

VILLAGE OF QUESTA

P.O. Box 260

Questa, New Mexico 87556-0260

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Esther Garcia, Mayor

Evelyn Ortega-Coggins, **Councilor**

Mark L. Gallegos, **Councilor**

Lawrence A. Ortega, **Councilor**

Louise T. Padilla, **Councilor**

Michael G. Rael, **Judge**

June 8, 2011

Dr. Bauer:

It is my understanding through Trudy Healy, Ron Gardiner and your publications of all the top notch independent work that the Bureau of Geology at New Mexico Tech has performed through your Aquifer Mapping Program here in the Taos Region. Your work of quantifying springs along the Rio Grande and the Red River is of particular interest to me as a lifelong resident of Questa and current Mayor. My family has owned properties and grazed cattle throughout the Sunshine and Punche Valley's where the water from many of those springs generate.

The Village of Questa is currently facing an underperformance of one of its two municipal wells near the outlet of the Cabresto Watershed. We are considering either augmenting the existing well or developing a new well. I hope that you will meet with Senator Carlos Cisneros and me to explore ways to engage your Aquifer Mapping Program and possibly fund the Bureau's activities in our area and support our knowledge of our local ground water resources.

We would welcome you addressing a work study session of our Village Council if that could fit into your busy work schedule. Whatever assistance that New Mexico Tech and the Bureau of Geology could afford our Village is greatly appreciated. I look forward to speaking with you.

Respectfully,

A handwritten signature in cursive script that reads "Esther Garcia".

Mayor Esther Garcia



New Mexico Bureau of Geology & Mineral Resources

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QUESTA HYDROGEOLOGY, GEOLOGY, AND GEOPHYSICS

STUDY SUMMARY

**New Mexico Bureau of Geology & Mineral Resources, New Mexico Tech
August 2013**

The Village of Questa lies along the banks of the Red River where it emerges from the Sangre de Cristo Mountains in northern Taos County. The area from the mountain front to the Rio Grande gorge and the Red River to the southern Sunshine Valley (Fig. 1) lies near the southern margin of the Questa sub-basin in a geologically complex, heavily faulted portion of the Rio Grande rift. Santa Fe Group basin fill and buried volcanic strata comprise the area's regional aquifer, which contains multiple groundwater horizons recharged by numerous groundwater sources. The presence of warm and cold water in springs and shallow wells demonstrates that groundwater sourcing from deep regional flow and mountain front recharge mixes in the upper horizons of the regional aquifer system and that intra-rift and rift-margin faults likely influence groundwater movement.

Stakeholders — Multiple water users and stakeholders with diverse interests and needs exist within this complex hydrogeologic setting. These include:

- Village of Questa – water supply and water quality
- Chevron Mining, Inc. – water quality and quantity
- New Mexico Environment Department – water quality and impairment
- New Mexico Department of Game and Fish – water quality for fisheries and fish hatcheries
- U. S. Bureau of Land Management, Wild and Scenic Rivers area and the Rio Grande del Norte National Monument – water quality, quantity and impairment in the Rio Grande
- New Mexico Interstate Stream Commission – water quantity and impairment in the Rio Grande
- Taos County – water quantity, quality and impairment
- Private well owners and water users – domestic water supply and water quality

These diverse stakeholders share a common interest in the need for greater understanding of local groundwater aquifers and the regional aquifer system.

Description and Scope of Hydrogeology Study — Based on requests for assistance from the Village of Questa starting in June 2011, together with interest from other stakeholders, the New Mexico Bureau of Geology (the “Bureau”), the Bureau’s Aquifer Mapping Program, the Healy

Foundation, and New Mexico Tech Department of Earth and Environmental Science (“NMT EES”) are combining funding and staff resources to launch a hydrogeology study in the Questa area. The study objective is to improve our understanding of interactions and intermixing between the shallow groundwater aquifer, the deep regional aquifer, stream and mountain block recharge, areal recharge through the mine tailings piles, and important surface water sources including the Rio Grande, the Red River, and their associated spring zones.

The study will utilize the Bureau’s geologists, hydrogeologists, and support staff in the Aquifer Mapping Program, graduate student research from NMT EES, and geophysical research from the U.S. Geological Survey, Denver (“USGS Denver”). Data sources, collection, and analyses will include:

- Geologic maps, subsurface geologic information, and geologic cross sections
- Gravity and magnetic data and models
- Groundwater levels
- Groundwater chemistry, age and isotopic characteristics
- Geochemical and groundwater flow modeling
- Incorporating existing data and conceptual models from previous studies in adjacent areas

Geophysical Study — Geophysical research will be contracted to the USGS Denver and focus on the southern part of the Questa sub-basin, including the piedmont between Questa and Cerro, where the Village of Questa water wells are located. Collection of magnetic and gravity data will occur in ground traverses across the targeted areas. Development of gravity-magnetic models will occur iteratively and in conjunction with construction of geologic cross sections by a Bureau geologist. The objectives and results will: (1) define the basin geometry; (2) estimate thickness of the basin-fill aquifer; (3) locate buried faults and buried volcanic rocks; (4) integrate geophysical and geologic information into a regional geophysical model; and (5) illustrate results in geologic cross sections. These products will provide the geologic framework for the regional aquifer study and will aid the Village of Questa with water-supply issues.

Village of Questa Water Supply Wells — Two wells located on the northeast side of the village provide most of the municipal water supply for the Village of Questa. The wells are 300 ft (north well) and 400 ft (south well) deep and penetrate about 125 to 230 feet of the productive basin-fill aquifer. Testing of the south well after it was drilled in 1964 suggests that a hydrologic barrier was encountered during well development that caused excessive drawdown. Production from the two wells barely meets the growing water demand of the village, particularly during the summer season. The 50-year old wells are pumped near or at capacity and need to be replaced with a deeper, larger capacity well(s). A geologic cross section showing the geologic setting of the northern village well is shown in Figure 2. In order to determine suitable locations for new wells, three things must be known: (1) thickness of the basin-fill aquifer; (2) locations of buried faults near the mountain front that create hydrologic barriers that interfere with groundwater flow to a pumping well; and (3) location and extent of buried volcanic strata. From a regional gravity model we roughly estimate that aquifer thickness near the mountain front ranges from 0 to as much as 1500 or 2000 ft, which is adequate to

accommodate deeper wells. However, existing data are inadequate to accurately delineate the shape of the basin, the extent of volcanic strata, how dramatically the aquifer thins, or the location and dip (angle) of mountain front faults that interfere with water movement to a well. The information needed to confidently site water wells for the Village of Questa can be determined from the geophysical study. The same information will be used to develop the geological framework for regional and local aquifer studies.

Geochemical and Groundwater Flow Modeling — The Bureau/NMT EES research in the Questa area is intended to include geochemical and groundwater flow modeling of the regional aquifer system or portions of it. Analyses of geochemical data will include mixing models and/or modeling of chemical interactions between various groundwater sources. Groundwater flow modeling may be useful in testing hydrogeologic conceptual models developed from geologic, hydrologic and geochemical data sets.

Project Schedule and Funding — The Questa hydrogeology study is planned as a three-year project, with a projected completion date of late 2016. Geologic and geophysical studies will be finalized in January 2014. Water-level monitoring is currently underway in a 40-well network and will continue for two years. Collection of groundwater samples for chemical analysis is slated for May-August 2014. The project will be funded through multiple sources including:

- New Mexico Bureau of Geology, Aquifer Mapping Program
- Healy Foundation
- Possible grants from interested stakeholders

Figure 1. Study area

Figure 2. Geologic cross section from the Rio Grande gorge to the mountain front through Village of Questa north well.

Co-Project Investigators:

Peggy Johnson
Senior Hydrogeologist
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575-835-5819 off
505-859-1468 cell

Paul Bauer
Principal Field Geologist
bauer@nmt.edu
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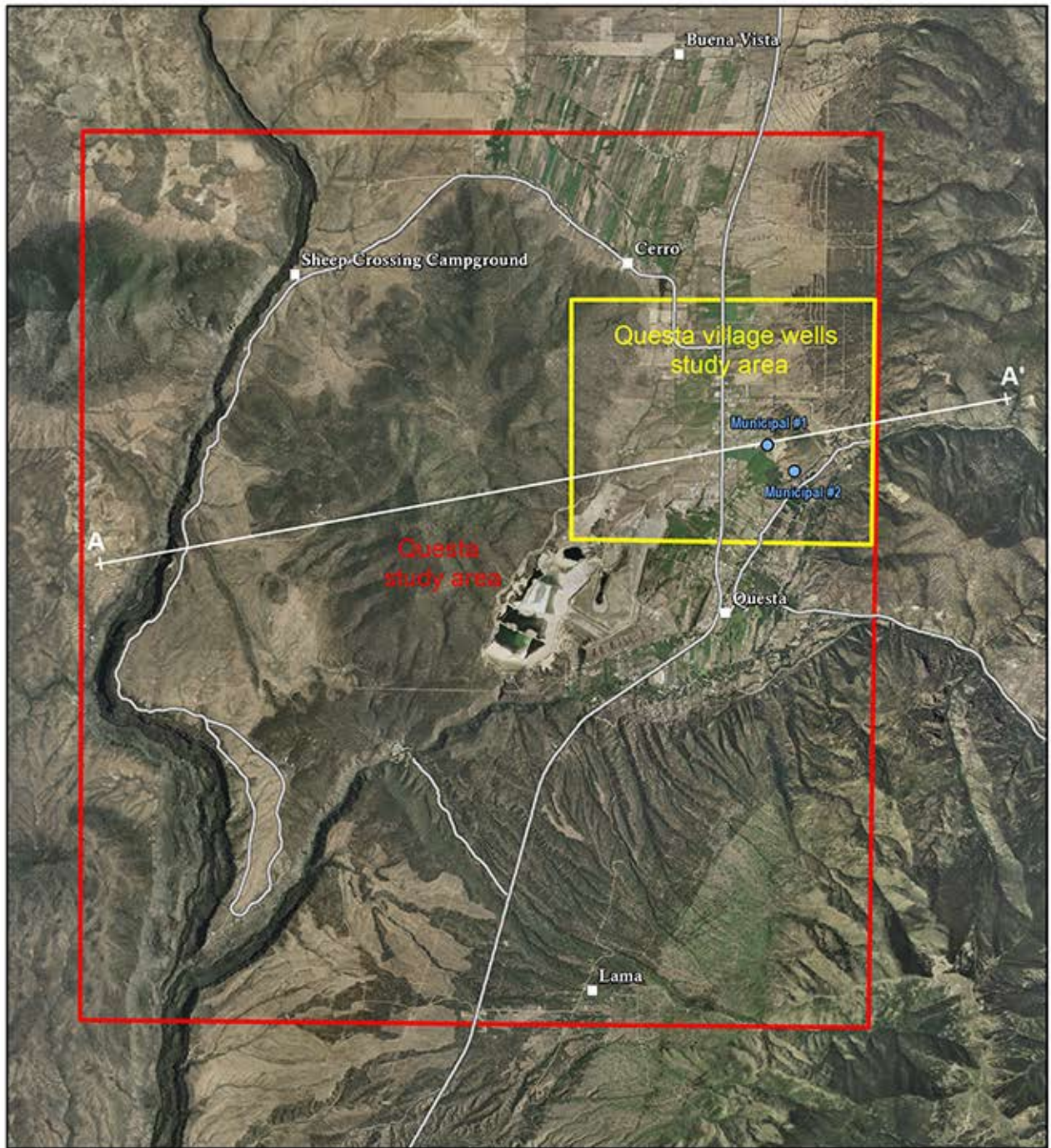


Figure 1. Location map of Questa hydrology study

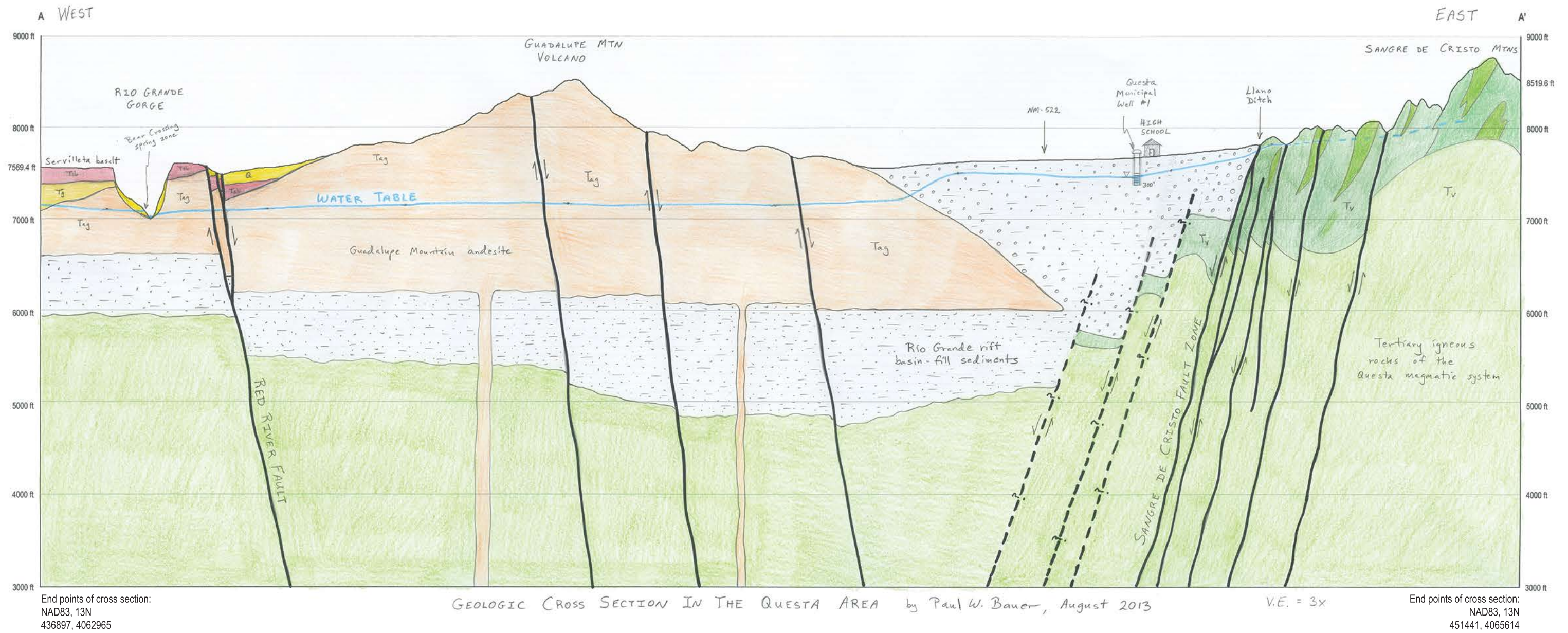


Figure 2. Geologic cross section in the Questa area.

TECHNICAL ASSISTANCE AGREEMENT

This Technical Assistance Agreement is entered into by and between U.S. Geological Survey, a Bureau of the Department of the Interior, through the offices of its Crustal Geophysics and Geochemistry Science Center, Denver, Colorado, hereinafter referred to as the "USGS" and Village of Questa, Questa, New Mexico, hereinafter referred to as "Collaborator" or "Village of Questa."

Whereas, the USGS is authorized to perform technical assistance with other Federal agencies, units of State or local government, industrial organizations, private corporations, public and private foundations, and nonprofit organizations (including universities) under the Stevenson-Wydler Act (15 U.S.C. § 3710a, as amended);

Whereas, the work provides new data and other information in an area under investigation by the ongoing USGS project "Cenozoic landscape evolution of the southern Rocky Mountains", funded by National Cooperative Geologic Mapping Program.

Whereas, the work will contribute to the Collaborator's understanding of the geologic framework for a regional aquifer study undertaken by the New Mexico Bureau of Geology and Mineral Resources whom the Collaborator is working with on this study and will aid the Collaborator with water-supply issues.

Whereas, the project is intended by the parties to be mutually beneficial and to benefit the people of the United States:

Now, therefore, the parties hereto agree as follows:

1. **Statement of Work.** The work in this agreement is unique in the fact that work is being performed with the Village of Questa in conjunction with the New Mexico Bureau of Geology and Mineral Resources. Funding in this agreement is the portion of work being paid for by the Village of Questa or Collaborator. Additional funding from the New Mexico Bureau of Geology and Mineral Resources is being provided in agreement 14SWTAANMBGMR. See attached Statement of Work (SOW)(Attachment A), incorporated by reference herein.

2. **Principal Investigator.** The USGS principal investigators (PIs) for this project are Dr. V.J.S. (Tien) Grauch, 303-236-1393, tien@usgs.gov, Box 25046, Denver Federal Center, MS 964, Denver, CO 80225 and Dr. Ben Drenth, 303-236-1827, bdrenth@usgs.gov, Box 25046, Denver Federal Center, MS 964, Denver, CO 80225. The PI for the Collaborator is Mayor Esther Garcia, 575-586-0694, mayorgarcia@villageofquesta.org, Box 260, Questa, NM 87556. In the event that a PI is unable to continue in this project, his sponsoring agency will make every effort to substitute a replacement acceptable to the other party.

In the case of a government emergency, the USGS will make every effort to ensure that work on the project is not delayed. However, Dr. Grauch and Dr. Drenth may be required to return to

their duty station in Denver, Colorado at the expense of the USGS. The parties involved will make every effort to assess and reevaluate project deadlines to ensure timely completion of work.

3. **Title to Equipment.** There will be no joint property purchased as a result of the work outlined in the SOW. Each party will provide its own equipment necessary to support its participation in the technical evaluation.

4. **Term.** The technical assistance contemplated by this agreement will commence on the effective date of this agreement. The effective date of this agreement shall be the later date of (1) January 8, 2014 or (2) the date of the last signature by the parties. The expiration date of this agreement shall be September 30, 2014. The agreement may be extended by mutual written agreement of the parties.

5. **Funding.**

(a) The Collaborator will provide \$24,000 in funds-in to the project.

(b) The USGS will provide in-kind services valued at an estimated \$11,478.40 in salary and benefits for Dr. Grauch and Dr. Drenth.

(c) Billing will be made in one payment in advance instead of monthly or quarterly billing. Invoices not paid within 60 days of receipt, will bear interest at the annual rate established by the U.S. Treasury pursuant to 31 USC § 3717.

6. **Termination.** This agreement may be terminated by either party on 30 days written notice to the other. In the event of an early termination, the USGS shall retain advanced funding from the Collaborator for any completed work or work in progress on the Effective Date of Termination (i.e., when the agreement actually terminates following the receipt of written notice from the other party). Any unspent advanced funds will be returned to Collaborator. The USGS shall also supply a copy of the evaluations completed as of the Effective Date of Termination in the event of an early termination of the project. This provision shall survive the termination of the agreement.

7. **Publications/Reports.**

(a) Each Party will be free to publish any non-proprietary results of the research.

(b) Under the authority of 15 USC § 3710a (c)(7)(B), as amended, the parties will have the opportunity, as part of the technical assistance, to identify protected research and development information, which is defined as information generated by the research which would have been proprietary information had it been obtained from a non-Federal entity. Each party may designate as protected research and development information, any information generated by its own employees, and with the agreement of the other party, mark any information produced by the other party's employees. Such protected research and development information shall be exempt from disclosure under Subchapter II of Chapter 5 of Title 5. After the protected research

and development information period has expired, the USGS may publish the results of the research as part of open literature (journal and proceeding articles) or as USGS open file reports.

(c) Generated information and results which have been created and marked as protected research and development information may be protected from release or disclosure for a period of two years, unless an earlier date is agreed upon by the parties.

8. Intellectual Property and Background Intellectual Property.

(a) All rights in intellectual property, which are defined as new/improved patents, copyrights, new inventions, discoveries, biological materials, or software, created in the course of the SOW, shall be the property or joint property of the organization employing the respective individual who made the invention or discovery. Any such inventions ("subject inventions") shall be reported to the PI within 60 days of creation, who in turn will notify their own management and the other party's PI. In the event that the intellectual property is a joint invention not described in paragraph (b) below, the parties agree to meet and negotiate a commercialization plan within 60 days of the receipt of a written request from the other party.

(b) For purposes of this agreement, background intellectual property refers to intellectual property, which was in existence prior to or first produced outside of this agreement, and was developed by a party either alone or with others, using one or more separate funding sources not related to the agreement. Background intellectual property is not considered a subject invention. In this agreement, the Collaborator is providing valuable patented/copyrighted material specified in the SOW to which the USGS may/could value. In the event that the joint efforts of the parties builds upon the preexisting background intellectual property of the Collaborator, the Collaborator may take ownership of the patent/copyright but must agree to negotiate a Government Purpose license or revenue sharing arrangement with the USGS that reflects USGS's contributions to the joint project.

9. **Notices.** Any notice required to be given or which shall be given under this agreement shall be in writing and delivered by first-class mail to the parties as follows:

USGS:

Technical:

Dr. V.J.S. (Tien) Grauch
Box 25046
Denver Federal Center, MS 964
Denver, CO 80225
tien@usgs.gov
303-236-1393

Dr. Ben Drenth
Box 25046
Denver Federal Center, MS 964

Collaborator:

Technical:

Mayor Esther Garcia
Box 260
Questa, NM 87556
mayorgarcia@villageofquesta.org
575-586-0694

Denver, CO 80225
bdrenth@usgs.gov
303-236-1827

Administrative:

Esther Wagner
Box 25046
Denver Federal Center, MS 935
Denver, CO 80225
ewagner@usgs.gov
303-236-5442

Administrative:

Jack Maes
Box 260
Questa, NM 87556
jmaes@villageofquesta.org
575-586-0694

Financial Contact Information for Collaborator:

Jack Maes
Box 260
Questa, NM 87556
jmaes@villageofquesta.org
575-586-0694

DUNS Number: 15-899-6467
Tax ID#: 85-0194565

10. **Independent Entity.** For purposes of this agreement and all research and services to be provided hereunder, each party shall be, and shall be deemed to be, an independent party and not an agent or employee of the other party. Each party shall have exclusive control over its employees in the performance of the work. While in field locations, a party's employees shall adhere to the safety and technical requirements imposed by the party controlling the work site.

Neither party shall have authority to make any statements, representations, or commitments of any kind, or take any action, which shall be binding on the other party, except as may be explicitly provided for herein or authorized in writing. Neither party may use the name of the other in advertising or other forms of publicity without the written permission of the other.

11. Governing Law.

- (a) The validity and interpretation of this agreement are subject to interpretation under Federal law. Each party agrees to be responsible for the activities, including the negligence, of their employees. The USGS responsibility for the payment of claims for loss of property, personal injury, or death caused by the negligence or wrongful act or omission of a USGS employee, while acting within the scope of their employment, is limited to provisions of the Federal Tort Claims Act, 28 USC §§ 2671-80.
- (b) The Collaborator responsibility for the payment of claims for loss of property, personal injury, or death caused by the negligence or wrongful act or omission by a Collaborator

employee, while acting within the scope of their employment, is limited to provisions of the New Mexico Tort Claims Act, NMSA (1978), Sec. 41-4-1, et. Seq.

- (c) The USGS and the Collaborator make no express or implied warranty as to the conditions of the research, merchantability or fitness for a particular purpose of the research, data, or resulting product incorporating data developed and exchanged under the SOW. These provisions shall survive the termination of the agreement.

12. **Force Majeure.** Neither party shall be liable for any unforeseeable event beyond its control, not caused by the fault or negligence of such party, which causes such party to be unable to perform its obligations under this agreement, and which it is unable to overcome by the exercise of due diligence including, but not limited to, flood, drought, earthquake, storm, fire, pestilence, lightning, and other natural catastrophes; epidemic, war, riot, civil disturbance, or disobedience; strikes, labor disputes, or failure, threat of failure, or sabotage; or any order or injunction made by a court or public agency. In the event of the occurrence of such a force majeure event, the party unable to perform shall promptly notify the other party. It shall further use its best efforts to resume performance as quickly as possible and shall suspend performance only for such period of time as is necessary as a result of the force majeure event.

13. **Entire Agreement.** This agreement contains all of the terms of the parties and supersedes all prior agreements and understandings related thereto. This agreement can be changed or amended only by a written instrument signed by the parties. Due to the specialized nature of the work, this contract is non-assignable by both parties.

14. **Disputes.** The signatories to this agreement shall expend their best efforts to amicably resolve any dispute that may arise under this agreement. Any dispute that the signatories are unable to resolve shall be submitted to the Director of the USGS or his/her designee and the Director of the Collaborator or his/her designee for resolution.

15. **Miscellaneous Provisions.**

(a) Pursuant to the Anti-Deficiency Act, 31 U.S.C. §1341 (a)(1), nothing herein contained shall be construed as binding the USGS to expend in any one fiscal year any sum in excess of its appropriations or funding in excess of what it has received for the collaborative work outlined in the SOW.

(b) The terms of this Technical Assistance Agreement are the only terms that govern the parties' agreement and the research/technical work to be completed by the USGS. The USGS is not bound by and does not accept any additional or supplemental terms or conditions contained in any Purchase Order or other document used by the Collaborator to order or pay for research services. Such documents are accepted by the USGS solely as a convenience to the Collaborator and are not intended to modify or expand the terms of the parties' agreement.

16. **Survivability.** The following provisions shall survive the termination of this Agreement: 1, 3, 5-8, 10-16.

IN WITNESS WHEREOF, the parties have caused this agreement to be executed on the last date listed below.

U.S. GEOLOGICAL SURVEY

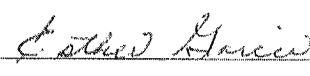
By: 

Name: TRUSE VUKOBRATOVIC - R. D. D.

Title: Director, Crustal Geophysics & Geochemistry Science Center

Date: 1/29/14

COLLABORATOR

By: 

Name: Esther Garcia

Title: MAYOR

Date: 1/24/14

ATTACHMENT A: STATEMENT OF WORK
U.S. Geological Survey Geophysical Work in Questa Area

The Study Area: The Questa/Red River/southern Sunshine Valley area, from the mountain front to the Rio Grande gorge. The geophysical work will focus on the southern part of the Questa sub-basin, including the piedmont between Questa and Cerro, where the Village of Questa water wells area located.

Objectives:

1. Define the basin geometry;
2. Estimate the thickness of the basin-fill aquifer;
3. Locate buried faults and buried volcanic rocks;
4. Integrate the above information into a regional geophysical model,
5. Illustrate results in geological cross-sections.

This information will provide a geologic framework for the regional aquifer between the Sunshine Valley, the mountain front, and the Rio Grande/Red River.

Strategy:

1. Acquire new gravity data to fill in holes in existing coverage, especially within the two detailed areas, including some traverses to accompany the magnetic traverses.
2. Acquire new magnetic data from two to three ~1 km-long ground traverses across targeted areas to help locate and characterize faults where suspected from existing airborne magnetic data and/or other information.
3. Develop models and interpretations of the gravity and magnetic data (airborne and ground traverses) in conjunction with construction of geologic cross sections by the NM Bureau of Geology (an iterative process).

Field work by Dr. Grauch and Dr. Drenth in the Questa area is estimated to occur over the course of one week in April. However, dates and length of travel are subject to change.

Deliverable:

Joint development of geologic cross sections with Dr. Paul Bauer of the NM Bureau of Geology.

Personnel and Roles:

- Dr. Tien Grauch (USGS, Denver) - Magnetic fieldwork and data processing; input on interpretations/models.
- Dr. Ben Drenth (USGS, Denver) - Gravity fieldwork and data processing; assist with magnetic fieldwork; gravity/magnetic model development and interpretation.