MELR

Work Plan (installations)

DEPARTMENT OF THE AIR FORCE
27TH SPECIAL OPERATIONS MISSION SUPPORT GROUP (AFSOC)
CANNON AIR FORCE BASE NEW MEXICO

ENTERED

MAY 31 2013

JUN 2013

Colonel David C. Piech
Commander
110 E Sextant Avenue Suite 1098
Cannon AFB NM 88103

Mr. Daniel Comeau
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East Bldg 1
Santa Fe NM 87505-6063

Dear Mr. Comeau

Attached is the *"Abbreviated Well Installation Work Plan Melrose AFR"*. If you have any questions regarding this submittal, please contact Mr. Ronald Lancaster, Chief, Installation Management Flight at (575) 784-1146 or Mr. Rick Crow, Environmental Element Chief at (575) 784-6383.

Sincerely,

DAVID C. PIECH, Colonel, USAF
Commander

Attachment:
Abbreviated Well Installation Work Plan Melrose AFR.

cc:
Environmental Protection Agency, Region VI, Ms. Wendy Jacques w/o Attachment

TRINITY
ANALYSIS & DEVELOPMENT CORP.
Environmental & Engineering Services

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May 17, 2013

Sheen Thomas Kottkamp M.S.
Environmental Program Manager/Scientist
AGEISS Inc.
27 SOCES/CEAN
Bldg. 355
506 Air Commando Way
Cannon AFB, NM 88103

RE**:** **Drilling Work Plan for the New Background Monitoring Well (MWQ-24) at Melrose AFR**
Melrose Air Force Range, New Mexico
USACE Contract No.: W9128F-10-D-0091, Task Order 006

Dear Mr. Kottkamp,

Enclosed for your review is the *Drilling Work Plan for the New Background Monitoring Well (MWQ-24) at Melrose Air Force Range.* We appreciate the opportunity to work with Cannon Air Force Base and USACE to provide service to Melrose Air Force Range. If you have any questions or need further information, please call me at (850) 613-6800.

Sincerely,
Trinity Analysis & Development Corp.

Jonathan Kramer
Geologist

Attachment

Distribution List

Recipient	Hard Copies	Electronic Copies
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Drilling Work Plan for the New Background Monitoring Well (MWQ-24) at Melrose Air Force Range

Primary Purpose	A new background monitoring well was initially requested on October 27, 2009 when NMED provided a review of the *Final Report, Initial Baseline Groundwater Monitoring, Melrose Air Force Range, New Mexico, June 2009* (URS, 2009). At the time, MWQ-10 was regarded as the background monitoring well. In that response NMED stated *"NMED discourages including stock wells with steel casings in the Groundwater Quality Well Network, e.g., MWL-6, MWQ-4, MWQ-5, MWQ-6, MWQ-7, and MWQ-8, with the exception of MWQ-10. Although MWQ- 10 has a steel casing, it is currently the only productive well located up-gradient of the impact area.* *The Permittee must install a replacement monitoring well up-gradient of the impact area, then discontinue sampling and analysis of MWQ-10…"* The subsequent contractor, Tidewater, Inc. was not under contract to install a background monitoring well as discussed in the *Response to Comments contained in the February 11, 2010 Notice of Disapproval to the Draft Work Plan, Groundwater Monitoring, Melrose Air Force Range, New Mexico, October 2009* (Tidewater, Inc., 2009). TRINITY proposed utilization of and subsequently sampled well MWQ-23 to determine if this location was a viable option as a background well. However, based on review of the collected groundwater quality information from MWQ-23, it did not appear to represent an ideal background groundwater quality sampling location. In addition, no well construction details were known about this well. Personnel from Cannon AFB (Mr. Matt Higginbotham) and TRINITY (Mr. Jonathan Kramer, and Mr. Richard Burdine) met with personnel from NMED (Mr. Dave Cobrain, Ms. Leona Tsinnajinnie, Mr. Dan Comeau, and Ms. Neelam Dhawan) on January 10, 2013 at their office in Santa Fe, New Mexico. Based on comments and discussions occurring during the meeting, NMED requested that a new background well be installed adjacent to MWQ-10. The approximate location of the proposed background well (MWQ-24) is 34°14'37.73"N, 103°50'30.43"W. It is estimated that the total depth of the well will not exceed approximately 100 feet, which will coincide with the base of the Ogallala Formation (Frm)/Southern High Plains Aquifer and the top of the Chinle Frm/Redbeds. The location of existing monitoring wells and the propsed location of the new background monitoring well are depicted on **Figure 1**.
Conceptual Model	The Melrose Air Force Range (AFR) is a bombing and air-to-ground gunnery range under management of Cannon AFB within AFSOC. The Melrose AFR is situated approximately eight miles southwest of the village of Melrose, and located predominately in Roosevelt County with a small parcel in Curry County, New Mexico (Figures 1 and 2). Access to the range is achieved by traveling south from Melrose on New Mexico State Road (SR) 267 for approximately 9.3 miles, then west on Sundale Valley Road for approximately seven miles to the security gate. Background monitoring well MWQ-24 will be located upgradient of the Solid Waste Management Units (SWMUs). For a more detailed discussion of the SWMUs and site

	history please see Phase I RCRA Facility Investigation for Melrose Air Force Range, Cannon Air Force Base, Clovis, New Mexico (Foster Wheeler, 1996), or the RCRA Facility Investigation Report Addendum for Melrose Bombing Range, Cannon Air Force Base, New Mexico (Foster Wheeler, 2003) both of which are part of NMED's administrative record. Melrose AFR is located near the western margin of the Southern High Plains Aquifer of which the Ogallala Formation is the primary water bearing unit. The Southern High Plains Aquifer forms the primary aquifer for potable, livestock, and irrigation water in the vicinity of Melrose AFR and throughout the eastern New Mexico region. In addition, there are several localized shallow water-bearing zones across the region used for irrigation purposes. No deeper aquifers are known to be in use in the vicinity of Melrose AFR. However, groundwater of poorer quality does occur in the Chinle Formation, which underlies the Ogallala Formation. Sediments expected to be encountered in the Ogallala/Southern High Plains Aquifer during drilling at Melrose AFR are predominately silts and very fine sand. Gravel, cobble, and boulder deposits normally associated with the base of the Ogallala formation and a fining up sequence above are not commonly identified during drilling activities at Melrose AFR. The Chinle Formation (Triassic age) is the base of the Ogallala/Southern High Plains Aquifer and is composed of red shales with interbedded sands (redbeds) deposited by low-energy streams in floodplains and deltas. The top of the Chinle Formation is marked by an erosional unconformity with up to several hundred feet of relief (Lee Wan and Associates, Inc., 1990). Based on the water level from an adjacent livestock supply well (MWQ-10) the depth to water groundwater at MWQ-24 is anticipated between approximately 39 and 45 feet below land surface (TRINITY, 2012; Table 2). Based on regional geology (Langman, 2004) the depth to the base of the aquifer/top of the Chinle Formation is not expected to exceed 100 to 150 feet.
Drilling Approach	Drilling will be conducted with methods selected to optimize the potential of completing the well without the use of drilling additives and within the target zone of saturation, given the low hydraulic conductivities and groundwater production anticipated. Air rotary casing advance (ARCA) or reverse circulation casing advance (RCCA) techniques are anticipated to be utilized. **Air Rotary Drilling** The air rotary method consists of a drill pipe or drill stem coupled to a drill bit that mobilizes (i.e. either rotation or hammering) when compressed air is forced down the casing to the bit. Cuttings generated at the drill bit and are lifted to the surface by compressed air through the annular space (between the drill pipe and the borehole wall). The circulation of the compressed air not only removes the cuttings from the borehole but also helps to cool the drill bit. When using air as a drilling fluid supplied by an air compressor during any drilling technique, the air compressor shall have an in-line filter system to filter the air coming from the compressor and prevent potential introduction of contaminants such as residual oils into the borehole. The filter system shall be inspected regularly and be subjected to routine maintenance, to ensure that the system is functioning properly. A cyclone separator or similar air containment/dust-suppression system shall be used to

	funnel the cuttings to one location instead of allowing the cuttings to discharge uncontrolled from the borehole. Particular attention will be paid to the management of cuttings and dust generated during air rotary drilling. *Air Rotary Casing Advance (ARCA)* ARCA with respect to the borehole and cuttings recovery operates technically in much the same was as traditional air rotary drilling as described above, though casing is advanced simultaneously as drilling is progressed to secure the borehole wall in unstable formations. Typically casing lengths will be telescoped as the boring is advanced to total depth.
Hydrogeologic and Geochemical Objectives	The primary objective for the proposed well is to monitor background water quality upgradient of the Solid Waste Management Units (SWMUs) at Melrose Air Force Range. The propsed background monitoring well is upgradient of SWMUs: • SWMU 114 – Expended Ordnance and Industrial Waste Burial Site (Motor Pool Trenches); • SWMU 115 – Explosives-Contaminated Burial Site (Arroyo Burial Site); • SWMU 117 – Domestic Waste Burial Site (Southeast of Main Building); • SWMU 130 – World War II Cantonment Disposal Site (formerly Area of Concern (AOC) 1); • SWMU 131 – Domestic Waste Burial Site (East of Fire Station; formerly AOC 2); • SWMU 132 – Disposal/Burn Site (North Helicopter Pad; formerly AOC 3); and • SWMU 133 – Northwest Munitions Disposal Site (Northwest Corner of Impact Area; formerly AOC 4). Additional objectives are as follows: • Monitor water levels in the regional aquifer in this area; and • Further define the hydrostratigraphy and structure of the site. These additional objectives will be addressed to the best extent possible, but drilling methods will be optimized to accomplish the primary objective.
Potential Groundwater Occurrence and Detection	Based on the water level from an adjacent livestock supply well (MWQ-10) the depth to water groundwater at MWQ-24 is anticipated between approximately 39 and 45 feet below land surface (TRINITY, 2012; Table 2).
Lithological Sampling	Lithological samples will be collected as chips from the cyclone discharge on the drilling rig on 10-foot centers. Chip samples will be archived in chip trays for future reference.
Groundwater Screening and Characterization Sampling	No groundwater screening or characterization sampling is currently planned or anticipated.
Geophysical Logging	In a dry, cased borehole, natural gamma is the only effective wireline geophysical logging method available to measure formation properties through the drive casing. This method yields information on the potential clay content of the formation, though the gamma response would be muted by the steel casing through which the measurement must be conducted. Geophysical logging is not currently planned; however, if equipment is available during drilling activities the open hole will be logged.

Well Completion	A well construction diagram for the proposed background monitoring well is provided on **Figure 2**. The adjacent supply well (MWQ-10) will be utilized to determine the approximate depth to groundwater in the borehole. Based on historic data it is anticipated that the depth to water below land surface will be between approximately 39 and 45 feet (TRINITY, 2012; Table 2). Based on regional geology (Langman, 2004) the depth to the base of the aquifer/top of the Chinle Frm is not expected to exceed 100 feet. Based on the limited saturated thickness of the aquifer TRINITY proposes screen length of sufficient length to extend from the base of the aquifer to five feet above the water table. Total screen length will not exceed 60 feet. The monitoring well will be constructed as follows: • Four-inch, flush-threaded Schedule 80 PVC casing; • Screen will consist of 0.01-inch Schedule 80 slotted screen; • No sump will be used at the bottom of the well; • Centralizers will be installed at 40-foot intervals and at the top and bottom of the screened interval. Additional centralizers may be required based on the length of the screen/depth of the well; • Before the well screen and casings are placed at the bottom of the borehole, at least six-inches of filter material will be placed using a tremie pipe at the bottom to serve as a firm footing; • Using a tremie pipe, the annular space will be filled from the bottom of the borehole to a minimum of two-feet above the well screen with an appropriate filter pack (i.e. 10/20 silica sand); • The filter pack will be placed using a tremie pipe to avoid bridging and ensure a continuous filter pack throughout the screened interval of the well; • A bentonite chip or pellet seal will be installed to a thickness of 10 to 20 feet above the filter pack and hydrated every one-foot per manufacturer instructions to ensure a competent seal. The seal will be placed using a tremie pipe; • After allowing a minimum of four-hours for the bentonite seal to hydrate, a 20 percent high solids bentonite grout slurry will be tremied above the bentonite seal to within 10 feet of the ground surface; • After waiting at minimum of 24-hours for the bentonite grout to cure, a neat cement grout will be tremied into the annular space to the ground surface. The mixture will consist of 94 pounds of Portland cement to seven-gallons of water and 3 percent by weight of sodium bentonite powder; • PVC well casing will extend approximately 2.5 feet above the ground surface and will be protected by installing a lockable 8-inch diameter by 5-foot long protective steel casing to a height 6-inches above the well casing; • A 4-foot by 4-foot by 4-inch concrete pad will then be poured and sloped in such a way as to direct surface runoff from the casing. A weep hole will be drilled in the outer protective casing above the concrete surface; and • The steel outer casing and well pad will be protected by installing four 4-inch diameter by 5-foot long steel bollards around the well on the outside of the concrete pad. • The well will be tagged with a corrosion resistant identification stamp on the protective casing which identifies the well number, depth, date of installation, and the adjusted top of casing elevation. The well number will also be inscribed into the concrete pad. The well will also be clearly designated as a monitoring well.
Well Development	Monitoring well development will be performed within one week after installation but

	no sooner than 48 hours after grout installation. The following procedure will be followed for the development of the new background well: • Initial development will consist of swabbing, bailing, and/or pumping until little or no sediment enters the well; • Following initial development, the well will be continuously pumped using an electric submersible or pneumatic drive positive displacement or bladder pump; • Water level, temperature, pH, specific conductance (SC), turbidity, dissolved oxygen (DO), and oxidation-reduction potential (ORP) will be monitored during pumping, and readings will be taken, at minimum, after every well volume is purged. Pumping will continue until these parameters have stabilized (less than 0.2 pH units or a 10 percent change for the other parameters between four consecutive readings) and the water is clear and free of fines. The main goal of well development is to reduce the turbidity to less than 10 Nephelometric Turbidity Units (NTUs) (however, under 100 NTUs is acceptable); • If these parameters have not stabilized after four hours of continuous pumping, the well will be allowed to sit overnight and development will continue the following day for a maximum of two hours. If the turbidity still does not fall below 100 NTUs, the project manager will be contacted and further direction will be sought; and • If the well goes dry during development a minimum of three well volumes will be removed before development is terminated.
Hydraulic Testing and Groundwater Sampling	No hydraulic testing is currently planned or anticipated. Sampling will be conducted in general accordance with the data quality objectives (DQOs) presented in the approved Final Work Plan for Annual Groundwater Monitoring, Melrose Air Force Range, New Mexico (Tidewater, Inc., 2010) and the Ground Water Monitoring Project Work Plan (TRINITY 2011). In accordance with the approved Work Plan, the new background monitoring well will be sampled for VOCs, explosives, metals, chloride, sulfate, nitrate, nitrite, total dissolved solids, alkalinity, cyanide, perchlorate, and hexavalent chromium. TPH DRO will also be included for the initial sampling event.
Investigation Derived Waste and Waste Characterization	All IDW will be properly managed and disposed of in accordance with state and federal regulations. The types of potential IDW anticipated during drilling and installation of the multi-level monitoring wells include: • Cuttings – unsaturated and saturated soil or rock generated during the drilling and sampling process (cuttings or cores); • Groundwater produced during well development; • Contact waste including used sampling equipment, PPE, plastic sheeting, and other debris that has contacted soil or fluids; and • Decontamination fluids: i.e. water and soap solutions used to wash and decontaminate equipment. At the time that IDW is generated (i.e. removed from the ground, comes in contact, etc.), it will be managed in general accordance with 40 CFR Part 264.34. The accumulation start date for all IDW will be the date that the waste is generated. One or more less than 90-day waste management units will be established in the field within

the perimeter of the groundwater monitoring wells to manage IDW.

To perform a "no longer contained-in" determination for listed hazardous wastes, the analytical data generated from borehole composite grab sampling may be compared to the applicable 40 CFR Part 268.40 Treatment Standards and the New Mexico Environment Department (NMED) Soil Screening Levels (SSLs) to determine whether the material poses an unacceptable risk. If contaminant concentrations are found to not pose an unacceptable risk, then NMED may determine that the wastes can be managed as no-longer containing listed wastes. A separate letter from NMED would be required to document such a determination.

To evaluate the toxicity characteristic, the total concentration of each reported constituent may be divided by 20 to determine the maximum theoretical leachate concentration that could result from performing the Toxicity Characteristic Leaching Procedure (TCLP – EPA Method 1311). These concentrations will be compared to the values listed in 40 CFR Part 261.24 Subpart C (Table 1) to determine if the waste exhibits the characteristic of toxicity.

The primary type of IDW generated during drilling activities at Melrose AFR will be drill cuttings and development/purge water. Drill cuttings will be stockpiled on plastic sheeting, bermed, and covered pending analytical results. Aqueous IDW from well purging will be contained in 55-gallon drums pending laboratory analysis. Aqueous IDW from decontamination activities will be segregated from other aqueous IDW and contained in separate drums. Used personal protective equipment (PPE) and disposable sampling materials will be treated as solid waste and disposed of at the installation in a trash receptacle.

Any IDW soil or groundwater that does not meet the definition of a hazardous waste, and does not contain hazardous constituents at concentrations above industrial soil screening levels will be spread on the ground near the well installation. IDW debris that is determined to be non-hazardous waste will be disposed of as solid waste. Soil and groundwater samples sent to the analytical laboratories will be disposed of by the laboratories as environmental samples in accordance with each individual laboratory's procedure.

Schedule

Task	Start Date	Duration
Field Mobilization/Drilling • Drilling equipment mobilization • Well installation • 4 hour hydration time for bentonite seal • 24-hour hydration time for grout slurry • 48 hour standby before development	July 22, 2013	3-4 days
Well Development & Surface Completion	July 25, 2013	1 day
Field Demobilization	July 26, 2013	1 day
Submission of Completion Report	October 24, 2013	---

References

Foster Wheeler. (1996). Phase I RCRA Facility Investigation for Melrose Air Force Range, Cannon Air Force Base, Clovis, New Mexico.

Foster Wheeler. (2003). RCRA Facility Investigation Report Addendum For Melrose Bombing Range, Cannon Air Force Base, New Mexico.

Langman, J. G. (2004). Ground-water hydrology and water quality of the Southern

High Plains aquifer, Melrose Air Force Range, Cannon Air Force Base, Curry and Roosevelt Counties, New Mexico, 2002-03: U.S. Geological Survey Scientific Investigations Report 2004-5158. United States Geological Survey.

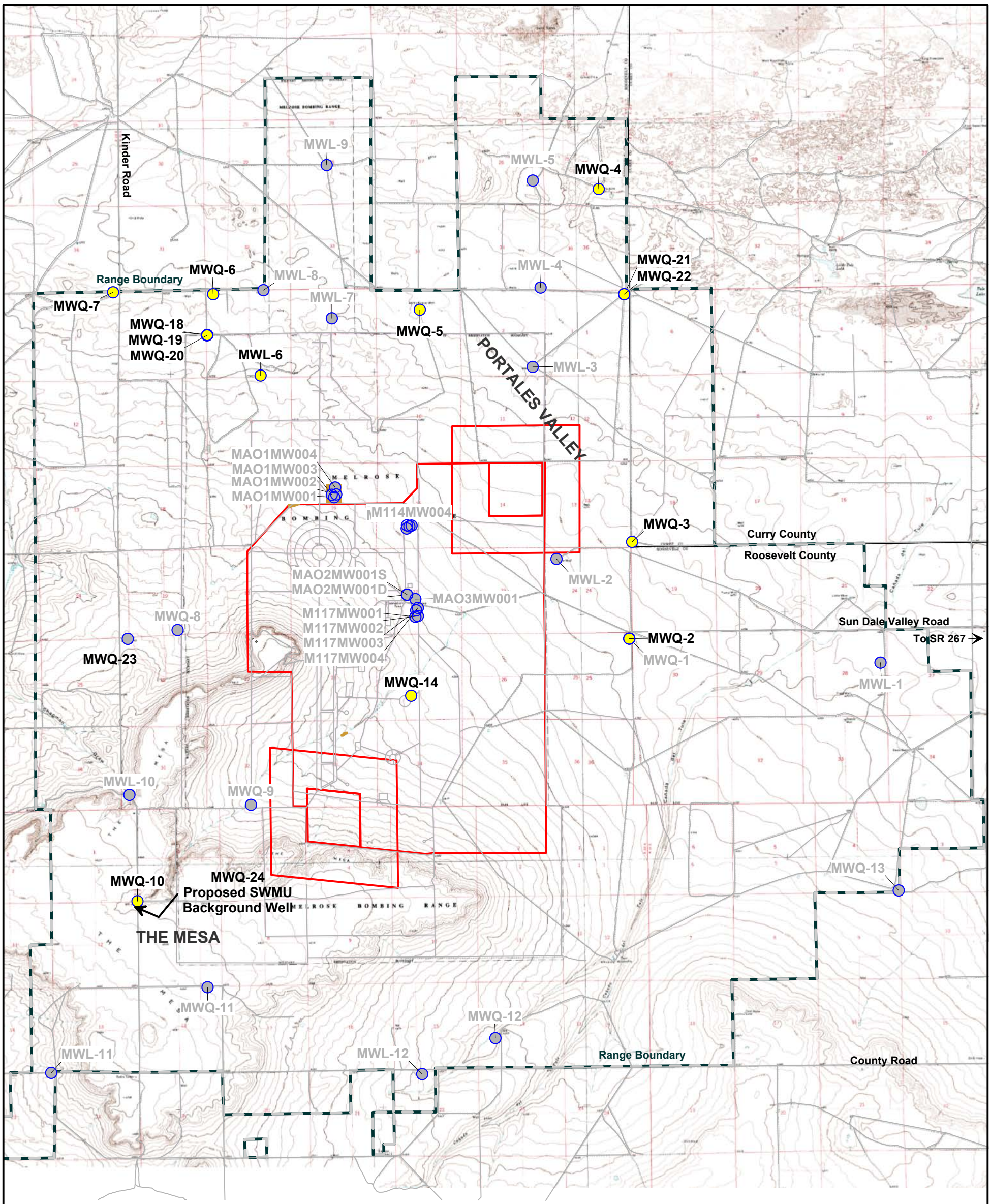
Tidewater, Inc. (2009). Response to Comments contained in the February 11, 2010 Notice of Disapproval to the Draft Work Plan, Groundwater Monitoring, Melrose Air Force Range, New Mexico, October 2009

Tidewater, Inc. (2010). Final Work Plan for Annual Groundwater Monitoring, Melrose Air Force Range, New Mexico.

Trinity Analysis & Development Corp. (2011). Ground Water Monitoring Project Work Plan.

Trinity Analysis & Development Corp. (2012). December 2011, Annual Groundwater Monitoring Report, Melrose Air Force Range, Roosevelt and Curry Counties, New Mexico.

URS. (2009). Final Report, Initial Baseline Groundwater Monitoring, Melrose Air Force Range, New Mexico.



Data files from GeoBase/CAFB

USGS Topographic map from TerraServer

Water level only or scheduled for abandonment
Monitoring Well
Solid Waste Management Unit
Impact Area
Range Boundary
Road

FIGURE 1
GROUND WATER MONITORING WELL NETWORK LOCATIONS
Melrose Air Force Range
Roosevelt and Curry Counties, New Mexico

Trinity Analysis and Development Corp.

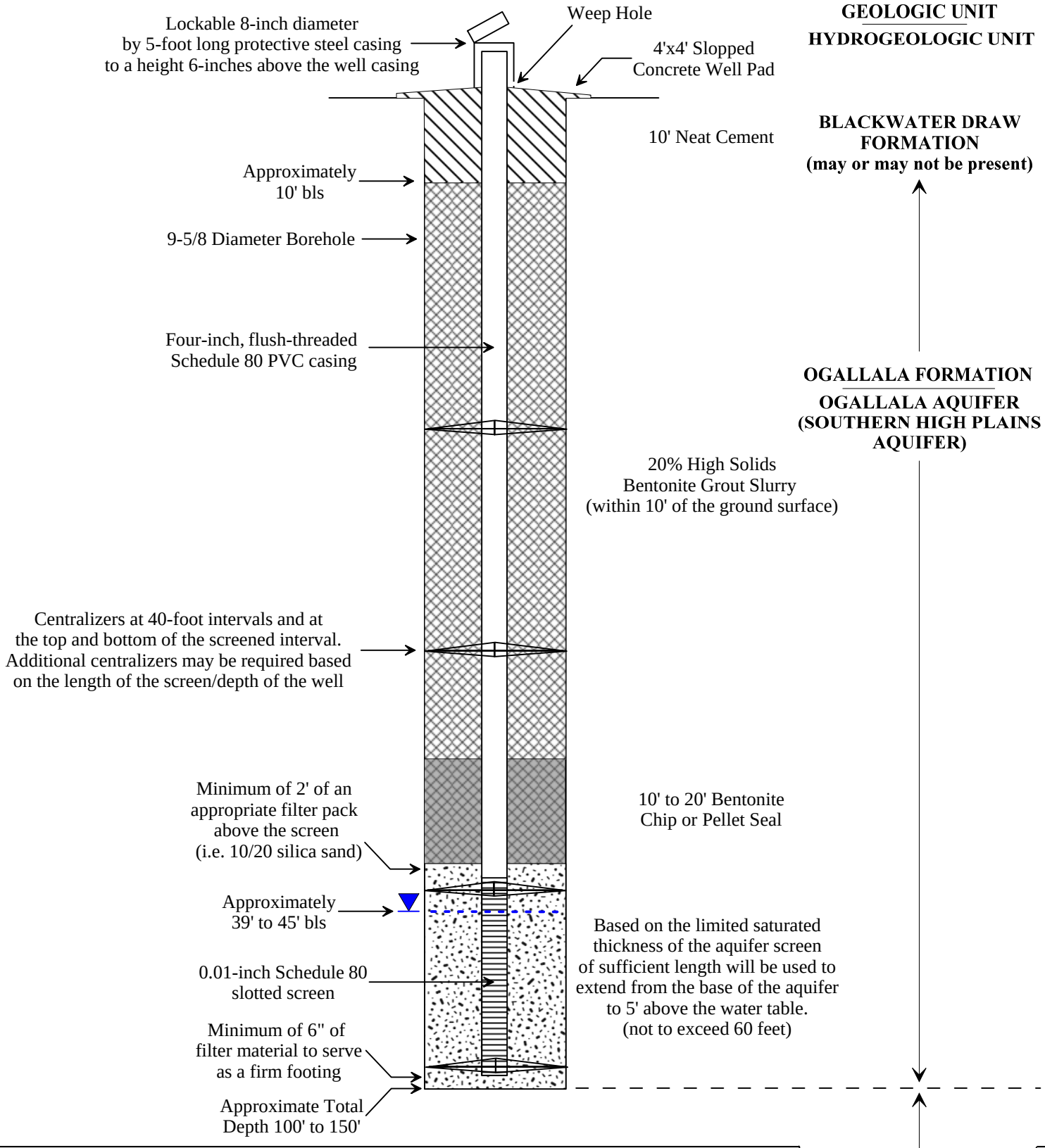


FIGURE 2
GENERAL WELL CONSTRUCTION DIAGRAM
Melrose Air Force Range
Roosevelt and Curry Counties, New Mexico