Abes
					ASSET	SM 2540C	TDS	12/11/2021	Claire Ignacio
					ASSET	SM2130B	TRB	12/8/2021	Claire Ignacio
					PACE	SM4500NH3G	NH3N	12/21/2021	Marion Cartin
					PACE	SM4500NO3-E	NO3NO2N	12/16/2021	Marion Cartin
SC-701	SC-701-WDR-620	Cameron Stone	10/5/2021	11:53:00 AM	Field	HACH	PH	10/5/2021	Cameron Stone
			10/6/2021	3:28:00 PM	ASSET	EPA 120.1	SC	10/7/2021	Lilia Ramit
					ASSET	EPA 200.8	AG	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	AS	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	BA	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	BE	11/6/2021	Claire Ignacio
					ASSET	EPA 200.8	CD	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	CO	11/4/2021	Claire Ignacio

Table 8. Monitoring Information*Fourth Quarter 2021 Monitoring Report for Interim Measure No.3 Groundwater Treatment System*

Location	Sample ID	Sampler Name	Sample Date	Sample Time	Lab	Analysis Method	Parameter	Analysis Date	Lab Technician
SC-701	SC-701-WDR-620	Cameron Stone	10/6/2021	3:28:00 PM	ASSET	EPA 200.8	CR	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	CU	11/6/2021	Claire Ignacio
					ASSET	EPA 200.8	MN	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	MO	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	NI	11/6/2021	Claire Ignacio
					ASSET	EPA 200.8	PB	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	SB	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	SE	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	TL	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	V	11/4/2021	Claire Ignacio
					ASSET	EPA 200.8	ZN	11/4/2021	Claire Ignacio
					ASSET	EPA 218.6	CR6	10/8/2021	Ria Abes
					ASSET	EPA 245.1	HG	10/13/2021	Diane Jetajobe
					ASSET	EPA 300.0	FL	10/7/2021	Ria Abes
					ASSET	SM 2540C	TDS	10/8/2021	Lilia Ramit
					ASSET	SM4500-HB	PH	10/7/2021	Lilia Ramit
Phase Separator	Phase Separator-620-Sludge	Cameron Stone	10/5/2021	11:40:00 AM	ASSET	EPA 300.0	FL	10/11/2021	Ria Abes
					ASSET	EPA 6010B	AG	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	BA	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	BE	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	CD	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	CO	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	CR	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	CRTTCLP	10/25/2021	Diane Jetajobe
					ASSET	EPA 6010B	CU	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	MN	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	MO	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	NI	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	PB	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	SB	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	SE	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	TL	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	V	10/9/2021	Diane Jetajobe
					ASSET	EPA 6010B	ZN	10/9/2021	Diane Jetajobe
					ASSET	EPA 7471A	HG	10/7/2021	Diane Jetajobe
					ASSET	SW 6020A	AS	10/13/2021	Claire Ignacio
					ASSET	SW 7199	CR6	10/13/2021	Ria Abes

Table 8. Monitoring Information

Fourth Quarter 2021 Monitoring Report for Interim Measure No.3 Groundwater Treatment System

Notes:

SC-700B = Sampling location for all effluent samples is tap on pipe downstream from tank T-700 to injection well IW-2 (see attached P&ID TP-PR-10-10-04).

SC-100B = Sampling location for all influent samples is tap on pipe from extraction wells into tank T-100 (see attached P&ID TP-PR-10-10-04).

SC-701 = Sampling location for all reverse osmosis samples is tap on pipe T-701 (see attached P&ID PR-10-04).

Prior to April 11, 2007 the analytical methods listed in the 40 CFR Part 136 for pH and TDS were E150.1 and E160.1, respectively. Per EPA and Department of Health Services guidelines, the analytical methods listed in the current 40 CFR Part 136 have changed to SM4500-H B and SM2540C as shown on the table.

ALKB =	alkalinity, bicarb as CaCO ₃	MO =	molybdenum
ALKC =	alkalinity, carb as CaCO ₃	MOIST =	moisture
AL =	aluminum	NH ₃ N =	ammonia (as N)
Ag =	silver	NI =	nickel
AS =	arsenic	NO ₃ NO ₂ N =	nitrate/nitrite (as N)
B =	boron	PB =	lead
BA =	barium	PH =	pH
BE =	beryllium	SB =	antimony
CD =	cadmium	SC =	specific conductance
CO =	cobalt	SE =	selenium
CR =	chromium	SO ₄ =	sulfate
CR ₆ =	hexavalent chromium	TDS =	total dissolved solids
CU =	copper	TL =	thallium
FE =	iron	TRB =	turbidity
FETD =	iron, dissolved	V =	vanadium
FL =	fluoride	ZN =	zinc
HG =	mercury		
MN =	manganese		
MND =	manganese, dissolved		

Figures

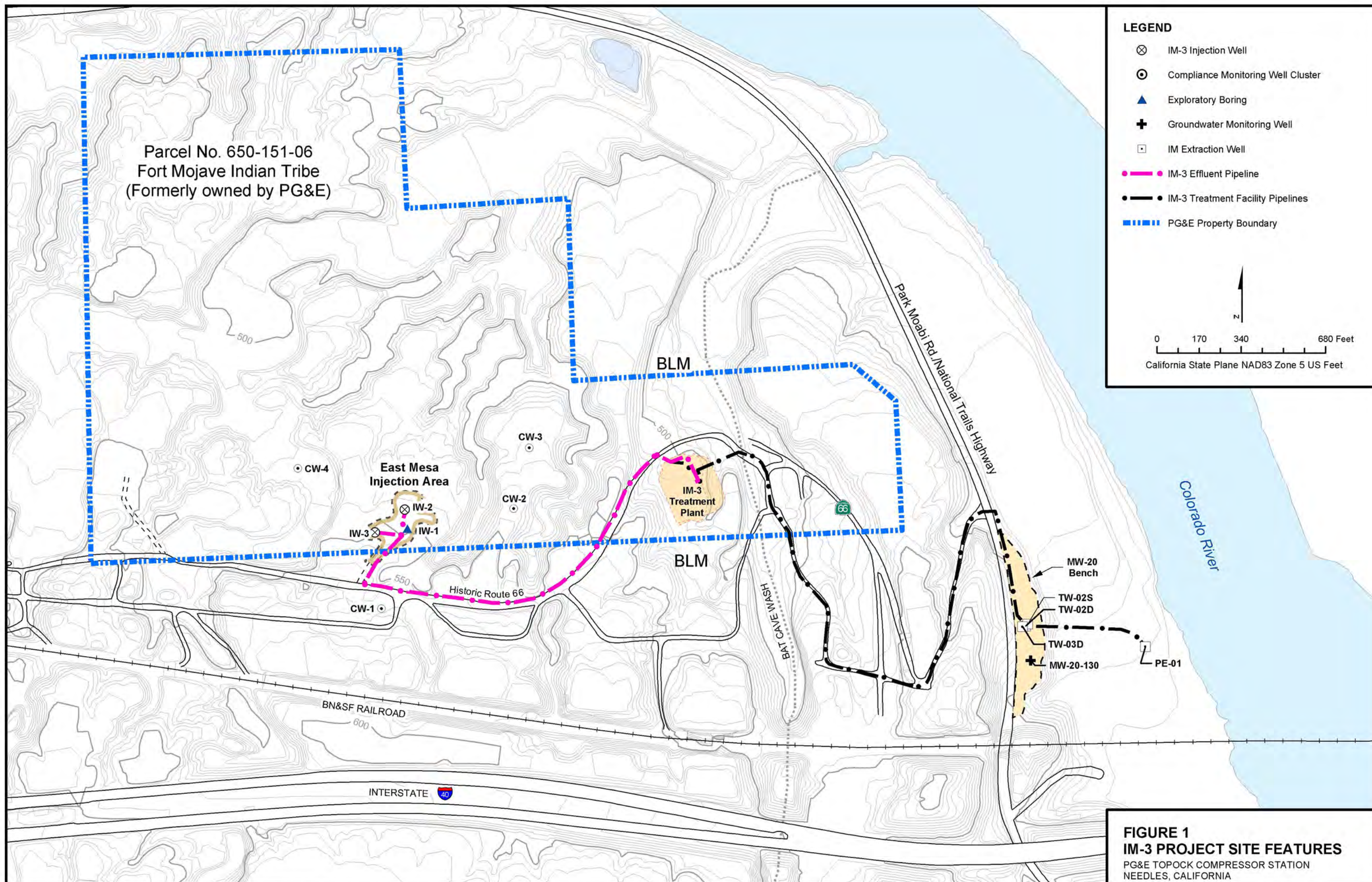
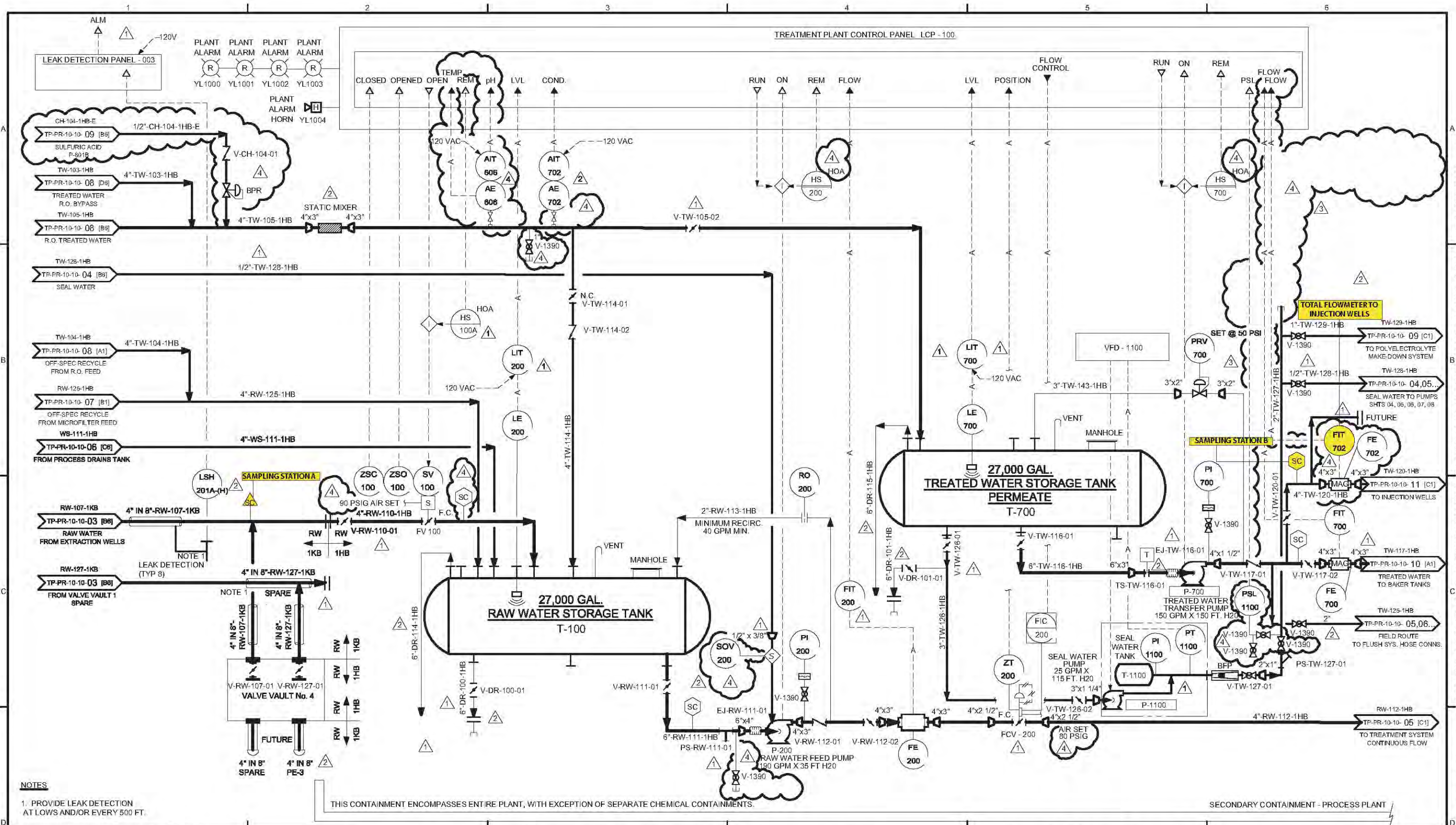
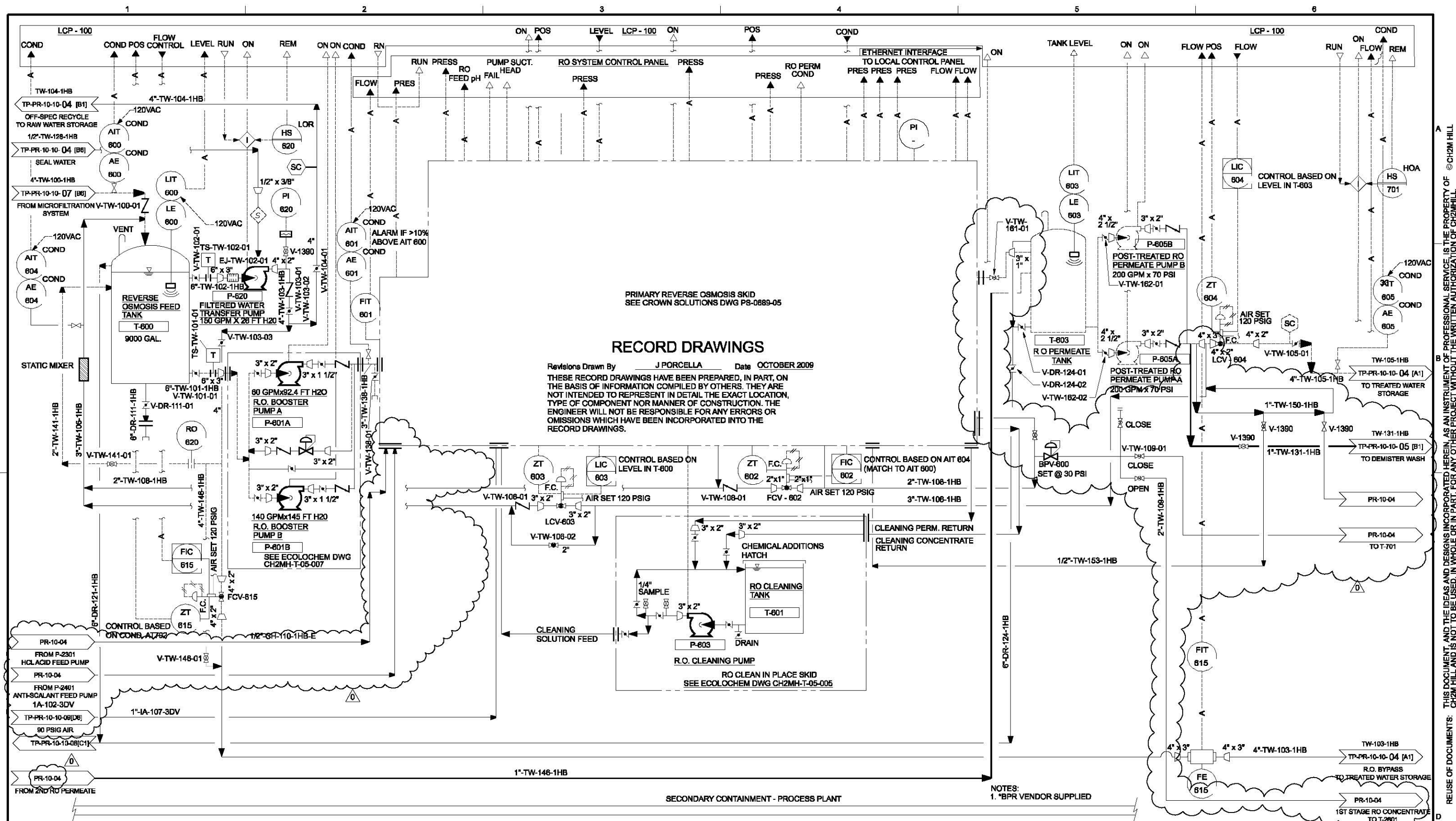


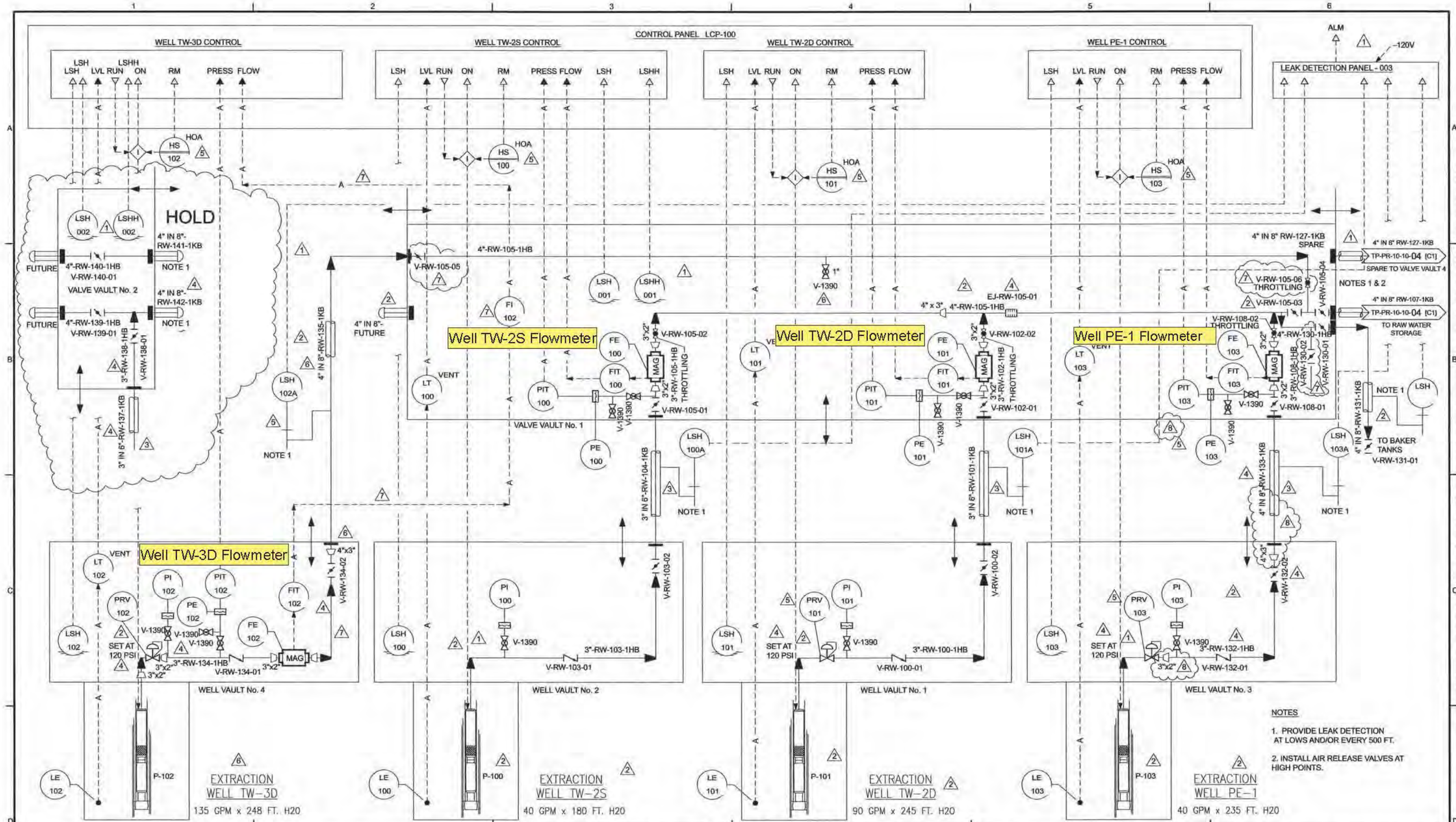
FIGURE 1
IM-3 PROJECT SITE FEATURES
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA



NO.	DATE	REVISION	BY	CHK	REVISION APPROVAL	REV 4	DATE 09/21/05	PRINT DISTRIBUTION	STATUS				PACIFIC GAS & ELECTRIC CO. TOPEAK COMPRESSOR STATION INTERIM MEASURE 3 EXPANDED GROUNDWATER EXTRACTION AND TREATMENT SYSTEM PROJ NO. 315994	PROCESS AND INSTRUMENTATION DIAGRAM SHEET 04 STORAGE AREA	
									ISSUED	REV	DATE	SDE	PEM		
0	07/28/04	FOR INTERNAL REVIEW	EFC	AJ	DISCIPLINE	REVIEWED	DISCIPLINE	REVIEWED	DATE						
0	09/03/04	APPROVED FOR CONSTRUCTION	EFC	AJ	CIVIL		ELECTRICAL		STATUS						
1	10/13/04	REVISED AND APPROVED FOR CONSTRUCTION	EFC	AJ	STRUCTURAL		INST & CONTROL		REV.		07/28/04				
2	01/23/05	REVISED AND APPROVED FOR CONSTRUCTION	EFC	AJ	MECHANICAL		ARCHITECTURAL		CLIENT		09/03/04	KLM	TP		
3	02/14/05	ADDED RECIRC. LINE AND PRV VALVE TO T-700 - APPROVED FOR CONSTRUCTION	EFC	AJ	PROCESS		ENVIRONMENTAL		FIELD						
4	09/21/05	REVISED PER AS-BUILT CONDITIONS	EFC	AJ	PIPING		GEN. ARRANG.		INTRA CO.						



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- NOTES
1. PROVIDE LEAK DETECTION AT LOWS AND/OR EVERY 500 FT.
 2. INSTALL AIR RELEASE VALVES AT HIGH POINTS.



RESPONSIBLE ENGINEER
Kenneth L. Martins
PE # CH4876
Exp. 6-30-05

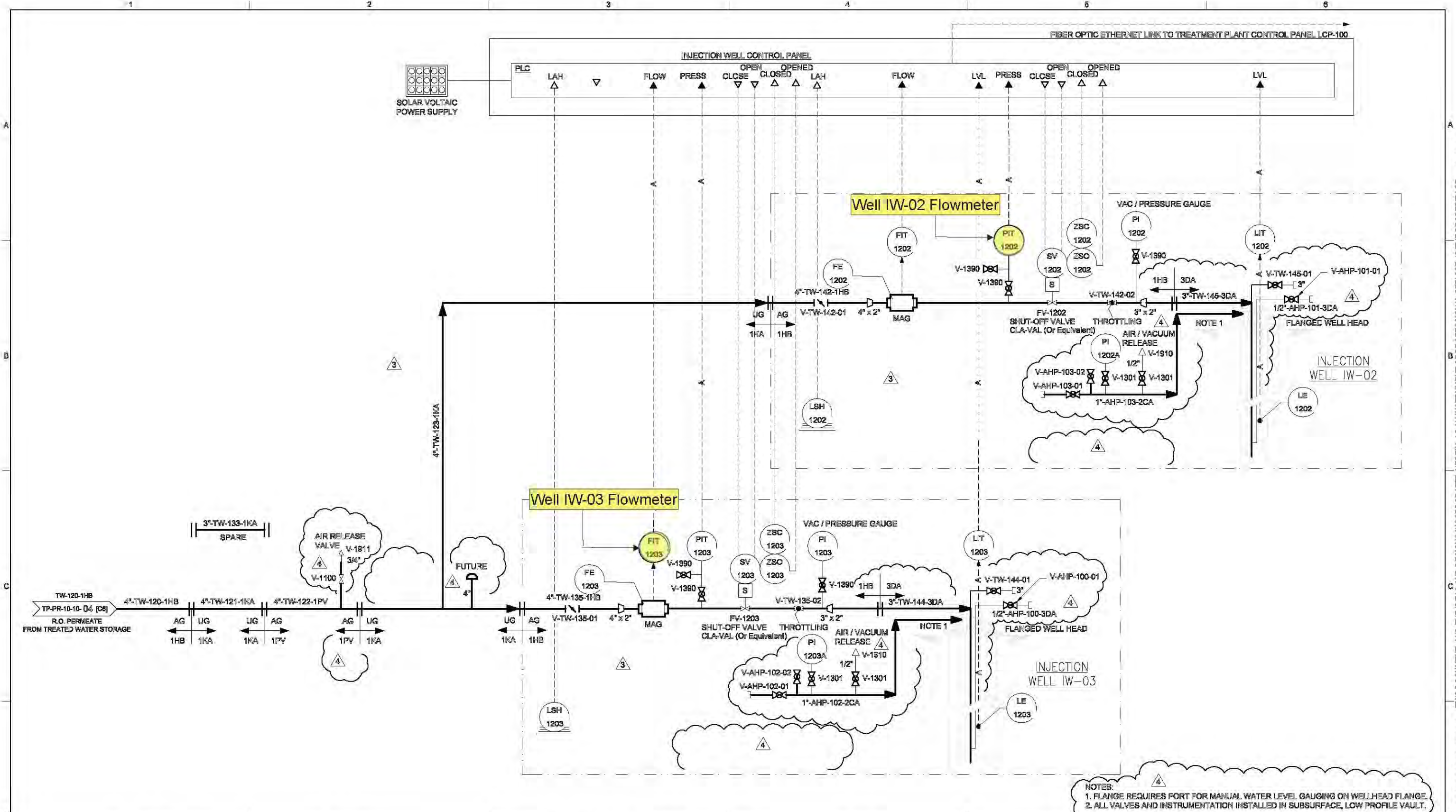
NO.	DATE	REVISION	BY	CHK	REVISION APPROVAL	REV	DATE	12/06/05	PRINT DISTRIBUTION	STATUS	ISSUED	REV	DATE	SDE	PEM
8	12/01/05	REMOVED PE-1 HOLDS	JBW	SDH	DISCIPLINE	REVIEWED	DISCIPLINE	REVIEWED	DATE	ISSUED	REV	DATE	SDE	PEM	
1	10/13/04	REVISED AND APPROVED FOR CONSTRUCTION	EFC	AJ	CIVIL		ELECTRICAL		STATUS	PRELIMINARY					
2	01/23/05	REVISED AND APPROVED FOR CONSTRUCTION	EFC	AJ	STRUCTURAL		INST. & CONTROL		REV.	FOR REVIEW AND APPROVAL	D	07/28/04			
3	03/16/05	DELETED NOTES. APPROVED FOR CONSTRUCTION	EFC	AJ	MECHANICAL		ARCHITECTURAL		CLIENT	APPROVED FOR CONSTRUCTION	0	09/03/04	KLM	TP	
4	07/20/05	RELIEF VALVE SETTINGS. WELL PE-1 LINE TAGS. HOLDS REMOVED. APPROVED FOR CONSTRUCTION	EFC	AJ	PROCESS		ENVIRONMENTAL		FIELD	REVISED & APPROVED FOR CONSTRUCTION	7	12/9/05	AS	AS	
5	09/27/05	FINAL RECORD ISSUE	EFC	AJ	PIPING	SDH	GEN. ARRANG.		INTRA CO.						
6	10/06/05	REVISED FINAL RECORD - ADDED TW-3D	EFC	AJ											
7	10/19/05	REVISED AS NOTED	EFC	AJ											

SCALE NONE

CH2MHILL

PROCESS AND INSTRUMENTATION DIAGRAM
SHEET 03
EXTRACTION WELLS
PE-1, TW-2D, TW-2S AND TW-3D
DWG. NO. TP-PR-10-10-03 REV. 8

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RESPONSIBLE ENGINEER: Kenneth L. Martins PE # CH4878 Exp 5-5-05	NO.	DATE	REVISION	BY	CHK	REVISION APPROVAL	REV 4	DATE 03/10/05	PRINT DISTRIBUTION	STATUS					PACIFIC GAS & ELECTRIC CO. TOPOCK COMPRESSOR STATION INTERIM MEASURE 3 EXPANDED GROUNDWATER EXTRACTION AND TREATMENT SYSTEM PROJ NO. 315994		PROCESS AND INSTRUMENTATION DIAGRAM SHEET 11 INJECTION WELLS	
	A	07/28/04	FOR INTERNAL REVIEW	EFC	AJ	DISCIPLINE	REVIEWED	DISCIPLINE	REVIEWED	DATE	ISSUED	REV	DATE	SDE	PEM	CH2MHILL	DWG. NO. TP-PR-10-10-11	REV. 4
	0	09/03/04	APPROVED FOR CONSTRUCTION	EFC	AJ	CIVIL		ELECTRICAL		STATUS	PRELIMINARY							
	1	10/13/04	REVISED AND APPROVED FOR CONSTRUCTION	EFC	AJ	STRUCTURAL		INST & CONTROL		REV.	FOR REVIEW AND APPROVAL	A	07/28/04					
	2	01/23/05	REVISED AND APPROVED FOR CONSTRUCTION	EFC	AJ	MECHANICAL		ARCHITECTURAL		CLIENT	APPROVED FOR CONSTRUCTION	0	09/03/04	KLM	TP			
	3	02/14/05	REVISED AND APPROVED FOR CONSTRUCTION	EFC	AJ	PROCESS		ENVIRONMENTAL		FIELD	REVISED & APPROVED FOR CONSTRUCTION	4	/ /					
	4	03/10/05	REMOVED HOLD AND APPROVED FOR CONSTRUCTION	EFC	AJ	PIPING		GEN. ARRANG.		INTRA CO.								

Appendix A
Semiannual Operations and Maintenance
Log, July 1, 2021 through
December 31, 2021

Appendix A: Semiannual Operations and Maintenance Log, July 1, 2021 through December 31, 2021

Downtime is defined as any periods when all extraction wells are not operating, so that no groundwater is being extracted and piped into IM-3 as influent. Periods of planned and unplanned extraction system downtime are summarized here. The times shown are in Pacific Standard Time (PST) to be consistent with other data collected at the site.

July 2021

During July 2021, the IM-3 facility treated approximately 4,967,668 gallons of extracted groundwater, including 3,886,336 gallons pumped from TW-01 for the aquifer test. The IM-3 facility also treated 0 gallons of Final Groundwater Remedy wastewater, 1,000 gallons of sampling purge water, and 0 gallons of groundwater from injection well backwashing/re-development during July 2021. Zero containers of solids from the IM-3 facility were transported offsite during July 2021.

Periods of planned and unplanned extraction system downtime (that together resulted in approximately 2.5 percent downtime during July 2021) are summarized below.

- **July 2, 2021 (unplanned):** The extraction well system was offline from 3:10 p.m. to 3:14 p.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 4 minutes.
- **July 6, 2021 (unplanned):** The extraction well system was offline from 4:02 p.m. to 4:06 p.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 4 minutes.
- **July 7, 2021 (unplanned):** The extraction well system was offline from 8:24 a.m. to 2:24 p.m. to replace the Clarifier Feed Pump (P-400). Extraction system downtime was 6 hours 0 minutes.
- **July 9, 2021 (unplanned):** The extraction well system was offline from 5:30 p.m. to 5:40 p.m. and from 5:52 p.m. to 6:00 p.m. due to a City of Needles power outage. The outage required switching to the backup generator and resuming normal power supply when the power outage ended. Extraction system downtime was 18 minutes.
- **July 13, 2021 (unplanned):** The extraction well system was offline from 1:56 p.m. to 2:02 p.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 6 minutes.
- **July 21, 2021 (unplanned):** The extraction well system was offline from 8:06 a.m. to 7:40 p.m. due to replacing microfilter modules. Extraction system downtime was 11 hours 34 minutes.
- **July 22, 2021 (unplanned):** The extraction well system was offline from 12:08 p.m. to 12:10 p.m. due to a City of Needles power outage. Extraction system downtime was 2 minutes.
- **July 22, 2021 (unplanned):** The extraction well system was offline from 12:16 p.m. to 12:18 p.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 2 minutes.
- **July 29, 2021 (unplanned):** The extraction well system was offline from 8:06 a.m. to 8:26 a.m. due to high-water levels in the clarifier. The operator shut down extraction so the clarifier could drain to a suitable level. Extraction system downtime was 20 minutes.

August 2021

During August 2021, the IM-3 facility treated approximately 5,241,218 gallons of extracted groundwater, including 3,803,477 gallons pumped from TW-01 for the aquifer test. The IM-3 facility also treated 0 gallons of Final Groundwater Remedy wastewater, 975 gallons of sampling purge water, and 0 gallons of groundwater from injection well backwashing/re-development during August 2021. Two containers of solids from the IM-3 facility were transported offsite during August 2021.

Periods of planned and unplanned extraction system down time (that together resulted in approximately 3.7 percent downtime during August 2021) are summarized below.

- **August 2, 2021 (unplanned):** The extraction well system was offline from 1:12 p.m. to 2:14 p.m. due to high-water levels in the Raw Water Storage Tank (T-100). The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 1 hour 2 minutes.
- **August 2-3, 2021 (unplanned):** The extraction well system was offline from 7:08 p.m. to 12:26 a.m. due to cleaning the clarifier Sludge Withdrawal Pump (P-401) and replacing the associated piping. Extraction system downtime was 5 hours 18 minutes.
- **August 3, 2021 (unplanned):** The extraction well system was offline from 6:52 p.m. to 9:34 p.m. due to high-water levels in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 2 hours 42 minutes.
- **August 4, 2021 (unplanned):** The extraction well system was offline from 3:24 a.m. to 4:20 a.m. due to high-water levels in T-100. The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 56 minutes.
- **August 4, 2021 (unplanned):** The extraction well system was offline from 9:00 a.m. to 6:14 p.m. due to cleaning the clarifier and repairing a leak in the ferrous chloride feed system. Extraction system downtime was 9 hours 14 minutes.
- **August 11, 2021 (unplanned):** The extraction well system was offline from 3:44 p.m. to 3:50 p.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 6 minutes.
- **August 11, 2021 (unplanned):** The extraction well system was offline from 7:06 p.m. to 7:08 p.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 2 minutes.
- **August 20, 2021 (unplanned):** The extraction well system was offline from 11:30 a.m. to 3:38 p.m. due to changing out the Clarifier Feed Pump (P-400) which was heavily scaled, reducing flow through the plant. Extraction system downtime was 4 hours 8 minutes.
- **August 31, 2021 (unplanned):** The extraction well system was offline from 5:08 p.m. to 8:56 p.m. due to high-water levels in T-100 caused by too much flow from extraction well TW-3D. Extraction system downtime was 3 hours 48 minutes.

September 2021

During September 2021, the IM-3 facility treated approximately 5,417,601 gallons of extracted groundwater, including 3,608,281 gallons pumped from TW-01 for the aquifer test. The IM-3 facility also treated 0 gallons of Final Groundwater Remedy wastewater, 150 gallons of sampling purge water, and 32,000 gallons of groundwater from injection well backwashing/re-development during September 2021. Two containers of solids from the IM-3 facility were transported offsite during September 2021.

Periods of planned and unplanned extraction system down time (that together resulted in approximately 7.3 percent downtime during September 2021) are summarized below.

- **September 1, 2021 (unplanned):** The extraction well system was offline from 12:08 p.m. to 2:36 p.m. due to high-water levels in the Raw Water Storage Tank (T-100). The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 2 hours 28 minutes.
- **September 3, 2021 (unplanned):** The extraction well system was offline from 9:20 a.m. to 11:04 a.m. due to troubleshooting microfilter operating issues and adjusting water levels in the process tanks. Extraction system downtime was 1 hour 44 minutes.
- **September 3, 2021 (unplanned):** The extraction well system was offline from 5:50 p.m. to 5:54 p.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 4 minutes.

- **September 4, 2021 (unplanned):** The extraction well system was offline from 2:06 a.m. to 12:42 a.m. due to an alarm in the extraction system leak detection system. Extraction system downtime was 10 hours 36 minutes.
- **September 4, 2021 (unplanned):** The extraction well system was offline from 3:08 p.m. to 3:10 p.m. due to sampling extraction well TW-2D. Extraction system downtime was 2 minutes.
- **September 8, 2021 (unplanned):** The extraction well system was offline from 8:04 a.m. to 3:44 p.m. due to changing microfilter modules and to replace a tank level sensor. Extraction system downtime was 7 hours 40 minutes.
- **September 9, 2021 (unplanned):** The extraction well system was offline from 6:36 a.m. to 8:34 a.m. due to repairing a leak in the microfilter piping. Extraction system downtime was 1 hour 58 minutes.
- **September 9, 2021 (unplanned):** The extraction well system was offline from 11:34 a.m. to 12:58 p.m. due to lowering water levels in T-100 to allow delivery of injection well IW-2 backwash water. Extraction system downtime was 1 hour 24 minutes.
- **September 13, 2021 (unplanned):** The extraction well system was offline from 8:32 a.m. to 11:36 a.m. due to high-water levels in T-100. Extraction system downtime was 3 hours 4 minutes.
- **September 14, 2021 (unplanned):** The extraction well system was offline from 2:28 a.m. to 5:14 a.m. due to high-water levels in T-100. Extraction system downtime was 2 hours 46 minutes.
- **September 15, 2021 (unplanned):** The extraction well system was offline from 7:34 p.m. to 9:16 p.m. due to high-water levels in T-100. Extraction system downtime was 1 hours 42 minutes.
- **September 19, 2021 (unplanned):** The extraction well system was offline from 11:14 a.m. to 12:06 p.m. due to replacing the flow control valve in extraction well TW-3D. Extraction system downtime was 52 minutes.
- **September 22, 2021 (unplanned):** The extraction well system was offline from 6:26 a.m. to 7:14 p.m. due to replacing the Clarifier Feed Pump (P-400) and associated piping. Extraction system downtime was 12 hours 48 minutes.
- **September 29, 2021 (unplanned):** The extraction well system was offline from 6:42 a.m. to 9:10 a.m. due to lowering water levels in T-100 to allow delivery of injection well IW-3 backwash water and maintain plant pH control system. Extraction system downtime was 2 hours 28 minutes.

October 2021

During October 2021, the IM-3 facility treated approximately 5,804,995 gallons of extracted groundwater, including 3,847,921 gallons pumped from TW-01 for the aquifer test. The IM-3 facility also treated zero gallons of Final Groundwater Remedy wastewater, 0 gallons of sampling purge water, and 0 gallons of groundwater from injection well backwashing/re-development during October 2021. Two containers of solids from the IM-3 facility were transported offsite during October 2021.

Periods of planned and unplanned extraction system down time (that together resulted in approximately 2.6 percent downtime during October 2021) are summarized below.

- **October 4, 2021 (unplanned):** The extraction well system was offline from 3:44 a.m. to 7:10 a.m. due to high-water levels in the Raw Water Storage Tank (T-100). The operator shut down extraction so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 3 hours 16 minutes.
- **October 6, 2021 (unplanned):** The extraction well system was offline from 7:48 a.m. to 12:50 a.m. due to completing maintenance of the HMI computer workstations. Extraction system downtime was 5 hours 2 minutes.

- **October 12, 2021 (unplanned):** The extraction well system was offline from 8:02 p.m. to 8:06 p.m. due to a power outage caused by high winds. Extraction system downtime was 4 minutes.
- **October 15, 2021 (unplanned):** The extraction well system was offline from 8:52 a.m. to 11:16 a.m. due to replacing the Clarifier Feed Pump (P-400) and a sludge control valve (FV-400). Extraction system downtime was 2 hours 24 minutes.
- **October 19, 2021 (unplanned):** The extraction well system was offline from 9:08 p.m. to 1:02 p.m. due to changing microfilter modules. Extraction system downtime was 3 hours 54 minutes.
- **October 28, 2021 (unplanned):** The extraction well system was offline from 12:08 p.m. to 12:14 p.m. and from 12:32 p.m. to 12:50 p.m. due to a power failure at the City of Needles power tap. Extraction system downtime was 24 minutes.
- **October 28, 2021 (unplanned):** The extraction well system was offline from 2:04 p.m. to 6:24 p.m. due to a low pH level in the Effluent Tank (T-700). The system was put in recirculation mode until the pH was raised to the target level. Extraction system downtime was 4 hours 20 minutes.

November 2021

During November 2021, the IM-3 facility treated approximately 5,486,301 gallons of extracted groundwater including 3,216,846 gallons pumped from TW-01 for the aquifer test. The IM-3 facility also treated zero gallons of Final Groundwater Remedy wastewater, 60 gallons of sampling purge water, and 30,000 gallons of groundwater from injection well backwashing/re-development during November 2021. Two containers of solids from the IM-3 facility were transported offsite during November 2021.

Periods of planned and unplanned extraction system down time (that together resulted in approximately 5 percent downtime during November 2021) are summarized below.

- **November 4, 2021 (unplanned):** The extraction well system was offline from 2:44 p.m. to 4:16 p.m. due to troubleshooting the caustic feed pump (P-802) associated with Iron Oxidation Reactor 2 (T-301B). Extraction system downtime was 1 hour 32 minutes.
- **November 5-6, 2021 (unplanned):** The extraction well system was offline from 6:42 p.m. to 7:22 a.m. and 7:44 a.m. to 11:52 a.m. due to troubleshooting the polymer batch solution concentration. The batch resulted in poor chromium removal. Extraction system downtime was 16 hours 48 minutes.
- **November 9, 2021 (unplanned):** The extraction well system was offline from 11:38 a.m. to 12:00 p.m. to allow TW-01 to pump. Extraction system downtime was 22 minutes.
- **November 19, 2021 (unplanned):** The extraction well system was offline from 10:50 a.m. to 15:40 p.m. due to processing water from injection well maintenance (IW-3). Extraction system downtime was 4 hours 50 minutes.
- **November 24, 2021 (unplanned):** The extraction well system was offline from 7:56 a.m. to 12:50 p.m. due to processing water from injection well maintenance (IW-2). Extraction system downtime was 4 hours 54 minutes.
- **November 26, 2021 (unplanned):** The extraction well system was offline from 12:12 a.m. to 1:14 a.m. due to a failure of the Post-treated RO Permeate Pump (P-605). Extraction system downtime was 1 hour 2 minutes.
- **November 30, 2021 (unplanned):** The extraction well system was offline from 10:42 a.m. to 1:42 p.m. due to changing microfilter modules. Extraction system downtime was 3 hours 20 minutes.

December 2021

During December 2021, the IM-3 facility treated approximately 3,955,114 gallons of extracted groundwater, including 1,545,996 gallons pumped from TW-01 for the aquifer test. The IM-3 facility also treated 9,000 gallons of Final Groundwater Remedy wastewater (TW-01 pipeline flush water), 600 gallons of sampling purge water, and 0 gallons of groundwater from injection well backwashing/re-development during December 2021. Two containers of solids from the IM-3 facility were transported offsite during December 2021. On December 21, 2021 at 2:20 p.m., the IM-3 extraction system was shut down and the plant began the layup procedure.

Periods of planned and unplanned extraction system down time (that together resulted in approximately 5.2 percent downtime during December 2021) are summarized below.

- **December 1, 2021 (unplanned):** The extraction well system was offline from 11:10 a.m. to 12:24 p.m. due to changing microfilter modules. Extraction system downtime was 1 hour 14 minutes.
- **December 15, 2021 (unplanned):** The extraction well system was offline from 4:16 a.m. to 5:12 a.m. to lower the water level in the Raw Water Storage Tank (T-100). Extraction system downtime was 56 minutes.
- **December 18, 2021 (unplanned):** The extraction well system was offline from 3:44 a.m. to 4:22 a.m. due to repairing a leaking hose on the microfilter skid. Extraction system downtime was 38 minutes.

Appendix B

Daily Volumes of Groundwater Treated

July 2021 Operational Data
IM-3 Groundwater Extraction and Treatment System
PG&E Topock Compressor Station, Needles, California

Month	Day	Year	Extraction Well System						Injection Well System		RO Brine	
			TW-1 (gallons)	TW-2S (gallons)	TW-2D (gallons)	TW-3D (gallons)	PE-1 (gallons)	Total (gallons)	IW-02 (gallons)	IW-03 (gallons)	Total (gallons)	(gallons)
July	1	2021	129,566	--	35,516	0	0	165,082	0	171,327	171,327	0
July	2	2021	129,957	--	35,628	0	0	165,585	0	171,719	171,719	0
July	3	2021	130,017	--	36,080	0	0	166,097	0	169,245	169,245	0
July	4	2021	130,027	--	36,071	0	0	166,098	0	171,489	171,489	0
July	5	2021	130,017	--	36,069	0	0	166,086	0	171,239	171,239	0
July	6	2021	130,027	--	35,779	0	0	165,806	0	170,246	170,246	0
July	7	2021	97,505	--	26,538	0	0	124,043	0	128,972	128,972	0
July	8	2021	130,027	--	35,465	0	0	165,491	0	171,715	171,715	0
July	9	2021	129,727	--	35,148	0	0	164,874	0	168,858	168,858	0
July	10	2021	129,316	--	35,993	0	0	165,309	0	172,913	172,913	0
July	11	2021	130,037	--	36,051	0	0	166,088	0	171,747	171,747	0
July	12	2021	130,017	--	36,020	0	0	166,037	0	168,505	168,505	0
July	13	2021	130,007	--	35,697	0	0	165,704	0	172,876	172,876	0
July	14	2021	130,027	--	35,510	0	0	165,537	0	172,418	172,418	0
July	15	2021	130,007	--	35,545	0	0	165,552	0	172,299	172,299	0
July	16	2021	130,017	--	35,524	0	0	165,541	0	172,275	172,275	0
July	17	2021	127,540	--	35,514	0	0	163,054	0	168,695	168,695	0
July	18	2021	126,846	--	35,538	0	0	162,383	0	170,110	170,110	0
July	19	2021	125,518	--	35,853	0	0	161,371	0	170,209	170,209	0
July	20	2021	126,846	--	35,744	0	0	162,589	0	170,261	170,261	0
July	21	2021	65,654	--	18,409	0	0	84,063	0	85,681	85,681	0
July	22	2021	126,152	--	35,388	0	0	161,540	0	171,486	171,486	0
July	23	2021	126,836	--	35,564	0	0	162,400	0	168,815	168,815	0
July	24	2021	126,826	--	35,661	0	0	162,487	0	172,118	172,118	0
July	25	2021	126,816	--	35,965	0	0	162,781	0	172,230	172,230	0
July	26	2021	126,816	--	35,839	0	0	162,656	0	171,617	171,617	0
July	27	2021	126,846	--	35,840	0	0	162,685	0	172,038	172,038	0
July	28	2021	126,846	--	35,831	0	0	162,676	0	171,516	171,516	0
July	29	2021	126,846	--	35,495	0	0	162,341	0	172,362	172,362	0
July	30	2021	126,826	--	36,068	0	0	162,894	0	174,095	174,095	0
July	31	2021	126,826	--	35,989	0	0	162,815	0	171,929	171,929	0
Total Monthly Volumes (gallons)			3,886,336	0	1,081,334	0	0	4,967,668	0	5,181,006	5,181,006	0
Average Pump/Injection Rates (gpm)			87.1	0.0	24.2	0.0	0.0	111.3	0.0	116.1	116.1	0.0

NOTES: gpm: gallons per minute RO: Reverse Osmosis

- Extraction wells TW-1, and TW-2D were operated during July 2021 at a target pump rate of 135 gpm excluding periods of planned and unplanned downtime. Extraction well TW-2S was not operated during July 2021.
- Effluent was discharged into injection well IW-03.
- The difference between influent flow rate and the sum of the effluent and reverse osmosis concentrate flow rates during July 2021 is approximately 4.29 percent and includes 0 gallons of groundwater remedy construction water and 0 gallons of injection well backwash water. The primary source of extracted groundwater to IM-3 is from outside the IM-3 system and introduces an unknown amount of error in the influent-effluent flow balance. While the TW-01 aquifer test continues, the standard error checks will be suspended but reported. No additional actions will be taken beyond normal calibrations of IM-3 flow instruments. A well is considered to be offline if the daily reported flow is 140 gallons per day or less.

August 2021 Operational Data
IM-3 Groundwater Extraction and Treatment System
PG&E Topock Compressor Station, Needles, California

Month	Day	Year	Extraction Well System						Injection Well System			RO Brine
			TW-1 (gallons)	TW-2S (gallons)	TW-2D (gallons)	TW-3D (gallons)	PE-1 (gallons)	Total (gallons)	IW-02 (gallons)	IW-03 (gallons)	Total (gallons)	
August	1	2021	126,406	--	36,048	0	0	162,454	0	171,690	171,690	0
August	2	2021	102,998	--	27,215	0	0	130,213	0	137,246	137,246	0
August	3	2021	124,902	--	31,227	0	0	156,130	0	172,031	172,031	0
August	4	2021	77,930	--	20,717	0	0	98,647	0	108,608	108,608	0
August	5	2021	125,752	--	36,033	0	0	161,785	0	167,732	167,732	0
August	6	2021	126,855	--	36,046	0	0	162,901	0	170,331	170,331	0
August	7	2021	126,855	--	36,133	0	0	162,989	0	169,603	169,603	0
August	8	2021	126,846	--	36,318	0	0	163,164	0	171,788	171,788	0
August	9	2021	126,846	--	36,403	0	0	163,248	0	175,496	175,496	0
August	10	2021	119,346	--	36,838	0	0	156,184	0	168,045	168,045	0
August	11	2021	125,938	--	36,360	0	0	162,297	0	171,445	171,445	0
August	12	2021	126,826	--	36,334	0	0	163,161	0	170,428	170,428	0
August	13	2021	126,826	--	36,364	0	0	163,191	0	170,504	170,504	0
August	14	2021	126,826	--	36,452	0	0	163,278	0	171,862	171,862	0
August	15	2021	126,836	--	36,553	0	0	163,389	0	172,558	172,558	0
August	16	2021	126,846	--	36,583	0	0	163,429	0	172,508	172,508	0
August	17	2021	126,846	--	36,686	0	0	163,532	0	172,072	172,072	0
August	18	2021	126,826	--	36,686	0	0	163,513	0	172,620	172,620	0
August	19	2021	126,807	--	36,797	0	0	163,604	0	172,504	172,504	0
August	20	2021	104,922	--	30,322	0	0	135,244	0	148,640	148,640	0
August	21	2021	126,768	--	16,159	39,700	0	182,627	0	182,219	182,219	0
August	22	2021	126,797	--	--	67,703	0	194,500	0	199,090	199,090	0
August	23	2021	126,797	--	--	67,627	0	194,424	0	197,828	197,828	0
August	24	2021	126,826	--	--	67,657	0	194,483	0	194,957	194,957	0
August	25	2021	126,846	--	--	67,816	0	194,662	0	195,188	195,188	0
August	26	2021	126,846	--	--	67,898	0	194,743	0	195,134	195,134	0
August	27	2021	126,846	--	--	67,979	0	194,825	0	199,053	199,053	0
August	28	2021	126,846	--	--	68,057	0	194,903	0	197,985	197,985	0
August	29	2021	122,295	--	--	70,657	0	192,952	0	199,152	199,152	0
August	30	2021	113,604	--	1,484	77,799	0	192,887	0	193,425	193,425	0
August	31	2021	122,773	--	--	65,088	0	187,861	0	195,835	195,835	0
Total Monthly Volumes (gallons)			3,803,477	0	709,761	727,981	0	5,241,218	0	5,457,575	5,457,575	0
Average Pump/Injection Rates (gpm)			85.2	0.0	15.9	16.3	0.0	117.4	0.0	122.3	122.3	0.0

NOTES: gpm: gallons per minute RO: Reverse Osmosis

- Extraction wells TW-1, TW-2D and TW-3D were operated during August 2021 at a target pump rate of 135 gpm excluding periods of planned and unplanned downtime. Extraction wells PE-1 and TW-2S were not operated during August 2021.
- Effluent was discharged into injection well IW-03.
- The difference between influent flow rate and the sum of the effluent and reverse osmosis concentrate flow rates during August 2021 is approximately 4.13 percent and includes 0 gallons of groundwater remedy construction water and 0 gallons of injection well backwash water. The primary source of extracted groundwater to IM-3 is from outside the IM-3 system and introduces an unknown amount of error in the influent-effluent flow balance. While the TW-01 aquifer test continues, the standard error checks will be suspended but reported. A well is considered to be offline if the daily reported flow is 140 gallons per day or less.

September 2021 Operational Data
IM-3 Groundwater Extraction and Treatment System
PG&E Topock Compressor Station, Needles, California

Month	Day	Year	Extraction Well System						Injection Well System		RO Brine	
			TW-1 (gallons)	TW-2S (gallons)	TW-2D (gallons)	TW-3D (gallons)	PE-1 (gallons)	Total (gallons)	IW-02 (gallons)	IW-03 (gallons)	Total (gallons)	(gallons)
September	1	2021	126,797	--	--	66,088	0	192,885	0	197,586	197,586	0
September	2	2021	126,826	--	--	66,780	0	193,606	0	197,210	197,210	0
September	3	2021	117,598	--	--	62,024	0	179,622	0	184,568	184,568	0
September	4	2021	71,660	--	1,130	35,822	0	108,612	0	112,160	112,160	0
September	5	2021	126,826	--	--	67,965	0	194,791	0	199,491	199,491	0
September	6	2021	126,836	--	--	68,081	0	194,917	0	198,784	198,784	0
September	7	2021	126,846	--	--	67,968	0	194,814	0	192,306	192,306	0
September	8	2021	86,445	--	1,705	42,961	0	131,111	0	136,020	136,020	0
September	9	2021	116,387	--	--	50,129	0	166,516	0	180,073	180,073	0
September	10	2021	126,846	--	--	65,364	0	192,209	0	189,008	189,008	0
September	11	2021	126,846	--	--	63,963	0	190,808	0	194,438	194,438	0
September	12	2021	126,846	--	--	63,433	0	190,279	0	191,371	191,371	0
September	13	2021	126,836	--	--	55,686	0	182,522	0	186,541	186,541	0
September	14	2021	126,836	--	--	56,725	0	183,560	0	188,387	188,387	0
September	15	2021	126,826	--	--	60,416	0	187,242	0	188,315	188,315	0
September	16	2021	126,816	--	--	60,455	0	187,271	0	195,672	195,672	0
September	17	2021	126,807	--	--	57,959	0	184,766	0	187,454	187,454	0
September	18	2021	126,816	--	--	62,131	0	188,947	0	191,282	191,282	0
September	19	2021	126,807	--	--	66,590	0	193,396	0	191,269	191,269	0
September	20	2021	126,660	--	6,130	54,427	0	187,217	0	191,323	191,323	0
September	21	2021	126,523	--	--	65,180	0	191,703	89,977	105,496	195,474	0
September	22	2021	59,180	--	--	28,677	0	87,857	112,617	0	112,617	0
September	23	2021	126,807	--	--	66,790	0	193,597	199,587	0	199,587	0
September	24	2021	126,807	--	--	65,964	0	192,771	198,012	0	198,012	0
September	25	2021	126,807	--	--	61,183	0	187,990	198,686	0	198,686	0
September	26	2021	126,797	--	--	62,658	0	189,455	198,901	0	198,901	0
September	27	2021	126,807	--	--	64,273	0	191,080	197,617	0	197,617	0
September	28	2021	126,797	--	--	65,743	0	192,540	198,771	0	198,771	0
September	29	2021	113,799	--	--	58,804	0	172,602	184,367	0	184,367	0
September	30	2021	126,797	--	--	66,117	0	192,913	199,339	0	199,339	0
Total Monthly Volumes (gallons)			3,608,281	0	8,965	1,800,355	0	5,417,601	1,777,875	3,798,754	5,576,629	0
Average Pump/Injection Rates (gpm)			83.5	0.0	0.2	41.7	0.0	125.4	41.2	87.9	129.1	0.0

NOTES: gpm: gallons per minute RO: Reverse Osmosis

- Extraction wells TW-1, TW-2D and TW-3D were operated during September 2021 at a target pump rate of 135 gpm excluding periods of planned and unplanned downtime. Extraction well TW-2S was not operated during September 2021.
- Effluent was discharged into injection wells IW-02 and IW-03.
- The difference between influent flow rate and the sum of the effluent and reverse osmosis concentrate flow rates during September 2021 is approximately 2.33 percent and includes 0 gallons of groundwater remedy construction water and 32,000 gallons of injection well backwash water. The primary source of extracted groundwater to IM-3 is from outside the IM-3 system and introduces an unknown amount of error in the influent-effluent flow balance. While the TW-01 aquifer test continues, the standard error checks will be suspended but reported. A well is considered to be offline if the daily reported flow is 140 gallons per day or less.

October 2021 Operational Data
IM-3 Groundwater Extraction and Treatment System
PG&E Topock Compressor Station, Needles, California

			Extraction Well System					Injection Well System			RO Brine	
Month	Day	Year	TW-1 (gallons)	TW-2S (gallons)	TW-2D (gallons)	TW-3D (gallons)	PE-1 (gallons)	Total (gallons)	IW-02 (gallons)	IW-03 (gallons)	Total (gallons)	(gallons)
October	1	2021	126,787	--	--	66,460	0	193,247	199,632	0	199,632	0
October	2	2021	126,797	--	--	67,176	0	193,973	198,994	0	198,994	0
October	3	2021	126,797	--	--	68,442	0	195,238	199,965	0	199,965	0
October	4	2021	126,797	--	--	57,254	0	184,051	203,202	0	203,202	0
October	5	2021	126,787	--	--	63,953	0	190,740	196,973	0	196,973	0
October	6	2021	100,381	--	--	49,701	0	150,082	153,726	0	153,726	0
October	7	2021	126,797	--	--	64,075	0	190,872	200,091	0	200,091	0
October	8	2021	126,787	--	--	64,292	0	191,079	199,014	0	199,014	0
October	9	2021	126,777	--	--	63,846	0	190,623	199,511	0	199,511	0
October	10	2021	126,787	--	--	64,303	0	191,090	199,532	0	199,532	0
October	11	2021	126,133	--	--	63,974	0	190,106	199,199	0	199,199	0
October	12	2021	126,553	--	--	65,763	0	192,315	199,239	0	199,239	0
October	13	2021	126,768	--	--	66,851	0	193,618	205,076	0	205,076	0
October	14	2021	126,768	--	--	67,089	0	193,857	199,110	0	199,110	0
October	15	2021	114,102	--	--	60,376	0	174,477	179,368	0	179,368	0
October	16	2021	126,787	--	--	68,018	0	194,805	202,621	0	202,621	0
October	17	2021	126,777	--	--	63,556	0	190,333	202,231	0	202,231	0
October	18	2021	126,777	--	--	59,305	0	186,082	197,438	0	197,438	0
October	19	2021	106,221	--	--	51,100	0	157,321	161,848	0	161,848	0
October	20	2021	126,777	--	--	64,801	0	191,579	198,024	0	198,024	0
October	21	2021	126,777	--	--	65,626	0	192,403	197,296	0	197,296	0
October	22	2021	126,787	--	--	66,399	0	193,186	196,909	0	196,909	0
October	23	2021	126,787	--	--	66,846	0	193,633	197,168	0	197,168	0
October	24	2021	126,777	--	--	67,365	0	194,143	200,041	0	200,041	0
October	25	2021	126,778	--	--	65,714	0	192,492	205,578	0	205,578	0
October	26	2021	126,768	--	--	62,615	0	189,383	199,989	0	199,989	0
October	27	2021	126,777	--	--	62,663	0	189,440	197,514	0	197,514	0
October	28	2021	104,951	--	--	50,155	0	155,106	158,546	0	158,546	0
October	29	2021	126,787	--	--	62,366	0	189,153	196,664	0	196,664	0
October	30	2021	126,787	--	--	63,172	0	189,959	197,110	0	197,110	0
October	31	2021	126,787	--	--	63,820	0	190,607	197,204	0	197,204	0
Total Monthly Volumes (gallons)			3,847,921	0	0	1,957,074	0	5,804,995	6,038,814	0	6,038,814	0
Average Pump/Injection Rates (gpm)			86.2	0.0	0.0	43.8	0.0	130.0	135.3	0.0	135.3	0.0

NOTES: gpm: gallons per minute RO: Reverse Osmosis

- Extraction wells TW-1, TW-2D and TW-3D were operated during October 2021 at a target pump rate of 135 gpm excluding periods of planned and unplanned downtime. Extraction wells PE-01, TW-2S and TW-2D were not operated during October 2021.
- Effluent was discharged into injection well IW-02.
- The difference between influent flow rate and the sum of the effluent and reverse osmosis concentrate flow rates during October 2021 is approximately 4.03 percent and includes 0 gallons of groundwater remedy construction water and 0 gallons of injection well backwash water. The primary source of extracted groundwater to IM-3 is from outside the IM-3 system and introduces an unknown amount of error in the influent-effluent flow balance. While the TW-01 aquifer test continues, the standard error checks will be suspended but reported. A well is considered to be offline if the daily reported flow is 140 gallons per day or less.

November 2021 Operational Data
IM-3 Groundwater Extraction and Treatment System
PG&E Topock Compressor Station, Needles, California

Month	Day	Year	Extraction Well System						Injection Well System		RO Brine	
			TW-1 (gallons)	TW-2S (gallons)	TW-2D (gallons)	TW-3D (gallons)	PE-1 (gallons)	Total (gallons)	IW-02 (gallons)	IW-03 (gallons)	Total (gallons)	(gallons)
November	1	2021	126,777	--	--	63,834	0	190,611	197,480	0	197,480	0
November	2	2021	126,777	--	--	63,879	0	190,656	197,635	0	197,635	0
November	3	2021	126,787	--	--	64,181	0	190,968	202,068	0	202,068	0
November	4	2021	118,867	--	--	59,452	0	178,320	190,277	0	190,277	0
November	5	2021	106,123	--	--	49,574	0	155,697	156,445	0	156,445	0
November	6	2021	3,525	--	--	99,146	0	102,672	101,452	0	101,452	0
November	7	2021	--	--	--	195,996	0	195,996	197,654	0	197,654	0
November	8	2021	--	--	--	196,171	0	196,171	198,566	0	198,566	0
November	9	2021	60,156	--	--	129,358	0	189,514	200,305	0	200,305	0
November	10	2021	126,777	--	--	68,433	0	195,210	198,146	0	198,146	0
November	11	2021	126,777	--	--	65,366	0	192,143	200,682	0	200,682	0
November	12	2021	126,777	--	--	65,368	0	192,145	201,477	0	201,477	0
November	13	2021	126,777	--	--	65,273	0	192,050	198,720	0	198,720	0
November	14	2021	126,777	--	--	65,513	0	192,290	199,042	0	199,042	0
November	15	2021	126,777	--	--	65,316	0	192,093	199,635	0	199,635	0
November	16	2021	126,768	--	--	65,194	0	191,962	199,986	0	199,986	0
November	17	2021	126,748	--	--	56,024	0	182,772	195,822	0	195,822	0
November	18	2021	126,768	--	--	64,036	0	190,803	200,011	0	200,011	0
November	19	2021	126,768	--	--	50,349	0	177,116	198,345	0	198,345	0
November	20	2021	126,738	--	--	63,866	0	190,604	198,183	0	198,183	0
November	21	2021	126,758	--	--	65,304	0	192,062	195,536	0	195,536	0
November	22	2021	126,768	--	--	65,146	0	191,914	197,016	0	197,016	0
November	23	2021	126,758	--	--	64,808	0	191,566	110,019	87,251	197,271	0
November	24	2021	126,748	--	--	50,990	0	177,738	0	196,676	196,676	0
November	25	2021	126,738	--	--	65,279	0	192,018	0	193,618	193,618	0
November	26	2021	105,088	--	7,390	58,863	0	171,341	0	177,208	177,208	0
November	27	2021	106,211	--	24,281	63,282	0	193,774	0	194,307	194,307	0
November	28	2021	109,355	--	--	61,287	0	170,643	0	175,035	175,035	0
November	29	2021	109,355	--	--	61,421	0	170,777	0	178,914	178,914	0
November	30	2021	89,600	--	10,896	54,181	0	154,677	0	156,464	156,464	0
Total Monthly Volumes (gallons)			3,216,846	0	42,566	2,226,889	0	5,486,301	4,334,502	1,359,473	5,693,975	0
Average Pump/Injection Rates (gpm)			74.5	0.0	1.0	51.5	0.0	127.0	100.3	31.5	131.8	0.0

NOTES: gpm: gallons per minute RO: Reverse Osmosis

- Extraction wells TW-1, TW-2D and TW-3D were operated during November 2021 at a target pump rate of 135 gpm excluding periods of planned and unplanned downtime. Extraction well TW-2S was not operated during November 2021.
- Effluent was discharged into injection wells IW-02 and IW-03.
- The difference between influent flow rate and the sum of the effluent and reverse osmosis concentrate flow rates during November 2021 is approximately 3.22 percent and includes 0 gallons of groundwater remedy construction water and 30,000 gallons of injection well backwash water. The primary source of extracted groundwater to IM-3 is from outside the IM-3 system and introduces an unknown amount of error in the influent-effluent flow balance. While the TW-01 aquifer test continues, the standard error checks will be suspended but reported. A well is considered to be offline if the daily reported flow is 140 gallons per day or less.

December 2021 Operational Data
IM-3 Groundwater Extraction and Treatment System
PG&E Topock Compressor Station, Needles, California

Month	Day	Year	Extraction Well System					Injection Well System			RO Brine	
			TW-1 (gallons)	TW-2S (gallons)	TW-2D (gallons)	TW-3D (gallons)	PE-1 (gallons)	Total (gallons)	IW-02 (gallons)	IW-03 (gallons)	Total (gallons)	(gallons)
December	1	2021	101,650	--	19,268	60,400	0	181,319	0	191,943	191,943	0
December	2	2021	106,602	--	23,654	63,766	0	194,021	0	198,580	198,580	0
December	3	2021	120,244	--	7,044	63,879	0	191,167	0	192,152	192,152	0
December	4	2021	126,738	--	--	63,883	0	190,621	0	195,267	195,267	0
December	5	2021	126,709	--	1,874	64,474	0	193,057	0	198,100	198,100	0
December	6	2021	126,738	--	3,766	64,841	0	195,345	0	194,238	194,238	0
December	7	2021	126,631	--	--	64,487	0	191,118	0	195,014	195,014	0
December	8	2021	126,611	--	--	64,939	0	191,550	0	192,745	192,745	0
December	9	2021	126,563	--	--	64,500	0	191,063	0	196,033	196,033	0
December	10	2021	126,426	--	--	63,307	0	189,733	0	195,875	195,875	0
December	11	2021	126,309	--	--	62,728	0	189,037	0	192,425	192,425	0
December	12	2021	126,152	--	7,636	63,512	0	197,300	0	192,653	192,653	0
December	13	2021	78,623	--	--	117,670	0	196,293	0	192,641	192,641	0
December	14	2021	--	--	--	198,863	0	198,863	0	194,883	194,883	0
December	15	2021	--	--	--	188,182	0	188,182	0	197,634	197,634	0
December	16	2021	--	--	--	192,653	0	192,653	0	191,893	191,893	0
December	17	2021	--	--	--	191,929	0	191,929	0	193,883	193,883	0
December	18	2021	--	--	--	186,797	0	186,797	0	189,118	189,118	0
December	19	2021	--	--	--	193,736	0	193,736	0	194,235	194,235	0
December	20	2021	--	--	--	194,793	0	194,793	0	194,309	194,309	0
December	21	2021	--	--	--	116,538	0	116,538	0	109,570	109,570	0
December	22	2021	--	--	--	0	0	0	0	0	0	0
December	23	2021	--	--	--	0	0	0	0	0	0	0
December	24	2021	--	--	--	0	0	0	0	0	0	0
December	25	2021	--	--	--	0	0	0	0	0	0	0
December	26	2021	--	--	--	0	0	0	0	0	0	0
December	27	2021	--	--	--	0	0	0	0	0	0	0
December	28	2021	--	--	--	0	0	0	0	24,251	24,251	0
December	29	2021	--	--	--	0	0	0	0	0	0	0
December	30	2021	--	--	--	0	0	0	0	0	0	0
December	31	2021	--	--	--	0	0	0	0	0	0	0
Total Monthly Volumes (gallons)			1,545,996	0	63,243	2,345,875	0	3,955,114	0	4,017,441	4,017,441	0
Average Pump/Injection Rates (gpm)			34.6	0.0	1.4	52.6	0.0	88.6	0.0	90.0	90.0	0.0

NOTES: gpm: gallons per minute RO: Reverse Osmosis

- Extraction wells TW-1, TW-2D and TW-3D were operated during December 2021 at a target pump rate of 135 gpm excluding periods of planned and unplanned downtime. Extraction wells PE-1 and TW-2S were not operated during December 2021.
- Effluent was discharged into injection well IW-03. Injection well IW-3 was operated on December 28, 2021 to drain the IM-3 tanks.
- The difference between influent flow rate and the sum of the effluent and reverse osmosis concentrate flow rates during December 2021 is approximately 1.35 percent and includes 9,000 gallons of groundwater remedy construction water and 9000 gallons of injection well backwash water. The primary source of extracted groundwater to IM-3 is from outside the IM-3 system and introduces an unknown amount of error in the influent-effluent flow balance. While the TW-01 aquifer test continues, the standard error checks will be suspended but reported. A well is considered to be offline if the daily reported flow is 140 gallons per day or less. IM-3 extraction was stopped on December 21, 2021.

Appendix C

Flowmeter Calibration Records

Endress+Hauser 
People for Process Automation

Flow Calibration with Adjustment

92009500-1304707

WWRA017112F

Purchase order number

US-3601532757-200 / Endress+Hauser Inc.

Order N°/Manufacturer

23P50-AL1A1AA022AW

Order code

PROMAG 23 P 2"

Transmitter/Sensor

6C037116000

Serial N°

-

Tag N°

FCP-8.2 US

Calibration rig

156 us.gal/min ($\pm 100\%$)

Calibrated full scale

Current 4 - 20 mA

Calibrated output

0.9164

Calibration factor

5

Zero point

77 °F

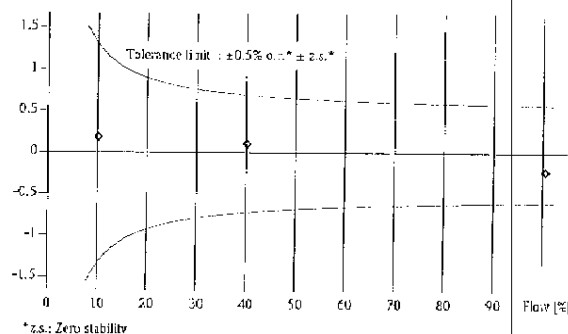
Water temperature

Flow [%]	Flow [us.gal/min]	Duration [sec]	V target [us.gal]	V mens. [us.gal]	Δ p.p.* [%]	Outp.** [mA]
10.0	15.575	60.1	15.590	15.620	0.19	5.60
40.0	62.448	60.1	62.513	62.585	0.11	10.41
40.0	62.468	60.0	62.512	62.583	0.11	10.41
100.4	156.636	60.1	156.798	156.474	-0.21	20.03
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

*o.p.: of rate

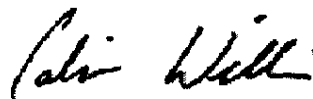
**Calculated value [4 - 20 mA]

Measured error % o.r.



For detailed data concerning output: specifications of the unit under test, see Technical Information (TI), chapter Performance characteristics.
Traceability to the national standard for all test instruments used for the calibration is guaranteed.

Endress+Hauser Flowtec operates ISO/IEC 17025 accredited calibration facilities in Reinach (CH), Cernay (FR), Greenwood (USA), Aurangabad (IN) and Suzhou (CN).



Calvin Williams
Operator

09-17-2015

Date of calibration

Endress+Hauser Inc.
16057 Porter Road
La Porte, Texas 77571

Flow Calibration with Adjustment

92020932-1304705

WWRA12397

Purchase order number

US-3601548887-200 / Endress+Hauser Inc.

Order N°/Manufacturer

23P50-AL1A1AA022AW

Order code

PROMAG 23 P 2"

Transmitter/Sensor

6C036F16000

Serial N°

FIT-1201

Tag N°

FCP-8.2 US

Calibration rig

156 us.gal/min ($\pm 100\%$)

Calibrated full scale

Current 4 - 20 mA

Calibrated output

0.9146

Calibration factor

-34

Zero point

73.2 °F

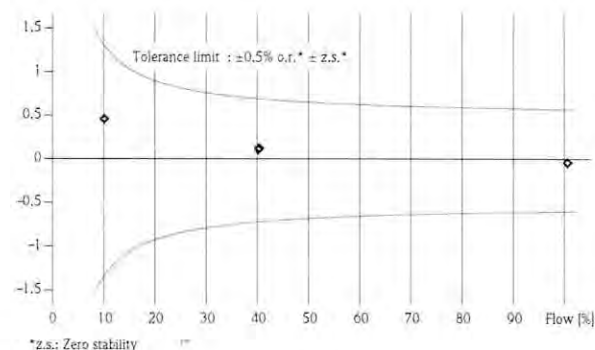
Water temperature

Flow [%]	Flow [us.gal/min]	Duration [sec]	V target [us.gal]	V meas. [us.gal]	Δ o.r.* [%]	Outp.** [mA]
10.0	15.520	60.1	15.536	15.608	0.47	5.60
40.1	62.554	60.1	62.611	62.688	0.12	10.42
40.2	62.731	60.1	62.796	62.882	0.14	10.44
100.4	156.663	60.1	156.815	156.776	-0.02	20.06
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

*o.r.: of reading

**Calculated value (4 - 20 mA)

Measured error % o.r.



For detailed data concerning output specifications of the unit under test, see Technical Information (TI), chapter Performance characteristics.
Traceability to the national standard for all test instruments used for the calibration is guaranteed.

Endress+Hauser Flowtec operates ISO/IEC 17025 accredited calibration facilities in Reinach (CH), Cernay (FR), Greenwood (USA), Aurangabad (IN), Suzhou (CN) and Itatiba (BR).

02-07-2020

Date of calibration

Endress+Hauser Inc.
10057 Porter Road
La Porte, Texas 77571



J. Reasoner

Operator

Flow Calibration with Adjustment

92022156-1385272

WWRA14109

Purchase order number

US-3601550502-200 / Endress+Hauser Inc.

Order N°/Manufacturer

23P50-AL1A1AA022AW

Order code

PROMAG 23 P 2"

Transmitter/Sensor

7700F216000

Serial N°

-

Tag N°

FCP-7.1.6 US

Calibration rig

156 us.gal/min ($\pm 100\%$)

Calibrated full scale

Current 4 - 20 mA

Calibrated output

0.9224

Calibration factor

0

Zero point

75.3 °F

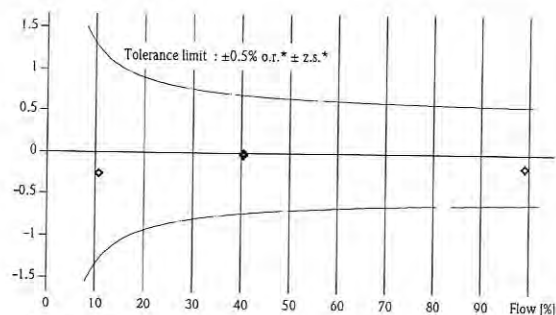
Water temperature

Flow [%]	Flow [us.gal/min]	Duration [sec]	V target [us.gal]	V meas. [us.gal]	Δ o.r.* [%]	Outp.** [mA]
10.6	16.455	60.2	16.510	16.470	-0.24	5.68
40.3	62.894	60.2	63.109	63.102	-0.01	10.45
40.3	62.909	60.2	63.124	63.132	0.01	10.45
99.0	154.393	60.2	154.898	154.670	-0.15	19.81
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

*o.r.: of reading

**Calculated value (4 - 20 mA)

Measured error % o.r.



*z.s.: Zero stability

For detailed data concerning output specifications of the unit under test, see Technical Information (TI), chapter Performance characteristics.
Traceability to the national standard for all test instruments used for the calibration is guaranteed.

Endress+Hauser Flowtec operates ISO/IEC 17025 accredited calibration facilities in Reinach (CH), Cernay (FR), Greenwood (USA), Aurangabad (IN), Suzhou (CN) and Itatiba (BR).

08-19-2020

Date of calibration

Endress+Hauser Inc.
2350 Endress Place
Greenwood, IN 46143

John Davis
Operator

Flow Calibration with Adjustment

92018011-1275190

WWRA7737

Purchase order number

US-3601544787-100 / Endress+Hauser Inc.

Order N°/Manufacturer

23P50-AL1A1RA022AW

Order code

PROMAG 23 P 2"

Transmitter/Sensor

6A021F16000

Serial N°

FIT-100 TW 2D

Tag N°

FCP-7.1.6 US

Calibration rig

155 us.gal/min ($\pm 100\%$)

Calibrated full scale

Current 4 - 20 mA

Calibrated output

0.9035

Calibration factor

-17

Zero point

70.6 °F

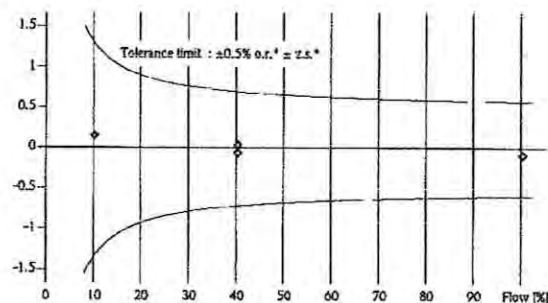
Water temperature

Flow [%]	Flow [us.gal/min]	Duration [sec]	V target [us.gal]	V meas. [us.gal]	Δ o.r.* [%]	Outp.** [mA]
10.0	15.541	60.2	15.592	15.618	0.16	5.61
40.2	62.279	60.2	62.481	62.510	0.05	10.43
40.2	62.297	60.2	62.511	62.477	-0.05	10.43
100.2	155.312	60.2	155.827	155.705	-0.08	20.02
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

*o.r.: of reading

**Calculated value (4 - 20 mA)

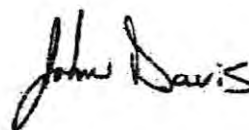
Measured error % o.r.



*z.s.: Zero stability

For detailed data concerning output specifications of the unit under test, see Technical Information (TI), chapter Performance characteristics. Traceability to the national standard for all test instruments used for the calibration is guaranteed.

Endress+Hauser Flowtec operates ISO/IEC 17025 accredited calibration facilities in Reinach (CH), Cernay (FR), Greenwood (USA), Aurangabad (IN), Suzhou (CN) and Itatiba (BR).



John Davis

Operator

12-05-2018

Date of calibration

Endress+Hauser Inc.
2350 Endress Place
Greenwood, IN 46143

Flow Calibration with Adjustment

30437052-4458240

3800382048

Purchase order number

US-3005992023-10 / Endress+Hauser Flowtec

Order N°/Manufacturer

5P2B50-79W4/0

Order code

Promag P 200 2"

Sensor/Transmitter

N6004E16000

Serial N°

-

Tag N°

FCP-8.B

Calibration rig

155.6102 us.gal/min ($\pm 100\%$)

Calibrated full scale

Service interface

Calibrated output

0.92223

Calibration factor

3

Zero point

75.9 °F

Water temperature

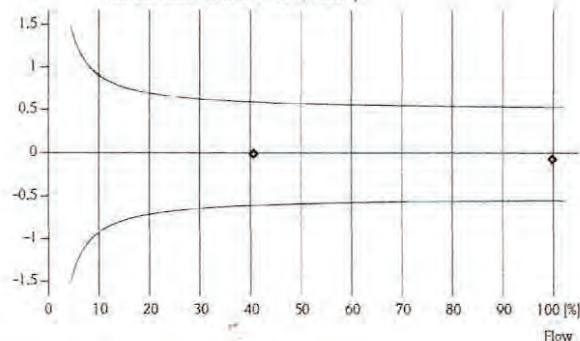
Flow [%]	Flow [us.gal/min]	Duration [s]	V target [us.gal]	V meas. [us.gal]	Δ o.r.* [%]	Outp.** [mA]
40.3	62.762	65.0	68.035	68.036	0.00	10.45
40.3	62.776	65.0	68.051	68.049	0.00	10.45
99.7	155.211	65.0	168.253	168.149	-0.06	19.95
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

*o.r.: of reading

**Calculated value (4 - 20 mA)

Measured error % o.r.

Tolerance limit: $\pm 0.5\%$ o.r.* \pm Zero stability



For detailed data concerning output specifications of the unit under test, see Technical Information (TI), chapter Performance characteristics.

The calibration is traceable to the N.I.S.T. through standards certified at preset intervals.

Endress+Hauser Flowtec operates ISO/IEC 17025 accredited calibration facilities in Reinach (CH), Cernay (FR), Greenwood (USA), Aurangabad (IN), Suzhou (CN) and Itatiba (BR).

Robert J Kizzee

06-13-2018

Date of calibration

Endress+Hauser Flowtec, Division USA
2330 Endress Place
Greenwood, IN 46143

Joe Kizzee

Operator

Certified acc. to
ISO 9001, Reg.-N° 030502.2
ISO 14001, Reg.-N° EMS561046

Flow Calibration without Adjustment

92020933-1304709

WWRA12397

Purchase order number

US-3601548887-100 / Endress+Hauser Inc.

Order N°/Manufacturer

23P50-AL1A1AA022AW

Order code

PROMAG 23 P 2"

Transmitter/Sensor

6C037316000

Serial N°

FIT-1205

Tag N°

FCP-8.2 US

Calibration rig

156 us.gal/min ($\pm 100\%$)

Calibrated full scale

Current 4 - 20 mA

Calibrated output

0.9189

Calibration factor

0

Zero point

73.2 °F

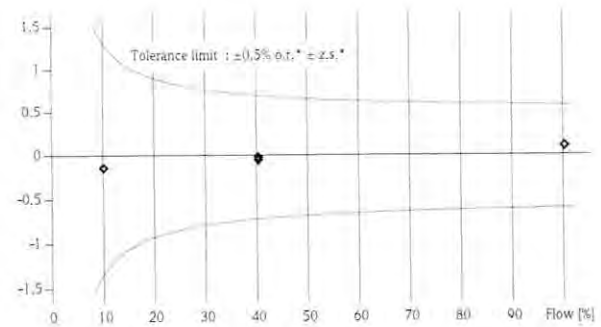
Water temperature

Flow [%]	Flow [us.gal/min]	Duration [sec]	V target [us.gal]	V meas. [us.gal]	Δ o.r.* [%]	Outp.** [mA]
9.9	15.472	60.1	15.487	15.468	-0.12	5.58
40.2	62.742	60.1	62.804	62.801	-0.01	10.43
40.2	62.739	60.1	62.803	62.779	-0.04	10.43
100.1	156.178	60.0	156.287	156.462	0.11	20.04
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

*o.r.: of reading

**Calculated value (4 - 20 mA)

Measured error % o.r.



For detailed data concerning output specifications of the unit under test, see Technical Information (TI), chapter Performance characteristics.
Traceability to the national standard for all test instruments used for the calibration is guaranteed.

Endress+Hauser Flowtec operates ISO/IEC 17025 accredited calibration facilities in Reinach (CH), Cernay (FR), Greenwood (USA), Aurangabad (IN), Suzhou (CN) and Itatiba (BR).



J. Reasoner

Operator

02-07-2020

Date of calibration

Endress+Hauser Inc.
10057 Porter Road
La Porte, Texas 77571

Flow Calibration without Adjustment

92019262-3757980

WWRA9505

Purchase order number

US-3601546580-100 / Endress+Hauser Inc.

Order N°/Manufacturer

5P2B80-1CX9/0

Order code

Promag P 200 3"

Sensor/Transmitter

L200E016000

Serial N°

FIT_700

Tag N°

FCP-7.1.6 US

Calibration rig

398.3621 us.gal/min ($\pm 100\%$)

Calibrated full scale

Current 4 - 20 mA

Calibrated output

1.1823

Calibration factor

1.0

Zero point

72.6 °F

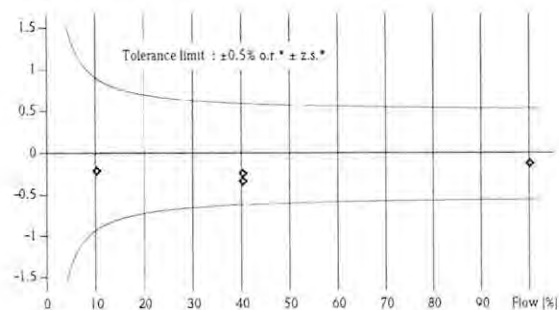
Water temperature

Flow [%]	Flow [us.gal/min]	Duration [sec]	V target [us.gal]	V meas. [us.gal]	Δ o.r.* [%]	Outp.** [mA]
10.1	40.040	60.2	40.172	40.094	-0.19	5.61
40.2	160.047	60.2	160.572	160.060	-0.32	10.41
40.2	160.116	60.2	160.669	160.306	-0.23	10.42
99.9	398.117	60.2	399.474	399.035	-0.11	19.97
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

*o.r.: of reading

**Calculated value (4 - 20 mA)

Measured error % o.r.



*z.s. Zero stability

For detailed data concerning output specifications of the unit under test, see Technical Information (TI), chapter Performance characteristics.
Traceability to the national standard for all test instruments used for the calibration is guaranteed.

Endress+Hauser Flowtec operates ISO/IEC 17025 accredited calibration facilities in Reinach (CH), Cernay (FR), Greenwood (USA), Aurangabad (IN), Suzhou (CN) and Itatiba (BR).



A. Geminden
Operator

05-28-2019

Date of calibration

Endress+Hauser Inc.
2350 Endress Place
Greenwood, IN 46143

Flow Calibration with Adjustment

30437050-4458241

3800382048

Purchase order number

US-3005992023-10 / Endress+Hauser Flowtec

Order N°/Manufacturer

5P2B50-79W4/0

Order code

Promag P 200 2"

Sensor/Transmitter

N6004F16000

Serial N°

-

Tag N°

FCP-8.B

Calibration rig

155.6102 us.gal/min ($\triangleq 100\%$)

Calibrated full scale

Service interface

Calibrated output

0.92113

Calibration factor

-4

Zero point

76 °F

Water temperature

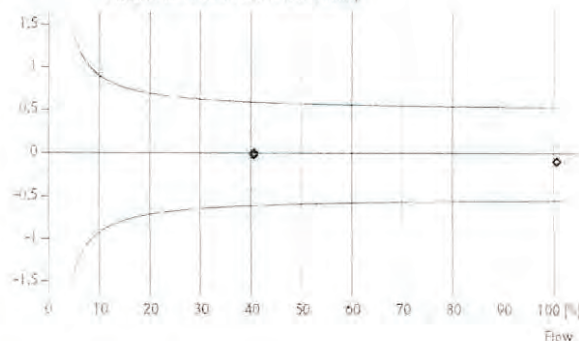
Flow (%)	Flow (us.gal/min)	Duration (s)	V target (us.gal)	V mess. (us.gal)	Δ o.r.* (%)	Outp.** (mA)
40.3	62.745	65.0	68.025	68.031	0.01	10.45
40.3	62.739	65.0	68.013	68.006	-0.01	10.45
100.5	156.427	65.0	169.573	169.427	-0.09	20.07
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

*o.r.: of reading

**Calculated value (4-20 mA)

Measured error % o.r.

Tolerance limit: $\pm 0.5\%$ o.r. + Zero stability



For detailed data concerning output specifications of the unit under test, see Technical Information (TI), chapter Performance characteristics.

The calibration is traceable to the N.I.S.T. through standards certified at preset intervals.

Endress+Hauser Flowtec operates ISO/IEC 17025 accredited calibration facilities in Reinach (CH), Cernay (FR), Greenwood (USA), Aurangabad (IN), Suzhou (CN) and Itatuba (BR).

Robert J Kizzee

06-13-2018

Date of calibration

Endress+Hauser Flowtec, Division USA
2330 Endress Place
Greenwood, IN 46143

Joe Kizzee

Operator

Certified acc. to
ISO 9001, Reg.-N° 030502.2
ISO 14001, Reg.-N° EMS561046

Appendix D
Fourth Quarter 2021
Laboratory Analytical Reports