



EMID-700130

DEPARTMENT OF ENERGY
Environmental Management Los Alamos Field Office (EM-LA)
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NOV 19 2018

Mr. John E. Kieling
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Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303



Dear Mr. Kieling:

Subject: Submittal of the Work Plan to Reconfigure Monitoring Wells R-19 and R-31

Enclosed please find two hard copies with electronic files of the "Work Plan to Reconfigure Monitoring Wells R-19 and R-31." This work plan presents the field activities and testing that will be conducted during reconfiguration of the remaining two Westbay wells located in the Water Canyon and Ancho Canyon watersheds.

Pursuant to Section XXIII.C of the Compliance Order on Consent, a pre-submission review meeting was held with Newport News Nuclear BWXT – Los Alamos, LLC, and the New Mexico Environment Department on October 15, 2018, to discuss the rehabilitation and conversion of monitoring wells R-19 and R-31.

If you have any questions, please contact Mark Everett at (505) 309-1367 (mark.everett@em-la.doe.gov) or Hai Shen at (505) 665-5046 (hai.shen@em.doe.gov).

Sincerely,

Arturo Q. Duran
Designated Agency Manager
Environmental Management
Los Alamos Field Office

Enclosures:

1. Work Plan to Reconfigure Monitoring Wells R-19 and R-31 (EM2018-0083)

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N3B Records

Public Reading Room (EPRR)

PRS Database

EM-LA-40AD-00343

November 2018
EM2018-0083


Work Plan to Reconfigure Monitoring Wells R-19 and R-31

Newport News Nuclear BWXT – Los Alamos, LLC (N3B), under the U.S. Department of Energy Office of Environmental Management Contract No. 89303318CEM000007 (the Los Alamos Legacy Cleanup Contract), has prepared this document pursuant to the Compliance Order on Consent, signed June 24, 2016. The Compliance Order on Consent contains requirements for the investigation and cleanup, including corrective action, of contamination at Los Alamos National Laboratory. The U.S. government has rights to use, reproduce, and distribute this document. The public may copy and use this document without charge, provided that this notice and any statement of authorship are reproduced on all copies.

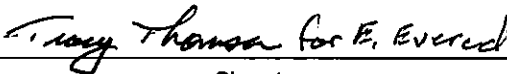
Work Plan to Reconfigure Monitoring Wells R-19 and R-31

November 2018


Responsible program director:

Bruce Robinson		Program Director	Water Program	11/7/2018
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Responsible N3B representative:

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Arturo Q. Duran		Designated Agency Manager	Office of Quality and Regulatory Compliance	11-19-2018
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1.0 INTRODUCTION

This work plan addresses the effort to disposition two wells configured with Westbay sampling systems at Los Alamos National Laboratory (LANL or the Laboratory). This plan proposes that monitoring wells R-19 and R-31 be reconfigured with sampling systems capable of purging the wells before sampling activities begin. Samples are anticipated to be more representative of groundwater if wells are purged before sampling.

Based on findings from “Technical Area 16 Well Network Evaluation and Recommendations” (LANL 2012, 213573), the U.S. Department of Energy (DOE) Environmental Management Los Alamos Field Office and the Laboratory have determined that Westbay systems will no longer be used in any of the Laboratory groundwater monitoring network wells. This work plan presents the field activities and testing that will be conducted during reconfiguration of two Westbay wells, R-19 and R-31, located in the Water Canyon and Ancho Canyon watersheds, respectively (Figure 1.0-1).

2.0 CURRENT GROUNDWATER MONITORING WELL CONFIGURATION

The two wells in the groundwater monitoring network are currently configured as follows.

R-19 currently has seven intermediate zone/regional aquifer screens at the following depths:

Screened Zone	Depth
Screen 1 upper intermediate zone (dry)	827.2–843.6 ft below ground surface (bgs)
Screen 2 lower intermediate zone (pending sampling results)	893.3–909.6 ft bgs
Screen 3 upper regional aquifer	1171.4–1215.4 ft bgs
Screen 4 lower regional aquifer	1410.2–1417.4 ft bgs
Screen 5 lower regional aquifer	1582.6–1589.8 ft bgs
Screen 6 lower regional aquifer	1726.8–1733.9 ft bgs
Screen 7 lower regional aquifer	1832.4–1839.5 ft bgs

R-31 currently has five intermediate zone/regional aquifer screens at the following depths:

Screened Zone	Depth
Screen 1 intermediate zone (dry)	439.1–454.4 ft bgs
Screen 2 upper regional aquifer	515.0–545.7 ft bgs
Screen 3 lower regional aquifer	666.3–676.3 ft bgs
Screen 4 lower regional aquifer	826.6–836.6 ft bgs
Screen 5 lower regional aquifer	1007.1–1017.1 ft bgs

3.0 FIELD ACTIVITIES

This section describes the following activities that will be conducted at the two groundwater monitoring wells:

- Westbay system removal
- video logging
- backfilling/abandonment
- swabbing and bailing
- purging and sampling
- prejetting step tests
- screen jetting
- postjetting step tests
- deploying temporary packer strings
- final sampling system design and installation

3.1 Removal of Westbay Sampling Systems, Video Logging, and Temporary Packer Installation

The Westbay systems will be removed first from R-19 and then from R-31. The packers will be deflated and the systems will be removed. Following removal of the Westbay system, a video log will be run in each well to investigate the condition of the well casing and screens and document whether water is flowing through each screen.

Temporary inflatable packers will be set to isolate the productive screens in the two wells. These temporary packers will be installed as soon as possible after removal of the Westbay systems to minimize cross-flow between screens.

3.2 Screen Abandonment

Table 3.2-1 summarizes the rationale for determining which screens will be retained, which screens will no longer be used, and which screens will be abandoned.

The lower portions of wells R-19 and R-31 will be backfilled with a combination of silica sand and cement in order to abandon the lower screened intervals in each well (Figures 3.2-1 and 3.2-2). The backfill will be capped with a k-packer, isolating the backfill material from the functioning part of each well.

3.3 Swabbing/Bailing, Purging/Sampling

Swabbing/bailing and purging/sampling will be conducted beginning with well R-19 and then followed by R-31. The temporary packers will be removed from each well, and the retained screens and the screen directly below the lowest retained screen will be swabbed and bailed to remove any formation fines present in the filter packs.

Next, a straddle packer and pump assembly capable of pumping 3–5 gallons per minute (gpm) will be installed. Pumping rates may need to be adjusted based upon the varying hydraulic yield of each screen. The packers will be set at a spacing which is greater than the length of each screen but which also minimizes the volume of water contained in the casing between packers.

During purging, field personnel will collect field parameters with a flow-through cell. In the case of R-19, swabbing/bailing and purging/sampling will begin with screen 4, the screen interval below the retained screen (screen 3) in the upper part of the regional aquifer. After all activities at screen 4 have been completed, the lower part of the well will be plugged and abandoned (Table 3.2-1). Swabbing/bailing and purging/sampling will then begin with screen 3. Some cross-flow will inherently occur between the retained intermediate zone screen and the regional aquifer during these activities, but it will be minimized as much as possible. A cross-flow estimate will determine how much water will be purged from the regional aquifer before initiating sample collection in each screen. At R-19, once key parameters are stable and the cross-flow volume has been removed, samples will then be collected after 3, 6, and 10 casing volumes have been removed.

At monitoring well R-31, swabbing/bailing and purging/sampling will begin with screen 3, the screen interval below the retained screen (screen 2) in the upper part of the regional aquifer. After all activities at screen 3 have been completed, the lower part of the well will be plugged and abandoned (Table 3.2-1). Swabbing/bailing and purging/sampling will then begin with screen 2. At R-31, once key parameters are stable, groundwater samples will be collected after 3, 6, and 10 casing volumes have been removed.

Groundwater samples will be analyzed for the following analytes: low-level tritium, high explosives screening (at Geochemistry and Geomaterials Research Laboratories), metals, volatile organic compounds, semivolatile organic compounds, high explosive and Royal Demolition Explosive degradation products, radionuclides, gross alpha/beta, general inorganics and perchlorate, nitrate/nitrite, and phosphorus. Transducer data will be collected during pumping in each well to track drawdown.

3.4 Hydraulic Step Tests—Prejetting

Short-duration hydraulic step tests will be conducted at the retained screens in each well before jetting the screens. Packers will be used to isolate the target screens. The results of the step tests will be used to calculate the prejetting specific capacity of each screened interval.

3.5 Screen Jetting

At wells R-19 and R-31, a jetting tool will be used to redevelop the retained screens. This technique uses pressurized pulses of water across the screened interval and is often effective at increasing the specific capacity of screened zones. The high-pressure jetting tool will be attached to the end of the discharge pipe of a pump hoist rig and lowered into the well and rotated as the tool is raised and lowered across the screened interval. Pumping will be conducted simultaneously with jetting to remove any particles loosened by the jetting technique.

3.6 Hydraulic Step Tests—Postjetting

Postjetting hydraulic step tests will be conducted in the same manner as the prejetting step tests. The postjetting specific capacity data will be compared with the prejetting data to determine if specific capacity improved. Samples will be collected in the same manner as described in section 3.3. Pre- and post-jetting analytical data will be compared to identify any improvements as a result of jetting.

3.7 Deployment of Temporary Packer Strings

Following completion of the screen conversions and jetting, temporary packer strings will be deployed in each well until the final sampling systems have been designed and procured.

Each productive screened interval will be isolated. The packer strings will consist of a series of adequately pressurized inflatable packers that will ensure isolation of water-bearing zones.

3.8 Final Sampling System Installation

Final sampling systems will be installed in the groundwater monitoring wells as follows:

- R-19: A single pump system will be installed to sample the retained regional aquifer screen. A Bennett pump may be installed to sample the lower intermediate zone if screen 2 is retained pending analytical results.
- R-31: A single pump system will be installed to sample the retained regional aquifer screen.

4.0 SCHEDULE

This work scope will be conducted following New Mexico Environment Department (NMED) approval of the work plan, with a proposed start date in the second quarter of fiscal year 2019. A summary of field activities will be included in the Westbay wells reconfiguration report due to NMED by August 30, 2019.

5.0 REFERENCES

The following reference list includes documents cited in this plan. Parenthetical information following each reference provides the author(s), publication date, and ERID, ESHID, or EMID. This information is also included in text citations. ERIDs were assigned by the Laboratory's Associate Directorate for Environmental Management (IDs through 599999); ESHIDs were assigned by the Laboratory's Associate Directorate for Environment, Safety, and Health (IDs 600000 through 699999); and EMIDs are assigned by N3B (IDs 700000 and above). IDs are used to locate documents in N3B's Records Management System and in the Master Reference Set. The NMED Hazardous Waste Bureau and N3B maintain copies of the Master Reference Set. The set ensures that NMED has the references to review documents. The set is updated when new references are cited in documents.

LANL (Los Alamos National Laboratory), March 2012. "Technical Area 16 Well Network Evaluation and Recommendations," Los Alamos National Laboratory document LA-UR-12-1082, Los Alamos, New Mexico. (LANL 2012, 213573)

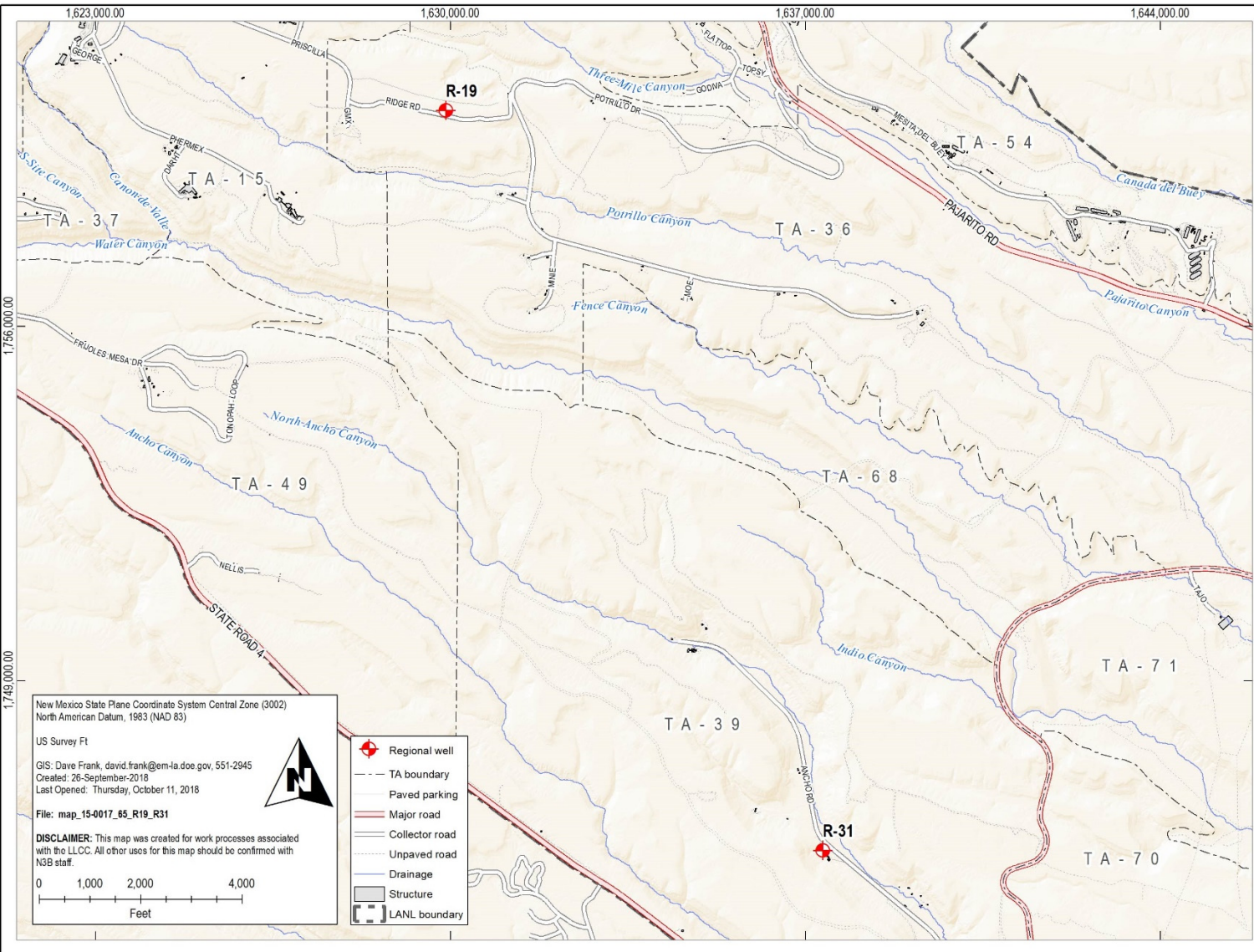


Figure 1.0-1 Site map showing monitoring wells R-19 and R-31

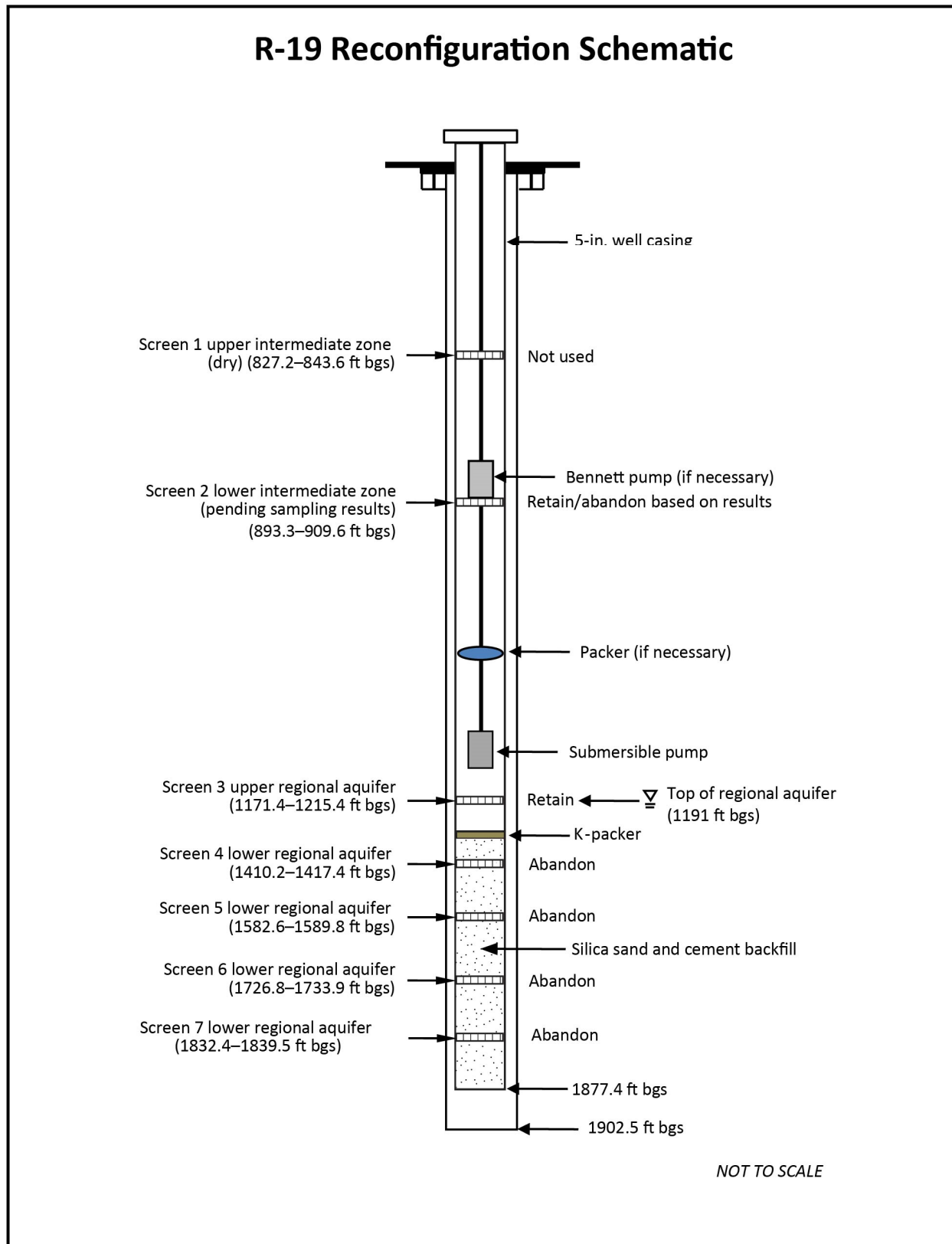


Figure 3.2-1 R-19 reconfiguration schematic

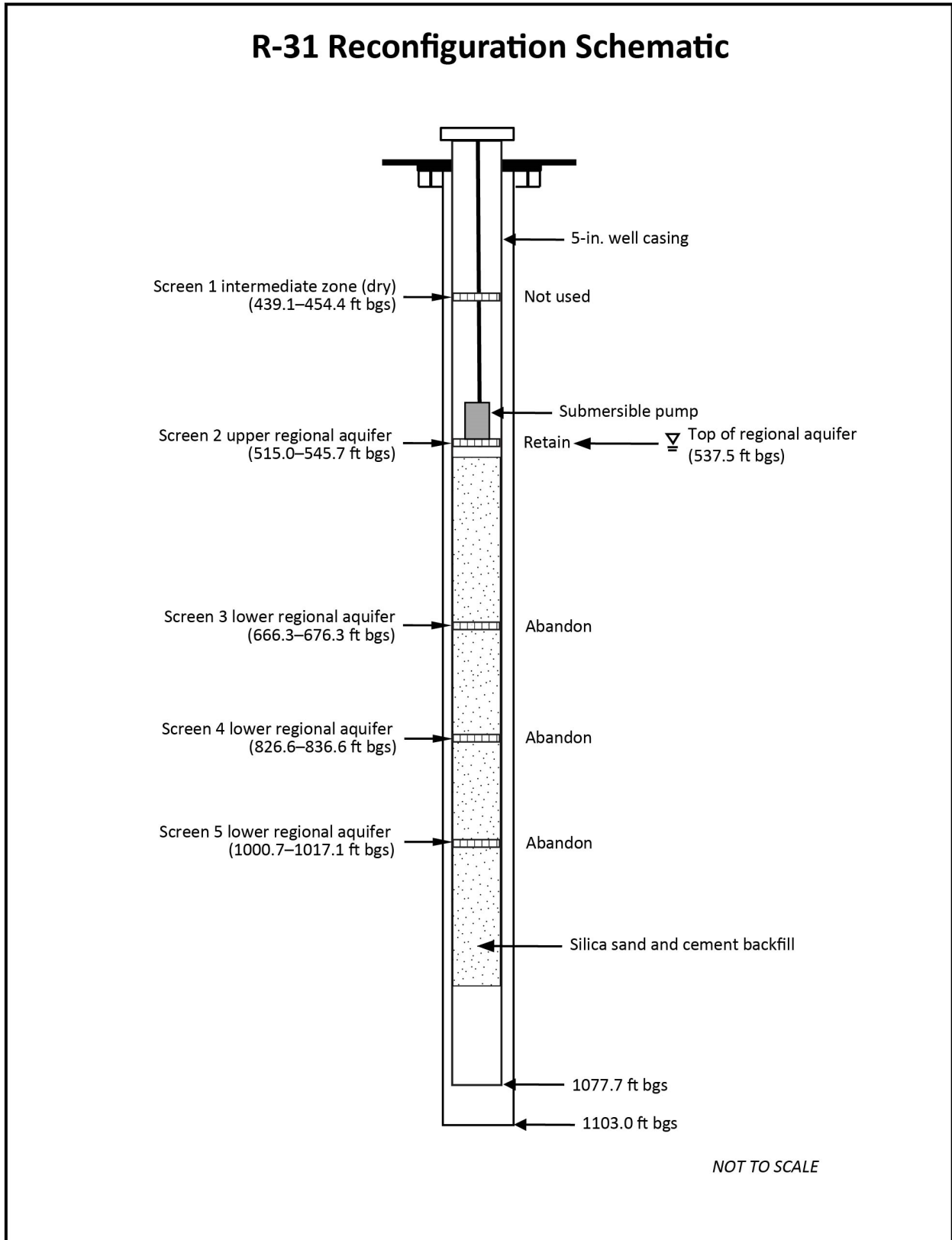


Figure 3.2-2 R-31 reconfiguration schematic

**Table 3.2-1
R-19 and R-31 Monitoring Well Reconfiguration Rationale**

Well	R-19	R-31
Well Location	Ridge Road, north of Potrillo Canyon	Lower North Ancho Canyon
Current screen numbers and monitored zones	Seven screens: <ul style="list-style-type: none"> • Screen 1 upper intermediate zone (dry) • Screen 2 lower intermediate zone (pending sampling results) • Screen 3 upper regional aquifer • Screen 4 lower regional aquifer • Screen 5 lower regional aquifer • Screen 6 lower regional aquifer • Screen 7 lower regional aquifer 	Five screens: <ul style="list-style-type: none"> • Screen 1 intermediate zone (dry) • Screen 2 upper regional aquifer • Screen 3 lower regional aquifer • Screen 4 lower regional aquifer • Screen 5 lower regional aquifer
Screen(s) to be abandoned/no longer used	<ul style="list-style-type: none"> • Screen 1 upper intermediate zone (dry) • Screen 2 lower intermediate zone (pending sampling results) • Screen 4 lower regional aquifer • Screen 5 lower regional aquifer • Screen 6 lower regional aquifer • Screen 7 lower regional aquifer 	<ul style="list-style-type: none"> • Screen 1 upper intermediate zone (dry) • Screen 3 lower regional aquifer • Screen 4 lower regional aquifer • Screen 5 lower regional aquifer
Screen(s) to be retained	<ul style="list-style-type: none"> • Screen 2 lower intermediate zone (pending sampling results) • Screen 3 upper regional aquifer 	<ul style="list-style-type: none"> • Screen 2 upper regional aquifer
Justification for proposed well configuration	Retaining the lower intermediate zone screen will serve a sentinel function to detect potential contaminants migrating in the subsurface. The upper regional aquifer screen is retained to serve in a sentinel function to detect potential contaminants reaching the regional aquifer.	The upper regional aquifer screen is retained to serve in a sentinel function to detect potential contaminants reaching the regional aquifer.
Method of screen abandonment	The lower part of the well will be filled with a combination of silica sand and cement. The backfill will be capped with a k-packer, isolating the abandonment material from the functioning portion of the well.	The lower part of the well will be filled with a combination of silica sand and cement. The backfill will be capped with a k-packer, isolating the abandonment material from the functioning portion of the well.
Replacement sampling system	A submersible pump will be configured to sample the upper regional aquifer screen. If necessary, a Bennett pump will be configured to sample the lower intermediate aquifer screen and an inflatable packer will be installed to isolate the two zones.	A submersible pump will be configured to sample the upper regional aquifer screen.

