Appendix H

Construction Quality Assurance Plan

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Construction Quality Assurance Plan

1.1 Introduction

This Construction Quality Assurance Plan supports the implementation of remedial activities at LEHR covered by the Remedial Design/Remedial Action Work Plan for the Former Laboratory for Energy-Related Health Research Federal Facility University of California, Davis. This plan is consistent with and supplements the requirements of the Quality Assurance Project Plan and quality assurance elements covered in Section 7 of the Remedial Design/Remedial Action Work Plan.

1.2 Distribution

This plan shall be distributed with the Remedial Design/Remedial Action Work Plan to all signatories of the ROD and those on the distribution list for the QAPP. The EH&S Unit at UC Davis shall provide this plan to all entities who conduct work subject to the Remedial Design/Remedial Action Work Plan.

1.3 Scope

This plan applies to all construction activities subject to the Remedial Design/Remedial Action Work Plan. These activities include installation of groundwater monitoring wells, installation of land monuments, and miscellaneous construction activities associated with the implementation of remedial actions subject to the Remedial Design /Remedial Action Work Plan.

1.4 Project Information

Site description information, site history and the purpose of remedial activities subject to this plan are described in Section 1 of the Remedial Design/Remedial Action Work Plan.

1.5 Quality Management Organizational Structure

The roles and responsibilities of project personnel are described in Section 2.1 of the QAPP. The installation of monitoring wells, fencing, and other structures at LEHR will be conducted by contractor personnel who will report to the Project Manager under a contract for the specific work to be conducted.

Project personnel may delegate the execution of, but not the responsibility for, their quality-affecting tasks to other qualified project personnel at any time. However, key project personnel may also delegate a substantial subset of their functions to a qualified deputy, who will assume full responsibility for the delegated duties. In either case, delegated duties and responsibilities shall be clearly defined, and documented in writing.

1.6 Qualifications

The Project Manager will ensure that all personnel who conduct work subject to the Remedial Design/Remedial Action Work Plan have appropriate qualification as required by Section 5 of the QAPP.

Personnel assigned to perform, review, approve, and/or certify the design of architectural, structural, mechanical, electrical, civil, or other engineering features of the work should be registered to practice in their particular professional field in the State of California.

1.7 Instructions and Procedures

Project design calculations and drawings will be developed, reviewed, documented, and filed in accordance with Section 10 of the QAPP. The PM will be primarily responsible for the implementation of design control requirements.

Inspections and observations will be used to ensure that the remediation activities and other associated work meet or exceed the project requirements, including any associated design criteria, plans, and specifications.

At the completion of certain work elements, the PQAS will conduct a completion inspection and develop a "punch list" of items that do not conform to the approved plans and specifications. A target date to complete punch list items will be established, and a subsequent completion inspection will be conducted. Deficiency correction dates will be consistent with the construction schedule.

1.8 Well Installation

New wells will be installed in hydrostratigraphic unit (HSU)-1 for groundwater monitoring purposes using a hollow-stem auger drill rig to advance an eight-inch-diameter borehole for a two-inch diameter well to approximately 75 feet below ground surface. Soil samples from well borings will be collected and logged according to Standard Operating Procedure (SOP) 3.2, "Subsurface Soil Sampling While Drilling," and SOP 15.1, "Lithologic Logging." The soil sample frequency will be not less than one sample per five feet of borehole from the surface to 45 feet below ground surface (ft bgs), with continuous soil core collected below 45 ft bgs. Soil cuttings and core generated during drilling activities shall be managed in accordance with the Soil Management Plan provided in Appendix A.

Wells will be installed in accordance with SOP 8.1, "Monitoring Well Installation," as shown in Figure H–1 and Figure H–2. Volumes of grout, bentonite, and filter pack will be calculated based on borehole and well casing diameters. The monitoring wells will be designed and installed under the supervision of an experienced geologist, working under the supervision of a California-certified professional geologist. To be consistent with previous wells, the HSU-1 wells will be constructed with threaded two-inch diameter schedule-40 polyvinyl chloride (PVC) casings with screen intervals that are 15 feet long. Assuming typical HSU-1 soil types are present, the wells will be constructed using 0.01-inch-slot PVC screen with a fine-grained sand pack. Soil core from the planned screened interval will be evaluated, however, and well construction will be modified, if needed, according to the procedure outlined in SOP 16.1, "Filter Pack and Well Screen Slot Size Determination."

Although the exact construction details will be based on the lithologic logging during drilling, the HSU-1 screened intervals are expected to extend from approximately 55 to 70 feet below ground surface. If the borehole is over-drilled, it will be grouted and plugged with bentonite to a depth corresponding to the depth of the well. The annular space will be filled with sand filter pack to two feet above the screened interval; a seal, at least three feet thick, consisting of hydrated bentonite chips, will be placed above the filter pack; and a primary sanitary seal of neat Portland cement will be placed above the bentonite-chip seal, to reach the surface. In addition to the steps outlined in SOP 8.1, the bentonite chips will be hydrated by adding water after each four-inch thick lift is placed to ensure hydration, unless the seal is definitely within the saturated zone. The wells will be completed with a locking well cap, and either a traffic-rated flush-mount

vault (Figure H–1) or a locking steel stove pipe (Figure H–2) with or without protective bollards (shown on Figure H–2), depending on the location.

1.8.1 Well Development

A minimum of 24 hours will elapse between completing the wells and beginning well development activities, to allow concrete and grout to attain sufficient strength. Well development activities will be performed at the discretion of the field geologist and hydrogeologist.

Well development will be considered complete when the water is free of sediment; when specific conductance (SC), pH, and temperature are within the stabilization goals for three consecutive readings; and when at least three times the water volume calculated to be in the well casing at the start of development has been removed. The stabilization goals are:

- Conductance: ± 10 percent.
- pH: ± 0.2.
- Temperature: ± 0.3 degrees Celsius.
- Turbidity: less than 10 nephelometric turbidity units (NTUs).

If the SC, pH, and temperature do not stabilize, or the turbidity is not reduced below 10 NTUs due to low recharge, well development will be considered complete when a minimum of three well casing volumes are removed and development has proceeded for at least four hours. Well development purge water and decontamination water will be discharged to the campus wastewater treatment plant.

1.8.2 Postings

Each monitoring well shall be marked with a plaque or tag (Figure H–3) that contains a discrete identifier (CERCLA Groundwater Monitoring Well No. UCDX-XXX). The plaque or tag shall state that destructing or tampering with the well without approval from agencies who are signatories to the ROD is prohibited.

1.9 Construction Quality Control Testing and Reporting

Quality control tests and checks will be performed per SQP 7.1.

10.0 Inspections and Reviews

Newly installed wells will be inspected by a competent person qualified to perform such inspection at the completion of the installation or the county inspector prior to well operation.

1.11 Sampling Requirements

Sample collection must conform to Sampling and Analysis Plans required by Section 3.2.4 of the QAPP. The SAP for groundwater sample collection required by the Remedial Action/Remedial Action Work Plan is defined in Section 3 of the Remedial Design/Remedial Action Work Plan. The quality assurance aspects of the sample collection, such as DQOs, are discussed in Section 7 of the Remedial Design/Remedial Action Work Plan. Sampling procedures in Appendix E apply to the sample collection activities.

1.12 Change Control

Changes to scope, schedule and cost will be documented in field work variances, as specified in Section 18 of the QAPP and SQP 11.1, "Field Work Variance." Field work variances will be documented and tracked by the SC, and reviewed and approved by the PM. The PHSM and/or the PQAM will be consulted on any changes that have the potential to affect H&S and/or quality.

1.13 Noncompliance and Corrective Action

Noncompliances and deficiencies associated with installed equipment, construction elements, samples, or data may be found during the normal course of activities and during inspections. Nonconformance Reports (NCRs) discussed in Section 16 of the QAPP will be employed to ensure continuous improvement of items and work processes. A NCR will be generated when a deficiency is encountered during a specific project task which cannot be immediately corrected during the operations, or which is of a repetitive nature. The processing of nonconformances will be implemented in accordance with SQP 10.1 "Nonconformance Control."

A nonconformance is defined as a deficiency or deviation in characteristic, documentation, or procedure that renders the quality of an item or activity unacceptable or indeterminate. The originator of a NCR will describe the nonconformance and the requirements deviated from on the form provided for that purpose and will notify the Project Quality Assurance Manager.

1.14 Documentation and Recordkeeping

Prior to issuance for use, all construction documents will be formally reviewed and approved. This review will cover administrative as well as technical and quality issues. Approval will be denoted by a signature and date page in each document, which will include the PM and PQAM, as a minimum.

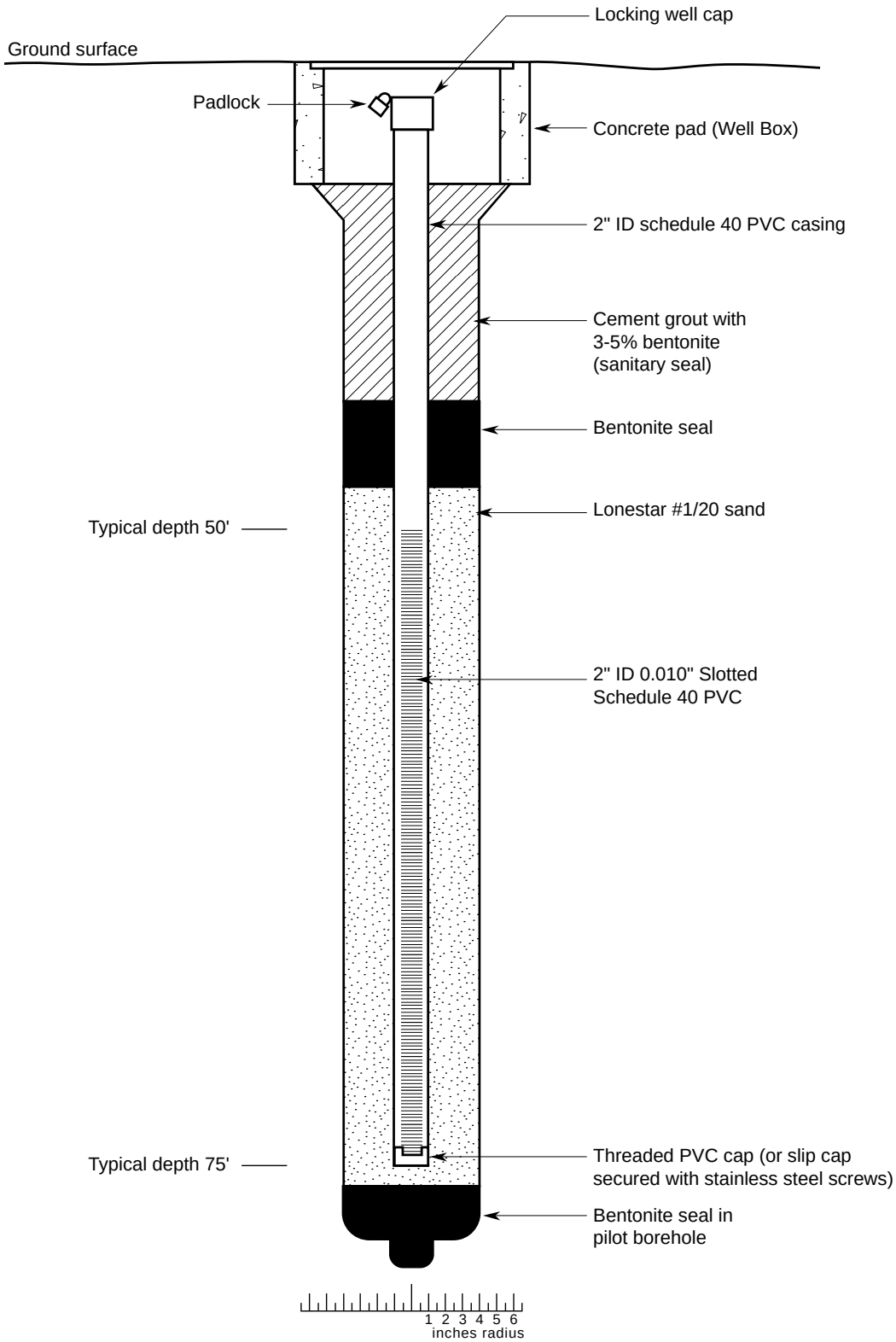
Quality records are those documents which provide direct documentary evidence of the quality of items, activities, services, and compliance with the contract or regulatory requirements, and which have been completed and submitted for acceptance and retention.

Administrative records are those documents which do not directly provide documentary evidence of the quality of items, activities, or compliance with the contract or regulatory requirements.

All quality-affecting records generated during the construction activities will be managed in accordance with Sections 4 and 8.2 of the QAPP; SQP 4.1, "Document Control"; and SQP 4.2, "Records Management." Quality-affecting documents include, but are not limited to, personal field logs, calibration records, monitoring data, inspection checklists, sampling documentation, and procurement records.

All records generated by project personnel must be complete, legible, and written in ink. Corrections must be made with a single line, and documented with the initials of the person making the correction and the date the correction was made.

Field documentation will be collected and compiled on a daily basis by the SC or designee.



NOTE: Depths and dimensions not to scale

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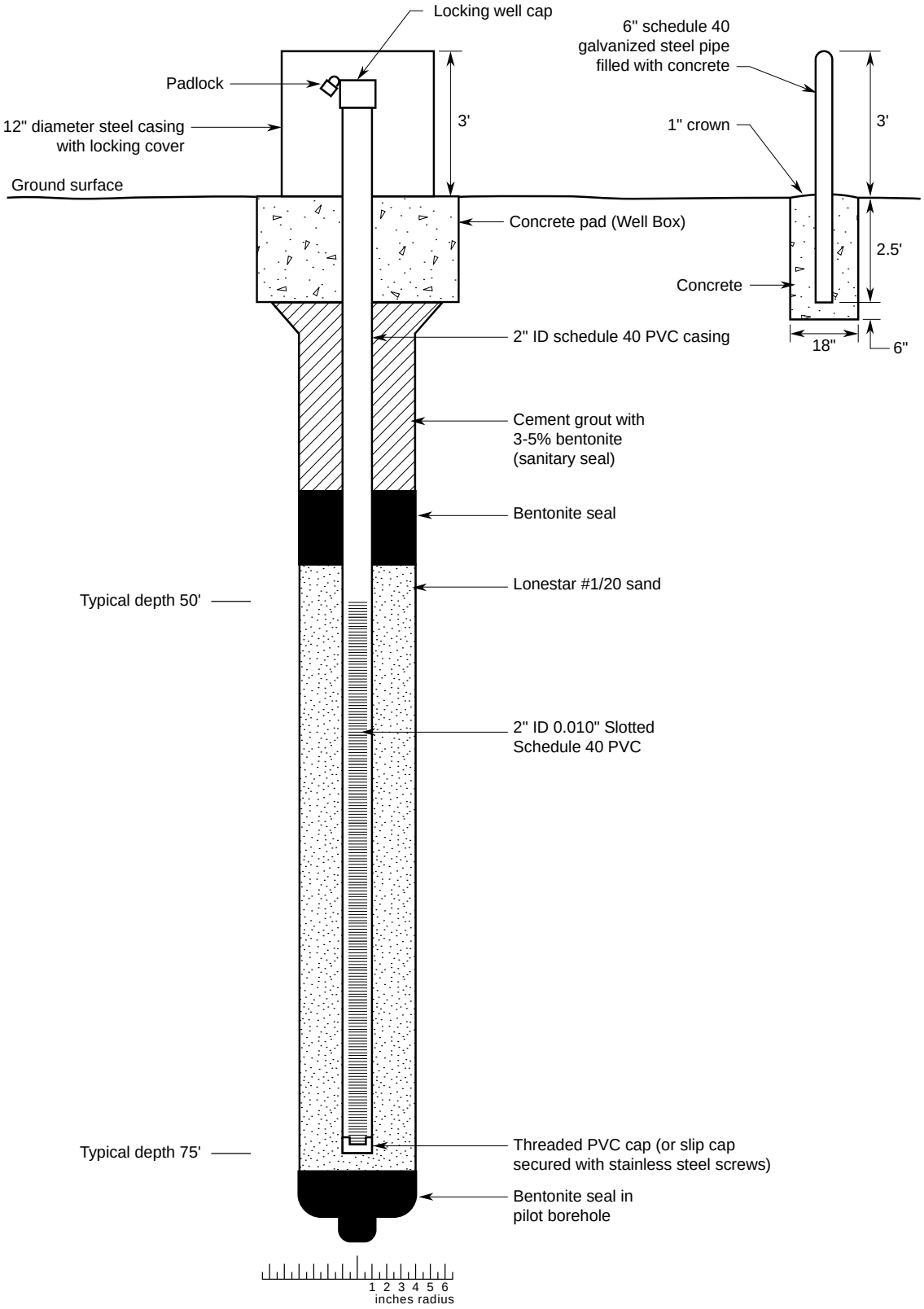
Figure H–1. Typical Installation Drawing—Well with Flush-Mounted Vault



NOTE: Depths and dimensions not to scale

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Figure H–2. Typical Installation Drawing—Well with Locking Steel Stove Pipe

CERCLA Groundwater Monitoring Well No. UCDX-XXX

Destruction of or tampering with this well is prohibited. Call (530) xxx-xxxx for information. Operated for the United States Department of Energy.

Dimensions: 3-inch wide × 2-inch high plaque
Material: Stainless Steel or Aluminum plaque with stamped lettering.
Text Font: Arial

Figure H–3. Typical Installation Drawing—Well Plaque or Sign

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